Service
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Service Manual

CLASS 1 LASER PRODUCT

RW DVD + ReWritable

DVD VIDEO

COMPACT disc DIGITAL VIDEO

COMPACT disc DIGITAL AUDIO

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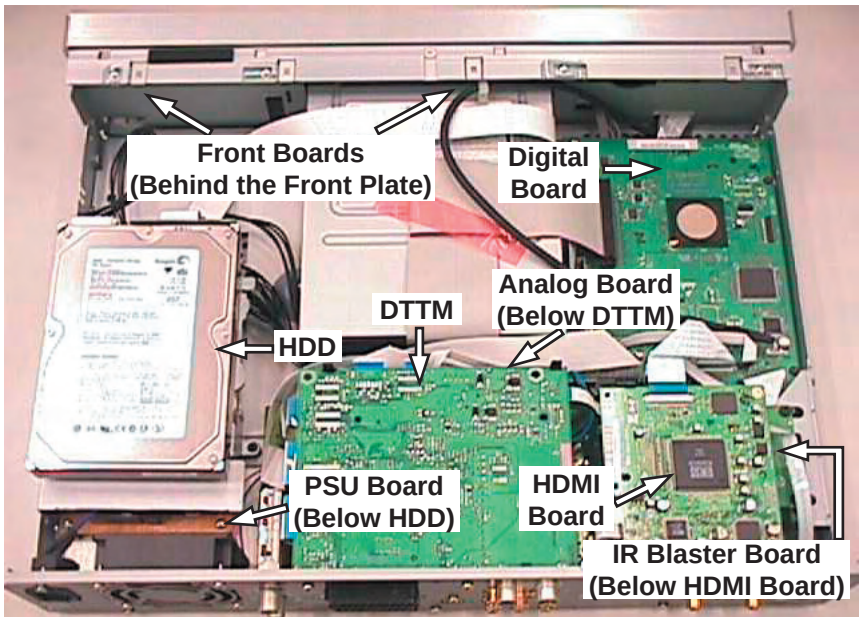
Published by KC-TE 0547 AV Systems Printed in the Netherlands Subject to modification EN 3139 785 31681

Version 1.1

PHILIPS

1. Technical Specifications and Connection Facilities

1.1 PCB Locations



1.2 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

1.3 General:

Mains voltage	:	200V – 240V
Mains frequency	:	50 Hz
Power consumption (record)	:	51 W
Standby Power Consumption	:	< 5 W
Eco standby	:	< 3 W

1.4 RF Tuner

1.4.1 RF Tuner (Analogue)

1.4.1.1 System

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

1.4.1.2 RF - Loop Through:

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

1.4.1.3 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

1.4.1.4 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

1.4.1.5 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%

1.4.1.6 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

1.4.2 RF Tuner (Digtal Terrestial)

1.4.2.1 DVB - T - Tuner

Frequency range	:	49-861MHz
Gain (ANT IN – ANT OUT)	:	-1 dB to 3 dB
Auto Search scanning time (without Antenna input signal)	:	40 sec typical

1.4.2.2 DVB-T- Video Performance

DVB-T – RF antenna signal IN ; Video performance measured at Rear Cinch Audio Out:

- S/N(Unweighted,5MHz-BW limitation, SC trap ON)	:	≥ 52dB
- Frequency response 0.1 to 4.8 MHz	:	+1/-5dB
- Y/Chroma delay	:	≤ 55ns

1.4.2.3 DVB-T- Audio Performance

DVB-T – RF antenna signal IN ; Audio performance measured at Rear Cinch Audio Out:

- S/N(A-weighted, 22kHz-BW limited)	:	≥ 88dB
- Frequency response 20Hz to 20kHz	:	± 1dB
- THD + Noise (at 1 kHz)	:	≥ 85dB
- THD + noise (ratio) for 16Hz to 20kHz	:	≥ 65dB
- Channel Separation (at 1kHz)	:	≥ 100dB

1.5 Analog Inputs / Outputs

1.5.1 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	

1.5.2 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	NC	
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	

1.5.3 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

1.5.4 Out 1

Component Video Cinch Y/Pb/Pr

according EIO-770-I-A, EIA-770-2

Audio - Cinch

Output voltage	:	2.2Vrms max.
Output impedance	:	> 10kΩ

1.5.5 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

1.6 Digital Inputs / Outputs

1.6.1 Digital Output

Digital Audio – Coaxial / Optical

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

1.6.2 HDMI Output

Type A connector (19 pins)

1.6.3 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

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

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

1.7 Video Performance

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

1.7.1 SCART (RGB)

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

1.8 Audio Performance

1.8.1 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

1.8.2 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

1.9 Dimensions and Weight

Height of feet	:	5.5mm
Apparatus tray closed	:	WxDxH:435x390x89mm
Apparatus tray open	:	WxDxH:435x525x89mm
Weight without packaging	:	approx. 7.1 ± 0.5kg
Weight with packaging	:	approx. 8.5kg

1.10 Laser Output Power & Wavelength

1.10.1 DVD

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

1.10.2 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:

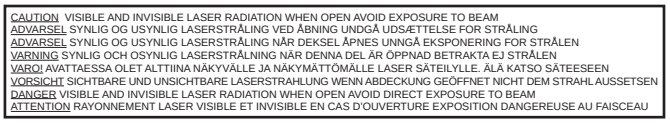


Figure 2-2

2.3 Lead Free Requirement

Information about Lead-free produced sets

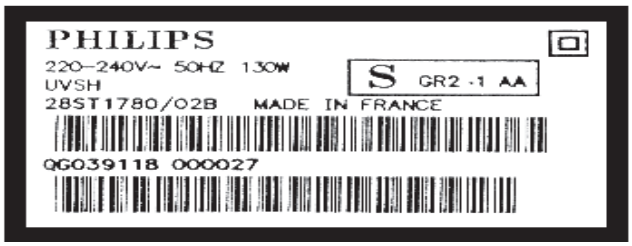
Philips CE is starting production of lead-free sets from 1.1.2005 onwards.

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

HDD & DVD Player / Recorder

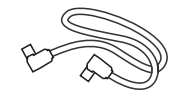
DVDR9000H

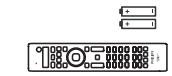
Quick Start Guide

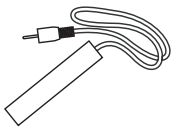
1 Connect
2 Set up
3 Enjoy

What's in the box?

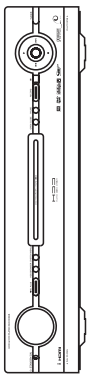

Quick Start Guide

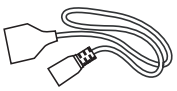

Tuner interlink cable

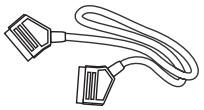

Remote Control and 2 batteries

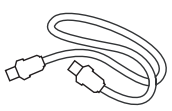

G-LINK cable & transmitter


User Manual


HDD & DVD Player / Recorder


Power cable


Scart cable


RF coaxial cable

1 Connect

Start with the 'Basic connection'.
If you have a VCR, follow the instructions for 'Connection with VCR or similar device'.
If you have a set-top box, follow the instructions for 'Connection with set-top box'.

Basic Connection

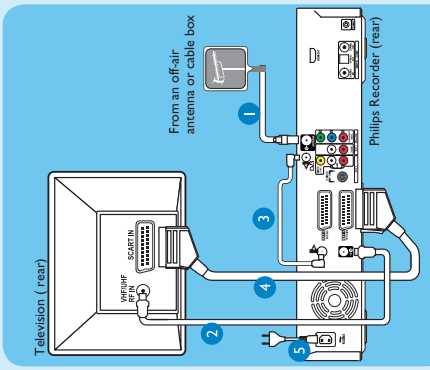
A Before Connecting

Unplug the antenna cable that is currently connected to your TV.

If you have only a single off-air antenna, follow '**B1**' connection.

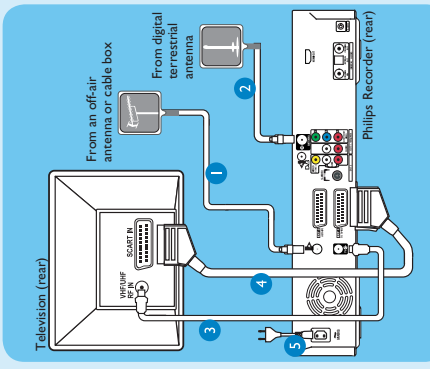
If you have both the off-air antenna and digital terrestrial antenna, follow '**B2**' connection.

B1 Connecting



1. Disconnect the antenna cable from your TV and connect it to the **ANTENNA** socket on this recorder.
2. Use the supplied RF coaxial cable to connect the **TV** socket on this recorder to the Antenna In socket on the TV.
3. Use the supplied Tuner interlink cable to connect the two '**A**'-sockets on this recorder.
4. Use the supplied scart cable to connect the EXT1 TO TV-I/O scart socket on this recorder to the SCART IN socket on your TV.
5. Plug in the power cable from the recorder to an AC power outlet

B2 Connecting (with digital terrestrial antenna)



1. Disconnect the antenna cable from your TV and connect it to the socket on this recorder.
2. Connect the indoor DVB-T antenna cable to the **ANTENNA** socket on this recorder.
2. Use the supplied RF coaxial cable to connect the **TV** socket on this recorder to the Antenna In socket on the TV.
4. Use the supplied scart cable to connect the EXT1 TO TV-I/O scart socket on this recorder to the SCART IN socket on your TV.
5. Plug in the power cable from the recorder to an AC power outlet

Note See the accompanying user manual for other possible connections (e.g. HDMI, Component Video)

PHILIPS

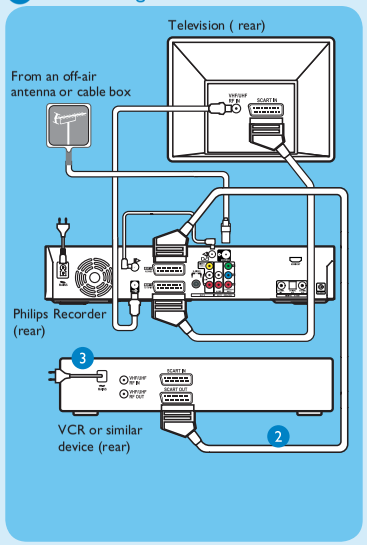
2 Set up

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



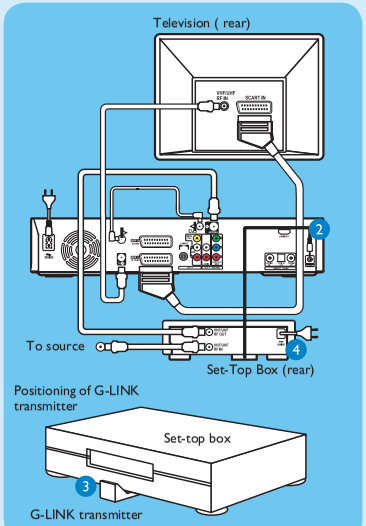
1. Follow step 1 to 5 of 'Basic connection' to connect this recorder before you proceed to step 2 below. Above illustration shown the connection without the digital terrestrial antenna.
2. Use another scart cable (not supplied) to connect the EXT2 AUX-I/O scart socket on this recorder to the SCART OUT 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 5 of 'Basic connection' to connect this recorder before you proceed to step 2 below. Above illustration shown the connection without the digital terrestrial antenna.
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 cable.

A Finding the viewing channel

1. Presss **STANDBY-ON** on the recorder. The recorder will display 'IS 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 the 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

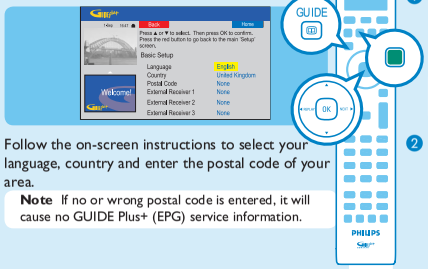
Use the recorder's remote control and follow the on-screen instructions to complete the installation.

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 for analogue and digital tuner/radio.
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. Follow the on-screen instructions to select your language, country and enter the postal code of your area.

Note If no or wrong postal code is entered, it will cause no GUIDE Plus+ (EPG) service information.

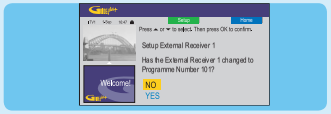
D Install the set-top box

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 EXT2 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. 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. Press the **green** button to exit.

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

E Load the TV listing data

1. Press **GUIDE** to exit 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 downloading the TV listings data immediately.

2. 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 **TUNER** to switch between analogue and digital tuner, then press **CH** + / – to select a TV programme.
2. Press ⏸ **PAUSE** to suspend it.
3. Press ▶ **PLAY** to continue.

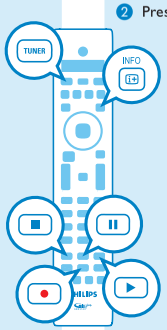
Note When the recorder is turned on, the programme you are watching will be stored in the temporary hard disk storage. When you switch the recorder to another input signal (e.g. CAM) or to standby mode, the programme will be erased.

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

Help text information bar

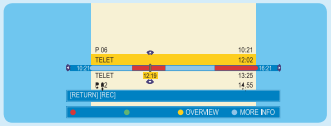
The help text bar located at the bottom of the screen is providing the information on:

- → remote control keys that can be used at the current state.
- → brief information of the selected item.



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 ● **RECORD** 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

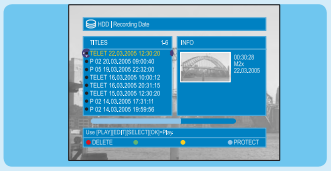
1. Press ● **RECORD** to start recording. It can record up to 6 hours.

Note To set the recording time, press ● repeatedly to extend the recording time in 30-minute increments, up to 6 hours. If 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

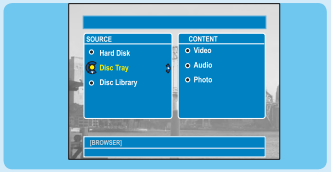
A From the hard disk



1. Press **HDD-BROWSER**, then press **NEXT** ▶ 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 ■ **STOP** until the disc tray opens. Load a disc and close the disc tray.



2. Press **HDD-BROWSER** to go to the disc menu. Select { Disc Tray } and press **NEXT** ▶ 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.

Using the GUIDE Plus+ system

Make sure that the analague tuner installation and TV listing data download is completed.

Record TV programmes

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

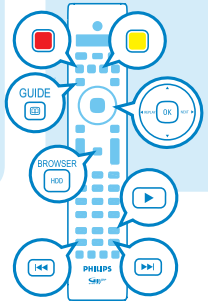
Note Press the **yellow** button to see an overview of all the available channels and choose from there.

3. Press ◀ **REPLAY** or **NEXT** ▶ to select a TV programme.

Note Press ⏮ or ⏭ 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.



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 3139 246 19341
www.philips.cocm

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 manually

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 910 out.

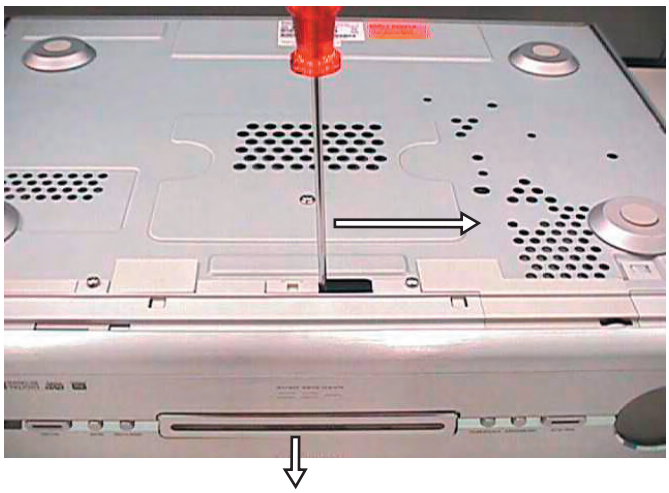


Figure 4-1

2) Remove the Tray cover assembly 910 as shown in Figure 4-2.

Figure 4-2

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

1) Remove 9 screws to loosen Top cover 210.
2) Remove 4 screws to loosen the Basic Engine assembly 1008+191+902 as shown in Figure 4-3.

Figure 4-3

3) Remove 2 screws to loosen the Bracket Loader 191 and uncatch the Dust cover assembly 902.
4) Remove 4 screws to loosen the Cover of the Basic Engine to reach Service position Figure 4-4.

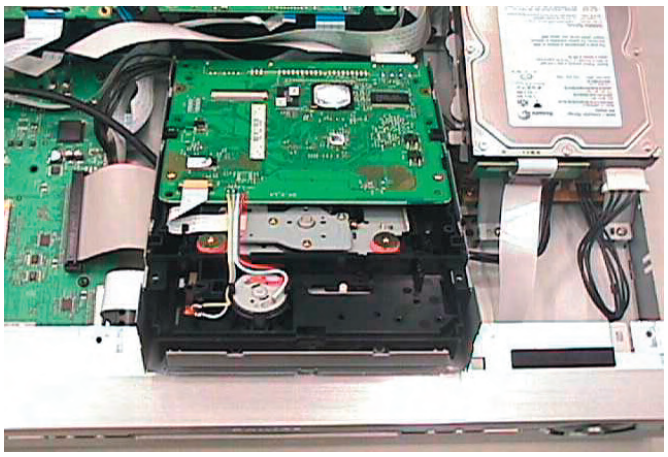


Figure 4-4: Basic Engine Service position

4.3 Dismantling of the HDD / PSU Board

1) Remove 4 screws to loosen the HDD assembly 1009+192+222 as shown in Figure 4-5.

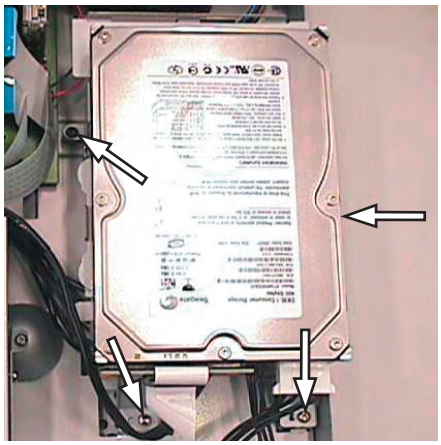


Figure 4-5: Digital Board

2) Remove 4 screws 285 to separate the Bracket HDD 192 and Bracket HDD suspension 222 from the HDD as shown in Figure 4-6.

Note: Screws 285 are special type of screws that must be replaced only with those specified in the Service Parts list on Chapter 10.

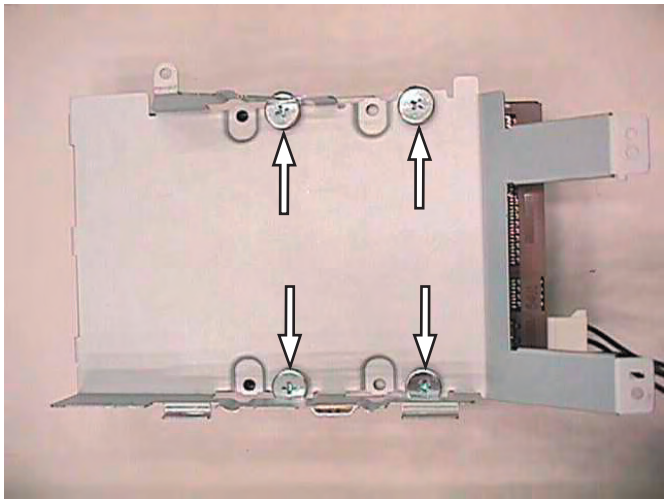


Figure 4-6

3) Remove 4 screws to loosen the PSU Board 1007 as shown in Figure 4-7.

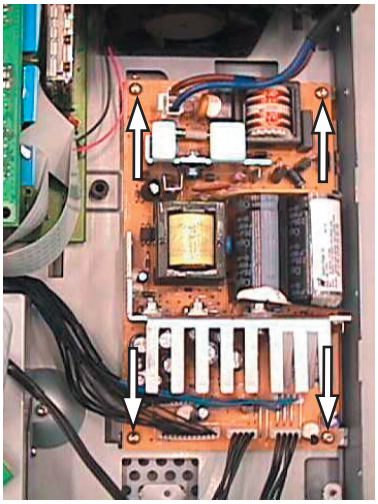


Figure 4-7

4) Service position for PSU Board is given in Figure 4-8.

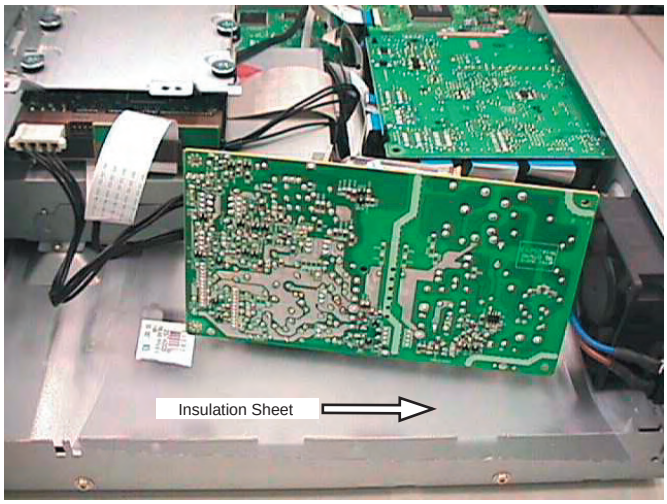


Figure 4-8: PSU Board Service Position

4.4 Dismantling of the Digital Board

1) Remove 4 screws to loosen the Digital Board 1004 as shown in Figure 4-9.

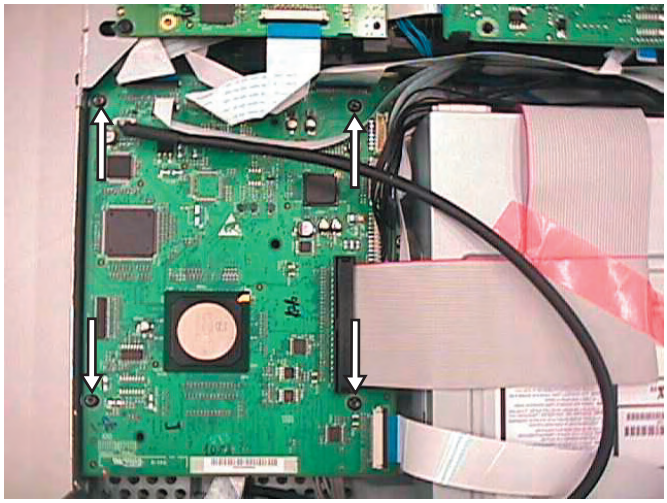


Figure 4-9

2) Service position for Digital Board is given in Figure 4-10.

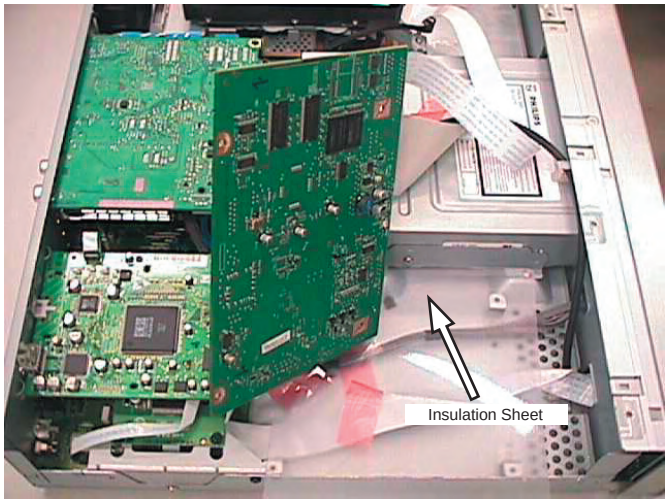


Figure 4-10: Digital Board Service Position

4.5 Dismantling of the DTTM, HDMI, IR Blaster and Analog Boards

1) Remove 4 screws and 3 catches the HDMI board (1x) and DTTM board (2x) as shown in Figure 4-11.

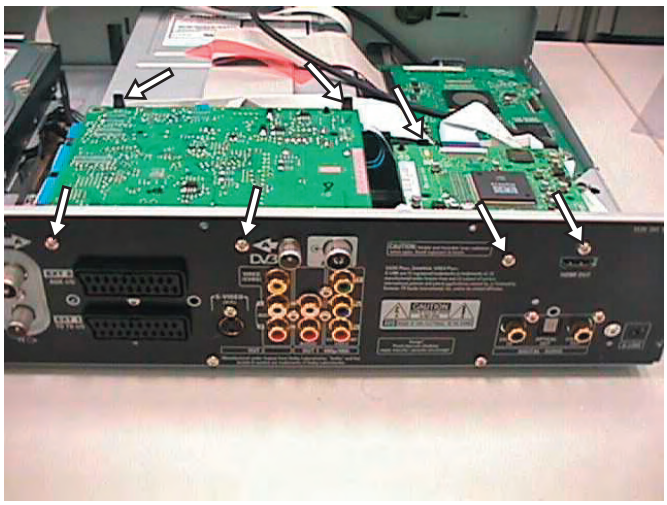


Figure 4-11

2) Remove 8 screws to loosen the Analog Board (3x) and IR Blaster board (2x) + bracket 193 assembly (3x) as shown in Figure 4.12.

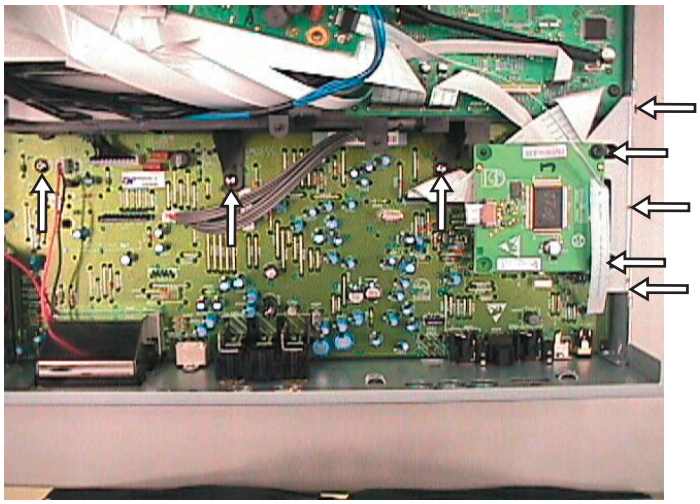


Figure 4-12

3) Remove 9 screws on the Rear Panel to remove the Analog Board as shown in Figure 4.13.

Note: It may be necessary to loosen the Digital Board because the cable from the Front Panel is sandwiched between the Digital and Analog Boards.

Figure 4-13

4) Service Position is achieved by placing the Analog Board in the vertical position as shown in Figure 4-14.

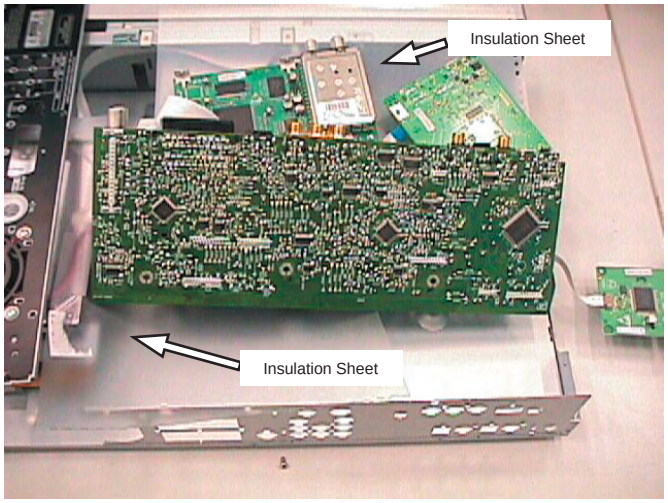


Figure 4-14: HDMI and Analog Boards Service Position

4.6 Dismantling of the Front Panel assembly

1) Remove the DVD Tray cover assembly 910 as given in step 4-1.
2) Loosen the Digital Board 1004 as given in step 4-4. There are 2 cables below the Digital Board that are tapped to the Bottom plate 182 that must be released in order to dismantle the Front Panel assembly.
3) Loosen the DTTM and IR Blaster Boards (see step 4.5) to disconnect the 2 cables
4) Loosen 4 screws + 4 catches (top) and 4 screws + 2 catches (bottom) to pull the Front Panel assembly towards the front away from the Bottom chassis 178.
5) Service position is achieved by placing the Front Panel assembly by the side & reconnecting the 3 cables.

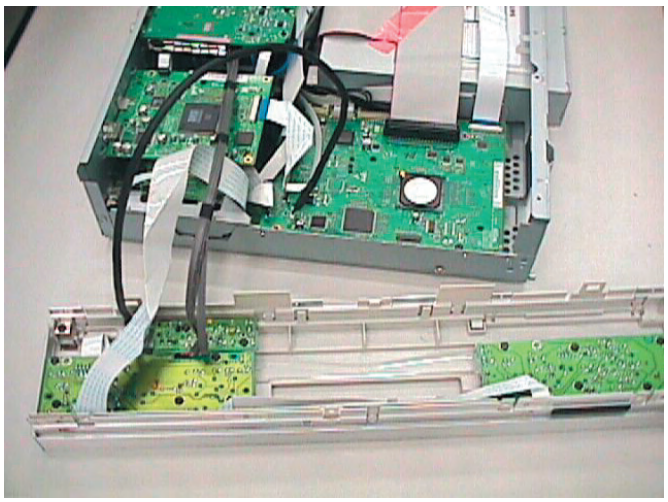


Figure 4-15: Front Board Service position

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> + <Open/Close> buttons down and Power up the set.
2. The tray opens and set will display:

   FORCE DL −>…. PUT DSC

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

   INIT DSC −> ……. DOWNLOAD −>…….
   The whole process takes less than 15 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

6. Close the tray and the set will display:

   DONE

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_3/493AN SV11205
   BE 43.2.13 ASP3,9,1,10FP
   DTTM HW:01020102 DTTM
   SW:00040200
   SIT9000-FF3F-S3_F540
   20051020-1815 pro sxcplusint
   EPG:3.04 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

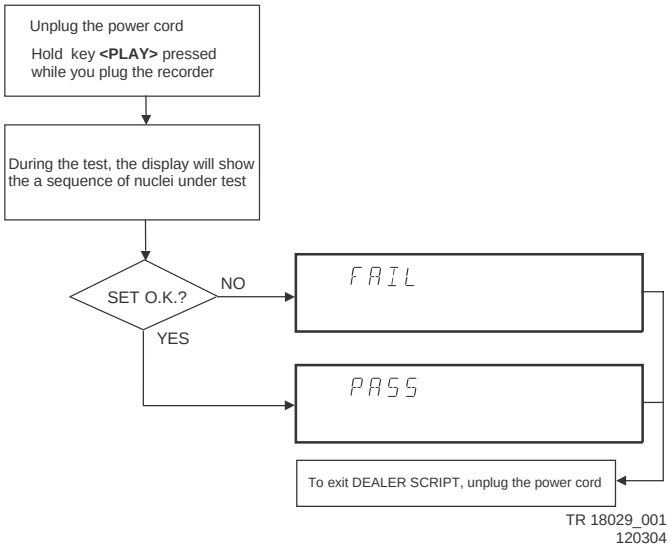


Figure 5-1

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.

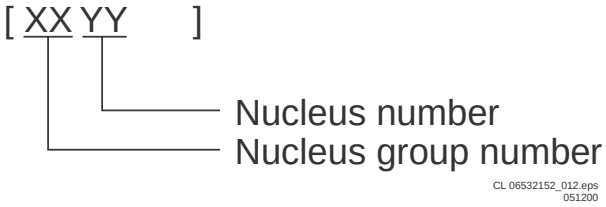


Figure 5-3

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 DVDR9000H Range

5.4.2 Error Handling

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

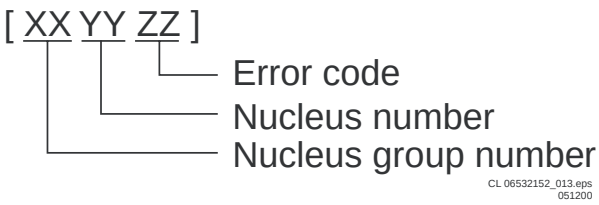


Figure 5-4

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

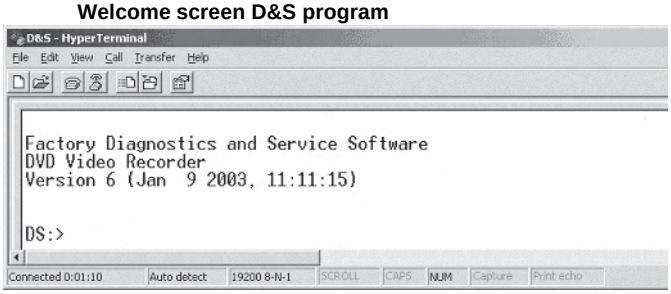


Figure 5-5

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

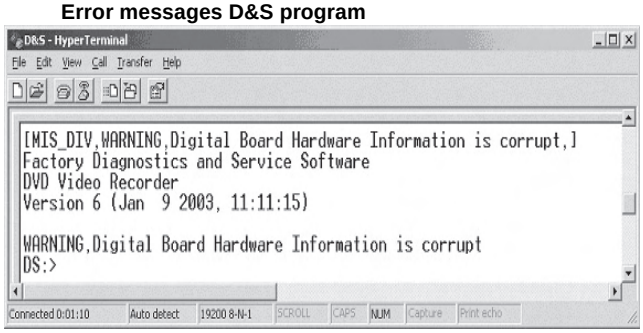


Figure 5-6a

Error messages D&S program

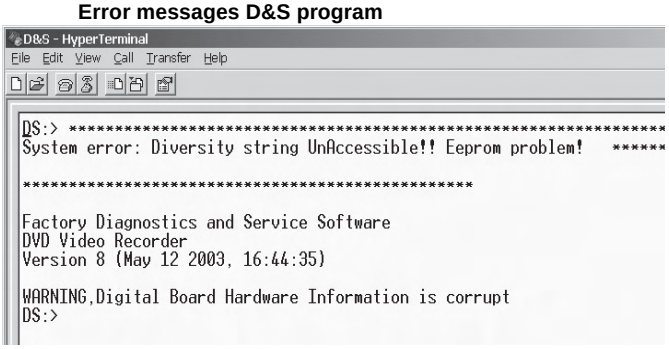


Figure 5-6b

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.

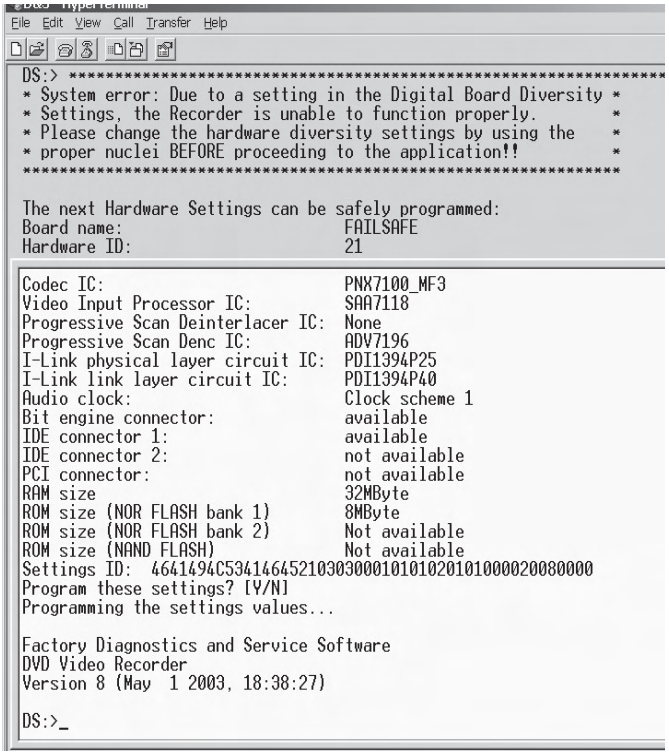


Figure 5-6c

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

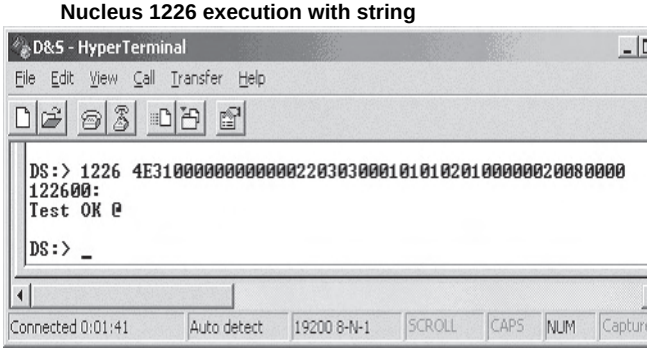


Figure 5-7

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

Nucleus 1228 info example

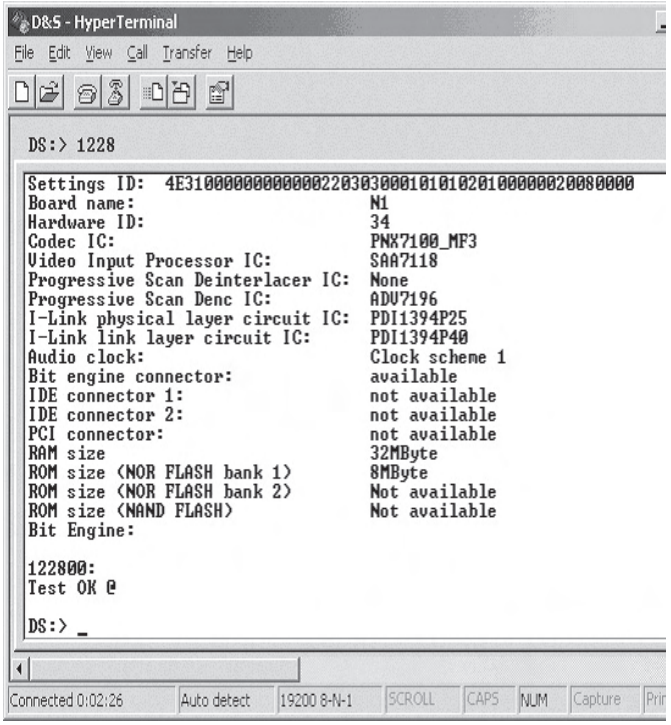


Figure 5-8

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>
<tr><td>6</td><td>Y_FRONT_IN</td></tr>
<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 @`	

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 @	

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 @`	

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 @`	

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 @`	

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 @`	

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
<table>
<tr><th>User input</th><th>Video input</th><th>Data path to VIP</th></tr>
<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>
</table>
OLAL22MKII (mark II) specific
<table>
<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:

GEN, OLAX, DXC, DTT specific
<table><tr><th>User input</th><th>Video input</th><th>Data path to VIP</th></tr><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>TEST</td><td>CVBS</td><td>CVBS from host controller.</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>
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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 64696167747374620101020001010101010000020080000`
	`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: 6D7920626F617264000203000101010201010000200800000 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	<pre>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 @</pre>	

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 @	

Digital Terrestrial Tuner Module (DTTM)

Nucleus Name	**DS_DTTM_Reset**	
Nucleus Number	2200	
Description	Resets the DTTM module in diagnostic mode, and the communication to it.	
Note	This reset action is also done before the first of the other executed DTTM nuclei, to set-up communications with the DTT module.	
Technical	- Setup of the Basic Engine UART port, which connects to the DTT Module. - Make RTS pin of the UART inactive - Toggle the reset-pin of the DTT Module - Wait for DTTM to become online - Send the Boot loader start character to the DTT Module - Check if the DTT Module boot loader accepted the character. It must return "READY>" - Put the DTTM into D&S command mode. - Empty the DTTM output buffer - Set Reset flag to prevent resetting before every nucleus.	
Execution Time	Approx. 5 sec.	
User Input	None	
Error	Number	Description
	220000	The DTT Module has been successfully reset.
	220001	The DTT Module could not be reset.
	220002	DTT Module initialisation failed.

Example	`DS:> 2200`
	`220000:`
	`Test OK @`	

Nucleus Name	**DS_DTTM_TransparentCommand**	
Nucleus Number	2201	
Description	Sends any DTTM DSW command to the DTT Module, and returns the response transparently.	
Note	No response will be returned before the required number of parameters (zero or more) has been supplied.	
Technical	- Sends all the parameters of this nucleus, starting with the DTTM command ID, to the DTT module. The parameter separator is changed into a single space character.	
Execution Time	Varies between 1 and 30 sec., depending on the supplied DTTM command.	
User Input	Any command ID with parameters, as described in the IBOZapper User Manual. [DTTM_UM]	
Error	Number	Description
	220100	Send/receive of DTTM command successful. (Irrespective of the result of this DTTM command)
	220101	Communication with the DTT Module failed.
	220102	DTT Module initialisation failed.

Example	`DS:> 2201  1503 0x0111 0x0112 0x0111`
	`220100:`
	`>0000:`
	`Test OK @`	

Nucleus Name	**DS_DTTM_Communication**	
Nucleus Number	2202	
Description	Checks the communication between the digital board and the DTT Module.	
Technical	- Send the DTTM DSW command ID 9101 (“switch to command mode”)	
Execution Time	< 1 sec.	
User Input	None	
Error	Number	Description
	220200	Communication with the DTT Module succeeded.
	220201	Communication with the DTT Module failed.
	220202	DTT Module initialisation failed.
Example	DS:> 2202 220200: Test OK @	

Nucleus Name	**DS_DTTM_FlashDeviceType**	
Nucleus Number	2203	
Description	Get the manufacture code and the device ID of the boot flash.	
Technical	- Send DTTM command ID 2701	
Execution Time	< 1 sec.	
User Input	None	
Error	Number	Description
	220300	Retrieving Flash device type succeeded.
	220301	Flash device type could not be returned
	220302	Communication with the DTT Module failed.
	220303	DTT Module initialisation failed.
Example	DS:> 2203 220300: Flash manufacture code: 0x00002000 Flash device ID : 0x0000DF22 Test OK @	

Nucleus Name	**DS_DTTM_DiagSwVersion**	
Nucleus Number	2204	
Description	The version of Diagnostics software of the DTT module is read from Boot Flash memory.	
Technical	- Send DTTM command ID 6101	
Execution Time	< 1 sec.	
User Input	None	
Error	Number	Description
	220400	Retrieving the DTTM DS version succeeded
	220401	DTTM DS version could not be returned
	220402	Communication with the DTT Module failed.
	220403	DTT Module initialisation failed.
Example	DS:> 2204 220400: DTT Module Diagnostics software version: 1.2 Test OK @	

Nucleus Name	**DS_DTTM_BootSwVersion**	
Nucleus Number	2205	
Description	The version of the Boot on the DTT module is read from Boot Flash memory. It checks also the CRC-value of the Boot software.	
Technical	- Send DTTM command ID 6201 - Send DTTM command ID 6202	
Execution Time	< 1 sec.	
User Input	None	
Error	Number	Description
	220500	Retrieving the Boot SW version succeeded
	220501	Boot SW version could not be returned
	220502	Boot SW CRC value could not be returned
	220503	Boot SW CRC value is different from stored one
	220504	Communication with the DTT Module failed.
	220505	DTT Module initialisation failed.

Example	`DS:> 2205`
	`220500:`
	`DTT Module Boot software version: 0x00000002`
	`Stored CRC value : 0x8980C5DC`
	`Calculated CRC value : 0x8980C5DC`
	`Test OK @`	

Nucleus Name	**DS_DTTM_ApplSwVersion**	
Nucleus Number	2206	
Description	The version of Application software at the DTT module is read out of Boot Flash memory.	
Technical	- Send DTTM command ID 6301	
Execution Time	< 1 sec.	
User Input	None	
Error	Number	Description
	220600	DTTM Application software version could be returned
	220601	No Application software present
	220602	DTTM Application software version could not be returned
	220603	Communication with the DTT Module failed.
	220604	DTT Module initialisation failed.

Example	`DS:> 2206`
	`220600:`
	`DTT Module Application software version: 0x0002 0x0605 (0x0265)`
	`DTT Module Hardware version : 0x0102 0x0101 (0x1211)`
	`Test OK @`	

Nucleus Name	**DS_DTTM_HardwareVersion**	
Nucleus Number	2207	
Description	The Hardware version of the DTT module is read from Boot Flash memory at two places, and compared.	
Technical	- Send DTTM command ID 6801 - Send DTTM command ID 6301 - Compare the results, and report if different.	
Execution Time	< 1 sec.	
User Input	None	
Error	Number	Description
	220700	Retrieving the DTTM Hardware version succeeded
	220701	DTTM Hardware version could not be returned
	220702	Stored DTTM Hardware version could not be returned
	220703	DTTM Hardware version does not start with 0x12
	220704	Downloaded DTTM Hardware version is different
	220705	No Application software present
	220706	Communication with the DTT Module failed.
	220707	DTT Module initialisation failed.

Example	`DS:> 2207`
	`220700:`
	`DTT Module Hardware model/version: 0x0102 0x0101 (0x1211)`
	`Test OK @`	

Nucleus Name	**DS_DTTM_SdramWriteRead**	
Nucleus Number	2208	
Description	Checks all data lines, address lines, and memory locations of the DTT module's SDRAM.	
Technical	- Send DTTM command ID 2201 (SDRAM stuck-at fault) with parameters: 0xa0000000 0x00800000 - Send DTTM command ID 2202 (SDRAM address w/r test) with parameters: 0xa0000000 0x00800000	
Execution Time	Approx. 45 sec.	
User Input	None	
Error	Number	Description
	220800	SDRAM WR test succeeded
	220801	SDRAM WR stuck-at test failed at given address
	220802	Other SDRAM WR stuck-at test failure
	220803	SDRAM WR write/read test failed at given address
	220804	Other SDRAM WR write/read test failure.
	220805	Communication with the DTT Module failed.
	220806	DTT Module initialisation failed.

Example	`DS:> 2208`
	`220800:`
	`Test OK @`	

Nucleus Name	**DS_DTTM_ SdramWriteReadFast**	
Nucleus Number	2209	
Description	Checks all datalines, address lines, and some memory locations of the DTT module's SDRAM.	
Technical	- Send DTTM command ID 2202	
Execution Time	< 1 sec.	
User Input	None	
Error	Number	Description
	220900	SDRAM WR test succeeded
	220901	SDRAM WR test failed at given address
	220902	SDRAM WR fast test failed w.r.t. data lines.
	220903	Other fast SDRAM test failure
	220904	Communication with the DTT Module failed.
	220905	DTT Module initialisation failed.

Example	`DS:> 2209`
	`220900:`
	`Test OK @`	

Nucleus Name	**DS_DTTM_EepromWriteRead**	
Nucleus Number	2210	
Description	Checks whether the bit cells in the User EEPROM can toggle.	
Technical	Send the DTTM command ID 2402 (stuck-at fault test)	
Execution Time	< 1 sec.	
User Input	None	
Error	Number	Description
	221000	EEPROM WR test succeeded
	221001	EEPROM WR test failed at given address
	221002	Other EEPROM test failure
	221003	Communication with the DTT Module failed.
	221004	DTT Module initialisation failed.

Example	`DS:> 2210`
	`221000:`
	`Test OK @`	

Nucleus Name	**DS_DTTM_FatalErrorRead**	
Nucleus Number	2211	
Description	Reads the fatal error database from the User EEPROM.	
Technical	- Send DTTM command ID 6303	
Execution Time	< 1 sec.	
User Input	None	
Error	Number	Description
	221100	Retrieving the Fatal error list succeeded
	221101	Fatal error list could not be returned
	221102	Communication with the DTT Module failed.
	221103	DTT Module initialisation failed.
Example	DS:> 2211 221100: Fatal error database content: 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 Test OK @	

Nucleus Name	**DS_DTTM_FatalErrorClear**	
Nucleus Number	2212	
Description	Clears the fatal error database in the User EEPROM.	
Technical	- Send DTTM command ID 6304	
Execution Time	< 1 sec.	
User Input	None	
Error	Number	Description
	221200	Clearing the Fatal error list succeeded
	221201	Fatal error list could not be cleared
	221202	Communication with the DTT Module failed.
	221203	DTT Module initialisation failed.
Example	DS:> 2212 221200: Test OK @	

Nucleus Name	**DS_DTTM_FactoryBitSet**	
Nucleus Number	2213	
Description	The factory bit is set in the user EEPROM.	
Technical	- Send DTTM command ID 6203	
Execution Time	< 1 sec.	
User Input	None	
Error	Number	Description
	221300	Setting the Factory bit succeeded
	221301	Factory bit could not be set
	221302	Communication with the DTT Module failed
	221303	DTT Module initialisation failed.
Example	DS:> 2213 221300: Test OK @	

Nucleus Name	**DS_DTTM_PllVcxoFrequencySet**	
Nucleus Number	2214	
Description	Set the PLL/VCXO frequency values of the processor. The M, N, and P values determine the PLL's clockspeed.	
Technical	- Send DTTM command ID 3101, with the given parameters.	
Execution Time	Approx. 2 sec.	
User Input	1. PLLNumber: The seq. nr of PLL to be changed [0,3] 2. Mvalue : PLL M value [0x1,0x7FF] 3. NValue : PLL N value [0x1,0xFF] 4. Pvalue : PLL P value [0x1,0x1F]	
Error	Number	Description
	221400	Setting the PLL/VCXO parameter values was successful
	221401	Insufficient number of input data supplied
	221402	One of the parameters not within range
	221403	The PLL/VCXO values could not be set
	221404	Communication with the DTT Module failed.
	221405	DTT Module initialisation failed.

Example	`DS:> 2214 0 0xef 0x03 0x01`
	`221400:`
	`Test OK @`	

Nucleus Name	**DS_DTTM_PllVcxoFrequencyGet**	
Nucleus Number	2215	
Description	Retrieves the PLL/VCXO values of the processor.	
Technical	- Send DTTM command ID 3102 with the PLL number. - Parse and format the response values.	
Execution Time	< 1 sec.	
User Input	PLLNumber: The seq. nr of PLL to be queried [0,3]	
Error	Number	Description
	221500	Retrieving the PLL/VCXO parameter values was successful
	221501	Insufficient number of input data supplied
	221502	Non-existent PLL number
	221503	The PLL/VCXO values of the processor could not be retrieved.
	221504	Communication with the DTT Module failed
	221505	DTT Module initialisation failed.

Example	`DS:> 2215 0`
	`221500:`
	`PLL M parameter value: 0x00EF`
	`PLL N parameter value: 0x0003`
	`PLL P parameter value: 0x0001`
	`Test OK @`	

Nucleus Name	**DS_DTTM_IicWrite**	
Nucleus Number	2216	
Description	Performs an IIC write action on the DTT module.	
Technical	- Send DTTM command ID 2902 with the supplied parameters, separated by a single space character.	
Execution Time	< 1 sec.	
User Input	1. IicChannel : IIC channel of the device 2. IicDeviceAddress : address of IIC device to write to 3. NrOfSubAddressBytes: number of sub-address bytes (=x) 4. SubAddressBytes : x sub-address bytes 5. NrOfValues : number of values to write (=y) 6. Data : y bytes data to write	
Error	Number	Description
	221600	The test was successful
	221601	Insufficient number of input data supplied
	221602	No response from the given device-address
	221603	Incorrect device address was given
	221604	Unable to send IIC start-condition
	221605	Error during write to IIC-address
	221606	Device does not support IIC write
	221607	The IIC write action failed.
	221608	Communication with the DTT Module failed.
	221609	DTT Module initialisation failed.

Example	`DS:> 2216 0x00 0x00 0 2 0xAA 0xBB`
	`221600:`
	`Test OK @`	

Nucleus Name	**DS_DTTM_IicRead**	
Nucleus Number	2217	
Description	Performs an IIC read action on the DTT module.	
Technical	- Send DTTM command ID 2901 with the supplied parameters, separated by a single space character.	
Execution Time	< 1 sec.	
User Input	1. IicChannel : IIC channel of the device 2. IicDeviceAddress : address of IIC device to read from 3. NrOfSubAddressBytes: number of sub-address bytes (=x) 4. SubAddressBytes : x sub-address bytes 5. NrOfValues : number of values to read (=y)	
Error	Number	Description
	221700	The test was successful
	221701	Insufficient number of input data supplied
	221702	No response from the given device-address
	221703	Incorrect device address was given
	221704	Unable to send IIC start-condition
	221705	Error during read from IIC-address
	221706	Device does not support IIC read
	221707	The IIC read action failed.
	221708	Communication with the DTT Module failed.
	221709	DTT Module initialisation failed.

Example	`DS:> 2217 0x00 0x10 2 0x00 0x00 2`
	`221700: Read values: 0x17 0x00`
	`Test OK @`	

Nucleus Name	**DS_DTTM_AvTsPidSet**	
Nucleus Number	2218	
Description	Sets the PID values of the transport stream.	
Technical	- Send the DTTM command ID 1503, with the supplied parameters.	
Execution Time	< 1 sec.	
User Input	1. Video PID value [0x0000-0x1FFF] 2. Audio PID value [0x0000-0x1FFF] 3. PRC PID value [0x0000-0x1FFF]	
Error	Number	Description
	221800	The TS PID's are set successfully
	221801	Insufficient number of input data supplied
	221802	One or more PID values is out of range
	221803	The TS PID's could not be set.
	221804	Communication with the DTT Module failed
	221805	DTT Module initialisation failed.

Example	`DS:> 2218 0x79 0x7a 0x79`
	`221800:`
	`Test OK @`	

Nucleus Name	**DS_DTTM_AvMojoBeepOn**	
Nucleus Number	2219	
Description	Generates the Mojo beep.	
Technical	- Send the DTTM command ID 1605.	
Execution Time	< 1 sec.	
User Input	None	
Error	Number	Description
	221900	The Mojo beep has been turned on successfully
	221901	Can not start another AV test (one is already running)
	221902	The Mojo beep could not be turned on
	221903	Communication with the DTT Module failed
	221904	DTT Module initialisation failed.

Example	`DS:> 2219`
	`221900:`
	`Test OK @`	

Nucleus Name	**DS_DTTM_AvMojoBeepOff**	
Nucleus Number	2220	
Description	Stops generating the Mojo beep.	
Technical	- Send the DTTM command ID 1606.	
Execution Time	< 1 sec.	
User Input	None	
Error	Number	Description
	222000	The Mojo beep has been turned off successfully
	222001	The Mojo beep could not be turned off
	222002	Communication with the DTT Module failed
	222003	DTT Module initialisation failed.

Example	`DS:> 2220`
	`222000:`
	`Test OK @`	

Nucleus Name	**DS_DTTM_ AvAudioVideoStreamPlay**	
Nucleus Number	2221	
Description	Selects a predefined stream, and configures the peripherals to enable streaming, and starts playing the selected audio and video streams.	
Technical	- Send the DTTM command ID 1002 with the selected stream number - Send the DTTM command ID 1001. - Ignore possible error code 2203 (AV play test already started)	
Execution Time	< 2 sec.	
User Input	Stream number: Stream number to be selected. [0-9]	
Error	Number	Description
	222100	The given predefined stream has been selected and started successfully
	222101	Insufficient number of input data supplied
	222102	The given stream could not be selected
	222103	The given stream number is not within range
	222104	The predefined stream has an out-of-range value
	222105	No carrier found
	222106	The selected predefined stream could not be started
	222107	Communication with the DTT Module failed
	222108	DTT Module initialisation failed.

Example	`DS:> 2221 2`
	`222100:`
	`Test OK @`	

Nucleus Name	**DS_DTTM_ AvPredefinedStreamGet**	
Nucleus Number	2222	
Description	Retrieves the settings of the currently selected stream.	
Technical	- Send the DTTM command ID 1003 - Parse and format the response values.	
Execution Time	< 1 sec.	
User Input	None	
Error	Number	Description
	222200	The settings of the currently selected predefined stream are retrieved successfully
	222201	The settings of the currently selected predefined stream could not be retrieved
	222202	Communication with the DTT Module failed
	222203	DTT Module initialisation failed.

Example	`DS:> 2222`
	`222200: The settings of the selected stream are:`
	`current video standard : 0 = PAL`
	`current video PID : 0x0083`
	`current audio PID : 0x0084`
	`current PCR PID : 0x0083`
	`tuner frequency : 506000000 Hz`
	`tuner bandwidth : 8000000 Hz`
	`tuner spectral inversion: 0 = Normal`
	`Test OK @`	

Nucleus Name	**DS_DTTM_ AvPredefinedStreamChange**	
Nucleus Number	2223	
Description	Adds or changes the settings of a predefined stream.	
Note	No parameter validity check is being performed. This is done when this stream is selected. Stream no 0 is built-in and cannot be changed.	
Technical	- Send the DTTM command ID 1004, with the supplied parameters.	
Execution Time	< 1 sec.	
User Input	1. Stream number : The stream to be changed. [1-9] 2. VideoStandard : video standard (0=PAL, 1=SECAM) 3. VideoTypeCh3 : TV channel video type (0=RGB, 1=YPbPr, 2=YC) 4. VideoTypeCh2 : TV channel video type (0=CVBS, 1=YC) 5. VideoTypeCh1 : AUX channel video type (0=YC, 1=CVBS) 6. VideoPid : current video PID [0x0000-0x1FFF] 7. AudioPid : current audio PID [0x0000-0x1FFF] 8. PCRPid : current PCR PID [0x0000-0x1FFF] 9. Frequency : tuner frequency [Hz] [5000000, 859000000] 10. Bandwidth : tuner bandwidth (0=7 MHz, 1=8 MHz) 11. SpectralInversion: tuner spectral inversion (0=normal, 1=inverse)	
Error	Number	Description
	222300	A predefined stream has been added or changed successfully
	222301	Insufficient number of input data supplied
	222302	Could not change or add a predefined stream
	222303	Communication with the DTT Module failed
	222304	DTT Module initialisation failed.

Example	`DS:> 2223 4 0 0 0 1 0x79 0x7a 0x79 506000000 1 0`
	`222300:`
	`Test OK @`	

Nucleus Name	**DS_DTTM_ AvMojoColourbarOn**	
Nucleus Number	2224	
Description	Activates the Mojo colour bar.	
Note	This nucleus will return with error 222401, if another AV test is already running.	
Technical	- Send the DTTM command ID 1607	
Execution Time	< 1 sec.	
User Input	None	
Error	Number	Description
	222400	The Mojo colour bar has been activated successfully
	222401	Can not start another AV test (one is already running)
	222402	The Mojo colour bar could not be activated
	222403	Communication with the DTT Module failed
	222404	DTT Module initialisation failed.

Example	`DS:> 2224`
	`222400:`
	`Test OK @`	

Nucleus Name	**DS_DTTM_ AvMojoColourbarOff**	
Nucleus Number	2225	
Description	Turns off the Mojo colour bar.	
Technical	- Send the DTTM command ID 1608	
Execution Time	< 1 sec.	
User Input	None	
Error	Number	Description
	222500	The Mojo colour bar has been turned off successfully
	222501	The Mojo colour bar could not be turned off
	222502	Communication with the DTT Module failed
	222503	DTT Module initialisation failed.

Example	`DS:> 2225`
	`222500:`
	`Test OK @`	

Nucleus Name	**DS_DTTM_ AvVideoStandardSet**	
Nucleus Number	2228	
Description	Configures the Mojo video channel to the given video standard.	
Technical	- Send the DTTM command ID 1501, together with supplied input value.	
Execution Time	< 1 sec.	
User Input	VideoStandard: Video standard to set the channel to (0=PAL, 1=SECAM)	
Error	Number	Description
	222800	Succeeded in configuring the Mojo video channel
	222801	Insufficient number of input data supplied
	222802	Non-existent video standard
	222803	Configuring the Mojo video channel was not successful
	222804	Communication with the DTT Module failed.
	222805	DTT Module initialisation failed.

Example	`DS:> 2228 0`
	`222800:`
	`Test OK @`	

Nucleus Name	**DS_DTTM_ AvVideoOutputSet**	
Nucleus Number	2229	
Description	Configures the video output to the selected video standard.	
Technical	- Send the DTTM command ID 1504, together with supplied input values.	
Execution Time	< 1 sec.	
User Input	1. VideoDAC : The video DAC to configure 0 = RGB / YUV / YC (TV DAC's) 1 = CVBS / Y (TV DAC) 2 = YC / CVBS (VCR DAC's) 2. VideoOutput: The video output to set the DAC's to 0 = RGB or CVBS or YC (resp. the chosen DAC's) 1 = YUV or YC or CVBS 2 = YC	
Error	Number	Description
	222900	Video output could be set successfully
	222901	Insufficient number of input data supplied
	222902	One of the parameter values is out of range
	222903	Video output could not be set
	222904	Communication with the DTT Module failed
	222905	DTT Module initialisation failed.

Example	`DS:> 2229 0 1`
	`222900:`
	`Test OK @`	

Nucleus Name	**DS_DTTM_FreRegisterRead**	
Nucleus Number	2230	
Description	Reads a single byte of data out of a demodulator register.	
Technical	- Send the DTTM command ID 3601, together with supplied input value.	
Execution Time	< 1 sec.	
User Input	Address: register address to read from	
Error	Number	Description
	223000	The selected address register could be read successfully
	223001	Insufficient number of input data supplied
	223002	The register address value is out-of-range
	223003	The selected address register could not be read
	223004	Communication with the DTT Module failed
	223005	DTT Module initialisation failed.

Example	`DS:> 2230 0x12`
	`223000: The value of this register: 0x00`
	`Test OK @`	

Nucleus Name	**DS_DTTM_FreRegisterWrite**	
Nucleus Number	2231	
Description	Writes a single byte of data out to a demodulator register.	
Technical	- Send the DTTM command ID 3602, together with supplied input values.	
Execution Time	< 1 sec.	
User Input	Address: register address to write to Data : the value to be written to the register	
Error	Number	Description
	223100	The selected address register has been written successfully
	223101	Insufficient number of input data supplied
	223102	The register address value is out-of-range
	223103	The selected address register could not be written
	223104	Communication with the DTT Module failed
	223105	DTT Module initialisation failed.

Example	`DS:> 2231 0x12 0xb1`
	`223100:`
	`Test OK @`	

Nucleus Name	**DS_DTTM_FreLockStatusGet**	
Nucleus Number	2232	
Description	Checks and returns the lock status of the front-end.	
Technical	- Send the DTTM command ID 3607. - Parse and format the response values.	
Execution Time	< 1 sec.	
User Input	None	
Error	Number	Description
	223200	The lock status of the front-end is returned successfully
	223201	The lock status of the front-end could not be returned
	223202	Communication with the DTT Module failed
	223203	DTT Module initialisation failed.

