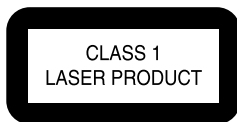


Service
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Service



Service Manual



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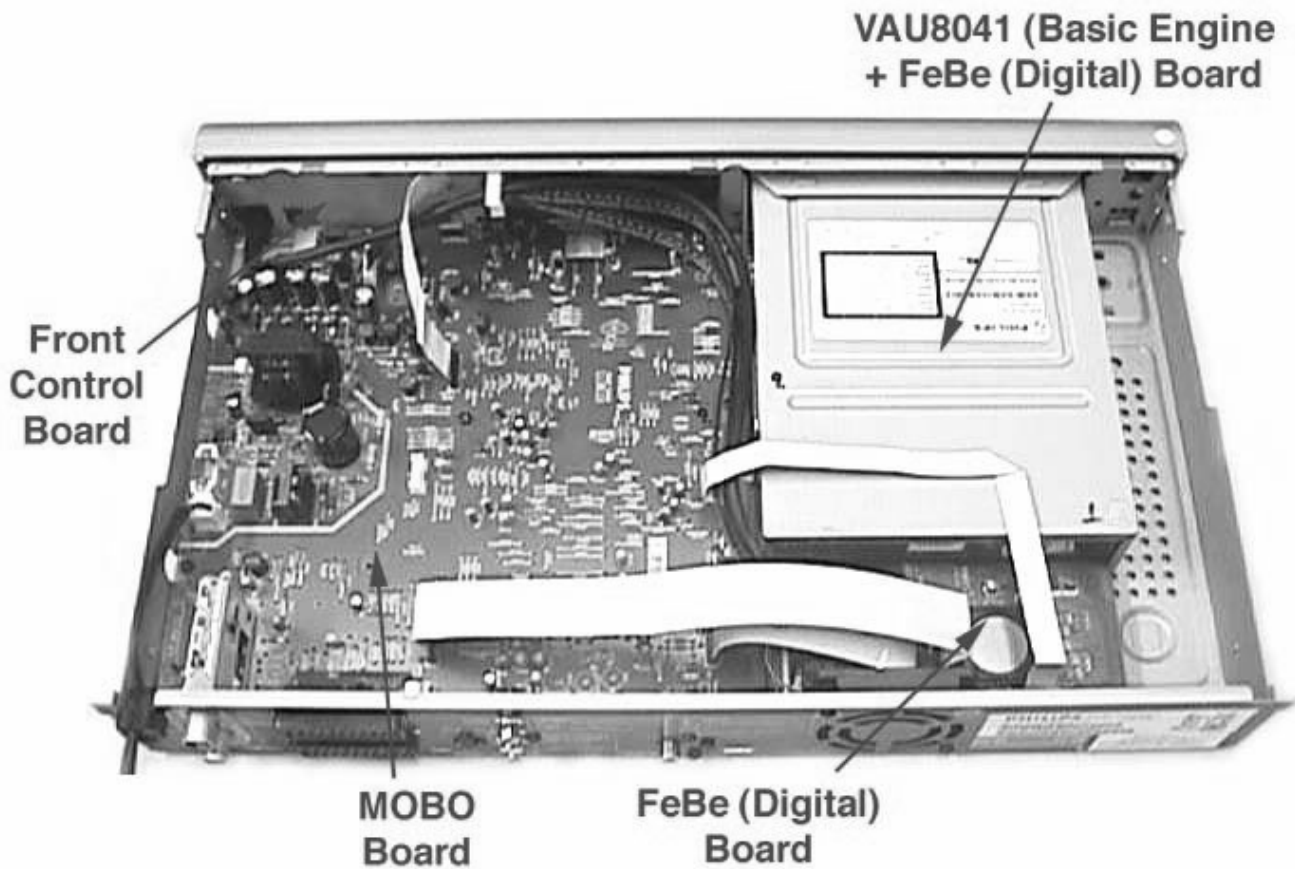
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1. Technical Specifications and Connection Facilities

1.1 PCB Locations



1.2 Diversity Matrix and Read and Write speed

Module / Pcb Application	VFM RANGE		
	DVDR610/0x/19/33	DVDR610/0x/19/33	DVDR610/0x/19/33
MOBO 04 E1 12NC: 3139 248 82891	x	x	x
VAU8041/11 DS version: E2_AV3_4 12NC: 9305 025 84111 FEBE pcb: 3104 128 09271 Drive: AV3.5	x		
VAU8041/21 DS version: E1_AV3_4 12NC: 9305 025 84121 pcb: 3104 128 09281 Drive: AV3.5		x	x

Type of Disc (Function)	Disc Rotation Speed
Read Speed CD	CAV 7x
Read Speed DVD	CAV 4x
Write Speed DVD+RW	ZCAV 2.4x
Write Speed DVD+R	ZCAV2.4x

1.3 General:

Mains voltage : 198V-276V
 Mains frequency : 43 Hz - 63Hz
 Power consumption (record) : 27 W

Power consumption (AV loop through) : < 15W
 Power consumption low power stand-by : < 3 W

1.4 RF Tuner

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

1.4.1 System:

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

1.4.2 RF - Loop Through:

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

1.4.3 Radio Interference:

input voltage /3 tone method (+40 dB min) : no limit

1.4.4 Receiver:

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

1.4.5 Video Performance:

Channel 25 / 503,25 MHz,
 Test pattern: PAL BG PHILIPS standard test pattern,
 RF Level 74 dBV
 Measured on SCART 1
 Frequency response: : 0.1- 4.00 MHz ± 3dB
 Group delay (0.1 MHz - 4.4 MHz) : 0 nsec ± 150nsec

1.4.6 Audio Performance:

Audio Performance Analogue - HiFi:

Frequency response at SCART 1
 (L+R) output: : 100 Hz - 12 kHz / 0±
 3dB
 S/N according to DIN 45405, 7, 1967 :
 and PHILIPS standard test pattern
 video signal: : ≥ 50dB, unweighted
 Harmonic distortion (1 kHz, ± 25
 kHz deviation): : ≤ 1.5%

Audio Performance NICAM:

Frequency response at SCART
 1(L+R) output: : 40 Hz - 15 kHz 0 ±
 3dB
 S/N according to DIN 45405, 7, 1967 :
 and PHILIPS standard test pattern
 video signal: : ≥ 60 dB unweighted
 Harmonic distortion (1 kHz): : ≤ 0.5 %

1.4.7 Tuning

Automatic Search Tuning
















scanning time without antenna : typ. 3 min.
 stop level (vision carrier) : ≥ 37dBμV
 Maximum tuning error of a recalled
 program : ± 62.5 kHz
 Maximum tuning error during
 operation : ± 100 kHz






Tuning Principle

automatic B,G, I, DK and L/L'detection
 manual selection in "STORE" mode






















1.5 Analogue Inputs / Outputs

1.5.1 SCART 1 (Connected to TV)

Pin Signals:
 1 - Audio R 1.8V RMS 
 2 - Audio R 
 3 - Audio L 1.8V RMS 
 4 - Audio GND 
 5 - Blue/Chroma GND 
 6 - Audio L 
 7 - Blue out/
 Chroma in 0.7Vpp ± 0.1V into 75 Ohm (*) 
 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 
 11 - Green 0.7Vpp ± 0.1V into 75 Ohm (*) 
 12 - Nc 
 13 - Red/Chroma GND 
 14 - fast switch GND 
 15 - Red out/
 Chroma out 0.7Vpp ± 0.1V into 75 Ohm (*)
 ± 3dB 0.3Vpp Chroma (burst) 

16 - fast switch
 RGB/ CVBS or Y <0.4V into 75 Ohm = CVBS
 >1V / <3V into 75 Ohm = RGB
 17 - Y/CVBS GND OUT 
 18 - Y/CVBS GND IN 
 19 - CVBS/Y 1Vpp ± 0.1V into 75 Ohm (*) 
 20 - CVBS/Y 
 21 - Shield 

1.5.2 SCART 2 (Connected to AUX)

Pin Signals:
 1 -Audio R 1.8V RMS 
 2 -Audio R 
 3 -Audio L 1.8V RMS 
 4 -Audio GND 
 5 -Blue/Chroma GND 
 6 -Audio L 
 7 -Blue in/
 Chroma out ± 3dB 0.3Vpp Chroma (burst) 
 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 GND OUT 
 18 -CVBS GND IN 
 19 -CVBS/Y/RGB
 sync 1Vpp ± 0.1V into 75 Ohm (*) 
 20 -CVBS/Y 
 21 -Shield 

(*) for 100% white

1.5.3 Audio/Video Front Input Connectors

Audio - Cinch

Input voltage : 2.2 Vrms
 Input impedance : >10kΩ

Video - Cinch

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

Video - YC (Hosiden)

According to IEC 933-5
 Superimposed DC-level on pin 4 (load > 100kΩ)
 < 2.4V is detected as 4:3 aspect ratio
 > 3.5V is detected as 16:9 aspect ratio
 Input voltage Y : 1Vpp ± 3dB
 Input impedance Y : 75 Ω
 Input voltage C : burst 300 mVpp ± 3
 dB
 Input impedance C : 75 Ω

1.5.4 Audio/Video Output rear Connectors

Audio- Cinch

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

Video- Cinch

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

Video - YC (Hosiden)

According to IEC 933-5
 Superimposed DC-level on pin 4 (load > 100kohm)
 < 2.4V is detected as 4:3 aspect ratio
 > 3.5V is detected as 16:9 aspect ratio
 Output voltage Y : 1Vpp +10/-15%
 Output voltage C : 300mVpp +1/-4dB

Annex A of 61883-1

1.10 P50 System Control

Via SCART pin nr 10

1.6 Video Performance

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

1.11 Dimensions and Weight

Height of feet : 5.5mm
 Apparatus tray closed : WxDxH :435 x 285x 65mm
 Apparatus tray open : WxDxH :435 x 422x 65mm
 Weight without packaging : app. 4 kg ± 0.5 kg
 Weight in packaging : app. 6.5 kg

1.6.1 SCART (RGB)

SNR : > -65 dB on all output
 Bandwidth : 4.8 MHz ± 2dB

1.12 Laser Output Power & Wavelength

1.12.1 DVD

Output power during reading : 0.8mW
 Output power during writing : 20mW
 Wavelength : 660nm

1.7 Audio Performance CD

1.7.1 Cinch Output Rear

Output voltage 2 channel mode : 2Vrms ± 2dB
 Channel unbalance (1kHz) : <1dB
 Crosstalk 1kHz : >95dB
 Crosstalk 16Hz-20kHz : >87dB
 Frequency response 20Hz- 20kHz : ±0.2dB max
 Signal to noise ratio : >85 dB
 Dynamic range 1kHz : >83dB
 Distortion and noise 1kHz : >83dB
 Distortion and noise 16Hz-20kHz : >75dB
 Intermodulation distortion : >70dB
 Mute : >95dB
 Outband attenuation: : >40dB above 30kHz

1.12.2 CD

Output power : 0.3mW
 Wavelength : 780nm

1.7.2 Scart Audio

Output voltage 2 channel mode : 1.6Vrms ± 2dB
 Channel unbalance (1kHz) : <1dB
 Crosstalk 1kHz : >85dB
 Crosstalk 16Hz-20kHz : >70dB
 Frequency response 20Hz- 20kHz : ± 0.2dB max
 Signal to noise ratio : >80 dB
 Dynamic range 1kHz : >75dB
 Distortion and noise 1kHz : >75dB
 Distortion and noise 16Hz-20kHz : >50dB
 Intermodulation distortion : >70dB
 Mute (spin-up, pause, access) : >80dB
 Outband attenuation: : >40dB above 25kHz

1.8 Digital Output

1.8.1 Coaxial

CDDA/ LPCM (incl MPEG1) : according IEC958
 MPEG2, AC3 audio : according IEC1937
 DTS : according IEC1937, amendment 1

1.9 Digital Video Input (IEEE 1394)

1.9.1 Applicable Standards


Implementation according:
 IEEE Std 1394-1995
 IEC 61883 - Part 1
 IEC 61883 - Part 2 SD-DVCR (02-01-1997)
 Specification of consumer use digital VCR's using 6.3 mm magnetic tape - dec.1994
 Mechanical connection according:

2. Safety Information, General Notes

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

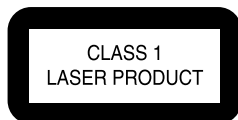



Figure 2-1

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 (pos. 1005), 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:

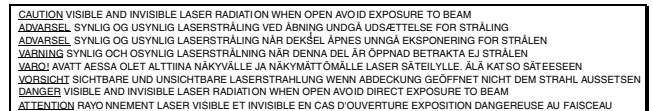


Figure 2-2

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.

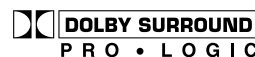


Figure 2-3

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.

3. Directions For Use

The following excerpt of the Quick Use Guide serves as an introduction to the set.

The complete Direction for Use can be downloaded in different languages from the internet site of Philips Customer Care Center:
www.p4c.philips.com

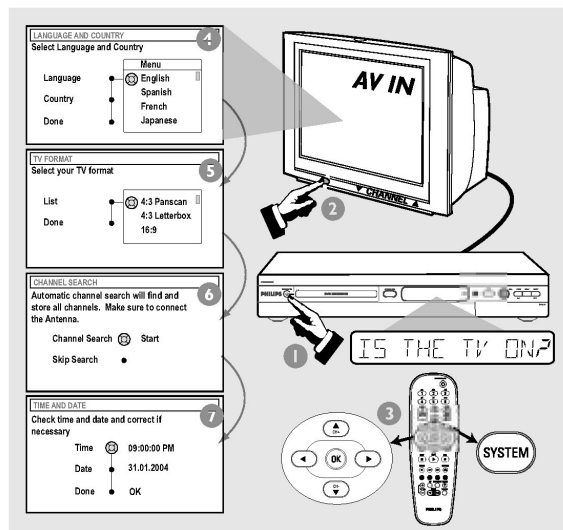
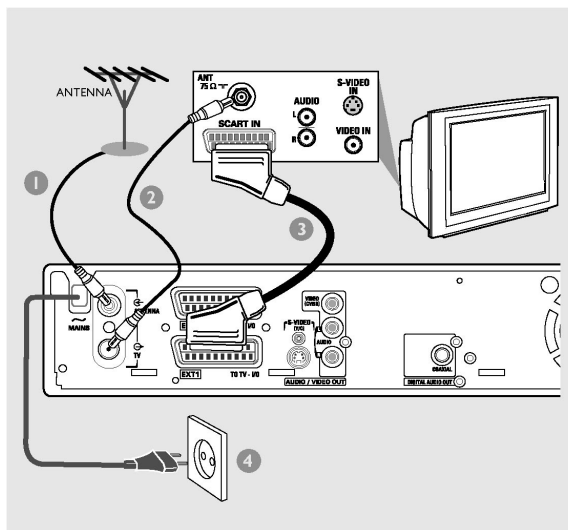
QUICK USE GUIDE

DVDR610

DVDR615

DVDR616

12nc: 3139 246 14051



1 First connect

- 1 Remove the antenna cable plug from your TV (or Satellite Receiver/Cable Box). Connect it to the **ANTENNA IN** socket at the back of the DVD recorder.
- 2 Use the supplied antenna cable to connect the DVD recorder's **TV OUT** socket to the antenna input socket at the back of your TV set.
- 3 Use the supplied scart cable to connect the DVD recorder's **EXT 1 TO TV-I/O** socket to the SCART socket at the back of your TV set.
- 4 Connect the power cable from the DVD recorder's **~ MAINS** to the power supply.

Helpful Hints:

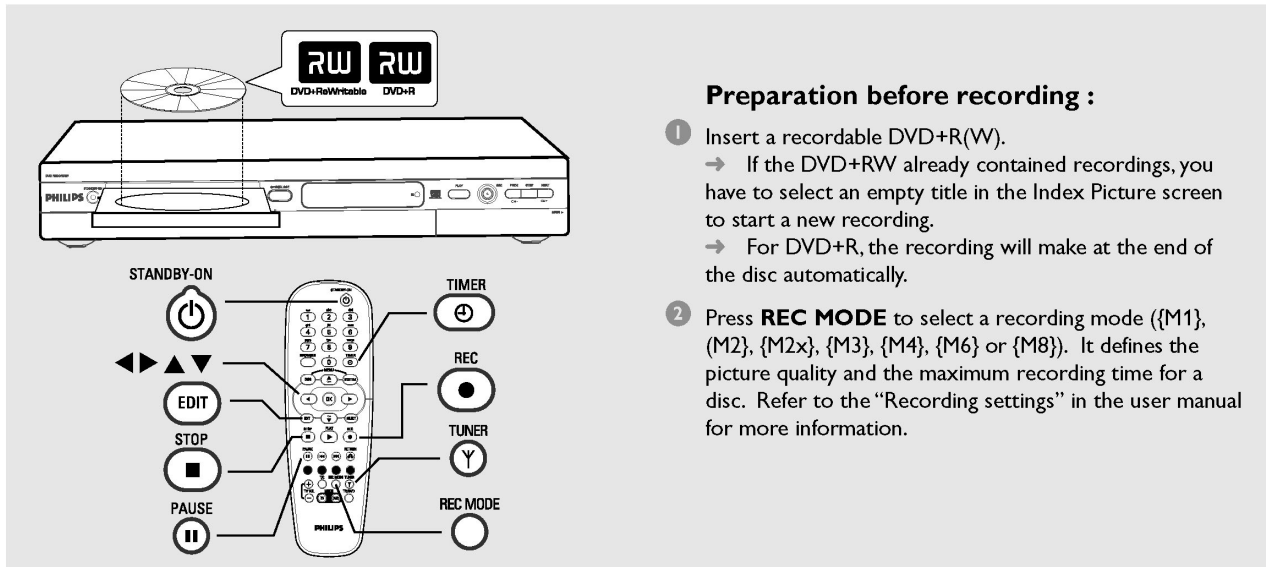
If your TV does not have the above-mentioned connectors, please refer to the user manual for more information on others possible connection to your TV set.

2 Start first installation

- 1 Press **STANDBY-ON** on the DVD recorder to switch it on.
- 2 Switch on the TV set.
If the first installation menu does not appear, press the **CHANNEL** button on the TV to select the correct video in channel, for example, 'EXT', '0', or 'AV'.
- 3 Press to select an item in the menu.
Press to access the selected item's options.
Press to confirm your selection.
Once completed, select { **Done** } in the menu and press **OK** to continue.
- 4 { **Language and Country** } menu appears.
{ **Language** } – select on-screen display language.
{ **Country** } – select country of your residence.
- 5 { **TV Format** } menu appears.
{ **List** } – select TV screen display.
- 6 { **Channel Search** } menu appears.
Press **OK** to start automatic TV channel search.
→ Once completed, the total number of channels found appears on the TV.
- 7 { **Time and Date** } menu appears.
If the time and date shown on the TV are not correct, press to enter the respective time/date field. Press to change the first digit and press to go to the next digit field. Once completed, press **OK**.
- 8 Press to select { **Done** } and press **OK** to save the changes.
→ The initial installation is now completed.

The DVD recorder is ready for use!

... cont.



Preparation before recording :

- 1 Insert a recordable DVD+R(W).
 - If the DVD+RW already contained recordings, you have to select an empty title in the Index Picture screen to start a new recording.
 - For DVD+R, the recording will make at the end of the disc automatically.
- 2 Press **REC MODE** to select a recording mode ({M1}, {M2}, {M2x}, {M3}, {M4}, {M6} or {M8}). It defines the picture quality and the maximum recording time for a disc. Refer to the "Recording settings" in the user manual for more information.

3 Start a manual recording

- 1 Press **TUNER** on the remote control to see the TV programmes, then press **▲ ▼** to select the programme number (or external input channel, for example EXT1, CAM1) you wish to record.
 - The input channel must correspond to the socket to which you have connected the additional device.
- 2 Press **REC ●** to start recording.
 - If required, you can press **REC ●** twice to start a 30-minute recording. Each time you press **REC ●** button, you will add 30 minutes to the recording time.
- 3 During recording, you may press **PAUSE II** to pause the recording and press **REC ●** to continue.
- 4 To stop the recording, press **STOP ■**.
 - Wait until the 'MENU UPDATE' message disappears from the display panel before you remove the disc.

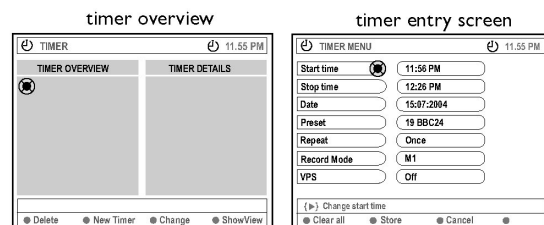
To play the DVD+R on other DVD players, you must finalise it first

- 1 Press **EDIT** on the remote control.
- 2 Press **▲ ▼** to select { **Finalise** } in the menu and press **OK** to start finalising the DVD+R.

Once finalised, no further recordings and editings can be made to the DVD+R. Unfinalise a DVD+R is not possible.

4 Prepare timer recording

- 1 Press **TIMER**.
 - The timer overview appears.



- 2 Press the matching colour coded button on the remote control to select { **New Timer** }.
 - The timer entry screen appears.
- 3 Use **▲ ▼ ◀ ▶** to select the appropriate entry field.
- 4 Use **▲ ▼ ◀ ▶** to enter the programme information (or use the **alphanumeric keypad 0-9**), then press **OK** to confirm.
- 5 Once completed, press the matching colour coded button on the remote control to select { **Store** }.
 - The timer overview screen will appear showing the stored programme information.
- 6 To exit, press **TIMER**.
- 7 Press **STANDBY-ON** to switch off the DVD recorder.
 - The DVD recorder must be off in order for the timer recording to occur, at least five minutes before the timer recording is set to begin.



Detailed playback features and additional functions are described in the accompanying user manual.

4. Mechanical Instructions

4.1 Dismantling and Assembly of the Set

For item numbers please see the exploded views in chapter 10.

4.1.1 Front Panel Assembly

- After removing the top cover, remove tray front 134+138, see picture 4-1
- Remove the three screws 188
- Release the two snap hooks on the sides and remove the front assembly
- Remove the 4 screws 186 to remove the front plate 184, see picture 4-2

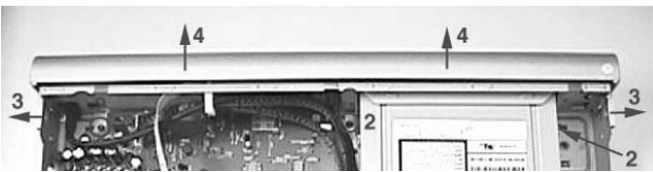
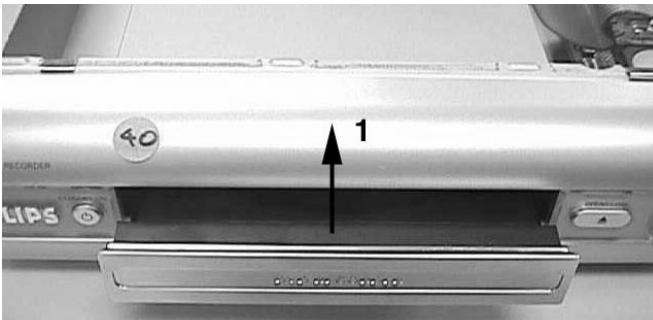


Figure 4-1

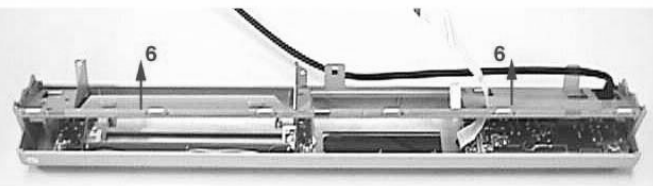
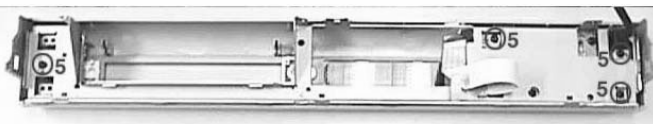


Figure 4-2

4.1.2 Basic Engine VAU8041

- Remove the Front Panel Assembly as given in 4.1.1
- Remove the 6 screws 260, 269 to free the Basic Engine
- Remove the dust cover assembly 147 and 148
- Loosen 2 screws to remove bracket 256
- Loosen 4 screws to remove the Basic Engine metal casing
- Place the Basic Engine in the service position

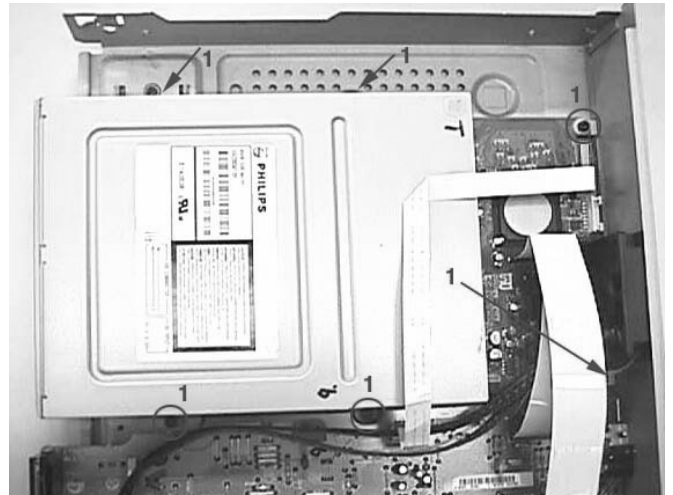


Figure 4-3

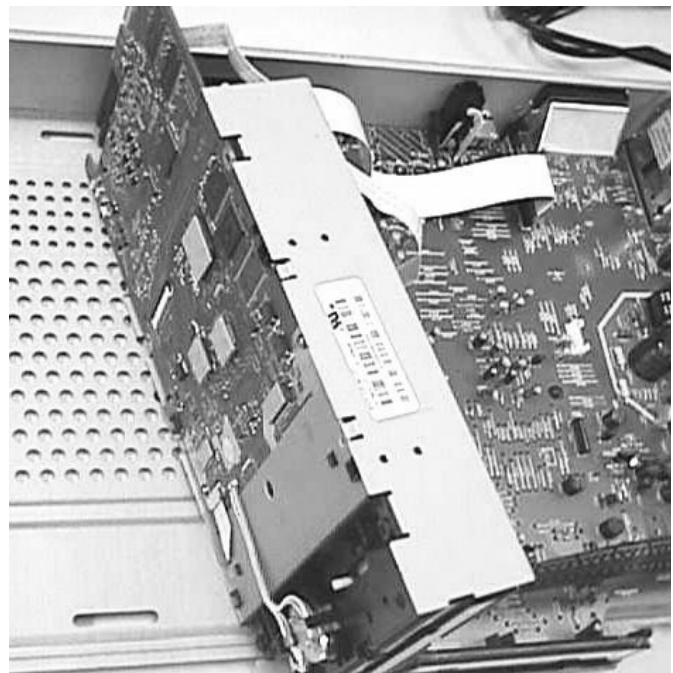


Figure 4-4

4.1.3 MOBO Board

- Remove the Front Panel assembly as given in 4.1.1
- Remove 6 screws 246 and 254
- Remove 4 screws 270
- Service position is achieved by flipping the MOBO board above the Basic Engine

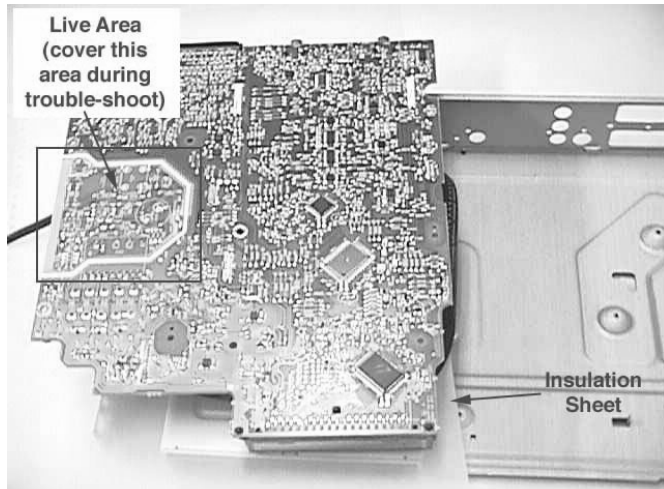


Figure 4-5

4.2 Dismantling and assembly of the VAU8041 Module

4.2.1 General

Follow the dismantling instructions in described order.
Do not place the unit with its PCB on a hard surface (e.g. table), as it could damage the components on it.
Always place something soft (a towel or foam cushion) under it.
Never touch the lens of the OPU.
Take sufficient ESD measures during handling.

4.2.2 Dismantling the FEBE Board

- Remove 4 screws to remove the metal case 150+180
- Remove 2 screws to separate the FEBE board 179 from the main Loader/Drive assembly

Note: After exchange of the PCB (or the Drive mechanism) the complete VAU8041 has to be adjusted! Refer to chapter 8 for adjustment instructions!

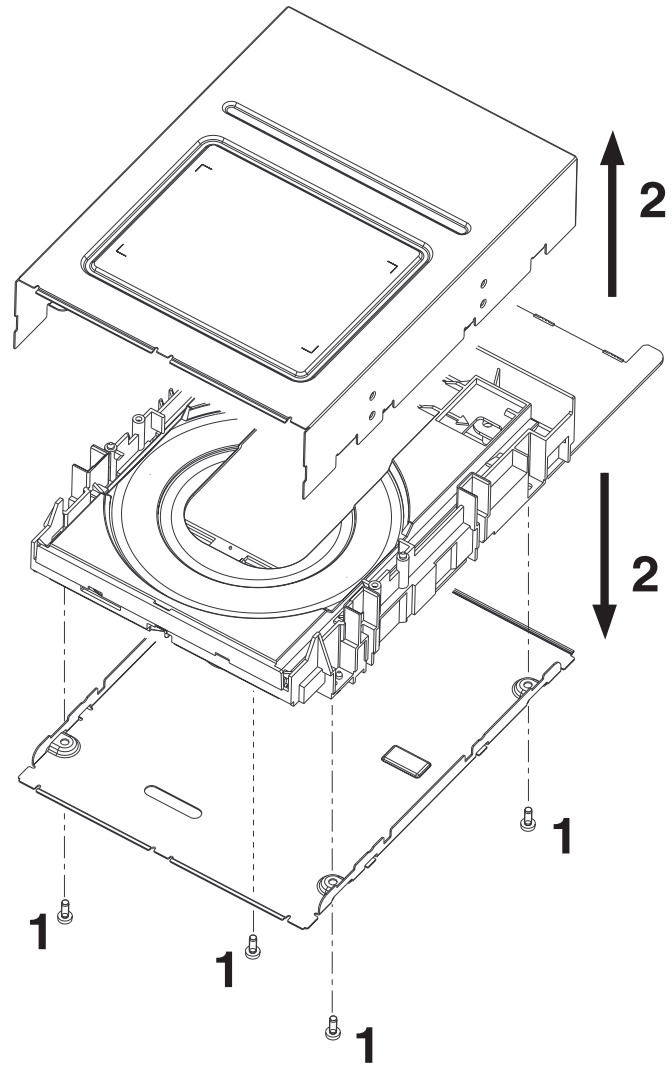


Figure 4-6 VAU8041 Module dismantling

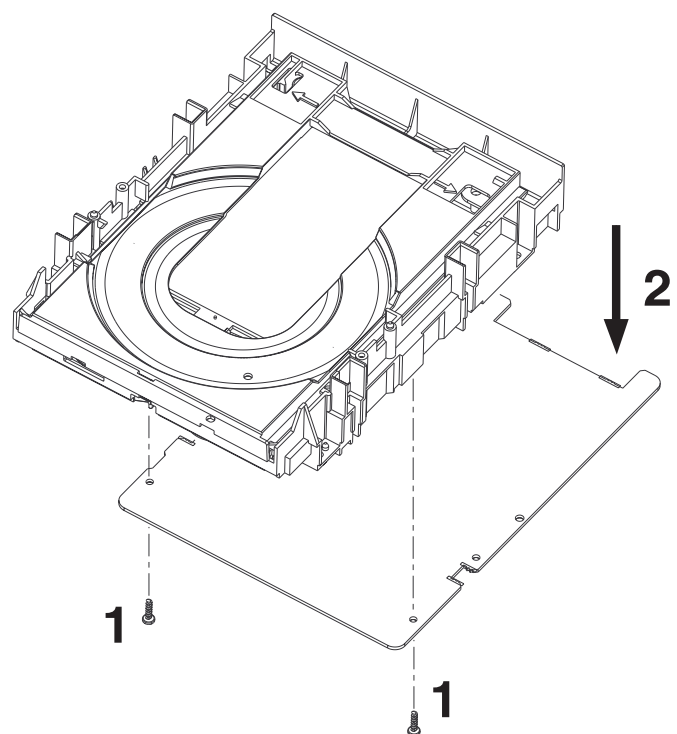


Figure 4-7 Remove FEBE board

4.2.3 Dismantling the Tray

- Remove the encasing as described in 4.2.2
- Disengage the two holders that fix the tray [1] and pull out the tray [2]

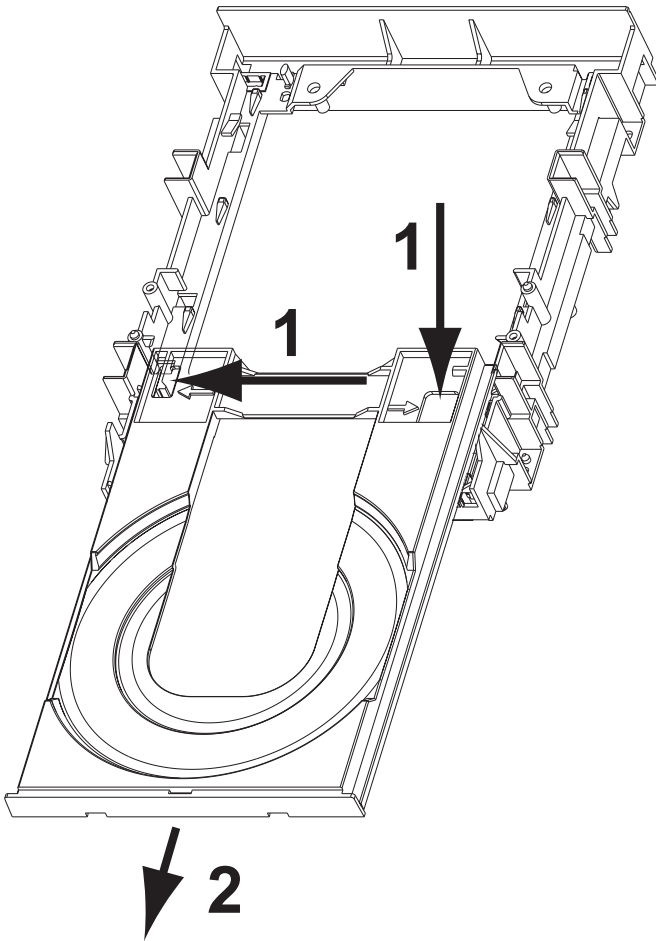


Figure 4-8 Remove Tray

4.2.4 DVD-M (Drive Mechanism)

Caution: Never try to align or repair the DVD-Module itself! Only the factory can do this properly. Service engineers are only allowed to exchange the sledge motor assy. After Exchanging the DVD-M (or the PCB) the complete drive has to be adjusted! Refer to chapter 8 for adjustment instructions!

- Remove encasing and FEBE board as described in 4.2.2
- Remove the Sealing strip 5 by uncatching it
- Loosen the 4 screws/washer [1] to remove the DVD-M [2]

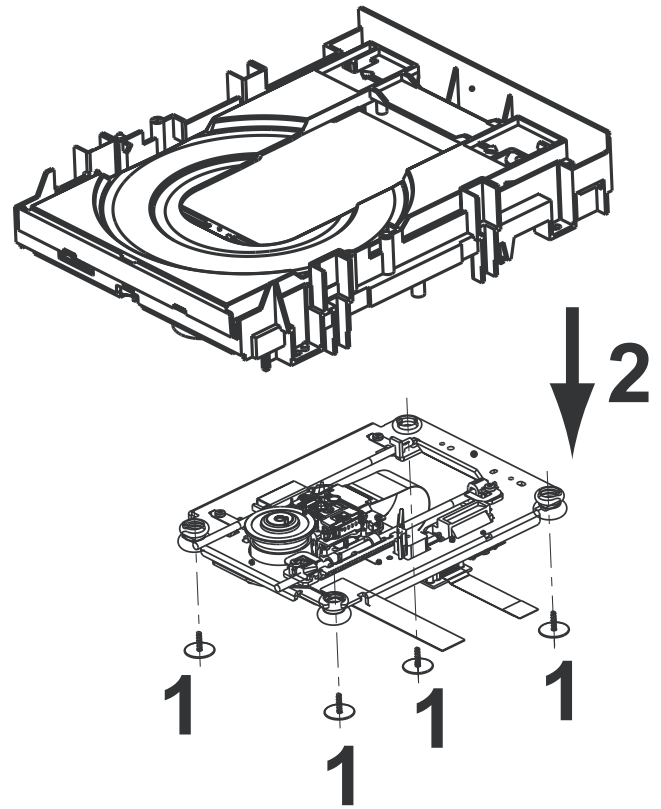


Figure 4-9 Remove DVD-M

4.2.5 Re - assembly

To re-assemble the module, do all processes in reverse order. Take care of the following:

- **Heat Paths:** Put the 5 heat paths (gray rubber pieces) back to their position on the ICs.
- **Complete module:** Place all wires/cables in their original positions
- **Emergency opening slot:** Be sure that the slot for the emergency tray opener is covered by adhesive tape!

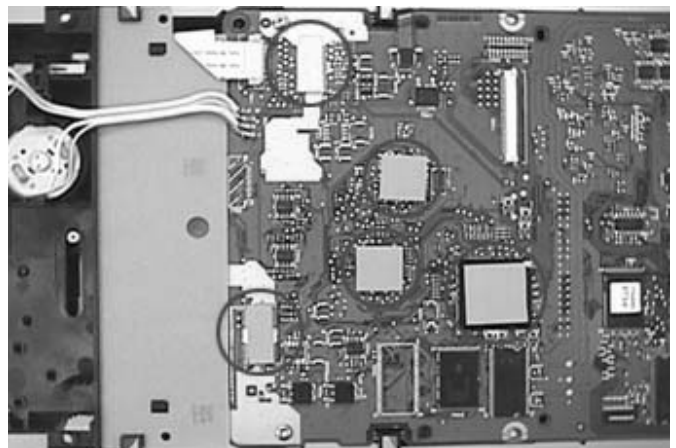
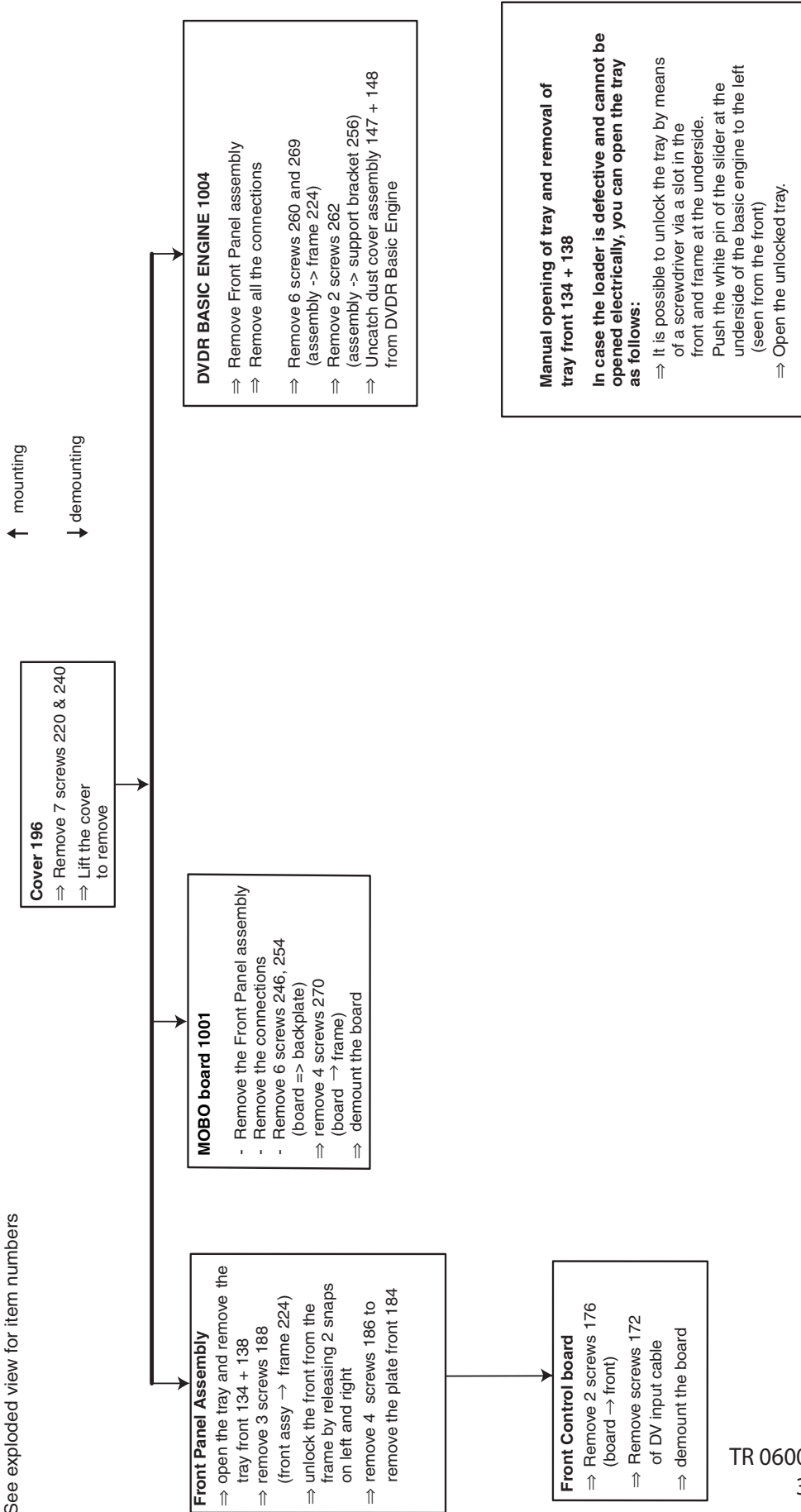


Figure 4-10 Heat Paths

4.3 Dismantling Instructions

DISMANTLING INSTRUCTIONS
See exploded view for item numbers



5. 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

5.1 End User/Dealer Script Interface

5.1.1 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.

5.1.3 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
-----------------	---

5.1.2 Structure

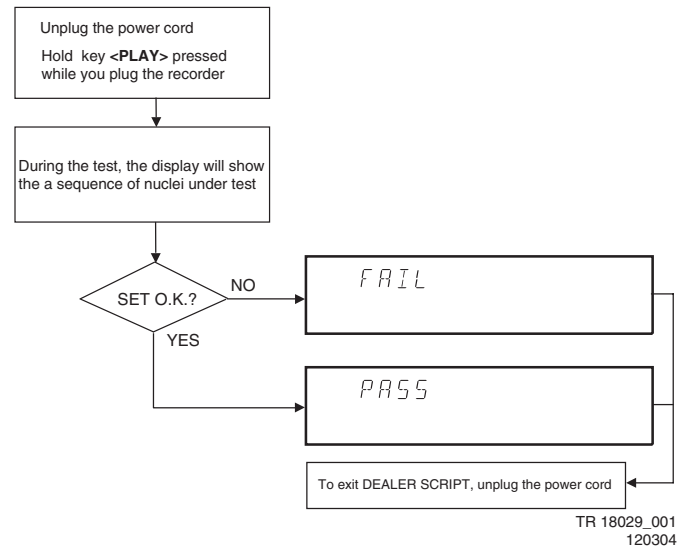


Figure 5-1

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

5.2 Player Script Interface

5.2.1 Trade Mode

TRADE MODE

When the recorder is in Trade Mode, the recorder cannot be controlled by means of the front key buttons, but only by means of the remote control.

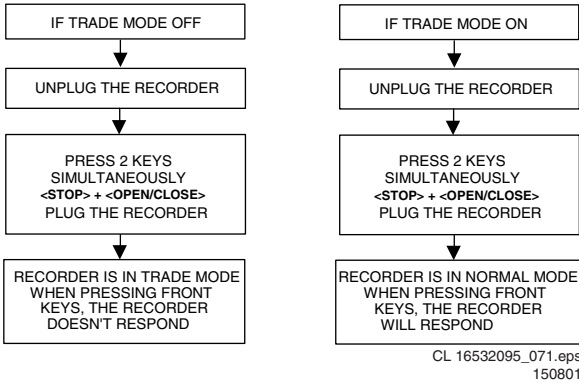


Figure 5-2

5.2.2 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.

5.3 Menu and Command Mode Interface

5.3.1 Nuclei Numeration

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

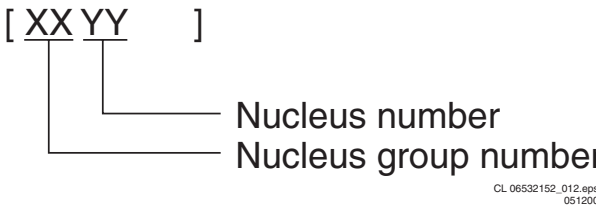


Figure 5-3

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

* Not applicable for DVDR610, DVDR615 & DVDR616 Range

5.3.2 Error Handling

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

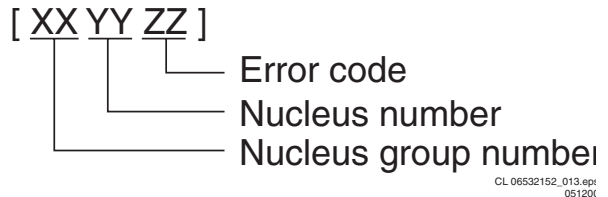


Figure 5-4

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

5.3.3 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

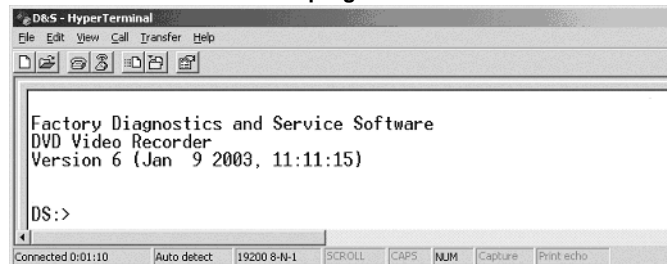


Figure 5-5

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

```

D&S - HyperTerminal
File Edit View Call Transfer Help

[WMIS_DIV,WARNING,Digital Board Hardware Information is corrupt,]
Factory Diagnostics and Service Software
DVD Video Recorder
Version 6 (Jan 9 2003, 11:11:15)

WARNING,Digital Board Hardware Information is corrupt
DS:>

```

Figure 5-6a

Error messages D&S program

```

D&S - HyperTerminal
File Edit View Call Transfer Help

DS:> *****
System error: Diversity string UnAccessible!! Eeprom problem! *****
*****

Factory Diagnostics and Service Software
DVD Video Recorder
Version 8 (May 12 2003, 16:44:35)

WARNING,Digital Board Hardware Information is corrupt
DS:>

```

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.

```

D&S - HyperTerminal
File Edit View Call Transfer Help

DS:> *****
* System error: Due to a setting in the Digital Board Diversity *
* Settings, the Recorder is unable to function properly. *
* Please change the hardware diversity settings by using the *
* proper nuclei BEFORE proceeding to the application!! *
*****

The next Hardware Settings can be safely programmed:
Board name: FAILSAFE
Hardware ID: 21

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
Settings ID: 4641494C5341464521030300010101020101000020080000
Program these settings? [Y/N]
Programming the settings values...

Factory Diagnostics and Service Software
DVD Video Recorder
Version 8 (May 1 2003, 18:38:27)
DS:>_

```

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 8.4 for details

Nucleus 1226 execution with string

```

D&S - HyperTerminal
File Edit View Call Transfer Help

DS:> 1226 4E31000000000002203030001010102010000020080000
122600:
Test OK e
DS:> _

```

Figure 5-7

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

Nucleus 1228 info example

```

D&S - HyperTerminal
File Edit View Call Transfer Help

DS:> 1228

Settings ID: 4E31000000000002203030001010102010000020080000
Board name: M1
Hardware ID: 34
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: not 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:

122800:
Test OK e
DS:> _

```

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	- 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 (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	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 videosignal to the proper output.
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.

Nucleus Name	DS_CHR_TestImageOn		
User Input	<p>The user has to decide which test image, video standard and video output must be used:</p> <p>Test image id:</p> <p>0 VERTICAL_COLOURBAR (default) 1 HORIZONTAL_COLOURBAR 2 WHITE 3 YELLOW 4 CYAN 5 GREEN 6 MAGENTA 7 RED 8 BLUE 9 BLACK 10GRAY 11TEST_IMAGE_FOR_PROGRESSIVE_SCAN</p> <p>Video standard: PAL (default) NTSC</p> <p>Video output ALL CVBS and YC and RGB (default) CVBS YC RGB YUV PSCAN progressive scan</p>		
Error	Number	Description	
	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	
Example	<pre>DS:> 101 010100: Test OK @ DS:> 101 0 pal cvbs 010100: Test OK @ DS:> 101 4 ntsc yc 010100: Test OK @</pre>		

Nucleus Name	DS_CHR_TestImageOff		
Nucleus Number	102		
Description	Switches the test-image off.		
Technical	- Stop the DENC module.		
Execution Time	Less than 1 second.		
User Input	None		
Error	Number	Description	
	10200	Stopping the test image generation succeeded	
	10201	The Codec DENC-module failed.	
Example	<pre>DS:> 102 010200: Test OK @</pre>		

Nucleus Name	DS_CHR_SineOn		
Nucleus Number	103		
Description	Generate an audio sine signal on the audio output of the digital board. Note: Left channel 6kHz, right channel 12 kHz sine. Make sure to route the signal first.		

Technical	<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 of the audio decoder did not configure
	10304	The dsp1 of the audio decoder did not configure
	10305	There was a delay-error before starting
	10306	Wrong input was given to the decoder function
	10307	Wrong input was given to the decoder function @@@@
10308	The audio decoder did not get into the 'prepared' state	
Example	DS:> 103 010300: Test OK @	

Nucleus Name	DS_CHR_SineOff	
Nucleus Number	104	
Description	Stop generating the audio sine signal	
Technical	<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	DS:> 104 010400: Test OK @	

Nucleus Name	DS_CHR_SineBurst	
Nucleus Number	105	
Description	Generate an audio sine signal on the audio output of the digital board for 4 seconds. Note: Left channel 6kHz, right channel 12 kHz sine with some known hick-ups	
Technical	<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	DS:> 105 010500: Test OK @	

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 	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	10600	Muting the audio succeeded

Example	DS:> 106 010600: Test OK @
---------	----------------------------------

Nucleus Name	DS_CHR_MuteOff	
Nucleus Number	107	
Description	De-mute the audio outputs of the digital board	
Technical	- Send the 'DeMute' command to the audio decoder	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	10700	De-muting the audio succeeded
Example	DS:> 107 010700: Test OK @	

Nucleus Name	DS_CHR_DvLedOn	
Nucleus Number	108	
Description	Check the connection to the DV-LED on the digital board by switching it on	
Technical	- Write to the PIO pin to light the DV LED	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	10800	Switching the DV-LED on succeeded
	10801	Switching the DV-LED on failed
Example	DS:> 108 010800: Test OK @	

Nucleus Name	DS_CHR_DvLedOff	
Nucleus Number	109	
Description	Switch off the DV-LED on the digital board	
Technical	- Write to the PIO pin to switch off the DV LED	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	10900	Switching the DV-LED off succeeded
	10901	Switching the DV-LED off failed
Example	DS:> 109 010900: Test OK @	

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

Nucleus Name	DS_CHR_MacroVisionOff	
Nucleus Number	111	
Description	Turn off MacroVision.	
Technical	- Set some registers of the DENC module in the Codec.	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	11100	Turning off MacroVision succeeded

	11101	Turning off MacroVision failed
Example	DS:> 111 011100: Test OK @	

Nucleus Name	DS_CHR_Peek	
Nucleus Number	112	
Description	Peek a value on a specified address	
Technical	<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	DS:> 112 0xa0700000 011200: Value read = 0x000001BD Test OK @	

Nucleus Name	DS_CHR_Poke	
Nucleus Number	113	
Description	Poke a value on a specified address	
Technical	<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	DS:> 113 0xa0700000 0xaabbccdd 011300: Test OK @	

Nucleus Name	DS_CHR_INT_PICInterrupts	
Nucleus Number	114	
Description	Test all interrupts of the priority interrupt controller	
Technical	<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	DS:> 114 011400: Test OK @	

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	DS:> 115 011500: Test OK @
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Boot EEPROM (BROM)

Nucleus Name	DS_BROM_Communication	
Nucleus Number	200	
Description	Check the communication between the IIC controller of the Chrysalis 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	DS:> 200 020000: Test OK @	

Nucleus Name	DS_BROM_WriteRead	
Nucleus Number	201	
Description	Check whether the Boot EEPROM can be written to and read from	
Technical	<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	DS:> 201 020100: Test OK @	

NVRAM

Nucleus Name	DS_NVRAM_Communication	
Nucleus Number	300	
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 NVRAM 	
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
	30006	@ @ @ @ @ @

Example	DS:> 300 030000: Test OK @
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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 - Backup data from location to modify - Write to location and read it back again - Write back the backed up data to the location to leave the NVRAM as found 	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	30100	The write-read test succeeded
	30101	The IIC bus could not be initialised
	30102	There was an NVRAM IO error
	30103	The value could not be read back from the NVRAM
Example	DS:> 301 030100: Test OK @	

Nucleus Name	DS_NVRAM_Clear	
Nucleus Number	302	
Description	Make the EEPROM empty, containing all zeroes.	
Technical	<ul style="list-style-type: none"> - Initialise IIC - Create a memory block filled with zeroes - Write this block to the NVRAM 	
Execution Time	16 seconds	
User Input	None	
Error	Number	Description
	30200	The clearing of the NVRAM succeeded
	30201	There was an IIC error
	30202	Clearing the NVRAM failed
Example	DS:> 302 030200: Test OK @	

Nucleus Name	DS_NVRAM_Modify	
Nucleus Number	303	
Description	Modifies one or more locations in NVRAM and updates the checksum of the section modified	
Technical	<ul style="list-style-type: none"> - Initialise IIC - 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	DS:> 303 DIAGNOSTICS 5 1 0x5a 030300: Section is modified successfully Test OK @
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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 - Decode user input - Read from the NVRAM and return this info to the user 	
Execution Time	Less than 1 second	
User Input	1. The location which must be read i.e. "ALL" "BOOT" "DIAGNOSTICS" "DOWN LOAD" "CONFIG" "RECORDER" or no string if an offset from the base address of the NVRAM is required 2. The offset and number of bytes to read <offset> <length>	
Error	Number	Description
	30400	Value read
	30401	Unable to initialise NVM
	30402	Reading the NVRAM contents failed
	30403	length out of range
	30404	unable to decode length
	30405	offset out of range
	30406	unable to decode offset
	30407	unknown location specified
	30408	no location is specified
Example	304 DIAGNOSTICS 0 6 030400: Value read = 0x00 0x00 0x00 0x00 0x00 0x5A Test OK @	

SDRAM

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 databus - Test the address bus - Test the integrity of the device itself (memory locations) 	
Execution Time	11 seconds for 32 Mb 23 seconds for 64 Mb	
User Input	None	
Error	Number	Description
	40000	The write-read test succeeded
	40001	The data bus contains an error
	40002	The address bus contains an error
	40003	The SDRAM itself contains an error
Example	DS:> 400 040000: Test OK @	

Nucleus Name	DS_SDRAM_WriteReadFast	
Nucleus Number	401	
Description	Check all data lines and address lines of the SDRAM	
Technical	<ul style="list-style-type: none"> - Test the databus - Test the addressbus 	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	40100	The write-read test succeeded
	40101	The data bus contains an error
	40102	The address bus contains an error
Example	DS:> 401 040100: Test OK @	

Nucleus Name	DS_SDRAM_Write	
Nucleus Number	402	
Description	Write to a specific 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	DS:> 402 0xa1000010 0xad112222 040200: Test OK @	

Nucleus Name	DS_SDRAM_Read	
Nucleus Number	403	
Description	Read from a specific 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	DS:> 403 0xa1000010 040300: Value read = 0xAD112222 Test OK @	

FLASH

Nucleus Name	DS_FLASH_DevTypeGet	
Nucleus Number	500	
Description	Get the device (revision) type information of the FLASH IC. (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	DS:> 500 050000: Found FLASH memory: NOR AMD 29DL640G 8MB,NOR AMD 29DL640G 8MB Test OK @	

Nucleus Name	DS_FLASH_WriteRead	
Nucleus Number	501	
Description	Check whether the FLASH can be written to and read from	
Technical	<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 seconds.	
User Input	None	
Error	Number	Description
	50100	The FLASH write-read test succeeded
	50101	The test segment could not be found
	50102	All bits is the TEST region are filled with 0 (region exhausted)

	50103	The WriteRead test failed
	50104	The Write Failed
Example	DS:> 501 050100: Test OK @	

Nucleus Name	DS_FLASH_Read	
Nucleus Number	502	
Description	Read from a specific memory address in FLASH	
Technical	<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 seconds.	
User Input	The location from which data must be read (FLASH starts at address 0xB8000000)	
Error	Number	Description
	50200	Reading the FLASH succeeded
	50201	Reading the FLASH failed; Wrong user input
	50202	Address is not dividable by 4
Example	DS:> 502 0xb8000000 050200: Value read = 0x3C08A000 Test OK @	

Nucleus Name	DS_FLASH_ChecksumProgram	
Nucleus Number	503	
Description	Check the checksum of the application partitions by recalculating and comparing partition checksums	
Technical	<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	DS:> 503 050300: BootCode checksum is: 0xBABE5B6F, which is correct Diagnostics checksum is : 0xBABEBAFF, which is correct Download checksum is: 0xBABEEDBF, which is correct Application checksum is : 0xBABE8EEC, which is correct Test OK @	

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

Nucleus Name	DS_FLASH_CalculateChecksumFast	
Nucleus Number	505	
Description	Calculate a checksum over a selected number of address locations	
Technical	- Run the checksum calculation algorithm on a selected number of flash memory addresses	
Execution Time	6 seconds	
User Input	None	
Error	Number	Description
	50500	Calculating the checksum over selected addresses succeeded

Example	DS:> 505 050500: The Checksum = 0xBABEB064 Test OK @
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Video Input Processor (VIP)

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

Nucleus Name	DS_VIP_Communication	
Nucleus Number	601	
Description	Check the communication between the IIC controller of the Codec and the VIP IC	
Technical	- Initialise IIC - Read data from a location in the VIP	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	60100	Communicating with the VIP succeeded
	60101	The IIC bus was not accessible
	60102	There was a timeout reading the device
	60103	The IIC acknowledge was not received
	60104	The communication with the device failed
	60105	The IIC bus initialisation failed
Example	DS:> 601 060100: Test OK @	

Nucleus Name	DS_VIP_ClockOutputOn	
Nucleus Number	602	
Description	Switch the clock output on	
Technical	- Initialise IIC - Set the clock output through IIC	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	60200	Switching the clock output on succeeded
	60201	Switching the clock output on failed
Example	DS:> 602 060200: Test OK @	

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

Example	DS:> 603 060300: Test OK @
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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	The input to select, see table below.	
Error	Number	Description
	60400	Selecting the input of the VIP succeeded
	60401	The user provided wrong input
	60402	The VIP was not accessible
	60402	An unsupported VIP was found
Example	DS:> 604 1 060400: Test OK @	

Table 5-1 Available channels for input of the 7118 and their description

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

Table 5-2 Available channels for input of the 7115 and their description

Channel number	Description
1	CVBS_Y_IN_B
2	CVBS_OUT_B_VIP
4	C_IN_VIP
7	CVBS_Y_IN_B

Digital Video Input Output (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	DS:> 700 070000: Device type of the link layer IC: ffc00301 Test OK @	

Nucleus Name	DS_DVIO_PhyDevTypeGet	
Nucleus Number	701	

Description	Get the device (revision) type information of the 1394 Physical layer IC
Technical	<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
Example	DS:> 701 070100: Physical layer IC: VendorID: 0x006037, ProductID: 0x412801 Test OK @

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

Nucleus Name	DS_DVIO_PhyCommunication	
Nucleus Number	703	
Description	Check the accessibility of the 1394 Physical layer IC by writing to and reading from a specific address	
Technical	<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	DS:> 703 070300: Test OK @	

Nucleus Name	DS_DVIO_Routing	
Nucleus Number	704	
Description	Route a DV stream containing an audio and video signal through the physical and link layer ICs to the Codec. This test works for both NTSC and PAL.	
Technical	<ul style="list-style-type: none"> - Initialise the DMA to transfer 5 frames PAL/NTSC - Initialise the DV demultiplexer - Initialise the 1394 interface and start reception of the DV stream - Check whether the stream was copied to memory properly by the byte input interface (port to memory type DMA) 	
Execution Time	6-10 seconds (6 when OK, 10 when no stream or error)	
User Input	None	

Error	Number	Description
	70400	Routing the signals succeeded
	70401	The 1394 link chip could not be initialised properly
	70402	There was a syntax error in the DV stream
	70403	DMA could not copy DV stream to memory. Stream connected?
	70404	DMA not working properly
Example	DS:> 704 070400: Test OK @	

Nucleus Name	DS_DVIO_DetectNode	
Nucleus Number	705	
Description	Check whether a DV node can be detected by the hardware. This test works for both NTSC and PAL.	
Technical	<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	DS:> 705 070500: Test OK @	

Nucleus Name	DS_DVIO_DetectStream	
Nucleus Number	706	
Description	Check whether a DV stream can be detected by the hardware. This test works for both NTSC and PAL.	
Technical	<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	DS:> 706 070600: Test OK @	

Progressive Scan (PSCAN)

Nucleus Name	DS_PSCAN_DencDevTypeGet	
Nucleus Number	800	
Description	Retrieve the device type information from the progressive scan DENC IC	
Technical	-	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	80000	Retrieving the device type information succeeded
	80001	The IIC bus was not accessible
	80002	There was a timeout reading the device
	80003	The IIC acknowledge was not received
	80004	Communicating with the progressive scan DENC-IC failed
	80005	The initialisation of the IIC bus failed
Example	DS:> 800 080000: Device Type xxxx t.b.d. Test OK @	

Nucleus Name	DS_PSCAN_CommunicationDenc	
Nucleus Number	801	
Description	Check the communication between the IIC controller of the chrysalis and the progressive scan DENC-IC	
Technical	<ul style="list-style-type: none"> - Initialise IIC - Write data to a register of the DENC through IIC 	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	80100	Communicating with the progressive scan DENC-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 DENC-IC failed
	80105	The initialisation of the IIC bus failed
	80106	The read data is not the same as the written data
80107	No chip was expected	
Example	DS:> 801 080100: Test OK @	

Nucleus Name	DS_PSCAN_TestImageOn	
Nucleus Number	802	
Description	Generate the test images that are present on the progressive scan IC.	
Technical	<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	In case of ADV7196: When no input is given "HATCH" is the default -"HATCH" -"FRAME" Remark: "HATCH" is a crosshatch test pattern (horizontal and vertical white lines are displayed against a black background) "FRAME" is a uniform coloured frame/field test pattern (default white). In case of FLI2300: Nothing.	
Error	Number	Description
	80200	The generation of the test image succeeded
	80201	Unable to initialise PSCAN IC
	80202	Unable to reset DENC
	80203	Unable to generate image
	80204	No chip was expected
Example	DS:> 802 HATCH 080200: Test OK @	

Nucleus Name	DS_PSCAN_TestImageOff	
Nucleus Number	803	
Description	Switch off the generated test image	
Technical	<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	DS:> 803 080300: Test OK @
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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	DS:> 804 yellow 080400: Test OK @ DS:> 804 0x6a 0xde 0xca 080400: Test OK @	

Nucleus Name	DS_PSCAN_TestImageColourSettingsGet	
Nucleus Number	805	
Description	Get the colour settings of the hatch- or the frame- field.	
Technical	<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	DS:> 805 080500: Colour Y Cr Cb values: 0xD2 0x92 0x10 Test OK @	

Nucleus Name	DS_PSCAN_Routing	
Nucleus Number	806	
Description	Route a video signal from the codec host processor through the progressive scan ICs to the progressive scan output of the set. Note: To route the progressive scan to the output of the set, first call the nucleus to do the video routing on the analogue (part of the) board.	
Technical	<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	DS:> 806 080600: Test OK @	

Nucleus Name	DS_PSCAN_DevTypeGetDeinterlacer	
Nucleus Number	807	
Description	Get the device (revision) type information of the progressive scan de-interlacer.	
Technical	<ul style="list-style-type: none"> - Initialise the de-interlacer. - Read the version register of the de-interlacer. 	
Execution Time	1 second	
User Input	None	
Error	Number	Description
	80700	Everything went well.
	80701	The communication with the device failed
	80702	No chip was expected
Example	DS:> 807 080700: Chip name : 2300 Chip version : 1 Test OK @	

Nucleus Name	DS_PSCAN_CommunicationDeinterlacer	
Nucleus Number	808	
Description	Check the communication between the IIC controller of the Codec and the progressive scan De-interlacer-IC	
Technical	<ul style="list-style-type: none"> - Initialise IIC - Set the video source synchronisation source to the Codec - Write data to the DENC through IIC 	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	80800	Communicating with the progressive scan De-interlacer-IC succeeded
	80801	The IIC bus was not accessible
	80802	There was a timeout reading the device
	80803	The communication with the device failed (no ACK)
	80804	Communicating with the progressive scan De-interlacer-IC failed
	80805	The initialisation of the IIC bus failed
	80806	The data read back is not the same as the data written
80807	No chip was expected	
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"> - Send the ECHO command - Check if the BE returned the string 0x00 0xAA 0x55 	
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	DS:> 902 090200: Self-test result byte : 00000000 Self-test result byte : 00000000 Self-test result byte : 00000000 Test OK @	

Nucleus Name	DS_BE_VersionGet	
Nucleus Number	903	
Description	Get the version of the basic engine and that of the optical unit	
Technical	<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	DS:> 903 090300: BE version = 31.30.24. PHILIPS ,VAD8031 ,31302400,REL_8031_313024 2073, Optical unit version = 00.06.82.19.00 Test OK @	

Nucleus Name	DS_BE_TrayOut	
Nucleus Number	904	
Description	Open the tray of the basic engine	
Technical	<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	DS:> 904 090400: Test OK @	

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	DS:> 905 090500: Test OK @	

Nucleus Name	DS_BE_WriteReadDvdRw	
Nucleus Number	906	
Description	Write data to and read data from a DVD+RW disc through the basic engine for verification of the writing	
Technical	<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	DS:> 906 090600: Testing on sector 0x5dbe0: OK Test OK @	

Nucleus Name	DS_BE_WriteReadDvdR	
Nucleus Number	907	
Description	Write data to and read data from a DVD+R disc through the basic engine for verification of the writing	
Technical	<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	DS:> 907 090700: Testing on sector 0x36210: OK Test OK @	

