HDD & DVD Recorder

DVDR5350H/02/05/19

DVDR7310H/75/97 & DVDR7300H/02/05/19/75/97

Service
Service
Service

Service Manual

CLASS 1
LASER PRODUCT

DVD + ReWritable

DVD VIDEO

COMPACT disc DIGITAL VIDEO

COMPACT disc DIGITAL AUDIO

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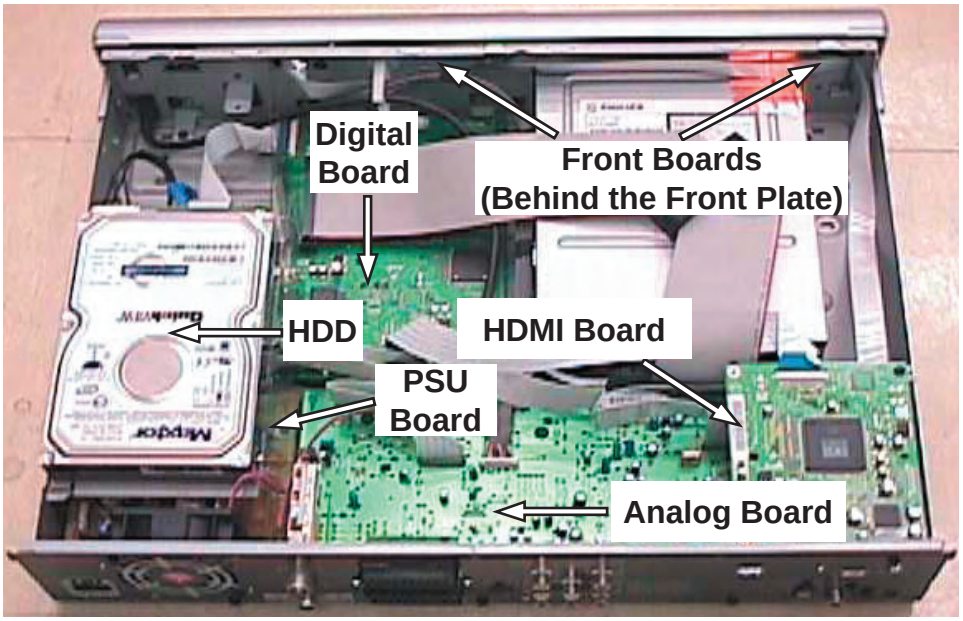
Version 1.2

PHILIPS

1. Technical Specifications and Connection Facilities

1.1 PCB Locations



1.2 Diversity Matrix

	DVDR5350H	DVDR7300H	DVDR7310H
HDD capacity	160GB	250GB	250GB
HDMI	–	x	x

1.3 Read / Write Speed

Type of Disc (Function)	Disc Rotation Speed
Read Speed CD	7X CAV
Read Speed DVD	4X CAV
Write Speed DVD+R/+RW	2.4X ZCAV
Write Speed DVD-R/-RW	2X

1.4 General:

Mains voltage : 220V – 240V
Mains frequency : 50 Hz
Power consumption (record) : 40 W
Standby Power Consumption : < 4 W
Eco standby : < 3 W

1.5 RF Tuner

Test equipment: Fluke 54200 TV Signal generator
Test streams: PAL BG Philips Standard test pattern

1.5.1 System

PAL B/G, PAL D/K, SECAM L/L', PAL I

1.5.2 RF - Loop Through:

Frequency range : 45 MHz – 860 MHz
Gain: (ANT IN - ANT OUT) : -6dB to 0dB

1.5.3 Receiver:

PLL tuning with AFC for optimum reception
Frequency range : 45.25 MHz – 857 MHz
Sensitivity at 40dB S/N (video unweighted) : ≤ 60dBµV at 75 Ω

1.5.4 Video Performance:

Channel 25 / 503,25 MHz,
Test pattern: PAL BG PHILIPS standard test pattern,
RF Level 74dBV, Measured on SCART 1
Frequency response : 0.1 MHz – 4 MHz ± 3dB
Group delay (0.1 MHz - 4.4 MHz) : 0 nsec ± 150 nsec

1.5.5 Audio Performance:

Audio Performance Analogue - HiFi:
Frequency response at SCART 1 (L+R) output : 100 Hz – 12 kHz / 0 ± 3dB
S/N Ratio (20Hz – 20kHz) unweighted : ≥ 50dB
Harmonic distortion (1 kHz, ± 25 kHz deviation) : ≤ 1.5%

Audio Performance NICAM:
Frequency response at SCART 1 (L+R) output : 40 Hz – 15 kHz / 0 ± 3dB
S/N Ratio (20Hz – 20kHz) unweighted : ≥ 60dB
Harmonic distortion (1kHz, ± 25 kHz deviation) : ≤ 0.5%

1.5.6 Tuning

Automatic Search Tuning

Scanning time without RF signal	:	3min. typical
Stop level (vision carrier)	:	≥ 37dB/µV
Maximum tuning error of a recalled program	:	± 100 kHz
Maximum tuning error (drift) during operation	:	± 100 kHz

Tuning Principle:
Automatic B, G, I, DK and L/L' detection
Manual selection in "STORE" mode

1.6 Analog Inputs / Outputs

1.6.1 SCART 1 (Connected to TV)

Pin Signals:

1	Audio-out R	1.8V RMS
2	Audio-in R	
3	Audio-out L	1.8V RMS
4	Audio GND	
5	Blue / Chroma GND	
6	Audio-in L	
7	Blue-out	0.7Vpp ± 0.1V into 75Ω
8	Function switch	< 2V = TV > 4.5V / < 7V = asp. Ratio 16:9 DVD > 9.5V / < 12V = asp. Ratio 4:3 DVD
9	Green GND	
10	P50 control	not use
11	Green out	0.7Vpp ± 0.1V into 75Ω
12	NC	
13	Red / Chroma GND	
14	Fast switch GND	
15	Red-out / Chroma-out	0.7Vpp ± 0.1V into 75Ω 300mVpp ± 3dB
16	Fast switch RGB / CVBS or Y out	< 0.4V into 75Ω = CVBS >1V / < 3V into 75Ω = RGB
17	Y/CVBS-out GND	
18	CVBS-in GND	
19	CVBS-out / Y-out	1Vpp ± 0.1V into 75Ω
20	CVBS-in	
21	Shield	

1.6.2 SCART 2 (Connected to AUX)

Pin Signals:

1	Audio-out R	1.8V RMS
2	Audio-in R	
3	Audio-out L	1.8V RMS
4	Audio GND	
5	Blue / Chroma GND	
6	Audio-in L	
7	Blue-in	
8	Function switch	
9	Green GND	
10	P50 control	
11	Green-in	
12	NC	
13	Red / Chroma GND	
14	Fast switch GND	
15	Red-in / Chroma-in	
16	Fast switch RGB / CVBS or Y in	
17	CVBS-out GND	
18	Y / CVBS-in GND	
19	CVBS-out	1Vpp ± 0.1V into 75Ω
20	CVBS-in / Y-in	
21	Shield	

1.6.3 Audio/Video Front Input Connectors

Audio - Cinch

Input voltage	:	2.2Vrms
Input impedance	:	> 10kΩ

Video - Cinch

Input voltage	:	1Vpp ± 3dB
Input impedance	:	75Ω

Video - YC (Hosiden)
According to IEC 933-5
Superimposed DC-level on pin 4 (load > 100kΩ)
< 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	:	75Ω
Input voltage C	:	300mVpp ± 3dB
Input impedance C	:	75Ω

1.6.4 Out 1

Component Video Cinch Y/Pb/Pr
according EIO-770-I-A, EIA-770-2

Audio - Cinch

Output voltage	:	2Vrms max.
Output impedance	:	> 10kΩ

1.6.5 Out 2

Audio - Cinch

Output voltage	:	2Vrms max.
Output impedance	:	> 10kΩ

Video - Cinch

Output voltage	:	1Vpp ± 3dB
Output impedance	:	75Ω

Video - YC (Hosiden)
According to IEC 933-5
Superimposed DC-level on pin 4 (load > 100kΩ)
< 2.4V is detected as 4:3 aspect ratio
> 3.5V is detected as 16:9 aspect ratio

Output voltage Y	:	1Vpp ± 3dB
Input impedance	:	75Ω
Output voltage C	:	300mVpp ± 3dB
Input impedance	:	75Ω

1.7 Digital Inputs / Outputs

1.7.1 Digital Output

Digital Audio – Coaxial / Optical

LCM	:	according IEC 60958
MPEG 1, MPEG 2, AC3	:	according IEC 61937
DTS	:	according IEC 61937 + addendum

1.7.2 HDMI Output

Type A connector (19 pins)

1.7.3 Digital Video Input (IEEE 1394)

Implementation Standard according:
IEEE Std 1394-1995
IEC61883 - Part1
IEC61883 - Part 2 SD-DVCR (02-01-1997)

Specification of consumer use digital VCR's using 6.3mm magnetic tape – dec.1994
Mechanical connection according to Annex of IEC 61883-1

1.7.4 G-Link (for IR-remote transmitting device)

Output voltage	:	5 ± 0.5V (high level) 0.4 ± 0.3V (low level)
Output impedance	:	150Ω

1.8 Video Performance

All outputs loaded with 75Ω
SNR measurements over full bandwidth without weighting.

1.8.1 SCART (RGB)

SNR	:	≥ 55dB on all output
Bandwidth	:	4.8MHz -3dB

1.9 Audio Performance

1.9.1 Cinch Output Rear

Output voltage 2 channel mode	:	2Vrms ± 2dB
Channel unbalance (1kHz)	:	< 0.22dB
Crosstalk 1kHz	:	> 100dB
Crosstalk 16Hz-20kHz	:	> 87dB
Frequency response 20Hz-20kHz	:	± 0.5dB
Signal to noise ratio (unweighted)	:	> 85dB
Dynamic range 1kHz	:	> 83dB
Distortion and noise 1kHz	:	> 83dB
Distortion and noise 16Hz-20kHz	:	> 75dB
Intermodulation distortion	:	> 70dB
Mute	:	> 95dB

1.9.2 Scart Audio

Output voltage 2 channel mode	:	1.6Vrms ± 2dB
Channel unbalance (1kHz)	:	< 1dB
Crosstalk 1kHz	:	> 85dB
Crosstalk 16Hz-20kHz	:	> 70dB
Frequency response 20Hz-20kHz	:	± 0.5dB
Signal to noise ratio (unweighted)	:	> 80dB
Dynamic range 1kHz	:	> 75dB
Distortion and noise 1kHz	:	> 75dB
Distortion and noise 16Hz-20kHz	:	> 50dB
Intermodulation distortion	:	> 70dB
Mute	:	> 80dB

1.10 Dimensions and Weight

Height of feet	:	5.5mm
Apparatus tray closed	:	WxDxH:435x335x76mm
Apparatus tray open	:	WxDxH:435x472x76mm
Weight without packaging	:	5kg
Weight with packaging	:	8kg

1.11 Laser Output Power & Wavelength

1.11.1 DVD

Output power during reading	:	0.8mW
Output power during writing	:	20mW
Wavelength	:	650nm

1.11.2 CD

Output power	:	0.3mW
Wavelength	:	780nm

2. Safety Information, General Notes & Lead Free Requirements

2.1 Safety Instructions

2.1.1 General Safety

Safety regulations require that during a repair:
- Connect the unit to the mains via an isolation transformer.
- Replace safety components, indicated by the symbol ⚠, only by components identical to the original ones. Any other component substitution (other than original type) may increase risk of fire or electrical shock hazard.

Safety regulations require that after a repair, you must return the unit in its original condition. Pay, in particular, attention to the following points:
- Route the wires/cables correctly, and fix them with the mounted cable clamps.
- Check the insulation of the mains lead for external damage.
- Check the electrical DC resistance between the mains plug and the secondary side:
  1. Unplug the mains cord, and connect a wire between the two pins of the mains plug.
  2. Set the mains switch to the 'on' position (keep the mains cord unplugged!).
  3. Measure the resistance value between the mains plug and the front panel, controls, and chassis bottom.
  4. Repair or correct unit when the resistance measurement is less than 1 MΩ.
  5. Verify this, before you return the unit to the customer/ user (ref. UL-standard no. 1492).
  6. Switch the unit 'off', and remove the wire between the two pins of the mains plug.

2.1.2 Laser Safety

This unit employs a laser. Only qualified service personnel may remove the cover, or attempt to service this device (due to possible eye injury).

Laser Device Unit

Type	:	Semiconductor laser GaAlAs
Wavelength	:	650 nm (DVD)
	:	780 nm (VCD/CD)
Output Power	:	20 mW (DVD+RW writing)
	:	0.8 mW (DVD reading)
	:	0.3 mW (VCD/CD reading)
Beam divergence	:	60 degree

Figure 2-1

Note: Use of controls or adjustments or performance of procedure other than those specified herein, may result in hazardous radiation exposure. Avoid direct exposure to beam.

2.2 Warnings

2.2.1 General

- All ICs and many other semiconductors are susceptible to electrostatic discharges (ESD, ⚠). Careless handling during repair can reduce life drastically. Make sure that, during repair, you are at the same potential as the mass of the set by a wristband with resistance. Keep components and tools at this same potential.
  Available ESD protection equipment:
  – Complete kit ESD3 (small tablemat, wristband, connection box, extension cable and earth cable) 4822 310 10671.
  – Wristband tester 4822 344 13999.
- Be careful during measurements in the live voltage section. The primary side of the power supply, including the heatsink, carries live mains voltage when you connect the player to the mains (even when the player is 'off'!). It is possible to touch copper tracks and/ or components in this unshielded primary area, when you service the player. Service personnel must take precautions to prevent touching this area or components in this area. A 'lightning stroke' and a stripe-marked printing on the printed wiring board, indicate the primary side of the power supply.
- Never replace modules, or components, while the unit is 'on'.

2.2.2 Laser

- The use of optical instruments with this product, will increase eye hazard.
- Only qualified service personnel may remove the cover or attempt to service this device, due to possible eye injury.
- Repair handling should take place as much as possible with a disc loaded inside the player.
- Text below is placed inside the unit, on the laser cover shield:

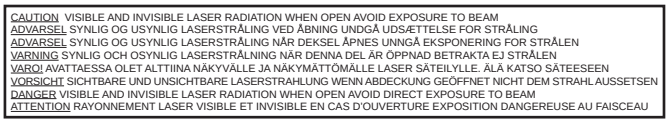


Figure 2-2

2.3 Lead Free Requirement

Information about Lead-free produced sets

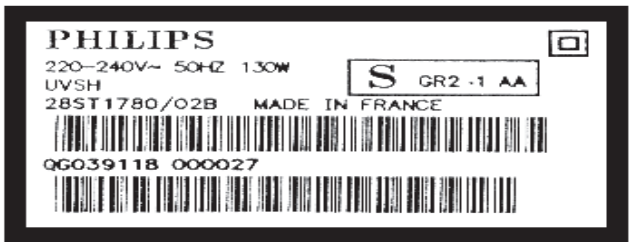
Philips CE is starting production of lead-free sets from 1.1.2005 onwards.

INDENTIFICATION:

Regardless of special logo (not always indicated) 

One must treat all sets from **1 Jan 2005** onwards, according next rules.

Example S/N:



Bottom line of typeplate gives a 14-digit S/N. Digit 5&6 is the year, digit 7&8 is the week number, so in this case 1991 wk 18

So from 0501 onwards = from 1 Jan 2005 onwards

Important note: In fact also products of year 2004 must be treated in this way as long as you avoid mixing solder-alloys (leaded/ lead-free). So best to always use SAC305 and the higher temperatures belong to this.

Due to lead-free technology some rules have to be respected by the workshop during a repair:

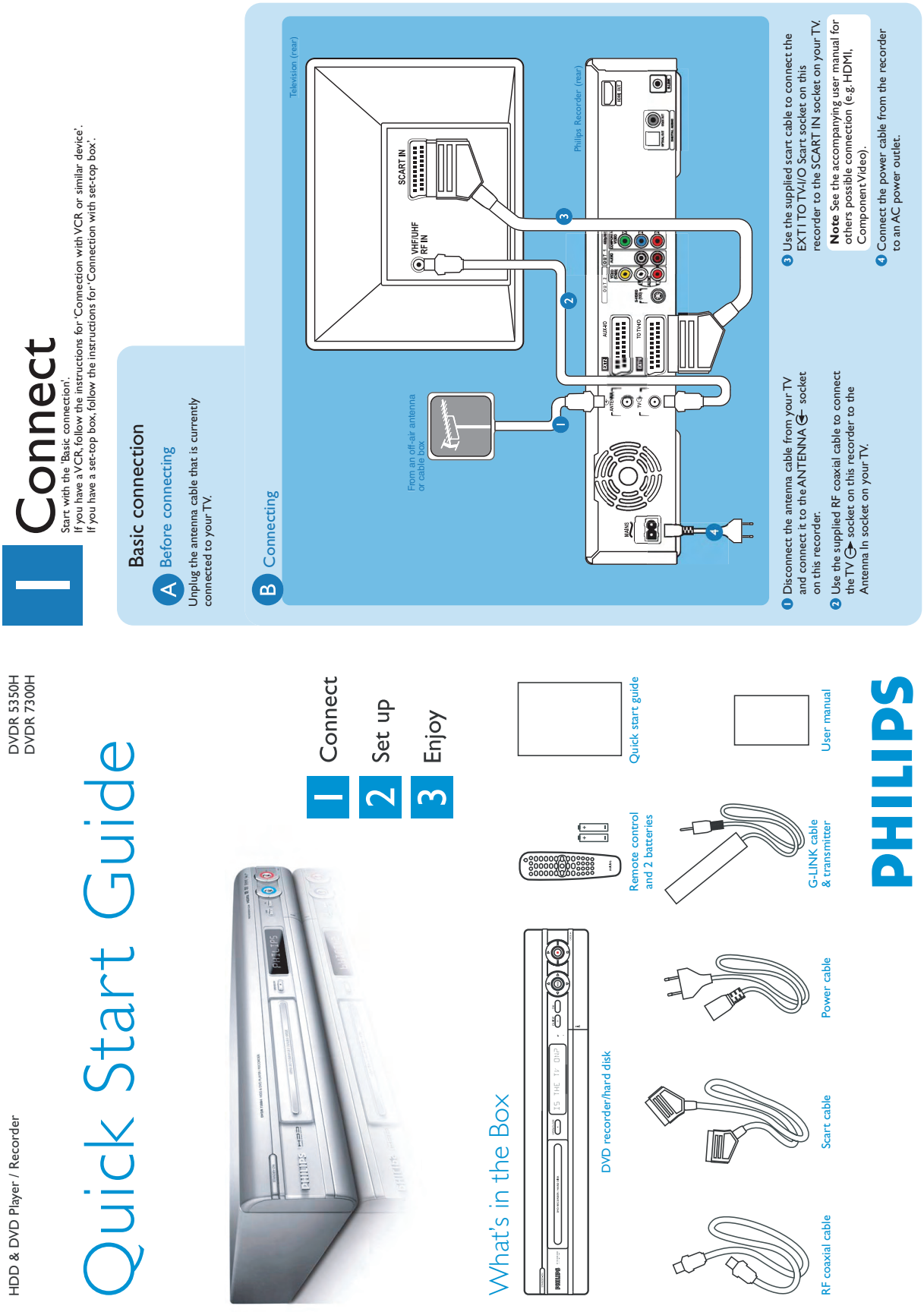
- Use only lead-free solder alloy Philips SAC305 with order code 0622 149 00106. If lead-free solder-pate is required, please contact the manufacturer of your solder-equipment. In general use of solder-paste within workshops should be avoided because paste is not easy to store and to handle.
- Use only adequate solder tools applicable for lead-free solder alloy. The solder tool must be able
  - o To reach at least a solder-temperature of 400°C,
  - o To stabilize the adjusted temperature at the solder-tip
  - o To exchange solder-tips for different applications.
- Adjust your solder tool so that a temperature around 360°C – 380°C is reached and stabilized at the solder joint. Heating-time of the solder-joint should not exceed ~ 4 sec. Avoid temperatures above 400°C otherwise wear-out of tips will rise drastically and flux-fluid will be destroyed. To avoid wear-out of tips switch off un-used equipment, or reduce heat.
- Mix of lead-free solder alloy / parts with leaded solder alloy / parts is possible but PHILIPS recommends strongly to avoid mixed solder alloy types (leaded and lead-free). If one cannot avoid or does not know whether product is lead-free, clean carefully the solder-joint from old solder alloy and re-solder with new solder alloy (SAC305).
- Use only original spare-parts listed in the Service-Manuals. Not listed standard-material (commodities) has to be purchased at external companies.
- Special information for BGA-ICs:
  - always use the 12nc-recognizable soldering temperature profile of the specific BGA (for de-soldering always use the lead-free temperature profile, in case of doubt)
  - lead free BGA-ICs will be delivered in so-called 'dry-packaging' (sealed pack including a silica gel pack) to protect the IC against moisture. After opening, dependent of MSL-level seen on indicator-label in the bag, the BGA-IC possibly still has to be baked dry. (MSL=Moisture Sensitivity Level). This will be communicated via AYS-website.
  Do not re-use BGAs at all.
- For sets produced before 1.1.2005 (except products of 2004), containing leaded solder-alloy and components, all needed spare-parts will be available till the end of the service-period. For repair of such sets nothing changes.
- On our website **www.atyourservice.ce.Philips.com** you find more information to:
  - BGA-de-/soldering (+ baking instructions)
  - Heating-profiles of BGAs and other ICs used in Philips-sets

  You will find this and more technical information within the "magazine", chapter "workshop news".

For additional questions please contact your local repair-helpdesk.

3. Directions For Use

The following except of the Quick Use Guide serves as an introduction to the set.
The Complete Direction for the Use can be downloaded in different languages from the internet site of Philips Customer care Center:
www.p4c.philips.com



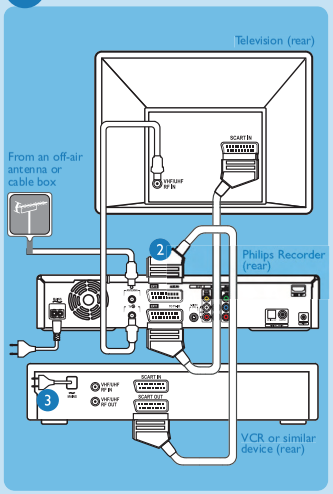
2 Set up

Connection with VCR or similar device

A Before connecting

Your new Philips Recorder replaces the VCR for your recording needs. First, unplug all the connections from your VCR.

B Connecting



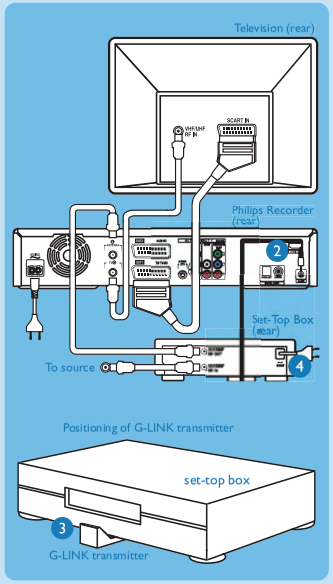
1. Follow step 1 to 4 of 'Basic connection' to connect this recorder before you proceed to step 2 below.
2. Use another scart cable (not supplied) to connect the EXT2 AUX-I/O Scart socket on this recorder to the SCART OUT socket on your VCR.
3. Connect the power cable from the VCR to an AC power outlet.

Note In this setup, the VCR cannot record TV programmes.

Connection with set-top box

Your new Philips Recorder provides a G-LINK transmitter which allows you to control the tuner of the set-top box (satellite receiver, cable TV box) through the GUIDE Plus+ system. You can record the TV programmes that are received through the set-top box.

Connecting



1. Follow step 1 to 4 of 'Basic connection' to connect this recorder before you proceed to step 2 below.
2. Connect the supplied G-LINK cable to the G-LINK socket on this recorder.
3. Place the G-LINK transmitter in front of your set-top box in such a way that it can acquire the signal broadcasted by the transmitter.
4. Connect the power cable from the set-top box to an AC power outlet.

A Finding the viewing channel

1. Press **STANDBY-ON** on the recorder. The recorder will display 'IS THE TV ON?'.
2. Switch on the TV. You should see the { EASY SETUP } menu.

Note If connected to your VCR, make sure it is turned off before proceeding.

3. If not, press the Channel Down button on your TV's remote control repeatedly (or AV, SELECT button) until you see the menu. This is the correct viewing channel for the recorder.

B Start basic setup

Use the recorder's remote control and follow the on-screen instructions to complete the installation.

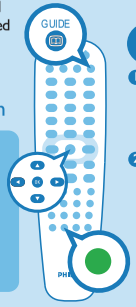
1. Select the desired menu language, your country and the TV shape.

Note Select { **Done** } in the menu and press OK to go to the next screen.

2. Activate automatic channel search.
3. Check the date and time and press OK.
4. To continue with the GUIDE Plus+ installation, select { Continue } and press OK.

   Otherwise, select { Do not install now } and press OK. Wait until the recorder has finished initialising the system, then press OK again.

C Install the GUIDE Plus+ system



1. Enter your language, country and postal code To change, press OK and follow the on-screen instructions.

D Install the set-top box

If you do not have a set-top box, skip '**D**' and go to '**E**'.

1. Press **DOWN** ▼ to select 'External Receiver 1' and press OK.
2. Press OK again to continue.
3. Select the type of reception, service provider and brand name of the connected set-top box.

Note Press OK to go to the next screen. Select { None } if none of the entries are applicable.

4. Select the recorder socket through which your set-top box is connected (e.g. 'EXT2' for EXT 2 AUX-I/O socket) and press OK.
5. Turn on your set-top box and select channel number **02** on the set-top box.
6. Read the instructions on the TV and press OK.

7. The recorder will now attempt to change the set-top box's channel through the G-LINK transmitter. If the set-top box has switched to the same programme number as displayed on the TV, select { Yes } in the menu and press OK.

Note If not, select { No } and press OK to try a different code.

8. Your set-top box is now installed.

E Load the TV listing data

1. Press the **GREEN** ● button to leave the menu.

Note To switch the GUIDE Plus+ system's host channel manually, go to { Host Channel Setup }.

2. Press **GUIDE** to exit the GUIDE Plus+ system. Leave the recorder in 'standby' mode and turn 'on' the set-top box overnight to collect the TV listing data, this may take up to 24 hours.

Note If you tune to your Host Channel before going to 'standby' mode, this recorder will start immediately to download the TV listings data.

3. Check the { Editor } screen the next day to ensure the source and programme numbers are matching for all channels.

3 Enjoy

Watch TV - Pause live TV

Your Philips Recorder allows you to control the TV programme. You can PAUSE it as if you were in control of the live broadcast.

1. Turn on your recorder and press **CHANNEL** +/– to select a TV programme.
2. Press **PAUSE** ⏸ to suspend it.
3. Press **PLAY** ▶ to continue.

Note When the recorder is turned on, the programme you are watching will be stored in the temporary hard disk storage. When you switch the recorder to another input signal (e.g. CAM) or to standby mode, the programme will be erased.

4. Press **TUNER** to return to the live broadcast.

Record to hard disk

A Contents in the temporary HDD storage

1. Press **INFO** to see what is temporarily stored in the hard disk storage.
2. Press **UP** ▲ or **DOWN** ▼ to choose the title you want to record.
3. Press **REC** ● to record the title.

Note The title will be marked in red and the recording will only take effect when you turn off the recorder.

B Current TV programme

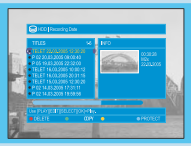
1. Press **REC** ● to start recording. It can record up to 6 hours.

Note To set the recording time, press **REC** ● repeatedly to extend the recording time in 30 minutes increments for up to 6 hours.
If the GUIDE Plus+ system is available, 'Record 1 program' is displayed and the current programme will be recorded.

2. Press **STOP** ■ to stop the recording immediately.

Start playback

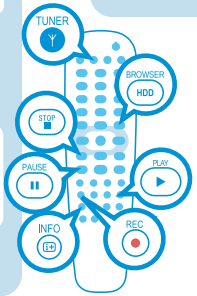
A From the hard disk



1. Press **HDD-BROWSER**, then press **RIGHT** ▶ until you see the { TITLES } and { INFO } menus.
2. Press **UP** ▲ or **DOWN** ▼ to select a title.
3. Press **PLAY** ▶ to start playback.

B From a disc

1. Hold down the **STOP** ■ until the disc tray opens, load in a disc and close the disc tray.
2. If the content menu appears, press **RIGHT** ▶ until you see the { TITLES }, { TRACKS } or { PHOTO ROLLS } menu, depending on the disc type.
3. Press **UP** ▲ or **DOWN** ▼ to select a title.
4. Press **PLAY** ▶ to start playback.



Record Mode	Hours of recordings can be stored on the HDD or an empty DVD recordable disc.		
	HDD (250 GB)	DVD±R/ DVD±RW	DVD+R Double Layer
HQ	47	1	1hr 55mins
SP	95	2	3hr 40mins
SPP	119	2.5	4hr 35mins
LP	143	3	5hr 30mins
EP	191	4	7hr 20mins
SLP	287	6	11h 05mins
SEP	400	8	14h 45mins

Using the GUIDE Plus+ system

Make sure that the TV listing data download is completed.

A Record TV programmes

1. Press **GUIDE**.
2. Press **DOWN** ▼ to select a TV channel.

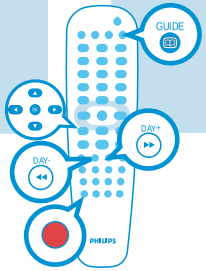
Note Press the **YELLOW** ● to see an overview of all the available channels and choose from there.

3. Press **RIGHT** ▶ or **LEFT** ◀ to select a TV programme.

Note Press **DAY-** or **DAY+** to go directly to a day before or the next day TV listings.

4. Press the **RED** ● button to set the highlighted programme for recording.

Note You can store up to 25 programmes for recording.



B Search TV programmes

1. Press **UP** ▲ until you highlight the menu bar ('Grid', 'Search', 'My TV', etc.)
2. Highlight { Search } and press **DOWN** ▼.
3. Press **RIGHT** ▶ or **LEFT** ◀ to select a search category and press **DOWN** ▼.

4. Press **DOWN** ▼ to select a sub-category and press **OK** to start the search.

Note If 'No programme found' appears, that means there are no programmes of that category for that day.

Need help?

GUIDE Plus+ system

Go to www.europe.guideplus.com

User Manual

See the user manual that came with your Philips Recorder

Online

Go to www.philips.com/support

Be responsible
Respect copyrights

12 NC 31 39 246 18511
www.philips.com

4. Mechanical Instructions

Note: The position numbers given here refers to the Exploded view on chapter 10.

4.1 Dismantling of the DVD Tray cover

1) Insert a screw-driver into the slot provided at the bottom of the set and push in the direction as shown in picture 4-1 to unlock before sliding the Tray cover assembly out.

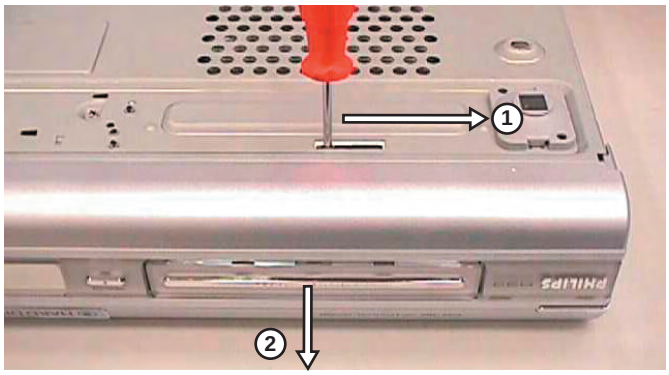


Figure 4-1: Remove DVDR tray

2) Remove the Tray cover assembly as shown in Figure 4-2.

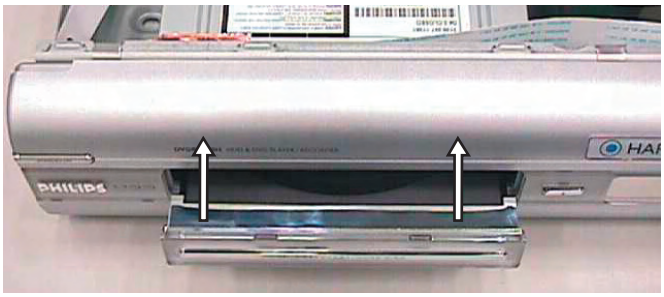


Figure 4-2: Remove tray cover assembly

4.2 Dismantling of the Front Panel assembly

1) Remove 7 screws to loosen Top cover.
2) Remove the DVD Tray cover as given in step 4-1.
3) Loosen the Digital Board & HDD as given in step 4-3.
4) Loosen 3 screws and 2 catches as shown in Figure 4-3 to separate the Front panel assembly from the Frame assembly.

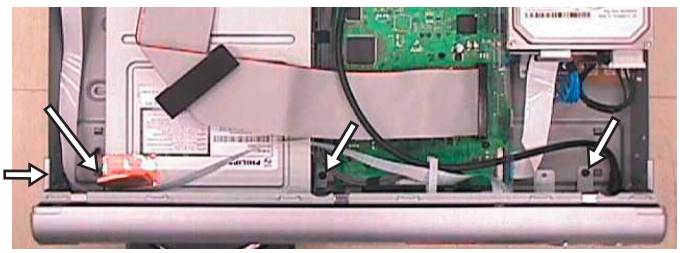


Figure 4-3

5) Remove 6 screws to loosen the Front plate to reach the Front board service position (see Figure 4-4).

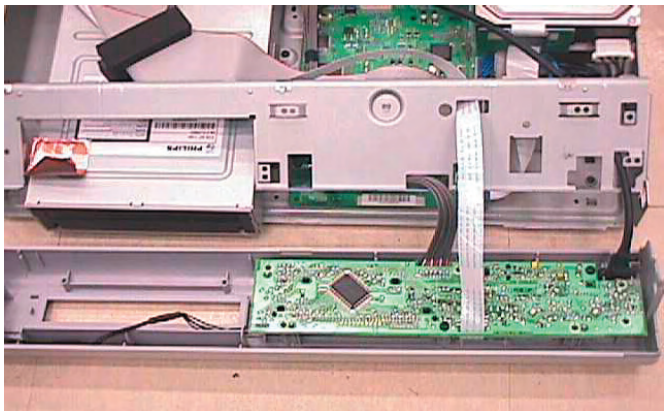


Figure 4-4: Front Board Service position

4.3 Dismantling of the Digital Board / HDD

1) Remove 4 screws to loosen the Digital Board as shown in Figure 4-5.

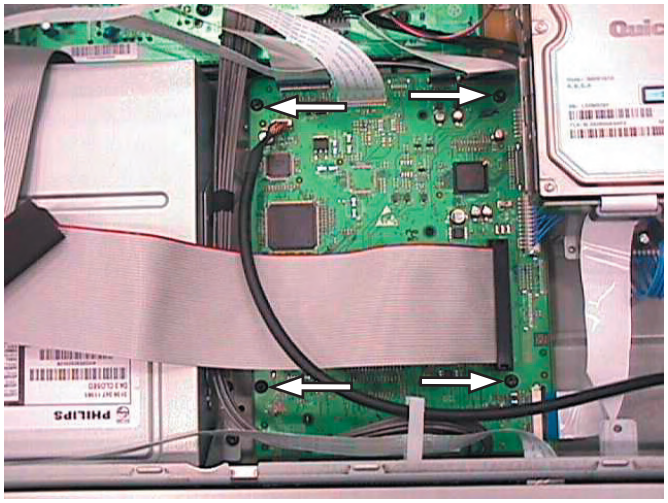


Figure 4-5: Digital Board

2) Service position for Digital Board is given in Figure 4-6.

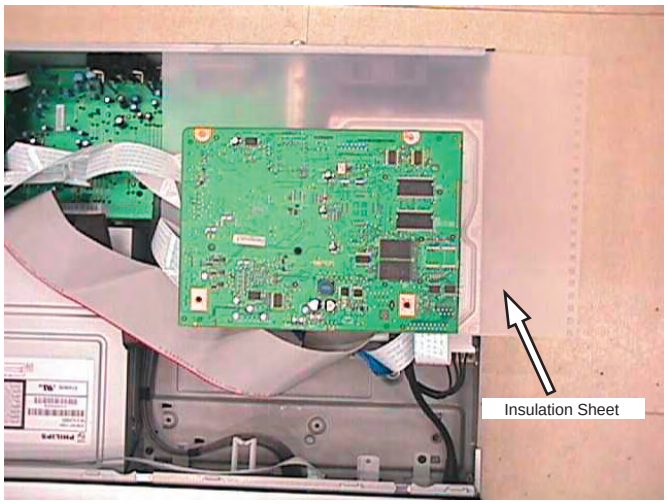


Figure 4-6: Digital Board Service Position

1) Remove the 3 screws to loosen the HDD assembly as shown in Figure 4-7.

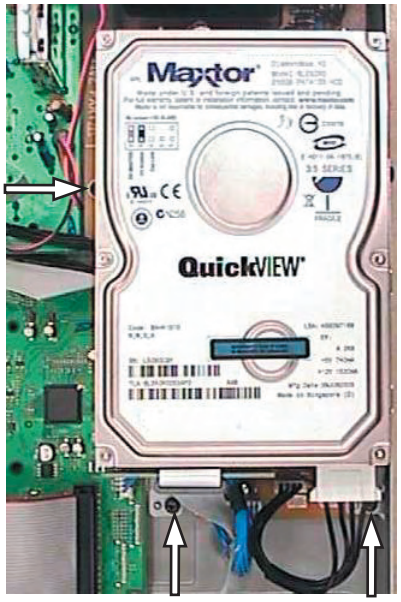


Figure 4-7

1) Unscrew screw labelled 1 in figure 4-8.
2) Lift up the harddisk in the arrow labeled 3 and 4 in figure 4-8.
3) Slide out in the direction of the arrow labeled 2 in figure 4-8.

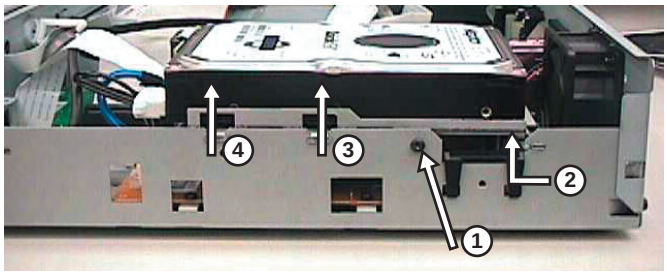


Figure 4-8

4) Remove 4 screws 247,248,249,250 to separate the Bracket HDD from the HDD.

Note: Screws 247,248,249,250 are special type of screws that must be replaced only with those specified in the Service Parts list on Chapter 10.

4.4 Dismantling of the PSU Board

1) Remove 3 mounting screw on PSU Board as shown in figure 4-9.

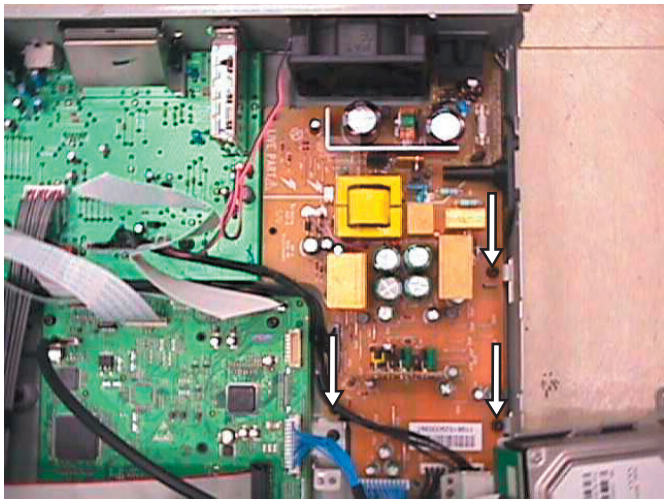


Figure 4-9: PSU remove screw

2) Service position for the PSU Board as shown in figure 4-10.

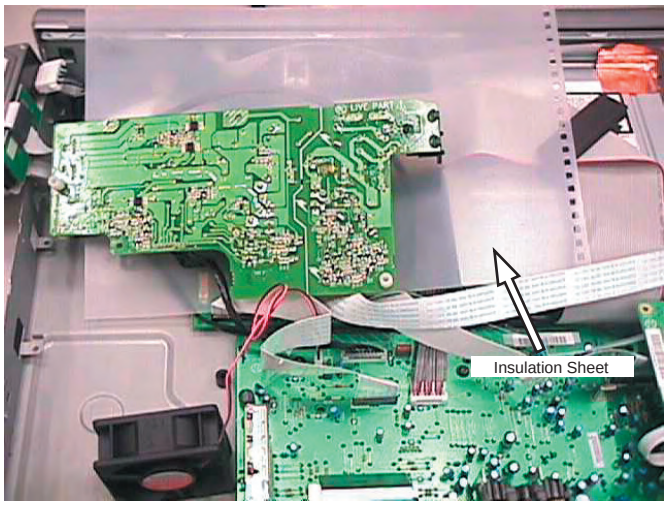


Figure 4-10: PSU Board Service Position

4.5 Dismantling of the Basic Engine (Drive D4.3)

1) Remove 4 screws to loosen the Basic Engine assembly as shown in Figure 4-11.

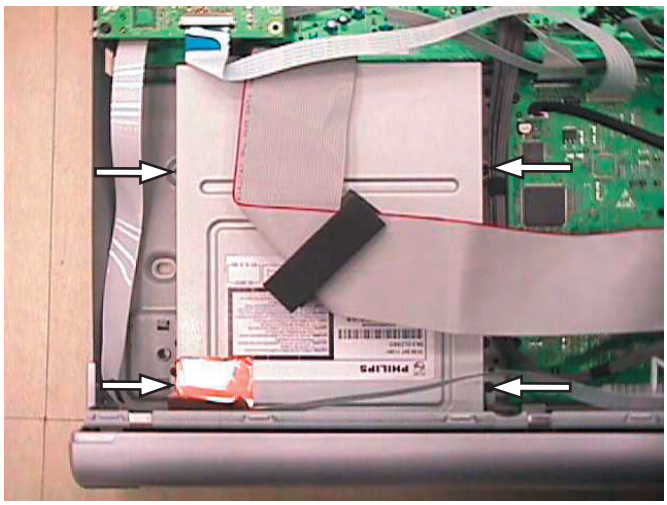


Figure 4-11

2) Remove 2 screws to loosen the Bracket Loader and uncatch the Dust cover assembly.
3) Remove 4 screws to loosen the Cover of the Basic Engine to reach Service position Figure 4-12.

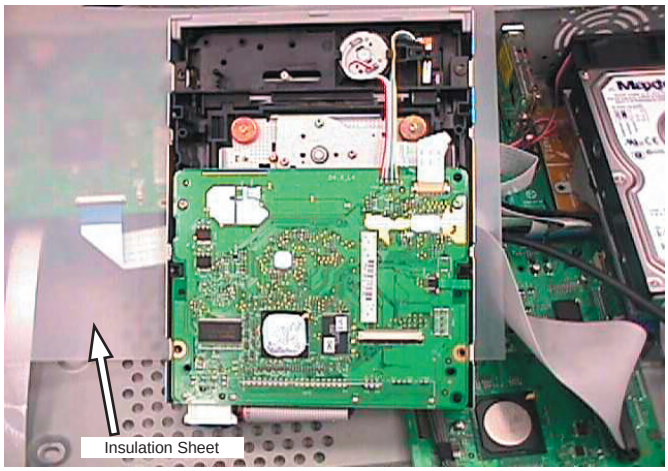


Figure 4-12: Basic Engine Service Position

4.6 Dismantling of the Analog Board

1) Remove the Basic Engine assembly as given in step 4.4.
2) Remove the HDMI board as shown in Figure 4-13.

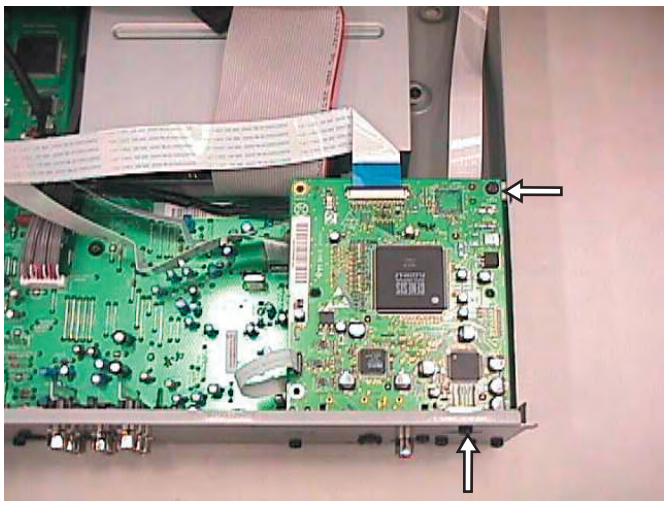


Figure 4-13

3) Remove 15 screws on the Rear panel as shown in Figure 4-13.

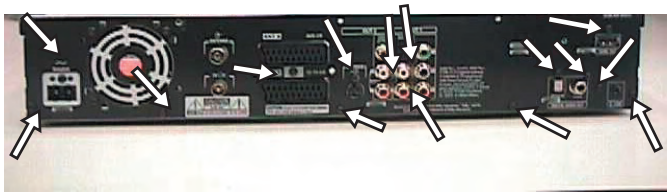


Figure 4-14

4) Remove 3 screw mounting the Analog Board to the Frame Assembly as given in Figure 4-13.

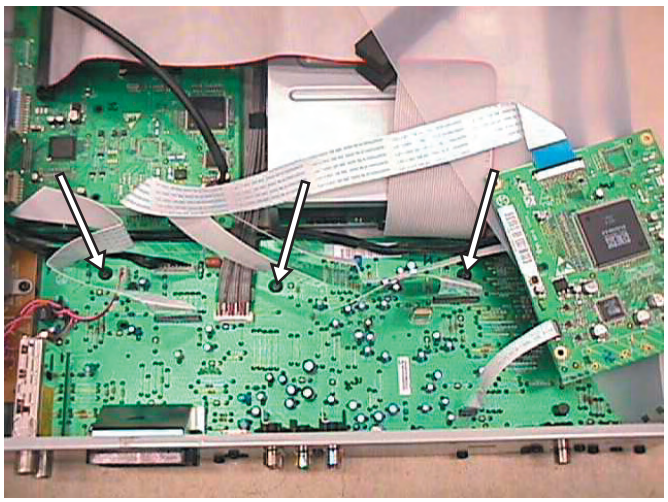


Figure 4-15

5) Service position is achieved by placing the Analog Board in the vertical position as shown in Figure 4-16.

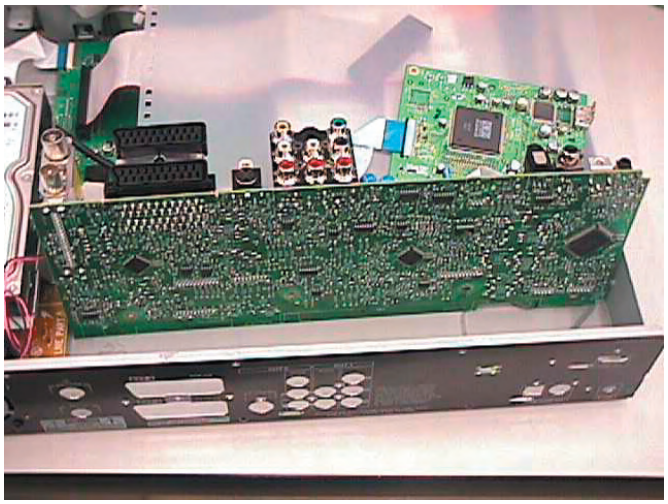


Figure 4-16: Analog Board Service Position

4.7 Dismantling of the HDMI Board

1) Remove the HDMI board as shown in Figure 4-13.
2) Service Position of HDMI board given in Figure 4-17.

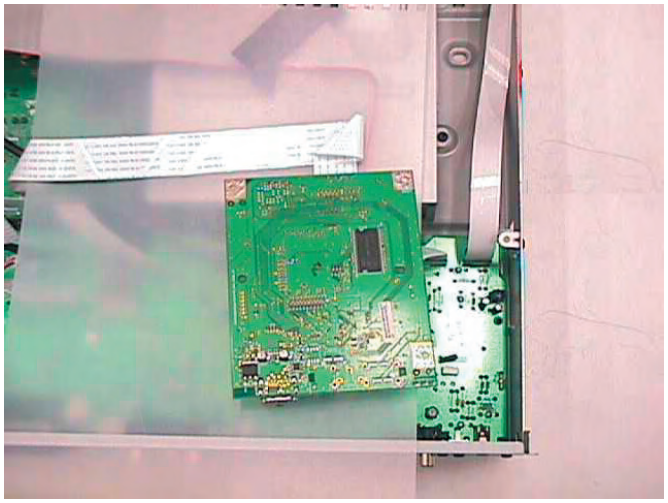


Figure 4-17: HDMI Board Service Position

5. Firmware Upgrading & Diagnostic Software

5.1 Firmware Upgrading

A. Preparation to upgrade firmware:

1. Unzip the zip-archive file
2. Start the CD Burning software and create a new CD project (data disc) with the following settings:
   - File system: Joliet
   - Format: MODE 2: CDROM XA
   - Recording mode: SINGLE SESSION (TRACK-AT-ONCE), FINALIZED CD

   Note: Long file name is necessary for the preparation of the upgrade disc

3. Place the content of the zip-archive into the root directory of the new CD project.
4. Burn the data onto a blank CDR or CD-RW

B. Procedure to apply the firmware upgrade:

1. Hold the <Record> + <Next> buttons down and Power up the set.
2. The tray opens and set will display:

   DOWNLOAD −>…….INSERT DISC

3. Insert the prepared Upgrade CDROM and close the tray.
4. The set will display:

   INIT DISC −> DOWNLOAD −>…….

   The whole process takes less than 10 minutes

   Note: Do not press any buttons or interrupt the mains supply during the upgrading process, otherwise the set may becomes defective.

5. When the upgrade is completed the tray will open automatically and the set will display:

   REMOVE DISC

6. Close the tray and the set will display:

   DONE

7. The set will go into Standby mode.

C. How to read out the firmware version to confirm set has been upgraded:

1. Power up the set.
2. Press <System> button on the Remote control and select {Setup} option
3. Press <Right> button to select {System}
4. The set will prompt you about clearing the Time Shift Buffer
5. Select {Yes} and press <OK> button
6. Press <Down> button several times to select {Version info}
7. Press <OK> button
8. The TV connected to the set will display:

   DIF05_5/56299AN_SV11201
   BE 43.2.13_ASP1,18,1,10FP
   SIT5300-FNAC6-S3_299-F536_B1
   20050909-1857 dev sxc
   EPG:DPMS:P_DPM

9. Press <System> button to exit

Diagnostic Software

Due to the complexity of the DVD recorder, the time to find a defect in the recorder can become long. To reduce this time, the recorder has been equipped with Diagnostic and Service software (DS). The DS offers functionality to diagnose the DVDR hardware and tests the following:

- Interconnections between components
- Accessibility of components
- Functionality of the audio and video paths

This functionality can be accessed via several interfaces:

1. End user/Dealer script interface
2. Command Interface

5.2 End User/Dealer Script Interface

5.2.1 Description

The End user/Dealer script interface gives a diagnosis on a stand alone DVD recorder. 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 don't cover the complete functionality of the recorder.

5.2.2 Structure

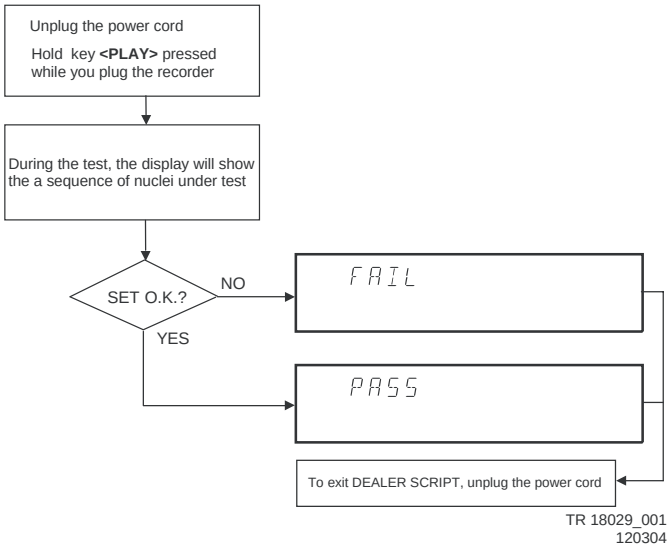


Figure 5-1

The End use/Dealer script executes all diagnostic nuclei that do not need any user interaction and are meaningful on a standalone DVD recorder.

5.2.3 Contents

Included tests:	1.DS_ANAB_COMMUNICATIONECHO_NUC 2.DS_DCB_COMMUNICATIONECHO_NUC 3. DS_BROM_COMMUNICATION_NUC 4. DS_SYS_SETTINGSDISPLAY_NUC 5. DS_CHR_DEVTYPEGET_NUC 6. DS_CHR_INT_PIC_NUC 7. DS_CHR_DMA_NUC 8. DS_BROM_WRITEREAD_NUC 9. DS_NVRAM_COMMUNICATION_NUC 10. DS_NVRAM_WRITEREAD_NUC 11. DS_SDRAM_WRITEREADFAST_NUC 12. DS_FLASH_WRITEREAD_NUC 13.DS_FLASH_CHECKSUMPROGRAM_NUC 14.DS_SYS_HARDWAREVERSIONGET_NUC 15. DS_VIP_DEVTYPEGET_NUC 16. DS_VIP_COMMUNICATION_NUC 17. DS_DVIO_LINKDEVTYPEGET_NUC 18. DS_DVIO_PHYDEVTYPEGET_NUC 19. DS_DVIO_LINKCOMMUNICATION_NUC 20. DS_DVIO_PHYCOMMUNICATION_NUC 21.DS_PSCAN_COMMUNICATIONDENC_NUC 22.DS_PSCAN_COMMUNICATIONDEINTERLACER_NUC 23. DS_BE_COMMUNICATIONECHO_NUC 24.DS_ANAB_COMMUNICATIONIICNVRAM_NUC 25.DS_ANAB_COMMUNICATIONIICTUNER_NUC 26.DS_ANAB_COMMUNICATIONIICSOUNDPROCESSOR_NUC 27.DS_ANAB_COMMUNICATIONIICAVSELECTOR_NUC 28. DS_ANAB_CHECKSUMPROGRAM_NUC

5.3 Player Script Interface

5.3.1 Virgin mode

If you want that the recorder starts up in Virgin mode, follow this procedure:

- Unplug the recorder
- plug the recorder again while you keep the STAND BY/ON key pressed
- the set starts up in Virgin mode.

5.4 Menu and Command Mode Interface

5.4.1 Nuclei Numeration

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

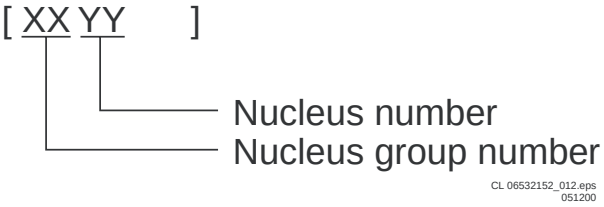


Figure 5-3

Group number	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
14*	PCMCIA
15	HDMI
16	Analogue Slave Processor
17	Analogue Board EEPROM
18	Video Matrix
19	Audio Matrix
20	Front End
21	Hard Disk
22*	Digital Terrestrial Tuner Module
23*	USB

* Not applicable for DVDR5350H, DVDR7300H and DVDR7310H Ranges

5.4.2 Error Handling

Each nucleus returns an error code. This code contains six numerals, which means:

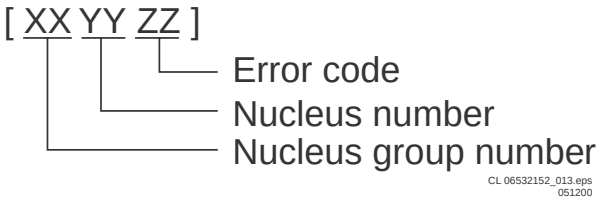


Figure 5-4

The nucleus group numbers and nucleus numbers are the same as above.

5.4.3 Command Mode Interface

Set-Up Physical Interface Components

Hardware required:

- Service PC
- one free COM port on the Service PC
- special cable to connect DVD recorder to Service PC

The service PC must have a terminal emulation program (e.g. Hyperterminal) installed and must have a free COM port (e.g. COM1). Activate the terminal emulation program and check that the port settings for the free COM port are: 19200 bps, 8 data bits, no parity, 1 stop bit and no flow control. The free COM port must be connected via a special cable to the RS232 port of the DVD recorder. This special cable will also connect the test pin, which is available on the connector, to ground (i.e. activate test pin).

Code number of PC interface cable: 3122 785 90017

Activation of Diagnostic Software

1. Pull the mains cord from the recorder and reconnect it again (reboot).
2. The next welcome message will appear on the PC:

Welcome screen D&S program

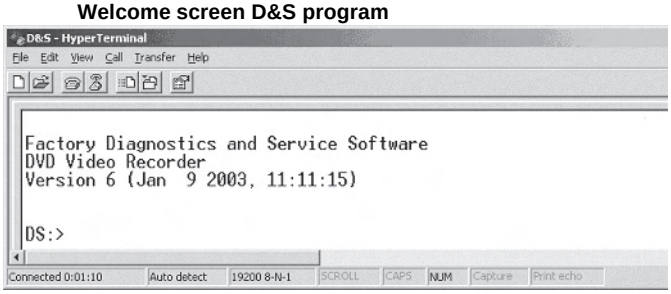


Figure 5-5

Now, the prompt 'DS:>' will appear. The diagnostic software is now ready to receive commands. The commands that can be given are the numbers of the nuclei. If you see above shown screen, continue with paragraph 'Nuclei Codes'.

3. It is possible that the next messages will appear when starting the DVD+RW for the first time

Error messages D&S program

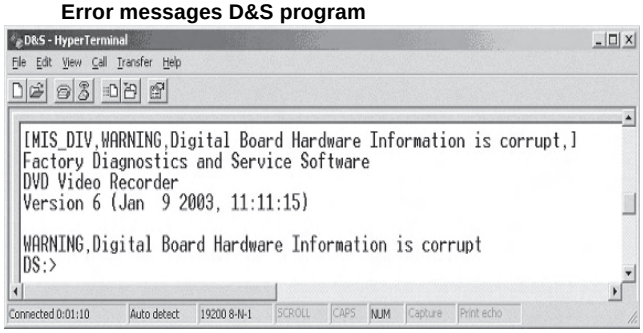


Figure 5-6a

Error messages D&S program

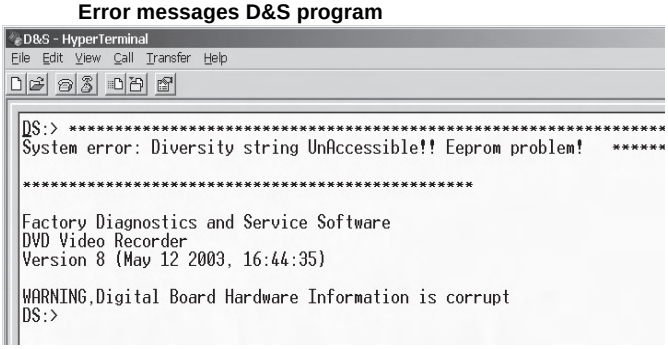


Figure 5-6b

In these cases, the boot EEPROM of the Digital Board does not contain the required string with the hardware information. To update the Digital Board with the correct string, nucleus 1226 must be executed.

See next section 'Diversity String Input'.
There can also be the next error message.

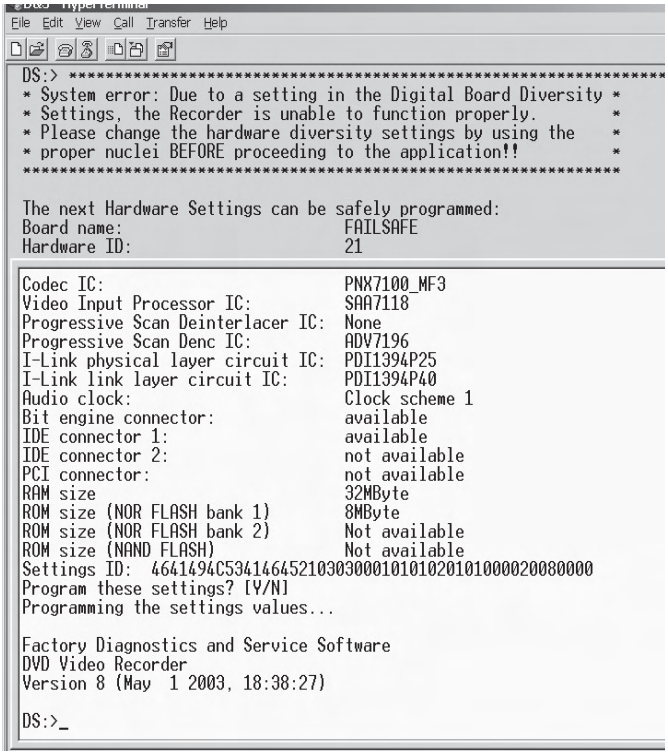


Figure 5-6c

Enter "Y" to program a safe string. With this automatically generated string the board will work in principle but it has to be checked if all board settings were detected correctly.

Diversity String Input

4. Execute nucleus 1226 to enter the string. Please see chapter 8 for details

Nucleus 1226 execution with string

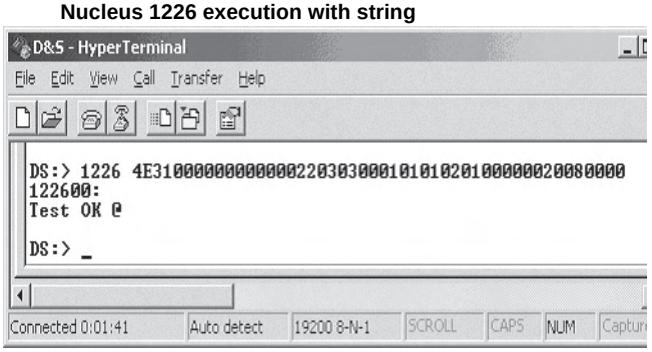


Figure 5-7

5. To check if the hardware info is filled correctly, you can execute nucleus 1228.

Nucleus 1228 info example

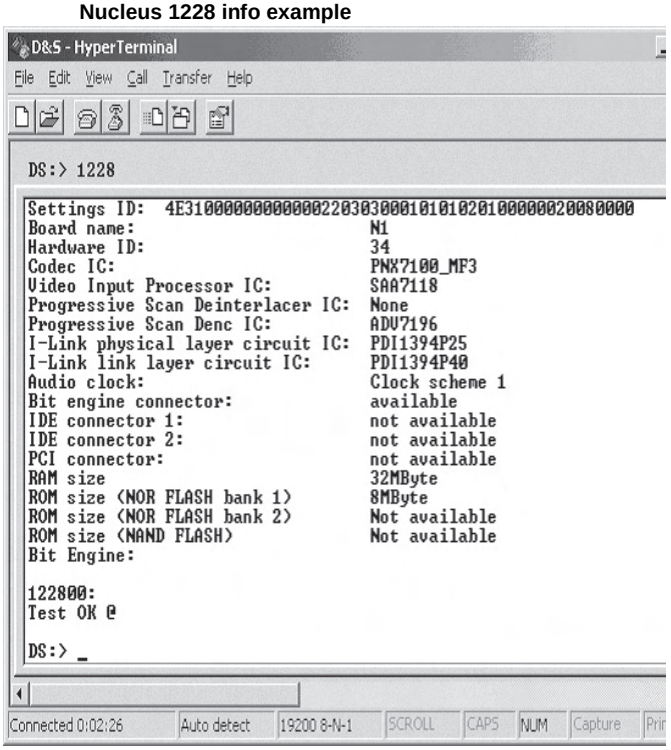


Figure 5-8

6. Exit the 'Terminal' program.

7. Reboot the DVD recorder to allow the software to start.

Command overview Digital Board

Below you will find an overview of the nuclei, their numbers, and their error codes. This overview is preliminary and subject to modifications.

Note: AV3 in the overview includes also the AV3.5 drive.

Codec Host Controller (CHR)

Nucleus Name	**DS_CHR_DevTypeGet**	
Nucleus Number	100	
Description	Retrieves the device id, the module ids and revisions of the Codec and returns them to the stdout port.	
Technical	- Determine the codec id by means of comparing version ids of the modules. - Read the module-id register of every module and display it to the user.	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	10000	Getting the information succeeded
	10001	Wrong codec id detected
Example	DS:> 100 010000: Device ID 7100 Codec ID PNX7100_C F-BCU (0x0102) 1.0 INTC (0x011d) 1.0 PCI-XIO(0x0113) 1.0 SIF (0x013b) 1.0 EJTAG (0x0104) 0.1 S-BCU (0x0102) 1.0 BOOT (0x010a) 1.0 CONFIG (0x013f) 1.1 RESET (0x0123) 1.0 DEBUG (0x0116) 0.0 UART0 (0x0107) 0.1 UART1 (0x0107) 0.1 UART2 (0x0107) 0.1 UART3 (0x0107) 0.1 I2C0 (0x0105) 0.1 I2C1 (0x0105) 0.1 GPIO (0x013c) 1.0 SYNC (0x013a) 1.0 DISP0 (0xa015) 1.12 DISP1 (0xa00f) 1.1 OSD (0x0136) 0.1 SPU (0xa00e) 0.0 MIXER (0x0137) 1.0 DENC (0x0138) 1.0 CCIR (0x0139) 1.0 VDEC (0x0133) 0.2 PARSER (0xa00d) 0.0 DV (0xa00c) 0.0 BEI (0xa00a) 0.1 IDE (0xa009) 0.1 SGDX (0xa008) 1.0 BYTE (0xa00b) 0.1 OUTPUT (0xa003) 1.0 ACOMP (0xa000) 1.0 VFE (0xa001) 0.1 VCOMP (0xa002) 1.0 SCR (0x0000) 0.0 SIFF (0xa011) 0.1 WMD (0xa010) 0.0 AUDIO0 (0xa015) 1.12 AUDIO1 (0xa00f) 1.1 PSCAN (0xa018) 0.1 Test OK @	

Nucleus Name	**DS_CHR_TestImageOn**
Nucleus Number	101
Description	Generates a test-image of a selected video standard on selected video output on the digital board. When no input is given, the default values will be used (see user input description below). Make sure to use the proper nuclei to route the video signal on the analogue board to get the video signal to the proper output. Note: Although a DTT has a Chrysalis C3, the codec IC may never use the YUV functionality of the internal DENC. This is specified by the hardware. The digital boards for DTT do have a YUV-matrix. The signals from this YUV-matrix are not routed to the regular video output connector but to the progressive scan output connector.
Technical	- Validate the user input. - Initialise the SYNC module. - Initialise the DISPLAY module. - Initialise the MIXER module. - Initialise the DENC module. - Set the selected video standard. - Generate the selected test image in memory. - Start the DISPLAY module. - Start the MIXER module. - Start the DENC module according to the selected test image id.
Execution Time	6 seconds.

<table>
<tr><td>User Input</td><td colspan="2">The user has to decide which test image, video standard and video output must be used: < Test image id > < Video standard > < Video output >

Test image id:
<table><tr><td>0</td><td>VERTICAL_COLOURBAR (default)</td></tr><tr><td>1</td><td>HORIZONTAL_COLOURBAR</td></tr><tr><td>2</td><td>WHITE</td></tr><tr><td>3</td><td>YELLOW</td></tr><tr><td>4</td><td>CYAN</td></tr><tr><td>5</td><td>GREEN</td></tr><tr><td>6</td><td>MAGENTA</td></tr><tr><td>7</td><td>RED</td></tr><tr><td>8</td><td>BLUE</td></tr><tr><td>9</td><td>BLACK</td></tr><tr><td>10</td><td>GRAY</td></tr><tr><td>11</td><td>TEST_IMAGE_FOR_PROGRESSIVE_SCAN</td></tr></table>
Video standard:
<table><tr><td>PAL</td><td>Standard PAL 50 Hz (default)</td></tr><tr><td>NTSC</td><td>Standard NTSC 60 Hz</td></tr></table>
Video output:
<table><tr><td>ALL</td><td>CVBS and YC and RGB DACs are enabled (default)</td></tr><tr><td>CVBS</td><td>CVBS DAC is enabled</td></tr><tr><td>YC</td><td>Y and C DAC is enabled</td></tr><tr><td>RGB</td><td>CVBS, R, G, and B DACs are enabled</td></tr><tr><td>YUV</td><td>Y, U, and V DACs are enabled</td></tr><tr><td>PSCAN</td><td>Progressive scan is enabled.</td></tr></table></td></tr>
<tr><td>Error</td><td>Number</td><td>Description</td></tr>
<tr><td></td><td>10100</td><td>Generating the test image succeeded.</td></tr>
<tr><td></td><td>10101</td><td>Invalid input was provided.</td></tr>
<tr><td></td><td>10102</td><td>The Codec SYNC-module cannot be initialised.</td></tr>
<tr><td></td><td>10103</td><td>The Codec MIXER-module cannot be initialised.</td></tr>
<tr><td></td><td>10104</td><td>The Codec VPP-module cannot be initialised.</td></tr>
<tr><td></td><td>10105</td><td>The Codec DENC-module cannot be initialised.</td></tr>
<tr><td></td><td>10106</td><td>The digital board hardware information is corrupt</td></tr>
<tr><td>Example</td><td colspan="2"><pre>DS:> 101
010100:
Test OK @

DS:> 101 0 pal cvbs
010100:
Test OK @

DS:> 101 4 ntsc yc
010100:
Test OK @</pre></td></tr>
</table>

Nucleus Name	**DS_CHR_TestImageOff**	
Nucleus Number	102	
Description	Switches the test-image off.	
Technical	- Stop the DENC module.	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	10200	Stopping the test image generation succeeded
	10201	The Codec DENC-module failed.

