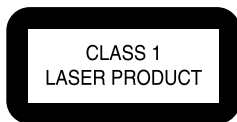


Service
Service
Service



Service Manual



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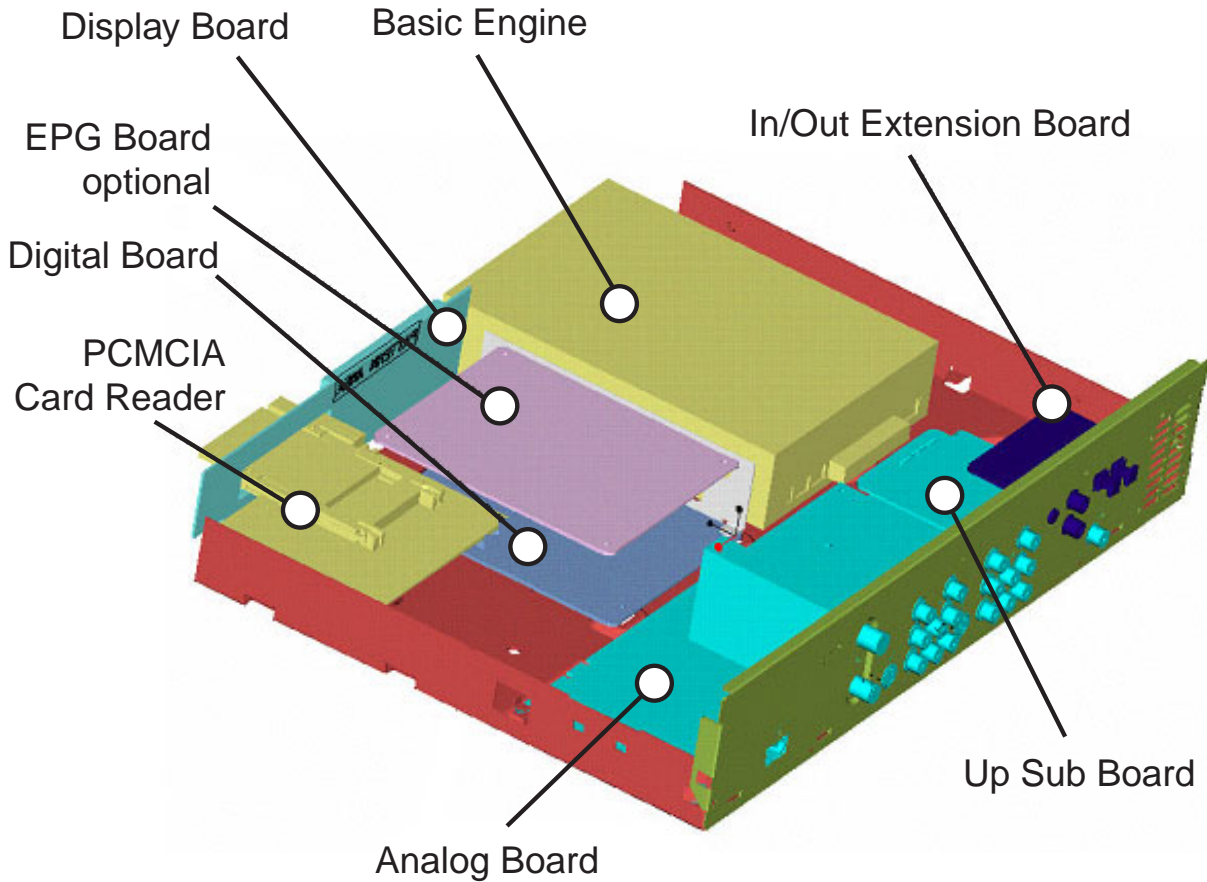
For the drive please refer to the service manual of the Basic Engine VAD8031, 3122 785 13680.

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1. Technical Specifications and Connection Facilities

1.1 PCB Locations



Remarks:

The EPG Board is not present in the DVDR77.

1.2 Diversity Matrix

Type	DVDR77/00 DVDR77/02
Digital Board (Chrysalis) 2.1	PCB ASSY CHRY 2.1_E4
Basic Engine AV3	VAD8031/01
I/O Extension Board IOE	PBAS IOE IST E2
UP Sub Board	PBA UP SUB IST E1
Analog-Board	PB AB ISTEP E1
Display Control	PCB ASSY DC1 IST E/N

1.3 General:

Mains voltage : 198V-276V
 Mains frequency : 43 Hz - 63Hz
 Power consumption mains : 28 W
 Power consumption standby : < 7 W
 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 - 4.00 MHz +0-4dB
 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: : FM: ≥ 50dB; AM ≥ 45dB, unweighted

Harmonic distortion (1 kHz, ± 25 kHz deviation): : FM ≤ 1.5%; AM ≤ 2%

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. PAL
 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

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		
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

Input voltage : 2 Vrms
 Input impedance : >10kΩ

Video - Cinch

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

Video - YC (Hosiden)

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

1.6 Video Performance

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

1.6.1 SCART (RGB)

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

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 20Hz-20kHz	: >85dB
Frequency response 20Hz- 20kHz	: ±0.2dB max
Signal to noise ratio	: >95 dB
Dynamic range 1kHz	: >85dB
Dynamic range 20Hz-20kHz	: >80dB
Distortion and noise 1kHz	: >85dB
Distortion and noise 20Hz-20kHz	: >75dB
Intermodulation distortion	: >77dB
Mute	: >95dB
Outband attenuation:	: >40dB above 30kHz

1.7.2 Scart Audio

Output voltage 2 channel mode	: 1.6Vrms ± 2dB
Channel unbalance (1kHz)	: <1dB
Crosstalk 1kHz	: >85dB
Crosstalk 20Hz-20kHz	: >70dB
Frequency response 20Hz- 20kHz	: ± 0.2dB max
Signal to noise ratio	: >85 dB
Dynamic range 1kHz	: >75dB
Dynamic range 20Hz-20kHz	: >70dB
Distortion and noise 1kHz	: >75dB
Distortion and noise 20Hz-20kHz	: >65dB
Intermodulation distortion	: >70dB
Mute (spin-up, pause, access)	: >85dB
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 Card Reader

IDE Interface ATA Card Reader
 PC Card Standard Rev 8.0 Type I & II PCMCIA ATA Flash
 Memory Card Standard
 Data transfer: 16.6MB/s max.
 Support of all types of IDE Hard Disk Drives, Compact Flash
 Cards, Smart Media Cards / Smart Media ROM Cards, MMC
 Cards, SD Cards,

1.10 Digital Video Input (IEEE 1394)

1.10.1 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:
 Annex A of 61883-1

1.11 P50 System Control

Via SCART pin nr 10

1.12 Dimensions and Weight

Height of feet	: 10mm
Apparatus tray closed	: WxDxH :435 x 324.5 x 88cm
Apparatus tray open	: WxDxH :435 x 366 x 88cm
Weight without packaging	: app. 4 kg ± 0.5 kg
Weight in packaging	: app. 6.5 kg

1.13 Laser Output Power & Wavelength

1.13.1 DVD

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

1.13.2 CD

Output power	: 0.3mW
Wavelength	: 780nm

- 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'.

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2.3.2 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:

CAUTION VISIBLE AND INVISIBLE LASER RADIATION WHEN OPEN AVOID EXPOSURE TO BEAM
 ADVARSEL SYNLIG OG USYNLIG LASERSTRÅLING VED ÅBNING UNDGÅ UDSÆTTELSE FOR STRÅLING
 ADVARSEL SYNLIG OG USYNLIG LASERSTRÅLING NÅR DEKSEL ÅPNES UNNGÅ EKSPONERING FOR STRÅLEN
 VARNING SYNLIG OCH OSYNLIG LASERSTRÅLING NÅR DENNA DEL ÅR ÖPPNAD BETRÄKTA EJ STRÅLEN
 VARO! AVATT AESSA OLET ALTTIINA NÄKYVÄLLE JA NÄKYMÄTTÖMÄLLE LASER SÄTEILYLLE. ÄLÄ KATSO SÄTEESEEN
 VORSICHT SICHTBARE UND UNSICHTBARE LASERSTRÄHLUNG WENN ABDECKUNG GEÖFFNET NICHT DEM STRAHL AUSSETZEN
 DANGER VISIBLE AND INVISIBLE LASER RADIATION WHEN OPEN AVOID DIRECT EXPOSURE TO BEAM
 ATTENTION RAYONNEMENT LASER VISIBLE ET INVISIBLE EN CAS D'OUVERTURE EXPOSITION DANGEREUSE AU FAISCEAU

Figure 2-2

2.3.3 Notes

Dolby

Manufactured under licence from Dolby Laboratories. "Dolby", "Pro Logic" and the double-D symbol are trademarks of Dolby Laboratories. Confidential Unpublished Works.

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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

3. Directions For Use

SYSTEM-MENU	System menu: Call up/cancel the main menu (menu bar at the top of the screen)
◀ ▶ ▲ ▼	Cursor keys: Cursor left, right, up, down
CHANNEL +	Plus: Next programme number
CHANNEL -	Minus: Previous programme number
OK	Store/confirm: To store or confirm entry
PLAY ▶	Playback: To play a recorded disc.
◀◀	Select previous title/search backwards: Briefly press the button during playback: Previous chapter/film or previous title Hold down the button: Search backwards Hold down button during still picture, slow motion backwards
STOP ■	Stop: Stop playback/recording, except with programmed recordings (TIMER) Hold down button, opens and closes the disc tray.
PAUSE II	Pause (still picture): If this button is pressed during playback, the DVD recorder switches to pause. You will see a still picture. If this button is pressed during recording, the DVD recorder will also switch to pause.
▶▶	Select next title/search forwards: Briefly press the button during playback: Next chapter/film or next title Hold down the button: Search forwards Hold down button during still picture, slow motion forwards
0..9/abc	Number-/Letter buttons: To enter numbers or letters in appropriate entry fields
CLEAR	Delete: To delete last entry or clear programmed recording (TIMER)

Additional TV functions

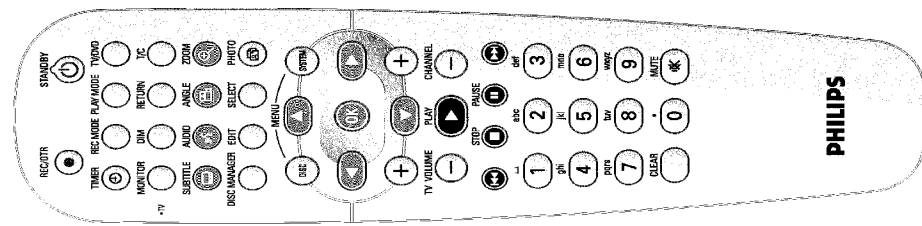
This will only work with TV sets with the same remote control code #RC5 (e.g. Philips TV sets)

TV VOLUME +	TV volume: Increase TV volume
TV VOLUME -	TV volume: Reduce TV volume
MUTE ✖	TV sound off: Switch TV sound on/off

For the following functions you need to hold down the button at the left side • TV and then select the function you need with the appropriate button.

STANDBY ⓪	Switching the TV off
0..9/abc	Number buttons: 0 - 9
CHANNEL +	TV programme number: To select a higher programme number
CHANNEL -	TV programme number: To select a lower programme number

The remote control



ENGLISH

REC/OTR ●	Record: Record the current TV channel
STANDBY ⓪	Switch on or off: To switch set on or off, interrupt menu function, interrupt a programmed recording (TIMER)
TIMER ⓪	TIMER: To make a TIMER programming with/without Show View® or to alter or clear a programmed TIMER
REC MODE	Record type (Picture quality): To select the maximum possible record time
PLAY MODE	Playback type: Choose between repeat, shuffle play and intro-scan
TV/DVD	TV/DVD switch: Switches the start socket. EXT 2 AUX-IO of the DVD recorder directly to the TV set. This lets you watch the picture from any unit connected to this start socket (set-top box, video recorder or satellite receiver) and at the same time record from another source. If you have not connected a device to the EXT 2 AUX-IO socket or the device is switched off, you can use this button to switch between TV reception and the signal of the DVD recorder. But this only works if you use a start cable to connect the TV set to your DVD recorder (EXT 1 TO TV-IO socket) and your TV set responds to this switch-over.
MONITOR	Monitor: This button lets you switch between disc playback or the picture of the internal tuner (TV channel).
DIM	Dimmer: This button lets you change the brightness of the display to one of two levels or switch it off.
RETURN	Back: Return to previous menu on a video CD (VCD). This also works with some DVDs.
TIC	Title/Chapter: Choose the T (Title) / C (Chapter) directly from the menu bar using ▶ ▲ . If TIC appears in the display, the index menu from a recorded disc or an introductory film will be shown. In this case, this function is not available.
SUBTITLE	Subtitle: Select the subtitle language
AUDIO	Audio: Selecting the audio language. For recording or during playback using the internal tuner (MONITOR key), select language 1 or 2.
ANGLE	Angle: Select the camera angle
ZOOM	Zoom: Enlarge the picture
DISC MANAGER	Disc Manager: Call up or cancel the Disc Manager
EDIT	EDIT: For displaying the edit menu for DVD+RW/R disc, for setting chapter markers, for editing the photos in the 'Digital Photo Manager'
SELECT	Select: Select function/value/photos
PHOTO	Digital Photo Manager: Open the 'Digital Photo Manager'
DISC-MENU	Disc menu: To show the DVD menu or the index screen

ENGLISH

Front of the device

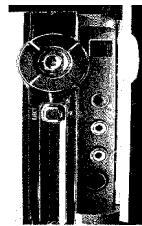


STANDBY-ON	Switch on or off: To switch off or on, interrupts a function, interrupts a programmed recording (TIMER)
OPEN/CLOSE	Open/Close disc tray: Open/close disc tray
MEDIA SLOT	Media Slot for PC (PCMCIA)-cards (adapters)
EJECT	Eject PC-(PCMCIA) card:
RECORD	Record: Record the current TV channel
	Playback: To play a recorded disc
	Select previous title/search backwards
	Select next title/search forwards
	Stop: Interrupt playback/recording

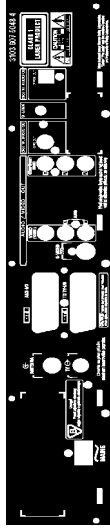
Behind the flap at the right-hand corner on the front

Switching between the **S-VIDEO** and **VIDEO** sockets takes place automatically. If a signal is available at both sockets at the same time, the signal at the **S-VIDEO** socket has priority.

S-VIDEO	S-Video socket: Connection of SV/HS/H8 camcorders or SV/HS/H8 video recorders (programme number EPR)
Yellow socket VIDEO	Video input socket: Connection of camcorders or video recorders (programme number EPR)
White/red socket left AUDIO right	Audio input socket left/right: Connection of camcorders or video recorders (programme number EPR)
DV IN	i-Link/DV socket (digital video input, IEEE 1394, FireWire): Connecting a digital camcorder or other suitable device (programme number EPR)



Back of the unit



~MAINS	Mains socket: Connection to the mains supply (230V/50Hz)
ANTENNA IN	Aerial input: Connection of the aerial
TV OUT	Aerial output: Connection of the TV set
EXT 2 AUX-I/O	Scart socket 2: Connection of an additional device (satellite receiver, set-top box, video recorder, camcorder, etc.), RGB input
EXT 1 TO TV-I/O	Scart socket 1: Connection of a TV set, RGB output

Output sockets (AUDIO/VIDEO OUT)

S-VIDEO (YC) OUT	S-Video output: Connection of an S-Video-compatible TV set
VIDEO (CVBS) OUT	Video output (yellow socket): Connecting a TV set with a video input (CVBS, Composite Video)
AUDIO L/R OUT	Analogue audio output (white/red socket): Connection of a TV set with audio input sockets or connection of an additional device
COMPONENT VIDEO OUT	Component Video output (red/blue/green socket): Connection of an additional device with Component Video input

Output sockets (DIGITAL AUDIO OUT)

COAX OUT	Coaxial digital audio output
OPTICAL AUDIO OUT	Optical digital audio output

Messages in the DVD recorder display

The following messages may appear in your DVD recorder display

















IS TV ON?	The DVD recorder is in initial installation mode. Switch the TV on, then read the paragraph on 'Initial installation' in 'Installing your DVD recorder'.
NO INPUT	No input signal available (signal inadequate or unstable)
NO MENU	The menu on the screen is active
DISC OPENING	Disc tray opening
DISC OPEN	Disc tray open
DISC CLOSING	Disc tray closing
DISC BEING READ	Disc being read
RECORDING COMPLETED	Once recording has been successfully completed the table of contents is created.
NEW MENU	The menu structure is created after the first recording has been made on a new disc
COPY PROTECT	You received a copy-protected signal. This may come from a copy-protected DVD/Video of a DVD/Video player or from a TV channel.
WAIT	Please wait until this message disappears. The DVD recorder is busy performing a task.
NO DISC	A disc has not been inserted for recording. If a disc has been inserted, it cannot be read.
INFO	Information about the inserted DVD is displayed on the screen
DISC COMPATIBLE	The DVD recorder is processing the changes to make them DVD compatible
ERASING	The entire disc is erased
ERASE COMPLETE	The disc inserted is either new or has been completely erased (no recordings).
PROTECT	The disc is protected against recording.
MAX TITLE	The maximum number of titles per disc has been reached. The maximum number of titles on a disc is 48.
MAX CHAP	The maximum number of chapters within a title/or the disc has been reached. The maximum number of chapters within a title is 99, on a disc 124.
DISC FULL	The disc is full. There is no space for new recordings

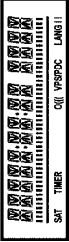
RECORDING

ENGLISH

The symbols on your DVD recorder display

These symbols can light up on your DVD recorder display:

	Multi-function display/text line
	Clock
	Discrete playing time
	OTR switch-off time
	Title name
	Display of the programme number of the TV channel/playing time/channel name/function.
	Display of information and alerts
	Disc bar: Displays the current position on the disc (disc pointer).
	Play/Record: Single flashing segment at the current position.
	Pause: Flashing segment on both sides of the current position.
	Stop: Illuminated segment at the current position.
	SAT: An automatic recording from a satellite receiver (SAT recording) has been programmed.
	TIMER: A recording (timer) has been programmed
	A remote control signal has been received
	Video programming system / programme delivery control: A VPS or PDC code will be transmitted for the selected TV program
	LANG II: During playback a 2-channel tone was detected or a 2-channel tone was received. I or II lights up depending on which sound channel has been selected (button AUDIO)



2

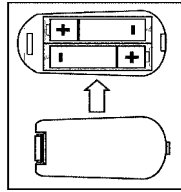
Connecting the DVD recorder

ENGLISH

PAL TV-SEC	A disc with PAL recordings has been inserted. The machine is trying to record an NTSC signal. Insert a new disc or one that contains NTSC recordings.
NTSC TV-SEC	A disc with NTSC recordings has been inserted. The machine is trying to record a PAL signal. Insert a new disc or one that contains PAL recordings.
RECORDING	An illegal action (e.g. OPEN/CLOSE ▲ button) was attempted during recording.
FREE TITLE	Playback was started for an empty title or the following title is empty.
TV-SEC CHECK	An attempt has been made to record during playback of a protected disc. This message appears if an attempt is made to insert a chapter marker (EDIT button).
TV-SEC ERR	An error occurred when writing the title. If this error keeps occurring, please clean the disc or use a new one. For instructions on how to clean a disc see the section on 'Cleaning the discs' in the next chapter.
TV-SEC WARN	An error occurred when writing the title. Recording was continued; the error was skipped.
SETUP	After the automatic search the menu for setting the date/time will appear on the screen.
WRITE 01	During the automatic channel search the TV channels found will be counted.
BLUE-KEY	The disc tray cannot be closed/opened.
SAFE REC	The new recording will be added at the end of all the other recordings (SAFE RECORD).
EASYLINK	Data transfer 'EasyLink' from the TV is in progress.
POST-FORMAT	After the creation of the menu structure the disc is prepared.
PHILIPS	The DVD-Recorder has been switched on.
STANDBY	The DVD-Recorder has been switched off.
PHOTO	The 'Digital Photo Manager' is switched on.
PHOTO	The 'Digital Photo Manager' will be switched off.
50%+ING	Data will be written on the inserted memory card or on a DVD+RW/R

ENGLISH

Preparing the remote control for operation



The remote control and its batteries are packed separately in the original DVD recorder packaging. You must install the batteries in the remote control before use - described in the following section.

- 1 Take the remote control and the enclosed batteries (2 batteries).
- 2 Open the battery compartment, insert the batteries as shown and then close the battery compartment.

The remote control is now ready to use. Its range is approximately 5 to 10 meters.

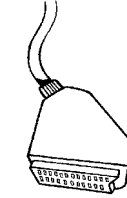
**Tip**

In the following sections, you will need the remote control for the first time. Aim the remote control at the DVD recorder and not at the TV set.

Connecting your DVD recorder to the TV set

The necessary cable connections must be made before you can record or playback TV programmes using your DVD recorder.

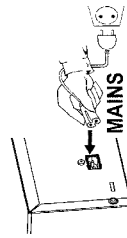
Connect the DVD recorder **directly** to your TV set. If there is a video recorder in between the picture quality may be poor.
We recommend that you use a start cable to connect your TV set and DVD recorder.

**What is a start cable?**

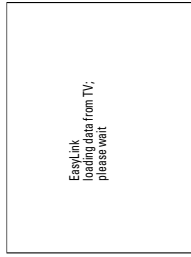
The start or Euro AV cable serves as the universal connector for picture, sound and control signals. With this type of connection, there is practically no loss of quality in picture or sound transmission.



- 5 Read the next chapter 'Connecting additional devices' on how to connect additional devices (satellite receivers, videorecorders,...) to the input/output sockets.
- 6 Switch on the TV set.



- 7 Use the supplied mains cable to connect the mains socket ~MAINS at the back of the DVD recorder with the wall outlet. The most important features of the DVD recorder will appear in scrolling text on the display. After the first installation is completed this function will be switched off. How you switch on this function again, read in the chapter 'User preferences' in the section 'standby'.



- 8 Switch on the DVD recorder using **STANDBY-ON**. A message appears on the screen announcing that the transfer has started. 'EFS54/1h3' appears on the display during transfer. The TV set transfers all saved TV channels, in the same order, to the DVD recorder. This may take several minutes.



Problem

- * 'Time', 'Year', 'Month', 'Date' appears on the TV screen
- 1 Check if the time in 'Time' is correct.
- 2 If required, change the time with the number buttons 0-9/abc on your remote control.
- 3 Select the next line with ▲ or ▼.
- 4 Check if the displayed settings for 'Year', 'Month' and 'Date' are correct.
- 5 When all information is correct, save by pressing **OK**.



Problem

- * I can see more installation menus on my TV set. Not all the necessary data has been transferred. Please enter the settings by hand as follows. For more information on the various functions see 'Initial installation' in installing your DVD recorder.
- 1 Select the desired audio language using ▼ or ▲ and confirm with **OK**.
- 2 Select the desired subtitle language with ▼ or ▲ and confirm with **OK**.
- 3 Select the desired screen format position using ▼ or ▲.
- 4:3 letterbox For a 4:3 TV set: cinema format (black bars above and below the picture)
- 4:3 panscan For a 4:3 TV set: full height-format with the sides cut off
- 16:9 For a 16:9 TV set
- 4 Confirm with **OK**.
- 5 Select the country of your residence with ▼ or ▲. If your country does not appear, select **Other**.
- 6 Confirm with **OK**.

Initial installation is now complete.

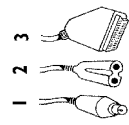
When you install your DVD recorder for the first time, select one of the following options:

- 'Connecting with a scart cable and Easy Link' if your TV set is equipped with 'Easy Link, Cinema Link, NextView Link, Q-Link, Smart Link, Megalogic, Datalogic, ...' and you wish to use a scart cable.
- 'Connecting with a scart cable without Easy Link' if your TV set is not equipped with 'Easy Link, Cinema Link, NextView Link, Q-Link, Smart Link, Megalogic, Datalogic, ...' and you wish to use a scart cable.
- 'Connecting with an S-Video(Y/C)cable' if your TV set is equipped with an S-Video(S/VHS) socket.
- 'Connecting with video(CVBS) cable' if your TV set is equipped only with a video(CVBS) socket.

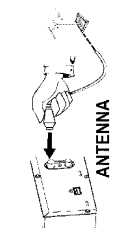
Connecting with a scart cable and 'Easy Link'

Your DVD recorder can exchange information with your TV set using 'Easy Link'. Your TV channels can also be transferred in the same order from your TV set to your DVD recorder using 'Easy Link'. Please see your TV's operating instructions.

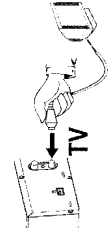
- 1 Have the following cables ready: an aerial cable (1, supplied), a mains cable (2, supplied), a special scart cable (3, suitable for Easylink).



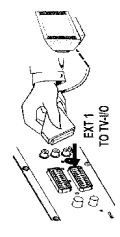
- 2 Switch off your TV set.
- 3 Remove the aerial cable plug from your TV set. Insert it into the **ANTENNA IN** socket at the back of the DVD recorder.



- 4 Insert one end of the supplied aerial cable into the **TV OUT** socket at the back of the DVD recorder and the other end into the aerial input socket at the back of the TV set.

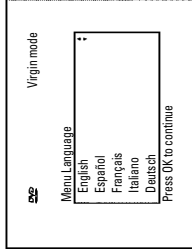


- 5 Plug in a full-pin scart cable (all 21 contacts wired) into the scart socket **EXT 1 TO TV-IO** at the back of the DVD recorder and the corresponding scart socket - suitable for Easylink - at the back of the TV set (see TV set operating instructions).



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8 If the connection was properly made and your TV was automatically switched to the programme number for the start socket, e.g. 'EXT', '0', 'AV', you will see the following picture:



***My screen is empty:**

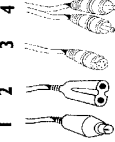
- ✓ Depending on the initialising period it can take some time before you see the picture on the TV.
- ✓ Many TV sets are switched by the DVD recorder to the programme number for the start socket by way of a control signal sent through the start cable.
- ✓ If the TV set does not automatically switch to the start socket programme number, manually change to the corresponding programme number on your TV set (see your TV's operating instructions).
- ✓ Check that the start cable is connected from the TV set to the EXT 1 TO TV-IO socket on the DVD recorder. The EXT 2 AUX-IO socket is intended only for additional devices.

Problem

Then, read the paragraph on 'Initial installation' in 'Installing your DVD recorder'.

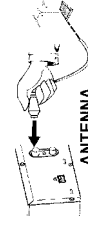
Connecting with an S-Video(Y/C) cable

This connecting cable, also known as the S-VHS cable, is used to transmit the brightness signal (Y signal) and colour signal (C signal) separately. This mini DIN socketplug is also called a Hostiden socket/plug.

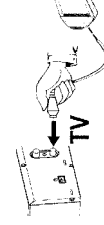


Have the following cables ready: an aerial cable (1, supplied), a mains cable (2, supplied), an S-Video(SVHS) cable (3), an audio cable (4, supplied, red/white plug).

1 Remove the aerial cable plug from your TV set. Insert it into the ANTENNA IN socket at the back of the DVD recorder.

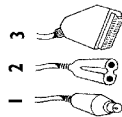


2 Insert one end of the supplied aerial cable into the TV OUT socket at the back of the DVD recorder and the other end into the aerial input socket at the back of the TV set.

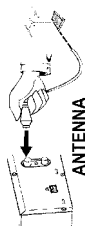


Connecting with a start cable without 'Easy Link'

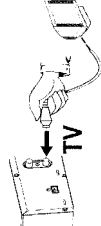
Have the following cables ready: an aerial cable (1, supplied), a mains cable (2, supplied), a start cable (3).



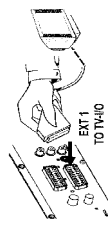
1 Remove the aerial cable plug from your TV set. Insert it into the ANTENNA IN socket at the back of the DVD recorder.



2 Insert one end of the supplied aerial cable into the TV OUT socket at the back of the DVD recorder and the other end into the aerial input socket at the back of the TV set.



3 Plug a start cable into the start socket. EXT 1 TO TV-IO at the back of the DVD recorder and the start socket for the DVD recorder at the back of the TV set (see TV set operating instructions).



My TV set has several start sockets. Which one should I use?
Select the start socket that is suitable for both video output and for video input.

My TV set shows me a selection menu for the start socket
Select 'VCR' as the source for this start socket.

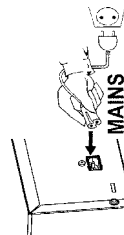
4 Read the next chapter 'Connecting additional devices' on how to connect additional devices (satellite receivers, videorecorders,...) to the input/output sockets.

5 Switch on the TV set.

6 Insert one end of the supplied mains cable into the mains socket ~MAINS at the back of the DVD recorder and the other end into the wall socket.

The most important features of the DVD recorder will appear in scrolling text on the display. After the first installation is completed this function will be switched off. How you switch on this function again, read in the chapter 'User preferences' in the section 'standby'.

7 Switch on the DVD recorder using STANDBY-ON (15 TV) will appear on the display.

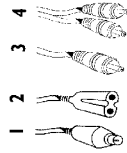


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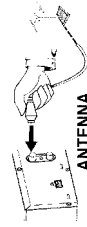
Connecting with video(CVBS) cable

This cable, usually with yellow Cinch connectors, is used for transmitting the Composite Video signal (EAS, CVBS). In this method of transmission the colour signal and the brightness signal are transmitted on the same cable. In certain circumstances, this can lead to problems with the picture, such as 'Moiré' patterns.

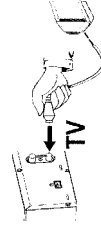
Have the following cables ready:
 an aerial cable (1, supplied), a mains cable (2, supplied), a video (CVBS)cable (3, supplied, yellow plug), an audio cable (4, supplied, red/white plug).



1 Remove the aerial cable plug from your TV set. Insert it into the **ANTENNA IN** socket at the back of the DVD recorder.



2 Insert one end of the supplied aerial cable into the **TV OUT** socket at the back of the DVD recorder and the other end into the aerial input socket at the back of the TV set.



3 Insert one end of the supplied video (CVBS) cable into the yellow Cinch socket **VIDEO (CVBS) OUT** at the back of the DVD recorder and the other end into the video input socket (usually yellow) on the TV set (usually labelled 'Video in' or 'AV in'. See TV operating instructions).

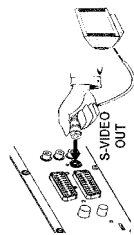


4 Insert one end of the supplied audio (Cinch) cable into the red/white Cinch socket **AUDIO L/R OUT** at the back of the DVD recorder and the other end into the audio input socket (usually red/white) on the TV set (usually labelled 'Audio in' or 'AV in'. See TV operating instructions).

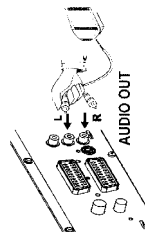


5 Read the next chapter 'Connecting additional devices' on how to connect additional devices (satellite receivers, videorecorders,...) to the input/output sockets.

3 Insert one end of an S-Video(SVHS) cable into the **S-VIDEO (V/C) OUT** socket at the back of the DVD recorder and the other end into the S-Video (SVHS) input socket on the TV set (usually labelled 'S-Video in' or 'SVHS in'. See TV operating instructions).

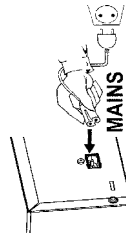


4 Insert one end of the supplied audio (Cinch) cable into the red/white Cinch socket **AUDIO L/R OUT** at the back of the DVD recorder and the other end into the audio input socket (usually red/white) on the TV set (usually labelled 'Audio in' or 'AV in'. See TV operating instructions).



5 Switch on the TV set. Switch the TV set over to the SVHS input socket or select the relevant programme number. Please see your TV's operating instructions for the programme number you need.

6 Insert one end of the supplied mains cable into the mains socket **~ MAINS** at the back of the DVD recorder and the other end into the wall socket.



The most important features of the DVD recorder will appear in scrolling text on the display. After the first installation is completed this function will be switched off. How you switch on this function again, read in the chapter 'User preferences' in the section 'Standby'.

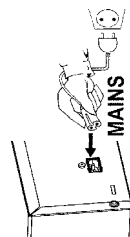
7 Switch on the DVD recorder using **STANDBY-ON** ⏻. 15 14 04P will appear on the display.

Then, read the paragraph on 'Initial installation' in 'Installing your DVD recorder'.

3

Connecting additional devices

6 Switch on the TV set. Switch the TV set over to the Video/Audio input socket or select the relevant programme number. Please see your TV's operating instructions for the programme number you need.



7 Insert one end of the supplied mains cable into the mains socket **~ MAINS** at the back of the DVD recorder and the other end into the wall socket.
The most important features of the DVD recorder will appear in scrolling text on the display. After the first installation is completed this function will be switched off. How you switch on this function again, read in the chapter 'User preferences' in the section 'standby'.

8 Switch on the DVD recorder using **STANDBY-ON**. '15 14 04' will appear on the display.

Then, read the paragraph on 'Initial installation' in 'Installing your DVD recorder'.

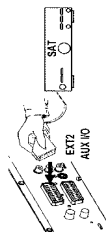
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Connecting additional devices to the second start socket

You can connect additional devices such as decoders, satellite receivers, camcorders, etc. to the **EXT 2 AUX-IO** socket. When playback is started on this additional device the DVD recorder automatically connects the **EXT 2 AUX-IO** start socket with the **EXT 1 TO TV-IO** start socket. You will then see the picture from the additional device on your TV set, even if the DVD recorder is switched off.

The **TV/DVD** button on the remote control allows you to switch between playback through the **EXT 2 AUX-IO** start socket and playback from the DVD recorder.

The DVD recorder must be connected **directly** to the TV set (**EXT 1 TO TV-IO** socket directly to the TV set). If there is a video recorder in between the picture quality may be poor because of the copy protection system built into the DVD recorder.



Connecting a video recorder, DVD player.

You can connect a video recorder or a DVD player to the **EXT 2 AUX-IO** input socket. If you already have an external receiver (satellite receiver, set-top box, cable TV box) connected to this socket, you can connect the video recorder to the 'VCR', 'TO VCR', ...socket of the external receiver.

You can also use the front sockets **S-VIDEO**, **VIDEO** and the **left AUDIO** right audio sockets.

Please note:

Most prerecorded video cassettes and DVDs are copy-protected. If you try to copy them you will see the message **[[COPY PROTECT]]** on the DVD recorder's display.

***When copying video cassettes the display on the DVD recorder shows 'NO SIGNAL'.**

- ✓ Check that the cable is plugged in firmly.
- ✓ If a recording is made from a video recorder, change the tracking on the video recorder.
- ✓ The DVD recorder may not be able to recognise the video input signal if this signal is poor or does not comply with relevant standards.

***When I copy DVD video discs or prerecorded video cassettes the picture is fuzzy and the brightness varies**

- ✓ This happens if you try to copy DVDs or video cassettes that have been copy-protected. Even though the picture on the TV is fine the recording on a DVD-RW+R is faulty. This interference is unavoidable with copy-protected DVDs or video cassettes.



Problem

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Connect camcorder to the front sockets

To copy camcorder recordings, you can use the front sockets. These sockets are located behind the flap on the right hand side.

Best picture quality

If you have a DV or Digital 8 camcorder, connect the **DV IN** input of the DVD recorder to the appropriate DV output on the camcorder.

When films are transferred the original recording date and time are stored as DVD subtitles.

On playback, this data can be displayed on the TV screen by using the  function (Subtitle).

Choose **EPH2** as a programme number for this input.

Very good picture quality

If you have a Hi8 or S-VHS(C) camcorder, connect the **S-VIDEO** input of the DVD recorder to the appropriate S-VHS output on the camcorder.

You must also connect the audio input **left AUDIO** right on the DVD recorder to the audio output on the camcorder.

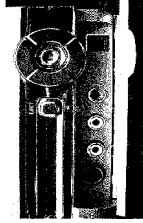
Choose **EPH1** as a programme number for this input.

Good picture quality

If you have a camcorder that only has a single video output (Composite Video, CVBS), connect the **VIDEO** input on the DVD recorder to the appropriate output on the camcorder.

You must also connect the audio input **left AUDIO** right on the DVD recorder to the audio output on the camcorder.

Choose **EPH1** as a programme number for this input.



Connecting an external receiver (satellite receiver, set-top box, cable TV box,...)

You can connect external receivers to the **EXT 2 AUX-IO** socket. For additional receivers, you can also use the **EXT 1 TO TV-IO** socket (if the TV set is connected to the **COMPONENT VIDEO OUT** sockets), and **VIDEO**, **S-VIDEO** sockets at the front. Please observe that you also have to connect an audio cable to the **IN AUDIO LR** or **left AUDIO** right socket.

- 1 Connect the **scart** socket of the receiver (satellite receiver) provided for the TV set (usually labelled 'TV', 'TO TV'), with the **EXT 2 AUX-IO** socket of the DVD recorder.

Why can't I use the 'VCR', 'TO VCR'... socket?

In order to achieve the best possible picture quality, you must use the RGB (red-green-blue) signal of the receiver. As a rule, this signal is available at the **TV', 'TO TV'...** socket. The DVD recorder transfers the signal to the **EXT 1 TO TV-IO** socket.

Some receivers only provide a 'Video (CVBS/FBAS)' signal at the 'VCR', 'TO VCR', socket. Read the instruction manual of the receiver on the signals available at the sockets.

If you are satisfied with the picture quality of the 'VCR', 'TO VCR'... socket, you can also use this socket.



- 2 If your external receiver offers several options for the signal available at the 'TV', 'TO TV'... socket, choose the RGB setting.

Connecting additional devices only via aerial cable

If you want to connect additional devices (e.g. satellite receiver,...) only via aerial cable, please observe the following:

The DVD-Recorder must be connected directly to the TV set. If there is a video recorder or an additional device in between, the picture quality may be poor because of the copy protection system built into the DVD-Recorder.

The additional device (satellite receiver) must be connected **before** the DVD recorder (additional device - DVD recorder - TV set). Only the TV set must be connected to the **TV OUT** socket.

- If there is interference in the picture when the additional device is switched on, a TV broadcaster may be transmitting on the same channel or a channel very close to that of the additional device. (e.g.: TV broadcaster on channel 45; additional device (satellite receiver) also on channel 45). In this case, change the channel of the additional device (satellite receiver). Consult the instruction manual of the additional device.

You must also store this channel on the DVD recorder to be able to record TV programmes from the additional device (satellite receiver).

- Switch on the additional device during the installation of the DVD recorder. During the automatic channel search, the channel on which the additional device is transmitting will be stored as a TV channel.

Connecting audio devices to the analogue audio sockets

Two audio output sockets **AUDIO LR OUT** are located on the back of the DVD recorder (audio signal output left/right)

These can be used to connect the following:

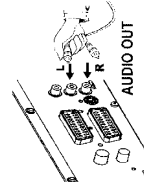
- a receiver with **Dolby Surround Pro Logic**
- a receiver with **two-channel analogue stereo**



Can I use the 'Phono' input on my amplifier?

This socket (input) on the amplifier is designed only for record players without preamplifiers. Do not use this input for connecting the DVD recorder.

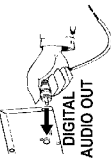
The DVD recorder or the amplifier may be damaged as a result.



4

Installing your DVD recorder

Connecting audio devices to the digital audio sockets



At the back of the DVD recorder there are two digital audio output sockets: **OPTICAL AUDIO OUT** for an optical cable and **COAX OUT** for a coaxial cable (Cinch cable).

- These can be used to connect the following:
 - an **AV receiver** or an **AV amplifier** with a **digital multi-channel sound decoder**
 - a receiver with **two-channel digital stereo (PCM)**

Digital multi-channel sound

Digital multi-channel sound offers the best possible sound quality. You will need a multi-channel AV receiver or amplifier that supports at least one of the audio formats of the DVD recorder (MPEG2, Dolby Digital and DTS). Consult the operating instructions for your receiver to find out which audio formats it supports.



Problem

* **All I can hear from my loudspeakers is a loud distorted noise**
 ✓ The receiver is not compatible with the digital audio format of the DVD recorder. The audio format of the DVD disc is displayed in the status window when you switch to another language. Playback in six-channel digital surround sound is only possible if the receiver has a digital multi-channel sound decoder.

Initial installation

After successfully connecting your DVD recorder to the TV set and other additional devices as described in the previous chapters, this chapter will show you how to start the initial installation. The DVD recorder automatically seeks out and stores all available TV channels.

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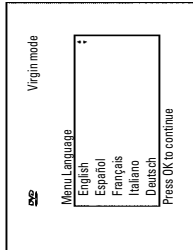
Connecting additional devices

If you have connected additional devices such as a satellite receiver to the aerial cable, switch them on. The automatic channel search will recognise it and save it. Please observe that you must switch on a "test signal" for some additional devices.

No aerial connected

Even if you only want to use the DVD recorder to play back or have only connected a satellite receiver, you must still complete the initial installation. This is necessary so that the basic settings are stored correctly. Once initial installation is complete you can use the DVD recorder as normal.

Tip



1

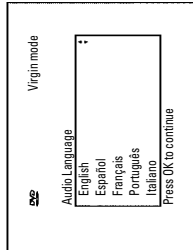
Select the desired language for the on-screen menu by pressing ▼ or ▲.

What is an on-screen menu?

The multi-language on-screen menu takes the mystery out of using your new DVD recorder. All settings and/or functions are displayed on your TV screen in the relevant language.



Confirm with **OK**.



3

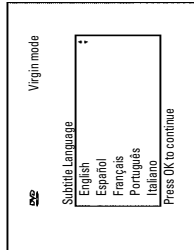
Select the desired audio language using ▼ or ▲.

What is an audio language?

The DVD will play the sound in the language you select, provided this language is available on the disc. If it is not available on the disc the first language on the DVD will be used instead. The DVD Video Disc menu, if available, will also be displayed in the language you select.



Confirm with **OK**.



5

Select the desired language for the subtitles by pressing ▼ or ▲.

What is the subtitle language?

The subtitles will be displayed in the language you select, provided this language is available on the disc. If it is not available on the disc the first language on the DVD will be used instead.



Confirm with **OK**.

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17 When all information is correct, save by pressing **OK**.

The initial installation is now complete.

Satellite receiver

If you are connecting a satellite receiver, please read the section on 'Using a satellite receiver'.

Decoder

If you are connecting a decoder, you must install it as described in the next section.



Tip



Problem

* **Sound may be distorted on some TV channels.**
 ✓ If the sound is distorted on any of the stored TV channels or if there is no sound at all, the wrong TV system may have been stored for the TV channel. Read 'Manual TV channel search' for information on how to change the TV system.

Using a satellite receiver

TV channels from a satellite receiver (connected to start socket **EXT 2 AUX-IO**) are received on the DVD recorder on programme number **EXTZ**

If necessary, use the **MONITOR** button to switch to the internal tuner. Select programme number **EXT1** with **0** on the remote control and then select programme number **EXTZ** with **CHANNEL -**. You should select the TV channels to be received by the satellite receiver directly on the receiver itself.

7 Select the desired screen format position using **▼** or **▲**. These settings will only be used if you insert a DVD that contains this information.

Which screen formats can I select?

'4:3 letterbox' for a wide-screen (cinema format) picture with black bars at the top and bottom.
 '4:3 panscan' for a full-height picture with the sides trimmed.
 '16:9' for a wide-screen TV set (screen edge ratio 16:9)



8 Confirm with **OK**.

9 Select the country of your residence with **▼** or **▲**. If your country does not appear, select **Other**.

Why do I have to select a country?

To call up the specific settings for the respective country, you must first install the country.

10 Confirm with **OK**.

11 After you connect the aerial (or cable TV, satellite receiver, etc.) to the DVD recorder, press **OK**. The automatic TV channel search starts. '00' will appear on the display.

* **The DVD recorder cannot find any TV stations**

✓ Select channel 1 on the TV set. Can you see the stored TV channel on the TV set?
 If not, check the cable connection from the aerial (aerial socket) to the DVD recorder and to the TV set.
 ✓ Please have patience.
 The DVD recorder searches the entire frequency range in order to find and save the largest possible number of TV channels.
 ✓ If you have not connected an aerial, go through all the basic settings right to the end and then, if you wish, start the automatic search (see 'Automatic TV station search').



Problem

12 When the automatic TV channel search is complete, **Autom. search complete** will appear on the TV screen. **'Time', 'Year', 'Month', 'Date'** will then appear on the TV screen.

13 Check if the time in **'Time'** is correct.

14 If required, change the time with the number buttons **0..9**abc on your remote control.

15 Select the next line with **▲** or **▼**.

16 Check if the displayed settings for **'Year', 'Month'** and **'Date'** are correct.

TV Shape

4:3 letterbox
4:3 panscan
16:9

Press OK to continue

Country

Austria
Belgium
Denmark
Finland
France

Press OK to continue

Installation

Autom. search

Searching for TV channels

00 Channels found

Please wait

Autom. search

Autom. search complete

00 Channels found

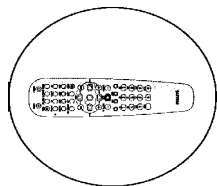
Time 20:01
Year 2003
Month 01
Date 01

To continue
Press OK

ENGLISH

Allocating a decoder

Some TV channels send coded TV signals that can only be viewed properly with a purchased or rented decoder. You can connect such a decoder (descrambler) to your DVD recorder. The following function automatically activates the connected decoder for the TV channel you want to watch.



How do I allocate the decoder for Easy Link?

If your TV set supports 'Easy Link', the decoder must be assigned to the relevant TV channel on the TV set (see the operating instructions for your TV set). Settings cannot then be made in this menu.



- 1 Switch on the TV set. If required, select the programme number for the DVD recorder.
- 2 Switch on the DVD recorder using **STANDBY-ON**.
- 3 Use the **CHANNEL +** and **CHANNEL -** buttons or the number buttons **0..9** on the remote control to select the TV channel for which you want to use the decoder. If necessary, use the **MONITOR** button to switch to the internal tuner.
- 4 Press the **SYSTEM-MENU** button on the remote control. The menu bar appears.
- 5 Select **"I"** symbol with **◀** or **▶**.
- 6 Select **'Installation'** using **▼** or **▲** and confirm with **▶**.
- 7 Select **'Manual search'** using **▼** or **▲** and confirm with **▶**.
- 8 Select **'Decoder'** using **▼** or **▲**.
- 9 Select **'On'** with **◀** or **▶**.

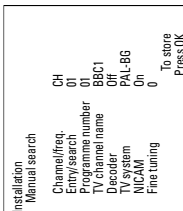
How do I switch the decoder off again?

Use **▶** to select **Off** in the **'Decoder'** line on the screen (Decoder off).

Confirm with **OK**.

To end, press **SYSTEM-MENU**.

Your decoder has now been allocated to this TV channel.



Connection using a component video (Y Pb Pr/YUV) cable

Component video (Y Pb Pr) is the highest quality picture transmission option. This is achieved by dividing the video signal into a luminance signal (Y) and two colour difference signals - red minus luminance (Pb) and blue minus luminance (Cb). As a rule, "Cr" or "R-Y" is used to describe the red difference signal and "Cb" or "B-Y" the blue difference signal.

These signals are transmitted through separate lines. The connectors of this cable and the corresponding sockets are usually green (luminance), blue (Pb, Cb, B-Y), and red (Pr, Cr, R-Y).

If you choose this type of connection, the DVD recorder must already be connected and completely installed (initial installation complete).

Switching of the signal to the **COMPONENT VIDEO OUT** sockets is carried out in a menu that is not yet available during the initial installation.

- 1 Switch on the TV set. If required, select the programme number for the DVD recorder.
- 2 Switch on the DVD recorder using **STANDBY-ON**.
- 3 Press the **SYSTEM-MENU** button on the remote control. The menu bar appears.
- 4 Select **"I"** using **◀** or **▶** and confirm with **▶**.
- 5 Select the **"I"** symbol using **▼** or **▲** and confirm with **▶**.
- 6 Select the line **'Video output'** using **▲** or **▼** and confirm with **▶**.
- 7 Select your setting with **▼** or **▲**.

Which setting should I choose?

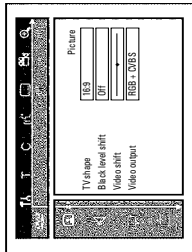
Since Y/Pb/Pr (YUV) signals are not transmitted simultaneously with S-video(Y/C) and video (BAS/CVBS) signals, you can choose between the two types. The RGB signal is switched off.

'S-video + Y/Pb/Pr' Component Video (YUV) and S-Video(YC).

'CVBS + Y/Pb/Pr' Component Video (YUV) and Video (BAS/CVBS).

With all other settings, the signal is switched off at the **COMPONENT VIDEO OUT** sockets. This will also be displayed as information on the screen. For more information on the other settings, read section 'Picture settings' (**Video output**) in chapter 'User preferences'.

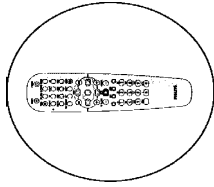
Confirm with **OK**.



ENGLISH

Manual TV channel search

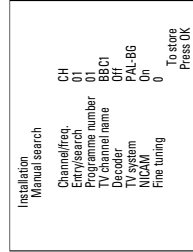
In some cases, not all of the available TV channels may have been found and stored during initial installation. In this case, you will need to search for and store the missing or coded TV channels manually.



Manual search with EasyLink
With 'Easy Link', the DVD recorder will automatically download the TV channels stored on the TV set. This is why some lines have no function. To store new TV channels, they must first be stored on the TV set. The information will then be transferred to the DVD recorder automatically.

Tip

- 1 Switch on the TV set. If required, select the programme number for the DVD recorder.
- 2 Switch on the DVD recorder using **STANDBY-ON**.
- 3 Press **SYSTEM-MENU** on the remote control. The menu bar appears.
- 4 Select 'Manual search' using **▼** or **▲** and confirm with **▶**.
- 5 Select 'Channel/freq.' using **▼** or **▲** and confirm with **▶**.
- 6 Select 'Freq.' using **▼** or **▲** and confirm with **▶**.



Problem

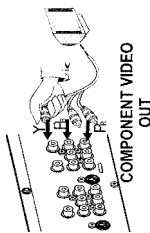
***I don't know the channel for my TV station**
In this case, press **▶** to start the automatic search. A changing channel number/frequency number will appear on the TV screen. Continue the automatic search until you have found the TV channel you are looking for.

Using **◀** or **▶** in 'Programme number', select the programme number you want to use for the TV channel, e.g. **01**.



How can I change the name of a TV channel?
1 In 'TV channel name', press **▶**.
2 Select the desired character position using **◀** or **▶**.
3 Change the character at the desired position with **▼** or **▲**.
4 Select the next character position in the same way.
5 Confirm with **OK**.

- 9 Use a component video (Y Pb Pr) cable, connect the three cinch sockets (red, blue, green) **COMPONENT VIDEO OUT** at the back of the DVD recorder with the corresponding three component video input sockets of your TV set, usually labelled 'Component Video Input', 'YUV Input', 'YpPr', 'YCbCr' or simply 'YUV'.



COMPONENT VIDEO OUT

Warning!

Do not confuse these sockets with the five-component RGB sockets (if available) or the yellow video (CVBS/FBAS) socket and the two audio sockets (red/white). The five-component RGB sockets are only provided for the R-G-B-Y signals (red, green, blue with horizontal and vertical synchronisation impulse).

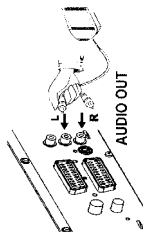
Please observe the colour sequence

The colours of the sockets at the DVD recorder and the connectors must match those of the socket colours at the TV set (red-red/blue-blue/green-green). If they don't, the colours of the picture may get mixed up or the picture may not be visible.



Tip

- 10 Use an audio (cinch) cable, connect the red/white cinch socket **AUDIO L/R OUT** at the back of the DVD recorder with the mostly red/white audio input socket of your TV set (usually labelled 'Audio In' or 'AV In'. See the instruction manual of your TV set.)
- 11 If necessary, switch your TV set to the component video input socket. Also consult the instruction manual of your TV set.



AUDIO OUT

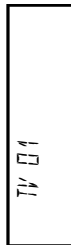
- 12 The menu of the DVD recorder should now appear on the TV screen. If not, check the cable connections and the settings on your TV set.

ENGLISH

6 Select line 'Follow TV with or ' and confirm with the button.

7 Confirm the message on the screen with **OK**. ' will appear in the DVD recorder display.

8 Select programme number '1' on the TV set.



Problem

* I cannot switch my TV set to programme number '1'.
 ✓ If you have connected additional devices to the EXT 2 AUX/IO socket, please disconnect these devices. Other connected devices may have switched the TV set to the programme number of the start socket.

9 Confirm with **OK** on the DVD recorder remote control. ' will appear in the display. The DVD recorder compares the TV channels on the TV set and the DVD recorder. If the DVD recorder finds the same TV channel as on the TV set it stores it at 'P01'.



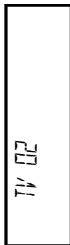
Problem

* 'P01' will appear in the display. The DVD recorder is not receiving a video signal from the TV set.
 ✓ Check the connectors at both ends of the start cable.
 ✓ Check your TV's operating instructions to see which start socket is used for video signals.
 ✓ If the problem persists, you won't be able to use this feature. Please read 'Sorting and deleting TV channels manually'.

10 Wait until for example ' appears in the display.

11 Select the next programme number on the TV set, e.g. '2'.

12 Confirm with **OK** on the DVD recorder remote control.



Tip

Deleting sorting
 You can delete incorrect TV channel sorting by pressing .

13 Repeat steps 10 to 12 until you have assigned all the TV channels from your TV set.

14 To end, press **SYSTEM-MENU**.

How can I change the TV system of the TV channel?

In 'TV system', use or to select the TV system that produces the least distortion of picture and sound.

What is NICAM?

NICAM is a digital sound transmission system. Using NICAM, you can transmit either 1 stereo channel or 2 separate mono channels. However, if reception is poor and the sound distorted you can turn off NICAM. In 'NICAM', select **Off** using or .

How can I improve the automatic process for storing channels?

To change the automatic process for storing channels (fine tuning), select **Fine tuning**. Using or you can try to fine-tune the TV channel manually.



Tip

10 Press **OK** to store the TV channel.

11 To search for other TV channels, begin again at 6.

12 To end, press **SYSTEM-MENU**.

Sorting TV channels automatically (Follow TV)

When the automatic channel search function is activated, the TV channels are stored in a specific order. This may differ from the order in which the TV channels appear on your TV set. This function changes the order of the TV channels stored in your DVD recorder to match the order on the TV set.

This only works if the DVD recorder (EXT 1 TO TV/IO socket) and the TV set are connected with a start cable.



Tip

My TV set has Easylink

If your TV set supports 'Easylink', TV channels will be stored during initial installation in the same order as they appear on the TV set. To store the TV channels in a different order, you'll need to change the order on the TV set. When you start the Follow TV function, the information is transferred again from the TV set.

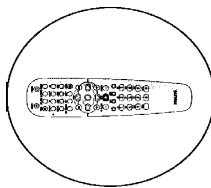
1 Switch on the TV set. If required, select the programme number for the DVD recorder.

2 Switch on the DVD recorder using **STANDBY-ON**.

3 Press the **SYSTEM-MENU** button on the remote control. The menu bar appears.

4 Select symbol with or .

5 Select 'Installation' using or and confirm with .

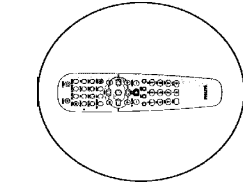


Automatic TV channel search

During installation, all available TV channels are searched for and stored. If the channel assignments of your cable or satellite TV provider change or if you are reinstalling the DVD recorder, e.g. after moving house, you can start this procedure again. This will replace the stored TV channels with the new ones.



Tip
My TV set has EasyLink
With EasyLink, you can search for and store TV channels only on the TV set. These settings are accepted by the DVD recorder. Use this function to start the transfer of TV channels from the TV set.



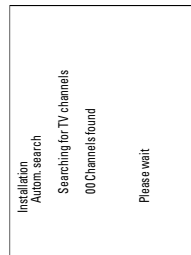
Sorting and deleting TV channels manually

After you have performed the automatic channel search you may not agree with the sequence in which the individual TV channels have been allocated to the programme positions (programme numbers). You can use this function to rearrange the TV channels already stored or to delete TV channels you don't want or those with poor reception.



Tip
EasyLink
With EasyLink, you can search for and store TV channels only on the TV set. These settings are then transferred to the DVD recorder. That is why you cannot select this function manually.

- 1 Switch on the TV set. If required, select the programme number for the DVD recorder.
- 2 Switch on the DVD recorder using **STANDBY-ON**.
- 3 Press **SYSTEM-MENU** on the remote control. The menu bar appears.
- 4 Select the **Installation** symbol with **◀** or **▶**.
- 5 Select **'Installation'** using **▼** or **▲** and confirm with **▶**.
- 6 Select **'Autom. search'** using **▼** or **▲**.
- 7 Press **▶**.



- 8 The automatic TV channel search starts. This allows the DVD recorder to save all available TV channels. This procedure may take several minutes.
- 9 When all the TV channels have been found, **'Autom. search complete'** will appear on the TV screen.
- 10 To end, press **SYSTEM-MENU**.

You can read about how to search for a TV channel manually in 'Manual TV channel search'.

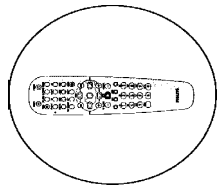
- 1 Switch on the TV set. If required, select the programme number for the DVD recorder.
- 2 Switch on the DVD recorder. Press the **SYSTEM-MENU** button on the remote control. The menu bar appears.
- 3 Select the **Installation** symbol with **◀** or **▶**.
- 4 Select **'Installation'** using **▼** or **▲** and confirm with **▶**.
- 5 Select **'Sort TV channels'** using **▼** or **▲** and confirm with **▶**.
- 6 Using **▼** or **▲**, select the TV channel that you want to delete or whose order you want to change.
- 7 Confirm with **▶**.



Tip
Deleting TV channels
Unwanted channels or those with poor reception can be deleted using **CLEAR**. Proceed at step 6.

- 8 Using **▼** or **▲**, shift the TV channel to the desired position and press the **▶** button. The DVD recorder will insert the TV channel.
- 9 Repeat steps 6 to 8 until you have resorted/deleted all the TV channels you want.
- 10 To store, press **OK**.
- 11 To end, press **SYSTEM-MENU**.

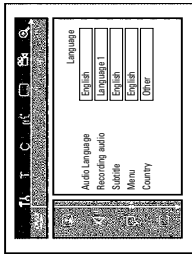
Setting the language/country



You can select the country and, for the basic setting of DVD playback, the language for the subtitles and the audio language. Please note that with some DVDs the audio language and/or subtitle language can be changed only via the DVD menu.
For bilingual shows, you can also select the sound channel of the TV station via the internal tuner (MONITOR button) for recording or playback.

You also have the option of setting one of the displayed languages for the on-screen menu (OSD). However, the DVD recorder display will only display English text regardless of this setting.

- 1 Switch on the TV set. If required, select the programme number for the DVD recorder.
- 2 Switch on the DVD recorder using **STANDBY-ON**.
- 3 Press **SYSTEM-MENU** on the remote control. The menu bar appears.
- 4 Select **Language** with **Left Arrow** or **Right Arrow**.
- 5 Select line **'Language'** with **Down Arrow** or **Up Arrow** and confirm with the **Enter** button.
- 6 Select the appropriate line and confirm with **Right Arrow**.



Tip

Which settings can I choose?
'Audio Language': The DVD will play back in the language you have chosen.
'Recording audio': In the case of bilingual programmes, you can choose either **'Language 1'** or **'Language 2'** as the default setting.
'Subtitle': Subtitle language
'Menu': Language of the OSD menu
'Country': Location

- 7 Select the appropriate setting using **Down Arrow** or **Up Arrow** and confirm with **OK**.
- 8 To end, press **SYSTEM-MENU**.

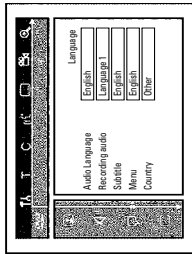
ENGLISH

'Recording audio' switching over (2-channel sound)

Some TV programmes transmit an extra audio signal in stereo in addition to the normal audio signal (2-channel sound). In most cases this means that an additional language is available. If a TV programme is available in, say, English and German, German may be available as the second language.

To record TV programmes in 2-channel sound, you can select the language you want as the default setting. This setting does not become active until the sound of a TV programme is transmitted in 2-channel sound.
When you play back the recording you can play back the sound only in the language you used for the recording.

- 1 Switch on the TV set. If required, select the programme number for the DVD recorder.
- 2 Switch on the DVD recorder using **STANDBY-ON**.
- 3 Press **SYSTEM-MENU** on the remote control. The menu bar appears.
- 4 Select **Language** symbol with **Left Arrow** or **Right Arrow**.
- 5 Select line **'Language'** with **Down Arrow** or **Up Arrow** and confirm with the **Enter** button.
- 6 Select line **'Recording audio'** and confirm with **Right Arrow**.
- 7 Select **'Language 1'** or **'Language 2'** with **Down Arrow** or **Up Arrow** and confirm with **OK**.
- 8 To end, press **SYSTEM-MENU**.



5

On-screen information

Setting the time and date

If the display shows an incorrect time or '---', the time and date must be reset manually.

'SMART CLOCK' automatically sets the time and date using the information transmitted by the TV channel. Normally the TV channel stored at programme number 'P01' is used. In the 'Clock preset' line you can select the programme number (channel name) whose TV channel transmits this information.

If the time/date is not displayed correctly you need to choose the 'Off' setting in the 'Clock preset' line and set the date and time manually.

ENGLISH

You can check or change many of the functions and settings of your DVD recorder via the system menu bar. The menu bar cannot be displayed during recording.

Symbols in the menu bar

Press **SYSTEM-MENU** to open and close the menu bar (main menu). Use **◀** and **▶** to select the relevant function. Use **▼** to confirm the function and go either to another menu or execute the function directly. Some functions may not be available, depending on the disc inserted.

Menu bar 1



- Th** User preferences
- T** Title/track
- C** Chapter/index
- lc** Audio language
- ct** Subtitle language
- Et** Camera angle
- Q** Zoom

Menu bar 2

While menu bar 1 is being displayed you can go to menu bar 2 by pressing **▶** again.

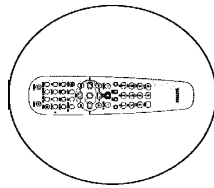


- ↔** Sound
- ◀▶** Frame advance
- ▶** Slow motion
- ▶▶** Fast forward
- ⌂** Search by time

Field for temporary messages

The top left corner of the menu line contains a field for temporary messages relating to the various operating modes. This information appears briefly on the screen when certain disc functions have been activated:

- Shuffle**
- Scan**
- Repeat entire disc**



1 Press **SYSTEM-MENU** on the remote control. The menu bar appears.

2 Select **Th** symbol with **◀** or **▶**.

3 Select 'Installation' using **▼** or **▲** and confirm with **▶**.

4 Select 'Time/Date' using **▼** or **▲** and confirm with **▶**.

5 Check if the time in 'Time' is correct. If required, change the time with the number buttons **0-9/abc** on your remote control.

6 Check 'Year', 'Month' and 'Date' in the same way. To move between the fields, use **▼** or **▲**.

*Time/date is displayed incorrectly despite manual setting

✓ With **SMART CLOCK**, time/date is transferred from the TV channel saved on 'P01' and automatically corrected. You can either enter another TV channel for transferring the data or disable the function. In the line 'Clock preset' select the relevant TV channel with **◀** or **▶**. To disable, select 'Off'.

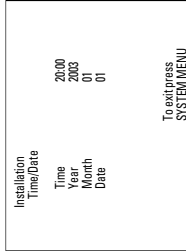


Problem

7 Check the displayed settings and confirm with **OK**.

'Stored' will appear briefly on the screen.

8 To end, press **SYSTEM-MENU**.



ENGLISH


Tuner information box

This field is located in the bottom left-hand corner of the screen. The aerial signal, the TV channel and the TV channel name for the selected programme are displayed.

Y	Current channel/selected input socket
Yx	No signal The TV channel is not available/the additional device is not connected or it is switched off
Y@	Copy-protected signal




'Live picture' in the 'Tuner information box'

Instead of the information about the aerial signal or the TV channel, you can watch the picture of the selected TV channel or the signal on the input socket.

- 1 Select in the system menu (button **SYSTEM-MENU**) the symbol  and confirm with **▶**
- 2 Select in the line 'Live source view' 'On' to view this picture or 'Off' to switch this picture off.
- 3 End with **OK** and then **SYSTEM-MENU**.

Timer information box

This box appears above the tuner information box. When a timer recording is set, it shows the timer icon and the start time or date of the first programme to be recorded. If no timer recording is scheduled, the current time is displayed. This box disappears during playback of a disc or after a recording starts. However, you can access it during an OTR recording by pressing **SYSTEM-MENU**.

	Timer starts on the day/time shown
	OTR recording runs until the stop time displayed
	Current time No timer event programmed

Repeat title

Repeat track

Repeat chapter

Repeat from A to the end

Repeat from A to B

Camera angle

Child lock enabled

Resume playback

Illegal action

Status field

The status field shows the current operating mode (status) of the DVD recorder and the type of disc inserted. This display can be disabled.

Disc type symbols

DVD+RW

DVD+R

DVD-Video

Video-CD

No disc

Error

Operating mode symbols

Recording

Stop

Playback

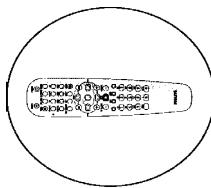
Playback-Pause

Record-Pause

Search forwards (8x speed)

Search backwards (8x speed)

Slow motion



General notes on playback

With this DVD recorder you can play back the following systems:

- ▶ DVD Video
- ▶ (Super)Video CD Disc
- ▶ DVD-RW Disc
- ▶ DVD-R Disc
- ▶ DVD-RW (video mode, finalised)
- ▶ DVD-R
- ▶ CD-R
- ▶ CD-RW
- ▶ Audio CD
- ▶ MP3 CD
- ▶ Picture (Photo)-CD (JPEG-data)

You can operate the video recorder using the remote control or the buttons on the front of the DVD recorder.

* The display will read "Child lock"

- ✓ The child lock has been activated for the inserted disc. Read the sections on 'Child lock' and 'Releasing a disc' in the chapter on 'Access control (child lock)'.
 * The menu on the screen is showing an 'X'

- ✓ Some DVD discs can be manufactured so that certain steps are required before the disc can be played, or so that only limited operation is possible during playback. When an 'X' appears on the screen the selected feature is not possible.

* The screen is showing regional code information

- ✓ Since DVD films are not normally released in all parts of the world at the same time, all DVD players have a specific regional code. Discs can be given a regional code. If the regional codes differ between the player and the disc, playback is not possible.
- ✓ The regional code is shown on the label on the back of the machine.
- ✓ The regional code does not apply to recordable DVDs.



Problem

Inserting a disc

1

Press the **OPEN/CLOSE** button on the front. The disc tray will open. While the disc tray is opening, **OPEN/HIS** and then **TRAY OPEN** when the tray is fully open.

2

Carefully place the disc in the tray with the label facing up and press **PLAY** or **OPEN/CLOSE** and then **OPEN/HIS** will appear in the display. The information on the disc will be read.



How do I insert a double-sided DVD?

Double-sided discs do not have labelling over the whole surface. The labelling for each side is in the centre of the disc. To play a side its label must be facing up.



ENGLISH



Tip

Opening/closing the tray using the remote control

You can open and close the disc tray using the remote control. Press and hold the **STOP** button on the remote control until the dialog box shows **OPEN/HIS** or **RELEASE DISC**.

3 Playback starts automatically.



A menu may appear when a DVD is played back. If the titles and chapters are numbered, press a number button on the remote control. You can also use the **◀**, **▶**, **▲**, **▼** buttons or number buttons **0-9/abc** to select a menu item and confirm with **OK**. You can also access the menu using **DISC-MENU** on the remote control. For further information see 'Playing a DVD video disc'.

When a DVD-RW is played back the index overview appears. Using **▼**, **▲**, **◀**, **▶** select the title you want to play back. Confirm with **OK**.

For further information see 'Playing back a DVD-RW/R Disc'.

If playback does not start automatically, press **PLAY**. For further information see 'Playing an audio CD'.

If the **■** symbol appears in the display, start playback by pressing **PLAY**. If a menu appears on the screen, use the remote control buttons indicated on the screen to select the menu option you want (**PREV**=**◀**, **NEXT**=**▶**) or with the number buttons **0-9/abc**. For further information see 'Playing a (Super) Video CD'.

Playing a DVD video disc

1

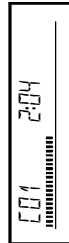
If playback does not start automatically, press **PLAY**. This will appear on the display: title/chapter number, elapsed time.

2

To stop playback, press **STOP** on the remote control or **■** on the DVD recorder.

3

To eject the disc, press **OPEN/CLOSE** on the front of the DVD recorder.



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Playing a DVD+RW/ +R disc

- 1 If the disc is write-protected or a finalised DVD+R disc, playback starts automatically.
- 2 If playback does not start automatically, use the **▼** or **▲** button to select the title you want to play on the index screen. You can also use the **◀▶** or **▶▶** button on the front.
- 3 Press the **PLAY ▶** button. This will appear on the display: title/chapter number, elapsed time.



Problem

* I can see the message **WRITE PROTECT**.
 ✓ The disc does not contain any recordings.

- 4 To stop playback, press **STOP ■** on the remote control or **■** on the DVD recorder.
- 5 To eject the disc, press **OPEN/CLOSE ▲** on the front of the DVD recorder.



What should I note when playing back different recording types (qualities)?
 The correct recording quality **M1, M2, M2x, M3, M4, M5/M8** will automatically be selected during playback. For more information see the section on 'Selecting the recording type (picture quality)' in the chapter on 'Manual recording'.

Playing an audio CD

You can also use the DVD recorder to play audio CDs

- 1 Insert an audio CD. Playback starts automatically.
- 2 Stop playback using **STOP ■**. The number of tracks and the total time are displayed.



Audio CD display
 If the TV is on, the audio CD screen appears automatically. During playback, the current track number and its elapsed playing time will show on the TV screen and on the recorder display.

Playing an MP3 CD

MP3 (MPEG1 Audio Layer-3) files are highly compressed music files. Using this technology the data volume can be compressed by a factor of 10. This means it is possible to record 10 hours of music in CD quality on a single CD-ROM.

When creating MP3 CDs please note the following:

- File system: ISO9660
- Directory structure: maximum of 8 levels
- Formats: *.mp3
- Filenames: maximum of 12 characters (8+3)
- Maximum of 32 albums, 999 titles
- Supported sampling frequencies: 32, 44.1, 48 (kHz). Music with sampling frequencies other than these will be skipped.
- Supported bit rates: 32, 64, 96, 128, 192, 256 (kbits)
- ID3 Tag: Version 1, 1.1. In later versions the directory name is displayed as the album and the filename as the title.

Important notes for playback:

Only the first session of a multi-session CD will play back.

- 1 Insert an MP3 CD. Playback starts automatically.



MP3 CD display
 If the TV is on, the MP3 CD screen appears automatically. During playback, the current track number and its elapsed playing time will show on the TV screen and on the recorder display. During stopped playback (**STOP ■** button) the numbers of the albums will show on the TV screen and on the display. Further information on the album, track and artist will also be displayed if included in the ID tag.

- 2 Stop playback using **STOP ■**. The number of albums is displayed in the display.








Additional playback features
 Using **◀▶** or **▶▶** select the next or previous title. You can also use the **T/C** button to select titles and albums. **1** Press the **T/C** button and use the **▶** or **◀** button to select the **T** symbol for title or **C** for chapter. **2** Use the **▼** or **▲** buttons or the number buttons **0-9/abc** on the remote control to select the number of the title/chapter. You can also use the repeat functions (**PLAY MODE** button).

7

Additional playback features

Playing a (Super) Video CD




(Super) Video CDs may be equipped with PBC (Play Back Control). This means that special playback functions (menus) can be directly selected. The video CD must be PBC compatible (see CD case). PBC is active in the default settings.

- 1 Insert a (Super) Video CD. If the  symbol appears in the display, start playback by pressing **PLAY** .
- 2 If a menu appears on the screen, use the remote control buttons indicated on the screen to select the menu option you want (PREV=, NEXT=) or with the number buttons **0-9/abc**. If a PBC menu consists of a list of titles, you can select a title directly.
- 3 Use **RETURN** to go back to the previous menu
- 4 Stop playback using **STOP** .

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Changing to another title/chapter







If there is more than one title or chapter on a disc you can change to another title or chapter as follows. However, if there are several chapters within a title, these will be selected. The title can then still be selected via the menu bar.

- 1 During playback, press  to go to the next title/chapter. Press  to return to the start of the current title/chapter. Press  twice to return to the start of the previous title/chapter.









Tip

Use the TIC (title/chapter) button

- 1 Press **TIC** (title/chapter) and then use  or  to select the appropriate title. Make sure the symbol  (title) is selected in the menu bar.
- 2 Use **TIC** to select chapters within a title. Press **TIC** and use  to select the 'C' symbol (chapter). Now select the appropriate chapter with  or .

Searching a disc

You can search the disc for a recording at 4x, 8x or 32x playback speed. Other speeds can only be selected via the menu bar ().

- 1 During playback, press and hold  (reverse) or  (forward) to switch to the search feature. You can switch between the playback speeds using  / .
- 2 To continue playback, press **PLAY**  twice at your chosen location.










Problem

* No sound

- ✓ The sound is switched off in search mode. This is not a fault in your machine.

Search feature via menu bar

- 1 During playback, press **SYSTEM-MENU** on the remote control. The menu bar will appear at the top of the screen.
- 2 Select the  symbol using  or  and confirm with .
- 3 You can now use the  or  button to select different forward and backward search speeds.
- 4 If necessary, switch the menu bar off with the **SYSTEM-MENU** button.
- 5 To continue playback, press **PLAY**  twice.



Tip

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- 3 Enter the start time with the digit keys 0-9abc from where playback should start.
- 4 Confirm with **OK**.

*The time entered will flash on the screen
 ✓ The selected title is shorter than the time entered. Enter a new time or cancel the function by pressing **SYSTEM-MENU**.

Problem

- 5 Playback starts at the time you entered.

Repeat/Shuffle play

You can mark entire sections or the whole disc for endless playback. Depending on the type of disc (DVD video, DVD+RW, video CD) you can select a chapter, title or the entire disc.

- 1 Select the desired chapter, title or the entire disc and start playback.
- 2 During playback, press **PLAY MODE**. By pressing **PLAY MODE** again you can choose from the following options:
 - ↳ **Chapter**: repeat chapter (DVD only)
 - ↳ **Title**: repeat track/title
 - ↳ **Disc**: repeat entire disc (Video CD, Audio CD only)
 - ↳ **Shuffle**: Shuffle
 - ↳ Display disappears: no repeat
- 3 To end the repeat, press the **STOP** button. You can also keep pressing the **PLAY MODE** button until the display disappears.

Repeating a passage (A-B)

You can repeat a particular passage within a title/chapter. You need to indicate the start and end of the passage.

- 1 During playback press **PAUSE II** at the start point. You will see a still picture.
- 2 Keep pressing **PLAY MODE** until 'A-B' appears on the screen. Press **PLAY** to start playback. The start point is now saved.
- 3 When the end point is reached press **OK**. 'A-B' appears on the TV screen. Playback now takes place within these points.
- 4 To end the repeat, press the **STOP** button. You can also keep pressing the **PLAY MODE** button until the display disappears.

Still picture

- 1 During playback, press **PAUSE II** to stop playback and display a still picture.

Frame advance via menu bar

- 1 During a still picture, press **SYSTEM-MENU** on the remote control. The menu bar will appear at the top of the screen.
- 2 Select the **FD** symbol using **▶** or **◀** and confirm with **▼**.
- 3 You can now use the **◀** or **▶** button to go forwards or backwards one frame at a time.
- 4 If necessary, switch the menu bar off with the **SYSTEM-MENU** button.

Tip

- 2 To continue playback, press **PLAY**.

Slow motion

- 1 During playback press **PAUSE II** on the remote control. Now hold down **◀◀** or **▶▶** to switch to slow motion.
- 2 You can switch between different speeds using **◀◀** or **▶▶**.

Slow motion via menu bar

- 1 During playback press **PAUSE II** and then **SYSTEM-MENU** on the remote control. The menu bar will appear at the top of the screen.
- 2 Select the **SM** symbol using **▶** or **◀** and confirm with **▼**.
- 3 You can now use the **◀** or **▶** button to select different forward and backward slow motion speeds.
- 4 If necessary, switch the menu bar off with the **SYSTEM-MENU** button.

Tip

- 3 To continue playback, press **PLAY** twice.

Search by time

Using this feature you can select where playback should start (select elapsed time).

- 1 During playback press **SYSTEM-MENU** on the remote control. The menu bar will appear at the top of the screen.
- 2 Select the **TD** symbol using **▶** or **◀** and confirm with **▼**. Playback is stopped and a box appears on the screen showing the elapsed time.



Select the audio language

Many pre-recorded DVD discs have more than one audio language. The language initially selected for playback will be the one you selected when you first set up the DVD recorder. However you can change the audio language of the inserted disc at any time. You can change the audio language either using the menu of the inserted disc (DISC-MENU button) or the AUDIO button. The audio languages for DVD playback in the two menus may be different. Please note that with some DVDs the audio language and/or subtitle language can be changed only via the DVD menu.

- 1 During playback press **AUDIO**.
- 2 Select the required audio language using **▼** or **▲**. You can also enter the number directly using the number buttons **0-9/abc**.
- 3 Play continues in the new audio language.

Subtitles

Many pre-recorded DVD discs have more than one subtitle language. The language initially selected for playback will be the one you selected when you first set up the DVD recorder. However you can change the subtitle language of the inserted disc at any time. You can change the subtitle language either using the menu of the inserted disc (DISC-MENU button) or the **SUBTITLE** button. The subtitle languages in the menus may differ.

- 1 During playback press **SUBTITLE**. Select the required subtitle language using **▼** or **▲**. You can also enter the number directly using the number buttons **0-9/abc**. You can switch off subtitles again with **0** or by pressing **off**.
- 2 Playback continues in the new subtitle language.

Scan feature

This feature plays back the first 10 seconds of each chapter (DVD) or track (CD).

- 1 During playback, press **PLAY MODE**. Select **SCAN** using **PLAY MODE**.
- 2 After 10 seconds the DVD recorder switches to the next chapter/index. To start playback at the relevant chapter/index press **STOP** and then **PLAY**.

Camera angle

If a DVD contains scenes that have been shot from different camera angles you can select these camera angles for playback.



Problem

*The **PAUSE** symbol will be hidden
 ✓ The selected scene has been shot from only one camera angle. This feature is therefore not available. For more information please read the cover of your DVD disc.

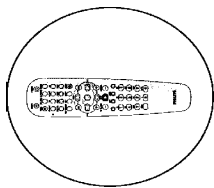
- 1 During playback, press **PAUSE II**. You will see a still picture.
- 2 Press **SYSTEM-MENU** and select the **PAUSE** icon using **▶**.
- 3 Select the required camera angle with **▼** or **▲**. You can also directly enter the number with the number buttons **0-9/abc**.
- 4 After a short time, playback will resume from the new camera angle. The **PAUSE** symbol will remain visible until a scene starts for which there is only one camera angle.

Zoom feature

The Zoom feature allows you to enlarge the video image and pan through the enlarged image.

- 1 During playback, press **ZOOM**. The DVD recorder switches to 'PAUSE'. You will see a still picture.
- 2 Select the required zoom factor using **▼** or **▲**.
- 3 When **press OK to pan** appears on the screen, the zoom process is complete.
- 4 Press **OK**. Using **▲**, **▼**, **▶**, **◀** select the part of the image you wish to view.
- 5 Confirm with **OK**.
- 6 To stop the feature, press **PLAY** and then **SYSTEM-MENU**.