Example	`DS:> 2232`
	`223200: Front-end lock status: 0x0F`
	`Internal PLL locked : YES`
	`Frequency Locked : YES`
	`Time locked : YES`
	`TPS locked : YES`
	
	`Test OK @`	

Nucleus Name	**DS_DTTM_FreLockingParamSet**	
Nucleus Number	2233	
Description	Configures the tuner and the demodulator according to the given parameters. First the configuration mode of the front-end is set to Manual or Autoconfig mode, depending on the number of supplied parameters.	
Technical	- Send the DTTM command ID 3604, with parameter value '0' to put the front-end to Manual configuration mode, or '1' for AutoConfig configuration mode. - Send the DTTM command ID 3605, together with supplied input value.	
Execution Time	< 1 sec.	
User Input	1. Frequency : Tuner frequency [Hz] [5000000 – 859000000] 2. Bandwidth : Tuner bandwidth (0=7MHz, 1=8MHz) 3. SpectralInversion : Spectral inversion (0=Normal, 1=Inverse) The following parameters are optional (Manual mode): 4. Constellation : Constellation type (0=QPSK, 1=QAM16, 2=QAM64, or 3=unknown) 5. Hierarchy : Hierarchy (0=None, 1=Alpha 1,2=Alpha 2, or 3=Alpha 4) 6. CodeRateHigh : High priority CodeRate (0=1_2, 2=2_3, 2=3_4, 3=5_6, 4=7_8, 5=unknown) 7. CodeRateLow : Low priority CodeRate (0-5) 8. GuardInterval : Guard interval (0=1/32, 1=1/16, 2=1/8, 3=1/4, 4=unknown) 9. TransmissionMode : Transmission mode (0=2 KO, 1=8 KO, or 3=unknown) 10. FrequencyOffset : Frequency offset [MHz] (0=none, 1=+1/6, 2=-1/6, 3=+2/6, 4=-2/6, 5=+3/6, 6=-3/6,7=unknown) 11. Priority : Priority (0=High, 1=Low, 2=Both, or 3=unknown)	
Error	Number	Description
	223300	The tuner and demodulator have been configured successfully
	223301	Insufficient number of input data supplied
	223302	One or more parameters is out-of-range
	223303	No carrier could be found with these parameters
	223304	The tuner and demodulator could not be configured
	223305	False lock achieved (incorrect parameters).
	223306	Communication with the DTT Module failed
	223307	DTT Module initialisation failed.

Example	`DS:> 2233 506000000 1 0 2 0 4 0 0 0 0 0`
	`223300:`
	`Test OK @`	

Nucleus Name	**DS_DTTM_FreLockingParamGet**	
Nucleus Number	2234	
Description	Retrieves the tuner and demodulator settings.	
Technical	- Send the DTTM command ID 3606. - Parse and format the response values.	
Execution Time	> 1 sec.	
User Input	None	
Error	Number	Description
	223400	The tuner and demodulator settings have been retrieved successfully
	223401	The tuner and demodulator settings could not be retrieved
	223402	Communication with the DTT Module failed
	223403	DTT Module initialisation failed.
Example	DS:> 2234 223400: The front-end locking parameters are: Tuner frequency : 506000000 Hz Tuner bandwidth : 8000000 Hz Spectral inversion : 0 = Normal Constellation type : 2 = QAM64 Hierarchy : 0 = None High Priority CodeRate: 4 = 7_8 Low Priority CodeRate: 0 = 1_2 Guard Interval : 0 = 1/32 Transmission mode : 0 = 2 KO Frequency offset : 0 = None Priority : 0 = High Test OK @	

Nucleus Name	**DS_DTTM_FreSignalStatusGet**	
Nucleus Number	2235	
Description	Retrieves the status of the current signal.	
Technical	- Send the DTTM command ID 3608. - Parse and format the response values.	
Execution Time	> 1 sec.	
User Input	None	
Error	Number	Description
	223500	The current signal status has been retrieved successfully
	223501	The current signal status could not be retrieved
	223502	Communication with the DTT Module failed
	223503	DTT Module initialisation failed.
Example	DS:> 2235 223500: Signal status: CBER : 25e-7 VBER : 0e-6 AGC IF : 160 AGC RF : Unknown SNR : 254 Cell ID: 0x0000 Test OK @	

Nucleus Name	**DS_DTTM_SwitchCVBSPath**	
Nucleus Number	2236	
Description	This function switches the CVBS path on the DTTM module by having the MOJO (on the DTTM module) toggle a PIO pin. There are two paths: - Passing video from the analogue board to the digital board - Passing video from the analogue board through the DTT module to the digital board (where the signal might be changed by DTT)	
Technical	- Send the DTTM command ID 3103. - Parse the response values and change bit two of the PIO pin. - Set the new PIO value using DTTM command ID 3104	
Execution Time	> 1 sec.	
User Input	There are three possibilities here: - 'pass' - The video is passed from the analogue board to the digital board - '' - The video is passed from the analogue board to the digital board - 'dttm' - The video is passed from the analogue board through the DTT module to the digital board (where the signal might be changed by DTT)	
Error	Number	Description
	223600	Switching the CVBS path through DTTM PIO succeeded
	223601	Executing the DTTM PIO write failed
	223602	Switching the CVBS path through DTTM PIO failed
	223603	DTT Module initialisation failed.

Example	`DS:> 2236 pass`
	`223600:`
	`Test OK @`
	
	`DS:> 2236 dttm`
	`223600:`
	`Test OK @`
	
	`DS:> 2236`
	`223600:`
	`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].

