

Service
Service
Service

DVDR3330H/02/05/19/51 & DVDR5330H/02/05/19



Back End Repair

Service Manual



Contents	Page
1 Technical Specifications and Connection Facilities	2
2 Safety Information, General Notes & Lead Free Requirements	5
3 Directions for Use	7
4 Mechanical Instructions	9
5 Firmware Upgrading & Diagnostic Software	12
6 Block Diagrams, Waveforms, Wiring Diagram	103
Overall block diagram	103
Wiring diagram	104
Waveforms of Digital Board	105
Waveforms of Analog Board	106
Waveforms of Front Board	107
Test Points Overview for Analog Board	108
Test Points Overview for Display/ Front Connector Board	109
Test Points Overview for Digital Board	110
7 Circuit Diagrams and PWB Layout	111
Analog: Frontend Video (FV)	111
Analog: Video In / Out (IOV)	112
Analog: Audio In / Out (IOA)	113
Analog: Power Supply (PS)	114
Analog: Multi Sound Processing (MSP)	115
Analog: Progressive (PROG)	116
Analog: Digital In / Out (DIGIO)	117
Analog: Audio Converter (DAC_ADC)	118
Analog: Control Unit (CU)	119

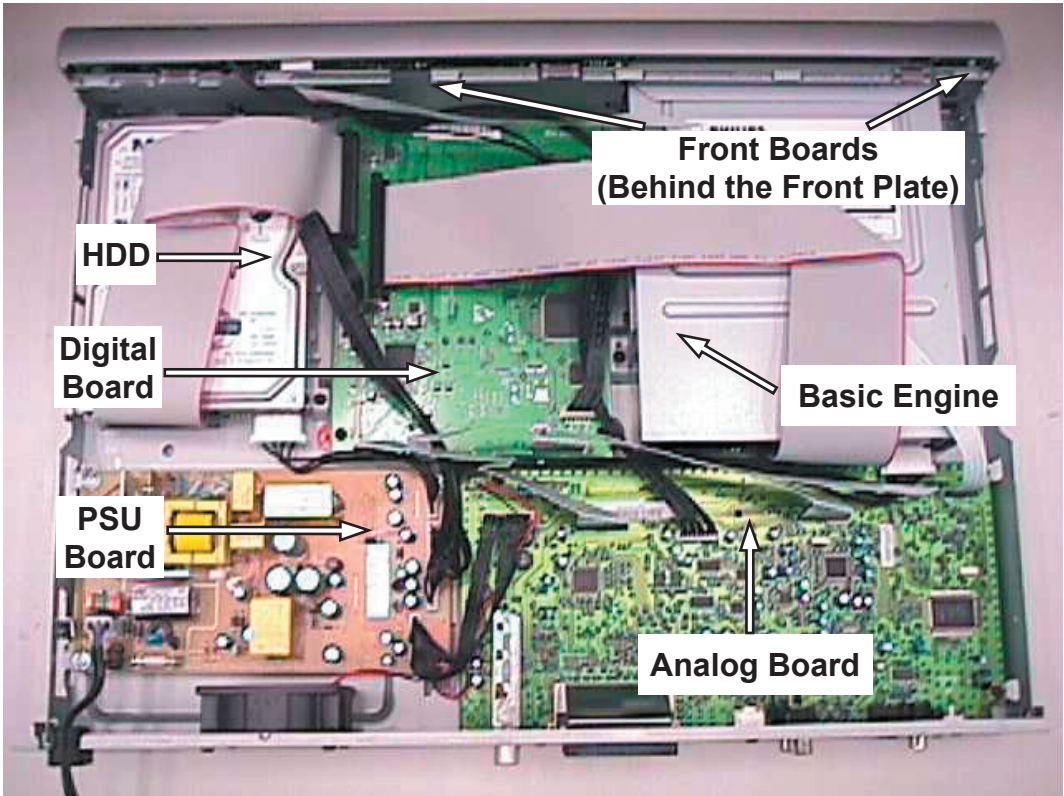
Contents	Page
Layout: Analog Component + SMD View	120
Layout: Analog Component View	121
Front: Display Part (DISP)	122
Front: Front Connector Part (FC)	123
Layout: Display / Front Connector	124
Front: Standby (STBY)	125
Digital: IDE1, Uarts, Reset, BE	126
Digital: 1394	127
Digital: Audio PLL	128
Digital: Chrysalis	129
Digital: Power Supply	130
Digital: Prog Scan DAC	131
Digital: Flash, SDRAM, EEPROM	132
Digital: Video IO	133
Digital: VIP	134
Digital: IDE2	135
Layout: Digital Top View	136
Layout: Digital Bottom View	137
8 Alignments & Test Procedures	139
9 Circuit and IC description	140
Circuit Description	140
IC Description	148
10 Exploded view & Service parts list	160
Exploded view	160
Service parts list	161

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1. Technical Specifications and Connection Facilities

1.1 PCB Locations



1.2 Diversity Matrix

	DVDR3300H	DVDR3330H	DVDR5330H
HDD capacity	80GB	160GB	250GB

1.3 Read / Write Speed

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

1.4 General:

Mains voltage : 220V – 240V
 Mains frequency : 50 Hz
 Power consumption (record) : 40 W
 Standby Power Consumption : < 6 W

1.5 RF Tuner

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

1.5.1 System

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

1.5.2 RF - Loop Through:

Frequency range : 45 MHz – 860 MHz
 Gain: (ANT IN - ANT OUT) : -5dB to 0dB

1.5.3 Receiver:

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

1.5.4 Video Performance:

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

1.5.5 Audio Performance:

Audio Performance Analogue - HiFi:

Frequency response at SCART 1 (L+R) output : 100 Hz – 12 kHz / 0 ± 3dB

S/N Ratio (20Hz – 20kHz) unweighted : ≥ 50dB
 Harmonic distortion (1kHz, ± 25 kHz deviation) : ≤ 0.5%

Audio Performance NICAM:

Frequency response at SCART 1 (L+R) output : 40 Hz – 15 kHz / 0 ± 3dB

S/N Ratio (20Hz – 20kHz) unweighted : ≥ 60dB
 Harmonic distortion (1kHz, ± 25 kHz deviation) : ≤ 0.5%

1.5.6 Tuning

Automatic Search Tuning

Scanning time without RF signal	: 3min. typical
Stop level (vision carrier)	: $\geq 37\text{dB}/\mu\text{V}$
Maximum tuning error of a recalled program	: $\pm 100\text{ kHz}$
Maximum tuning error (drift) during operation	: $\pm 100\text{ kHz}$

Tuning Principle:

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

1.6 Analog Inputs / Outputs

1.6.1 SCART 1 (Connected to TV)

Pin Signals:

1	Audio-out R	1.8V RMS
2	Audio-in R	
3	Audio-out L	1.8V RMS
4	Audio GND	
5	Blue / Chroma GND	
6	Audio-in L	
7	Blue-out / Chroma-in	$0.7\text{Vpp} \pm 0.1\text{V}$ 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	$0.7\text{Vpp} \pm 0.1\text{V}$ into 75Ω
12	NC	
13	Red / Chroma GND	
14	Fast switch GND	
15	Red-out / Chroma-out	$0.7\text{Vpp} \pm 0.1\text{V}$ into 75Ω $300\text{mVpp} \pm 3\text{dB}$
16	Fast switch RGB / CVBS or Y	< 0.4V into 75Ω = CVBS > 1V / < 3V into 75Ω = RGB
17	Y/CVBS-out GND	
18	CVBS-in GND	
19	CVBS-out / Y-out	$1\text{Vpp} \pm 0.1\text{V}$ into 75Ω
20	CVBS-in	
21	Shield	

1.6.2 SCART 2 (Connected to AUX)

Pin Signals:

1	Audio-out R	1.8V RMS
2	Audio-in R	
3	Audio-out L	1.8V RMS
4	Audio GND	
5	Blue / Chroma GND	
6	Audio-in L	
7	Blue-in / Chroma-out	$300\text{mVpp} \pm 3\text{dB}$
8	Function switch	
9	Green GND	
10	P50 control	
11	Green-in	
12	NC	
13	Red / Chroma GND	
14	Fast switch GND	
15	Red-in / Chroma-in	
16	Fast switch RGB / CVBS or Y	
17	CVBS-out GND	
18	Y / CVBS-in GND	
19	CVBS-out	$1\text{Vpp} \pm 0.1\text{V}$ into 75Ω
20	CVBS-in / Y-in	
21	Shield	

1.6.3 Audio/Video Front Input Connectors

Audio - Cinch

Input voltage	: 2Vrms
Input impedance	: > $10\text{k}\Omega$

Video - Cinch

Input voltage	: $1\text{Vpp} \pm 3\text{dB}$
Input impedance	: 75Ω

Video - YC (Hosiden)

According to IEC 933-5

Superimposed DC-level on pin 4 (load > $100\text{k}\Omega$)
< 2.4V is detected as 4:3 aspect ratio
> 3.5V is detected as 16:9 aspect ratio

Input voltage Y	: $1\text{Vpp} \pm 3\text{dB}$
Input impedance Y	: 75Ω
Input voltage C	: $300\text{mVpp} \pm 3\text{dB}$
Input impedance C	: 75Ω

1.6.4 Audio/Video Output rear Connectors

Audio - Cinch

Output voltage	: 2Vrms max.
Output impedance	: > $10\text{k}\Omega$

Video - Cinch

Output voltage	: $1\text{Vpp} \pm 3\text{dB}$
Output impedance	: 75Ω

Video - YC (Hosiden)

According to IEC 933-5

Superimposed DC-level on pin 4 (load > $100\text{k}\Omega$)
< 2.4V is detected as 4:3 aspect ratio
> 3.5V is detected as 16:9 aspect ratio

Output voltage Y	: $1\text{Vpp} \pm 3\text{dB}$
Input impedance	: 75Ω
Output voltage C	: $300\text{mVpp} \pm 3\text{dB}$
Input impedance	: 75Ω

1.7 Digital Inputs / Outputs

1.7.1 Digital Output

Digital Audio – Coaxial / Optical

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

1.7.2 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

1.8 Video Performance

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

1.8.1 SCART (RGB)

SNR	: $\geq 55\text{dB}$ on all output
Bandwidth	: 4.8MHz -3dB

1.9 Audio Performance

1.9.1 Cinch Output Rear

Output voltage 2 channel mode	: 1.8Vrms ± 2dB
Channel unbalance (1kHz)	: < 1dB
Crosstalk 1kHz	: > 85dB
Crosstalk 20Hz-20kHz	: > 70dB
Frequency response 20Hz-20kHz	: ± 0.5dB
Signal to noise ratio (unweighted)	: > 80dB
Dynamic range 1kHz	: > 75dB
Distortion and noise 1kHz	: > 70dB
Distortion and noise 20Hz-20kHz	: > 55dB
Intermodulation distortion	: > 70dB
Mute	: > 85dB
Outband attenuation (above 30kHz):	> 40dB

1.9.2 Scart Audio

Output voltage 2 channel mode	: 1.4Vrms ± 2dB
Channel unbalance (1kHz)	: < 1dB
Crosstalk 1kHz	: > 85dB
Crosstalk 20Hz-20kHz	: > 70dB
Frequency response 20Hz-20kHz	: ± 0.5dB
Signal to noise ratio (unweighted)	: > 80dB
Dynamic range 1kHz	: > 75dB
Distortion and noise 1kHz	: > 70dB
Distortion and noise 20Hz-20kHz	: > 55dB
Intermodulation distortion	: > 70dB
Mute	: > 85dB
Outband attenuation (above 30kHz):	> 40dB

1.10 Dimensions and Weight

Height of feet	: 5.5mm
Apparatus tray closed	: WxDxH:435x340x65mm
Apparatus tray open	: WxDxH:435x477x65mm
Weight without packaging	: 4.3kg
Weight with packaging	: 6.0kg

1.11 Laser Output Power & Wavelength

1.11.1 DVD

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

1.11.2 CD


Output power	: 0.3mW
Wavelength	: 780nm

2. Safety Information, General Notes & Lead Free Requirements

2.1 Safety Instructions

2.1.1 General Safety

Safety regulations require that during a repair:

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

Safety regulations require that after a repair, you must return the unit in its original condition. Pay, in particular, attention to the following points:

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

2.1.2 Laser Safety

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

Laser Device Unit

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




Figure 2-1

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

2.2 Warnings

2.2.1 General

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

2.2.2 Laser

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

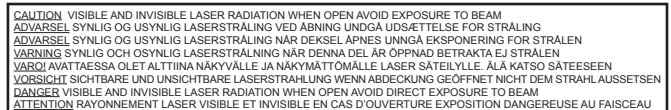


Figure 2-2

2.2.3 Notes

Dolby

Manufactured under licence from Dolby Laboratories. "Dolby", "Pro Logic" and the double-D symbol are trademarks of Dolby Laboratories. Confidential Unpublished Works. ©1992-1997 Dolby Laboratories, Inc. All rights reserved.



Figure 2-3

Trusurround

TRUSURROUND, SRS and symbol (fig 2-4) are trademarks of SRS Labs, Inc. TRUSURROUND technology is manufactured under licence from SRS labs, Inc.



Figure 2-4

Video Plus

"Video Plus+" and "PlusCode" are registered trademarks of the Gemstar Development Corporation. The "Video Plus+" system is manufactured under licence from the Gemstar Development Corporation.



Figure 2-5

Macrovision

This product incorporates copyright protection technology that is protected by method claims of certain U.S. patents and other intellectual property rights owned by Macrovision Corporation and other rights owners.

Use of this copyright protection technology must be authorized by Macrovision Corporation, and is intended for home and other limited viewing uses only unless otherwise authorized by Macrovision Corporation. Reverse engineering or disassembly is prohibited.

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
 - To reach at least a solder-temperature of 400°C,
 - To stabilize the adjusted temperature at the solder-tip
 - 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 excerpt 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

Hard Disk/DVD Recorder

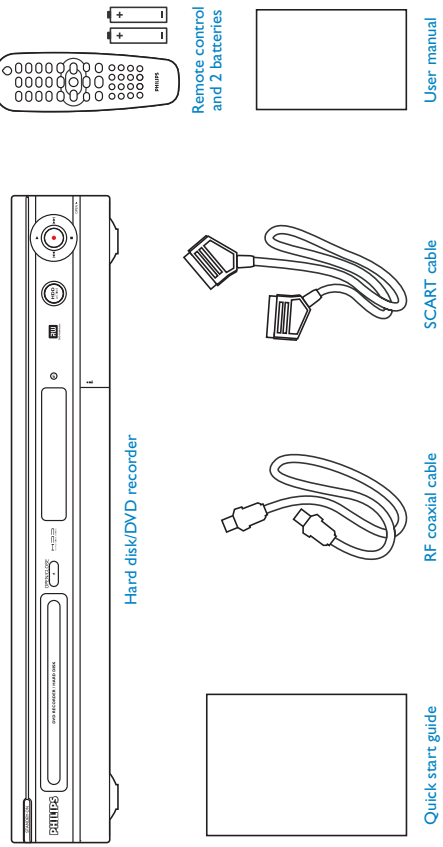
DVDR 3300H
DVDR 3330H
DVDR 5330H

Quick Start Guide



- 1** Connect
- 2** Set Up
- 3** Enjoy

What's in the Box



3 Enjoy

Recording to hard disk

- Press **INFO** and a bar representing what is temporarily stored will appear.
- Press **PREVIOUS** or **NEXT** to search for where you want to start recording.
Tip You can also press **JUMP BACK**, **JUMP FWD** or press and hold **PREVIOUS**, **NEXT**.
- Press **REC**.
- Key in the time period to record or press **REC** again for a 30 minutes recording.
Tip Each time you press **REC** another 30 minutes recording time is added.

Play recording while recording it

- Press **PREVIOUS**; a bar representing what is temporarily stored will appear with the recording marked in red, continue to press **PREVIOUS** to go back to the part of the recording you want to watch and the recorder will start playing from there.
- Press **TUNER** to go back to the live TV broadcast.
Tip You can pause and jump forward or backward of what you have already recorded without interfering with the recording.

Troubleshooting

For more troubleshooting tips, see the user manual.

Problem	Tip
Remote control	<ul style="list-style-type: none"> Aim remote control at recorder (not TV) or remove any obstacles in the way. Batteries are weak; replace the batteries.
Disc does not play	<ul style="list-style-type: none"> The child lock is on. Refer to user manual to unlock it. Wrong region code. The DVD must be coded for ALL regions or Region 2. Check if the disc is defective, scratched or warped. Clean the disc or try another disc.
The picture is distorted	<ul style="list-style-type: none"> The disc does not match the TV colour system standard (PAL/NTSC). When playing DVD set Record Mode to high-quality speed to improve picture quality.
Recordings are not occurring as scheduled. New recordings cannot be made.	<ul style="list-style-type: none"> Channel you are recording is not stored or the wrong programme number is selected. If you adjust the clock after you set a timer recording, reset the timer recording. The recorder cannot duplicate copyrighted material onto a recordable DVD. A finalised DVD+R has been inserted. Change disc.

Need help?

User Manual
See the user manual that came with your hard disk/DVD recorder

Online
Go to www.philips.com/support

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I2 NC 31 39 246 17151
www.philips.com



1 Connect

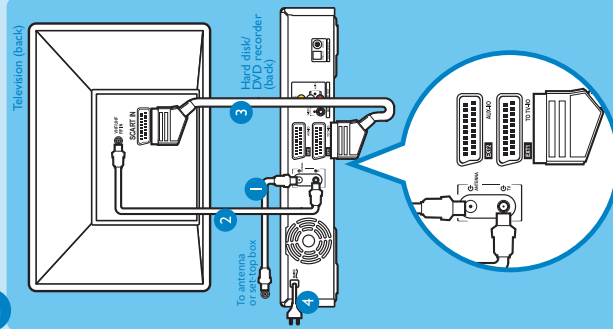
If you have a VCR, follow the instructions for 'Connection with VCR or similar device', if you don't have a VCR follow the instructions for 'Connection without VCR'.

Connection without VCR

A Before connecting

Your TV should be connected to the cable box/set-top box, satellite receiver or aerial, unplug the antenna cable from the TV.

B Connecting



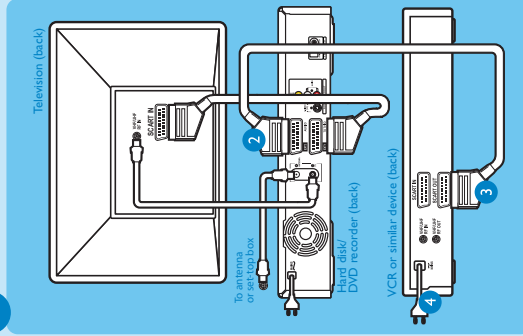
- 1 Connect the antenna cable (plugged out from the VCR or TV) to the ANTENNA socket at the rear of the recorder.
- 2 Connect the supplied RF coaxial cable into the TV socket at the rear of the recorder and into the Antenna In socket of the TV.
- 3 Connect the SCART cable to the SCART IN socket of the TV and to the EXTI socket at rear of the recorder.
- 4 Plug in the power cable from the recorder to an AC power outlet.

Connection with VCR or similar device

A Before connecting

Your new Philips hard disk/DVD recorder can replace the VCR for all your recording needs, just unplug all the connections from your VCR.

B Connecting



- 1 Follow steps 1 to 4 of 'Connecting' under 'Connection without VCR' to connect the recorder before you proceed to step 2 below.
- 2 Connect another SCART cable (not supplied) into the EXT2 AUX I/O SCART socket at the rear of the recorder.
- 3 Connect the other end into the SCART OUT socket at the rear of your VCR.
- 4 Plug in the power cable from your VCR to an AC power outlet.

Note In this setup the VCR cannot record TV programmes.

2 Set Up

A Inserting batteries



Note where the positive and negative ends go.

B Finding the viewing channel

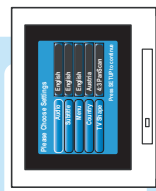


- 1 Press **STANDBY-ON** on the recorder.

- 2 Switch on the TV.

Tip If connected to your VCR, make sure the VCR is switched off or in standby mode before proceeding.

- 3 Press '0' on the TV's remote control, then press the Channel Down button repeatedly until you see the General Setup page. This is the correct viewing channel for the recorder.



Tip You may press the AV or SELECT button on the TV's remote control (if available) to select the correct viewing channel. See your TV's user manual.

C Conduct installation

- 1 Select your Audio Language, Subtitle Language, Menu Language, Country and TV Steps.

Tip Use the recorder's remote control to make your choice.

- 2 Press **SETUP** to save and you are now prompted to connect the antenna.

- 3 Activate automatic Channel Search.

Tip If no channels were found, check the antenna connection and refer to user manual to search again once installation is done.

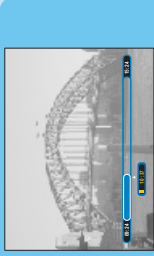
- 4 Check Date and Time.

- 5 Press **SETUP** to finish installation.

3 Enjoy

Pause Live TV

Sometimes you might be interrupted while watching your favourite programme. Now you can PAUSE it, as if you were in control of the broadcast.

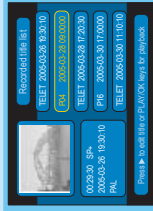


- 1 Press **PAUSE** while watching any live TV programme to suspend it.
- 2 Press **PLAY** to continue.

Tip When the recorder is switched on, the programme you are watching is temporarily recorded. In Pause Live TV the recorder replays the recorded footage, which will be erased when the recorder is switched to standby.

- 3 Press **TUNER** to go back to live broadcast.

Playback from hard disk



- 1 Press **HDD** to see the titles on hard disk.
- 2 Press **UP** or **DOWN** to select a title.
- 3 Press **PLAY** on the title you want.

Record



- 1 Press **REC** to record.
- 2 Key in the amount of time to record or press **REC** again for a 30 minutes recording.
- 3 Press **STOP** to stop the recording.

Tip Every time you press **REC** an additional 30 minutes is added to the recording time.

4. Mechanical Instructions

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

4.1 Dismantling of the DVD Tray cover

- 1) Insert a screw-driver into the slot provided at the bottom of the set and push in the direction as shown in picture 4-1 to unlock before sliding the Tray cover assembly 910 out.

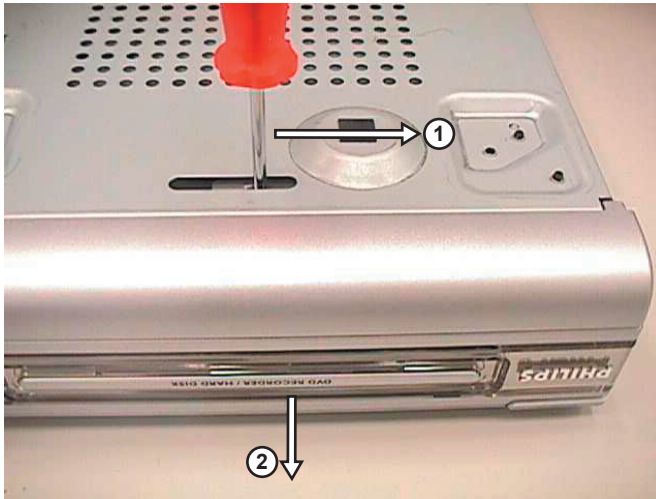


Figure 4-1

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

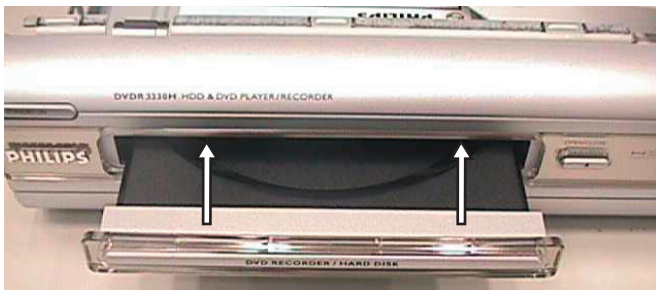


Figure 4-2

4.2 Dismantling of the Front Panel assembly

- 1) Remove 7 screws 220+240 to loosen Top cover 196.
- 2) Remove the DVD Tray cover as given in step 4-1.
- 3) Loosen the Digital Board 1001 & HDD 1007+264 as given in step 4-3.
- 4) Loosen 3 screws and 2 catches as shown in Figure 4-3 to separate the Front panel assembly from the Frame assembly 920.

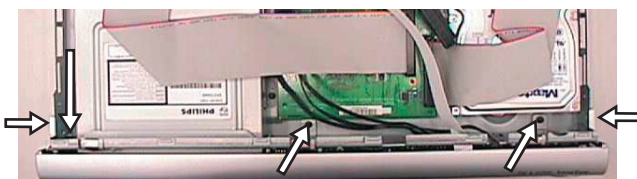


Figure 4-3

- 5) Remove 6 screws to loosen the Front plate 184 to reach the Front board service position (see Figure 4-4).

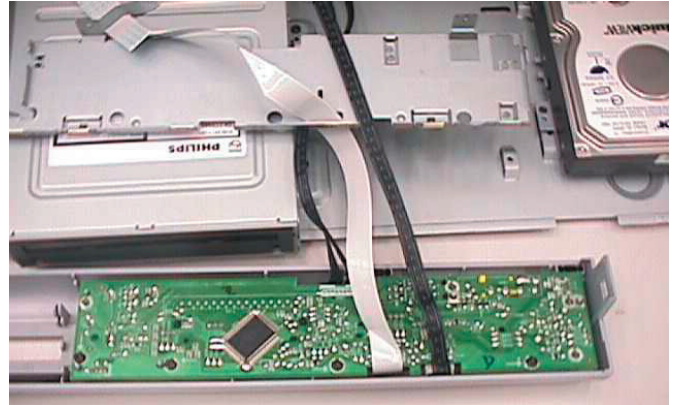


Figure 4-4: Front Board Service position

4.3 Dismantling of the Digital Board / HDD

- 1) Remove 4 screws to loosen the Digital Board 1001 as shown in Figure 4-5.

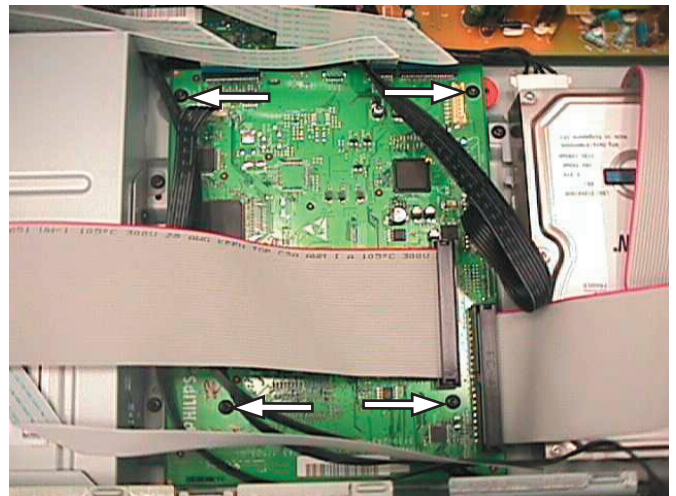


Figure 4-5

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

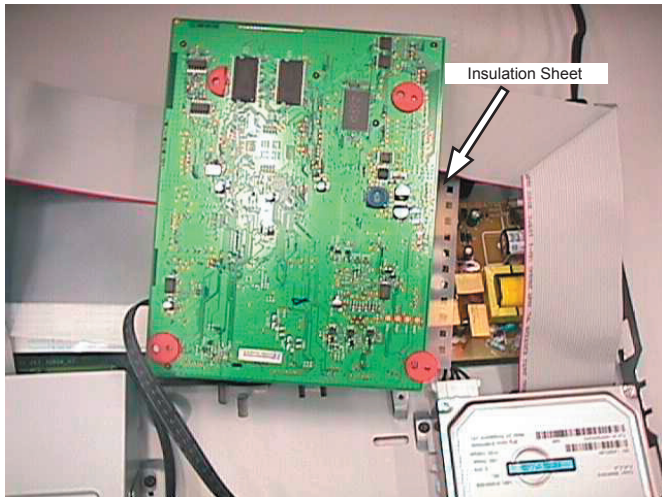


Figure 4-6: Digital Board Service Position

- 3) Remove 4 screws to loosen the HDD assembly 1007 + 264 as shown in Figure 4-7.
- 4) Remove 4 screws 272 to separate the Bracket HDD from the HDD.

Note: Screws 272 are special type of screws that must be replaced only with those specified in the Service Parts list on Chapter 10

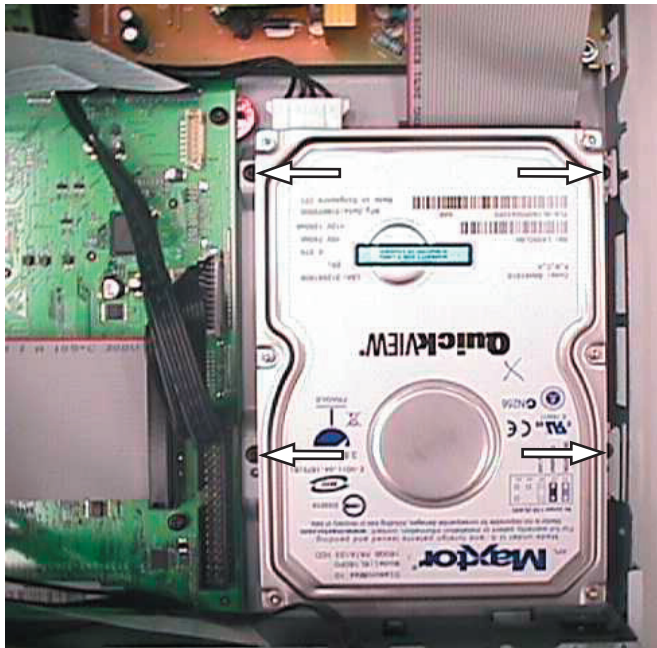


Figure 4-7

4.4 Dismantling of the PSU Board

- 1) Remove 4 screws to loosen the PSU Board 1006 as shown in Figure 4-8.

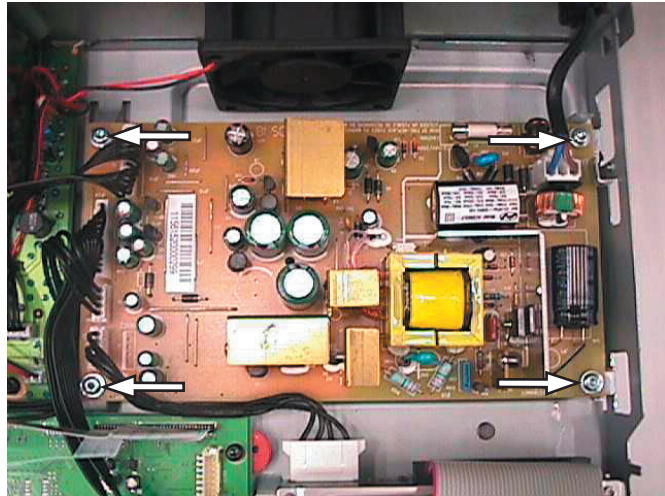


Figure 4-8

- 2) Service position for PSU Board is given in Figure 4-9.

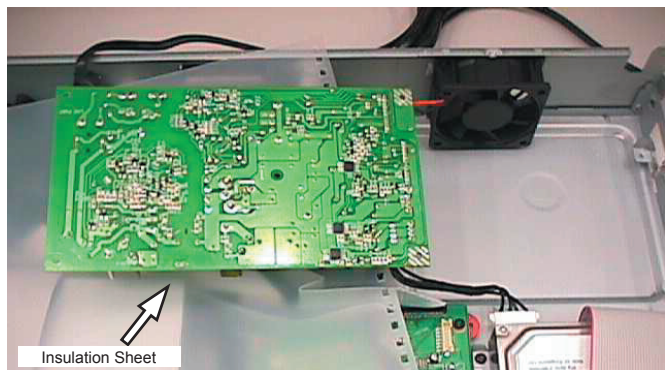


Figure 4-9: PSU Board Service Position

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

- 1) Remove 4 screws to loosen the Basic Engine assembly 1005+258+902 as shown in Figure 4-10.

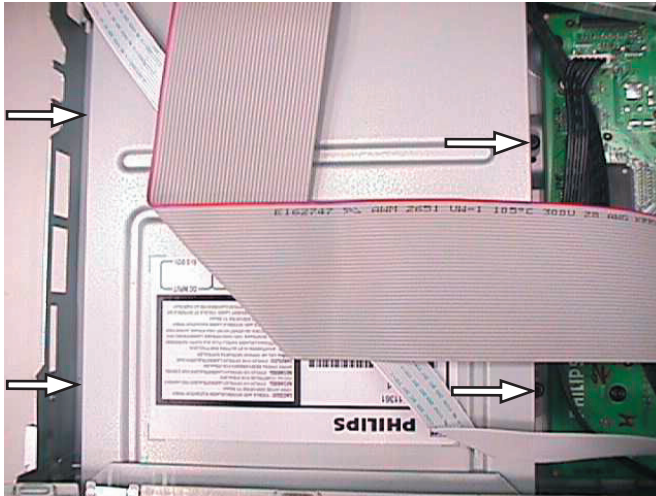


Figure 4-10

- 2) Remove 2 screws to loosen the Bracket Loader 258 and uncatch the Dust cover assembly 902.
- 3) Remove 4 screws to loosen the Cover of the Basic Engine to reach Service position Figure 4-11.

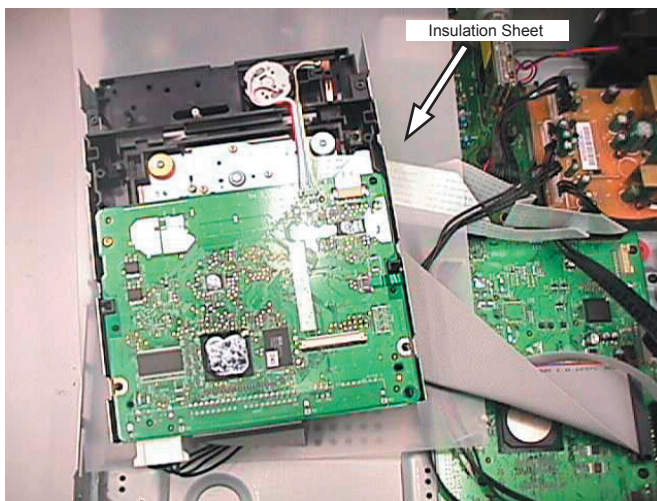


Figure 4-11: Basic Engine Service Position

4.6 Dismantling of the Analog Board

- 1) Remove the Basic Engine assembly as given in step 4.5.
- 2) Remove 7 screws on the Rear panel 228 as shown in Figure 4-12.

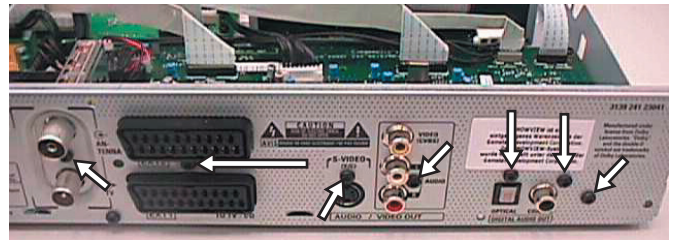


Figure 4-12

- 3) Remove 3 screws and 1 catch mounting the Analog Board to the Frame assembly 920 as given in Figure 4-13

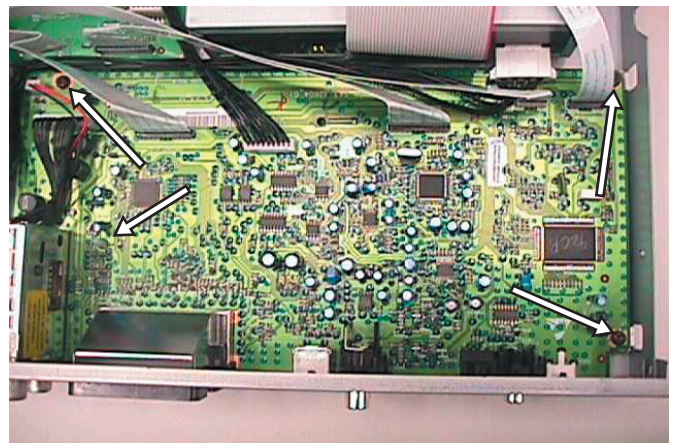


Figure 4-13

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

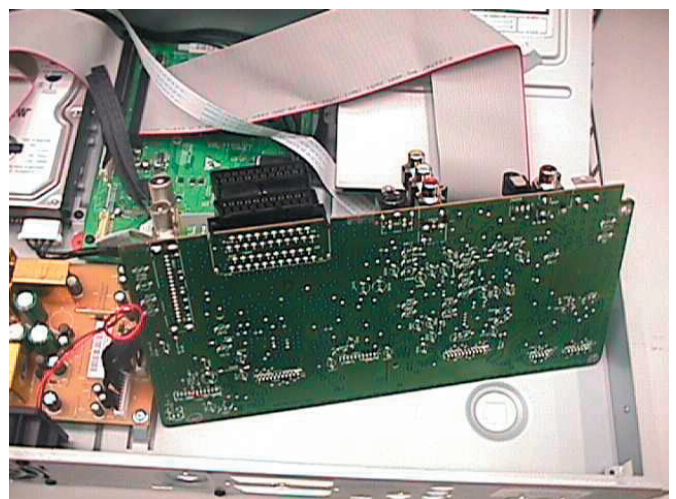


Figure 4-14: Analog Board Service Position

5. Firmware Upgrading & Diagnostic Software

5.1 Firmware Upgrading

A. Preparation to upgrade firmware:

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

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

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

B. Procedure to apply the firmware upgrade:

1. Hold the Record + Next buttons down and Power up the set to go into "Forced Download". The tray door opens automatically and the display shows:

DOWNLOAD ->.....PUT DISC

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

READING -> DOWNLOAD ->.....

The whole process takes less than 10 minutes

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

4. When the upgrade is completed the tray opens automatically and the set will display:

REMOVE

5. Remove the Upgrade CDROM and close the tray. The display shows:

DONE

6. The set switches automatically into Standby mode. Power off the set to complete the download process.

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

1. Power up the set.
2. Press <System menu> button on the Remote control and select {Feature} option.
3. Press <Right> button to select {Access Control} option.
4. Press <1> <5> <9> <6> buttons in sequence.
5. The TV connected to the set will display:

**AB 1.18.19 DB F05_4/53122
BE 43.2.14 SV 11203 DV 1234567890
BASE FF7_a 122_16_20050810 dev sxc 3300h rad
SpectraCORE 3300v1.13**

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:

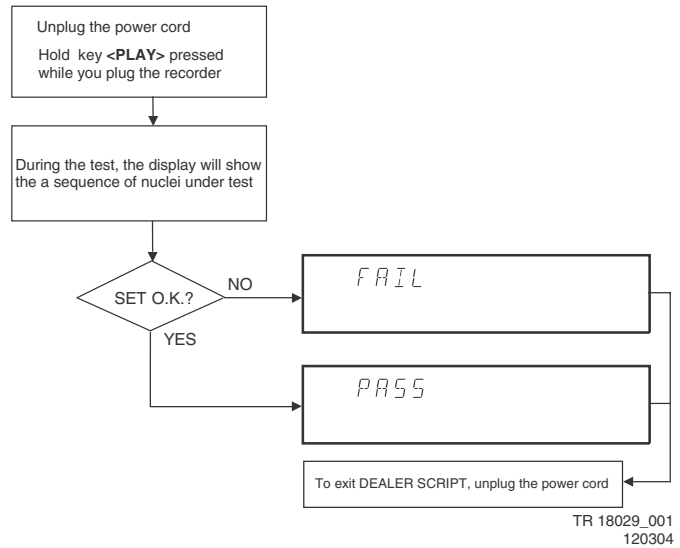
1. End user/Dealer script interface
2. Command Interface

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



TR 18029_001
120304

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.

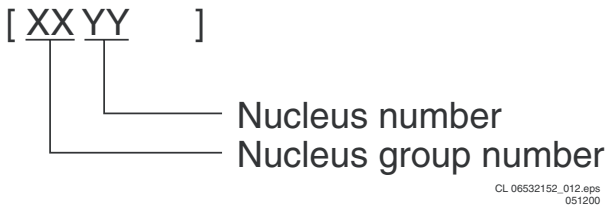


Figure 5-3

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 DVDR3300H, DVDR3330H and DVDR5330H Ranges

5.4.2 Error Handling

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

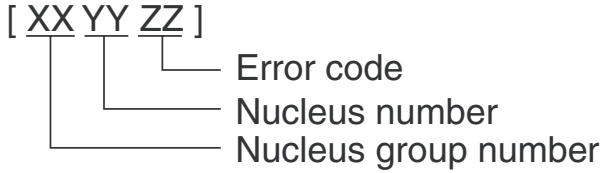


Figure 5-4

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

5.4.3 Command Mode Interface

Set-Up Physical Interface Components

Hardware required:

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

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

Code number of PC interface cable: 3122 785 90017

Activation of Diagnostic Software

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

Welcome screen D&S program

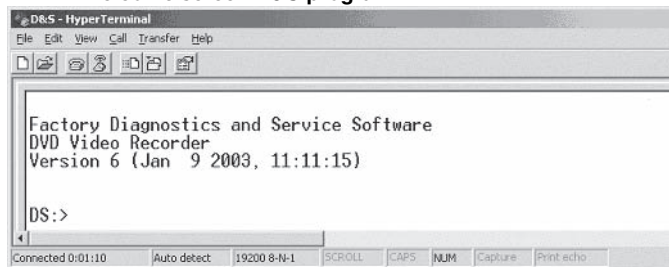


Figure 5-5

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

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

Error messages D&S program

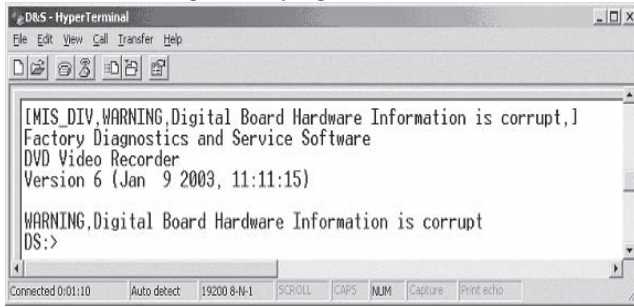


Figure 5-6a

Error messages D&S program

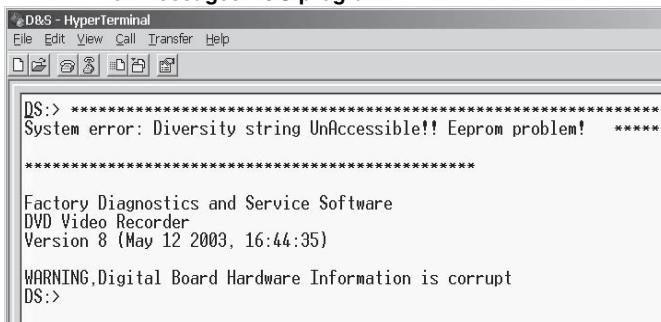


Figure 5-6b

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

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

Nucleus 1226 execution with string

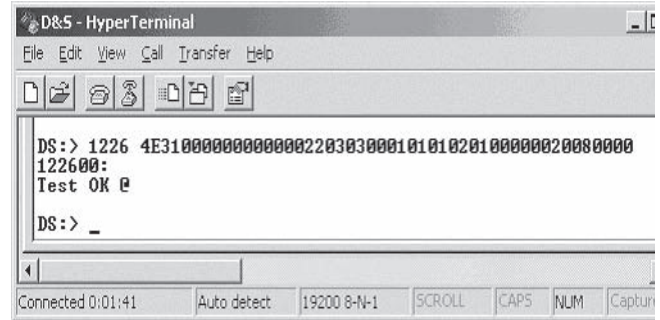


Figure 5-7

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

Nucleus 1228 info example

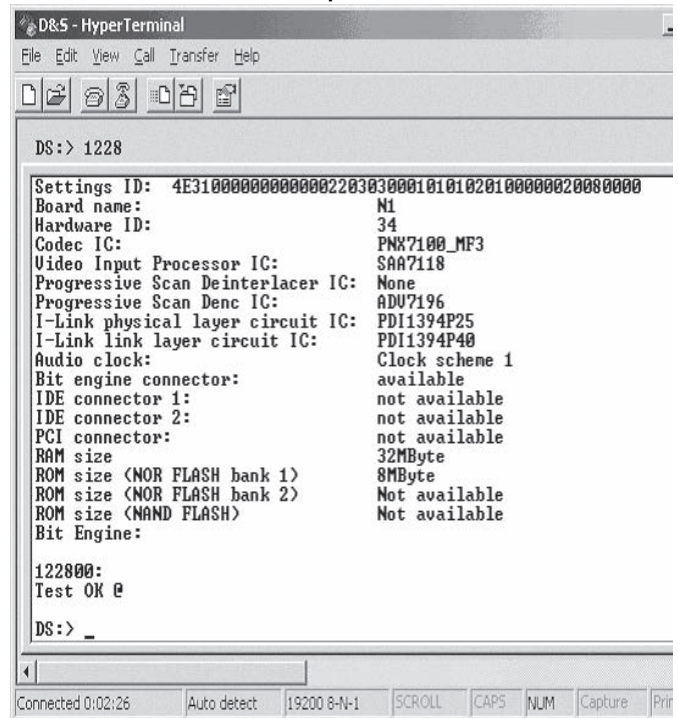


Figure 5-8

- Exit the 'Terminal' program.
- 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	<ul style="list-style-type: none"> - 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	<pre>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 @</pre>	

Nucleus Name	DS_CHR_TestImageOn	
Nucleus Number	101	
Description	<p>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.</p> <p>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.</p>	
Technical	<ul style="list-style-type: none"> - 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.	