Disc Manager (DM)



General information

The 'Disc Manager' is an integrated database in the DVD recorder that remembers all recordings made by this DVD recorder. This gives you a complete overview of your entire video collection at the touch of a button. The Disc Manager gives you quick and easy access to every recording made with this DVD recorder. The Disc Manager also tells you which film was recorded on which disc and how many unrecorded minutes remain on the discs.
And: You can go automatically to the beginning of the selected recording and start playback.



How many discs can I save in the Disc Manager?

You can store up to 999 discs on this DVD recorder. The maximum number of titles per disc is 49.



Caution when recording with other DVD recorders

Don't use a disc stored in the Disc Manager for recording on other DVD recorders. If you use a disc to record on another DVD recorder, then this disc will no longer be recognised by the Disc Manager. In this case, delete the disc from the Disc Manager's memory and then add it after it has been recorded.

Adding 'child-proof discs'

If you want to add child-proof discs you need to enter the PIN code.

Tip

Adding a disc to the Disc Manager

You can only add DVD-RW or DVD+R discs to the Disc Manager since other discs do not hold any information on the titles or lengths of the recordings. These discs have to be at least once recorded in the DVD-Recorder. A table of content have to be available.
DVD+R discs can also be finalised. Other discs cannot be added to the Disc Manager.



Recordings are saved automatically

On a disc that has been added to the Disc Manager, you can make new recordings as often as you like using this DVD recorder. The titles of these recordings will be stored in the Disc Manager automatically.

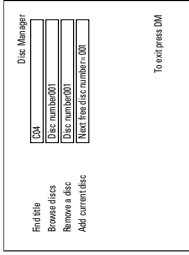
Tip

- Switch on the TV set. If required, select the programme number for the DVD recorder.

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- Insert a DVD-RW/+R disc in the DVD recorder.



* When I insert a disc I see a number on the screen in the index picture screen in the top left-hand corner.
✓ You have inserted a disc that has already been registered by the Disc Manager.

Problem

- Press the **DISC MANAGER** button on the remote control.
- Select **Add current disc** using **▲** or **▼** and confirm with **▶**.
- Confirm with **OK**.
- The disc number will be added to the Disc Manager.
- The disc number is then displayed and the disc tray opens automatically.
- The disc is now stored in the Disc Manager under the displayed disc number.
Please write this number on the disc and on the cover.



Why do I need to label the discs?

When searching for unrecorded free space or available recordings, you will be asked to insert the appropriate discs (disc numbers).

- To end, press **DISC MANAGER**.

The DVD recorder will immediately recognise that this disc is saved in the Disc Manager. When this disc is inserted the disc number will appear in the title overview in the top left-hand corner.

Removing discs from the Disc Manager

Every DVD-RW/+R is stored with a number in the Disc Manager (DM). You can remove this disc number from the Disc Manager to use the Disc Manager's memory for new discs or to remove damaged discs from memory.

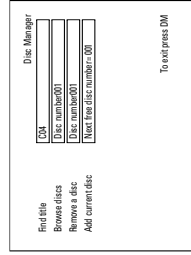
- Press **DISC MANAGER** on the remote control.
- Select **Remove a disc** using **▲** or **▼** and confirm with **▶**.
- Select the disc number with **▲** or **▼** and confirm with **OK**.



Tip

Disc contents are not deleted.
The disc is only removed from the Disc Manager's memory. Its contents remain unchanged.

- To end, press **DISC MANAGER**.



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- Press **▲** or **▼** to select the desired title.
- Confirm with **OK**.

* I see the message **'Insert disc number'** on my screen
 ✓ The selected recording is located on the Disc Manager disc with the displayed disc number. Please insert the appropriate disc.

Problem

- The DVD recorder searches for the start of the appropriate recording.

Searching for a blank section

You can search for space for a new recording on the disc (at least 1 minute of blank space), for example at the end of existing recordings. This only works with discs which have already been stored in the Disc Manager.

- Press **DISC MANAGER** on the remote control.
- Select **'Browse discs'** using **▲** or **▼**.
- Confirm with **OK**. A list of the recordings on the disc you have selected will appear on the TV screen.
- Use **▲** or **▼** to select a disc (disc number) on which there is enough space for the recording.



How can I see how much space is available for the recording?

The space available is designated as **'Empty'**. The time is displayed next to the title **'Empty'**. You can use the **REC-MODE** button to change the recording mode (recording time).

How can I choose the title **'Empty'** if there were many recordings on the disc?
 In this case press **▶** and then select with **▼**, **▲** the title **'Empty'**.



- Select the title **'Empty'** with **▲** or **▼**.
- Confirm with **OK**.

* I see the message **'Insert disc number'** on the screen.
 ✓ The blank space is located on the Disc Manager disc with the displayed disc number. Please insert the appropriate disc.

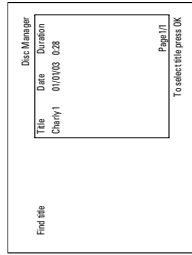
Problem

The DVD recorder rewinds to the beginning of that particular part and automatically switches to Stop.

Searching for a title in the Disc Manager

This function can be used to quickly and easily find and play back a recording saved in the Disc Manager.

- Press **DISC MANAGER** on the remote control.
- Select **'Find title'** using **▼** or **▲** and confirm with **▶**.



Tip

What do the displays on the screen mean?

'Title' = Title
 'Date' = Date of the recording
 'Duration' = Length of the recording



Problem

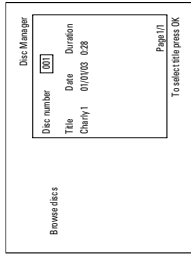
* I see the message **'Insert disc number'** on my screen
 ✓ The selected recording is located on the Disc Manager disc with the displayed disc number. Please insert the appropriate disc. After a brief check, the DVD recorder will jump to the start of the selected recording.

- Select the title that you want to play back with **▼** or **▲**.
- Confirm with **▶**. The DVD recorder will jump to the start of the selected recording.

Searching discs

You can easily search for the title of a recording stored in the Disc Manager. To do this, the appropriate disc does not have to be in the DVD recorder.

- Press **DISC MANAGER** on the remote control.
- Select **'Browse discs'** using **▼** or **▲**.
- Confirm with **▶**. The screen will show the contents of the last Disc Manager disc used.



What do the displays on the screen mean?


'Title' = Title
 'Date' = Date of the recording
 'Duration' = Length of the recording

Use **▲** or **▼** to select a different disc number if necessary and confirm with **▶**. You can also enter the disc number directly with the **0-9/abc** buttons on the remote control.

The 'Digital Photo Manager'

Using the 'Digital Photo Manager', you can view, modify, and save JPEG pictures (®JPG) on a memory card, Picture CD, DVD, or a CD ROM. In addition, you can store the pictures in a so-called album in a specific order, yet without changing the order in which the pictures are stored on the memory card. Moreover, you can view the pictures in a slide show at adjustable intervals. Store the pictures on a DVD+RW/R or so you can view them on a DVD player.

How many pictures can be organized from the DVD-Recorder?
 Since the storage size of a JPEG picture depends on different parameters (quality, picture information, JPEG compression, resolution of the camera,...) the limitation is only the available storage capacity. You can store up to a maximum of 999 photos in one album on a DVD+RW/R or memory card. In case you want to store pictures on a medium that cannot be recorded by the DVD recorder (Picture CD, CD-ROM, finalized DVD+R, DVD), you can store up to a maximum of 100 pictures per album in 20 albums. These albums will be stored in the internal memory with the appropriate disc ID-number. With this number the allocation to the different disc is possible.



Select from the following chapters:

'The PC (PCMCIA) card'
 to install or remove the memory card.

'Showing JPEG pictures from a roll'
 in order to view and modify the pictures and create slide shows from the roll.

'Advanced editing of JPEG-pictures'
 for advanced editing options such as color, sharpness...

'Creating an album'
 to arrange pictures from different rolls in a definite order and to create a slideshow from the album.

'Making a DVD compatible slide show'
 Make a slide show from the roll/album for viewing on a DVD-player.


'Storing rolls/albums on a DVD+RW/R'
 Store your JPEG pictures for archiving on a DVD+RW/R.

'Changing roll settings'
 to modify the rolls to your personal preferences.

'Changing album settings'
 to modify the albums to your personal preferences, erstellen.

'Changing the media settings'
 to modify the storage media (DVD+RW/R, memory cards) to your personal preferences.

What is the difference between a 'Roll' and an 'Albums'?
'Roll'
 A directory containing JPEG pictures. It is comparable with a conventional 35mm film for cameras. Roll will be created automatically from the digital cameras.
'Albums'
 A binary file containing references to the pictures on the rolls. It is comparable with a conventional photo album that may contain the pictures of different films (rolls).
 You can delete an album without deleting the pictures of the rolls.



ENGLISH

The PC (PCMCIA) Card

In this DVD-Recorder you can use the following types of memory cards with an adapter:

- 1) SD memory cards
- 2) Multimedia Card
- 3) CompactFlash
- 4) SmartMedia
- 5) Memory Stick/Memory Stick pro
- 6) Micro Drive
- 7) xD Picture Card

The DVD-Recorder can read/write files, which were stored on memory cards using the file systems FAT 8, FAT 12, FAT16 and FAT 32. This means that it can handle memory cards larger than 2 GB.

Inserting the PC Card

- 1 If necessary, insert the memory card into the PC Card adapter first. The label must be facing up. The contacts must be facing the device.
- 2 Insert the PC Card into the media slot in the front of the recorder until the EJECT button sticks out of the device front completely. Press this button to remove the PC Card.

Removing the PC Card

- 1 Press the EJECT button next to the PC Card.
- 2 This will push the card out of its slot. If the card remains in the slot, insert the PC Card once again and press the EJECT button again.

Warning!
 Insert/Remove the PC Card only when there is no access to the memory card. This could damage the memory card.

You can recognise the access by:

- A moving disc symbol lights up on the top left corner of the screen.
- The warning 'Do not remove media' appears on the screen.

If you were not sure, press in the 'Digital Photo Manager' the button PHOTO. This will take you directly into the 'Media menu' screen. You can also switch the DVD-Recorder off with the STANDBY button.

Showing JPEG pictures from a roll

The DVD recorder can read JPEG pictures stored on a CD-ROM, Picture CD, memory card, or a DVD and write them on a DVD+RW/+R or memory card.

Please observe the following:

- The file extension has to be ".jpg" and not ".jpeg".
- These pictures must be stored in the root directories or in a subdirectory called 'DCIM' in folders. These will be recognized by the DVD recorder as rolls (comparable with a 35mm roll for cameras). You can select the directories (folders) as rolls in the **'Media menu'**.
- This device is compatible with still pictures (JPEG)
- It can only display DCF-standard still pictures or JPEG pictures e.g. TIFF. It cannot play back moving pictures, Motion JPEG, and other formats, or pictures in formats other than JPEG, or pictures associated with sound e.g. AVI files.

- 1 Insert the medium you want to use (CD, DVD+RW/+R, memory card).
- 2 Press **PHOTO** on the remote control. The **'Media menu'** will appear.
- 3 Use **▼** or **▲** to select the medium you want to process (disc or memory card). If you did not insert the corresponding medium (disc or memory card), a warning sign will appear above the symbol on the left hand side of the screen.
- 4 Confirm with **▶**.
- 5 Select **'Roll'** using **▼** or **▲** and confirm with **▶**.
- 6 You will see an overview with the first picture of each roll that contains pictures. The display and the description of the roll will depend on the camera or the computer program used to create this roll.
- 7 Select the desired roll using **▼** or **▲** and confirm with **OK**.
- 8 The data will be read and then an overview of the stored pictures will be displayed.
- 9 You can select a picture for viewing or processing with **◀**, **▶**, **▲**, **▼**.



Fast browsing through the pictures
With **▶▶** or **◀◀** you can switch one page forward or backward. You can also select a picture with the number buttons **0..9/abc** on the remote.

- 10 Press **OK** to select the desired picture.
- 11 The picture will be displayed as a full picture on the screen.

Editing JPEG pictures

- 1 On the corresponding pictures press **SELECT** to select them for processing. The picture frame appears in a different color. Press **SELECT** on the selected pictures again to deselect them.
- 2 Keep pressing **▲** until the menu bar is selected. Select one of the displayed functions with the **▶** or **◀** button.

Which options are available?

- 'Menu'**: leave the menu
 - 'Play'**: Starts the slide show
 - 'Erase'**: Erases the selected pictures
 - 'Rotate'**: Rotates the selected pictures by 90
 - 'Copy'**: copies the selected pictures on the other loaded media (from memory card to DVD+RW/+R or vice versa)
 - 'Select all'**: Selects all pictures
 - 'Cancel'**: Cancels the changes
- Using the buttons on the remote**
- 'Play'**: Button **PLAY ▶**
 - 'Erase'**: Button **CLEAR** and then **OK**
 - 'Rotate'**: Button **ANGLE**



Tip

Slide show

You can display JPEG pictures in the selected roll automatically one after the other at adjustable intervals.

Starting the slide show

- 1 Press **PLAY ▶** to start the slide show.

Interrupting the slide show

- 1 Press **PAUSE II** . This will stop the automatic display of the pictures.
- 2 Press **PLAY ▶** to resume the slide show.

Closing the slide show

- 1 Press **STOP ■** . The picture overview will appear.

ENGLISH

Changing the slide show settings

- 1 Press **SYSTEM-MENU** during playback.
- 2 Select one of the displayed functions with the ◀ or ▶ button.

Which options are available?

'Overview': Returns to the picture overview. Has the same function as **STOP** ■.

'Play': Resumes the slide show. Has the same function as **PLAY** ▶.

'Timer': Select one of various speeds by pressing ▼.

Confirm with **OK**.

Start the slide show with **PLAY** ▶.

'Repeat': Switches repeat playback of the slide show on and off.

Using the buttons on the remote

'Repeat': Button. **PLAY MODE**
Bild wiederholen. Button. **ZOOM**
Bild vergrößern. Button. **EDIT**
Bild verändern. Button. **EDIT**

**Tip****Advanced editing of the JPEG pictures**

You can edit the pictures in the DVD recorder and then store them back on the memory card or a DVD-RW/+R. The original picture remains unchanged, and the modified one is additionally stored on the medium.

Please make sure the memory card or DVD-RW/+R is not write-protected and has enough storage space.

- 1 Press at the required picture the button **EDIT**.
- 2 Select one of the displayed functions with the ◀ or ▶ button.

Using the buttons on the remote

ANGLE: Rotates the picture

ZOOM ■: Enlarge the picture

STOP ■: Returns to the picture overview

CLEAR: Discard the changes. The picture will be reloaded.

**Tip****'Overview'**

Returns to the picture overview.

'Rotate'

Rotates the picture by 90° each time you press **OK**.

'Flip'

Mirrors the picture along its vertical axis when you press **OK**.

'Zoom'

Using this function, you can enlarge the picture and pan through the enlarged picture.

- 1 Press **OK** to activate the zoom function.
- 2 Select the area to be enlarged with ◀, ▶, ▼, ▲.
- 3 You can press **ZOOM** to enlarge the selected area at several steps.
- 4 Press **OK** to return to the normal picture size.

'Filters'

Using this function, you can modify the picture properties.

- 1 Press ▼ and select one of the displayed functions using ▼ or ▲.
- 2 Confirm with ▶.

Which options are available?

Sepia: Displays the entire picture in brown colors. It gives the picture an antique appearance.

Negative: Converts the picture into a black-and-white negative.

Colour negative: Converts the picture into a color negative. Comparable to a color negative film.

Black & white: Converts the picture into a black-and-white picture.

Softer: Use this function to reduce picture sharpness in three steps, from edge blurring to a visible blur.

**Tip**

- 2 Keep pressing ▲ until the menu bar is selected.

'Colour'

Using this function, you can change the red, green, and blue color components of the picture.

- 1 Press ▼.
- 2 Use ▼ or ▲ to select the corresponding color control.
- 3 Change the color using ◀ or ▶.
- 4 Keep pressing ▲ until the menu bar is selected.

'Reset'

This setting will appear only if changes have already been made to the picture. If you want to discard the changes, confirm with **OK**.

'Save'

This setting will appear only if changes have already been made to the picture. If you want to save the changes, confirm with **OK**.

Creating an album

You can store pictures contained in a memory card or DVD+RW/R, in a so-called 'Albums' in a different order. Albums are binary files containing information on the orientation and storage location of the pictures.

Albums from a medium that cannot be recorded by the DVD recorder (Picture CD, CD-ROM, finalised DVD-R), will be stored in the internal memory of the DVD recorder. You can store up to a maximum of 100 pictures per album in 20 albums.

Adding pictures to an album

- 1 Select 'Albums' in the 'Media menu' using **▼** or **▲** and confirm with **▶**.
- 2 An overview of the albums you already created will appear. Select 'New album' with **▼** to create a new album.
- 3 Press **▶**. The menu 'Album Settings' will appear. In a new album, the line 'Add photos' is already highlighted.
- 4 Confirm with **OK**.
- 5 The roll overview will appear.
- 6 Use **▼** or **▲** to select the roll from which you want to add pictures to the album.
- 7 Confirm with **▶**. The picture overview will appear.
- 8 Use **◀**, **▶**, **▼**, **▲** to select the pictures you want to add to the album.
- 9 Confirm each selected picture with **SELECT**. Do not pay attention to the order of the pictures. You can change it later in the album.

Select all pictures

If you want to create many pictures in the album, select 'Select all'. Then use **SELECT** to select the pictures you don't want to add to the album. These pictures will be deselected.



Tip

- 10 Keep pressing **▲** until the menu bar is highlighted.
- 11 Select 'Done' with **◀** or **▶** to add all selected pictures to the album.
- 12 Confirm with **OK**. The album will be created. '5P/14E' will appear in the display while the album is created. **Do not remove the medium from the device!**
- 13 The menu 'Album Settings' will then automatically appear.

ENGLISH

- 14 To add additional pictures, use **▼** to select 'Add photos' and confirm with **OK**.
- 15 Repeat steps 5 to 14 until the album contains all the desired pictures.

Changing the picture order within an album

You can change the order of the pictures within an album as you wish. The order of the pictures of the rolls remains unchanged.

- 1 Select 'Albums' in the 'Media menu' using **▼** or **▲** and confirm with **▶**. An overview of the albums you already created will appear.
- 2 Press **▶** to select the desired album. The 'Album Settings' menu will appear.
- 3 Select 'Overview' by pressing **▼**. The 'Overview' option can be found on the second menu page.
- 4 Confirm with **OK**.
- 5 Use **▼**, **▲**, **◀**, **▶** to select the picture you want to move to a different position.
- 6 Press **SELECT**. The picture frame appears in a different color.
- 7 Keep pressing **▲** until the menu bar is highlighted.
- 8 Select 'Move' using **◀** or **▶** and confirm with **OK**.
- 9 Use **▼**, **▲**, **◀**, **▶** to select the position before which the desired picture is to be moved.
- 10 Confirm with **OK**. The picture will be inserted.

Changing the album name

You can re-enter or change the name of an existing album.

- 1 Select the **'Album name'** in the **'Album Settings'** using **▼**, **▲** and confirm with **▶**.
- 2 Type the new album name using the **0-9/abc** buttons like you would do on a cellular phone. You can also move to the position where you want to enter or change a character using **◀**, **▶**. Change the characters with **▼**, **▲**.

How can I enter the characters with the buttons 0-9/abc?


Press a number button as often as the required character or the number appears. You can enter language dependent characters with the buttons **◀◀** or **▶▶** on the corresponding character e.g.: **3**, button **2** for **'a'** and then with **▶▶** as often as **'a'** appears.

For special characters press **1** more the once.

To enter a space press the **1** button.

To switch over to upper case characters press **SELECT**.

To erase a character press **CLEAR**.



- 3 To end, press **OK**.

Changing the album date

- 1 Select **'Date'** in the **'Album Settings'** using **▼**, **▲** and confirm with **▶**.
- 2 Select the field you want to change using **◀**, **▶**.
- 3 Change the date using **▼**, **▲** or use the **0-9/abc** buttons to enter the numbers.
- 4 Confirm the changes with **OK**.

Calling the album overview directly

- 1 Select **'Overview'** (second page) in the **'Album Settings'** using **▼**, **▲** and confirm with **OK**.
- 2 This will take you directly into the album overview where you can make changes.

Editing pictures in an album

You can also erase, rotate, or hide pictures in an album. These changes will only affect the album. The pictures on the disc or the memory card will remain unchanged.

- 1 Select the pictures you want to change in the **'Album overview'** using **SELECT**.
- 2 Keep pressing **▲** until the menu bar is highlighted.
- 3 Select one of the displayed functions with the **◀** or **▶** button.

What do the individual functions mean?

'Menu': Closes the current menu

'Play': Starts the slide show of the album

'Move': Changes the order of pictures within an album.

'Erase': Erases the pictures from an album. The picture on the media remains unchanged.

'Rotate': Rotates pictures by 90

'Hide': Hides pictures for the slide show

'Select all': Selects all pictures


'Cancel': Disappears all changes

Using of the buttons on the remote

'Play': Button **PLAY MODE**

'Erase': Button **CLEAR**

'Rotate': Button **ANGLE**



Changing album settings

You can adjust various album settings to your individual needs. You can change the name and date of an album. Moreover, you can copy or delete the album.

Changing the cover picture

You can change the picture used to represent a certain album in the **'Album overview'**. As a rule, the first picture of an album is used as the cover picture. However, you can use any picture in the album as a cover picture.

- 1 Select **'New cover photo'** in the **'Album Settings'** using **▼**, **▲** and confirm with **OK**. The album will be read and a picture overview of the album will appear.
- 2 Use **▼**, **▲**, **◀**, **▶** to select the picture you want to use as the cover picture.
- 3 Confirm with **OK**. The new 'cover picture' appears in the bottom left corner of the **'Album Settings'**.

Copying an album

Using this function, you can:

- Copy albums created on a memory card to a DVD+RW/R or
- Copy albums created on a DVD or a CD-ROM to a memory card. This will also store the pictures used for the album.

- ➊ Select **'Copy album'** (second page) in the **'Album Settings'** using **▼**, **▲** and confirm with **OK**.



*It is not possible to select **'Copy album'**

- ✓ There is no media in the DVD-Recorder to store an album/Roll. Insert a DVD+RW/R, disc or insert a memory card.

Problem

Erasing an album

It is also possible to erase an album. The pictures within an album will not be deleted and shall remain on the storage medium (disc or memory card) unchanged.

- ➊ Select **'Remove album'** (second page) in the **'Album Settings'** using **▼**, **▲** and confirm with **OK**.
- ➋ If you really want to erase the album, press **OK** to confirm; otherwise cancel the function using **▲**.
- ➌ The overview of all albums will then be displayed.


Changing roll settings

You can adjust various roll settings to your individual needs. You can change the name and date of a roll.

Changing the rolls name

You can re-enter or change the name of an existing roll. The name on the storage media will not be changed. The new name will be stored additionally.

- ➊ Select **'Roll name'** in the menu **'Roll Settings'** using **▼**, **▲** and confirm with **▶**.
- ➋ Type the new roll name using the **0-9/abc** buttons like you would do on a cellular phone. You can also move to the position where you want to enter or change a character using **◀**, **▶**.
- ➌ Enter the new name with the buttons **▼**, **▲**.



Tip


Enter the characters with the buttons 0-9/abc.
Press a number button as often as the required character or the number appears. You can enter language dependent characters with the buttons **◀◀** or **▶▶** on the corresponding character eg: **1**, button **2** for a and then with **▶▶** as often as it appears.
For special characters press **1** more the once.
The position for the following character will be selected automatically.
To enter a space press the **1** button.
To switch over to upper case characters press **SELECT**.
To erase a character press **CLEAR**.

- ➍ To end, press **OK**.

Changing the rolls date

- ➊ Select **'Date'** in the menu **'Roll Settings'** using **▼**, **▲** and confirm with **▶**.
- ➋ Select the field you want to change using **◀**, **▶**.
- ➌ Change the date using **▼**, **▲** or use the **0-9/abc** buttons to enter the numbers.
- ➍ Confirm the changes with **OK**.

What is the difference?
'Photo only'
 The DVD+RW/+R will be prepared so that only pictures can be stored on the entire disc (4.4 GB).
'Video & photo'
 On the DVD+RW/+R a space (650 MB) will be reserved for storing pictures additionally to movies. So you can store the appropriate photos after the movie.
How long does this process last?
 A DVD-R can not be prepared for 'Video & photo'.
 To prepare a disc for 'Video & photo', a new DVD+RW has to be formatted first. This can take up to 25 minutes. You can speed up the process, if you use a prerecorded disc.



- 6 Confirm with **OK**.
- 7 **WARNING!**
All data on the disc will be erased. If you want to continue, press **OK**. To cancel the process, press **▼** or **▲**.
- 8 **'PREPARED'** will appear in the display until the preparation is complete.
- 9 If the disc has been successfully prepared, the **'Media settings'** menu will appear, indicating the available storage space. (4.4 GB for 'Photo only'/650MB for 'Video & photo')

Transfer the photos to a DVD+RW/+R

Using this function, you can store the pictures on the DVD+RW/+R in the same format as on a memory card. You can handle these pictures as if they were stored on a memory card. If you want to play this DVD on a computer drive, ensure that the operating system of your computer can handle the file system UDF 1.5 (Universal Disc Format).
 If you want to play back a DVD+RW/+R on a DVD player, read section 'Making a DVD compatible slide show'.

- 1 Press **PHOTO** on the remote control. The **'Media menu'** will appear.
- 2 Use **▼** or **▲** to select the disc with the memory card (last symbol). If you did not insert a disc, a warning sign will appear above the symbol on the left hand side of the screen.
- 3 Press **▶**.
- 4 Use **▼** or **▲** to select whether you want to copy the complete memory card into a roll or to create additionally to the roll an album that contains the same pictures as the roll. The creation of the album makes edits easier: only on the album as well.
Storing the album will also store the corresponding pictures.
- 5 Confirm with **OK**. **'STORE/YES'** will appear on the display. A bar with a time display will appear on the screen until the process has been completed.

Calling roll overview directly

- 1 Select **'Overview'** in the **'Roll Settings'** using **▼**, **▲**, and confirm with **OK**.
- 2 This will take you directly into the roll overview where you can make changes.

Deleting a roll

WARNING!

This procedure cannot be reversed, since the rolls will also be erased from the corresponding media. Deleting a roll will also affect any album that uses this pictures contained in a roll. Therefore, apply this function with particular care.

- 1 Select **'Erase roll'** in the menu **'Roll Settings'** using **▼**, **▲**, and confirm with **OK**.
- 2 If you really want to delete the roll, press **OK** to confirm, otherwise cancel the function using **▲**.
- 3 The overview of all rolls will then be displayed.

Storing rolls/albums on a DVD+RW/+R

If you want to store the JPEG pictures from the rolls/albums on a DVD+RW/+R, you must first prepare the disc.

Preparing a DVD+RW/+R

- 1 Press **PHOTO** on the remote control. The media menu will appear.
- 2 Use **▼** or **▲** to select the disc alone as a medium. If you did not insert a disc, a warning sign will appear above the symbol on the left hand side of the screen.
- 3 Press **▶**.
- 4 Select **'Media settings'** using **▼** and confirm with **OK**.
- 5 Use **▼** or **▲** to select whether you want to store **'Photo only'** or **'Video & photo'** together on this disc.
Please note, that DVD-R's or memory cards can only be prepared for **'Photo only'**.

Making a slide show from an album

- 7 Select the disc (top symbol) in the **'Media menu'** and confirm with **▶**.
- 8 Add pictures to the album as described in chapter 'Adding pictures to the album'.
- 9 You can change the order of the pictures, erase unwanted pictures, enter a new name for an album, or change the cover picture of the album, until the album corresponds to your personal preferences.
- 10 Select **'Make video title'** in the menu **'Album Settings'** using **▼**, **▲**.
- 11 Confirm with **OK**. **'SPY/HIS'** will appear in the display and the screen will show the time left until completion.
The new album will be stored on the DVD+RW as a video title (movie). It will appear in the index picture overview as a separate title.
This video will be recorded automatically after the last recording. No existing titles will be overwritten.
Ensure that there is enough space on the disc.
- 12 To end, press **DISC-MENU**.

Making a DVD compatible slide show

Using this function, you can record the pictures in such a way, that you can also view the slide show from a film or an album on a DVD player.
The slide show will be stored on the DVD+RW/R as a video title. If you want to store additionally to the video title the photos in the JPEG format, you must prepare the DVD+RW so that you can store both pictures and videos. Die Dia-Show wird auf der DVD+RW/R als Videotitel gespeichert. Möchten Sie auf einer DVD+RW zusätzlich zu dem Videotitel auch die Fotos im JPEG-Format speichern, müssen Sie die DVD+RW so vorbereiten. See section 'Preparing a DVD+RW/R'.
On a DVD+R only photos or only videos can be stored. A combination of JPEG photos and video is not possible.

Making a slide show from a roll

Each roll will be stored as one video title on the DVD+RW/R.
If you want to make a video title from different rolls, you have to create an album first. Then you can store the album as a video title on the DVD+RW/R.

- 1 Select in the **'Media menu'** screen the memory card (symbol in the middle) and confirm with **▶**.
- 2 Select the line **'Rolls'** and confirm with **▶**.
- 3 Select with **▼**, **▲**, the roll from which you want to make a video title.
- 4 Press **▶** the **'Roll Settings'** menu will appear.
- 5 Select the line **'Make video title'** using **▼**, **▲** and confirm with **OK**.
'SPY/HIS' will appear in the display and the screen will show the time left until completion.
The new roll will be stored on the DVD+RW/R as a video title (movie). It will appear in the index picture overview as a separate title.
This video will be recorded automatically after the last recording. No existing titles will be overwritten.
Ensure that there is enough space on the disc.
- 6 To end, press **DISC-MENU**.

Problem solving for 'Digital Photo Manager'

PROBLEM	SOLUTION
<p>Messages instead of the thumbnails:</p>	<ul style="list-style-type: none"> ✓ Thumbnail not available The photo does not have a associated thumbnail. In this case, the photo but not the thumbnail is viewable. ✓ Too large to display The image is too large to be viewed in its thumbnail format. ✓ Hidden photo The corresponding (hidden) photo will not be shown during the slide show. You can unhide this photo in the album overview again. ✓ Photo not found In the album overview a photo entry is found that no longer exists on the referenced source media.
<p>Error message 'Media does not contain photos':</p>	<ul style="list-style-type: none"> ✓ On the inserted media (disc or memory card) no photo can be found. ✓ The file extension has to be *.JPG and not *.JPEG. ✓ The storage media should contain a sub directory 'DCIM'. Under that there should be folders so called 'Rols'. Only pictures in these folders can be recognised ✓ Pictures can also be stored in the root directory. <p>Before you make changes to the storage media check the content of the media in a computer or in a digital camera.</p>
<p>My computer can not read the DVD-RW/+R:</p>	<ul style="list-style-type: none"> ✓ Check that your DVD drive on the computer can read DVD-RW/+R discs. ✓ Check that your operating system or your computer support the file system UDF (Universal Disc Format). Install if necessary the required driver. From the DVD-Recorder the DVD-RW/+Rs were recorded in the format UDF 1.02 (Video & photo) and UDF 1.50 (Photo only).
<p>The DVD-Recorder can not read the disc (CD-ROM, DVD), no pictures available:</p>	<ul style="list-style-type: none"> ✓ The file extension has to be *.JPG and not *.JPEG. ✓ The disc should contain a sub directory 'DCIM'. Under that there should be folders so called 'Rols'. Only pictures in these folders can be recognised. ✓ Pictures can also be stored in the root directory. ✓ If you create a CD-ROM, you have to store the photos in the same directory structure as on a DVD-RW/+R ✓ If you use a CD-ROM from a photo shop or something similar, the whole disc will be searched for the photos on the basis of the disc format.
<p>The memory card can not be read by the DVD-Recorder, no pictures available:</p>	<ul style="list-style-type: none"> ✓ The memory card should contain a sub directory 'DCIM'. Under that there should be folders so called 'Rols'. Only pictures in these folders can be recognised. ✓ Pictures can also be stored in the root directory. ✓ The file extension has to be *.JPG and not *.JPEG.

Changing the media settings

You can adjust various settings for a DVD-RW/+R or a memory card. If a CD-R/RW is loaded no changes can be made, because this media cannot be recorded by the DVD recorder.

- 1 Press PHOTO on the remote control. The **'Media menu'** screen will appear.
- 2 Use ▼ or ▲ to select the medium you want to process (disc or memory card). If you did not insert the corresponding medium (disc or memory card), a warning sign will appear above the symbol on the left hand side of the screen.
- 3 Press ▶.
- 4 Select the line **'Media settings'** and confirm with OK.

'Media name'

The name of the media will be created by the digital camera.

'Protection'

The write protection of the media can be switched on or off. You can use this function only if the write protection can be switched off by a software. You can not select this line if your memory card was equipped with a mechanically switch.

'Prepare media'

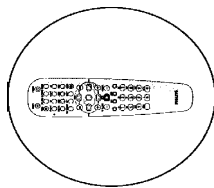
The DVD-RW/+R will be prepared for the data transfer. Read further information in the section 'Preparing a DVD-RW/+R'.

'Finalise disc'

You can select this line only if a 'not finalised' DVD+R is loaded. If you store pictures on a DVD+R, you have to finalise the disc to play it on a DVD-player. Once this process is complete, no further changes can be made.

'Erase media'

With these setting all data (rolls and albums) can be erased on a recordable media (DVD-RW or memory card). This procedure cannot be reversed



General

Which discs can I use for recording?

With this DVD recorder, you can record on two types of DVD:

DVD-RW

This disc can be written to and then the contents deleted.

DVD+R

This type of disc can only be recorded once.

If you want to play this DVD in a DVD player, it must be finalised using the 'Finalise disc' function. It is not possible to make further recordings using this disc.

If this disc is to be played in a DVD recorder, it must not be finalised. Recordings can be added and deleted. The disc space (playback time) from the deleted recording cannot be recovered for further recordings.



Use the 'Manual recording' function to spontaneously start recording (e.g. to record a TV show already in progress).

In the 'index display' select the title to be overwritten or 'Empty title' with **▼**, **▲**. If you insert recordings between existing recordings, check the lengths of the old and new recordings. If the new recording is too long the subsequent recording (title/chapter) will be overwritten.

Insert new recordings at the end of all existing recordings (Safe Record)

To add a new recording at the end of the last recording on the disc, hold down the **REC/OTR** button until the message 'SAFE REC' appears on the display.

For DVD+R discs each new recording is always added at the end of all previous recordings as existing recordings cannot be overwritten.

End of disc is reached

If the end of a disc is reached during recording, recording will stop and the Recorder will turn itself off automatically.



Tip

Please refer to section 'Recording without automatic switch-off', if you want to manually start and stop your own recording.

If you want to start a recording manually but have it stopped automatically, read the section 'Recording with automatic switch-off' (e.g. not to record to the end of the disc).

Read the section 'Automatic recording from a satellite receiver', if you want a recording to be controlled automatically by a satellite receiver.

Read the section 'Direct record' if you want to record a programme currently being shown.

Recording without automatic switch-off

1 Switch on the TV set and select the programme number for the DVD recorder.

2 Insert a disc on which the recording is to be made. This disc is then checked for content and system. **REMAINING** will appear on the display.

* Index display

✓ A DVD+RW disc has been inserted that already contains recordings. Use the **▲** or **▼** button to select the point where the recording is to start.

* The message **REMAINING** appears in the display.

✓ The disc inserted is a blank DVD disc.

* A dialog box appears asking you whether you want to delete the contents or eject the disc.

✓ The disc inserted is a DVD+RW but its contents are not DVD video-compatible (e.g. a data disc). Recordings on this disc can only be made if the entire disc is first deleted with the **REC/OTR** button.

* The message **Title limit** appears on the screen if a recording is to be made.

✓ A disc may contain a maximum of 48 titles (including blank titles). Delete titles or change the disc.



Problem

3 If necessary, use the **MONITOR** button on the remote control to switch to the internal tuner in the DVD recorder.

4 Use **CHANNEL +** or **CHANNEL -** to select the programme number (station name) you want to record. This will appear on the display.



Programme numbers of the external inputs:

EXT 1 Start socket at the back **EXT 1 TO TV-IO**

EXT 2 Start socket at the back **EXT 2 AUX-IO**

EXT 3 Front SVHS/audio sockets **S-VIDEO / left AUDIO right**

Switching between the **S-VIDEO** and **VIDEO** sockets takes place automatically. If a signal is available at both sockets at the same time, the signal at the **S-VIDEO** socket has priority.

EXT 4 Digital Video (i Link) front socket **DV IN**



Tip

5 To start recording, press **REC/OTR** on the remote control or **RECORD** on the DVD recorder.

If you want to start the recording at the end of the existing recordings, hold down the **REC/OTR** button until the message **SAFE REC** appears on the display.

For DVD+R discs each new recording is always added at the end of all previous recordings as existing recordings cannot be overwritten. This will, for example, appear in the display:

Recording with automatic switch-off (OTR one-touch-recording)

- 1 Insert a disc.
- 2 If necessary, use the **MONITOR** button on the remote control to switch to the internal tuner in the DVD recorder.
- 3 Use **CHANNEL+** or **CHANNEL-** to select the programme number (channel name) you want to record.
- 4 Press **REC/OTR** on the remote control.
- 5 Each time you press **REC/OTR** you will add 30 minutes to the recording time.



How can I cancel the recording time I have just entered?

To delete an entry, press **CLEAR** while the display shows the recording time.

How can I check the remaining recording time?

Press **SYSTEM-MENU** while an OTR is in progress. The time at which the recording will end will appear on the TV screen in the timer info box.

Insert chapter markers

During recording you can mark scenes so you can find them or hide them later.
 During recording, press **EDIT** at the start point. **Inserting marker** appears on the TV screen. In the display, the number of the **CHAPTER** increases by one.
 For further information on titles and chapters, see the section on 'Changing to another title/chapter' in **Playback**.



Tip

- 6 Use the **STOP** button on the remote control or **■** on the machine to stop the recording. **"MENU UP/PT"** will appear on the display. The DVD recorder is writing the list of contents. Wait until the message disappears from the display. The recording is then complete.



Problem

* **The display will read "DISC ERROR"**
 Recording could not be completed correctly because of a disc error. Check the disc and clean it if necessary.



Tip

Making recordings on DVD-R discs compatible

If you want to play back the recording on a DVD player, you need to finalise the disc. In the DVD recorder, you can prepare your DVD for use in a DVD player using the **"Finalising"** feature. See 'Finalising DVD-R discs' in 'Managing the disc contents'.

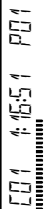
Interrupt recording (Pause)

- 1 During recording press **PAUSE II**, for example to avoid recording the commercials.
- 2 To continue recording, press **REC/OTR**.



Tip

End recording
 To end the recording, press the **STOP** button. Wait until **"MENU UP/PT"** disappears from the display.



Preventing accidental erasing of discs

To ensure you don't accidentally delete a recording you can protect the entire disc. You can only ever protect the entire disc. You cannot protect individual recordings.



What happens with DVD-R discs?

As long as these discs are not finalised, they can be protected against accidental erasure in the same way as DVD-RW discs.

- 1 Insert the disc to be protected.
- 2 While the index screen is displayed press **STOP** on the remote control. The first title is highlighted.
- 3 Press **▲**. This takes you to the disc info screen.
- 4 Press the **▶** button. Select the **'Protection'** line. Confirm with **▶**.

- 5 Select 'Protected' with the **▼** button and confirm with **OK**.
- 6 Press **◀** and then **DISC-MENU** to terminate.

The entire disc is now protected. If an attempt is made to record on a protected disc, **DISC LOCKED** will appear on the display and **Disc locked** will appear on the screen.



Tip

If you later decide to record on the disc, follow these steps but select 'Unprotected' at step 6.

Lining up recordings within a title (assemble cut)

On a recorded DVD-RW disc you can add another recording to an existing title. This recording is added to the title as a 'chapter'. The existing information will be overwritten starting from this point. Titles will also be overwritten that follow the current title depending on the length of the new recording. The recording type (Quality) will be taken from the current title. To play back this recording, press **SYSTEM-MENU** and use the **▶** button to select the 'C' (Chapter) symbol. You can also use the **T/C** key.



What happens with DVD-R discs?

New recordings on DVD-R discs can only be added after existing recordings. It is not possible to overwrite existing recordings on DVD-R discs.

- 1 In the index display, find the title to which the new recording is to be added.
- 2 Look at the last minute of the old recording (playback)
- 3 Press **PAUSE II** on the remote control at the position where the new recording is to go. **II** will appear on the screen.
- 4 To monitor the recording you can press **MONITOR** to switch to the internal tuner.
- 5 Now start recording as usual by pressing **RECOTR** on the remote control. The new recording will be inserted.
- 6 Stop recording with **STOP**.

Selecting the recording type (picture quality)

You can select the picture quality of the recording using the recording quality feature and hence the maximum recording time per disc. To check the quality of a recording mode you can make a 'test recording' with the desired recording mode. Check during playback the quality of this 'test recording'. During playback, the correct picture quality will automatically be selected.

- 1 Switch on the TV set. If required, select the programme number for the DVD recorder.
- Select the record mode with the button **REC MODE** on the remote control.

Which recording types can I choose!
Please observe, that you can not switch the recording type during recording. You have to interrupt the recording with the **STOP** button.

- 'M1': High Quality offers the best picture quality and a recording time of 1 hour.
- 'M2': Standard Play (pre-recorded DVD quality) offers standard picture quality and a recording time of 2 hours.
- 'M2X': Standard Play plus (better than S-VHS quality) offers standard picture quality and a recording time of 2.5 hours.
- 'M3': Long Play (S-VHS picture quality). Recording time of 3 hours.
- 'M4': Extended Play (better than VHS picture quality). Recording time of 4 hours.
- 'M5': Super Long Play (VHS picture quality). Recording time of 6 hours.
- 'M8': Super Extended Play (VHS picture quality). Recording time of 8 hours.

Can I select the recording type via a menu as well!

- 1 Press the **SYSTEM-MENU** button.
- 2 Select **T1** symbol with **◀** or **▶**.
- 3 Select **Record settings** using **▼** or **▲** and confirm with **▶**.
- 4 In the line **Record mode** select the recording type with **◀** or **▶**.
- 5 Confirm using **OK** and **SYSTEM-MENU**.
- 6 If you have selected the recording mode **M3**, **M4**, **M6** or **M8**, you can select the **Standard** (Standard) or **Sport** setting (for rapid movements) in the **Filter mode** line.



Tip

ENGLISH

Direct Record

Can you record the right TV channel in seconds when the DVD recorder is switched off? No problem. If recording is started manually, the **switched-off** DVD recorder takes the current TV channel from the TV set via the start cable. You will find more information on how to switch 'Direct record' on or off in the next section 'Direct record'.

How does Direct Record work?

The DVD recorder compares the TV channel selected on the TV set with its stored TV channels via the start cable. If the same TV channel is found, it switches the DVD recorder to the corresponding programme number and starts recording.

Please do not change channel on the TV during the search. This could affect the tuning of the DVD recorder.



1 On the TV set, select the programme number you want make the recording from.

2 Press **REC/IO** with the DVD recorder switched off.

***The display will read 'OFF'.**

✓ The DVD recorder is comparing its saved TV channels with those of the TV set. Please do not change the TV channel on the TV set while 'OFF' is shown in the display.

***'OFF' appears in the display**

✓ This TV channel could not be found in the DVD recorder's memory. Check that all TV channels saved on the TV set are available on the DVD recorder. If required, save any missing channels. Please read 'Manual TV channel search' in installing your DVD recorder.

✓ Check the connectors at both ends of the start cable.

✓ Check your TV's operating instructions to see which start socket is used for video signals.

✓ If the problem persists, you won't be able to use this feature.

3 Stop recording with **STOP**.

Problem

Automatic recording from a satellite receiver (Sat recording)

You can use this function if your own a satellite receiver that can control other devices via a start cable and a programming function (timer). For more information, please see the operating instructions for the satellite receiver.

1 Switch on the TV set. If required, select the programme number for the DVD recorder.

2 Press **SYSTEM-MENU** on the remote control. The menu bar appears.

3 Select 'TA' symbol with ◀ or ▶.

4 Select 'Record settings' using ▼ or ▲ and confirm with ►.

5 Select 'Sat record' using ▼ or ▲.

6 Select 'EXTZ' with ◀ or ▶.

**Tip**

Switching off 'Sat Recording'

To switch off the function, select 'Off' using ► or ◀.

7 Confirm with **OK**.

8 Use a start cable to connect start socket **EXT 2 AUX-IO** on the DVD recorder to the corresponding start socket on the satellite receiver.

9 To end, press **SYSTEM-MENU**.

10 Insert a disc you want to use for recording.

11 Programme the satellite receiver with the required information (programme number of the TV channel, start time, finish time). If necessary, please see the operating instructions for your satellite receiver.

12 Switch off the DVD recorder using **STANDBY**. 'SAT' also appears in the display to indicate that the function is active.

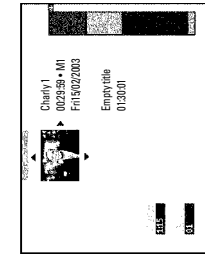
The DVD recorder is now ready to record. The start and end of the recording is controlled via start cable **EXT 2 AUX-IO**.



Managing the disc contents

Switching 'Direct Record' on or off

- 1 Switch on the TV set. If required, select the programme number for the DVD recorder.
- 2 Press **SYSTEM-MENU** on the remote control. The menu bar appears.
- 3 Select "A" symbol with **◀** or **▶**.
- 4 Select **'Record settings'** using **▼** or **▲** and confirm with **▶**.
- 5 Select **'Direct Record'** using **▼** or **▲**.
- 6 Select **'On'** (Direct Record on) or **'Off'** (Direct Record off) using **◀** or **▶**.
- 7 Confirm with **OK**.
- 8 To end, press **SYSTEM-MENU**.
- 9 Switch off with **STANDBY**



General

When a recording is made to disc, the following additional information is also stored at the beginning of the recording:

- Name of the recording
- If the TV station does not transmit a name, only the channel number and time will be stored as the name
- Length of the recording
- Record type (Quality)
- Date of the recording
- Index picture of the recording

A marker will be set every 5-6 minutes. If the **'Auto chapters'** function is activated in the **'Record settings'** menu. This marker is known as a 'chapter'. These markers can be changed when the recording has finished.



Can markers be set on a DVD-R disc?

Markers can be set on these discs if they have not been finalised.

It is also possible to add 'chapters' later. This means that scenes you do not want to see during playback, such as commercials, can be hidden or skipped. During playback you can watch your recording as a continuous sequence without the hidden chapters.

Select from the following chapters:

'Favorite Scene Selection',
to divide the title into chapters or to manage the chapters.

'Editing recording titles (name)',
to change the recording names.

'Play complete title',
to play the entire title including the hidden chapters.

'Delete recording/title' to delete the relevant title and therefore also the recording.

'Disc settings' to change the general settings of the disc.

- 6 Set the end marker with **OK**. This will also be the start marker of the next chapter.
The number of chapters (C) in the menu line increases by one.

x The number of chapters (C) has increased by two or more numbers
✓ This is the case when you want to hide a chapter that, due to automatic chapter numbering (if switched on), stretches over two or more chapters. In this case, you must delete the start of the automatically generated chapter:

- 1 Press **T/C** twice while the editing menu is displayed to change the chapter number.
- 2 Select the chapter between the new markers using **▼** or **▲**. Press **PAUSE II**.
- 3 Select **Delete marker** with **▼** to delete the current chapter marker. Confirm with **OK**. The current chapter number decreases by one.

Problem



- 7 Press **T/C** twice to change the chapter number 'C'.
- 8 Select the previous chapter with **▼**, since you are already in the next chapter (end of the chapter is also the beginning of the next chapter).

- 9 Wait until the chapter has been played and press **PAUSE II** to stop playback.

- 10 Select **Current chapter** using **▼** or **▲**.
- 11 Using **▶** select 'hidden'. The picture is shown darker.

Switching quickly

You can switch between show chapters (**visible**) and hide chapters (**hidden**) quickly and easily using **SELECT**.
This function is independent from the selected line.

- 12 To end, press **EDIT**.

During playback this chapter will be skipped.
If the chapter is not visible, select **Visible** in step 3 with **▶**.



Tip

Favorite Scene Selection

In this menu you can adapt a title to suit your particular needs. You can insert/delete chapter markers, hide chapters, select a new index, or split up a title. Press **EDIT** on the remote control during recording to open this menu.

Insert chapter markers

During recording you can set or delete chapter markers within a title. The maximum number of chapters per disc is 124 and 99 per title. If one of these limits is reached the following message will appear on the screen: **Chapter limit**. You need to delete some markers before you can insert new ones or make recordings.

- 1 During playback, press **EDIT** on the remote control at the appropriate point. The **Favorite Scene Selection** menu appears on the TV screen.

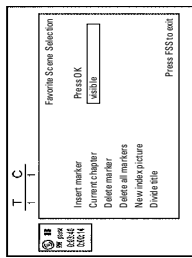
- 2 Confirm **Insert marker** by pressing **OK**. **Inserting marker** appears on the TV screen.

X will appear on the screen:

This DVD is write-protected or the disc is a finalised DVD-R. Subsequent changes cannot be made.

- 3 To stop this function, press **EDIT**.

Tip



Hiding chapters

Initially, all the chapters are visible. You can hide chapters for playback (e.g. advertisements) or make them visible again. In editing mode, hidden chapters are shown darker. A chapter always consists of a start marker and an end marker. To hide a certain scene, proceed as follows:

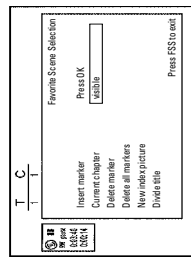
- 1 Search the beginning of the scene you want to hide. Press **PAUSE II**.

- 2 Press **EDIT** on the remote control to call the **Favorite Scene Selection** editing menu.

- 3 Set the start marker using **OK**.
The number of chapters (C) in the menu line will increase by one.

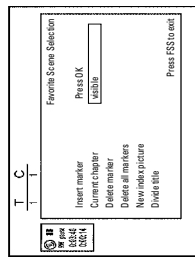
- 4 Search for the end of the scene. You can also use **▶▶** or **◀◀** to search faster for the end of the scene. Make sure that you do not jump into the next title (title number 'T' must not change). Only chapters within a title can be hidden.

- 5 Press **PAUSE II** at the corresponding position.



Deleting chapter markers

Within a title you can delete either all markers or individual markers.



- 1 While the relevant chapter is playing, press **EDIT** on the remote control. The **'Favorite Scene Selection'** menu appears on the TV screen.

How can I select different chapters?

- 1 Press the **T/C** button on the remote control. Titles and chapters are displayed at the top of the screen.
- 2 Select title (T) or chapter (C) with **▶** or **◀**.
- 3 Use **▲** or **▼** to select the title/chapter channel you want to edit.

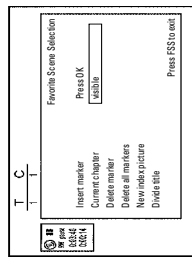


Tip

- 2 Use **▼** to select either **'Delete marker'** for this chapter or **'Delete all markers'** for all chapters within the selected title.
- 3 Confirm with **OK**. (You will be prompted to press **OK** again to make sure you really want to delete all markers. If you do not want to, press the **◀** button.)
- 4 To end, press **EDIT**.

Changing the index picture

Normally the picture from the begin of a recording is used as the index picture. You can however choose any picture from the recording as the index picture.



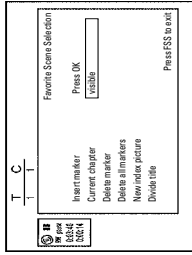
- 1 During playback, search for location of the new index picture. Press the **PAUSE/II** button.
- 2 Press the **EDIT** button. The **'Favorite Scene Selection'** menu appears on the TV screen.
- 3 Select line **'New index picture'** and confirm with **OK**.
- 4 Start the change with **OK**. **'Updating menu'** appears on the TV screen.

Once the revision has been completed successfully the DVD recorder reverts to the index overview.

Changing the menu background

You can choose any frame from the recording as the menu background. This setting is stored on the inserted DVD. Please note that after the modification the 'original background' will be lost. If you erase the complete disc (close the disc tray with **CLEAR** and make a recording) the 'original background' will be restored.

- 1 During playback, search for the location that is to be used as the new menu background. Press the **PAUSE/II** button.
- 2 Press the **EDIT** button. The **'Favorite Scene Selection'** menu appears on the TV screen.
- 3 Select line **'New background'** and confirm with **OK**.
- 4 Start the change with **OK**. **'Updating menu'** appears on the TV screen.



Once the revision has been completed successfully the DVD recorder reverts to the index overview.

Dividing titles

You can divide a title into several sections (titles) of any size. Each of these sections (titles) is identified by its own index.

Note: This division cannot be undone.



Can I divide titles on DVD+R discs?

As recordings on DVD+R discs cannot be overwritten, it is not possible to divide titles on DVD+R discs.

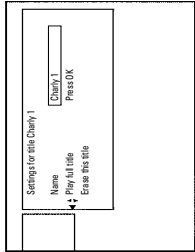
- 1 While the relevant title is playing, press **EDIT** on the remote control. The **'Favorite Scene Selection'** menu appears on the TV screen.
- 2 Select **'Divide title'** and confirm with the **OK** button.
- 3 If you are sure, press **OK** to start the process. **'Dividing title'** appears on the TV screen.
- 4 Wait until the new title is displayed with an index picture in the index picture overview.

The process of splitting the title is now complete.

Playing the entire title

If you have hidden certain sections (chapters) of a title, this setting lets you watch the entire title including the hidden sections. To do this, proceed as follows:

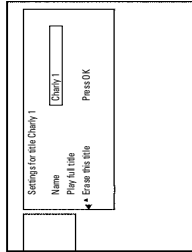
- 1 Press the **STOP** button or during playback press **DISC-MENU**.
- 2 Using **▲** or **▼** select the title you want to play all of and confirm with **▶**. The title editing menu will appear.
- 3 Select **Play full title** using **▲** or **▼** and confirm with **OK**.
- 4 Playback starts automatically. The title is played in its entirety - including the hidden chapters.



Erasing recordings/titles

You can erase specific recordings from a disc. To do this, proceed as follows:

- 1 Press the **STOP** button or during playback press **DISC-MENU**.
- 2 Using **▲** or **▼** select the title you want to delete and confirm with **▶**. The title editing menu will appear.
- 3 Select **Erase this title** using **▲** or **▼** and confirm with **OK**. **This will completely erase this title** appears on the TV screen. Press **OK** to confirm.
- 4 If you want to delete this title, press **OK** to confirm. Otherwise press **◀**.
- 5 **Erase title** appears on the TV screen.
- 6 At this point, **Empty title** appears in the 'index picture display'. A new recording can now be made here. If the deleted title was very short (less than 1 minute) **Empty title** will not appear at this point.



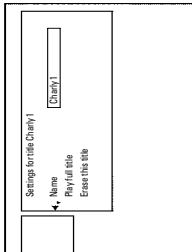
Can titles be deleted from a DVD+R disc?

Titles on DVD+R discs are only marked as deleted. **Deleted title** will appear in the display instead of **Empty title**. During playback the 'deleted' title is skipped. The space used for this title cannot be used again as the title has not been physically deleted. Once the disc has been finalised no further changes can be made.

Editing recording titles (name)

Some TV stations transmit the title (name) of a programme. In this case, the name will be included automatically (eg. 'ROCKY'). Otherwise, the only the programme number (programme name) and the time are stored as the name of the recording. The name of the recording can only be changed after the recording has been completed.

- 1 If required, press the **STOP** button to interrupt playback.
- 2 Using **▲** or **▼** select the title whose name you want to edit and confirm with **▶**. The menu for editing names appears.
- 3 Select **Name** using **▲** or **▼** and confirm with **▶**.
- 4 Using **▶** or **◀** select the position where the letter/number/icon is to be changed/re-entered.
- 5 Change the icon using **▲** or **▼**. You can switch between upper and lowercase using **SELECT**. You can delete the character using **CLEAR**.



How can I enter the characters with the buttons 0-9/ABC?

Press a number button as often as the required character or the number appears. You can enter language dependent characters with the buttons **◀◀** or **▶▶** on the corresponding character e.g.: button **2** for 'a' and then with **▶▶** as often as 'ä' appears.
For special characters press 1 more the once.
The position for the following character will be selected automatically.
To enter a space press the 1 button.
To switch over to upper case characters press **SELECT**.
To erase a character press **CLEAR**.

- 6 Repeat 4 and 5 until you have made the changes you want.
- 7 Save the new name with **OK**. **Storing name** appears on the TV screen for confirmation.
- 8 To end, press **◀**.

Finishing editing

If one or more titles have been edited a DVD player may still display the original titles. You can prepare your DVD+RW disc in such a way that a DVD player will be able to play the edited version.

- 1 In the 'Disc info display' press **▶**. The **'Settings for'** menu appears on the TV screen.
 - 2 Select **'Make edits compatible'** using **▲** or **▼** and confirm with **OK**.
- *'Make edits compatible' does not appear**

 - ✓ Your disc is already compatible. There is no need for conversion. To end, press **SYSTEM-MENU**.
- 3 The screen displays **'This will take'** to show how long the process will last.
 - 4 To confirm press **OK**. **'Working'** appears on the TV screen. A bar will move from left to right indicating progress.



Problem

Finalising DVD+R discs

This feature is required to play back a DVD+R disc in a DVD player. Once the disc has been finalised no further recordings or changes can be made.

- 1 In the 'Disc info display' press **▶**. The **'Settings for'** menu appears on the TV screen.
 - 2 Select **'Finalise disc'** using **▲** or **▼** and confirm with **OK**.
- *'Finalise disc' does not appear**

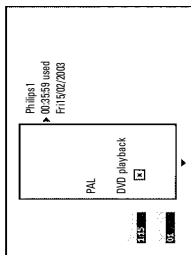
 - ✓ Either there is no DVD+R disc inserted or the disc is already finalised. To end, press **SYSTEM-MENU**.
 - ✓ The **'Settings for'** menu does not appear
 - ✓ The menu may not appear if the disc has been recorded on another DVD recorder. In this case, use the **'Finalise disc'** feature in the **▶** menu, under **'Features'**.
- 3 The screen displays **'This will take...'** to show how long the process will take.
 - 4 To confirm press **OK**. **'Working'** appears on the TV screen. A bar will move from left to right indicating progress.



Problem

Disc settings

This screen appears before the first title and contains general information about the current disc.



You can:

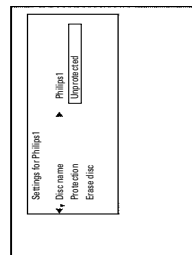
- ▶ change the name of the disc
- ▶ activate or deactivate write protection on the disc
- ▶ Finish editing (make the disc DVD compatible)
- ▶ finalise a DVD+R
- ▶ delete a DVD+RW

To get to this display, proceed as follows:

- 1 Press the **STOP** button or during playback press **DISC-MENU**.
- 2 Select the first title with **▲** or press **STOP**.
- 3 Press the **▲** button. The disc info display will appear.

Changing the disc name

- 1 In the 'Disc info display' press **▶**. The **'Settings for'** menu appears on the TV screen.
- 2 Select **'Disc name'** using **▲** or **▼** and confirm with **▶**.
- 3 Using **▶** or **◀** select the position where the letter/number/icon is to be changed/re-entered.
- 4 Change the icon using **▲** or **▼**. You can switch between upper and lowercase using **SELECT**. You can delete the character using **CLEAR**.
- 5 Repeat **3** and **4** until you have made the changes you want.
- 6 Save the new title with **OK**. **'Storing name'** appears on the TV screen for confirmation.
- 7 To end, press **◀**.



12

Programming a recording (TIMER)

ENGLISH

General

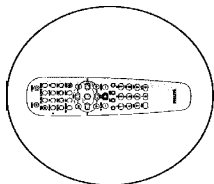
Use 'Programming a recording (TIMER)', to automatically start and stop a recording at a later date.

The DVD recorder will switch to the right programme number and begin recording at the correct time.

With this DVD recorder, you can pre-programme up to six recordings within a period of one month.

To make a programmed recording, your DVD recorder needs to know:

- * the date you want to make the recording
- * the programme number of the TV channel
- * the start and stop time of the recording
- * VPS or PDC on or off
- * the recording mode (picture quality) (M1/M2/M3/M4/M6/M8)



Tip

Fit to space Recording

You can select also the recording mode 'FR'. With these setting the recording mode (bit rate) will be automatically calculated to use the complete empty space (titled *EMPTY*). If the empty space is too small the recording will be stopped to prevent the following titles from being overwritten.

This information is saved in a 'TIMER block'. Before you begin, make sure the clock is set. If the clock is not set, the 'Time/Date' menu will appear when you press the **TIMER** button.

What is 'VPS/PDC'?

VPS (Video Programming System)/PDC (Programme Delivery Control) are used to control the start and duration of TV channel recordings. If a TV programme starts earlier or ends later than was scheduled, the DVD recorder will then turn on and off at the correct time.

What do I need to know about 'VPS/PDC'?

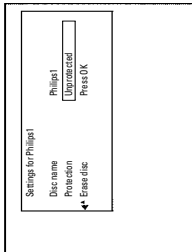
- * Usually the start time is the same as the VPS or PDC time. If a different 'VPS/PDC time' is indicated, e.g.: '20.15 (VPS/PDC 20.14)', the 'VPS/PDC time' '20.14' must be entered exactly to the minute during programming. If you want to programme a time that is different from the VPS or PDC time, you must switch off VPS or PDC.
- * Only one TV program of a TV channel can be controlled using VPS/PDC at a time. If you want to record two or more TV programmes on a TV channel using VPS/PDC, you will need to programme these as two separate recordings.
- * Since the DVD recorder requires a certain lead time (for getting the disc up to speed and positioning the laser) before recording can start, it is possible that the recorder will miss the first few seconds of a TV show recorded with VPS/PDC. In this case, disable VPS/PDC and enter a start time one minute earlier.



?

Erase DVD+RW disks

- In the 'Disc info display' press **▶**. The 'Settings for' menu appears on the TV screen.
- Select **Erase disc** using **▲** or **▼** and confirm with **OK**. This will erase all titles appears on the TV screen. Press **OK** to confirm.
- If you want to delete all the titles, press **OK** to confirm. Otherwise press **◀**.
- Erasing disc** appears on the TV screen.
- After deletion, the index picture display shows the free space on the disc.



Tip

If the disc is empty already, you cannot select **Erase disc**.

Programming recordings with the ShowView® System

SHOWVIEW®

Thanks to this programming system, you no longer need to tediously enter the date, programme number, start and finish times. All the information needed by the DVD recorder for programming is contained in the ShowView® programming number. This 9-digit ShowView® number is found in most TV listings magazine.

- 1 Switch on the TV set. If required, select the programme number for the DVD recorder.
- 2 Press **TIMER** on the remote control.
The programming method selected list is marked.
- 3 Select 'ShowView system' using **▼** or **▲** and confirm with **▶**.
- 4 Enter the entire ShowView number. This number is up to 9 digits long and can be found next to the start time of the TV programme in your TV listings magazine.
eg.: 5-312-4 or 5312 4
Enter 53124 for the ShowView-number.
If you make a mistake, you can clear your instructions with **CLEAR**.



Selecting daily/weekly recordings

Using **SELECT**, select from the following options:
Mo-Fri: Repeated daily recordings (Monday to Friday).
Weekly: Repeated weekly recordings (every week on the same day).

Tip

- 5 Confirm with **OK**.

- * **The following message appears on the screen: 'Please enter programme number'**
 ✓ The programme number of the TV channel has not yet been assigned to the ShowView number. Use **▶**, **◀** or the number buttons **0, 9/abc** on the remote control to select the appropriate programme number (name) of the TV channel and confirm with **OK**.
- * **The following message appears on the screen: 'ShowView number wrong'**
 ✓ The entered ShowView number is incorrect. Correct your entry or cancel using the **SYSTEM-MENU** button.
 ✓ Check the timetable (see 'Setting the time & date' in 'Installing your DVD recorder').
- * **The following message appears on the screen: 'Weekend programming not possible'**
 ✓ A daily recording was entered for the wrong day. Daily programming can only be used for recordings to be made from Monday to Friday.

Problem

The decoded data appears after confirmation. You can go back and change the data. Select the appropriate input field with **▶** or **◀**. If required, make changes using **▲**, **▼** or the number buttons **0, 9/abc**.

Switching on 'VPS/PDC' in the 'Start' input field

Select the 'Start' input field using **▶**. Using **SELECT** switch on 'VPS/PDC' (* lights up). If you press **SELECT** again, you will switch 'VPS/PDC' off (* goes out).

Changing the recording mode in input field 'End'

Select the 'End' input field using **▶**.
 Use **REC MODE** to select the recording mode **M1, M2, M2x, M3, M4, M6, M8**.

Fit to space Recording

You can select also the recording mode **FR**.
 With these setting the recording mode (bit rate) will be automatically calculated to use the complete empty space (title **Empty**).
 If the empty space is too small the recording will be stopped to prevent the following titles from being overwritten.

Do not use this function under the following conditions:

- ▶ more than one programmed recordings
 - ▶ daily/weekly repeated recordings
 - ▶ recordings with VPS/PDC
- May be the calculation of the recording mode can not function properly.

Tip

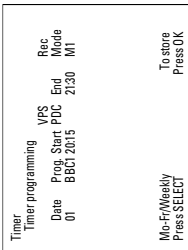
- 7 If all information is correct, press the **OK** button. The programming information is stored in a **TIMER** block.
- 8 To end, press **TIMER**.
- 9 Insert a recordable disc (one without write protection).
 The inserted disk is checked.
- 10 Search the position on the disc where the recording should begin.
 Press **STOP**.
- 11 Switch the DVD recorder off with **STANDBY**.
 The programmed recording will only function properly if the DVD recorder has been **switched off** using the **STANDBY** button.

ENGLISH

Programming recordings without the ShowView® System

If any of the **TIMER** blocks are in use, **TIMER** will light up on the recorder display.

- 1 Switch on the TV set. If required, select the programme number for the DVD recorder.
- 2 Press **TIMER** on the remote control. The programming method selected last is marked.
- 3 Select line **Timer programming** with **▼** or **▲**, and confirm with the **►** button. The information will appear on the screen.
- 4 Select the input field with **◀** or **▶**.
- 5 Enter information with **▼** or **▲** or with the number buttons **0..9/abc**.




Selecting daily/weekly recordings
In **Date** use **SELECT** to select from the following options:
'Mo-F': Repeated daily recordings from Monday to Friday
'Mon': Repeated weekly recordings (every week on the same day, e.g. Monday).

Programme numbers of the 'EXT1' and 'EXT2' start socket
You can also programme recordings from external sources via start socket **EXT 1 TO TV-I/O (EXT1)** or **EXT 2 AUX-I/O (EXT2)**.

Switching on 'VPS/PDC' in the 'Start' input field
Select the **Start** input field using **TIMER**. Using **SELECT** switch on **VPS/PDC** (* lights up). If you press **SELECT** again, you will switch **VPS/PDC** off (* goes out).

Changing the recording quality in input field 'End'
Select the **End** input field using **►**.
Use **SELECT** to select the recording mode.

Tip


- 6 If all information is correct, press the **OK** button. The programming information is stored in a **TIMER** block.
- 7 To end, press **TIMER**.
- 8 The disk you have inserted will be checked.
- 9 Search the position on the disc where the recording should begin.
- 10 Switch off with **STANDBY**.
The programmed recording will only function properly if the DVD recorder has been **switched off** using the **STANDBY** button.

If any of the **TIMER** blocks are in use, **TIMER** will light up on the recorder display.

Problem solving for programmed recordings

PROBLEM	SOLUTION
The DVD recorder is not responding	<ul style="list-style-type: none"> While a programmed recording is being made, you cannot operate your DVD recorder manually. If you want to cancel the programmed recording, press STANDBY.
'Switch off, timer recording' flashes on the TV screen.	<ul style="list-style-type: none"> The DVD recorder was switched on a few minutes before the start of a programmed recording. Switch off the DVD recorder using STANDBY. A programmed recording (timer) will only function if the DVD recorder is switched off (STANDBY button).
Error message: 'Insert recordable disc'	<ul style="list-style-type: none"> Either a disc has not been inserted or the disc cannot be used for recording. Insert a disc on which recordings can be made. Search the position on the disc where you want the recording to begin. Switch off the DVD recorder using STANDBY.
The error message 'Disc locked' appears briefly on the screen.	<ul style="list-style-type: none"> A write-protected disc has been inserted. Undo the write protection (see 'Preventing accidental erasing of discs' in 'Manual recording') or insert a different disc.
Error message: 'Memory full'	<ul style="list-style-type: none"> If this error message appears after pressing TIMER, then all TIMER blocks are already programmed. No more recordings can be programmed. Press the ▶ button. If you want to clear or check a programmed recording (TIMER block), select it with ▲ or ▼.
The 'Data error' message appears on the screen.	<ul style="list-style-type: none"> The data for the recording could not be transferred. Please check date, start time and finish time of the programmed recording.
The 'Collision' message appears on the screen.	<ul style="list-style-type: none"> Two programmed recordings overlap. <ul style="list-style-type: none"> If you ignore this error message the show with the earlier start time will be recorded first. The start of the second show will not be recorded. Change the setting for either of the two recordings. Clear either of the two recordings.

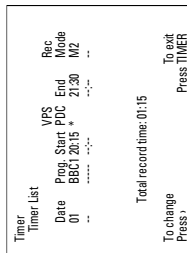
How to change or delete a programmed recording (TIMER)

- Switch on the TV set. If required, select the programme number for the DVD recorder.
- Press **TIMER** on the remote control. The programming mode selected list is marked.
- Select **'Timer List'** using **▼** or **▲** and confirm with **▶**.
- Select the programmed recording (**TIMER**) you want to check, change or delete with **▼** or **▲**.



Tip

- Delete programmed recording**
- Press the **CLEAR** button.
 - Confirm with **OK**. **'Timer Cleared'** will briefly appear on the TV screen.
 - To end, press **TIMER**.



- Press **▶**. Select the input field with **◀** or **▶**. If required, change the information with **▲**, **▼** or the number buttons **0..9/abc**.
- Confirm with **OK**.
- To end, press **TIMER**.
- Switch off with **STANDBY**.

'NexTVView Link'

This DVD recorder is equipped with the 'NexTVView Link' feature. If your television is also equipped with this function, you can mark TV programmes on the television for programming. These TV programmes will automatically be transmitted to a **TIMER** block on the DVD recorder. If you clear the marking of the TV programme on the television, the corresponding **TIMER** block on the DVD recorder will also be cleared. For more information, read the instruction manual of your TV set.

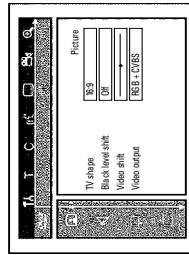
In this section you will learn how to set your user preferences on the DVD recorder. The symbols have the following meanings:

	Picture setting
	Sound setting
	Language setting
	Additional settings
	Remote control settings Control the DVD recorder using the remote control of your Philips TV set
	Disc settings
	Recording settings
	Installation

- Switch on the TV set. If required, select the programme number for the DVD recorder.
- Press **SYSTEM-MENU** on the remote control. The menu bar appears.
- Select **TV** using **←** or **→** and confirm with **↵**.
- Select the appropriate function with **▼** or **▲** and confirm with **↵**.
- Select the appropriate line using **▼** or **▲** and confirm with **↵**.
- Select the appropriate function using **▼** or **▲** or the setting with **←** or **→**.
- Confirm the new setting by pressing **OK**.
- To close the menu item, press **←**.

Picture settings

You can choose the following features in this menu:



'TV shape'

The picture signal from your DVD Recorder can be set to match your TV screen.

- '4:3 letterbox'**: for a 'wide-screen' picture with black bars at the top and bottom
- '4:3 panscan'**: for a full-height picture with the sides trimmed.
- '16:9'**: for a wide-screen TV set (screen edge ratio 16:9)

'Black level shift'

Adapts the colour dynamics for NTSC playback when switched to 'On'

ENGLISH

'Video shift'

Use this feature to adjust the position of the picture on your TV left or right using **←**, **→** to suit your TV set.

'RGB attenuation'

With the buttons **←**, **→** you can attenuate or boost the RGB-signal on the input socket **EXT 2 AUX-IO**. These settings concern only the input signal. The RGB output signal on the socket **EXT 1 TO TV-IO** leaves unchanged.

'Video output'

Since RGB and S-Video signals sometimes use the same connections on a scart cable, the two signals cannot be transmitted simultaneously. With these settings, you can decide whether RGB or S-Video signals should be transmitted. This setting affects only the scart sockets of the DVD recorder (**EXT 1 TO TV-IO** output socket and **EXT 2 AUX-IO** input socket). Please also observe which signals are available at which scart socket of the TV set or how the scart sockets need to be switched. If necessary, consult the instruction manual of your TV set.

'Which settings can I select'

'RGB + CVBS' Depending on the TV set you are using, switching between the 'RGB' and the 'Video(CVBS/FBAS)' signal is done automatically. If the picture scrolls to the side or the colour quality is poor on some TV sets when the setting is **'RGB + CVBS'**, you must select **'CVBS only'**.

'S-video only' Both scart sockets (**EXT 1 TO TV-IO** output socket and **EXT 2 AUX-IO** input socket) process only the S-Video signal. In case the scart socket of the TV set is not suitable for S-Video (Y/C) signals, you will only see a black-and-white picture, although the recording will be made in colour.

Moreover, only the video (CVBS; FBAS) signal will be used for recordings via the **EXT 1 TO TV-IO** scart socket. Please observe that when making recordings from a video recorder that transmits only video (CVBS/FBAS) signals through the scart cable, recordings via scart socket **EXT 2 AUX-IO** may be made in black and white.

Therefore, use this setting with caution.

'CVBS only' Only the video (CVBS/FBAS) signal is transmitted regardless of the video signals (RGB, Y/C) on the scart sockets. This setting is selected automatically when no 'RGB' or 'S-VIDEO' signal is detected at the scart socket.

When selecting the settings **'S-video only'** or **'CVBS only'**, the RGB signal is switched off.



Language settings

You can choose the following settings in this menu:

'Audio Language'

Playback audio language

'Recording audio'

Selection of audio recording for bilingual programmes

'Subtitle'

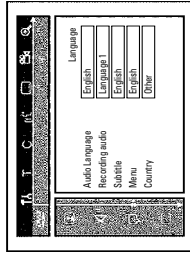
Subtitle language

'Menu'

Screen menu language

'Country'

Select the country you currently live from the list.



Additional settings

You can select the following functions in this menu:

'Status box'

Along with the on screen menu, the OSD (On Screen Display) also displays information on the current operating status (counter, playback, recording, TV channel, etc.) on the TV screen. You can switch off the information about the operating status so that the on screen display (OSD) is not recorded during copying.

'On': The OSD information appears in every selected mode for a few seconds and disappears again.

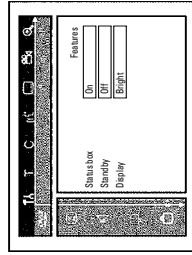
'Off': The OSD information is switched off. It is no longer displayed on the screen.

'Live source view'

With this function you can switch between the live picture or the information of the selected TV channel/input socket in the 'Tuner information box' (left-hand corner of the screen).

'On': The live picture of the selected TV channel or signal on the input sockets is visible.

'Off': The information about the selected TV channel or signal on the input sockets is visible.



Sound settings

Depending on which audio outputs are used, you can select the settings in this menu. If you only use the analogue audio output (AUDIO L/R OUT), select the settings 'Off' in the 'Digital output' menu.

'Digital output'

You can select one of the following settings for devices that are connected to the COAX OUT or OPTICAL-AUDIO OUT sockets:

'All': Dolby Digital and DTS signals are fed unaltered to the digital output. MPEG-2 multi-channel signals are converted to PCM (Pulse Code Modulation).

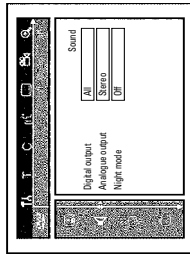
For receivers/amplifiers with digital multi-channel sound decoders.

'PCM only': Dolby Digital and MPEG-2 multi-channel signals are converted to PCM (Pulse Code Modulation).

For receivers/amplifiers without digital multi-channel sound decoders.

'Off': Digital output switched off.

For devices with analogue audio input.



'Analogue output'

For devices connected to the analogue audio output (AUDIO L/R OUT), you can select from the following settings.

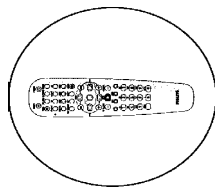
'Stereo': For devices without Dolby/Surround or TruSurround. Use this setting if the DVD recorder is only connected to a stereo TV set.

'Surround': Dolby Digital and MPEG-2 multi-channel are mixed down to a DOLBY surround-compatible two-channel output signal.

For devices with Dolby Surround Pro Logic decoder.

'Night mode'

Night mode optimises the sound for playback at low volume. You are therefore less likely to disturb your neighbours. This only works for Dolby Digital audio on DVD video discs.



Child lock (DVD and VCD)

This feature enables discs to be locked for children. When Child Lock is on, a 4-digit code (PIN) needs to be entered before a disc can be played. You can also decide whether the inserted disc should always be played or should be played only once, despite the child lock.

***Play always:**

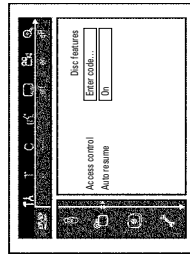
This disc is stored in a memory with space for 50 child-safe discs. If more than 50 discs are stored, the last disc in the list is removed and the new disc is added. The screen shows 'Child safe' at the start of playback.

***Play once:**

This disc is only authorised for single playback. If the recorder is switched off, the PIN code must be re-entered.

Activating/deactivating child lock

- 1 Switch on the TV set. If required, select the programme number for the DVD recorder.
- 2 Switch on the DVD recorder using **STANDBY-ON**.
- 3 Press **SYSTEM-MENU**. The menu bar appears.
- 4 Select the **TL** icon using **◀** or **▶**.
- 5 Select **(Disc features)** using **▼** or **▲** and confirm with **▶**.
- 6 Confirm **'Access control'** using **▶**.
- 7 Enter a 4-digit code of your choice. If the code is new, you may have to enter the code a second time as confirmation.
- 8 Select **'Child lock'** using **▲** or **▼** and confirm with **▶**.
- 9 Select the **OK** icon using **▼** or **▲**.
- 10 Confirm with **OK**.
- 11 Quit the feature using **◀** and **SYSTEM-MENU**.



Unauthorised discs can only be played by entering the four-digit PIN code. To deactivate the child lock, select the **TL** icon in 6.

Authorising a disc

- 1 Insert a disc. The access control box will appear after a short delay.
- 2 Using **▲** or **▼** select **'Play once'** or **'Play always'**.
- 3 Enter your PIN code using the number buttons **0..9/abc**.

Double-sided DVDs may have a different ID for each side. For these discs, each side must be authorised. Video CDs may have a different ID for each disc. For these CDs, each disc must be authorised.

Locking unlocked discs

To lock a disc that was formerly authorised follow the instructions below

- 1 Insert a disc. Playback starts automatically. If the playback does not start automatically, press **PLAY**.
- 2 Press the **STOP** button while the **TL** icon is visible. The icon changes to **TL**. The disc is now locked.

Parental level control (DVD video only)

Films on pre-recorded DVD discs may contain scenes not suitable for children. Therefore, some discs may contain 'Parental Control' rating information that applies to the entire disc or to certain scenes on the disc.

The appropriate scenes have filter values that range from L-8. If such a scene is detected during playback, the filter value set on the DVD recorder is compared to the scene. If the filter value is higher than the setting, an alternative scene will be played (if available).

Most DVDs apply the rating to an entire DVD. Therefore, if certain scenes exceed the rating you select, the entire disc will be blocked from viewing.

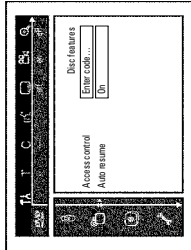
Activating/deactivating parental level control

- 1 Switch on the TV set. If required, select the programme number for the DVD recorder.
- 2 Switch on the DVD recorder using **STANDBY-ON**.
- 3 Press **SYSTEM-MENU**. The menu bar appears.
- 4 Select the **TL** icon using **◀** or **▶**.
- 5 Select **(Disc features)** using **▼** or **▲** and confirm with **▶**.