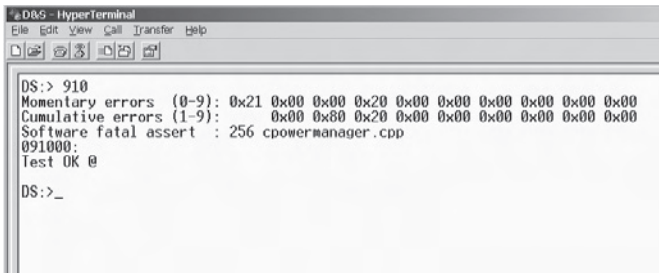
Example

```
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)

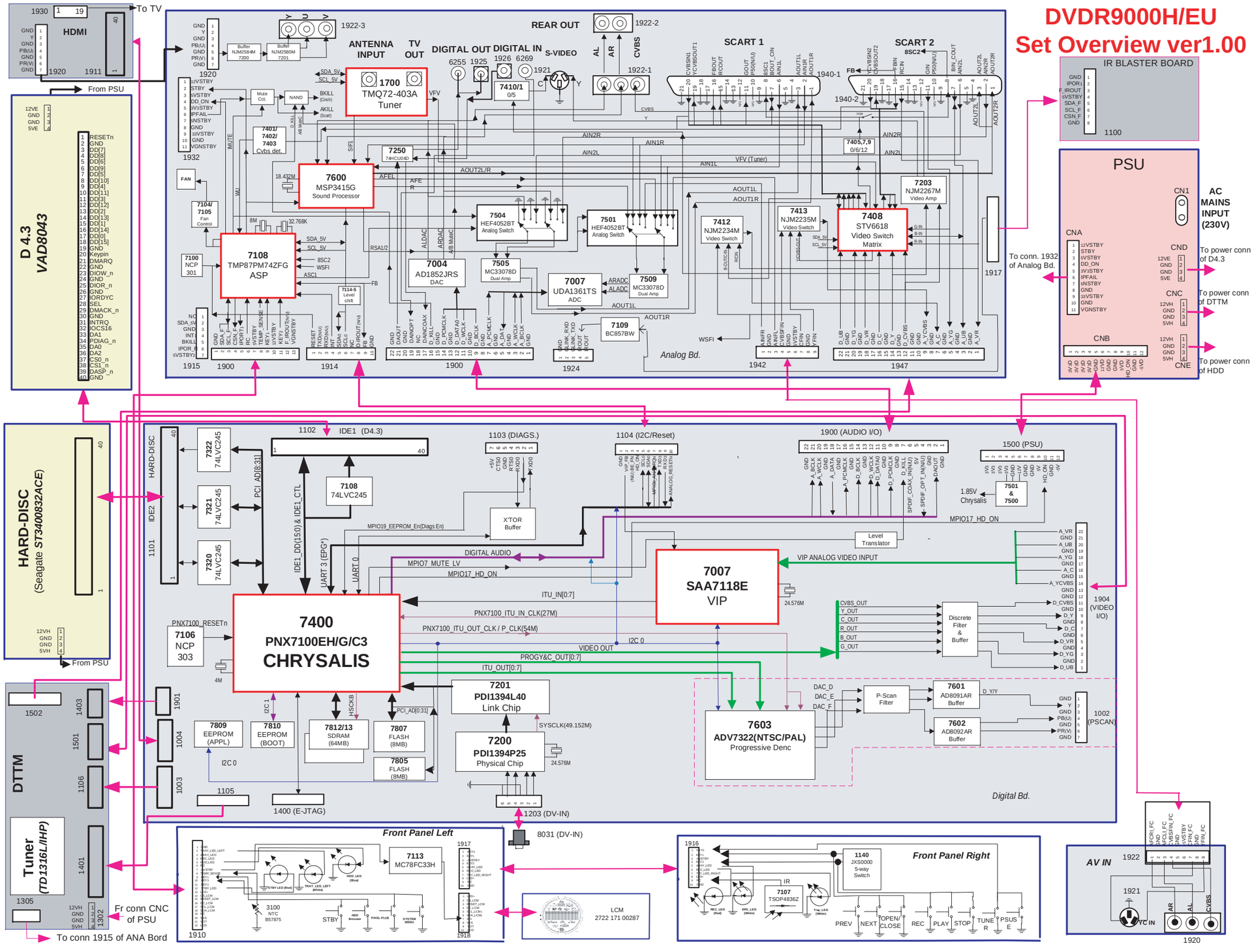
error code	error	meaning
0x39	opc_power_calculation_error	Error during OPC power calculation (samples are wrong)
0x3A	opc_test_zone_full_error	OPC can't be performed because test zone is full
0x3B	opc_bad_jitter_measurement_error	The jitter measurement during OPC samples readback failed
0x3C	opc_read_samples_error	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.

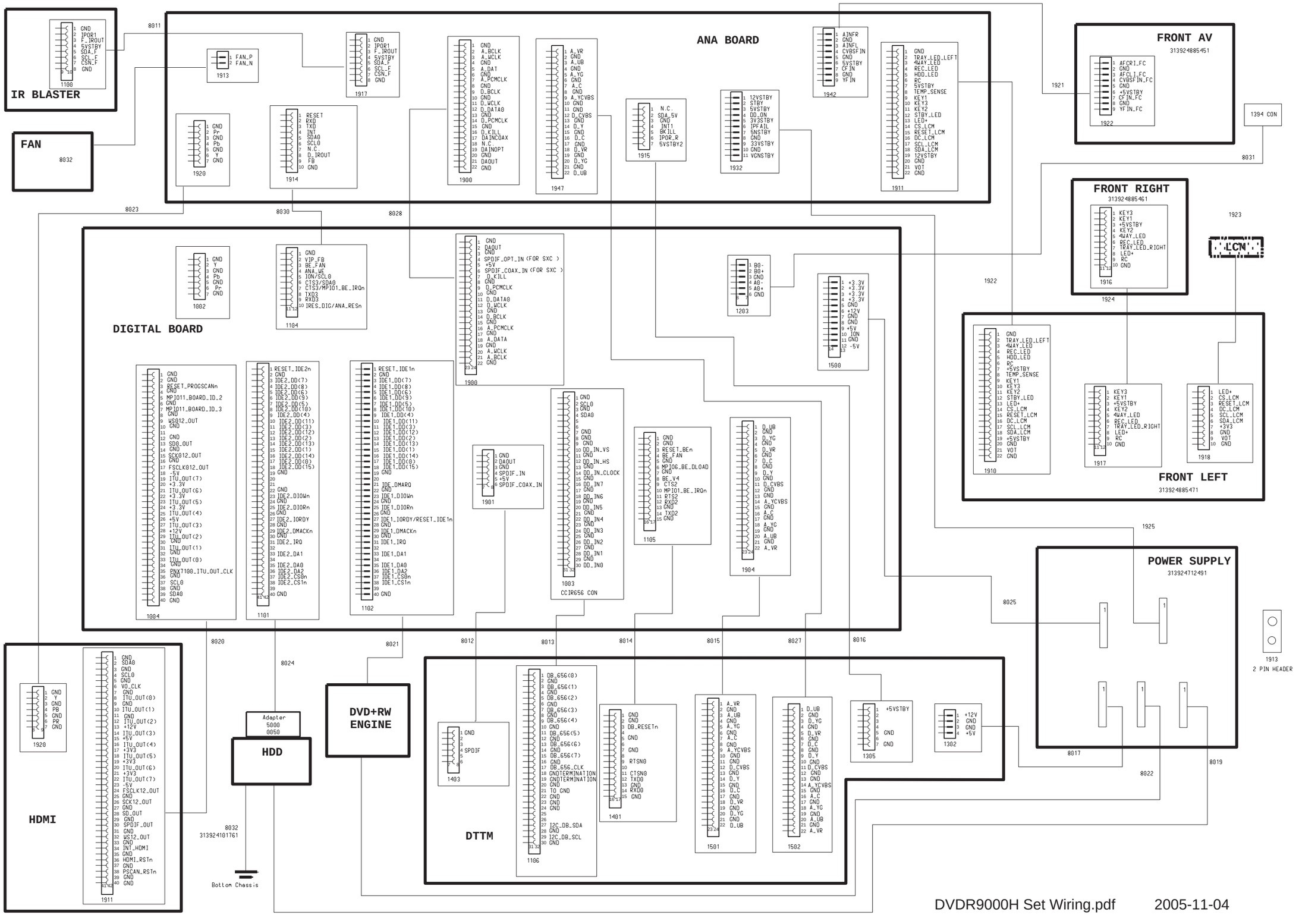
6. Block Diagrams, Waveforms, Wiring Diagram

Overall Block Diagram

DVDR9000H/EU
Set Overview ver1.00

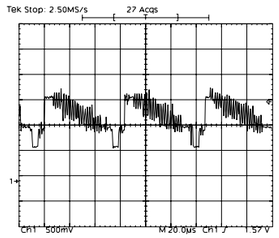


Wiring Diagram

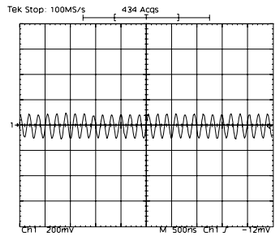


Waveforms of Analog Board

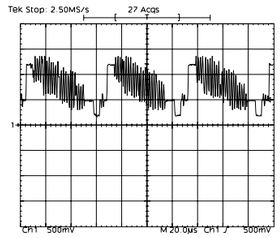
I700 IC 1700VIDOUT



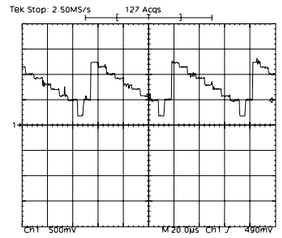
I703



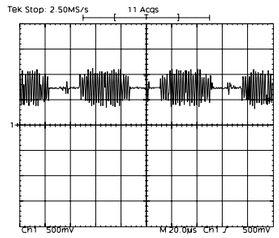
F4019 CVBS_OUT



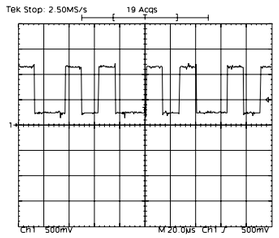
F4019 Y_OUT



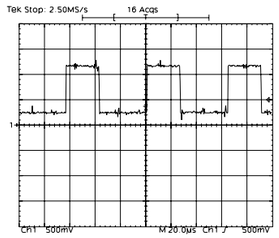
F4015 R_OUT



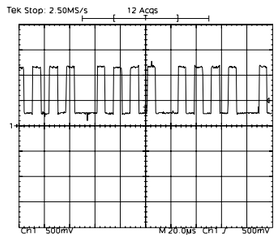
F4015 C_OUT



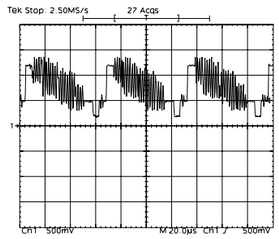
F4011 G_OUT



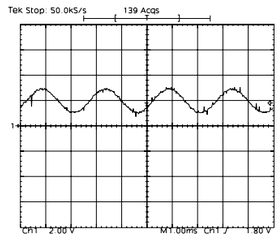
F4007 B_OUT



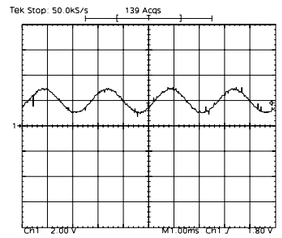
F4119 CVBS_OUT



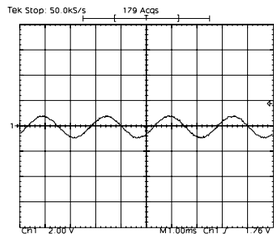
I502 AFER



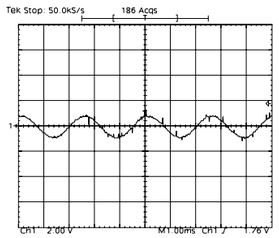
I504 AFEL



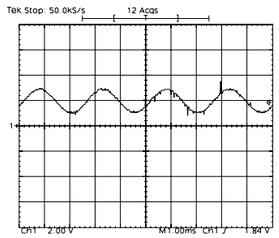
F502 IC 7504 PIN 12



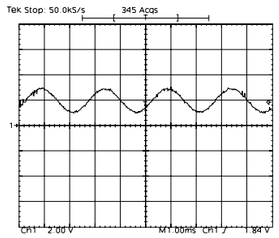
F501 IC 7504 PIN 5



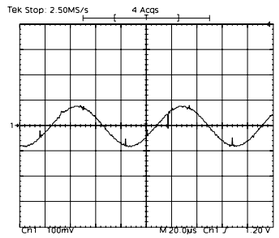
I618_AFER



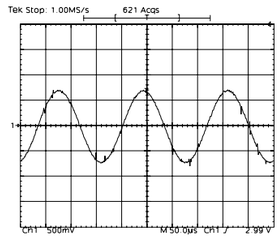
I619_AFEL



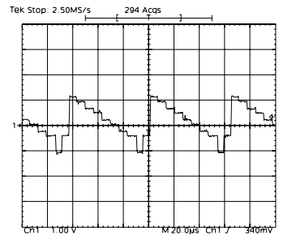
I612_AOUT2R



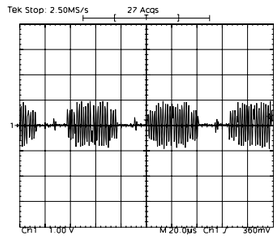
I634_AOUT2L



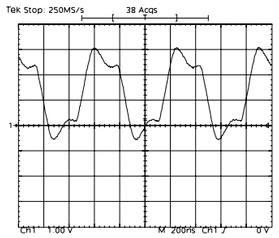
F210 Y_OUT



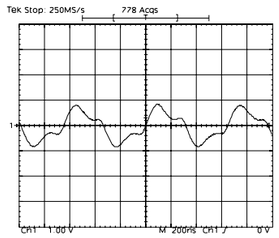
F211 C_OUT



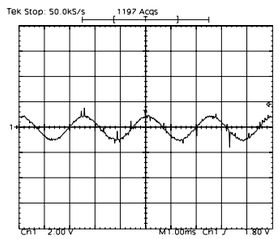
F251 DIGITAL_OUT OPTICAL



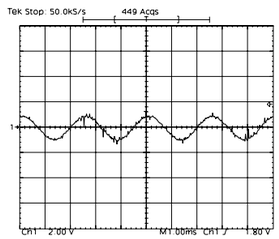
F2502 DIGITAL_OUT CINCH



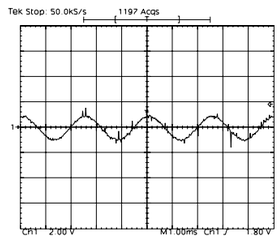
I014 ARADC



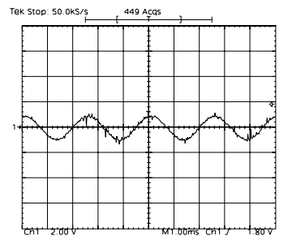
I032 ALADC



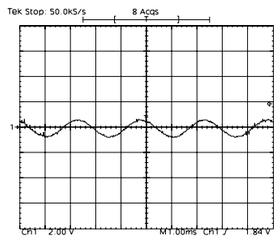
I528 IC 7509 PIN 7



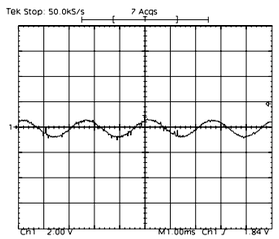
I505 IC 7509 PIN 1



I506 AOUT1L

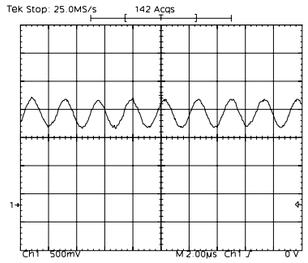


I507 AOUT1R

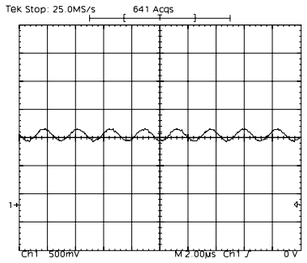


Waveforms of Digital Board

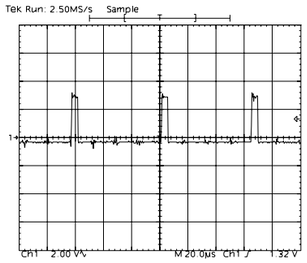
F203 IC 7200 PIN 60



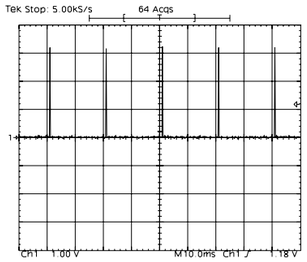
IC 7200 PIN 59



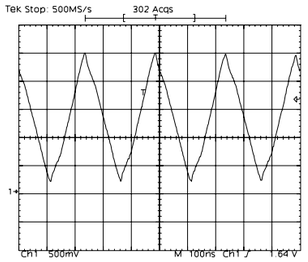
F403 HS_OUT



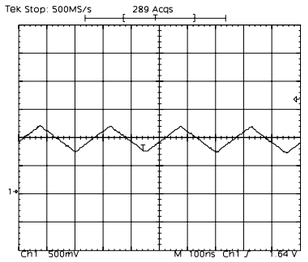
F404 VS_OUT



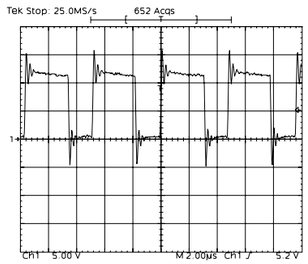
F405 XTAL_IN



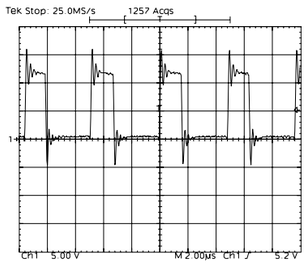
F406 XTAL_OUT



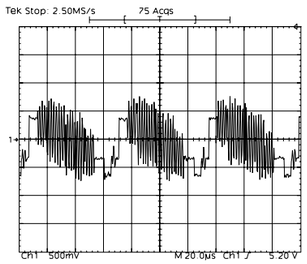
IC7501 PIN 5



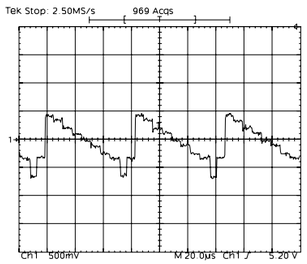
IC7501 PIN 6



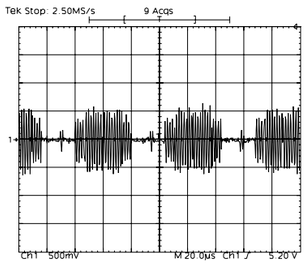
I912 D_CVBS



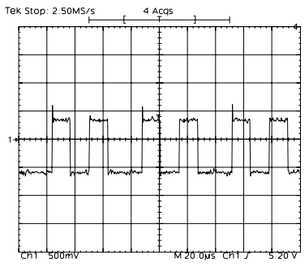
I913 D_Y



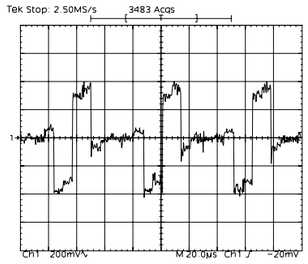
I914 D_C



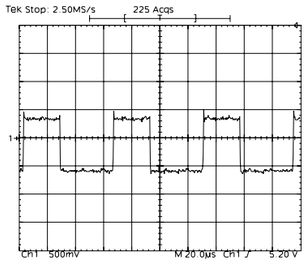
I915 D_R



I915 D_V



I916 D_G



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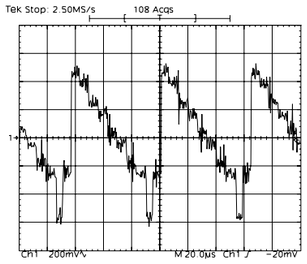
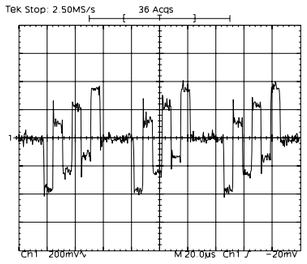
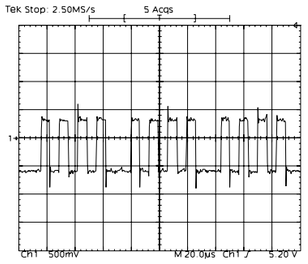


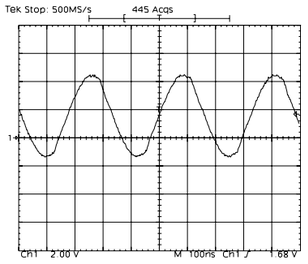
I917 D_U



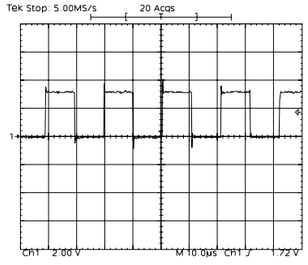
I917 D_B



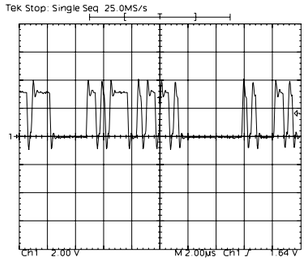
F1914 D_BCLK



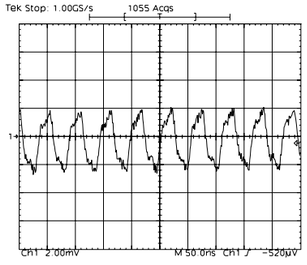
F1912 W_BCLK



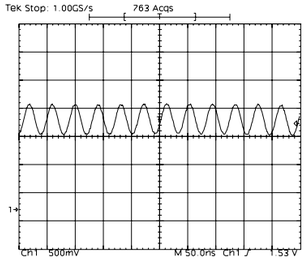
F1911 D_DATA0



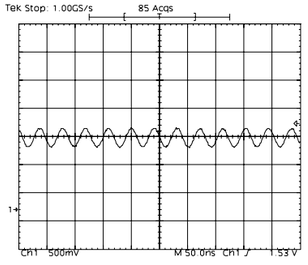
F1909 D_PCMCLK



XTAL 1001_IN

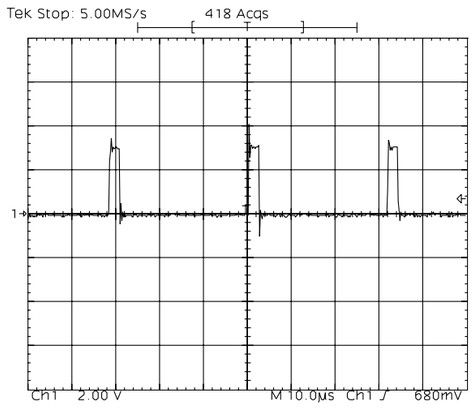


XTAL 1001_OUT

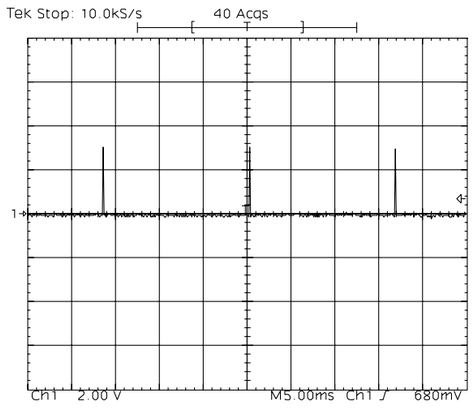


Waveforms of HDMI Board

F111 P H_SYNC

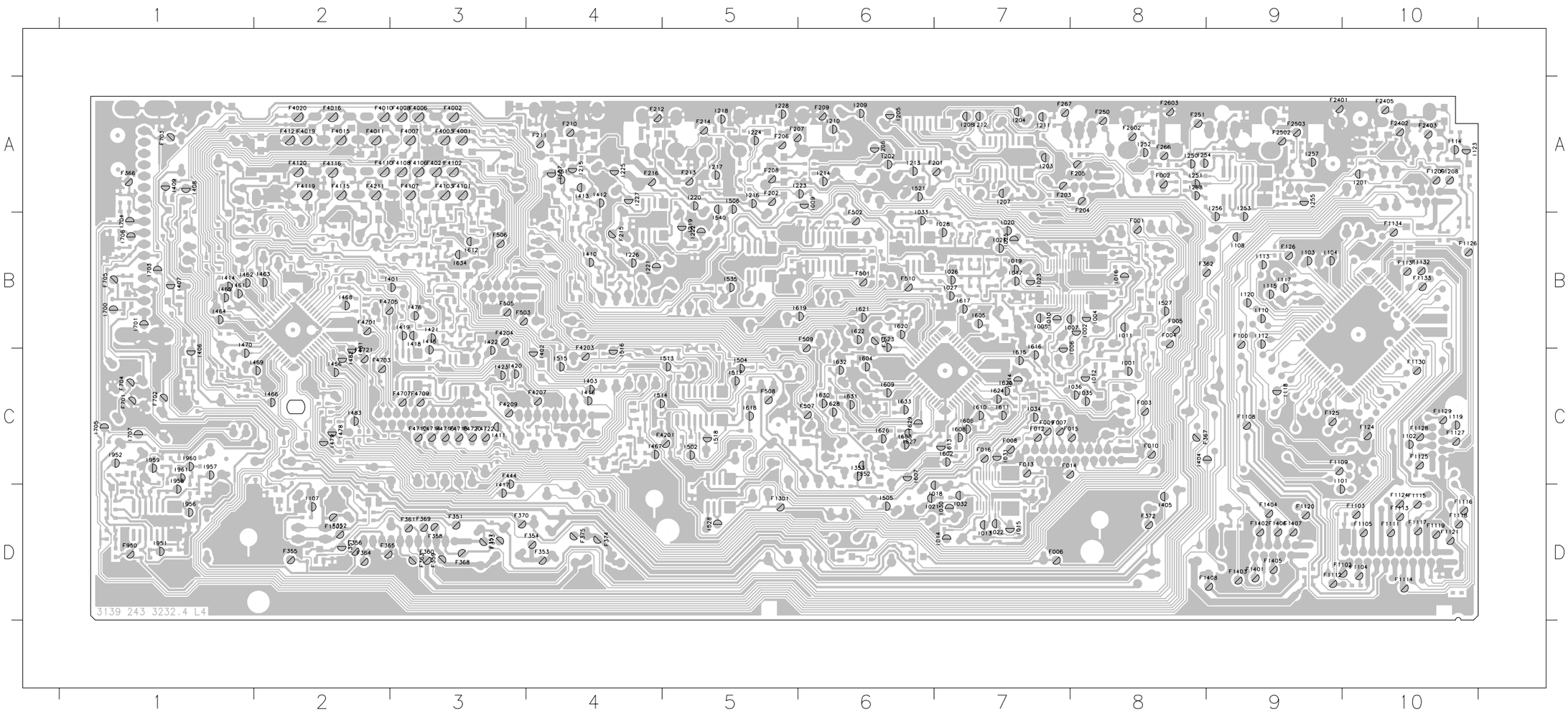


F112 P V_SYNC



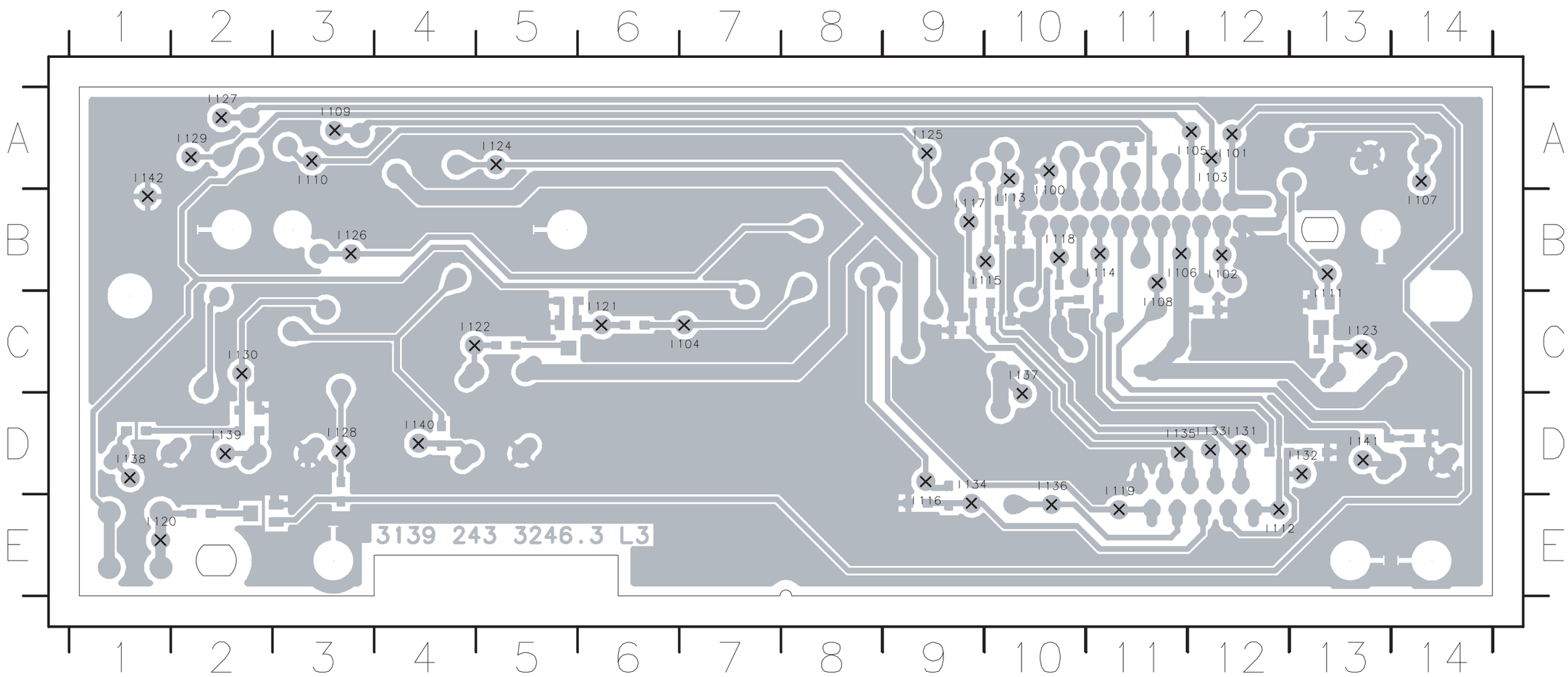
Test Points Overview for Analog Board

F001 B8
F002 A8
F003 C8
F004 B8
F005 B8
F006 C7
F007 C7
F008 C7
F009 C7
F010 C8
F011 C7
F012 C7
F013 C7
F014 C7
F015 C8
F016 C7
F100 B9
F1102 D10
F1103 D10
F1104 D10
F1105 D10
F1108 C9
F1109 C9
F1111 D10
F1112 D9
F1113 D10
F1114 D10
F1115 D10
F1116 D10
F1117 D10
F1118 D10
F1119 D10
F1120 D9
F1121 D10
F1124 D10
F1125 C10
F1126 C10
F1127 C10
F1128 C10
F1129 C10
F1130 C10
F1131 B10
F1132 B10
F1133 B10
F1134 A8
F1208 A10
F1209 A10
F124 C10
F125 C9
F126 B9
F1301 D5
F1302 D2
F1401 D9
F1402 D9
F1403 D9
F1404 D9
F1405 D9
F1406 D9
F1407 D9
F1408 D9
F2401 A9
F2402 A10
F2403 A10
F2405 A10
F250 A8
F2501 A8
F2502 A9
F2503 A9
F2551 A8
F2602 A8
F2603 A8
F266 A8
F267 A7
F2701 D7
F2711 A4
F2712 A4
F2713 A5
F2714 A5
F2715 B4
F2716 A4
F358 D3
F359 D3
F360 D3
F361 D3
F362 B8
F363 D3
F364 D2
F365 D2
F366 A1
F367 C8
F368 D3
F369 D3
F370 D3
F371 B6
F372 D8
F373 D3
F374 D4
F375 D4
F4001 A3
F4002 A3
F4003 A3
F4006 A3
F4007 A3
F4008 A3
F4010 A2
F4011 A2
F4015 A2
F4016 A2
F4019 A2
F4020 A2
F4021 A3
F4101 A3
F4102 A3
F4103 A3
F4106 A3
F4107 A3
F4108 A3
F4110 A2
F4111 A2
F4115 A2
F4116 A2
F4119 A2
F4120 A2
F4121 A2
F4201 C5
F4203 B4
F4204 B3
F4207 C4
F4209 C3
F4211 A2
F444 C3
F4701 B2
F4703 C2
F4705 B2
F4707 C3
F4709 C3
F4712 C3
F4714 C3
F4716 C3
F501 B6
F502 B6
F503 B3
F505 B3
F506 B3
F507 C6
F508 C6
F509 B6
F510 B6
F701 C1
F702 C1
F703 A1
F704 C1
F705 B1
F950 D1
I001 C8
I002 B8
I004 B8
I005 B7
I006 B8
I007 B8
I009 A6
I010 B7
I011 B8
I012 C8
I013 D7
I014 D7
I015 D7
I016 B8
I017 B7
I018 D7
I019 B7
I020 B7
I021 D6
I022 D7
I023 B7
I024 B7
I025 B7
I026 B7
I027 B7
I028 B7
I030 D7
I031 C7
I032 D7
I033 B6
I034 C7
I035 C8
I036 C8
I101 C9
I102 C10
I103 B9
I104 B9
I107 D2
I108 B9
I110 B9
I112 B9
I113 B9
I114 A10
I115 B9
I117 B9
I118 C9
I119 C10
I120 B9
I123 A10
I201 A10
I202 A6
I203 A7
I204 A7
I205 A6
I206 A6
I207 A7
I208 A7
I209 A6
I210 A6
I211 A7
I212 A7
I213 A6
I214 A6
I215 A4
I216 A5
I217 A5
I218 A5
I219 B5
I220 A5
I221 B4
I222 B5
I223 A6
I224 A5
I225 A4
I226 B4
I227 A4
I228 A5
I250 A8
I251 A8
I252 A8
I253 A9
I254 A8
I255 A9
I256 A9
I257 A9
I258 A8
I351 D2
I352 C6
I353 C6
I401 B3
I402 C4
I403 C4
I404 C8
I405 D8
I406 C1
I407 B1
I408 A1
I409 A1
I410 B4
I411 C3
I412 A4
I413 A4
I414 B1
I415 B3
I416 C4
I417 D3
I418 B3
I419 B3
I420 C3
I421 B3
I422 B3
I423 C3
I451 A4
I456 C2
I461 B1
I462 B1
I463 B2
I464 B1
I465 B1
I466 C2
I467 C4
I468 B2
I469 C2
I470 B1
I471 C2
I478 C2
I479 C2
I481 C2
I482 C2
I483 C2
I502 C5
I504 C5
I505 D6
I506 A5
I507 A4
I513 C5
I514 C4
I515 C4
I516 C4
I517 C5
I518 C5
I521 A6
I527 B8
I528 D5
I535 D5
I540 B5
I602 C7
I603 C6
I604 C6
I605 B7
I606 C7
I607 C6
I608 C7
I609 C7
I610 C7
I611 C7
I612 C7
I613 C7
I614 C7
I615 B7
I616 B7
I617 B7
I618 C5
I619 B6
I620 B6
I621 B6
I622 B6
I623 B6
I624 C7
I625 C7
I626 C6
I627 C6
I628 C6
I629 C6
I630 C6
I631 C6
I632 C6
I633 C6
I634 B3
I688 B7
I700 B1
I701 B1
I703 B1
I704 B1
I705 C1
I706 B1
I707 C1
I951 D1
I952 D1
I956 D1
I957 C1
I958 C1
I959 C1
I960 C1
I961 C1



Test Points Overview for Front Left Board

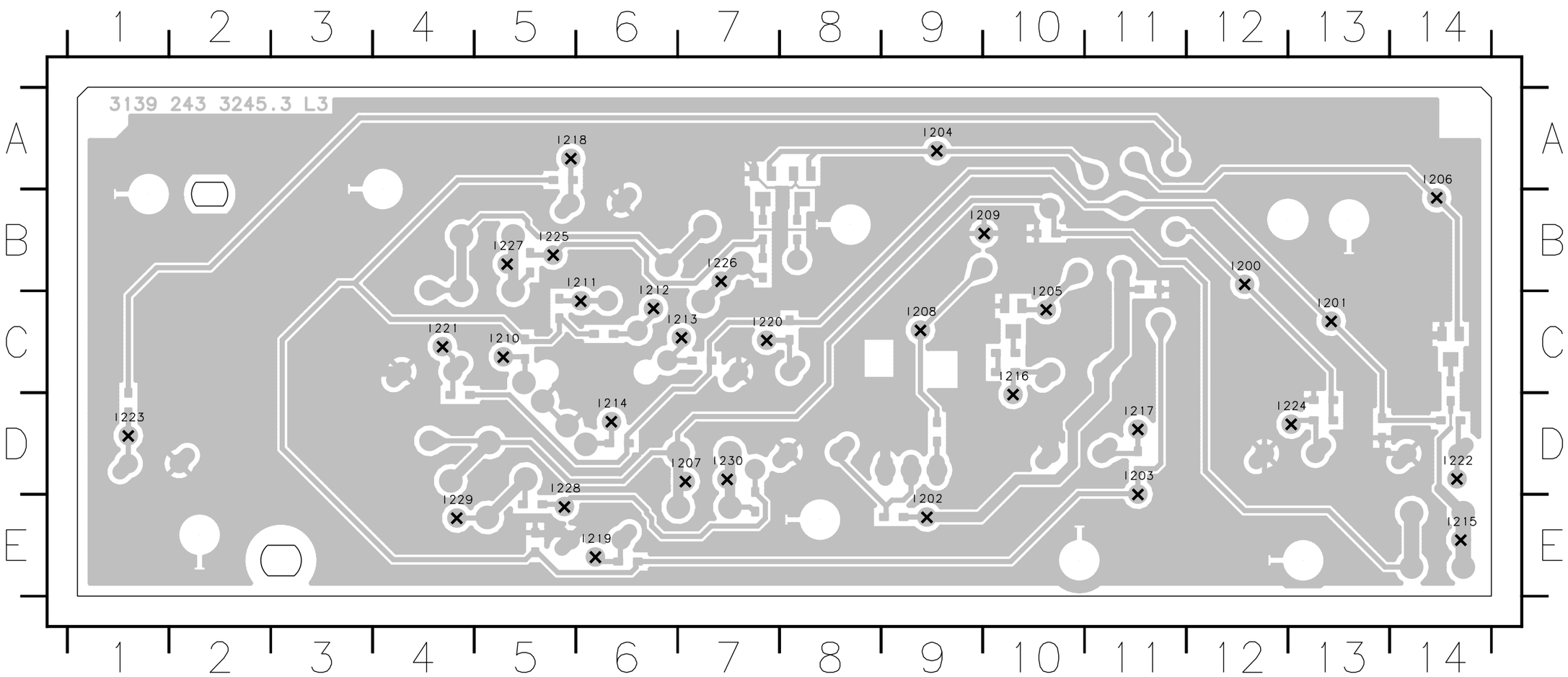
I100 A10	I105 A12	I110 A3	I115 B10	I120 E1	I125 A9	I130 C2	I135 D11	I140 D4
I101 A12	I106 B11	I111 B13	I116 D9	I121 C6	I126 B3	I131 D12	I136 E10	I141 D13
I102 B12	I107 A14	I112 E12	I117 B9	I122 C4	I127 A2	I132 D13	I137 D10	I142 B1
I103 A12	I108 B11	I113 A10	I118 B10	I123 C13	I128 D3	I133 D12	I138 D1	
I104 C7	I109 A3	I114 B11	I119 E11	I124 A5	I129 A2	I134 E9	I139 D2	



front_left_3139_243_32463_testpoint_2.pdf 2005-10-31

Test Points Overview for Front Right Board

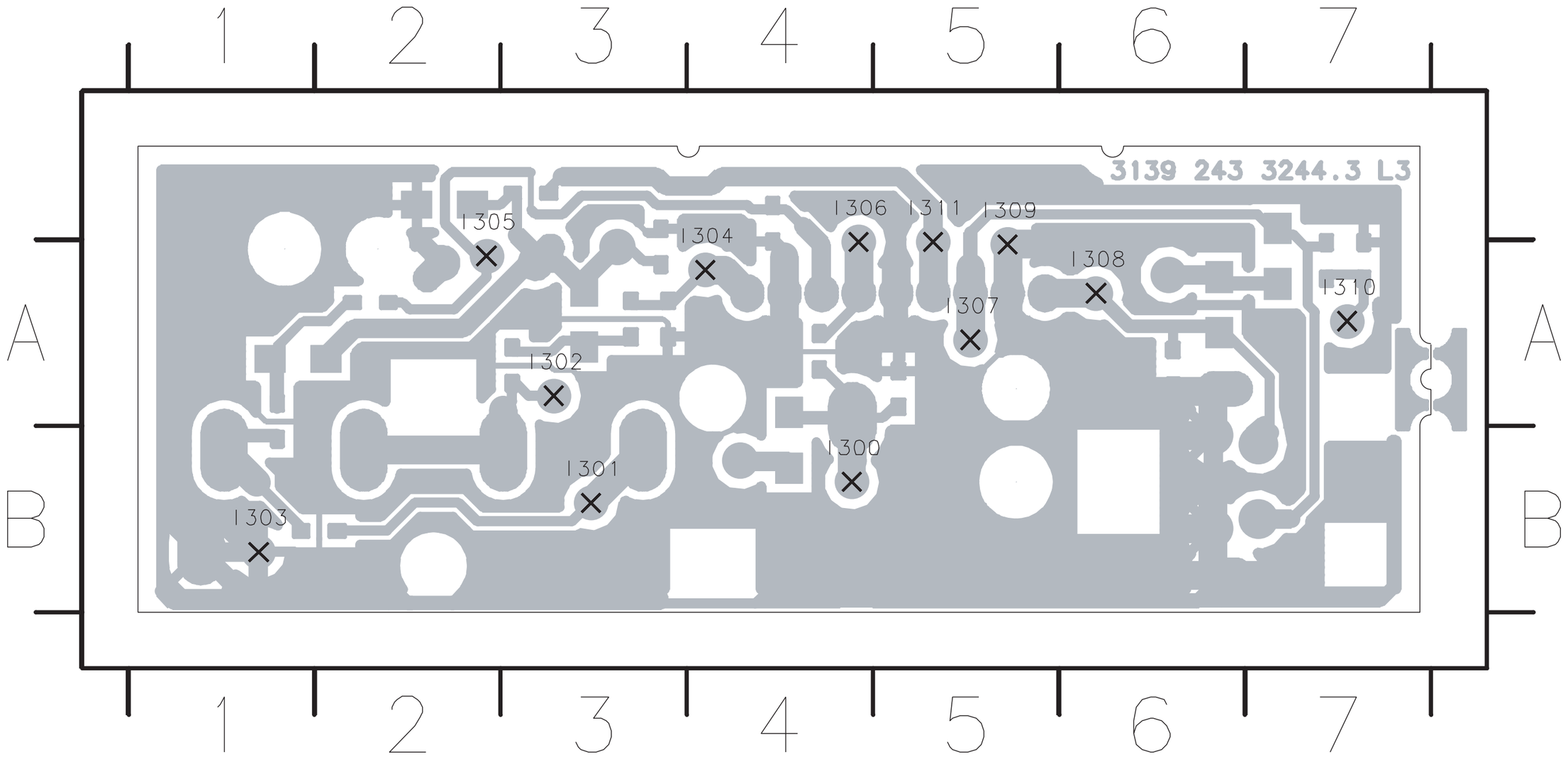
I200 B12	I203 D11	I207 D7	I210 C5	I214 D6	I217 D11	I221 C4	I224 D13	I228 D5
I200 B12	I204 A9	I207 D7	I211 B6	I214 D6	I218 A5	I221 C4	I225 B5	I228 E5
I201 C13	I204 A9	I208 C9	I211 C6	I215 E14	I218 A5	I222 D14	I225 B5	I229 E4
I201 C13	I205 C10	I208 C9	I212 B6	I215 E14	I219 E6	I222 D14	I226 B7	I229 E4
I202 E9	I205 C10	I209 B10	I212 C6	I216 C10	I219 E6	I223 D1	I226 B7	I230 D7
I202 E9	I206 A14	I209 B10	I213 C7	I216 D10	I220 C7	I223 D1	I227 B5	I230 D7
I203 D11	I206 B14	I210 C5	I213 C7	I217 D11	I220 C7	I224 D13	I227 B5	



front_right_3139_243_32453_tpoint2.pdf 2005-10-31

Test Points Overview for Front AV_INPUT Board

I300 B4	I303 B1	I306 A4	I309 A5
I301 B3	I304 A4	I307 A5	I310 A7
I302 A3	I305 A2	I308 A6	I311 A5



front_av_in_3139_243_32443_testpoint_2.pdf 2005-10-31

Test Points Overview for Digital Board

U1 B1 F0004 D3 F0109 F8 F0125 F8 F017 E3 F0210 F5 F0231 E6 F0314 F2 F0406 D1 F0425 C1 F0508 F5 F1402 A6 F1501 E3 F1902 B1 F201 A3 I106 D6 I411 A6 I901 E1
U1 B1 F0004 D3 F0109 F8 F0125 F8 F017 E3 F0210 F5 F0231 E6 F0314 F2 F0406 D1 F0425 C1 F0508 F5 F1402 A6 F1501 E3 F1902 B1 F201 A3 I106 D6 I411 A6 I901 E1
U2 B1 F0005 D3 F0111 D3 F0127 F8 F018 E3 F0211 F5 F0232 E6 F0315 F2 F0407 D1 F0426 C1 F0509 F5 F1403 A6 F1502 E3 F1903 B1 F202 A2 I107 A7 I412 A6 I902 D1
U2 B1 F0005 D3 F0111 D3 F0127 F8 F018 E3 F0211 F5 F0232 E6 F0315 F2 F0407 D1 F0426 C1 F0509 F5 F1403 A6 F1502 E3 F1903 B1 F202 A2 I107 A7 I412 A6 I902 D1
U3 B1 F0006 D3 F0110 F8 F0129 F8 F019 E3 F0212 F5 F0233 E6 F0316 F2 F0408 D1 F0427 C1 F0510 F5 F1405 A5 F1503 E4 F1904 B1 F203 A2 I108 A7 I413 C6 I903 E1
U3 B1 F0006 D3 F0110 F8 F0129 F8 F019 E3 F0212 F5 F0233 E6 F0316 F2 F0408 D1 F0427 C1 F0510 F5 F1405 A5 F1503 E4 F1904 B1 F203 A2 I108 A7 I413 C6 I903 E1
U4 B1 F0007 D3 F0111 F8 F0131 E2 F020 F3 F0213 F5 F0234 E6 F0317 F2 F0409 B6 F0428 C1 F0511 F5 F1407 A5 F1505 E4 F1907 A1 F204 A4 I109 A3 I414 B4 I904 E1
U4 B1 F0007 D3 F0111 F8 F0131 E2 F020 F3 F0213 F5 F0234 E6 F0317 F2 F0409 B6 F0428 C1 F0511 F5 F1407 A5 F1505 E4 F1907 A1 F204 A4 I109 A3 I414 B4 I904 E1
F0001 F5 F0008 D2 F0112 F8 F0131 E8 F0201 F4 F0214 F5 F0233 E6 F0318 F2 F0410 A8 F0429 C1 F0512 F5 F1408 A5 F1506 E3 F1909 A1 F205 C5 I110 A7 I415 A6 I905 D1
F0001 F5 F0008 D2 F0112 F8 F0131 E8 F0201 F4 F0214 F5 F0233 E6 F0318 F2 F0410 A8 F0429 C1 F0512 F5 F1408 A5 F1506 E3 F1909 A1 F205 C5 I110 A7 I415 A6 I905 D1
F0003 F6 F0009 D2 F0113 F8 F0132 E7 F0202 F4 F0215 F5 F0234 E6 F0319 F2 F0411 B1 F0430 C1 F0513 F5 F1409 A5 F1507 E4 F1911 A1 F206 A4 I111 C2 I416 B5 I906 E1
F0003 F6 F0009 D2 F0113 F8 F0132 E7 F0202 F4 F0215 F5 F0234 E6 F0319 F2 F0411 B1 F0430 C1 F0513 F5 F1409 A5 F1507 E4 F1911 A1 F206 A4 I111 C2 I416 B5 I906 E1
F0005 F5 F0101 A8 F0114 F8 F0133 E7 F0203 F4 F0216 F5 F0235 E6 F0320 F2 F0412 B1 F0431 C1 F0514 F5 F1411 C4 F1509 E4 F1912 A1 F207 A4 I112 A7 I417 D5 I907 E1
F0005 F5 F0101 A8 F0114 F8 F0133 E7 F0203 F4 F0216 F5 F0235 E6 F0320 F2 F0412 B1 F0431 C1 F0514 F5 F1411 C4 F1509 E4 F1912 A1 F207 A4 I112 A7 I417 D5 I907 E1
F0005 F6 F0101 A8 F0114 F8 F0133 E7 F0203 F4 F0216 F5 F0235 E6 F0320 F2 F0412 B1 F0431 C1 F0514 F5 F1411 C4 F1509 E4 F1912 A1 F207 A4 I112 A7 I417 D5 I907 E1
F0005 F6 F0101 A8 F0114 F8 F0133 E7 F0203 F4 F0216 F5 F0235 E6 F0320 F2 F0412 B1 F0431 C1 F0514 F5 F1411 C4 F1509 E4 F1912 A1 F207 A4 I112 A7 I417 D5 I907 E1
F0007 F6 F0102 E4 F0115 F8 F0134 E7 F0204 F4 F0217 F5 F0236 E6 F0321 F2 F0413 B1 F0432 C1 F0515 F5 F1412 C4 F1510 E4 F1913 A1 F208 A4 I113 A6 I418 C3 I908 E1
F0007 F6 F0102 E4 F0115 F8 F0134 E7 F0204 F4 F0217 F5 F0236 E6 F0321 F2 F0413 B1 F0432 C1 F0515 F5 F1412 C4 F1510 E4 F1913 A1 F208 A4 I113 A6 I418 C3 I908 E1
F0009 F6 F0103 F8 F0116 F8 F0135 E7 F0205 F4 F0218 F5 F0237 E6 F0322 F2 F0414 B1 F0433 C1 F0516 F5 F1413 A5 F1511 E4 F1914 A1 F209 A4 I114 A6 I419 C6 I909 E1
F0009 F6 F0103 F8 F0116 F8 F0135 E7 F0205 F4 F0218 F5 F0237 E6 F0322 F2 F0414 B1 F0433 C1 F0516 F5 F1413 A5 F1511 E4 F1914 A1 F209 A5 I114 A6 I419 C6 I909 E1
F0011 E2 F0104 F8 F0117 F8 F0136 E7 F0206 F5 F0221 E6 F0238 E6 F0323 F2 F0415 B1 F0434 C1 F0517 F5 F1414 A5 F1512 E4 F1916 A1 F210 A4 I115 A7 I420 C7 I910 E1
F0011 E2 F0104 F8 F0117 F8 F0136 E7 F0206 F5 F0221 E6 F0238 E6 F0323 F2 F0415 B1 F0434 C1 F0517 F5 F1414 A5 F1512 E4 F1916 A1 F210 A4 I115 A7 I420 C7 I910 E1
F0011 F6 F0105 F8 F0118 F8 F0137 E7 F0207 F5 F0223 E6 F0239 E7 F0324 F2 F0416 B1 F0435 C1 F0518 F5 F1415 A5 F1513 E4 F1918 A1 F211 A4 I116 E6 I421 C6 I911 E1
F0011 F6 F0105 F8 F0118 F8 F0137 E7 F0207 F5 F0223 E6 F0239 E7 F0324 F2 F0416 B1 F0435 C1 F0518 F5 F1415 A5 F1513 E4 F1918 A1 F211 A4 I116 E6 I421 C6 I911 E1
F0015 F7 F0106 F8 F012 E3 F014 E4 F021 F4 F0225 E6 F0240 E7 F0325 F2 F0417 B1 F0436 C1 F0519 F5 F1416 A5 F1514 E4 F1919 A1 F212 A4 I117 E3 I422 D6 I912 E1
F0015 F7 F0106 F8 F012 E3 F014 E4 F021 F4 F0225 E6 F0240 E7 F0325 F2 F0417 B1 F0436 C1 F0519 F5 F1416 A5 F1514 E4 F1919 A1 F212 A4 I117 E3 I422 D6 I912 E1
F002 E3 F0107 F8 F0121 F8 F015 E2 F0208 F5 F0226 E6 F0241 E7 F0326 F2 F0418 B1 F0437 C1 F0520 F5 F1417 A5 F1515 E4 F1920 A1 F213 A4 I118 B1 I423 C6 I913 E1
F002 E3 F0107 F8 F0121 F8 F015 E2 F0208 F5 F0226 E6 F0241 E7 F0326 F2 F0418 B1 F0437 C1 F0520 F5 F1417 A5 F1515 E4 F1920 A1 F213 A4 I118 B1 I423 C6 I913 E1
F002 E3 F0107 F8 F0121 F8 F0155 E2 F0209 F5 F0227 E6 F0310 F2 F0404 D1 F0423 C1 F0503 F5 F1205 A5 F1604 C1 F1922 E7 F214 C5 I119 F9 I424 C2 I914 E1
F002 E3 F0107 F8 F0121 F8 F0155 E2 F0209 F5 F0227 E6 F0310 F2 F0404 D1 F0423 C1 F0503 F5 F1205 A5 F1604 C1 F1922 E7 F214 C5 I119 F9 I424 C2 I914 E1
F003 D2 F0108 F8 F0123 F8 F016 E3 F021 F3 F0229 E6 F0312 F2 F0405 D1 F0424 C1 F0506 F5 F1401 A6 F1427 A5 F1606 C1 F200 A4 F215 C5 I123 A6 I425 D6 I915 E1
F003 D3 F0108 F8 F0123 F8 F016 E3 F021 F3 F0229 E6 F0312 F2 F0405 D1 F0424 C1 F0506 F5 F1401 A6 F1427 A5 F1606 C1 F200 A4 F215 C5 I123 A6 I425 D6 I915 E1
F216 A4 I124 A8 I426 D6 I916 E1
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F217 A4 I125 A7 I427 D5 I917 E1
F217 A4 I125 A7 I427 D5 I917 E1
F320 E9 I200 D4 I428 C6 I918 B1
F320 E9 I200 D4 I428 C6 I918 B1
F321 E8 I201 A2 I429 C6 I919 D1
F321 E8 I201 A2 I429 C6 I919 D1
F322 E7 I202 A2 I430 C6 I920 E1
F322 E7 I202 A2 I430 C6 I920 E1
F323 E7 I203 A2 I431 D5 I921 D3
F323 E7 I203 A2 I431 D5 I921 D3
F324 E8 I204 A3 I431 D5 I922 D3
F324 E8 I204 A3 I431 D5 I922 D3
F400 C7 I205 A7 I432 C6 I923 C3
F400 C7 I205 A7 I432 C6 I923 C3
F401 C6 I206 D4 I433 E6 I924 C3
F401 C7 I206 D4 I433 E6 I924 C3
F402 D6 I207 A1 I434 D5 I925 C3
F402 D6 I207 A1 I434 D5 I925 C3
F403 B5 I208 A2 I435 C6 I926 C3
F403 B5 I208 A2 I435 C6 I926 C3
F404 B5 I209 A1 I436 D6 I927 E1
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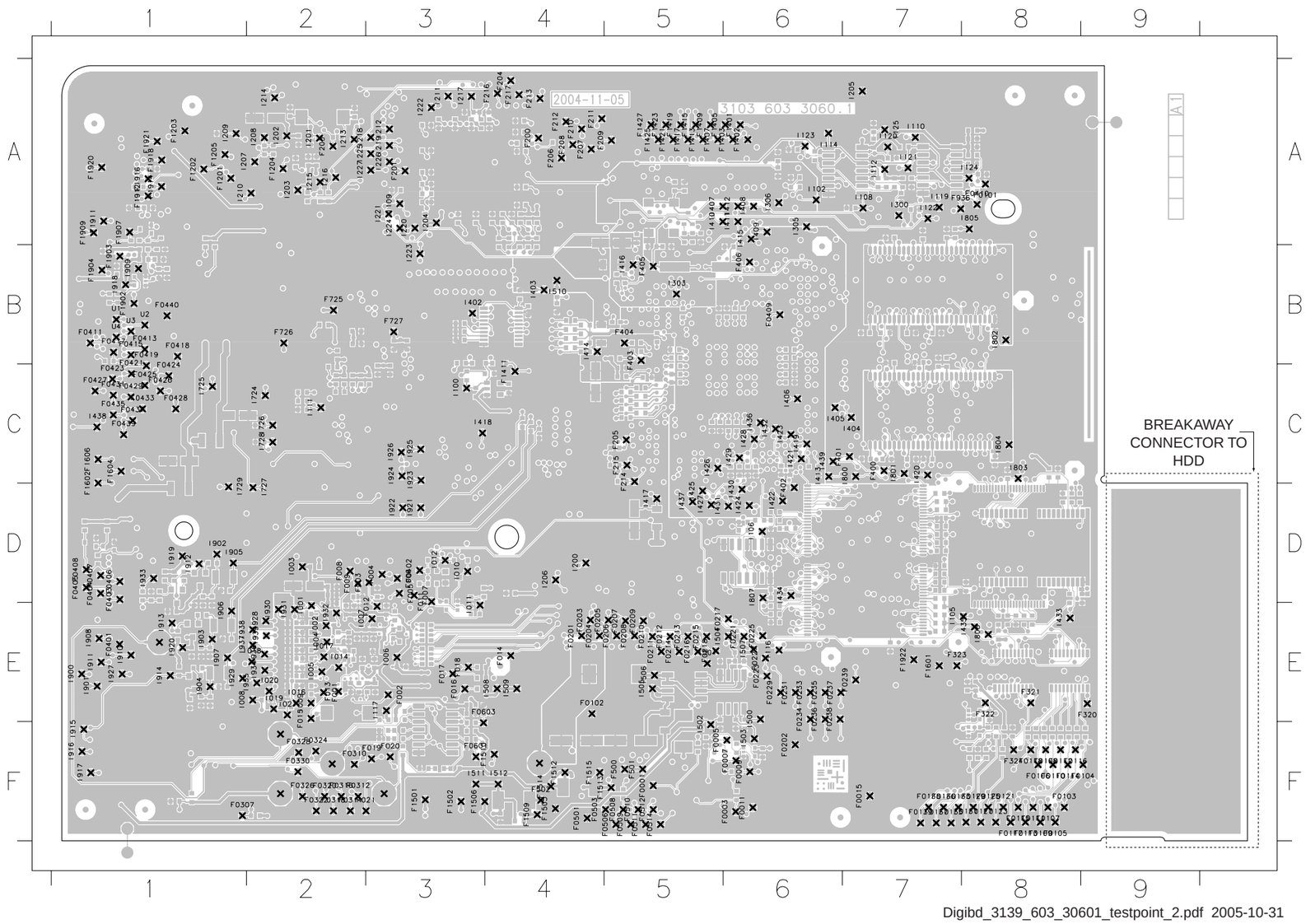
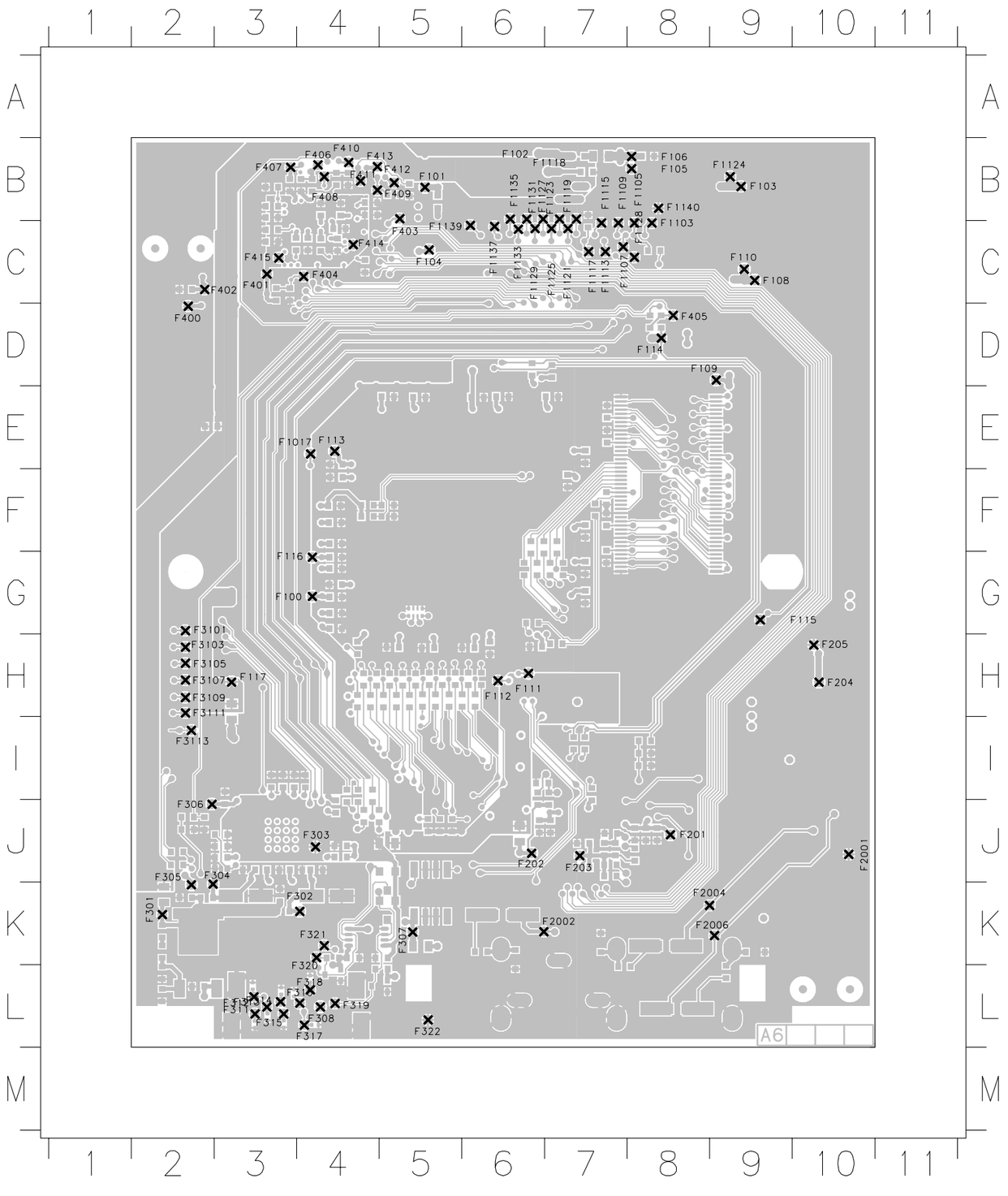
F405 B5 I210 A2 I437 D5 I928 E2
F405 B5 I210 A2 I437 D5 I928 E2
F406 B5 I211 A3 I438 C6 I929 E1
F406 B5 I211 A3 I438 C6 I929 E1
F500 E5 I212 A3 I439 C6 I930 E2
F500 E5 I212 A3 I439 C6 I930 E2
F501 E5 I213 A2 I500 E6 I931 E2
F501 E5 I213 A2 I500 E6 I931 E2
F502 E4 I214 A2 I501 E5 I932 E2
F502 E4 I214 A2 I501 E5 I932 E2
F725 B3 I215 A2 I502 E5 I933 D1
F725 B3 I215 A2 I502 E5 I933 D1
F726 B3 I216 A2 I503 E5 I934 E2
F726 B3 I216 A2 I503 E5 I934 E2
F727 B3 I217 A3 I504 E6 I935 E1
F727 B3 I217 A3 I504 E6 I935 E1
F936 A7 I218 A2 I505 E5 I936 E2
F936 A7 I218 A3 I505 E5 I936 E2
F001 E2 I219 A3 I506 E6 I937 E1
F001 E2 I219 A3 I506 E6 I937 E1
F002 E2 I220 A3 I507 E6 I938 E2
F002 E2 I220 A3 I507 E6 I938 E2
F003 D2 I221 A3 I508 E4 I939 E2
F003 D2 I221 A3 I508 E4 I939 E2
F004 E2 I222 A3 I509 E4
F004 E2 I222 A3 I509 E4
F005 E2 I223 B3 I510 B4
F005 E2 I223 B3 I510 B4
F006 E3 I224 A3 I511 E3
F006 E3 I224 A3 I511 E3
F007 E3 I225 A3 I512 E4
F007 E3 I225 A3 I512 E4
F008 E1 I226 A3 I513 C2
F008 E2 I226 A3 I724 C2
F009 E2 I227 A2 I725 C1
F009 E2 I227 A3 I725 C1
F010 D3 I300 A7 I726 C2
F010 D3 I300 A7 I726 C2
F011 E3 I303 B5 I727 D2
F011 E3 I303 B5 I727 D2
F012 E3 I305 A6 I728 C2
F012 E3 I305 A6 I728 C2
F014 E2 I306 A6 I729 D1
F014 E2 I306 A6 I729 D1
F015 E2 I402 B3 I800 C7
