

# DVD RECORDER

# DRX-2

## SERVICE MANUAL

### IMPORTANT NOTICE

This manual has been provided for the use of authorized YAMAHA Retailers and their service personnel. It has been assumed that basic service procedures inherent to the industry, and more specifically YAMAHA Products, are already known and understood by the users, and have therefore not been restated.

**WARNING:** Failure to follow appropriate service and safety procedures when servicing this product may result in personal injury, destruction of expensive components, and failure of the product to perform as specified. For these reasons, we advise all YAMAHA product owners that any service required should be performed by an authorized YAMAHA Retailer or the appointed service representative.

**IMPORTANT:** The presentation or sale of this manual to any individual or firm does not constitute authorization, certification or recognition of any applicable technical capabilities, or establish a principle-agent relationship of any form.

The data provided is believed to be accurate and applicable to the unit(s) indicated on the cover. The research, engineering, and service departments of YAMAHA are continually striving to improve YAMAHA products. Modifications are, therefore, inevitable and specifications are subject to change without notice or obligation to retrofit. Should any discrepancy appear to exist, please contact the distributor's Service Division.

**WARNING:** Static discharges can destroy expensive components. Discharge any static electricity your body may have accumulated by grounding yourself to the ground buss in the unit (heavy gauge black wires connect to this buss).

**IMPORTANT:** Turn the unit OFF during disassembly and part replacement. Recheck all work before you apply power to the unit.

## ■ CONTENTS

TO SERVICE PERSONNEL .....	2~4	CIRCUIT DESCRIPTIONS .....	98~114
PREVENTION OF ELECTRO STATIC DISCHARGE ...	4	ABBREVIATION LIST .....	115~118
LOCALE MANAGEMENT INFORMATION .....	4	IC DATA .....	119~126
FRONT PANELS .....	5	BLOCK DIAGRAM .....	127
REMOTE CONTROL PANEL .....	5	WIRING DIAGRAM .....	128
REAR PANELS .....	6	WAVEFORMS .....	129~130
SPECIFICATIONS .....	6~8	PRINTED CIRCUIT BOARD .....	131~149
DISASSEMBLY PROCEDURES .....	9~11	SCHEMATIC DIAGRAM .....	150~177
DIAGNOSTIC SOFTWARE .....	12~94	PARTS LIST .....	178~189
ALIGNMENTS .....	95~97		

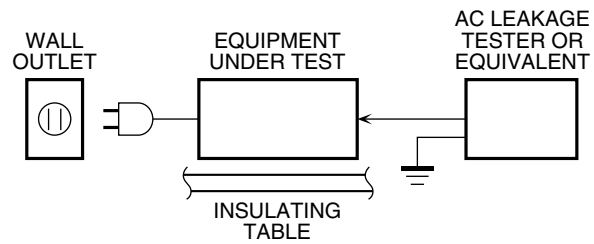


このサービスマニュアルは、エコマーク認定の再生紙を使用しています。  
This Service Manual uses recycled paper.



## ■ TO SERVICE PERSONNEL

1. Critical Components Information  
Components having special characteristics are marked ⚠ and must be replaced with parts having specifications equal to those originally installed.
2. Leakage Current Measurement (For 120V Models Only)  
When service has been completed, it is imperative to verify that all exposed conductive surfaces are properly insulated from supply circuits.
  - Meter impedance should be equivalent to 1500 ohm shunted by 0.15µF.



- Leakage current must not exceed 0.5mA.
- Be sure to test for leakage with the AC plug in both polarities.

THE DVD RECORDER SHOULD NOT BE ADJUSTED OR REPAIRED BY ANYONE EXCEPT PROPERLY QUALIFIED SERVICE PERSONNEL.



### CAUTION

- 1001 (ANALOG P.C.B.): FOR CONTINUED PROTECTION AGAINST RISK OF FIRE, REPLACE ONLY WITH SAME TYPE 125mA, 250V FUSE.
- 1300 (ANALOG P.C.B.): FOR CONTINUED PROTECTION AGAINST RISK OF FIRE, REPLACE ONLY WITH SAME TYPE 2.5A, 250V FUSE.
- 1303 (ANALOG P.C.B.): FOR CONTINUED PROTECTION AGAINST RISK OF FIRE, REPLACE ONLY WITH SAME TYPE 1.0A, 250V FUSE.
- 1304 (ANALOG P.C.B.): FOR CONTINUED PROTECTION AGAINST RISK OF FIRE, REPLACE ONLY WITH SAME TYPE 4.0A, 250V FUSE.
- 1306 (ANALOG P.C.B.): FOR CONTINUED PROTECTION AGAINST RISK OF FIRE, REPLACE ONLY WITH SAME TYPE 125mA, 250V FUSE.
- 1307 (ANALOG P.C.B.): FOR CONTINUED PROTECTION AGAINST RISK OF FIRE, REPLACE ONLY WITH SAME TYPE 1.0A, 250V FUSE.
- 1308 (ANALOG P.C.B.): FOR CONTINUED PROTECTION AGAINST RISK OF FIRE, REPLACE ONLY WITH SAME TYPE 500mA, 250V FUSE.
- 1309 (ANALOG P.C.B.): FOR CONTINUED PROTECTION AGAINST RISK OF FIRE, REPLACE ONLY WITH SAME TYPE 800mA, 250V FUSE.
- 1505 (DIGITAL P.C.B.): FOR CONTINUED PROTECTION AGAINST RISK OF FIRE, REPLACE ONLY WITH SAME TYPE 1.0A, 125V FUSE.
- 1506 (DIGITAL P.C.B.): FOR CONTINUED PROTECTION AGAINST RISK OF FIRE, REPLACE ONLY WITH SAME TYPE 1.0A, 125V FUSE.
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### ATTENTION

- 1001 (ANALOG P.C.B.): UTILISER UN FUSIBLE DE RECHANGE DE MEME TYPE DE 125mA, 250V.
- 1300 (ANALOG P.C.B.): UTILISER UN FUSIBLE DE RECHANGE DE MEME TYPE DE 2.5A, 250V.
- 1303 (ANALOG P.C.B.): UTILISER UN FUSIBLE DE RECHANGE DE MEME TYPE DE 1.0A, 250V.
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- 1507 (DIGITAL P.C.B.): UTILISER UN FUSIBLE DE RECHANGE DE MEME TYPE DE 1.0A, 125V.

## WARNING: CHEMICAL CONTENT NOTICE!

The solder used in the production of this product contains LEAD. In addition, other electrical/electronic and /or plastic (where applicable) components may also contain traces of chemicals found by the California Health and Welfare Agency (and possibly other entities) to cause cancer and/or birth defects or other reproductive harm.

DO NOT PLACE SOLDER, ELECTRICAL/ELECTRONIC OR PLASTIC COMPONENTS IN YOUR MOUTH FOR ANY REASON WHATSOEVER!

Avoid prolonged, unprotected contact between solder and your skin! When soldering, do not inhale solder fumes or expose eyes to solder/flux vapor!

If you come in contact with solder or components located inside the enclosure of this product, wash your hands before handling food.

## WARNING: Laser Safety

This product contains a laser beam component. This component may emit invisible, as well as visible radiation, which may cause eye damage. To protect your eyes and skin from laser radiation, the following precautions must be used during servicing of the unit.

- 1) When testing and/or repairing any component within the product, keep your eyes and skin more than 30 cm away from the laser pick-up unit at all times. Do not stare at the laser beam at any time.
- 2) Do not attempt to readjust, disassemble or repair the laser pick-up, unless noted elsewhere in this manual.
- 3) CAUTION: Use of controls, adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

## Laser Emitting conditions:

- 1) When the Top Cover is removed and the "STANDBY/ON" SW is turned to the "ON" position, the laser component will emit a beam for several seconds to detect if a disc is present. During this time (5 - 10 sec.) the laser may radiate through the lens of the laser pick-up unit. Do not attempt any servicing during this period!  
If no disc is detected, the laser will stop emitting the beam. When a disc is loaded, you will not be exposed to any laser emissions.
- 2) The laser power level can be adjusted with the VR on the pick-up PWB. However, this level has been set by the factory prior to shipping from the factory. Do not adjust this laser level control unless instruction is provided elsewhere in this manual. Adjustment of this control can increase the laser emission level from the device.

## Laser Diode Properties

Type:	InGaAlP Semiconductor laser (DVD) AlGaAs Semiconductor laser (CD)
Wave length:	660 nm (DVD) 780 nm (CD)
Output Power: (out of objective)	20 mW (DVD writing) 0.8 mW (DVD reading) 0.3mW (CD reading)
Beam divergence:	82 degrees (DVD) 54 degrees (CD)

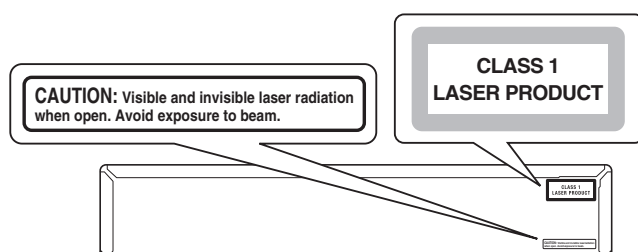
**VARO!** : AVATTAESSA JA SUOJALUKITUS OHITETTAESSA OLET ALTTIINA NÄKYMÄTTÖMÄLLE LASER-SÄTEILYLLE. ÄLÄ KATSO SÄTEESEEN.

**WARNING!** : OSYNLIG LASERSTRÅLNING NÄR DENNA DEL ÄR ÖPPNAD OCH SPÄRREN ÄR URKOPPLAD. BETRAKTA EJ STRÅLEN.

## WARNING

The use of optical instruments with this product will increase eye hazard.

Repair handling should take place as much as possible with a disc loaded inside the player.



## WARNING LOCATION: Top of the DVDR Mechanism

CAUTION VISIBLE AND INVISIBLE LASER RADIATION WHEN OPEN AVOID EXPOSURE TO BEAM  
 ADVARSEL SYNLIG OG USYNLIG LASERSTRÅLING VED ÅBNING  
 UNDGA UDSÆTTELSE FOR STRÅLING  
 ADVARSEL SYNLIG OG USYNLIG LASERSTRÅLING NÄR DEKSEL  
 ÅPNES UNNGÅ EKSPONERING FOR STRÅLEN  
 VARNING SYNLIG OCH OSYNLIG LASERSTRÅLNING NÄR  
 DENNA DEL ÄR ÖPPNAD BETRAKTA EJ STRÅLEN  
 VARO! AVATTAESSA OLET ALTTIINA NÄKYVÄLLE JA  
 NÄKYMÄTTÖMÄLLE LASER SÄTEILYLLE. ÄLÄ KATSO SÄTEESEEN  
 VORSICHT SICHTBARE UND UNSICHTBARE LASERSTRAHLUNG  
 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  
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## Warning for power supply

The primary side of the power supply carries live mains voltage when the player is connected to the mains even when the player is switched off !

This primary area is not shielded so it is possible to touch copper tracks and/or components when servicing the player. Service personnel have to take precautions to prevent touching this area or components in this area .

The primary side of the power supply has been indicated with a lightening stroke and a stripe-marked print on the printed wiring board

### Note:

The screws on the DVDR mechanism may never be touched, removed or re-adjusted.

Handle the DVDR mechanism with care when the unit has to be exchanged!

The DVDR mechanism is very sensitive for dropping or giving shocks.

## ■ PREVENTION OF ELECTRO STATIC DISCHARGE

The laser diode in the DVDR mechanism may be damaged due to static electricity from clothes or the human body. Use caution to prevent electrostatic damage when servicing or handling the DVDR mechanism.

### 1. Grounding for electrostatic damage prevention

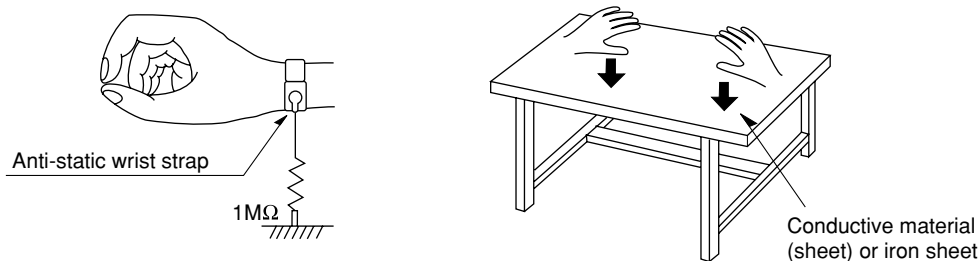
Some devices, such as the DVD recorder, use an optical pickup (laser diode) that will be damaged by static electricity in the working environment. Only attempt service after ensuring that all grounding procedures have been completed.

#### 1. Worktable grounding

Put a grounded conductive material (sheet) or iron sheet on the area where the optical pickup is placed.

#### 2. Human body grounding

Use an anti-static wrist strap to discharge the static electricity from your body.



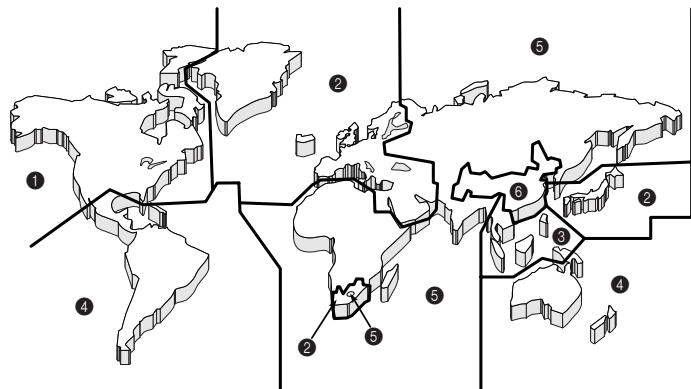
### 2. Handling Precautions for DVDR mechanism

1. Handle the DVDR mechanism gently, as it is an extremely high-precision assembly.
2. The flexible cable lines may break if an excessive force is applied to it. Use caution when handling the cable.
3. The semi-fixed resistor for laser power adjustment should not be adjusted. Do not turn the resistor.

## ■ LOCALE MANAGEMENT INFORMATION

Locale Management Information : This DVD recorder is designed and manufactured to respond to the Locale Management Information that is recorded on the DVDR disc. If the Locale number described on the DVDR disc does not correspond to the Locale number of this DVD recorder, this DVD recorder cannot play this disc.

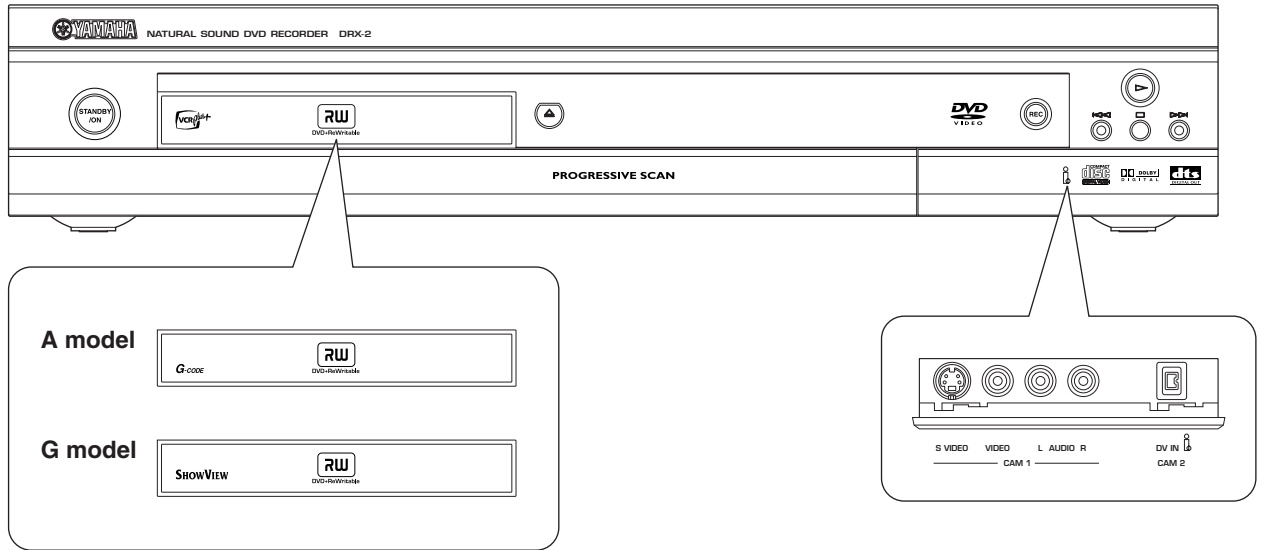
This product incorporates copyright protection technology that is protected by method claims of certain U.S. patents and other intellectual property rights owned by Macrovision Corporation and other rights owners. Use of this copyright protection technology must be authorized by Macrovision Corporation, and is intended for home and other limited viewing uses only unless otherwise authorized by Macrovision Corporation. Reverse engineering or disassembly is prohibited.



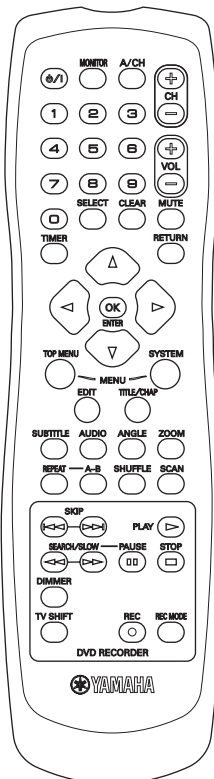


## FRONT PANELS

### U model

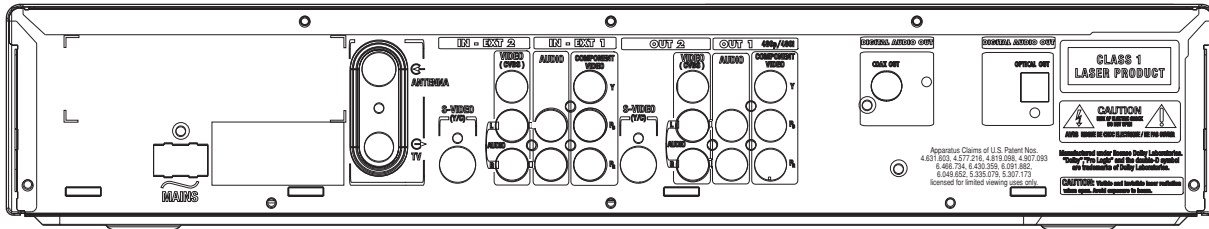


## REMOTE CONTROL PANEL

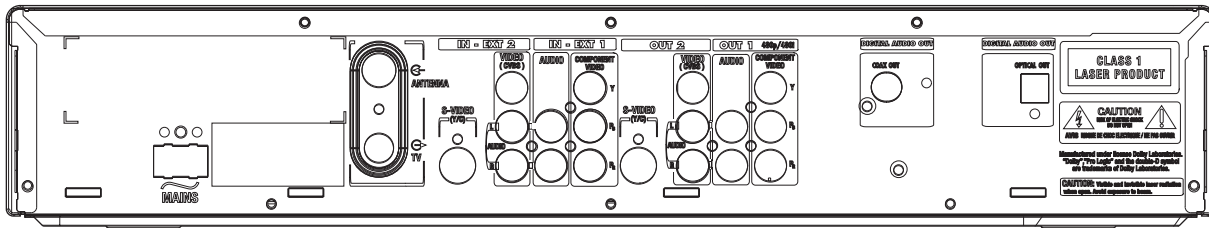


## REAR PANELS

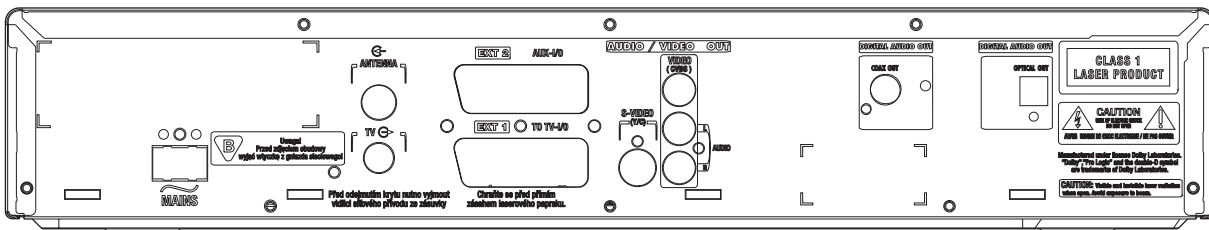
### U model



### A model



### G model



## SPECIFICATIONS

### DISC FORMATS SUPPORTED

Disc type	Playback	Recording
DVD+RW	•	•
DVD+R	•	•
DVD-RW (Video mode)	•	—
DVD-R	•	—
DVD-Video	•	—
SVCD	•	—
Video CD	•	—
Audio CD	•	—
CD-R	•	—
CD-RW	•	—

### RECORDABLE DISC FORMATS

Medium	DVD+RW: Phase-Change ReWritable		
Diameter	DVD+R: dye-based		
Capacity (single side)	4.7 Gbyte		
Recording time	M1	60'	9.72 Mbit/s
	M2	120'	5.07 Mbit/s
	M2x	150'	4.06 Mbit/s
	M3	180'	3.38 Mbit/s
	M4	240'	2.54 Mbit/s
	M6	360'	1.69 Mbit/s

TV Standard	PAL	NTSC
Scan Frequency	50Hz	60Hz
Number of Lines	625	525
Playback	•	•
Recording	•	•
Internal Tuner	•	–

#### VIDEO RESOLUTION 50Hz 60Hz

DVD-Video/DVD+RW/DVD+R(M1/M2/M2x)	50Hz	60Hz
• Horiz. Resolution	720 pixels <sup>1</sup>	720 pixels <sup>1</sup>
• Vertical Resolution	576 lines	480 lines
DVD+RW_DVD+R(M3/M4/M6)		
• Horiz. Resolution	360 pixels <sup>2</sup>	360 pixels <sup>2</sup>
• Vertical Resolution	576 lines	480 lines
VCD		
• Horiz. Resolution	352 pixels	352 pixels
• Vertical Resolution	288 lines	288 lines

<sup>1</sup> equivalent to 500 lines on your TV  
<sup>2</sup> equivalent to 250 lines on your TV

#### VIDEO PERFORMANCE

DA Converter	10-bit
AD Converter	9-bit
Signal Handling	Components
Video Output	1 Vpp into 75 ohms
S-video Output	Y: 1 Vpp into 75 ohms C: 0.286 Vpp into 75 ohms (U, A models) C: 0.300 Vpp into 75 ohms (G model)
Component Output	Y: 1Vpp into 75 ohms (U, A models) Pb: 0.7 Vpp into 75 ohms (U, A models) Pr: 0.7 Vpp into 75 ohms (U, A models)
RGB Output	0.7 Vpp into 75 ohms (G model)

#### AUDIO FORMAT

Compressed Digital	Playback	Recording
• Dolby Digital	Multi-channel (AC-3)	2-channel 16 bit, fs 48 kHz
• DTS	Multi-channel	—
• MPEG1	2-channel SPdif	—
• PCM	2-channel 16, 20, 24 bit fs 48 kHz	2-channel 16 bit, fs 48 kHz

#### AUDIO PERFORMANCE

DA Converter	24-bit
AD Converter	16-bit
DVD	fs 96 kHz 4 Hz - 44 kHz fs 48 kHz 4 Hz - 22 kHz
Video CD	fs 44.1 kHz 4 Hz - 20 kHz
Audio CD	fs 44.1 kHz 4 Hz - 20 kHz

#### FRONT CONNECTIONS

i.LINK DV	IEEE 1394 4-pin
S-video Input	Hosiden 4-pin
Video Input	Cinch (yellow)
Audio Left/Right Input	Cinch (white/red)

#### REAR CONNECTIONS

Component Video Input	Cinch (green/blue/red)
Component Video Output	Cinch (green/blue/red)
S-video Input	Hosiden 4-pin (U, A models)
S-video Output	Hosiden 4-pin
Video Input	Cinch (yellow) (U, A model)
Video Output	Cinch (yellow)
scart 1	CVBS, S-video/RGB-out, Decoder (G model)
scart 2	CVBS, S-video/RGB-in, Decoder (G model)
Audio L/R Input	Cinch (white/red) (U, A models)
Audio L/R Output	Cinch (white/red)
Digital Audio Output	1 coaxial, 1 optical IEC958 for CDDA / LPCM IEC1937 for MPEG2, Dolby Digital (U, A models) IEC1937, Dolby Digital, DTS (G model)
RF Antenna Input	Coaxial 75 ohms
RF TV Output	Coaxial 75 ohms
Power	Standard (IEC type)

#### POWER SUPPLY

Power Supply		
U model	120V, 60Hz	
A, G models	220 - 240V, 50 Hz	
Power Consumption	Operation	27 W
	Low-power standby	3 W

#### CABINET

Dimensions (WxHxD)	435 x 82 x 347 mm (17-1/8" x 3-1/4" x 13-11/16")
Net Weight	4.0 kg (8 lbs. 13 oz.)

#### OPERATING ENVIRONMENT

Operating Position	maximum 10 degree inclination in all directions
Ambient Temperature	15 – 35 °C (59 – 95 °F)
Humidity	25 – 75 %

#### ACCESSORIES

- Remote Control x 1
- Battery x 2
- Power Cable x 1
- SCART Cable x 1 (G model)
- Audio Pin Cable (2P) x 1 (U, A models)
- Video Cable (1P) x 1 (U, A models)
- RF Cable for NAFTA x 1 (U model)
- RF Cable for PAL x 1 (A, G models)
- Pin Cable (3P) x 1 (U, A models)
- DVD+RW Disc x 1 (U, A models)

\* Specifications are subject to change without notice due to product improvements.

U ..... U.S.A. model

A ..... Australian model

G ..... European model



Simple programming system for DVD recorders. Simply enter the number code associated with your television program. This number is located in your television listings magazine.

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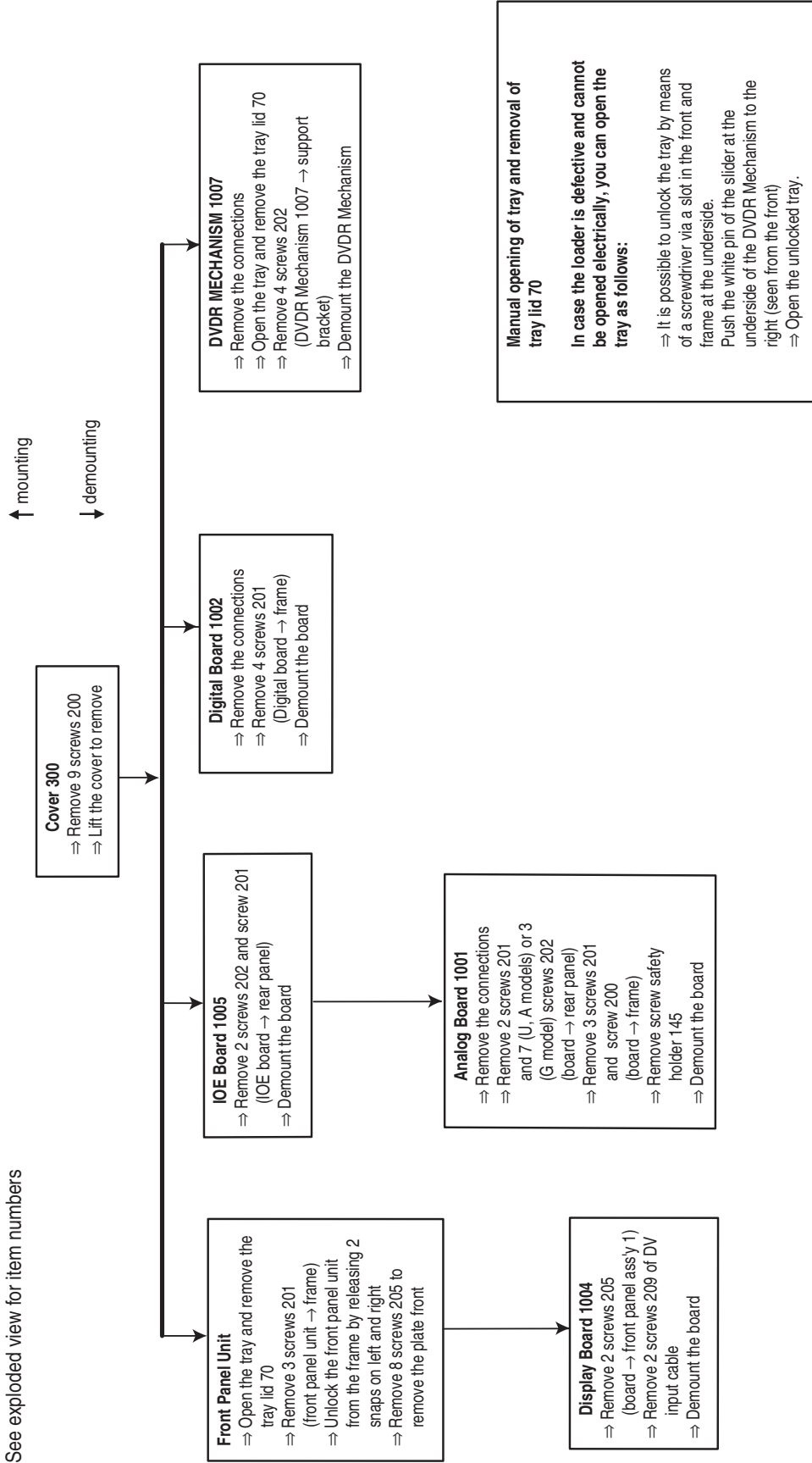
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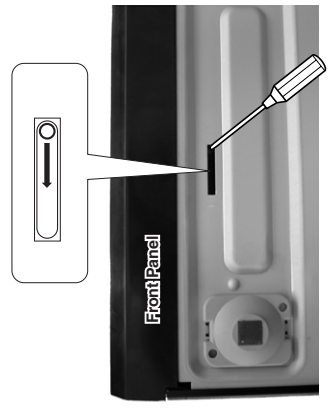
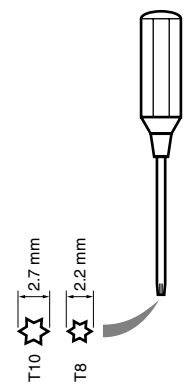
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# DISASSEMBLY PROCEDURES

See exploded view for item numbers



When disassembling, use the special screw driver with tip shape in figure.



● Dismantling and Assembly of the Set

For item numbers please see the exploded views.

1. Front

- a. After removing the top cover, remove tray lid 70. (Fig. 1)
- b. Remove the 3 screws 201. (Fig. 2)
- c. Release the 2 snap hooks on the sides and remove the front panel unit. (Fig. 2)
- d. Remove the 8 screws 205 to remove the front plate. (Fig. 3 and 4)

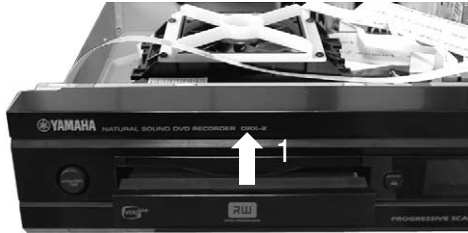


Fig. 1

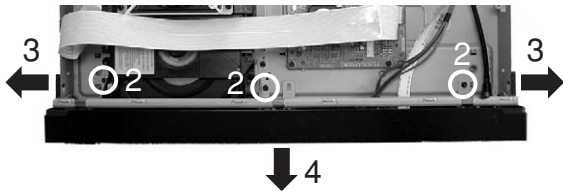


Fig. 2

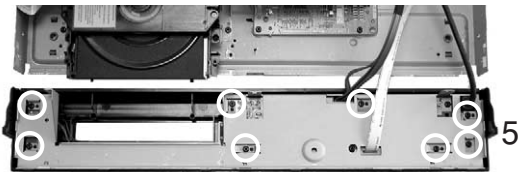


Fig. 3



Fig. 4

2. Digital Board

- a. Remove the 4 screws 201. (Fig. 5)
- b. Turn the PCB in the service position. (Fig. 6)

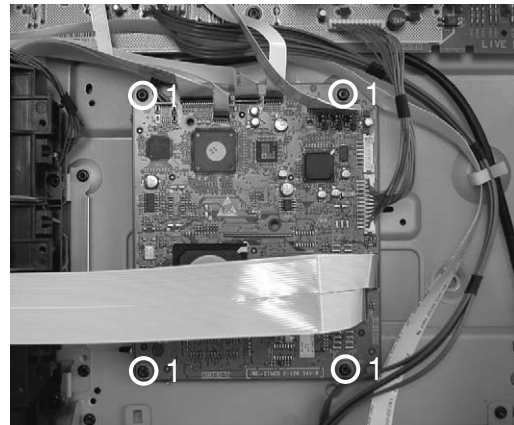


Fig. 5

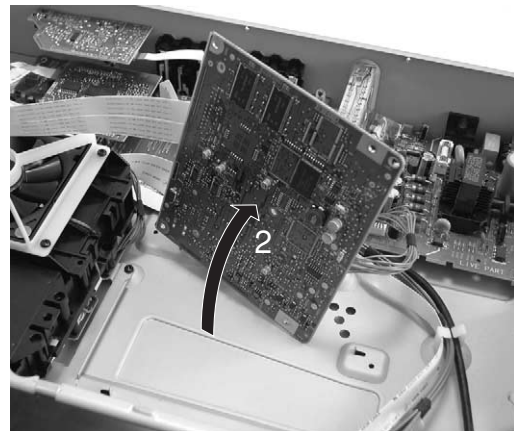


Fig. 6

DRX-2



### 3. DVDR Mechanism

- Remove the 4 screws 202. (Fig. 7)
- Turn the DVDR mechanism in the service position. (Fig. 8)

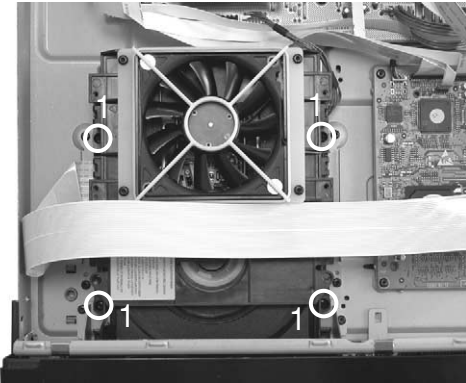


Fig. 7

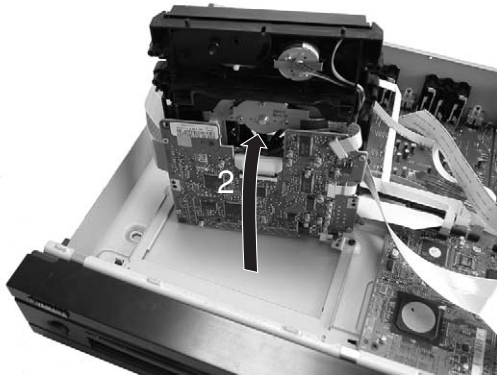
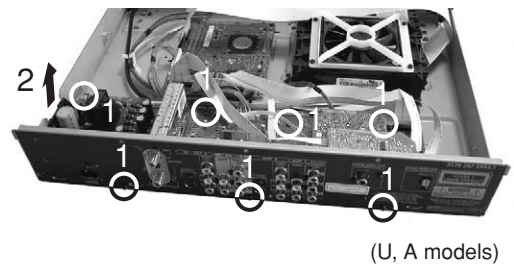


Fig. 8

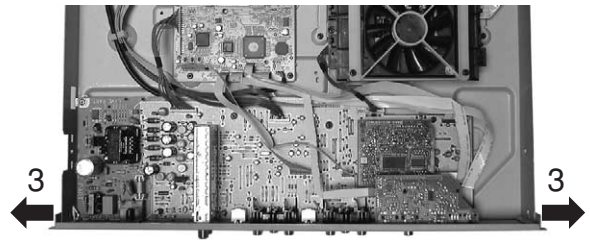
### 4. Analog Board

- Remove the 7 screws 200 and 201. (Fig. 9)
- Remove screw safety holder 145. (Fig. 9)
- Unlock the 2 snaps hooks on the left and right. (Fig. 10)
- Turn the PCB in the service position. (Fig. 11)



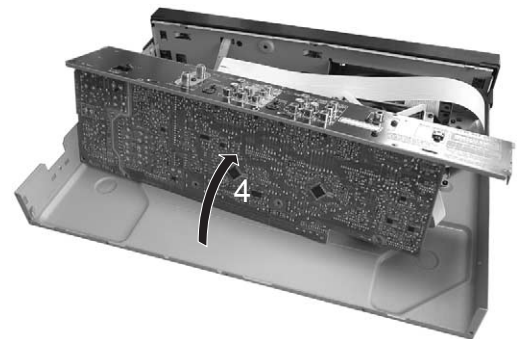
(U, A models)

Fig. 9



(U, A models)

Fig. 10



(U, A models)

Fig. 11

## ■ 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. Player script interface

### 1. End User/Dealer Script Interface

#### 1.1 Description

The End user/Dealer script interface gives a diagnosis on a stand alone DVD recorder; no other equipment is needed. 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.

#### 1.3 Contents for sets with Digital Board Chrysalis

Included tests:	<ol style="list-style-type: none"> <li>1. DS_ANAB_COMMUNICATIONECHO_NUC</li> <li>2. DS_DCB_COMMUNICATIONECHO_NUC</li> <li>3. DS_BROM_COMMUNICATION_NUC</li> <li>4. DS_SYS_SETTINGSDISPLAY_NUC</li> <li>5. DS_CHR_DEVTYPEGET_NUC</li> <li>6. DS_CHR_INT_PIC_NUC</li> <li>7. DS_CHR_DMA_NUC</li> <li>8. DS_BROM_WRITEREAD_NUC</li> <li>9. DS_NVRAM_COMMUNICATION_NUC</li> <li>10. DS_NVRAM_WRITEREAD_NUC</li> <li>11. DS_SDRAM_WRITEREADFAST_NUC</li> <li>12. DS_FLASH_WRITEREAD_NUC</li> <li>13. DS_FLASH_CHECKSUMPROGRAM_NUC</li> <li>14. DS_SYS_HARDWAREVERSIONGET_NUC</li> <li>15. DS_VIP_DEVTYPEGET_NUC</li> <li>16. DS_VIP_COMMUNICATION_NUC</li> <li>17. DS_DVIO_LINKDEVTYPEGET_NUC</li> <li>18. DS_DVIO_PHYDEVTYPEGET_NUC</li> <li>19. DS_DVIO_LINKCOMMUNICATION_NUC</li> <li>20. DS_DVIO_PHYCOMMUNICATION_NUC</li> <li>21. DS_PSCAN_COMMUNICATIONDENC_NUC</li> <li>22. DS_PSCAN_COMMUNICATIONDEINTERLACER_NUC</li> <li>23. DS_BE_COMMUNICATIONECHO_NUC</li> <li>24. DS_ANAB_COMMUNICATIONIICNVRAM_NUC</li> <li>25. DS_ANAB_COMMUNICATIONIICTUNER_NUC</li> <li>26. DS_ANAB_COMMUNICATIONIICSOUNDPROCESSOR_NUC</li> <li>27. DS_ANAB_COMMUNICATIONIICAVSELECTOR_NUC</li> <li>28. DS_ANAB_CHECKSUMPROGRAM_NUC</li> </ol>
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### 1.2 Contents

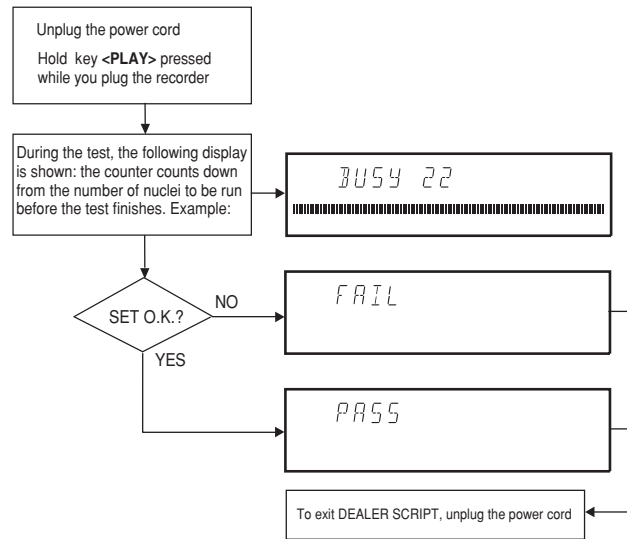


Fig. A

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

## 1.4 Error Log

### Explanation:

The application errors will be logged in the NVRAM. The maximum number of error bytes that will be visible is 19. The last reported error is shown as DN D0000000, the oldest visible error as D0000000 UP and the errors in between as DN D0000000 UP. DN stands for DOWN, UP stands for UPWARDS. The shown error codes are identical to the Nuclei Error Codes (paragraph 3).