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

<p>Nucleus Name</p>	<p>DS_CHR_TestImageOff</p>	
<p>Nucleus Number</p>	<p>102</p>	
<p>Description</p>	<p>Switches the test-image off.</p>	
<p>Technical</p>	<p>- Stop the DENC module.</p>	
<p>Execution Time</p>	<p>Less than 1 second.</p>	
<p>User Input</p>	<p>None</p>	
<p>Error</p>	<p>Number</p>	<p>Description</p>
	10200	Stopping the test image generation succeeded
	10201	The Codec DENC-module failed.
<p>Example</p>	<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	<ul style="list-style-type: none"> - 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	<pre>DS:> 103 010300: Test OK @</pre>	

Nucleus Name	DS_CHR_SineOff	
Nucleus Number	104	
Description	Stop generating the audio sine signal	
Technical	<ul style="list-style-type: none"> - 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	<pre>DS:> 104 010400: Test OK @</pre>	

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	<ul style="list-style-type: none"> - 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	<pre>DS:> 105 010500: Test OK @</pre>	

Nucleus Name	DS_CHR_MuteOn	
Nucleus Number	106	
Description	Mute the audio outputs of the digital board	
Technical	<ul style="list-style-type: none"> - 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	<pre>DS:> 106 010600: Test OK @ DS:> 106 PIO 010600: Test OK @</pre>	

Nucleus Name	DS_CHR_MuteOff	
Nucleus Number	107	
Description	De-mute the audio outputs of the digital board	
Technical	<ul style="list-style-type: none"> - 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	<pre>DS:> 107 010700: Test OK @ DS:> 107 PIO 010700: Test OK @</pre>	

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	<ul style="list-style-type: none"> - 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	<pre>DS:> 108 010800: Test OK @</pre>	

Nucleus Name	DS_CHR_DvLedOff	
Nucleus Number	109	
Description	Switch off the DV-LED on the digital board	
Technical	<ul style="list-style-type: none"> - 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	<pre>DS:> 109 010900: Test OK @</pre>	

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	<pre>DS:> 110 011000: Test OK @</pre>	

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	<pre>DS:> 111 011100: Test OK @</pre>	

Nucleus Name	DS_CHR_Peek	
Nucleus Number	112	
Description	Peek a value on a specified address	
Technical	<ul style="list-style-type: none"> - 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	<pre>DS:> 112 0xa0700000 011200: Value read = 0x000001BD Test OK @</pre>	

Nucleus Name	DS_CHR_Poke	
Nucleus Number	113	
Description	Poke a value on a specified address	
Technical	<ul style="list-style-type: none"> - 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	<pre>DS:> 113 0xa0700000 0xaabbccdd 011300: Test OK @</pre>	

Nucleus Name	DS_CHR_INT_PICInterrupts	
Nucleus Number	114	
Description	Test all interrupts of the priority interrupt controller	
Technical	<ul style="list-style-type: none"> - 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	<pre>DS:> 114 011400: Test OK @</pre>	

Nucleus Name	DS_CHR_DMA_TestDMA	
Nucleus Number	115	
Description	Test the memory to memory DMA transfer	
Technical	<ul style="list-style-type: none"> - 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	<pre>DS:> 115 011500: Test OK @</pre>	

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	<ul style="list-style-type: none"> - 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	<pre>DS:> 200 020000: Test OK @</pre>	

Nucleus Name	DS_BROM_WriteRead	
Nucleus Number	201	
Description	Check whether the Boot EEPROM can be written to and read from	
Technical	<ul style="list-style-type: none"> - 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	<pre>DS:> 201 020100: Test OK @</pre>	

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	<ul style="list-style-type: none"> - 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	<pre>DS:> 300 030000: Test OK @</pre>	

Nucleus Name	DS_NVRAM_WriteRead	
Nucleus Number	301	
Description	Check whether the EEPROM can be written to and read from	
Technical	<ul style="list-style-type: none"> - 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	<pre>DS:> 301 030100: Test OK @</pre>	

Nucleus Name	DS_NVRAM_Clear	
Nucleus Number	302	
Description	Make the EEPROM empty, containing all zeroes.	
Technical	<ul style="list-style-type: none"> - 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 Digital Video 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	<pre>DS:> 302 030200: Test OK @</pre>	

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	<ul style="list-style-type: none"> - 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	<ol style="list-style-type: none"> 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	<pre>DS:> 303 DIAGNOSTICS 5 1 0x5a 030300: Section is modified successfully Test OK @</pre>	

Nucleus Name	DS_NVRAM_Read	
Nucleus Number	304	
Description	Read out one or more locations in the NVRAM	
Technical	<ul style="list-style-type: none"> - 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	<ol style="list-style-type: none"> 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	<pre>304 DIAGNOSTICS 0 6 030400: Value read = 0x00 0x00 0x00 0x00 0x00 0x5A Test OK @</pre>	

SDRAM (SDRAM)

Nucleus Name	DS_SDRAM_WriteRead	
Nucleus Number	400	
Description	Check all data lines, address lines and memory locations of the SDRAM	
Technical	<ul style="list-style-type: none"> - 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	<pre>DS:> 400 040000: Test OK @</pre>	

Nucleus Name	DS_SDRAM_WriteReadFast	
Nucleus Number	401	
Description	Check all data lines and address lines of the SDRAM	
Technical	<ul style="list-style-type: none"> - 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	<pre>DS:> 401 040100: Test OK @</pre>	

Nucleus Name	DS_SDRAM_Write	
Nucleus Number	402	
Description	Write to a specific un-cached memory address	
Technical	<ul style="list-style-type: none"> - 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	<ol style="list-style-type: none"> 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	<pre>DS:> 402 0xa1000010 0xad112222 040200: Test OK @</pre>	

Nucleus Name	DS_SDRAM_Read	
Nucleus Number	403	
Description	Read from a specific un-cached memory address	
Technical	<ul style="list-style-type: none"> - 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	<pre>DS:> 403 0xa1000010 040300: Value read = 0xAD112222 Test OK @</pre>	

Nucleus Name	DS_SDRAM_DmaWriteRead	
Nucleus Number	404	
Description	Write a pattern to the entire SDRAM using DMA and check the data	
Technical	<ul style="list-style-type: none"> - 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	<pre>DS:> 404 040400: Test OK @</pre>	

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	<ul style="list-style-type: none"> - 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	<pre>DS:> 500 050000: Found FLASH memory: NOR AMD 29DL640G 8MB,NOR AMD 29DL640G 8MB Test OK @</pre>	

Nucleus Name	DS_FLASH_WriteRead	
Nucleus Number	501	
Description	Check whether the FLASH can be written to and read from	
Technical	<ul style="list-style-type: none"> - 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	<pre>DS:> 501 050100: Test OK @</pre>	

Nucleus Name	DS_FLASH_Read	
Nucleus Number	502	
Description	Read from a specific memory address in FLASH	
Technical	<ul style="list-style-type: none"> - 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	<pre>DS:> 502 0xb8000000 050200: Value read = 0x3C08A000 Test OK @</pre>	

Nucleus Name	DS_FLASH_ChecksumProgram	
Nucleus Number	503	
Description	Check the checksum of the application partitions by recalculating and comparing partition checksums	
Technical	<ul style="list-style-type: none"> - 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	<pre>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 @</pre>	

Nucleus Name	DS_FLASH_CalculateChecksum	
Nucleus Number	504	
Description	Calculate the checksum over all memory addresses. Used to check entire FLASH contents	
Technical	<ul style="list-style-type: none"> - 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	<pre>DS:> 504 050400: The Checksum = 0xBABE30A4 Test OK @</pre>	

Nucleus Name	DS_FLASH_CalculateChecksumFast	
Nucleus Number	505	
Description	Calculate a checksum over a selected number of address locations	
Technical	<ul style="list-style-type: none"> - 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	<pre>DS:> 505 050500: The Checksum = 0xBABEB064 Test OK @</pre>	

Video Input Processor (VIP)

Nucleus Name	DS_VIP_DevTypeGet	
Nucleus Number	600	
Description	Get the device (revision) type information of the VIP IC	
Technical	<ul style="list-style-type: none"> - 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	<pre>DS:> 600 060000: Found SAA7118 Test OK @</pre>	

Nucleus Name	DS_VIP_Communication	
Nucleus Number	601	
Description	Check the communication between the IIC controller of the Codec and the VIP IC	
Technical	<ul style="list-style-type: none"> - 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	<pre>DS:> 601 060100: Test OK @</pre>	

Nucleus Name	DS_VIP_ClockOutputOn	
Nucleus Number	602	
Description	Switch the clock output on	
Technical	<ul style="list-style-type: none"> - 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	<pre>DS:> 602 060200: Test OK @</pre>	

Nucleus Name	DS_VIP_ClockOutputOff	
Nucleus Number	603	
Description	Switch the clock output off	
Technical	<ul style="list-style-type: none"> - 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	<pre>DS:> 603 060300: Test OK @</pre>	

Nucleus Name	DS_VIP_SelectInput																																																																																						
Nucleus Number	604																																																																																						
Description	Select an input video path to be switched to the analogue output pin (AOUT) of the VIP																																																																																						
Technical	<ul style="list-style-type: none"> - Check the user input - Initialise IIC - Read out the VIP id - Write the set of registers required for the input specified 																																																																																						
Execution Time	Less than 1 second																																																																																						
User Input	<p>The input to select, see table below.</p> <p>Available channels for input of the 7118 and their description:</p> <table border="1"> <thead> <tr> <th>Channel number</th> <th>Description</th> </tr> </thead> <tbody> <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> </tbody> </table> <p>Available channels for input of the 7115 and their description:</p> <table border="1"> <thead> <tr> <th>Channel number</th> <th>Description</th> </tr> </thead> <tbody> <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> </tbody> </table> <p>Available channels for input of the 7119 and their description:</p> <table border="1"> <thead> <tr> <th>Channel number</th> <th>Description</th> </tr> </thead> <tbody> <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> </tbody> </table> <p>Available channels for input of the 7173 and their description:</p> <table border="1"> <thead> <tr> <th>Channel number</th> <th>Description</th> </tr> </thead> <tbody> <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> </tbody> </table>	Channel number	Description	1	CVBS_Y_IN_A	2	CVBS_OUT_B	3	CVBS_Y_IN_B	4	CVBS_Y_IN_C	6	C_IN	8	G_IN	9	Y_IN	13	B_IN	14	U_IN	18	R_IN	19	V_IN	Channel number	Description	1	CVBS_Y_IN_B	2	CVBS_OUT_B_VIP	4	C_IN_VIP	7	CVBS_Y_IN_B	Channel number	Description	1	Y / CVBS	3	CVBS	4	Y3	6	C / CVBS	8	G	9	Y	12	Y2	13	B	14	U	17	C	18	R	19	V	Channel number	Description	1	CVBS_TUNER_IN	2	CVBS_REAR_IN	3	CVBS_FRONT_IN	4	C_REAR_IN	5	Y_REAR_IN	6	Y_FRONT_IN	7	C_FRONT_IN	8	AL_REAR_IN	9	AL_FRONT_IN	10	AR_FRONT_IN	11	AR_REAR_IN	12	SIF_TUNER_IN
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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	<pre>DS:> 604 1 060400: Test OK @</pre>	

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	<ul style="list-style-type: none"> - 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	<pre>DS:> 700 070000: Device type of the link layer IC: ffc00301 Test OK @</pre>	

Nucleus Name	DS_DVIO_PhyDevTypeGet	
Nucleus Number	701	
Description	Get the device (revision) type information of the 1394 Physical layer IC	
Technical	<ul style="list-style-type: none"> - 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	<pre>DS:> 701 070100: Physical layer IC: VendorID: 0x006037, ProductID: 0x412801 Test OK @</pre>	

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	<ul style="list-style-type: none"> - 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	<pre>DS:> 702 070200: Test OK @</pre>	

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	<ul style="list-style-type: none"> - 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	<pre>DS:> 703 070300: Test OK @</pre>	

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	<ul style="list-style-type: none"> - 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	<pre>DS:> 704 070400: Test OK @</pre>	

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	<ul style="list-style-type: none"> - 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	<pre>DS:> 705 070500: Test OK @</pre>	

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	<ul style="list-style-type: none"> - 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	<pre>DS:> 706 070600: Test OK @</pre>	

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	<ul style="list-style-type: none"> - 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	<pre>DS:> 800 080000: Chip name : 2300 Chip version : 1 Test OK @</pre>	
	<pre>DS:> 800 080000: Chip name : ADV7196 Test OK @</pre>	
	<pre>DS:> 800 080000: Chip name : ADV7302 Test OK @</pre>	

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	<ul style="list-style-type: none"> - 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	<pre>DS:> 801 080100: Test OK @</pre>	

Nucleus Name	DS_PSCAN_TestImageOn	
Nucleus Number	802	
Description	Generate the test images that are present on the progressive scan IC.	
Technical	<ul style="list-style-type: none"> - 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	<p>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.</p>	
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	<pre>DS:> 802 HATCH 080200: Test OK @</pre>	

Nucleus Name	DS_PSCAN_TestImageOff	
Nucleus Number	803	
Description	Switch off the generated test image	
Technical	<ul style="list-style-type: none"> - 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	<pre>DS:> 803 080300: Test OK @</pre>	

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	<ul style="list-style-type: none"> - 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	<pre>DS:> 804 yellow 080400: Test OK @ DS:> 804 0x6a 0xde 0xca 080400: Test OK @</pre>	

Nucleus Name	DS_PSCAN_TestImageColourSettingsGet	
Nucleus Number	805	
Description	Get the colour settings of the hatch- or the frame- field.	
Technical	<ul style="list-style-type: none"> - 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	<pre>DS:> 805 080500: Colour Y Cr Cb values: 0xD2 0x92 0x10 Test OK @</pre>	

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	<ul style="list-style-type: none"> - 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	<pre>DS:> 806 080600: Test OK @</pre>	

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 <i>echo</i> command	
Technical	<ul style="list-style-type: none"> - 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 <i>echo</i> 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	<ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> - 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	<pre>DS:> 902 090200: Self-test result byte : 00000000 Self-test result byte : 00000000 Self-test result byte : 00000000 Test OK @</pre>	

Nucleus Name	DS_BE_VersionGet	
Nucleus Number	903	
Description	Get the version of the basic engine and that of the optical unit	
Technical	<ul style="list-style-type: none"> - 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)	<pre>DS:> 903 090300: BE version = 20.09.18 Optical unit version = 3C.00.09.41.08 Test OK @</pre>	
Example (AV3)	<pre>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 @</pre>	

Nucleus Name	DS_BE_TrayOut	
Nucleus Number	904	
Description	Open the tray of the basic engine	
Technical	<ul style="list-style-type: none"> - 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	<pre>DS:> 904 090400: Test OK @</pre>	

Nucleus Name	DS_BE_TrayIn	
Nucleus Number	905	
Description	Close the tray of the basic engine	
Technical	<ul style="list-style-type: none"> - 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	<pre>DS:> 905 090500: Test OK @</pre>	

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	<ul style="list-style-type: none"> - 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	<pre>DS:> 906 090600: Testing on sector 0x5dbe0: OK Test OK @</pre>	

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	<ul style="list-style-type: none"> - 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	<pre>DS:> 907 090700: Testing on sector 0x36210: OK Test OK @</pre>	

Nucleus Name	DS_BE_StatisticalInformationGet	
Nucleus Number	908	
Description	Retrieve the statistical information from the basic engine	
Technical	<ul style="list-style-type: none"> - 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)	<pre>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 @</pre>	
Example (AV3)	<pre>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 @</pre>	

Nucleus Name	DS_BE_StatisticalInformationReSet	
Nucleus Number	909	
Description	Reset the statistical information in the basic engine	
Technical	<ul style="list-style-type: none"> - Check if an AV2 or AV3 is connected - In case of an AV2 <ul style="list-style-type: none"> - 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	<pre>DS:> 909 090900: Test OK @</pre>	

Nucleus Name	DS_BE_ErrorLogGet	
Nucleus Number	910	
Description	Get the error log from the basic engine	
Technical	<ul style="list-style-type: none"> - 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)	<pre>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 @</pre>	
Example (AV3)	<pre>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 @</pre>	

Nucleus Name	DS_BE_ErrorLogReset	
Nucleus Number	911	
Description	Reset the error log in the basic engine	
Technical	<ul style="list-style-type: none"> - Check if an AV2 or AV3 is connected - In case of an AV2 <ul style="list-style-type: none"> - 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
	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	<pre>DS:> 911 091100: Test OK @</pre>	

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	<ul style="list-style-type: none"> - Check if an AV2 or AV3 is connected - Send the TRAY_IN command - Send the READ_TOC command - In case of an AV2 <ul style="list-style-type: none"> - 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)	<pre>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 @</pre>	
Example (AV3)	<pre>DS:> 912 091200: Average Jitter, Bler C1, Bler C2: (92,4,254) Test OK @</pre>	

Nucleus Name	DS_BE_FocusOn	
Nucleus Number	913	
Description	Put the laser of the BE into focus	
Technical	<ul style="list-style-type: none"> - 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	<pre>DS:> 913 091300: Test OK @</pre>	

Nucleus Name	DS_BE_FocusOff	
Nucleus Number	914	
Description	Turn off putting the laser of the BE into focus	
Technical	<ul style="list-style-type: none"> - 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	<pre>DS:> 914 091400: Test OK @</pre>	

Nucleus Name	DS_BE_MotorOn	
Nucleus Number	915	
Description	Turn on the turntable motor	
Technical	<ul style="list-style-type: none"> - 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	<pre>DS:> 915 091500: Test OK @</pre>	

Nucleus Name	DS_BE_MotorOff	
Nucleus Number	916	
Description	Turn off the turntable motor	
Technical	<ul style="list-style-type: none"> - 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	<pre>DS:> 916 091600: Test OK @</pre>	

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	<ul style="list-style-type: none"> - Check if an AV2 or AV3 is connected - In case of an AV2 <ul style="list-style-type: none"> - 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)	<pre>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 @</pre>	
Example (AV3)	<pre>DS:> 920 092010: Tilt function is not supported by the engine Error @</pre>	

Nucleus Name	DS_BE_CheckDisc	
Nucleus Number	921	
Description	Check whether there is a disc inside the BE	
Technical	<ul style="list-style-type: none"> - 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	<pre>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 @</pre>	

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	<ul style="list-style-type: none"> - 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	<pre>DS:> 922 092200: Test OK @</pre>	

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	<ul style="list-style-type: none"> - 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	<pre>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 @</pre>	

Nucleus Name	DS_BE_DiscErase	
Nucleus Number	925	
Description	Perform a DC-erase on a DVD+RW disc.	
Technical	<ul style="list-style-type: none"> - Check if an AV2 or AV3 is connected - In case of an AV2 <ul style="list-style-type: none"> - 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)	<pre>DS:> 925 The entirely disc will be erased. Are you sure you want this?[y/n] 092500: Test OK @</pre>	
Example (AV3)	<pre>092510: This nucleus is not supported by the engine Error @</pre>	

Nucleus Name	DS_BE_RegionCodeSet	
Nucleus Number	928	
Description	Set the region code in the AV3.	
Technical	<ul style="list-style-type: none"> - 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 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)	<pre>DS:> 928 092810: This nucleus is not supported by the engine Error @</pre>	
Example (AV2)	<pre>DS:> 928 1 092800: Test OK @</pre>	

Nucleus Name	DS_BE_RegionCodeGet	
Nucleus Number	929	
Description	Read the region code from the AV3.	
Technical	<ul style="list-style-type: none"> - 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)	<pre>DS:> 929 092906: This nucleus is not supported by the engine Error @</pre>	
Example (AV3)	<pre>DS:> 929 092900: DVD region 1 Test OK @</pre>	

Nucleus Name	DS_BE_RegionCounterReset	
Nucleus Number	930	
Description	Reset the region counter in the AV3.	
Technical	<ul style="list-style-type: none"> - 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)	<pre>DS:> 930 093006: This nucleus is not supported by the engine Error @</pre>	
Example (AV3)	<pre>DS:> 930 093000: Test OK @</pre>	

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	<ul style="list-style-type: none"> - 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)	<pre>DS:> 931 093107: This nucleus is not supported by the engine Error @</pre>	
Example (AV3)	<pre>DS:> 931 093100: Test OK @</pre>	

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	<ul style="list-style-type: none"> - 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	<pre>DS:> 932 093200: Dual Layer DVD+R test on LBA 0x750 and 0x1fdf60 OK Test OK @</pre>	

System (SYS)

Nucleus Name	DS_SYS_HardwareVersionGet	
Nucleus Number	1200	
Description	Get the hardware version and type of the digital board	
Technical	<ul style="list-style-type: none"> - 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	<pre>DS:> 1200 120000: Hardware ID = 0x29 Test OK @</pre>	

Nucleus Name	DS_SYS_SoftwareVersionBootGet	
Nucleus Number	1201	
Description	Get the version of the boot software on the digital board	
Technical	<ul style="list-style-type: none"> - 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	<pre>DS:> 1201 120100: Software Boot Version = 0331 Test OK @</pre>	

Nucleus Name	DS_SYS_SoftwareVersionDownloadGet	
Nucleus Number	1202	
Description	Get the version of the download software on the digital board	
Technical	<ul style="list-style-type: none"> - 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	<pre>DS:> 1202 120200: Software Download Version = 0001 Test OK @</pre>	

Nucleus Name	DS_SYS_SoftwareVersionApplGet	
Nucleus Number	1203	
Description	Get the version of the application software on the digital board	
Technical	<ul style="list-style-type: none"> - 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	<pre>DS:> 1203 120300: Software Application Version = 0001 Test OK @</pre>	

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	<pre>DS:> 1204 120400: Software Diagnostics Version = 0001 Test OK @</pre>	

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	<ul style="list-style-type: none"> - 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	<p>Choose one of the following parameters for the nucleus:</p> <ol style="list-style-type: none"> 1. Upload the contents of the NVRAM of the digital board 2. Upload the contents of the NVRAM of the analogue board <p>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.</p>	
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	<pre>DS:> 1205 1 120500: Test OK @</pre>	

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	<ul style="list-style-type: none"> - 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: <ol style="list-style-type: none"> 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	<pre>DS:> 1206 1 120600: Test OK @</pre>	

Nucleus Name	DS_SYS_DvIdNumberSet	
Nucleus Number	1207	
Description	Set the IEEE 1394 unique ID	
Technical	<ul style="list-style-type: none"> - 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	<pre>DS:> 1207 1234567890 120700: Test OK @</pre>	

Nucleus Name	DS_SYS_DvIdNumberGet	
Nucleus Number	1208	
Description	Get the IEEE1394 unique ID	
Technical	<ul style="list-style-type: none"> - 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	<pre>DS:> 1208 120800: The DvIdNumber is: 1234567890 Test OK @</pre>	

Nucleus Name	DS_SYS_licWrite	
Nucleus Number	1209	
Description	Perform an IIC write action on the digital board	
Technical	<ul style="list-style-type: none"> - 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><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	<pre>DS:> 1209 0 0xa0 1 0x6 120900: 1 Bytes written Test OK @</pre>	

Nucleus Name	DS_SYS_licRead	
Nucleus Number	1210	
Description	Perform an IIC read action on the digital board	
Technical	<ul style="list-style-type: none"> - 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	<pre>DS:> 1210 0 0xa0 0x20 Read : 0x0000: 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x0008: 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x0010: 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x0018: 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 121000: 0 0xa0 0x20 Test OK @</pre>	

Nucleus Name	DS_SYS_UartWrite	
Nucleus Number	1211	
Description	Perform an UART write action on the digital board on a specified UART	
Technical	<ul style="list-style-type: none"> - 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	<p>The user inputs the UART to write to, the number of bytes and the bytes to be written to the UART.</p> <p>1=UART port 1 : not used 2=UART port 2 : Bit Engine 3=UART port 3 : Analogue board</p> <p><UartNr><Number of bytes to write><d1><d2><..><dx></p>	
Error	Number	Description
	121100	Writing the bytes to the UART succeeded
	121101	The user provided wrong input
	121102	Writing to the UART failed
Example	<pre>DS:> 1211 2 2 0xd1 0x01 121100: Test OK @</pre>	

Nucleus Name	DS_SYS_UartRead	
Nucleus Number	1212	
Description	Perform an UART read action on the digital board on a specified UART	
Technical	<ul style="list-style-type: none"> - 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	<p>The user inputs the UART to read from.</p> <p>1=UART port 1 : not used 2=UART port 2 : Bit Engine 3=UART port 3 : Analogue board</p> <p><UartNr ></p>	
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	<pre>DS:> 1212 2 121200: The HEX value that was read is: 0x50 0xD1 0x00 Test OK @</pre>	

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	<ul style="list-style-type: none"> - 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 !	

<p>User Input</p>	<p><vipInput> <VideoOutput> <VideoStandard> 1. vipInput (see table below).</p> <p>GEN, OLAX, DXC, DTT specific</p> <table border="1"> <thead> <tr> <th>User input</th> <th>Video input</th> <th>Data path to VIP</th> </tr> </thead> <tbody> <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> </tbody> </table> <p>OLAL22LITE specific</p> <table border="1"> <thead> <tr> <th>User input</th> <th>Video input</th> <th>Data path to VIP</th> </tr> </thead> <tbody> <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> </tbody> </table> <p>OLAL22PREMIER specific</p> <table border="1"> <thead> <tr> <th>User input</th> <th>Video input</th> <th>Data path to VIP</th> </tr> </thead> <tbody> <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> </tbody> </table> <p>OLAL22MKII (mark II) specific</p> <table border="1"> <thead> <tr> <th>User input</th> <th>Video input</th> <th>Data path to VIP</th> </tr> </thead> <tbody> <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> </tbody> </table> <p>OLAL22VCRCOMBI specific: Same as Premier, except User input nr 4 is for tuner and VCR module</p> <p>2. VideoOutput (YUV, RGB). 3. VideoStandard (PAL, NTSC).</p>		User input	Video input	Data path to VIP	CVBS	RGB	CVBS from analogue board	YC	YC	YC from analogue board	YUV	CVBS	YUV from analogue board	RGB	CVBS	RGB from analogue board	10	XPORT	Digital video from DTT module	User input	Video input	Data path to VIP	R_CVBS	CVBS	Rear CVBS	F_CVBS	CVBS	Front CVBS	T_CVBS	CVBS	Tuner CVBS	R_YC	YC	Rear YC	F_YC	YC	Front YC	User input	Video input	Data path to VIP	1	RGB	SCART aux RGB in	2	YC	SCART aux YC in	3	CVBS	SCART aux CVBS	4	CVBS	Tuner	5	YC	Front YC	6	CVBS	Front CVBS	7	CVBS	SCART TV CVBS	8	YC	CE mode YC in	9	CVBS	CE mode CVBS in	User input	Video input	Data path to VIP	F_CVBS	CVBS	Front CVBS	T_CVBS	CVBS	Tuner CVBS	E1_CVBS	CVBS	SCART 1 CVBS in	E2_CVBS	CVBS	SCART 2 CVBS in	F_YC	YC	Front YC
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	121300	Video LoopthroughStart succeeded																																																																																				
	121301	User input is not valid.																																																																																				
	121302	Initialisation of the VIP failed.																																																																																				
	121303	Unable to stop the loop through before restarting.																																																																																				
	121304	Video Signal on the input is not a valid signal.																																																																																				
	121305	Initialisation of the VFE failed.																																																																																				
	121306	The digital board hardware information is corrupt																																																																																				
<p>Example</p>	<pre>DS:> 1213 CVBS RGB PAL 121300: Test OK @</pre>																																																																																					

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	<pre>DS:> 1214 121400: Test OK @</pre>	

Nucleus Name	DS_SYS_VideoLoop	
Nucleus Number	1215	
Description	<p>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.</p> <p>Note: Before executing this nucleus the user must route the video signal on the analog board with the proper nucleus.</p>	
Technical	<ul style="list-style-type: none"> - 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	

<p>User Input</p>	<p><vipinput> <video standard> 1 Vip input of the digital board:</p> <p>GEN, OLAX, DXC, DTT specific</p> <table border="1"> <thead> <tr> <th>User input</th> <th>Video input</th> <th>Data path to VIP</th> </tr> </thead> <tbody> <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> </tbody> </table> <p>OLAL22LITE specific</p> <table border="1"> <thead> <tr> <th>User input</th> <th>Video input</th> <th>Data path to VIP</th> </tr> </thead> <tbody> <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> </tbody> </table> <p>OLAL22PREMIER specific</p> <table border="1"> <thead> <tr> <th>User input</th> <th>Video input</th> <th>Data path to VIP</th> </tr> </thead> <tbody> <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> </tbody> </table> <p>OLAL22MKII (mark II) specific</p> <table border="1"> <thead> <tr> <th>User input</th> <th>Video input</th> <th>Data path to VIP</th> </tr> </thead> <tbody> <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> </tbody> </table> <p>2 Video standard: - PAL - NTSC</p> <p>When no input is given, the nucleus will take TEST for video input and PAL for video standard.</p>		User input	Video input	Data path to VIP	CVBS	RGB	CVBS from analogue board	YC	YC	YC from analogue board	YUV	CVBS	YUV from analogue board	RGB	CVBS	RGB from analogue board	TEST	CVBS	CVBS from host controller.	10	XPORT	Digital video from DTT module	User input	Video input	Data path to VIP	R_CVBS	CVBS	Rear CVBS	F_CVBS	CVBS	Front CVBS	T_CVBS	CVBS	Tuner CVBS	R_YC	YC	Rear YC	F_YC	YC	Front YC	User input	Video input	Data path to VIP	1	RGB	SCART aux RGB in	2	YC	SCART aux YC in	3	CVBS	SCART aux CVBS	4	CVBS	Tuner	5	YC	Front YC	6	CVBS	Front CVBS	7	CVBS	SCART TV CVBS	8	YC	CE mode YC in	9	CVBS	CE mode CVBS in	User input	Video input	Data path to VIP	F_CVBS	CVBS	Front CVBS	T_CVBS	CVBS	Tuner CVBS	E1_CVBS	CVBS	SCART 1 CVBS in	E2_CVBS	CVBS	SCART 2 CVBS in	F_YC	YC	Front YC
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	121500	Videoloop test succeeded.																																																																																							
	121501	Wrong user input.																																																																																							
	121502	The Codec SYNC-module cannot be initialised.																																																																																							
	121503	The Codec MIXER-module cannot be initialised.																																																																																							
	121504	The Codec VideoPostProcessor-module cannot be initialised.																																																																																							
	121505	The Codec DENC-module cannot be initialised.																																																																																							
	121506	The VideoInputProcessor cannot be initialised.																																																																																							
	121507	The VideoInputProcessor cannot detect a sync-signal.																																																																																							
	121508	The Codec VideoFrontEnd-module cannot be initialised.																																																																																							
	121509	The Codec VideoFrontEnd-module cannot capture a video field.																																																																																							

	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	<p>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.</p> <p>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.</p>	
Technical	<ul style="list-style-type: none"> - 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: <ul style="list-style-type: none"> - I2S (default, when no user input is given) - SPDIF: This input needs a second parameter: <ul style="list-style-type: none"> - 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	<pre>DS:> 1216 121600: Test OK @ DS:> 1216 spdif coax 121600: Test OK @ DS:> 1216 spdif opt 121600: Test OK @</pre>
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Nucleus Name	DS_SYS_SlashVersionSet	
Nucleus Number	1217	
Description	Set the slash version of the system	
Technical	<ul style="list-style-type: none"> - 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	<pre>DS:> 1217 82 121700: Test OK @</pre>	

Nucleus Name	DS_SYS_SlashVersionGet	
Nucleus Number	1218	
Description	Get the slash version of the system	
Technical	<ul style="list-style-type: none"> - 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	<pre>DS:> 1218 121800: The slash version is: 82 Test OK @</pre>	

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	<pre>DS:> 1222 122200: The Virgin Mode functionality is: ON Test OK @</pre>	

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	<pre>DS:> 1223 122300: Test OK @</pre>	

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	<pre>DS:> 1224 122400: Test OK @</pre>	

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 <i>display fatal</i> 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	<pre>DS:> 1225 122500: The Display Fatal functionality is ON Test OK @</pre>	

Nucleus Name	DS_SYS_SettingsSet	
Nucleus Number	1226	
Description	Programs the digital board settings into the boot EEPROM on the digital board.	
Technical	<ul style="list-style-type: none"> - 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	<pre>DS:> 1226 646961677473746201010200010101010101000020080000 122600: Test OK @</pre>	

Nucleus Name	DS_SYS_SettingsDisplay	
Nucleus Number	1228	
Description	Show the settings that are programmed in the BROM on the digital board.	
Technical	<ul style="list-style-type: none"> - 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	<pre> DS:> 1228 Settings ID: 444248491D9420014E46332B0000000029040303000101020001010040080800 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 @ </pre>	

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	<ul style="list-style-type: none"> - 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	<pre> DS:> 1229 122900: 6D7920626F61726400020300010101020101000020080000 Test OK @ </pre>	

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	<ul style="list-style-type: none"> - 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	<p><u>Available for all sets except for sets with a SAA7173 VIP onboard</u></p> <p>InputType:</p> <ul style="list-style-type: none"> - I2S (default) - SPDIF (Only for recorders with 5.1 input and DTT module) <p>InputPort: (Only for recorders with 5.1 input. For DTT modules no parameter should be filled in, so default is chosen)</p> <ul style="list-style-type: none"> - OPT : Optical input path is selected (default) - COAX : Coax input path is selected <p><u>Available only for sets with a SAA7173 VIP onboard</u></p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>User input</th> <th>Data path to VIP</th> </tr> </thead> <tbody> <tr> <td>R_A</td> <td>Rear Cinch</td> </tr> <tr> <td>F_A</td> <td>Front Cinch</td> </tr> <tr> <td>T_A</td> <td>Tuner</td> </tr> </tbody> </table>		User input	Data path to VIP	R_A	Rear Cinch	F_A	Front Cinch	T_A	Tuner
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	<ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> - <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	<pre> 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 @ </pre>	

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	<ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> - '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	<pre> 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:> </pre>	

Nucleus Name	DS_SYS_SettingsDITableFilenameSet	
Nucleus Number	1234	
Description	This nucleus sets the Download table filename in the HW-diversity string	
Technical	<ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> - 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	<pre>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 @</pre>	

Nucleus Name	DS_SYS_licWriteRead	
Nucleus Number	1235	
Description	Perform an IIC write-read action on the digital board	
Technical	<ul style="list-style-type: none"> - 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	<p>The user inputs the Bus ID, Slave Address, number of bytes to read, number of bytes to write and the bytes to be written</p> <p><NucNr><BusId><SlaveAddr><ReadLen><WriteLen><WrByte0...WrByteN></p> <p>Max number of bytes to write: 255</p> <p>Max number of bytes to read: 255</p>	
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	<pre>DS:> 1235 0 0xa0 0xf 1 0 0x0000: 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x0008: 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 123500: Test OK @</pre>	

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	<pre> DS:> 1236 123600: Version :560 Build :20040614_0510 Release :C1 Buildtype :no Baseline :F_P1_9_152 Variant :verum:dvdrw2_lib Test OK @ </pre>	

Nucleus Name	DS_SYS_UartSetup	
Nucleus Number	1237	
Description	Set up a configuration for the selected UART	
Technical	<ul style="list-style-type: none"> - Parse user input - Use MIS_UART_Setup to setup the selected UART with the requested parameters 	
Execution Time	Less than 1 second	
User Input	<p>The user inputs 6 parameters:</p> <p style="padding-left: 40px;"><UartNr><baudrate><flowcontrol><databits><parity><stopbits></p> <p>UartNr:</p> <p style="padding-left: 40px;">1=UART port 1 : not used (Chrysalis only) 2=UART port 2 : Bit Engine or DTTM (Chrysalis only) 3=UART port 3 : Analogue board</p> <p>baudrate:</p> <p style="padding-left: 40px;">115200,62500,57600,38400,19200,9600,4800,2400,1200</p> <p>flowcontrol:</p> <p style="padding-left: 40px;">0=disabled 1=enabled</p> <p>databits:</p> <p style="padding-left: 40px;">7 or 8</p> <p>parity:</p> <p style="padding-left: 40px;">"NO", "ODD" or "EVEN"</p> <p>stopbits:</p> <p style="padding-left: 40px;">1 or 2</p>	
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)	<pre> DS:> 1237 2 38400 0 8 NO 1 123700: Test OK @ </pre>	
Example (Leco)	<pre> DS:> 1237 2 38400 0 8 NO 1 123703: The selected UART is not available Error @ </pre>	

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	<ul style="list-style-type: none"> - 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	<pre>DS:> 1238 123800: Test OK @</pre>	

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	<ul style="list-style-type: none"> - 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	<pre>DS:> 1600 160000: Test OK @</pre>	

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	<ul style="list-style-type: none"> - 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	<pre>DS:> 1601 160100: Software version : 0.9 Display driver version: 0.1 Hardware version : 0x02 Hardware layout : 0x03 Hardware revision : 0x00 Test OK @</pre>	
Example MCU	<pre>DS:> 1601 160100: Software main version: 0.3 Software sub version: 0.0 Test OK @</pre>	

Nucleus Name	DS_ASP_RealTimeClockSetValues	
Nucleus Number	1602	
Description	This nucleus is used to set the real time clock to the correct values.	
Technical	<ul style="list-style-type: none"> - 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	<pre>DS:> 1602 03:20:01 22/06/03 160200: Test OK @</pre>	

Nucleus Name	DS_ASP_RealTimeClockGetValues	
Nucleus Number	1603	
Description	This nucleus is used to retrieve the actual real time from the ASP	
Technical	<ul style="list-style-type: none"> - 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	<pre>DS:> 1603 Time: 03:20:17 Date: 22/06/03 (dd/mm/yy) 160300: Test OK @</pre>	

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	<ul style="list-style-type: none"> - 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	<pre>DS:> 1605 160500: Test OK @</pre>	

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	<ul style="list-style-type: none"> - 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	<pre>DS:> 1606 160600: Temperature(NTC) ADC input value = 0x94 Test OK @</pre>	

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	<ul style="list-style-type: none"> - 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	<pre>DS:> 1607 low 160700: Test OK @</pre>	

Nucleus Name	DS_ASP_LightDisplay	
Nucleus Number	1608	
Description	This nucleus lights the entire display.	
Technical	<ul style="list-style-type: none"> - 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	<pre>DS:> 1608 160800: Test OK @</pre>	

Nucleus Name	DS_ASP_BlinkDisplay	
Nucleus Number	1609	
Description	This nucleus lights the entire display, and lets it blink. Only for ASP	
Technical	<ul style="list-style-type: none"> - 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	<pre>DS:> 1609 160900: Test OK @ DS:> 1609 off 160900: Test OK @</pre>	
Example MCU	<pre>DS:> 1609 160900: Empty function Test OK @</pre>	

Nucleus Name	DS_ASP_DimmingDisplay	
Nucleus Number	1610	
Description	This nucleus lights the entire display, and dims it.	
Technical	<ul style="list-style-type: none"> - 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	<pre>DS:> 1610 ON 161000: Test OK @</pre>	

Nucleus Name	DS_ASP_ClearDisplay	
Nucleus Number	1611	
Description	This nucleus clears the display and deactivates dimming/blinking functionality	
Technical	<ul style="list-style-type: none"> - 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	<pre>DS:> 1611 161100: Test OK @</pre>	

Nucleus Name	DS_ASP_Keyboard	
Nucleus Number	1612	
Description	<p>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.</p> <p>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.</p> <p>Indicate the number of keys pressed to the user, both in the terminal logging and on the display.</p>	
Technical	<ul style="list-style-type: none"> - 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	<pre>DS:> 1612 161200: 3 keys were pressed. Test OK @</pre>	

Nucleus Name	DS_ASP_RemoteControl	
Nucleus Number	1613	
Description	<p>This nucleus checks the interface to the remote control by having the user confirm the key-code displayed.</p> <p>At least one key must be tested.</p> <p>If the user presses 'a' or 'A' the test is aborted. If the user presses 'o' or 'O' the test is indicated as OK.</p> <p>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.</p> <p>Indicate the number of keys pressed to the user, both in the terminal logging and on the display.</p>	
Technical	<ul style="list-style-type: none"> - 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	<pre>DS:> 1613 161300: 4 keys were pressed. Test OK @</pre>	

Nucleus Name	DS_ASP_LEDsOn	
Nucleus Number	1614	
Description	Switches on the display leds.	
Technical	<p>ASP specific</p> <ul style="list-style-type: none"> - 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. <p>MCU Specific</p> <ul style="list-style-type: none"> - 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	<pre>DS:> 1614 161400: Test OK @</pre>	

Nucleus Name	DS_ASP_LEDsOff	
Nucleus Number	1615	
Description	This nucleus switches off the display leds.	
Technical	<p>ASP specific</p> <ul style="list-style-type: none"> - 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. <p>MCU Specific</p> <ul style="list-style-type: none"> - 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	<pre>DS:> 1615 161500: Test OK @</pre>	

Nucleus Name	DS_ASP_Reset	
Nucleus Number	1616	
Description	This nucleus resets the ASP.	
Technical	<ul style="list-style-type: none"> - 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	<pre>DS:> 1616 161600: Test OK @</pre>	

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	<ul style="list-style-type: none"> - 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	<pre>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:dvdwr2_lib DS:></pre>	

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	<ul style="list-style-type: none"> - 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	<pre>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:dvdwr2_lib DS:></pre>	

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	<ul style="list-style-type: none"> - 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	<pre>DS:> 1620 162000: Active video is ON Test OK @</pre>	

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	<ul style="list-style-type: none"> - 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	<pre>DS:> 1621 162100: Test OK @</pre>	