F015 E2 I402 B3 I800 C7
F016 E2 I403 B4 I801 C7
F016 E2 I403 B4 I801 C7
F017 E3 I404 C7 I802 B6
F017 E3 I404 C7 I802 B6
F018 E3 I405 C6 I803 B6
F018 E3 I405 C6 I803 B6
F019 E3 I406 C6 I804 C6
F019 E3 I406 C6 I804 C6
F020 E3 I407 A5 I805 A6
F020 E3 I407 A5 I805 A6
F021 E3 I408 A6 I806 D6
F021 E3 I408 A6 I806 D6
I100 C3 I409 A6 I807 D6
I100 C3 I409 A6 I807 D6
I101 A6 I410 A5 I900 E1
I101 A6 I410 A5 I900 E1
I105 E7
I105 E8



Digibd_3139_603_30601_testpoint_2.pdf 2005-10-31

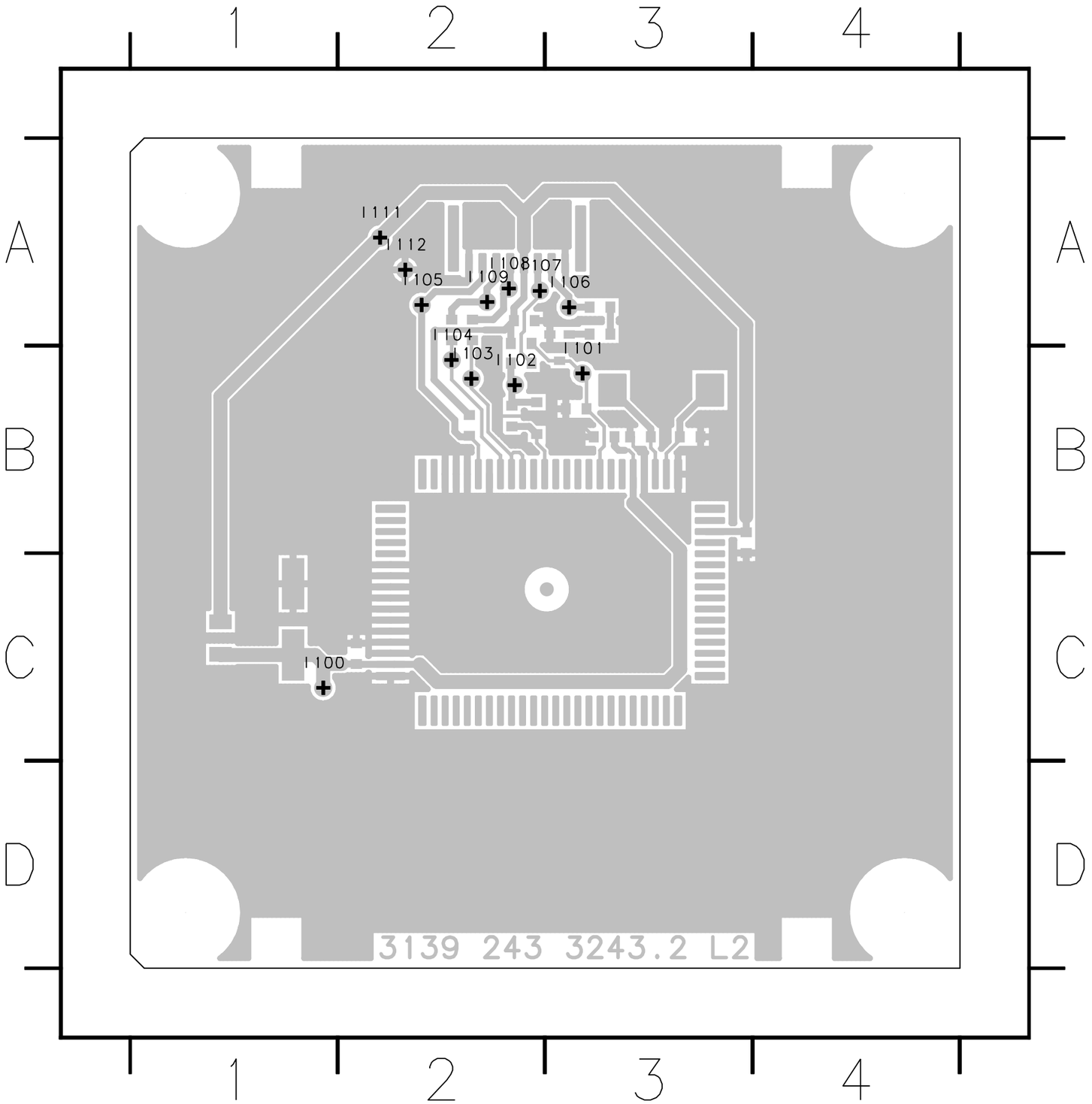
Test Points Overview for HDMI Board



F100 G3	F115 G10	F320 K4
F100 G4	F115 G9	F320 L4
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 K7	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	F3111 L3	
F1127 B6	F3111 L3	
F1128 C8	F3111 H2	
F1128 C8	F3111 H2	
F1129 C6	F3113 I2	
F1129 C6	F3113 I2	
F1133 E4	F3312 L3	
F1133 E4	F3312 L3	
F1131 B6	F3313 L3	
F1131 B6	F3313 L3	
F1133 C6	F3314 L3	
F1133 C6	F3314 L3	
F1135 B6	F3315 L3	
F1135 B6	F3315 L3	
F1137 C6	F3316 L4	
F1137 C6	F3316 L4	
F1139 C5	F3317 L4	
F1139 C6	F3317 L4	
F1140 D8	F3318 L4	
F1140 D8	F3318 L4	
F1140 B8	F3319 L4	
F1140 B8	F3319 L4	

HDMIbd_3139_603_30586_testpoint_2.pdf 2005-10-31

Test Points Overview for IR Blaster Board

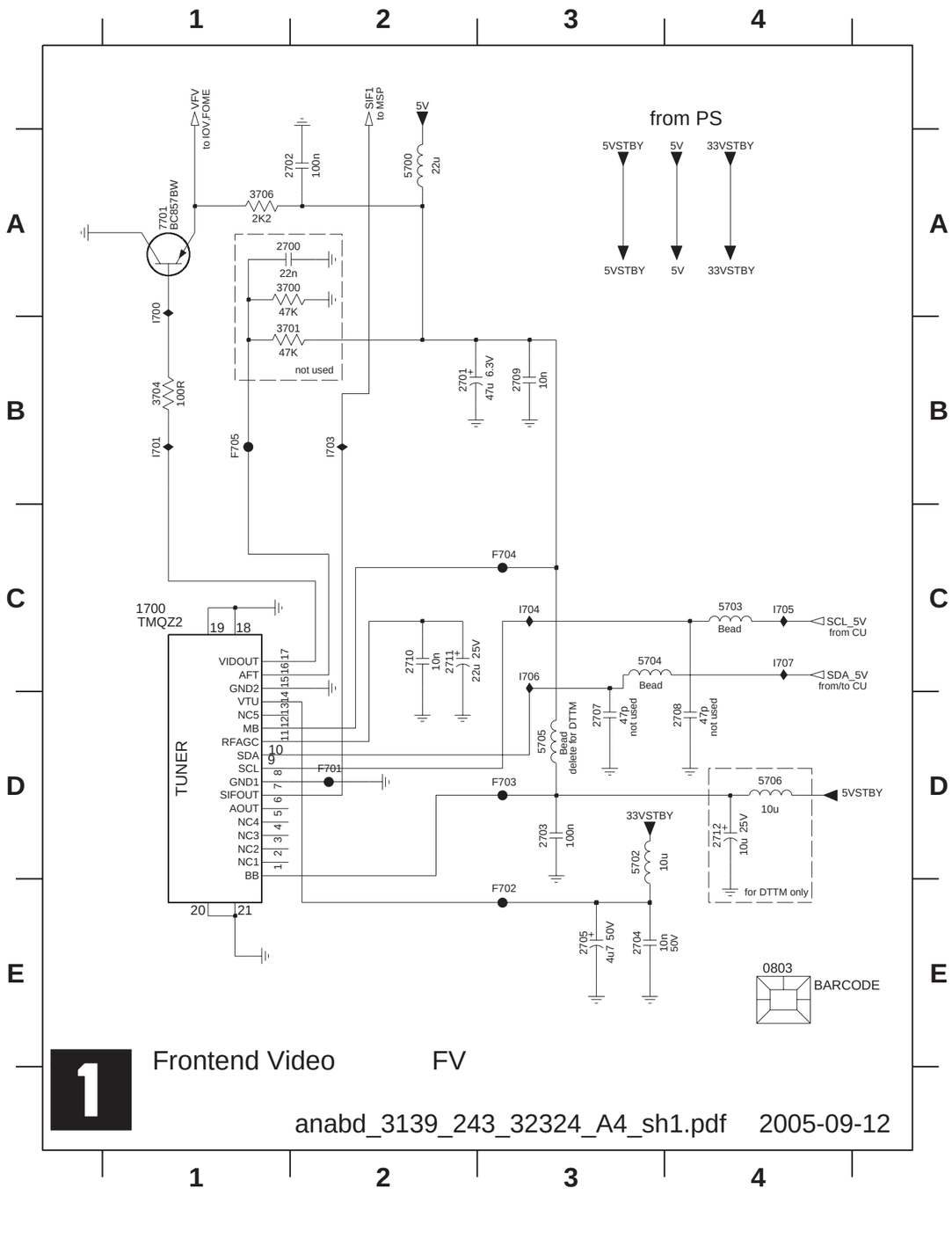


I100	C1
I100	C1
I101	B3
I101	B3
I102	B2
I102	B2
I103	B2
I103	B2
I104	A2
I104	B2
I105	A2
I105	A2
I106	A3
I106	A3
I107	A2
I107	A2
I108	A2
I108	A2
I109	A2
I109	A2
I111	A2
I111	A2
I112	A2
I112	A2

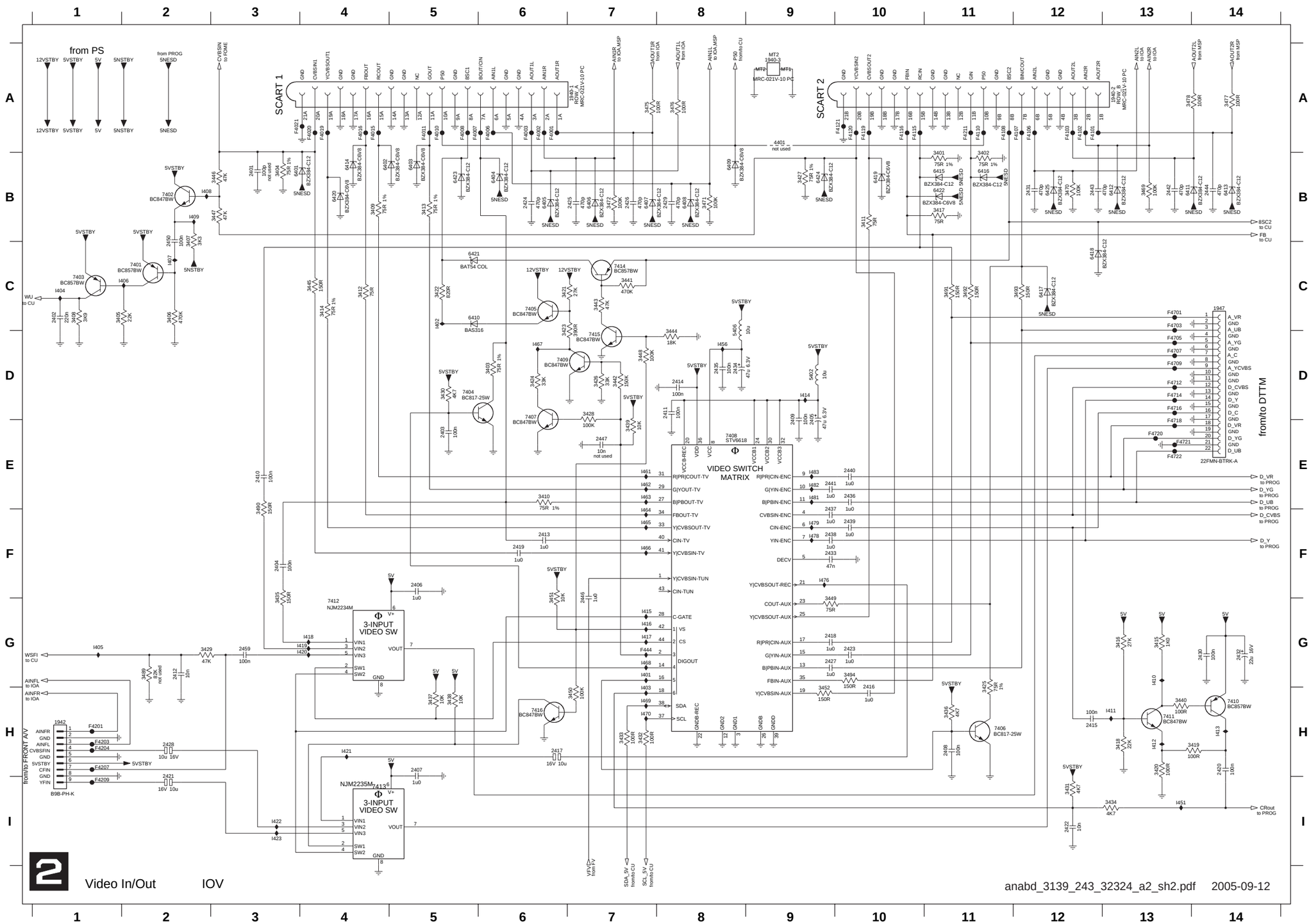
7. Circuit Diagrams and PWB Layouts

Analog: Frontend Video (FV)

0803 E4 2702 A2 2707 D3 2711 C2 3704 B1 5703 C4 7701 A1 F704 C3 I703 B2 I707 C4
1700 C1 2703 D3 2708 D4 2712 D4 3706 A1 5704 C3 F701 D2 F705 B1 I704 C3
2700 A1 2704 E3 2709 B3 3700 A1 5700 A2 5705 D3 F702 E3 I700 A1 I705 C4
2701 B2 2705 E3 2710 C2 3701 B1 5702 D3 5706 D4 F703 D3 I701 B1 I706 C3

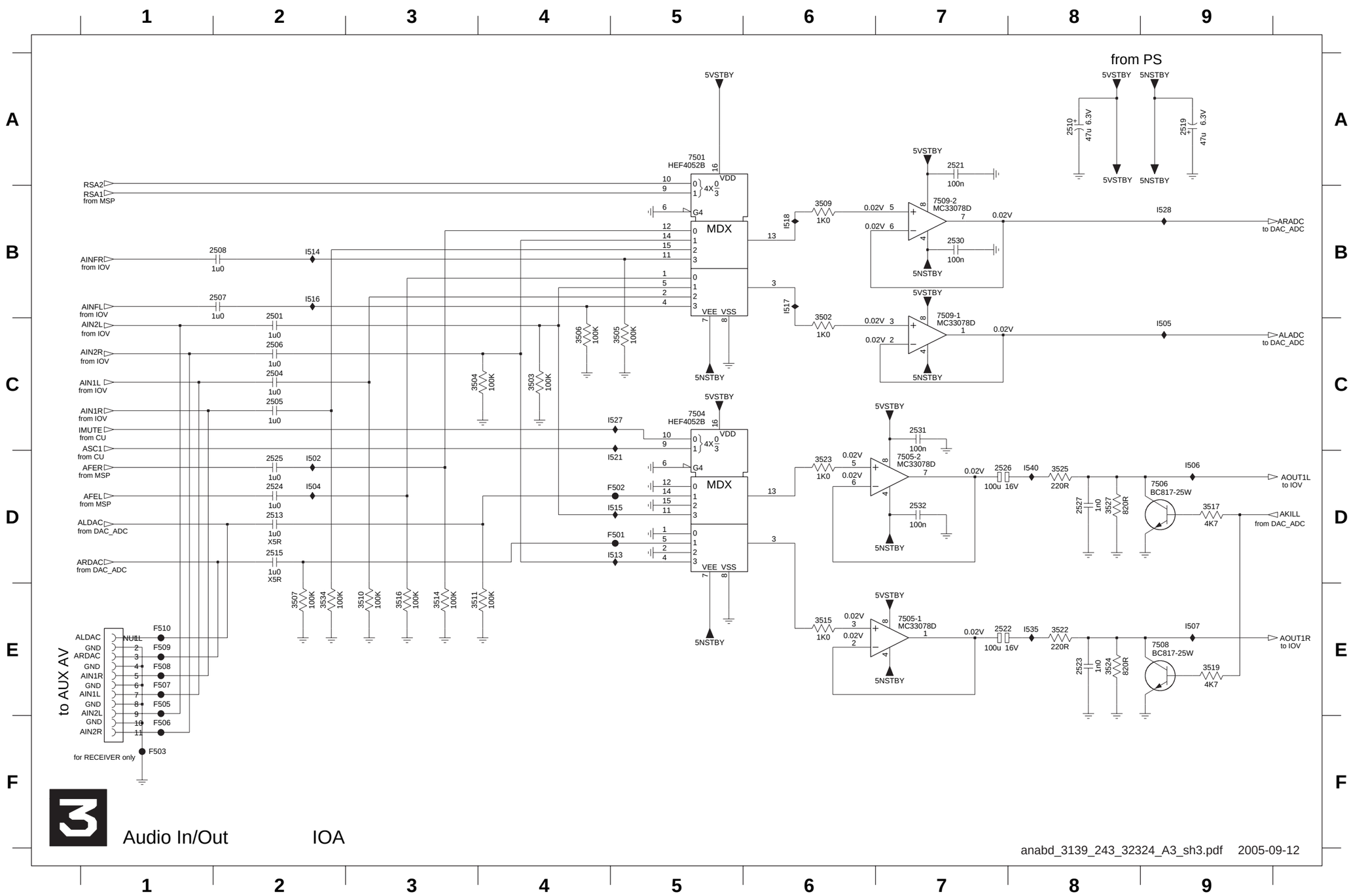


Analog: Video In / Out (IOV)



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

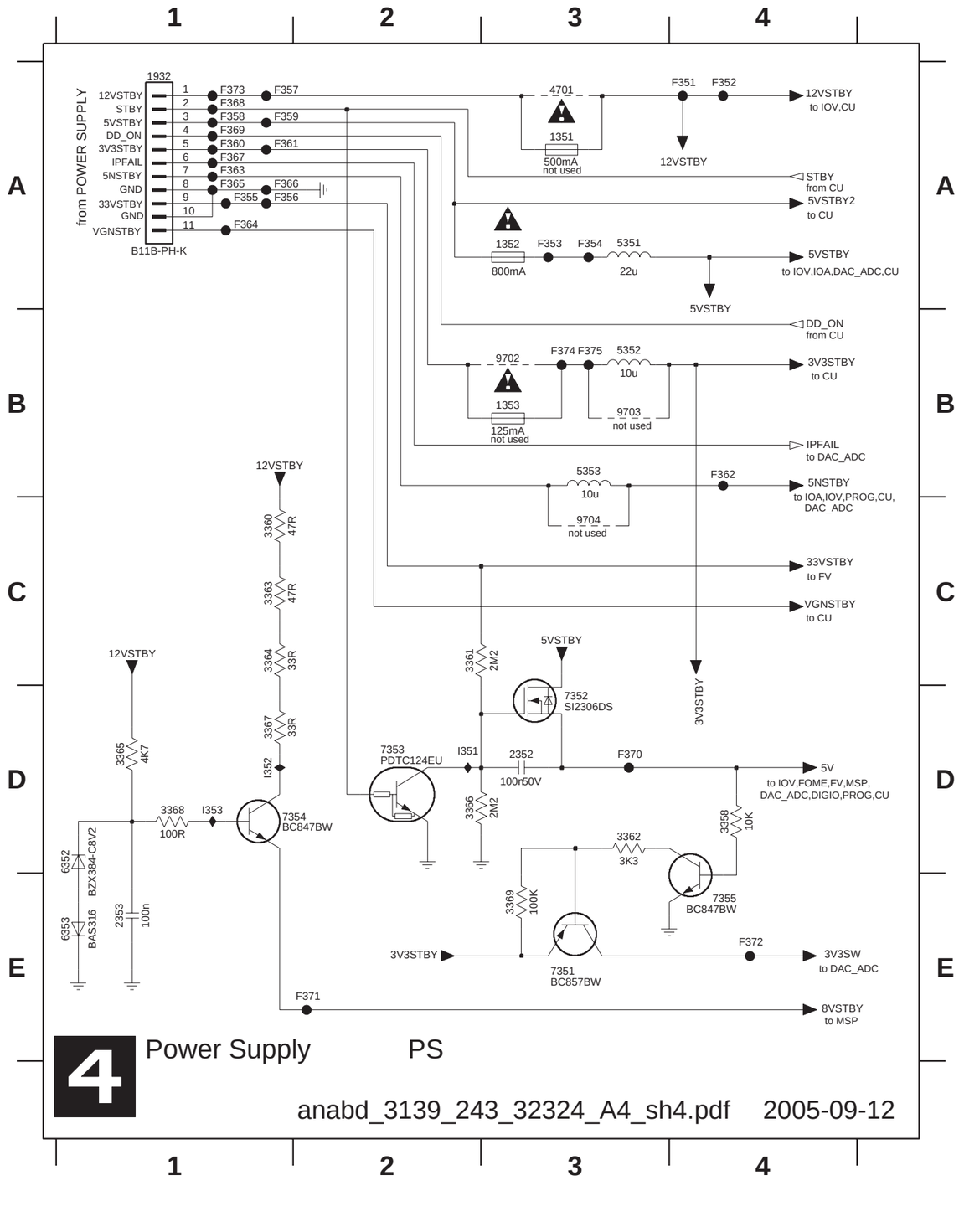
Analog: Audio In / Out (IOA)



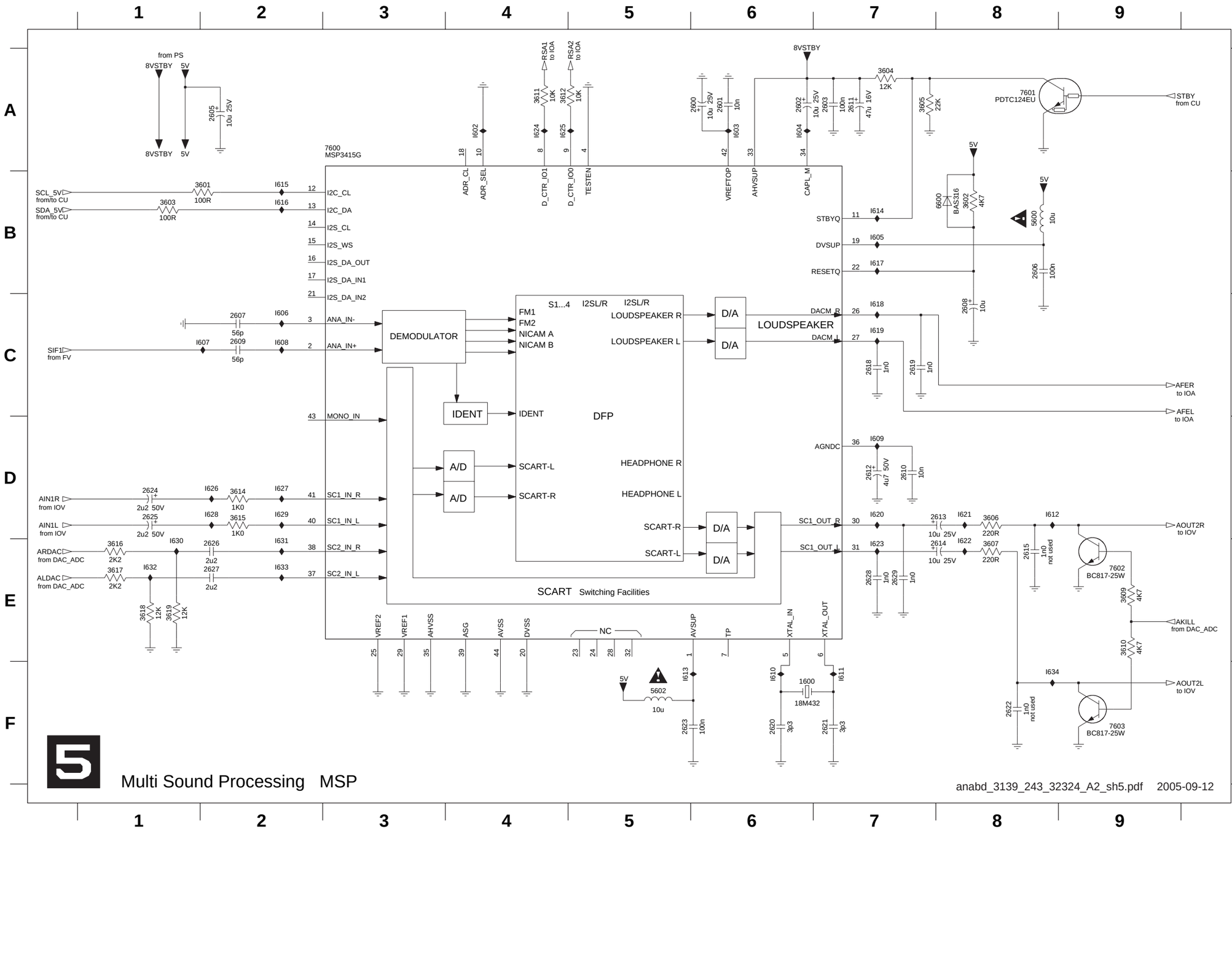
2501 C2
2504 C2
2505 C2
2506 C2
2507 B2
2508 B2
2510 A8
2513 D2
2515 D2
2519 A9
2521 A7
2522 E7
2523 E8
2524 D2
2525 D2
2526 D7
2527 D8
2530 B7
2531 C7
2532 D7
3502 C6
3503 C4
3504 C3
3505 C5
3506 C4
3507 E2
3509 B6
3510 E3
3511 E3
3514 E3
3515 E6
3516 E3
3517 D9
3519 E9
3522 E8
3523 D6
3524 E8
3525 D8
3527 D8
3534 E2
7501 A5
7504 C5
7505-1 E7
7505-2 D7
7506 D9
7508 E9
7509-1 B7
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 D1	F351 A4	F356 A1	F361 A1	F366 A1	F371 E2	I351 D2	
1353 B3	3360 C1	3365 D1	4701 A3	6353 E1	7355 E4	F352 A4	F357 A1	F362 B4	F367 A1	F372 E4	I352 D1	
1932 A1	3361 C2	3366 D2	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 A1	F364 A1	F369 A1	F374 B3		

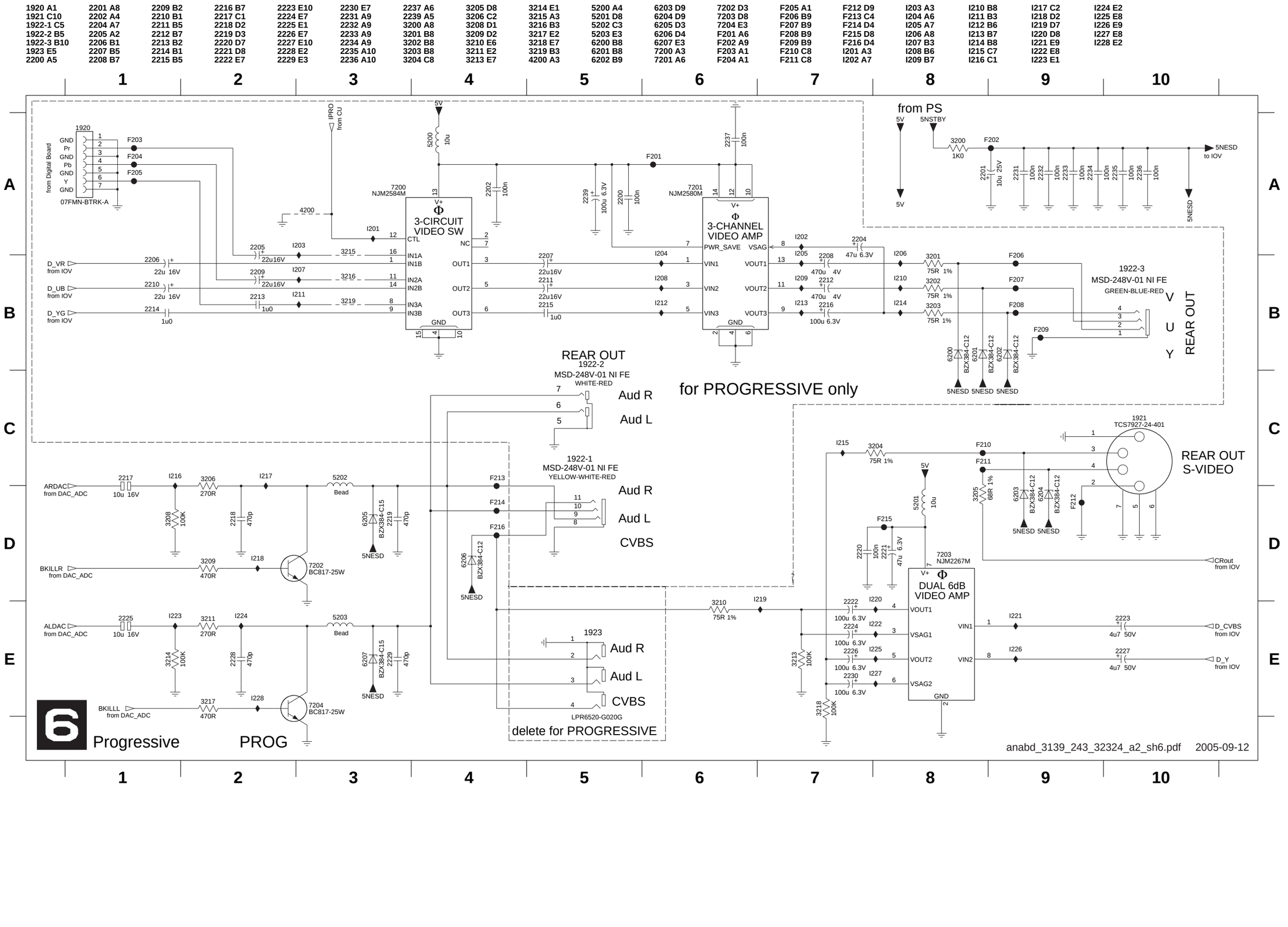


Analog: Multi Sound Processing (MSP)



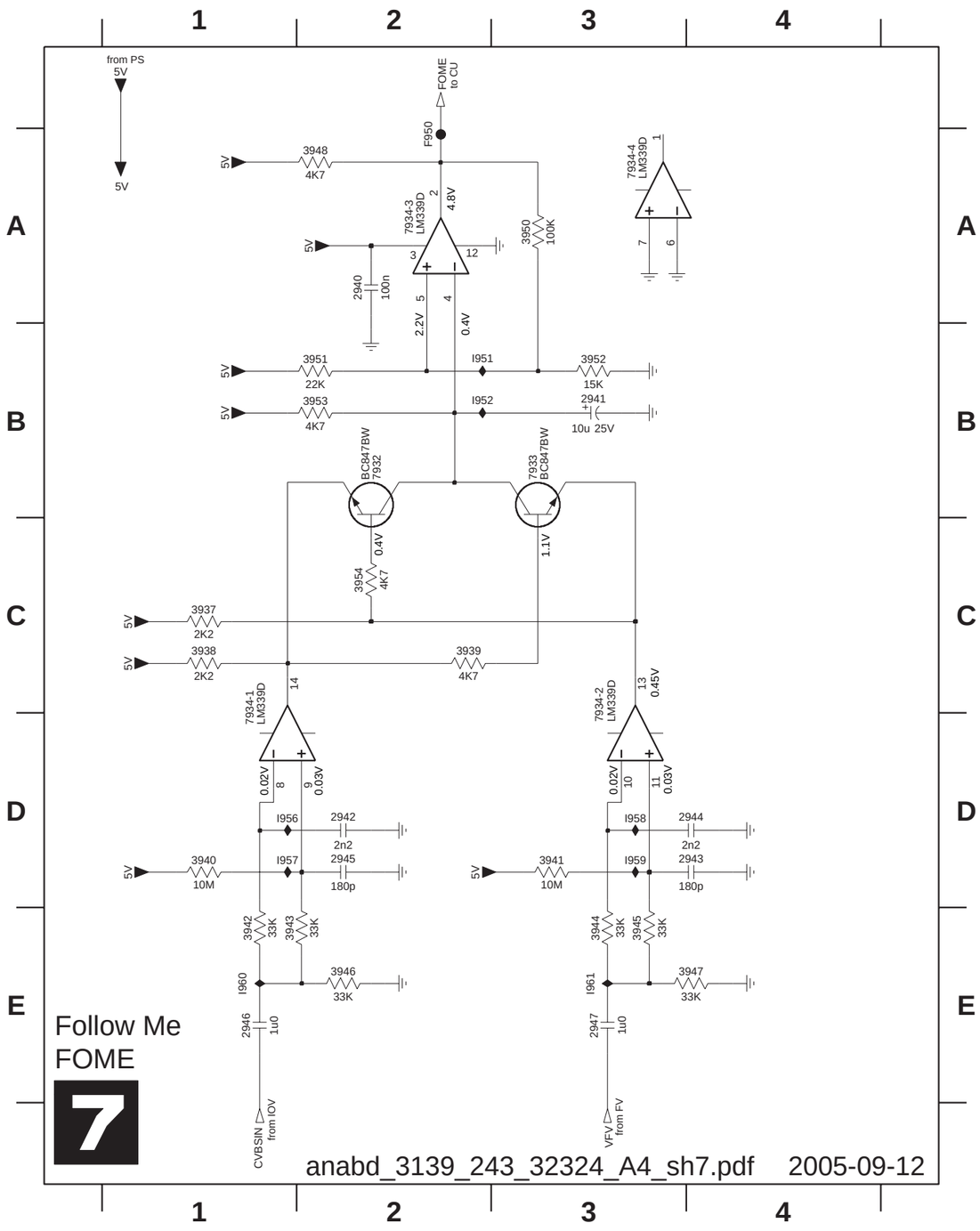
1600 F6 I633 E2
2600 A6 I634 F8
2601 A6
2602 A6
2603 A7
2605 A2
2606 B8
2607 C2
2608 C8
2609 C2
2610 D7
2611 A7
2612 D7
2613 D8
2614 E8
2615 E8
2618 C7
2619 C7
2620 F6
2621 F7
2622 F8
2623 F5
2624 D1
2625 D1
2626 E2
2627 E2
2628 E7
2629 E7
3601 B2
3602 B8
3603 B1
3604 A7
3605 A7
3606 D8
3607 E8
3609 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
I603 A6
I604 A6
I605 B7
I606 C2
I607 C2
I608 C2
I609 D7
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 E8
I623 E7
I624 A4
I625 A4
I626 D2
I627 D2
I628 D2
I629 D2
I630 E1
I631 E2
I632 E1

Analog: Progressive (PROG)

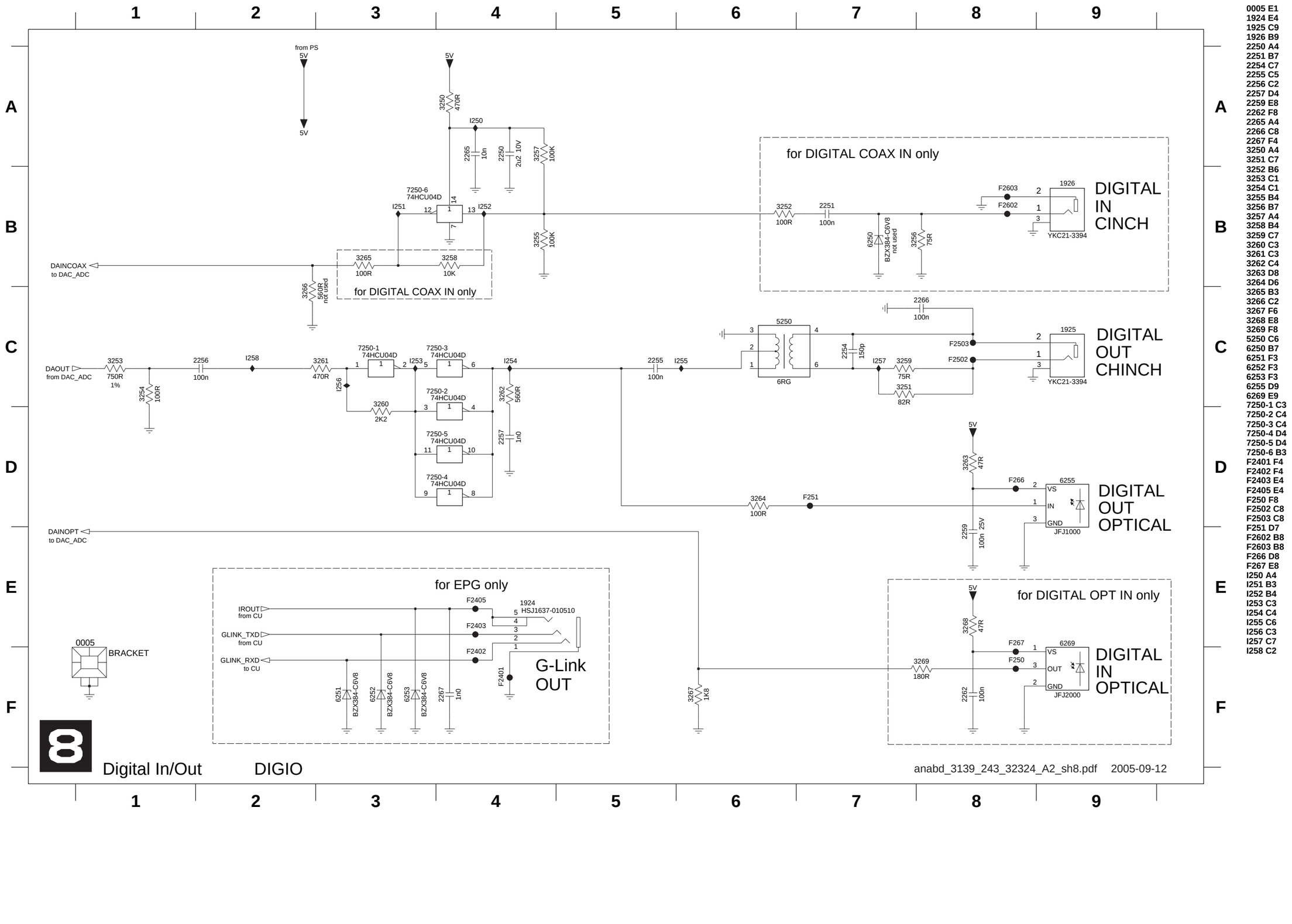


Analog: Follow Me (FOME)

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

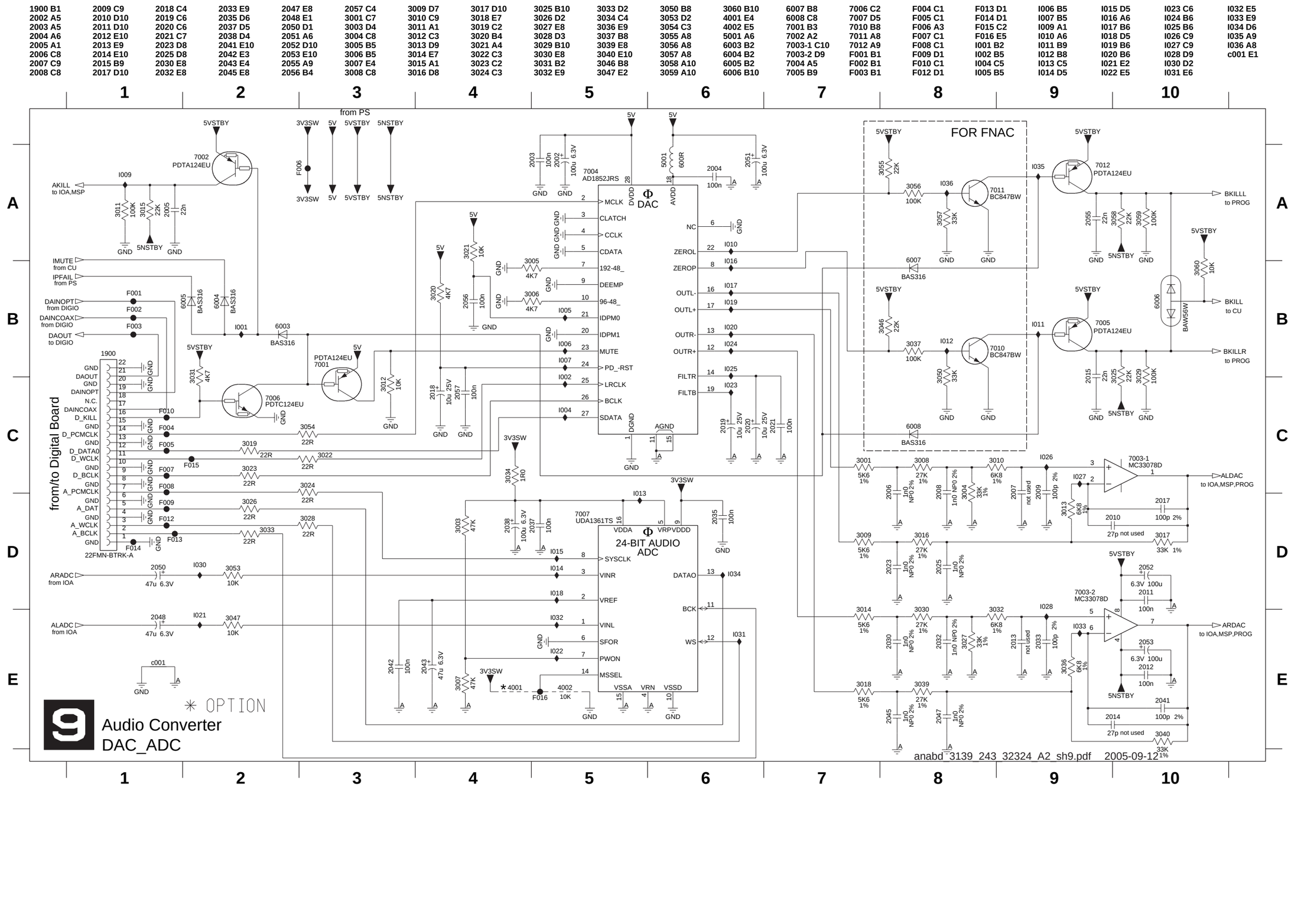


Analog: Digital In / Out (DIGIO)

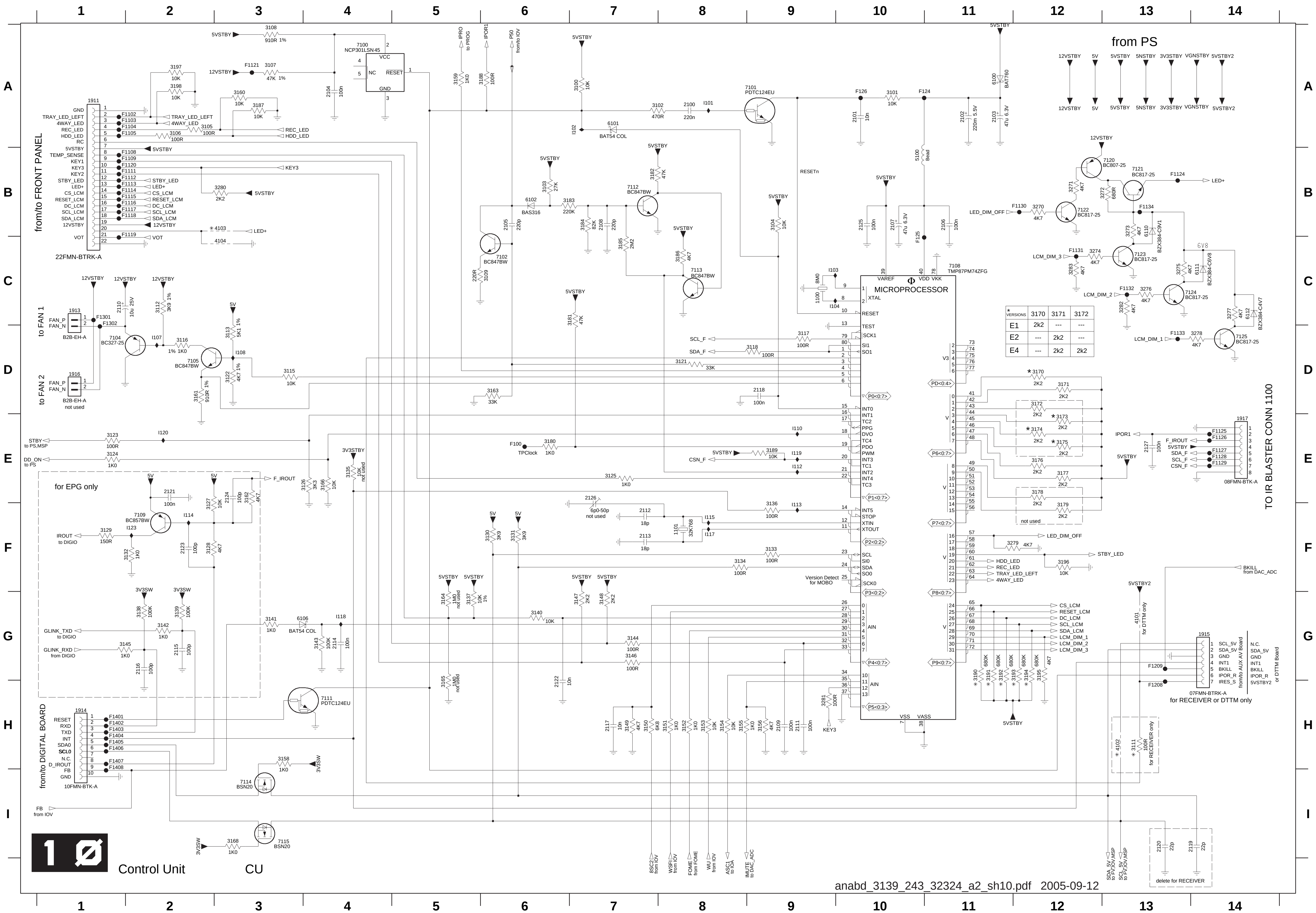


0005 E1
1924 E4
1925 C9
1926 B9
2250 A4
2251 B7
2254 C7
2255 C5
2256 C2
2257 D4
2259 E8
2262 F8
2265 A4
2266 C8
2267 F4
3250 A4
3251 C7
3252 B6
3253 C1
3254 C1
3255 B4
3256 B7
3257 A4
3258 B4
3259 C7
3260 C3
3261 C3
3262 C4
3263 D8
3264 D6
3265 B3
3266 C2
3267 F6
3268 E8
3269 F8
5250 C6
6250 B7
6251 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)



Analog: Control Unit (CU)



1100 C9	3187 A3
1101 F8	3188 A6
1911 A1	3189 E9
1913 C1	3190 G11
1914 H1	3191 G11
1915 G14	3192 G11
1916 D1	3193 G12
1917 E14	3194 G12
2100 A8	3195 G12
2101 A10	3196 F12
2102 A11	3197 A2
2103 A11	3198 A2
2104 A4	3270 B12
2105 B6	3271 B12
2106 B11	3272 B13
2107 B10	3273 B13
2108 B7	3274 C12
2109 H9	3275 C13
2110 C1	3276 C13
2111 H9	3277 C14
2112 F7	3278 D14
2113 F7	3279 F11
2114 G4	3280 B3
2115 G2	3281 H9
2116 G2	3282 C13
2117 H7	3283 C12
2118 D9	4101 G13
2119 I14	4102 H13
2120 I13	4103 B3
2121 E2	4104 C3
2122 H6	5100 B10
2123 F2	6100 A11
2124 E3	6101 A7
2125 B10	6102 B6
2126 E7	6106 G3
2127 E13	6110 B13
3100 A7	6111 C14
3101 A10	6112 C14
3102 A7	7100 A4
3103 B6	7101 A8
3104 B9	7102 C6
3105 A2	7104 D1
3106 A2	7105 D2
3107 A3	7108 C11
3108 A3	7109 F2
3109 C6	7111 H4
3111 H13	7112 B7
3112 C2	7113 C8
3113 D3	7114 I3
3115 D3	7115 I3
3116 D2	7120 B13
3117 D9	7121 B13
3118 D9	7122 B12
3121 D8	7123 C13
3122 D3	7124 C13
3123 E1	7125 D14
3124 E1	F100 E6
3125 E7	F1102 A2
3126 E4	F1103 A2
3127 F2	F1104 A2
3128 F2	F1105 A2
3129 F1	F1108 B2
3130 F6	F1109 B2
3131 F6	F1111 B2
3132 F2	F1112 B2
3133 F9	F1113 B2
3134 F8	F1114 B2
3135 E4	F1115 B2
3136 F9	F1116 B2
3137 G5	F1117 B2
3138 G2	F1118 B2
3139 G2	F1119 B2
3140 G6	F1120 B2
3141 G3	F1121 A3
3142 G2	F1124 B13
3143 G4	F1125 E14
3144 G7	F1126 E14
3145 G1	F1127 E14
3146 G7	F1128 E14
3147 G7	F1129 E14
3148 G7	F1130 B12
3149 H7	F1131 C12
3150 H7	F1132 C13
3151 H8	F1133 D13
3152 H8	F1134 B13
3153 H8	F1208 H13
3154 H8	F1209 G13
3155 H8	F124 A11
3156 H9	F125 C10
3158 H3	F126 A10
3159 A5	F1301 C1
3160 A3	F1302 C1
3161 D2	F1401 H1
3162 E3	F1402 H1
3163 D6	F1403 H1
3164 G5	F1404 H1
3165 H5	F1405 H1
3166 E4	F1406 H1
3168 I3	F1407 H1
3170 D12	F1408 H1
3171 D12	I101 A8
3172 D12	I102 A7
3173 E12	I103 C9
3174 E12	I104 C9
3175 E12	I107 D2
3176 E12	I108 D3
3177 E12	I110 E9
3178 E12	I112 E9
3179 F12	I113 F9
3180 E6	I114 F2
3181 C7	I115 F8
3182 B7	I117 F8
3183 B6	I118 G4
3184 B7	I119 E9
3185 C7	I120 E2
3186 C8	I123 F2

Layout: Analog Component + SMD VIEW

2003 B8 2004 B7 2005 B7 2006 B7 2007 B7 2008 B7 2009 B7 2010 B6 2011 B6 2012 B7 2013 B7 2014 B6 2015 B8 2017 B6 2021 B7 2023 B7 2025 B7 2030 B7 2032 B7 2033 B7 2035 D7 2037 D7 2041 B6 2042 C7 2045 B7
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3210 A5 3211 A5 3212 B5 3214 B5 3215 A7 3216 A7 3217 A5 3218 A4 3219 A7 3250 A8 3251 A9 3252 A8 3253 C8 3254 A8 3255 A9 3256 A8 3257 A8 3258 A8 3259 A9 3260 B9 3261 A8 3262 A9 3263 A8 3264 A8 3265 A8
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3700 B1 3701 B1 3704 C1 3706 C1 3937 D1 3938 D1 3939 C1 3940 D1 3941 C1 3942 D1 3943 C1 3944 D1 3945 C1 3946 C1 3947 C1 3948 D1 3950 D1 3951 D1 3952 D1 3953 D1 3954 D1 4001 C7 4002 D7 4003 B3 4004 B2
4005 D2 4006 A3 4007 B2 4008 B2 4009 B2 4010 B2 4012 C2 4014 B2 4015 C2 4016 C2 4017 C3 4018 C3 4019 B3 4020 C3 4021 B3 4022 C1 4023 C8 4024 B2 4025 B8 4026 B3 4027 B3 4028 B3 4029 C5 4030 C3 4031 C3
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4200 A7 4206 A4 4401 A3 4701 D3 4999 D10 5001 B7 5202 A5 5203 A5 5703 B1 5704 B1 5705 B1 6003 C8 6004 B8 6005 C8 6101 B10 6200 A5 6201 A5 6202 A5 6203 A4 6204 A4 6205 A5 6206 A4 6207 A5 6250 A8 6251 A10
6252 A10 6253 A10 6323 C6 6401 A1 6402 A2 6403 A2 6404 A3 6405 A3 6406 A3 6407 A3 6408 A3 6409 A3 6410 C4 6411 B3 6412 A3 6413 A3 6414 A2 6415 B2 6416 A2 6417 A3 6418 A2 6419 A2 6420 A2 6421 B3
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7354 C6 7355 D6 7401 B1 7402 B1 7403 C1 7404 B1 7405 C4 7406 B3 7407 C4 7408 B2 7414 B3 7415 B3 7416 B3 7501 C5 7504 B6 7505 B5 7506 A4 7508 B4 7509 D5 7600 C7
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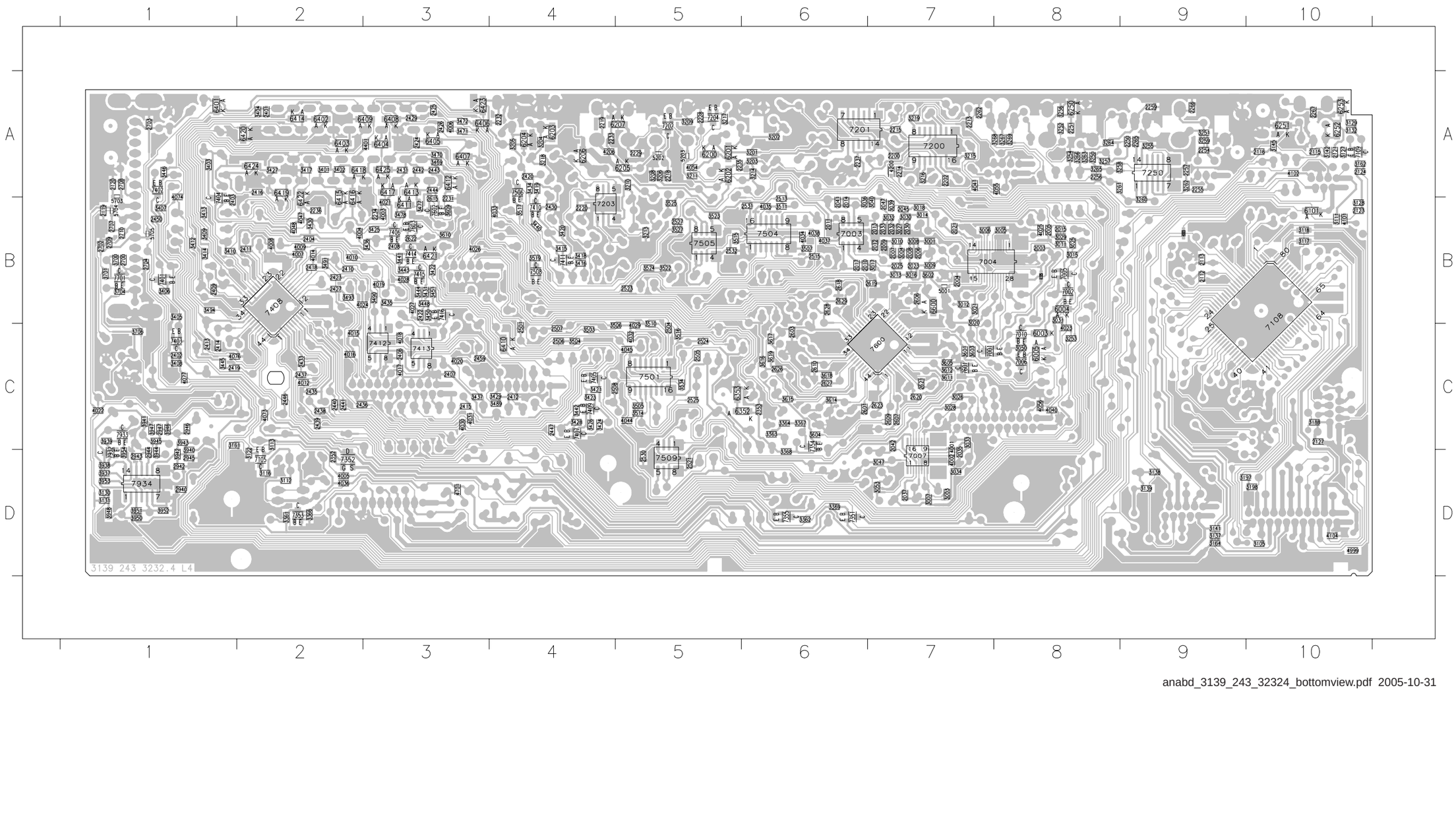
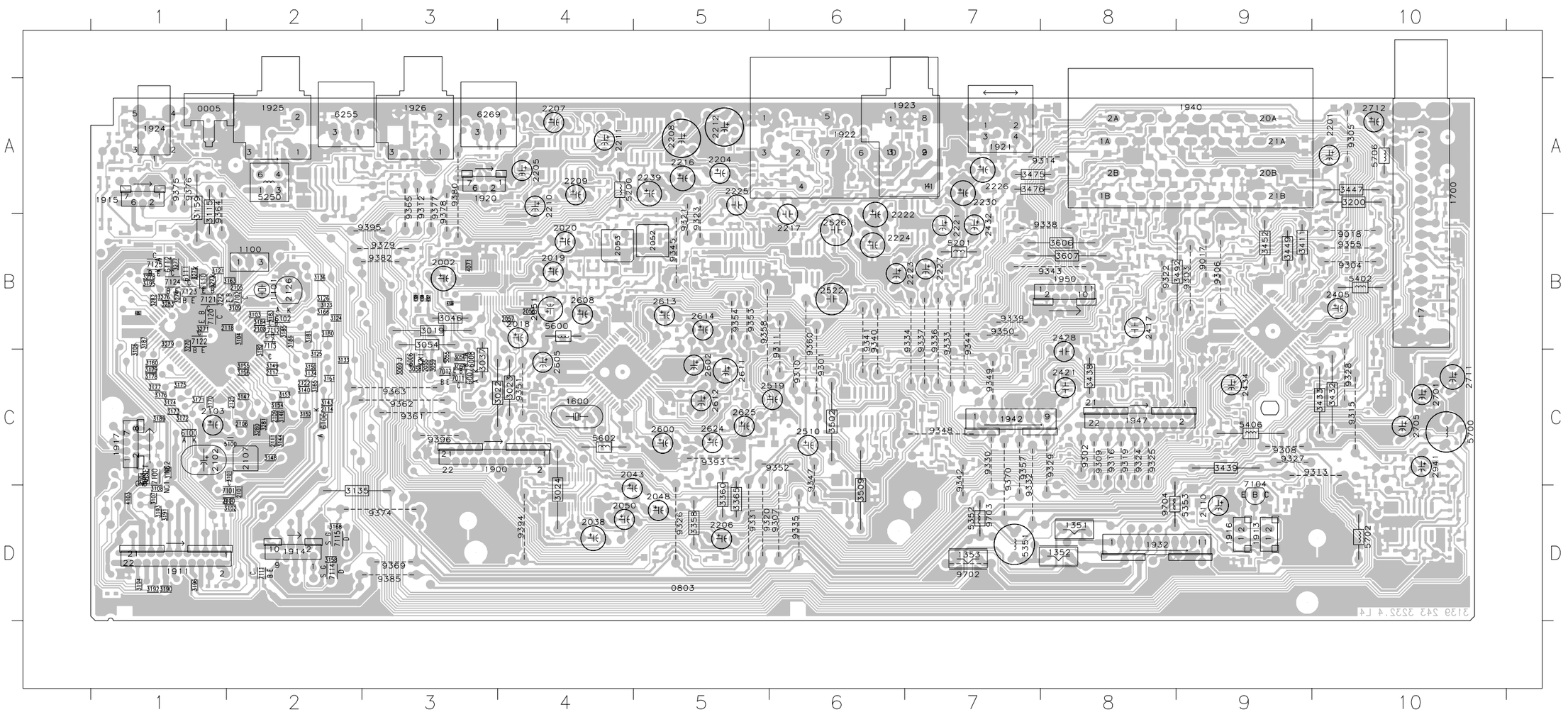


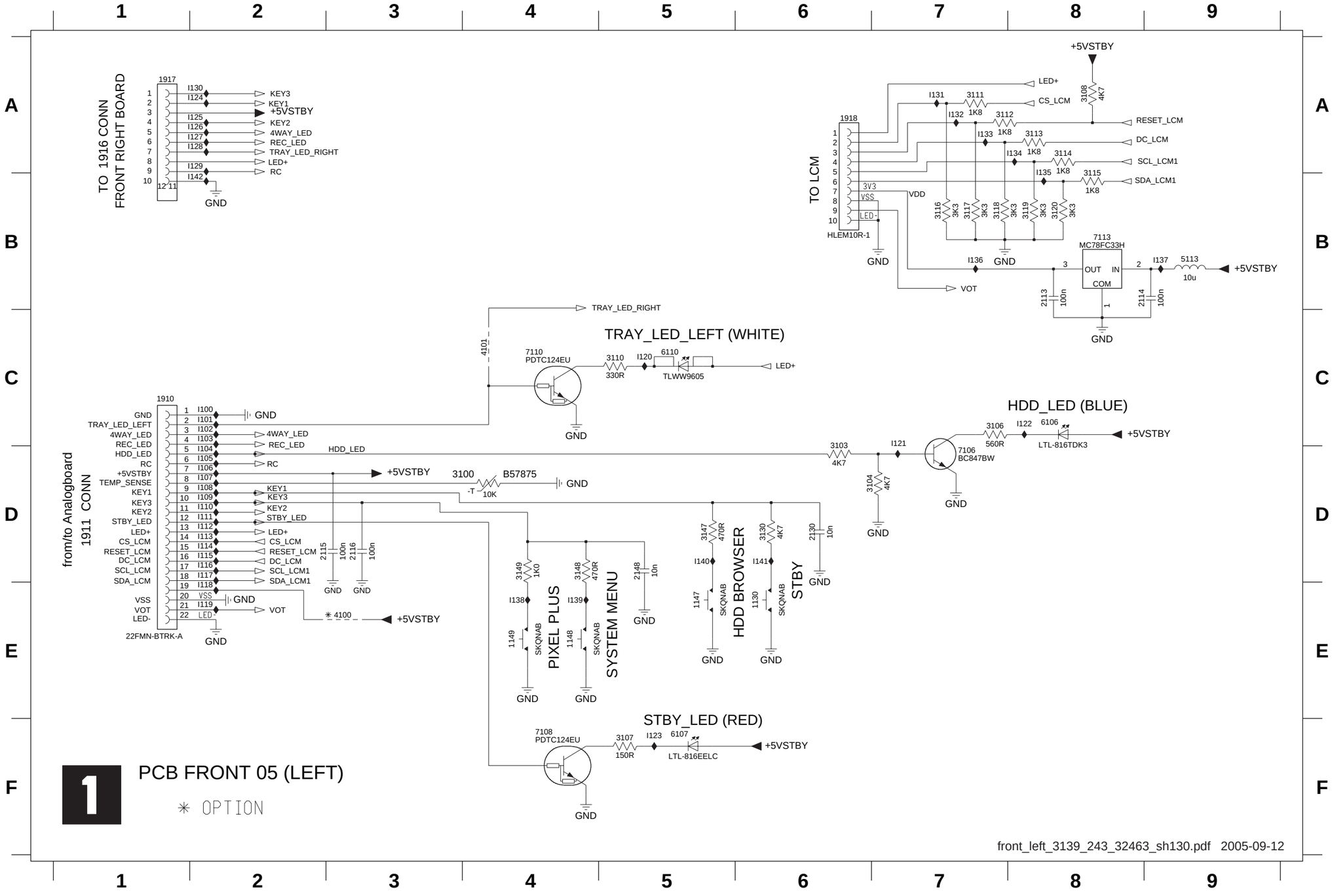
Layout: Analog Component View

0005 A1 0803 A5 1100 B2 1101 B2 1351 D8 1352 D8 1353 D7 1600 C4 1700 A10 1900 C3 1911 D1 1913 D9 1914 D2 1915 A1 1916 D9 1917 C1 1920 A3 1921 A7 1922 A6 1923 A6 1924 A1 1925 A2 1926 A3 1932 D6 1940 A9 1942 C7 1947 C8 1950 B8 2002 B5 2018 B4 2019 B4 2020 B4 2038 D4 2043 C4 2048 C4 2050 D4 2102 C1 2103 C1 2104 C1 2105 B2 2106 C2 2107 C2 2108 B2 2109 C2 2110 D6 2111 C2 2114 C2 2117 C2 2118 B2 2122 C2 2125 C2 2126 B2 2201 A10 2204 A6 2205 A4 2206 D5 2207 A4 2208 A5 2209 A4 2210 A4 2211 A4 2212 A5 2216 A5 2217 B6 2221 B7 2222 B6 2223 B7 2224 B6 2225 A5 2227 B7 2230 A7 2239 A5 2407 B10 2417 C8 2421 C8 2428 B8 2432 B7 2434 C9 2510 C6 2519 C6 2522 B6 2526 B6 2600 C5 2602 C4 2605 C4 2608 B4 2611 C5 2612 C5 2613 B5 2614 B5 2624 C5 2625 C5 2701 C10 2705 C10 2711 C10 2941 C10 3019 B3 3022 C3 3023 C4 3024 D4 3037 C3 3046 B3 3054 B3 3055 C3 3056 C3 3057 C3 3058 C3 3059 C3 3060 C3 3100 C1 3101 C2 3102 D2 3103 B2 3104 B2 3106 C1 3107 D1 3108 D1 3109 B2 3115 A1 3121 B1 3123 B2 3124 B2 3125 C2 3126 B2 3133 C2 3134 C2 3135 D2 3136 B2 3140 C2 3143 C2 3144 C2 3146 C2 3147 C2 3148 C2 3149 C2 3150 C2 3151 C2 3152 C2 3153 C2 3154 C2 3155 C2 3156 C2 3158 D2 3159 A1 3160 C1 3163 B2 3166 B2 3168 D2 3170 C1 3171 C1 3172 C1 3173 C1 3174 C1 3175 C1 3176 C1 3177 C1 3178 C1 3179 C1 3180 B2 3181 B2 3182 C2 3183 B2 3184 B2 3185 B2 3186 B2 3187 B1 3189 D1 3190 D1 3191 D1 3192 D1 3193 D1 3194 D1 3195 B1 3196 D1 3200 A10 3270 B1 3271 B1 3272 B1 3273 B1 3274 B1 3275 B1 3276 B1 3277 B1 3278 B1 3279 B1 3280 C2 3281 C2 3282 B1 3283 B1 3358 D5 3360 D5 3365 D5 3411 B9 3432 C10 3433 C10 3438 C8 3439 C9 3447 A10 3449 B9 3452 B9 3475 A7 3476 A7 3502 C6 3509 D6 3606 B8 3607 B8 4051 B1 4071 B3 4103 D1 4106 B3 4107 B3 4108 B3 4109 B3 5100 C2 5200 A4 5201 B7 5250 A2 5351 D7 5352 D7 5353 D9 5402 B10 5406 C9 5600 B4 5602 C4 5700 C10 5702 D10 5706 A10 6007 C3 6008 C3 6100 C1 6102 B2 6106 C2 6110 B1 6111 B1 6112 B1 6255 A2 6269 A3 7011 C3 7012 C3 7100 C1 7101 C2 7102 B2 7104 C9 7111 D2 7112 B2 7113 B2 7114 D2 7115 D2 7120 B1 7121 B1 7122 B1 7123 B1 7124 D2 7125 B1 9017 B9 9018 B10 9301 B6 9302 C8 9303 B9 9304 B10 9305 A10 9306 B9 9307 D6 9308 C9 9309 C8 9310 D6 9311 B6 9312 A3 9313 C10 9314 A8 9315 C10 9316 C8 9320 D5 9321 B5 9322 B8 9323 C8 9324 C8 9325 C8 9326 D5 9327 C9 9328 C10 9329 C7 9330 C7 9331 D5 9332 C7 9333 B7 9334 B7 9335 D6 9336 B7 9337 B7 9338 B8 9339 B7 9340 B6 9341 B6 9342 C7 9343 B8 9344 B7 9345 B5 9347 C6 9348 C7 9349 C7 9350 B7 9351 C4 9352 C6 9353 B5 9354 B5 9355 B10 9357 C7 9358 B5 9360 B6 9361 C3 9362 C3 9363 C3 9364 A1 9365 A3 9369 D3 9370 C7 9374 D3 9375 A1 9376 A1 9377 A3 9378 A3 9379 B3 9380 A3 9382 B3 9385 D3 9393 C5 9394 D4 9395 B3 9396 C3 9702 D7 9703 D7 9704 D8



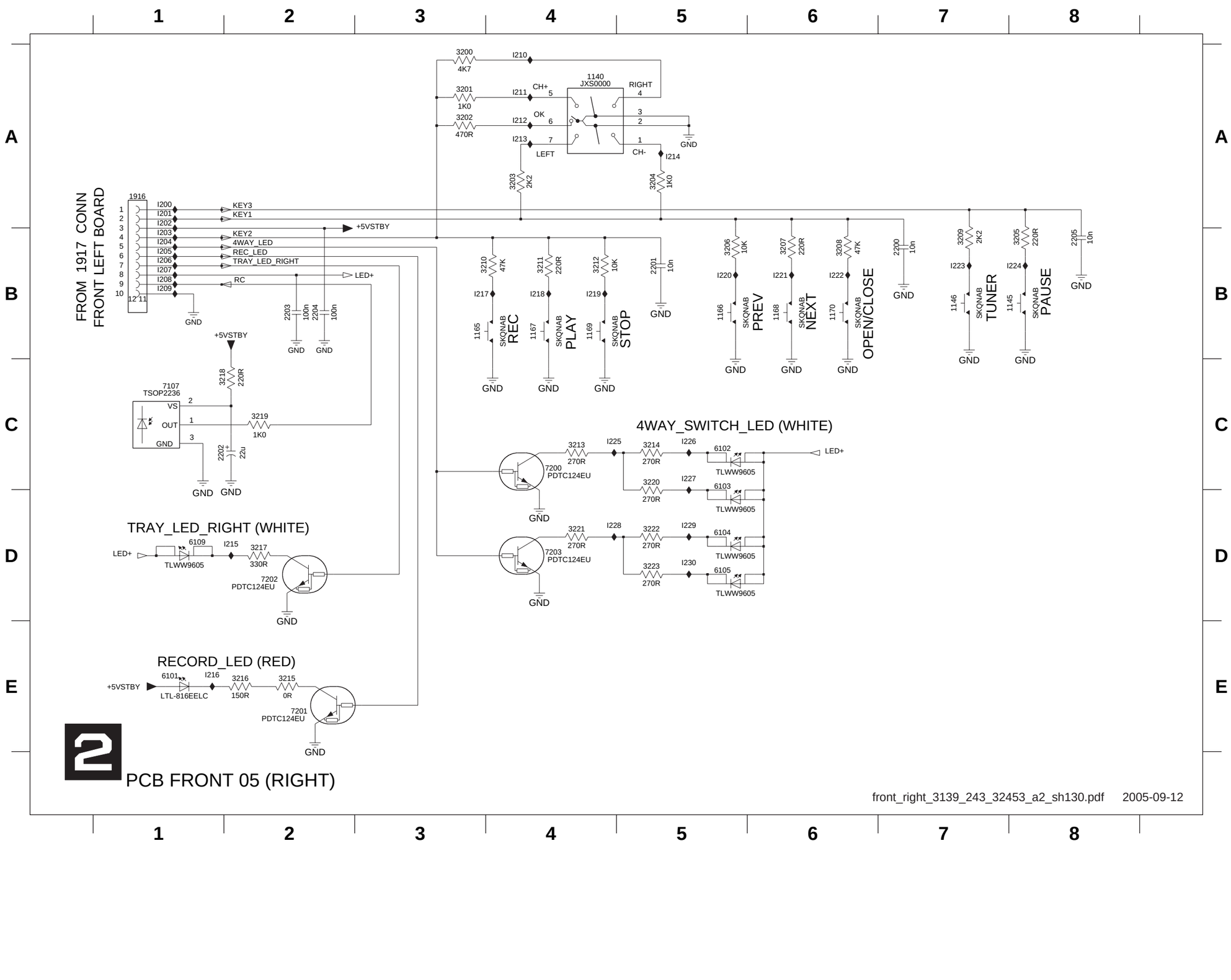
anabd_3139_243_32324_topview.pdf 2005-10-31

PCB Front (LEFT)



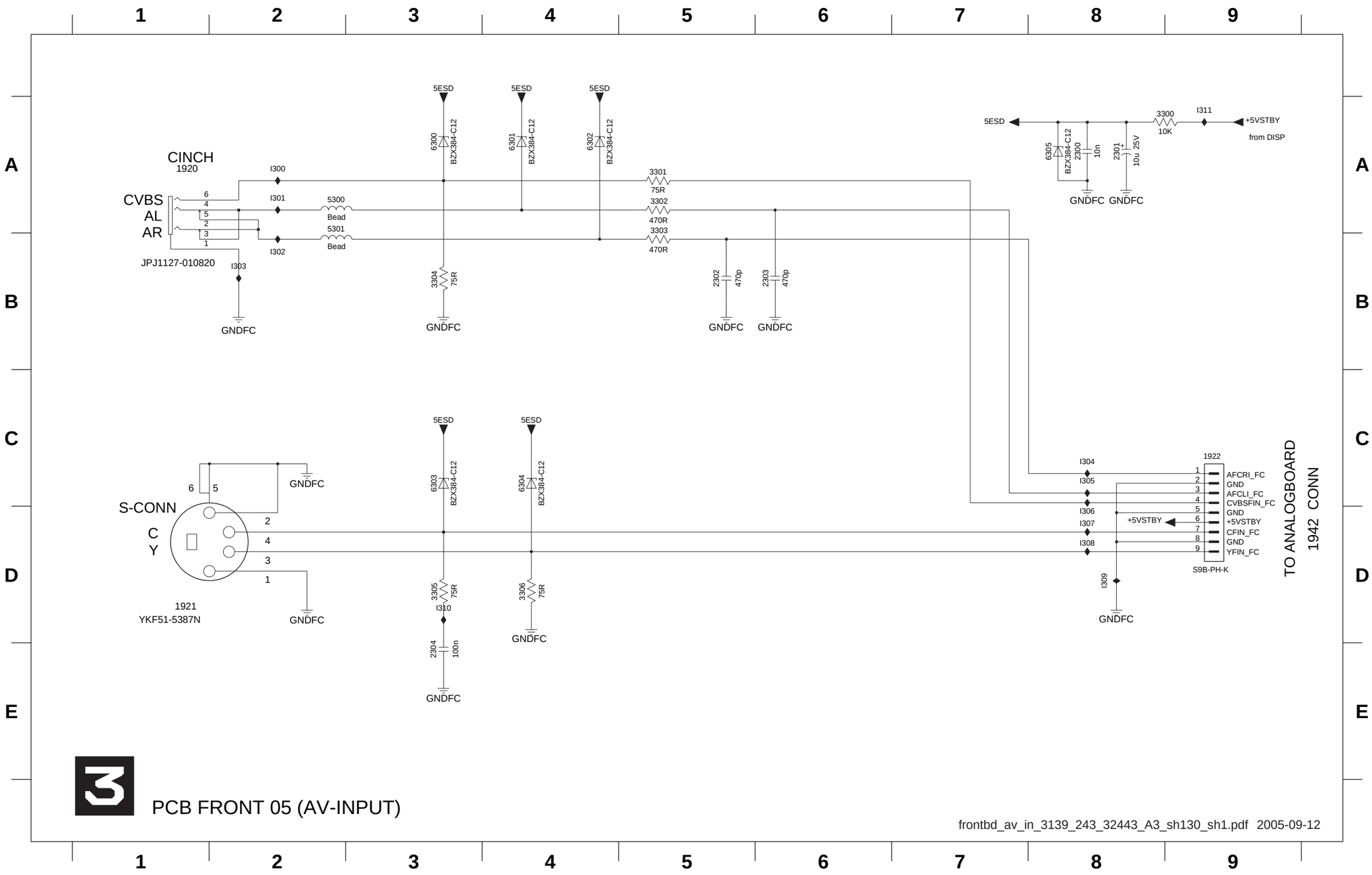
1130 E6 I129 A2
1147 E5 I130 A2
1148 E4 I131 A7
1149 E4 I132 A7
1910 C1 I133 A7
1917 A1 I134 A8
1918 A6 I135 A8
2113 B8 I136 B7
2114 B8 I137 B9
2115 D2 I138 E4
2116 D3 I139 E4
2130 D6 I140 D5
2148 D5 I141 D6
3100 D4 I142 B2
3103 D6
3104 D7
3106 C7
3107 F5
3108 A8
3110 C5
3111 A7
3112 A7
3113 A8
3114 A8
3115 B8
3116 B7
3117 B7
3118 B7
3119 B8
3120 B8
3130 D6
3147 D5
3148 D4
3149 D4
4100 E3
4101 C4
5113 B9
6106 C8
6107 F5
6110 C5
7106 D7
7108 F4
7110 C4
7113 B8
I100 C2
I101 C2
I102 C2
I103 C2
I104 D2
I105 D2
I106 D2
I107 D2
I108 D2
I109 D2
I110 D2
I111 D2
I112 D2
I113 D2
I114 D2
I115 D2
I116 D2
I117 D2
I118 E2
I119 E2
I120 C5
I121 C7
I122 C8
I123 F5
I124 A2
I125 A2
I126 A2
I127 A2
I128 A2

PCB Front (RIGHT)



1140 A4 I221 B6
1145 B8 I222 B6
1146 B7 I223 B7
1165 B3 I224 B8
1166 B5 I225 C4
1167 B4 I226 C5
1168 B6 I227 C5
1169 B4 I228 D4
1170 B6 I229 D5
1916 A1 I230 D5
2200 B7
2201 B5
2202 C1
2203 B2
2204 B2
2205 B8
3200 A3
3201 A3
3202 A3
3203 A4
3204 A5
3205 B8
3206 B5
3207 B6
3208 B6
3209 B7
3210 B4
3211 B4
3212 B4
3213 C4
3214 C5
3215 E2
3216 E2
3217 D2
3218 C2
3219 C2
3220 C5
3221 D4
3222 D5
3223 D5
6101 E1
6102 C5
6103 C5
6104 D5
6105 D5
6109 D1
7107 C1
7200 C4
7201 E2
7202 D2
7203 D4
I200 A1
I201 A1
I202 A1
I203 B1
I204 B1
I205 B1
I206 B1
I207 B1
I208 B1
I209 B1
I210 A4
I211 A4
I212 A4
I213 A4
I214 A5
I215 D2
I216 E1
I217 B3
I218 B4
I219 B4
I220 B5

PCB Front (AV-INPUT)



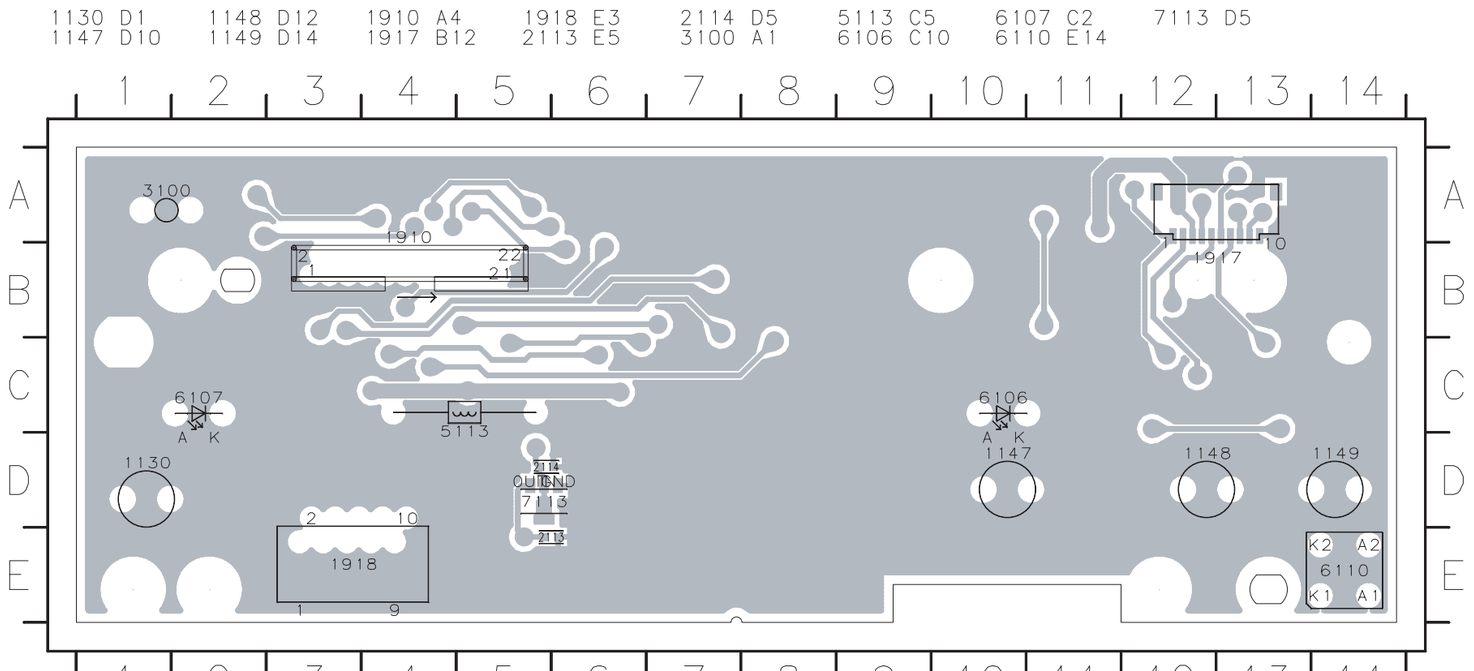
1920 A1
1921 D1
1922 C9
2300 A8
2301 A8
2302 B5
2303 B6
2304 E3
3300 A9
3301 A5
3302 A5
3303 A5
3304 B3
3305 D3
3306 D4
5300 A2
5301 A2
6300 A3
6301 A4
6302 A4
6303 C3
6304 C4
6305 A8
I300 A2
I301 A2
I302 B2
I303 B2
I304 C8
I305 C8
I306 D8
I307 D8
I308 D8
I309 D8
I310 D3
I311 A9

PCB FRONT 05 (AV-INPUT)

frontbd_av_in_3139_243_32443_A3_sh130_sh1.pdf 2005-09-12

Layout: Front (LEFT) (Top View)

1130 D1
1147 D10
1148 D12
1149 D14
1910 A4
1917 B12
1918 E3
2113 E5
2114 D5
3100 A1
5113 C5
6106 C10
6107 C2
6110 E14
7113 D5



front_left_3139_243_32463_topview.pdf 2005-10-31

Layout: Front (LEFT) (Bottom View)

2115 C12
2116 A11
2130 D14
2148 D2
3103 C6
3104 C5
3106 C5
3107 C13
3108 C11
3110 E2
3111 B10
3112 D12
3113 C10
3114 E9
3115 C9
3116 B10
3117 D13
3118 C10
3119 E9
3120 C9
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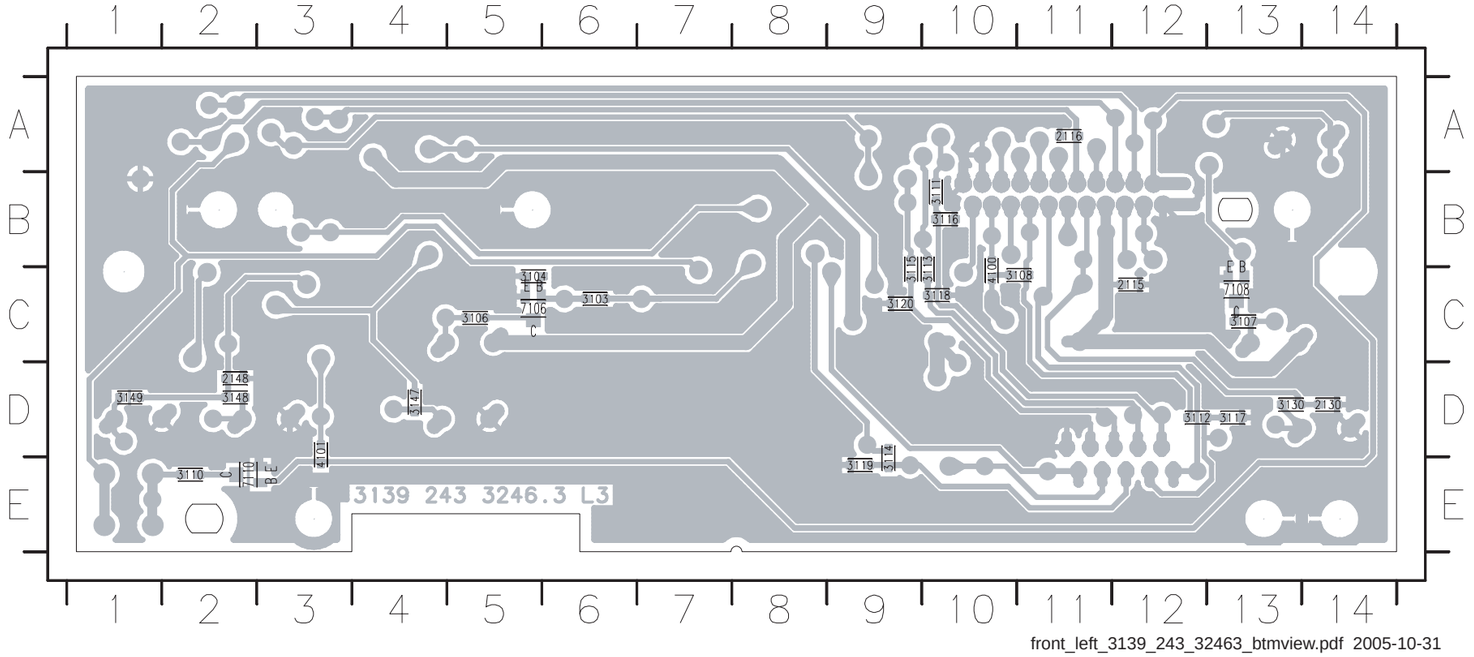
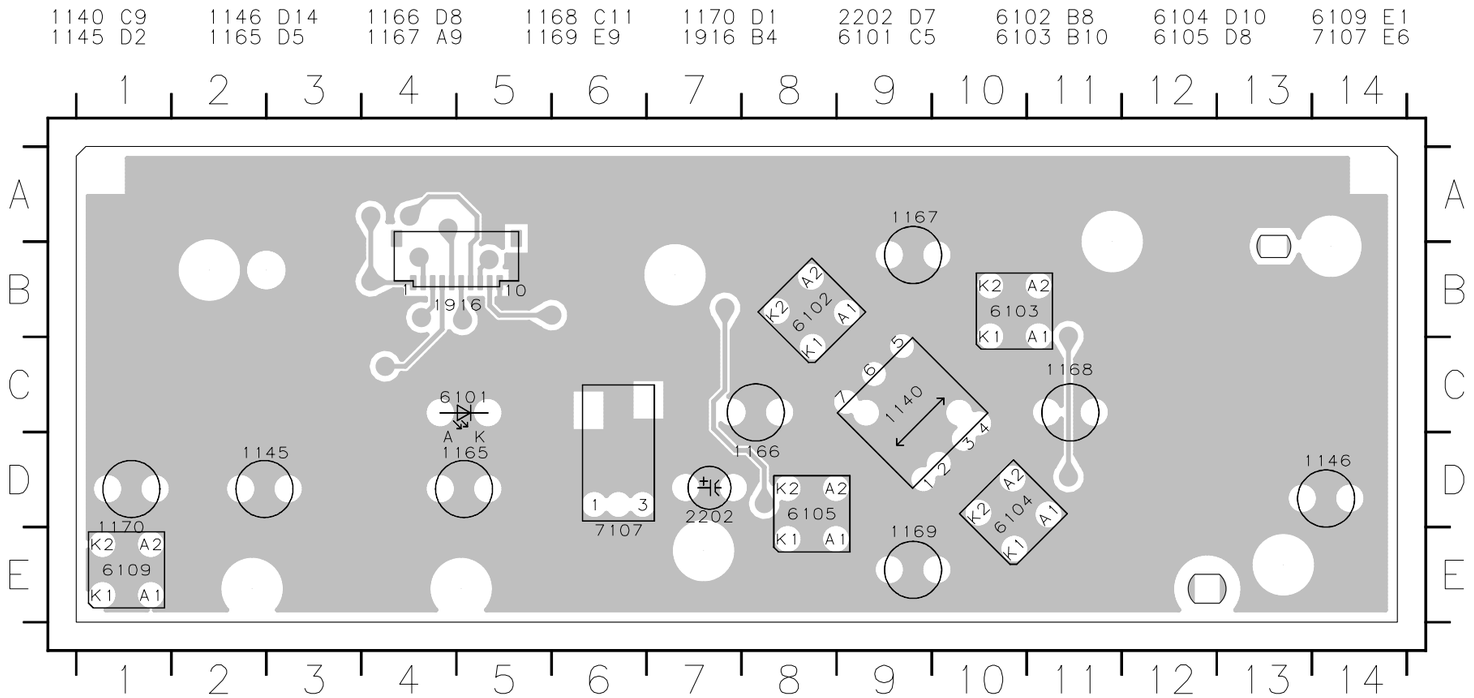
7106 C5
7108 C13
7110 E2



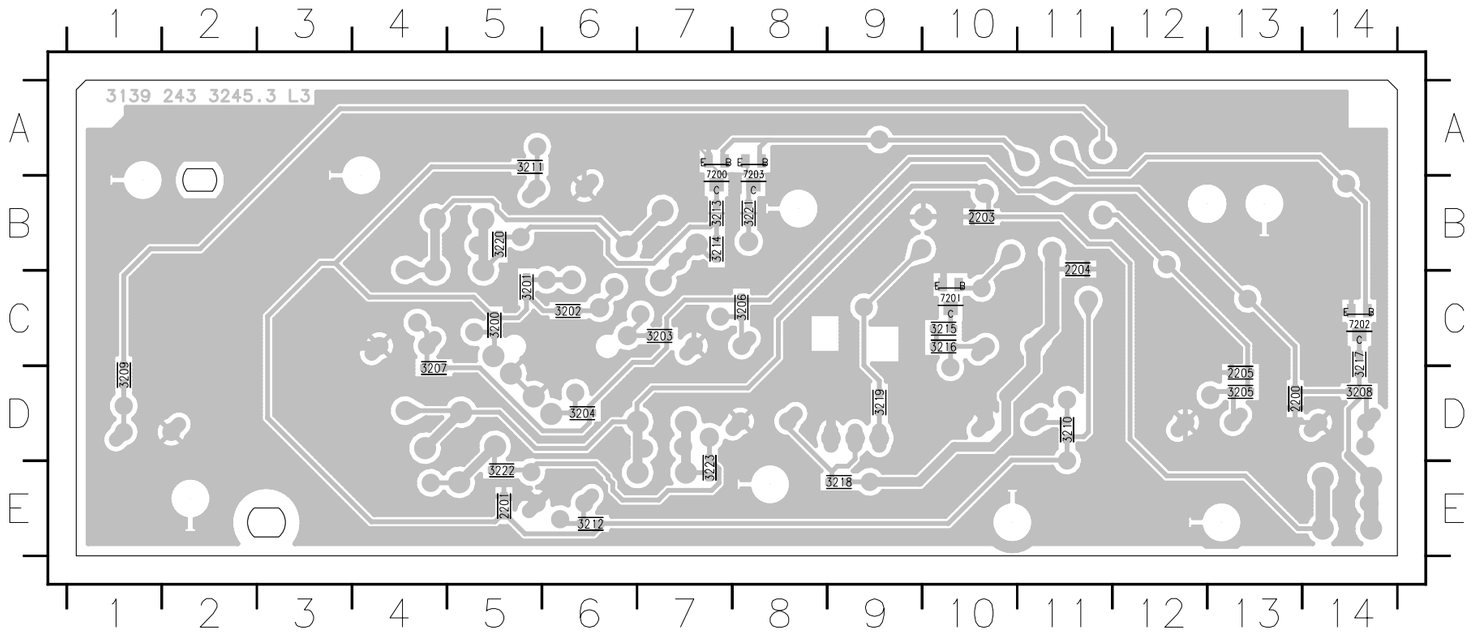
front_left_3139_243_32463_btmview.pdf 2005-10-31

Layout: Front (RIGHT) (Top View)



front_right_3139_243_32453_topview.pdf 2005-10-31

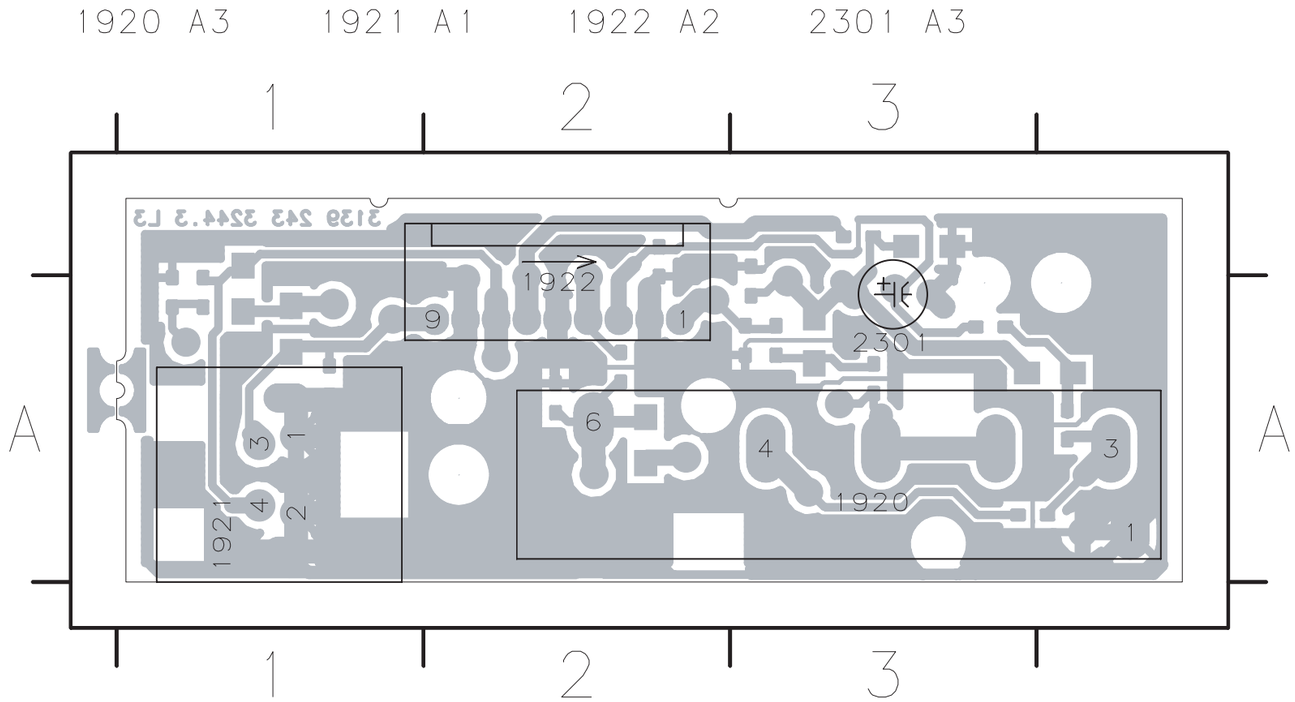
Layout: Front (RIGHT) (Bottom View)



front_right_3139_243_32453_btmview.pdf 2005-10-31

Layout: Front (AV-INPUT) (Top View)

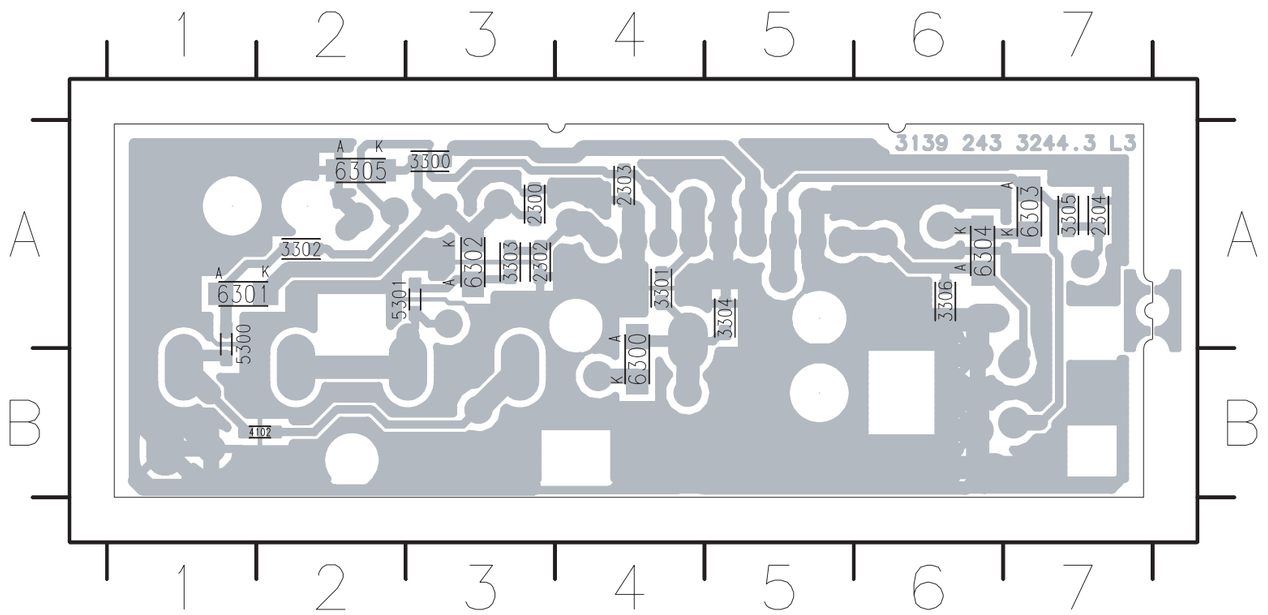
1920 A3
1921 A1
1922 A2
2301 A3



front_av_in_3139_243_32443_topview.pdf 2005-10-31

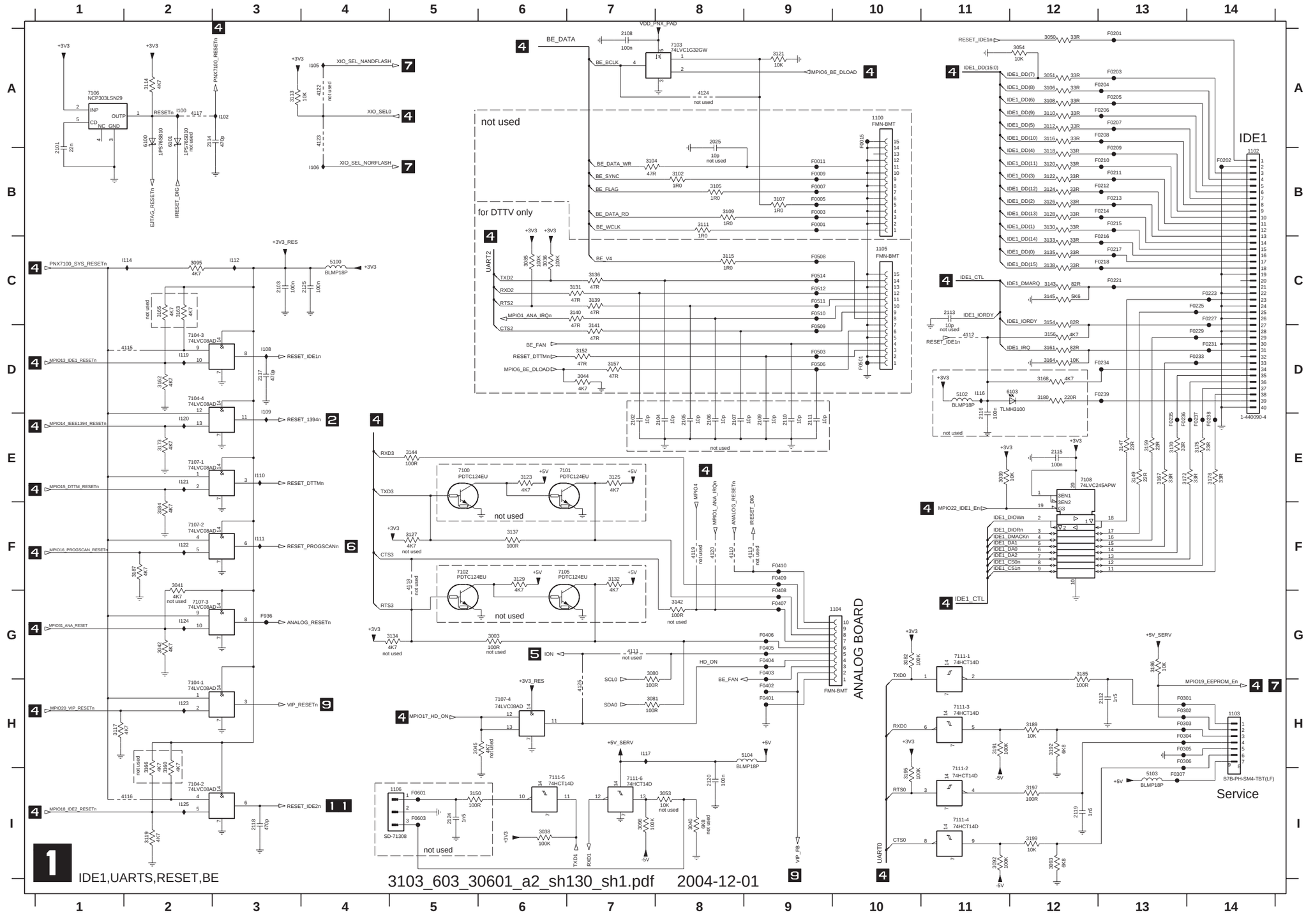
Layout: Front (AV-INPUT) (Bottom View)

2300 A3
2302 A3
2303 A4
2304 A7
3300 A3
3301 A4
3302 A2
3303 A3
3304 A5
3305 A7
3306 A6
4102 B2
5300 A1
5301 A2
6300 B4
6301 A1
6302 A3
6303 A7
6304 A6
6305 A2



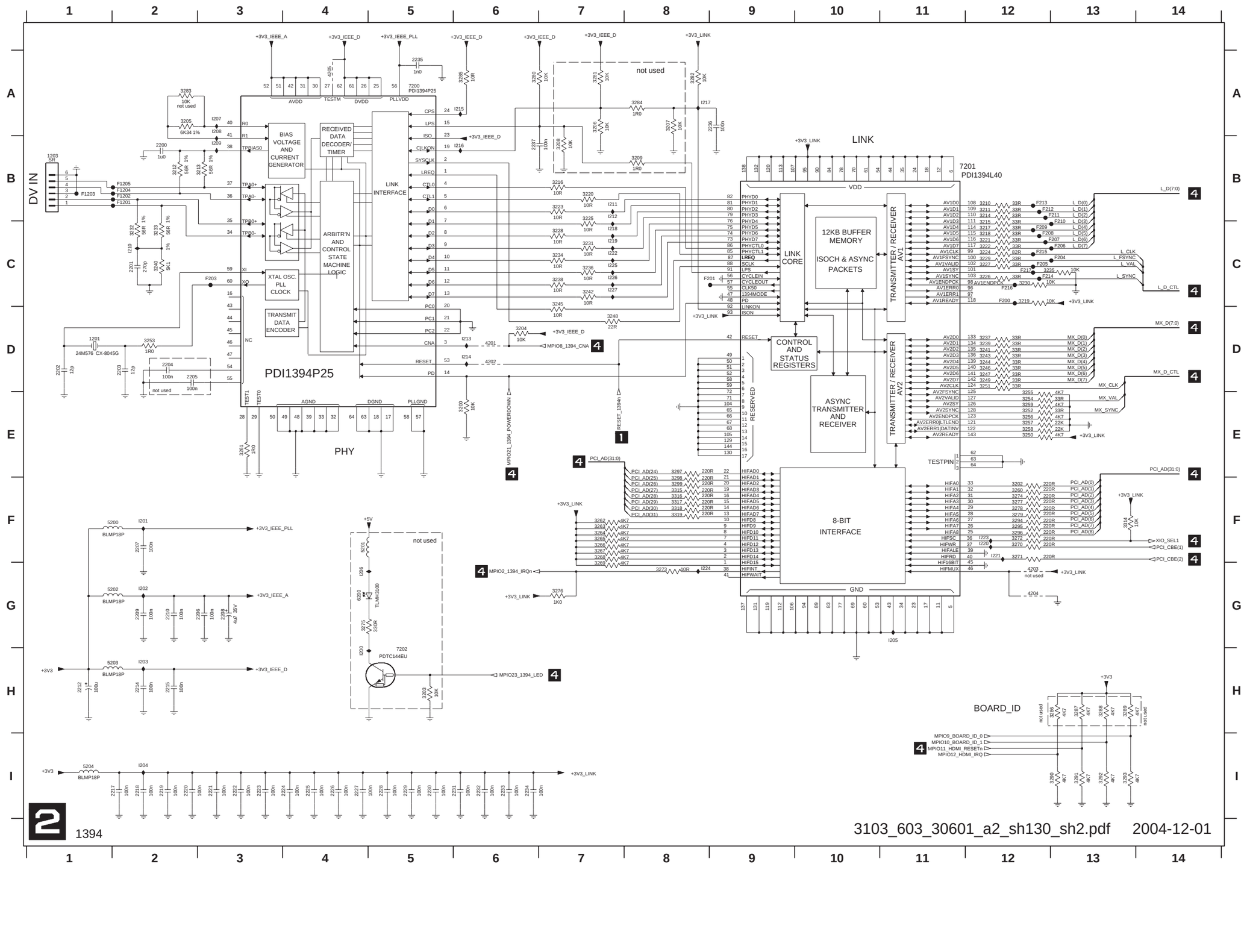
front_av_in_3139_243_32443_bottomview.pdf 2005-10-31

Digital: IDE1, Uarts, Reset, BE



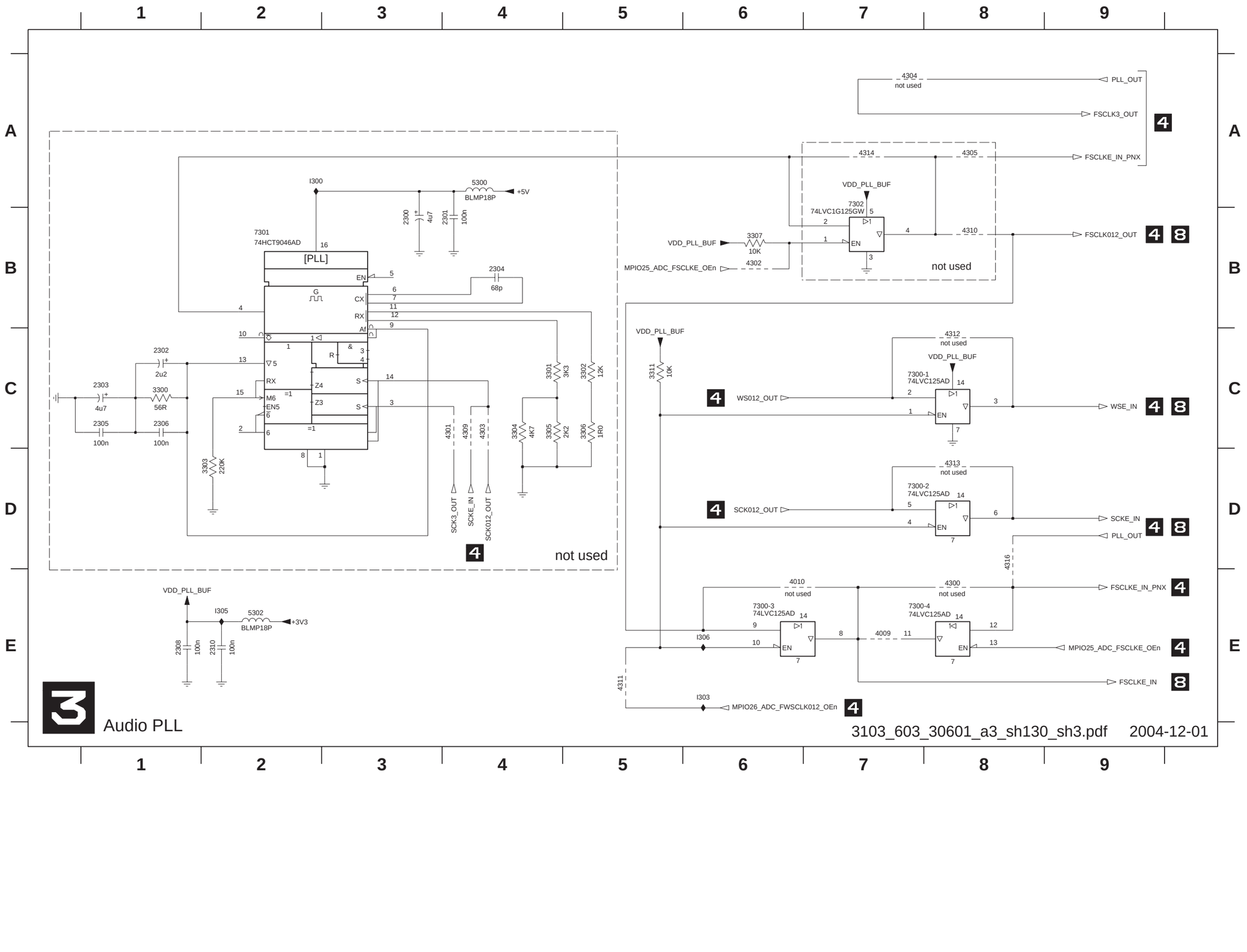
1100 A10 4112 D11
1102 B14 4113 F9
1103 H14 4115 D2
1104 G9 4116 I2
1105 C10 4117 A2
1106 I5 4118 F5
2025 A8 4119 F8
2101 B1 4120 F8
2102 E7 4122 A4
2103 C3 4123 A4
2104 E8 4124 A4
2105 E8 4125 H7
2106 E8 5100 C4
2107 E8 5102 D11
2108 A7 5103 I13
2109 E9 5104 H9
2110 E9 6100 A2
2111 E9 6101 A2
2112 H13 6103 D12
2113 C11 7100 E5
2114 A2 7101 E6
2115 E12 7102 F5
2116 E11 7103 A8
2117 D3 7104-1 H2
2118 I3 7104-2 I2
2119 I12 7104-3 D2
2120 I8 7104-4 D2
2124 I5 7105 F6
2125 C4 7106 A1
3003 G6 7107-1 E2
3036 C6 7107-2 F2
3038 I6 7107-3 G2
3039 E11 7107-4 H6
3040 I8 7108 E12
3041 F2 7111-1 G11
3042 G2 7111-2 I11
3044 D7 7111-3 H11
3045 H5 7111-4 I11
3050 A12 7111-5 I6
3051 A12 7111-6 I7
3053 I8 F0001 B9
3054 A12 F0003 B9
3080 G7 F0005 B9
3081 H7 F0007 B9
3082 G10 F0009 B9
3085 C6 F0011 B9
3092 I11 F0015 A10
3093 I12 F0201 A13
3095 C2 F0202 B14
3098 I7 F0203 A13
3102 B8 F0204 A13
3104 B7 F0205 A13
3105 B8 F0206 A13
3106 A12 F0207 A13
3107 B9 F0208 A13
3108 A12 F0209 B13
3109 B8 F0210 B13
3110 A12 F0211 B13
3111 B8 F0212 B13
3112 A12 F0213 B13
3113 A3 F0214 B13
3114 A2 F0215 B13
3115 C8 F0216 C13
3116 A12 F0217 C13
3117 H1 F0218 C13
3118 B12 F0221 C13
3119 I2 F0223 C14
3120 B12 F0225 C14
3121 A9 F0227 C14
3122 B12 F0229 D14
3123 E6 F0231 D14
3124 B12 F0233 D14
3125 E7 F0234 D13
3126 B12 F0235 E13
3127 F5 F0236 E13
3128 B12 F0237 E14
3129 F6 F0238 E14
3130 B12 F0239 D13