Example	<pre>DS:> 102
	010200:
	Test OK @</pre>	

Nucleus Name	**DS_CHR_SineOn**	
Nucleus Number	103	
Description	Generate an audio sine signal on the audio output of the digital board. Note: Left channel 6kHz, right channel 12 kHz sine. Make sure to route the signal first.	
Technical	- De-mute the analogue board - Set fifo parameters for audio - Set the volume - Set the I2S outputs and configuration paths - Set the decoder mode - Configure the audio decoder - Put the AC3 audio in the fifo - Send 'prepare' command to the audio decoder - Send 'play' command to the audio decoder	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	10300	The sine signal was successfully generated
	10301	The analogue board could not be de-muted
	10302	The audio decoder did not initialise
	10303	The dsp2 (DUET) of the audio decoder did not configure
	10304	The dsp1 (PALM) of the audio decoder did not configure
	10305	There was a delay-error before starting
	10306	Wrong input was given to the decoder function
	10307	Wrong input was given to the decoder function @@@@@
	10308	The audio decoder did not get into the 'prepared' state

Example	`DS:> 103`
	`010300:`
	`Test OK @`	

Nucleus Name	**DS_CHR_SineOff**	
Nucleus Number	104	
Description	Stop generating the audio sine signal	
Technical	- Reset the audio block of the Codec	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	10400	Switching off the audio sine signal succeeded
	10401	Failed to reset the audio decoder

Example	`DS:> 104`
	`010400:`
	`Test OK @`	

Nucleus Name	**DS_CHR_SineBurst**	
Nucleus Number	105	
Description	Generate an audio sine signal on the audio output of the digital board for 4 seconds. Note: Left channel 6kHz, right channel 12 kHz sine with some known hick-ups	
Technical	- Call the DS_CHR_SineOn nucleus - Delay for 4 seconds - Call the DS_CHR_SineOff nucleus	
Execution Time	4 seconds	
User Input	None	
Error	Number	Description
	10500	The sine signal burst was successfully generated
	10501	The delay did not succeed during the burst
	10502	The audio sine could not be generated

Example	`DS:> 105`
	`010500:`
	`Test OK @`	

Nucleus Name	**DS_CHR_MuteOn**	
Nucleus Number	106	
Description	Mute the audio outputs of the digital board	
Technical	- Send the 'Mute' command to the audio decoder - Activate the 'audio mute' PIO pin	
Execution Time	Less than 1 second.	
User Input	"PIO" to just use the PIO pin mute. When muting using this, also de-mute using this as this works 'paired'.	
Error	Number	Description
	10600	Muting the audio succeeded
	10601	Muting the audio through the PIO-pin failed

Example	`DS:> 106`
	`010600:`
	`Test OK @`
	
	`DS:> 106 PIO`
	`010600:`
	`Test OK @`	

Nucleus Name	**DS_CHR_MuteOff**	
Nucleus Number	107	
Description	De-mute the audio outputs of the digital board	
Technical	- Send the 'DeMute' command to the audio decoder - Deactivate the 'audio mute' PIO pin	
Execution Time	"PIO" to just use the PIO pin de-mute. Only de-mute using this when you muted using the PIO parameter, as this works ''paired.	
User Input	None	
Error	Number	Description
	10700	De-muting the audio succeeded
	10701	De-muting the audio through the PIO-pin failed

Example	`DS:> 107`
	`010700:`
	`Test OK @`
	
	`DS:> 107 PIO`
	`010700:`
	`Test OK @`	

Nucleus Name	**DS_CHR_DvLedOn**	
Nucleus Number	108	
Description	Check the connection to the DV-LED on the digital board by switching it on	
Technical	- Write to the PIO pin to light the DV LED	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	10800	Switching the DV-LED on succeeded
	10801	Switching the DV-LED on failed

Example	`DS:> 108`
	`010800:`
	`Test OK @`	

Nucleus Name	**DS_CHR_DvLedOff**	
Nucleus Number	109	
Description	Switch off the DV-LED on the digital board	
Technical	- Write to the PIO pin to switch off the DV LED	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	10900	Switching the DV-LED off succeeded
	10901	Switching the DV-LED off failed

Example	`DS:> 109`
	`010900:`
	`Test OK @`	

Nucleus Name	**DS_CHR_MacroVisionOn**	
Nucleus Number	110	
Description	Turn on MacroVision.	
Technical	- Set some registers of the DENC module in the Codec.	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	11000	Turning on MacroVision succeeded
	11001	Turning on MacroVision failed
Example	DS:> 110 011000: Test OK @	

Nucleus Name	**DS_CHR_MacroVisionOff**	
Nucleus Number	111	
Description	Turn off MacroVision.	
Technical	- Set some registers of the DENC module in the Codec.	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	11100	Turning off MacroVision succeeded
	11101	Turning off MacroVision failed
Example	DS:> 111 011100: Test OK @	

Nucleus Name	**DS_CHR_Peek**	
Nucleus Number	112	
Description	Peek a value on a specified address	
Technical	- Check the user input - Read out the address specified - Check whether the address to be read is aligned on 4 bytes	
Execution Time	Less than 1 second.	
User Input	The address to peek on	
Error	Number	Description
	11200	Peeking on the specified address succeeded
	11201	Peeking on the specified address failed, wrong user input
	11202	Peeking on the specified address failed due to misalignment
Example	DS:> 112 0xa0700000 011200: Value read = 0x000001BD Test OK @	

Nucleus Name	**DS_CHR_Poke**	
Nucleus Number	113	
Description	Poke a value on a specified address	
Technical	- Check the user input - Change the value on the address specified - Check whether the address to be modified is aligned on 4 bytes	
Execution Time	Less than 1 second.	
User Input	The address to poke and the value: <address><value>	
Error	Number	Description
	11300	Poking the specified address succeeded
	11301	Poking the specified address failed, wrong user input
	11302	Poking the specified address failed due to misalignment
Example	DS:> 113 0xa0700000 0xaabbccdd 011300: Test OK @	

Nucleus Name	**DS_CHR_INT_PICInterrupts**	
Nucleus Number	114	
Description	Test all interrupts of the priority interrupt controller	
Technical	- Install interrupt handlers - Generate interrupts - Test whether all interrupts were received	
Execution Time	Less than 1 second.	
User Input	-	
Error	Number	Description
	11400	Testing all the PIC interrupts succeeded
	11401	Testing all the PIC interrupts failed
Example	DS:> 114 011400: Test OK @	

Nucleus Name	**DS_CHR_DMA_TestDMA**	
Nucleus Number	115	
Description	Test the memory to memory DMA transfer	
Technical	- Create a block with known data in memory - Copy this block to the consecutive area using 3 different DMAs - Check whether all DMAs transferred the data properly	
Execution Time	Less than 2 seconds.	
User Input	-	
Error	Number	Description
	11500	The testing of the DMAs succeeded
	11501	The initialisation of the DMAs failed for one or more DMA
	11502	One or more DMAs failed the test
Example	DS:> 115 011500: Test OK @	

Boot EEPROM (BROM)

Nucleus Name	**DS_BROM_Communication**	
Nucleus Number	200	
Description	Check the communication between the IIC controller of the Codec and the boot EEPROM	
Technical	- Initialise IIC - Read something from the EEPROM	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	20000	The data is properly read so the communication is OK
	20001	The IIC bus was not accessible
	20002	There was a timeout reading the device
	20003	The IIC acknowledge was not received
	20004	An IIC-bus error occurred
	20005	The IIC bus initialisation failed
	20006	An unexpected IIC error occurred
Example	DS:> 200 020000: Test OK @	

Nucleus Name	**DS_BROM_WriteRead**	
Nucleus Number	201	
Description	Check whether the Boot EEPROM can be written to and read from	
Technical	- Initialise IIC - Write something to the EEPROM - Read from the same location and check whether it is the same as written	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	20100	The write-read test succeeded
	20101	The write-read test failed
	20102	An IIC-bus error occurred
	20103	There was a timeout reading the device
	20104	The IIC bus was not accessible
	20105	The IIC acknowledge was not received
	20106	Got unknown IIC bus error
	20107	The IIC bus initialisation failed

Example	`DS:> 201`
	`020100:`
	`Test OK @`	

Non Volatile RAM (NVRAM)

Nucleus Name	**DS_NVRAM_Communication**	
Nucleus Number	300	
Description	Check the communication between the IIC controller of the Codec and the NVRAM EEPROM	
Technical	- Initialise IIC - Read from a location in the NVRAM EEPROM device	
Important note:	This nucleus only checks the physical connection between the Codec and IIC EEPROM. If no EEPROM is mounted this test will fail. However other NVRAM nuclei might still work because the software will store NVM data into flash memory	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	30000	Something is properly read so the communication is OK
	30001	The IIC bus was not accessible
	30002	There was a timeout reading the device
	30003	The IIC acknowledge was not received
	30004	The communication with the device failed
	30005	The IIC bus initialisation failed

Example	`DS:> 300`
	`030000:`
	`Test OK @`	

Nucleus Name	**DS_NVRAM_WriteRead**	
Nucleus Number	301	
Description	Check whether the EEPROM can be written to and read from	
Technical	- Initialise IIC - If no IIC EEPROM was found then initialise flash memory to use NVM pages - Backup data from location to modify - Write to location and read it back again - Write back the backed up data to the location to leave the NVRAM as found	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	30100	The write-read test succeeded
	30101	The IIC bus could not be initialised
	30102	There was an NVRAM IO error
	30103	The value could not be read back from the NVRAM

Example	`DS:> 301`
	`030100:`
	`Test OK @`	

Nucleus Name	**DS_NVRAM_Clear**	
Nucleus Number	302	
Description	Make the EEPROM empty, containing all zeroes.	
Technical	- Initialise IIC - If no IIC EEPROM was found then initialise flash memory to use NVM pages - Read the DVID and diversity string from NVM (either EEPROM or Flash) - Create a memory block filled with zeroes - Write this block to the NVRAM (either EEPROM or Flash) - Write back the Read the DVID and diversity string to NVM (either EEPROM or Flash)	
Important note:	The Hardware Diversity Information and unique identification number (IEE1394-specific) of the **D**igital **V**ideo processing part is NOT cleared by this nucleus!	
Execution Time	16 seconds	
User Input	None	
Error	Number	Description
	30200	The clearing of the NVRAM succeeded
	30201	There was an IIC error
	30202	Clearing the NVRAM failed

Example	`DS:> 302`
	`030200:`
	`Test OK @`	

Nucleus Name	**DS_NVRAM_Modify**	
Nucleus Number	303	
Description	Modifies one or more locations in NVRAM and updates the checksum of the section modified	
Technical	- Initialise IIC - If no IIC EEPROM was found then initialise flash memory to use NVM pages - Decode user input - Modify the NVRAM as indicated - Validate the NVRAM by calculating the checksum and storing it	
Execution Time	Less than 1 second	
User Input	1. The location that must be modified i.e. "ALL" "BOOT" "DIAGNOSTICS" "DOWNLOAD" "CONFIG" "RECORDER" or no string if an offset from the base address of the NVRAM is required 2. The offset and data which to put on the selected location <offset> <length> <data>	
Error	Number	Description
	30300	Modifying the NVRAM contents succeeded
	30301	Unable to initialise NVM
	30302	Modifying the NVRAM contents failed
	30303	length out of range
	30304	unable to decode length
	30305	offset out of range
	30306	unable to decode offset
	30307	unknown location specified
	30308	no location is specified
	30309	number of values incorrect
	30310	There was an IIC error

Example	`DS:> 303 DIAGNOSTICS 5 1 0x5a`
	`030300: Section is modified successfully`
	`Test OK @`	

Nucleus Name	**DS_NVRAM_Read**	
Nucleus Number	304	
Description	Read out one or more locations in the NVRAM	
Technical	- Initialise IIC - If no IIC EEPROM was found then initialise flash memory to use NVM pages - Decode user input - Read from the NVRAM and return this info to the user	
Execution Time	Less than 1 second	
User Input	1. The location which must be read i.e. "ALL" "BOOT" "DIAGNOSTICS" "DOWNLOAD" "CONFIG" "RECORDER" or no string if an offset from the base address of the NVRAM is required 2. The offset and number of bytes to read <offset> <length>	
Error	Number	Description
	30400	Value read
	30401	Unable to initialise NVM
	30402	Reading the NVRAM contents failed
	30403	Length out of range
	30404	Unable to decode length
	30405	Offset out of range
	30406	Unable to decode offset
	30407	Unknown location specified
	30408	No location is specified

Example	`304 DIAGNOSTICS 0 6`
	`030400: Value read = 0x00 0x00 0x00 0x00 0x00 0x5A`
	`Test OK @`	

SDRAM (SDRAM)

Nucleus Name	**DS_SDRAM_WriteRead**	
Nucleus Number	400	
Description	Check all data lines, address lines and memory locations of the SDRAM	
Technical	- Test the data bus - Test the address bus - Test the integrity of the device itself (memory locations)	
Execution Time	11 seconds for 32 Mb 23 seconds for 64 Mb	
User Input	None	
Error	Number	Description
	40000	The write-read test succeeded
	40001	The data bus contains an error
	40002	The address bus contains an error
	40003	The SDRAM itself contains an error

Example	`DS:> 400`
	`040000:`
	`Test OK @`	

Nucleus Name	**DS_SDRAM_WriteReadFast**	
Nucleus Number	401	
Description	Check all data lines and address lines of the SDRAM	
Technical	- Test the data bus - Test the address bus	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	40100	The write-read test succeeded
	40101	The data bus contains an error
	40102	The address bus contains an error

Example	`DS:> 401`
	`040100:`
	`Test OK @`	

Nucleus Name	**DS_SDRAM_Write**	
Nucleus Number	402	
Description	Write to a specific un-cached memory address	
Technical	- Decode the user input and check its ranges and alignment on 4 bytes - Write the data to the SDRAM	
Execution Time	Less than 1 second	
User Input	1. The location that must be modified (SDRAM starts at address 0xA0000000) 2. The value to put on the selected location	
Error	Number	Description
	40200	Writing to the SDRAM succeeded
	40201	Writing to the SDRAM failed; Wrong user input
	40202	Address is not dividable by 4

Example	`DS:> 402 0xa1000010 0xad112222`
	`040200:`
	`Test OK @`	

Nucleus Name	**DS_SDRAM_Read**	
Nucleus Number	403	
Description	Read from a specific un-cached memory address	
Technical	- Decode the user input and check the ranges - Read from the SDRAM and return this info to the user	
Execution Time	Less than 1 second	
User Input	The location from which the data must be read (SDRAM starts at address 0xA0000000)	
Error	Number	Description
	40300	Reading from the SDRAM succeeded
	40301	Reading from the SDRAM failed; Wrong user input
	40302	Address is not dividable by 4

Example	`DS:> 403 0xa1000010`
	`040300: Value read = 0xAD112222`
	`Test OK @`	

Nucleus Name	**DS_SDRAM_DmaWriteRead**	
Nucleus Number	404	
Description	Write a pattern to the entire SDRAM using DMA and check the data	
Technical	- Check if the Stack pointer is not in the write range - Clear a 64kb block and then fill it with a pattern - Initialise the DMA controller and write the data to the SDRAM - Then check if all the data was written correctly (except descriptor tables) - Repeat the process 4 times with 4 different patterns	
Execution Time	24 seconds	
User Input	None.	
Error	Number	Description
	40400	Writing to the SDRAM succeeded
	40401	Stack area definition ERROR!
	40402	DMA controller could not be initialised.
	40403	Not all data was transferred correctly

Example	`DS:> 404`
	`040400:`
	`Test OK @`	

FLASH (FLASH)

Nucleus Name	**DS_FLASH_DevTypeGet**	
Nucleus Number	500	
Description	Get the device (revision) type information of the FLASH ICs. (type, manufacturer, device ID and size)	
Technical	- Set the timing for the flash writing - Write a command sequence to determine device type information - Return the information to the user	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	50000	Getting the information from the FLASH succeeded
	50001	Getting the information from the FLASH failed

Example	`DS:> 500`
	`050000: Found FLASH memory:`
	`NOR AMD 29DL640G 8MB,NOR AMD 29DL640G 8MB`
	`Test OK @`	

Nucleus Name	**DS_FLASH_WriteRead**	
Nucleus Number	501	
Description	Check whether the FLASH can be written to and read from	
Technical	- Find the test segment in flash - Read the data into SDRAM - Modify the data - Write this data from SDRAM to FLASH and verify it by reading back again	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	50100	The FLASH write-read test succeeded
	50101	The test segment could not be found
	50102	All bits in the TEST region are filled with 0 (region exhausted)
	50103	The Write Read test failed
	50104	The Write Failed

Example	`DS:> 501`
	`050100:`
	`Test OK @`	

Nucleus Name	**DS_FLASH_Read**	
Nucleus Number	502	
Description	Read from a specific memory address in FLASH	
Technical	- Decode the user input and check the ranges and whether the address is aligned on 4 bytes - Read the data and return this to the user	
Execution Time	Less than 1 second.	
User Input	The location from which data must be read (FLASH starts at address 0xB8000000)	
Error	Number	Description
	50200	Reading the FLASH succeeded
	50201	Reading the FLASH failed; Wrong user input
	50202	Address is not dividable by 4

Example	`DS:> 502 0xb8000000`
	`050200: Value read = 0x3C08A000`
	`Test OK @`	

Nucleus Name	**DS_FLASH_ChecksumProgram**	
Nucleus Number	503	
Description	Check the checksum of the application partitions by recalculating and comparing partition checksums	
Technical	- Determine the number of segments - Find the application in each segment and determine its checksum - Check whether the checksums stored match the newly calculated	
Execution Time	6 seconds	
User Input	None	
Error	Number	Description
	50300	The checksum is valid, the test succeeded
	50301	The checksum is invalid
Example	DS:> 503 050300: BootCode checksum is: 0xBABE5B6F, which is correct Diagnostics checksum is: 0xBABEBAFF, which is correct Download checksum is: 0xBABEEDBF, which is correct Application checksum is: 0xBABE8EEC, which is correct Test OK @	

Nucleus Name	**DS_FLASH_CalculateChecksum**	
Nucleus Number	504	
Description	Calculate the checksum over all memory addresses. Used to check entire FLASH contents	
Technical	- Run the checksum calculation algorithm on all flash memory addresses	
Execution Time	6 seconds	
User Input	None	
Error	Number	Description
	50400	Calculating the checksum over all addresses succeeded
Example	DS:> 504 050400: The Checksum = 0xBABE30A4 Test OK @	

Nucleus Name	**DS_FLASH_CalculateChecksumFast**	
Nucleus Number	505	
Description	Calculate a checksum over a selected number of address locations	
Technical	- Run the checksum calculation algorithm on a selected number of flash memory addresses	
Execution Time	6 seconds	
User Input	None	
Error	Number	Description
	50500	Calculating the checksum over selected addresses succeeded
Example	DS:> 505 050500: The Checksum = 0xBABEB064 Test OK @	

Video Input Processor (VIP)

Nucleus Name	**DS_VIP_DevTypeGet**	
Nucleus Number	600	
Description	Get the device (revision) type information of the VIP IC	
Technical	- Initialise IIC - Read out the device (revision) type information of the VIP IC	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	60000	Getting the information from the VIP succeeded
	60001	The IIC bus initialisation failed
	60002	The was an error getting the information from the VIP
	60003	Type not according to type stored in HW diversity string
Example	DS:> 600 060000: Found SAA7118 Test OK @	

Nucleus Name	**DS_VIP_Communication**	
Nucleus Number	601	
Description	Check the communication between the IIC controller of the Codec and the VIP IC	
Technical	- Initialise IIC - Read data from a location in the VIP	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	60100	Communicating with the VIP succeeded
	60101	The IIC bus was not accessible
	60102	There was a timeout reading the device
	60103	The IIC acknowledge was not received
	60104	The communication with the device failed
	60105	The IIC bus initialisation failed

Example	`DS:> 601`
	`060100:`
	`Test OK @`	

Nucleus Name	**DS_VIP_ClockOutputOn**	
Nucleus Number	602	
Description	Switch the clock output on	
Technical	- Initialise IIC - Set the clock output through IIC	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	60200	Switching the clock output on succeeded
	60201	Switching the clock output on failed

Example	`DS:> 602`
	`060200:`
	`Test OK @`	

Nucleus Name	**DS_VIP_ClockOutputOff**	
Nucleus Number	603	
Description	Switch the clock output off	
Technical	- Initialise IIC - Reset the clock output through IIC	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	60300	Switching the clock output off succeeded
	60301	Switching the clock output off failed

Example	`DS:> 603`
	`060300:`
	`Test OK @`	

<table>
<tr><td>Nucleus Name</td><td>DS_VIP_SelectInput</td></tr>
<tr><td>Nucleus Number</td><td>604</td></tr>
<tr><td>Description</td><td>Select an input video path to be switched to the analogue output pin (AOUT) of the VIP</td></tr>
<tr><td>Technical</td><td>- Check the user input
- Initialise IIC
- Read out the VIP id
- Write the set of registers required for the input specified</td></tr>
<tr><td>Execution Time</td><td>Less than 1 second</td></tr>
<tr><td>User Input</td><td>The input to select, see table below.

Available channels for input of the 7118 and their description:
<table>
<tr><th>Channel number</th><th>Description</th></tr>
<tr><td>1</td><td>CVBS_Y_IN_A</td></tr>
<tr><td>2</td><td>CVBS_OUT_B</td></tr>
<tr><td>3</td><td>CVBS_Y_IN_B</td></tr>
<tr><td>4</td><td>CVBS_Y_IN_C</td></tr>
<tr><td>6</td><td>C_IN</td></tr>
<tr><td>8</td><td>G_IN</td></tr>
<tr><td>9</td><td>Y_IN</td></tr>
<tr><td>13</td><td>B_IN</td></tr>
<tr><td>14</td><td>U_IN</td></tr>
<tr><td>18</td><td>R_IN</td></tr>
<tr><td>19</td><td>V_IN</td></tr>
</table>
Available channels for input of the 7115 and their description:
<table>
<tr><th>Channel number</th><th>Description</th></tr>
<tr><td>1</td><td>CVBS_Y_IN_B</td></tr>
<tr><td>2</td><td>CVBS_OUT_B_VIP</td></tr>
<tr><td>4</td><td>C_IN_VIP</td></tr>
<tr><td>7</td><td>CVBS_Y_IN_B</td></tr>
</table>
Available channels for input of the 7119 and their description:
<table>
<tr><th>Channel number</th><th>Description</th></tr>
<tr><td>1</td><td>Y / CVBS</td></tr>
<tr><td>3</td><td>CVBS</td></tr>
<tr><td>4</td><td>Y3</td></tr>
<tr><td>6</td><td>C / CVBS</td></tr>
<tr><td>8</td><td>G</td></tr>
<tr><td>9</td><td>Y</td></tr>
<tr><td>12</td><td>Y2</td></tr>
<tr><td>13</td><td>B</td></tr>
<tr><td>14</td><td>U</td></tr>
<tr><td>17</td><td>C</td></tr>
<tr><td>18</td><td>R</td></tr>
<tr><td>19</td><td>V</td></tr>
</table>
Available channels for input of the 7173 and their description:
<table>
<tr><th>Channel number</th><th>Description</th></tr>
<tr><td>1</td><td>CVBS_TUNER_IN</td></tr>
<tr><td>2</td><td>CVBS_REAR_IN</td></tr>
<tr><td>3</td><td>CVBS_FRONT_IN</td></tr>
<tr><td>4</td><td>C_REAR_IN</td></tr>
<tr><td>5</td><td>Y_REAR_IN</td></tr>
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<tr><td>7</td><td>C_FRONT_IN</td></tr>
<tr><td>8</td><td>AL_REAR_IN</td></tr>
<tr><td>9</td><td>AL_FRONT_IN</td></tr>
<tr><td>10</td><td>AR_FRONT_IN</td></tr>
<tr><td>11</td><td>AR_REAR_IN</td></tr>
<tr><td>12</td><td>SIF_TUNER_IN</td></tr>
</table>
</td></tr>
</table>

Error	Number	Description
	60400	Selecting the input of the VIP succeeded
	60401	The user provided wrong input
	60402	The VIP was not accessible
	60403	An unsupported VIP was found
Example	DS:> 604 1 060400: Test OK @	

Digital Video Input Output Circuit (DVIO)

Nucleus Name	**DS_DVIO_LinkDevTypeGet**	
Nucleus Number	700	
Description	Get the device (revision) type information of the 1394 Link layer IC	
Technical	- Initialise the PIO pins on the Codec - Read out the ID register	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	70000	Getting the information from the link layer IC succeeded
	70001	Getting the information from the link layer IC failed
	70002	Type not according to type stored in HW diversity string
Example	DS:> 700 070000: Device type of the link layer IC: ffc00301 Test OK @	

Nucleus Name	**DS_DVIO_PhyDevTypeGet**	
Nucleus Number	701	
Description	Get the device (revision) type information of the 1394 Physical layer IC	
Technical	- Initialise the PIO pins of the Codec - Write the PHY-access register in the Link chip to indicate phy read access - Wait until the link chip has obtained the value from the phy-chip - Read this out and filter the data to be returned to the user	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	70100	Getting the information from the physical layer IC succeeded
	70101	The physical layer IC was not accessible
	70102	Getting the information from the physical layer IC failed
	70103	Type not according to type stored in HW diversity
Example	DS:> 701 070100: Physical layer IC: VendorID: 0x006037, ProductID: 0x412801 Test OK @	

Nucleus Name	**DS_DVIO_LinkCommunication**	
Nucleus Number	702	
Description	Check the accessibility of the 1394 Link layer IC by writing to and reading from a specific address	
Technical	- Initialise the PIO pins of the Codec - Write a pattern to the CYCTM register of the link chip - Read back and verify the pattern	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	70200	Communicating with the link layer IC succeeded
	70201	Communicating with the link layer IC failed
	70202	Result of nucleus not according to HW diversity string
Example	DS:> 702 070200: Test OK @	

Nucleus Name	**DS_DVIO_PhyCommunication**	
Nucleus Number	703	
Description	Check the accessibility of the 1394 Physical layer IC by writing to and reading from a specific address	
Technical	- Initialise the PIO pins of the Codec - Initialise IIC - Write the data to be written to the PHY-chip to the link chip first - Wait until the link chip indicates that the data has been written to the PHY - Write the PHY-access register in the Link chip to indicate PHY read access - Wait until the link chip has obtained the value from the PHY-chip - Test whether the value read back equals the one previously written	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	70300	Communicating with the physical layer IC succeeded
	70301	The physical layer IC was not accessible
	70302	Communicating with the physical layer IC failed
	70303	Result of nucleus not according to HW diversity string

Example	`DS:> 703`
	`070300:`
	`Test OK @`	

Nucleus Name	**DS_DVIO_Routing**	
Nucleus Number	704	
Description	Route a DV stream containing an audio and video signal through the physical and link layer ICs to the Codec. This test works for both NTSC and PAL.	
Technical	- Initialise the DMA to transfer 5 frames PAL/NTSC - Initialise the DV de-multiplexer - Initialise the 1394 interface and start reception of the DV stream - Check whether the stream was copied to memory properly by the byte input interface (port to memory type DMA)	
Execution Time	6-10 seconds (6 when OK, 10 when no stream or error)	
User Input	None	
Error	Number	Description
	70400	Routing the signals succeeded
	70401	The 1394 link chip could not be initialised properly
	70402	There was a syntax error in the DV stream
	70403	DMA could not copy DV stream to memory. Stream connected?
	70404	DMA not working properly

Example	`DS:> 704`
	`070400:`
	`Test OK @`	

Nucleus Name	**DS_DVIO_DetectNode**	
Nucleus Number	705	
Description	Check whether a DV node can be detected by the hardware. This test works for both NTSC and PAL.	
Technical	- Initialise the 1394 interface - Detect whether a node is in range	
Execution Time	3 or 5 seconds (3 when OK, 5 when no stream or error)	
User Input	None	
Error	Number	Description
	70500	The node was detected OK
	70501	The 1394 link chip could not be initialised properly
	70502	Unable to write to 1394 PHY chip
	70503	Unable to read from 1394 PHY chip
	70504	No node was detected

Example	`DS:> 705`
	`070500:`
	`Test OK @`	

Nucleus Name	**DS_DVIO_DetectStream**	
Nucleus Number	706	
Description	Check whether a DV stream can be detected by the hardware. This test works for both NTSC and PAL.	
Technical	- Initialise the 1394 interface - Start receiving the stream - Detect whether the stream is OK	
Execution Time	3 or 5 seconds (3 when OK, 5 when no stream or error)	
User Input	None	
Error	Number	Description
	70600	The stream was detected
	70601	The 1394 link chip could not be initialised properly
	70602	No stream detected

Example	`DS:> 706`
	`070600:`
	`Test OK @`	

Progressive Scan Circuit (PSCAN)

Nucleus Name	**DS_PSCAN_DevTypeGet**	
Nucleus Number	800	
Description	Get the device (revision) type information of the progressive scan ic.	
Technical	- Initialise the progressive scan ic. - Try to read the version register of the progressive scan ic.	
Execution Time	1 second	
User Input	None	
Error	Number	Description
	80000	Everything went well.
	80001	The communication with the device failed
	80002	No chip was expected

Example	`DS:> 800`
	`080000:`
	`Chip name : 2300`
	`Chip version : 1`
	`Test OK @`	

	`DS:> 800`
	`080000:`
	`Chip name : ADV7196`
	`Test OK @`	

	`DS:> 800`
	`080000:`
	`Chip name : ADV7302`
	`Test OK @`	

Nucleus Name	**DS_PSCAN_Communication**	
Nucleus Number	801	
Description	Check the communication between the IIC controller of the Codec and the progressive scan IC	
Technical	- Initialise IIC - Write data to a register of the progressive scan ic through IIC	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	80100	Communicating with the progressive scan ic succeeded
	80101	The IIC bus was not accessible
	80102	There was a timeout reading the device
	80103	The IIC acknowledge was not received
	80104	Communicating with the progressive scan ic failed
	80105	The initialisation of the IIC bus failed
	80106	The read data is not the same as the written data
	80107	No chip was expected

Example	`DS:> 801`
	`080100:`
	`Test OK @`	

Nucleus Name	**DS_PSCAN_TestImageOn**	
Nucleus Number	802	
Description	Generate the test images that are present on the progressive scan IC.	
Technical	- Determine whether the user wanted a HATCH or a FRAME image pattern - Initialise the PIO pins of the Codec - Initialise IIC - Reset the DENC - Enable the 27Mhz clock - Send all settings for the pattern to the DENC through IIC	
Execution Time	Less than 1 second	
User Input	In case of ADV7196: When no input is given “HATCH” is the default -“HATCH” -“FRAME” Remark: “HATCH” is a crosshatch test pattern (horizontal and vertical white lines are displayed against a black background) “FRAME” is a uniform coloured frame/field test pattern (default white). In case of FLI2300: Nothing.	
Error	Number	Description
	80200	The generation of the test image succeeded
	80201	Unable to initialise PSCAN IC
	80202	Unable to reset DENC
	80203	Unable to generate image
	80204	No chip was expected

Example	`DS:> 802 HATCH`
	`080200:`
	`Test OK @`	

Nucleus Name	**DS_PSCAN_TestImageOff**	
Nucleus Number	803	
Description	Switch off the generated test image	
Technical	- Initialise IIC - Send the default DENC settings to the DENC through IIC	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	80300	Turning off the test image succeeded
	80301	Unable to initialise PSCAN IC
	80302	IIC Error during writing PSCAN IC
	80303	No chip was expected

Example	`DS:> 803`
	`080300:`
	`Test OK @`	

Nucleus Name	**DS_PSCAN_TestImageColourSettingsSet**	
Nucleus Number	804	
Description	Set the colour of the hatch- or the frame- field to a different value than the default white	
Technical	- Determine which colour must be set. - Initialise IIC. - Enable 27 MHz PSCAN Clock. - Send all settings to the DENC through IIC.	
Execution Time	Less than 1 second.	
User Input	A colour string of one of the next non-case sensitive strings (WHITE, BLACK, RED, GREEN, BLUE, YELLOW, CYAN, MAGENTA) or Y Cr Cb (hexa-) decimal values.	
Error	Number	Description
	80400	Setting the new colour-settings succeeded
	80401	The user provided wrong input
	80402	Unable to initialise PSCAN IC
	80403	Unable to set colour
	80404	No chip was expected

Example	`DS:> 804 yellow`
	`080400:`
	`Test OK @`
	
	`DS:> 804 0x6a 0xde 0xca`
	`080400:`
	`Test OK @`	

Nucleus Name	**DS_PSCAN_TestImageColourSettingsGet**	
Nucleus Number	805	
Description	Get the colour settings of the hatch- or the frame- field.	
Technical	- Initialise IIC. - Read the colour settings from the DENC through IIC.	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	80500	Getting the colour-settings succeeded
	80501	The progressive scan DENC-IC was not accessible through IIC
	80502	Unable to get colour
	80503	No chip was expected

Example	`DS:> 805`
	`080500: Colour Y Cr Cb values: 0xD2 0x92 0x10`
	`Test OK @`	

Nucleus Name	**DS_PSCAN_Routing**	
Nucleus Number	806	
Description	Route a video signal from the codec host processor through the progressive scan ICs to the progressive scan output of the set. **Note**: To route the progressive scan to the output of the set, first call the nucleus to do the video routing on the analogue (part of the) board.	
Technical	- Initialise the PIO pins of the codec - Initialise IIC - Reset the DENC - Enable the 27Mhz clock - Send all settings to the DENC through IIC.	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	80600	Routing path is created successfully.
	80601	Unable to initialise the Codec.
	80602	Unable to access DENC
	80603	Unable to access de-interlacer.
	80604	Wrong chips were expected.

Example	`DS:> 806`
	`080600:`
	`Test OK @`	

Nucleus Name	**DS_PSCAN_DevTypeGetDeinterlacer**
Nucleus Number	807
Description	See nucleus 800.
Example	DS:> 807 080700: Chip name : 2300 Chip version : 1 Test OK @

Nucleus Name	**DS_PSCAN_CommunicationDeinterlacer**
Nucleus Number	808
Description	See nucleus 801.
Example	DS:> 808 080800: Test OK @

Basic Engine (BE)

Nucleus Name	**DS_BE_CommunicationEcho**	
Nucleus Number	900	
Description	Check the communication between the digital board and the basic engine by issuing an *echo* command	
Technical	- Check if an AV2 or AV3 is connected - In case of an AV2 Check the communication between the digital board and the basic engine by issuing an *echo* command over the S2B interface - Check if the BE returned the string 0x00 0xAA 0x55 - In case of an AV3 send an ATAPI TEST_UNIT_READY command	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	90000	Communicating with the BE over the S2B interface succeeded
	90001	There was a time-out while communicating
	90002	The Basic Engine returned an unexpected result
	90003	The Basic Engine returned an error code
	90004	No acknowledge received from BE
	90005	Communicating with the Basic Engine failed
	90006	Echo check failed, no echo received
	90007	Echo check failed, received wrong pattern
Example	DS:> 900 090000: Test OK @	

Nucleus Name	**DS_BE_Reset**	
Nucleus Number	901	
Description	Reset the basic engine	
Technical	- Check if an AV2 or AV3 is connected - In case of an AV2 Toggle the reset pin of the I2S interface - In case of an AV3 Toggle the reset pin of the IDE interface	
Execution Time	2 seconds on AV2 9 seconds on AV3 (when disc inside)	
User Input	None	
Error	Number	Description
	90100	Resetting the Basic Engine succeeded
	90101	Resetting the Basic Engine failed
Example	DS:> 901 090100: Test OK @	

Nucleus Name	**DS_BE_GetSelftestResult**	
Nucleus Number	902	
Description	Return the self-test results through the service port	
Technical	- Check if an AV2 or AV3 is connected - In case of an AV2 Send the S2B GET_SELF_TEST_RESULT command - In case of an AV3 Send the ATAPI REPORT_DRIVE_DIAGNOSTICS command - On error display the specific error codes received from the BE	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	90200	Self test succeeded, no errors
	90201	There was a time-out while communicating
	90202	The Basic Engine returned an unexpected result
	90203	The BE returned an error code
	90204	No acknowledge received from BE
	90205	Communicating with the Basic Engine failed
	90206	Basic Engine returned no info
	90207	Self test failed, errors are echoed

Example	`DS:> 902`
	`090200:`
	`Self-test result byte : 00000000`
	`Self-test result byte : 00000000`
	`Self-test result byte : 00000000`
	`Test OK @`	

Nucleus Name	**DS_BE_VersionGet**	
Nucleus Number	903	
Description	Get the version of the basic engine and that of the optical unit	
Technical	- Check if an AV2 or AV3 is connected - In case of an AV2 send the S2B GET_VERSION_NUMBER command - In case of an AV3 send the ATAPI INQUIRY command - Send the GET_OPU_VERSION command - Display the returned version information	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	90300	BE version OK
	90301	There was a time-out while communicating
	90302	The Basic Engine returned an unexpected result
	90303	The BE returned an error code
	90304	No acknowledge received from BE
	90305	Communicating with the Basic Engine failed
	90306	The BE returned no info

Example (AV2)	`DS:> 903`
	090300: BE version = 20.09.18 Optical unit version = 3C.00.09.41.08
	`Test OK @`	

Example (AV3)	`DS:> 903`
	`090300:`
	`BE version = 31.30.24. PHILIPS ,VAD8031`
	`,31302400,REL_8031_313024 2073,`
	`Optical unit version = 00.06.82.19.00`
	`Test OK @`	

Nucleus Name	**DS_BE_TrayOut**	
Nucleus Number	904	
Description	Open the tray of the basic engine	
Technical	- Check if an AV2 or AV3 is connected - In case of an AV2 Send the S2B TRAY_OUT command - In case of an AV3 send an ATAPI START_STOP_UNIT command	
Execution Time	Approximately 2 seconds	
User Input	None	
Error	Number	Description
	90400	The command executed successfully
	90401	There was a time-out while communicating
	90402	The Basic Engine returned an unexpected result
	90403	The BE returned an error code
	90404	No acknowledge received from BE
	90405	Unable to enter normal mode
	90406	Communicating with the Basic Engine failed

Example	`DS:> 904`
	`090400:`
	`Test OK @`	

Nucleus Name	**DS_BE_TrayIn**	
Nucleus Number	905	
Description	Close the tray of the basic engine	
Technical	- Check if an AV2 or AV3 is connected - Send the S2B TRAY_IN command - In case of an AV3 send an ATAPI START_STOP_UNIT command	
Execution Time	Approximately 1 - 2 seconds	
User Input	None	
Error	Number	Description
	90500	The command executed successfully
	90501	There was a time-out while communicating
	90502	The Basic Engine returned an unexpected result
	90503	The BE returned an error code
	90504	No acknowledge received from BE
	90505	Unable to enter normal mode
	90506	Communicating with the Basic Engine failed

Example	`DS:> 905`
	`090500:`
	`Test OK @`	

Nucleus Name	**DS_BE_WriteReadDvdRw**	
Nucleus Number	906	
Description	Write data to and read data from a DVD+RW disc through the basic engine for verification of the writing	
Technical	- Check if an AV2 or AV3 is connected - Execute DS_BE_GetSelftestResults - Send the TRAY_IN command - Send the READ_TOC command - Generate a random disc location - Generate test data to write to the DVD+RW - In case of an AV2 Transfer the test data to the disc location using DMA - In case of an AV3 Transfer the test data to the disc location using PIO mode ATAPI WRITE_10 - In case of an AV2 Read back the data from disc using DMA - In case of an AV3 Transfer the test data to the disc location using PIO mode ATAPI READ_10 - Compare the two data areas and check whether the areas are equal	
Execution Time	Approximately 20 seconds	
User Input	None	
Error	Number	Description
	90600	The command executed successfully
	90601	This nucleus cannot be executed because the Self-Test failed
	90602	The BE cannot enter normal operating mode
	90603	Unable to send the tray in
	90604	Unable to read TOC from disc
	90605	Invalid disc is loaded, please insert a DVD+RW disc
	90606	Writing the test pattern to DVD+RW failed
	90607	Reading back the test pattern from DVD+RW failed
	90608	Compare check failed
	90609	Calibrating DVD+RW failed

Example	`DS:> 906`
	`090600: Testing on sector 0x5dbe0: OK`
	`Test OK @`	

Nucleus Name	**DS_BE_WriteReadDvdR**	
Nucleus Number	907	
Description	Write data to and read data from a DVD+R disc through the basic engine for verification of the writing	
Technical	- Check if an AV2 or AV3 is connected - Execute DS_BE_GetSelftestResults - Send the TRAY_IN command - Send the READ_TOC command - Use the OPC area to test if the DVD+R is (still) writable - Generate test data to write to the DVD+R - In case of an AV2 Transfer the test data to the disc location using DMA - In case of an AV3 Transfer the test data to the disc location using PIO mode ATAPI WRITE_10 - In case of an AV2 Read back the data from disc using DMA - In case of an AV3 Transfer the test data to the disc location using PIO mode ATAPI READ_10 - Compare the two data areas and check whether the areas are equal	
Execution Time	Approximately 20 seconds	
User Input	None	
Error	Number	Description
	90700	The command executed successfully
	90701	This nucleus cannot be executed because the Self-Test failed
	90702	The BE cannot enter normal operating mode
	90703	Unable to send the tray in
	90704	Unable to read TOC from disc
	90705	Invalid disc is loaded, please insert a DVD+RW disc
	90706	Unable to write, the DVD+R disc is full
	90707	No writable DVD+R sector found
	90708	Writing the test pattern to DVD failed
	90709	Reading back the test pattern from DVD failed
	90710	Compare check failed

Example	`DS:> 907`
	`090700: Testing on sector 0x36210: OK`
	`Test OK @`	

Note:	**Not for ATAPI based drives!** **Command may not work for ATAPI based drives!**	
Nucleus Name	**DS_BE_StatisticalInformationGet**	
Nucleus Number	908	
Description	Retrieve the statistical information from the basic engine	
Technical	- Check if an AV2 or AV3 is connected - In case of an AV2 Send the S2B GET_STATISTICAL_INFO command - In case of an AV3 Send the transparent BIT engine GET_STATISTICAL_INFO command - Display the info returned from the BE	
Execution Time	Less than 1 second on AV2 2 seconds on AV3	
User Input	None	
Error	Number	Description
	90800	The command executed successfully
	90801	There was a time-out while communicating
	90802	The Basic Engine returned an unexpected result
	90803	The BE returned an error code
	90804	No acknowledge received from BE
	90805	Communicating with the Basic Engine failed
	90806	The BE returned no info
Example (AV2)	DS:> 908 Number of times Tray went Open/Closed : 4 Total minutes the CD laser was on : 0 Total minutes the DVD laser was on : 0 Total minutes the write laser was on : 0 090800: Test OK @	
Example (AV3)	DS:> 908 Number of times Tray went Open/Closed 4 Total time the power power on (HR:MIN) 0:0h Total time of reading CDROM discs (HR:MIN) 0:0h Total time of reading high speed CD-R discs (HR:MIN) 0:0h Total time of reading other CD-R discs (HR:MIN) 0:0h Total time of reading high speed CD-RW discs (HR:MIN) 0:0h Total time of reading other CD-RW discs (HR:MIN) 0:0h Total time of reading high speed DVD SL discs (HR:MIN) 0:0h Total time of reading other DVD SL discs (HR:MIN) 0:0h Total time of reading high speed DVD DL discs (HR:MIN) 0:0h Total time of reading other DVD DL discs (HR:MIN) 0:0h Total time of reading high speed DVD+R discs (HR:MIN) 0:0h Total time of reading other DVD+R discs (HR:MIN) 0:2h Total time of reading high speed DVD+RW discs (HR:MIN) 0:0h Total time of reading other DVD+RW discs (HR:MIN) 0:35h Total time of writing DVD+R discs at 2.4 x (HR:MIN) 0:0h Total time of writing DVD+R discs at 4 x (HR:MIN) 0:0h Total time of writing DVD+RW discs at 2.4 x (HR:MIN) 0:0h Total time of writing DVD+RW discs at 4 x (HR:MIN) 0:0h 090800: Test OK @	

Note:	**Not for ATAPI based drives!** **Command may not work for ATAPI based drives!**	
Nucleus Name	**DS_BE_StatisticalInformationReSet**	
Nucleus Number	909	
Description	Reset the statistical information in the basic engine	

Technical	- Check if an AV2 or AV3 is connected
	- In case of an AV2
	  - Send the S2B RESET_STATISTICAL_INFO command
	  - Send the S2B POWER_DOWN command
	  - Toggle the reset pin of the I2S interface
	- In case of an AV3 Send the transparent BIT engine RESET_STATISTICAL_INFO command	

Execution Time	2 seconds	
User Input	None	
Error	Number	Description
	90900	The command executed successfully
	90901	There was a time-out while communicating
	90902	The Basic Engine returned an unexpected result
	90903	The BE returned an error code
	90904	No acknowledge received from BE
	90905	Communicating with the Basic Engine failed
Example	DS:> 909 090900: Test OK @	

Note:	**Not for ATAPI based drives!** **Command may not work for ATAPI based drives!**	
Nucleus Name	**DS_BE_ErrorLogGet**	
Nucleus Number	910	
Description	Get the error log from the basic engine	
Technical	- Check if an AV2 or AV3 is connected - In case of an AV2 Send the S2B GET_ERROR command - In case of an AV3 Send the transparent BIT engine GET_ERROR and GET_FATAL commands - Display the returned info	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	91000	The command executed successfully
	91001	There was a time-out while communicating
	91002	The Basic Engine returned an unexpected result
	91003	The BE returned an error code
	91004	No acknowledge received from BE
	91005	Communicating with the Basic Engine failed
	91006	The BE returned no info
Example (AV2)	DS:> 910 Momentary errors (Byte 1 - Byte 7) : 0x00 0x00 0x00 0x00 0x00 0x00 0x00 Cumulative errors (Byte 1 - Byte 7) : 0x00 0x00 0x00 0x20 0x00 0x00 0x00 Fatal errors (Oldest - Youngest) : 0x00 0x00 0x00 0x00 0x00 091000: Test OK @	
Example (AV3)	DS:> 910 Momentary errors (0-9): 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 Cumulative errors (1-9) : 0x00 0x80 0x20 0x00 0x00 0x00 0x00 0x00 0x00 Software fatal assert : 799 engineproxy.cpp 091000: Test OK @	

Note:	**Not for ATAPI based drives!** **Command may not work for ATAPI based drives!**	
Nucleus Name	**DS_BE_ErrorLogReset**	
Nucleus Number	911	
Description	Reset the error log in the basic engine	

Technical	- Check if an AV2 or AV3 is connected
	- In case of an AV2
	  - Send theS2B RESET_STATISTICAL_INFO command
	  - Send the S2B POWER_DOWN command
	  - Toggle the reset pin of the I2S interface
	- In case of an AV3 Send the transparent BIT engine RESET_STATISTICAL_INFO command	

Execution Time	2 seconds	
User Input	None	
Error	Number	Description
	91100	The command executed successfully
	91101	There was a time-out while communicating
	91102	The Basic Engine returned an unexpected result
	91103	The BE returned an error code
	91104	No acknowledge received from BE
	91105	Communicating with the Basic Engine failed

Example	`DS:> 911`
	`091100:`
	`Test OK @`	

Nucleus Name	**DS_BE_JitterOptimise**	
Nucleus Number	912	
Description	Perform jitter optimisation: A formatted DVD must be loaded into the engine before executing this nucleus	

Technical	- Check if an AV2 or AV3 is connected
	- Send the TRAY_IN command
	- Send the READ_TOC command
	- In case of an AV2
	  - Send the JITTER_COMMAND command with parameter 0x00 0x00
	  - Send the JITTER_COMMAND command with parameter 0x00 0x01
	  - Send the JITTER_COMMAND command with parameter 0x00 0x02 until offset 0x80 is received
	- In case of an AV3 Send the MEASURE_JITTER_BLER_PPN command and display the average jitter and bler values	

Execution Time	Approximately 20 seconds	
User Input	None	
Error	Number	Description
	91200	Optimising jitter succeeded
	91201	There was a time-out while communicating
	91202	The Basic Engine returned an unexpected result
	91203	The Basic Engine returned an error code
	91204	No acknowledge received from BE
	91205	Unable to send tray in
	91206	Unable to read the disc
	91207	No disc is loaded
	91208	Unknown disc is loaded
	91209	Unable to enter service mode

Example (AV2)	`DS:> 912`
	`091200: Jitter bathtub: (-42,135)(-40,127)(-38,106)(-36,106)(-34,101)(-32,97)(-30,92)(-28,92)(-26,92)(-24,92)(-22,86)(-20,80)(-18,86)(-16,86)(-14,80)(-12,80)(-10,80)(-8,80)(-6,80)(-4,86)(-2,86)(0,86)(2,86)(4,92)(6,92)(8,101)(10,106)(12,111)(14,120)(16,123)(18,127)(20,142)`
	`Test OK @`	

Example (AV3)	`DS:> 912`
	`091200: Average Jitter, Bler C1, Bler C2: (92,4,254)`
	`Test OK @`	

Note:	**Not for ATAPI based drives!** **Command may not work for ATAPI based drives!**	
Nucleus Name	**DS_BE_FocusOn**	
Nucleus Number	913	
Description	Put the laser of the BE into focus	
Technical	- Check if an AV2 or AV3 is connected - In case of an AV2 Send the FOCUS command with parameter 0x01 - In case of an AV3 Send the transparent BIT engine FOCUS command	
Execution Time	3 seconds	
User Input	None	
Error	Number	Description
	91300	Focus on succeeded
	91301	There was a time-out while communicating
	91302	The Basic Engine returned an unexpected result
	91303	The BE returned an error code
	91304	No acknowledge received from BE
	91305	Communicating with the Basic Engine failed
	91306	Unable to enter service mode

Example	`DS:> 913`
	`091300:`
	`Test OK @`	

Note:	**Not for ATAPI based drives!** **Command may not work for ATAPI based drives!**	
Nucleus Name	**DS_BE_FocusOff**	
Nucleus Number	914	
Description	Turn off putting the laser of the BE into focus	
Technical	- Check if an AV2 or AV3 is connected - In case of an AV2 Send the FOCUS command with parameter 0x00 - In case of an AV3 Send the transparent BIT engine FOCUS command	
Execution Time	Less than 1 second on AV2 2 seconds on AV3	
User Input	None	
Error	Number	Description
	91400	Focus off succeeded
	91401	There was a time-out while communicating
	91402	The Basic Engine returned an unexpected result
	91403	The BE returned an error code
	91404	No acknowledge received from BE
	91405	Communicating with the Basic Engine failed
	91406	Unable to enter service mode

Example	`DS:> 914`
	`091400:`
	`Test OK @`	

Nucleus Name	**DS_BE_MotorOn**	
Nucleus Number	915	
Description	Turn on the turntable motor	
Technical	- Check if an AV2 or AV3 is connected - In case of an AV2 Send the TURN_TABLE_MOTOR_ON command - In case of an AV3 Send the transparent BIT engine TTM command	
Execution Time	Less than 1 second on AV2 4 seconds on AV3	
User Input	None	
Error	Number	Description
	91500	Turn table motor is on
	91501	There was a time-out while communicating
	91502	The Basic Engine returned an unexpected result
	91503	The BE returned an error code
	91504	No acknowledge received from BE
	91505	Communicating with the Basic Engine failed
	91506	Unable to enter service mode

Example	`DS:> 915`
	`091500:`
	`Test OK @`	

Nucleus Name	**DS_BE_MotorOff**	
Nucleus Number	916	
Description	Turn off the turntable motor	
Technical	- Check if an AV2 or AV3 is connected - In case of an AV2 Send the TURN_TABLE_MOTOR_OFF command - In case of an AV3 Send the transparent BIT engine TTM command	
Execution Time	Less than 1 second on AV2 4 seconds on AV3	
User Input	None	
Error	Number	Description
	91600	Turn table motor is off
	91601	There was a time-out while communicating
	91602	The Basic Engine returned an unexpected result
	91603	The BE returned an error code
	91604	No acknowledge received from BE
	91605	Communicating with the Basic Engine failed
	91606	Unable to enter service mode

Example	`DS:> 916`
	`091600:`
	`Test OK @`	

Nucleus Name	**DS_BE_Tilt**	
Nucleus Number	920	
Description	Test the tilt mechanism control loop, or allow its proper functioning to be measured. Before executing this nucleus a non-empty disc must be loaded in the recorder	

Technical	- Check if an AV2 or AV3 is connected
	- In case of an AV2
	  - Send the TRAY_IN command
	  - Send the READ_TOC command
	  - Send the TILT_COMMAND command with parameter 0x00 0x00
	  - Send the TILT_COMMAND command with parameter 0x00 0x01
	  - Send the TILT_COMMAND command with parameter 0x00 0x02
	- In case of an AV3 display a “not supported” message	

Execution Time	Approximately 15 seconds	
User Input	None	
Error	Number	Description
	92000	The command executed successfully
	92001	There was a time-out while communicating
	92002	The Basic Engine returned an unexpected result
	92003	The Basic Engine returned an error code
	92004	No acknowledge received from BE
	92005	Unable to send tray in
	92006	Unable to read the disc
	92007	No disc is loaded
	92008	Unknown disc is loaded
	92009	Unable to enter service mode
	92010	This nucleus is not supported by the engine

Example (AV2)	`DS:> 920`
	`092000: Tilt sensor bathtub: (71,-12,145)(68,-12,135)(62,-10,120)(56,-92,97)(50,-75,86)(44,-59,80)(41,-52,80)(35,-37,86)(29,-22,86)(23,-7,92)(17,8,111)(11,23,135)(8,31,138)(5,39,158)`
	`Test OK @`	

Example (AV3)	`DS:> 920`
	`092010: Tilt function is not supported by the engine`
	`Error @`	

Nucleus Name	**DS_BE_CheckDisc**	
Nucleus Number	921	
Description	Check whether there is a disc inside the BE	
Technical	- Send the TRAY_IN command - Send the READ_TOC command - Display the Disc type info - If Disc type is a DVD+R(W), then read ADIP info. - Display manufacturer and media type.	
Execution Time	Approximately 10 seconds	
User Input	None	
Error	Number	Description
	92100	There was a disc inside the set
	92101	Unable to load the tray
	92102	Error received from BE
Example	DS:> 921 092100: Disc type: DVD+RW disc Disc manufacturer id: PHILIPS Media type id: 010 Test OK @ DS:> 921 090500: Disc type: None Test OK @ DS:> 921 092100: Disc type: DVD+R disc Disc manufacturer id: RICOHJPN Media type id: R00 Test OK @	

Nucleus Name	**DS_BE_SledgeMotor**	
Nucleus Number	922	
Description	Send the sledge to its home position, then to the middle of the disc, and then to the end.	
Technical	- Send the PCS_COMMAND command with parameter 0x03 0x00 - Send the PCS_COMMAND command with parameter 0x02 0x00 - Send the PCS_COMMAND command with parameter 0x00 0x01 - Send the PCS_JUMP_SLEGE_STEPS command for 3 times - Send the PCS_COMMAND command with parameter 0x00 0x00	
Execution Time	4 seconds on AV2 11 seconds on AV3	
User Input	None	
Error	Number	Description
	92200	The command executed successfully
	92201	There was a time-out while communicating
	92202	The Basic Engine returned an unexpected result
	92203	The BE returned an error code
	92204	No acknowledge received from BE
	92205	Communicating with the Basic Engine failed
	92206	Unable to enter service mode
Example	DS:> 922 092200: Test OK @	

Nucleus Name	**DS_BE_ReadTocInfo**	
Nucleus Number	924	
Description	Read the TOC from the disc. This gives a good indication if the BE works properly.	
Technical	- Send the TRAY_IN command - Send the READ_TOC command - Display the TOC info.	
Execution Time	Approximately 10 seconds	
User Input	None	
Error	Number	Description
	92400	A disc is loaded, TOC info if echoed
	92401	Unable to load the tray
	92402	The BE has not returned TOC info
	92403	Error received from BE
Example	DS:> 924 092400: TOC info [hex] = 91 3A 0C Test OK @ DS:> 924 092403: The BE returned: 0x10 #{no_disc_error} No disc is detected Error @ DS:> 924 092403: The BE returned: 0x1e #{illegal_medium_error} Engine unable to handle current disc. Probably illegal medium. Error @	

Nucleus Name	**DS_BE_DiscErase**	
Nucleus Number	925	
Description	Perform a DC-erase on a DVD+RW disc.	

Technical	- Check if an AV2 or AV3 is connected
	- In case of an AV2
	  - Execute DS_BE_GetSelftestResults
	  - Send the TRAY_IN command
	  - Send the READ_TOC command
	  - Send the SET_INPUT_TYPE command with parameter DC_ERASE
	  - Overwrite the header of the DVD+RW disc with DC erase data.
	  - Send the SET_INPUT_TYPE command with parameter NORMAL.
	- In case of an AV3 display a “not supported” message	

Execution Time	Approximately 1:15 minute	
User Input	None	
Error	Number	Description
	92500	A DVD+RW disc is erased
	92501	This nucleus cannot be executed because the Self-Test failed
	92502	The BE cannot enter normal operating mode
	92503	Unable to send the tray in
	92504	Unable to read TOC from disc
	92505	Invalid disc is loaded, please insert a DVD+RW disc
	92506	Calibrating DVD+RW failed
	92507	Set Input Type command failed
	92508	Erasing the DVD+RW disc failed
	92509	Erasing is aborted by user
	92510	This nucleus is not supported by the engine
Example (AV2)	DS:> 925 The entirely disc will be erased. Are you sure you want this?[y/n] 092500: Test OK @	
Example (AV3)	092510: This nucleus is not supported by the engine Error @	

Nucleus Name	**DS_BE_RegionCodeSet**	
Nucleus Number	928	
Description	Set the region code in the AV3.	
Technical	- Check if an AV2 or AV3 is connected - In case of anAV2 display a “not supported” message - In case of an AV3 send the ATAPI SEND_KEY command	
Execution Time		
User Input	Region code	
Error	Number	Description
	92800	The command executed successfully
	92801	There was a time-out while communicating
	92802	The Basic Engine returned an unexpected result
	92803	The BE returned an error code
	92804	No acknowledge received from BE
	92805	Communicating with the Basic Engine failed
	92806	No disc is present, please insert disc
	92807	Region code out of range
	92808	User input wrong
	92809	Region counter expired
	92810	This nucleus is not supported by the engine

Example (AV2)	`DS:> 928`
	`092810: This nucleus is not supported by the engine`
	`Error @`	

Example (AV2)	`DS:> 928 1`
	`092800:`
	`Test OK @`	

Nucleus Name	**DS_BE_RegionCodeGet**	
Nucleus Number	929	
Description	Read the region code from the AV3.	
Technical	- Check if an AV2 or AV3 is connected - In case of an AV2 display a “not supported” message - In case of an AV3 send the ATAPI REPORT_KEY command	
Execution Time		
User Input	None	
Error	Number	Description
	92900	The command executed successfully
	92901	There was a time-out while communicating
	92902	The Basic Engine returned an unexpected result
	92903	The BE returned an error code
	92904	No acknowledge received from BE
	92905	Communicating with the Basic Engine failed
	92906	This nucleus is not supported by the engine

Example (AV2)	`DS:> 929`
	`092906: This nucleus is not supported by the engine`
	`Error @`	

Example (AV3)	`DS:> 929`
	`092900: DVD region 1`
	`Test OK @`	

Nucleus Name	**DS_BE_RegionCounterReset**	
Nucleus Number	930	
Description	Reset the region counter in the AV3.	
Technical	- Check if an AV2 or AV3 is connected - In case of an AV2 display a “not supported” message - In case of an AV3 send a special ATAPI RESET_REGION_COUNTER command	
Execution Time		
User Input	None	
Error	Number	Description
	93000	The command executed successfully
	93001	There was a time-out while communicating
	93002	The Basic Engine returned an unexpected result
	93003	The BE returned an error code
	93004	No acknowledge received from BE
	93005	Communicating with the Basic Engine failed
	93006	This nucleus is not supported by the engine

Example (AV2)	`DS:> 930`
	`093006: This nucleus is not supported by the engine`
	`Error @`	

Example (AV3)	`DS:> 930`
	`093000:`
	`Test OK @`	

Nucleus Name	**DS_BE_AdjustLaserControl**	
Nucleus Number	931	
Description	Adjust the DVD-M (with the OPU) with PCBA. (So adjusts the two PCBS to each other)	
Technical	- Check if an AV2 or AV3 is connected - In case of an AV2 display a “not supported” message - In case of an AV3 adjust the DVD-M (with the OPU) with PCBA by sending a S2B command to align the PCBs to each other.	
Execution Time	30 seconds	
User Input	None	
Error	Number	Description
	93100	The command executed successfully
	93101	There was a time-out while communicating
	93102	The Basic Engine returned an unexpected result
	93103	The BE returned an error code
	93104	No acknowledge received from BE
	93105	Communicating with the Basic Engine failed
	93106	Unable to enter service mode
	93107	This nucleus is not supported by the engine

Example (AV2)	`DS:> 931`
	`093107: This nucleus is not supported by the engine`
	`Error @`	

Example (AV3)	`DS:> 931`
	`093100:`
	`Test OK @`	

Nucleus Name	**DS_BE_WriteReadDvdRDualLayer**	
Nucleus Number	932	
Description	Write data to and read data from both layers of a DVD+R DL disc through the basic engine for verification of the writing	
Technical	- Send the TRAY_IN command - Send the READ_TOC command - Use READ_TRACK_INFORMATION to determine the next free writable address on Layer 0. - In case of address 0, reserve a track of 0x1FD800 sectors for Layer 0 - Use command SEND_OPC_INFORMATION to calibrate Layer 0 - Generate test data to write to the disc - Transfer the test data to Layer 0 using PIO mode ATAPI WRITE_12 - Use READ_TRACK_INFORMATION to determine the next free writable address on Layer 1 - Use command SEND_OPC_INFORMATION to calibrate Layer 1 - Transfer the test data to Layer 1 using PIO mode ATAPI WRITE_12 - Read back the data of Layer 0 using PIO mode ATAPI READ_12 - Compare the original data with the read data and check whether the areas are equal - Read back the data of Layer 1 using PIO mode ATAPI READ_12 - Compare the original data with the read data and check whether the areas are equal	
Execution Time	Approximately 30 seconds	
User Input	None	
Error	Number	Description
	93200	The command executed successfully
	93201	This nucleus cannot be executed because the Self-Test failed
	93202	The BE cannot enter normal operating mode
	93203	Unable to send the tray in
	93204	Unable to read TOC from disc
	93205	Invalid disc is loaded, please insert a DVD+R DL disc
	93206	Unable to write, the DVD+R DL disc is full
	93207	No writable sector found
	93208	Writing the test pattern to Layer 0 failed
	93209	Writing the test pattern to Layer 1 failed
	93210	Reading back the test pattern from Layer 0 failed
	93211	Reading back the test pattern from Layer 1 failed
	93212	Compare check for Layer 0 failed
	93213	Compare check for Layer 1 failed

Example	`DS:> 932`
	`093200: Dual Layer DVD+R test on LBA 0x750 and 0x1fdf60 OK`
	`Test OK @`	

System (SYS)

Nucleus Name	**DS_SYS_HardwareVersionGet**	
Nucleus Number	1200	
Description	Get the hardware version and type of the digital board	
Technical	- Initialise the PIO pins of the Codec - Read the segment header in FLASH and determine hardware version	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	120000	Getting the hardware version and type of the digital board succeeded
	120001	Getting the hardware version and type of the digital board failed
	120002	Wrong hardware version read from FLASH

Example	`DS:> 1200`
	`120000: Hardware ID = 0x29`
	`Test OK @`	

Nucleus Name	**DS_SYS_SoftwareVersionBootGet**	
Nucleus Number	1201	
Description	Get the version of the boot software on the digital board	
Technical	- Read the segment header in FLASH and determine Boot software version	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	120100	Getting the Boot software version succeeded
	120101	Getting the Boot software version failed

Example	`DS:> 1201`
	`120100: Software Boot Version = 0331`
	`Test OK @`	

Nucleus Name	**DS_SYS_SoftwareVersionDownloadGet**	
Nucleus Number	1202	
Description	Get the version of the download software on the digital board	
Technical	- Read the segment header in FLASH and determine Download software version	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	120200	Getting the Download software version succeeded
	120201	Getting the Download software version failed

Example	`DS:> 1202`
	`120200: Software Download Version = 0001`
	`Test OK @`	

Nucleus Name	**DS_SYS_SoftwareVersionApplGet**	
Nucleus Number	1203	
Description	Get the version of the application software on the digital board	
Technical	- Read the segment header in FLASH and determine Application software version	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	120300	Getting the Application software version succeeded
	120301	Getting the Application software version failed

Example	`DS:> 1203`
	`120300: Software Application Version = 0001`
	`Test OK @`	

Nucleus Name	**DS_SYS_SoftwareVersionDiagnosticsGet**	
Nucleus Number	1204	
Description	Get the version of the diagnostics software on the digital board	
Technical	- Read the segment header in FLASH and determine Diagnostics software version	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	120400	Getting the Diagnostics software version succeeded
	120401	Getting the Diagnostics software version failed

Example	`DS:> 1204`
	`120400: Software Diagnostics Version = 0001`
	`Test OK @`	

Nucleus Name	**DS_SYS_EepromUpload**	
Nucleus Number	1205	
Description	Upload the contents of the NVRAM on the analogue board or the digital board to the service PC, by using the X-modem protocol	
Technical	- Decode the user input - Determine whether to upload the analogue board or digital board NVRAM - Start uploading using the XMODEM protocol - Determine whether all was uploaded OK	
Execution Time	This depends on the chosen NVRAM and the User.	
User Input	Choose one of the following parameters for the nucleus: 1. Upload the contents of the NVRAM of the digital board 2. Upload the contents of the NVRAM of the analogue board Choose in the terminal on the control PC **-> transfer -> receive file**. Select **X-modem** protocol. Then click **receive** in the dialogue and fill in the file name in which you want to store the data. **Note**: If no analogue board NVRAM is in the product no user input is needed.	
Error	Number	Description
	120500	Download succeeded.
	120501	User input is not valid.
	120502	Something went wrong while copying the data from NVRAM to SDRAM .
	120503	Something went wrong while transferring the data.
	120504	User cancelled the upload.

Example	`DS:> 1205 1`
	`120500:`
	`Test OK @`	

Nucleus Name	**DS_SYS_EepromDownload**	
Nucleus Number	1206	
Description	Download a file with the contents of the NVRAM for the analogue board or the digital board from the service PC to the recorder, by using the X-modem protocol	
Technical	- Decode the user input and determine what EEPROM to fill: digital / analogue - Store the downloaded (using XMODEM) bytes in SDRAM first - Then copy these contents into the EEPROM after verification	
Execution Time	This depends on the chosen NVRAM and the User.	
User Input	Choose one of the following parameters for the nucleus: 1. Download the contents of the NVRAM of the digital board 2. Download the contents of the NVRAM of the analogue board Choose in the terminal of the control **PC -> transfer -> send file**. Select **X-modem** protocol. Then choose a file with the Browse button in the dialogue and click on **send**. **Note**: If no analogue board NVRAM is in the product no user input is needed.	
Error	Number	Description
	120600	Download succeeded
	120601	The write to NVRAM failed.
	120602	Timeout. Too many retries.
	120603	A file was sent with a wrong header.
	120604	User cancelled the download.
	120605	User input is not valid.
	120606	Unknown Error

Example	`DS:> 1206 1`
	`120600:`
	`Test OK @`	

Nucleus Name	**DS_SYS_DvIdNumberSet**	
Nucleus Number	1207	
Description	Set the IEEE 1394 unique ID	
Technical	- Decode the user input - Store the id (<b4><b3><b2><b1><b0>) into NVRAM (offset + <b4><b3><b2><b1><b0>) - Validate the segment of storage by updating the checksum	
Execution Time	Less than 1 second.	
User Input	The unique ID to be set.	
Error	Number	Description
	120700	Setting the unique DV ID succeeded
	120701	User input is not valid.
	120702	Setting the unique DV ID failed.
	120703	Write succeeded, but checksum is corrupt.

Example	`DS:> 1207 1234567890`
	`120700:`
	`Test OK @`	

Nucleus Name	**DS_SYS_DvIdNumberGet**	
Nucleus Number	1208	
Description	Get the IEEE1394 unique ID	
Technical	- Read out the ID from the configuration segment and return this info to the user	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	120800	Getting the unique DV ID succeeded
	120801	Getting the unique DV ID failed
	120802	Reading an unexpected section version in NVRAM

Example	`DS:> 1208`
	`120800: The DvIdNumber is: 1234567890`
	`Test OK @`	

Nucleus Name	**DS_SYS_IicWrite**	
Nucleus Number	1209	
Description	Perform an IIC write action on the digital board	
Technical	- Determine bus ID, slave address, number of bytes to be written and the byte array of data from the user input - Initialise IIC - Write the data to the slave specified through IIC	
Execution Time	Less than 1 second	
User Input	The user input the number of bytes to write followed by the bytes to write: <BusID><Slave address to write to><number of bytes to write><d1><d2><..><dx> Where the bus id is either 0 (normally used) or 1	
Error	Number	Description
	120900	Writing the data over IIC succeeded
	120901	The IIC bus was not accessible
	120902	There was a timeout writing to the device
	120903	The IIC acknowledge was not received
	120904	The communication with the device failed
	120905	Got unknown IIC bus error:
	120906	Unable to initialise IIC bus
	120907	Decoding bus ID unsigned value failed
	120908	Decoding slaveAddr unsigned value failed
	120909	Decoding nrBytes unsigned value failed
	120910	Bus ID out of range
	120911	nrBytes out of range
	120912	Unable to decode parameters

Example	`DS:> 1209 0 0xa0 1 0x6`
	`120900: 1 Bytes written`
	`Test OK @`	

Nucleus Name	**DS_SYS_IicRead**	
Nucleus Number	1210	
Description	Perform an IIC read action on the digital board	
Technical	- Determine the bus ID, slave address and number of bytes to read from the user input - Initialise IIC - Read the data form the slave specified	
Execution Time	Less than 1 second	
User Input	The user inputs the bus number, the address to read them from and the number of bytes to read: <BusID><Slave address to read from><Number of bytes to read> Where the bus id is either 0 (normally used) or 1	
Error	Number	Description
	121000	Reading the data over IIC succeeded
	121001	The IIC bus was not accessible
	121002	There was a timeout writing to the device
	121003	The IIC acknowledge was not received
	121004	The communication with the device failed
	121005	There was an unknown IIC bus error
	121006	IIC bus initialisation failed
	121007	Decoding bus ID unsigned value failed
	121008	Decoding slave address unsigned value failed
	121009	Decoding number of bytes unsigned value failed
	121010	Bus ID out of range
	121011	nrBytes out of range

Example	`DS:> 1210 0 0xa0 0x20`
	`Read :`
	`0x0000:  0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00`
	`0x0008:  0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00`
	`0x0010:  0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00`
	`0x0018:  0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00`
	
	`121000:  0 0xa0 0x20`
	`Test OK @`	

Nucleus Name	**DS_SYS_UartWrite**	
Nucleus Number	1211	
Description	Perform an UART write action on the digital board on a specified UART	
Technical	- Decode the user input for the proper port to use - Write out the bytes through the indicated port	
Execution Time	Less than 1 second.	
User Input	The user inputs the UART to write to, the number of bytes and the bytes to be written to the UART. 1=UART port 1 : not used 2=UART port 2 : Bit Engine 3=UART port 3 : Analogue board <UartNr><Number of bytes to write><d1><d2><..><dx>	
Error	Number	Description
	121100	Writing the bytes to the UART succeeded
	121101	The user provided wrong input
	121102	Writing to the UART failed

Example	`DS:> 1211 2 2 0xd1 0x01`
	`121100:`
	`Test OK @`	

Nucleus Name	**DS_SYS_UartRead**	
Nucleus Number	1212	
Description	Perform an UART read action on the digital board on a specified UART	
Technical	- Decode the user input for the port to read from - Read from the port and return data read to the user	
Execution Time	Less than 1 second.	
User Input	The user inputs the UART to read from. 1=UART port 1 : not used 2=UART port 2 : Bit Engine 3=UART port 3 : Analogue board <UartNr >	
Error	Number	Description
	121200	Reading the data from the UART succeeded
	121201	The user provided wrong input
	121202	Reading the data from the UART failed

Example	`DS:> 1212 2`
	`121200: The HEX value that was read is:  0x50 0xD1 0x00`
	`Test OK @`	

Nucleus Name	**DS_SYS_VideoLoopThroughStart**
Nucleus Number	1213
Description	The video signal, which is conform the user input, is routed from the input to the output. The input is set using the proper nucleus to route the signal on the board(s). All outputs are enabled.
Technical	- Decode the videosignal: PAL / NTSC and Y/C, RGB, CVBS,YUV - Initialise the Video Input Processor and check for valid signal - Initialise the Video Front End and start capturing frames to memory - Initialise the SYNC module - Initialise the Video Post Processing and retrieve frames from memory - Initialise the mixer - Initialise the DENC module - Route the signal to all outputs
Execution Time	Less than 1 second, but stays running.
Note:	When a DTT module is in the set use **DS_DTTM_SwitchCVBSPath** as well !

<table>
<tr><td>User Input</td><td colspan="2">
<vipInput> <VideoOutput> <VideoStandard>
1. vipInput (see table below).

GEN, OLAX, DXC, DTT specific
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<tr><td>CVBS</td><td>RGB</td><td>CVBS from analogue board</td></tr>
<tr><td>YC</td><td>YC</td><td>YC from analogue board</td></tr>
<tr><td>YUV</td><td>CVBS</td><td>YUV from analogue board</td></tr>
<tr><td>RGB</td><td>CVBS</td><td>RGB from analogue board</td></tr>
<tr><td>10</td><td>XPORT</td><td>Digital video from DTT module</td></tr>
</table>
OLAL22LITE specific
<table>
<tr><th>User input</th><th>Video input</th><th>Data path to VIP</th></tr>
<tr><td>R_CVBS</td><td>CVBS</td><td>Rear CVBS</td></tr>
<tr><td>F_CVBS</td><td>CVBS</td><td>Front CVBS</td></tr>
<tr><td>T_CVBS</td><td>CVBS</td><td>Tuner CVBS</td></tr>
<tr><td>R_YC</td><td>YC</td><td>Rear YC</td></tr>
<tr><td>F_YC</td><td>YC</td><td>Front YC</td></tr>
</table>
OLAL22PREMIER specific
<table>
<tr><th>User input</th><th>Video input</th><th>Data path to VIP</th></tr>
<tr><td>1</td><td>RGB</td><td>SCART aux RGB in</td></tr>
<tr><td>2</td><td>YC</td><td>SCART aux YC in</td></tr>
<tr><td>3</td><td>CVBS</td><td>SCART aux CVBS</td></tr>
<tr><td>4</td><td>CVBS</td><td>Tuner</td></tr>
<tr><td>5</td><td>YC</td><td>Front YC</td></tr>
<tr><td>6</td><td>CVBS</td><td>Front CVBS</td></tr>
<tr><td>7</td><td>CVBS</td><td>SCART TV CVBS</td></tr>
<tr><td>8</td><td>YC</td><td>CE mode YC in</td></tr>
<tr><td>9</td><td>CVBS</td><td>CE mode CVBS in</td></tr>
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OLAL22MKII (mark II) specific
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<tr><th>User input</th><th>Video input</th><th>Data path to VIP</th></tr>
<tr><td>F_CVBS</td><td>CVBS</td><td>Front CVBS</td></tr>
<tr><td>T_CVBS</td><td>CVBS</td><td>Tuner CVBS</td></tr>
<tr><td>E1_CVBS</td><td>CVBS</td><td>SCART 1 CVBS in</td></tr>
<tr><td>E2_CVBS</td><td>CVBS</td><td>SCART 2 CVBS in</td></tr>
<tr><td>F_YC</td><td>YC</td><td>Front YC</td></tr>
</table>
OLAL22VCRCOMBI specific:
Same as Premier, exept User input nr 4 is for tuner and VCR module

2. VideoOutput (YUV, RGB).
3. VideoStandard (PAL, NTSC).
</td></tr>
<tr><td>Error</td><td>Number</td><td>Description</td></tr>
<tr><td></td><td>121300</td><td>Video LoopthroughStart succeeded</td></tr>
<tr><td></td><td>121301</td><td>User input is not valid.</td></tr>
<tr><td></td><td>121302</td><td>Initialisation of the VIP failed.</td></tr>
<tr><td></td><td>121303</td><td>Unable to stop the loop through before restarting.</td></tr>
<tr><td></td><td>121304</td><td>Video Signal on the input is not a valid signal.</td></tr>
<tr><td></td><td>121305</td><td>Initialisation of the VFE failed.</td></tr>
<tr><td></td><td>121306</td><td>The digital board hardware information is corrupt</td></tr>
<tr><td>Example</td><td colspan="2">DS:> 1213 CVBS RGB PAL
121300:
Test OK @</td></tr>
</table>

Nucleus Name	**DS_SYS_VideoLoopThroughStop**	
Nucleus Number	1214	
Description	Stop routing the video input to all the outputs.	
Technical	- Stop the DENC and the Video Front End	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	121400	VideoLoopthroughStop succeeded
	121401	DENC module on Codec failed.

Example	`DS:> 1214`
	`121400:`
	`Test OK @`	

Nucleus Name	**DS_SYS_VideoLoop**
Nucleus Number	1215
Description	The Codec generates a video signal with a specific signature and sends it to the output of the digital board. The user selects which video input path must be routed on the digital board and a video standard. The Codec encodes the video signal, checks the signature, and returns a conclusion. **Note**: Before executing this nucleus the user must route the video signal on the analog board with the proper nucleus.
Technical	- Evaluate user input. - Reset the global variables, video memory. - Fill the video memory with a vertical colourbar. - Initialise the Codec SYNC-module. - Initialise the Codec MIXER-module. - Initialise the Codec VPP-module. - Initialise the Codec DENC-module. - Display the original image. - Initialise the VIP. - Initialise the Codec VFE-module. - Try to detect a sync in the VIP input. - Catch the received image in memory. - Display the received image. - Compare the received image with original image. - Create a conclusion.
Execution Time	3 seconds.
NOTE!!	MORE INFO ON NEXT PAGES

<table>
<tr><td>User Input</td><td colspan="2"><vipinput> <video standard>
1 Vip input of the digital board:

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2 Video standard:
- PAL
- NTSC

When no input is given, the nucleus will take TEST for video input and PAL for video standard.</td></tr>
<tr><td>Error</td><td>Number</td><td>Description</td></tr>
<tr><td></td><td>121500</td><td>Videoloop test succeeded.</td></tr>
<tr><td></td><td>121501</td><td>Wrong user input.</td></tr>
<tr><td></td><td>121502</td><td>The Codec SYNC-module cannot be initialised.</td></tr>
<tr><td></td><td>121503</td><td>The Codec MIXER-module cannot be initialised.</td></tr>
<tr><td></td><td>121504</td><td>The Codec VideoPostProcessor-module cannot be initialised.</td></tr>
<tr><td></td><td>121505</td><td>The Codec DENC-module cannot be initialised.</td></tr>
<tr><td></td><td>121506</td><td>The VideoInputProcessor cannot be initialised.</td></tr>
<tr><td></td><td>121507</td><td>The VideoInputProcessor cannot detect a sync-signal.</td></tr>
<tr><td></td><td>121508</td><td>The Codec VideoFrontEnd-module cannot be initialised.</td></tr>
<tr><td></td><td>121509</td><td>The Codec VideoFrontEnd-module cannot capture a video field.</td></tr>
</table>

	121510	When selected the RGB video input: Error in colour red signal and/or Error in colour green signal and/or Error in colour blue signal. When selected one of the other video inputs: Error in luminance signal (Y) and/or Error in chrominance signal (U) and/or Error in chrominance signal (V).
	121511	The digital board hardware information is corrupt

Example	<pre>DS:> 1215 cvbs ntsc
	121500:
	Test OK @
	
	DS:> 1215 cvbs pal
	121508: The VideoInputProcessor cannot detect a sync-signal.
	Error @
	
	DS:> 1215 yuv ntsc
	121511:
	Error in luminance signal(Y)
	Error in chrominance signal(U)
	Error in chrominance signal(V)
	Error @</pre>	

Nucleus Name	**DS_SYS_AudioLoop**	
Nucleus Number	1216	
Description	The user first needs to select how the audio path must be routed on the analogue board and/or digital board before calling this nucleus. The user also has to route the audio outputs back to the inputs by means of cables. In this nucleus the Codec generates an audio sine signal with a specific signature and sends it to the output of the digital board. The Codec encodes the audio signal to MPEG I layer II and after this the signature of the signal will be checked.	
Technical	- The user needs to route the signal to the audio inputs so the test can encode the audio to MPEG I layer II - An audio signal is generated, resulting in a sine of 6kHz on the left and 12kHz on the right channel. - Then the signal is decoded in memory. - When both signals are detected correctly in the MPEG, the test succeeded.	
Execution Time	Approximately 9 seconds	
User Input	InputType: - I2S (default, when no user input is given) - SPDIF: This input needs a second parameter: - OPT (optical, default, when no user input is given) - COAX	
Error	Number	Description
	121600	Testing the components on the audio signal path succeeded
	121601	The audio encoder did not initialise.
	121602	No audio could be generated.
	121603	The audio encoder did not encode audio.
	121604	The audio could not be decoded.
	121605	Frequency on left channel out of range.
	121606	Frequency on right channel out of range.
	121607	The frequencies on both channels are out of range.
	121608	Frequency on left channel out of range. Right channel silent.
	121609	Right channel is silent.
	121610	Frequency on right channel out of range. Left channel silent.
	121611	Left channel is silent.
	121612	Both channels are silent.

Example	DS:> 1216 121600: Test OK @ DS:> 1216 spdif coax 121600: Test OK @ DS:> 1216 spdif opt 121600: Test OK @

Nucleus Name	**DS_SYS_SlashVersionSet**	
Nucleus Number	1217	
Description	Set the slash version of the system	
Technical	- Decode the user input for the slash version to set - Issue the command to set the slash version to the analogue board	
Execution Time	Less than 1 second.	
User Input	The slash version	
Error	Number	Description
	121700	Setting the slash version succeeded
	121701	Invalid slash version, no slash version is set.
	121702	Setting the slash version on the Analogue Board fails.
	121703	Invalid input.
	121704	The returned error code from the analogue board is unknown:
	121705	No DS error code known for analogue board error:
	121706	There was no response from the analogue board.
	121707	Retrieving the current version failed
	121708	Unknown recorder layout type
	121709	Validating the section where the version is stored failed
	121710	Getting the configuration section from NVRAM failed
	121711	Initialisation of IIC or reaching NVRAM failed
Example	DS:> 1217 82 121700: Test OK @	

Nucleus Name	**DS_SYS_SlashVersionGet**	
Nucleus Number	1218	
Description	Get the slash version of the system	
Technical	- Issue the command to get the slash version to the analogue board - Return the received information to the user	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	121800	Getting the slash version succeeded
	121801	Getting the slash version failed
	121802	The IIC write failed
	121803	The IIC read failed
	121804	There was no response from the analogue board.
	121805	No DS error code known for analogue board error:
	121806	Reading the slash version failed
	121807	Initialisation of IIC or reaching NVRAM failed
	121808	Reading an unexpected section version in NVRAM
Example	DS:> 1218 121800: The slash version is: 82 Test OK @	

Nucleus Name	**DS_SYS_Virginize**	
Nucleus Number	1219	
Description	(Re-) Virginize the recorder. User data in the NVRAM of the analogue board is cleared	
Technical	- Issue the command to return to the factory defaults to the analogue board	
Execution Time	1 second.	
User Input	None	
Error	Number	Description
	121900	Virginization succeeded
	121901	Virginization on the Analogue Board failed.
	121902	The returned error code from the analogue board is unknown:
	121903	No DS error code known for analogue board error:
	121904	There was no response from the analogue board.