Nucleus Name	DS_BE_StatisticalInformationGet	
Nucleus Number	908	
Description	Retrieve the statistical information from the basic engine	
Technical	<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)	DS:> 908 Number of times Tray went Open/Closed : 4 Total minutes the CD laser was on : 0 Total minutes the DVD laser was on : 0 Total minutes the write laser was on : 0 090800: Test OK @	
Example (AV3)	DS:> 908 Number of times Tray went Open/Closed 4 Total time the power power on (HR:MIN) 0:0h Total time of reading CDROM discs (HR:MIN) 0:0h Total time of reading high speed CD-R discs (HR:MIN) 0:0h Total time of reading other CD-R discs (HR:MIN) 0:0h Total time of reading high speed CD-RW discs (HR:MIN) 0:0h Total time of reading other CD-RW discs (HR:MIN) 0:0h Total time of reading high speed DVD SL discs (HR:MIN) 0:0h Total time of reading other DVD SL discs (HR:MIN) 0:0h Total time of reading high speed DVD DL discs (HR:MIN) 0:0h Total time of reading other DVD DL discs (HR:MIN) 0:0h Total time of reading high speed DVD+R discs (HR:MIN) 0:0h Total time of reading other DVD+R discs (HR:MIN) 0:2h Total time of reading high speed DVD+RW discs (HR:MIN) 0:0h Total time of reading other DVD+RW discs (HR:MIN) 0:35h Total time of writing DVD+R discs at 2.4 x (HR:MIN) 0:0h Total time of writing DVD+R discs at 4 x (HR:MIN) 0:0h Total time of writing DVD+RW discs at 2.4 x (HR:MIN) 0:0h Total time of writing DVD+RW discs at 4 x (HR:MIN) 0:0h 090800: Test OK @	

Nucleus Name	DS_BE_StatisticalInformationReSet	
Nucleus Number	909	
Description	Reset the statistical information in the basic engine	
Technical	<ul style="list-style-type: none"> - Send the RESET_STATISTICAL_INFO command - Send the POWER_DOWN command - Toggle the reset pin of the I2S interface 	
Execution Time	2 seconds	
User Input	None	
Error	Number	Description
	90900	The command executed successfully
	90901	There was a time-out while communicating
	90902	The Basic Engine returned an unexpected result
	90903	The BE returned an error code
	90904	No acknowledge received from BE
	90905	Communicating with the Basic Engine failed
Example	DS:> 909 090900: Test OK @	

Nucleus Name	DS_BE_ErrorLogGet	
Nucleus Number	910	
Description	Get the error log from the basic engine	
Technical	<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)	DS:> 910 Momentary errors (Byte 1 - Byte 7) : 0x00 0x00 0x00 0x00 0x00 0x00 0x00 Cumulative errors (Byte 1 - Byte 7) : 0x00 0x00 0x00 0x20 0x00 0x00 0x00 Fatal errors (Oldest - Youngest) : 0x00 0x00 0x00 0x00 0x00 091000: Test OK @	
Example (AV3)	DS:> 910 Momentary errors (0-9): 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 Cumulative errors (1-9) : 0x00 0x80 0x20 0x00 0x00 0x00 0x00 0x00 0x00 Software fatal assert : 799 engineproxy.cpp 091000: Test OK @	

Nucleus Name	DS_BE_ErrorLogReset	
Nucleus Number	911	
Description	Reset the error log in the basic engine	
Technical	<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	DS:> 911 091100: Test OK @	

Nucleus Name	DS_BE_JitterOptimise	
Nucleus Number	912	
Description	Perform jitter optimisation: A formatted DVD must be loaded into the engine before executing this nucleus	
Technical	<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)	DS:> 912 091200: Jitter bathtub: (-42,135)(-40,127)(-38,106)(-36,106)(-34,101)(-32,97)(-30,92)(-28,92)(-26,92)(-24,92)(-22,86)(-20,80)(-18,86)(-16,86)(-14,80)(-12,80)(-10,80)(-8,80)(-6,80)(-4,86)(-2,86)(0,86)(2,86)(4,92)(6,92)(8,101)(10,106)(12,111)(14,120)(16,123)(18,127)(20,142) Test OK @	
Example (AV3)	DS:> 912 091200: Average Jitter, Bler C1, Bler C2: (92,4,254) Test OK @	

Nucleus Name	DS_BE_FocusOn	
Nucleus Number	913	
Description	Put the laser of the BE into focus	
Technical	<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	DS:> 913 091300: Test OK @	

Nucleus Name	DS_BE_FocusOff	
Nucleus Number	914	
Description	Turn off putting the laser of the BE into focus	
Technical	<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	DS:> 914 091400: Test OK @	

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	DS:> 915 091500: Test OK @	

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_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
	91600	Turn table motor is off
	91601	There was a time-out while communicating
	91602	The Basic Engine returned an unexpected result
	91603	The BE returned an error code
	91604	No acknowledge received from BE
	91605	Communicating with the Basic Engine failed
	91606	Unable to enter service mode
Example	DS:> 916 091600: Test OK @	

Nucleus Name	DS_BE_Tilt	
Nucleus Number	920	
Description	Test the tilt mechanism control loop, or allow its proper functioning to be measured. Before executing this nucleus a 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 0x02 - In case of an AV3 display a "not supported" message 	
Execution Time	Approximately 15 seconds	
User Input	None	
Error	Number	Description
	92000	The command executed successfully
	92001	There was a time-out while communicating
	92002	The Basic Engine returned an unexpected result
	92003	The Basic Engine returned an error code
	92004	No acknowledge received from BE
	92005	Unable to send tray in
	92006	Unable to read the disc
	92007	No disc is loaded
	92008	Unknown disc is loaded
	92009	Unable to enter service mode
	92010	This nucleus is not supported by the engine

Example(AV2)	DS:> 920 092000: Tilt sensor bathtub: (71,-12,145)(68,-12,135)(62,-10,120)(56,-92,97)(50,-75,86) (44,-59,80)(41,-52,80)(35,-37,86)(29,-22,86) (23,-7,92)(17,8,111)(11,23,135)(8,31,138)(5,39,158) Test OK @
Example (AV3)	DS:> 920 092010: Tilt function is not supported by the engine Error @

Nucleus Name	DS_BE_CheckDisc	
Nucleus Number	921	
Description	Check whether there is a disc inside the BE	
Technical	<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	DS:> 921	
	092100:	
	Disc type:	DVD+RW disc
	Disc manufacturer id:	PHILIPS
	Media type id:	010
	Test OK @	
	DS:> 921	
	090500:	
	Disc type:	None
Test OK @		
DS:> 921		
092100:		
Disc type:	DVD+R disc	
Disc manufacturer id:	RICOHJPN	
Media type id:	R00	
Test OK @		

Nucleus Name	DS_BE_SledgeMotor	
Nucleus Number	922	
Description	Send the sledge to its home position, then to the middle of the disc, and then to the end.	
Technical	<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	DS:> 922	
	092200:	
	Test OK @	

Nucleus Name	DS_BE_ReadTocInfo	
Nucleus Number	924	
Description	Read the TOC from the disc. This gives a good indication if the BE works properly.	
Technical	<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 -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)	DS:> 928 092810: This nucleus is not supported by the engine Error @	
Example (AV3)	DS:> 928 1 092800: Test OK @	

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)	DS:> 929 092906: This nucleus is not supported by the engine Error @	
Example (AV3)	DS:> 929 092900: DVD region 1 Test OK @	

Nucleus Name	DS_BE_RegionCounterReset	
Nucleus Number	930	
Description	Reset the region counter in the AV3.	
Technical	<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)	DS:> 930 093006: This nucleus is not supported by the engine Error @
Example (AV3)	DS:> 930 093000: Test OK @

Nucleus Name	DS_BE_AdjustLaserControl	
Nucleus Number	931	
Description	Adjust the DVD-M (with the OPU) with PCBA. (So adjusts the two PCBS to each other)	
Technical	<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)	DS:> 931 093107: This nucleus is not supported by the engine Error @	
Example (AV3)	DS:> 931 093100: Test OK @	

System (SYS)

Nucleus Name	DS_SYS_HardwareVersionGet	
Nucleus Number	1200	
Description	Get the hardware version and type of the digital board	
Technical	Initialise the PIO pins of the Codec Read the segment header in FLASH and determine hardware version	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	120000	Getting the hardware version and type of the digital board succeeded
	120001	Getting the hardware version and type of the digital board failed
	120002	Wrong hardware version read from FLASH
Example	DS:> 1200 120000: Hardware ID = 0x29 Test OK @	

Nucleus Name	DS_SYS_SoftwareVersionBootGet	
Nucleus Number	1201	
Description	Get the version of the boot software on the digital board	
Technical	Read the segment header in FLASH and determine Boot software version	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	120100	Getting the Boot software version succeeded
	120101	Getting the Boot software version failed
Example	DS:> 1201 120100: Software Boot Version = 0331 Test OK @	

Nucleus Name	DS_SYS_SoftwareVersionDownloadGet	
Nucleus Number	1202	
Description	Get the version of the download software on the digital board	
Technical	Read the segment header in FLASH and determine Download software version	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	120200	Getting the Download software version succeeded
	120201	Getting the Download software version failed
Example	DS:> 1202 120200: Software Download Version = 0001 Test OK @	

Nucleus Name	DS_SYS_SoftwareVersionApplGet	
Nucleus Number	1203	
Description	Get the version of the application software on the digital board	
Technical	Read the segment header in FLASH and determine Application software version	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	120300	Getting the Application software version succeeded
	120301	Getting the Application software version failed
Example	DS:> 1203 120300: Software Application Version = 0001 Test OK @	

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

Error	Number	Description
	120400	Getting the Diagnostics software version succeeded
	120401	Getting the Diagnostics software version failed
Example	DS:> 1204 120400: Software Diagnostics Version = 0001 Test OK @	

Nucleus Name	DS_SYS_EepromUpload	
Nucleus Number	1205	
Description	Upload the contents of the NVRAM on the analogue board or the digital board to the service PC, by using the X-modem protocol	
Technical	<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	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. Upload the contents of the NVRAM of the digital board 2. Upload the contents of the NVRAM of the analogue board Choose in the terminal on the control PC -> transfer -> receive file . Select X-modem protocol. Then click receive in the dialogue and fill in the file name in which you want to store the data.	
Error	Number	Description
	120500	Download succeeded.
	120501	User input is not valid.
	120502	Something went wrong while copying the data from NVRAM to SDRAM .
	120503	Something went wrong while transferring the data.
	120504	User cancelled the upload.
Example	DS:> 1205 1 120500: Test OK @	

Nucleus Name	DS_SYS_EepromDownload	
Nucleus Number	1206	
Description	Download a file with the contents of the NVRAM for the analogue board or the digital board from the service PC to the recorder, by using the X-modem protocol	
Technical	<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	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 .	
Error	Number	Description
	120600	Download succeeded
	120601	The write to NVRAM failed.
	120602	Timeout. Too many retries.
	120603	A file was sent with a wrong header.
	120604	User cancelled the download.
	120605	User input is not valid.
	120606	Unknown Error
Example	DS:> 1206 1 120600: Test OK @	

Nucleus Name	DS_SYS_DvidNumberSet	
Nucleus Number	1207	
Description	Set the IEEE 1394 unique ID	
Technical	<ul style="list-style-type: none"> - Decode the user input - Store the id into NVRAM - Validate the segment of storage by updating the checksum 	
Execution Time	Less than 1 second.	

User Input	The unique ID to be set.	
Error	Number	Description
	120700	Setting the unique DV ID succeeded
	120701	User input is not valid.
	120702	Setting the unique DV ID failed.
	120703	Write succeeded, but checksum is corrupt.
Example	DS:> 1207 1234567890 120700: Test OK @	

Nucleus Name	DS_SYS_DvIdNumberGet	
Nucleus Number	1208	
Description	Get the IEEE1394 unique ID	
Technical	- Read out the ID from the configuration segment and return this info to the user	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	120800	Getting the unique DV ID succeeded
	120801	Getting the unique DV ID failed
	120802	Reading an unexpected section version in NVRAM
Example	DS:> 1208 120800: The DvIdNumber is: 1234567890 Test OK @	

Nucleus Name	DS_SYS_licWrite	
Nucleus Number	1209	
Description	Perform an IIC write action on the digital board	
Technical	- Determine bus ID, slave address, number of bytes to be written and the byte array of data from the user input - Initialise IIC - Write the data to the slave specified through IIC	
Execution Time	Less than 1 second	
User Input	The user input the number of bytes to write followed by the bytes to write: <...> Where the bus id is either 0 (normally used) or 1	
Error	Number	Description
	120900	Writing the data over IIC succeeded
	120901	The IIC bus was not accessible
	120902	There was a timeout writing to the device
	120903	The IIC acknowledge was not received
	120904	The communication with the device failed
	120905	Got unknown IIC bus error:
	120906	Unable to initialise IIC bus
	120907	Decoding bus ID unsigned value failed
	120908	Decoding slaveAddr unsigned value failed
	120909	Decoding nrBytes unsigned value failed
	120910	Bus ID out of range
	120911	nrBytes out of range
120912	Unable to decode parameters	
Example	DS:> 1209 0 0xa0 1 0x6 120900: 1 Bytes written Test OK @	

Nucleus Name	DS_SYS_licRead	
Nucleus Number	1210	
Description	Perform an IIC read action on the digital board	
Technical	- Determine the bus ID, slave address and number of bytes to read from the user input - Initialise IIC - Read the data form the slave specified	
Execution Time	Less than 1 second	

User Input	The user inputs the bus number, the address to read them from and the number of bytes to read: <BusID><Slave address to read from><Number of bytes to read>Where the bus id is either 0 (normally used) or 1	
Error	Number	Description
	121000	Reading the data over IIC succeeded
	121001	The IIC bus was not accessible
	121002	There was a timeout writing to the device
	121003	The IIC acknowledge was not received
	121004	The communication with the device failed
	121005	There was an unknown IIC bus error
	121006	IIC bus initialisation failed
	121007	Decoding bus ID unsigned value failed
	121008	Decoding slave address unsigned value failed
	121009	Decoding number of bytes unsigned value failed
	121010	Bus ID out of range
	121011	nrBytes out of range
Example	DS:> 1210 0 0xa0 0x20 Read : 0x0000: 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 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 @	

Nucleus Name	DS_SYS_UartWrite	
Nucleus Number	1211	
Description	Perform an UART write action on the digital board on a specified UART	
Technical	- Decode the user input for the proper port to use - Write out the bytes through the indicated port	
Execution Time	Less than 1 second.	
User Input	The user inputs the UART to write to, the number of bytes and the bytes to be written to the UART. 1=UART port 1 : not used 2=UART port 2 : Bit Engine 3=UART port 3 : Analogue board <UartNr><Number of bytes to write><d1><d2><...><dx>	
Error	Number	Description
	121100	Writing the bytes to the UART succeeded
	121101	The user provided wrong input
	121102	Writing to the UART failed
Example	DS:> 1211 2 2 0xd1 0x01 121100: Test OK @	

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

	121202	Reading the data from the UART failed
Example	DS:> 1212 2 121200: The HEX value that was read is: 0x50 0xD1 0x00 Test OK @	

Nucleus Name	DS_SYS_VideoLoopThroughStart																																		
Nucleus Number	1213																																		
Description	The video signal, which is conform the user input, is routed from the input to the output. The input is set using the proper nucleus to route the signal on the board(s). All outputs are enabled.																																		
Technical	<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.																																		
User Input	<p><vipInput> <VideoOutput> <VideoStandard></p> <p>1. vipInput (CVBS, YC, YUV, RGB, 1 to 9(see table below)). LECO Premier specific</p> <table border="1" style="margin-left: 40px;"> <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 Y/C 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 Y/C</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 Y/C in</td></tr> <tr><td>9</td><td>CVBS</td><td>CE mode CVBS in</td></tr> <tr><td>10</td><td>XPORT</td><td>XPORT</td></tr> </tbody> </table> <p>2. VideoOutput (YUV, RGB). 3. VideoStandard (PAL, NTSC).</p>		User input	Video input	Data path to VIP	1	RGB	SCART aux RGB in	2	YC	SCART aux Y/C in	3	CVBS	SCART aux CVBS	4	CVBS	Tuner	5	YC	Front Y/C	6	CVBS	Front CVBS	7	CVBS	SCART TV CVBS	8	YC	CE mode Y/C in	9	CVBS	CE mode CVBS in	10	XPORT	XPORT
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Error	Number	Description																																	
	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																																	
Example	DS:> 1213 CVBS RGB PAL 121300: Test OK @																																		

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	-	
Error	Number	Description
	121400	VideoLoopthroughStop succeeded
	121401	DENC module on Codec failed.
Example	DS:> 1214 121400: Test OK @	

Nucleus Name	DS_SYS_VideoLoop	
Nucleus Number	1215	

Description	<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.																																		
User Input	<p>Video input of the digital board:</p> <ul style="list-style-type: none"> - CVBS - YC - YUV - RGB - TEST (The video output will be routed to the video input on the digital board.) - 1 to 9 - LECO Premier specific (see table below) <table border="0" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">User input</th> <th style="text-align: left;">Video input</th> <th style="text-align: left;">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 Y/C 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 Y/C</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 Y/C in</td></tr> <tr><td>9</td><td>CVBS</td><td>CE mode CVBS in</td></tr> <tr><td>10</td><td>XPORT</td><td>XPORT</td></tr> </tbody> </table> <p>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	1	RGB	SCART aux RGB in	2	YC	SCART aux Y/C in	3	CVBS	SCART aux CVBS	4	CVBS	Tuner	5	YC	Front Y/C	6	CVBS	Front CVBS	7	CVBS	SCART TV CVBS	8	YC	CE mode Y/C in	9	CVBS	CE mode CVBS in	10	XPORT	XPORT
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10	XPORT	XPORT																																	
Error	Number	Description																																	
	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	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 @	

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	None	
Error	Number	Description
	121600	Testing the components on the audio signal path succeeded
	121601	The audio encoder did not initialise.
	121602	No audio could be generated.
	121603	The audio encoder did not encode audio.
	121604	The audio could not be decoded.
	121605	Frequency on left channel out of range.
	121606	Frequency on right channel out of range.
	121607	The frequencies on both channels are out of range.
	121608	Frequency on left channel out of range. Right channel silent.
	121609	Right channel is silent.
	121610	Frequency on right channel out of range. Left channel silent.
	121611	Left channel is silent.
	121612	Both channels are silent.
Example	DS:> 1216 121600: Test OK @	

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	DS:> 1217 82 121700: Test OK @	

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

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

Nucleus Name	DS_SYS_VirginModeOn	
Nucleus Number	1220	
Description	Turn on the virgin mode functionality (e.g. the auto channel search upon start-up)	
Technical	Issue the command to set the bit for the virgin mode to the analogue board	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	122000	Turning on the virgin mode succeeded
	122001	Turning on VirginMode on the Analogue Board failed.
	122002	The returned error code from the analogue board is unknown:
	122003	No DS error code known for analogue board error:

	122004	There was no response from the analogue board.
	122005	Section validation or write failed in NVRAM
	122006	Reading the CONFIG section from NVRAM failed
	122007	Initialisation of IIC or reaching NVRAM failed
Example	DS:> 1220 122000: Test OK @	

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

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

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

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

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

Nucleus Name	DS_SYS_SettingsSet	
Nucleus Number	1226	
Description	Programs the digital board settings into the boot EEPROM on the digital board.	
Technical	Evaluate user input. Set-up IIC-bus. Write data to boot EEPROM. Update checksum.	
Execution Time	1 second	
User Input	A large hexadecimal value that represents the digital board settings obtained from the XDIVTOOL.exe program or from a reference set.	
Error	Number	Description
	122600	The settings were successfully programmed.
	122601	User input is invalid.
	122602	IIC access failed.
Example	DS:> 1226 6469616774737462010102000101010101000020080000 122600: Test OK @	

Nucleus Name	DS_SYS_SettingsDisplay	
Nucleus Number	1228	
Description	Show the settings that are programmed in the BROM on the digital board.	
Technical	Set-up IIC-bus. Read Digital Board Settings from boot EEPROM. Display the settings.	

Execution Time	1 second	
User Input	None.	
Error	Number	Description
	122800	The settings were successfully displayed.
	122801	IIC access failed.
	122802	Invalid settings
Example	DS:> 1228 Settings ID: 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 @	

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	DS:> 1229 122900: 6D7920626F61726400020300010101020101000020080000 Test OK @	

Nucleus Name	DS_SYS_AudioLoopThroughStart	
Nucleus Number	1230	
Description	Description: The audio input is routed from the input to all outputs. The input is set routing the signal with the proper nucleus. All outputs are enabled.	
Technical	<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	None.	
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 @	

Nucleus Name	DS_SYS_AudioLoopThroughStop	
Nucleus Number	1231	
Description	Stop routing the audio input to all the outputs	
Technical	Send the Mute command to the audio decoder and reset the audio decoder	
Execution Time	Less than 1 second.	
User Input	-	
Error	Number	Description
	123100	AudioLoopthroughStop succeeded
	123101	Resetting the audio decoder failed
	123102	Resetting the audio encoder failed
Example	<pre>DS:> 1231 123100: Test OK @</pre>	

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	- 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 inthe 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	<p>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 @</p> <p>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 @</p>	

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	The user inputs the Bus ID, Slave Address, number of bytes to read, number of bytes to write and the bytes to be written <NucNr><BusId><SlaveAddr><ReadLen><WriteLen><WrByte0...WrByteN> Max number of bytes to write: 255 Max number of bytes to read: 255	
Error	Number	Description
	123500	Writing data to and reading data from the IIC slave succeeded
	123501	The IIC bus was not accessible
	123502	There was a bus timeout reading the device
	123503	The IIC acknowledge was not received
	123504	Unable to initialise IIC bus
	123505	The communication with the device failed
	123506	Unknown IIC bus error received
	123507	Decoding bus ID unsigned value failed
	123508	Decoding slave address unsigned value failed
	123509	Decoding number of bytes unsigned value failed
	123510	Bus ID out of range
	123511	Number of bytes out of range
Example	DS:> 1235 0 0xa0 0xf 1 0 0x0000: 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x0008: 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 121000: Test OK @	

Nucleus Name	DS_SYS_UartSetup	
Nucleus Number	1236	
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	The user inputs 6 parameters: <UartNr><baudrate><flowcontrol><databits><parity><stopbits> UartNr: 1=UART port 1 : not used (Chrysalis only) 2=UART port 2 : Bit Engine or DTTM (Chrysalis only) 3=UART port 3 : Analogue board baudrate: 115200,62500,57600,38400,19200,9600,4800,2400,1200 flowcontrol: 0=disabled 1=enabled databits: 7 or 8 parity: "NO", "ODD" or "EVEN" stopbits: 1 or 2	
Error	Number	Description
	123600	Setting up the selected UART succeeded
	123601	User provided Invalid setup parameters
	123602	Setting up the selected UART Failed
	123603	Selected UART is not available
Example (Chrysalis)	DS:> 1236 2 38400 0 8 NO 1 123600: Test OK @	
Example (Leco)	DS:> 1236 2 38400 0 8 NO 1 123603: The selected UART is not available Error @	

Electronic Program Guide Board (EPGB)

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

ANALOGUE SLAVE PROCESSOR (ASP)

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

	160006	The IIC bus initialisation failed
Example	DS:> 1600 160000: Test OK @	

Nucleus Name	DS_ASP_Version	
Nucleus Number	1601	
Description	This nucleus returns the version number of the software running on the ASP and if available that of the display driver.	
Technical	Read versions from ASP and display it.	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	160100	Retrieving the software versions succeeded
	160101	The IIC bus initialisation failed.
	160102	The IIC bus failed.
	160103	The CRC checksum of the message is wrong.
Example	DS:> 1601 160100: Software version : 0.9 Display driver version: 0.1 Hardware version : 0x02 Hardware layout : 0x03 Hardware revision : 0x00 Test OK @	

Nucleus Name	DS_ASP_RealTimeClockSetValues	
Nucleus Number	1602	
Description	This nucleus is used to set the real time clock to the correct values.	
Technical	- Decode the user input. - Write RTC value to ASP.	
Execution Time	Less than 1 second.	
User Input	User must give time and date like this: hh:mm:ss dd/mm/yy	
Error	Number	Description
	160200	Setting the real time clock succeeded
	160201	The ASP initialisation failed.
	160202	The IIC bus failed.
	160203	Wrong user input.
Example	DS:> 1602 03:20:01 22/06/03 160200: Test OK @	

Nucleus Name	DS_ASP_RealTimeClockGetValues	
Nucleus Number	1603	
Description	This nucleus is used to retrieve the actual real time from the ASP	
Technical	- Read RTC value from ASP. - Decode the RTC value.	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	160300	Retrieving the real time succeeded
	160301	The ASP initialisation failed.
	160302	The IIC bus failed.
	160303	The CRC checksum of the message is wrong.
	160304	The Real Time Clock has been found invalid and thus set to default values.
Example	DS:> 1603 Time: 03:20:17 Date: 22/06/03 (dd/mm/yy) 160300: Test OK @	

Nucleus Name	DS_ASP_RealTimeClockSetCorrection	
Nucleus Number	1604	
Description	This nucleus sets the correction value needed for the real time clock	

Technical	T.B.D. !!	
Execution Time	Less than 1 second.	
User Input	none	
Error	Number	Description
	160400	Setting the correction values succeeded
Example	DS:> 1604 160400: T.B.D. !! Test OK @	

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

Nucleus Name	DS_ASP_NTCGet	
Nucleus Number	1606	
Description	This nucleus reads the value of the NTC-resistor connected to the ASP, which tells the ambient temperature to the processor.	
Technical	- Read the ADC input pin of the ASP that is connected to the NTC-resistor. - Display this value.	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	160600	Getting the NTC-value succeeded
	160601	The IIC bus failed
Example	DS:> 1606 160600: Temperature(NTC) ADC input value = 0x94 Test OK @	

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

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

	160801	IIC-bus communication failed
Example	DS:> 1608 160800: Test OK @	

Nucleus Name	DS_ASP_BlinkDisplay	
Nucleus Number	1609	
Description	This nucleus lights the entire display, and lets it blink.	
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	DS:> 1609 160900: Test OK @ DS:> 1609 off 160900: Test OK @	

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

Nucleus Name	DS_ASP_ClearDisplay	
Nucleus Number	1611	
Description	This nucleus clears the display and deactivates dimming/blinking functionality	
Technical	<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	DS:> 1611 161100: Test OK @	

Nucleus Name	DS_ASP_KeyBoard	
Nucleus Number	1612	
Description	This nucleus checks all keys of the keyboard by having the user confirm the key-code displayed of all keys. If the user presses a or A the test is aborted. If the user presses o or O the test is indicated as OK. If the user holds down PLAY for more than a second the test is indicated as OK, if the user holds down RECORD the test is indicated as failed.	

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	DS:> 1612 161200: Test OK @	

Nucleus Name	DS_ASP_RemoteControl	
Nucleus Number	1613	
Description	This nucleus checks the interface to the remote control by having the user confirm the key-code displayed. At least one key must be tested. If the user presses a or A the test is aborted. If the user presses o or O the test is indicated as OK. If the user holds down PLAY for more than a second the test is indicated as OK, if the user holds down RECORD the test is indicated as failed.	
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	DS:> 1613 161300: Test OK @	

Nucleus Name	DS_ASP_LEDsOn	
Nucleus Number	1614	
Description	This nucleus switches on the RECORD, TRAY, and EPG-LED, when available	
Technical	<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. 	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	161400	Switching on the LEDs succeeded
	161401	IIC-bus communication failed
Example	DS:> 1614 161400: Test OK @	

Nucleus Name	DS_ASP_LEDsOff	
Nucleus Number	1615	
Description	This nucleus switches off the RECORD, TRAY, and EPG-LED, when available	
Technical	<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. 	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	161500	Switching off the LEDs succeeded
	161501	IIC-bus communication failed
Example	DS:> 1615 161500: Test OK @	

Nucleus Name	DS_ASP_Reset	
Nucleus Number	1616	
Description	This nucleus resets the ASP.	
Technical	<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	DS:> 1616 161600: Test OK @	

ANALOGUE BOARD EEPROM (AROM)

Nucleus Name	DS_AROM_Communication	
Nucleus Number	1700	
Description	Check the communication between the IIC controller of the Codec and the EEPROM	
Technical	<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	DS:> 1700 170000: Test OK @	

VIDEO MATRIX (VMIX)

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

Nucleus Name	DS_VMIX_Routing	
Nucleus Number	1801	
Description	This nucleus performs the routing of the video signals in the set. It sets the video path according to the user input.	
Technical	<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	DS:> 1801 00 180100: Test OK @	

Table 5-3 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.
02	- DbOut-YC to RearOut-YC. - FrontIn-YC to Dbln-YC.
03	- DbOut-CVBS to Scart_1-CVBS. - Scart_2-CVBS to Dbln-CVBS.
04	- DbOut-YC to Scart_1-YC. - Scart_2-YC to Dbln-YC.
05	- DbOut-RGB to Scart_1-RGB. - Scart_2-RGB to Dbln-RGB.
06	- DbOut-CVBS to RearOut-CVBS. - Tuner-CVBS to Dbln-CVBS.
07	DbOut-CVBS to Dbln-CVBS.
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 5-4 Available VIDEO path-Ids for NAFTA / APAC routing

NAFTA Path ID	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.

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	<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 	
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 5-5 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.
02	- DbOut to Scart_1-AOut. - Scart_2-Aln to Dbln.
03	- DbOut to Scart_2-AOut. - Scart_1-Aln to Dbln.
04	- DbOut to RearOut for CVBS/YC. - Tuner to Dbln.
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.

Table 5-6 Available AUDIO path-Ids for NAFTA/APAC routing

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

Nucleus Name	DS_AMIX_Control	
Nucleus Number	1903	
Description	Test the controllability of the sound processor by performing a controlled reset	
Technical	Test the control register, contains 0x80 after reset and 0x0 after first read of this control register. MSP is reset and the control register is tested for the 0x80 reset indication	
Execution Time	1 second	
User Input	-	
Error	Number	Description
	190300	Testing the controllability succeeded
	190301	Accessing the MSP failed
	190302	Accessing the MSP succeeded, but wrong data was returned
Example	DS:> 1903 190300: Test OK @	

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

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

Nucleus Name	DS_AMIX_Mute	
Nucleus Number	1907	
Description	Set or unset the master mute of the ADC/DAC chip (UDA 1380) on the analogue board	

Technical	Send the master mute command via IIC	
Execution Time	Less than 1 second.	
User Input	'ON' or 'OFF'	
Error	Number	Description
	190700	Muting the sound processor succeeded
	190701	Muting sound processor failed
Example	DS:> 1907 190700: Test OK @	

FRONTEND TUNER (FRE)

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

Nucleus Name	DS_FRE_ChannelSelect																																																														
Nucleus Number	2001																																																														
Description	This nucleus sets the tuner to receive a valid audio and video signal																																																														
Technical	-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> 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> </tr> </thead> <tbody> <tr> <td>1</td> <td>FE1316 (Europe Philips)</td> </tr> <tr> <td>2</td> <td>FE1319 (Europe Philips)</td> </tr> <tr> <td>3</td> <td>TMQZ2-403A (Europe ALPS)</td> </tr> <tr> <td>4</td> <td>JS6B2-L121 (Europe Xuguang)</td> </tr> <tr> <td>5</td> <td>TCPK0601 (APAC Samsung)</td> </tr> <tr> <td>6</td> <td>TCMN0682 (NAFTA Samsung)</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	1	FE1316 (Europe Philips)	2	FE1319 (Europe Philips)	3	TMQZ2-403A (Europe ALPS)	4	JS6B2-L121 (Europe Xuguang)	5	TCPK0601 (APAC Samsung)	6	TCMN0682 (NAFTA Samsung)
Name	Colour system	Transmission standard	Sound modulation																																																												
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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																																																													
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6	TCMN0682 (NAFTA Samsung)																																																														
Error	Number	Description																																																													
	200100	Setting the tuner channel succeeded																																																													
	200101	Invalid user input																																																													

Nucleus Name	DS_FRE_ChannelSelect	
	200102	Getting the version of the set failed
	200103	Configuration of the tuner failed
	200104	Configuration of the IF module failed
Example	DS:> 2001 3456 0 1200100: Test OK @	

Nucleus Name	DS_FRE_AFCReferenceVoltage	
Nucleus Number	2002	
Description	This nucleus stores the reference voltage for the tuner in the factory settings	
Technical	<ul style="list-style-type: none"> - Parse the user input - Initialise IIC and NVRAM-connection - Put the new values in NVRAM 	
Execution Time	Less than 1 second.	
User Input	The reference voltage to store, in a range between 0 and 255. (dec.)	
Error	Number	Description
	200200	Storing the reference voltage for the tuner succeeded
	200201	The user provided wrong input
	200202	The section in NVRAM could not be validated after write
	200203	Writing the value to NVRAM failed
	200204	Initialisation of IIC failed or NVRAM unreachable
Example	DS:> 2002 0xaa 200200: Test OK @	

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	-	
Error	Number	Description
	200300	Communicating with the front end succeeded
	200301	The IIC bus was not accessible
	200302	There was a timeout reading the device
	200303	The IIC acknowledge was not received
	200304	An IIC-bus error occurred
	200305	Got unknown IIC bus error
	200306	The IIC bus initialisation failed
	200307	Not a Europe set
Example	DS:> 2003 200300: Test OK @	

Nucleus Name	DS_FRE_TunerTypeGet	
Nucleus Number	2004	
Description	This nucleus retrieves the tuner type information and translates this to the region involved as well.	
Technical	<ul style="list-style-type: none"> - Check the region through the ASP - Read out the tuner type through IIC 	
Execution Time	Less than 1 second	
User Input	-	
Error	Number	Description
	200400	Getting the tuner type information succeeded
	200401	Getting the type of the tuner OK, but unknown type returned
	200402	Getting the tuner type information failed
Example	DS:> 2004 200400: NAFTA Tuner: TCMN0682 Test OK @	

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	<pre> 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: 4C4541440D0000000030300010101020101000020080000 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 </pre>

Example	<pre> Busy executing NUC100 5-28 Device ID 7100 Codec ID PNX7100_MF3 F-BCU (0x0102) 1.0 INTC (0x011d) 1.0 PCI-XIO(0x0113) 1.0 SIF (0x013b) 1.0 EJTAG (0x0104) 0.0 S-BCU (0x0102) 1.0 BOOT (0x010a) 1.0 CONFIG (0x013f) 1.0 RESET (0x0123) 1.0 DEBUG (0x0116) 0.0 UART0 (0x0107) 0.1 UART1 (0x0107) 0.1 UART2 (0x0107) 0.1 UART3 (0x0107) 0.1 I2C0 (0x0105) 0.1 I2C1 (0x0105) 0.1 GPIO (0x013c) 1.0 SYNC (0x013a) 1.0 DISP0 (0xa015) 0.2 DISP1 (0xa00f) 0.0 OSD (0x0136) 0.1 SPU (0xa00e) 0.0 MIXER (0x0137) 1.0 DENC (0x0138) 0.1 CCIR (0x0139) 1.0 VDEC (0x0133) 0.1 PARSER (0xa00d) 0.0 DV (0xa00c) 0.0 BEI (0xa00a) 0.0 IDE (0xa009) 0.0 SGDX (0xa008) 0.0 BYTE (0xa00b) 0.0 OUTPUT (0xa003) 0.0 ACOMP (0xa000) 0.0 VFE (0xa001) 0.0 VCOMP (0xa002) 0.0 SCR (0x0000) 0.0 SIFF (0xa011) 0.0 WMD (0xa010) 0.0 AUDIO0 (0xa015) 0.2 AUDIO1 (0xa00f) 0.0 PSCAN (0xa018) 0.0 Busy executing NUC114 6-28 Busy executing NUC115 7-28 Busy executing NUC201 8-28 Busy executing NUC300 9-28 Busy executing NUC301 10-28 Busy executing NUC401 11-28 Busy executing NUC501 12-28 Busy executing NUC503 13-28 BootCode checksum is: 0xBABEB432, which is correct Diagnostics checksum is: 0xBABED22B, which is correct Download checksum is: 0xBABE025F, which is correct Application checksum is: 0xBABE2825, which is correct Busy executing NUC1200 14-28 Hardware ID = 00 Busy executing NUC600 15-28 Found SAA7118 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:> </pre>
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5.4 DVD Module Error code