ENGLISH

Changing the PIN code

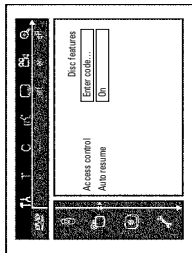
- 1 Switch on the TV set. If required, select the programme number for the DVD recorder.
- 2 Switch on the DVD recorder using **STANDBY-ON**.
- 3 Press **SYSTEM-MENU**. The menu bar appears.
- 4 Select the **PA** icon using **◀** or **▶**.
- 5 Select **(Disc features)** using **▼** or **▲** and confirm with **▶**.
- 6 Confirm **'Access control'** using **▶**.
- 7 Enter your four-digit PIN code. If the code is new, you may have to enter the code a second time as confirmation.
- 8 Select **'Change code'** using **▲** or **▼** and confirm with **▶**.
- 9 Enter the new code using the number buttons **0-9abc**. Enter the same code again as confirmation.
- 10 Quit using **◀** and **SYSTEM-MENU**.



Tip

I have forgotten my code
Press **STOP** four times (step 7), then press **OK**. Access control is now switched off. You can now enter a new code as described above.

- 6 Confirm **'Access control'** using **▶**.
- 7 Enter a 4-digit code of your choice. If the code is new, you may have to enter the code a second time as confirmation.
- 8 Select the **'Parental level'** using **▲** or **▼** and confirm with **▶**. A bar appears to select the parental level.
- 9 Select the appropriate rating using **▼**, **▲** or the number buttons **0-9abc**.



Tip

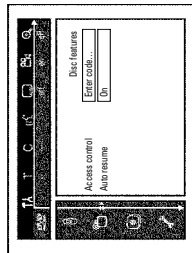
What do the ratings mean?
Rating 0 (displayed as '-') parental control not active.
Rating 1 (suitable for children)
Rating 8 (only suitable for adults)
What happens if a DVD scene contains a higher level than the rating set?
If the recorder does not find a suitable alternative, playback will stop and you must enter the four-digit code.

- 10 Confirm with **OK**. Quit using **◀** and **SYSTEM-MENU**.

Changing the country

The set filter values depend on the respective country. It is therefore necessary to enter the country to which these filter values apply.

- 1 Switch on the TV set. If required, select the programme number for the DVD recorder.
- 2 Switch on the DVD recorder using **STANDBY-ON**.
- 3 Press **SYSTEM-MENU**. The menu bar appears.
- 4 Select the **PA** icon using **◀** or **▶**.
- 5 Select line **(Disc features)** using **▼** or **▲** and confirm with **▶**.
- 6 Confirm the line **'Access control'** using **▶**.
- 7 Enter your four-digit code. If the code is new, you may have to enter the code a second time as confirmation.
- 8 Select **'Change country'** using **▼** or **▲** and confirm with **▶**.
- 9 Select the corresponding country using **▲** or **▼** and confirm with **OK**.
- 10 To end, press **◀** and then **SYSTEM-MENU**.



4. Mechanical Instructions

4.1 Dismantling and Assembly of the Set

Remark: Exploded views can be found in chapter 10.

4.1.1 Manually opening the tray

- In case the loader is defective or cannot be opened electrically you can open the tray manually.
- Through a slot at the underside of the cabinet a slider that unlocks the tray can be accessed. However the slot is covered by an adhesive tape on the cabinet of the drive to prevent dust coming into the drive. Push through this adhesive tape by means of a thin screwdriver and move the slider to the left, see picture 4-1.
- **Make sure that an adhesive tape has been reapplied to the drive when repair is finished!**

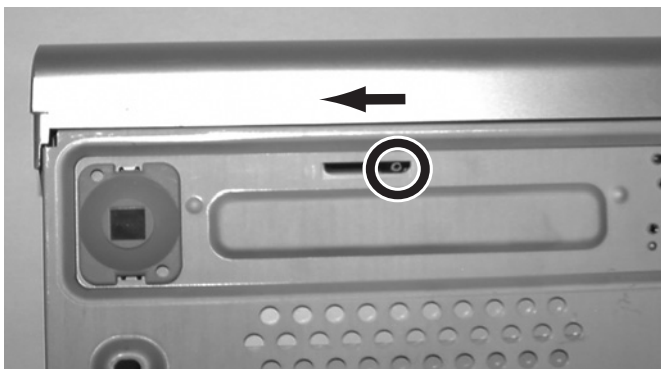


Figure 4-1

4.1.2 Front

- Before removing the front panel the tray has to be in the opened position.
- Remove the top cover
- Remove tray front by pulling it upwards (1), see picture 4-2
- Unplug the IDE cable that connects to the card reader (2), see picture 4-3
- Remove the 2 screws (3) that fix the card reader
- Remove the card reader PCB (4)
- Remove the screw (5) that fixes the bracket of the card reader to the front plate, see picture 4-4
- Remove the three screws (6) fixing the front panel
- Release the cables from the clamps (7)
- Release the two snap hooks at the sides (8) and remove the front (9), see picture 4-5
- Remove the 9 screws (10) to remove the front plate (11), see picture 4-6, 4-7



Figure 4-2

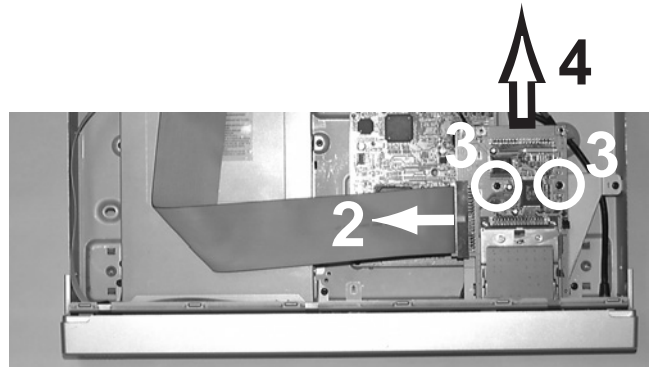


Figure 4-3

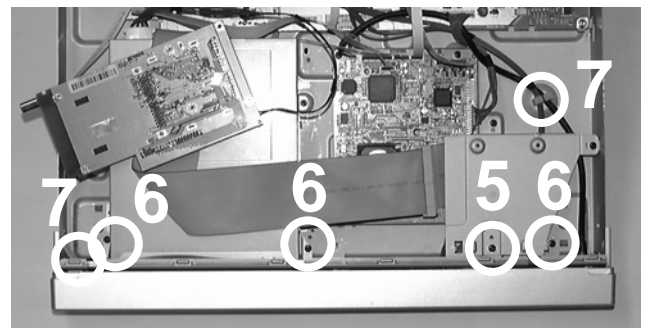


Figure 4-4

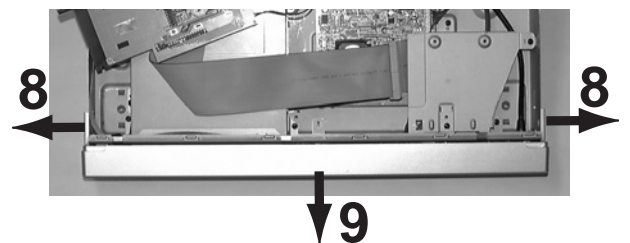


Figure 4-5

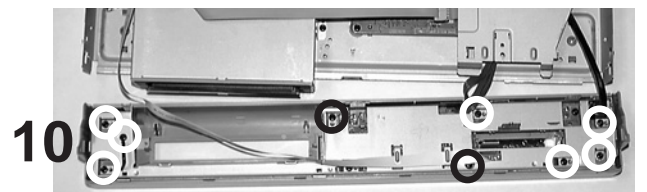


Figure 4-6

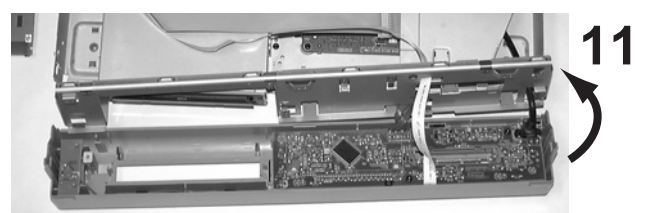


Figure 4-7

4.1.3 Digital Board

- Unplug the IDE cable that connects to the card reader (1), see picture 4-8
- Remove the 2 screws (2) that fix the card reader
- Remove the card reader PCB (3)
- Remove the 3 screws (4) that fix the bracket of the card reader, see picture 4-9.
- Remove the 4 screws (5) that fix the Digital Board, see picture 4-10, and turn the Digital Board to the required service position, see picture 4-11

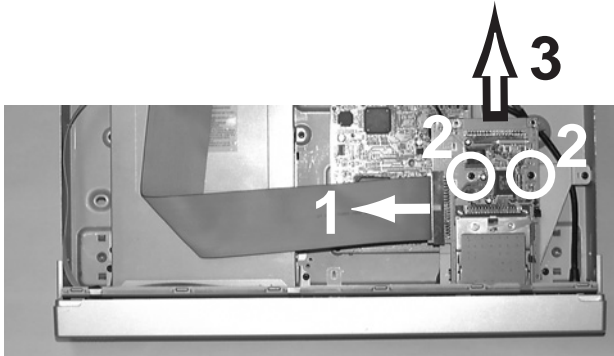


Figure 4-8

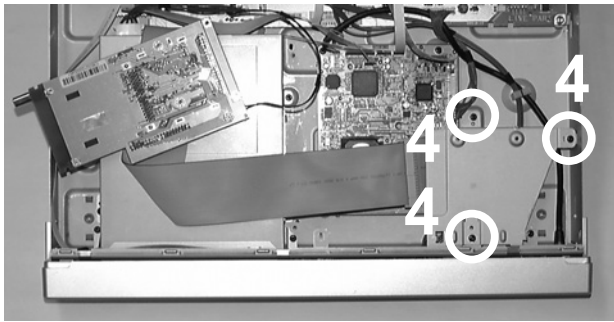


Figure 4-9

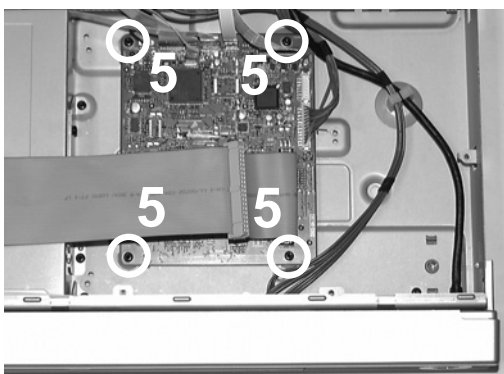


Figure 4-10

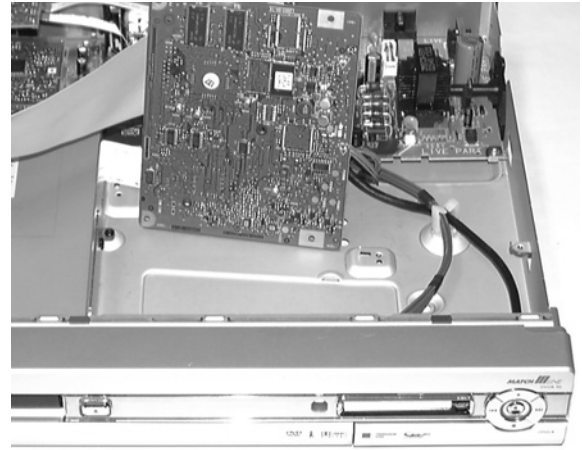


Figure 4-11

4.1.4 Basic Engine

- Remove the tray, see picture 4-2
- Remove the 4 screws that fix the drive, see picture 4-12

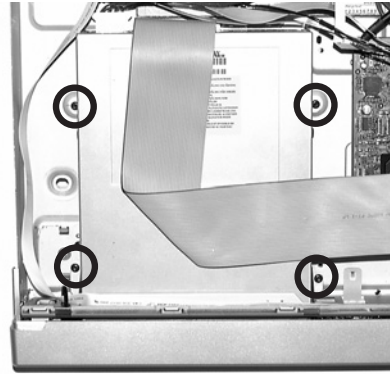


Figure 4-12

4.1.5 Analog Board

- Remove the 3 screws (1) that fix the back plate to the bottom plate, see picture 4-13
- Remove the 4 screws (2) that fix the Analog Board to the bottom plate
- Remove the Fan assy by releasing the fixing screw (3)
- Remove screw safety holder (4)
- Unlock the two snaps hooks at the left and right (5), see picture 4-14, and pull the board and backplate out gently (6)
- Turn the PCB in the service position (7), see picture 4-15

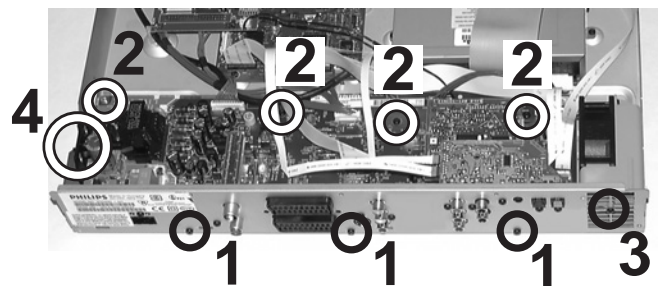


Figure 4-13

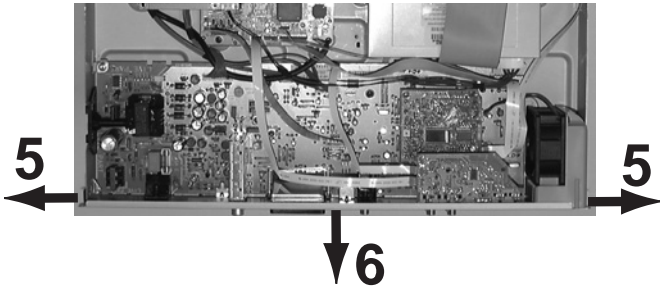


Figure 4-14

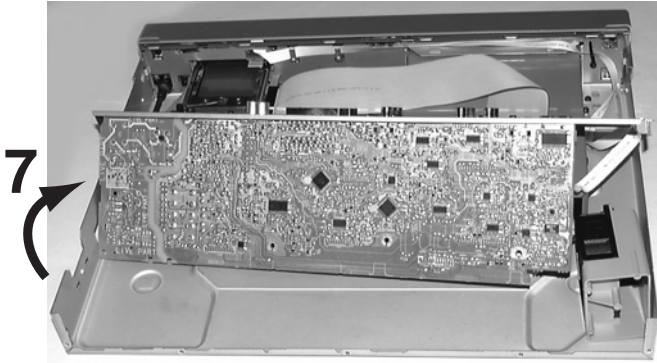


Figure 4-15

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.

5.1.2 Structure

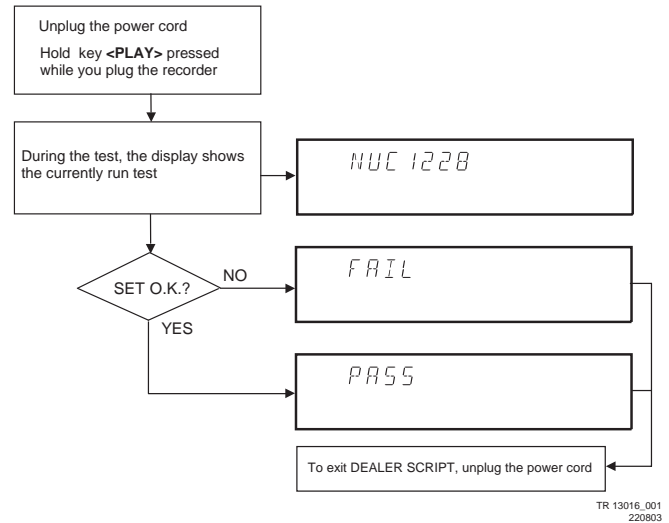


Figure 5-1

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

5.2 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.

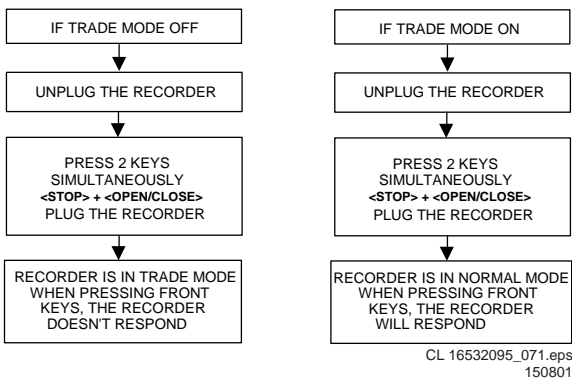


Figure 5-2

5.3 Virgin mode

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

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

5.4 Command Mode Interface

5.4.1 Nuclei Numeration

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

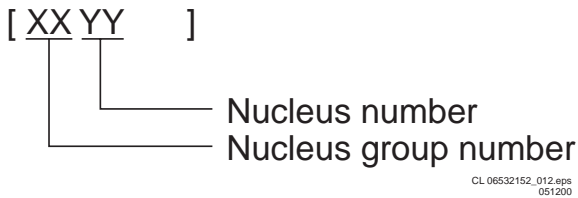


Figure 5-3

The following groups are defined for Digital Board Chrysalis:

Group number	Group name
0	Basic / Scripts
1	Chrysalis
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

5.4.2 Error Handling

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

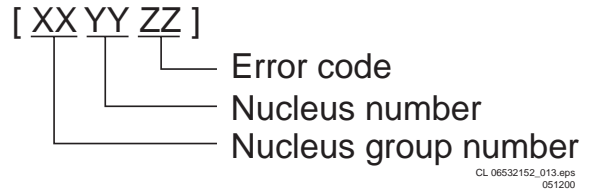


Figure 5-4

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

5.4.3 Command Mode Interface

Set-Up Physical Interface Components

Hardware required:

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

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

Code number of PC interface cable: 3122 785 90017

Activation Digital Board Chrysalis

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

Startup screen

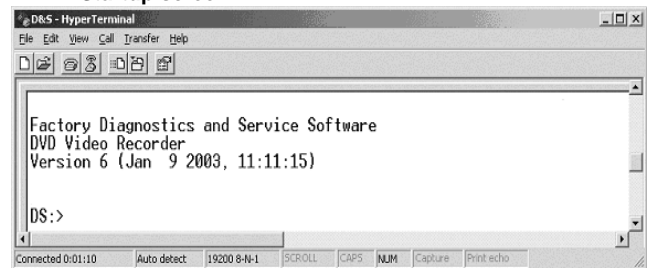
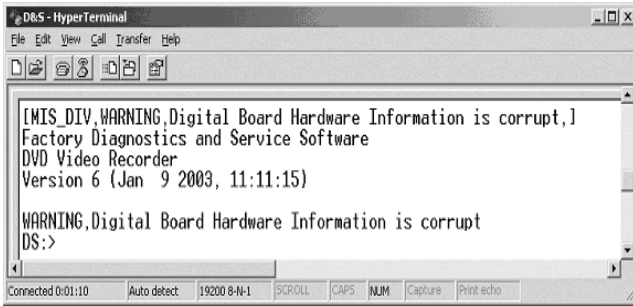


Figure 5-5

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

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

Error messages startup



```

D&S - HyperTerminal
File Edit View Call Transfer Help

[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 Chrysalis 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: 4641494C53414645210303000101010201010000020080000
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:>_

```

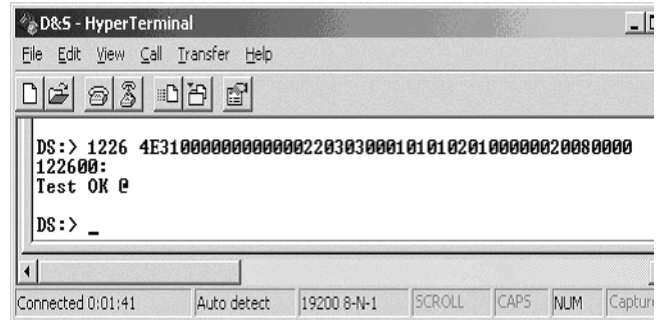
Figure 5-6c

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 adjustment instructions in chapter 8 for details

Nucleus 1226 execution with string



```

D&S - HyperTerminal
File Edit View Call Transfer Help

DS:> 1226 4E31000000000002203030001010102010000020080000
122600:
Test OK e

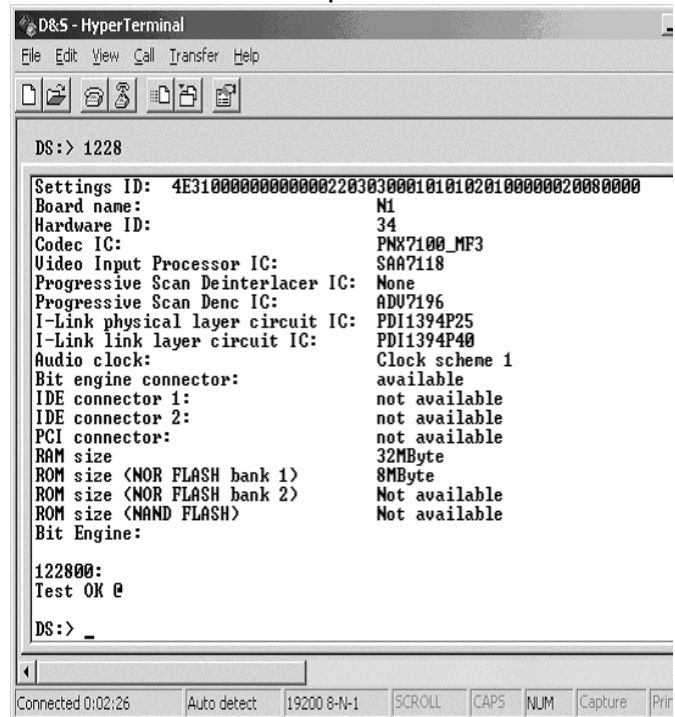
DS:> _

```

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: N1
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 Chrysalis

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

Chrysalis (CHR)

Nucleus Name	DS_CHR_DevTypeGet
Nucleus Number	100
Description	Sends the device ID and the module ids and revisions of the PNX7100 (Chrysalis) to the stdout port.
User Input	None
Example	<pre>DS:> 100 Device ID 7100 Codec ID PNX7100_MF2 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) 0.1 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) 0.1 AUDIO1 (0xa00f) 0.0 PSCAN (0xa018) 0.0 010000: 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. Use nucleus DS_ANAB_VideoRouting to route the video signal on the analogue board output
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> <ul style="list-style-type: none"> 0 VERTICAL_COLOURBAR (default) 1 HORIZONTAL_COLOURBAR 2 WHITE 3 YELLOW 4 CYAN 5 GREEN 6 MAGENTA 7 RED 8 BLUE 9 BLACK 10 GRAY <p>Video standard:</p> <ul style="list-style-type: none"> PAL (default) NTSC <p>Video output:</p> <ul style="list-style-type: none"> ALL CVBS and YC and RGB (default) CVBS YC RGB YUV PSCAN progressive scan
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.
User Input	None

Example	DS:> 102 010200: Test OK @
---------	----------------------------------

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.
User Input	None
Example	DS:> 103 010300: Test OK @

Nucleus Name	DS_CHR_SineOff
Nucleus Number	104
Description	Stop generating the audio sine signal
User Input	None
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
User Input	None
Example	DS:> 105 010500: Test OK @

Nucleus Name	DS_CHR_MuteOn
Nucleus Number	106
Description	Mute the audio outputs of the digital board
User Input	None
Example	DS:> 106 010600: Test OK @

Nucleus Name	DS_CHR_MuteOff
Nucleus Number	107
Description	De-mute the audio outputs of the digital board
User Input	None
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
User Input	None
Example	DS:> 108 010800: Test OK @

Nucleus Name	DS_CHR_DvLedOff
Nucleus Number	109
Description	Switch off the DV-LED on the digital board
User Input	None
Example	DS:> 109 010900: Test OK @

Nucleus Name	DS_CHR_MacroVisionOn	
Nucleus Number	110	
Description	Turn on MacroVision.	
User Input	None	
Example	DS:> 110 011000: Test OK @	

Nucleus Name	DS_CHR_MacroVisionOff	
Nucleus Number	111	
Description	Turn off MacroVision.	
User Input	None	
Example	DS:> 111 011100: Test OK @	

Nucleus Name	DS_CHR_Peek	
Nucleus Number	112	
Description	Peek a value on a specified address	
User Input	The address to peek on	
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	
User Input	The address to poke and the value: <address><value>	
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	
User Input	-	
Example	DS:> 114 011400: Test OK @	

Nucleus Name	DS_CHR_DMA_TestDMA	
Nucleus Number	115	
Description	Test the memory to memory DMA transfer	
User Input	-	
Example	DS:> 115 011500: Test OK @	

Boot EEPROM (BROM)

Nucleus Name	DS_BROM_Communication	
Nucleus Number	200	
Description	Check the communication between the IIC controller of the Chrysalis and the boot EEPROM	
User Input	None	
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	
User Input	None	

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 Chrysalis and the EEPROM
User Input	None
Example	DS:> 300 030000: Test OK @

Nucleus Name	DS_NVRAM_WriteRead
Nucleus Number	301
Description	Check whether the EEPROM can be written to and read from
User Input	None
Example	DS:> 301 030100: Test OK @

Nucleus Name	DS_NVRAM_Clear
Nucleus Number	302
Description	Make the EEPROM empty, containing all zeroes.
User Input	None
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
User Input	1. The location that must be modified i.e. "ALL" "BOOT" "DIAGNOSTICS" "DOWNLOAD" "CONFIG" "RECORDER" or no string if an offset from the base address of the NVRAM is required 2. The offset and data which to put on the selected location <offset> <length> <data>
Example	DS:> 303 DIAGNOSTICS 5 1 0x5a 030300: Section is modified successfully Test OK @

Nucleus Name	DS_NVRAM_Read
Nucleus Number	304
Description	Read out one or more locations in the NVRAM
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>
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
User Input	None
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
User Input	None
Example	DS:> 401 040100: Test OK @

Nucleus Name	DS_SDRAM_Write
Nucleus Number	402
Description	Write to a specific memory address
User Input	1. The location that must be modified (SDRAM starts at address 0xA0000000) 2. The value to put on the selected location
Example	DS:> 402 0xa1000010 0xad112222 040200: Test OK @

Nucleus Name	DS_SDRAM_Read
Nucleus Number	403
Description	Read from a specific memory address
User Input	The location from which the data must be read (SDRAM starts at address 0xA0000000)
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. (manufacturer and device ID)
User Input	None
Example	DS:> 500 050000: Found FLASH memory: Manufacturer ID: 0x01 Device ID : 0x01 Test OK @

Nucleus Name	DS_FLASH_WriteRead
Nucleus Number	501
Description	Check whether the FLASH can be written to and read from
User Input	None
Example	DS:> 501 050100: Test OK @

Nucleus Name	DS_FLASH_Read
Nucleus Number	502
Description	Read from a specific memory address in FLASH
User Input	The location from which data must be read (FLASH starts at address 0xB8000000)
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
User Input	None
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
User Input	None
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
User Input	None
Example	DS:> 505 050500: The Checksum = 0xBABEB064 Test OK @

Video Input Processor (VIP)

Nucleus Name	DS_VIP_DevTypeGet
Nucleus Number	600
Description	Get the device (revision) type information of the VIP IC
User Input	None
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 chrysalis and the VIP IC
User Input	None
Example	DS:> 601 060100: Test OK @

Nucleus Name	DS_VIP_ClockOutputOn
Nucleus Number	602
Description	Switch the clock output on
User Input	None
Example	DS:> 602 060200: Test OK @

Nucleus Name	DS_VIP_ClockOutputOff
Nucleus Number	603
Description	Switch the clock output off
User Input	None
Example	DS:> 603 060300: Test OK @

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
User Input	The input to select, see table below. 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

Example	DS:> 604 1 060400: Test OK @
---------	------------------------------------

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
User Input	None
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
User Input	None
Example	DS:> 701 070100: Device type of the phy layer IC: 0 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
User Input	None
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
User Input	None
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 Chrysalis
User Input	None, test works for both NTSC and PAL
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
User Input	None, test works for both NTSC and PAL
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
User Input	None, test works for both NTSC and PAL
Example	DS:> 706 070600: Test OK @

Progressive Scan (PSCAN)

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
User Input	None
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.
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.
Example	DS:> 802 HATCH 080200: Test OK @

Nucleus Name	DS_PSCAN_TestImageOff
Nucleus Number	803
Description	Switch off the generated test image
User Input	None
Example	DS:> 803 080300: Test OK @

Nucleus Name	DS_PSCAN_TestImageColourSettingsSet
Nucleus Number	804
Description	Set the colour of the hatch- or the frame- field to a different value than the default white
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.
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.
User Input	None
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 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 nucleus 1112 with parameter 0 (video routing on analogue board).
User Input	None
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 deinterlacer.
User Input	None
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 chrysalis and the progressive scan Deinterlacer-IC
User Input	None
Example	DS:> 808 080800: Test OK @

Basic Engine (BE)

Nucleus Name	DS_BE_CommunicationEcho
Nucleus Number	900
Description	Check the communication between the digital board and the basic engine by issuing an echo command over the S2B interface
User Input	None
Example	DS:> 900 090000: Test OK @

Nucleus Name	DS_BE_Reset
Nucleus Number	901
Description	Reset the basic engine
User Input	None
Example	DS:> 901 090100: Test OK @

Nucleus Name	DS_BE_VersionGet
Nucleus Number	903
Description	Get the version of the basic engine and that of the optical unit
User Input	None
Example	DS:> 903 090300: BE version = 20.09.18 Optical unit version = 3C.00.09.41.08 Test OK @

Nucleus Name	DS_BE_GetSelftestResult
Nucleus Number	902
Description	Return the self-test results through the service port
User Input	None
Example	DS:> 902 090200: Test OK @

Nucleus Name	DS_BE_TrayOut
Nucleus Number	904
Description	Open the tray of the basic engine
User Input	None
Example	DS:> 904 090400: Test OK @

Nucleus Name	DS_BE_TrayIn
Nucleus Number	905
Description	Close the tray of the basic engine

User Input	None
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
User Input	None
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
User Input	None
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
User Input	None
Example	DS:> 908 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 DVD SL discs (HR:MIN) 0: 0h Total time of reading other DVD SL discs (HR:MIN) 0: 0h Total time of reading high DVD DL discs (HR:MIN) 0: 0h Total time of reading other DVD DL discs (HR:MIN) 0: 0h Total time of reading high DVD+R discs (HR:MIN) 0: 0h Total time of reading other DVD+R discs (HR:MIN) 0: 0h Total time of reading high DVD+RW discs (HR:MIN) 0: 0h Total time of reading other DVD+RW discs (HR:MIN) 1: 0h Total time of writing DVD+R discs in 2HRS mode (HR:MIN) 0: 0h Total time of writing DVD+R discs in 4HRS mode (HR:MIN) 0: 0h Total time of writing DVD+R discs in 6HRS mode (HR:MIN) 0: 2h Total time of writing DVD+RW discs in 2HRS mode (HR:MIN) 0: 0h Total time of writing DVD+RW discs in 4HRS mode (HR:MIN) 0: 3h Total time of writing DVD+RW discs in 6HRS mode (HR:MIN) 0: 0h 090800: Test OK @

Nucleus Name	DS_BE_StatisticalInformationReSet
Nucleus Number	909
Description	Reset the statistical information in the basic engine
User Input	None
Example	DS:> 909 090900: Test OK @

Nucleus Name	DS_BE_ErrorLogGet
Nucleus Number	910
Description	Get the error log from the basic engine
User Input	None
Example	DS:> 910 Momentary errors (0-9): 0x21 0x00 0x00 0x20 0x00 0x00 0x00 0x00 0x00 Cumulative errors (1-9): 0x00 0x80 0x20 0x00 0x00 0x00 0x00 0x00 0x00 assert : 256 cpowermanager.cpp 091000: Test OK @

Nucleus Name	DS_BE_ErrorLogReset
Nucleus Number	911
Description	Reset the error log in the basic engine
User Input	None
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
User Input	none
Example	DS:> 912 Test OK @

Nucleus Name	DS_BE_FocusOn
Nucleus Number	913
Description	Put the laser of the BE into focus
User Input	None
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
User Input	None
Example	DS:> 914 091400: Test OK @

Nucleus Name	DS_BE_MotorOn
Nucleus Number	915
Description	Turn on the turntable motor
User Input	None
Example	DS:> 915 091500: Test OK @

Nucleus Name	DS_BE_MotorOff
Nucleus Number	916
Description	Turn off the turntable motor
User Input	None
Example	DS:> 916 091600: Test OK @

Nucleus Name	DS_BE_RadialOn
Nucleus Number	917
Description	Close the radial loop
User Input	A formatted DVD must be loaded into the engine before executing this nucleus
Example	DS:> 917 091700: Test OK @

Nucleus Name	DS_BE_RadialOff
Nucleus Number	918
Description	Open the radial loop
User Input	None
Example	DS:> 918 091800: Test OK @

Nucleus Name	DS_BE_RadialCalibration
Nucleus Number	919
Description	Calibrate the radial loop
User Input	A formatted DVD must be loaded into the engine before executing this nucleus
Example	DS:> 919 091900: 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 into the recorder
User Input	None
Example	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 @

Nucleus Name	DS_BE_CheckDisc
Nucleus Number	921
Description	Check whether there is a disc inside the BE
User Input	None
Example	DS:> 921 092100: A DVD+Rewritable is loaded (disc is empty or partially recorded) Test OK @ DS:> 921 092100: No Disc is loaded 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.
User Input	None
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..
User Input	None
Example	DS:> 924 092400: TOC info [hex] = 91 3A 0C Test OK@ DS:> 924 092403: The BE returned: 0x10 #{no_disc_error} No disc is detected Error@ DS:> 924 092403: The BE returned: 0x1e #{illegal_medium_error} Engine unable to handle current disc. Probably illegal medium. Error @

Nucleus Name	DS_BE_DiscErase
Nucleus Number	925
Description	Perform a DC-erase on a DVD+RW disc.
User Input	None

Example	DS:> 925 The entirely disc will be erased. Are you sure you want this?[y/n] 092500: Test OK @
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Nucleus Name	DS_BE_RegionCodeSet
Nucleus Number	928
Description	Set the region code in the AV3.
User Input	Region code
Example	DS:> 928 1 092800: Test OK @ DS:> 928 This nucleus is not supported by the engine 092800: Test OK @

Nucleus Name	DS_BE_RegionCodeGet
Nucleus Number	929
Description	Read the region code from the AV3.
User Input	None
Example	DS:> 929 092900: DVD region 1 Test OK @ DS:> 929This nucleus is not supported by the engine 092900: Test OK @

Nucleus Name	DS_BE_RegionCounterReset
Nucleus Number	930
Description	Reset the region counter in the AV3.
User Input	None
Example	DS:> 930 093000: Test OK @ DS:> 930 This nucleus is not supported by the engine 093000: Test OK @

Display and Control Board (DCB)

Nucleus Name	DS_DCB_CommunicationEcho
Nucleus Number	1000
Description	Check the communication between the digital board and the DCB by issuing an echo command
User Input	None
Example	DS:> 1000 100000: Test OK @

Nucleus Name	DS_DCB_VersionGet
Nucleus Number	1001
Description	Get the version of the DCB
User Input	None
Example	DS:> 1001 100100: DCB version: 13 Test OK @

Nucleus Name	DS_DCB_LightDisplay
Nucleus Number	1002
Description	Light the entire display of the DCB, and clear the display after confirmation. User confirmation is necessary.
User Input	None

Example	DS:> 1002 100200: Test OK @
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Nucleus Name	DS_DCB_Keyboard
Nucleus Number	1004
Description	Check all keys of the keyboard by confirming the key-code displayed of each key.
User Input	None
Example	DS:> 1004 100400: Test OK @

Nucleus Name	DS_DCB_RemoteControl
Nucleus Number	1005
Description	Check the interface between the remote control and the DCB by checking the key-code displayed
User Input	None
Example	DS:> 1005 100500: Test OK @

Nucleus Name	DS_DCB_Led
Nucleus Number	1006
Description	Switch the record LED on, and after confirmation off. The user confirms by pressing the REC key, STOP key, or the PLAY key on the local keyboard. The PLAY key confirms that the LED is on and the REC key
User Input	None
Example	DS:> 1006 100600: Test OK @

Analogue Board (ANAB)

Nucleus Name	DS_ANAB_CommunicationEcho
Nucleus Number	1100
Description	Check the communication between the digital board and the analogue board by issuing some echo string.
User Input	None
Example	DS:> 1100 110000: Hello Analogue Board Test OK @

Nucleus Name	DS_ANAB_CommunicationIcNvram
Nucleus Number	1101
Description	Check the communication between the digital board and the NVRAM on the analogue board.
User Input	None
Example	DS:> 1101 110100: Test OK @

Nucleus Name	DS_ANAB_CommunicationIcTuner
Nucleus Number	1102
Description	Check the communication between the digital board and the tuner on the analogue board
User Input	None
Example	DS:> 1102 110200: Test OK @

Nucleus Name	DS_ANAB_CommunicationIcDataSlicer
Nucleus Number	1103
Description	Check the communication between the digital board and the data slicer on the analogue board
User Input	None

Example	DS:> 1103 110300: Test OK @
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Nucleus Name	DS_ANAB_CommunicationIcSoundProcessor
Nucleus Number	1104
Description	Check the communication between the digital board and the sound processor on the analogue board
User Input	None
Example	DS:> 1104 110400: Test OK @

Nucleus Name	DS_ANAB_CommunicationIcAVSelector
Nucleus Number	1105
Description	Check the communication between the digital board and the A/V-selector on the analogue board
User Input	None
Example	DS:> 1105 110500: Test OK @

Nucleus Name	DS_ANAB_HardwareVersionGet
Nucleus Number	1106
Description	Get the hardware version of the analogue board
User Input	None
Example	DS:> 1106 110600: Analogue hardware version : 11 Test OK @

Nucleus Name	DS_ANAB_SoftwareVersionBootGet
Nucleus Number	1107
Description	Get the software version of the boot software of the analogue board
User Input	None
Example	DS:> 1107 110700: Bootcode application version : 11.00.11 Test OK @

Nucleus Name	DS_ANAB_SoftwareVersionDownloadGet
Nucleus Number	1108
Description	Get the software version of the download software of the analogue board
User Input	None
Example	DS:> 1108 110800: Download application version : 11.00.06 Test OK @

Nucleus Name	DS_ANAB_SoftwareVersionApplGet
Nucleus Number	1109
Description	Get the software version of the application software of the analogue board
User Input	None
Example	DS:> 1109 110900: Recorder application version : 11.00.23 Test OK @

Nucleus Name	DS_ANAB_SoftwareVersionDiagnosticsGet
Nucleus Number	1110
Description	Get the software version of the diagnostic software of the analogue board
User Input	None
Example	DS:> 1110 111000: Diagnostics application version : 11.00.13 Test OK @

Nucleus Name	DS_ANAB_ChecksumProgram
Nucleus Number	1111

Description	Check the checksum of the several partitions by recalculating and comparing partition checksums
User Input	None
Example	DS:> 1111 BootCode checksum is: 0xBABE6240, which is correct Diagnostics checksum is : 0xBABEBEAD, which is correct Download checksum is: 0xBABEA6B7, which is correct Application checksum is : 0xBABEB277, which is correct 111100: Test OK @

Nucleus Name	DS_ANAB_VideoRouting
Nucleus Number	1112
Description	Perform the routing of the video paths on the analogue board
User Input	The user has to input the correct parameter for the routing (see table 'video routing' below).
Example	DS:> 1112 00 111200: Test OK @

Video routing paths (Europe)

Path ID	Description
0	Input signal is VIDEO(CVBS) from digital board and will be re-routed back to the digital board.
1	Input signal is from FRONT VIDEO(CVBS) IN and will be routed to the digital board.
2	No Routing.
3	Input signal is from FRONT S-VIDEO(Y/C) and will be routed to the digital board.
4	No Routing.
5	Input signal is CVBS from SCART1 and will be routed to the digital board.
6	Input signal is CVBS from SCART2 and will be routed to the digital board.
7	Input Signal is CVBS from Digital Board and it will be routed to Scart1 and Scart2.
8	Input signal is VIDEO(CVBS) from ANTENNA IN and will be routed to SCART2.
9	Input signal is VIDEO(CVBS) from SCART1 and will be routed to SCART2.
10	Input signal is VIDEO(CVBS) from SCART2 and will be routed to SCART1.
11	Signal path is routed Fast Blank from Scart2 pin16 and will be routed SCART1 pin16
12	Input Signal is YC from Digital Board and it will be routed to SCART1.
13	
14	No Routing.
15	Input Signal is CVBS from TUNER and it will be routed to Digital .
16	No Routing.
17	Input Signal is routed from digital board YC to REAR S-VIDEO(YC) OUT
18	Signal path is routed from digital board RGB to RGB SCART1 and from digital board CVBS to digital board CVBS.
19	No Routing.
20	Input RGB Signal is routed from Digital Board to SCART1(RGB),Input CVBS Signal from Digital Board to Digital Board and Fast Blanking Signal from SCART2 to SCART1.
21	Input Y/C Signal from Digital Board is routed to Rear Y/C Connector and Input Y/C Signal from Front Y/C connector is routed to Digital Board.

Video routing paths (NAFTA)

Path ID	Description
0	No Routing.
1	Input signal is from FRONT VIDEO(CVBS) IN and will be routed to the digital board. This routing is same as the above path id.
2	Input signal is from REAR VIDEO(CVBS) IN and will be routed to the digital board.
3	Input signal is from FRONT S-VIDEO(Y/C) IN and the signal received will be routed to the digital board.
4	Input signal is from REAR S-VIDEO(Y/C) IN and will be routed to the digital board.
5	No Routing.
6	No routing.
7	No routing.
8	Input signal is VIDEO(CVBS) from TUNER and will be routed to Y Pin of Rear Y/C Connector. This will give only black/White Picture .
9	Input signal is from YUV IN and will be routed to YUV OUT. This is possible only if Digital Board routes back YUV signal received back to the Analogue board(DENC)

10	No routing.
11	No routing.
12	No Routing.
13	No Routing.
14	No Routing.
15	Input CVBS Signal from Tuner is routed to Digital Board..
16	No Routing.
17	No Routing.
18	Input Signal from CVBS Rear In is routed to Digital Board. This is the same as path ID 02.
19	Input Y/C signal from Digital Board is routed to Y/C Rear Out Connector and Input signal from Y/C Front In Connector is routed to Y/C Digital Board.
20	Y/C signal from Digital Board is routed to Y/C Rear Out Connector and Input signal from Y/C Rear In Connector is routed to Y/C Digital Board.
23	The Video signal received from the Digital board will be output on Modulator channel 3.
24	The Video signal received from the Digital board will be output on Modulator channel 4.

Nucleus Name	DS_ANAB_AudioRouting
Nucleus Number	1113
Description	Perform the routing of the audio paths on the analogue board
User Input	The user has to input the correct parameter for the routing (see table 'audio routing' below)
Example	DS:> 1113 00 111300: Test OK @

Audio routing paths (Europe)

Path ID	Description
0	Input signal is from FRONT AUDIO IN and will be routed to the digital board.
1	Input signal is from FRONT AUDIO IN and will be routed to the digital board.
2	No Routing.
3	Input signal is AUDIO from SCART1 and will be routed to the digital board.
4	Input signal is AUDIO from SCART2 and will be routed to the digital board.
5	No routing.
6	No routing.
7	Input Audio signal is from the digital Board and it will be routed to the SCART1 and SCART2
8	Input AUDIO signal from TUNER and will be routed to SCART2.
9	Input signal is AUDIO from SCART1 and will be routed to SCART2.
10	Input audio signal from SCART2 is routed to SCART1.
11	Input Audio signal is routed from DVIO to SCART2.
12	
13	No Routing.
14	Input is Audio Signal from DVIO and it will be routed to Digital Board.
15	Input is Audio Signal from TUNER and it will be routed to Digital Board..
16	No routing.
17	No Routing.
18	Input signal is from FRONT AUDIO IN and will be routed to SCART2.
21	Input signal is from FRONT AUDIO IN and will be routed to the digital board.

Audio routing paths (NAFTA)

Path ID	Description
0	No Routing.
1	Input signal is from FRONT AUDIO IN and will be routed to the digital board.
2	Input signal is from REAR AUDIO IN 2 and will be routed to the digital board.
3	Input Audio Signal is routed from FRONT Cinch In to Digital Board.(This is same as path ID 01)
4	Input Signal is from Rear Cinch In1 and it will be routed to Digital Board..
5	No routing.
6	No routing.
7	No routing.
8	No Routing.
9	No routing.
10	No Routing.
11	No Routing.
12	No Routing.

13	Input Signal is from Digital Board and it will be routed to the digital board.
14	No routing.
15	Input is Audio Signal from TUNER and it will be routed to Digital Board.
16	Input signal is AUDIO from dvio board and will be routed to Digital Board.
17	No routing.
18	No routing.
19	No routing.
20	Input signal is from REAR AUDIO IN 2 and will be routed to the digital board.
21	Input signal is from REAR AUDIO IN 1 and will be routed to the digital board.
22	Input signal is from REAR AUDIO IN 1 and will be routed to the digital board.
23	The Audio signal received from the Digital board will be outputted on Modulator channel 3.
24	The Audio signal received from the Digital board will be outputted on Modulator channel 4.

Nucleus Name	DS_ANAB_SelectTunerChannel																										
Nucleus Number	1114																										
Description	Set the tuner to receive a valid audio and video signal																										
User Input	<p><Frequency*16> <video standard id> 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.) Video standard id: The table below shows which video standards are possible</p> <table border="1"> <thead> <tr><th>Video standard id</th><th>Europe</th><th>NAFTA</th></tr> </thead> <tbody> <tr><td>16</td><td>PAL_BG</td><td>NTSC</td></tr> <tr><td>32</td><td>PAL_I</td><td>Invalid</td></tr> <tr><td>48</td><td>PAL_DK</td><td>Invalid</td></tr> <tr><td>64</td><td>SEC_L</td><td>Invalid</td></tr> <tr><td>80</td><td>SEC_LS</td><td>Invalid</td></tr> <tr><td>96</td><td>SEC_BG</td><td>Invalid</td></tr> <tr><td>112</td><td>SEC_DK</td><td>Invalid</td></tr> </tbody> </table>			Video standard id	Europe	NAFTA	16	PAL_BG	NTSC	32	PAL_I	Invalid	48	PAL_DK	Invalid	64	SEC_L	Invalid	80	SEC_LS	Invalid	96	SEC_BG	Invalid	112	SEC_DK	Invalid
Video standard id	Europe	NAFTA																									
16	PAL_BG	NTSC																									
32	PAL_I	Invalid																									
48	PAL_DK	Invalid																									
64	SEC_L	Invalid																									
80	SEC_LS	Invalid																									
96	SEC_BG	Invalid																									
112	SEC_DK	Invalid																									
Example	DS:> 1114 3456 16 111400: Test OK @																										

Nucleus Name	DS_ANAB_IICWriteRead		
Nucleus Number	1115		
Description	Perform an IIC write and read action on the analogue board		
User Input	Writing: [<W> <w>] [I2C address] [number of data bytes to write] with <data[0]...data[n]> Max 16 data bytes (n < 16). Reading: [<R> <r>] [I2C address] [number of data bytes to read] Max 16 data bytes (n < 16).		
Example	DS:> 1115 w 0x94 2 0x06 0x02 111500: Test OK @		

Nucleus Name	DS_ANAB_ClockAdjust		
Nucleus Number	1116		
Description	Set the clock to the value passed through in the YYYY MM DD HH MM SS format		
User Input	<YYYY> <MM> <DD> <HH> <MM> <SS>		
Example	DS:> 1116 2002 11 11 11 11 11 111600: Test OK @		

Nucleus Name	DS_ANAB_ClockReference		
Nucleus Number	1117		
Description	Generate a 1 kHz signal on pin 7 (INT) of the clock IC		
User Input	None		
Example	DS:> 1117 111700: Test OK @		

Nucleus Name	DS_ANAB_ClockCorrection		
Nucleus Number	1118		

Description	Store the clock IC correction value in NVRAM
User Input	The correction value for the clock
Example	DS:> 1118 1000023 111800: Test OK @

Nucleus Name	DS_ANAB_TunerAFCReferenceVoltage
Nucleus Number	1119
Description	Store the reference voltage for the tuner in NVRAM
User Input	The reference voltage, between 0 and 255
Example	DS:> 1119 5 111900: Test OK @

Nucleus Name	DS_ANAB_TunerFrequencyDownload
Nucleus Number	1120
Description	Store the frequency table in NVRAM. The frequency table is passed through the error-string provided to the nucleus.
User Input	See frequency table
Example	DS:> 1120 2233 00 02 4E45442031 112000: Test OK @

Nucleus Name	DS_ANAB_StoreExternalPresets
Nucleus Number	1121
Description	Store the external presets in NVRAM
User Input	None
Example	DS:> 1121 112100: Test OK @

Nucleus Name	DS_ANAB_BargraphLevelAdjust
Nucleus Number	1122
Description	Measure the audio signal corresponding to 0dB per channel and store it as correction value in NVRAM
User Input	none
Example	DS:> 1122 112200: Test OK @

Frequency download string format

Format	description	remarks
X(XXX)	Preset number	
VVWW	VV: Channel number WW : Channel offset	
ZZ	Byte containing 8 bit fields for TRUE/FALSE : BIT 0: Decoder BIT 1: Modulation BIT 2: NICAM SAP BIT 3: Satpreset BIT 4: Presetdefined Channelpreferred BIT 5: ExtPreset BIT 6: NameManuallyChanged BIT 7: ChannelPreset	NICAM/stereo bit for Europe SAP/stereo bit for NAFTA Preset defined bit is only used for Europe. For NAFTA, it is renamed as channelpreferred to indicate if a channel is preferred or not. TRUE if preset is defined from P50 as extern [TGA]
HH	HfSystemFineTuning	HfS: 4 bit, FT: -4,...,4
IJJKLLMM	Netname	Range: A,...,Z,0,...,9,... Netname length exists for Europe only. 'II' is the HEX-value for the first character, 'JJ' for the second, Ö

The message string of (DS_MessageDef *msgString) should be in the format:

"X(XXX)_VVWW_ZZ_HH_IJJKLLMM".

Here will be 'X(XXX)' a decimal value in the range of 0 to 255.

V, W, Z, H, I, J, K, L, M are hex values with out the prefix '0x' (in the range 0... 9,A ... F)

"_" Denotes a space character.

Remarks:

CHANNEL_SYSTEM is for NAFTA.

PRESET_SYSTEM is for Europe.

System (SYS)

Nucleus Name	DS_SYS_HardwareVersionGet
Nucleus Number	1200
Description	Get the hardware version and type of the digital board
User Input	None
Example	DS:> 1200 120000: Hardware ID = 00 The (PIO-pins) Digital Board ID = 2 Test OK @ DS:>

Nucleus Name	DS_SYS_SoftwareVersionBootGet
Nucleus Number	1201
Description	Get the version of the boot software on the digital board
User Input	None
Example	DS:> 1201 120100: Software Boot Version = 0001 Test OK @

Nucleus Name	DS_SYS_SoftwareVersionDownloadGet
Nucleus Number	1202
Description	Get the version of the download software on the digital board
User Input	None
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
User Input	None
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	
User Input	None	
Example	DS:> 1204 120400: Software Diagnostics Version = 0001 Test OK @	
	120503	Something went wrong while transferring the data.
	120504	User cancelled the upload.
Example	DS:> 1205 1 120500: 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

User Input	Choose one of the following parameters for the nucleus: 1. Upload the contents of the NVRAM of the digital board 2. Upload the contents of the NVRAM of the analogue board Choose in the terminal on the control PC -> transfer -> receive file. Select X-modem protocol. Then click receive in the dialogue and fill in the file name in which you want to store the data.
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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
User Input	Choose one of the following parameters for the nucleus: 1. Download the contents of the NVRAM of the digital board 2. Download the contents of the NVRAM of the analogue board Choose in the terminal of the control PC -> transfer -> send file. Select X-modem protocol. Then choose a file with the Browse button in the dialogue and click on send.
Example	DS:> 1206 1 120600: Test OK @

Nucleus Name	DS_SYS_DvidNumberSet
Nucleus Number	1207
Description	Set the IEEE 1394 unique ID The unique ID to be set.
User Input	None
Example	DS:> 1207 1234567890 120700: Test OK @

Nucleus Name	DS_SYS_DvidNumberGet
Nucleus Number	1208
Description	Get the IEEE1394 ID
User Input	None
Example	DS:> 1208 120800: The DvidNumber is: 0x0C22384E5A Test OK @

Nucleus Name	DS_SYS_licWrite
Nucleus Number	1209
Description	Perform an IIC write action on the digital board
User Input	The user input the number of bytes to write followed by these bytes: <BusID><Slave address to write to><number of bytes to write><d1><d2><...><dx> Where the bus ID is either 0 (normally used) or 1
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
User Input	The user inputs the number of bytes to read and the address to read them from: <BusID><Slave address to read from><Number of bytes to read> Where the bus ID is either 0 (normally used) or 1
Example	DS:> 1210 0 0xa0 1 121000: Value read =0x06 Test OK @

Nucleus Name	DS_SYS_UartWrite
Nucleus Number	1211
Description	Perform an UART write action on the digital board on a specified UART

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

Nucleus Name	DS_SYS_VideoLoopThroughStart
Nucleus Number	1213
Description	The video signal, which is confirm the user input, is routed from the input to the output. Input is set with the routing nucleus 1112. All outputs are enabled.
User Input	<viplnput> <VideoOutput> <VideoStandard> 1. viplnput (CVBS, YC, YUV, RGB). 2. VideoOutput (YUV, RGB). 3. VideoStandard (PAL, NTSC).
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.
User Input	-
Example	DS:> 1214 121400: Test OK @

Nucleus Name	DS_SYS_VideoLoop
Nucleus Number	1215
Description	Note: Before executing this nucleus the user must route the video signal on the analog board with nucleus DS_ANAB_VideoRouting(1112).
User Input	Video input of the digital board: - CVBS - YC - YUV - RGB - TEST (The video output will be routed to the video input on the digital board.) Video standard: - PAL - NTSC When no input is given, the nucleus will take TEST for video input and PAL for video standard.
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	The user first needs to select how the audio path must be routed on the analogue board (FRS_DS_ANAB_AUDIO_VIDEO_ROUTING) and/or digital board before calling this nucleus. The user also has to route the audio outputs back to the inputs by means of cables. In this nucleus the Chrysalis generates an audio sine signal with a specific signature and sends it to the output of the digital board (FRS_DS_CHR_SINE). The Chrysalis encodes the audio signal to MPEG I layer II and after this the signature of the signal will be checked.
User Input	None
Example	DS:> 1216 121600: Test OK @

Nucleus Name	DS_SYS_SlashVersionSet
Nucleus Number	1217
Description	Set the slash version of the system
User Input	The slash version
Example	DS:> 1217 82 121700: Test OK @

Nucleus Name	DS_SYS_SlashVersionGet
Nucleus Number	1218
Description	Get the slash version of the system
User Input	None
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
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)
User Input	None
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)
User Input	None
Example	DS:> 1221 122100: 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
User Input	None
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
User Input	None
Example	DS:> 1224 122400: Test OK @

Nucleus Name	DS_SYS_DisplayFatalGet
Nucleus Number	1225
Description	Get the display-fatal flag of the recorder
User Input	None
Example	DS:> 1225 122500: Test OK @

Nucleus Name	DS_SYS_SettingsSet
Nucleus Number	1226
Description	Programs the digital board settings into the boot EEPROM on the digital board.
User Input	A large hexadecimal value that represents the digital board settings obtained from the DbString.exe program or from a reference set.
Example	DS:> 1226 646961677473746201010200010101010101000020080000 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.
User Input	None.
Example	DS:> 1228 Settings ID: 6D7920626F61726400020300010101020101000020080000 Board name: my board Hardware ID: 0 Codec IC: PNX7100_MF2 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 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.
User Input	None.
Example	DS:> 1229 122900: 6D7920626F61726400020300010101020101000020080000 Test OK @

Nucleus Name	DS_SYS_AudioLoopThroughStart
Nucleus Number	1230
Description	Description: The audio input is routed from the an input to all outputs. Input is set with the routing nucleus 1113. All outputs are enabled.

User Input	None.	
Example	DS:> 1230 123000: Test OK @	

Nucleus Name	DS_SYS_AudioLoopThroughStop	
Nucleus Number	1231	
Description	Stop routing the audio input to all the outputs	
User Input	-	
Example	DS:> 1231 123100: Test OK @	

Electronic Program Guide Board (EPGB)

Nucleus Name	DS_EPGB_VersionGet	
Nucleus Number	1300	
Description	Returns the version of the EPG board.	
User Input	None	
Example	DS:> 1300 130000: Version : 6.1.9 Test OK @	

PCMCIA INTERFACE (PCMCIA)

Nucleus Name	DS_PCPCIA_Reset	
Nucleus Number	1400	
Description	Reset the PCMCIA device by sending a reset command through IDE	
Example	DS:> 1400 140000: Test OK @	

Nucleus Name	DS_PCPCIA_Inquiry	
Nucleus Number	1401	
Description	Get the vendor- and product identification and the product revision level of the media in the slot.	
Example	DS:> 1401 140100: Test OK @	

Nucleus Name	DS_PCPCIA_WriteRead	
Nucleus Number	1402	
Description	Perform a Write Read test to a random sector on the inserted medium in the PCMCIA device and check if the data read is equal to the data written.	
Example	DS:> 1402 140200: Test OK @	

Nucleus Name	DS_PCPCIA_Diagnostics	
Nucleus Number	1403	
Description	Shall perform the internal diagnostic tests implemented by the media in the slot.	
Example	DS:> 1403 140300: Test OK @	

Script

Nucleus Name	DS_IH_ScriptHandler	
Nucleus Number	Script	
Description		

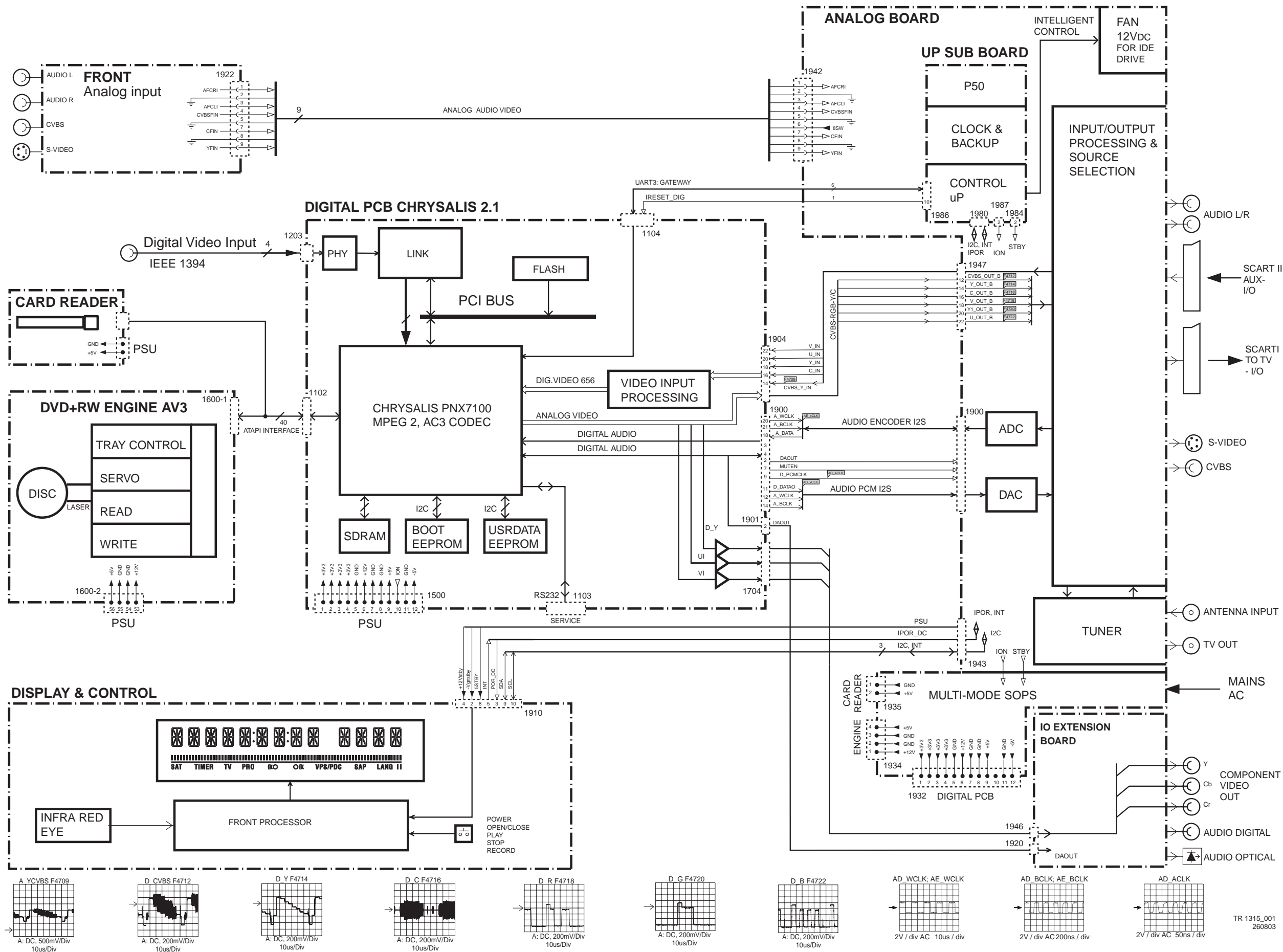
Included tests:	<ol style="list-style-type: none"> 1. DS_ANAB_COMMUNICATIONECHO_NUC 2. DS_DCB_COMMUNICATIONECHO_NUC 3. DS_BROM_COMMUNICATION_NUC 4. DS_SYS_SETTINGSDISPLAY_NUC 5. DS_CHR_DEVTYPEGET_NUC 6. DS_CHR_INT_PIC_NUC 7. DS_CHR_DMA_NUC 8. DS_BROM_WRITEREAD_NUC 9. DS_NVRAM_COMMUNICATION_NUC 10. DS_NVRAM_WRITEREAD_NUC 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
User Input	None

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: 4C4541440D00000000030300010101020101000020080000 Board name: LEAD Hardware ID: 0 Codec IC: PNX7100_MF3 Video Input Processor IC: SAA7118 Progressive Scan Deinterlacer IC: None Progressive Scan Denc IC: ADV7196 I-Link physical layer circuit IC: PDI1394P25 I-Link link layer circuit IC: PDI1394P40 Audio clock: Clock scheme 1 Bit engine connector: available IDE connector 1: available IDE connector 2: not available PCI connector: not available RAM size 32MByte ROM size (NOR FLASH bank 1) 8MByte ROM size (NOR FLASH bank 2) Not available ROM size (NAND FLASH) Not available Bit Engine: AV 2.0 Busy executing NUC100 5-28 Device ID 7100 Codec ID PNX7100_MF3 F-BCU (0x0102) 1.0 INTC (0x011d) 1.0 PCI-XIO(0x0113) 1.0 SIF (0x013b) 1.0 EJTAG (0x0104) 0.0 S-BCU (0x0102) 1.0 BOOT (0x010a) 1.0 CONFIG (0x013f) 1.0 RESET (0x0123) 1.0 DEBUG (0x0116) 0.0 UART0 (0x0107) 0.1 UART1 (0x0107) 0.1 UART2 (0x0107) 0.1 UART3 (0x0107) 0.1 I2C0 (0x0105) 0.1 I2C1 (0x0105) 0.1 GPIO (0x013c) 1.0 SYNC (0x013a) 1.0 DISP0 (0xa015) 0.2 DISP1 (0xa00f) 0.0 OSD (0x0136) 0.1 SPU (0xa00e) 0.0 MIXER (0x0137) 1.0 DENC (0x0138) 0.1 CCIR (0x0139) 1.0 VDEC (0x0133) 0.1 PARSER (0xa00d) 0.0 DV (0xa00c) 0.0 BEI (0xa00a) 0.0 IDE (0xa009) 0.0 SGDX (0xa008) 0.0 BYTE (0xa00b) 0.0 OUTPUT (0xa003) 0.0 ACOMP (0xa000) 0.0 VFE (0xa001) 0.0 VCOMP (0xa002) 0.0 SCR (0x0000) 0.0 SIFF (0xa011) 0.0 WMD (0xa010) 0.0 AUDIO0 (0xa015) 0.2 AUDIO1 (0xa00f) 0.0 PSCAN (0xa018) 0.0 Busy executing NUC114 6-28 Busy executing NUC115 7-28 Busy executing NUC201 8-28 Busy executing NUC300 9-28 Busy executing NUC301 10-28 Busy executing NUC401 11-28 Busy executing NUC501 12-28 Busy executing NUC503 13-28 BootCode checksum is: 0xBABEB432, which is correct Diagnostics checksum is: 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 </pre>
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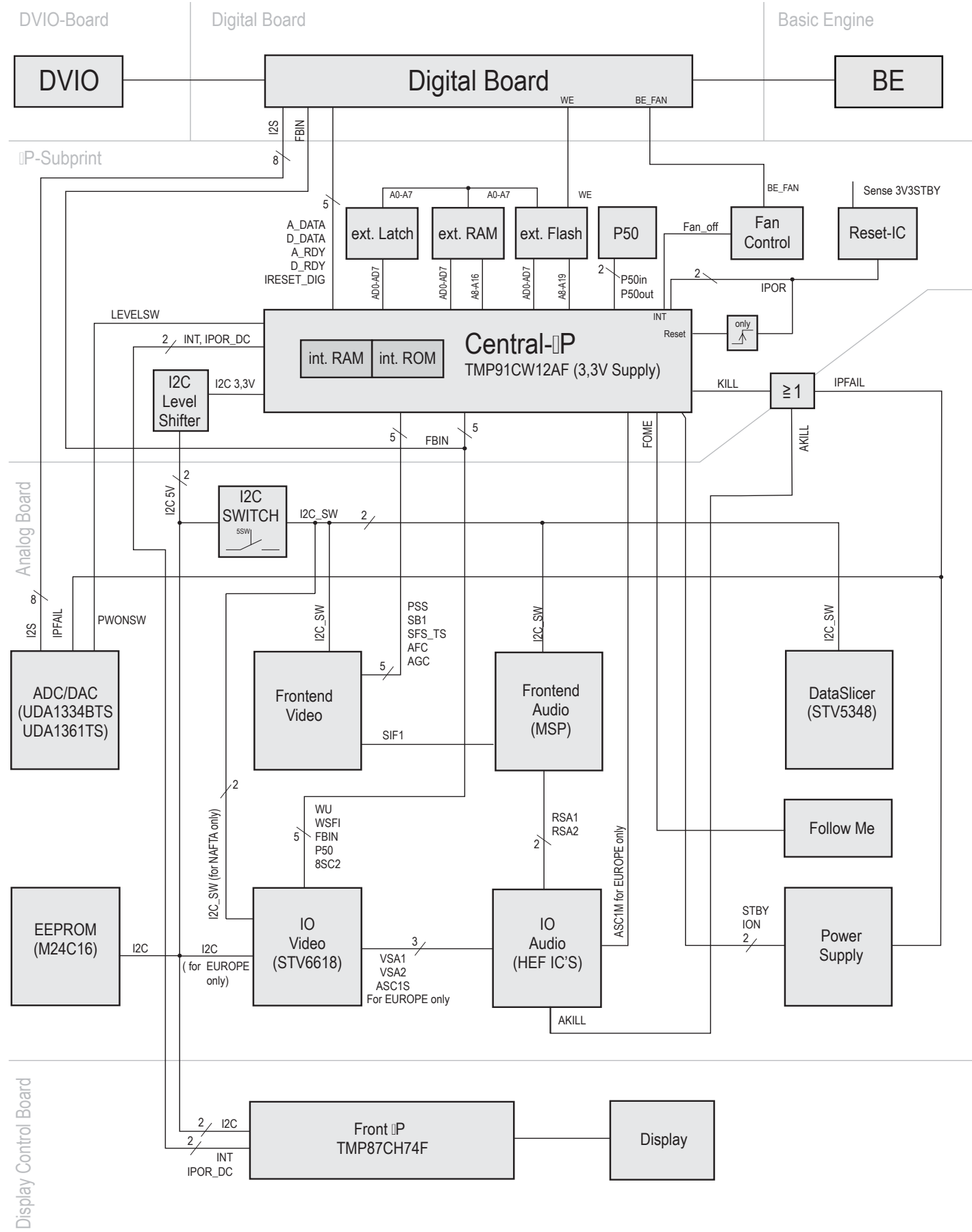
Example	<pre>Busy executing NUC601 16-28 Busy executing NUC700 17-28 Device type of the link layer IC: ffc00301 Busy executing NUC701 18-28 Device type of the phy layer IC: 0 Busy executing NUC702 19-28 Busy executing NUC703 20-28 Busy executing NUC801 21-28 Busy executing NUC808 22-28 The IIC acknowledge 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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6. Block Diagrams, Waveforms, Wiring Diagram.