## 1.5 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.**

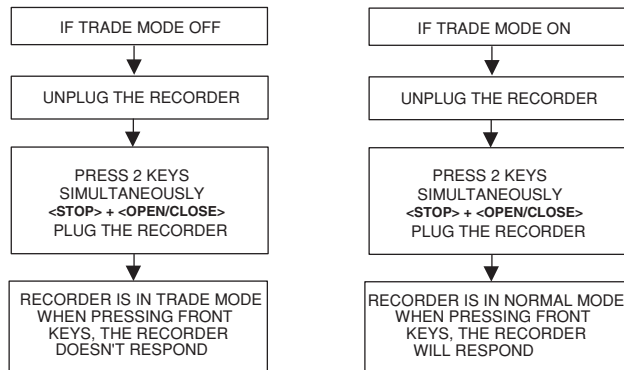


Fig. B

## 1.6 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 STANDBY/ ON key pressed
- the set starts up in Virgin mode.

## 2. Menu and Command Mode Interface

### 2.1 Nuclei Numeration

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

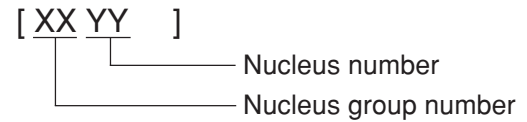


Fig. 1

The following groups are defined for Digital Board 1.5, Empress:

Group number	Group name
0	Basic / Scripts
1	Host decoder (Sti5505 and memory)
2	Audio / video encoder (DVDR only)
3	VSM (DVDR only)
4	NVRAM
5	Front Panel
6	DVDR Mechanism
7	Analog board (DVDR only)
8	DVIO (DVDR only)
9	Loop nuclei (DVDR only)
10	Library sub nuclei (I2C nuclei)
11	User interface
12	Furore (SACD only)
13	DAC (SACD only)

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	DVDR Mechanism
10	Display and Control Board
11	Analog Board
12	System

## 2.2 Error Handling

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

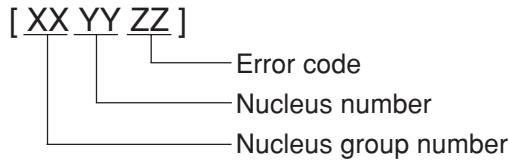


Fig. 2

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

## 2.3 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 (AAX57390)**

### 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:

### Welcome screen D&S program



Fig. 3

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 message will appear when starting the DVD+RW for the first time

### Error message D&S program

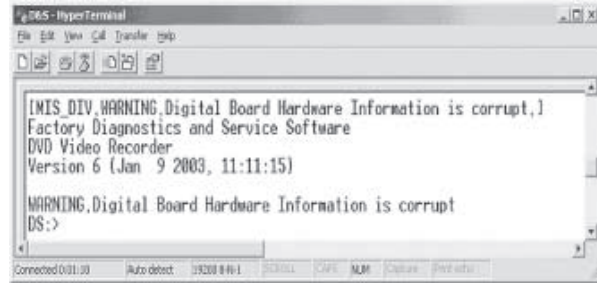


Fig. 4

In this case, 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.

Before doing so, one must generate this string. In order to generate the correct parameters, an MS Windows utility, called "dbstring.exe", is available (contact your Philips regional service support for this). For a detailed description, see next section 'String Generation'.

### String Generation

4. Browse to the directory with the Diagnostics software (e.g. type 'cd c:\ds\'), and execute the 'dbstring.exe' application.

### Opening screen 'dbstring' program

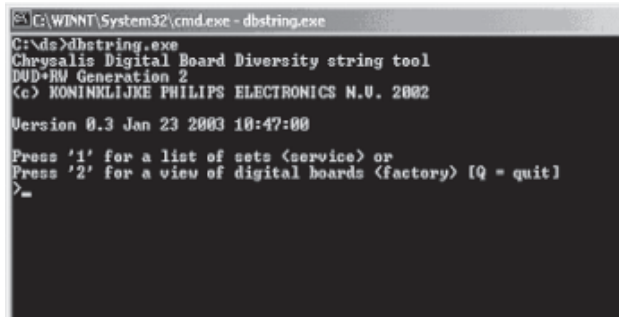


Fig. 5

5. Type '1' for a list of DVD recorders, or '2' for a list of Chrysalis Digital boards. In this example, '2' is entered.

## Board overview

```

C:\WINNT\System32\cmd.exe - dbstring.exe
>?
Factory view of boards
-----
ID Board  UIP  ROM  RAM  DU  DU  Prog  2nd  SW
  Name  Type  <NOR> In conn. Scan  IDE  image
-----
1. Lead890 7118 8 32  yes SMK  Chry  no  8x21
2. E1      7118 8 32  yes JST no   no  8x23
3. E2      7118 8 32  no  JST  no   no  8x22
4. E3      7118 12 32 yes JST no   no  8x25
5. E4      7118 16 64 yes JST Chry  no  8x27
6. NI      7118 8 32  yes JST Chry  no  8x22
7. NF1     7118 8 32  yes JST Faroudja no 8x22
8. NF2     7118 12 32 yes JST Faroudja no 8x26
Please enter the board id [Q = quit]
>6
  
```

Fig. 6

6. You now are asked to enter an ID of the board that must be programmed. Type a number, e.g. '6' followed by 'Enter'.

## Board periphery

```

C:\WINNT\System32\cmd.exe - dbstring.exe
>6
4E310000000000022030300010101020100000020080000
Board name:          NI
Hardware ID:         8x22
Codec IC:            PNX7100_MF3
Video Input Processor IC: SAA7118
Progressive Scan Deinterlacer IC: None
Progressive Scan Denc IC: ADU7196
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
Is this the correct board setting [y/n]
  
```

Fig. 7

7. Confirm the choice by typing 'y' followed by 'Enter'. Now press any key to return to the prompt.
8. A text file called 'DBSTRING.TXT' is created, which contains the parameters that are necessary for nucleus 1226. Copy this string from the text-file (e.g. by using 'Ctrl C').

## Example of the string

```

DBSTRING.TXT - Notepad
File Edit Format Help
4E310000000000022030300010101020100000020080000
  
```

Fig. 8

9. Execute nucleus 1226 with the string (paste with 'Edit' > 'Paste to host').

## Nucleus 1226 execution with string

```

D&S - HyperTerminal
File Edit View Call Transfer Help
DS:> 1226 4E310000000000022030300010101020100000020080000
122600:
Test OK @
DS:> _
  