Nucleus Name	DS_ASP_VcrControl																																																												
Nucleus Number	1622																																																												
Description	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.																																																												
Technical	- Get the parameters from the user input and then execute the correct test																																																												
Execution Time	1 seconds.																																																												
User Input	<p><Command> <parameters> 1 Command:</p> <p>OPERATE:</p> <table border="1"> <thead> <tr> <th>User input</th> <th>Meaning of value</th> </tr> </thead> <tbody> <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><i>Reserved</i></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><i>Reserved</i></td></tr> </tbody> </table> <p>SETUPPLAY: (One byte)</p> <table border="1"> <thead> <tr> <th>7</th> <th>6</th> <th>5</th> <th>4</th> <th>3</th> <th>2</th> <th>1</th> <th>0</th> </tr> </thead> <tbody> <tr> <td>N.U.</td> <td colspan="3">HiFiAudioSelect</td> <td colspan="2">SmartPicture</td> <td colspan="2">Videosystem</td> </tr> </tbody> </table> <p><u>VideoSystem:</u> (Selects type of video system for playback.) 0 Auto 1 SECAM 2 PAL 3 ME-SECAM</p> <p><u>SmartPicture:</u> (Selects how video is enhanced during playback.) 0 Natural 1 Distinct 2 Soft 3 Sharp</p> <p><u>HiFiAudioSelect:</u> (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 <i>Reserved</i></p> <p><u>NotUsed:</u></p>	User input	Meaning of value	0	Stop	1	Eject	2	Play	3	Pause	4	Fast Forward (FF)	5	Rewind (REW)	6	Slow	7	Enter Index Search	8	Forward Index Search	9	Reverse Index Search	10	Record (REC)	11	DVDR->VCR Dubbing Standby	12	VCR->DVDR Dubbing Standby	13	Start Dubbing	14	Cancel Dubbing	15	<i>Reserved</i>	16	Increase Tracking Value	17	Decrease Tracking Value	18	Restore Default Tracking Value	19	Cancel Tracking	20-31	<i>Reserved</i>	7	6	5	4	3	2	1	0	N.U.	HiFiAudioSelect			SmartPicture		Videosystem	
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<p>User Input Continued</p>	<p>SETUPRECORD: (One Byte)</p> <table border="1"> <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>Not Used</td> <td>T.E.</td> <td>S.</td> <td>M.A.</td> <td>A.</td> <td colspan="3">VideoSys</td> </tr> </table> <p>VideoSystem: Selects type of video system to record. Value range: [0..3] Default value: 0 Meaning of values: 0 Auto 1 SECAM 2 PAL 3 ME-SECAM</p> <p>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</p> <p>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</p> <p>Speed: Selects tape speed for recording. Value range: [0..1] Default value: 0 Meaning of values: 0 SP 1 LP</p> <p>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</p> <p>NotUsed:</p> <p>STATUS: No Parameters needed</p>	7	6	5	4	3	2	1	0	Not Used	T.E.	S.	M.A.	A.	VideoSys		
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<p>Example</p>	<pre>DS:> 1622 operate 0 162200: Test OK @</pre>																

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	<ul style="list-style-type: none"> - 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	<pre>DS:> 1700 170000: Test OK @</pre>	

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	<ul style="list-style-type: none"> - 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	<pre>DS:> 1800 180000: Test OK @</pre>	

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	<ul style="list-style-type: none"> - 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	<pre>DS:> 1801 00 180100: Test OK @</pre>	

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

EURO Path ID	Description
	(DbOut=Digital Board Output, Dbln = 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 Dbln-CVBS. - FrontIn-CVBS to Vcrln-CVBS. (If a VCR module is present)
02	- DbOut-YC to RearOut-YC. - FrontIn-YC to Dbln-YC.
03	- DbOut-CVBS to Scart_1-CVBS. - Scart_2-CVBS to Dbln-CVBS. - Scart_2-CVBS to Vcrln-CVBS. (If a VCR module is present)
04	- DbOut-YC to Scart_1-YC. - Scart_2-YC to Dbln-YC. - Scart_2-YC to Vcrln-YC. (If a VCR module is present)
05	- DbOut-RGB to Scart_1-RGB. - Scart_2-RGB to Dbln-RGB.
06	- DbOut-CVBS to RearOut-CVBS. - Tuner-CVBS to Dbln-CVBS. - Tuner-CVBS to Vcrln-CVBS. (If a VCR module is present)
07	- DbOut-CVBS to Dbln-CVBS. - DbOut-CVBS to Vcrln-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 Dbln-CVBS.
11	- DbOut-YC to Scart_2-YC. - Scart_1-YC to Dbln-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, Dbln = Digital Board Input)
00	DbOut-CVBS/YC/YUV to RearOut-CVBS/YC/YUV.
01	- DbOut-CVBS to RearOut-CVBS. - FrontIn-CVBS to Dbln-CVBS.
02	- DbOut-YC to RearOut-YC. - FrontIn-YC to Dbln-YC.
03	- DbOut-CVBS to RearOut-CVBS. - RearIn-CVBS to Dbln-CVBS.
04	- DbOut-YC to RearOut-YC. - RearIn-YC to Dbln-YC.
05	- DbOut-YUV to RearOut-YUV. - RearIn-YUV to Dbln-YUV.
06	- DbOut-CVBS to RearOut-CVBS. - Tuner-CVBS to Dbln-CVBS.
07	DbOut-CVBS to Dbln-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	<ul style="list-style-type: none"> - 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	<pre>DS:> 1803 180300: Test OK @</pre>	

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	<ul style="list-style-type: none"> - 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	<pre>DS:> 1804 180400: Test OK @</pre>	

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	<ul style="list-style-type: none"> - Check user input - In case of Rear In YC <ul style="list-style-type: none"> - 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 <ul style="list-style-type: none"> - 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	<pre>DS:> 1805 rear 180500: Test OK @</pre>	

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	<ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> - 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, Dbln = Digital Board Input)
00	DbOut to All Outs.
01	- DbOut to RearOut for CVBS/YC, and RearOut for YUV. - FrontIn to Dbln. - FrontIn to VcrIn. (If a VCR module is present)
02	- DbOut to Scart_1-AOut. - Scart_2-Aln to Dbln. - Scart_2-Aln to VcrIn. (If a VCR module is present)
03	- DbOut to Scart_2-AOut. - Scart_1-Aln to Dbln. - Scart_1-Aln to VcrIn. (If a VCR module is present)
04	- DbOut to RearOut for CVBS/YC. - Tuner to Dbln. - Tuner to VcrIn. (If a VCR module is present)
05	DbOut to RearOut-5.1.
06	DbOut to Dbln
07	Scart_2-Aln to Scart_1-AOut.
08	Scart_1-Aln to Scart_2-AOut.
09	VcrOut to Dbln (If a VCR module is present)

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

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

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

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	<pre>DS:> 1903 190300: Test OK @</pre>	

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
Example	190402	The user provided the wrong input
	<pre>DS:> 1904 ON 190400: Test OK @</pre>	

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 @	

Nucleus Name	DS_FRE_ChannelSelect																																																																													
Nucleus Number	2001																																																																													
Description	This nucleus sets the tuner to receive a valid audio and video signal																																																																													
Technical	<ul style="list-style-type: none"> - Parse the user input to determine all parameters to set - Pass these parameters to the respective parts using IIC 																																																																													
Execution Time	Less than 1 second																																																																													
User Input	<p><Frequency*16> <video standard id> <Tuner></p> <p>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.)</p> <table border="1"> <thead> <tr> <th>Name</th> <th>Colour system</th> <th>Transmission standard</th> <th>Sound modulation</th> </tr> </thead> <tbody> <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> </tbody> </table> <p>Video Standard ID: The table below shows which video standards are possible</p> <table border="1"> <thead> <tr> <th>ID</th> <th>Europe</th> <th>Nafta / Apac</th> </tr> </thead> <tbody> <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> </tbody> </table> <p>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).)</p> <table border="1"> <thead> <tr> <th>Tuner</th> <th>Tuner ID</th> <th>Runtime Detected</th> </tr> </thead> <tbody> <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> </tbody> </table>		Name	Colour system	Transmission standard	Sound modulation	PAL_BG_S	PAL	BG	FM-Stereo	PAL_BG_M	PAL	BG	FM-Mono / NICAM	PAL_I_M	PAL	I	FM-Mono / NICAM	PAL_DK_S	PAL	DK	FM-Stereo	PAL_DK_M	PAL	DK	FM-Mono / NICAM	NTSC_M_S	NTSC	M	FM-Stereo	ID	Europe	Nafta / Apac	0	PAL_BG_S	NTSC	1	PAL_BG_M	Invalid	2	PAL_I_M	Invalid	3	PAL_DK_S	Invalid	4	PAL_DK_M	Invalid	Tuner	Tuner ID	Runtime Detected	1	FE1316 (Europe Philips)	V	2	FE1319 (Europe Philips)	V	3	TMQZ2-403A (Europe ALPS)		4	JS6B2-L121 (Europe Xuguang)		5	TCPK0601 (APAC Samsung)		6	TCMN0682 (NAFTA Samsung)	V	7	TCPK0600 (APAC Samsung)		8	TCPD0601 (APAC Samsung)		9	VPC12R_ENG56PPG1F (Panasonic)	
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Error	Number	Description																																																																												
	200100	Setting the tuner channel succeeded																																																																												
	200101	Invalid user input																																																																												
	200102	Getting the version of the set failed																																																																												
	200103	Configuration of the tuner failed																																																																												
	200104	Configuration of the IF module failed																																																																												
Example	<pre>DS:> 2001 3456 0 1 200100: Test OK @</pre>																																																																													

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).)													
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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	<pre>DS:> 2003 3 200300: Test OK @</pre>													

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	<pre>DS:> 2100 210000: Found a hard disk drive: MASTER device on IDE interface 1 Test OK @</pre>	

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	Number	Description
	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	<pre>DS:> 2101 210100: Resetting IDE interface 1 succeeded Test OK @</pre>	

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	<ul style="list-style-type: none"> - 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	<pre>DS:> 2102 210200: Serial number = F19LP8WE, Firmware rev. = VAM51JJ0 , Model nu mber = Maxtor 2F040L0 Test OK @</pre>	

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	<ul style="list-style-type: none"> - 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	<pre>DS:> 2103 210300: OK, writing to sector 3f95776 Test OK @</pre>	

Nucleus Name	DS_HDD_CapabilitiesGet	
Nucleus Number	2104	
Description	Get the cylinders, heads and track information of the hard disk drive	
Technical	<ul style="list-style-type: none"> - 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	<pre>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 @</pre>	

Nucleus Name	DS_HDD_Diagnostics	
Nucleus Number	2105	
Description	Shall perform the internal diagnostic tests implemented by the hard disk drive.	
Technical	<ul style="list-style-type: none"> - 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	<pre>DS:> 2105 210500: Test OK @</pre>	

Nucleus Name	DS_HDD_UploadImage	
Nucleus Number	2106	
Description	Upload raw data from the HDD to a DVD+RW	
Technical	<ul style="list-style-type: none"> - 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.	

User Input	<p>The user can enter 3 parameters in the next format: <COMMAND> <HDD sector> <nr of HDD sectors> <COMMAND> is one of the next strings:</p> <ul style="list-style-type: none"> • 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 <p><HDD sector> = the sector on HDD to start reading from <HDD sectors> = the number of HDD sectors to transfer</p>	
Error	Number	Description
	210600	Uploading image succeeded
	210601	The initialisation of IDE failed
	210602	Communication with the hard disk drive failed
	210603	Communication with the AV3 failed
	210604	No DVD+RW is available
	210605	Calibrating DVD+RW failed
	210607	Error while reading image data from HDD
	210608	Error while writing image to DVD+RW
	210609	Unable to update the transfer table on the DVD+RW
Example	<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>	

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	<ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> - Initialise the HDD connection - Get the user input - Generate a random sequence of test sectors - For every sector in the random sequence do <ul style="list-style-type: none"> - 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	<pre>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 @</pre>	

Nucleus Name	DS_HDD_LinearSurfaceScan	
Nucleus Number	2109	
Description	Perform a linear surface scan so that most of the disc is covered.	
Technical	<ul style="list-style-type: none"> - 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 <ul style="list-style-type: none"> - 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	<pre>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 @</pre>	

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	<ul style="list-style-type: none"> - 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	<pre>DS:> 2110 211000: Test OK @</pre>	

Nucleus Name	DS_HDD_SectorRead	
Nucleus Number	2111	
Description	Read 512 bytes from a specified sector on HDD	
Technical	<ul style="list-style-type: none"> - 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 <ul style="list-style-type: none"> - 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	<pre>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 @</pre>	

Nucleus Name	DS_HDD_SetPower	
Nucleus Number	2112	
Description	Set the power of the HDD On or Off	
Technical	<ul style="list-style-type: none"> - 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	<pre>DS:> 2112 off 211200: Test OK @</pre>	

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:	<ol style="list-style-type: none"> 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: 4C4541440D00000000030300010101020101000020080000
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: 0xBABED22E, 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.

```

D8S - Hyperterminal
File Edit View Call Transfer Help
DS:> 910
Momentary errors (0-9): 0x21 0x00 0x00 0x20 0x00 0x00 0x00 0x00 0x00 0x00
Cumulative errors (1-9): 0x00 0x80 0x20 0x00 0x00 0x00 0x00 0x00 0x00
Software fatal assert : 256 cpowermanager.cpp
091000:
Test OK @
DS:>_

```

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

error code	error	meaning
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 self-test 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)

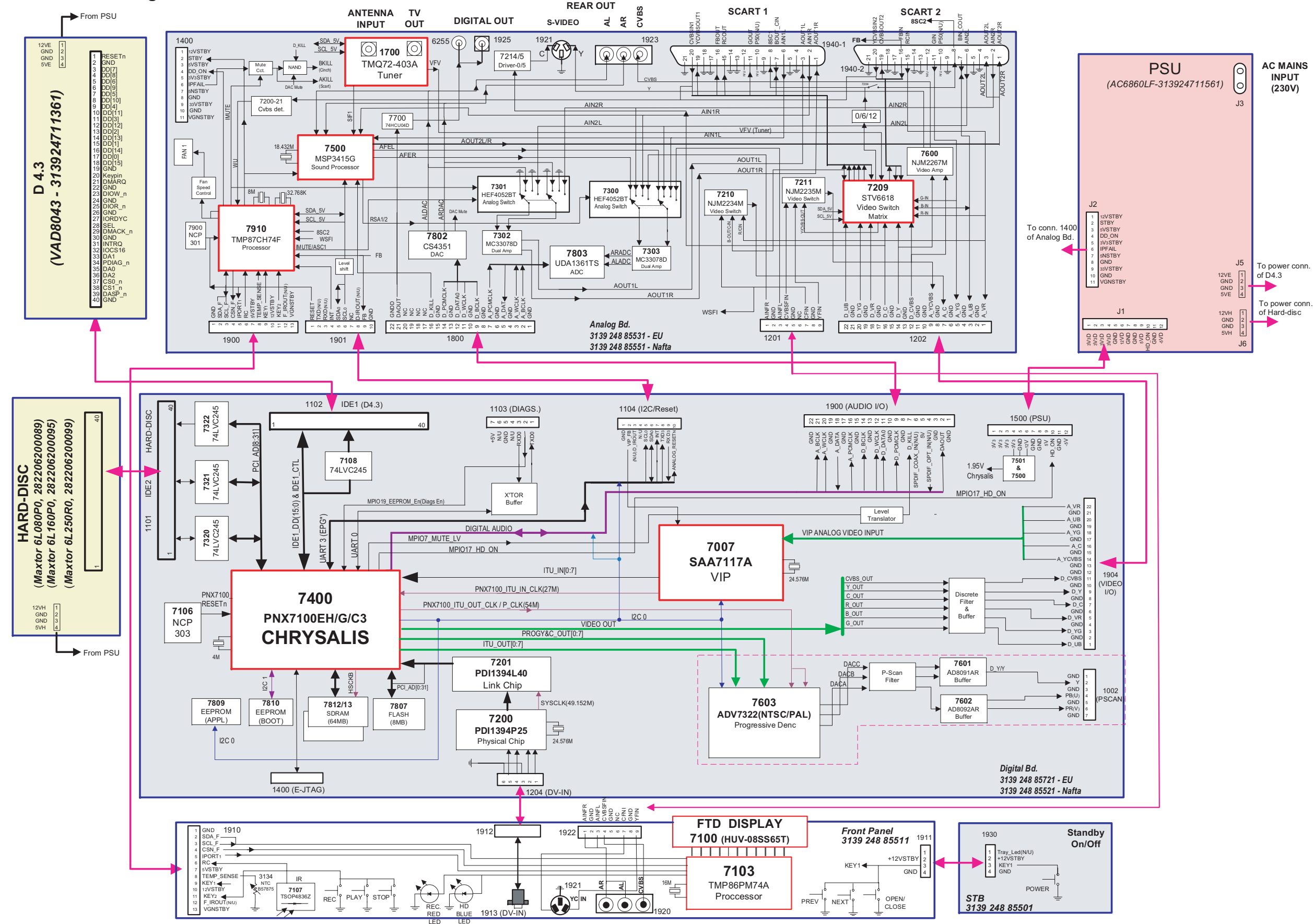
error code	error	meaning
0x39	opc_power_calculation_error	Error during OPC power calculation (samples are wrong)
0x3A	opc_test_zone_full_error	OPC can't be performed because test zone is full
0x3B	opc_bad_jitter_measurement_error	The jitter measurement during OPC samples readback failed
0x3C	opc_read_samples_error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

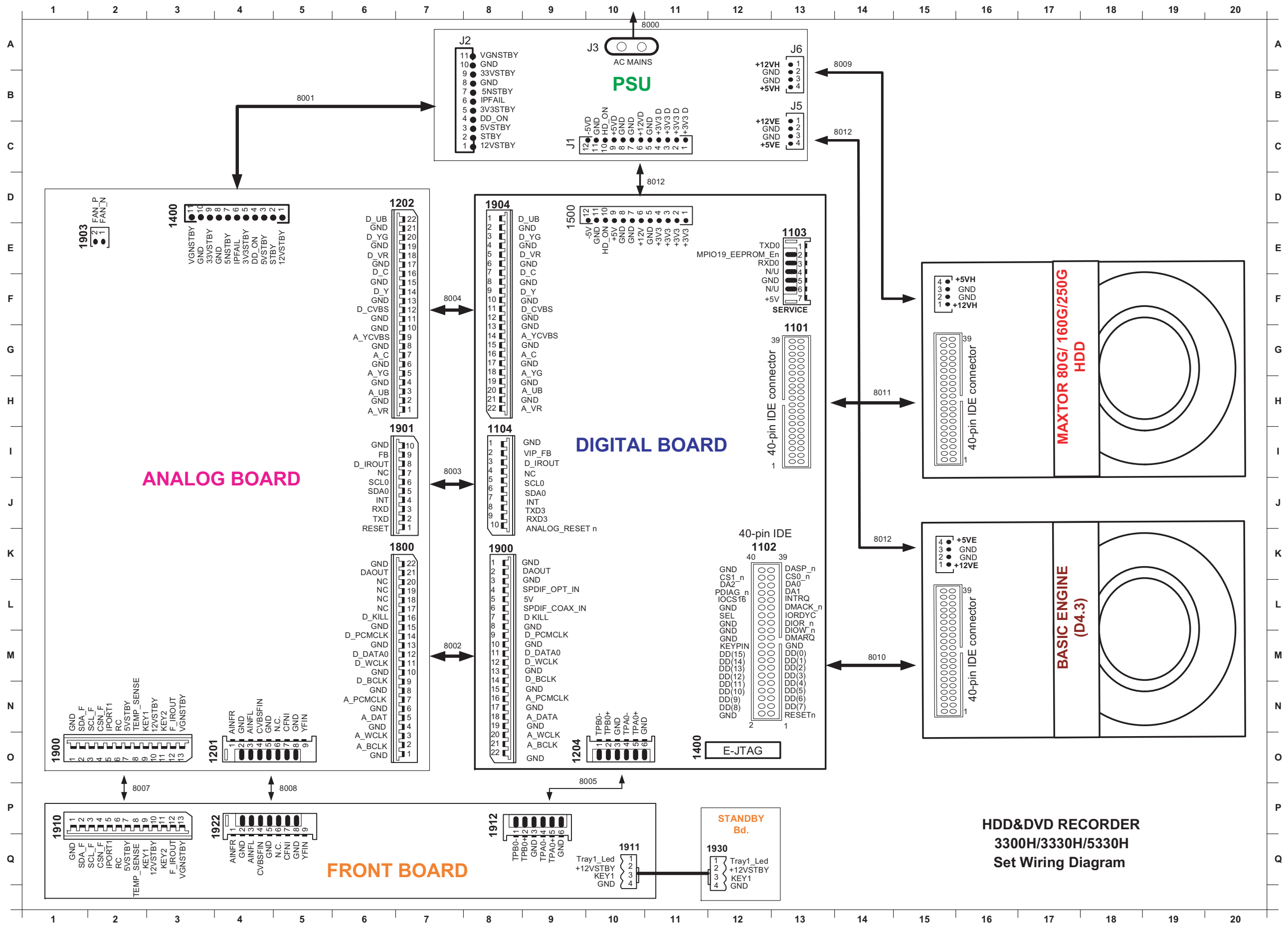
Notes:

6. Block Diagrams, Waveforms, Wiring Diagram

Overall Block Diagram

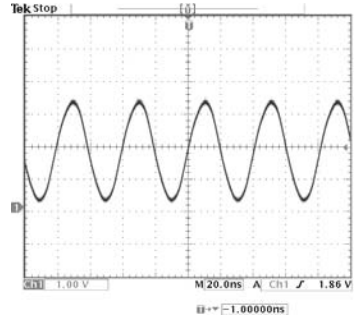


Wiring Diagram

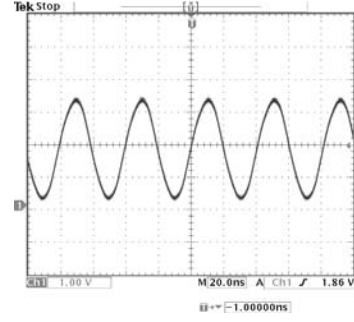


Waveforms of Digital Board

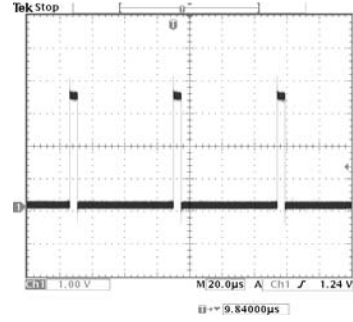
F203 IC7200 PIN 60



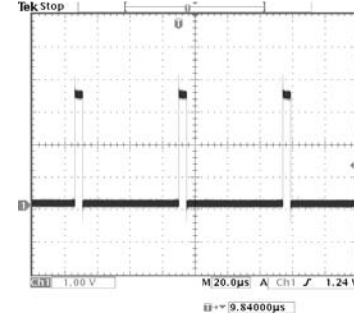
IC7200 PIN 59



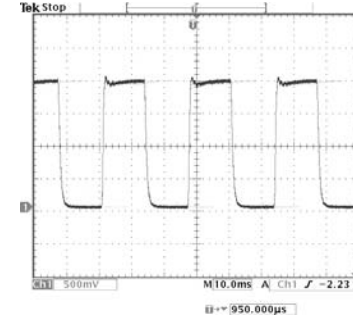
F403 HS_OUT



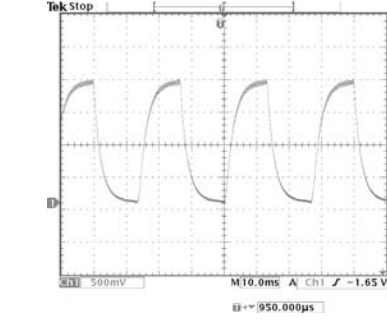
F404 VS_OUT



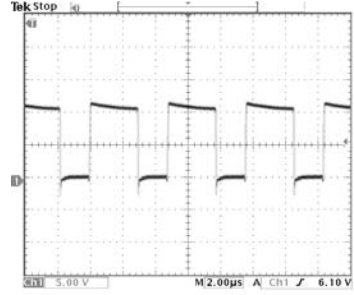
F405 XTAL_IN



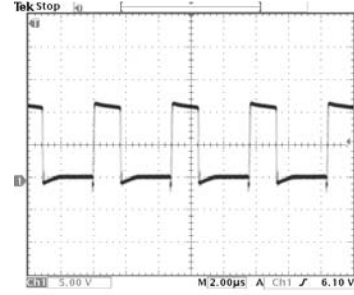
F406 XTAL_OUT



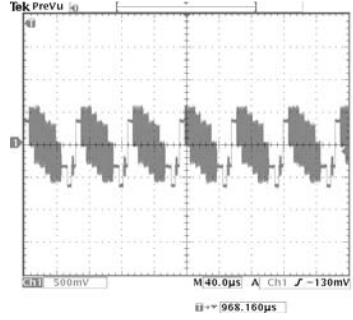
IC7501 PIN 5



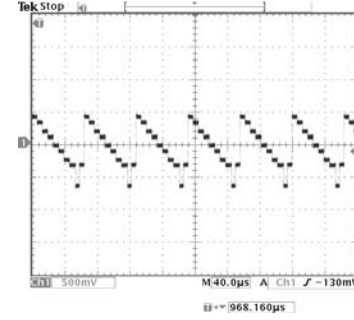
IC7501 PIN 6



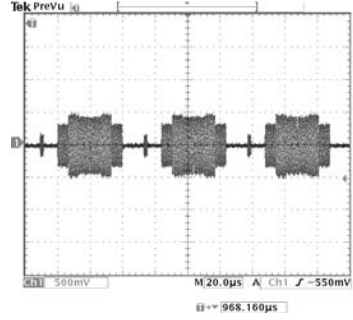
I912 D_CVBS



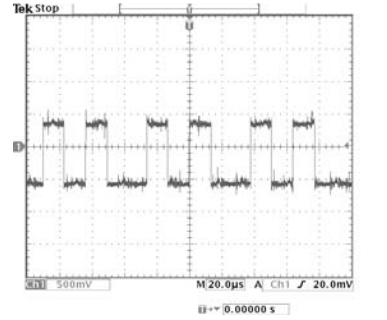
I913 D_Y



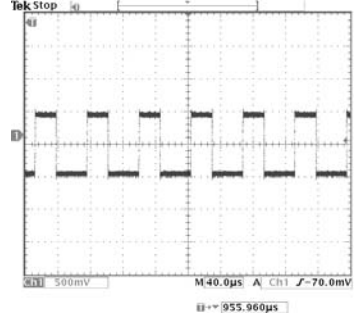
I914 D_C



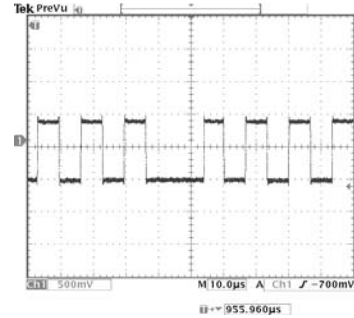
I915 D_VR



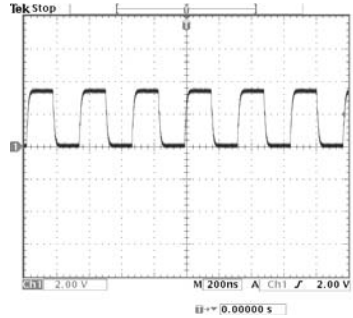
I916 D_YG



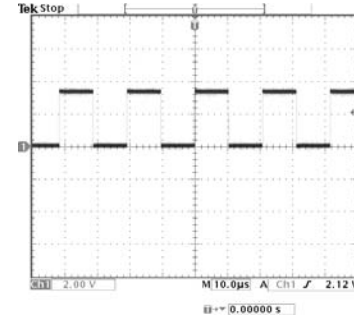
I917 D_UB



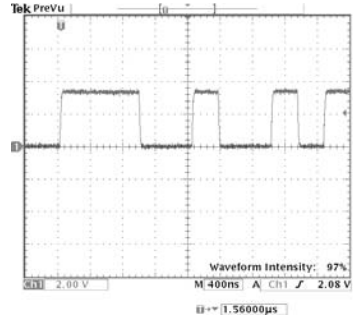
F1914 D_BCLK



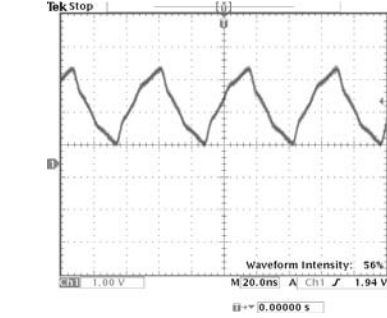
F1912 D_WCLK



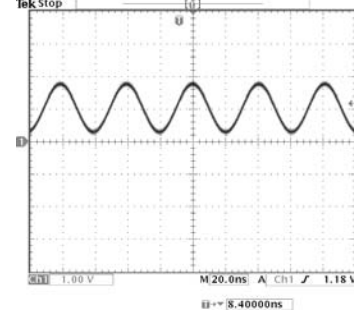
F1911 D_DATA0



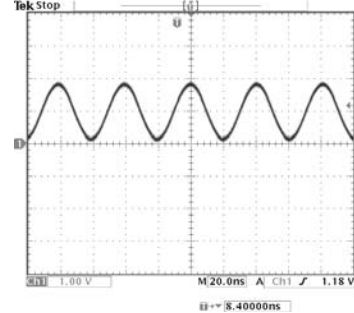
F1909 D_PCMCLK



XTAL 1001_IN

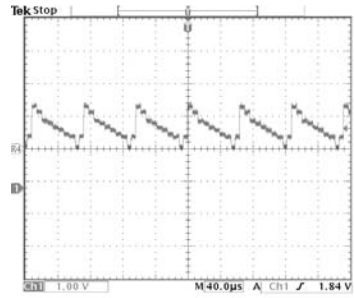


XTAL 1001_OUT

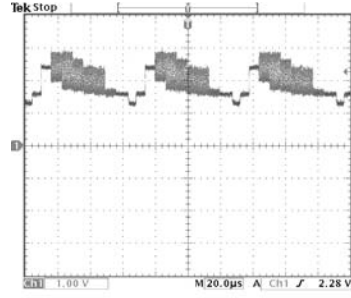


Waveforms of Analog Board

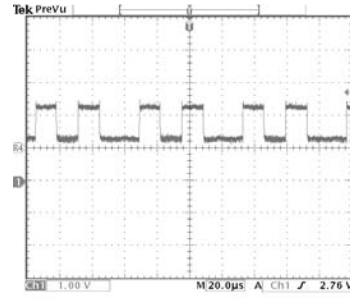
F202 CVBS_OUT



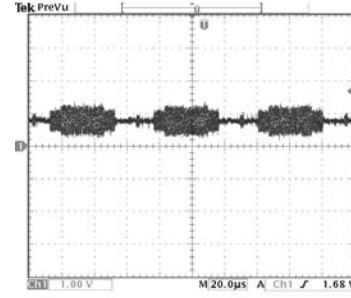
F202 Y_OUT



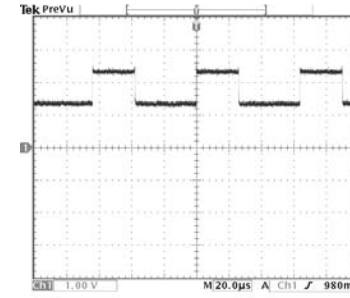
F204 R_OUT



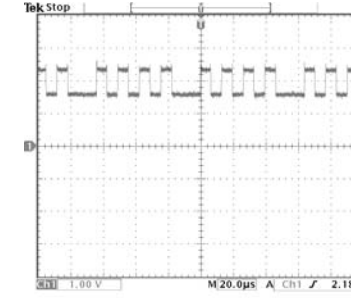
F204 C_OUT



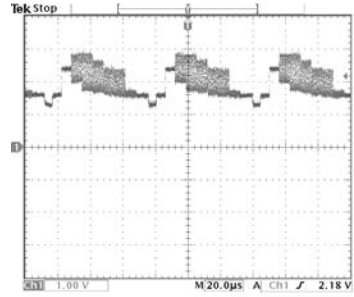
F205 G_OUT



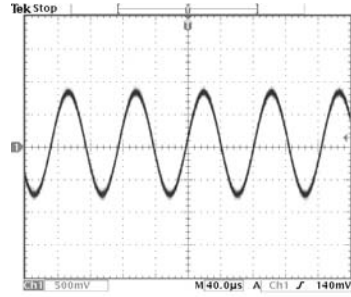
F208 B_OUT



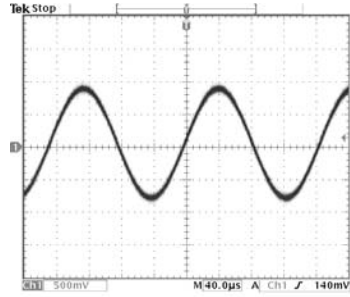
F215 CVBS_OUT



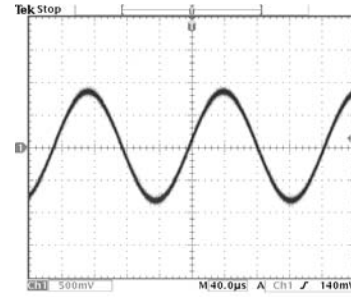
I300 ARADC



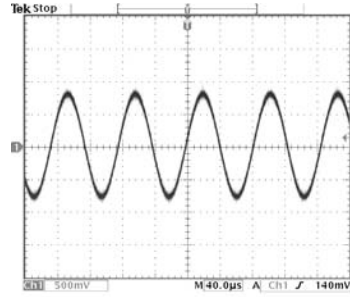
I305 ALADC



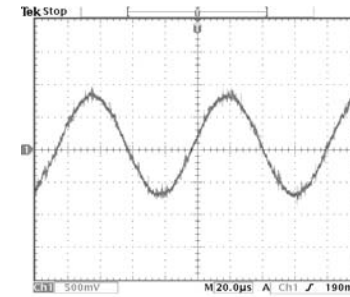
I311 AOUT1L



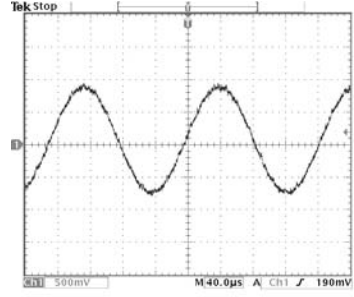
I315 AOUT1R



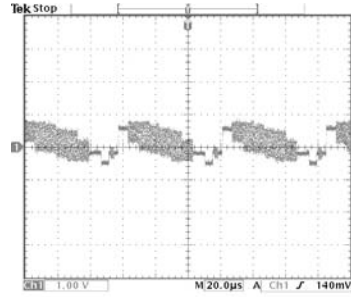
I520 AOUT2R



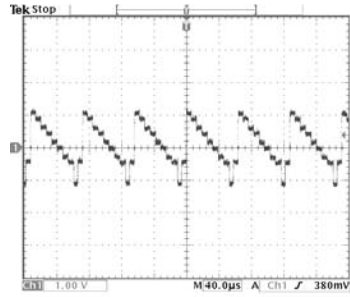
I521 AOUT2L



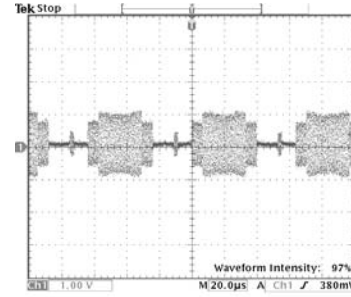
F600 CVBS_OUT



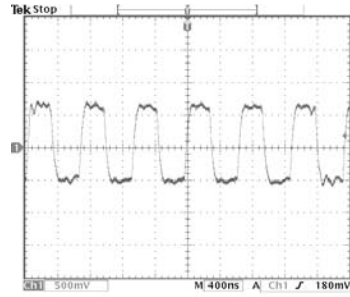
F602 Y_OUT



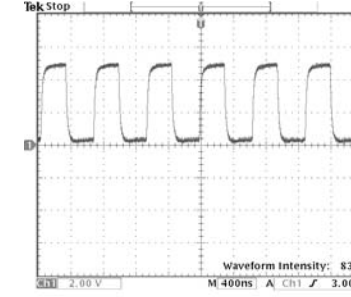
F603 C_OUT



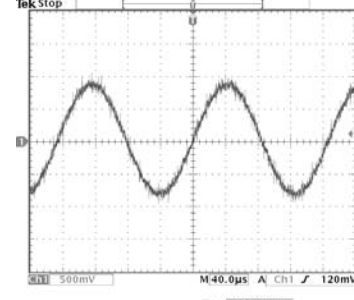
F700 DIGITAL_OUT



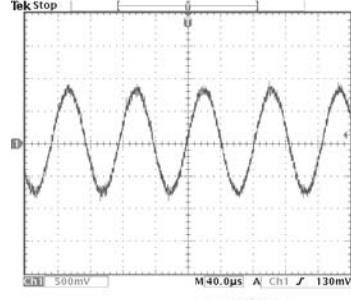
F702 OPTICAL_OUT



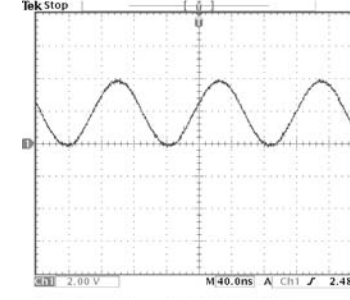
I822 ALDAC



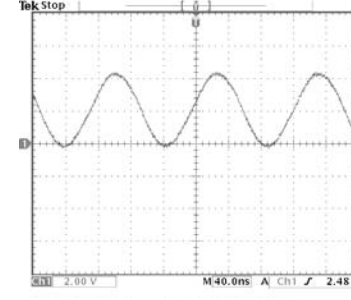
I821 ARDAC



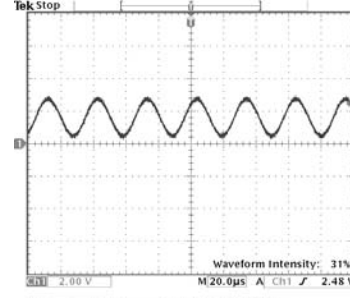
I911 IC7910 PIN 9



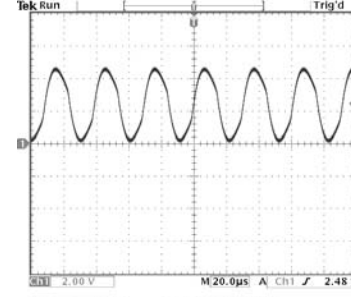
I910 IC7910 PIN 8



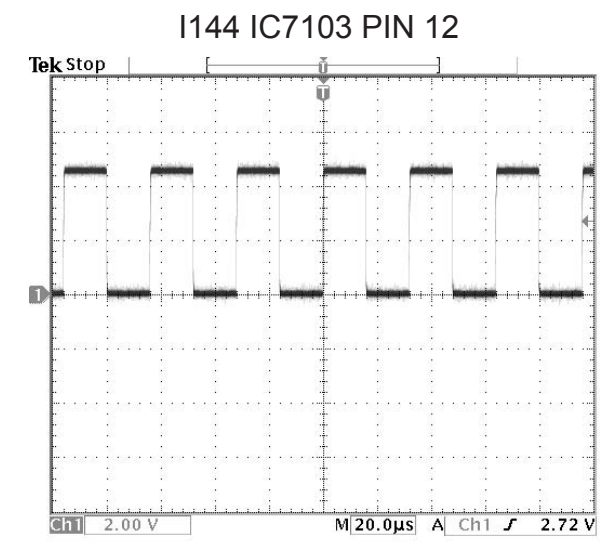
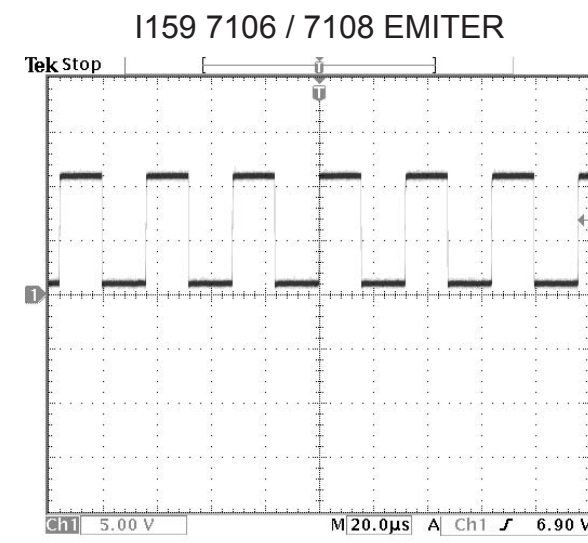
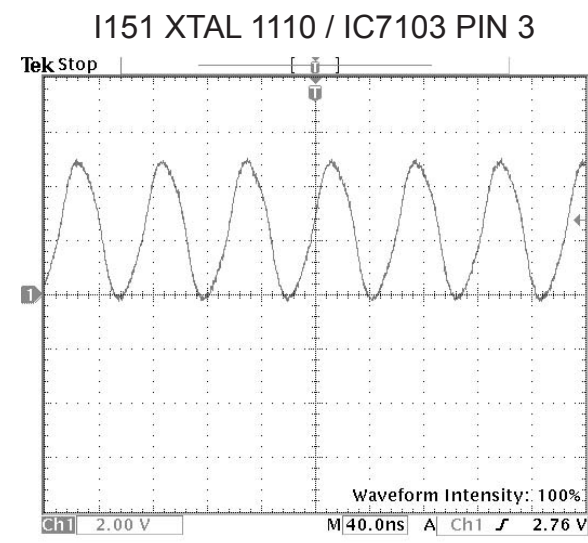
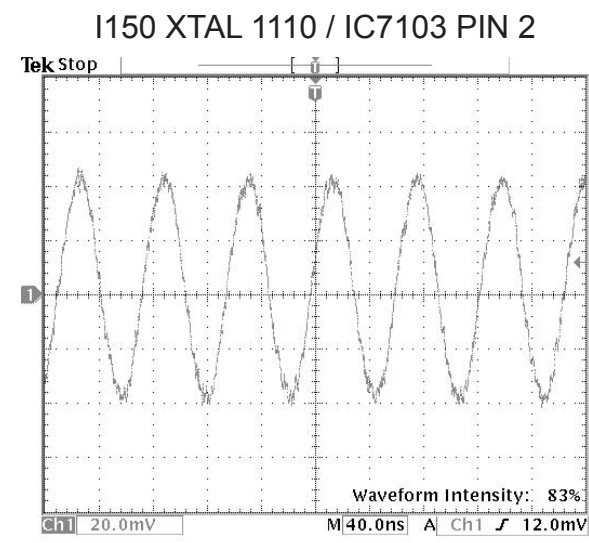
I904 IC7910 PIN 12