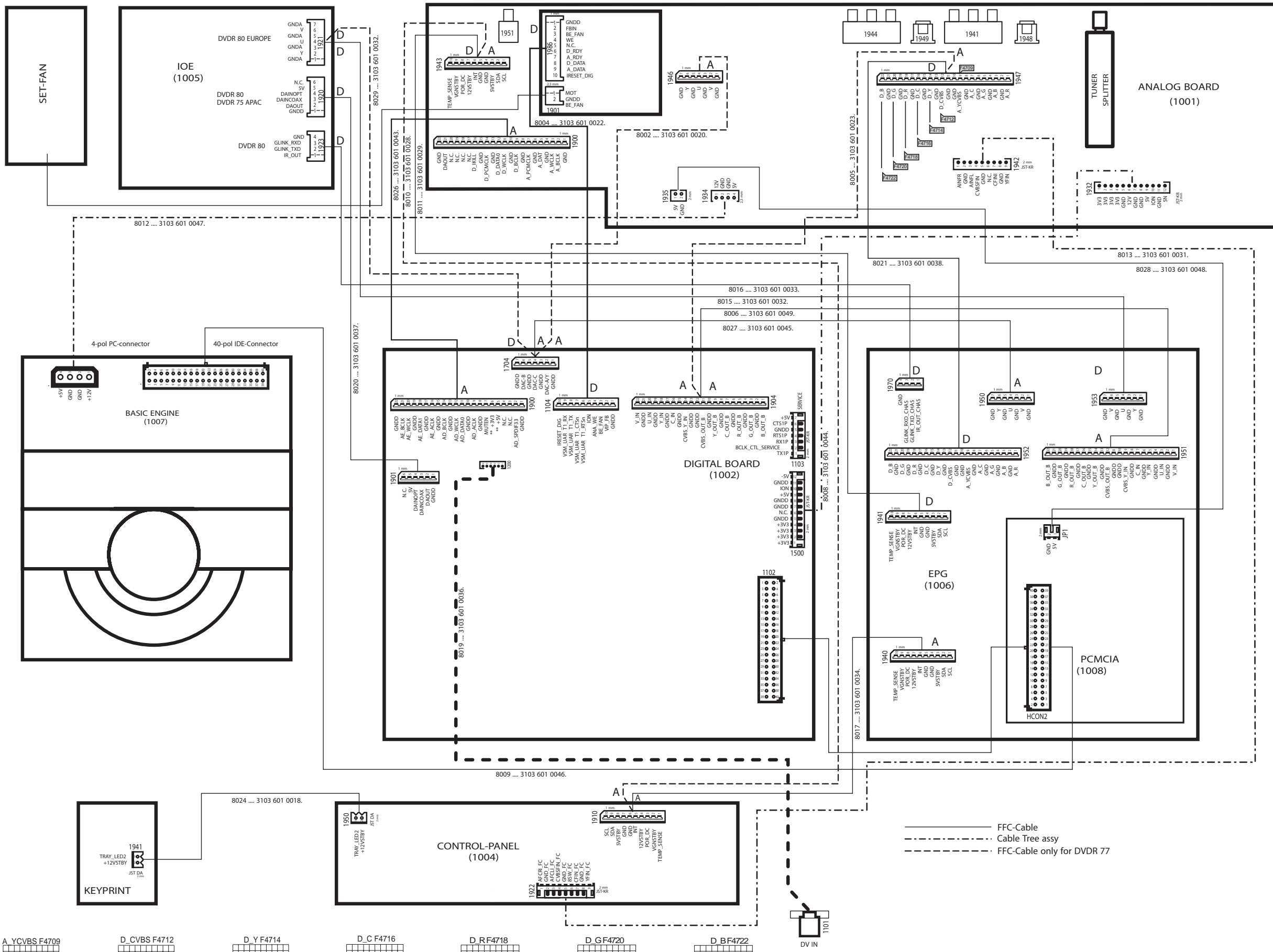
Overall Block Diagram Digital Board 2.1 Chrysalis



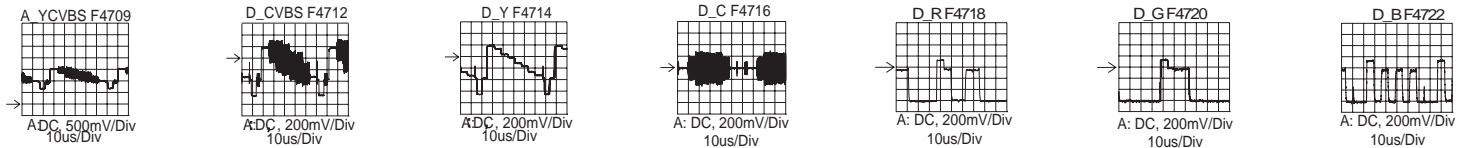
Control Block Diagram Analog Board, uP Board



Wiring Diagram



— FFC-Cable
 - - - Cable Tree assy
 - - - FFC-Cable only for DVDR 77

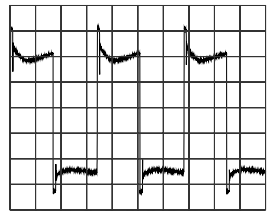


Waveforms

Waveforms Analog Board

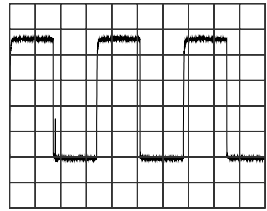
Waveforms Display Board

7106/7108-Emitter



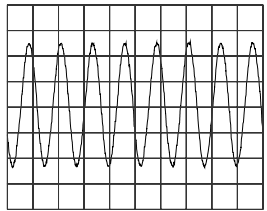
A: DC, 2 V/Div, 10us/Div

IC7103-19



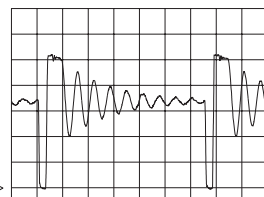
A: DC, 1 V/Div, 10us/Div

IC7103-8



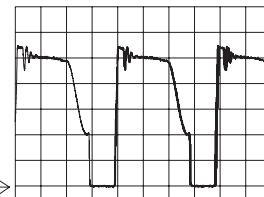
A: DC, 1 V/Div, 100ns/Div

F327 VDrain (Standby)



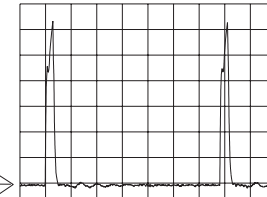
A: DC, 100V/Div
5us/Div

F327 VDrain (no disc loaded)



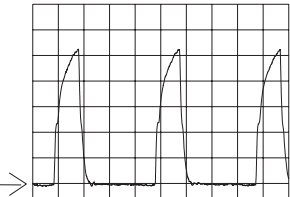
A: DC, 100V/Div
2us/Div

I324 VGate (Standby)



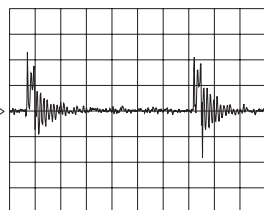
A: DC, 1V/Div
5us/Div

I324 VGate (no disc loaded)



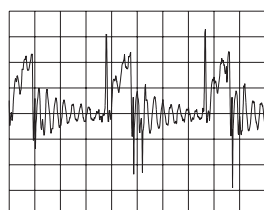
A: DC, 2V/Div
2us/Div

I324 VSource (Standby)



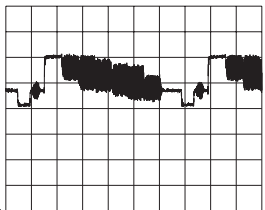
A: DC, 50mV/Div
5us/Div

I324 VSource (no disc loaded)



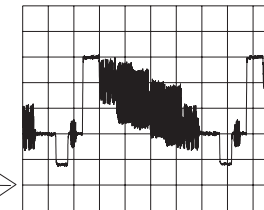
A: DC, 50mV/Div
2us/Div

F723 VFV I723



A: DC, 500mV/Div
10us/Div

E465



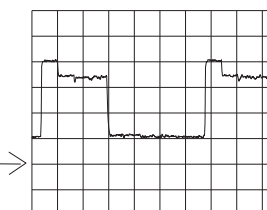
A: DC, 500mV/Div
10us/Div

E461



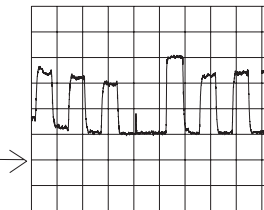
A: DC, 500mV/Div
10us/Div

E462



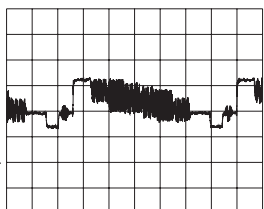
A: DC, 500mV/Div
10us/Div

E463



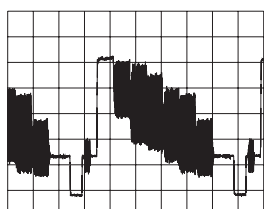
A: DC, 500mV/Div
10us/Div

A_CVBS I405



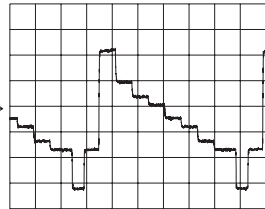
A: DC, 500mV/Div
10us/Div

D_CVBS F4712



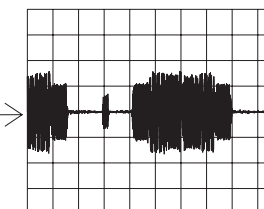
A: DC, 200mV/Div
10us/Div

D_Y F4714



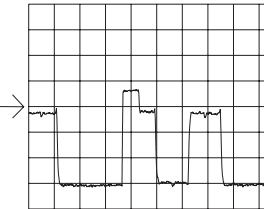
A: DC, 200mV/Div
10us/Div

D_C F4716



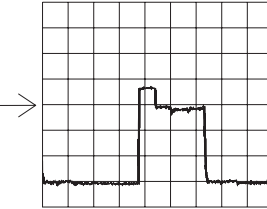
A: DC, 200mV/Div
10us/Div

D_R F4718



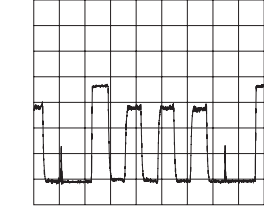
A: DC, 200mV/Div
10us/Div

D_G F4720



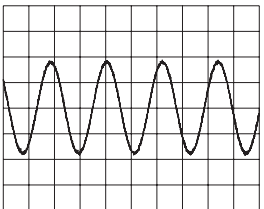
A: DC, 200mV/Div
10us/Div

D_B F4722



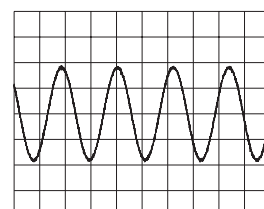
A: DC, 200mV/Div
10us/Div

I502/I504



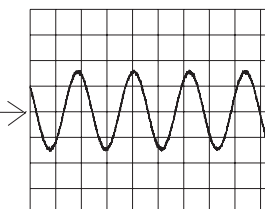
A: DC, 500mV/Div
500us/Div

I517/I518



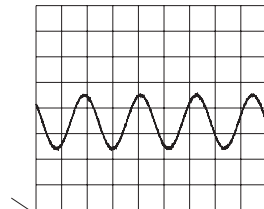
A: DC, 500mV/Div
500us/Div

F501/F502



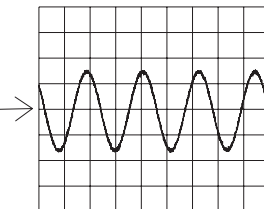
A: DC, 500mV/Div
500us/Div

I014/I032



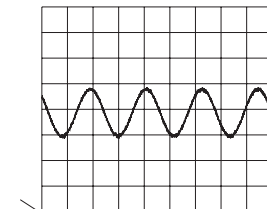
A: DC, 500mV/Div
500us/Div

ARDAC/ALDAC F010/F011



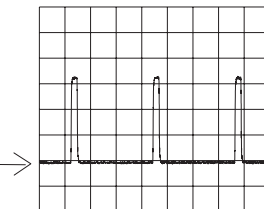
A: DC, 500mV/Div
500us/Div

I623



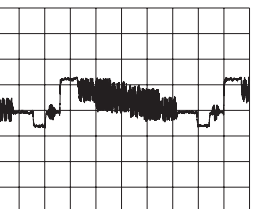
A: DC, 1 V/Div
500us/Div

SYNC F843



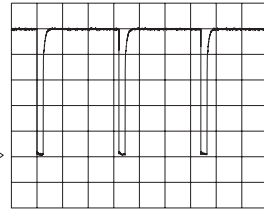
A: DC, 500mV/Div
10us/Div

A_CVBS F8008



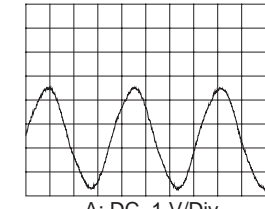
A: DC, 500mV/Div

I818



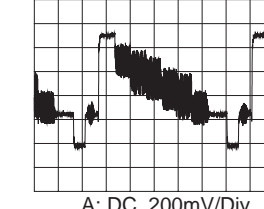
A: DC, 1 V/Div
20us/Div

I994



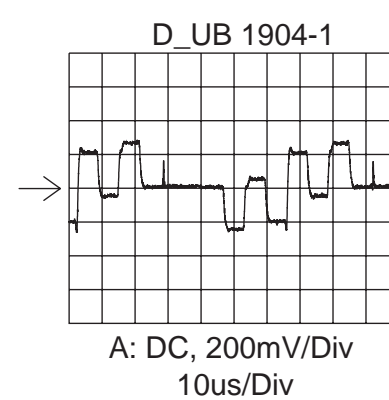
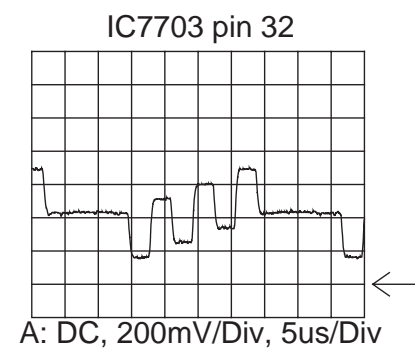
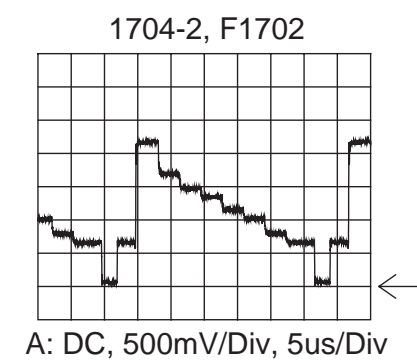
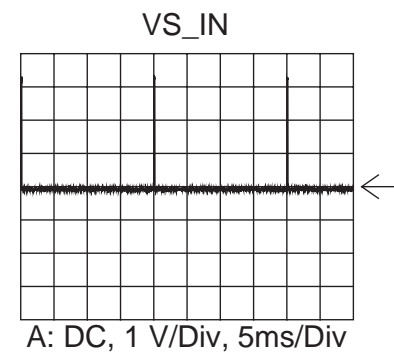
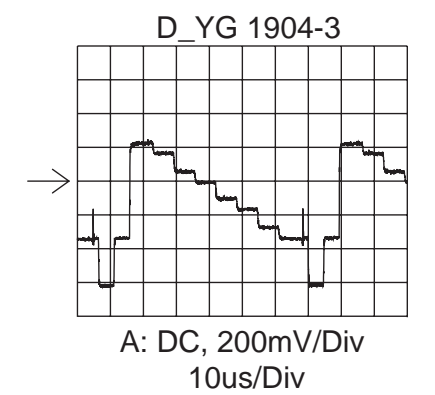
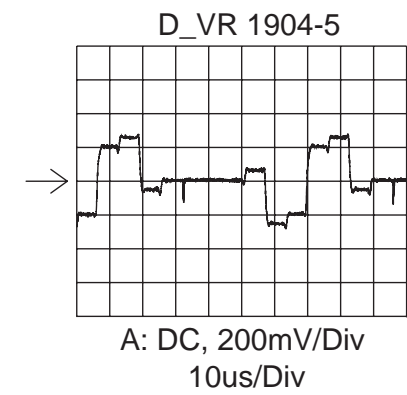
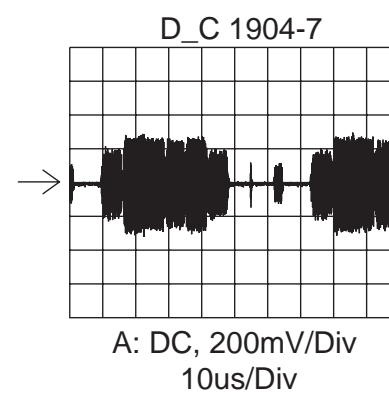
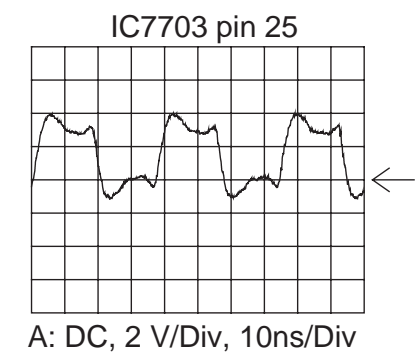
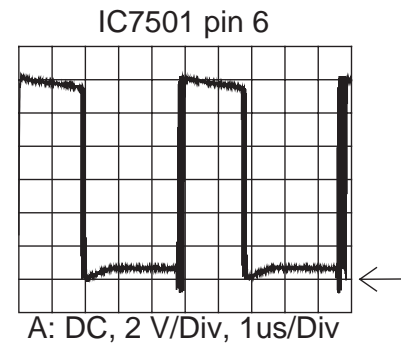
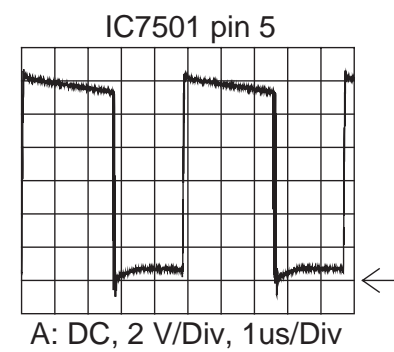
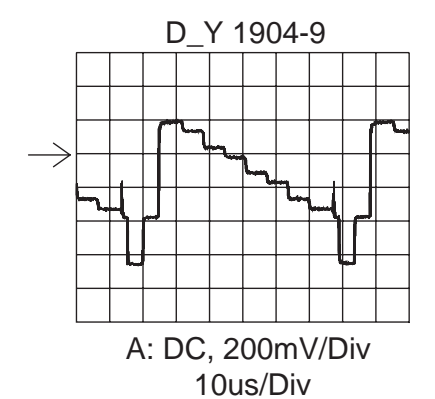
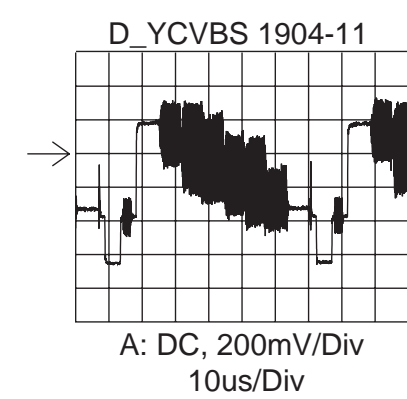
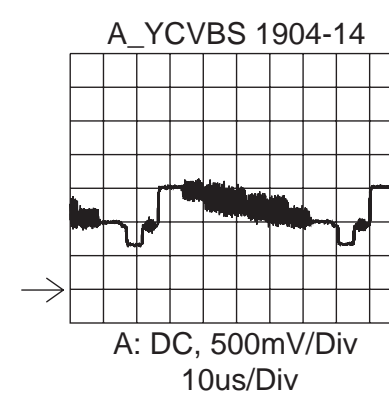
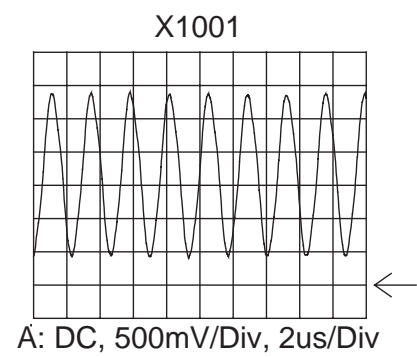
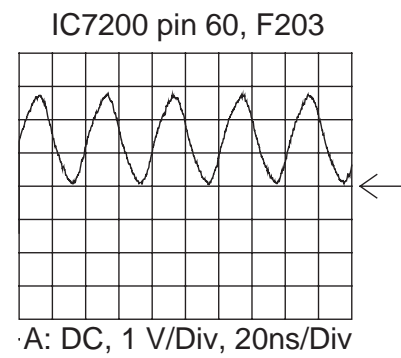
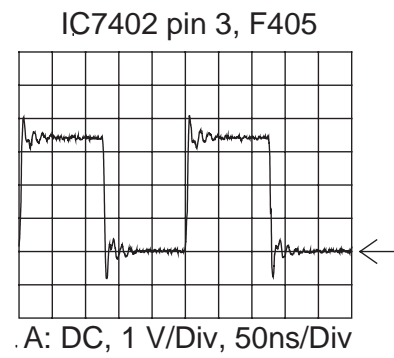
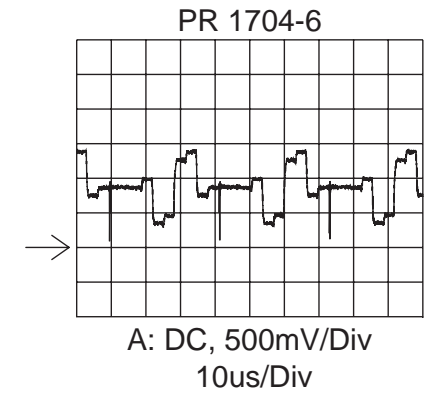
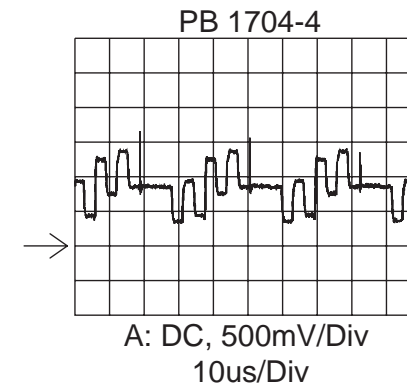
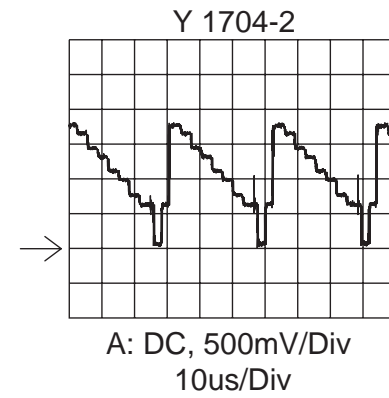
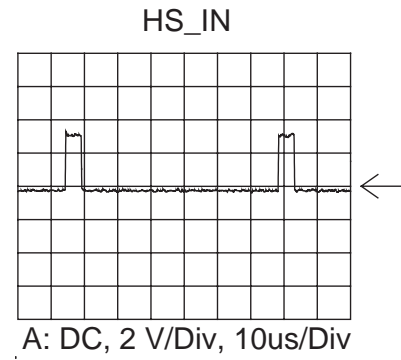
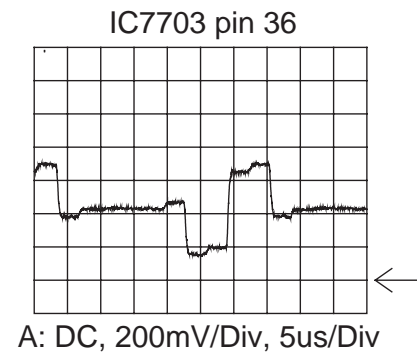
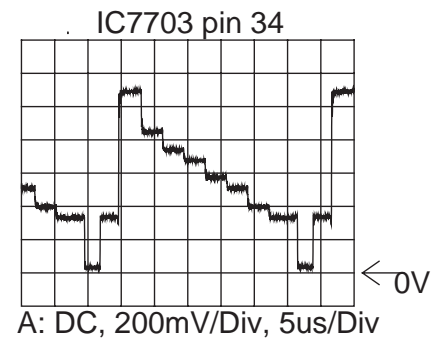
A: DC, 1 V/Div
20ns/Div

I989



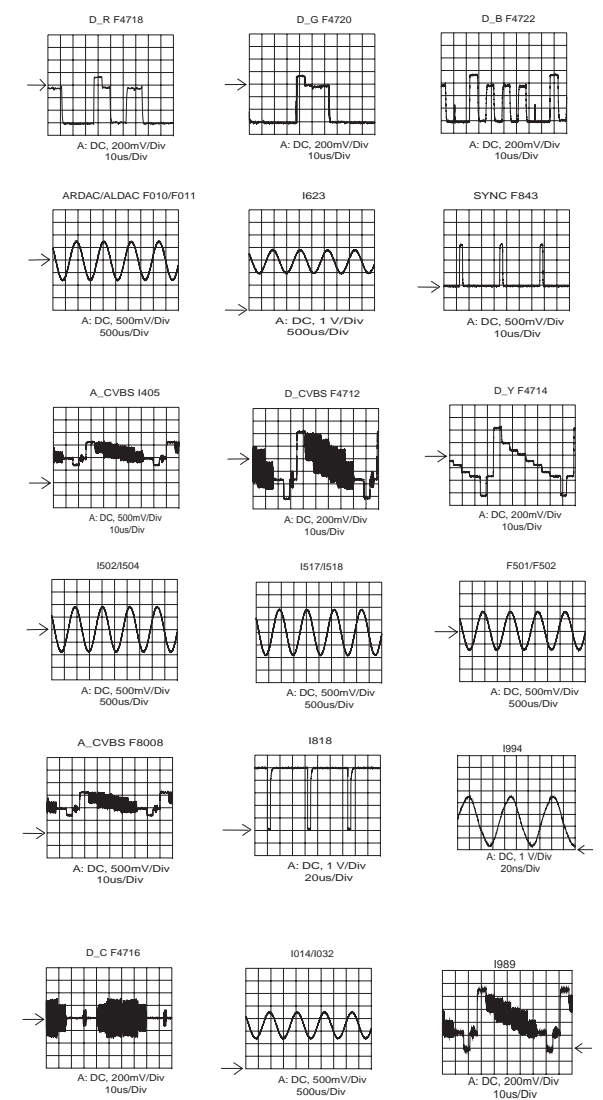
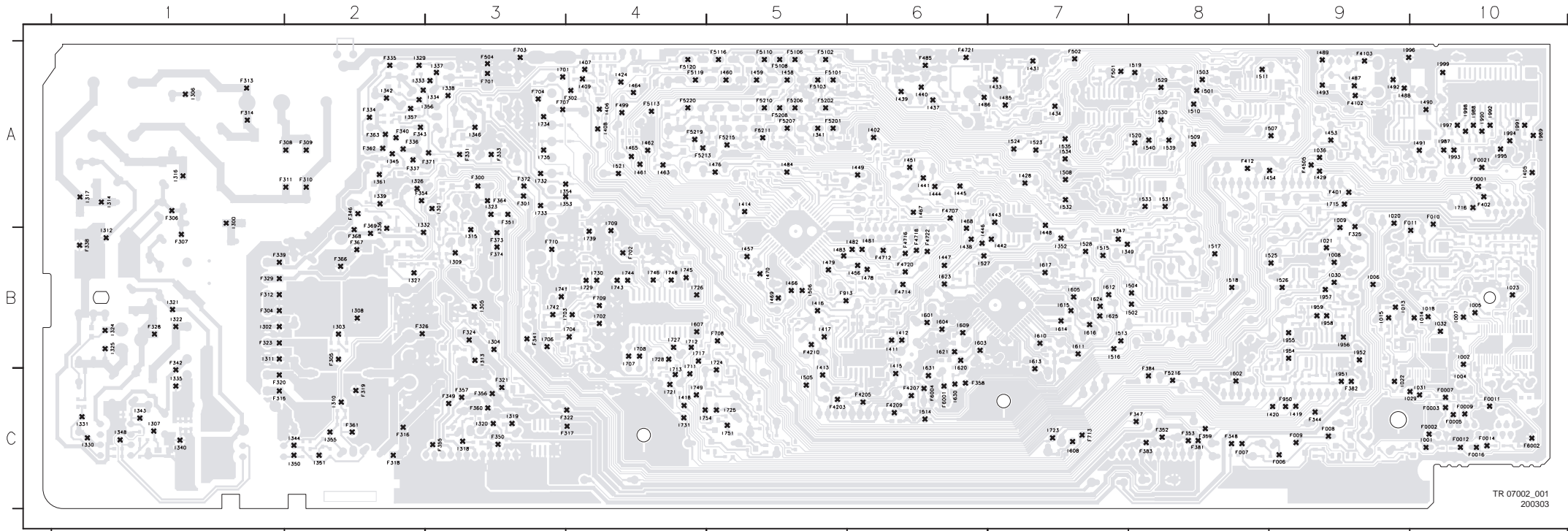
A: DC, 200mV/Div
10us/Div

Waveforms Digital Board Chrysalis 2.1



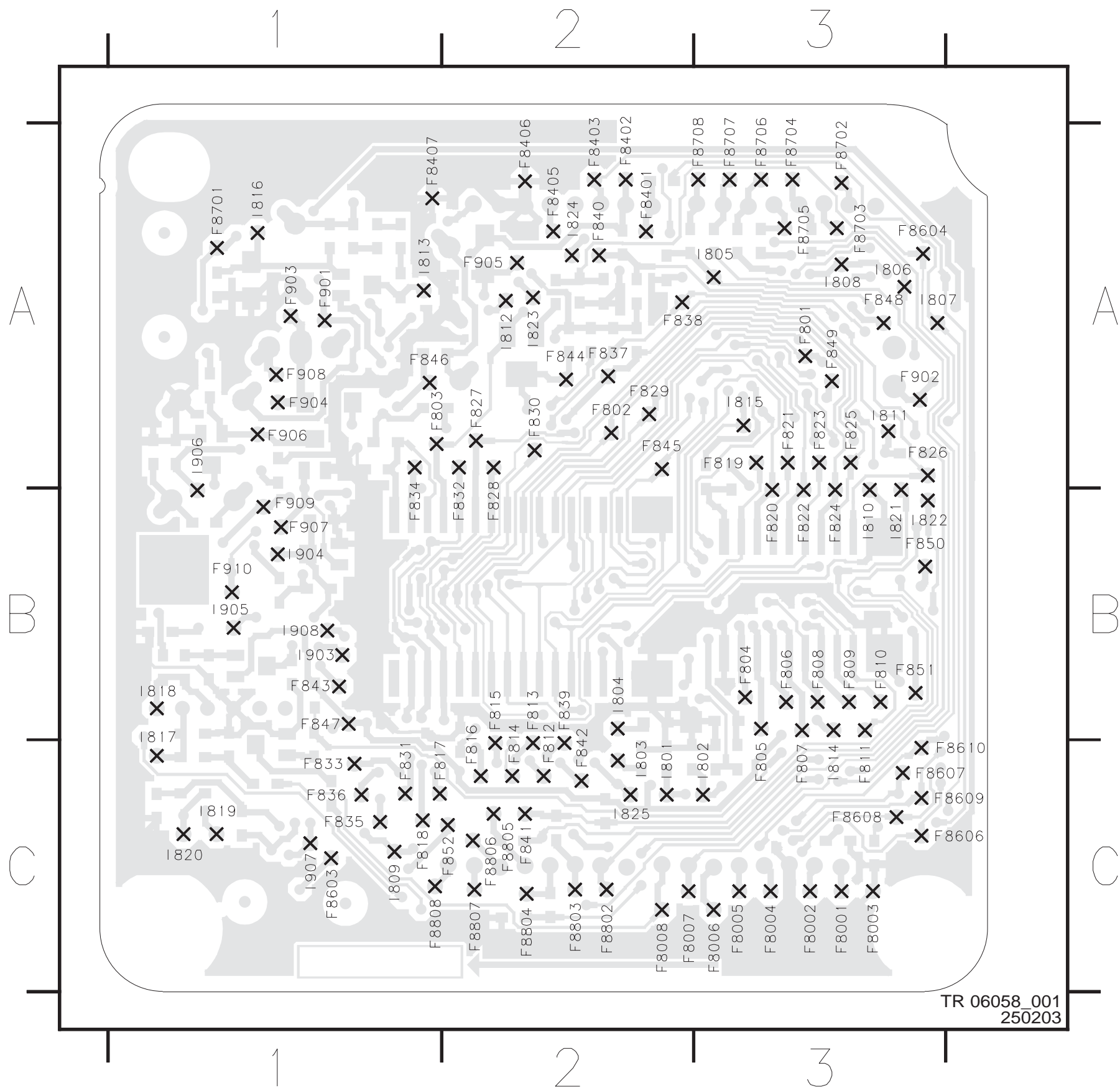
Test points overview Analog Board

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F0002 C10	F302 A4	F322 C4	F344 C9	F364 A3	F4207 C6	F5103 A5	F5219 A4	I005 B10	I030 A1	I320 C3	I340 C1	I402 A6	I431 A7	I456 B6	I482 B6	I508 A7	I612 B7	I529 A8	I708 B4	I733 A3	I957 B9
F0003 C10	F304 B1	F323 B1	F346 A2	F366 B2	F4209 C6	F5106 A5	F5220 A4	I006 B9	I031 A3	I321 B1	I341 A5	I405 A10	I433 A7	I457 B5	I483 B5	I509 A8	I613 C7	I530 A8	I709 B4	I734 A3	I958 B9
F0005 C10	F305 B2	F324 B3	F347 C8	F367 B2	F4210 B5	F5108 A5	F6001 C6	I007 B10	I032 B2	I322 B1	I342 A2	I406 A4	I434 A7	I458 A5	I484 A5	I510 A8	I614 B7	I531 A8	I711 C4	I735 A3	I959 B9
F0007 C10	F306 A1	F325 A9	F348 C8	F368 B2	F4505 A9	F5110 A5	F6002 C10	I008 B9	I034 B3	I323 A3	I343 C1	I407 A4	I437 A6	I459 A5	I485 A7	I511 A8	I615 B7	I532 A7	I712 B4	I739 B4	I987 A10
F0009 C10	F307 B1	F326 B2	F349 C3	F369 B2	F4707 A6	F5113 A4	F6004 C6	I009 B9	I035 B3	I324 B1	I344 C2	I408 A4	I438 B6	I460 A5	I486 A6	I513 B7	I616 B7	I533 A8	I713 C4	I741 B3	I988 A10
F0010 C9	F308 A2	F328 B1	F350 C3	F371 A3	F4712 B6	F5116 A5	F701 A3	I013 B9	I036 A1	I325 B1	I345 A2	I409 A4	I439 A6	I461 A4	I487 A9	I514 C6	I617 B7	I534 A7	I715 A9	I742 B3	I989 A10
F0011 C10	F309 A2	F329 B1	F351 A3	F372 A3	F4714 B6	F5119 A4	F702 B4	I014 B10	I037 C1	I326 A2	I346 A3	I411 B6	I440 A6	I462 A4	I488 A9	I515 B7	I620 B6	I535 A7	I716 A10	I743 B4	I990 A10
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F0014 C10	F311 A2	F333 A3	F353 C8	F374 B3	F4718 B6	F5201 A5	F704 A3	I018 B10	I039 B3	I329 A2	I348 C1	I413 C5	I442 B7	I464 A4	I490 A10	I517 B8	I623 B6	I540 A8	I721 C4	I745 B4	I992 A10
F0016 C10	F312 B1	F334 A2	F354 A2	F381 C8	F4720 B6	F5202 A5	F707 A3	I019 B10	I040 B2	I330 C1	I349 B7	I414 A5	I443 A7	I465 A4	I491 A10	I518 B8	I624 B7	I541 A8	I723 C7	I746 B4	I993 A10
F0021 A10	F313 A1	F335 A2	F355 C3	F382 C9	F4721 A6	F5203 A5	F708 B5	I020 A9	I041 B1	I331 C1	I350 C2	I415 C6	I444 A6	I466 B5	I492 A9	I519 A8	I625 B7	I542 A7	I724 C5	I748 B4	I994 A10
F006 C9	F314 A1	F336 A2	F356 C3	F383 C8	F4722 B6	F5206 A5	F709 B4	I021 B9	I042 B1	I332 B2	I351 C2	I416 B5	I445 A5	I467 A6	I493 A9	I520 A8	I630 C6	I543 A8	I725 C5	I749 C4	I995 A10
F007 C8	F315 C1	F337 A2	F357 C3	F384 C8	F485 A6	F5207 A5	F710 B3	I022 C9	I043 B3	I333 A3	I352 B7	I417 B5	I446 B6	I468 B6	I501 A8	I521 A4	I631 C6	I544 B6	I726 B4	I751 C5	I996 A9
F008 C9	F316 C2	F338 B1	F358 C6	F401 A9	F489 A4	F5208 A5	F713 C7	I023 B10	I044 A1	I334 A2	I353 A3	I418 C4	I447 B6	I469 B5	I502 B8	I523 A7	I632 B7	I545 B7	I727 B4	I754 C4	I997 A10
F009 C9	F317 C4	F339 B1	F359 C8	F4102 A9	F501 A7	F5210 A5	F913 B5	I029 C10	I045 A1	I335 C1	I354 A3	I419 C9	I448 A7	I470 B5	I503 A8	I524 A7	I633 B6	I546 B7	I728 B4	I755 A4	I998 A10
F010 A10	F318 C2	F340 A2	F360 C3	F4103 A9	F502 A7	F5211 A5	F950 C9	I030 B9	I046 A1	I336 B2	I355 C2	I420 C9	I449 A6	I472 A5	I504 B8	I525 B9	I634 B6	I547 B7	I729 B4	I756 B4	I999 A10
F011 B10	F319 C2	F341 B3	F361 C2	F412 A8	F504 A3	F5213 A4	I001 C10	I031 C10	I047 A1	I337 A3	I356 A2	I424 A4	I451 A6	I478 B6	I505 C5	I526 B9	I635 B6	I548 B7	I730 B4	I757 B4	I954 B9
F300 A3	F320 C1	F342 C1	F362 A2	F4203 C5	F5101 A5	F5215 A5	I002 B10	I032 B10	I048 A7	I338 A3	I357 A2	I428 A7	I453 A9	I479 B5	I506 B5	I527 B6	I706 B3	I610 B7	I731 C4	I955 B9	



TR 07002_001
200303

Test points overview UP Sub Board

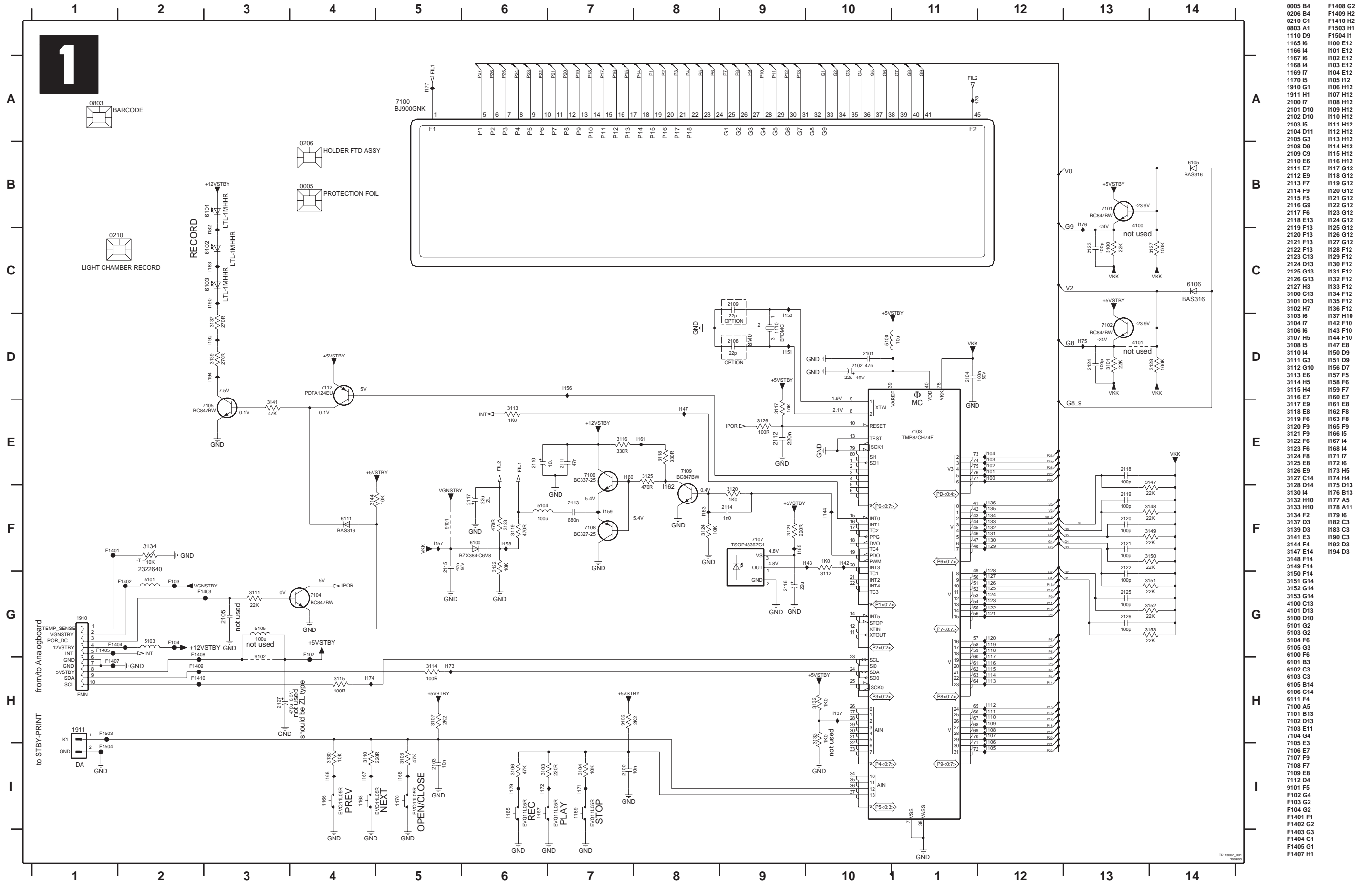


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| F8002 C3 | F832 A2 | F8701 A1 | I809 C1 |
| F8003 C3 | F833 C1 | F8702 A3 | I810 B3 |
| F8004 C3 | F834 A1 | F8703 A3 | I811 A3 |
| F8005 C3 | F835 C1 | F8704 A3 | I812 A2 |
| F8006 C3 | F836 C1 | F8705 A3 | I813 A1 |
| F8007 C2 | F837 A2 | F8706 A3 | I814 B3 |
| F8008 C2 | F838 A2 | F8707 A3 | I815 A3 |
| F801 A3 | F839 C2 | F8708 A3 | I816 A1 |
| F802 A2 | F840 A2 | F8802 C2 | I817 C1 |
| F803 A1 | F8401 A2 | F8803 C2 | I818 B1 |
| F804 B3 | F8402 A2 | F8804 C2 | I819 C1 |
| F805 B3 | F8403 A2 | F8805 C2 | I820 C1 |
| F807 B3 | F8406 A2 | F8806 C2 | I821 B3 |
| F812 C2 | F8407 A1 | F8807 C2 | I822 B3 |
| F813 C2 | F841 C2 | F8808 C1 | I823 A2 |
| F814 C2 | F842 C2 | F901 A1 | I824 A2 |
| F815 C2 | F843 B1 | F902 A3 | I825 C2 |
| F816 C2 | F844 A2 | F903 A1 | I903 B1 |
| F817 C1 | F845 A2 | F904 A1 | I904 B1 |
| F818 C1 | F846 A1 | F905 A2 | I905 B1 |
| F819 A3 | F847 B1 | F906 A1 | I906 B1 |
| F820 B3 | F848 A3 | F907 B1 | I907 C1 |
| F821 A3 | F849 A3 | F908 A1 | I908 B1 |
| F822 B3 | F850 B3 | F909 B1 | |
| F823 A3 | F851 B3 | F910 B1 | |
| F824 B3 | F852 C2 | I801 C2 | |
| F825 A3 | F8603 C1 | I802 C3 | |
| F826 A3 | F8604 A3 | I803 C2 | |
| F827 A2 | F8606 C3 | I804 B2 | |
| F828 A2 | F8607 C3 | I805 A3 | |
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TR 06058_001
250203

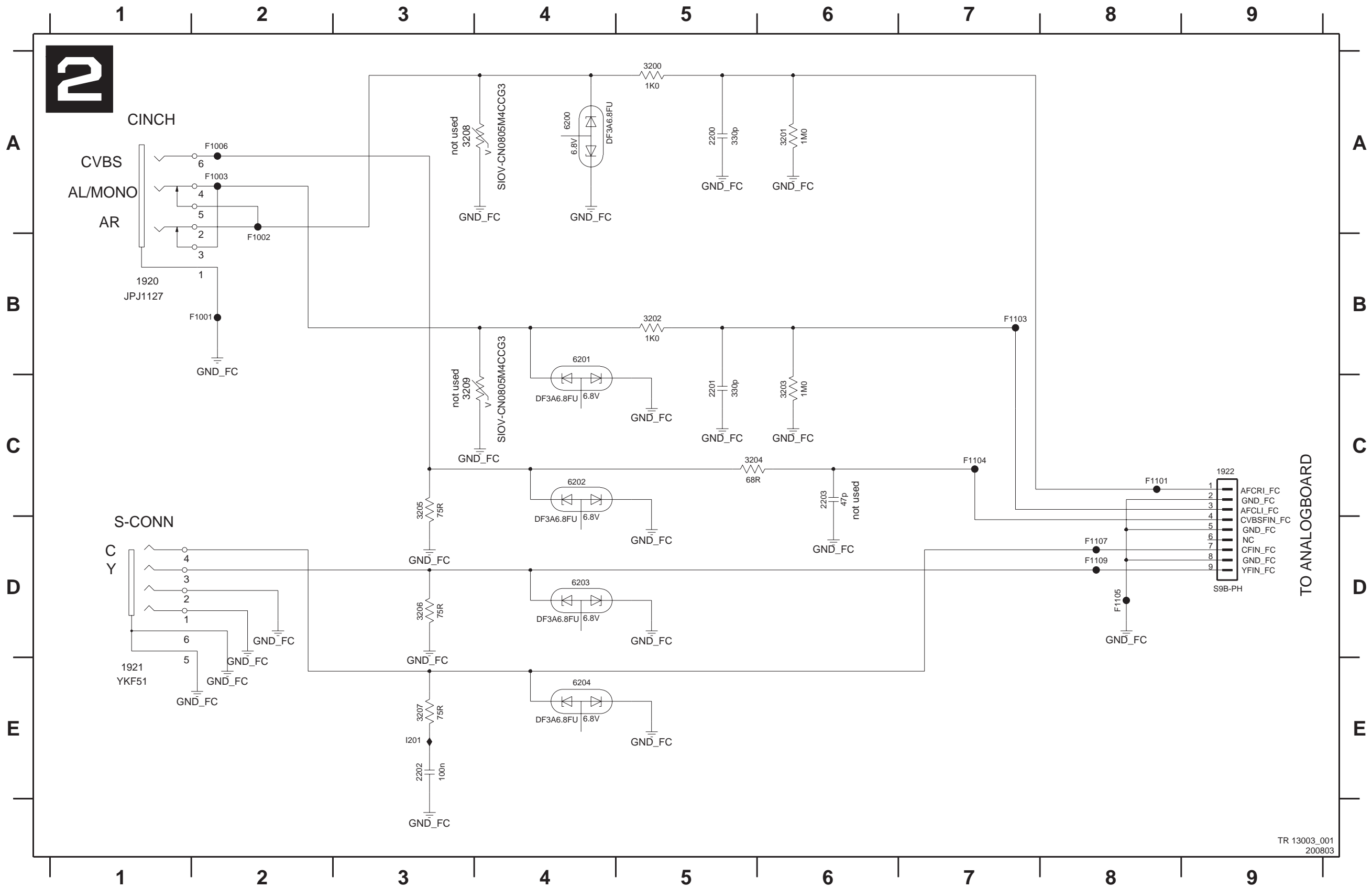
7. Circuit Diagrams and PWB Layouts

Display Board: Display Part (DISP)



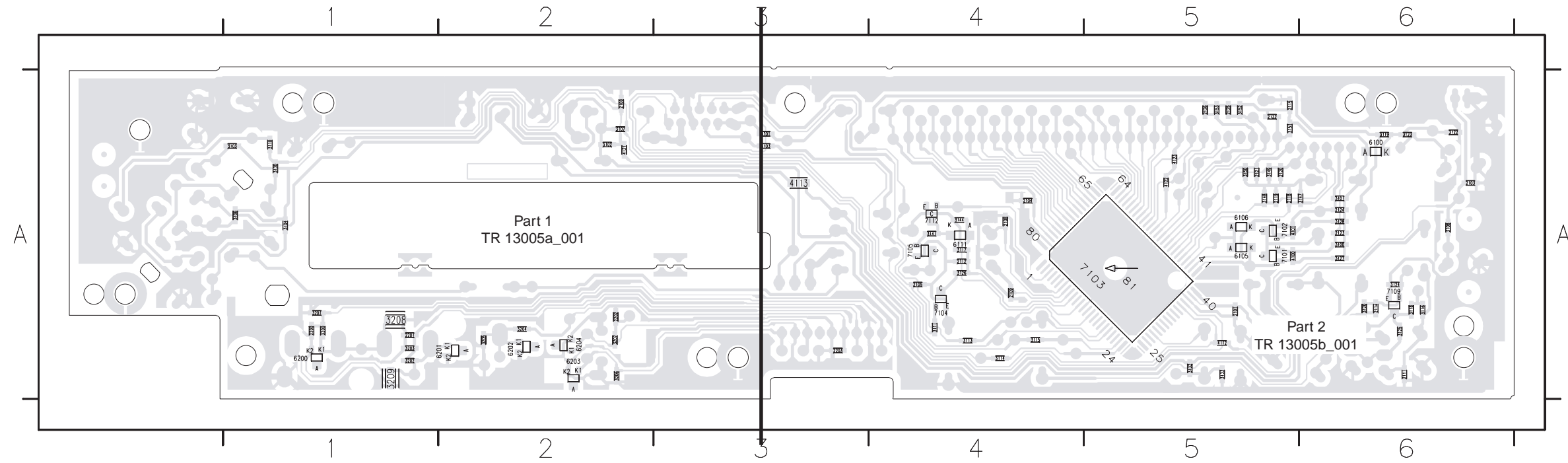
- 0005 B4
- 0206 B4
- 0210 C1
- 0803 A1
- 1110 D9
- 1165 I6
- 1166 I4
- 1167 I6
- 1168 I4
- 1169 I7
- 1170 I5
- 1910 G1
- 1911 H1
- 2100 I7
- 2101 D10
- 2102 D10
- 2103 I5
- 2104 D11
- 2105 G3
- 2108 D9
- 2109 C9
- 2110 E6
- 2111 E7
- 2112 E9
- 2113 F7
- 2114 F9
- 2115 F5
- 2116 G9
- 2117 F6
- 2118 E13
- 2119 F13
- 2120 F13
- 2121 F13
- 2122 F13
- 2123 C13
- 2124 D13
- 2125 G13
- 2127 H3
- 3100 C13
- 3101 D13
- 3102 H7
- 3103 I6
- 3104 I7
- 3106 I6
- 3107 H5
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- 3128 D14
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- 3137 D3
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- 3141 E3
- 3144 F4
- 3147 E14
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- 3149 F14
- 3150 F14
- 3151 G14
- 3152 G14
- 3153 G14
- 4100 C13
- 4101 D13
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- 5101 G2
- 5104 F6
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- 6100 F6
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- 6102 C3
- 6103 C3
- 6105 B14
- 6106 C14
- 6111 F4
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- 7101 B13
- 7102 D13
- 7103 E11
- 7104 G4
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- 7112 D4
- 9101 F5
- F102 G4
- F103 G2
- F104 G2
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- F1405 G1
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- F1409 H2
- F1410 H2
- F1503 H1
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- I101 E12
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- I107 H2
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- I167 I4
- I171 I7
- I172 I6
- I173 H5
- I174 H4
- I175 D13
- I176 B13
- I177 A5
- I178 A11
- I179 I6
- I182 C3
- I183 C3
- I184 C3
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- I188 I4
- I192 D3
- I194 D3

Display Board: Front Connector (FC)

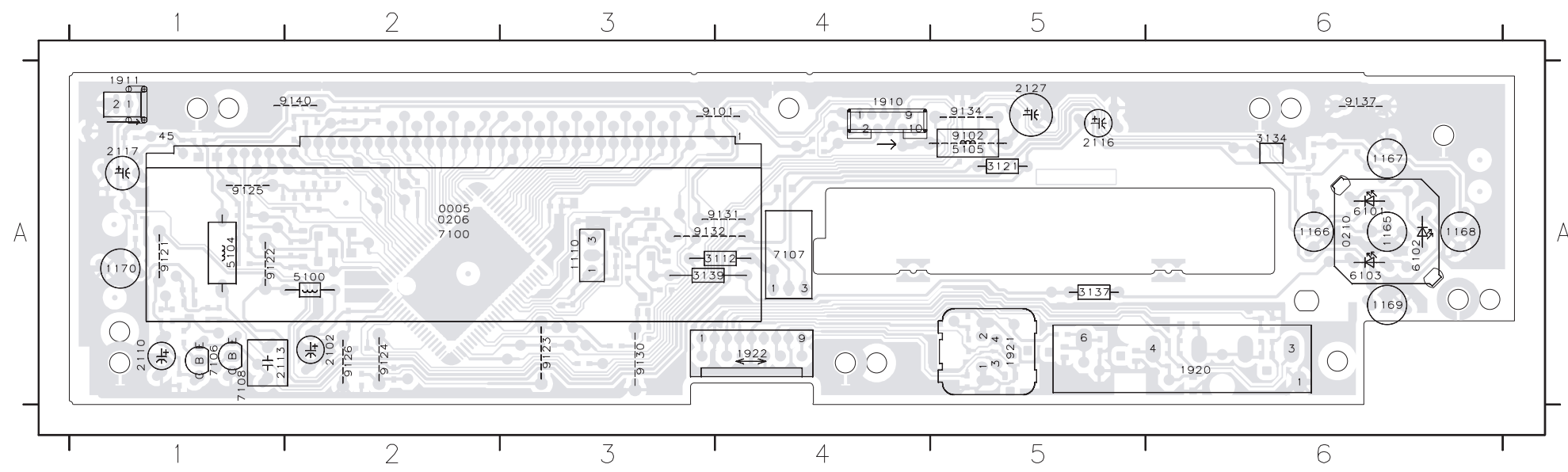


- 1920 B1
- 1921 E1
- 1922 C9
- 2200 A5
- 2201 C5
- 2202 E3
- 2203 C6
- 3200 A5
- 3201 A6
- 3202 B5
- 3203 C6
- 3204 C5
- 3205 C3
- 3206 D3
- 3207 E3
- 3208 A3
- 3209 C3
- 6200 A4
- 6201 B4
- 6202 C4
- 6203 D4
- 6204 E4
- F1001 B2
- F1002 B2
- F1003 A2
- F1006 A2
- F1101 C8
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- F1104 C8
- F1105 C8
- F1107 D8
- F1109 D8
- I201 E3

Layouts Display Panel

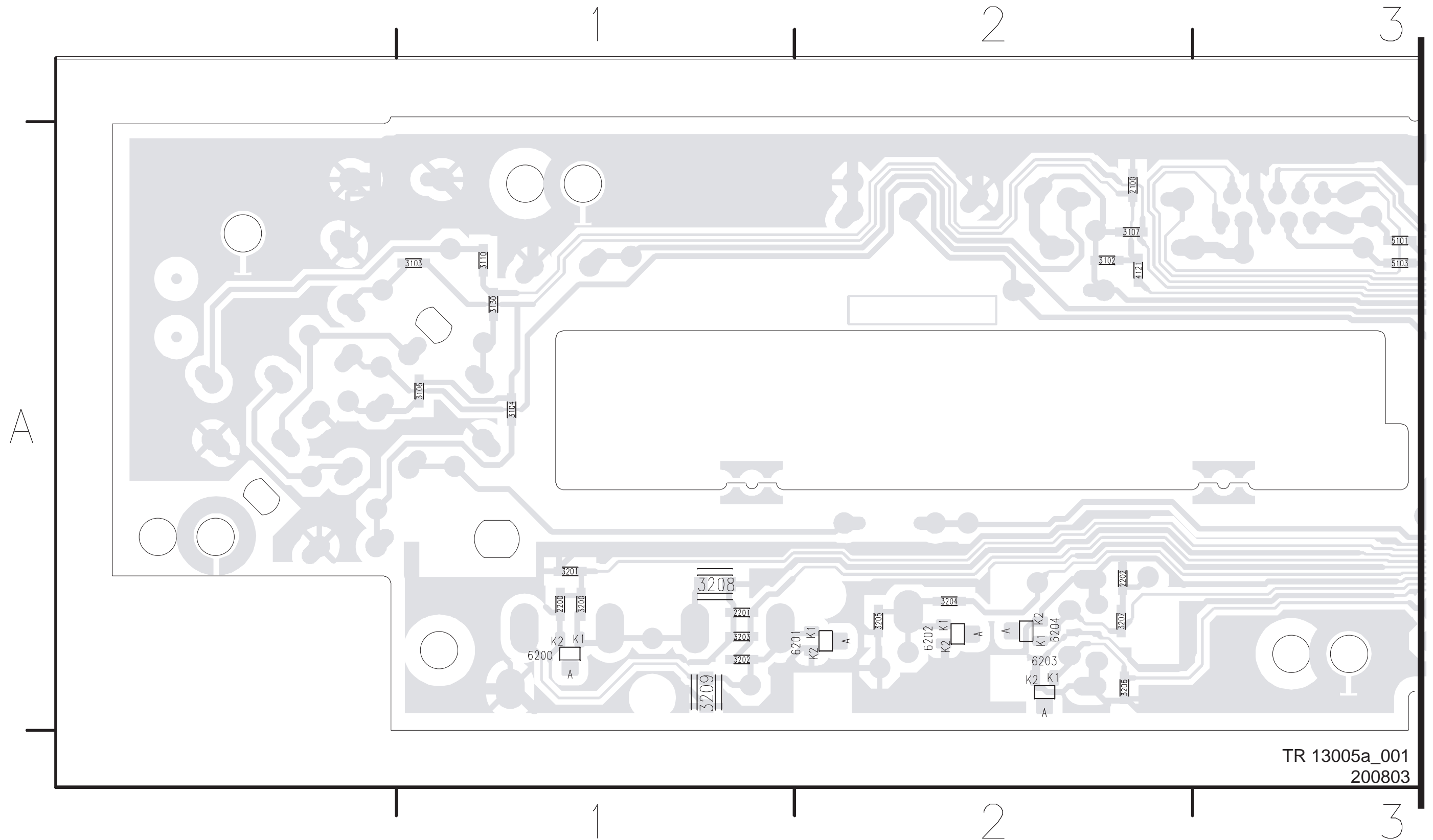


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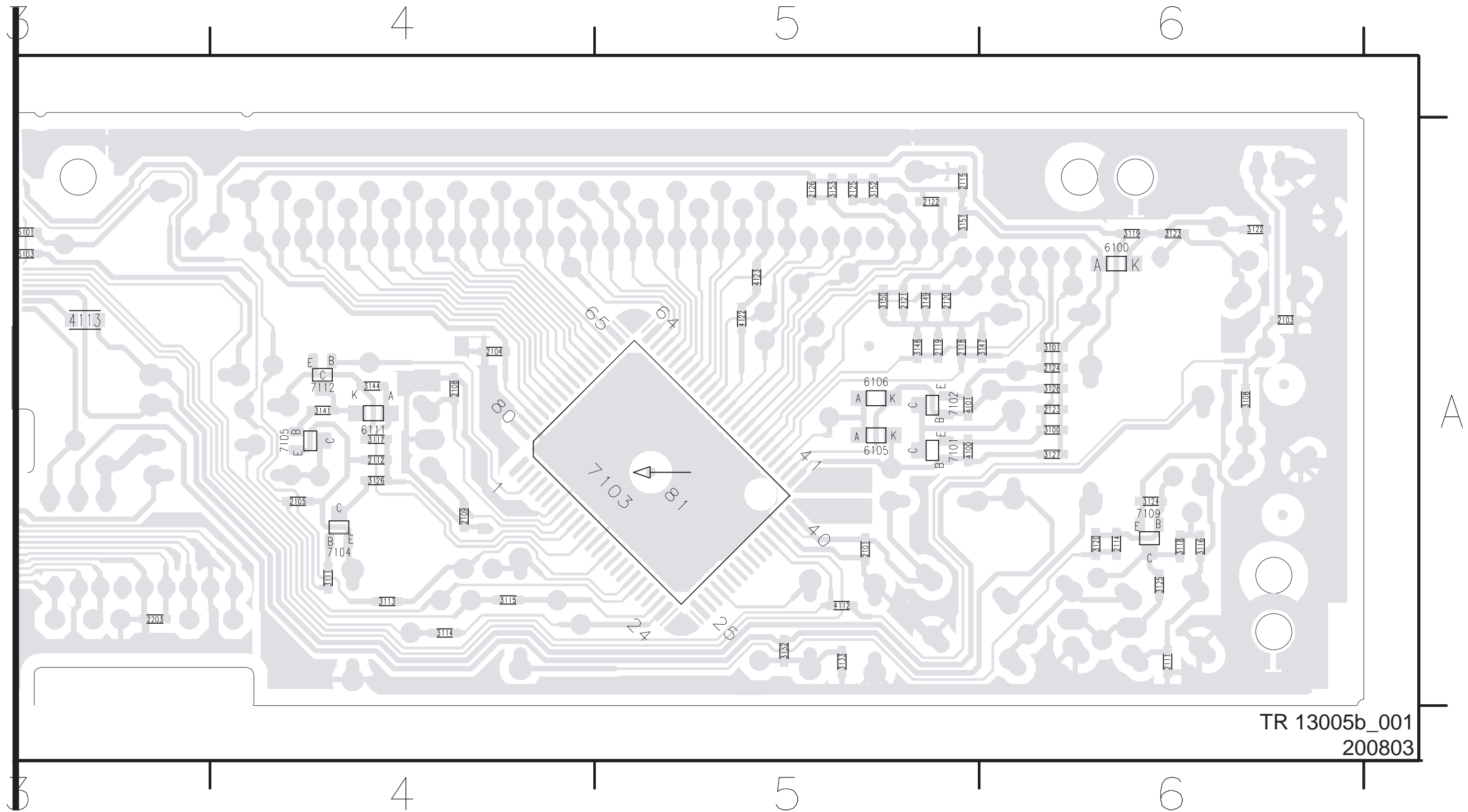
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Layout Display Panel (Part 1 Bottom View)



TR 13005a_001
200803

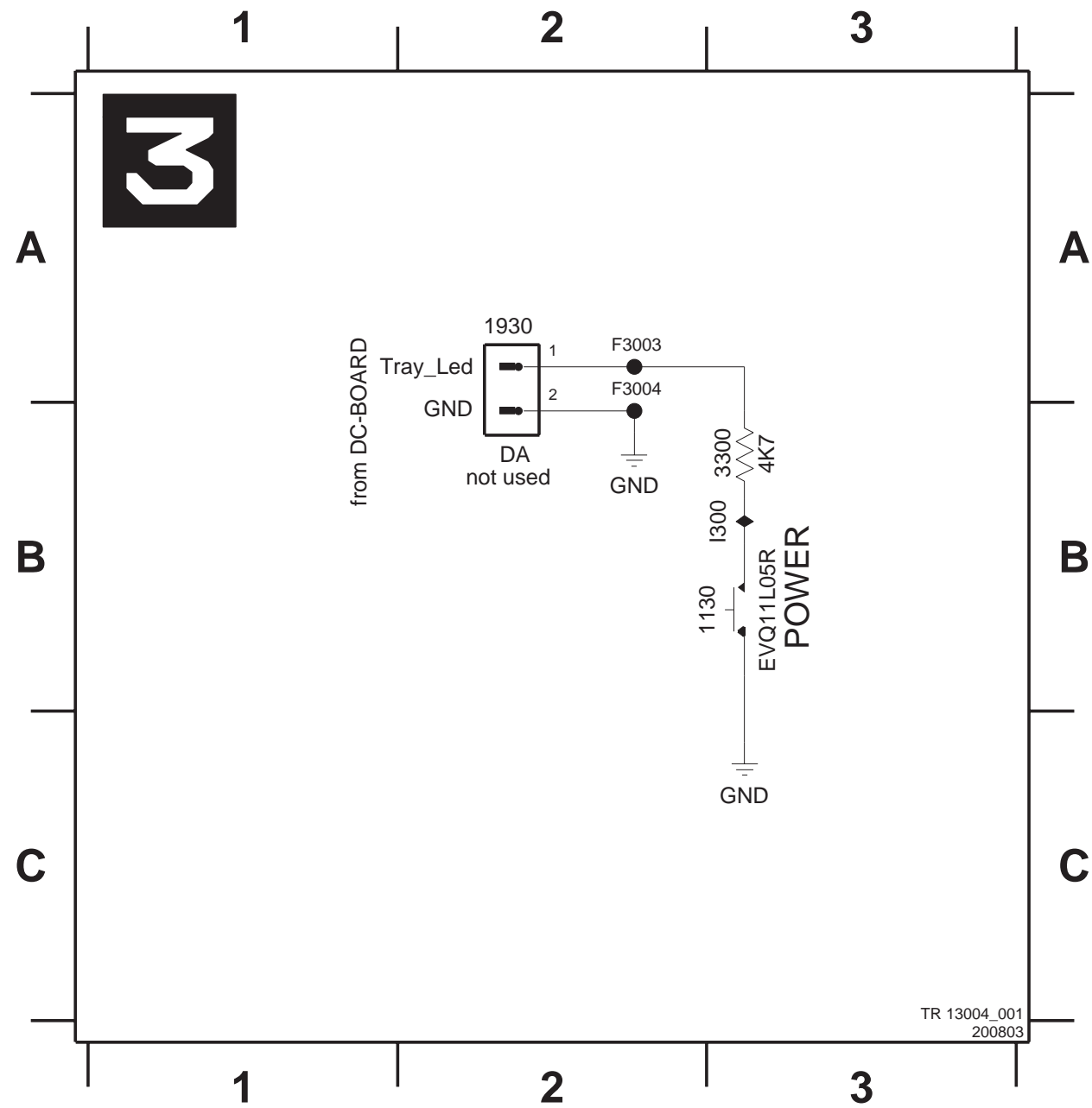
Layout Display Panel (Part 2 Bottom View)



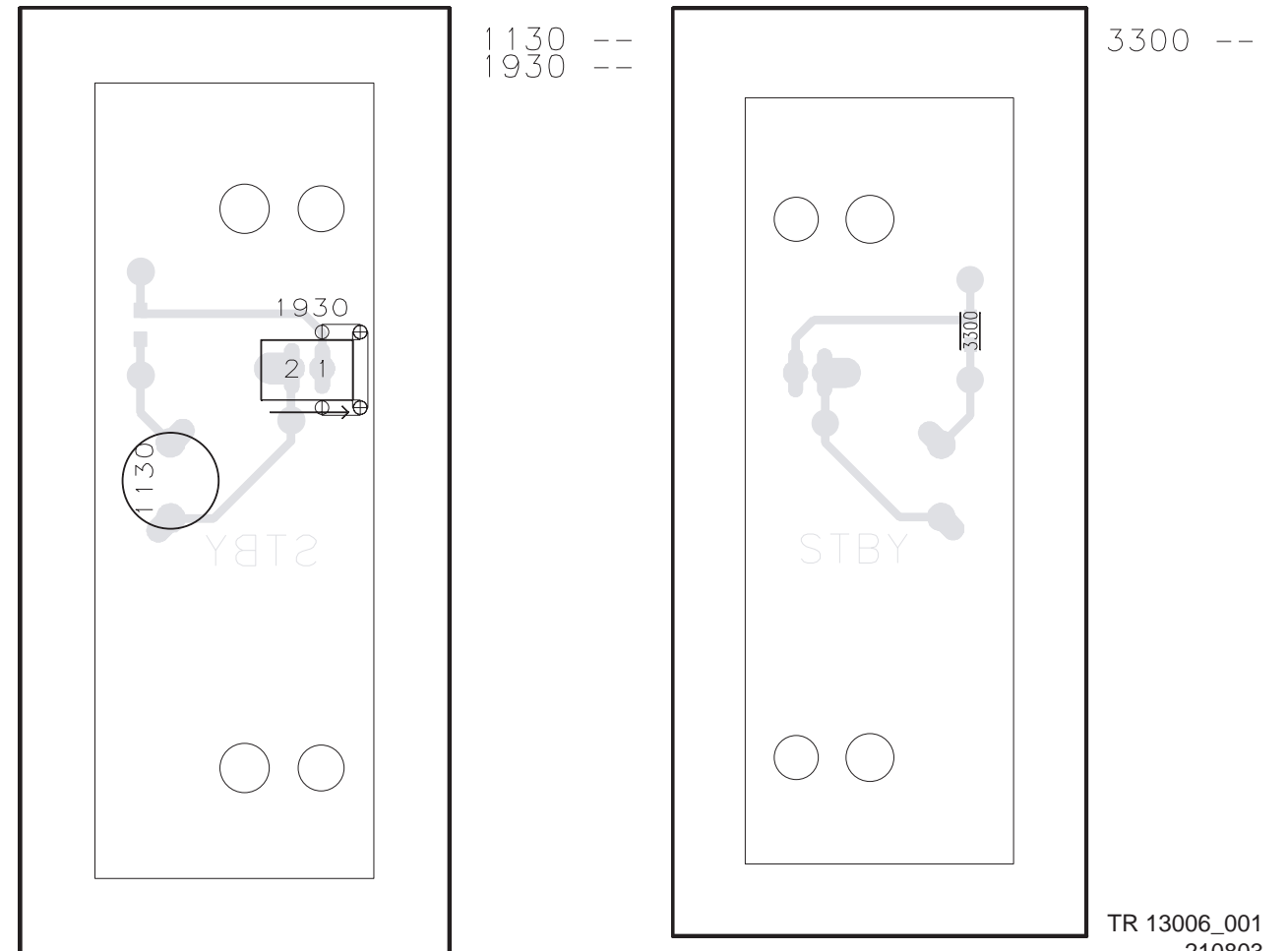
TR 13005b_001
200803

Display Board: Standby (STBY)

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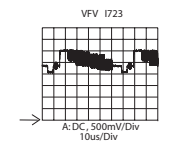
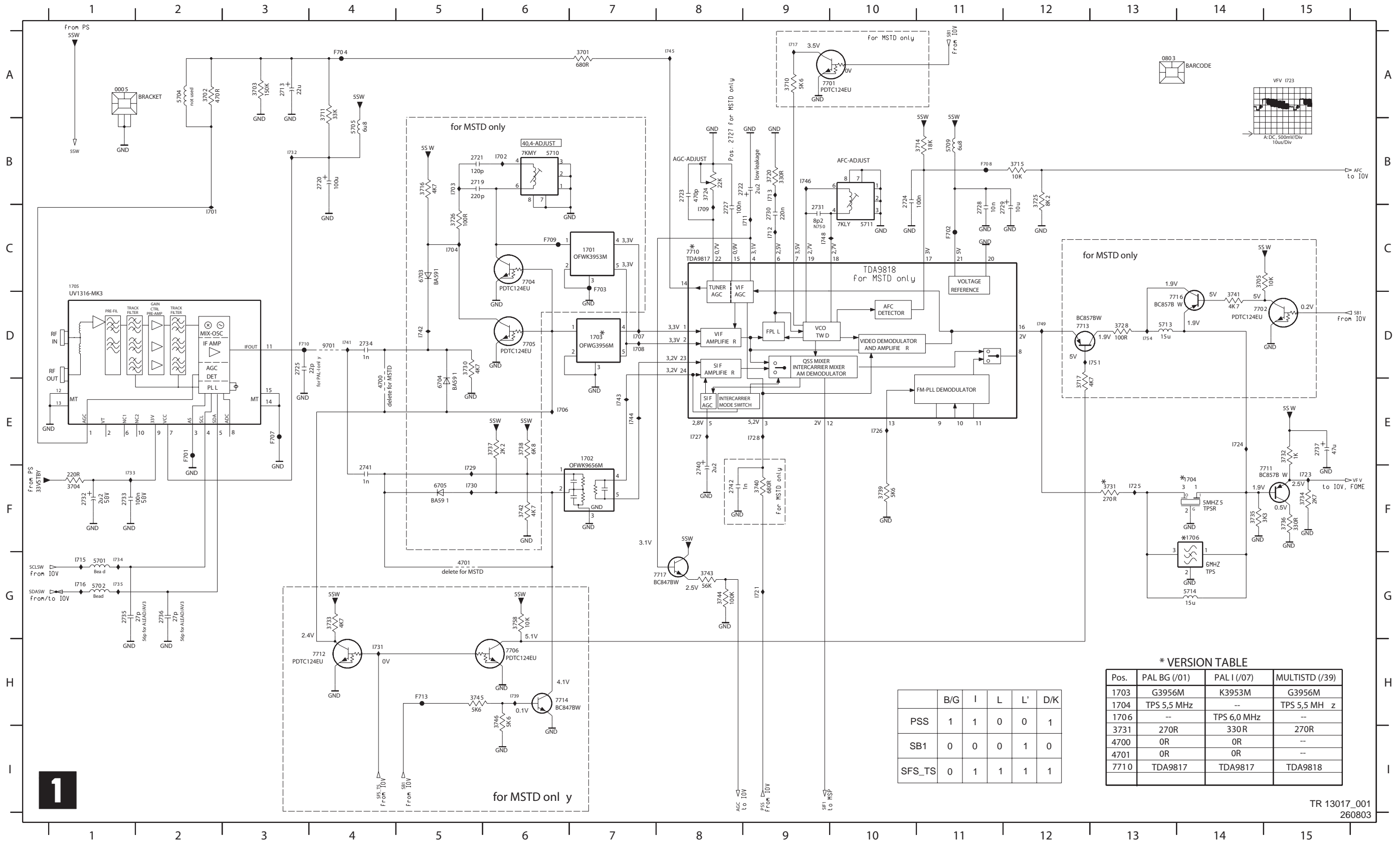


Layout Standby (STBY)



Analog Board: Frontend Video (FV)

- 0005 A1 1703 D7 2713 A3 2722 B8 2727 C8 2731 C9 2735 G1 2741 F4 3703 A3 3711 A4 3717 E12 3726 C5 3732 E15 3736 F15 3740 F9 3744 G8 4700 E4 5704 A2 5711 C10 6704 E5 7704 C6 7711 F1 4 7716 D14 F702 C11 F708 B1 1 I701 C2 I706 E6 I711 C9 I716 G1 I724 E14 I728 E9 I732 B3 I739 H6 I744 E7 I749 D12
- 0803 A13 1704 F1 4 2719 B5 2723 B8 2728 C1 1 2732 F1 2736 G2 2742 F8 3704 F1 3714 B11 3720 B9 3728 D13 3733 G4 3737 E6 3741 D14 3745 H5 4701 G5 5705 B4 5713 D13 6705 F5 7705 D6 7712 H4 7717 G7 7716 D14 F703 D7 F709 C6 I702 B6 I707 D7 I712 C9 I717 A9 I725 F1 3 I729 F5 I733 F1 I741 D4 I745 A8 I751 D13
- 1701 C7 1705 C1 2720 B4 2724 B10 2729 C1 2 2733 F1 2737 E15 3701 A7 3705 C14 3715 B12 3724 B8 3730 D5 3734 F15 3738 E6 3742 F6 3746 H6 5701 G1 5709 B1 1 5714 G14 7701 A10 7706 H6 7713 D1 2 9701 D4 F704 A4 F710 D3 I703 B5 I708 D7 I713 B9 I721 G9 I726 E10 I730 F5 I734 G1 I742 D5 I746 B9 I754 D13
- 1702 E7 1706 F14 2721 B5 2725 D3 2730 C9 2734 D4 2740 F8 3702 A2 3710 A9 3716 B5 3725 B12 3731 F1 3 3735 F14 3739 F10 3743 G8 3758 G6 5702 G1 5710 B6 6703 C5 7702 D15 7710 C8 7714 H6 F701 E2 F707 E3 F713 H5 I704 C5 I709 C8 I715 G1 I723 F1 5 I727 E8 I731 H4 I735 G1 I743 E7 I748 C9



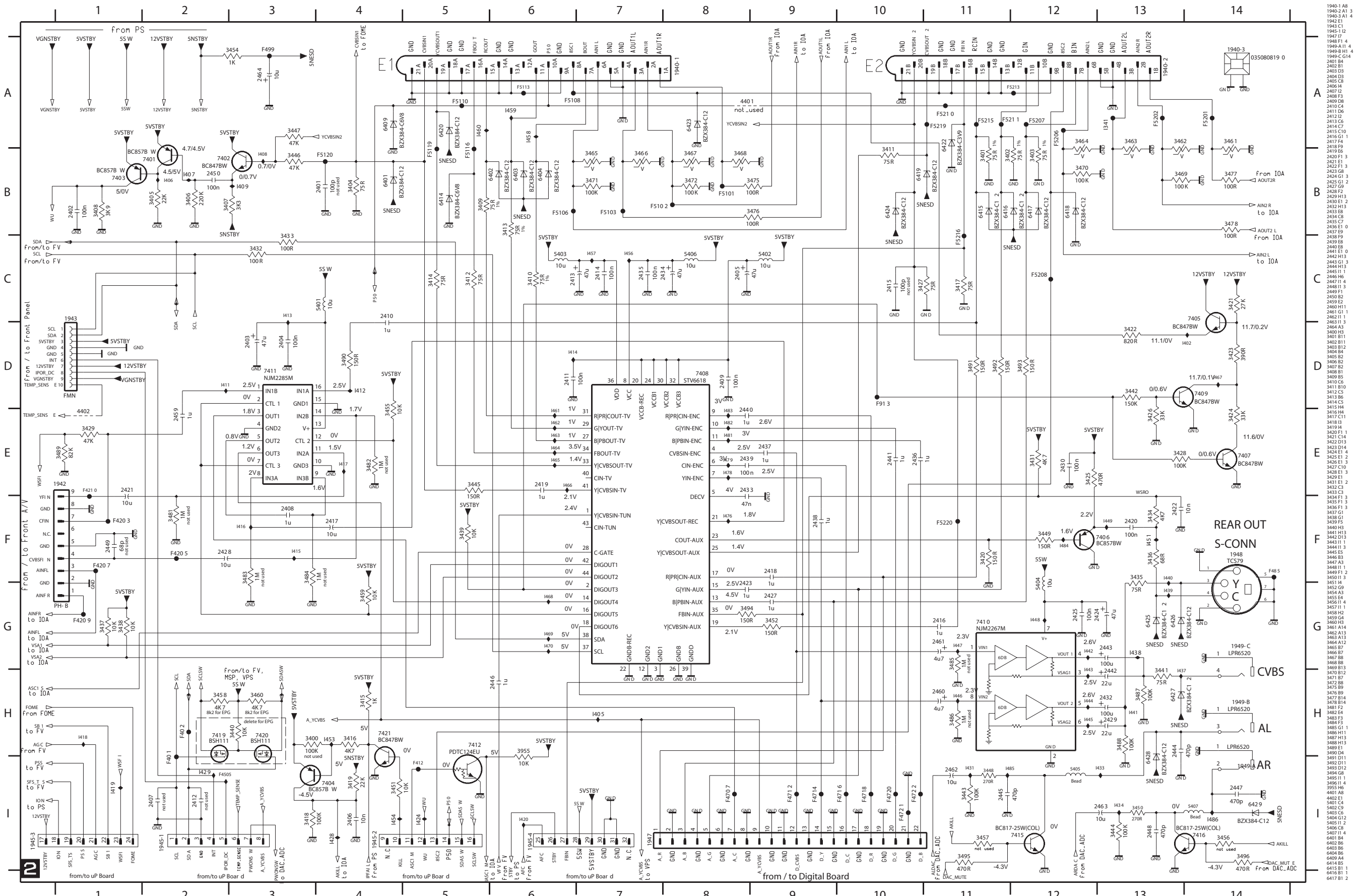
* VERSION TABLE

Pos.	PAL BG (/01)	PAL I (/07)	MULTISTD (/39)
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1704	TPS 5,5 MHz	--	TPS 5,5 MHz z
1706	--	TPS 6,0 MHz	--
3731	270R	330R	270R
4700	OR	OR	--
4701	OR	OR	--
7710	TDA9817	TDA9817	TDA9818

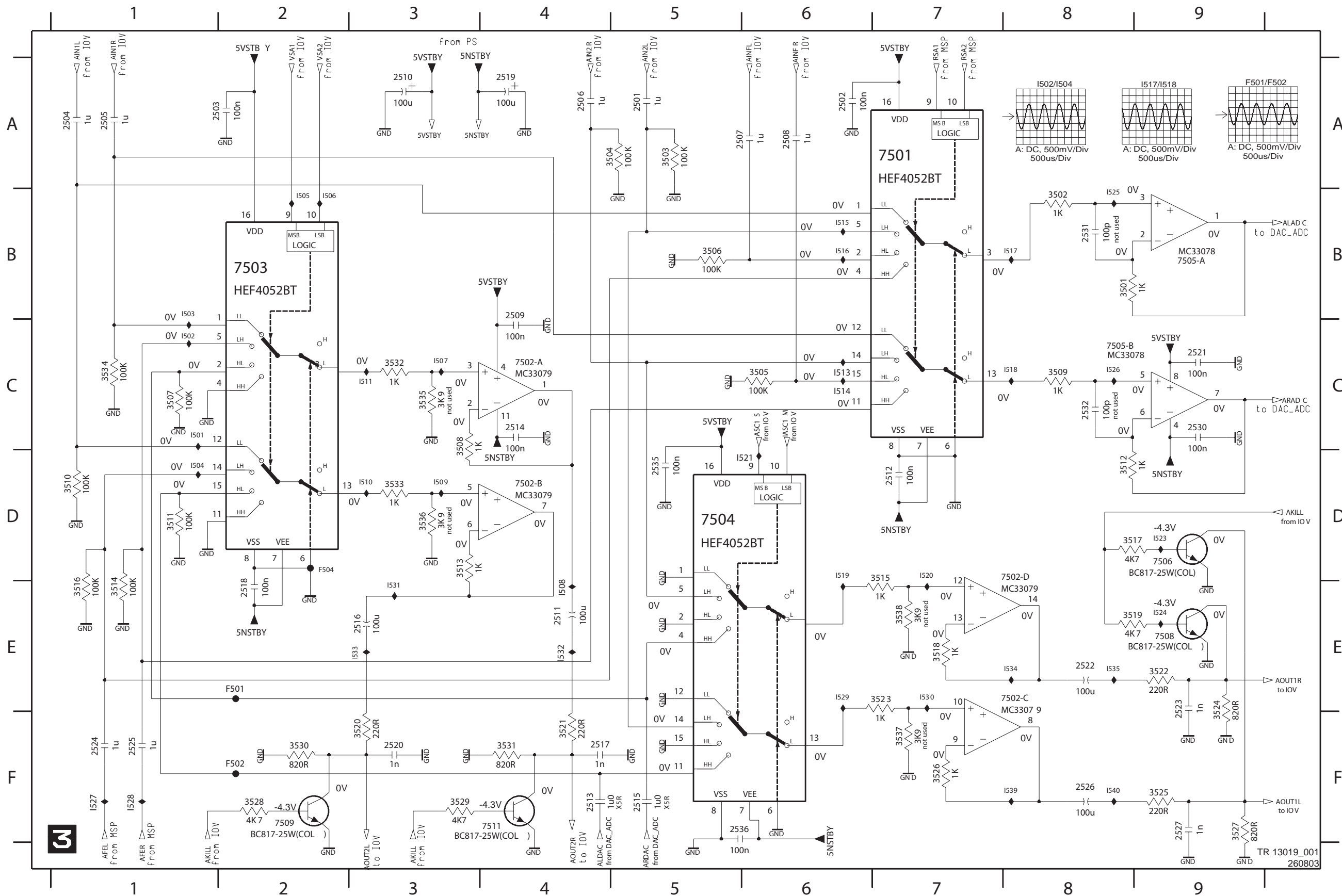
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SB1	0	0	0	1	0
SFS_TS	0	1	1	1	1

1

Analog Board: In/Out Video (IOV)



Analog Board: IN/Out Audio (IOA)

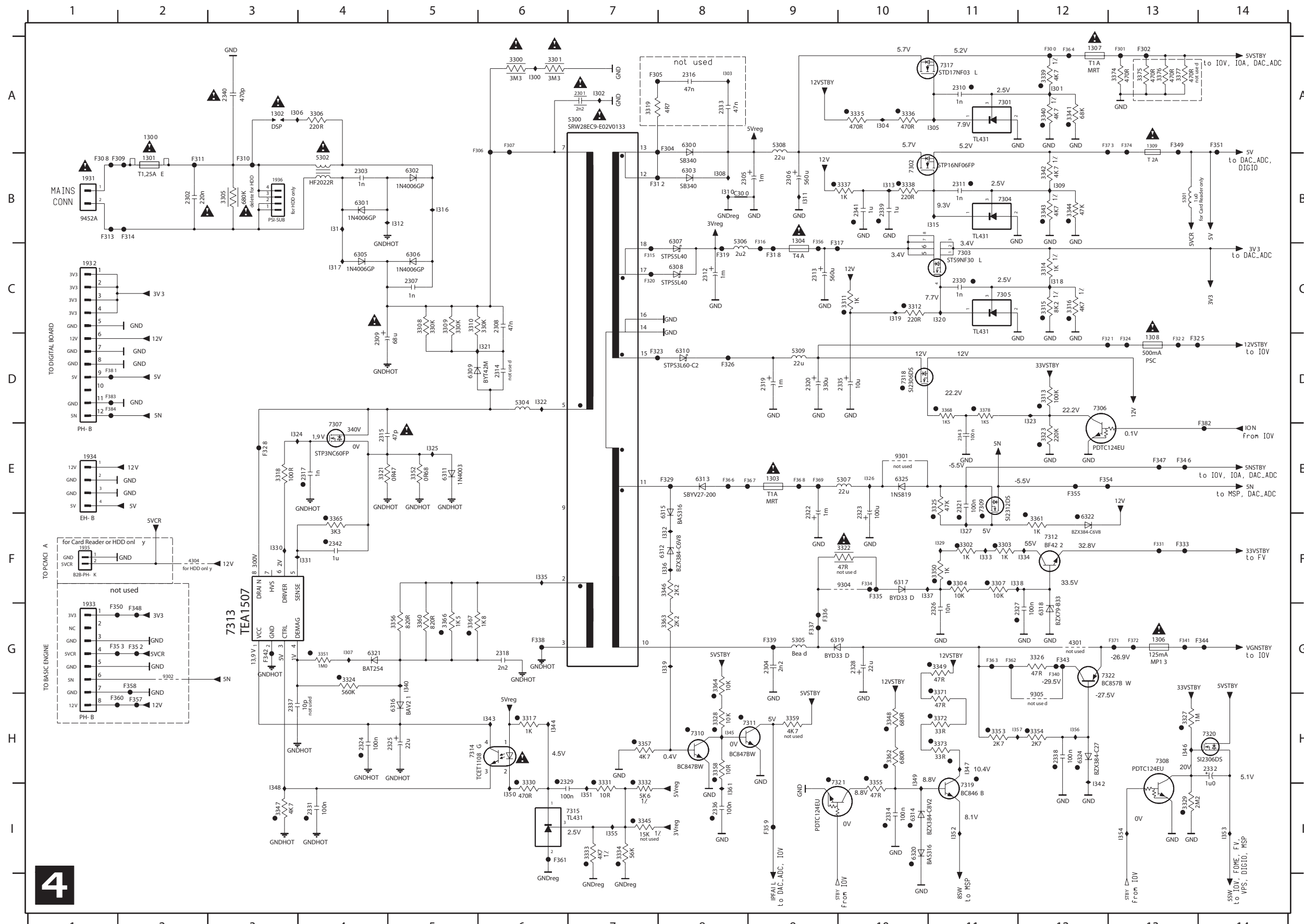


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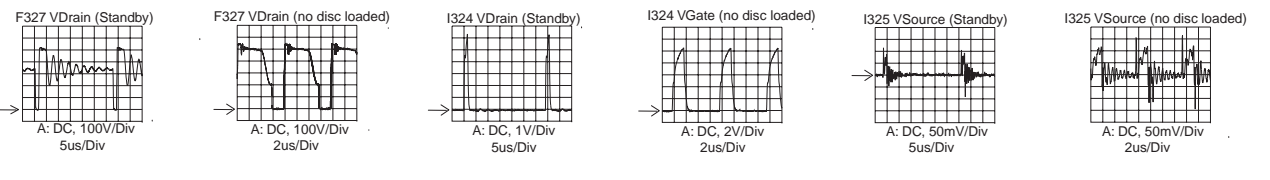
TR 13019_001
260803

Analog Board: Power Supply (PS)