```

Fig. 9

10. 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: 4E310000000000022030300010101020100000020080000
Board name:          NI
Hardware ID:         34
Codec IC:            PNX7100_MF3
Video Input Processor IC: SAA7118
Progressive Scan Deinterlacer IC: None
Progressive Scan Denc IC: ADU7196
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 @
DS:> _
  
```

Fig. 10

11. Exit the 'Terminal' program.
12. Reboot the DVD recorder to allow the software to start. Browse to the directory with the Diagnostics software (e.g. type 'cd c:\ds\'), and execute the 'dbstring.exe' application.



**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.	
Technical	<ul style="list-style-type: none"> <li>- Determine the codec ID by means of comparing version ids of the modules.</li> <li>- Read the module-id register from every module.</li> </ul>	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	10000	Getting the information succeeded
	10001	Wrong codec ID detected
Example	<pre> DS:&gt; 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 analog board output	



Technical	<ul style="list-style-type: none"> <li>- Validate the user input.</li> <li>- Initialise the SYNC module.</li> <li>- Initialise the DISPLAY module.</li> <li>- Initialise the MIXER module.</li> <li>- Initialise the DENC module.</li> <li>- Set the selected video standard.</li> <li>- Generate the selected test image in memory.</li> <li>- Start the DISPLAY module.</li> <li>- Start the MIXER module.</li> <li>- Start the DENC module according to the selected test image id.</li> </ul>	
Execution Time	1 second.	
User Input	The user has to decide which test image, video standard and video output must be used:	
	<p>Test image id:</p> <p>0        VERTICAL_COLOURBAR (default)</p> <p>1        HORIZONTAL_COLOURBAR</p> <p>2        WHITE</p> <p>3        YELLOW</p> <p>4        CYAN</p> <p>5        GREEN</p> <p>6        MAGENTA</p> <p>7        RED</p> <p>8        BLUE</p> <p>9        BLACK</p> <p>10       GRAY</p> <p>Video standard:</p> <p>PAL     (default)</p> <p>NTSC</p> <p>Video output:</p> <p>ALL     CVBS and YC and RGB (default)</p> <p>CVBS</p> <p>YC</p> <p>RGB</p> <p>YUV</p> <p>PSCAN   progressive scan</p>	
Error	Number	Description
	10100	Generating the test image succeeded.
	10101	Invalid input was provided.
	10102	The Chrysalis SYNC-module cannot be initialised.
	10103	The Chrysalis MIXER-module cannot be initialised.
	10104	The Chrysalis VPP-module cannot be initialised.
	10105	The Chrysalis DENC-module cannot be initialised.
Example	<pre>DS:&gt; 101 010100: Test OK @ DS:&gt; 101 0 pal cvbs 010100: Test OK @ DS:&gt; 101 4 ntsc yc 010100: Test OK @</pre>	

Nucleus Name	DS_CHR_TestImageOff
Nucleus Number	102
Description	Switches the test-image off.
Technical	- Stop the DENC module.
Execution Time	Less than 1 second.
User Input	None
Error	Number Description
Example	10200 Stopping the test image generation succeeded 10201 The Chrysalis DENC-module failed. 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.
Technical	<ul style="list-style-type: none"> <li>- De-mute the analog board</li> <li>- Set fifo parameters for audio</li> <li>- Set the volume</li> <li>- Set the I2S outputs and configuration paths</li> <li>- Set the decoder mode</li> <li>- Configure the DUET DSP</li> <li>- Configure the PALM DSP</li> <li>- Put the AC3 audio in the fifo</li> <li>- Send 'prepare' command to the audio decoder</li> <li>- Send 'play' command to the audio decoder</li> </ul>
Execution Time	Less than 1 second
User Input	None
Error	Number Description
	10300 The sine signal was successfully generated
	10301 The analog board could not be de-muted
	10302 The audio decoder did not initialise
	10303 The dsp2 of the audio decoder did not configure
	10304 The dsp1 of the audio decoder did not configure
	10305 There was a delay-error before starting
	10306 Wrong input was given to the decoder function
Example	DS:> 103 010300: Test OK @

Nucleus Name	DS_CHR_SineOff
Nucleus Number	104
Description	Stop generating the audio sine signal
Technical	- Reset the audio block of the Chrysalis
Execution Time	Less than 1 second.
User Input	None
Error	Number Description
	10400 Switching off the audio sine signal succeeded
Example	DS:> 104 010400: Test OK @

Nucleus Name	DS_CHR_SineBurst	
Nucleus Number	105	
Description	Generate an audio sine signal on the audio output of the digital board for 4 seconds. Note: Left channel 6kHz, right channel 12 kHz sine with some known hick-ups	
Technical	<ul style="list-style-type: none"> <li>- Call the DS_CHR_SineOn nucleus</li> <li>- Delay for 4 seconds</li> <li>- Call the DS_CHR_SineOff nucleus</li> </ul>	
Execution Time	4 seconds	
User Input	None	
Error	Number	Description
	10500	The sine signal burst was successfully generated
	10501	The delay did not succeed during the burst
	10502	The audio sine could not be generated
Example	DS:> 105 010500: Test OK @	

Nucleus Name	DS_CHR_MuteOn	
Nucleus Number	106	
Description	Mute the audio outputs of the digital board	
Technical	<ul style="list-style-type: none"> <li>- Send the 'Mute' command to the PALM DSP</li> </ul>	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	10600	Muting the audio succeeded
Example	DS:> 106 010600: Test OK @	

Nucleus Name	DS_CHR_MuteOff	
Nucleus Number	107	
Description	De-mute the audio outputs of the digital board	
Technical	<ul style="list-style-type: none"> <li>- Send the 'DeMute' command to the PALM DSP</li> </ul>	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	10700	De-muting the audio succeeded
Example	DS:> 107 010700: Test OK @	

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

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

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

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

Nucleus Name	DS_CHR_Peek	
Nucleus Number	112	
Description	Peek a value on a specified address	
Technical	<ul style="list-style-type: none"> <li>- Check the user input</li> <li>- Read out the address specified</li> <li>- Check whether the address to be read is aligned on 4 bytes</li> </ul>	
Execution Time	Less than 1 second.	
User Input	The address to peek on	
Error	Number	Description
	11200	Peeking on the specified address succeeded
	11201	Peeking on the specified address failed, wrong user input
	11202	Peeking on the specified address failed due to misalignment
Example	DS:> 112 0xa0700000 011200: Value read = 0x000001BD Test OK @	

Nucleus Name	DS_CHR_Poke	
Nucleus Number	113	
Description	Poke a value on a specified address	
Technical	<ul style="list-style-type: none"> <li>- Check the user input</li> <li>- Change the value on the address specified</li> <li>- Check whether the address to be modified is aligned on 4 bytes</li> </ul>	
Execution Time	Less than 1 second.	
User Input	The address to poke and the value: <address><value>	
Error	Number	Description
	11300	Poking the specified address succeeded
	11301	Poking the specified address failed, wrong user input
	11302	Poking the specified address failed due to misalignment
Example	DS:> 113 0xa0700000 0xaabbccdd 011300: Test OK @	

Nucleus Name	DS_CHR_INT_PICInterrupts	
Nucleus Number	114	
Description	Test all interrupts of the priority interrupt controller	
Technical	<ul style="list-style-type: none"> <li>- Install interrupt handlers</li> <li>- Generate interrupts</li> <li>- Test whether all interrupts were received</li> </ul>	
Execution Time	Less than 1 second.	
User Input	-	
Error	Number	Description
	11400	Testing all the PIC interrupts succeeded
	11401	Testing all the PIC interrupts failed
Example	DS:> 114 011400: Test OK @	

Nucleus Name	DS_CHR_DMA_TestDMA	
Nucleus Number	115	
Description	Test the memory to memory DMA transfer	
Technical	<ul style="list-style-type: none"> <li>- Create a block with known data in memory</li> <li>- Copy this block to the consecutive area using 3 different DMAs</li> <li>- Check whether all DMAs transferred the data properly</li> </ul>	
Execution Time	Less than 2 seconds.	
User Input	-	
Error	Number	Description
	11500	The testing of the DMAs succeeded
	11501	The initialisation of the DMAs failed for one or more DMA
	11502	One or more DMAs failed the test
Example	DS:> 115 011500: Test OK @	

#### Boot EEPROM (BROM)

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



Nucleus Name	DS_BROM_WriteRead	
Nucleus Number	201	
Description	Check whether the Boot EEPROM can be written to and read from	
Technical	<ul style="list-style-type: none"> <li>- Initialise IIC</li> <li>- Write something to the eeprom</li> <li>- Read from the same location and check whether it is the same as written</li> </ul>	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	20100	The write-read test succeeded
	20101	The write-read test failed
	20102	An IIC-bus error occurred
	20103	There was a timeout reading the device
	20104	The IIC bus was not accessible
	20105	The IIC acknowledge was not received
	20106	Got unknown IIC bus error
	20107	The IIC bus initialisation failed
Example	DS:> 201 020100: Test OK @	

#### NVRAM

Nucleus Name	DS_NVRAM_Communication	
Nucleus Number	300	
Description	Check the communication between the IIC controller of the Chrysalis and the EEPROM	
Technical	<ul style="list-style-type: none"> <li>- Initialise IIC</li> <li>- ReadfromalocationinNVRAM</li> </ul>	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	30000	Something is properly read so the communication is OK
	30001	The IIC bus was not accessible
	30002	There was a timeout reading the device
	30003	The IIC acknowledge was not received
	30004	The communication with the device failed
	30005	The IIC bus initialisation failed
Example	DS:> 300 030000: Test OK @	

Nucleus Name	DS_NVRAM_WriteRead	
Nucleus Number	301	
Description	Check whether the EEPROM can be written to and read from	
Technical	<ul style="list-style-type: none"> <li>- Initialise IIC</li> <li>- Backup data from location to modify</li> <li>- Write to location and read it back again</li> <li>- Write back the backed up data to the location to leave the nvram as found</li> </ul>	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	30100	The write-read test succeeded
	30101	The IIC bus could not be initialised
	30102	There was an NVRAM IO error
	30103	The value could not be read back from the NVRAM
Example	DS:> 301 030100: Test OK @	

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

Nucleus Name	DS_NVRAM_Modify	
Nucleus Number	303	
Description	Modifies one or more locations in NVRAM and updates the checksum of the section modified	
Technical	<ul style="list-style-type: none"> <li>- Initialise IIC</li> <li>- Decode user input</li> <li>- Modify the NVRAM as indicated</li> <li>- Validate the NVRAM by calculating the checksum and storing it</li> </ul>	
Execution Time	Less than 1 second	
User Input	<ol style="list-style-type: none"> <li>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</li> <li>2. The offset and data which to put on the selected location &lt;offset&gt; &lt;length&gt; &lt;data&gt;</li> </ol>	
Error	Number	Description
	30300	Modifying the NVRAM contents succeeded
	30301	Unable to initialise NVM
	30302	Modifying the NVRAM contents failed
	30303	length out of range
	30304	unable to decode length
	30305	offset out of range
	30306	unable to decode offset
	30307	unknown location specified
	30308	no location is specified
	30309	number of values incorrect
30310	There was an IIC error	
Example	DS:-> 303 DIAGNOSTICS 5 1 0x5a 030300: Section is modified successfully Test OK @	

Nucleus Name	DS_NVRAM_Read	
Nucleus Number	304	
Description	Read out one or more locations in the NVRAM	
Technical	<ul style="list-style-type: none"> <li>- Initialise IIC</li> <li>- Decode user input</li> <li>- Read from the NVRAM and return this info to the user</li> </ul>	
Execution Time	Less than 1 second	
User Input	<ol style="list-style-type: none"> <li>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</li> <li>2. The offset and number of bytes to read &lt;offset&gt; &lt;length&gt;</li> </ol>	
Error	Number	Description
	30400	Value read
	30401	Unable to initialise NVM
	30402	Reading the NVRAM contents failed
	30403	length out of range
	30404	unable to decode length
	30405	offset out of range
	30406	unable to decode offset
	30407	unknown location specified
	30408	no location is specified
Example	304 DIAGNOSTICS 0 6 030400: Value read = 0x00 0x00 0x00 0x00 0x00 0x5A Test OK @	

## SDRAM

Nucleus Name	DS_SDRAM_WriteRead	
Nucleus Number	400	
Description	Check all data lines, address lines and memory locations of the SDRAM	
Technical	<ul style="list-style-type: none"> <li>- Test the databus</li> <li>- Test the addressbus</li> <li>- Test the integrity of the device itself (memory locations)</li> </ul>	
Execution Time	11 seconds	
User Input	None	
Error	Number	Description
	40000	The write-read test succeeded
	40001	The data bus contains an error
	40002	The address bus contains an error
	40003	The SDRAM itself contains an error
Example	DS:> 400 040000: Test OK @	

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

Nucleus Name	DS_SDRAM_Write	
Nucleus Number	402	
Description	Write to a specific memory address	
Technical	<ul style="list-style-type: none"> <li>- Decode the user input and check its ranges and alignment on 4 bytes</li> <li>- Writethe data to theSDRAM</li> </ul>	
Execution Time	Less than 1 second	
User Input	1. The location that must be modified ( SDRAM starts at address 0xA0000000 ) 2. The value to put on the selected location	
Error	Number	Description
	40200	Writing to the SDRAM succeeded
	40201	Writing to the SDRAM failed; Wrong user input
	40202	Address is not dividable by 4
Example	DS:> 402 0xa1000010 0xad112222 040200: Test OK @	

Nucleus Name	DS_SDRAM_Read	
Nucleus Number	403	
Description	Read from a specific memory address	
Technical	<ul style="list-style-type: none"> <li>- Decode the user input and check the ranges</li> <li>- Read from the SDRAM and return this info to the user</li> </ul>	
Execution Time	Less than 1 second	
User Input	The location from which the data must be read ( SDRAM starts at address 0xA0000000 )	
Error	Number	Description
	40300	Reading from the SDRAM succeeded
	40301	Reading from the SDRAM failed; Wrong user input
	40302	Address is not dividable by 4
Example	DS:> 403 0xa1000010 040300: Value read = 0xAD112222 Test OK @	

## FLASH

Nucleus Name	DS_FLASH_DevTypeGet	
Nucleus Number	500	
Description	Get the device (revision) type information of the FLASH IC. (manufacturer and device ID)	
Technical	<ul style="list-style-type: none"> <li>- Set the timing for the flash writing</li> <li>- Write a command sequence to determine device type information</li> <li>- Return the information to the user</li> </ul>	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	50000	Getting the information from the FLASH succeeded
	50001	Getting the information from the FLASH failed
Example	DS:> 500 050000: Found FLASH memory: 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	
Technical	<ul style="list-style-type: none"> <li>- Find the test segment in flash</li> <li>- Read the data into SDRAM</li> <li>- Modify the data</li> <li>- Write this data from SDRAM to FLASH and verify it by reading back again</li> </ul>	
Execution Time	Less than 1 seconds.	
User Input	None	
Error	Number	Description
	50100	The FLASH write-read test succeeded
	50101	The test segment could not be found
	50102	All bits is the TEST region are filled with 0
	50103	The WriteRead test failed
	50104	The Write Failed
Example	DS:> 501 050100: Test OK @	

Nucleus Name	DS_FLASH_Read	
Nucleus Number	502	
Description	Read from a specific memory address in FLASH	
Technical	<ul style="list-style-type: none"> <li>- Decode the user input and check the ranges and whether the address is aligned on 4 bytes</li> <li>- Read the data and return this to the user</li> </ul>	
Execution Time	Less than 1 seconds.	
User Input	The location from which data must be read ( FLASH starts at address 0xB8000000 )	
Error	Number	Description
	50200	Reading the FLASH succeeded
	50201	Reading the FLASH failed; Wrong user input
	50202	Address is not dividable by 4
Example	DS:> 502 0xb8000000 050200: Value read = 0x3C08A000 Test OK @	

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

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



Nucleus Name	DS_FLASH_CalculateChecksumFast	
Nucleus Number	505	
Description	Calculate a checksum over a selected number of address locations	
Technical	- Run the checksum calculation algorithm on a selected number of addresses	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	50500	Calculating the checksum over selected addresses succeeded
Example	DS:> 505 050500: The Checksum = 0xBABEB064 Test OK @	

## VIDEO INPUT PROCESSOR (VIP)

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

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

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

Nucleus Name	DS_VIP_ClockOutputOff	
Nucleus Number	603	
Description	Switch the clock output off	
Technical	<ul style="list-style-type: none"> <li>- Initialise IIC</li> <li>- Reset the clock output through IIC</li> </ul>	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	60300	Switching the clock output off succeeded
	60301	Switching the clock output off failed
Example	DS:> 603 060300: Test OK @	

Nucleus Name	DS_VIP_SelectInput	
Nucleus Number	604	
Description	Select an input video path to be switched to the analog output pin (AOUT) of the VIP	
Technical	<ul style="list-style-type: none"> <li>- Check the user input</li> <li>- Initialise IIC</li> <li>- Read out the VIP id</li> <li>- Write the set of registers required for the input specified</li> </ul>	
Execution Time	Less than 1 second	
User Input	<p>The input to select, see table below.</p> <ul style="list-style-type: none"> <li>1 CVBS_Y_IN_A</li> <li>2 CVBS_OUT_B</li> <li>3 CVBS_Y_IN_B</li> <li>4 CVBS_Y_IN_C</li> <li>6 C_IN</li> <li>8 G_IN</li> <li>9 Y_IN</li> <li>13 B_IN</li> <li>14 U_IN</li> <li>18 R_IN</li> <li>19 V_IN</li> </ul>	
Error	Number	Description
	60400	Selecting the input of the VIP succeeded
	60401	The user provided wrong input
	60402	The VIP was not accessible
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	
Technical	<ul style="list-style-type: none"> <li>- Initialise the PIO pins on the chrysalis</li> <li>- Read out the ID register</li> </ul>	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	70000	Getting the information from the link layer IC succeeded
	70001	Getting the information from the link layer IC failed
	70002	Type not according to type stored in HW diversity string
Example	DS:> 700 070000: Device type of the link layer IC: ffc00301 Test OK @	

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

Nucleus Name	DS_DVIO_PhyCommunication	
Nucleus Number	703	
Description	Check the accessibility of the 1394 Physical layer IC by writing to and reading from a specific address	
Technical	<ul style="list-style-type: none"> <li>- Initialise the PIO pins of the chrysalis</li> <li>- Initialise IIC</li> <li>- Write the data to be written to the phy-chip to the link chip first</li> <li>- Wait until the link chip indicates that the data has been written to the phy</li> <li>- Write the phy-access register in the Link chip to indicate phy read access</li> <li>- Wait until the link chip has obtained the value from the phy-chip</li> <li>- Test whether the value read back equals the one previously written</li> </ul>	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	70300	Communicating with the physical layer IC succeeded
	70301	The physical layer IC was not accessible
	70302	Communicating with the physical layer IC failed
	70303	Result of nucleus not according to HW diversity string
Example	DS:> 703 070300: Test OK @	

Nucleus Name	DS_DVIO_Routing	
Nucleus Number	704	
Description	Route a DV stream containing an audio and video signal through the physical and link layer ICs to the Chrysalis	
Technical	<ul style="list-style-type: none"> <li>- Initialise the DMA to transfer 5 frames PAL/NTSC</li> <li>- Initialise the DV demultiplexer</li> <li>- Initialise the 1394 interface and start reception of the DV stream</li> <li>- Check whether the stream was copied to memory properly by the byte input interface (port to memory type DMA)</li> </ul>	
Execution Time	6-10 seconds (6 when OK, 10 when no stream or error)	
User Input	None, test works for both NTSC and PAL	
Error	Number	Description
	70400	Routing the signals succeeded
	70401	The 1394 link chip could not be initialised properly
	70402	There was a syntax error in the DV stream
	70403	DMA could not copy DV stream to memory. Stream connect-ed?
	70404	DMA not working properly
Example	DS:> 704 070400: Test OK @	

Nucleus Name	DS_DVIO_DetectNode	
Nucleus Number	705	
Description	Check whether a DV node can be detected by the hardware	
Technical	<ul style="list-style-type: none"> <li>- Initialise the 1394 interface</li> <li>- Detect whether a node is in range</li> </ul>	
Execution Time	3 or 5 seconds (3 when OK, 5 when no stream or error)	
User Input	None, test works for both NTSC and PAL	
Error	Number	Description
	70500	The node was detected OK
	70501	The 1394 link chip could not be initialised properly
	70502	Unable to write to 1394 PHY chip
	70503	Unable to read from 1394 PHY chip
	70504	No node was detected
Example	DS:> 705 070500: Test OK @	

Nucleus Name	DS_DVIO_DetectStream	
Nucleus Number	706	
Description	Check whether a DV stream can be detected by the hardware	
Technical	<ul style="list-style-type: none"> <li>- Initialise the 1394 interface</li> <li>- Start receiving the stream</li> <li>- Detect whether the stream is OK</li> </ul>	
Execution Time	3 or 5 seconds (3 when OK, 5 when no stream or error)	
User Input	None, test works for both NTSC and PAL	
Error	Number	Description
	70600	The stream was detected
	70601	The 1394 link chip could not be initialised properly
	70602	No stream detected
Example	DS:> 706 070600: Test OK @	

## Progressive Scan (PSCAN)

Nucleus Name	DS_PSCAN_CommunicationDenc	
Nucleus Number	801	
Description	Check the communication between the IIC controller of the chrysalis and the progressive scan DENC-IC	
Technical	<ul style="list-style-type: none"> <li>- Initialise IIC</li> <li>- Write data to a register of the DENC through IIC</li> </ul>	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	80100	Communicating with the progressive scan DENC-IC succeed-ed
	80101	The IIC bus was not accessible
	80102	There was a timeout reading the device
	80103	The IIC acknowledge was not received
	80104	Communicating with the progressive scan DENC-IC failed
	80105	The initialisation of the IIC bus failed
	80106	The read data is not the same as the written data
Example	80107	No chip was expected
	DS:> 801 080100: Test OK @	

Nucleus Name	DS_PSCAN_TestImageOn	
Nucleus Number	802	
Description	Generate the test images that are present on the progressive scan IC.	
Technical	<ul style="list-style-type: none"> <li>- See whether the user wanted a HATCH or a FRAME image pattern</li> <li>- Initialise the PIO pins of the chrysalis</li> <li>- Initialise IIC</li> <li>- Reset the DENC</li> <li>- Enable the 27Mhz clock</li> <li>- Send all settings for the pattern to the DENC through IIC</li> </ul>	
Execution Time	Less than 1 second	
User Input	In case of ADV7196: When no input is given "HATCH" is the default <ul style="list-style-type: none"> <li>- "HATCH"</li> <li>- "FRAME"</li> </ul> Remark: "HATCH" is a crosshatch test pattern (horizontal and vertical white lines are displayed against a black background) "FRAME" is a uniform coloured frame/field test pattern (default white). In case of FLI2300: Nothing.	
Error	Number	Description
	80200	The generation of the test image succeeded
	80201	Unable to initialise pscan ic
	80202	Unable to reset DENC
	80203	Unable to generate image
	80204	No chip was expected
Example	DS:> 802 HATCH 080200: Test OK @	

Nucleus Name	DS_PSCAN_TestImageOff	
Nucleus Number	803	
Description	Switch off the generated test image	
Technical	<ul style="list-style-type: none"> <li>- Initialise IIC</li> <li>- Send the default DENC settings to the DENC through IIC</li> </ul>	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	80300	Turning off the test image succeeded
	80301	Unable to initialise pscan ic
	80302	IIC Error during writing pscan ic
	80303	No chip was expected
Example	DS:> 803 080300: Test OK @	

Nucleus Name	DS_PSCAN_TestImageColourSettingsSet	
Nucleus Number	804	
Description	Set the colour of the hatch- or the frame- field to a different value than the default white	
Technical	<ul style="list-style-type: none"> <li>- Determine which colour must be set.</li> <li>- Initialise IIC.</li> <li>- Enable 27 Mhz PSCAN Clock.</li> <li>- Send all settings to the DENC through IIC.</li> </ul>	
Execution Time	Less than 1 second.	
User Input	A colour string of one of the next non-case sensitive strings ( WHITE, BLACK, RED, GREEN, BLUE, YELLOW, CYAN, MAGENTA ) or Y Cr Cb (hexa-) decimal values.	
Error	Number	Description
	80400	Setting the new colour-settings succeeded
	80401	The user provided wrong input
	80402	Unable to initialise pscan ic
	80403	Unable to set colour
	80404	No chip was expected
Example	DS:> 804 yellow 080400: Test OK @ DS:> 804 0x6a 0xde 0xca 080400: Test OK @	

Nucleus Name	DS_PSCAN_TestImageColourSettingsGet	
Nucleus Number	805	
Description	Get the colour settings of the hatch- or the frame- field.	
Technical	<ul style="list-style-type: none"> <li>- Initialise IIC.</li> <li>- Read the colour settings from the DENC through IIC.</li> </ul>	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	80500	Getting the colour-settings succeeded
	80501	The progressive scan DENC-IC was not accessible through IIC
	80502	Unable to get colour
	80503	No chip was expected
Example	DS:> 805 080500: Colour Y Cr Cb values: 0xD2 0x92 0x10 Test OK @	

Nucleus Name	DS_PSCAN_Routing	
Nucleus Number	806	
Description	Route a video signal from the 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 analog board).	
Technical	<ul style="list-style-type: none"> <li>- Initialise the PIO pins of the chrysalis</li> <li>- Initialise IIC</li> <li>- Reset the DENC</li> <li>- Enable the 27Mhz clock</li> <li>- Send all settings to the DENC through IIC.</li> </ul>	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	80600	Routing path is created successfully.
	80601	Unable to initialise the Chrysalis.
	80602	Unable to access DENC
	80603	Unable to access deinterlacer.
	80604	Wrong chips were expected.
Example	DS:> 806 080600: Test OK @	



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

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	