I905 IC7910 PIN 11



Waveforms of Front Board

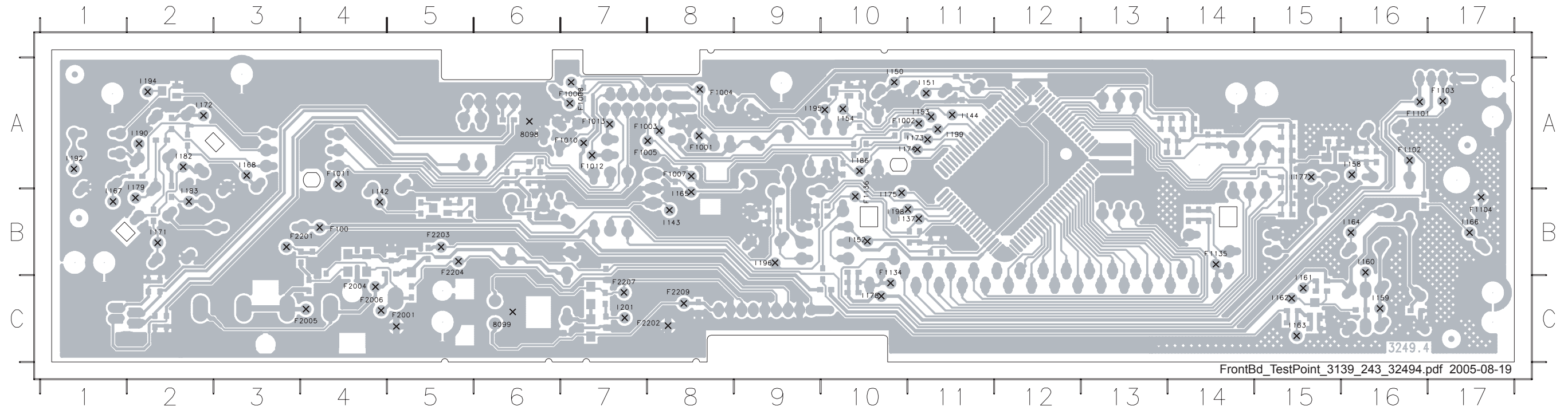


Test Points Overview for Analog Board

F100	C22	F22	A6	F27	F4	F6	F8	F10	F12	F14	F16	F18	F20	F22	F24	F26	F28	F30	F32	F34	F36	F38	F40	F42	F44	F46	F48	F50	F52	F54	F56	F58	F60	F62	F64	F66	F68	F70	F72	F74	F76	F78	F80	F82	F84	F86	F88	F90	F92	F94	F96	F98	F100	F102	F104	F106	F108	F110	F112	F114	F116	F118	F120	F122	F124	F126	F128	F130	F132	F134	F136	F138	F140	F142	F144	F146	F148	F150	F152	F154	F156	F158	F160	F162	F164	F166	F168	F170	F172	F174	F176	F178	F180	F182	F184	F186	F188	F190	F192	F194	F196	F198	F200	F202	F204	F206	F208	F210	F212	F214	F216	F218	F220	F222	F224	F226	F228	F230	F232	F234	F236	F238	F240	F242	F244	F246	F248	F250	F252	F254	F256	F258	F260	F262	F264	F266	F268	F270	F272	F274	F276	F278	F280	F282	F284	F286	F288	F290	F292	F294	F296	F298	F300	F302	F304	F306	F308	F310	F312	F314	F316	F318	F320	F322	F324	F326	F328	F330	F332	F334	F336	F338	F340	F342	F344	F346	F348	F350	F352	F354	F356	F358	F360	F362	F364	F366	F368	F370	F372	F374	F376	F378	F380	F382	F384	F386	F388	F390	F392	F394	F396	F398	F400	F402	F404	F406	F408	F410	F412	F414	F416	F418	F420	F422	F424	F426	F428	F430	F432	F434	F436	F438	F440	F442	F444	F446	F448	F450	F452	F454	F456	F458	F460	F462	F464	F466	F468	F470	F472	F474	F476	F478	F480	F482	F484	F486	F488	F490	F492	F494	F496	F498	F500	F502	F504	F506	F508	F510	F512	F514	F516	F518	F520	F522	F524	F526	F528	F530	F532	F534	F536	F538	F540	F542	F544	F546	F548	F550	F552	F554	F556	F558	F560	F562	F564	F566	F568	F570	F572	F574	F576	F578	F580	F582	F584	F586	F588	F590	F592	F594	F596	F598	F600	F602	F604	F606	F608	F610	F612	F614	F616	F618	F620	F622	F624	F626	F628	F630	F632	F634	F636	F638	F640	F642	F644	F646	F648	F650	F652	F654	F656	F658	F660	F662	F664	F666	F668	F670	F672	F674	F676	F678	F680	F682	F684	F686	F688	F690	F692	F694	F696	F698	F700	F702	F704	F706	F708	F710	F712	F714	F716	F718	F720	F722	F724	F726	F728	F730	F732	F734	F736	F738	F740	F742	F744	F746	F748	F750	F752	F754	F756	F758	F760	F762	F764	F766	F768	F770	F772	F774	F776	F778	F780	F782	F784	F786	F788	F790	F792	F794	F796	F798	F800	F802	F804	F806	F808	F810	F812	F814	F816	F818	F820	F822	F824	F826	F828	F830	F832	F834	F836	F838	F840	F842	F844	F846	F848	F850	F852	F854	F856	F858	F860	F862	F864	F866	F868	F870	F872	F874	F876	F878	F880	F882	F884	F886	F888	F890	F892	F894	F896	F898	F900	F902	F904	F906	F908	F910	F912	F914	F916	F918	F920	F922	F924	F926	F928	F930	F932	F934	F936	F938	F940	F942	F944	F946	F948	F950	F952	F954	F956	F958	F960	F962	F964	F966	F968	F970	F972	F974	F976	F978	F980	F982	F984	F986	F988	F990	F992	F994	F996	F998	F1000	F1002	F1004	F1006	F1008	F1010	F1012	F1014	F1016	F1018	F1020	F1022	F1024	F1026	F1028	F1030	F1032	F1034	F1036	F1038	F1040	F1042	F1044	F1046	F1048	F1050	F1052	F1054	F1056	F1058	F1060	F1062	F1064	F1066	F1068	F1070	F1072	F1074	F1076	F1078	F1080	F1082	F1084	F1086	F1088	F1090	F1092	F1094	F1096	F1098	F1100	F1102	F1104	F1106	F1108	F1110	F1112	F1114	F1116	F1118	F1120	F1122	F1124	F1126	F1128	F1130	F1132	F1134	F1136	F1138	F1140	F1142	F1144	F1146	F1148	F1150	F1152	F1154	F1156	F1158	F1160	F1162	F1164	F1166	F1168	F1170	F1172	F1174	F1176	F1178	F1180	F1182	F1184	F1186	F1188	F1190	F1192	F1194	F1196	F1198	F1200	F1202	F1204	F1206	F1208	F1210	F1212	F1214	F1216	F1218	F1220	F1222	F1224	F1226	F1228	F1230	F1232	F1234	F1236	F1238	F1240	F1242	F1244	F1246	F1248	F1250	F1252	F1254	F1256	F1258	F1260	F1262	F1264	F1266	F1268	F1270	F1272	F1274	F1276	F1278	F1280	F1282	F1284	F1286	F1288	F1290	F1292	F1294	F1296	F1298	F1300	F1302	F1304	F1306	F1308	F1310	F1312	F1314	F1316	F1318	F1320	F1322	F1324	F1326	F1328	F1330	F1332	F1334	F1336	F1338	F1340	F1342	F1344	F1346	F1348	F1350	F1352	F1354	F1356	F1358	F1360	F1362	F1364	F1366	F1368	F1370	F1372	F1374	F1376	F1378	F1380	F1382	F1384	F1386	F1388	F1390	F1392	F1394	F1396	F1398	F1400	F1402	F1404	F1406	F1408	F1410	F1412	F1414	F1416	F1418	F1420	F1422	F1424	F1426	F1428	F1430	F1432	F1434	F1436	F1438	F1440	F1442	F1444	F1446	F1448	F1450	F1452	F1454	F1456	F1458	F1460	F1462	F1464	F1466	F1468	F1470	F1472	F1474	F1476	F1478	F1480	F1482	F1484	F1486	F1488	F1490	F1492	F1494	F1496	F1498	F1500	F1502	F1504	F1506	F1508	F1510	F1512	F1514	F1516	F1518	F1520	F1522	F1524	F1526	F1528	F1530	F1532	F1534	F1536	F1538	F1540	F1542	F1544	F1546	F1548	F1550	F1552	F1554	F1556	F1558	F1560	F1562	F1564	F1566	F1568	F1570	F1572	F1574	F1576	F1578	F1580	F1582	F1584	F1586	F1588	F1590	F1592	F1594	F1596	F1598	F1600	F1602	F1604	F1606	F1608	F1610	F1612	F1614	F1616	F1618	F1620	F1622	F1624	F1626	F1628	F1630	F1632	F1634	F1636	F1638	F1640	F1642	F1644	F1646	F1648	F1650	F1652	F1654	F1656	F1658	F1660	F1662	F1664	F1666	F1668	F1670	F1672	F1674	F1676	F1678	F1680	F1682	F1684	F1686	F1688	F1690	F1692	F1694	F1696	F1698	F1700	F1702	F1704	F1706	F1708	F1710	F1712	F1714	F1716	F1718	F1720	F1722	F1724	F1726	F1728	F1730	F1732	F1734	F1736	F1738	F1740	F1742	F1744	F1746	F1748	F1750	F1752	F1754	F1756	F1758	F1760	F1762	F1764	F1766	F1768	F1770	F1772	F1774	F1776	F1778	F1780	F1782	F1784	F1786	F1788	F1790	F1792	F1794	F1796	F1798	F1800	F1802	F1804	F1806	F1808	F1810	F1812	F1814	F1816	F1818	F1820	F1822	F1824	F1826	F1828	F1830	F1832	F1834	F1836	F1838	F1840	F1842	F1844	F1846	F1848	F1850	F1852	F1854	F1856	F1858	F1860	F1862	F1864	F1866	F1868	F1870	F1872	F1874	F1876	F1878	F1880	F1882	F1884	F1886	F1888	F1890	F1892	F1894	F1896	F1898	F1900	F1902	F1904	F1906	F1908	F1910	F1912	F1914	F1916	F1918	F1920	F1922	F1924	F1926	F1928	F1930	F1932	F1934	F1936	F1938	F1940	F1942	F1944	F1946	F1948	F1950	F1952	F1954	F1956	F1958	F1960	F1962	F1964	F1966	F1968	F1970	F1972	F1974	F1976	F1978	F1980	F1982	F1984	F1986	F1988	F1990	F1992	F1994	F1996	F1998	F2000	F2002	F2004	F2006	F2008	F2010	F2012	F2014	F2016	F2018	F2020	F2022	F2024	F2026	F2028	F2030	F2032	F2034	F2036	F2038	F2040	F2042	F2044	F2046	F2048	F2050	F2052	F2054	F2056	F2058	F2060	F2062	F2064	F2066	F2068	F2070	F2072	F2074	F2076	F2078	F2080	F2082	F2084	F2086	F2088	F2090	F2092	F2094	F2096	F2098	F2100	F2102	F2104	F2106	F2108	F2110	F2112	F2114	F2116	F2118	F2120	F2122	F2124	F2126	F2128	F2130	F2132	F2134	F2136	F2138	F2140	F2142	F2144	F2146	F2148	F2150	F2152	F2154	F2156	F2158	F2160	F2162	F2164	F2166	F2168	F2170	F2172	F2174	F2176	F2178	F2180	F2182	F2184	F2186	F2188	F2190	F2192	F2194	F2196	F2198	F2200	F2202	F2204	F2206	F2208	F2210	F2212	F2214	F2216	F2218	F2220	F2222	F2224	F2226	F2228	F2230	F2232	F2234	F2236	F2238	F2240	F2242	F2244	F2246	F2248	F2250	F2252	F2254	F2256	F2258	F2260	F2262	F2264	F2266	F2268	F2270	F2272	F2274	F2276	F2278	F2280	F2282	F2284	F2286	F2288	F2290	F2292	F2294	F2296	F2298	F2300	F2302	F2304	F2306	F2308	F2310	F2312	F2314	F2316	F2318	F2320	F2322	F2324	F2326	F2328	F2330	F2332	F2334	F2336	F2338	F2340	F2342	F2344	F2346	F2348	F2350	F2352	F2354	F2356	F2358	F2360	F2362	F2364	F2366	F2368	F2370	F2372	F2374	F2376	F2378	F2380	F2382	F2384	F2386	F2388	F2390	F2392	F2394	F2396	F2398	F2400	F2402	F2404	F2406	F2408	F2410	F2412	F2414	F2416	F2418	F2420	F2422	F2424	F2426	F2428	F2430	F2432	F2434	F2436	F2438	F2440	F2442	F2444	F2446	F2448	F2450	F2452	F2454	F2456	F2458	F2460	F2462	F2464	F2466	F2468	F2470	F2472	F2474	F2476	F2478	F2480	F2482	F2484	F2486	F2488	F2490	F2492	F2494	F2496	F2498	F2500	F2502	F2504	F2506	F2508	F2510	F2512	F2514	F2516	F2518	F2520	F2522	F2524	F2526	F2528	F2530	F2532	F2534	F2536	F2538	F2540	F2542	F2544	F2546	F2548	F2550	F2552	F2554	F2556	F2558	F2560	F2562	F2564	F2566	F2568	F2570	F2572	F2574	F2576	F2578	F2580	F2582	F2584	F2586	F2588	F2590	F2592	F2594	F2596	F2598	F2600	F2602	F2604	F2606	F2608	F2610	F2612	F2614	F2616	F2618	F2620	F2622	F2624	F2626	F2628	F2630	F2632	F2634	F2636	F2638	F2640	F2642	F2644	F2646	F2648	F2650	F2652	F2654	F2656	F2658	F2660	F2662	F2664	F2666	F2668	F2670	F2672	F2674	F2676	F2678	F2680	F2682	F2684	F2686	F2688	F2690	F2692	F2694	F2696	F2698	F2700	F2702	F2704	F2706	F2708	F2710	F2712	F2714	F2716	F2718	F2720	F2722	F2724	F2726	F2728	F2730	F2732	F2734	F2736	F2738	F2740	F2742	F2744	F2746	F2748	F2750	F2752	F2754	F2756	F2758	F2760	F2762	F2764	F2766	F2768	F2770	F2772	F2774	F2776	F2778	F2780	F2782	F2784	F2786	F2788	F2790	F2792	F2794	F2796	F2798	F2800	F2802	F2804	F2806	F2808	F2810	F2812	F2814
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Test Points Overview for Display/Front Connector Board

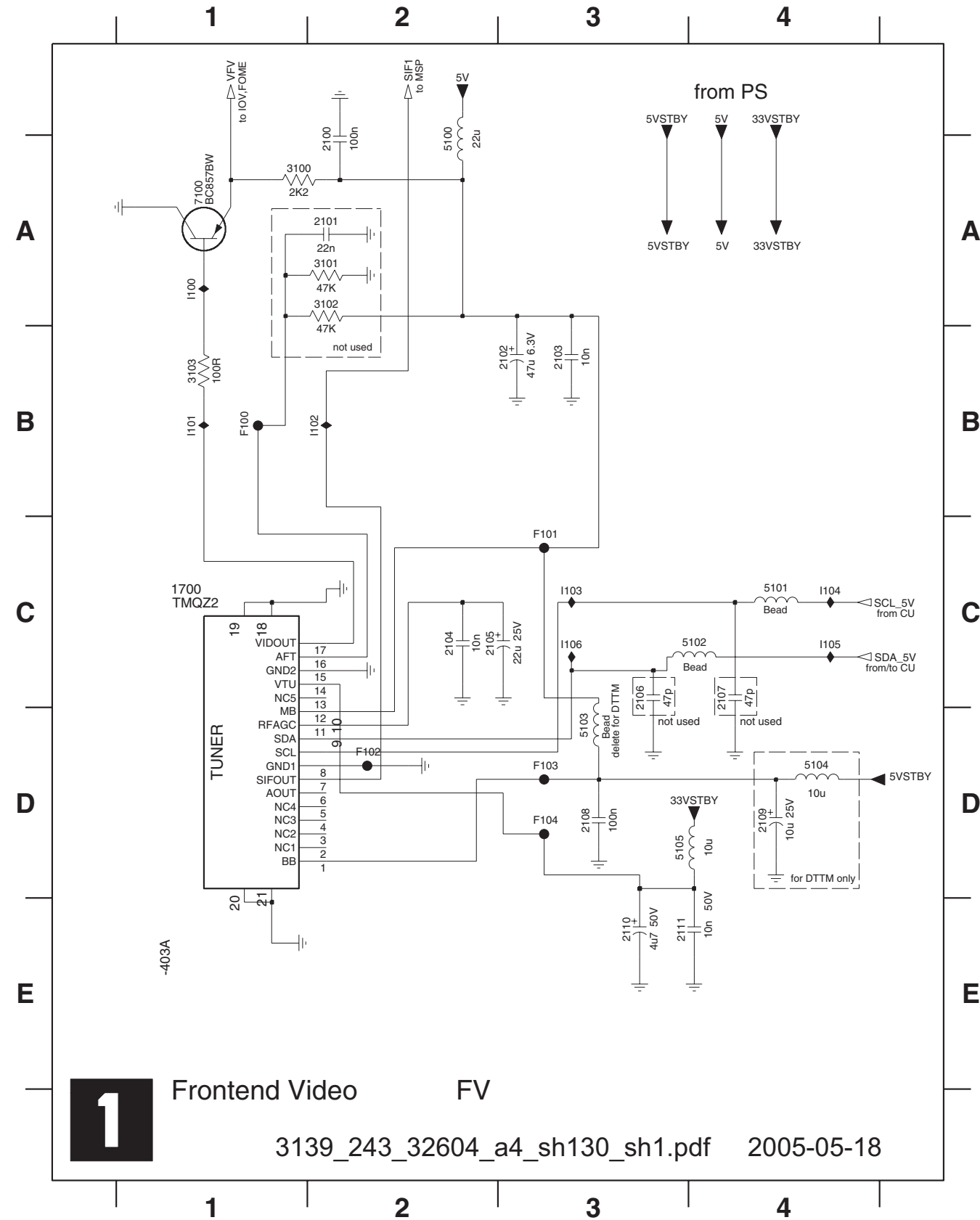
8098 A6	F 1003 A8	F 1008 A7	F 1101 A16	F 1135 B14	F 2006 C4	F 2207 C7	I 144 A11	I 154 A10	I 162 C15	I 167 B1	I 174 A11	I 182 A2	I 194 A2	I 201 C7
8099 C6	F 1004 A8	F 1010 A7	F 1102 A16	F 1136 B10	F 2201 B3	F 2209 C8	I 150 A10	I 158 A16	I 163 C15	I 168 A3	I 175 B10	I 183 B2	I 195 A10	
F 100 B4	F 1005 A8	F 1011 A4	F 1103 A17	F 2001 C5	F 2202 C8	I 137 B11	I 151 A11	I 159 C16	I 164 B16	I 171 B2	I 177 A15	I 186 A10	I 196 B9	
F 1001 A8	F 1006 A7	F 1012 A7	F 1104 B17	F 2004 C4	F 2203 B5	I 142 B4	I 152 B10	I 160 B16	I 165 B8	I 172 A2	I 178 C10	I 190 A2	I 198 B11	
F 1002 A11	F 1007 A8	F 1013 A7	F 1134 C10	F 2005 C4	F 2204 B5	I 143 B8	I 153 A11	I 161 C15	I 166 B17	I 173 A11	I 179 B2	I 192 A1	I 199 A11	



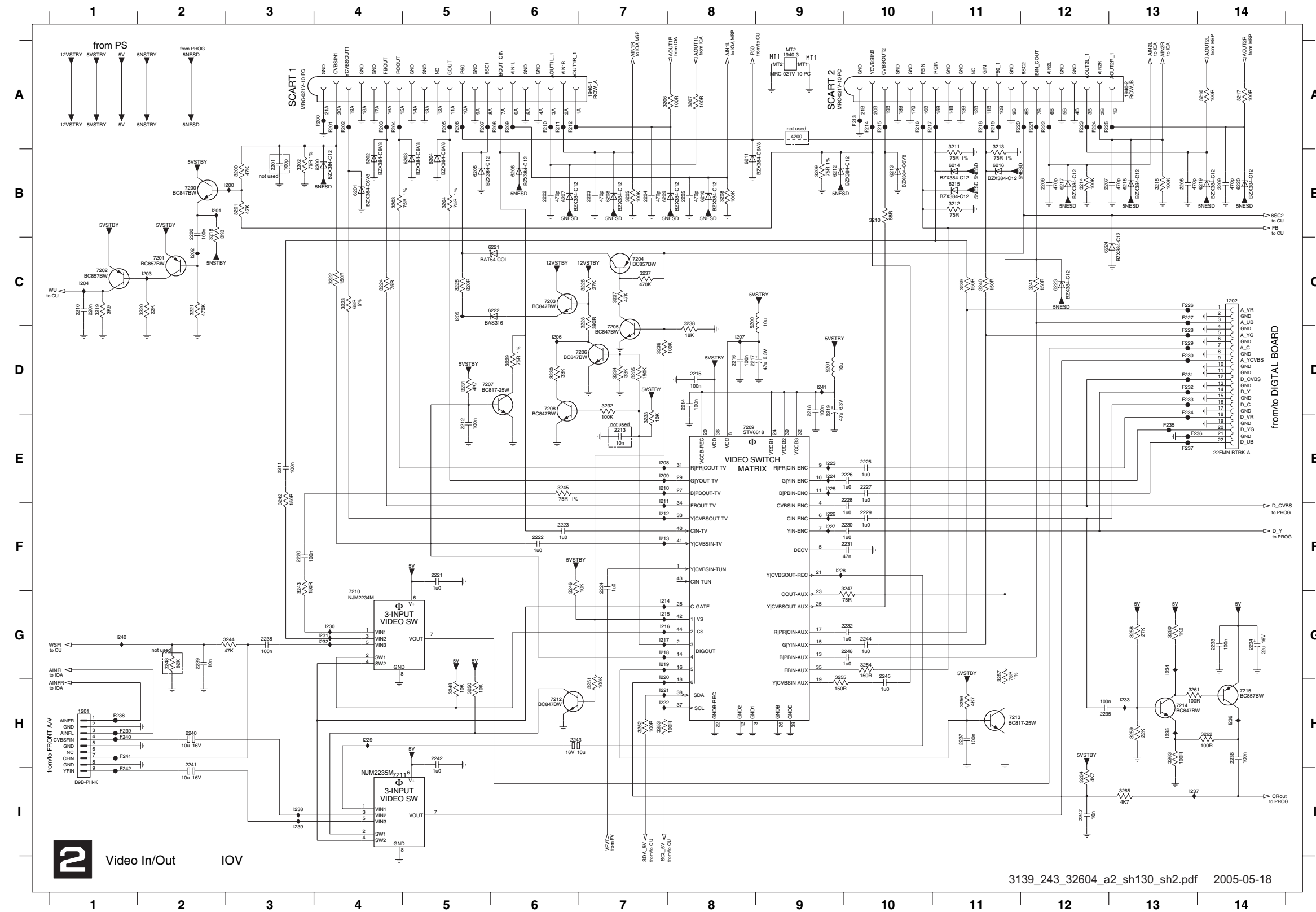
7. Circuit Diagrams and PWB Layouts

Analog: Frontend Video (FV)

1700 C1	2102 B3	2105 C2	2108 D3	2111 E3	3102 A2	5101 C4	5104 D4	F100 B1	F103 D3	I101 B1	I104 C4
2100 A2	2103 B3	2106 C3	2109 D4	3100 A1	3103 B1	5102 C4	5105 D3	F101 C3	F104 D3	I102 B2	I105 C4
2101 A2	2104 C2	2107 C4	2110 E3	3101 A2	5100 A2	5103 D3	7100 A1	F102 D2	I100 A1	I103 C3	I106 C3

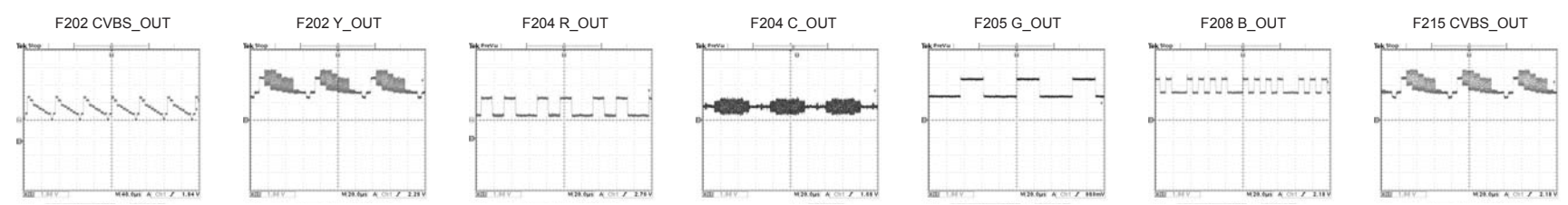


Analog: Video In / Out (IOV)

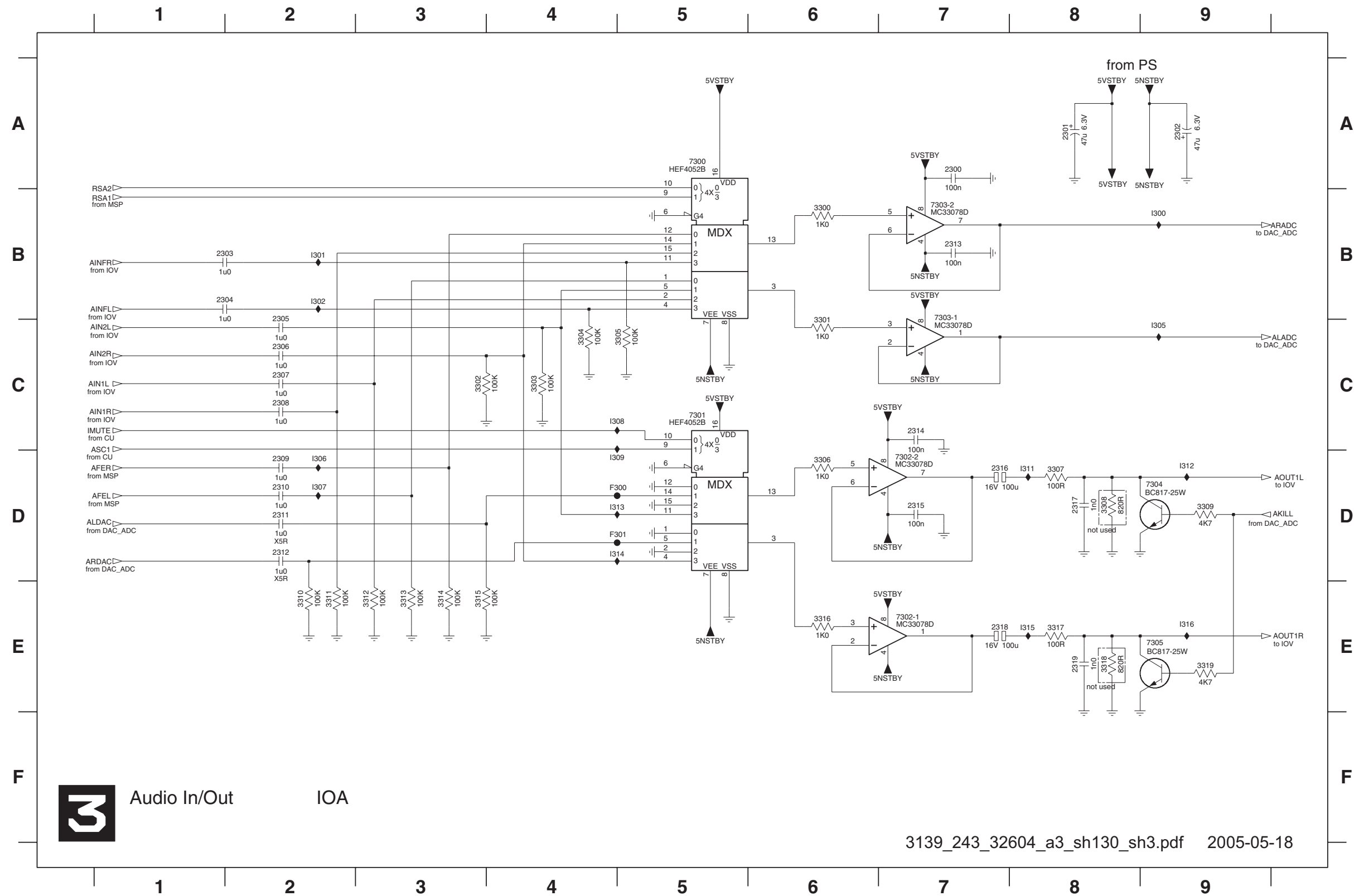


- 1201 H1
- 1202 C14
- 1940-1 A7
- 1940-2 A13
- 1940-3 A9
- 2200 B2
- 2201 B3
- 2202 B6
- 2203 B7
- 2204 B7
- 2205 B8
- 2206 B8
- 2207 B12
- 2208 B13
- 2209 B14
- 2210 C1
- 2211 E3
- 2212 E5
- 2213 E7
- 2214 D8
- 2215 D8
- 2216 D8
- 2217 D8
- 2218 D9
- 2219 D9
- 2220 F3
- 2221 F5
- 2222 F6
- 2223 F6
- 2224 F7
- 2225 E10
- 2226 E10
- 2227 E10
- 2228 E10
- 2229 F10
- 2230 F10
- 2231 F10
- 2232 G10
- 2233 G14
- 2234 G14
- 2235 H12
- 2236 H14
- 2237 H11
- 2238 G3
- 2239 G2
- 2240 H2
- 2241 H2
- 2242 H5
- 2243 H6
- 2244 G10
- 2245 G10
- 2246 G10
- 2247 I12
- 3200 B3
- 3201 B3
- 3202 B3
- 3203 B4
- 3204 B5
- 3205 B7
- 3206 A7
- 3207 A8
- 3208 B8
- 3209 B8
- 3210 B10
- 3211 H1
- 3212 B11
- 3213 A11
- 3214 B11
- 3215 B12
- 3216 A14
- 3217 A14
- 3218 B2
- 3219 C1
- 3220 C2
- 3221 C2
- 3222 C4
- 3223 C4
- 3224 C4
- 3225 C5
- 3226 C7
- 3227 C7
- 3228 C7
- 3229 D6
- 3230 D6
- 3231 D5
- 3232 D7
- 3233 E7
- 3234 D7
- 3235 D7
- 3236 D7
- 3237 C7
- 3238 C8
- 3239 C11
- 3240 C11
- 3241 C12
- 3242 E3
- 3243 F3
- 3244 G3
- 3245 E6
- 3246 F6
- 3247 F10
- 3248 G2
- 3249 H5
- 3250 H5
- 3251 H7
- 3252 H7
- 3253 H7
- 3254 G10
- 3255 G9
- 3256 H11
- 3257 G11
- 3258 G13
- 3259 H13
- 3260 G13
- 3261 H13
- 3262 H14
- 3263 H13
- 3264 I12
- 3265 I13
- 4200 A9
- 5200 C8
- 5201 D9
- 6200 B4
- 6201 B4
- 6202 B4
- 6203 B5
- 6204 B5

3139_243_32604_a2_sh130_sh2.pdf 2005-05-18

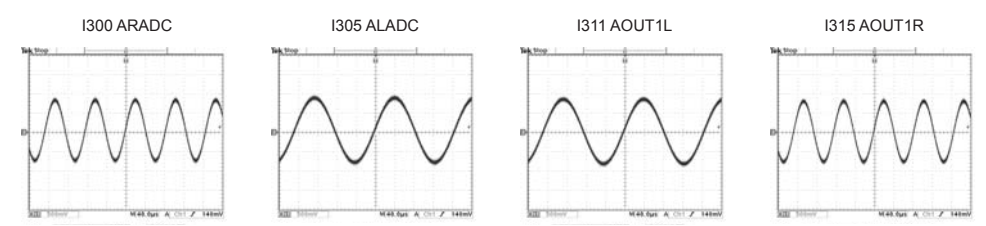


Analog: Audio In / Out (IOA)



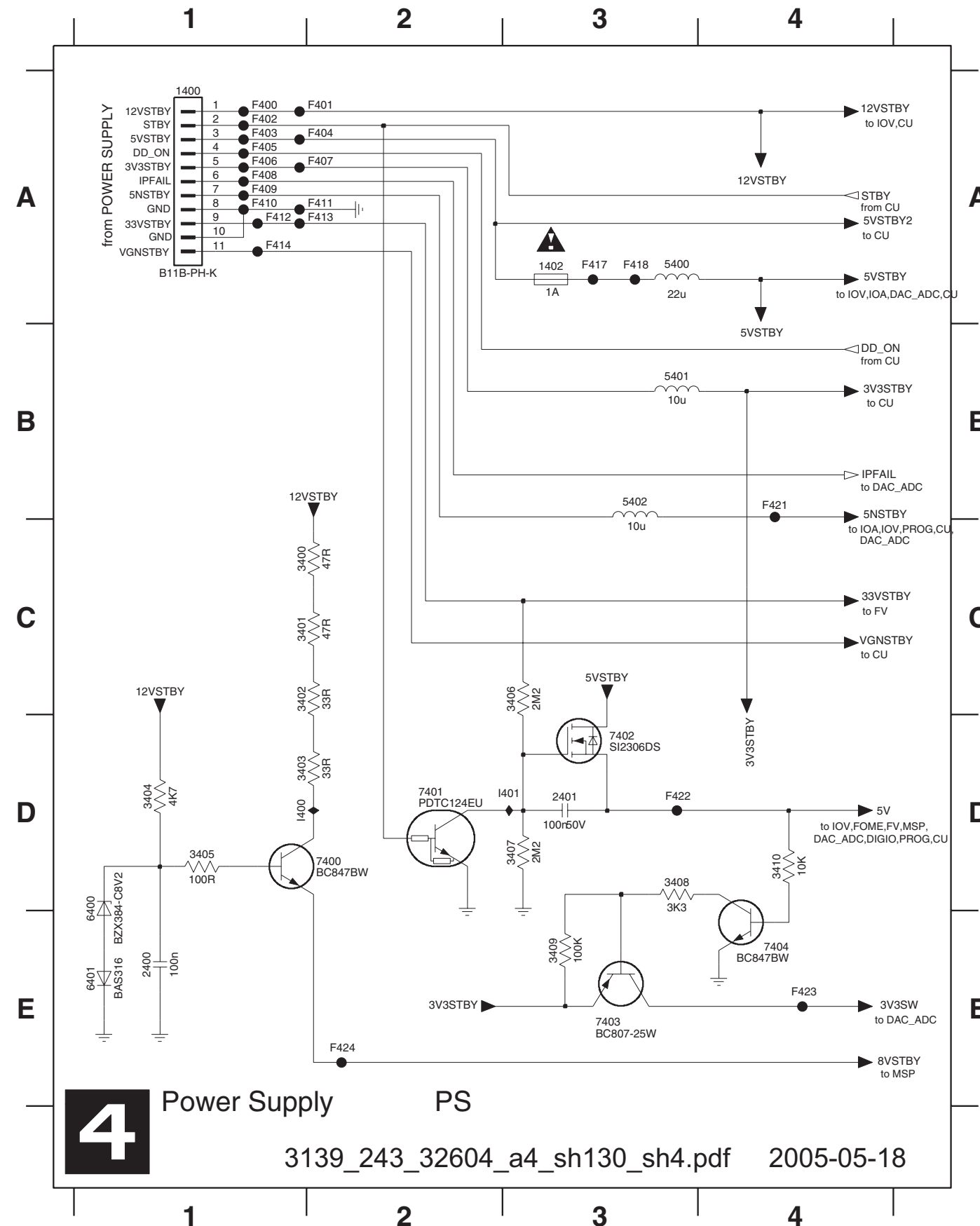
- 2300 A7
- 2301 A8
- 2302 A9
- 2303 B1
- 2304 B1
- 2305 C2
- 2306 C2
- 2307 C2
- 2308 C2
- 2309 D2
- 2310 D2
- 2311 D2
- 2312 D2
- 2313 B7
- 2314 C7
- 2315 D7
- 2316 D7
- 2317 D8
- 2318 E7
- 2319 E8
- 3300 B6
- 3301 C6
- 3302 C3
- 3303 C4
- 3304 C4
- 3305 C5
- 3306 D6
- 3307 D8
- 3308 D8
- 3309 D9
- 3310 E2
- 3311 E2
- 3312 E3
- 3313 E3
- 3314 E3
- 3315 E3
- 3316 E6
- 3317 E8
- 3318 E8
- 3319 E9
- 7300 A5
- 7301 C5
- 7302-1 E7
- 7302-2 D7
- 7303-1 C7
- 7303-2 B7
- 7304 D9
- 7305 E9
- F300 D5
- F301 D5
- I300 B9
- I301 B2
- I302 B2
- I305 C9
- I306 D2
- I307 D2
- I308 C4
- I309 D4
- I311 D8
- I312 D9
- I313 D4
- I314 D4
- I315 E8
- I316 E9

3139_243_32604_a3_sh130_sh3.pdf 2005-05-18

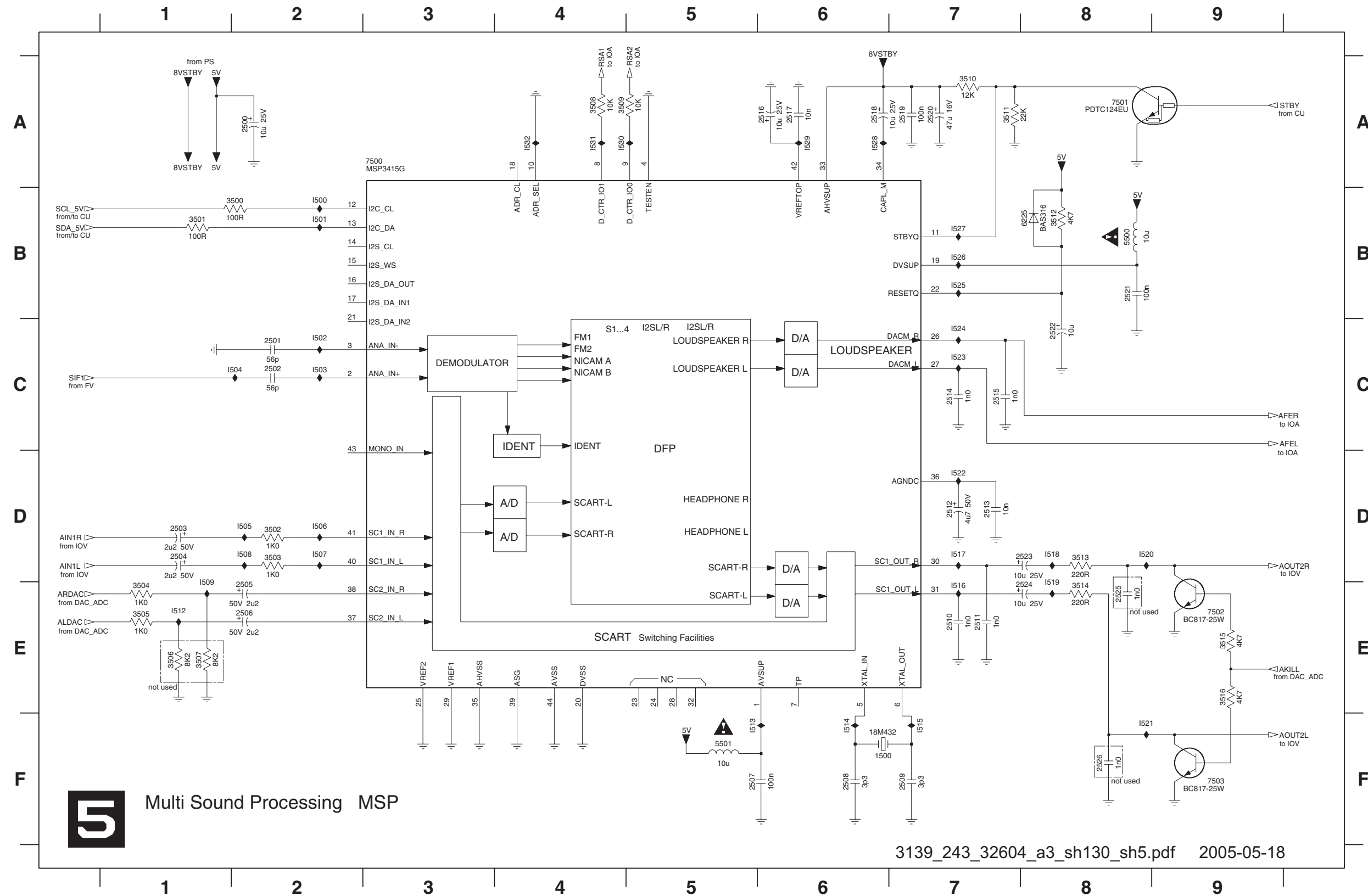


Analog: Power Supply (PS)

1400 A1	3400 C1	3404 D1	3408 D3	5401 B3	7400 D2	7404 E4	F403 A1	F407 A2	F411 A2	F417 A3	F423 E4
1402 A3	3401 C1	3405 D1	3409 E3	5402 B3	7401 D2	F400 A1	F404 A2	F408 A1	F412 A1	F418 A3	F424 E2
2400 E1	3402 C1	3406 C3	3410 D4	6400 D1	7402 D3	F401 A2	F405 A1	F409 A1	F413 A2	F421 B4	I400 D1
2401 D3	3403 D1	3407 D3	5400 A3	6401 E1	7403 E3	F402 A1	F406 A1	F410 A1	F414 A1	F422 D3	I401 D3



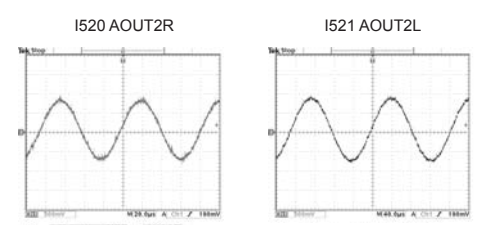
Analog: Multi Sound Processing (MSP)



5 Multi Sound Processing MSP

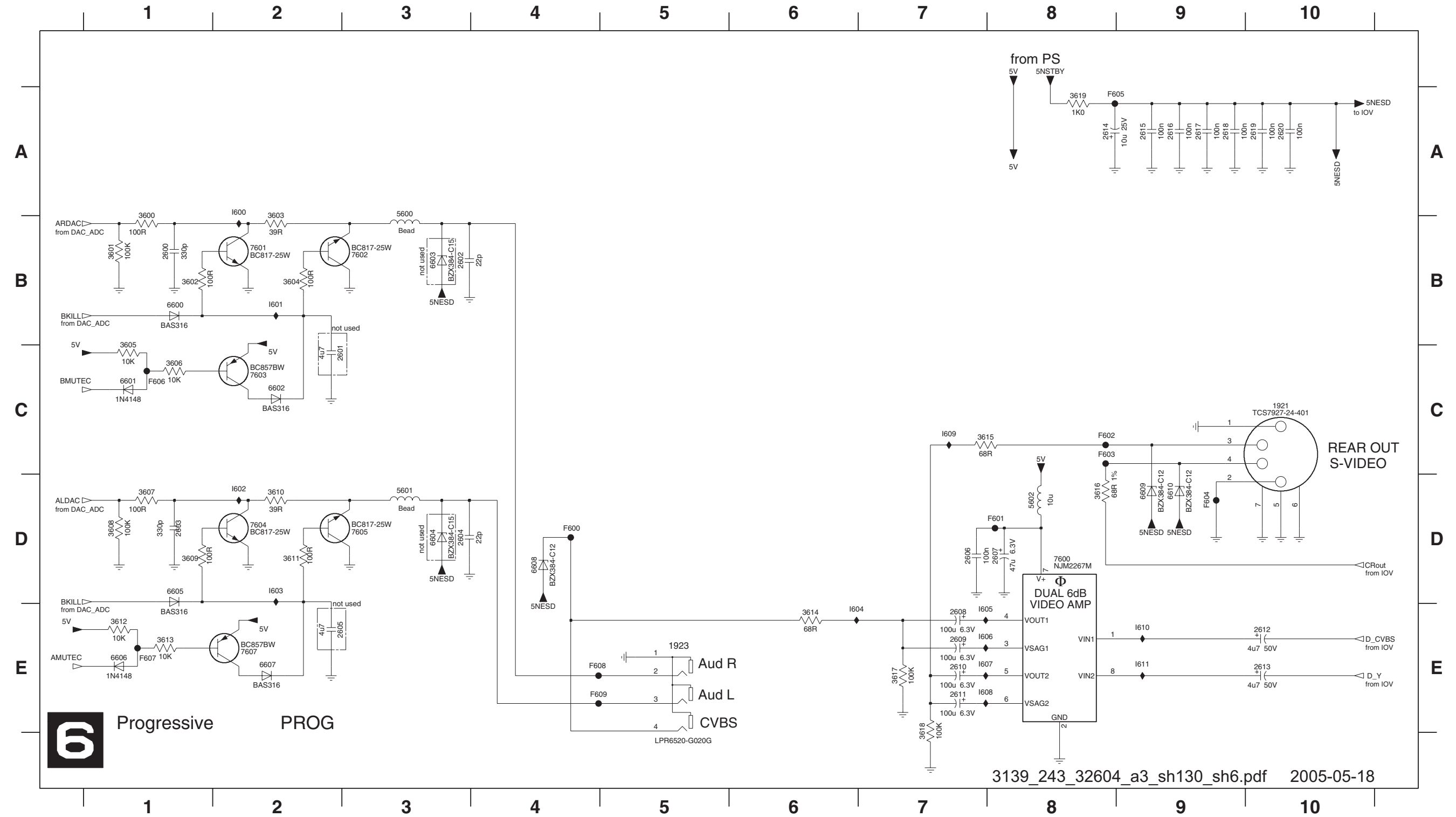
3139_243_32604_a3_sh130_sh5.pdf 2005-05-18