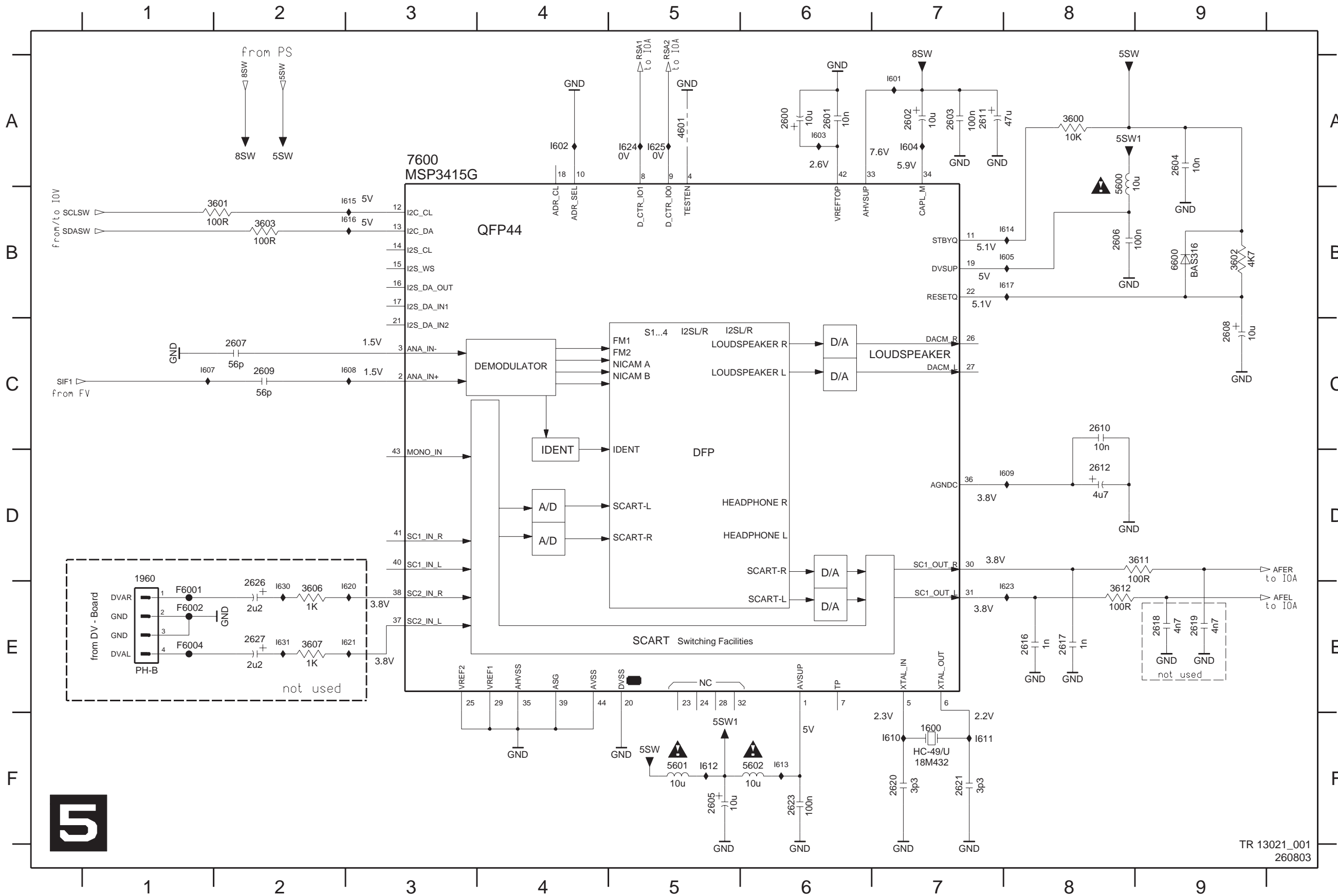


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1304 B9	3365 F4	F350 G1
1306 G1 3	3366 G5	F351 A14
1307 A1 2	3367 G5	F352 G2
1308 D1 3	3368 D1 1	F353 G1
1309 A1 3	3371 H1 1	F354 E1 2
1931 B1	3372 H1 1	F355 E1 2
1932 C1	3373 H1 1	F356 C9
1933 G1	3374 A1 3	F357 H2
1934 E1	3375 A1 3	F358 G2
1935 F1	3376 A1 3	F359 I9
1936 B3	3377 A1 3	F360 H1
2301 A7	3378 D1 1	F361 I6
2302 B2	4301 G1 2	F362 G1 1
2303 B4	4304 F2	F363 G1 1
2304 G9	5300 A6	F364 A12
2305 B8	5301 B1 3	F366 E8
2306 B9	5302 B4	F367 E9
2307 C5	5304 D6	F368 E9
2308 C6	5305 G9	F369 E9
2309 D4	5306 C8	F371 G1 3
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2311 B1 1	5308 A9	F373 A12
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2313 C9	6300 A8	F381 D1
2314 D6	6301 B4	F382 E14
2315 E4	6302 B5	F383 D1
2316 A8	6303 B8	F384 D1
2317 E4	6305 C4	I300 A6
2318 E6	6306 C5	I301 A1 2
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2329 I6	6317 F10	I312 B5
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2336 I8	6325 E1 0	I319 C10
2337 H3	7301 A1 1	I320 C11
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2339 B1 0	7303 C1 1	I322 D6
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2342 F4	7306 D1 2	I325 E5
2343 E11	7307 E4	I326 E10
3300 A6	7308 H1 3	I327 F1 1
3301 A6	7309 E11	I329 F1 1
3302 F1 1	7310 H8	I330 F3
3303 F1 1	7311 H8	I331 F4
3304 F1 1	7312 F1 2	I332 F8
3305 B3	7313 G3	I333 F1 1
3306 A4	7314 H5	I334 F1 2
3307 F1 1	7315 I6	I335 F6
3308 C5	7317 A1 1	I336 F8
3309 C5	7318 D1 0	I337 F1 0
3310 C5	7319 I11	I338 F1 1
3311 C1 0	7320 H1 4	I339 G8
3312 C1 0	7321 I10	I340 G5
3313 D1 2	7322 G12	I342 I12
3314 C1 2	9301 I10	I343 H6
3315 C1 2	9302 G2	I344 H6
3316 C1 2	9304 F10	I345 H8
3317 H6	9305 H1 2	I346 H13
3318 E3	C300 B8	I347 H11
3319 A7	F300 A12	I348 I3
3321 E4	F301 A1 3	I349 H10
3322 F1 0	F302 A13	I350 I6
3323 E12	F304 A8	I351 I7
3324 G4	F305 A7	I352 I11
3325 E11	F306 A6	I353 I14
3326 G1 2	F307 A6	I354 I13
3327 H1 3	F308 B1	I355 I7
3328 H8	F309 B2	I356 H12
3329 I13	F310 B3	I357 H11
3330 I6	F311 B2	I361 I8
3331 I7	F312 B7	
3332 I7	F313 B1	
3333 I7	F314 B2	
3334 I7	F315 C7	
3335 A1 0	F316 C9	
3336 A10	F317 C9	
3337 B10	F318 C9	
3338 B1 0	F319 C8	
3339 A12	F320 C7	
3340 A12	F321 D12	
3341 A12	F322 D13	
3342 B12	F323 D7	
3343 B12	F324 D13	
3344 B1 2	F325 D13	
3345 I7	F326 D8	
3346 F8	F328 E3	
3347 I3	F329 E8	
3348 H1 0	F331 F1 3	
3349 G1 1	F333 F1 0	
3350 F1 1	F334 F1 3	
3351 G4	F335 F1 0	
3352 E5	F336 G5	
3353 H1 1	F337 G9	
3354 H1 2	F338 G6	
3355 I10	F339 G9	
3356 G5	F340 G12	
3357 H7	F341 G13	
3358 H8	F342 G3	
3359 H9	F343 G12	
3360 G5	F344 G14	

4



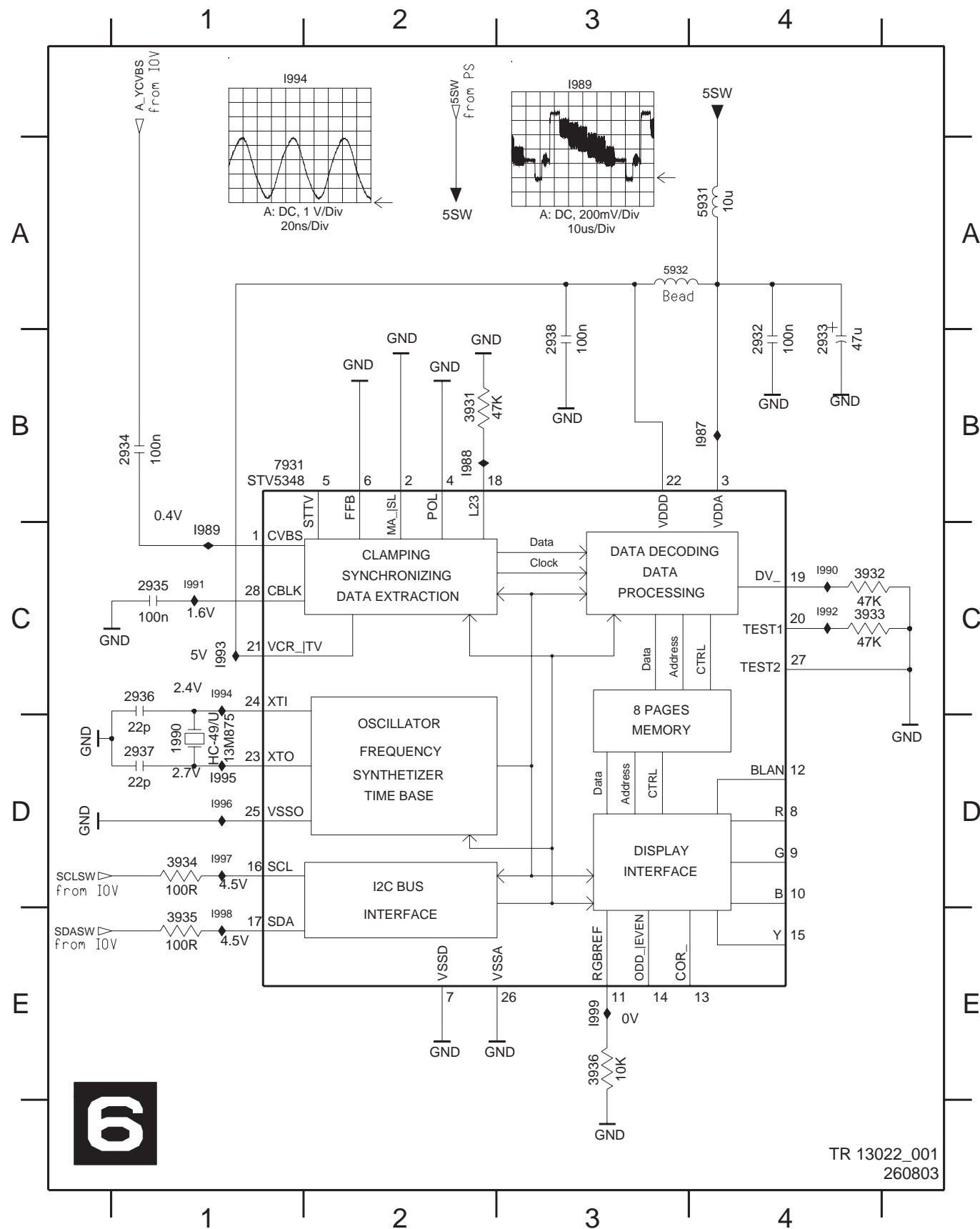
Analog Board: Multi Sound Processing (MSP)



- 1600 F7
- 1960 E1
- 2600 A6
- 2601 A6
- 2602 A7
- 2603 A7
- 2604 A9
- 2605 F5
- 2606 B8
- 2607 C2
- 2608 C9
- 2609 C2
- 2610 C8
- 2611 A7
- 2612 D8
- 2616 E8
- 2617 E8
- 2618 E9
- 2619 E9
- 2620 F7
- 2621 F7
- 2623 F6
- 2626 E2
- 2627 E2
- 3600 A8
- 3601 B2
- 3602 B9
- 3603 B2
- 3606 E2
- 3607 E2
- 3611 D9
- 3612 E8
- 4601 A5
- 5600 A8
- 5601 F5
- 5602 F6
- 6600 B9
- 7600 A3
- F6001 E1
- F6002 E1
- F6004 E1
- I601 A7
- I602 A4
- I603 A6
- I604 A7
- I605 B8
- I607 C1
- I608 C3
- I609 D8
- I610 F7
- I611 F7
- I612 F5
- I613 F6
- I614 B8
- I615 B3
- I616 B3
- I617 B8
- I620 E3
- I621 E3
- I623 E8
- I624 A5
- I625 A5
- I630 E2
- I631 E2

Analog Board: VPS

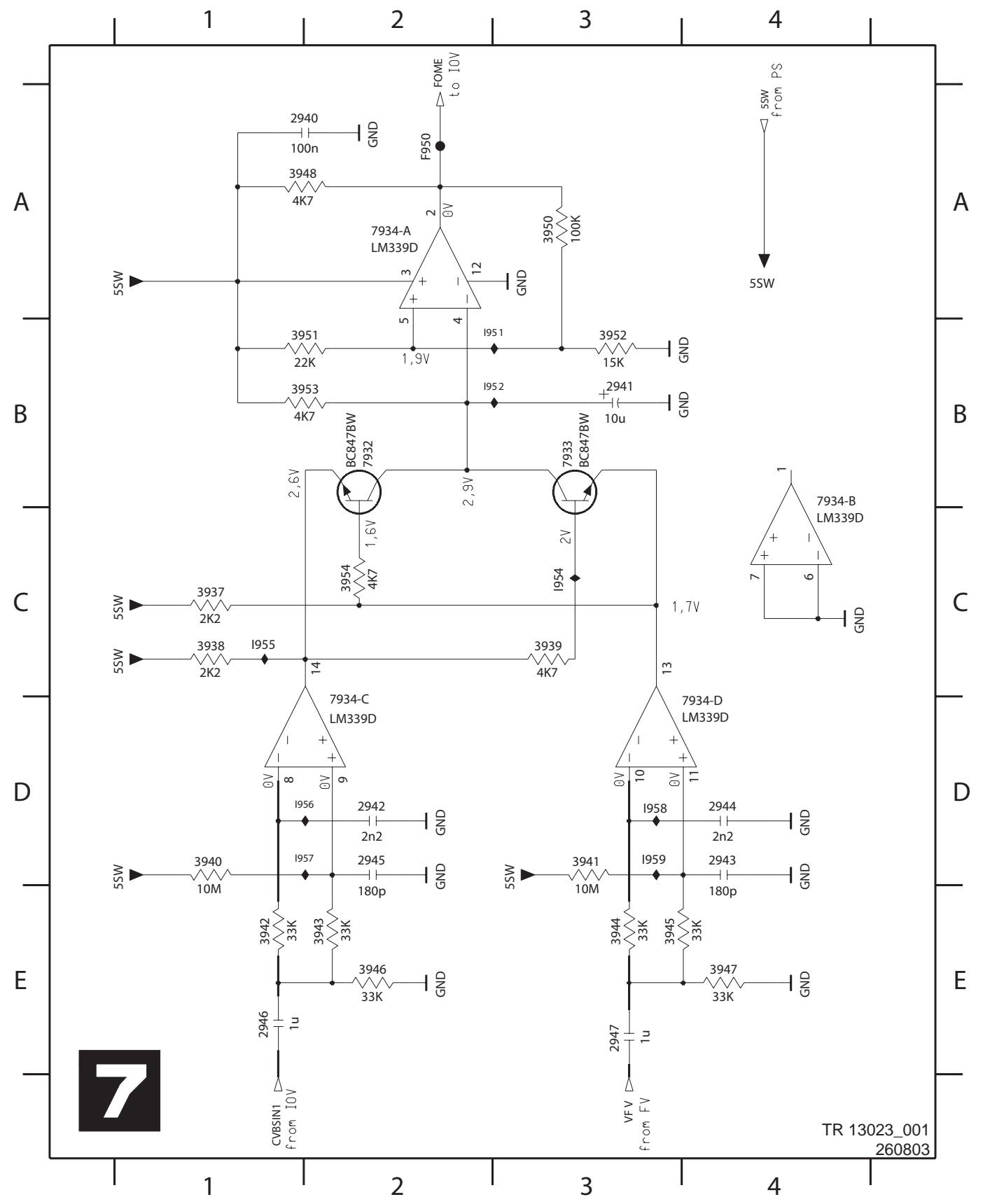
1990 D1	2934 B1	2937 D1	3932 C4	3935 E1	5932 A3	1988 B2	1991 C1	1994 C1	1997 D1
2932 B4	2935 C1	2938 B3	3933 C4	3936 E3	7931 B2	1989 C1	1992 C4	1995 D1	1998 E1
2933 B4	2936 C1	3931 B2	3934 D1	5931 A4	1987 B4	1990 C4	1993 C1	1996 D1	1999 E3



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260803

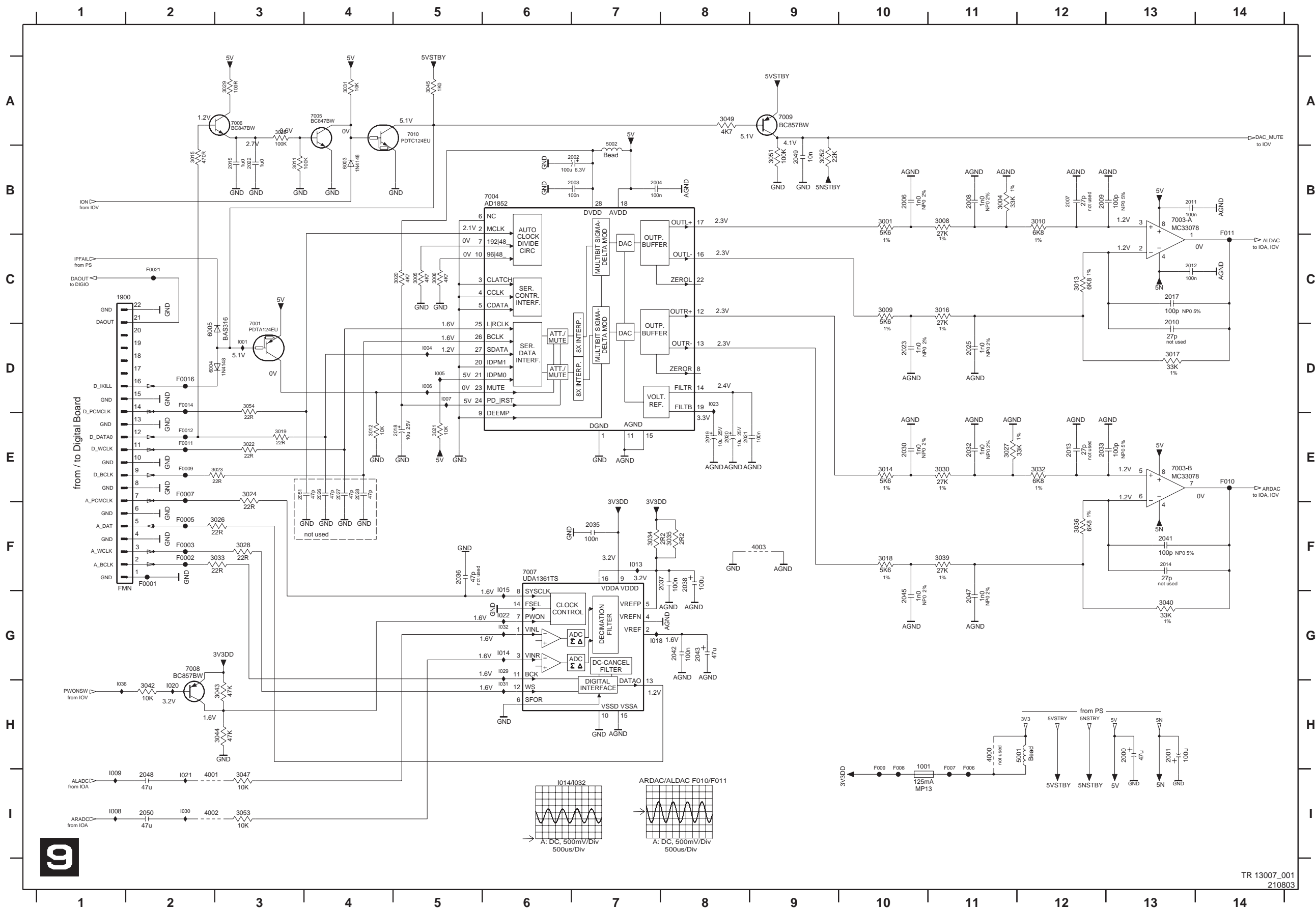
Analog Board: Follow Me (FOME)

2940 A2	2944 D4	3937 C1	3941 D3	3945 E3	3950 A3	3954 C2	7934-B B4	1951 B3	1956 D2
2941 B3	2945 D2	3938 C1	3942 E1	3946 E2	3951 B2	7932 B2	7934-C C2	1952 B3	1957 D2
2942 D2	2946 E1	3939 C3	3943 E2	3947 E4	3952 B3	7933 B3	7934-D C3	1954 C3	1958 D3
2943 D4	2947 E3	3940 D1	3944 E3	3948 A2	3953 B2	7934-A A2	F950 A2	1955 C1	1959 D3



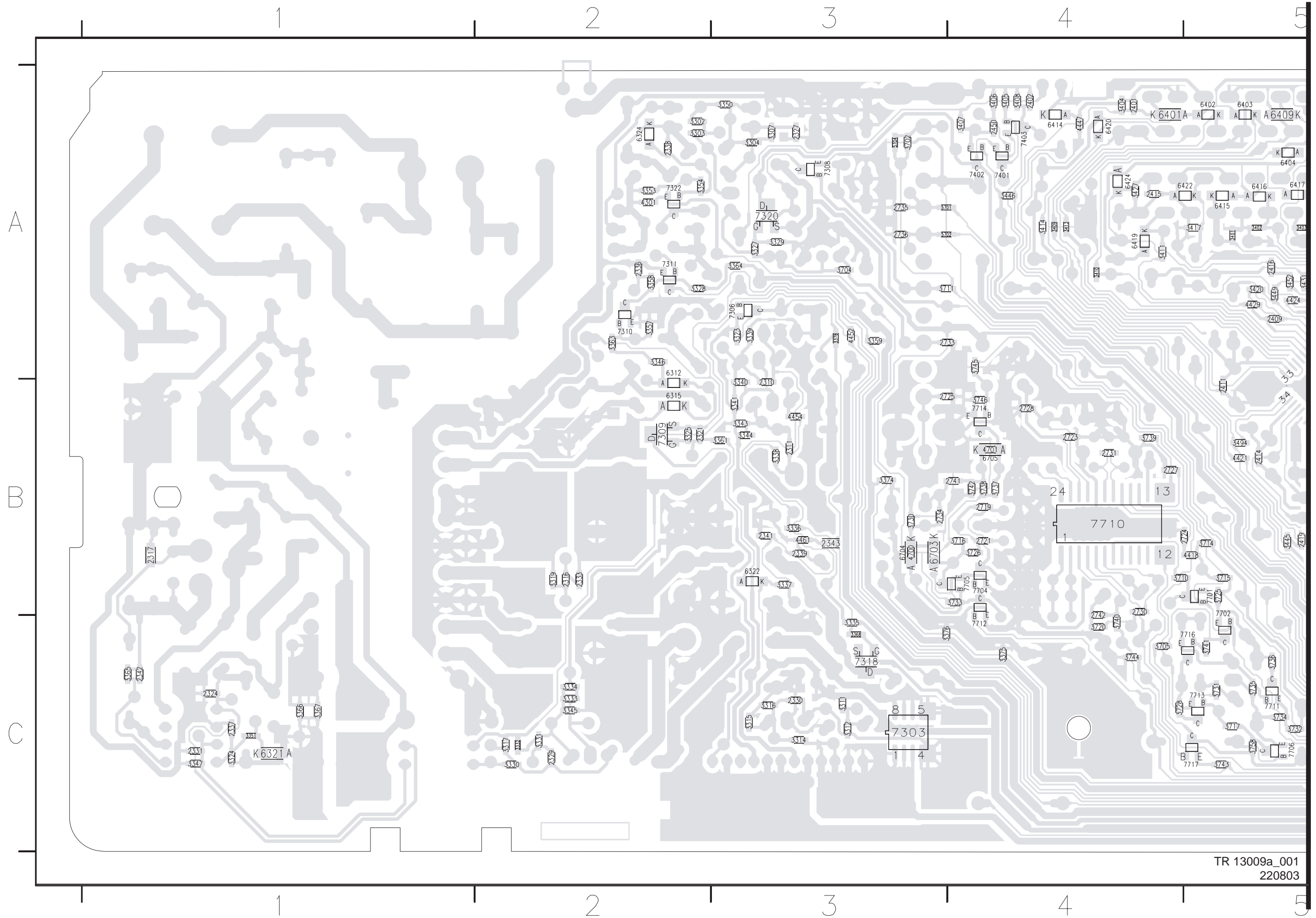
TR 13023_001
260803

Analog Board: Audio Converter (DAC_ADC)

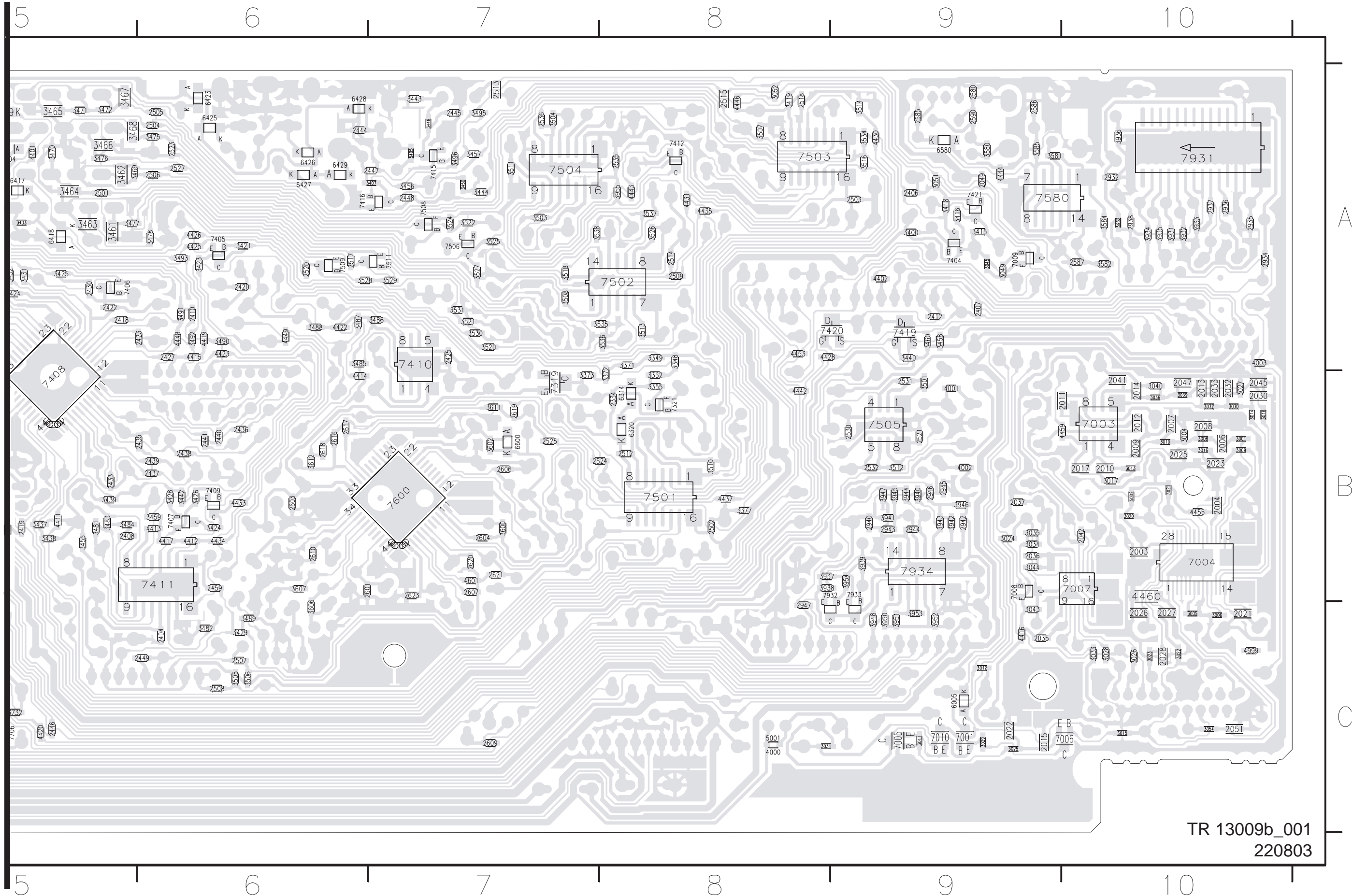


- 1001 H10
- 1900 C2
- 2000 H13
- 2001 H13
- 2002 B7
- 2003 B7
- 2004 B7
- 2006 B10
- 2007 B12
- 2008 B11
- 2009 B12
- 2010 D13
- 2011 B13
- 2012 C13
- 2013 E12
- 2014 F13
- 2015 B3
- 2017 C13
- 2018 E5
- 2019 E8
- 2020 E8
- 2021 E8
- 2022 B3
- 2023 D10
- 2025 D11
- 2026 E4
- 2027 E4
- 2028 E4
- 2030 E10
- 2032 E11
- 2033 E12
- 2035 F7
- 2036 F5
- 2037 F7
- 2038 F8
- 2041 F13
- 2042 G8
- 2043 G8
- 2045 G10
- 2047 G11
- 2048 I2
- 2049 B9
- 2050 I2
- 2051 E3
- 3001 B10
- 3004 B11
- 3005 C5
- 3006 C5
- 3008 B11
- 3009 C10
- 3010 B12
- 3011 B3
- 3012 E4
- 3013 C12
- 3014 E10
- 3015 B2
- 3016 C11
- 3017 D13
- 3018 F10
- 3019 E3
- 3020 C5
- 3021 E5
- 3022 E3
- 3023 E3
- 3024 E3
- 3025 A3
- 3026 F3
- 3027 E11
- 3028 F3
- 3029 A3
- 3030 E11
- 3031 A4
- 3032 E12
- 3033 F3
- 3034 F7
- 3035 F8
- 3036 F12
- 3039 F11
- 3040 G13
- 3042 H2
- 3043 H3
- 3044 H3
- 3045 A5
- 3047 I3
- 3049 A8
- 3051 B9
- 3052 B9
- 3053 I3
- 3054 D3
- 4000 H11
- 4001 I2
- 4002 I2
- 4003 F9
- 5001 H12
- 5002 B7
- 6003 B4
- 6004 D2
- 6005 D2
- 7001 C3
- 7003-A B13
- 7003-B E13
- 7004 B6
- 7005 A4
- 7006 A3
- 7007 F6
- 7008 G2
- 7009 A9
- 7010 A5
- F0001 F2
- F0002 F2
- F0003 F2
- F0005 F2
- F0007 E2
- F0009 E2
- F0011 E2

Layout Analog Board (Part 1 Bottom View)

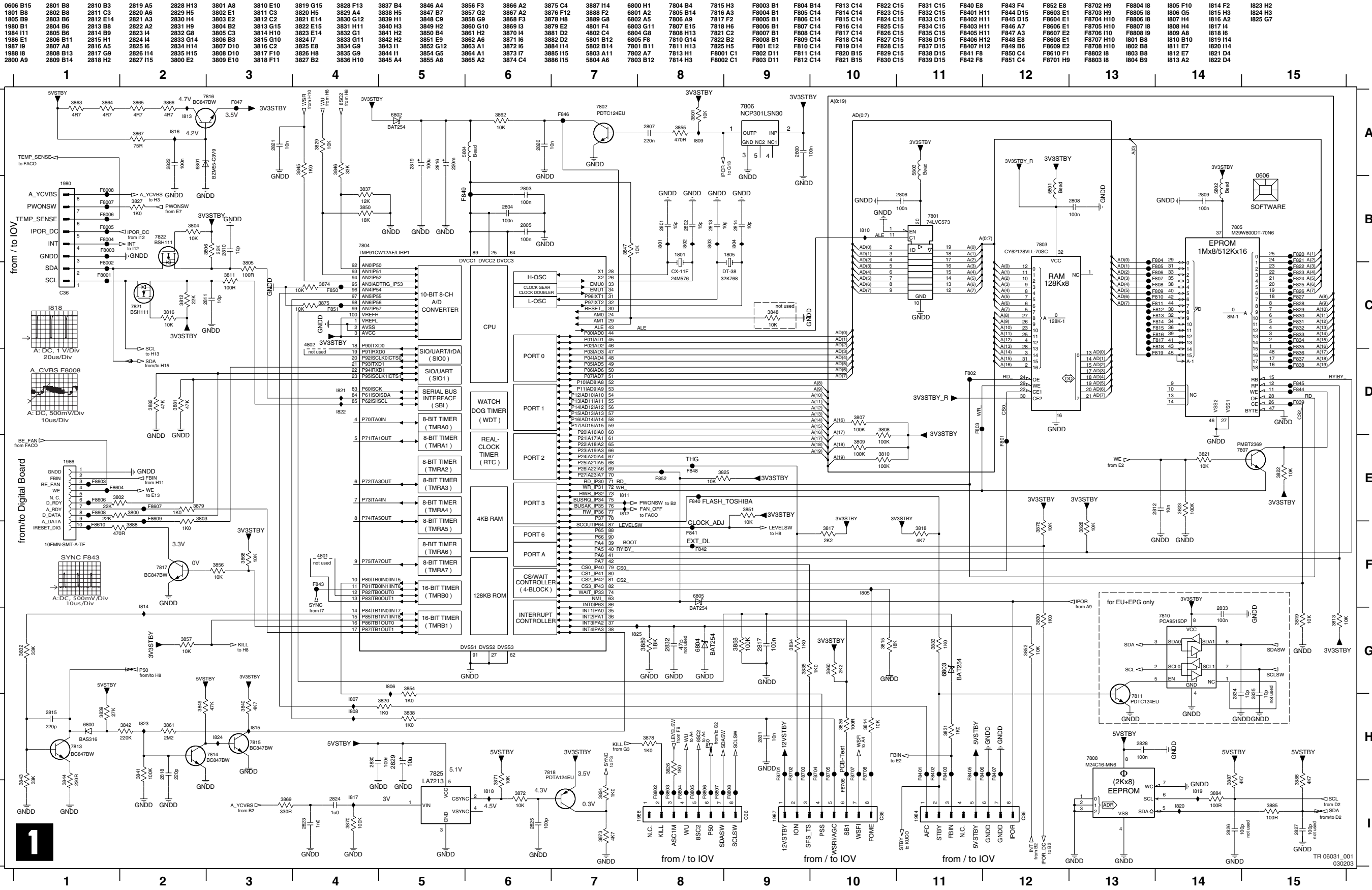


Layout Analog Board (Part 2 Bottom View)



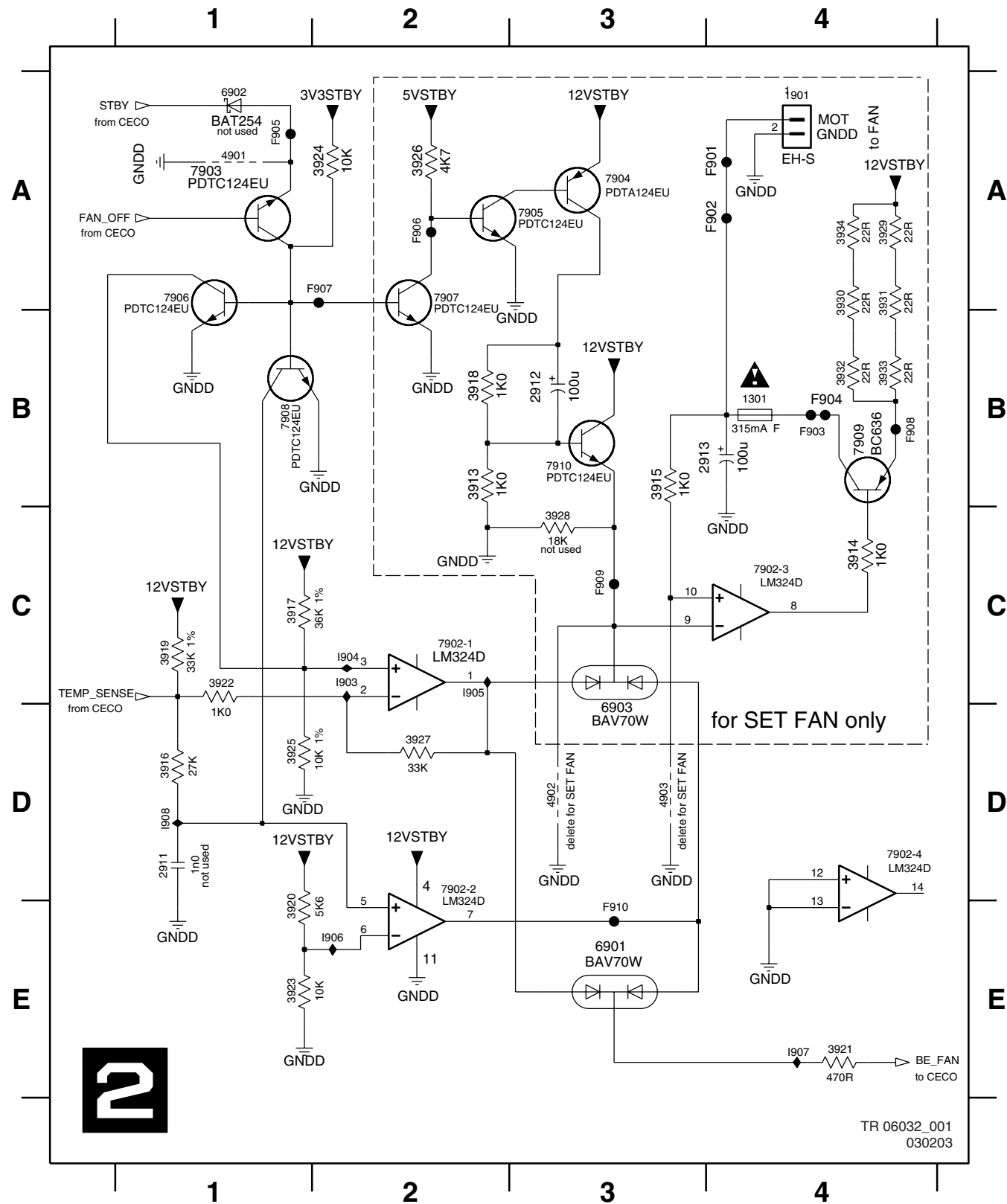
TR 13009b_001
220803

UP Sub Board: Central Controller (CECO)

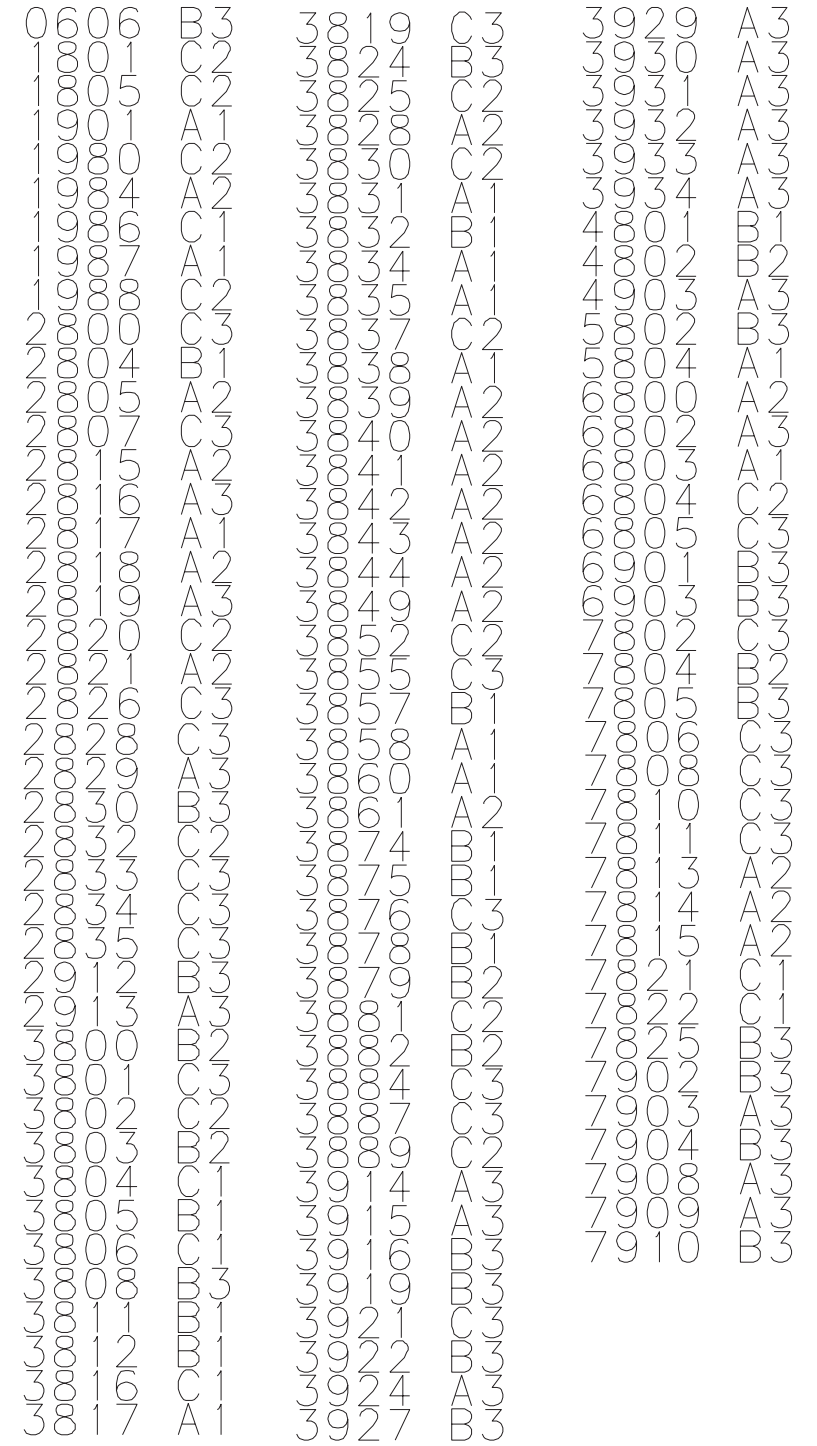
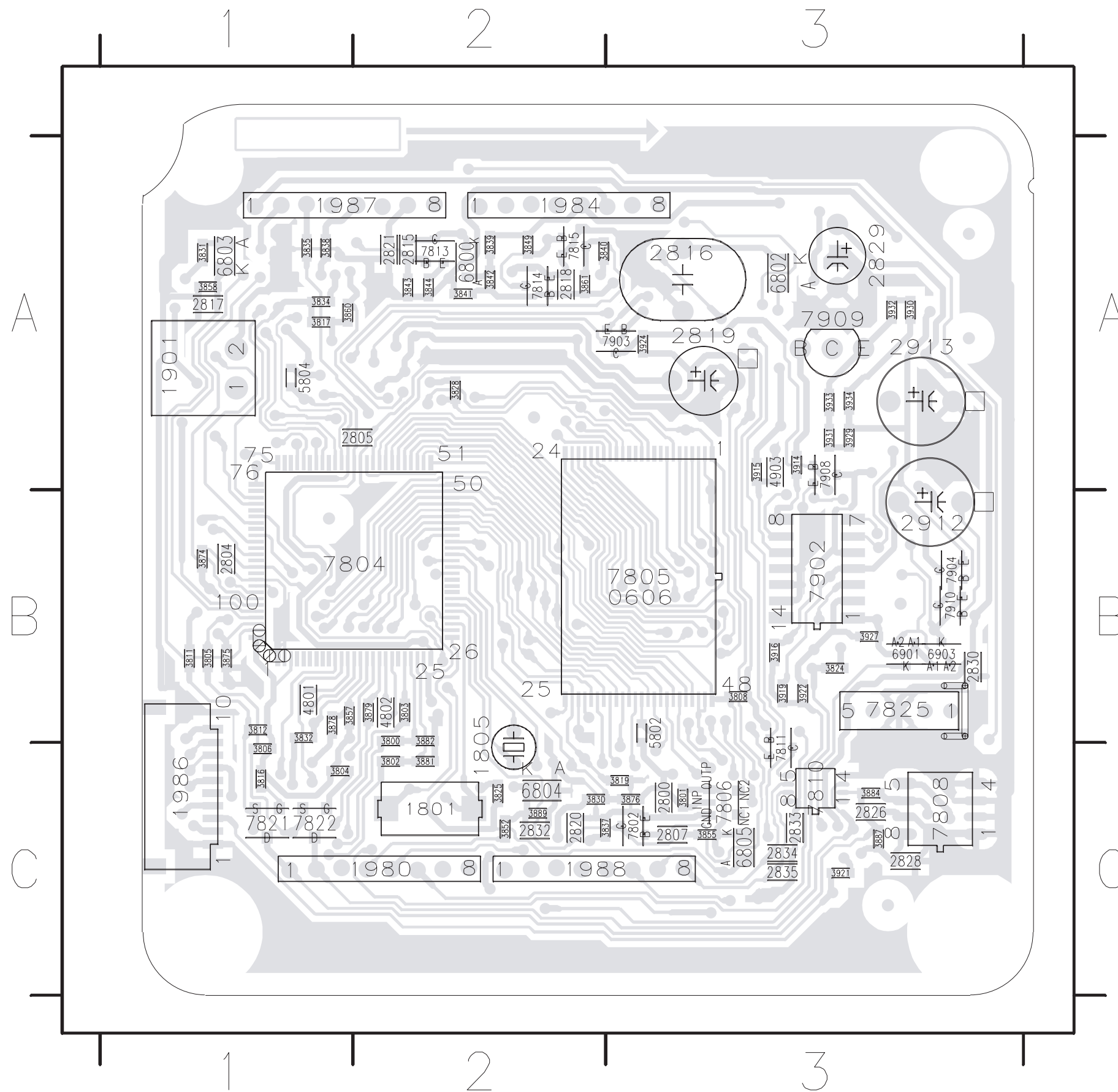


UP Sub Board: Fan Control (FACO)

1301 B4	3915 B3	3922 C1	3929 A4	4902 D3	7902-3 C4	7908 B1	F905 A1	I904 C2
1901 A4	3916 D1	3923 E1	3930 A4	4903 D3	7902-4 D4	7909 B4	F906 A2	I905 C2
2911 D1	3917 C1	3924 A2	3931 A4	6901 E3	7903 A1	7910 B3	F907 A2	I906 E2
2912 B3	3918 B2	3925 D1	3932 B4	6902 A1	7904 A3	F901 A4	F908 B4	I907 E4
2913 B4	3919 C1	3926 A2	3933 B4	6903 C3	7905 A3	F902 A4	F909 C3	I908 D1
3913 B2	3920 E1	3927 D2	3934 A4	7902-1 C2	7906 A1	F903 B4	F910 E3	
3914 C4	3921 E4	3928 C3	4901 A1	7902-2 D2	7907 A2	F904 B4	I903 C2	

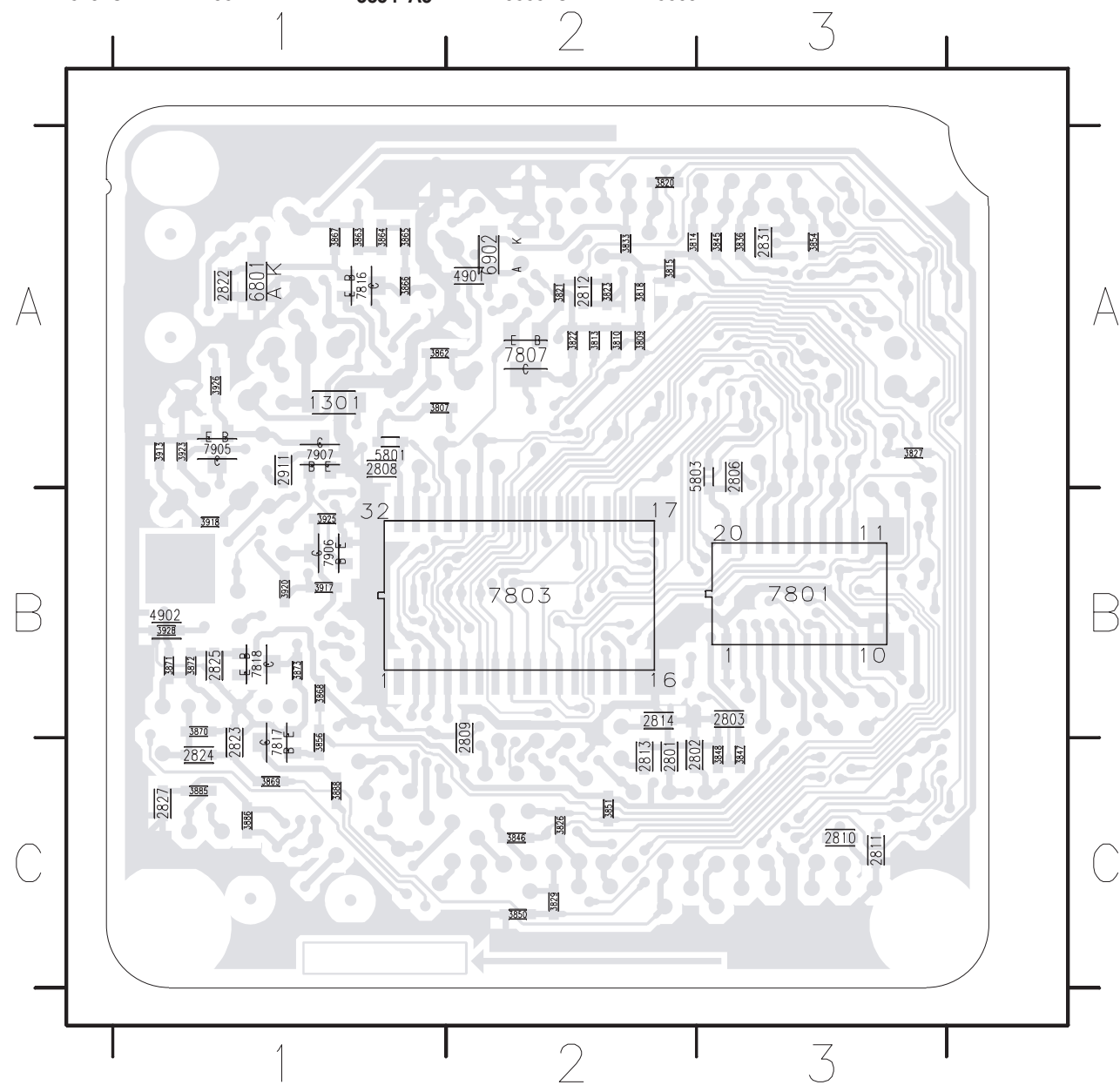


Layout UP Sub Board (Top View)

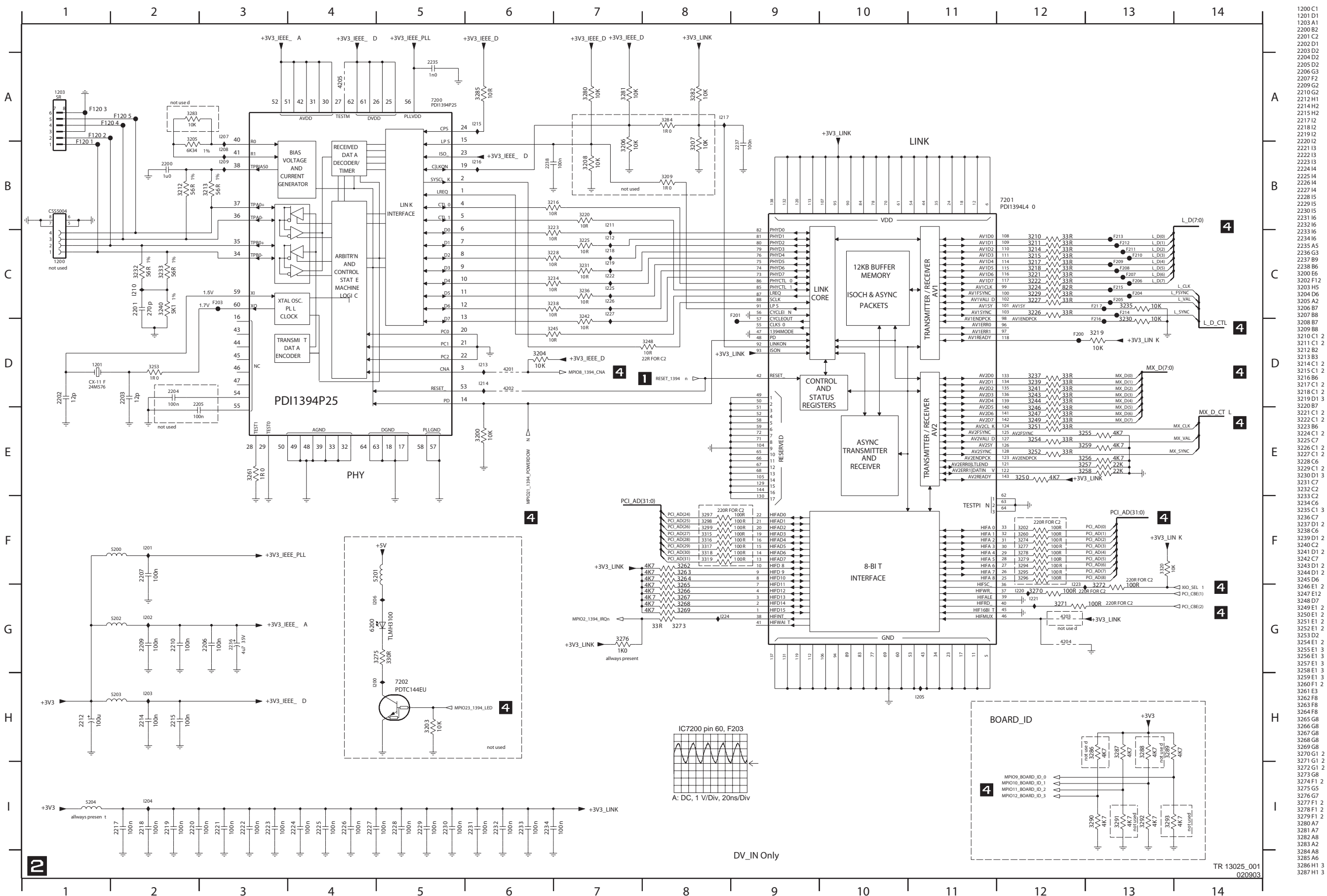


Layout UP Sub Board (Bottom View)

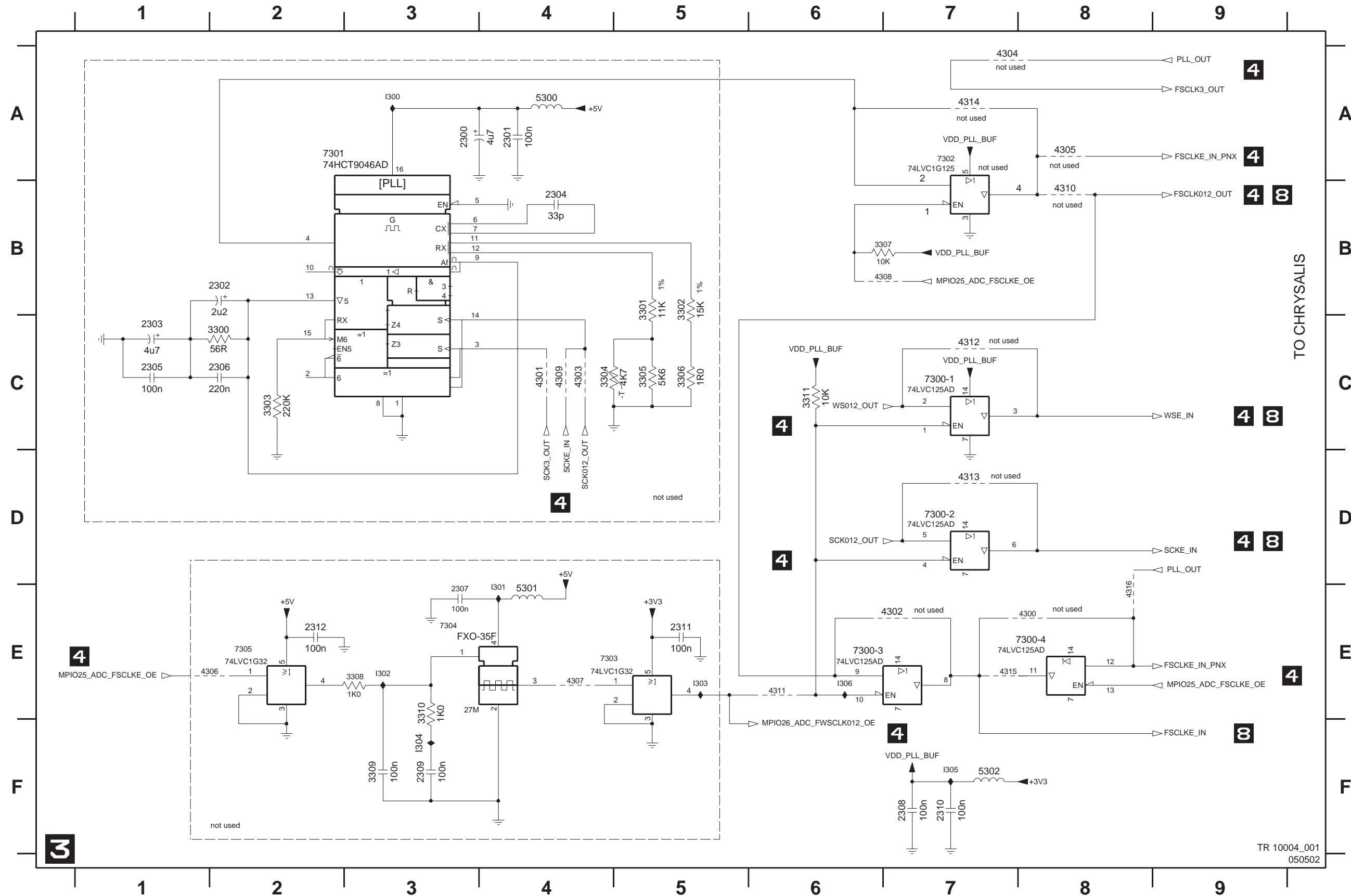
1301 A1	2824 C1	3822 A2	3856 C1	3886 C1	6801 A1
2801 C2	2825 B1	3823 A2	3862 A1	3888 C1	6902 A2
2802 C2	2827 C1	3826 C2	3863 A1	3913 A1	7801 B3
2803 B3	2831 A3	3827 A3	3864 A1	3917 B1	7803 B2
2806 A3	2911 A1	3829 C2	3865 A1	3918 B1	7807 A2
2808 A1	3807 A1	3833 A2	3866 A1	3920 B1	7816 A1
2809 B2	3809 A2	3836 A3	3867 A1	3923 A1	7817 C1
2810 C3	3810 A2	3845 A3	3868 B1	3925 B1	7818 B1
2811 C3	3813 A2	3846 C2	3869 C1	3926 A1	7905 A1
2812 A2	3814 A2	3847 C3	3870 B1	3928 B1	7906 B1
2813 C2	3815 A2	3848 C3	3871 B1	4901 A2	7907 A1
2814 B2	3818 A2	3850 C2	3872 B1	4902 B1	
2822 A1	3820 A2	3851 C2	3873 B1	5801 A1	
2823 C1	3821 A2	3854 A3	3885 C1	5803 A2	



Digital Board Chrysalis 2.1: 1394

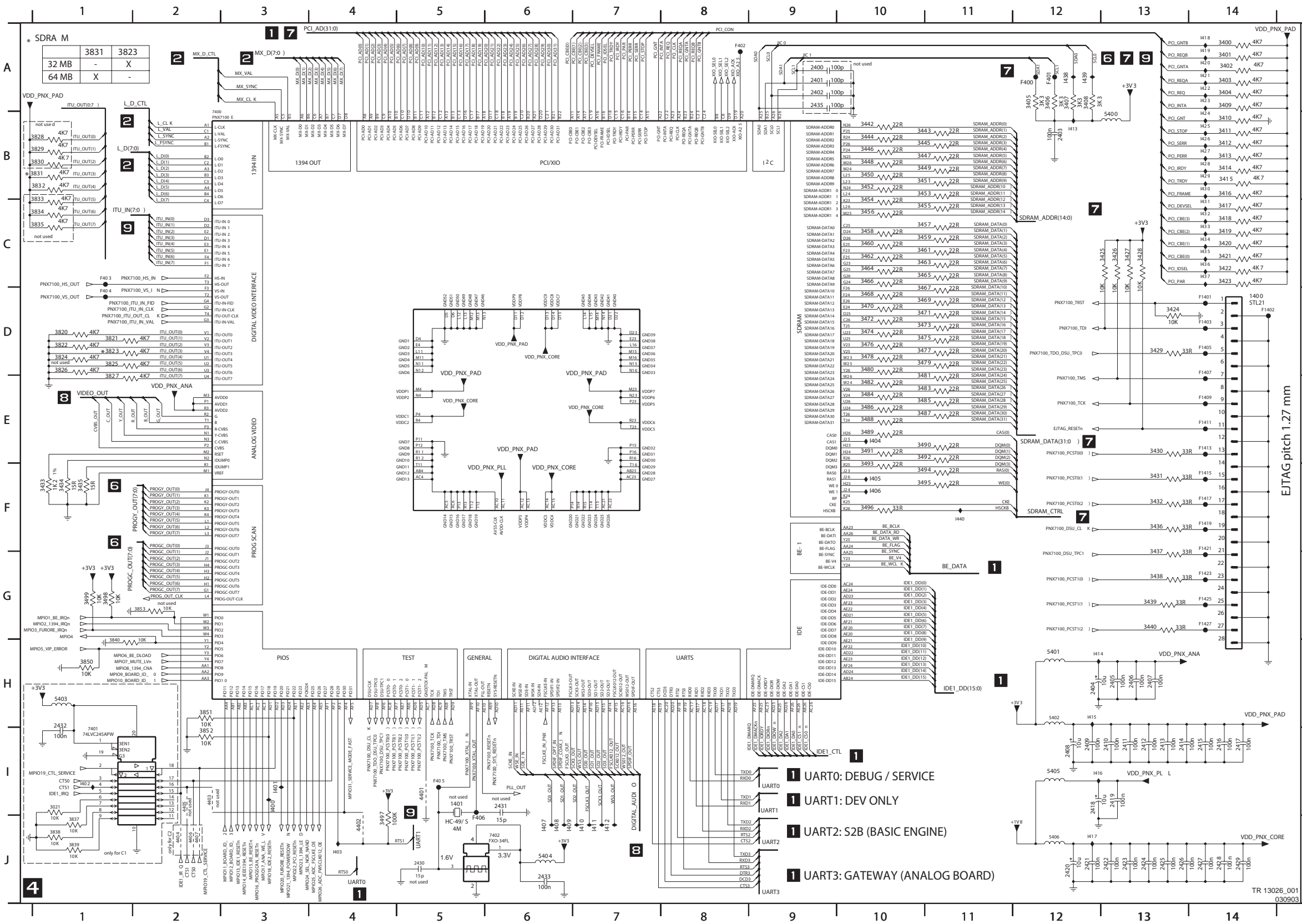


Digital Board Chrysalis 2.1: Audio PLL



- 2300 A3
- 2301 A4
- 2302 B2
- 2303 C1
- 2304 B4
- 2305 C1
- 2306 C2
- 2307 E3
- 2308 F7
- 2309 F3
- 2310 F7
- 2311 E5
- 2312 E2
- 3300 C2
- 3301 B5
- 3302 B5
- 3303 C2
- 3304 C4
- 3305 C5
- 3306 C5
- 3307 B6
- 3308 E3
- 3309 F3
- 3310 E3
- 3311 C6
- 4300 E8
- 4301 C4
- 4302 E7
- 4303 C4
- 4304 A7
- 4305 A8
- 4306 E1
- 4307 E4
- 4308 B6
- 4309 C4
- 4310 B8
- 4311 E6
- 4312 C7
- 4313 D7
- 4314 A7
- 4315 E7
- 4316 E8
- 5300 A4
- 5301 E4
- 5302 F7
- 7300-1 C7
- 7300-2 D7
- 7300-3 E6
- 7300-4 E8
- 7301 A2
- 7302 A7
- 7303 E5
- 7304 E3
- 7305 E2
- I300 A3
- I301 E4
- I302 E3
- I303 E5
- I304 F3
- I305 F7
- I306 E6

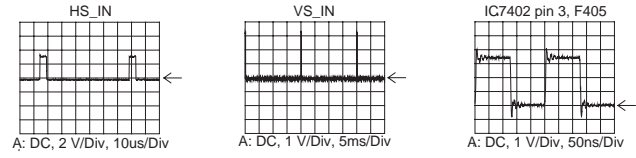
Digital Board Chrysalis 2.1: Chrysalis



1400	D14	3447	B11	5400	B13
1401	I5	3448	B10	5401	H12
2400	A9	3449	B11	5402	H12
2401	A9	3450	B10	5403	H1
2402	A9	3451	B11	5404	J6
2403	B12	3452	B10	5405	I2
2404	H12	3453	B11	5406	J12
2405	H13	3454	C10	7400	B2
2406	H13	3455	C11	7401	I1
2407	H13	3456	C10	7402	J6
2408	I12	3457	C11	F1401	D14
2409	I12	3458	C10	F1402	D14
2410	I13	3459	C11	F1403	D14
2411	I13	3460	C10	F1405	D14
2412	I13	3461	C11	F1407	D14
2413	I13	3462	C10	F1409	E14
2414	I13	3463	C11	F1411	E14
2415	I14	3464	C10	F1413	E14
2416	I14	3465	C11	F1415	F14
2417	I14	3466	C10	F1417	F14
2418	I12	3467	D11	F1419	F14
2419	I13	3468	D10	F1421	F14
2420	J12	3469	D11	F1423	G14
2421	J12	3470	D10	F1425	G14
2422	J13	3471	D11	F1427	G14
2423	J13	3472	D10	F400	A12
2424	J13	3473	D11	F401	A12
2425	J13	3474	D10	F402	A8
2426	J13	3475	D11	F403	C1
2427	J14	3476	D10	F404	D1
2428	J14	3477	D11	F405	I5
2429	J14	3478	D10	F406	I5
2430	J5	3479	D11	I400	I3
2431	I6	3480	D10	I401	I3
2432	I1	3481	E11	I402	I1
2433	J6	3482	E10	I403	J4
2435	A9	3483	E11	I404	E10
3021	I1	3484	E10	I405	F10
3400	A14	3485	E11	I406	F10
3401	A14	3486	E10	I407	J6
3402	A14	3487	E11	I408	J6
3403	A14	3488	E10	I409	J6
3404	A14	3489	E10	I410	J7
3405	A12	3490	E11	I411	J7
3406	A12	3491	E10	I412	J7
3407	A12	3492	E11	I413	B12
3408	A12	3493	F10	I414	H12
3409	A14	3494	F11	I415	H12
3410	B14	3495	F11	I416	I12
3411	B14	3496	F10	I417	J12
3412	B14	3497	J4	I418	A14
3413	B14	3498	G1	I419	A14
3414	B14	3499	G1	I420	A14
3415	B14	3820	D1	I421	A14
3416	B14	3821	D1	I422	A14
3417	C14	3822	D1	I423	A14
3418	C14	3823	D1	I424	B14
3419	C14	3824	D1	I425	B14
3420	C14	3825	D1	I426	B14
3421	C14	3826	D1	I427	B14
3422	C14	3827	E1	I428	B14
3423	C14	3828	B1	I429	B14
3424	D13	3829	B1	I430	B14
3425	D13	3830	B1	I431	C14
3426	C13	3831	B1	I432	C14
3427	C13	3832	B1	I433	C14
3428	C13	3833	C1	I434	C14
3429	D13	3834	C1	I435	C14
3430	E13	3835	C1	I436	C14
3431	F13	3837	J1	I437	C14
3432	F13	3838	J1	I438	A12
3433	F1	3839	J1	I439	A12
3434	F1	3840	H1	I440	F11
3435	F1	3850	H1		
3436	F13	3851	H2		
3437	G13	3852	I2		
3438	G13	3853	G2		
3439	G13	4401	I5		
3440	G13	4402	J4		
3442	B10	4403	I2		
3443	B11	4404	J2		
3444	B10	4405	J2		
3445	B11	4406	J2		
3446	B10	4407	J2		

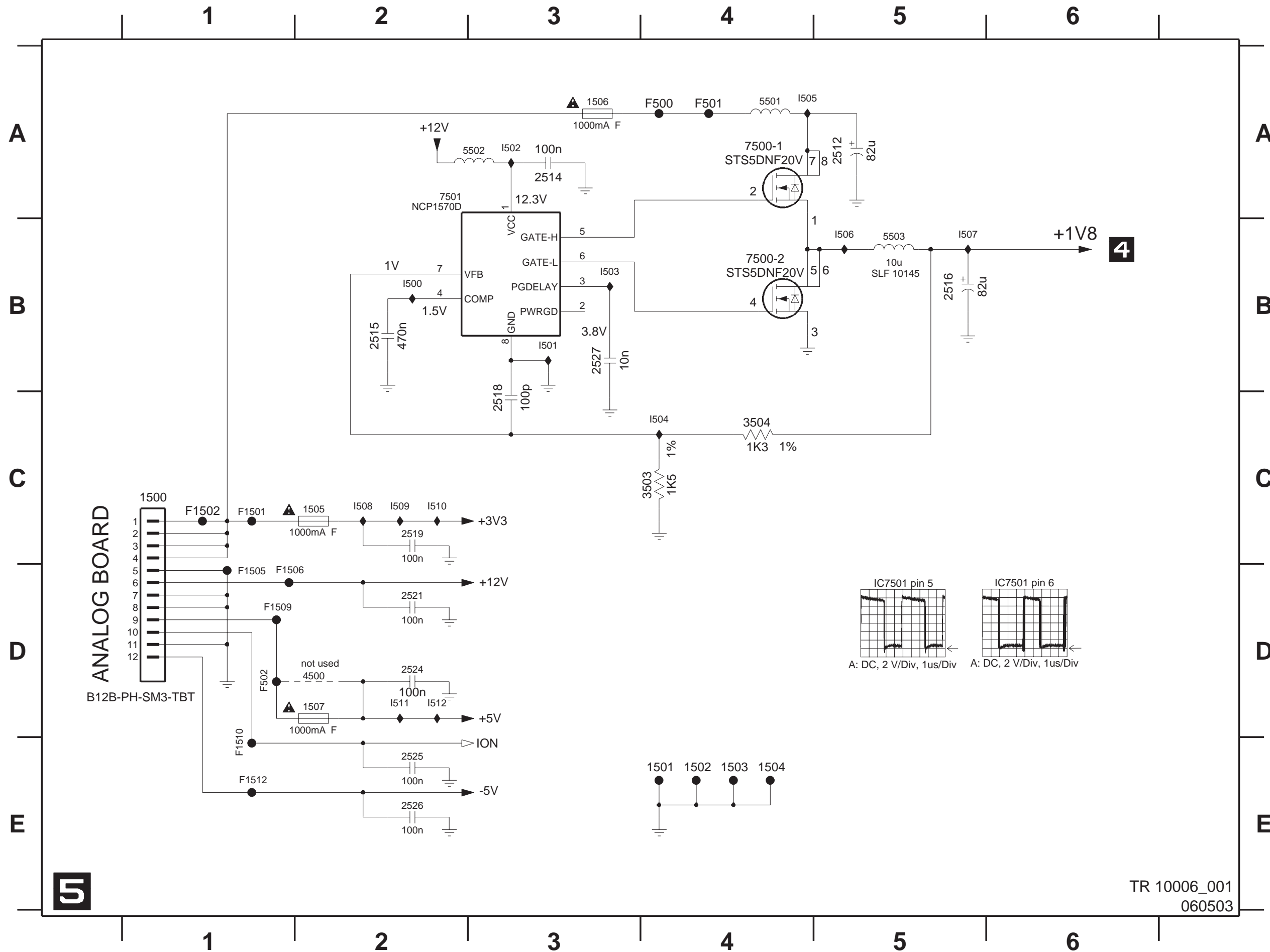
EJTAG pitch 1.27 mm

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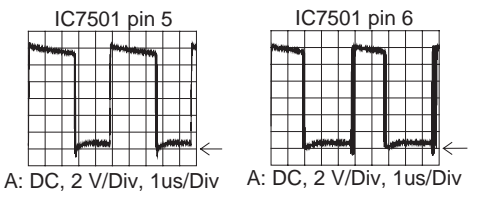


- 1 UART0: DEBUG / SERVICE
- 1 UART1: DEV ONLY
- 1 UART2: S2B (BASIC ENGINE)
- 1 UART3: GATEWAY (ANALOG BOARD)

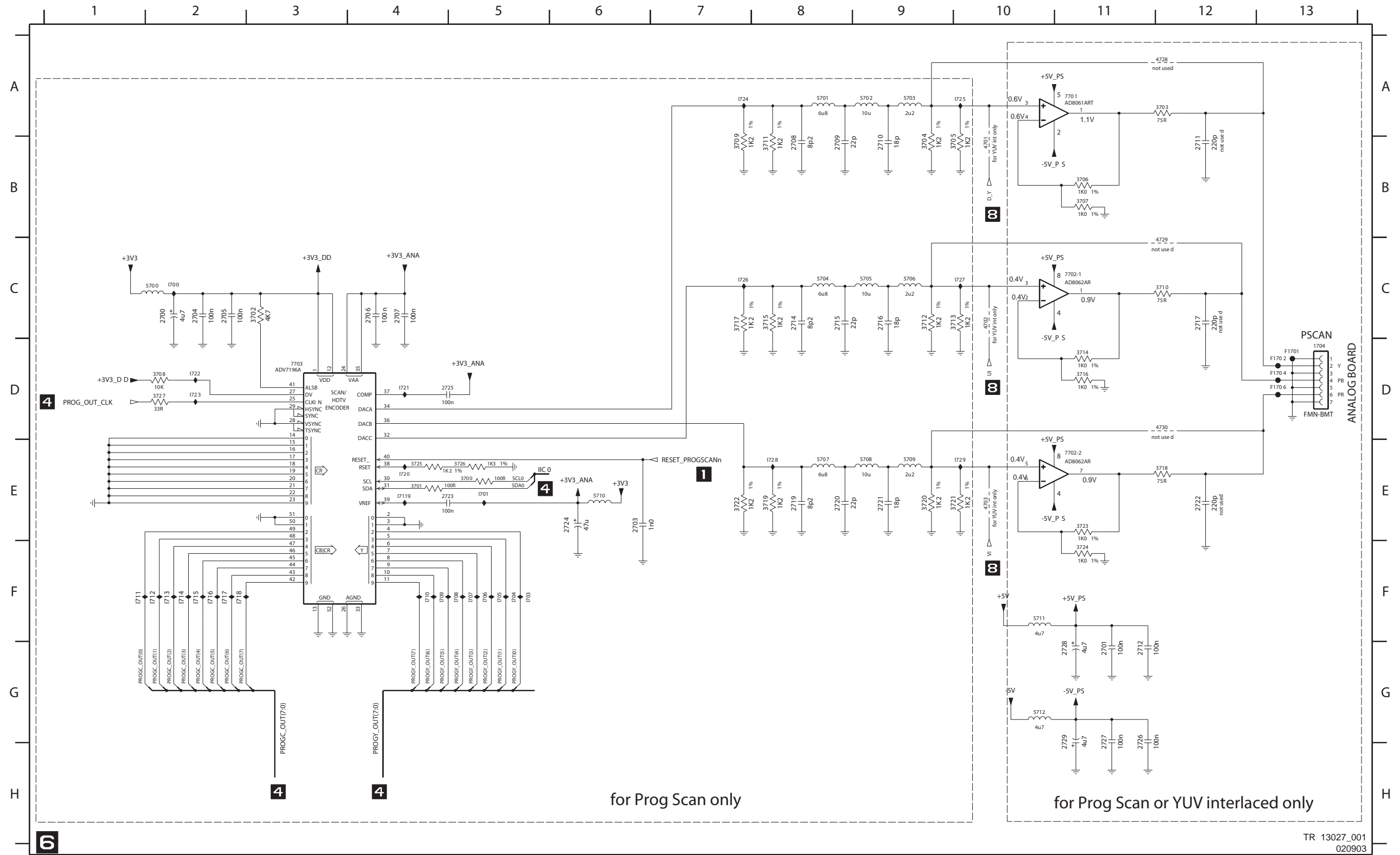
Digital Board Chrysalis 2.1: 1.8V Power



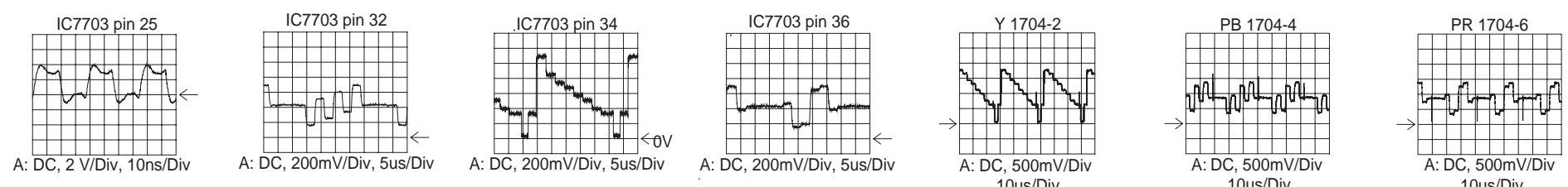
- 1500 C1
- 1501 E4
- 1502 E4
- 1503 E4
- 1504 E4
- 1505 C2
- 1506 A3
- 1507 D2
- 2512 A5
- 2514 A3
- 2515 B2
- 2516 B5
- 2518 C3
- 2519 C2
- 2521 D2
- 2524 D2
- 2525 E2
- 2526 E2
- 2527 B3
- 3503 C4
- 3504 C4
- 4500 D2
- 5501 A4
- 5502 A3
- 5503 B5
- 7500-1 A4
- 7500-2 B4
- 7501 A2
- F1501 C1
- F1502 C1
- F1505 D1
- F1506 D1
- F1509 D1
- F1510 E1
- F1512 E1
- F500 A4
- F501 A4
- F502 D1
- I500 B2
- I501 B3
- I502 A3
- I503 B3
- I504 C4
- I505 A4
- I506 B5
- I507 B5
- I508 C2
- I509 C2
- I510 C2
- I511 D2
- I512 D2



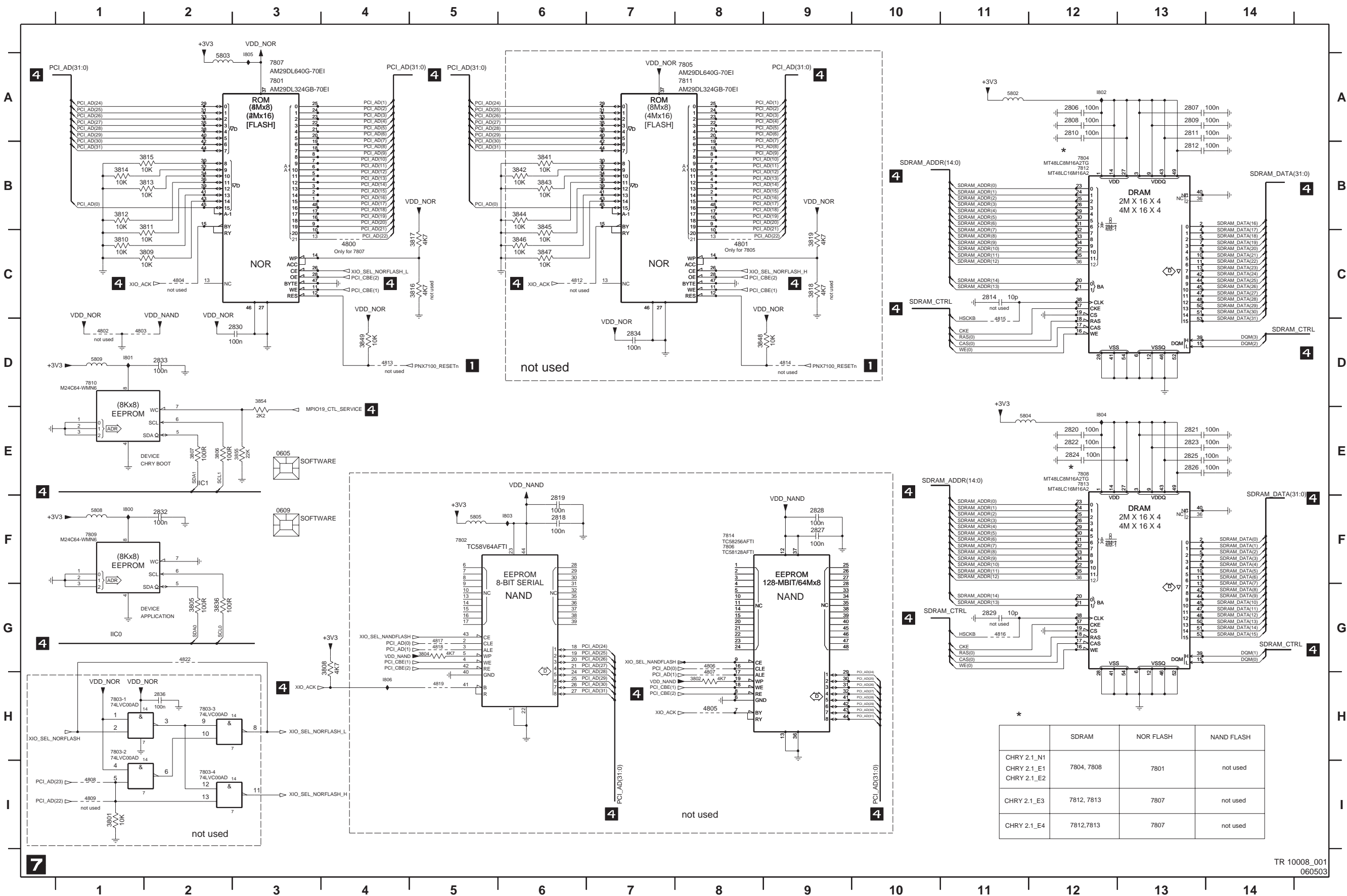
Digital Board Chrysalis 2.1: Prog. scan DAC