Technical	<ul style="list-style-type: none"> <li>- Initialise IIC</li> <li>- Set the video source synchronisation source to the Chrysalis</li> <li>- Write data to the DENC through IIC</li> </ul>	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	80800	Communicating with the progressive scan Deinterlacer-IC succeeded
	80801	The IIC bus was not accessible
	80802	There was a timeout reading the device
	80803	The communication with the device failed (no ACK)
	80804	Communicating with the progressive scan Deinterlacer-IC failed
	80805	The initialisation of the IIC bus failed
	80806	The data read back is not the same as the data written
	80807	No chip was expected
	Example	<pre>DS:&gt; 808 080800: Test OK @</pre>

DVDR Mechanism (BE)

Nucleus Name	DS_BE_CommunicationEcho	
Nucleus Number	900	
Description	Check the communication between the digital board and the DVDR Mechanism by issuing an echo command over the S2B interface	
Technical	<ul style="list-style-type: none"> <li>- Send the ECHO command</li> <li>- Check if the BE returned the string 0x00 0xAA 0x55</li> </ul>	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	90000	Communicating with the BE over the S2B interface succeed-ed
	90001	There was a time-out while communicating
	90002	The DVDR Mechanism returned an unexpected result
	90003	The DVDR Mechanism returned an error code
	90004	No acknowledge received from BE
	90005	Communicating with the DVDR Mechanism failed
	90006	Echo check failed, no echo received
Example	90007	Echo check failed, received wrong pattern
	DS:> 900 090000: Test OK @	

Nucleus Name	DS_BE_Reset	
Nucleus Number	901	
Description	Reset the DVDR Mechanism	
Technical	<ul style="list-style-type: none"> <li>- Toggle the reset pin of the I2S interface</li> </ul>	
Execution Time	2 seconds	
User Input	None	
Error	Number	Description
	90100	Resetting the DVDR Mechanism succeeded
	90101	Resetting the DVDR Mechanism failed
Example	DS:> 901 090100: Test OK @	

Nucleus Name	DS_BE_VersionGet	
Nucleus Number	903	
Description	Get the version of the DVDR Mechanism and that of the optical unit	
Technical	<ul style="list-style-type: none"> <li>- Send the GET_VERSION_NUMBER command</li> <li>- Display the returned version</li> </ul>	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	90300	BE version OK
	90301	There was a time-out while communicating
	90302	The DVDR Mechanism returned an unexpected result
	90303	The BE returned an error code
	90304	No acknowledge received from BE
	90305	Communicating with the DVDR Mechanism failed
	90306	The BE returned no info
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	
Technical	<ul style="list-style-type: none"> <li>- Send the GET_SELF_TEST_RESULT command</li> <li>- On error display the error received form the BE</li> </ul>	
Execution Time	Less than 1 second	
User Input	None	
Error Number	Description	
	90200	Self test succeeded, no errors
	90201	There was a time-out while communicating
	90202	The DVDR Mechanism returned an unexpected result
	90203	The BE returned an error code
	90204	No acknowledge received from BE
	90205	Communicating with the DVDR Mechanism failed
	90206	DVDR Mechanism returned no info
	90207	Self test failed, errors are echoed
Example	DS:> 902 090200: Test OK @	

Nucleus Name	DS_BE_TrayOut	
Nucleus Number	904	
Description	Open the tray of the DVDR Mechanism	
Technical	- Send the TRAY_OUT command	
Execution Time	Approximately 2 seconds	
User Input	None	
Error	Number	Description
	90400	The command executed successfully
	90401	There was a time-out while communicating
	90402	The DVDR Mechanism returned an unexpected result
	90403	The BE returned an error code
	90404	No acknowledge received from BE
	90405	Unable to enter normal mode
	90406	Communicating with the DVDR Mechanism failed
Example	DS:> 904 090400: Test OK @	

Nucleus Name	DS_BE_TrayIn	
Nucleus Number	905	
Description	Close the tray of the DVDR Mechanism	
Technical	- Send the TRAY_IN command	
Execution	Time Approximately 1 - 2 seconds	
User Input	None	
Error	Number	Description
	90500	The command executed successfully
	90501	There was a time-out while communicating
	90502	The DVDR Mechanism returned an unexpected result
	90503	The BE returned an error code
	90504	No acknowledge received from BE
	90505	Unable to enter normal mode
	90505	Communicating with the DVDR Mechanism failed
Example	DS:> 905 090500: Test OK @	

Nucleus Name	DS_BE_WriteReadDvdRw	
Nucleus Number	906	
Description	Write data to and read data from a DVD+RW disc through the DVDR Mechanism for verification of the writing	
Technical	<ul style="list-style-type: none"> <li>- Execute DS_BE_GetSelftestResults</li> <li>- Send the TRAY_IN command</li> <li>- Send the READ_TOC command</li> <li>- Generate a random disc location</li> <li>- Generate test data to write to the DVD+RW</li> <li>- Transfer the test data to the disc location using DMA</li> <li>- Read back the data from disc using DMA</li> <li>- Compare the two data areas and check whether the areas are equal</li> </ul>	
Execution Time	Approximately 20 seconds	
User Input	None	
Error	Number	Description
	90600	The command executed successfully
	90601	This nucleus cannot be executed because the Self-Test failed
	90602	The BE cannot enter normal operating mode
	90603	Unable to send the tray in
	90604	Unable to read TOC from disc
	90605	Invalid disc is loaded, please insert a DVD+RW disc
	90606	Writing the test pattern to DVD+RW failed
	90607	Reading back the test pattern from DVD+RW failed
	90608	Compare check failed
	90609	Calibrating DVD+RW failed
Example	DS:> 906 090600: Testing on sector 0x5dbe0: OK Test OK @	

Nucleus Name	DS_BE_WriteReadDvdR	
Nucleus Number	907	
Description	Write data to and read data from a DVD+R disc through the DVDR Mechanism for verification of the writing	
Technical	<ul style="list-style-type: none"> <li>- Execute DS_BE_GetSelftestResults</li> <li>- Send the TRAY_IN command</li> <li>- Send the READ_TOC command</li> <li>- Use the OPC area to test if the DVD+R is (still) writable</li> <li>- Generate test data to write to the DVD+R</li> <li>- Transfer the test data to the disc location using DMA</li> <li>- Read back the data from disc using DMA</li> <li>- Compare the two data areas and check whether the areas are equal</li> </ul>	
Execution Time	Approximately 20 seconds	
User Input	None	
Error	Number	Description
	90700	The command executed successfully
	90701	This nucleus cannot be executed because the Self-Test failed
	90702	The BE cannot enter normal operating mode
	90703	Unable to send the tray in
	90704	Unable to read TOC from disc
	90705	Invalid disc is loaded, please insert a DVD+RW disc
	90706	Unable to write, the DVD+R disc is full
	90707	No writable DVD+R sector found
	90708	Writing the test pattern to DVD failed
	90709	Reading back the test pattern from DVD failed
	90710	Compare check failed
Example	DS:> 907 090700: Testing on sector 0x36210: OK Test OK @	

Nucleus Name	DS_BE_StatisticalInformationGet	
Nucleus Number	908	
Description	Retrieve the statistical information from the DVDR Mechanism	
Technical	<ul style="list-style-type: none"> <li>- Send the GET_STATISTICAL_INFO command</li> <li>- Display the info returned from the BE</li> </ul>	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	90800	The command executed successfully
	90801	There was a time-out while communicating
	90802	The DVDR Mechanism returned an unexpected result
	90803	The BE returned an error code
	90804	No acknowledge received from BE
	90805	Communicating with the DVDR Mechanism failed
	90806	The BE returned no info
Example	DS:> 908 Number of times Tray went Open/Closed : 4 Total minutes the CD laser was on : 0 Total minutes the DVD laser was on : 0 Total minutes the write laser was on : 0 090800: Test OK @	

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

Nucleus Name	DS_BE_ErrorLogGet	
Nucleus Number	910	
Description	Get the error log from the DVDR Mechanism	
Technical	<ul style="list-style-type: none"> <li>- Send the GET_ERROR command</li> <li>- Display the returned info</li> </ul>	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	91000	The command executed successfully
	91001	There was a time-out while communicating
	91002	The DVDR Mechanism returned an unexpected result
	91003	The BE returned an error code
	91004	No acknowledge received from BE
	91005	Communicating with the DVDR Mechanism failed
	91006	The BE returned no info
Example	DS:> 910 Momentary errors (Byte 1 - Byte 7) : 0x00 0x00 0x00 0x00 0x00 0x00 0x00 Cumulative errors (Byte 1 - Byte 7) : 0x00 0x00 0x00 0x20 0x00 0x00 0x00 Fatal errors (Oldest - Youngest) : 0x00 0x00 0x00 0x00 0x00 091000: Test OK @	

Nucleus Name	DS_BE_ErrorLogReset	
Nucleus Number	911	
Description	Reset the error log in the DVDR Mechanism	
Technical	<ul style="list-style-type: none"> <li>- Send the RESET_STATISTICAL_INFO command</li> <li>- Send the POWER_DOWN command</li> <li>- Toggle the reset pin of the I2S interface</li> </ul>	
Execution Time	2 seconds	
User Input	None	
Error	Number	Description
	91100	The command executed successfully
	91101	There was a time-out while communicating
	91102	The DVDR Mechanism returned an unexpected result
	91103	The BE returned an error code
	91104	No acknowledge received from BE
	91105	Communicating with the DVDR Mechanism failed
Example	DS:> 911 091100: Test OK @	

Nucleus Name	DS_BE_JitterOptimise	
Nucleus Number	912	
Description	Perform jitter optimisation: A formatted DVD must be loaded into the DVDR Mechanism before executing this nucleus	
Technical	<ul style="list-style-type: none"> <li>- Send the TRAY_IN command</li> <li>- Send the READ_TOC command</li> <li>- Send the JITTER_COMMAND command with parameter 0x00 0x00</li> <li>- Send the JITTER_COMMAND command with parameter 0x00 0x01</li> <li>- Send the JITTER_COMMAND command with parameter 0x00 0x02 until offset 0x80 is received</li> </ul>	
Execution Time	Approximately 20 seconds	
User Input	None	
Error	Number	Description
	91200	Optimising jitter succeeded
	91201	There was a time-out while communicating
	91202	The DVDR Mechanism returned an unexpected result
	91203	The DVDR Mechanism returned an error code
	91204	No acknowledge received from BE
	91205	Unable to send tray in
	91206	Unable to read the disc
	91207	No disc is loaded
	91208	Unknown disc is loaded
	91209	Unable to enter service mode
Example	DS:> 912 Test OK @	



Nucleus Name	DS_BE_FocusOn	
Nucleus Number	913	
Description	Put the laser of the BE into focus	
Technical	- Send the FOCUS command with parameter 0x01	
Execution Time	3 seconds	
User Input	None	
Error	Number	Description
	91300	Focus on succeeded
	91301	There was a time-out while communicating
	91302	The DVDR Mechanism returned an unexpected result
	91303	The BE returned an error code
	91304	No acknowledge received from BE
	91305	Communicating with the DVDR Mechanism failed
	91306	Unable to enter service mode
Example	DS:> 913 091300: Test OK @	

Nucleus Name	DS_BE_FocusOff	
Nucleus Number	914	
Description	Turn off putting the laser of the BE into focus	
Technical	- Send the FOCUS command with parameter 0x00	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	91400	Focus off succeeded
	91401	There was a time-out while communicating
	91402	The DVDR Mechanism returned an unexpected result
	91403	The BE returned an error code
	91404	No acknowledge received from BE
	91405	Communicating with the DVDR Mechanism failed
	91406	Unable to enter service mode
Example	DS:> 914 091400: Test OK @	

Nucleus Name	DS_BE_MotorOn	
Nucleus Number	915	
Description	Turn on the turntable motor	
Technical	- Send the TURN_TABLE_MOTOR_ON command	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	91500	Turn table motor is on
	91501	There was a time-out while communicating
	91502	The DVDR Mechanism returned an unexpected result
	91503	The BE returned an error code
	91504	No acknowledge received from BE
	91505	Communicating with the DVDR Mechanism failed
	91506	Unable to enter service mode
Example	DS:> 915 091500: Test OK @	

Nucleus Name	DS_BE_MotorOff	
Nucleus Number	916	
Description	Turn off the turntable motor	
Technical	- Send the TURN_TABLE_MOTOR_OFF command	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	91600	Turn table motor is off
	91601	There was a time-out while communicating
	91602	The DVDR Mechanism returned an unexpected result
	91603	The BE returned an error code
	91604	No acknowledge received from BE
	91605	Communicating with the DVDR Mechanism failed
	91606	Unable to enter service mode
Example	DS:> 916 091600: Test OK @	

Nucleus Name	DS_BE_RadialOn	
Nucleus Number	917	
Description	Close the radial loop	
Technical	<ul style="list-style-type: none"> <li>- Send the TRAY_IN command</li> <li>- Send the READ_TOC command</li> <li>- Send the RADIAL_COMMAND command with parameter 0x00 0x01</li> </ul>	
Execution Time	Approximately 10 ñ 15 seconds	
User Input	A formatted DVD must be loaded into the DVDR Mechanism before executing this nucleus	
Error	Number	Description
	91700	Radial loop is close
	91701	There was a time-out while communicating
	91702	The DVDR Mechanism returned an unexpected result
	91703	The DVDR Mechanism returned an error code
	91704	No acknowledge received from BE
	91705	Unable to send tray in
	91706	Unable to read the disc
	91707	No disc is loaded
	91708	Unknown disc is loaded
	91709	Unable to enter service mode
Example	DS:> 917 091700: Test OK @	

Nucleus Name	DS_BE_RadialOff	
Nucleus Number	918	
Description	Open the radial loop	
Technical	- Send the RADIAL_COMMAND command with parameter 0x00 0x00	
Execution	Time 1 second if radial loop is open otherwise 3 seconds	
User Input	None	
Error	Number	Description
	91800	Radial loop is open
	91801	There was a time-out while communicating
	91802	The DVDR Mechanism returned an unexpected result
	91803	The BE returned an error code
	91804	No acknowledge received from BE
	91805	Communicating with the DVDR Mechanism failed
	91806	Unable to enter service mode
Example	DS:> 918 091800: Test OK @	

Nucleus Name	DS_BE_RadialCalibration	
Nucleus Number	919	
Description	Calibrate the radial loop	
Technical	<ul style="list-style-type: none"> <li>- Send the TRAY_IN command</li> <li>- Send the READ_TOC command</li> <li>- Send the RADIAL_COMMAND command with parameter 0x03 0x05</li> <li>- Send the RADIAL_COMMAND command with parameter 0x03 0x06</li> <li>- Send the RADIAL_COMMAND command with parameter 0x03 0x09</li> </ul>	
Execution Time	Approximately 15 seconds	
User Input	A formatted DVD must be loaded into the DVDR Mechanism before executing this nucleus	
Error	Number	Description
	91900	The command executed successfully
	91901	There was a time-out while communicating
	91902	The DVDR Mechanism returned an unexpected result
	91903	The DVDR Mechanism returned an error code
	91904	No acknowledge received from BE
	91905	Unable to send tray in
	91906	Unable to read the disc
	91907	No disc is loaded
	91908	Unknown disc is loaded
	91909	Unable to enter service mode
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	
Technical	<ul style="list-style-type: none"> <li>- Send the TRAY_IN command</li> <li>- Send the READ_TOC command</li> <li>- Send the TILT_COMMAND command with parameter 0x00 0x00</li> <li>- Send the TILT_COMMAND command with parameter 0x00 0x01</li> <li>- Send the TILT_COMMAND command with parameter 0x00 0x02</li> </ul>	
Execution	Time Approximately 15 seconds	
User Input	None	
Error	Number	Description
	92000	The command executed successfully
	92001	There was a time-out while communicating
	92002	The DVDR Mechanism returned an unexpected result
	92003	The DVDR Mechanism returned an error code
	92004	No acknowledge received from BE
	92005	Unable to send tray in
	92006	Unable to read the disc
	92007	No disc is loaded
	92008	Unknown disc is loaded
	92009	Unable to enter service mode
Example	<pre>DS:&gt; 920 092000: Tilt sensor bathtub: (71,-12,145)(68,-12,135)(62,-10,120)(56,-92,97)(50,-75,86) (44,-59,80)(41,-52,80)(35,-37,86)(29,-22,86) (23,-7,92)(17,8,111)(11,23,135)(8,31,138)(5,39,158) Test OK @</pre>	

Nucleus Name	DS_BE_CheckDisc	
Nucleus Number	921	
Description	Check whether there is a disc inside the BE	
Technical	<ul style="list-style-type: none"> <li>- Send the TRAY_IN command</li> <li>- Send the READ_TOC command</li> <li>- Display the Disc type info</li> </ul>	
Execution	Time Approximately 15 seconds	
User Input	None	
Error	Number	Description
	92100	There was a disc inside the set
	92101	A disc is loaded, disc type info if echoed
	92102	Unable to load the tray
	92103	Error received from BE
Example	<pre>DS:&gt; 921 092100: A DVD+Rewritable is loaded (disc is empty or partially recorded) Test OK @ DS:&gt; 921 092100: No Disc is loaded Test OK @</pre>	

Nucleus Name	DS_BE_SledgeMotor	
Nucleus Number	922	
Description	Send the sledge to its home position, then to the middle of the disc, and then to the end.	
Technical	<ul style="list-style-type: none"> <li>- Send the PCS_COMMAND command with parameter 0x03 0x00</li> <li>- Send the PCS_COMMAND command with parameter 0x02 0x00</li> <li>- Send the PCS_COMMAND command with parameter 0x00 0x01</li> <li>- Send the PCS_JUMP_SLEGE_STEPS command for 3 times</li> <li>- Send the PCS_COMMAND command with parameter 0x00 0x00</li> </ul>	
Execution	Time 4 seconds	
User Input	None	
Error	Number	Description
	92200	The command executed successfully
	92201	There was a time-out while communicating
	92202	The DVDR Mechanism returned an unexpected result
	92203	The BE returned an error code
	92204	No acknowledge received from BE
	92205	Communicating with the DVDR Mechanism failed
	92206	Unable to enter service mode
Example	<pre>DS:&gt; 922 092200: Test OK @</pre>	

#### 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	
Technical	<ul style="list-style-type: none"> <li>- Send an echo command to the DCB via the analog board and wait for the result</li> </ul>	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	100000	Communicating with the DCB succeeded
	100001	The DCB could not be accessed by the analog board.
	100002	There was no response from the analog board.
	100003	The returned errorcode from the analog board is un-known
	100004	Something went wrong with the error code.
Example	<pre>DS:&gt; 1000 100000: Test OK @</pre>	

Nucleus Name	DS_DCB_VersionGet	
Nucleus Number	1001	
Description	Get the version of the DCB	
Technical	- Issue the DCB version get command to the analog board and wait for the result	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	100100	Retrieving the version of the DCB succeeded
	100101	The DCB could not be accessed by the analog board.
	100102	There was no response from the analog board.
	100103	The returned errorcode from the analog board is un-known
	100104	Something went wrong with the error code.
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.	
Technical	<ul style="list-style-type: none"> <li>- First issue a command to clear the display and wait for the result</li> <li>- Then issue the command to light the entire display and wait for confirmation by the user</li> </ul>	
Execution Time	Until user confirmation.	
User Input	None	
Error	Number	Description
	100200	Lighting the entire display succeeded
	100201	The DCB could not be accessed by the analog board.
	100202	There was no response from the analog board.
	100203	The returned errorcode from the analog board is un-known
	100204	The DCB could not be accessed by the analog board.
	100205	There was no response from the analog board.
	100206	The DCB did not light all labels.
	100207	The user skipped the rest of the DCB_Light_Display test.
	100208	The user returned an unknown confirmation:
	100209	The returned errorcode from the analog board is un-known
Example	DS:> 1002 100200: Test OK @	

Nucleus Name	DS_DCB_Keyboard	
Nucleus Number	1004	
Description	Check all keys of the keyboard by confirming the key-code displayed of each key.	
Technical	<ul style="list-style-type: none"> <li>- Initialise the display</li> <li>- Display the key pressed by the user on the display</li> <li>- Monitor the service port for an abort and get the next key pressed</li> <li>- Update the display and repeat previous steps until user stops / confirms</li> </ul>	
Execution Time	Until user confirmation.	
User Input	None	
Error	Number	Description
	100400	All the keys on the keyboard have been pressed
	100401	DCB Keyboard; test failed
	100402	DCB Keyboard; test aborted
	100403	Not all the keys were pressed.
	100404	The DCB could not be accessed by the analog board.
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	
Technical	<ul style="list-style-type: none"> <li>- Initialise the display</li> <li>- Display the key pressed by the user on the display</li> <li>- Monitor the service port for an abort and get the next key pressed</li> <li>- Update the display and repeat previous steps until user stops / confirms</li> </ul>	
Execution Time	Until user confirmation.	
User Input	None	
Error	Number	Description
	100500	Remote Control test succeeded
	100501	DCB Remote control; test failed
	100502	DCB Remote control; test aborted
	100503	The DCB could not be accessed by the analog board.
	100504	DCB Remote control; no user input received
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	
Technical	- Issue the command to light the record LED via the analog board and wait for confirmation by the user	
Execution Time	Until user confirmation.	
User Input	None	
Error	Number	Description
	100600	Switching Led on succeeded
	100601	The DCB could not be accessed by the analog board.
	100602	There was no response from the analog board.
	100603	The DCB did not light the record LED.
	100604	The user skipped the rest of the DCB_Led test.
	100605	The user returned an unknown confirmation:
	100606	The returned errorcode from the analog board is unknown
Example	DS:> 1006 100600: Test OK @	

## Analog Board (ANAB)

Nucleus Name	DS_ANAB_CommunicationEcho	
Nucleus Number	1100	
Description	Check the communication between the digital board and the analog board by issuing some echo string.	
Technical	Send command P_DS_ANACOM_ECHO with the parameter string "Hello Analog board" to the analog board and read back the result	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	110000	Communicating with the analog board succeeded
	110001	The test returned the wrong string
	110002	Communicating with the analog board failed
	110103	The analog board returned an unexpected result
Example	DS:> 1100 110000: Hello Analog Board Test OK @	



Nucleus Name	DS_ANAB_CommunicationIcNvram	
Nucleus Number	1101	
Description	Check the communication between the digital board and the NVRAM on the analog board.	
Technical	Send command P_DS_ANACOM_NVRAM with no parameters to the analog board and read back the result	
Execution Time	Less than 3 seconds	
User Input	None	
Error	Number	Description
	110100	Communicating with the NVRAM on the analog board succeeded
	110101	The analog board could not communicate with the NVRAM
	110102	Communicating with the analog board failed
	110103	The analog board returned an unexpected result
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 analog board	
Technical	Send command P_DS_ANACOM_TUNER with no parameters to the analog board and read back the result	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	110200	Communicating with the tuner on the analog board succeeded
	110201	The analog board could not communicate with the tuner
	110202	There was an error communicating with the analog board
	110203	The analog board returned an unexpected result
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 analog board	
Technical	Send command P_DS_ANACOM_DATA_SLICER with no parameters to the analog board and read back the result	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	110300	Communicating with the data slicer on the analog board succeeded
	110301	The analog board could not communicate with the data slicer
	110302	There was an error communicating with the analog board
	110303	The analog board returned an unexpected result
Example	DS:> 1103 110300: Test OK @	

Nucleus Name	DS_ANAB_CommunicationIcSoundProcessor	
Nucleus Number	1104	
Description	Check the communication between the digital board and the sound processor on the analog board	
Technical	Send command P_DS_ANACOM_SOUND_PROCESSOR with no parameters to the analog board and read back the result	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	110400	Communicating with the sound processor on the analog board succeeded
	110401	The analog board could not communicate with the sound processor
	110402	There was an error communicating with the analog board
	110403	The analog board returned an unexpected result
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 analog board	
Technical	Send command P_DS_ANACOM_AV_SELECTOR with no parameters to the analog board and read back the result	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	110500	Communicating with the A/V selector on the analog board succeeded
	110501	The analog board could not communicate with the A/V selector
	110502	There was an error communicating with the analog board
	110503	The analog board returned an unexpected result
Example	DS:> 1105 110500: Test OK @	

Nucleus Name	DS_ANAB_HardwareVersionGet	
Nucleus Number	1106	
Description	Get the hardware version of the analog board	
Technical	Send command P_DS_ANACOM_HARDWARE_VERSION with no parameters to the analog board and read back the result	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	110600	Reading the hardware version succeeded
	110601	The segment containing the hardware version could not be found
	110602	There was an error communicating with the analog board
	110603	The analog board returned an unexpected result
Example	DS:> 1106 110600: Analog hardware version : 11 Test OK @	

Nucleus Name	DS_ANAB_SoftwareVersionBootGet	
Nucleus Number	1107	
Description	Get the software version of the boot software of the analog board	
Technical	Send command P_DS_ANACOM_SOFTWARE_VERSION with no parameters to the analog board and read back the result	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	110700	Reading the boot-software version succeeded
	110701	The segment containing the boot-software version could not be found
	110702	There was an error communicating with the analog board
	110703	The analog board returned an unexpected result
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 analog board	
Technical	Send command P_DS_ANACOM_SW_VERSION_DOWN with no parameters to the analog board and read back the result	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	110800	Reading the download-software version succeeded