- 1500 F6
- 2500 A2
- 2501 C2
- 2502 C2
- 2503 D1
- 2504 D1
- 2505 E2
- 2506 E2
- 2507 F5
- 2508 F6
- 2509 F7
- 2510 E7
- 2511 E7
- 2512 D7
- 2513 D7
- 2514 C7
- 2515 C7
- 2516 A6
- 2517 A6
- 2518 A6
- 2519 A7
- 2520 A7
- 2521 B8
- 2522 C8
- 2523 D8
- 2524 E8
- 2525 E8
- 2526 F8
- 3500 B2
- 3501 B1
- 3502 D2
- 3503 D2
- 3504 E1
- 3505 E1
- 3506 E1
- 3507 E1
- 3508 A4
- 3509 A4
- 3510 A7
- 3511 A7
- 3512 B8
- 3513 D8
- 3514 E8
- 3515 E9
- 3516 E9
- 5500 B8
- 5501 F5
- 6225 B8
- 7500 A3
- 7501 A8
- 7502 E9
- 7503 F9
- I500 B2
- I501 B2
- I502 C2
- I503 C2
- I504 C2
- I505 D2
- I506 D2
- I507 D2
- I508 D2
- I509 E1
- I512 E1
- I513 F5
- I514 F6
- I515 F7
- I516 E7
- I517 D7
- I518 D8
- I519 E8
- I520 D8
- I521 F8
- I522 D7
- I523 C7
- I524 C7
- I525 B7
- I526 B7
- I527 B7
- I528 A6
- I529 A6
- I530 A4
- I531 A4
- I532 A4



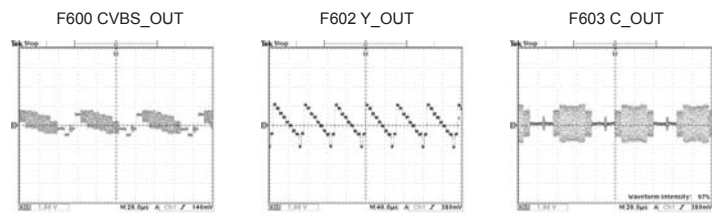
Analog: Progressive (PROG)

1921 C10	2602 B3	2606 D7	2610 E7	2614 A8	2618 A9	3601 B1	3605 C1	3609 D1	3613 E1	3617 E7	5601 D3	6602 C2	6606 E1	6610 D9	7603 C2	F600 D4	F604 D9	F608 E4	I602 D2	I606 E7	I610 E9
1923 E5	2603 D1	2607 D8	2611 E7	2615 A9	2619 A10	3602 B1	3606 C1	3610 D2	3614 E6	3618 E7	5602 D8	6603 B3	6607 E2	7600 D8	7604 D2	F601 D8	F605 A8	F609 E4	I603 D2	I607 E7	I611 E9
2600 B1	2604 D3	2608 E7	2612 E10	2616 A9	2620 A10	3603 B2	3607 D1	3611 D2	3615 C7	3619 A8	6600 B1	6604 D3	6608 D4	7601 B2	7605 D3	F602 C8	F606 C1	I600 A2	I604 E6	I608 E7	
2601 C2	2605 E2	2609 E7	2613 E10	2617 A9	3600 B1	3604 B2	3608 D1	3612 E1	3616 D8	5600 B3	6601 C1	6605 D1	6609 D9	7602 B3	7607 E2	F603 C8	F607 E1	I601 B2	I605 E7	I609 C7	

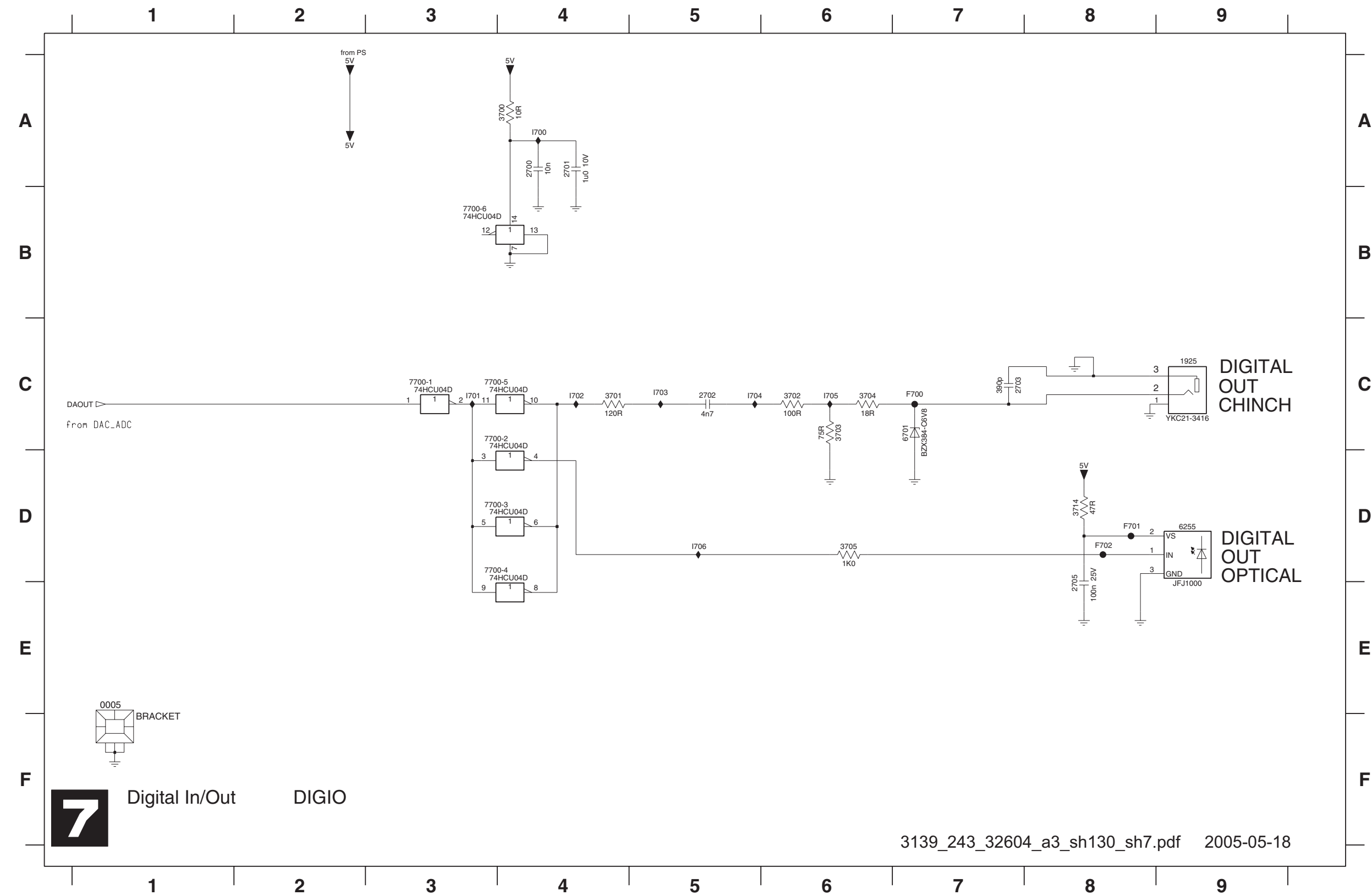


6 Progressive PROG

3139_243_32604_a3_sh130_sh6.pdf 2005-05-18



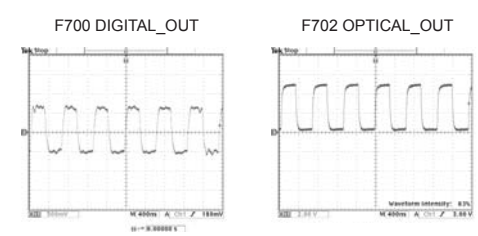
Analog: Digital In / Out (DIGIO)



- 0005 E1
- 1925 C9
- 2700 A4
- 2701 A4
- 2702 C5
- 2703 C7
- 2705 E8
- 3700 A4
- 3701 C4
- 3702 C6
- 3703 C6
- 3704 C6
- 3705 D6
- 3714 D8
- 6255 D9
- 6701 C7
- 7700-1 C3
- 7700-2 C4
- 7700-3 C4
- 7700-4 D4
- 7700-5 D4
- 7700-6 B3
- F700 C7
- F701 D8
- F702 D8
- I700 A4
- I701 C3
- I702 C4
- I703 C5
- I704 C5
- I705 C6
- I706 D5

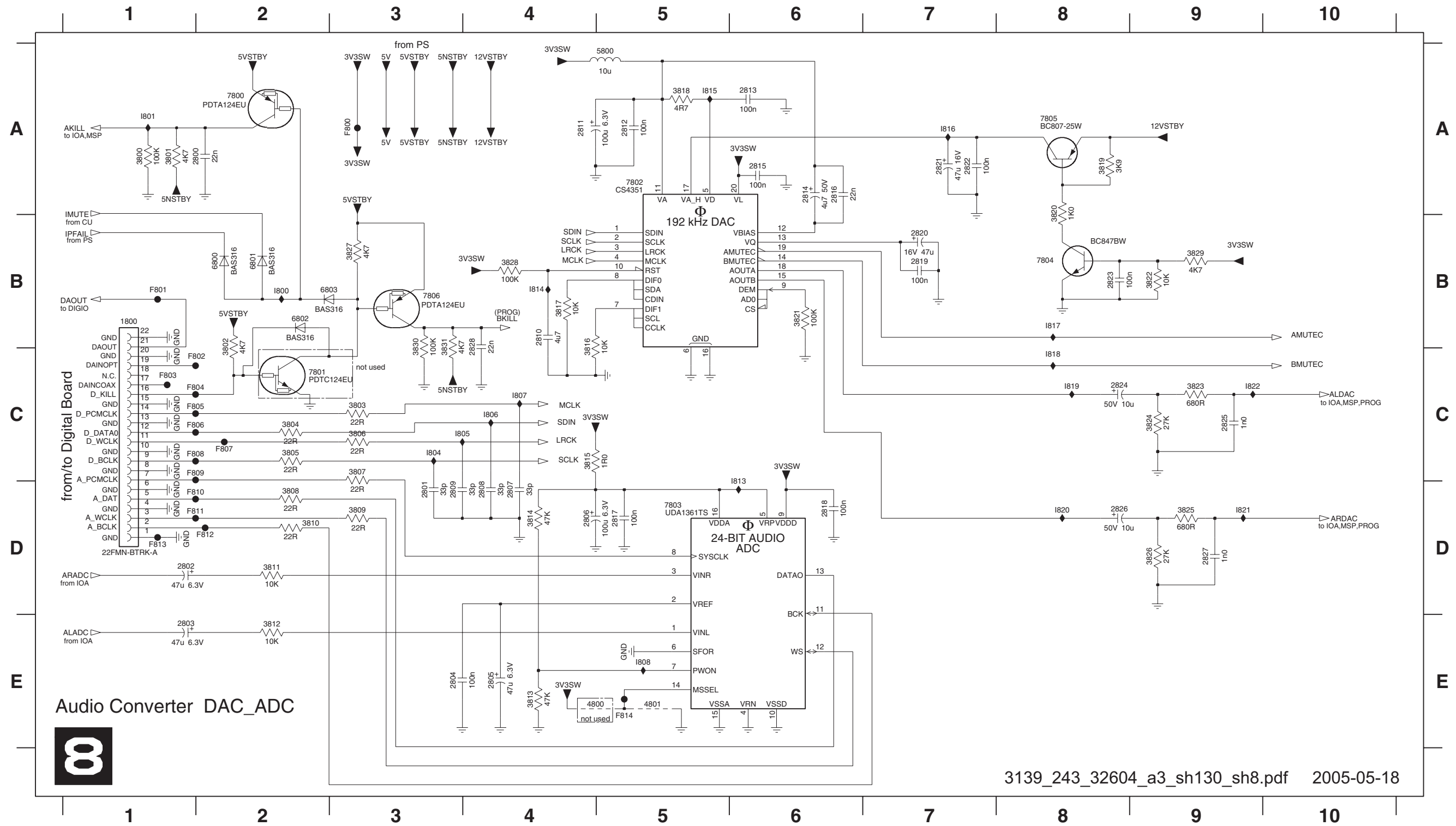
7 Digital In/Out DIGIO

3139_243_32604_a3_sh130_sh7.pdf 2005-05-18

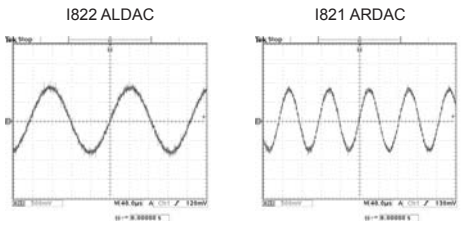


Analog: Audio Converter (DAC_ADC)

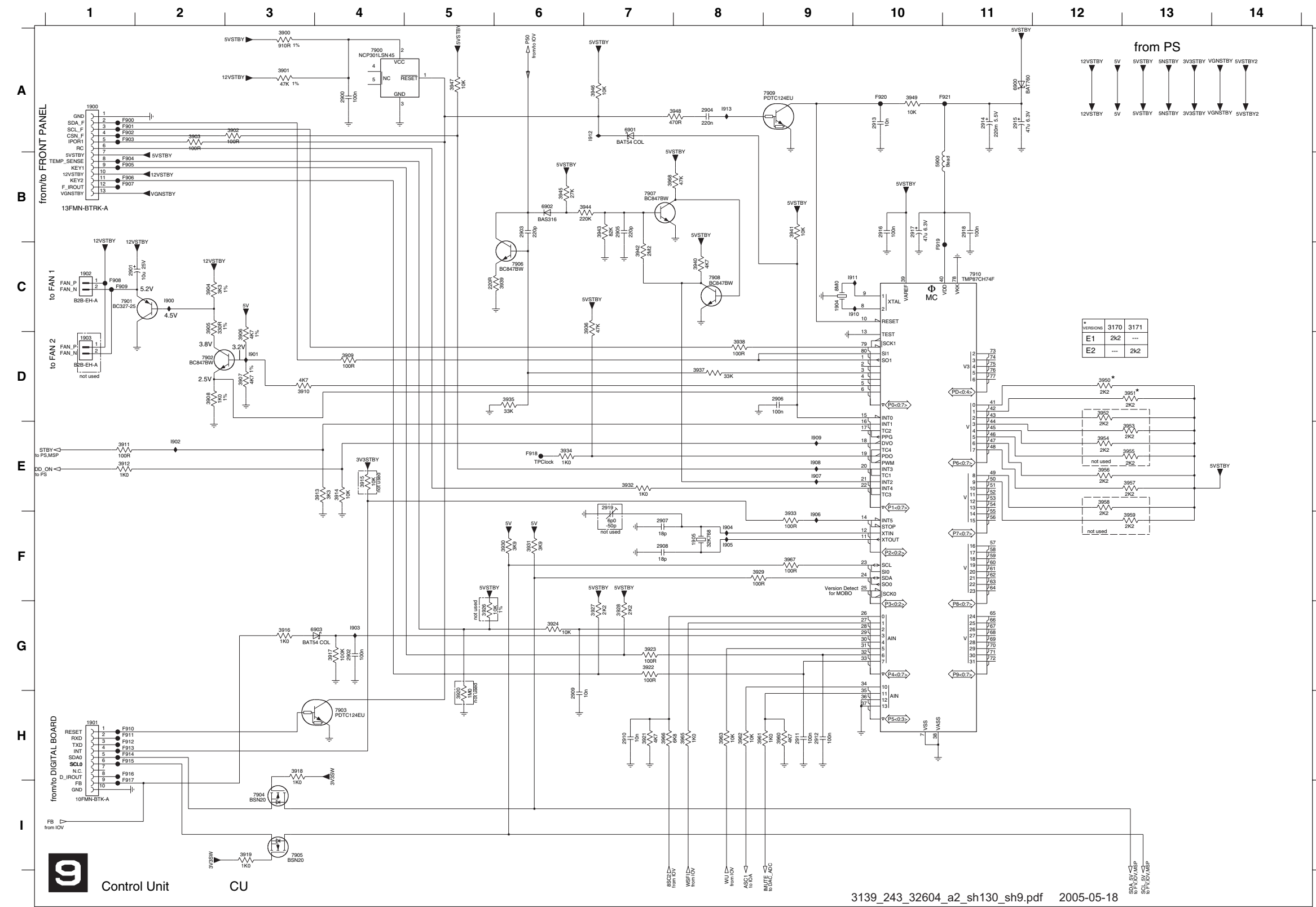
1800 B1	2803 E1	2807 D4	2811 A4	2815 A6	2819 B7	2823 B8	2827 D9	3802 B2	3806 C3	3810 D2	3814 D4	3818 A5	3822 B9	3826 D9	3830 B3	5800 A5	6803 B2	7803 D5	F800 A3	F804 C1	F808 C1	F812 D2	I801 A1	I807 C4	I815 A5	I819 C8
2800 A2	2804 E3	2808 D4	2812 A5	2816 A6	2820 B7	2824 C8	2828 B4	3803 C3	3807 C3	3811 D2	3815 C4	3819 A8	3823 C9	3827 B3	3831 B3	6800 B2	7800 A2	7804 B8	F801 B1	F805 C1	F809 C1	F813 D1	I804 C3	I808 E5	I816 A7	I820 D8
2801 D3	2805 E4	2809 D3	2813 A6	2817 D5	2821 A7	2825 C9	3800 A1	3804 C2	3808 D2	3812 E2	3816 B4	3820 A8	3824 C9	3828 B4	4800 E4	6801 B2	7801 C2	7805 A8	F802 C2	F806 C1	F810 D1	F814 E5	I805 C3	I813 C6	I817 B8	I821 D9
2802 D1	2806 D4	2810 B4	2814 A6	2818 D6	2822 A7	2826 D8	3801 A1	3805 C2	3809 D3	3813 E4	3817 B4	3821 B6	3825 D9	3829 B9	4801 E5	6802 B2	7802 A5	7806 B3	F803 C1	F807 C2	F811 D1	I800 B2	I806 C4	I814 B4	I818 C8	I822 C9



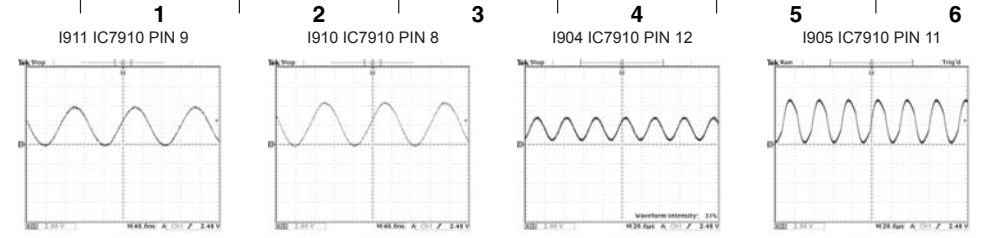
3139_243_32604_a3_sh130_sh8.pdf 2005-05-18



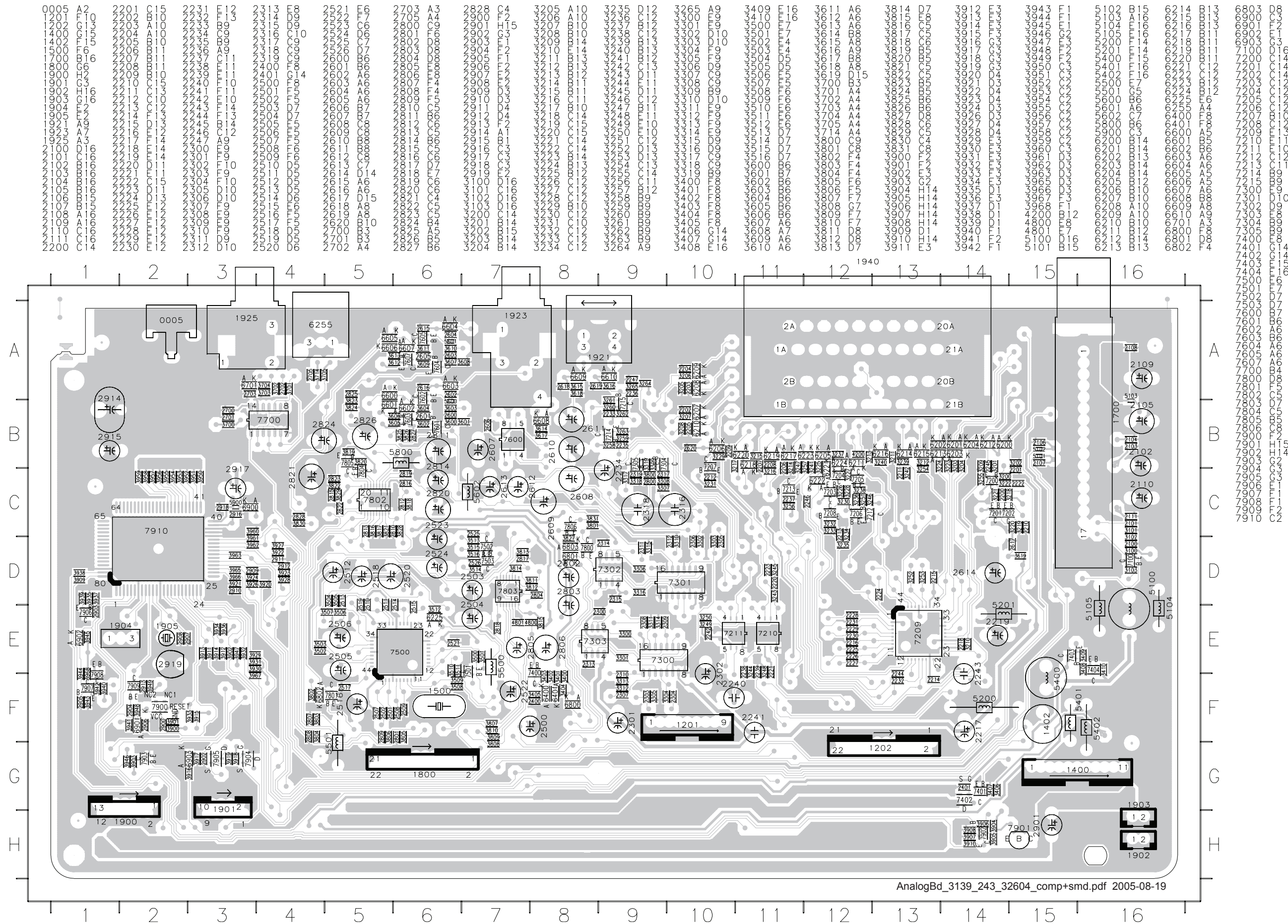
Analog: Control Unit (CU)



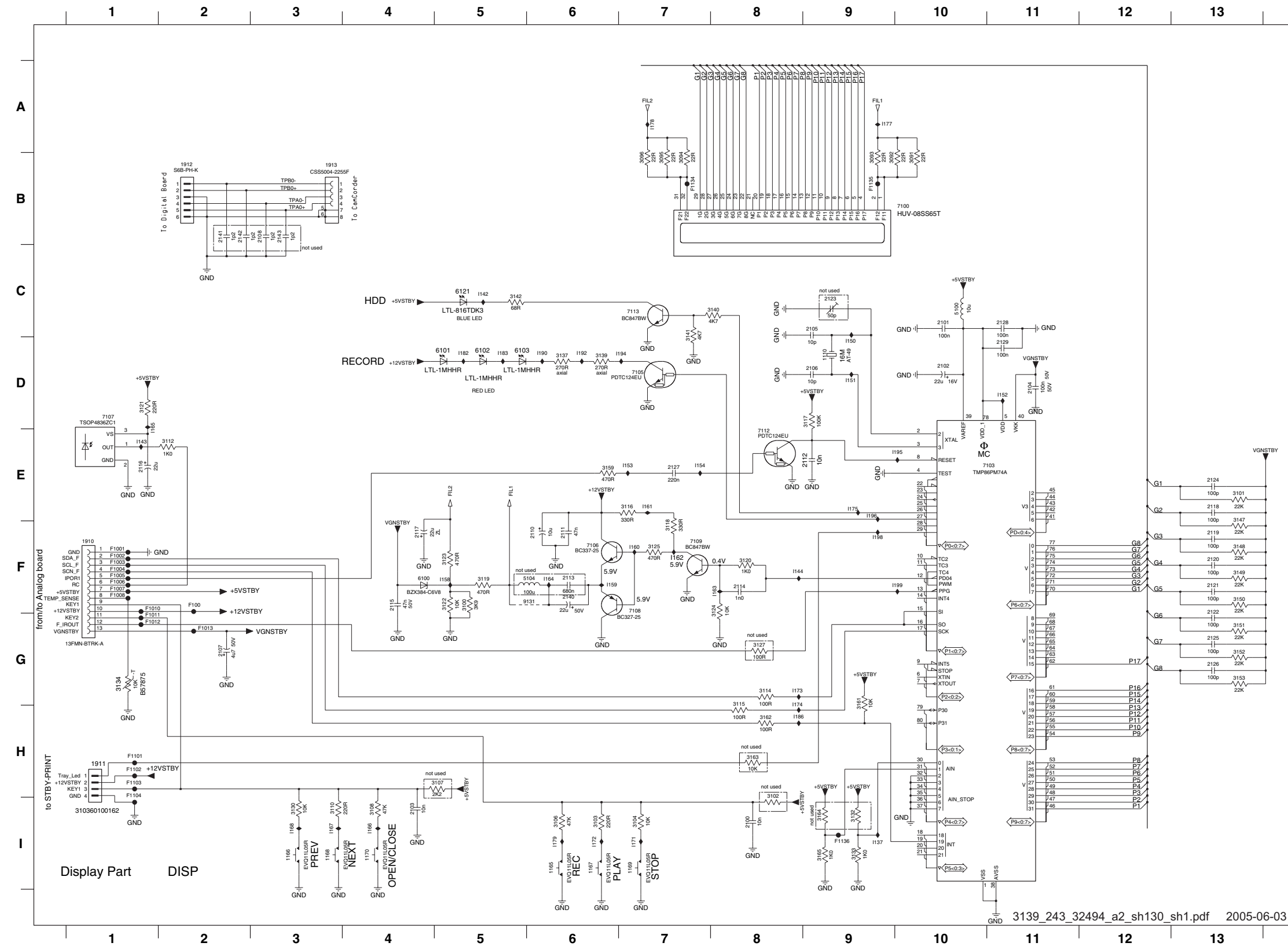
- 1900 A1
- 1901 H1
- 1902 C1
- 1903 D1
- 1904 C9
- 1905 F8
- 1906 A4
- 1907 C1
- 1908 G4
- 1909 B6
- 1910 A8
- 1911 C9
- 1912 A7
- 1913 A8
- 1914 H1
- 1915 H1
- 1916 H1
- 1917 I1
- 1918 E9
- 1919 C10
- 1920 A10
- 1921 A11
- 1922 A11
- 1923 D3
- 1924 H7
- 1925 G4
- 1926 F8
- 1927 A10
- 1928 C2
- 1929 H6
- 1930 D3
- 1931 H7
- 1932 G4
- 1933 F8
- 1934 A10
- 1935 F8
- 1936 F9
- 1937 E9
- 1938 B10
- 1939 E9
- 1940 C10
- 1941 C9
- 1942 A7
- 1943 A8
- 1944 H1
- 1945 H1
- 1946 H1
- 1947 A5
- 1948 A8
- 1949 A10
- 1950 D12
- 1951 D13
- 1952 D12
- 1953 E13
- 1954 E12
- 1955 E13
- 1956 E12
- 1957 E13
- 1958 E12
- 1959 F13
- 1960 H9
- 1961 H8
- 1962 H8
- 1963 H8
- 1964 H8
- 1965 H7
- 1966 F9
- 1967 F9
- 1968 B7
- 1969 B10
- 1970 A11
- 1971 A7
- 1972 B6
- 1973 G4
- 1974 A4
- 1975 C1
- 1976 D2
- 1977 H4
- 1978 I3
- 1979 C6
- 1980 B7
- 1981 H8
- 1982 C8
- 1983 A9
- 1984 C11
- 1985 A1
- 1986 A1
- 1987 A1
- 1988 B1
- 1989 B1
- 1990 B1
- 1991 B1
- 1992 B1
- 1993 B1
- 1994 B1
- 1995 B1
- 1996 B1
- 1997 B1



Layout: Analog Component + SMD VIEW



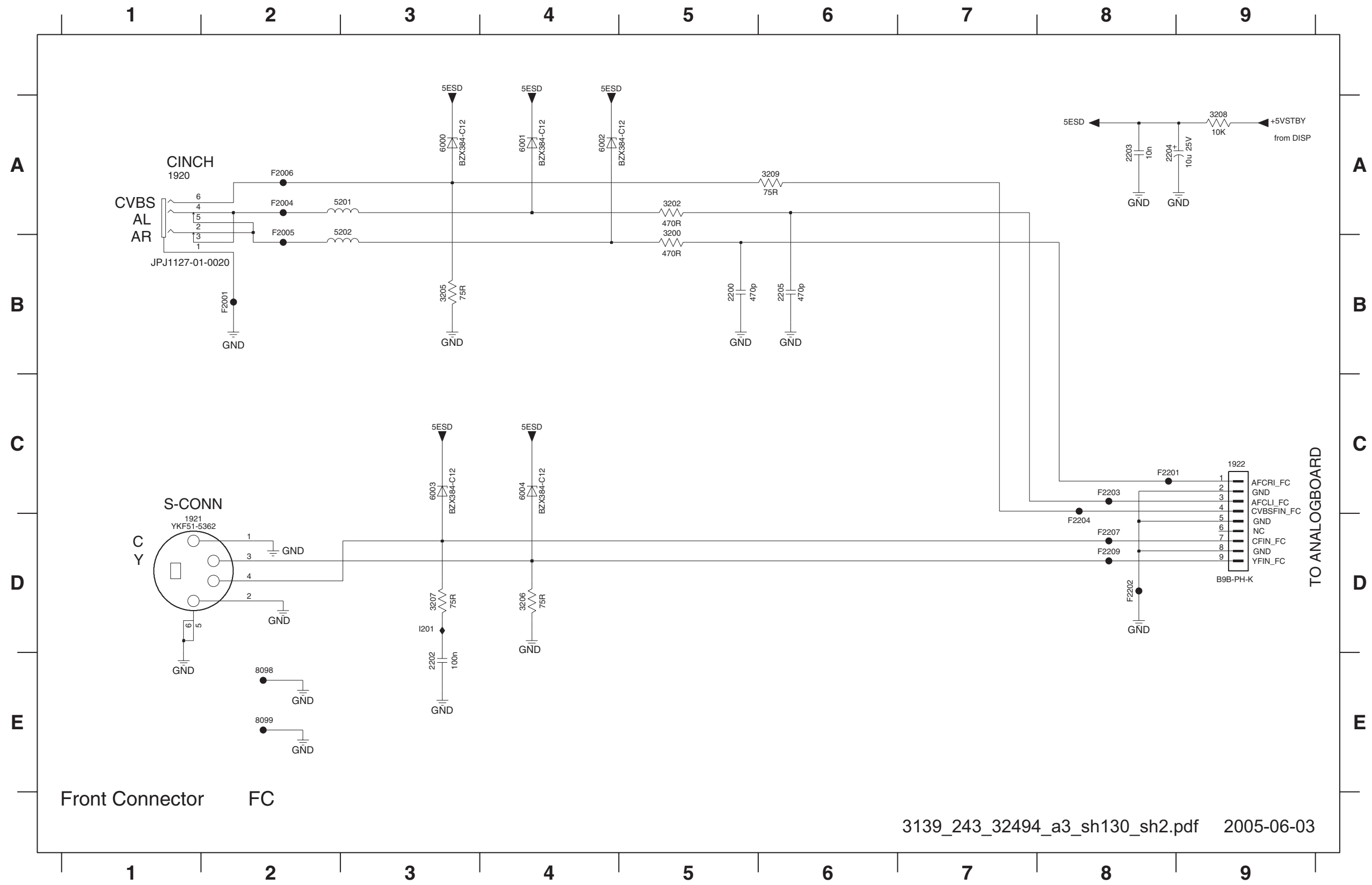
Front: Display Part (DISP)



1110 D9	F1004 F1
1165 I6	F1005 F1
1166 I3	F1006 F1
1167 I6	F1007 F1
1168 I3	F1008 F1
1169 I7	F1010 F1
1170 I4	F1011 G1
1910 F1	F1012 G1
1911 H1	F1013 G2
1912 B2	F1101 H1
1913 B3	F1102 H1
2100 I8	F1103 H1
2101 C10	F1104 H1
2102 D10	F1134 B7
2103 I4	F1135 B9
2104 D11	F1136 I9
2105 C9	I137 I9
2106 D9	I142 C5
2107 G2	I143 E1
2108 B3	I144 F8
2110 F6	I150 D9
2111 F6	I151 D9
2112 E9	I152 D11
2113 F6	I153 E7
2114 F8	I154 E7
2115 F4	I158 F5
2116 E1	I159 F6
2117 F4	I160 F7
2118 E13	I161 E7
2119 F13	I162 F7
2120 F13	I163 F8
2121 F13	I164 F6
2122 G13	I165 D1
2123 C9	I166 I4
2124 E13	I167 I3
2125 G13	I168 I3
2126 G13	I171 I7
2127 E7	I172 I6
2128 C11	I173 G8
2129 D11	I174 G8
2140 F6	I175 E9
2141 B2	I177 A9
2142 B2	I178 A7
2143 B3	I179 I6
3091 B10	I182 D5
3092 B9	I183 D5
3093 B9	I186 H8
3094 B7	I190 D6
3095 B7	I192 D6
3096 B7	I194 D7
3100 F5	I195 E10
3101 E13	I196 E9
3102 I8	I198 F9
3103 I6	I199 F10
3104 I7	
3105 I6	
3107 H5	
3108 I4	
3110 I3	
3112 E2	
3114 G8	
3115 H8	
3116 E7	
3117 D9	
3118 F7	
3119 F5	
3120 F8	
3121 D1	
3122 F5	
3123 F5	
3124 F9	
3125 F9	
3127 G8	
3130 I3	
3132 I9	
3133 I9	
3134 G1	
3137 D6	
3139 D8	
3140 C8	
3141 C7	
3142 C5	
3147 F13	
3148 F13	
3149 F13	
3150 F13	
3151 G13	
3152 G13	
3153 G13	
3159 E6	
3161 G9	
3162 H8	
3163 H8	
3164 I9	
3165 I9	
5100 C10	
5104 F6	
6100 F4	
6101 D5	
6102 D5	
6103 D5	
6121 C5	
7100 B10	
7103 E10	
7105 D7	
7106 F6	
7107 D1	
7108 F7	
7109 F7	
7112 E8	
7113 C7	
9131 F6	
F100 F2	
F1001 F1	
F1002 F1	
F1003 F1	



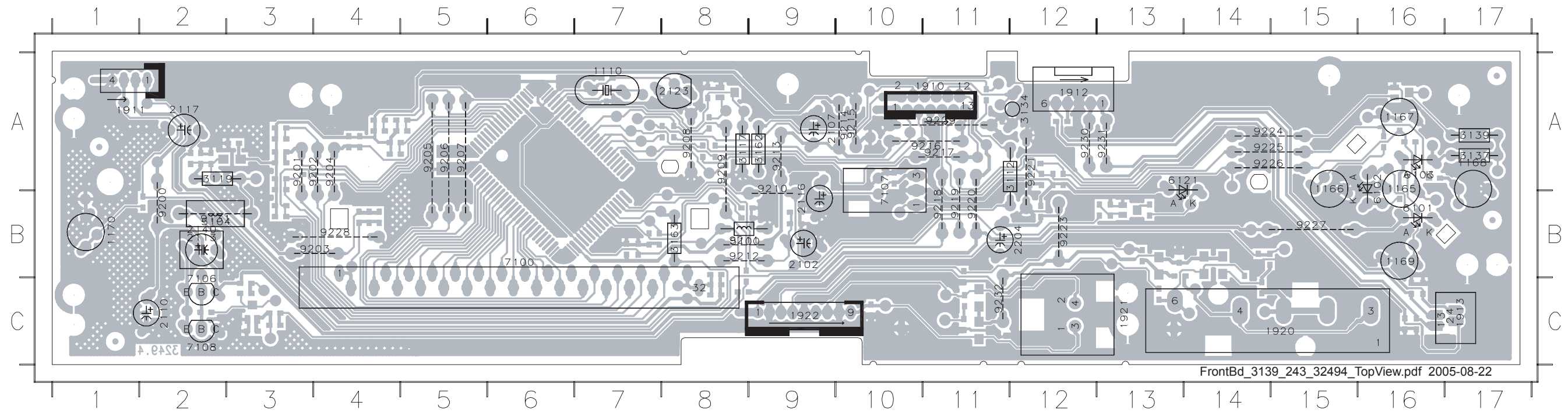
Front: Front Connector Part (FC)



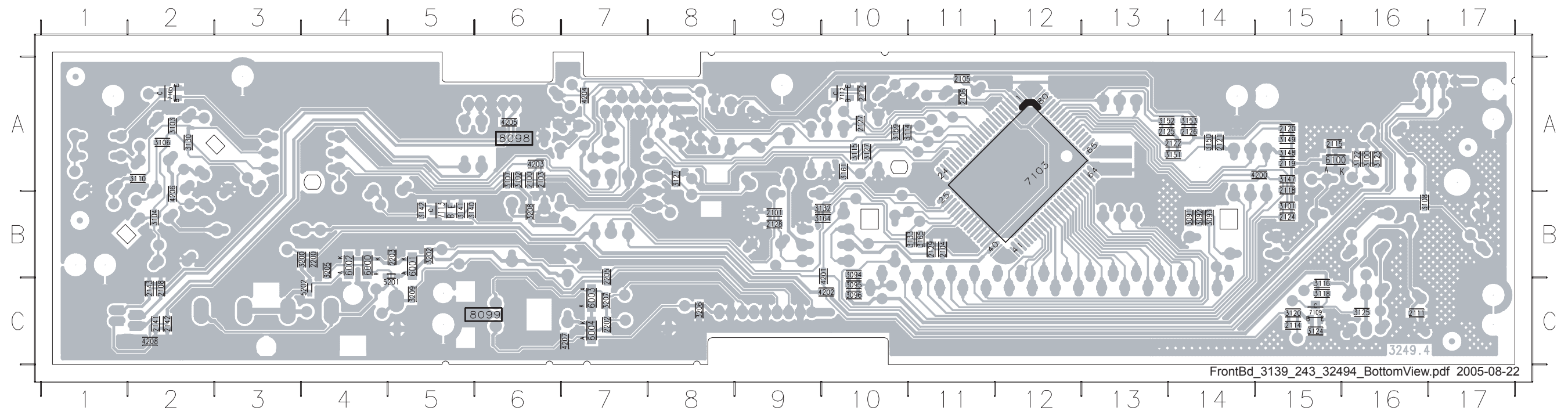
- 1920 A1
- 1921 D1
- 1922 C9
- 2200 B5
- 2202 E3
- 2203 A8
- 2204 A8
- 2205 B6
- 3200 B5
- 3202 A5
- 3205 B3
- 3206 D4
- 3207 D3
- 3208 A9
- 3209 A6
- 5201 A3
- 5202 A3
- 6000 A3
- 6001 A4
- 6002 A4
- 6003 C3
- 6004 C4
- 8098 E2
- 8099 E2
- F2001 B2
- F2004 A2
- F2005 A2
- F2006 A2
- F2201 C8
- F2202 D8
- F2203 C8
- F2204 D8
- F2207 D8
- F2209 D8
- I201 D3

Layout: Display/Front Connector

1110 A7	1169 B16	1913 C17	2107 A9	2123 A8	3119 A2	3163 B8	6103 A16	7108 C2	9203 B4	9208 A8	9213 A9	9218 B11	9224 A14	9229 A11
1165 A16	1170 B1	1920 C15	2110 C2	2140 B2	3134 A12	5100 B8	6121 A13	9131 B2	9204 A4	9209 A8	9214 A10	9219 B11	9225 A14	9230 A12
1166 A15	1910 A11	1921 C13	2113 B2	2204 B12	3137 A17	5104 B2	7100 B6	9200 B2	9205 A5	9210 A9	9215 A10	9220 B11	9226 A14	9231 A13
1167 A16	1911 A1	1922 C9	2116 B9	3112 A12	3139 A17	5101 B16	7106 C2	9201 A3	9206 A5	9211 B8	9216 A11	9221 A12	9227 B15	9232 C11
1168 A17	1912 A12	2102 B9	2117 A2	3117 A8	3162 A9	6102 A16	7107 A10	9202 A3	9207 A5	9212 B8	9217 A11	9223 B12	9228 B4	

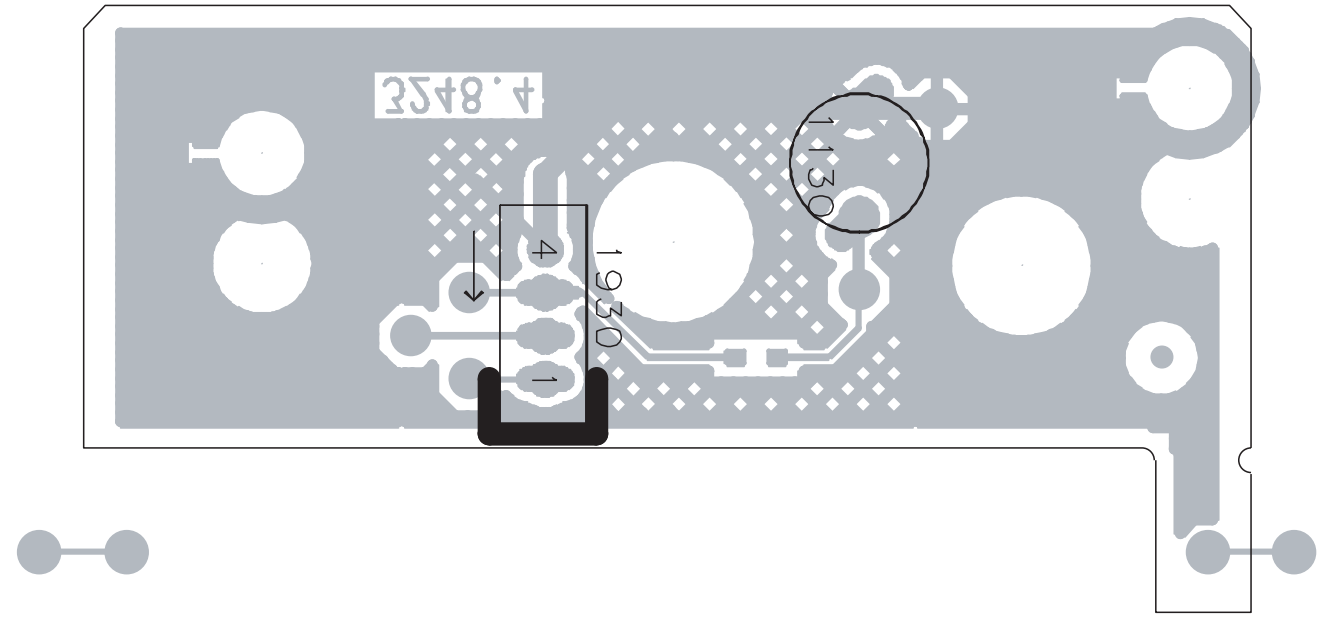
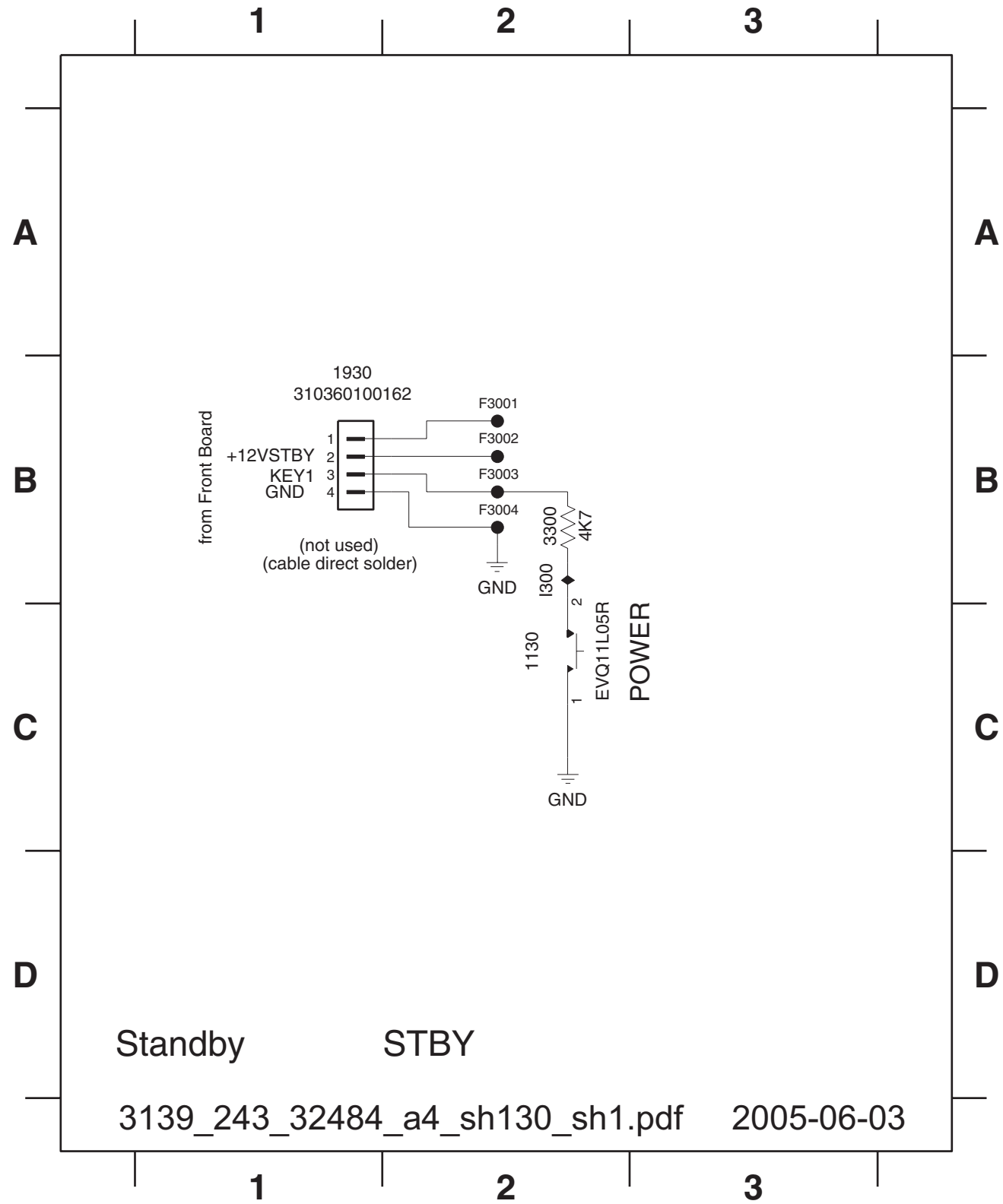