3131 C7 F0301 H13
3132 F7 F0302 H13
3133 C12 F0303 H13
3134 G5 F0304 H13
3135 C12 F0305 H13
3136 C7 F0306 H13
3137 F6 F0307 I13
3138 C12 F0401 H9
3139 C7 F0402 H9
3140 C7 F0403 G9
3141 D7 F0404 G9
3142 G8 F0405 G9
3143 C12 F0406 G9
3144 E5 F0407 G9
3145 C12 F0408 G9
3147 E13 F0409 F9
3149 E13 F0410 F9
3150 I5 F0501 D10
3152 D7 F0503 D9
3154 C12 F0506 D9
3156 D12 F0508 C9
3157 D7 F0509 D9
3159 E13 F0510 C9
3160 H2 F0511 C9
3161 D12 F0512 C9
3162 D2 F0514 C9
3163 C2 F0601 I5
3164 D12 F0603 I5
3165 C2 F936 G3
3166 H2 I100 A2
3167 E13 I102 A3
3168 D12 I105 A4
3170 E13 I106 B4
3172 E13 I108 D3
3173 E2 I109 D3
3175 E14 I110 E3
3178 E14 I111 F3
3180 D12 I112 C3
3184 F2 I114 C2
3185 G12 I116 D11
3186 G13 I117 H7
3187 F2 I119 D2
3189 H12 I120 E2
3191 H11 I121 E2
3192 H12 I122 F2
3195 I10 I123 F2
3197 I12 I124 G2
3199 I12 I125 I2
4110 F8
4111 G7

Digital: 1394



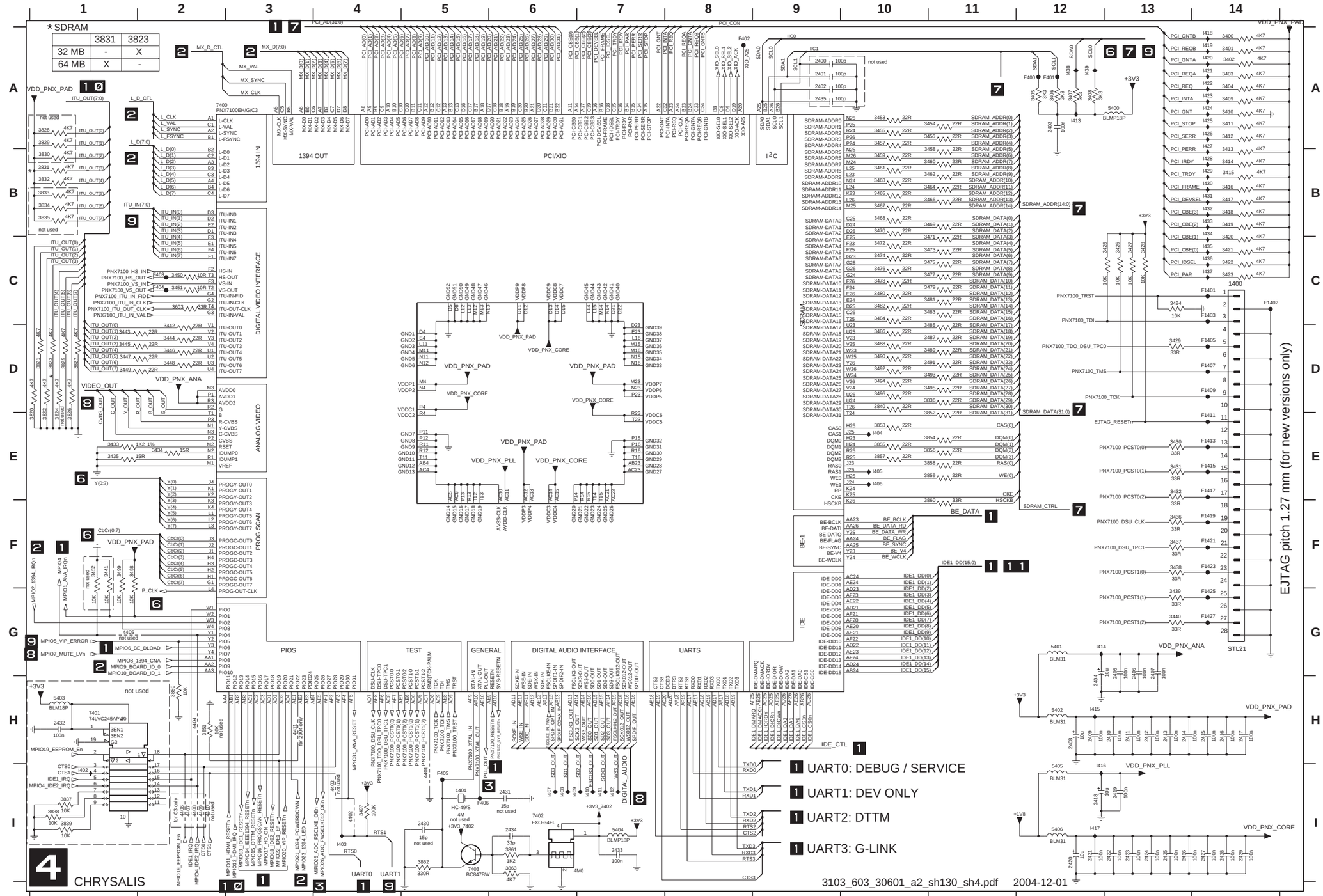
1201 D1	3289 H13
1203 B1	3290 I13
2200 B2	3291 I13
2201 C2	3292 I13
2202 D1	3293 I13
2203 D2	3294 F12
2204 D2	3295 F12
2205 D2	3296 F12
2206 G3	3297 E8
2207 F2	3298 F8
2208 G3	3299 F8
2209 G2	3314 F13
2210 G2	3315 F8
2212 H1	3316 F8
2214 H2	3317 F8
2215 H2	3318 F8
2217 I2	3319 F8
2218 I2	4201 D6
2219 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 G11
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



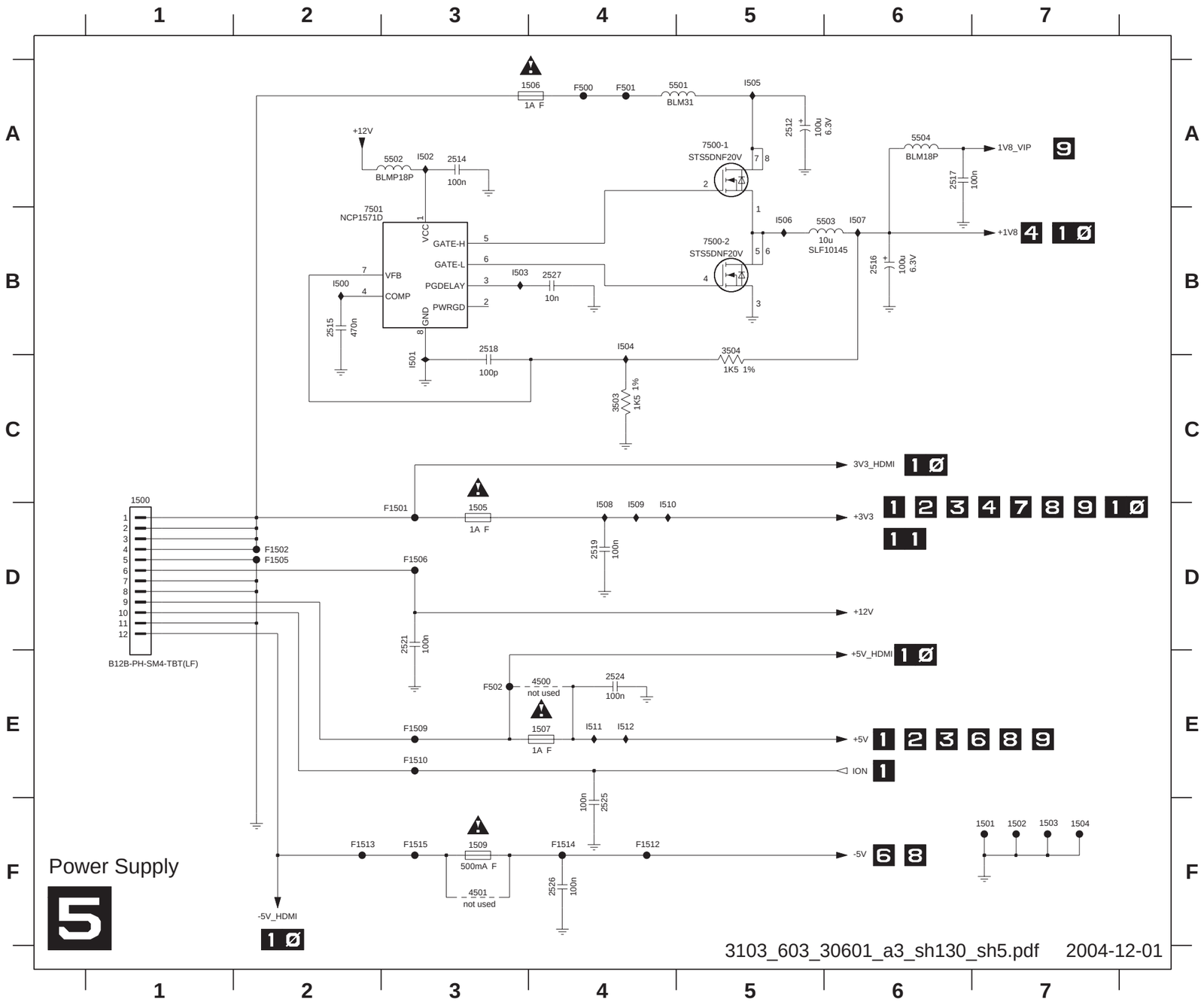
2300 B3
2301 B4
2302 C1
2303 C1
2304 B4
2305 C1
2306 C1
2308 E1
2310 E2
3300 C1
3301 C4
3302 C5
3303 D2
3304 C4
3305 C4
3306 C5
3307 B6
3311 C5
4009 E7
4010 E6
4300 E8
4301 C4
4302 B6
4303 C4
4304 A7
4305 A8
4309 C4
4310 B8
4311 E5
4312 C8
4313 D8
4314 A7
4316 D8
5300 A4
5302 E2
7300-1 C7
7300-2 D7
7300-3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

Digital: Chrysalis



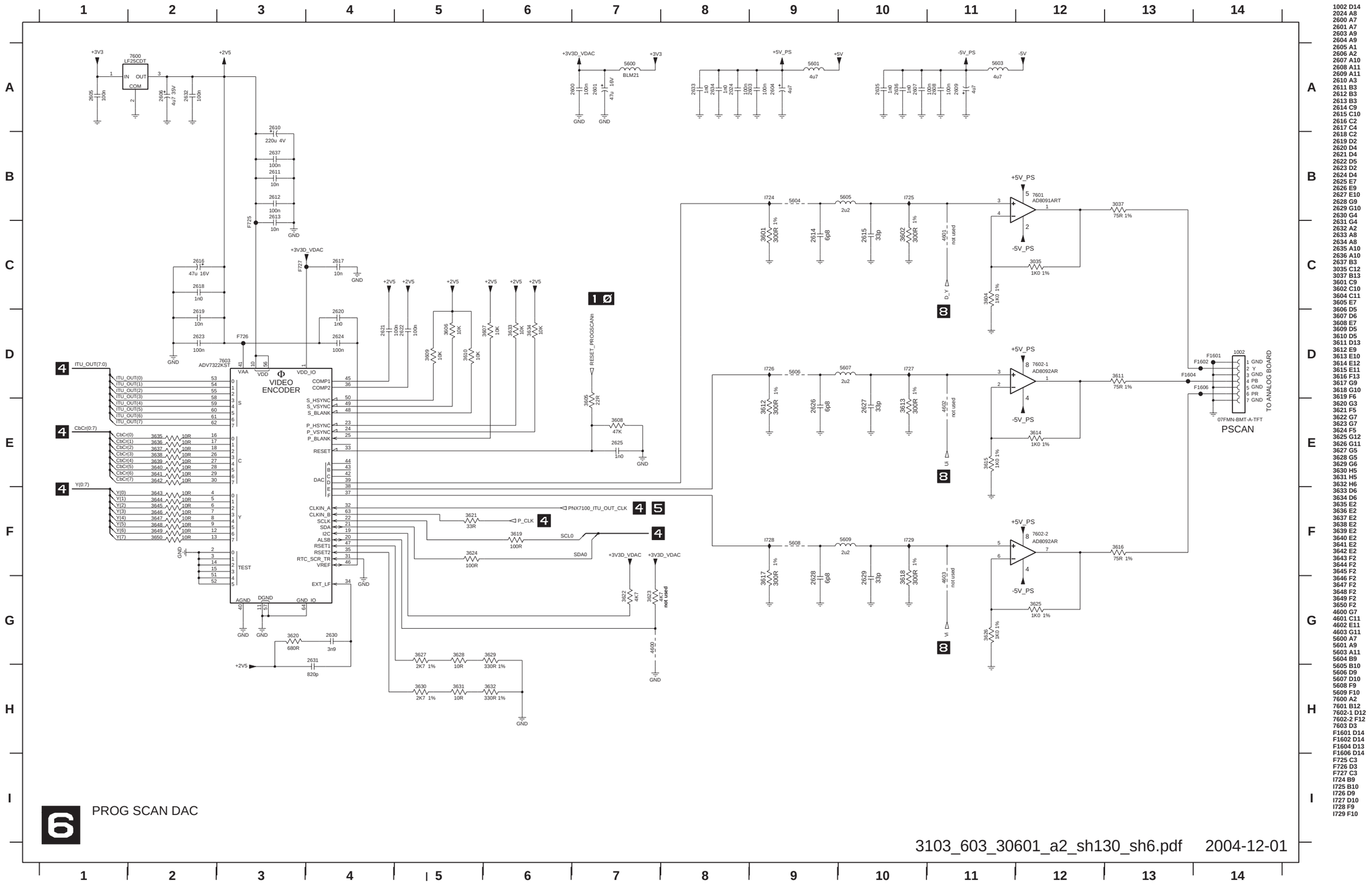
1400 C14 3493 D11
1401 I5 3494 D10
2400 A9 3495 D11
2401 A9 3496 D10
2402 A9 3497 I4
2403 A12 3498 F1
2404 H12 3499 F1
2405 G13 3603 C2
2406 G13 3820 D1
2407 G13 3821 D1
2408 H12 3822 D1
2409 H12 3823 D1
2410 H13 3824 D1
2411 H13 3825 D1
2412 H13 3826 D1
2413 H13 3827 D1
2414 H13 3828 A1
2415 H14 3829 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 I5 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 4001 I5
3406 A12 4002 I4
3407 A12 4003 I4
3408 A12 4004 H2
3409 A14 4005 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



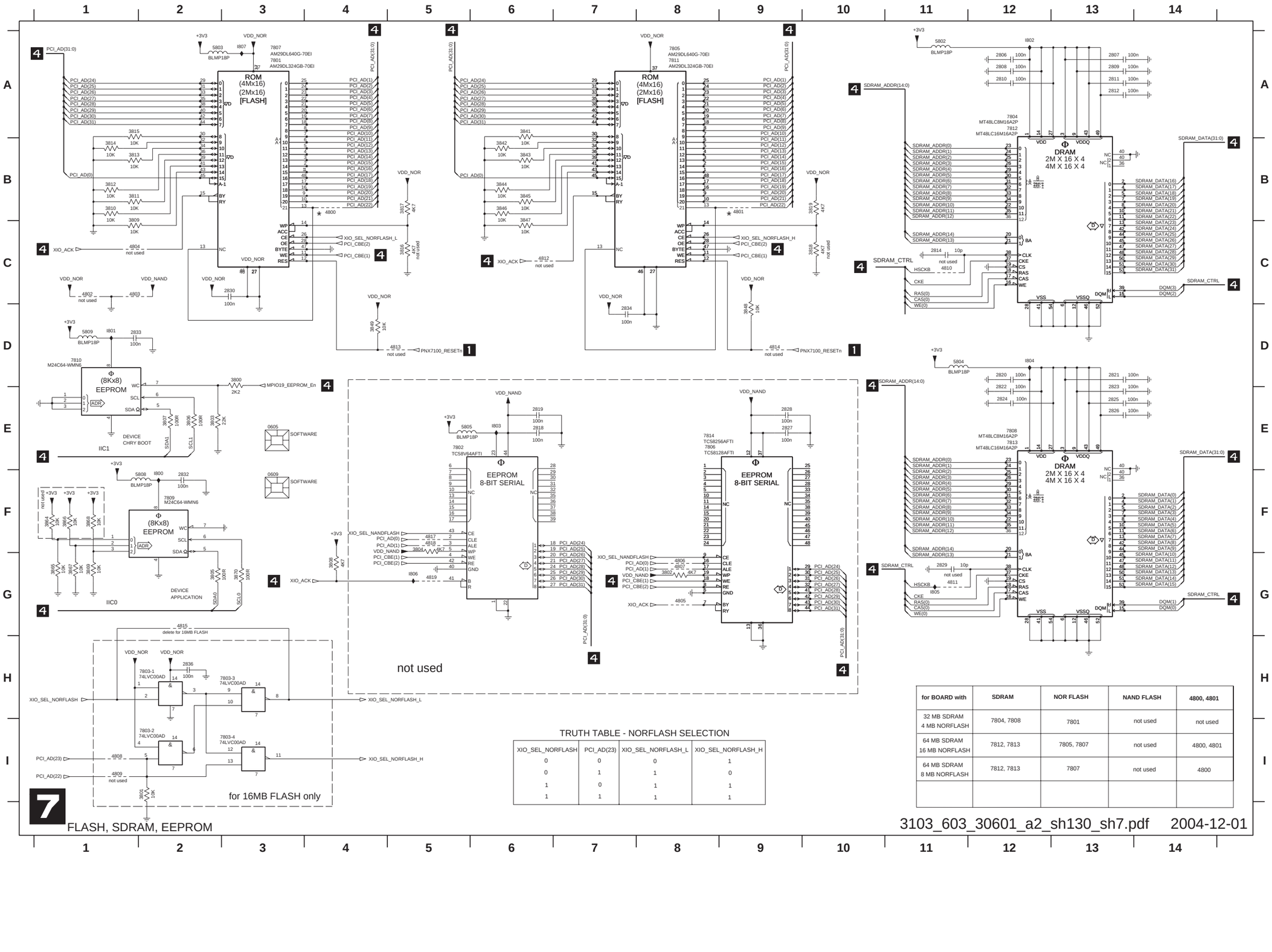
1500 D1
1501 F7
1502 F7
1503 F7
1504 F7
1505 D3
1506 A4
1507 E4
1509 F3
2512 A5
2514 A3
2515 B2
2516 B6
2517 A6
2518 B3
2519 D4
2521 D3
2524 E4
2525 F4
2526 F4
2527 B4
3503 C4
3504 B5
4500 E4
4501 F3
5501 A5
5502 A3
5503 B6
5504 A6
7500-1 A5
7500-2 B5
7501 B3
F1501 D3
F1502 D2
F1505 D2
F1506 D3
F1509 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



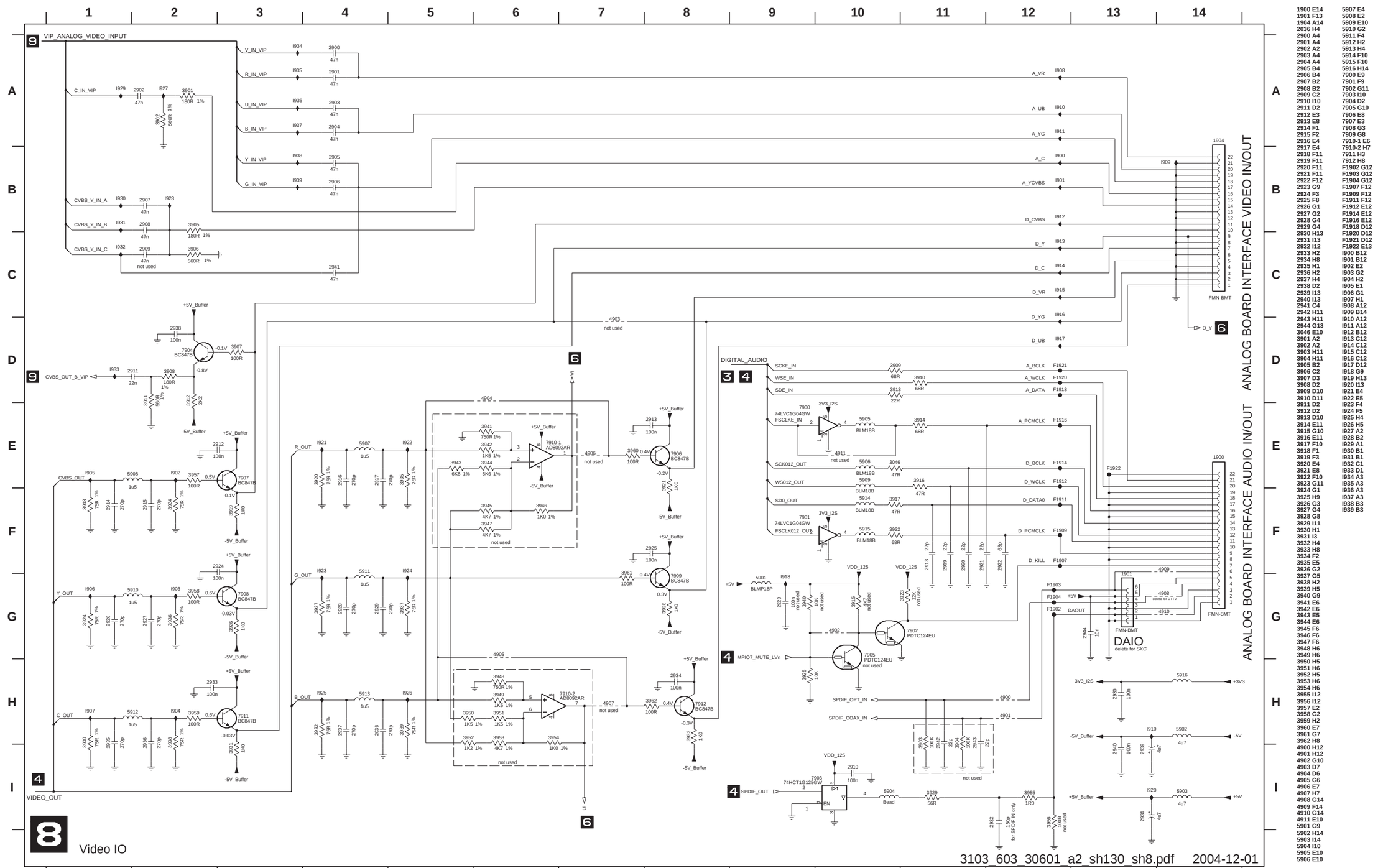
TRUTH TABLE - NORFLASH SELECTION

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

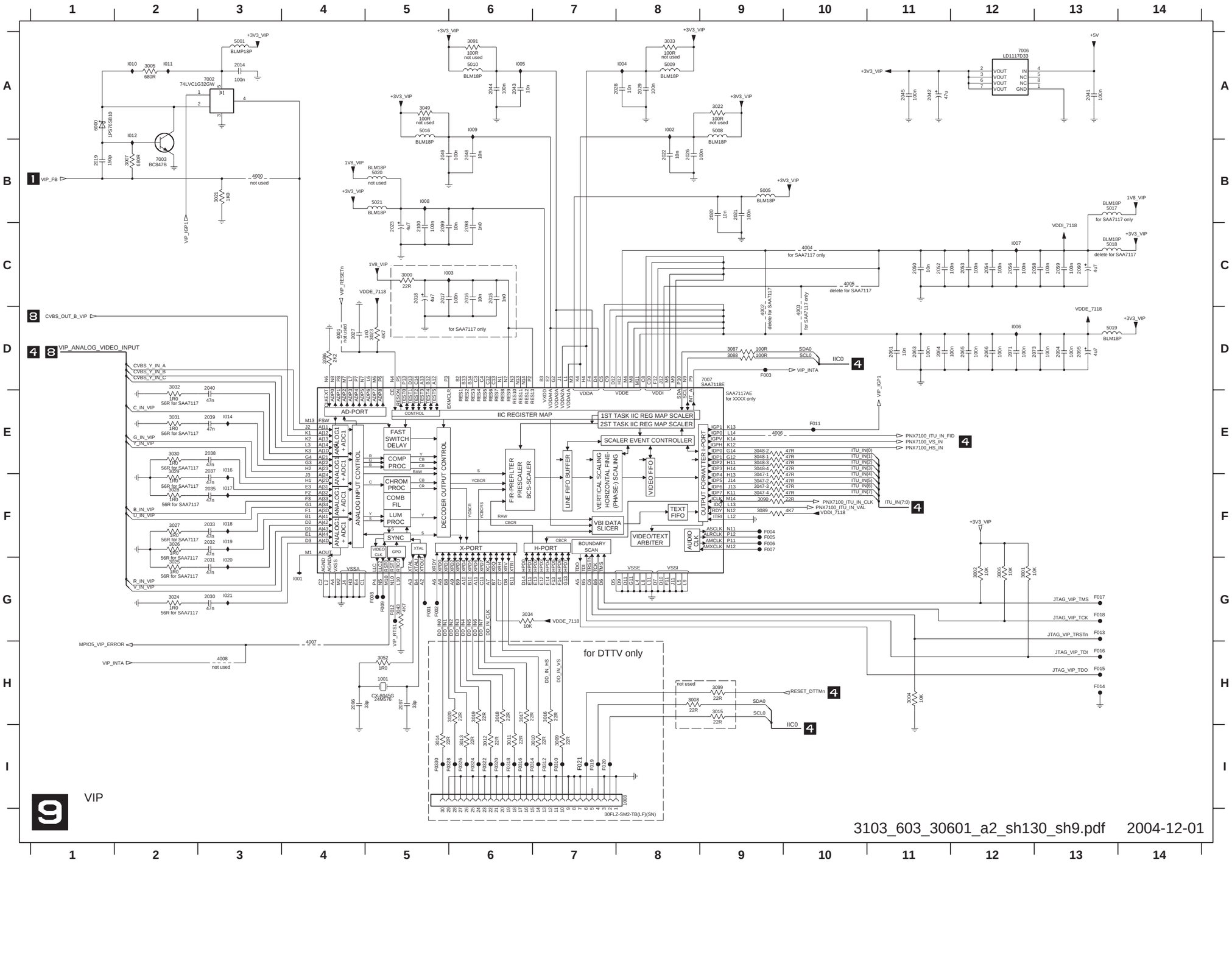
0605 E3
0609 F3
2806 A12
2807 A13
2808 A12
2809 A13
2810 A12
2811 A13
2812 A13
2814 C11
2818 E6
2819 E6
2820 D12
2821 D13
2822 E12
2823 E13
2824 E12
2825 E13
2826 E13
2827 E9
2828 E9
2829 G11
2830 C3
2832 F2
2833 D1
2834 D7
2836 H2
3800 D3
3801 I2
3802 G8
3803 E2
3804 F5
3805 G2
3806 E2
3807 E2
3808 G4
3809 C1
3810 B1
3811 B1
3812 B1
3813 B1
3814 B1
3815 A1
3816 C5
3817 B5
3818 C10
3819 B10
3841 A6
3842 B6
3843 B6
3844 B6
3845 B6
3846 B6
3847 C6
3848 D9
3849 D4
3864 F1
3865 G1
3866 F1
3867 G1
3868 F1
3869 G1
3870 G3
4800 B4
4801 B9
4802 C1
4803 C1
4804 C1
4805 G8
4806 G8
4807 G8
4808 I1
4809 I1
4810 C11
4811 G11
4812 C6
4813 D5
4814 D9
4815 G2
4817 F5
4818 F5
4819 G5
5802 A11
5803 A2
5804 D11
5805 E5
5808 F2
5809 D1
7801 A3
7802 E5
7803-1 H2
7803-2 I2
7803-3 H2
7803-4 I2
7804 A12
7805 A8
7806 E8
7807 A3
7808 E12
7809 F2
7810 D1
7811 A8
7812 A12
7813 E12
7814 E8
I800 F2
I801 D1
I802 A12
I803 E6
I804 D12
I805 G11
I806 G5
I807 A3

Digital: Video IO



1900 E14	5907 E4
1901 F13	5908 E2
1904 A14	5909 E10
2036 H4	5910 G2
2900 A4	5911 F4
2901 A4	5912 H2
2902 A2	5913 H4
2903 A4	5914 F10
2904 A4	5915 F10
2905 B4	5916 H14
2906 B4	7900 E9
2907 B2	7901 F9
2908 B2	7902 G11
2909 C2	7903 I10
2910 I10	7904 D2
2911 D2	7905 G10
2912 E3	7906 E8
2913 E8	7907 E3
2914 F1	7908 G3
2915 F2	7909 G8
2916 E4	7910-1 E6
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



9 VIP

3103_603_30601_a2_sh130_sh9.pdf 2004-12-01

1001 H5	5008 A9	I010 A2
1003 I8	5009 A8	I011 A2
2014 A3	5010 A6	I012 A2
2015 C6	5016 A5	I014 E3
2016 C6	5017 B13	I016 E3
2017 C5	5018 C13	I017 F3
2018 C5	5019 D13	I018 F3
2019 B1	5020 B5	I019 F3
2020 B9	5021 B5	I020 G3
2021 B9	6000 A1	I021 G3
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	
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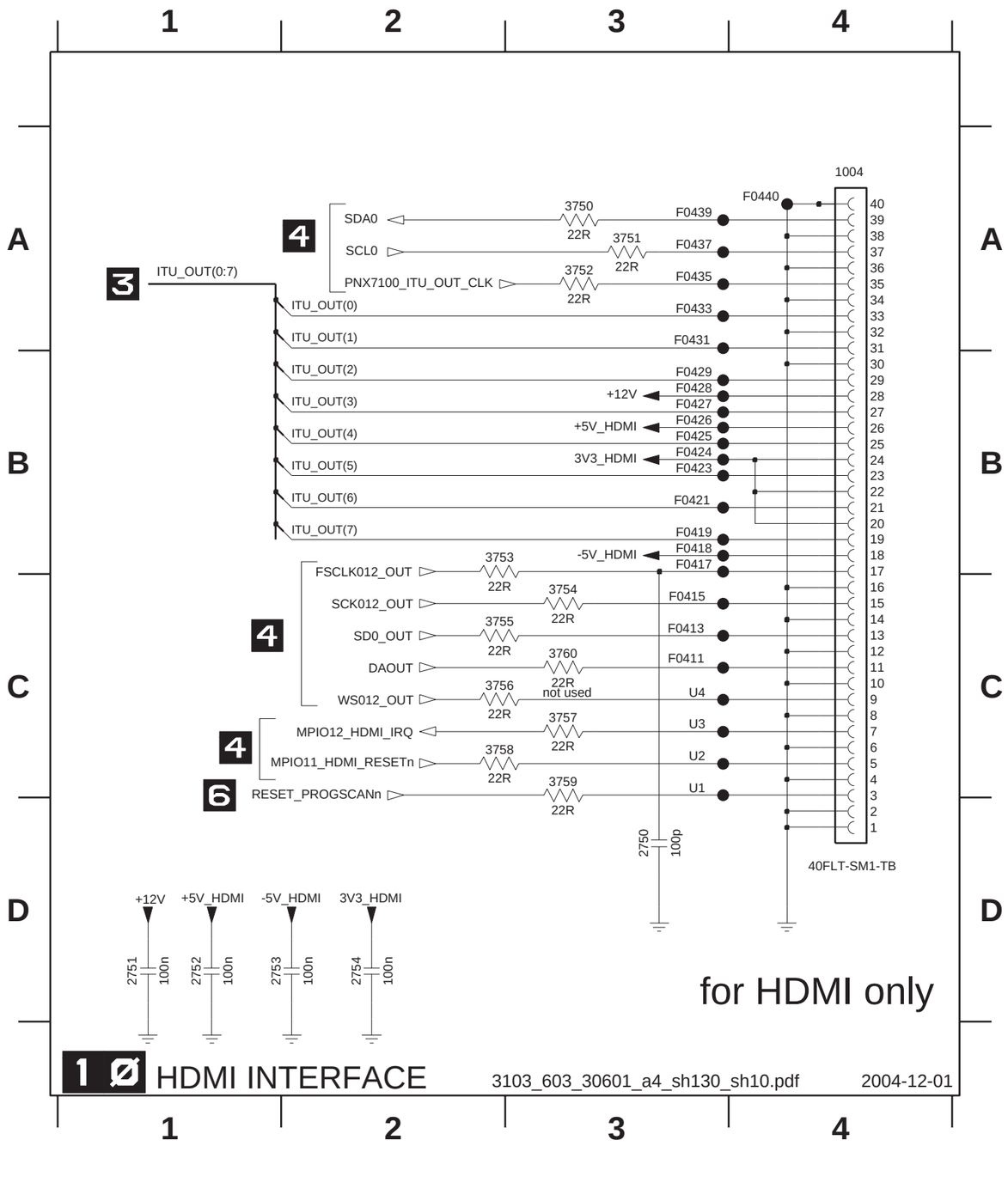
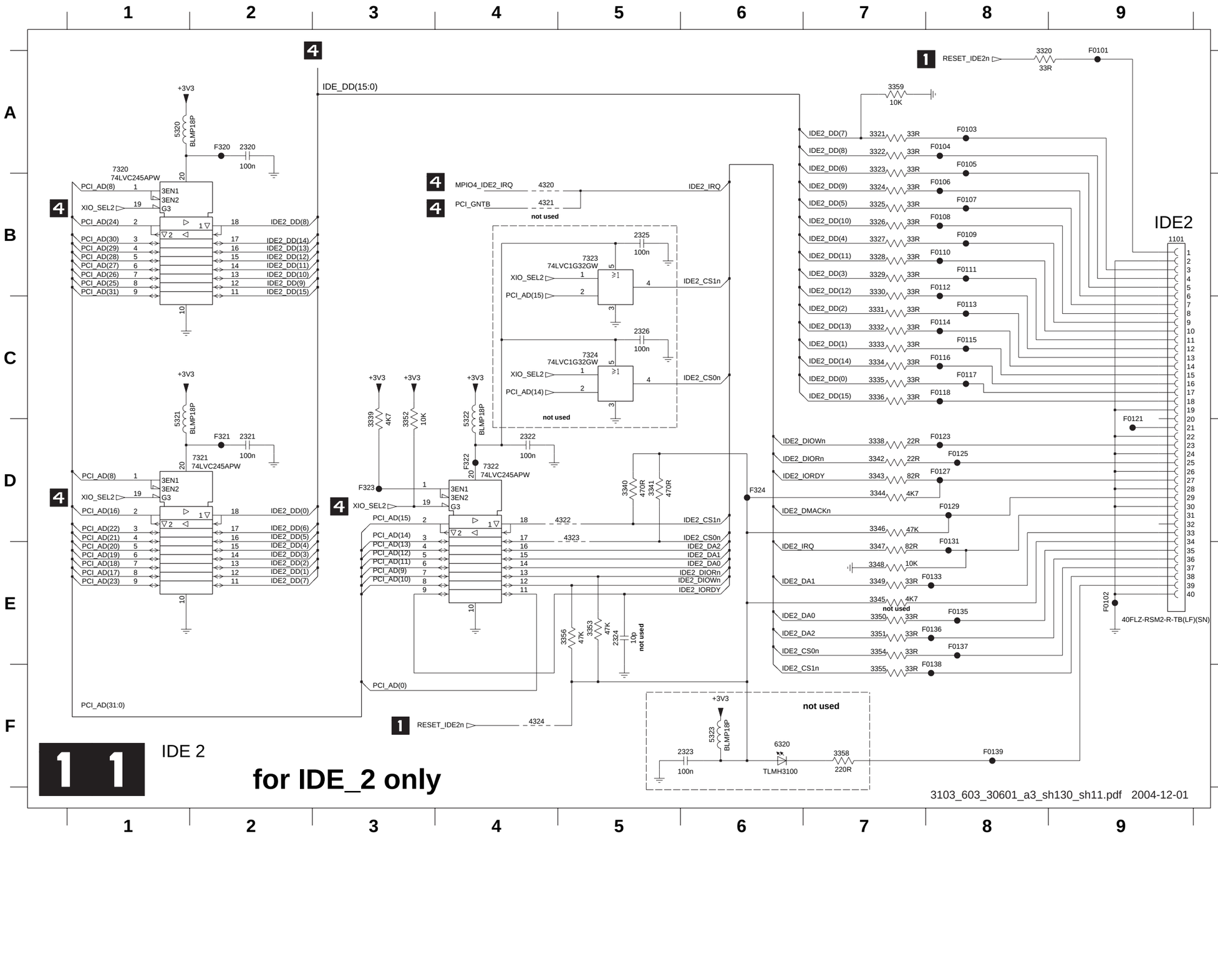


Digital: IDE2



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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 D9
F0123 D8
F0125 D8
F0127 D8
F0129 D8
F0131 E8
F0133 E8
F0135 E8
F0136 E8
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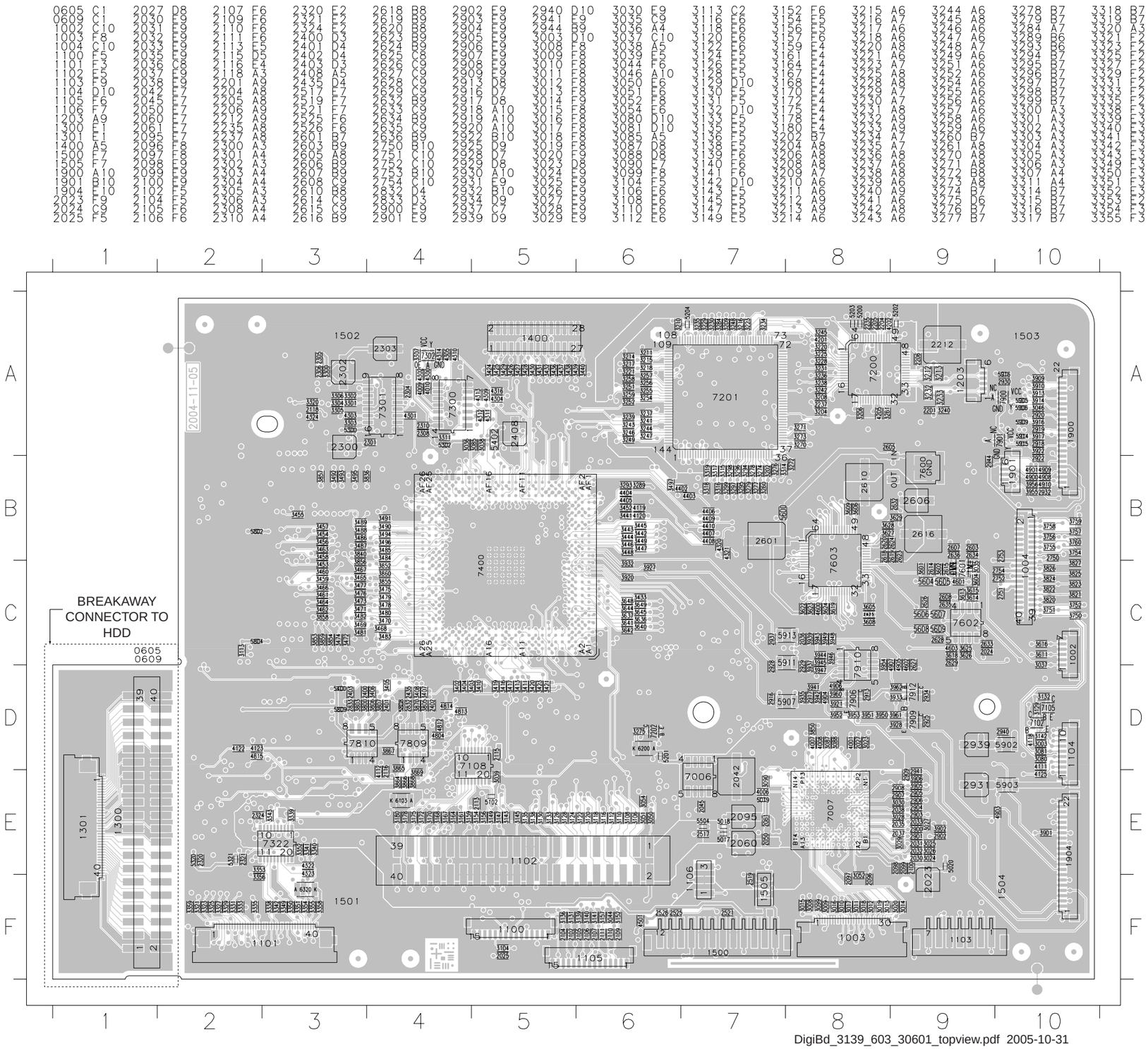
F0138 F8
F0139 F8
F320 A2
F321 D2
F322 D4
F323 D3
F324 D6

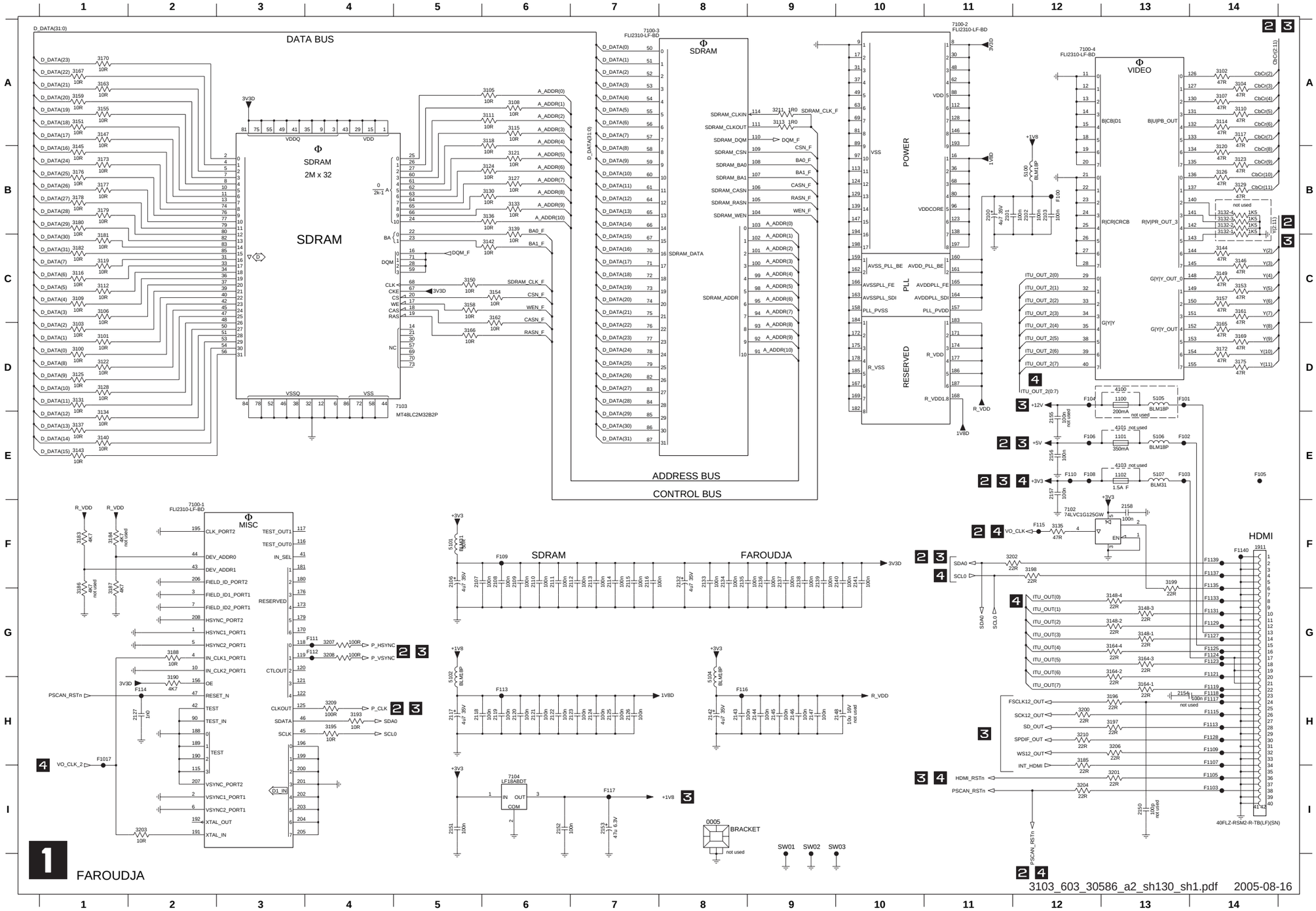
Layout: Digital Top View



DigiBd_3139_603_30601_topview.pdf 2005-10-31

Layout: Digital Bottom View

HDMI: Faroudja



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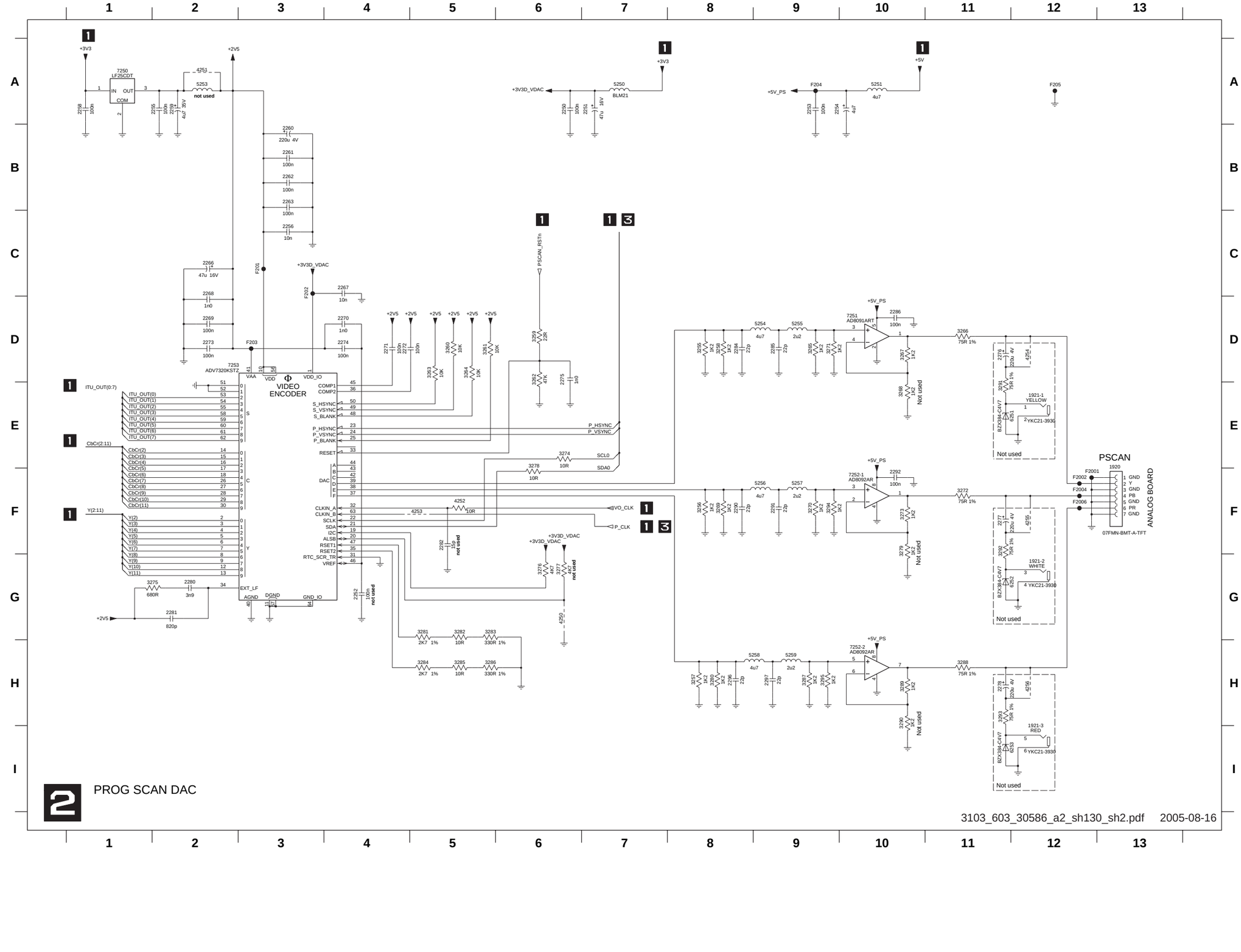
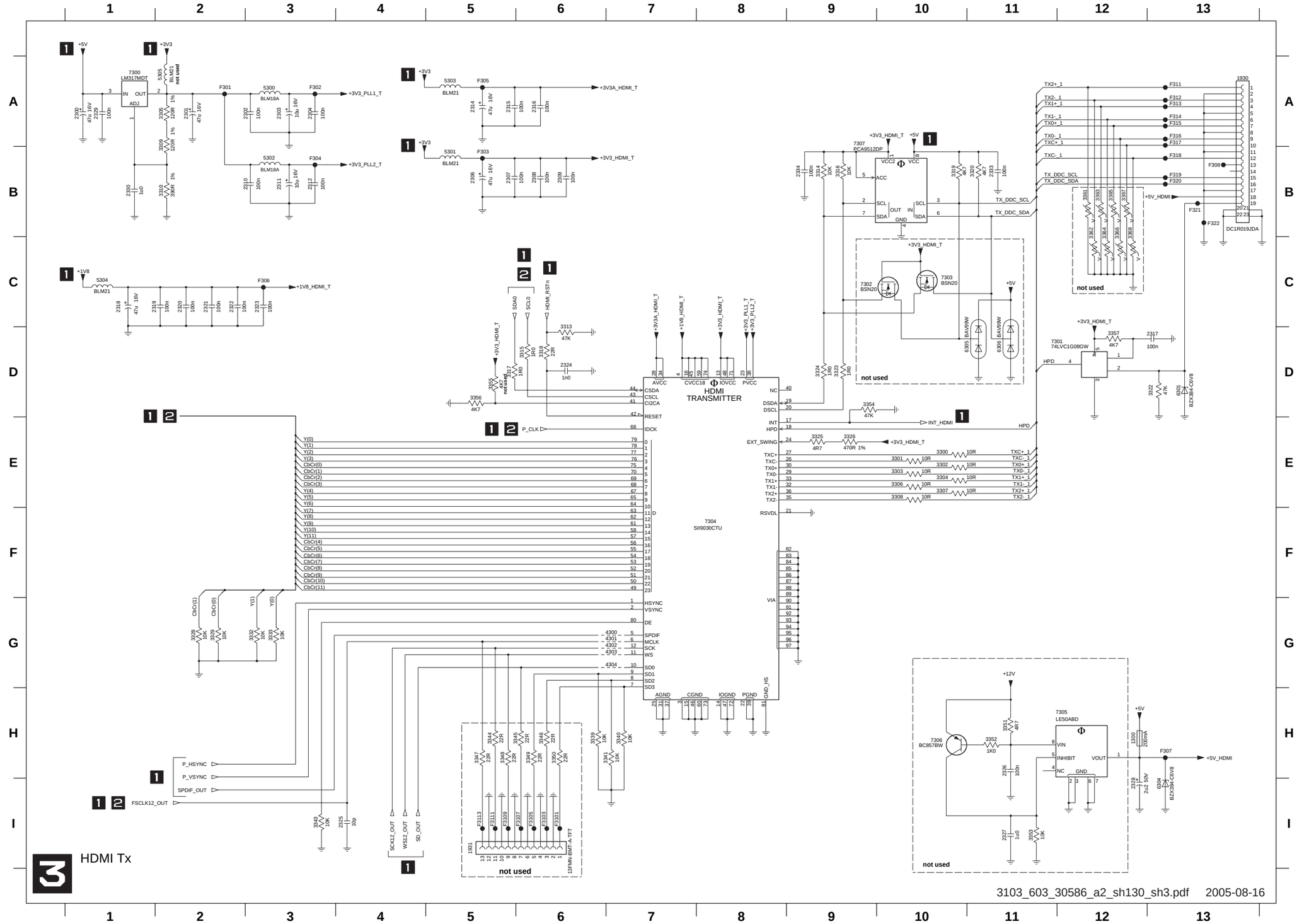
3151 A1	
3153 C14	
3154 C6	
3155 A1	
3157 C14	

HDMI: Prog Scan DAC



1920 F13 F203 D3
1921-1 E12 F204 A9
1921-2 G12 F205 A12
1921-3 H12
2250 A6
2251 A7
2252 G4
2253 A9
2254 A9
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

HDMI: HDMI Tx



1300 H12
1930 A13
1931 I5
2300 A1
2301 A2
2302 A3
2303 A3
2304 A3
2306 B5
2307 B5
2308 B6
2309 B6
2310 B3
2311 B3
2312 B3
2314 A5
2315 A5
2316 A6
2317 D13
2318 C1
2319 C2
2320 C2
2321 C2
2322 C2
2323 C3
2324 D6
2325 I4
2326 H11
2327 I11
2328 I12
2329 A1
2330 B1
2333 B11
2334 B9
3300 E10
3301 E10
3302 E10
3303 E10
3304 E10
3305 A2
3306 E10
3307 E10
3308 E10
3309 A2
3310 B2
3313 D6
3314 B9
3315 D6
3316 B9
3317 D5
3318 D6
3319 B10
3320 B11
3322 D13
3323 D9
3324 D9
3325 E9
3326 E9
3328 G2
3329 G2
3332 G3
3333 G3
3339 H6
3340 H7
3341 H7
3343 I3
3344 H5
3345 H6
3346 H6
3347 H5
3348 H5
3349 H6
3350 H6
3351 H11
3352 H11
3353 I11
3354 D9
3355 D5
3356 D5
3357 D12
3361 B12
3362 B12
3363 B12
3364 B12
3365 B12
3366 B12
3367 B12
3368 B12
4300 G7
4301 G7
4302 G7
4303 G7
4304 G7
5300 A3
5301 B5
5302 B3
5303 A5
5304 C1
5305 A2
6301 D13
6304 I13
6305 D10
6306 D11
7300 A1
7301 D11
7302 C9
7303 C10
7304 F8
7305 H11
7306 H10
7307 A9
F301 A2
F302 A3
F303 B5
F304 B3
F305 A5
F306 C3
F307 H13
F308 B13
F3101 I6
F3103 I6
F3105 I6
F3107 I6
F3109 I5
F311 A13
F3111 I5
F3113 I5
F312 A13
F313 A13
F314 A13
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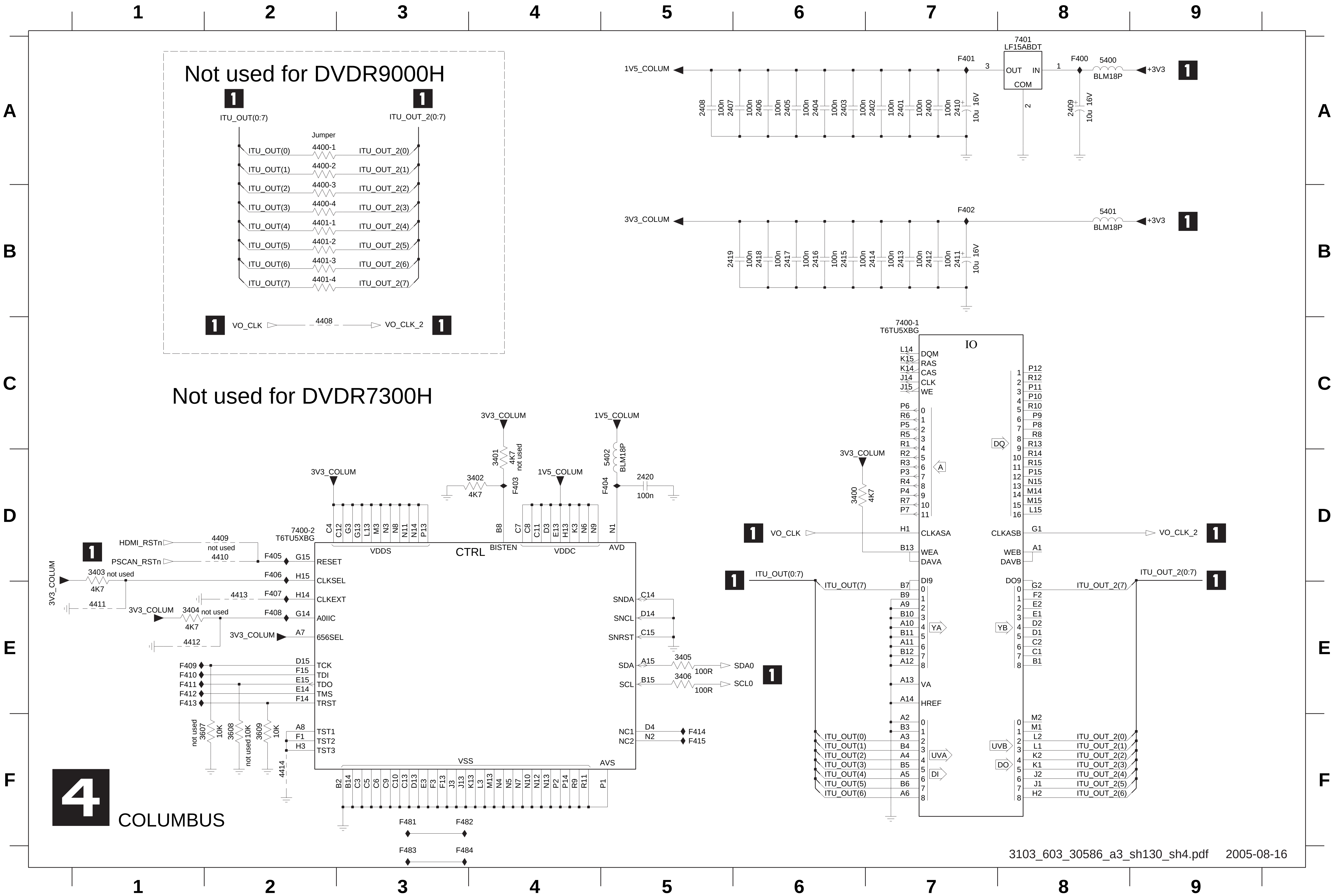
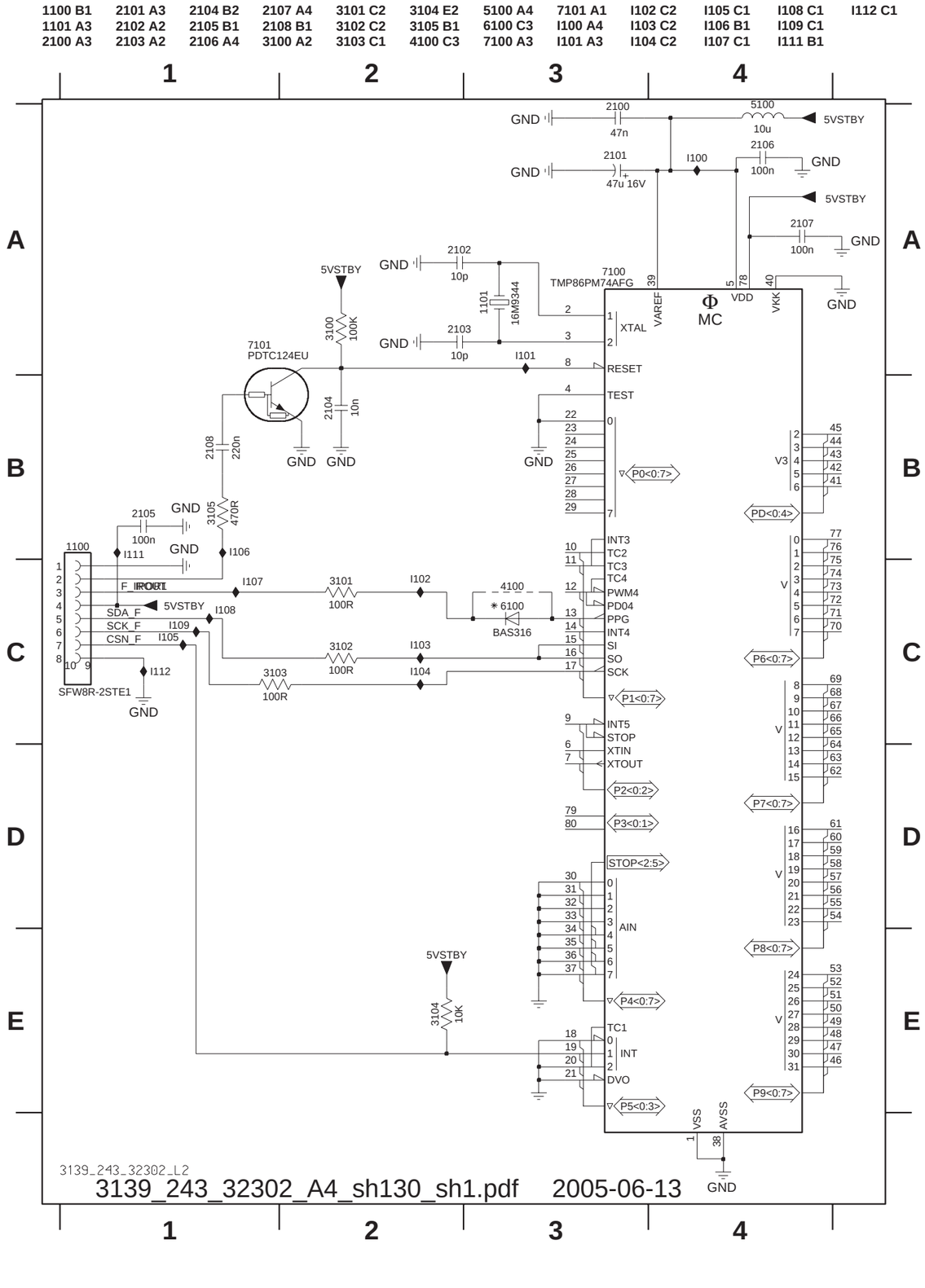
F316 A13
F317 A13
F318 B13
F319 B13
F320 B13
F321 B13
F322 B13

HDMI: Columbus

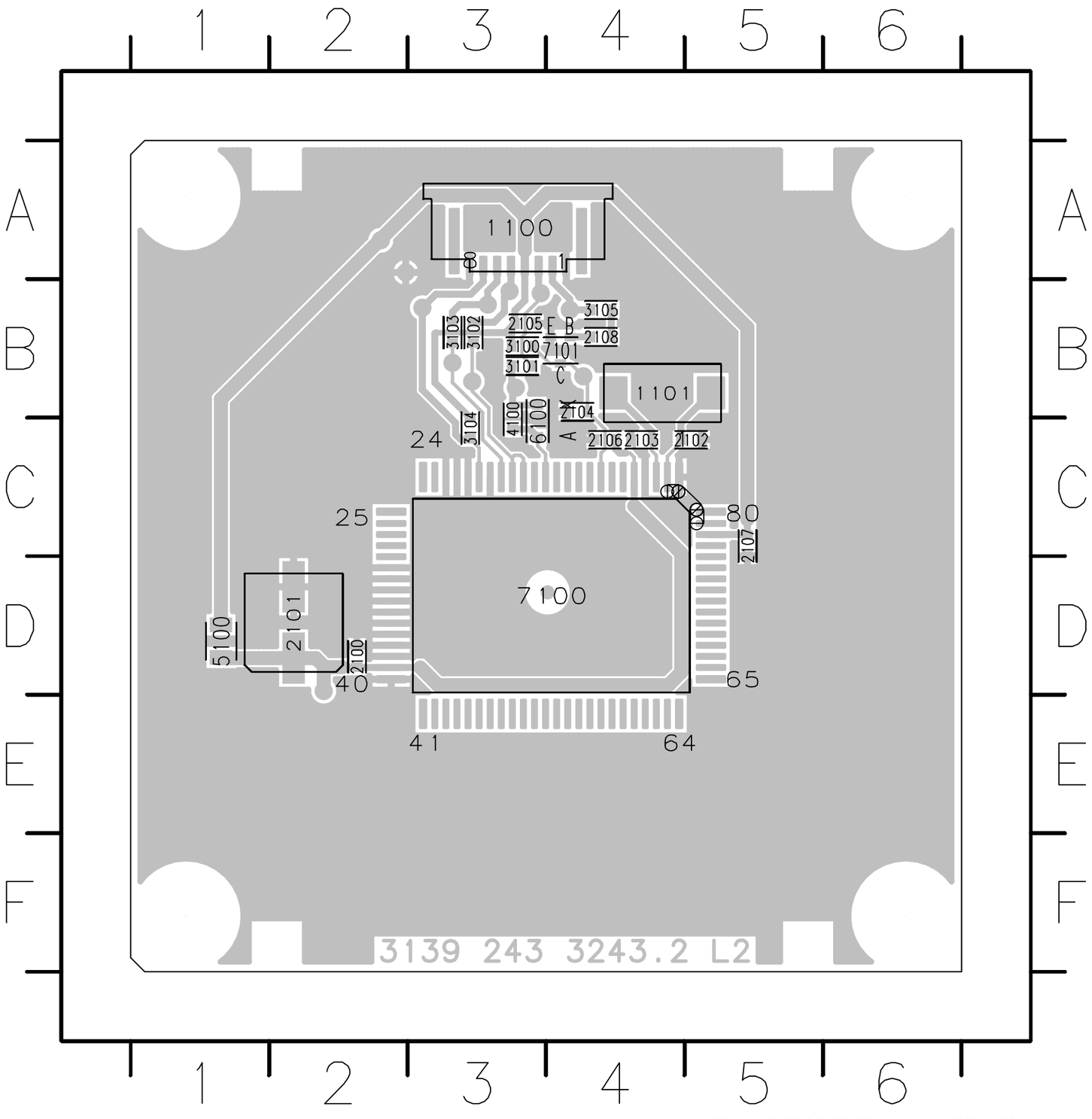


2400 A7	2401 A7
2402 A7	2403 A6
2404 A6	2405 A6
2406 A6	2407 A5
2408 A5	2409 A8
2410 A7	2411 B7
2412 B7	2413 B7
2414 B7	2415 B6
2416 B6	2417 B6
2418 B6	2419 B5
2420 D5	3400 D6
3401 D4	3402 D4
3403 D1	3404 E1
3405 E5	3406 E5
3607 F2	3608 F2
3609 F2	4400-1 A2
4400-2 A2	4400-3 B2
4400-4 B2	4401-1 B2
4401-2 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
F408 E2	F409 E1
F410 E1	F411 E1
F412 E1	F413 E1
F414 F5	F415 F5

IR Blaster Board



Layout: IR Blaster Top View



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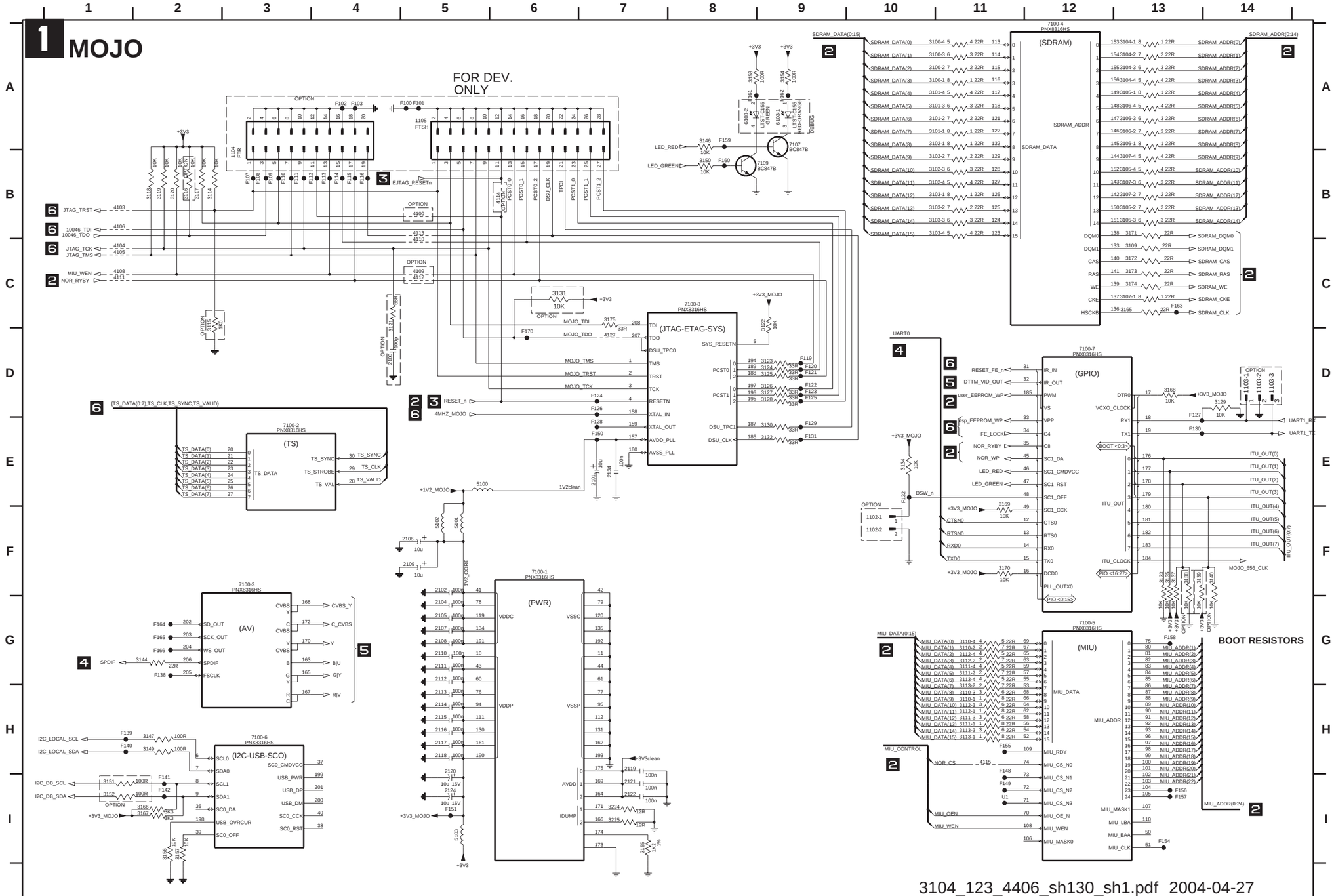
2100	D2
2101	D2
2102	C5
2103	C4
2104	B4
2105	B3
2106	C4
2107	C5
2108	B4
3100	B3
3101	B3
3102	B3
3103	B3
3104	C3
3105	B4
4100	C3
5100	D1
6100	C3
7100	D4
7101	B4

IRBlaster_3139_243_32432_topview.pdf 2005-11-09

DTTM: MOJO



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1102-1 F10	3165 C13	6103-2 A8	F100 A5
1102-2 F10	3166 I2	7100-1 F6	F101 A5
1103-1 D14	3167 I2	7100-2 E3	F102 A4
1103-2 D14	3168 D13	7100-3 F3	F103 A4
1103-3 D14	3169 E11	7100-4 A12	F104 A4
1104 B3	3170 F11	7100-5 G12	F105 A4
1105 A5	3171 B13	7100-6 H3	F106 A4
2100 D4	3172 C13	7100-7 D12	F107 A4
2101 E7	3173 C13	7100-8 C8	F108 B3
2102 F5	3174 C13	7107 A9	F109 B3
2104 G5	3175 C7	7109 B9	F110 B3
2105 G5	3224 I7	F100 A5	F111 B3
2106 F5	3225 I7	F101 A5	F112 B3
2107 G5	4100 B5	F102 A4	F113 B4
2108 G5	4103 B1	F103 A4	F114 B4
2109 F5	4104 C1	F104 A4	F115 B4
2110 G5	4105 C1	F105 A4	F116 B4
2111 G5	4106 B1	F106 A4	F117 B4
2112 G5	4108 C1	F107 A4	F118 B4
2113 H5	4109 C5	F108 B3	F119 D9
2114 H5	4110 C5	F109 B3	F120 D9
2115 H5	4111 C1	F110 B3	F121 D9
2116 H5	4112 C5	F111 B3	F122 D9
2117 H5	4113 B5	F112 B3	F123 D9
2118 H5	4114 B6	F113 B4	F124 D7
2119 H7	4115 H11	F114 B4	F125 D9
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2121 I7	5100 E5	F116 B4	F127 D13
2122 I7	5101 F5	F117 B4	F128 E7
2124 I5	5102 F5	F118 B4	F129 E9
2134 E7	5103 I5	F119 D9	F130 E10
3100-1 A11	6103-1 A9	F120 D9	F131 E9
3100-2 A11	6103-2 A8	F121 D9	F132 E10
3100-3 A11	7100-1 F6	F122 D9	F138 G2
3100-4 A11	7100-2 E3	F123 D9	F139 H1
3101-1 A11	7100-3 F3	F124 D7	F140 H1
3101-2 A11	7100-4 A12	F125 D9	F141 I2
3101-3 A11	7100-5 G12	F126 D7	F142 I2
3101-4 A11	7100-6 H3	F127 D13	F148 H11
3102-1 A11	7100-7 D12	F128 E7	F149 I11
3102-2 B11	7100-8 C8	F129 E9	F150 E7
3102-3 B11	7107 A9	F130 E10	F151 I5
3102-4 B11	7109 B9	F131 E9	F154 I13
3103-1 B11	F100 A5	F132 E10	F155 H11
3103-2 B11	F101 A5	F138 G2	F156 I13
3103-3 B11	F102 A4	F139 H1	F157 I13
3104-1 A13	F103 A4	F140 H1	F158 G13
3104-2 A13	F104 A4	F141 I2	F159 A8
3104-3 A13	F105 A4	F142 I2	F160 B8
3104-4 A13	F106 A4	F148 H11	F161 A8
3105-1 A13	F107 A4	F149 I11	F162 A9
3105-2 B13	F108 B3	F150 E7	F163 C13
3105-3 B13	F109 B3	F151 I5	F164 G2
3105-4 B13	F110 B3	F154 I13	F165 G2
3106-1 A13	F111 B3	F155 H11	F166 G2
3106-2 A13	F112 B3	F156 I13	F170 D6
3106-3 A13	F113 B4	F157 I13	
3106-4 A13	F114 B4	F158 G13	
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3107-2 B13	F116 B4	F160 B8	
3107-3 B13	F117 B4	F161 A8	
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3110-2 G11	F121 D9	F165 G2	
3110-3 H11	F122 D9	F166 G2	
3110-4 G11	F123 D9	F170 D6	
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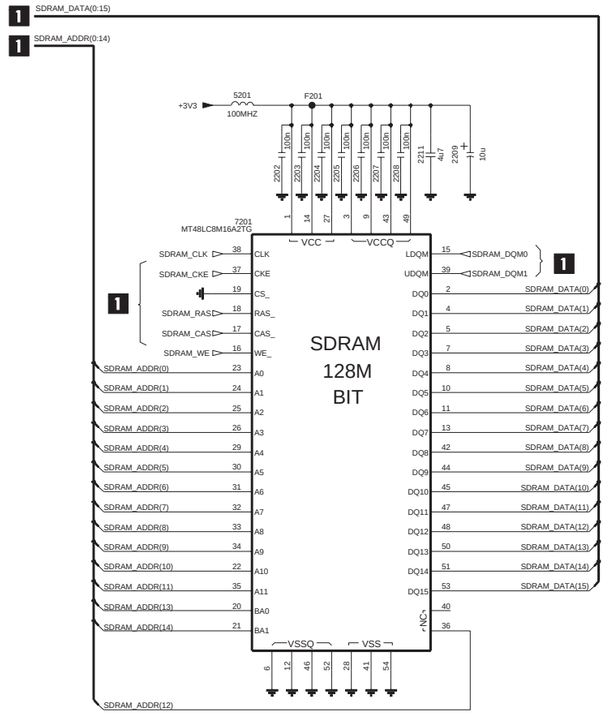
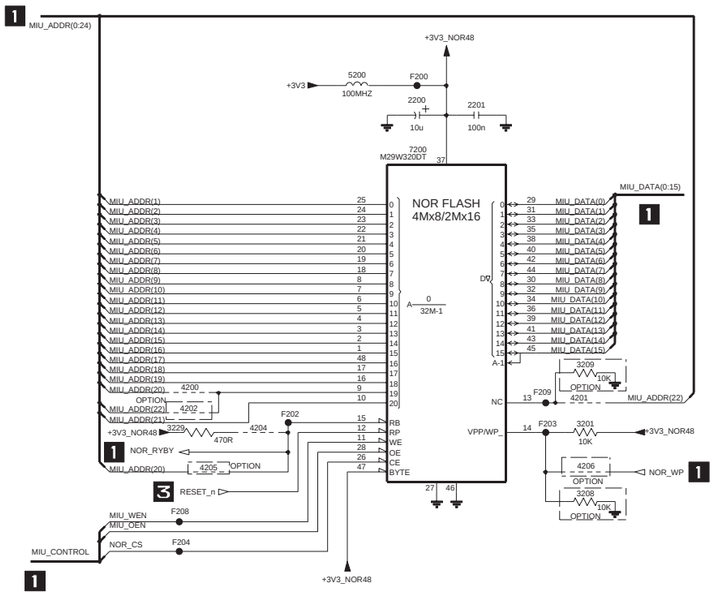
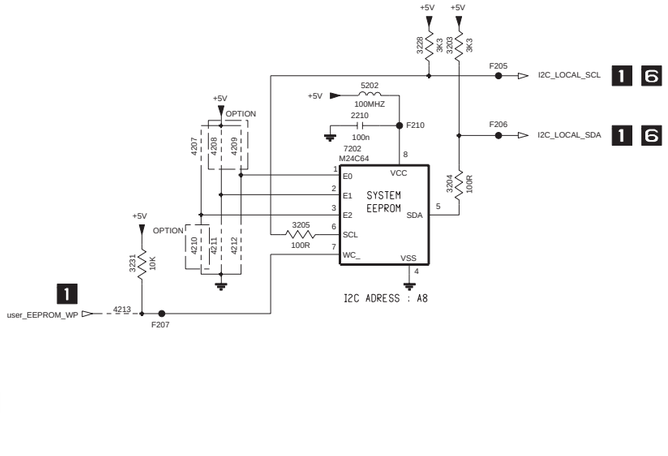
3111-2 G11	F125 D9		
3111-3 H11	F126 D7		
3111-4 G11	F127 D13		
3112-1 H11	F128 E7		
3112-2 G11	F129 E9		
3112-3 H11	F130 E10		
3112-4 G11	F131 E9		
3113-1 H11	F132 E10		
3113-2 H11	F138 G2		
3113-3 H11	F139 H1		
3113-4 G11	F140 H1		
3114 B2	F141 I2		
3115 C2	F142 I2		
3116 B2	F148 H11		
3117 B2	F149 I11		
3118 B2	F150 E7		
3119 B2	F151 I5		
3120 B2	F154 I13		
3121 C4	F155 H11		
3122 C9	F156 I13		
3123 D9	F157 I13		
3124 D9	F158 G13		
3125 D9	F159 A8		
3126 D9	F160 B8		
3127 D9	F161 A8		
3128 D9	F162 A9		
3129 D14	F163 C13		
3130 E9	F164 G2		
3131 C6	F165 G2		
3132 E9	F166 G2		
3133 F13	F170 D6		
3134 E10			
3135 F13			
3137 F13			
3138 F13			
3139 F13			
3140 F14			
3144 G2			
3146 A8			
3147 H2			
3149 H2			
3150 B8			
3151 I1			
3152 I1			
3153 A8			
3154 A9			
3155 I7			
3156 I2			

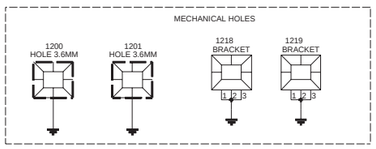
DTTM: FLASH MEMORY

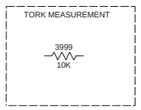
2 FLASH MEMORY







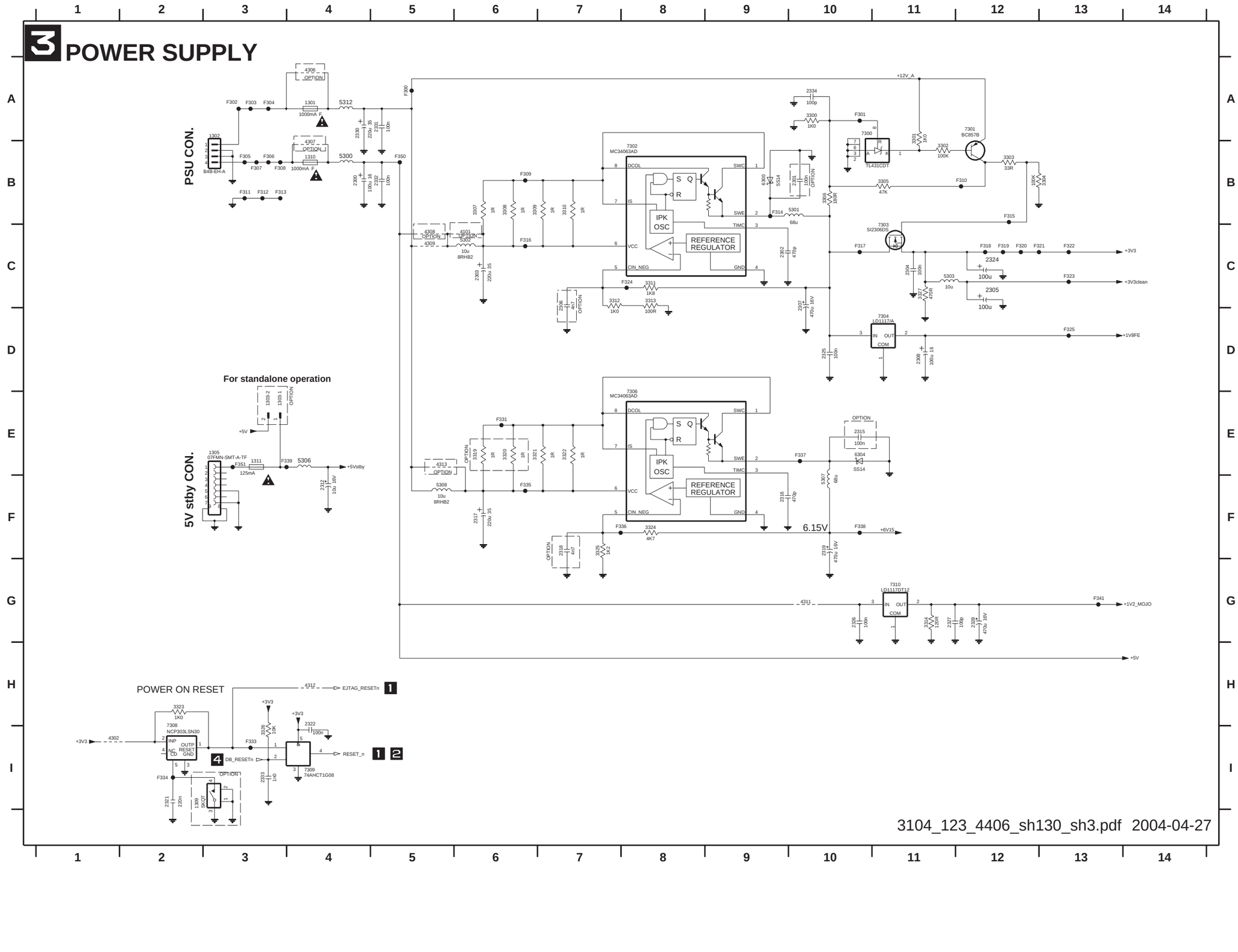




3104_123_4406_sh130_sh2.pdf 2004-04-27

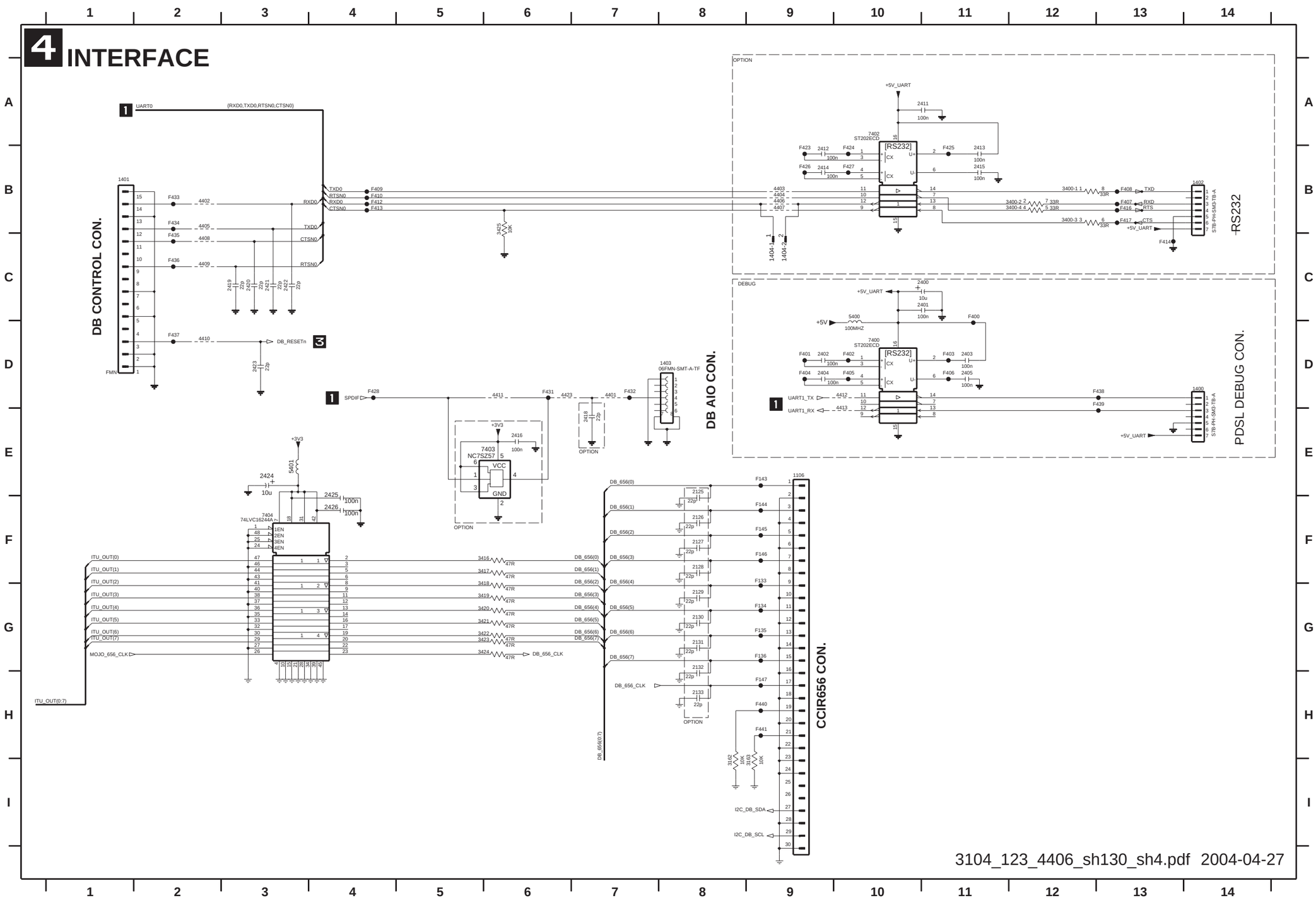
1200 I7
1201 I7
1218 I8
1219 I8
2200 C8
2201 C8
2202 D2
2203 D2
2204 D3
2205 D3
2206 D3
2207 D3
2208 D3
2209 C4
2210 D12
2211 C3
3201 E9
3203 C13
3204 D13
3205 E12
3208 F9
3209 E9
3228 C13
3229 E6
3231 E11
3999 I12
4200 E6
4201 E9
4202 E6
4204 E7
4205 F6
4206 F9
4207 D11
4208 D11
4209 D12
4210 E11
4211 E11
4212 E12
4213 E11
5200 C7
5201 C2
5202 D13
7200 C8
7201 D2
7202 D12
F200 C8
F201 C2
F202 E7
F203 E9
F204 F6
F205 C13
F206 D13
F207 E11
F208 F6
F209 E9
F210 D13

DTTM: POWER SUPPLY



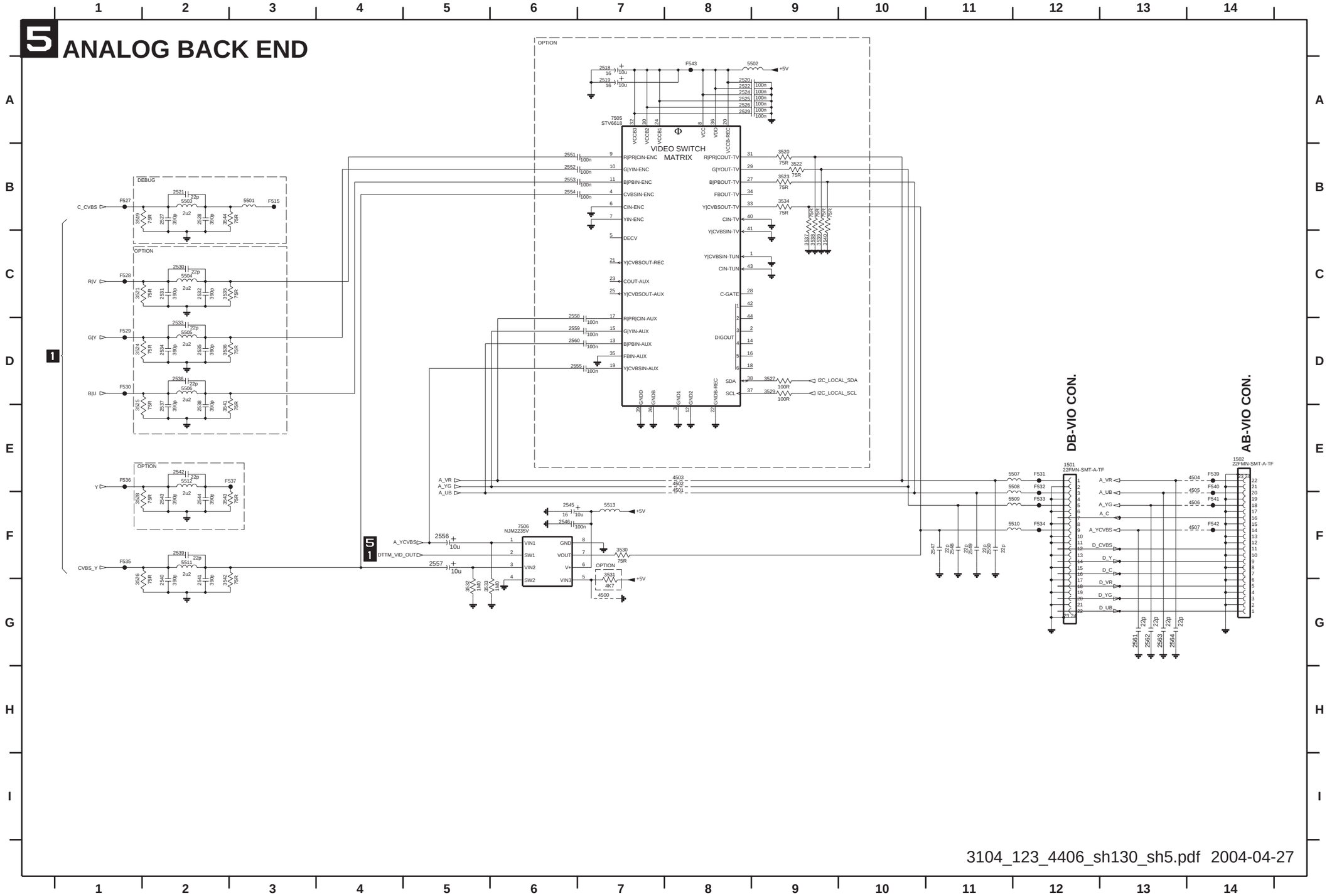
1301 A4
1302 A3
1303-1 D3
1303-2 D3
1305 E3
1309 I2
1310 B4
1311 E3
2300 B4
2301 B10
2302 C9
2303 C6
2304 C11
2305 C12
2306 C7
2307 C10
2308 D11
2312 F4
2315 E10
2316 F9
2317 F6
2318 F7
2319 F10
2321 I2
2322 H4
2324 C12
2325 D10
2326 G10
2327 G11
2328 G12
2330 A4
2331 A5
2332 B5
2333 I3
2334 A10
3300 A10
3301 A11
3302 B11
3303 B12
3304 B13
3305 B11
3306 B10
3307 B6
3308 B6
3309 B6
3310 B7
3311 C8
3312 C7
3313 C8
3314 G11
3319 E6
3320 E6
3321 E6
3322 E7
3323 H2
3324 F8
3325 F7
3326 I3
3327 C11
4101 C6
4302 I1
4306 A4
4307 B4
4308 C5
4309 C5
4311 G10
4312 H4
4313 E5
5300 B4
5301 B10
5302 C6
5303 C11
5306 E4
5307 F10
5308 F5
5312 A4
6300 B9
6304 E10
7300 A10
7301 A12
7302 B8
7303 C11
7304 D11
7306 E8
7308 I2
7309 I4
7310 G11
F300 A5
F301 A10
F302 A3
F303 A3
F304 A3
F305 B3
F306 B3
F307 B3
F308 B3
F309 B6
F310 B12
F311 B3
F312 B3
F313 B3
F314 B9
F315 B12
F316 C6
F317 C10
F318 C12
F319 C12
F320 C12
F321 C12
F322 C13
F323 C13
F324 C8
F325 D13
F331 E6
F333 I3
F334 I2
F335 F6
F336 F7
F337 E10
F338 F10
F339 E3
F341 G13
F350 B5
F351 E3

DTTM: INTERFACE



1106 E9
1400 D14
1401 B1
1402 B14
1403 D8
1404-1 C9
1404-2 C9
2125 E8
2126 F8
2127 F8
2128 F8
2129 G8
2130 G8
2131 G8
2132 G8
2133 H8
2400 C11
2401 C11
2402 D9
2403 D11
2404 D9
2405 D11
2411 A11
2412 B9
2413 B11
2414 B9
2415 B11
2416 E6
2418 E7
2419 C3
2420 C3
2421 C3
2422 C3
2423 D3
2424 E3
2425 F4
2426 F4
3162 I8
3163 I9
3400-1 B12
3400-2 B12
3400-3 B12
3400-4 B12
3416 F5
3417 F5
3418 G5
3419 G5
3420 G5
3421 G5
3422 G5
3423 G5
3424 G5
3425 B6
4401 D7
4402 B2
4403 B9
4404 B9
4405 B2
4406 B9
4407 B9
4408 C2
4409 C2
4410 D2
4411 D6
4412 D10
4413 E10
4423 D6
5400 C10
5401 E3
7400 D10
7402 A10
7403 E6
7404 F3
F133 F9
F134 G9
F135 G9
F136 G9
F143 E9
F144 F9
F145 F9
F146 F9
F147 H9
F400 C11
F401 D9
F402 D10
F403 D11
F404 D9
F405 D10
F406 D11
F407 B13
F408 B13
F409 B4
F410 B4
F412 B4
F413 B4
F414 C13
F416 B13
F417 B13
F423 B9
F424 B10
F425 B11
F426 B9
F427 B10
F428 D4
F431 D6
F432 D7
F433 B2
F434 B2
F435 C2
F436 C2
F437 D2
F438 D13
F439 D13
F440 H9
F441 H9

DTTM: ANALOG BACK END



1501 E12
1502 E14
2518 A7
2519 A7
2520 A8
2521 B2
2522 A8
2524 A8
2525 A8
2526 A8
2527 B2
2528 B2
2529 A8
2530 C2
2531 C2
2532 C2
2533 D2
2534 D2
2535 D2
2536 D2
2537 E2
2538 E2
2539 F2
2540 G2
2541 G2
2542 E2
2543 F2
2544 F2
2545 F6
2546 F6
2547 F11
2548 F11
2549 F11
2550 F11
2551 B6
2552 B6
2553 B6
2554 B6
2555 D6
2556 F5
2557 F5
2558 D6
2559 D6
2560 D6
2561 G13
2562 G13
2563 G13
2564 G13
3519 B1
3520 B9
3521 C1
3522 B9
3523 B9
3524 D1
3525 E1
3526 G1
3527 D9
3528 F1
3529 D9
3530 F7
3531 F7
3532 G5
3533 G5
3534 B9
3535 C2
3536 D2
3537 C9
3538 C9
3539 C9
3540 C9
3541 E2
3542 G2
3543 F2
3544 B2
4500 G7
4501 F8
4502 E8
4503 E8
4504 E14
4505 F14
4506 F14
4507 F14
5501 B3
5502 A9
5503 B2
5504 C2
5505 D2
5506 D2
5507 E12
5508 E12
5509 F12
5510 F12
5511 F2
5512 E2
5513 F7
7505 A7
7506 F6
F515 B3
F527 B1
F528 C1
F529 D1
F530 D1
F531 E12
F532 E12
F533 F12
F534 F12
F535 F1
F536 E1
F537 E3
F539 E14
F540 E14
F541 F14
F542 F14
F543 A8

DTTM: FRONT END

6 FRONT END

1602 TD1316AL/IHP

RF IN
RF/MOD OUT
LB
MB
HB
OSC
PLL
SCL
SDA
XTAL
RF-OUT
VID
AUD
VMOD
NC
AGC
VTUN
IF-OUT
IF-AGC
IF-1
IF-2
MT

7605 FXO-31FL
VDD
TS
OSC
OUT
GND

7307 LF50CDT
IN OUT COM

7600-A LM393D
7600-B LM393D

7602 74LVC1GU04

7603 TDA10046HT

4MHZ_MOJO
4MHz
RESET_FE_n
COMP_OUT
FE_LOCK
I2C_TDA_SCL
I2C_TDA_SDA
I2C_LOCAL_SDA
I2C_LOCAL_SCL
dsp_EEPROM_WP

COFDM CHANNEL DECODER

CLR_
AGC_TUN
AGC_IF
VIP
VIM
XIN
XOUT
GPIO0
GPIO1
GPIO2
GPIO3
SADDR0
SADDR1
SDA
SCL
SDA_TUN
SCL_TUN