Example	`DS:> 1219`
	`121900:`
	`Test OK @`	

Nucleus Name	**DS_SYS_VirginModeOn**	
Nucleus Number	1220	
Description	Turn on the virgin mode functionality (e.g. the auto channel search upon start-up)	
Technical	- Issue the command to set the bit for the virgin mode to the analogue board	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	122000	Turning on the virgin mode succeeded
	122001	Turning on VirginMode on the Analogue Board failed.
	122002	The returned error code from the analogue board is unknown:
	122003	No DS error code known for analogue board error:
	122004	There was no response from the analogue board.
	122005	Section validation or write failed in NVRAM
	122006	Reading the CONFIG section from NVRAM failed
	122007	Initialisation of IIC or reaching NVRAM failed

Example	`DS:> 1220`
	`122000:`
	`Test OK @`	

Nucleus Name	**DS_SYS_VirginModeOff**	
Nucleus Number	1221	
Description	Turn off the virgin mode functionality (e.g. the auto channel search upon start-up)	
Technical	- Issue the command to reset the bit for the virgin mode to the analogue board	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	122100	Turning off the virgin mode succeeded
	122101	Turning off VirginMode on the Analogue Board failed.
	122102	The returned error code from the analogue board is unknown:
	122103	No DS error code known for analogue board error:
	122104	There was no response from the analogue board.
	122105	Section validation or write failed in NVRAM
	122106	Reading the CONFIG section from NVRAM failed
	122107	Initialisation of IIC or reaching NVRAM failed

Example	`DS:> 1221`
	`122100:`
	`Test OK @`	

Nucleus Name	**DS_SYS_VirginModeGet**	
Nucleus Number	1222	
Description	Get the virgin mode functionality status (e.g. the auto channel search upon start-up)	
Technical	- Issue the command to reset the bit for the virgin mode to the analogue board	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	122200	Getting the virgin mode succeeded
	122201	Reading the Virgin Mode flag from NVRAM failed
	122202	Initialisation of IIC or reaching the NVRAM failed
	122203	Reading an unexpected version of the section in NVRAM

Example	`DS:> 1222`
	`122200: The Virgin Mode functionality is: ON`
	`Test OK @`	

Nucleus Name	**DS_SYS_DisplayFatalOn**	
Nucleus Number	1223	
Description	Turn on the display-fatal functionality which displays debug-information on the display when encountering a fatal error condition from which could not be recovered automatically	
Technical	- Issue the command to use the display-fatal functionality to the analogue board	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	122300	Turning on the display-fatal functionality succeeded
	122301	Turning on the display-fatal functionality failed
	122302	The returned error code from the analogue board is unknown:
	122303	No DS error code known for analogue board error:
	122304	There was no response from the analogue board.
	122305	Section validation or write failed in NVRAM
	122306	Reading the section from NVRAM failed
	122307	Initialisation of IIC or reaching NVRAM failed

Example	`DS:> 1223`
	`122300:`
	`Test OK @`	

Nucleus Name	**DS_SYS_DisplayFatalOff**	
Nucleus Number	1224	
Description	Turn off the display-fatal functionality which displays debug-information on the display when encountering a fatal error condition from which could not be recovered automatically	
Technical	- Issue the command to stop using the display-fatal functionality to the analogue board	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	122400	Turning off the display-fatal functionality succeeded
	122401	Turning off the display-fatal functionality failed
	122402	The returned errorcode from the analogue board is unknown:
	122403	No DS errCode known for analogue board error:
	122404	There was no response from the analogue board.
	122405	Section validation or write failed in NVRAM
	122406	Reading the section from NVRAM failed
	122407	Initialisation of IIC or reaching NVRAM failed

Example	`DS:> 1224`
	`122400:`
	`Test OK @`	

Nucleus Name	**DS_SYS_DisplayFatalGet**	
Nucleus Number	1225	
Description	Get the display-fatal flag of the recorder	
Technical	- Issue the command to get the status of the display-fatal functionality to the analogue board	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	122500	Getting the display-fatal flag succeeded
	122501	Getting the display-fatal flag failed
	122502	The returned errorcode from the analogue board is unknown:
	122503	No DS errCode known for analogue board error:
	122504	There was no response from the analogue board.
	122505	Reading the *display fatal* flag failed
	122506	Initialisation of IIC or reaching NVRAM failed
	122507	Unexpected version read from NVRAM section
	122508	Reading the fatal flag from NVRAM failed

Example	`DS:> 1225`
	`122500: The Display Fatal functionality is ON`
	`Test OK @`	

Nucleus Name	**DS_SYS_SettingsSet**	
Nucleus Number	1226	
Description	Programs the digital board settings into the boot EEPROM on the digital board.	
Technical	- Evaluate user input. - Set-up IIC-bus. - Write data to boot EEPROM. - Update checksum.	
Execution Time	1 second	
User Input	A large hexadecimal value that represents the digital board settings obtained from the **XDIVTOOL.exe** program or from a reference set.	
Error	Number	Description
	122600	The settings were successfully programmed.
	122601	User input is invalid.
	122602	IIC access failed.

Example	`DS:> 1226 6469616774737462010102000101010101000020080000`
	`122600:`
	`Test OK @`	

Nucleus Name	**DS_SYS_SettingsDisplay**	
Nucleus Number	1228	
Description	Show the settings that are programmed in the BROM on the digital board.	
Technical	- Set-up IIC-bus. - Read Digital Board Settings from boot EEPROM. - Display the settings.	
Execution Time	1 second	
User Input	None.	
Error	Number	Description
	122800	The settings were successfully displayed.
	122801	IIC access failed.
	122802	Invalid settings
Example	DS:> 1228 Settings ID: 444248491D9420014E46332B00000000290403030001010200010100400808000 Board name: NF3+ Hardware ID: 29 Codec IC: PNX7100_C2/C3 Video Input Processor IC: SAA7118 Progressive Scan Deinterlacer IC: S2301 Progressive Scan Denc IC: None I-Link physical layer circuit IC: PDI1394P25 I-Link link layer circuit IC: PDI1394P40 Audio clock: Clock scheme 1 Bit engine connector: not available IDE connector 1: available IDE connector 2: available PCI connector: not available RAM size 64MByte ROM size (NOR FLASH bank 1) 8MByte ROM size (NOR FLASH bank 2) 8MByte ROM size (NAND FLASH) Not available Bit Engine: AV 3.1 122800: Test OK @	

Nucleus Name	**DS_SYS_SettingsGet**	
Nucleus Number	1229	
Description	Get the digital board diversity settings string that is programmed in the BROM on the digital board.	
Technical	- Set-up IIC-bus. - Read Digital Board Settings from boot EEPROM. - Read System Settings from boot EEPROM. - Display the settings.	
Execution Time	1 second	
User Input	None.	
Error	Number	Description
	122900	The settings were successfully displayed.
	122901	IIC access failed.
	122902	The settings are invalid
Example	DS:> 1229 122900: 6D7920626F617264000203000101010201010000020080000 Test OK @	

Nucleus Name	**DS_SYS_AudioLoopThroughStart**	
Nucleus Number	1230	
Description	Description: The audio input is routed from the input to all outputs. The input is set routing the signal with the proper nucleus. All outputs are enabled.	
Technical	- Encode the audio to AC3 in memory - Decode the AC3 in memory to audio on the outputs	
Execution Time	1second buffer time and 30 seconds playing.	
User Input	**Available for all sets except for sets with a SAA7173 VIP onboard** InputType: - I2S (default) - SPDIF (Only for recorders with 5.1 input and DTT module) InputPort: (Only for recorders with 5.1 input. For DTT modules no parameter should be filled in, so default is chosen) - OPT : Optical input path is selected (default) - COAX : Coax input path is selected	
	Available only for sets with a SAA7173 VIP onboard **User input** / **Data path to VIP** R_A / Rear Cinch F_A / Front Cinch T_A / Tuner	
Error	Number	Description
	123000	AudioLoopthroughStart succeeded
	123001	Resetting the audio decoder failed
	123002	Resetting the audio encoder failed
	123003	Encoding the audio failed
	123004	Decoding the audio failed

Example	`DS:> 1230`
	`123000:`
	`Test OK @`	

Example DTT	`DS:> 1230 spdif`
	`123000:`
	`Test OK @`	

Example 5.1 input	`DS:> 1230 spdif coax`
	`123000:`
	`Test OK @`	

Example SAA7173	`DS:> 1230 T_A`
	`123000:`
	`Test OK @`	

Nucleus Name	**DS_SYS_AudioLoopThroughStop**	
Nucleus Number	1231	
Description	Stop routing the audio input to all the outputs	
Technical	- Send the 'Mute' command to the audio decoder and reset the audio decoder	
Execution Time	Less than 1 second.	
User Input	None.	
Error	Number	Description
	123100	AudioLoopthroughStop succeeded
	123101	Resetting the audio decoder failed
	123102	Resetting the audio encoder failed

Example	`DS:> 1231`
	`123100:`
	`Test OK @`	

Nucleus Name	**DS_SYS_SettingsHwIdSet**	
Nucleus Number	1232	
Description	This nucleus sets the HW-Id in the HW-diversity string	
Technical	- Read out the HW-diversity string - Modify the HW-ID in that string as requested - Write the modified HW-diversity string to the EEPROM	
Execution Time	Less than 1 second.	
User Input	- <HW-ID> - The hardware ID to set - No input - The user will be asked for the ID	
Error	Number	Description
	123200	Setting the hardware ID succeeded
	123201	Setting the hardware ID failed
	123202	The user aborted setting the hardware ID, no changes made
Example	DS:> 1232 Enter the new HW ID of the digital board (Currently equals 21) Enter a value between 0 and 99: > 22 The HW ID will be set to: 22. Is that correct? ([Y/N]):y 123200: Test OK @ DS:> 1232 Enter the new HW ID of the digital board (Currently equals 22) Enter a value between 0 and 99: > The HW ID will be set to: 0. Is that correct? ([Y/N]):N 123202: Setting the HW ID was aborted by the user. Error @ DS:> 1232 99 123200: Test OK @	

Nucleus Name	**DS_SYS_SettingsDoubleCheck**	
Nucleus Number	1233	
Description	Double check whether stored HW-string equals actual HW as far as we can automatically detect this. An automatic and a manual mode is supported.	
Technical	- Read out the HW diversity string - Check whether these settings correspond the actual hardware - In case of modification: Write back the new HW-diversity settings.	
Execution Time	4 seconds in auto mode when everything matches	
User Input	- 'manual' or 'MANUAL' to enter manual mode - default is automatic mode where the nucleus stops upon and reports the first encountered error	
Error	Number	Description
	123300	Double checking the HW-diversity settings succeeded
	123301	Double check failed, a difference in settings was encountered
	123302	Reading the HW-diversity settings failed
	123303	Writing the modified HW-diversity settings failed

Example

```
DS:> 1233
123300:
Test OK @

DS:> 1233 manual
123300:
Test OK @

DS:> 1233
123301:
Hardware ID mismatch: in HW-Diversity string:99, actual in FLASH:0

Error @

DS:> 1233 manual
Hardware ID mismatch! in HW-Diversity string:99, actual in FLASH:0

Enter the correct HW ID of the digital board.
>   0
The HW-diversity string has been modified by you. Settings:

Board name:                         DIAG
Hardware ID:                        0
Codec IC:                           PNX7100_MF3
Video Input Processor IC:           SAA7118
Progressive Scan Deinterlacer IC:   None
Progressive Scan Denc IC:           ADV7196
I-Link physical layer circuit IC:   PDI1394P25
I-Link link layer circuit IC:       PDI1394P40
Audio clock:                        Clock scheme 1
Bit engine connector:               available
IDE connector 1:                    available
IDE connector 2:                    not available
PCI connector:                      not available
RAM size                            32MByte
ROM size (NOR FLASH bank 1)         8MByte
ROM size (NOR FLASH bank 2)         Not available
ROM size (NAND FLASH)               Not available
Is it OK to program this in
the new HW-diversity string? ([y]es/[n]o):y
Diversity HW-string programmed successfully.

123300:
Test OK @

DS:>
```

Nucleus Name	**DS_SYS_SettingsDlTableFilenameSet**	
Nucleus Number	1234	
Description	This nucleus sets the Download table filename in the HW-diversity string	
Technical	- Retrieve the new filename from the user - Ask the user whether the filename is correct before setting it - Update the diversity settings to use the newly entered filename	
Execution Time	Dependent on the user confirmation	
User Input	- The filename to be set - No input - No new filename will be set	
Error	Number	Description
	123400	Setting the new filename succeeded
	123401	Unsupported setting of the current HW-diversity settings
	123402	Setting the filename was aborted by the user.
Example	DS:> 1234 Enter the new Download Table Filename (Currently equals DVDR2001.001) Enter a filename: > The Download Table Filename will be set to: DVDR2001.001. Is that correct? ([Y/N]): 123402: Setting the filename was aborted by the user. Error @ DS:> 1234 Enter the new Download Table Filename (Currently equals DVDR2001.001) Enter a filename: >DVDR2002.001 The Download Table Filename will be set to: DVDR2002.001. Is that correct? ([Y/N]):Y 123400: Test OK @	

Nucleus Name	**DS_SYS_IicWriteRead**	
Nucleus Number	1235	
Description	Perform an IIC write-read action on the digital board	
Technical	- Determine bus ID, slave address, number of bytes to be written and the byte array of data from the user input - Initialise IIC - Write the data to the IIC slave - Read the data from the IIC slave	
Execution Time	Less than 1 second	
User Input	The user inputs the Bus ID, Slave Address, number of bytes to read, number of bytes to write and the bytes to be written <NucNr><BusId><SlaveAddr><ReadLen><WriteLen><WrByte0...WrByteN> Max number of bytes to write: 255 Max number of bytes to read: 255	
Error	Number	Description
	123500	Writing data to and reading data from the IIC slave succeeded
	123501	The IIC bus was not accessible
	123502	There was a bus timeout reading the device
	123503	The IIC acknowledge was not received
	123504	Unable to initialise IIC bus
	123505	The communication with the device failed
	123506	Unknown IIC bus error received
	123507	Decoding bus ID unsigned value failed
	123508	Decoding slave address unsigned value failed
	123509	Decoding number of bytes unsigned value failed
	123510	Bus ID out of range
	123511	Number of bytes out of range
Example	DS:> 1235 0 0xa0 0xf 1 0 0x0000: 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x0008: 0x00 0x00 0x00 0x00 0x00 0x00 0x00 123500: Test OK @	

Nucleus Name	**DS_SYS_BuildInfoGet**	
Nucleus Number	1236	
Description	Retrieve the software build information of the Diagnostics & Service application	
Technical	- Show the information that is stored in the DVDR_BuildInfoType structure	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	123600	Retrieving build info succeeded
	123601	Retrieving build info failed
Example	DS:> 1236 123600: Version :560 Build :20040614_0510 Release :C1 Buildtype :no Baseline :F_P1_9_152 Variant :verum:dvdrw2_lib Test OK @	

Nucleus Name	**DS_SYS_UartSetup**	
Nucleus Number	1237	
Description	Set up a configuration for the selected UART	
Technical	- Parse user input - Use MIS_UART_Setup to setup the selected UART with the requested parameters	
Execution Time	Less than 1 second	
User Input	The user inputs 6 parameters: <UartNr><baudrate><flowcontrol><databits><parity><stopbits> UartNr: 1=UART port 1 : not used (Chrysalis only) 2=UART port 2 : Bit Engine or DTTM (Chrysalis only) 3=UART port 3 : Analogue board baudrate: 115200,62500,57600,38400,19200,9600,4800,2400,1200 flowcontrol: 0=disabled 1=enabled databits: 7 or 8 parity: “NO”, “ODD” or “EVEN” stopbits: 1 or 2	
Error	Number	Description
	123700	Setting up the selected UART succeeded
	123701	User provided Invalid setup parameters
	123702	Setting up the selected UART Failed
	123703	Selected UART is not available
Example (Chrysalis)	DS:> 1237 2 38400 0 8 NO 1 123700: Test OK @	
Example (Leco)	DS:> 1237 2 38400 0 8 NO 1 123703: The selected UART is not available Error @	

Nucleus Name	**DS_SYS_GLinkWriteRead**	
Nucleus Number	1238	
Description	Send out some data through the G-Link UART and read back the data. The user must short-circuit the TX and RX line of the G-Link connector.	
Technical	- UART 3 setup (1200, 8, n, 1) - Send “HELLO”. - Receive data. - Compare data with “HELLO”.	
Execution Time	1 second	
User Input	None	
Error	Number	Description
	123800	Writing and reading back data through the G-Link succeeded
	123801	Unable to setup the G-Link UART
	123802	Failed to write data to the the G-Link connector
	123803	No data was received from the G-Link connector
	123804	Invalid data was received from the G-Link connector
Example	DS:> 1238 123800: Test OK @	

Electronic Program Guide Board (EPGB)

Nucleus Name	**DS_EPGB_VersionGet**	
Nucleus Number	1300	
Description	Returns the version of the EPG board.	
Technical	- Issue the command to get the version of the EPG board to the analogue board - Return the received information to the user	
Execution Time	3 seconds.	
User Input	None	
Error	Number	Description
	130000	Getting the version succeeded
	130001	Communication with the analogue board failed.
	130002	Communication with the EPG board failed.
	130003	There was no response from the analogue board.
	130004	No DS error code known for analogue board error.
Example	DS:> 1300 130000: Version : 6.1.9 Test OK @	

High-Definition Multimedia Interface (HDMI)

Nucleus Name	**DS_HDMI_DevTypeGet**	
Nucleus Number	1500	
Description	Get the device (revision) type information of the HDMI-IC.	
Technical	- Read out the information through IIC	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	150000	Getting the device type of the nucleus succeeded
	150001	Failed to retrieve the hardware diversity string
	150002	Failed to initialise the IIC communication
	150003	The hardware was not detected although indicated by Diversity
	150004	Failed to access HDMI transmitter chip SI9030
Example	DS:> 1500 150000: Vendor ID : 0x 0 0x 1 Device ID : 0x91 0x42 Device Revision : 0x 0 Test OK @	

Nucleus Name	**DS_HDMI_Communication**	
Nucleus Number	1501	
Description	Check the communication between the I2C controller on the Codec and the HDMI-IC by reading and writing data to one device register. This test detects faults of the I2C lines or a defected HDMI transmitter IC.	
Technical	- Read out an accessible register in the HDMI transmitter IC - Modify this register by writing a known value to it - Read back and check this value for correctness	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	150100	Communicating with the HDMI tx chip succeeded
	150101	Failed to retrieve the hardware diversity string
	150102	Failed to initialise the IIC communication
	150103	The hardware was not detected although indicated by Diversity
	150104	An IIC-bus error occurred
	150105	There was a timeout reading the device
	150106	The IIC bus was not accessible
	150107	The IIC acknowledge was not received
	150108	There was an IIC error upon the stop-condition
	150109	The IIC bus was chosen wrong
	150110	The IIC functionality is not running
	150111	An unknown error was returned by the IIC read
	150112	The data written did not equal the date read

Example	`DS:> 1501`
	`150100:`
	`Test OK @`	

Nucleus Name	**DS_HDMI_EdidParse**	
Nucleus Number	1502	
Description	Return the E-EDID (Enhanced Extended Display Identification Data) contained in the HDMI / DVI able TV attached to the DVD+RW. Parse the information retrieved to print the capabilities of the TV in user understandable format	
Technical	- Read out the E-EDID through the DDC channel (IIC) - Parse the information contained in the E-EDID - Print out the information to the user in understandable format	
Execution Time	2 seconds.	
User Input	None	
Error	Number	Description
	150200	Getting the configuration of the HDMI-IC succeeded
	150201	Failed to retrieve the hardware diversity string
	150202	Failed to initialise the IIC communication
	150203	The hardware was not detected although indicated by Diversity
	150204	Retrieving the E-EDID failed

Example	<pre>DS:> 1502
	Checksum OK of EDID block 0.
	
	Checking EDID Structure with 1 extensions:
	  Checking each Extension for consistency.
	E-EDID structure contains no errors.
	EDID structure OK.
	Vendor Specific Data Block: 03 0c 00 10 00
	Attached Display is an HDMI device.
	  EDID Version 1.3
	  Total Native DTD Formats = 0
	  Monitor Features (CEA Byte 3): BasicAudio YCbCr444
	YCbCr422
	HDMI compatible EDID
	Supported video format 1
	Supported video format 2
	Supported video format 3
	Supported video format 5
	Supported video format 6
	Supported video format 7
	index:0 Linear PCM 1 channels, 48KHz, 44KHz, 32KHz,
	
	SPK:RLC FLC RC RL FC LFE FL
	  RRC FRC .. RR .. ... FR
	
	Attached display is HDMI compatible.
	Display is YCbCr444 compatible.
	Display is YCbCr422 compatible.
	
	150200:
	Test OK @</pre>	

Nucleus Name	**DS_HDMI_DefaultVideoSet**	
Nucleus Number	1503	
Description	Set a default video configuration in the HDMI TX chip (720x480p)	
Technical	- Write a known configuration for 720x480P in the registers of the HDMI transmitter chip	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	150300	Setting the video configuration succeeded
	150301	Failed to retrieve the hardware diversity string
	150302	Failed to initialise the IIC communication
	150303	The hardware was not detected although indicated by Diversity
	150304	Setting the video configuration failed

Example	`DS:> 1503`
	`150300:`
	`Test OK @`
	
	`DS:> 101 11 ntsc all`
	`010100:`
	`Test OK @`	

Nucleus Name	**DS_HDMI_Reset**	
Nucleus Number	1504	
Description	Reset the HDMI transmitter chip by means of a hardware reset and re-initialize in order to have the HDMI transmitter chip accessible again.	
Technical	- Pull the reset line connected to the HDMI transmitter low - Wait a little while - Enable the HDMI chip again by setting the reset line high	
Execution Time	9 seconds.	
User Input	None	
Error	Number	Description
	150400	Resetting the HDMI tx chip succeeded
	150401	Failed to retrieve the hardware diversity string
	150402	Failed to initialise the IIC communication
	150403	The hardware was not detected although indicated by Diversity
	150404	Resetting the HDMI tx chip trhrough PIO failed.
	150405	Software Reset of the HDMI tx chip failed.

Example	`DS:> 1504`
	`150400:`
	`Test OK @`	

Nucleus Name	**DS_HDMI_Bist**	
Nucleus Number	1505	
Description	This nucleus performs the Built In Self Test (BIST) of the SII9030	
Technical	-	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	150500	The BIST succeeded
	150501	Failed to retrieve the hardware diversity string
	150502	Failed to initialise the IIC communication
	150503	The hardware was not detected although indicated by Diversity
	150504	The BIST failed
	150505	There was no IIC communication to the BIST registers
	150506	Counter expired in BIST test
	150507	The BIST failed due to an unknown type of error
	150508	BIST prerequisites were not met

Example	`DS:> 1505`
	`150500:`
	`Test OK @`	

Nucleus Name	**DS_HDMI_DdclicWrite**	
Nucleus Number	1506	
Description	Perform an IIC write action to a device on the DDC bus	
Technical	-	
Execution Time	Less than 1 second.	
User Input	<TimeOut> <Slave address> <offset> <nr of bytes> <d1> <.> <dx>	
Error	Number	Description
	150600	Writing to the device was OK, number of bytes is echoed
	150601	Failed to retrieve the hardware diversity string
	150602	Failed to initialise the IIC communication
	150603	The hardware was not detected although indicated by Diversity
	150604	Writing the bytes to the device failed
	150605	Decoding time-out unsigned value failed
	150606	Decoding slave address unsigned value failed
	150607	Decoding offset unsigned value failed
	150608	Decoding number of bytes unsigned value failed
	150609	Number of bytes out of range. Should be less than 17.
	150610	Incorrect number of data bytes entered
	150611	Unable to initialise IIC

Example	`DS:> 1506 1 0xa0 1 0`
	`150600:`
	`Test OK @`
	
	`DS:> 1506 1 0xa8 1 0`
	`150604: Writing the bytes to the device failed.`
	`Error @`	

Nucleus Name	**DS_HDMI_DdclicRead**	
Nucleus Number	1507	
Description	Perform an IIC read action to a device on the DDC bus	
Technical	-	
Execution Time	Less than 1 second.	
User Input	<TimeOut> <Slave address> <Offset> <Number of bytes>	
Error	Number	Description
	150700	
	150701	Failed to retrieve the hardware diversity string
	150702	Failed to initialise the IIC communication
	150703	The hardware was not detected although indicated by Diversity
	150704	Reading from the device on the DDC bus failed
	150705	Decoding time-out unsigned value failed
	150706	Decoding slave address unsigned value failed
	150707	Decoding offset unsigned value failed
	150708	Decoding number of bytes unsigned value failed
	150709	Unable to initialise IIC bus

Example	`DS:> 1507 1 0xa0 0 15`
	`[  0]:0x0`
	`[  1]:0xff`
	`[  2]:0xff`
	`[  3]:0xff`
	`[  4]:0xff`
	`[  5]:0xff`
	`[  6]:0xff`
	`[  7]:0x0`
	`[  8]:0x34`
	`[  9]:0xa9`
	`[ 10]:0x53`
	`[ 11]:0xc0`
	`[ 12]:0x1a`
	`[ 13]:0x0`
	`[ 14]:0x0`
	`150700:`
	`Test OK @`	

Nucleus Name	**DS_HDMI_ExtendedWrite**	
Nucleus Number	1508	
Description	Perform an IIC write action on port 0/1 of the HDMI transmitter	
Technical	-	
Execution Time	Less than 1 second.	
User Input	<Port> <Register> <Data> Where 0 == Port 0 and 1 == Port 1	
Error	Number	Description
	150800	Byte was written OK
	150801	Failed to retrieve the hardware diversity string
	150802	Failed to initialise the IIC communication
	150803	The hardware was not detected although indicated by Diversity
	150804	A wrong port number was given by the user
	150805	An invalid register was given by the user
	150806	Invalid data was given by the user
	150807	There was an error writing to the register indicated

Example	`DS:> 1508 0 0x10 0x22`
	`150800:`
	`Test OK @`	

Nucleus Name	**DS_HDMI_ExtendedRead**	
Nucleus Number	1509	
Description	Perform an IIC read action on port 0 or 1 of the HDMI transmitter	
Technical	-	
Execution Time	Less than 1 second.	
User Input	<Port> <Register> Where 0 == Port0 and 1 == Port 1	
Error	Number	Description
	150900	Byte was read and echoed OK
	150901	Failed to retrieve the hardware diversity string
	150902	Failed to initialise the IIC communication
	150903	The hardware was not detected although indicated by Diversity
	150904	A wrong port number was given by the user
	150905	An invalid register was given by the user
	150906	There was an error reading the register indicated

Example	`DS:> 1509 0 0x10`
	`150900: Data read: 0x22`
	`Test OK @`	

Nucleus Name	**DS_HDMI_CheckHPDTx**	
Nucleus Number	1510	
Description	Check whether Hot-Plugging of the HDMI cable is detected by the SII9030 HDMI transmitter.	
Technical	-	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	151000	The Hot Plug was detected OK by the HDMI transmitter
	151001	Failed to retrieve the hardware diversity string
	151002	Failed to initialise the IIC communication
	151003	The hardware was not detected although indicated by Diversity
	151004	Error writing to interrupt register
	151005	Error reading interrupt register
	151006	Test aborted by user
	151007	Unknown action

Example	`DS:> 1510`
	`Insert or remove the HDMI cable.(or type 'a' to abort):`
	`151006: Test aborted by user.`
	`Test OK @`
	
	`DS:> 1510`
	`Insert or remove the HDMI cable.(or type 'a' to abort):`
	`151000:`
	`Test OK @`	

Nucleus Name	**DS_HDMI_CheckHPDChrysalis**	
Nucleus Number	1511	
Description	Check whether Hot-Plugging of the HDMI cable is detected by the software. This tests the interrupt line to the Chrysalis.	
Technical	-	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	151100	The Hot Plug was detected OK by software. Interrupt line OK.
	151101	Failed to retrieve the hardware diversity string
	151102	Failed to initialise the IIC communication
	151103	The hardware was not detected although indicated by Diversity
	151104	Error writing to HDMI tx register
	151105	User aborted HPD test
	151106	Error reading from HDMI tx register

Example	`DS:> 1511`
	`Insert or remove the HDMI cable.(or type 'a' to abort):`
	`151100:`
	`Test OK @`
	
	`DS:> 1511`
	`Insert or remove the HDMI cable.(or type 'a' to abort):`
	`151105: User aborted HPD test.`
	`Test OK @`	

Nucleus Name	**DS_HDMI_FLI2310_DevTypeGet**	
Nucleus Number	1512	
Description	Get the device and revision information of the FLI2310	
Technical	-	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	151200	Retrieving the device type information succeeded
	151201	Failed to retrieve the hardware diversity string
	151202	Failed to initialise the IIC communication
	151203	The hardware was not detected although indicated by Diversity
	151204	The communication with the device failed

Example	`DS:> 1512`
	`151200:`
	`Chip name    : 2300`
	`Chip version : 4`
	`Test OK @`	

Nucleus Name	**DS_HDMI_FLI2310_Communication**	
Nucleus Number	1513	
Description	Test whether the communication to the FLI2310 can be established	
Technical	-	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	151300	Something is properly read so the communication is OK
	151301	Failed to retrieve the hardware diversity string
	151302	Failed to initialise the IIC communication
	151303	The hardware was not detected although indicated by Diversity
	151304	The IIC bus was not accessible
	151305	There was a timeout reading the device
	151306	The IIC acknowledge was not received
	151307	The communication with the device failed
	151308	The IIC bus initialisation failed
	151309	The read data is not the same as the written data

Example	`DS:> 1513`
	`151300:`
	`Test OK @`	

Nucleus Name	**DS_HDMI_FLI2310_TestImageOn**	
Nucleus Number	1514	
Description	Generate a test image using the FLI2310	
Technical	-	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	151400	Test image is generated successfully
	151401	Failed to retrieve the hardware diversity string
	151402	Failed to initialise the IIC communication
	151403	The hardware was not detected although indicated by Diversity
	151404	Unable to generate image
	151405	Unable to initialise De-inter-lacer

Example	`DS:> 1514`
	`151400:`
	`Test OK @`	

Nucleus Name	**DS_HDMI_FLI2310_TestImageOff**	
Nucleus Number	1515	
Description	Switch of test-image generation by the FLI2310	
Technical	-	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	151500	Test image is turned off successfully
	151501	Failed to retrieve the hardware diversity string
	151502	Failed to initialise the IIC communication
	151503	The hardware was not detected although indicated by Diversity
	151504	Unable to initialise De-Inter-lacer
	151505	IIC Error during writing DENC

Example	`DS:> 1515`
	`151500:`
	`Test OK @`	

Nucleus Name	**DS_HDMI_FLI2310_Routing**	
Nucleus Number	1516	
Description	Have the FLI2310 pass the video from its input to its output	
Technical	-	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	151600	Routing path is created successfully
	151601	Failed to retrieve the hardware diversity string
	151602	Failed to initialise the IIC communication
	151603	The hardware was not detected although indicated by Diversity
	151604	Unable to initialise the Chrysalis.
	151605	Unable to access de-inter-lacer

Example	`DS:> 1516`
	`151600:`
	`Test OK @`	

Nucleus Name	**DS_HDMI_FLI2310_ExtendedWrite**	
Nucleus Number	1517	
Description	Write to any register of the FLI2310	
Technical	-	
Execution Time	Less than 1 second.	
User Input	<Register> <RegLen:1=8bits;2=16bits> <Data>	
Error	Number	Description
	151700	The IIC write action succeeded
	151701	Failed to retrieve the hardware diversity string
	151702	Failed to initialise the IIC communication
	151703	The hardware was not detected although indicated by Diversity
	151704	Decoding register unsigned value failed
	151705	Decoding register length unsigned value failed
	151706	Decoding register data unsigned value failed
	151707	Error writing to register

Example	`DS:> 1517 0x303 1 0x9a`
	`151700:`
	`Test OK @`	

Nucleus Name	**DS_HDMI_FLI2310_ExtendedRead**	
Nucleus Number	1518	
Description	Read from any register of the FLI2310	
Technical	-	
Execution Time	Less than 1 second.	
User Input	<Register> <RegLen:1=8bits;2=16bits>	
Error	Number	Description
	151800	The IIC read action succeeded
	151801	Failed to retrieve the hardware diversity string
	151802	Failed to initialise the IIC communication
	151803	The hardware was not detected although indicated by Diversity
	151804	Decoding register unsigned value failed
	151805	Decoding register length unsigned value failed
	151806	Error reading from the register

Example	`DS:> 1518 0x303 1`
	`151800: Data read:  0x009A`
	`Test OK @`	

Nucleus Name	**DS_HDMI_FLI2310_1080I**	
Nucleus Number	1519	
Description	Set the Faroudja FLI2310 to generate a 1080I image from the video on its inputs.	
Technical	-	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	151900	Generating the up-scaled image succeeded
	151901	Failed to retrieve the hardware diversity string
	151902	Failed to initialise the IIC communication
	151903	The hardware was not detected although indicated by Diversity
	151904	Generating the up-scaled image failed

Example	`DS:> 1519`
	`151900:`
	`Test OK @`	

Nucleus Name	**DS_HDMI_Adv7302_Communication**	
Nucleus Number	1520	
Description	Test whether communication with the ADV7320 can be established	
Technical	-	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	152000	Something is properly written so the communication is OK
	152001	Failed to retrieve the hardware diversity string
	152002	Failed to initialise the IIC communication
	152003	The hardware was not detected although indicated by Diversity
	152004	The IIC bus was not accessible
	152005	There was a timeout reading the device
	152006	The IIC acknowledge was not received
	152007	The communication with the device failed
	152008	Data read back does not match the data written
	152009	Got unknown error: xx on MIS_IIC_Read
	152010	Unable to initialise the ADV7320

Example	`DS:> 1520`
	`152000:`
	`Test OK @`	

Nucleus Name	**DS_HDMI_Adv7302_TestImageOn**	
Nucleus Number	1521	
Description	Generate a test-image using the ADV7320. Generate the test images that are present on the progressive scan DENC-IC. This can be a crosshatch test pattern (horizontal and vertical white lines are displayed against a black background) or a uniform coloured frame/field test pattern. Default is a white hatch.	
Technical	-	
Execution Time	Less than 1 second.	
User Input	Image pattern type containing the next non-case sensitive string "HATCH" or "FRAME" or nothing.	
Error	Number	Description
	152100	Test image is generated successfully
	152101	Failed to retrieve the hardware diversity string
	152102	Failed to initialise the IIC communication
	152103	The hardware was not detected although indicated by Diversity
	152104	Unable to generate image
	152105	Unable to initialise DENC
	152106	Unable to reset DENC

Example	`DS:> 1521`
	`152100:`
	`Test OK @`
	
	`DS:> 1521 FRAME`
	`152100:`
	`Test OK @`
	
	`DS:> 1521 HATCH`
	`152100:`
	`Test OK @`	

Nucleus Name	**DS_HDMI_Adv7302_TestImageOff**	
Nucleus Number	1522	
Description	Switch off test-image generation by the ADV7320	
Technical	-	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	152200	Testimage is turned off successfully
	152201	Failed to retrieve the hardware diversity string
	152202	Failed to initialise the IIC communication
	152203	The hardware was not detected although indicated by Diversity
	152204	IIC Error during writing DENC

Example	`DS:> 1522`
	`152200:`
	`Test OK @`	

Nucleus Name	**DS_HDMI_Adv7302_Routing**	
Nucleus Number	1523	
Description	Have the ADV7320 pass the video from its inputs to its outputs	
Technical	-	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	152300	Routing path is created successfully
	152301	Failed to retrieve the hardware diversity string
	152302	Failed to initialise the IIC communication
	152303	The hardware was not detected although indicated by Diversity
	152304	Unable to initialise the Chrysalis
	152305	Unable to access DENC

Example	`DS:> 1523`
	`152300:`
	`Test OK @`	

Nucleus Name	**DS_HDMI_Adv7302_ColSettingsSet**	
Nucleus Number	1524	
Description	Set the colour of the hatch- or frame-field to a different colour than the default white colour.	
Technical	-	
Execution Time	Less than 1 second.	
User Input	colour string or Y Cr Cb values: either one of the next non-case sensitive strings: - WHITE, BLACK, RED, GREEN, BLUE, YELLOW, CYAN, MAGENTA or 3 unsigned values, - hex: <0xYY> <0xUU> <0xVV> or decimal <YY> <UU> <VV>	
Error	Number	Description
	152400	Colour is set successfully
	152401	Failed to retrieve the hardware diversity string
	152402	Failed to initialise the IIC communication
	152403	The hardware was not detected although indicated by Diversity
	152404	Invalid parameters
	152405	IIC Error during writing DENC

Example	`DS:> 1524 yellow`
	`152400:`
	`Test OK @`
	
	`DS:> 1524 0x6a 0xde 0xca`
	`152400:`
	`Test OK @`	

Nucleus Name	**DS_HDMI_Adv7302_ColSettingsGet**	
Nucleus Number	1525	
Description	Get the colour settings of the hatch- or frame-field	
Technical	-	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	152500	Reading the colour settings succeeded
	152501	Failed to retrieve the hardware diversity string
	152502	Failed to initialise the IIC communication
	152503	The hardware was not detected although indicated by Diversity
	152504	IIC Error during accessing DENC

Example	`DS:> 1525`
	`152500: Colour Y Cr Cb values: 0x6A 0xDE 0xCA`
	`Test OK @`	

Nucleus Name	**DS_HDMI_Adv7302_ExtendedWrite**	
Nucleus Number	1526	
Description	Perform an IIC write action to the ADV7320	
Technical	-	
Execution Time	Less than 1 second.	
User Input	The register to write to and the data to be written: <Register> <data>	
Error	Number	Description
	152600	Writing to the register succeeded
	152601	Failed to retrieve the hardware diversity string
	152602	Failed to initialise the IIC communication
	152603	The hardware was not detected although indicated by Diversity
	152604	Decoding register unsigned value failed
	152605	Decoding data unsigned value failed
	152606	Error writing to the register

Example	`DS:> 1526 0 0x1e`
	`152600:`
	`Test OK @`	

Nucleus Name	**DS_HDMI_Adv7302_ExtendedRead**	
Nucleus Number	1527	
Description	Perform an IIC read action on the ADV7320	
Technical	-	
Execution Time	Less than 1 second.	
User Input	The register to read from: <Register>	
Error	Number	Description
	152700	Reading from the register succeeded
	152701	Failed to retrieve the hardware diversity string
	152702	Failed to initialise the IIC communication
	152703	The hardware was not detected although indicated by Diversity
	152704	Decoding register unsigned value failed
	152705	Error reading from register

Example	`DS:> 1527 0`
	`152700: Data read:  0x1E`
	`Test OK @`	

Nucleus Name	**DS_HDMI_Audio**	
Nucleus Number	1528	
Description	Set the proper audio settings to the HDMI transmitter. **Note:** When **1528 spdif** is used to set the HDMI transmitter audio settings correctly and just **103** is entered i.s.o. **103 spdif** then 'clicking' audio is heard because the Chrysalis audio decoder does not use its SPDIF-path explicitly. **Note:** Currently there is an issue in the order of the tests: - Reboot the set. - First create the video, as audio is passed alongside the video on HDMI - Create the spdif audio using nucleus **103 spdif** - Create the spdif audio settings in the HDMI transmitter using nucleus **1528 spdif** - The spdif audio will be audible - Switch off spdif audio using nucleus **104** - Create i2s audio using nucleus **103** - Create the i2s audio settings in the HDMI transmitter using nucleus **1528** or **1528 I2S** - The audio will be audible - Switch off the audio using nucleus **104**	
Technical	-	
Execution Time	Less than 1 second.	
User Input	'SPDIF' - Set the HDMI transmitter's audio path to SPDIF 'I2S' or nothing - Set the HDMI transmitter's audio path to I2S	
Error	Number	Description
	152800	Creating the proper audio settings succeeded
	152801	Failed to retrieve the hardware diversity string
	152802	Failed to initialise the IIC communication
	152803	The hardware was not detected although indicated by Diversity

Example	`DS:> 1528 i2s`
	`152800:  i2s`
	`Test OK @`
	
	`DS:> 1528 spdif`
	`152800:  spdif`
	`Test OK @`	

Nucleus Name	**DS_HDMI_ColumbusTestImage**	
Nucleus Number	1529	
Description	Have the Columbus IC generate a test image	
Technical	-	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	152900	Generating the test-image on the Columbus succeeded
	152901	Failed to retrieve the hardware diversity string
	152902	Failed to initialise the IIC communication
	152903	The hardware was not detected although indicated by Diversity
	152904	Generating the test-image on the Columbus failed
	152905	Soft reset of the Columbus failed
	152906	IIC initialisation failed
	152907	Columbus did not answer the call (reading dig. ID)

Example	`DS:> 1529`
	`152905: Soft reset of Columbus failed.`
	`Test OK @`
	
	`DS:> 1529`
	`152900:`
	`Test OK @`	

Nucleus Name	**DS_HDMI_ColumbusPass**	
Nucleus Number	1530	
Description	Have the Columbus pass the video from its inputs to its outputs	
Technical	-	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	153000	Getting the columbus to pass the video succeeded
	153001	Failed to retrieve the hardware diversity string
	153002	Failed to initialise the IIC communication
	153003	The hardware was not detected although indicated by Diversity
	153004	Getting the columbus to pass the video failed

Example	`DS:> 1530`
	`153000:`
	`Test OK @`	

Analogue Slave Processor (ASP)

Nucleus Name	**DS_ASP_Communication**	
Nucleus Number	1600	
Description	This nucleus checks the communication between the IIC controller of the Codec and the ASP.	
Technical	- Initialise IIC-bus. - Read something from ASP. - Handle the errorcode.	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	160000	Communicating with the ASP succeeded
	160001	The IIC bus was not accessible
	160002	There was a timeout reading the device
	160003	The IIC acknowledge was not received
	160004	An IIC-bus error occurred
	160005	Got unknown IIC bus error
	160006	The IIC bus initialisation failed

Example	`DS:> 1600`
	`160000:`
	`Test OK @`	

Nucleus Name	**DS_ASP_Version**	
Nucleus Number	1601	
Description	This nucleus returns the version number of the software running on the ASP or MCU and if available that of the display driver.	
Technical	- Read versions from ASP and display it.	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	160100	Retrieving the software versions succeeded
	160101	The IIC bus initialisation failed.
	160102	The IIC bus failed.
	160103	The CRC checksum of the message is wrong.

Example ASP	`DS:> 1601`
	`160100:`
	`Software version : 0.9`
	`Display driver version: 0.1`
	`Hardware version : 0x02`
	`Hardware layout : 0x03`
	`Hardware revision : 0x00`
	`Test OK @`	

Example MCU	`DS:> 1601`
	`160100:`
	`Software main version: 0.3`
	`Software sub version: 0.0`
	`Test OK @`	

Nucleus Name	**DS_ASP_RealTimeClockSetValues**	
Nucleus Number	1602	
Description	This nucleus is used to set the real time clock to the correct values.	
Technical	- Decode the user input. - Write RTC value to ASP.	
Execution Time	Less than 1 second.	
User Input	User must give time and date like this: hh:mm:ss dd/mm/yy	
Error	Number	Description
	160200	Setting the real time clock succeeded
	160201	The ASP initialisation failed.
	160202	The IIC bus failed.
	160203	Wrong user input.

Example	`DS:> 1602 03:20:01 22/06/03`
	`160200:`
	`Test OK @`	

Nucleus Name	**DS_ASP_RealTimeClockGetValues**	
Nucleus Number	1603	
Description	This nucleus is used to retrieve the actual real time from the ASP	
Technical	- Read RTC value from ASP. - Decode the RTC value.	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	160300	Retrieving the real time succeeded
	160301	The ASP initialisation failed.
	160302	The IIC bus failed.
	160303	The CRC checksum of the message is wrong.
	160304	The Real Time Clock has been found invalid or was not found.

Example	`DS:> 1603`
	` Time: 03:20:17`
	` Date: 22/06/03 (dd/mm/yy)`
	`160300:`
	`Test OK @`	

Nucleus Name	**DS_ASP_RealTimeClockAdjustment**	
Nucleus Number	1605	
Description	This nucleus sets a test signal for clock crystal measurement. The signal with a frequency of 1 kHz and duty cycle of 50% appears on pin RCC.	
Technical	- Send ‘Clock Adjustment’ command to the ASP.	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	160500	The test succeeded
	160501	The ASP initialisation failed.
	160502	The IIC bus failed.

Example	`DS:> 1605`
	`160500:`
	`Test OK @`	

Nucleus Name	**DS_ASP_NTCGet**	
Nucleus Number	1606	
Description	This nucleus reads the value of the NTC-resistor connected to the ASP, which tells the ambient temperature to the processor.	
Technical	- Read the ADC input pin of the ASP that is connected to the NTC-resistor. - Display this value.	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	160600	Getting the NTC-value succeeded
	160601	The IIC bus failed

Example	`DS:> 1606`
	`160600: Temperature(NTC) ADC input value = 0x94`
	`Test OK @`	

Nucleus Name	**DS_ASP_FanSpeedSet**	
Nucleus Number	1607	
Description	This nucleus sets the speed of the fan that controls the temperature within the set.	
Technical	- Decode user input. - Set pio-pins FAN_C1 and FAN_C2.	
Execution Time	Less than 1 second.	
User Input	Speed to be set: off, low, medium, high	
Error	Number	Description
	160700	Setting the new fan speed succeeded
	160701	The IIC bus failed
	160702	The user provided wrong input

Example	`DS:> 1607 low`
	`160700:`
	`Test OK @`	

Nucleus Name	**DS_ASP_LightDisplay**	
Nucleus Number	1608	
Description	This nucleus lights the entire display.	
Technical	- Set all segments on in the display buffer. - Set the grids correct in the display buffer. - Send the display buffer to the ASP.	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	160800	Lighting the entire display succeeded
	160801	IIC-bus communication failed

Example	`DS:> 1608`
	`160800:`
	`Test OK @`	

Nucleus Name	**DS_ASP_BlinkDisplay**	
Nucleus Number	1609	
Description	This nucleus lights the entire display, and lets it blink. Only for ASP	
Technical	- Set all segments on in the blink buffer. - Set the grids correct in the blink buffer. - Send the blink buffer to the ASP.	
Execution Time	Less than 1 second.	
User Input	None or ‘on’ to start the blinking of the display. ‘off’ To stop the blinking of the display.	
Error	Number	Description
	160900	The test succeeded
	160901	IIC-bus communication failed
	160902	The user provided wrong input

Example ASP	`DS:> 1609`
	`160900:`
	`Test OK @`
	
	`DS:> 1609 off`
	`160900:`
	`Test OK @`	

Example MCU	`DS:> 1609`
	`160900: Empty function`
	`Test OK @`	

Nucleus Name	**DS_ASP_DimmingDisplay**	
Nucleus Number	1610	
Description	This nucleus lights the entire display, and dims it.	
Technical	- Change in a loop the display brightness from maximum to minimum.	
Execution Time	Less than 1 second.	
User Input	‘ON’ or ‘OFF’	
Error	Number	Description
	161000	The test succeeded
	161001	IIC-bus communication failed
	161002	The user provided wrong input

Example	`DS:> 1610 ON`
	`161000:`
	`Test OK @`	

Nucleus Name	**DS_ASP_ClearDisplay**	
Nucleus Number	1611	
Description	This nucleus clears the display and deactivates dimming/blinking functionality	
Technical	- Make the display buffer empty. - Make the blink buffer empty. - Send the display buffer to the ASP. - Send the blink buffer to the ASP.	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	161100	The test succeeded
	161101	IIC-bus communication failed

Example	`DS:> 1611`
	`161100:`
	`Test OK @`	

Nucleus Name	**DS_ASP_KeyBoard**	
Nucleus Number	1612	
Description	This nucleus checks all keys of the keyboard by having the user confirm the key-code displayed of all keys. If the user presses ‘a’ or ‘A’ the test is aborted. If the user presses ‘o’ or ‘O’ the test is indicated as OK. If the user holds down ‘PLAY’ for more than a second the test is indicated as OK, if the user holds down ‘RECORD’ the test is indicated as failed. Indicate the number of keys pressed to the user, both in the terminal logging and on the display.	
Technical	- Initialise the display. - Display the key pressed by the user on the display. - Monitor the service port for an abort and get the next key pressed. - Update the display and repeat previous steps until user stops / confirms. - Display the number of keys that were pressed.	
Execution Time	Depends on the user.	
User Input	None	
Error	Number	Description
	161200	Checking all keys succeeded
	161201	IIC-bus communication failed
	161202	The user signals a failure of the keyboard
	161203	The user aborted the test

Example	`DS:> 1612`
	`161200: 3 keys were pressed.`
	`Test OK @`	

Nucleus Name	**DS_ASP_RemoteControl**	
Nucleus Number	1613	
Description	This nucleus checks the interface to the remote control by having the user confirm the key-code displayed. At least one key must be tested. If the user presses ‘a’ or ‘A’ the test is aborted. If the user presses ‘o’ or ‘O’ the test is indicated as OK. If the user holds down ‘PLAY’ for more than a second the test is indicated as OK, if the user holds down ‘RECORD’ the test is indicated as failed. Indicate the number of keys pressed to the user, both in the terminal logging and on the display.	
Technical	- Initialise the display. - Display the key pressed by the user on the display. - Monitor the service port for an abort and get the next key pressed. - Update the display and repeat previous steps until user stops / confirms. - Display the number of keys that were pressed.	
Execution Time	Depends on the user.	
User Input	None	
Error	Number	Description
	161300	The test succeeded
	161301	IIC-bus communication failed
	161302	The user signals a failure of the remote control
	161303	The user aborted the test

Example	`DS:> 1613`
	`161300: 4 keys were pressed.`
	`Test OK @`	

Nucleus Name	**DS_ASP_LEDsOn**	
Nucleus Number	1614	
Description	Switches on the display leds.	
Technical	ASP specific - Check if the analogue board is a MOBO board, if so: - Read the ASP pio port. - Set the RECORD-LED bit on in this port. - Write the ASP pio port. - Read the ASP pio port. - Set the TRAY-LED bit on in this port. - Write the ASP pio port. - Read the ASP pio port. - Set the EPG-LED bit on in this port. - Write the ASP pio port. - Else - Set the RECORD-LED bit on. - Write the external ASP pio port. - Set the TRAY-LED bit on. - Write the external ASP pio port. - Set the EPG-LED bit on. - Write the external ASP pio port. MCU Specific - Get the user input and capitalize it and check validity - Check which lights should be turned on - Write the command to the MCU	
Execution Time	Less than 1 second.	
User Input	None, Green or Red: Choose which colour of the bi-led should be lit with the rest (only for OLAL22PREMIER variant)	
Error	Number	Description
	161400	Switching on the LEDs succeeded
	161401	IIC-bus communication failed
	161402	Invalid parameter

Example	`DS:> 1614`
	`161400:`
	`Test OK @`	

Nucleus Name	**DS_ASP_LEDsOff**	
Nucleus Number	1615	
Description	This nucleus switches off the display leds.	
Technical	ASP specific - Check if the analogue board is a MOBO board, if so: - Read the ASP pio port. - Set the RECORD-LED bit off in this port. - Write the ASP pio port. - Read the ASP pio port. - Set the TRAY-LED bit off in this port. - Write the ASP pio port. - Read the ASP pio port. - Set the EPG-LED bit off in this port. - Write the ASP pio port. - Else - Set the RECORD-LED bit off. - Write the external ASP pio port. - Set the TRAY-LED bit off. - Write the external ASP pio port. - Set the EPG-LED bit off. - Write the external ASP pio port. MCU Specific - Write the command to the MCU to turn all display leds off	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	161500	Switching off the LEDs succeeded
	161501	IIC-bus communication failed

Example	`DS:> 1615`
	`161500:`
	`Test OK @`	

Nucleus Name	**DS_ASP_Reset**	
Nucleus Number	1616	
Description	This nucleus resets the ASP.	
Technical	- Reset the ASP by toggling the reset wire by a GPIO pin of the codec. - Wait 500ms according to the HSI. - Read Status from ASP. - Put ASP in normal mode. - Configure general ASP PIO. - Make a ASP pio pin low to read the version. - Get GPP40 - GPP47 and GPP48 - GPP55. - Decode hardware version, revision, and layout. - Configure the ASP clock. - Configure display, part 1. - Configure display, part 2. - Configure blinking. - Configure external ASP PIO. - Configure ADC input. - Configure remote control input. - Enable power on the AV3.	
Execution Time	3 seconds.	
User Input	None	
Error	Number	Description
	161600	Reset command succeeded
	161601	IIC-bus communication failed

Example	`DS:> 1616`
	`161600:`
	`Test OK @`	

Nucleus Name	**DS_ASP_Watchdog**	
Nucleus Number	1618	
Description	This nucleus configures the watchdog timer of the ASP, and waits till the watchdog expires. The watchdog time-out is 10 seconds. On expiry of the watchdog timer, the ASP switching off, and on its power supply, and resets the main controller. So, this nucleus will not return an error code when the test succeeded, but the system will restart again.	
Technical	- Configure watchdog timer. - Wait till the watchdog expired.	
Execution Time	10 seconds.	
User Input	None	
Error	Number	Description
	161801	IIC-bus communication failed.
	161802	The ASP did not reset the host processor.
Example	DS:> 1618 Waiting till the watchdog expires. Factory Diagnostics and Service Software DVD Video Recorder (Sep 10 2004, 08:11:24) Version :662 Build :20040910_0515 Release :C1_1 Buildtype :no Baseline :F_C1_195 Variant :verum:dvdrw2_lib DS:>	

Nucleus Name	**DS_ASP_Reboot**	
Nucleus Number	1619	
Description	This command forces a reboot of the main controller. The ASP shutdown the digital board power supply and then switch it on to force reset. So, this nucleus will not return an error code when the test succeeded, but the system will restart again.	
Technical	- Send command reboot to ASP.	
Execution Time	2 seconds.	
User Input	None	
Error	Number	Description
	161901	IIC-bus communication failed.
	161902	The ASP did not reset the host processor.
Example	DS:> 1619 Factory Diagnostics and Service Software DVD Video Recorder (Sep 10 2004, 08:11:24) Version :662 Build :20040910_0515 Release :C1_1 Buildtype :no Baseline :F_C1_195 Variant :verum:dvdrw2_lib DS:>	

Nucleus Name	**DS_ASP_DetectVideo**	
Nucleus Number	1620	
Description	Checks if an active video signal is available on the CVBS input of SCART 1 or SCART 2.	
Technical	- Read out the WU ADC pin on the ASP	
Execution Time	2 seconds.	
User Input	None	
Error	Number	Description
	162000	Detecting the Active video succeeded.
	162001	Detecting the Active video failed.
	162002	This test is not applicable for current HW layout.
	162003	Could not retrieve hardware version from ASP.
Example	DS:> 1620 162000: Active video is ON Test OK @	

Nucleus Name	**DS_ASP_GlinkRcLoop**	
Nucleus Number	1621	
Description	Checks if an RC command can be transmitted via the G-Link connector and test if the sent command can be read back. The user must connect the G-Link to the rear G-Link connector and place the RC transmitter in front of the RC receiver of the front panel.	
Technical	- Send IR data to the ASP. - Check the RC input of the ASP.	
Execution Time	2 seconds.	
User Input	None	
Error	Number	Description
	162100	Detecting the Active video succeeded.
	162101	Sending RC command failed.
	162102	Receiving RC command failed.
	162103	No RC command was received
	162104	Could not retrieve hardware version from ASP

Example	`DS:> 1621`
	`162100:`
	`Test OK @`	

<table>
<tr><td>Nucleus Name</td><td>DS_ASP_VcrControl</td></tr>
<tr><td>Nucleus Number</td><td>1622</td></tr>
<tr><td>Description</td><td>This nucleus makes it possible to control the VCR module. It puts the VCR module into specified operation. It configures VCR play parameters. It configures VCR record parameters. It returns the status of the VCR module.</td></tr>
<tr><td>Technical</td><td>- Get the parameters from the user input and then execute the correct test</td></tr>
<tr><td>Execution Time</td><td>1 seconds.</td></tr>
<tr><td>User Input</td><td><Command> <parameters>
1 Command:

OPERATE:
<table>
<tr><th>User input</th><th>Meaning of value</th></tr>
<tr><td>0</td><td>Stop</td></tr>
<tr><td>1</td><td>Eject</td></tr>
<tr><td>2</td><td>Play</td></tr>
<tr><td>3</td><td>Pause</td></tr>
<tr><td>4</td><td>Fast Forward (FF)</td></tr>
<tr><td>5</td><td>Rewind (REW)</td></tr>
<tr><td>6</td><td>Slow</td></tr>
<tr><td>7</td><td>Enter Index Search</td></tr>
<tr><td>8</td><td>Forward Index Search</td></tr>
<tr><td>9</td><td>Reverse Index Search</td></tr>
<tr><td>10</td><td>Record (REC)</td></tr>
<tr><td>11</td><td>DVDR->VCR Dubbing Standby</td></tr>
<tr><td>12</td><td>VCR->DVDR Dubbing Standby</td></tr>
<tr><td>13</td><td>Start Dubbing</td></tr>
<tr><td>14</td><td>Cancel Dubbing</td></tr>
<tr><td>15</td><td>Reserved</td></tr>
<tr><td>16</td><td>Increase Tracking Value</td></tr>
<tr><td>17</td><td>Decrease Tracking Value</td></tr>
<tr><td>18</td><td>Restore Default Tracking Value</td></tr>
<tr><td>19</td><td>Cancel Tracking</td></tr>
<tr><td>20-31</td><td>Reserved</td></tr>
</table>
SETUPPLAY: (One byte)
<table>
<tr><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
<tr><td>N.U.</td><td colspan="3">HiFiAudioSelect</td><td colspan="2">SmartPicture</td><td colspan="2">Videosystem</td></tr>
</table>
VideoSystem: (Selects type of video system for playback.)
0 Auto
1 SECAM
2 PAL
3 ME-SECAM

SmartPicture: (Selects how video is enhanced during playback.)
0 Natural
1 Distinct
2 Soft
3 Sharp

HiFiAudioSelect: (type of audio for playback of recorded HiFi tape.)
0 Stereo left & right channels
1 Left channel only
2 Right channel only
3 Mono channel
4 Mixed left & right channels
5..7 Reserved

NotUsed:</td></tr>
</table>

User Input Continued

SETUPRECORD: (One Byte)

7	6	5	4	3	2	1	0
Not Used		T.E.	S.	M.A.	A.	VideoSys	

VideoSystem:
Selects type of video system to record.
Value range: [0..3]
Default value: 0
Meaning of values:
0Auto
1 SECAM
2 PAL
3 ME-SECAM

Aspect:
Selects video aspect ratio during DVDR→VCR dubbing.
Value range: [0..1]
Default value: 0
Meaning of values:
0 4:3
1 16:9

MonoAudio:
Selects type of audio to record on monoaural audio track.
Value range: [0..1]
Default value: 0
Meaning of values:
0 Mixed left & right channels
1 Left channel only

Speed:
Selects tape speed for recording.
Value range: [0..1]
Default value: 0
Meaning of values:
0 SP
1 LP

TapeEnd:
Selects how tape end condition is handled during recording.
Value range: [0..1]
Default value: 0
Meaning of values:
0 Auto-rewind and go to Stop
1 Eject and go to Stop

NotUsed:

STATUS:
No Parameters needed

Error	Number	Description
	162200	succeeded.
	162201	The IIC bus failed.
	162202	The CRC checksum of the message is wrong.
	162203	Invalid parameter.

Example

```
DS:> 1622 operate 0
162200:
Test OK @
```

Analogue Board EEPROM (AROM)

Nucleus Name	**DS_AROM_Communication**	
Nucleus Number	1700	
Description	Check the communication between the IIC controller of the Codec and the EEPROM	
Technical	- Initialise IIC - Read from a location in AROM	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	170000	Something is properly read so the communication is OK
	170001	The IIC bus was not accessible
	170002	There was a timeout reading the device
	170003	The IIC acknowledge was not received
	170004	The communication with the device failed
	170005	The IIC bus failed
	170006	The IIC bus initialisation failed

Example	`DS:> 1700`
	`170000:`
	`Test OK @`	

Video Matrix (VMIX)

Nucleus Name	**DS_VMIX_Communication**	
Nucleus Number	1800	
Description	This nucleus checks the communication between the IIC controller of the Codec and the Video Matrix on the analogue board	
Technical	- Try to read anything from the video matrix by means of IIC	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	180000	Communicating wit the Video Matrix succeeded
	180001	An IIC-bus error occurred
	180002	There was a timeout reading the device
	180003	The IIC bus was not accessible
	180004	The IIC acknowledge was not received
	180005	There was an IIC error upon the stop-condition
	180006	The IIC bus was chosen wrong
	180007	The IIC functionality is not running
	180008	An unknown error was returned

Example	`DS:> 1800`
	`180000:`
	`Test OK @`	

Nucleus Name	**DS_VMIX_Routing**	
Nucleus Number	1801	
Description	This nucleus performs the routing of the video signals in the set. It sets the video path according to the user input.	
Technical	- Determine whether the set is NAFTA/APAC or EUROPE - Switch the videomatrix according to the input specified by the user	
Execution Time	Less than 1 second.	
User Input	The user inputs the path Id of choice, as specified in tables below for Europe/NAFTA-APAC	
Error	Number	Description
	180100	Routing the video path succeeded
	180101	The user provided wrong input
	180102	There was no response from the video matrix
	180103	Could not retrieve region from analogue slave processor

Example	`DS:> 1801 00`
	`180100:`
	`Test OK @`	

*Table 6: Available VIDEO path-Ids for **EUROPE** routing*

EURO Path ID	Description
	(DbOut=Digital Board Output, DbIn = Digital Board Input)
00	DbOut-CVBS/YC/RGB to RearOut-CVBS/YC and Scart_1-RGB.
01	- DbOut-CVBS to RearOut-CVBS. - FrontIn-CVBS to DbIn-CVBS. - FrontIn-CVBS to VcrIn-CVBS. (If a VCR module is present)
02	- DbOut-YC to RearOut-YC. - FrontIn-YC to DbIn-YC.
03	- DbOut-CVBS to Scart_1-CVBS. - Scart_2-CVBS to DbIn-CVBS. - Scart_2-CVBS to VcrIn-CVBS. (If a VCR module is present)
04	- DbOut-YC to Scart_1-YC. - Scart_2-YC to DbIn-YC. - Scart_2-YC to VcrIn-YC. (If a VCR module is present)
05	- DbOut-RGB to Scart_1-RGB. - Scart_2-RGB to DbIn-RGB.
06	- DbOut-CVBS to RearOut-CVBS. - Tuner-CVBS to DbIn-CVBS. - Tuner-CVBS to VcrIn-CVBS. (If a VCR module is present)
07	- DbOut-CVBS to DbIn-CVBS. - DbOut-CVBS to VcrIn-CVBS. (If a VCR module is present
08	DbOut-PSCAN to RearOut-YUV.
09	DbOut-YUV to RearOut-YUV.
10	- DbOut-CVBS to Scart_2-CVBS. - Scart_1-CVBS to DbIn-CVBS.
11	- DbOut-YC to Scart_2-YC. - Scart_1-YC to DbIn-YC.
12	Scart_2-RGB to Scart_1-RGB.
13	Scart_2-CVBS to Scart_1-CVBS.
14	Scart_1-CVBS to Scart_2-CVBS.

*Table 7: Available VIDEO path-Ids for **NAFTA / APAC** routing*

NAFTA PathID	Description
	(DbOut=Digital Board Output, DbIn = Digital Board Input)
00	DbOut-CVBS/YC/YUV to RearOut-CVBS/YC/YUV.
01	- DbOut-CVBS to RearOut-CVBS. - FrontIn-CVBS to DbIn-CVBS.
02	- DbOut-YC to RearOut-YC. - FrontIn-YC to DbIn-YC.
03	- DbOut-CVBS to RearOut-CVBS. - RearIn-CVBS to DbIn-CVBS.
04	- DbOut-YC to RearOut-YC. - RearIn-YC to DbIn-YC.
05	- DbOut-YUV to RearOut-YUV. - RearIn-YUV to DbIn-YUV.
06	- DbOut-CVBS to RearOut-CVBS. - Tuner-CVBS to DbIn-CVBS.
07	DbOut-CVBS to DbIn-CVBS.
08	DbOut-PSCAN to RearOut-YUV.

Nucleus Name	**DS_VMIX_FastBlankingCheck**	
Nucleus Number	1803	
Description	Check if the Fast Blanking signal can be set low and high. The user must connect SCART2 (pin16) to SCART1 (pin16) on the outside of the set. Works on EURO sets only.	
Technical	- Set the Fast blanking pin of the Video Matrix low - Measure the value on the ASP Fast blanking input ADC - Set the Fast blanking pin of the Video Matrix high - Measure the value on the ASP Fast blanking input ADC	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	180300	Detecting Fast blanking signal succeeded
	180301	Detecting Fast blanking signal failed
	180302	This test is not applicable for current HW layout
	180304	Could not retrieve hardware version from AS

Example	`DS:> 1803`
	`180300:`
	`Test OK @`	

Nucleus Name	**DS_VMIX_8SC2Check**	
Nucleus Number	1804	
Description	Check if the 8SC2 signal (slow blanking) can be set low, medium and high. The user must connect SCART2 (pin8) to SCART1 (pin8) on the outside of the set. Works on EURO sets only.	
Technical	- Set the Digital out 3 pin of the Video Matrix low - Measure the value on the ASP 8SC2 input ADC - Set the Digital out 3 pin of the Video Matrix to medium level - Measure the value on the 8SC2 input ADC - Set the Digital out 3 pin of the Video Matrix high - Measure the value on the ASP 8SC2 input ADC	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	180400	Detecting 8SC2 signal succeeded
	180401	Detecting 8SC2 signal failed
	180402	This test is not applicable for current HW layout
	180403	Could not retrieve hardware version from AS

Example	`DS:> 1804`
	`180400:`
	`Test OK @`	

Nucleus Name	**DS_VMIX_WideScreenSignallingCheck**	
Nucleus Number	1805	
Description	Check if the wide screen signal can be set low and high The user must specify if he uses the Rear In-YC or the Front In-YC. Before starting this nucleus, Rear Out-YC must be connected to Rear In-YC to Front In-YC. Works on NAFTA and APAC sets only.	

Technical	- Check user input
	- In case of Rear In YC
	  - Set the Digital out 5 & 6 pin of the Video Matrix low
	  - Measure the value on the ASP AIN0 input ADC
	  - Set the Digital out 5 to HIGH and 6 to LOW
	  - Measure the value on the ASP AIN0 input ADC
	- In case of Front In YC
	  - Set the Digital out 5 to HIGH and 6 to LOW
	  - Measure the value on the ASP AIN1 input ADC
	  - Set the Digital out 5 to HIGH and 6 to HIGH
	  - Measure the value on the ASP AIN1 input ADC	

Execution Time	Less than 1 second	
User Input	The route to check i.e. - "REAR": to test the Rear In-YC - "FRONT": to test the Front In-YC	
Error	Number	Description
	180400	Detecting wide screen signal succeeded
	180401	Detecting wide screen signal failed
	180402	This test is not applicable for current HW layout
	180403	Could not retrieve hardware version from ASP
	180404	Invalid user input

Example	`DS:> 1805 rear`
	`180500:`
	`Test OK @`	

Audio Matrix (Sound Processor) (AMIX)

Nucleus Name	**DS_AMIX_Communication**	
Nucleus Number	1900	
Description	This nucleus checks the communication between the IIC controller of the Codec and the Audio Matrix (sound processor) on the analogue board	
Technical	- Test whether anything can be read from the sound processor	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	190000	Communicating wit the Audio Matrix succeeded
	190001	An IIC-bus error occurred
	190002	There was a timeout reading the device
	190003	The IIC bus was not accessible
	190004	The IIC acknowledge was not received
	190005	There was an IIC error upon the stop-condition
	190006	The IIC bus was chosen wrong
	190007	The IIC functionality is not running
	190008	An unknown error was returned

Example	`DS:> 1900`
	`190000:`
	`Test OK @`	

Nucleus Name	**DS_AMIX_Routing**	
Nucleus Number	1901	
Description	This nucleus performs the routing of the audio signals in the set. It sets the audio path according to the user input.	
Technical ASP	- Determine whether the set is of type NAFTA-APAC or EUROPE - Parse the user input to determine the routing - According to parameters set the sound processor and multiplexers	
Technical MCU	- Determine whether the set is of type NAFTA-APAC or EUROPE - Configure the UDA1380 - Parse the user input to determine the routing - According to parameters set the sound processor and multiplexers	
Execution Time	Less than 1 second.	
User Input	The user inputs the path ID of his/her choice, as specified in tables below for Europe/NAFTA	
Error	Number	Description
	190100	Routing the audio path succeeded
	190101	Routing the audio path failed
	190102	There was an error resetting the sound processor
	190103	The user provided wrong input
	190104	There was no response from the ASP

Example	`DS:> 1901 00`
	`190100:`
	`Test OK @`	

*Table 8: Available AUDIO path-Ids for **EUROPE** routing*

EURO Path ID	Description
	(DbOut=Digital Board Output, DbIn = Digital Board Input)
00	DbOut to All Outs.
01	- DbOut to RearOut for CVBS/YC, and RearOut for YUV. - FrontIn to DbIn. - FrontIn to VcrIn. (If a VCR module is present)
02	- DbOut to Scart_1-AOut. - Scart_2-AIn to DbIn. - Scart_2-AIn to VcrIn. (If a VCR module is present)
03	- DbOut to Scart_2-AOut. - Scart_1-AIn to DbIn. - Scart_1-AIn to VcrIn. (If a VCR module is present)
04	- DbOut to RearOut for CVBS/YC. - Tuner to DbIn. - Tuner to VcrIn. (If a VCR module is present)
05	DbOut to RearOut-5.1.
06	DbOut to DbIn
07	Scart_2-AIn to Scart_1-AOut.
08	Scart_1-AIn to Scart_2-AOut.
09	VcrOut to DbIn (If a VCR module is present)

*Table 9: Available AUDIO path-Ids for **NAFTA / APAC** routing*

NAFTA PathID	Description
	(DbOut=Digital Board Output, DbIn = Digital Board Input)
00	DbOut to All Outputs.
01	- DbOut to RearOut for CVBS/YC, and RearOut for YUV. - FrontIn to DbIn.
02	- DbOut to RearOut for CVBS/YC, and RearOut for YUV. - RearIn1 (**EXT2**) for CVBS/YC to DbIn.
03	- DbOut to RearOut for CVBS/YC, and RearOut for YUV. - RearIn2 (**EXT1**) for YUV to DbIn.
04	- DbOut to RearOut for CVBS/YC, and RearOut for YUV. - Tuner to DbIn.
05	DbOut to RearOut-5.1.
06	DbOut to DbIn.

Nucleus Name	**DS_AMIX_VersionGet**	
Nucleus Number	1902	
Description	This nucleus gets the version information from the sound processor.	
Technical	- Read the information from the sound processor using IIC	
Execution Time	Less than 1 second	
User Input	-	
Error	Number	Description
	190200	Getting the version info from the sound processor succeeded
	190201	Getting the version info from the sound processor failed

Example	`DS:> 1902`
	`Hardware Version:0x 2,  Revision Code   :0x 7`
	`MSP Product Code:0x19,  ROM Version Code:0x48`
	`190200:`
	`Test OK @`	

Nucleus Name	**DS_AMIX_Control**	
Nucleus Number	1903	
Description	Test the controllability of the sound processor by performing a controlled reset	
Technical	Test the control register, contains 0x80 after reset and 0x0 after first read of this control register. MSP is reset and the control register is tested for the 0x80 reset indication	
Execution Time	1 second	
User Input	None	
Error	Number	Description
	190300	Testing the controllability succeeded
	190301	Accessing the MSP failed
	190302	Accessing the MSP succeeded, but wrong data was returned

Example	`DS:> 1903`
	`190300:`
	`Test OK @`	

Note	**European sets only !!**	
Nucleus Name	**DS_AMIX_Beep**	
Nucleus Number	1904	
Description	Test the beeper functionality of the sound processor	
Technical	-	
Execution Time	3 seconds	
User Input	'ON' or 'OFF'	
Error	Number	Description
	190400	Testing the beeper succeeded
	190401	Testing the beeper failed
	190402	There was an error routing the test path
	190402	The user provided the wrong input

Example	`DS:> 1904 ON`
	`190400:`
	`Test OK @`	

Nucleus Name	**DS_AMIX_CommunicationAdcDac**	
Nucleus Number	1906	
Description	This nucleus checks the communication between the IIC controller of the Codec and the ADC/DAC chip (UDA 1380) on the analogue board	
Technical	- Test whether anything can be read from the ADC/DAC	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	190600	Communicating with the ADC/DAC succeeded
	190601	The IIC bus was not accessible
	190602	There was a timeout reading the device
	190603	The IIC acknowledge was not received
	190604	An IIC-bus error occurred
	190605	Got unknown IIC bus error
	190606	The IIC bus initialisation failed

Example	`DS:> 1906`
	`190600:`
	`Test OK @`	

Nucleus Name	**DS_AMIX_Mute**	
Nucleus Number	1907	
Description	Set or unset the master mute of the ADC/DAC chip (UDA 1380) on the analogue board	
Technical	- Send the master mute command via IIC	
Execution Time	Less than 1 second.	
User Input	'ON' or 'OFF'	
Error	Number	Description
	190700	Muting the sound processor succeeded
	190701	Muting sound processor failed

Example	`DS:> 1907`
	`190700:`
	`Test OK @`	

Frontend (Tuner) (FRE)

Nucleus Name	**DS_FRE_Communication**	
Nucleus Number	2000	
Description	This nucleus checks the communication between the IIC controller of the Codec and the Front End (Tuner) on the analogue board	
Technical	- Determine whether anything can be read from the FRE through IIC	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	200000	Communicating with the front end succeeded
	200001	The IIC bus was not accessible
	200002	There was a timeout reading the device
	200003	The IIC acknowledge was not received
	200004	An IIC-bus error occurred
	200005	Got unknown IIC bus error
	200006	The IIC bus initialisation failed

Example	`DS:> 2000`
	`200000:`
	`Test OK @`	

<table>
<tr><td>Nucleus Name</td><td colspan="2">DS_FRE_ChannelSelect</td></tr>
<tr><td>Nucleus Number</td><td colspan="2">2001</td></tr>
<tr><td>Description</td><td colspan="2">This nucleus sets the tuner to receive a valid audio and video signal</td></tr>
<tr><td>Technical</td><td colspan="2">- Parse the user input to determine all parameters to set
- Pass these parameters to the respective parts using IIC</td></tr>
<tr><td>Execution Time</td><td colspan="2">Less than 1 second</td></tr>
<tr><td>User Input</td><td colspan="2"><Frequency*16> <video standard id> <Tuner>

Tuner frequency: to tune the tuner to e.g. 216 MHz, this parameter must be 3456. (Since 216*16 = 3456. This is to avoid the decimal points to the parameter list.)

<table>
<tr><th>Name</th><th>Colour system</th><th>Transmission standard</th><th>Sound modulation</th></tr>
<tr><td>PAL_BG_S</td><td>PAL</td><td>BG</td><td>FM-Stereo</td></tr>
<tr><td>PAL_BG_M</td><td>PAL</td><td>BG</td><td>FM-Mono / NICAM</td></tr>
<tr><td>PAL_I_M</td><td>PAL</td><td>I</td><td>FM-Mono / NICAM</td></tr>
<tr><td>PAL_DK_S</td><td>PAL</td><td>DK</td><td>FM-Stereo</td></tr>
<tr><td>PAL_DK_M</td><td>PAL</td><td>DK</td><td>FM-Mono / NICAM</td></tr>
<tr><td>NTSC_M_S</td><td>NTSC</td><td>M</td><td>FM-Stereo</td></tr>
</table>

Video Standard ID: The table below shows which video standards are possible
<table>
<tr><th>ID</th><th>Europe</th><th>Nafta / Apac</th></tr>
<tr><td>0</td><td>PAL_BG_S</td><td>NTSC</td></tr>
<tr><td>1</td><td>PAL_BG_M</td><td>Invalid</td></tr>
<tr><td>2</td><td>PAL_I_M</td><td>Invalid</td></tr>
<tr><td>3</td><td>PAL_DK_S</td><td>Invalid</td></tr>
<tr><td>4</td><td>PAL_DK_M</td><td>Invalid</td></tr>
</table>

Tuner: Select the tuner type that you want to tune. This input is not mandatory. (If no input is detected, tuner will be defined run-time (if recognised).)