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

```

aD&S - 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 disc type)
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.

Byte 1 - 9: cumulative errors of previous error occurrences.
Every individual error has its own bit in the 9-byte structure as described in the drawing below:

Format of the BE error bytes.

byte 1

b7	b6	b5	b4	b3	b2	b1	b0
reserved	FOCUS AGC ERROR	FOCUS RETRIES ERROR	FOCUS TIMEOUT ERROR	RADIAL AGC ERROR	RADIAL RETRIES ERROR	RADIAL TIMEOUT ERROR	RADIAL INIT ERROR

byte 2

TRAY ERROR	reserved	JITTER OPTIMIZATION ERROR	SLEDGE HOME ERROR	SLEDGE UNSTABLE ERROR	SLEDGE CALIBRATION ERROR	TILT SENSOR OFFSET CALIBRATION ERROR	TILT CALIBRATION ERROR
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byte 3

RECORD ERROR	SEEK ERROR	NO DISC ERROR	NOT INITIALISED ERROR	ILLEGAL STOPADDRESS ERROR	ILLEGAL PARAMETER ERROR	ILLEGAL COMMAND ERROR	COMMAND TIMEOUT ERROR
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byte 4

SERVO FATAL ERROR	reserved	reserved	HF PLL ERROR	NO HF PRESENT ERROR	HEADER TIMEOUT ERROR	SUBCODE NOTFOUND ERROR	SUBCODE TIMEOUT ERROR
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byte5

WOBBLE PLL ERROR	ADIP SYNC ERROR	ADIP WINDOW ERROR	ADIP TIMEOUT ERROR	ATIP NOTFOUND ERROR	ATIP SYNC ERROR	ATIP WINDOW ERROR	ATIP TIMEOUT ERROR
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byte6

WSG CALCULATION ERROR	DVD FREQUENCY ERROR	CD FREQUENCY ERROR	ILLEGAL RECORDING SPEED ERROR	SPEED WINDOW ERROR	SPEED TIMEOUT ERROR	NON EXISTING BCA ERROR	BCA READ ERROR
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byte7

LASER FORWARD SENSE ERROR	NVRAM CHECKSUM UPDATE ERROR	FRONTEND OFFSET CALIBRATION ERROR	LASER PLL ERROR	ILLEGAL READING SPEED ERROR	ILLEGAL MEDIUM ERROR	SELFTTEST ERROR	I ² C ERROR
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byte8

OPC READ SAMPLES ERROR	OPC BAD JITTER MEASUREMENT ERROR	OPC TEST ZONE FULL ERROR	OPC POWER CALCULATION ERROR	OPC START POWER HIGH ERROR	OPC START POWER LOW ERROR	OPC RECORD POWER ERROR	OPC MEDIA PARAMETER ERROR
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byte9

RETURN VALUE INVALID ERROR	BUFFER OVERRUN ERROR	BETA OVER/UNDER FLOW ERROR	NOT ENOUGH CALIB POINTS ERROR	NOT ENOUGH POWER ERROR	ROPC ALPHA GAIN ERROR	ROPC ALPHA REF CURRENT ERROR	ROPC ALPHA OVERFLOW ERROR
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These errors are kept in memory until a power down of the drive (e.g. when recorder goes to standby) or reset of the drive.

5.4.2 Cumulative errors

These errors are stored in EEPROM and are thus non-volatile showing the complete error history of the drive.

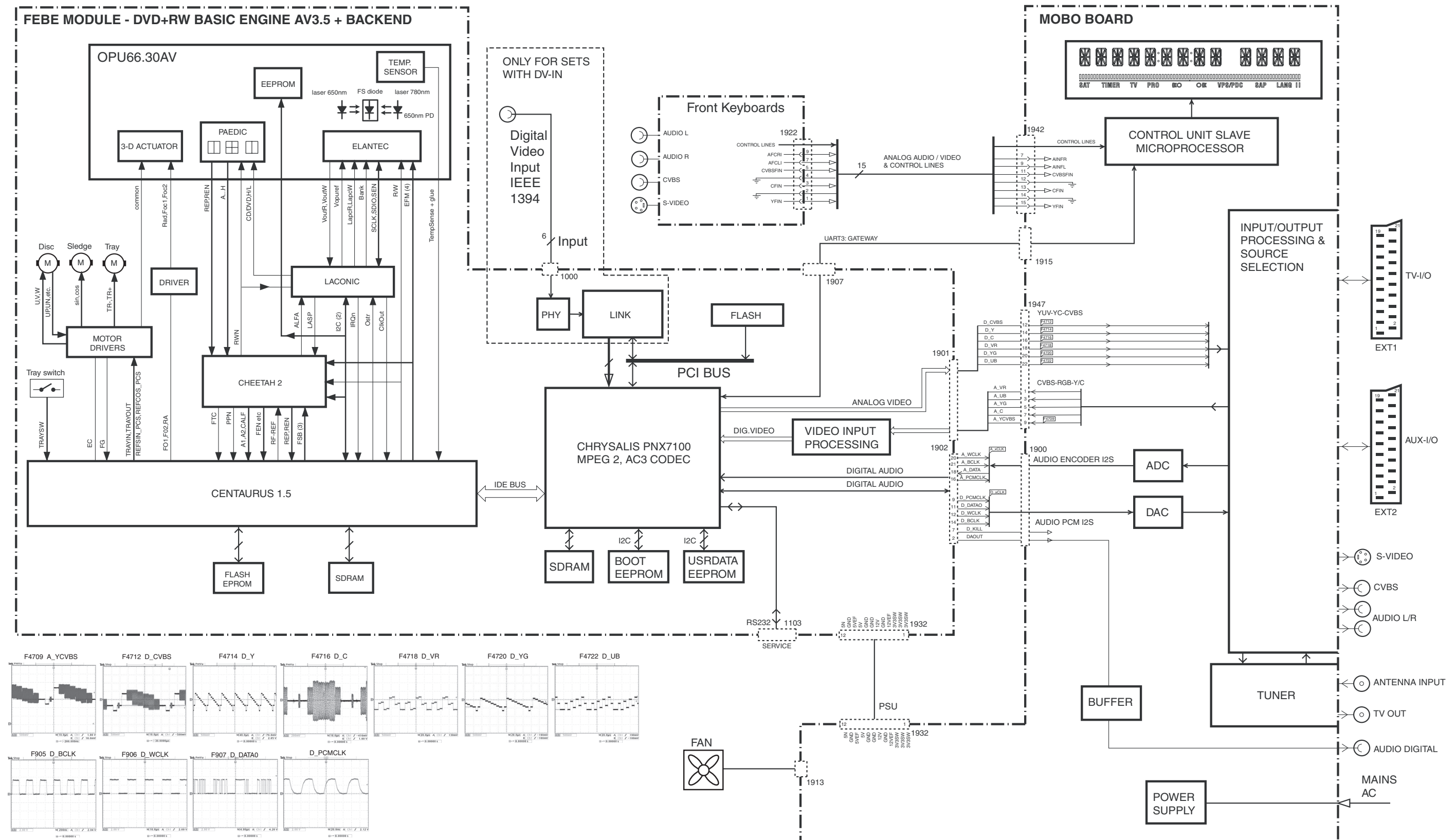
Byte 1 - 9: cumulative errors of previous player / inquiry error occurrences. These bytes are the same as the nine bytes (1-9) of the Momentary errors

5.4.3 Software fatal assert

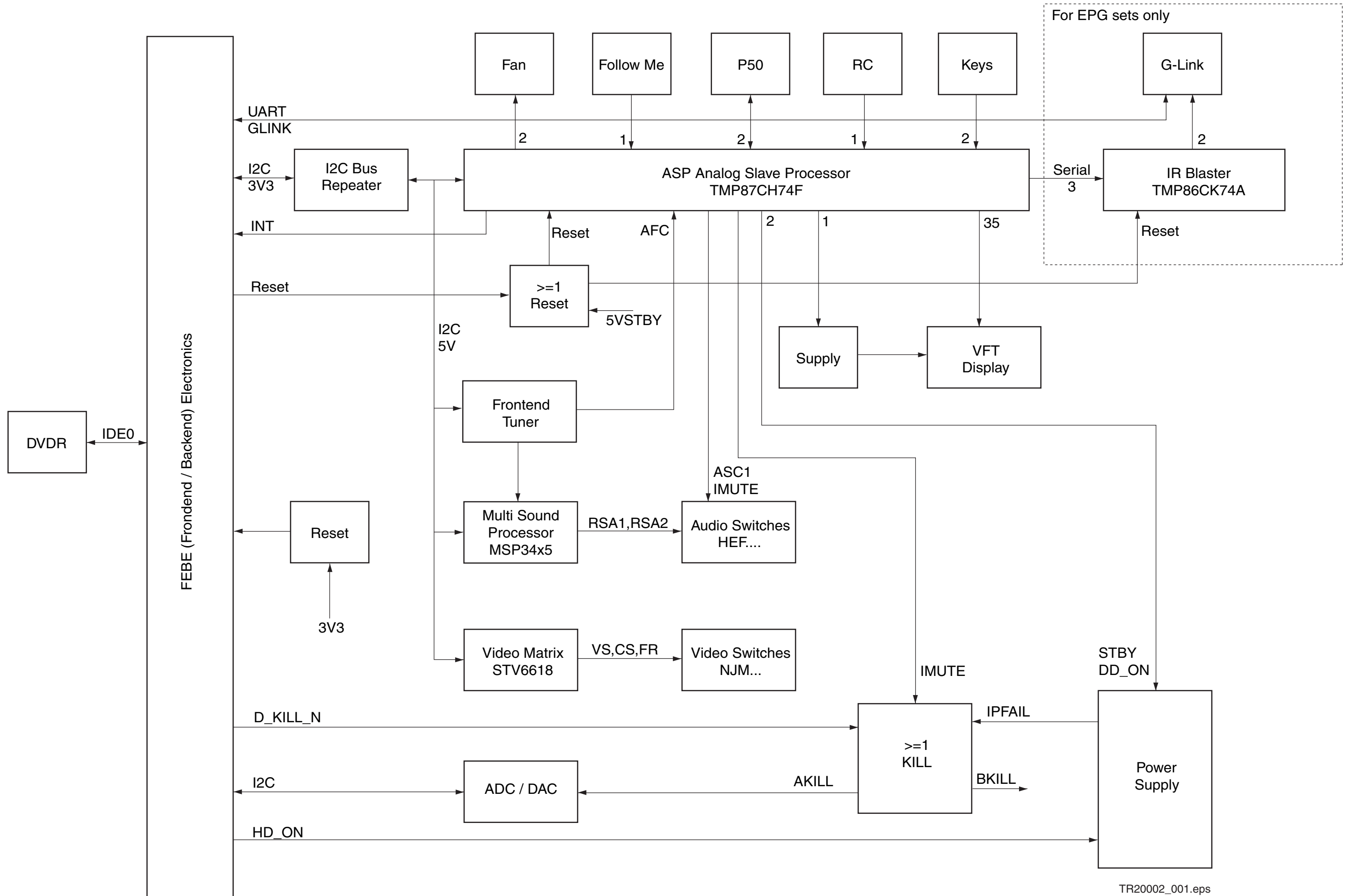
Gives row number and file name in the source code of the firmware of the data path of the AV3

6. Block Diagrams, Waveforms, Wiring Diagram.

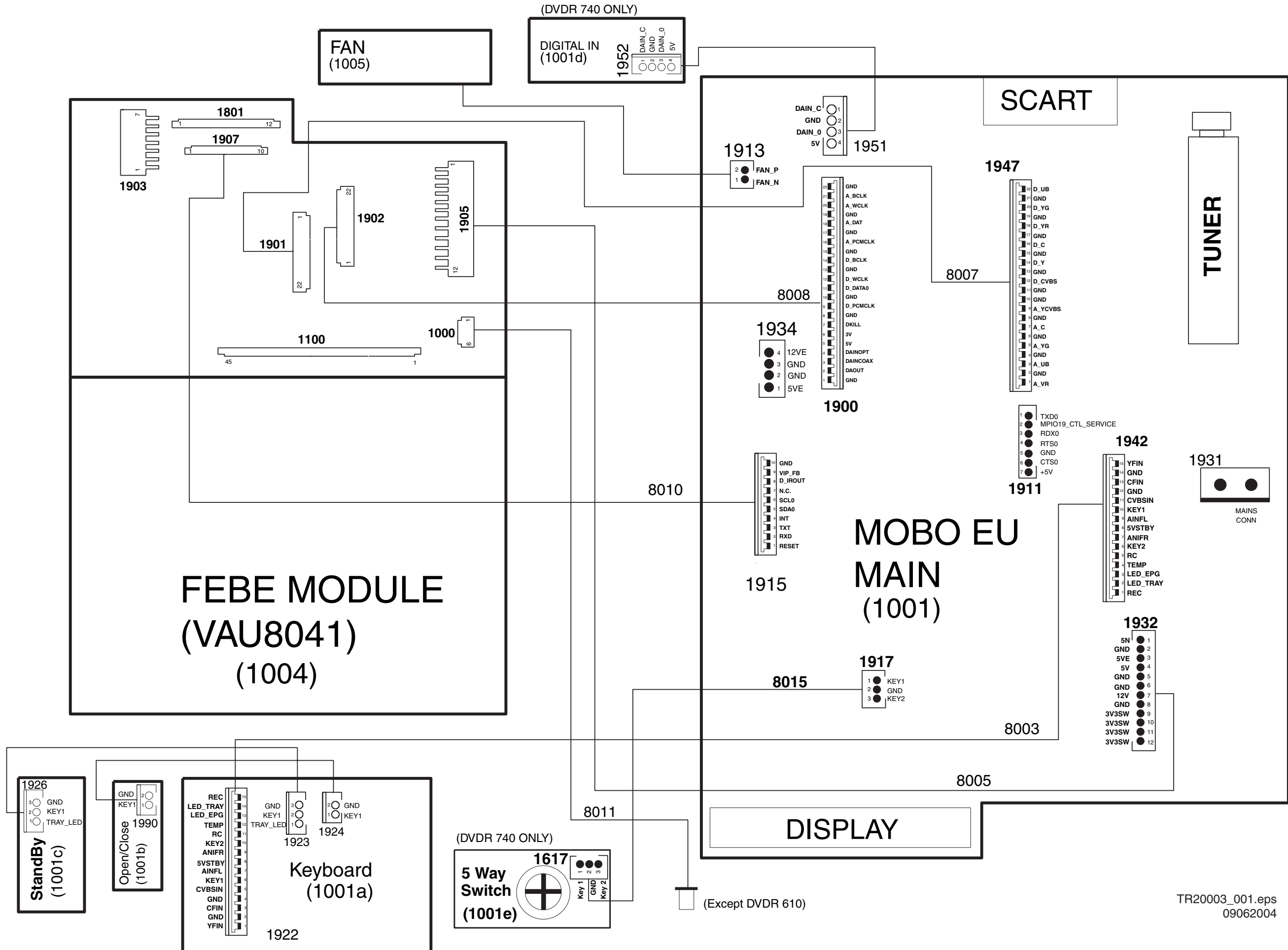
Overall Block Diagram of the Set



Control Block Diagram MOBO Board

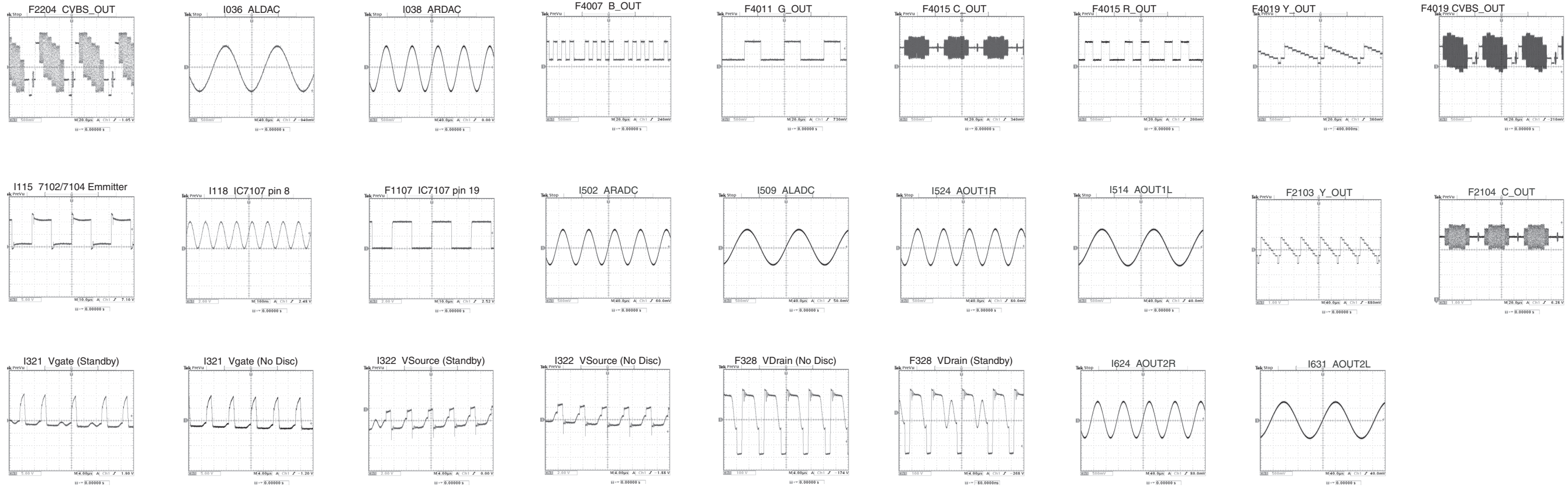


Wiring Diagram

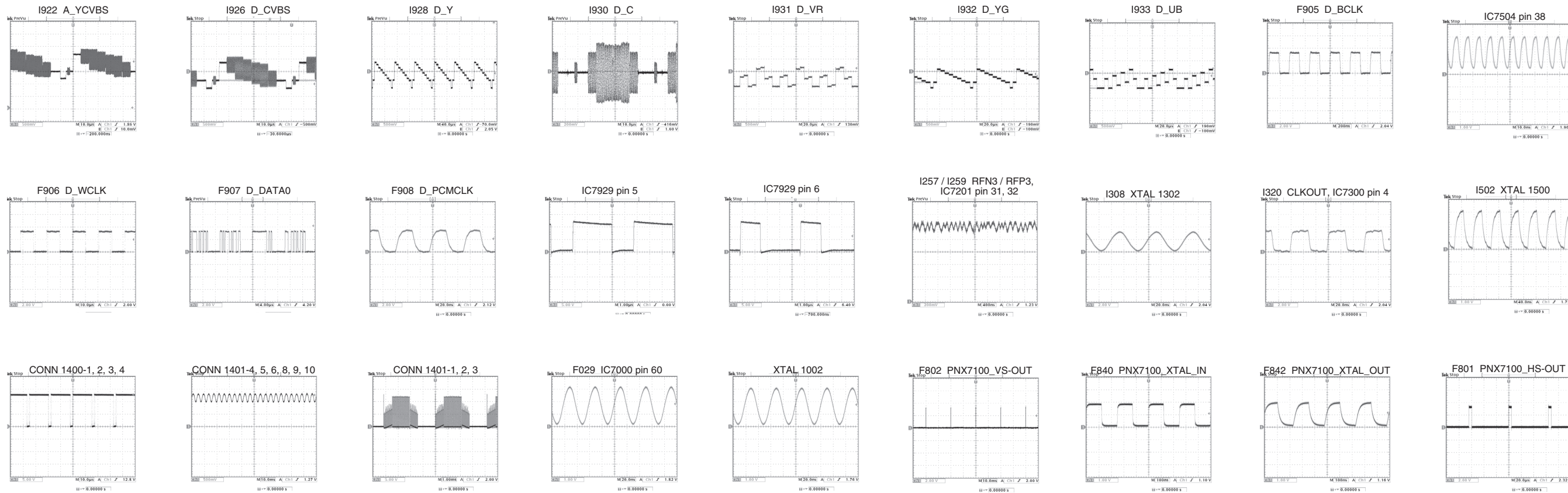


Waveforms

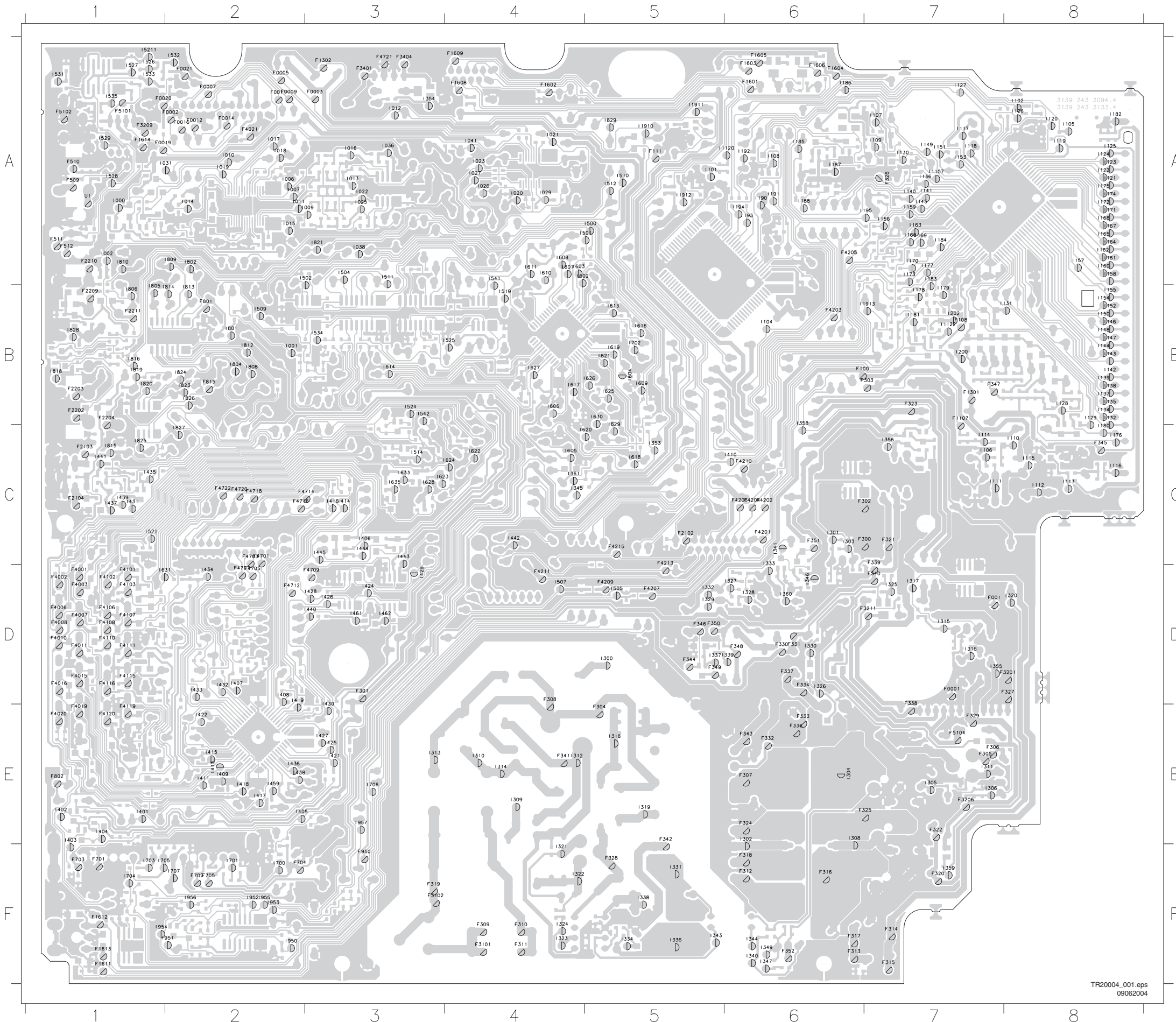
MOBO Board Waveforms



FEBE Board Waveforms

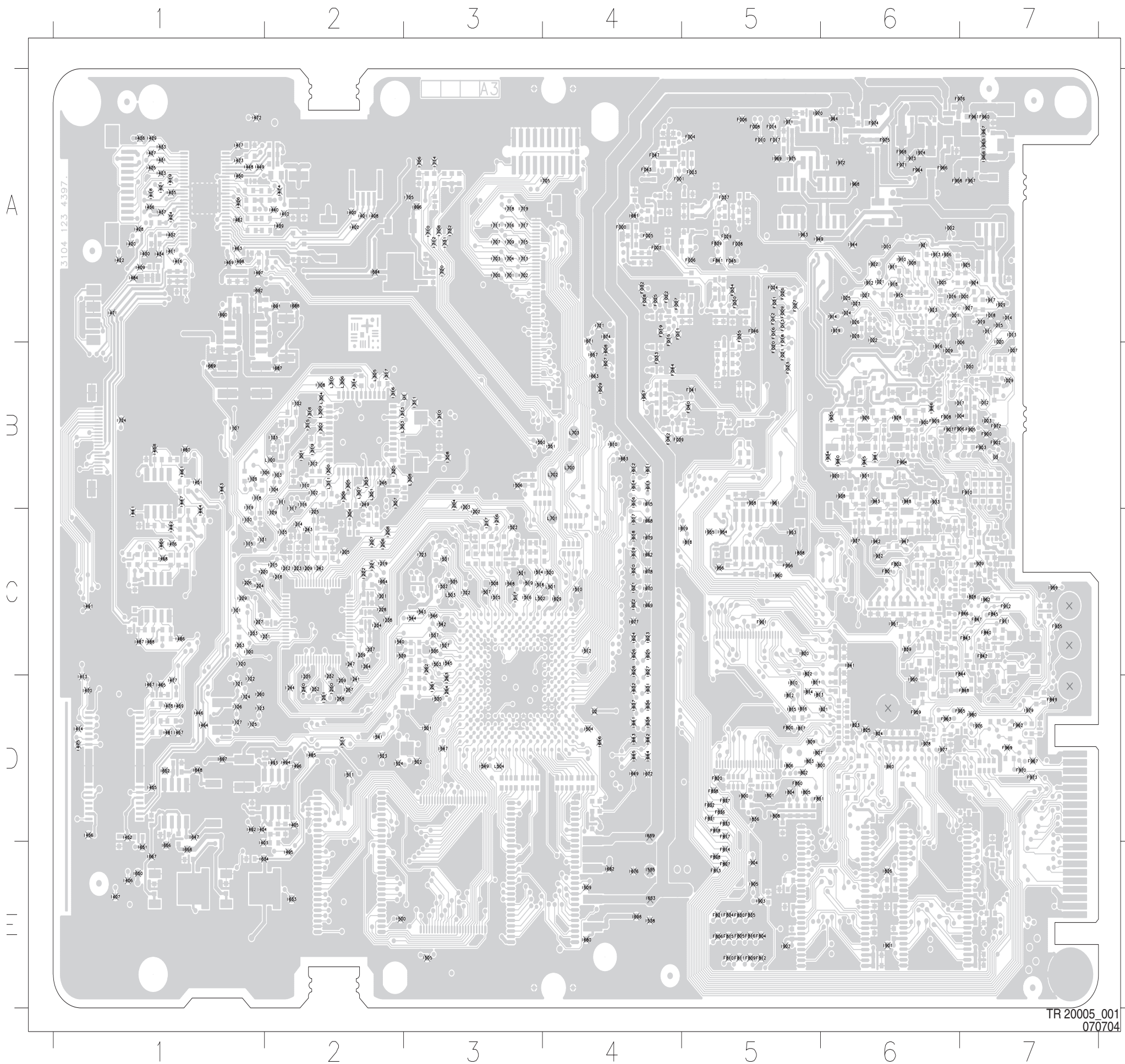


Test points overview MOBO Board



U1	A1	F4003	D1	I1122	B7	I317	D7	I532	A2
F0001	D7	F4006	D1	I113	C8	I318	E5	I533	A1
F0002	A2	F4007	D1	I114	C7	I319	E5	I534	B3
F0003	A3	F4008	D1	I115	C8	I320	D8	I535	A1
F0005	A2	F4010	D1	I116	C8	I321	F4	I541	A4
F0007	A2	F4011	D1	I117	A7	I322	F4	I542	B3
F0009	A2	F4015	D1	I118	A7	I323	F4	I602	A4
F001	D7	F4016	D1	I119	A8	I324	F4	I603	A4
F0011	A2	F4019	E1	I120	A8	I325	D7	I604	B5
F0012	A2	F4020	E1	I121	A8	I326	D6	I605	C4
F0014	A2	F4021	A2	I122	A8	I327	D6	I606	B4
F0016	A2	F4101	D1	I123	A8	I328	D6	I607	A4
F0019	A1	F4102	D1	I124	A8	I329	D5	I608	A4
F0020	A1	F4103	D1	I125	A8	I330	D6	I609	B5
F0021	A2	F4106	D1	I126	A8	I331	F5	I610	A4
F100	B6	F4107	D1	I127	A7	I332	D5	I611	A4
F108	B7	F4108	D1	I128	B8	I333	C6	I613	B5
F1107	B7	F4110	D1	I129	B8	I334	F5	I614	B3
F111	A5	F4111	D1	I130	A7	I336	F5	I616	B5
F1301	B7	F4115	D1	I131	B8	I337	D5	I617	B4
F1302	A3	F4116	D1	I132	B8	I338	F5	I618	B5
F1601	A6	F4119	E1	I134	B8	I339	D6	I619	B5
F1602	A4	F4120	E1	I135	B8	I340	F6	I620	C5
F1603	A6	F4201	C6	I136	A7	I341	C6	I621	B5
F1604	A6	F4202	C6	I137	B8	I343	F5	I622	C4
F1605	A6	F4203	B6	I138	B8	I344	F6	I623	C3
F1606	A6	F4204	C6	I139	B8	I345	C4	I624	C4
F1608	A4	F4205	A6	I140	A7	I346	D6	I625	B5
F1609	A4	F4206	C6	I141	A7	I347	F6	I626	B5
F1611	F1	F4207	D5	I142	B8	I349	F6	I627	B4
F1612	F1	F4209	D5	I143	B8	I353	C5	I628	C3
F1613	F1	F4210	C6	I144	B8	I354	A3	I629	B5
F1614	A1	F4211	D4	I145	A7	I355	D7	I630	B5
F2102	C5	F4213	C5	I146	B8	I356	C7	I631	D1
F2103	C1	F4215	C5	I147	B8	I358	B6	I633	C3
F2104	C1	F4701	C2	I148	B8	I359	F7	I635	C3
F2202	B1	F4703	C2	I149	A7	I360	D6	I700	F2
F2203	B1	F4705	D2	I150	B8	I361	C4	I701	F2
F2204	B1	F4707	D2	I151	A7	I401	E1	I702	B5
F2209	B1	F4709	D3	I152	B8	I402	E1	I703	F1
F2210	A1	F4712	D2	I153	A7	I403	E1	I704	F1
F2211	B1	F4714	C3	I154	B8	I404	E1	I705	F1
F300	C7	F4716	C2	I155	B8	I405	E2	I706	E3
F301	D3	F4718	C2	I156	A7	I406	C3	I707	F2
F302	C7	F4720	C2	I157	A8	I407	D2	I801	B2
F303	B7	F4721	A3	I158	A8	I408	D2	I802	A2
F304	E5	F4722	C2	I159	A7	I409	E2	I804	B2
F305	E7	F509	A1	I160	A8	I410	C6	I805	B1
F306	E7	F510	A1	I161	A8	I411	E2	I806	B1
F307	E6	F5101	A1	I162	A8	I413	E2	I808	B2
F308	D4	F5102	A1	I163	A7	I414	C3	I809	A2
F309	F4	F5104	E7	I164	A8	I415	E2	I810	A1
F310	F4	F511	A1	I165	A8	I416	C3	I812	B2
F3101	F4	F512	A1	I166	A7	I417	E2	I813	B2
F3102	F3	F701	F1	I167	A8	I418	E2	I814	B2
F311	F4	F702	F2	I168	A8	I419	D2	I815	C1
F312	F6	F703	F1	I169	A7	I421	E3	I816	B1
F313	F6	F704	F2	I170	A7	I422	E2	I818	B1
F314	F7	F705	F2	I171	A8	I424	D3	I819	B1
F315	F7	F801	B2	I172	A8	I425	E3	I820	B1
F316	F6	F802	E1	I173	A7	I426	D3	I821	A3
F317	F6	F815	B2	I174	A8	I427	E3	I823	B2
F318	F6	F950	F3	I175	A8	I428	D3	I824	B2
F319	F3	I000	A1	I176	C8	I429	D3	I825	B1
F320	F7	I001	B2	I177	A7	I430	D3	I826	B2
F3201	D8	I002	A1	I178	B7	I431	C1	I827	C2
F3206	E7	I006	A2	I179	B7	I432	D2	I828	B1
F3209	A1	I007	A2	I180	C8	I433	D2	I829	F5
F321	C7	I009	A3	I181	B7	I434	D2	I950	F2
F3211	D7	I010	A2	I182	A8	I435	C1	I951	F2
F322	E7	I011	A2	I183	A7	I436	E2	I952	F2
F323	B7	I012	A3	I184	A7	I437	C1	I953	F1
F324	E6	I013	A3	I185	A6	I438	E2	I954	F2
F325	E7	I014	A2	I186	A6	I439	C1	I955	F2
F326	A7	I015	A2	I187	A6	I440	D3	I956	F2
F327	D8	I016	A3	I188	A6	I441	C1	I957	E3
F328	F5	I017	A2	I190	A6	I442	C4		
F329	E7	I018	A2	I191	A6	I443	C3		
F330	D6	I019	A2	I1910	A5	I444	C3		
F331	D6	I020	A4	I1911	A5	I445	C3		
F332	E6	I021	A4	I1912	A5	I459	E2		
F333	E6	I022	A3	I1913	B7	I461	D3		
F334	D6	I023	A4	I192	A6	I462	D3		
F336	E6	I025	A3	I193	A6	I500	A5		
F337	D6	I026	A4	I194	A6	I501	A5		
F338	D7	I027	A4	I195	A7	I502	A3		
F339	C7	I029	A4	I200	B7	I504	A3		
F340	D7	I031	A2	I202	B7	I505	D5		
F3401	A3	I036	A3	I300	D5	I507	D4		
F3404	A3	I038	A3	I301	C6	I509	B2		
F341	E4	I041	A4	I302	E6	I510	A5		
F342	E5	I101	A5	I303	C6	I511	A3		
F343	E6	I102	A8	I304	E6	I512	A5		
F344	D5	I104	B6	I305	E7	I514	C3		
F345	C8	I105	A8	I306	E7	I519	B4		
F346	D5	I106	C7	I308	E6	I521	C1		
F347	B7	I107	A7	I309	E4	I5211	A1		
F348	D6	I108	A6	I310	E4	I524	B3		
F349	D5	I109	A7	I311	E7	I525	B4		
F350	D5	I110	C8	I312	E4	I526	A1		
F351	C6	I1107	A7	I313	E3	I527	A1		
F352	F6	I111	C7	I314	E4	I528	A1		
F4001	D1	I112	C8	I315	D7	I529	A1		
F4002	D1	I1120	A6	I316	D7	I531	A1		

Test points overview FEBE Board



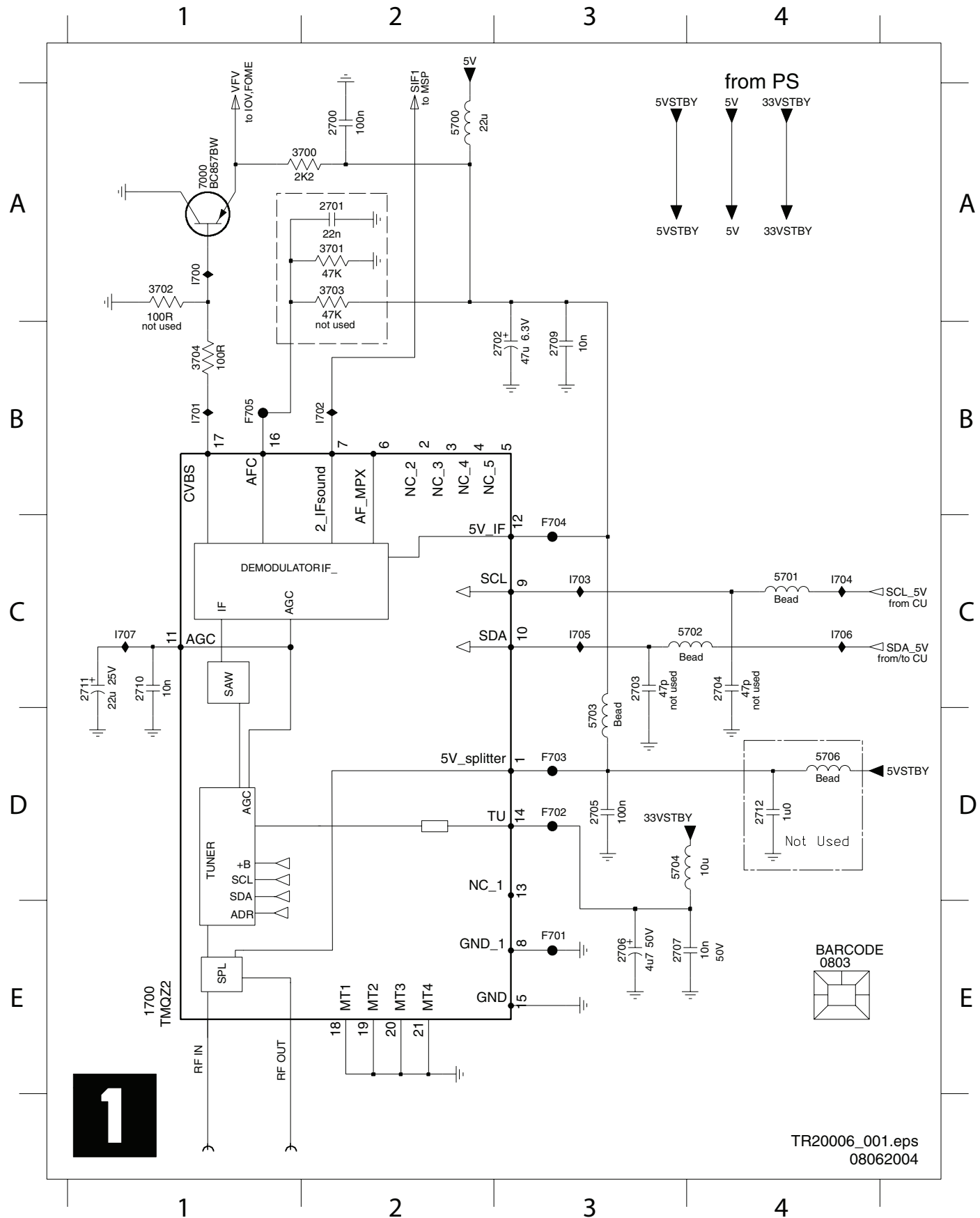
F839 A5	I028 A6	I257 D2	I457 D1	I550 B3	I702 A3	I925 A7
F840 C7	I029 B7	I258 D2	I458 B1	I551 B4	I703 A3	I926 B6
F841 A5	I030 B7	I259 D2	I459 D1	I555 E4	I704 A3	I927 A7
F842 C7	I100 C1	I260 D1	I460 C1	I607 B4	I705 A4	I928 B6
F843 C7	I101 C1	I261 D3	I461 B1	I608 B4	I706 A3	I929 A7
F844 C7	I102 B2	I262 C3	I463 A1	I609 B4	I707 A3	I930 B6
F845 C7	I103 B2	I263 D3	I464 D1	I610 B4	I708 A3	I931 B6
F846 C7	I104 B2	I264 C2	I465 D1	I611 B4	I709 A3	I932 C6
F847 C7	I106 B2	I300 B2	I467 D1	I612 B4	I710 A3	I933 B6
F848 D7	I107 B1	I301 B2	I468 C1	I613 B4	I711 A3	I934 B6
F849 D7	I108 B2	I302 B2	I469 A1	I614 B4	I712 A3	I935 B6
F850 D5	I110 B2	I303 B2	I470 D1	I615 B4	I713 A3	I936 A6
F851 D5	I111 B2	I304 C2	I471 A1	I616 B4	I714 A3	I937 C6
F900 B7	I115 C1	I305 B2	I472 A1	I617 C4	I715 A3	I938 B6
F901 C5	I116 B2	I306 B2	I473 A1	I618 C4	I716 A3	I939 C7
F902 B7	I117 B2	I307 B2	I474 A2	I619 C4	I717 A3	I940 B6
F903 B7	I118 B1	I308 B3	I475 D1	I620 C4	I718 A3	I941 B6
F904 B6	I119 B1	I310 B3	I476 C1	I621 C4	I719 A3	I942 C6
F905 B7	I120 C1	I311 B3	I477 D1	I622 C4	I720 A3	I943 B6
F906 B6	I121 D1	I312 B2	I478 D1	I623 C4	I721 A4	I944 A6
F907 B6	I122 D1	I313 B2	I480 B1	I624 C4	I722 C3	I945 B6
F908 B6	I123 D1	I314 B2	I481 D1	I625 C4	I723 C3	I946 B6
F909 B6	I124 D1	I315 B2	I482 A1	I626 C4	I724 B1	I947 C6
F910 B7	I125 D1	I316 B2	I484 A1	I627 C4	I731 A3	I948 B6
F911 C7	I126 D1	I317 B2	I485 D2	I628 C4	I732 A3	I949 A5
F912 C7	I127 D1	I318 B2	I486 C1	I629 C4	I735 A3	I950 D6
F935 C7	I128 B1	I319 B2	I487 C1	I631 D4	I800 D5	I951 C6
F950 D7	I129 C2	I320 B2	I488 C1	I632 D4	I801 D5	I953 C5
F951 C7	I130 C1	I400 A2	I491 C1	I633 E2	I802 D5	I954 C5
F952 C7	I131 C1	I401 A2	I492 D1	I634 E1	I803 D5	I955 C5
F954 D6	I132 B2	I402 A2	I493 D2	I636 D4	I804 D5	I956 C5
F956 C5	I133 B2	I403 E1	I494 D2	I637 D4	I805 D5	I957 B4
F957 A7	I135 C2	I404 D1	I495 E2	I638 D4	I806 D5	I958 B5
F958 A6	I201 C2	I405 D2	I496 D2	I641 D4	I807 D5	I959 C7
F959 D6	I202 C3	I406 E1	I497 A1	I642 D4	I808 D5	I960 C5
F960 A7	I203 B3	I407 E1	I498 A1	I643 D4	I809 D5	I961 B5
F961 A7	I204 B3	I408 A2	I500 E2	I644 D4	I810 D5	I962 C7
F962 D7	I205 C2	I409 A1	I501 D3	I645 D4	I811 D5	I963 A5
F963 D6	I206 C2	I410 A2	I502 D3	I646 D4	I812 D5	I964 A6
F964 A6	I207 C2	I411 A1	I503 C3	I647 D1	I813 D5	I965 A7
F965 D7	I208 C2	I413 D1	I504 D4	I648 D1	I814 D5	I966 A7
F966 A6	I209 C2	I414 D1	I505 E3	I649 D4	I815 D5	I967 A7
F967 D7	I212 C2	I416 A1	I506 B3	I650 E1	I816 D5	I968 A6
F968 A6	I214 C2	I417 A1	I507 C3	I651 E1	I817 D5	I969 A5
F969 D7	I215 C2	I418 A1	I508 C3	I652 D1	I818 C5	I970 A5
F970 D7	I216 C3	I419 A1	I509 E4	I653 E4	I819 C5	I971 A5
F971 A6	I217 C3	I420 A1	I510 C4	I654 C2	I820 C5	I972 A6
F972 B7	I218 C2	I421 A1	I511 D2	I656 E1	I821 D6	I973 A6
F973 D7	I219 C2	I422 A1	I512 C4	I657 B4	I822 C5	I974 A6
F974 A6	I220 C1	I423 A1	I513 D2	I658 E1	I823 D6	I975 A5
F975 A6	I221 C2	I424 A1	I514 C3	I659 D4	I824 D6	I976 D7
F976 A7	I222 C2	I425 A1	I515 C3	I662 C4	I825 D6	I977 D6
I001 A6	I223 C2	I426 A1	I516 C3	I663 B4	I826 E6	I978 D6
I0010 A7	I224 C1	I427 A1	I517 C3	I667 E1	I828 C7	I979 D7
I002 A6	I225 C2	I428 A1	I518 C3	I668 C4	I836 D5	I980 D7
I003 B7	I226 C1	I429 A1	I519 C3	I669 C4	I838 C5	L100 B2
I004 B6	I227 C1	I430 A1	I520 C4	I670 C4	I839 C6	L301 B2
I005 A6	I228 C2	I431 A1	I521 C3	I671 A4	I840 D6	L302 B2
I006 B6	I229 C1	I432 A1	I522 C3	I672 D4	I841 C6	L304 B2
I007 B7	I231 C2	I433 A1	I523 D2	I674 A4	I840 D5	L305 B2
I008 A6	I232 D2	I434 A1	I524 D2	I676 E4	I901 E6	L306 B2
I009 B6	I233 C1	I435 A1	I527 C3	I677 C4	I902 E5	L307 B2
I010 A6	I234 C2	I436 A1	I530 D3	I678 C4	I903 E5	L308 B3
I011 A7	I235 D2	I437 A1	I531 C3	I679 C4	I904 E5	L309 B2
I012 B7	I237 C2	I438 A1	I532 C3	I680 E4	I905 E5	L310 B2
I013 A7	I238 C2	I439 A2	I535 C3	I681 A4	I910 A6	L311 B2
I014 A7	I239 C2	I440 A2	I536 C3	I682 E4	I911 A6	L501 C4
I015 A7	I240 D2	I441 C1	I537 C3	I683 B4	I912 A6	L502 C3
I016 A6	I241 D2	I442 C1	I538 E4	I687 B2	I913 A6	L503 C3
I017 B6	I242 C2	I443 B1	I539 C2	I688 A2	I914 A6	L504 D3
I018 A7	I243 C2	I444 C1	I540 C2	I689 B1	I915 A6	L700 B4
I019 A7	I244 D2	I446 D1	I541 D2	I690 A1	I916 B6	L701 C4
I020 A7	I247 C2	I447 B1	I542 C3	I691 A2	I917 A7	L702 B4
I021 A6	I248 B2	I448 A1	I543 C3	I692 A1	I918 A6	L703 B4
I022 A6	I249 B2	I449 A1	I544 C3	I694 A2	I919 A6	
I023 A6	I250 D2	I450 A1	I545 C3	I696 A3	I920 B6	
I024 A6	I251 D2	I451 B1	I546 C3	I697 D1	I921 A6	
I025 A6	I252 D2	I452 D1	I547 D3	I698 E4	I922 A6	
I026 A6	I253 C1	I455 D1	I548 C3	I700 A3	I923 A6	
I027 A6	I254 D3	I456 D1	I549 D3	I701 A3	I924 A7	

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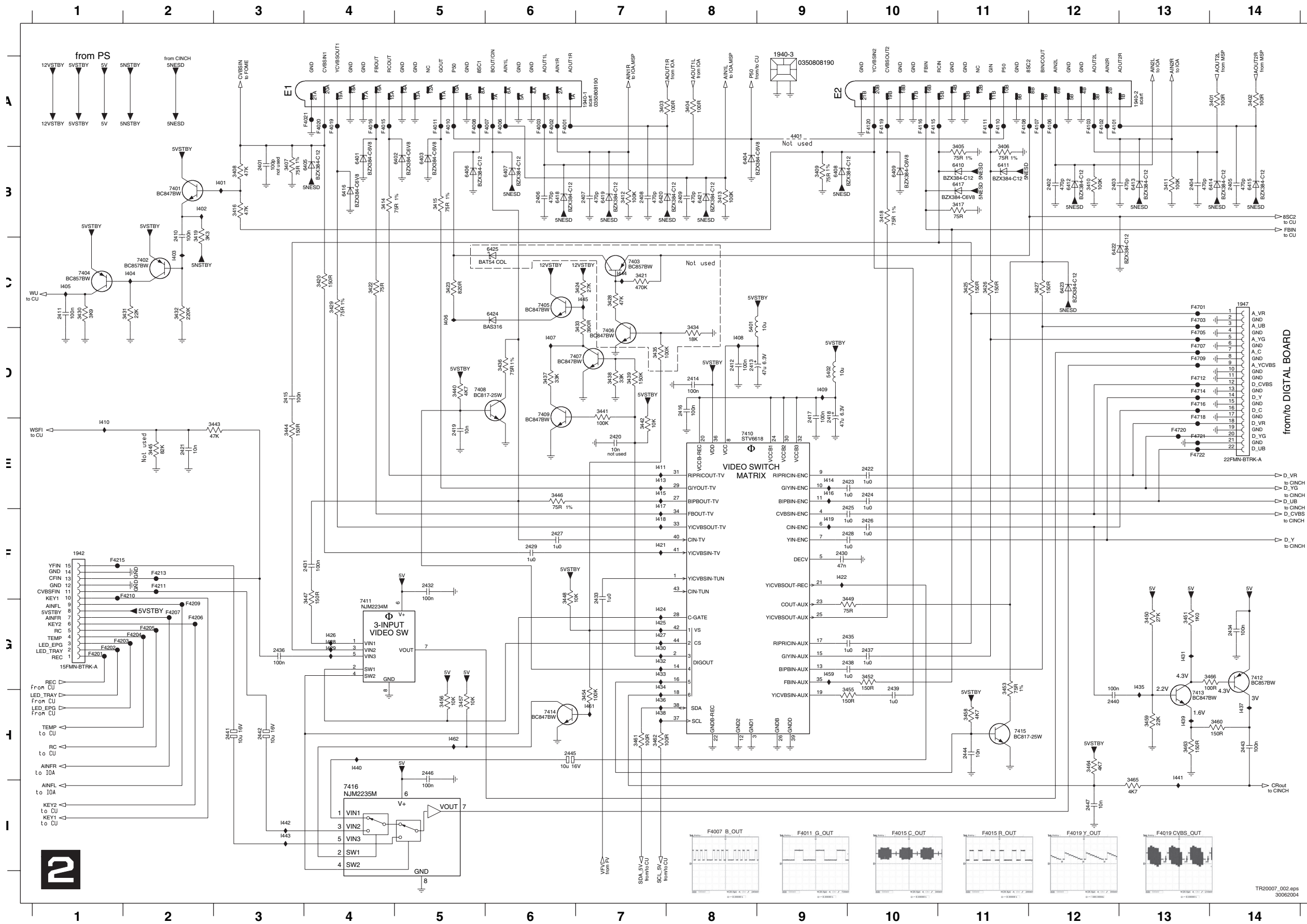
7. Circuit Diagrams and PWB Layouts

MOBO: Frontend Video (FV)

0803 E4	2702 B3	2706 E3	2711 C1	3702 A1	5701 C4	5706 D4	F703 D3	I701 B1	I705 C3
1700 E1	2703 C3	2707 E3	2712 D4	3703 A2	5702 C4	7000 A1	F704 C3	I702 B2	I706 C4
2700 A2	2704 C4	2709 B3	3700 A2	3704 B1	5703 D3	F701 E3	F705 B1	I703 C3	I707 C1
2701 A2	2705 D3	2710 C1	3701 A2	5700 A2	5704 D3	F702 D3	I700 A1	I704 C4	

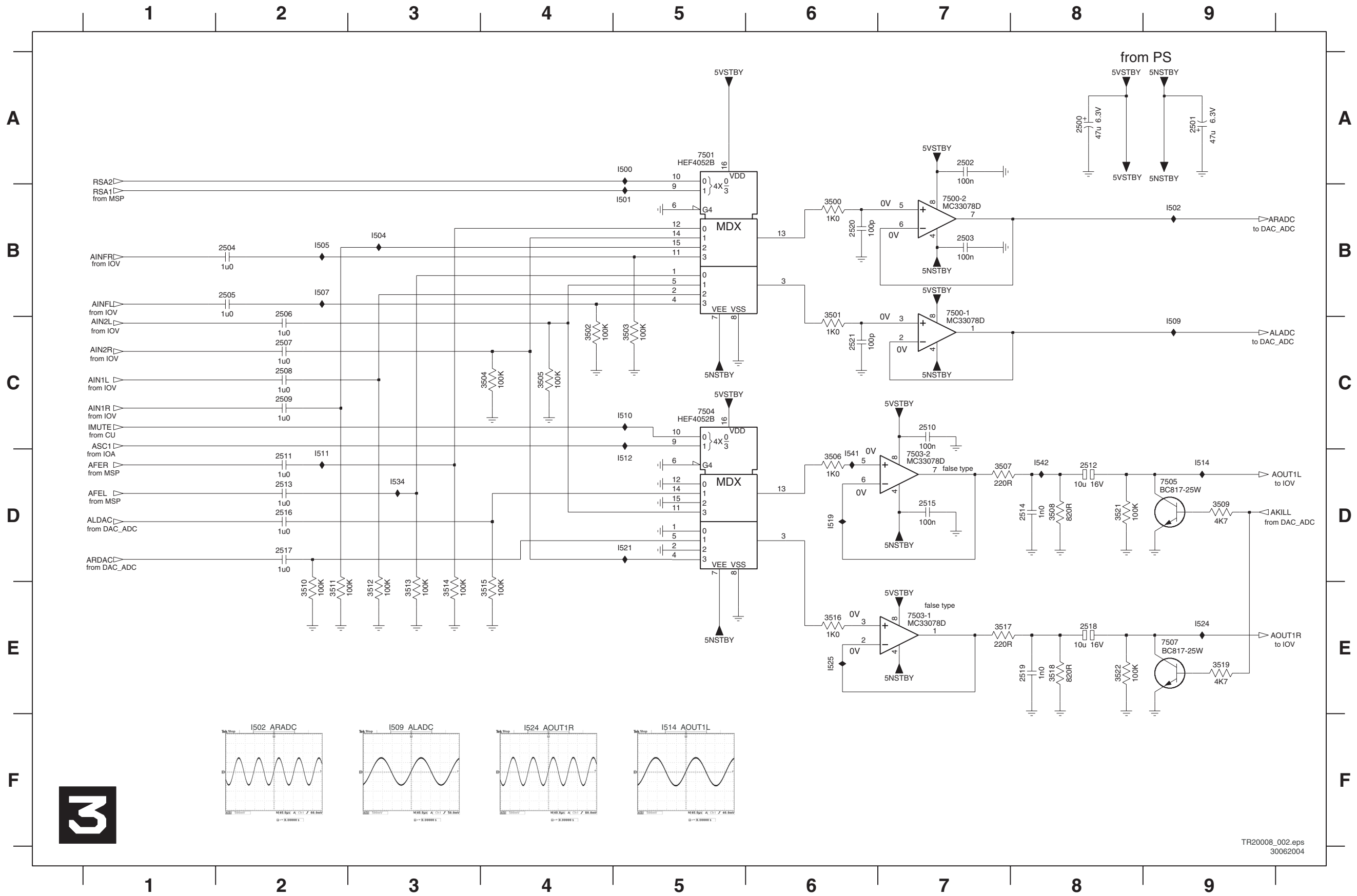


MOBO: Video In/Out (IOV)



1940-1 A7	3465 I13	I425 G7
1940-2 A13	3466 G14	I426 G4
1940-3 A9	4401 A9	I427 G7
1942 F7	5401 C8	I428 G4
1947 C14	5402 D9	I429 G4
2401 B3	6401 B4	I430 G7
2402 B12	6402 B5	I431 G13
2403 B12	6403 B5	I432 G7
2404 B13	6404 B8	I433 G7
2405 B14	6405 B4	I434 G7
2406 B6	6406 B5	I435 G13
2407 B7	6407 B6	I436 H7
2408 B7	6408 B9	I437 H14
2409 B8	6409 B10	I438 H7
2410 B2	6410 B11	I439 H13
2411 C1	6411 B11	I440 H4
2412 D8	6412 B12	I441 H13
2413 D8	6413 B13	I442 I3
2414 D8	6414 B14	I443 I3
2415 D3	6415 B14	I444 C7
2416 D6	6416 B4	I445 C7
2417 D9	6417 B11	I446 H7
2418 D9	6418 B6	I447 G7
2419 E5	6419 B7	I448 H7
2420 E7	6420 B7	I449 B9
2421 E2	6421 B8	I450 H7
2422 E10	6422 C12	I451 G7
2423 E10	6423 C12	I452 G4
2424 E10	6424 C6	I453 G7
2425 F10	6425 C6	I454 H7
2426 F10	7401 B2	I455 H7
2427 F6	7402 C2	I456 H7
2428 F10	7403 C7	I457 H7
2429 F6	7404 C1	I458 H7
2430 F9	7405 C6	I459 H7
2431 F4	7406 D7	I460 H7
2432 F5	7407 D7	I461 H7
2433 F7	7408 D5	I462 H5
2434 G14	7409 D6	
2435 G10	7410 E8	
2436 G3	7411 G4	
2437 G10	7412 G14	
2438 G10	7413 H13	
2439 H10	7414 H6	
2440 H12	7415 H11	
2441 H3	7416 H4	
2442 H3	F4001 A6	
2443 H14	F4002 A6	
2444 H11	F4003 A6	
2445 H6	F4006 A6	
2446 H5	F4007 A6	
2447 I12	F4008 A5	
2448 A14	F4010 A5	
2449 A14	F4011 A5	
2450 A7	F4015 A4	
2451 B11	F4016 A4	
2452 B11	F4019 A4	
2453 B3	F4020 A4	
2454 B3	F4021 A4	
2455 B9	F4102 A12	
2456 B12	F4103 A12	
2457 B13	F4106 A12	
2458 B7	F4107 A12	
2459 B8	F4108 A11	
2460 B4	F4110 A11	
2461 B5	F4111 A11	
2462 B3	F4115 A10	
2463 B11	F4116 A10	
2464 B10	F4119 A10	
2465 B2	F4120 A10	
2466 C4	F4201 C1	
2467 C7	F4202 G1	
2468 C4	F4203 G1	
2469 C5	F4204 G2	
2470 C7	F4205 G2	
2471 C11	F4206 G2	
2472 C11	F4207 G2	
2473 C12	F4209 G2	
2474 C7	F4210 F2	
2475 C9	F4211 F2	
2476 C1	F4213 F2	
2477 C2	F4215 F1	
2478 C7	F4701 C13	
2479 C7	F4703 C13	
2480 D8	F4705 D13	
2481 D7	F4707 D13	
2482 D6	F4712 D13	
2483 D7	F4714 D13	
2484 D7	F4716 D13	
2485 D5	F4718 E13	
2486 D7	F4720 E13	
2487 E7	F4721 E13	
2488 E3	F4722 E13	
2489 E3	I401 B3	
2490 E2	I402 B2	
2491 E6	I403 C2	
2492 F4	I404 C2	
2493 F6	I405 C1	
2494 G10	I406 C5	
2495 G13	I407 D6	
2496 G13	I408 D8	
2497 G10	I409 D9	
2498 G11	I410 E1	
2499 H7	I411 E7	
2500 H10	I413 E7	
2501 H5	I414 E9	
2502 H5	I415 E7	
2503 H11	I416 E9	
2504 H13	I417 E7	
2505 H14	I418 F7	
2506 F9	I419 F9	
2507 H7	I421 F7	
2508 H13	I422 F9	
2509 H12	I424 G7	

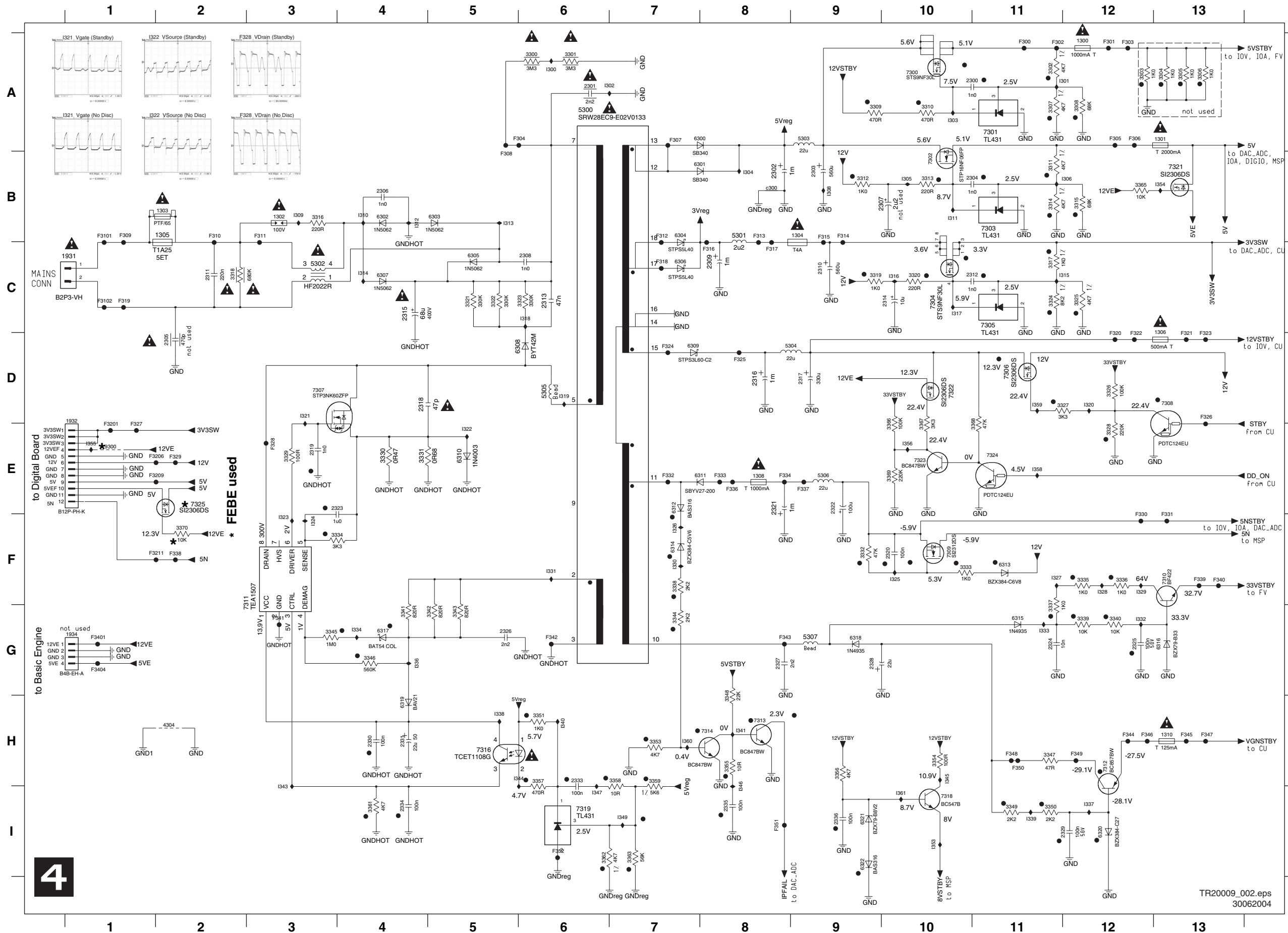
MOBO: Audio In/Out (IOA)



- 2500 A8
- 2501 A9
- 2502 A7
- 2503 B7
- 2504 B2
- 2505 B2
- 2506 B2
- 2507 C2
- 2508 C2
- 2509 C2
- 2510 C7
- 2511 D2
- 2512 D8
- 2513 D2
- 2514 D8
- 2515 D7
- 2516 D2
- 2517 D2
- 2518 E8
- 2519 E8
- 2520 B6
- 2521 C6
- 3500 B6
- 3501 C6
- 3502 C4
- 3503 C5
- 3504 C4
- 3505 C4
- 3506 D6
- 3507 D7
- 3508 D8
- 3509 D9
- 3510 E2
- 3511 E2
- 3512 E3
- 3513 E3
- 3514 E3
- 3515 E4
- 3516 E6
- 3517 E7
- 3518 E8
- 3519 E9
- 3521 D8
- 7500-1 B7
- 7500-2 B7
- 7501 A5
- 7503-1 E7
- 7503-2 D7
- 7504 C5
- 7505 D9
- 7507 E9
- I500 A5
- I501 B5
- I502 B9
- I504 B3
- I505 B2
- I509 C9
- I510 C5
- I511 D2
- I512 D5
- I514 D9
- I519 D6
- I521 D5
- I524 E9
- I525 E6
- I534 D3
- I541 D6
- I542 D8

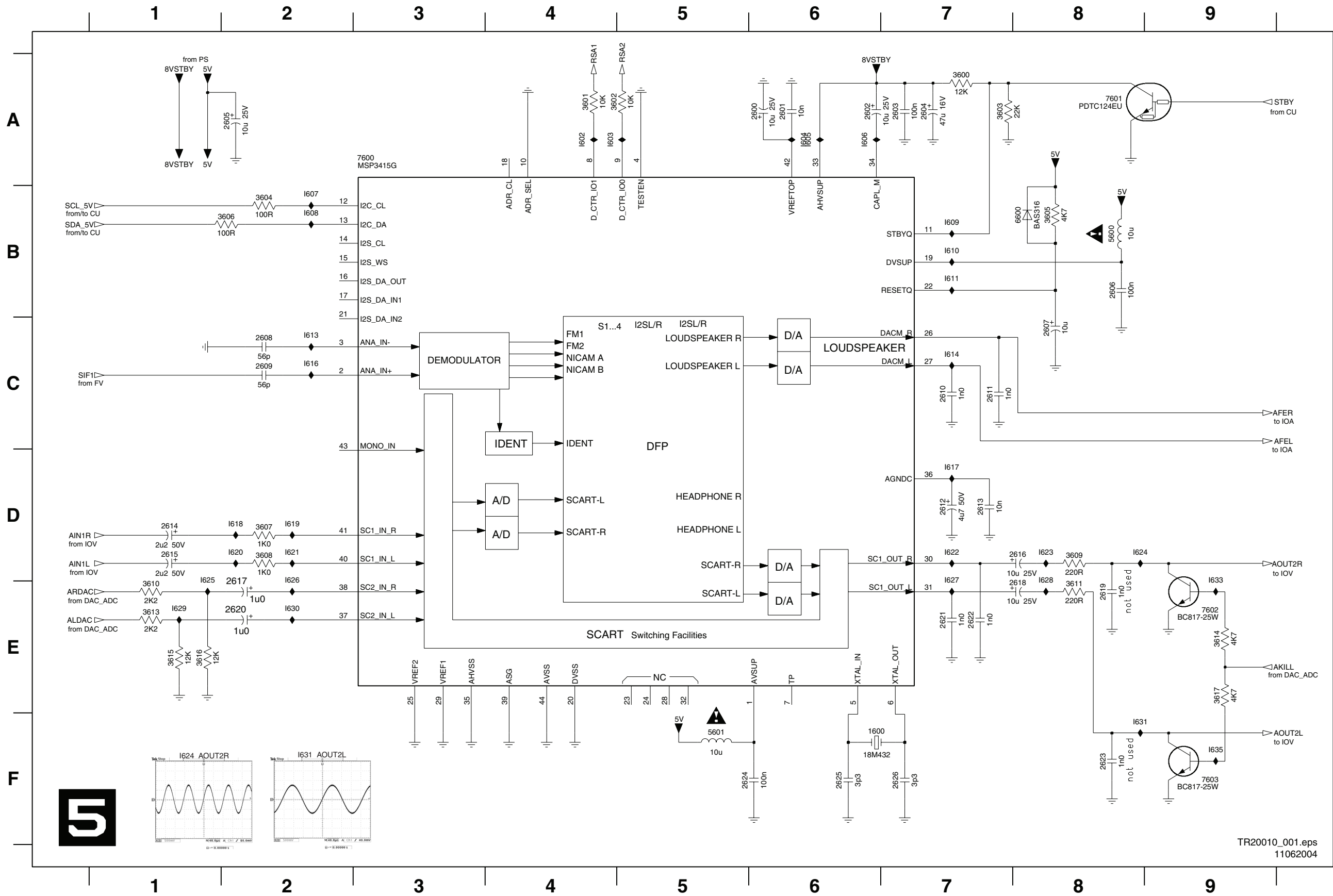


MOBO: Power Supply (PS)



1300 A12	5300 A6	1302 A7
1301 A13	5301 B8	1303 A10
1302 B3	5302 C3	1304 B8
1303 B2	5303 A9	1305 B10
1304 B9	5304 D9	1306 B12
1305 B2	5305 D6	1307 B3
1306 D13	5306 E9	1308 B3
1308 E8	5307 G9	1310 B4
1310 H13	6300 A7	1311 B10
1931 C1	6301 B7	1312 B4
1932 D1	6302 B4	1313 B5
1934 G1	6303 B5	1314 C4
2300 A11	6304 B7	1315 C10
2301 A6	6305 C5	1316 C12
2302 B8	6306 C7	1317 C10
2303 B9	6307 C4	1318 C6
2304 E11	6308 D6	1319 D6
2305 D2	6309 D7	1320 D12
2306 B4	6310 E5	1321 D3
2307 B10	6311 E8	1322 E5
2308 C6	6312 E7	1323 F3
2309 C8	6313 F11	1324 F3
2310 C9	6314 F7	1325 F10
2311 C2	6315 G11	1326 F7
2312 C11	6316 G13	1327 F11
2313 C6	6317 G4	1328 F12
2314 C10	6318 G6	1329 F12
2315 C4	6319 H4	1330 F7
2316 D8	6320 H2	1331 F6
2317 D9	6321 I9	1332 G12
2318 D4	6322 I9	1333 G11
2319 E3	7300 A10	1334 G4
2320 F10	7301 A11	1336 G4
2321 E8	7302 B10	1337 H12
2322 E9	7303 B11	1338 H5
2323 E4	7304 C10	1339 I11
2324 G1	7305 C11	1340 H6
2325 G12	7306 D14	1341 H8
2326 G5	7307 D3	1343 I3
2327 G8	7308 D13	1344 H6
2328 G9	7309 F10	1345 H10
2329 I12	7310 F13	1346 H8
2330 H4	7311 G3	1347 I6
2331 H4	7312 H12	1349 I7
2333 H6	7313 H8	1353 I10
2334 I4	7314 H8	1354 B13
2335 I8	7315 H5	1355 E1
2336 I9	7316 I10	1356 E10
3300 A6	7319 I6	1358 E11
3301 A6	7321 B13	1359 D11
3302 A11	7322 D10	1360 H7
3303 A12	7323 E10	1361 I10
3304 A13	7324 E11	c300 B8
3305 A13	7325 E2	
3306 A13	9300 E1	
3307 A11	F300 A11	
3308 A12	F301 A12	
3309 A9	F302 A11	
3310 A10	F303 A12	
3311 B11	F304 A6	
3312 B9	F305 A12	
3313 B10	F306 A12	
3314 B11	F307 A7	
3315 B12	F308 B5	
3316 B3	F309 B1	
3317 C11	F310 B2	
3318 C2	F310 B1	
3319 C9	F310 C1	
3320 C10	F311 B3	
3321 C5	F312 B7	
3322 C5	F313 B8	
3323 C6	F314 B9	
3324 C11	F315 B9	
3325 C12	F316 C8	
3326 D12	F317 C8	
3327 D12	F318 C7	
3328 E12	F319 C1	
3329 E3	F320 D12	
3330 E4	F320 E1	
3331 E4	F320 E2	
3332 E9	F320 E2	
3333 F10	F321 D13	
3334 F4	F321 F2	
3335 F12	F322 D12	
3336 F12	F323 D13	
3337 G11	F324 D7	
3338 F7	F325 D8	
3339 G12	F326 D13	
3340 G12	F327 E1	
3341 G4	F328 E3	
3342 G5	F329 E2	
3343 G5	F330 F12	
3344 G7	F331 F13	
3345 G3	F332 E7	
3346 G4	F333 E8	
3347 H11	F334 E8	
3348 H8	F336 E8	
3349 I11	F337 E9	
3350 I11	F338 F2	