	110801	The segment containing the download-software version could not be found
	110802	There was an error communicating with the analog board
	110803	The analog board returned an unexpected result
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 analog board	
Technical	Send command P_DS_ANACOM_SW_VERSION_APPL with no parameters to the analog board and read back the result	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	110900	Reading the application-software version succeeded
	110901	The segment containing the application-software version could not be found
	110902	There was an error communicating with the analog board
	110903	The analog board returned an unexpected result
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 analog board	
Technical	Send command P_DS_ANACOM_SW_VERSION_DIAG with no parameters to the analog board and read back the result	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	111000	Reading the diagnostics-software version succeeded
	111001	The segment containing the diagnostics-software version could not be found
	111002	There was an error communicating with the analog board
	111003	The analog board returned an unexpected result
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	
Technical	Send command P_DS_ANACOM_FLASH_CHECKSUM with no parameters to the analog board and read back the result	
Execution Time	Less than 5 seconds	
User Input	None	
Error	Number	Description
	111100	Checksum calculation succeeded
	111101	The FLASH was not accessible
	111102	The checksum stored in FLASH is not correct
	111103	There was an error communicating with the analog board
	111104	The analog board returned an unexpected result
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 analog board	
Technical	Send command P_DS_ANACOM_ROUTE_VIDEO with parameters to the analog board and read back the result	
Execution Time	Less than 1 second	
User Input	The user has to input the correct parameter for the routing (see table 'video routing' below).	
Error	Number	Description
	111200	Routing the video on the analog board succeeded
	111201	Routing the video on the analog board failed
	111202	The user provided wrong input
	111203	There was an error communicating with the analog board
	111204	The analog board returned an unexpected result
Example	DS:> 1112 00 111200: Test OK @	

Nucleus Name	DS_ANAB_AudioRouting	
Nucleus Number	1113	
Description	Perform the routing of the audio paths on the analog board	
Technical	Send command P_DS_ANACOM_ROUTE_AUDIO with parameters to the analog board and read back the result	
Execution Time	Less than 1 second	
User Input	The user has to input the correct parameter for the routing (see table 'audio routing' below)	
Error	Number	Description
	111300	Routing the audio on the analog board succeeded
	111301	Routing the audio on the analog board failed
	111302	The user provided wrong input
	111303	There was an error communicating with the analog board
	111304	The analog board returned an unexpected result
Example	DS:> 1113 00 111300: Test OK @	

Nucleus Name	DS_ANAB_SelectTunerChannel	
Nucleus Number	1114	
Description	Set the tuner to receive a valid audio and video signal	
Technical	Send command P_DS_ANACOM_TUNER_FREQ_SELECT with parameters to the analog board and read back the result	
Execution Time	Less than 1 second	
User Input	<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	
	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
Error	Number	Description
	111400	Setting the tuner channel succeeded
	111401	Setting the tuner channel failed
	111402	The user provided wrong input
	111403	There was an error communicating with the analog board
	111404	The analog board returned an unexpected result
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 analog board	
Technical	Send command P_DS_ANACOM_I2C_WRR with parameters to the analog board and read back the result	
Execution Time	Less than 1 second	
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).	
Error	Number	Description
	111500	Reading and writing IIC on the analog board succeeded
	111501	The user provided wrong input
	111502	Reading and writing IIC on the analog board failed
	111503	There was an error communicating with the analog board
	111504	The analog board returned an unexpected result
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	
Technical	Send command P_DS_ANACOM_CLOCK_ADJUST with parameters to the analog board and read back the result	
Execution Time	Less than 1 second	
User Input	<YYYY> <MM> <DD> <HH> <MM> <SS>	
Error	Number	Description
	111600	Adjusting the clock succeeded
	111601	Adjusting the clock failed
	111602	The user provided wrong input
	111603	There was an error communicating with the analog board
	111604	The analog board returned an unexpected result
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	
Technical	Send command P_DS_ANACOM_CLOCK_REFERENCE with no parameters to the analog board and read back the result	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	111700	Generating the signal on the designated pin succeeded
	111701	Generating the signal on the designated pin failed
	111702	There was an error communicating with the analog board
	111703	The analog board returned an unexpected result
Example	DS:> 1117 111700: Test OK @	

Nucleus Name	DS_ANAB_ClockCorrection	
Nucleus Number	1118	
Description	Store the clock IC correction value in NVRAM	
Technical	Send command P_DS_ANACOM_CLOCK_CORRECTION with parameters to the analog board and read back the result	
Execution Time	Less than 1 second	
User Input	The correction value for the clock	
Error	Number	Description
	111800	Storing the correction value for the clock in NVRAM succeeded
	111801	Storing the correction value for the clock in NVRAM failed
	111802	Value out of range: default value stored
	111803	The user provided wrong input
	111804	There was an error communicating with the analog board
	111805	The analog board returned an unexpected result
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	
Technical	Send command P_DS_ANACOM_AFC_REFERENCE_TUNER with no parameters to the analog board and read back the result	
Execution Time	Less than 1 second	
User Input	The reference voltage, between 0 and 255	
Error	Number	Description
	111900	Storing the reference voltage for the tuner in NVRAM succeeded
	111901	Storing the reference voltage for the tuner in NVRAM failed
	111902	The user provided wrong input
	111903	There was an error communicating with the analog board
	111904	The analog board returned an unexpected result
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.	
Technical	Send command P_DS_ANACOM_FREQ_DOWNLOAD with parameters to the analog board and read back the result	
Execution Time	Less than 3 seconds	
User Input	See frequency table	
Error	Number	Description
	112000	Downloading the frequency table in NVRAM succeeded
	112001	Downloading the frequency table in NVRAM failed
	112002	The user provided wrong input
	112003	There was an error communicating with the analog board
	112004	The analog board returned an unexpected result
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	
Technical	Send command P_DS_ANACOM_STORE_EXT_PRESETS with no parameters to the analog board and read back the result	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	112100	Storing the external presets in NVRAM succeeded
	112101	Storing the external presets in NVRAM failed
	112102	There was an error communicating with the analog board
	112103	The analog board returned an unexpected result
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	
Technical	Send command P_DS_ANACOM_BARGRAPH_LEVEL_ADJUSTMENT with no parameters to the analog board and read back the result	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	112200	Storing the bargraph adjustment values in NVRAM succeeded
	112201	Storing the bargraph adjustment values in NVRAM failed
	112202	There was an error communicating with the analog board
	112203	The analog board returned an unexpected result
Example	DS:> 1122 112200: 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 Analog 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.

## 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.

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
IIJJKLLMM	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, 'O'
<p>The message string of (DS_MessageDef *msgString) should be in the format: "X(XXX)_VVWW_ZZ_HH_IIJJKLLMM". 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.</p>		

System (SYS)

Nucleus Name	DS_SYS_HardwareVersionGet	
Nucleus Number	1200	
Description	Get the hardware version and type of the digital board	
Technical	<ul style="list-style-type: none"> <li>- Initialize the PIO pins of the chrysalis</li> <li>- Read out the hardware version through the PIO pins</li> <li>- Read the segment header in FLASH and determine hardware version</li> </ul>	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	120000	Getting the hardware version and type of the digital board succeeded
	120001	Getting the hardware version and type of the digital board failed
Example	120002	Wrong hardware version read from FLASH
	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	
Technical	- Read the segment header in FLASH and determine Boot software version	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	120100	Getting the Boot software version succeeded
	120101	Getting the Boot software version failed
Example	DS:> 1201 120100: Software Boot Version = 0001 Test OK @	

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

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

Nucleus Name	DS_SYS_SoftwareVersionDiagnosticsGet	
Nucleus Number	1204	
Description	Get the version of the diagnostics software on the digital board	
Technical	- Read the segment header in FLASH and determine Diagnostics software version	
Execution Time	Less than 1 second	
User Input	None	
Error	Number	Description
	120400	Getting the Diagnostics software version succeeded
	120401	Getting the Diagnostics software version failed
Example	DS:> 1204 120400: Software Diagnostics Version = 0001 Test OK @	
	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 analog board or the digital board to the service PC, by using the X-modem protocol	
Technical	<ul style="list-style-type: none"> <li>- Decode the user input</li> <li>- Determine whether to upload the analog board or digital board NVRAM</li> <li>- Start uploading using the XMODEM protocol</li> <li>- Determine whether all was uploaded OK</li> </ul>	
Execution Time	Depends on the chosen NVRAM and the User.	
User Input	<p>Choose one of the following parameters for the nucleus:</p> <ol style="list-style-type: none"> <li>1. Upload the contents of the NVRAM of the digital board</li> <li>2. Upload the contents of the NVRAM of the analog board</li> </ol> <p>Choose in the terminal on the control PC -&gt; transfer -&gt; 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.</p>	
Error	Number	Description
	120500	Download succeeded.
	120501	User input is not valid.
	120502	Something went wrong while copying the data from NVRAM to SDRAM .

Nucleus Name	DS_SYS_EepromDownload	
Nucleus Number	1206	
Description	Download a file with the contents of the NVRAM for the analog board or the digital board from the service PC to the recorder, by using the X-modem protocol	
Technical	<ul style="list-style-type: none"> <li>- Decode the user input and determine what eeprom to fill: digital / analog</li> <li>- Store the downloaded (using XMODEM) bytes in SDRAM first</li> <li>- Then copy these contents into the eeprom after verification</li> </ul>	
Execution Time	Depends on the chosen NVRAM and the User.	
User Input	<p>Choose one of the following parameters for the nucleus:</p> <ol style="list-style-type: none"> <li>1. Download the contents of the NVRAM of the digital board</li> <li>2. Download the contents of the NVRAM of the analog board</li> </ol> <p>Choose in the terminal of the control PC -&gt; transfer -&gt; send file.  Select X-modem protocol. Then choose a file with the Browse button in the dialogue and click on send.</p>	
Error	Number	Description
	120600	Download succeeded
	120601	The write to NVRAM failed.
	120602	Timeout. Too many retries.
	120603	A file was sent with a wrong header.
	120604	User cancelled the download.
	120605	User input is not valid.
120606	Unknown Error	
Example	<pre>DS:&gt; 1206 1 120600: Test OK @</pre>	

Nucleus Name	DS_SYS_DvIdNumberGet	
Nucleus Number	1208	
Description	Get the IEEE1394 ID	
Technical	<ul style="list-style-type: none"> <li>- Read out the ID from the configuration segment and return this info to the user</li> </ul>	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	120800	Getting the unique DV ID succeeded
	120801	Getting the unique DV ID failed
Example	<pre>DS:&gt; 1208 120800: The DvIdNumber is: 0x0C22384E5A Test OK @</pre>	

Nucleus Name	DS_SYS_licWrite	
Nucleus Number	1209	
Description	Perform an IIC write action on the digital board	
Technical	<ul style="list-style-type: none"> <li>- Determine bus ID, slave address, number of bytes to be written and the byte array of data from the user input</li> <li>- Initialize IIC</li> <li>- Write the data to the slave specified through IIC</li> </ul>	
Execution Time	Less than 1 second	
User Input	<p>The user input the number of bytes to write followed by these bytes:          &lt;BusID&gt;&lt;Slave address to write to&gt;&lt;number of bytes to write&gt;&lt;d1&gt;&lt;d2&gt;&lt;...&gt;&lt;dx&gt;</p> <p>Where the bus ID is either 0 (normally used) or 1</p>	
Error	Number	Description
	120900	Writing the data over IIC succeeded
	120901	The IIC bus was not accessible
	120902	There was a timeout writing to the device
	120903	The IIC acknowledge was not received
	120904	The communication with the device failed
	120905	Got unknown IIC bus error:
	120906	Unable to initialize IIC bus
	120907	Decoding bus ID unsigned value failed
	120908	Decoding slaveAddr unsigned value failed
	120909	Decoding nrBytes unsigned value failed
	120910	Bus ID out of range
	120911	nrBytes out of range
	120912	Unable to decode parameters
Example	<p>DS:&gt; 1209 0 0xa0 1 0x6          120900: 1 Bytes written          Test OK @</p>	



Nucleus Name	DS_SYS_licRead	
Nucleus Number	1210	
Description	Perform an IIC read action on the digital board	
Technical	<ul style="list-style-type: none"> <li>- Determine the bus ID, slave address and number of bytes to read from the user input</li> <li>- Initialize IIC</li> <li>- Read the data form the slave specified</li> </ul>	
Execution Time	Less than 1 second	
User Input	<p>The user inputs the number of bytes to read and the address to read them from:          &lt;BusID&gt;&lt;Slave address to read from&gt;&lt;Number of bytes to read&gt;          Where the bus ID is either 0 (normally used) or 1</p>	
Error	Number	Description
	121000	Reading the data over IIC succeeded
	121001	The IIC bus was not accessible
	121002	There was a timeout writing to the device
	121003	The IIC acknowledge was not received
	121004	The communication with the device failed
	121005	There was an unknown IIC bus error
	121006	IIC bus initialization failed
	121007	Decoding bus ID unsigned value failed
	121008	Decoding slave address unsigned value failed
	121009	Decoding number of bytes unsigned value failed
	121010	Bus ID out of range
	121011	nrBytes out of range
Example	DS:> 1210 0 0xa0 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	
Technical	<ul style="list-style-type: none"> <li>- Decode the user input for the proper port to use</li> <li>- Write out the bytes through the indicated port</li> </ul>	
Execution Time	Less than 1 second.	
User Input	<p>The user inputs the UART to write to, the number of bytes and the bytes to be written to the UART.</p> <p>1=UART port 1 : not used          2=UART port 2 : Bit DVDR Mechanism          3=UART port 3 : Analog board          &lt;UartNr&gt;&lt;Number of bytes to write&gt;&lt;d1&gt;&lt;d2&gt;&lt;...&gt;&lt;dx&gt;</p>	
Error	Number	Description
	121100	Writing the bytes to the UART succeeded
	121101	The user provided wrong input
	121102	Writing to the UART failed
Example	DS:>1211 2 2 0xd1 0x01 121100: Test OK @	

Nucleus Name	DS_SYS_UartRead	
Nucleus Number	1212	
Description	Perform an UART read action on the digital board on a specified UART	
Technical	<ul style="list-style-type: none"> <li>- Decode the user input for the port to read from</li> <li>- Read from the port and return data read to the user</li> </ul>	
Execution Time	Less than 1 second.	
User Input	The user inputs the UART to read from. 1=UART port 1 : not used 2=UART port 2 : Bit DVDR Mechanism 3=UART port 3 : Analog board <UartNr >	
Error	Number	Description
	121200	Reading the data from the UART succeeded
	121201	The user provided wrong input
	121202	Reading the data from the UART failed
Example	DS:> 1212 2 121200: The 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.	
Technical	<ul style="list-style-type: none"> <li>- Decode the videosignal: PAL / NTSC and Y/C, RGB, CVBS, YUV</li> <li>- Initialize the Video Input Processor and check for valid signal</li> <li>- Initialize the Video Front End and start capturing frames to memory</li> <li>- Initialize the SYNC module</li> <li>- Initialize the Video Post Processing and retrieve frames from memory</li> <li>- Initialize the mixer</li> <li>- Initialize the DENC module</li> <li>- Route the signal to all outputs</li> </ul>	
Execution Time	Less than 1 second, but stays running.	
User Input	<vipInput> <VideoOutput> <VideoStandard> 1. vipInput (CVBS, YC, YUV, RGB). 2. VideoOutput (YUV, RGB). 3. VideoStandard (PAL, NTSC).	
Error	Number	Description
	121300	Video LoopthroughStart succeeded
	121301	User input is not valid.
	121302	Initialization of the VIP failed.
	121303	Video Signal on the input is not a valid signal.
	121304	Initialization of the VFE failed.
Example	DS:> 1213 CVBS RGB PAL 121300: Test OK @	

DRX-2

Nucleus Name	DS_SYS_VideoLoopThroughStop	
Nucleus Number	1214	
Description	Stop routing the video input to all the outputs.	
Technical	- Stop the DENC and the Video Front End	
Execution Time	Less than 1 second.	
User Input	-	
Error	Number	Description
	121400	VideoLoopthroughStop succeeded
	121401	DENC module on Chrysalis failed.
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 ).	
Technical	<ul style="list-style-type: none"> <li>- Evaluate user input.</li> <li>- Reset the global variables, video memory.</li> <li>- Fill the video memory with a vertical colourbar.</li> <li>- Initialize the Chrysalis SYNC-module.</li> <li>- Initialize the Chrysalis MIXER-module.</li> <li>- Initialize the Chrysalis VPP-module.</li> <li>- Initialize the Chrysalis DENC-module.</li> <li>- Display the original image.</li> <li>- Initialize the VIP.</li> <li>- Initialize the Chrysalis VFE-module.</li> <li>- Try to detect a sync in the VIP input.</li> <li>- Catch the received image in memory.</li> <li>- Display the received image.</li> <li>- Compare the received image with original image.</li> <li>- Create a conclusion.</li> </ul>	
Execution Time	3 seconds.	
User Input	<p>Video input of the digital board:</p> <ul style="list-style-type: none"> <li>- CVBS</li> <li>- YC</li> <li>- YUV</li> <li>- RGB</li> <li>- TEST (The video output will be routed to the video input on the digital board.)</li> </ul> <p>Video standard:</p> <ul style="list-style-type: none"> <li>- PAL</li> <li>- NTSC</li> </ul> <p>When no input is given, the nucleus will take TEST for video input and PAL for video standard.</p>	

Error	Number	Description
	121500	Videoloop test succeeded.
	121501	Wrong user input.
	121502	The Chrysalis SYNC-module cannot be initialized.
	121503	The Chrysalis MIXER-module cannot be initialized.
	121504	The Chrysalis VideoPostProcessor-module cannot be initialized.
	121505	The Chrysalis DENC-module cannot be initialized.
	121506	The VideoInputProcessor cannot be initialized.
	121507	The VideoInputProcessor cannot detect a sync-signal.
	121508	The Chrysalis VideoFrontEnd-module cannot be initialized.
	121509	The Chrysalis VideoFrontEnd-module cannot capture a video field.
	121510	When selected the RGB video input: Error in color red signal and/or Error in color green signal and/or Error in color blue signal. When selected one of the other video inputs: Error in luminance signal (Y) and/or Error in chrominance signal (U) and/or Error in chrominance signal (V).
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_SlashVersionSet	
Nucleus Number	1217	
Description	Set the slash version of the system	
Technical	<ul style="list-style-type: none"> <li>- Decode the user input for the slash version to set</li> <li>- Issue the command to set the slash version to the analog board</li> <li>- Wait for the result and return this to the user</li> </ul>	
Execution Time	Less than 1 second.	
User Input	The slash version	
Error	Number	Description
	121700	Setting the slash version succeeded
	121701	Invalid slash version, no slash version is set.
	121702	Setting the slash version on the Analog Board fails.
	121703	Invalid input.
	121704	The returned errorcode from the analog board is unknown:
	121705	No DS errCode known for analog board error:
	121706	There was no response from the analog board.
Example	DS:> 1217 82 121700: Test OK @	

Nucleus Name	DS_SYS_SlashVersionGet	
Nucleus Number	1218	
Description	Get the slash version of the system	
Technical	<ul style="list-style-type: none"> <li>- Issue the command to get the slash version to the analog board</li> <li>- Return the received information to the user</li> </ul>	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	121800	Getting the slash version succeeded
	121801	Getting the slash version failed
	121802	The IIC write failed
	121803	The IIC read failed
	121804	There was no response from the analog board.
	121805	No DS errCode known for analog board error:
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 analog board is cleared	
Technical	<ul style="list-style-type: none"> <li>- Issue the command to return to the factory defaults to the analog board</li> <li>- Wait for the result and return this to the user</li> </ul>	
Execution Time	1 second.	
User Input	None	
Error	Number	Description
	121900	Virginization succeeded
	121901	Virginization on the Analog Board failed.
	121902	The returned errorcode from the analog board is unknown:
	121903	No DS errCode known for analog board error:
	121904	There was no response from the analog board.
Example	DS:> 1219 121900: Test OK @	

Nucleus Name	DS_SYS_VirginModeOn	
Nucleus Number	1220	
Description	Turn on the virgin mode functionality (e.g. the auto channel search upon start-up)	
Technical	<ul style="list-style-type: none"> <li>- Issue the command to set the bit for the virgin mode to the analog board</li> <li>- Wait for the result and return this to the user</li> </ul>	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	122000	Turning on the virgin mode succeeded
	122001	Turning on VirginMode on the Analog Board failed.
	122002	The returned errorcode from the analog board is unknown:
	122003	No DS errCode known for analog board error:
	122004	There was no response from the analog board.
Example	DS:> 1220 122000: Test OK @	

Nucleus Name	DS_SYS_VirginModeOff	
Nucleus Number	1221	
Description	Turn off the virgin mode functionality (e.g. the auto channel search upon start-up)	
Technical	<ul style="list-style-type: none"> <li>- Issue the command to reset the bit for the virgin mode to the analog board</li> <li>- Wait for the result and return this to the user</li> </ul>	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	122100	Turning off the virgin mode succeeded
	122101	Turning off VirginMode on the Analog Board failed.
	122102	The returned errorcode from the analog board is unknown:
	122103	No DS errCode known for analog board error:
	122104	There was no response from the analog board.
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	
Technical	<ul style="list-style-type: none"> <li>- Issue the command to use the display-fatal functionality to the analog board</li> <li>- Wait for the result and return this to the user</li> </ul>	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	122300	Turning on the display-fatal functionality succeeded
	122301	Turning on the display-fatal functionality failed
	122302	The returned errorcode from the analog board is unknown:
	122303	No DS errCode known for analog board error:
	122304	There was no response from the analog board.
Example	DS:> 1223 122300: Test OK @	

Nucleus Name	DS_SYS_DisplayFatalOff	
Nucleus Number	1224	
Description	Turn off the display-fatal functionality which displays debug-information on the display when encountering a fatal error condition from which could not be recovered automatically	
Technical	Issue the command to stop using the display-fatal functionality to the analog board Wait for the result and return this to the user	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	122400	Turning off the display-fatal functionality succeeded
	122401	Turning off the display-fatal functionality failed
	122402	The returned errorcode from the analog board is unknown:
	122403	No DS errCode known for analog board error:
	122404	There was no response from the analog board.
Example	DS:> 1224 122400: Test OK @	

Nucleus Name	DS_SYS_DisplayFatalGet	
Nucleus Number	1225	
Description	Get the display-fatal flag of the recorder	
Technical	<ul style="list-style-type: none"> <li>- Issue the command to get the status of the display-fatal functionality to the analog board</li> <li>- Wait for the result and return this to the user</li> </ul>	
Execution Time	Less than 1 second.	
User Input	None	
Error	Number	Description
	122500	Getting the display-fatal flag succeeded
	122501	Getting the display-fatal flag failed
	122502	The returned errorcode from the analog board is unknown:
	122503	No DS errCode known for analog board error:
	122504	There was no response from the analog board.
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.	
Technical	<ul style="list-style-type: none"> <li>- Evaluate user input.</li> <li>- Setup IIC-bus.</li> <li>- Writedata to boot EEPROM.</li> <li>- Update checksum.</li> </ul>	
Execution Time	1 second	
User Input	A large hexadecimal value that represents the digital board settings obtained from the DbString.exe program or from a reference set.	
Error	Number	Description
	122600	The settings were successfully programmed.
	122601	User input is invalid.
	122602	IIC access failed.
Example	DS:> 1226 6469616774737462010102000101010101000020080000 122600: Test OK @	

Nucleus Name	DS_SYS_SettingsDisplay	
Nucleus Number	1228	