<table>
<tr><th>Tuner</th><th>Tuner ID</th><th>Runtime Detected</th></tr>
<tr><td>1</td><td>FE1316 (Europe Philips)</td><td>V</td></tr>
<tr><td>2</td><td>FE1319 (Europe Philips)</td><td>V</td></tr>
<tr><td>3</td><td>TMQZ2-403A (Europe ALPS)</td><td></td></tr>
<tr><td>4</td><td>JS6B2-L121 (Europe Xuguang)</td><td></td></tr>
<tr><td>5</td><td>TCPK0601 (APAC Samsung)</td><td></td></tr>
<tr><td>6</td><td>TCMN0682 (NAFTA Samsung)</td><td>V</td></tr>
<tr><td>7</td><td>TCPK0600 (APAC Samsung)</td><td></td></tr>
<tr><td>8</td><td>TCPD0601 (APAC Samsung)</td><td></td></tr>
<tr><td>9</td><td>VPC12R_ENG56PPG1F (Panasonic)</td><td></td></tr>
</table>
</td></tr>
<tr><td>Error</td><td>Number</td><td>Description</td></tr>
<tr><td></td><td>200100</td><td>Setting the tuner channel succeeded</td></tr>
<tr><td></td><td>200101</td><td>Invalid user input</td></tr>
<tr><td></td><td>200102</td><td>Getting the version of the set failed</td></tr>
<tr><td></td><td>200103</td><td>Configuration of the tuner failed</td></tr>
<tr><td></td><td>200104</td><td>Configuration of the IF module failed</td></tr>
<tr><td>Example</td><td colspan="2">DS:> 2001 3456 0 1
200100:
Test OK @</td></tr>
</table>

Note	**European sets only!!**	
Nucleus Name	**DS_FRE_CommunicationIfModule**	
Nucleus Number	2003	
Description	This nucleus checks the communication with the IF(Intermediate Frequency) module of the front end	
Technical	- Determine whether the IF module can be read through IIC	
Execution Time	Less than 1 second	
User Input	<Tuner> Tuner: Select the tuner type that you want to tune. This input is not mandatory. (If no input is detected, tuner will be defined run-time (if recognised).) **Tuner** / **Tuner ID** / **Runtime Detected** 1 / FE1316 (Europe Philips) / V 2 / FE1319 (Europe Philips) / V 3 / TMQZ2-403A (Europe ALPS) /	
Error	Number	Description
	200300	Communicating with the front end succeeded
	200301	The IIC bus was not accessible
	200302	There was a timeout reading the device
	200303	The IIC acknowledge was not received
	200304	An IIC-bus error occurred
	200305	Got unknown IIC bus error
	200306	The IIC bus initialisation failed
	200307	Not a Europe set

Example	`DS:> 2003 3`
	`200300:`
	`Test OK @`	

Hard Disk Drive (HDD)

Nucleus Name	**DS_HDD_Communication**	
Nucleus Number	2100	
Description	Check the communication between the digital board and the hard disk drive by querying the device type of the hard disk drive	
Technical	- Initialise/start IDE - Check for an ATA device on the IDE interface	
Execution Time	3 seconds	
User Input	None	
Error	Number	Description
	210000	Communication with the hard disk drive succeeded
	210001	The initialisation of IDE failed
	210002	Communication with the hard disk drive failed

Example	`DS:> 2100`
	`210000: Found a hard disk drive: MASTER device on IDE interface 1`
	`Test OK @`	

Nucleus Name	**DS_HDD_Reset**	
Nucleus Number	2101	
Description	Reset the hard disk drive	
Technical	- Initialise/start IDE - Check for an ATA device on the IDE interface - Toggle the IDE reset pin of the selected interface	
Execution Time	1 second	
User Input	None	
Error	210100	Resetting the hard disk drive succeeded
	210101	The initialisation of IDE failed
	210102	Communication with the hard disk drive failed
	210103	Failed to reset the hard disk drive

Example	`DS:> 2101`
	`210100: Resetting IDE interface 1 succeeded`
	`Test OK @`	

Nucleus Name	**DS_HDD_VersionGet**	
Nucleus Number	2102	
Description	Get the vendor- and product identification and the product revision level of the hard disk drive	
Technical	- Initialise/start IDE - Send ATA command IDENTIFY DRIVE - Display the serial, firmware revision and model information	
Execution Time	Less than 1 second.	
User Input	None	
Error	210200	Version info successfully
	210201	The initialisation of IDE failed
	210202	Communication with the hard disk drive failed
	210203	Failed to get version info from the hard disk drive

Example	`DS:> 2102`
	`210200: Serial number = F19LP8WE,Firmware rev. = VAM51JJ0 ,Model nu`
	`mber = Maxtor 2F040L0`
	`Test OK @`	

Nucleus Name	**DS_HDD_WriteRead**	
Nucleus Number	2103	
Description	Write data to the hard disk, read it back and verify the data read back.	
Technical	- Initialise/start IDE - Generate a random sector number - Generate test data to write to the disk - Read the data from the sector using READ_SECTOR(S) and store this in a temporarily buffer - Transfer the test data to the disk location using ATA command WRITE_SECTOR(S) - Read back the data from the disk location using ATA command READ_SECTOR(S) - Compare the two data areas and check whether the areas are equal - Write back the data from the temporarily buffer	
Execution Time	3 seconds	
User Input	None	
Error	210300	Version info successfully
	210301	The initialisation of IDE failed
	210302	Communication with the hard disk drive failed
	210303	Unable to retrieve device capabilities from HDD
	210304	Writing data to HDD failed
	210305	Reading back data from HDD failed
	210306	Data read back did not equal written data

Example	`DS:> 2103`
	`210300: OK, writing to sector 3f95776`
	`Test OK @`	

Nucleus Name	**DS_HDD_CapabilitiesGet**	
Nucleus Number	2104	
Description	Get the cylinders, heads and track information of the hard disk drive	
Technical	- Initialise/start IDE - Send ATA command Identify drive information - Display all required capabilities	
Execution Time	Less than 1 second.	
User Input	None	
Error	210400	Capabilities are displayed correctly
	210401	The initialisation of IDE failed
	210402	Communication with the hard disk drive failed
	210403	Failed to get information from the hard disk drive
Example	DS:> 2104 Number of cylinders 16383 Number of heads 16 Number of sectors per track 63 Capacity in sectors 80293248 Number of current cylinders 16383 Number of current heads 16 Number of current sectors per track 63 Current capacity in sectors 16514064 Number of unformatted bytes per track 0 Number of unformatted bytes per sector 0 210400: Test OK @	

Nucleus Name	**DS_HDD_Diagnostics**	
Nucleus Number	2105	
Description	Shall perform the internal diagnostic tests implemented by the hard disk drive.	
Technical	- Initialise/start IDE - Send the diagnostic (ATA) command to the HDD device	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	210500	The Diagnostic test on the hard disk drive device succeeded
	210501	The initialisation of IDE failed
	210502	The hard disk drive failed
	210503	The diagnostics ATA command failed
Example	DS:> 2105 210500: Test OK @	

Nucleus Name	**DS_HDD_UploadImage**
Nucleus Number	2106
Description	Upload raw data from the HDD to a DVD+RW
Technical	- Initialise/start IDE - Check for an ATA device on the IDE interface - Check for an ATAPI DVD+RW drive - Calibrate the DVD+RW laser - Repeat until transfer is completed - Read x MB from HDD source sector into SDRAM - Write x MB from SDRAM to the destination sector on DVD+RW - Read sector 0x34000 on DVD containing the transfer table to use - Update the contents of the table and write it back
Execution Time	Depending on the number of sectors to transfer it may take approximately 2 MB per second.

<table>
<tr><td>User Input</td><td colspan="2">The user can enter 3 parameters in the next format:
<COMMAND> <HDD sector> <nr of HDD sectors>
<COMMAND> is one of the next strings:
• NEW: Create a new transfer image table, <HDD sector> and <nr of HDD sectors> must be entered. The tray of the DVD drive is sent out an the user is asked to insert a DVD+RW
• ADD: Add a section to the current transfer table, <HDD sector> and <nr of HDD sectors> must be entered
• READ: Read the current transfer image table from the DVD. The tray of the DVD drive is sent out an the user is asked to insert a DVD+RW
• VIEW: View the contents of the current transfer table
• GO: Copy data from the HDD to the DVD+RW according to the currently entered transfer table
<HDD sector> = the sector on HDD to start reading from
<HDD sectors> = the number of HDD sectors to transfer</td></tr>
<tr><td>Error</td><td>Number</td><td>Description</td></tr>
<tr><td></td><td>210600</td><td>Uploading image succeeded</td></tr>
<tr><td></td><td>210601</td><td>The initialisation of IDE failed</td></tr>
<tr><td></td><td>210602</td><td>Communication with the hard disk drive failed</td></tr>
<tr><td></td><td>210603</td><td>Communication with the AV3 failed</td></tr>
<tr><td></td><td>210604</td><td>No DVD+RW is available</td></tr>
<tr><td></td><td>210605</td><td>Calibrating DVD+RW failed</td></tr>
<tr><td></td><td>210607</td><td>Error while reading image data from HDD</td></tr>
<tr><td></td><td>210608</td><td>Error while writing image to DVD+RW</td></tr>
<tr><td></td><td>210609</td><td>Unable to update the transfer table on the DVD+RW</td></tr>
<tr><td>Example</td><td colspan="2">
<pre>
DS:> 2106
210605: Invalid user input
Error @

DS:> 2106 READ
Please insert a writable DVD+RW
210609: Unable to update transfer table
Error @

DS:> 2106 NEW 0x1 2048
Creating new transfer table
Adding entry 1 to transfer table
Length 1 entries
210605: NEW 0X1 2048
Test OK @

DS:> 2106 VIEW
Length 1 entries
Entry 1:
  hddPosition : 0x1
  nrHddSectors : 0x800
  dvdPosition : 0x34040
  nrDvdSectors : 0x200
210605: VIEW
Test OK @

DS:> 2106 ADD 0x2001 20480
Adding entry 2 to transfer table
Length 2 entries
210605: ADD 0X2001 20480
Test OK @

DS:> 2106 GO
Please insert a writable DVD+RW
Executing transfer table 1 of 1, size 1048576 bytes (=1 MB)
Calibrating laser of DVD drive
Start creating image on DVD at 0x34040. Checking ... <OK>
210600: Transfer OK
Test OK @
</pre>
</td></tr>
</table>

Nucleus Name	**DS_HDD_DownloadImage**	
Nucleus Number	2107	
Description	Download a raw image from a DVD+RW disc to the hard disc drive. This image will be written on the hard disc drive.	
Technical	- Initialise/start IDE - Check for an ATA device on the IDE interface - Check for an ATAPI DVD+RW drive - Mount the DVD containing the image to transfer - Read sector x containing the transfer table to use - Read the source sector, destination sector and transfer length from the transfer table - Repeat until transfer is completed - Read x MB from DVD source sector into SDRAM - Write x MB from SDRAM to the destination sector on HDD	
Execution Time	Assumption based on 4.3GB data → 11 movies of 3 minutes. 33 minutes	
User Input	Actions: The tray of the DVD drive is sent out and the user is asked to insert a DVD+RW	
Error	Number	Description
	210700	Downloading image succeeded
	210701	The initialisation of IDE failed
	210702	Communication with the hard disk drive failed
	210703	Communication with the AV3 failed
	210704	No disc is available
	210705	Invalid medium is mounted
	210706	Unable to read the transfer table from DVD
	210707	Error while reading image from DVD
	210708	Error while writing image to HDD

Example	`DS:> 2107`
	`Please insert the Master DVD <OK>`
	`Executing transfer table 1 of 4`
	`524288 bytes`
	`  Dvd Sector  0x50000`
	`  Dvd Sector Count 256`
	`  Hdd Sector  0x40000`
	`  Hdd Sector Count 1024`
	`please wait ..<OK>`
	`Executing transfer table 2 of 4`
	`10485760 bytes (=10 MB)`
	`  Dvd Sector  0x70000`
	`  Dvd Sector Count 5120`
	`  Hdd Sector  0x60000`
	`  Hdd Sector Count 20480`
	`please wait ..<OK>`
	`Executing transfer table 3 of 4`
	`524288 bytes`
	`  Dvd Sector  0x50000`
	`  Dvd Sector Count 256`
	`  Hdd Sector  0x40000`
	`  Hdd Sector Count 1024`
	`please wait ..<OK>`
	`Executing transfer table 4 of 4`
	`524288 bytes`
	`  Dvd Sector  0x50000`
	`  Dvd Sector Count 256`
	`  Hdd Sector  0x40000`
	`  Hdd Sector Count 1024`
	`please wait ..<OK>`
	`210700: Transfer OK`
	`Test OK @`	

Nucleus Name	**DS_HDD_RandomReadScan**	
Nucleus Number	2108	
Description	Perform a short random read scan of x times 1000 commands (x is selectable between 1 to 20) to test the servo. If anything would be wrong with the servo or tracking, the result would be too slow. Recheck the LBA addresses that caused the disc to fail in order to avoid incorrect failure caused by shock or vibrations during the measurement.	

Technical	- Initialise the HDD connection
	- Get the user input
	- Generate a random sequence of test sectors
	- For every sector in the random sequence do
	  - Read 1000 sectors and measure the time to perform this action
	  - Update a list of statistics about the measurement
	- Display statistical information about the test sequence
	- If more than 10% above 160 ms and/or more than 1 request in between 200 & 250ms and/or requests above 250 ms make the result of the test fail.	

Execution Time	Depending on the user input x times 4 minutes	
User Input	parameters in the next format: <nr_cmds><GRAPH> - Number of commands to send (in multiples of 1000), if no input is given 1000 commands will be sent - "GRAPH" optional to print out the measured read scan graph	
Error	Number	Description
	210800	Communication with the hard disk drive succeeded
	210801	The initialisation of the HDD failed
	210802	Invalid user input
	210803	Performance failure: more than 10% above 160 ms and/or more than 1 request in between 200 & 250ms and/or requests above 250 msec
	210804	Read error, unable to read a specified sector from disc

Example	`DS:> 2108 1`
	`210800:`
	`Minimum access time = 142 msec`
	`Maximum access time = 159 msec`
	`Average access time = 146 msec`
	`Number of commands below 160 msec = 1000`
	`Number of commands between 160 and 200 msec = 0`
	`Number of commands between 200 and 250 msec = 0`
	`Number of commands above 250 = 0`
	`Test OK @`	

Nucleus Name	**DS_HDD_LinearSurfaceScan**	
Nucleus Number	2109	
Description	Perform a linear surface scan so that most of the disc is covered.	

Technical	- Initialise the HDD connection
	- Get the user input
	- Generate a sequence of test sectors according to the user input
	- For every sector in the sequence do
	  - Read the sector and measure the time to perform this action
	  - Update a list of statistics about the measurement
	- Display statistical information about the test sequence
	- If more than 1% above 100 ms and/or more than 0.1% above 200 msec and/or requests above 300 msec make the result of the test fail.	

Execution Time	Depending on the user input and HDD size	
User Input	parameters in the next format: <SECTORS> <STEP> <LOW> <HIGH> where - SECTORS: Specifies the number of sectors to read in each access - STEP: Specifies the step (in sectors) between each access. - LOW: The start sector address of an explicit range of LBA addresses to be used for testing. If no value is entered LBA 0 will be used - HIGH: The end sector address of an explicit range of LBA addresses to be used for testing. If no value is entered the maximum LBA will be used. The user must enter either no parameter or all parameters If no parameters are entered the next defaults will be used: 1000 sector each access, steps of 1000 sectors and an address range from 0 to the maximum LBA	
Error	Number	Description
	210900	Communication with the hard disk drive succeeded
	210901	The initialisation of the HDD failed
	210902	Invalid user input
	210903	Performance failure: more than 10% above 160 ms and/or more than 1 request in between 200 & 250ms and/or requests above 250 msec
	210904	Read error, unable to read a specified sector from disc

Example	`DS:> 2109 1000 1000 0 100000`
	`210900:`
	`Executed 100 linear seeks of 1000 sectors each`
	`Minimum access time = 141 msec`
	`Maximum access time = 148 msec`
	`Average access time = 141 msec`
	`Number of commands below 160 msec = 100`
	`Number of commands between 160 and 200 msec = 0`
	`Number of commands between 200 and 250 msec = 0`
	`Number of commands above 250 = 0`
	`Test OK @`	

Nucleus Name	**DS_HDD_SpinOff**	
Nucleus Number	2110	
Description	Put the HDD in parking position by sending the sleep command so it can be moved without endangering the mechanical parts	
Technical	- Initialise/start IDE - Send the Sleep (ATA) command to the HDD device	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	211000	The spin off of the hard disk drive device succeeded
	211001	The initialisation of IDE failed
	211002	The hard disk drive failed
	211003	The sleep ATA command failed
Note	**All other HDD nuclei will not work until DS_HDD_Reset is executed**	

Example	`DS:> 2110`
	`211000:`
	`Test OK @`	

Nucleus Name	**DS_HDD_SectorRead**	
Nucleus Number	2111	
Description	Read 512 bytes from a specified sector on HDD	
Technical	- Get the user input - Read the data from the sector using READ_SECTOR(S) and display the contents	
Execution Time	Less than 1 second.	
User Input	3 parameters in the next format: <sector> <offset> <length> where - sector is the sector to read from - offset is the byte-offset in the sector buffer (0 .. 256) - length the length (in bytes) of the data to display (1 .. 256)	
Error	Number	Description
	211100	Reading from HDD succeeded
	211101	Invalid user input
	211102	The initialisation of IDE failed
	211103	The hard disk drive failed
	211104	The read command failed
Example	DS:> 2111 0x80001 0 128 211100: 0x00 : 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0x08 : 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0x10 : 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0x18 : 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0x20 : 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0x28 : 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0x30 : 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0x38 : 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0x40 : 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0x48 : 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0x50 : 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0x58 : 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0x60 : 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0x68 : 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0x70 : 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0x78 : 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF 0xFF Test OK @	

Nucleus Name	**DS_HDD_SetPower**	
Nucleus Number	2112	
Description	Set the power of the HDD On or Off	
Technical	- Get user input - Set the IDE1_POWER PIO line to the desired value	
Execution Time	Less than 1 second.	
User Input	1 parameter: "ON" , enables the power of the HDD "OFF" , turn off the power of the HDD	
Error	Number	Description
	211200	Setting the HDD power mode succeeded
	211201	Setting the HDD power mode failed
	211202	Invalid user input
Note	**All other HDD nuclei will not work until DS_HDD_Reset is executed**	
Example	DS:> 2112 off 211200: Test OK @	

SCRIPT (SCRIPT)

Nucleus Name	**DS_IH_ScriptHandler**
Nucleus Number	Script
Description	The test requires no user interaction. A number of nuclei will be run before a message is returned indicating if there is a failure in the DVD Recorder. When a nucleus failed, the script stops and displays the message "**FAIL**". Otherwise it displays "**PASS**" at the end when all nuclei are executed. During the execution of a script, a progress indicator is displayed on the display of the DVD Recorder.
Technical	Execute the included nuclei one by one If a nucleus fails quit and display the failed nucleus on the local display and service port
Execution Time	16 seconds
Included tests:	1. DS_ANAB_COMMUNICATIONECHO_NUC 2. DS_DCB_COMMUNICATIONECHO_NUC 3. DS_BROM_COMMUNICATION_NUC 4. DS_SYS_SETTINGSDISPLAY_NUC 5. DS_CHR_DEVTYPEGET_NUC 6. DS_CHR_INT_PIC_NUC 7. DS_CHR_DMA_NUC 8. DS_BROM_WRITEREAD_NUC 9. DS_NVRAM_COMMUNICATION_NUC 10. DS_NVRAM_WRITEREAD_NUC 11. DS_SDRAM_WRITEREADFAST_NUC 12. DS_FLASH_WRITEREAD_NUC 13. DS_FLASH_CHECKSUMPROGRAM_NUC 14. DS_SYS_HARDWAREVERSIONGET_NUC 15. DS_VIP_DEVTYPEGET_NUC 16. DS_VIP_COMMUNICATION_NUC 17. DS_DVIO_LINKDEVTYPEGET_NUC 18. DS_DVIO_PHYDEVTYPEGET_NUC 19. DS_DVIO_LINKCOMMUNICATION_NUC 20. DS_DVIO_PHYCOMMUNICATION_NUC 21. DS_PSCAN_COMMUNICATIONDENC_NUC 22. DS_PSCAN_COMMUNICATIONDEINTERLACER_NUC 23. DS_BE_COMMUNICATIONECHO_NUC 24. DS_ANAB_COMMUNICATIONIICNVRAM_NUC 25. DS_ANAB_COMMUNICATIONIICTUNER_NUC 26. DS_ANAB_COMMUNICATIONIICSOUNDPROCESSOR_NUC 27. DS_ANAB_COMMUNICATIONIICAVSELECTOR_NUC 28. DS_ANAB_CHECKSUMPROGRAM_NUC
Note!	**Invocation by holding down the PLAY button when powering up the system**
Note!	The following example is for a generation 2.1 DVD+RW recorder. The variant you test may behave differently. For a detailed description of the script-behaviour of your variant under test refer to the [RW2_1_SWA_DS].

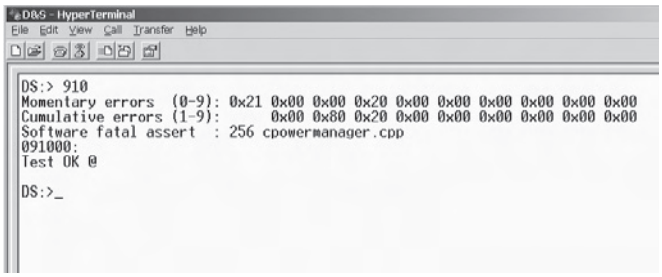
Example

```
DS:> script
Executing User/Dealer script.
Busy executing NUC1100 1-28
Hello Analogue Board
Busy executing NUC1000 2-28

Busy executing NUC200 3-28

Busy executing NUC1228 4-28

Settings ID:  4C4541440D0000000003030001010102010100002008000
Board name:                          LEAD
Hardware ID:                         0
Codec IC:                            PNX7100_MF3
Video Input Processor IC:            SAA7118
Progressive Scan Deinterlacer IC:  None
Progressive Scan Denc IC:            ADV7196
I-Link physical layer circuit IC:  PDI1394P25
I-Link link layer circuit IC:      PDI1394P40
Audio clock:                         Clock scheme 1
Bit engine connector:                available
IDE connector 1:                     available
IDE connector 2:                     not available
PCI connector:                       not available
RAM size                             32MByte
ROM size (NOR FLASH bank 1)          8MByte
ROM size (NOR FLASH bank 2)          Not available
ROM size (NAND FLASH)                Not available
Bit Engine: AV 2.0

Busy executing NUC100 5-28

Device ID  7100
Codec ID   PNX7100_MF3
F-BCU  (0x0102) 1.0    INTC   (0x011d) 1.0    PCI-XIO(0x0113) 1.0
SIF    (0x013b) 1.0    EJTAG  (0x0104) 0.0    S-BCU  (0x0102) 1.0
BOOT   (0x010a) 1.0    CONFIG (0x013f) 1.0    RESET  (0x0123) 1.0
DEBUG  (0x0116) 0.0    UART0  (0x0107) 0.1    UART1  (0x0107) 0.1
UART2  (0x0107) 0.1    UART3  (0x0107) 0.1    I2C0   (0x0105) 0.1
I2C1   (0x0105) 0.1    GPIO   (0x013c) 1.0    SYNC   (0x013a) 1.0
DISP0  (0xa015) 0.2    DISP1  (0xa00f) 0.0    OSD    (0x0136) 0.1
SPU    (0xa00e) 0.0    MIXER  (0x0137) 1.0    DENC   (0x0138) 0.1
CCIR   (0x0139) 1.0    VDEC   (0x0133) 0.1    PARSER (0xa00d) 0.0
DV     (0xa00c) 0.0    BEI    (0xa00a) 0.0    IDE    (0xa009) 0.0
SGDX   (0xa008) 0.0    BYTE   (0xa00b) 0.0    OUTPUT (0xa003) 0.0
ACOMP  (0xa000) 0.0    VFE    (0xa001) 0.0    VCOMP  (0xa002) 0.0
SCR    (0x0000) 0.0    SIFF   (0xa011) 0.0    WMD    (0xa010) 0.0
AUDIO0 (0xa015) 0.2    AUDIO1 (0xa00f) 0.0    PSCAN  (0xa018) 0.0

Busy executing NUC114 6-28

Busy executing NUC115 7-28

Busy executing NUC201 8-28

Busy executing NUC300 9-28

Busy executing NUC301 10-28

Busy executing NUC401 11-28

Busy executing NUC501 12-28

Busy executing NUC503 13-28

BootCode    checksum is: 0xBABEB432, which is correct
Diagnostics checksum is: 0xBABED22B, which is correct
Download    checksum is: 0xBABE025F, which is correct
Application checksum is: 0xBABE2825, which is correct

Busy executing NUC1200 14-28
Hardware ID = 00
Busy executing NUC600 15-28
Found SAA7118
```

Example	Busy executing NUC601 16-28 Busy executing NUC700 17-28 Device type of the link layer IC: ffc00301 Busy executing NUC701 18-28 Device type of the phy layer IC: 0 Busy executing NUC702 19-28 Busy executing NUC703 20-28 Busy executing NUC801 21-28 Busy executing NUC808 22-28 The IIC acknowledge was not received, which is correct Busy executing NUC900 23-28 Busy executing NUC1101 24-28 Busy executing NUC1102 25-28 Busy executing NUC1104 26-28 Busy executing NUC1105 27-28 Busy executing NUC1111 28-28 BootCode checksum is: 0xBABE6240, which is correct Diagnostics checksum is: 0xBABEDC9A, which is correct Download checksum is: 0xBABEA6B7, which is correct Application checksum is: 0xBABE5968, which is correct PASS DS:>

5.4 DVD Module Error code

With DSW command 910 the set software can retrieve an overview of all occurred engine errors.



5.4.1 Momentary Errors

Byte 0: latest error:

Overview of the BE error codes.

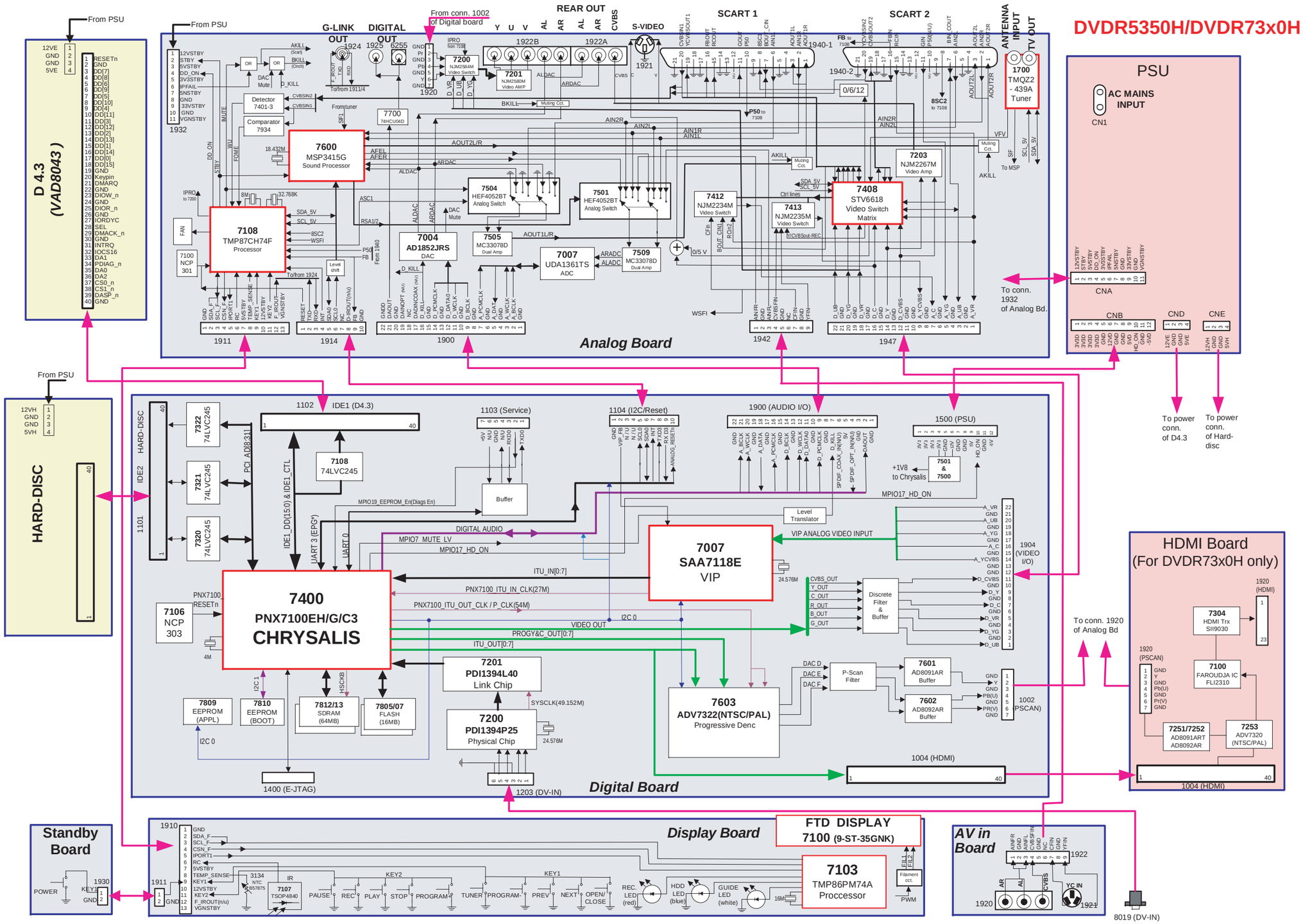
error code	error	meaning
0x00	no_error	No error has occurred
0x01	illegal_command_error	Command not allowed in this state or unknown command
0x02	illegal_parameter_error	Parameter(s) not valid for this command
0x03	command_timeout_error	The maximum execution time for the command has exceeded
0x04	sledge_home_error	The sledge could not be moved home
0x05	sledge_calibration_error	An error occurred during calibration of the sledge
0x06	sledge_unstable_error	The sledge detected unstable control
0x07	speed_timeout_error	Spindle motor could not reach its target speed within timeout
0x08	speed_window_error	Measured spinning speed is not within expected window
0x09	focus_timeout_error	Focus could not be achieved within the timeout
0x0A	focus_retries_error	The amount of focus retries expired
0x0B	focus_agc_error	The focus agc results are out of range
0x0C	radial_timeout_error	Servo didn't get on track within the timeout
0x0D	radial_retries_error	Servo didn't get on track after several retries
0x0E	radial_agc_error	The radial agc results are out of range
0x0F	radial_init_error	Unreliable signal scaling after the radial initialisation
0x10	hf_pll_error	HF-decoder pll could not lock to HF signal
0x11	wobble_pll_error	Wobble pll could not lock to wobble signal
0x12	subcode_timeout_error	Subcode information could not be read
0x13	subcode_notfound_error	Requested subcode item could not be found
0x14	header_timeout_error	Header information could not be read
0x15	adip_timeout_error	Adip information could not be read
0x16	adip_window_error	Adip address was not within expected window
0x17	adip_sync_error	No adip sync was detected
0x18	atip_timeout_error	Atip information could not be read
0x19	atip_notfound_error	Requested atip item could not be found
0x1A	atip_window_error	Atip address was not within expected window
0x1B	atip_sync_error	No atip sync was detected
0x1C	tray_error	Tray could not be closed or opened within the timeout
0x1D	seek_error	The requested seek couldn't be performed within the timeout
0x1E	no_hf_present_error	Attempt to read from a blank area
0x1F	record_error	An error occurred during the recording
0x20	illegal_stopaddress_error	The requested stopaddress with modify-stop-address is not valid
0x21	no_disc_error	No disc is detected
0x22	not_initialised_error	The system is not initialised (e.g. seek on unknown disctype)
0x23	illegal_medium_error	BE detected an unsupported medium during disc recognition
0x24	cd_frequency_error	Measured HF frequency is not within CD frequency range
0x25	dvd_frequency_error	Measured HF frequency is not within DVD frequency range
0x26	reserved(non_existing_bca_error)	Attempt to read non-existing bca information
0x27	reserved(bca_read_error)	An error occurred during reading of bca information
0x28	selftest_error	An error occurred during the selftest of the BE
0x29	i2c_error	The I2C interface does not operate
0x2A	laser_pll_error	Laser control pll did not lock or lost lock on write clock
0x2B	laser_forward_sense_error	Forward sense value didn't change with changing laser power
0x2C	jitter_optimisation_error	An error occurred during optimisation of the jitter
0x2D	tilt_calibration_error	An error occurred during calibration of the tilt frame
0x2E	reserved	
0x2F	frontend_offset_calib_error	The offset in the frontend couldn't be calibrated
0x30	reserved	
0x31	wsg_calculation_error	An error occurred in the calculation of the write strategy
0x32	buffer_overrun_error	The buffer input stream overran the buffer output stream
0x33	return_value_invalid_error	The requested information is not available for this inquiry
0x34	illegal_recording_speed_error	The selected speed is not allowed for a recording on this medium
0x35	opc_media_parameter_error	The media parameters (info in ATIP/ADIP) are invalid or not read
0x36	opc_record_power_error	The final optimum power was not reached
0x37	opc_start_power_low_error	OPC start power too low (optimum power is higher)
0x38	opc_start_power_high_error	OPC start power too high (optimum power is lower)

error code	error	meaning
0x39	opc_power_calculation_error	Error during OPC power calculation (samples are wrong)
0x3A	opc_test_zone_full_error	OPC can’t be performed because test zone is full
0x3B	opc_bad_jitter_measurement_error	The jitter measurement during OPC samples readback failed
0x3C	opc_read_samples_error	An error occurred during OPC readback sampling
0x3D	ropc_alpha_overflow_error	The determined value for the optimum power is too high
0x3E	ropc_alpha_ref_current_error	The alpha measurement reference current is wrong (IAN)
0x3F	ropc_alpha_gain_error	The alpha measurement alpha gain is wrong
0x40	beta_over_under_flow_error	During the walking OPC a beta over-/under-flow was detected
0x41	not_enough_calib_points_error	Not enough valid calibration points available for re-calibration
0x42	not_enough_power_error	The calculated power during re-calibration exceeds max power
0x43	illegal_reading_speed_error	The selected speed is not allowed for the requested command
0x44	servo_fatal_error	The actuator dissipation became too high during a servo recovery

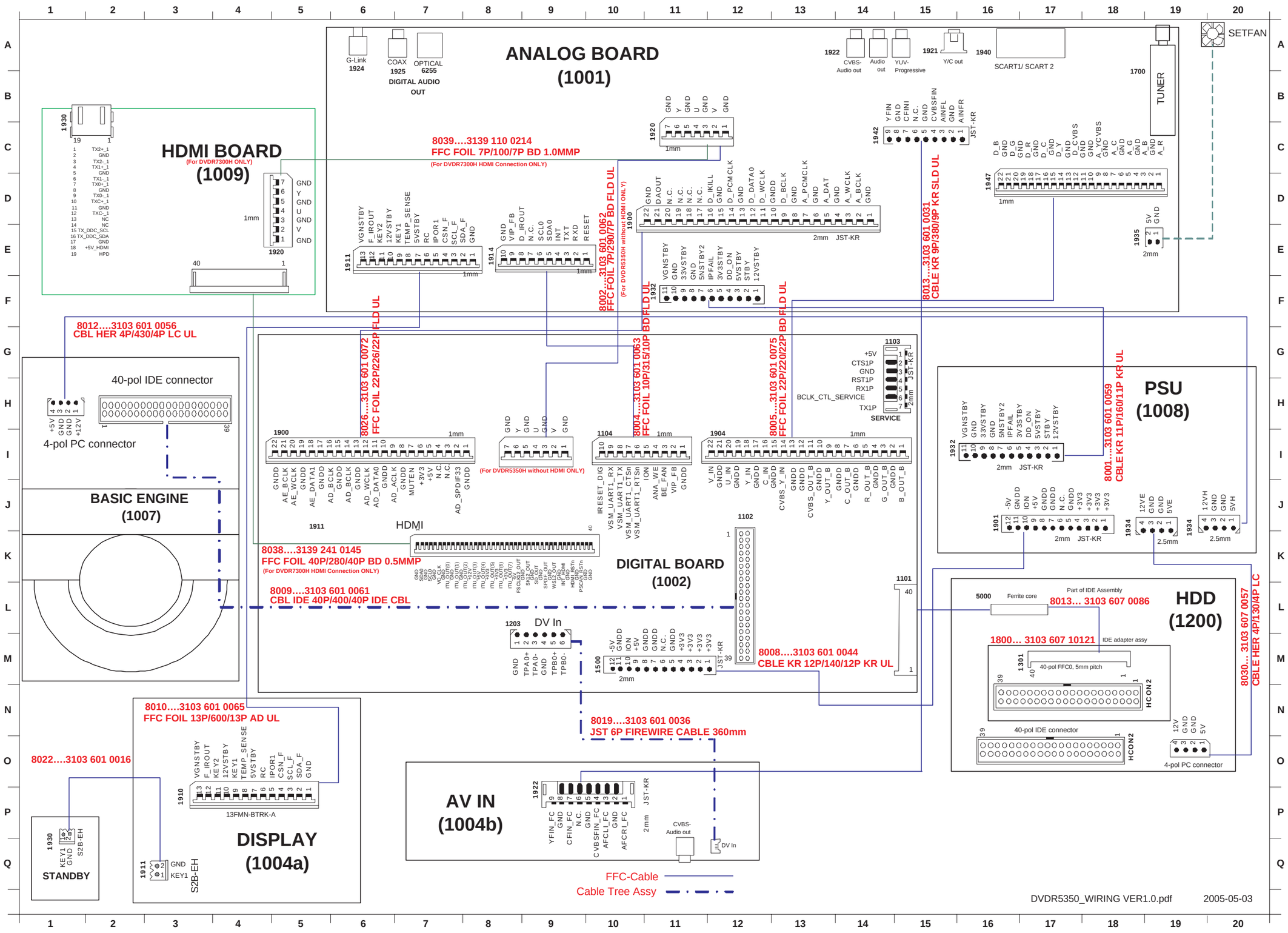
This error is overwritten by the next player / inquiry command.

6. Block Diagrams, Waveforms, Wiring Diagram

Overall Block Diagram

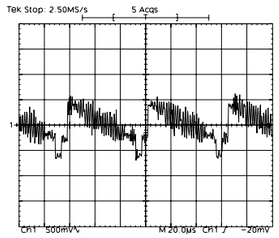


Wiring Diagram

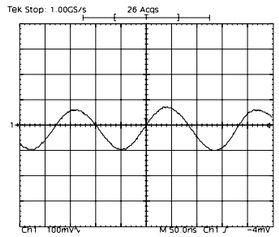


Waveforms of Analog Board

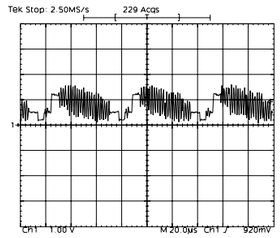
I700 IC 1700VIDOUT



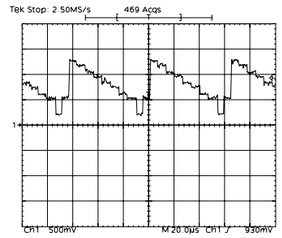
I703



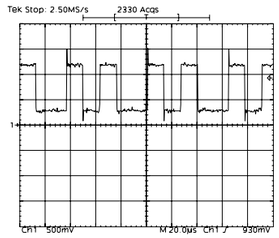
F4019 CVBS_OUT



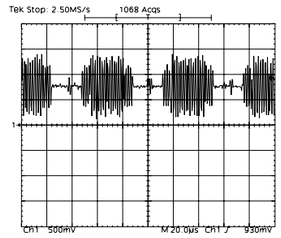
F4019 Y_OUT



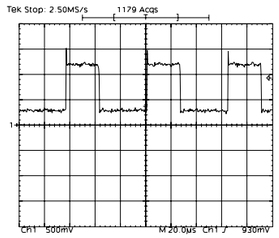
F4015 R_OUT



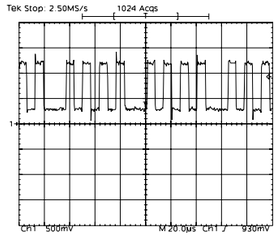
F4015 C_OUT



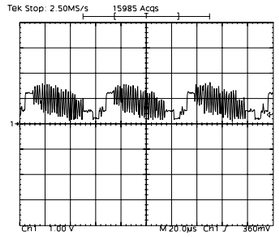
F4011 G_OUT



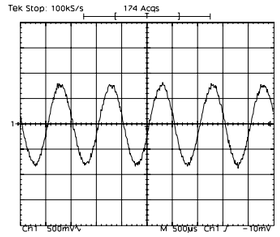
F4007 B_OUT



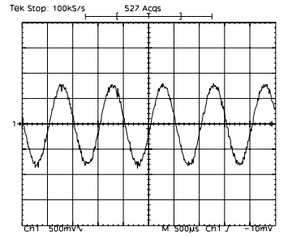
F4119 CVBS_OUT



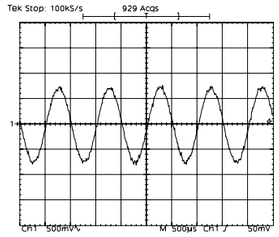
I502 AFER



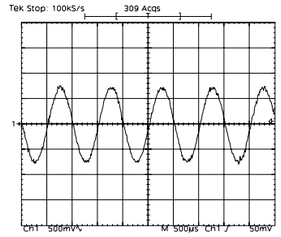
I504 AFEL



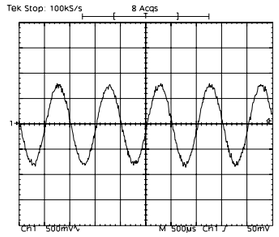
F502 IC 7504 PIN 12



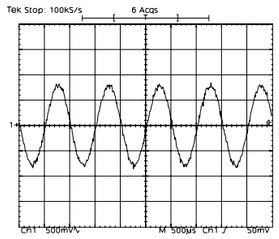
F501 IC 7504 PIN 5



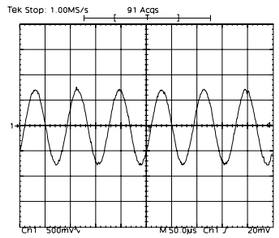
I618_AFER



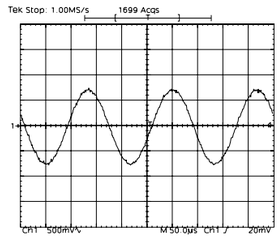
I619_AFEL



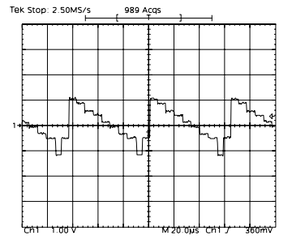
I612_AOUT2R



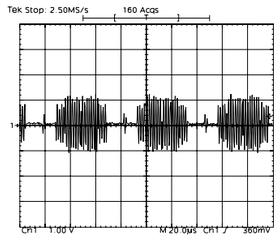
I634_AOUT2L



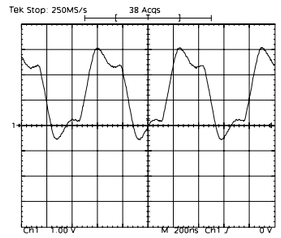
F210 Y_OUT



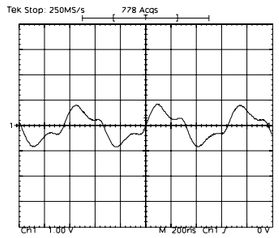
F211 C_OUT



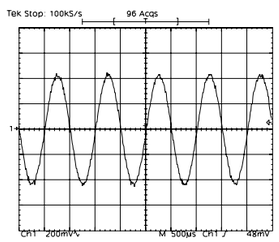
F251 DIGITAL_OUT OPTICAL



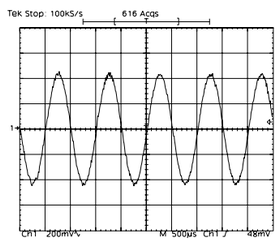
F2502 DIGITAL_OUT CHINCH



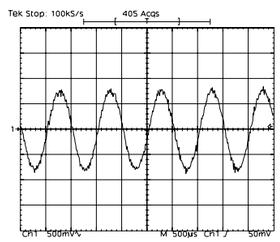
I014 ARADC



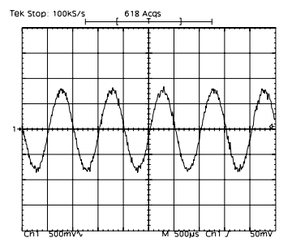
I032 ALADC



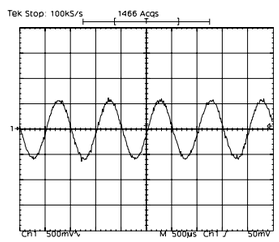
I528 IC 7509 PIN 7



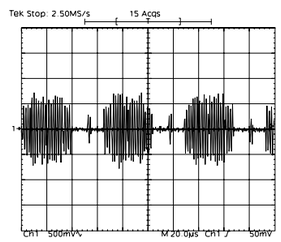
I505 IC 7509 PIN 1



I506 AOUT1L

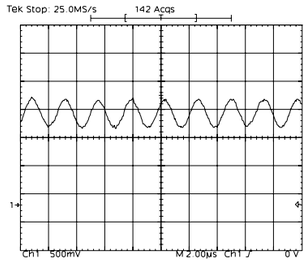


I507 AOUT1R

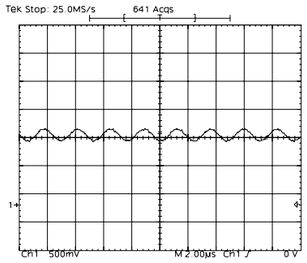


Waveforms of Digital Board

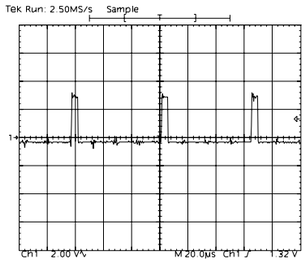
F203 IC 7200 PIN 60



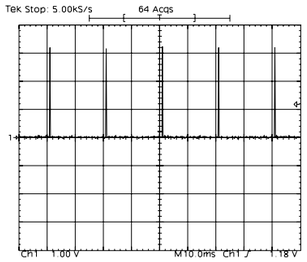
IC 7200 PIN 59



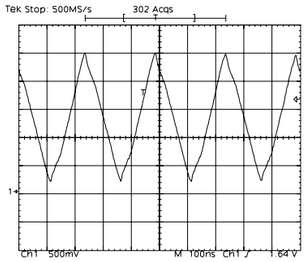
F403 HS_OUT



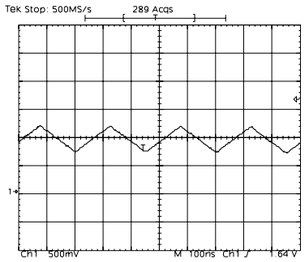
F404 VS_OUT



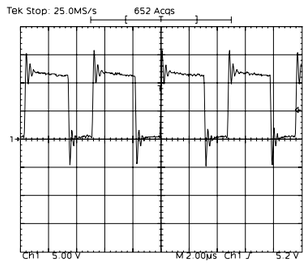
F405 XTAL_IN



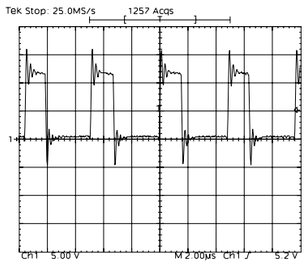
F406 XTAL_OUT



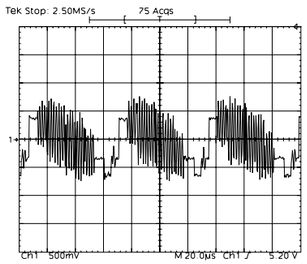
IC7501 PIN 5



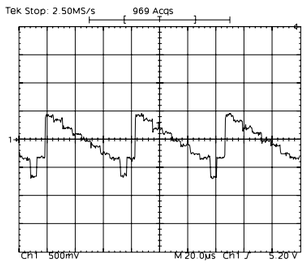
IC7501 PIN 6



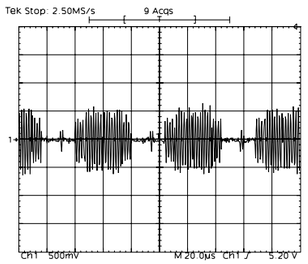
I912 D_CVBS



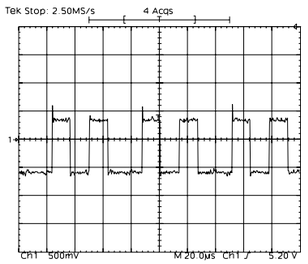
I913 D_Y



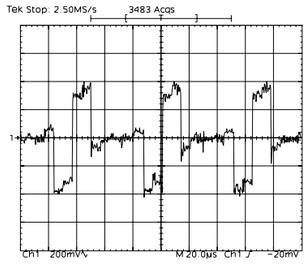
I914 D_C



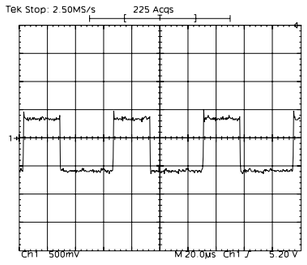
I915 D_R



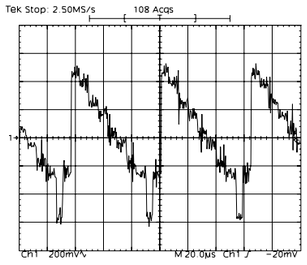
I915 D_V



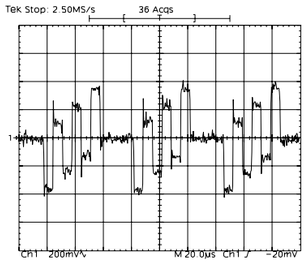
I916 D_G



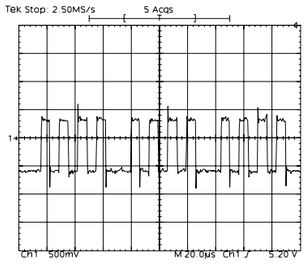
I916 D_Y



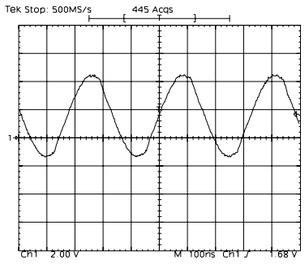
I917 D_U



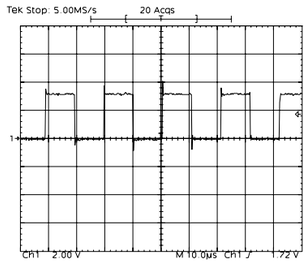
I917 D_B



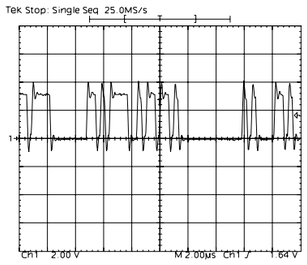
F1914 D_BCLK



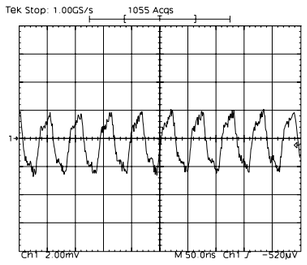
F1912 W_BCLK



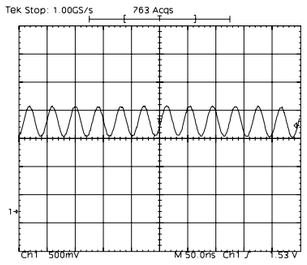
F1911 D_DATA0



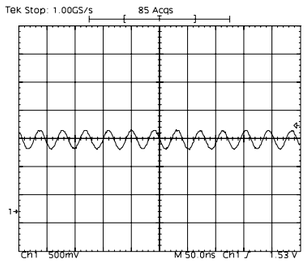
F1909 D_PCMCLK



XTAL 1001_IN

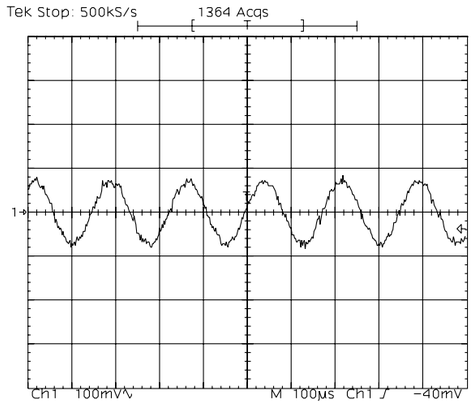


XTAL 1001_OUT

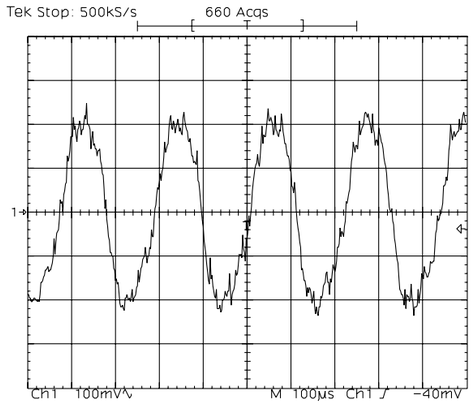


Waveforms of Front Board

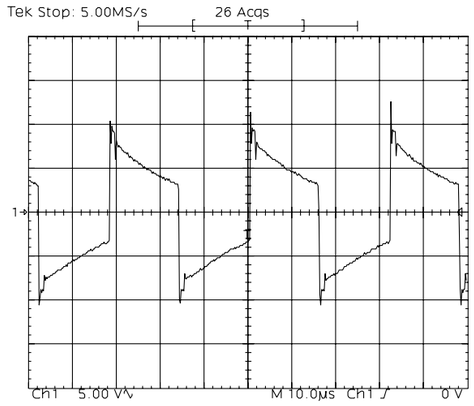
I150 IC7103 PIN 2



I151 IC7103 PIN 3

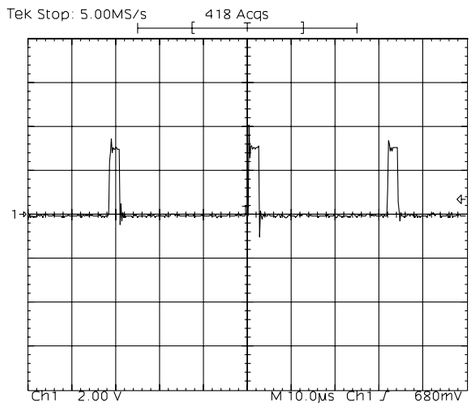


I164 7106 / 7108 EMITTER

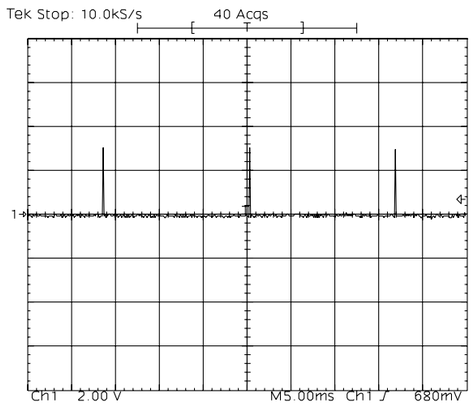


Waveforms of HDMI Board

F111 P H_SYNC



F112 P V_SYNC



Test Points Overview for Analog Board

F001 A7	F1102 C9	F1401 C8	F209 A5	F2503 A8	F361 C3	F4001 A3	F4106 A3	F444 C3	F4705 B3	F505 A3	I005 B7	I022 C6	I104 A9	I204 A7	I219 A5	I256 A8	I410 A4	I456 B2	I482 B2	I535 A5	I618 B5	I951 C1
F001 A7	F1102 C9	F1402 C8	F209 A5	F251 A8	F361 C3	F4002 A3	F4106 A3	F4701 B2	F505 B3	F506 A3	I006 B7	I022 C6	I107 C2	I204 A7	I220 A5	I256 A8	I411 B3	I461 A2	I483 B2	I535 A5	I619 B5	I951 C1
F0010 C7	F1103 A9	F1402 C8	F210 A4	F251 A8	F362 A8	F4002 A3	F4107 A3	F4701 B2	F506 A3	I006 B7	I023 A7	I107 C2	I205 A6	I220 A5	I257 A8	I411 B3	I461 A2	I483 B2	I540 A5	I619 B5	I952 B1	
F002 A8	F1103 A9	F1403 C8	F210 A4	F2602 A7	F362 A8	F4003 A3	F4107 A3	F4703 B3	F506 A3	I007 B7	I023 A7	I108 A9	I205 A6	I221 A4	I257 A8	I412 A4	I462 A2	I502 B5	I540 A5	I620 B6	I952 C1	
F002 A8	F1104 B8	F1403 C8	F211 A4	F2602 A7	F363 C3	F4003 A3	F4108 A3	F4705 B3	F507 B5	I007 B7	I024 A6	I108 A9	I206 A6	I221 A4	I258 A8	I412 A4	I462 A2	I502 B5	I602 B6	I620 B6	I956 C1	
F003 B7	F1104 B8	F1404 C8	F211 A4	F2603 A8	F363 C3	F4006 A3	F4109 A3	F4705 B3	F507 B5	I009 A5	I024 A6	I110 B8	I206 A6	I222 A5	I258 A8	I413 A4	I463 A2	I503 B5	I603 B6	I621 B6	I956 C1	
F003 B7	F1105 C9	F1404 C8	F212 A4	F2603 A8	F364 C8	F4006 A3	F4110 A3	F4706 B3	F508 B5	I009 A5	I025 A7	I110 B8	I207 A7	I222 A5	I351 C2	I413 A4	I463 A2	I504 B5	I605 B6	I621 B6	I956 C2	
F004 B8	F1105 C9	F1405 C8	F212 A4	F266 A8	F364 C8	F4007 A3	F4110 A3	F4707 B3	F508 B5	I010 B7	I025 A7	I112 A8	I207 A7	I223 A5	I351 C2	I414 A2	I464 B2	I505 C6	I605 B6	I622 B6	I957 C2	
F004 B8	F1108 C9	F1405 C8	F213 A5	F266 A8	F365 C3	F4007 A3	F4115 A2	F4707 B3	F509 B5	I010 B7	I026 A6	I112 A8	I208 A6	I223 A5	I352 C6	I414 A2	I464 B2	I505 C6	I606 B6	I622 B6	I958 C1	
F005 B8	F1108 C9	F1406 C8	F213 A5	F267 A7	F365 C3	F4008 A3	F4115 A2	F4709 B3	F509 B5	I011 B7	I026 A6	I113 A8	I208 A6	I224 A5	I352 C6	I415 B3	I465 A2	I506 A5	I606 B6	I623 B6	I958 C1	
F005 B8	F1109 C9	F1406 C8	F214 A5	F267 A7	F366 A1	F4008 A3	F4116 A2	F4709 B3	F510 A6	I011 B7	I027 A6	I113 A8	I209 A6	I224 A5	I353 C6	I415 B3	I465 A2	I506 A5	I607 C6	I623 B6	I959 B1	
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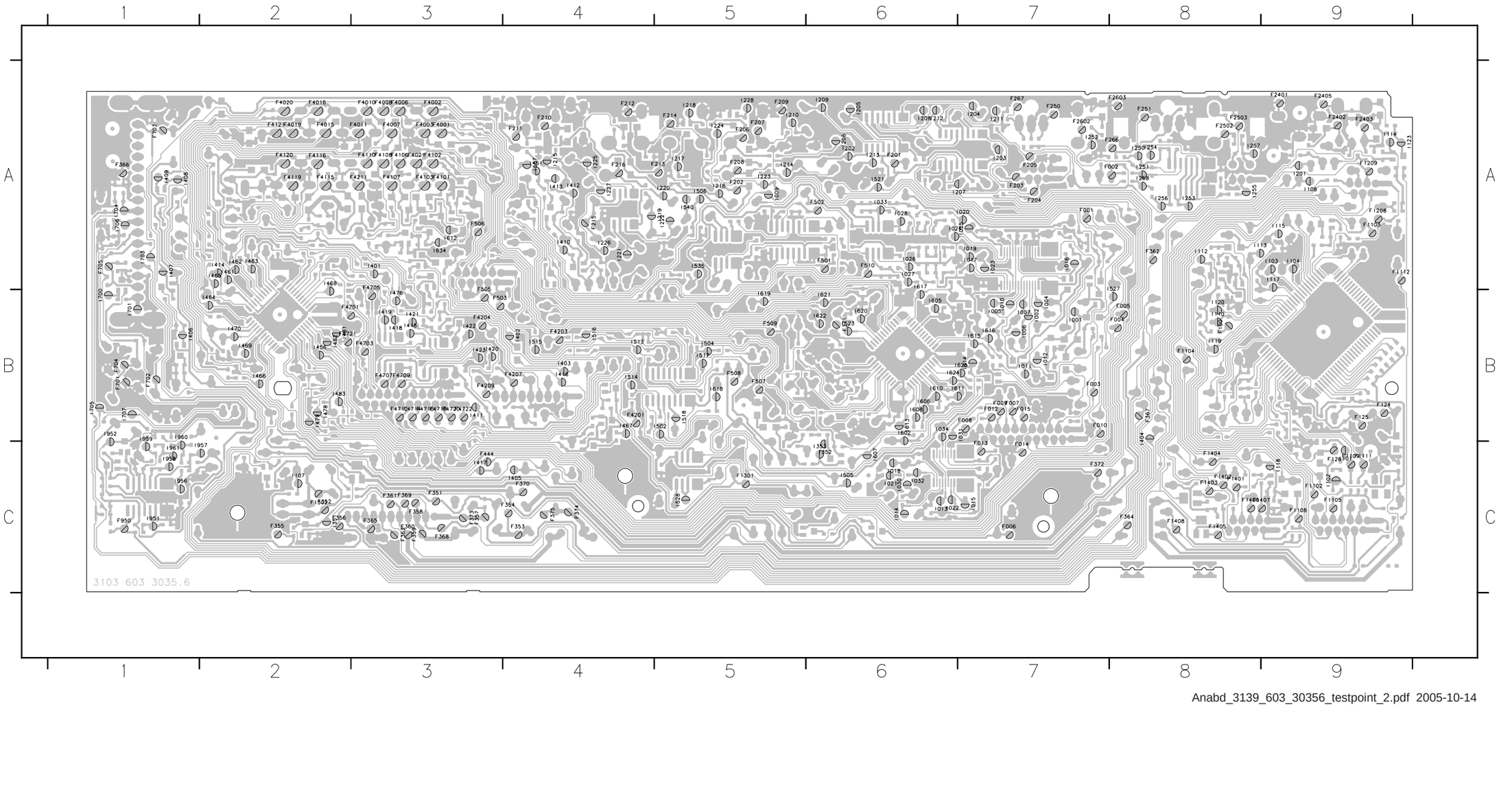
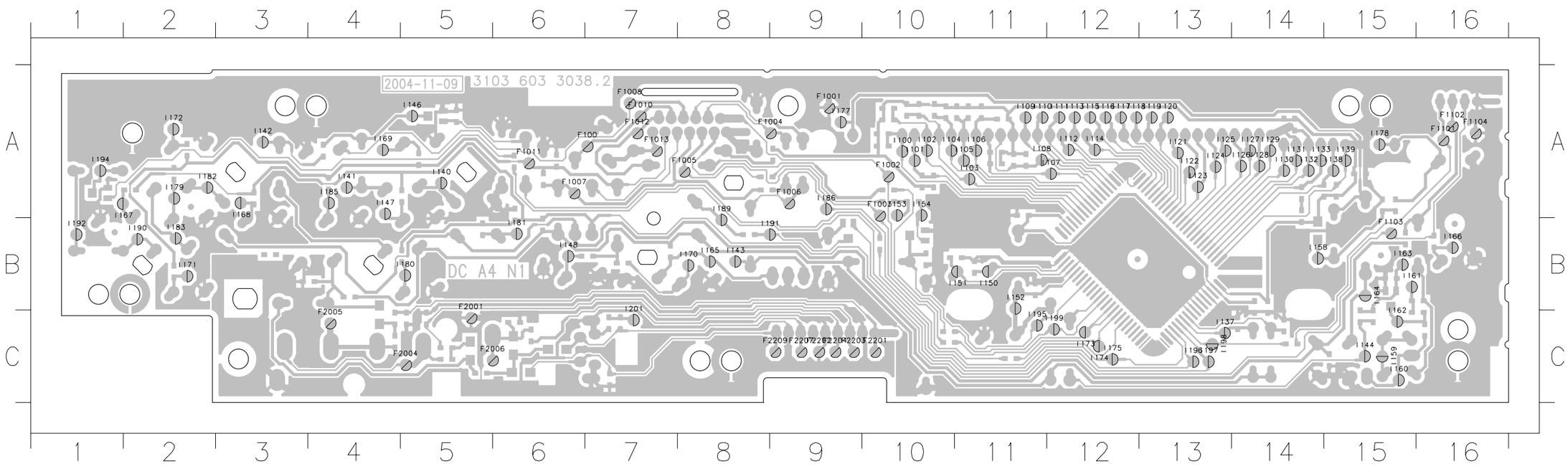
F100 B8	F1401 C8	F208 A5	F2503 A8	F360 C3	F4001 A3	F4103 A3	F444 C3	F503 B3	I005 B7	I021 C6	I104 A9	I203 A7	I219 A4	I255 A8	I410 A4	I456 B2	I482 B2	I528 C5	I618 B5	I707 B1		



Anabd_3139_603_30356_testpoint_2.pdf 2005-10-14

Test Points Overview for Display/Front Connector Board

F100 A7	F1008 A7	F1104 A16	F2204 C9	I105 A11	I113 A12	I121 A13	I129 A14	I140 A5	I150 B11	I161 B15	I169 A4	I178 A15	I189 A8	I198 C13
F1001 A9	F1010 A7	F2001 B5	F2207 C9	I106 A11	I114 A12	I122 A13	I130 A14	I141 A4	I151 B11	I162 C15	I170 B8	I179 A2	I190 B2	I199 C12
F1002 A10	F1011 A6	F2004 C5	F2209 C9	I107 A12	I115 A12	I123 A13	I131 A14	I142 A3	I152 B11	I163 B15	I171 B2	I180 B5	I191 B8	I201 B7
F1003 A10	F1012 A7	F2005 C4	I100 A10	I108 A11	I116 A12	I124 A13	I132 A14	I143 B8	I153 A10	I164 B15	I172 A2	I181 B6	I192 B1	
F1004 A9	F1013 A7	F2006 C5	I101 A10	I109 A11	I117 A12	I125 A13	I133 A14	I144 C15	I154 A10	I165 B8	I173 C12	I182 A2	I194 A1	
F1005 A8	F1101 A16	F2201 C10	I102 A10	I110 A11	I118 A12	I126 A14	I137 C13	I146 A5	I158 B14	I166 B16	I174 C12	I183 B2	I195 C11	
F1006 A9	F1102 A16	F2202 C9	I103 A11	I111 A12	I119 A13	I127 A14	I138 A15	I147 A4	I159 C15	I167 A1	I175 C12	I185 A4	I196 C13	
F1007 A6	F1103 B15	F2203 C9	I104 A10	I112 A12	I120 A13	I128 A14	I139 A15	I148 B6	I160 C15	I168 A3	I177 A9	I186 A9	I197 C13	



Frontbd_3139_603_30380_testpoint_2.pdf 2005-10-14

Test Points Overview for Digital Board

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U2	B1
U2	B1
U3	B1
U3	B1
U4	B1
U4	B1
F0001	F5
F0001	F5
F0003	F6
F0003	F6
F0005	F5
F0005	F6
F0007	F6
F0007	F6
F0009	F6
F0009	F6
F001	E2
F001	E2
F0011	F6
F0011	F6
F0015	F7
F0015	F7
F002	E3
F002	E3
F003	D2
F003	D3
F004	D3
F004	D3
F005	D3
F005	D3
F006	D3
F006	D3
F007	D3
F007	D3
F008	D2
F008	D2
F009	D2
F009	D2
F0101	A8
F0101	A8
F0102	E4
F0102	E4
F0103	F8
F0103	F8
F0104	F9
F0104	F9
F0105	F8
F0105	F8
F0106	F8
F0106	F8
F0107	F8
F0107	F8
F0108	F8
F0108	F8
F0109	F8
F0109	F8
F011	D3
F011	D3
F0110	F8
F0110	F8
F0111	F8
F0111	F8
F0112	F8
F0112	F8
F0113	F8
F0113	F8
F0114	F8
F0114	F8
F0115	F8
F0115	F8
F0116	F8
F0116	F8
F0117	F8
F0117	F8
F0118	F8
F0118	F8
F012	E3
F012	E3
F0121	F8
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F0123	F8
F0123	F8
F0125	F8
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F0201	E4
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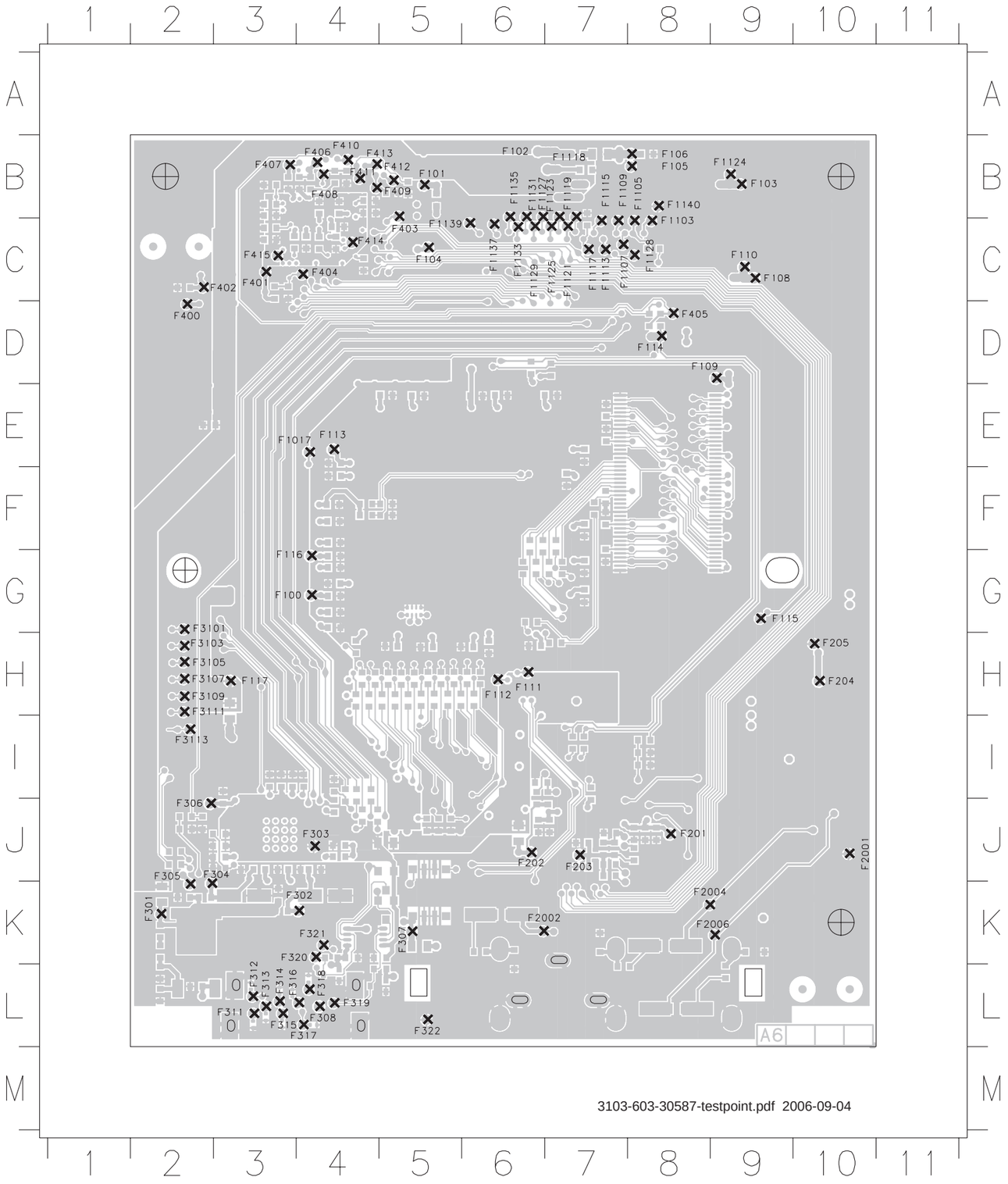
I410	A5
I410	A5
I411	A6
I411	A6
I412	A6
I412	A6
I413	C6
I413	C6
I414	B4
I414	B4
I415	A6
I415	A6
I416	B5
I416	B5
I417	D5
I417	D5
I418	C3
I418	C3
I419	C6
I419	C6
I420	C7
I420	C7
I421	C6
I421	C6
I422	D6
I422	D6
I423	C6
I423	C6
I424	D6
I424	D6
I425	D5
I425	D5
I426	C5
I426	C5
I427	D5
I427	D5
I428	C6
I428	C6
I429	C6
I429	C6
I430	D6
I430	D6
I431	D5
I431	D6
I432	C6
I432	C6
I433	E8
I433	E8
I434	D6
I434	D6
I435	E8
I435	E8
I436	C6
I436	C6
I437	D5
I437	D5
I438	C1
I438	C1
I439	C6
I439	C6
I500	E6
I500	E6
I501	E5
I501	E5
I502	F5
I502	F5
I503	F6
I503	F6
I504	E5
I504	E6
I505	E5
I505	E5
I506	E5
I506	E5
I507	E6
I507	E6
I508	E4
I508	E4
I509	E4
I509	E4
I510	B4
I510	B4
I511	F3
I511	F3
I512	F4
I512	F4
I724	C2
I724	C2
I725	C1
I725	C1
I726	C2
I726	C2
I727	D2
I727	D2
I728	C2
I728	C2
I729	D1
I729	D1
I800	C7
I800	C7
I801	C7
I801	C7
I802	B8
I802	B8
I803	C8
I803	C8
I804	C8
I804	C8
I805	A8
I805	A8
I806	E8
I806	E8
I807	D6
I807	D6
I900	E1
I900	E1
I901	E1
I901	E1
I902	D1
I902	D1
I903	E1
I903	E1
I904	E1
I904	E1
I905	D1
I905	D1
I906	E1
I906	E1
I907	E1
I907	E1
I908	E1
I908	E1
I909	B1
I909	B1
I910	E1
I910	E1
I911	E1
I911	E1
I912	D1
I912	D1
I913	E1
I913	E1
I914	E1
I914	E1
I915	F1
I915	F1
I916	F1
I916	F1
I917	F1
I917	F1
I918	B1
I918	B1
I919	D1
I919	D1
I920	E1
I920	E1
I921	D3
I921	D3
I922	D3
I922	D3
I923	C3
I923	C3
I924	C3
I924	C3
I925	C3
I925	C3
I926	C3
I926	C3
I927	E1
I927	E1
I928	E2
I928	E2
I929	E1
I929	E1
I930	E2
I930	E2
I931	E2
I931	E2
I932	E2
I932	E2
I933	D1
I933	D1
I934	E2
I934	E2
I935	E1
I935	E2
I936	E2
I936	E2
I937	E1
I937	E2
I938	E1
I938	E2
I939	E2
I939	E2