- 1704 D1 3
- 1715 F2
- 2700 C2
- 1716 F2
- 2701 G1 1
- 1717 F2
- 2703 E6
- 1718 F2
- 2704 C2
- 1720 E4
- 2705 C2
- 1721 D4
- 2706 C4
- 1722 D2
- 2707 C4
- 1723 D2
- 2708 B8
- 1724 A7
- 2709 B8
- 1725 A10
- 2710 B9
- 1726 C7
- 2711 B12
- 1727 C10
- 2712 G11
- 1728 E8
- 2714 C8
- 1729 E10
- 2715 C8
- 2716 C9
- 2717 C12
- 2719 E8
- 2720 E8
- 2721 E9
- 2722 E1 2
- 2723 E4
- 2724 E6
- 2725 D4
- 2726 G11
- 2727 G11
- 2728 G11
- 2729 G11
- 3700 E5
- 3701 E4
- 3702 C3
- 3703 A12
- 3704 B9
- 3705 B10
- 3706 B11
- 3707 B11
- 3708 D2
- 3709 B7
- 3710 C12
- 3711 B8
- 3712 C9
- 3713 C10
- 3714 D11
- 3715 C8
- 3716 D1 1
- 3717 C7
- 3718 E12
- 3719 E8
- 3720 E9
- 3721 E10
- 3722 E7
- 3723 E11
- 3724 F1 1
- 3725 E4
- 3726 E5
- 3727 D2
- 4701 B10
- 4702 C10
- 4703 E10
- 4704 C10
- 4705 E10
- 4706 C12
- 4707 D12
- 5700 C2
- 5701 A8
- 5702 A9
- 5703 A9
- 5704 C8
- 5705 C9
- 5706 C9
- 5707 E8
- 5708 E9
- 5709 E9
- 5710 E6
- 5711 F10
- 5712 G10
- 7701 A11
- 7702-1 C11
- 7702-2 E11
- 7703 D3
- F1701 D13
- F1702 D13
- F1704 D13
- F1706 D13
- I700 C2
- I701 E5
- I703 F5
- I704 F5
- I705 F5
- I706 F5
- I707 F5
- I708 F5
- I709 F4
- I710 F4
- I711 F1
- I719 E4
- I72 F2
- I73 F2
- I74 F2



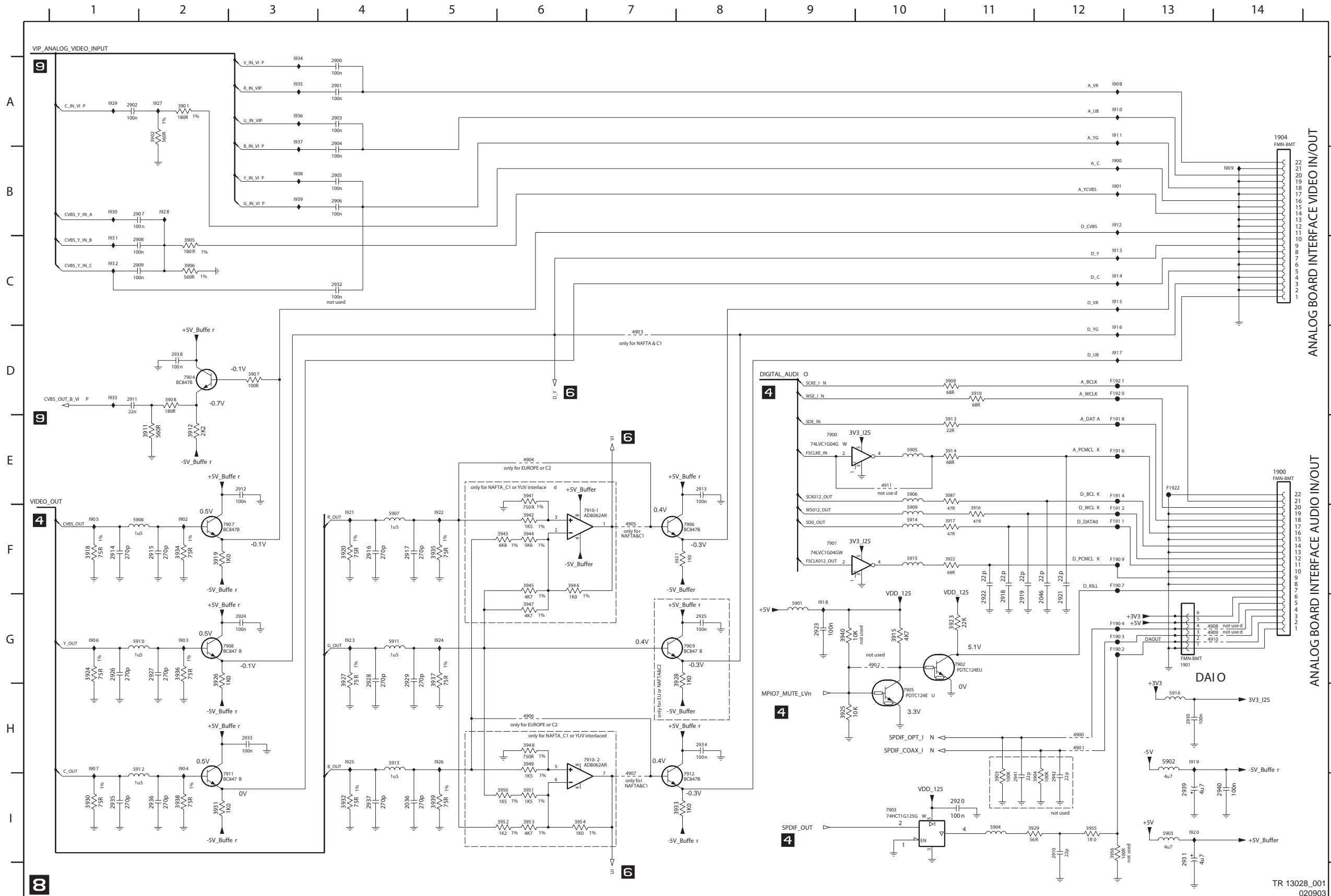
Digital Board Chrysalis 2.1: Flash SDRAM EEPROM



- 0605 E3
- 0609 F3
- 2806 A12
- 2807 A13
- 2808 A12
- 2809 A13
- 2810 A12
- 2811 A13
- 2812 B13
- 2814 C11
- 2818 F6
- 2819 F6
- 2820 E12
- 2821 E13
- 2822 E12
- 2823 E13
- 2824 E12
- 2825 E13
- 2826 E13
- 2827 F9
- 2828 F9
- 2829 G11
- 2830 D3
- 2832 F2
- 2833 D2
- 2834 D7
- 2836 H2
- 3801 I1
- 3802 H8
- 3804 G5
- 3805 G2
- 3806 E2
- 3807 E2
- 3808 G4
- 3809 C2
- 3810 C1
- 3811 B2
- 3812 B1
- 3813 B2
- 3814 B1
- 3815 B2
- 3816 C5
- 3817 C5
- 3818 C9
- 3819 C9
- 3836 G2
- 3841 B6
- 3842 B6
- 3843 B6
- 3844 B6
- 3845 B6
- 3846 C6
- 3847 C6
- 3848 D8
- 3849 D4
- 3854 D3
- 3855 E3
- 4800 C4
- 4801 C8
- 4802 D1
- 4803 D1
- 4804 C2
- 4805 H8
- 4806 G8
- 4807 H8
- 4808 I1
- 4809 I1
- 4812 C6
- 4813 D4
- 4814 D9
- 4815 D11
- 4816 G11
- 4817 G5
- 4818 G5
- 4819 H5
- 4822 G2
- 5802 A11
- 5803 A2
- 5804 E11
- 5805 F5
- 5808 F1
- 5809 D1
- 7801 A3
- 7802 F5
- 7803-1 H1
- 7803-2 H1
- 7803-3 H2
- 7803-4 I2
- 7804 B12
- 7805 A8
- 7806 F8
- 7807 A3
- 7808 E12
- 7809 F1
- 7810 D1
- 7811 A8
- 7812 B12
- 7813 E12
- 7814 F9
- 8000 F1
- 8001 D1
- 8002 A12
- 8003 F6
- 8004 E12
- 8005 A3
- 8006 H4

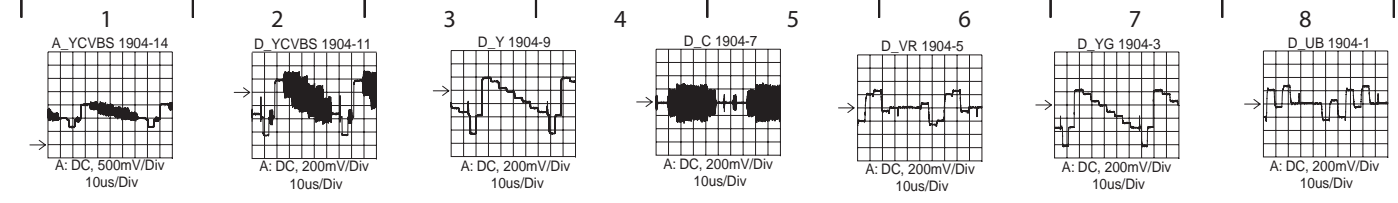
	SDRAM	NOR FLASH	NAND FLASH
CHRY 2.1_N1	7804, 7808	7801	not used
CHRY 2.1_E1			
CHRY 2.1_E2			
CHRY 2.1_E3	7812, 7813	7807	not used
CHRY 2.1_E4	7812, 7813	7807	not used

Digital Board Chrysalis 2.1: Video IO

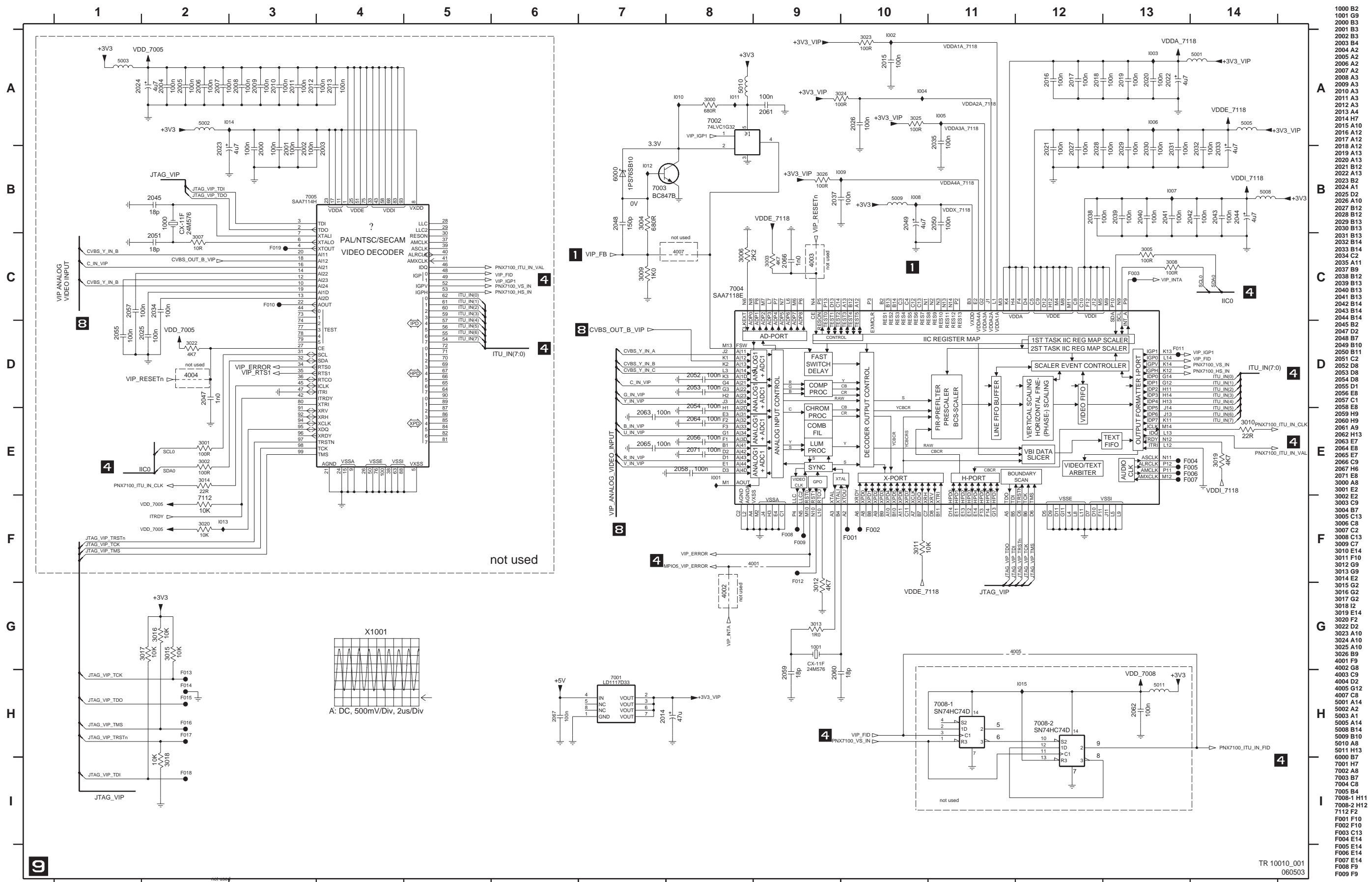


1900 E14	5914 F1 0
1901 G1 3	5915 F1 0
1904 A1 4	5916 H1 3
2036 I5	7900 E9
2046 G1 2	7901 F9
2900 A4	7902 G11
2901 A4	7903 I10
2902 A1	7904 D2
2903 A4	7905 H1 0
2904 A4	7906 F8
2905 B4	7907 F2
2906 B4	7908 G2
2907 B1	7909 G8
2908 C1	7910-1 F6
2909 C1	7910-2 H6
2910 I12	7911 I2
2911 D1	7912 I8
2912 E3	F1902 G1 2
2913 E8	F1903 G1 2
2914 F1	F1904 G1 2
2915 F2	F1907 F1 2
2916 F4	F1909 F1 2
2917 F5	F1911 F1 2
2918 G1 1	F1912 F1 2
2919 G1 1	F1914 E1 2
2920 I11	F1916 E1 2
2921 G1 2	F1918 E1 2
2922 G11	F1920 D1 2
2923 G9	F1921 D1 2
2924 G3	F1922 E13
2925 G8	1900 B12
2926 G1	1901 B12
2927 G2	1902 F2
2928 G4	1903 G2
2929 G5	1904 H2
2930 H1 3	1905 F1
2931 I13	1906 G1
2932 C4	1907 H1
2933 H3	1908 A12
2934 H8	1909 B14
2935 I1	1910 A12
2936 I2	1911 A12
2937 I4	1912 B12
2938 D2	1913 C12
2939 I13	1914 C12
2940 I14	1915 C12
2941 I11	1916 D12
2942 I12	1917 D12
3087 E1 1	1918 G9
3901 A2	1919 H13
3902 A2	1920 I1 3
3903 I11	1921 F4
3904 I12	1922 F5
3905 C2	1923 G4
3906 C2	1924 G5
3907 D3	1925 H4
3908 D2	1926 H5
3909 D11	1927 A2
3910 D1 1	1928 B2
3911 E2	1929 A1
3912 E2	1930 B1
3913 E11	1931 C1
3914 E1 1	1932 C1
3915 G10	1933 D1
3916 F11	1934 A3
3917 F11	1935 A3
3918 F1	1936 A3
3919 F2	1937 A3
3920 F4	1938 B3
3921 F7	1939 B3
3922 F1 1	
3923 G1 1	
3924 G1	
3925 H9	
3926 G2	
3927 G4	
3928 G7	
3929 I11	
3930 I1	
3931 I2	
3932 I4	
3933 I7	
3934 F2	
3935 F5	
3936 G2	
3937 G5	
3938 I2	
3939 I5	
3940 G9	
3941 E6	
3942 F6	
3943 F6	
3944 F6	
3945 F6	
3946 F6	
3948 H6	
3949 H6	
3950 H6	
3951 H6	
3952 I6	
3953 I6	
3954 I6	
3955 I12	
3956 I12	
4900 H1 2	
4901 H1 2	
4902 G1 0	
4903 D7	
4904 E6	
4905 F7	
4906 H6	
4907 I7	
4908 G13	
4909 G13	
4910 G13	
4911 E1 0	
5901 G9	
5902 H1 3	
5903 I13	
5904 I11	
5905 E10	
5906 E10	
5907 F4	
5908 F1	
5909 F1 0	
5910 G1	
5911 G4	
5912 H1	
5913 H4	

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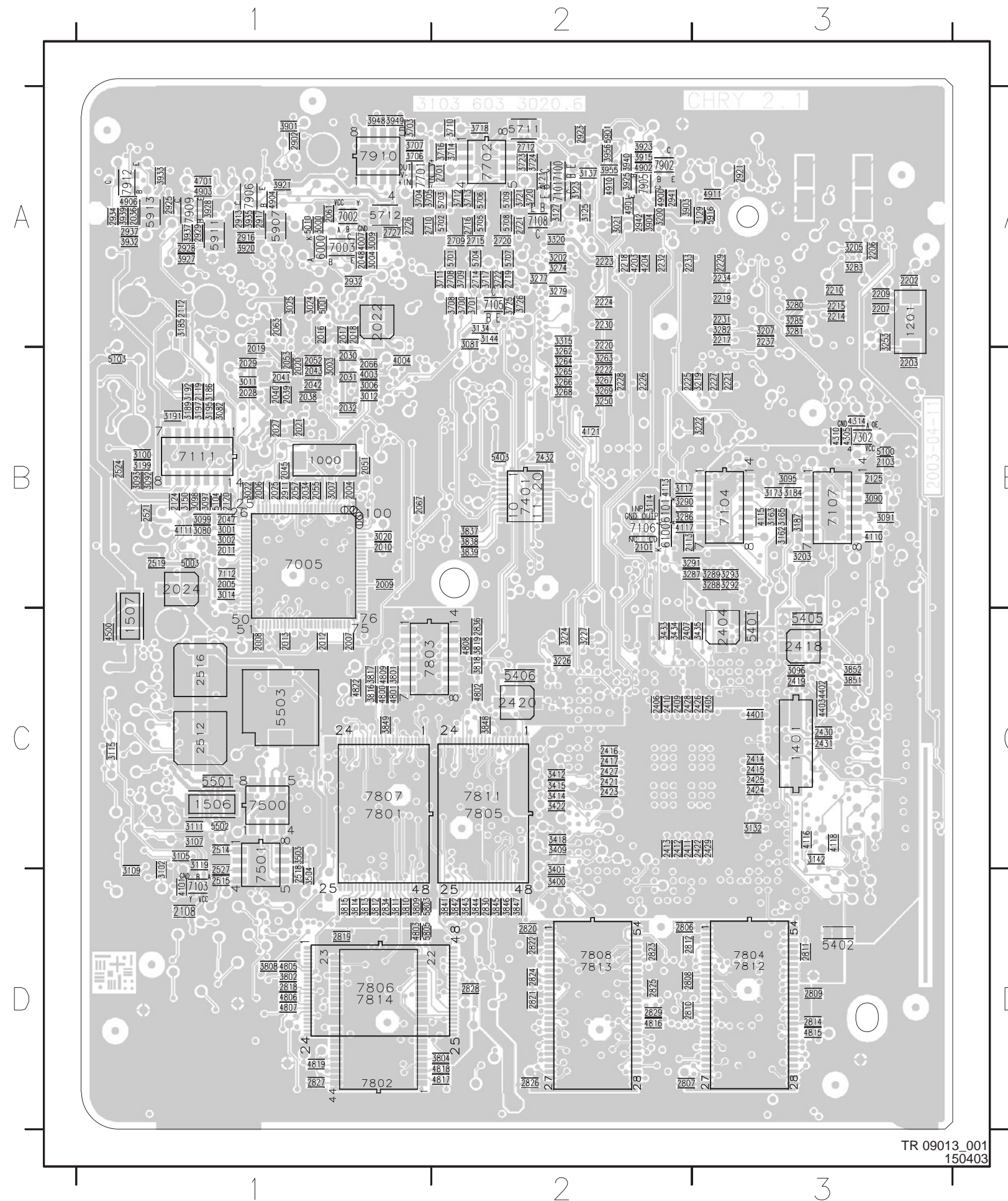


Digital Board Chrysalis 2.1: VIPs



- 1000 B2
- 1001 G9
- 2000 B3
- 2001 B3
- 2002 B3
- 2003 B4
- 2004 A2
- 2005 A2
- 2006 A2
- 2007 A2
- 2008 A3
- 2009 A3
- 2010 A3
- 2011 A3
- 2012 A3
- 2013 A4
- 2014 H7
- 2015 A10
- 2016 A12
- 2017 A12
- 2018 A12
- 2019 A13
- 2020 A13
- 2021 B12
- 2022 A13
- 2023 B2
- 2024 B3
- 2025 D2
- 2026 A10
- 2027 B12
- 2028 B12
- 2029 B13
- 2030 B13
- 2031 B13
- 2032 B14
- 2033 B14
- 2034 C2
- 2035 A11
- 2037 B9
- 2038 B12
- 2039 B13
- 2040 B13
- 2041 B13
- 2042 B14
- 2043 B14
- 2044 B14
- 2045 B2
- 2047 D2
- 2048 B7
- 2049 B10
- 2050 B11
- 2051 C2
- 2052 D8
- 2053 D8
- 2054 D8
- 2055 D1
- 2056 E8
- 2057 C1
- 2058 E8
- 2059 H9
- 2060 H9
- 2061 A9
- 2062 H13
- 2063 E7
- 2064 E8
- 3001 E2
- 3002 E2
- 3003 C9
- 3004 B7
- 3005 C13
- 3006 C8
- 3007 C2
- 3008 C13
- 3009 C7
- 3010 E14
- 3011 F10
- 3012 G9
- 3013 G9
- 3014 E2
- 3015 G2
- 3016 G2
- 3017 G2
- 3018 I2
- 3019 E14
- 3020 F2
- 3022 D2
- 3023 A10
- 3024 A10
- 3025 A10
- 3026 B9
- 4001 F9
- 4002 G8
- 4003 C9
- 4004 D2
- 4005 G12
- 4007 C8
- 5001 A14
- 5002 A2
- 5003 A1
- 5005 A14
- 5008 B14
- 5009 B10
- 5010 A8
- 5011 H13
- 6000 B7
- 7001 H7
- 7002 A8
- 7003 B7
- 7004 C8
- 7005 B4
- 7006-1 H11
- 7006-2 H12
- 7112 F2
- F001 F10
- F002 F10
- F003 C13
- F004 E14
- F005 E14
- F006 E14
- F007 E14
- F008 F9
- F009 F9

Layout Digital Board Chrysalis 2.1 (Bottom View)



1000 B1	2409 C2	3007 B1	3291 B2	3956 A2	7107 B3
1201 A3	2410 C2	3009 A1	3292 B3	4003 B1	7108 A2
1401 C3	2411 C2	3011 B1	3293 B3	4004 B1	7111 B1
1506 C1	2412 C2	3012 B1	3315 A2	4007 A1	7112 B1
1507 C1	2413 C2	3014 B1	3320 A2	4101 D1	7302 B3
2004 B1	2414 C3	3020 B1	3400 D2	4110 B3	7401 B2
2005 B1	2415 C3	3021 A2	3401 D2	4111 B1	7500 C1
2006 B1	2416 C2	3022 B1	3409 C2	4113 B2	7501 C1
2007 C1	2417 C2	3024 A1	3412 C2	4115 B3	7701 A1
2008 C1	2418 C3	3025 A1	3414 C2	4116 C3	7702 A2
2009 B1	2419 C3	3080 B1	3415 C2	4117 B2	7801 C1
2010 B1	2420 C2	3081 A2	3418 C2	4118 C3	7802 D1
2011 B1	2421 C2	3082 B1	3422 C2	4121 B2	7803 C1
2012 C1	2422 C3	3090 B3	3433 C2	4203 A2	7804 D3
2013 C1	2423 C2	3091 B3	3434 C2	4204 A2	7805 C2
2016 A1	2424 C3	3092 B1	3435 C3	4305 B3	7806 D1
2017 A1	2425 C3	3093 B1	3503 C1	4310 B3	7807 C1
2018 A1	2426 C3	3095 B3	3504 D1	4314 B3	7808 D2
2019 B1	2427 C2	3096 C3	3700 A2	4401 C3	7811 C2
2020 B1	2428 C2	3097 B1	3701 A2	4402 C3	7812 D3
2021 B1	2429 C3	3098 B1	3703 A1	4403 C3	7813 D2
2022 A1	2430 C3	3099 B1	3704 A1	4500 C1	7814 D1
2024 B1	2431 C3	3100 B1	3705 A1	4701 A1	7902 A2
2025 B1	2432 B2	3102 D1	3706 A1	4800 C1	7905 A2
2027 B1	2512 C1	3105 C1	3707 A1	4801 C1	7906 A1
2028 B1	2514 C1	3107 C1	3708 A2	4802 C2	7909 A1
2029 B1	2515 D1	3109 D1	3709 A2	4803 D1	7910 A1
2030 B1	2516 C1	3111 C1	3710 A2	4805 D1	7912 A1
2031 B1	2518 D1	3114 B2	3711 A2	4806 D1	
2032 B1	2519 B1	3115 C1	3712 A2	4807 D1	
2034 B1	2521 B1	3117 B2	3713 A2	4808 C2	
2036 A1	2524 B1	3119 C1	3714 A2	4809 C1	
2038 B1	2527 D1	3121 A2	3716 A2	4815 D3	
2039 B1	2701 A2	3123 A2	3717 A2	4816 D2	
2040 B1	2708 A2	3125 A2	3718 A2	4817 D2	
2041 B1	2709 A2	3127 A2	3720 A2	4818 D2	
2042 B1	2710 A1	3129 A3	3721 A2	4819 D1	
2043 B1	2712 A2	3132 C3	3722 A2	4822 C1	
2045 B1	2714 A2	3134 A2	3723 A2	4900 A2	
2047 B1	2715 A2	3137 A2	3724 A2	4901 A2	
2048 A1	2716 A2	3142 C3	3725 A2	4902 A2	
2051 B1	2719 A2	3144 A2	3726 A2	4903 A1	
2052 B1	2720 A2	3150 B1	3801 C1	4904 A1	
2053 B1	2721 A2	3162 B3	3802 D1	4906 A1	
2055 B1	2726 A1	3163 B3	3804 D2	4910 A2	
2057 B1	2727 A1	3165 B3	3808 D1	4911 A3	
2061 A1	2806 D2	3173 B3	3809 D1	5001 A1	
2063 A1	2807 D2	3184 B3	3810 D1	5003 B1	
2066 B1	2808 D2	3185 A1	3811 D1	5010 A1	
2067 B1	2809 D3	3186 B1	3812 D1	5100 B3	
2101 B2	2810 D2	3187 B3	3813 D1	5103 B1	
2103 B3	2811 D3	3189 B1	3814 D1	5104 B1	
2108 D1	2812 D2	3191 B1	3815 D1	5401 C3	
2112 A1	2814 D3	3192 B1	3816 C1	5402 D3	
2113 B2	2818 D1	3195 B1	3817 C1	5403 B2	
2119 B1	2819 D1	3197 B1	3818 C2	5405 C3	
2120 B1	2820 D2	3199 B1	3819 C2	5406 C2	
2124 B1	2821 D2	3200 A2	3837 B2	5501 C1	
2125 B3	2822 D2	3202 A2	3838 B2	5502 C1	
2202 A3	2823 D2	3203 B3	3839 B2	5503 C1	
2203 B3	2824 D2	3205 A3	3841 D2	5701 A2	
2206 A3	2825 D2	3207 A3	3842 D2	5702 A2	
2207 A3	2826 D2	3219 B3	3843 D2	5703 A2	
2209 A3	2827 D1	3222 B3	3844 D2	5704 A2	
2210 A3	2828 D2	3224 C2	3845 D2	5705 A2	
2214 A3	2829 D2	3226 C2	3846 D2	5706 A2	
2215 A3	2830 D2	3227 C2	3847 D2	5707 A2	
2217 A3	2834 D1	3250 B2	3848 C2	5708 A2	
2218 A2	2836 C2	3253 A3	3849 C1	5709 A2	
2219 A3	2902 A1	3262 B2	3851 C3	5711 A2	
2220 A2	2911 B1	3263 B2	3852 C3	5712 A1	
2221 B3	2913 A1	3264 B2	3901 A1	5803 D1	
2222 B2	2916 A1	3265 B2	3903 A2	5805 D1	
2223 A2	2917 A1	3266 B2	3904 A2	5901 A2	
2224 A2	2921 A3	3267 B2	3915 A2	5907 A1	
2225 B2	2923 A2	3268 B2	3920 A1	5911 A1	
2226 B2	2925 A1	3269 B2	3921 A1	5913 A1	
2227 B3	2928 A1	3274 A2	3923 A2	5916 A3	
2228 B2	2929 A1	3277 A2	3925 A2	6000 A1	
2229 A3	2932 A1	3279 A2	3927 A1	6100 B2	
2230 A2	2934 A1	3280 A3	3928 A1	6101 B2	
2231 A3	2937 A1	3281 A3	3932 A1	7002 A1	
2232 A2	2941 A2	3282 A3	3933 A1	7003 A1	
2233 A2	2942 A2	3283 A3	3935 A1	7005 B1	
2234 A3	3000 A1	3285 A3	3937 A1	7100 A2	
2237 A3	3001 B1	3286 B2	3939 A1	7101 A2	
2404 C3	3002 B1	3287 B2	3940 A2	7103 D1	
2405 C3	3003 B1	3288 B3	3948 A1	7104 B3	
2406 C2	3004 A1	3289 B3	3949 A1	7105 A2	
2407 C2	3006 B1	3290 B2	3955 A2	7106 B2	

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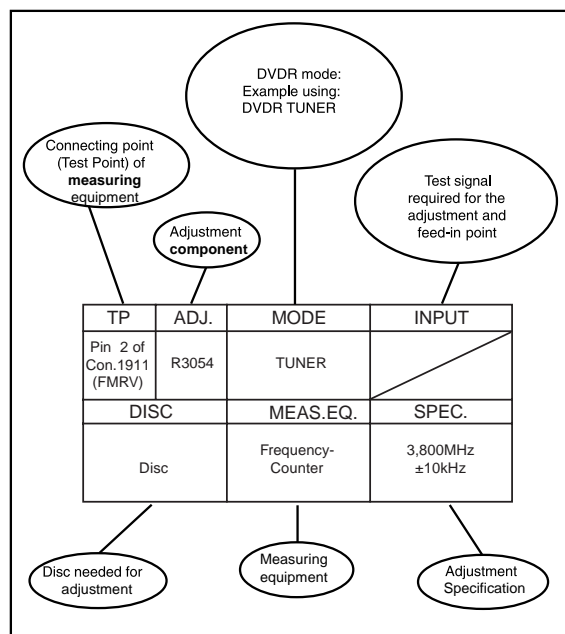
8. Alignments

8.1 Alignment Instructions Analog Board

Test equipment:

- Dual-trace oscilloscope
Voltage range : 0.001 ~ 50 V/div
Frequency : DC ~ 50 MHz
Probe : 10:1, 1:1
- DVM (Digital voltmeter)
- Frequency counter
- Sinus generator
Sinus : 0 ~ 50 MHz
- Test pattern generator

How to read the adjustment procedures:



Front End (FV)

Service tasks after replacement of IC 7710, coil L5710 and L5711:

1 AFC Adjustment:

Purpose: Correct adjustment of demodulator AFC - circuit

Symptom, if incorrectly set:

Bad or disturbed TV channel reception.

PAL - AFC adjustment [5711]:

TP	ADJ.	MODE	INPUT
IC 7710 Pin 17 (F708)	L5711	TUNER	38,9MHz 500mV _{pp} at Tuner 1705, Pin 11 (F710, IF-out)
DISC		MEAS.EQ.	SPEC.
		DC Voltmeter Frequ. Generator	2,5V ±0,1V

Storage in NVRAM via command mode interface of DSW:

After adjustment, the AFC reference value has to be stored in the NVRAM.

This reference value is 256 * measured voltage/Ucc. Ucc is 5.0V.

Store the reference value via command 732 , followed by the ref. value.

Example: DD:> 732 128

2 HF - AGC adjustment [3724]:

Service tasks after replacement of IC 7710:

Purpose: Set amplifier control.

Symptom, if incorrectly set:

Picture jitter if input level is too low and picture distortion if input level is too high.

TP	ADJ.	MODE	INPUT
Tuner 1705 Pin 11 (F710, IF-out)	R3707	Set tuned to channel 25 503.25 MHz	5mV(74dBμV) on aerial input PAL white picture, audio IF on, no modulation
DISC		MEAS.EQ.	SPEC.
		Oscilloscope Video Pattern Generator	500mV _{pp} +/-0.5dB (use a 10:1 probe)

3 Attenuating the 40.4 MHz [5710]: (SECAM only)

Service tasks after replacement of coil 5710:

Purpose: To attenuate the band I carrier rests.

Symptom, if incorrectly set:

Bad picture quality when the filter attenuates the picture carrier (38.9MHz).

TP	ADJ.	MODE	INPUT
OFW 1701 Pin 1 (F709)	L5710	TUNER	40.4 MHz, 200mV _{rms} at Tuner 1705, Pin 11 (F710, IF-out)
DISC		MEAS.EQ.	SPEC.
		Oscilloscope, Sinus Generator, Counter	adjust minimum amplitude

If the adjustment is correct the signal at pin 1 of OFW [1701] must be smaller than the input signal amplitude by at least 6 dB.

8.2 Reprogramming Procedure of NVM on the Microprocessor Sub PCB

The NVM, item 7808, on the Microprocessor Sub board contains the following factory settings:

1. Clock correction factor
2. AFC reference value
3. Slash version

The settings 1,2 and 3 are stored in the NVM during the production of the analogue board.

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.

8.2.1 Clock Correction Adjustment

To guarantee an exact function of the real time clock, an adjustment of the clock frequency is possible. The adjustment value is stored in the NVM.

Procedure:

- put the set in service command mode
- execute command 1117 to initiate that a signal with 32768 Hz is available on pin 3 of connector 1988
example:
DD:>1117
- measure the frequency f_{meas} of the Clock Crystal with an accuracy of 0.1 Hz.
- Calculate the parameter to be entered: $32768/f_{meas} * 106$
- Normally the parameter must be between 999902 and 1000097. If the parameter and therefore the frequency of the crystal is outside this range, the crystal must be replaced.
- Execute command 1118 with the parameter as input
example:
DD:>1118 1000023

8.2.2 AFC Reference Voltage Tuner

This function stores the reference voltage for the tuner in the NVM. Before this value can be stored, the AFC adjustment, described in the adjustment instructions of the analogue board, must be carried out.

Procedure:

- Adjust AFC circuit
- Calculate the reference value
- Execute command 1119 and use the calculated reference value as parameter example: DD:>1119 128

8.2.3 Slash Version

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

The slash versions used in DVDR77 are the following:

- DVDR77/00/02: 71
- DVDR77/05: 72
- DVDR77/17: 166

Example:

DD:>1217 65

Reset of Slash Version

Use command 1115 to reset the analogue board to the default setting.

Procedure:

- Put the set in DSW command mode
- Execute command 1115 with the following parameters:
DD:> 1115 w 0xAE 2 0xD0 0x00
- Leave the DSW command mode and start up the set in application mode
No background is visible on the TV screen. The analogue board is ready to accept the appropriate slash version

8.3 Rework Procedure IEEE Unique Number

8.3.1 Scope:

The procedure describes how to upgrade sets with a unique number after repair. This unique number is stored in the NVRAM (item 7809) of the digital board at the end of the production line.

This procedure is only valid or necessary when:

- The digital board is replaced
- NVRAM on the digital 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.

8.3.2 Handling:

State of original (defective) board:

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

8.3.3 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 nucleus 1208
example:
DD:> 1208
120800: DV Unique ID = 00D7A1FC6C Test OK @
4. note read out
5. program new digital board via nucleus 1207
example:
DD:> 1207 00D7A1FC6C 120700: Test OK @

The set has now the original unique number

8.3.4 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:
 $35828 * \text{YEAR} + 676 * \text{WEEK} + 26 * V + N + 8788$
 The figures are fixed, YEAR + WEEK + factory code (V + N) are variable
 Example: $35828 * 01 + 676 * 36 + 26 * 22 + 14 + 8788 = 69538$
 (decimal)
 Then we translate the decimal number to a hexadecimal number. example: 69538 (decimal)= 10FA2 (hex)
4. Last 5 numbers: The last 5 numbers exist out of the Lot and SERIAL number according formula below:
 $\text{serial nr} + 1 * 100000$
 Example: $130156 + 100000 = 230156$ (decimal)
 230156 (decimal) = 3830C (hex)
5. Program new digital board via nucleus or 1207. Therefore we use the 10 hexadecimal numbers we calculated above:
 example:
 >1207 10D7A3830C
 12700: Test OK @

The set has now its original unique number

8.4 Alignments after replacing the Boot EEPROM 7810 in sets with Digital Board Chrysalis

The NVM, item 7810, on the Digital Board Chrysalis 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 Digital Board Chrysalis

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 DVDR77/0x1 are the following:

Chrysalis Board Type	String
E4	444248496214200145340000000000027030300 000101020001000040080000
E4+	44424849CB40200145342B0000000000027040300 000101020001000040080000

Example:

```
DD:> 1226 44424849A8E92001453100000000000230303
00000101020100000020040000
122600
Test OK @
```

E4...Digital Board Chrysalis version Euro 4
 E4+...Digital Board Chrysalis version Euro 4 Plus; with Chrysalis Version C2.

With command 1228 the settings can be displayed.

9. Circuit-, IC descriptions and list of abbreviations

9.1 Display Board

9.1.1 Microcontroller

The core element of the Display Control unit is the microcontroller TMP87CH74AF [7103]. The TMP87CH74AF is an 8 bit microcontroller fitted with 32kB ROM and 1kB RAM. It requires 5V supply and is responsible for the following functions:

- Interface to Central Controller-P
- Evaluation of the keyboard matrix
- Decoding the remote control commands from the infra-red receiver
- Activation and control of the local display
- Heater voltage generation

The 8 MHz resonator (Pos. 1110) generates the system clock. The reset is generated by the CC-P via "POR_DC"-signal where the transistor [7104] is used as a level-shifter from 3V3 to 5V.

9.1.2 Interface to the Central Control μ P

The communication to the main microcontroller (CC) on the P-Sub-PCB is done via I2C-Interface, where the TMP87CH74AF acts in slave-mode.

An additional wire ("INT"-line) is used to signal the Central controller that data are ready, e.g. when a key has been pressed.

9.1.3 Evaluation of the keyboard matrix

There are 12 different keys on the display board. A resistor network is used to generate a specific direct voltage value, depending on the pressed key. Via the resistors 3107 and 3102 on the analog/digital (A/D) ports (7103 pin 36 and 37) the evaluation is done.

9.1.4 IR receiver and signal evaluation

The IR receiver [7107] contains a selectively controlled amplifier as well as a photo-diode. The photo-diode changes the received infra red transmission (approx. 940nm) to electrical pulses, which are then amplified and demodulated. On the output of the IR receiver [7107], a pulse sequence with TTL-level, which corresponds to the envelope curve of the received IR remote control command, can be measured. This pulse sequence is fed into the controller for further processing via port TC1 [7103, pin20].

9.1.5 Vacuum Fluorescence Display

The VFD "BJ900GNK" [POS 7100] is fully controlled by the microcontroller. The μ C also includes the driving stages. Only two additional drivers [POS 7101 and 7102] are necessary for the grids 8 and 9 because of their large size.

9.1.6 VFD Heater Voltage Generator

The circuit around POS [7106, 7108 and 7109] 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 30 kHz at pin 19. Pos. [5104] and [2113] are acting as a resonance-circuit. Via Zener-Diode (POS[6100]) and resistors [3119, 3122 and 3123] the two heater-pins of the VFD ("FIL1" and "FIL2") are clamped so that the grids and segments can be fully switched off.

9.1.7 REC-LED

The REC-LED-ring is made with 3 red LED, controlled via pin 3 (only for flashing) and pin 12 for on/off switching, of the microcontroller. The POS [7105] is used as a driver for the led.

9.1.8 EPG-LED

The EPG led is a white led and controlled from the pin 14 from the microcontroller. The POS [7110] is used as a driver for the led.

9.1.9 TRAY-LED

There are 6 leds (chip) necessary to illuminate the tray, these 6 leds are located on a little sub-pcb connected over a 4 pin connector POS [1911] from the DC-print. The leds are controlled from pin 11 of the microcontroller.

9.2 Microcontroller Sub Board (UP SUB Board)

9.2.1 General

This small PCB is directly soldered in on top of the Analogue-Board.

It is used with no diversity in all three different basic versions (Europe, NAFTA and APAC-Pal). Only the software being loaded into the external Flash-memory is not the same.

9.2.2 Microcontroller

The main part of the Sub-PCB is the central controller (CC) μ P [7804] TMP91CW12AF, which is a 16-bit CPU with 128kBROM and 4kB RAM.

It works with a 3V3 supply and a system clock of 24,576MHz [1801].

The 3V3-supply is made out of the "5VSTBY" by the circuit around [7816].

After connecting the set to the mains (power-up) the IC [7806] generates a reset pulse. This signal ("IPOR") is directly fed to first priority interrupt input (pin 63) for power fail detection and also to the Reset-Input of the CC (Pin30) via [7802], which is necessary to generate a reset only during power-up. In case of power fail pin 30 of the CC must be kept high (3V3).

The internal memory of the CC is too small for all necessary demands. Therefore an external Flash-ROM [7805] with 1MByte in size and a RAM [7803] with 128kByte are necessary. Both parts are connected to the μ P via a parallel address-/data-bus. The lower eight bus-lines (AD0 to AD7) are multiplexed by [7801] and the "ALE"-signal of the CC.

For updating of the software the external Flash-ROM can be reprogrammed by the μ P. During this process [7807] is switched on by the "WE"-signal.

When no mains is connected, the CC is supplied via Gold-Cap [2816] during the power backup period. The diode [6802] prevents unwanted current consumption of other components. The internal ROM of the μ P holds the program code for the Real-Time-Clock. Only the microprocessor is supplied by the backup cell, not the external memories and the μ P operates in a low frequency mode with the clock crystal [1805] only (32.768 kHz). To adjust the clock the frequency can be measured at pin 87 of the μ P in a special test-mode.

9.2.3 Control-Interfaces

The CC is communicating with the digital board via a serial connection, which operates at a speed of 19,4 kbit/s ("D_DATA"-, "A_DATA", "D_RDY"- and "A_RDY"-signal on

[1986]). By generating a high level on pin 16 of the CC the digital PCB can be reset (inverter [7817] in between). Most of the other parts are controlled by the μP via I2C-bus ("SDA"- and "SCL"-signal). The FETs [7821] and [7822] are used for adaptation of the 3V3-level on CC-side to the components supplied with 5V. The CC can also reset the display-board- μP by pulling pin 39 to high.

The transistor [7819] acts as a level shifter for the "INT"-signal. In the European sets a bi-directional interface is established between the recording unit and the TV device at pin 10 of the Scart ("P50"-line/Easy Link). The processing is done via pin 14 (output) and pin 38 (input) of the CC and the circuit around [7813], [7814] and [7815].

9.2.4 EEPROM

The EEPROM M24C16 [7808] is an electrical erasable and programmable, non-volatile memory. The EEPROM stores data specific to the device, such as the AFC-reference value of the Europe IF-part, the clock-correction-factor, etc. It is accessed by the μP via the I2C-bus.

9.2.5 Sync Separator

To detect whether a video signal is available or not a separate IC [7825] is used to extract the sync information out of the video signal that is also routed to the digital board for recording. While on the input a low-pass-filter ([2823] and [3869]) limits the bandwidth an additional filter (circuit around [7818]) on the output avoids distortions. Afterwards the sync-signal is routed to pin11 of the CC.

9.2.6 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 on top of the basic engine. The speed control is dependent on the ambient temp. A NTC resistor [3134] located on the display board measures the temperature. An operational amplifier [7902-B] generates a proper voltage, which is then fed to the engine ("BE_FAN"-line). Below 28°C ambient temp. the fan-voltage is approx. 5V and is increased to 10V when the ambient temperature goes up to approx. 38°C. The second part of the Op-Amp. [7902-A] prevents damage of any temperature-sensitive part in case the NTC or the wire in between is damaged. It acts as a comparator and pulls the "BE_FAN"-signal to 10V. As the fan has to be stopped in case the tray of the drive is open this voltage is "killed" by the CC ("FAN_OFF"-signal). The double-diode [6901] acts for both Op.-Amp.-circuits. The circuit is also prepared for a set-fan (circuit around the Op-Amp. [7902-C]).

9.3 Analog board Europe

9.3.1 General

This PCB consists out of the following parts:

- Power-Supply-Unit
- Frontend (Audio & Video)
- Input-/Output-switching
- Audio ADC- & DAC-processing
- VPS/PDC- and Text-Data slicer
- Analog Follow-Me Circuit

All functional groups are either controlled via I2C-bus or via separate signal lines by the Central-Controller on the μP -Sub-Board. This sub board is directly soldered in onto the analog PCB. During Stand-By mode of the set, several parts are not supplied (Tuner, MSP, ...). The microprocessor is running and maintains the clock of the set.

To avoid bus blockades the I2C-bus ("SCLSW" & "SDASW") to/from these units is decoupled via transistors [7419], [7420] from the general bus ("SCL" & "SDA").

9.3.2 Power Supply Unit

Functional principle:

This power supply works in the way of a flyback converter. In the mains input part [1931 to 2309], the mains voltage is rectified and buffered in the capacitor [2309]. From this direct voltage at [2309] 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 [7313].

Mains input part:

The mains input part extends from the mains socket [1931] to the capacitor [2309]. The diodes [6301, 6302, 6305 and 6306] rectify the AC supply voltage, which is then buffered by the capacitor [2309]. The common mode coil [5302] and capacitor [2302] work as a filter to block interference arising in the power supply from the mains. Components [1302], [3306] and [3304] 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 [2325] is loaded via a current source between pin 8 and pin 1 in the IC [7313]. Once the voltage on [2325] and therefore the supply voltage V_{cc} of the IC [7313] 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_{ac} exceeds approximately 16V (e.g. interruption of the control loop), the output of the IC [7313, pin 5] is blocked and a new start-up cycle begins. (See also "Overload, Power Limitation, 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 [2309] through the primary coil of the transformer [5300, pins 7-5], the transistor [7307] and resistors [3321, 3352] 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, 6303, 6307, 6308, 6310, 6313, 6317 and 6319] block. From the controller [7315] a current is supplied into the CTRL input on the IC [pin 3, 7313] via optocoupler [7314]. 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, 6303, 6307, 6308, 6310, 6313, 6317 and 6319] become conductive and current flows into the capacitors [2305, 2312, 2319, 2322, 2326 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 [2309] into the transformer. The regulation information is provided by voltage reference [7315]. This element compares the 5V-output voltage via voltage divider [3332, 3333, 3334] with an internal 2.5V reference voltage. The output voltage of [7315] passes via an optocoupler [7314] for insulation of primary and secondary parts as a current value into pin 3 on the IC [7313]. 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 [3321] and [3352] via [3365] to pin 5 of the IC [7313]. If the voltage on pin 2 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. 60W can be taken out from the mains (= power limitation).

If the power supply reaches the power limit, the output voltages and the supply voltage Vcc on pin 1 of the IC [7313] will be reduced following further loading. If Vcc is less than approx. 9V at any point during this process, the output of the IC [7313, pin 6] is blocked. All output voltages and Vcc 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 'ION' control line is primarily used to switch off all output voltages for Basic Engine and Digital Board (supplies 3V3, 5V, 12V, 5N and 4V6 at Connectors 1932 and 1933) of the power supply. This reduces the amount of power taken from the mains. In Low Power Standby mode additionally the 'STBY' control line is used to switch off output voltages 5SW and 8SW. This reduces power consumption to less than 3W, if additionally the display is switched off. The power supply will continue operating in Standby mode with a switching frequency of approx. 25 kHz.

9.3.3 Frontend

This unit is designed to support two basic versions, which are distinguished by a different assembly variant only (one for multistandard and the second for Pal-I only) and comprises the following parts:

- Tuner UV1316K [1705]
- IF amplifier & video demodulator IC TDA 9818/9817 [7710]
- Sound processor MSP3415G [7600]

Tuner and IF selection

The Tuner [1705] converts the RF-signal coming from the antenna input to an IF-signal. The tuner is fully controlled via I²C-bus of the CC-μP. [1705] is also equipped with a "passive-loop-through" between antenna-in and -out to save power in stand-by of the set, when the complete part is not supplied. The IF frequency of the video carrier is 38.9 MHz for all systems except SECAM L' (34,0 MHz).

A quasi-split audio system is used. Separate surface-wave filters (SAW) are required. [1701], [1703] for video, [1702] for audio. [1701] is switched into the signal path for DK/I-SECAM L/L' reception, if the signal "SFS_TS" is "high". In this case the switches [7704], [7705] are open and the diode [6703] is conducting. [1703] is switched into the signal path for BG reception ("SFS_TS" is "low"). Then the switch [7712] is open and the diode [6704] is conducting. For DK/I-SECAM L/L'

reception, an additional circuit for suppressing the audio carrier of the adjacent channel is used. This circuitry is adjusted by coil [5710] for maximum suppression at 40.4MHz.

IF demodulator

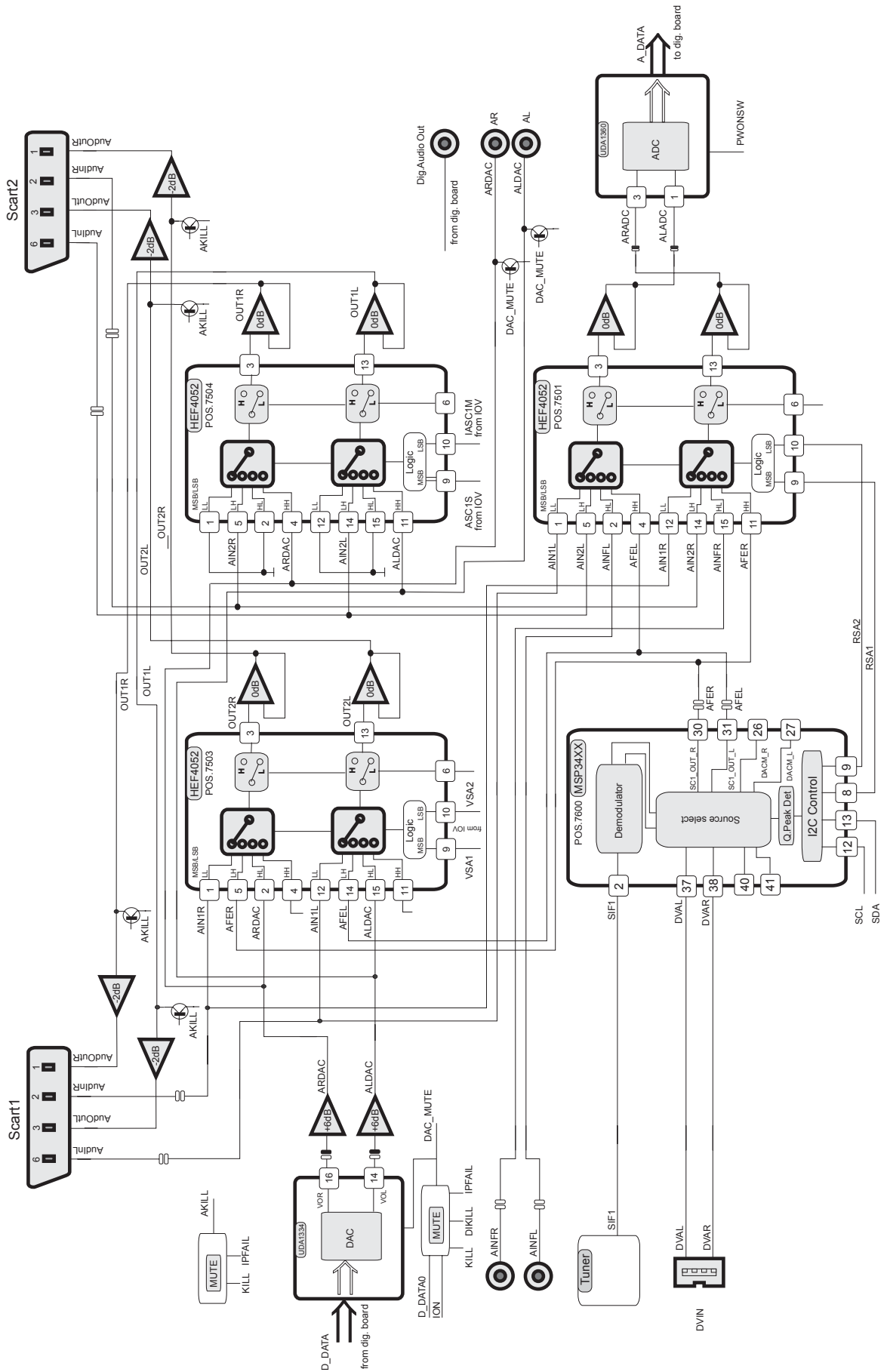
The signal from the tuner and IF-selection circuit is processed by the demodulator IC TDA 9818/9817 [7710]. The signal "PSS" to pin 3 switches between demodulation of positive (SECAM only) or negative modulated video carriers. A QSS-audio-IF signal SIF1 is generated for demodulation in the sound processor [7600]. The audio-IF carrier is selected in the audio SAW filter [1702]. This filter is switched for SECAM L'. If the signal "SB1" is "high", the switch [7714] is closed and the diode [6705] is not conducting. For all other standards the diode [6705] is conducting and the switch [7714] is open. The output signal of this SAW filter is firstly processed in the TDA 9818. Audio carriers are converted from the tuner IF level to the audio IF position and further processed in the audio demodulator [7600]. The AFC coil [5711] on the TDA 9818/9817 is adjusted so that when a frequency of 38.90 MHz is supplied to the IF output of the tuner, the AFC voltage on pin 17 of [7710] is 2.5V. The setting of the picture carrier frequency for SECAM L in the TDA 9818 is achieved by connecting pin 7 of the IC via a resistor [3710] to ground. The switch [7701] and the signal "SB1" do this. The HF-AGC is set using the potentiometer [3724] so that, with a sufficiently large antenna input signal (74 dBμV), the voltage at the IF output of the tuner [1705] pin 11 is 500 mVpp. This setting must be carried out when the audio carrier is switched off. The demodulated video signal appears on pin 16 of [7710]. The AGC voltage at pin 4 is used to determine the antenna signal strength after a buffer [7717] with the signal "AGC" and an analog input port of the CC-P. The trap [1704] reduces the sound carrier remainders in the video for BG standards. The trap [1706] works in the same way for the Pal-I standard only. For all other standards the switch [7713] is closed via [7706] and "SFS_TS"-line set "high" to bypass this trap. In these cases the selectivity of the SAW filter [1701] is sufficient. The coil [5713] for non-BG standards realizes a frequency response correction. This correction is not desired for SECAM L' and therefore short-circuited by [7716] (signal SB1 is "high" and [7702] has on-status). The demodulated video signal "VFV" is available after the buffer and limiting stage for noise peaks [7711]. The FM-PLL demodulator function of TDA 9818 is not necessary and therefore deactivated by the resistor [3739].

Audio demodulator

The sound demodulation is done by the MSP3415 [7600], which is also fully controlled via I²C-bus by the CC-P (determination of bandwidth, amplitude, standard, ...). The audio signals are available at pin 30 and pin 31 of [7600] and fed as "AFER"- & "AFEL"-line to the audio-I/O for further processing.

9.3.4 Audio routing

Audio IO Europa Overview



11.03.2002 Vers. (

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. 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 [7408] (IC [7408] acts as a port expander for the CC-P) and "IASC1M", which is directly coming from the CC. Pos [7412] is used for level adaptation (3V3 to 5V) for the "IASC1M"-signal.

b) Scart 2-Output-Path:

Pos [7503] selects between Scart 1-Input ("AIN1L"/"AIN1R"), signals from the internal frontend ("AFEL"/"AFER") via MSP [7600] or audio directly from the DAC [7004] ("ALDAC"/"ARDAC"). The outputs of this switch are routed to Scart 2 ("AOUT2L"/"AOUT2R"). This switch is controlled via "VSA1"- and "VSA2"-line. These lines come from [7408] that is acting as a port expander for the CC-P.

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 [7007] ("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 CC-P. As there can also exist a fifth input in case of DV-In is present the corresponding analog audio signals from the DVIO-board are firstly routed via extra cable and connector [1960] to the MSP. The MSP acts as a preselector between audio from internal frontend or the DV-Input.

Each of these three selectors ([7501], [7503] & [7504]) has a separate Op-Amp on the output for level-adaptation-, performance- and line-driving-reasons. [7505-A & -B] for record, [7502-C & -D] for Scart 1-Output and [7502-A & -B] respectively for Scart 2. Every audio output line on the two Scart connectors can be "killed" (muted) by an extra transistors ([7506], [7508], [7509] & [7511]), which can be activated by the "AKILL"-line. This signal is generated by the circuit around [7404]/[7421] and is a combination of the "KILL"- from the CC-P and the "IPFAIL" of the power-supply-unit.

d) Line-Out-Path:

see chapter 9.3.5

e) Digital Audio Output-Path without IOE-Print:

Additionally to analog audio the set is also equipped with a digital output via cinch plug [1951]. The signal is generated on the dig. board and routed via audio interface cable and connector [1900] to the Ana-PCB. Here the "DAOUT"-line first passes a 6-fold inverter [7580] being used as a driver and for performance reasons (noise reduction, jitter, etc.). Afterwards a transformer [5580] is necessary to achieve the correct level and also to have a floating output with isolated ground before the signal is fed via [3580] to cinch plug [1951]. The capacitor [2580] performs an AC-coupling between connector- and set-ground.

f) Digital Audio Output-Path with IOE-Print:

In case of usage of the IOE-print the digital audio signals (input and output) are directly routed from digital board via interface cable to plug [1920] on the IOE-print. The "DAOUT"-line is splitted into two signals, one for cinch out and one for optical out. The signal to cinch out first passes a 5-fold inverter [7250] being used as a driver and for performance reasons (noise reduction, jitter, etc.). Afterwards a transformer [5250] is necessary to achieve the correct level and also to have a floating output with isolated ground before the signal is fed via [3259] to the cinch plug [1925] (or [1926-B] in case of option

"DIGITAL IN"). The capacitors [2256] and [2266] perform an AC-coupling between connector- and set-ground. The second "DAOUT"-signal is fed directly via [3264] to the optical out transmitter [6255].

g) Digital Audio Input-Path with IOE-Print:

There are two possibilities for a digital audio input signal in case of option "DIGITAL IN". One is the signal from the optical receiver [6259], which is routed via [3269] directly to plug [1920]. The second is the signal from the cinch plug [1926-A]. This signal then passes an inverting amplifier [7250-6] and is then routed via [2253] to the plug [1920].

9.3.5 Audio ADC/DAC

a) PCBs with AD1852 [7004]:

The conversion of analog audio signals from the record-selector [7501] in the I/O ("ALADC"- & "ARADC") is done via UDA1361TS [7007]. This IC can process input signals up to 2Vrms by using external resistors [3047], [3053] in series to the input pins. As the level from the DVIO-Board is only 1Vrms a 6dB step can be performed by setting pin 7 of [7007] to 3,3V via [7008] and the "PWONSW"-line controlled by the CC-P to use the whole dynamic range of the ADC. All required clock signals are generated on the dig. board and only the audio data ("A_DAT"-line) are routed from Ana- to Dig.-PCB for further processing.

The transformation of dig. audio back into the analog domain is done by AD1852 [7004]. All necessary clock signals are coming from the dig. board and dig. audio data ("D_DATA0"-line) are converted into analog signals, which are available at pin 17/16 and pin 12/13 of [7004] as symmetrical signals.

Afterwards an Op-Amp. [7003] (line driver & converting to unsymmetrical signal, gain = 1), which is also working as 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 23 to 5V via [7001]. This mute is controlled either by the dig. board ("D_IKILL"-line) or the "IPFAIL"-signal from power-supply-unit (in this case it's the combination of "A_KILL" and "IPFAIL").

If the DAC is muted externally via pin 23 or if there are no audio data available (e.g. "D_DATA0"-line zero), the output pins 8 and 22 of the DAC change to high (+ 5V). These two signals are then combined with diode pos. 6006. After decoupling via [7009] the signal "DAC_MUTE" is used as mute signal for the mute transistors [7415], [7416] for cinch rear out.

b) PCBs with UDA1334BTS [7001]:

The conversion of analog audio signals from the record-selector [7501] in the I/O ("ALADC"- & "ARADC") is done via UDA1361TS [7005]. This IC can process input signals up to 2Vrms by using external resistors [3039], [3041] in series to the input pins. As the level from the DVIO-Board is only 1Vrms a 6dB step can be performed by setting pin 7 of [7005] to 3,3V via [7006] and the "PWONSW"-line controlled by the CC-P to use the whole dynamic range of the ADC. All required clock signals are generated on the dig. board and only the audio data ("A_DAT"-line) are routed from Ana- to Dig.-PCB for further processing.

The transformation of dig. audio back into the analog domain is done by UDA1334BTS [7001]. All necessary clock signals are coming from the dig. board and dig. audio data ("D_DATA0"-line) are converted into analog signals, which are available at pin 14 and pin 16 of [7001]. Afterwards an Op-Amp. [7002] (line driver & level adaptation, gain = 2) which is also working as 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 3,3V via [7003]. This mute is controlled either by the dig. board

("D_IKLL"-line) or the "IPFAIL"-signal from power-supply-unit (in this case it's the combination of "A_KILL" and "IPFAIL"). In addition to that the DAC [7001] and the cinch outputs can be killed (muted) in case of "digital silence" by the circuit around [7008], [7009] and [7010], when no audio data are available (e.g. "D_DATA0"-line zero). This function can be also activated via the "ION"-line (set to high during any stand-by mode). To avoid signal distortions (clipping) the mute transistors for cinch rear out [7415], [7416] are decoupled via [7011].

9.3.6 Video-routing

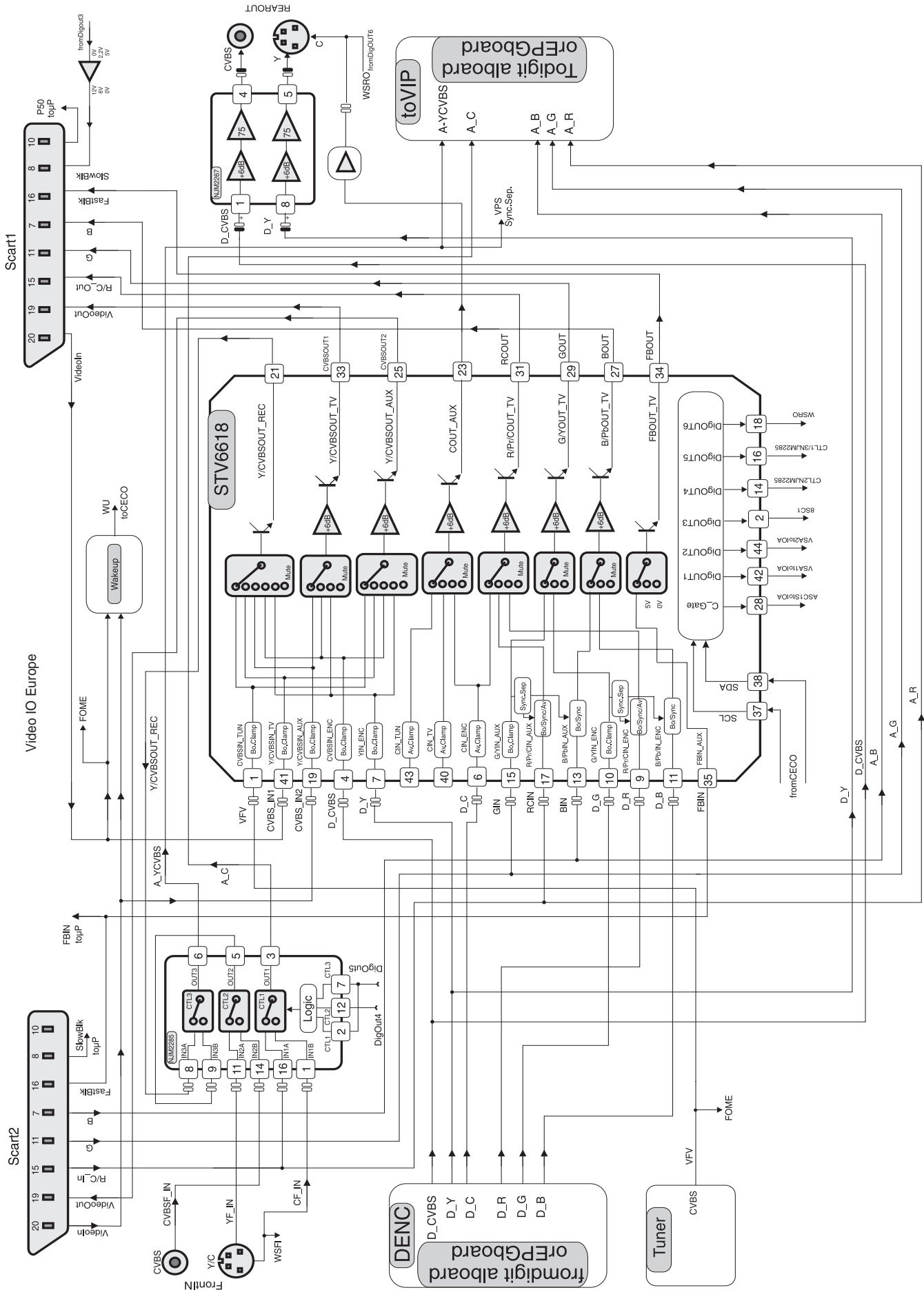


Figure 9-1

The Video-I/O-switching is basically realized by the matrix switch STV6618 [7408], which is controlled via I²C-bus by the CC. 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 frontend ("VFV"), the input from Scart 1 ("YCVBSIN1") or the signal from Scart 2 ("YCVBSIN2"). Afterwards the signal passes another switch [7411] in which a selection between signals from the front or the preselected ones are done. The output signals of [7411] are fed as "A_YCVBS"- and "A_C"-line to the digital board for further processing.

To reduce the number of external presets there exists only one preset for CVBS- and Y/C-front. The set automatically detects between the two inputs depending on the presence of a video signal (sync separator-circuit on μ P-sub-board) where Y/C has higher priority.

The R/G/B-inputs and the Fast-Blanking-line from Scart 2 are routed over the optional EPG board to the digital PCB. Also all other video signal from the analog board are routed through the EPG board if present. 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] & [7403] 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 CC-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 digital board ("D_R", "D_G", "D_B", "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. In case of EPG the signals from the digital board are routed through the EPG board where the selection between digital board video or EPG OSD is taken.

The "D_CVBS"- and the "D_Y"-line are passing a 6 dB-amplifier and driver-IC [7410] 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 - which makes the 6 dB-amplification - and a driver [7406] in between.

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 CC-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.

For generation of the appropriate DC-voltage on the Y/C-out rear the "WSRO"-line is controlled via pin 18 of [7408] by the CC-P (Pin 18 set to low means 4:3, pin 18 set to high determines 16:9).

The control of the switching voltage (Pin 8 of Scart 1) is done via 3-level-pin (nr.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).

9.3.7 VPS/PDC- and Text-Dataslicer

For extraction of relevant information out of the video signal (time controlled recording, net-name-identification, time- & date- download) the STV5348 [7931] is used. Data transfer to/ from the CC is fully done via I²C-bus and the input signal for decoding is the same as the one being routed to the digital board for recording purposes ("A_YCVBS"-line).

9.3.8 Analog Follow-Me

This circuit compares the video signal from the internal frontend ("VFV") of the recorder with that one of the connected TV-set ("CVBS1"). The TV set delivers the signal via Scart-cable. A comparator [7934] and several additional parts ([7932], [7933], ...) 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 CC-P.

9.4 Analog board NAFTA- & APAC-Pal- version

9.4.1 Frontend NAFTA

[1701] demodulates the video signal from the antenna input. Tuner and IF-demodulator are in one unit. Also a modulator is included in that part. The audio- and video-signal to the modulator are the ones from the selected input or the playback path of the set ("AMCO"- and "D_CVBS"-line). The control of the tuner is fully done via I²C-bus by the CC-P. Via the "MSW"-signal and [7701] the modulator is switched on and off. In opposite to this the antenna loop-through is opened or closed. In the APAC-Pal version POS [1700] is used with the difference that it demodulates only PAL- instead of NTSC-signals and has also no modulator. The "CSW_SSW" line switches the modulator between CH3 or CH4 in the NTSC-version. To achieve optimal tuning the "AFC"-signal is detected by the CC via an analog input; [3701], [3702] and [3703] are used for level adaptation (5V to 3V3). Pos [7700] is a driver for the video signal.

The sound demodulation is realized by the MSP34x5 [7600], which is also fully controlled via I²C-bus by the CC-P (determination of bandwidth, amplitude, standard, ...). The audio signals are available at pin 30 and pin 31 of [7600] and fed as "AFER"- & "AFEL"-line to the audio-I/O for further processing. As this PCB is used for different regions (NAFTA and APAC) either MSP3425 or MSP3415 are assembled.

9.4.2 Audio routing

Audio IO NAFTA / APAC Overview

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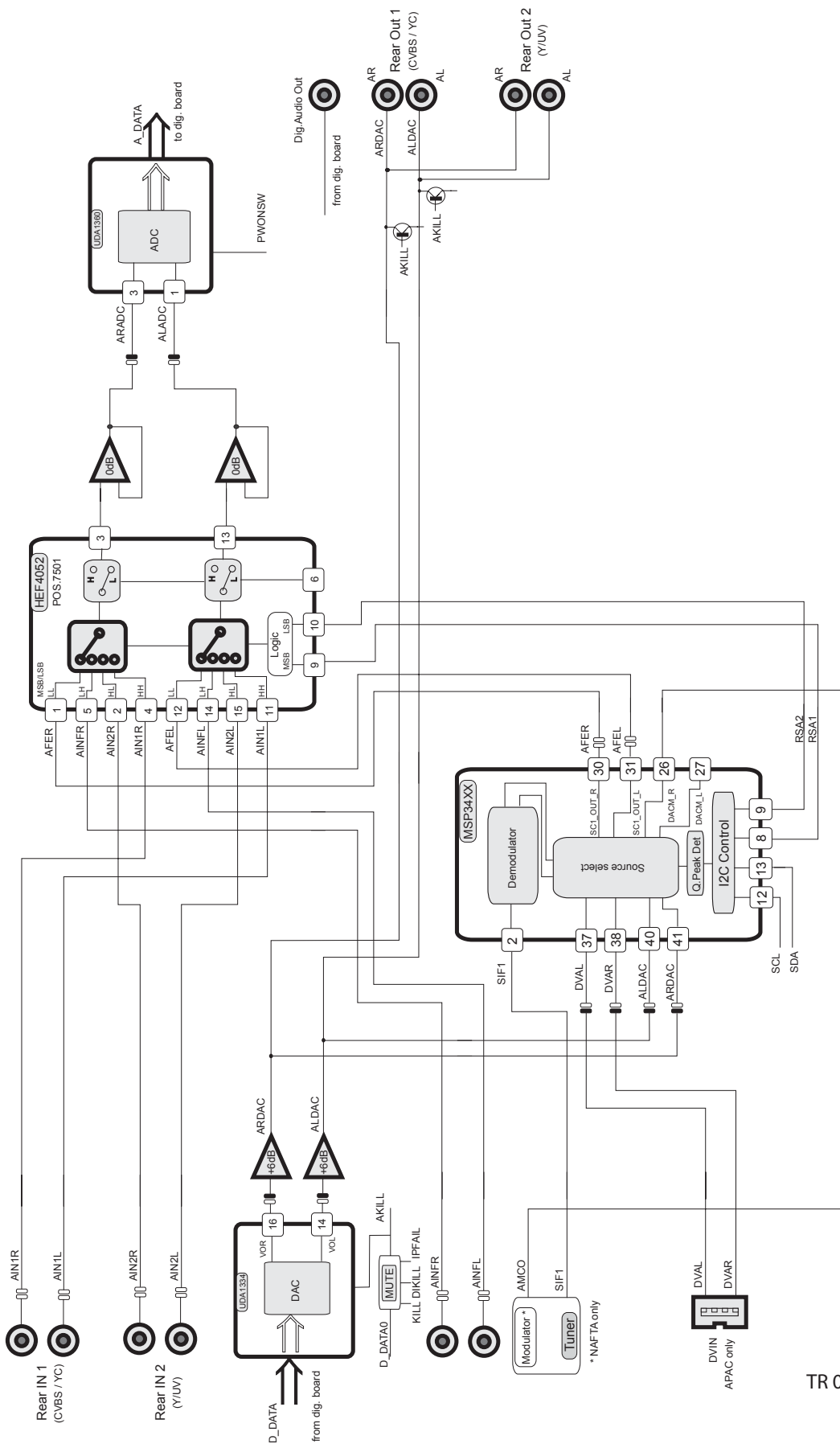


Figure 9-2

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170502

The sound processing is always done in stereo (that means separate left- and right-channel).

a) Record-Path:

The complete selection of the audio signal for recording is done by a HEF4052 [7501], which is a dual four-to-one multiplexer. The input lines for the selector [7501] are coming either from MSP [7600] ("AFEL"/"AFER") or cinch rear in 1 ("AIN1L"/"AIN1R") or cinch rear in 2 ("AIN2L"/"AIN2R") or the cinch in front ("AINFL"/"AINFR"). The [7501] is controlled via "RSA1"- and "RSA2"-signals coming from the MSP [7600]. The MSP acts as a port expander of the CC-P. The Op-Amp on the output [7504] is necessary for performance reasons and acts also as a driver. The selected signals "ARADC" and "ALADC" are directly fed to the Audio-ADC.

As there can exist also a fifth input in case of DV-In is present the corresponding analog audio signals from the DVIO-board are firstly routed via extra cable and connector [1960] to the MSP, which acts as a preselector between audio from internal frontend or the DV-Input.

b) Line-Out-Path:

see chapter 9.4.3

c) Digital Audio Output-Path without IOE-Print:

Additionally to analog audio the set is also equipped with a digital output via cinch plug [1951]. The signal is generated on the dig. board and routed via audio interface cable and connector [1900] to the Ana-PCB. Here the "DAOUT"-line first passes a 6-fold inverter [7580] being used as a driver and for performance reasons (noise reduction, jitter, etc.). Afterwards a transformer [5580] is necessary to achieve the correct level and also to have a floating output with isolated ground before the signal is fed via [3580] to cinch plug [1951]. The capacitors [2580], [2582] and [2583] perform an AC-coupling between connector- and set-ground.

d) Digital Audio Output-Path with IOE-Print:

see chapter 9.3.4.f

e) Digital Audio Input-Path with IOE-Print:

see chapter 9.3.4.g

9.4.3 Audio ADC/DAC

The conversion of analog audio signals from the record-selector [7501] in the I/O ("ALADC"- & "ARADC") is done via UDA1361TS [7005]. This IC can process input signals up to 2Vrms by using an external resistor [3039], [3041] in series to the input pins. As the level from the DVIO-Board is only 1Vrms a 6dB step can be performed by setting pin 7 of [7005] to 3,3V via [7006] and "PWONSW"-line controlled by the CC-P to use the whole dynamic range of the ADC. All required clock signals are generated on the dig. board and only the audio data ("A_DAT"-line) are routed from Ana- to Dig.-PCB for further processing.

The transformation of dig. audio back to the analog domain is done by UDA1334BTS [7001]. All necessary clock signals are coming from the dig. board and dig. audio data ("D_DATA0"-line) are converted into analog signals, which are available at pin 14 and pin 16 of [7001]. Afterwards an Op-Amp. [7002] (line driver & level adaptation) which also works as 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. The DAC has also a mute possibility, which can be activated by setting pin 8 to 3,3V via [7003]. This mute is controlled either by the dig. board ("D_IKLL"-line) or the "IPFAIL"-signal from power-supply-unit. In addition to that the DAC [7001] and the cinch outputs can be killed (muted) in case of "digital silence" by the circuit around [7008], [7009] and [7010], when no audio data are available (e.g. "D_DATA0"-line zero).

The signals from the audio DAC part ("ARDAC"/"ALDAC") are directly routed to both cinch rear outputs, which are connected

in parallel. To avoid plops and any other audible noise on the output there is a mute-stage implemented [7509], [7511] for each channel. The activation is done via "AKILL"-line, which is a combination of the "KILL" from CC-P, "DAC_MUTE" from DAC-part and "IPFAIL" from the power-supply-unit. The circuit around [6430], [6431], [7430] and [7404] generates this signal.

9.4.4 Video-routing

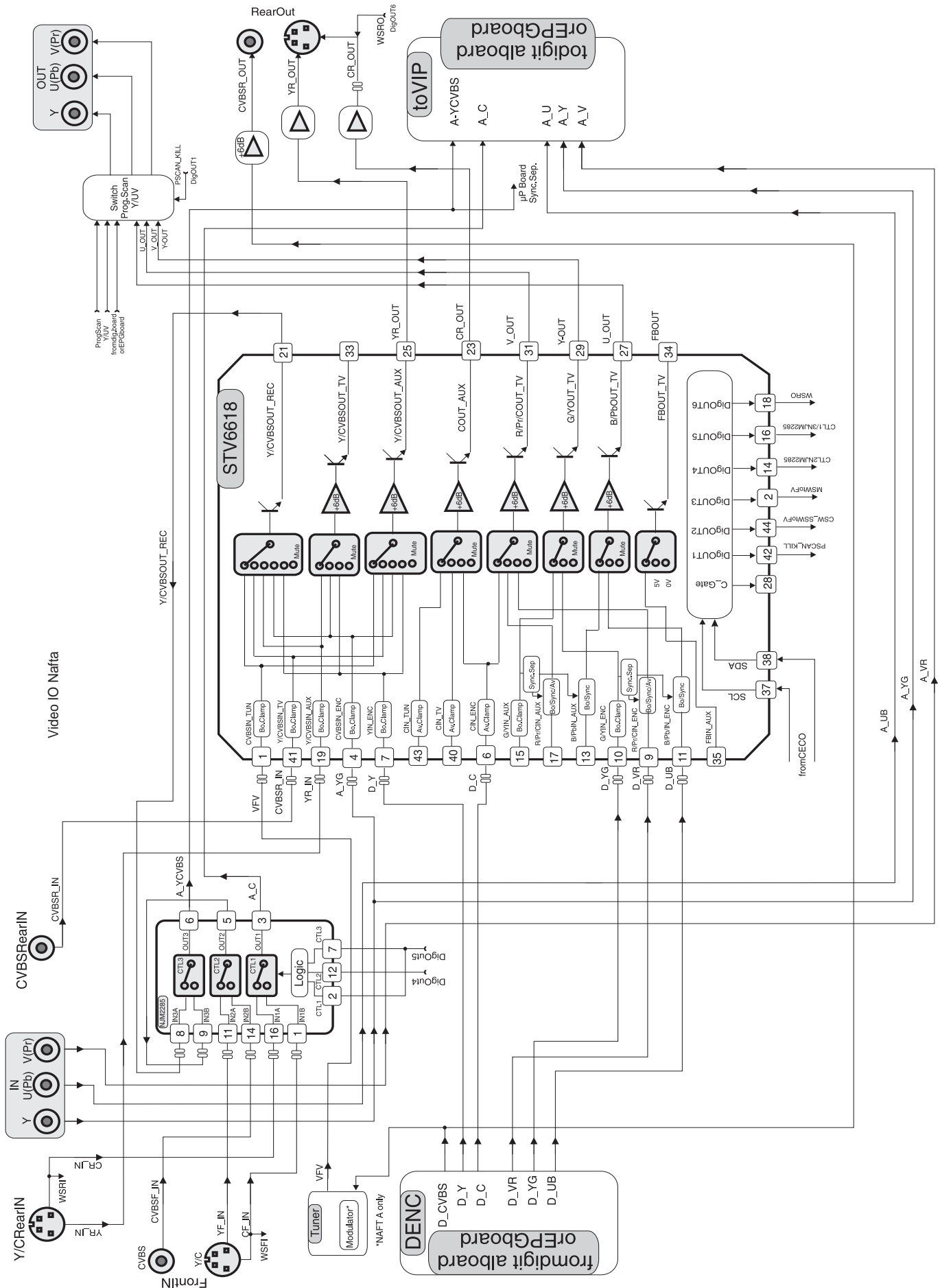


Figure 9-3

The Video-I/O-switching is basically realized by the matrix switch STV6618 [7408], which is controlled via I²C-bus by the CC. All used outputs excluding pin 21 (Y/CVBS-REC) have a 6dB-amplification and a 75 Ohms-driver-stage inside. This IC also includes several digital outputs, which are used for switching purposes on the analog board. The record selector inside the switch selects between the CVBS from frontend, the CVBS from Cinch-Rear or Y from the S-Video-input rear. Afterwards the signal passes another switch [7411] in which a selection between signals from the front or the preselected ones is done. The output signals of [7411] are fed as "A_YCVBS"- and "A_C"-line to the digital board for further processing.