2100 A6	2108 C2	2119 A15	2126 A14	2143 C2	3092 B14	3101 B15	3108 B16	3120 C15	3127 A10	3142 B5	3152 A13	3200 B4	3209 C5	4205 A6	6000 B4	7103 A12
2101 B9	2111 C16	2120 A15	2127 A10	2200 B4	3093 B14	3102 A6	3110 A2	3121 A8	3130 A2	3147 A15	3153 A14	3202 B5	4200 A15	4206 B2	6001 B5	7105 A2
2103 A6	2112 A10	2121 A14	2128 B9	2202 C7	3094 B10	3103 A2	3114 A10	3122 A16	3132 B10	3148 A15	3159 A10	3205 B4	4201 B10	4207 C7	6002 B4	7109 C15
2104 B11	2114 C15	2122 A14	2129 B11	2203 B5	3095 C10	3104 B2	3115 A10	3123 A16	3133 B11	3149 A15	3161 A10	3206 C8	4202 C10	4208 C2	6003 C7	7112 A10
2105 A11	2115 A15	2124 B15	2141 C2	2205 B7	3096 C10	3106 A2	3116 C15	3124 C15	3140 B5	3150 A14	3164 B10	3207 C7	4203 A6	5201 C5	6004 C7	7113 B5
2106 A11	2118 A15	2125 A13	2142 C2	3091 B14	3100 A16	3107 A6	3118 C15	3125 C16	3141 B5	3151 A14	3165 B11	3208 B6	4204 A7	5202 C4	6100 A15	

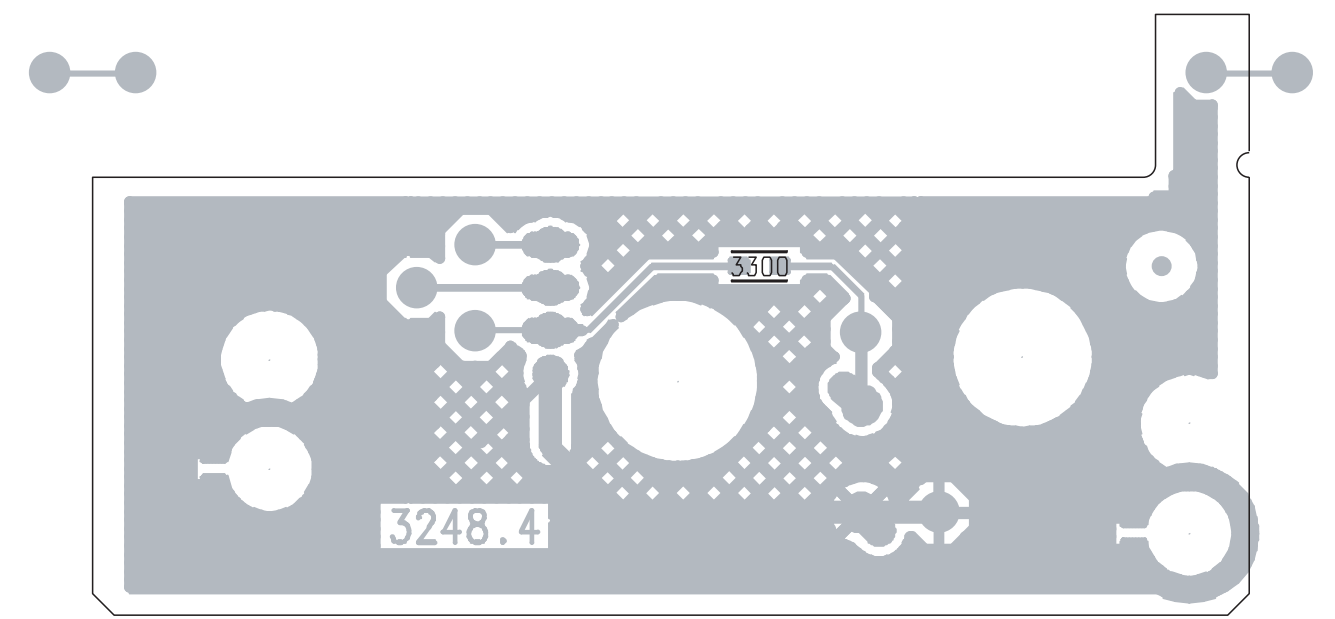


Front: Standby (STBY)

1130 C2 1930 B1 3300 B2 F3001 B2 F3002 B2 F3003 B2 F3004 B2 I300 B2

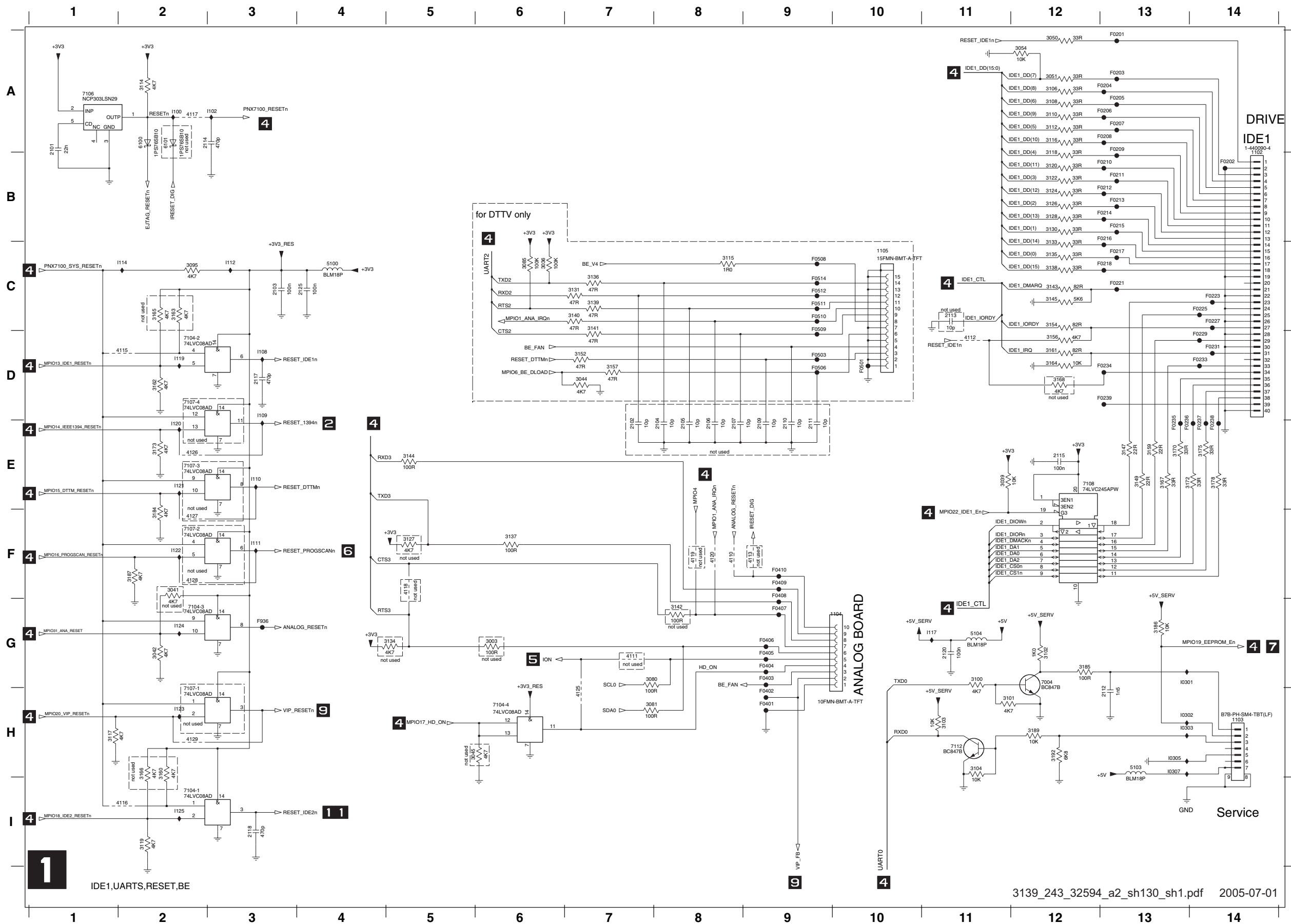


StbyBd_3139_243_32484_TopView.pdf 2005-08-22



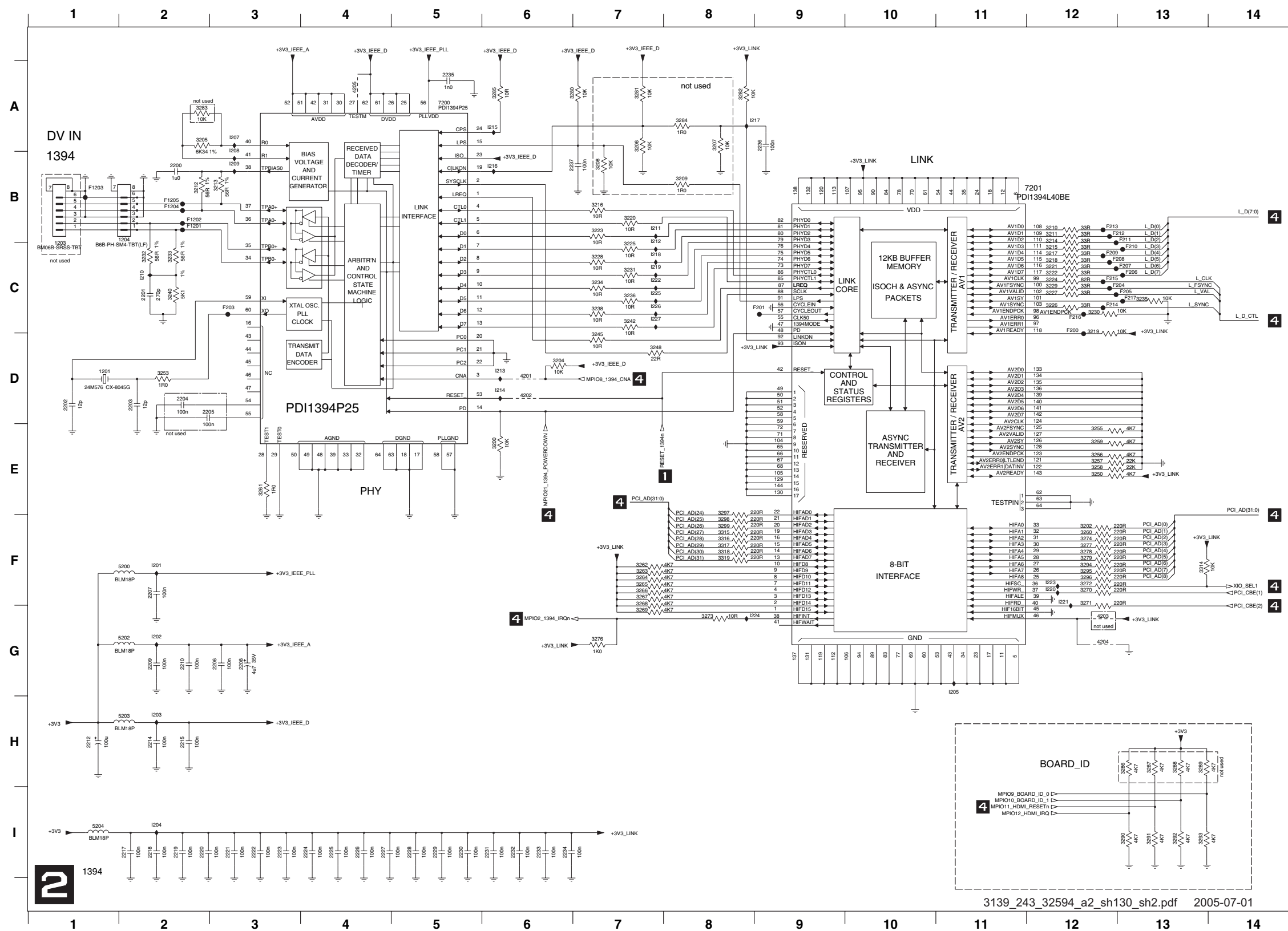
StbyBd_3139_243_32484_BottomView.pdf 2005-08-22

Digital: IDE1, Uarts, Reset, BE



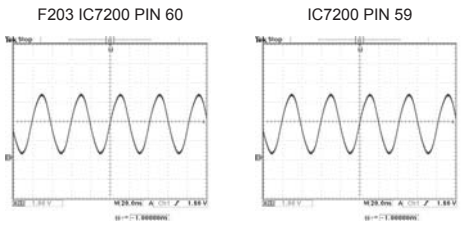
- 1102 B14
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- 1104 G9
- 1105 C10
- 2101 A1
- 2102 E7
- 2103 C3
- 2104 E8
- 2105 E8
- 2106 E8
- 2107 E8
- 2109 E9
- 2110 E9
- 2111 E9
- 2112 H13
- 2113 C11
- 2114 A2
- 2115 E12
- 2117 D3
- 2118 B3
- 2120 G11
- 2125 C4
- 3003 G6
- 3035 C8
- 3039 E11
- 3041 F2
- 3042 G2
- 3044 D7
- 3045 H5
- 3050 A12
- 3051 A12
- 3054 A12
- 3080 G7
- 3081 H7
- 3085 C6
- 3095 C2
- 3100 G11
- 3101 H11
- 3102 G12
- 3103 H11
- 3104 H11
- 3106 A12
- 3108 A12
- 3110 A12
- 3112 A12
- 3114 A2
- 3115 C8
- 3116 A12
- 3117 H1
- 3118 B12
- 3119 I2
- 3120 B12
- 3122 B12
- 3124 B12
- 3125 B12
- 3127 F5
- 3128 B12
- 3130 B12
- 3131 C7
- 3133 C12
- 3134 G5
- 3135 C12
- 3136 C7
- 3137 F6
- 3138 C12
- 3139 C7
- 3140 C7
- 3141 C7
- 3142 G8
- 3143 C12
- 3144 E2
- 3145 C12
- 3147 E13
- 3149 E13
- 3152 D7
- 3154 C12
- 3156 D12
- 3157 D7
- 3159 E13
- 3160 H2
- 3161 D12
- 3162 D2
- 3163 C2
- 3164 D12
- 3165 C2
- 3166 H2
- 3167 E13
- 3168 D12
- 3170 E13
- 3172 E13
- 3173 E2
- 3175 E14
- 3178 E14
- 3184 F2
- 3185 G12
- 3186 C13
- 3187 F2
- 3189 H12
- 3192 H12
- 4110 F8
- 4111 G7
- 4112 D11
- 4113 F9
- 4115 D2
- 4117 A2
- 4118 F5
- 4119 F8
- 4120 F8
- 4125 H7
- 4126 E2
- 4127 F2
- 4128 F2
- 4129 H2
- 5100 C4
- 5103 H13
- 5104 G11
- 6100 A2
- 6101 A2
- 7004 G12
- 7104-1 I2
- 7104-2 D2
- 7104-3 G2
- 7104-4 H6
- 7106 A1
- 7107-1 H2
- 7107-2 F2
- 7107-3 E2

Digital: 1394

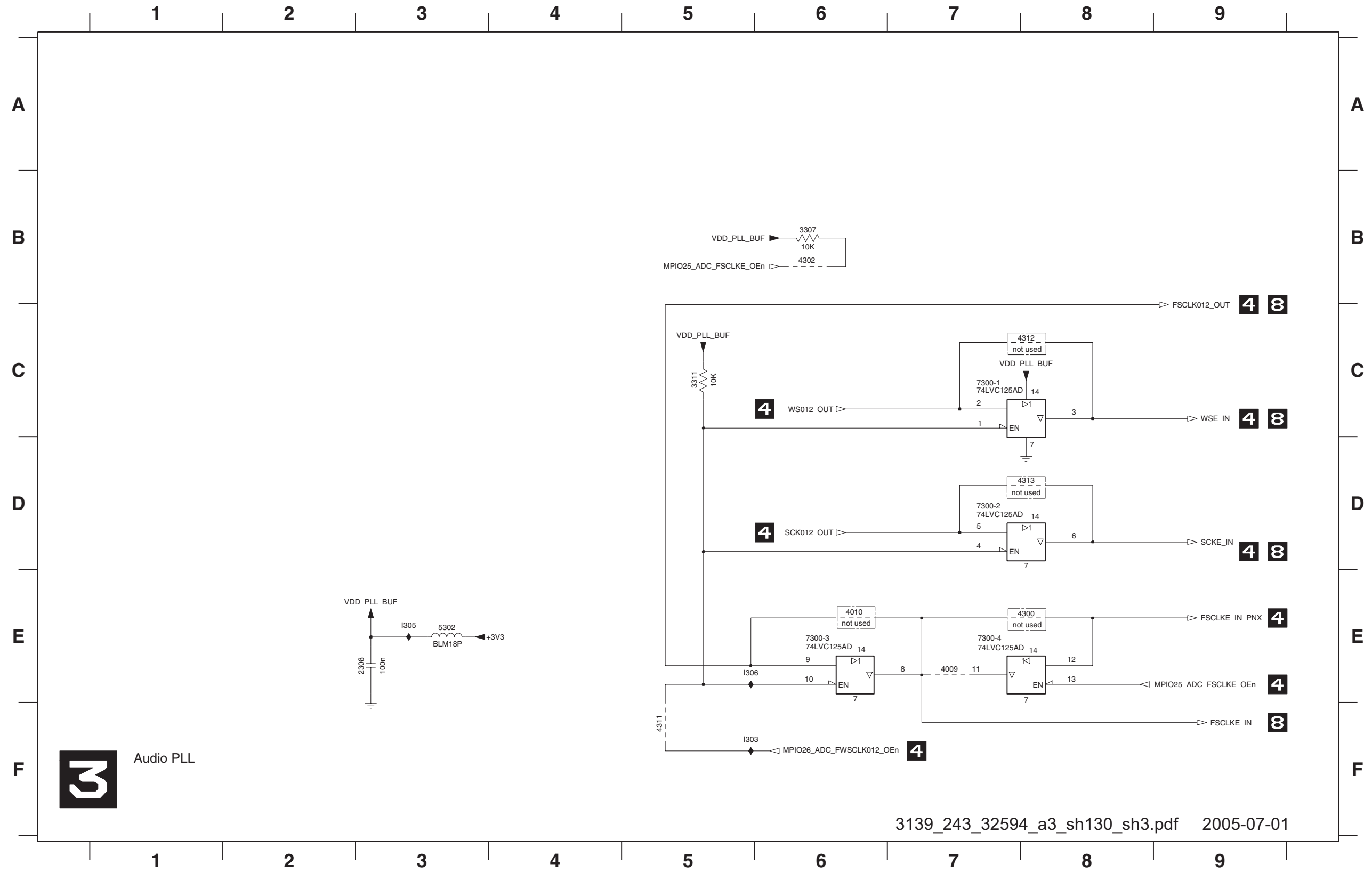


- 1201 D1
- 1203 C1
- 1204 B2
- 2200 B2
- 2201 C2
- 2202 D1
- 2203 D2
- 2204 D2
- 2205 D2
- 2206 G3
- 2207 F2
- 2208 G3
- 2209 G2
- 2210 G2
- 2212 H1
- 2214 H2
- 2215 H2
- 2217 I2
- 2218 I2
- 2219 I2
- 2220 I2
- 2221 I3
- 2222 I3
- 2223 I3
- 2224 I4
- 2225 I4
- 2226 I4
- 2227 I4
- 2228 I5
- 2229 I5
- 2230 I5
- 2231 I6
- 2232 I6
- 2233 I6
- 2234 I6
- 2235 A5
- 2236 A9
- 2237 B7
- 2238 E6
- 3202 F12
- 3204 D6
- 3205 A2
- 3206 A7
- 3207 A8
- 3208 B3
- 3209 B8
- 3210 C2
- 3211 B12
- 3212 B7
- 3213 D6
- 3214 B12
- 3215 C12
- 3216 B7
- 3217 C12
- 3218 I12
- 3219 C12
- 3220 B7
- 3221 C12
- 3222 C12
- 3223 B7
- 3224 C12
- 3225 C7
- 3226 C12
- 3227 C12
- 3228 C7
- 3229 C12
- 3230 C12
- 3231 C7
- 3232 C2
- 3233 C2
- 3234 C7
- 3235 C13
- 3236 C7
- 3237 C7
- 3240 C2
- 3242 C7
- 3243 D7
- 3248 D7
- 3250 E12
- 3253 D2
- 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
- 3276 G7
- 3277 F12
- 3278 F12
- 3279 F12
- 3280 A7
- 3281 A7
- 3282 A8
- 3283 A2
- 3284 A8
- 3285 A6
- 3286 H13
- 3287 H13
- 3288 H13
- 3289 H13
- 3290 H13
- 3291 H13
- 3292 H13
- 3293 H13
- 3294 F12
- 3295 F12
- 3296 F12
- 3297 E8
- 3298 F8
- 3299 F8
- 3314 F13
- 3315 F8
- 3316 F8
- 3317 F8
- 3318 F8
- 3319 F8
- 4201 D6
- 4202 D6
- 4203 G12
- 4204 G12
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- 5200 F2
- 5202 G2
- 5203 H2
- 5204 H2
- 7200 A5
- 7201 B12
- 7201 B2
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- 7206 C12
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- 7219 I2
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- 7230 I5
- 7231 I6
- 7232 I6
- 7233 I6
- 7234 I6
- 7235 A5
- 7236 A9
- 7237 B7
- 7238 E6
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3139_243_32594_a2_sh130_sh2.pdf 2005-07-01



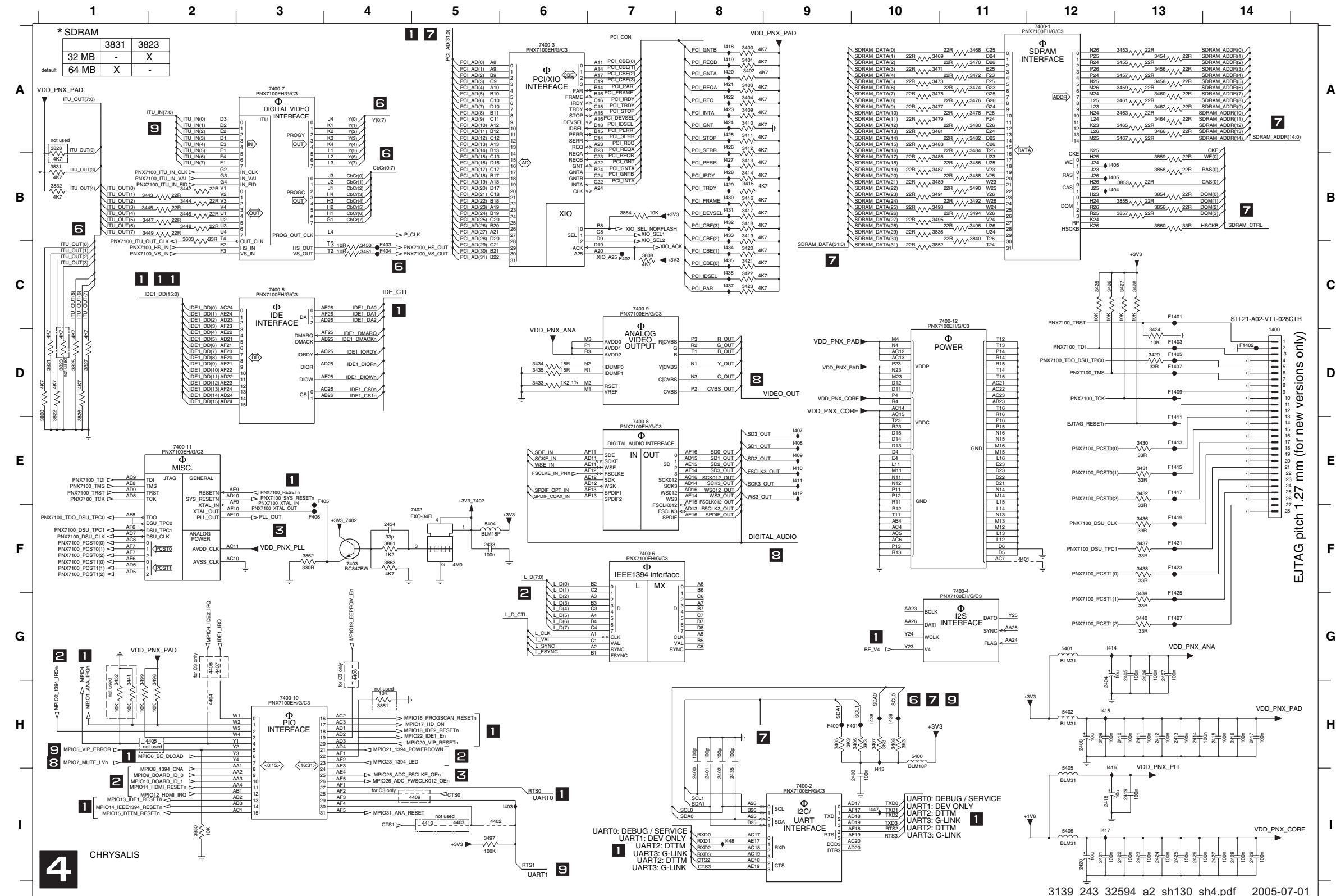
Digital: Audio PLL



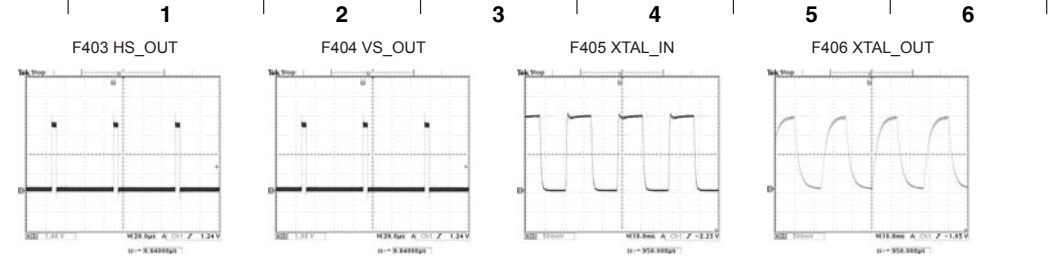
- 2308 E3
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- 3311 C5
- 4009 E7
- 4010 E8
- 4300 E8
- 4302 B6
- 4311 F5
- 4312 C8
- 4313 D8
- 5302 E3
- 7300-1 C7
- 7300-2 D7
- 7300-3 E6
- 7300-4 E7
- I303 F5
- I305 E3
- I306 E5

3 Audio PLL

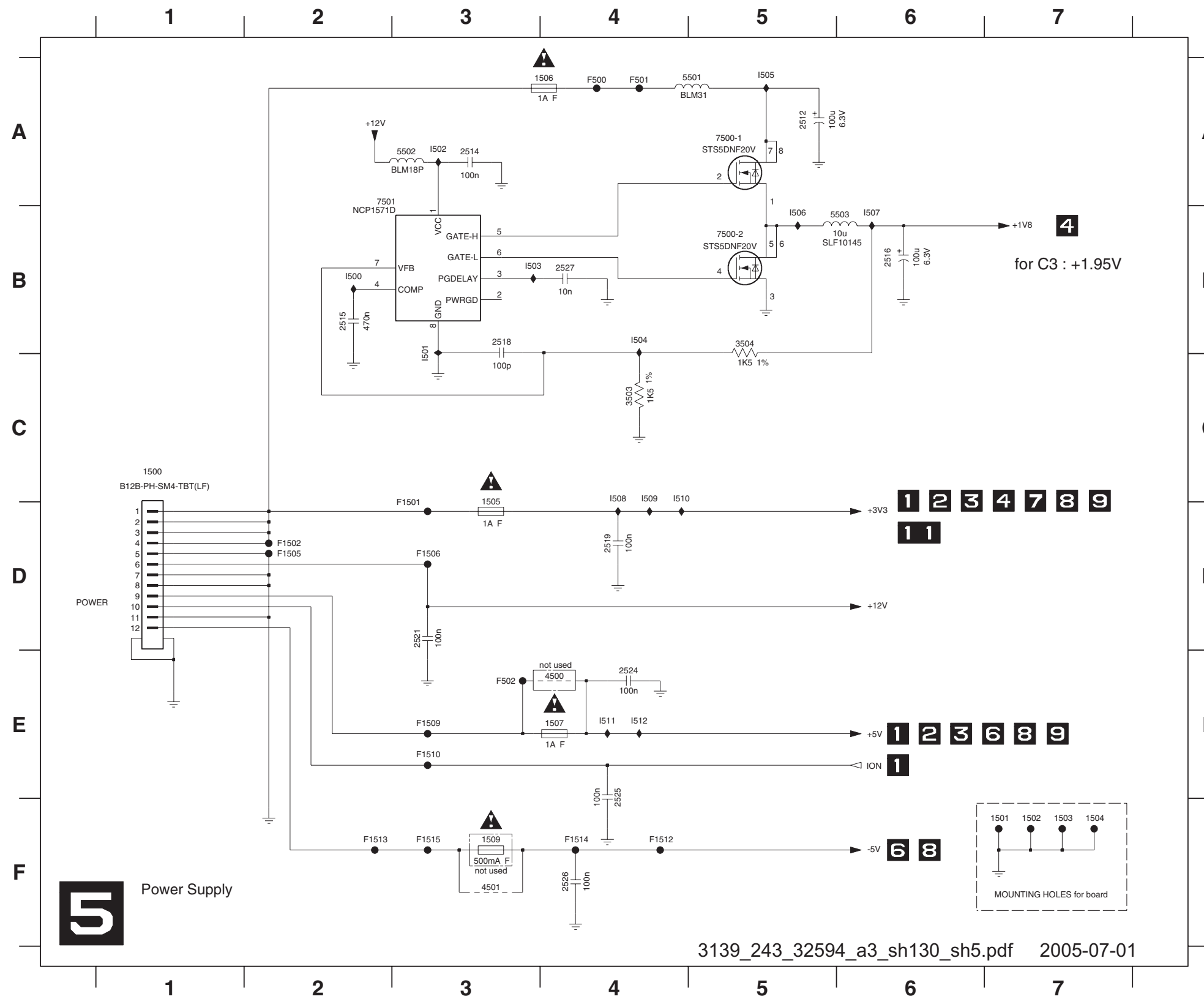
Digital: Chrysalis



- 1400 D14
- 2400 I8
- 2401 I8
- 2402 I8
- 2403 I10
- 2404 H12
- 2405 G13
- 2406 G13
- 2407 G13
- 2408 H12
- 2409 H12
- 2410 H13
- 2411 H13
- 2412 H13
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- 2499 I8
- 2500 I8

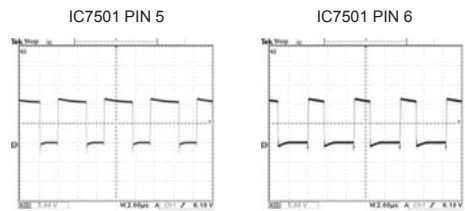


Digital: Power Supply

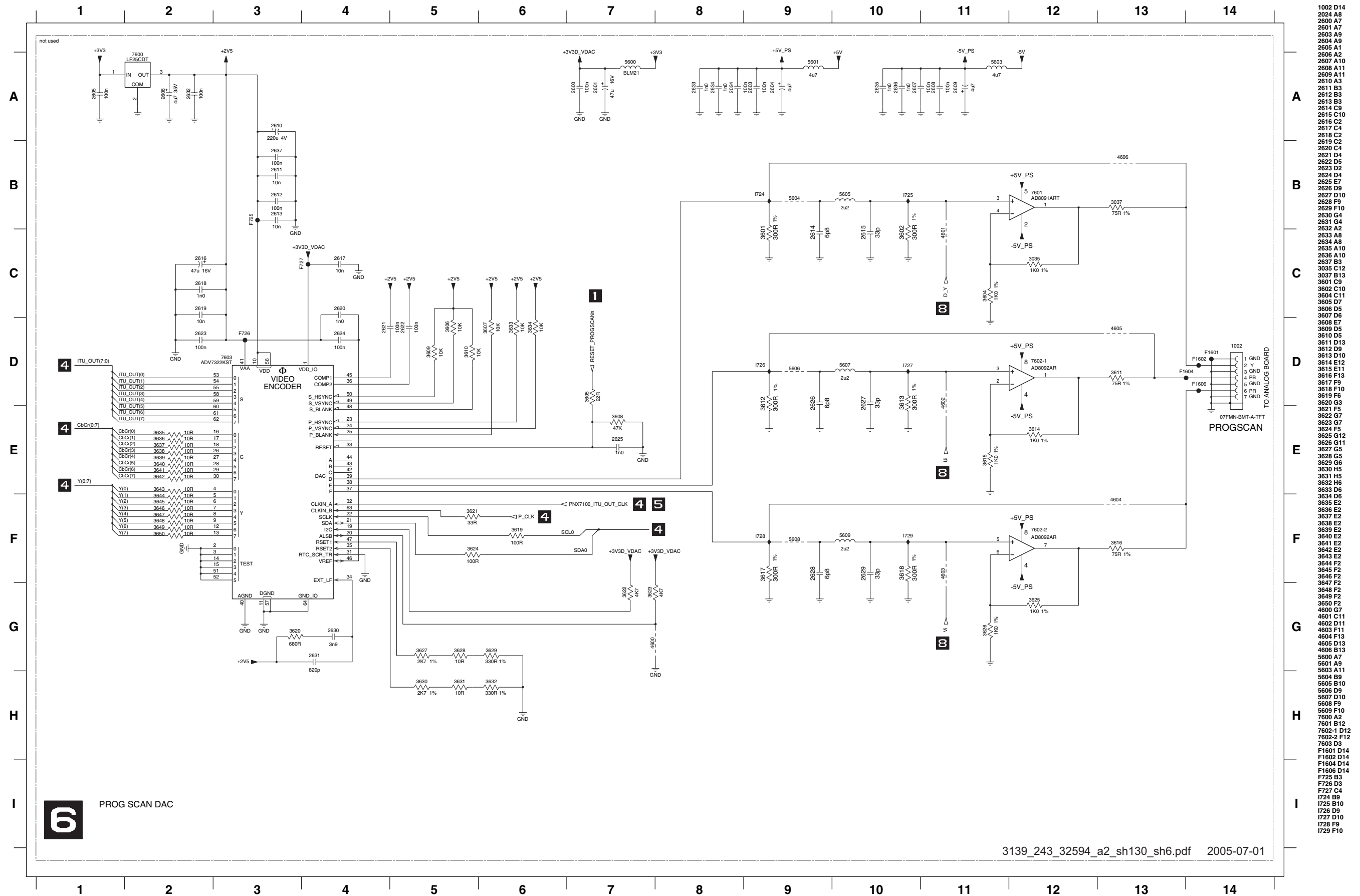


- 1500 C1
- 1501 F7
- 1502 F7
- 1503 F7
- 1504 F7
- 1505 D3
- 1506 A4
- 1507 E4
- 1509 F3
- 2512 A5
- 2514 A3
- 2515 B2
- 2516 B6
- 2518 B3
- 2519 D4
- 2521 D3
- 2524 E4
- 2525 E4
- 2526 F4
- 2527 B4
- 3503 C4
- 3504 B5
- 4500 E4
- 4501 F3
- 5501 A5
- 5502 A3
- 5503 B6
- 7500-1 A5
- 7500-2 B5
- 7501 A3
- 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 B3
- I502 A3
- I503 B3
- I504 B4
- I505 A5
- I506 B5
- I507 B6
- I508 C4
- I509 C4
- I510 C4
- I511 E4
- I512 E4

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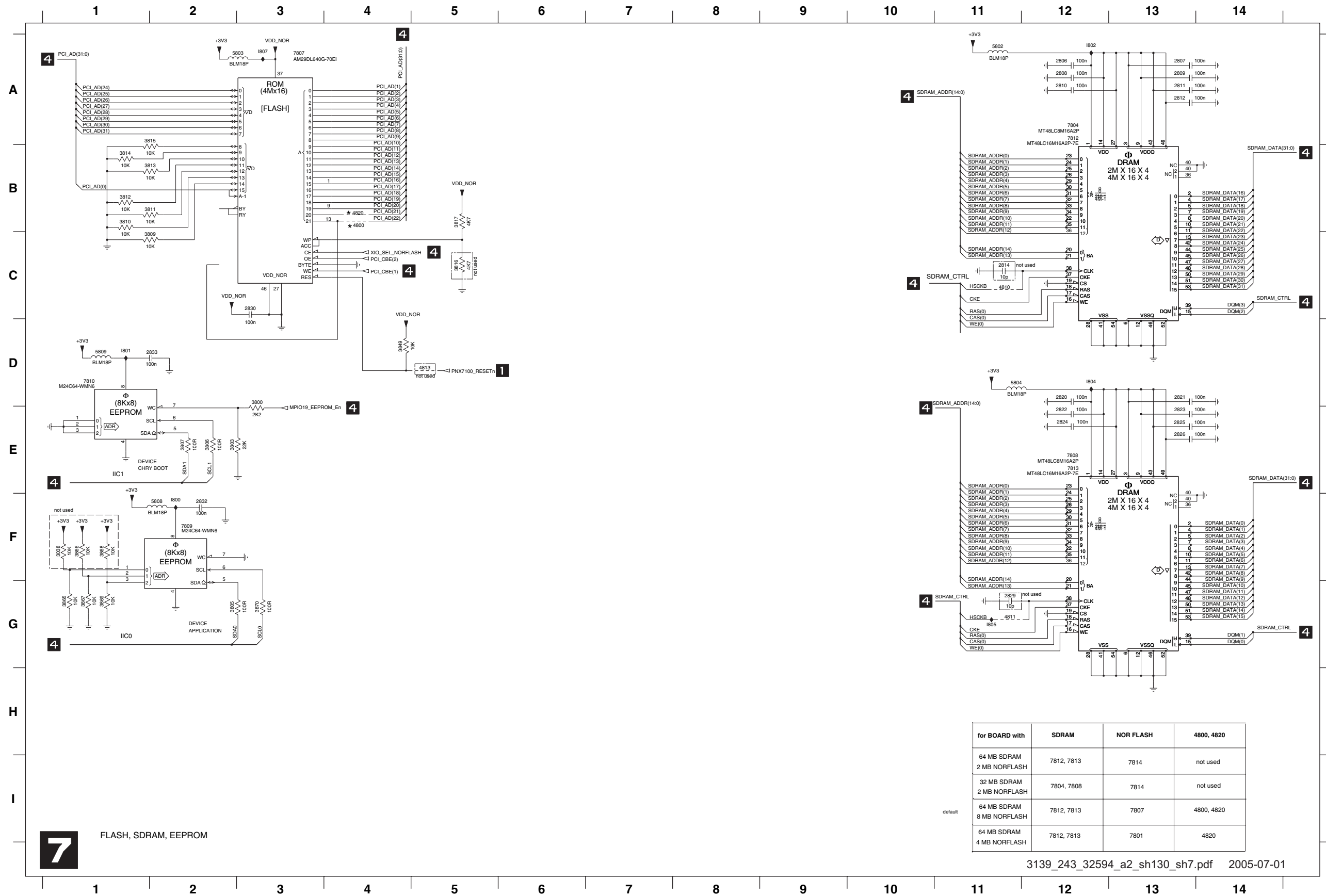