Digibd_3139_603_30601_testpoint_2.pdf 2005-10-14

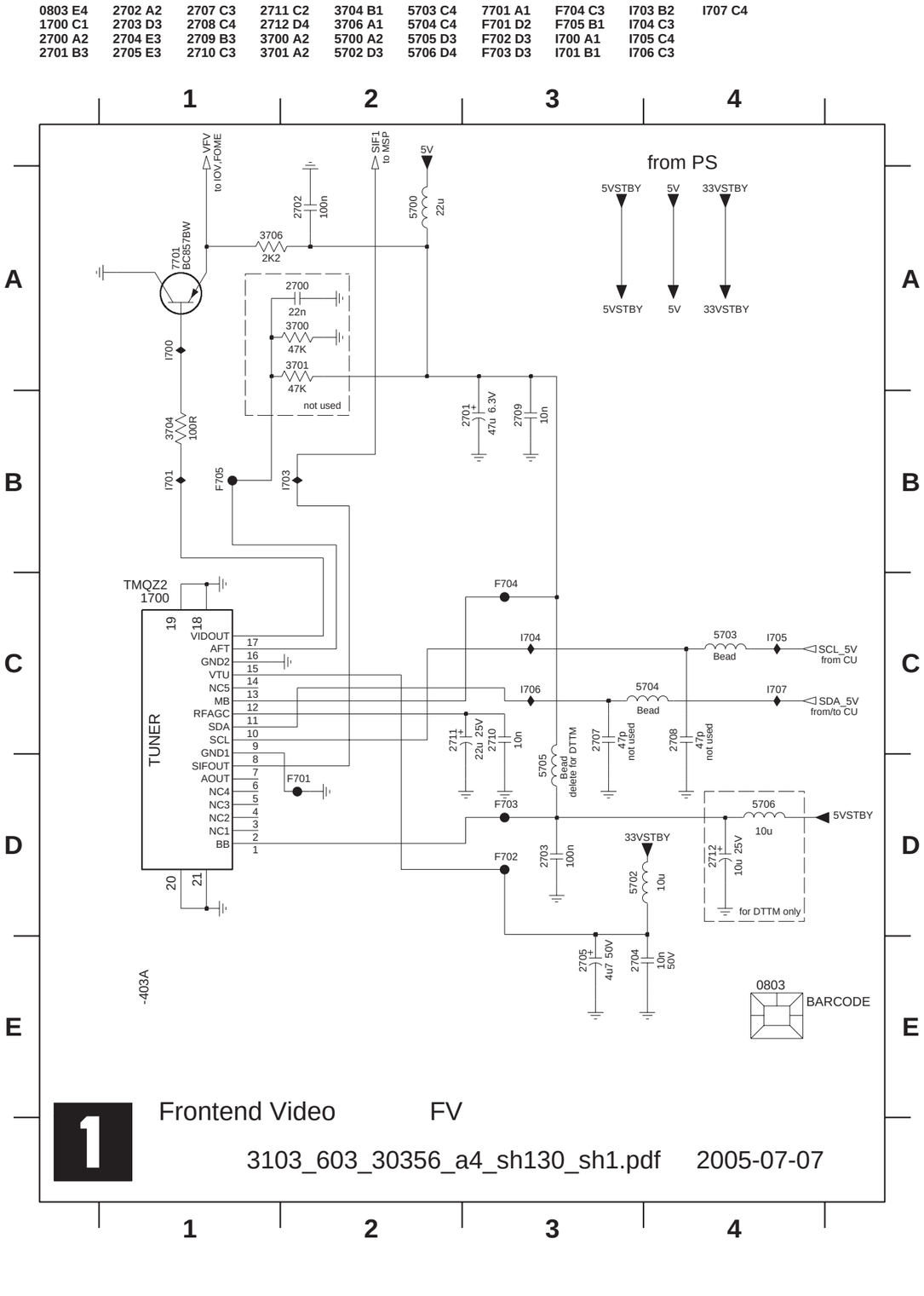
Test Points Overview for HDMI Board



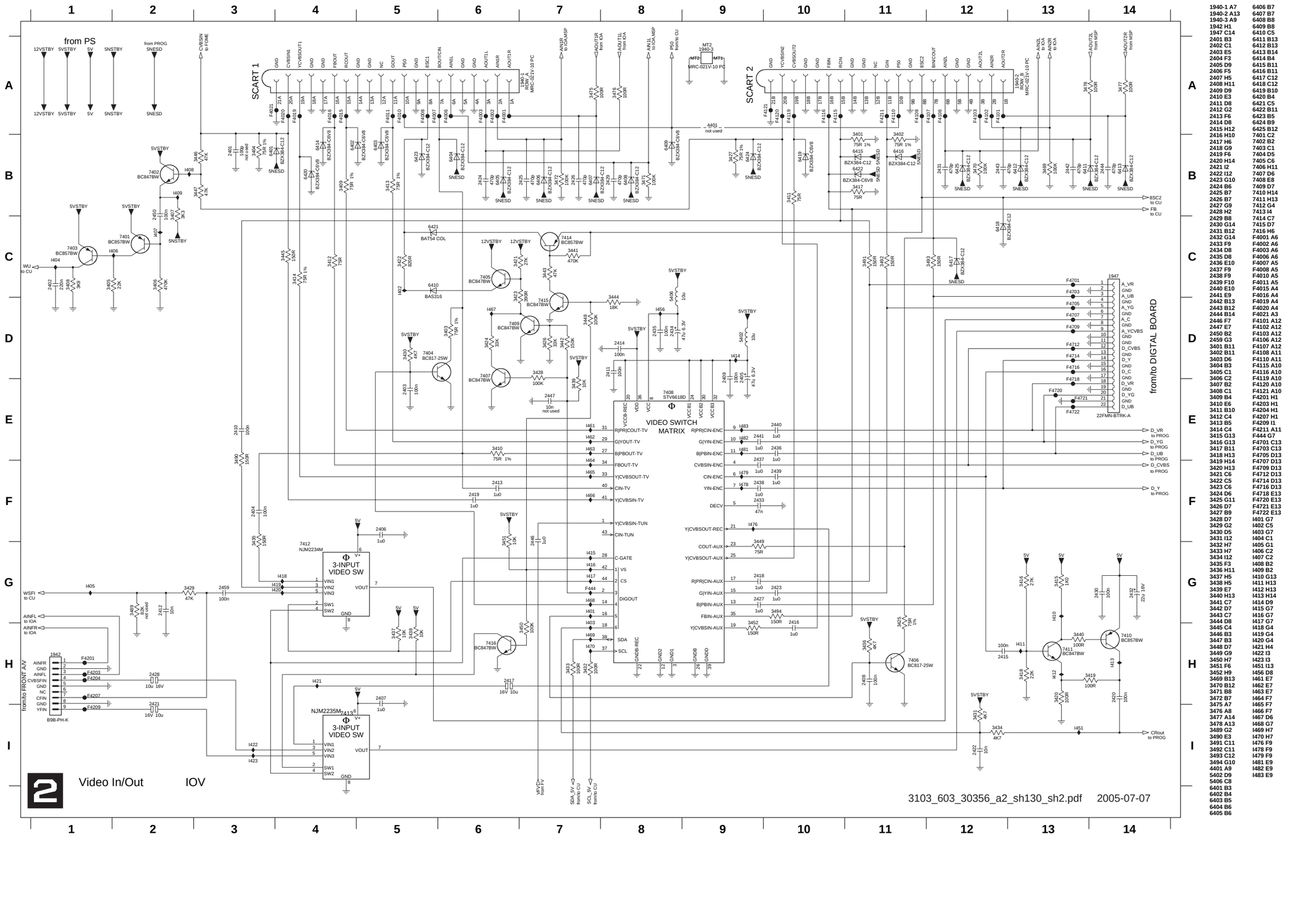
F100 G3	F115 G9	F320 K3
F100 G4	F115 G9	F320 K4
F101 B5	F116 G3	F321 K4
F101 B5	F116 G4	F321 K4
F1017 E3	F117 H3	F322 L5
F1017 E4	F117 H3	F322 L5
F102 B6	F2001 J10	F400 D2
F103 B9	F2001 J10	F400 D2
F103 B9	F2002 K6	F401 C3
F104 C5	F2002 K6	F401 C3
F104 C5	F2004 K8	F402 C2
F105 B8	F2004 K8	F402 C3
F105 B8	F2006 K9	F403 B5
F106 B8	F2006 K9	F403 C5
F106 B8	F201 J8	F404 C4
F108 C9	F201 J8	F404 C4
F108 C9	F202 J6	F405 D8
F109 D8	F202 J6	F405 D8
F109 D9	F203 J7	F406 B4
F110 C9	F203 J7	F406 B4
F110 C9	F204 H10	F407 B3
F1103 C8	F204 H10	F407 B3
F1103 C8	F205 H10	F408 B4
F1105 B8	F205 H10	F408 B4
F1105 C8	F301 K2	F409 B4
F1107 C7	F301 K2	F409 B5
F1107 C7	F302 K4	F410 B4
F1109 B7	F302 K4	F410 B4
F1109 C7	F303 J4	F411 B4
F111 H6	F303 J4	F411 B4
F111 H6	F304 K2	F412 B5
F1113 C7	F304 J3	F412 B5
F1113 C7	F305 J2	F413 B4
F1115 B7	F305 K2	F413 B5
F1115 C7	F306 J2	F414 C4
F1117 C7	F306 J2	F414 C4
F1117 C7	F307 K5	F415 C3
F1118 B7	F307 K5	F415 C3
F1119 B7	F308 L4	
F1119 B7	F308 L4	
F112 H6	F3101 G2	
F112 H6	F3101 G2	
F1121 C7	F3103 H2	
F1121 C7	F3103 H2	
F1123 B7	F3105 H2	
F1123 B7	F3105 H2	
F1124 B9	F3107 H2	
F1124 B9	F3107 H2	
F1125 C7	F3109 H2	
F1125 C7	F3109 H2	
F1127 B6	F311 L3	
F1127 B6	F311 L3	
F1128 C8	F3111 H2	
F1128 C8	F3111 H2	
F1129 C6	F3113 I2	
F1129 C6	F3113 I2	
F113 E4	F312 L3	
F113 E4	F312 L3	
F1131 B6	F313 L3	
F1131 B6	F313 L3	
F1133 C6	F314 L3	
F1133 C6	F314 L3	
F1135 B6	F315 L3	
F1135 B6	F315 L3	
F1137 C6	F316 L3	
F1137 C6	F316 L4	
F1139 C5	F317 L4	
F1139 C6	F317 L4	
F114 D8	F318 L4	
F114 D8	F318 L4	
F1140 B8	F319 L4	
F1140 B8	F319 L4	

7. Circuit Diagrams and PWB Layouts

Analog: Frontend Video (FV)

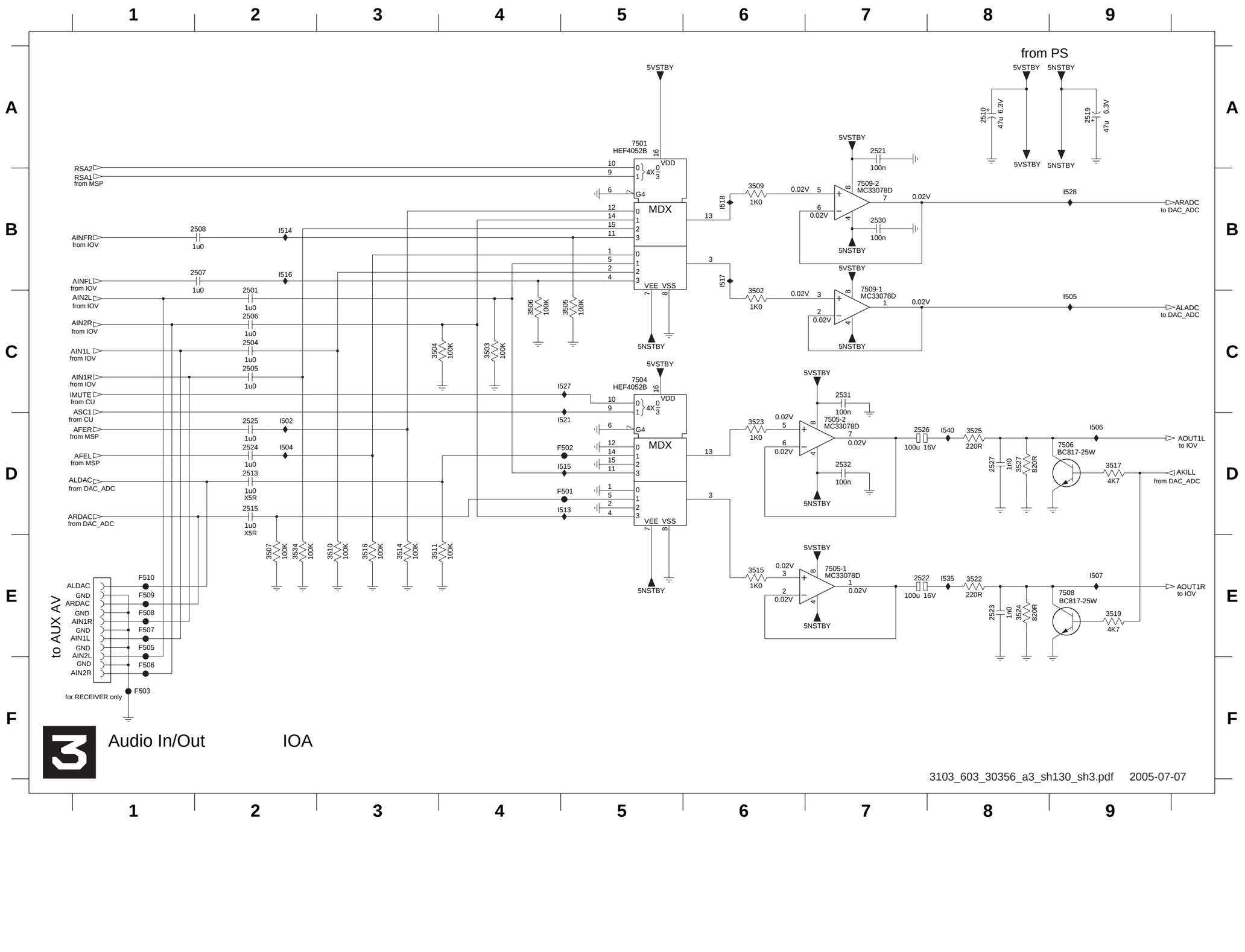


Analog: Video In / Out (IOV)



1940-1 A7	6406 B7
1940-2 A13	6407 B7
1940-3 A9	6408 B8
1942 H1	6409 B8
1947 C14	6410 C5
2401 B3	6411 B13
2402 C1	6412 B13
2403 E5	6413 B14
2404 F3	6414 B4
2405 D9	6415 B11
2406 F5	6416 B11
2407 H5	6417 C12
2408 H11	6418 C12
2409 D9	6419 B10
2410 E3	6420 B4
2411 D8	6421 C5
2412 G2	6422 B11
2413 F6	6423 B5
2414 D8	6424 B9
2415 H12	6425 B12
2416 H10	7401 C2
2417 H6	7402 B2
2418 G9	7403 C1
2419 F6	7404 D5
2420 H14	7405 C6
2421 I2	7406 H11
2422 I12	7407 D6
2423 G10	7408 E8
2424 B6	7409 D7
2425 B7	7410 H14
2426 B7	7411 H13
2427 G9	7412 G4
2428 H2	7413 I4
2429 B8	7414 C7
2430 G14	7415 D7
2431 B12	7416 H6
2432 G14	F4001 A6
2433 F9	F4002 A6
2434 D8	F4003 A6
2435 D8	F4006 A6
2436 E10	F4007 A5
2437 F9	F4008 A5
2438 F9	F4010 A5
2439 F10	F4011 A5
2440 E10	F4015 A4
2441 E9	F4016 A4
2442 B13	F4019 A4
2443 B12	F4020 A4
2444 B14	F4021 A3
2446 F7	F4101 A12
2447 E7	F4102 A12
2450 B2	F4103 A12
2459 G3	F4106 A12
3401 B11	F4107 A12
3402 B11	F4108 A11
3403 D6	F4110 A11
3404 B3	F4115 A10
3405 C1	F4116 A10
3406 C2	F4119 A10
3407 B2	F4120 A10
3408 C1	F4121 A10
3409 B4	F4201 H1
3410 E6	F4203 H1
3411 B10	F4204 H1
3412 C4	F4207 H1
3413 B5	F4209 I1
3414 C4	F4211 A11
3415 G13	F444 G7
3416 G13	F4701 C13
3417 B11	F4703 C13
3418 H13	F4705 D13
3419 H14	F4707 D13
3420 H13	F4709 D13
3421 C6	F4712 D13
3422 C5	F4714 D13
3423 C6	F4716 D13
3424 D6	F4718 E13
3425 G11	F4720 E13
3426 D7	F4721 E13
3427 B9	F4722 E13
3428 D7	I401 G7
3429 G2	I402 C5
3430 D5	I403 G7
3431 I12	I404 C1
3432 H7	I405 G1
3433 H7	I406 C2
3434 I12	I407 C2
3435 F3	I408 B2
3436 H11	I409 B2
3437 H5	I410 G13
3438 H5	I411 H13
3439 E7	I412 H13
3440 H13	I413 H14
3441 C7	I414 D9
3442 D7	I415 G7
3443 C7	I416 G7
3444 D8	I417 G7
3445 C4	I418 G4
3446 B3	I419 G4
3447 B3	I420 G4
3448 D7	I421 H4
3449 G9	I422 I3
3450 H7	I423 I3
3451 F6	I451 I13
3452 H9	I456 D8
3469 B13	I461 E7
3470 B12	I462 E7
3471 B8	I463 E7
3472 B7	I464 F7
3475 A7	I465 F7
3476 A8	I466 F7
3477 A14	I467 D6
3478 A13	I468 G7
3489 G2	I469 H7
3490 E3	I470 H7
3491 C11	I476 F9
3492 C11	I478 F9
3493 C12	I479 F9
3494 G10	I481 E9
4401 A9	I482 E9
5402 D9	I483 E9
5406 C8	
6401 B3	
6402 B4	
6403 B5	
6404 B6	
6405 B6	

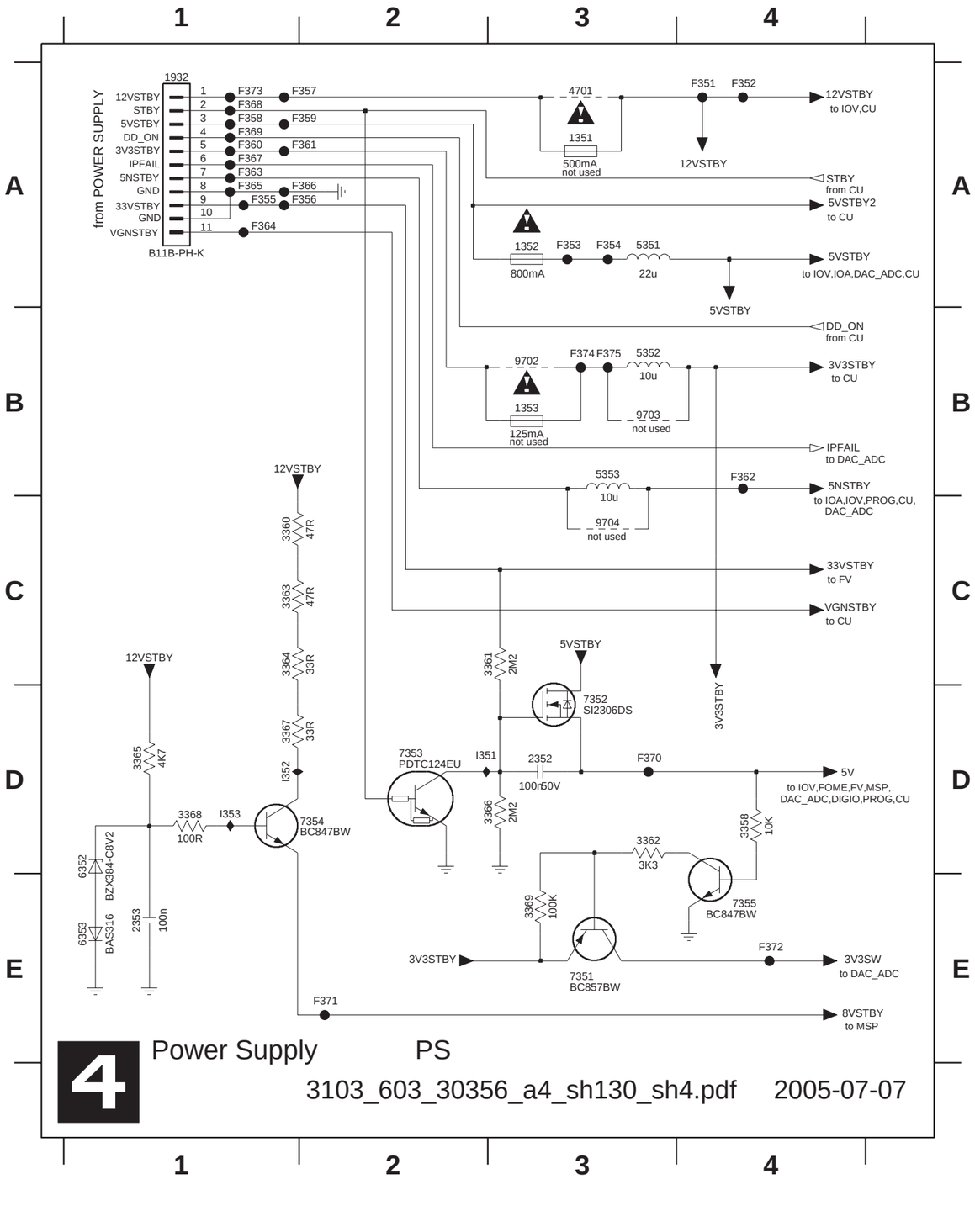
Analog: Audio In / Out (IOA)



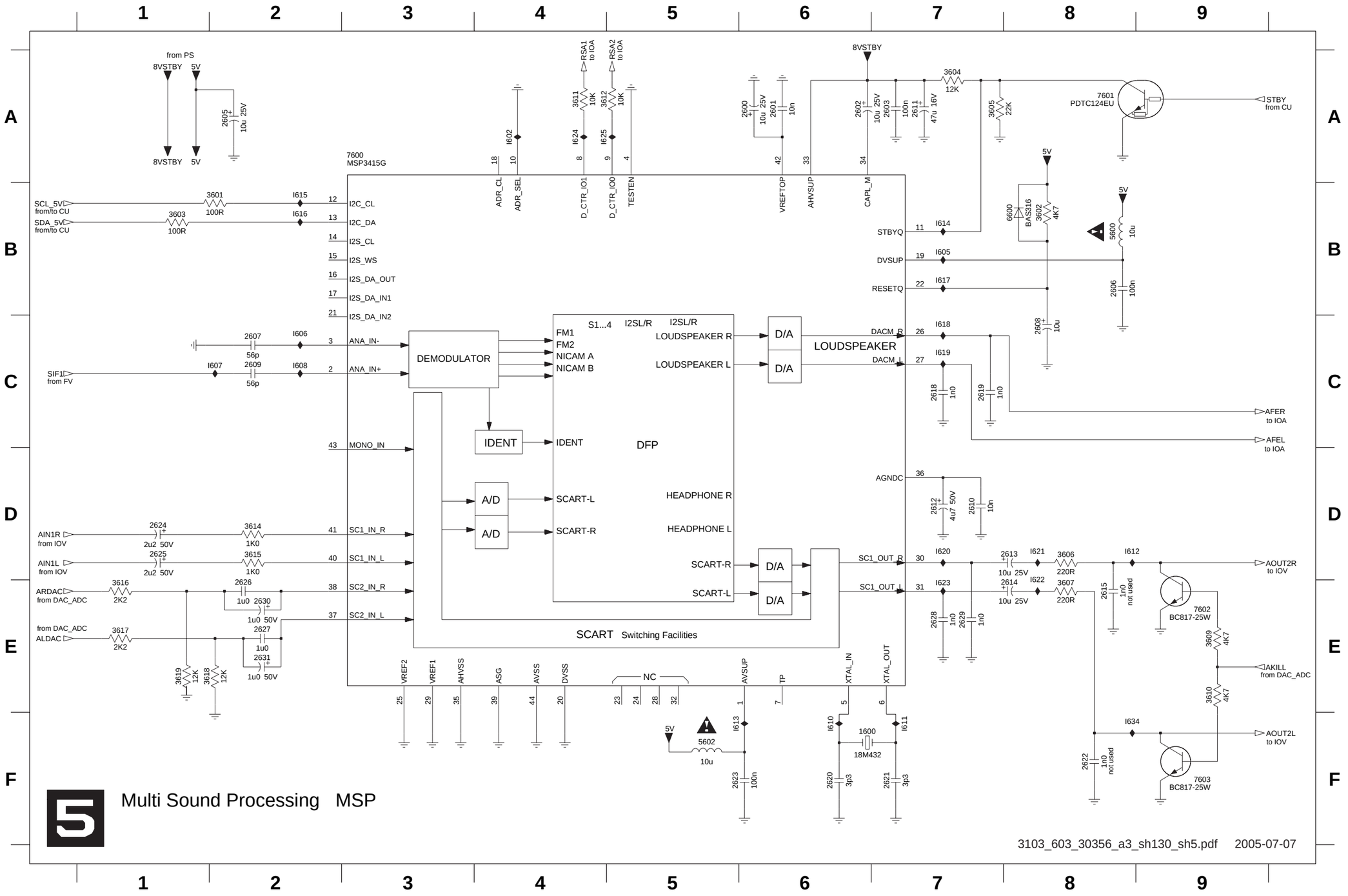
2501 C2
2504 C2
2505 C2
2506 C2
2507 B2
2508 B2
2510 A8
2513 D2
2515 D2
2519 A9
2521 A7
2522 E7
2523 E8
2524 D2
2525 D2
2526 D7
2527 D8
2530 B7
2531 C7
2532 D7
3502 C6
3503 C4
3504 C3
3505 C5
3506 C4
3507 E2
3509 B6
3510 E3
3511 E3
3514 E3
3515 E6
3516 E3
3517 D9
3519 E9
3522 E8
3523 D6
3524 E8
3525 D8
3527 D8
3534 E2
7501 A5
7504 C5
7505-1 E7
7505-2 D7
7506 D9
7508 E9
7509-1 C7
7509-2 B7
F501 D5
F502 D5
F503 F1
F505 E1
F506 F1
F507 E1
F508 E1
F509 E1
F510 E1
I502 D2
I504 D2
I505 C9
I506 D9
I507 E9
I513 D5
I514 B2
I515 D5
I516 B2
I517 B6
I518 B6
I521 D5
I527 C5
I528 B9
I535 E8
I540 D8

Analog: Power Supply (PS)

1351 A3	2353 E1	3363 C1	3368 D1	5353 B3	7353 D2	9704 C3	F355 A1	F360 A1	F365 A1	F370 D3	F375 B3	
1352 A3	3358 D4	3364 C1	3369 E3	6352 D1	7354 D2	F351 A4	F356 A2	F361 A2	F366 A2	F371 E2	I351 D2	
1353 B3	3360 C1	3365 D1	4701 A3	6353 E1	7355 E4	F352 A4	F357 A2	F362 B4	F367 A1	F372 E4	I352 D1	
1932 A1	3361 C3	3366 D3	5351 A3	7351 E3	9702 B3	F353 A3	F358 A1	F363 A1	F368 A1	F373 A1	I353 D1	
2352 D3	3362 D3	3367 D1	5352 B3	7352 D3	9703 B3	F354 A3	F359 A2	F364 A1	F369 A1	F374 B3		



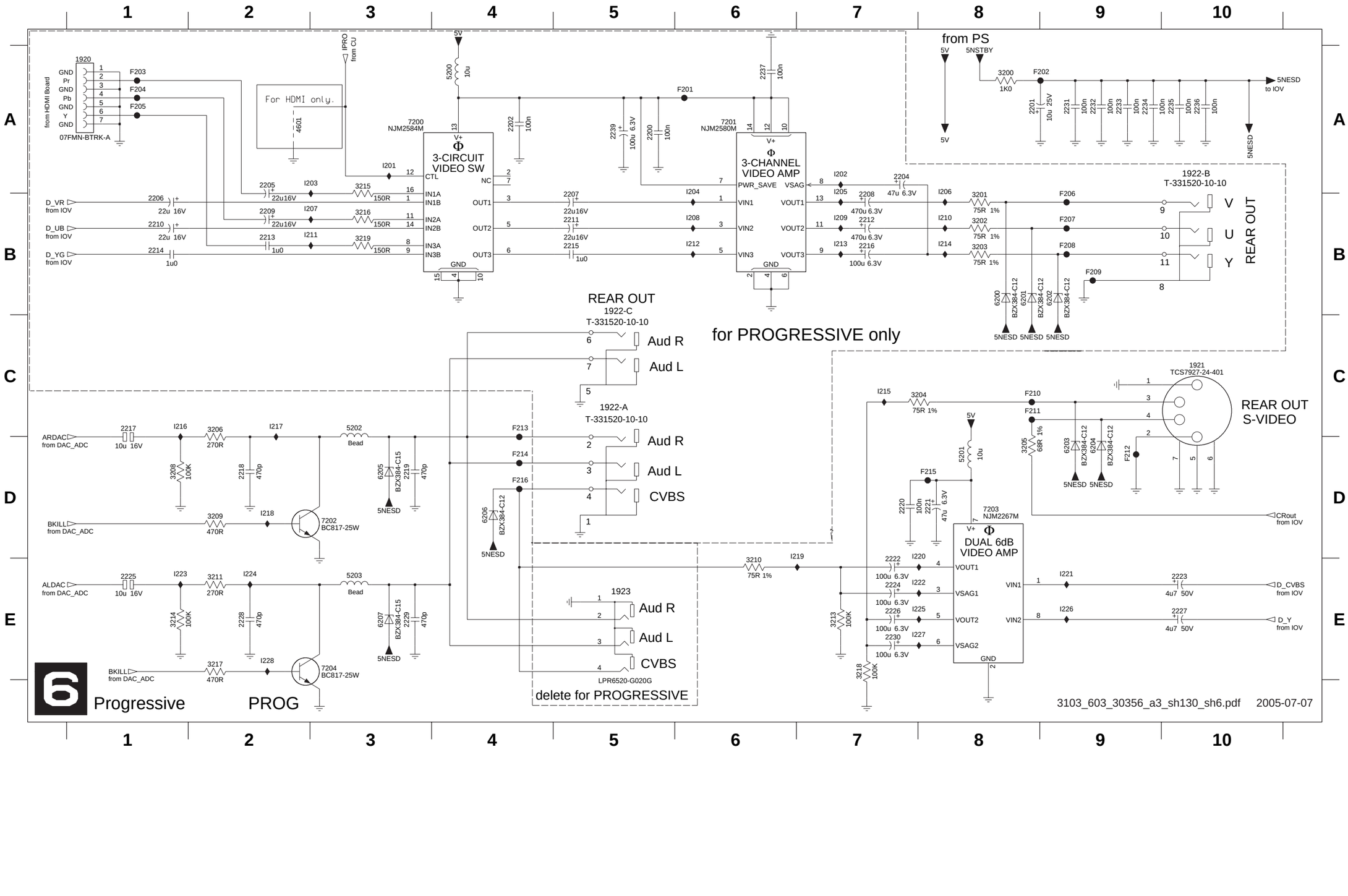
Analog: Multi Sound Processing (MSP)



1600 F6
2600 A6
2601 A6
2602 A6
2603 A7
2605 A2
2606 B8
2607 C2
2608 C8
2609 C2
2610 D7
2611 A7
2612 D7
2613 D8
2614 E8
2615 E8
2618 C7
2619 C7
2620 F6
2621 F7
2622 F8
2623 F5
2624 D1
2625 D1
2626 E2
2627 E2
2628 E7
2629 E7
2630 E2
2631 E2
3601 B2
3602 B8
3603 B1
3604 A7
3605 A7
3606 D8
3607 E8
3609 E9
3610 E9
3611 A4
3612 A4
3614 D2
3615 D2
3616 E1
3617 E1
3618 E1
3619 E1
5600 B8
5602 F5
6600 B8
7600 A3
7601 A8
7602 E9
7603 F9
I602 A4
I605 B7
I606 C2
I607 C2
I608 C2
I610 F6
I611 F7
I612 D8
I613 F5
I614 B7
I615 B2
I616 B2
I617 B7
I618 C7
I619 C7
I620 D7
I621 D8
I622 D8
I623 E7
I624 A4
I625 A4
I634 F8

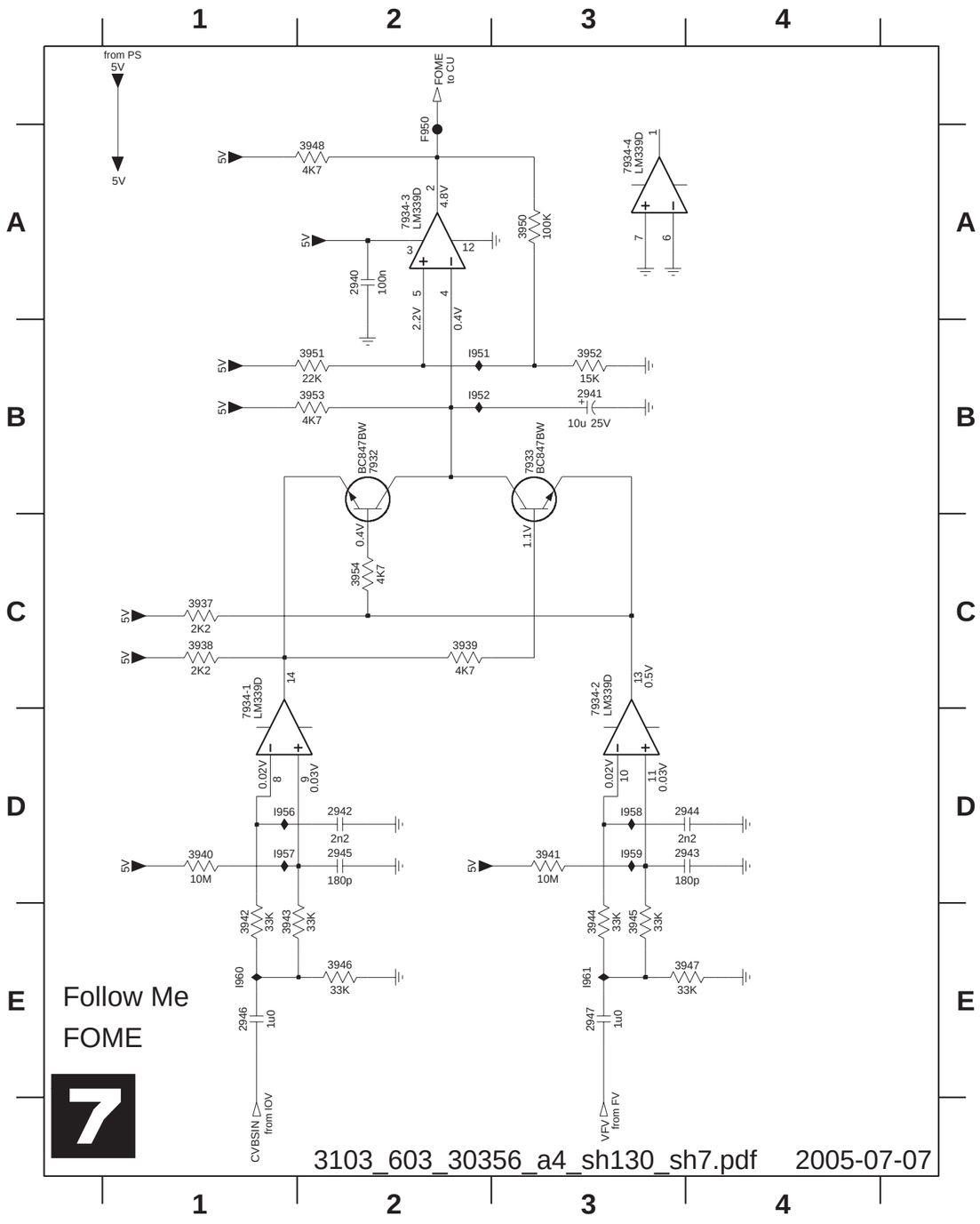
Analog: Progressive (PROG)

1920 A1	2201 A8	2209 B2	2216 B7	2223 E10	2230 E7	2237 A6	3205 D8	3214 E1	5200 A4	6203 D9	7202 D3	F205 A1	F212 D9	I203 A3	I210 B8	I217 C2	I224 E2
1921 C10	2202 A4	2210 B1	2217 C1	2224 E7	2231 A9	2239 A5	3206 C2	3215 A3	5201 D8	6204 D9	7203 D8	F206 B9	F213 C4	I204 A6	I211 B3	I218 D2	I225 E8
1922-A C5	2204 A7	2211 B5	2218 D2	2225 E1	2232 A9	3200 A8	3209 D2	3216 B3	5202 C3	6205 D3	7204 E3	F207 B9	F214 D4	I205 A7	I212 B6	I219 D7	I226 E9
1922-B A10	2205 A2	2212 B7	2219 D3	2226 E7	2233 A9	3201 B8	3210 E6	3217 E2	5203 E3	6206 D4	F201 A6	F208 B9	F215 D8	I206 A8	I213 B7	I220 D8	I227 E8
1922-C B5	2206 B1	2213 B2	2220 D7	2227 E10	2234 A9	3202 B8	3211 E2	3218 E7	5200 B8	6207 E3	F202 A9	F209 B9	F216 D4	I207 B3	I214 B8	I221 E9	I228 E2
1923 E5	2207 B5	2214 B1	2221 D8	2228 E2	2235 A10	3203 B8	3212 E3	4601 A2	6201 B8	7200 A3	F203 A1	F210 C8	I201 A3	I208 B6	I215 C7	I222 E8	
2200 A5	2208 B7	2215 B5	2222 E7	2229 E3	2236 A10	3204 C8	3213 E7		6202 B9	7201 A6	F204 A1	F211 C8	I202 A7	I209 B7	I216 C1	I223 E1	

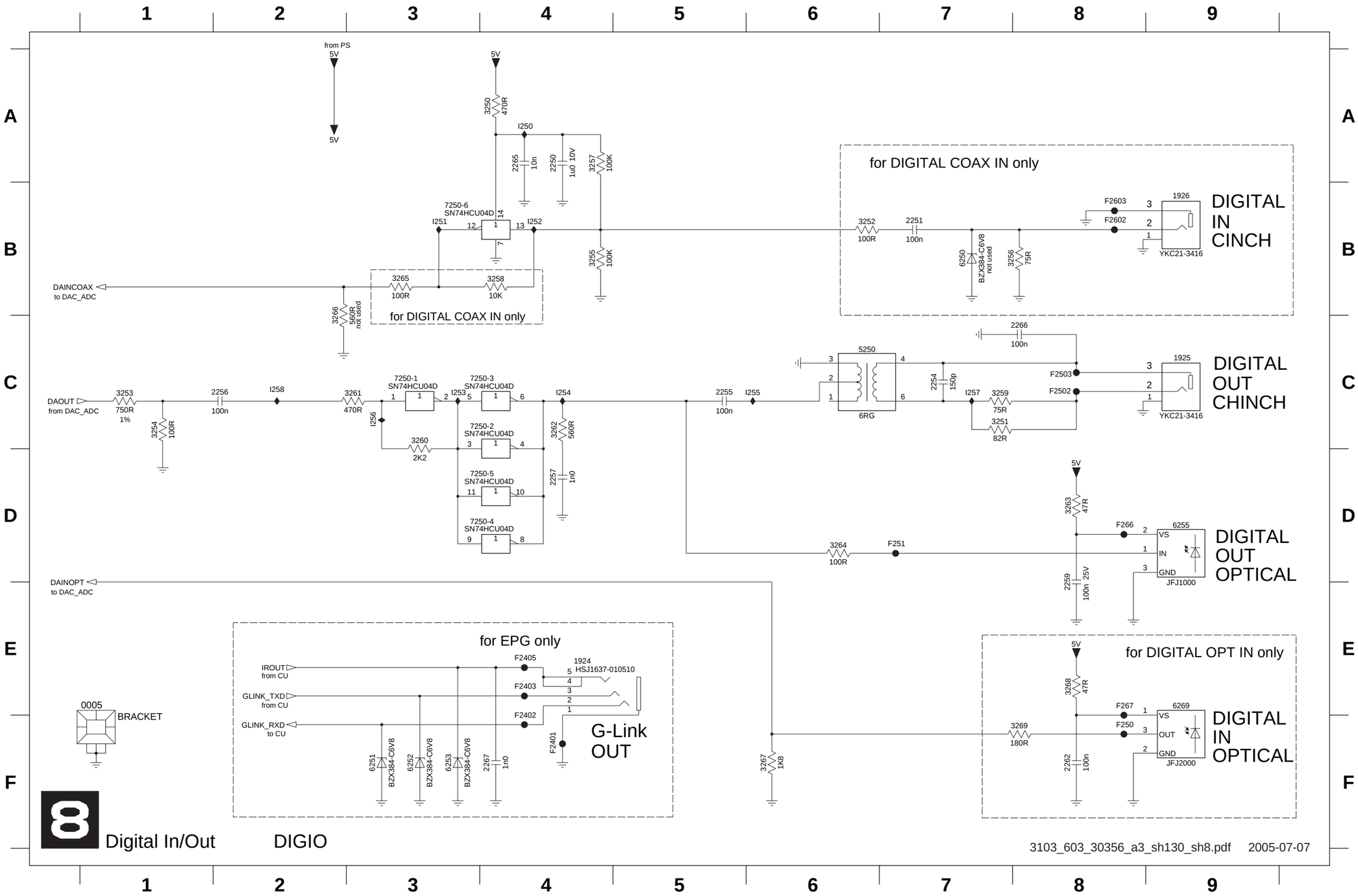


Analog: Follow Me (FOME)

2940 A2	2944 D4	3937 C1	3941 D3	3945 E3	3950 A3	3954 C2	7934-2 D3	I951 B2	I958 D3
2941 B3	2945 D2	3938 C1	3942 E1	3946 E2	3951 B2	7932 B2	7934-3 A2	I952 B2	I959 D3
2942 D2	2946 E1	3939 C2	3943 E1	3947 E4	3952 B3	7933 B3	7934-4 A3	I956 D1	I960 E1
2943 D4	2947 E3	3940 D1	3944 E3	3948 A2	3953 B2	7934-1 D1	F950 A2	I957 D1	I961 E3



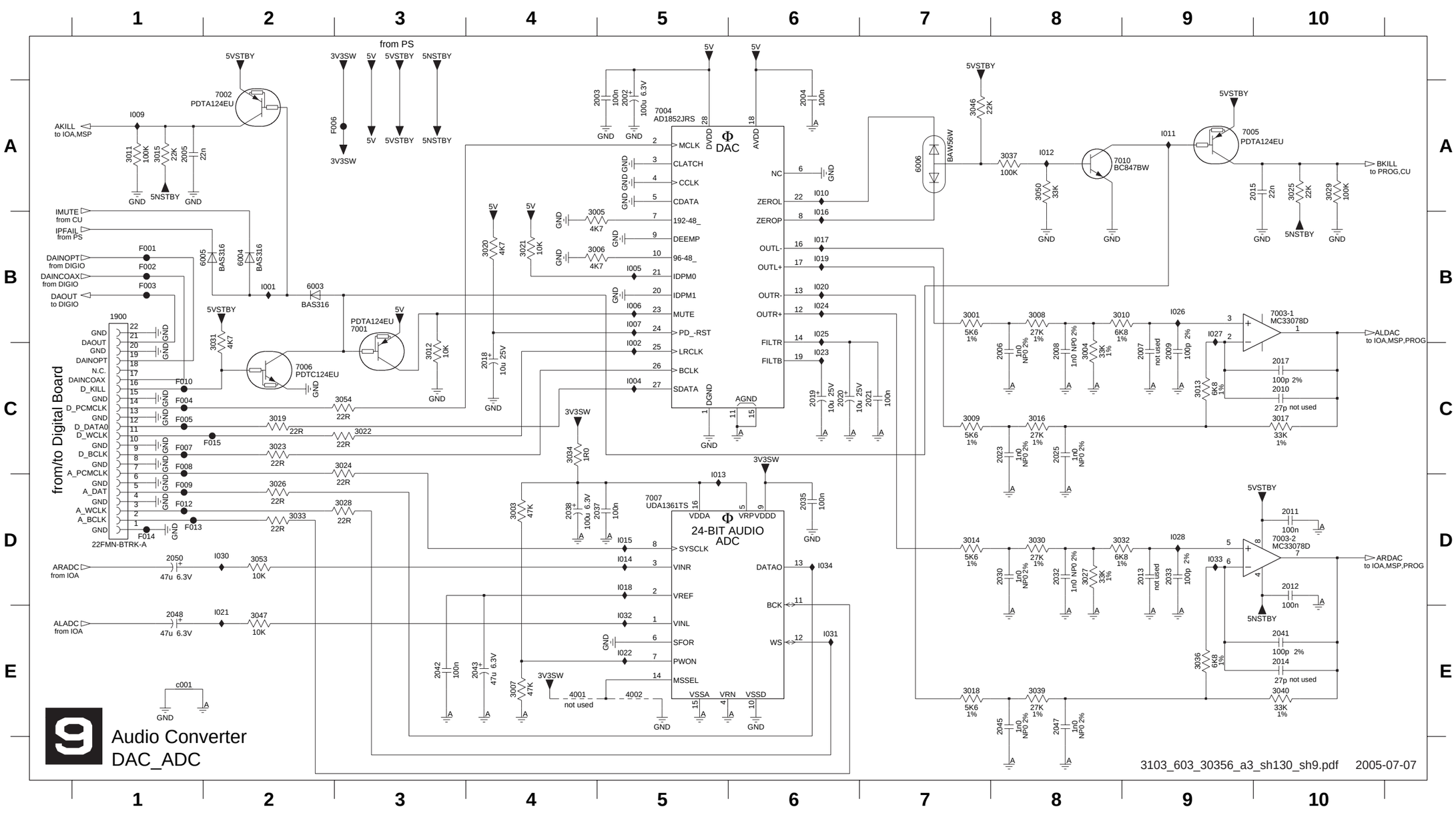
Analog: Digital In / Out (DIGIO)



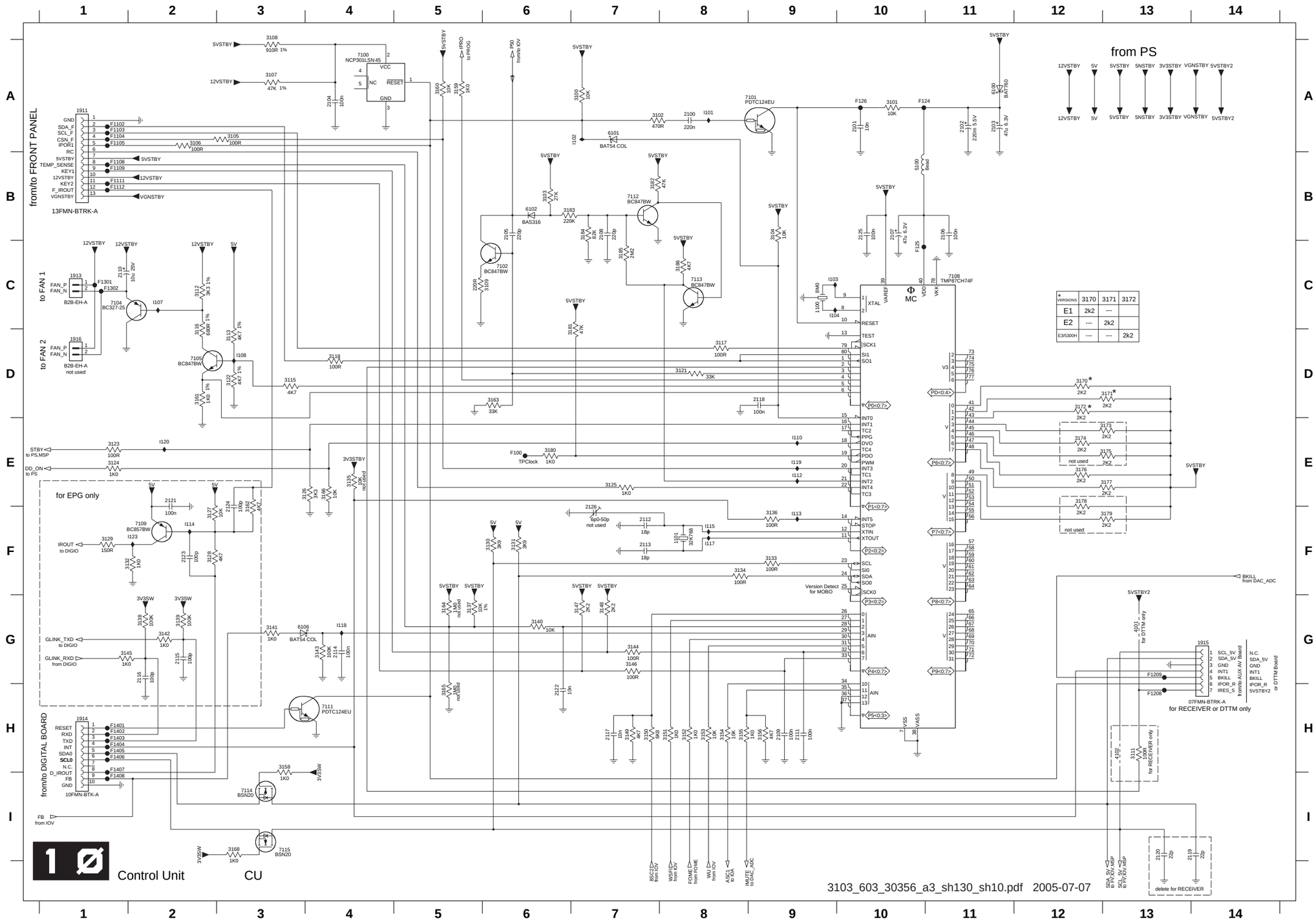
0005 E1
1924 E4
1925 C9
1926 B9
2250 A4
2251 B7
2254 C7
2255 C5
2256 C2
2257 D4
2259 D8
2262 F8
2265 A4
2266 C8
2267 F4
3250 A4
3251 C7
3252 B6
3253 C1
3254 C1
3255 B4
3256 B8
3257 A4
3258 B4
3259 C7
3260 C3
3261 C3
3262 C4
3263 D8
3264 D6
3265 B3
3266 B2
3267 F6
3268 E8
3269 F8
5250 C6
6250 B7
6251 F3
6252 F3
6253 F3
6255 D9
6269 E9
7250-1 C3
7250-2 C4
7250-3 C4
7250-4 D4
7250-5 D4
7250-6 B3
F2401 F4
F2402 F4
F2403 E4
F2405 E4
F250 F8
F2502 C8
F2503 C8
F251 D7
F2602 B8
F2603 B8
F266 D8
F267 E8
I250 A4
I251 B3
I252 B4
I253 C3
I254 C4
I255 C6
I256 C3
I257 C7
I258 C2

Analog: Audio Converter (DAC_ADC)

1900 B1	2008 C8	2015 A10	2025 C8	2041 E10	3001 B7	3009 C7	3016 C8	3023 C2	3030 D8	3039 E8	4001 E4	7002 A2	7010 A8	F007 C1	F015 C2	I009 A1	I016 B6	I023 C6	I031 E6
2002 A5	2009 C9	2017 C10	2030 D8	2042 E3	3003 D4	3010 B8	3017 C10	3024 C3	3031 B2	3040 E10	4002 E5	7003-1 B10	F001 B1	F008 C1	I001 B2	I010 A6	I017 B6	I024 B6	I032 E5
2003 A5	2010 C10	2018 C4	2032 D8	2043 E4	3004 C8	3011 A1	3018 E7	3025 A10	3032 D8	3046 A7	6003 B2	7003-2 D10	F002 B1	F009 D1	I002 C5	I011 A9	I018 D5	I025 B6	I033 D9
2004 A6	2011 D10	2019 C6	2033 D9	2045 E8	3005 B4	3012 C3	3019 C2	3026 D2	3033 D2	3047 E2	6004 B2	7004 A5	F003 B1	F010 C1	I004 C5	I012 A8	I019 B6	I026 B9	I034 D6
2005 A1	2012 D10	2020 C6	2035 D6	2047 E8	3006 B4	3013 C9	3020 B4	3027 D8	3034 C4	3050 A8	6005 B2	7005 A9	F004 C1	F012 D1	I005 B5	I013 D5	I020 B6	I027 B9	c001 E1
2006 C8	2013 D9	2021 C7	2037 D5	2048 E1	3007 E4	3014 D7	3021 B4	3028 D3	3035 E9	3053 D2	6006 A7	7006 C2	F005 C1	F013 D1	I006 B5	I014 D5	I021 E2	I028 D9	
2007 C9	2014 E10	2023 C8	2038 D4	2050 D1	3008 B8	3015 A1	3022 C3	3029 A10	3037 A8	3054 C3	7001 B3	7007 D5	F006 A3	F014 D1	I007 B5	I015 D5	I022 E5	I030 D2	



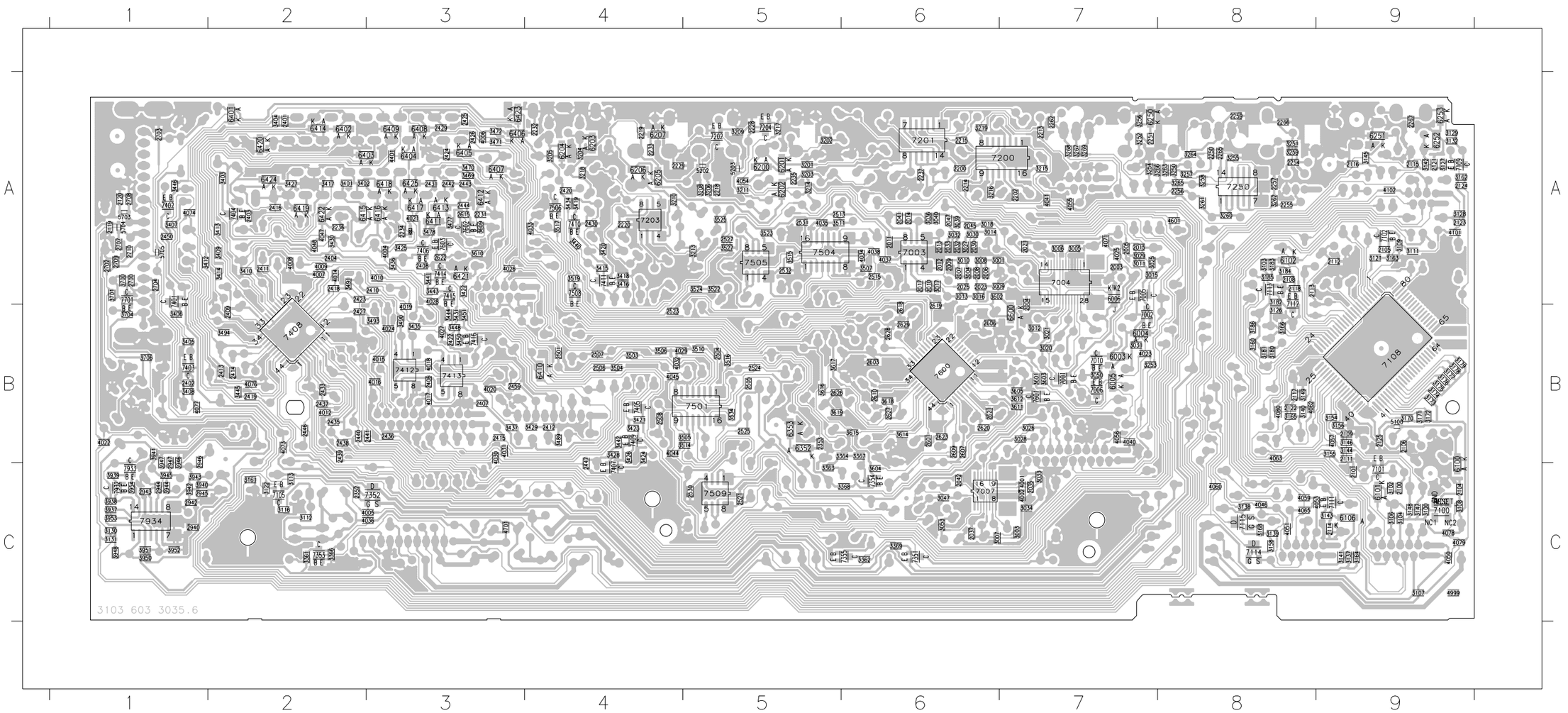
Analog: Control Unit (CU)



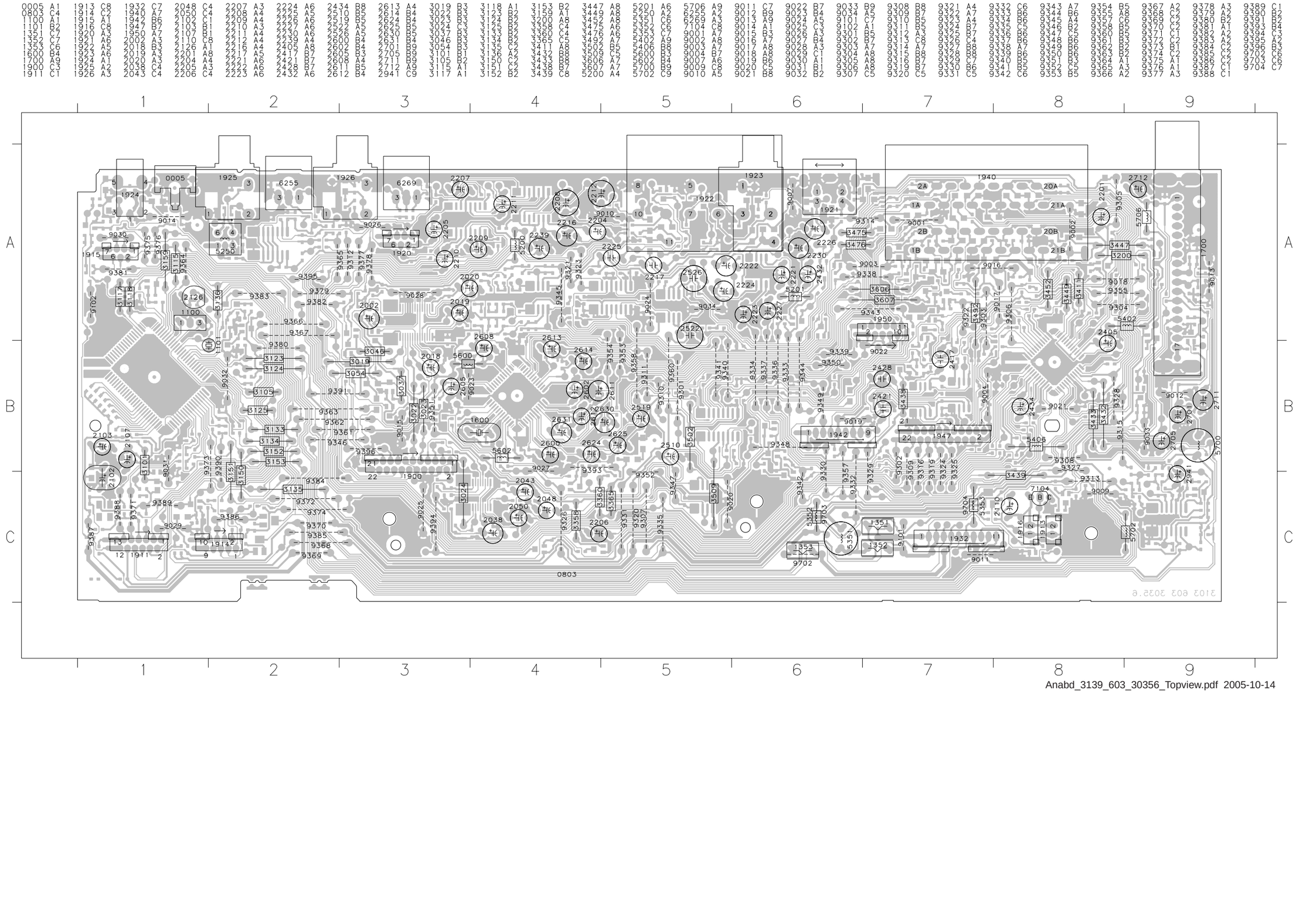
* VERSIONS	3170	3171	3172
E1	2k2	---	
E2	---	2k2	
E3/5300H	---	---	2k2

1100 C9
1101 F8
1911 A1
1913 C1
1914 H1
1915 G14
1916 D1
2100 A8
2101 A10
2102 A11
2103 A11
2104 A4
2105 B6
2106 B11
2107 B10
2108 B7
2109 H9
2110 C1
2111 H9
2112 F7
2113 F7
2114 G4
2115 G2
2116 G2
2117 H7
2118 D9
2119 I14
2120 I13
2121 E2
2122 H6
2123 F2
2124 F3
2125 B10
2126 F7
3100 A7
3101 A10
3102 A7
3103 B6
3104 B9
3105 A3
3106 B2
3109 C6
3111 H13
3112 C2
3113 D3
3115 D3
3116 D2
3117 D8
3118 D4
3121 D8
3122 D3
3123 E1
3124 E1
3125 E7
3126 E4
3127 F2
3128 F2
3129 F1
3130 F6
3131 F6
3132 F2
3133 F9
3134 F8
3135 E4
3136 F9
3137 G5
3138 G2
3139 G2
3140 G6
3141 G3
3142 G2
3143 G4
3144 G7
3145 G1
3146 G7
3147 G7
3148 G7
3149 H7
3150 H7
3151 H8
3152 H8
3153 H8
3154 H8
3155 H8
3156 H9
3158 H3
3159 A5
3160 A5
3161 E2
3162 F3
3163 D6
3164 G5
3165 H5
3166 E4
3168 I3
3170 D12
3171 D12
3172 D12
3173 E12
3174 E12
3175 E12
3176 E12
3177 E12
3178 E12
3179 F12
3180 E6
3181 D7
3182 B7
3183 B6
3184 B7
3185 C7
3186 C8
4101 G13
4102 H13
5100 B10
6100 A11
6101 A7
6102 B6
6106 G3
7100 A4
7101 A8
7102 C6
7104 D1
7105 D2
7108 C11
7109 F2
7111 H4
7112 B7
7113 C8
7114 I3
7115 I3
F100 E6
F1102 A1
F1103 A1
F1104 A1
F1105 B1
F1108 B1
F1109 B1
F1111 B1
F1112 B1
F1208 H13
F1209 G13
F124 A10
F125 C10
F126 A10
F1301 C1
F1302 C1
F1401 H1
F1402 H1
F1403 H1
F1404 H1
F1405 H1
F1406 H1
F1407 H1
F1408 I1
I101 A8
I102 A7
I103 C9
I104 C9
I107 D2
I108 D3
I110 E9
I112 E9
I113 F9
I114 F2
I115 E8
I117 F8
I118 G4
I119 E9
I120 E2
I123 F2

Layout: Analog Component + SMD VIEW

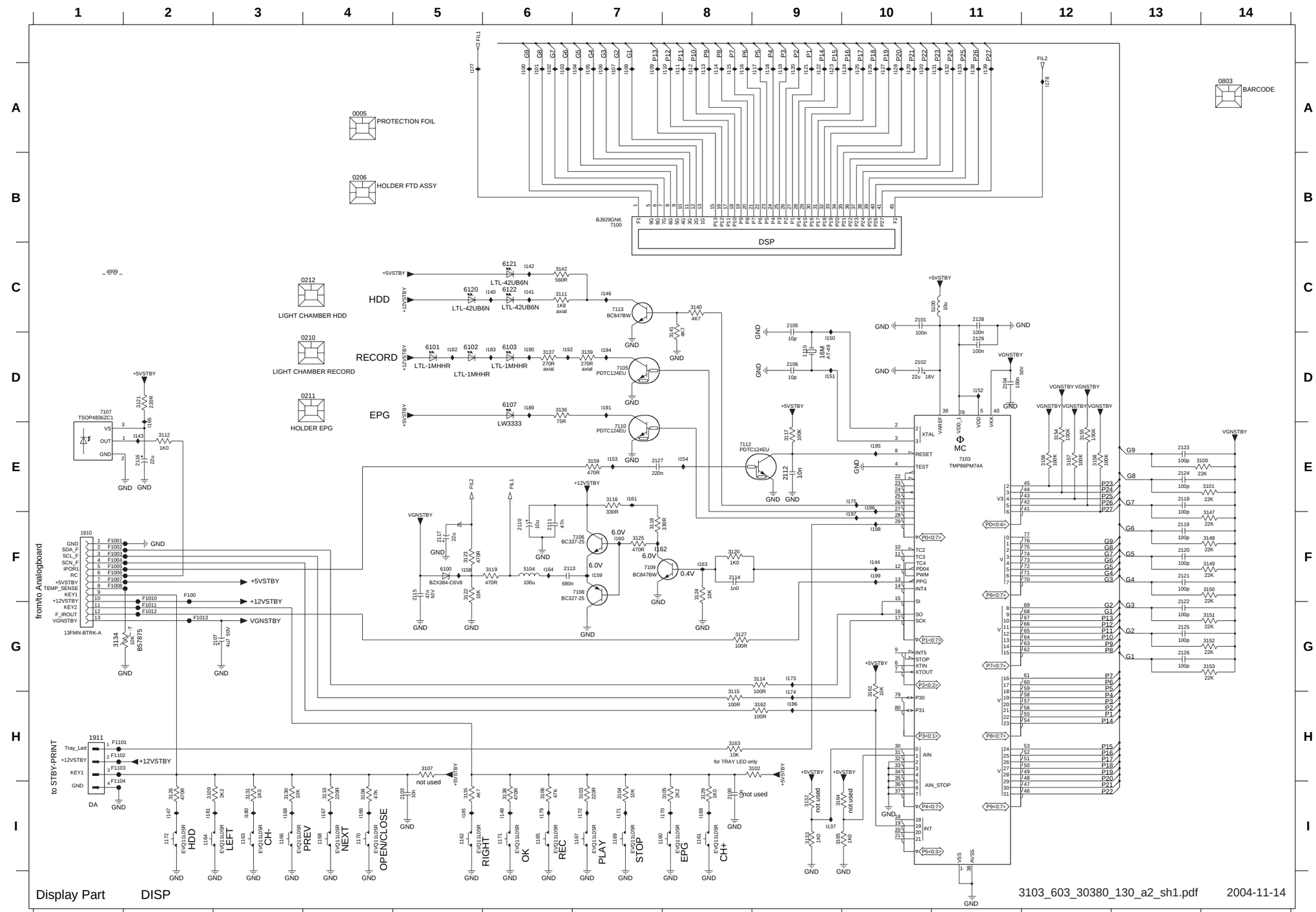


Layout: Analog Component View



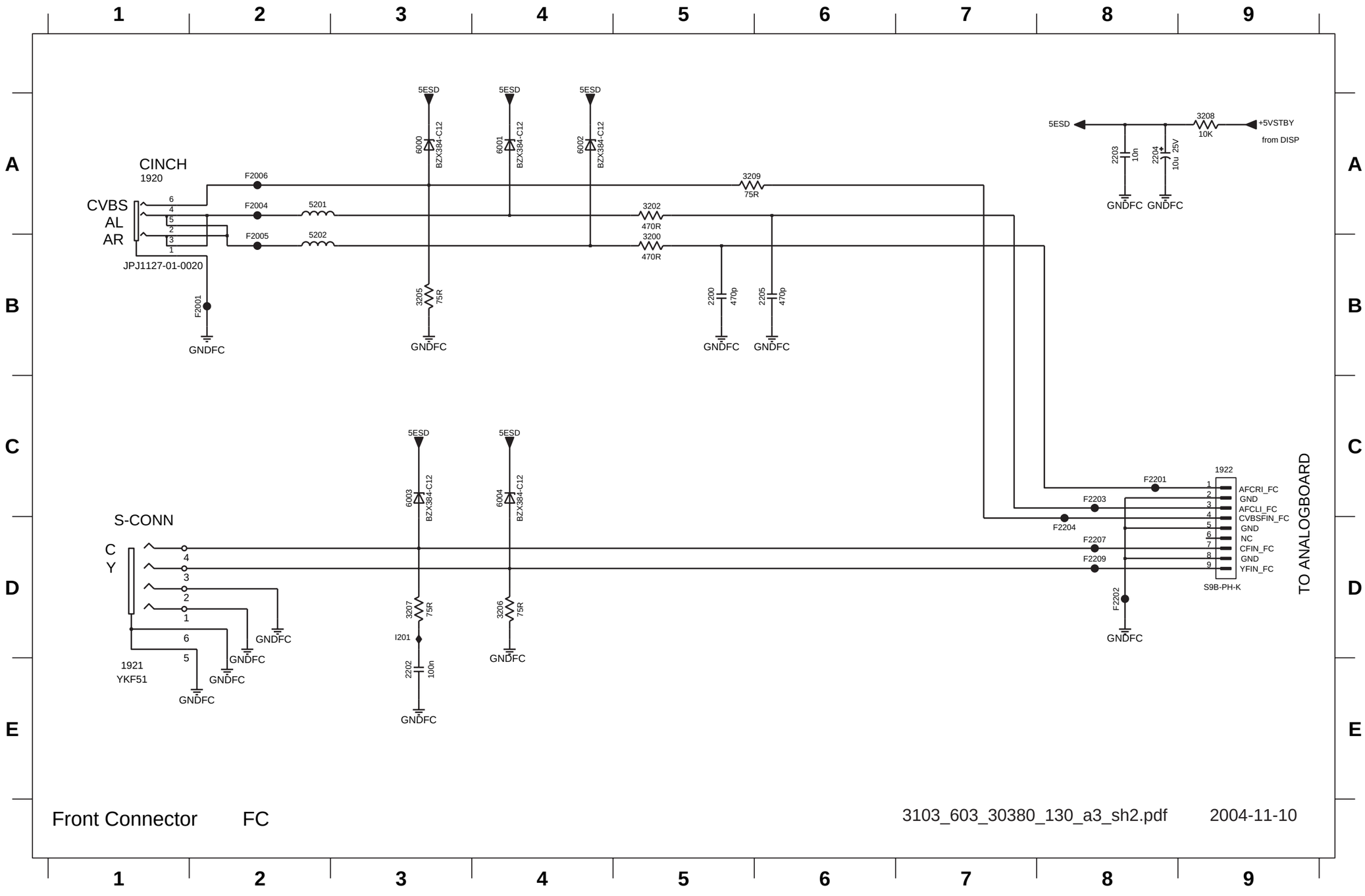
Anabd_3139_603_30356_Topview.pdf 2005-10-14

Front: Display Part (DISP)



0005 A4	6121 C6
0206 B4	6122 C5
0210 D3	7100 A5
0211 D3	7103 E11
0212 C3	7105 D7
0803 A14	7106 F7
1110 D9	7107 D1
1160 I7	7108 F7
1161 I8	7109 F8
1162 I5	7110 E7
1163 I3	7112 E8
1164 I2	7113 C7
1165 I6	F100 G2
1166 I3	F1001 E2
1167 I7	F1002 F2
1168 I4	F1003 F2
1169 I7	F1004 F2
1170 I4	F1005 F2
1171 I6	F1006 F2
1172 I2	F1007 F2
1910 E1	F1008 F2
1911 H1	F1010 G2
2100 I8	F1011 G2
2101 C10	F1012 G2
2102 D10	F1013 G2
2103 I5	F1101 H1
2104 D11	F1102 H1
2105 C9	F1103 H1
2106 D9	F1104 I1
2107 G3	I100 A6
2110 F6	I101 A6
2111 F6	I102 A6
2112 E9	I103 A6
2113 F6	I104 A7
2114 F8	I105 A7
2115 F5	I106 A7
2116 E2	I107 A7
2117 F5	I108 A7
2118 E13	I109 A7
2119 F13	I110 A8
2120 F13	I111 A8
2121 F13	I112 A8
2122 G13	I113 A8
2123 E13	I114 A8
2124 E13	I115 A8
2125 G13	I116 A8
2126 G13	I117 A9
2127 E7	I118 A9
2128 C11	I119 A9
2129 D11	I120 A9
3100 E14	I121 A9
3101 E14	I122 A9
3102 I9	I123 A9
3103 I7	I124 A10
3104 I7	I125 A10
3105 I8	I126 A10
3106 I6	I127 A10
3107 H5	I128 A10
3108 I4	I129 A10
3109 I2	I130 A10
3110 I4	I131 A11
3111 C6	I132 A11
3112 E2	I133 A11
3114 G9	I137 I10
3115 H8	I138 A11
3116 E7	I139 A11
3117 D9	I140 C5
3118 F7	I141 C6
3119 F6	I142 C6
3120 F8	I143 E2
3121 D2	I144 F9
3122 F5	I146 C7
3123 F5	I147 I2
3124 F8	I148 I6
3125 F7	I150 D9
3126 I2	I151 D9
3127 G8	I152 D11
3129 I8	I153 E7
3130 I3	I154 E8
3131 I3	I158 F5
3132 I9	I159 F7
3133 I9	I160 F7
3134 G1	I161 E7
3135 I5	I162 F7
3136 D6	I163 F8
3137 D6	I164 F6
3138 I6	I165 E2
3139 D7	I166 I4
3140 C8	I167 I4
3141 C8	I168 I3
3142 C6	I169 I8
3147 F14	I170 I8
3148 F14	I171 I7
3149 F14	I172 I7
3150 F14	I173 G9
3151 G14	I174 H9
3152 G14	I175 E10
3153 G14	I177 A5
3154 E12	I178 A12
3155 E12	I179 I6
3156 E12	I180 I3
3157 E12	I181 I2
3158 E12	I182 D5
3159 E7	I183 D6
3161 G10	I185 I5
3162 H9	I186 H9
3163 H8	I189 D6
3164 I9	I190 D6
3165 I9	I191 D6
5100 C11	I192 D6
5104 F6	I194 D7
6100 F5	I195 E10
6101 D5	I196 E10
6102 D5	I197 F10
6103 D6	I198 F10
6107 D5	I199 F10
6120 C5	

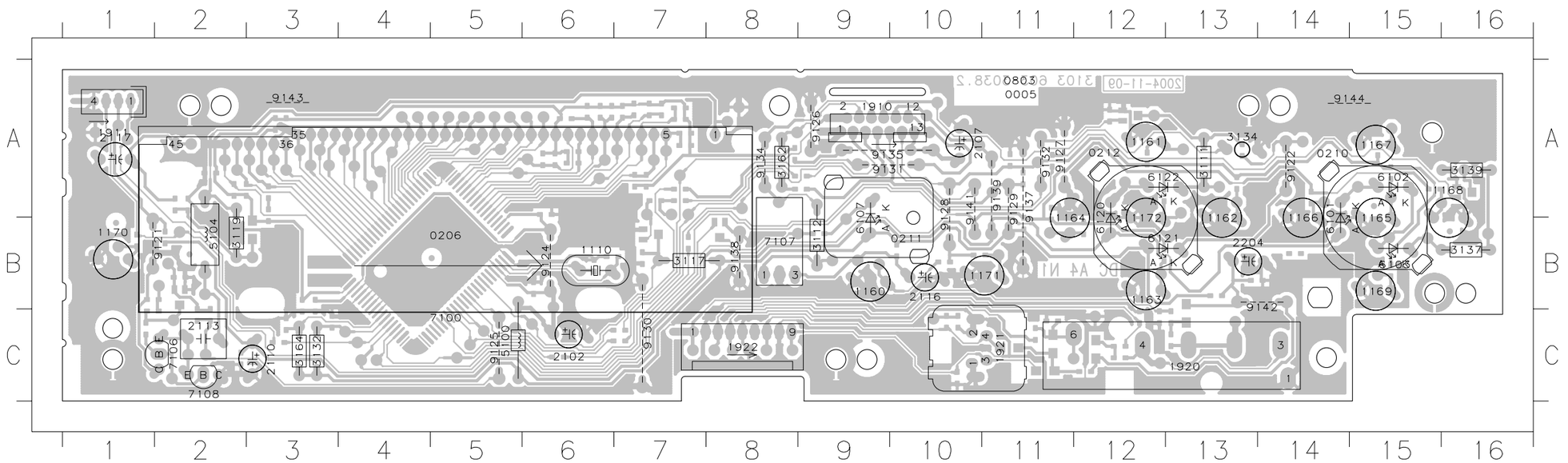
Front: Front Connector (FC)



1920 B1
1921 E1
1922 C9
2200 B5
2202 E3
2203 A8
2204 A8
2205 B6
3200 B5
3202 A5
3205 B3
3206 D4
3207 D3
3208 A9
3209 A5
5201 A2
5202 B2
6000 A3
6001 A4
6002 A4
6003 C3
6004 C4
F2001 B2
F2004 A2
F2005 B2
F2006 A2
F2201 C8
F2202 D8
F2203 C8
F2204 D8
F2207 D8
F2209 D8
I201 D3

Layout: Display/Front Connector (Top View)

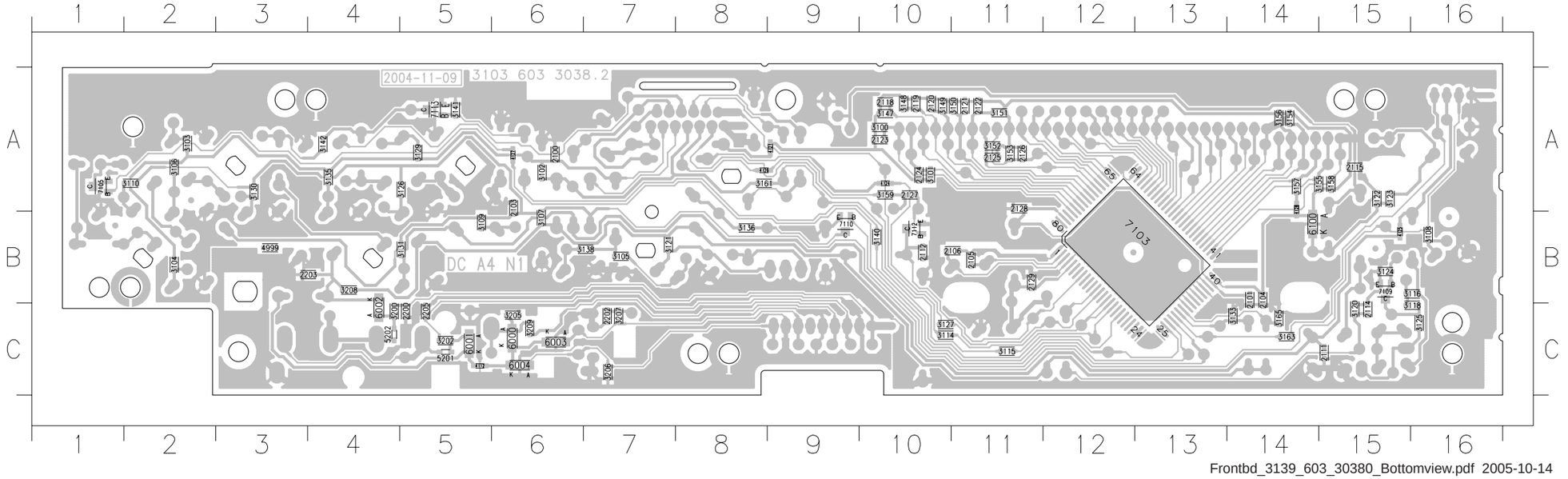
0005 A11
0206 B5
0210 A14
0211 B10
0212 A12
0803 A11
1110 B6
1160 B9
1161 A12
1162 B13
1163 B12
1164 B11
1165 B15
1166 B14
1167 A15
1168 A16
1169 B15
1170 B1
1171 B11
1172 B12
1910 A9
1911 A1
1920 C13
1921 C11
1922 C8
2102 C6
2107 A10
2110 C3
2113 C2
2116 B10
2117 A1
2204 B13
3111 A13
3112 B9
3117 B7
3119 B2
3132 C3
3134 A13
3137 B16
3139 A16
3162 A8
3164 C3
5100 C5
5104 B2
6101 B14
6102 A15
6103 B15
6107 B9
6120 B12
6121 B12
6122 A12
7100 C5
7106 C2
7107 B8
7108 C2
9121 B2
9122 A14
9124 B6
9125 C5
9126 A9
9127 A11
9128 A10
9129 A11
9130 C7
9131 A9
9132 A11
9134 A8
9135 A9
9137 A11
9138 B8
9139 A11
9141 A10
9142 B14
9143 A3
9144 A14



Frontbd_3139_603_30380_Topview.pdf 2005-10-14

Layout: Display/Front Connector (Bottom View)