Description	Show the settings that are programmed in the BROM on the digital board.	
Technical	<ul style="list-style-type: none"> <li>- Set-up IIC-bus.</li> <li>- Read Digital Board Settings from boot EEPROM.</li> <li>- Display the settings.</li> </ul>	
Execution	Time 1 second	
User Input	None.	
Error	Number	Description
	122800	The settings were successfully displayed.
	122801	IIC access failed.
	122802	Invalid settings
Example	<pre> DS:&gt; 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 DVDR Mechanism 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 DVDR Mechanism:         AV 2.0 122800: Test OK @                     </pre>	

Nucleus Name	DS_SYS_SettingsGet	
Nucleus Number	1229	
Description	Get the digital board diversity settings string that is programmed in the BROM on the digital board.	
Technical	<ul style="list-style-type: none"> <li>- Setup IIC-bus.</li> <li>- Read Digital Board Settings from boot EEPROM.</li> <li>- Read System Settings from boot EEPROM.</li> <li>- Display the settings.</li> </ul>	
Execution Time	1 second	
User Input	None.	
Error	Number	Description
	122900	The settings were successfully displayed.
	122901	IIC access failed.
	122902	The settings are invalid
Example	<pre> DS:&gt; 1229 122900: 6D7920626F61726400020300010101020101000020080000 Test OK @                     </pre>	



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.	
Technical	<ul style="list-style-type: none"> <li>- Encode the audio to AC3 in memory</li> <li>- Decode the AC3 in memory to audio on the outputs</li> </ul>	
Execution Time	1second buffer time and 30 seconds playing.	
User Input	None.	
Error	Number	Description
	123000	AudioLoopthroughStart succeeded
	123001	Resetting the audio decoder failed
	123002	Resetting the audio encoder failed
	123003	Encoding the audio failed
	123004	Decoding the audio failed
Example	DS:> 1230 123000: Test OK @	

Nucleus Name	DS_SYS_AudioLoopThroughStop	
Nucleus Number	1231	
Description	Stop routing the audio input to all the outputs	
Technical	<ul style="list-style-type: none"> <li>- Send the 'Mute' command to the audio decoder</li> </ul>	
Execution Time	Less than 1 second.	
User Input	-	
Error	Number	Description
	123100	AudioLoopthroughStop succeeded
	123101	Resetting the audio decoder failed
	123102	Resetting the audio encoder failed
Example	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.	
Technical	<ul style="list-style-type: none"> <li>- Issue the command to get the version of the EPG board to the analog board</li> <li>- Return the received information to the user</li> </ul>	
Execution Time	3 seconds.	
User Input	None	
Error	Number	Description
	130000	Getting the version succeeded
	130001	Communication with the analog board failed.
	130002	Communication with the epg board failed.
	130003	There was no response from the analog board.
	130004	No DS errCode known for analog board error.
Example	DS:> 1300 130000: Version : 6.1.9 Test OK @	

## Script

Nucleus Name	DS_IH_ScriptHandler
Nucleus Number	Script
Description	
Technical	Execute the included nuclei one by one If a nucleus fails quit and display the failed nucleus on the local display and service port
Execution Time	16 seconds
Included tests:	<ol style="list-style-type: none"> <li>1. DS_ANAB_COMMUNICATIONECHO_NUC</li> <li>2. DS_DCB_COMMUNICATIONECHO_NUC</li> <li>3. DS_BROM_COMMUNICATION_NUC</li> <li>4. DS_SYS_SETTINGSDISPLAY_NUC</li> <li>5. DS_CHR_DEVTYPEGET_NUC</li> <li>6. DS_CHR_INT_PIC_NUC</li> <li>7. DS_CHR_DMA_NUC</li> <li>8. DS_BROM_WRITEREAD_NUC</li> <li>9. DS_NVRAM_COMMUNICATION_NUC</li> <li>10. DS_NVRAM_WRITEREAD_NUC</li> <li>11. DS_SDRAM_WRITEREADFAST_NUC</li> <li>12. DS_FLASH_WRITEREAD_NUC</li> <li>13. DS_FLASH_CHECKSUMPROGRAM_NUC</li> <li>14. DS_SYS_HARDWAREVERSIONGET_NUC</li> <li>15. DS_VIP_DEVTYPEGET_NUC</li> <li>16. DS_VIP_COMMUNICATION_NUC</li> <li>17. DS_DVIO_LINKDEVTYPEGET_NUC</li> <li>18. DS_DVIO_PHYDEVTYPEGET_NUC</li> <li>19. DS_DVIO_LINKCOMMUNICATION_NUC</li> <li>20. DS_DVIO_PHYCOMMUNICATION_NUC</li> <li>21. DS_PSCAN_COMMUNICATIONDENC_NUC</li> <li>22. DS_PSCAN_COMMUNICATIONDEINTERLACER_NUC</li> <li>23. DS_BE_COMMUNICATIONECHO_NUC</li> <li>24. DS_ANAB_COMMUNICATIONIICNVRAM_NUC</li> <li>25. DS_ANAB_COMMUNICATIONIICTUNER_NUC</li> <li>26. DS_ANAB_COMMUNICATIONIICSOUNDPROCESSOR_NUC</li> <li>27. DS_ANAB_COMMUNICATIONIICAVSELECTOR_NUC</li> <li>28. DS_ANAB_CHECKSUMPROGRAM_NUC</li> </ol>
User Input	None
Example	<pre>DS:&gt; script Executing User/Dealer script. Busy executing NUC1100 1-28 Hello Analog 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</pre>

Example	<p> 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 DVDR Mechanism 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 DVDR Mechanism: 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  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 </p>
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Example	<p>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:&gt;</p>
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### 3. Nuclei Error Codes

In the following table the error codes will be described.

Error	Nr Error String
10000	"Checksum is OK"
10001	"segment name Checksum doesn't match" or "segment name segment not found"
10100	""
10101	"FLASH 1 Write access test failed"
10200	""
10201	"FLASH 2 Write access test failed"
10300	""
10301	"FLASH write test failed"
10302	"FLASH write command failed"
10303	"FLASH write test done max. number of times"
10400	""
10401	"HostDec SDRAM Memory data bus test goes wrong."
10402	" HostDec SDRAM Memory address bus test goes wrong."
10403	" HostDec SDRAM Physical memory device test goes wrong."
10500	""
10501	" HostDec SDRAM Memory data bus test goes wrong."
10502	" HostDec SDRAM Memory address bus test goes wrong."
10503	" HostDec SDRAM Physical memory device test goes wrong."
10600	""
10601	"HostDec DRAM Memory data bus test goes wrong."
10602	"HostDec DRAM Memory address bus test goes wrong."
10603	"HostDec DRAM Physical memory device test goes wrong."
10700	""
10701	"HostDec DRAM Memory data bus test goes wrong."
10702	"HostDec DRAM Memory address bus test goes wrong."
10703	"HostDec DRAM Physical memory device test goes wrong."
10800	"Host Decoder version(cut) number: version number""Digital hardware version"
10801	"Can not find version in FLASH."
10900	""
10901	"Error muting audio"
11000	""
11001	"Error demuting audio"
11500	""
11501	"Init of I2C failed"
11502	"The selection of the clock source failed"
11504	"The demute of the audio failed"

Error	Nr Error String
11600	""
11601	"Init of I2C failed"
11602	"The mute of the audio failed"
11700	""
11701	"Init of I2C failed"
11702	"The muting of the audio failed"
11703	"The demute of the audio failed"
11704	"The selection of the clock source failed"
11707	"Setup of Front panel failed"
11708	"Sine on Front panel keyboard failed"
11800	""
11801	"Init of I2C failed"
11802	"The muting of the audio failed"
11803	"The demute of the audio failed"
11804	"The selection of the clock source failed"
11805	"Error cannot start VSM audio in port"
11900	""
11901	"Init of I2C failed"
11902	"The muting of the audio failed"
11903	"The demute of the audio failed"
11904	"The selection of the clock source failed"
11905	"Error cannot start VSM audio in port"
12000	""
12001	"Invalid input"
12100	""
12200	""
12201	"I2C bus busy before start"
12202	"NVRAM access time-out"
12203	"No NVRAM acknowledge"
12204	"NVRAM time-out"
12205	"NVRAM Write/Read back failed"
12300	""
12301	"I2C bus busy before start"
12302	"NVRAM read access time-out"
12303	"No NVRAM read acknowledge"
12304	"NVRAM read failed"
13000	"Bootcode application version : bootversion"
13001	"Can not find version in FLASH."
13100	"Recorder application version : recorderversion"
13101	"Can not find version in FLASH."
13200	"Diagnostics application version : diagversion"
13201	"Can not find version in FLASH."
13300	"Download application version : downloadversion"
13301	"Can not find version in FLASH."
13700	""
13701	"Turning off MacroVision failed"
20000	""
20001	"I2C bus busy before start"

Error	Nr Error String
20002	"Video Encoder access time-out"
20003	"No acknowledge from Video Encoder"
20004	"No data send/received to or from Video Encoder"
20005	"SAA7118 VIP can not be initialized"
20200	""
20201	"I2C bus busy before start"
20202	"SAA7118 VIP access time-out"
20203	"No acknowledge from SAA7118 VIP"
20204	"No data received from SAA7118 VIP"
20300	""
20301	"Error audio encoder SRAM access cannot initialize I2C"
20302	"Error audio encoder SRAM access cannot reset DSP through I2C"
20303	"Error audio encoder SRAM access cannot download boot"
20304	"Error audio encoder cannot download test code"
20305	"Error audio encoder cannot obtain result of test"
20306	"Error audio encoder SRAM access stuck-at-zero data line "
20307	"Error audio encoder SRAM access stuck-at-one data line "
20308	"Error audio encoder SRAM access stuck-at-one address line "
20309	"Error audio encoder SRAM access address line address line x is connected to data line data line y"
20310	"Error audio encoder SRAM access address lines address line x and address line y are connected "
20311	"Error audio encoder SRAM access data lines data line x and data line y are connected "
20312	"Error audio encoder SRAM access illegal data received"
20400	""
20401	"Error audio encoder access cannot initialize I2C"
20402	"Error audio encoder access cannot reset DSP through I2C"
20403	"Error audio encoder accessing ICR register"
20404	"Error audio encoder access stuck-at-zero of data line "
20405	"Error audio encoder access stuck-at-one of data line "
20406	"Audio encoder access data lines data line x and data line y are interconnected "
20500	""
20501	"Error audio encoder SRAM WRR cannot initialize I2C"
20502	"Error audio encoder SRAM WRR cannot reset DSP through I2C"

Error	Nr Error String
20503	"Error audio encoder WRR cannot download boot"
20504	"Error audio encoder cannot download test code"
20505	"Error audio encoder SRAM WRR cannot obtain result of test"
20506	"Error audio encoder WRR SRAM stuck-at-zero data bit "
20507	"Error audio encoder WRR SRAM stuck-at-one data bit "
20508	"Error audio encoder WRR SRAM data lines data line x and data line y are connected"
20509	"Error audio encoder WRR SRAM illegal data received"
20600	""
20601	"Error audio encoder interrupt cannot initialize I2C"
20602	"Error audio encoder interrupt cannot reset DSP through I2C"
20603	"Error audio encoder cannot download test code"
20604	"Error occurred accessing VSM"
20605	"Audio encoder interrupt not received"
20606	"Error occurred while activating the encoder"
20607	"Error audio encoder interrupt cannot initialize empres"
20608	"Error occurred while getting interrupt reason"
20700	""
20701	"Error audio encoder I2C cannot reset DSP through I2C"
20702	"Error audio encoder cannot download boot"
20703	"Error audio encoder cannot download TEST code"
20704	"Error audio encoder I2C bus busy"
20705	"Error audio encoder I2C cannot write slave address"
20706	"Error audio encoder I2C no acknowledge received"
20707	"Error audio encoder I2C cannot send/receive data"
20708	"Error audio encoder received data through I2C was invalid"
20800	""
20801	"I2C access failed."
20802	"SAA7118 VIP can not be initialized."
20803	"Invalid input"
20900	"B1.B2. B3.B4. B5.B6. B7.B8. B9.B10. B11.B12."
20901	"Firmware download of EMPRESS failed"
20902	"I2C bus busy before start"
20903	"EMPRESS access time-out"
20904	"No acknowledge from the EMPRESS"
20905	"No data send to the EMPRESS"
20906	"No data received from the EMPRESS"

Error	Nr Error String
30000	""
30001	"VSM SDRAM Bank1 Memory databus test goes wrong."
30002	"VSM SDRAM Bank1 Memory addressbus test goes wrong."
30003	"VSM SDRAM Bank1 Physical memory device test goes wrong."
30004	" VSM SDRAM Bank2 Memory databus test goes wrong."
30005	" VSM SDRAM Bank2 Memory addressbus test goes wrong."
30006	" VSM SDRAM Bank2 Physical memory device test goes wrong."
30007	"VSM SDRAM Bank1 VSM interrupt register A has a -stuck at- error for value:"
30008	"VSM SDRAM Bank2 VSM interrupt register A has a -stuck at- error for value:"
30100	""
30101	"VSM SDRAM Bank1 Memory databus test goes wrong."
30102	"VSM SDRAM Bank1 Memory addressbus test goes wrong."
30103	"VSM SDRAM Bank1 Physical memory device test goes wrong."
30104	" VSM SDRAM Bank2 Memory databus test goes wrong."
30105	" VSM SDRAM Bank2 Memory addressbus test goes wrong."
30106	" VSM SDRAM Bank2 Physical memory device test goes wrong."
30200	""
30201	"VSM SDRAM Bank1 Memory databus test goes wrong."
30202	"VSM SDRAM Bank1 Memory addressbus test goes wrong."
30203	"VSM SDRAM Bank1 Physical memory device test goes wrong."
30204	" VSM SDRAM Bank2 Memory databus test goes wrong."
30205	" VSM SDRAM Bank2 Memory addressbus test goes wrong."
30206	" VSM SDRAM Bank2 Physical memory device test goes wrong."
30300	""
30301	"VSM interrupt register A has a -stuck at- error for value:"
30302	"VSM interrupt register B has a -stuck at- error for value:"
30303	"Interrupt A wasn't raised."
30304	"Interrupt B wasn't raised."
30305	"Interrupts A and B were raised."
30400	""
30401	"VSM SDRAM Bank1 Memory databus test goes wrong."

Error	Nr Error String
30402	"VSM SDRAM Bank1 Memory addressbus test goes wrong."
30403	"VSM SDRAM Bank1 Physical memory device test goes wrong."
30404	" VSM SDRAM Bank2 Memory databus test goes wrong."
30405	" VSM SDRAM Bank2 Memory addressbus test goes wrong."
30406	" VSM SDRAM Bank2 Physical memory device test goes wrong."
30500	""
30501	"Communication with the analogue board fails."
30502	"Echo test to analogue board returned wrong string."
40000	""
40001	"NVRAM Reset; I2C failed"
40100	"NVRAM address = 0xaddress -> Byte value = 0xvalue"
40101	"NVRAM Read; I2C failed"
40102	"NVRAM Read; Invalid input"
40200	""
40201	"NVRAM Modify; I2C failed"
40202	"NVRAM Modify; Invalid input"
40300	"DV Unique ID = id"
40301	"NVRAM Read DV Unique ID; I2C failed"
40400	"\r\n Error log:\r\n errorString \r\n "
40401	"NVRAM error log; I2C failed"
40402	"NVRAM error log is invalid"
40403	"Front panel failed"
40700	""
40701	"NVRAM error log reset; I2C failed"
40900	"Region code Change counter is reset"
40901	"NVRAM region code reset; I2C failed"
41000	""
41001	"NVRAM Store DV Unique ID; I2C failed"
41002	"NVRAM Store DV Unique ID; Invalid input"
50000	""
50007	"Execution of the command on the analogue board failed."
50008	"The frontpanel could not be accessed by the analog board."
50009	"The echo from the frontpanel processor was not correct."
50100	" Front panel version: FPversion "
50102	"Execution of the command on the analogue board failed."
50103	"The frontpanel could not be accessed by the analog board."
50200	""
50204	"Execution of the command on the analogue board failed."



Error	Nr Error String
50205	"The frontpanel could not be accessed by the analog board."
50206	"The frontpanel did not show a starburst."
50207	"The user skipped the FP-which pattern test."
50208	"The user returned an unknown confirmation: confirmation"
50209	"The frontpanel did not show horizontal segments."
50210	"The frontpanel did not show vertical segments."
50300	""
50304	"Execution of the command on the analogue board failed."
50305	"The frontpanel could not be accessed by the analog board."
50306	"The frontpanel did not light all labels."
50307	"The user skipped the rest of the FP-label test."
50308	"The user returned an unknown confirmation: confirmation"
50400	""
50404	"Execution of the command on the analogue board failed."
50405	"The frontpanel could not be accessed by the analog board."
50406	"The LED's could not be turned on."
50407	"The user skipped the rest of the FP-LED test."
50408	"The user returned an unknown confirmation: confirmation"
50500	""
50502	"Front panel Keyboard; test failed"
50503	"Front panel Keyboard; test aborted"
50504	"Front panel Keyboard; not all keys were pressed"
50505	"Front panel keyboard I2C connection failed"
50506	"Unable to get slashversion"
50600	""
50602	"Front panel Remote control; test failed"
50603	"Front panel Remote control; test aborted"
50604	"Front panel remote control; can not access FP"
50605	"Front panel remote control; no user input received"
50700	""
50701	"Execution of the command on the analogue board failed."
50702	"The frontpanel could not be accessed by the analog board."
50703	"The frontpanel did not show a starburst."
50704	"The user skipped the FP-starburst test."
50705	"The user returned an unknown confirmation: confirmation"

Error	Nr Error String
50800	""
50801	"Execution of the command on the analogue board failed."
50802	"The frontpanel could not be accessed by the analog board."
50803	"The frontpanel did not show vertical segments."
50804	"The user skipped the FP-vertical segments test."
50805	"The user returned an unknown confirmation: confirmation"
50900	""
50901	"Execution of the command on the analogue board failed."
50902	"The frontpanel could not be accessed by the analog board."
50903	"The frontpanel did not show horizontal segments."
50904	"The user skipped the FP-horizontal segments test."
50905	"The user returned an unknown confirmation: confirmation"
51400	""
51401	"Execution of the command on the analogue board failed."
51402	"The frontpanel could not be accessed by the analog board."
51403	"The beeper did not sound."
51404	"The user skipped the FP-Beep test."
51405	"The user returned an unknown confirmation: confirmation"
51500	""
51501	"Execution of the command on the analogue board failed."
51502	"The frontpanel could not be accessed by the analog board."
51503	"The discbar did not display properly."
51504	"The user skipped the discbar test."
51505	"The user returned an unknown confirmation: confirmation"
51600	""
51601	"Execution of the command on the analogue board failed."
51602	"The frontpanel could not be accessed by the analog board."
51603	"The discbar dots did not display properly."
51604	"The user skipped the discbar dots test."
51605	"The user returned an unknown confirmation: confirmation"
51700	""
51701	"Execution of the command on the analogue board failed."
51702	"The frontpanel could not be accessed by the analog board."



Error	Nr Error String
51703	"The VU grid did not display properly."
51704	"The user skipped the VU gridtest."
51705	"The user returned an unknown confirmation: confirmation"
51800	""
51801	"Execution of the command on the analogue board failed."
51802	"The frontpanel could not be accessed by the analog board."
51803	"The frontpanel could not be dimmed."
51804	"The user skipped the FP-Dim test."
51805	"The user returned an unknown confirmation: confirmation"
51900	""
51901	"Execution of the command on the analogue board failed."
51902	"The frontpanel could not be accessed by the analog board."
51903	"The frontpanel did not show segments blinking."
51904	"The user skipped the FP-blinking test."
51905	"The user returned an unknown confirmation: confirmation"
52000	""
52001	"Execution of the command on the analogue board failed."
52002	"The frontpanel could not be accessed by the analog board."
52003	"The frontpanel did not show all segments lit."
52004	"The user skipped the FP-light all segments test."
52005	"The user returned an unknown confirmation: confirmation"
52200	""
52201	"Communication with Analogue Board fails."
52202	"Frontpanel can not be accessed by the Analogue Board."
52300	""
52301	"Communication with Analogue Board fails."
52302	"Frontpanel can not be accessed by the Analogue Board."
60000	""
60100	""
60101	"DVDR mechanism returned error number 0xerrornumber"
60102	"Parity error from DVDR mechanism to Serial"
60103	"Communication time-out error"
60104	"Unexpected response from DVDR mechanism"
60105	"Echo loop could not be closed"
60106	"Wrong echo pattern received"
60200	"Version: nr1.nr2.nr3"

Error	Nr Error String
60201	"DVDR mechanism returned error number 0xerrornumber"
60202	"Parity error from DVDR mechanism to Serial"
60203	"Communication time-out error"
60204	"Unexpected response from DVDR mechanism"
60205	"Front Panel failed."
60300	""
60301	"Basic-Engine time-out error"
60400	""
60401	"DVDR mechanism returned error number 0xerrornumber"
60402	"Parity error from DVDR mechanism to Serial"
60403	"Communication time-out error"
60404	"Unexpected response from DVDR mechanism"
60405	"Focus loop could not be closed"
60500	""
60501	"DVDR mechanism returned error number 0xerrornumber"
60502	"Parity error from DVDR mechanism to Serial"
60503	"Communication time-out error"
60504	"Unexpected response from DVDR mechanism"
60600	""
60601	"DVDR mechanism returned error number 0xerrornumber"
60602	"Parity error from DVDR mechanism to Serial"
60603	"Communication time-out error"
60604	"Unexpected response from DVDR mechanism"
60700	""
60701	"DVDR mechanism returned error number 0xerrornumber"
60702	"Parity error from DVDR mechanism to Serial"
60703	"Communication time-out error"
60704	"Unexpected response from DVDR mechanism"
60800	""
60801	"DVDR mechanism returned error number 0xerrornumber"
60802	"Parity error from DVDR mechanism to Serial"
60803	"Communication time-out error"
60804	"Unexpected response from DVDR mechanism"
60805	"Radial loop could not be closed"
60900	""
60901	"DVDR mechanism returned error number 0xerrornumber"
60902	"Parity error from DVDR mechanism to Serial"
60903	"Communication time-out error"
60904	"Unexpected response from DVDR mechanism"

Error	Nr Error String
61500	""
61501	"DVDR mechanism returned error number 0xerrornumber"
61502	"Parity error from DVDR mechanism to Serial"
61503	"Communication time-out error"
61504	"Unexpected response from DVDR mechanism"
61600	""
61601	"DVDR mechanism returned error number 0xerrornumber"
61602	"Parity error from DVDR mechanism to Serial"
61603	"Communication time-out error"
61604	"Unexpected response from DVDR mechanism"
61700	""
61701	"BE tray-in command failed"
61702	"BE read-TOC command failed"
61703	"BE VSM interrupt initialization failed"
61704	"BE set irq command failed"
61705	"BE no disc or wrong disc inserted"
61706	"BE rec-pause command failed"
61707	"BE VSM BE out DMA initialization failed"
61708	"BE VSM BE out initialization failed"
61709	"BE VSM BE out DMA start failed"
61710	"BE VSM BE out start failed"
61711	"BE rec command failed"
61712	"BE VSM out underrun error occurred"
61713	"BE record complete interrupt not raised"
61714	"BE get irq command failed"
61715	"BE no interrupt was raised by BE"
61716	"BE VSM DMA out not finished"
61717	"BE stop command after writing failed"
61718	"BE VSM Sector processor initialization failed"
61719	"BE VSM sector processor DMA initialization failed"
61720	"BE VSM sector processor DMA start failed"
61721	"BE VSM sector processor start failed"
61722	"BE seek command failed"
61723	"BE VSM sector processor error occurred"
61724	"BE read timeout occurred"
61725	"BE stop command after reading failed"
61726	"BE difference found in data at disc sector 0xdiscsector"
61727	"This nucleus cannot be executed because the Self-Test failed"
61800	""
61801	"BE i2c initialization failed"
61802	"This nucleus cannot be executed because the Self-Test failed"
61900	""
61901	"The SelfTest failed with result: 0xnr1 0xnr2 0xnr3"

Error	Nr Error String
61902	"DVDR mechanism returned error number 0xerrornumber"
61903	"Parity error from DVDR mechanism to Serial"
61904	"Communication time-out error"
61905	"Unexpected response from DVDR mechanism"
62000	""
62001	"Self-Test : errorstring1 Laser-Test : errorstring2 SpindleM-Test: errorstring3 SledgeM-Test : errorstring4 Focus-Test : errorstring5"
62100	"The forward sense level is 0xlevel"
62101	"DVDR mechanism returned error number 0xerrornumber"
62102	"Parity error from DVDR mechanism to Serial"
62103	"Communication time-out error"
62104	"Unexpected response from DVDR mechanism"
62200	""
62201	"The BE-self-diagnostic-spindle-motor-test failed"
62202	"DVDR mechanism returned error number 0xerrornumber"
62203	"Parity error from DVDR mechanism to Serial"
62204	"Communication time-out error"
62205	"Unexpected response from DVDR mechanism"
62300	""
62301	"The BE-focus-test failed"
62302	"DVDR mechanism returned error number 0xerrornumber"
62303	"Parity error from DVDR mechanism to Serial"
62304	"Communication time-out error"
62305	"Unexpected response from DVDR mechanism"
62400	""
62401	"The BE-self-diagnostic-sledge-motor-test failed"
62402	"DVDR mechanism returned error number 0xerrornumber"
62403	"Parity error from DVDR mechanism to Serial"
62404	"Communication time-out error"
62405	"Unexpected response from DVDR mechanism"
62500	""
62600	""
62700	"BE EEPROM address = address -> Byte value = 0xvalue"
62701	"DVDR mechanism returned error number 0xerrornumber"
62702	"Parity error from DVDR mechanism to Serial"
62703	"Communication time-out error"

Error	Nr Error String
62704	"Unexpected response from DVDR mechanism"
62705	"BE read EEPROM; invalid input"
62800	""
62801	"DVDR mechanism returned error number 0xerrornumber"
62802	"Parity error from DVDR mechanism to Serial"
62803	"Communication time-out error"
62804	"Unexpected response from DVDR mechanism"
62805	"BE write EEPROM; invalid input"
62900	""
62901	"DVDR mechanism returned error number 0xerrornumber"
62902	"Parity error from DVDR mechanism to Serial"
62903	"Communication time-out error"
62904	"Unexpected response from DVDR mechanism"
62905	"Radial loop could not be closed"
63000	""
63001	"DVDR mechanism returned error number 0xerrornumber"
63002	"Parity error from DVDR mechanism to Serial"
63003	"Communication time-out error"
63004	"Unexpected response from DVDR mechanism"
63100	" Number of times Tray went Open/Closed : nr1" " Total hours the CD laser was on : nr2" "Total hours the DVD laser was on : nr3" " Total hours the write laser was on : nr4"
63101	"DVDR mechanism returned error number 0xerrornumber"
63102	"Parity error from DVDR mechanism to Serial"
63103	"Communication time-out error"
63104	"Unexpected response from DVDR mechanism"
63200	""
63201	"DVDR mechanism returned error number 0xerrornumber"
63202	"Parity error from DVDR mechanism to Serial"
63203	"Communication time-out error"
63204	"Unexpected response from DVDR mechanism"
63300	Momentary errors (Byte 1 - Byte 7) : 0xb1 0xb2 0xb3 0xb4 0xb5 0xb6 0xb7 Cumulative errors (Byte 1 - Byte 7): : 0xb1 0xb2 0xb3 0xb4 0xb5 0xb6 0xb7 Fatal errors (Oldest - Youngest) : : 0xb1 0xb2 0xb3 0xb4 0xb5
63301	"DVDR mechanism returned error number 0xerrornumber"
63302	"Parity error from DVDR mechanism to Serial"
63303	"Communication time-out error"
63304	"Unexpected response from DVDR mechanism"

Error	Nr Error String
63400	""
63401	"DVDR mechanism returned error number 0xerrornumber"