3351 H6	F339 F13	
3353 H7	F340 F13	
3354 H10	F340 G1	
3355 H8	F340 G1	
3356 H9	F341 G3	
3357 H6	F342 G6	
3358 H7	F343 G8	
3359 H7	F344 H12	
3361 I4	F345 H13	
3362 I6	F346 H12	
3363 I7	F347 H13	
3365 B12	F348 H11	
3366 E10	F349 H12	
3367 E10	F350 H11	
3368 E11	F351 I8	
3369 E10	F352 I6	
3370 F2	I300 A6	
4304 H2	I301 A12	

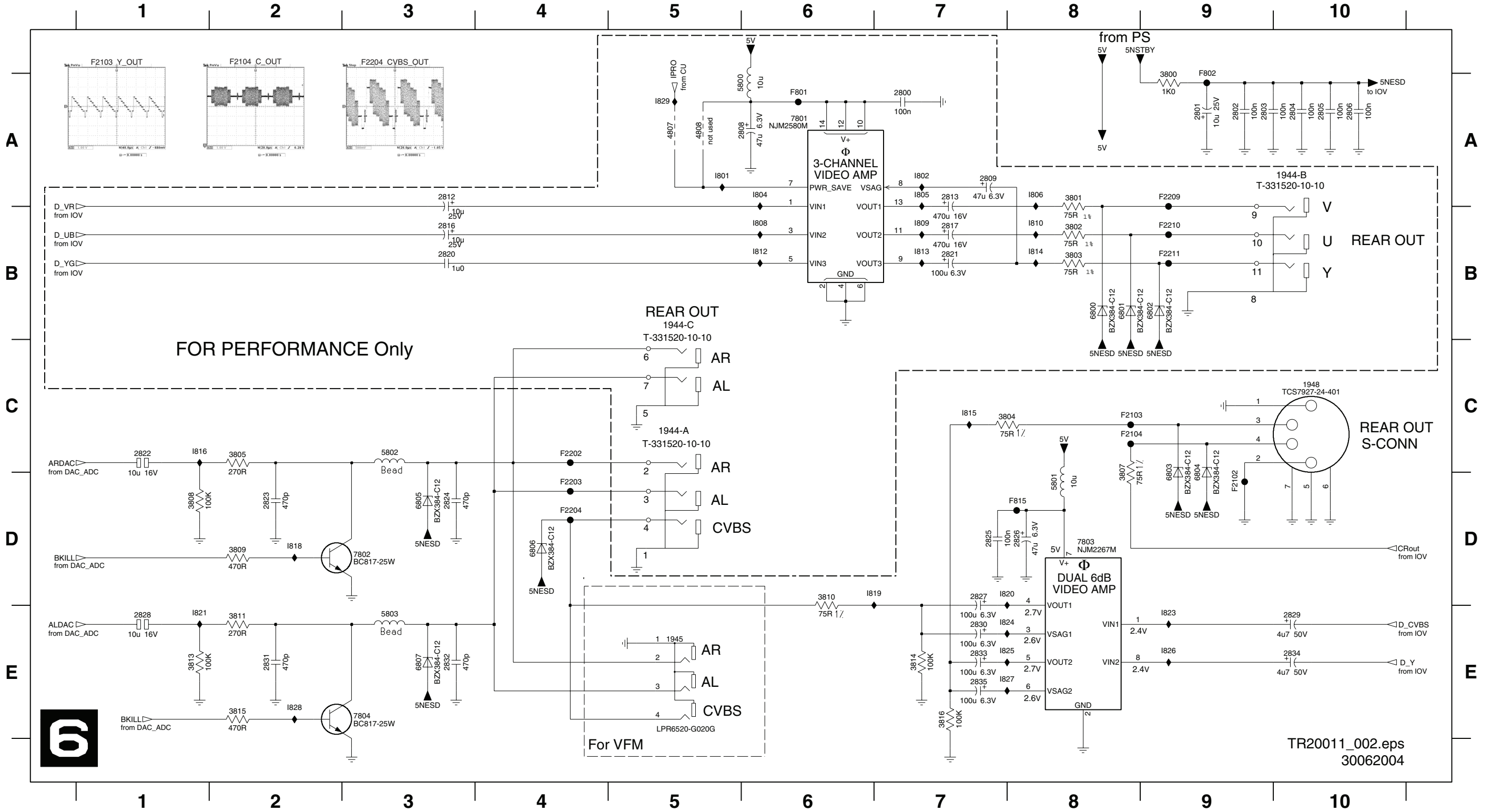
MOBO: Multi Sound Processing (MSP)



- 1600 F6
- 2600 A6
- 2601 A6
- 2602 A6
- 2603 A7
- 2604 A7
- 2605 A2
- 2606 B8
- 2607 C8
- 2608 C2
- 2609 C2
- 2610 C7
- 2611 C7
- 2612 D7
- 2613 D7
- 2614 D1
- 2615 D1
- 2616 D8
- 2617 E2
- 2618 E8
- 2619 E8
- 2620 E2
- 2621 E7
- 2622 E7
- 2623 F8
- 2624 F5
- 2625 F6
- 2626 F7
- 3600 A7
- 3601 A4
- 3602 A4
- 3603 A7
- 3604 B2
- 3605 B8
- 3606 B2
- 3607 D2
- 3608 D2
- 3609 D8
- 3610 E1
- 3611 E8
- 3613 E1
- 3614 E9
- 3615 E1
- 3616 E1
- 3617 E9
- 5600 B8
- 5601 F5
- 6600 B8
- 7600 A3
- 7601 A8
- 7602 E9
- 7603 F9
- I602 A4
- I603 A4
- I604 A6
- I605 A6
- I606 A6
- I607 B2
- I608 B2
- I609 B7
- I610 B7
- I611 B7
- I613 C2
- I614 C7
- I616 C2
- I617 D7
- I618 D2
- I619 D2
- I620 D2
- I621 D2
- I622 D7
- I623 D8
- I624 D8
- I625 D1
- I626 D2
- I627 D7
- I628 D8
- I629 E1
- I630 E2
- I631 F8
- I633 D9
- I635 F9

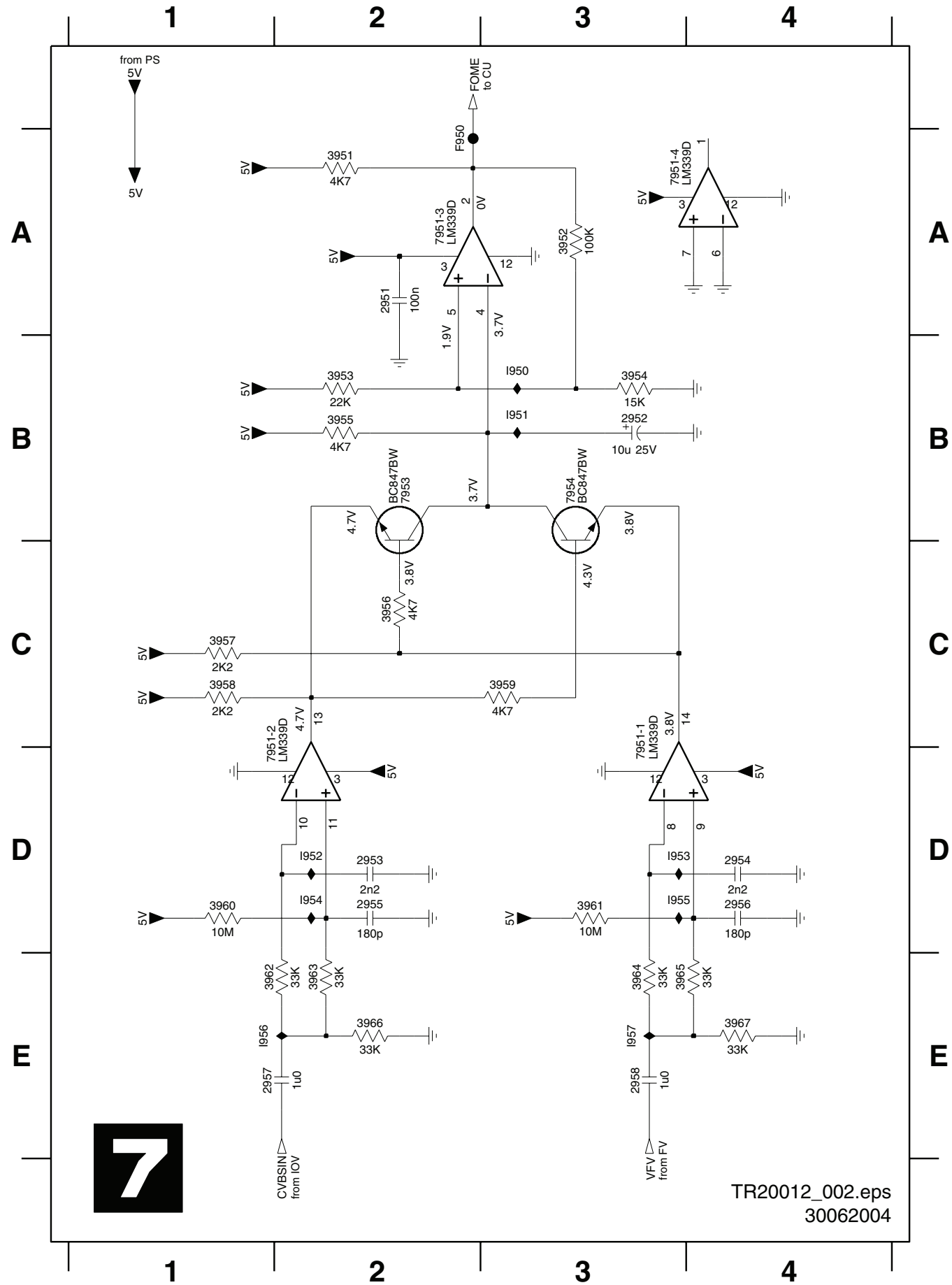
MOBO: Cinch Out (CINCH)

1944-A C5	2801 A9	2808 A6	2820 B3	2826 D8	2832 E3	3802 B8	3809 D2	3816 E7	5803 E3	6805 D3	7804 E3	F2204 D4	F815 D8	I808 B6	I815 C7	I823 E9	I829 A5
1944-B A10	2802 A9	2809 A7	2821 B7	2827 D7	2833 E7	3803 B8	3810 D6	4807 A5	6800 B8	6806 D4	F2102 D9	F2209 A9	I801 A5	I809 B7	I816 C1	I824 E7	
1944-C B5	2803 A9	2812 A3	2822 C1	2828 E1	2834 E10	3804 C7	3811 E2	4808 A5	6801 B8	6807 E3	F2103 C8	F2210 B9	I802 A7	I810 B8	I818 D2	I825 E7	
1945 E5	2804 A10	2813 A7	2823 D2	2829 E10	2835 E7	3805 C2	3813 E1	5800 A6	6802 B9	7801 A6	F2104 C8	F2211 B9	I804 A6	I812 B6	I819 D6	I826 E9	
1948 C10	2805 A10	2816 B3	2824 D3	2830 E7	3800 A9	3807 C8	3814 E7	5801 D8	6803 C9	7802 D3	F2202 C4	F801 A6	I805 A7	I813 B7	I820 D7	I827 E7	
2800 A7	2806 A10	2817 B7	2825 D7	2831 E2	3801 A8	3808 D1	3815 E2	5802 C3	6804 C9	7803 D8	F2203 D4	F802 A9	I806 A8	I814 B8	I821 E1	I828 E2	



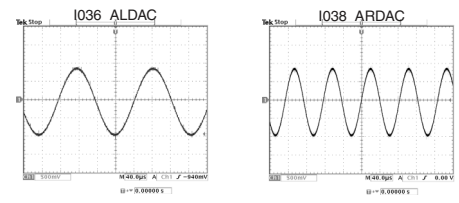
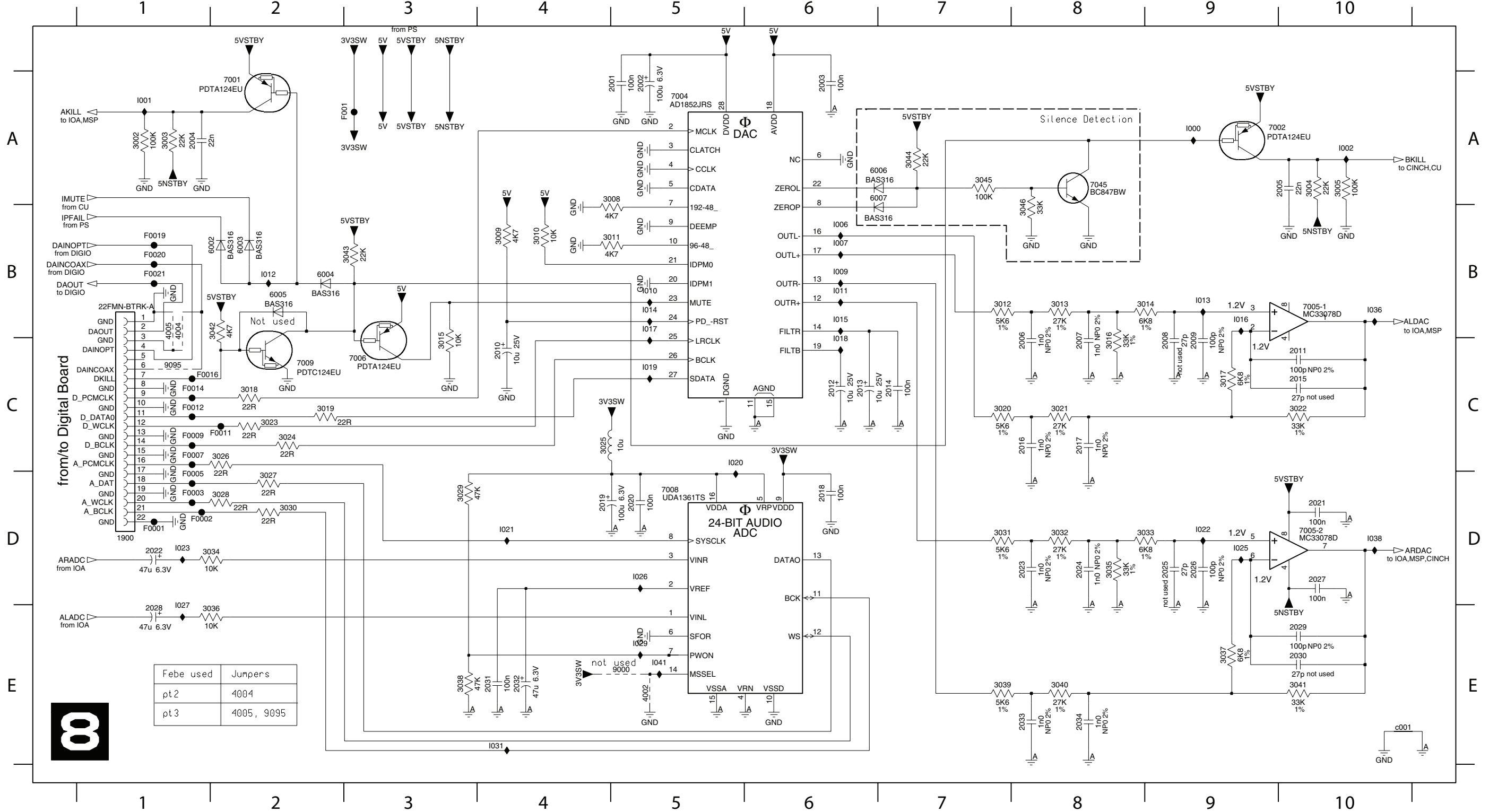
MOBO Board: Follow Me (FOME)

2951 A2	2956 D4	3953 B2	3958 C1	3963 E2	7951-1 D3	7954 B3	I953 D3
2952 B3	2957 E1	3954 B3	3959 C3	3964 E3	7951-2 D1	F950 A2	I954 D2
2953 D2	2958 E3	3955 B2	3960 D1	3965 E3	7951-3 A2	I950 B3	I955 D3
2954 D4	3951 A2	3956 C2	3961 D3	3966 E2	7951-4 A3	I951 B3	I956 E1
2955 D2	3952 A3	3957 C1	3962 E1	3967 E4	7953 B2	I952 D2	I957 E3

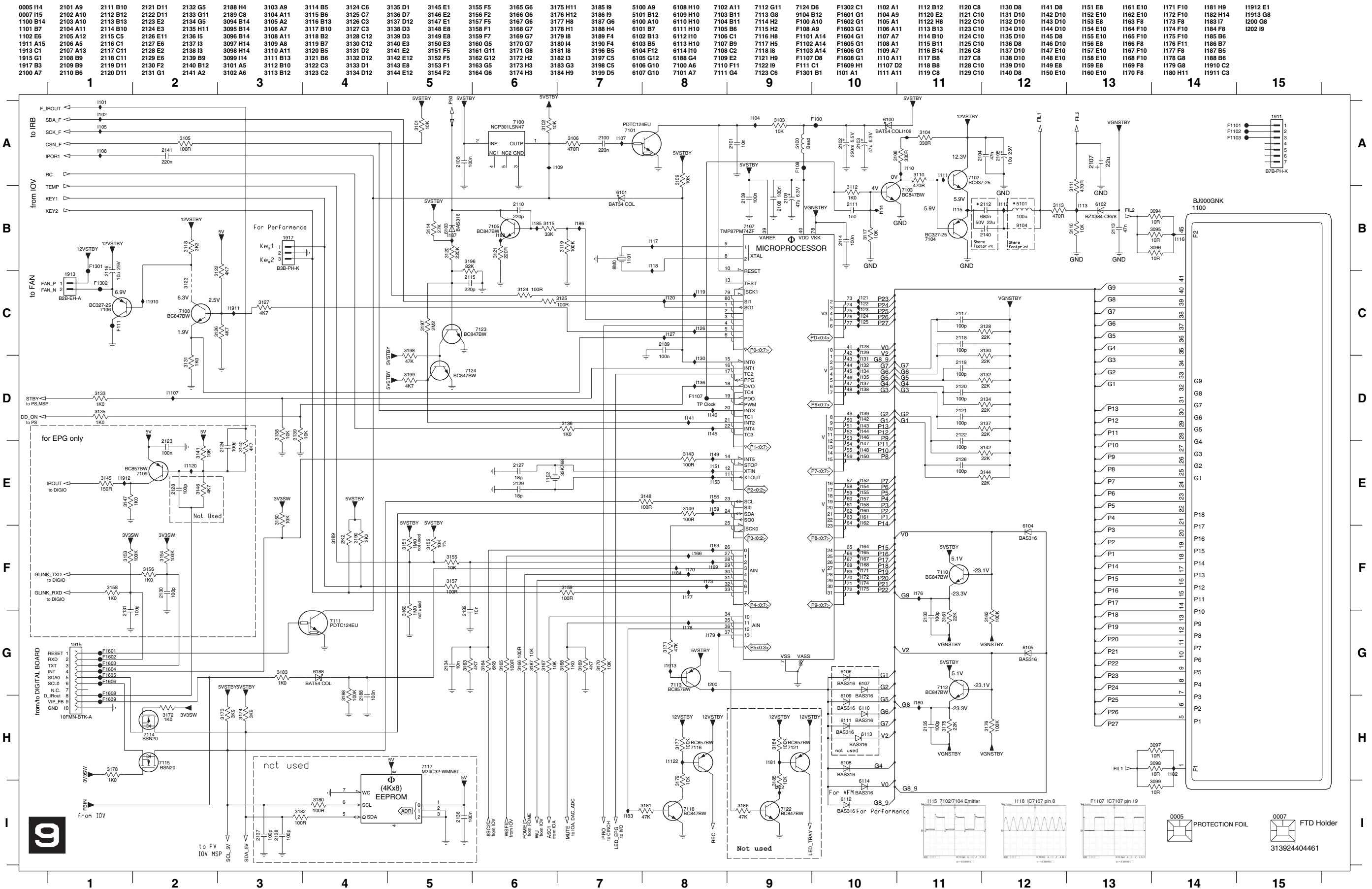


MOBO Board: Audio Converter (DAC_ADC)

1900 D1	2008 C9	2016 C8	2024 D8	2032 E4	3009 B4	3017 C9	3025 C4	3033 D9	3041 E10	4005 B1	7002 A9	9000 E5	F001 A3	I000 A9	I012 B2	I020 C5	I031 E4
2001 A5	2009 C9	2017 C8	2025 D9	2033 E8	3010 B4	3018 C2	3026 C2	3034 D2	3042 B2	6002 B2	7004 A5	9095 C1	F0011 C2	I001 A1	I013 B9	I021 D4	I036 B10
2002 A5	2010 C4	2018 D6	2026 D9	2034 E8	3011 B5	3019 C2	3027 D2	3035 D8	3043 B3	6003 B2	7005-1 B10	F0001 D1	F0012 C1	I002 A10	I014 B5	I022 D9	I038 D10
2003 A6	2011 C10	2019 D4	2027 D10	2035 A1	3012 B7	3020 C7	3028 D2	3036 E2	3044 A7	6004 B2	7005-2 D10	F0002 D1	F0014 C1	I006 B6	I015 B6	I023 D1	I041 E5
2004 A1	2012 C6	2020 D5	2028 E1	3003 A1	3013 B8	3021 C8	3029 D3	3037 E9	3045 A7	6005 B2	7006 C3	F0003 D1	F0016 C1	I007 B6	I016 B9	I025 D9	c001 E10
2005 A10	2013 C6	2021 D10	2029 E10	3004 A10	3014 B9	3022 C10	3030 D2	3038 E3	3046 B8	6006 A7	7008 D5	F0005 D1	F0019 B1	I009 B6	I017 B5	I026 D5	
2006 C8	2014 C7	2022 D1	2030 E10	3005 A10	3015 C3	3023 C2	3031 D7	3039 E7	4002 E5	6007 A7	7009 C2	F0007 C1	F0020 B1	I010 B5	I018 C6	I027 E1	
2007 C8	2015 C10	2023 D8	2031 E4	3008 A5	3016 C8	3024 C2	3032 D8	3040 E8	4004 B1	7001 A2	7045 A8	F0009 C1	F0021 B1	I011 B6	I019 C5	I029 E5	



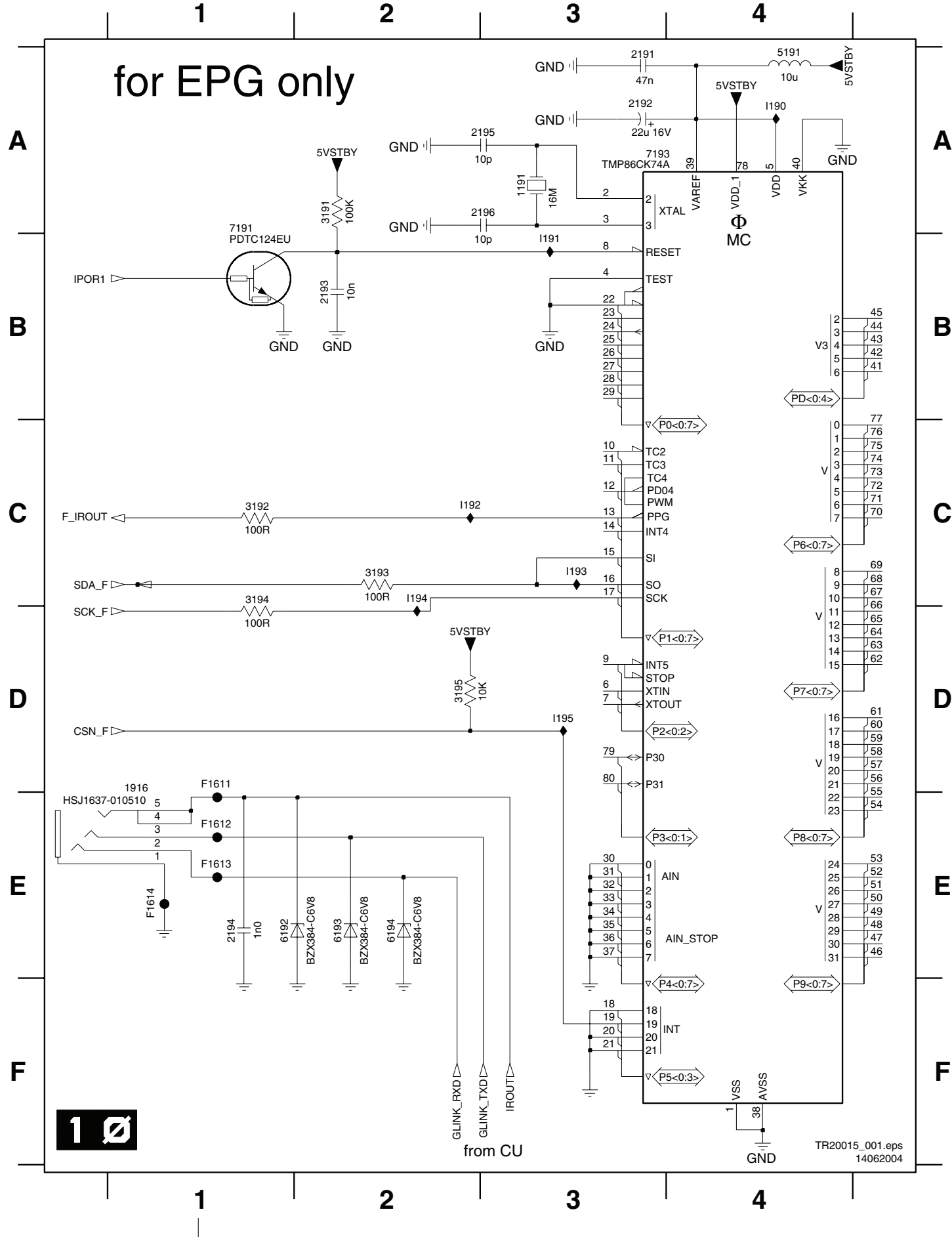
MOBO Board: Control Unit (CU)



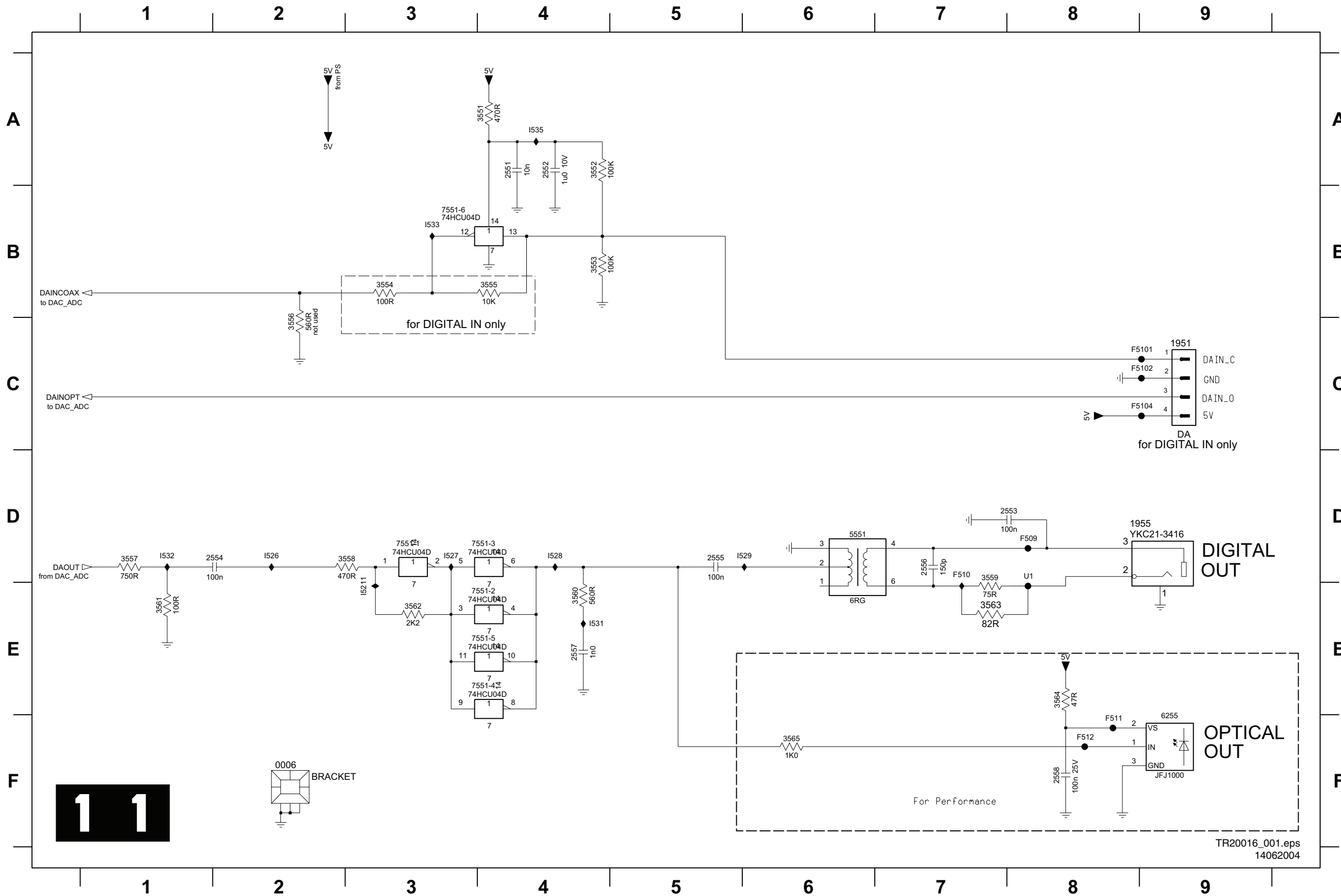
PROTECTION FOIL
FTD Holder
313924404461

MOBO Board: IR Blaster (IRB)

1191 A3	2192 A3	2195 A3	3192 C1	3195 D2	6193 E2	7193 A4	F1613 E1	I191 B3	I194 C2
1916 D1	2193 B2	2196 A3	3193 C2	5191 A4	6194 E2	F1611 D1	F1614 E1	I192 C2	I195 D3
2191 A3	2194 E1	3191 A2	3194 C1	6192 E1	7191 A1	F1612 E1	I190 A4	I193 C3	

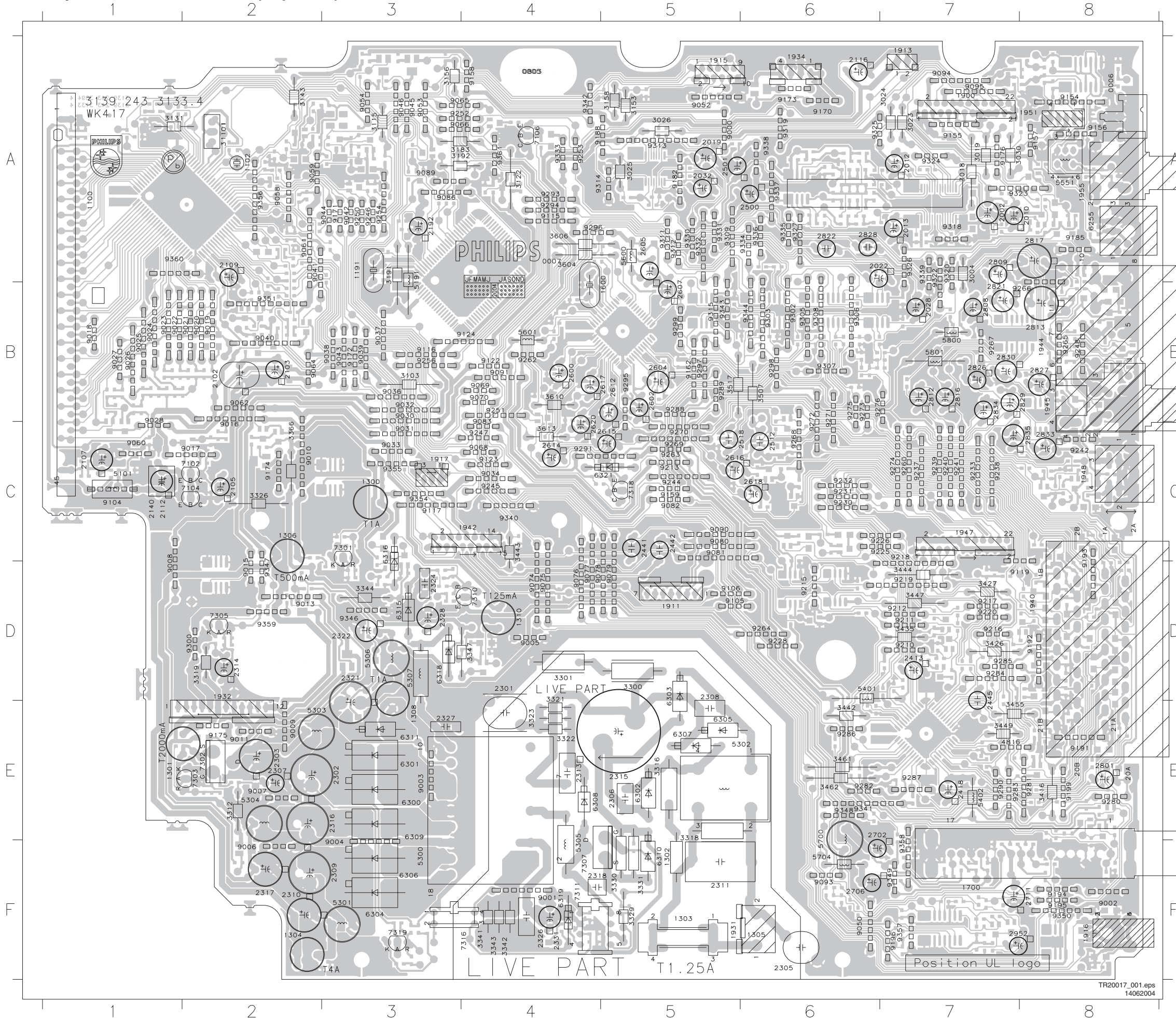


MOBO Board: Digital In/Out 1 (DIGIO 1)



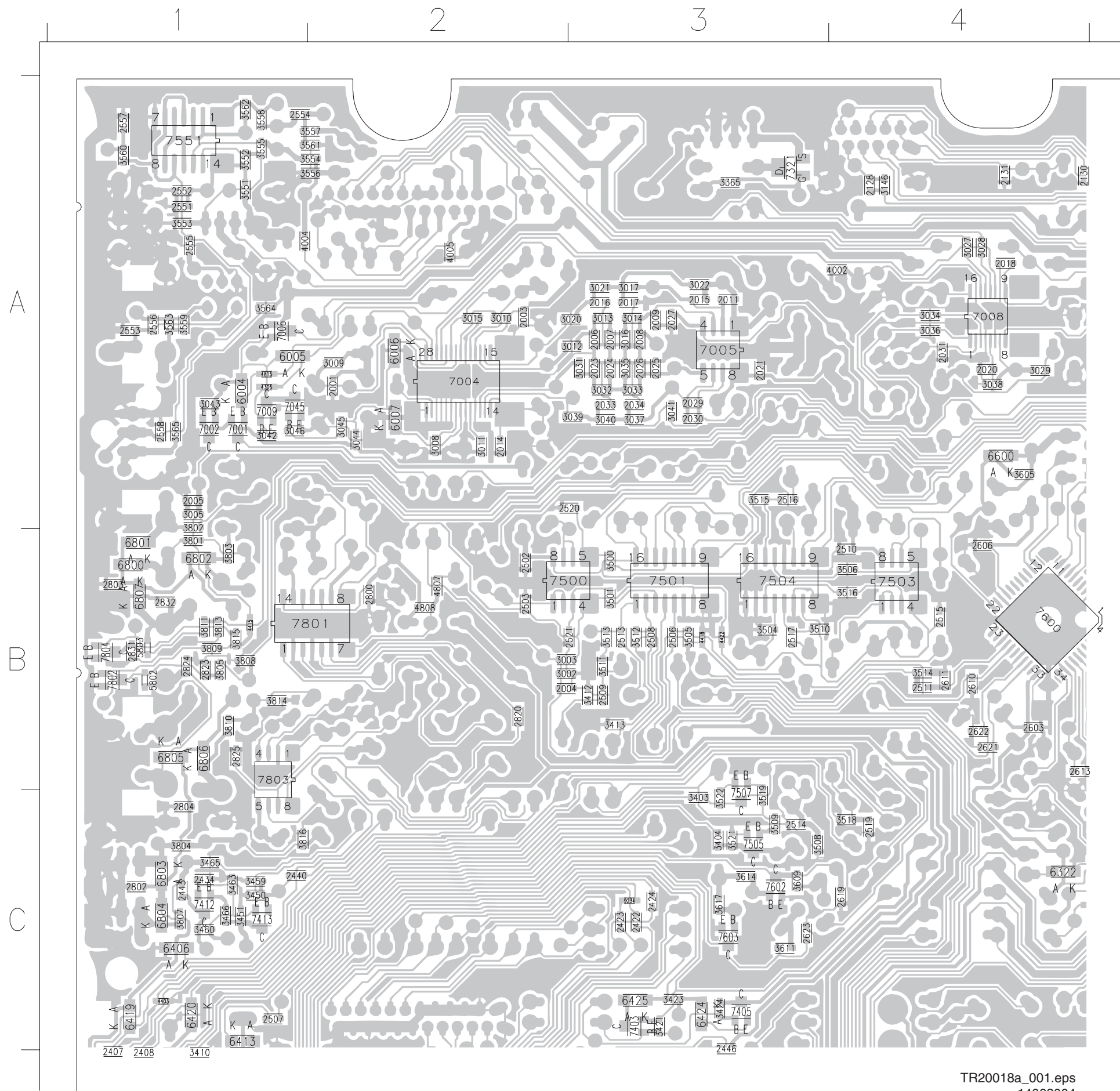
- U1 D8
- 0006 F2
- 1951 C9
- 1955 D8
- 2551 A4
- 2552 A4
- 2553 D8
- 2554 D2
- 2555 D5
- 2556 D7
- 2557 E4
- 2558 F8
- 3551 A4
- 3552 A4
- 3553 B4
- 3554 B3
- 3555 B4
- 3556 C2
- 3557 D1
- 3558 D3
- 3559 D7
- 3560 E4
- 3561 E1
- 3562 E3
- 3563 E7
- 3564 E8
- 3565 F6
- 5551 D6
- 6255 F9
- 7551-1 D3
- 7551-2 E4
- 7551-3 D4
- 7551-4 E4
- 7551-5 E4
- 7551-6 B3
- F509 D8
- F510 D7
- F5101 C9
- F5102 C9
- F5104 C9
- F511 F8
- F512 F8
- I5211 E3
- I526 D2
- I527 D3
- I528 D4
- I529 D6
- I531 E4
- I532 D1
- I533 B3
- I535 A4

Layout: MOBO - Main Part (Top View)

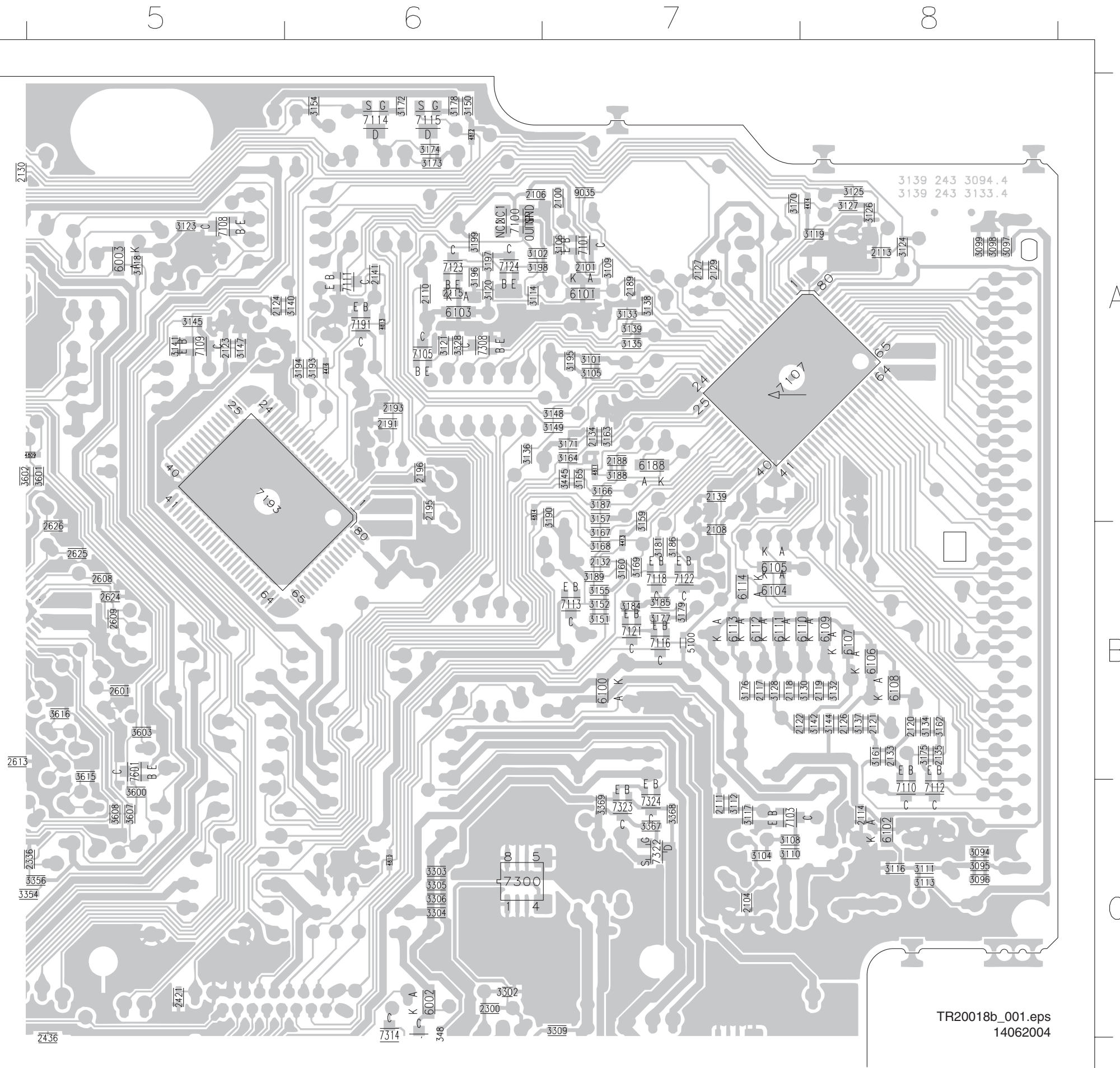


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0006	A8	3131	A1	9036	B3	9281	E8
0007	A4	3143	A2	9037	B3	9282	E6
0803	A4	3153	A5	9038	B3	9283	E7
1100	A1	3156	A3	9039	B3	9284	D7
1101	A2	3158	A5	9040	B2	9285	D7
1102	A2	3183	A3	9041	A2	9286	E6
1191	A3	3191	A3	9042	A3	9287	E7
1300	C3	3192	A3	9043	B3	9288	B5
1301	E1	3300	D5	9044	A3	9289	B5
1302	F5	3301	D4	9045	A3	9290	E7
1303	F5	3312	E2	9046	A3	9291	C4
1304	F2	3316	E5	9050	F6	9293	A4
1305	F6	3318	E5	9052	A5	9294	A4
1306	C2	3319	D2	9053	A3	9295	B5
1308	E3	3321	D4	9054	A3	9296	A4
1310	D4	3322	E4	9058	A2	9297	B5
1600	B5	3323	E4	9059	A2	9298	B6
1700	F7	3326	C2	9060	C1	9299	B5
1900	A7	3329	F5	9061	A2	9300	D2
1911	D5	3330	F5	9062	B2	9302	B6
1913	A7	3331	F5	9063	B2	9303	B6
1915	A5	3341	F4	9065	A3	9305	B6
1916	B8	3342	F4	9066	A3	9306	B6
1917	C3	3343	F4	9068	C4	9307	B6
1931	F5	3344	D3	9069	B4	9308	B6
1932	D2	3347	D4	9070	B4	9309	A5
1934	A6	3366	C2	9074	D4	9311	A5
1940	D8	3416	E8	9075	D4	9312	A5
1942	C4	3426	D7	9076	D4	9313	A5
1944	B8	3427	D7	9077	D4	9314	A4
1945	B8	3435	D7	9079	D4	9315	B5
1947	C7	3442	E6	9079	D5	9318	A7
1948	C8	3443	C4	9080	C5	9319	A6
1951	A8	3444	D7	9081	C5	9320	A7
1955	A8	3447	D7	9082	C5	9322	A7
2002	A7	3449	E7	9083	B4	9323	A7
2010	A8	3455	E7	9086	A3	9324	A7
2012	A7	3461	E6	9089	A3	9325	A6
2013	A7	3462	E6	9090	C5	9326	A7
2017	B5	3507	B6	9091	B5	9327	A6
2022	A6	3517	B5	9093	F6	9330	A5
2028	B7	3604	A4	9094	A7	9331	A5
2032	A5	3606	A4	9095	A7	9332	A5
2102	B2	3610	B4	9104	C1	9333	A4
2103	B2	3613	C4	9105	D5	9334	A6
2105	C2	4816	E7	9106	D5	9335	A6
2107	C1	5101	C1	9115	A4	9336	A6
2109	B2	5191	A3	9116	A3	9337	A6
2112	C1	5300	F3	9117	C3	9338	A6
2116	A6	5301	F3	9119	D8	9339	A7
2140	C1	5302	E6	9122	B4	9340	C4
2192	A3	5303	E2	9123	C4	9341	E6
2301	D4	5304	E2	9124	B4	9342	A4
2302	E3	5305	F4	9154	A8	9343	B5
2303	E2	5306	D3	9155	A7	9344	B6
2306	E5	5307	D3	9157	A6	9346	D3
2306	E5	5401	D6	9157	A8	9347	D2
2307	E2	5402	E7	9158	A4	9348	E6
2308	D5	5551	A8	9159	C5	9349	F7
2309	F3	5600	A5	9162	B5	9350	F8
2310	F2	5601	B4	9170	A6	9351	B2
2311	F5	5700	E6	9171	A3	9354	C3
2313	F4	5704	F6	9172	B3	9355	C3
2314	D2	5800	B7	9173	A6	9356	A2
2315	E5	5801	B7	9174	C2	9357	F7
2316	E3	6255	A8	9175	E2	9358	F7
2317	F2	6300	E3	9176	A7	9359	D2
2318	F4	6301	E3	9182	A5	9360	A1
2321	D3	6302	E5	9185	A8	9361	A4
2322	D3	6303	D5	9188	A4		
2324	D3	6304	F3	9191	E8		
2325	F4	6305	E4	9192	D8		
2327	E3	6306	F3	9193	C8		
2328	D3	6307	E5	9194	F8		
2331	F4	6308	E4	9195	F8		
2413	D7	6309	E3	9196	F7		
2418	E7	6310	F5	9199	E8		
2441	C5	6311	E3	9210	D7		
2442	C5	6313	D3	9211	D7		
2443	D7	6316	C3	9212	D7		
2500	A6	6318	D3	9213	C5		
2501	A5	6319	F4	9215	D6		
2512	C6	6321	C5	9216	D7		
2518	C6	7102	C2	9217	D7		
2600	B4	7104	C2	9218	C7		
2602	B5	7106	A4	9219	D7		
2604	B5	7301	C3	9220	D7		
2605	A5	7302	E2	9225	C7		
2607	B5	7303	E2	9226	C7		
2612	B5	7305	D2	9228	D6		
2614	C4	7307	F4	9230	C6		
2615	C5	7310	D4	9231	C6		
2616	C5	7311	F4	9232	C6		
2617	B5	7316	F4	9233	C7		
2618	C6	7318	C5	9237	C7		
2620	C4	7319	F3	9238	C7		
2702	E6	9000	A5	9239	C7		
2706	F6	9001	F4	9240	C7		
2711	F8	9002	F8	9241	C7		
2801	E8	9003	E3	9242	C8		
2808	B7	9004	F3	9244	C5		
2809	A7	9005	D4	9245	C4		
2812	B7	9006	F2	9246	A3		
2813	F7	9025	B7	9247	C4		
2816	B7	9008	D1	9248	B8		
2817	A8	9009	E2	9250	A3		
2821	B7	9010	C2	9251	B4		
2822	A6	9011	E2	9252	A3		
2826	B7	9013	D2	9253	A4		
2827	B8	9015	D2	9254	A3		
2828	A6	9016	C2	9256	B3		
2829	B8	9017	C2	9260	C7		
2830	B7	9018	B1	9262	B4		
2833	C8	9019	B2	9263	C5		
2834	B7	9020	B2	9264	D6		
2835	C8	9021	B2	9265	B8		
2952	F7	9022	B1	9266	B8		
3004	A7	9023	B1	9267	B7		
3018	A7	9024	B1	9268	C6		
3019	A7	9025	B1	9269	C5		
3023	A7	9026	B1	9270	C5		
3024	A7	9027	B1	9271	B6		
3025	A5	9028	B1	9272	C6		
3026	A5	9030	B3	9273	B6		
3030	A7	9031	C3	9274	C7		
3103	B3	9032	B3	9275	B6		
3115	A3	9033	C3	9276	B6		

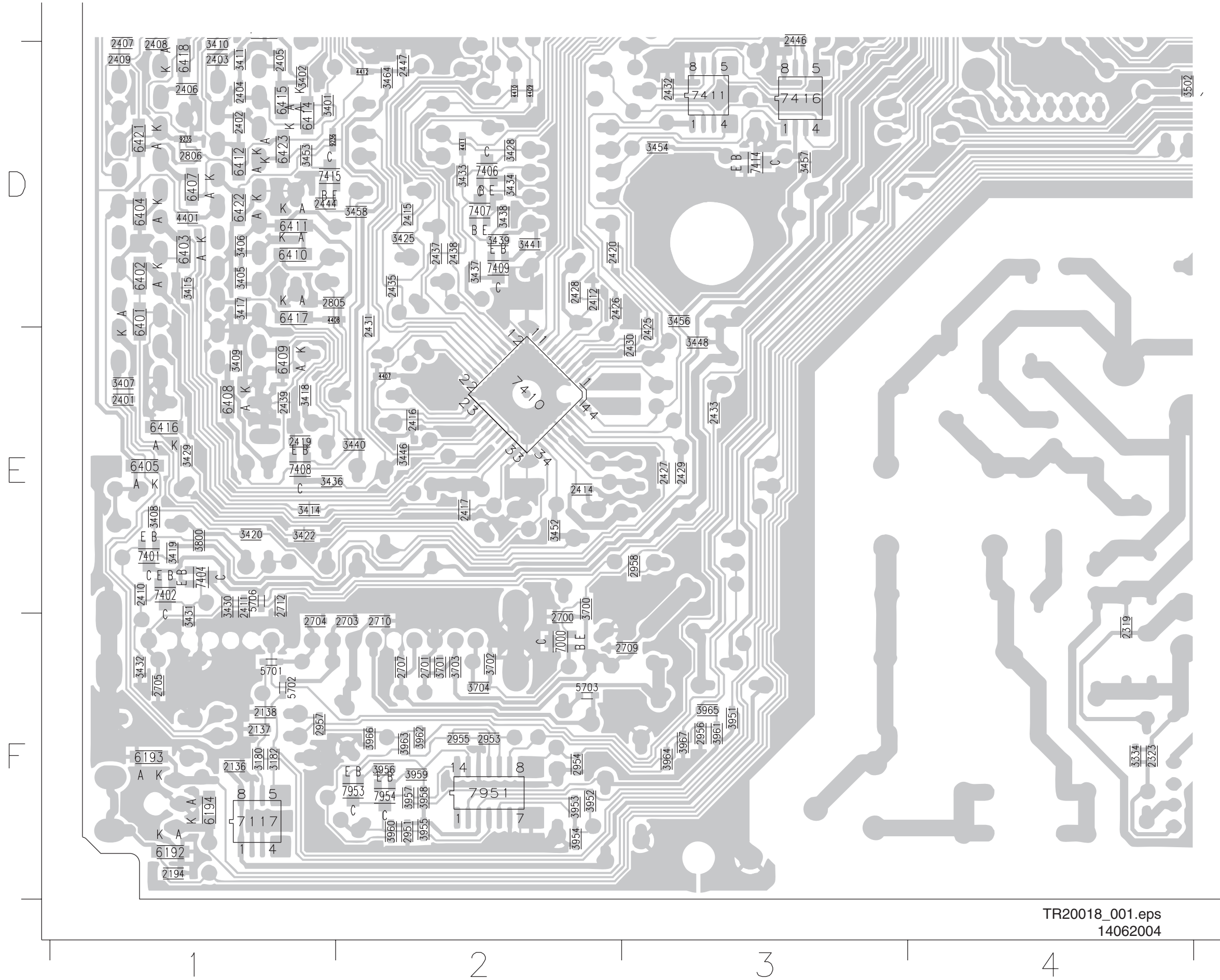
Layout: MOBO - Main Part (Bottom View) Part 1



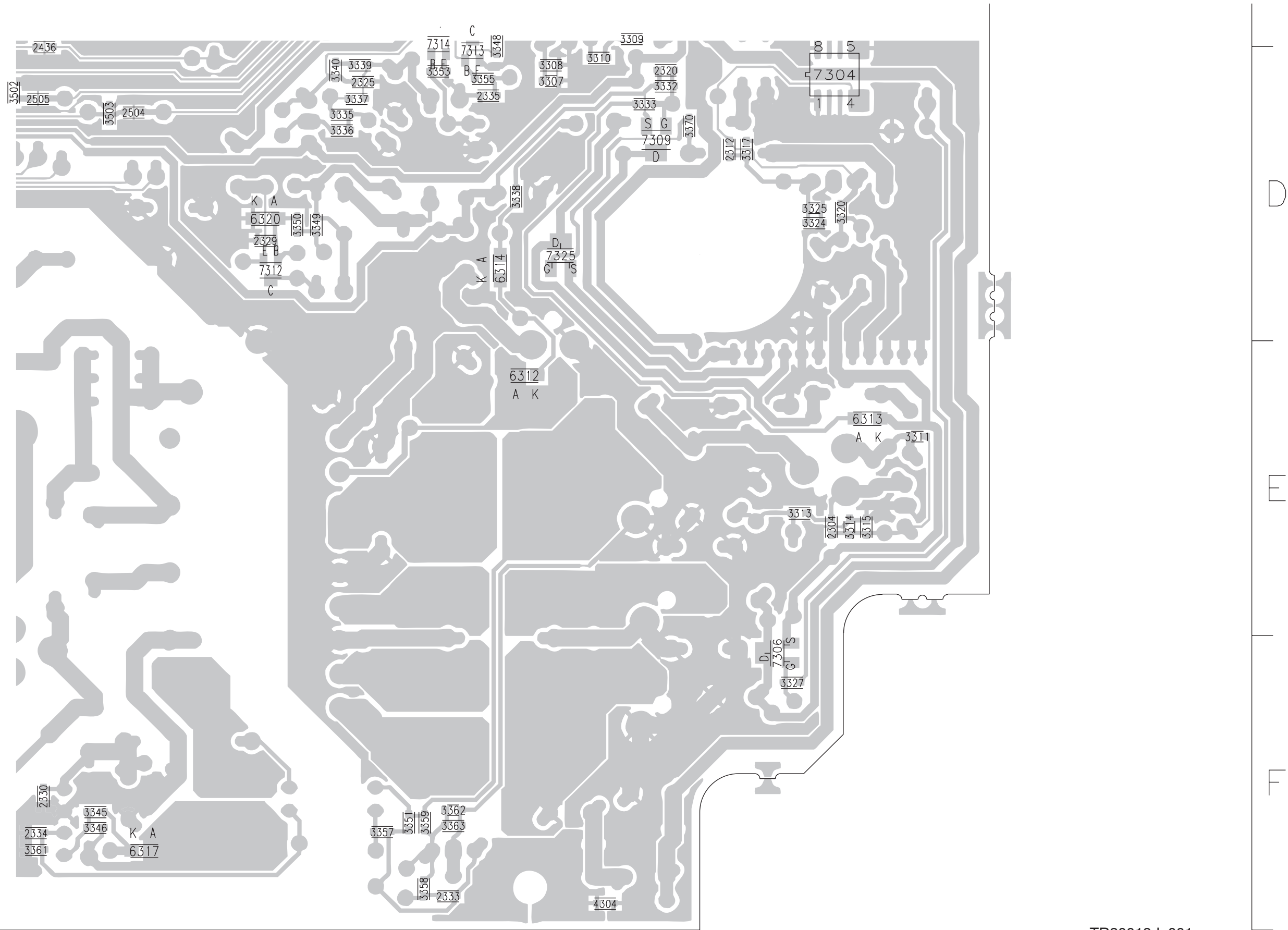
Layout: MOBO - Main Part (Bottom View) Part 2



Layout: MOBO - Main Part (Bottom View) Part 3

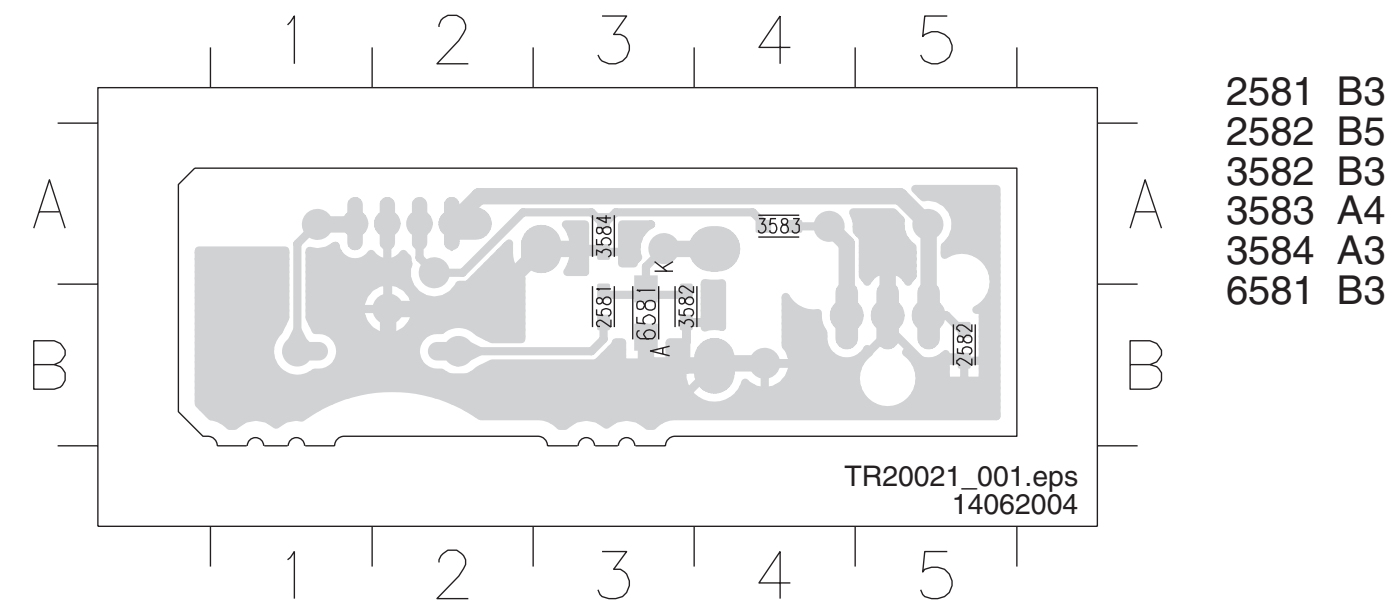
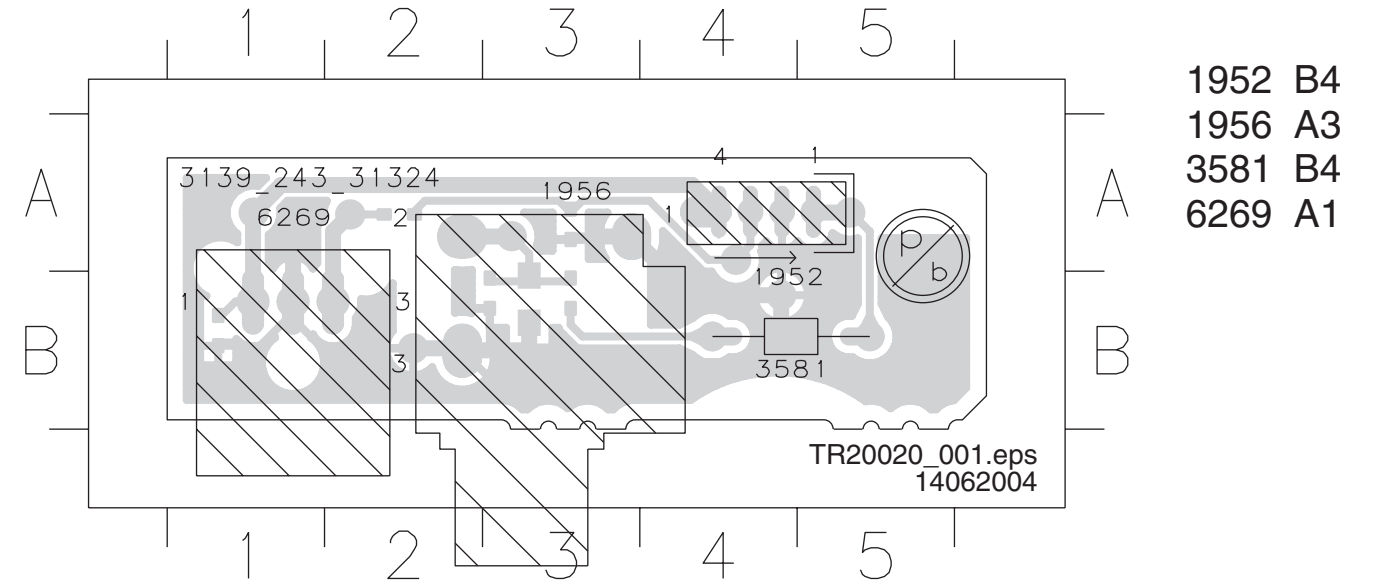
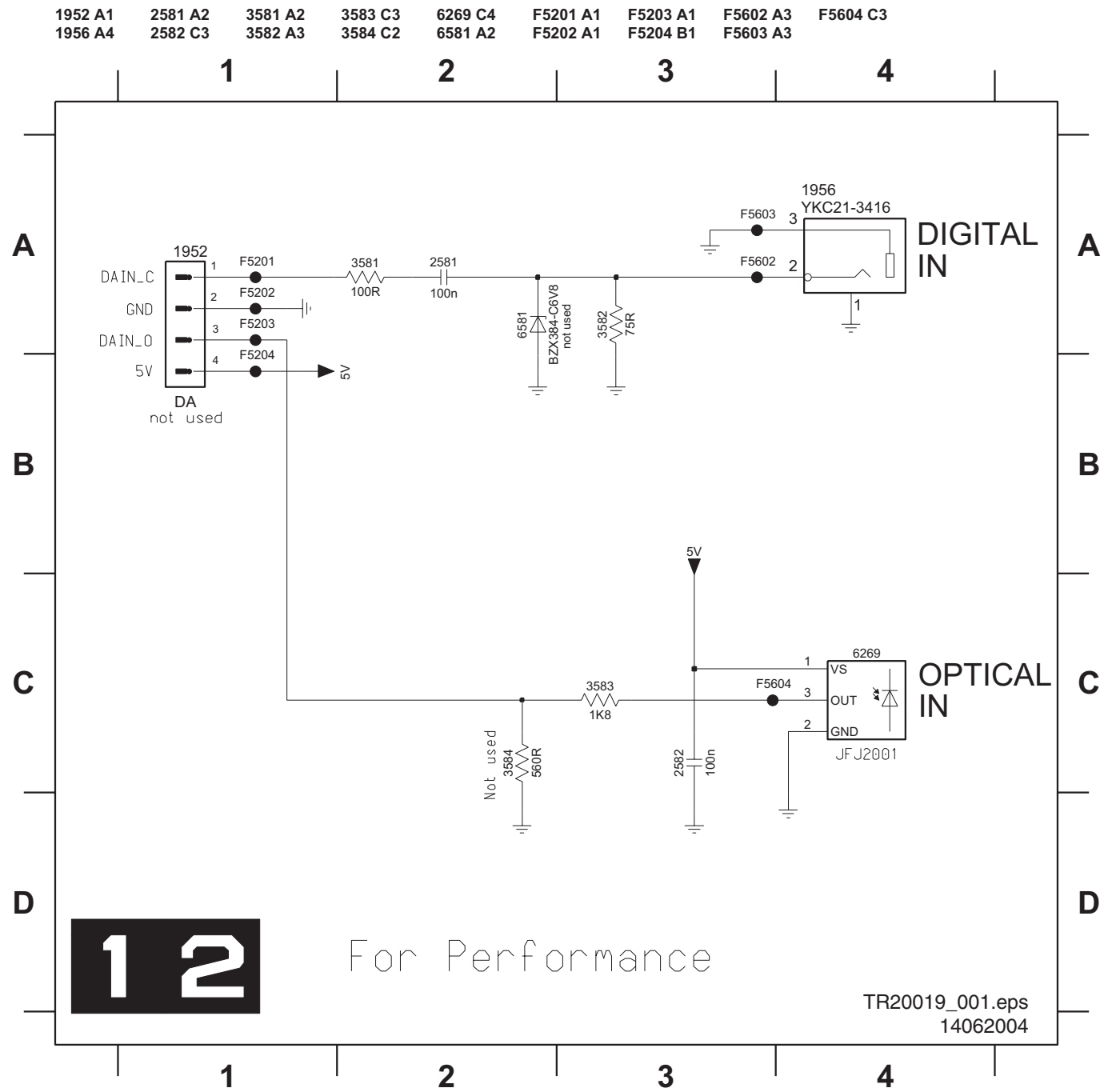


Layout: MOBO - Main Part (Bottom View) Part 4

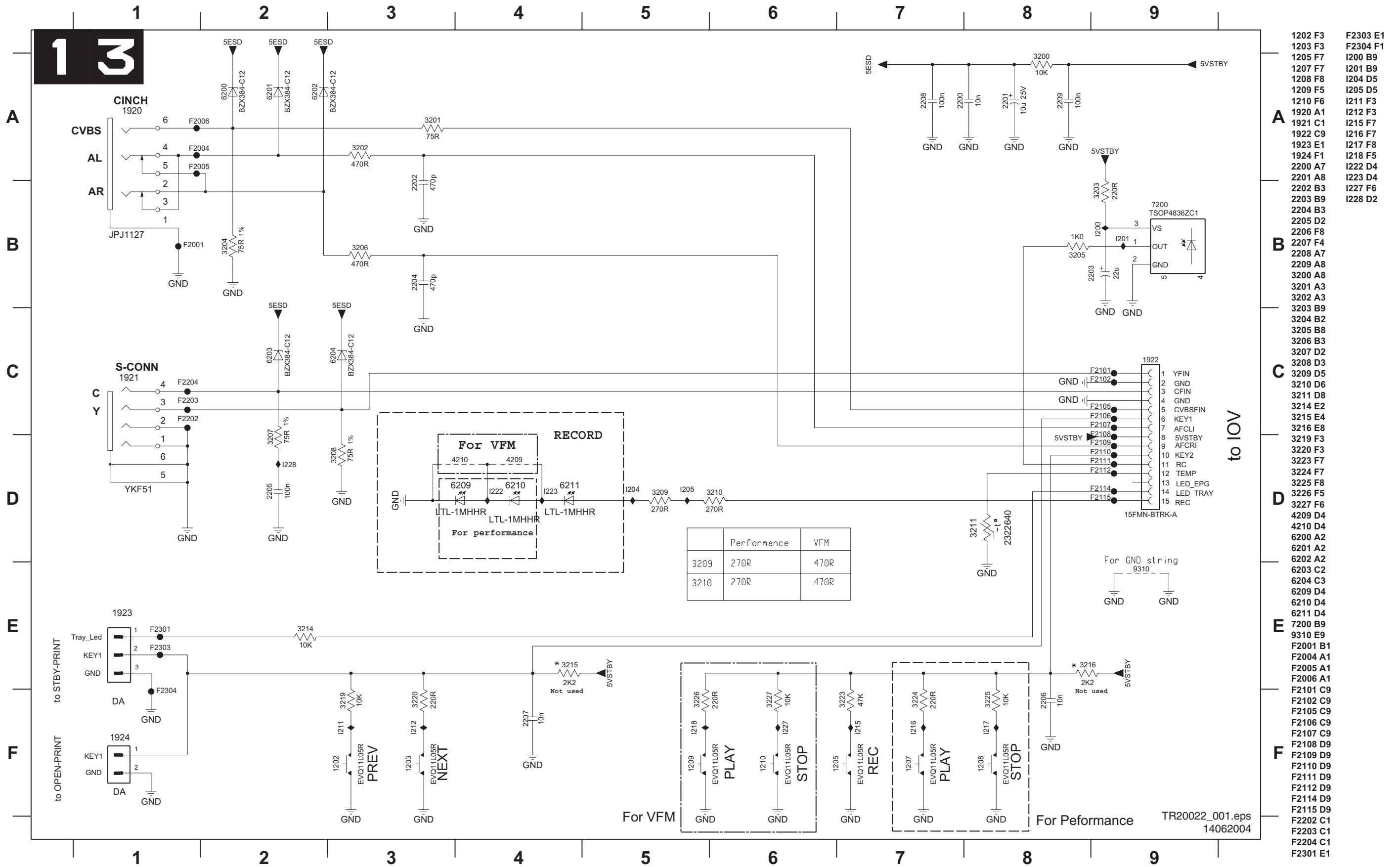


MOBO : Digital In/Out 2 (DIGIO 2)

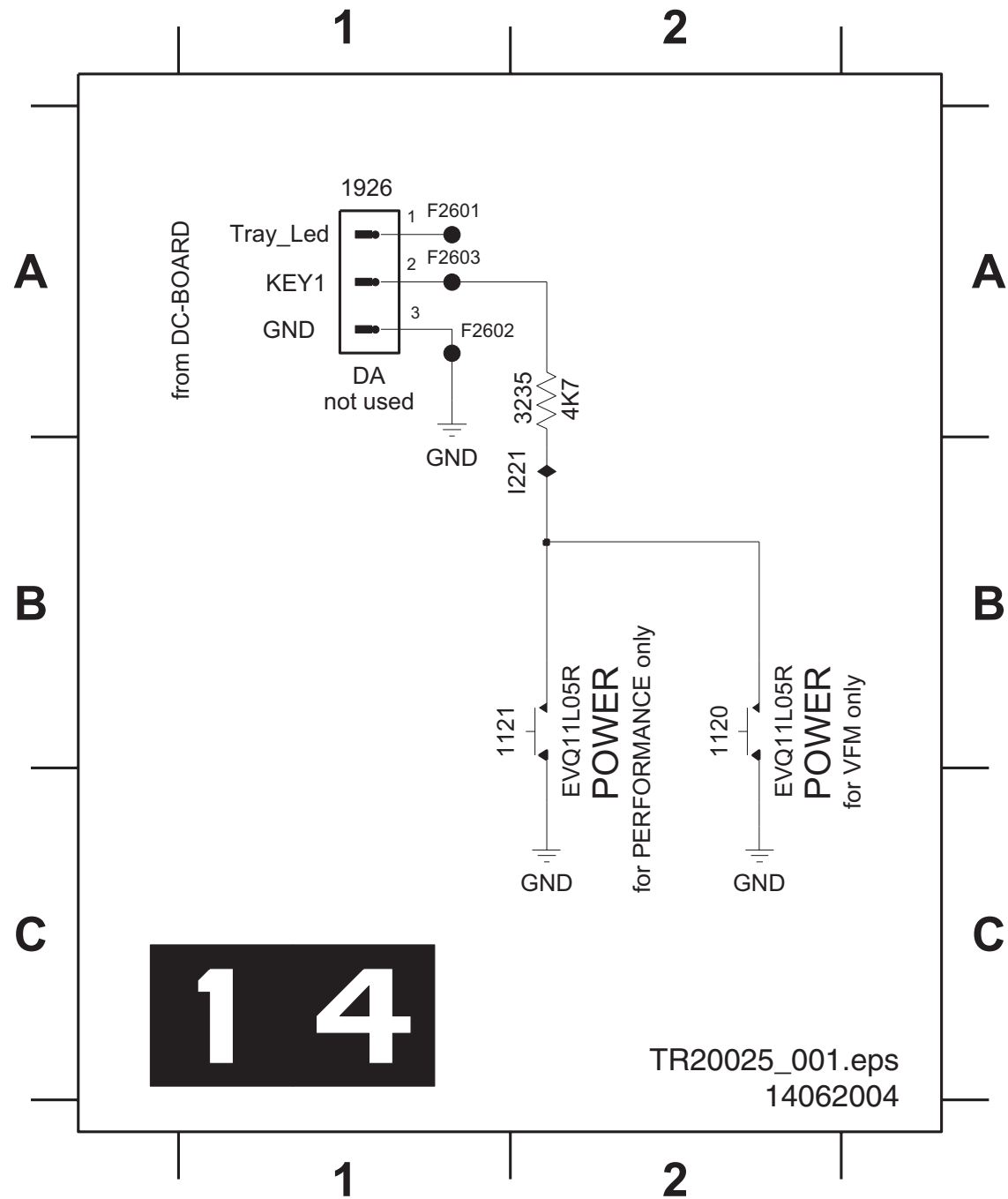
Layout: MOBO - Digital In/Out 2 Part



MOBO Keyboard (KEY)

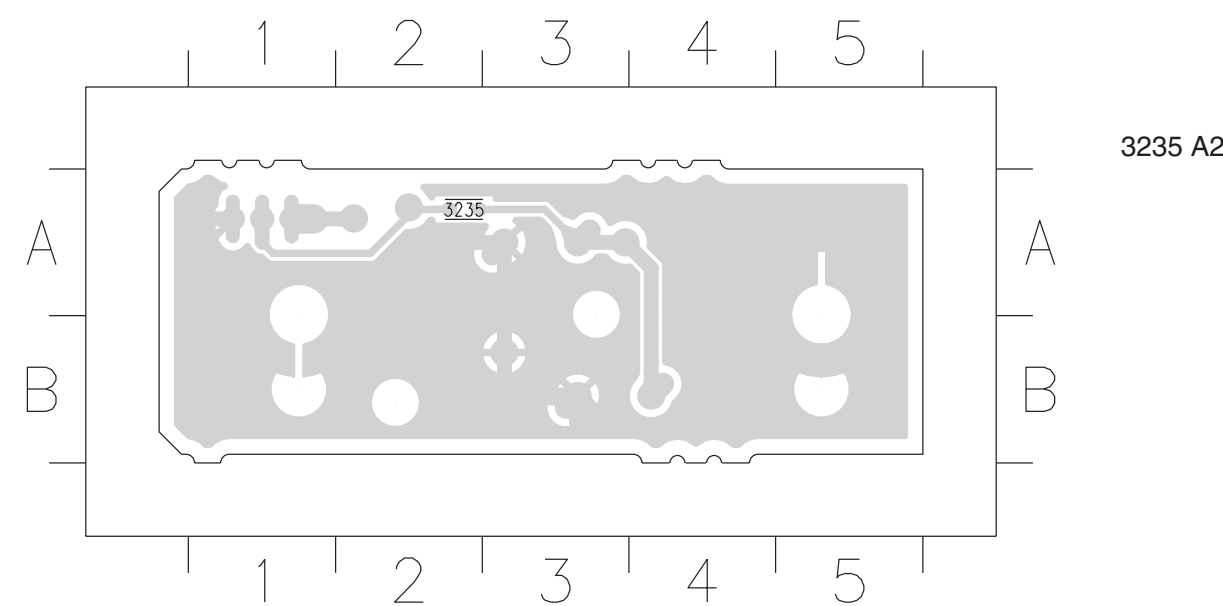
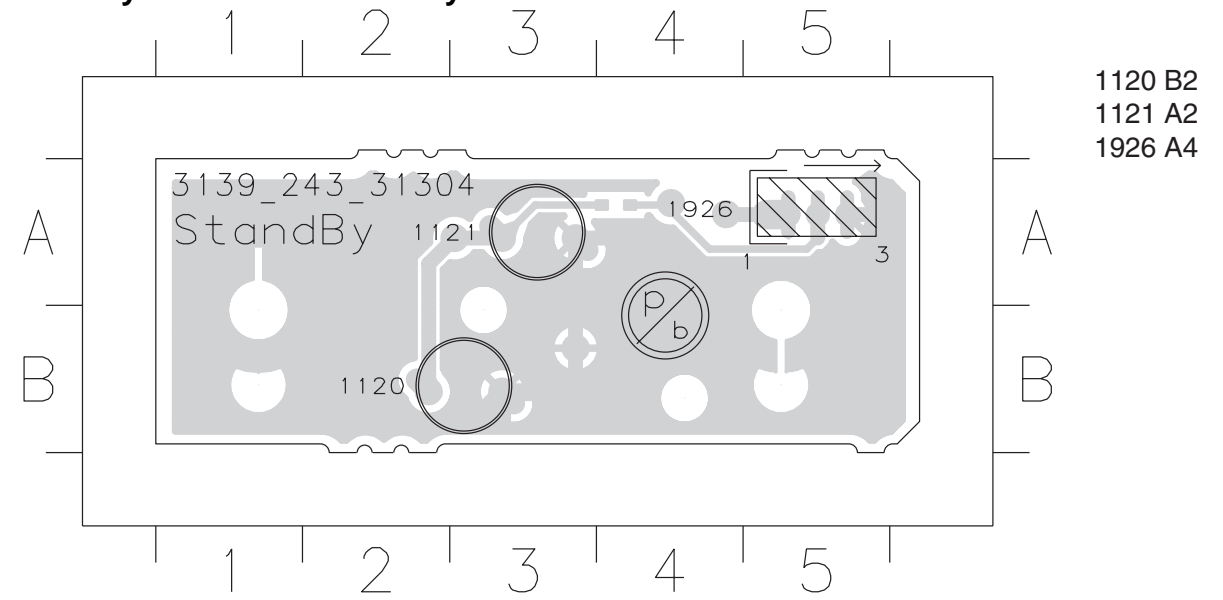


MOBO: Stand-by(STBY)



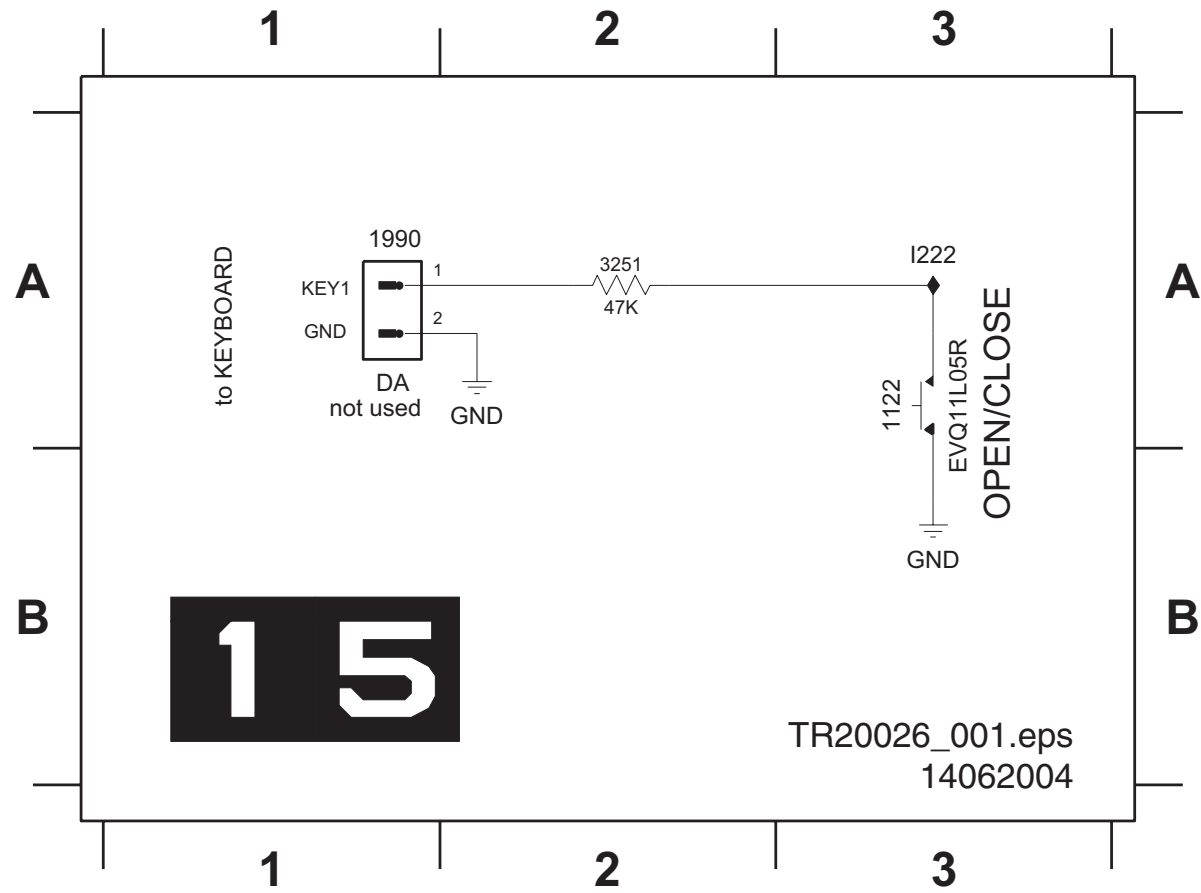
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14062004

Layout: MOBO - Standby Part



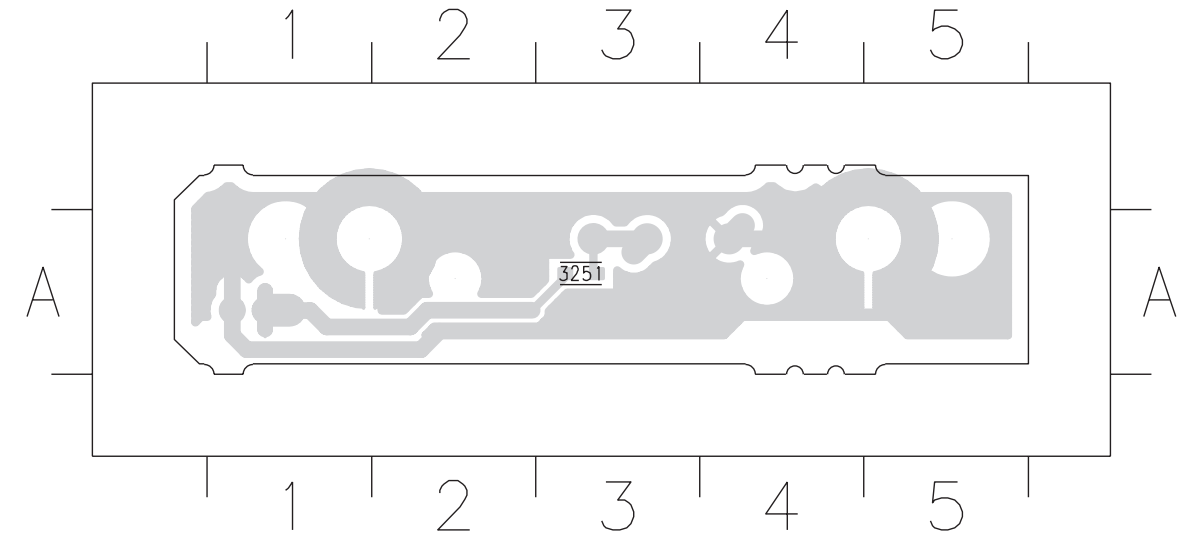
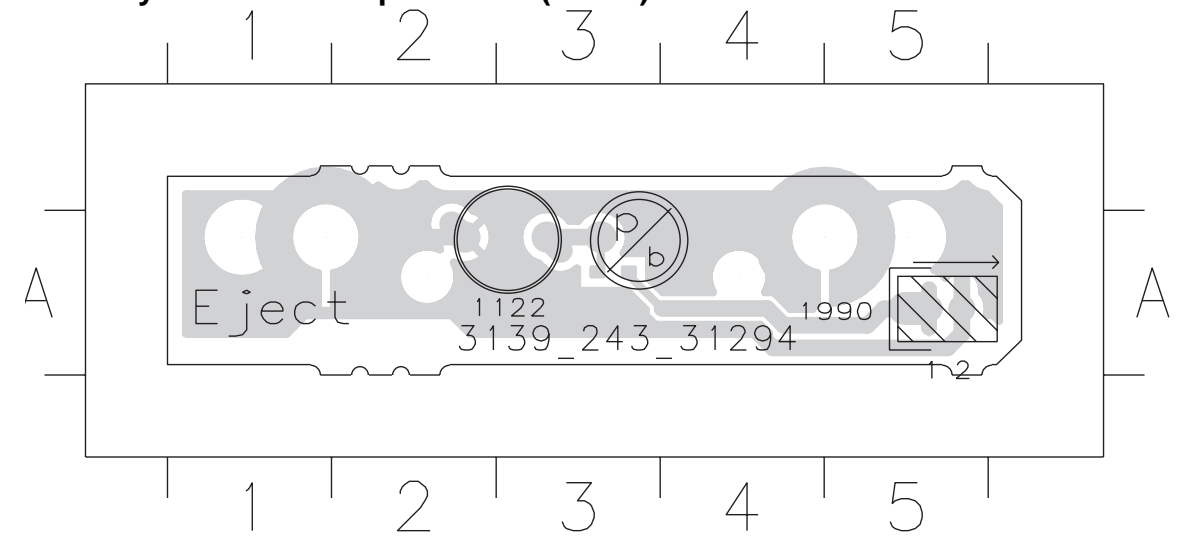
TR20053_001.eps
30062004

MOBO: Open/Close (OPCL)



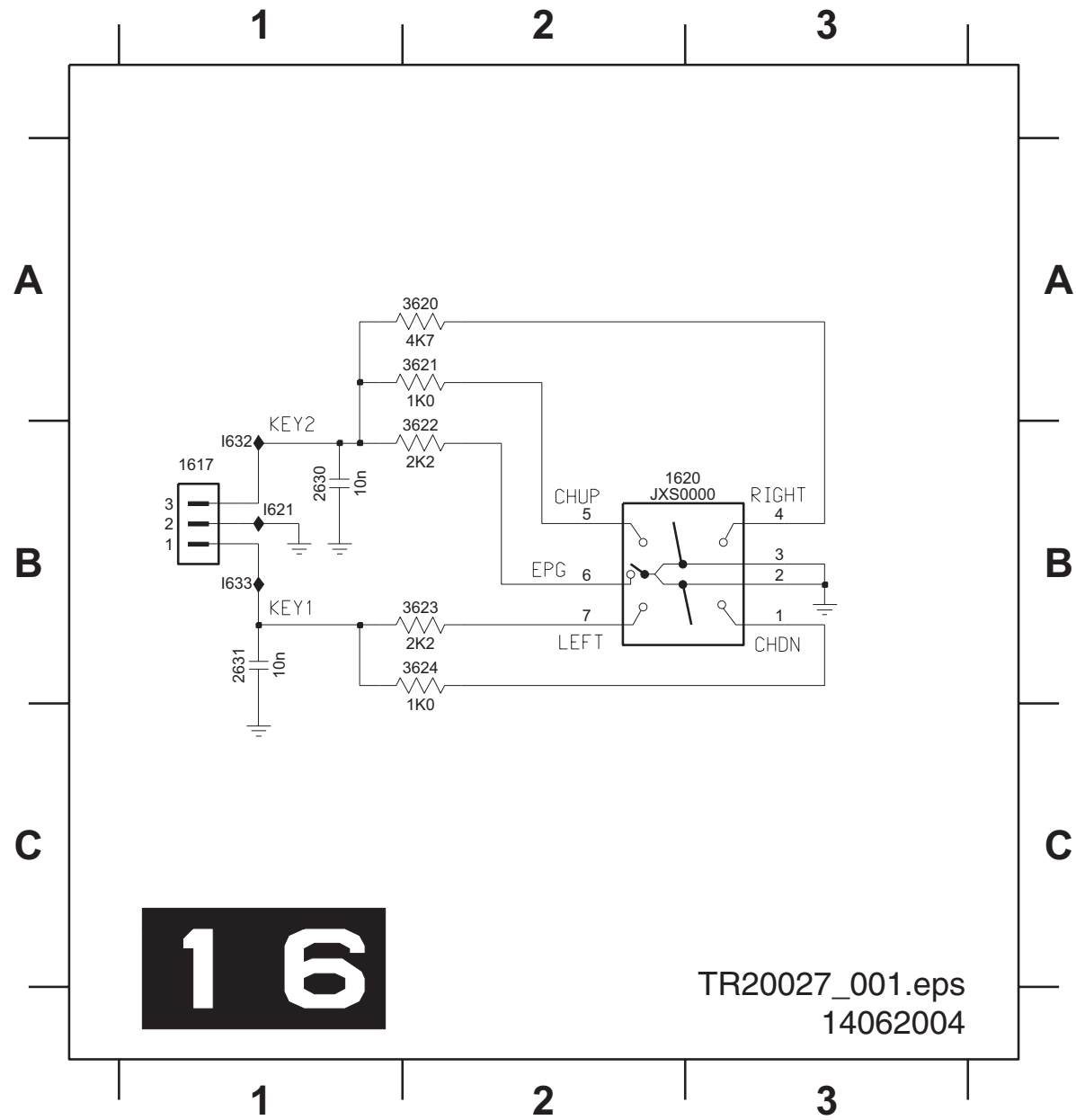
1122 A
1990 A
3251 A
I222 A:

Layout: MOBO - Open/Close (OPCL)



TR20054_001.eps
30062004

MOBO: 5-Way Switch (5WSW)

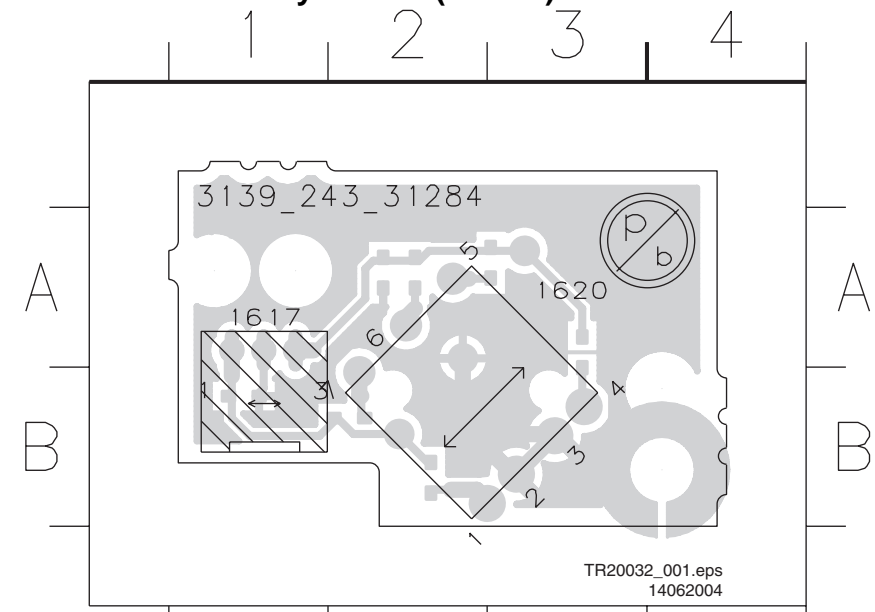


16

TR20027_001.eps
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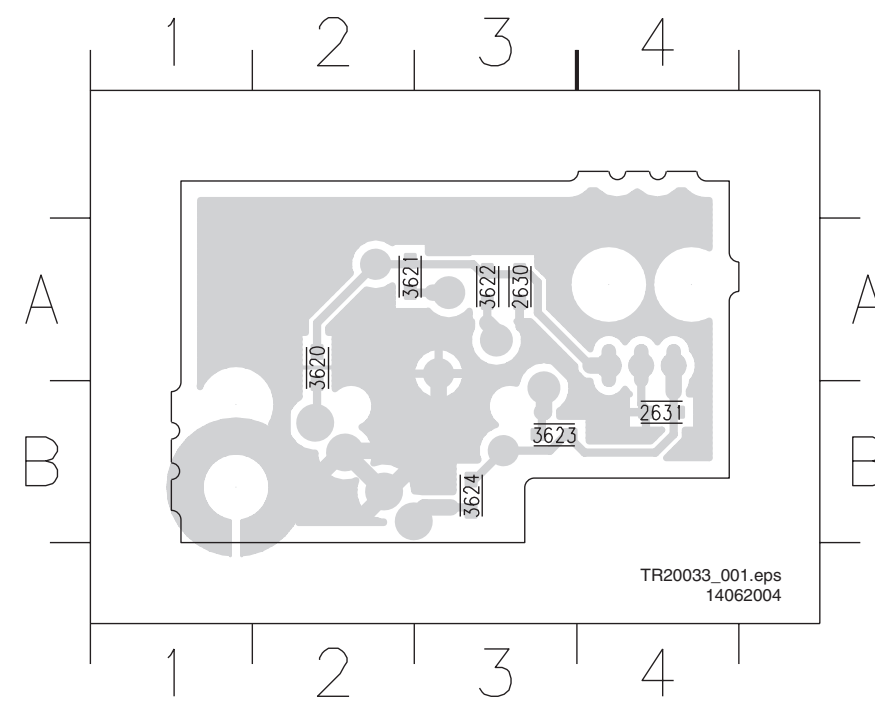
- 1617 B1
- 1620 B2
- 2630 B1
- 2631 B1
- 3620 A2
- 3621 A2
- 3622 B2
- 3623 B2
- 3624 B2
- I621 B1
- I632 B1
- I633 B1

MOBO: 5-Way Switch (5WSW)



TR20032_001.eps
14062004

- 1617 A1
- 1620 A3

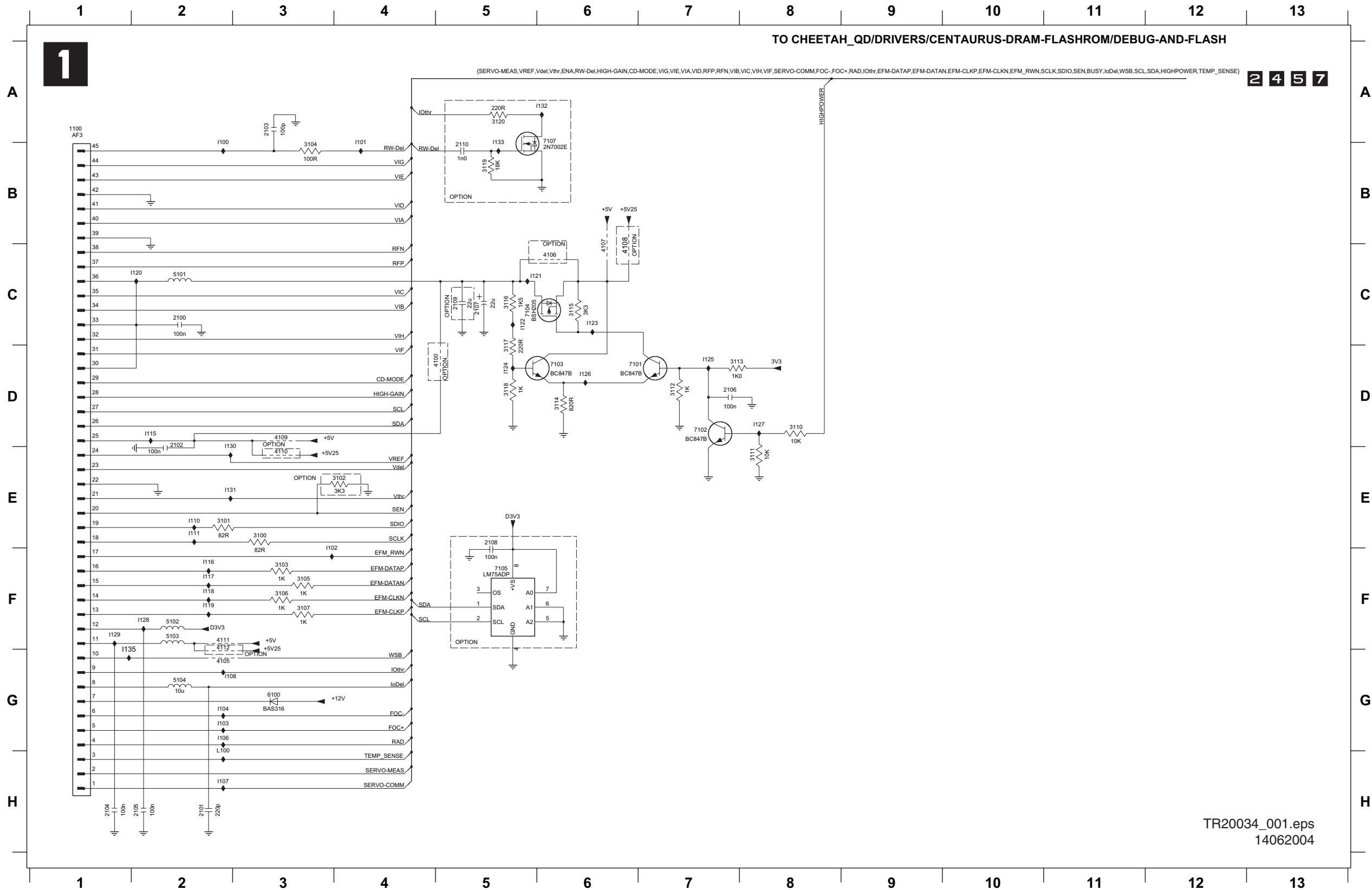


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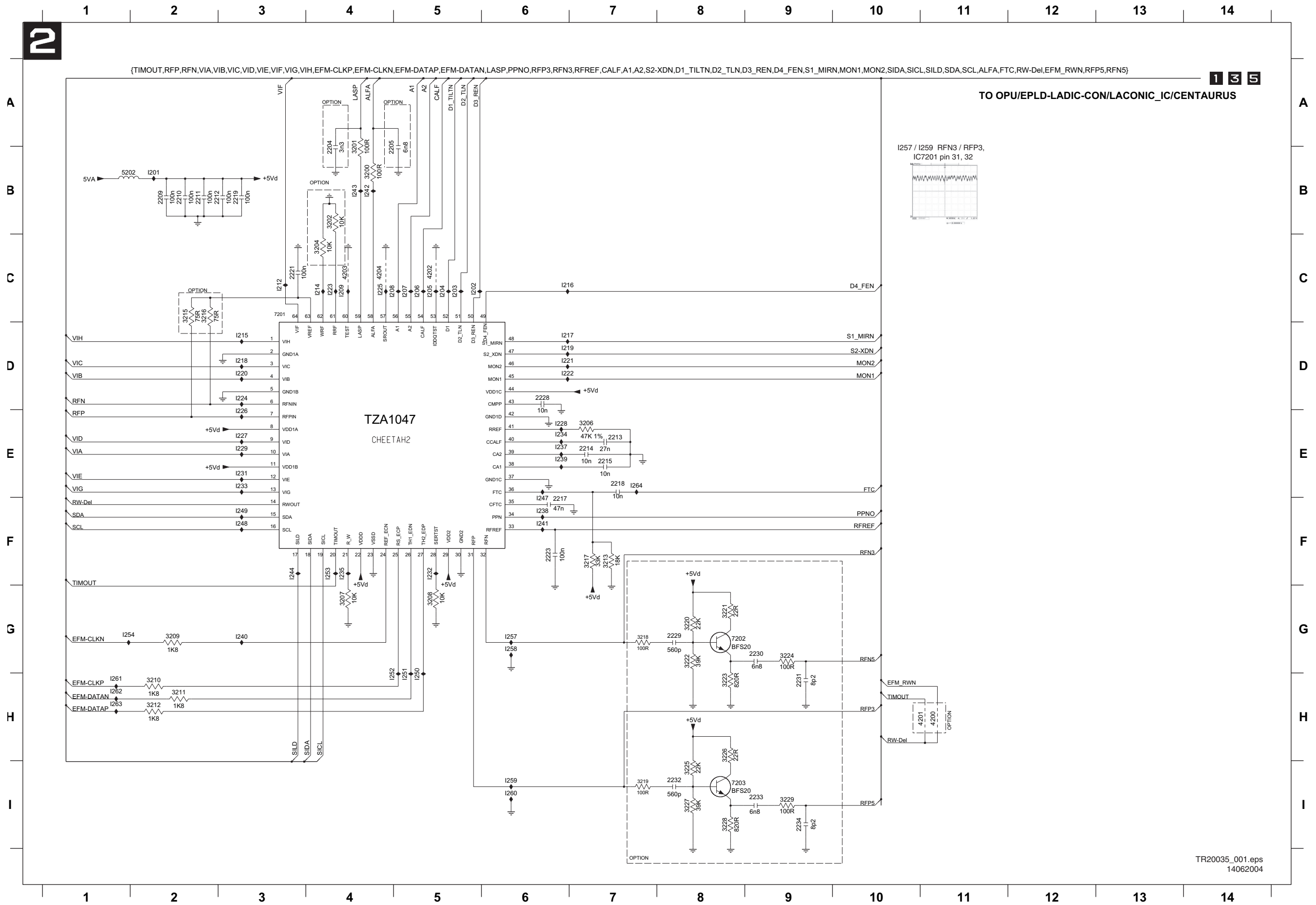
- 2630 A3
- 2631 B4
- 3620 A2
- 3622 A3
- 3623 B3
- 3624 B3

FEBE: FE OPU Interface

TO CHEETAH_QD/DRIVERS/CENTAURUS-DRAM-FLASHROM/DEBUG-AND-FLASH

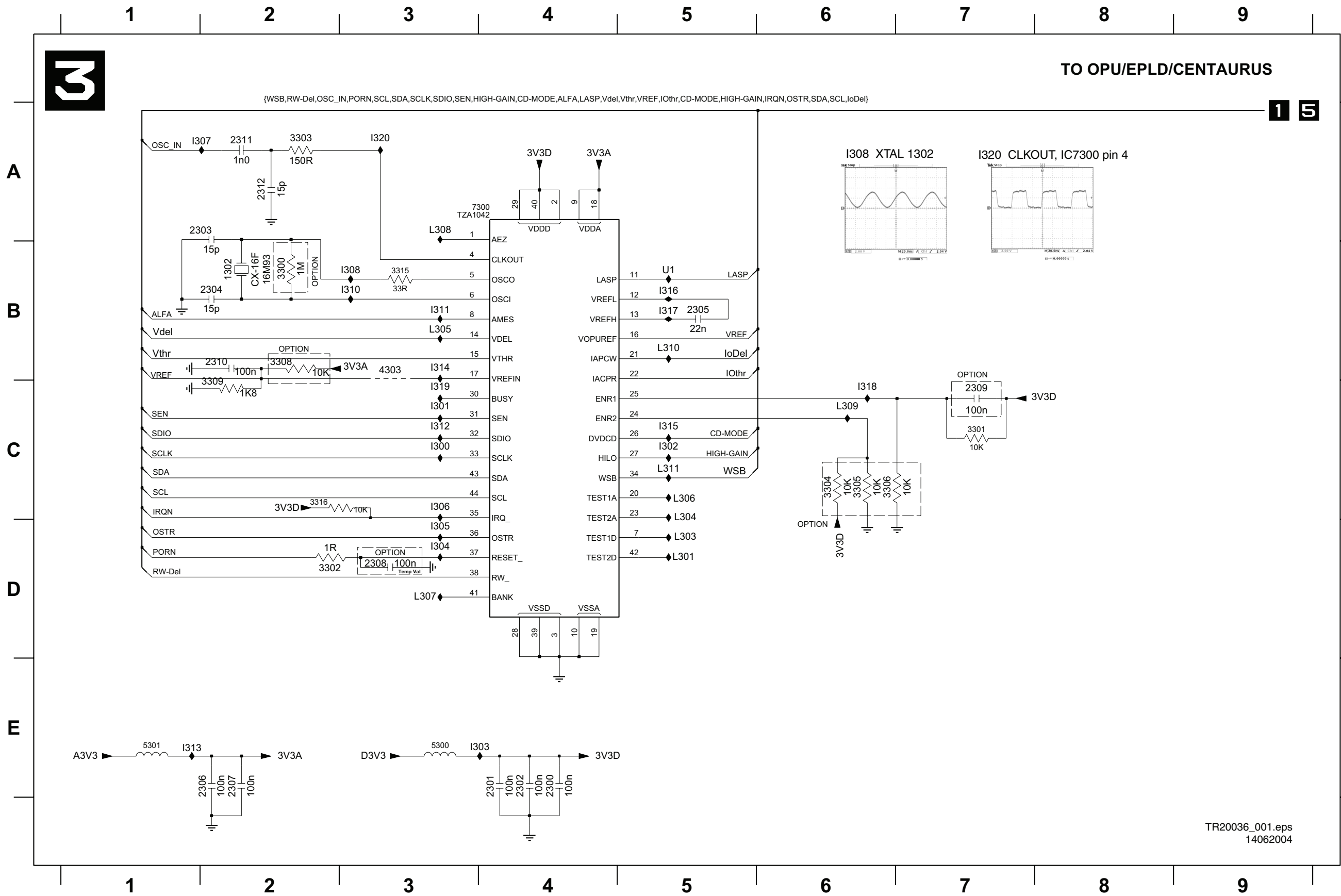


FEBE: FE Cheetah 2 Pre-processing



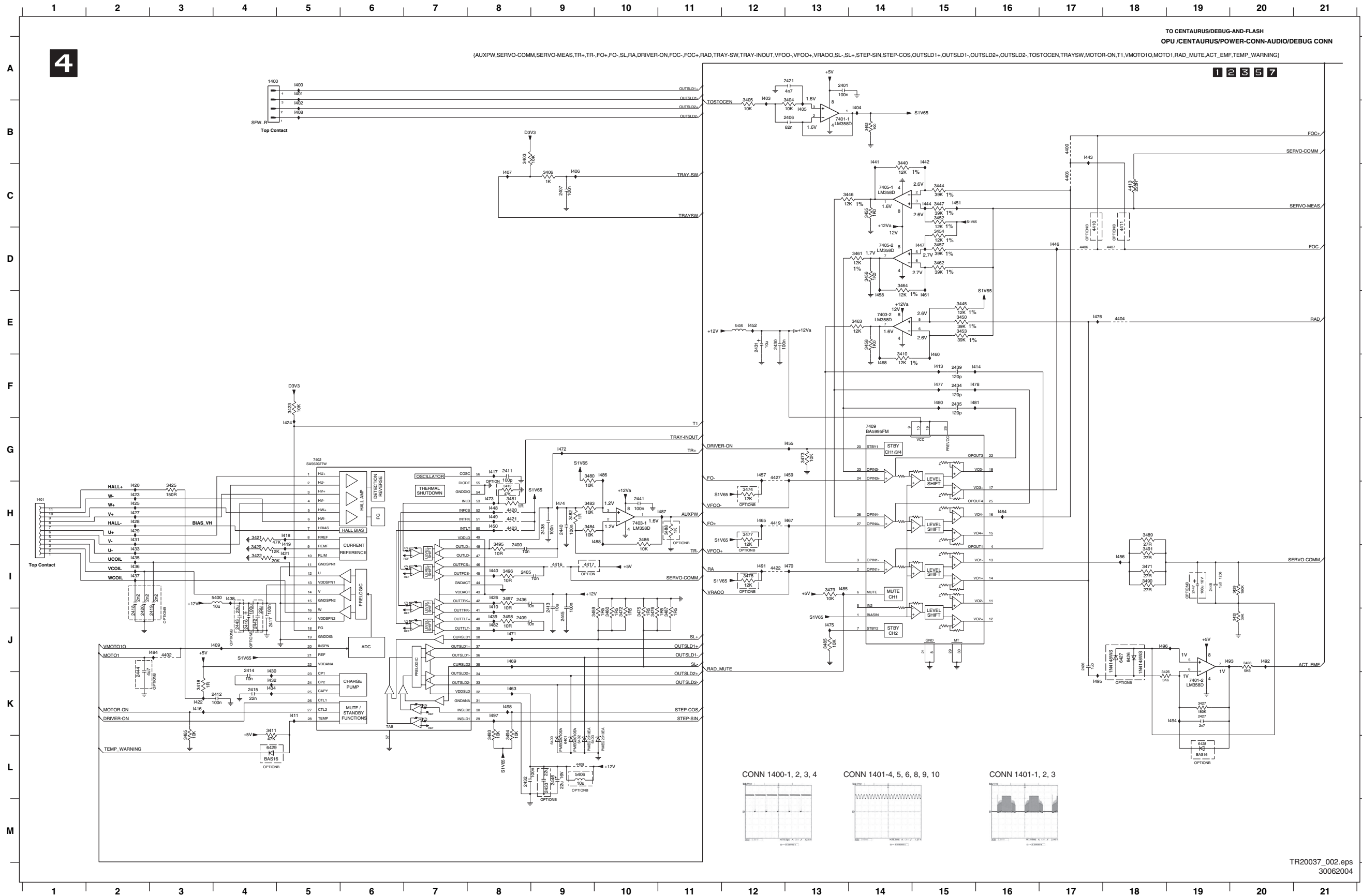
- 2204 B4
- 2205 B4
- 2209 B2
- 2210 B2
- 2211 B2
- 2212 B3
- 2213 E7
- 2214 E7
- 2215 E7
- 2217 E6
- 2218 E7
- 2219 B3
- 2221 C3
- 2223 F6
- 2228 D6
- 2229 G8
- 2230 G9
- 2231 H9
- 2232 I8
- 2233 I9
- 2234 I9
- 3200 B4
- 3201 B4
- 3202 B4
- 3204 C4
- 3206 E7
- 3207 G4
- 3208 G5
- 3209 G2
- 3210 H2
- 3211 H2
- 3212 H2
- 3213 F7
- 3215 C2
- 3216 C2
- 3217 F7
- 3218 G7
- 3219 I7
- 3220 G8
- 3221 G8
- 3222 G8
- 3223 H8
- 3224 G9
- 3225 I8
- 3226 H8
- 3227 I8
- 3228 I8
- 3229 I9
- 4200 H11
- 4201 H11
- 4202 C5
- 4203 C4
- 4204 C4
- 5202 B1
- 7201 C3
- 7202 G8
- 7203 I8
- I201 B2
- I202 C5
- I203 C5
- I204 C5
- I205 C5
- I206 C5
- I207 C5
- I208 C4
- I209 C4
- I212 C3
- I214 C4
- I215 D3
- I216 C6
- I217 D6
- I218 D3
- I219 D6
- I220 D3
- I221 D6
- I222 D6
- I223 C4
- I224 D3
- I225 C4
- I226 E3
- I227 E3
- I228 E6
- I229 E3
- I231 E3
- I232 F5
- I233 E3
- I234 E6
- I235 F4
- I237 E6
- I238 F6
- I239 E6
- I240 G3
- I241 F6
- I242 B4
- I243 B4
- I244 F3
- I247 F6
- I248 F3
- I249 F3
- I250 H5
- I251 H5
- I252 H4
- I253 F4
- I254 G1
- I257 G6
- I258 G6
- I259 I6
- I260 I6
- I261 H1
- I262 H1
- I263 H1
- I264 E7

FEBE: FE Laconic Pre-processing



- U1 B5
- 1302 B2
- 2300 E4
- 2301 E4
- 2302 E4
- 2303 A2
- 2304 B2
- 2305 B5
- 2306 E2
- 2307 E2
- 2308 D3
- 2309 C7
- 2310 B2
- 2311 A2
- 2312 A2
- 3300 B2
- 3301 C7
- 3302 D2
- 3303 A2
- 3304 C6
- 3305 C6
- 3306 C6
- 3308 B2
- 3309 B2
- 3315 B3
- 3316 C2
- 4303 B3
- 5300 E3
- 5301 E1
- 7300 A4
- I300 C3
- I301 C3
- I302 C5
- I303 E4
- I304 D3
- I305 D3
- I306 C3
- I307 A2
- I308 B3
- I310 B3
- I311 B3
- I312 C3
- I313 E1
- I314 B3
- I315 C5
- I316 B5
- I317 B5
- I318 C6
- I319 C3
- I320 A3
- L301 D5
- L303 D5
- L304 C5
- L305 B3
- L306 C5
- L307 D3
- L308 A3
- L309 C6
- L310 B5
- L311 C5

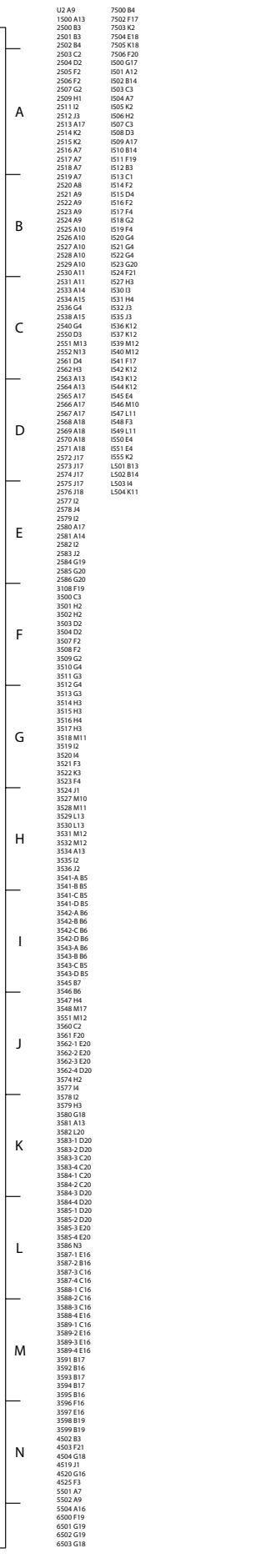
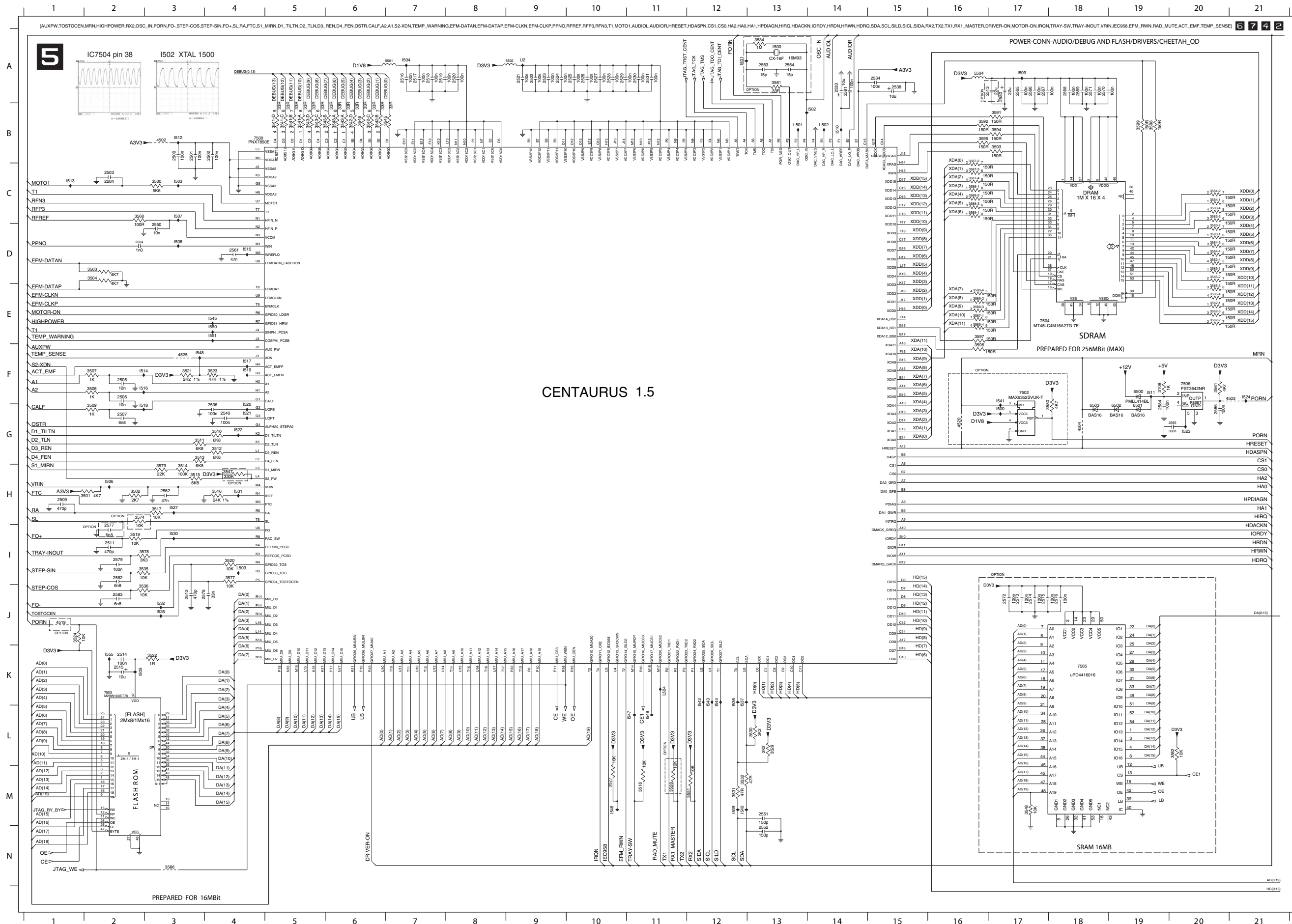
FEBE: FE Drivers



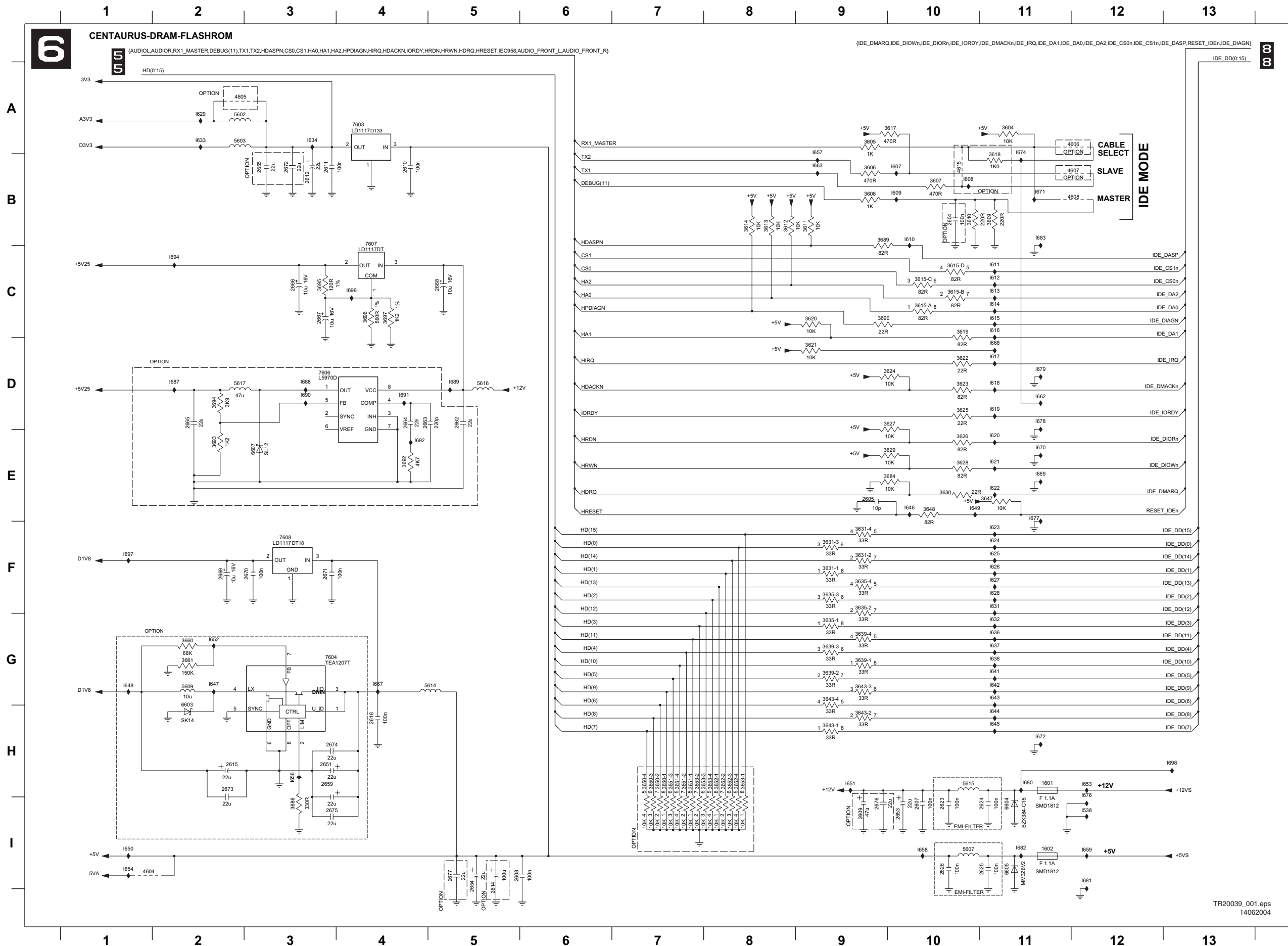
TR20037_002.eps
30062004

1400 A5	I421 I5
1401 H1	I422 K3
2400 H8	I423 G2
2401 A13	I424 G5
2405 B	I425 H2
2406 B13	I426 B
2407 C9	I427 H2
2409 J8	I428 H2
2411 G8	I429 H2
2412 K4	I430 J4
2413 B9	I431 B10
2414 J4	I432 K4
2415 K4	I433 I2
2416 J4	I434 K4
2417 J4	I435 I2
2418 J2	I436 I2
2420 J2	I438 I4
2421 A13	I439 J8
2425 J17	I440 B
2427 K19	I441 B14
2430 E12	I442 B15
2431 E12	I443 B17
2432 L8	I444 C19
2433 L8	I445 D17
2434 F15	I447 D15
2435 F15	I448 H8
2436 B	I449 H8
2439 H9	I450 H8
2439 F15	I451 C15
2440 H9	I452 E12
2441 H10	I453 G13
2442 J4	I456 I18
2443 J4	I457 G12
2444 K2	I458 E14
2445 J9	I459 G13
2446 L9	I460 F15
2447 B	I461 E15
2448 B13	I463 K8
2449 B13	I464 H18
2450 B12	I467 H13
2450 C9	I468 F14
2451 F14	I469 J8
2451 K4	I470 I13
2452 H8	I471 B
2453 H8	I472 G9
2454 H4	I473 H8
2454 H4	I474 H9
2455 H4	I475 J13
2456 H4	I476 E17
2457 H4	I477 F15
2458 H4	I478 F15
2459 H4	I479 F15
2460 H4	I480 F15
2461 H4	I481 F15
2462 H4	I482 J8
2463 H4	I483 J3
2464 H4	I485 I13
2465 H4	I486 G15
2466 H4	I487 H11
2467 H4	I488 H10
2468 H4	I489 I18
2469 H4	I490 H11
2470 H4	I491 I18
2471 H4	I492 B14
2472 H4	I493 K8
2473 H4	I494 B
2474 H4	I495 B
2475 H4	I496 B
2476 H4	I497 B
2477 H4	I498 J10
2478 H4	I499 J10
2479 H4	I500 J10
2480 G9	I501 G13
2481 H9	I502 H8
2482 H9	I503 H8
2483 H9	I504 H8
2484 H9	I505 H8
2485 J10	I506 H10
2486 H10	I507 H10
2487 H10	I508 H10
2488 H10	I509 H10
2489 H10	I510 H10
2490 H10	I511 H10
2491 H10	I512 H10
2492 H10	I513 H10
2493 H10	I514 H10
2494 H10	I515 H10
2495 H10	I516 H10
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2497 H10	I518 H10
2498 H10	I519 H10
2499 H10	I520 H10

FEBE: FE Centaurus 1.5 Processor

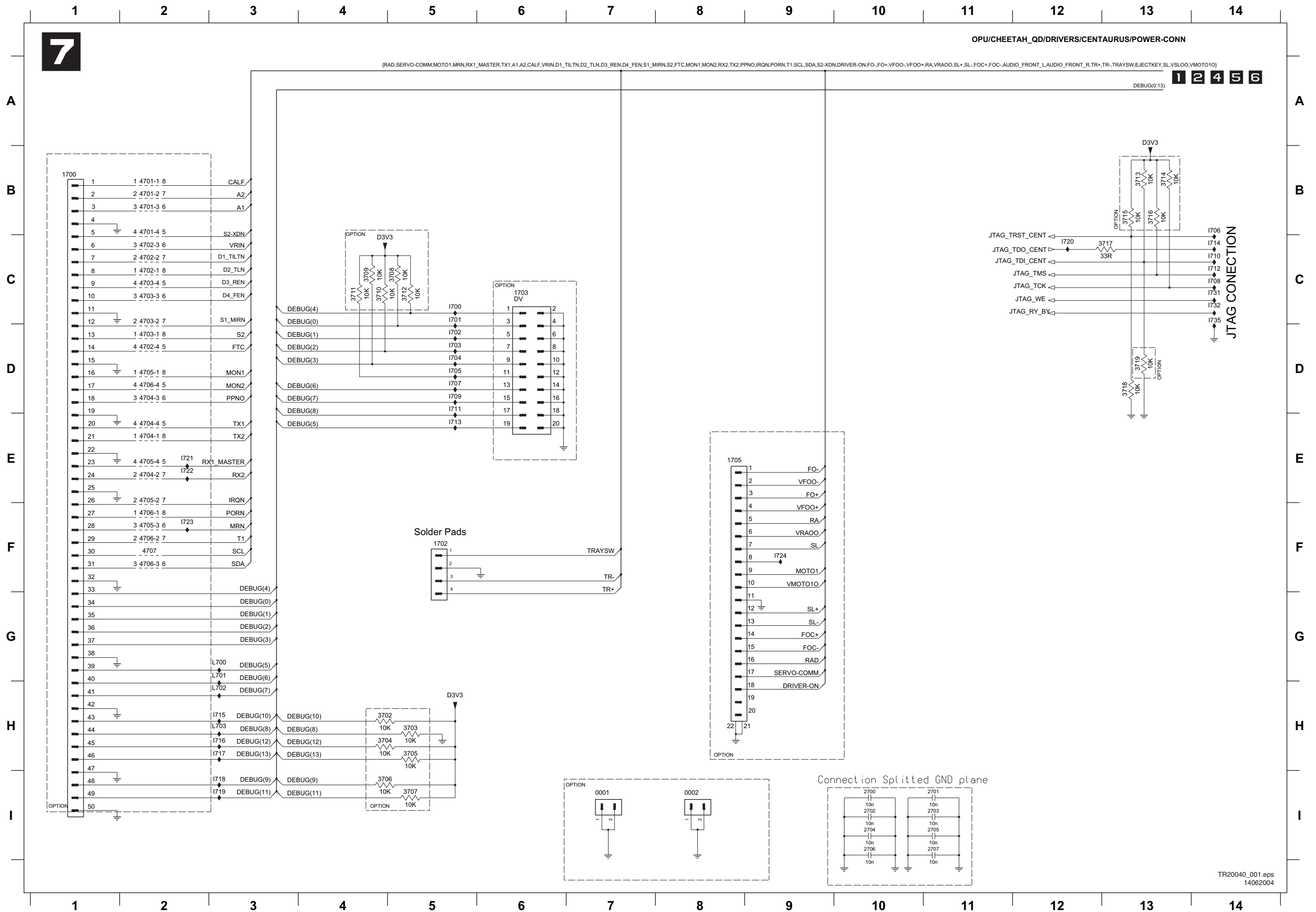


FEBE: FE Supply / BE Interface



- 1601 H11
- 1602 I11
- 2604 B10
- 2605 E9
- 2607 I10
- 2608 I5
- 2609 I9
- 2610 B4
- 2611 B3
- 2612 B3
- 2614 I5
- 2615 H2
- 2618 H4
- 2623 I10
- 2624 I11
- 2625 I11
- 2626 I10
- 2651 H3
- 2653 I10
- 2654 I5
- 2655 B3
- 2659 H3
- 2662 D5
- 2663 D4
- 2664 D4
- 2665 D2
- 2666 C3
- 2667 C3
- 2668 C5
- 2669 F2
- 2670 F3
- 2671 F3
- 2672 B3
- 2673 H2
- 2674 H3
- 2675 I3
- 2676 I9
- 2677 I5
- 3604 A11
- 3605 A9
- 3606 B9
- 3607 B10
- 3608 B9
- 3609 B11
- 3610 B10
- 3611 B9
- 3612 B8
- 3613 B8
- 3614 B8
- 3615-A C10
- 3615-B C10
- 3615-C C10
- 3615-D C10
- 3617 A10
- 3618 B11
- 3619 C10
- 3620 C9
- 3621 D9
- 3622 D10
- 3623 D10
- 3624 D10
- 3625 D10
- 3626 E10
- 3628 E10
- 3629 E10
- 3630 E10
- 3631-1 F9
- 3631-2 F9
- 3631-3 F9
- 3631-4 F9
- 3635-1 G9
- 3635-2 F9
- 3635-3 F9
- 3635-4 F9
- 3639-1 G9
- 3639-2 G9
- 3639-3 G9
- 3639-4 G9
- 3643-1 H9
- 3643-2 H9
- 3643-3 G9
- 3643-4 G9
- 3647 E11
- 3648 E10
- 3650-1 H7
- 3650-2 H7
- 3650-3 H7
- 3650-4 H7
- 3651-1 H7
- 3651-2 H7
- 3651-3 H7
- 3651-4 H7
- 3652-1 H8
- 3652-2 H8
- 3652-3 H8
- 3652-4 H8
- 3653-1 H8
- 3653-2 H7
- 3653-3 H8
- 3653-4 H8
- 3660 G2
- 3661 G2
- 3684 E10
- 3686 I3
- 3689 B9
- 3690 C9
- 3692 E4
- 3693 E2
- 3694 D2
- 3695 C3
- 3696 C4
- 3697 C4
- 4604 I1
- 4605 A2
- 4606 A12
- 4607 B12
- 4608 B12
- 4615 B10
- 5602 A2
- 5603 A2
- 5607 I10
- 5609 G2
- 5614 G5
- 5615 H10
- 5616 D5
- 5617 D2
- 5618 H2
- 5620 I11
- 5623 A4
- 5624 G3
- 5626 D3
- 5627 B4
- 5628 F3
- 5629 I2
- 5638 I2
- 5639 B10
- 5639 B10
- 5640 B10
- 5641 C11
- 5642 C11
- 5643 C11
- 5644 C11
- 5645 H11
- 5645 H11
- 5646 E10
- 5647 G1
- 5648 E10
- 5649 E10
- 5650 I1
- 5651 H9
- 5652 G2
- 5653 H12
- 5654 I1
- 5656 H3
- 5657 A9
- 5658 H10
- 5659 H2
- 5662 D11
- 5663 B9
- 5667 G4
- 5668 D11
- 5669 E11
- 5670 E11
- 5671 B11
- 5672 H11
- 5674 A11
- 5676 H12
- 5677 E11
- 5678 D11
- 5679 D11
- 5680 H11
- 5681 I12
- 5682 H11
- 5683 B11
- 5687 D2
- 5688 D3
- 5689 D5
- 5690 D3
- 5691 D4
- 5692 E4
- 5694 C2
- 5696 C4
- 5697 F1
- 5698 H13

FEBE: FE Tray Motor / Switch Connection & Debug Connectors



- 0001 I7
- 0002 I8
- 1700 B1
- 1702 F5
- 1703 C6
- 1705 E8
- 1700 I10
- 2701 I11
- 2702 I10
- 2703 I11
- 2704 I10
- 2705 I11
- 2706 I10
- 2707 I11
- 3702 H4
- 3703 H5
- 3704 H4
- 3705 H5
- 3706 I4
- 3707 I5
- 3708 C5
- 3709 C4
- 3710 C4
- 3711 C4
- 3712 C5
- 3713 B1:
- 3714 B1:
- 3715 B1:
- 3716 B1:
- 3717 C1:
- 3718 D1:
- 3719 D1:
- 4701-1 E
- 4701-2 E
- 4701-3 E
- 4701-4 E
- 4702-1 C
- 4702-2 C
- 4702-3 C
- 4702-4 C
- 4703-1 C
- 4703-2 C
- 4703-3 C
- 4703-4 C
- 4704-1 E
- 4704-2 E
- 4704-3 C
- 4704-4 E
- 4705-1 C
- 4705-2 E
- 4705-3 F
- 4705-4 E
- 4706-1 F
- 4706-2 F
- 4706-3 F
- 4706-4 C
- 4707 F2
- 1700 C5
- 1701 C5
- 1702 D5
- 1703 D5
- 1704 D5
- 1705 D5
- 1706 B14
- 1707 D5
- 1708 C14
- 1709 D5
- 1710 C14
- 1711 D5
- 1712 C14
- 1713 E5
- 1714 C14
- 1715 H3
- 1716 H3
- 1717 H3
- 1718 I3
- 1719 I3
- 1720 C12
- 1721 E2
- 1722 E2
- 1723 F2
- 1724 F9
- 1731 C14
- 1732 C14
- 1735 C14
- L700 G3
- L701 G3
- L702 H3
- L703 H3

FEBE: BE Chrysalis

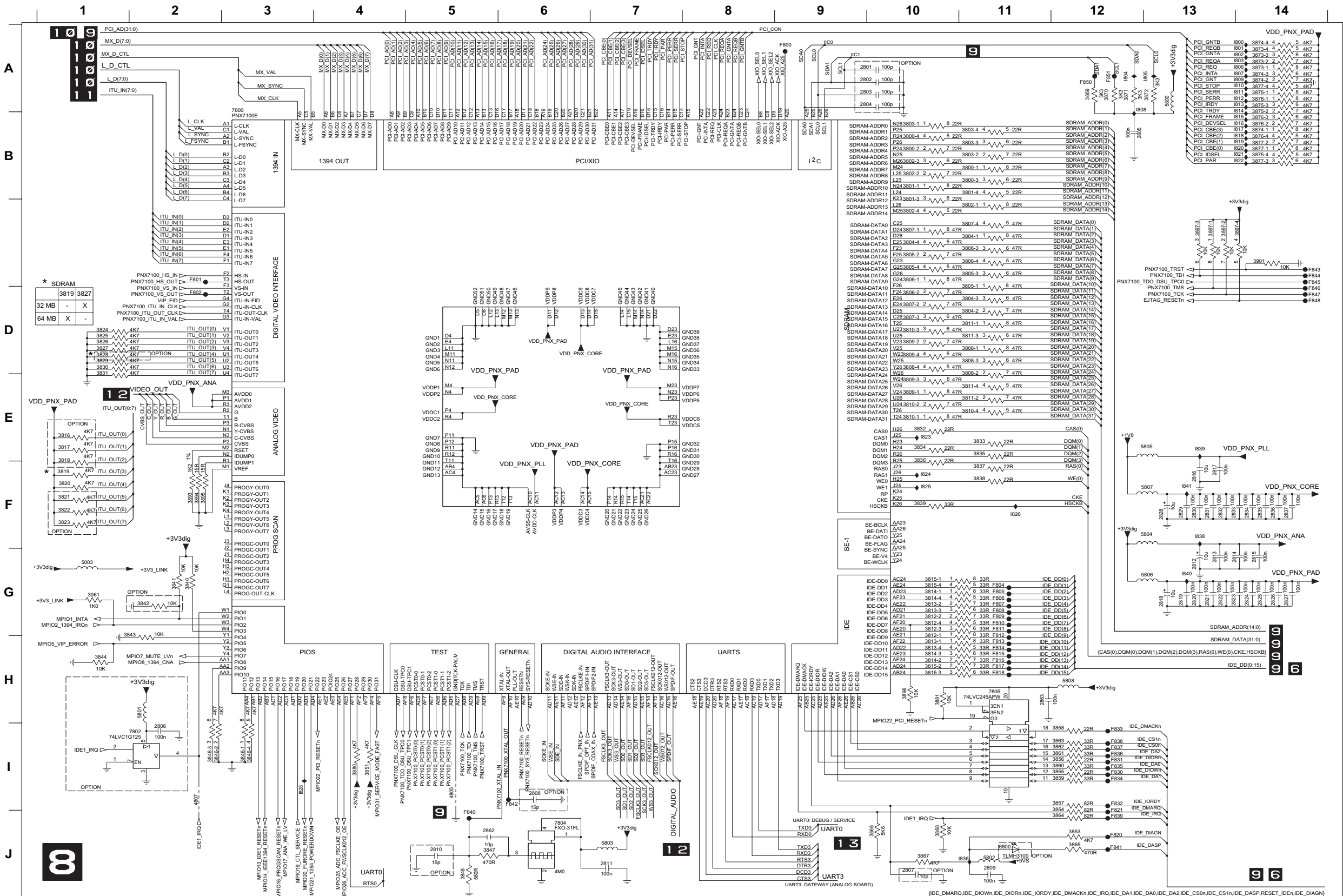
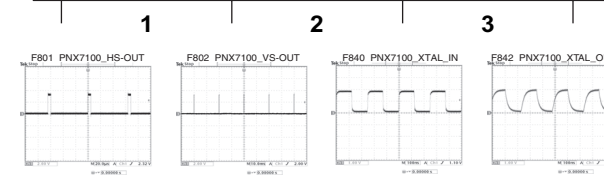
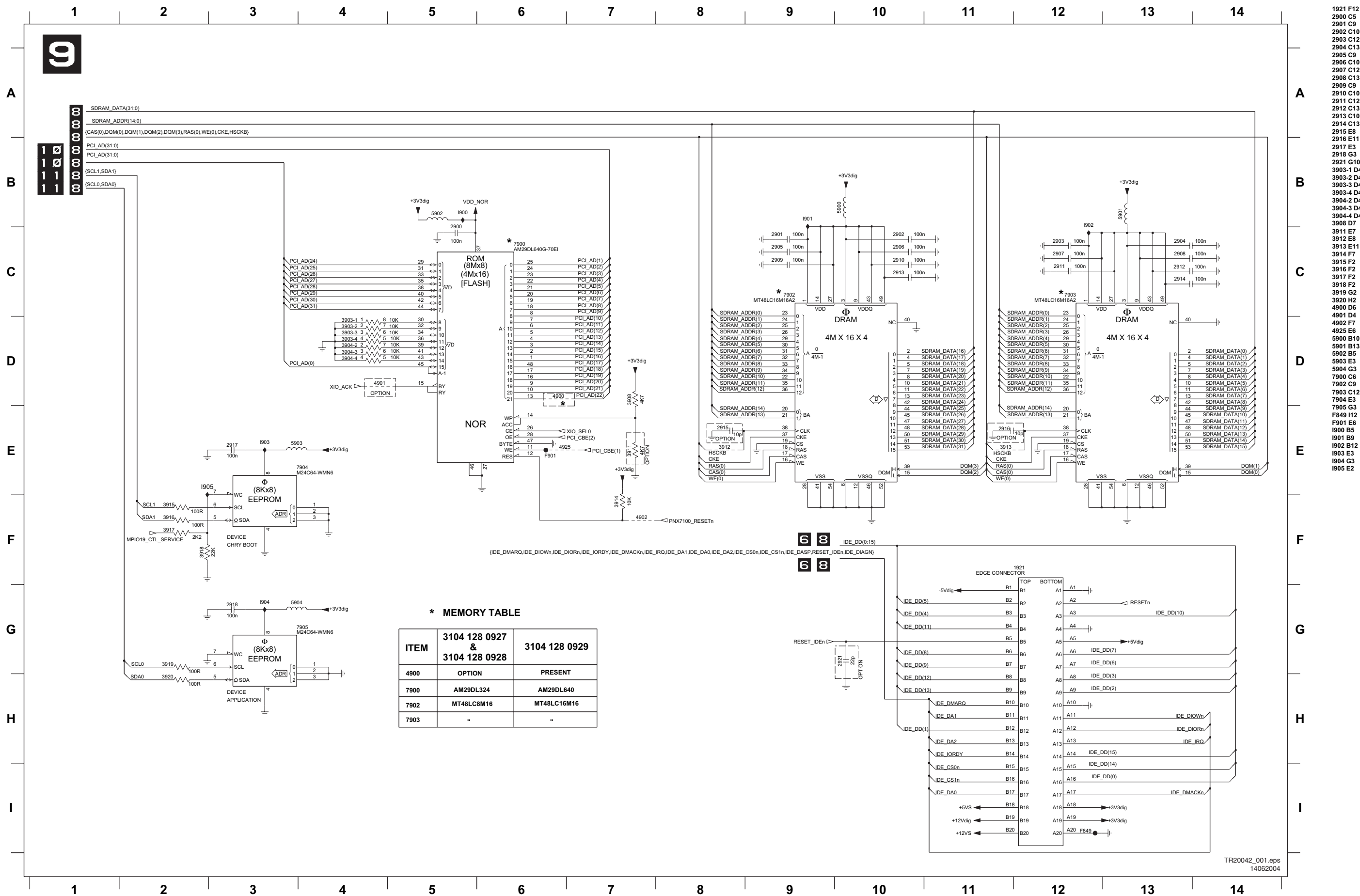


Table of component values and designators for various components like resistors, capacitors, and ICs, organized by grid coordinates (e.g., 2801 A9, 2802 A9).

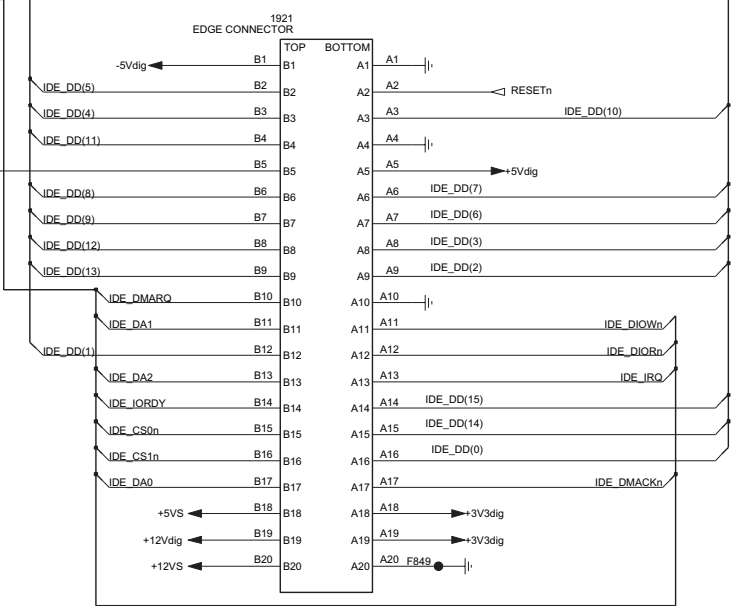


FEBE: BE Flash, EEPROM & SDRAM



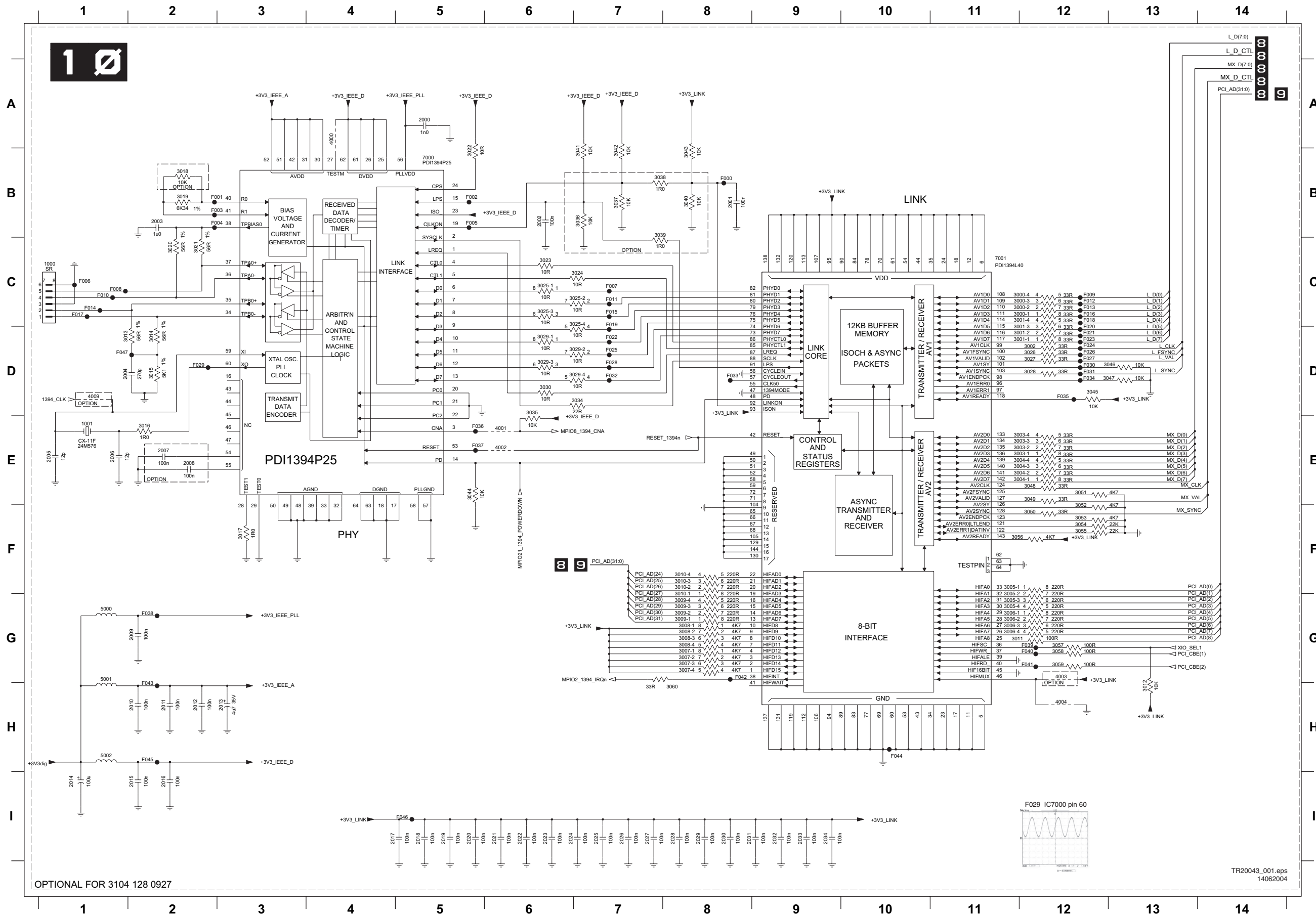
*** MEMORY TABLE**

ITEM	3104 128 0927 & 3104 128 0928	3104 128 0929
4900	OPTION	PRESENT
7900	AM29DL324	AM29DL640
7902	MT48LC8M16	MT48LC16M16
7903	"	"



- 1921 F12
- 2900 C5
- 2901 C9
- 2902 C10
- 2903 C12
- 2904 C13
- 2905 C9
- 2906 C10
- 2907 C12
- 2908 C13