TEST
I2C

MPEG-TS (SERIAL)
JTAG
TDO
TDI
TMS
TCK
TRST
ENSERI
S_DO
S_OCLK
S_DEN
S_PSYNC
S_UNCOR

MPEG-TS (PARALLEL)
DO0 DO1 DO2 DO3 DO4 DO5 DO6 DO7
OCLK
DEN
PSYNC
UNCOR
SACLK

{TS_DATA(0:7),TS_CLK,TS_VALID,TS_SYNC,UNCOR}

I2C ADDRESS BITS

CA1	CA0	R1	R2
0	0	NC	4K7
0	1	NC	NC
1	0	10K	10K
1	1	4K7	NC

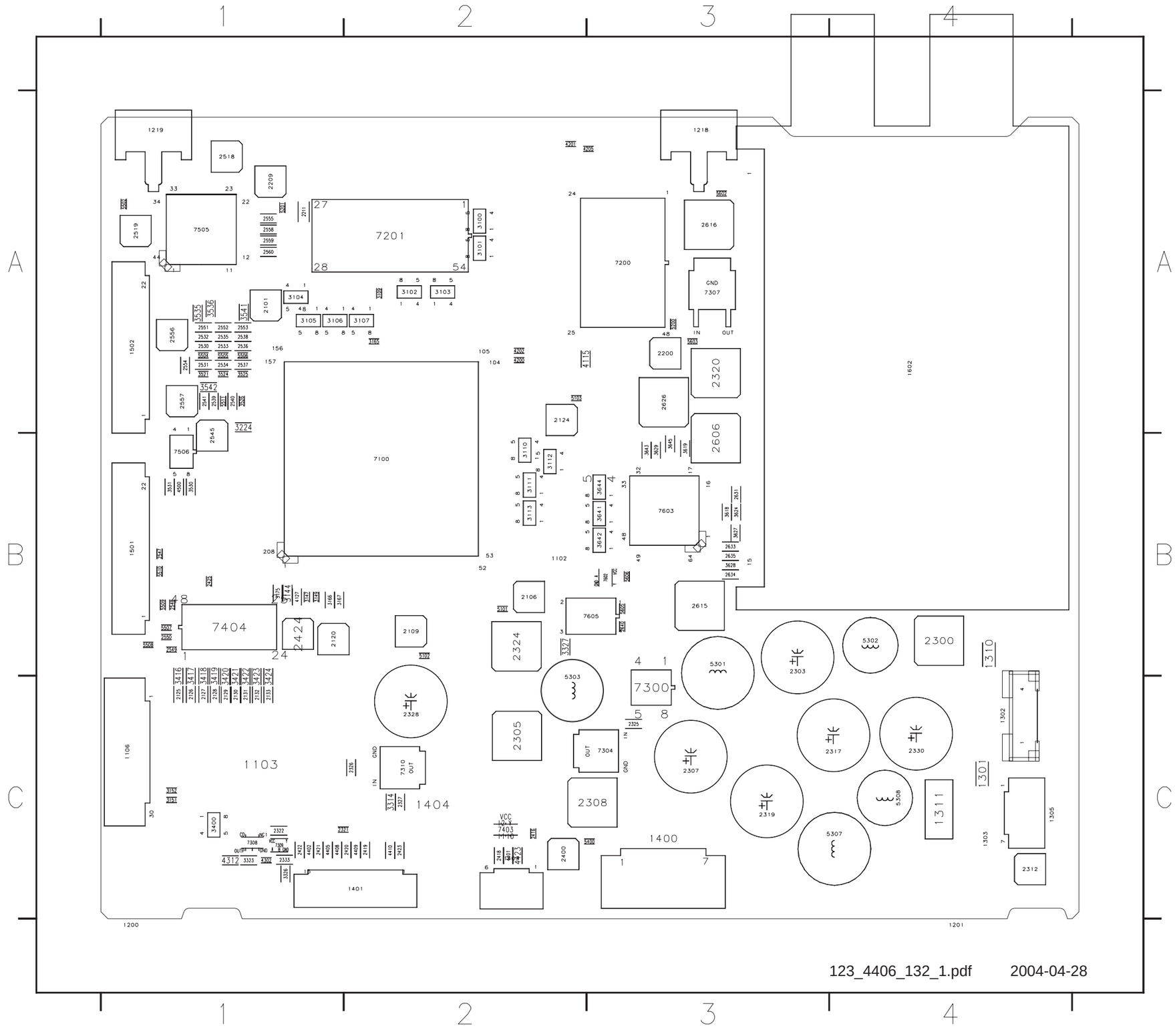
7604 M24256-BWMN6 Φ (32Kx8) EEPROM

EEPROM

3104_123_4406_sh130_sh6.pdf 2004-04-27

1602 A2
2320 D2
2606 C4
2607 C4
2608 C9
2609 C9
2610 C10
2611 C10
2612 C10
2613 C11
2614 C11
2615 C11
2616 C2
2617 C2
2618 D8
2619 D7
2621 D8
2622 D6
2623 D11
2624 D11
2625 D11
2626 D13
2627 D7
2629 E2
2630 E5
2631 E6
2632 E1
2633 E7
2634 F6
2635 F5
2638 H4
2639 E2
2640 B7
3608 C4
3609 C4
3610 D6
3611 D7
3612 D7
3613 D4
3614 D7
3615 D4
3616 E5
3617 E6
3618 E7
3619 E11
3620 E1
3621 E7
3622 E2
3623 E6
3624 E6
3625 E5
3627 F5
3628 F5
3629 F8
3630 G8
3631 G5
3632 G5
3633 G8
3634 G8
3635 G8
3636 H5
3637 H5
3638 I3
3639 C7
3640 C8
3641-1 G11
3641-2 G11
3641-3 G11
3641-4 F11
3642-1 G11
3642-2 G11
3642-3 G11
3642-4 G11
3643 G8
3644-1 G11
3644-2 G11
3644-3 G11
3645 F8
4602 E3
4603 E5
4604 I3
4605 C7
4606 C5
4607 C8
4608 C8
4609 F8
5601 C12
5602 C2
5603 D13
5604 H4
5605 B7
5606 D6
7307 D1
7600-A E2
7600-B F2
7602 D7
7603 D9
7604 H4
7605 B6
F603 C4
F604 C5
F605 C3
F606 D4
F607 D4
F608 D4
F609 D5
F610 E8
F611 E12
F612 E12
F613 E4
F614 E5
F615 E5
F616 E12
F617 E12
F618 E5
F619 E5
F620 E12
F621 F5
F622 F8
F623 F11
F624 F8
F625 F11
F626 F11
F627 F8
F628 F11
F629 F8
F630 F11
F631 F7
F632 F8
F634 G8
F647 H11
F649 H11
F650 I4
F651 C2
F652 E7
F653 C11
F654 D14

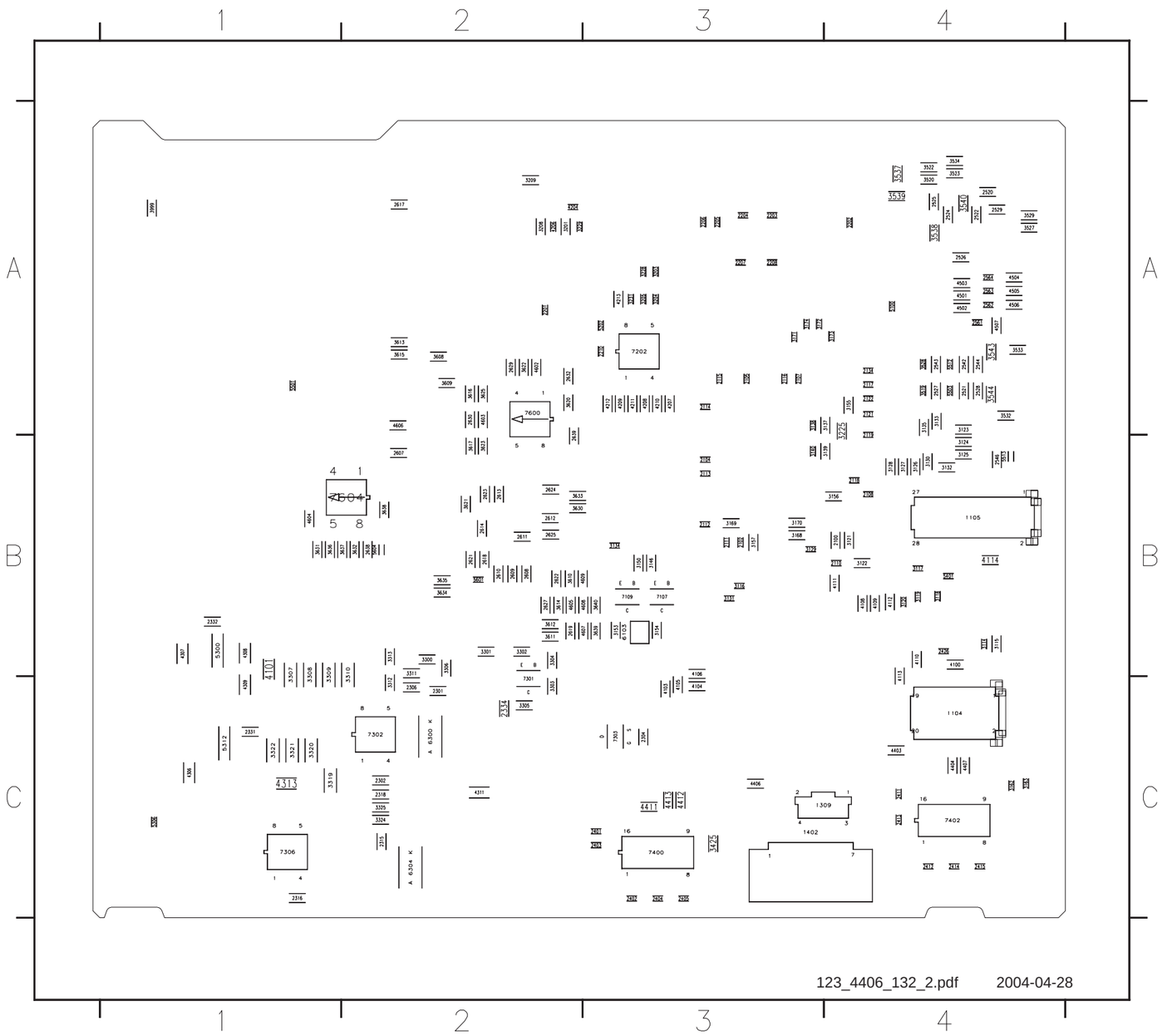
DTTM: Top Component View



123_4406_132_1.pdf 2004-04-28

1102	B2	2540	A1	3641	B3		
1103	C1	2541	A1	3642	B3		
1104	C1	2545	B1	3643	B3		
1105	B1	2547	B1	3644	B3		
1106	C1	2548	B1	3645	B3		
1218	A3	2549	B1	4115	A2		
1219	A1	2550	B1	4127	B1		
1301	C4	2551	A1	4200	A2		
1302	C4	2552	A1	4201	A2		
1303	C4	2553	A1	4202	A2		
1305	C4	2554	A1	4205	A3		
1309	C2	2555	A1	4302	C1		
1310	B4	2556	A1	4312	C1		
1311	C4	2557	A1	4401	C2		
1400	C3	2558	A1	4402	C1		
1401	C2	2559	A1	4405	C1		
1402	C2	2560	A1	4408	C1		
1403	C2	2606	B3	4409	C2		
1404	C2	2615	B3	4410	C2		
1501	B1	2616	A3	4423	C2		
1502	A1	2626	A3	4500	B1		
1602	A4	2631	B3	5101	B2		
2101	A1	2633	B3	5102	B2		
2106	B2	2634	B3	5103	A2		
2109	B2	2635	B3	5200	A3		
2120	B1	2640	B3	5201	A1		
2124	A2	3100	A2	5301	B3		
2125	C1	3101	A2	5302	B4		
2126	C1	3102	A2	5303	C2		
2127	C1	3103	A2	5307	C4		
2128	C1	3104	A1	5308	C4		
2129	C1	3105	A1	5400	C3		
2130	C1	3106	A1	5502	A1		
2131	C1	3107	A2	5504	A1		
2132	C1	3109	A2	5505	A1		
2133	C1	3110	B2	5506	A1		
2200	A3	3111	B2	5507	B1		
2209	A1	3112	B2	5508	B1		
2211	A1	3113	B2	5509	B1		
2300	B4	3144	B1	5510	B1		
2303	B3	3147	B1	5511	A1		
2305	C2	3149	B1	5602	A3		
2307	C3	3151	C1	5603	A3		
2308	C3	3152	C1	5605	B3		
2312	C4	3165	A2	5606	B3		
2317	C4	3166	B1	6103	B2		
2319	C3	3167	B1	7100	B2		
2320	A3	3175	B1	7200	A3		
2321	C1	3224	A1	7201	A2		
2322	C1	3314	C2	7300	C3		
2324	B2	3323	C1	7304	C3		
2325	C3	3326	C1	7307	A3		
2326	C2	3327	B2	7308	C1		
2327	C2	3400	C1	7309	C1		
2328	C2	3416	C1	7310	C2		
2330	C4	3417	C1	7403	C2		
2333	C1	3418	C1	7404	B1		
2400	C2	3419	C1	7505	A1		
2416	C2	3420	C1	7506	B1		
2418	C2	3421	C1	7602	B3		
2419	C2	3422	C1	7603	B3		
2420	C2	3423	C1	7605	B3		
2421	C1	3424	C1	F163	A2		
2422	C1	3521	A1				
2423	C2	3524	A1				
2424	B1	3525	A1				
2425	B1	3526	A1				
2518	A1	3530	B1				
2519	A1	3531	B1				
2530	A1	3535	A1				
2531	A1	3536	A1				
2532	A1	3541	A1				
2533	A1	3542	A1				
2534	A1	3618	B3				
2535	A1	3619	B3				
2536	A1	3624	B3				
2537	A1	3627	B3				
2538	A1	3628	B3				
2539	A1	3629	B3				

DTTM: Bottom Component View



U1 B3	2622 B2	3322 C1	4411 C3	F142 C4	F408 C2	F654 B2			
2100 B4	2623 B2	3324 C2	4412 C3	F143 C4	F409 C3				
2102 B3	2624 B2	3325 C2	4413 C3	F144 C4	F410 C3				
2104 B3	2625 B2	3425 C3	4501 A4	F145 C4	F412 C3				
2105 A3	2627 B2	3519 A4	4502 A4	F146 C4	F413 C3				
2107 A3	2629 A2	3520 A4	4503 A4	F147 C4	F414 C2				
2108 B4	2630 A2	3522 A4	4504 A4	F148 B3	F416 C2				
2110 B4	2632 A2	3523 A4	4505 A4	F149 B3	F417 C2				
2111 B3	2638 B2	3527 A4	4506 A4	F150 A4	F423 C4				
2112 B3	2639 B2	3528 A4	4507 A4	F151 A3	F424 C4				
2113 B3	3114 B4	3529 A4	4602 A2	F154 B3	F425 C4				
2114 A3	3115 B4	3532 A4	4603 A2	F155 A3	F426 C4				
2115 A3	3116 B3	3533 A4	4604 B1	F156 A3	F427 C4				
2116 A3	3117 B4	3534 A4	4605 B2	F157 A3	F428 C3				
2117 A4	3118 B4	3537 A4	4606 A2	F158 B3	F431 C3				
2118 B4	3119 B4	3538 A4	4607 B3	F159 B3	F432 C3				
2119 B4	3120 B4	3539 A4	4608 B3	F160 B3	F433 C4				
2121 A4	3121 B4	3540 A4	4609 B3	F161 B3	F434 C4				
2122 A4	3122 B4	3543 A4	5100 A4	F162 B3	F435 C4				
2134 A4	3123 A4	3544 A4	5202 A3	F164 B4	F436 C3				
2201 A2	3124 B4	3608 A2	5300 B1	F165 B4	F437 C3				
2202 A4	3125 B4	3609 A2	5306 C1	F166 B4	F438 C4				
2203 A3	3126 B4	3610 B2	5312 C1	F170 B4	F439 C4				
2204 A3	3127 B4	3611 B2	5401 B4	F200 A2	F440 C4				
2205 A3	3128 B4	3612 B2	5501 A1	F201 A4	F441 C4				
2206 A3	3129 B3	3613 A2	5503 A4	F202 A2	F515 A1				
2207 A3	3130 B4	3614 B2	5512 A4	F203 A2	F527 A4				
2208 A3	3131 B3	3615 A2	5513 B4	F204 A3	F528 A4				
2210 A3	3132 B4	3616 A2	5601 B2	F205 A3	F529 A4				
2301 C2	3133 A4	3617 B2	5604 B2	F206 A3	F530 A4				
2302 C2	3134 B3	3620 A2	6300 C2	F207 A3	F531 B4				
2304 C3	3135 A4	3621 B2	6304 C2	F208 A2	F532 B4				
2306 C2	3137 A4	3622 A2	7107 B3	F209 A2	F533 B4				
2315 C2	3138 A3	3623 B2	7109 B3	F210 A3	F534 B4				
2316 C1	3139 B4	3625 A2	7202 A3	F300 C1	F535 A4				
2318 C2	3140 B3	3630 B2	7301 C2	F301 C2	F536 A4				
2331 C1	3146 B3	3631 B1	7302 C2	F302 C1	F537 A4				
2332 B1	3150 B3	3632 B2	7303 C3	F303 C1	F539 A4				
2334 C2	3153 B3	3633 B2	7306 C1	F304 C1	F540 A4				
2401 C3	3154 B3	3634 B2	7400 C3	F305 B1	F541 A4				
2402 C3	3155 A4	3635 B2	7402 C4	F306 B1	F542 A4				
2403 C3	3156 B4	3636 B1	7600 A2	F307 B1	F543 A4				
2404 C3	3157 B3	3637 B2	7604 B2	F308 B1	F603 B2				
2405 C3	3162 C4	3638 B2	F100 B4	F309 C1	F604 B2				
2411 C4	3163 C4	3639 B3	F101 B4	F310 C2	F605 A2				
2412 C4	3168 B3	3640 B3	F102 C4	F311 C1	F606 A2				
2413 C4	3169 B3	3999 A1	F103 C3	F312 C1	F607 A2				
2414 C4	3170 B3	4100 B4	F107 B4	F313 C1	F608 A2				
2415 C4	3171 A3	4101 B1	F108 B4	F314 C2	F609 B2				
2426 B4	3172 A3	4103 C3	F109 B4	F315 C2	F610 B2				
2520 A4	3173 A4	4104 C3	F110 B4	F316 B2	F611 B3				
2521 A4	3174 A3	4105 C3	F111 B4	F317 C2	F612 B3				
2522 A4	3201 A2	4106 B3	F112 C4	F318 B3	F613 A2				
2524 A4	3203 A3	4108 B4	F113 B4	F319 B3	F614 A2				
2525 A4	3204 A3	4109 B4	F114 B4	F320 C3	F615 B2				
2526 A4	3205 A3	4110 B4	F115 B4	F321 C3	F616 B3				
2527 A4	3208 A2	4111 B4	F116 C4	F322 C3	F617 B3				
2528 A4	3209 A2	4112 B4	F119 A4	F323 C3	F618 B2				
2529 A4	3225 A4	4113 B4	F120 B4	F324 B2	F619 B2				
2542 A4	3228 A3	4114 B4	F121 B4	F325 C2	F620 B3				
2543 A4	3229 A2	4204 A2	F122 B4	F331 C2	F621 B2				
2544 A4	3231 A3	4206 A2	F123 B4	F333 C4	F622 B3				
2546 B4	3300 B2	4207 A3	F124 B4	F334 C4	F623 B2				
2561 A4	3301 B2	4208 A3	F125 B4	F335 C1	F624 B2				
2562 A4	3302 B2	4209 A3	F126 A4	F336 C1	F625 B2				
2563 A4	3303 C2	4210 A3	F127 B3	F337 C2	F626 B2				
2564 A4	3304 B2	4211 A3	F128 A4	F338 C2	F627 A2				
2607 B2	3305 C2	4212 A3	F129 B4	F339 C1	F628 B2				
2608 B2	3306 B2	4213 A3	F130 C4	F341 C3	F629 B2				
2609 B2	3307 B1	4306 C1	F131 B4	F350 C1	F630 B2				
2610 B2	3308 B1	4307 B1	F132 B3	F351 C1	F631 B2				
2611 B2	3309 B1	4308 B1	F133 C4	F400 C3	F632 A2				
2612 B2	3310 B2	4309 C1	F134 C4	F401 C2	F634 B2				
2613 B2	3311 B2	4311 C2	F135 C4	F402 C3	F647 B2				
2614 B2	3312 C2	4313 C1	F136 C4	F403 C2	F649 B3				
2617 A2	3313 B2	4403 C4	F138 B4	F404 C3	F650 B1				
2618 B2	3319 C1	4404 C4	F139 C4	F405 C3	F651 A2				
2619 B2	3320 C1	4406 C3	F140 C4	F406 C3	F652 B2				
2621 B2	3321 C1	4407 C4	F141 C4	F407 C2	F653 B2				

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 DVDR9000H families are as follows:

- DVDR9000H/10: 11205
- DVDR9000H/75: 11220
- DVDR9000H/97: 11219

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 DVDR9000H/10 are as follows:

DVDR9000H/10:
4442484973EF40014630355F33000000490403000001010200010100400808004456445232303031 2E3030310102020808000000010002010000000000000000

Example:
DS:> 1226
4442484973EF40014630355F33000000490403000001010200010100400808004456445232303031 2E3030310102020808000000010002010000000000000000
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

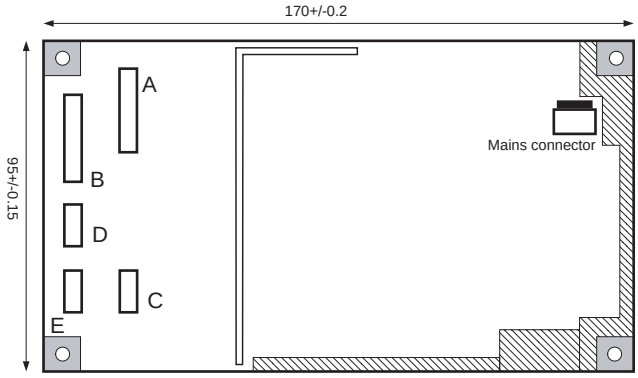


Figure 9-1 PSU Board Layout

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 DTTM

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: Supply to HDD

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

⚠ The Mains must be disconnected from the Set before attempting the procedure mentioned below:

The PSU is designed with short-circuit protection that will shutdown the power supply. When this happen, the voltage stored in capacitor C1 and C2 will prevent the Power Supply to turn-on, therefore they must be discharged with a screwdriver with high electrical isolation handle before the PSU can function normally again.

Note: During the process of discharging the capacitors ,spark can be observed which is typical of the high voltage stored in Capacitor C1 and C2.

9.2. Front Board (Panel – Display + Key)

9.2.1. General

This board consists of the following parts:

- Frontend (Audio & Video)
- Keypad registration

9.2.2. Frontend (Audio & Video)

The Frontend connector on AV_Input board[1001] allows for Audio and Video Connector to connect to Audio and video sources for recording using the Basic Engine or HDD.

The Front Left board [1002] and Front Right board[1003] allows for keypad registration when users depresses any of the button and the key is sent to Analog board via Connector 1911 to Microprocessor for controlling the various function on the recorder.

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. µP (IC 7108 : TMP87PM74AFG)

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 7103 and 7104

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 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).

9.3.6. 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.

9.3.7. Audio routing

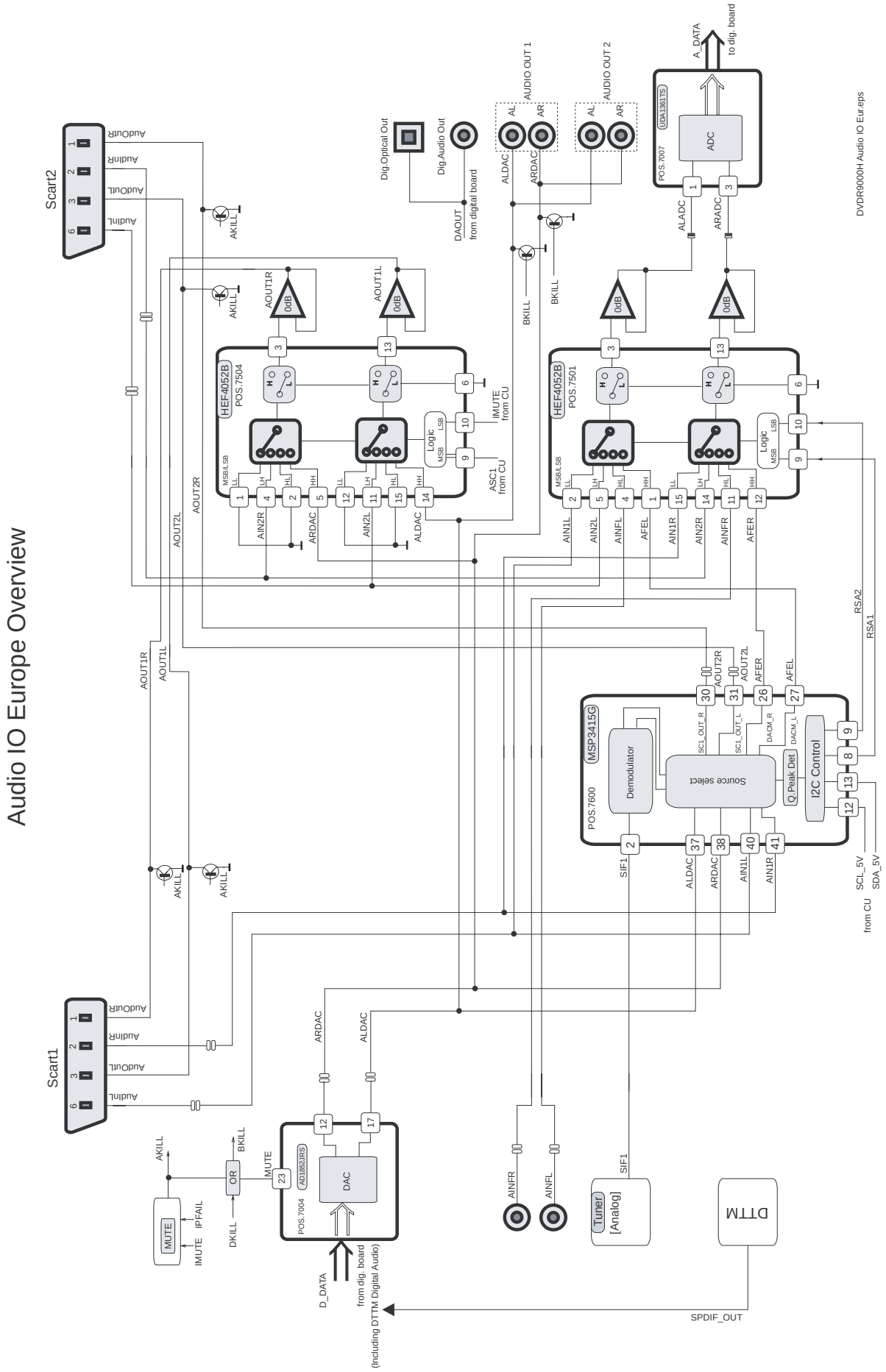


Figure 9-2 Analog Audio In / Out Overview

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 [7250] 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.

9.3.8. 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.

9.3.9. 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.

9.3.10. Video-routing

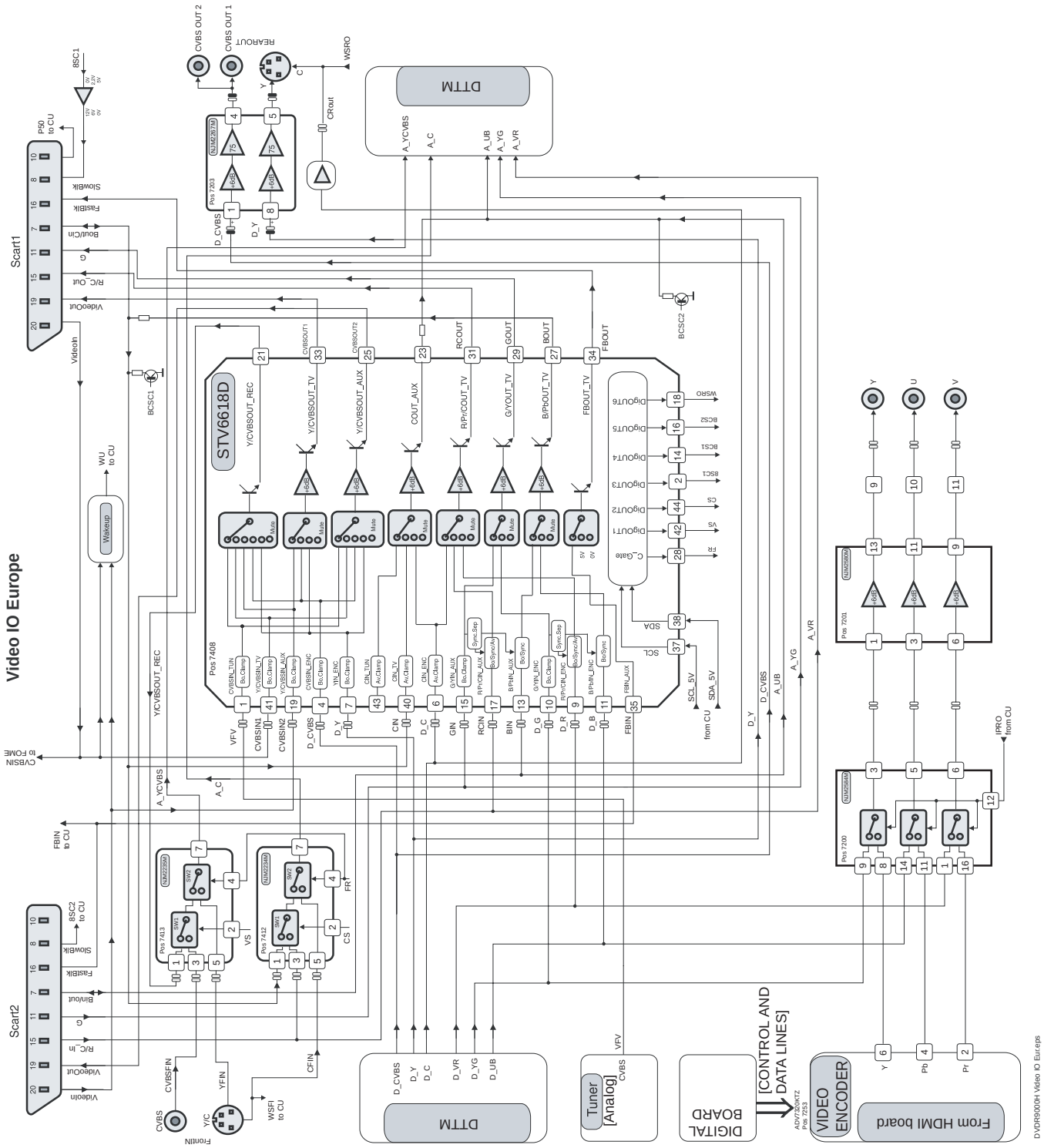


Figure 9-3 Analog Video In / Out Overview

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

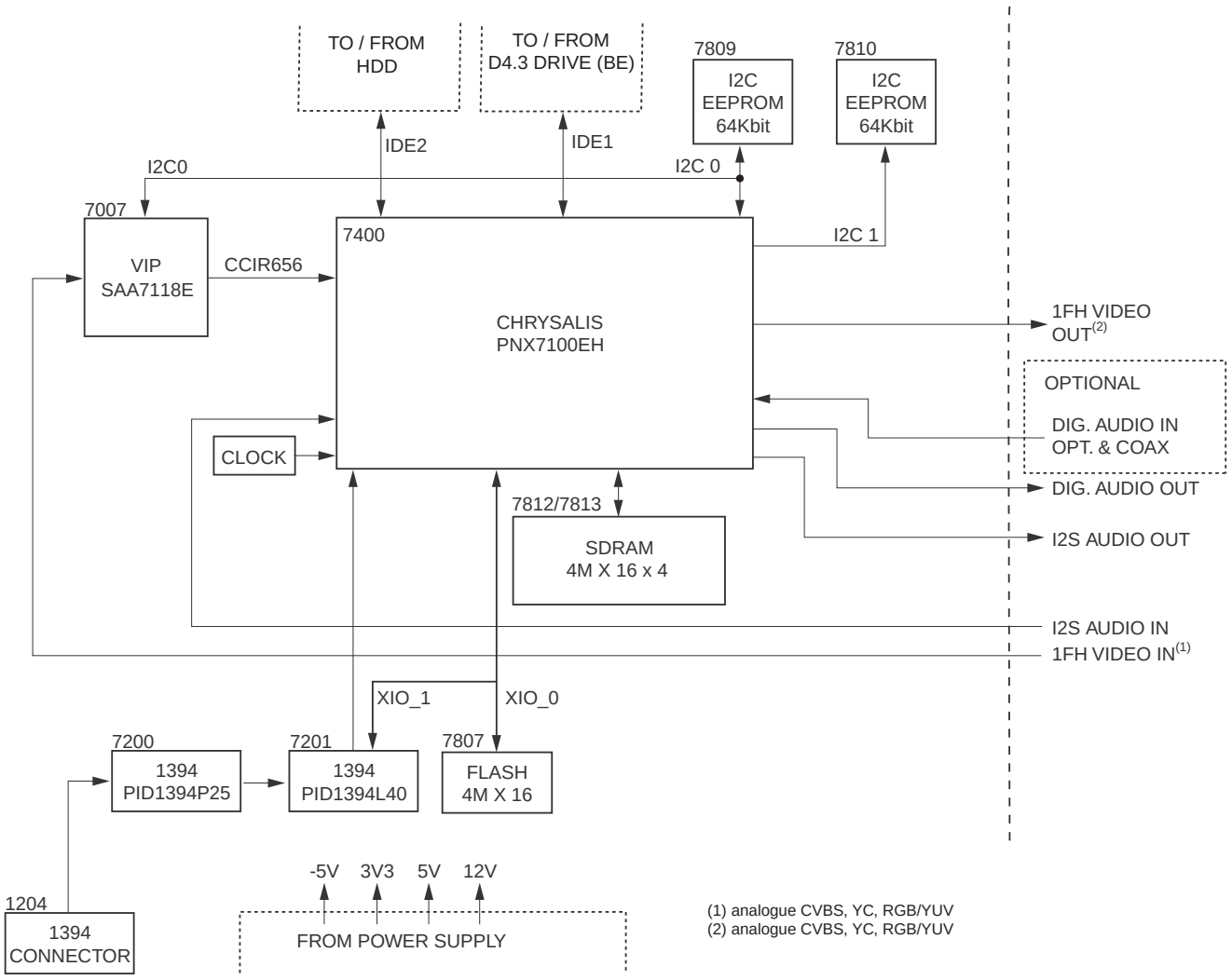


Figure 9-4 Block Diagram of Chrysalis Board

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 1107 respectively.

9.5.4. Clock Distribution

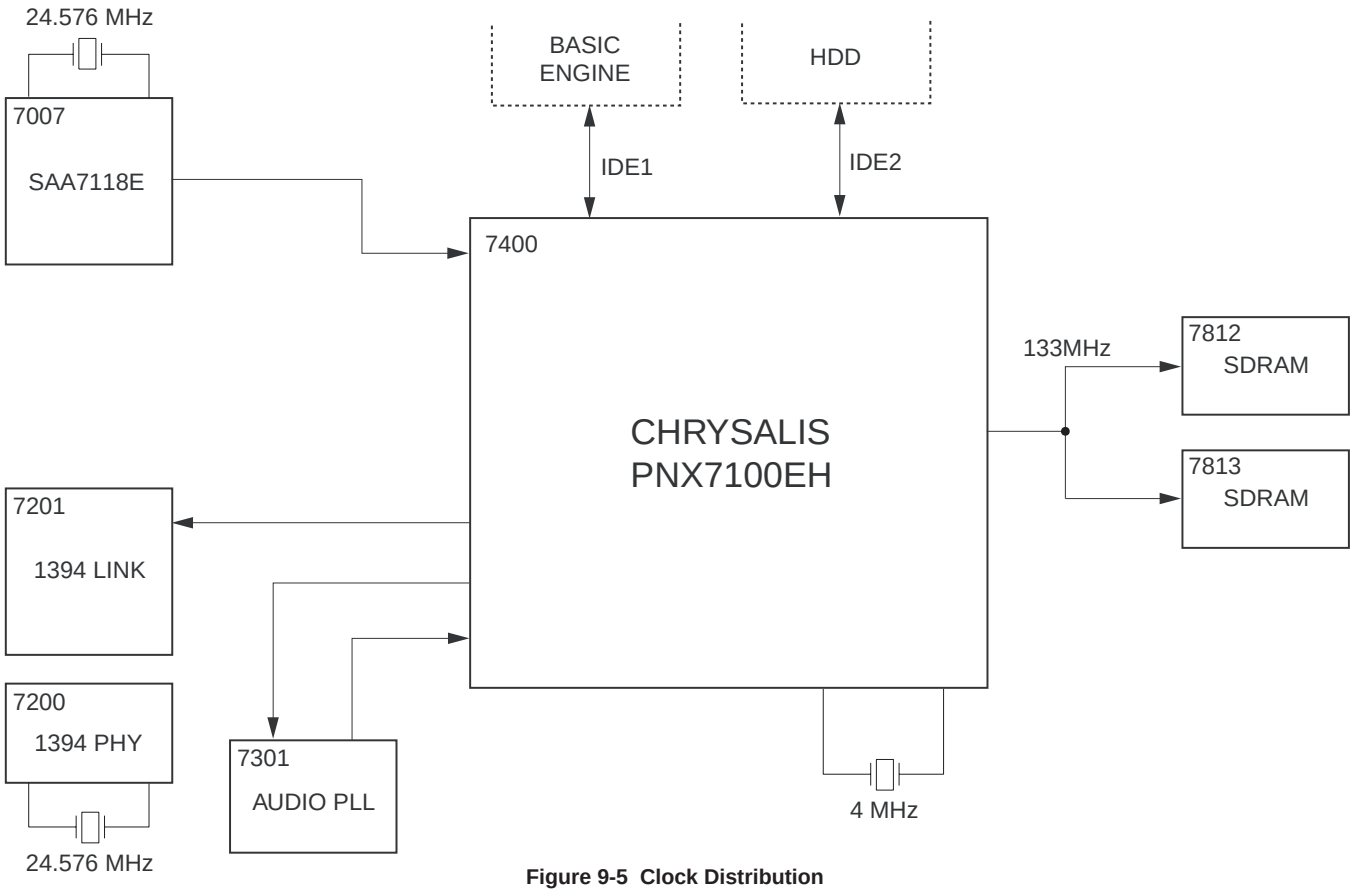


Figure 9-5 Clock Distribution

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

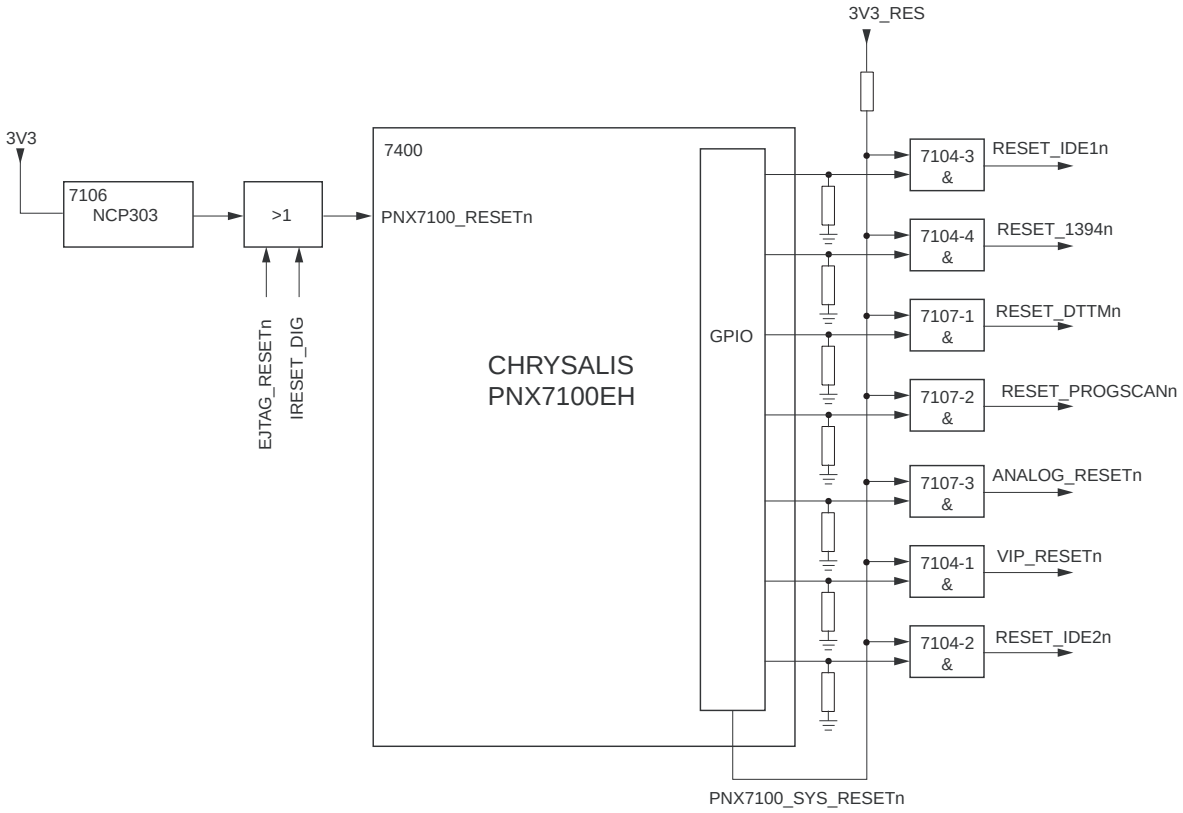


Figure 9-6 Reset concept

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 different 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. HDMI Board(High Definition Multimedia Interface)

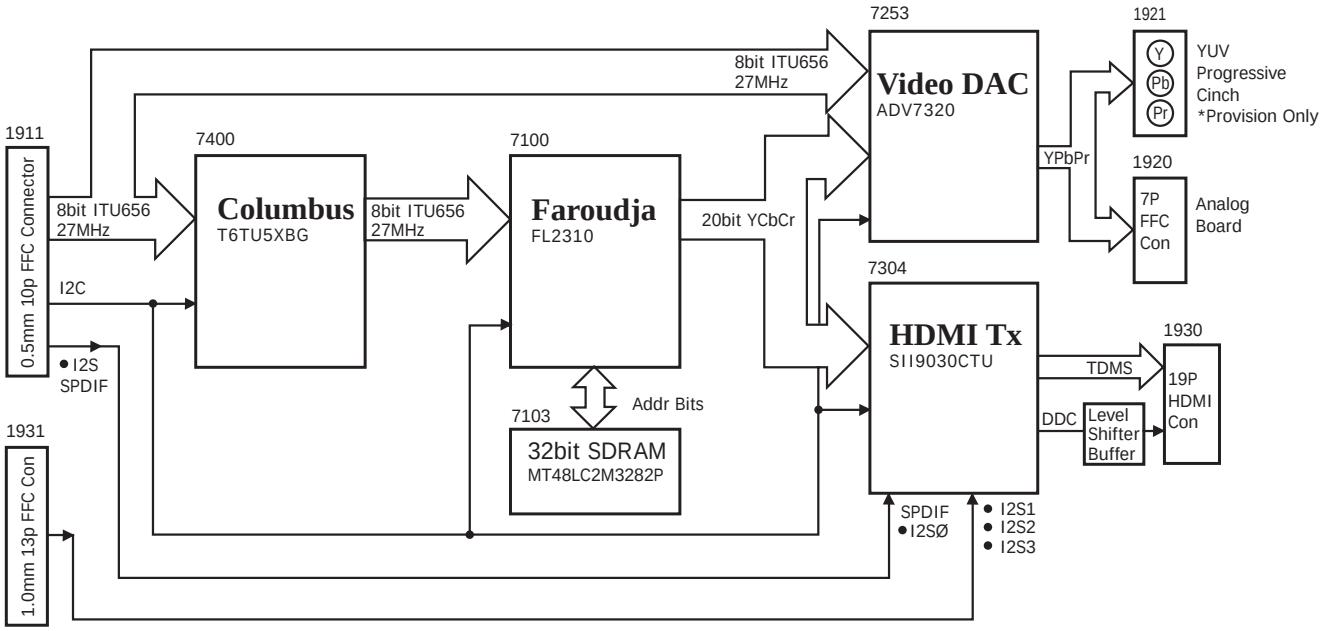


Figure 9-7 Module Block Diagram

9.6.1. The HDMI board is capable of Interlace output or Progressive Scan. Upon the sensing of HDMI connection, for interlace output,it will take the upscaled 20 bit YCbCr from the Faroudja and output to HDMI-compatible receiver.

When YUV is connected, Video DAC will take the 8bit ITU656 digital video from Chrysalis to output to YUV for progressive output or output to Analog Board for further processing.

The Control of Routing of Digital Video to either Progressive YUV output or HDMI output is control by I2C Control lines.

9.6.2. The HDMI board functions is based on the Columbus, Faroudja,Video DAC and HDMI Transmitter (Tx) Integrated Chips as mentioned below:

T6TU5XG[7400]Columbus which accept 8-bit ITU656 digital video signal and functions as below:

- Combination of a 2D Combinational filter for both PAL and NTSC
- Spatial /temporal noise reduction system for both colour and luminance signals

Faroudja FLI2310[7100] is a highly integrated digital video format converters for DTV and DVD which functions as belows:

- Picture Enhancement
- Motion Adaptive Noise Reduction – Improves picture quality for off-air material.
- Cross Color Suppressor (CCS) – Removes cross color artifacts in composite video signals due to poor Y/C separation in standard 2-D video decoders, eliminating the need for expensive 3-D video decoders.
- Adaptive Deinterlacing used for proper de-interlacing of 3:2 and 2:2 pulldown
- High Quality Fully Programmable Two Dimensional Scaler

Video DAC ADV7320KSTZ[7253] is a multi-format 216 MHz Video Encoder with 6 NSV12-bit DACS which functions as belows:

- Possess a separate 8/10/16/20-Bit wide input ports which accept data in high definition and/or standard definition video format.
- For all standards,external horizontal, vertical and blanking signals or EAV/SAV timing codes control the insertion of appropriate synchronisation signals into the the digital data stream and therefore the output signal.

HDMI Transmitter SII9030CTU [7304] is a high-resolution panellink cinema transmitter that support the HDMI 1.1 specifications which functions as belows:

- Sending protected digital audio and video content to HDMI receiver.
- Built in backward compatibility with DVI 1.0 allows HDMI to connect to any DVI 1.0 display
- HDMI Transmitter SII9030 support up to 4x I2S and SPDIF but at the moment only 1x I2S and SPDIF are used.

***HDCP Security keys are pre-programmed, providing highest level of security, simplifying manufacturing.**

9.7. Infrared (IR) Blaster Board

The IR Blaster consists of a slave µp TMP86PM74AFG[7100] to be controlled by Digital Board Microprocessor to wake-up external Set-top satellite box via G-Link for timed Recordings. The tuner and GuidePlus programme of the external Set-top box will be activated when IR blaster sends signal for activation.

9.8. Digital Terrestial Tuner Module (DTTM)

The DTTM module received DVB-T signal from Digital Tuner and outputs to the DB AIO Connector [1403] for Audio signal processing and DB-VIO-CONN [1501], AB-VIO-CONN [1502] for video processing.

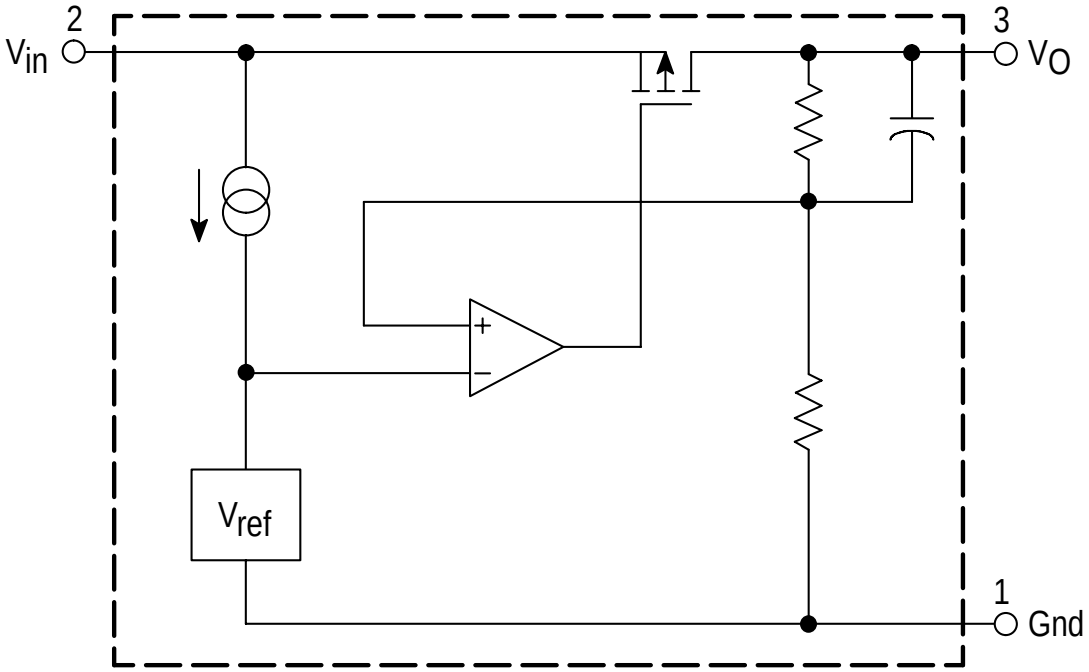
9.9 IC Description

9.9.1 Front Board

IC7113 - MC78FC33H - Front Right Board

BLOCK DIAGRAM

Representative Block Diagram



This device contains 11 active transistors.

Figure 9-7

PIN CONFIGURATION

PIN CONNECTIONS

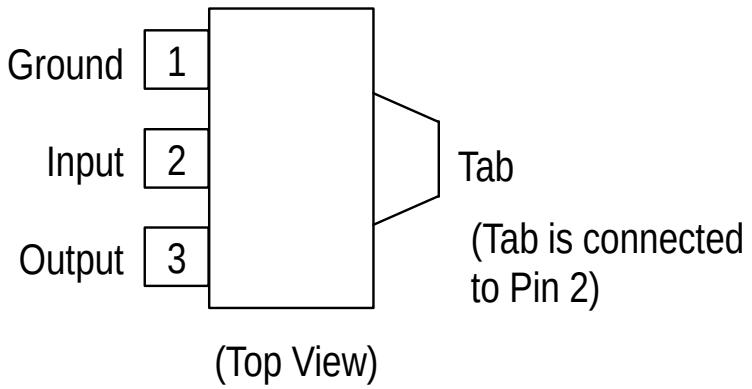


Figure 9-8

9.9.2 Analog Board

IC7004 - AD1852JRS - Digital to Analogue Converter

BLOCK DIAGRAM

FUNCTIONAL BLOCK DIAGRAM

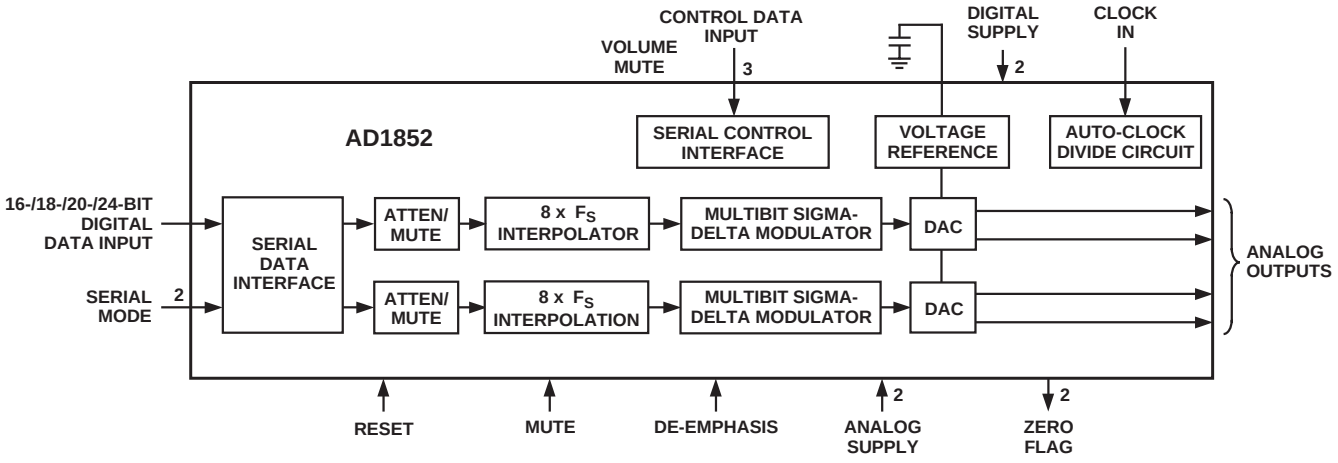


Figure 9-9

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

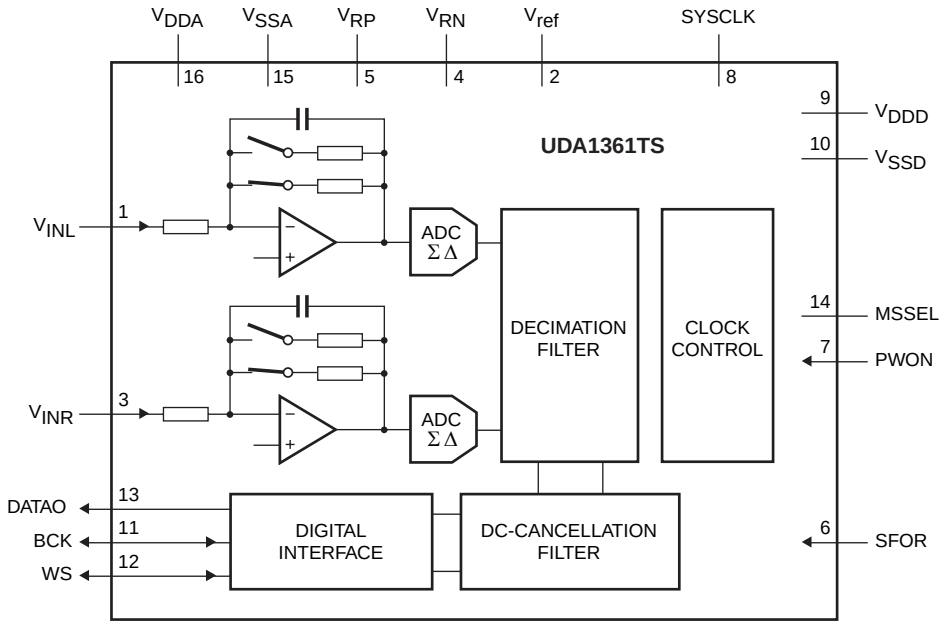


Figure 9-10 Block diagram.

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
DATA O	13	data output
MSSEL	14	master/slave select
V_{SSA}	15	analog ground
V_{DDA}	16	analog supply voltage

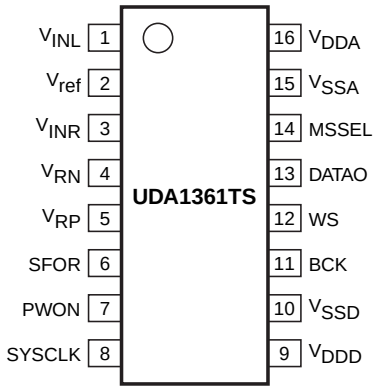


Figure 9-11 Pin configuration.

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

BLOCK DIAGRAM

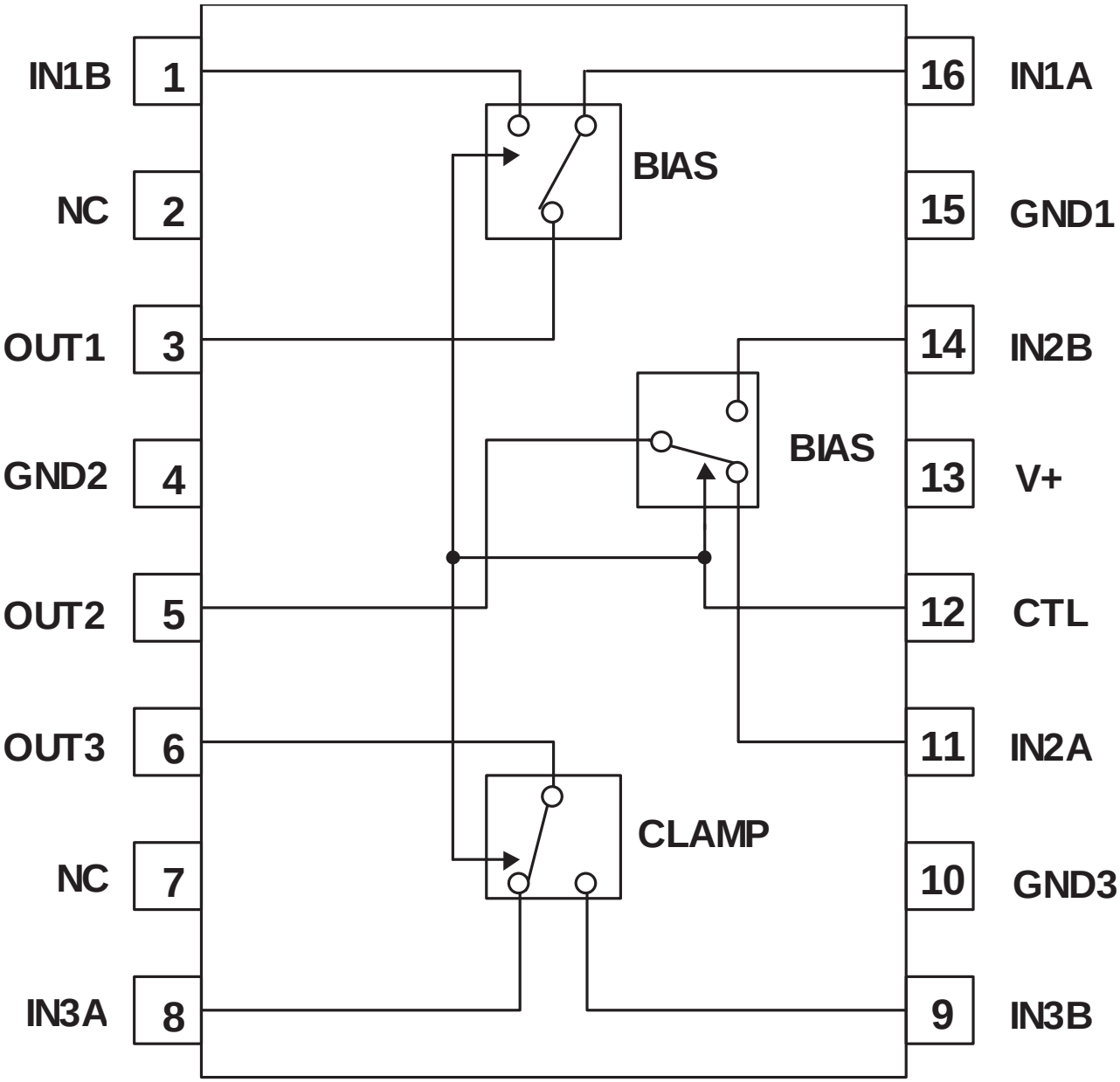


Figure 9-12

IC7201 - NJM2580M - 3-Channel Video Amplifier

BLOCK DIAGRAM