Digital: Prog Scan DAC



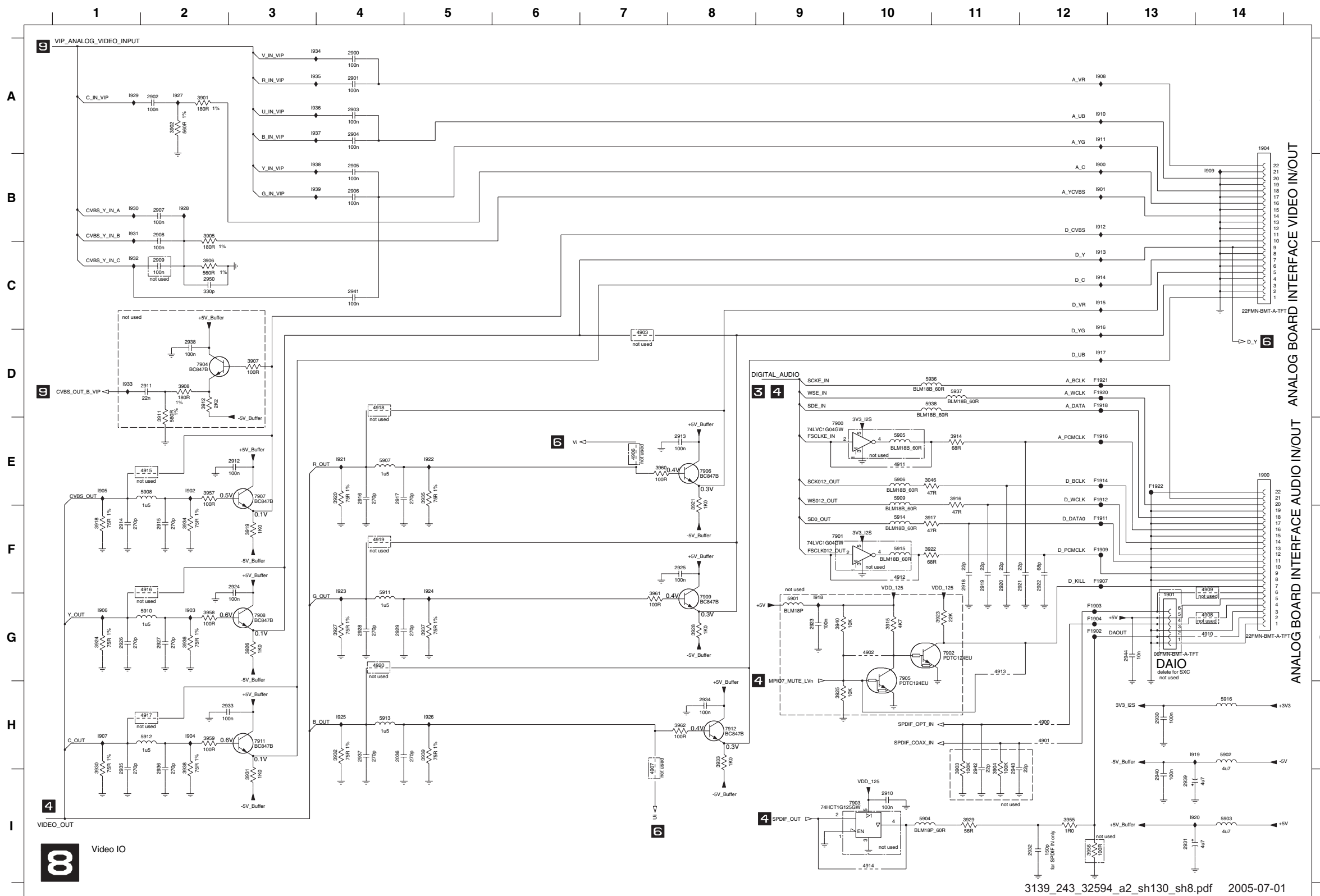
- 1002 D14
- 2024 A8
- 2600 A7
- 2601 A7
- 2603 A9
- 2604 A9
- 2605 A1
- 2606 A2
- 2607 A10
- 2608 A11
- 2609 A11
- 2610 A3
- 2611 B3
- 2612 B3
- 2613 B3
- 2614 C9
- 2615 C10
- 2616 C2
- 2617 C4
- 2618 C2
- 2619 C2
- 2620 C4
- 2621 D4
- 2622 D5
- 2623 D2
- 2624 D4
- 2625 E7
- 2626 D9
- 2627 D10
- 2628 F9
- 2629 F10
- 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 D7
- 3606 D5
- 3607 D6
- 3608 E7
- 3609 D5
- 3610 D5
- 3611 D13
- 3612 D9
- 3613 D10
- 3614 E12
- 3615 F11
- 3616 F13
- 3617 F9
- 3618 F10
- 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 E2
- 3644 F2
- 3645 F2
- 3646 F2
- 3647 F2
- 3648 F2
- 3649 F2
- 3650 F2
- 4600 C7
- 4601 C11
- 4602 D11
- 4603 F11
- 4604 F13
- 4605 D13
- 4606 B13
- 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 D14
- F1608 D14
- F725 B3
- F726 D3
- F727 C4
- I724 B9
- I725 B10
- I726 D9
- I727 D10
- I728 F9
- I729 F10

Digital: Flash, SDRAM, EEPROM



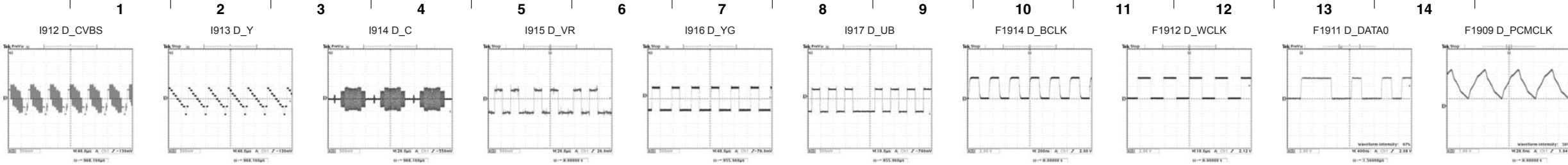
2806 A12
2807 A13
2808 A12
2809 A13
2810 A12
2811 A13
2812 A13
2814 C11
2820 D12
2821 D13
2822 E12
2823 E13
2824 E12
2825 E13
2826 E13
2829 G11
2830 C3
2832 F2
2833 D2
3038 F1
3800 D3
3803 E2
3805 G2
3806 E2
3807 E2
3809 C2
3810 B1
3811 B2
3812 B1
3813 B2
3814 B1
3815 A2
3816 C5
3849 D4
3865 G1
3866 F1
3867 G1
3868 F1
3869 G1
3870 G3
4800 B4
4810 C11
4811 G11
4813 D5
4820 B4
5802 A11
5803 A3
5804 D11
5808 F2
5809 D1
7801 A3
7804 A12
7807 A3
7808 E12
7809 F2
7810 D1
7812 A12
7813 E12
I800 F2
I801 D1
I802 A12
I804 D12
I805 G11
I807 A3

Digital: Video IO

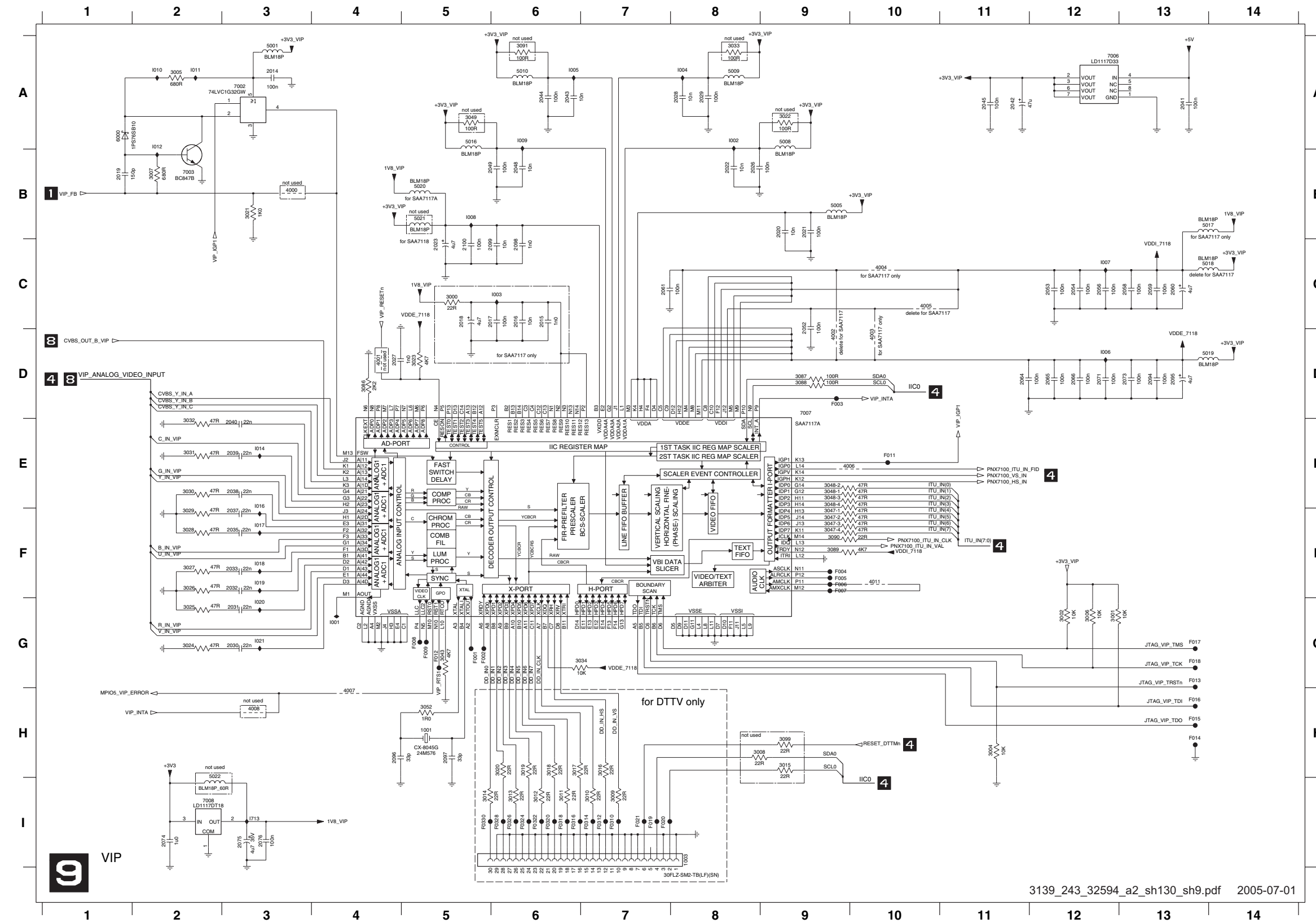


1900 E14	5836 D10
1901 F13	5837 D11
1904 A14	5838 D10
2036 H4	7900 E9
2900 A4	7901 F9
2901 A4	7902 G11
2902 A2	7903 I10
2903 A4	7904 D2
2904 A4	7905 G10
2905 B4	7906 E8
2906 B4	7907 E3
2907 B2	7908 G3
2908 B2	7909 G8
2909 C2	7911 H3
2910 I10	7912 H8
2911 D2	F1902 G12
2912 E3	F1903 G12
2913 E8	F1904 G12
2914 F1	F1907 F12
2915 F2	F1909 F12
2916 E4	F1911 F12
2917 E4	F1912 E12
2918 F11	F1914 E12
2919 F11	F1916 E12
2920 F11	F1918 D12
2921 F12	F1920 D12
2922 F12	F1921 D12
2923 G9	F1922 E13
2924 F3	I900 B12
2925 F8	I901 B12
2926 G1	I902 E2
2927 G2	I903 G2
2928 G4	I904 H2
2929 G4	I905 E1
2930 H13	I906 G1
2931 H3	I907 H1
2932 I12	I908 A12
2933 H2	I909 B14
2934 H8	I910 A12
2935 H1	I911 A12
2936 H2	I912 B12
2937 H4	I913 C12
2938 D2	I914 C12
2939 I13	I915 C12
2940 I13	I916 C12
2941 C4	I917 D12
2942 H11	I918 G9
2943 H11	I919 H13
2944 G13	I920 I13
2950 C2	I921 E4
3046 E10	I922 E5
3901 A2	I923 F4
3902 A2	I924 F5
3903 H11	I925 H4
3904 H11	I926 H5
3905 B2	I927 A2
3906 C2	I928 B2
3907 D3	I929 A1
3908 D2	I930 B1
3911 D2	I931 B1
3912 D2	I932 C1
3914 E11	I933 D1
3915 G10	I934 A3
3916 E11	I935 A3
3917 F10	I936 A3
3918 F1	I937 A3
3919 F3	I938 B3
3920 E4	I939 B3
3921 E8	
3922 F10	
3923 G11	
3924 G1	
3925 H9	
3926 G3	
3927 G4	
3928 G8	
3929 H11	
3930 H1	
3931 I3	
3932 H4	
3933 H8	
3934 F2	
3935 E5	
3936 C2	
3937 G5	
3938 H2	
3939 H5	
3940 G9	
3955 I12	
3956 I12	
3957 E2	
3958 G2	
3959 H2	
3960 E7	
3961 G7	
3962 H8	
4900 H12	
4901 H12	
4902 G10	
4903 D7	
4906 E7	
4907 H7	
4908 G14	
4909 F14	
4910 G14	
4911 E10	
4912 F10	
4913 G11	
4914 I10	
4915 E2	
4916 F2	
4917 H2	
4918 D4	
4919 F4	
4920 G4	
5901 G9	
5902 H14	
5903 I14	
5904 I10	
5905 E10	
5906 E10	
5907 E4	
5908 E2	
5909 E10	
5910 G2	
5911 G4	
5912 H2	
5913 H4	
5914 F10	
5915 F10	
5916 H14	

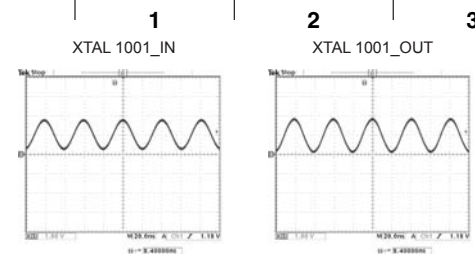
3139_243_32594_a2_sh130_sh8.pdf 2005-07-01



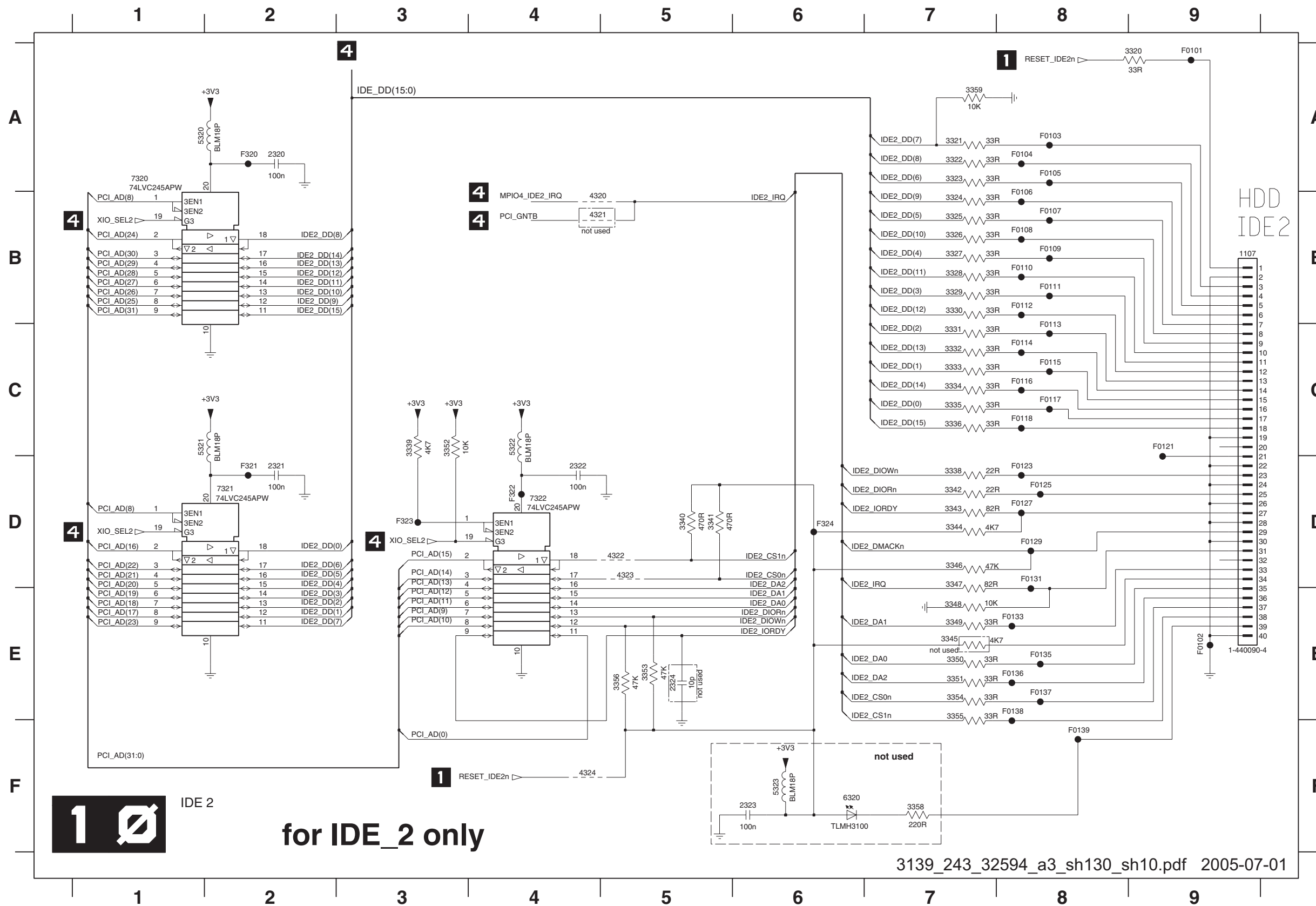
Digital: VIP



1001 H5	4011 F10
1003 B8	5001 A3
2014 A3	5005 B9
2015 C6	5008 A9
2016 C6	5009 A8
2017 C6	5010 A6
2018 C5	5016 A5
2019 B1	5017 B13
2020 B9	5018 C13
2021 B9	5019 D13
2022 B8	5020 B5
2023 C5	5021 B5
2026 B6	5022 I2
2027 D4	6000 A1
2028 A8	7002 A3
2029 A8	7003 B2
2030 G3	7006 A12
2031 G3	7007 D9
2032 F3	7008 I2
2033 F3	F001 G5
2035 F3	F002 G5
2037 F3	F003 D9
2038 E3	F004 F9
2039 E3	F005 F9
2040 E3	F006 F9
2041 A13	F007 F9
2042 A11	F008 G5
2043 A6	F009 G5
2044 A6	F011 E10
2045 A11	F012 G5
2048 B6	F013 G13
2049 B6	F014 H13
2052 C9	F015 H13
2053 C12	F016 H13
2054 C12	F017 G13
2056 C12	F018 G13
2058 C13	F019 I7
2059 C13	F020 I7
2060 C13	F021 I7
2061 C7	F0310 I7
2064 D11	F0312 I7
2065 D12	F0314 I7
2066 D12	F0316 I6
2071 D12	F0318 I6
2073 D13	F0320 I6
2074 I2	F0322 I6
2075 I3	F0324 I6
2076 I3	F0326 I6
2094 D13	F0328 I6
2095 D13	F0330 I5
2096 H4	I001 G4
2097 H5	I002 A8
2098 C6	I003 C6
2099 C6	I004 A8
2100 C5	I005 A6
3000 C5	I006 D12
3001 G12	I007 C12
3002 G12	I008 B5
3004 H11	I009 A6
3005 A2	I010 A2
3006 G12	I011 A2
3007 B2	I012 A2
3008 H8	I014 E3
3009 I7	I015 E3
3010 I7	I017 F3
3011 I6	I018 F3
3012 I6	I019 F3
3013 I6	I020 G3
3014 I5	I021 G3
3015 H9	I023 I3
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 F2	
3030 E2	
3031 E2	
3032 D2	
3033 A8	
3034 G7	
3043 G5	
3047-1 F9	
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 E5	
4001 D4	
4002 D9	
4003 D10	
4004 C10	
4005 C10	
4006 E9	
4007 H4	
4008 H3	



Digital: IDE2



- 1107 B9
- 2320 A2
- 2321 D4
- 2322 D4
- 2323 F6
- 2324 E5
- 3320 A9
- 3321 A7
- 3322 A7
- 3323 A7
- 3324 B7
- 3325 B7
- 3326 B7
- 3327 B7
- 3328 B7
- 3329 B7
- 3330 B7
- 3331 C7
- 3332 C7
- 3333 C7
- 3334 C7
- 3335 C7
- 3336 C7
- 3338 D7
- 3339 C3
- 3340 D5
- 3341 D5
- 3342 D7
- 3343 D7
- 3344 D7
- 3345 E7
- 3346 D7
- 3347 D7
- 3348 E7
- 3349 E7
- 3350 E7
- 3351 E7
- 3352 C3
- 3353 E5
- 3354 E7
- 3355 E7
- 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
- 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 C9
- F0123 D8
- F0125 D8
- F0127 D8
- F0129 D8
- F0131 D8
- F0133 E8
- F0135 E8
- F0136 E8
- F0137 E8
- F0138 E8
- F0139 F8
- F320 A2
- F321 D2
- F322 D4
- F323 D3
- F324 D6

1 IDE 2
for IDE_2 only

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 DVDR3300H, DVDR3330H and DVDR5330H families are as follows:

- DVDR3300H/02: 11203
- DVDR3300H/05: 11204
- DVDR3300H/19: 11203
- DVDR3300H/51: 11206
- DVDR3330H/02: 11211
- DVDR3330H/05: 11212
- DVDR3330H/19: 11211
- DVDR3330H/51: 11213
- DVDR5330H/02: 11214
- DVDR5330H/05: 11215
- DVDR5330H/19: 11214
- DVDR5330H/51: 11216

Example:
DS:> 1217 11203

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:
 - $35828 \cdot \text{YEAR} + 676 \cdot \text{WEEK} + 26 \cdot A + H + 8788$
 - The figures are fixed, YEAR + WEEK + production center code (A + H) are variables
 - Example: $35828 \cdot 01 + 676 \cdot 36 + 26 \cdot 1 + 8 + 8788 = 68986$ (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 Boot Eeprom 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 Diagnostic Software the "Diversity String" is stored with the command 1226, followed by the "Diversity String" as parameter.

The Diversity strings used in DVDR3300H/DVDR3330H/ DVDR5330H Range is as follows:

```
4442484927E940014630355F34000000530
40500000101020001010040080000445644
52323030312E303031010200000800000000
000020100000000000000000
```

Example:

```
DS:> 1226 4442484927E940014630355F3400000053040500
00010102000101004008000044564452323030312E3030310
10200000800000000000201000000000000000
Test OK @
```

With DS command 1228 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 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

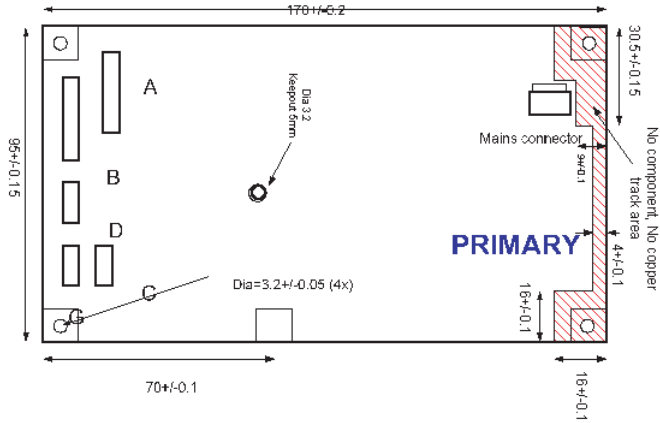


Figure 9-1 PSU Board Layout

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 & G is off
11	GND	
12	5ND	

- Connector C: not in use
- Connector D: Supply to Basic Engine

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

- Connector G: Supply to HDD

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

9.2. Front Board (Panel – Display + Key)

9.2.1. General

This board consists of the following parts:

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

9.2.2. μ P (IC 7103 : TMP86PM74A)

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

- Interface with the Slave μ P on the Analog board via I²C bus
- Driver for the FTD display [1203 : HUV-08SS65T]

9.2.3. VFD Heater Voltage Generator

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

9.3. Analog Board

9.3.1. General

The Analog board consists of the following parts:

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

9.3.2. Slave μ P (IC 7910 : TMP87CM74AFG)

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

- Interface with the Chrysalis chip on the Digital Board via I²C 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 I²C bus
- Timer Wake-up activation
- Fan control via transistors 7901 and 7902

It runs on two clock frequencies namely:

- 5MHz for normal operation
- 32.768KHz for the real time clock

9.3.3. Timer Wake-up activation

During the Standby mode, the slave μ P 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 I²C (SCL_5V- and SDA_5V-) lines coming from the Slave μ P [7910].

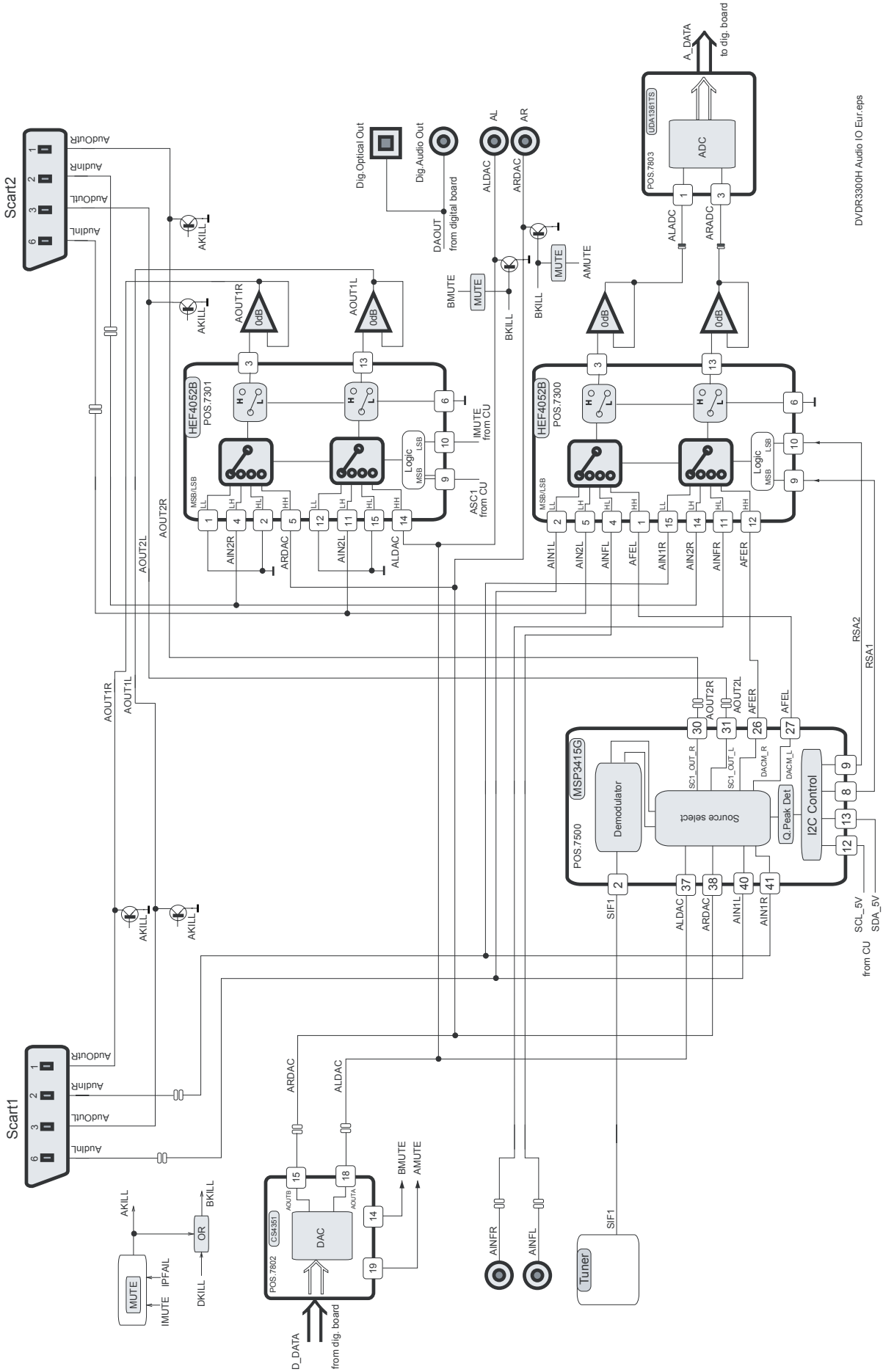
Complete video processing is done in this unit and the video output (CVBS) is taken out from the [VIDOUT] pin 17 via a transistor [7100] as VFV-line to the Video I/O circuitry. The audio-IF component SIF1 is taken out from the [SIFOUT] pin 7 for the demodulation by the Multi-sound processor (MSP).

Audio demodulator

The sound demodulation is done by the MSP3415 [7500], which is also fully controlled via I²C bus by the Slave μ P. The audio signals are available at pin 26 and pin 27 and fed as AFER- & AFEL- line to the audio I/O for further processing.

9.3.6. Audio routing

Audio IO Europe Overview



DVDR3300H Audio IO Eur.eps

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 [7301] 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 [7500] selects either signals from the Scart 1 Input (AIN1L/AIN1R), the Audio DAC (ALDAC/ARDAC) or the Tuner Frontend as the output source for Scart 2 (AOUT2L/AOUT2R).

c) Digital audio-out path

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

d) Record path

The record-selector [7300] selects either signals from the Scart 1 Input (AIN1L/AIN1R), Scart 2 Input (AIN2L/AIN2R), Front Cinch (AINFL/AINFR) or the MSP (AFEL/AFER) and routes to the audio ADC (ALADC/ARADC) for record purposes. The switch is controlled via RSA1 and RSA2 signals coming from the MSP.

9.3.7. Audio ADC/DAC

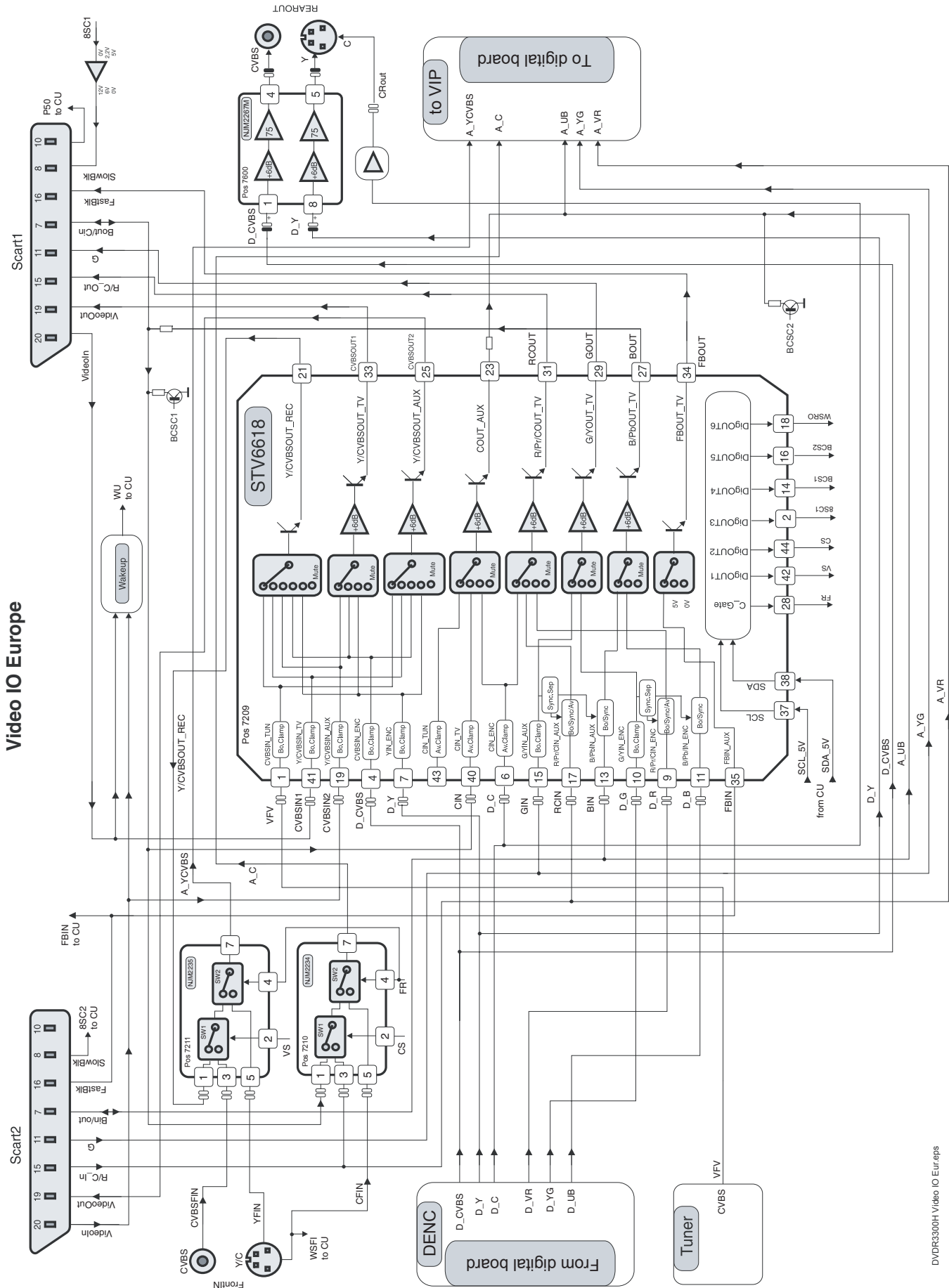
The conversion of analog audio signals from the record-selector [7300] outputs (ALADC/ARADC) is done via UDA1361TS [7803]. This IC can process input signals up to $2V_{rms}$ by using external resistors in series to the input pins. All required clock signals are generated on the digital board and only 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 CS4351 [7802]. All necessary clock signals are coming from the digital board and digital audio data (D_DATA0-line) are converted into analog signals (pin 15 and 18). The output signals from the audio DAC part (ALDAC/ARDAC) are directly routed to the rear cinch sockets. To avoid plops and any other audible noise on the output muting circuits are implemented for each channel.

9.3.8. Muting

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

9.3.9. Video-routing



DVDR3300H Video IO Europe

Figure 9-3 Analog Video In / Out Overview

A matrix switch STV6618 [7209] controlled by the Slave μ P via I²C-bus is used for Video I/O switching. All used outputs excluding pin 21 (Y/CVBS-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 [7600] (6dB amplification) and D_C via transistors [7214 & 7215] 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

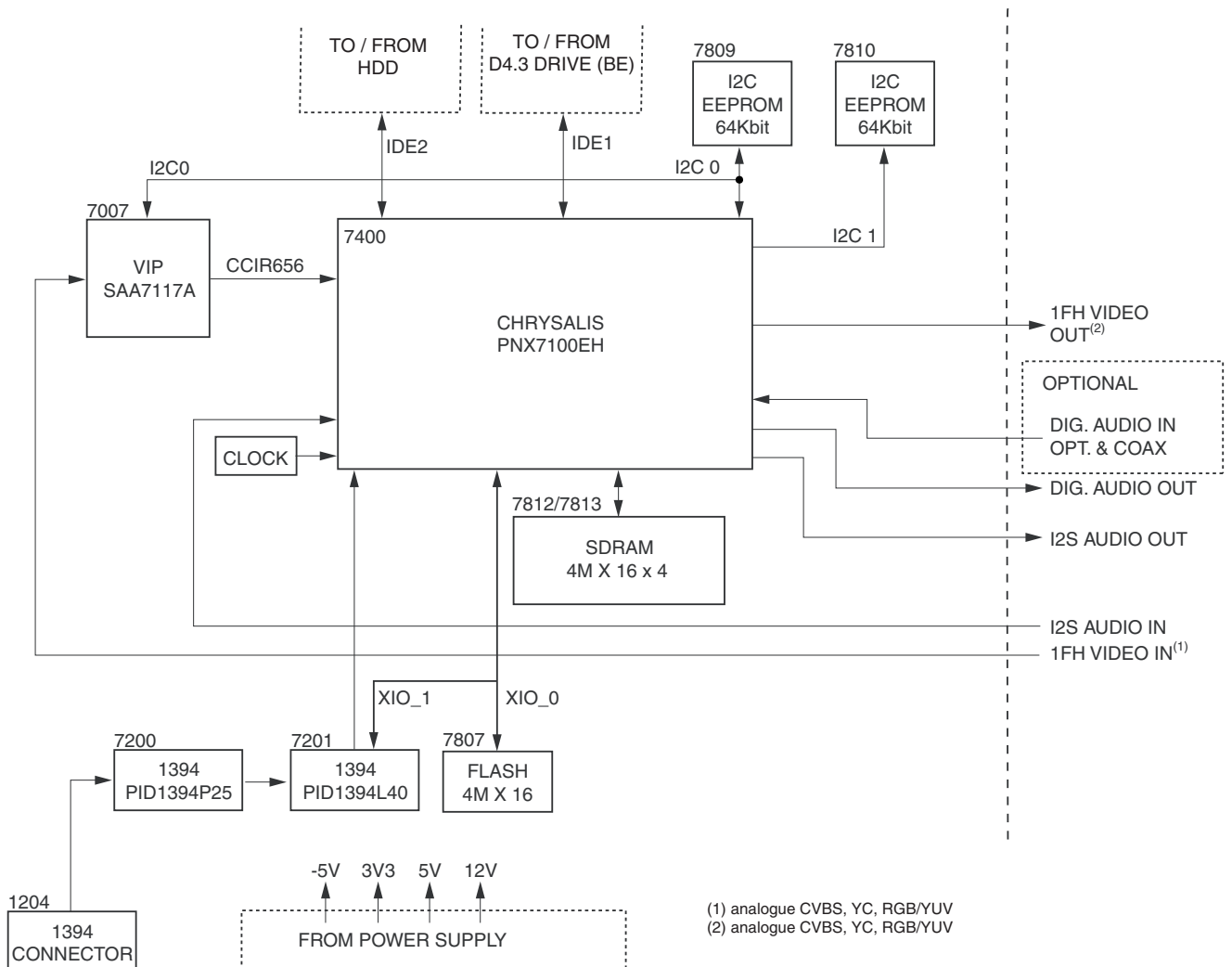


Figure 9-4 Block Diagram of Chrysalis Board

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, SAA7117A [7007]. 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 1204 via the 1394 PHY IC [7200] and the 1394 LINK IC [7201] also to the Chrysalis chip.

Audio Part

I²S audio is sent from the Analog board to the Chrysalis chip via connector 1900.

The Chrysalis chip compresses the I²S audio data into an MPEG1-L2 / AC3 audio stream.

Front-end I²S

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 I²S stream. In normal recording the serial data are sent 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
- I²S audio (PCM format) on connector 1900
- SPDIF audio (digital audio output) on connector 1900
- Progressive Scan output connector 1002 (Not for European version)

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.

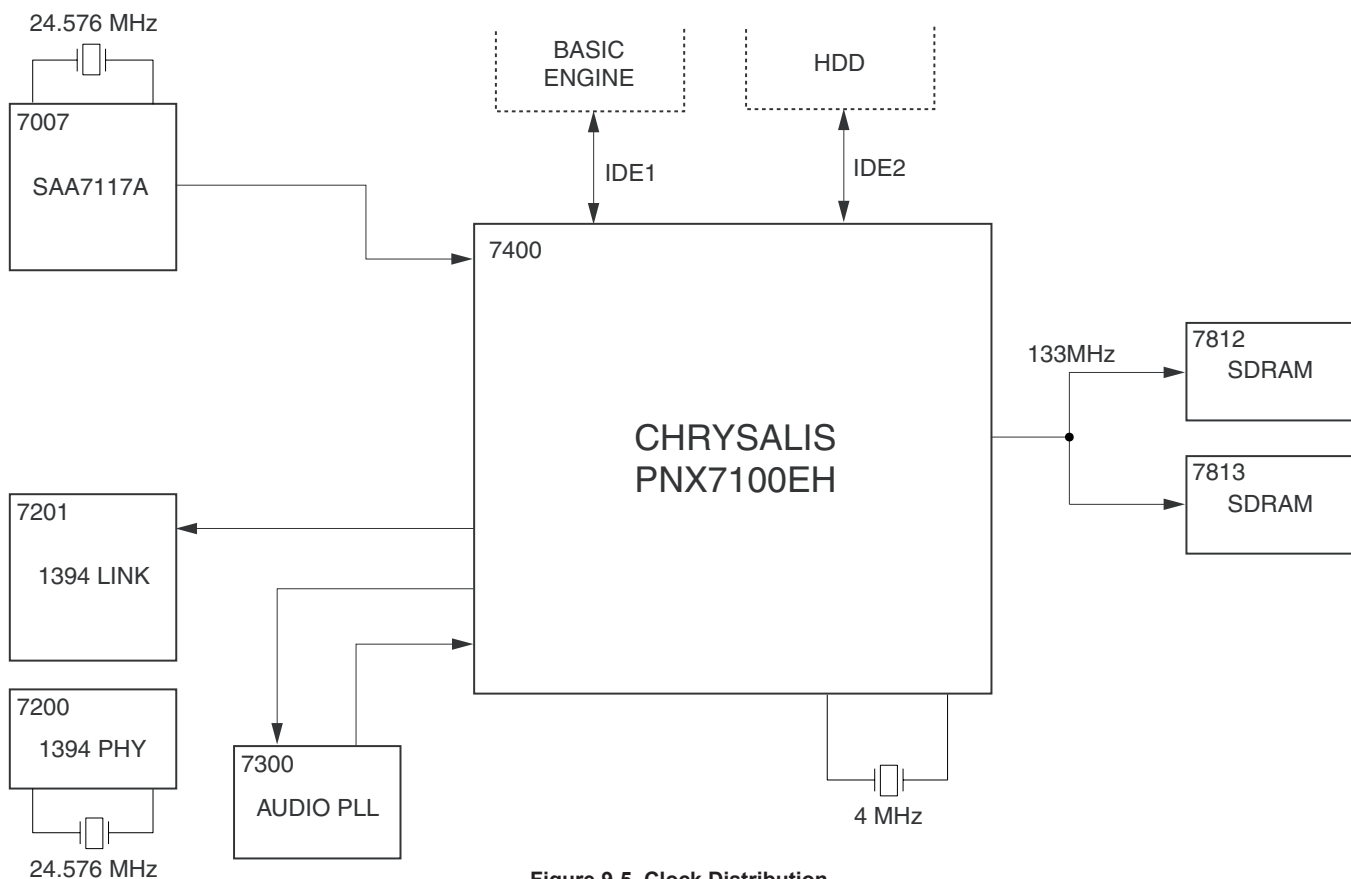
9.5.4. Clock Distribution

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 7402
- SAA7117A (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

9.5.7. Reset

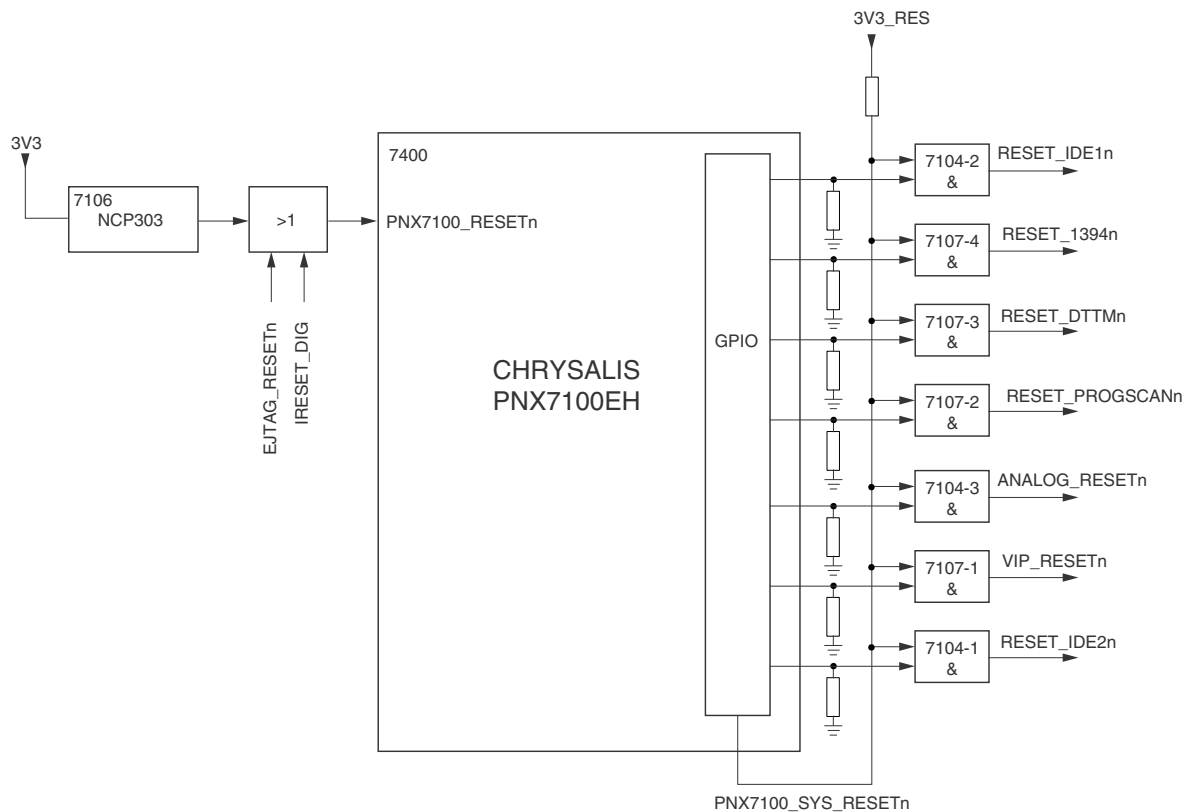


Figure 9-6 Reset concept

Reset concept Digital board

The voltage detector NCP303LSN29 [7106] provides the reset signal PNX7100_RESETh 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_RESETh = High {the Digital board is up and running}
- PNX7100_RESETh = 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_RESETh (only for production)

The PNX7100_SYS_RESETh 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.