63402	"Parity error from DVDR mechanism to Serial"
63403	"Communication time-out error"
63404	"Unexpected response from DVDR mechanism"
63500	""
63501	"DVDR mechanism returned error number 0xerrornumber"
63502	"Parity error from DVDR mechanism to Serial"
63503	"Communication time-out error"
63504	"Unexpected response from DVDR mechanism"
63505	"errorstring_the DVDR mechanism will reject all player commands"
63900	""
63901	"DVDR mechanism returned error number 0xerrornumber"
63902	"Parity error from DVDR mechanism to Serial"
63903	"Communication time-out error"
63904	"Unexpected response from DVDR mechanism"
64000	"BE OPU number = opunumber"
64001	"DVDR mechanism returned error number 0xerrornumber"
64002	"Parity error from DVDR mechanism to Serial"
64003	"Communication time-out error"
64004	"Unexpected response from DVDR mechanism"
64100	"The data was successfully written on and read from a DVD disc"
64101	"The tray-in command failed"
64102	"The read-TOC command failed"
64103	"The VSM interrupt initialization failed"
64104	"The set irq command failed"
64105	"No disc or wrong disc inserted"
64106	"The rec-pause command failed"
64107	"The VSM BE out DMA initialization failed"
64108	"The VSM BE out initialization failed"
64109	"The VSM BE out DMA start failed"
64110	"The VSM BE out start failed"
64111	"The rec command failed"
64112	"The VSM out underrun error occurred"
64113	"The record complete interrupt was not raised"
64114	"The get irq command failed"
64115	"There was no interrupt raised by BE"
64116	"The VSM DMA did not finished"
64117	"The stop command after writing failed"
64118	"The VSM Sector processor initialization failed"

Error	Nr Error String
64119	"The VSM sector processor DMA initialization failed"
64120	"The VSM sector processor DMA start failed"
64121	"The VSM sector processor start failed"
64122	"The seek command failed"
64123	"The VSM sector processor error occurred"
64124	"The read timeout occurred"
64125	"The stop command after reading failed"
64126	"There was a difference found in data at a specific disc sector"
64127	"The result of the self test contains errors"
64128	"An error interrupt was raised by BE"
64129	"The calibrate-record command failed"
64130	"To many retries"
64131	"BE update RAI command after writing failed"
64132	"BE find first recordable address command failed"
64133	"DVD+R disc is full"
64200	""
64201	"BE i2c initialization failed"
64202	"This nucleus cannot be executed because the Self-Test failed"
70000	"Echo test OK"
70001	"Echo test returned wrong string."
70002	"Communication with Analogue Board fails"
70300	"SoftwareVersion"
70301	"Can not find segment in FLASH ROM on the Analog Board"
70302	"Communication with Analogue Board fails"
70400	"HardwareVersion"
70401	"Can not find segment in FLASH ROM on the Analog Board"
70402	"Communication with Analogue Board fails"
70500	"Clock adjusted OK"
70501	"Can not adjust the clock on the Analogue Board."
70502	"Wrong date/time text size."
70503	"Communication with Analogue Board fails"
70600	"Tuner accessibility test OK"
70601	"Can not access tuner on the Analogue Board."
70602	"Communication with Analogue Board fails"
70700	"Frequency download OK"
70701	"Wrong frequency table size."
70702	"Can not download the frequency table into the analog NVRAM."
70703	"Can not download the frequency table into the analog NVRAM."
70704	"Communication with Analogue Board fails"
70800	"Data slicer test OK"
70801	"Test of the Data slicer on the Analogue Board fails."

Error	Nr Error String
70802	"Communication with Analogue Board fails"
70900	"Sound Processor test OK"
70901	"Test of the Sound Processor on the Analogue Board fails."
70902	"Communication with Analogue Board fails"
71000	"AV Selector test OK"
71001	"Test of the AV Selector on the Analogue Board fails."
71002	"Communication with Analogue Board fails"
71100	"NVRAM test OK"
71101	"Test of the NVRAM on the Analogue Board fails."
71102	"Communication with Analogue Board fails"
71200	"Video routing on the Analogue Board OK"
71201	"Routing the video on the Analogue Board fails."
71202	"Invalid input."
71203	"Communication with Analogue Board fails"
71300	"Audio routing on the Analogue Board OK"
71301	"Routing the audio on the Analogue Board fails."
71302	"Invalid input."
71303	"Communication with Analogue Board fails"
71500	""
71501	"Invalid slash version, default slash version is set."
71502	"Setting the slash version on the Analogue Board fails."
71503	"Communication with Analogue Board fails"
71600	"ApplicationVersion"
71601	"Can not find segment in FLASH ROM on the Analog Board"
71602	"Communication with Analogue Board fails"
71700	"DiagnosticsVersion"
71701	"Can not find segment in FLASH ROM on the Analog Board"
71702	"Communication with Analogue Board fails"
71800	"DownloadVersion"
71801	"Can not find segment in FLASH ROM on the Analog Board"
71802	"Communication with Analogue Board fails"
72300	""
72000	""
72001	"Adjusting BarGraphLevel failed"
72002	"Communication with Analogue Board fails"
72100	""
72101	"Storing clock correction failed"
72102	"Value out of range : default value stored "
72103	"Invalid input."
72104	"Communication with Analogue Board fails"
72200	""

Error	Nr Error String
72201	"Initializing the 1Hz signal on the Clock IC failed"
72202	"Communication with Analogue Board fails"
72301	"Clearing the NVRAM on the Analogue Board fails"
72302	"Communication with Analogue Board fails"
72400	"segment checksum is : checksum which is correct"" for every segment"
72401	"segment could not be found" or "segment checksum is : checksumC ,however it should be : checksumE"" for every segment"
72402	"Communication with Analogue Board fails"
72900	"Date received"
72901	"Data returned"
72902	"Communication on I2C-bus failed on the Analog Board fails."
72903	"Communication with Analogue Board fails"
73000	""
73001	"Storing the external presets on the Analogue Board fails"
73002	"Communication with Analogue Board fails"
73100	"0xslashversion"" where slashversion is the slash version read from the analogue board"
73101	"Error while reading out slash version."
73102	"I2C Write error."
73103	"I2C Read error."
73104	"Communication with Analogue Board fails"
73200	""
73201	"Storing the Reference Voltage for the Tuner failed"
73202	"Invalid input."
73203	"Communication with Analogue Board fails"
80000	"The DVIO module is present in the system."
80001	"The DVIO module is not present in the system."
80100	"The DVIO module has been reset OK."
80101	"The DVIO module is not present in the system."
80102	"The DVIO module could not be reset."
80103	"Could not initialize I2C before Reset."
80200	"The accessibility of the DVIO module is OK."
80201	"The DVIO board is not present in this DVDR."
80202	"Could not initialize I2C."
80203	"Unable to reset the DVIO module."
80204	"Unable to receive the reset indication from the DVIO module."
80205	"Unable to send the configuration to the DVIO module."
80206	"Unable to download the chip ID to the DVIO module."
80207	"Unable to set the mode of the DVIO module to IDLE."

Error	Nr Error String
80208	"Software Error in function HandleStateAwaitingReply!!"
80209	"Maximal number of retries reached by HandleStateSending!!"
80210	"Maximal number of retries (NACKs) reached (HandleStateSending)"
80211	"We tried to receive a reply for DVIO_MAX_RETRIES_ACKREPLY times !!"
80212	"We tried to receive a reply for DVIO_MAX_RETRIES_REPLY times !!"
80213	"We tried to receive an Ack for DVIO_MAX_RETRIES_ACK times!!"
80214	"VSM UART error timeout transmitting command"
80215	"VSM UART error timeout receiving reply"
80216	"VSM UART frame error occurred receiving from DVIO board"
80217	"VSM UART parity error occurred receiving from DVIO board"
80218	"The confirmation/indication from the DVIO module is invalid."
80300	"The accessibility of the DVIO module is OK."
80301	"The DVIO board is not present in this DVDR."
80302	"Could not initialize I2C."
80303	"Unable to reset the DVIO module."
80304	"Unable to receive the reset indication from the DVIO module."
80305	"Unable to send the configuration to the DVIO module."
80306	"Unable to download the chip ID to the DVIO module."
80307	"Unable to set the mode of the DVIO module to IDLE."
80308	"Software Error in function HandleStateAwaitingReply!!"
80309	"Maximal number of retries reached by HandleStateSending!!"
80310	"Maximal number of retries (NACKs) reached (HandleStateSending)"
80311	"We tried to receive a reply for DVIO_MAX_RETRIES_ACKREPLY times !!"
80312	"We tried to receive a reply for DVIO_MAX_RETRIES_REPLY times !!"
80313	"We tried to receive an Ack for DVIO_MAX_RETRIES_ACK times!!"
80314	"VSM UART error timeout transmitting command"
80315	"VSM UART error timeout receiving reply"
80316	"VSM UART frame error occurred receiving from DVIO board"
80317	"VSM UART parity error occurred receiving from DVIO board"
80318	"The confirmation/indication from the DVIO module is invalid."



Error	Nr Error String
80400	"The accessibility of the DVIO module is OK."
80401	"The DVIO board is not present in this DVDR."
80402	"Could not initialize I2C."
80403	"Unable to reset the DVIO module."
80404	"Unable to receive the reset indication from the DVIO module."
80405	"Unable to send the configuration to the DVIO module."
80406	"Unable to download the chip ID to the DVIO module."
80407	"Unable to set the mode of the DVIO module to IDLE."
80408	"Software Error in function HandleStateAwaitingReply!!"
80409	"Maximal number of retries reached by HandleStateSending!!"
80410	"Maximal number of retries (NACKs) reached (HandleStateSending)"
80411	"We tried to receive a reply for DVIO_MAX_RETRIES_ACKREPLY times!!"
80412	"We tried to receive a reply for DVIO_MAX_RETRIES_REPLY times!!"
80413	"We tried to receive an Ack for DVIO_MAX_RETRIES_ACK times!!"
80414	"VSM UART error timeout transmitting command"
80415	"VSM UART error timeout receiving reply"
80416	"VSM UART frame error occurred receiving from DVIO board"
80417	"VSM UART parity error occurred receiving from DVIO board"
80418	"The confirmation/indication from the DVIO module is invalid."
80500	""
80501	"The DVIO board is not present in this DVDR."
80502	"The I2C could not be initialized."
80503	"The DVIO module could not be reset."
80504	"Unable to receive the reset indication from the DVIO module."
80505	"Unable to send the configuration to the DVIO module."
80506	"Unable to download the chip ID to the DVIO module."
80507	"Unable to set the mode of the DVIO module to IDLE."
80508	"Software Error in HandleStateAwaitingReply function!"
80509	"Maximal number of retries reached by HandleStateSending!"
80510	"Maximal number of retries (NACK's) reached ""(HandleStateSending)"
80511	"We tried to receive a reply for DVIO_MAX_RETRIES_ACKREPLY times!"

Error	Nr Error String
80512	"We tried to receive a reply for DVIO_MAX_RETRIES_REPLY times!"
80513	"We tried to receive an Acknowledge for DVIO_MAX_RETRIES_ACK times!"
80514	"VSM UART error timeout transmitting command"
80515	"VSM UART error timeout receiving reply"
80516	"VSM UART frame error occurred receiving from DVIO board"
80517	"VSM UART parity error occurred receiving from DVIO board"
80518	"The confirmation/indication from the DVIO module is invalid."
80519	"Setting the DVIO module in/out diagnostics mode failed"
80520	"Invalid input"
80521	"Getting the errors of the self-test failed"
80522	"Self-test failed"
80600	""
80601	"The DVIO board is not present in this DVDR."
80602	"The I2C could not be initialized."
80603	"The DVIO module could not be reset."
80604	"Unable to receive the reset indication from the DVIO module."
80605	"Unable to send the configuration to the DVIO module."
80606	"Unable to download the chip ID to the DVIO module."
80607	"Unable to set the mode of the DVIO module to IDLE."
80608	"Software Error in HandleStateAwaitingReply function!"
80609	"Maximal number of retries reached by HandleStateSending!"
80610	"Maximal number of retries (NACK's) reached ""(HandleStateSending)"
80611	"We tried to receive a reply for DVIO_MAX_RETRIES_ACKREPLY times!"
80612	"We tried to receive a reply for DVIO_MAX_RETRIES_REPLY times!"
80613	"We tried to receive an Acknowledge for DVIO_MAX_RETRIES_ACK times!"
80614	"VSM UART error timeout transmitting command"
80615	"VSM UART error timeout receiving reply"
80616	"VSM UART frame error occurred receiving from DVIO board"
80617	"VSM UART parity error occurred receiving from DVIO board"
80618	"The confirmation/indication from the DVIO module is invalid."
80619	"Setting the DVIO module in/out diagnostics mode failed"
80700	""

Error	Nr Error String
80701	"The DVIO board is not present in this DVDR."
80702	"The I2C could not be initialized."
80703	"The DVIO module could not be reset."
80704	"Unable to receive the reset indication from the DVIO module."
80705	"Unable to send the configuration to the DVIO module."
80706	"Unable to download the chip ID to the DVIO module."
80707	"Unable to set the mode of the DVIO module to IDLE."
80708	"Software Error in HandleStateAwaitingReply function!"
80709	"Maximal number of retries reached by HandleStateSending!"
80710	"Maximal number of retries (NACK's) reached ""(HandleStateSending)"
80711	"We tried to receive a reply for DVIO_MAX_RETRIES_ACKREPLY times!"
80712	"We tried to receive a reply for DVIO_MAX_RETRIES_REPLY times!"
80713	"We tried to receive an Acknowledge for DVIO_MAX_RETRIES_ACK times!"
80714	"VSM UART error timeout transmitting command"
80715	"VSM UART error timeout receiving reply"
80716	"VSM UART frame error occurred receiving from DVIO board"
80717	"VSM UART parity error occurred receiving from DVIO board"
80718	"The confirmation/indication from the DVIO module is invalid."
80719	"Setting the DVIO module in/out diagnostics mode failed"
90121	"Error: audio data in host memory contains wrong frequency: frequency Hz"
90122	"Error: audio data in host memory contains silence!"
90123	"There is no correct audio frame in the buffer"
90124	"The audio frame has an illegal version bit"
90125	"The audio frame has an illegal bitrate-index"
90126	"The audio frame has an illegal sampling rate"
90127	"The CRC of the audio frame is wrong"
90128	"The audio frame is not MPEG-I layer II !"
90129	"Error cannot de-mute DAC on analogue board"
90200	""
90201	"Initialization of I2C failed"
90202	"Initialization of VIP and EMPIRE failed"
90203	"Initialization of PLL / Link failed."
90204	"Next descriptor address set wrong."
90205	"Turning on the colourbar failed"
90206	"No I2C communication possible to start video encoder."

Error	Nr Error String
90207	"Starting the video encoder failed."
90208	"Transfer of data from video encoder to VSM failed."
90209	"Stopping the encoder failed."
90210	"Turning off the colourbar failed."
90211	"Cannot initialize hostdecoder parallel input"
90212	"Cannot initialize VSM AV-out DMA port"
90213	"Cannot initialize VSM AV-out port"
90214	"Cannot start VSM AV-out DMA port"
90215	"Cannot start VSM AV-out port"
90216	"Transfer of data from VSM to host decoder failed."
90217	"VSM and Hostdec memory do not match (compared after transfer)"
90218	"Decoding of the video data in the hostdecoder memory failed"
90219	"The data in the hostdecoder is not equal to a colourbar"
90220	"The video encoder did not return the Group Of Picture count."
90221	"The video encoder did not receive data from the VIP."
90223	"Initialization of VIP and EMPRESS failed"
90224	"The video encoder did not return the current status."
90225	"The video encoder timed out in BUSY mode. (no VIP input)"
90226	"The video encoder did not return the current bitrate."
90227	"The video encoder did not switch to ENCODING mode."
90228	"The video encoder could not start from STOP/ IDLE mode."
90229	"The video encoder did not switch from IDLE to STOP mode."
90300	""
90301	"Initialization of I2C failed"
90302	"I2C communication to VIP failed"
90303	"Initialization of VIP failed"
90304	"Generation of Close Caption data failed"
90305	"VIP not locked to video signal"
90306	"Initialization of VBI Extractor failed"
90307	"No CC data received"
90308	"Closed Caption data overrun"
90309	"Closed Caption data does not match"
90310	"Switch off ColourBar failed"
90400	""
90401	"Initialization of I2C failed"
90402	"Initialization of VIP and EMPIRE failed"
90403	"Initialization of PLL / Link failed."
90404	"Next descriptor address set wrong."
90405	"Turning on the colourbar failed"

Error	Nr Error String
90406	"No I2C communication possible to start video encoder."
90407	"Starting the video encoder failed."
90408	"Transfer of data from video encoder to VSM failed."
90409	"Stopping the encoder failed."
90410	"Turning off the colourbar failed."
90411	"Cannot initialize hostdecoder parallel input"
90412	"Cannot initialize VSM AV-out DMA port"
90413	"Cannot initialize VSM AV-out port"
90414	"Cannot start VSM AV-out DMA port"
90415	"Cannot start VSM AV-out port"
90416	"Transfer of data from VSM to host decoder failed."
90417	"VSM and Hostdec memory do not match (compared after transfer)"
90418	"Decoding of the video data in the hostdecoder memory failed"
90419	"The data in the hostdecoder is not equal to a colourbar"
90420	"The video encoder did not return the Group Of Picture count."
90421	"The video encoder did not receive data from the VIP."
90422	"Execution of the command on the analogue board failed."
90423	"Initialization of VIP and EMPRESS failed"
90424	"The video encoder did not return the current status."
90425	"The video encoder timed out in BUSY mode. (no VIP input)"
90426	"The video encoder did not return the current bitrate."
90427	"The video encoder did not switch to ENCODING mode."
90428	"The video encoder could not start from STOP/IDLE mode."
90429	"The video encoder did not switch from IDLE to STOP mode."
90500	"
90501	"Initialization of I2C failed"
90502	"I2C communication to VIP failed"
90503	"Initialization of VIP failed"
90504	"Generation of Close Caption data failed"
90505	"VIP not locked to video signal"
90506	"Initialization of VBI Extractor failed"
90507	"No CC data received"
90508	"Closed Caption data overrun"
90509	"Closed Caption data does not match"
90510	"Switch off ColourBar failed"
90511	"Execution of the command on the analogue board failed."

Error	Nr Error String
90600	"
90601	"Initialization of I2C failed"
90602	"Initialization of VIP and EMPIRE failed"
90603	"Initialization of PLL / Link failed."
90604	"Next descriptor address set wrong."
90605	"Turning on the colourbar failed"
90606	"No I2C communication possible to start video encoder."
90607	"Starting the video encoder failed."
90608	"Transfer of data from video encoder to VSM failed."
90609	"Stopping the encoder failed."
90610	"Turning off the colourbar failed."
90611	"Cannot initialize hostdecoder parallel input"
90612	"Cannot initialize VSM AV-out DMA port"
90613	"Cannot initialize VSM AV-out port"
90614	"Cannot start VSM AV-out DMA port"
90615	"Cannot start VSM AV-out port"
90616	"Transfer of data from VSM to host decoder failed."
90617	"VSM and Hostdec memory do not match (compared after transfer)"
90618	"Decoding of the video data in the hostdecoder memory failed"
90619	"The data in the hostdecoder is not equal to a colourbar"
90620	"The video encoder did not return the Group Of Picture count."
90621	"The video encoder did not receive data from the VIP."
90622	"Execution of the command on the analogue board failed."
90623	"Initialization of VIP and EMPRESS failed"
90624	"The video encoder did not return the current status."
90625	"The video encoder timed out in BUSY mode. (no VIP input)"
90626	"The video encoder did not return the current bitrate."
90627	"The video encoder did not switch to ENCODING mode."
90628	"The video encoder could not start from STOP/IDLE mode."
90629	"The video encoder did not switch from IDLE to STOP mode."
90700	"
90701	"Initialization of I2C failed"
90702	"I2C communication to VIP failed"
90703	"Initialization of VIP failed"
90704	"Generation of Close Caption data failed"
90705	"VIP not locked to video signal"
90706	"Initialization of VBI Extractor failed"
90707	"No CC data received"



Error	Nr Error String
90708	"Closed Caption data overrun"
90709	"Closed Caption data does not match"
90710	"Switch off ColourBar failed"
90711	"Execution of the command on the analogue board failed."
90800	""
90801	"Error routing the audio back to the digital board."
90802	"Error cannot initialize I2C"
90803	"Error cannot initialize VIP"
90804	"Error cannot set ADC enable pin"
90805	"Error cannot set VSM audio clock"
90806	"Error preparing the 12kHz audio-sine"
90807	"Error cannot initialize audio encoder"
90808	"Error cannot initialize VSM audio in port"
90809	"Error cannot initialize VSM audio in DMA port"
90810	"Error cannot initialize VSM audio out DMA port"
90811	"Error cannot initialize audio VSM out port"
90812	"Error cannot initialize host decoder audio in"
90813	"Error loop audio user/dealer cannot start audio encoder"
90814	"Error cannot start VSM audio in DMA port"
90815	"Error starting the 12kHz audio-sine"
90816	"Error transfer data from audio encoder to VSM"
90817	"Error cannot start VSM AV out DMA port"
90818	"Error cannot start VSM AV out port"
90819	"Error transfer data from VSM to host decoder"
90820	"Error: audio data in host memory and VSM memory differ"
90821	"Error: audio data in host memory contains wrong frequency: frequency Hz"
90822	"Error: audio data in host memory contains silence!"
90823	"There is no correct audio frame in the buffer"
90824	"The audio frame has an illegal version bit"
90825	"The audio frame has an illegal bitrate-index"
90826	"The audio frame has an illegal sampling rate"
90827	"The CRC of the audio frame is wrong"
90828	"The audio frame is not MPEG-I layer II !"
90829	"Error cannot de-mute DAC on analogue board"
90900	""
90901	"Error routing the audio back to the digital board."
90902	"Error cannot initialize I2C"
90903	"Error cannot initialize VIP"
90904	"Error cannot set ADC enable pin"
90905	"Error cannot set VSM audio clock"

Error	Nr Error String
90906	"Error preparing the 12kHz audio-sine"
90907	"Error cannot initialize audio encoder"
90908	"Error cannot initialize VSM audio in port"
90909	"Error cannot initialize VSM audio in DMA port"
90910	"Error cannot initialize VSM audio out DMA port"
90911	"Error cannot initialize audio VSM out port"
90912	"Error cannot initialize host decoder audio in"
90913	"Error loop audio user/dealer cannot start audio encoder"
90914	"Error cannot start VSM audio in DMA port"
90915	"Error starting the 12kHz audio-sine"
90916	"Error transfer data from audio encoder to VSM"
90917	"Error cannot start VSM AV out DMA port"
90918	"Error cannot start VSM AV out port"
90919	"Error transfer data from VSM to host decoder"
90920	"Error: audio data in host memory and VSM memory differ"
90921	"Error: audio data in host memory contains wrong frequency: frequency Hz"
90922	"Error: audio data in host memory contains silence!"
90923	"There is no correct audio frame in the buffer"
90924	"The audio frame has an illegal version bit"
90925	"The audio frame has an illegal bitrate-index"
90926	"The audio frame has an illegal sampling rate"
90927	"The CRC of the audio frame is wrong"
90928	"The audio frame is not MPEG-I layer II !"
90929	"Error cannot de-mute DAC on analogue board"
140000	""
140001	"I2C to Clock failed"" or ""I2C initialization failed"
140100	""
140101	"I2C to Clock failed"" or ""I2C initialization failed"
141200	""
141201	"Progressive Scan Board I2C bus busy"
141211	"Progressive Scan Board I2C FLI2200 bus busy"
141212	"Progressive Scan Board I2C FLI2200 read access time-out"
141213	"Progressive Scan Board I2C FLI2200 no read acknowledge"
141214	"Progressive Scan Board I2C FLI2200 read failed"
141215	"Progressive Scan Board I2C FLI2200 write access time-out"
141216	"Progressive Scan Board I2C FLI2200 no write acknowledge"

<b>Error</b>	<b>Nr Error String</b>
141217	"Progressive Scan Board I2C FLI2200 write failed"
141218	"Progressive Scan Board I2C FLI2200 failed"
141221	"Progressive Scan Board I2C AD7196 bus busy"
141222	"Progressive Scan Board I2C AD7196 read access time-out"
141223	"Progressive Scan Board I2C AD7196 no read acknowledge"
141224	"Progressive Scan Board I2C AD7196 read failed"
141225	"Progressive Scan Board I2C AD7196 write access time-out"
141226	"Progressive Scan Board I2C AD7196 no write acknowledge"
141227	"Progressive Scan Board I2C AD7196 write failed"
141228	"Progressive Scan Board I2C AD7196 failed"
141300	"
141301	"Progressive Scan Route Enable failed"
141302	"Generating test image in Hostdecoder failed"
141400	"
141401	"Progressive Scan Route Disable failed"
141402	"Turning off test image in Hostdecoder failed"
141500	"
141501	"Progressive Scan Board I2C failed"
141600	"
141601	"Progressive Scan Board I2C failed"

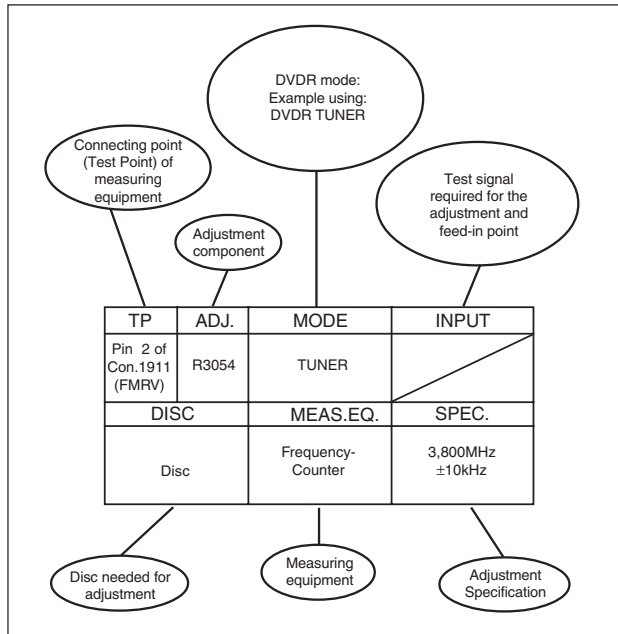
## ■ ALIGNMENTS

### 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:

#### 1.1 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	38.9 MHz 500 mVpp at Tuner 1705, Pin 11 (F710, IF-out)
DISC		MEAS.EQ.	SPEC.
		DC Voltmeter Frequ. Generator	2.5 V ±0.1 V

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  $256 * \text{measured voltage} / U_{cc}$ .  $U_{cc}$  is 5.0V.

Store the reference value via command 1119, followed by the ref. value.

Example: DS:> 1119 128

#### 1.2 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	500mVpp +/- 0.5dB (use a 10:1 probe)

**1.3 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)
<b>DISC</b>		<b>MEAS.EQ.</b>	<b>SPEC.</b>
		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.

**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.

**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  
DS:>1117
- measure the frequency f means of the Clock Crystal with an accuracy of ± 0.1 Hz.

- Calculate the parameter to be entered: 32768/f means \*10 6
- 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:  
DS:>1118 1000023

**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:  
DS:>1119 128

**2.3 Slash Version**

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

The slash versions used are the following:

- U model: 178
- A model: 97
- G model: 57

Example:

DS:>1217 57

**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:  
DS:> 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

### 3. Rework Procedure IEEE Unique Number

#### 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 7201) 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 reassure the unique number depending on the possibilities of repair or the state the faulty set is in.

#### 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.

#### 3.3 Procedure A

1. Connect defective digital board to PC via serial cable (3122 785 90017) (AAX57390)