- 2909 C9
- 2910 C10
- 2911 C12
- 2912 C13
- 2913 C10
- 2914 C13
- 2915 E8
- 2916 E11
- 2917 E3
- 2918 G3
- 2921 G10
- 3903-1 D4
- 3903-2 D4
- 3903-3 D4
- 3903-4 D4
- 3904-2 D4
- 3904-3 D4
- 3904-4 D4
- 3908 D7
- 3911 E7
- 3912 E8
- 3913 E11
- 3914 F7
- 3915 F2
- 3917 F2
- 3918 F2
- 3919 G2
- 3920 H2
- 4900 D6
- 4901 D4
- 4902 F7
- 4925 E6
- 5900 B10
- 5901 B5
- 5902 B3
- 5903 E3
- 5904 G3
- 7900 C6
- 7902 C9
- 7903 C12
- 7904 E3
- 7905 G3
- F949 I12
- F901 E6
- I900 B5
- I901 B9
- I902 B12
- I903 E3
- I904 G3
- I905 E2

FEBE: BE DV In IEEE1394

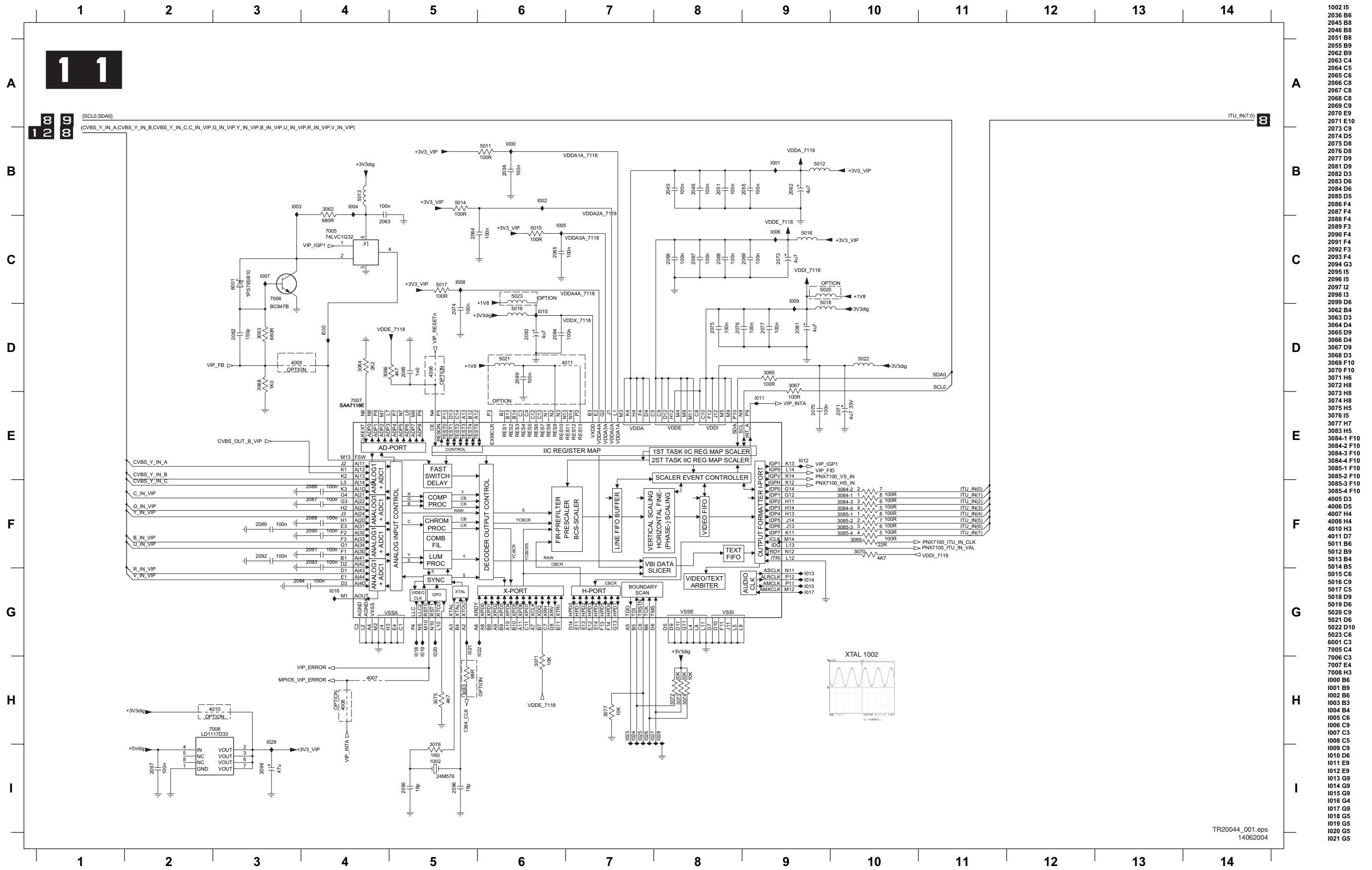


1000 C1	3046 D13
1001 E1	3047 D13
2000 A5	3048 E12
2001 B8	3049 E12
2002 B6	3050 F12
2003 B2	3051 E12
2004 D1	3052 F12
2005 E1	3053 F12
2006 E1	3054 F12
2007 E2	3055 F12
2008 E2	3056 F11
2009 G2	3057 G12
2010 H2	3058 G12
2011 H2	3059 G12
2012 H2	3060 H8
2013 H3	4000 A4
2014 I1	4001 E6
2015 I2	4002 E6
2016 I2	4003 G12
2017 I4	4004 H12
2018 I5	4009 D1
2019 I5	5000 G1
2020 I5	5001 G1
2021 I6	5002 H1
2022 I6	7000 B5
2023 I6	7001 C11
2024 I6	F000 B8
2025 I7	F001 B3
2026 I7	F002 B5
2027 I7	F003 B3
2028 I8	F004 B3
2029 I8	F005 B5
2030 I8	F006 C1
2031 I8	F007 C7
2032 I9	F008 C1
2033 I9	F009 C12
2034 I9	F010 C1
3000-1 C12	F011 C7
3000-2 C12	F012 C12
3000-3 C12	F013 C12
3000-4 C12	F014 C1
3001-1 D12	F015 C7
3001-2 D12	F016 C12
3001-3 D12	F017 C1
3001-4 C12	F018 C12
3002 D12	F019 C7
3003-1 E12	F020 D12
3003-2 E12	F021 D12
3003-3 E12	F022 D7
3003-4 E12	F023 D12
3004-1 E12	F024 D12
3004-2 E12	F025 D7
3004-3 E12	F026 D12
3004-4 E12	F027 D12
3005-1 F12	F028 D7
3005-2 G12	F029 D2
3005-3 G12	F030 D12
3005-4 G12	F031 D12
3006-1 G12	F032 D7
3006-2 G12	F033 D8
3006-3 G12	F034 D12
3006-4 G12	F035 D12
3007-1 G8	F036 E5
3007-2 G8	F037 E5
3007-3 G8	F038 G2
3007-4 G8	F039 G12
3008-1 G8	F040 G12
3008-2 G8	F041 G12
3008-3 G8	F042 G8
3008-4 G8	F043 H2
3009-1 G8	F044 H10
3009-2 G8	F045 H2
3009-3 G8	F046 I5
3009-4 G8	F047 D1
3010-1 G8	
3010-2 F8	
3010-3 F8	
3010-4 F8	
3011 C12	
3012 H13	
3013 D1	
3014 D2	
3015 D2	
3016 E2	
3017 F3	
3018 B2	
3019 B2	
3020 C2	
3021 C2	
3022 B5	
3023 C6	
3024 C7	
3025-1 C6	
3025-2 C7	
3025-3 C6	
3026 D12	
3027 D12	
3028 D12	
3029-1 D6	
3029-2 D7	
3029-3 D6	
3029-4 D7	
3030 D6	
3034 D7	
3035 D6	
3036 B7	
3037 B7	
3038 B7	
3039 B7	
3040 B8	
3041 B7	
3042 B7	
3043 B8	
3044 E5	
3045 D12	

OPTIONAL FOR 3104 128 0927

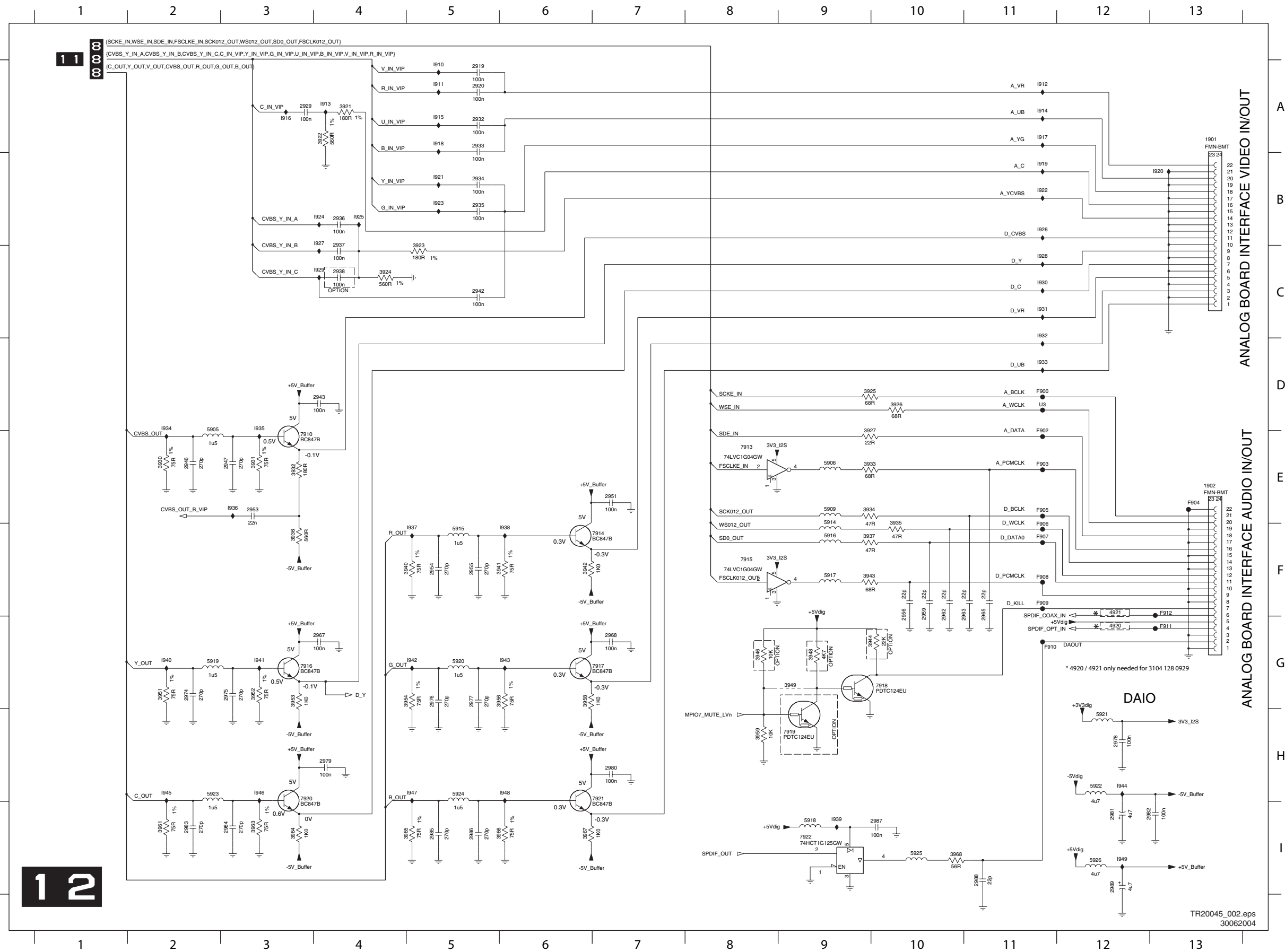
TR20043_001.eps
14062004

FEBE: BE Video In Processing (VIP)



- 1002 I5
- 2036 B6
- 2045 H7
- 2046 B8
- 2046 B8
- 2051 B8
- 2055 B9
- 2062 B9
- 2063 C4
- 2064 C5
- 2065 C6
- 2066 C8
- 2067 C8
- 2068 C8
- 2069 C9
- 2070 E9
- 2071 E10
- 2073 C9
- 2074 D5
- 2075 D8
- 2076 D8
- 2077 D9
- 2081 D9
- 2082 D3
- 2083 D6
- 2084 D6
- 2085 D5
- 2086 F4
- 2087 F4
- 2088 F4
- 2089 F3
- 2090 F4
- 2091 F4
- 2092 F3
- 2093 F4
- 2094 G3
- 2095 I5
- 2096 I5
- 2097 I2
- 2098 I3
- 2099 D6
- 3062 B4
- 3063 D3
- 3064 D4
- 3065 D9
- 3066 D4
- 3067 D9
- 3068 D3
- 3069 F10
- 3070 F10
- 3071 H6
- 3072 H8
- 3073 H8
- 3074 H8
- 3075 H5
- 3076 I5
- 3077 H7
- 3083 H5
- 3084-1 F10
- 3084-2 F10
- 3084-3 F10
- 3084-4 F10
- 3085-1 F10
- 3085-2 F10
- 3085-3 F10
- 3085-4 F10
- 4005 D3
- 4006 D5
- 4007 H4
- 4008 H4
- 4010 H3
- 4011 D7
- 5011 B6
- 5012 B9
- 5013 B4
- 5014 B5
- 5015 C6
- 5016 C9
- 5017 C5
- 5018 D9
- 5019 D6
- 5020 C9
- 5021 D6
- 5022 D10
- 5023 C6
- 6001 C3
- 7005 C4
- 7006 C3
- 7007 E4
- 7008 H3
- 1000 B6
- 1001 B9
- 1002 B6
- 1003 B3
- 1004 B4
- 1005 C6
- 1006 C9
- 1007 C3
- 1008 C5
- 1009 C9
- 1010 D6
- 1011 E9
- 1012 E9
- 1013 G9
- 1014 G9
- 1015 G9
- 1016 G4
- 1017 G9
- 1018 G5
- 1019 G5
- 1020 G5
- 1021 G5
- 1022 G6
- 1023 H7
- 1024 H7
- 1025 H7
- 1026 H7
- 1027 H7
- 1028 H8
- 1029 H3
- 1030 D4

FEBE: BE Audio & Video In/Out

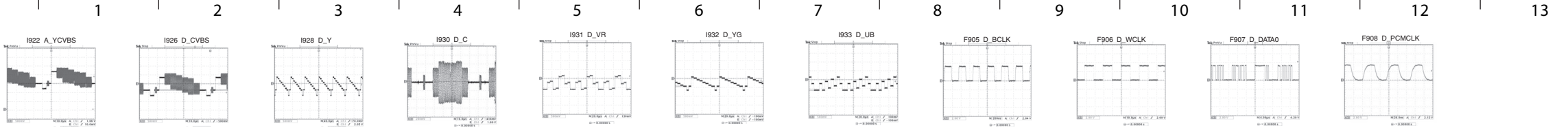


- U3 D11
- 1901 A13
- 1902 E13
- 2919 A5
- 2920 A5
- 2929 A3
- 2932 A5
- 2933 A5
- 2934 B5
- 2935 B5
- 2936 B4
- 2937 C4
- 2938 C4
- 2942 C5
- 2943 D4
- 2946 E2
- 2947 E3
- 2951 E7
- 2953 E3
- 2954 F5
- 2955 F5
- 2956 F10
- 2959 F10
- 2962 F10
- 2963 F11
- 2965 F11
- 2967 G4
- 2968 G7
- 2974 G2
- 2975 G3
- 2976 G5
- 2977 G5
- 2978 H12
- 2979 H4
- 2980 H7
- 2981 I2
- 2982 I13
- 2983 I2
- 2984 I3
- 2985 I5
- 2986 I5
- 2987 I10
- 2988 I11
- 2989 I12
- 3921 A4
- 3922 A4
- 3923 C5
- 3924 C4
- 3925 D9
- 3926 D10
- 3927 E9
- 3930 E2
- 3931 E3
- 3932 E3
- 3933 E9
- 3934 E9
- 3935 F10
- 3936 F3
- 3937 F9
- 3940 F5
- 3941 F6
- 3942 F6
- 3943 F9
- 3944 G10
- 3946 G8
- 3948 G9
- 3949 G9
- 3951 G2
- 3952 G3
- 3953 G3
- 3954 G5
- 3955 G6
- 3958 G6
- 3959 H8
- 3961 I2
- 3963 I3
- 3964 I3
- 3965 I5
- 3966 I6
- 3967 I6
- 3968 I10
- 4920 G12
- 4921 F12
- 5905 E2
- 5906 E9
- 5909 E9
- 5914 F9
- 5915 F5
- 5916 F9
- 5917 F9
- 5918 I9
- 5919 G2
- 5920 G5
- 5921 H12
- 5922 H12
- 5923 H2
- 5924 H5
- 5925 I10
- 5926 I12
- 7910 E3
- 7913 E8
- 7914 F7
- 7915 F8
- 7916 G3
- 7917 G7
- 7918 G10
- 7919 H9
- 7920 H3
- 7921 H7
- 7922 I9
- F900 D11
- F902 E11
- F903 E11
- F904 E13
- F905 E11
- F906 F11
- F907 F11
- F908 F11
- F909 F11
- F910 G11
- F911 G13
- F912 F13
- F910 A5
- F911 A5
- F912 A11
- F913 A4
- F914 A11
- F915 A5
- F916 A3
- F917 A11
- F918 A5
- F919 B11
- F920 B13
- F921 B5
- F922 B11
- F923 B5
- F924 B4
- F925 B4
- F926 B11
- F927 B4
- F928 C11
- F929 C4
- F930 C11
- F931 C11
- F932 C11
- F933 D11
- F934 D2
- F935 D3
- F936 E3
- F937 F5
- F938 F6
- F939 I9
- F940 G2
- F941 G3
- F942 G5
- F943 G6
- F944 H12
- F945 H2
- F946 H3
- F947 H5
- F948 H6
- F949 H12

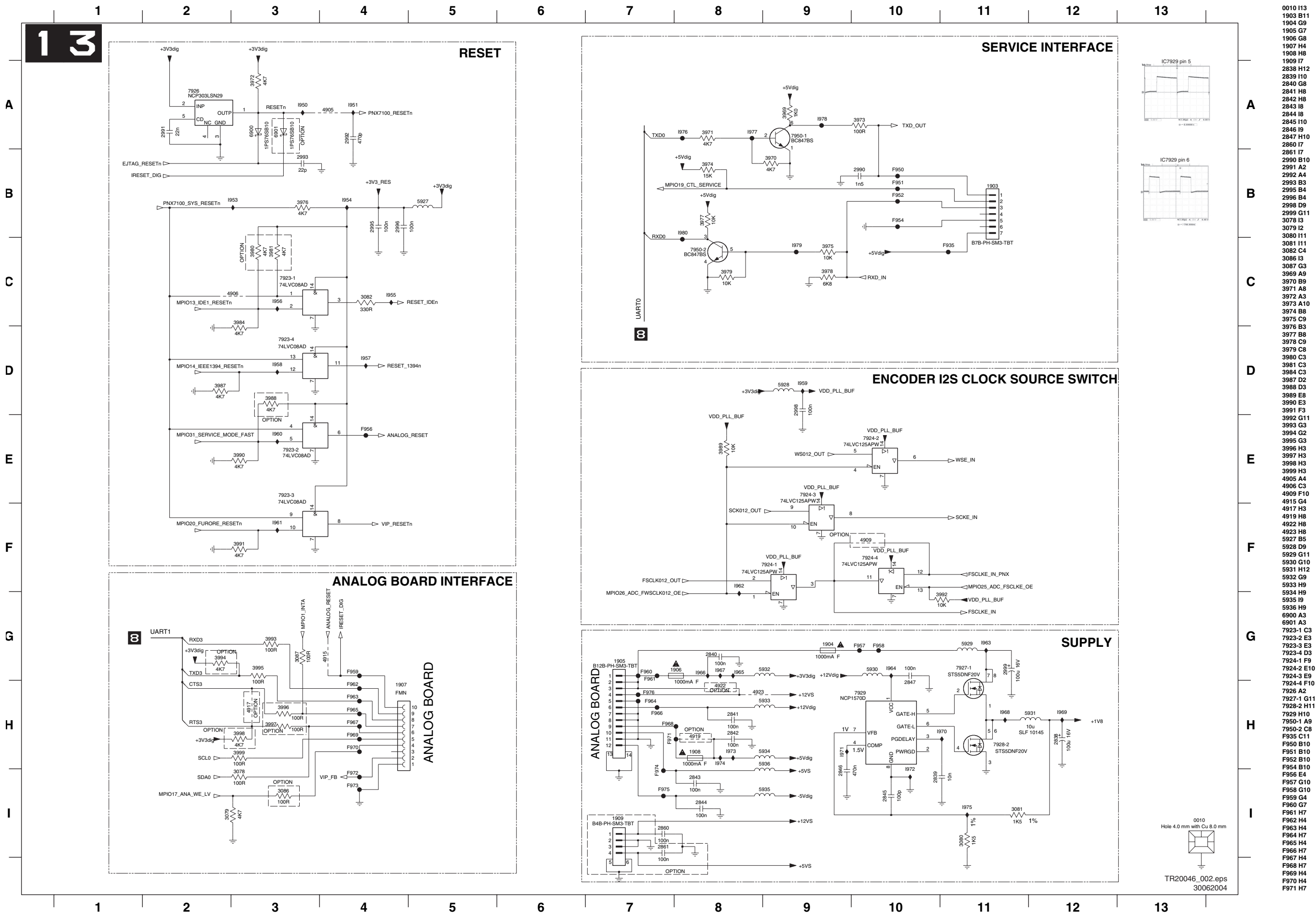
ANALOG BOARD INTERFACE VIDEO IN/OUT

ANALOG BOARD INTERFACE AUDIO IN/OUT

TR20045_002.eps
30062004



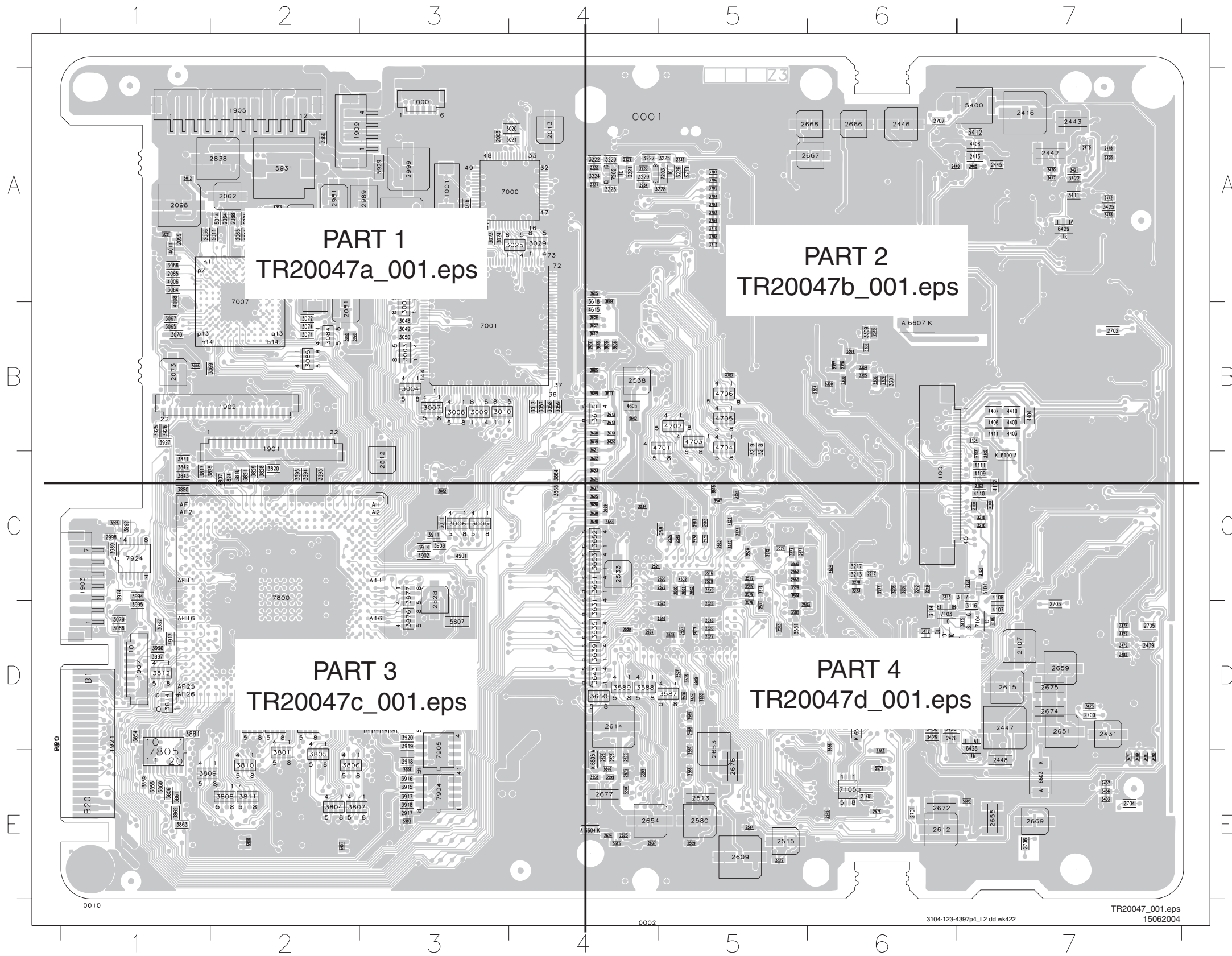
FEBE: BE Supply, Reset, UART, Encoder I2S Clock Source Switch



- 0010 I13
- 1903 B11
- 1904 G9
- 1905 G7
- 1906 G8
- 1907 H4
- 1908 H8
- 1909 I7
- 2838 H12
- 2839 I10
- 2840 G8
- 2841 H8
- 2842 H8
- 2843 I8
- 2844 I8
- 2845 I10
- 2846 I9
- 2847 H10
- 2860 I7
- 2861 I7
- 2900 B10
- 2901 A2
- 2902 A4
- 2903 B3
- 2905 B4
- 2906 B4
- 2908 D9
- 2909 G11
- 3078 I3
- 3079 I2
- 3080 I11
- 3081 I11
- 3082 C4
- 3086 I3
- 3087 G3
- 3089 A9
- 3090 A9
- 3091 A8
- 3092 A3
- 3093 A10
- 3094 B8
- 3095 C9
- 3096 B3
- 3097 B8
- 3098 C9
- 3099 C3
- 3099 H3
- 3099 H3
- 3099 H3
- 4905 A4
- 4906 C3
- 4909 F10
- 4915 G4
- 4917 H3
- 4919 H8
- 4922 H8
- 4923 H8
- 5927 B5
- 5928 D9
- 5929 G11
- 5930 G10
- 5931 H12
- 5932 G9
- 5933 H9
- 5934 H9
- 5935 I9
- 5936 H9
- 6900 A3
- 6901 A3
- 7923-1 C3
- 7923-2 E3
- 7923-3 E3
- 7923-4 D3
- 7924-1 F9
- 7924-2 E10
- 7924-3 E9
- 7924-4 F10
- 7926 A2
- 7927-1 G11
- 7928-2 H11
- 7929 H10
- 7950-1 A9
- 7950-2 C8
- 7953 C11
- 7950 B10
- 7951 B10
- 7952 B10
- 7954 B10
- 7956 E4
- 7957 G10
- 7958 G10
- 7959 G4
- 7960 G7
- 7961 H7
- 7962 H4
- 7963 H4
- 7964 H7
- 7965 H4
- 7966 H7
- 7967 H4
- 7968 H7
- 7969 H4
- 7970 H4
- 7971 H7
- F972 I4
- F973 I4
- F974 I7
- F975 I7
- F976 H7
- F950 A3
- F951 A4
- F953 B3
- F954 B4
- F955 C4
- F956 C3
- F957 D4
- F958 D3
- F959 D9
- F960 E3
- F961 F3
- F962 F8
- F963 G11
- F964 G10
- F965 G8
- F966 G8
- F967 G8
- F968 H11
- F969 H12
- F970 H11
- F971 H9
- F972 H8
- F973 H8
- F974 H8
- F975 I11
- F976 A8
- F977 A8
- F978 A9
- F979 C9
- F980 B8

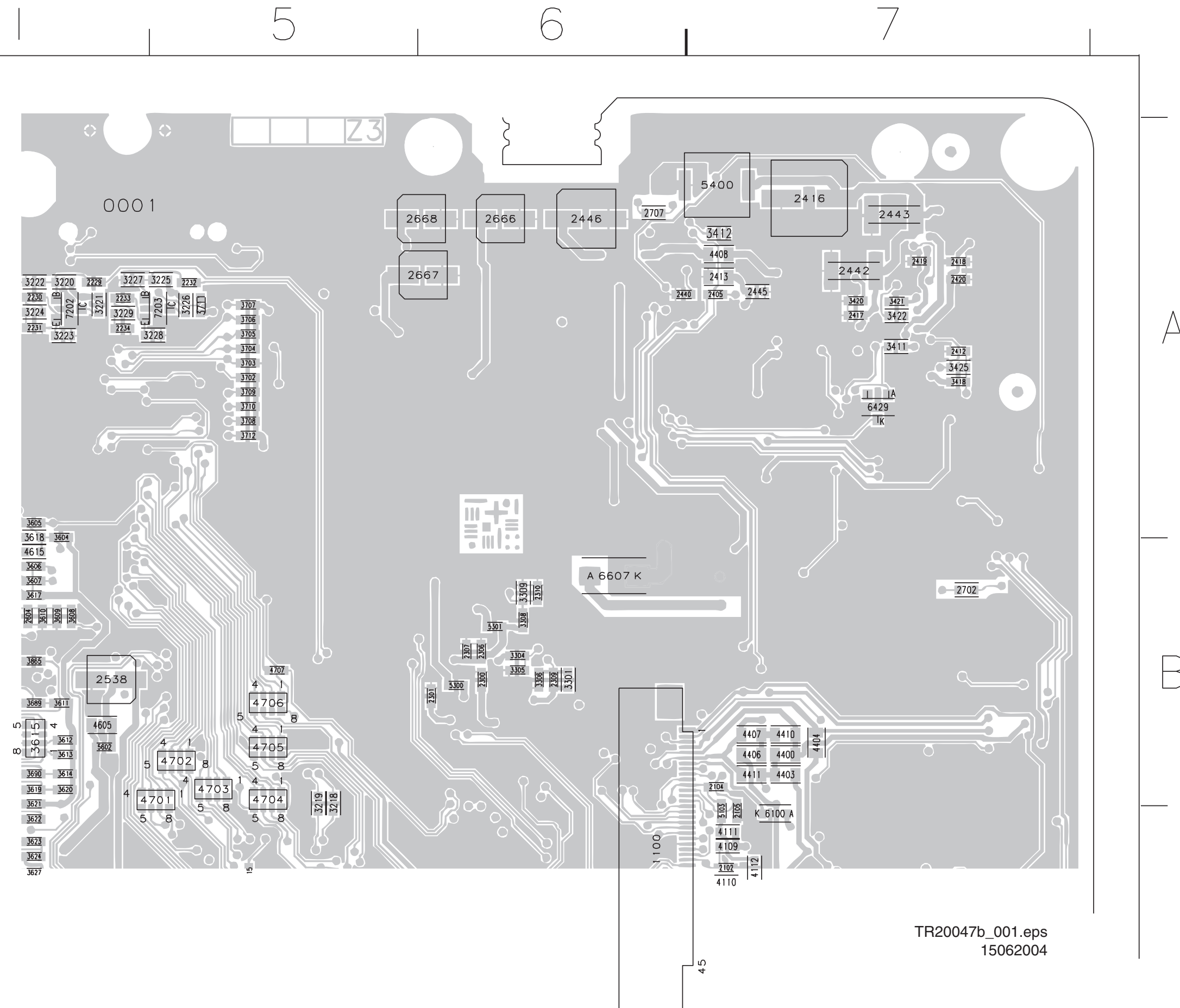
0010
Hole 4.0 mm with Cu 0.8 mm
TR20046_002.eps
30062004

Layout: FEBE Top View

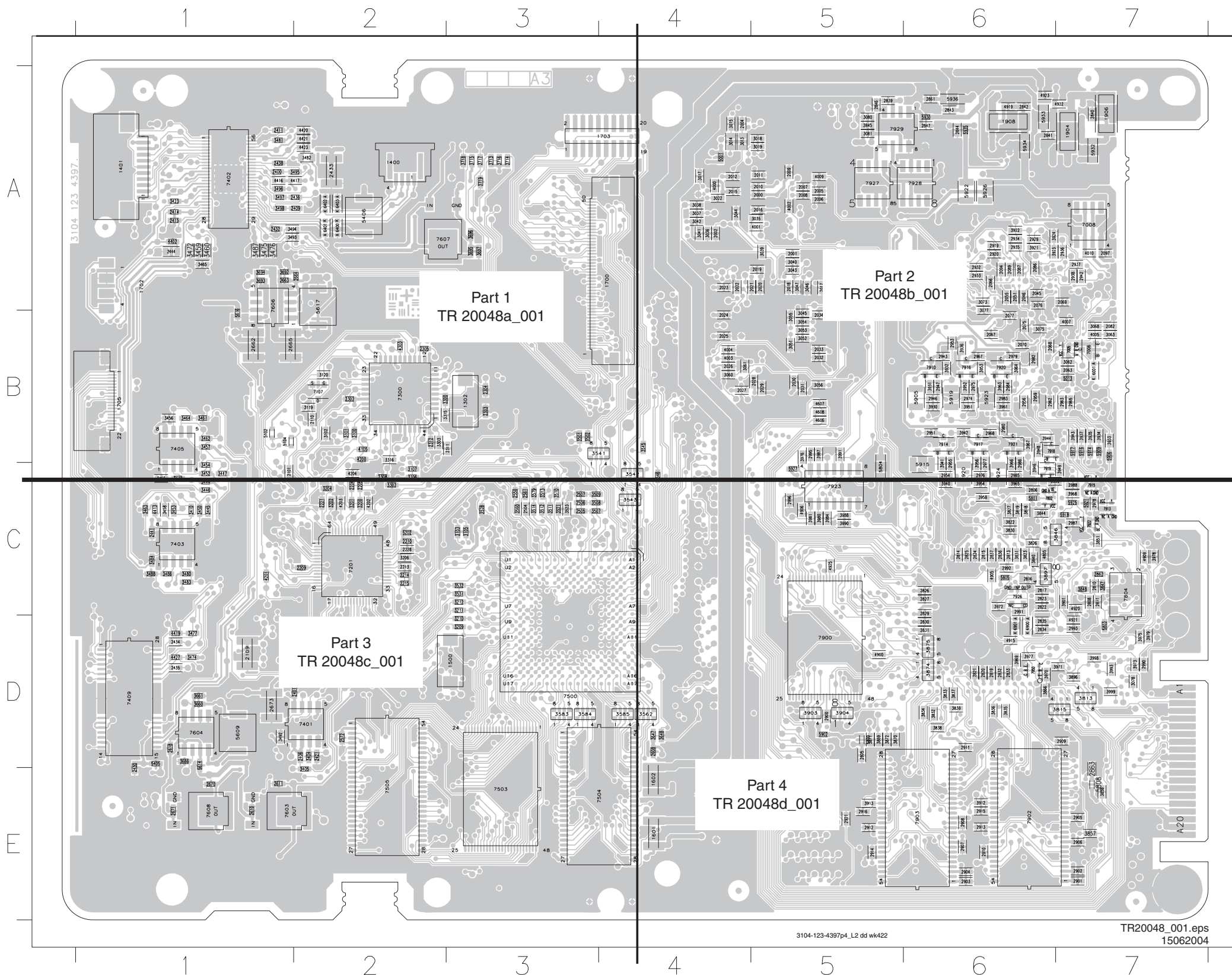


1000	A3	2540	C5	3059	B4	3592	D5	3917	E3	7101	D6
1001	A3	2551	C5	3064	A1	3593	D5	3918	E3	7102	D7
1002	A2	2552	C5	3065	B1	3594	D5	3919	D3	7103	D6
1100	C6	2562	C5	3066	A1	3595	D5	3920	D3	7104	D7
1901	B2	2563	D5	3067	B1	3596	D5	3925	B1	7105	E6
1902	B2	2564	D5	3069	B2	3597	D5	3926	B1	7202	A4
1903	C1	2565	D5	3070	B1	3598	E4	3927	B1	7203	A5
1905	A2	2566	D5	3071	B2	3599	E4	3974	C1	7502	D6
1907	D1	2567	E5	3072	B2	3604	A4	3969	C1	7506	D6
1909	A2	2568	E5	3074	B2	3605	A4	3992	C1	7800	C2
2003	A3	2569	E5	3076	A2	3606	B4	3994	C1	7805	E1
2013	A4	2570	E4	3079	D1	3607	B4	3995	D1	7904	E3
2014	A3	2571	E4	3082	C3	3608	B4	3996	D1	7905	E3
2036	A1	2573	E6	3083	A2	3609	B4	3997	D1	7924	C1
2062	A2	2574	E6	3084	B2	3610	B4	4006	A1		
2064	A2	2575	E6	3085	B2	3611	B4	4008	A1		
2065	A2	2576	D6	3086	D1	3612	B4	4011	A1		
2071	A2	2577	C5	3087	D1	3613	B4	4100	C7		
2073	B1	2578	C5	3104	C7	3614	B4	4106	D7		
2074	A2	2579	C5	3108	D6	3615	B4	4107	D7		
2081	B2	2580	E5	3110	D6	3617	B4	4108	C7		
2083	A2	2581	C5	3111	D7	3618	A4	4109	C7		
2084	A2	2582	C5	3112	D6	3619	B4	4110	C7		
2085	A1	2583	C5	3113	D6	3620	B4	4111	C7		
2088	A2	2584	D6	3114	D6	3621	B4	4112	C7		
2090	A2	2585	D6	3115	D7	3622	C4	4400	B7		
2091	A2	2586	D6	3116	D7	3623	C4	4403	B7		
2092	A2	2604	B4	3117	C7	3624	C4	4404	B7		
2093	A2	2605	D6	3118	C6	3625	C4	4406	B7		
2098	A1	2607	E4	3207	C6	3626	C4	4407	B7		
2099	A1	2609	E5	3208	C6	3627	C4	4408	A7		
2100	C7	2612	E6	3213	C6	3628	C4	4410	B7		
2102	C7	2614	D4	3215	C7	3629	C4	4411	B7		
2103	C7	2615	D7	3216	C7	3630	C4	4422	D7		
2104	B7	2623	E4	3217	C6	3631	D4	4502	C5		
2105	C7	2624	E4	3218	B5	3635	D4	4503	D6		
2106	D6	2625	E4	3219	B5	3639	D4	4504	D6		
2107	D7	2626	E4	3220	A4	3643	D4	4519	D5		
2108	E6	2651	D7	3221	A4	3650	D4	4520	D6		
2211	C6	2653	D5	3222	A4	3651	C4	4525	C5		
2212	C6	2654	E4	3223	A4	3652	C4	4604	C6		
2217	C6	2655	E7	3224	A4	3653	C4	4605	B4		
2218	C6	2659	D7	3225	A5	3654	C4	4615	B4		
2219	C6	2666	A6	3226	A5	3689	B4	4701	B5		
2223	C6	2667	A6	3227	A4	3690	B4	4702	B5		
2229	A4	2668	A6	3228	A5	3702	A5	4703	B5		
2230	A4	2669	E7	3229	A4	3703	A5	4704	B5		
2231	A4	2672	E6	3301	B6	3704	A5	4705	B5		
2232	A5	2674	D7	3304	B6	3705	A5	4706	B5		
2233	A4	2675	D7	3305	B6	3706	A5	4707	B5		
2234	A4	2676	E5	3306	B6	3707	A5	4807	C2		
2300	B6	2677	E4	3308	B6	3708	A5	4901	C3		
2301	B6	2700	D7	3309	B6	3709	A5	4902	C3		
2306	B6	2701	E6	3403	E7	3710	A5	4917	D1		
2307	B6	2702	B7	3406	E7	3711	A5	5000	A3		
2309	B6	2703	D7	3411	A7	3712	A5	5002	A3		
2310	B6	2704	E7	3412	A7	3800	D2	5011	A2		
2405	A7	2705	D7	3418	A7	3801	E2	5012	A1		
2407	E7	2706	D7	3420	A7	3802	D2	5014	A2		
2412	A7	2707	A6	3421	A7	3803	D2	5015	A2		
2413	A7	2801	D3	3422	A7	3804	E2	5016	B1		
2416	A7	2802	D3	3425	A7	3805	E2	5017	A2		
2417	A7	2803	D3	3426	D6	3806	E2	5018	B2		
2418	A7	2804	D3	3427	D7	3807	E2	5019	A2		
2419	A7	2807	D3	3428	D7	3808	E2	5020	B2		
2420	A7	2809	D3	3429	D6	3809	E1	5021	A1		
2426	D6	2812	C3	3430	D6	3810	E2	5022	A2		
2431	D7	2815	D3	3471	E7	3811	E2	5023	A2		
2431	D7	2828	C3	3473	D7	3812	D1	5101	C7		
2439	D7	2838	A2	3478	D7	3814	D1	5103	C7		
2440	A6	2860	A2	3479	D7	3816	C2	5300	B6		
2442	A7	2917	E3	3485	D7	3817	C1	5301	B6		
2443	A7	2918	E3	3489	E7	3820	C2	5400	A7		
2445	A7	2981	A2	3490	E7	3821	C2	5501	D6		
2446	A6	2989	A3	3491	E7	3824	C2	5502	D5		
2447	D7	2998	C1	3500	D5	3825	C1	5504	E4		
2448	E7	2999	A3	3503	D5	3828	C2	5602	B4		
2500	C5	3000	A3	3504	C5	3829	C2	5603	E7		
2501	C5	3001	B3	3515	C5	3841	C1	5607	E4		
2502	C5	3002	A3	3516	C5	3842	C1	5615	E4		
2503	D5	3003	B3	3517	C5	3843	C1	5802	D3		
2509	C5	3004	B3	3518	D5	3853	D3	5806	D3		
2511	D5	3005	C3	3519	C5	3854	D1	5807	D3		
2512	C5	3006	C3	3520	C5	3855	E1	5900	E2		
2513	E5	3007	B3	3522	E5	3856	E1	5901	E2		
2514	E5	3008	B3	3524	D5	3859	E1	5903	E3		
2515	E5	3009	B3	3527	C5	3860	E1	5904	E3		
2516	D5	3010	B3	3529	C5	3861	E1	5928	C1		
2517	D5	3011	C3	3530	C5	3862	E1	5929	A3		
2518	D5	3012	B4	3534	D5	3863	E1	5931	A2		
2519	C5	3016	A3	3535	C5	3864	C4	6100	C7		
2520	C5	3020	A4	3536	C5	3865	B4	6426	D6		
2521	C4	3021	A4	3547	C5	3867	D3	6427	D6		
2522	C5	3023	A3	3548	D5	3868	C4	6428	D7		
2523	D5	3024	A3	3551	C5	3873	D3	6429	A7		
2524	D4	3025	A4	3561	D6	3876	D3	6500	D6		
2525	D5	3026	A3	3574	C5	3877	C3	6501	D6		
2526	D5	3027	A3	3577	C5	3880	C1	6502	D6		
2527	D5	3028	A3	3578	D5	3881	D1	6503	D6		
2528	D5	3029	A4	3580	D6	3893	C2	6603	E7		
2529	C5	3030	A3	3581	D5	3894	C2	6604	E4		
2530	D4	3034	A3	3582	E6	3895	C2	6605	E4		
2531	D5	3048	B3	3586	D6	3908	C3	6607	B6		
2533	C4	3049	B3	3587	D5	3911	C3	6800	D3		
2534	C4	3050	B3	3588	D4	3914	C3	7000	A4		
2536	C5	3057	B4	3589	D4	3915	E3	7001	B3		
2538	B4	3058	B4	3591	E4	3916	E3	7007	A2		

Layout: FEBE Top View Part 2



Layout: FEBE Bottom View



1302 B3	2421 D2	2935 A6	3211 C3	3717 A3	3990 C5	6900 D6
1400 A2	2430 E1	2936 A7	3212 C3	3718 A3	3991 B5	6901 D6
1401 A1	2432 A1	2937 A7	3300 B2	3719 A3	3993 D7	7005 B7
1500 D3	2433 A2	2938 A7	3302 C2	3813 D7	3998 D7	7006 B7
1601 E4	2434 D1	2942 A7	3303 B2	3815 D7	3999 D7	7008 A7
1602 E4	2435 D1	2943 B6	3315 B2	3818 C6	4000 A4	7107 B2
1700 A4	2436 A2	2946 B6	3316 B2	3819 C6	4001 A5	7201 C2
1702 A1	2438 A1	2947 B6	3404 D2	3822 C6	4002 A5	7300 B2
1703 A4	2441 C1	2951 B6	3405 E2	3823 C6	4003 B4	7401 D2
1705 B1	2444 A1	2953 B6	3410 C1	3826 C6	4004 B4	7402 A1
1904 A7	2504 C3	2954 C6	3423 A1	3827 C6	4005 B7	7403 C1
1906 A7	2505 C3	2955 C6	3440 C1	3830 C6	4007 B7	7405 B1
1908 A6	2506 C3	2956 B6	3444 C1	3831 C6	4009 A5	7409 D1
2000 A5	2507 C3	2959 B6	3445 C1	3832 D6	4010 A7	7500 D3
2001 A5	2550 C3	2962 B6	3446 C1	3833 D6	4105 B2	7503 E3
2002 A4	2561 C3	2963 B7	3447 C1	3834 D6	4200 B2	7504 E4
2004 A4	2572 D2	2965 B7	3450 C1	3835 D6	4201 C1	7505 E2
2005 A5	2608 D4	2967 B6	3452 C1	3836 D6	4202 C2	7603 E1
2006 A5	2610 E1	2968 B6	3453 C1	3837 D6	4204 C2	7604 D1
2007 A5	2611 E1	2974 B6	3454 C1	3838 D6	4203 C2	7606 A1
2008 A5	2618 D1	2975 B6	3455 C1	3839 D6	4303 B2	7607 A2
2009 A5	2662 B1	2976 C6	3456 B1	3840 C6	4402 A1	7608 E1
2010 A5	2663 A1	2977 C6	3457 B1	3844 C6	4413 C1	7802 C6
2011 A5	2664 A2	2978 C7	3458 C1	3846 C7	4416 A1	7804 C7
2012 A4	2665 B1	2979 B6	3459 A1	3847 C7	4417 A2	7900 D5
2015 A4	2670 E1	2980 B6	3460 A1	3848 C7	4419 D1	7902 E6
2016 A5	2671 E1	2982 B6	3461 B1	3851 C7	4420 A2	7903 E6
2017 A5	2673 D1	2983 B6	3462 B1	3857 E7	4421 A2	7910 B6
2018 A5	2805 D5	2984 B6	3463 C1	3858 E7	4423 A2	7913 C7
2019 A5	2806 C6	2985 C6	3464 B1	3866 D6	4427 D1	7914 B6
2020 A5	2808 C7	2986 C6	3465 A1	3869 D5	4606 B5	7915 C7
2021 A5	2810 C7	2987 C7	3472 A1	3870 D5	4607 B5	7916 B6
2022 A4	2811 C7	2988 C7	3474 D1	3871 D5	4608 B5	7917 B6
2023 A4	2813 C6	2990 D7	3475 A1	3872 D5	4805 C6	7918 B6
2024 B4	2814 C6	2991 C6	3476 A1	3874 D6	4900 D5	7919 C6
2025 B4	2815 C6	2992 C6	3477 D1	3875 D6	4905 C6	7920 B6
2026 B4	2816 C6	2993 D7	3480 C1	3896 D7	4906 C5	7921 B6
2027 B4	2817 C6	2995 B5	3481 C1	3897 C6	4909 C7	7922 C7
2028 B5	2819 D6	2996 C5	3482 A2	3901 C7	4915 D6	7923 C5
2029 B5	2820 D6	3013 A4	3483 C1	3903 D5	4919 A6	7926 C6
2030 B5	2821 D6	3014 A4	3484 C1	3904 D5	4920 C7	7927 A5
2031 B5	2822 C6	3015 A4	3486 C1	3912 E6	4921 D7	7928 A6
2032 B5	2823 C6	3017 A4	3487 A1	3913 E5	4922 A7	7929 A5
2033 B5	2824 C6	3018 A5	3488 C1	3921 A6	4923 A6	7950 D6
2034 B5	2825 C6	3019 A5	3492 D1	3922 A6	4925 C5	
2045 A6	2826 C6	3022 A4	3493 A1	3923 A6	5001 A4	
2046 A6	2827 C6	3035 A5	3494 A1	3924 A6	5003 A5	
2051 A6	2829 C6	3036 A4	3495 A2	3930 B6	5013 B7	
2055 A6	2830 D6	3037 A4	3496 A1	3931 B6	5102 B1	
2063 B7	2831 D6	3038 A4	3497 A1	3932 B6	5104 B1	
2066 A6	2832 D6	3039 A5	3498 A1	3933 B7	5202 C2	
2067 B6	2833 D6	3040 A5	3501 B3	3934 B7	5405 D1	
2068 B6	2834 D6	3041 A4	3502 B3	3935 B7	5406 A2	
2069 A7	2835 D6	3042 A4	3507 C3	3936 B6	5609 D1	
2070 B6	2836 C6	3043 A5	3508 C3	3937 B7	5614 D1	
2075 B6	2837 C6	3044 A4	3509 C3	3940 C6	5616 B1	
2076 A6	2839 A5	3045 B5	3510 C3	3941 C6	5617 A2	
2077 B6	2840 A7	3046 A5	3511 C3	3942 B6	5800 D5	
2082 B7	2841 A6	3047 A5	3512 C3	3943 B7	5801 C6	
2086 A6	2842 A6	3051 B5	3513 C3	3944 B6	5803 D7	
2087 A6	2843 A6	3052 B5	3514 C3	3946 C6	5804 C5	
2089 A6	2844 A6	3053 B5	3521 C3	3948 B6	5805 C6	
2094 A6	2845 A5	3054 B5	3523 C3	3949 C7	5808 E7	
2095 A6	2846 A5	3055 B5	3528 C3	3951 B6	5902 D5	
2096 A6	2847 A6	3056 B5	3531 C3	3952 B6	5905 B6	
2097 A7	2861 A6	3060 B4	3532 C3	3953 B6	5906 B7	
2101 C1	2862 C7	3061 B4	3541 B3	3954 C6	5909 B7	
2110 D1	2863 E7	3062 B7	3542 C4	3956 C6	5914 B7	
2110 B2	2900 D5	3063 B7	3543 C4	3958 C6	5915 C6	
2204 C2	2901 E7	3068 B7	3545 B4	3959 C6	5916 B7	
2205 C2	2902 E7	3073 A6	3546 C4	3961 B6	5917 B7	
2209 C2	2903 E6	3075 B6	3560 C3	3963 B6	5918 C7	
2210 C2	2904 E6	3077 B6	3562 D4	3964 B6	5919 B6	
2213 C2	2905 E7	3078 D7	3579 C3	3965 C6	5920 C6	
2214 C2	2906 E7	3080 A5	3583 D3	3966 C6	5921 C7	
2215 C2	2907 E6	3081 A5	3584 D3	3967 B6	5922 A6	
2221 C2	2908 E6	3100 B2	3585 D4	3968 C7	5923 B6	
2228 C2	2909 D7	3101 B2	3647 D4	3969 D6	5924 C6	
2302 B2	2910 E6	3102 B2	3648 D4	3970 D6	5925 C7	
2303 B3	2911 D6	3103 C3	3660 D1	3971 D7	5926 A6	
2304 B3	2912 E5	3105 C3	3661 D1	3972 C6	5927 C5	
2305 B2	2913 E6	3106 C2	3686 D1	3973 D7	5930 A6	
2308 C2	2914 E5	3107 C2	3692 A1	3975 D7	5932 A7	
2311 B3	2915 E6	3119 B2	3693 A1	3976 B5	5933 A6	
2312 B2	2916 E5	3120 B2	3694 A1	3977 D6	5934 A6	
2400 A1	2919 A6	3200 C2	3695 A3	3978 C7	5935 A6	
2401 D2	2920 A6	3201 C2	3696 A3	3979 D7	5936 A6	
2406 D2	2921 E5	3202 C2	3697 A3	3980 C5	6001 B7	
2409 A2	2929 A6	3204 C2	3713 A3	3981 C5	6400 A2	
2411 A1	2932 A6	3206 C2	3714 A3	3984 C5	6401 A2	
2414 A1	2933 A6	3209 D3	3715 A3	3987 B5	6402 A2	
2415 A1	2934 A6	3210 D3	3716 A3	3988 C5	6403 A2	

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15062004

Layout: FEBE Bottom View Part 2

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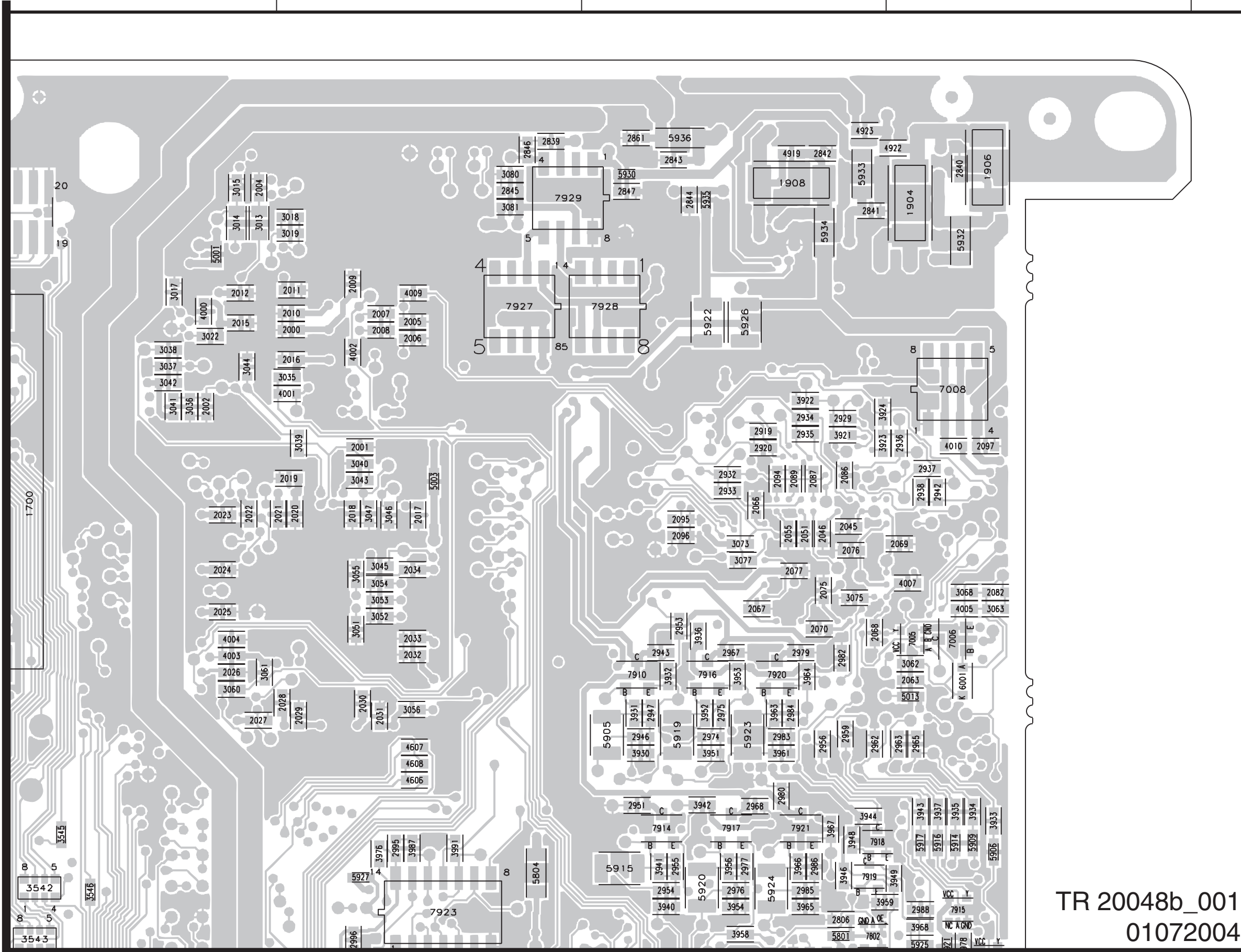
5

6

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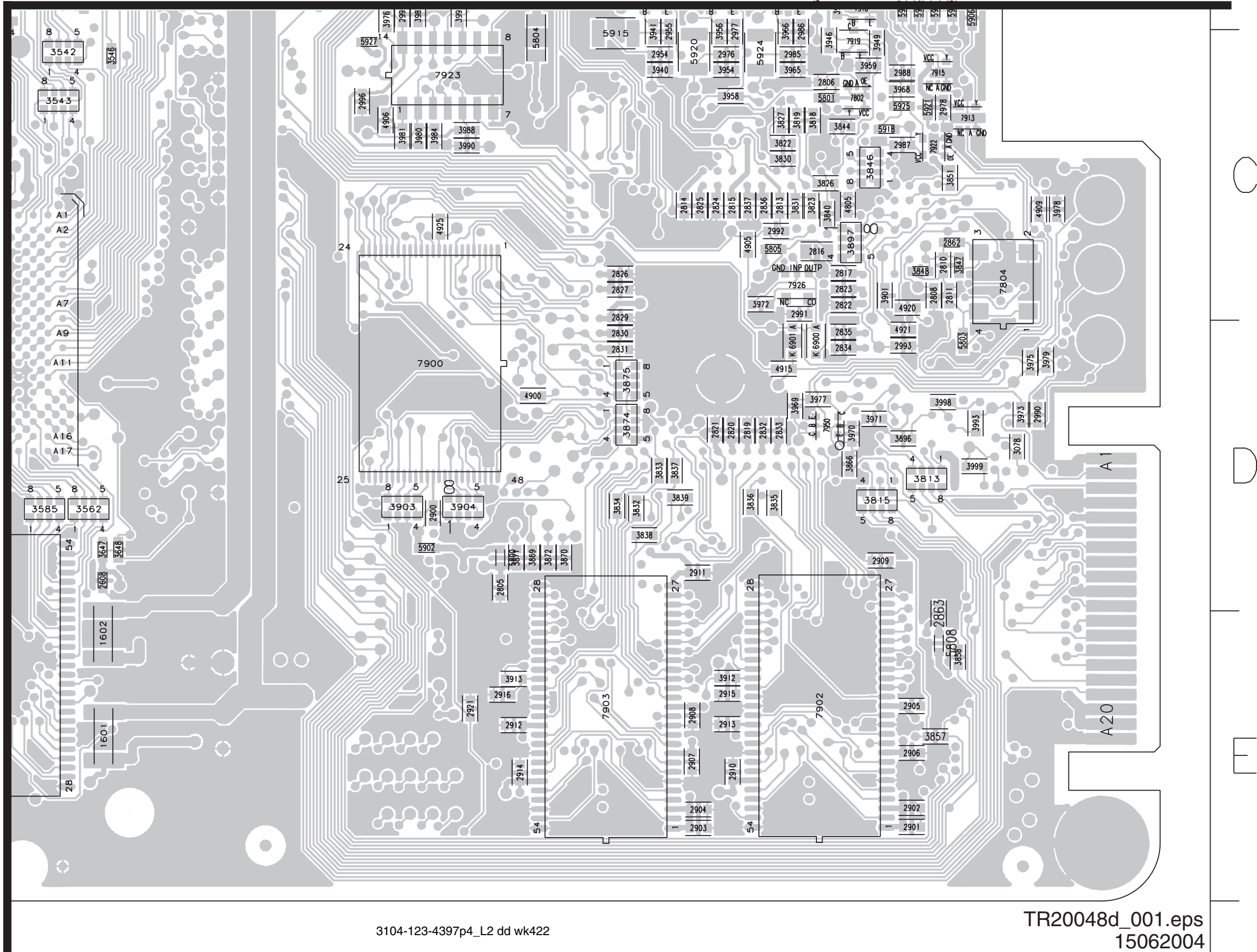
A

B



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Layout: FEBE Bottom View Part 4



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8. Alignments

8.1 Reprogramming Procedure of NVM on the FEBE board

The NVM, item 7905, on the FEBE board contains the slash information of the set

The slash version is stored at the end of the production line of the set.

In case of failure, the NVM must be replaced by an empty device. By way of commands via the Diagnostic Software or via ComPair, the factory settings must be restored in the NVM.

8.1.1 Slash Version

The slash version is stored with command 1217 followed by the slash version as parameter.

The slash versions used in DVDR610, DVDR615 and DVDR616 are the following:

- DVDR610/00/02/19/33: 11001
- DVDR610/05: 11002
- DVDR615/00/02/19/33: 11003
- DVDR615/05: 11004
- DVDR616/00/02/19/33: 11003
- DVDR616/05: 11004

Example:

```
DD:>1217 11003
```

8.2 Rework Procedure IEEE Unique Number

8.2.1 Scope:

The procedure describes how to upgrade sets with a unique number after repair. This unique number is stored in the NVRAM (item 7001) of the FEBE board at the end of the production line.

This procedure is only valid or necessary when:

- The FEBE board is replaced
- NVRAM on the FEBE board is replaced
- NVRAM is cleared

In all other cases the repaired set retains its unique number.

The procedure defines several means to re-assure the unique number depending on the possibilities of repair or the state the faulty set is in.

8.2.2 Handling:

State of original (defective) board:

1. The FEBE board starts up in Diagnostics Mode: follow procedure A to retrieve the valid unique number
2. The FEBE board does NOT start up in Diagnostics Mode: follow procedure B.

8.2.3 Procedure A

1. Connect defective digital board to PC via serial cable (3122 785 90017)
2. start up hyper terminal or any other serial terminal via the correct settings (DSW command mode interface)
3. read out existing unique number via 1208
example:
DS:> 1208 120800: DvldNumber is: 0x0C22384E5A
Test OK @
4. note read out
5. program new digital board via nucleus 1207
example:
DS:> 1207 1234567890 120700: Test OK @

The set has now the original unique number

8.2.4 Procedure B

1. Note the serial number of the set example:
VN050136130156
 - VN = production centre (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 the formula below: $35828 * \text{YEAR} + 676 * \text{WEEK} + 26 * A + H + 8788$ The figures are fixed, YEAR + WEEK + factory code (A + H) are variable Example: $35828 * 01 + 676 * 36 + 26 * 1 + 8 + 8788 = 68986$ (decimal) Then we translate the decimal number to a hexadecimal number. example: 68986 (decimal) = 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. Program new digital board via nucleus 1207. Therefore we use the 10 hexadecimal numbers we calculated above:
example:
DS:>1207 10D7A1FC6C
120700: Test OK @

The set has now its original unique number

8.3 Alignments after replacing the Boot EEPROM 7904 on the FEBE Board

The NVM, item 7904, on the FEBE Board contains the "Diversity String" that tells the software during startup which hardware version is present.

The setting is stored in the NVM during the production of the FEBE Board.

In case of a fault the NVM must be replaced by a programmed device containing the boot script.

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

The diversity strings used in DVDR610, DVDR615 and DVDR616 are the following:"

FEBE Board Type:	String
E1_AV3_4	444248495AB8200145315F4156335F34350 40300000101020001000020040000
E2_AV3_4	444248496CB8200145325F4156335F34360 4030000000020001000020040000

Example:

```
DS:> 1226 444248495AB8200145315F4156335F34350  
40300000101020001000020040000  
122600  
Test OK @
```

E1_AV3_4 FEBE Board (for DVDR615/00/02/05/19/33 and DVDR616/00/02/05).

E2_AV3_4 FEBE Board (for DVDR610/00/02/05/19/33).

With command 1228 the settings can be displayed.

9. Circuit-, IC descriptions and list of abbreviations

9.1 MOBO (Analog) Board

9.1.1 General

The pcba consists of the following parts:

- Control unit Slave μ P
- Power supply unit
- Frontend (Audio & Video)
- Input/Output switching
- Audio ADC & DAC processing
- Analog Follow-Me circuit
- IR Blaster (for EPG sets only)

9.1.2 Control unit Slave μ P

The core element of the MOBO analog board is the slave μ P TMP87CM74AF [7107].

It runs on a 5V supply and is responsible for the following functions:

- Interface with the Chrysalis chip on the FEBE Digital backend
- Evaluation of the keyboard matrix
- Decoding the remote control commands from the infra-red receiver
- Activation and control of the display
- Heater voltage generation
- Fan control
- IR Blaster (for EPG sets only)

It runs on a high clock frequency of 8MHz with resonator [1101] and a low clock frequency of 32.768kHz with resonator [1102].

9.1.3 Interface to the Chrysalis chip

The communication to the Chrysalis chip on the FEBE Digital backend is done via I²C interface, where the TMP87CM74AF acts in slave-mode.

9.1.4 Evaluation of the keyboard matrix

A resistor network on the Keyboard is used to generate a specific direct voltage value (KEY1- & KEY2-line), depending on the pressed key. Via the resistors 3157 and 3159 on the analog/digital (A/D) ports, [7107] pin 32 and 32 the evaluation is done.

9.1.5 IR receiver and signal evaluation

The IR receiver [7200] on the Keyboard contains a selectively controlled amplifier as well as a photo-diode. The photo-diode changes the received infra red transmission to electrical pulses, which are then amplified and demodulated. On the output of the IR receiver [7200], a pulse sequence with TTL-level, which corresponds to the envelope curve of the received IF remote control command, can be measured. This pulse sequence is fed into the controller for further processing via pin 22 [7107].

9.1.6 Vacuum Fluorescence Display

The VFD BJ900GNK [1100] is fully controlled by the microcontroller. The microcontroller also includes the driving stages. Only two additional drivers [7110] and [7112] are necessary for the grids 8 and 9 because of their large size.

9.1.7 VFD Heater Voltage Generator

The circuit around [7102], [7103] and [7104] is used to generate a proper AC-voltage for the filament of the VFD. For

this the microcontroller generates an appropriate rectangular signal with 50% duty-cycle and a frequency of 30kHz at pin 19. [5101] and [2112] are acting as resonance circuit. Via zener-diode [6102] and resistors [3111], [3113] and [3116] the two heater pins of the VFD (FIL1 and FIL2) are clamped so that the grids and segments can be fully switched off.

9.1.8 Fan Control

To avoid unwanted temperatures inside the set (especially the Laser on the OPU of the drive is very sensitive) a fan is located at the rear of the FEBE module. The speed control is dependent on the ambient temperature. A NTC resistor [3211] located on the Keyboard measures the temperature. The change in temperature is translated into dc levels and send to pin 28 of slave μ P [7107]. High / low signals is then sends out via pin 5 and 6 of slave μ P [7107] to control transistors [7106] and [7108] which regulates the fan motor to 3 different speeds

9.1.9 Power Supply Unit

Functional principle:

This power supply works in the way of a flyback converter. In the mains input part [1931 to 2315], the mains voltage is rectified and buffered in the capacitor [2315]. From this direct voltage at [2315] energy is transferred into the transformer [5300, pins 7-5] during the conductive phase of the switching transistor [7307] and is stored there as magnetic energy. This energy is passed to the secondary outputs of the power supply in the blocking phase of the switching transistor [7307]. With the switch-on time of the switching transistor [7307], the energy transferred in every cycle is regulated in such a way that the output voltages remain constant regardless of changes in the load or mains voltage. The power transistor is driven by the integrated circuit [7311].

Mains input part:

The mains input part extends from the mains socket [1931] to the capacitor [2315]. The diodes [6302, 6303, 6305 and 6307] rectify the AC supply voltage, which is then buffered by the capacitor [2315]. The common mode coil [5302] and capacitor [2311] work as a filter to block interference arising in the power supply from the mains. Components [1302], [3316] protect the power supply against short-term over voltages in the mains, e.g. caused by indirect lightning.

Start-up with Mains-on:

After connecting the power cord to the mains, the capacitor [2331] is loaded via a current source between pin 8 and pin 1 in the IC [7311]. Once the voltage on [2331] and therefore the supply voltage V_{CC} of the IC [7311] has reached approx. 11V, the IC starts up and provides pulses at its output pin 5. These pulses are used to drive the gate of the power transistor [7307]. The frequency of these pulses is depending on load and mains voltage. The current consumption of the IC is approx. 5 mA at V_{CC} in normal mode.

If V_{CC} drops to below approx. 9V (e.g. with power limitation) or if V_{CC} exceeds approximately 16V (e.g. interruption of the control loop), the output of the IC [7311, pin 5] is blocked and a new start-up cycle begins.

(See also Overload, Power Limitation and Burst Mode section)

Normal operation:

With the power supply in normal mode, the periodic sequences in the circuit are divided primarily into the conductive and blocking phase of the switching transistor [7307]. During the **conductive phase** of the switching transistor [7307], current flows from the rectified mains voltage at capacitor [2315] through the primary coil of the transformer [5300, pins 7-5], the transistor [7307] and resistors [3330, 3331] to ground. The

positive voltage on pin 7 of the transformer [5300] can be assumed as constant for a switching cycle. The current in the primary coil of the transformer [5300] increases linearly. A magnetic field representing a certain value of the primary current is formed inside the transformer. In this phase, the voltages on the secondary coils are polarized such that the diodes [6300, 6301, 6304, 6306, 6309, 6311, 6315 and 6318] block. From the controller [7319] a current is supplied into the CTRL input on the IC [pin 3, 7311] via optocoupler [7316]. Once the switch on time of the switching transistor [7307] - that corresponds to the current supplied into the CTRL input - has been reached, the switching transistor [7307] is switched off. When the switching transistor has been switched off, the **blocking phase** begins. No more energy will be transferred into the transformer. The inductivity of the transformer will still attempt to keep the current flowing at a constant level ($U=L \cdot di/dt$). Switching off transistor [7307] interrupts the primary current circuit. The polarity of the voltages on the transformer is reversed, which means that the diodes [6300, 6301, 6304, 6306, 6309, 6311, 6315 and 6318] become conductive and current flows into the capacitors [2302, 2309, 2316, 2321, 2324 and 2328] and the load. This current is also ramp-shaped (di/dt negative, therefore decreasing).

The **feedback control** for the switched-mode power supply is done by changing the conductive phase of the switching transistor so that either more or less energy is transferred from the rectified mains voltage at [2315] into the transformer. The regulation information is provided by voltage reference [7319]. This element compares the 5V-output voltage via voltage divider [3359, 3362, 3363] with an internal 2.5V reference voltage. The output voltage of [7319] passes via an optocoupler [7316] for insulation of primary and secondary parts as a current value into pin 3 on the IC [7311]. The switch-on time of the transistor [7307] is inversely proportional to the value of this current.

Overload, power limitation, burst mode:

With increasing load on one or more of the power supply outputs, the switch-on time for the power transistor [7307] increases, and thus also the peak value of the delta-shaped current through this power transistor. The equivalent voltage of this current profile is passed from resistors [3330] and [3331] via [3334] to pin 5 of the IC [7311]. If the voltage on pin 5 reaches approx. 0.4V in one switching cycle, the conductive phase of the switching transistor is ended immediately. The check is done in each individual switching cycle. This process ensures that no more than approx. 50W can be taken out from the mains (= **power limitation**).

If the power supply reaches the power limit, the output voltages and the supply voltage V_{CC} on pin 1 of the IC [7311] will be reduced following further loading. If V_{CC} is less than approx. 9V at any point during this process, the output of the IC [7311, pin 6] is blocked. All output voltages and V_{CC} decrease and a new start-up cycle begins. If the overload status or short-circuit remains, the power limitation will be activated immediately and the voltages will again decrease, followed by another start-up cycle (**Burst Mode**). The amount of power taken up from the mains in burst mode is low.

Standby modes:

In the AV-Standby operating mode of the set, the DD_ON control line is low switching off the +5VE and +12VE supply [connector 1932] to the FEBE Frontend and DVD drive. This reduces the amount of power taken from the mains.

In Low Power Standby mode, additional STBY control line is high switching off the 12V, 5V, 5N and 3V3SW supply. In this mode all functions are switch off and the slave μP (in idle mode) and real time clock (32.768kHz) is running. This reduces power consumption to less than 3W. In some program mode the slave μP provides a wakeup service (STBY-line switches to low), then the Chrysalis main controller starts up and asks for the wakeup reason.

9.1.10 Tuner Frontend

This unit support Broadcast System PAL: BG, DK, I and SECAM: L, L'.

It has a RF IN for antenna connection and RF OUT which provides a RF loop through during Standby mode for connection to the TV.

The frontend is controlled by the I²C (SCL_5V- and SDA_5V-) lines coming from the slave μP .

Complete video processing is done in this unit and the video output (CVBS) is out from pin 17 via transistor 7000 as VFV-line to the Video I/O and Follow Me circuitry.

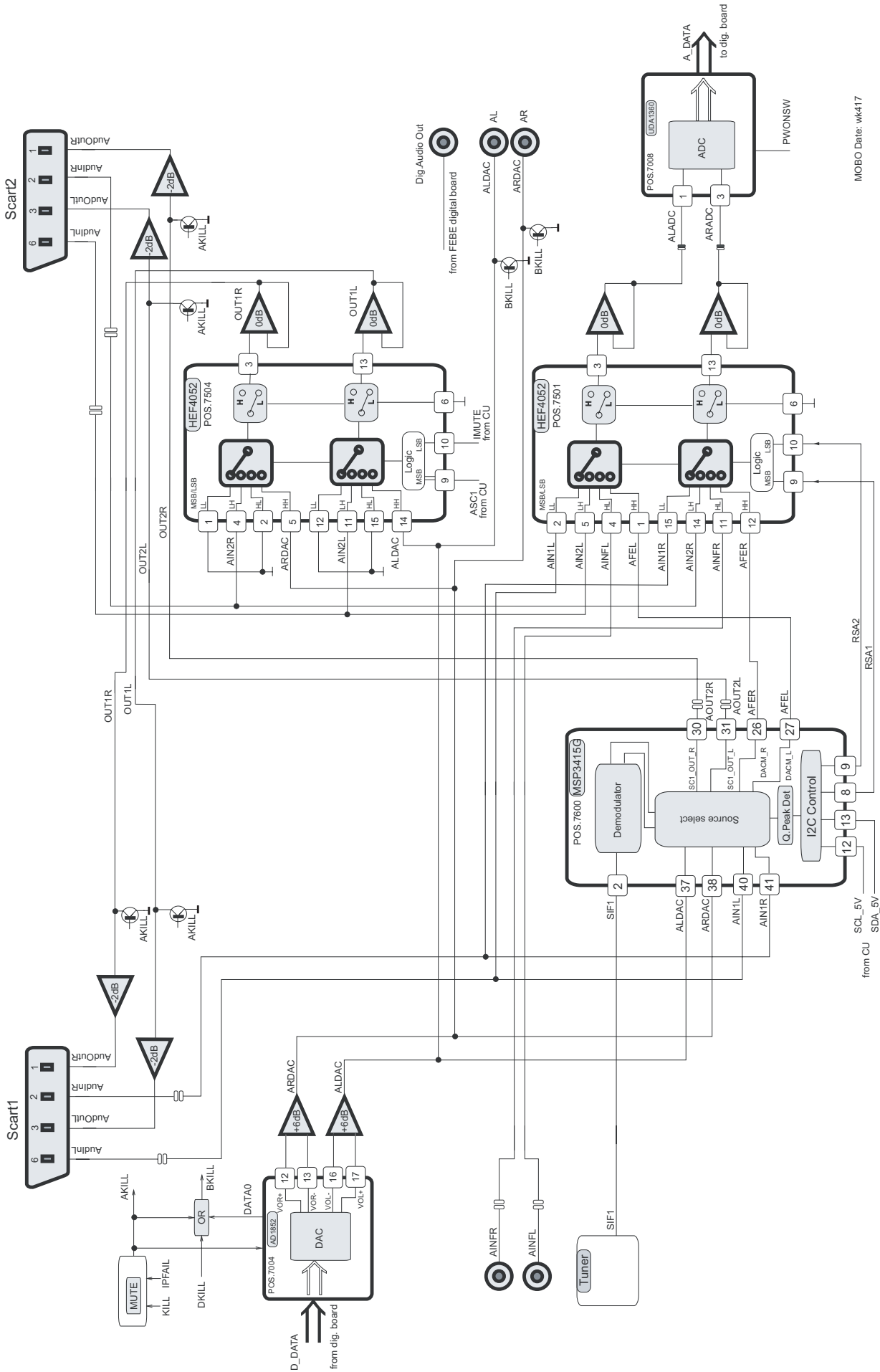
The audio-IF component SIF1 is taken out from pin 7 for demodulation in the sound processor [7600].

Audio demodulator

The sound demodulation is done by the MSP3415 [7600], which is also fully controlled via I²C-bus by the slave μP (determination of bandwidth, amplitude, standard, ...). The audio signals are available at pin 26 and pin 27 of [7600] and fed as AFER- & AFEL-line to the audio-I/O for further processing.

9.1.11 Audio routing

Audio IO Europe Overview



MOBO Date: wk417

Figure 9-1 MOBO Audio IO Eur

The processing of audio is always done in stereo (e.g. separate left- and right-channel) and the complete switching is realized by using HEF4052, which is a dual four-to-one multiplexer and MSP3415G, multi-sound processor. In principle there are three independent selectors:

a) Scart 1-Output-Path:

Pos [7504] is used to select either Scart 2-Input (AIN2L/AIN2R) or the signal directly from the audio DAC [7004] (ALDAC/ARDAC) as the output source for Scart 1 (AOUT1L/AOUT1R). The control is done by means of the lines ASC1S coming from slave μ P [7107].

b) Scart 2-Output-Path:

The MSP [7600] is used to select either Scart 1-Input (AIN1L/AIN1R), signals from the DAC [7004] (ALDAC/ARDAC) or Tuner frontend as the output source for Scart 2 (AOUT2L/AOUT2R).

c) Record-Path:

Pos [7501] selects either signals from Scart 1 (AIN1L/AIN1R) or Scart 2 (AIN2L/AIN2R) or Cinch-Front (AINFL/AINFR) or the MSP [7600] (AFEL/AFER) and routes to the audio ADC [7008] (ALADC/ARADC) for record purposes. The switch is controlled via RSA1 and RSA2 signals. These signals come from the MSP [7600], which acts as a port expander of the slave μ P. The two selectors [7501] & [7504] has a separate Op-Amp on the output for level-adaptation-, performance- and line-driving-reasons: [7500-1 & -2] for record, [7503-1 & -2] for Scart 1-Output respectively. Every audio output line on the two Scart connectors and rear Cinch sockets can be killed (muted) by the AKILL-line [7505], [7507], [7602] & [7603] and the BKILL-line [7802], [7804].

Additionally to analog audio the set is also equipped with a digital output via cinch plug [1955]. The signal is generated on the FEBE Digital backend and routed via audio interface cable and connector [1900] to the MOBO analog board. Here the DAOUT-line first passes a 6-fold inverter [7551] being used as a driver and for performance reasons (noise reduction, jitter, ...). Afterwards a transformer [5551] is necessary to achieve the correct level and also to have a floating output with isolated ground before the signal is fed via [3559 & 3563] to cinch plug [1955]. The capacitor [2553] performs an AC-coupling between connector- and set-ground.

9.1.12 Audio ADC/DAC

The conversion of analog audio signals from the record-selector [7501] in the audio I/O (ALADC & ARADC) is done via UDA1361TS [7008]. This IC can process input signals up to $2V_{rms}$ by using external resistors [3034], [3036] in series to the input pins. All required clock signals are generated on the FEBE Digital backend and only the audio data (A_DAT-line) are routed from MOBO analog board to FEBE Digital backend for further processing.

The transformation of digital audio back into the analog domain is done by AD1852 [7004]. All necessary clock signals are coming from the FEBE digital backend and digital audio data (D_DATA0-line) are converted into analog signals, which are available at pin 12 & 13 (right channel) and pin 16 & 17 (left channel) of [7004]. Afterwards an Op-Amp. [7005] (line driver & level adaptation) and a low-pass-filter to increase signal performance (noise, distortions,...). is passed. Then both signals (ALDAC & ARDAC) are directly routed to the rear cinch output and also used in the audio-I/O for further processing.

The DAC has also a mute possibility, which can be activated by setting pin 8 to high via [7006]. This mute is controlled either by the FEBE digital backend (D_IKLL-line), IMUTE-signal from the slave μ P or the IPFAIL-signal from power-supply-unit.

In addition to that the cinch outputs is killed (muted) in case of digital silence (D_DATA0-line zero) by the circuit around [7045] and [7002] via the BKILL-line.

9.1.13 Video-routing

Video IO Europe

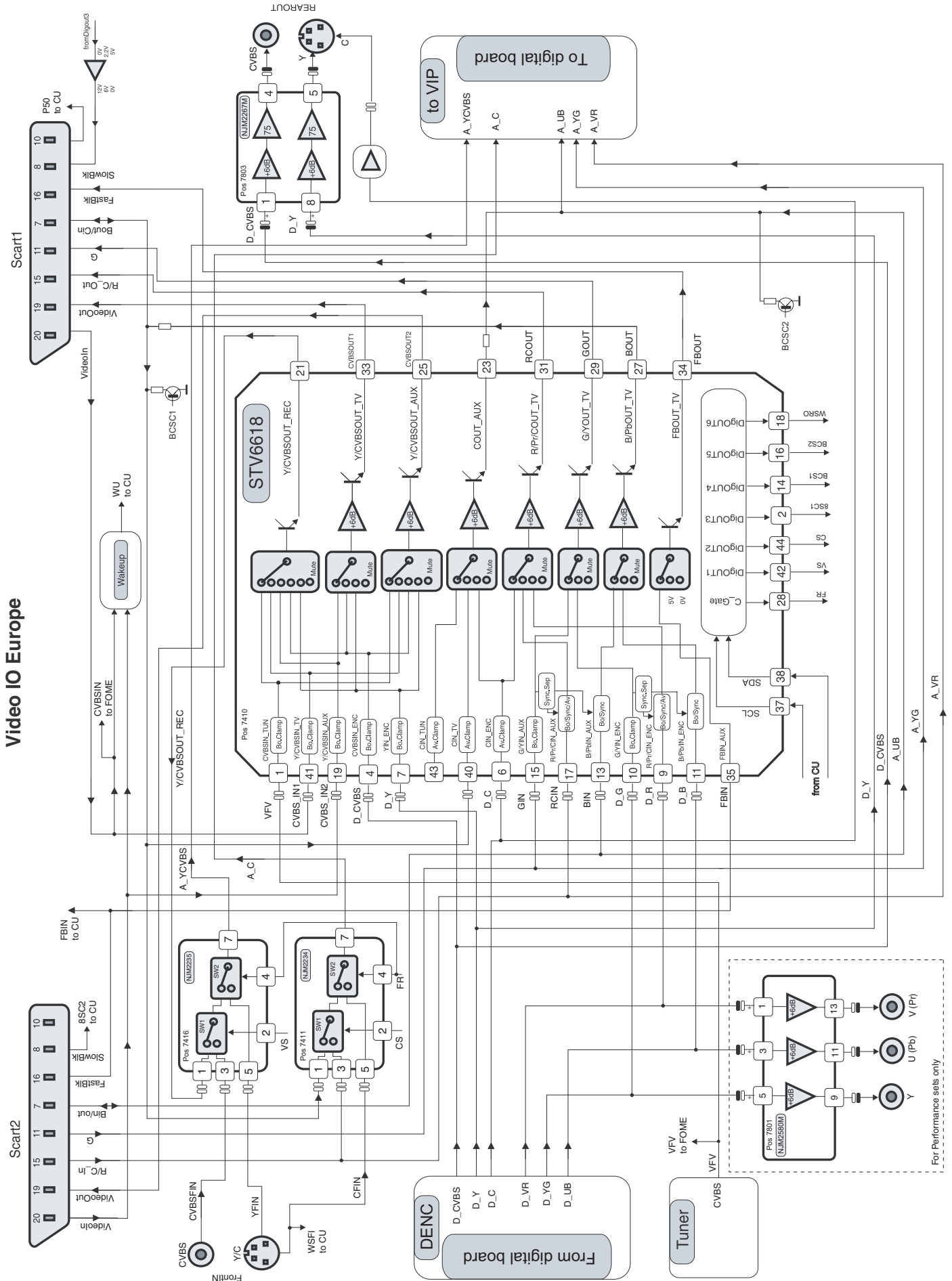


Figure 9-2 MOBO Video IO Eu

The complete Video-I/O-switching is basically realized by the matrix switch STV6618 [7410], which is controlled via I²C-bus by the slave μ P. All used outputs excluding pin 21 (Y/CVBS-REC) have a 6 dB-amplification and a 75 Ohms driver-stage inside. This IC includes also several digital outputs, which are used for switching purposes on the analog board. The record selector inside the switch selects between the CVBS from Tuner frontend (VFV), the input from Scart 1 (YCVBSIN1) or the signal from Scart 2 (YCVBSIN2). Afterwards the signal passes another switch [7416] in which a selection between signals from the front or the preselected ones are done.

Likewise a second switch [7411] selects between Scart 1 (CIN) and Scart 2 (RCIN) and front (CFIN). The output signals of [7416] A_YCVBS- and [7411] A_C-lines are fed to the VIP on FEBE Digital backend for further processing.

The R/G/B-inputs and the Fast-Blanking-line from Scart 2 are directly routed to the FEBE Digital backend. These signals are also available on the corresponding input-pins of the STV6618 to enable a loop-through in AV-Standby. In this mode the set has to behave like a cable between the two Scart-connectors. AV-Standby is activated either by a high level on pin 8 of Scart 2 (active device is present) or by the WU-line (wake up). This signal is generated out of the circuit around [7401], [7402] & [7404] and will become high if there is a signal on pin 20 of Scart 1- or Scart 2. The detection of the input level on pin 8 of Scart 2 (8SC2) is done via an analog input of the slave μ P (less than 2V means inactive; 4,5V to 7V determines a source with 16:9 picture-ratio and greater than 9,5V is an active 4:3 source).

All signals from the FEBE Digital backend (D_VR, D_YG, D_UB, D_C, D_Y and D_CVBS) are routed to the proper inputs of the STV6618 for amplification and driving purpose before they can be seen on the appropriate Scart outputs.

Parallel to this the D_CVBS- and the D_Y-line are passing a 6 dB-amplifier and driver-IC [7803] and are then routed to the CVBS-Cinch and Y/C-out rear. The chroma signal for this Y/C out is coming from the STV6618.

The detection of the picture ratio information on the Y/C-input front is made by measuring the DC-level on the Chroma signal via analog input of the slave μ P (WSFI-line). In case the level is higher than 3,5V the input signal is a 16:9 source. If the level is lower than 2,4V the picture ratio is 4:3.

Likewise for the D_VR-, D_YG- and D_UB- lines are passing a 6dB-amplifier and driver-IC [7801] and routed as component video YUV (For Performance set only).

The control of the switching voltage (Pin 8 of Scart 1) is done via 3-level-pin (pin 2) of the STV6618 [7408] and the transistors [7405], [7407] & [7409]. A low on pin 2 of [7408] causes around 11V on pin 8-Scart 1 (e.g. source with 4:3 picture-ratio active). Medium level (2,5V) on pin 2 of the STV6618 generates medium level (approx. 6V) on pin 8-Scart 1 (e.g. active source with 16:9) and a high on pin 2 of the STV6618 pushes pin 8-Scart 1 to low (e.g. inactive).

9.1.14 Analog Follow-Me

This circuit compares the video signal from the Tuner frontend (VFV) of the recorder with that one of the connected TV-set (CVBSIN). The TV set delivers the signal via Scart-cable. A comparator [7951] and several additional parts [7953], [7954], ... are used to compare the two video signals. In case of both input signals are equal the output-line of this circuit (FOME) is set to low. Detection is made via an input port of the slave μ P.

9.2 VAU8041 (FEBE / AV3.5) Module

9.2.1 General

The Video Recorder Drive VAU8041 module known as FEBE 1.0 with AV3.5 drive is actually the Video Recorder Drive VAD8041 module with an extended board. The new FEBE board contains both the frontend Servo and backend Digital

portion. Being physically on the same board the IDE connector is no longer required.

The recorder engine performs all basic servo tasks - reading and writing data on the disc and controls all functions like tray control, start/stop the disc, tracking, jumping and communicating to the host.

Mechanically, the module consists of a motorized tray loader that contains the dual laser optical pickup unit and a board that contains all the electronics needed to control the drive and interfacing to the MPEG encoder/decoder backend Digital portion

The backend Digital portion encodes and multiplexes analogue video and digital uncompressed audio (I²S) into an MPEG2 stream. This MPEG2 stream is formatted, to be recorded by the DVD+RW/+R engine. In playback, it decodes the MPEG2 stream into analogue and digital audio and into analogue video. 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.

9.2.2 Power Supply

The +3V3, +5V, -5V and +12V come from the PSU of the MOBO analog board via connector [1905] while the +1V8 core voltage is generated on the board by a low voltage buck controller [7929]. It provides the control for DC-DC power solution producing a +1.8V output power over a wide current range. The NCP1570-based solution is powered from +12V with the output derived from the +3V3 supply. It contains all required circuitry for a synchronous NFET [7927-1] and [7928-2] buck regulator.

9.2.3 Frontend part

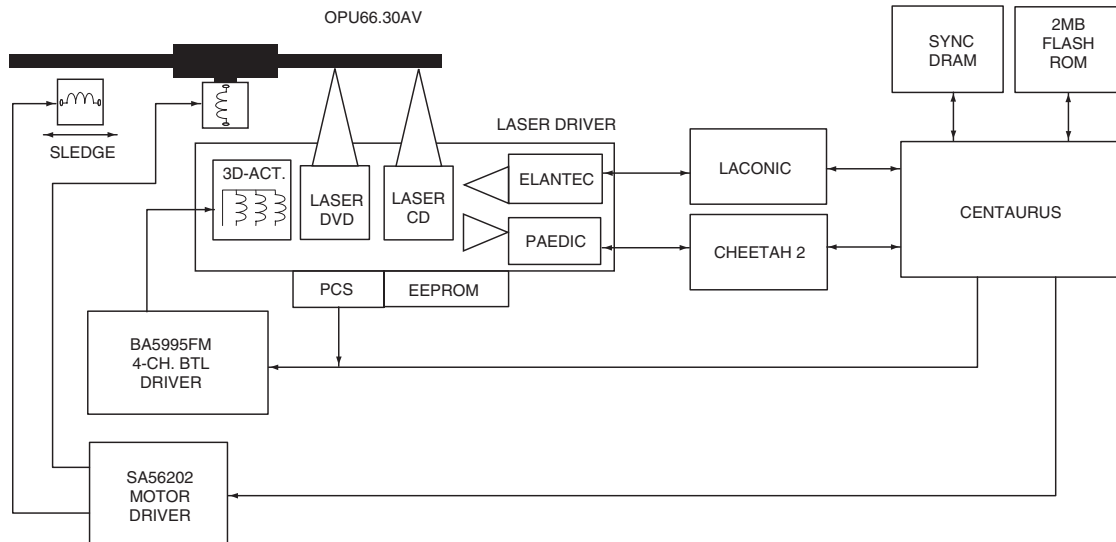


Figure 9-3 Servo Block

This section describes briefly the functional behavior of the engine. It performs all basic servo and data processing function:

- it reads data from the disc
- it writes data to the disc - it controls all other functions like tray control, start/stop the disc, tracking, jumping, and communication to the host.
- encodes and multiplexes analogue video and digital uncompressed audio (I²C) into a MPEG2 stream
- decodes the MPEG2 stream into analogue and digital audio and into analogue video

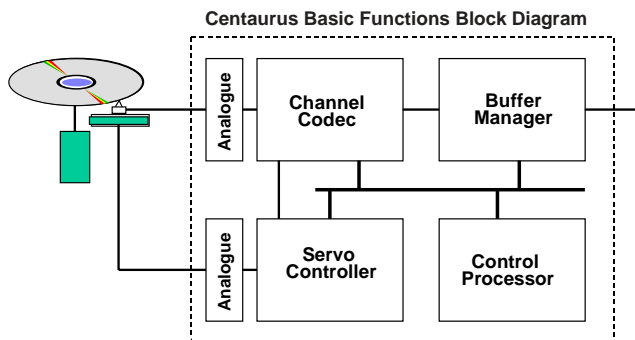
Centaurus 1.5 (PNX7850E)

Figure 9-4 Centaurus

The Centaurus [7500] is a highly integrated IC that controls all the functions of the drive. It interfaces via the IDE bus to the MPEG backend and incorporates the following functions.

- CD/DVD channel decoder/encoder
- CD/DVD data block decoder/encoder
- Buffer Manager
- Digital Servo processor using digital signal processor
- Drive system microprocessor based on MIPS core

The MIPS microcontroller uses Flash ROM for the firmware and SRAM to execute the program. SDRAM is provided for the encoding/decoding function block of centaurus [7500]. 2 Mbytes of data buffer size is available inside the IC for data storage.

Cheetah 2 (TZA1047)

The Cheetah2, [7201] is an analogue pre-processing for the diode signals coming from the OPU. It contains an amplifier with programmable gain that amplifies the RF signal to adapt the output for the different reflectivity of the various discs. The

tracking signals are filtered and normalized. In addition the IC contains a timing circuit for the sample and holding circuits and for switching the various blocks between read and write. Supporting functions such as laser control and offset control are incorporated. Communication to and from the IC is based on a fast two-wire serial bus that works according to the I²C interface protocol.

Laconic (TZA1042)

The main function of the Laconic, [7300] is to control the laser power. The IC forms a closed control loop in combination with the Elantec located on the OPU. It compensates aging and temperature of the laser. Furthermore it forms a fingerprint correction loop. It also acts as bridge between I²C and serial bus of the Elantec laser driver on the CPU.

Optical Pick-up Unit

The OPU66 is a dual laser Optical Pick-up Unit for the DVD+RW/+R. It consists of a 3-D actuator for focusing, radial tracking and tilt correction.

- 650nm laser for DVD
- 780nm laser for CD

On the interconnecting flex several electrical components are mounted.

- Elantec: programmable laser diode power driver
- Paedic: integrated photo detector with programmable gain pre-amplifier
- Eeprom: containing a number of values representing adjustments belonging to the OPU

The laser control and diode signal processor ICs together with an Eeprom are mounted on the OPU flex.

The laser control IC generates the DVD laser read and writing signals needed for reading DVD discs and writing DVD+RW/+R discs (write strategies of DVD+RW/+R discs).

The diode signal processor is an analogue pre-processor adapted for the CD and CD-R/RW read function.

The Eeprom contains information about writing current, writing strategies and other parameters belonging to the OPU.

Motor and Servo drivers

The disc, tray and sledge motors are driven by a one-chip motor driver SA56202 [7402] while the 3-D actuator is driven & control by a 4-channel BTL driver BA5995FM [7409] and some low power Ops amplifier LM358D [7401], [7403] and [7405].

9.2.4 Backend Digital part

Record Mode

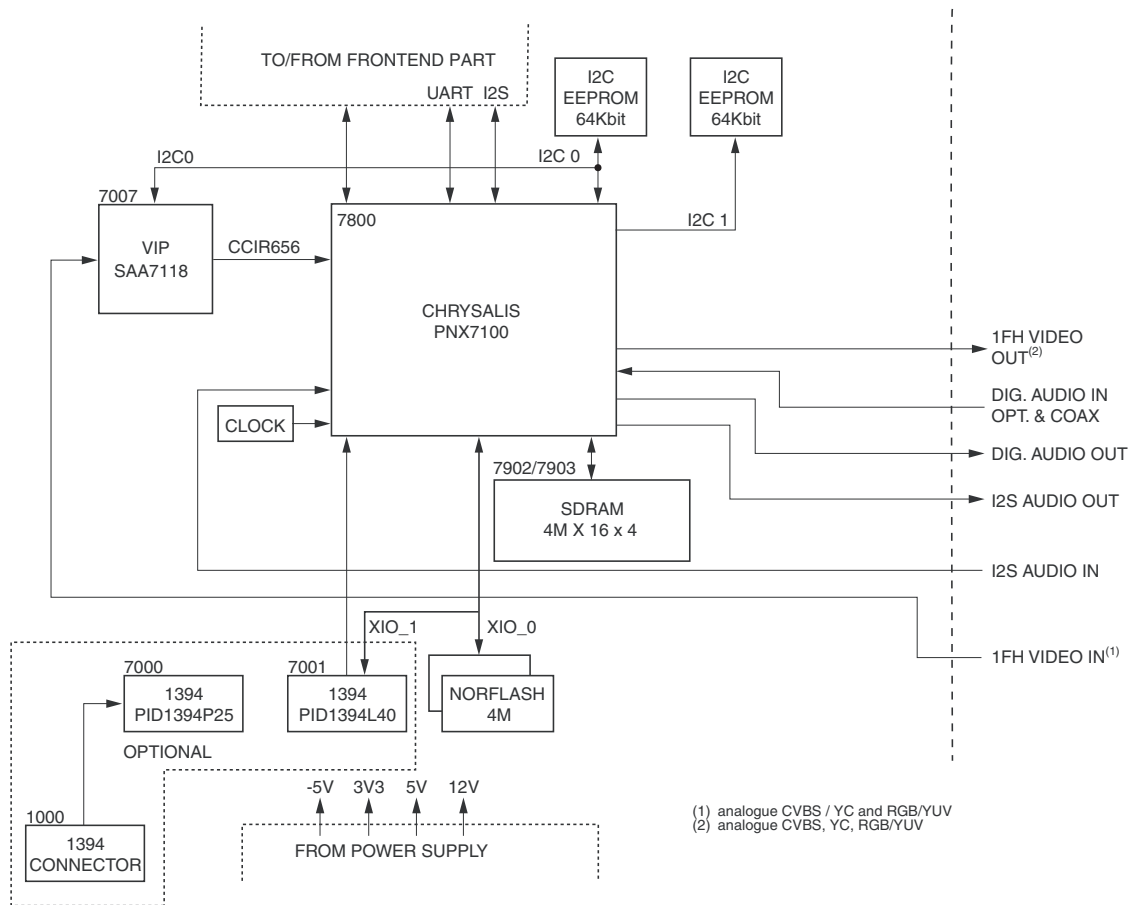


Figure 9-5 Chrysalis Block

Video Part

The analogue video input signals CVBS, YC and YUV/RGB (RGB for Euro and YUV for USA) from the MOBO analog board are routed from connector [1901] to IC [7007] SAA7118, Video Input Processor.

The digital video input signals are routed from the DV-in connector [1000] via ICs [7000], 1394 PHY and [7001] 1394 LINK to Chrysalis PNX7100 [7800].

The multi-standard Video Input Processor VIP, [7007] encodes the analogue video to digital stream (CCIR656 format). It provides filtering of the analogue signals and separation of luminance and chrominance by a comb filter. The output stream, named ITU_IN(7:0), is then routed to the Chrysalis [7800]. This IC encodes and decodes the digital video stream into/from MPEG2 format.

Audio Part

I²S audio is sent from the MOBO analog board to the Chrysalis [7800] via connector [1902]. The Chrysalis [7800] compresses the I²S audio data into an MPEG1-L2/AC3 audio stream.

Front-end I²S

Chrysalis [7800] interfaces directly with the Centaurus [7500] and buffers the in- and out-going data streams.

In the Chrysalis [7800], the video MPEG2 stream and the audio AC3 stream are multiplexed into an I²S stream. The serial data are sent to the Centaurus [7500] for recording.

Playback Mode

During playback, the serial data from the Centaurus [7500] is going directly to the Chrysalis [7800] via the serial front-end I²S interface. The Chrysalis [7800] is an MPEG CoDec and has the following outputs:

- To the MOBO analog board: analogue video RGB, YC, CVBS on connector [1901].
- I²S audio (PCM format) on connector [1902].
- SPDIF audio (digital audio output) on connector [1902].
- Communication gateway (RS232) on connector [1907].

Clock Distribution

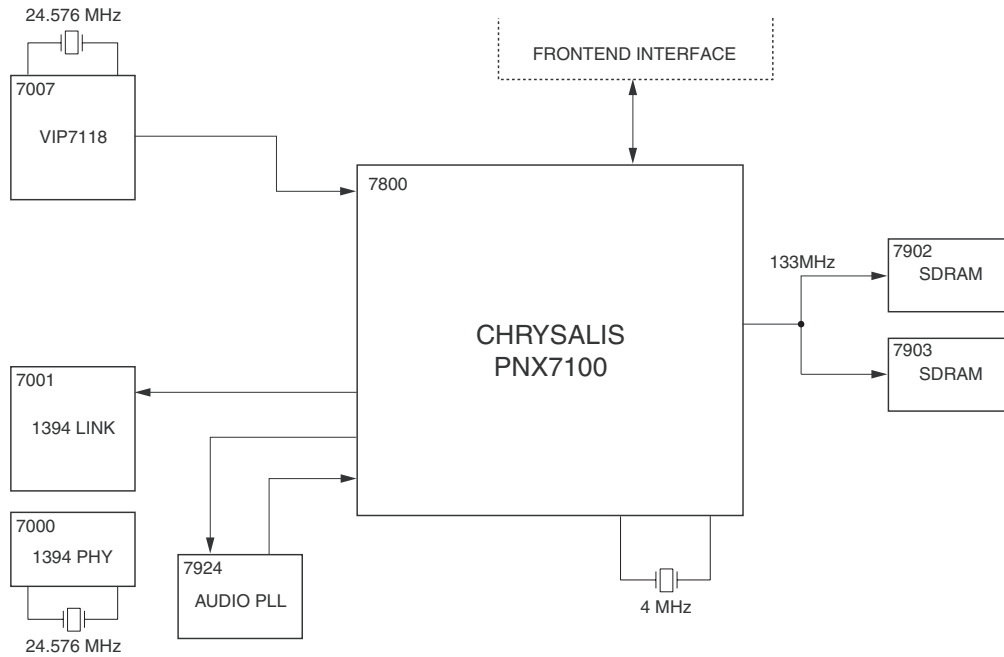


Figure 9-6 Chrysalis Clock

The Chrysalis [7800] has a complex clock 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 frequency to allow the modules to run at their nominal frequencies. Thanks to a clock blocking mechanism, the frequency switching is glitch free.

System clocks:

- PNX7100 [7800], pins AF9 and AF10 : 4MHz provided by the crystal oscillator [7804]
- SAA7118 [7007], pins A3 and B4 : 24.576 MHz provided by crystal [1002]

- SDRAM [7902] and [7903], pin 38 : 133MHz provided by PNX7100
- 1394-LINK [7001], pin 88 : 49.152MHz provided by 1394-PHY
- 1394-PHY [7000], pin 59 and 60 : 24.576MHz provided by crystal [1001]

Memory

Several memories are used on the Chrysalis [7800]:

- EEPROM [7904] : this memory contains all the necessary boot parameters of the board
- EEPROM [7905] : this memory contains all the necessary parameters for the application
- FLASH [7900] : this memory contains the application, diagnosis and service software

Reset

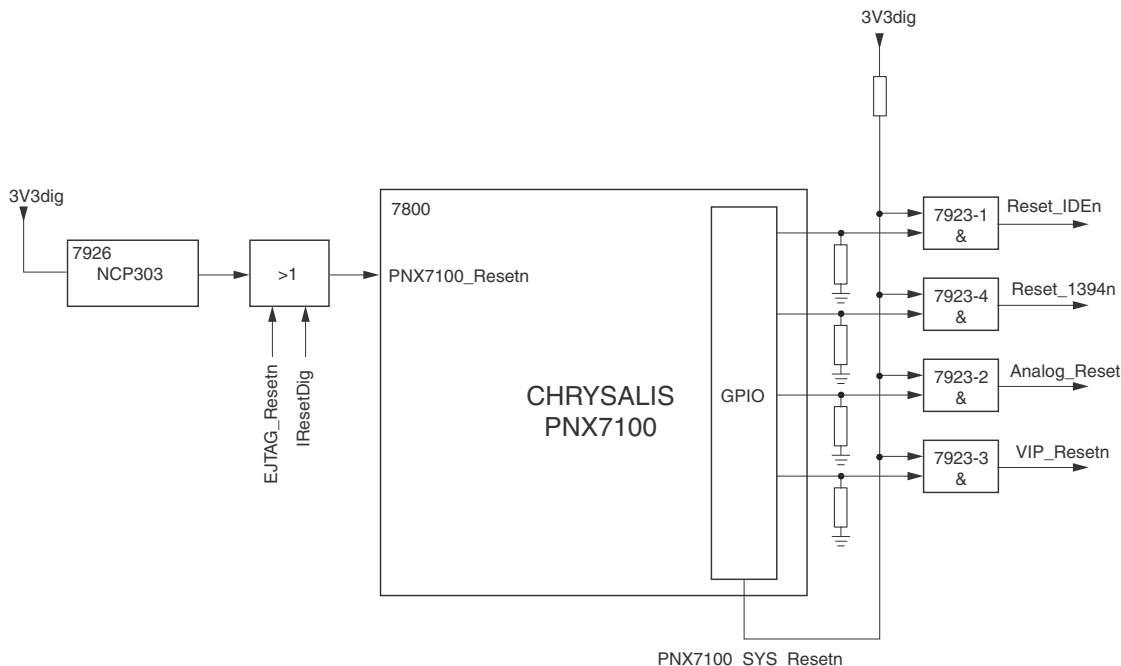


Figure 9-7 Chrysalis reset

The voltage detector NCP303LSN290 [7926] provides the reset signal PNX7100_RESETh (active: low) with the correct timing behavior. This circuitry functions as a Power-On Reset (POR) module, which detects the minimum functional voltage that is needed by the device. It also detects any voltages drop. When the power voltage is outside the nominal range, a reset signal is generated by the POR module and fed to the reset module which controls the individual reset of the different peripherals and processing units.

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

- IRESET_DIG (controlled by the slave μ P on the MOBO Analog board)
- EJTAG_RESETh (only for production)

They can pull the output of the NCP303LSN29 [7926] down via a shottky diode.

So when the output signal PNX7100_RESETh is low, the board will reset. When this signal is high, the board is up and running. The PNX7100_SYS_RESETh is a general enabling signal for the different reset lines. All other reset lines are directly driven from Chrysalis [7800] port pins (eg. MPIO13_IDE1_RESETh). All reset lines are logically connected via 74LVC08AD [7923] AND-gates. If both reset signals are low, all other external devices are initialized.

I²C Bus

The Chrysalis [7800] is the master of all the I²C bus (during reset, external I²C masters are allowed). The following ICs are controlled by the I²C bus:

- [7904] Boot Eeprom
- [7905] NVRAMs
- [7007] VIP

9.2.5 I/O Connectors

Audio IO Connector [1902]

The Audio In/Out (AIO) connector is used to interchange digital audio signals between MOBO Analog and FEBE Backend Digital portion.

Video IO Connector [1901]

The Video In/Out (VIO) connector is used to interchange analogue video signals between MOBO Analog and FEBE Backend Digital portion.

9.2.6 Service UART Interface

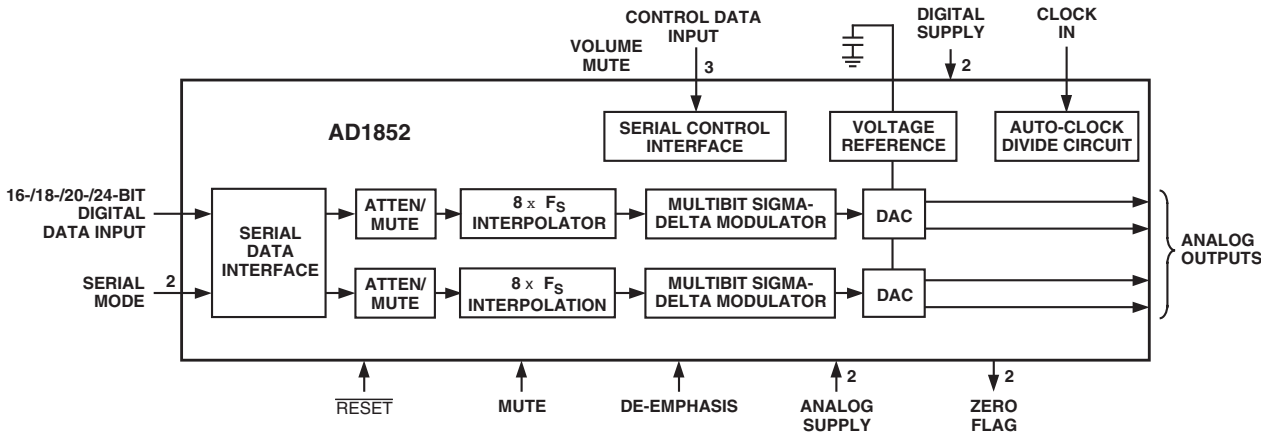
Transistor 7950, BC847BS is used to make a level conversion from microprocessor (LVTTTL) to +/-5V (compatible with most RS232 interfaces) and vice versa. The control line MPIO19_CTL_SERVICE is used to activate service and diagnostic SW at start up procedure. The connectivity is provided via an external service tool.

9.3 IC Descriptions

9.3.1 MOBO Board

IC7004: AD1852 MOBO Board, Digital to Analogue Converter

FUNCTIONAL BLOCK DIAGRAM



*Patents Pending

Figure 9-8

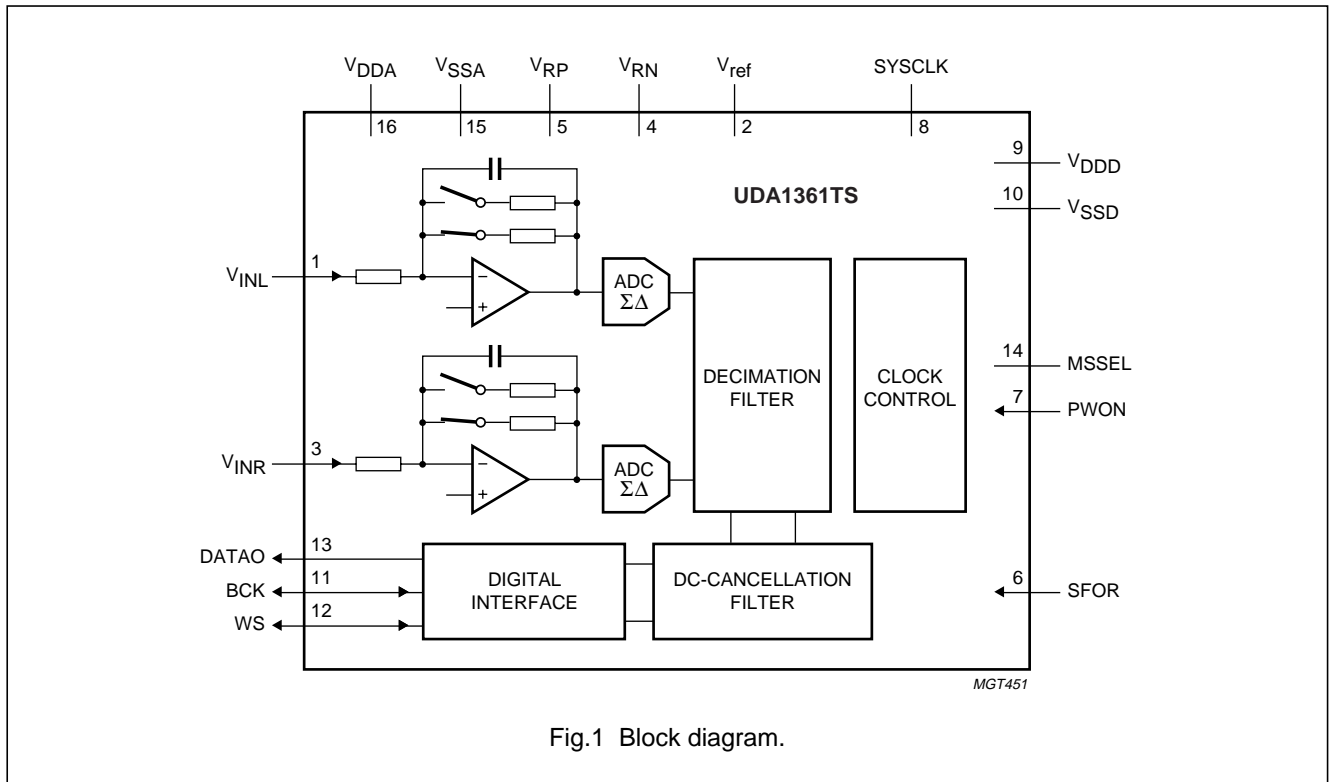
PIN FUNCTION DESCRIPTIONS

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

Figure 9-9

IC7008: UDA1361TS MOBO Board, Analogue to Digital Converter

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
MSESEL	14	master/slave select
V_{SSA}	15	analog ground
V_{DDA}	16	analog supply voltage

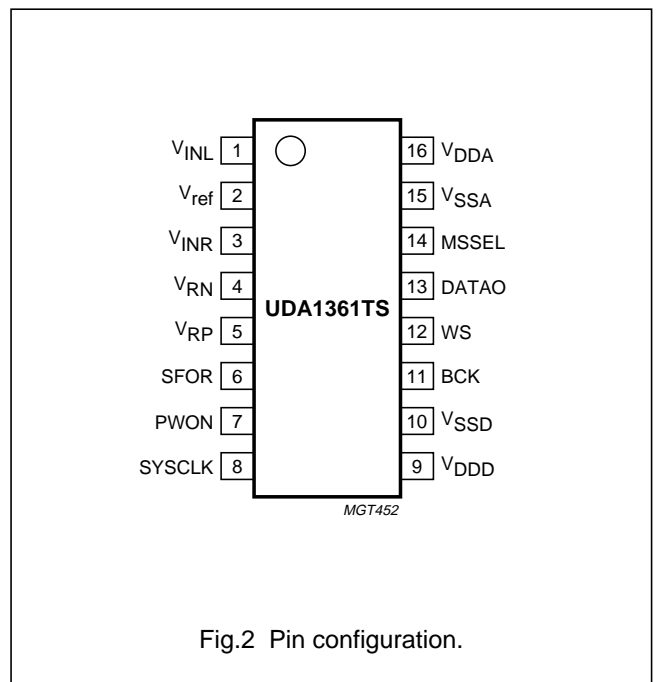
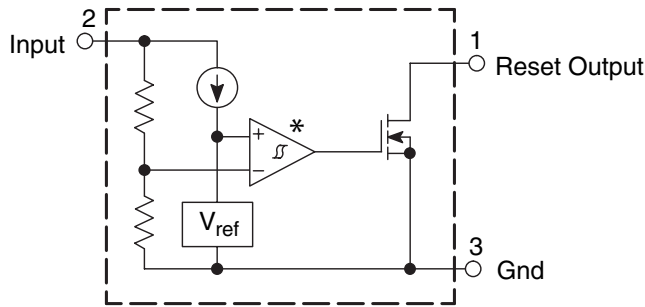


Figure 9-10

IC7100 NCP301LSNxx MOBO Board, Reset Circuit

**NCP301xSNxxT1
Open Drain Output Configuration**



* The representative block diagrams depict active low reset output 'L' suffix devices. The comparator inputs are interchanged for the active high output 'H' suffix devices.

This device contains 25 active transistors.

Figure 1. Representative Block Diagrams

Figure 9-11

IC7107 TMP87CM74AF MOBO Board, Microprocessor

Block Diagram

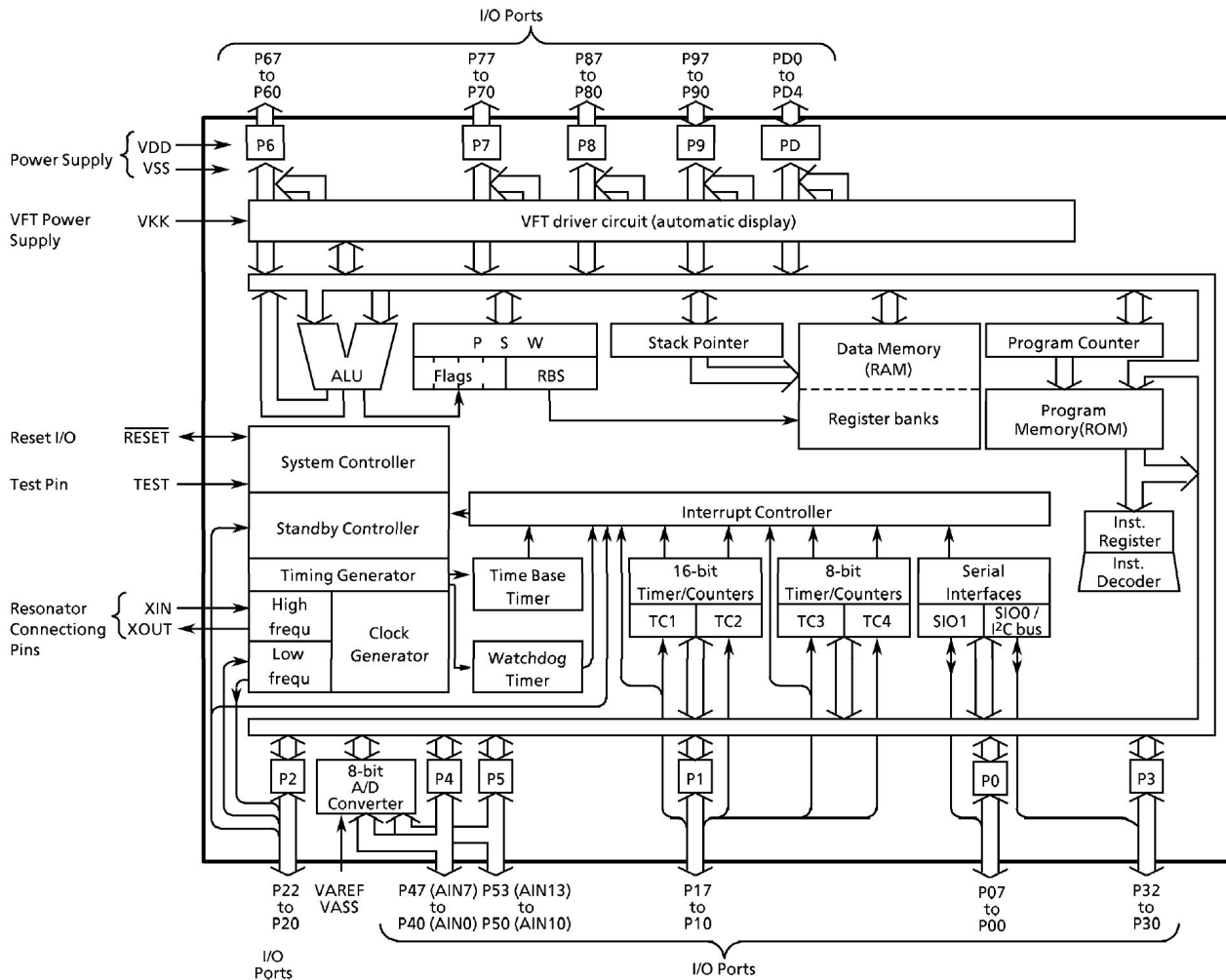


Figure 9-12

Pin Function

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 ($\overline{\text{SCK1}}$)	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)	I/O (I/O)	Timer counter 4 input or 8-bit programmable divider output or 8-bit PWM output	
P13 (DVO)	I/O (Output)	Divider output	
P12 (TC2/PPG)	I/O (I/O)	Timer counter 2 input or Programmable pulse generator output	
P11 (INT1)	I/O (Input)	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 ($\overline{\text{INT5/STOP}}$)			
P32 ($\overline{\text{SCK0}}$)	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 I2C input/output, the latch must be set to "1".	I2Cbus serial data input/output or SIO0 serial data output
P30 (SCL/SI0)			I/O (I/O/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 an analog input, the P4CR must be set to "0".
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 an 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 breakdown 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".	

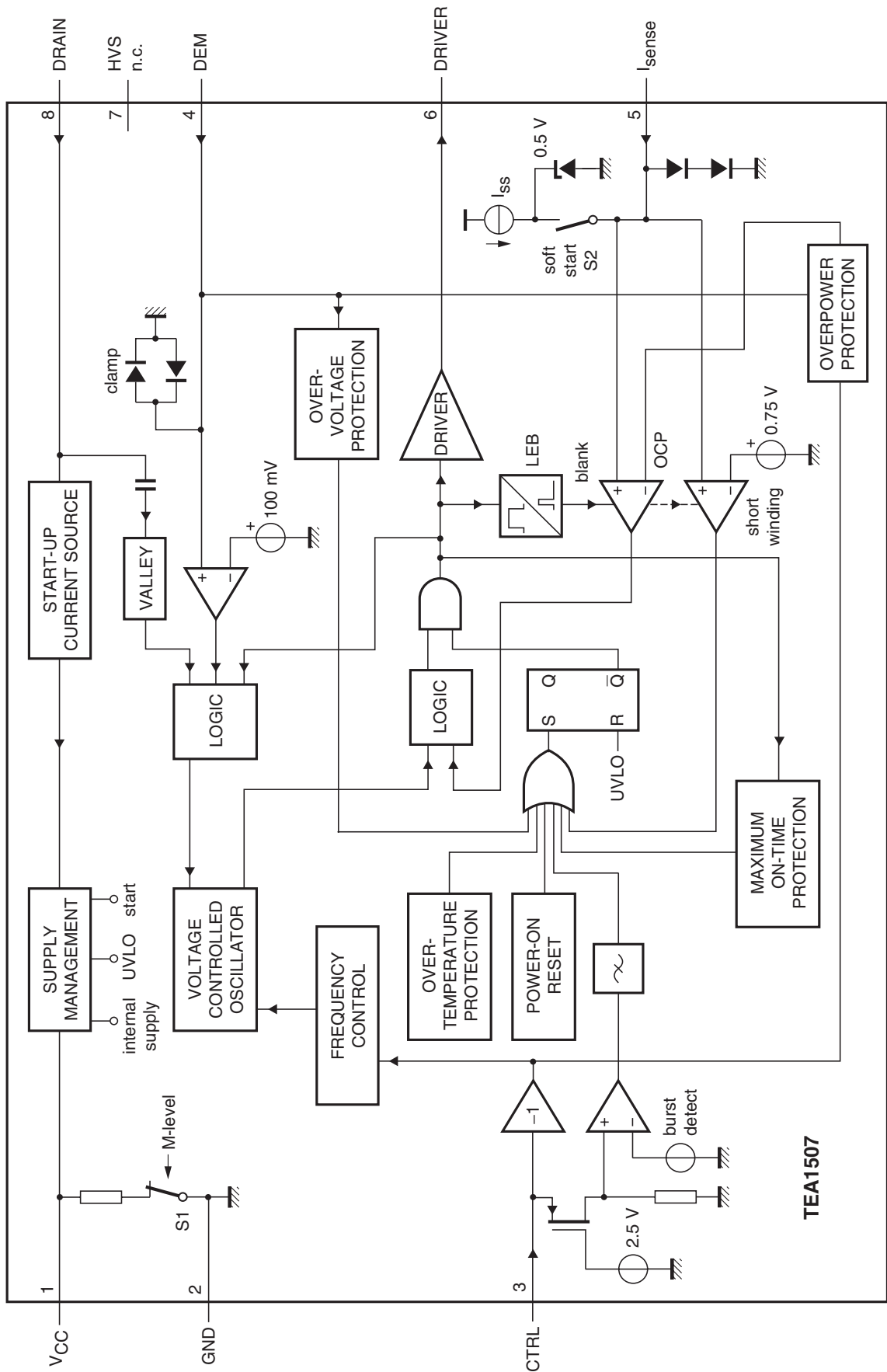
Figure 9-13

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)

Figure 9-14

IC7311 TEA 1507 MOBO Board, Power Supply Control

BLOCK DIAGRAM



MGU230

TEA1507

Fig.2 Block diagram.

Figure 9-15

IC7410: STV6618 MOBO Board, Video Switch Matrix

1.2 Pin Description

Pin No.	Symbol	Description
1	Y/CVBSIN_TUN	Y/CVBS Input from Tuner
2	DIGOUT3	Digital Output Pin 3
3	GND1	Ground Supply 1 for 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 Power Supply for Video Inputs
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 Supply 2 for 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 Supply for 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 Supply for Video Buffer
27	B/PBOUT_TV	Blue or Pb Output to TV (SCART1 or external Cinch)
28	C_GATE	External Transistor Command for Bidirectional 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)

Figure 9-16

Pin No.	Symbol	Description
36	VDD	+5 V Digital Power Supply
37	SCL	I ² C Bus Clock
38	SDA	I ² C Bus Data
39	GNDD	Digital Ground Supply
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

Figure 2: STV6618 Input/Output Diagram

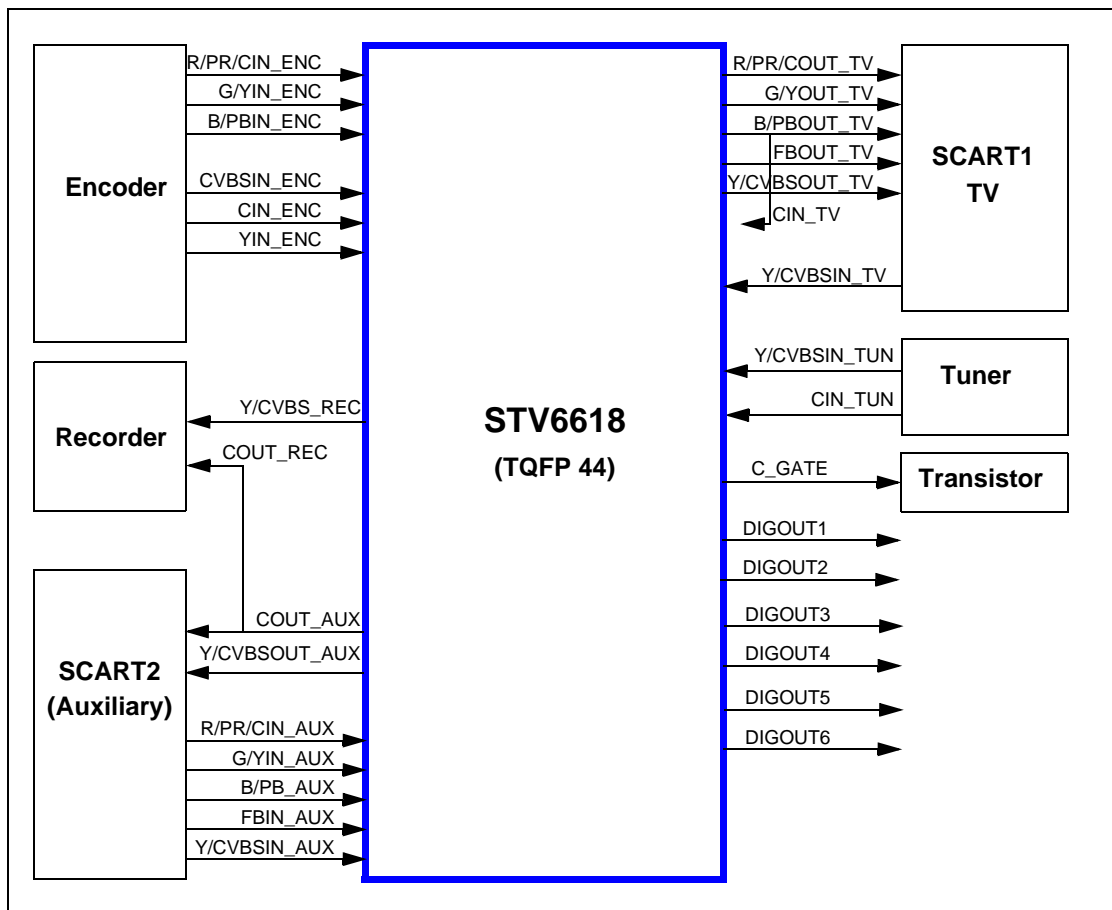


Figure 9-17

Figure 3: STV6618 Block Diagram

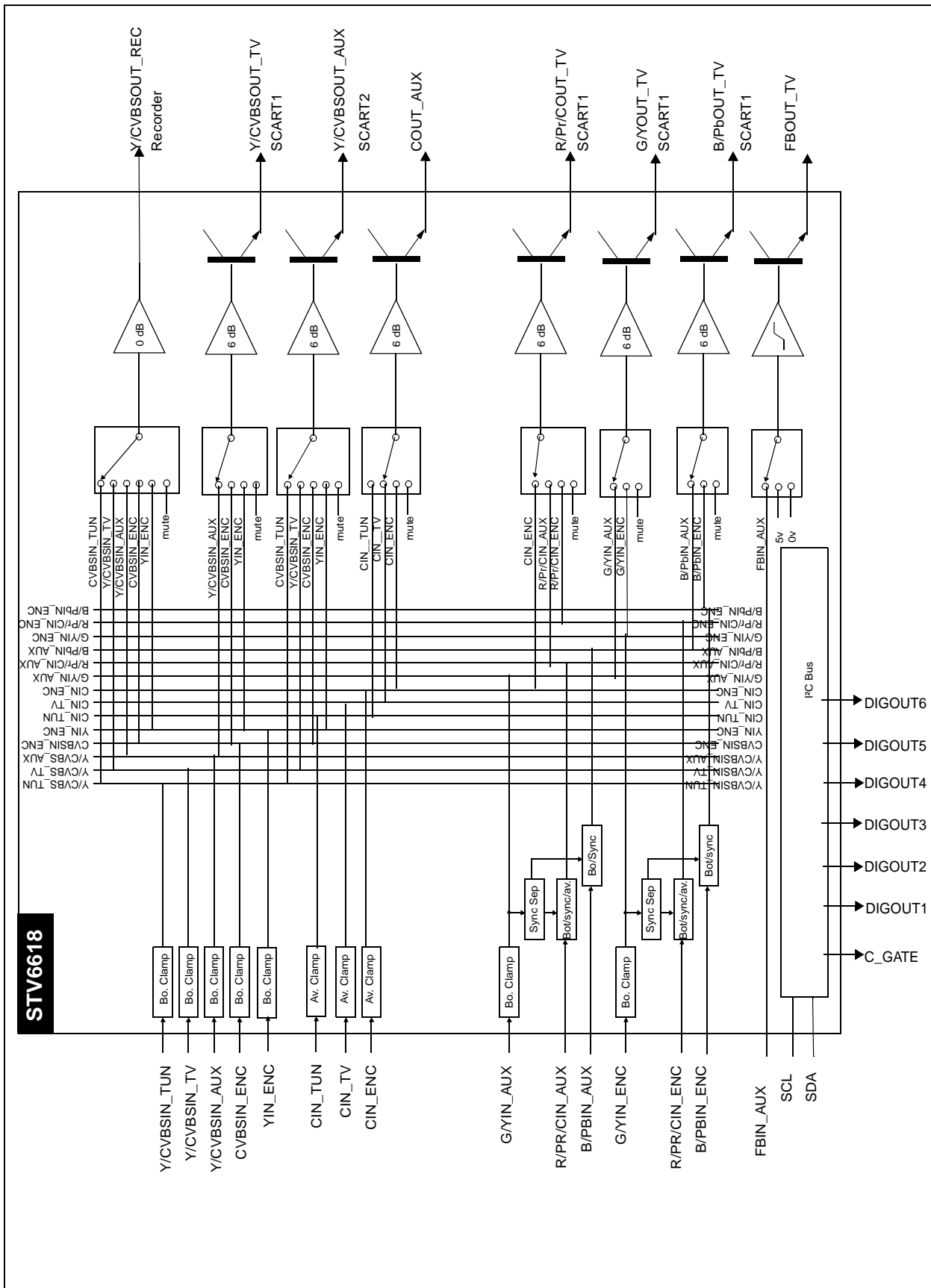


Figure 9-18

IC7411: NJM2234 MOBO Board, 3-Input Video Switch

■ BLOCK DIAGRAM

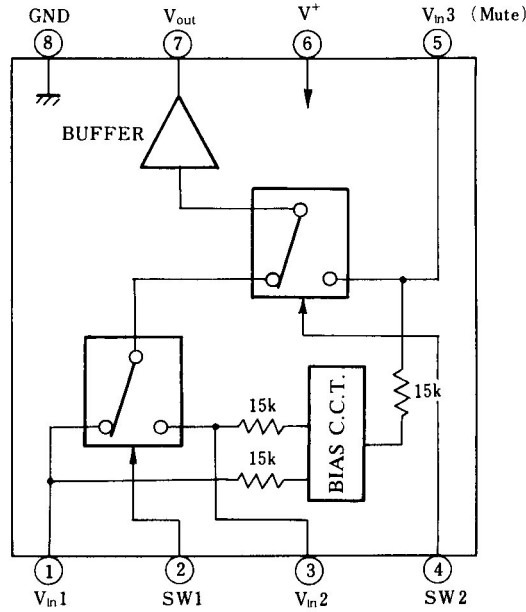


Figure 9-19

INPUT CONTROL SIGNAL – OUTPUT SIGNAL

SW 1	SW 2	OUTPUT SIGNAL
L	L	V _{in1}
H	L	V _{in2}
LH	H	V _{in3}

Figure 9-20

IC7416: NJM2235 MOBO Board, 3-Input Video Switch

BLOCK DIAGRAM

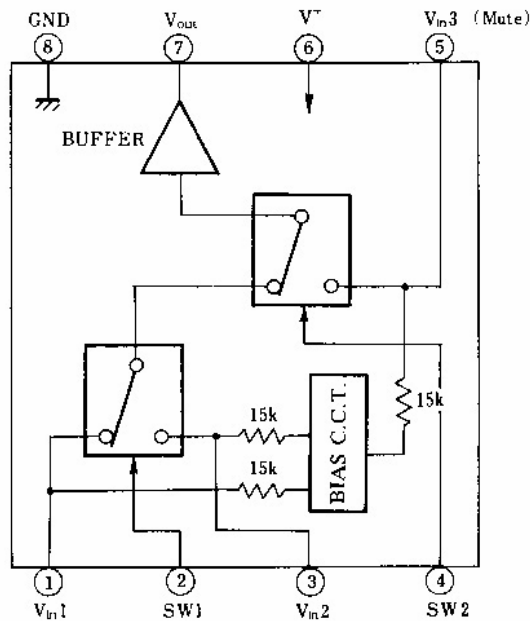


Figure 9-21

INPUT CONTROL SIGNAL – OUTPUT SIGNAL

SW 1	SW 2	OUTPUT SIGNAL
L	L	V _{IN1}
H	L	V _{IN2}
L/H	H	V _{IN3}

Figure 9-22

IC7600: MSP3415G MOBO Board, Multi Sound Processor

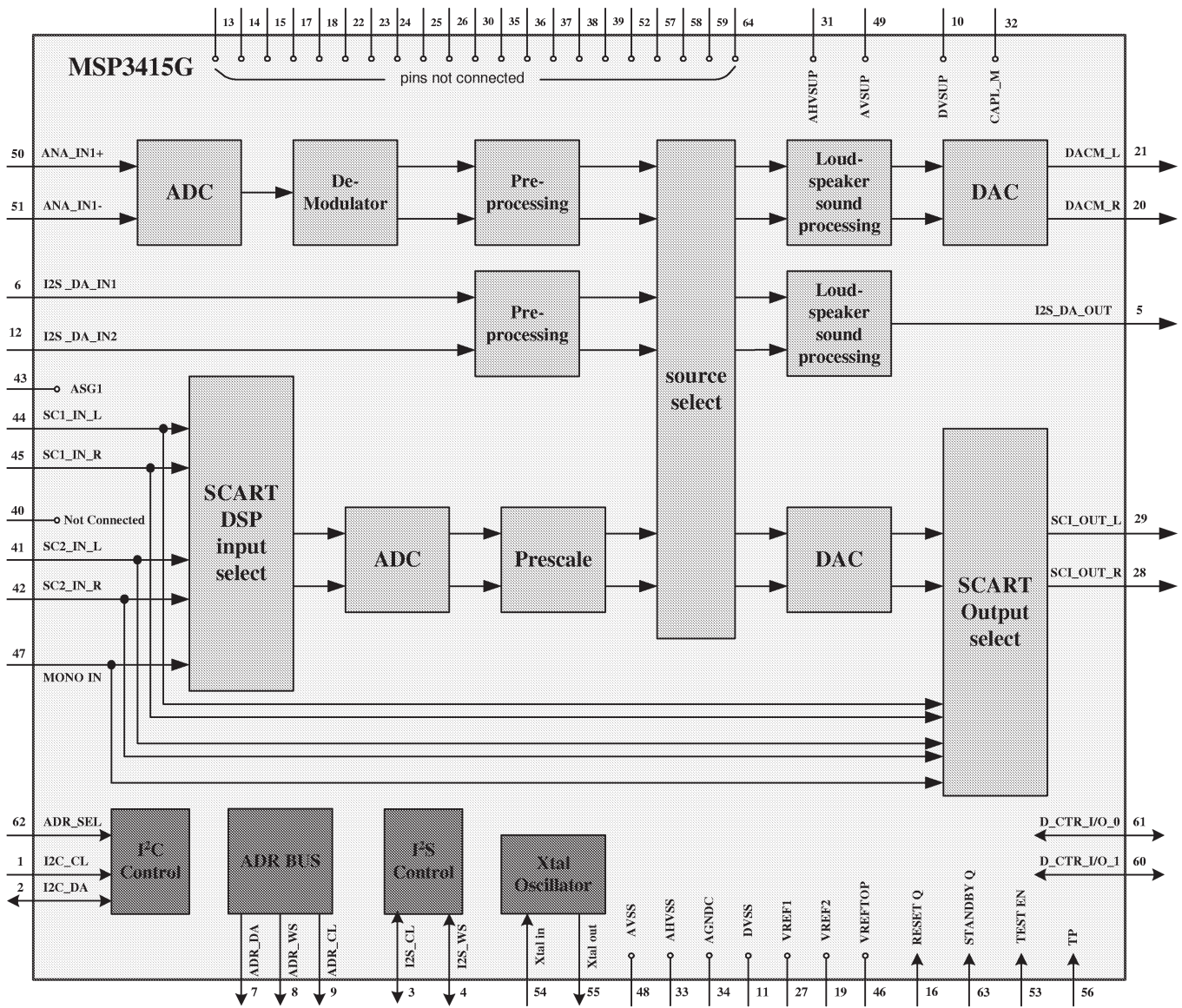