To reduce the number of external presets there is only one station for CVBS or Y/C (front and rear). The set automatically detects between the two inputs depending on the presence of a video signal (sync separator-circuit on μ P-sub-board) where Y/C has higher priority.

The Y/U/V-inputs are routed over the optional EPG board to the digital PCB. Only the Y-line has to be present additionally on pin 4 of [7408] for video recognition. Also all other video signal from the analog board are routed through the EPG board if present.

The signals "D_C" and "D_Y" are fed through [7408] (6dB amplification) and via [7406], [7409] used as driver to the S-Video output connector. The "D_CVBS" line is directly routed to the modulator and via the circuit around [7431] and [7432] amplified by 6dB before it is fed to the CVBS output plug. In case of EPG the signals from the digital board are routed through the EPG board where the selection between digital board video or EPG OSD is taken.

The Y/U/V signals from the digital board are also passing [7408] for 6dB amplification and driving purpose.

To achieve optimal picture quality the set is equipped with a simple progressive scan function based on a so-called line doubler. The complete generation of the signal is done on the digital board and via a separate cable and connector [1946] the corresponding Y/U/V lines are routed to the analog PCB. Also the YUVprogressive signals are switchable to EPG OSD on the EPG board if implemented. As there is only one Y/U/V output available a switching between interlaced and progressive output is necessary. While the transistors [7421], [7422], [7424], [7425], [7427] and [7428] are used as driver for Y/U/V progressive, [7423], [7426] and [7429] together with [7405] are necessary for killing these signals via pin 42 of [7408] in case the interlaced is selected ("PSCAN_KILL"-line set to low). If progressive output is active the pins 27, 29 and 31 of [7408] are set to high impedance and "PSCAN_KILL" is also high (e.g. 5V).

The detection of the picture ratio information on the Y/C inputs (rear or front) is done by measuring the DC-level on the Chroma signal via an analog input of the CC-P ("WSRI"- and "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.

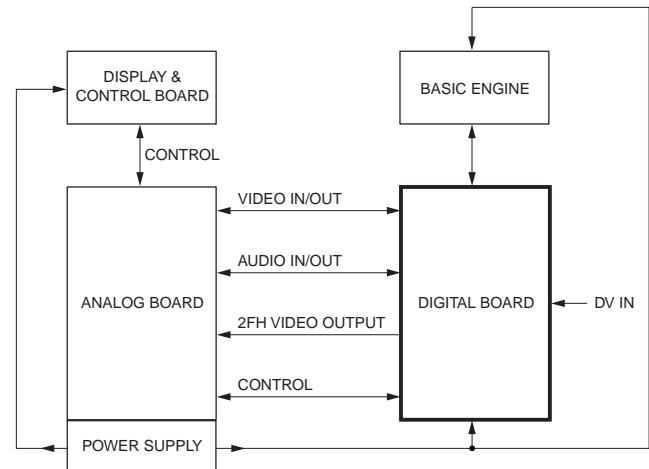
For generation of the appropriate DC-voltage on the Y/C output the "WSRO"-line is controlled via pin18 of [7408] by the CC-P (Pin 18 set to low means 4:3, pin 18 set to high determines 16:9).

During Stand-By there is also no loop-through of any input to any output performed.

9.5 Digital Board Chrysalis 2.1

9.5.1 Introduction

Block diagram 2nd generation DVD recorder



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142003

Figure 9-4

This 2nd generation Digital Board is based on the highly integrated 'Chrysalis' IC. Its predecessors, the 'Empire' and 'Empress' based boards, had two PWBs mounted on top of each other (due to separate DVIO board). For this new generation, all functionality is now available on one PWB in one BGA IC (Ball Grid Array) i.s.o. four VLSI ICs.

The board 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 engine. In playback, the board will decode the MPEG2 stream into analogue and digital audio and into analogue video. In addition, a DV stream can be received via IEEE1394 (i-Link), and transformed to MPEG2 format.

There are versions foreseen, to generate a progressive scan analogue video output. In the standard Chrysalis board, the progressive video output is generated by the PNX7100. In the Chrysalis 'F' it is generated by the Faroudja FLi2301.

The Chrysalis Digital board is pin compatible with the Empress digital board in terms of A/V IO, BE interface, Power Supply, and Service interface. For functional enhancements, several connectors are added: IDE connector (HDD, AV3, PCMCIA, etc.).

9.5.2 Record Mode

Block diagram Chrysalis Digital Board

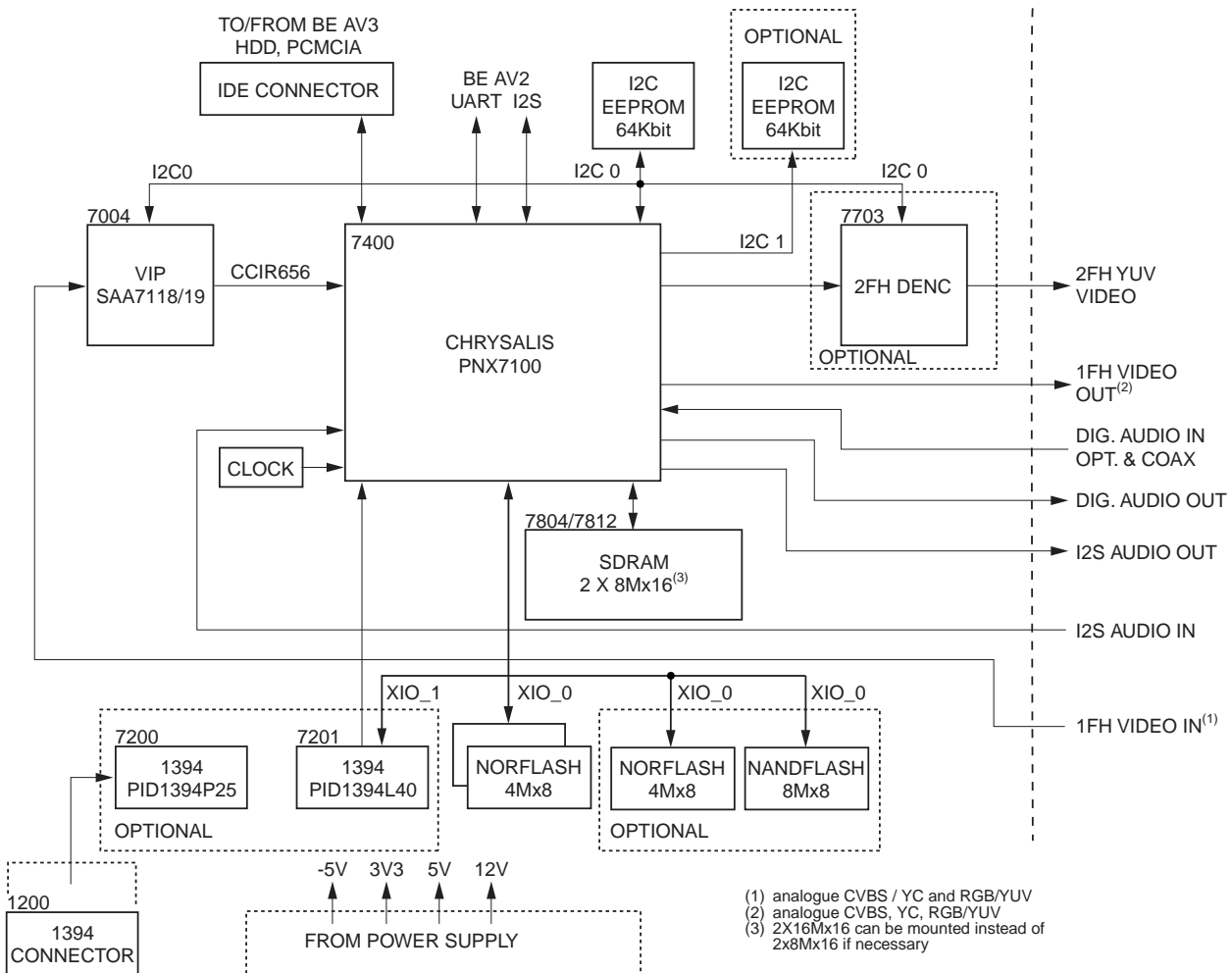


Figure 9-5

Video Part

The analogue video input signals CVBS, YC, and YUV/RGB (RGB for EURO and YUV for USA), are routed via the analogue board to connector 1904 and sent to IC7004 (SAA7118, Video Input Processor).

The digital video input signals are routed from the DV-In connector (item 1200) via ICs 7200 (1394 PHY) and 7201 (1394 LINK) to IC7400 (PNX7100, Chrysalis).

The multistandard Video Input Processor (VIP, IC7400) encodes the analogue video to digital video 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 IC (PNX7100). This IC encodes and decodes the digital video stream into/from MPEG2 format.

Audio Part

I2S audio is sent from the analog board to the Chrysalis IC via connector 1900. The Chrysalis compresses the I2S audio data into an MPEG1-L2/AC3 audio stream.

Front-end I2S

IC7400 (Chrysalis) interfaces directly to the Basic Engine (BE) via connectors 1100 (clock and data) and 1105 (control). For future use (with AV3 BE module, HDD, or card reader) it also interfaces to an IDE bus via connector 1102.

It buffers the data streams that are coming from (or going to) these hardware modules.

In the Chrysalis, the video MPEG2 stream and the audio AC3 stream are multiplexed into an I2S stream. The serial data are sent to the Basic Engine for recording.

9.5.3 Playback Mode

During playback, the serial data from the Basic Engine is going directly to the PNX7100 via the serial front-end I2S interface. The PNX7100 is an MPEG CoDec and has the following outputs:

- To the analogue board: analogue video RGB, YC, CVBS on connector 1904.
- I2S audio (PCM format) on connector 1900.
- SPDIF audio (digital audio output) on connector 1904.
- Progressive video on connector 1704.
- Communication gateway (RS232) on connector 1104.

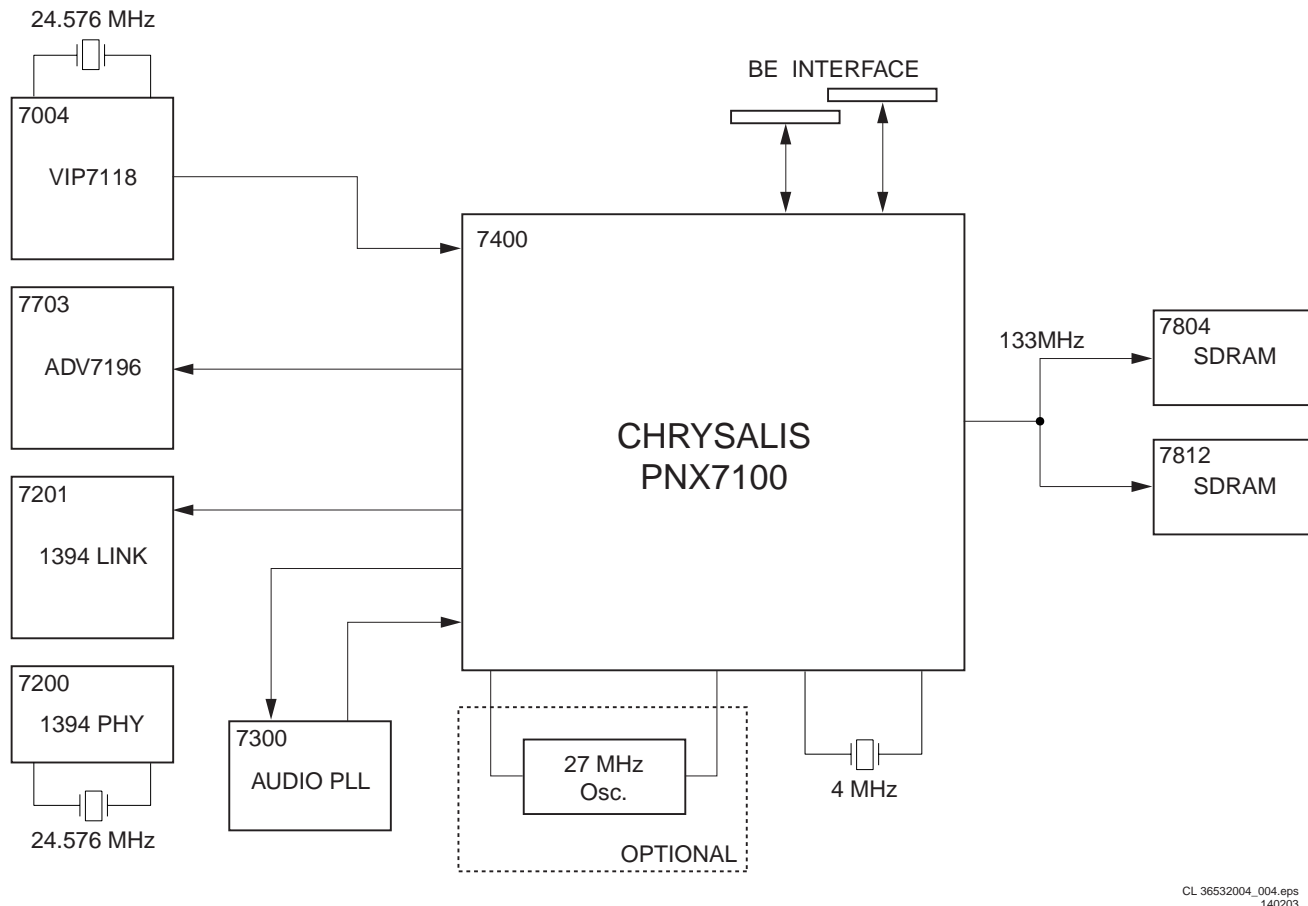
9.5.4 Basic Engine Interfaces**AV2 Basic Engine (VAE8015 and VAE8020)**

The UART interface (for the S2B commands) between the Chrysalis and the servo processor (MACE3 on the BE module), controls the AV2 Basic Engine during record and playback mode. For data transport, an I2S bus is used. For detailed information on the AV2 BE module, see Service Manual 3122 785 12470.

AV3 Basic Engine (VAE8030)

To be prepared for new developments, the Chrysalis Digital Board is equipped with two IDE busses (ATAPI). They can be

used for connecting to the new generation Basic Engine (e.g. the AV3), a Hard Disc Drive (HDD), or a Smart Card Reader.

9.5.5 Clock Distribution**Clock distribution on Chrysalis board**

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140203

Figure 9-6

The PNX7100 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 initialisation of all the registers and state machines, all the PLLs are switched to their default frequency and the reset sequence is run at 4 MHz. 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 (IC7400, pins AF9 and AF10) : 4 MHz provided by the xtal oscillator 7402.
- SAA7118 (IC7004, pins A3 and B4): 24.576 MHz provided by xtal 1001.
- ADV7196 (IC7703, pin 25): 27 MHz provided by PNX7100.
- SDRAM (IC7804 and 7808, pin 38): 133 MHz provided by the PNX7100.
- 1394-LINK (IC7201, pin 88): 49.152 MHz provided by 1394-PHY.
- 1394-PHY (IC7200, pins 59 and 60): 24.576 MHz provided by xtal 1201.

9.5.6 Power Supply

The Digital Board is not powered in standby mode. The control signal 'ION' (Inverse On), coming from the analogue board, will enable the PSU, and power the digital board.

- ION = High: the digital board is in powered down standby mode.
- ION = Low: the power supply to the digital board is enabled.

The 3V3, +5V, -5V, and +12V come from the PSU, while the 1V8 core voltage is generated on the board by a low voltage buck controller (item 7501). It provides the control for a DC-DC power solution producing an 1.8V output voltage over a wide current range. The NCP1570-based solution is powered from 12 V with the output derived from the 3V3 supply. It contains all required circuitry for a synchronous NFET (IC7500-1 and -2) buck regulator.

9.5.7 Memory

Several memories are used on the Chrysalis Digital Board:

- EEPROM IC7810: this memory contains all the necessary boot parameters of the board.
- EEPROM IC7809: this memory contains all the necessary parameters for the application.

- FLASH IC7807(05/11): this memory contains the application-, diagnosis-, and service software.

9.5.8 Reset

Reset concept Chrysalis board

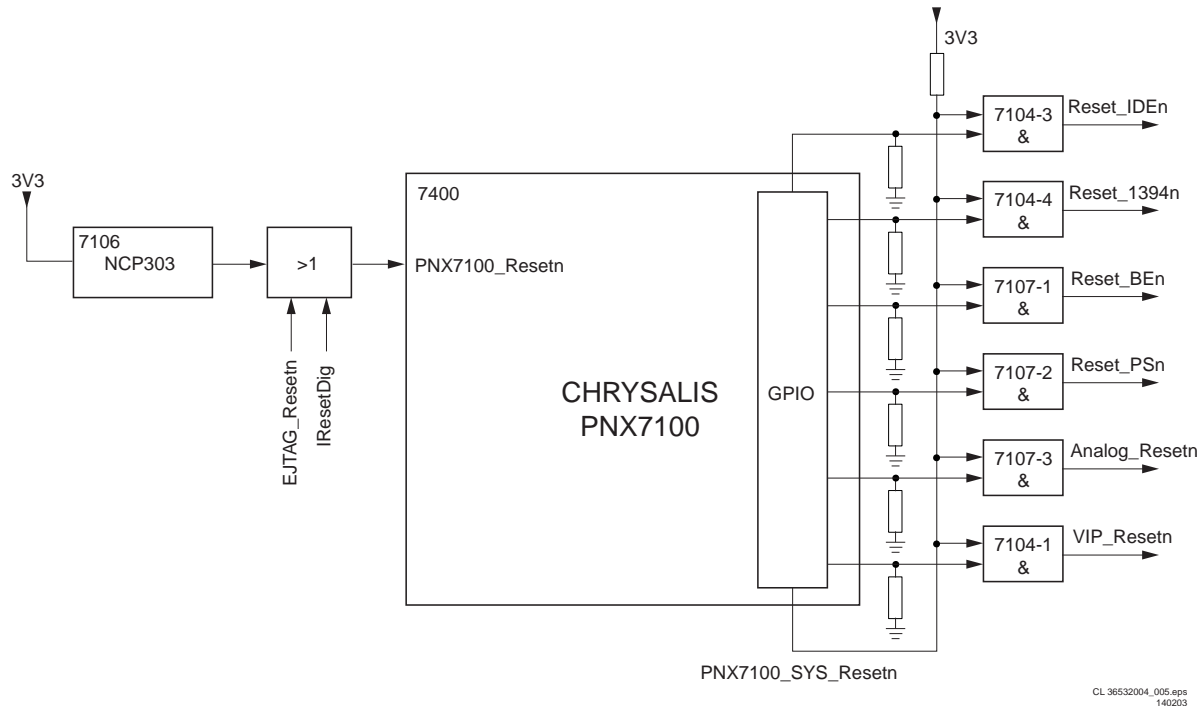


Figure 9-7

The voltage detector NCP303LSN29 (IC7600) provides the reset signal PNX7100_RESETEn (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 voltage 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 microprocessor on the Analogue Board).
- EJTAG_RESETEn (only for production).

They can pull the output of the NCP303LSN29 (item 7106) down via a shottky diode.

So when the output signal PNX7100_RESETEn is 'low', the board will reset. When this signal is 'high', the board is up and running.

The PNX7100_SYS_RESETEn is a general enabling signal for the different reset lines. All other reset lines are directly driven from Chrysalis port pins (e.g. MPIO13_IDE1_RESETEn). All reset lines are logically connected via 74LVC08D (item 7104) and (item 7107) AND-gates. If both reset signals are low, all other external devices are initialised.

9.5.9 I2C Bus

The PNX7100 is the master of the I2C bus (during reset, external I2C masters are allowed). The following ICs are controlled by the I2C bus:

- IC7809.
- IC7810 NVRAMs.
- IC7004 VIP.

- IC7700 FLI2301 Video De-interlacer Line Doubler (for Chrysalis-F boards).
- IC7703 ADV7196 Video Enc (for progressive scan done by Chrysalis).

9.5.10 I/O Connectors

AIO Connector (item 1900)

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

DAIO Connector (item 1901)

The Digital Audio In/Out (DAIO) connector is used to interchange digital audio (SPDIF) signals between the IOE-Board and the Digital Board.

VIO Connector (item 1904)

The Video In/Out (VIO) connector is used to interchange analogue video signals between Analog- and Digital-Board.

9.5.11 Progressive Scan

Introduction

There are two versions foreseen, to generate a progressive scan analogue video output:

- In the standard Chrysalis board, the 'low end' progressive video output is generated by the PNX7100.
- In the Chrysalis 'F', the 'high end' progressive output is generated by the Faroudja FLI2301. This IC offers additionally DCDi, upscaling to HDTV, and picture enhancement.

Description

The progressive scan part is integrated in the Digital Board and built around the FLI2301 de-interlace/line doubler (7701). This

I2C controlled de-interlace uses a 64Mbit SDRAM (32bit x 2M) to perform high quality de-interlacing (meshing). The de-interlace gets its digital YUV input data from the PNX7100 (7400). The format of the digital YUV input to the Fli2301 is CCIR656 with separated Hsync, Vsync, and odd/even signal running on 27MHz.

9.6 Service UART Interface

Logic IC 74HCT14D (item 7111) 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.

9.7 I/O Extension Board

This board feeds the internal S/PDIF signal from the Digital board to an optical and/or digital out connector. For European players, also an YUV output is present on this board.

9.8 IC Descriptions

9.8.1 Display Board

IC 7103 TMP87CH74F Display Board, Front Microprocessor

Block Diagram

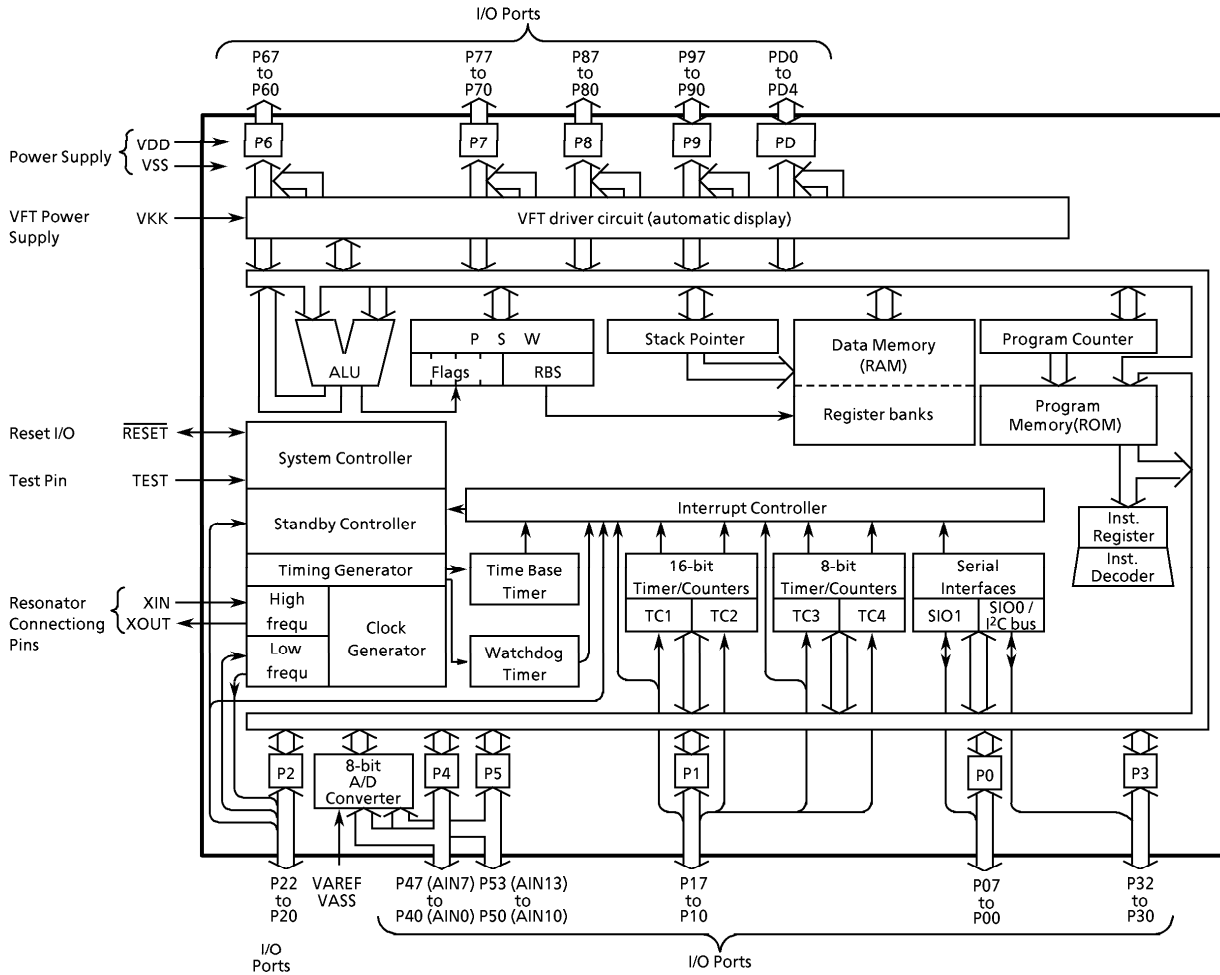


Figure 9-8

Pin Function

Pin Name	Input / Output	Function		
P07 to P03	I/O	Two 8-bit programmable input/output ports (tri-state). Each bit of these ports can be individually configured as an input or an output under software control. When used as a 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	
P02 (SO1)	I/O (Output)			
P01 (SI1)	I/O (Input)			
P00 (SCK1)	I/O (I/O)			
P17 (INT4/TC3)	I/O (Input)			External interrupt input 4 or Timer/Counter 3 input
P16 (INT2)				External interrupt input 2
P15 (INT3/TC1)				External interrupt input 3 or Timer/Counter 1 input
P14 (TC4/PDO/PWM)				Timer counter 4 input or 8-bit programmable divider output or 8-bit PWM output
P13 (DVO)				Divider output
P12 (TC2/PPG)				Timer counter 2 input or Programmable pulse generator output
P11 (INT1)		External interrupt input 1		
P10 ($\overline{\text{INT0}}$)	I/O (Input)	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)			
P20 ($\overline{\text{INT5/STOP}}$)				External interrupt input 5 or STOP mode release signal input
P32 ($\overline{\text{SCK0}}$)	I/O (I/O)	3-bit programmable input/output ports (Sink open drain). Each bit of these ports can be individually configured as an input or an output under software control. When used as a I ² C input/output, the latch must be set to "1".	SIO0 serial clock input/output	
P31 (SDA/SO0)	I/O (I/O/Output)			
P30 (SCL/SI0)	I/O (I/O/Input)			I ² Cbus serial data input/output or SIO0 serial data output
P47 (AIN7) to P40 (AIN0)	I/O (Input)	8-bit programmable input/output ports (tri-state). Each bit of these ports can be individually configured as an input or an output under software control. When used as a analog input, the P4CR must be set to "0".	A/D converter analog inputs	
P53 (AIN13) to P50 (AIN10)	I/O (Input)			
P67 (V7) to P60 (V0)	I/O (Output)	4-bit programmable input/output ports (tri-state). Each bit of these ports can be individually configured as an input or an output under software control. When used as a analog input, the P5CR must be set to "0".	A/D converter analog inputs	
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".	VFT driver outputs	

Figure 9-9

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.
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 9-10

9.8.2 IC's Analog Board

IC7408: STV6618 Analog 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)

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

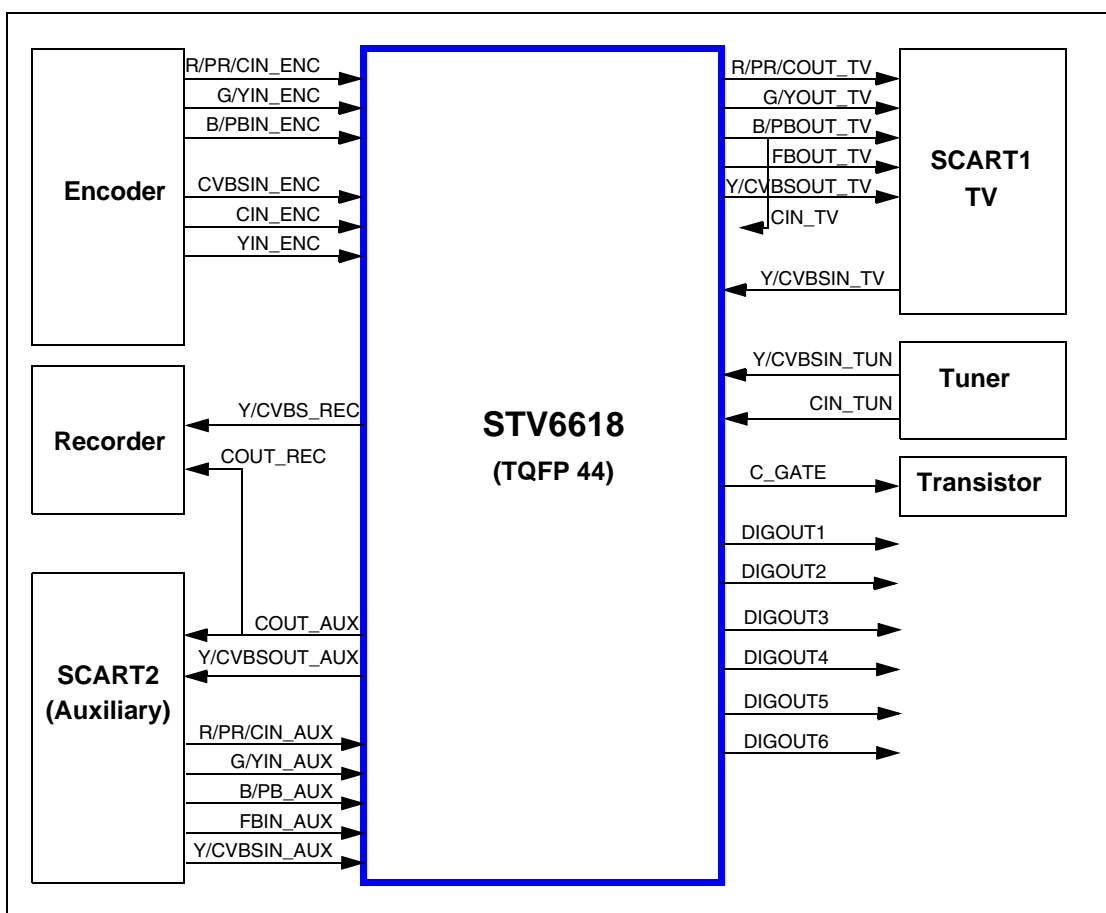
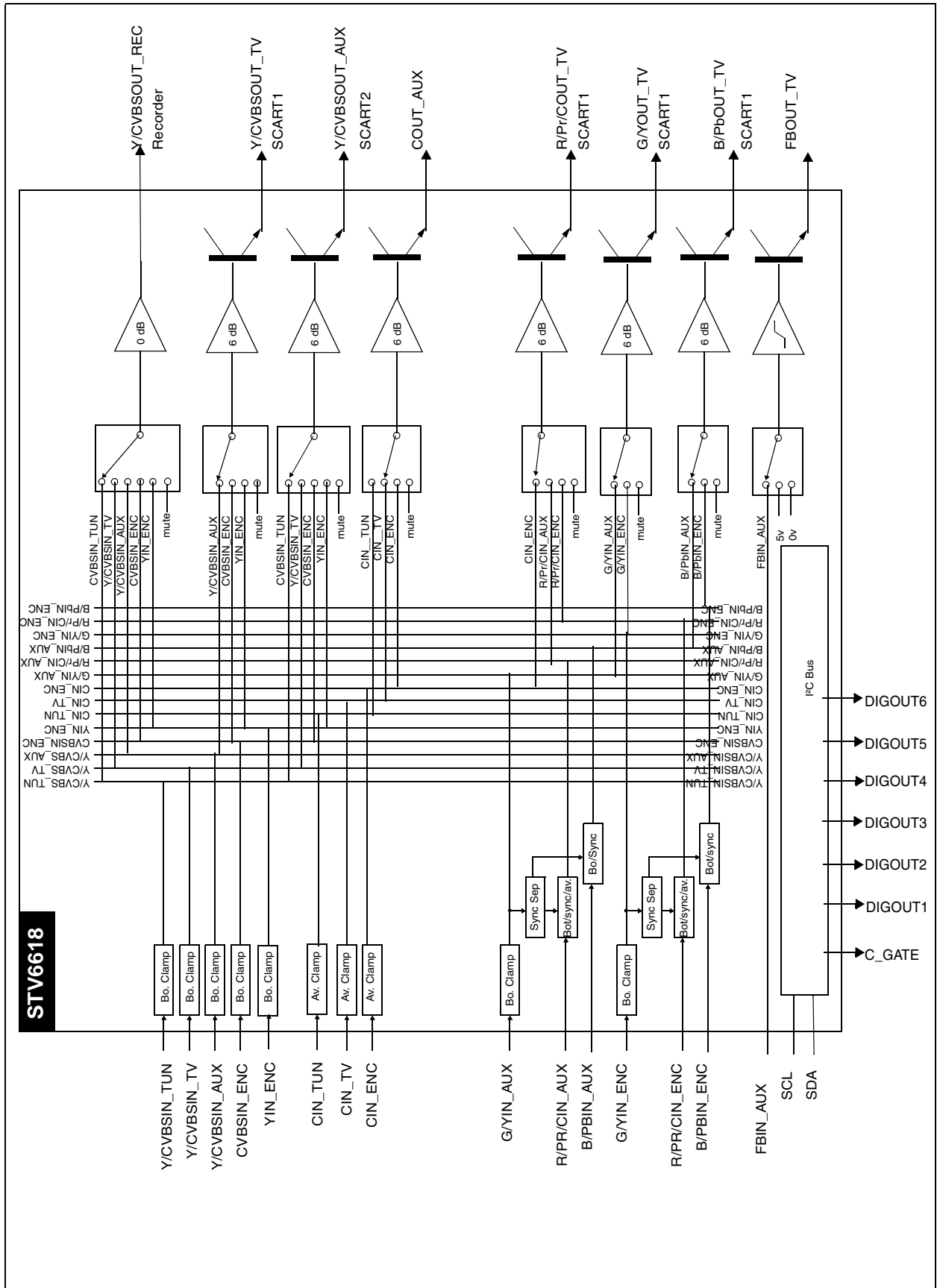
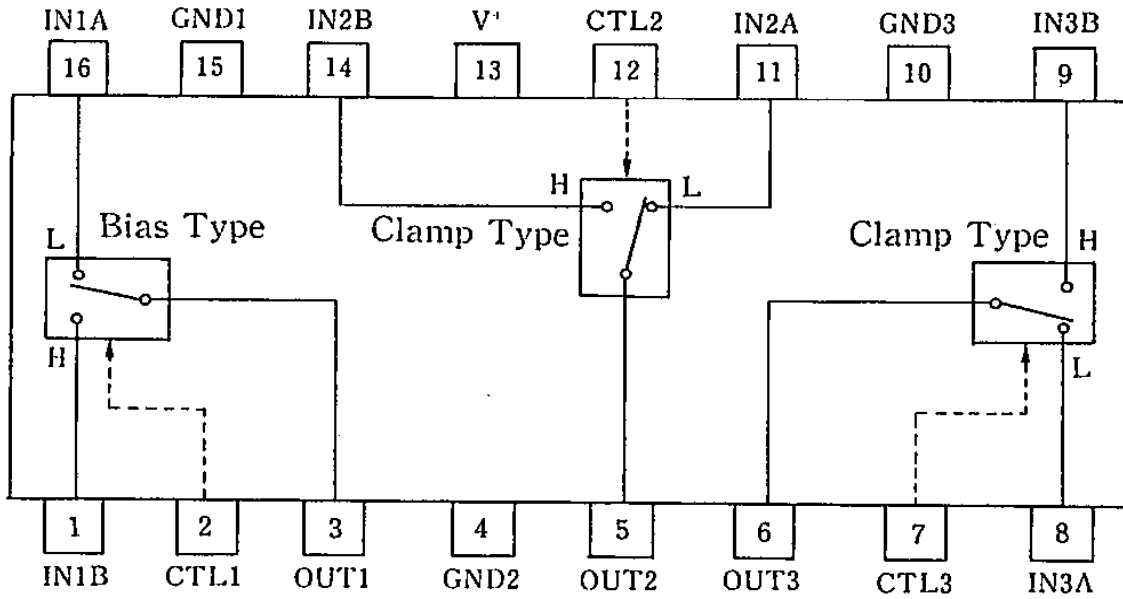


Figure 3: STV6618 Block Diagram



IC7411: NJM2285 Analog Board, Video Switch



NJM2285D
NJM2285M
NJM2285V

IC7313 TEA 1507 Analog Board, Power Supply Control

BLOCK DIAGRAM

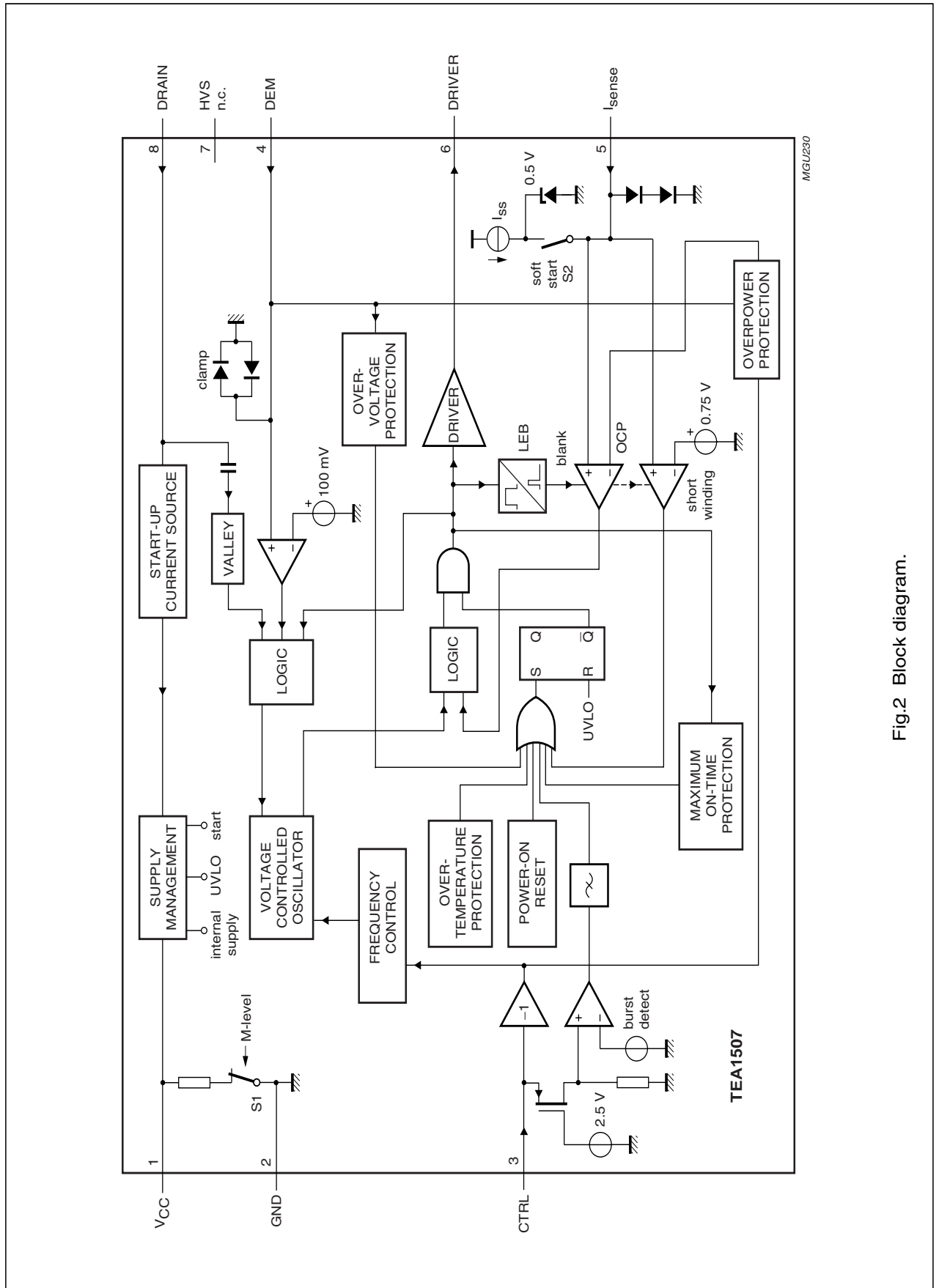
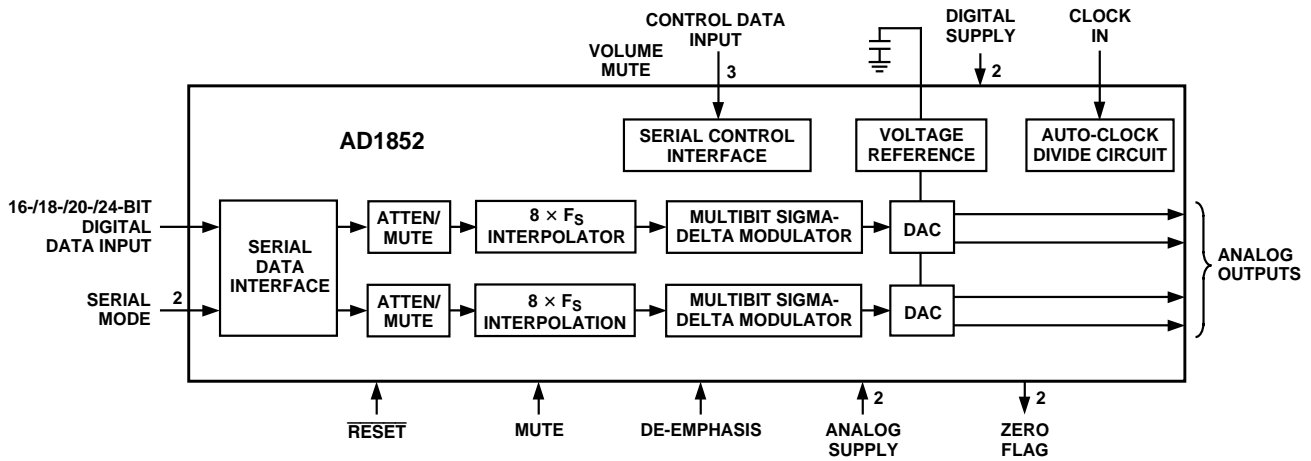


Fig.2 Block diagram.

IC7404: AD1582 Analog Board, Digital/Analogue Converter

FUNCTIONAL BLOCK DIAGRAM



AD1852

PIN FUNCTION DESCRIPTIONS

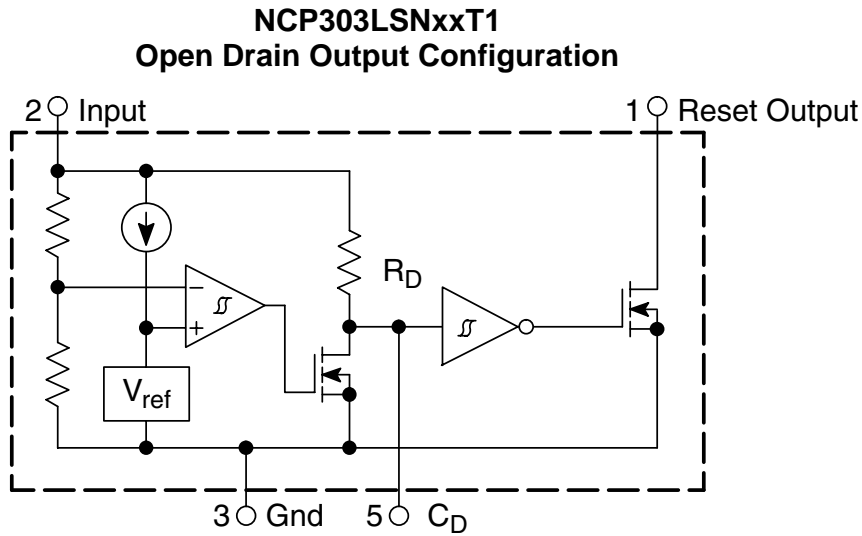
Pin	Input/Output	Pin Name	Description
1	I	DGND	Digital Ground.
2	I	MCLK	Master Clock Input. Connect to an external clock source at either 256 F _s , 384 F _s , 512 F _s , 768 F _s , or 1024 F _s .
3	I	CLATCH	Latch Input for Control Data. This input is rising-edge sensitive.
4	I	CCLK	Control Clock Input 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 μs/15 μs response characteristic on the output audio spectrum at an assumed 44.1 kHz sample rate. Curves for 32 kHz and 48 kHz sample rates may be selected via SPI control register.
10	I	96/48	Selects 48 kHz (LO) or 96 kHz Sample Frequency.
11, 15	I	AGND	Analog Ground.
12	O	OUTR+	Right Channel Positive Line Level Analog Output.
13	O	OUTR-	Right Channel Negative Line Level Analog Output.
14	O	FILTR	Voltage Reference Filter Capacitor Connection. Bypass and decouple the voltage reference with parallel 10 μF and 0.1 μF capacitors to the AGND.
16	O	OUTL-	Left Channel Negative Line Level Analog Output.
17	O	OUTL+	Left Channel Positive Line Level Analog Output.
18	I	AVDD	Analog Power Supply. Connect to Analog 5 V Supply.
19		FILTB	Filter Capacitor Connection. Connect 10 μF capacitor to AGND (Pin 15).
20	I	IDPM1	Input Serial Data Port Mode Control One. With IDPM0, defines 1 of 4 serial modes.
21	I	IDPM0	Input Serial Data Port Mode Control Zero. With IDPM1, defines 1 of 4 serial modes.
22	O	ZEROL	Left Channel Zero Flag Output. This pin goes HI when Left Channel has no signal input for more than 1024 LR Clock Cycles.
23	I	MUTE	Mute. Assert HI to mute both stereo analog outputs. Deassert LO for normal operation.
24	I	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.

Table I. Serial Data Input Mode

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

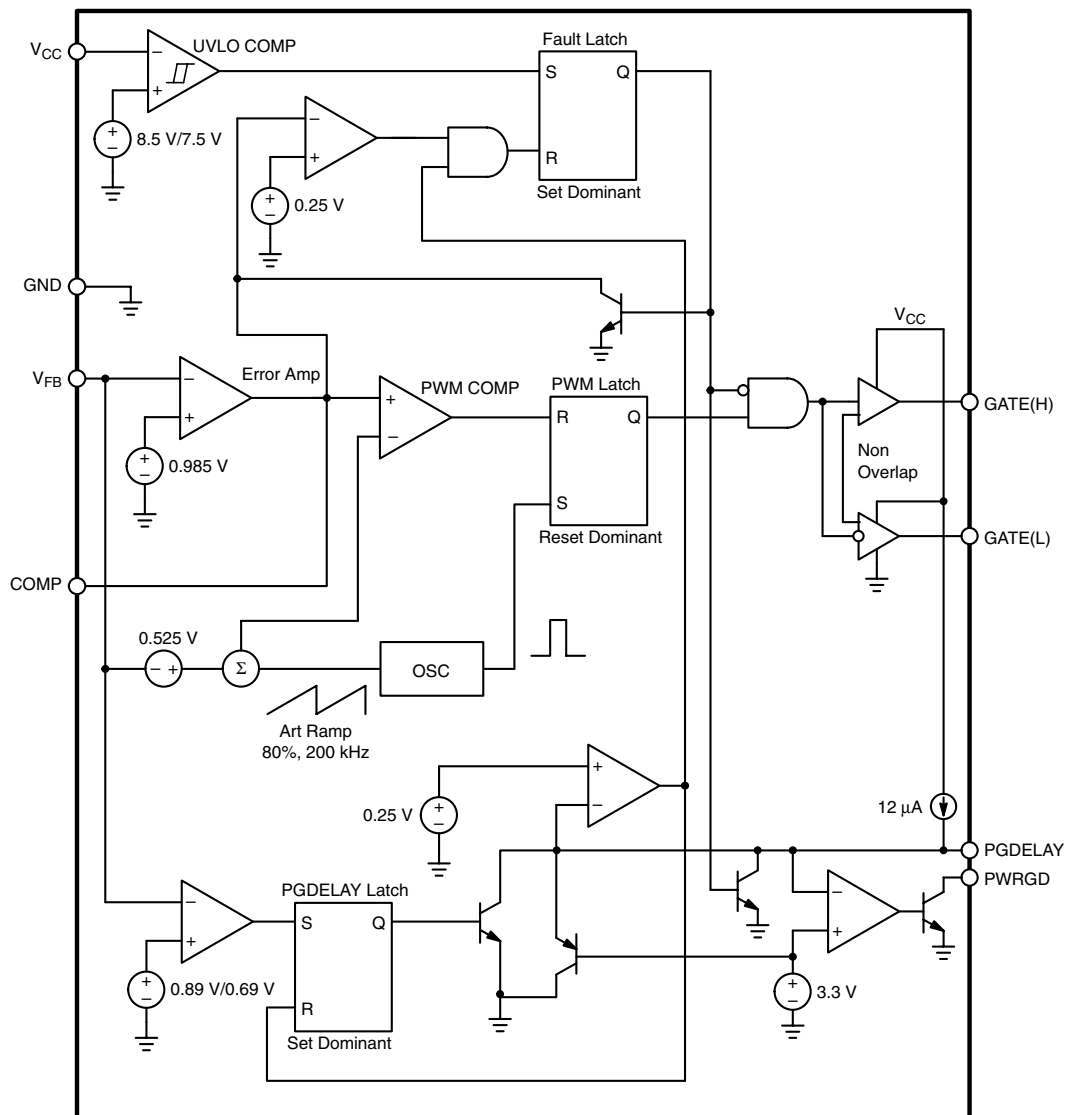
9.8.3 ICs Digital Board Chrysalis

IC7106 NCP303LSN29, Digital Board 2.1 Chrysalis, Reset Circuit



IC7501 NCP1570D, Digital Board 2.1 Chrysalis, DC/DC Converter Control

NCP1570

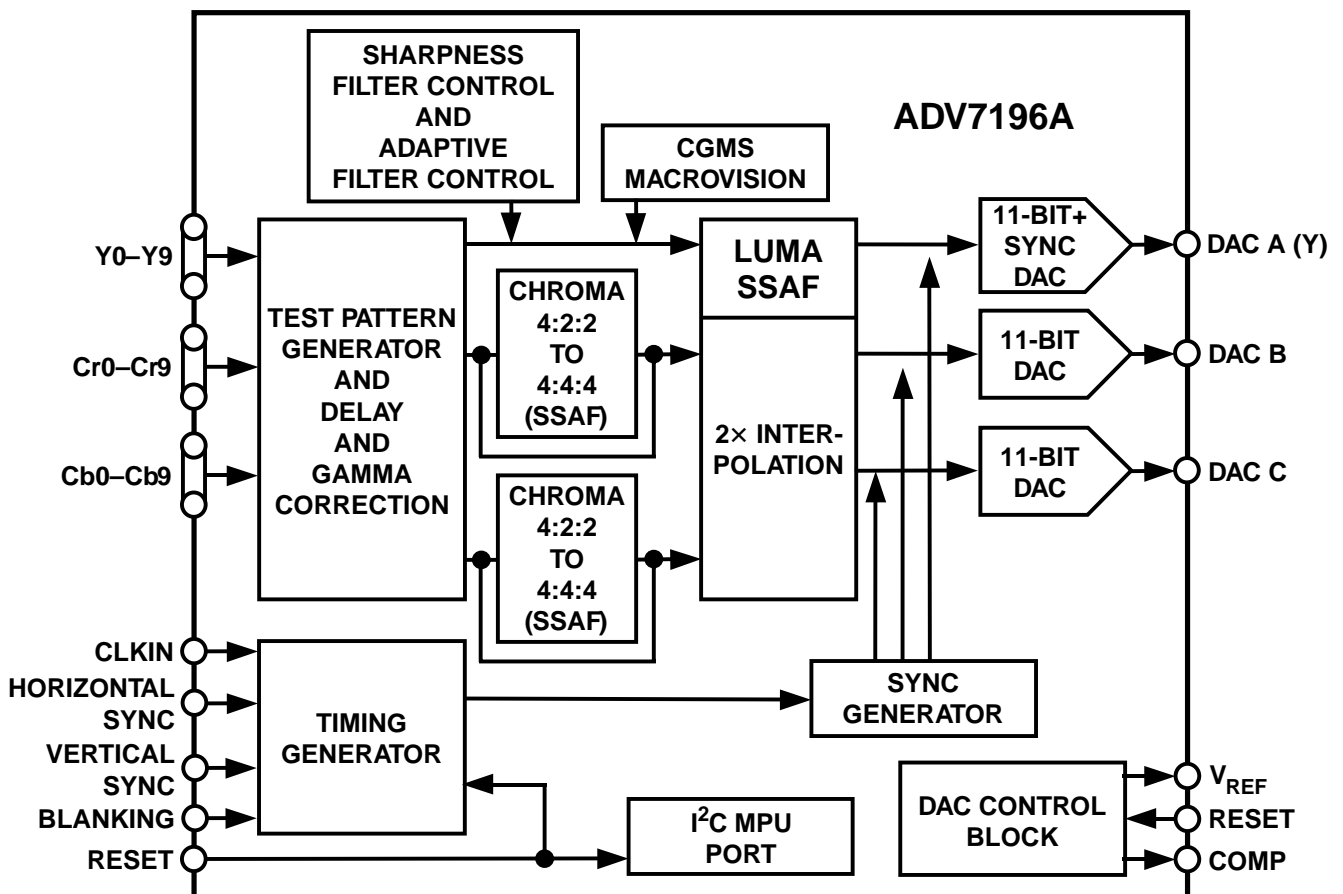


PACKAGE PIN DESCRIPTION

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.

IC7703 ADV7196A, Digital Board 2.1 Chrysalis, Progressive Scan Video Encoder

FUNCTIONAL BLOCK DIAGRAM



ADV7196A

PIN FUNCTION DESCRIPTIONS

Pin	Mnemonic	Input/Output	Function
1, 12	V _{DD}	P	Digital Power Supply
2–11	Y0–Y9	I	10-Bit Progressive Scan/HDTV Input Port for Y Data. Input for G data when RGB data is input.
13, 52	GND	G	Digital Ground
14–23	Cr0–Cr9	I	10-Bit Progressive Scan/HDTV Input Port for Color Data in 4:4:4 Input Mode. In 4:2:2 mode this input port is not used. Input port for R data when RGB data is input.
24, 35	V _{AA}	P	Analog Power Supply
25	CLKIN	I	Pixel Clock Input. Requires a 27 MHz reference clock for standard operation in Progressive Scan Mode or a 74.25 MHz (74.1758 MHz) reference clock in HDTV mode.
26, 33	AGND	G	Analog Ground
27	DV	I	Video Blanking Control Signal Input
28	$\overline{\text{VSYNC}}$ / TSYNC	I	$\overline{\text{VSYNC}}$, Vertical Sync Control Signal Input or TSYNC Input Control Signal in Async Timing Mode
29	$\overline{\text{HSYNC}}$ / SYNC	I	$\overline{\text{HSYNC}}$, Horizontal Sync Control Signal Input or $\overline{\text{SYNC}}$ Input Control Signal in Async Timing Mode
30	SCL	I	MPU Port Serial Interface Clock Input
31	SDA	I/O	MPU Port Serial Data Input/Output
32	DAC C	O	Color Component Analog Output of Input Data on Cb/Cr9–0 Input Pins
34	DAC A	O	Y Analog Output
36	DAC B	O	Color Component Analog Output of Input Data on Cr9–Cr0 Input Pins
37	COMP	O	Compensation Pin for DACs. Connect 0.1 μF capacitor from COMP pin to V _{AA} .
38	R _{SET}	I	A 2470 Ω resistor (for input ranges 64–940 and 64–960; output standards EIA-770.1–EIA-770.3) must be connected from this pin to ground and is used to control the amplitudes of the DAC outputs. For input ranges 0–1023 (output standards RS-170, RS-343A) the R _{SET} value must be 2820 Ω .
39	V _{REF}	I/O	Optional External Voltage Reference Input for DACs or Voltage Reference Output (1.235 V)
40	$\overline{\text{RESET}}$	I	This input resets the on-chip timing generator and sets the ADV7196A into Default Register setting. Reset is an active low signal.
41	ALSB	I	TTL Address Input. This signal sets up the LSB of the MPU address. When this pin is tied high, the I ² C filter is activated which reduces noise on the I ² C interface. When this pin is tied low, the input bandwidth on the I ² C interface is increased.
42–51	Cb/Cr9–0	I	10-Bit Progressive Scan/HDTV Input Port for Color Data. In 4:2:2 mode the multiplexed CrCb data must be input on these pins. Input port for B data when RGB is input.

9.9 List of Abbreviations

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 and Data 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
ASCC1M	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
IRR	Signal from IR-Receiver
K1	Key-Input-Line
K2	Key-Input-Line
KILL	Audio Mute
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	Pal/Secam-Select

PWM_FIL	Control line for Filament Voltage Generation
PWONSW	Amplifier Switch Audio A/D Converter
RD	Output Enable Read (CC - Flash-ROM and S-RAM)
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	I ² C-Bus
SCLSW	Switched I ² C-Bus
SDA	I ² C-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
X2	Oscillator Pin
XIN	Oscillator Pin
XOUT	Oscillator Pin
XT1	Low Frequency Oscillator Pin
XT2	Low Frequency Oscillator Pin
YFIN	Luminance Front In

Digital Board Chrysalis

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
ABCK	Audio Bit Clock
AD (1:10)	Address bus lines for Host I/F of Link+Codec IC7431
AEMP1	PCM1 emphasis ON/OFF for PCM1 output
AFS1	Audio sampling frequency indication signal
ALRCLK	Audio Word Select
AMCLK44	11.2896MHz (=256 * 44.1 kHz) audio master clock signal for 44.1 kHz audio
AMCLK48	12.288MHz (=256 * 48 kHz) audio master clock signal for 32 kHz and 48 kHz audio
APWM	PWM signal for audio PLL
ASIC	Application Specific Integrated Circuit
BUFENn_AUD	Buffer Enable Audio
BUFENn_VID	Buffer Enable Video
CLK27M_CON	27MHz Clock to Digital Board
CS	Parallel interface chip select input of Link+Codec IC7431
CTL (0:1)	Link interface control lines
CTSN	Clear to Send
D (0:15)	Flash data lines of Link+Codec IC7431
DCDi	Directional Correlational Deinterlacing. Circuitry that reduces jaggies on diagonal edges when deinterlacing video-sourced material.
DV_STATUS	Interrupt pin for reading DV-status
HS_CLK	Video clock input of Link+Codec IC7431
INT	Interrupt request output of Link+Codec IC7431 (input to Micro-Controller)
IOR	Parallel interface IO read control input of Link+Codec IC7431
ISPN	In System Programming signal (used for programming IC7802)
LKON	Link-on signal output
LPS	Link power status input
LREQ	Link request input
MA (0:10)	SDRAM address lines of Link+Codec IC7431
MCAS	SDRAM column address strobe signal
MCLK	SDRAM clock signal
MD (0:15)	SDRAM data lines of Link+Codec IC7431
MRAS	SDRAM row-address strobe signal
MWE	SDRAM write enable signal
PCM1	Audio Serial Data Output of Link+Codec IC7431
PCM1_NEW	'MSB justified' to I2S converted audio serial data; audio serial data input of audio DAC UDA1334A
PD (0:15)	Data bus lines for Host I/F of Link+Codec IC7431
PHY_D (0:7)	Data bus connection between PHY and LINK device
RESETn	DVIO board reset
RESET_FM	Reset signal driven by Flashmaster programming device
RESTB	Reset input of Link+Codec IC7431
RTSN	Request to Send
RWZ	Parallel interface read/write control input of Link+Codec IC7431
RXD	Receive Data
SCLK	Link control output clock
TXD	Transmit Data
VPP	+10V switchable programming voltage of microcontroller
YUV (0:7)	Digital Video

10. Spare Parts List

10.1 Exploded View of the Set

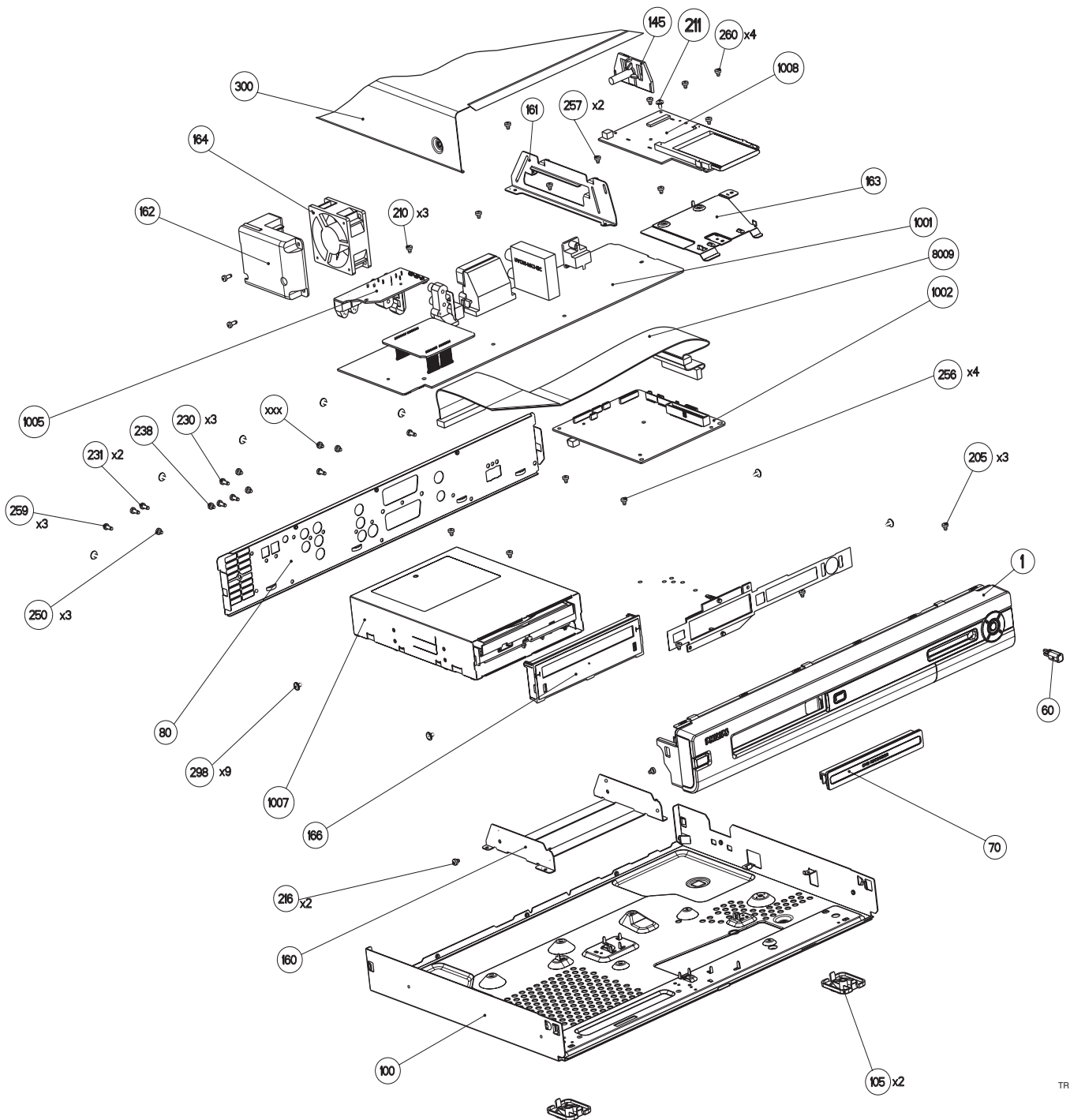
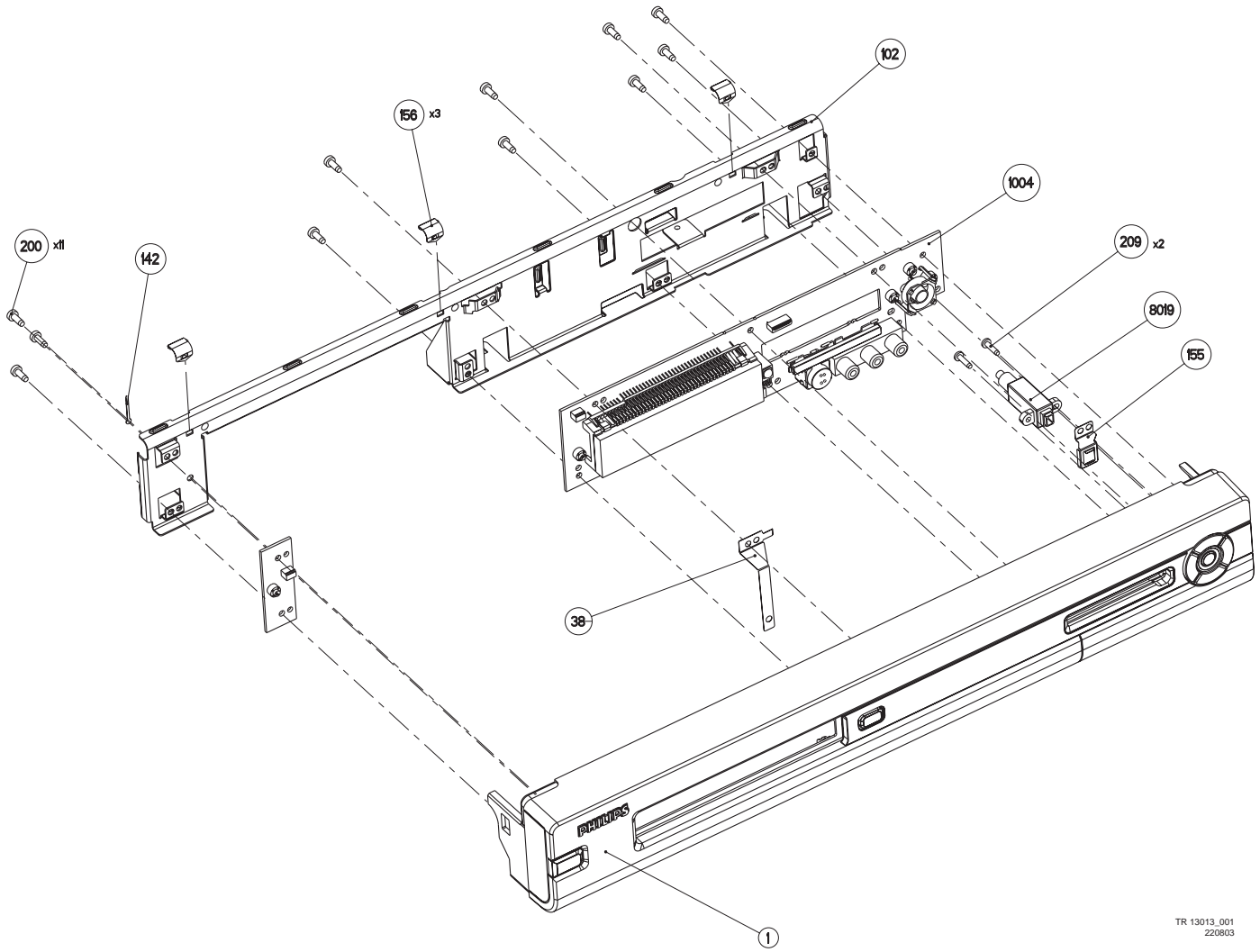


Figure 10-1

10.2 Exploded View of the Front Panel Complete



TR 13013_001
220803

Figure 10-2

10.3 Exploded View of the Front without PWBs

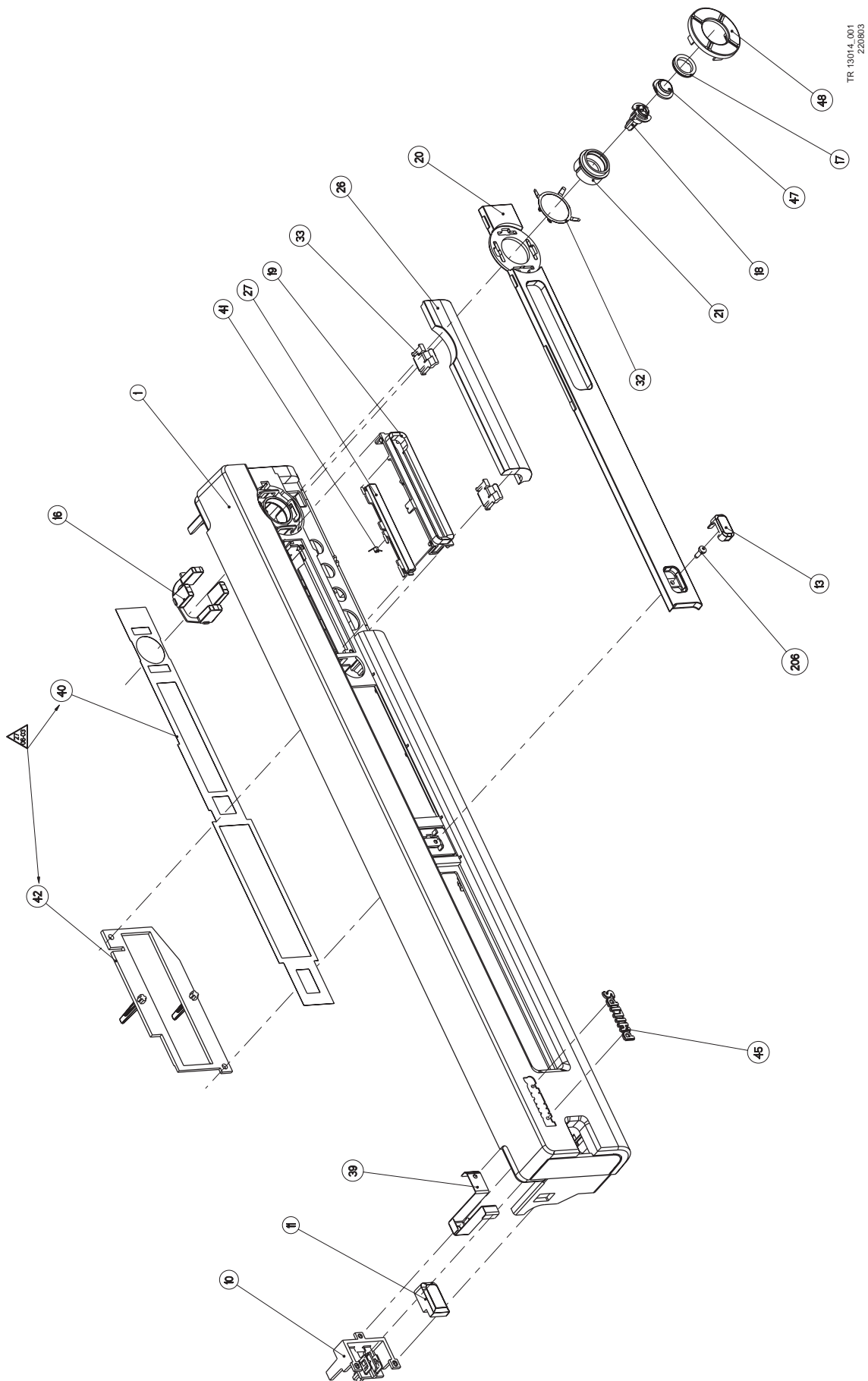


Figure 10-3

Mechanical

Various

0001	3103 607 90511	PANEL FRONT ASSY 77/EU
0011	3103 607 50341	BUTTON CAP STAND BY
0013	3103 607 50361	BUTTON CAP OPEN CL.
0020	3103 607 50611	WINDOW DISPLAY ASSY
0026	3103 607 50931	DOOR FRONT AV ASSY
0033	3103 604 00441	HINGE DOOR FRONT AV
0047	3103 607 50411	BUTTON CAP RECORD
0048	3103 607 50991	RING ROCKER PLAY PAUSE ASSY
0070	3103 607 90411	COVER TRAY ASSY
0161	3103 601 00431	FFC 22-POL-A-TYP 245MM (AB-DB)
0164	3103 308 52950	FAN KD120 6PTS 3 - C112
0165	3103 607 90431	BUTTON EJECT ASSY
0300	3103 607 50681	COVER ASSY
0350	3128 147 15411	RC19046005/01
0351	2422 070 98133	MAINSCORD EUR 1M5 BK
0352	2422 076 00532	SCART CABLE
0357	4822 320 50377	CONNECT. CABLE PAL
1008	2822 062 41022	CARD READER WRITER IIA
8004	3103 601 00220	FFC 10-POL-D-TYP 350MM (UP-DB)
8005	3103 601 00230	FFC 22-POL-A-TYP 210MM (AB-DB)
8008	3103 601 00441	CBLE KR 12P/130/12P UL
8009	3103 601 00461	CBLE IDE 40P/470/40P UL
8010	3103 601 00280	FFC 10-POL-A-TYP 650MM (AB-DC)
8012	3103 601 00471	CBLE EHR 4P/180/4P LC UL
8013	3103 601 00310	KR 9POL GESCH 370MM
8019	3103 601 00360	IEEE 1394 CHRYSALIS 350MM
8020	3103 601 00370	FFC 6-POL-D-TYP 220MM (DIO-DB)
8026	3103 601 00431	FFC 22-POL-A-TYP 245MM (AB-DB)
8028	3103 601 00481	CBLE KR 2P/230/2P KR UL
8029	3103 601 00320	FFC 7-POL-D-TYP 280MM (DIO-EP)

Display Board

Various

1110	4822 242 82114	EFOEC8004/T4
1130	4822 276 13732	Tact switch
1165	4822 276 13732	Tact switch
1166	4822 276 13732	Tact switch
1167	4822 276 13732	Tact switch
1168	4822 276 13732	Tact switch
1169	4822 276 13732	Tact switch
1170	4822 276 13732	Tact switch
1910	4822 267 11031	10P. FEM. V
1911	3103 601 00180	CABLE TREE ASSY 2 POL
1920	2422 026 05301	SOC CINCH V 3P
1921	2422 026 05307	CON MDIN H 4P F YKF51 B
1922	2422 025 10185	CON BM H 9P M 2.00 PH B

—||—

2100	5322 126 11583	10nF 10% 50V 0603
2101	3198 017 34730	47nF 16V 0603
2102	4822 124 11946	22µF 20% 16V
2103	5322 126 11583	10nF 10% 50V 0603
2104	2238 586 59812	100nF 20-80% 50V 0603
2110	4822 124 21732	10µF 20% 25V
2111	3198 017 34730	47nF 16V 0603
2112	4822 126 13879	220nF 20% 16V
2113	5322 121 42498	680nF 5% 63V
2114	5322 126 11578	1nF 10% 50V 0603
2115	3198 024 44730	47nF 50V 0603
2116	4822 124 11946	22µF 20% 16V
2117	4822 124 81151	22µF 50V
2118	2020 552 94427	100pF 5% 50v 0603
2119	2020 552 94427	100pF 5% 50v 0603
2120	2020 552 94427	100pF 5% 50v 0603
2121	2020 552 94427	100pF 5% 50v 0603
2122	2020 552 94427	100pF 5% 50v 0603
2123	2020 552 94427	100pF 5% 50v 0603
2124	2020 552 94427	100pF 5% 50v 0603
2125	2020 552 94427	100pF 5% 50v 0603
2126	2020 552 94427	100pF 5% 50v 0603
2200	4822 126 14241	330pF 50V 0603
2201	4822 126 14241	330pF 50V 0603
2202	2238 586 59812	100nF 20-80% 50V 0603

—W—

3100	4822 051 30223	22kΩ 5% 0.062W
3101	4822 051 30223	22kΩ 5% 0.062W
3102	4822 051 30222	2.2kΩ 5% 0.062W
3103	4822 051 30221	220Ω 5% 0.062W
3104	4822 051 30103	10kΩ 5% 0.062W
3106	4822 117 12925	47kΩ 1% 0.063W 0603
3107	4822 051 30222	2.2kΩ 5% 0.062W
3108	4822 117 12925	47kΩ 1% 0.063W 0603
3110	4822 051 30221	220Ω 5% 0.062W
3111	4822 051 30223	22kΩ 5% 0.062W
3112	4822 050 11002	1kΩ 1% 0.4W
3113	4822 051 30102	1kΩ 5% 0.062W
3114	4822 051 30101	100Ω 5% 0.062W
3115	4822 051 30101	100Ω 5% 0.062W
3116	4822 051 30331	330Ω 5% 0.062W
3117	4822 051 30103	10kΩ 5% 0.062W
3118	4822 051 30331	330Ω 5% 0.062W
3119	4822 051 30471	470Ω 5% 0.062W
3120	4822 051 30102	1kΩ 5% 0.062W
3121	4822 116 83872	220Ω 5% 0.5W
3122	4822 051 30103	10kΩ 5% 0.062W
3123	4822 051 30471	470Ω 5% 0.062W
3124	4822 051 30103	10kΩ 5% 0.062W
3125	4822 051 30471	470Ω 5% 0.062W
3126	4822 051 30101	100Ω 5% 0.062W
3127	4822 117 13632	100kΩ 1% 0603 0.62W
3128	4822 117 13632	100kΩ 1% 0603 0.62W
3130	4822 051 30103	10kΩ 5% 0.062W
3132	4822 051 30102	1kΩ 5% 0.062W
3134	4822 117 12063	NTC DC 5W 10K 5%
3137	4822 116 83876	270Ω 5% 0.5W
3139	4822 116 83876	270Ω 5% 0.5W
3141	4822 117 12925	47kΩ 1% 0.063W 0603
3144	4822 051 30103	10kΩ 5% 0.062W
3147	4822 051 30223	22kΩ 5% 0.062W
3148	4822 051 30223	22kΩ 5% 0.062W
3149	4822 051 30223	22kΩ 5% 0.062W
3150	4822 051 30223	22kΩ 5% 0.062W
3151	4822 051 30223	22kΩ 5% 0.062W
3152	4822 051 30223	22kΩ 5% 0.062W
3153	4822 051 30223	22kΩ 5% 0.062W
3200	4822 051 30102	1kΩ 5% 0.062W
3201	4822 051 30105	1MΩ 5% 0.062W
3202	4822 051 30102	1kΩ 5% 0.062W
3203	4822 051 30105	1MΩ 5% 0.062W
3204	4822 051 30689	68Ω 5% 0.063W 0603
3205	4822 051 30759	75Ω 5% 0.062W
3206	4822 051 30759	75Ω 5% 0.062W
3207	4822 051 30759	75Ω 5% 0.062W
3300	4822 051 30472	4.7kΩ 5% 0.062W
4112	4822 051 30008	Jumper 0603
4113	4822 051 20008	Jumper 0805
4121	4822 051 30008	Jumper 0603
4122	4822 051 30008	Jumper 0603
4123	4822 051 30008	Jumper 0603