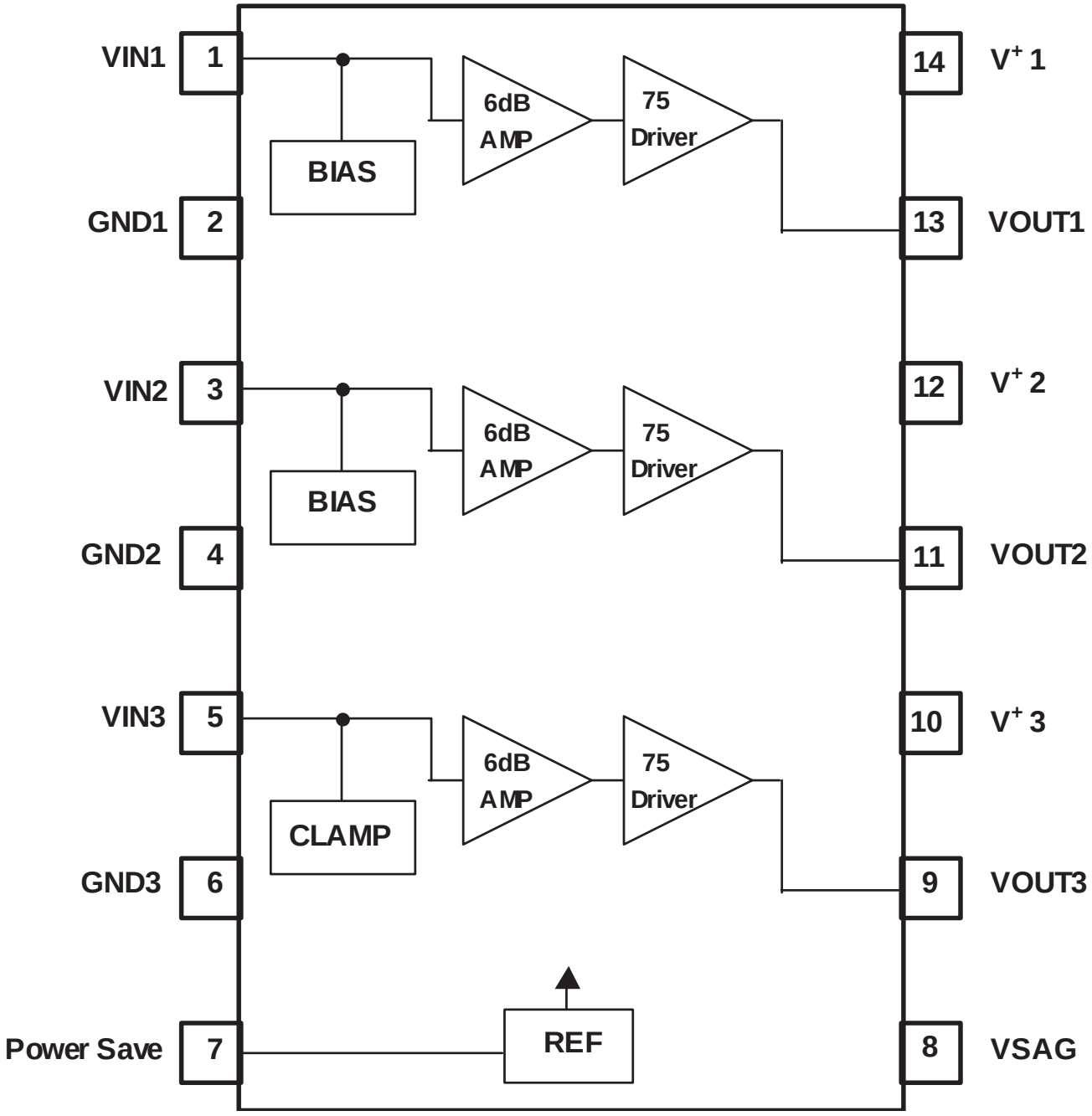


Figure 9-13

IC7203 - NJM2267M - Dual Video 6dB Amplifier

BLOCK DIAGRAM

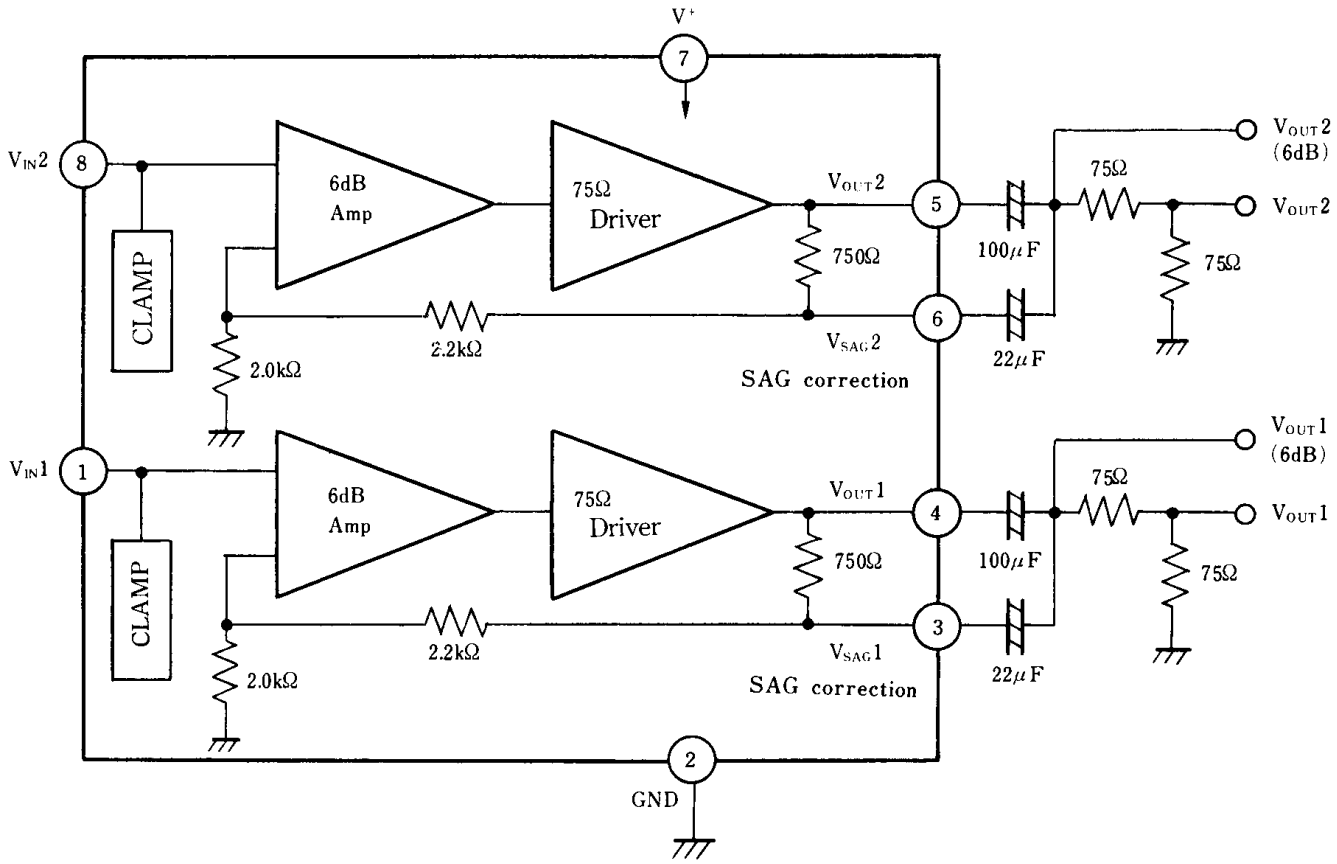


Figure 9-14

IC7408 - STV6618D - Video Switch Matrix

BLOCK DIAGRAM

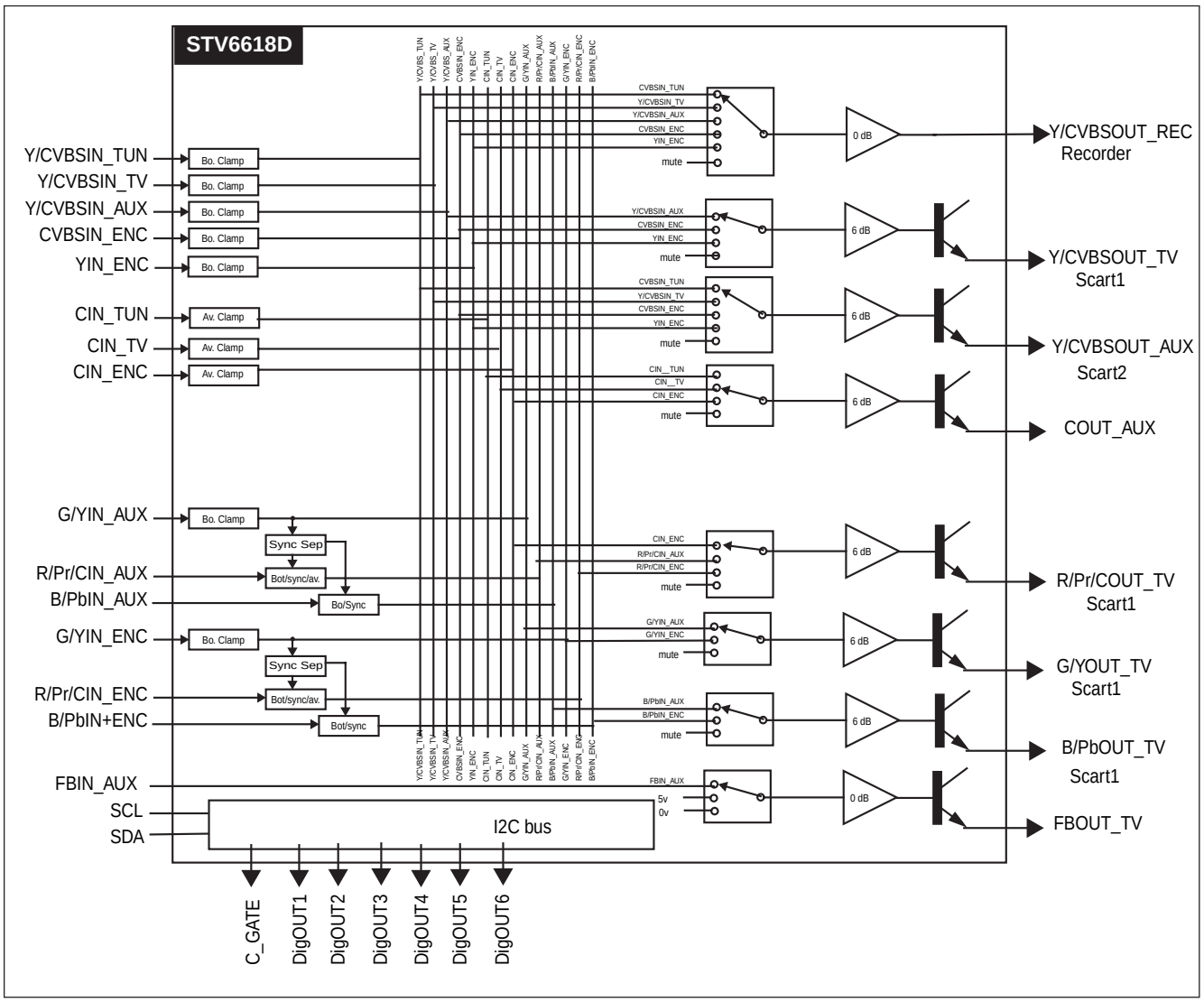


Figure 9-15

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

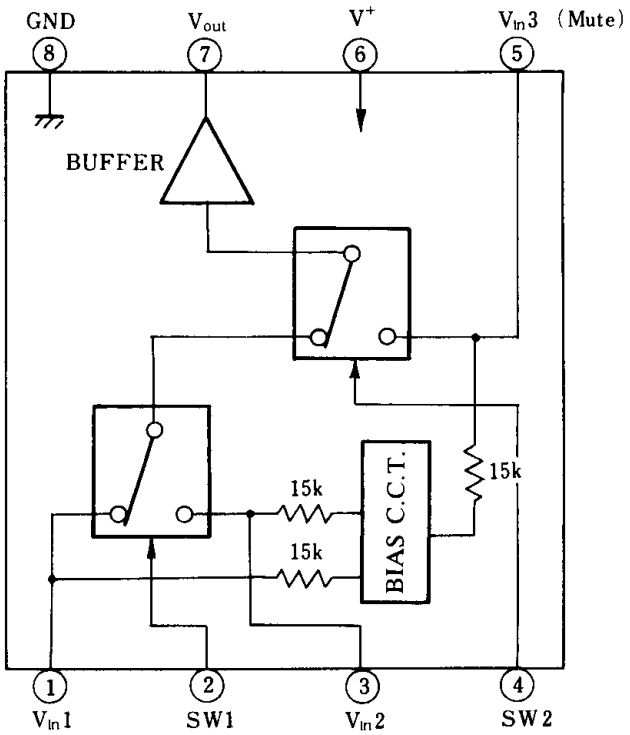


Figure 9-16

IC7213 - NJM2235M - 3-Input Video Switch

BLOCK DIAGRAM

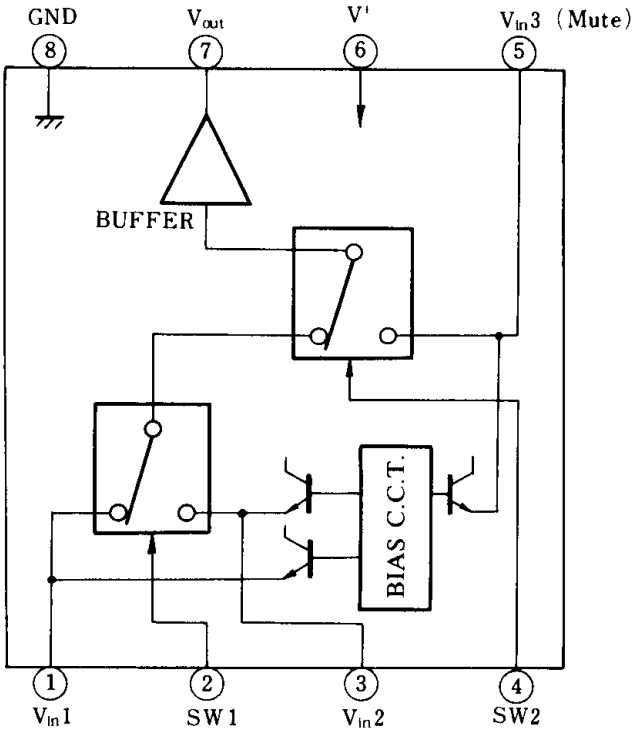


Figure 9-17

IC - TMP87PM74ZFG - Microprocessor

PIN CONFIGURATION

Pin Assignments (Top View)

P-QFP80-1420-0.80B

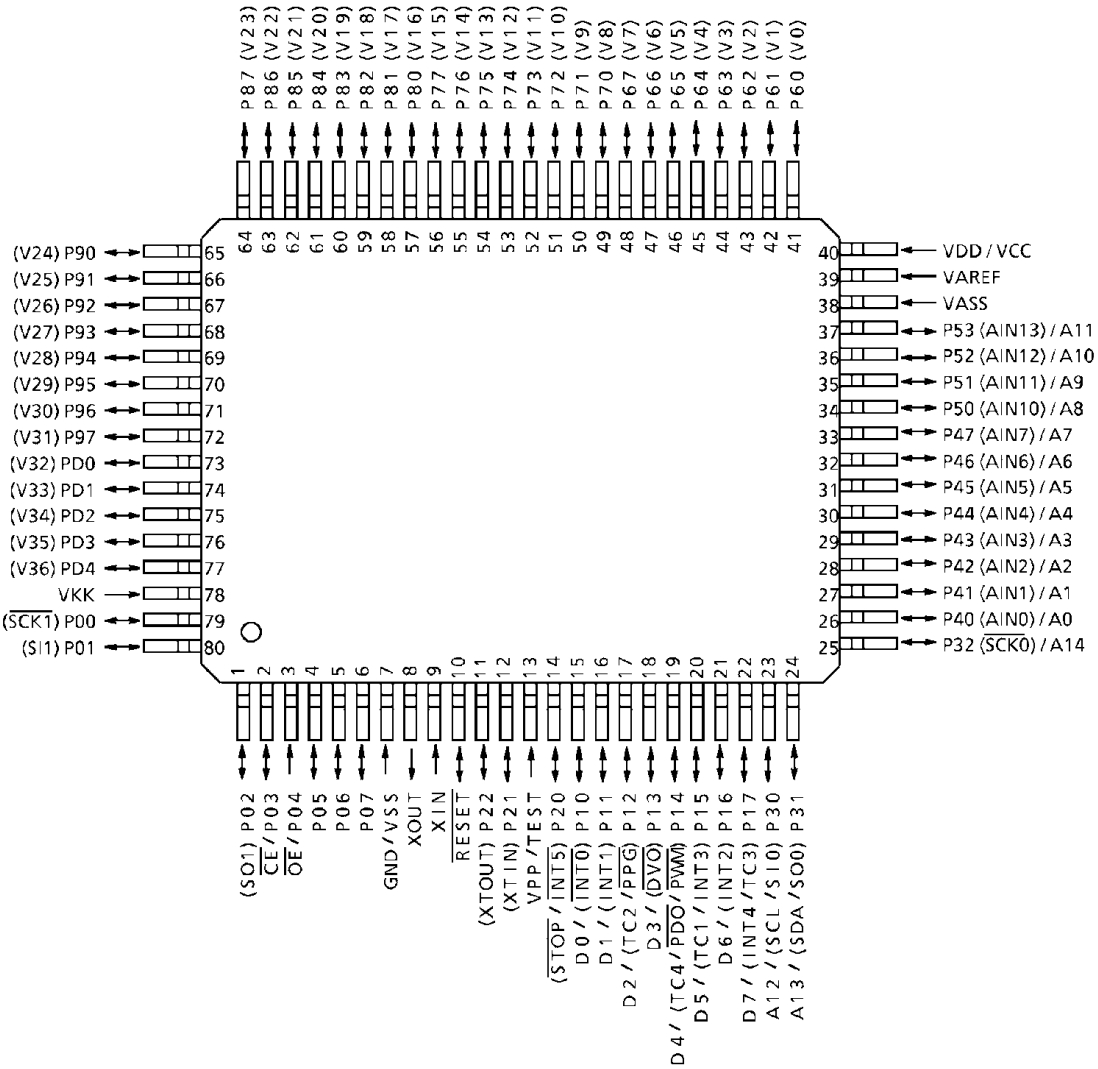


Figure 9-18

9.9.3 Digital Board

IC7601 - NCP1571D - Low voltage Synchronous Buck Controller

BLOCK DIAGRAM

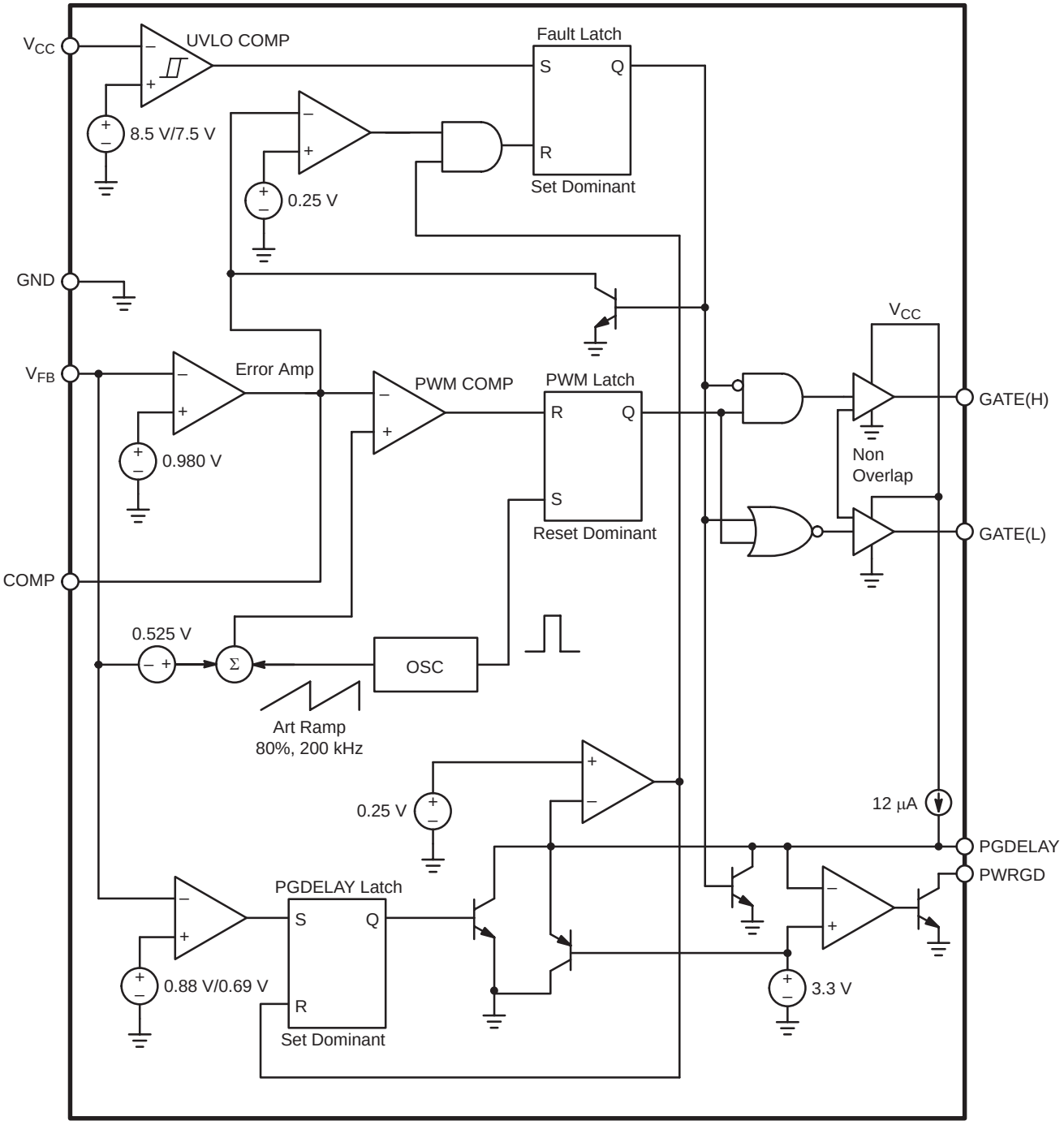


Figure 9-19

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

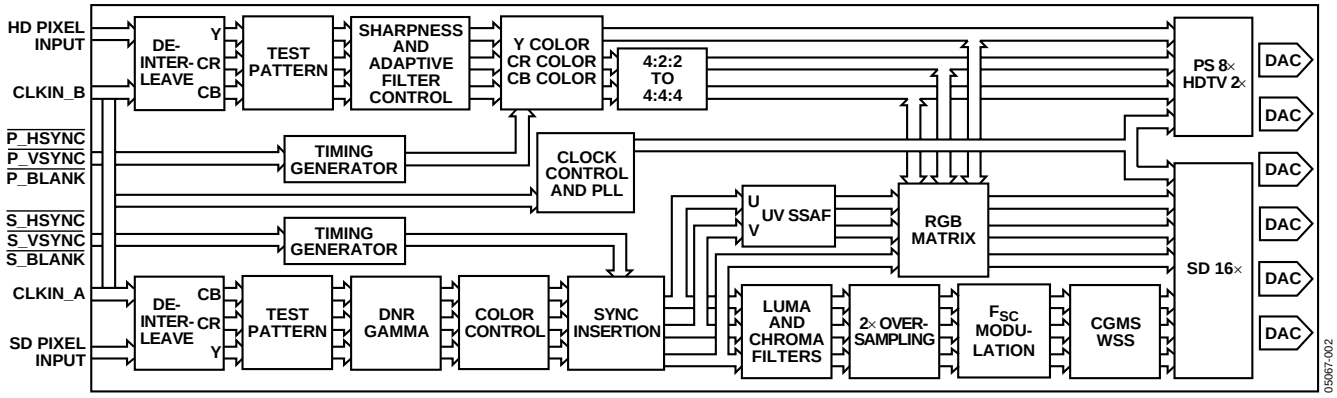


Figure 9-20

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

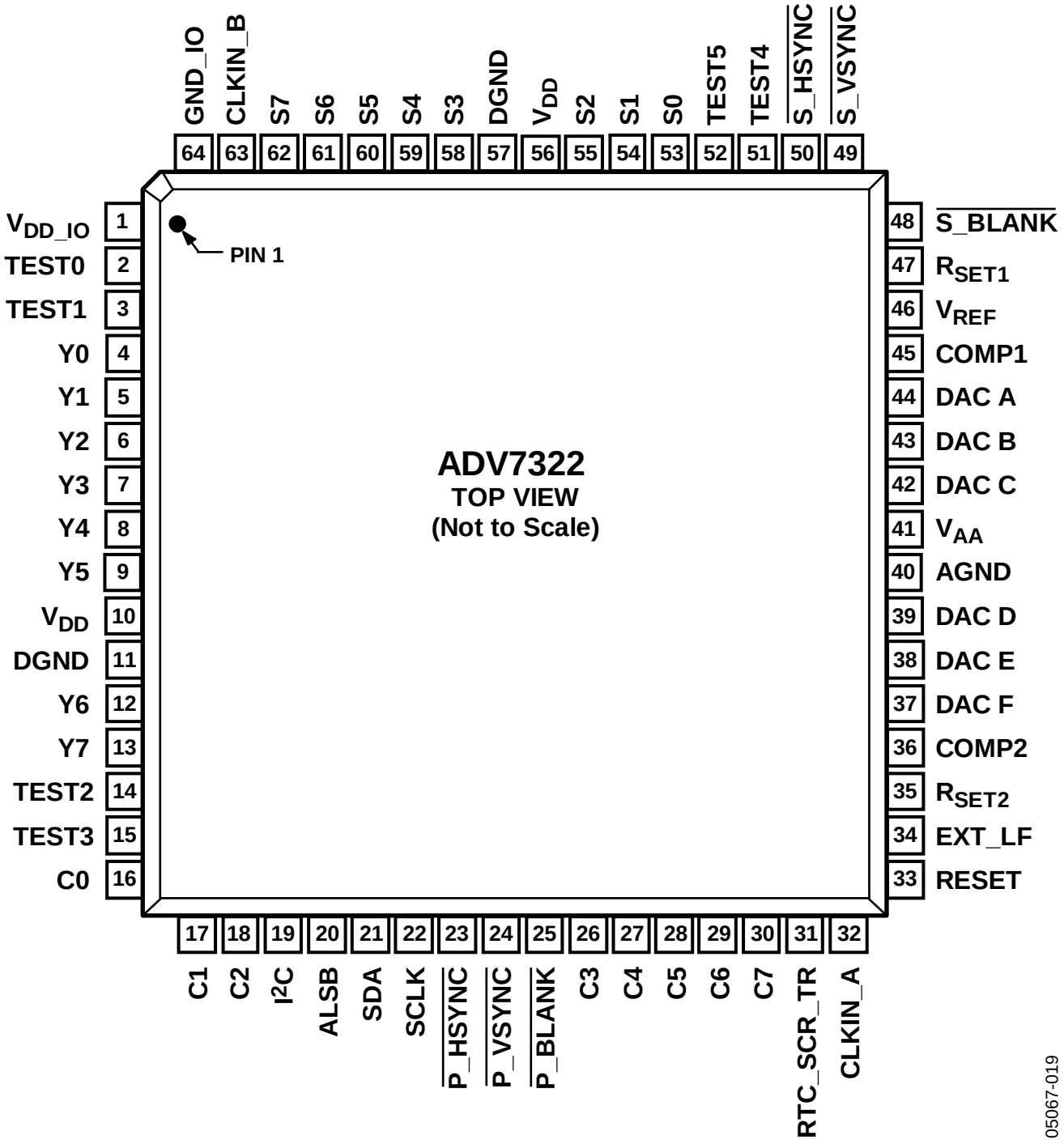


Figure 9-21

9.9.4 HDMI Board

IC7253 - ADV7320KSTZ - Multi-Format 216 MHz Video Encoder

BLOCK DIAGRAM

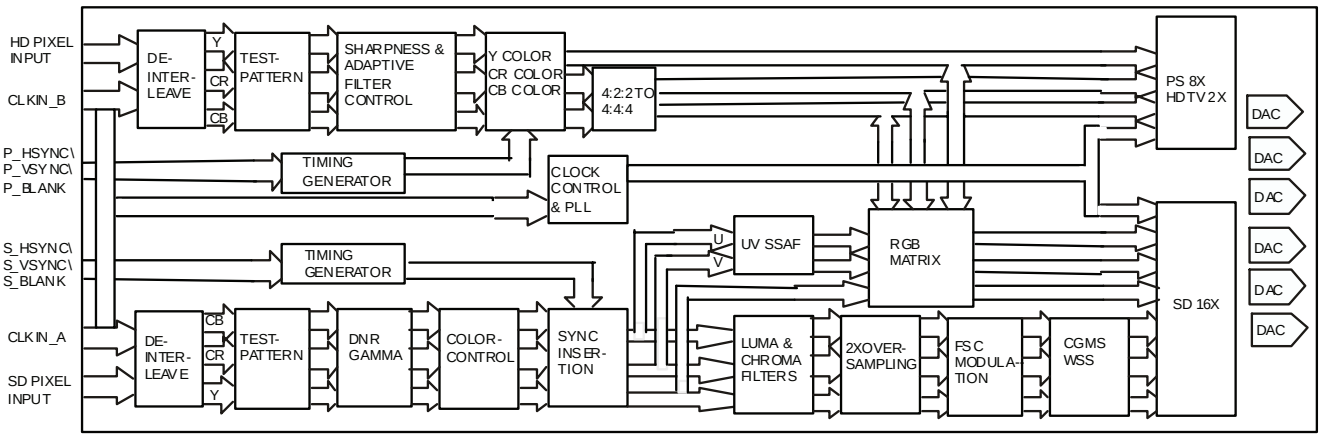


Figure 9-22

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

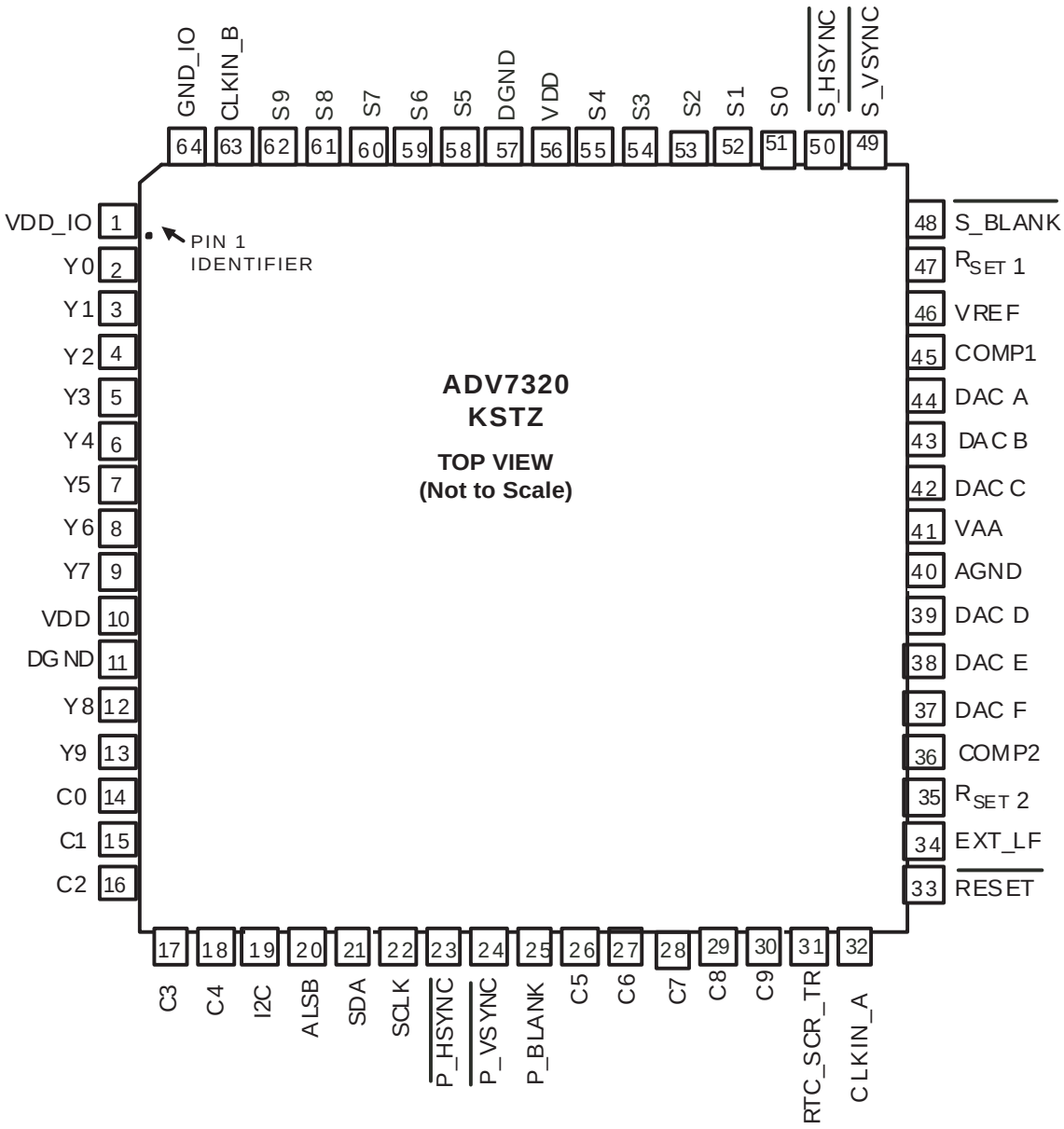


Figure 9-23

IC7400 - T6TU5XBG - Columbus Color Luminance Baseband Universal Sub-system

BLOCK DIAGRAM

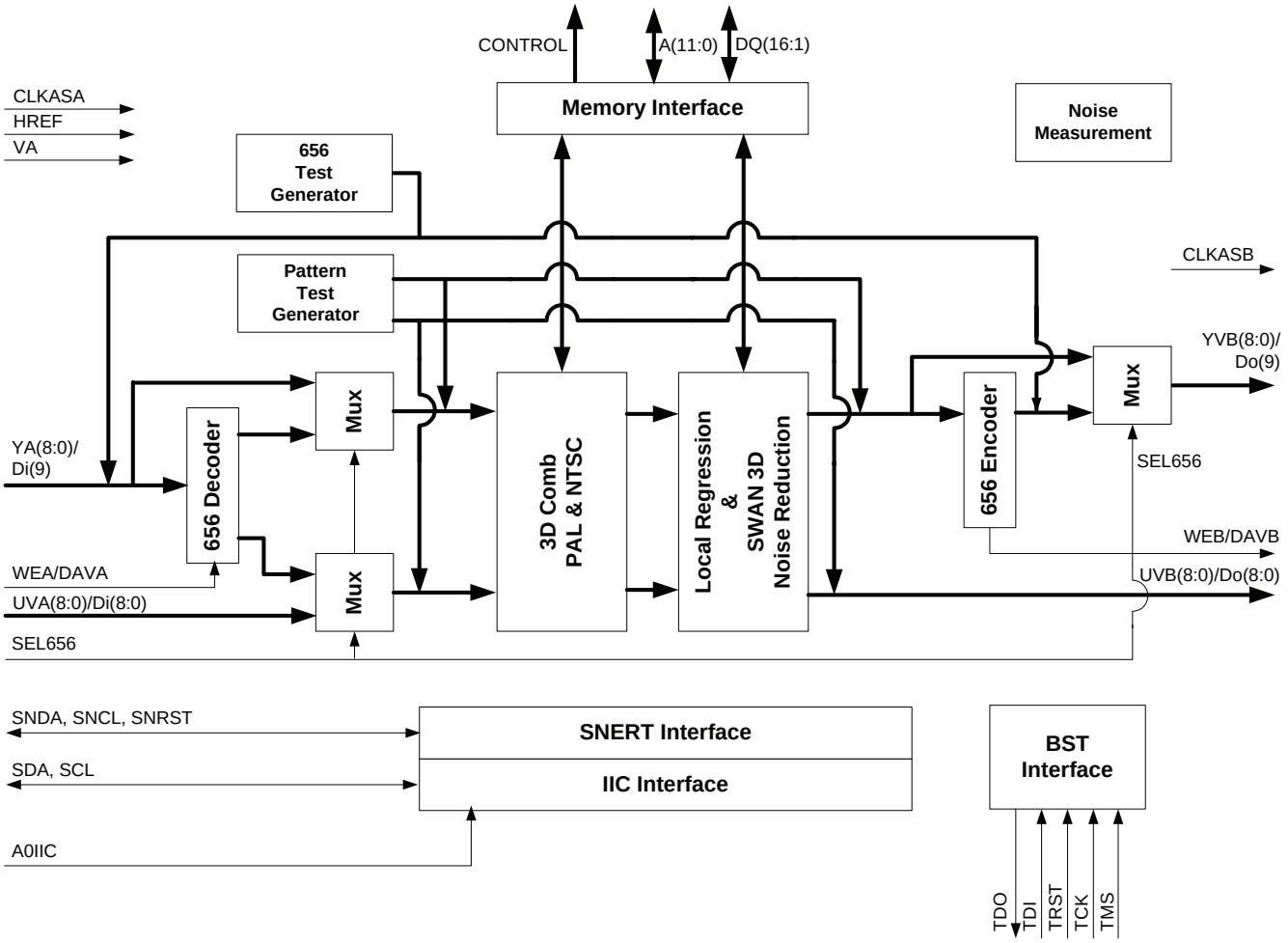


Figure 9-24

PIN DESCRIPTION

Signal name	Pin no.	I/O	Short description
WEB/DAVB	A1	Out	Write enable B / Data valid B
UVA0/Di0	A2	In	UV input 0 / 656 Data Input 0
UVA2/Di2	A3	In	UV input 2 / 656 Data Input 2
UVA4/Di4	A4	In	UV input 4 / 656 Data Input 4
UVA6/Di6	A5	In	UV input 6 / 656 Data Input 6
UVA8/Di8	A6	In	UV input 8 / 656 Data Input 8
SEL656	A7	In	Select 656
TST1	A8	In	Test input 1.
YA2	A9	In	Luminance input 2
YA4	A10	In	Luminance input 4
YA6	A11	In	Luminance input 6
YA8	A12	In	Luminance input 8
VA	A13	In	Vertical synchronisation
HREF	A14	In	Horizontal reference signal
SDA	A15	I/O	IIC Serial Data
YB8	B1	Out	Luminance output 8
VSS	B2		Ground
UVA1/Di1	B3	In	UV input 1 / 656 Data Input 1
UVA3/Di3	B4	In	UV input 3 / 656 Data Input 3
UVA5/Di5	B5	In	UV input 5 / 656 Data Input 5
UVA7/Di7	B6	In	UV input 7 / 656 Data Input 7
YA0/Di9	B7	In	Luminance input 0 / 656 Data Input 9
BISTEN	B8	In	Build In Self Test Enable
YA1	B9	In	Luminance input 1
YA3	B10	In	Luminance input 3
YA5	B11	In	Luminance input 5
YA7	B12	In	Luminance input 7
WEA/DAVA	B13	In	Write Enable input from picnic/656 Data input valid
VSS	B14		Ground
SCL	B15	In	IIC Serial Clock
YB7	C1	Out	Luminance output 7
YB6	C2	Out	Luminance output 6
VSS	C3		Ground
VDDS	C4		3.3 V supply voltage
VSS	C5		Ground
VSS	C6		Ground

Signal name	Pin no.	I/O	Short description
VDDC	C7		1.5V Core supply voltage
VDDC	C8		1.5V Core supply voltage
VSS	C9		Ground
VSS	C10		Ground
VDDC	C11		1.5V Core supply voltage
VDDS	C12		3.3 V supply voltage
VSS	C13		Ground
SNDA	C14	I/O	Snert Data
SNRST	C15	In	Snert Reset
YB5	D1	Out	Luminance output 5
YB4	D2	Out	Luminance output 4
VDDC	D3		1.5V Core supply voltage
N.C.	D4		
VSS	D13		Ground
SNCL	D14	In	Snert Clock
TCK	D15	In	Boundary scan test, Test clock
YB3	E1	Out	Luminance output 3
YB2	E2	Out	Luminance output 2
VSS	E3		Ground
VDDC	E13		1.5V Core supply voltage
TMS	E14	In	Boundary scan test, Test Mode Select
TDO	E15	Out	Boundary scan test, Test Data Out
TST2	F1	In	Test input 2
YB1	F2	Out	Luminance output 1
VSS	F3		Ground
VSS	F13		Ground
TRST	F14	In	Boundary scan test, Reset
TDI	F15	In	Boundary scan test, Test Data In
CLKASB	G1	Out	Clock ASB
YB0/Do9	G2	Out	Luminance output 0 / 656 Data output 9
VDDS	G3		3.3 V supply voltage
VDDS	G13		3.3 V supply voltage
A0IIC	G14	In	IIC address select
Reset	G15	In	Resets the 656-outputs and SDRAM Data I/Os to tri-state and resets the (asynchronous) IIC transceiver. + defauls. Reset is active low.
CLKASA	H1	In	Clock ASA
UVB8/Do8	H2	Out	UV output 8 / 656 Data output 8
TST3	H3	In	Test input 3
VDDC	H13		1.5V core supply voltage

Signal name	Pin no.	I/O	Short description
CLKEXT	H14	In	External clock input
CLKSEL	H15	In	External clock select
UVB7/Do7	J1	Out	UV output 7 / 656 Data output 7
UVB6/Do6	J2	Out	UV output 6 / 656 Data output 6
VSS	J3		Ground
VSS	J13		Ground
CLK	J14	Out	SDRAM Clock
WEN	J15	Out	SDRAM Write Enable Not. Active Low.
UVB5/Do5	K1	Out	UV output 5 / 656 Data output 5
UVB4/Do4	K2	Out	UV output 4 / 656 Data output 4
VDDC	K3		1.5V core supply voltage
VSS	K13		Ground
CASN	K14	Out	SDRAM Column Access Not. Active Low.
RASN	K15	Out	SDRAM Row Access Not. Active Low.
UVB3/Do3	L1	Out	UV output 3 / 656 Data output 3
UVB2/Do2	L2	Out	UV output 2 / 656 Data output 2
VSS	L3		Ground
VDDS	L13		3.3 V supply voltage
DQM	L14	Out	SDRAM Data mask
DQ16	L15	I/O	SDRAM Data bit 16
UVB1/Do1	M1	Out	UV output 1 / 656 Data output 1
UVB0/Do0	M2	Out	UV output 0 / 656 Data output 0
VDDS	M3		3.3 V supply voltage
VSS	M13		Ground
DQ14	M14	I/O	SDRAM Data bit 14
DQ15	M15	I/O	SDRAM Data bit 15
AVD	N1		PLL Supply Voltage
N.C.	N2		
VDDS	N3		3.3 V supply voltage
VSS	N4		Ground
VSS	N5		Ground
VDDC	N6		1.5V core supply voltage
VSS	N7		Ground
VDDS	N8		3.3 V supply voltage
VDDC	N9		1.5 V core supply voltage
VSS	N10		Ground
VDDS	N11		3.3 V supply voltage
VSS	N12		Ground
VSS	N13		Ground

Signal name	Pin no.	I/O	Short description
VDDS	N14		3.3 V supply voltage
DQ13	N15	I/O	SDRAM Data bit 13
AVS	P1		PLL Ground
VSS	P2		Ground
A7	P3	Out	SDRAM Address bit 7
A9	P4	Out	SDRAM Address bit 9
A2	P5	Out	SDRAM Address bit 2
A0	P6	Out	SDRAM Address bit 0
A11	P7	Out	SDRAM Address bit 11
DQ7	P8	I/O	SDRAM Data bit 7
DQ6	P9	I/O	SDRAM Data bit 6
DQ4	P10	I/O	SDRAM Data bit 4
DQ3	P11	I/O	SDRAM Data bit 3
DQ1	P12	I/O	SDRAM Data bit 1
VDDS	P13		3.3 V supply voltage
VSS	P14		Ground
DQ12	P15	I/O	SDRAM Data bit 12
A4	R1	Out	SDRAM Address bit 4
A5	R2	Out	SDRAM Address bit 5
A6	R3	Out	SDRAM Address bit 6
A8	R4	Out	SDRAM Address bit 8
A3	R5	Out	SDRAM Address bit 3
A1	R6	Out	SDRAM Address bit 1
A10	R7	Out	SDRAM Address bit 10
DQ8	R8	I/O	SDRAM Data bit 8
VSS	R9		Ground
DQ5	R10	I/O	SDRAM Data bit 5
VSS	R11		Ground
DQ2	R12	I/O	SDRAM Data bit 2
DQ9	R13	I/O	SDRAM Data bit 9
DQ10	R14	I/O	SDRAM Data bit 10
DQ11	R15	I/O	SDRAM Data bit 11

IC7100 - FLI2310 - Faroudja Digital Video Format Converter

BLOCK DIAGRAM

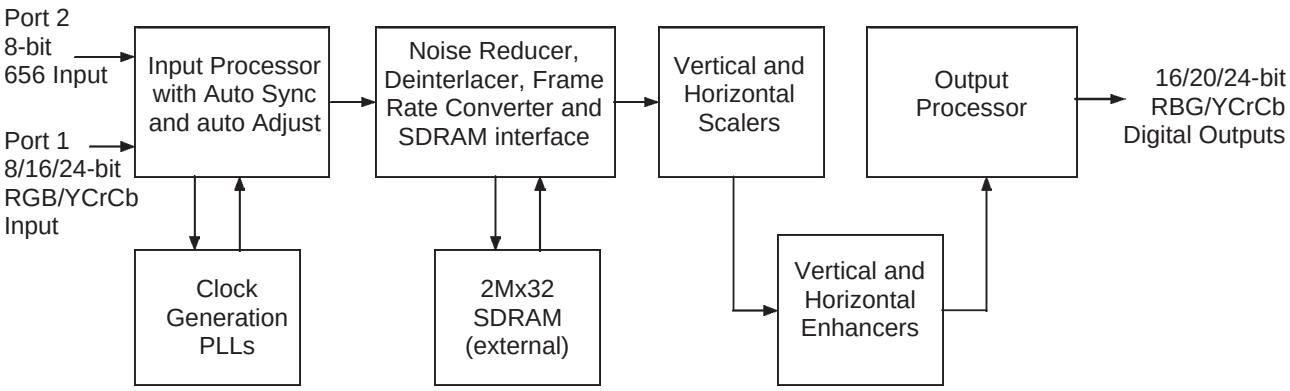
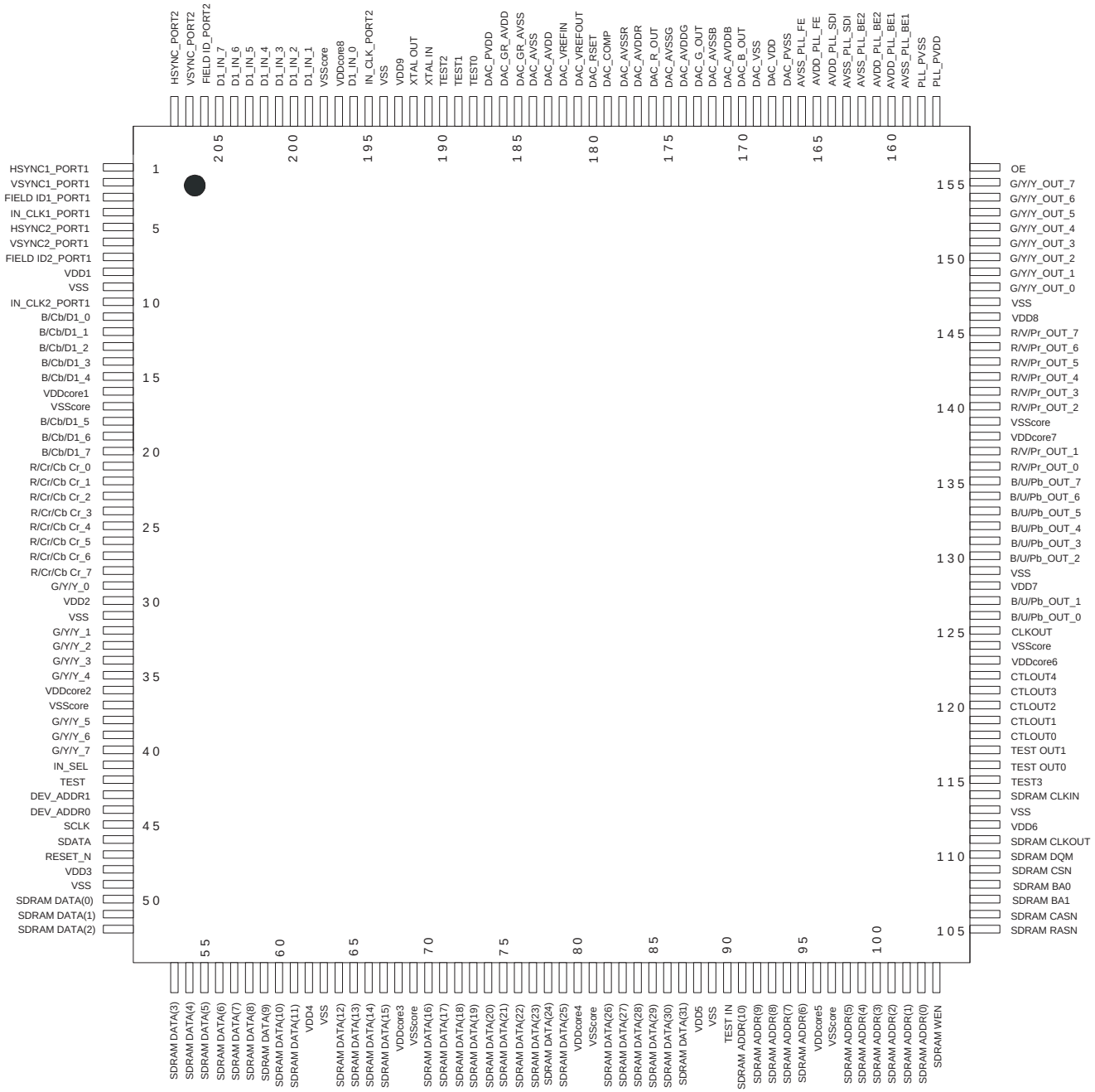


Figure 9-25: FLI2310 – Simplified Internal Block Diagram

PIN CONFIGURATION

Figure 3.1: Pinout Information



Package: 208-pin PQFP

Figure 9-26

PIN DESCRIPTION

Pin No	Pin Name	I/O Type	Voltage Tolerance	Drive	Pull up/ Pulldown	Description
1	HSYNC1_PORT1	Input	5v			Horizontal sync or reference -CTL1 of Port 1
2	VSYNC1_PORT1	Input	5v			Vertical sync or reference -CTL1 of Port 1
3	FIELD ID1_PORT1	Input	5v			Odd/Even Field identification -CTL1 of Port 1
4	IN_CLK1_PORT1	Input	5v			Data Clock input -CTL1 of Port 1
5	HSYNC2_PORT1	Input	5v			Horizontal sync or reference –CTL2 of Port 1
6	VSYNC2_PORT1	Input	5v			Vertical sync or reference –CTL2 of Port 1
7	FIELD ID2_PORT1	Input	5v			Odd/Even Field identification –CTL2 of Port 1
8	VDD1	Power				3.3 V - Power pin for IO
9	VSS	Ground				Ground
10	IN_CLK2_PORT1	Input	5v			Data Clock input –CTL2 of Port 1
11	B/Cb/D1_0	Input	5v			Port 1 – Digital video input (Blue/Cb/D1)
12	B/Cb/D1_1	Input	5v			Port 1 – Digital video input (Blue/Cb/D1)
13	B/Cb/D1_2	Input	5v			Port 1 – Digital video input (Blue/Cb/D1)
14	B/Cb/D1_3	Input	5v			Port 1 – Digital video input (Blue/Cb/D1)
15	B/Cb/D1_4	Input	5v			Port 1 – Digital video input (Blue/Cb/D1)
16	VDDcore1	Power				1.8 V - Power pin for core
17	VSS	Ground				Ground
18	B/Cb/D1_5	Input	5v			Port 1 – Digital video input (Blue/Cb/D1)
19	B/Cb/D1_6	Input	5v			Port 1 – Digital video input (Blue/Cb/D1)
20	B/Cb/D1_7	Input	5v			Port 1 – Digital video input (Blue/Cb/D1)
21	R/Cr/CrCb_0	Input	5v			Port 1 – Digital video input (Red/Cr/CrCb)
22	R/Cr/CrCb_1	Input	5v			Port 1 – Digital video input (Red/Cr/CrCb)
23	R/Cr/CrCb_2	Input	5v			Port 1 – Digital video input (Red/Cr/CrCb)
24	R/Cr/CrCb_3	Input	5v			Port 1 – Digital video input (Red/Cr/CrCb)
25	R/Cr/CrCb_4	Input	5v			Port 1 – Digital video input (Red/Cr/CrCb)
26	R/Cr/CrCb_5	Input	5v			Port 1 – Digital video input (Red/Cr/CrCb)
27	R/Cr/CrCb_6	Input	5v			Port 1 – Digital video input (Red/Cr/CrCb)
28	R/Cr/CrCb_7	Input	5v			Port 1 – Digital video input (Red/Cr/CrCb)
29	G/Y/Y_0	Input	5v			Port 1 – Digital video input (Green/Y)
30	VDD2	Power				3.3 V - Power pin for IO
31	VSS	Ground				Ground
32	G/Y/Y_1	Input	5v			Port 1 – Digital video input (Green/Y)
33	G/Y/Y_2	Input	5v			Port 1 – Digital video input (Green/Y)
34	G/Y/Y_3	Input	5v			Port 1 – Digital video input (Green/Y)
35	G/Y/Y_4	Input	5v			Port 1 – Digital video input (Green/Y)
36	VDDcore2	Power				1.8 V - Power pin for core
37	VSS	Ground				Ground
38	G/Y/Y_5	Input	5v			Port 1 – Digital video input (Green/Y)
39	G/Y/Y_6	Input	5v			Port 1 – Digital video input (Green/Y)
40	G/Y/Y_7	Input	5v			Port 1 – Digital video input (Green/Y)
41	IN_SEL	Output	5v	8 mA		Output to select external video mux
42	TEST	Input	5v			Connect to Ground
43	DEV_ADDR1	Input	5v			Device address setting 1
44	DEV_ADDR0	Input	5v			Device address setting 0

Pin No	Pin Name	I/O Type	Voltage Tolerance	Drive	Pull up/ Pulldown	Description
45	SCLK	I/O	5v	8 mA		2-wire serial control bus clock
46	SDATA	I/O	5v	8 mA		2-wire serial control bus data
47	RESET_N	Input	5v		PU	Reset
48	VDD3	Power				3.3 V – Power pin for IO
49	VSS	Ground				Ground
50	SDRAM DATA(0)	Tristate I/O	5v	4 mA	PD	SDRAM data bus *
51	SDRAM DATA(1)	Tristate I/O	5v	4 mA	PD	SDRAM data bus *
52	SDRAM DATA(2)	Tristate I/O	5v	4 mA	PD	SDRAM data bus *
53	SDRAM DATA(3)	Tristate I/O	5v	4 mA	PD	SDRAM data bus *
54	SDRAM DATA(4)	Tristate I/O	5v	4 mA	PD	SDRAM data bus *
55	SDRAM DATA(5)	Tristate I/O	5v	4 mA	PD	SDRAM data bus *
56	SDRAM DATA(6)	Tristate I/O	5v	4 mA	PD	SDRAM data bus *
57	SDRAM DATA(7)	Tristate I/O	5v	4 mA	PD	SDRAM data bus *
58	SDRAM DATA(8)	Tristate I/O	5v	4 mA	PD	SDRAM data bus *
59	SDRAM DATA(9)	Tristate I/O	5v	4 mA	PD	SDRAM data bus *
60	SDRAM DATA(10)	Tristate I/O	5v	4 mA	PD	SDRAM data bus *
61	SDRAM DATA(11)	Tristate I/O	5v	4 mA	PD	SDRAM data bus *
62	VDD4	Power				3.3 V – Power pin for IO
63	VSS	Ground				Ground
64	SDRAM DATA(12)	Tristate I/O	5v	4 mA	PD	SDRAM data bus *
65	SDRAM DATA(13)	Tristate I/O	5v	4 mA	PD	SDRAM data bus *
66	SDRAM DATA(14)	Tristate I/O	5v	4 mA	PD	SDRAM data bus *
67	SDRAM DATA(15)	Tristate I/O	5v	4 mA	PD	SDRAM data bus *
68	VDDcore3	Power				1.8 V - Power pin for core
69	VSS	Ground				Ground
70	SDRAM DATA(16)	Tristate I/O	5v	4 mA	PD	SDRAM data bus *
71	SDRAM DATA(17)	Tristate I/O	5v	4 mA	PD	SDRAM data bus *
72	SDRAM DATA(18)	Tristate I/O	5v	4 mA	PD	SDRAM data bus *
73	SDRAM DATA(19)	Tristate I/O	5v	4 mA	PD	SDRAM data bus *
74	SDRAM DATA(20)	Tristate I/O	5v	4 mA	PD	SDRAM data bus *
75	SDRAM DATA(21)	Tristate I/O	5v	4 mA	PD	SDRAM data bus *
76	SDRAM DATA(22)	Tristate I/O	5v	4 mA	PD	SDRAM data bus *
77	SDRAM DATA(23)	Tristate I/O	5v	4 mA	PD	SDRAM data bus *
78	SDRAM DATA(24)	Tristate I/O	5v	4 mA	PD	SDRAM data bus *
79	SDRAM DATA(25)	Tristate I/O	5v	4 mA	PD	SDRAM data bus *
80	VDDcore4	Power				1.8 V – Power pin for core
81	VSS	Ground				Ground
82	SDRAM DATA(26)	Tristate I/O	5v	4 mA	PD	SDRAM data bus *
83	SDRAM DATA(27)	Tristate I/O	5v	4 mA	PD	SDRAM data bus *
84	SDRAM DATA(28)	Tristate I/O	5v	4 mA	PD	SDRAM data bus *
85	SDRAM DATA(29)	Tristate I/O	5v	4 mA	PD	SDRAM data bus *
86	SDRAM DATA(30)	Tristate I/O	5v	4 mA	PD	SDRAM data bus *
87	SDRAM DATA(31)	Tristate I/O	5v	4 mA	PD	SDRAM data bus *
88	VDD5	Power				3.3 V – Power pin for IO
89	VSS	Ground				Ground
90	TEST IN	Input	5V			Test input-Connect to ground

Pin No	Pin Name	I/O Type	Voltage Tolerance	Drive	Pull up/ Pulldown	Description
91	SDRAM ADDR(10)	Tristate O/P	5v	8 mA		SDRAM address bus *
92	SDRAM ADDR(9)	Tristate O/P	5v	8 mA		SDRAM address bus *
93	SDRAM ADDR(8)	Tristate O/P	5v	8 mA		SDRAM address bus *
94	SDRAM ADDR(7)	Tristate O/P	5v	8 mA		SDRAM address bus *
95	SDRAM ADDR(6)	Tristate O/P	5v	8 mA		SDRAM address bus *
96	VDDcore5	Power				1.8 V – Power pin for core
97	VSS	Ground				Ground
98	SDRAM ADDR(5)	Tristate O/P	5v	8 mA		SDRAM address bus *
99	SDRAM ADDR(4)	Tristate O/P	5v	8 mA		SDRAM address bus *
100	SDRAM ADDR(3)	Tristate O/P	5v	8 mA		SDRAM address bus *
101	SDRAM ADDR(2)	Tristate O/P	5v	8 mA		SDRAM address bus *
102	SDRAM ADDR(1)	Tristate O/P	5v	8 mA		SDRAM address bus *
103	SDRAM ADDR(0)	Tristate O/P	5v	8 mA		SDRAM address bus *
104	SDRAM WEN	Tristate O/P	5v	8 mA		SDRAM write enable *
105	SDRAM RASN	Tristate O/P	5v	8 mA		SDRAM row address select *
106	SDRAM CASN	Tristate O/P	5v	8 mA		SDRAM column address select *
107	SDRAM BA1	Tristate O/P	5v	8 mA		SDRAM bank select 1*
108	SDRAM BA0	Tristate O/P	5v	8 mA		SDRAM bank select 0*
109	SDRAM CSN	Tristate O/P	5v	4 mA		SDRAM CS *
110	SDRAM DQM	Tristate O/P	5v	8 mA		SDRAM DQM *
111	SDRAM CLKOUT	Output	5v	12 mA		Clock out to SDRAM *
112	VDD6	Power				3.3 V - Power pin for IO
113	VSS	Ground				Ground
114	SDRAM CLKIN	Input	5v			Trace delayed SDRAM Clock in
115	TEST3	Input				Test input – Connect to ground
116	TEST OUT0	Output				Test output – leave open
117	TEST OUT1	Output				Test output – leave open
118	CTLOUT0	Tristate O/P	5v	8 mA		Control signal output selectable as HSync1/ CSync/HRef/Monitor coast
119	CTLOUT1	Tristate O/P	5v	8 mA		Control signal output selectable as VSync1/CRef/VRef/Film Indicator
120	CTLOUT2	Tristate O/P	5v	8 mA		Control signal output selectable as Monitor coast/HRef/VDD_en / HSync2
121	CTLOUT3	Tristate O/P	5v	8 mA		Control signal output selectable as Film Indicator/VRef/backlight_en/VSync2
122	CTLOUT4	Tristate O/P	5v	8 mA		Control signal output selectable as CRef/Field ID/CSync/Monitor coast
123	VDDcore6	Power				1.8 V - Power pin for core
124	VSS	Ground				Ground
125	CLKOUT	Tristate O/P	5v	12 mA		Output data rate clock
126	B/U/Pb_OUT_0	Tristate O/P	5v	8 mA		Digital video output – Blue/U/Pb
127	B/U/Pb_OUT_1	Tristate O/P	5v	8 mA		Digital video output – Blue/U/Pb
128	VDD7	Power				3.3 V - Power pin for IO
129	VSS	Ground				Ground
130	B/U/Pb_OUT_2	Tristate O/P	5v	8 mA		Digital video output – Blue/U/Pb
131	B/U/Pb_OUT_3	Tristate O/P	5v	8 mA		Digital video output – Blue/U/Pb
132	B/U/Pb_OUT_4	Tristate O/P	5v	8 mA		Digital video output – Blue/U/Pb

Pin No	Pin Name	I/O Type	Voltage Tolerance	Drive	Pull up/ Pulldown	Description
133	B/U/Pb_OUT_5	Tristate O/P	5v	8 mA		Digital video output – Blue/U/Pb
134	B/U/Pb_OUT_6	Tristate O/P	5v	8 mA		Digital video output – Blue/U/Pb
135	B/U/Pb_OUT_7	Tristate O/P	5v	8 mA		Digital video output – Blue/U/Pb
136	R/V/Pr_OUT_0	Tristate O/P	5v	8 mA		Digital video output – Red/V/Pr
137	R/V/Pr_OUT_1	Tristate O/P	5v	8 mA		Digital video output – Red/V/Pr
138	VDDcore7	Power				1.8 V - Power pin for core
139	VSS	Ground				Ground
140	R/V/Pr_OUT_2	Tristate O/P	5v	8 mA		Digital video output – Red/V/Pr
141	R/V/Pr_OUT_3	Tristate O/P	5v	8 mA		Digital video output – Red/V/Pr
142	R/V/Pr_OUT_4	Tristate O/P	5v	8 mA		Digital video output – Red/V/Pr
143	R/V/Pr_OUT_5	Tristate O/P	5v	8 mA		Digital video output – Red/V/Pr
144	R/V/Pr_OUT_6	Tristate O/P	5v	8 mA		Digital video output – Red/V/Pr
145	R/V/Pr_OUT_7	Tristate O/P	5v	8 mA		Digital video output – Red/V/Pr
146	VDD8	Power				3.3 V - Power pin for IO
147	VSS	Ground				Ground
148	G/Y/Y_OUT_0	Tristate O/P	5v	8 mA		Digital video output – Green/Y
149	G/Y/Y_OUT_1	Tristate O/P	5v	8 mA		Digital video output – Green/Y