- 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 (Not for European set)

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

9.5.8. 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] (Not for European version)

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

9.5.9. Service UART Interface

Transistors 7004 and 7112 are used to make a level conversion between LVTTL and 5V (compatible with most RS232 interfaces) and vice versa. The control line MPIO19_EEPROM_En is used to activate service and diagnostic SW at start-up. The connectivity is provided via an external service tool.

9.6 IC Description

9.6.1 Analog Board

IC7209 - STV6618 - Video Switch Matrix

BLOCK DIAGRAM

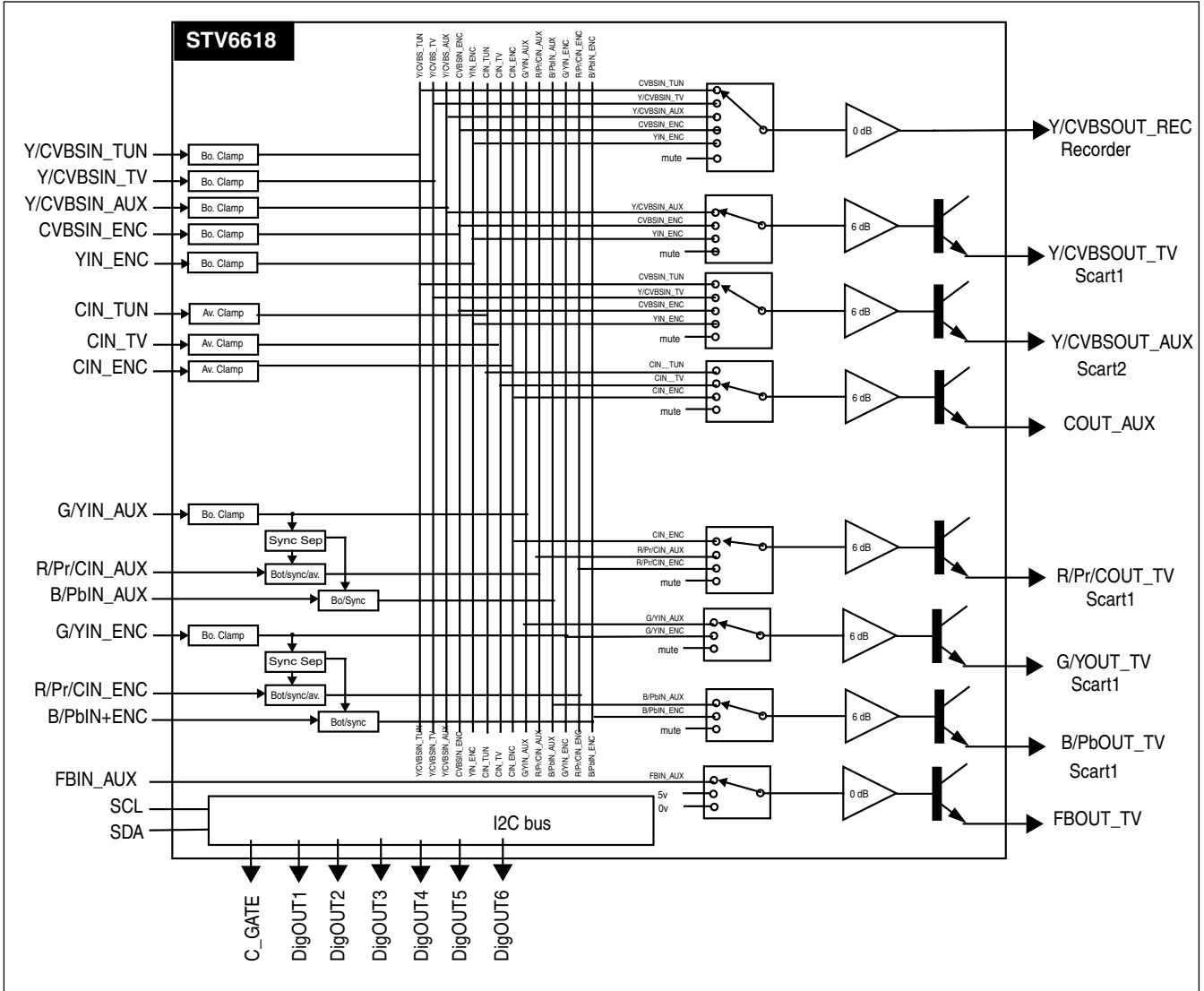


Figure 9-7

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 ² C Bus Clock
38	SDA	I ² C 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

IC7210 - NJM2234M - 3-Input Video Switch

BLOCK DIAGRAM

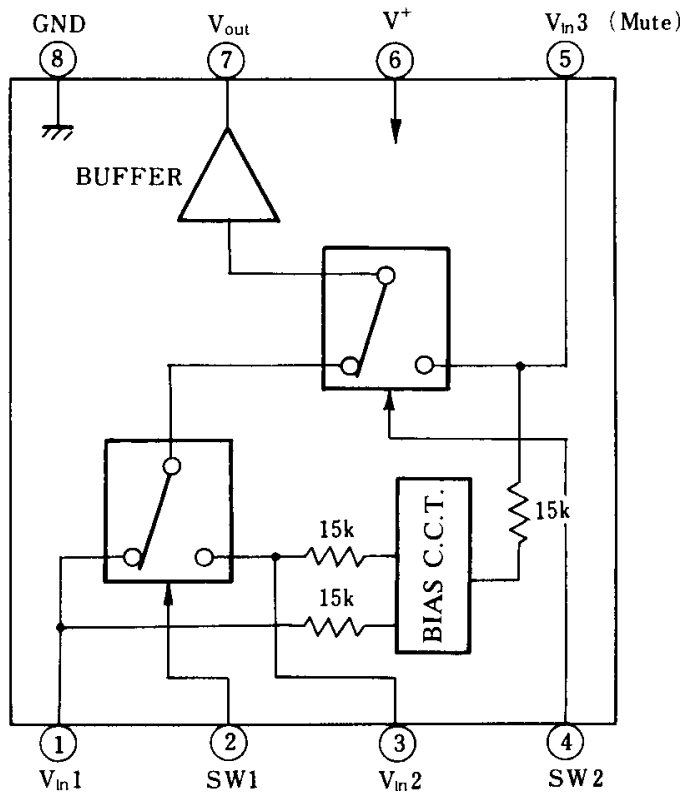


Figure 9-8

IC7210 - NJM2235M - 3-Input Video Switch

BLOCK DIAGRAM

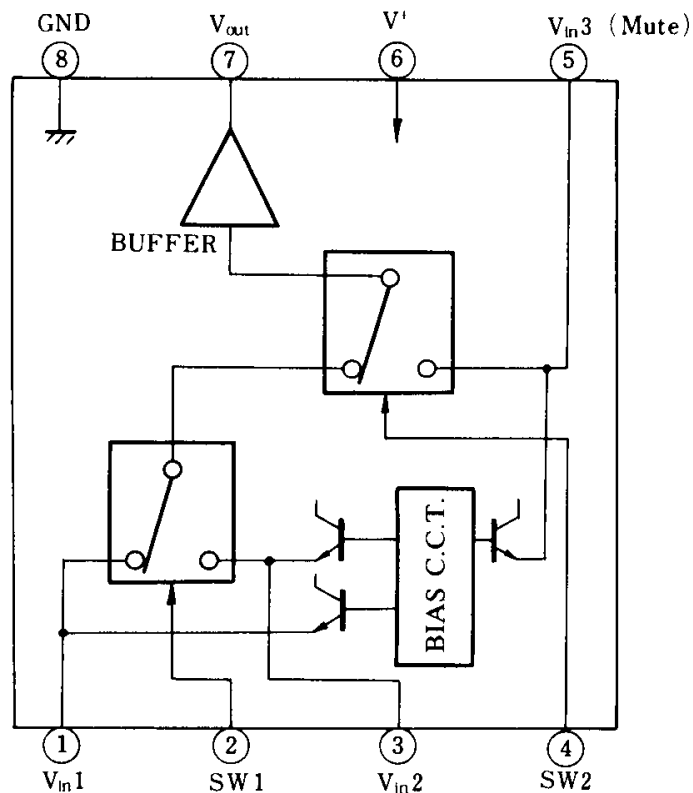


Figure 9-9

IC7500 - MSP3415G - Multi Sound Processor

BLOCK DIAGRAM

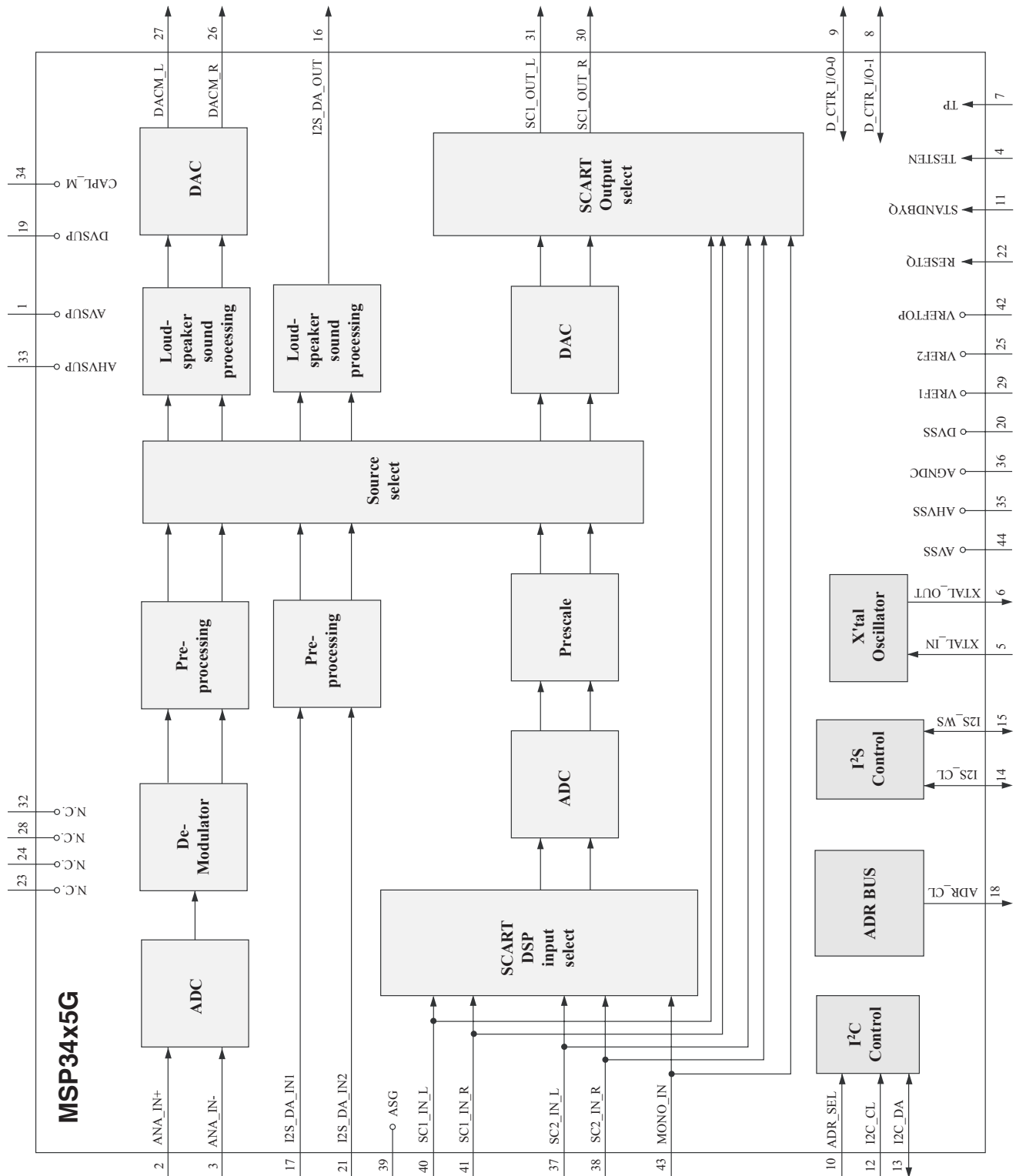


Figure 9-10

IC7600 - NJM2267M - Dual Video 6dB Amplifier

BLOCK DIAGRAM

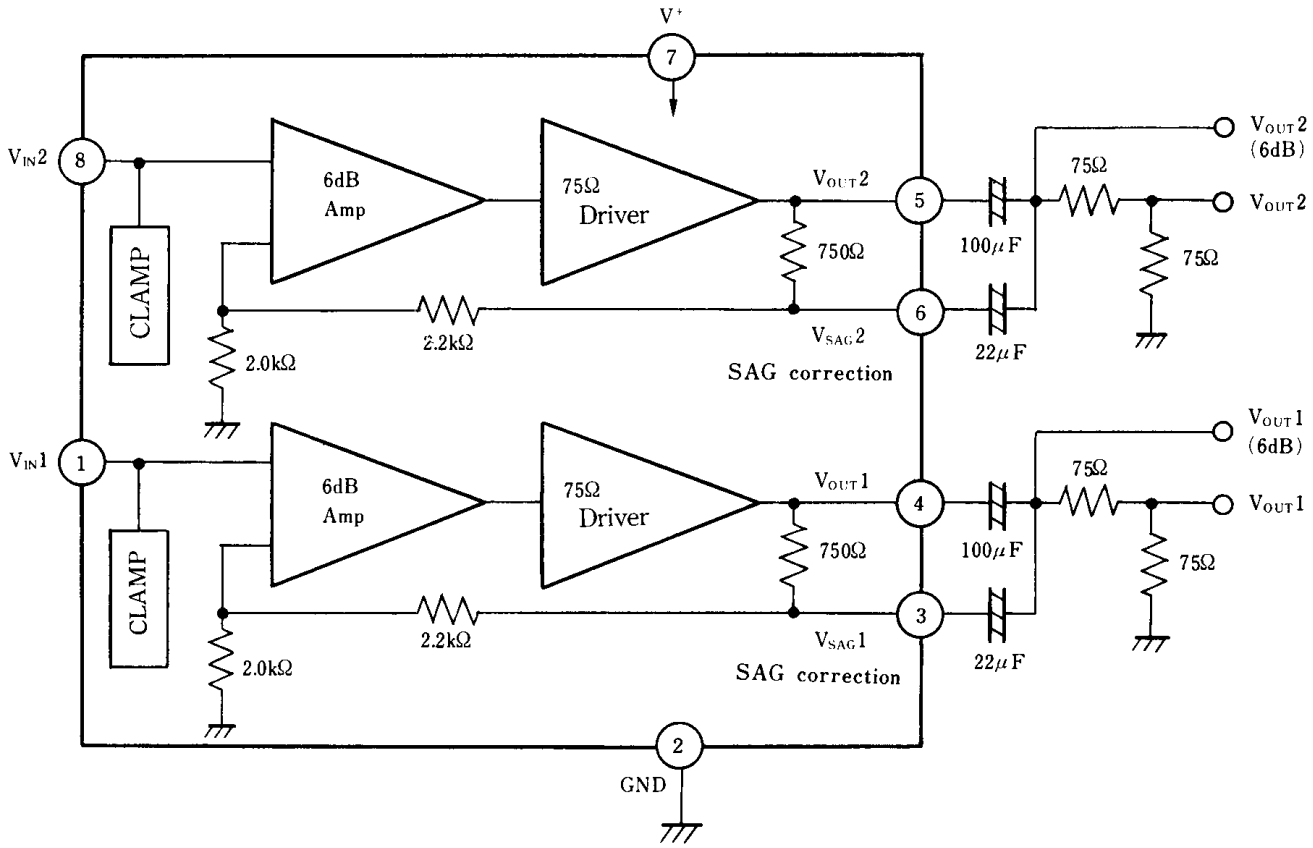


Figure 9-11

IC7802 - CS4351 - Digital to Analogue Converter

BLOCK DIAGRAM

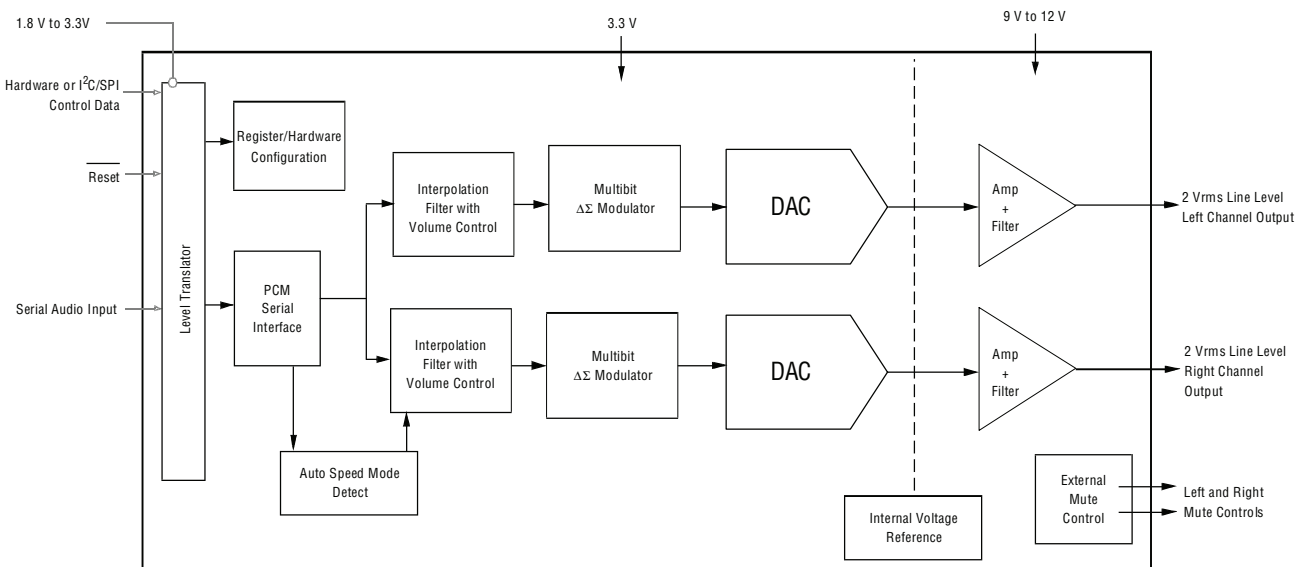
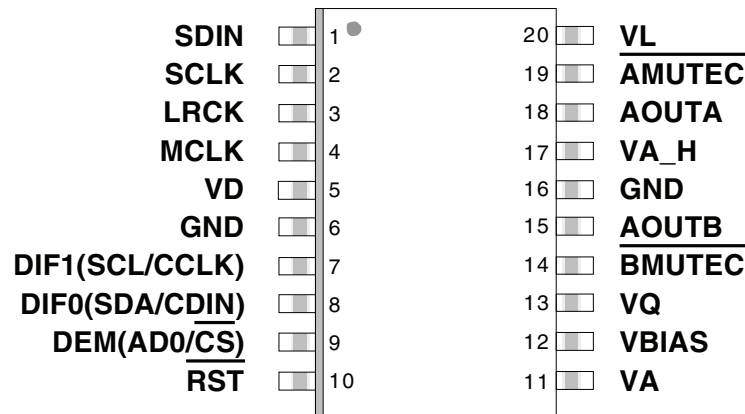


Figure 9-12

PIN DESCRIPTION AND CONFIGURATION



Pin Name	#	Pin Description
SDIN	1	Serial Audio Data Input (<i>Input</i>) - Input for two's complement serial audio data.
SCLK	2	Serial Clock (<i>Input</i>) - Serial clock for the serial audio interface.
LRCK	3	Left / Right Clock (<i>Input</i>) - Determines which channel, Left or Right, is currently active on the serial audio data line.
MCLK	4	Master Clock (<i>Input</i>) - Clock source for the delta-sigma modulator and digital filters.
VD	5	Digital Power (<i>Input</i>) - Positive power supply for the digital section.
GND	6 16	Ground (<i>Input</i>) - Ground reference.
RST	10	Reset (<i>Input</i>) - Powers down device and resets all internal registers to their default settings when enabled.
VA	11	Low Voltage Analog Power (<i>Input</i>) - Positive power supply for the analog section.
VBIAS	12	Positive Voltage Reference (<i>Output</i>) - Positive reference voltage for the internal DAC.
VQ	13	Quiescent Voltage (<i>Output</i>) - Filter connection for internal quiescent voltage.
VA_H	17	High Voltage Analog Power (<i>Input</i>) - Positive power supply for the analog section.
VL	20	Serial Audio Interface Power (<i>Input</i>) - Positive power for the serial audio interface.
BMUTEC	14	Mute Control (<i>Output</i>) - Control signal for optional mute circuit.
AMUTEC	19	
AOUTB	15	Analog Outputs (<i>Output</i>) - The full scale analog line output level is specified in the <i>Analog Characteristics</i> table.
AOUTA	18	
Control Port Definitions		
SCL/CCLK	7	Serial Control Port Clock (<i>Input</i>) - Serial clock for the control port interface.
SDA/CDIN	8	Serial Control Data (<i>Input/Output</i>) - Input/Output for I ² C data. Input for SPI data.
AD0/CS	9	Address Bit 0 / Chip Select (<i>Input</i>) - Chip address bit in I ² C Mode. Control Port enable in SPI mode.
Stand-Alone Definitions		
DIF0	8	Digital Interface Format (<i>Input</i>) - Defines the required relationship between the Left Right Clock, Serial Clock, and Serial Audio Data.
DIF1	7	
DEM	9	De-emphasis (<i>Input</i>) - Selects the standard 15µs/50µs digital de-emphasis filter response for 44.1 kHz sample rates

IC7803 - UDA1361TS - Analogue to Digital Converter

BLOCK DIAGRAM, PIN DESCRIPTION AND CONFIGURATION

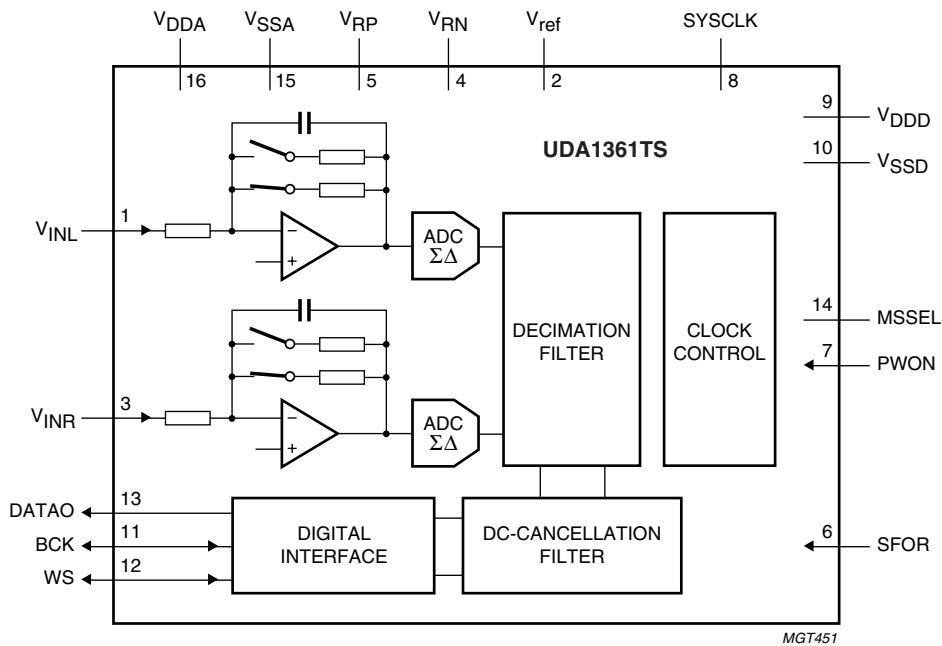


Fig.1 Block diagram.

PINNING

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

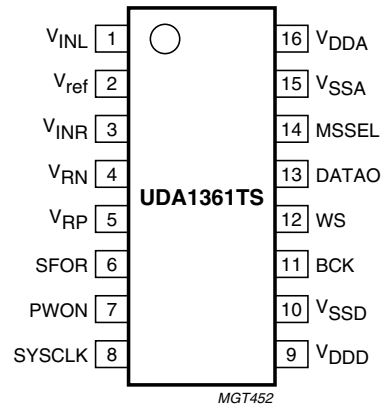


Fig.2 Pin configuration.

IC7900 - NCP301LSN45 - Reset circuit

BLOCK DIAGRAM

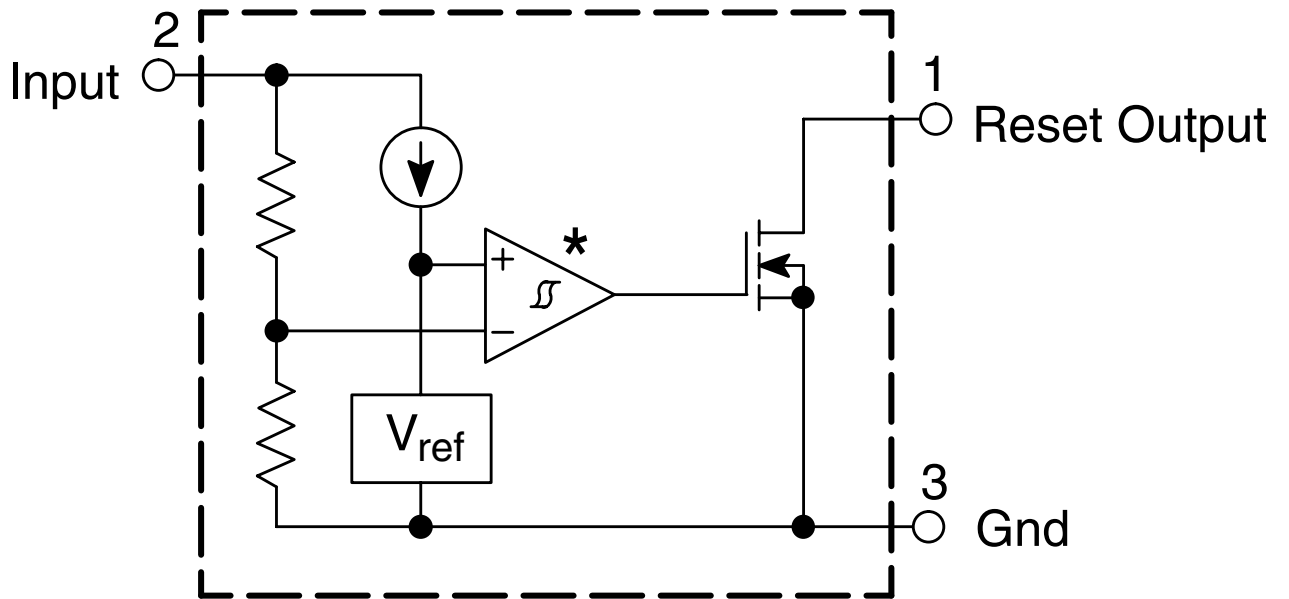


Figure 9-13

IC7910 - TMP87CH74ZF - Microprocessor

BLOCK DIAGRAM

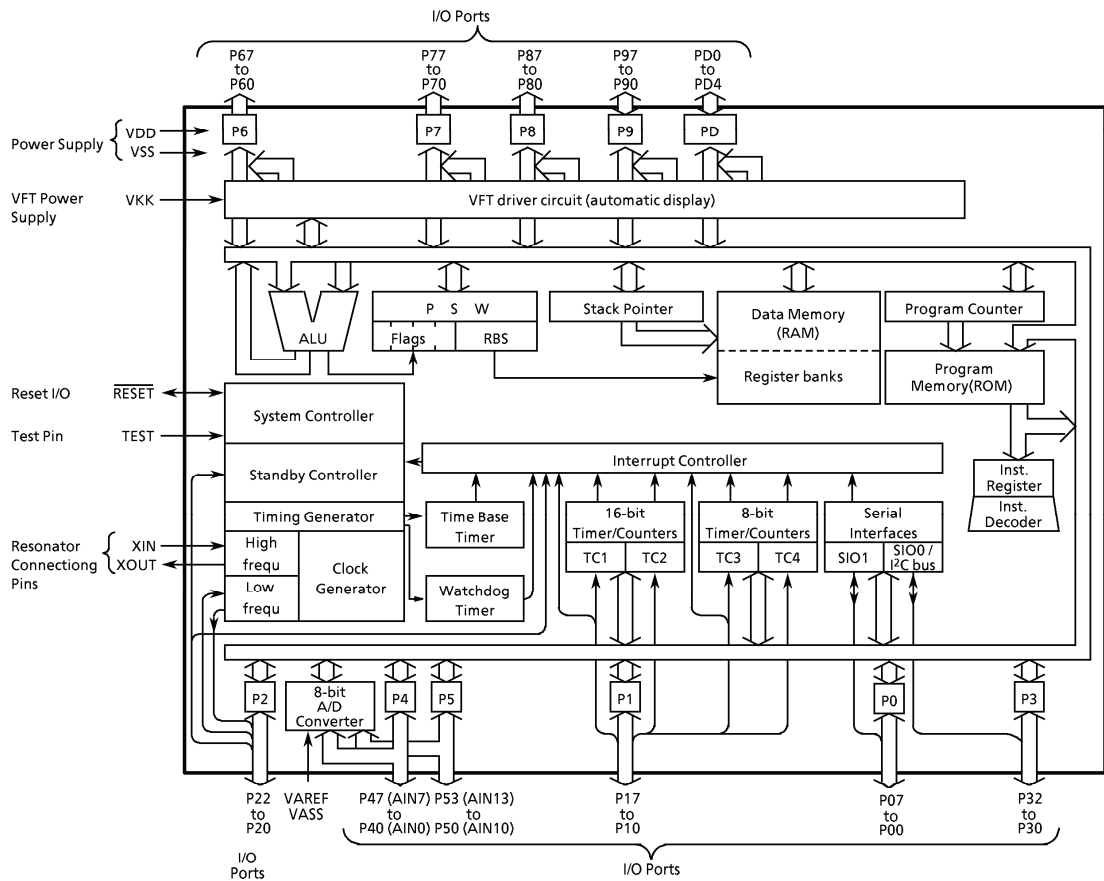


Figure 9-14

PIN DESCRIPTION AND CONFIGURATION

Pin Name	Input / Output	Function	
P07 to P03	I/O	Two 8-bit programmable input/output ports (tri-state).	
P02 (SO1)	I/O (Output)	Each bit of these ports can be individually configured as an input or an output under software control. When used as a SIO input/output, an External interrupt input, a timer/counter input, the latch must be set to "0". When used as a PPG output or divider output, the latch must be set to "1".	SIO1 serial data Output
P01 (SI1)	I/O (Input)		SIO1 serial data Input
P00 (SCK1)	I/O (I/O)		SIO1 serial clock input/output
P17 (INT4/TC3)	I/O (Input)		External interrupt input 4 or Timer/Counter 3 input
P16 (INT2)		External interrupt input 2	
P15 (INT3/TC1)		External interrupt input 3 or Timer/Counter 1 input	
P14 (TC4/PDO/PWM)		Timer counter 4 input or 8-bit programmable divider output or 8-bit PWM output	
P13 (DVO)		Divider output	
P12 (TC2/PPG)		Timer counter 2 input or Programmable pulse generator output	
P11 (INT1)		External interrupt input 1	
P10 (INT0)		External interrupt input 0	
P22 (XTOUT)	I/O (Output)	3-bit input/output port with latch. When used as input port, or external interrupt input, STOP mode release signal input, the latch must be set to "1".	Resonator connecting pins (32.768 kHz). For inputting external clock, XTIN is used and XTOUT is opened.
P21 (XTIN)	I/O (Input)		External interrupt input 5 or STOP mode release signal input
P20 (INT5/STOP)			
P32 (SCK0)	I/O (I/O)	3-bit programmable input/output ports (Sink open drain).	SIO0 serial clock input/output
P31 (SDA/SO0)	I/O (I/O/Output)	Each bit of these ports can be individually configured as an input or an output under software control. When used as a I ² C input/output, the latch must be set to "1".	I ² Cbus serial data input/output or SIO0 serial data output
P30 (SCL/SIO)			I ² Cbus serial clock input/output or SIO0 serial data Input
P47 (AIN7) to P40 (AIN0)	I/O (Input)	8-bit programmable input/output ports (tri-state). Each bit of these ports can be individually configured as an input or an output under software control. When used as a analog input, the P4CR must be set to "0".	A/D converter analog inputs
P53 (AIN13) to P50 (AIN10)	I/O (Input)	4-bit programmable input/output ports (tri-state). Each bit of these ports can be individually configured as an input or an output under software control. When used as a analog input, the P5CR must be set to "0".	A/D converter analog inputs
P67 (V7) to P60 (V0)	I/O (Output)	Four 8-bit high brackdown voltage output ports with the latch. When used as a VFT driver output, the latch must be cleared to "0".	VFT driver outputs
P77 (V15) to P70 (V8)			
P87 (V23) to P80 (V16)			
P97 (V31) to P90 (V24)			
PD4 (V36) to PD0 (V32)	I/O (Output)	5-bit high breakdown voltage output ports with the latch. When used as a VFT driver output, the latch must be cleared to "0".	

Pin Name	Input / Output	Function
XIN, XOUT	Input, Output	Resonator connecting pins for high-frequency clock. For inputting external clock, XIN is used and XOUT is opened.
$\overline{\text{RESET}}$	I/O	Reset signal input or watchdog timer output/address-trap-reset output/system-clock-reset outputted.
TEST	Input	Test pin for out-going test. Be tied to low.
VDD, VSS	Power Supply	+ 5 V, 0 V (GND)
VKK		VFT driver power supply
VAREF, VASS		Analog reference voltage inputs (High, Low)

9.6.2 Digital Board

IC7106 - NCP303LSN29 - Reset circuit

BLOCK DIAGRAM

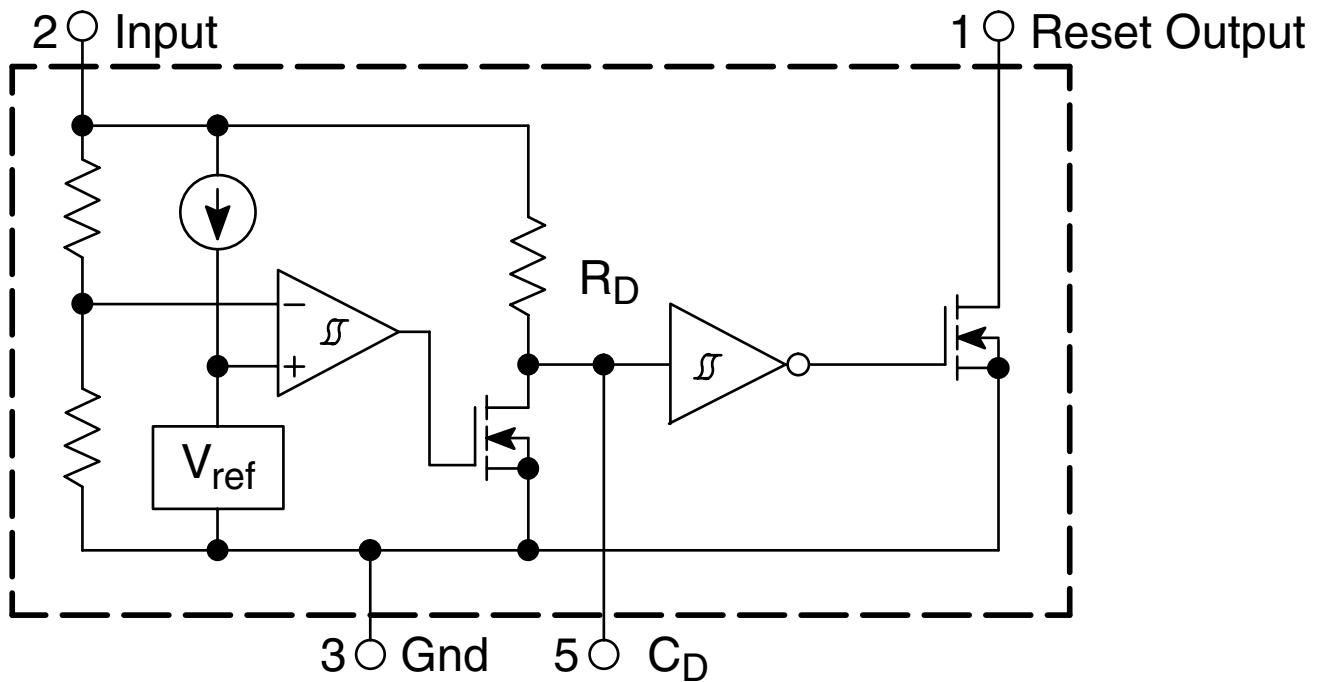


Figure 9-15

IC7501 - NCP1571D - Low voltage Synchronous Buck Controller

BLOCK DIAGRAM

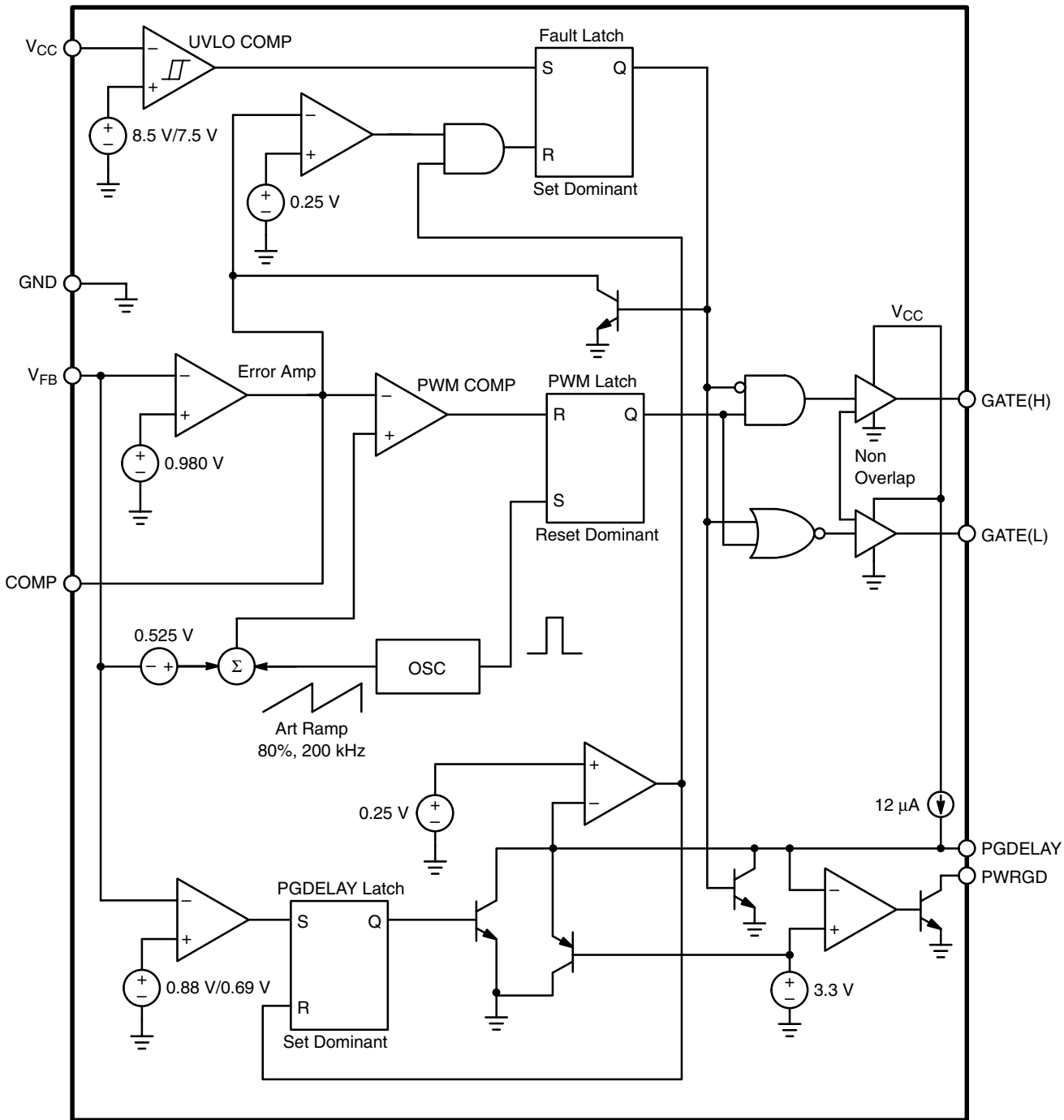


Figure 9-16

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.

MISCELLANEOUS – SET & ACCESSORY

164	3103 601 20231	SPRING GROUND
196	3139 241 23061	COVER TOP DVDR3300H
228	3139 241 23041	PLATE REAR DVDR3300H
288	4822 532 60948	BUSH, AC CORD
292	2822 031 00024	FAN 12VDC 0.8W 3100RPM
901	3143 027 62751	FRONT ASSY DVDR3300H/02/19/51
901	3143 027 62771	FRONT ASSY DVDR3300H/05
901	3143 027 62972	FRONT ASSY DVDR3330H/02/19/51
901	3143 027 63002	FRONT ASSY DVDR3330H/05
901	3143 027 63431	FRONT ASSY DVDR5330H/02/19
901	3143 027 63461	FRONT ASSY DVDR5330H/05
902	3103 607 50971	COVER DUST ASSY
910	3143 027 62791	COVER TRAY ASSY DVDR3300H
910	3143 027 62991	COVER TRAY ASSY DVDR3330H
910	3143 027 63451	COVER TRAY ASSY DVDR5330H
920	3143 027 62801	FRAME ASSY DVDR3300H
333	2422 549 00587	REMOTE CONTR DVDR3300H/EU
336	4822 321 11499	△ MAINSCORD 2.0M – EU /02/19/51
336	2422 070 98236	△ MAINSCORD UK 5A 1M8 /05
342	2422 076 00532	CBLE SCART 1M5 SCART 21P BK B
345	4822 320 50377	RF CABLE PAL
1001	3139 248 85601	PCBAS DVDR3300H DIG PANEL EU
1002	3139 248 85581	PCBAS DVDR3300H ANA PANEL EU
1004	3139 248 85541	PCBAS DVDR3300H FRONT PANEL
1005	3139 247 11361	MODULE DRIVE D4.3 CLOSED
1006	3139 247 11561	PSU BOARD 05H80 EU
1007	2822 062 00089	HDD 3.5 80GB 6L080P0 (MAXT) DVDR3300H
1007	2822 062 00095	HDD 3.5 160GB 6L160P0 (MAXT) DVDR3330H
1007	2822 062 00099	HDD 3.5 250GB 6L250R0 (MAXT) DVDR5330H
8001	3139 110 28181	CWAS 11PH/11PH 120 6 5 BK 26S
8002	3139 241 01631	FFC FOIL 22P/180/22P BD FOLD
8003	3139 241 01641	FFC FOIL 10P/280/10P BD FOLD
8004	3139 241 01631	FFC FOIL 22P/180/22P BD FOLD
8005	3104 157 04201	CBLE PH 06P/340/06P PH 26ST BK
8007	3139 271 00001	FFC FOIL 13P/480/13P AD 1MMP
8008	3104 157 02021	CBLE PH 09P/340/09P PH 26ST BK
8009	3139 110 28301	CBLE PH 12P/220/12P PH 26ST BK
8011	3139 241 00921	CBLE IDE 40P/280/40P IDE UL
8012	3103 601 00571	CBLE EHR 4P/130/4P LC UL
8013	3139 241 01211	CBLE HR 04P/340/04P LC UL

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