Figure 9-23

IC7201, TZA1047: FEBE Baord, Analogue Processor

Block diagram

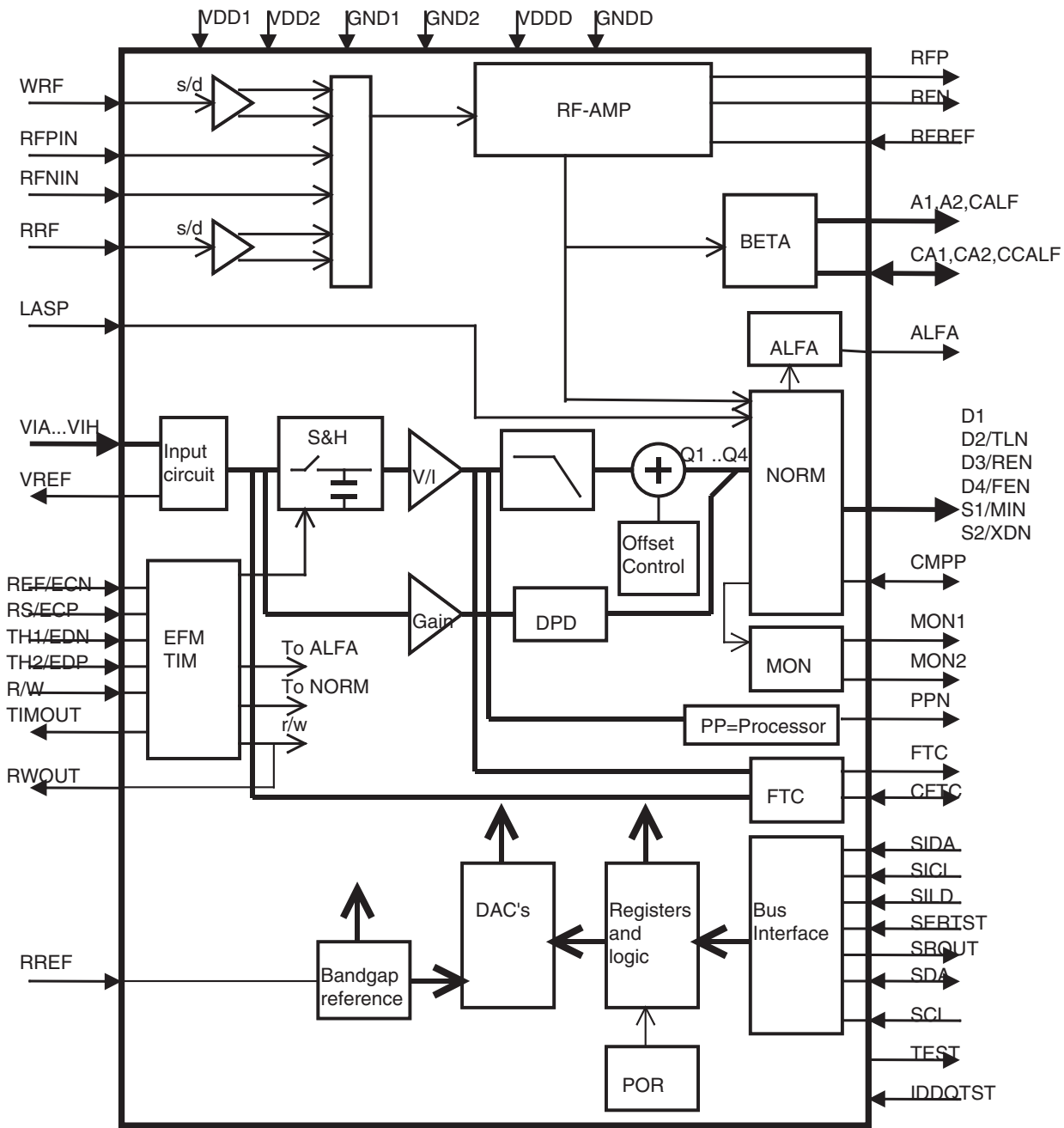


Fig 1. TZA1047 Block Diagram

Figure 9-26

Pin description

Table 1: Pin description

Symbol	Pin	Description
VIH	1	Satellite segment H input
GND1	2	Ground
VIC	3	Central segment C input
VIB	4	Central segment B input
GND1	5	Ground
RFNIN	6	Inverse differential RF input / Single-ended RF read input
RFPIN	7	Differential RF input/ Single-ended RF write input
VDD1	8	Positive supply
VID	9	Central segment D input
VIA	10	Central segment A input
VDD1	11	Positive supply
VIE	12	Satellite segment E input
VIG	13	Satellite segment G input
RWOUT	14	R/W signal output
SDA	15	Data input/output I ² C
SCL	16	Clock input I ² C
SILD	17	Strobe line of serial bus interface
SIDA	18	Data line of serial bus interface
SICL	19	Clock line of serial bus interface
TIMOUT	20	EFMTIM test output
R/W	21	External Read/Write signal input
VDDD	22	Positive supply digital part
VSSD	23	digital ground
REF/ECN	24	Reference input for timing signals in EFMTIM bypass mode ^[1] / Inverse EFM clock input ^[2]
RS/ECP	25	RF sampling signal ^[1] / EFM clock input ^[2]
TH1/EDN	26	Segment sampling timing signal ^[1] / Inverse EFM data input ^[2]
TH2/EDP	27	Segment sampling timing signal ^[1] / EFM data input ^[2]
SERTST	28	Enable test mode (Tie to GND or leave open for normal operation)
VDD2	29	Positive supply voltage

Figure 9-27

Table 1: Pin description (Continued)

Symbol	Pin	Description
GND2	30	Supply ground
RFP	31	RF output voltage, positive
RFN	32	RF output voltage, negative
RFREF	33	Reference voltage for differential RF output common mode level
PPN	34	Output PP voltage
CFTC	35	FTC high pass filter capacitor
FTC	36	FTC output
GND1	37	Supply ground
CA1	38	Beta circuit external capacitor
CA2	39	Beta circuit external capacitor
CCALF	40	Beta circuit external capacitor
RREF	41	Reference resistor to ground
GND1	42	Supply ground
CMPP	43	MPP external capacitor
VDD1	44	Positive supply
MON1	45	Monitor output voltage
MON2	46	Monitor output voltage
S2/XDN	47	Servo output current
S1/MIRN	48	Servo output current
D4/FEN	49	Servo output current
D3/REN	50	Servo output current
D2/TLN	51	Servo output current
D1	52	Servo output current
IDDQTST	53	Select zero dissipation mode (tie to GND for normal operation)
CALF	54	RF average level signal
A2	55	RF bottom level signal
A1	56	RF top level signal
SROUT	57	shift register output for register test mode
ALFA	58	alfa output current
LASP	59	laser power setpoint signal
TEST	60	Test output
RRF	61	Single ended RF read input voltage

Figure 9-28

Table 1: Pin description (Continued)

Symbol	Pin	Description
W R F	6 2	Single ended RF write input voltage
V R E F	63	PDIC reference voltage output
V I F	6 4	Satellite segment F input

[1] Only in EFM bypass mode

[2] EFM clock and data when not in EFM bypass mode.

Figure 9-29

IC7300, TZA1042: FEBE Baord, Laser Power Controller

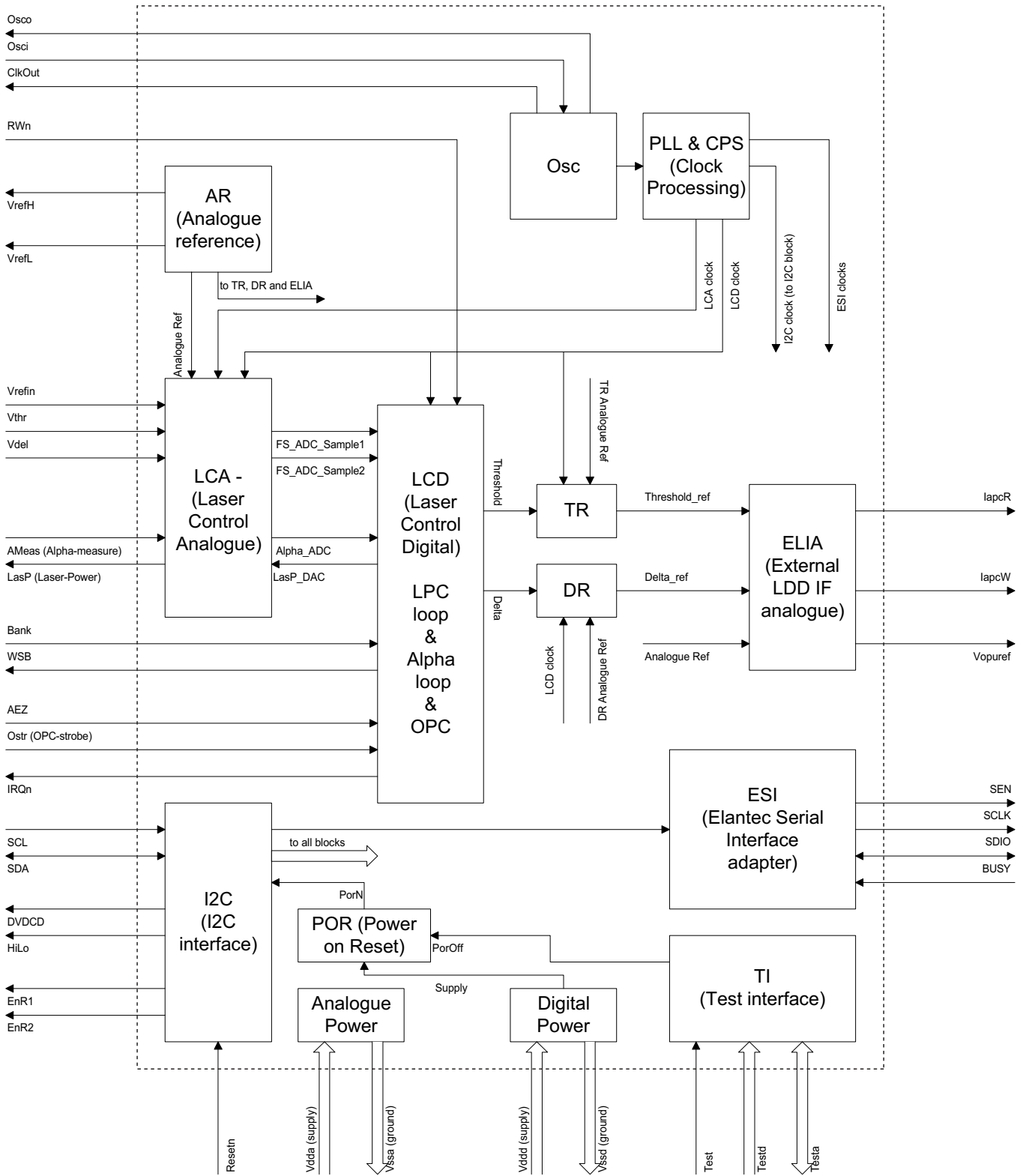


Figure 9-30

Pin description

Symbol	Pin	Type	Drive /Thr.	Description
AEZ	1	I hy pd	T	Alpha Error Zero/Alpha Set Zero
V _{DD3}	2	P	-	Digital Pad Supply
V _{SS3}	3	P	-	Digital Pad Supply
CLOCKOUT	4	T	M	Buffered Oscillator Output
OSCO	5	AO	A	Output of inverting Amplifier that forms oscillator
OSCI	6	AI	A	Input of inverting Amplifier that forms oscillator
TEST1D	7	I pd	T	Test pin
AMEAS	8	AI	A	Alpha Measure – value of measured disk writing quality
V _{DDA1}	9	P	-	Analogue Supply
V _{SSA1}	10	P	-	Analogue Supply
LASP	11	AO	A	Laser Power – indicates power level
VREFL	12	AO	A	Bandgap Voltage Reference ground connection
VREFH	13	AO	A	Bandgap Voltage Reference output
VDEL	14	AI	A	Voltage input for Delta “laser power”
VTHR	15	AI	A	Voltage input for Threshold “laser power”
VOPUREF	16	AO	A	Reference Voltage for OPU
VREFIN	17	AI	A	Input Reference Voltage for Vthr and Vdel
V _{DDA2}	18	P	-	Analogue Supply
V _{SSA2}	19	P	-	Analogue Supply
TEST1A	20	AB	A	Test pin
IAPCW	21	AO	A	Current Output of Delta Reference
IAPCR	22	AO	A	Current Output of Threshold Reference
TEST2A	23	AB	A	Test pin
ENR2	24	T	M	Programmable Output Flag
ENR1	25	B pd	M/T	Device Initialisation/Programmable Output Flag (must be driven to VDD during reset)
DVDCD	26	T	M	Programmable Output Flag for indicating DVD/CD mode
HILO	27	T	M	Programmable Output Flag for indicating High/Low reflectivity
V _{SSD1}	28	P	-	Digital Pad Supply
V _{DD1}	29	P	-	Digital Pad Supply
BUSY	30	B	M/T	Busy Enable input from Elantec / Board test IO
SEN	31	B	M/T	Serial Enable output to Elantec / Board test IO
SDIO	32	B	M/T	Serial data input output from/to Elantec / Board test IO
SCLK	33	B	M/T	Busy Enable input from Elantec / Board test IO
WSB	34	B	M/T	Write Strategy Bank – output controls OPU write switching / Board test IO

Figure 9-31

TEST2D	42	I pd	T	Test pin
SDA	43	BOD	M/T	I ² C Serial Data
SCL	44	I	T	I ² C Serial Clock

- [1] All supply pins must be connected to the same external power supply voltage
- [2] All inputs are 5V tolerant – i.e. they will drive the supply voltage (3.0-3.6V), but will work correctly when interface to a 5V drive device
- [3] The pin type definition is given below:

PinType Definition Table

Type	Definition
I	input
O	output
OD	open drain
B	bi-directional
BOD	bi-directional open drain
T	tri-state output
AI	analog input
AO	analog output
AB	analog bi-directional
P	power connection
hy	hysteresis on input
pd	hysteresis on output

Figure 9-32

IC7402, SA56202 FEBE Board, Motor Drivers

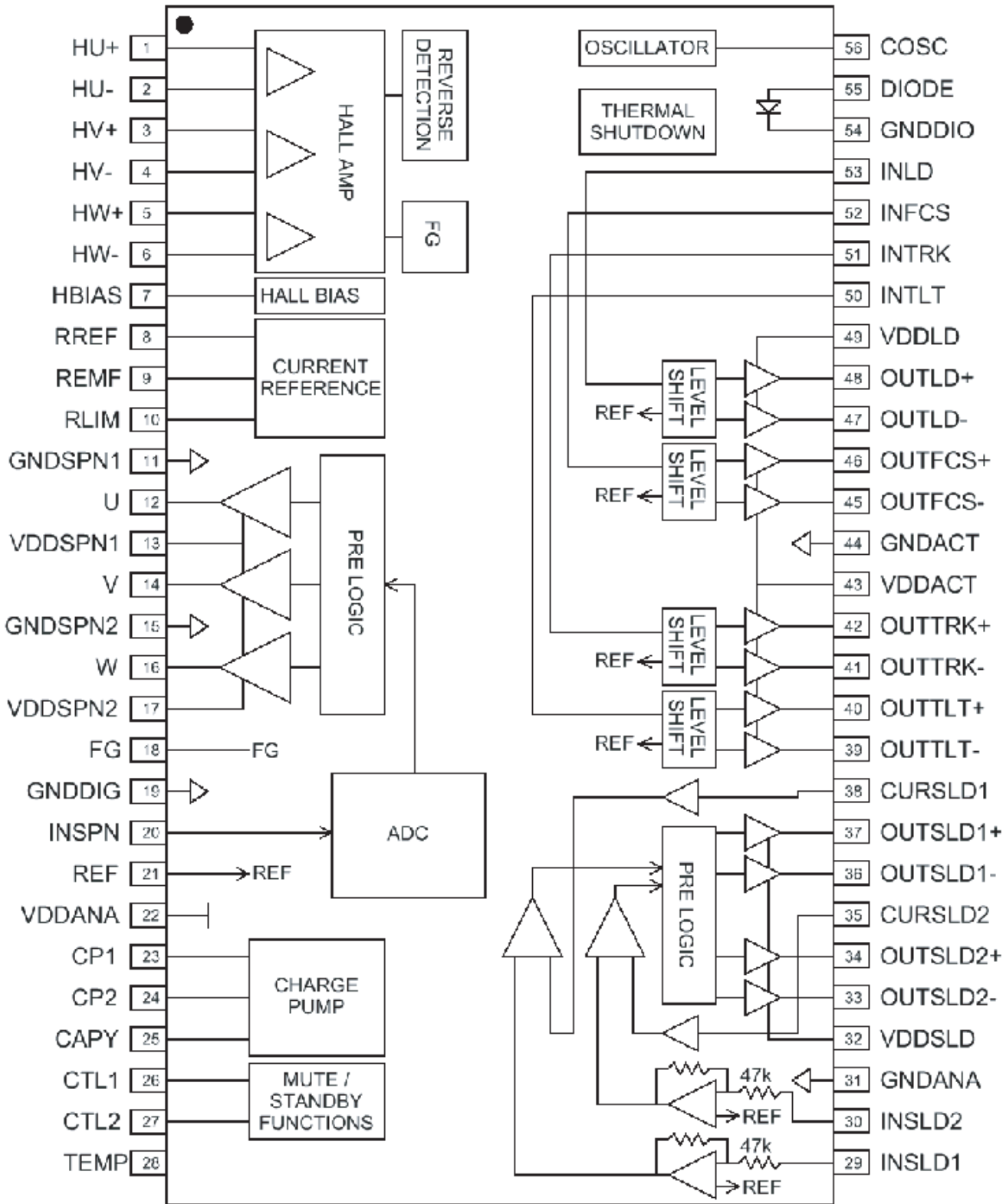


Fig.2 Block diagram SA56202.

Figure 9-33

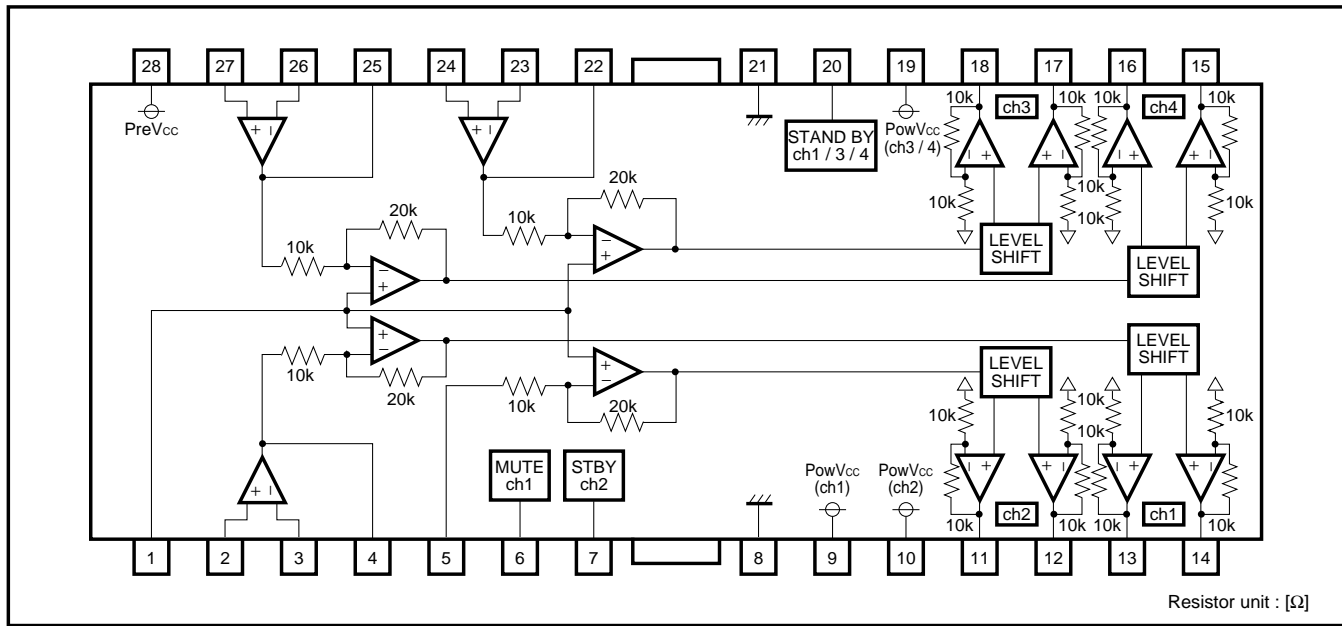
PIN DESCRIPTION

PIN	SYMBOL	DESCRIPTION	PIN	SYMBOL	DESCRIPTION
1	HU+	positive Hall input U	56	COSC	ext. capacitor for int. oscillator
2	HU-	negative Hall input U	55	DIODE	diode for temperature readout
3	HV+	positive Hall input V	54	GNDDIO	temperature diode ground
4	HV-	negative Hall input V	53	INLD	loading driver input
5	HW+	positive Hall input W	52	INFCS	focus driver input
6	HW-	negative Hall input W	51	INTRK	tracking driver input
7	HBIAS	Hall element bias	50	INTLT	tilting driver input
8	RREF	ext. res. for current reference	49	VDDL	loading driver power supply
9	REMF	ext. res. for EMF regeneration	48	OUTLD+	loading driver positive output
10	RLIM	ext. res. for current limit	47	OUTLD-	loading driver negative output
11	GNDSPN1	spindle driver power ground 1	46	OUTFCS+	focus driver positive output
12	U	spindle driver output U	45	OUTFCS-	focus driver negative output
13	VDDSPN1	spindle driver power supply 1	44	GNDACT	actuator drivers power ground
14	V	spindle driver output V	43	VDDACT	actuator drivers power supply
15	GNDSPN2	spindle driver power ground 2	42	OUTTRK+	tracking driver pos. output
16	W	spindle driver output W	41	OUTTRK-	tracking driver neg. output
17	VDDSPN2	spindle driver power supply 2	40	OUTTLT+	tilting driver pos. output
18	FG	frequency generator output	39	OUTTLT-	tilting driver neg. output
19	GNDDIG	ground supply	38	CURSLD1	sled driver 1 current sense
20	INSPN	spindle driver input	37	OUTSLD1+	sled driver 1 positive output
21	REF	reference input voltage	36	OUTSLD1-	sled driver 1 negative output
22	VDDANA	system supply voltage	35	CURSLD2	sled driver 2 current sense
23	CP1	charge pump cap. conn. 1	34	OUTSLD2+	sled driver 2 positive output
24	CP2	charge pump cap. conn. 2	33	OUTSLD2-	sled driver 2 negative output
25	CAPY	charge pump output voltage	32	VDDSLD	sled driver power supply
26	CTL1	driver logic control input 1	31	GNDANA	ground supply
27	CTL2	driver logic control input 2	30	INSLD2	sled driver 2 input
28	TEMP	thermal warning	29	INSLD1	sled driver 1 input

Figure 9-34

IC7409 BA5995: FEBE Board, 4-channel BTL driver

●Block diagram



●Pin descriptions

Pin No.	Pin name	Function
1	BIAS IN	Input for bias-amplifier
2	OPIN1 (+)	Non inverting input for CH1 OP-AMP
3	OPIN1 (-)	Inverting input for CH1 OP-AMP
4	OPOUT1	Output for CH1 OP-AMP
5	IN2	Input for CH2
6	MUTE	Input for CH1 mute control
7	STBY2	Input for CH2 stand by control
8	GND	Substrate ground
9	PowVcc1	Vcc for CH1 power block
10	PowVcc2	Vcc for CH2 power block
11	V _{O2} (-)	Inverted output of CH2
12	V _{O2} (+)	Non inverted output of CH2
13	V _{O1} (-)	Inverted output of CH1
14	V _{O1} (+)	Non inverted output of CH1

Pin No.	Pin name	Function
15	V _{O4} (+)	Non inverted output of CH4
16	V _{O4} (-)	Inverted output of CH4
17	V _{O3} (+)	Non inverted output of CH3
18	V _{O3} (-)	Inverted output of CH3
19	PowVcc3	Vcc for CH3/4 power block
20	STBY1	Input for CH1/3/4 stand by control
21	GND	Substrate ground
22	OPOUT3	Output for CH3 OP-AMP
23	OPIN3 (-)	Inverting input for CH3 OP-AMP
24	OPIN3 (+)	Non inverting input for CH3 OP-AMP
25	OPOUT4	Output for CH4 OP-AMP
26	OPIN4 (-)	Inverting input for CH4 OP-AMP
27	OPIN4 (+)	Non inverting input for CH4 OP-AMP
28	PreVcc	Vcc for pre block

Note) Symbol of + and - (output of drivers) means polarity to input pin.
(For example if voltage of pin4 high, pin14 is high.)

Figure 9-35

IC7500, PNX7850: FEBE Board, Channel Codec/Buffer Manager/Servo Processor and Controller

Nexperia PNX7850 conceptual block diagram

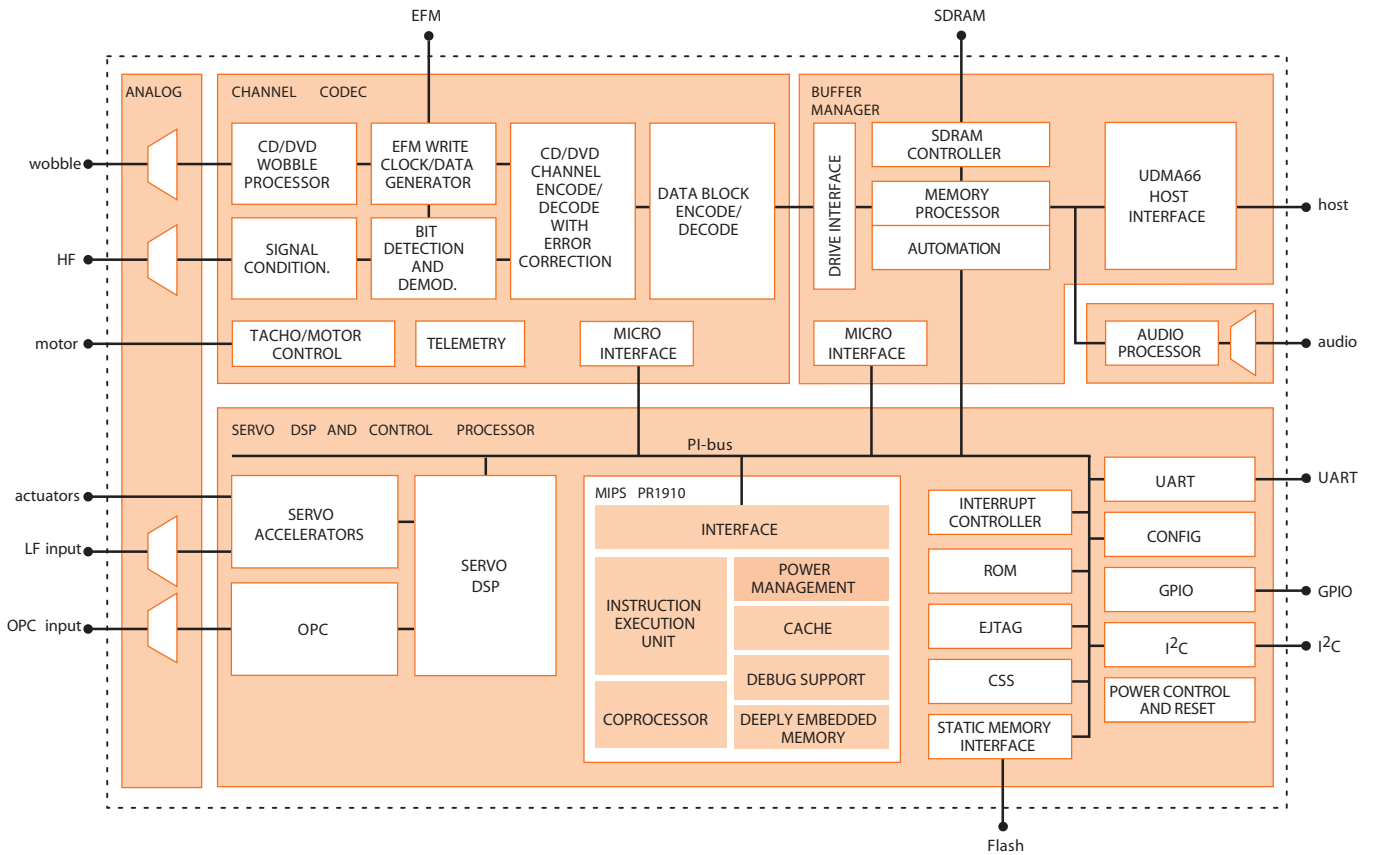


Figure 9-36

IC7926 NCP303LSN, FEBE Board, Reset Circuit

NCP303LSNxxT1
Open Drain Output Configuration

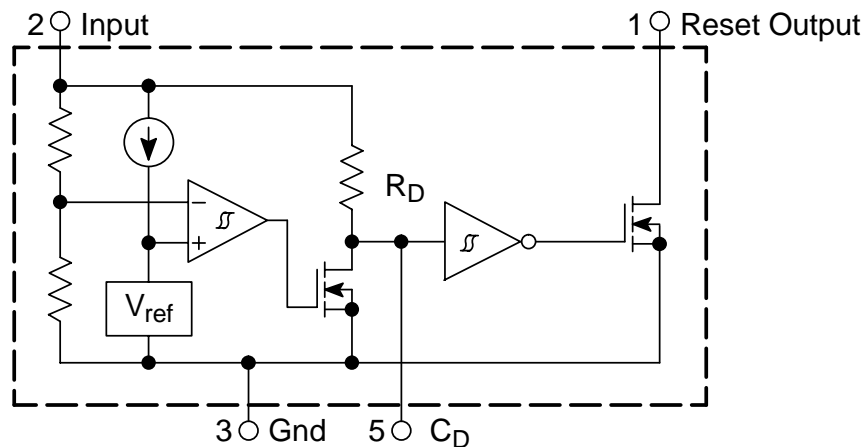


Figure 9-37

IC7929 NCP1570D, FEBE Board, DC/DC Converter Control

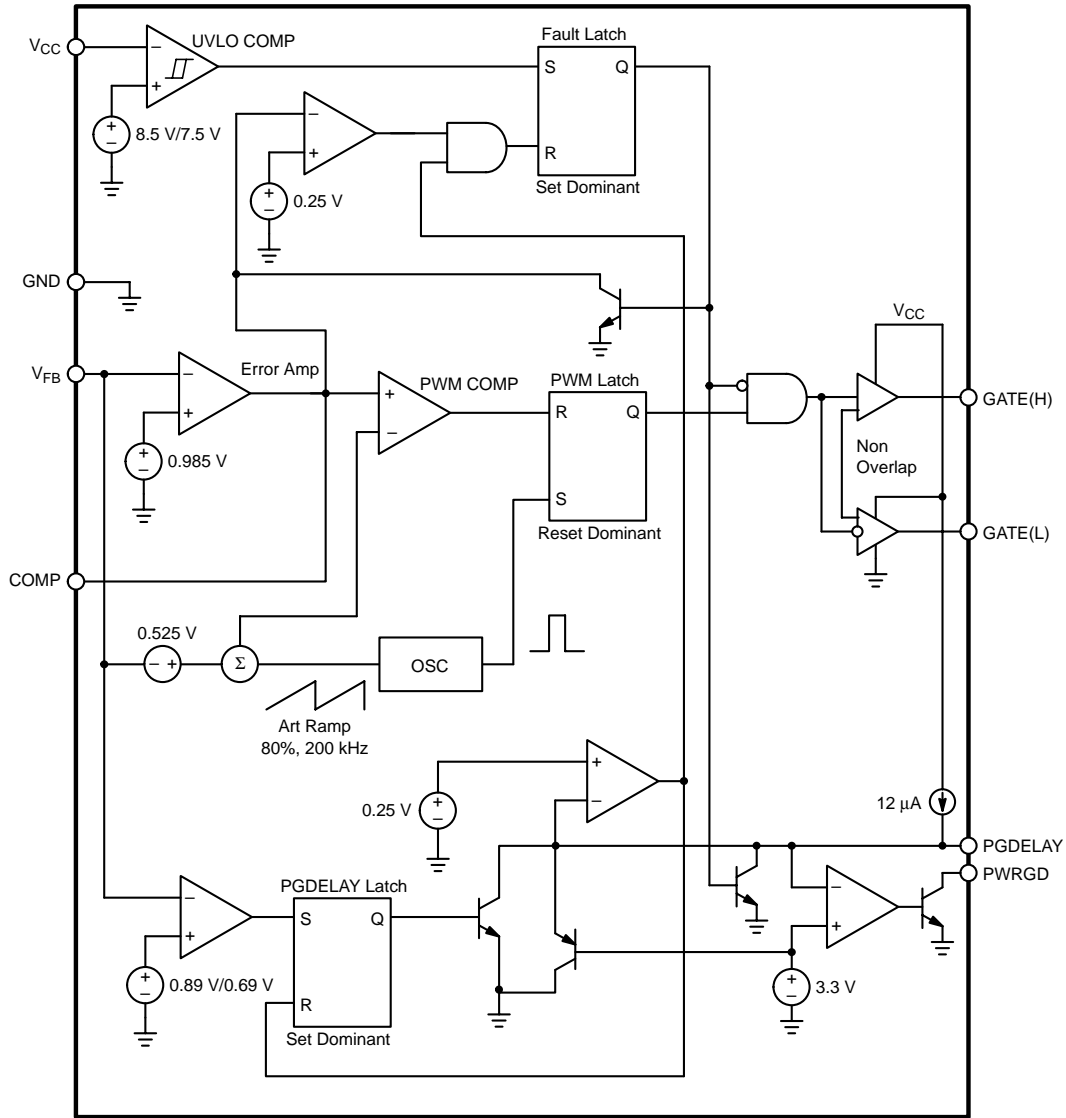


Figure 9-38

PACKAGE PIN DESCRIPTION

PACKAGE PIN #	PIN SYMBOL	FUNCTION
SO-8		
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 < 0.45 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.

Figure 9-39

9.4 List of Abbreviations

MOBO (Analog) Board

+5VSTBY	Permanent Supply 5V
8SC2	Pin8 Scart2 (only for Europe)
A_DATA	Data from Analog- to Digital-Board (UART-Communication)
A_RDY	Analog-board ready (status information to digital-board)
A18 - A19	Parallel Address Bus (CC - Flash-ROM and S-RAM)
A8 - A17	Parallel Address Bus (CC - Flash-ROM and S-RAM)
AD0 - AD7	Parallel Address Bus (CC - Flash-ROM and S-RAM)
AFC	Automatic Frequency Control
AFEL	Audio Frontend Left
AFER	Audio Frontend Right
AGC / WSRI	Automatic Gain Control (for Europe), Wide Screen Rear In (for NTSC)
AINFL	Audio In Front Left
AINFR	Audio In Front Right
AKILL	Audio Kill Signal
ALADC	Audio Left to ADC
ALDAC	Audio Left from DAC
ALE	Address Latch Enable
AM0	Address-mode 0
AM1	Address-mode 1
ARADC	Audio Right to ADC
ARDAC	Audio Right from DAC
ASCC1	Audio Scart 1 Mute (System Clock Output for Real time Clock-Adjustment)
AVCC	Power Supply for A/D-converter
AVSS	GND-Pin for A/D-converter
CFIN	Chroma Front In
CS0_	Chip Select 0 (CC - S-RAM)
CS2_	Chip Select 2 (CC - Flash-ROM)
CVBSFIN	Video Front In
D_DATA	Data from Digital- to Analog-Board (UART-Communication)
D_RDY	Digital-board ready (status information from digital-board)
DAC_MUTE	Mute Signal for DAC
DAOUT	Digital Audio Out
DVAL	Audio from Digital Video In Left
DVAR	Audio from Digital Video In Right
DVCC1	Power Supply Pin
DVCC2	Power Supply Pin
DVCC3	Power Supply Pin
DVSS1	GND Pin
DVSS2	GND Pin
DVSS3	GND Pin
FAN_OFF	Fan for Basic engine
FBIN	Fast Blanking input
FOME	FOLLOW ME Status line (matching signals yes/no; only for Europe)
G1...10	DISPLAY GRID
INT	Interrupt OUT for the CC
INT	Interrupt – line from Display Print
ION	Inverse ON-Line
IPFAIL	Inverse Power Fail Detection
IPOR	Inverse Power On Reset
IRESET	Inverse Reset Input
K1	Key-Input-Line
K2	Key-Input-Line
KILL	Signal from IR-Receiver
P50 IN	P50 INput-line (only for Europe)
P50 OUT	P50 OUTput-line (only for Europe)
POR_DC	Power On Reset for Display Control Print (Ext_DL)
PSS	Output Enable Read (CC - Flash-ROM and S-RAM)

PWM_FIL	Control line for Filament Voltage Generation
PWONSW	Amplifier Switch Audio A/D Converter
RD_	Pal/Secam-Select
RECLEd	Control Signal for REC-LED
RESET_DIG	Reset Line to Digital Board
RP_	Inverse Reset line to Flash-ROM
RSA1/2	Record Selector 1/2
RY/BY_	Ready/Busy – input line (from Flash-ROM)
SIF1	Sound intermediate frequency
SB1	Secam Band 1 (PCB-Test entrance)
SCL	IC-Bus
SCLSW	Switched I ² C-Bus
SDA	IC-Bus
SDASW	Switched I ² C-Bus
SFS_TS	SAW Filter Select Trap Select
STBY	Standby-Line (Flash_Toshiba)
SYNC	Video Sync input
TEMP_SENSE	Temperature Sense Line
VER	HW-version input
VFV	Video from Frontend
VKK	VFT Driver Power Supply
VREFH	Pin for Reference-voltage input to A/D-converter
VREFL	Pin for Reference-voltage input to A/D-converter
VS1/2	View Selector 1/2
WR_	Write Enable (CC - Flash-ROM and S-RAM)
WSFI	Wide Screen Signalling Front In
WU	Wake Up
X1	Oscillator Pin
X12	Oscillator Pin
XIN	Oscillator Pin
XOUT	Oscillator Pin
XT1	Low Frequency Oscillator Pin
XT2	Low Frequency Oscillator Pin
YFIN	Luminance Front In

FEBE Board (Backend part)

ADC	Analog to Digital Converter
DAC	Digital to Analog Converter
DENC	Digital (Video) Encoder (Video DAC)
DV	Digital Video (Camcorder)
EF	Emitter Follower
OSD	On-Screen Display
VIP	Video Input Processor (Video ADC)
2Fh	Progressive scan video
2V5	+2V5 Power supply for Link+Codec IC7431
3V3	+3V3 Power supply
3V3_A	+3V3 Analog power supply for PHY IC7400
3V3_D	+3V3 Digital power supply for PHY IC7400
3V3_DLY	+3V3 Power supply for IC7500
3V3_LINK	+3V3 Power supply for Link+Codec IC7431
3V3_F	+3V3 Power supply for optional Flash memory IC7432
3V3_RAM	+3V3 Power supply for SDRAM IC7430
3V3_uP	+3V3 Power supply for Micro-controller IC7802
3V3_32kHz	+3V3 Power supply for audio format adaptation circuitry IC7507 and IC7508
3V3_AC	+3V3 Power supply for audio system clock generator IC7605 and IC7606
+5V	+5V Power supply
5V_PLL	+5V Power supply for VCO of audio PLL IC7604
A (1:17)	Flash address lines of uPD72893

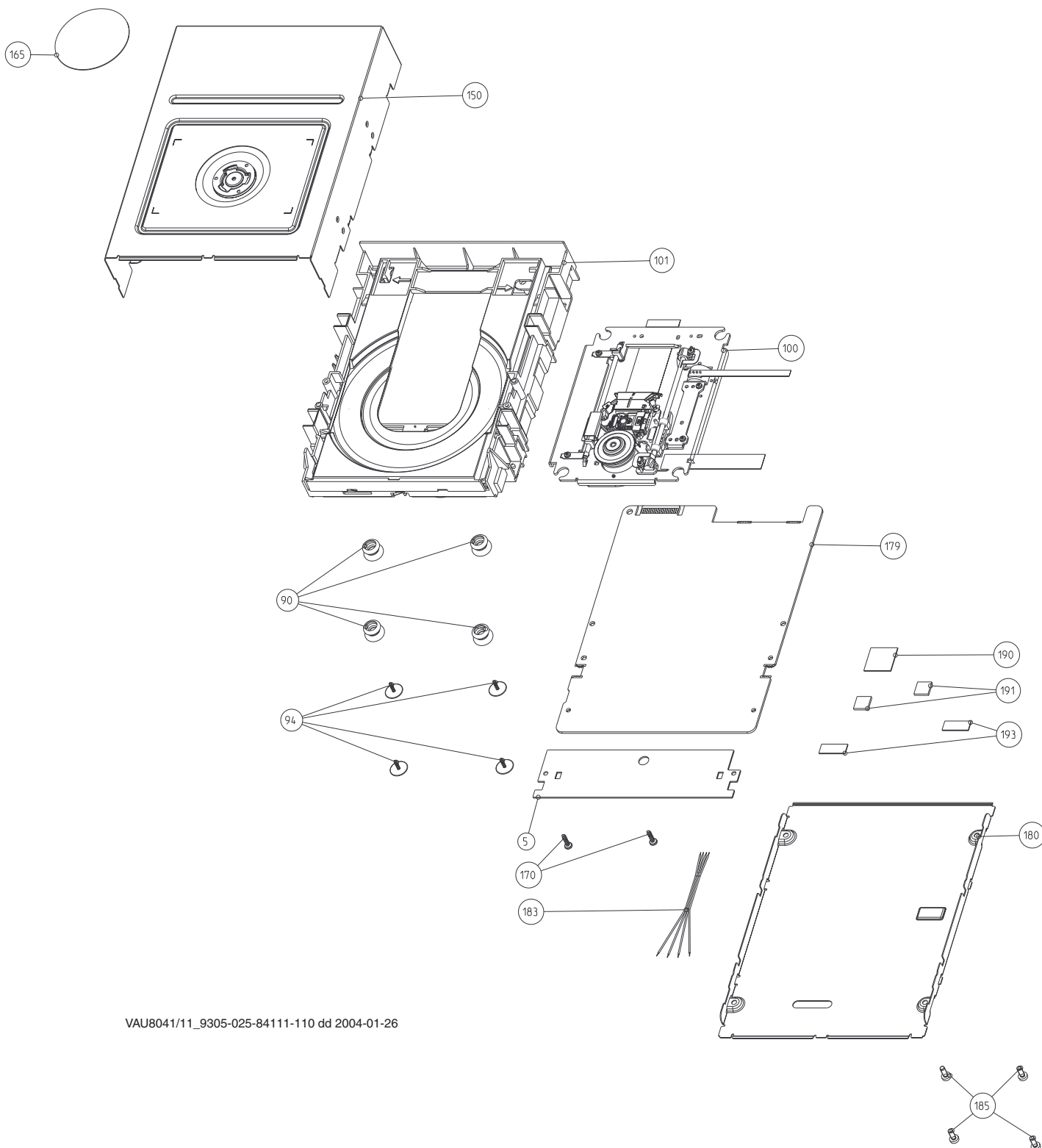
A_MUTE	Audio Mute	AGC	Automatic Gain Control
ABCK	Audio Bit Clock	CD	Compact Disc
AD (1:10)	Address bus lines for Host I/F of Link+Codec IC7431	CLV	Constant Linear Velocity
AEMP1	PCM1 emphasis ON/OFF for PCM1 output	DROPP1	Dvd Rewritable Opu Pre-Processor IC
AFS1	Audio sampling frequency indication signal	AM	Amplitude Modulation
ALRCLK	Audio Word Select	BE	Basic Engine
AMCLK44	11.2896MHz (=256 * 44.1 kHz) audio master clock signal for 44.1 kHz audio	ComPair	Computer aided rePair
AMCLK48	12.288MHz (=256 * 48 kHz) audio master clock signal for 32 kHz and 48 kHz audio	CD-DA	CD Digital Audio
APWM	PWM signal for audio PLL	CS	Chip Select
ASIC	Application Specific Integrated Circuit	DAC	Digital to Analogue Converter
BUFENn_AUD	Buffer Enable Audio	DAIO	Digital Audio Input Output
BUFENn_VID	Buffer Enable Video	DENC	Digital Encoder
CLK27M_CON	27MHz Clock to Digital Board	DFU	Direction For Use: description for the end user
CS	Parallel interface chip select input of Link+Codec IC7431	DNR	Dynamic Noise Reduction
CTL (0:1)	Link interface control lines	DRAM	Dynamic RAM
CTSN	Clear to Send	DSD	Direct Stream Digital
D (0:15)	Flash data lines of Link+Codec IC7431	DSP	Digital Signal Processing
DCDi	Directional Correlational Deinterlacing. Circuitry that reduces jaggies on diagonal edges when deinterlacing video-sourced material.	DVD	Digital Versatile Disc
DV_STATUS	Interrupt pin for reading DV-status	EEPROM	Electrical Erasable Programmable ROM
HS_CLK	Video clock input of Link+Codec IC7431	EFM	Eight to Fourteen bit Modulation
INT	Interrupt request output of Link+Codec IC7431 (input to Micro-Controller)	FDS	Full Diagnostic Software
IOR	Parallel interface IO read control input of Link+Codec IC7431	HF	High Frequency
ISPN	In System Programming signal (used for programming IC7802)	I ² C	Integrated Ic bus (signals at 5V level)
LKON	Link-on signal outputLPSLink power status inputLREQLink request input	I2S	Integrated Ic Sound bus (signals at 3.3V level)
MA (0:10)	SDRAM address lines of Link+Codec IC7431	IC	Integrated Circuit
MCAS	SDRAM column address strobe signal	IF	Intermediate Frequency
MCLK	SDRAM clock signal	IRQ	Interrupt ReQuest
MD (0:15)	SDRAM data lines of Link+Codec IC7431	LADIC	LAser Driver IC
MRAS	SDRAM row-address strobe signal	LLD	Loss Less Decoder
MWE	SDRAM write enable signal	LPCM	Linear Pulse Code Modulation
PCM1	Audio Serial Data Output of Link+Codec IC7431	LRCLK	Left/Right CLock
PCM1_NEW	'MSB justified' to I2S converted audio serial data; audio serial data input of audio DAC UDA1334A	MACE	Mini All Cd Engine
PD (0:15)	Data bus lines for Host I/F of Link+Codec IC7431	MPEG	Motion Pictures Experts Group
PHY_D (0:7)	Data bus connection between PHY and LINK device	NC	Not Connected
RESETn	DVIO board reset	NVM	Non Volatile Memory: IC containing DVD related data e.g. alignments
RESET_FM	Reset signal driven by Flashmaster programming device	OPC	Optimum Power Calibration
RETB	Reset input of Link+Codec IC7431	OPU	Optical Pickup Unit
RTSN	Request to Send	PCB	Printed Circuit Board (see PWB)
RWZ	Parallel interface read/write control input of Link+Codec IC7431	PCS	Position Control Sledge
RXD	Receive Data	PLL	Phase Locked Loop
SCLK	Link control output clock	PCM	Pulse Code Modulation
TXD	Transmit Data	PCM_CLK	Audio system clock for DAC
VPP	+10V switchable programming voltage of microcontroller	PCM_OUTx	Audio serial output data
YUV (0:7)	Digital Video	PSU	Power Supply Unit
		PWB	Printed Wiring Board (see PCB)
		RAM	Random Access Memory
		RGB	Red, Green and Blue colour space
		ROM	Read Only Memory
		RF	Radio Frequency
		S2B	Serial to Basic engine, communication bus between host- and servo processor
		SCL	Serial Clock I ² C
		SCLK	Audio serial bit clock
		SDA	Serial Data I ² C
		SDRAM	Synchronous DRAM
		SMC	Surface Mounted Components
		S/PDIF	Sony Philips Digital InterFace
		SPIDRE	Signal Processing Ic for Dvd REwritable
		SRAM	Static Random Access Memory
		STBY	STandBY
		SVCD	Super Video CD
		SW	SoftWare
		THD	Total Harmonic Distortion
		TTL	Transistor Transistor Logic (5V logic)
		uP	Microprocessor
		VCD	Video CD
		Y/C	Luminance (Y) and Chrominance (C) signal
		YUV	Component video

FEBE Board (Frontend part)

ADC	Analogue to Digital Converter
ADIP	Address In Pre-groove

10. Spare Parts List

10.1 Exploded View of FEBE Module (VAU8041)



VAU8041/11_9305-025-84111-110 dd 2004-01-26

Figure 10-1

10.2 Exploded View of the Loader Mechanism

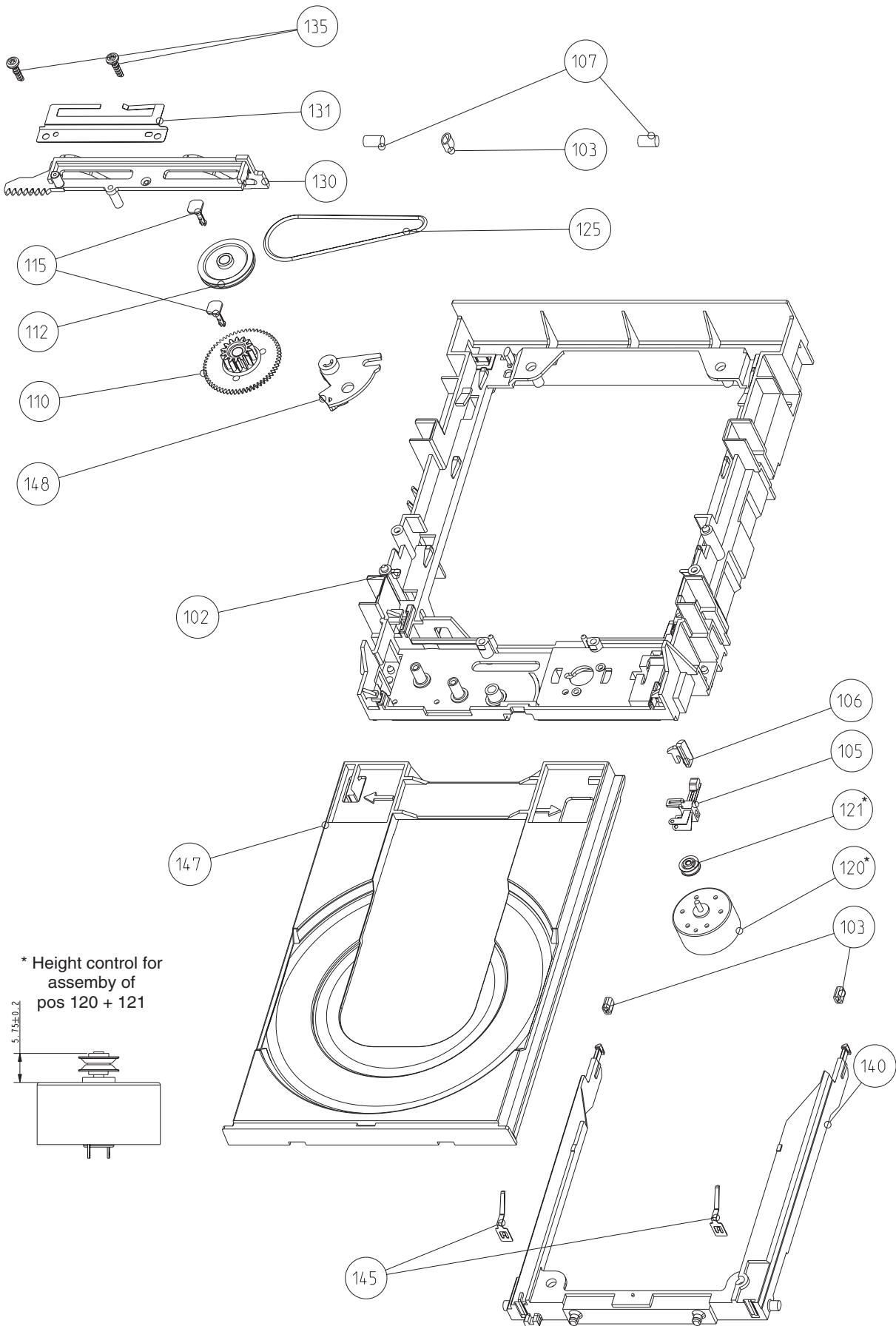
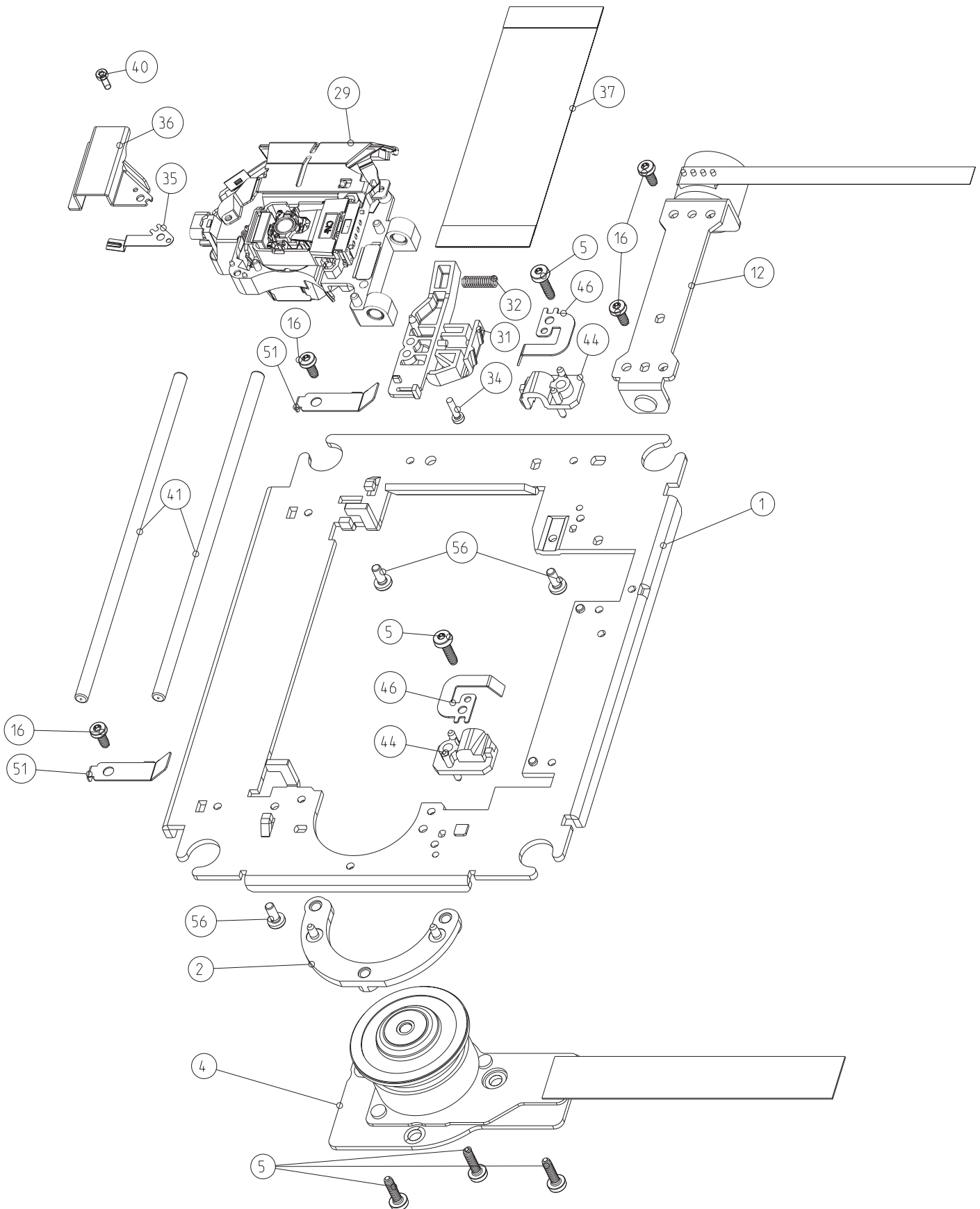


Figure 10-2

10.3 Exploded View of the DVDR Drive Mechanism



AV3.5 Mechanism_3139-197-50301-110 dd 2004-02-13 (POS)

Figure 10-3

10.4 Exploded View of the Set

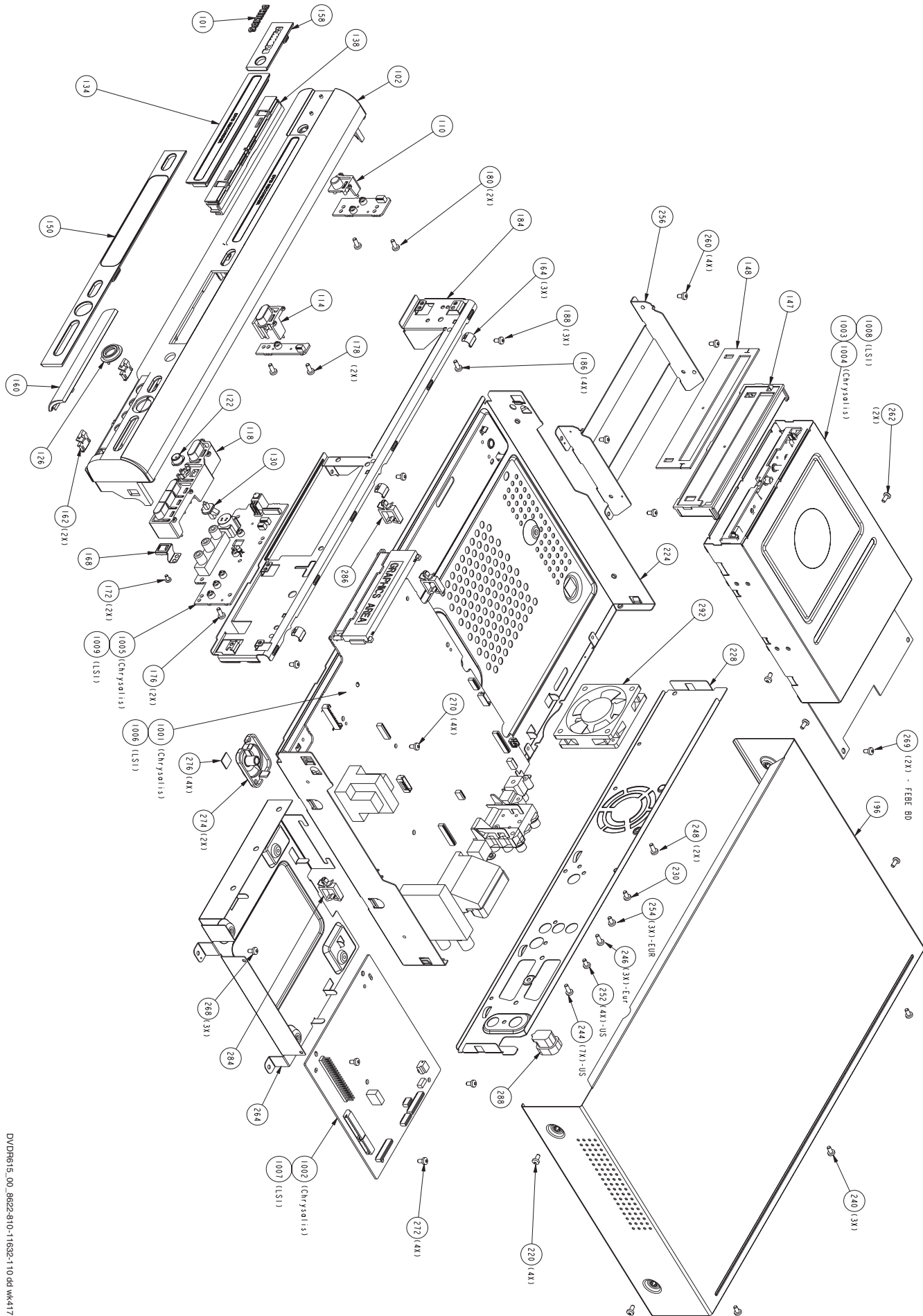


Figure 10-4

MISCELLANEOUS - SET EXPLODED VIEW**Various**

101	3139 247 51831	BADGE PHILIPS ASSY SILVER
102	3139 244 04741	CABINET FRONT DVDR610/00/02/19/33
102	3139 244 04731	CABINET FRONT DVDR610/05
102	3139 244 04671	CABINET FRONT DVDR615/00/02/19/33
102	3139 244 04751	CABINET FRONT DVDR615/05
102	3139 244 05621	CABINET FRONT DVDR616/00/02
102	3139 244 05611	CABINET FRONT DVDR616/05
110	3139 244 04561	BUTTON STANDBY
114	3139 244 04531	BUTTON EJECT
118	3139 244 04521	BUTTON SET
122	3139 244 04491	BUTTON CAP REC
126	3139 244 04511	RING REC
130	3139 244 04501	LIGHT GUIDE REC
134	3139 244 04551	COVER TRAY
138	3103 604 00811	HOLDER COVER TRAY
147	3103 604 01141	COVER DUST
148	3103 603 20122	FOAM RUBBER SEALING
150	3139 244 04541	WINDOW DVDR610/615
150	3139 244 04711	WINDOW DVDR616
158	3139 244 04481	WINDOW LEFT DVDR610/615
158	3139 244 04701	WINDOW LEFT DVDR616
160	3139 244 04721	DOOR FLAP DVDR610
160	3139 244 04471	DOOR FLAP DVDR615/616
162	3103 604 00441	HINGE DOOR FRONT AV
164	3103 601 20231	SPRING GROUND
168	3103 601 20212	SPRING I-LINK DVDR615/616
196	3139 241 21871	COVER TOP
274	3103 604 00622	FOOT
276	3103 603 20041	CUSHION FOOT
288	4822 532 60948	BUSH, MAINS CORD
292	2822 031 01441	FAN 12VDC 0.7W 3000RPM B
333	3139 248 72121	REMOTE CONTROL
336	2422 070 98231	MAINS CORD IEC 2A5 1M8 / 00/02/19/33
336	2422 070 98236	MAINS CORD UK 5A 1M8 / 05
342	2422 076 00532	CBLE SCART 1M5 SCART 21P BK B
345	4822 320 50377	CONNECT. CABLE PAL
1001	3139 248 82891	PCBAS MOBO BOARD 04 E1
1004	9305 025 84111	VAU8041/21 (PHOS) Y DVDR610
1004	9305 025 84121	VAU8041/21 (PHOS) Y DVDR615/616
8003	3139 111 04001	FFC FOIL 15P/180/15P BD 1MMP
8007	3139 111 03991	FFC FOIL 22P/280/22P BD 1MMP
8008	3139 110 34891	FFC FOIL 22P/120/22P AD 1MMP
8010	3139 111 03981	FFC FOIL 10P/280/10P BD 1MMP
8011	2422 076 00578	CBLE IEEE1394 F/480/SHR B DVDR615/616

MISCELLANEOUS VAU8041 MODULE EXPLODED VIEW**Various**

5	3139 194 01581	SEALING STRIP
12	3104 148 01950	SLEDGE MOTOR
90	3104 144 10730	SUSPENSION
94	3139 190 40231	T6 PAN HEAD M2X8.5 TT-P SEMS FW
100	3139 197 50301	AV3.5 MECHANISM ASSY (DVD-M)
101	3139 197 60291	AV3.5 LOADER ASSY
105	3139 198 80010	SEALING STRIP
120	3139 198 00620	TRAY MOTOR
121	3104 144 04980	MOTOR PULLEY, TRAY
125	3104 144 10121	TRAY MOTOR BELT
147	3104 144 04272	TRAY

150	3139 197 60301	TOP PLATE ASSY
179	3104 128 09271	FEBE PCBA 4MB/32MB NO DV-IN DVDR610
179	3104 128 09281	FEBE PCBA 4MB/32MB W/ DV-IN DVDR615/616
190	3139 194 01541	HEAT SINK PAD (CENTAURUS)
191	3139 194 01551	HEAT SINK PAD (CHEETAH)
193	3139 194 01561	HEAT SINK PAD (DRIVER)

MOBO (ANALOG) BOARD**Various**

1100	2722 171 00042	VFD DISPLAY BJ928GN
1101	4822 242 82114	CERAM RESONATOR 8MHZ
1102	4822 242 70938	RES XTL 32KHZ768 12P5 DT-38 B
1120	4822 276 13732	SWITCH TACT PUSH
1122	4822 276 13732	SWITCH TACT PUSH
1202	4822 276 13732	SWITCH TACT PUSH
1203	4822 276 13732	SWITCH TACT PUSH
1205	4822 276 13732	SWITCH TACT PUSH
1209	4822 276 13732	SWITCH TACT PUSH
1210	4822 276 13732	SWITCH TACT PUSH
1300▲	4822 071 51002	FUSE RAD LT 1A 250V IEC A
1301▲	9965 000 07788	FUSE RAD T2A IEC UL250V
1302▲	4822 252 11215	SURGE PROTECT DSP-301N-A21F A
1303▲	4822 265 11253	SOC FUSE V 1P F PTF/65 B
1304▲	2422 086 10786	FUSE RAD LT 4A 250V IEC A
1305▲	2422 086 10899	FUSE 5X20 ET 1A25 250V IEC B
1306▲	4822 071 55001	FUSE RAD LT 500MA 250V IEC A
1308▲	4822 071 51002	FUSE RAD LT 1A 250V IEC A
1310▲	2422 086 10769	FUSE RAD LT 125MA 250V IEC A
1600	2422 543 01427	RES XTL 18M432 12P HC49/US A
1700	2422 542 90147	TUN IF V+U PLL IEC BGIDKL B
1900	4822 265 11154	CON V 22P F 1.00 FFC 0.3 B
1915	4822 267 11031	CON V 10P F 1.00 FFC 0.3 B
1920	2422 026 05301	SOC CINCH V 3P FJPJ1127 B
1921	2422 026 05307	CON MDIN H 4P F YKF51 B
1922	2422 025 17797	CON V 15P F 1.00 FFC 0.3 B
1931▲	4822 265 20723	CON BM V 2P M 7.92 VH B
1940	2422 033 00334	CON BM EURO H 42P F BK GRND-L
1942	2422 025 17797	CON V 15P F 1.00 FFC 0.3 B
1945	2422 026 05308	SOC CINCH H 3P F YEWHRD Y
1947	4822 265 11154	CON V 22P F 1.00 FFC 0.3 B
1948	4822 267 10994	SOC MDIN H 4P F TCS7927 B
1955	4822 267 31729	SOC CINCH H 1P F BK B

—||—

2102	4822 124 11968	SUPCAP SE 5V5 S 220MF P80M20 A
2301	2020 554 90173	CERSAF KX 250V S 2,2NF PM20 B
2302	2020 021 91506	ELCAP ZL 16V S 1000UF PM20 B
2306	4822 122 31175	1NF 10% 500V
2308	4822 122 31175	1NF 10% 500V
2309	2020 021 91506	ELCAP ZL 16V S 1000UF PM20 B
2311▲	4822 121 10512	275V 220NF 20%
2313	4822 121 70386	47NF 10% 250V
2315▲	2022 020 00742	ELCAP LS 400V S 68UF PM20 B
2316	2020 021 91506	ELCAP ZL 16V S 1000UF PM20 B
2318▲	4822 126 14525	47PF 5% 1KV
2321	2020 021 91506	ELCAP ZL 16V S 1000UF PM20 B
2324	4822 121 41857	10NF 5% 250V
2326	4822 126 10206	2,2NF 10% 500V
2327	4822 121 51598	2,2NF 5% 400V

—W—

3211	4822 117 12063	NTC DC 5W 10K 5%
3300▲	4822 053 21335	3M3 5% 0,5W
3301▲	4822 053 21335	3M3 5% 0,5W
3318▲	4822 053 21684	680K 5% 0,5W
3330	2322 193 14477	RST MFLM PR01 A 0,47R PM5 A
3331	2322 193 14687	RST MFLM PR01 A 0,68R PM5

—W—

5100	2422 549 43062	IND FXD EMI 100MHZ 600R R
5101	4822 157 50964	100MUH
5300▲	2422 531 02546	TFM SMT SLOT SRW28EC9-E01V0* B
5301	2422 535 94634	IND FXD LHL08 S 2U2 PM20 A
5302▲	2422 549 44509	FIL MAINS 25MH 0A4 HF2022R Y
5303	4822 157 11737	22UH 10% 9X9,5
5304	4822 157 11737	22UH 10% 9X9,5
5305	4822 157 70826	2,4UH
5306	4822 157 11737	22UH 10% 9X9,5
5307	4822 157 70826	2,4UH
5401	4822 157 11706	10UH 5% 2,4X3,4
5402	4822 157 11706	10UH 5% 2,4X3,4
5551	2422 536 00019	TRANSFORMER 6RG (SAGA) B
5600	4822 157 11706	10UH 5% 2,4X3,4
5601	4822 157 11706	10UH 5% 2,4X3,4
5700	4822 157 11737	22UH 10% 9X9,5
5701	2422 549 43062	IND FXD EMI 100MHZ 600R R
5702	2422 549 43062	IND FXD EMI 100MHZ 600R R
5703	2422 549 43062	IND FXD EMI 100MHZ 600R R
5704	4822 157 11706	10UH 5% 2,4X3,4
5801	4822 157 11706	10UH 5% 2,4X3,4
5802	2422 549 43062	IND FXD EMI 100MHZ 600R R
5803	2422 549 43062	IND FXD EMI 100MHZ 600R R

—H—

6002	4822 130 11397	BAS316
6003	4822 130 11397	BAS316
6004	4822 130 11397	BAS316
6006	4822 130 11397	BAS316
6007	4822 130 11397	BAS316
6100	4822 130 80622	BAT54
6101	4822 130 80622	BAT54
6102	4822 130 11416	PDZ6.8B
6103	4822 130 11397	BAS316
6104	4822 130 11397	BAS316
6105	4822 130 11397	BAS316
6108	4822 130 11397	BAS316
6114	4822 130 11397	BAS316
6188	4822 130 80622	BAT54
6200	9340 548 61115	PDZ12B
6201	9340 548 61115	PDZ12B
6202	9340 548 61115	PDZ12B
6203	9340 548 61115	PDZ12B
6204	9340 548 61115	PDZ12B
6211	9322 190 44676	LED VS LTL-1MHHR
6300	9322 161 76682	SB340L-7024
6301	9322 161 76682	SB340L-7024
6302	4822 130 31083	BYW55
6303	4822 130 31083	BYW55
6304	9322 184 68682	STPS5L40-C2
6305	4822 130 31083	BYW55
6306	9322 184 68682	STPS5L40-C2
6307	4822 130 31083	BYW55
6308	9322 126 71673	BYT42M A
6309	9322 161 78682	SB360L-7024
6310	4822 130 31878	1N4003G
6311	4822 130 10871	SBYV27-200
6312	4822 130 11397	BAS316
6313	4822 130 11416	PDZ6.8B
6314	3198 020 55680	BZX384-C5V6
6315	4822 130 41601	BYV95A
6316	4822 130 34142	BZX79-B33
6317	4822 130 80622	BAT54
6318	4822 130 41601	BYV95A
6319	4822 130 30842	BAV21
6320	9340 548 69115	PDZ27B
6321	4822 130 34382	BZX79-B8V2

6322	4822 130 11397	BAS316
6401	4822 130 11416	PDZ6.8B
6402	4822 130 11416	PDZ6.8B
6403	4822 130 11416	PDZ6.8B
6404	4822 130 11416	PDZ6.8B
6405	9340 548 61115	PDZ12B
6406	9340 548 61115	PDZ12B
6407	9340 548 61115	PDZ12B
6408	9340 548 61115	PDZ12B
6409	4822 130 11416	PDZ6.8B
6410	9340 548 61115	PDZ12B
6411	9340 548 61115	PDZ12B
6412	9340 548 61115	PDZ12B
6413	9340 548 61115	PDZ12B
6414	9340 548 61115	PDZ12B
6415	9340 548 61115	PDZ12B
6416	4822 130 11416	PDZ6.8B
6417	4822 130 11416	PDZ6.8B
6418	9340 548 61115	PDZ12B
6419	9340 548 61115	PDZ12B
6420	9340 548 61115	PDZ12B
6421	9340 548 61115	PDZ12B
6422	9340 548 61115	PDZ12B
6423	9340 548 61115	PDZ12B
6424	4822 130 11397	BAS316
6600	4822 130 11397	BAS316
6803	9340 548 61115	PDZ12B
6804	9340 548 61115	PDZ12B
6805	4822 130 11522	UDZ15B
6806	9340 548 61115	PDZ12B
6807	4822 130 11522	UDZ15B

7402	3198 010 42320	BC857BW
7404	3198 010 42320	BC857BW
7405	3198 010 42310	BC847BW
7407	3198 010 42310	BC847BW
7408	9340 219 30115	BC817-25W
7409	3198 010 42310	BC847BW
7410	9322 173 41668	ST6618
7411	9322 024 55662	NJM2234M
7412	3198 010 42320	BC857BW
7413	3198 010 42310	BC847BW
7414	3198 010 42310	BC847BW
7415	9340 219 30115	BC817-25W
7416	9322 174 75668	NJM2235M
7500	4822 209 62312	MC33078D
7501	5322 209 11102	HEF4052BT
7503	4822 209 62312	MC33078D
7504	5322 209 11102	HEF4052BT
7505	9340 219 30115	BC817-25W
7507	9340 219 30115	BC817-25W
7551	5322 209 11517	PC74HCU04T
7600	9322 186 87668	MSP3415G-QG-B8V3 (MIAS)
7601	4822 130 61553	DTC124EU
7602	9340 219 30115	BC817-25W
7603	9340 219 30115	BC817-25W
7802	9340 219 30115	BC817-25W
7803	9322 174 76668	NJM2267M
7804	9340 219 30115	BC817-25W
7951	4822 209 60177	LM339D
7953	3198 010 42310	BC847BW
7954	3198 010 42310	BC847BW

2668	4822 124 23002	10UF 16V
2669	4822 124 23002	10UF 16V
2812	4822 124 23002	10UF 16V
2818	4822 124 23002	10UF 16V
2828	4822 124 23002	10UF 16V
2838	2020 021 91857	ELCAP FK 6V3 100U PM20 R
2981	2020 021 91729	ELCAP RKV 35V 4U7 PM20 R
2989	2020 021 91729	ELCAP RKV 35V 4U7 PM20 R
2999	2020 021 91857	ELCAP FK 6V3 100U PM20 R

-W-

3000	3198 031 13390	RST NETW 1206 4X 33R PM5 COL
3001	3198 031 13390	RST NETW 1206 4X 33R PM5 COL
3003	3198 031 13390	RST NETW 1206 4X 33R PM5 COL
3004	3198 031 13390	RST NETW 1206 4X 33R PM5 COL
3005	4822 117 13523	220R 5% RESN 0.63W
3006	4822 117 13523	220R 5% RESN 0.63W
3007	3198 031 14720	RST NETW 1206 4X4K7 PM5 COL R
3008	3198 031 14720	RST NETW 1206 4X4K7 PM5 COL R
3009	4822 117 13523	220R 5% RESN 0.63W
3010	4822 117 13523	220R 5% RESN 0.63W
3025	4822 117 12662	10R X4 5%
3029	4822 117 12662	10R X4 5%
3084	3198 031 11010	RST NETW 1206 4X100R PM5 COL R
3085	3198 031 11010	RST NETW 1206 4X100R PM5 COL R
3541	3198 031 13390	RST NETW 1206 4X 33R PM5 COL
3542	3198 031 13390	RST NETW 1206 4X 33R PM5 COL
3543	3198 031 13390	RST NETW 1206 4X 33R PM5 COL
3562	4822 117 13526	150R 5% RESN 0.63W
3583	4822 117 13526	150R 5% RESN 0.63W
3584	4822 117 13526	150R 5% RESN 0.63W
3585	4822 117 13526	150R 5% RESN 0.63W
3587	4822 117 13526	150R 5% RESN 0.63W
3588	4822 117 13526	150R 5% RESN 0.63W
3589	4822 117 13526	150R 5% RESN 0.63W
3615	2350 035 10829	RST NETW ARV24 4X 82R PM5 R
3631	3198 031 13390	RST NETW 1206 4X 33R PM5 COL
3635	3198 031 13390	RST NETW 1206 4X 33R PM5 COL
3639	3198 031 13390	RST NETW 1206 4X 33R PM5 COL
3643	3198 031 13390	RST NETW 1206 4X 33R PM5 COL
3800	2350 035 10229	RST NETW ARV24 4X22R PM5 R
3801	2350 035 10229	RST NETW ARV24 4X22R PM5 R
3802	2350 035 10229	RST NETW ARV24 4X22R PM5 R
3803	2350 035 10229	RST NETW ARV24 4X22R PM5 R
3804	4822 117 13573	NETW 4 X 47R 5% MNR14
3805	4822 117 13573	NETW 4 X 47R 5% MNR14
3806	4822 117 13573	NETW 4 X 47R 5% MNR14
3807	4822 117 13573	NETW 4 X 47R 5% MNR14
3808	4822 117 13573	NETW 4 X 47R 5% MNR14
3809	4822 117 13573	NETW 4 X 47R 5% MNR14
3810	4822 117 13573	NETW 4 X 47R 5% MNR14
3811	4822 117 13573	NETW 4 X 47R 5% MNR14
3812	3198 031 13390	RST NETW 1206 4X 33R PM5 COL
3813	3198 031 13390	RST NETW 1206 4X 33R PM5 COL
3814	3198 031 13390	RST NETW 1206 4X 33R PM5 COL
3815	3198 031 13390	RST NETW 1206 4X 33R PM5 COL
3846	3198 031 14720	RST NETW 1206 4X4K7 PM5 COL R
3873	3198 031 14720	RST NETW 1206 4X4K7 PM5 COL R
3874	3198 031 14720	RST NETW 1206 4X4K7 PM5 COL R
3875	3198 031 14720	RST NETW 1206 4X4K7 PM5 COL R

FEBE BOARD

Various

1000	2422 025 17955	CON V 6P M 1.00 SR R
1001	2422 543 01368	RES XTL 24M576 12P CX8045 R
1002	2422 543 01422	RES XTL 24M576 18P CX8045 R
1100	2422 025 17821	CON H 45P F 0.50 FPC 0.3 R
1302	2422 543 01025	RES XTL 16M93 20P CX-16F R
1400	2422 025 05548	CON H 4P F 1.00 FFC 0.3
1401	2422 025 18382	CON H 11P F 1.00 FPC 0.3
1601	2122 662 00152	PTC 1812 16V 0R18 PM
1602	2122 662 00136	PTC 1812 6V 0R21 PM
1901	2422 025 16389	CON BM V 22P F 1.00 FFC 0.3 R
1902	2422 025 16389	CON BM V 22P F 1.00 FFC 0.3 R
1903	8204 056 66001	CON V 7P M 2.00 PH R
1904▲	2422 086 11087	FUSE F 1A 125V UL R
1905	8204 056 66011	CON V 11P M 2.00 PH R
1906▲	2422 086 11087	FUSE F 1A 125V UL R
1907	2422 025 16729	CON BM V 10P F 1.00 FFC 0.3 R
1908▲	2422 086 11087	FUSE F 1A 125V UL R

-II-

2013	2020 021 91729	ELCAP RKV 35V 4U7 PM20 R
2014	4822 124 12095	100UF 20% 16V
2062	2020 021 91729	ELCAP RKV 35V 4U7 PM20 R
2071	2020 021 91729	ELCAP RKV 35V 4U7 PM20 R
2073	2020 021 91729	ELCAP RKV 35V 4U7 PM20 R
2081	2020 021 91729	ELCAP RKV 35V 4U7 PM20 R
2083	2020 021 91729	ELCAP RKV 35V 4U7 PM20 R
2098	4822 124 80151	47UF 16V
2107	5322 124 41945	22UF20% 35V
2416	4822 124 12095	100UF 20% 16V
2431	4822 124 23002	10UF 16V
2446	5322 124 41945	22UF20% 35V
2448	2020 552 95812	CER2 1206 X7R 16V 1U PM10 R
2515	4822 124 23002	10UF 16V
2533	4822 124 23002	10UF 16V
2538	4822 124 23002	10UF 16V
2580	5322 124 41945	22UF20% 35V
2612	5322 124 41945	22UF20% 35V
2653	5322 124 41945	22UF20% 35V
2654	5322 124 41945	22UF20% 35V
2666	4822 124 23002	10UF 16V
2667	4822 124 23002	10UF 16V



7000	3198 010 42320	BC857BW
7001	4822 130 60854	DTA124EU-W
7002	4822 130 60854	DTA124EU-W
7004	9322 148 78668	AD1852JRS
7005	4822 209 62312	MC33078D
7006	4822 130 60854	DTA124EU-W
7008	9352 670 99118	UDA1361TS/N1
7009	4822 130 61553	DTC124EU
7045	3198 010 42310	BC847BW
7100	9322 196 98685	NCP301LSN47
7101	4822 130 61553	DTC124EU
7102	4822 130 40981	BC337-25
7103	3198 010 42310	BC847BW
7104	4822 130 41246	BC327-25
7105	3198 010 42310	BC847BW
7106	4822 130 41246	BC327-25
7107	3139 240 50861	TMP87CM74AFG-5JP4 w/ mark "ASP017-50861" (Lead-free)
7107	3139 240 50921	TMP87CM74AF-5JP4 w/ mark "ASP017-50921" (non Lead-free)
7108	3198 010 42310	BC847BW
7110	3198 010 42310	BC847BW
7111	4822 130 61553	DTC124EU
7112	3198 010 42310	BC847BW
7113	3198 010 42320	BC857BW
7114	9965 000 04199	BSN20
7115	9965 000 04199	BSN20
7116	3198 010 42320	BC857BW
7118	3198 010 42310	BC847BW
7123	3198 010 42310	BC847BW
7124	3198 010 42310	BC847BW
7200	9322 185 95667	IR RECEIVER TSOP4836
7300	9322 183 38668	STS9NF30L
7301	4822 209 14933	TL431IZ
7302	4822 130 11336	STP16NE06FP
7303	4822 209 14933	TL431IZ
7304	9322 183 38668	STS9NF30L
7305	4822 209 14933	TL431IZ
7306	9322 163 75685	SI2306DS
7307	4822 130 11417	STP3NB60FP
7308	4822 130 61553	DTC124EU
7309	9322 180 12685	SI2312DS
7310	4822 130 41782	BF422
7311	9352 673 56112	TEA1507P/N1
7312	3198 010 42320	BC857BW
7313	3198 010 42310	BC847BW
7314	3198 010 42310	BC847BW
7316	9965 000 09548	PHOTOCOUPLER TCET1108G
7318	4822 130 40959	BC547B
7319	4822 209 14933	TL431IZ
7321	9322 163 75685	SI2306DS
7322	9322 163 75685	SI2306DS
7323	3198 010 42310	BC847BW
7324	4822 130 61553	DTC124EU
7325	9322 163 75685	SI2306DS
7401	3198 010 42310	BC847BW