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5100	4822 157 11706	10µH 5%
5101	2422 549 44607	Bead 600Ω at 100MHz
5103	2422 549 44607	Bead 600Ω at 100MHz
5104	4822 157 50964	100µH 20%

—D—

6100	4822 130 11416	PDZ6.8B
6101	9322 190 44676	LTL-1MHHR
6102	9322 190 44676	LTL-1MHHR
6103	9322 190 44676	LTL-1MHHR
6105	4822 130 11397	BAS316
6106	4822 130 11397	BAS316
6111	4822 130 11397	BAS316
6200	9322 146 61685	DF3A6.8FU
6201	9322 146 61685	DF3A6.8FU
6202	9322 146 61685	DF3A6.8FU
6203	9322 146 61685	DF3A6.8FU
6204	9322 146 61685	DF3A6.8FU

—E—

7100	2722 171 07736	VFD BJ900GNK
7101	3198 010 42310	BC847BW
7102	3198 010 42310	BC847BW
7103	3103 165 13731	TMP87C874F/LDCP1
7104	3198 010 42310	BC847BW
7105	3198 010 42310	BC847BW
7106	4822 130 40981	BC337-25
7107	9322 185 95667	TSOP4836
7108	4822 130 41246	BC327-25

7109	3198 010 42310	BC847BW
7112	4822 130 60854	DTA124EU-W

Analog Board

Various

1001▲	2422 086 10919	Fuse 65V 125mA
1300▲	2422 086 10899	FUSE5X20ET1A25 250V IEC B
1301▲	4822 265 11253	Fuse holder 2p
1302▲	4822 252 11215	Spark gap
1303▲	4822 071 51002	19372(1A)
1304▲	2422 086 10786	FUSE 4A
1304▲	9965 000 07786	Fuse T4.0A 250V
1306▲	2422 086 10919	Fuse 65V 125mA
1307▲	4822 071 51002	19372(1A)
1308▲	2422 086 10951	PROT DEV 65V 500MA PSC
1308▲	4822 252 51187	19398E1(0.500A)
1309▲	2422 086 10783	FUSE RAD LT 2A 250V IEC A
1309▲	9965 000 07788	FUSE RAD T2A IEC UL250V
1600	4822 242 10434	Crystal 18.432 MHz
1701	4822 242 81436	Filter OFWK3953M
1702	2422 549 44341	SAW 38.9MHz OFWK9656M
1703	4822 242 10307	OFWK3956M
1704	2422 549 44611	FIL CER 5MHZ5 TPSR*MBQ2 BS A
1704	4822 242 72586	TPS5.5MB-TF20
1705	3139 147 17001	TUNER UV1316MK3
1900	2422 025 18009	Connector 22P
1900	4822 265 11154	Connector 22p
1931▲	2422 030 00304	Socket 2P m h mains
1932	2422 025 10772	CON BM V 12P M 2.00 PH B
1934	4822 267 10565	Connector 4p
1935	5322 268 90415	B2B-PH-K
1940	2422 033 00334	CON BM EURO H 42P
1942	2422 025 10769	CON BMT 9P VERT PH-B
1943	2422 025 18143	CON V 10P F 1.00 FFC 0.3
1943	4822 267 11031	10P. FEM. V
1947	2422 025 18009	Connector 22P
1947	4822 265 11154	Connector 22p
1948	4822 267 10994	Socket SVHS
1949	2422 026 05308	SOC CINCH H 3P
1990	4822 242 73552	13,875 000 MC

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2000	4822 124 80483	47µF20% 6,3V
2001	4822 124 42234	100µF 20% 6,3V
2002	4822 124 42234	100µF 20% 6,3V
2003	2238 586 59812	100nF 20-80% 50V 0603
2004	2238 586 59812	100nF 20-80% 50V 0603
2006	2238 916 11449	1nF 2% NPO 25V 0603
2008	2238 916 11449	1nF 2% NPO 25V 0603
2009	2020 552 94427	100pF 5% 50v 0603
2011	2238 586 59812	100nF 20-80% 50V 0603
2012	2238 586 59812	100nF 20-80% 50V 0603
2016	4822 124 22652	2.2µF 20% 50V
2017	2020 552 94427	100pF 5% 50v 0603
2018	4822 124 21732	10µF 20% 25V
2019	4822 124 21732	10µF 20% 25V
2020	4822 124 21732	10µF 20% 25V
2021	2238 586 59812	100nF 20-80% 50V 0603
2023	2238 916 11449	1nF 2% NPO 25V 0603
2025	2238 916 11449	1nF 2% NPO 25V 0603
2030	2238 916 11449	1nF 2% NPO 25V 0603
2032	2238 916 11449	1nF 2% NPO 25V 0603
2033	2020 552 94427	100pF 5% 50v 0603
2035	2238 586 59812	100nF 20-80% 50V 0603
2037	2238 586 59812	100nF 20-80% 50V 0603
2038	4822 124 42234	100µF 20% 6,3V
2041	2020 552 94427	100pF 5% 50v 0603
2042	2238 586 59812	100nF 20-80% 50V 0603
2043	4822 124 80483	47µF20% 6,3V
2045	2238 916 11449	1nF 2% NPO 25V 0603
2047	2238 916 11449	1nF 2% NPO 25V 0603
2048	2020 009 90097	100µF BP 16V 20%
2048	2022 036 00005	10µF 16V 20%
2048	4822 124 12392	47?F 20% 16V
2049	5322 126 11583	10nF 10% 50V 0603
2050	2020 009 90097	100µF BP 16V 20%
2050	2022 036 00005	10µF 16V 20%
2050	4822 124 12392	47?F 20% 16V
2301▲	2020 554 90173	2.2nF 20% 250V
2302▲	4822 121 10512	220nF 275V 20%
2303	4822 122 31175	1nF 10% 500V
2304▲	4822 121 51598	2.2nF 5% 400V
2305	2020 021 91506	100µF 20% 16V
2306	2020 021 91528	560µF 6V3 20%
2307	4822 122 31175	1nF 10% 500V

2308	2022 318 00108	47nF 250V 10%	2511	2020 009 90097	100µF BP 16V 20%	3014	5322 117 13031	5.6kΩ 1% 0603
2308	4822 121 70386	47nF 10% 250V	2511	2022 036 00005	10µF 16V 20%	3015	4822 051 30471	470Ω 5% 0.062W
2309▲	2222 151 90053	68µF 400V 20%	2512	2238 586 59812	100nF 20-80% 50V 0603	3016	5322 117 13038	27K 1% 0.063W 0603 RC22H
2310	5322 126 11578	1nF 10% 50V 0603	2513	2020 552 96807	1µF 10V 0603 X5R	3017	5322 117 13024	33kΩ 1% 0.063W 0603
2311	5322 126 11578	1nF 10% 50V 0603	2514	2238 586 59812	100nF 20-80% 50V 0603	3018	5322 117 13031	5.6kΩ 1% 0603
2312	2020 021 91506	1000µF 20% 16V	2515	2020 552 96807	1µF 10V 0603 X5R	3019	4822 116 52186	22Ω 5% 0.5W
2313	2020 021 91528	560µF 6V3 20%	2516	2020 009 90097	100µF BP 16V 20%	3020	4822 051 30472	4.7kΩ 5% 0.062W
2315▲	4822 126 14525	47pF 5% 1kV	2516	2022 036 00005	10µF 16V 20%	3021	4822 051 30103	10kΩ 5% 0.062W
2317	5322 126 11578	1nF 10% 50V 0603	2517	5322 126 11578	1nF 10% 50V 0603	3022	4822 117 12139	22Ω 5% 0.062W
2318	4822 126 10206	2.2nF 10% 500V	2518	2238 586 59812	100nF 20-80% 50V 0603	3023	4822 117 12139	22Ω 5% 0.062W
2319	2020 021 91506	1000µF 20% 16V	2519	4822 124 42234	100µF 20% 6,3V	3024	4822 117 12139	22Ω 5% 0.062W
2320	4822 124 40849	330µF 20% 16V	2520	5322 126 11578	1nF 10% 50V 0603	3025	4822 117 13632	100kΩ 1% 0603 0.62W
2321	2238 586 59812	100nF 20-80% 50V 0603	2521	2238 586 59812	100nF 20-80% 50V 0603	3026	4822 117 12139	22Ω 5% 0.062W
2322▲	2020 021 91506	1000µF 20% 16V	2522	2020 009 90097	100µF BP 16V 20%	3027	5322 117 13024	33kΩ 1% 0.063W 0603
2323	4822 124 42234	100µF 20% 6,3V	2522	2022 036 00005	10µF 16V 20%	3028	4822 117 12139	22Ω 5% 0.062W
2324	2238 586 59812	100nF 20-80% 50V 0603	2523	5322 126 11578	1nF 10% 50V 0603	3029	4822 051 30101	100Ω 5% 0.062W
2325	4822 124 81151	22µF 50V	2524	3198 017 41050	1µF 10V 0603	3030	5322 117 13038	27K 1% 0.063W 0603 RC22H
2326	4822 121 41857	10nF 5% 250V	2525	3198 017 41050	1µF 10V 0603	3031	4822 051 30103	10kΩ 5% 0.062W
2327	2238 586 59812	100nF 20-80% 50V 0603	2526	2020 009 90097	100µF BP 16V 20%	3032	5322 117 13053	6.8kΩ 1% 0.063W 0603
2328	4822 124 81151	22µF 50V	2526	2022 036 00005	10µF 16V 20%	3033	4822 117 12139	22Ω 5% 0.062W
2329	2238 586 59812	100nF 20-80% 50V 0603	2527	5322 126 11578	1nF 10% 50V 0603	3034	4822 117 13613	2R2 5% 0603
2330	5322 126 11578	1nF 10% 50V 0603	2530	2238 586 59812	100nF 20-80% 50V 0603	3035	4822 117 13613	2R2 5% 0603
2331	2238 586 59812	100nF 20-80% 50V 0603	2535	2238 586 59812	100nF 20-80% 50V 0603	3036	5322 117 13053	6.8kΩ 1% 0.063W 0603
2332	4822 124 22651	1µF 20% 50V	2536	2238 586 59812	100nF 20-80% 50V 0603	3039	5322 117 13038	27K 1% 0.063W 0603 RC22H
2334	2238 586 59812	100nF 20-80% 50V 0603	2600	4822 124 21732	10µF 20% 25V	3040	5322 117 13024	33kΩ 1% 0.063W 0603
2335	4822 124 21732	10µF 20% 25V	2601	5322 126 11583	10nF 10% 50V 0603	3042	4822 050 21003	10kΩ 1% 0.6W
2336	2238 586 59812	100nF 20-80% 50V 0603	2602	4822 124 21732	10µF 20% 25V	3043	4822 117 12925	47kΩ 1% 0.063W 0603
2338	2238 586 59812	100nF 20-80% 50V 0603	2603	2238 586 59812	100nF 20-80% 50V 0603	3044	4822 117 12925	47kΩ 1% 0.063W 0603
2339	3198 017 41050	1µF 10V 0603	2604	5322 126 11583	10nF 10% 50V 0603	3045	4822 051 30102	1kΩ 5% 0.062W
2340▲	2020 554 90169	470pF 250V 10%	2605	4822 124 21732	10µF 20% 25V	3047	4822 050 21003	10kΩ 1% 0.6W
2341	3198 017 41050	1µF 10V 0603	2606	2238 586 59812	100nF 20-80% 50V 0603	3049	4822 051 30472	4.7kΩ 5% 0.062W
2342	3198 017 41050	1µF 10V 0603	2607	4822 126 14225	56pF 5% 50V 0603	3051	4822 117 13632	100kΩ 1% 0603 0.62W
2343	2238 586 59812	100nF 20-80% 50V 0603	2608	4822 124 21732	10µF 20% 25V	3052	4822 051 30223	22kΩ 5% 0.062W
2402	2238 586 59812	100nF 20-80% 50V 0603	2609	4822 126 14225	56pF 5% 50V 0603	3053	4822 050 21003	10kΩ 1% 0.6W
2403	4822 124 80483	47µF20% 6,3V	2610	5322 126 11583	10nF 10% 50V 0603	3054	4822 117 12139	22Ω 5% 0.062W
2404	2238 586 59812	100nF 20-80% 50V 0603	2611	4822 124 80231	47µF20% 16V	3300▲	4822 053 21335	3.3MΩ 5% 0.5W
2405	4822 124 80483	47µF20% 6,3V	2612	4822 124 40769	4.7µF 20% 100V	3301▲	4822 053 21335	3.3MΩ 5% 0.5W
2406	5322 126 11583	10nF 10% 50V 0603	2616	5322 126 11578	1nF 10% 50V 0603	3302	4822 051 30102	1kΩ 5% 0.062W
2407	4822 122 33741	10pF 10% 50V	2617	5322 126 11578	1nF 10% 50V 0603	3303	4822 051 30102	1kΩ 5% 0.062W
2408	3198 017 41050	1µF 10V 0603	2620	3198 016 33380	3.3pF 50V 0603	3304	4822 051 30103	10kΩ 5% 0.062W
2409	2238 586 59812	100nF 20-80% 50V 0603	2621	3198 016 33380	3.3pF 50V 0603	3305▲	4822 053 21684	680kΩ 5% 0.5W
2410	3198 017 41050	1µF 10V 0603	2623	2238 586 59812	100nF 20-80% 50V 0603	3306	4822 116 83872	220Ω 5% 0.5W
2411	2238 586 59812	100nF 20-80% 50V 0603	2713	4822 124 11946	22µF 20% 16V	3307	4822 051 30103	10kΩ 5% 0.062W
2412	4822 122 33741	10pF 10% 50V	2719	4822 126 13883	220pF 5% 50V	3308	4822 116 52272	330k 5% 0.5W
2413	4822 124 80483	47µF20% 6,3V	2720	4822 124 42234	100µF 20% 6,3V	3309	4822 116 52272	330k 5% 0.5W
2414	2238 586 59812	100nF 20-80% 50V 0603	2721	5322 122 33861	120pF 10% 50V	3310	4822 116 52272	330k 5% 0.5W
2416	3198 017 41050	1µF 10V 0603	2722	2022 020 00861	2.2µF 50V 20%	3311	4822 051 30102	1kΩ 5% 0.062W
2417	4822 124 11947	10?F 20% 16V	2722	5322 124 41379	2.2?F 20% 50V	3312	4822 051 30221	220Ω 5% 0.062W
2418	3198 017 41050	1µF 10V 0603	2723	4822 126 13881	470pF 5% 50V	3313	4822 116 52234	100kΩ 5% 0.5W
2419	3198 017 41050	1µF 10V 0603	2724	2238 586 59812	100nF 20-80% 50V 0603	3314	4822 117 13611	1KΩ 1% 0603 ERJ3E
2420	2238 586 59812	100nF 20-80% 50V 0603	2727	2238 586 59812	100nF 20-80% 50V 0603	3314	5322 117 13018	1kΩ 1% 0.063W 0603
2421	4822 124 11947	10?F 20% 16V	2728	5322 126 11583	10nF 10% 50V 0603	3315	4822 117 12902	8.2kΩ 1% 0.063W 0603
2422	5322 126 11583	10nF 10% 50V 0603	2729	4822 124 21732	10µF 20% 25V	3315	5322 117 13056	8.2K 1% 0.063W 0603
2423	3198 017 41050	1µF 10V 0603	2730	4822 126 13879	220nF 20% 16V	3316	5322 117 13026	4.7kΩ 1% 0.063W 0603
2424	4822 124 80483	47µF20% 6,3V	2731	2020 552 94523	8.2pF 50V 0603	3317	4822 051 30102	1kΩ 5% 0.062W
2425	2238 586 59812	100nF 20-80% 50V 0603	2732	4822 124 22652	2.2µF 20% 50V	3318	4822 116 52175	100Ω 5% 0.5W
2427	3198 017 41050	1µF 10V 0603	2733	2238 586 59812	100nF 20-80% 50V 0603	3321	2322 193 14477	RST MFLM PR01 A 0R47 PM5 A
2428	4822 124 11947	10?F 20% 16V	2734	5322 126 11578	1nF 10% 50V 0603	3323	4822 117 12891	220kΩ 1% 0.063W 0603
2429	4822 124 11946	22µF 20% 16V	2735	4822 126 11669	27pF 5% 50V 0603	3324	2322 702 60564	560kΩ 5% 0603
2430	2238 586 59812	100nF 20-80% 50V 0603	2736	4822 126 11669	27pF 5% 50V 0603	3325	4822 117 12925	47kΩ 1% 0.063W 0603
2432	4822 124 42234	100µF 20% 6,3V	2737	4822 124 80483	47µF20% 6,3V	3326	4822 116 52195	47Ω 5% 0.5W
2433	3198 017 34730	47nF 16V 0603	2740	4822 124 22652	2.2µF 20% 50V	3327	4822 051 30105	1MΩ 5% 0.062W
2434	4822 124 80483	47µF20% 6,3V	2741	5322 126 11578	1nF 10% 50V 0603	3328	4822 051 30103	10kΩ 5% 0.062W
2435	2238 586 59812	100nF 20-80% 50V 0603	2742	5322 126 11578	1nF 10% 50V 0603	3329	3198 021 32250	2.2MΩ 5% 0603
2436	3198 017 41050	1µF 10V 0603	2932	2238 586 59812	100nF 20-80% 50V 0603	3330	4822 051 30471	470Ω 5% 0.062W
2437	3198 017 41050	1µF 10V 0603	2933	4822 124 80483	47µF20% 6,3V	3331	4822 051 30109	10kΩ 5% 0.062W
2438	3198 017 41050	1µF 10V 0603	2934	2238 586 59812	100nF 20-80% 50V 0603	3332	5322 117 13031	5.6kΩ 1% 0603
2439	2238 586 59812	100nF 20-80% 50V 0603	2935	2238 586 59812	100nF 20-80% 50V 0603	3333	5322 117 13026	4.7kΩ 1% 0.063W 0603
2440	3198 017 41050	1µF 10V 0603	2936	4822 122 33761	22pF 5% 50V	3334	4822 051 30563	56kΩ 5% 0.062W
2441	3198 017 41050	1µF 10V 0603	2937	4822 122 33761	22pF 5% 50V	3335	4822 051 30471	470Ω 5% 0.062W
2442	4822 124 11946	22µF 20% 16V	2938	2238 586 59812	100nF 20-80% 50V 0603	3336	4822 051 30471	470Ω 5% 0.062W
2443	4822 124 42234	100µF 20% 6,3V	2940	2238 586 59812	100nF 20-80% 50V 0603	3337	4822 051 30102	1kΩ 5% 0.062W
2444	4822 126 13881	470pF 5% 50V	2941	4822 124 21732	10µF 20% 25V	3338	4822 051 30221	220Ω 5% 0.062W
2445	4822 126 13881	470pF 5% 50V	2942	4822 126 14238	2.2nF 50V 0603	3339	5322 117 13026	4.7kΩ 1% 0.063W 0603
2446	3198 017 41050	1µF 10V 0603	2943	4822 126 14508	180pF 5% 50V	3340	5322 117 13026	4.7kΩ 1% 0.063W 0603
2447	4822 126 13881	470pF 5% 50V	2944	4822 126 14238	2.2nF 50V 0603	3341	4822 051 30683	68kΩ 5% 0.062W
2448	4822 126 13881	470pF 5% 50V	2945	4822 126 14508	180pF 5% 50V	3342	4822 116 52283	4.7kΩ 5% 0.5W
2450	2238 586 59812	100nF 20-80% 50V 0603	2946	3198 017 41050	1µF 10V 0603	3343	5322 117 13026	4.7kΩ 1% 0.063W 0603
2459	3198 017 41050	1µF 10V 0603	2947	3198 017 41050	1µF 10V 0603	3344	4822 117 12925	47kΩ 1% 0.063W 0603
2460	4822 124 40769	4.7µF 20% 100V				3346	4822 051 30222	2.2kΩ 5% 0.062W
2461	4822 124 40769	4.7µF 20% 100V				3347	4822 051 30472	4.7kΩ 5% 0.062W
2462	4822 124 11947	10?F 20% 16V				3348	4822 051 30681	680Ω 5% 0.062W
2463	4822 124 11947	10?F 20% 16V				3349	4822 051 30479</	

3356	4822 116 52231	820Ω 5% 0.5W	3477	4822 051 30101	100Ω 5% 0.062W	3939	4822 051 30472	4.7kΩ 5% 0.062W
3357	4822 051 30472	4.7kΩ 5% 0.062W	3478	4822 051 30101	100Ω 5% 0.062W	3940	3198 021 31060	10MΩ 5% 0.062W 0603
3358	4822 051 30109	10Ω 5% 0.062W	3487	4822 117 13632	100kΩ 1% 0603 0.62W	3941	3198 021 31060	10MΩ 5% 0.062W 0603
3360	4822 116 52231	820Ω 5% 0.5W	3488	4822 117 13632	100kΩ 1% 0603 0.62W	3942	4822 051 30333	33kΩ 5% 0.062W
3361	4822 051 30102	1kΩ 5% 0.062W	3489	4822 117 12864	82kΩ 5% 0.6W	3943	4822 051 30333	33kΩ 5% 0.062W
3362	4822 051 30681	680Ω 5% 0.062W	3490	4822 051 30151	150Ω 5% 0.062W	3944	4822 051 30333	33kΩ 5% 0.062W
3363	4822 051 30222	2.2kΩ 5% 0.062W	3491	4822 051 30151	150Ω 5% 0.062W	3945	4822 051 30333	33kΩ 5% 0.062W
3364	4822 051 30103	10kΩ 5% 0.062W	3492	4822 051 30151	150Ω 5% 0.062W	3946	4822 051 30333	33kΩ 5% 0.062W
3365	4822 051 30332	3.3kΩ 5% 0.062W	3493	4822 051 30151	150Ω 5% 0.062W	3947	4822 051 30333	33kΩ 5% 0.062W
3366	4822 051 30152	1.5kΩ 5% 0.062W	3494	4822 051 30151	150Ω 5% 0.062W	3948	4822 051 30472	4.7kΩ 5% 0.062W
3367	4822 117 12903	1.8kΩ 1% 0.063W 0603	3495	4822 051 30471	470Ω 5% 0.062W	3950	4822 117 13632	100kΩ 1% 0603 0.62W
3368	4822 051 30152	1.5kΩ 5% 0.062W	3496	4822 051 30471	470Ω 5% 0.062W	3951	4822 051 30223	22kΩ 5% 0.062W
3371	4822 051 30479	47Ω 5% 0.062W	3501	4822 051 30102	1kΩ 5% 0.062W	3952	4822 051 30153	15kΩ 5% 0.062W
3372	4822 051 30339	33kΩ 5% 0.062W	3502	4822 050 11002	1kΩ 1% 0.4W	3953	4822 051 30472	4.7kΩ 5% 0.062W
3373	4822 051 30339	33kΩ 5% 0.062W	3503	4822 117 13632	100kΩ 1% 0603 0.62W	3954	4822 051 30472	4.7kΩ 5% 0.062W
3374	4822 051 30471	470Ω 5% 0.062W	3504	4822 117 13632	100kΩ 1% 0603 0.62W	3955	4822 051 30103	10kΩ 5% 0.062W
3378	4822 051 30152	1.5kΩ 5% 0.062W	3505	4822 117 13632	100kΩ 1% 0603 0.62W	4001	4822 051 30008	Jumper 0603
3401	5322 117 13055	75R 1% 0.063W 0603	3506	4822 117 13632	100kΩ 1% 0603 0.62W	4002	4822 051 30008	Jumper 0603
3402	5322 117 13055	75R 1% 0.063W 0603	3507	4822 117 13632	100kΩ 1% 0603 0.62W	4003	4822 051 30008	Jumper 0603
3403	5322 117 13055	75R 1% 0.063W 0603	3508	4822 051 30102	1kΩ 5% 0.062W	4402	4822 051 30008	Jumper 0603
3404	4822 051 30759	75Ω 5% 0.062W	3509	4822 050 11002	1kΩ 1% 0.4W	4411	4822 051 30008	Jumper 0603
3405	4822 051 30223	22kΩ 5% 0.062W	3510	4822 117 13632	100kΩ 1% 0603 0.62W	4412	4822 051 30008	Jumper 0603
3406	4822 117 12891	220kΩ 1% 0.063W 0603	3511	4822 117 13632	100kΩ 1% 0603 0.62W	4413	4822 051 30008	Jumper 0603
3407	4822 051 30332	3.3kΩ 5% 0.062W	3512	4822 051 30102	1kΩ 5% 0.062W	4414	4822 051 30008	Jumper 0603
3408	4822 051 30392	3.9kΩ 5% 0.063W 0603	3513	4822 051 30102	1kΩ 5% 0.062W	4415	4822 051 30008	Jumper 0603
3409	5322 117 13055	75R 1% 0.063W 0603	3514	4822 117 13632	100kΩ 1% 0603 0.62W	4416	4822 051 30008	Jumper 0603
3410	5322 117 13055	75R 1% 0.063W 0603	3515	4822 050 11002	1kΩ 1% 0.4W	4417	4822 051 30008	Jumper 0603
3411	4822 051 30759	75Ω 5% 0.062W	3516	4822 117 13632	100kΩ 1% 0603 0.62W	4418	4822 051 30008	Jumper 0603
3412	4822 116 52201	75Ω 5% 0.5W	3517	4822 116 52283	4.7kΩ 5% 0.5W	4419	4822 051 30008	Jumper 0603
3413	5322 117 13055	75R 1% 0.063W 0603	3518	4822 051 30102	1kΩ 5% 0.062W	4420	4822 051 30008	Jumper 0603
3414	4822 051 30759	75Ω 5% 0.062W	3519	4822 116 52283	4.7kΩ 5% 0.5W	4421	4822 051 30008	Jumper 0603
3415	4822 051 30102	1kΩ 5% 0.062W	3520	4822 051 30221	220Ω 5% 0.062W	4422	4822 051 30008	Jumper 0603
3416	4822 051 30472	4.7kΩ 5% 0.062W	3521	4822 051 30221	220Ω 5% 0.062W	4423	4822 051 30008	Jumper 0603
3417	4822 051 30759	75Ω 5% 0.062W	3522	4822 051 30221	220Ω 5% 0.062W	4424	4822 051 30008	Jumper 0603
3418	4822 117 13632	100kΩ 1% 0603 0.62W	3523	4822 050 11002	1kΩ 1% 0.4W	4425	4822 051 30008	Jumper 0603
3419	4822 051 30223	22kΩ 5% 0.062W	3524	4822 117 12968	820Ω 5% 0.62W	4426	4822 051 30008	Jumper 0603
3420	4822 051 30151	150Ω 5% 0.062W	3525	4822 051 30221	220Ω 5% 0.062W	4428	4822 051 30008	Jumper 0603
3421	4822 051 30273	27kΩ 5% 0.062W	3526	4822 051 30102	1kΩ 5% 0.062W	4429	4822 051 30008	Jumper 0603
3422	4822 116 52231	820Ω 5% 0.5W	3527	4822 117 12968	820Ω 5% 0.62W	4430	4822 051 30008	Jumper 0603
3423	4822 051 30391	390Ω 5% 0.062W	3528	4822 051 30472	4.7kΩ 5% 0.062W	4431	4822 051 30008	Jumper 0603
3424	4822 051 30333	33kΩ 5% 0.062W	3529	4822 051 30472	4.7kΩ 5% 0.062W	4433	4822 051 30008	Jumper 0603
3425	4822 051 30471	470Ω 5% 0.062W	3530	4822 117 12968	820Ω 5% 0.62W	4434	4822 051 30008	Jumper 0603
3426	4822 051 30333	33kΩ 5% 0.062W	3531	4822 117 12968	820Ω 5% 0.62W	4435	4822 051 30008	Jumper 0603
3427	4822 051 30759	75Ω 5% 0.062W	3532	4822 050 11002	1kΩ 1% 0.4W	4437	4822 051 30008	Jumper 0603
3428	4822 117 13632	100kΩ 1% 0603 0.62W	3533	4822 050 11002	1kΩ 1% 0.4W	4442	4822 051 30008	Jumper 0603
3429	4822 117 12925	47kΩ 1% 0.063W 0603	3534	4822 117 13632	100kΩ 1% 0603 0.62W	4443	4822 051 30008	Jumper 0603
3431	4822 051 30472	4.7kΩ 5% 0.062W	3600	4822 051 30103	10kΩ 5% 0.062W	4444	4822 051 30008	Jumper 0603
3432	4822 116 52175	100Ω 5% 0.5W	3601	4822 116 52175	100Ω 5% 0.5W	4446	4822 051 30008	Jumper 0603
3433	4822 116 52175	100Ω 5% 0.5W	3602	4822 051 30472	4.7kΩ 5% 0.062W	4447	4822 051 30008	Jumper 0603
3434	4822 116 52283	4.7kΩ 5% 0.5W	3603	4822 116 52175	100Ω 5% 0.5W	4448	4822 051 30008	Jumper 0603
3435	4822 116 52201	75Ω 5% 0.5W	3611	4822 051 30101	100Ω 5% 0.062W	4449	4822 051 30008	Jumper 0603
3436	4822 116 52199	68Ω 5% 0.5W	3612	4822 051 30101	100Ω 5% 0.062W	4452	4822 051 30008	Jumper 0603
3437	4822 051 30103	10kΩ 5% 0.062W	3701	4822 116 52228	680Ω 5% 0.5W	4453	4822 051 30008	Jumper 0603
3438	4822 051 30103	10kΩ 5% 0.062W	3702	4822 051 30471	470Ω 5% 0.062W	4454	4822 051 30008	Jumper 0603
3439	4822 051 30103	10kΩ 5% 0.062W	3703	4822 116 52245	150kΩ 5% 0.5W	4455	4822 051 30008	Jumper 0603
3441	4822 116 52201	75Ω 5% 0.5W	3704	4822 051 30221	220Ω 5% 0.062W	4459	4822 051 30008	Jumper 0603
3442	4822 051 30154	150kΩ 5% 0.062W	3705	4822 051 30103	10kΩ 5% 0.062W	4460	4822 051 10008	Jumper 1206
3443	4822 117 13632	100kΩ 1% 0603 0.62W	3710	4822 051 30562	5.6kΩ 5% 0.063W 0603	4461	4822 051 30008	Jumper 0603
3444	4822 117 13632	100kΩ 1% 0603 0.62W	3711	4822 051 30333	33kΩ 5% 0.062W	4601	4822 051 30008	Jumper 0603
3445	4822 051 30151	150Ω 5% 0.062W	3714	4822 051 30183	18kΩ 5% 0.062W	4999	4822 051 30008	Jumper 0603
3446	4822 117 12925	47kΩ 1% 0.063W 0603	3715	4822 051 30103	10kΩ 5% 0.062W			
3447	4822 116 83884	47kΩ 5% 0.5W	3716	4822 051 30472	4.7kΩ 5% 0.062W			
3448	4822 051 30271	270Ω 5% 0.062W	3717	4822 051 30472	4.7kΩ 5% 0.062W			
3449	4822 051 30151	150Ω 5% 0.062W	3720	4822 051 30331	330Ω 5% 0.062W			
3450	4822 051 30271	270Ω 5% 0.062W	3724	4822 100 12158	22K 30%	5001	2422 549 43062	Bead 600Ω at 100MHz
3451	4822 050 21003	10kΩ 1% 0.6W	3725	4822 117 12902	8.2kΩ 1% 0.063W 0603	5002	2422 549 43062	Bead 600Ω at 100MHz
3452	4822 051 30151	150Ω 5% 0.062W	3726	4822 051 30101	100Ω 5% 0.062W	5300▲	2422 531 02546	TFM SMT SLOT SRW28EC9-E01V0* B
3454	4822 050 11002	1kΩ 1% 0.4W	3728	4822 051 30101	100Ω 5% 0.062W	5300▲	3128 138 40782	CT286D8 B
3455	4822 051 30103	10kΩ 5% 0.062W	3730	4822 051 30472	4.7kΩ 5% 0.062W	5301	4822 157 51195	1 UH 20% 4X9,8MM
3458	4822 117 12902	8.2kΩ 1% 0.063W 0603	3731	4822 051 30271	270Ω 5% 0.062W	5302▲	2422 549 44509	FIL MAINS 25MH 0A4 HF2022R Y
3459	4822 051 30103	10kΩ 5% 0.062W	3732	4822 051 30102	1kΩ 5% 0.062W	5304	4822 157 70826	2.4μH
3460	4822 117 12902	8.2kΩ 1% 0.063W 0603	3733	4822 051 30472	4.7kΩ 5% 0.062W	5305	4822 157 70826	2.4μH
3461	2122 551 00031	VDR 0805 1mA/6V4 21V	3734	4822 051 30272	2.7kΩ 5% 0.062W	5306	2422 535 94634	2.2μH LHL08 20%
3461	2322 574 10402	VDR 0805 1mA/6V4 21V	3735	4822 051 30332	3.3kΩ 5% 0.062W	5307	4822 157 11737	22μH 10%
3462	2122 551 00031	VDR 0805 1mA/6V4 21V	3736	4822 051 30331	330Ω 5% 0.062W	5308	4822 157 11737	22μH 10%
3462	2322 574 10402	VDR 0805 1mA/6V4 21V	3737	4822 051 30222	2.2kΩ 5% 0.062W	5309	4822 157 11737	22μH 10%
3463	2122 551 00031	VDR 0805 1mA/6V4 21V	3738	4822 051 30682	6.8kΩ 5% 0.062W	5401	4822 157 11706	10μH 5%
3463	2322 574 10402	VDR 0805 1mA/6V4 21V	3739	4822 051 30562	5.6kΩ 5% 0.063W 0603	5402	4822 157 11706	10μH 5%
3464	2122 551 00031	VDR 0805 1mA/6V4 21V	3740	4822 051 30681	680Ω 5% 0.062W	5403	4822 157 11706	10μH 5%
3464	2322 574 10402	VDR 0805 1mA/6V4 21V	3741	4822 051 30472	4.7kΩ 5% 0.062W	5404	4822 157 11706	10μH 5%
3465	2122 551 00031	VDR 0805 1mA/6V4 21V	3742	4822 051 30472	4.7kΩ 5% 0.062W	5405	2422 549 43062	Bead 600Ω at 100MHz
3465	2322 574 10402	VDR 0805 1mA/6V4 21V	3743	4822 051 30563	56kΩ 5% 0.062W	5406	4822 157 11706	10μH 5%
3466	2122 551 00031	VDR 0805 1mA/6V4 21V	3744	4822 117 13632	100kΩ 1% 0603 0.62W	5407	2422 549 43062	Bead 600Ω at 100MHz
3466	2322 574 10402	VDR 0805 1mA/6V4 21V	3745	4822 051 30562	5.6kΩ 5% 0.063W 0603	5600▲	4822 157 11706	10μH 5%
3467	2122 551 00031	VDR 0805 1mA/6V4 21V	3746	4822 051 30562	5.6kΩ 5% 0.063W 0603	5601▲	4822 157 11706	10μH 5%
3467	2322 574 10402	VDR 0805 1mA/6V4 21V	3758	4822 051 30103	10kΩ 5% 0.062W	5602▲	4822 157 11706	10μH 5%
3467	2322 574 10402	VDR 0805 1mA/6V4 21V	3931	4822 117 12925	47kΩ 1% 0.063W 0603	5701	24	

3878	4822 051 30102	1kΩ 5% 0.062W
3879	4822 051 30102	1kΩ 5% 0.062W
3881	4822 117 12925	47kΩ 1% 0.063W 0603
3882	4822 117 12925	47kΩ 1% 0.063W 0603
3884	4822 051 30101	100Ω 5% 0.062W
3885	4822 051 30101	100Ω 5% 0.062W
3886	4822 051 30472	4.7kΩ 5% 0.062W
3887	4822 051 30472	4.7kΩ 5% 0.062W
3888	4822 051 30471	470Ω 5% 0.062W
3889	4822 051 30183	18kΩ 5% 0.062W
3913	4822 051 30102	1kΩ 5% 0.062W
3914	4822 051 30102	1kΩ 5% 0.062W
3915	4822 051 30102	1kΩ 5% 0.062W
3916	4822 051 30273	27kΩ 5% 0.062W
3917	2322 704 63603	36kΩ 0603 RC22H 1%
3918	4822 051 30102	1kΩ 5% 0.062W
3919	5322 117 13024	33kΩ 1% 0.063W 0603
3920	4822 051 30562	5.6kΩ 5% 0.063W 0603
3921	4822 051 30471	470Ω 5% 0.062W
3922	4822 051 30102	1kΩ 5% 0.062W
3923	4822 051 30103	10kΩ 5% 0.062W
3924	4822 051 30103	10kΩ 5% 0.062W
3925	4822 117 12706	10kΩ 1% 0.063W 0603
3926	4822 051 30472	4.7kΩ 5% 0.062W
3927	4822 051 30333	33kΩ 5% 0.062W
3929	4822 051 30008	Jumper 0603
3931	4822 051 30008	Jumper 0603
3933	4822 051 30008	Jumper 0603
4901	4822 051 30008	Jumper 0603
4904	4822 051 10008	Jumper 1206

5801	2422 549 44607	Bead 600Ω at 100MHz
5802	2422 549 44607	Bead 600Ω at 100MHz
5803	2422 549 44607	Bead 600Ω at 100MHz
5804	2422 549 44607	Bead 600Ω at 100MHz

6800	4822 130 11397	BAS316
6801	4822 130 11564	UDZ3.9B
6802	4822 130 10654	BAT254
6803	4822 130 10654	BAT254
6804	4822 130 10654	BAT254
6805	4822 130 10654	BAT254
6901	5322 130 34331	BAV70
6903	5322 130 34331	BAV70

7801	9352 190 00118	74LVCS573AD
7802	4822 130 61553	DTC124EU
7803	9322 186 16668	CY62128VLL-70SC
7804	3103 165 13721	TMP91CW12AF/LIRP1
7805	9965 000 17112	M29W800-AN1300XX
7806	9322 163 26685	NCP301LSN30
7807	4822 209 73852	PMBT2369
7808	4822 209 16907	M24C16-MN6T
7810	9352 686 35118	PCA9515DP
7811	4822 130 61553	DTC124EU
7813	3198 010 42310	BC847BW
7814	3198 010 42310	BC847BW
7815	3198 010 42310	BC847BW
7816	3198 010 42310	BC847BW
7817	3198 010 42310	BC847BW
7818	4822 130 60854	DTA124EU-W
7821	9340 560 36235	B5H111
7822	9340 560 36235	B5H111
7825	9322 181 92682	LA7213
7902	4822 209 63709	LM324D
7903	4822 130 61553	DTC124EU
7904	4822 130 60854	DTA124EU-W
7905	4822 130 61553	DTC124EU
7906	4822 130 61553	DTC124EU
7907	4822 130 61553	DTC124EU
7908	4822 130 61553	DTC124EU
7909	4822 130 41087	BC638
7910	4822 130 61553	DTC124EU

In Out Extension Board

Various

1920	2422 025 17897	CON H 6P F 1.00 FFC 0.3
1921	2422 025 16924	CON H 7P
1922	2422 026 05374	SOC CINCH H 3P F 3L1
1925	4822 267 31729	CONNECTOR

2250	3198 017 41050	1μF 10V 0603
2254	4822 122 33753	150pF 5% 50V
2255	2238 586 59812	100nF 20-80% 50V 0603
2256	2238 586 59812	100nF 20-80% 50V 0603
2257	5322 126 11578	1nF 10% 50V 0603
2258	2238 586 59812	100nF 20-80% 50V 0603
2259	2222 867 15339	33pF 5% 50V 0603
2260	2238 586 59812	100nF 20-80% 50V 0603
2261	4822 124 42234	100μF 20% 6.3V
2265	5322 126 11583	10nF 10% 50V 0603
2266	2238 586 59812	100nF 20-80% 50V 0603

3250	4822 116 52219	330Ω 5% 0.5W
3252	4822 051 30101	100Ω 5% 0.062W
3255	4822 117 13632	100kΩ 1% 0603 0.62W
3259	4822 116 52201	75Ω 5% 0.5W
3260	4822 051 30222	2.2kΩ 5% 0.062W
3261	4822 051 30471	470Ω 5% 0.062W
3262	4822 051 30561	560Ω 5% 0.062W
3263	4822 116 52195	47Ω 5% 0.5W
3264	4822 051 30101	100Ω 5% 0.062W
4001	4822 051 30008	Jumper 0603
4201	4822 051 30008	Jumper 0603

5250	2422 536 00019	TRANSFORMER 6RG
5251	2422 549 43062	Bead 600Ω at 100MHz
5255	2422 549 43062	Bead 600Ω at 100MHz

6255	9322 175 41687	SOC OPT JFJ1000-010010
6256	9322 146 61685	DF3A6.8FU
6257	9322 146 61685	DF3A6.8FU
6258	9322 146 61685	DF3A6.8FU

7250	5322 209 11517	PC74HCU04T
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Digital Board

Various

1001	2422 543 89017	24M576 18P CX-11F
1102	2422 025 18185	CON V 40P M 2.54
1103	2422 025 17104	Connector 7p m
1104	2422 025 16729	Connector FFC 10p m
1201	2422 543 01115	24.576MHz 12P QS06
1203	2422 025 17955	CON V 6P M 1.00 SM SR
1400	8203 107 92221	CON BM V 28P SMD 1.27
1500	2422 025 17441	CON BM V 12P M 2.00 PH
1505▲	2422 086 11087	FUSE F 1A 125V
1506▲	2422 086 11087	FUSE F 1A 125V
1507▲	2422 086 11087	FUSE F 1A 125V
1704	2422 025 16794	CON BM V 7P F 1.00 FFC
1900	2422 025 16389	CON BM V 22P F 1.00 FFC
1901	2422 025 16987	CON V 6P F 1.00 SM FFC
1904	2422 025 16389	CON BM V 22P F 1.00 FFC

2014	4822 124 80151	47μF 20% 16V
2015	2238 586 59812	100nF 20-80% 50V 0603
2016	2238 586 59812	100nF 20-80% 50V 0603
2017	2238 586 59812	100nF 20-80% 50V 0603
2018	2238 586 59812	100nF 20-80% 50V 0603
2019	2238 586 59812	100nF 20-80% 50V 0603
2020	2238 586 59812	100nF 20-80% 50V 0603
2021	2238 586 59812	100nF 20-80% 50V 0603
2022	2020 021 91729	4.7μF 20% 35V
2026	2238 586 59812	100nF 20-80% 50V 0603
2027	2238 586 59812	100nF 20-80% 50V 0603
2028	2238 586 59812	100nF 20-80% 50V 0603
2029	2238 586 59812	100nF 20-80% 50V 0603
2030	2238 586 59812	100nF 20-80% 50V 0603
2031	2238 586 59812	100nF 20-80% 50V 0603
2032	2238 586 59812	100nF 20-80% 50V 0603
2033	2020 021 91729	4.7μF 20% 35V
2035	2238 586 59812	100nF 20-80% 50V 0603
2036	4822 126 14506	270pF 5% 50V 0603
2037	2238 586 59812	100nF 20-80% 50V 0603
2038	2238 586 59812	100nF 20-80% 50V 0603

2039	2238 586 59812	100nF 20-80% 50V 0603
2040	2238 586 59812	100nF 20-80% 50V 0603
2041	2238 586 59812	100nF 20-80% 50V 0603
2042	2238 586 59812	100nF 20-80% 50V 0603
2043	2238 586 59812	100nF 20-80% 50V 0603
2044	2020 021 91729	4.7μF 20% 35V
2046	4822 122 33761	22pF 5% 50V
2048	4822 122 33753	150pF 5% 50V
2049	2020 021 91729	4.7μF 20% 35V
2050	2238 586 59812	100nF 20-80% 50V 0603
2052	2238 586 59812	100nF 20-80% 50V 0603
2053	2238 586 59812	100nF 20-80% 50V 0603
2054	2238 586 59812	100nF 20-80% 50V 0603
2056	2238 586 59812	100nF 20-80% 50V 0603
2058	2238 586 59812	100nF 20-80% 50V 0603
2059	4822 126 14507	18pF 5% 50V 0603
2060	4822 126 14507	18pF 5% 50V 0603
2061	2238 586 59812	100nF 20-80% 50V 0603
2063	2238 586 59812	100nF 20-80% 50V 0603
2064	2238 586 59812	100nF 20-80% 50V 0603
2065	2238 586 59812	100nF 20-80% 50V 0603
2066	3198 016 31020	1nF 10% 25V 0603
2067	2238 586 59812	100nF 20-80% 50V 0603
2071	2238 586 59812	100nF 20-80% 50V 0603
2101	2238 916 15641	22nF 10% 25V 0603
2103	2238 586 59812	100nF 20-80% 50V 0603
2108	4822 126 14585	100nF 10% 50V
2112	4822 126 14247	1.5nF 50V 0603
2113	4822 126 13881	470pF 5% 50V
2116	2238 586 59812	100nF 20-80% 50V 0603
2119	4822 126 14247	1.5nF 50V 0603
2120	2238 586 59812	100nF 20-80% 50V 0603
2125	2238 586 59812	100nF 20-80% 50V 0603
2200	3198 017 41050	1μF 10V 0603
2201	4822 126 14506	270pF 5% 50V 0603
2202	4822 126 11663	12pF 5% 50V 0603
2203	4822 126 11663	12pF 5% 50V 0603
2206	2238 586 59812	100nF 20-80% 50V 0603
2207	2238 586 59812	100nF 20-80% 50V 0603
2209	2238 586 59812	100nF 20-80% 50V 0603
2210	2238 586 59812	100nF 20-80% 50V 0603
2212	4822 124 12095	100μF 20% 16V
2214	2238 586 59812	100nF 20-80% 50V 0603
2215	2238 586 59812	100nF 20-80% 50V 0603
2217	2238 586 59812	100nF 20-80% 50V 0603
2218	2238 586 59812	100nF 20-80% 50V 0603
2219	2238 586 59812	100nF 20-80% 50V 0603
2220	2238 586 59812	100nF 20-80% 50V 0603
2221	2238 586 59812	100nF 20-80% 50V 0603
2222	2238 586 59812	100nF 20-80% 50V 0603
2223	2238 586 59812	100nF 20-80% 50V 0603
2224	2238 586 59812	100nF 20-80% 50V 0603
2225	2238 586 59812	100nF 20-80% 50V 0603
2226	2238 586 59812	100nF 20-80% 50V 0603
2227	2238 586 59812	100nF 20-80% 50V 0603
2228	2238 586 59812	100nF 20-80% 50V 0603
2229	2238 586 59812	100nF 20-80% 50V 0603
2230	2238 586 59812	100nF 20-80% 50V 0603
2231	2238 586 59812	100nF 20-80% 50V 0603
2232	2238 586 59812	100nF 20-80% 50V 0603
2233	2238 586 59812	100nF 20-80% 50V 0603
2234	2238 586 59812	100nF 20-80% 50V 0603
2235	3198 016 31020	1nF 10% 25V 0603
2236	2020 021 91729	4.7μF 20% 35V
2237	2238 586 59812	100nF 20-80% 50V 0603
2238	2238 586 59812	100nF 20-80% 50V 0603
2308	2238 586 59812	100nF 20-80% 50V 0603
2310	2238 586 59812	100nF 20-80% 50V 0603
2403	2238 586 59812	100nF 20-80% 50V 0603
2404	4822 124 23002	10μF 20% 16V
2405	2238 586 59812	100nF 20-80% 50V 0603
2406	2238 586 59812	100nF 20-80% 50V 0603
2407	2238 586 59812	100nF 20-80% 50V 0603
2408	4822 124 23002	10μF 20% 16V
2409	2238 586 59812	100nF 20-80% 50V 0603
2410	2238 586 59812	100nF 20-80% 50V 0603
2411	2238 586 59812	100nF 20-80% 50V 0603
2412	2238 586 59812	100nF 20-80% 50V 0603
2413	2238 586 59812	100nF 20-80% 50V 0603
2414	2238 586 59812	100nF 20-80% 50V 0603

2429	2238 586 59812	100nF 20-80% 50V 0603	3015	4822 051 30103	10kΩ 5% 0.062W	3227	4822 051 30339	33Ω 5% 0.062W
2432	2238 586 59812	100nF 20-80% 50V 0603	3016	4822 051 30103	10kΩ 5% 0.062W	3228	4822 051 30109	10Ω 5% 0.062W
2433	2238 586 59812	100nF 20-80% 50V 0603	3017	4822 051 30103	10kΩ 5% 0.062W	3229	4822 051 30339	33Ω 5% 0.062W
2512	2020 021 91672	100μF 6V3 20%	3018	4822 051 30103	10kΩ 5% 0.062W	3230	4822 051 30103	10kΩ 5% 0.062W
2512	2020 021 91857	100μF 6V3 20%	3019	4822 051 30472	4.7kΩ 5% 0.062W	3231	4822 051 30109	10Ω 5% 0.062W
2514	2238 586 59812	100nF 20-80% 50V 0603	3021	4822 051 30103	10kΩ 5% 0.062W	3232	2322 734 65609	56Ω 1% 0.125W 0805
2515	3198 017 44740	470nF 10V 0603	3023	4822 051 30101	100Ω 5% 0.062W	3233	2322 734 65609	56Ω 1% 0.125W 0805
2516	2020 021 91672	100μF 6V3 20%	3024	4822 051 30101	100Ω 5% 0.062W	3234	4822 051 30109	10Ω 5% 0.062W
2516	2020 021 91857	100μF 6V3 20%	3025	4822 051 30101	100Ω 5% 0.062W	3235	4822 051 30103	10kΩ 5% 0.062W
2518	2020 552 94427	100pF 5% 50V 0603	3026	4822 051 30101	100Ω 5% 0.062W	3236	4822 051 30109	10Ω 5% 0.062W
2519	2238 586 59812	100nF 20-80% 50V 0603	3082	4822 117 13632	100kΩ 1% 0603 0.62W	3237	4822 051 30339	33Ω 5% 0.062W
2521	2238 586 59812	100nF 20-80% 50V 0603	3087	4822 051 30479	47Ω 5% 0.062W	3238	4822 051 30109	10Ω 5% 0.062W
2524	2238 586 59812	100nF 20-80% 50V 0603	3088	4822 117 13632	100kΩ 1% 0603 0.62W	3239	4822 051 30339	33Ω 5% 0.062W
2525	2238 586 59812	100nF 20-80% 50V 0603	3090	4822 051 30472	4.7kΩ 5% 0.062W	3240	2322 704 65102	5.1kΩ 1% 0603
2526	2238 586 59812	100nF 20-80% 50V 0603	3092	4822 117 13632	100kΩ 1% 0603 0.62W	3241	4822 051 30339	33Ω 5% 0.062W
2527	5322 126 11583	10nF 10% 50V 0603	3093	4822 051 30682	6.8kΩ 5% 0.062W	3242	4822 051 30109	10Ω 5% 0.062W
2701	2238 586 59812	100nF 20-80% 50V 0603	3095	4822 051 30472	4.7kΩ 5% 0.062W	3243	4822 051 30339	33Ω 5% 0.062W
2712	2238 586 59812	100nF 20-80% 50V 0603	3096	4822 051 30472	4.7kΩ 5% 0.062W	3244	4822 051 30339	33Ω 5% 0.062W
2726	2238 586 59812	100nF 20-80% 50V 0603	3098	4822 117 13632	100kΩ 1% 0603 0.62W	3245	4822 051 30109	10Ω 5% 0.062W
2727	2238 586 59812	100nF 20-80% 50V 0603	3100	4822 051 30103	10kΩ 5% 0.062W	3246	4822 051 30339	33Ω 5% 0.062W
2728	2020 021 91729	4.7μF 20% 35V	3101	4822 051 30339	33Ω 5% 0.062W	3247	4822 051 30339	33Ω 5% 0.062W
2729	2020 021 91729	4.7μF 20% 35V	3103	4822 051 30339	33Ω 5% 0.062W	3248	4822 051 30109	10Ω 5% 0.062W
2806	2238 586 59812	100nF 20-80% 50V 0603	3106	4822 051 30339	33Ω 5% 0.062W	3248	4822 117 12139	22Ω 5% 0.062W
2807	2238 586 59812	100nF 20-80% 50V 0603	3108	4822 051 30339	33Ω 5% 0.062W	3249	4822 051 30339	33Ω 5% 0.062W
2808	2238 586 59812	100nF 20-80% 50V 0603	3110	4822 051 30339	33Ω 5% 0.062W	3250	4822 051 30472	4.7kΩ 5% 0.062W
2809	2238 586 59812	100nF 20-80% 50V 0603	3112	4822 051 30339	33Ω 5% 0.062W	3251	4822 051 30339	33Ω 5% 0.062W
2810	2238 586 59812	100nF 20-80% 50V 0603	3113	4822 051 30103	10kΩ 5% 0.062W	3252	4822 051 30339	33Ω 5% 0.062W
2811	2238 586 59812	100nF 20-80% 50V 0603	3114	4822 051 30472	4.7kΩ 5% 0.062W	3253	4822 117 12917	1Ω 5% 0.062W 0603
2812	2238 586 59812	100nF 20-80% 50V 0603	3116	4822 051 30339	33Ω 5% 0.062W	3254	4822 051 30339	33Ω 5% 0.062W
2820	2238 586 59812	100nF 20-80% 50V 0603	3117	4822 051 30472	4.7kΩ 5% 0.062W	3255	4822 051 30472	4.7kΩ 5% 0.062W
2821	2238 586 59812	100nF 20-80% 50V 0603	3118	4822 051 30339	33Ω 5% 0.062W	3256	4822 051 30472	4.7kΩ 5% 0.062W
2822	2238 586 59812	100nF 20-80% 50V 0603	3119	4822 051 30103	10kΩ 5% 0.062W	3257	4822 051 30223	22kΩ 5% 0.062W
2823	2238 586 59812	100nF 20-80% 50V 0603	3120	4822 051 30339	33Ω 5% 0.062W	3258	4822 051 30223	22kΩ 5% 0.062W
2824	2238 586 59812	100nF 20-80% 50V 0603	3122	4822 051 30339	33Ω 5% 0.062W	3259	4822 051 30472	4.7kΩ 5% 0.062W
2825	2238 586 59812	100nF 20-80% 50V 0603	3124	4822 051 30339	33Ω 5% 0.062W	3260	4822 051 30101	100Ω 5% 0.062W
2826	2238 586 59812	100nF 20-80% 50V 0603	3126	4822 051 30339	33Ω 5% 0.062W	3260	4822 051 30221	220Ω 5% 0.062W
2830	2238 586 59812	100nF 20-80% 50V 0603	3128	4822 051 30339	33Ω 5% 0.062W	3261	4822 117 12917	1Ω 5% 0.062W 0603
2832	2238 586 59812	100nF 20-80% 50V 0603	3130	4822 051 30339	33Ω 5% 0.062W	3262	4822 051 30472	4.7kΩ 5% 0.062W
2833	2238 586 59812	100nF 20-80% 50V 0603	3132	4822 051 30101	100Ω 5% 0.062W	3263	4822 051 30472	4.7kΩ 5% 0.062W
2900	2238 586 59812	100nF 20-80% 50V 0603	3133	4822 051 30339	33Ω 5% 0.062W	3264	4822 051 30472	4.7kΩ 5% 0.062W
2901	2238 586 59812	100nF 20-80% 50V 0603	3135	4822 051 30339	33Ω 5% 0.062W	3265	4822 051 30472	4.7kΩ 5% 0.062W
2902	2238 586 59812	100nF 20-80% 50V 0603	3137	4822 051 30101	100Ω 5% 0.062W	3266	4822 051 30472	4.7kΩ 5% 0.062W
2903	2238 586 59812	100nF 20-80% 50V 0603	3138	4822 051 30339	33Ω 5% 0.062W	3267	4822 051 30472	4.7kΩ 5% 0.062W
2904	2238 586 59812	100nF 20-80% 50V 0603	3142	4822 051 30101	100Ω 5% 0.062W	3268	4822 051 30472	4.7kΩ 5% 0.062W
2905	2238 586 59812	100nF 20-80% 50V 0603	3143	4822 117 13501	82Ω 5% 0.62W 0603	3269	4822 051 30472	4.7kΩ 5% 0.062W
2906	2238 586 59812	100nF 20-80% 50V 0603	3144	4822 051 30101	100Ω 5% 0.062W	3270	4822 051 30101	100Ω 5% 0.062W
2907	2238 586 59812	100nF 20-80% 50V 0603	3145	4822 051 30562	5.6kΩ 5% 0.063W 0603	3270	4822 051 30221	220Ω 5% 0.062W
2908	2238 586 59812	100nF 20-80% 50V 0603	3147	4822 117 12139	22Ω 5% 0.062W	3271	4822 051 30101	100Ω 5% 0.062W
2909	2238 586 59812	100nF 20-80% 50V 0603	3149	4822 117 12139	22Ω 5% 0.062W	3271	4822 051 30221	220Ω 5% 0.062W
2910	4822 122 33761	22pF 5% 50V	3154	4822 117 13501	82Ω 5% 0.62W 0603	3272	4822 051 30101	100Ω 5% 0.062W
2911	2238 916 15641	22nF 10% 25V 0603	3156	4822 051 30102	1kΩ 5% 0.062W	3272	4822 051 30221	220Ω 5% 0.062W
2912	2238 586 59812	100nF 20-80% 50V 0603	3159	4822 117 12139	22Ω 5% 0.062W	3273	4822 051 30339	33Ω 5% 0.062W
2913	2238 586 59812	100nF 20-80% 50V 0603	3161	4822 117 13501	82Ω 5% 0.62W 0603	3274	4822 051 30101	100Ω 5% 0.062W
2914	4822 126 14506	270pF 5% 50V 0603	3162	4822 051 30472	4.7kΩ 5% 0.062W	3274	4822 051 30221	220Ω 5% 0.062W
2915	4822 126 14506	270pF 5% 50V 0603	3164	4822 051 30103	10kΩ 5% 0.062W	3276	4822 051 30102	1kΩ 5% 0.062W
2916	4822 126 14506	270pF 5% 50V 0603	3167	4822 051 30339	33Ω 5% 0.062W	3277	4822 051 30101	100Ω 5% 0.062W
2917	4822 126 14506	270pF 5% 50V 0603	3168	4822 051 30472	4.7kΩ 5% 0.062W	3277	4822 051 30221	220Ω 5% 0.062W
2918	4822 122 33761	22pF 5% 50V	3170	4822 051 30339	33Ω 5% 0.062W	3278	4822 051 30101	100Ω 5% 0.062W
2919	4822 122 33761	22pF 5% 50V	3172	4822 051 30339	33Ω 5% 0.062W	3278	4822 051 30221	220Ω 5% 0.062W
2920	2238 586 59812	100nF 20-80% 50V 0603	3173	4822 051 30472	4.7kΩ 5% 0.062W	3279	4822 051 30101	100Ω 5% 0.062W
2921	4822 122 33761	22pF 5% 50V	3175	4822 051 30339	33Ω 5% 0.062W	3279	4822 051 30221	220Ω 5% 0.062W
2922	4822 122 33761	22pF 5% 50V	3178	4822 051 30339	33Ω 5% 0.062W	3280	4822 051 30103	10kΩ 5% 0.062W
2923	2238 586 59812	100nF 20-80% 50V 0603	3184	4822 051 30472	4.7kΩ 5% 0.062W	3281	4822 051 30103	10kΩ 5% 0.062W
2924	2238 586 59812	100nF 20-80% 50V 0603	3185	4822 051 30101	100Ω 5% 0.062W	3282	4822 051 30103	10kΩ 5% 0.062W
2925	2238 586 59812	100nF 20-80% 50V 0603	3186	4822 051 30103	10kΩ 5% 0.062W	3285	4822 051 30109	10Ω 5% 0.062W
2926	4822 126 14506	270pF 5% 50V 0603	3187	4822 051 30472	4.7kΩ 5% 0.062W	3287	4822 051 30472	4.7kΩ 5% 0.062W
2927	4822 126 14506	270pF 5% 50V 0603	3189	4822 051 30103	10kΩ 5% 0.062W	3289	4822 051 30472	4.7kΩ 5% 0.062W
2928	4822 126 14506	270pF 5% 50V 0603	3191	4822 117 13632	100kΩ 1% 0603 0.62W	3290	4822 051 30472	4.7kΩ 5% 0.062W
2929	4822 126 14506	270pF 5% 50V 0603	3192	4822 051 30682	6.8kΩ 5% 0.062W	3292	4822 051 30472	4.7kΩ 5% 0.062W
2930	2238 586 59812	100nF 20-80% 50V 0603	3195	4822 117 13632	100kΩ 1% 0603 0.62W	3294	4822 051 30101	100Ω 5% 0.062W
2931	2020 021 91729	4.7μF 20% 35V	3197	4822 051 30101	100Ω 5% 0.062W	3294	4822 051 30221	220Ω 5% 0.062W
2933	2238 586 59812	100nF 20-80% 50V 0603	3199	4822 051 30103	10kΩ 5% 0.062W	3295	4822 051 30101	100Ω 5% 0.062W
2934	2238 586 59812	100nF 20-80% 50V 0603	3200	4822 051 30103	10kΩ 5% 0.062W	3295	4822 051 30221	220Ω 5% 0.062W
2935	4822 126 14506	270pF 5% 50V 0603	3202	4822 051 30101	100Ω 5% 0.062W	3296	4822 051 30101	100Ω 5% 0.062W
2936	4822 126 14506	270pF 5% 50V 0603	3202	4822 051 30221	220Ω 5% 0.062W	3296	4822 051 30221	220Ω 5% 0.062W
2937	4822 126 14506	270pF 5% 50V 0603	3204	4822 051 30103	10kΩ 5% 0.062W	3297	4822 051 30101	100Ω 5% 0.062W
2938	2238 586 59812	100nF 20-80% 50V 0603	3205	2322 704 66342	6.34kΩ 0603 RC22H 1%	3297	4822 051 30221	220Ω 5% 0.062W
2939	2020 021 91729	4.7μF 20% 35V	3210	4822 051 30339	33Ω 5% 0.062W	3298	4822 051 30101	100Ω 5% 0.062W
2940	2238 586 59812	100nF 20-80% 50V 0603	3211	4822 051 30339	33Ω 5% 0.062W	3298	4822 051 30221	220Ω 5% 0.062W
			3212	2322 734 65609	56Ω 1% 0.125W 0805	3299	4822 051 30101	100Ω 5% 0.062W
			3213	2322 734 65609	56Ω 1% 0.125W 0805	3299	4822 051 30221	220Ω 5% 0.062W
			3214	4822 051 30				

3400	4822 051 30472	4.7kΩ 5% 0.062W	3495	4822 117 12139	22Ω 5% 0.062W	3942	5322 117 13034	1.5kΩ 1% 0.063W 0603
3401	4822 051 30472	4.7kΩ 5% 0.062W	3496	4822 051 30339	33Ω 5% 0.062W	3943	5322 117 13053	6.8kΩ 1% 0.063W 0603
3402	4822 051 30472	4.7kΩ 5% 0.062W	3497	4822 117 13632	100kΩ 1% 0603 0.62W	3944	5322 117 13031	5.6kΩ 1% 0603
3403	4822 051 30472	4.7kΩ 5% 0.062W	3498	4822 051 30103	10kΩ 5% 0.062W	3945	5322 117 13026	4.7kΩ 1% 0.063W 0603
3404	4822 051 30472	4.7kΩ 5% 0.062W	3499	4822 051 30103	10kΩ 5% 0.062W	3946	2322 704 61002	1kΩ 0603 RC22H PM1
3405	4822 051 30332	3.3kΩ 5% 0.062W	3503	5322 117 13034	1.5kΩ 1% 0.063W 0603	3946	5322 117 13018	1kΩ 1% 0.063W 0603
3406	4822 051 30332	3.3kΩ 5% 0.062W	3504	2322 704 61302	1k3 1% 0.063W 0603	3947	5322 117 13026	4.7kΩ 1% 0.063W 0603
3407	4822 051 30332	3.3kΩ 5% 0.062W	3504	2322 704 61402	1.4kΩ 0603 RC22H PM1	3948	2322 704 87501	750Ω 603 RC22H 1%
3408	4822 051 30332	3.3kΩ 5% 0.062W	3703	4822 051 30759	75Ω 5% 0.062W	3949	5322 117 13034	1.5kΩ 1% 0.063W 0603
3409	4822 051 30472	4.7kΩ 5% 0.062W	3706	2322 704 61002	1kΩ 0603 RC22H PM1	3950	5322 117 13034	1.5kΩ 1% 0.063W 0603
3410	4822 051 30472	4.7kΩ 5% 0.062W	3706	5322 117 13018	1kΩ 1% 0.063W 0603	3951	5322 117 13034	1.5kΩ 1% 0.063W 0603
3411	4822 051 30472	4.7kΩ 5% 0.062W	3707	2322 704 61002	1kΩ 0603 RC22H PM1	3952	5322 117 13036	1.2kΩ 1% 0.063W 0603
3412	4822 051 30472	4.7kΩ 5% 0.062W	3707	5322 117 13018	1kΩ 1% 0.063W 0603	3953	5322 117 13026	4.7kΩ 1% 0.063W 0603
3413	4822 051 30472	4.7kΩ 5% 0.062W	3710	4822 051 30759	75Ω 5% 0.062W	3954	2322 704 61002	1kΩ 0603 RC22H PM1
3414	4822 051 30472	4.7kΩ 5% 0.062W	3714	2322 704 61002	1kΩ 0603 RC22H PM1	3954	5322 117 13018	1kΩ 1% 0.063W 0603
3415	4822 051 30472	4.7kΩ 5% 0.062W	3714	5322 117 13018	1kΩ 1% 0.063W 0603	3955	4822 117 12917	1Ω 5% 0.062W 0603
3416	4822 051 30472	4.7kΩ 5% 0.062W	3716	2322 704 61002	1kΩ 0603 RC22H PM1	4001	4822 051 30008	Jumper 0603
3417	4822 051 30472	4.7kΩ 5% 0.062W	3716	5322 117 13018	1kΩ 1% 0.063W 0603	4005	4822 051 30008	Jumper 0603
3418	4822 051 30472	4.7kΩ 5% 0.062W	3718	4822 051 30759	75Ω 5% 0.062W	4111	4822 051 30008	Jumper 0603
3419	4822 051 30472	4.7kΩ 5% 0.062W	3723	2322 704 61002	1kΩ 0603 RC22H PM1	4113	4822 051 30008	Jumper 0603
3420	4822 051 30472	4.7kΩ 5% 0.062W	3723	5322 117 13018	1kΩ 1% 0.063W 0603	4115	4822 051 30008	Jumper 0603
3421	4822 051 30472	4.7kΩ 5% 0.062W	3724	2322 704 61002	1kΩ 0603 RC22H PM1	4117	4822 051 30008	Jumper 0603
3422	4822 051 30472	4.7kΩ 5% 0.062W	3724	5322 117 13018	1kΩ 1% 0.063W 0603	4123	4822 051 30008	Jumper 0603
3423	4822 051 30472	4.7kΩ 5% 0.062W	3805	4822 051 30101	100Ω 5% 0.062W	4201	4822 051 30008	Jumper 0603
3424	4822 051 30103	10kΩ 5% 0.062W	3806	4822 051 30101	100Ω 5% 0.062W	4202	4822 051 30008	Jumper 0603
3425	4822 051 30103	10kΩ 5% 0.062W	3807	4822 051 30101	100Ω 5% 0.062W	4204	4822 051 30008	Jumper 0603
3426	4822 051 30103	10kΩ 5% 0.062W	3808	4822 051 30472	4.7kΩ 5% 0.062W	4205	4822 051 30008	Jumper 0603
3427	4822 051 30103	10kΩ 5% 0.062W	3809	4822 051 30103	10kΩ 5% 0.062W	4308	4822 051 30008	Jumper 0603
3428	4822 051 30103	10kΩ 5% 0.062W	3810	4822 051 30103	10kΩ 5% 0.062W	4311	4822 051 30008	Jumper 0603
3429	4822 051 30339	33Ω 5% 0.062W	3811	4822 051 30103	10kΩ 5% 0.062W	4315	4822 051 30008	Jumper 0603
3430	4822 051 30339	33Ω 5% 0.062W	3812	4822 051 30103	10kΩ 5% 0.062W	4316	4822 051 30008	Jumper 0603
3431	4822 051 30339	33Ω 5% 0.062W	3813	4822 051 30103	10kΩ 5% 0.062W	4401	4822 051 30008	Jumper 0603
3432	4822 051 30339	33Ω 5% 0.062W	3814	4822 051 30103	10kΩ 5% 0.062W	4402	4822 051 30008	Jumper 0603
3433	5322 117 13036	1.2kΩ 1% 0.063W 0603	3815	4822 051 30103	10kΩ 5% 0.062W	4404	4822 051 30008	Jumper 0603
3434	4822 117 12971	15Ω 5% 0.62W 0603	3817	4822 051 30472	4.7kΩ 5% 0.062W	4406	4822 051 30008	Jumper 0603
3435	4822 117 12971	15Ω 5% 0.62W 0603	3820	4822 051 30472	4.7kΩ 5% 0.062W	4407	4822 051 30008	Jumper 0603
3436	4822 051 30339	33Ω 5% 0.062W	3821	4822 051 30472	4.7kΩ 5% 0.062W	4701	4822 051 30008	Jumper 0603
3437	4822 051 30339	33Ω 5% 0.062W	3822	4822 051 30472	4.7kΩ 5% 0.062W	4702	4822 051 30008	Jumper 0603
3438	4822 051 30339	33Ω 5% 0.062W	3825	4822 051 30472	4.7kΩ 5% 0.062W	4703	4822 051 30008	Jumper 0603
3439	4822 051 30339	33Ω 5% 0.062W	3826	4822 051 30472	4.7kΩ 5% 0.062W	4800	4822 051 30008	Jumper 0603
3440	4822 051 30339	33Ω 5% 0.062W	3827	4822 051 30472	4.7kΩ 5% 0.062W	4803	4822 051 30008	Jumper 0603
3442	4822 117 12139	22Ω 5% 0.062W	3831	4822 051 30472	4.7kΩ 5% 0.062W	4815	4822 051 30008	Jumper 0603
3443	4822 117 12139	22Ω 5% 0.062W	3832	4822 051 30472	4.7kΩ 5% 0.062W	4816	4822 051 30008	Jumper 0603
3444	4822 117 12139	22Ω 5% 0.062W	3836	4822 051 30101	100Ω 5% 0.062W	4822	4822 051 30008	Jumper 0603
3445	4822 117 12139	22Ω 5% 0.062W	3837	4822 051 30103	10kΩ 5% 0.062W	4900	4822 051 30008	Jumper 0603
3446	4822 117 12139	22Ω 5% 0.062W	3838	4822 051 30103	10kΩ 5% 0.062W	4901	4822 051 30008	Jumper 0603
3447	4822 117 12139	22Ω 5% 0.062W	3839	4822 051 30103	10kΩ 5% 0.062W	4904	4822 051 30008	Jumper 0603
3448	4822 117 12139	22Ω 5% 0.062W	3840	4822 051 30103	10kΩ 5% 0.062W	4906	4822 051 30008	Jumper 0603
3449	4822 117 12139	22Ω 5% 0.062W	3849	4822 051 30103	10kΩ 5% 0.062W	4910	4822 051 30008	Jumper 0603
3450	4822 117 12139	22Ω 5% 0.062W	3850	4822 051 30103	10kΩ 5% 0.062W			
3451	4822 117 12139	22Ω 5% 0.062W	3851	4822 051 30103	10kΩ 5% 0.062W			
3452	4822 117 12139	22Ω 5% 0.062W	3852	4822 051 30103	10kΩ 5% 0.062W			
3453	4822 117 12139	22Ω 5% 0.062W	3854	4822 051 30222	2.2kΩ 5% 0.062W			
3454	4822 117 12139	22Ω 5% 0.062W	3855	4822 051 30223	22kΩ 5% 0.062W	5001	4822 157 11499	BLM11P600SPT
3455	4822 117 12139	22Ω 5% 0.062W	3901	2322 704 61801	180Ω 0603 RC22H PM1	5005	4822 157 11499	BLM11P600SPT
3456	4822 117 12139	22Ω 5% 0.062W	3901	5322 117 13061	180Ω 1% 0.063W 0603	5008	4822 157 11499	BLM11P600SPT
3457	4822 117 12139	22Ω 5% 0.062W	3902	5322 117 13059	560Ω 1% 0.063W 0603	5009	4822 157 11499	BLM11P600SPT
3458	4822 117 12139	22Ω 5% 0.062W	3905	2322 704 61801	180Ω 0603 RC22H PM1	5010	4822 157 11499	BLM11P600SPT
3459	4822 117 12139	22Ω 5% 0.062W	3905	5322 117 13061	180Ω 1% 0.063W 0603	5100	4822 157 11499	BLM11P600SPT
3460	4822 117 12139	22Ω 5% 0.062W	3906	5322 117 13059	560Ω 1% 0.063W 0603	5102	4822 157 11499	BLM11P600SPT
3461	4822 117 12139	22Ω 5% 0.062W	3907	4822 051 30101	100Ω 5% 0.062W	5103	4822 157 11499	BLM11P600SPT
3462	4822 117 12139	22Ω 5% 0.062W	3908	4822 051 30181	180Ω 5% 0.062W	5104	4822 157 11499	BLM11P600SPT
3463	4822 117 12139	22Ω 5% 0.062W	3909	4822 051 30689	68Ω 5% 0.063W 0603	5200	4822 157 11499	BLM11P600SPT
3464	4822 117 12139	22Ω 5% 0.062W	3910	4822 051 30689	68Ω 5% 0.063W 0603	5202	4822 157 11499	BLM11P600SPT
3465	4822 117 12139	22Ω 5% 0.062W	3911	4822 051 30561	560Ω 5% 0.062W	5203	4822 157 11499	BLM11P600SPT
3466	4822 117 12139	22Ω 5% 0.062W	3912	4822 051 30222	2.2kΩ 5% 0.062W	5204	4822 157 11499	BLM11P600SPT
3467	4822 117 12139	22Ω 5% 0.062W	3913	4822 117 12139	22Ω 5% 0.062W	5302	4822 157 11499	BLM11P600SPT
3468	4822 117 12139	22Ω 5% 0.062W	3914	4822 051 30689	68Ω 5% 0.063W 0603	5400	4822 157 11499	BLM11P600SPT
3469	4822 117 12139	22Ω 5% 0.062W	3915	4822 051 30472	4.7kΩ 5% 0.062W	5401	4822 157 11717	BLM31P500SPT
3470	4822 117 12139	22Ω 5% 0.062W	3916	4822 051 30479	47Ω 5% 0.062W	5402	4822 157 11717	BLM31P500SPT
3471	4822 117 12139	22Ω 5% 0.062W	3917	4822 051 30479	47Ω 5% 0.062W	5403	4822 157 11499	BLM11P600SPT
3472	4822 117 12139	22Ω 5% 0.062W	3918	5322 117 13055	75R 1% 0.063W 0603	5404	4822 157 11499	BLM11P600SPT
3473	4822 117 12139	22Ω 5% 0.062W	3919	4822 051 30102	1kΩ 5% 0.062W	5405	4822 157 11717	BLM31P500SPT
3474	4822 117 12139	22Ω 5% 0.062W	3920	5322 117 13055	75R 1% 0.063W 0603	5406	4822 157 11717	BLM31P500SPT
3475	4822 117 12139	22Ω 5% 0.062W	3921	4822 051 30102	1kΩ 5% 0.062W	5501	4822 157 11717	BLM31P500SPT
3476	4822 117 12139	22Ω 5% 0.062W	3922	4822 051 30689	68Ω 5% 0.063W 0603	5502	4822 157 11499	BLM11P600SPT
3477	4822 117 12139	22Ω 5% 0.062W	3923	4822 051 30223	22kΩ 5% 0.062W	5503	2422 535 94995	10μH 1014520%
3478	4822 117 12139	22Ω 5% 0.062W	3924	5322 117 13055	75R 1% 0.063W 0603	5711	4822 157 70649	4.7μH (NL322522T-4R7J)
3479	4822 117 12139	22Ω 5% 0.062W	3925	4822 051 30103	10kΩ 5% 0.062W	5712	4822 157 70649	4.7μH (NL322522T-4R7J)
3480	4822 117 12139	22Ω 5% 0.062W	3926	4822 051 30102	1kΩ 5% 0.062W	5802	4822 157 11499	BLM11P600SPT
3481	4822 117 12139	22Ω 5% 0.062W	3927	5322 117 13055	75R 1% 0.063W 0603	5803	4822 157 11499	BLM11P600SPT
3482	4822 117 12139	22Ω 5% 0.062W	3928	4822 051 30102	1kΩ 5% 0.062W	5804	4822 157 11499	BLM11P600SPT
3483	4822 117 12139	22Ω 5% 0.062W	3929	2322 704 65609	56Ω 0603 RC22H 1%	5808	4822 157 11499	BLM11P600SPT
3484	4822 117 12139	22Ω 5% 0.062W	3930	5322 117 13055	75R 1% 0.063W 0603	5809	4822 157 11499	BLM11P600SPT
3485	4822 117 12139	22Ω 5% 0.062W	3931	4822 051 30102	1kΩ 5% 0.062W	5901	4822 157 11499	BLM11P600SPT
3486	4822 117 12139	22Ω 5% 0.062W	3932	5322 117 13055	75R 1% 0.063W 0603	5902	4822 157 70649	4.7μH (NL322522T-4R7J)
3487	4822 117 12139	22Ω 5% 0.062W	3933					

5911	2422 536 00598	1.5µH 1210 20%
5912	2422 536 00598	1.5µH 1210 20%
5913	2422 536 00598	1.5µH 1210 20%
5914	2422 549 45634	0603 EMI 100MHZ 60R
5915	2422 549 45634	0603 EMI 100MHZ 60R
5916	4822 157 11499	BLM11P600SPT



6000	4822 130 11528	1PS76SB10
6100	4822 130 11528	1PS76SB10
6101	4822 130 11528	1PS76SB10



7001	9322 116 74668	LD1117D33
7002	9352 683 81115	74LVC1G32GW
7003	5322 130 60159	BC846B
7004	9352 673 95518	SAA7118E/V1
7103	9352 683 81115	74LVC1G32GW
7104	9352 500 20118	74LVC08AD
7106	9322 191 99685	NCP303LSN29
7107	9352 500 20118	74LVC08AD
7111	5322 209 71568	PC74HCT14T
7200	9352 683 02157	PDI1394P25BD
7201	9352 682 52557	PDI1394L40
7300	9352 317 00118	74LVC125AD
7400	9352 725 55557	PNX7100EH/C1 only for Board E4!
7400	9352 730 27557	PNX7100EH/C2 only for Board E4Plus!
7401	9352 115 40118	74LVC245APW
7402	2722 171 08819	4MHZ 15P FXO34FL
7500	9322 188 69668	STS5DNF20V
7501	9322 188 68668	NCP1570D
7701	9322 167 49685	AD8061ART
7702	9322 169 89668	AD8062AR
7807	9965 000 21567	AM29DL640G-70EI/I-STEP
7809	9322 130 41668	M24C64-WMN6
7810	9965 000 18099	M24C64-WMN6/CHR BOOT1.0
7812	9322 187 09668	MT48LC16M16A2TG-7E
7813	9322 187 09668	MT48LC16M16A2TG-7E
7900	9352 684 56115	74LVC1G04GW
7901	9352 684 56115	74LVC1G04GW
7902	4822 130 61553	DTC124EU
7903	9352 456 80115	74HCT1G125GW
7904	5322 130 60159	BC846B
7905	4822 130 61553	DTC124EU
7906	5322 130 60159	BC846B
7907	5322 130 60159	BC846B
7908	5322 130 60159	BC846B
7909	5322 130 60159	BC846B
7910	9322 169 89668	AD8062AR
7911	5322 130 60159	BC846B
7912	5322 130 60159	BC846B