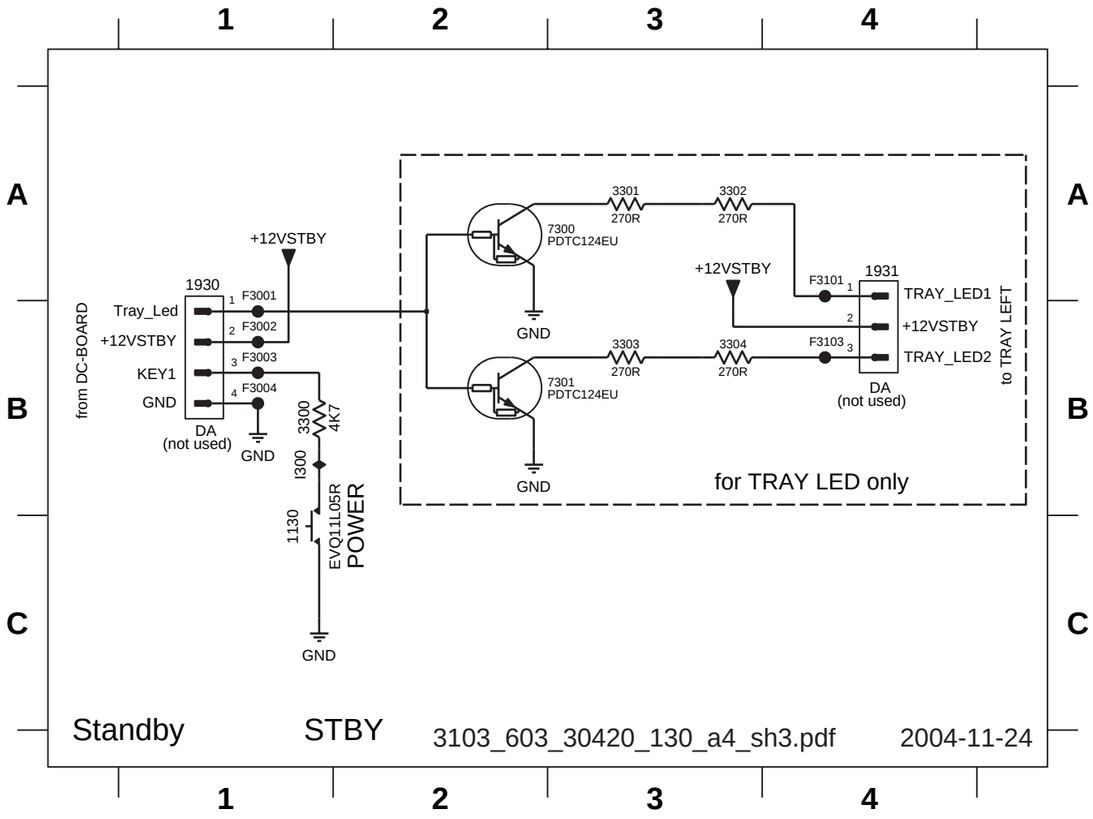
2100 A6
2101 B14
2103 A6
2104 B14
2105 B11
2106 B11
2111 C15
2112 B10
2114 C15
2115 A15
2118 A10
2119 A10
2120 A10
2121 A11
2122 A11
2123 A10
2124 A10
2125 A11
2126 A11
2127 A10
2128 A11
2129 B11
2200 C5
2202 C7
2203 B4
2205 C5
3100 A10
3101 A10
3102 A6
3103 A2
3104 B2
3105 B7
3106 A2
3107 B6
3108 B16
3109 B5
3110 A2
3114 C10
3115 C11
3116 B16
3118 C16
3120 C15
3121 B7
3122 A15
3123 A15
3124 B15
3125 C16
3126 A5
3127 C10
3129 A5
3130 A3
3131 B5
3133 C14
3135 A4
3136 B8
3138 B7
3140 B10
3141 A5
3142 A4
3147 A10
3148 A10
3149 A10
3150 A11
3151 A11
3152 A11
3153 A11
3154 A14
3155 A14
3156 A14
3157 A14
3158 A15
3159 A10
3161 A8
3163 C14
3165 C14
3200 C4
3202 C5
3205 C6
3206 C7
3207 C7
3208 B4
3209 C6
4112 C5
4121 A9
4124 A10
4125 B15
4126 A8
4127 A6
4128 A14
4999 B3
5201 C5
5202 C4
6000 C6
6001 C5
6002 C4
6003 C6
6004 C6
6100 B14
7103 B13
7105 A1
7109 B15
7110 B9
7112 B10
7113 A5



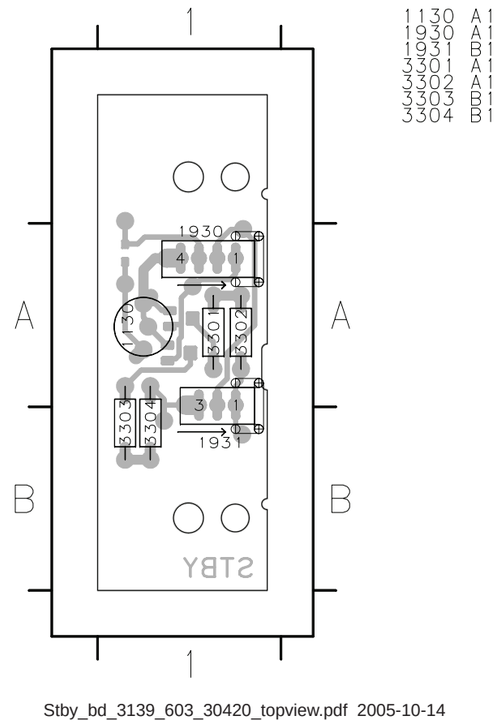
Frontbd_3139_603_30380_Bottomview.pdf 2005-10-14

Front: Standby (STBY)

1130 C1 **1931 A4** **3301 A3** **3303 B3** **7300 A2** **F3001 A1** **F3003 B1** **F3101 A4** **I300 B1**
1930 A1 **3300 B1** **3302 A3** **3304 B3** **7301 B2** **F3002 B1** **F3004 B1** **F3103 B4**

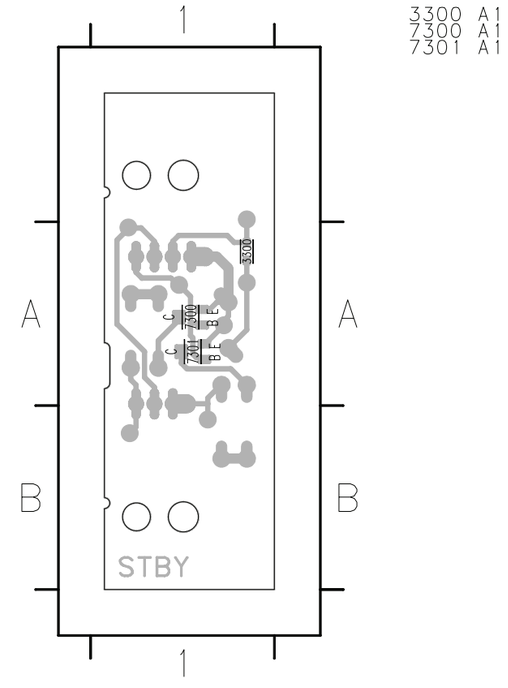


Layout: Standby (STBY) (Top View)



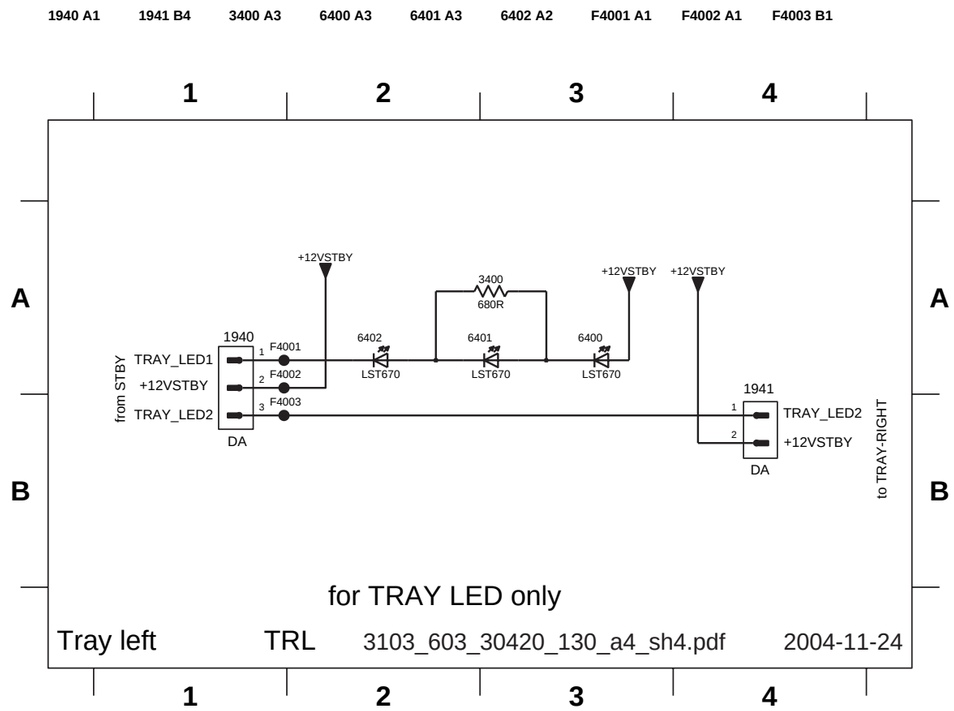
Stby_bd_3139_603_30420_topview.pdf 2005-10-14

Layout: Standby (STBY) (Bottom View)

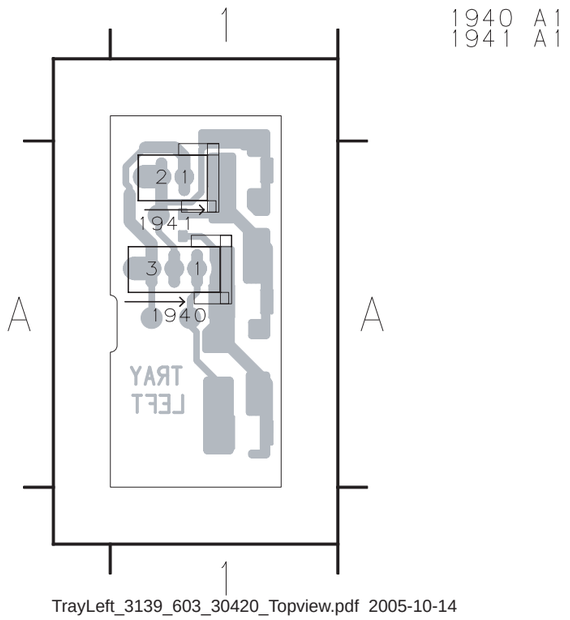


Stby_bd_3139_603_30420_btmview.pdf 2005-10-14

Front: Tray Left TRL

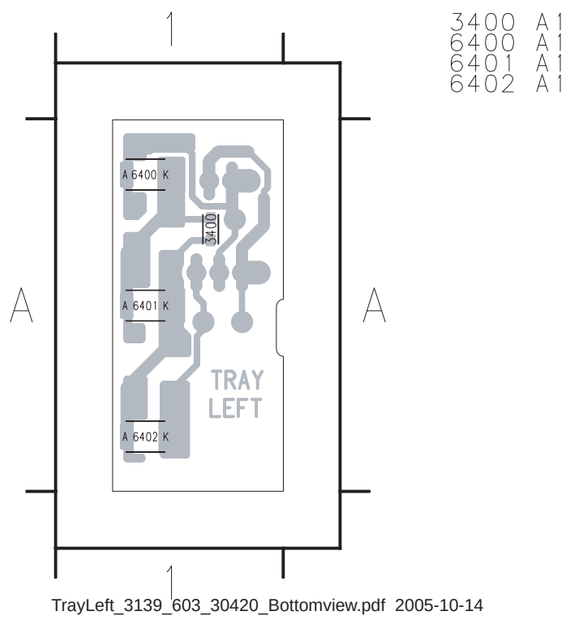


Layout: Tray Led (Left) (Top View)



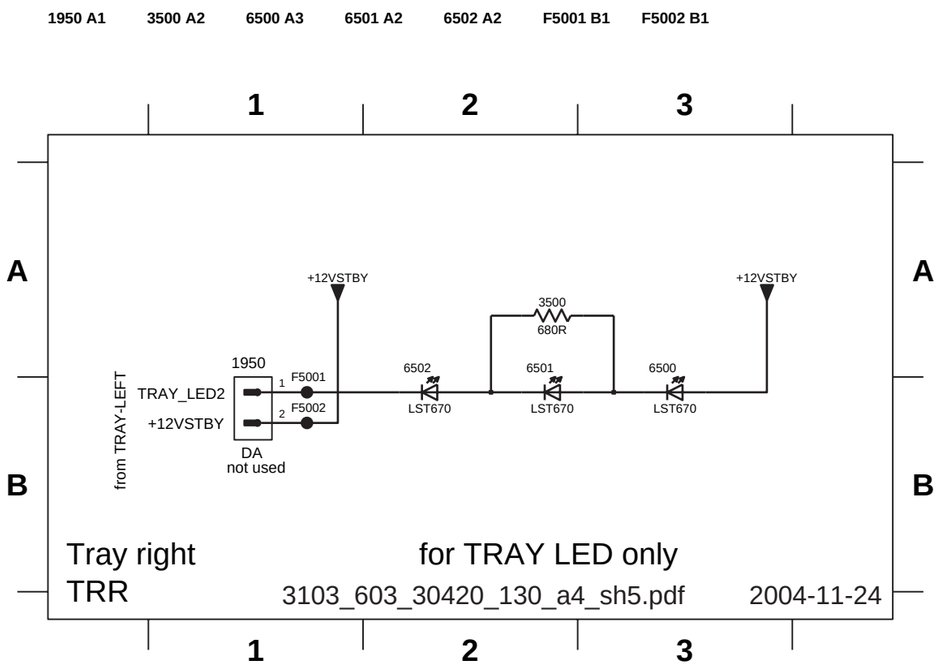
TrayLeft_3139_603_30420_Topview.pdf 2005-10-14

Layout: Tray Led (Left) (Bottom View)

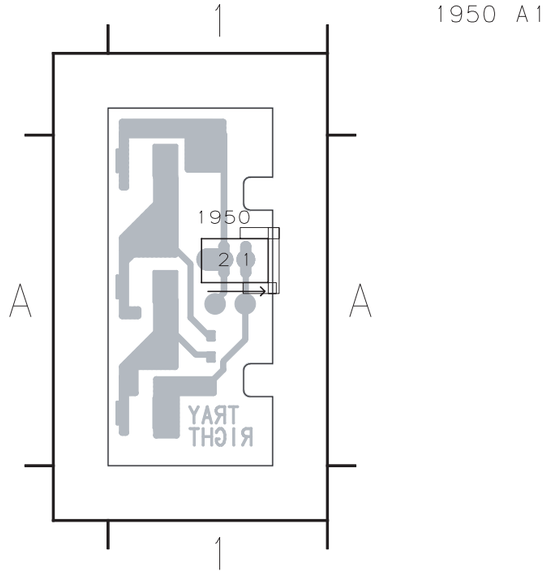


TrayLeft_3139_603_30420_Bottomview.pdf 2005-10-14

Front: Tray Right TRR

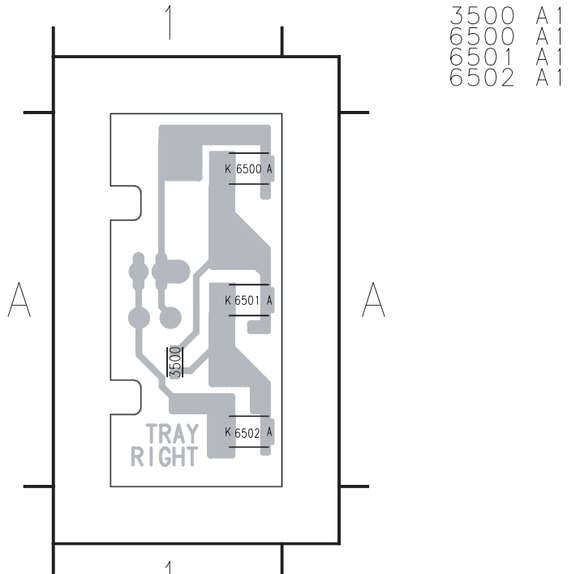


Layout: Tray Led (Right) (Top View)



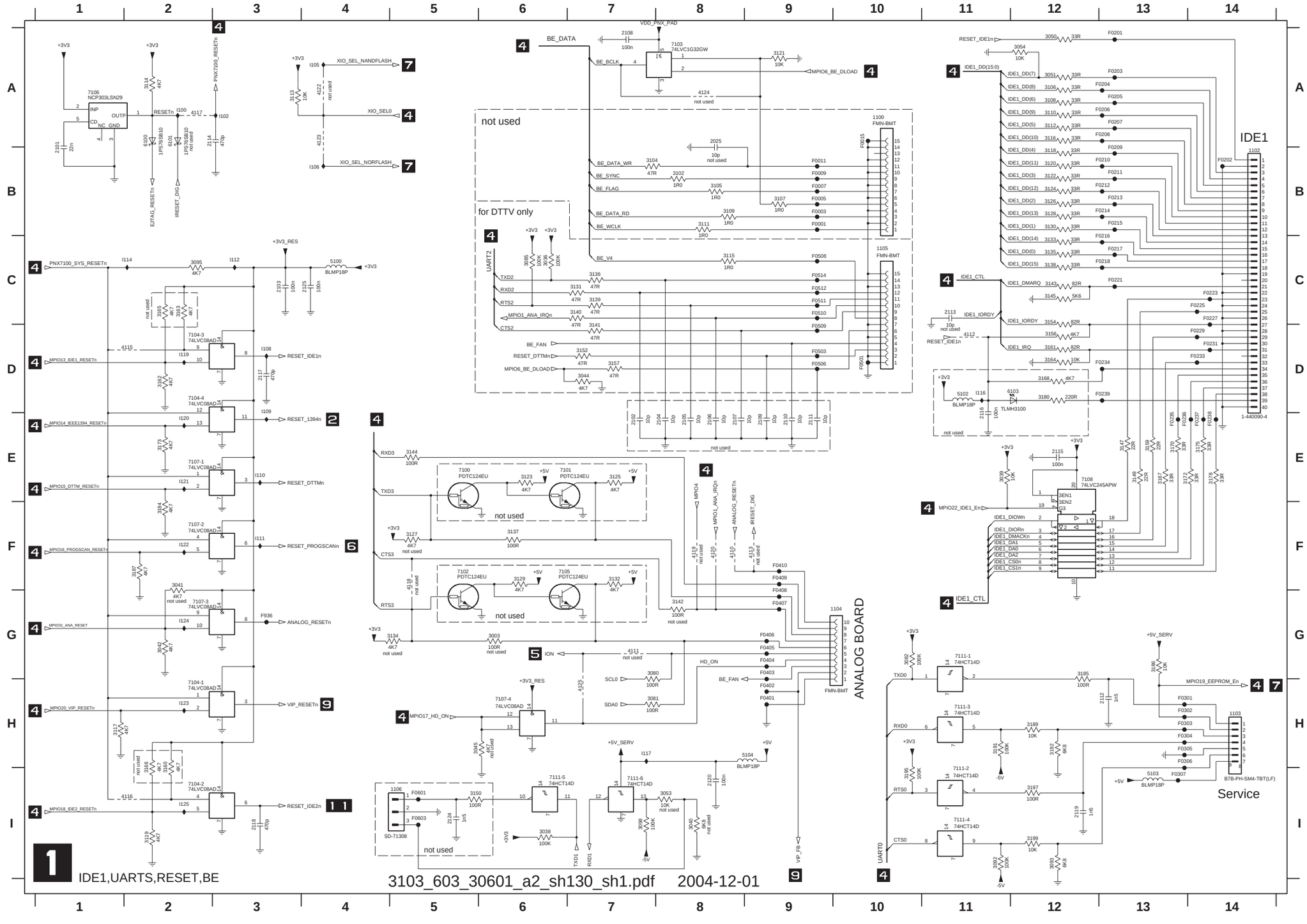
TrayRight_3139_603_30420_Topview.pdf 2005-10-14

Layout: Tray Led (Right) (Bottom View)

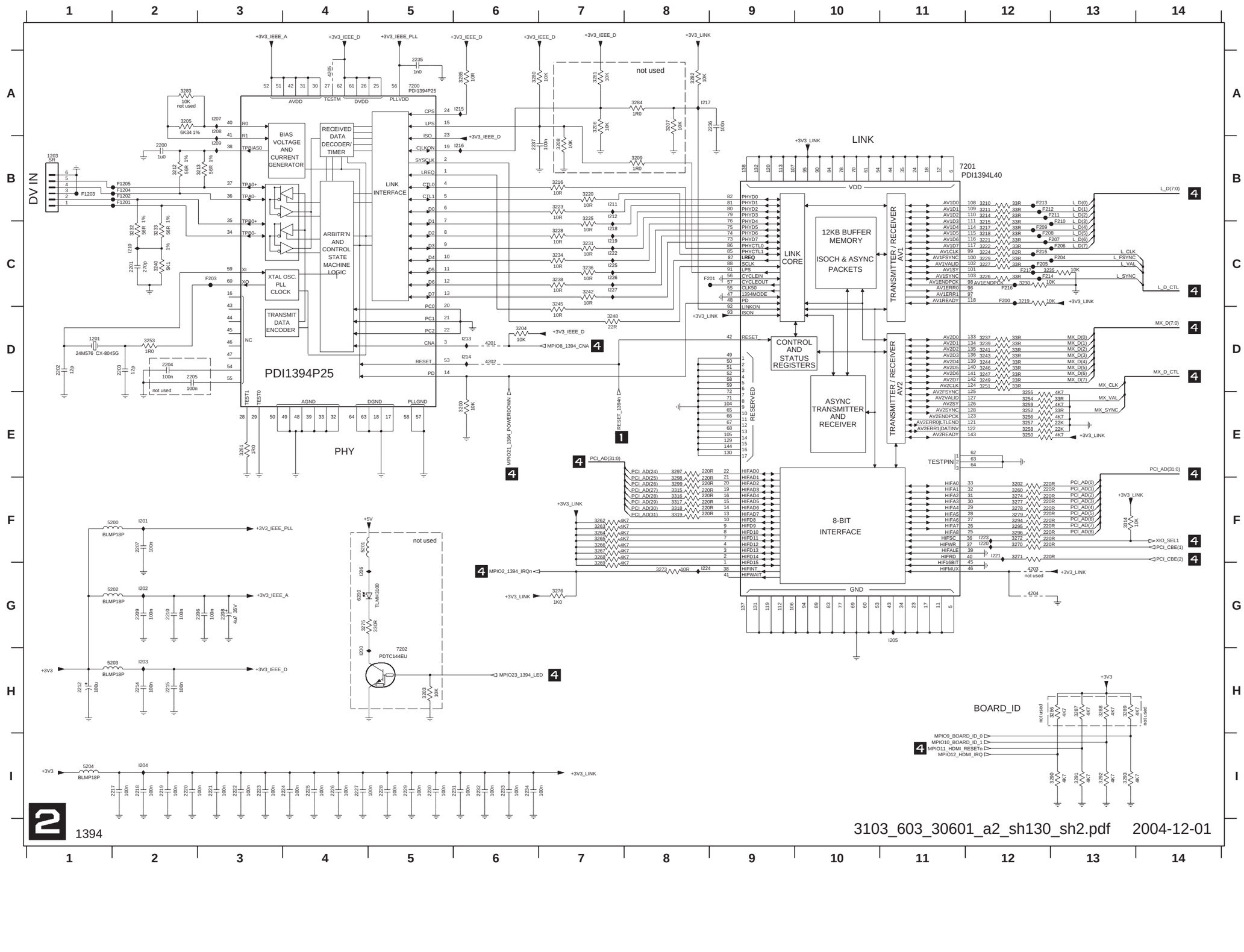


TrayRight_3139_603_30420_Bottomview.pdf 2005-10-14

Digital: IDE1, Uarts, Reset, BE

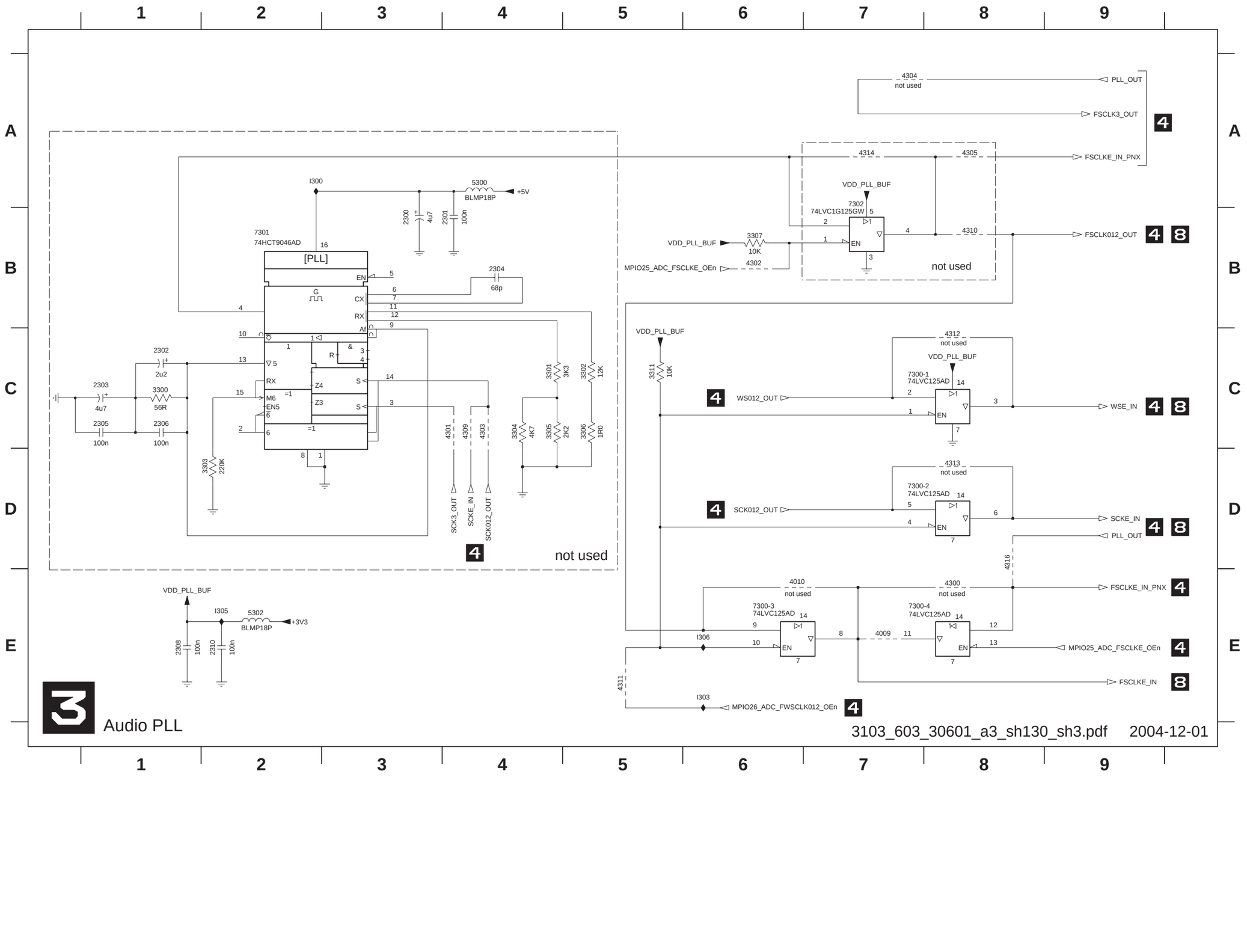


Digital: 1394



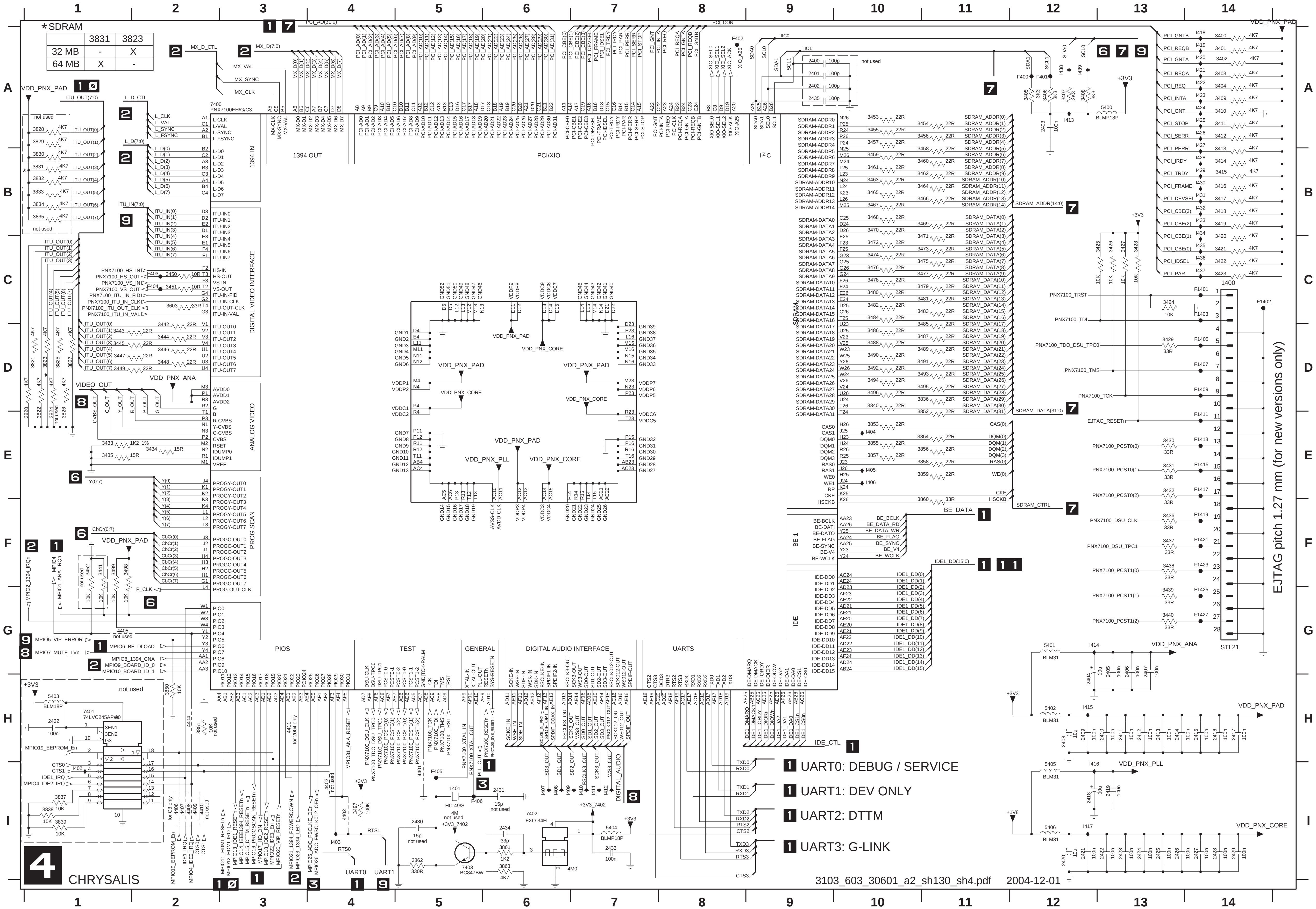
1201 D1	3289 H13
1203 B1	3290 I13
2200 B2	3291 I13
2201 C2	3292 I13
2202 D1	3293 I13
2203 D2	3294 F12
2204 D2	3295 F12
2205 D2	3296 F12
2206 G3	3297 E8
2207 F2	3298 F8
2208 G3	3299 F8
2209 G2	3314 F13
2210 G2	3315 F8
2212 H1	3316 F8
2214 H2	3317 F8
2215 H2	3318 F8
2217 I2	3319 F8
2218 I2	4201 D6
2219 I2	4202 D6
2220 I2	4203 G12
2221 I3	4204 G12
2222 I3	4205 A4
2223 I3	5200 F2
2224 I4	5201 F4
2225 I4	5202 G2
2226 I4	5203 H2
2227 I4	5204 I1
2228 I5	6200 G4
2229 I5	7200 A5
2230 I5	7201 B12
2231 I6	7202 H5
2232 I6	F1201 B2
2233 I6	F1202 B2
2234 I6	F1203 B1
2235 A5	F1204 B2
2236 A9	F1205 B2
2237 B6	F200 C12
3200 E6	F201 C9
3202 F12	F203 C3
3203 H5	F204 C13
3204 D6	F205 C12
3205 A2	F206 C13
3206 A7	F207 C12
3207 A8	F208 C12
3208 B7	F209 C12
3209 B8	F210 C13
3210 B12	F211 B12
3211 B12	F212 B12
3212 B2	F213 B12
3213 B3	F214 C12
3214 B12	F215 C12
3215 C12	F216 C12
3216 B7	F217 C12
3217 C12	I200 H4
3218 C12	I201 F2
3219 C12	I202 G2
3220 B7	I203 H2
3221 C12	I204 I2
3222 C12	I205 G11
3223 B7	I206 G4
3224 C12	I207 A3
3225 B7	I208 A3
3226 C12	I209 B3
3227 C12	I210 C2
3228 C7	I211 B7
3229 C12	I212 B7
3230 C12	I213 D6
3231 C7	I214 D6
3232 C2	I215 A6
3233 C2	I216 B6
3234 C7	I217 A8
3235 C12	I218 C7
3236 C7	I219 C7
3237 D12	I220 F12
3238 C7	I221 F12
3239 D12	I222 C7
3240 C2	I223 F12
3241 D12	I224 G8
3242 C7	I225 C7
3243 D12	I226 C7
3244 D12	I227 C7
3245 C7	
3246 D12	
3247 D12	
3248 D7	
3249 D12	
3250 E12	
3251 D12	
3252 E12	
3253 D2	
3254 E12	
3255 E12	
3256 E12	
3257 E12	
3258 E12	
3259 E12	
3260 F12	
3261 E3	
3262 F7	
3263 F7	
3264 F7	
3265 F7	
3266 F7	
3267 F7	
3268 F7	
3269 G7	
3270 F12	
3271 F12	
3272 F12	
3273 G8	
3274 F12	
3275 G4	
3276 G7	
3277 F12	
3278 F12	
3279 F12	
3280 A6	
3281 A7	
3282 A8	
3283 A2	
3284 A8	
3285 A6	
3286 H13	
3287 H13	
3288 H13	

Digital: Audio PLL



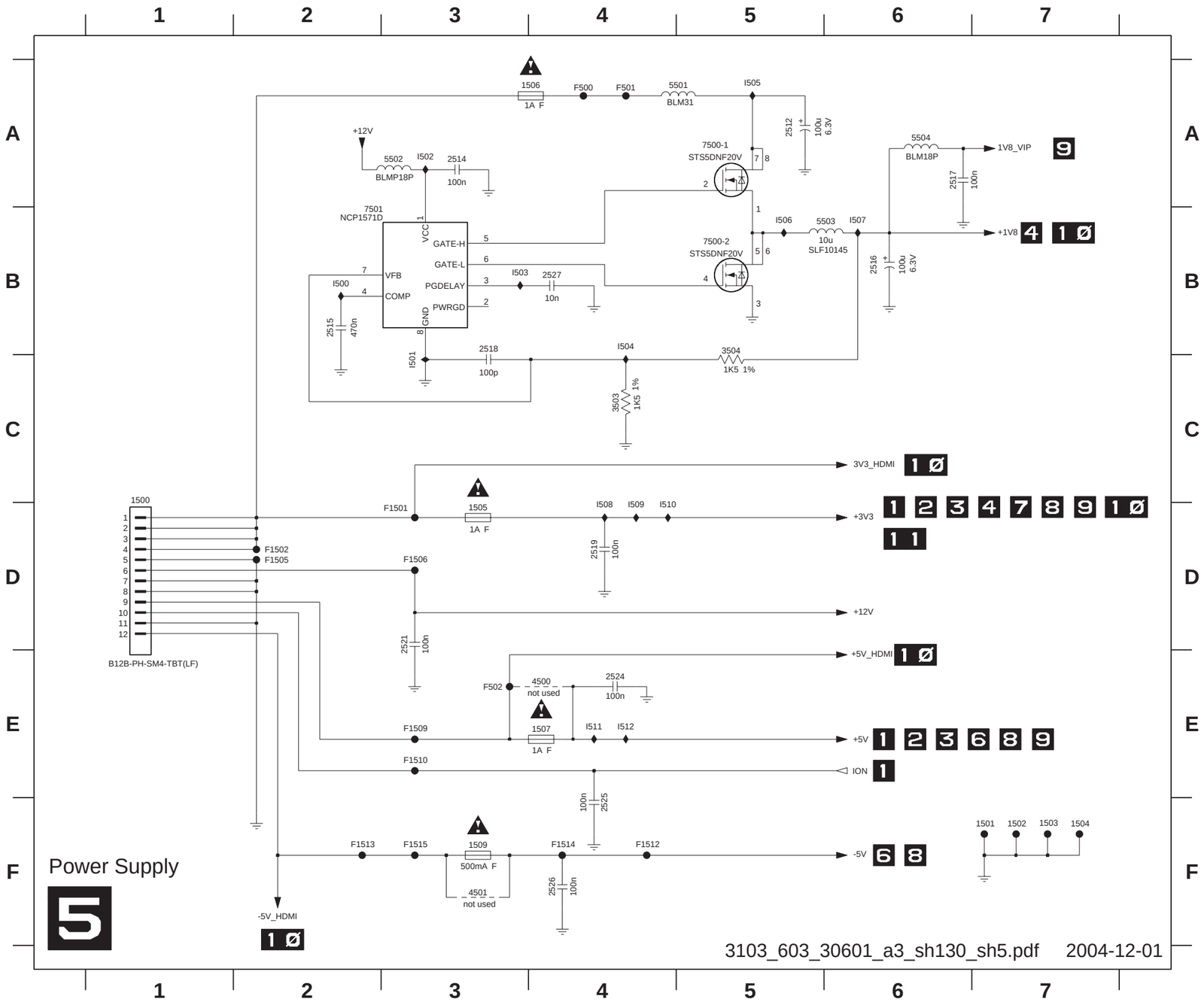
2300 B3
2301 B4
2302 C1
2303 C1
2304 B4
2305 C1
2306 C1
2308 E1
2310 E2
3300 C1
3301 C4
3302 C5
3303 D2
3304 C4
3305 C4
3306 C5
3307 B6
3311 C5
4009 E7
4010 E6
4300 E8
4301 C4
4302 B6
4303 C4
4304 A7
4305 A8
4309 C4
4310 B8
4311 E5
4312 C8
4313 D8
4314 A7
4316 D8
5300 A4
5302 E2
7300-1 C7
7300-2 D7
7300-3 E6
7300-4 E7
7301 B2
7302 A7
I300 A2
I303 E6
I305 E2
I306 E6

Digital: Chrysalis



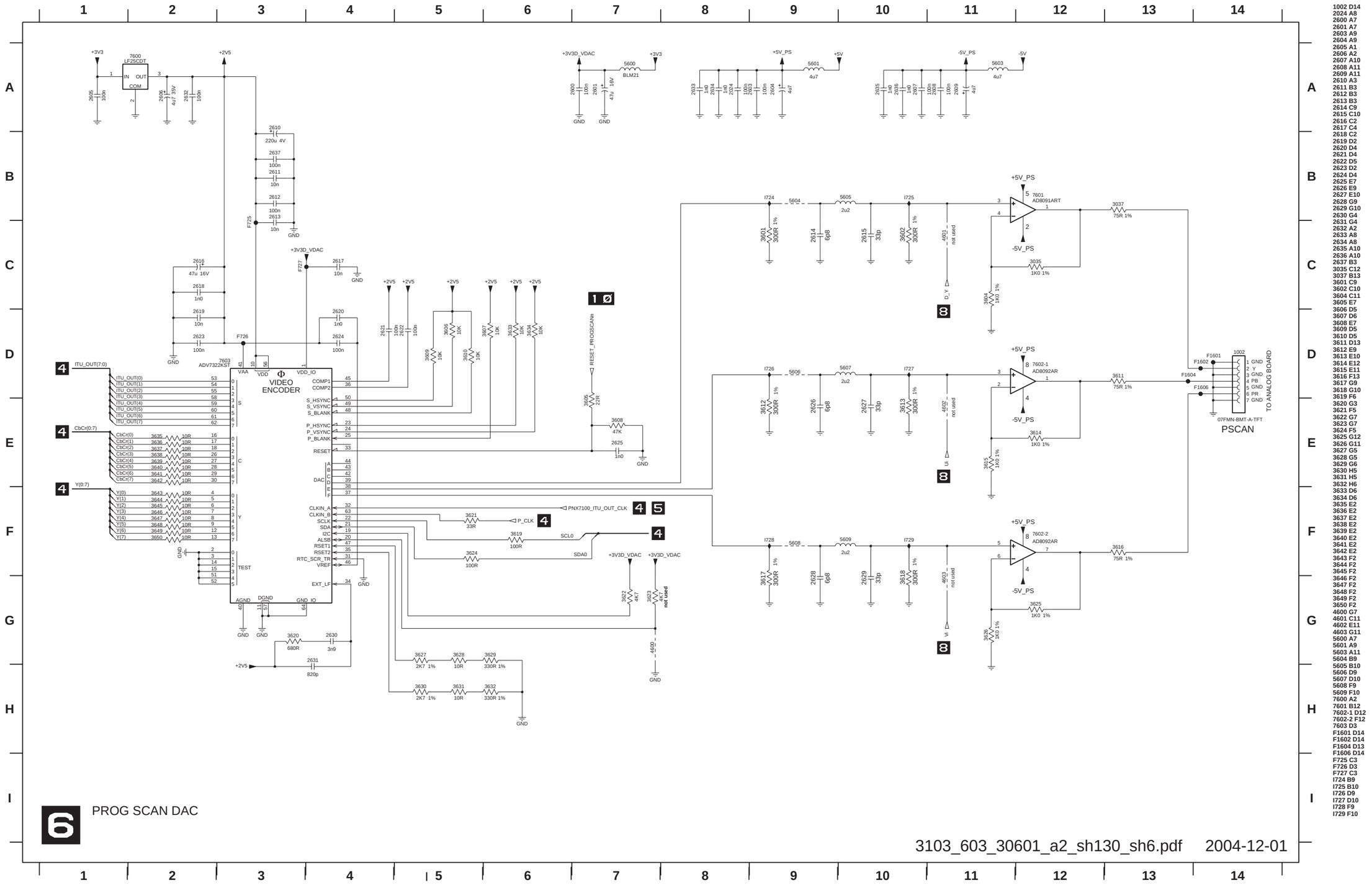
Ref	Loc	Ref	Loc
1400	C14	3493	D11
1401	I5	3494	D10
2400	A9	3495	D11
2401	A9	3496	D10
2402	A9	3497	I4
2403	A12	3498	F1
2404	H12	3499	F1
2405	G13	3603	C2
2406	G13	3820	D1
2407	G13	3821	D1
2408	H12	3822	D1
2409	H12	3823	D1
2410	H13	3824	D1
2411	H13	3825	D1
2412	H13	3826	D1
2413	H13	3827	D1
2414	H13	3828	A1
2415	H14	3829	A1
2416	H14	3830	B1
2417	H14	3831	B1
2418	I12	3832	B1
2419	I13	3833	B1
2420	I12	3834	B1
2421	I12	3835	B1
2422	I13	3836	D11
2423	I13	3837	I1
2424	I13	3838	I1
2425	I13	3839	I1
2426	I13	3840	D10
2427	I14	3850	H2
2428	I14	3851	H2
2429	I14	3852	E11
2430	I5	3853	E10
2431	I6	3854	E11
2432	H1	3855	E10
2433	I7	3856	E11
2434	I6	3857	E10
2435	A9	3858	E11
3400	A14	3859	E11
3401	A14	3860	F11
3402	A14	3861	I6
3403	A14	3862	I5
3404	A14	3863	I6
3405	A12	4401	I5
3406	A12	4402	I4
3407	A12	4403	I4
3408	A12	4404	H2
3409	A14	4405	G1
3410	A14	4406	I2
3411	A14	4407	I2
3412	A14	4408	I2
3413	B14	4409	I2
3414	B14	4410	I2
3415	B14	4411	H3
3416	B14	5400	A13
3417	B14	5401	G12
3418	B14	5402	H12
3419	B14	5403	H1
3420	C14	5404	I7
3421	C14	5405	I12
3422	C14	5406	I12
3423	C14	7400	A2
3424	C13	7401	H1
3425	C13	7402	I6
3426	C13	7403	I5
3427	C13	F1401	C14
3428	C13	F1402	C14
3429	D13	F1403	C14
3430	E13	F1405	D14
3431	E13	F1407	D14
3432	E13	F1409	D14
3433	E1	F1411	E14
3434	E2	F1413	E14
3435	E1	F1415	E14
3436	F13	F1417	E14
3437	F13	F1419	F14
3438	F13	F1421	F14
3439	G13	F1423	F14
3440	G13	F1425	G14
3441	F1	F1427	G14
3442	D2	F400	A12
3443	D1	F401	A12
3444	D2	F402	A8
3445	D1	F403	C2
3446	D2	F404	C2
3447	D1	F405	I5
3448	D2	F406	I5
3449	D1	I402	I1
3450	C2	I403	I4
3451	C2	I404	E10
3452	F1	I405	E10
3453	A10	I406	E10
3454	A11	I407	I6
3455	A10	I408	I6
3456	A11	I409	I6
3457	A10	I410	I7
3458	B11	I411	I7
3459	B10	I412	I7
3460	B11	I413	A12
3461	B10	I414	G12
3462	B11	I415	H12
3463	B10	I416	I12
3464	B11	I417	I12
3465	B10	I418	A14
3466	B11	I419	A14
3467	B10	I420	A14
3468	B10	I421	A14
3469	B11	I422	A14
3470	B10	I423	A14
3471	C11	I424	A14
3472	C10	I425	A14
3473	C11	I426	A14
3474	C10	I427	A14
3475	C11	I428	B14
3476	C10	I429	B14
3477	C11	I430	B14
3478	C10	I431	B14
3479	C11	I432	B14
3480	C10	I433	B14
3481	C11	I434	B14
3482	C10	I435	C14
3483	C11	I436	C14
3484	C10	I437	C14
3485	D11	I438	A12
3486	D10	I439	A12
3487	D11		
3488	D10		
3489	D11		
3490	D10		
3491	D11		
3492	D10		

Digital: Power Supply



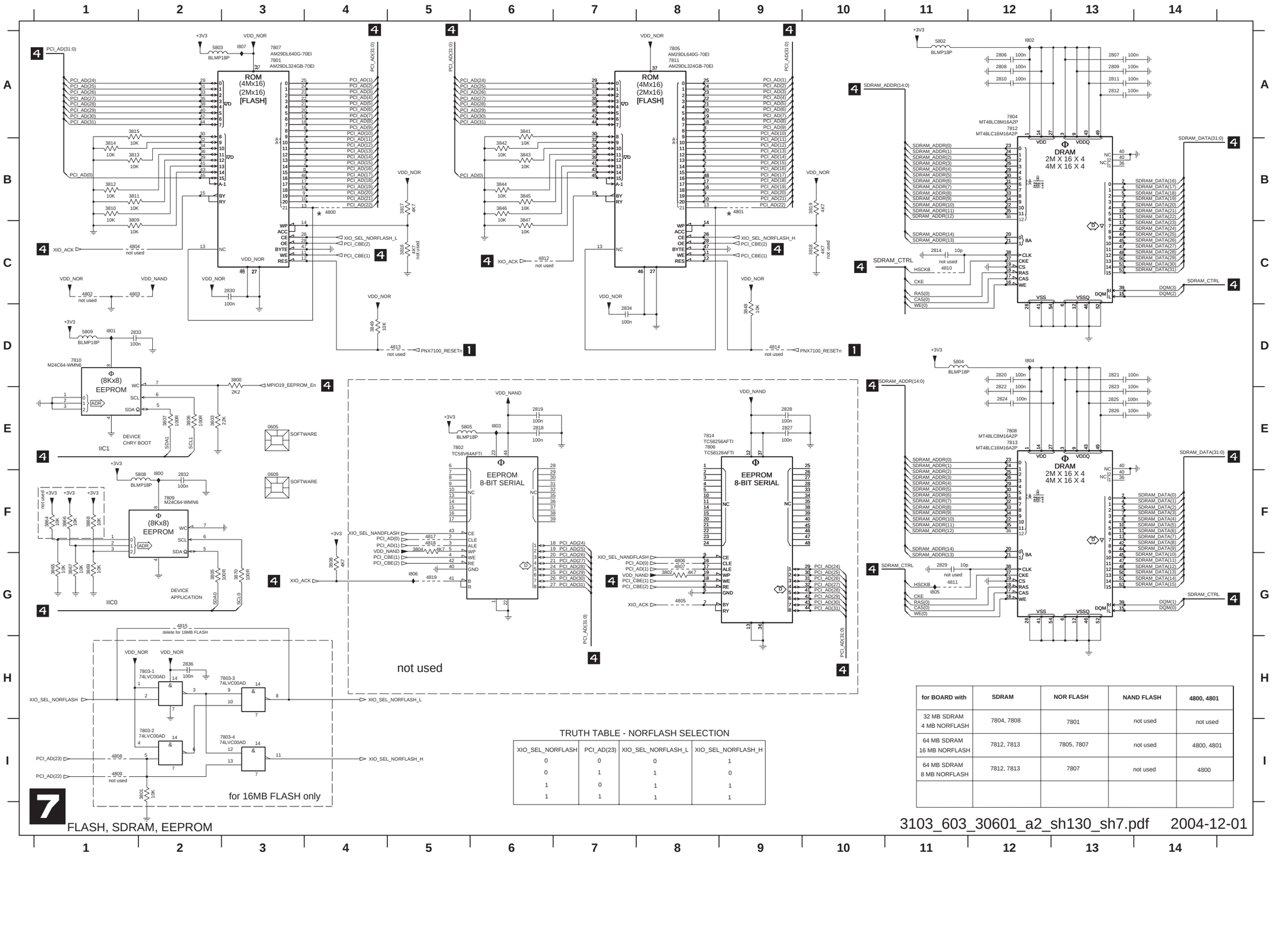
1500 D1
1501 F7
1502 F7
1503 F7
1504 F7
1505 D3
1506 A4
1507 E4
1509 F3
2512 A5
2514 A3
2515 B2
2516 B6
2517 A6
2518 B3
2519 D4
2521 D3
2524 E4
2525 F4
2526 F4
2527 B4
3503 C4
3504 B5
4500 E4
4501 F3
5501 A5
5502 A3
5503 B6
5504 A6
7500-1 A5
7500-2 B5
7501 B3
F1501 D3
F1502 D2
F1505 D2
F1506 D3
F1509 E3
F1510 E3
F1512 F4
F1513 F2
F1514 F4
F1515 F3
F500 A4
F501 A4
F502 E3
I500 B2
I501 C3
I502 A3
I503 B3
I504 B4
I505 A5
I506 B5
I507 B6
I508 D4
I509 D4
I510 D4
I511 E4
I512 E4

Digital: Prog Scan DAC



1002 D14
2024 A8
2600 A7
2601 A7
2603 A9
2604 A9
2605 A1
2606 A2
2607 A10
2608 A11
2609 A11
2610 A3
2611 B3
2612 B3
2613 B3
2614 C9
2615 C10
2616 C2
2617 C4
2618 C2
2619 D2
2620 D4
2621 D4
2622 D5
2623 D2
2624 D4
2625 E7
2626 E9
2627 E10
2628 G9
2629 G10
2630 G4
2631 G4
2632 A2
2633 A8
2634 A8
2635 A10
2636 A10
2637 B3
3035 C12
3037 B13
3601 C9
3602 C10
3604 C11
3605 E7
3606 D5
3607 D6
3608 E7
3609 D5
3610 D5
3611 D13
3612 E9
3613 E10
3614 E12
3615 E11
3616 F13
3617 G9
3618 G10
3619 F6
3620 G3
3621 F5
3622 G7
3623 G7
3624 F5
3625 G12
3626 G11
3627 G5
3628 G5
3629 G6
3630 H5
3631 H5
3632 H6
3633 D6
3634 D6
3635 E2
3636 E2
3637 E2
3638 E2
3639 E2
3640 E2
3641 E2
3642 E2
3643 F2
3644 F2
3645 F2
3646 F2
3647 F2
3648 F2
3649 F2
3650 F2
4600 G7
4601 C11
4602 E11
4603 G11
5600 A7
5601 A9
5603 A11
5604 B9
5605 B10
5606 D9
5607 D10
5608 F9
5609 F10
7600 A2
7601 B12
7602-1 D12
7602-2 F12
7603 D3
F1601 D14
F1602 D14
F1604 D13
F1606 D14
F725 C3
F726 D3
F727 C3
I724 B9
I725 B10
I726 D9
I727 D10
I728 F9
I729 F10

Digital: Flash, SDRAM, EEPROM

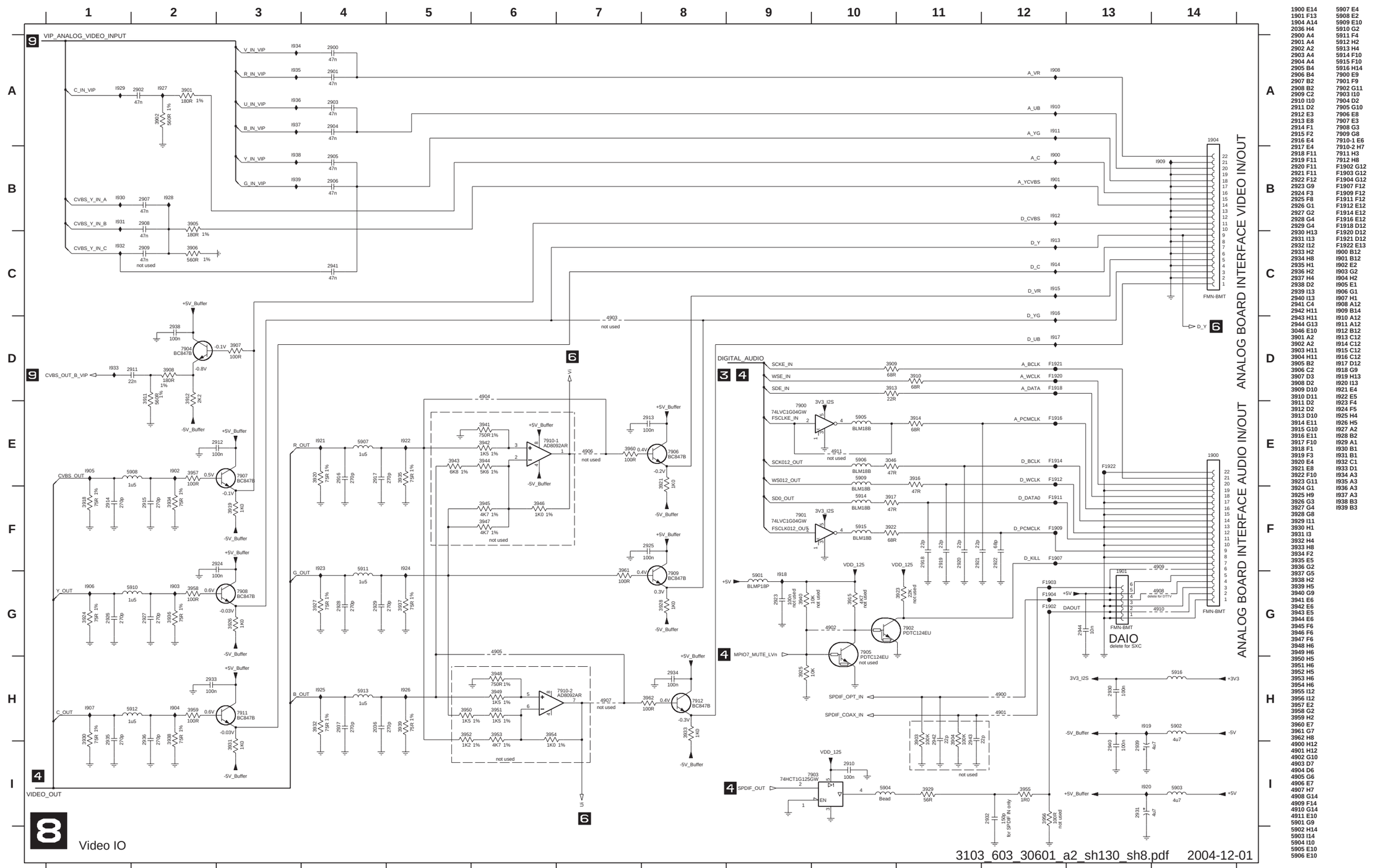


TRUTH TABLE - NORFLASH SELECTION

XIO_SEL_NORFLASH	PCI_AD(23)	XIO_SEL_NORFLASH_L	XIO_SEL_NORFLASH_H
0	0	0	1
0	1	1	0
1	0	1	1
1	1	1	1

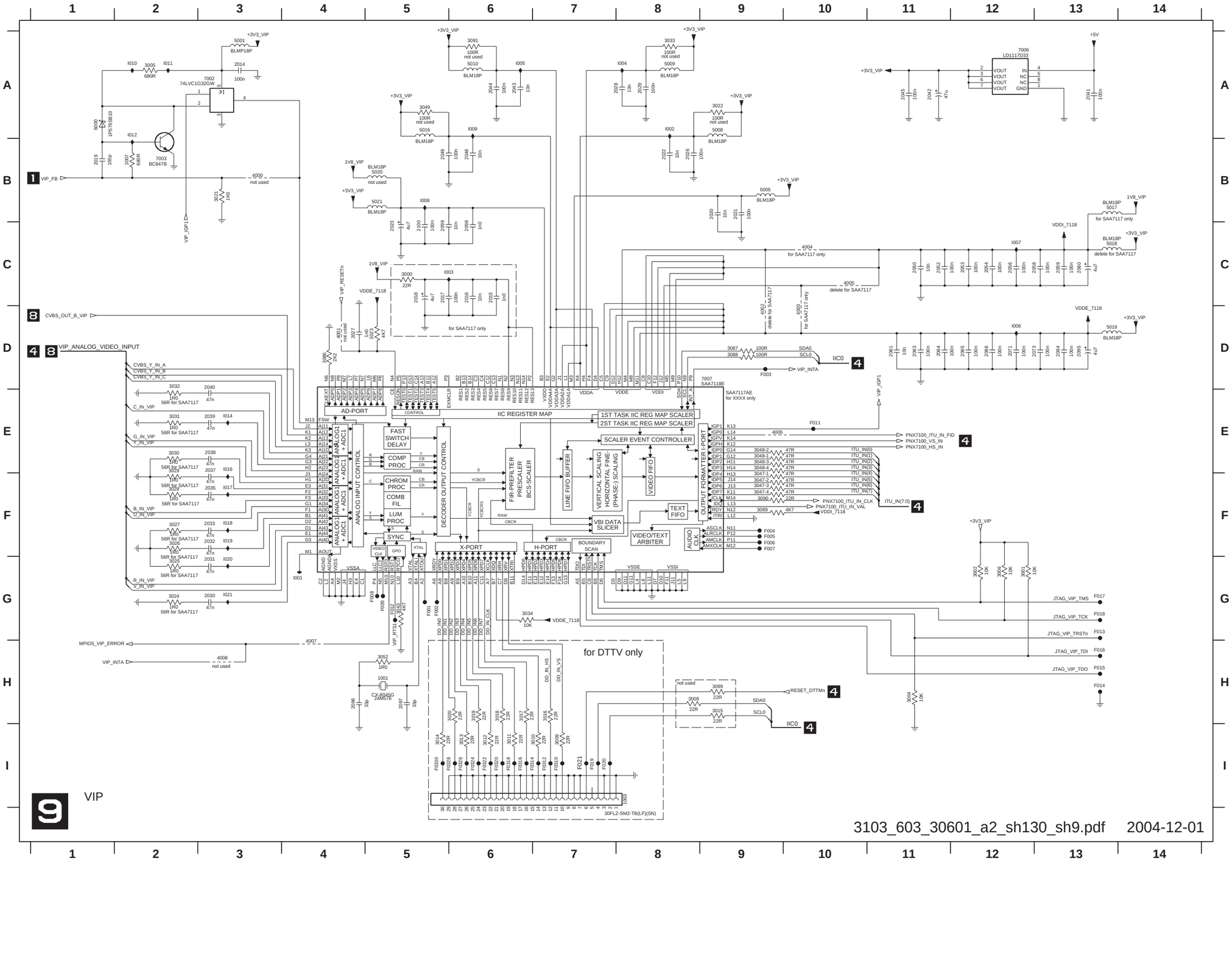
for BOARD with	SDRAM	NOR FLASH	NAND FLASH	4800, 4801
32 MB SDRAM 4 MB NORFLASH	7804, 7808	7801	not used	not used
64 MB SDRAM 16 MB NORFLASH	7812, 7813	7805, 7807	not used	4800, 4801
64 MB SDRAM 8 MB NORFLASH	7812, 7813	7807	not used	4800

Digital: Video IO



1900 E14	5907 E4	I919 H13	
1901 F13	5908 E2	I920 I13	
1904 A14	5909 E10	I921 E4	
2036 H4	5910 G2	I922 E5	
2900 A4	5911 F4	I923 F4	
2901 A4	5912 H2	I924 F5	
2902 A2	5913 H4	I925 H4	
2903 A4	5914 F10	I926 H5	
2904 A4	5915 F10	I927 A2	
2905 B4	5916 H14	I928 B2	
2906 B4	7900 E9	I929 A1	
2907 B2	7901 F9	I930 B1	
2908 B2	7902 G11	I931 B1	
2909 C2	7903 I10	I932 C1	
2910 I10	7904 D2	I933 D1	
2911 D2	7905 G10	I934 A3	
2912 E3	7906 E8	I935 A3	
2913 E8	7907 E3	I936 A3	
2914 F1	7908 G3	I937 A3	
2915 F2	7909 G8	I938 B3	
2916 E4	7910-1 E6	I939 B3	
2917 E4	7910-2 H7		
2918 F11	7911 H3		
2919 F11	7912 H8		
2920 F11	F1902 G12		
2921 F11	F1903 G12		
2922 F12	F1904 G12		
2923 G9	F1907 F12		
2924 F3	F1909 F12		
2925 F8	F1911 F12		
2926 G1	F1912 E12		
2927 G2	F1914 E12		
2928 G4	F1916 E12		
2929 G4	F1918 D12		
2930 H13	F1920 D12		
2931 I13	F1921 D12		
2932 I12	F1922 E13		
2933 H2	I900 B12		
2934 H8	I901 B12		
2935 H1	I902 E2		
2936 H2	I903 G2		
2937 H4	I904 H2		
2938 D2	I905 E1		
2939 I13	I906 G1		
2940 I13	I907 H1		
2941 C4	I908 A12		
2942 H11	I909 B14		
2943 H11	I910 A12		
2944 G13	I911 A12		
3046 E10	I912 B12		
3901 A2	I913 C12		
3902 A2	I914 C12		
3903 H11	I915 C12		
3904 H11	I916 C12		
3905 B2	I917 D12		
3906 C2	I918 G9		
3907 D3	I919 H13		
3908 D2	I920 I13		
3909 D10	I921 E4		
3910 D11	I922 E5		
3911 D2	I923 F4		
3912 D2	I924 F5		
3913 D10	I925 H4		
3914 E11	I926 H5		
3915 G10	I927 A2		
3916 E11	I928 B2		
3917 F10	I929 A1		
3918 F1	I930 B1		
3919 F3	I931 B1		
3920 E4	I932 C1		
3921 E8	I933 D1		
3922 F10	I934 A3		
3923 G11	I935 A3		
3924 G1	I936 A3		
3925 H9	I937 A3		
3926 G3	I938 B3		
3927 G4	I939 B3		
3928 G8			
3929 I11			
3930 H1			
3931 I3			
3932 H4			
3933 H8			
3934 F2			
3935 E5			
3936 G2			
3937 G5			
3938 H2			
3939 H5			
3940 G9			
3941 E6			
3942 E6			
3943 E5			
3944 E6			
3945 F6			
3946 F6			
3947 F6			
3948 H6			
3949 H6			
3950 H5			
3951 H6			
3952 H5			
3953 H6			
3954 H6			
3955 I12			
3956 I12			
3957 E2			
3958 G2			
3959 H2			
3960 E7			
3961 G7			
3962 H8			
4900 H12			
4901 H12			
4902 G10			
4903 D7			
4904 D6			
4905 G6			
4906 E7			
4907 H7			
4908 G14			
4909 F14			
4910 G14			
4911 E10			
5901 G9			
5902 H14			
5903 I14			
5904 I10			
5905 E10			
5906 E10			

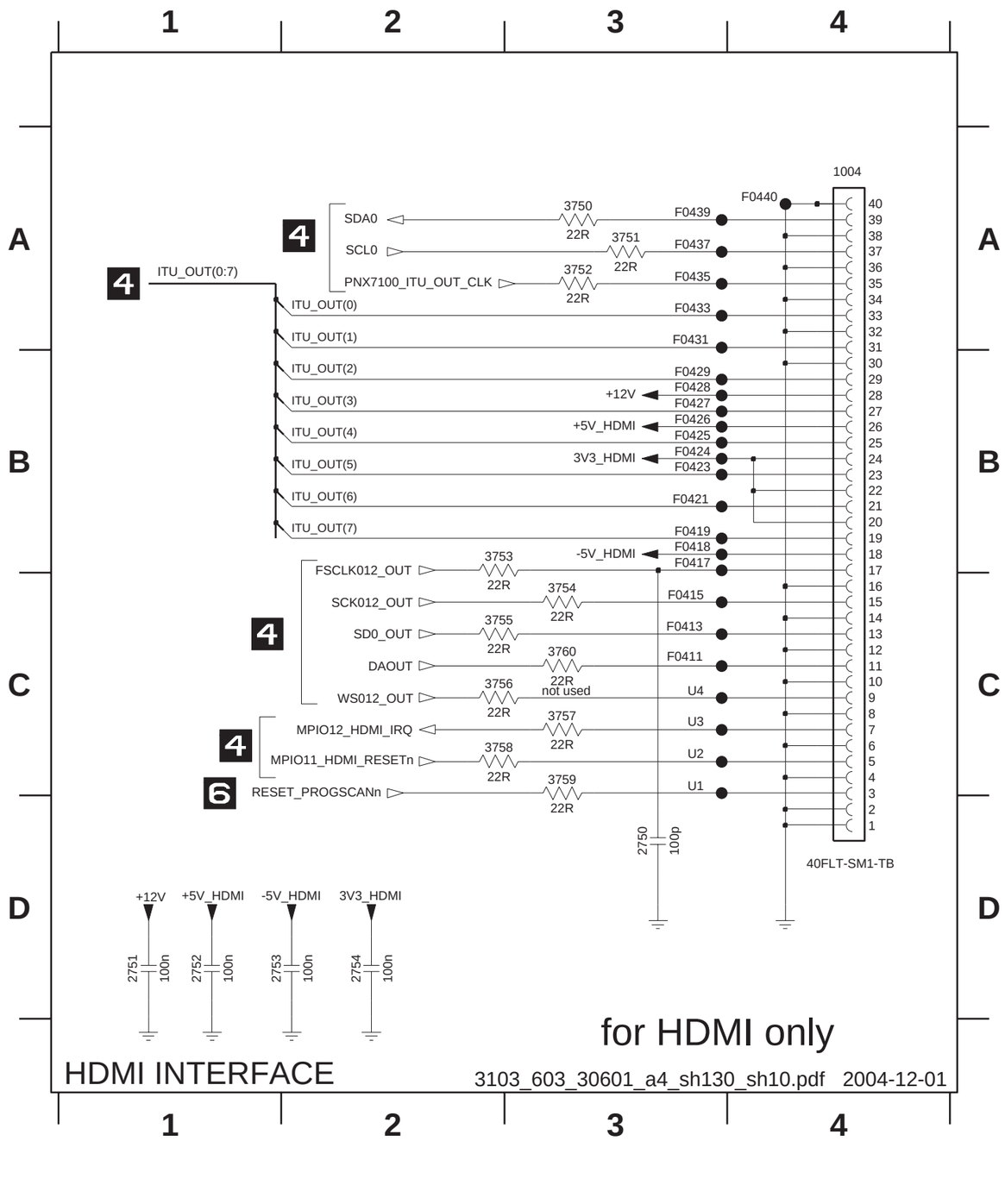
Digital: VIP



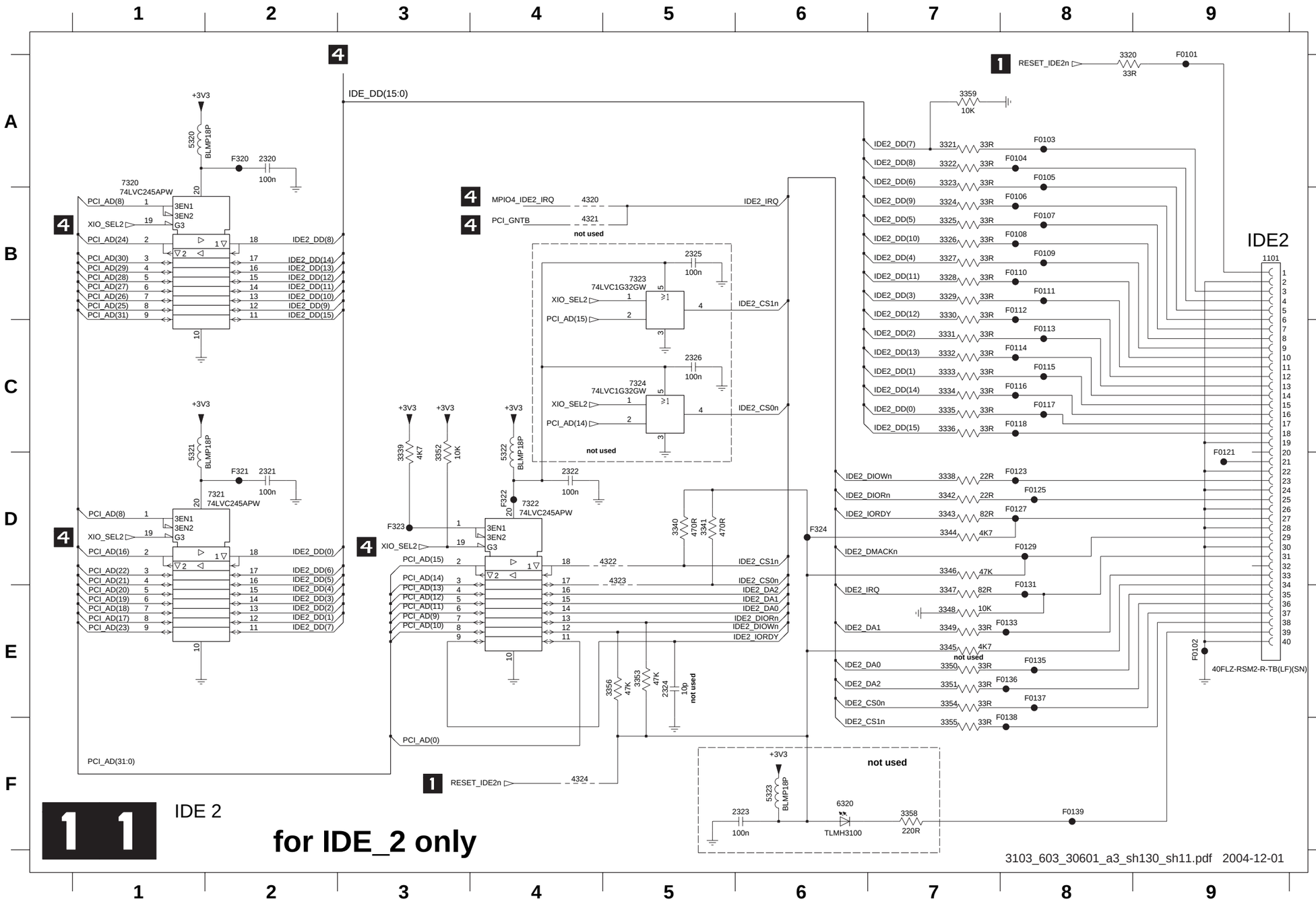
1001 H5	5008 A9
1003 I8	5009 A8
2014 A3	5010 A6
2015 C6	5016 A5
2016 C6	5017 B13
2017 C5	5018 C13
2018 C5	5019 D13
2019 B1	5020 B5
2020 B9	5021 B5
2021 B9	6000 A1
2022 B8	7002 A3
2023 C5	7003 B2
2026 B8	7006 A12
2027 D4	7007 D9
2028 A8	F001 G5
2029 A8	F002 G5
2030 G3	F003 D9
2031 G3	F004 F9
2032 F3	F005 F9
2033 F3	F006 F9
2035 F3	F007 F9
2037 E3	F008 G5
2038 E3	F009 G5
2039 E3	F011 E10
2040 D3	F012 G5
2041 A13	F013 G13
2042 A11	F014 H13
2043 A6	F015 H13
2044 A6	F016 H13
2045 A11	F017 G13
2048 B6	F018 G13
2049 B5	F019 I7
2050 C11	F020 I7
2052 C11	F021 I7
2053 C12	F0310 I7
2054 C12	F0312 I7
2056 C12	F0314 I7
2058 C13	F0316 I6
2059 C13	F0318 I6
2060 C13	F0320 I6
2061 D11	F0322 I6
2063 D11	F0324 I6
2064 D11	F0326 I6
2065 D12	F0328 I6
2066 D12	F0330 I5
2071 D12	I001 G4
2073 D13	I002 A8
2094 D13	I003 C5
2095 D13	I004 A8
2096 H4	I005 A6
2097 H5	I006 D12
2098 C6	I007 C12
2099 C5	I008 B5
2100 C5	I009 A6
3000 C5	I010 A2
3001 G12	I011 A2
3002 G12	I012 A2
3004 H11	I014 E3
3005 A2	I016 E3
3006 G12	I017 F3
3007 B2	I018 F3
3008 H8	I019 F3
3009 I7	I020 G3
3010 I7	I021 G3
3011 I6	
3012 I6	
3013 I6	
3014 I5	
3015 H9	
3016 H7	
3017 H6	
3018 H6	
3019 H6	
3020 H6	
3021 B3	
3022 A9	
3023 D5	
3024 G2	
3025 G2	
3026 F2	
3027 F2	
3028 F2	
3029 E2	
3030 E2	
3031 E2	
3032 D2	
3033 A8	
3034 G7	
3043 G5	
3047-1 E9	
3047-2 F9	
3047-3 F9	
3047-4 F9	
3048-1 E9	
3048-2 E9	
3048-3 E9	
3048-4 E9	
3049 A5	
3052 H5	
3086 D4	
3087 D9	
3088 D9	
3089 F9	
3090 F9	
3091 A6	
3099 H9	
4000 B3	
4001 D4	
4002 D9	
4003 D10	
4004 C10	
4005 C10	
4006 E9	
4007 H4	
4008 H3	
5001 A3	
5005 B9	

Digital: HDMI Interface

1004 A4	2754 D2	3754 C3	3759 C3	F0409 C3	F0418 B3	F0425 B3	F0431 A3	F0440 A4
2750 D3	3750 A3	3755 C2	3760 C3	F0411 C3	F0419 B3	F0426 B3	F0433 A3	
2751 D1	3751 A3	3756 C2	F0403 C3	F0413 C3	F0421 B3	F0427 B3	F0435 A3	
2752 D1	3752 A3	3757 C3	F0405 C3	F0415 C3	F0423 B3	F0428 B3	F0437 A3	
2753 D1	3753 B2	3758 C2	F0407 C3	F0417 B3	F0424 B3	F0429 B3	F0439 A3	



Digital: IDE2



1101 B9 C1 C2 C3 C4 C5 C6 C7 C8 D1 D2 D3 D4 D5 D6 D7 D8 D9 E1 E2 E3 E4 E5 E6 E7 E8 F1 F2 F3 F4 F5 F6 F7 F8

2320 A2 **2321** D2 **2322** D4 **2323** F6 **2324** E5 **2325** B5 **2326** C5

3320 A8 **3321** A7 **3322** A7 **3323** A7 **3324** B7 **3325** B7 **3326** B7 **3327** B7 **3328** B7 **3329** B7 **3330** B7 **3331** C7 **3332** C7 **3333** C7 **3334** C7 **3335** C7 **3336** C7 **3338** D7 **3339** D3 **3340** D5 **3341** D5 **3342** D7 **3343** D7 **3344** D7 **3345** E7 **3346** D7 **3347** E7 **3348** E7 **3349** E7 **3350** E7 **3351** E7 **3352** D3 **3353** E5 **3354** E7 **3355** F7 **3356** E5 **3358** F7 **3359** A7

4320 B4 **4321** B4 **4322** D5 **4323** D5 **4324** F4

5320 A1 **5321** C1 **5322** C4 **5323** F6

6320 F6

7320 A1 **7321** D2 **7322** D4 **7323** B5 **7324** C5

F0101 A9 **F0102** E9 **F0103** A8 **F0104** A8 **F0105** A8 **F0106** B8 **F0107** B8 **F0108** B8 **F0109** B8 **F0110** B8 **F0111** B8 **F0112** B8 **F0113** C8 **F0114** C8 **F0115** C8 **F0116** C8 **F0117** C8 **F0118** C8 **F0121** D8 **F0123** D8 **F0125** D8 **F0127** D8 **F0129** D8 **F0131** E8 **F0133** E8 **F0135** E8 **F0136** E8 **F0137** E8 **F0138** F8 **F0139** F8 **F320** A2 **F321** D2 **F322** D4 **F323** D3 **F324** D6