150	G/Y/Y_OUT_2	Tristate O/P	5v	8 mA		Digital video output – Green/Y
151	G/Y/Y_OUT_3	Tristate O/P	5v	8 mA		Digital video output – Green/Y
152	G/Y/Y_OUT_4	Tristate O/P	5v	8 mA		Digital video output – Green/Y
153	G/Y/Y_OUT_5	Tristate O/P	5v	8 mA		Digital video output – Green/Y
154	G/Y/Y_OUT_6	Tristate O/P	5v	8 mA		Digital video output – Green/Y
155	G/Y/Y_OUT_7	Tristate O/P	5v	8 mA		Digital video output – Green/Y
156	OE	Input	5v			Output data enable for Digital video output
157	PLL_PVDD	Power				1.8 V – Power pin for PLL pads
158	PLL_PVSS	Ground				Ground for PLL pads
159	AVSS_PLL_BE1	Ground				PLL Ground
160	AVDD_PLL_BE1	Power				1.8 V – Power pin for PLL
161	AVDD_PLL_BE2	Power				1.8 V – Power pin for PLL
162	AVSS_PLL_BE2	Ground				PLL Ground
163	AVSSPLL_SDI	Ground				PLL Ground
164	AVDDPLL_SDI	Power				1.8 V – Power pin for PLL
165	AVDDPLL_FE	Power				1.8 V – Power pin for PLL
166	AVSSPLL_FE	Ground				PLL Ground
167	R_VSS	Ground				Ground
168	R_VDD1.8	Power				1.8 V
169	R_VSS	Ground				Ground
170	Reserved	-				Leave open
171	R_VDD	Power				3.3 V
172	R_VSS	Ground				Ground
173	Reserved	-				Leave open
174	R_VDD	Power				3.3 V
175	R_VSS	Ground				Ground
176	Reserved	-				Leave open
177	R_VDD	Power				3.3 V
178	R_VSS	Ground				Ground

Pin No	Pin Name	I/O Type	Voltage Tolerance	Drive	Pull up/ Pulldown	Description
179	Reserved	-				Leave open
180	Reserved	-				Leave open
181	Reserved	-				Leave open
182	R_VSS	Ground				Ground
183	R_VDD	Power				3.3 V
184	R_VSS	Ground				Ground
185	R_VSS	Ground				Ground
186	R_VDD	Power				3.3 V
187	R_VDD	Power				3.3 V
188	TEST0	Input	5v			Test pin – connect to ground
189	TEST1	Input	5v			Test pin – connect to ground
190	TEST2	Input	5v			Test pin – connect to ground
191	XTAL IN	Input				External parallel crystal oscillator
192	XTAL OUT	Output				External parallel crystal oscillator
193	VDD9	Power				3.3 V - Power pin for IO
194	VSS	Ground				Ground
195	CLK_PORT 2	Input	5v	4 mA		Port 2 - Data Clock input
196	D1_IN_0	Input	5v	4 mA		Port 2 - ITU-R BT656 digital data input
197	VDDcore8	Power				1.8 V – Power pin for core
198	VSS	Ground				Ground
199	D1_IN_1	Input	5v	4 mA		Port 2 - ITU-R BT656 digital data input
200	D1_IN_2	Input	5v	4 mA		Port 2 - ITU-R BT656 digital data input
201	D1_IN_3	Input	5v	4 mA		Port 2 - ITU-R BT656 digital data input
202	D1_IN_4	Input	5v	4 mA		Port 2 - ITU-R BT656 digital data input
203	D1_IN_5	Input	5v	4 mA		Port 2 - ITU-R BT656 digital data input
204	D1_IN_6	Input	5v	4 mA		Port 2 - ITU-R BT656 digital data input
205	D1_IN_7	Input	5v	4 mA		Port 2 - ITU-R BT656 digital data input
206	FIELD ID_PORT 2	Input	5v	4 mA		Port 2 - Odd/Even Field identification
207	VSYNC_ PORT 2	Input	5v	4 mA		Port 2 - Vertical sync or reference
208	HSYNC_PORT 2	Input	5v	4 mA		Port 2 - Horizontal sync or reference

IC7030 - SII9030CTU - Silicon HDMI Panelink Cinema Transmitter

BLOCK DIAGRAM

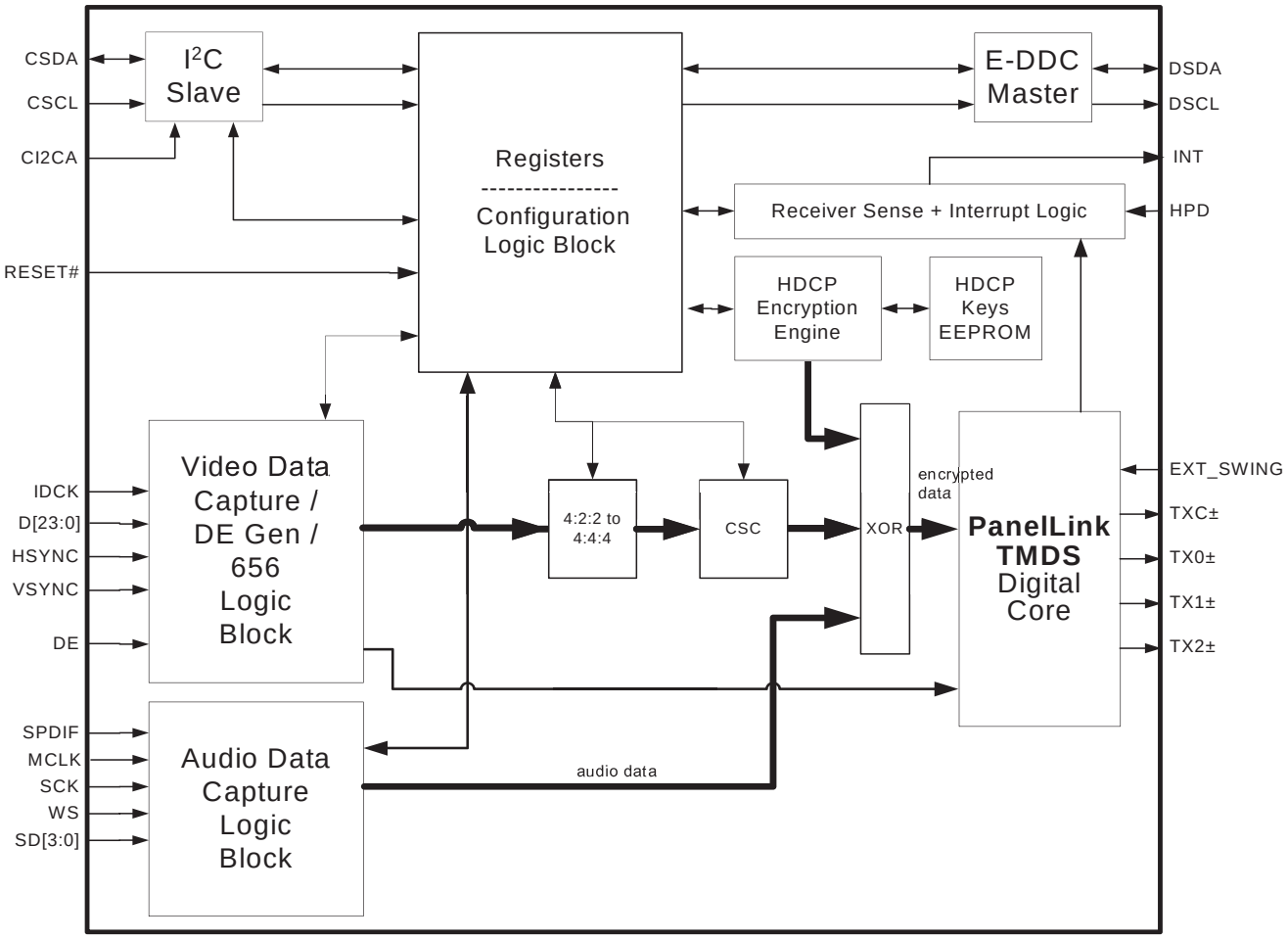


Figure 9-27

PIN CONFIGURATION

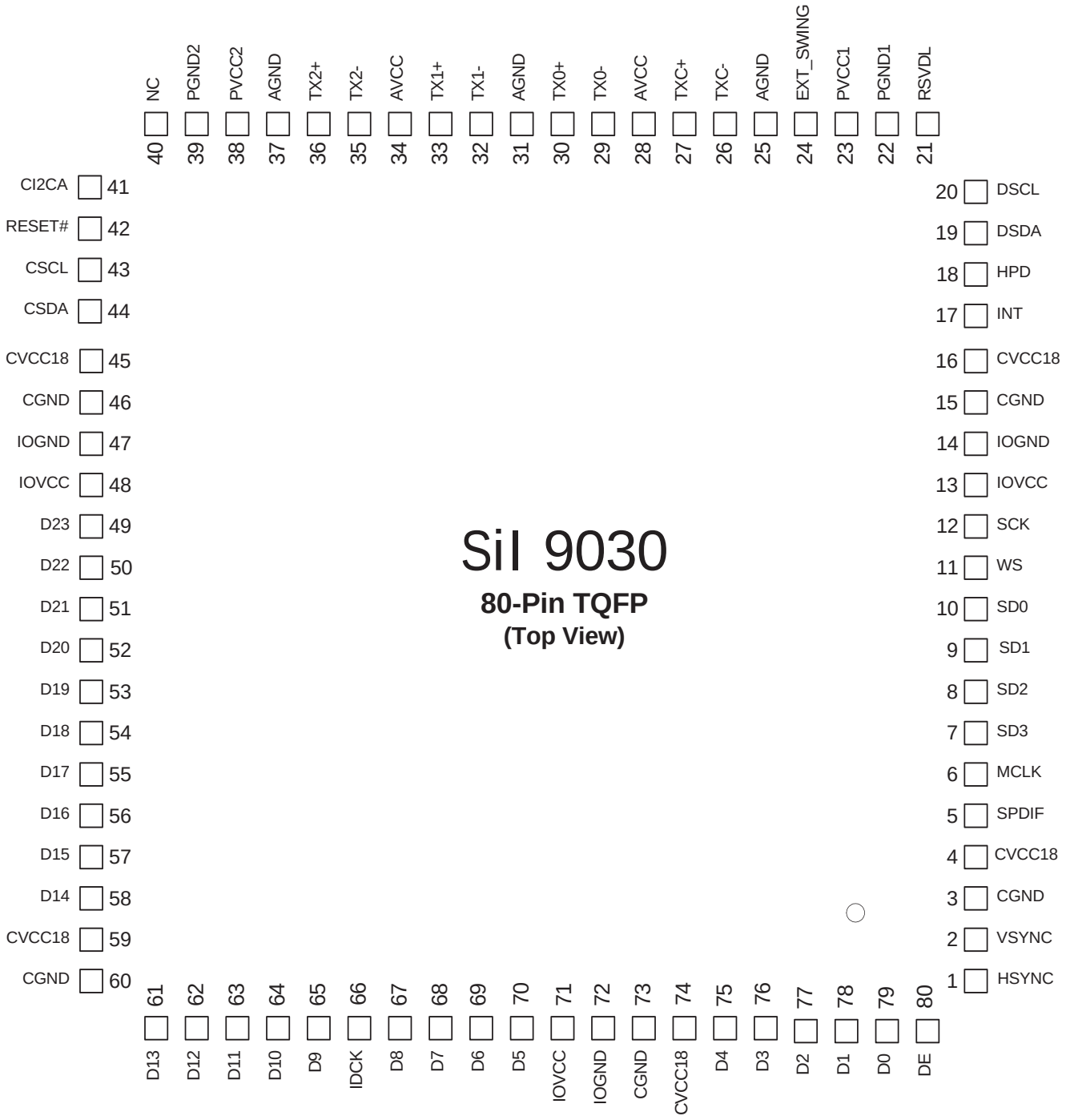


Figure 9-28

9.9.5 DTTM

IC7603 - TDA10046HT - DVB-T Channel Receiver

BLOCK DIAGRAM

INTERNAL BLOCK DIAGRAM

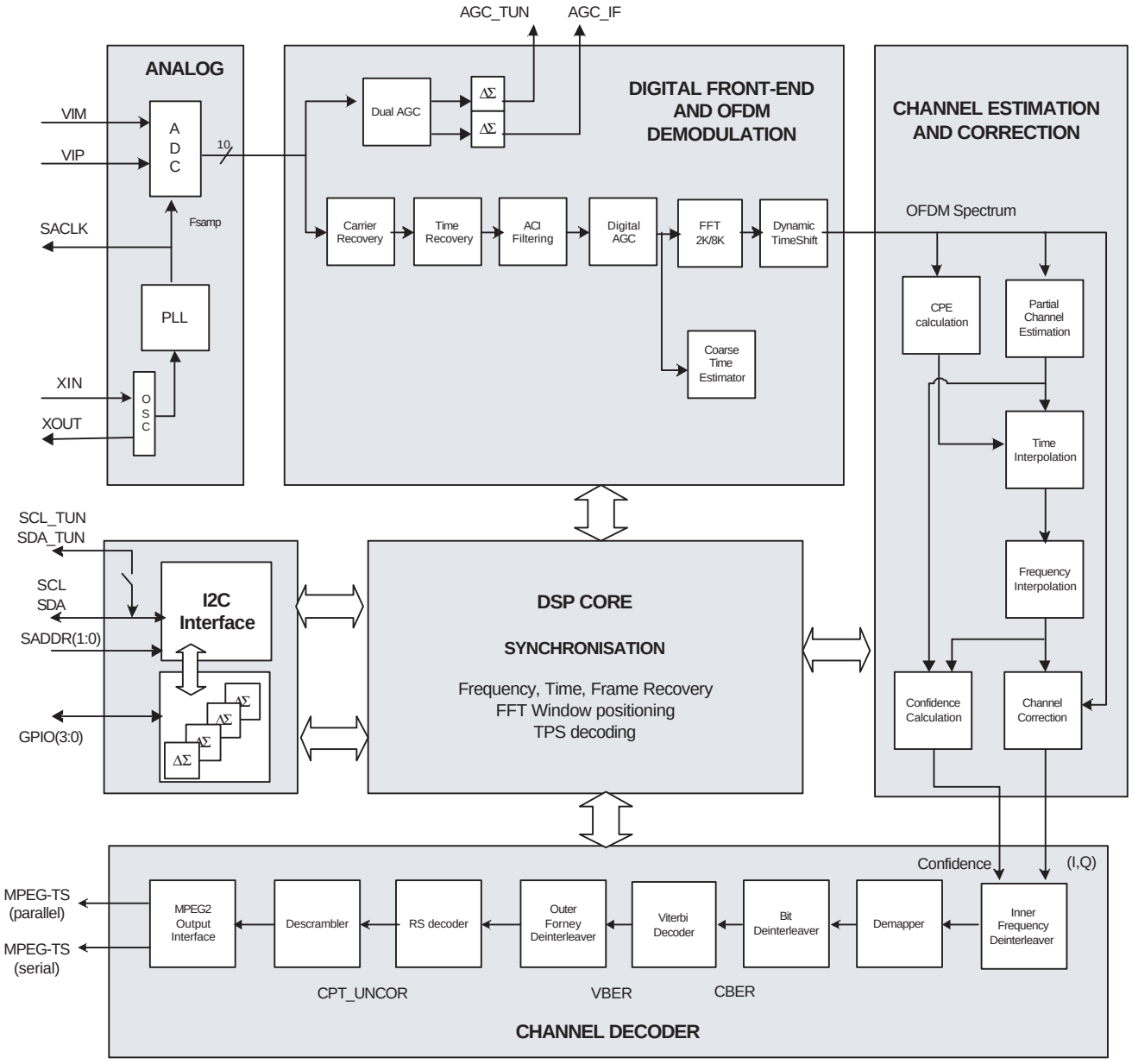


Figure 9-29

EXTERNAL BLOCK DIAGRAM

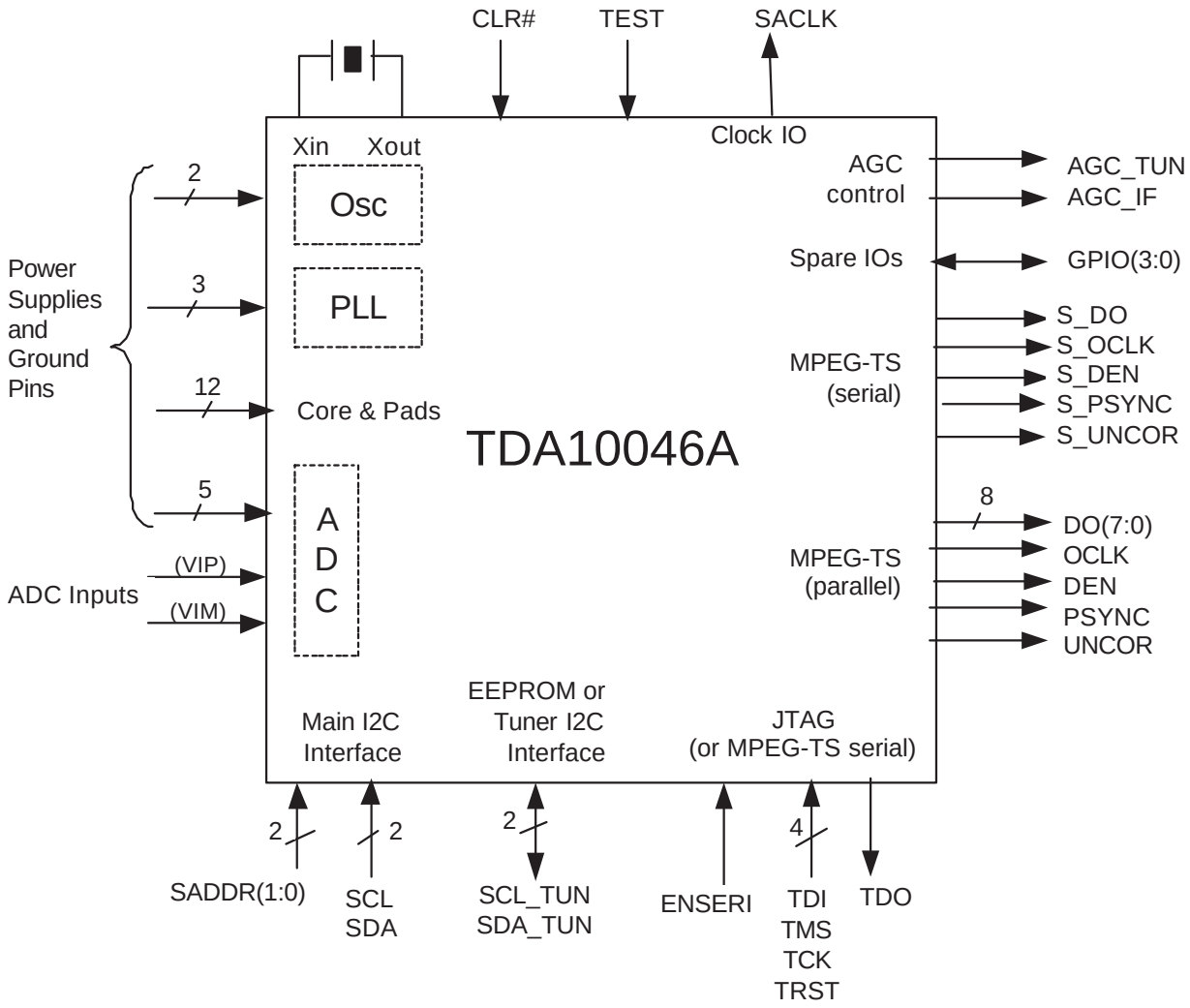


Figure 9-30

PIN DESCRIPTION

Symbol	Pin Number	Type	DESCRIPTION
CLR#	9	I (5v tol)	The CLR# input is asynchronous and active low, and clears the TDA10046A. When CLR# goes low, the circuit immediately enters its RESET mode and normal operation will resume 11 XIN falling edges later after CLR# returned high. The I2C register contents are all initialized to their default values. The minimum width of CLR# at low level is 4 XIN clock periods.
XIN	54	I	XTAL oscillator input pin. Typically a fundamental XTAL oscillator is connected between the XIN and XOUT pins.
XOUT	55	O	XTAL oscillator output pin. Typically a fundamental XTAL oscillator is connected between the XIN and XOUT pins.
SACLK	51	I/O T 8mA	Sampling CLocK. This pin could also be used to provide the sampling clock to an external ADC. This pin can be set to tri-state (default state at reset).
AGC_TUN	1	I/O OD T 4mA	First delta/sigma encoded output signal for the Tuner AGC. This signal is typically fed to the AGC Tuner amplifier through a single RC network. But AGC_TUN can also be configured to output a delta/sigma signal, which can be used to measure the level of a free running tuner RF AGC. This output can be set to tri-state (default state at reset) or 3.3V push-pull or open-drain output (if 5V level is required).
AGC_IF	2	O OD T 4mA	Second delta/sigma encoded output signal for the IF AGC. This signal is typically fed to the AGC IF amplifier through a single RC network. This output can be set to tri-state (default state at reset) or 3.3V push-pull or open-drain output (if 5V level is required).
DO[7:0]	49,48, 46,44, 43,41, 39,38	I/O T 4mA	Data Output Bus. These 8-bit parallel data are the outputs of the TDA10046A after demodulation, de-interleaving, RS decoding and de-scrambling (MPEG Transport Stream) This output can be set to tri-state (default state at reset).
OCLK	37	I/O T 4mA	Output CLock. OCLK is the output clock for the parallel DO[7:0] output Bus. OCLK is internally generated depending on which interface is selected. This output can be set to tri-state (default state at reset).
DEN	36	I/O T 4mA	Data ENable : this output signal is high when there is a valid data on the output Bus DO[7:0]. This output can be set to tri-state (default state at reset).
PSYNC	35	I/O T 4mA	Pulse SYNChro. This output signal goes high when the sync byte (47_{16}) is provided, then it goes low until the next sync byte. If the serial interface is selected, then PSYNC is high only on the first bit of the sync byte (47_{16}) or during the 8 bit of the sync byte depending on I2C programming. This output can be set to tri-state (default state at reset).
UNCOR	33	I/O T 4mA	UNCORrectable packet. This output signal is high when the provided MPEG-TS packet is uncorrectable (during the 188 bytes of the packet). The uncorrectable packet is not affected by the Reed Solomon decoder, but the MSB of the byte following the sync byte is forced «1 » for the MPEG2 process: Error Flag Indicator (if RSI and IEI are set low in the I2C table). This output can be set to tri-state (default state at reset).
S_DO	32	I/O	Serial data output bus. These data is the output of the TDA10046A after

Symbol	Pin Number	Type	DESCRIPTION
		T 4mA	demodulation, de-interleaving, RS decoding and de-scrambling. In serial mode. This output can be set to tri-state (default state at reset).
S_OCLK	31	I/O T 4mA	Serial Output CLock. S_OCLK is the output clock for the serial S_DO output. S_OCLK is internally generated depending on which interface is selected. This output can be set to tri-state (default state at reset).
S_DEN	30	I/O T 4mA	Serial Data Enable : this output signal is high when there is a valid data on output bus S_DO. This output can be set to tri-state (default state at reset).
S_PSYNC	28	I/O T 4mA	Serial TS Pulse SYNChro. This output signal goes high when the sync byte (47_{16}) is provided, then it goes low until the next sync byte. S_PSYNC is high during the first bit of the sync byte (47_{16}) or during the 8 bit of the sync byte depending on I2C programming This output can be set to tri-state (default state at reset).
S_UNCOR	27	I/O T 4mA	Serial TS UNCORrectable packet. This output signal is high when the provided packet is uncorrectable (during the 188 bytes of the packet). The uncorrectable packet is not affected by the Reed Solomon decoder, but the MSB of the byte following the sync byte is forced «1 » for the MPEG2 process: Error Flag Indicator (if RSI and IEI are set low in the I2C table). This output can be set to tri-state (default state at reset).
SADDR[1:0]	10,11	I (5v tol)	SADDR are the 2 LSBs of the I2C address of the TDA10046A. The MSBs are internally set to 00010. Therefore the complete I2C address of the TDA10046A is (MSB to LSB) : 0,0,0,0,1,0, SADDR[1], SADDR[0].
SDA	8	I/O (5v tol) 4mA	I2C data input. SDA is a bi-directional signal. It is the serial input/output of the I2C internal block. A pull-up resistor (typically 4.7 kΩ) must be connected between SDA and VDD for proper operation (Open Drain output).
SCL	6	I (5v tol)	I2C clock input. SCL should nominally be a square wave with a maximum frequency of 400KHz. SCL is generated by the system I2C master.
TEST	12	I (5v tol)	Test input pin. For normal operation of the TDA10046A, TEST must be grounded.
ENSERI	13	I (5v tol)	When high this pin enables the serial output transport stream through the boundary scan pins (TRST,TDO,TCK,TDI,TMS). Must be set low in boundary scan mode.
TRST	14	I/O T (5v tol) 4mA	Test ReSeT. This active low input signal is used to reset the TAP controller when in boundary scan mode. In normal mode of operation TRST must be set low. In serial mode, TRST is the uncorrectable output (S_UNCOR)
TDO	20	O T (5v tol) 4mA	Test Data Out. This is the serial Test output pin used in boundary scan mode. Serial Data are provided on the falling edge of TCK. In Serial mode, TDO is the data output (S_DO).
TCK	18	I/O T (5v tol) 4mA	Test ClocK : an independent clock used to drive the TAP controller when in boundary scan mode. In normal mode of operation, TCK must be set low. In serial mode, TCK is the clock output (S_OCLK).
TDI	17	I/O T	Test Data In. The serial input for Test data and instruction when in boundary scan mode. In normal mode of operation, TDI must be set to

Symbol	Pin Number	Type	DESCRIPTION
		(5v tol) 4mA	low. In serial mode, the TDI is the Pulse Synchro output (S_PSYNC)
TMS	16	I/O T (5v tol) 4mA	Test Mode Select. This input signal provides the logic levels needed to change the TAP controller from state to state. In normal mode of operation, TMS must be set to high. In serial mode TMS is the data Enable output (S_DEN).
GPIO[3:0]	26, 25, 23, 21	I/O OD T 4mA	General purpose IO's. When used as output, could provide either synchronization or interrupt internal flags, or variable control voltages through $\Delta\Sigma$ outputs filtered by external RC networks. When used as input, allow the host to read/monitor external events or switches.
SCL_TUN	3	OD 4mA	SCL_TUN can be configured to output SCL_TUN input. SCL_TUN is an open drain output and therefore requires an external pull up resistor.
SDA_TUN	4	I/OD (5v tol) 4mA	SDA_TUN is equivalent to SDA I/0 of TDA10046A but can be tri-stated by I2C programmation. SDA_TUN is an open drain output and therefore requires an external pull up resistor.
VIP	62	I	Positive input to the A/D converter. The input of the A/D converter can be either AC-coupled by means of one capacitor or DC-coupled when connected directly to the input signal (the choice is made by I2C). The differential input range can be chosen by I2C between 2.0 Vpp or 1.0 Vpp. Differential input is of course recommended for better performances, but in case of single-ended input, the input signal should be connected to VIP by means of a coupling capacitor.
VIM	61	I	Negative input to the A/D converter. This input of the A/D converter can be either AC-coupled by means of one capacitor or DC-coupled when connected directly to the input signal (the choice is made by I2C). The differential input range can be chosen by I2C between 2.0 Vpp or 1.0 Vpp. Differential input is of course recommended for better performances, but in case of single-ended input, VIM should be connected to GND.
VD33_ADC	64	PS	ADC Digital Power Supply 3.3V typical
VDA33_ADC	60	PS	ADC Analog Power Supply 3.3V typical
VSA_ADC	63	GND	ADC Analog Ground level 0V typical
VD18_PLL_ADC	59	PS	ADC and PLL Digital Power Supply 1.8V typical
VSA_PLL_ADC	58	GND	ADC and PLL Digital Ground level 0V typical
VDA18_PLL	57	PS	PLL Analog Power Supply 1.8V typical
VSA_OSC	56	GND	OSC Analog Ground level 0V typical
VDA18_OSC	53	PS	OSC Analog Power Supply 1.8V typical
VDDI18	50,42, 22,5	PS	Core Digital Power Supply 1.8V typical
VDDE33	47,34, 19	PS	Pads Digital Power Supply 3.3V typical
VSS	52, 45, 40,29, 24, 15, 7	GND	Pads/Core Digital Ground level 0V typical

PIN CONFIGURATION

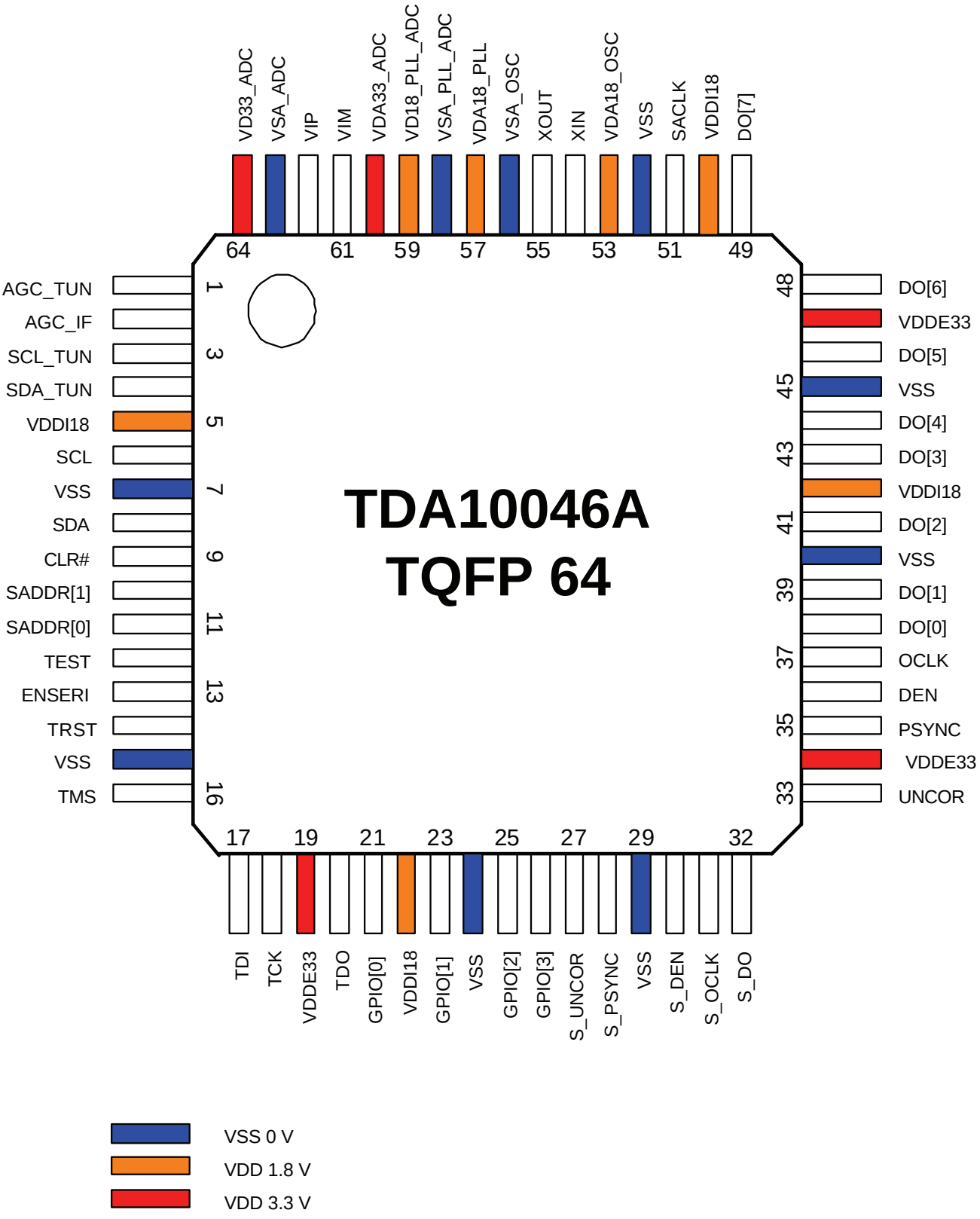


Figure 9-31

Exploded View of the set

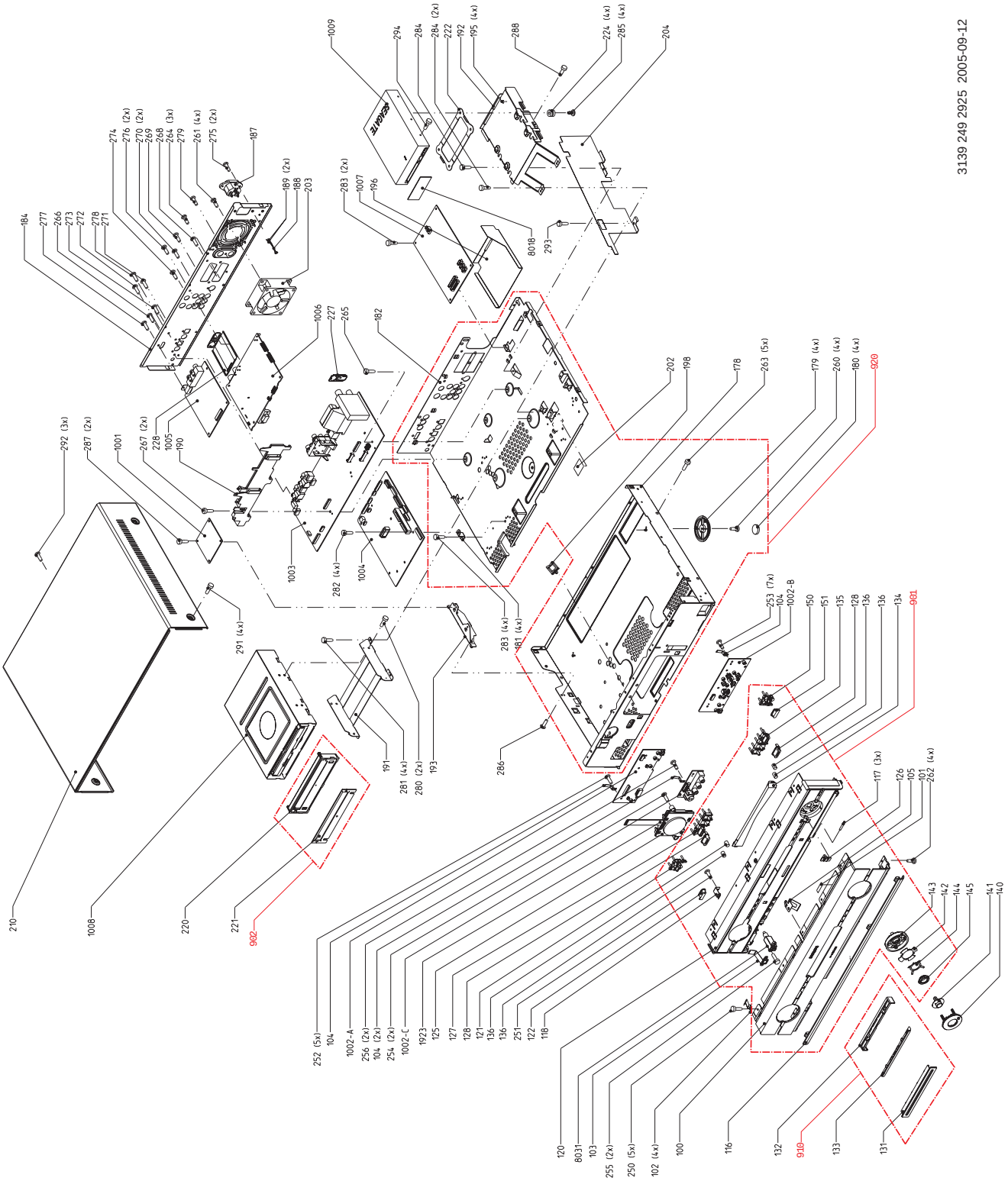


Figure 10-1

DVDR9000H/10

102	3103 601 60021		EARTHSPRING
104	3139 241 23752		SPRING GND S-VIDEO DVDR9000H
105	3139 241 24251		SPRING GND LOADER
125	3139 244 07391		WINDOW DISPLAY DVDR9000H
140	3139 244 07311		BUTTON JOYSTICK FUNCTION
141	3139 244 07301		JOYSTICK FUNCTION
184	3139 241 60152		PLATE REAR DVDR9000H/10
184	3139 241 25351		PLATE REAR DVDR9000H/75/97
187	2422 030 00408		SOC NBM POW H 2P M AC IEC B
188	3139 241 02561		CABLE MAINS VH 2P3/130/2P OE
189	3139 243 40001		SHRINKABLE TUBE D6.0 L20MM 224
195	3139 243 10081		CUSHION FOOT
203	2822 031 00031		FAN 12VDC 1.1W 2300RPM B
204	3139 243 20411		SHEET AIR GUIDE DVDR9000H
210	3139 241 22911		COVER TOP DVDR9000H
224	3139 244 09101		HDD DAMPER
227	3103 601 20611		SPRING GROUND TUNER
228	3139 241 23771		SPRING TUNER-DTT DVDR9000H
285	2522 200 00027		SCR WAFER PH STZN BU 6/32X12
333	3128 147 17941		RC4363/01 IRT PROD ASSY
335	2422 070 00114	⚠	MAINSCORD IEC 10A 2M /10
335	2422 070 00004	⚠	MAINSCORD AUS/NZ 2M /75
335	2422 070 00005	⚠	MAINSCORD IEC 10A 2M /97
341	2422 076 00718		CINCH CABLE 1M5 R/Y/W /75/97
345	2422 076 00522		CBLE PHONE-M 2P 3000 IR-LED /10
352	2422 076 00825		CBLE SCART 1M5 SCART 21P /10
357	4822 320 50377		RF CABLE PAL
901	3143 027 63034		FRONT ASSY DVDR9000H
902	3143 027 63321		COVER DUST ASSY DVDR9000H
910	3143 027 63051		COVER TRAY ASSY DVDR9000H
920	3143 027 63065		FRAME ASSY DVDR9000H
1001	3139 248 85241		PCBAS IR BLASTER 05 DVDR9000H
1002	3139 248 85251		PCBAS FRONT 05 DVDR9000H
1003	3139 248 85261		PCBAS ANA 05 E1 DVDR9000H

DVDR9000H/10

1004	3139 248 85951		PCBAS CHRY_F05_3 DVDR9000H
1005	3103 608 51882		PBAS PSCAN HDMI VIE C
1006	3104 129 81451		PBAS DTTM DVD RW B
1007	3139 247 12491	⚠	PSU PSU05H90-B DELTA DVDR9000H
1008	3139 247 12032		BASIC ENGINE D4.3 CLOSED/AG
1009	2822 062 00109		“HDD 3.5” 400GB ST3400832ACE B
1921	3103 601 00311		KR 9POL GESCH 370MM
1922	3139 241 01661		FFC FOIL 22P/340 AD 1MMP FOLD
1923	2722 171 00287		LCD MODULE 5475FGPWTWC(IDWO) Y
1924	3139 241 01591		FFC FOIL 10P/280 AD 1MMP FOLD
1925	3139 110 28211		CWAS 11P/11PW 220 6+5 BK 26S
5000	2422 549 00107		FERRITE CORE RP 25X5X12 Y
8011	3139 110 36061		FFC FOIL 08P/100/08P BD 1MMP
8012	3139 241 01681		FFC FOIL 06P/280 AD 1MMP FOLD
8013	3139 241 01691		FFC FOIL 30P/280 BD 0.5MM FOLD
8014	3139 241 01651		FFC FOIL 15P/280 AD 1MMP FOLD
8015	3139 241 01701		FFC FOIL 22P/340 BD 1MMP FOLD
8016	3139 241 00621		FFC FOIL 07P/220/07P BD 1MMP
8017	3103 601 00802		CBLE HR 4P/390/4P HR UL
8019	3139 241 00591		CBLE HR 04P/220/04P LOADER SUP
8020	3139 241 01581		FFC FOIL 40P/100 BD 0.5MM FOLD
8021	3139 241 00921		CBLE IDE 40P/280/40P IDE UL
8022	3139 241 01211		CBLE HR 04P/340/04P LC UL
8023	3139 111 02141		FFC FOIL 07P/100/07P BD 1.0MMP
8024	3139 241 01321		FFC FOIL 40P/400/40P BD 0.5MMP
8025	3139 241 01201		CBLE KR 12P/340/12P KR UL
8027	3139 110 35631		FFC FOIL 22P/180/22P BD 1MMP
8028	3139 241 01571		FFC FOIL 22P/140 BD 1MMP FOLD
8030	3139 241 01671		FFC FOIL 10P/100 BD 1MMP FOLD
8032	3139 241 01761		CBLE SRA 1P/80/1P SRA 18ST BK

11 REVISION LIST

Version 1.0
* Initial Release

Version 1.1
* Addition of DVDR9000H/75 and DVDR9000H/97
* Update service parts list