Layout: Digital Top View

0605	C1
0609	C1
1002	C10
1003	F8
1004	C10
1100	F5
1101	F3
1102	E5
1103	F9
1104	D10
1105	F6
1106	F7
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1301	E1
1400	A5
1500	F7
1505	F7
1900	A10
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1904	E10
2023	F9
2024	C9
2025	F5
2027	D8
2030	E9
2031	E9
2032	E9
2033	E9
2035	E9
2036	C8
2037	E9
2038	E9
2042	E7
2045	E7
2050	E7
2060	E7
2061	E7
2095	E7
2096	F8
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2098	E9
2099	E9
2100	E9
2102	F5
2104	F5
2105	F6
2106	F6
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2109	F6
2110	F6
2111	F6
2113	E5
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2201	A9
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2205	A8
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2212	A9
2235	A8
2237	A8
2300	A3
2301	A4
2302	A3
2303	A4
2304	A4
2305	A3
2306	A3
2308	A4
2310	A4
2320	E2
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2324	E2
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2402	D4
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2519	F7
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2928	D7
2929	D8
2930	A10
2931	E9
2932	B10
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2940	D10
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3029	E9
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3037	C10
3038	A5
3039	E5
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3081	D10
3085	A5
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3088	D8
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3108	E6
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3274	B7
3275	D6
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3836	B3
3840	B3
3850	D8
3852	C4
3853	C3
3854	C3
3855	C4
3856	C3
3857	B3
3858	C3
3859	C3
3860	C4
3864	E4
3865	D4
3866	E4
3867	D4
3868	E4
3869	E4
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3953	D8
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3956	B10
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4007	D8
4008	D8
4009	A4
4010	A4
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4118	D10
4119	B6
4120	B6
4122	D2
4123	D2
4125	E10
4201	A8
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4205	A8
4300	A4
4301	A4
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4303	A3
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4312	A5
4313	A5
4314	A4
4316	A5
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4321	B7
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4804	D4
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5019	E7
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5300	A3
5302	A4
5320	E2
5321	E2
5400	D3
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5600	B7
5604	C9
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5808	D4
5809	D3
5902	D10
5903	E10
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5907	D8
5909	A10
5911	C8
5913	C8
5914	A10
5915	A10
5916	A10
6103	E4
6200	D6
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7201	A7
7202	D6
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7301	A4
7302	A4
7322	E3
7400	C5
7600	B9
7601	C9
7602	C9
7603	C8
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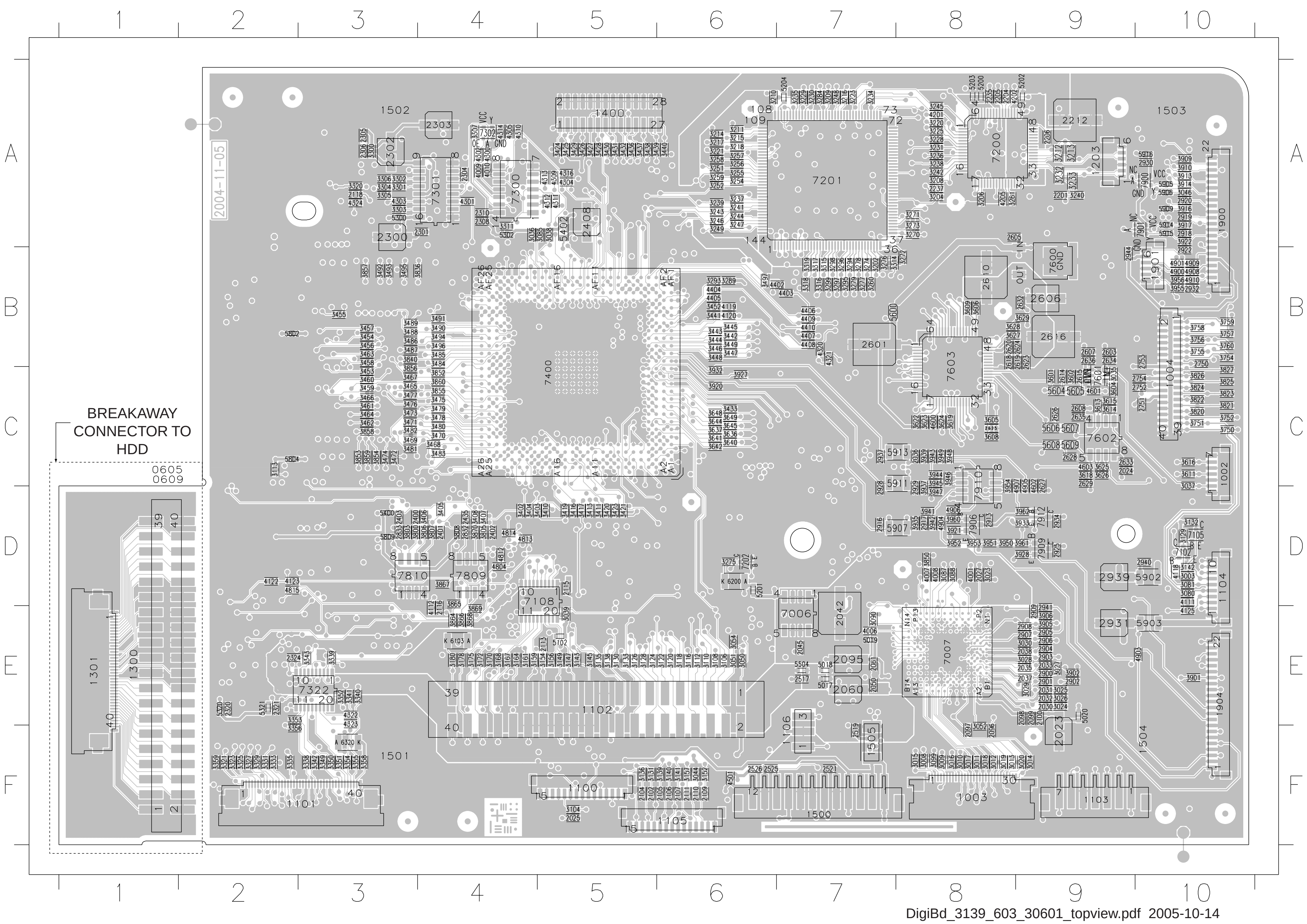
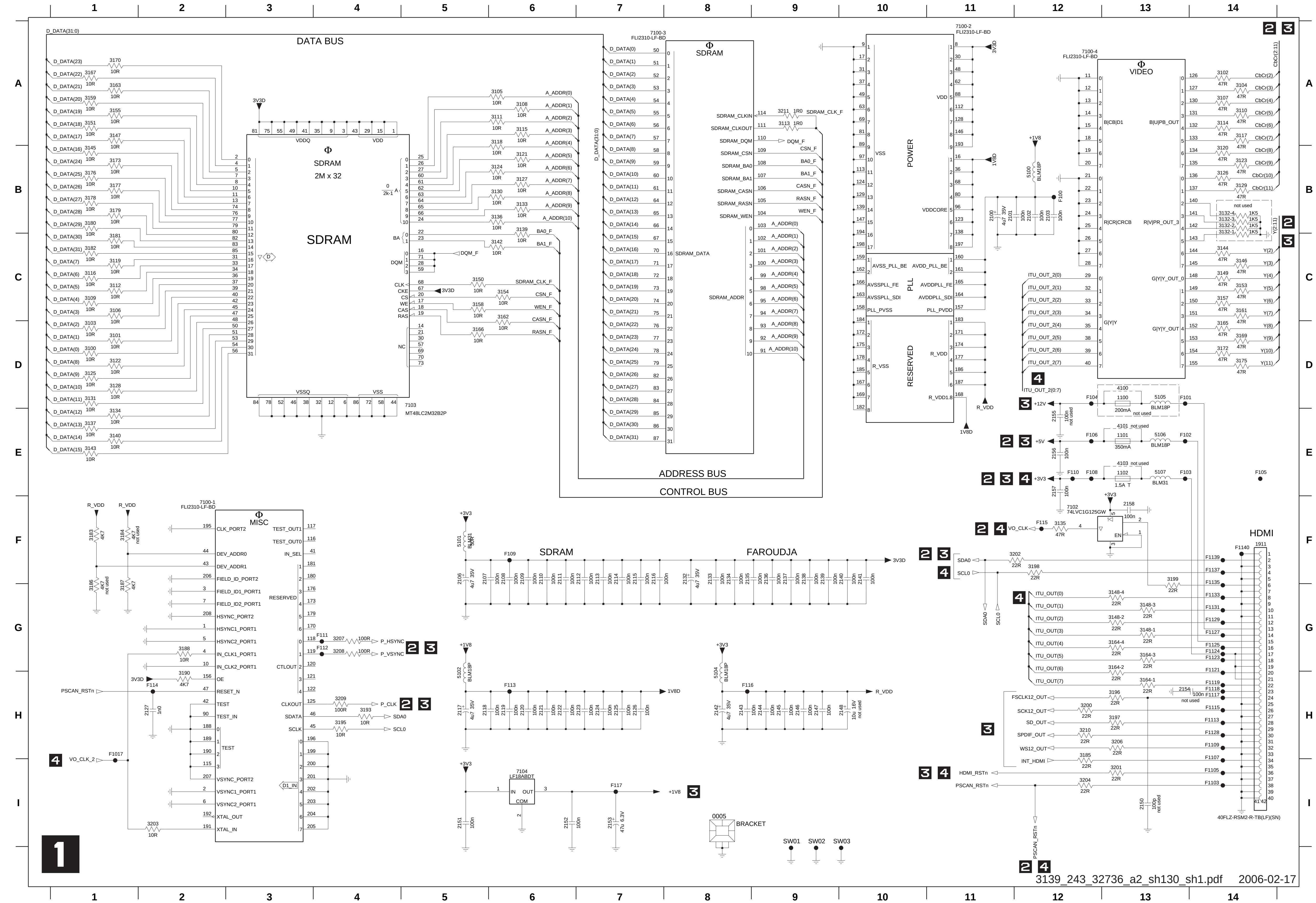
7912	D9



DigiBd_3139_603_30601_topview.pdf 2005-10-14

Layout: Digital Bottom View

HDMI: Faroudja



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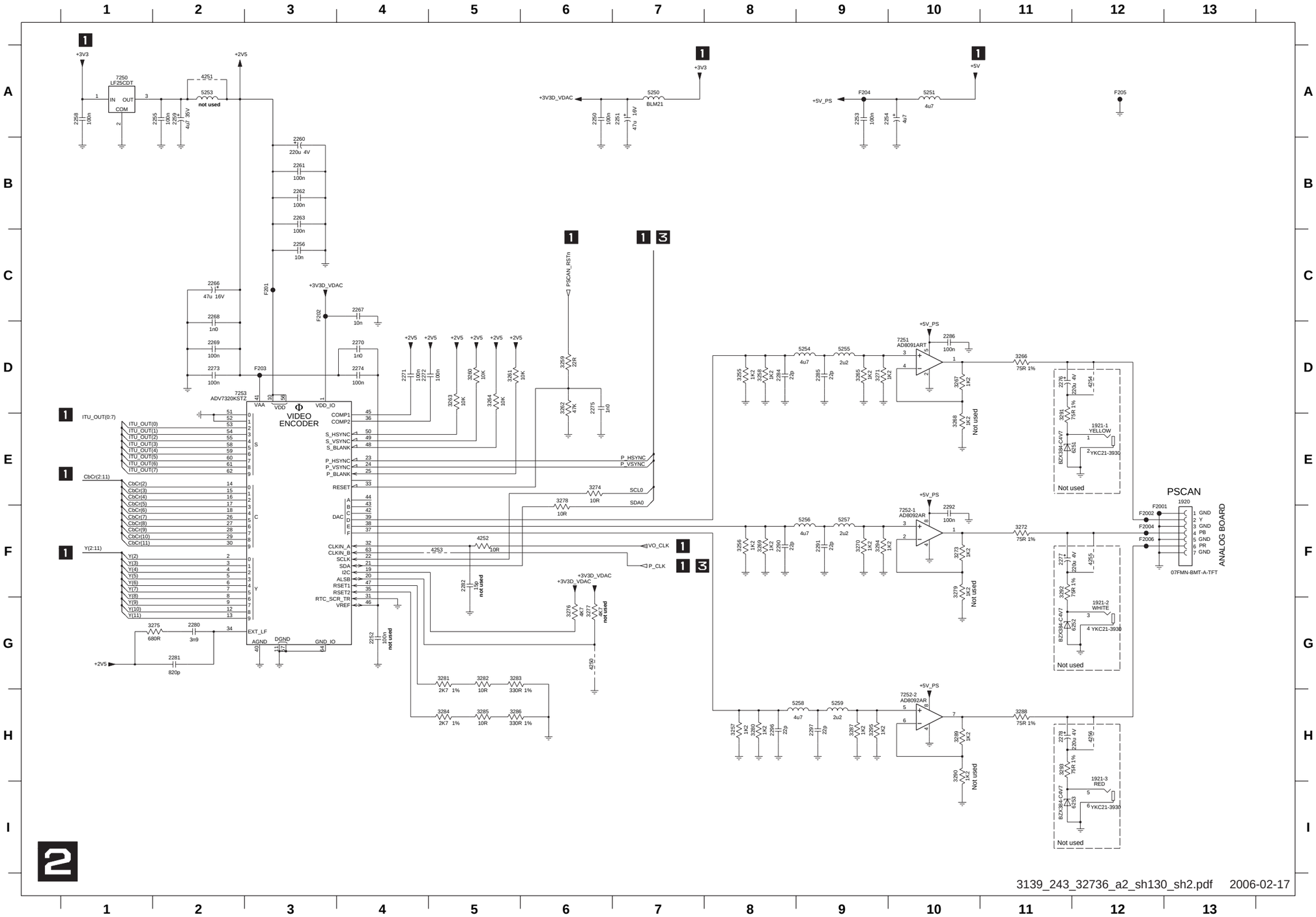
1100 D13
1101 E13
1102 E13
1911 F14
2100 B11
2101 B11
2102 B12
2103 B12
2106 F5
2107 F5
2108 F6
2109 F6
2110 F6
2111 F6
2112 F7
2113 F7
2114 F7
2115 F7
2116 F7
2117 H5
2118 H5
2119 H6
2120 H6
2121 H6
2122 H6
2123 H7
2124 H7
2125 H7
2126 H7
2127 H2
2132 F8
2133 F8
2134 F8
2135 F8
2136 F9
2137 F9
2138 F9
2139 F9
2140 F10
2141 F10
2142 H8
2143 H8
2144 H9
2145 H9
2146 H9
2147 H9
2148 H10
2150 I13
2151 I5
2152 I6
2153 I7
2154 H13
2155 E12
2156 E12
2157 E12
2158 F13
3100 D1
3101 D1
3102 A14
3103 D1
3104 A14
3105 A6
3106 C1
3107 A14
3108 A6
3109 C1
3110 A14
3111 A6
3112 C1
3113 A9
3114 A14
3115 A6
3116 C1
3117 A14
3118 A6
3119 C1
3120 B14
3121 B6
3122 D1
3123 B14
3124 B6
3125 D1
3126 B14
3127 B6
3128 D1
3129 B14
3130 B6
3131 D1
3132-1 C14
3132-2 B14
3132-3 B14
3132-4 B14
3133 B6
3134 E1
3135 F12
3136 B6
3137 E1
3139 B6
3140 E1
3142 C6
3143 E1
3144 C14
3145 B1
3146 C14
3147 A1
3148-1 G13
3148-2 G13
3148-3 G13
3148-4 G13
3149 C14
3150 C5
3151 A1
3153 C14
3154 C6
3155 A1
3157 C14
3158 C5
3159 A1
3161 C14
3162 C6
3163 A1
3164-1 H13
3164-2 G13
3164-3 G13
3164-4 G13
3165 D14
3166 D5
3167 A1
3169 D14
3170 A1
3172 D14
3173 B1
3175 D14
3176 B1
3177 B1
3178 B1
3179 B1
3180 B1
3181 C1
3182 C1
3183 F1
3184 F1
3185 H12
3186 G1
3187 G1
3188 G2
3190 H2
3193 H4
3195 H4
3196 H13
3197 H13
3198 F12
3199 F13
3200 H12
3201 I13
3202 F12
3203 I2
3204 I12
3206 H13
3207 G4
3208 G4
3209 H4
3210 H12
3211 A9
4100 D13
4101 E13
4103 E13
5100 B12
5101 F5
5102 H5
5104 H8
5105 D13
5106 E13
5107 E13
7100-1 F2
7100-2 A11
7100-3 A8
7100-4 A12
7102 F12
7103 D5
7104 I6
F100 B12
F101 D13
F1017 H1
F102 E13
F103 E13
F104 D12
F105 E14
F106 E12
F108 E12
F109 F6
F110 E12
F1103 I14
F1105 I14
F1107 I14
F1109 H14
F111 G4
F1113 H14
F1115 H14
F1117 H14
F1118 H14
F1119 H14
F112 G4
F1121 H14
F1123 G14
F1124 G14
F1125 G14
F1127 G14
F1128 H14
F1129 G14
F113 H6
F1131 G14
F1133 G14
F1135 G14
F1137 F14
F1139 F14
F114 H2
F1140 F14
F115 F12
F116 H8
F117 I7
SW01 I9
SW02 I9
SW03 I10

HDMI: Prog Scan DAC



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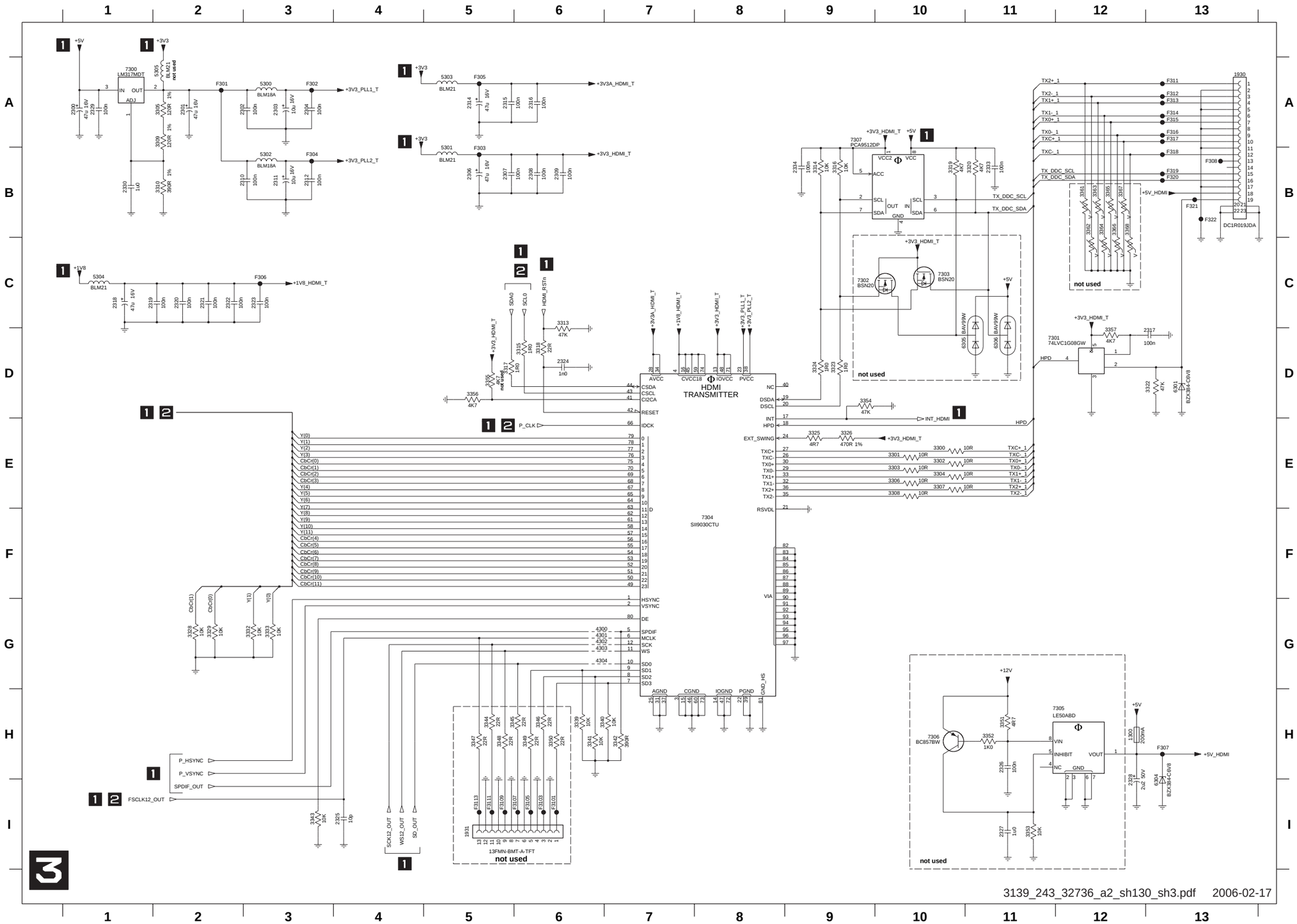
1921-1 E12 F205 A12
1921-2 G12
1921-3 H12
2250 A6
2251 A7
2252 G4
2253 A9
2254 A10
2255 A2
2256 C3
2258 A1
2259 A2
2260 B3
2261 B3
2262 B3
2263 B3
2266 C2
2267 C4
2268 C2
2269 D2
2270 D4
2271 D4
2272 D4
2273 D2
2274 D4
2275 D6
2276 D11
2277 F11
2278 H11
2280 G2
2281 G2
2282 F5
2284 D8
2285 D9
2286 D10
2290 F8
2291 F9
2292 F10
2296 H8
2297 H9
3255 D8
3256 F8
3257 H8
3258 D8
3259 D6
3260 D5
3261 D5
3262 D6
3263 D5
3264 D5
3265 D9
3266 D11
3267 D10
3268 E10
3269 F8
3270 F9
3271 D9
3272 F11
3273 F10
3274 E6
3275 G2
3276 G6
3277 G6
3278 E6
3279 F10
3280 H8
3281 G5
3282 G5
3283 G5
3284 H5
3285 H5
3286 H5
3287 H9
3288 H11
3289 H10
3290 H10
3291 E11
3292 F11
3293 H11
3294 F9
3295 H9
4250 G6
4251 A2
4252 F5
4253 F5
4254 D12
4255 F12
4256 H12
5250 A7
5251 A10
5253 A2
5254 D9
5255 D9
5256 F9
5257 F9
5258 H9
5259 H9
6251 E11
6252 G11
6253 I11
7250 A1
7251 D10
7252-1 F10
7252-2 H10
7253 D3
F2001 F12
F2002 F12
F2004 F12
F2006 F12
F201 C3
F202 C3
F203 D3

HDMI: HDMI Tx



HDMI: Columbus

Not used for DVDR9000H

Not used for DVDR7300H

3139_243_32736_a2_sh130_sh4.pdf 2006-02-17

2400 A7
2401 A7
2402 A7
2403 A6
2404 A6
2405 A6
2406 A6
2407 A5
2408 A5
2409 A8
2410 A7
2411 B7
2412 B7
2413 B7
2414 B7
2415 B6
2416 B6
2417 B6
2418 B6
2419 B5
2420 D5
3400 D6
3401 D4
3402 D4
3403 D1
3404 E1
3405 E5
3406 E5
3607 F2
3608 F2
3609 F2
4400-1 A2
4400-2 A2
4400-3 B2
4400-4 B2
4401-1 B2
4401-2 B2
4401-3 B2
4401-4 B2
4408 C2
4409 D2
4410 D2
4411 E1
4412 E1
4413 E2
4414 F2
5400 A8
5401 B8
5402 D5
7400-1 C7
7400-2 D2
7401 A8
F400 A8
F401 A7
F402 B7
F403 D4
F404 D5
F405 D2
F406 D2
F407 E2
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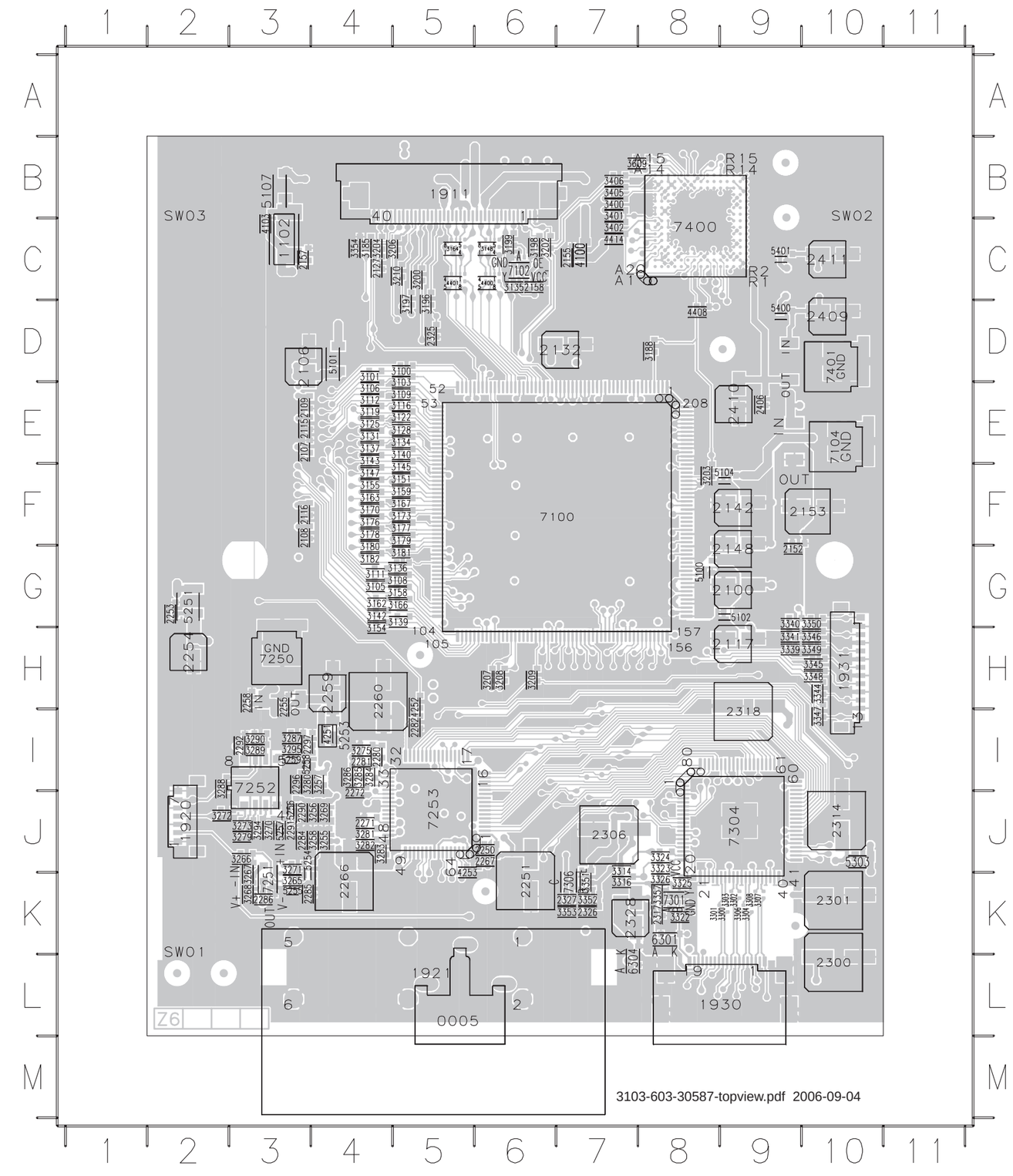
F409 E1
F410 E1
F411 E1
F412 E1
F413 E1
F414 F5
F415 F5

Layout: HDMI Top View



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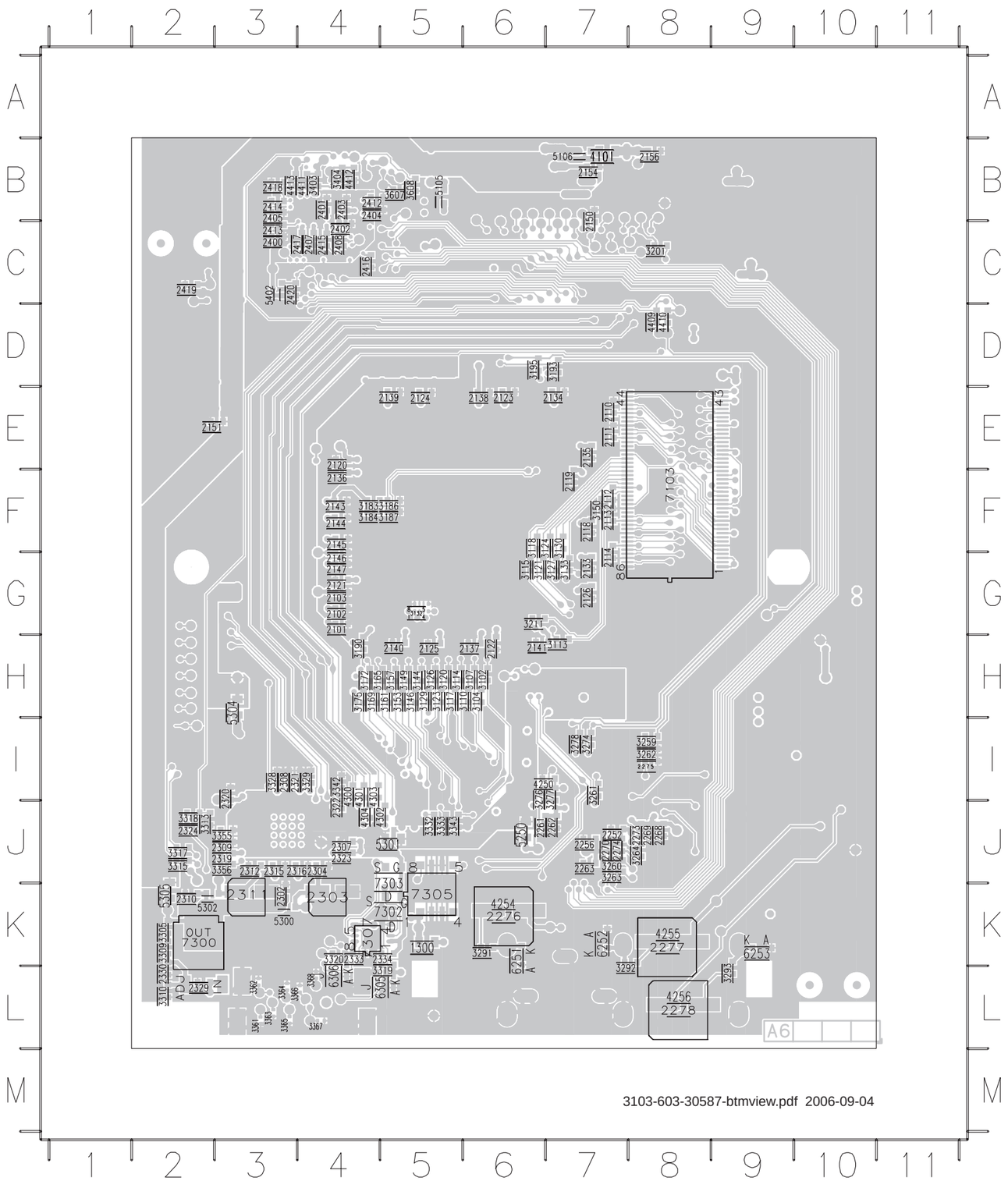
1102	C3	3125	E4	3289	I3	7252	I3
1911	B5	3128	E5	3290	I3	7253	J5
1920	J2	3131	E4	3294	J3	7301	K8
1921	L5	3134	E5	3295	I3	7304	J9
1930	L8	3135	C6	3300	K9	7306	K7
1931	H10	3136	G5	3301	K8	7400	C8
2100	G9	3137	E4	3302	K9	7401	D10
2106	D3	3139	G5	3303	K9		
2107	E3	3140	E5	3304	K9		
2108	F3	3142	G4	3306	K9		
2109	E3	3143	E4	3307	K9		
2115	E3	3145	F5	3308	K9		
2116	F3	3147	F4	3314	J7		
2117	H9	3148	C6	3316	K7		
2127	C4	3151	F5	3322	K8		
2132	D7	3154	H4	3323	J8		
2142	F9	3155	F4	3324	J8		
2148	G9	3158	G5	3325	K8		
2152	G9	3159	F5	3326	K8		
2153	F10	3162	G4	3339	H9		
2155	C7	3163	F4	3340	G9		
2157	C3	3164	C5	3341	H9		
2158	C6	3166	G5	3344	H10		
2250	J6	3167	F5	3345	H10		
2251	K6	3170	F4	3346	H10		
2253	G2	3173	F5	3347	I10		
2254	H2	3176	F4	3348	H10		
2255	H3	3177	F5	3349	H10		
2258	H3	3178	F4	3350	G10		
2259	H4	3179	F5	3351	K7		
2260	H4	3180	G4	3352	K7		
2266	K4	3181	G5	3353	K7		
2267	J6	3182	G4	3354	C4		
2271	J4	3185	C4	3357	K8		
2272	J4	3188	D8	3400	B7		
2280	I4	3196	D5	3401	B7		
2281	I4	3197	D5	3402	C7		
2282	I5	3198	C6	3405	B7		
2284	J3	3199	C6	3406	B7		
2285	K3	3200	C5	3609	B7		
2286	K3	3202	C6	4100	C7		
2290	J3	3203	F8	4103	C3		
2291	J3	3204	C4	4251	I4		
2292	I3	3206	C4	4252	H5		
2296	I3	3207	H6	4253	J5		
2297	I3	3208	H6	4400	C6		
2300	L10	3209	H6	4401	C5		
2301	K10	3210	C5	4408	D8		
2306	J7	3255	J4	4414	C7		
2314	J10	3256	J4	5100	G8		
2317	K8	3257	I4	5101	D4		
2318	I9	3258	J4	5102	G9		
2325	D5	3265	K3	5104	F9		
2326	K7	3266	J3	5107	B3		
2327	K7	3267	K3	5251	G2		
2328	K7	3268	K3	5253	I4		
2406	E9	3269	J4	5254	J3		
2409	D10	3270	J3	5255	K3		
2410	E9	3271	J3	5256	J3		
2411	C10	3272	J2	5257	J3		
3100	D5	3273	J3	5258	I3		
3101	D4	3275	I4	5259	I3		
3103	E5	3279	J3	5303	J10		
3105	G4	3280	I3	5400	D9		
3106	E4	3281	J4	5401	C9		
3108	G5	3282	J4	6301	K8		
3109	E5	3283	J4	6304	L7		
3111	G4	3284	I4	7100	F7		
3112	E4	3285	I4	7102	C6		
3116	E5	3286	I4	7104	E10		

Layout: HDMI Bottom View



1101	B7	2400	C3	3313	J2		
1300	K5	2401	B4	3315	J2		
2101	G4	2402	C4	3317	J2		
2102	G4	2403	B4	3318	J2		
2103	G4	2404	B4	3319	L5		
2110	E7	2405	B3	3320	K4		
2111	E7	2407	C4	3328	I3		
2112	F7	2408	C4	3329	I4		
2113	F7	2412	B4	3332	J5		
2114	G7	2413	C3	3333	J5		
2118	F7	2414	B3	3342	I4		
2119	F7	2415	C4	3343	J5		
2120	E4	2416	C4	3355	J3		
2121	G4	2417	C3	3356	J3		
2122	H6	2418	B3	3361	L3		
2123	E6	2419	C2	3362	L3		
2124	E5	2420	C3	3363	L3		
2125	H5	3102	H6	3364	L3		
2126	G7	3104	H6	3365	L3		
2133	G7	3107	H6	3366	L3		
2134	E7	3110	H6	3367	L4		
2135	E7	3113	H7	3368	L4		
2136	F4	3114	H5	3403	B4		
2137	H6	3115	G6	3404	B4		
2138	E6	3117	H5	3607	B5		
2139	E5	3118	F6	3608	B5		
2140	H5	3120	H5	4101	B7		
2141	H6	3121	G6	4250	I6		
2143	F4	3123	H5	4254	K6		
2144	F4	3124	F6	4255	K8		
2145	F4	3126	H5	4256	L8		
2146	G4	3127	G7	4300	I4		
2147	G4	3129	H5	4301	I4		
2150	C7	3130	F7	4302	J4		
2151	E2	3132	G5	4303	I4		
2154	B7	3133	G7	4304	J4		
2156	B8	3144	H5	4409	D8		
2252	J7	3146	H5	4410	D8		
2256	J7	3149	H5	4411	B4		
2261	J6	3150	F7	4412	B4		
2262	J7	3153	H5	4413	B3		
2263	J7	3157	H5	5105	B5		
2268	J8	3161	H5	5106	B7		
2269	J8	3165	H4	5250	J6		
2270	J7	3169	H4	5300	K3		
2273	J8	3172	H4	5301	J5		
2274	J7	3175	H4	5302	K2		
2275	I8	3183	F4	5304	H3		
2276	K6	3184	F4	5305	K2		
2277	K8	3186	F5	5402	C3		
2278	L8	3187	F5	6251	K6		
2302	K3	3190	H4	6252	K7		
2303	K4	3193	D7	6253	K9		
2304	J4	3195	D6	6305	L5		
2307	J4	3201	C8	6306	L4		
2308	I3	3211	G6	7103	F8		
2309	J3	3259	I8	7300	K2		
2310	K2	3260	J7	7302	K5		
2311	K3	3261	I7	7303	K5		
2312	J3	3262	I8	7305	K5		
2315	J3	3263	J7	7307	K4		
2316	J3	3264	J8				
2319	J3	3274	I7				
2320	I3	3276	I6				
2321	I3	3277	I7				
2322	J4	3278	I7				
2323	J4	3291	K6				
2324	J2	3292	L7				
2329	L2	3293	L9				
2330	L2	3305	K2				
2333	K4	3309	K2				
2334	K5	3310	L2				

Notes:

8. Alignments & Test Procedures

8.1. Reprogramming Procedure of NVM on the Digital Board

The NVM, item 7809 on the Digital board contains the following:

- Slash information (or slash version)
- IEEE Unique number

The slash version and IEEE Unique number are stored at the end of the production line of the set.

In case of failure the NVM is replaced by an empty device. After replacement of the NVM the set can only startup in Diagnostic software mode because the Slash version is not in placed.

By way of commands via the Diagnostic Software (DS) and hyperterminal connection to the PC, these factory settings must be restored in the NVM.

8.1.1. Slash Version

The slash version is stored with DS command 1217 followed by the slash version as parameter.
The slash versions used in DVDR5350H and DVDR7300H families are as follows:

- DVDR5350H/02: 11201
- DVDR5350H/05: 11205
- DVDR5350H/19: 11201
- DVDR7300H/02: 11207
- DVDR7300H/05: 11208
- DVDR7300H/19: 11207
- DVDR73x0H/75: 11207
- DVDR73x0H/97: 11207

Example:
DS:> 1217 11201

With DS command 1218 the slash version can be displayed

8.1.2. IEEE Unique Number

1. Note the serial number of the set example: VN050136130156
   - VN = production center (VN….Szekesfehervar). According to UAW-500: V=22 and N=14
   - 05 = change code (this is not used for this calculation)
   - 01 = YEAR
   - 36 = Production WEEK
   - 130156 = Lot and SERIAL number
2. Calculate the unique number: this number always exists out of 10 hexadecimal numbers
3. First 5 numbers: First we calculate a decimal number according to formula below:
   - 35828*YEAR + 676*WEEK + 26*A + H + 8788
   - The figures are fixed, YEAR + WEEK + production center code (A + H) are variables
   - Example: 35828*01 + 676*36 + 26*1 + 8 + 8788 = 68986 (decimal)
   - Then we translate this decimal number to a hexadecimal number.
   - Example: 68986 = 10D7A (hex)
4. Last 5 numbers: The last 5 numbers exist out of the Lot and SERIAL number.
   We have to translate the decimal number to the next 5 hexadecimal numbers:
   Example: 130156 (decimal) = 1FC6C (hex)
5. This IEEE Unique number (10-digit hexadecimal number) is stored with DS command 1207.
   Example:
   DS:>1207 10D7A1FC6C
   120700: Test OK@

The set has now its original IEEE unique number.
With DS command 1208 the slash version can be displayed.

8.2. Reprogramming Procedure of NVM on the Digital Board

The Boot Eeprom, item 7810 on the Digital board contains the “Diversity String” that tells the software during startup which hardware version is present. This setting is stored during the production of the Digital board.
In case of failure the Eeprom must be replaced by a programmed device containing the boot script.
Via the Dignostic Software the “Diversity String” is stored with the command 1226, followed by the “Diversity String” as parameter.

The Diversity strings used in DVDR5350H and DVDR7300H are as follows:

DVDR5350H:
444248497E0440014630355F3500000056040300000101020
0010100400808004456445232303031 2E3030310102020808
0700000000020100000000000000000

DVDR73x0H:
444248499BFB40014630355F3300000055040300000101 02
0001010040080800445644523230303 12E303031010202080
8000000010002010000000000000000

Example:
DS:> 1226
444248499BFB40014630355F3300000055040300000101 02
0001010040080800445644523230303 12E303031010202080
8000000010002010000000000000000
Test OK @

With DS command 1229 the settings can be displayed.

8.3. Laser Control Adjustment

In case of exchanging DVD-M or Frontend Board (PCBA of the Basic Engine) an adjustment to align the OPU and Frontend Board to each other is necessary.

8.3.1. Adjustment procedure

This adjustment is done with the DSW software nucleus 931. The adjustments takes about 30 seconds and the data is stored in the OPU Eeprom.

Example:
DS:> 931
93100
Test OK @

8.4. Procedure for 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 DVD via the Diagnostic software nucleus 2107.

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

9. Circuit- and IC description

9.1. PSU Board

9.1.1. General

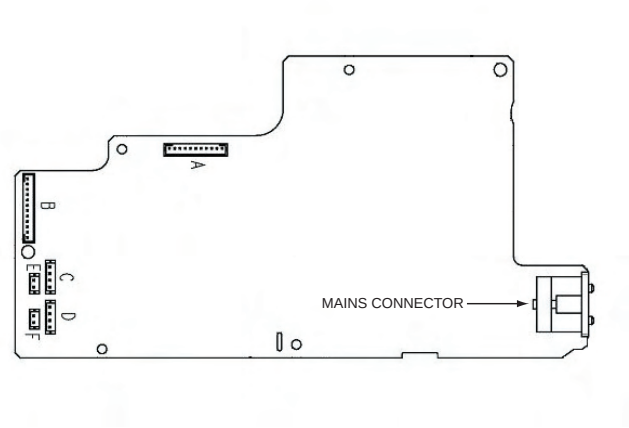


Figure 9-1 PSU Board Layout

The PSU board provides the following connection to the rest of the set:

- Connector A: Supply/Signal to Analog Board

Pin no.	Supply / Signal	Remarks
1	12VSTBY	
2	STBY control	>2.5V = supply for conn. B is off (Standby mode) <0.5V = supply for conn. B is on (On mode)
3	5VSTBY	
4	DD_ON	>2.5V = supply for conn. D is on <0.5V = supply for conn. D is off
5	3V3STBY	
6	IPFAIL	>4.0V = power is good <0.5V = power fail
7	5NSTBY	
8	GND	
9	33VSTBY	
10	GND	
11	VGNSTBY	

- Connector B: Supply to Digital Board

Pin no.	Supply / Signal	Remarks
1	3V3D	
2	3V3D	
3	3V3D	
4	3V3D	
5	GND	
6	12VD	
7	GND	
8	GND	
9	5VD	
10	HD_ON	>2.5V = supply for conn. C & G is on <0.5V = supply for conn. C is off
11	GND	
12	5ND	

- Connector C: Supply to HDD

Pin no.	Supply
1	12VH
2	GND
3	GND
4	5VH

- Connector D: Supply to Basic Engine

Pin no.	Supply
1	12VE
2	GND
3	GND
4	5VE

- Connector E: Not in use
  F: Not in use

The PSU is designed with short-circuit protection that will shutdown the power supply. When this happen, the voltage stored in capacitor C1 and C40 will prevent the Power Supply to turn-on, therefore they must be discharged before the PSU can function normally again.

9.2. Front Board (Panel – Display + Key)

9.2.1. General

This board consists of the following parts:

- µP driver for the FTD
- Frontend (Audio & Video)
- VFD Heater voltage Generator

9.2.2. µP (IC 7103 : TMP86CM74AFG)

The core element of the Front (Display + Key) board is the µP [7103].
It runs on a 5V supply & a clock frequency of 16MHz, and is responsible for the following functions:

- Interface with the Slave µP on the Analog board via I^2C bus
- Driver for the FTD display [1203 : HUV-08SS65T]

9.2.3. VFD Heater Voltage Generator

Pin 12 of µP [7103] provides the necessary sine wave signal out for transistor [7106, 7108 & 7109] to generate the 50% duty-cycle 48KHz AC square-wave signal for the filament of the FTD.

9.3. Analog Board

9.3.1. General

The Analog board consists of the following parts:

- Slave µP
- Fan Control
- Simple Power Supply
- Tuner Frontend
- Audio ADC/DAC

9.3.2. Slave µP (IC 7108 : TMP87CH74F)

The slave µP which run on a 5V supply and is responsible for the following functions:

- Interface with the Chrysalis chip on the Digital Board via I^2C interface, where it functions in the slave-mode
- Evaluation of the keyboard matrix (network of resistors) on the Front board via pin 32 and 33.
- Decoding the remote control commands from the infra-red receiver on the Front board via pin 22.
- Activation and control of the FTD display on the Front board (with the help of 7103 as driver) via I^2C bus
- Timer Wake-up activation
- Fan control via transistors 7104 and 7105

It runs on two clock frequencies namely:

- 8MHz for normal operation
- 32.768KHz for the real time clock

9.3.3. Timer Wake-up activation

During the Standby mode, the slave µP provides a wakeup call (STBY-line switches to high) to the PSU Board switching on the Digital Board.

9.3.4. Simple Power Supply

The main power supply for this set is generated in the PSU board. Within the Analog board only the 5V, 3V3SW and 8VSTBY lines are generated.

Below are the supply lines from the Simple Power supply on the Analog board:

- 3V3SW to DAC_ADC and CU
- 3V3STBY to CU
- 5V to IOV, CU, PROG, MSP, DIGIO and FV
- 5NSTBY to IOA, PROG, DAC_ADC and Front board
- 5VSTBY to IOA, IOV, FV, CU, DAC_ADC and Front Board
- 8VSTBY to MSP
- 12VSTBY to CU, IOV, DAC_ADC and Front Board
- 33VSTBY to FV
- VGNSTBY to CU and Front Board

Standby modes:
In Standby mode the STBY control line is low, switching off the 3V3D, 5VD, 5ND and 12VE supply and thus reducing the power consumption.

9.3.5. Tuner Frontend [1700 : TMQZ2-439A]

It has a RF IN for antenna connection and RF OUT which provides a RF loop through for connection to the TV.
The Frontend (Tuner & IF-demodulator) is controlled by I^2C (SCL_5V- and SDA_5V-) lines coming from the Slave µP [7108].
Complete video processing is done in this unit and the video output (CVBS) is taken out from the [VIDOUT] pin 17 via a transistor [7100] as VFV-line to the Video I/O circuitry. The audio-IF component SIF1 is taken out from the [SIFOUT] pin 7 for the demodulation by the Multi-sound processor (MSP).

Audio demodulator
The sound demodulation is done by the MSP3415 [7600], which is also fully controlled via I^2C bus by the Slave µP. The audio signals are available at pin 26 and pin 27 and fed as AFER- & AFEL- line to the audio I/O for further processing.

9.3.6. Audio routing

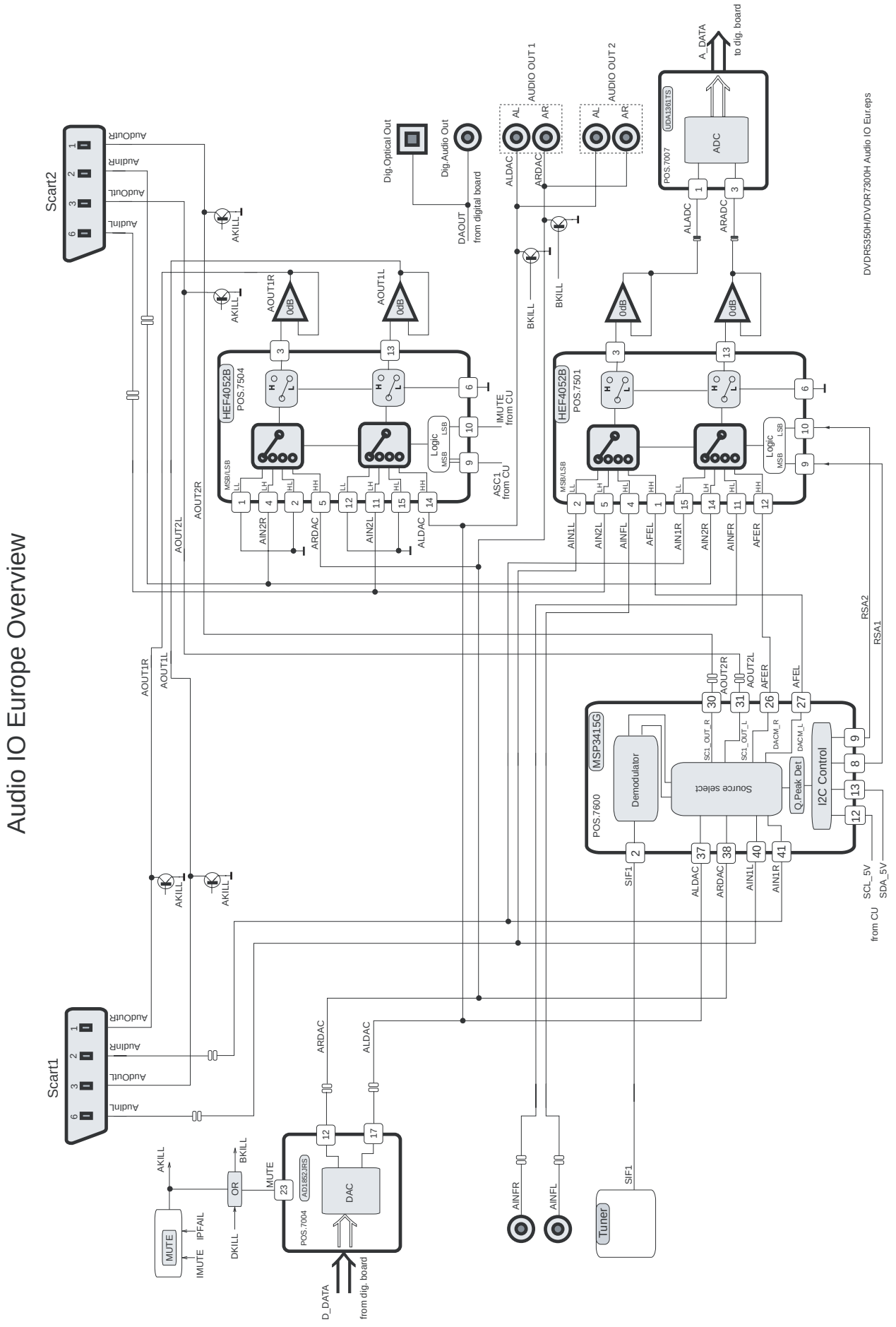


Figure 9-2 Analog Audio In / Out Overview

The sound processing is always done in stereo (that means separate left- and right- channel) and the complete switching is realized by using HEF4052B which is a dual four-to-one multiplexer and MSP3415G which is a multi-sound processor.

a) Scart 1 – Output path
The multiplexer [7501] selects either signals from the Scart 2 Input (AIN2L/AIN2R) or the Audio DAC (ALDAC/ARDAC) as the output source for Scart 1 (AOUT1L/AOUT1R).

b) Scart 2 – Output path
The MSP [7600] selects either signals from the Scart 1 Input (AIN1L/AIN1R), the Audio DAC (ALDAC/ARDAC) or the Tuner Frontend as the output source for Scart 2 (AOUT2L/ AOUT2R).

c) Digital audio-out path
In addition, a digital output (DAOUT) coming from the Digital board is passed through a 6-fold inverter [7700] for performance reasons (noise reduction, jitter, …) as digital Audio / Optical outputs at the rear.

d) Record path
The record-selector [7501] selects either signals from the Scart 1 Input (AIN1L/AIN1R), Scart 2 Input (AIN2L/AIN2R), Front Cinch (AINFL/AINFR) or the MSP (AFEL/AFER) and routes to the audio ADC (ALADC/ARADC) for record purposes. The switch is controlled via RSA1 and RSA2 signals coming from the MSP.

9.3.7. Audio ADC/DAC

The conversion of analog audio signals from the record-selector [7501] outputs (ALADC/ARADC) is done via UDA1361TS [7007]. This IC can process input signals up to $2V_{rms}$ by using external resistors in series to the input pins. All required clock signals are generated on the digital board and only the audio data (A_DAT-line) are routed to Digital board for further processing.

The transformation of digital audio back into analog domain is done by AD1852JRS [7004]. All necessary clock signals are coming from the digital board and digital audio data (D_DATA0-line) are converted into analog signals (pin 15 and 18). The output signals from the audio DAC part (ALDAC/ ARDAC) are directly routed to the rear cinch sockets. To avoid plops and any other audible noise on the output muting circuits are implemented for each channel.

9.3.8. Muting

Muting for the various outputs (Scart 1, Scart 2 and rear Cinch sockets) are done via the AKILL, BKILL lines which is a combination of the D_KILL from the Digital board, IMUTE from the Slave µP and IPFAIL from power supply.

9.3.9. Video-routing

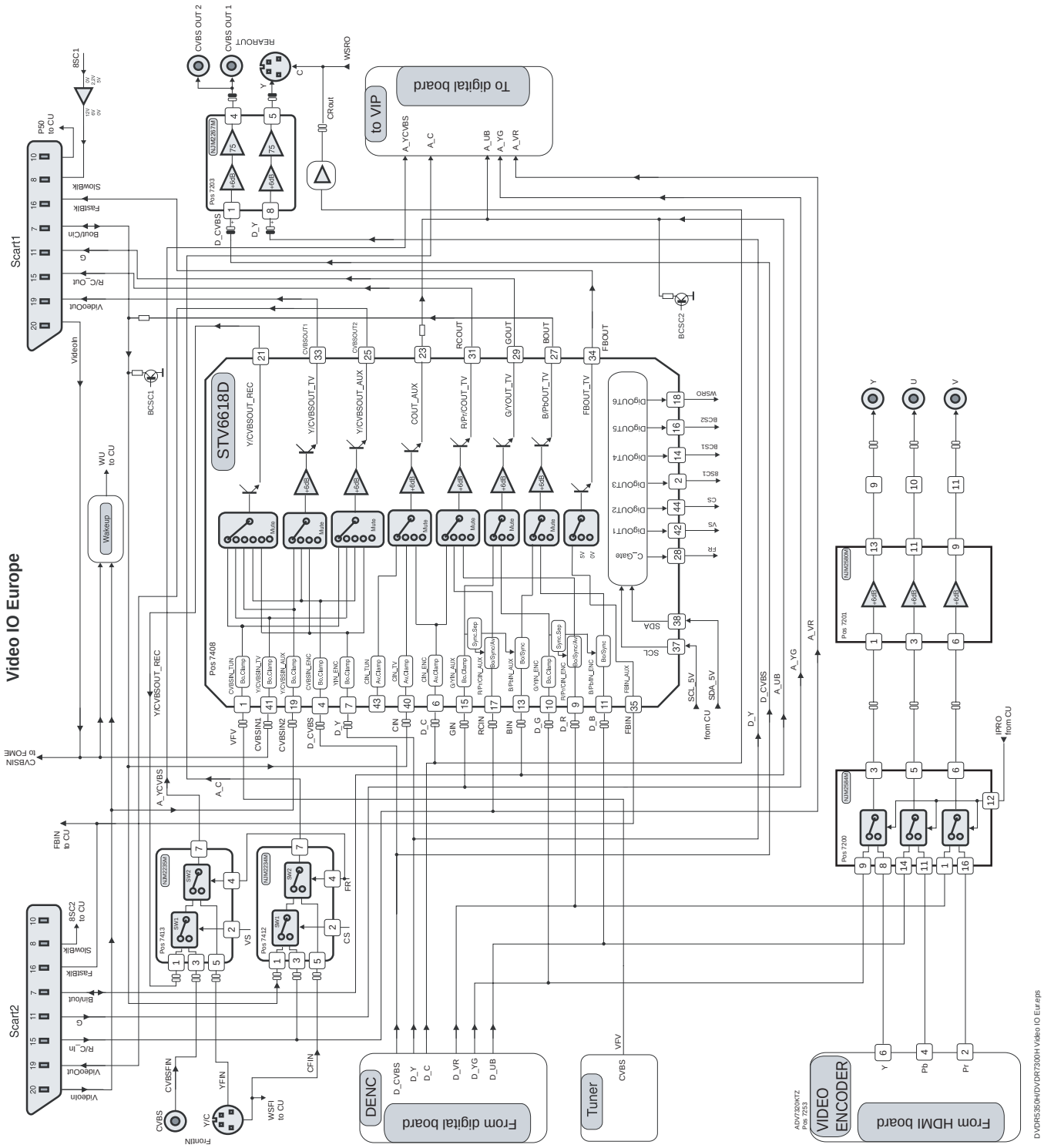


Figure 9-3 Analog Video In / Out Overview

A matrix switch STV6618D [7408] controlled by the Slave µP via I²C-bus is used for Video I/O switching. All used outputs excluding pin 21 (Y/CVBSOUT-REC) have a 6dB-amplification and a 75 ohms-driver-stage inside. This IC also includes several digital outputs, which are used for switching purposes on the Analog board.
This matrix switch routes the selected inputs to the correct output lines for TV viewing and further processing in the Digital board.

The record selector inside the switch selects between the inputs from Tuner Frontend (VFV), CVBS Scart1 (CVBSIN1), CVBS Scart2 (CVBSIN2) or D_CVBS from the DENC (on Digital board). The output signal CVBS_REC together with the other signals CVBSFIN, YFIN & C_FIN from the Front and RCB from Scart2 are routed directly to the VIP (on Digital board) for further processing.

The signals D_CVBS and D_Y are fed through NJM2267M [7203] (6dB amplification) and D_C via transistors [7410 & 7411] as driver to the rear S-Video output socket and CVBS cinch socket.

9.4. Basic Engine

The VAD8043 module (also known as D4.3 drive) is dual format DVD-R/+R and DVD-RW/+RW drive video recorder with an E-IDE/ATAPI interface.

The video recorder engine performs all basic servo tasks. It reads data from and writes data to the disc and controls all functions like tray control, start/stop the disc, tracking, jumping and communicating with the host.
Mechanically, the module consists of a motorized tray loader that contains the dual laser optical pickup unit and a PCBA that contains all the electronics needed to control the drive and interfacing the MPEG encoder/decoder back-end application.
There is a temperature sensor included in the drive that prevents malfunction or destruction of the drive in case the temperature inside the drive gets too high.

9.5. Digital Board

The Digital Board is based on the highly integrated Chrysalis BGA chip (Ball Grid Array), PNX7100EH and supports 2 IDE (ATAPI) connection.
The board encodes and multiplexes the analogue video and digital uncompressed audio (I²S) into an MPEG2 stream. This MPEG2 stream is formatted for recording by the DVD+RW engine. In the playback, the board will decode the MPEG2 video into analogue video. In addition, a DV stream can be received via IEEE 1394 (i-Link), and transformed to MPEG2 format.

9.5.1. Record Mode

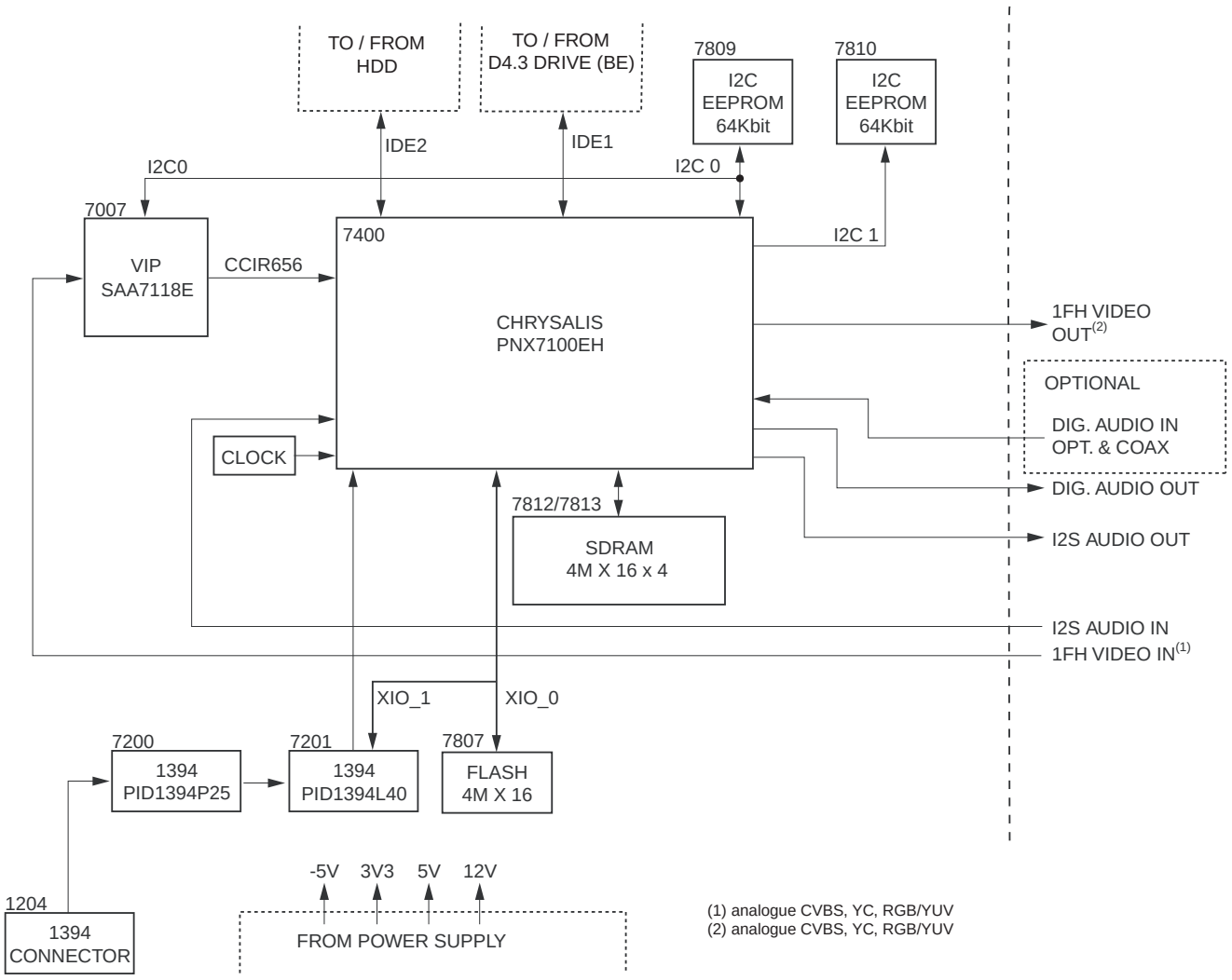


Figure 9-4 Block Diagram of Chrysalis Board

Video Part
The analogue video input signals CVBS, YC and RGB are routed via the board to connector 1904 and sent to Video Input Processor, SAA7118E. The Video Input Processor encodes the analogue video to digital video stream (CCIR656 format). The output stream, named ITU_IN(7:0), is then routed to the Chrysalis chip. This IC encodes and decodes the digital video stream into / from MPEG2 format.

The digital video input signals from the DV-in are routed from connector 1203 via the 1394 PHY IC [7200] and the 1394 LINK IC [7201] also to the Chrysalis chip.

Audio Part
I^2S audio is sent from the Analog board to the Chrysalis chip via connector 1900.
The Chrysalis chip compresses the I^2S audio data into an MPEG1-L2 / AC3 audio stream.

Front-end I^2S
The Chrysalis chip interfaces directly to the Basic Engine and HDD via the IDE connectors.
It buffers the data streams that are coming from (or going to) these hardware devices.

In the Chrysalis chip, the video MPEG2 stream and the audio AC3 stream are multiplexed into an I^2S stream. In normal recording the serial data are send to the HDD for recording. Only archiving and playback is done with optical drive.

9.5.2. Playback mode

During playback, the serial data from the Basic Engine is going directly to the Chrysalis chip via ATAPI interface. The Chrysalis chip has the following outputs:

- Analog video CVBS, YC and RGB outputs on connector 1904
- I^2S audio (PCM format) on connector 1900
- SPDIF audio (digital audio output) on connector 1900
- Progressive Scan output connector 1002

9.5.3. Basic Engine Interface

The Digital board is equipped with 2 IDE bus (ATAPI) for connecting to the Basic Engine and HDD via connectors 1102 and 1101 respectively.

9.5.4. Clock Distribution

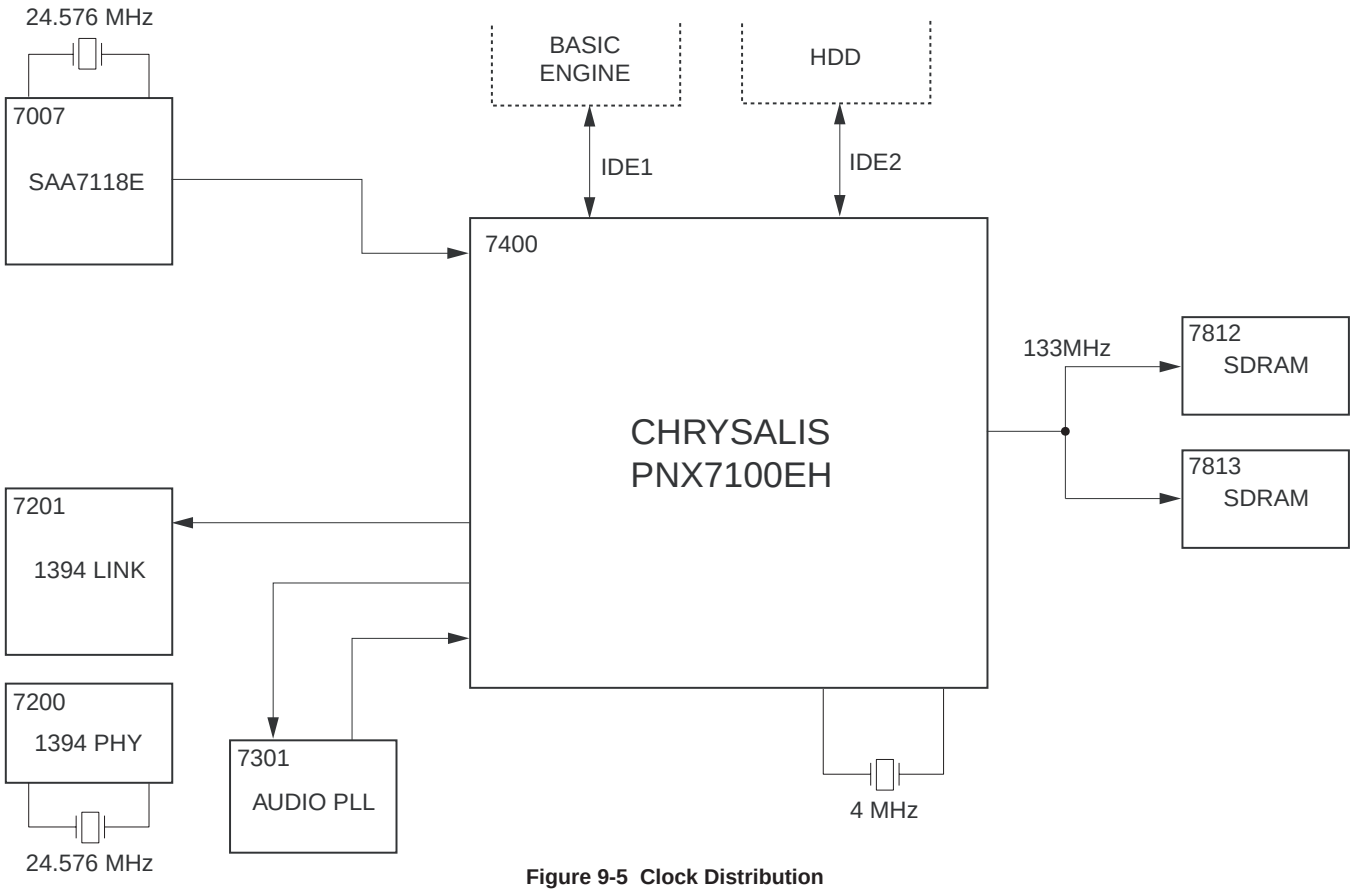


Figure 9-5 Clock Distribution

The Chrysalis chip has a complex system, which is needed to support the processes running at different frequencies such as video decoding, audio decoding or peripheral I/O devices etc. To ensure a synchronous initialization of all the registers and state machines, all the PLLs are switched to their default frequency and the reset sequence is run at 4MHz.
Then when the booting control unit is correctly initialized and once it has captured all the booting parameters, it sets the PLLs to its functional frequencies to allow the modules to run at their nominal frequencies. Thanks to a clock blocking mechanism, the frequency switching is glitch free.

System clocks:
- PNX7100EH (7400, pin AF9 and AF10) : 4MHz provided by the x'tal 1401
- SAA7118E (7007, pins A3 and B4) : 24.576MHz provided by x'tal 1001
- 1394-PHY (7200, pins 59 and 60) : 24.576MHz provided by x'tal 1201
- 1394-LINK (7201, pin 88) : 49.152MHz provided by 1394-PHY
- SDRAM (7812 and 7813, pin 38) : 133MHz provided by the Chrysalis chip

9.5.5. Power Supply

The Digital board is not powered in standby mode. The control signal STBY on the analog board will enable the PSU and power the digital board.

- STBY = High : the digital board is in powered down standby mode
- STBY = Low : the power supply to the digital board is enabled. The 3V3, -5V, +5V and +12V come from the PSU, while the following voltages are generated in the digital board:
- 1.8V core voltage generated by a NCP1571D [7501] . It provides a DC-DC power solution producing a 1.8V output voltage over a wide current range
- 1.8V_VIP generated by LD1117D18 [7008] for the VIP
- 3.3V_VIP generated by LD1117D33 [7006] for the VIP
- 2.5V generated by a LF25CDT [7600] for Pro-scan Video Encoder

9.5.6. Memory

Several memories are used on the Digital Board:

- Eeprom IC [7809] : this memory contains all the parameters for the application
- Eeprom IC [7810] : this memory contains the boot parameters of the board
- Flash IC [7807] : this memory contains the application and Service diagnostic firmware

9.5.7. Reset

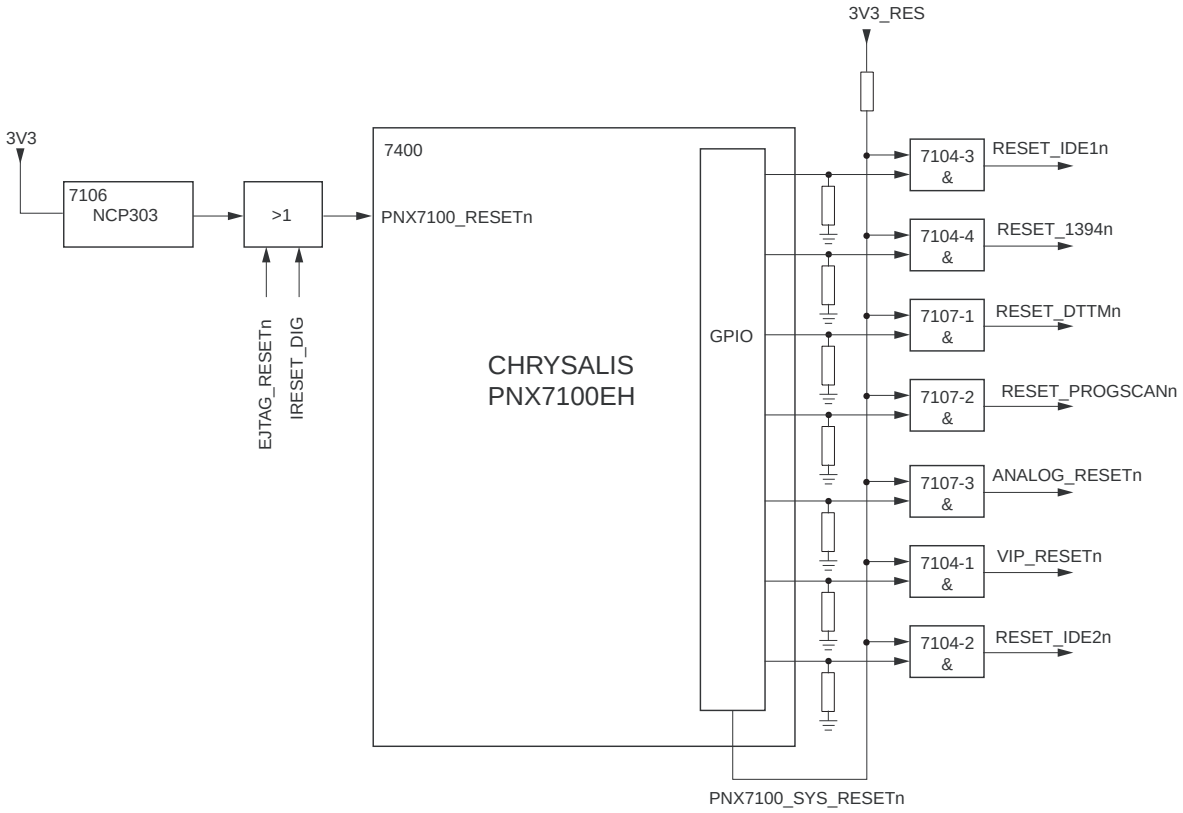


Figure 9-6 Reset concept

Reset concept Digital board

The voltage detector NCP303LSN29 [7106] provides the reset signal PNX7100_RESETn with the correct timing behavior. This circuitry functions as a Power-on reset module which detects the minimum functional voltage that is needed by the device. It also detects any voltage drop. When the power voltage is outside the nominal range, a reset signal is generated and fed to the Chrysalis chip to reset the differenct peripherals and processing units.

- PNX7100_RESETn = High {the Digital board is up and running}
- PNX7100_RESETn = Low {the Digital board will reset}

There are two control lines which can overrule this reset signal:

- IRESET_DIG (controlled by the microprocessor on the Analog Board)
- EJTAG_RESETn (only for production)

The PNX7100_SYS_RESETn is a general enabling signal for the different reset lines. All other reset lines are directly driven from the Chrysalis port pins. All reset lines are logically connected via 74LVC08AD [7104 and 7107] AND-gates. If both reset signals are low, all other external devices are initialized.

9.5.8. In/Out Connector

Audio In/Out Connector [1900]

The Audio In / Out (AIO) connector is used to interchange digital audio signals between the Analog and Digital board.

Video In/Out Connector [1904]

The Video In / Out (VIO) Connector is used to interchange analogue video signals between the Analog and Digital board.

Video Out Connector [1002]

The Video Out Connector is used for Progressive Scan video signals to the Analog board

9.5.9. Service UART Interface

Hex Inverting Schmitt trigger 74HCT14D [7111] are used to make a level conversion between LVTTL and 5V (compatible with most RS232 interfaces) and vice versa. The control line MPIO19_EEPROM_En is used to activate service and diagnostic SW at start-up. The connectivity is provided via an external service tool.

9.6 IC Description

9.6.1 Analog Board

IC7004 - AD1852JRS - Digital to Analogue Converter

BLOCK DIAGRAM

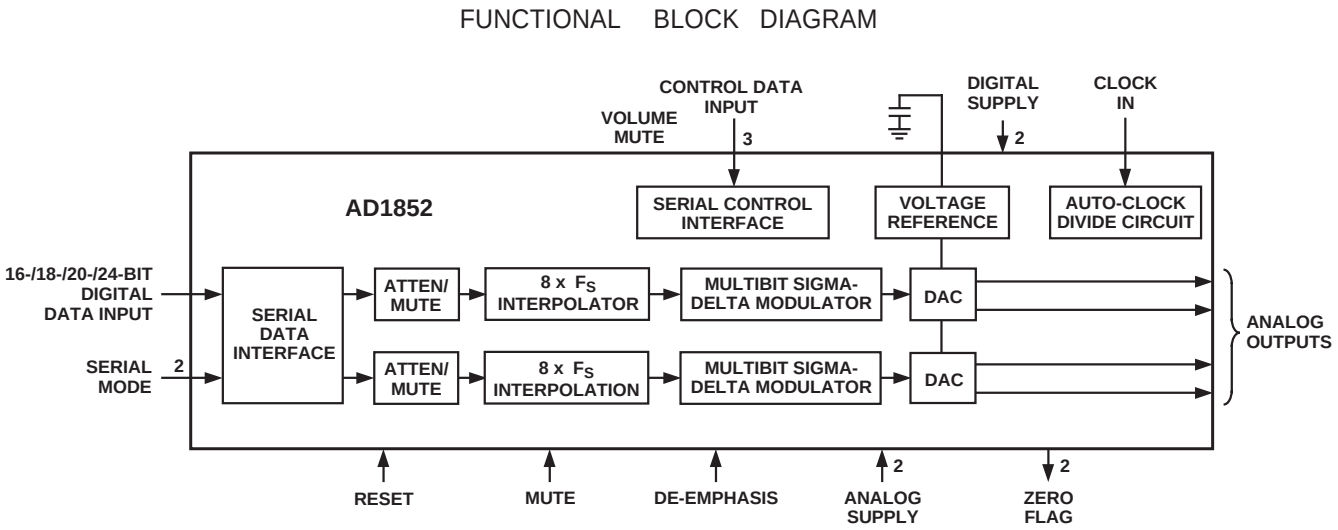


Figure 9-7

PIN DESCRIPTION AND CONFIGURATION

Pin	Input/Output	Pin Name	Description
1	I	DGND	Digital Ground.
2	I	MCLK	Master Clock Input. Connect to an external clock source at either 256 F_S, 384 F_S, 512 F_S, 768 F_S, or 1024 F_S.
3	I	CLATCH	Latch Input for Control Data. This input is rising-edge sensitive.
4	I	CCLK	Control Clock Input for Control Data. Control input data must be valid on the rising edge of CCLK. CCLK may be continuous or gated.
5	I	CDATA	Serial Control Input, MSB first, containing 16 bits of unsigned data per channel. Used for specifying channel-specific attenuation and mute.
6		NC	No Connect.
7	I	192/$\overline{48}$	Selects 48 kHz (LO) or 192 kHz Sample Frequency.
8	O	ZEROR	Right Channel Zero Flag Output. This pin goes HI when Right Channel has no signal input for more than 1024 LR Clock Cycles.
9	I	DEEMP	De-Emphasis. Digital de-emphasis is enabled when this input signal is HI. This is used to impose a 50 µs/15 µs response characteristic on the output audio spectrum at an assumed 44.1 kHz sample rate. Curves for 32 kHz and 48 kHz sample rates may be selected via SPI control register.
10	I	96/$\overline{48}$	Selects 48 kHz (LO) or 96 kHz Sample Frequency.
11, 15	I	AGND	Analog Ground.
12	O	OUTR+	Right Channel Positive Line Level Analog Output.
13	O	OUTR–	Right Channel Negative Line Level Analog Output.
14	O	FILTR	Voltage Reference Filter Capacitor Connection. Bypass and decouple the voltage reference with parallel 10 µF and 0.1 µF capacitors to the AGND.
16	O	OUTL–	Left Channel Negative Line Level Analog Output.
17	O	OUTL+	Left Channel Positive Line Level Analog Output.
18	I	AVDD	Analog Power Supply. Connect to Analog 5 V Supply.
19		FILTB	Filter Capacitor Connection. Connect 10 µF capacitor to AGND (Pin 15).
20	I	IDPM1	Input Serial Data Port Mode Control One. With IDPM0, defines 1 of 4 serial modes.
21	I	IDPM0	Input Serial Data Port Mode Control Zero. With IDPM1, defines 1 of 4 serial modes.
22	O	ZEROL	Left Channel Zero Flag Output. This pin goes HI when Left Channel has no signal input for more than 1024 LR Clock Cycles.
23	I	MUTE	Mute. Assert HI to mute both stereo analog outputs. Deassert LO for normal operation.
24	I	$\overline{\text{RESET}}$	Reset. The AD1852 is reset on the rising edge of this signal. The serial control port registers are reset to the default values. Connect HI for normal operation.
25	I	L/$\overline{\text{R}}$CLK	Left/$\overline{\text{Right}}$ Clock Input for Input Data. Must run continuously.
26	I	BCLK	Bit Clock Input for Input Data. Need not run continuously; may be gated or used in a burst fashion.
27	I	SDATA	Serial Input, MSB first, containing two channels of 16, 18, 20, and 24 bits of twos complement data per channel.
28	I	DVDD	Digital Power Supply Connect to digital 5 V supply.

Table I. Serial Data Input Mode

IDPM1 (Pin 20)	IDPM0 (Pin 21)	Serial Data Input Format
0	0	Right-Justified
0	1	I^2S-Compatible
1	0	Left-Justified
1	1	DSP

IC7007 - UDA 1361S - Analogue to Digital Converter

BLOCK DIAGRAM, PIN DESCRIPTION AND CONFIGURATION

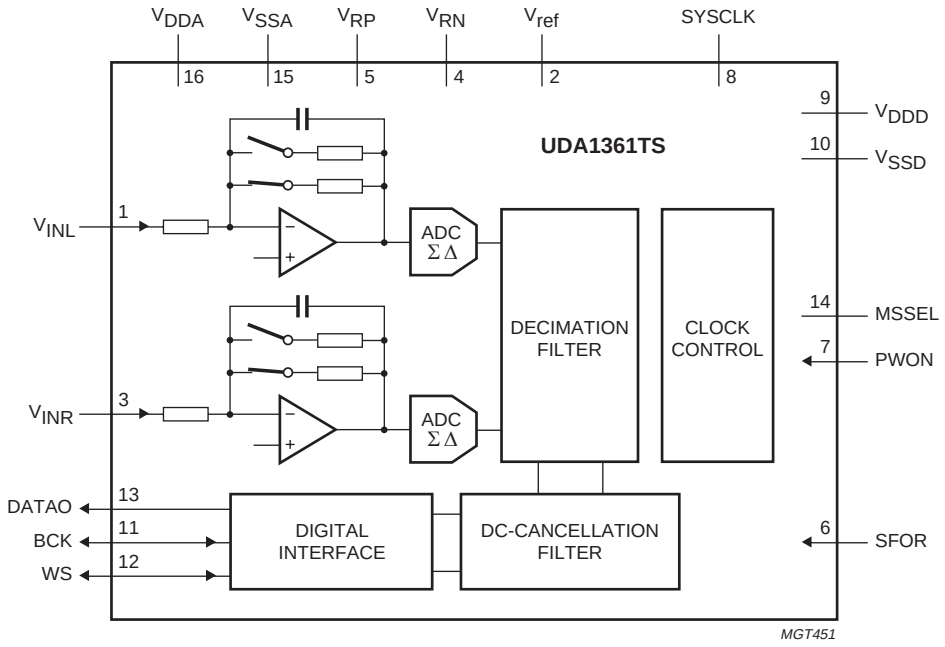


Fig.1 Block diagram.

PINNING

SYMBOL	PIN	DESCRIPTION
V_{INL}	1	left channel input
V_{ref}	2	reference voltage
V_{INR}	3	right channel input
V_{RN}	4	negative reference voltage
V_{RP}	5	positive reference voltage
SFOR	6	data format selection input
PWON	7	power control input
SYSCLK	8	system clock 256, 384, 512 or 768f_s
V_{DDD}	9	digital supply voltage
V_{SSD}	10	digital ground
BCK	11	bit clock input/output
WS	12	word select input/output
DATAO	13	data output
MSSEL	14	master/slave select
V_{SSA}	15	analog ground
V_{DDA}	16	analog supply voltage

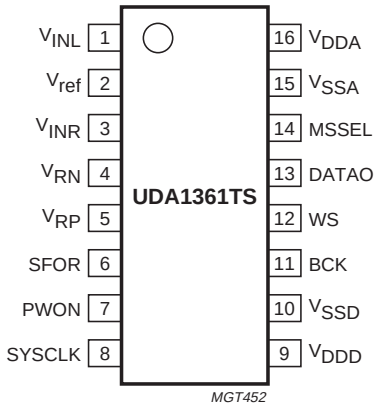


Fig.2 Pin configuration.

Figure 9-8

IC7200 - NJM2584M - 2-Input 1-Output 3 Circuit Video Switch

BLOCK DIAGRAM

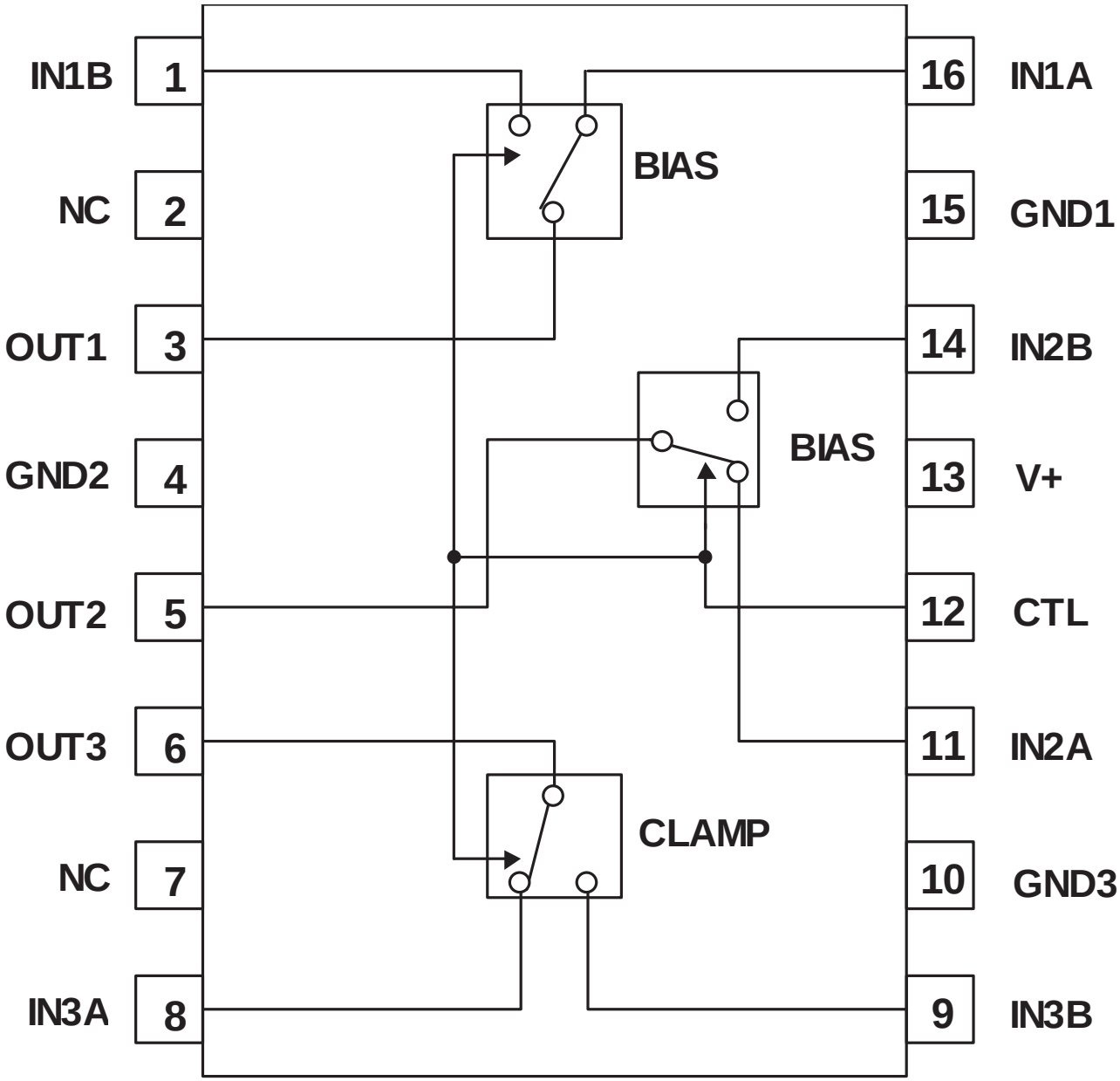


Figure 9-9

IC7201 - NJM2580M - 3-Channel Video Amplifier

BLOCK DIAGRAM

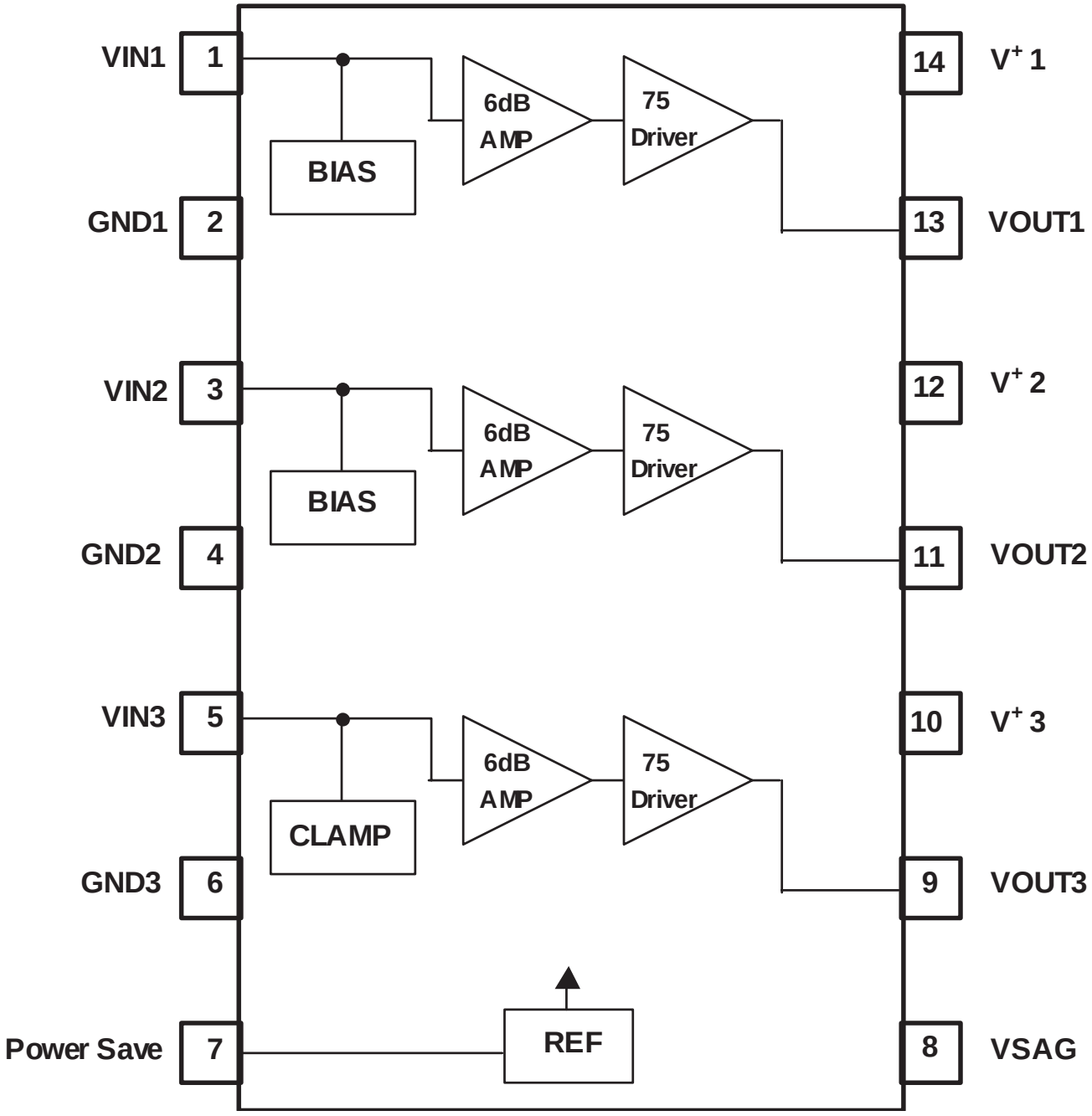


Figure 9-10

IC7203 - NJM2267M - Dual Video 6dB Amplifier

BLOCK DIAGRAM

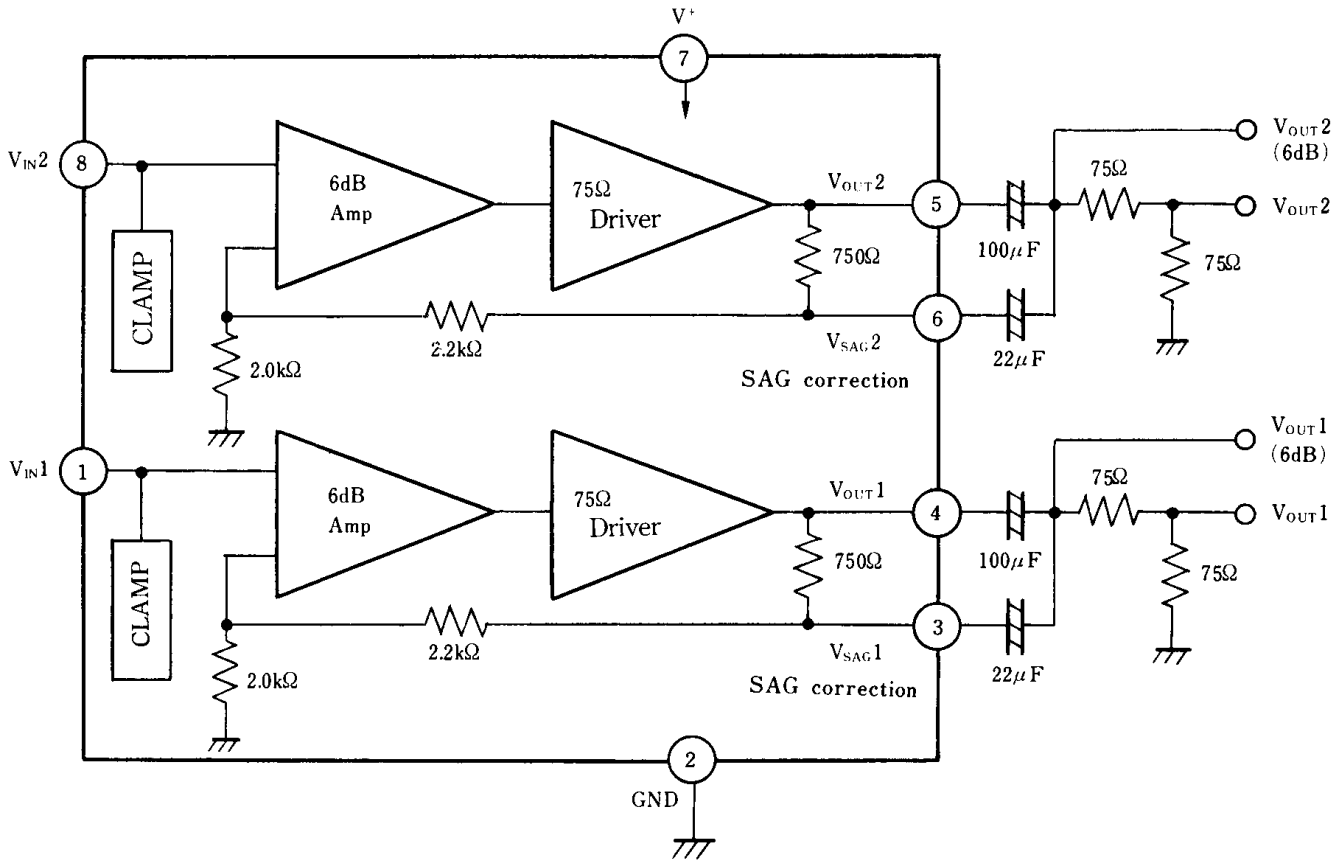


Figure 9-11

IC7408 - STV6618D - Video Switch Matrix

BLOCK DIAGRAM

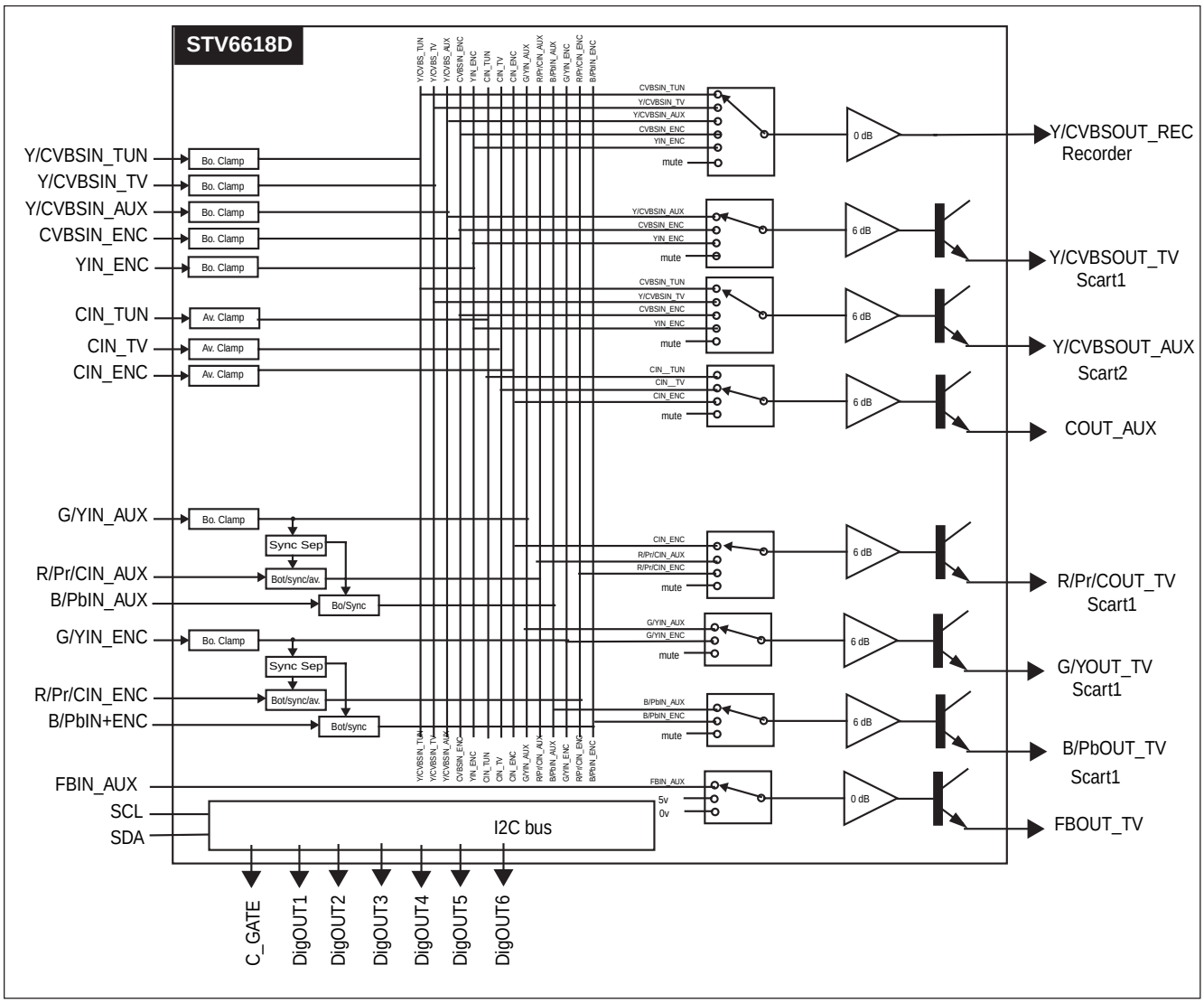


Figure 9-12

PIN DESCRIPTION AND CONFIGURATION

Pin Number	Symbol	Description
1	Y/CVBSIN_TUN	Y/CVBS Input from tuner
2	digOUT3	Digital output pin 3
3	GND1	ground, video inputs
4	CVBSIN_ENC	CVBS Input from Encoder
5	DECV	Video decoupling capacitor
6	CIN_ENC	chroma Input from Encoder
7	YIN_ENC	Y Input from Encoder
8	V_{cc}	+5 V Supply, video
9	R/Pr/CIN_ENC	Red or Pr or Chroma Input from Encoder
10	G/YIN_ENC	Green or Y Input from Encoder
11	B/PbIN_ENC	Blue or Pb Input from Encoder
12	GND2	ground, video inputs
13	B/PbIN_AUX	Blue or Pb input from Auxiliary (scart2 or external cinch)
14	DigOUT4	Digital output pin 4
15	G/YIN_AUX	Green or Y input from Auxiliary (scart2 or external cinch)
16	DigOUT5	Digital output pin 5
17	R/Pr/CIN_AUX	Red or Pr or Chroma input from Auxiliary (scart2 or external cinch)
18	DigOUT6	Digital output pin 6
19	Y/CVBSIN_AUX	Y/CVBS Input from Auxiliary (scart2 or external cinch)
20	VCCB_REC	Video Output recorder Buffer Supply Pin
21	Y/CVBSOUT_REC	Y/CVBS Output to Recorder
22	GNDB_REC	ground , recorder buffer
23	COUT_AUX	Chroma Output to Auxiliary (scart2 or external cinch)
24	VCCB1	Video Output Buffer Supply Pin
25	Y/CVBSOUT_AUX	Y/CVBS Output to Auxiliary(scart2 or external cinch)
26	GNDB	Ground video buffer
27	B/PbOUT_TV	Blue or Pb output to TV (scart1 or external cinch)
28	C_GATE	external transistor command for bidirectinnal B/C scart I/O
29	G/YOUT_TV	Green or Y output to TV (scart1 or external cinch)
30	VCCB2	Video Buffer
31	R/Pr/COUT_TV	Red or Pr or Chroma output to TV (scart1 or external cinch)
32	VCCB3	Video Output Buffer Supply Pin
33	Y/CVBSOUT_TV	Y/CVBS output to TV(scart1 or external cinch)
34	FBOUT_TV	Fast Blanking Output to TV (scart1)
35	FBIN_AUX	Fast blanking Input from auxiliary (scart2))
36	VDD	+5V digital supply
37	SCL	I^2C Bus Clock
38	SDA	I^2C Bus Data
39	GNDD	ground digital
40	CIN_TV	Chroma Input from TV (scart1 or external cinch)
41	Y/CVBSIN_TV	Y/CVBS Input from TV (scart1 or external cinch)
42	digOUT1	Digital output pin 1
43	CIN_TUN	Chroma Input from Tuner
44	digOUT2	Digital output pin 2

IC7212 - NJM2234M - 3-Input Video Switch

BLOCK DIAGRAM

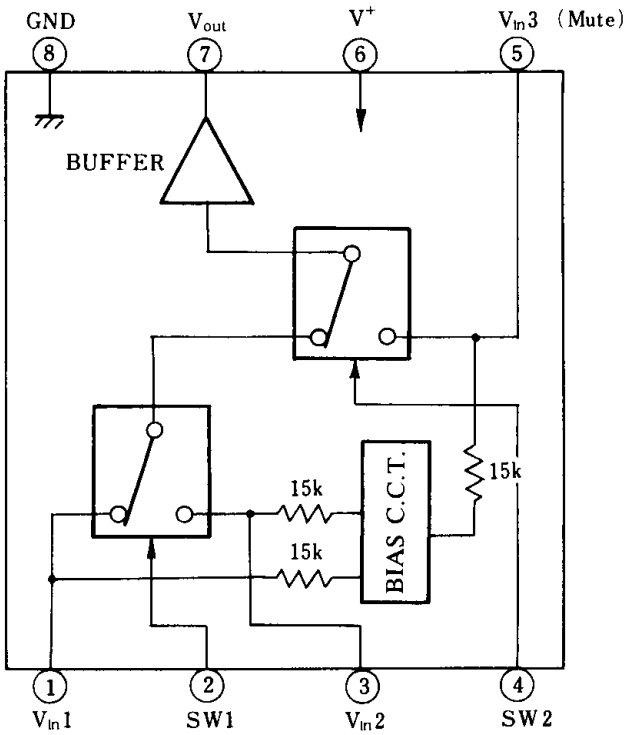


Figure 9-13

IC7213 - NJM2235M - 3-Input Video Switch

BLOCK DIAGRAM

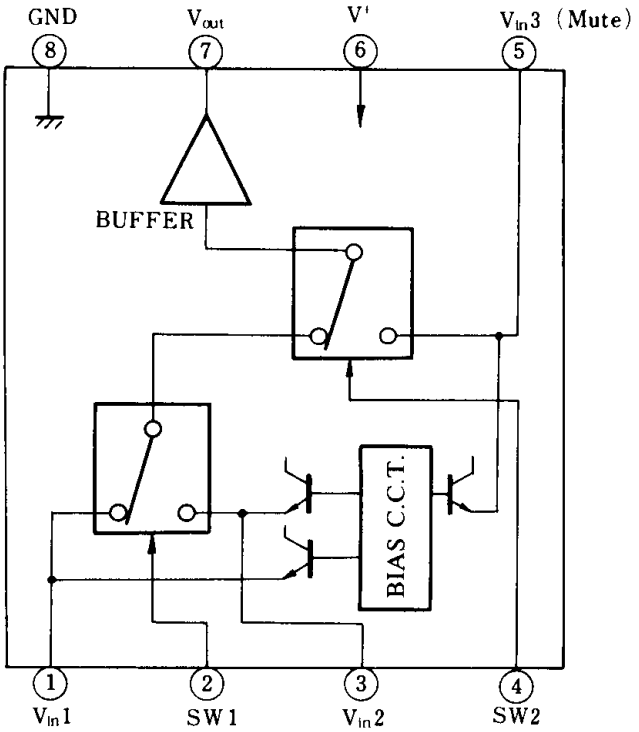


Figure 9-14

9.6.2 Digital Board

IC7601 - NCP1571D - Low voltage Synchronous Buck Controller

BLOCK DIAGRAM

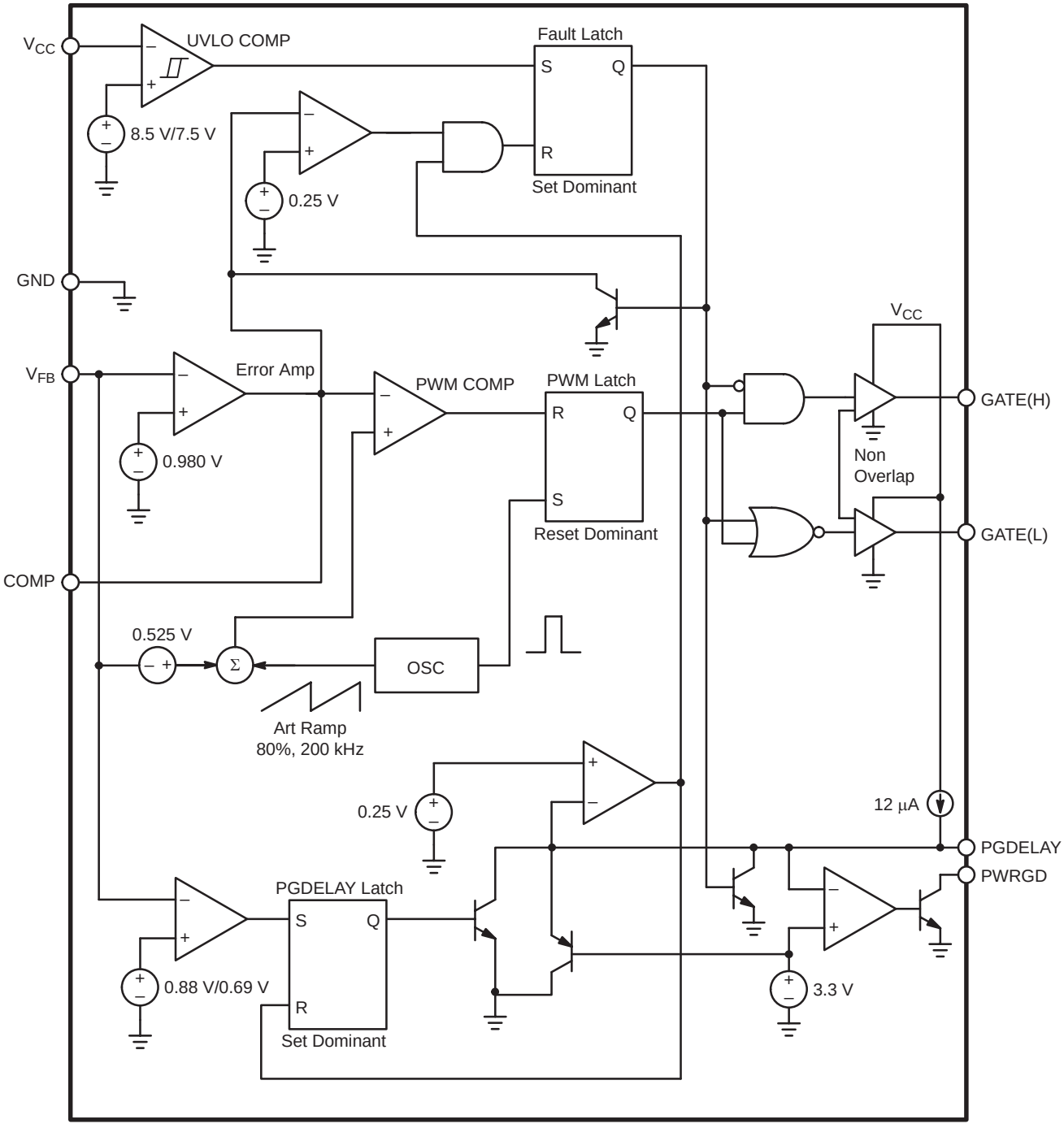


Figure 9-15

PIN DESCRIPTION AND CONFIGURATION

PACKAGE PIN #	PIN SYMBOL	FUNCTION
1	V_{CC}	Power supply input.
2	PWRGD	Open collector output goes low when V_{FB} is out of regulation. User must externally limit current into this pin to less than 20 mA.
3	PGDELAY	External capacitor programs PWRGD low–to–high transition delay.
4	COMP	Error amp output. PWM comparator reference input. A capacitor to LGND provides error amp compensation and Soft Start. Pulling pin < 0.475 V locks gate outputs to a zero percent duty cycle state.
5	GATE(H)	High–side switch FET driver pin. Capable of delivering peak currents of 1.5 A.
6	GATE(L)	Low–side synchronous FET driver pin. Capable of delivering peak currents of 1.5 A.
7	V_{FB}	Error amplifier and PWM comparator input.
8	GND	Power supply return.

IC7603 - ADV7322KST - Multi-Format 11-Bit HDTV Video Encoder

BLOCK DIAGRAM

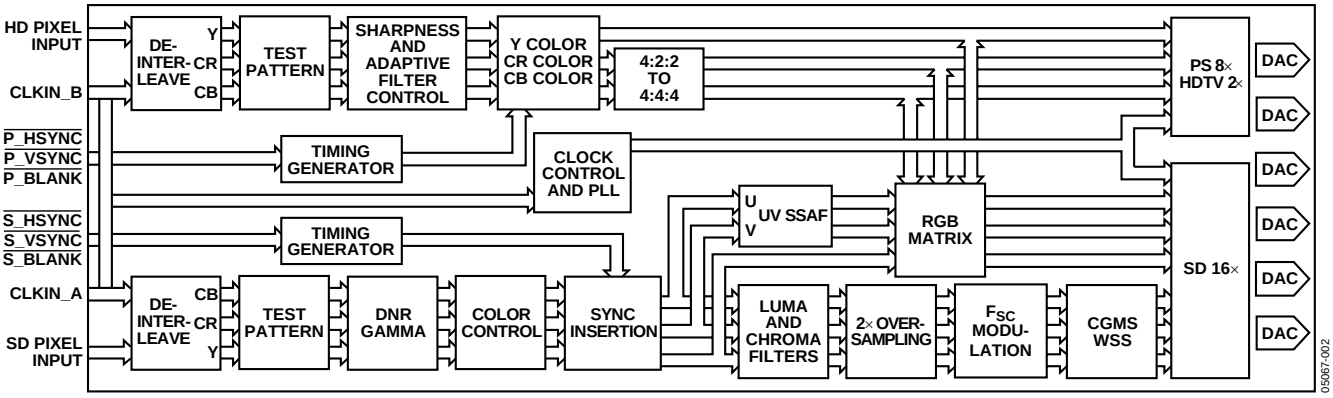


Figure 9-16

PIN DESCRIPTION

Mnemonic	Input/Output	Function
DGND	G	Digital Ground.
AGND	G	Analog Ground.
CLKIN_A	I	Pixel Clock Input for HD (74.25 MHz Only, PS Only (27 MHz), SD Only (27 MHz).
CLKIN_B	I	Pixel Clock Input. Requires a 27 MHz reference clock for progressive scan mode or a 74.25 MHz (74.1758 MHz) reference clock in HDTV mode. This clock is only used in dual modes.
COMP1, COMP2	O	Compensation Pin for DACs. Connect 0.1 µF capacitor from COMP pin to V_{AA}.
DAC A	O	CVBS/Green/Y/Y Analog Output.
DAC B	O	Chroma/Blue/U/Pb Analog Output.
DAC C	O	Luma/Red/V/Pr Analog Output.
DAC D	O	In SD Only Mode: CVBS/Green/Y Analog Output; in HD Only Mode and Simultaneous HD/SD Mode: Y/Green [HD] Analog Output.
DAC E	O	In SD Only Mode: Luma/Blue/U Analog Output; in HD Only Mode and Simultaneous HD/SD Mode: Pr/Red Analog Output.
DAC F	O	In SD Only Mode: Chroma/Red/V Analog Output; in HD Only Mode and Simultaneous HD/SD Mode: Pb/Blue [HD] Analog Output.
$\overline{\text{P\_HSYNC}}$	I	Video Horizontal Sync Control Signal for HD in Simultaneous SD/HD Mode and HD Only Mode.
$\overline{\text{P\_VSYNC}}$	I	Video Vertical Sync Control Signal for HD in Simultaneous SD/HD Mode and HD Only Mode.
$\overline{\text{P\_BLANK}}$	I	Video Blanking Control Signal for HD in Simultaneous SD/HD Mode and HD Only Mode.
$\overline{\text{S\_BLANK}}$	I/O	Video Blanking Control Signal for SD Only.
$\overline{\text{S\_HSYNC}}$	I/O	Video Horizontal Sync Control Signal for SD Only.
$\overline{\text{S\_VSYNC}}$	I/O	Video Vertical Sync Control Signal for SD Only.
Y7 to Y0	I	SD or Progressive Scan/HDTV Input Port for Y Data. Input port for interleaved progressive scan data. The LSB is set up on Pin Y0.
C7 to C0	I	Progressive Scan/HDTV Input Port 4:4:4 Input Mode. This port is used for the Cb [Blue/U] data. The LSB is set up on Pin C0.
S7 to S0	I	SD or Progressive Scan/HDTV Input Port for Cr [Red/V] data in 4:4:4 input mode. LSB is set up on Pin S0.
$\overline{\text{RESET}}$	I	This input resets the on-chip timing generator and sets the ADV7322 into default register setting. $\overline{\text{RESET}}$ is an active low signal.
R_{SET1}, R_{SET2}	I	A 3040 Ω resistor must be connected from this pin to AGND and is used to control the amplitudes of the DAC outputs.
SCLK	I	I^2C Port Serial Interface Clock Input.
SDA	I/O	I^2C Port Serial Data Input/Output.
ALSB	I	TTL Address Input. This signal sets up the LSB of the I^2C address. When this pin is tied low, the I^2C filter is activated, which reduces noise on the I^2C interface.
V_{DD_IO}	P	Power Supply for Digital Inputs and Outputs.
V_{DD}	P	Digital Power Supply.
V_{AA}	P	Analog Power Supply.
V_{REF}	I/O	Optional External Voltage Reference Input for DACs or Voltage Reference Output (1.235 V).
EXT_LF	I	External Loop Filter for the Internal PLL.
RTC_SCR_TR	I	Multifunctional Input. Real time control (RTC) input, timing reset input, subcarrier reset input.
I^2C	I	This input pin must be tied high (V_{DD_IO}) for the ADV7322 to interface over the I^2C port.
GND_IO		Digital Input/Output Ground.
TEST0 to TEST5	I	Not used. Tie to DGND

PIN CONFIGURATION

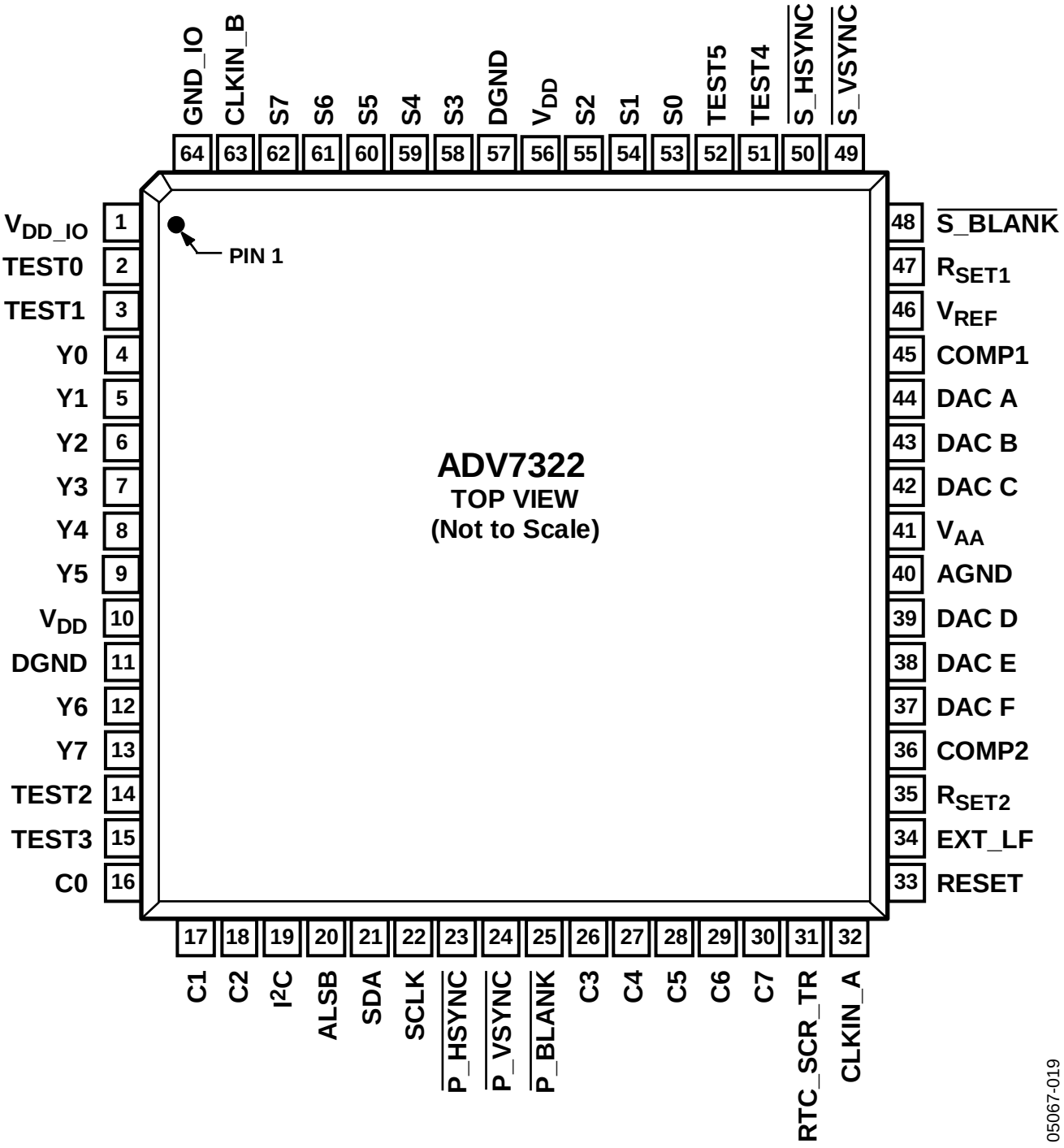


Figure 9-17

9.6.3 HDMI Board

IC7253 - ADV7320KSTZ - Multi-Format 216 MHz Video Encoder

BLOCK DIAGRAM

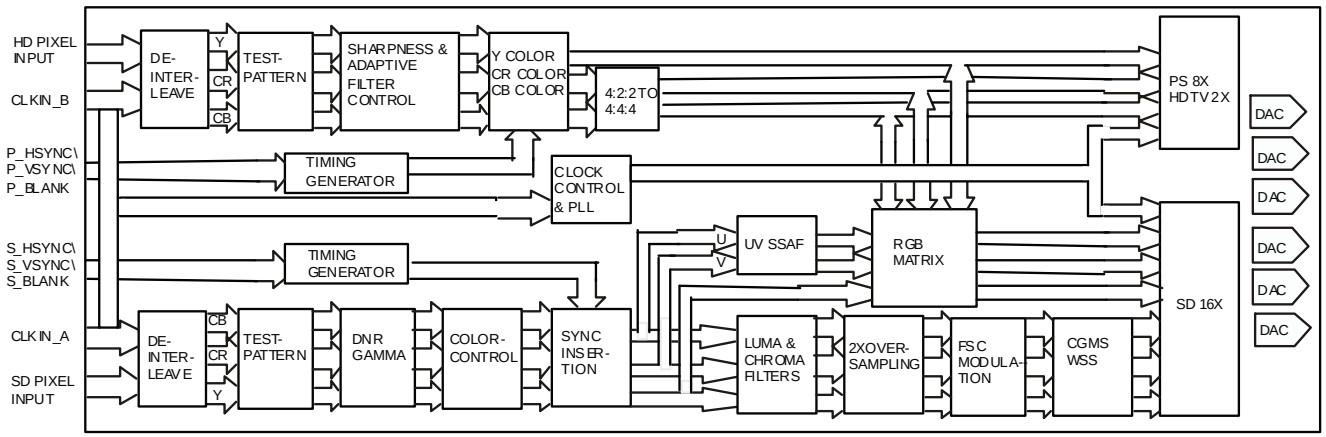


Figure 9-18

PIN DESCRIPTION

Pin Name	Input/Output	Function
DGND	G	Digital Ground
AGND	G	Analog Ground
CLKIN_A	I	Pixel Clock Input for HD (74.25MHz Only , PS Only (27MHz), SD Only (27MHz).
CLKIN_B	I	Pixel Clock Input. Requires a 27MHz reference clock for Progressive Scan Mode or a 74.25MHz (74.1758MHz) reference clock in HDTV mode. This Clock is only used in dual Modes.
COMP1,2	O	Compensation Pin for DACs. Connect 0.1uF Capacitor from COMP pin to V_{AA}.
DAC A	O	CVBS/ GREEN/ Y / Y analog output.
DAC B	O	Chroma/ BLUE/ U / Pb analog output.
DAC C	O	Luma/ RED/ V / Pr analog output.
DAC D	O	In SD onlyu mode: CVBS/Green/Y analog outptu, in HD only mode and simultaneous HD/SD mode: Y/Green [HD] analog output.
DAC E	O	In SD onlyu mode: Luma/Blue/U analog outptu, in HD only mode and simultaneous HD/SD mode: Pr/Red analog output.
DAC F	O	In SD onlyu mode: Chroma/Red/ V analog outptu, in HD only mode and simultaneous HD/SD mode: Pb/Blue [HD] analog output.
$\overline{\text{P\_HSYNC}}$	I	Video Horizontal Sync Control Signal for HD in simultaneous Sd/HD mode and HD mode only.
$\overline{\text{P\_VSYNC}}$	I	Video Vertical Sync Control Signal for HD in simultaneous SD/HD mode and HD mode only.
$\overline{\text{P\_BLANK}}$	I	Video Blanking Control signal for HD in simultaneous SD/HD mode and HD mode only.
$\overline{\text{S\_BLANK}}$	I	Video Blanking Control Signal for SD only.
$\overline{\text{S\_HSYNC}}$	I	Video Horizontal Sync Control Signal for SD only.
$\overline{\text{S\_VSYNC}}$	I	Video Vertical Sync Control Signal for SD only.
Y9-0	I	SD or Progressive scan/ HDTV input port for Y data. Input port for interleaved Progressive Scan data. The LSB is set up on pin Y0. For 8-bit data input LSB is set up on Y2.
C9-C0	I	Progressive Scan/ HDTV input port :4:4 input mode this port is used for the Cb[Blue/U] data. The LSB is set up on pin C0. For 8-bit data input LSB is set up on C2.
S9-S0	I	SD or Progressive Scan/HDTV input port for Cr [Red/V] data in 4:4:4 input mode. LSB is set up on pin S0. For 8-bit data input LSB is set up on S2.
$\overline{\text{RESET}}$	I	This input resets the on-chip timing generator and sets the ADV7310/11 into Default Register setting. Reset is an active low signal.
$R_{SET1,2}$	I	A 3040 Ohms resistor must be connected from this pin to AGND and is used to control the amplitudes of the DAC outputs.
SCLk	I	I2C Port Serial Interface Clock Input .

SDA	I/O	I2C Port Serial Data Input/Output .
ALSB	I/O	TTL Address Input. This signal sets up the LSB of the I2C address. When this pin is tied low the I2C filter is activated which reduces noise on the I2C interface.
V_{DD_IO}	P	Power supply for digital i/ps and o/ps
V_{DD}	P	Digital power supply
V_{AA}	P	Analog power supply
V_{REF}	I/O	Optional External Voltage Reference Input for DACs or Voltage Reference Output (1.235V).
EXT_LF	I	External Loop filter for the internal PLL.
RTC_SCR_TR	I	Multifunctional Input: Real Time Control (RTC) input, Timing Reset input, Subcarrier Reset input.
I^2C	I	This Input Pin must be tied High (V_{DD_IO}) for the ADV7310/ADV7311 to interface over the I^2C port.
GND_IO		

PIN CONFIGURATION

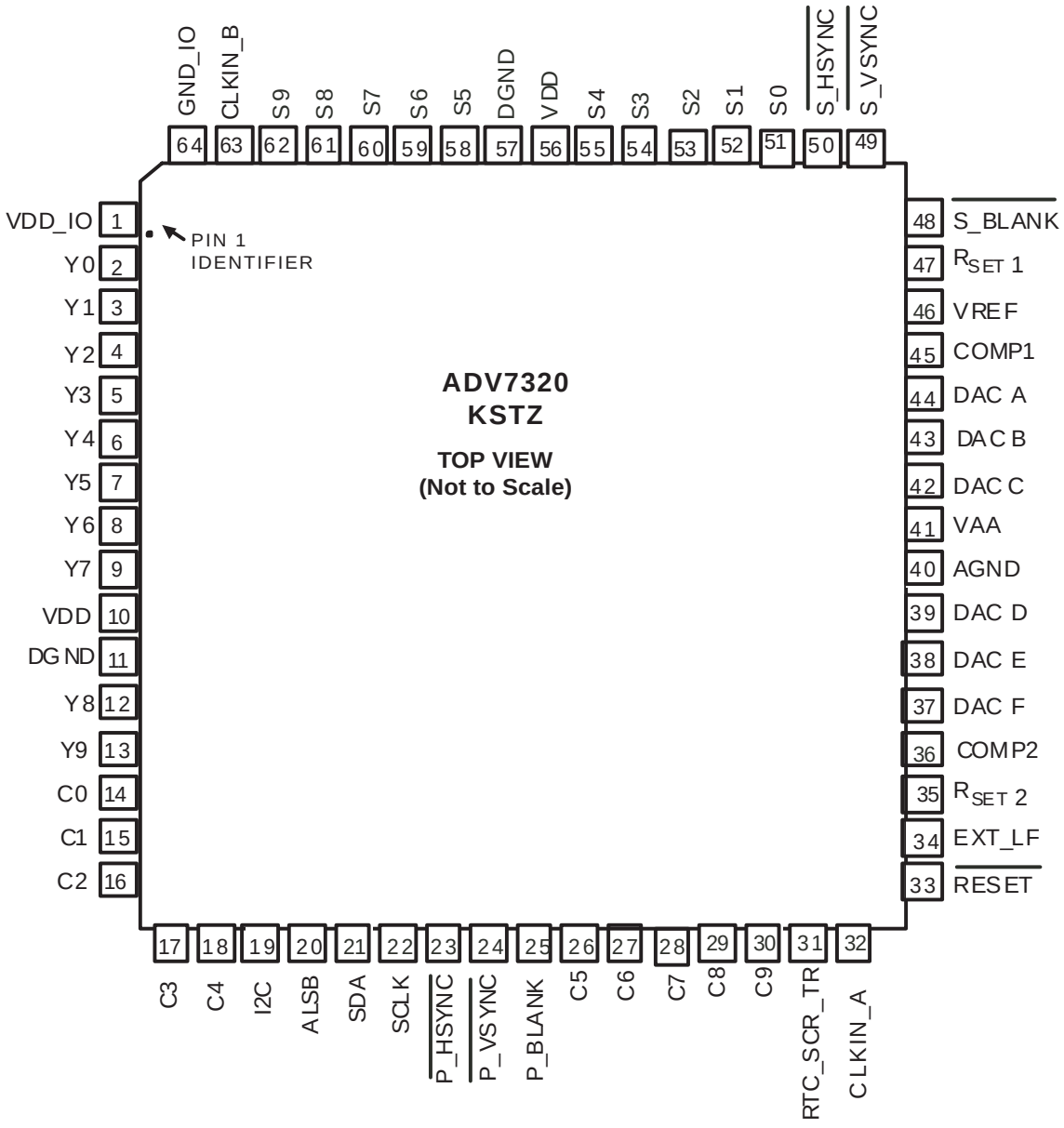


Figure 9-19

Exploded View of Front Portion (DVDR5350H & DVDR7300H)

3139 247 6117 2005-07-22

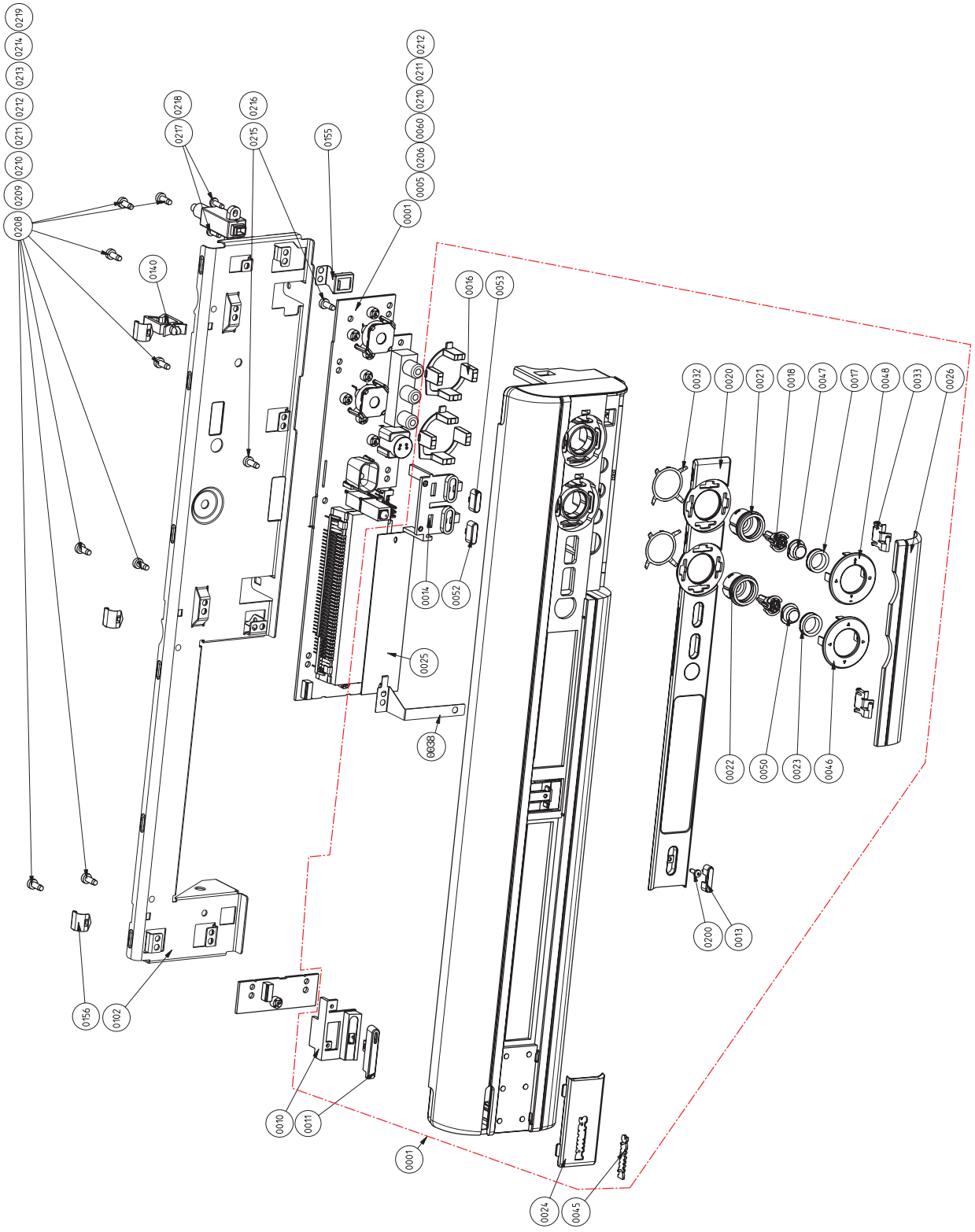


Figure 10-1

Exploded View of Rear Portion
DVDR5350H

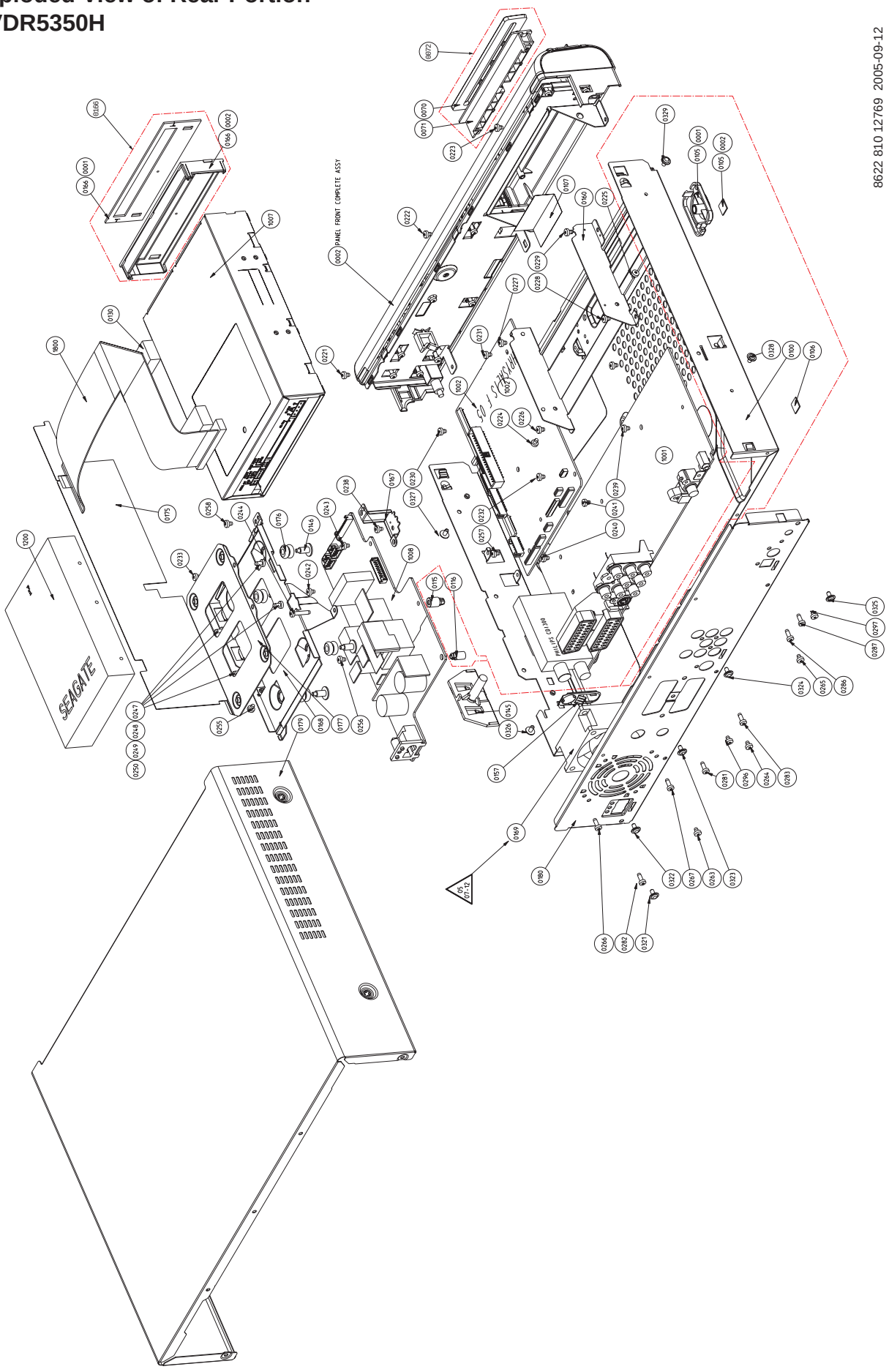


Figure 10-2

Exploded View of Rear Portion
DVDR7300H

8622 810 12637 2005-07-12

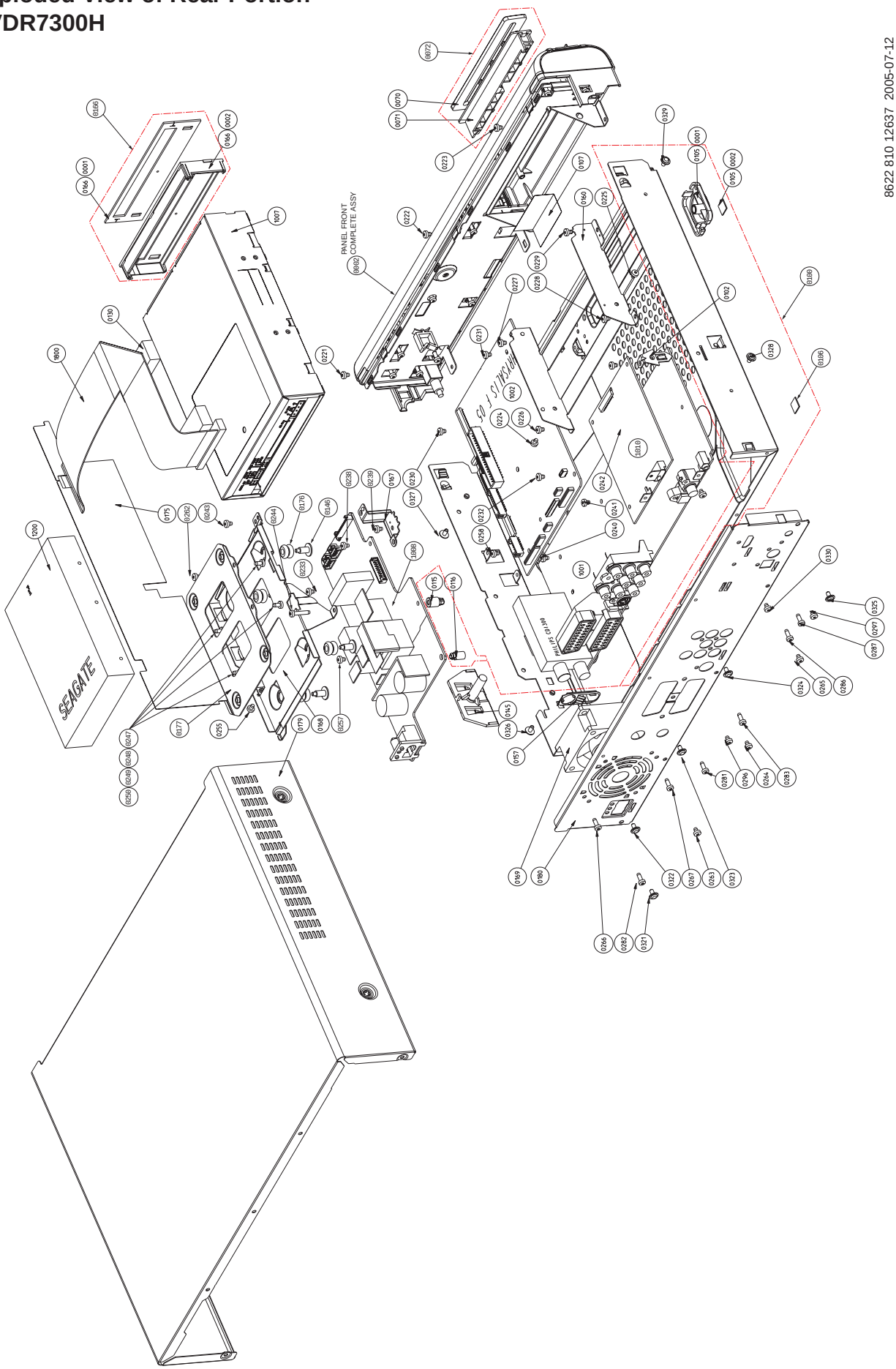


Figure 10-3

Exploded View of DVDR7310H/75/97

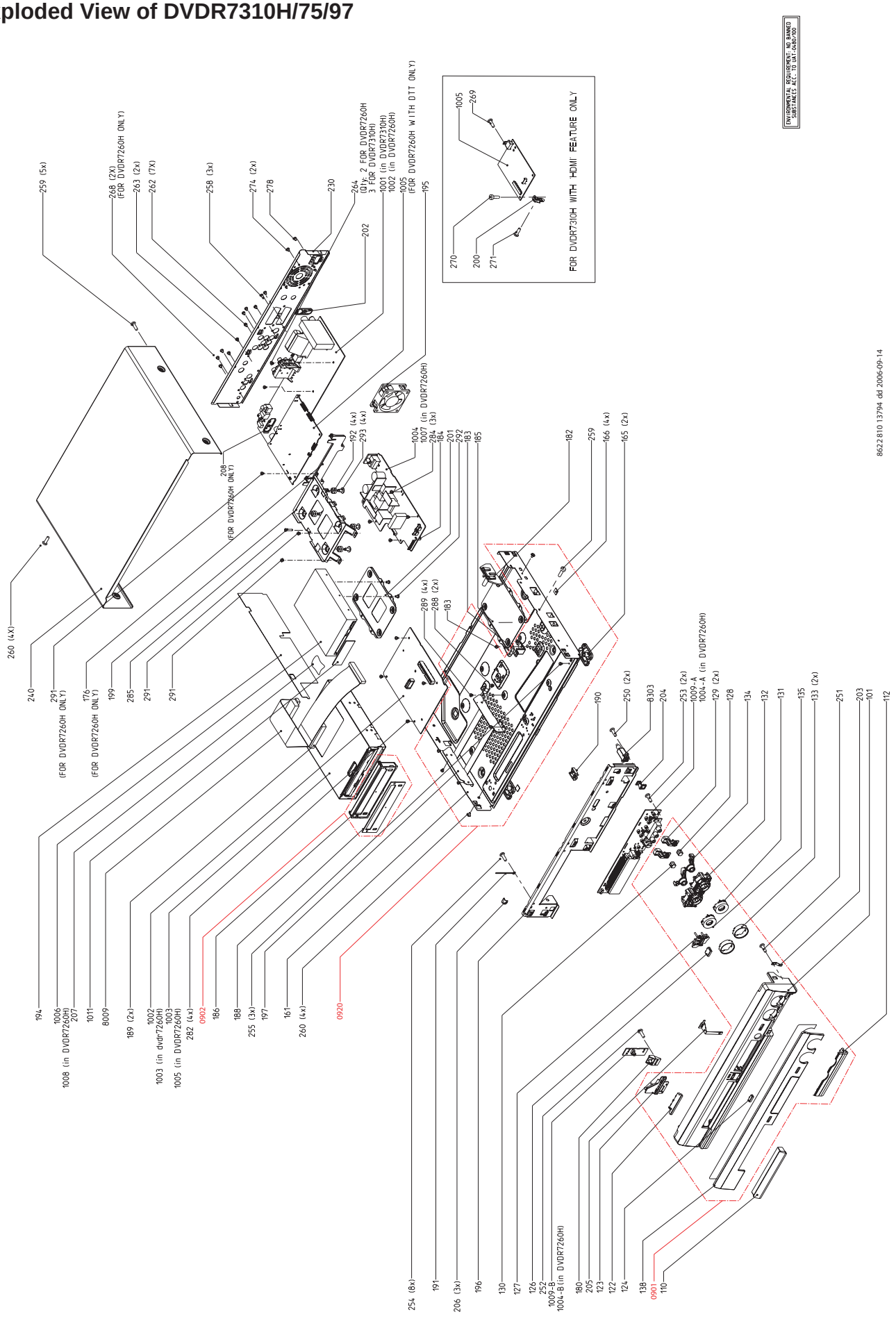


Figure 10-4

DVDR5350H/DVDR7300H

EXPLODED VIEW - FRONT PORTION

1	3139 247 61171	FRONT ASSY DVDR5350H	/02/05/19
1	3139 247 61191	FRONT ASSY DVDR7300H	/02/05/19
1	3139 247 61391	FRONT ASSY DVDR7300H	/75,/97
38	3103 601 20291	SPRING ESD	
140	2422 015 00493	SADDLE WIRE NY6/6 NT 19.1MM B	
155	3103 601 20212	SPRING I-LINK	
156	3103 601 20231	SPRING GROUND	

EXPLODED VIEW - REAR PORTION DVDR5350H

72	3103 607 91131	COVER TRAY ASSY COMPL DVDR5300	
100	3103 607 90911	FRAME ASSY DVDR745	
107	3139 243 20441	EMC TAPE (COPPER)	
116	3103 604 01311	SPACER 9	
130	3103 603 20141	SPACER RUBBER IDE CABLE	
145	3103 604 00291	SCREW SAFETY HOLDER	
146	3103 600 30021	SCREW-DAMPER-M3	
157	3103 601 20612	SPRING GROUND TUNER	
166	3103 607 50971	COVER DUST ASSY	
169	2822 031 00041	FAN 12VDC 0.8W 3100RPM B	
175	3103 603 20201	AIR GUIDE	
176	3103 604 01861	DAMPER HDD	
179	3103 607 51621	COVER ASSY DVDR5300H	
180	3139 247 61201	PLATE BACK EUR DVDR5350H	
247	2522 200 98475	SCR PAN TORX ST BK #6-32X6	
248	2522 200 98475	SCR PAN TORX ST BK #6-32X6	
249	2522 200 98475	SCR PAN TORX ST BK #6-32X6	
250	2522 200 98475	SCR PAN TORX ST BK #6-32X6	
349	2422 549 00739	REMOTE CONTR DVDR5350H/7300H B	
351	2422 070 98151 ⚠	MAINSCORD EUR 1M5 BK B	/02/19
351	4822 321 10713 ⚠	MAINSCORD UK 5A 1M8 VH BK B	/05
352	2422 076 00532	CBLE SCART 1M5 SCART 21P BK B	
352	2422 076 00825*	CBLE SCART 1M5 SCART 21P BK B	
357	4822 320 50377	CONNECT. CABLE PAL	
358	2422 076 00522	G-LINK CABLE & TRANSMITTER	
363	2422 076 00718	CBLE CINCH 1M5 CINCH RDYEWH B	
1001	3103 608 51941	PBAS AB 04 E3/5300H	
1002	3139 248 86441	PCBAS CHRY-F05 DVDR5350H	
1004	3103 608 51242	PBAS DC 04 N1	
1007	3139 247 11362	MODULE DRIVE D4.3 CLOSED	
1008	3139 247 11985 ⚠	MODULE PSU 05H8000 EU	
1011	3139 248 86111	PCBAS IDE HDD DVDR7300H	
1200	2822 062 00071	HDD 3.5” 160GB WD1600BB-55GUC0	
1800	3103 607 10121	ADAPTER HDD-IDE-CON ASSY 180MM	
5000	2422 549 00107	FERRITE CORE RP 25X5X12 Y	
8001	3103 601 00591	CBLE KR 11P/160/11P KR UL	
8002	3103 601 00621	FFC FOIL 7P/290/7P BD FLD UL	
8004	3103 601 00631	FFC FOIL 10P/315/10P BD FLD UL	
8005	3103 601 00751	FFC FOIL 22P/220/22P BD FLD UL	
8008	3103 601 00442	CBLE KR 12P/130/12P UL	
8009	3103 601 00611	CBLE IDE 40P/400/40P IDE UL	
8010	3103 601 00651	FFC FOIL 13P/600/13P AD UL	
8012	3103 601 00561	CBLE EHR 4P/430/4P LC UL	
8013	3103 601 00311	KR 9POL GESCH 370MM	
8018	3103 601 00861	FFC FOIL 40P/180/40P BD UL	
8019	3103 601 00361	IEEE 1394 CHRYSALIS 350MM	
8026	3103 601 00721	FFC FOIL 22P/220/22P BD FLD UL	
8030	3103 601 00571	CBLE EHR 4P/130/4P LC UL	

EXPLODED VIEW - REAR PORTION DVDR7300H

72	3103 607 91131	COVER TRAY ASSY COMPL DVDR5300	
100	3103 607 90911	FRAME ASSY DVDR745	
107	3139 243 20441	EMC TAPE (COPPER)	
116	3103 604 01311	SPACER 9	
130	3103 603 20141	SPACER RUBBER IDE CABLE	
145	3103 604 00291	SCREW SAFETY HOLDER	
146	3103 600 30021	SCREW-DAMPER-M3	
157	3103 601 20612	SPRING GROUND TUNER	
166	3103 607 50971	COVER DUST ASSY	
169	2822 031 00041	FAN 12VDC 0.8W 3100RPM B	
175	3103 603 20201	AIR GUIDE	
176	3103 604 01861	DAMPER HDD	
179	3103 607 51621	COVER ASSY DVDR5300H	
180	3139 247 61211	PLATE BACK HDMI EUR DVDR7300H	
247	2522 200 98475	SCR PAN TORX ST BK #6-32X6	
248	2522 200 98475	SCR PAN TORX ST BK #6-32X6	
249	2522 200 98475	SCR PAN TORX ST BK #6-32X6	
250	2522 200 98475	SCR PAN TORX ST BK #6-32X6	
349	2422 549 00739	REMOTE CONTR DVDR5350H/7300H B	
351	2422 070 98151 ⚠	MAINSCORD EUR 1M5 BK B /02/19	
351	4822 321 10713 ⚠	MAINSCORD UK 5A 1M8 VH BK B	/05
352	2422 076 00532	CBLE SCART 1M5 SCART 21P BK B /02/05/19	
352	2422 076 00825*	CBLE SCART 1M5 SCART 21P BK B /02/05/19	
353	2422 070 00016 ⚠	MAINSCORD AUS/NZ 1M9 DET 2P B /75	
354	2422 070 98151 ⚠	MAINSCORD EUR 1M5 BK B	/97

357	4822 320 50377		CONNECT. CABLE PAL
358	2422 076 00522		G-LINK CABLE & TRANSMITTER /02/05/19
363	2422 076 00655		AV CABLE CINCH 3P 1M5 CINCH /75/97
363	2422 076 00718*		CBLE CINCH 1M5 CINCH RDYEWH B /75/97
1001	3103 608 51941		PBAS AB 04 E3/5300H
1002	3139 248 86101		PCBAS CHRY-F05 DVDR7300H
1004	3103 608 51242		PBAS DC 04 N1
1007	3139 247 11362		MODULE DRIVE D4.3 CLOSED
1008	3139 247 11985	⚠	MODULE PSU 05H8000 EU
1010	3103 608 51872		PBAS PSCAN HDMI VIE L
1011	3139 248 86111		PCBAS IDE HDD DVDR7300H
1200	2822 062 00099		HDD 3.5" 250GB 6L250R0 (MAXT)Y
1800	3103 607 10121		ADAPTER HDD-IDE-CON ASSY 180MM
5000	2422 549 00107		FERRITE CORE RP 25X5X12 Y
8001	3103 601 00591		CBLE KR 11P/160/11P KR UL
8004	3103 601 00631		FFC FOIL 10P/315/10P BD FLD UL
8005	3103 601 00751		FFC FOIL 22P/220/22P BD FLD UL
8008	3103 601 00442		CBLE KR 12P/130/12P UL
8009	3103 601 00611		CBLE IDE 40P/400/40P IDE UL
8010	3103 601 00651		FFC FOIL 13P/600/13P AD UL
8012	3103 601 00561		CBLE EHR 4P/430/4P LC UL
8013	3103 601 00311		KR 9POL GESCH 370MM
8018	3103 601 00861		FFC FOIL 40P/180/40P BD UL
8019	3103 601 00361		IEEE 1394 CHRYSALIS 350MM
8026	3103 601 00721		FFC FOIL 22P/220/22P BD FLD UL
8030	3103 601 00571		CBLE EHR 4P/130/4P LC UL
8038	3139 241 01451		FFC FOIL 40P/280/40P BD 0.5MMP
8039	3139 111 02141		FFC FOIL 07P/100/07P BD 1.0MMP

EXPLODED VIEW - DVDR7310H/75/97

110	3139 244 14751		COVER TRAY DVDR7310H
182	3103 604 00291		SCREW SAFETY HOLDER
184	3103 604 01311		SPACER 9
189	3103 603 20141		SPACER RUBBER IDE CABLE
190	2422 015 00493		SADDLE WIRE NY6/6 NT 19.1MM B
192	3103 604 01861		DAMPER HDD
194	3103 603 20201		AIR GUIDE
195	2822 031 00041		FAN 12VDC 0.8W 3100RPM B
202	3103 601 20611		SPRING GROUND TUNER
204	3103 601 20212		SPRING I-LINK
205	3103 601 20291		SPRING ESD
206	3103 601 20231		SPRING GROUND
230	3139 247 61211		PLATE BACK HDMI EUR DVDR7300H
240	3103 607 51621		COVER ASSY DVDR5300H
292	2522 200 98475		SCR PAN TORX ST BK #6-32X6
293	3103 600 30021		SCREW-DAMPER-M3
341	2422 549 00739		REMOTE CONTR DVDR5350H/7300H B
345	2422 070 00016	⚠	MAINSCORD AUS/NZ 1M9 DET 2P B /75
345	2422 070 98151	⚠	MAINSCORD EUR 1M5 BK B /97
350	2422 076 00718		CBLE CINCH 1M5 CINCH RDYEWH B
353	4822 320 50377		CONNECT. CABLE PAL
0901	3143 027 66281		FRONT CAB ASSY DVDR7310H AP
0902	3143 027 63321		COVER DUST ASSY DVDR9000H
0920	3143 027 66201		FRAME ASSY DVDR7310H
1001	3103 608 51941		PBAS AB 04 E3/5300H
1002	3139 248 86101		PCBAS CHRY-F05 DVDR7300H
1003	3139 247 11362		MODULE DRIVE D4.3 CLOSED
1004	3139 247 11985	⚠	MODULE PSU 05H8000 EU
1005	3103 608 51872		PBAS PSCAN HDMI VIE L
1006	2822 062 00099		HDD 3.5" 250GB 6L250R0 (MAXT)Y
1009	3103 608 51242		PBAS DC 04 N1
1011	2422 549 00107		FERRITE CORE RP 25X5X12 Y
1012	3103 601 00861		FFC FOIL 40P/180/40P BD UL
1013	3139 248 86111		PCBAS IDE HDD DVDR7300H
8001	3103 601 00591		CBLE KR 11P/160/11P KR UL
8002	3103 601 00631		FFC FOIL 10P/315/10P BD FLD UL
8003	3103 601 00751		FFC FOIL 22P/220/22P BD FLD UL
8004	3103 601 00441		CBLE KR 12P/130/12P UL
8005	3103 601 00611		CBLE IDE 40P/400/40P IDE UL
8006	3103 601 00561		CBLE EHR 4P/430/4P LC UL
8007	3103 601 00721		FFC FOIL 22P/220/22P BD FLD UL
8008	3103 601 00571		CBLE EHR 4P/130/4P LC UL
8009	3139 241 01451		FFC FOIL 40P/280/40P BD 0.5MMP
8010	3139 111 02141		FFC FOIL 07P/100/07P BD 1.0MMP
8011	3103 601 00651		FFC FOIL 13P/600/13P AD UL
8012	3103 601 00310		KR 9POL GESCH 370MM
8013	3103 601 00360		IEEE 1394 CHRYSALIS 350MM

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

11. REVISION LIST

Version 1.0
* Initial Release

Version 1.1
* Addition of DVDR7300H/75 and DVDR7300H/97
* Update service parts list

Version 1.2
* Addition of DVDR5350H/05 and DVDR7310H/75/97
* Update service parts list
* Include DVDR7310H Exploded View