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:  
DS:> 1208  
120800: The DvldNumber is: XXXXXXXXXXXX  
Test OK @
4. note read out
5. program new digital board via nucleus 1207  
example: DD:> 1207 00D7A1FC6C  
41000:  
Test OK @

The set has now the original unique number

#### 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\*YEAR + 676\*WEEK + 26\*A +H+8788**

**The figures are fixed**, YEAR + WEEK + factory code (A +H)arevariable

Example:

**35828\*01+676\*36+26\*1+8+8788 = 68986 (decimal)**

Then we translate the decimal number to a hexadecimal number.

example:

68986 (decimal)= 10D7A (hex)

4. Last 5 numbers: The last 5 numbers exist out of the Lot and SERIAL number.

We have to translate the decimal number to the next 5 hexadecimal numbers:

Example: 130156 (decimal) = 1FC6C (hex)

5. Program new digital board via nucleus 410 Therefore we use the 10 hexadecimal numbers we calculated above:

example:

DD:> 410 10D7A1FC6C

41000:

Test OK @

The set has now its original unique number

## ■ CIRCUIT DESCRIPTIONS

### 1. Display Board

#### 1.1 Microcontroller

The core element of the Display Control unit is the microcontroller TMP87CH74AF [7110]. 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 infrared receiver
- Activation and control of the local display
- Heater voltage generation

The 8 MHz resonator (Pos. 1111) generates the system clock.

The reset is generated by the CC-P via "POR\_DC"-signal where the transistor [7106] is used as a level-shifter from 3V3 to 5V.

#### 1.2 Interface to the Central Control 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.

#### 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 37 and 38) the evaluation is done.

#### 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 or further processing via port TC1 [7103, pin20].

#### 1.5 Vacuum Fluorescence Display

The VFD "BJ900GNK" [POS 7100] is fully controlled by the microcontroller. The 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.

#### 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.

#### 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.

#### 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.

#### 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.

## 2 Microcontroller Sub Board (UP SUB Board)

### 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.

### 2.2 Microcontroller

The main part of the Sub-PCB is the central controller (CC) 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 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 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 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 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 P in a special test-mode.

## 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 P 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-P 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].

## 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 P via the I2C-bus.

## 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.

## 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 DVDR mechanism. 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]).

# 3 Analog board Europe

## 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 P-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").

### 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  $V_{cc}$  on pin 1 of the IC [7313] will be reduced following further loading. If  $V_{cc}$  is less than approx. 9V at any point during this process, the output of the IC [7313, pin 6] is blocked. All output voltages and  $V_{cc}$  decrease and a new start-up cycle begins. If the overload status or short-circuit remains, the power limitation will be activated immediately and the voltages



will again decrease, followed by another start-up cycle (Burst Mode ). The amount of power taken up from the mains in burst mode is low.

#### Standby modes:

In the 'AV-Standby' operating mode of the set, the 'ION' control line is primarily used to switch off all output voltages for DVDR mechanism 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.

### 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 I 2 C-bus of the CC-P. [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

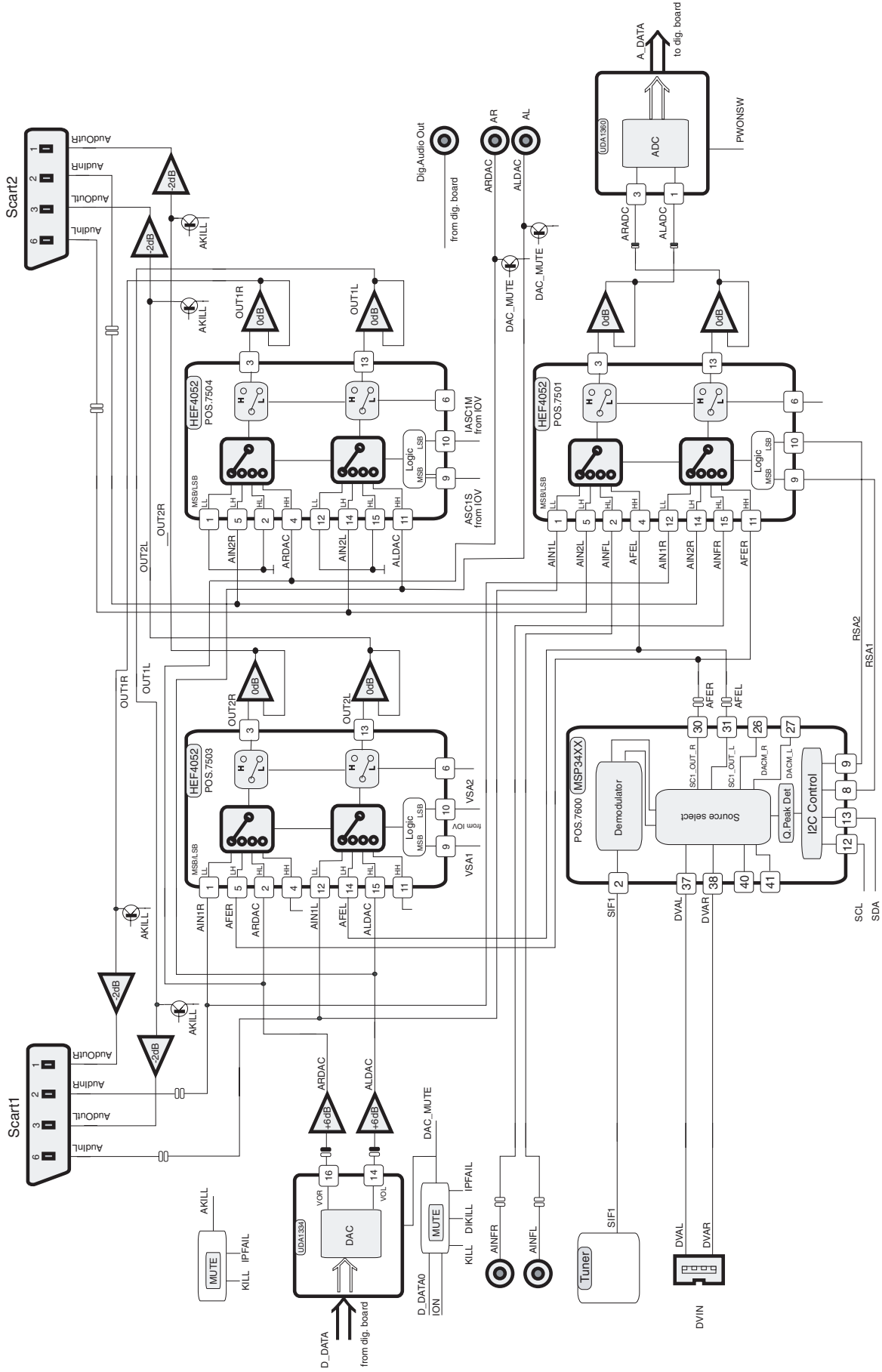
demodulation in the sound processor [7600]. The audio-IF carrier is selected in the audio SAW filter [1702]. This filter is switched for SECAM L'. If the signal "SB1" is "high", the switch [7714] is closed and the diode [6705] is not conducting. For all other standards the diode [6705] is conducting 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 dBV), 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 I 2 C-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.

### 3.4 Audio routing

#### Audio IO Europe Overview



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 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].

### 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\_IKLL"-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]:

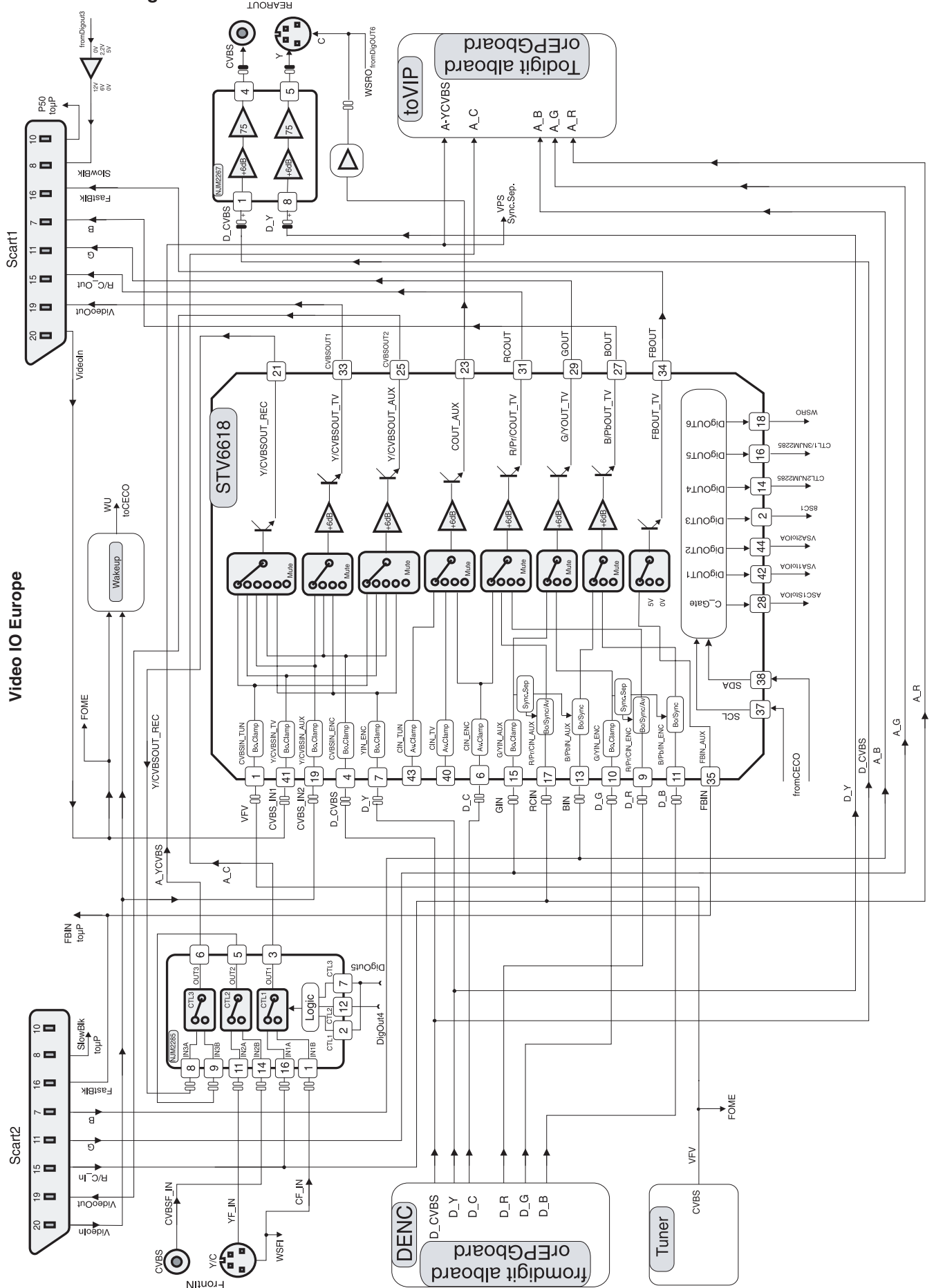
The conversion of analog audio signals from the record-selector [7501] in the I/O ("ALADC"- & "ARADC") is done via UDA1361TS [7005]. This IC can process input signals up to 2Vrms by using external resistors [3039], [3041] in series to the input pins. As the level from the DVIO-Board is only 1Vrms a 6dB 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].

### 3.6 Video-routing





The Video-I/O-switching is basically realized by the matrix switch STV6618 [7408], which is controlled via I 2 C-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 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 Scart2 ("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).

### 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 I 2 C-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).

### 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.

## 4 Analog board NAFTA- & APAC-Pal- version

### 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 I 2 C-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.

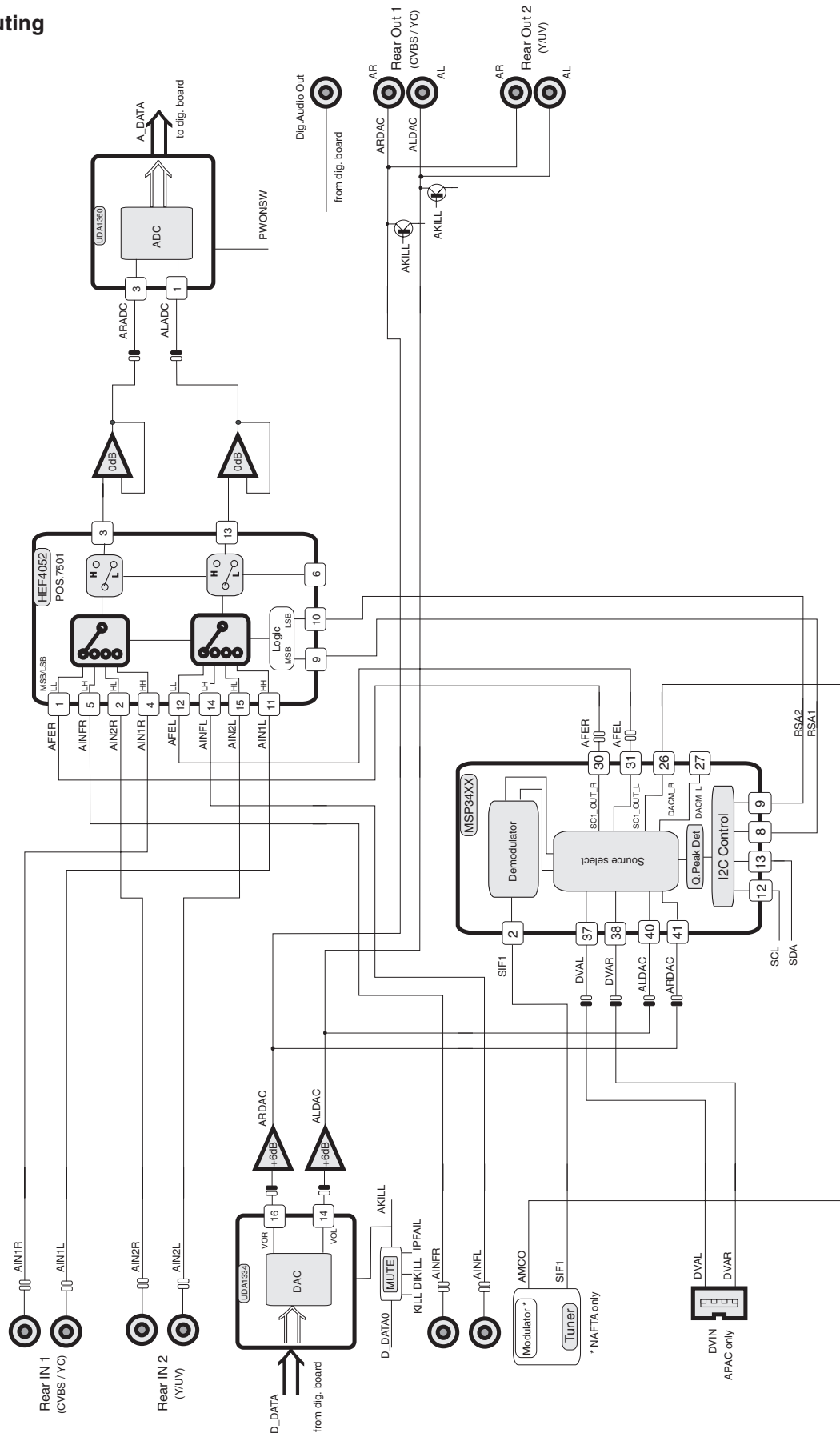
To achieve optimal tuning the "AFC"-signal is detected by the CC via an analog input; [3701], [3702] and [3703] are used for level adaptation (5V to 3V3). Pos [7700] is a driver for the video signal.

The sound demodulation is realized by the MSP34x5 [7600], which is also fully controlled via I 2 C-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.

### 4.2 Audio routing

Audio IO NAFTA / APAC Overview



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 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 3.4.f

e) Digital Audio Input-Path with IOE-Print:

see chapter 3.4.g

### 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.

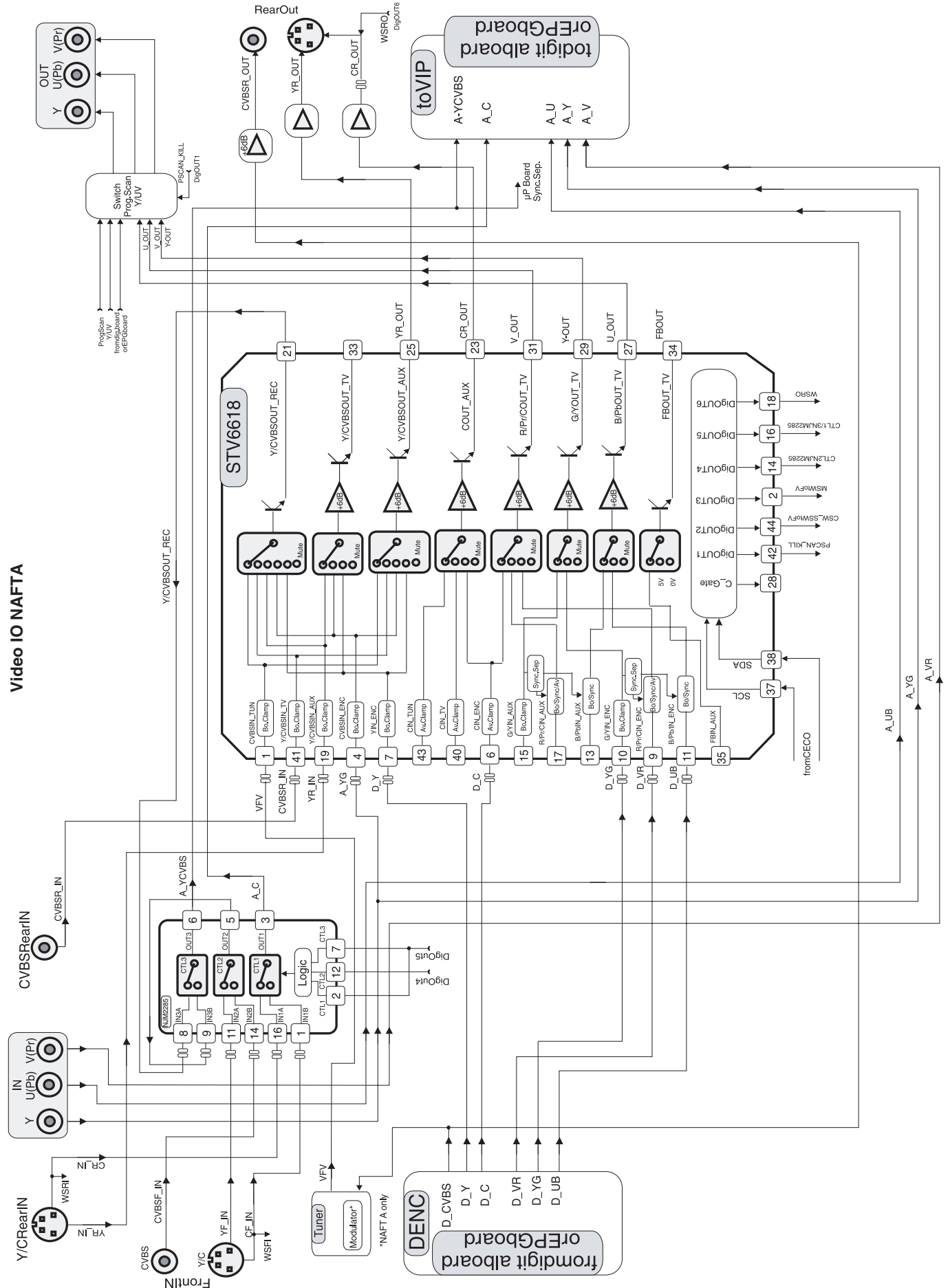
The transformation of dig. audio back to the analog domain is done by UDA1334BTS [7001]. All necessary clock signals are coming from the dig. board and dig. audio data ("D\_DATA0"-line) are converted into analog signals, which are available at pin 14 and pin 16 of [7001]. Afterwards an Op-Amp. [7002] (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.



### 4.4 Video-routing



Video IO NAFTA

DRX-2

The Video-I/O-switching is basically realized by the matrix switch STV6618 [7408], which is controlled via I<sup>2</sup>C-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 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 YUV progressive 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.

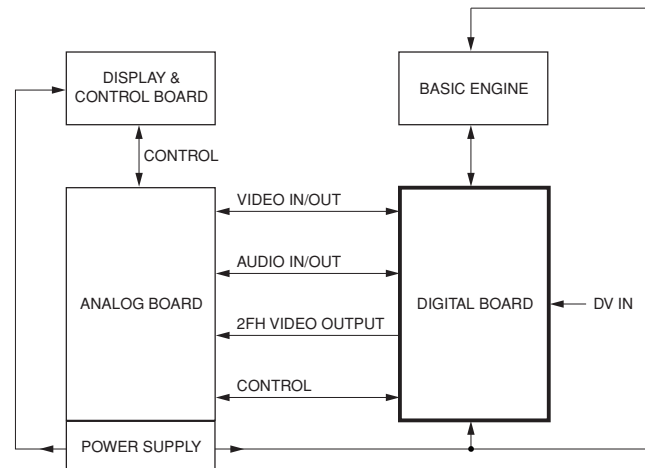
For generation of the appropriate DC-voltage on the Y/C output the "WSRO"-line is controlled via pin18 of [7408] by the CC-P (Pin 18 set to low means 4:3, pin 18 set to high determines 16:9).

During Stand-By there is also no loop-through of any input to any output performed.

## 5. Digital Board Chrysalis 2.1

### 5.1 Introduction

Block diagram 2nd generation DVD recorder



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.

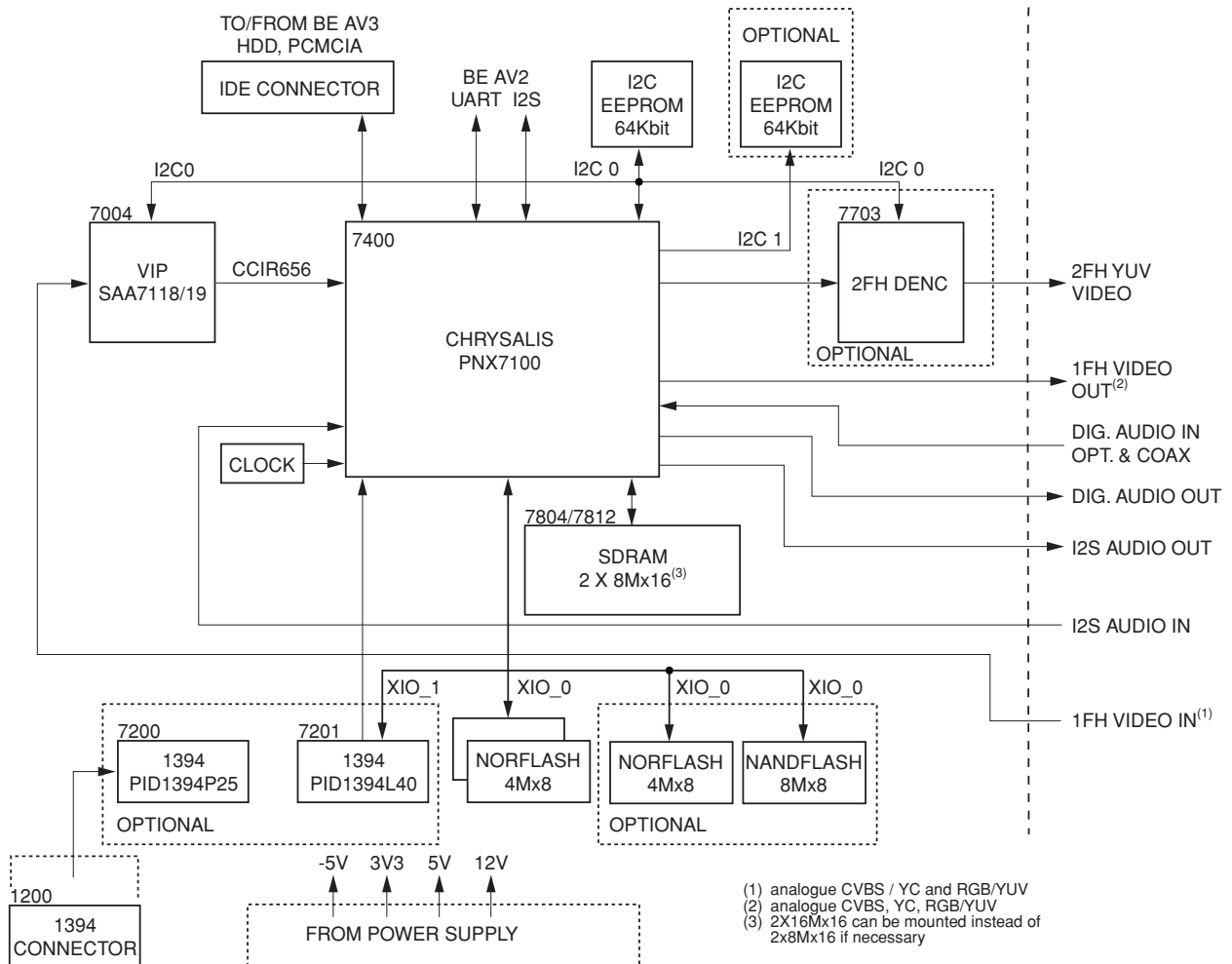
The board encodes and multiplexes analogue video and digital uncompressed audio (I2S) into an MPEG2 stream. This MPEG2 stream is formatted, to be recorded by the DVD+RW engine. In playback, the board will decode the MPEG2 stream into analogue and digital audio and into analogue video. In addition, a 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.).

## 5.2 Record Mode

### Block diagram Chrysalis Digital Board



#### 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 DVDR mechanism (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 DVDR mechanism for recording.

### 5.3 Playback Mode

During playback, the serial data from the DVDR mechanism 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.

### 5.4 DVDR Mechanism Interfaces

#### AV2 DVDR Mechanism (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 DVDR mechanism during record and playback mode. For data transport, an I2S bus is used.

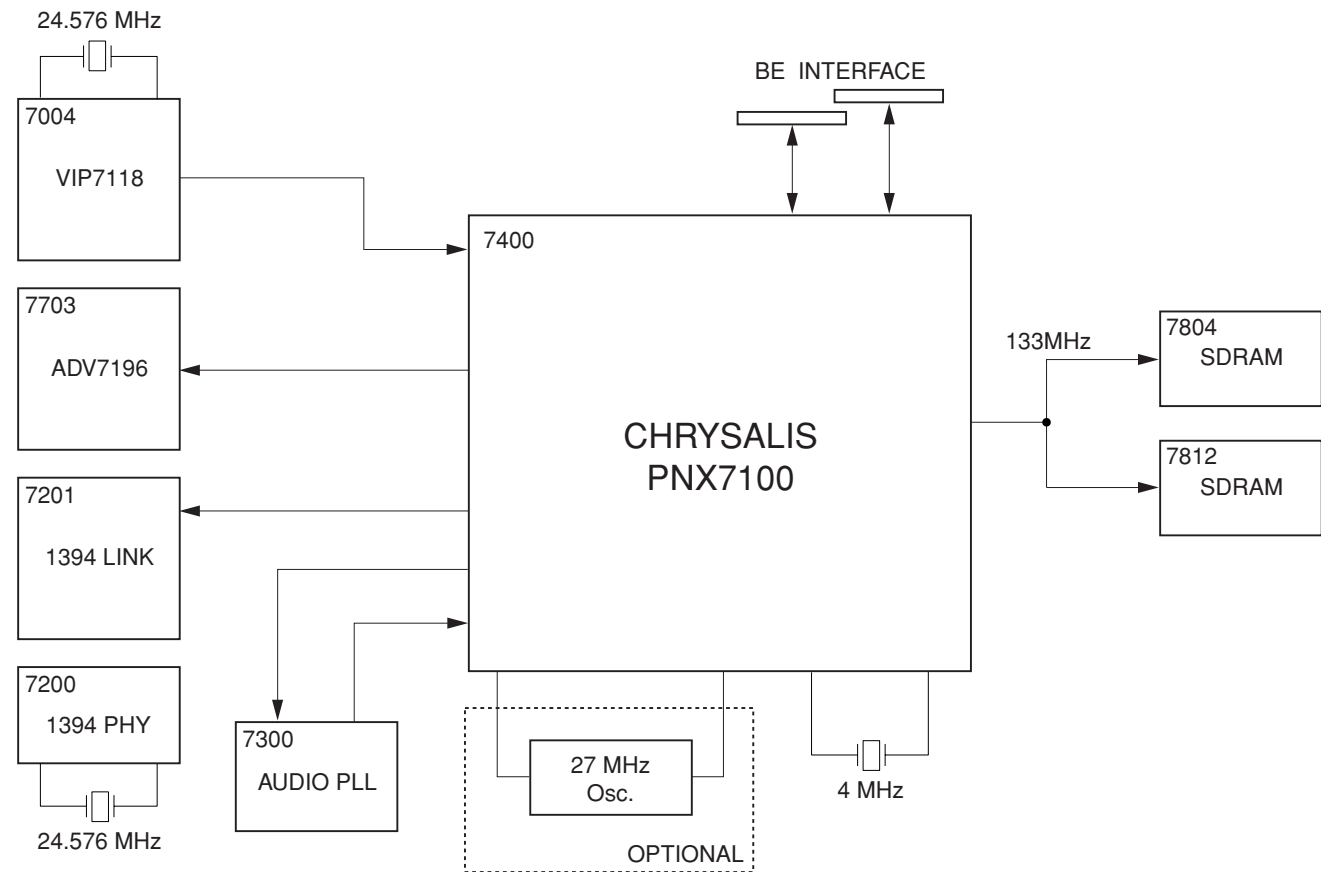
For detailed information on the AV2 BE module, see Service Manual 3122 785 12470.

#### AV3 DVDR Mechanism (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 DVDR mechanism (e.g. the AV3), a Hard Disc Drive (HDD), or a Smart Card Reader.

### 5.5 Clock Distribution

#### Clock distribution on Chrysalis board



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 initialization 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.

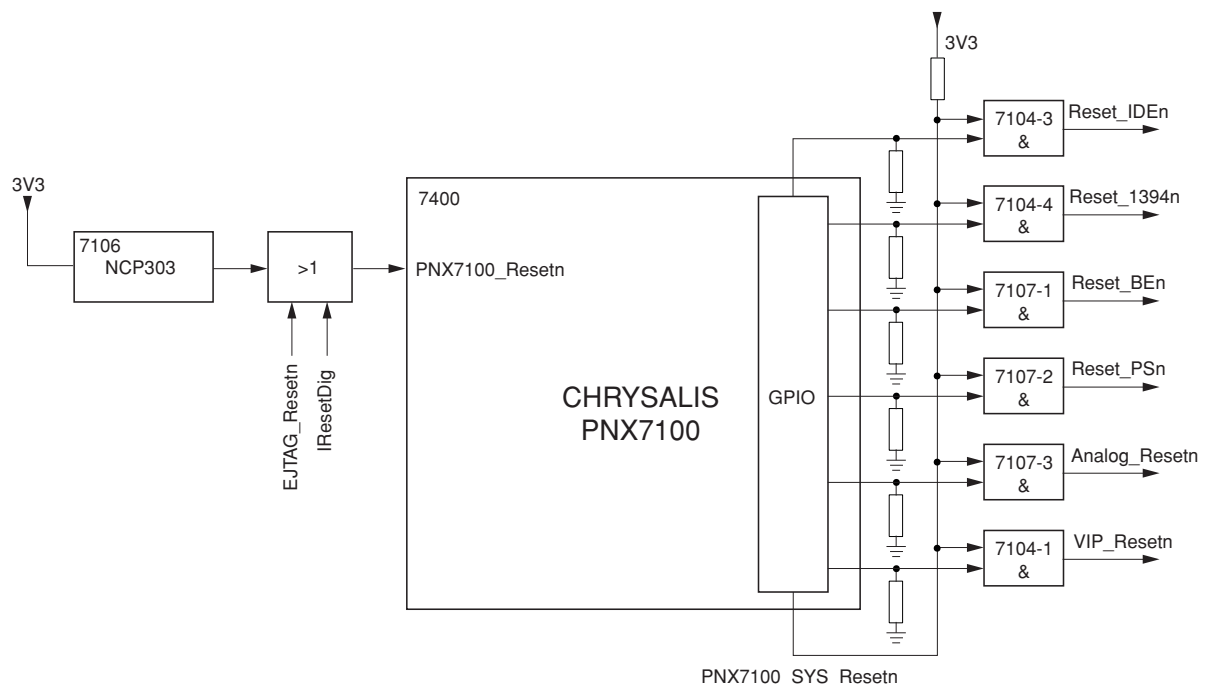
## 5.6 Power Supply

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.

## 5.8 Reset

### Reset concept Chrysalis board



The voltage detector NCP303LSN29 (IC7600) provides the reset signal PNX7100\_RESETn (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.

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.

## 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.

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\_RESETh (only for production).

They can pull the output of the NCP303LSN29 (item 7106) down via a shottky diode.

So when the output signal PNX7100\_RESETh is 'low', the board will reset. When this signal is 'high', the board is up and running.

The PNX7100\_SYS\_RESETh is a general enabling signal for the different reset lines. All other reset lines are directly driven from Chrysalis port pins (e.g. MPIO13\_IDE1\_RESETh). All and (item 7107) AND-gates. If both reset signals are low, all other external devices are initialized.

### 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).

### 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.

### 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.

### 6. 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.

## ■ ABBREVIATION LIST

### Analog Board

+5VSTBY	Audio Scart 1 Mute (System Clock Output for Real time Clock-Adjustment)
Permanent Supply 5V	AVCC
8SC2	Power Supply for A/D-converter
Pin8 Scart2 (only for Europe)	AVSS
A_DATA	GND-Pin for A/D-converter
Data from Analog- to Digital-Board (UART-Communication)	CFIN
A_RDY	Chroma Front In
Analog-board ready (status information to digital-board)	CS0_
A18 - A19	Chip Select 0 (CC - S-RAM)
Parallel Address Bus (CC - Flash-ROM and S-RAM)	CS2_
A8 - A17	Chip Select 2 (CC - Flash-ROM)
Parallel Address Bus (CC - Flash-ROM and S-RAM)	CVBSFIN
AD0 - AD7	Video Front In
Parallel Address and Data Bus (CC - Flash-ROM and S-RAM)	D_DATA
AFC	Data from Digital- to Analog-Board (UART-Communication)
Automatic Frequency Control	D_RDY
AFEL	Digital-board ready (status information from digital-board)
Audio Frontend Left	DAC_MUTE
AFER	Mute Signal for DAC
Audio Frontend Right	DAOUT
AGC / WSRI	Digital Audio Out
Automatic Gain Control (for Europe), Wide Screen Rear In (for NTSC)	DVAL
AINFL	Audio from Digital Video In Left
Audio In Front Left	DVAR
AINFR	Audio from Digital Video In Right
Audio In Front Right	DVCC1
AKILL	Power Supply Pin
Audio Kill Signal	DVCC2
ALADC	Power Supply Pin
Audio Left to ADC	DVCC3
ALDAC	Power Supply Pin
Audio Left from DAC	DVSS1
ALE	GND Pin
Address Latch Enable	DVSS2
AM0	GND Pin
Adress-mode 0	DVSS3
AM1	GND Pin
Adress-mode 1	FAN_OFF
ARADC	Fan for DVDR mechanism
Audio Right to ADC	FBIN
ARDAC	Fast Blanking input
Audio Right from DAC	FOME
ASCC1M	FOLLOW ME Status line (matching signals yes/no; only for Europe)
	G1...10
	DISPLAY GRID
	INT

Interrupt OUT for the CC	IC-Bus
INT	SCLSW
Interrupt – line from Display Print	Switched IC-Bus
ION	SDA
Inverse ON-Line	IC-Bus
IPFAIL	SDASW
Inverse Power Fail Detection	Switched IC-Bus
IPOR	SFS_TS
Inverse Power On Reset	SAW Filter Select Trap Select
IRESET	STBY
Inverse Reset Input	Standby-Line (Flash_Toshiba)
IRR	SYNC
Signal from IR-Receiver	Video Sync input
K1	TEMP_SENSE
Key-Input-Line	Temperature Sense Line
K2	VER
Key-Input-Line	HW-version input
KILL	VFV
Audio Mute	Video from Frontend
P50 IN	VKK
P50 INput-line (only for Europe)	VFT Driver Power Supply
P50 OUT	VREFH
P50 OUTput-line (only for Europe)	Pin for Reference-voltage input to A/D-converter
POR_DC	VREFL
Power On Reset for Display Control Print (Ext_DL)	Pin for Reference-voltage input to A/D-converter
PSS	VS1/2
Pal/Secam-Select	View Selector 1/2
PWM_FIL	WR_
Control line for Filament Voltage Generation	Write Enable (CC - Flash-ROM and S-RAM)
PWONSW	WSFI
Amplifier Switch Audio A/D Converter	Wide Screen Signalling Front In
RD_	WU
Output Enable ReaD (CC - Flash-ROM and S-RAM)	Wake Up
RECLED	X1
Control Signal for REC-LED	Oscillator Pin
RESET_DIG	X2
Reset Line to Digital Board	Oscillator Pin
RP_	XIN
Inverse Reset line to Flash-ROM	Oscillator Pin
RSA1/2	XOUT
Record Selector 1/2	Oscillator Pin
RY/BY_	XT1
Ready/Busy – input line (from Flash-ROM)	Low Frequency Oscillator Pin
SIF1	XT2
Sound intermediate frequency	Low Frequency Oscillator Pin
SB1	YFIN
Secam Band 1 (PCB-Test entrance)	Luminance Front In
SCL	



## Digital Board Chrysalis

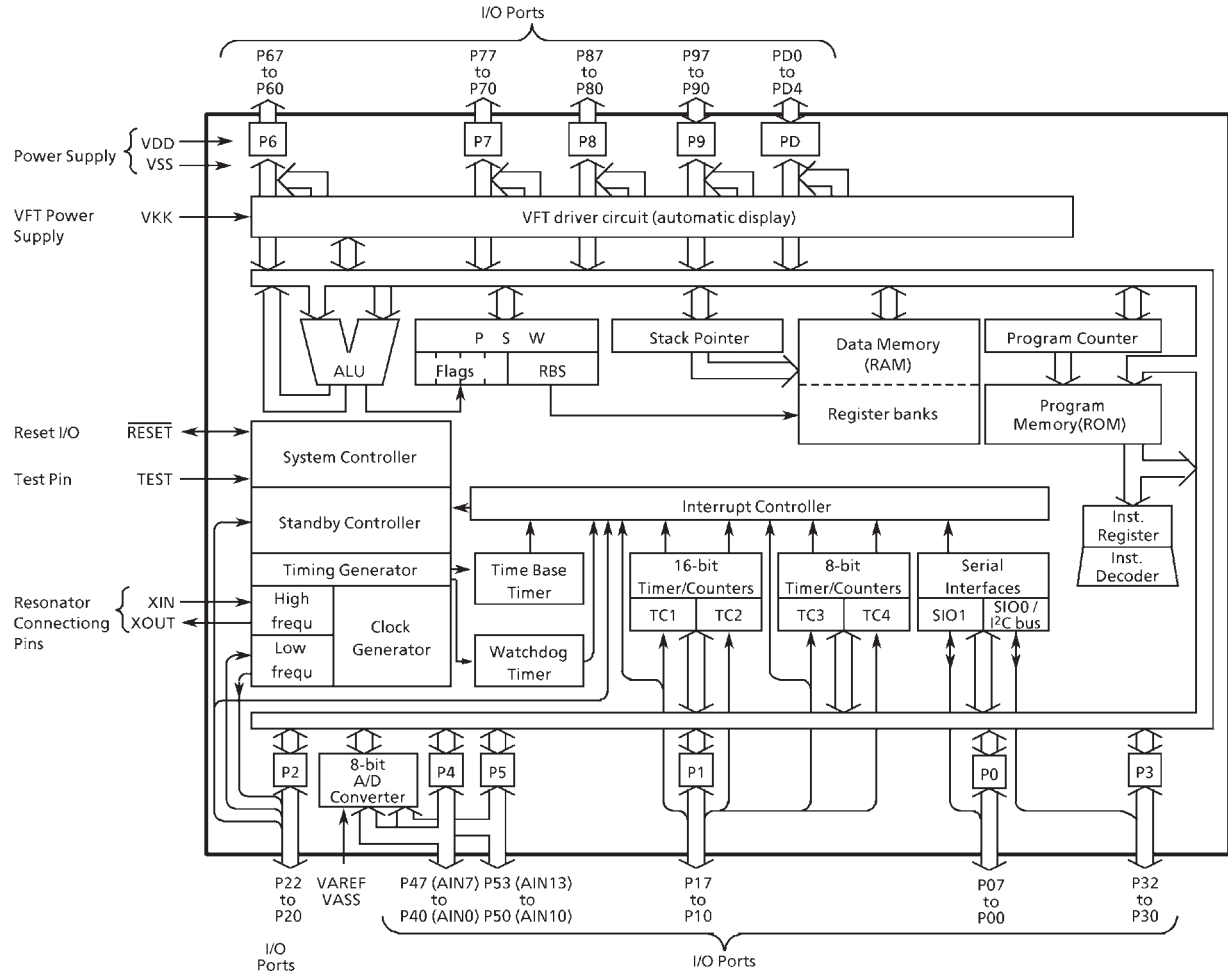
ADC:Analog to Digital Converter	Audio sampling frequency indication signal
DAC:Digital to Analog Converter	ALRCLK
DENC:Digital (Video) Encoder (Video DAC)	Audio Word Select
DV: Digital Video (Camcorder)	AMCLK44
EF: Emitter Follower	11.2896MHz (=256 * 44.1 kHz) audio master clock signal for 44.1 kHz audio
OSD:On-Screen Display	AMCLK48
VIP:Video Input Processor (Video ADC)	12.288MHz (=256 * 48 kHz) audio master clock signal for 32 kHz and 48 kHz audio
2Fh: Progressive scan video	APWM
2V5	PWM signal for audio PLL
+2V5 Power supply for Link+Codec IC7431	ASIC
3V3	Application Specific Integrated Circuit
+3V3 Power supply	BUFENn_AUD
3V3_A	Buffer Enable Audio
+3V3 Analog power supply for PHY IC7400	BUFENn_VID
3V3_D	Buffer Enable Video
+3V3 Digital power supply for PHY IC7400	CLK27M_CON
3V3_DLY	27MHz Clock to Digital Board
+3V3 Power supply for IC7500	CS
3V3_LINK	Parallel interface chip select input of Link+Codec IC7431
+3V3 Power supply for Link+Codec IC7431	CTL (0:1)
3V3_F	Link interface control lines
+3V3 Power supply for optional Flash memory IC7432	CTSN
3V3_RAM	Clear to Send
+3V3 Power supply for SDRAM IC7430	D (0:15)
3V3_uP	Flash data lines of Link+Codec IC7431
+3V3 Power supply for Micro-controller IC7802	DCDi
3V3_32kHz	Directional Correlational Deinterlacing. Circuitry that reduces jaggies on diagonal edges when deinterlacing video-sourced material.
+3V3 Power supply for audio format adaptation circuitry IC7507 and IC7508	DV_STATUS
3V3_AC	Interrupt pin for reading DV-status
+3V3 Power supply for audio system clock generator IC7605 and IC7606	HS_CLK
+5V	Video clock input of Link+Codec IC7431
+5V Power supply	INT
5V_PLL	Interrupt request output of Link+Codec IC7431 (input to Micro-Controller)
+5V Power supply for VCO of audio PLL IC7604	IOR
A (1:17)	Parallel interface IO read control input of Link+Codec IC7431
Flash address lines of uPD72893	ISPN
A_MUTE	In System Programming signal (used for programming IC7802)
Audio Mute	LKON
ABCK	Link-on signal output
Audio Bit Clock	LPS
AD (1:10)	Link power status input
Address bus lines for Host I/F of Link+Codec IC7431	LREQ
AEMP1	Link request input
PCM1 emphasis ON/OFF for PCM1 output	MA (0:10)
AFS1	

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  
RETB  
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

# IC DATA

## Display Board

IC7103: TMP87CH74F



DRX-2

## IC7103: TMP87CH74F

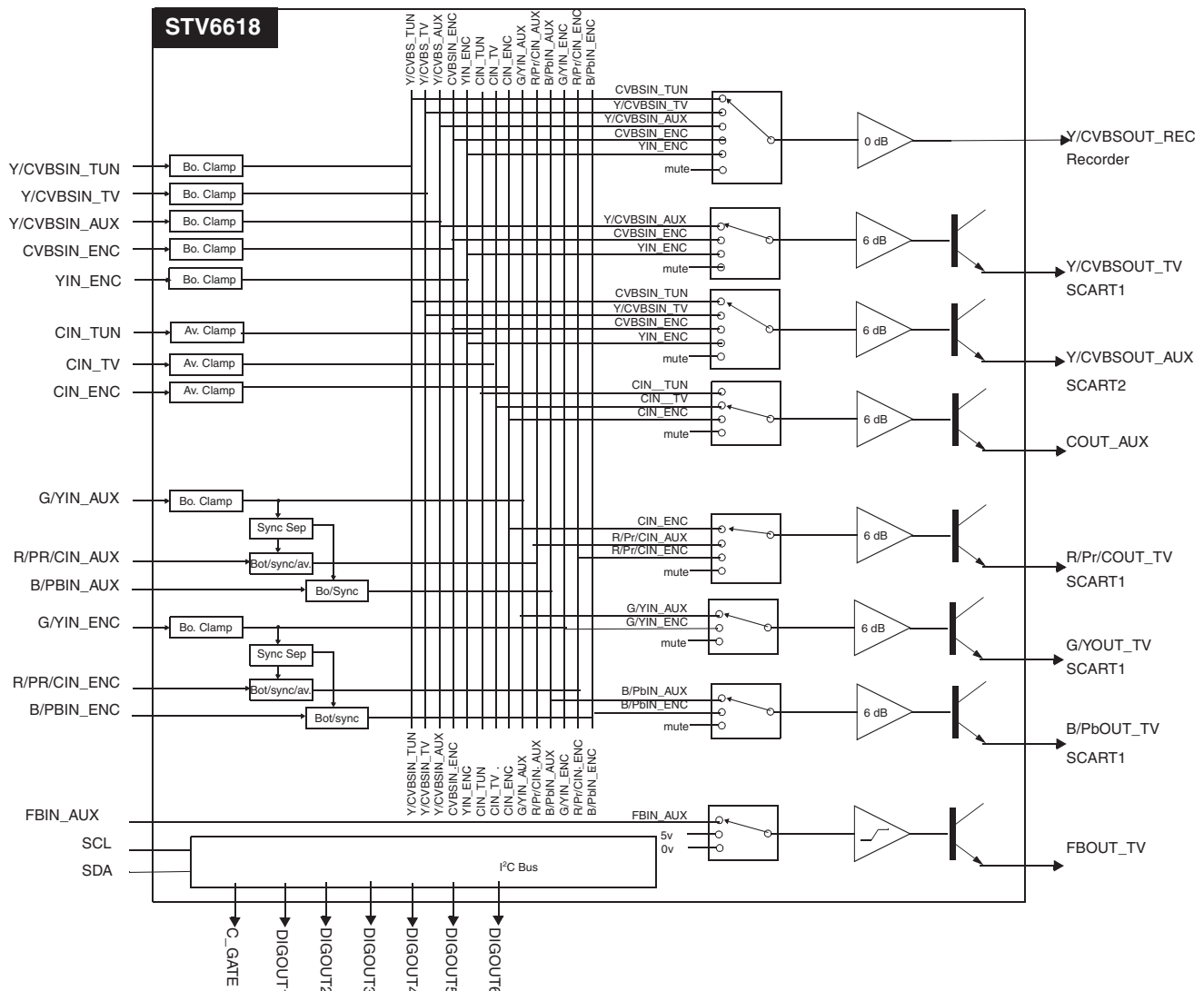
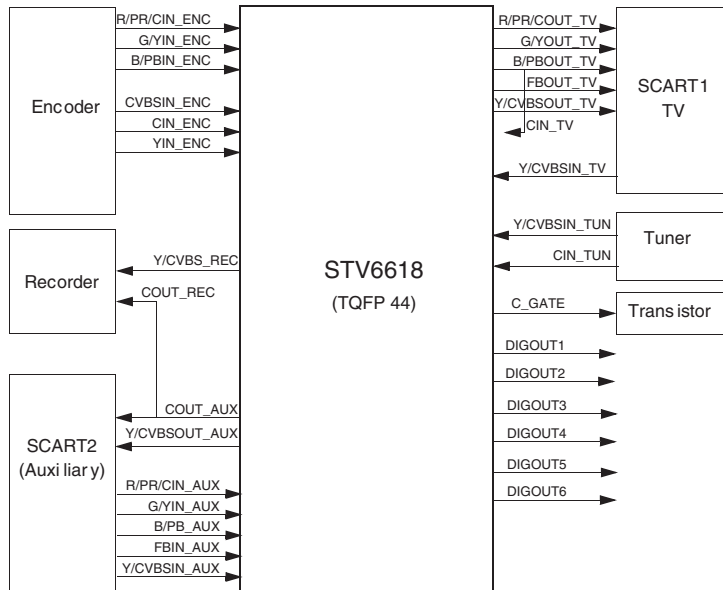
Pin Name	Input / Output	Function	
P07 to P03	I/O	Two 8-bit programmable input/output ports (tri-state). Each bit of these ports can be individually configured as an input or an output under software control. When used as a SIO input/output, an External interrupt input, a timer/counter input, the latch 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)		SIO1 serial data Input
P01 (SI1)	I/O (Input)		SIO1 serial clock input/output
P00 (SCK1)	I/O (I/O)		External interrupt input 4 or Timer/Counter 3 input
P17 (INT4/TC3)	I/O (Input)		External interrupt input 2
P16 (INT2)			External interrupt input 3 or Timer/Counter 1 input
P15 (INT3/TC1)	I/O (I/O)		Timer counter 4 input or 8-bit programmable divider output or 8-bit PWM output
P14 (TC4/PDO/PWM)			Divider output
P13 (DVO)	I/O (Output)		Timer counter 2 input or Programmable pulse generator output
P12 (TC2/PPG)	I/O (I/O)		External interrupt input 1
P11 (INT1)	I/O (Input)	External interrupt input 0	
P10 (INT0)			
P22 (XTOUT)	I/O (Output)	3-bit input/output port with latch. When used as input port, or external interrupt input, STOP mode release signal input, the latch must be set to "1".	Resonator connecting pins (32.768 kHz). For inputting external clock, XTIN is used and XTOUT is opened.
P21 (XTIN)	I/O (Input)		External interrupt input 5 or STOP mode release signal input
P20 (INT5/STOP)			
P32 (SCK0)	I/O (I/O)	3-bit programmable input/output ports (Sink open drain). Each bit of these ports can be individually configured as an input or an output under software control. When used as a I <sup>2</sup> C input/output, the latch must be set to "1".	SIO0 serial clock input/output
P31 (SDA/SO0)	I/O (I/O/Output)		I <sup>2</sup> Cbus serial data input/output or SIO0 serial data output
P30 (SCL/SI0)	I/O (I/O/Input)		I <sup>2</sup> Cbus serial clock input/output or SIO0 serial data Input
P47 (AIN7) to P40 (AIN0)	I/O (Input)	8-bit programmable input/output ports (tri-state). Each bit of these ports can be individually configured as an input or an output under software control. When used as an analog input, the P4CR must be set to "0".	A/D converter analog inputs
P53 (AIN13) to P50 (AIN10)	I/O (Input)	4-bit programmable input/output ports (tri-state). Each bit of these ports can be individually configured as an input or an output under software control. When used as an analog input, the P5CR must be set to "0".	A/D converter analog inputs
P67 (V7) to P60 (V0)	I/O (Output)	Four 8-bit high breakdown voltage output ports with the latch. When used as a VFT driver output, the latch must be cleared to "0".	VFT driver outputs
P77 (V15) to P70 (V8)			
P87 (V23) to P80 (V16)			
P97 (V31) to P90 (V24)			
PD4 (V36) to PD0 (V32)	I/O (Output)	5-bit high breakdown voltage output ports with the latch. When used as a VFT driver output, the latch must be cleared to "0".	

## IC7103: TMP87CH74F

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

# Analog Board

IC7408: STV6618

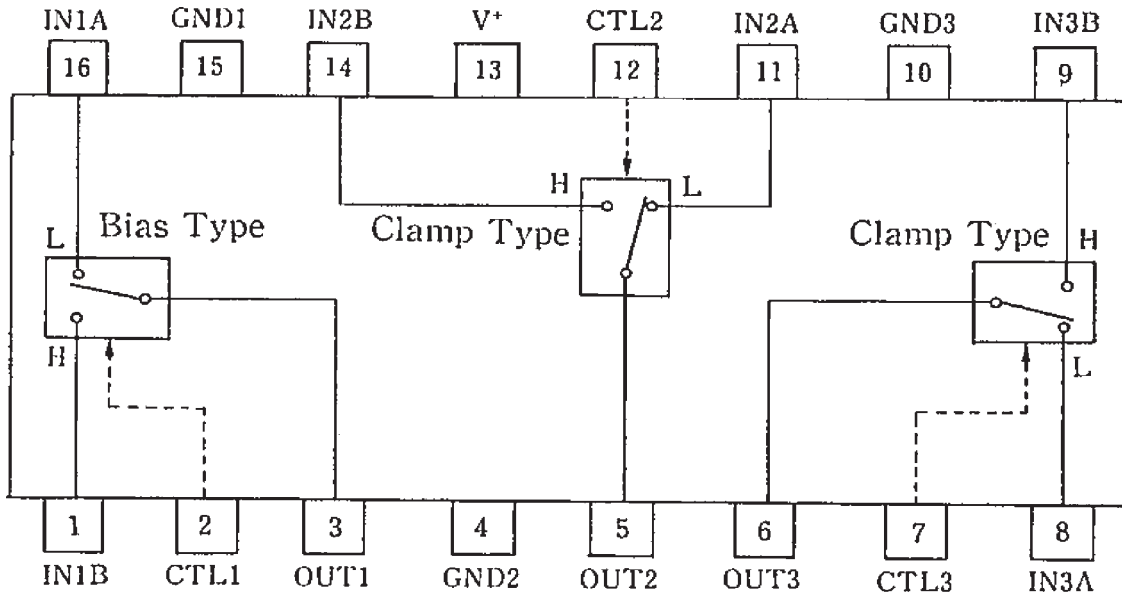


DRX-2

## IC7408: STV6618

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 (Unconnected)
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) (Unconnected)
34	FBOUT_TV	Fast Blanking Output to TV (SCART1) (Unconnected)
35	FBIN_AUX	Fast Blanking Input from Auxiliary (SCART2)
36	VDD	+5 V Digital Power Supply
37	SCL	IC BusClock
38	SDA	IC 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

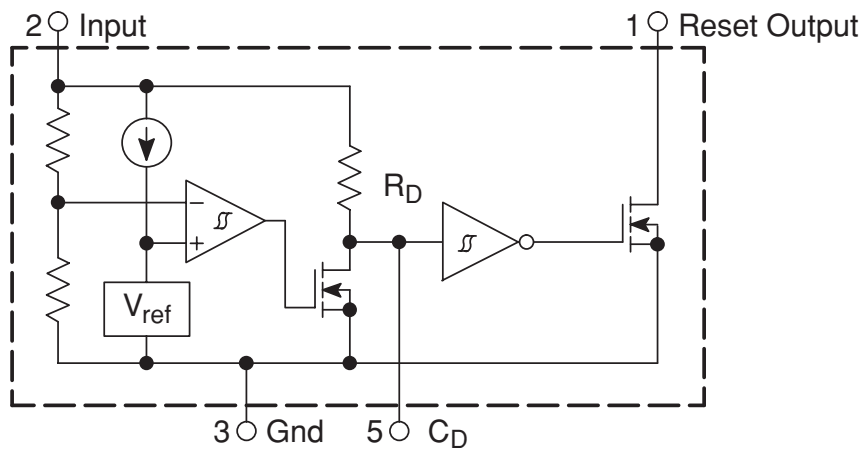
IC7411: NJM2285



NJM2285D  
NJM2285M  
NJM2285V

Digital Board Chrysalis

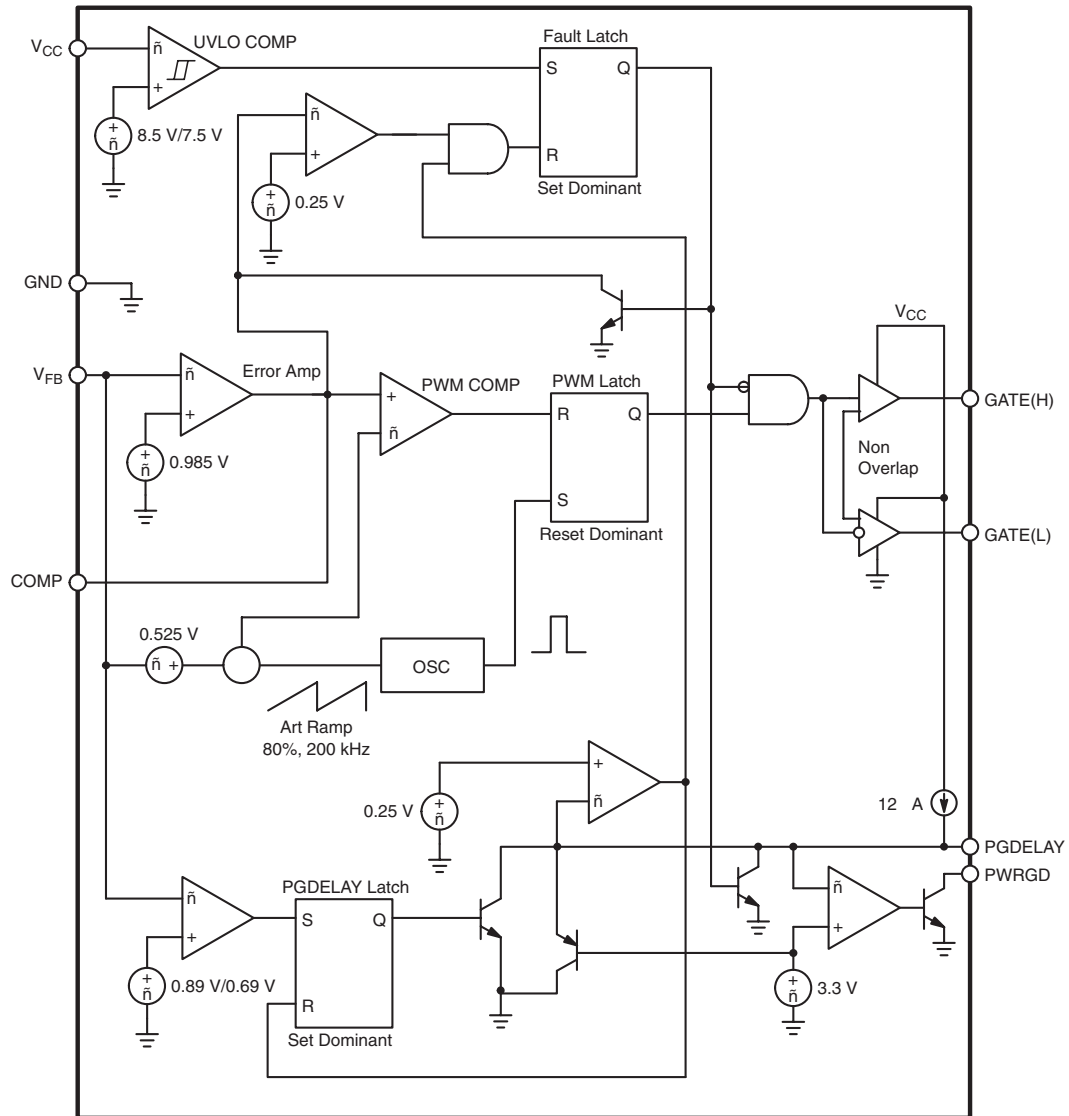
IC7106: NCP303LSN29



DRX-2

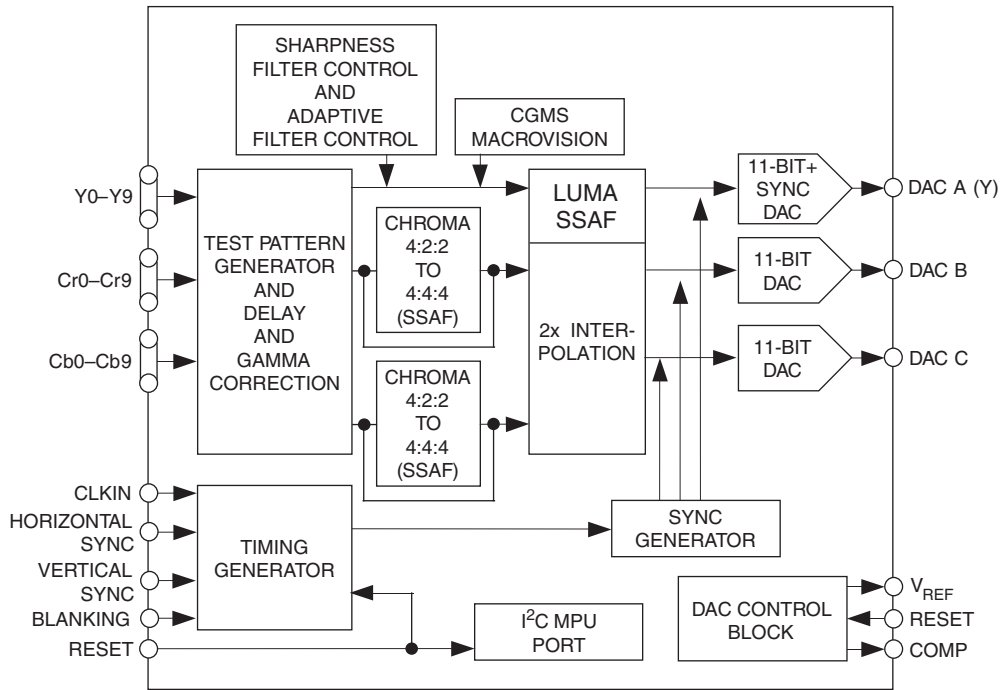


## IC7501: NCP1570D



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. (Unconnected)
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.

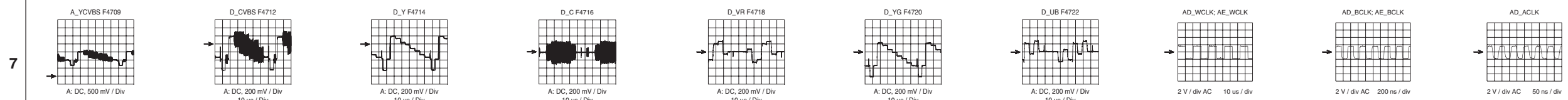
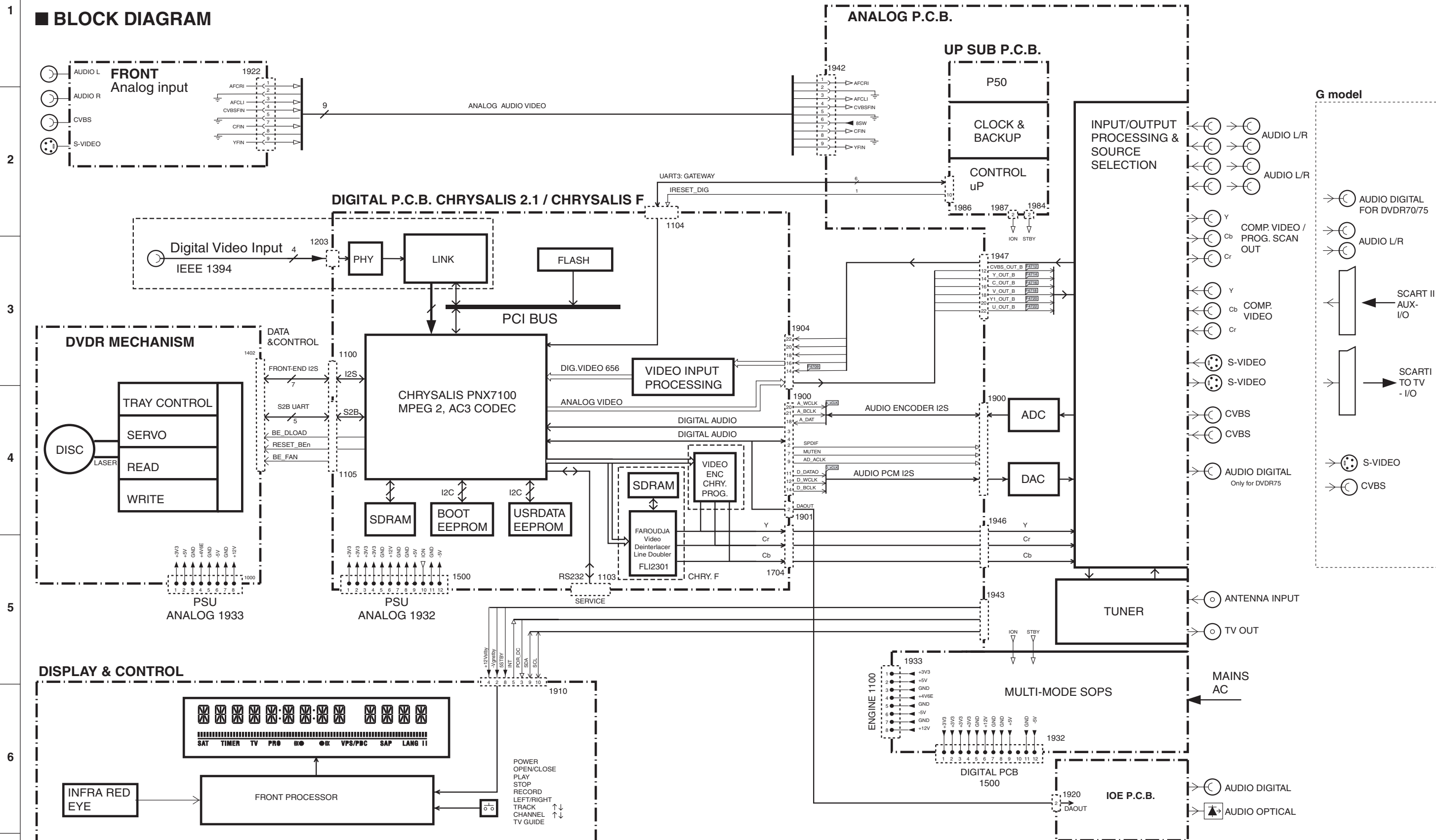
IC7703: ADV7196A



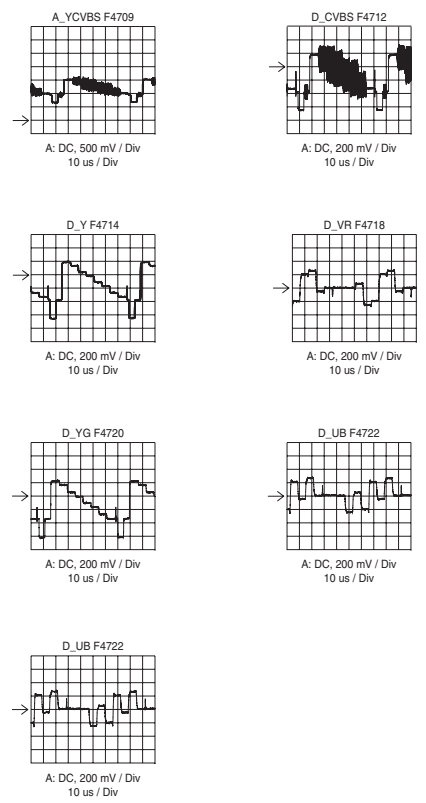
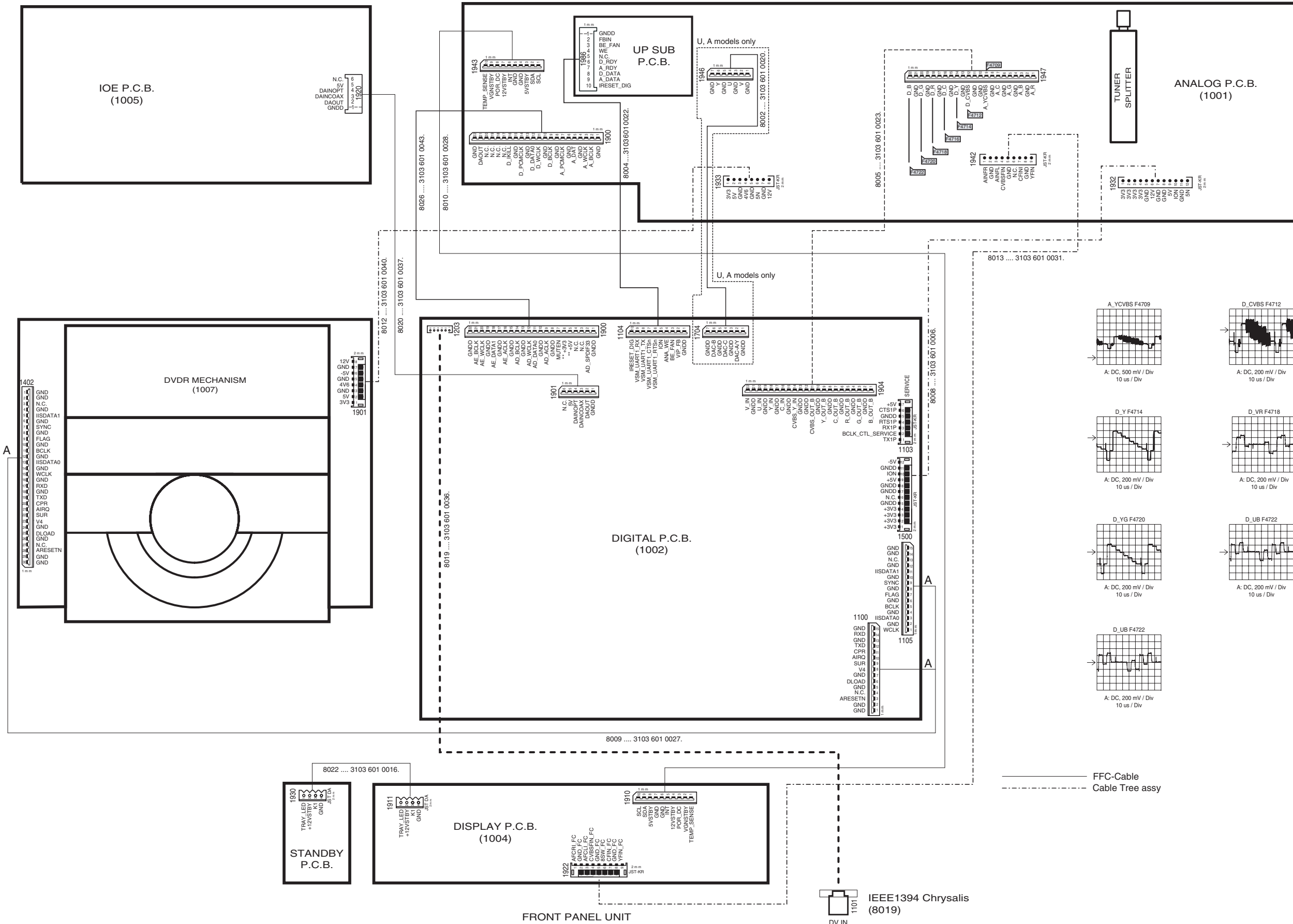
Pin	Mnemonic	Input/Output	Function
1, 12	VDD	P	Digital Power Supply
2–11	Y0–Y9	I	10-Bit Progressive Scan/HDTV Input Port for Y Data. Input for G data when RGB data is input.
13, 52	GND	G	Digital Ground
14–23	Cr0–Cr9	I	10-Bit Progressive Scan/HDTV Input Port for Color Data in 4:4:4 Input Mode. In 4:2:2 mode this input port is not used. Input port for R data when RGB data is input.
24, 35	VAA	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	VSYNC/ TSYNC	I	VSYNC , Vertical Sync Control Signal Input or TSYNC Input Control Signal in TSYNC Async Timing Mode
29	HSYNC/ SYNC	I	HSYNC , Horizontal Sync Control Signal Input or SYNC Input Control Signal in SYNC 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 F capacitor from COMP pin to VAA.
38	RSET	I A	2470 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 RSET value must be 2820 .
39	VREF	I/O	Optional External Voltage Reference Input for DACs or Voltage Reference Output (1.235 V)
40	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.

DRX-2

# BLOCK DIAGRAM



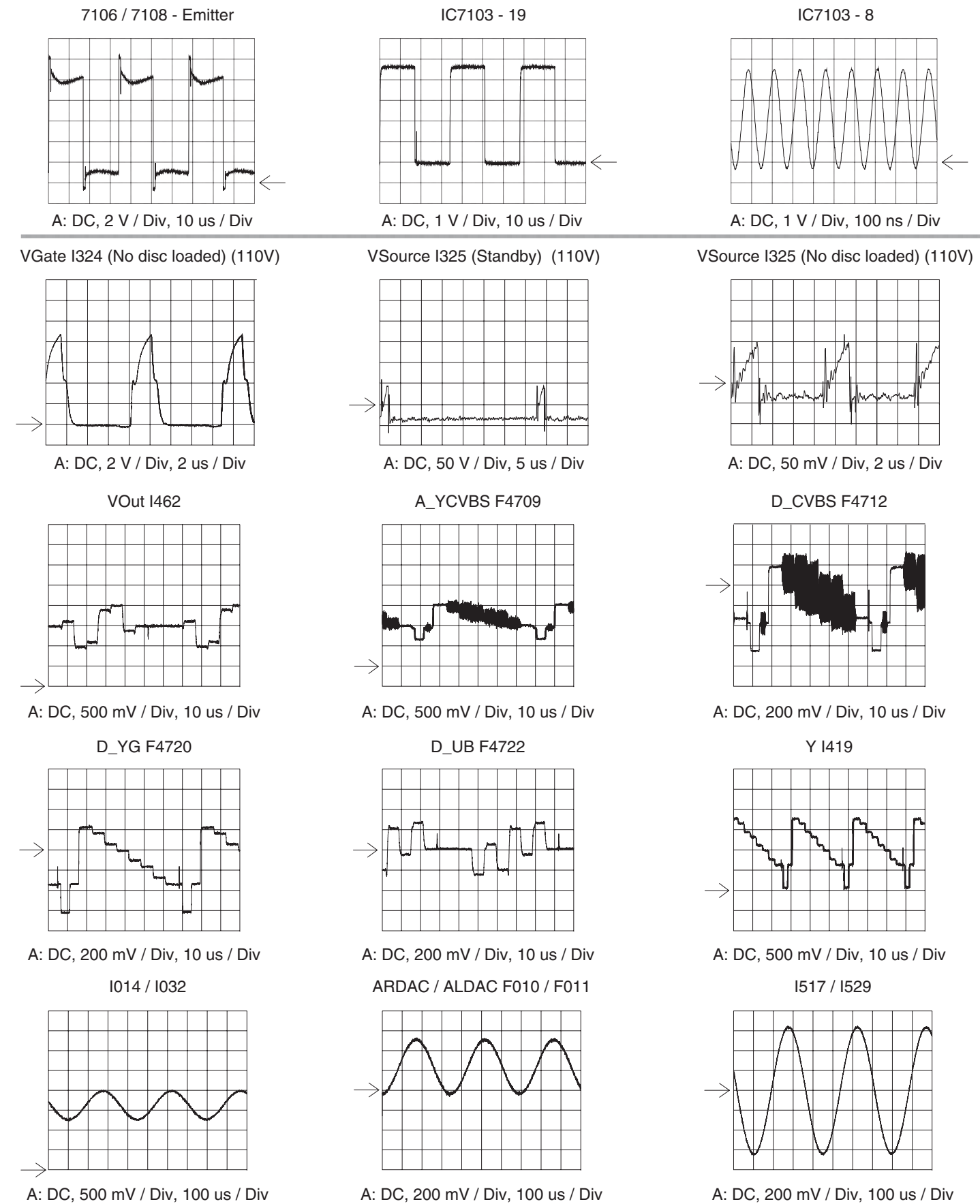
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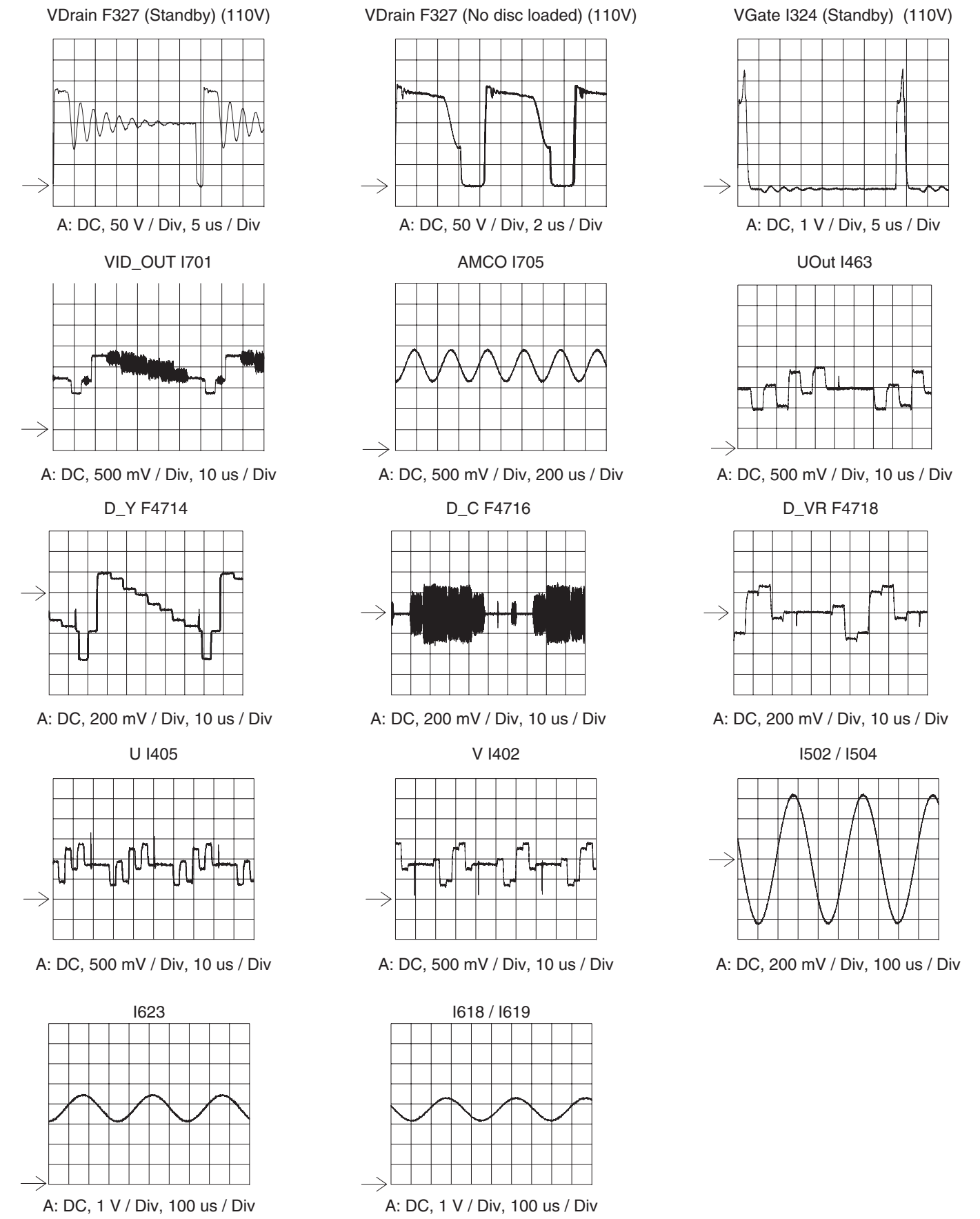
— FFC-Cable  
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■ WAVEFORMS

DISPLAY P.C.B.



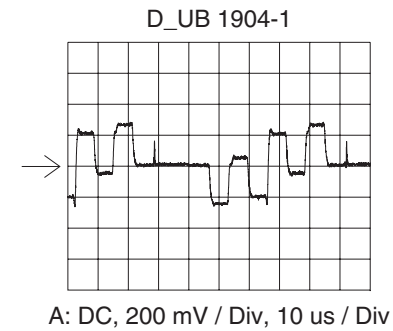
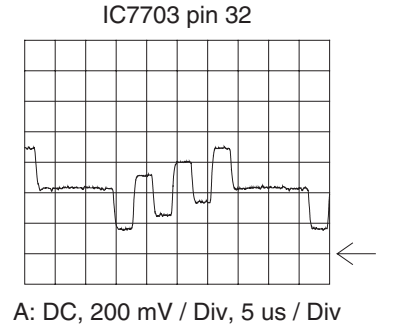
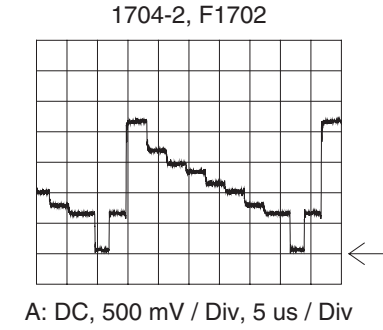
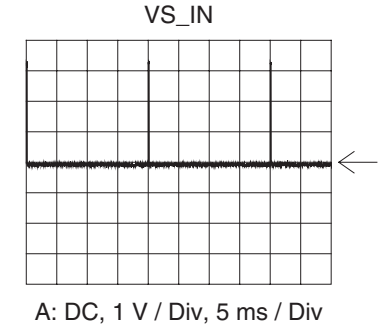
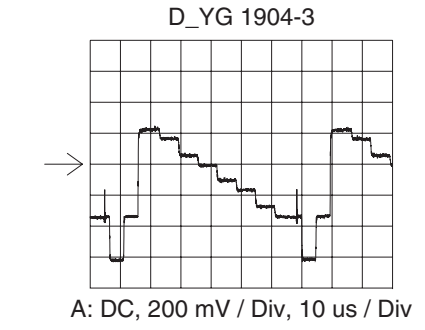
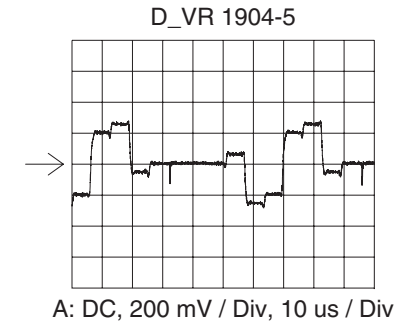
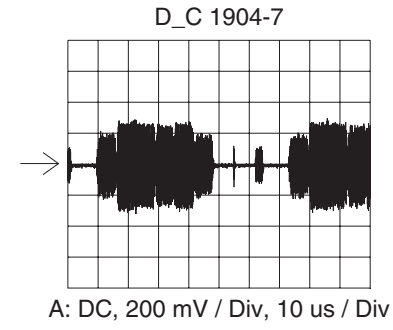
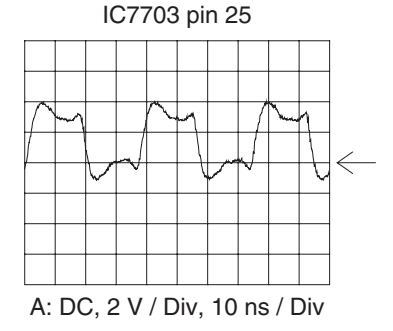
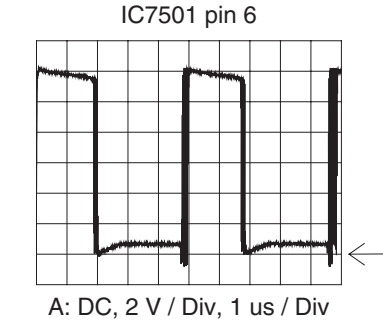
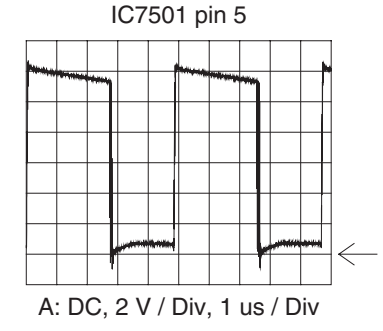
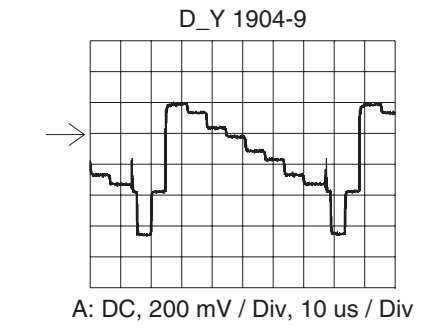
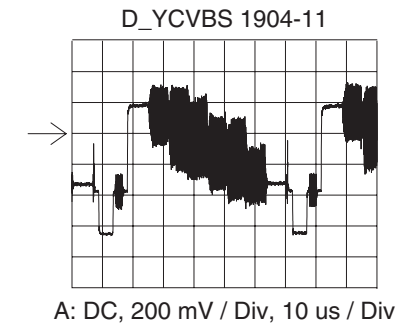
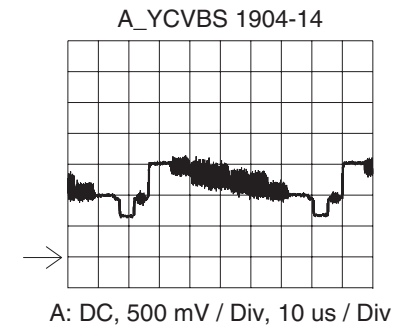
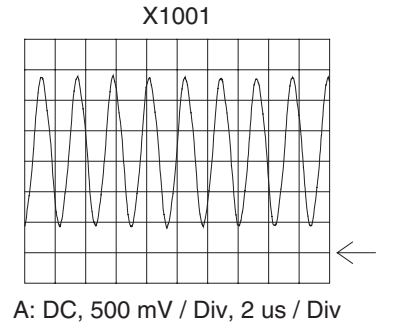
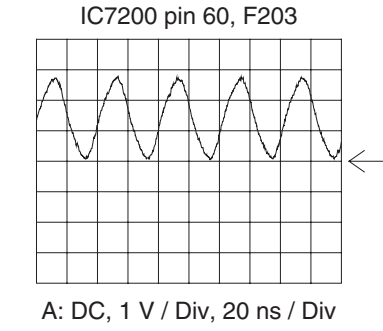
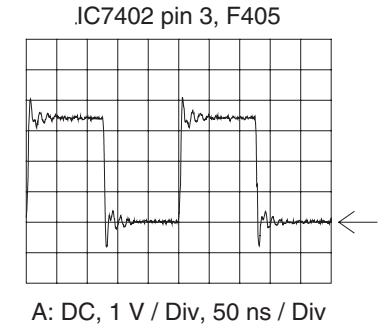
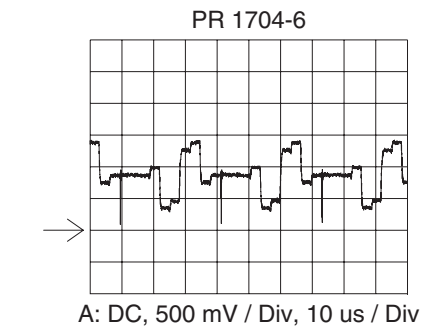
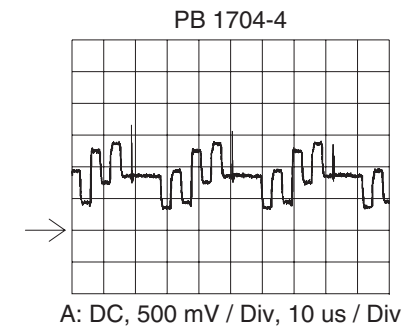
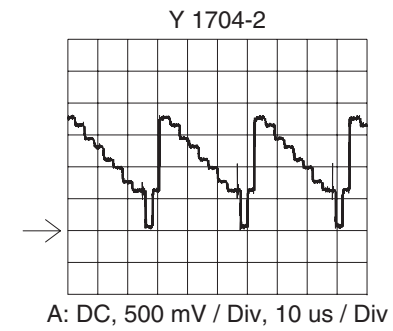
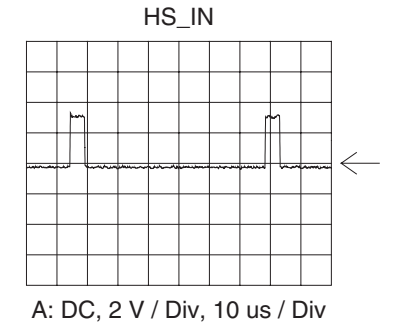
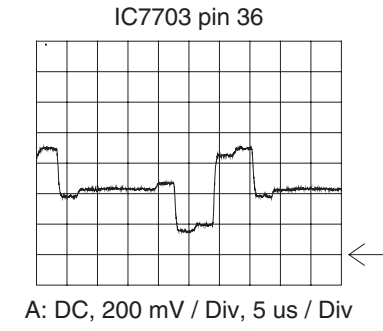
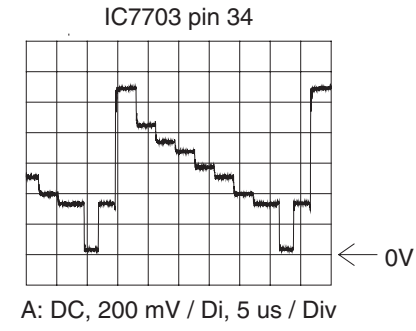
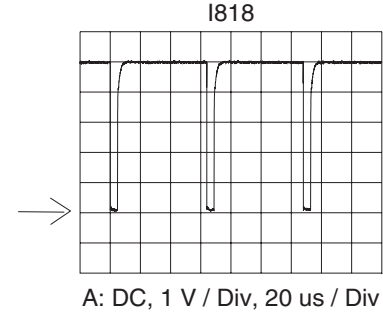
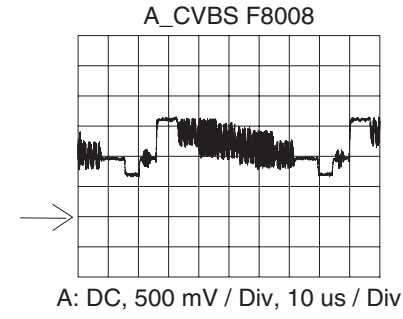
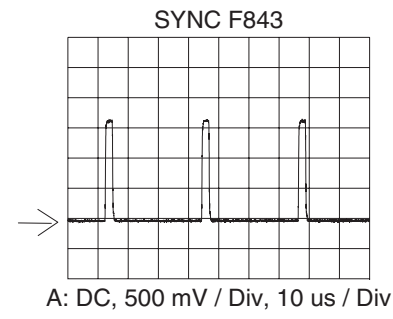
ANALOG P.C.B.



# WAVEFORMS

## UP SUB P.C.B.

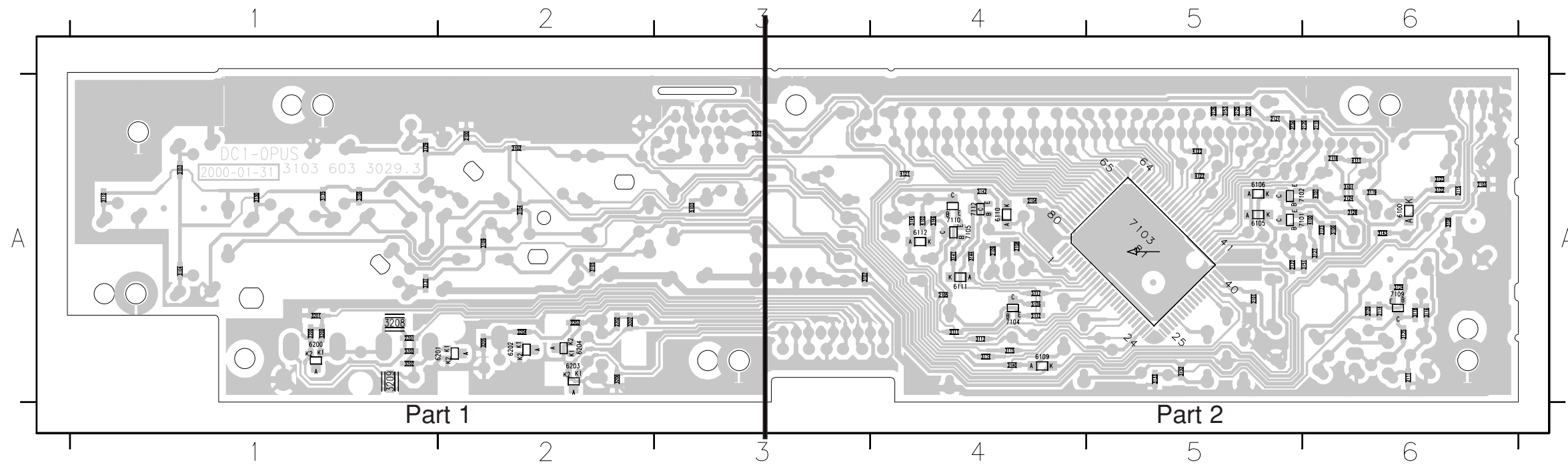
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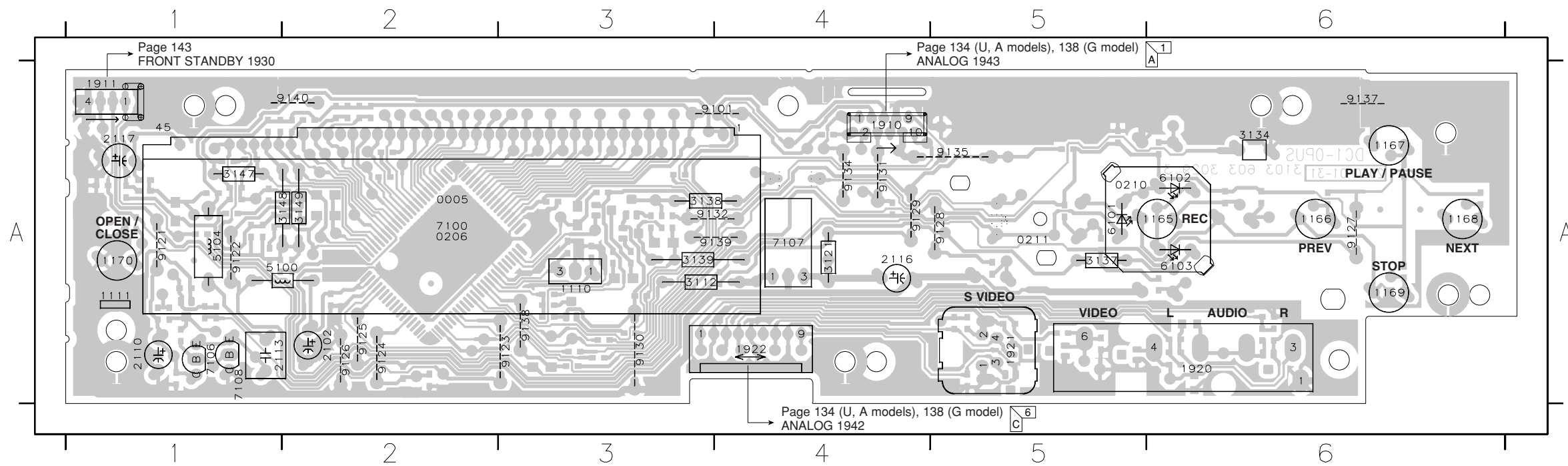
PRINTED CIRCUIT BOARD

FRONT DISPLAY P. C. B. (Bottom View)



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0002	A4
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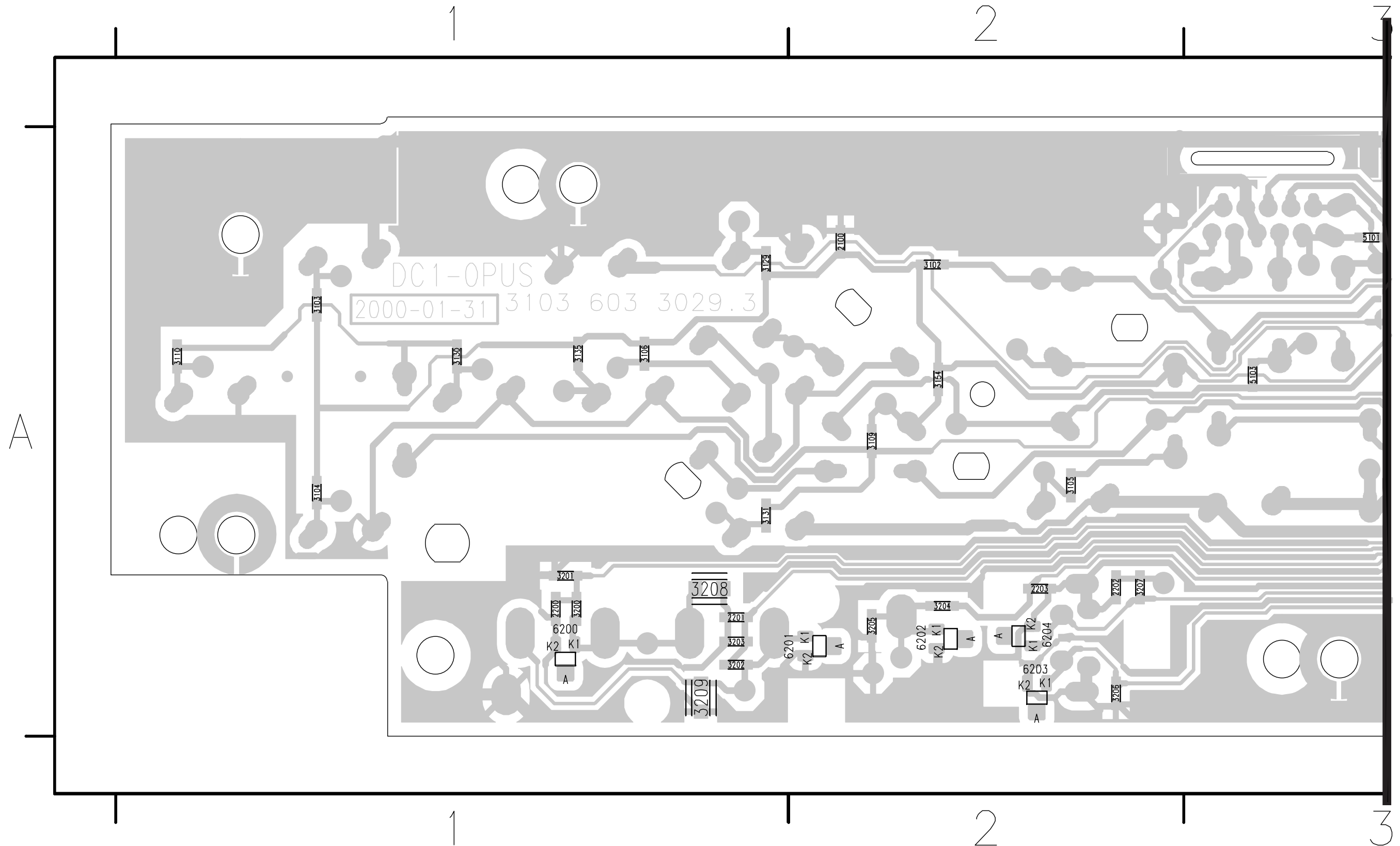
FRONT DISPLAY P. C. B. (Top View)



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■ PRINTED CIRCUIT BOARD

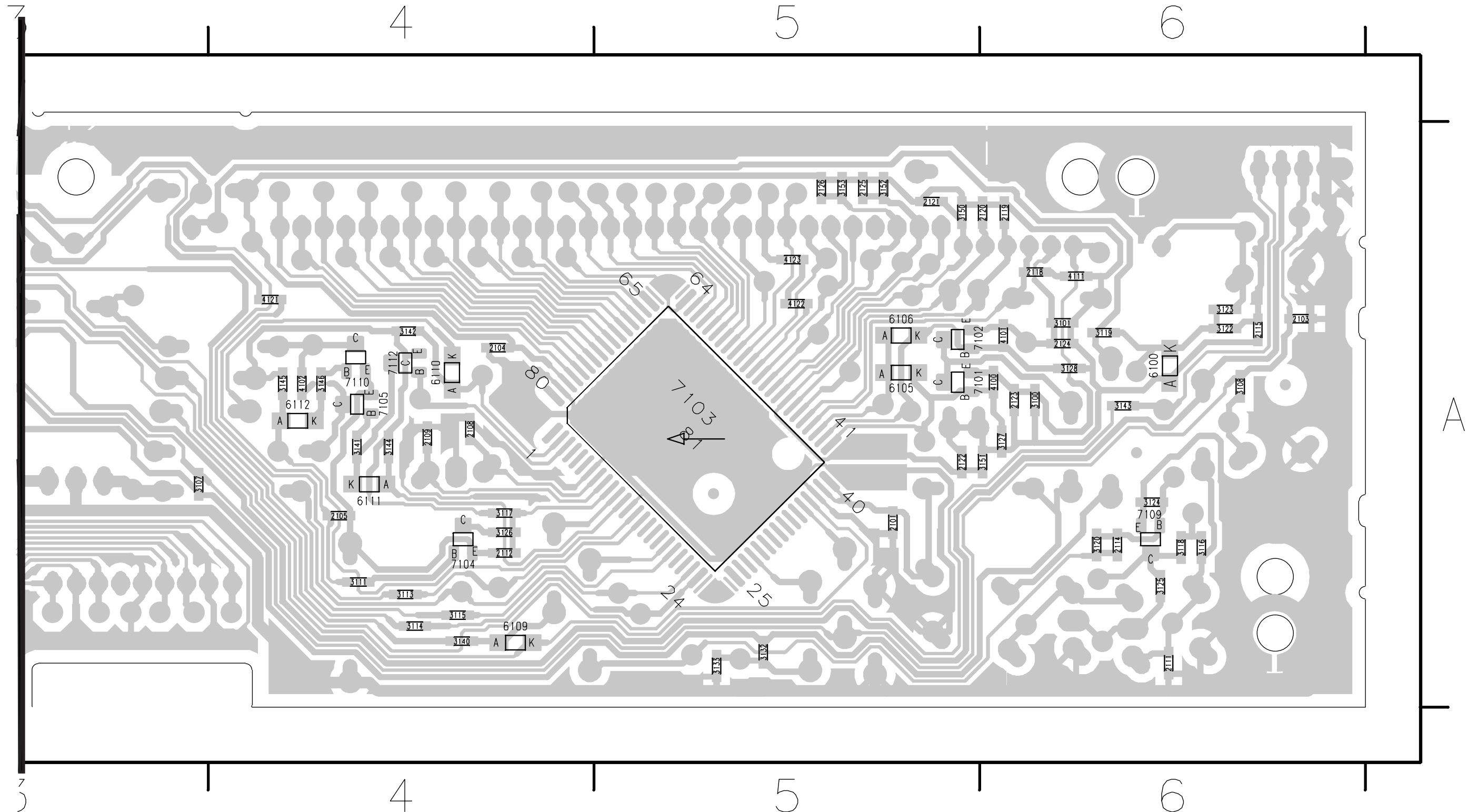
FRONT DISPLAY P. C. B. (Part 1 Bottom View)





■ PRINTED CIRCUIT BOARD

FRONT DISPLAY P. C. B. (Part 2 Bottom View)



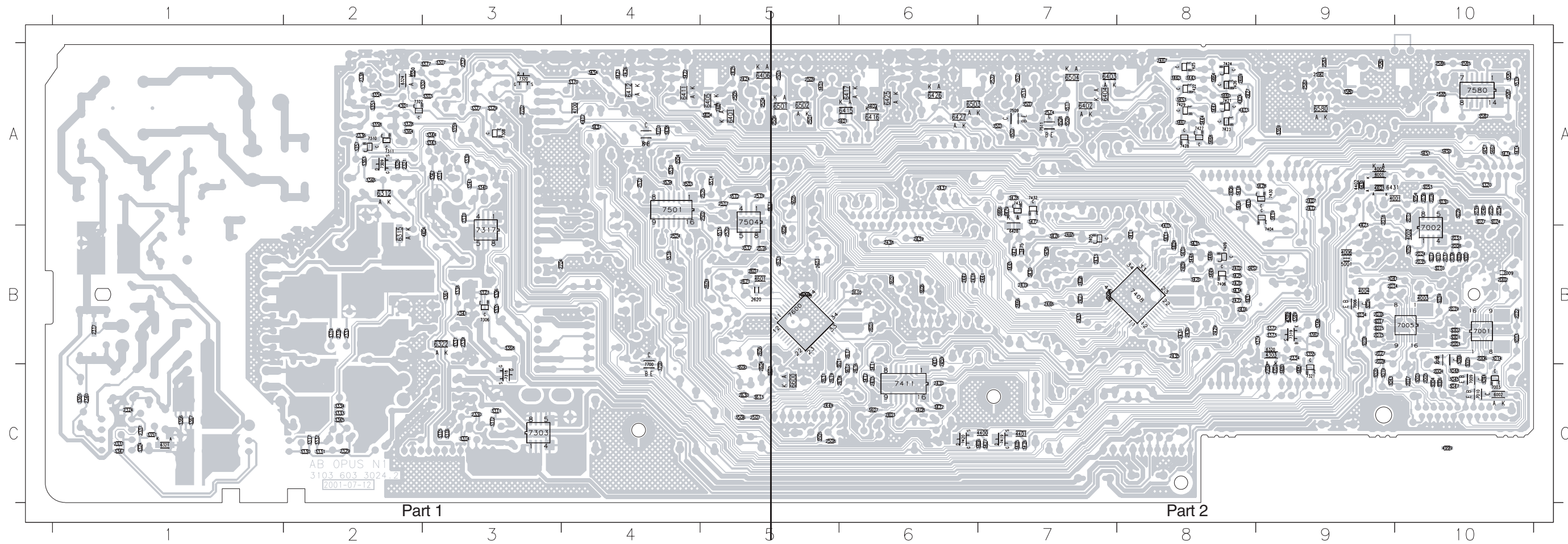


PRINTED CIRCUIT BOARD

U, A models

ANALOG P. C. B. (Bottom View)

200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000
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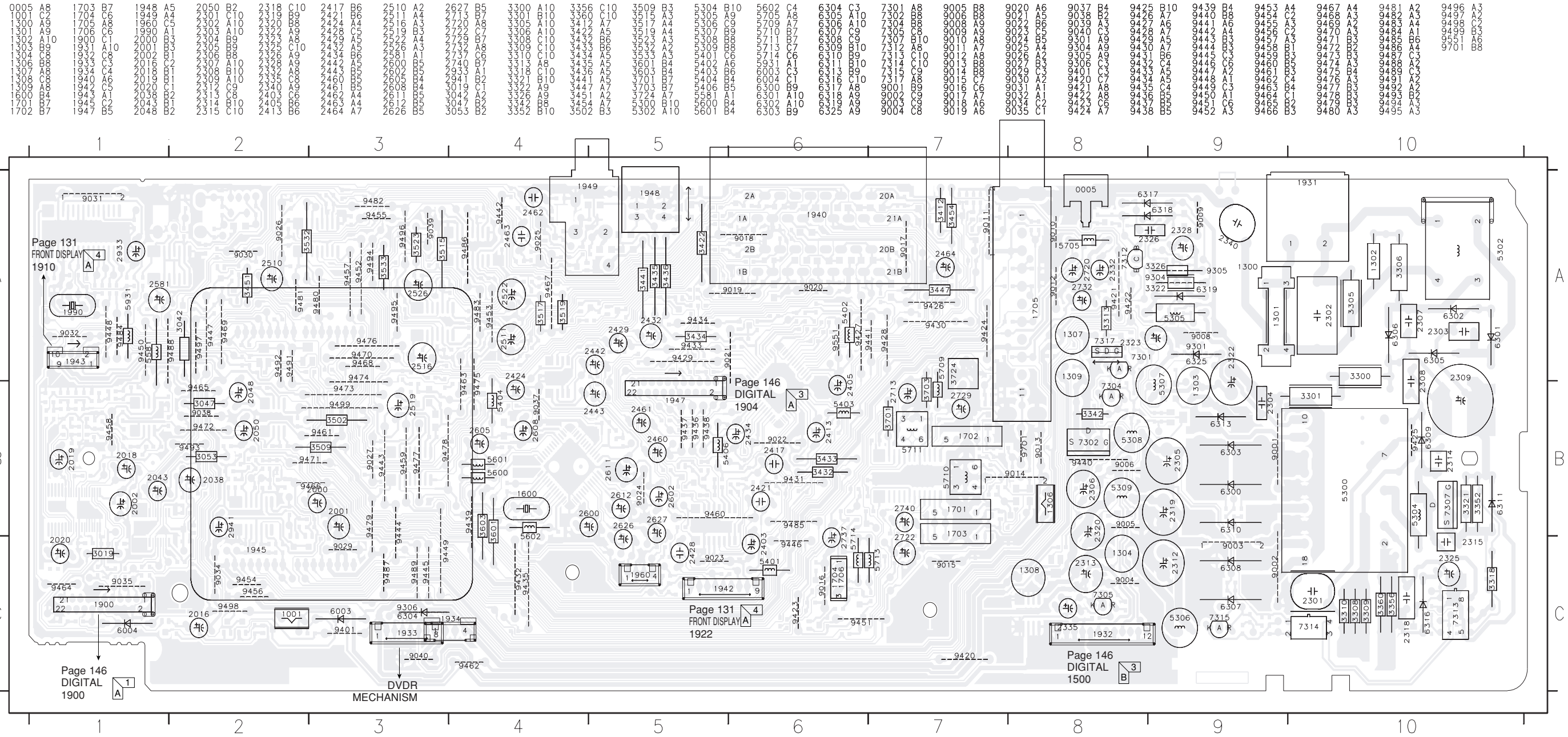




PRINTED CIRCUIT BOARD

G model

ANALOG P. C. B. (Top View)

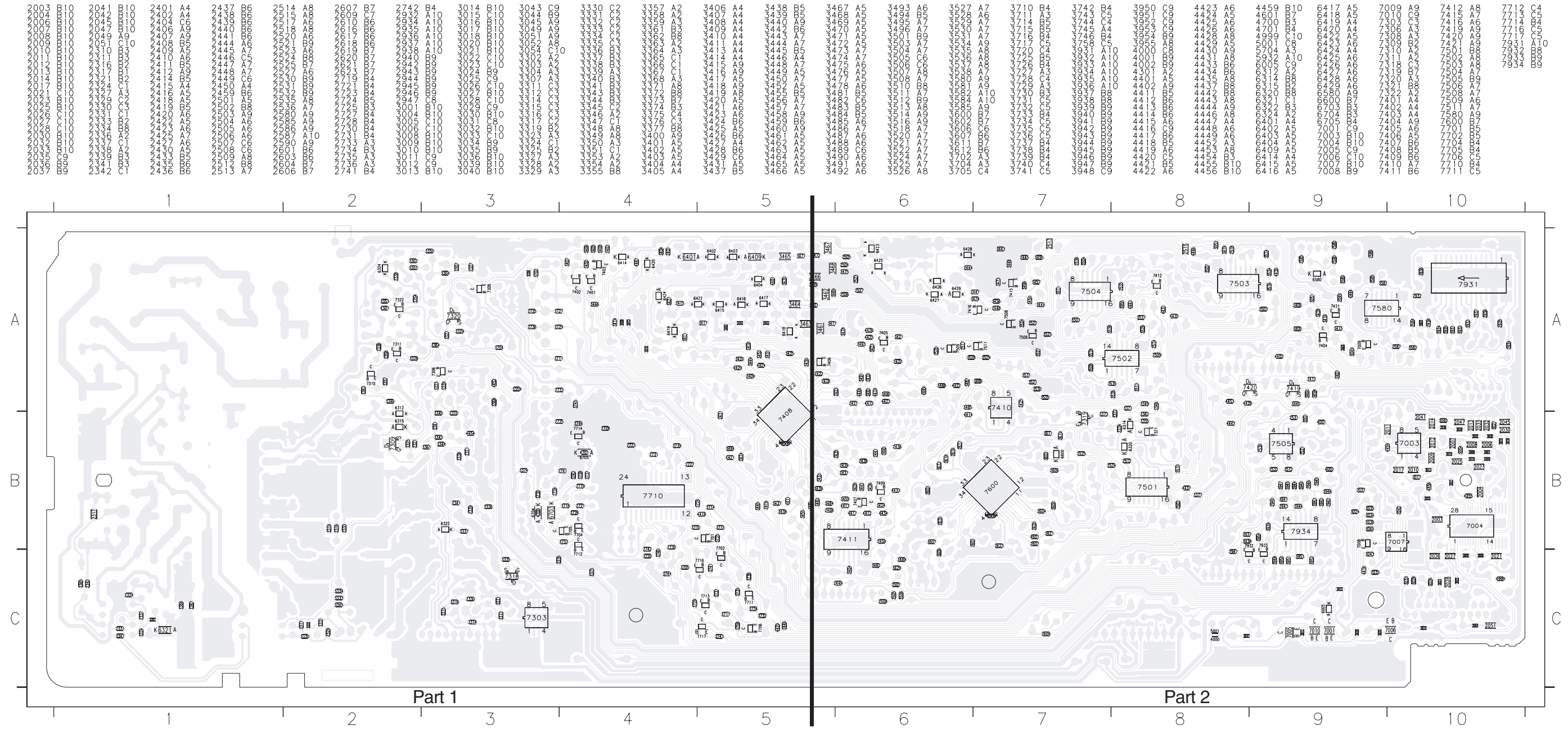


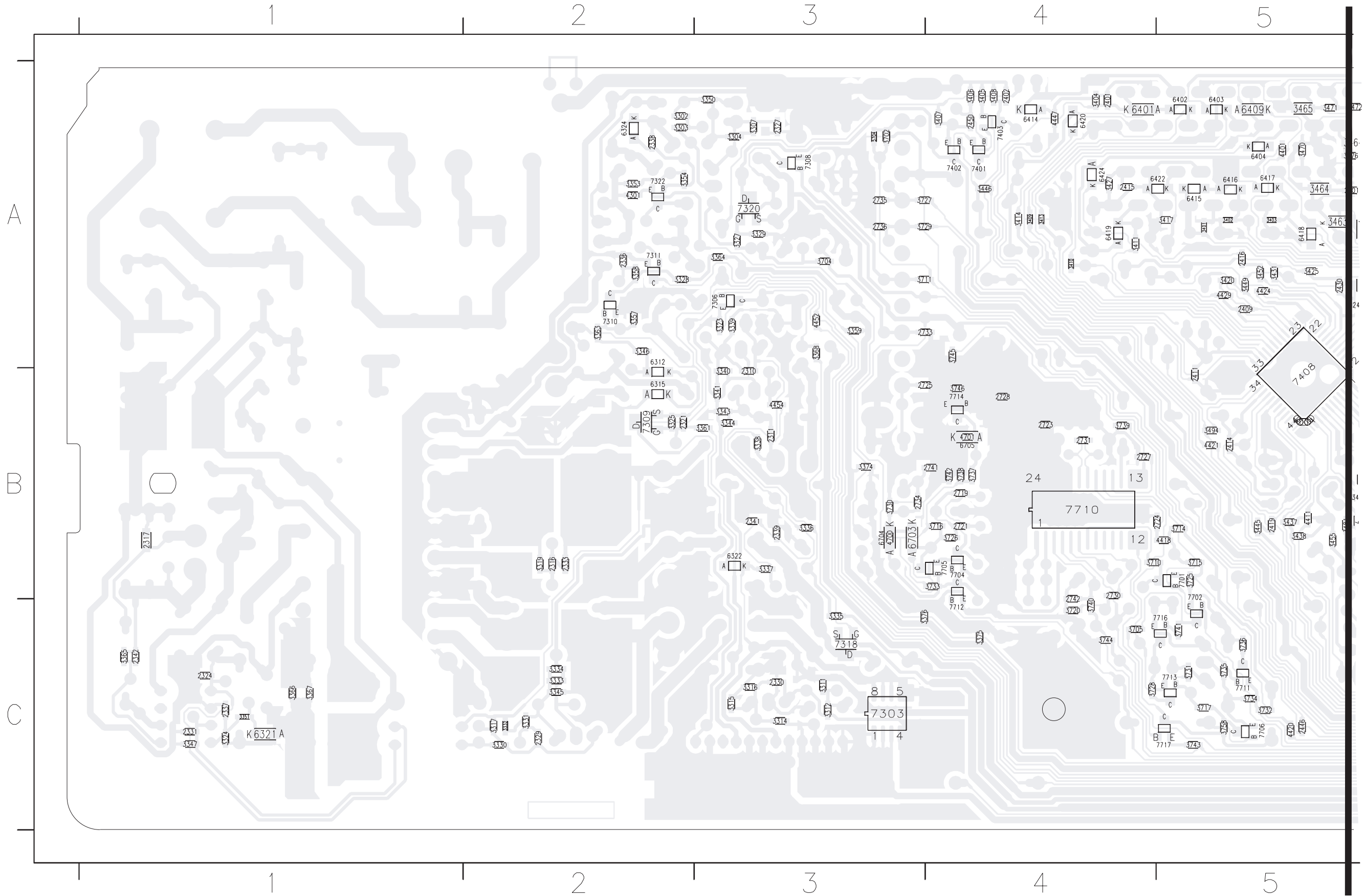


PRINTED CIRCUIT BOARD

G model

ANALOG P. C. B. (Bottom View)



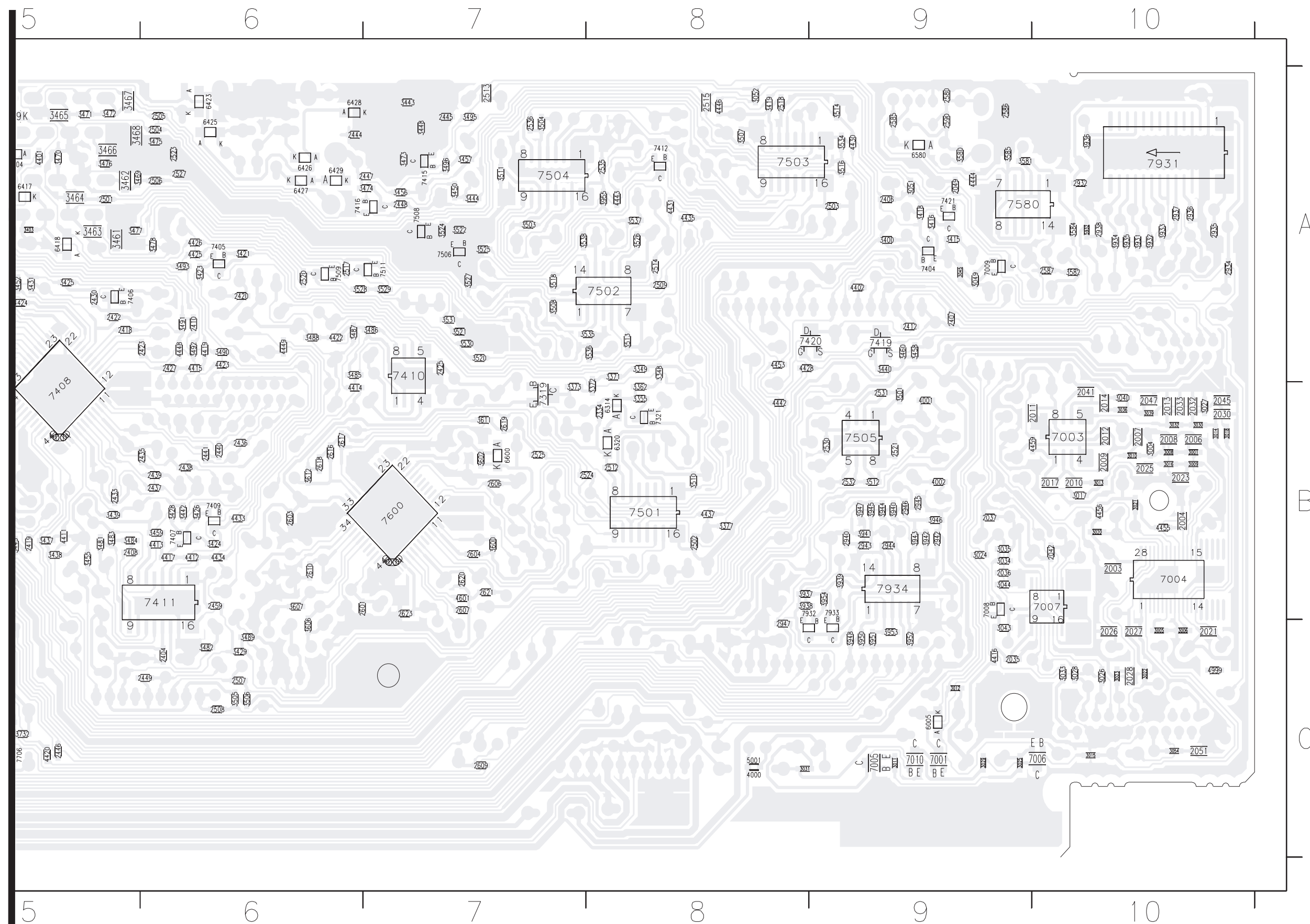




PRINTED CIRCUIT BOARD

G model

ANALOG P. C. B. (Part 2 Bottom View)

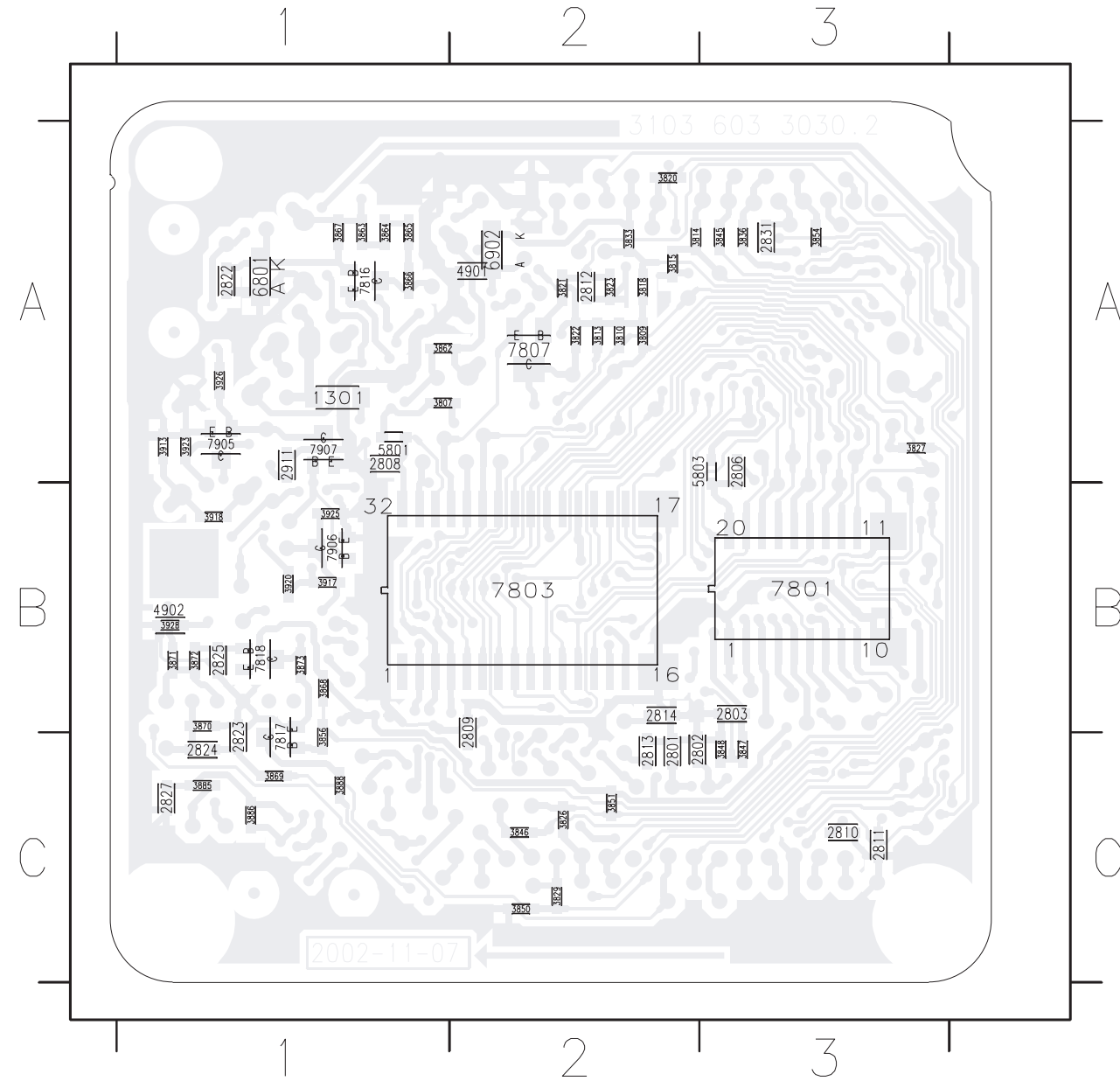




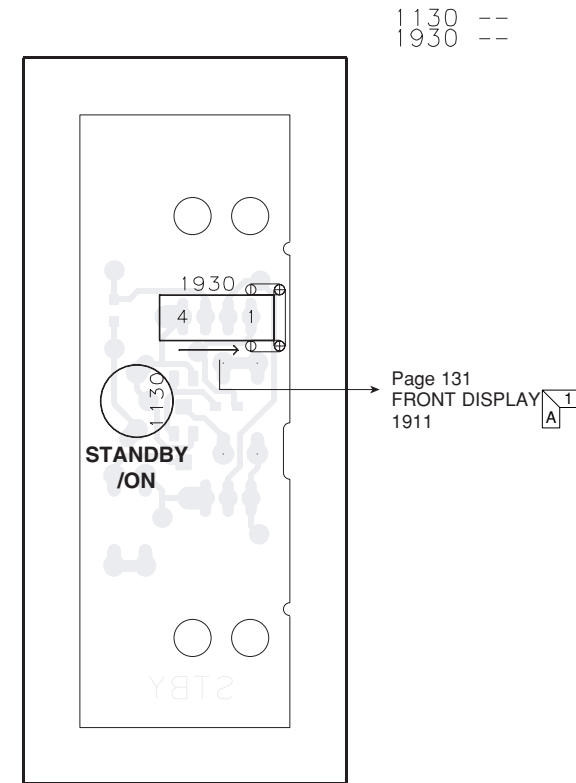
■ PRINTED CIRCUIT BOARD

UP SUB P. C. B. (Bottom View)

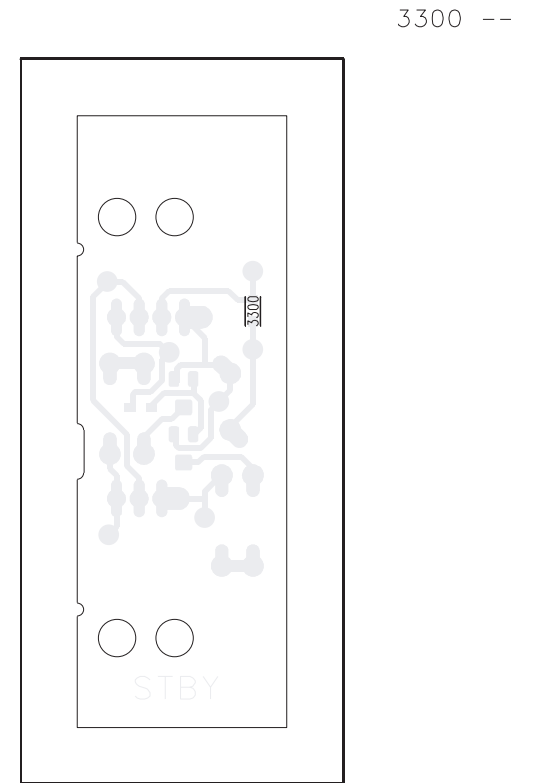
1301 A1	2824 C1	3822 A2	3856 C1	3886 C1	6801 A1
2801 C2	2825 B1	3823 A2	3862 A1	3888 C1	6902 A2
2802 C2	2827 C1	3826 C2	3863 A1	3913 A1	7801 B3
2803 B3	2831 A3	3827 A3	3864 A1	3917 B1	7803 B2
2806 A3	2911 A1	3829 C2	3865 A1	3918 B1	7807 A2
2808 A1	3807 A1	3833 A2	3866 A1	3920 B1	7816 A1
2809 B2	3809 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	



FRONT STANDBY P. C. B. (Top View)



FRONT STANDBY P. C. B. (Bottom View)





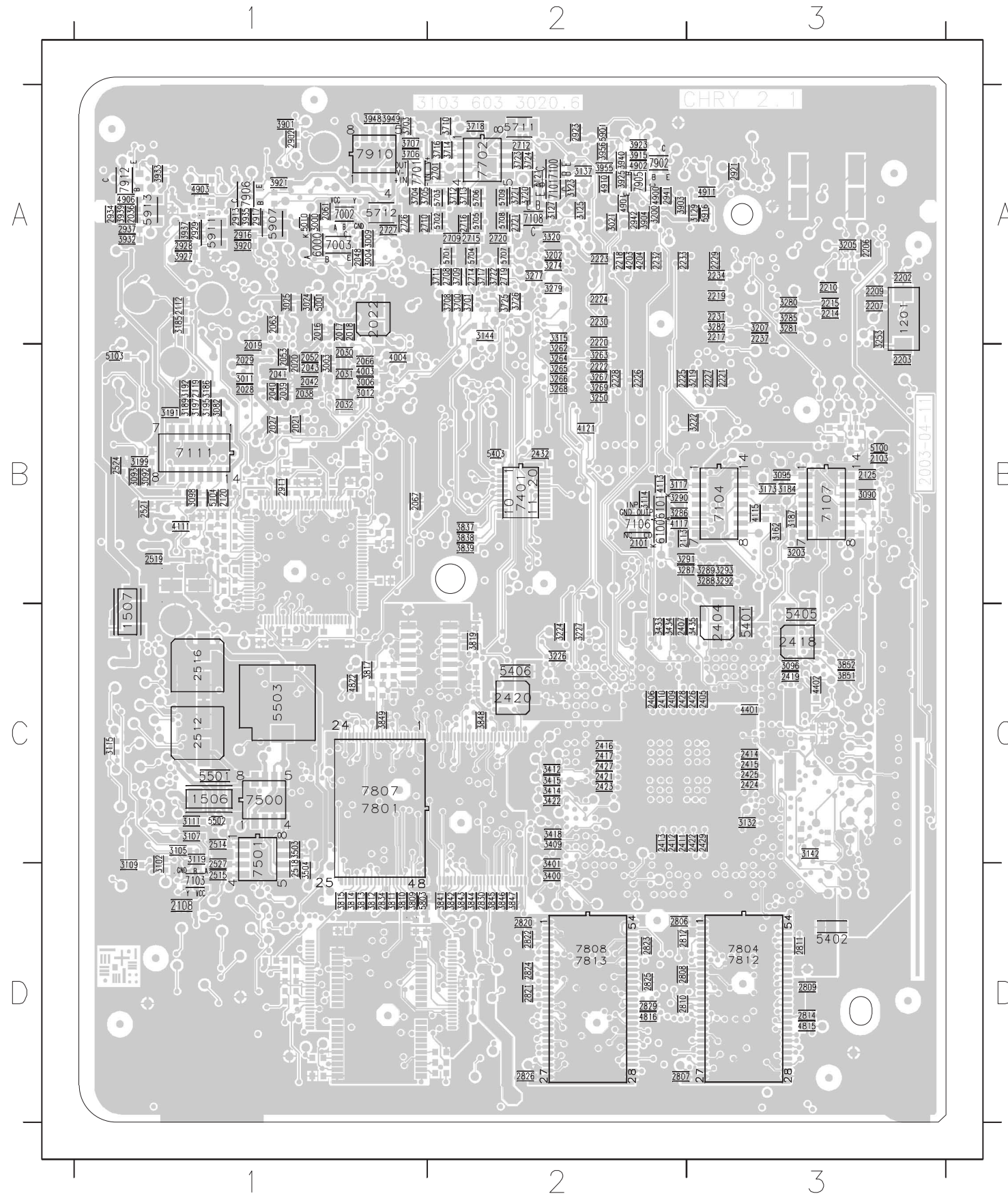




PRINTED CIRCUIT BOARD

U, A models

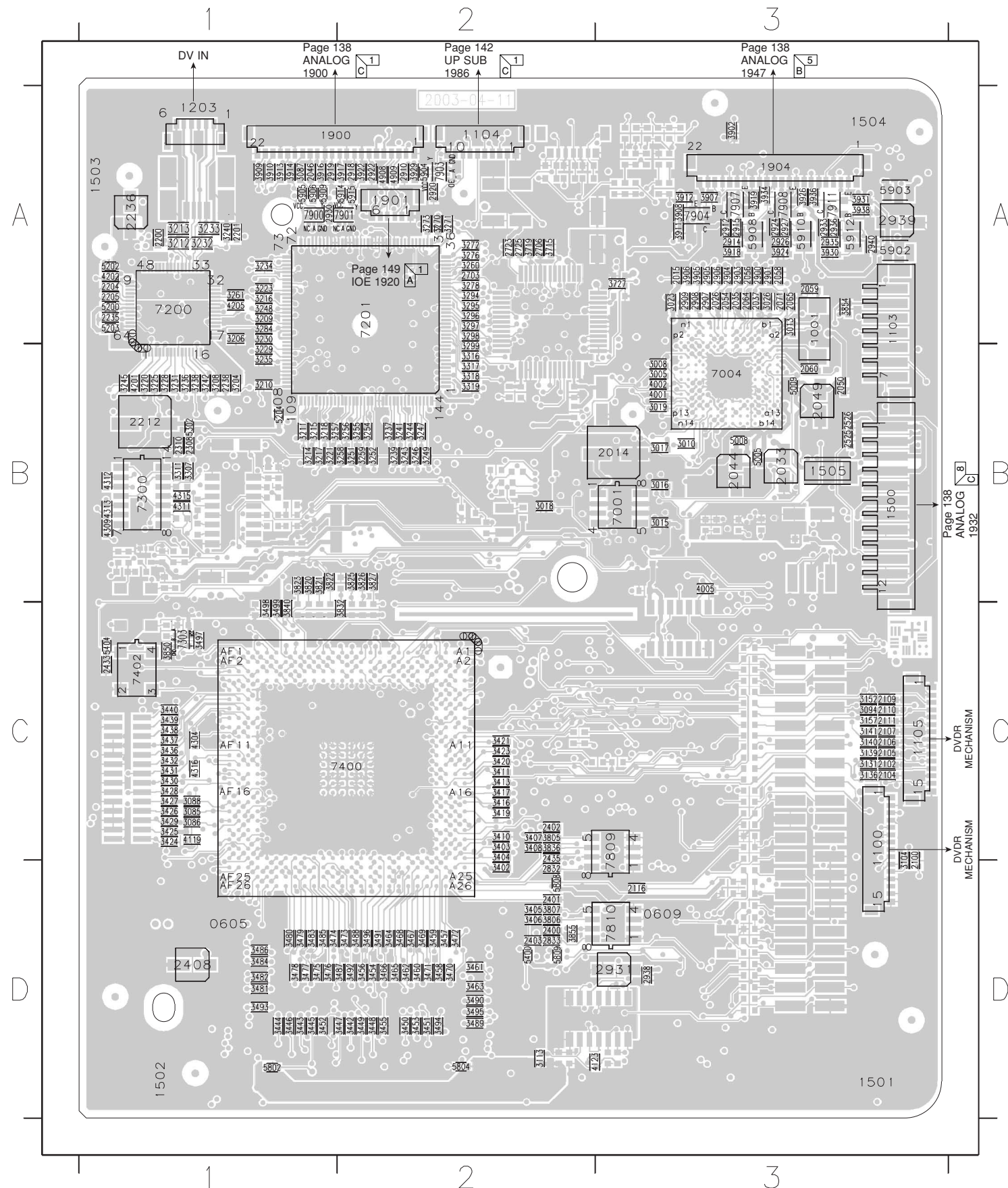
DIGITAL P. C. B. (Bottom View)



1201 A3	2419 C3	3095 B3	3434 C2	4401 C3
1506 C1	2420 C2	3096 C3	3435 C3	4402 C3
1507 C1	2421 C2	3098 B1	3503 C1	4815 D3
2016 A1	2422 C3	3102 D1	3504 D1	4816 D2
2017 A1	2423 C2	3105 C1	3700 A2	4822 C1
2018 A1	2424 C3	3107 C1	3701 A2	4900 A2
2019 B1	2425 C3	3109 D1	3703 A1	4901 A2
2020 B1	2426 C3	3111 C1	3704 A1	4902 A2
2021 B1	2427 C2	3114 B2	3705 A1	4903 A1
2022 A1	2428 C2	3115 C1	3706 A1	4906 A1
2027 B1	2429 C3	3117 B2	3707 A1	4910 A2
2028 B1	2432 B2	3119 C1	3708 A2	4911 A3
2029 B1	2512 C1	3121 A2	3709 A2	5001 A1
2030 B1	2514 C1	3123 A2	3710 A2	5010 A1
2031 B1	2515 D1	3125 A2	3711 A2	5100 B3
2032 B1	2516 C1	3127 A2	3712 A2	5103 B1
2036 A1	2518 D1	3129 A3	3713 A2	5104 B1
2038 B1	2519 B1	3132 C3	3714 A2	5401 C3
2039 B1	2521 B1	3137 A2	3716 A2	5402 D3
2040 B1	2524 B1	3142 C3	3717 A2	5403 B2
2041 B1	2527 D1	3144 A2	3718 A2	5405 C3
2042 B1	2701 A2	3162 B3	3720 A2	5406 C2
2043 B1	2708 A2	3173 B3	3721 A2	5501 C1
2048 A1	2709 A2	3184 B3	3722 A2	5502 C1
2052 B1	2710 A1	3185 A1	3723 A2	5503 C1
2053 B1	2712 A2	3186 B1	3724 A2	5701 A2
2061 A1	2714 A2	3187 B3	3725 A2	5702 A2
2063 A1	2715 A2	3189 B1	3726 A2	5703 A2
2066 B1	2716 A2	3191 B1	3809 D1	5704 A2
2067 B1	2719 A2	3192 B1	3810 D1	5705 A2
2101 B2	2720 A2	3195 B1	3811 D1	5706 A2
2103 B3	2721 A2	3197 B1	3812 D1	5707 A2
2108 D1	2726 A1	3199 B1	3813 D1	5708 A2
2112 A1	2727 A1	3200 A2	3814 D1	5709 A2
2113 B2	2806 D2	3202 A2	3815 D1	5711 A2
2119 B1	2807 D2	3203 B3	3817 C1	5712 A1
2120 B1	2808 D2	3205 A3	3819 C2	5803 D1
2125 B3	2809 D3	3207 A3	3837 B2	5901 A2
2202 A3	2810 D2	3219 B3	3838 B2	5907 A1
2203 B3	2811 D3	3222 B3	3839 B2	5911 A1
2206 A3	2812 D2	3224 C2	3841 D2	5913 A1
2207 A3	2814 D3	3226 C2	3842 D2	5916 A3
2209 A3	2820 D2	3227 C2	3843 D2	6000 A1
2210 A3	2821 D2	3250 B2	3844 D2	6100 B2
2214 A3	2822 D2	3253 A3	3845 D2	6101 B2
2215 A3	2823 D2	3262 B2	3846 D2	7002 A1
2217 A3	2824 D2	3263 B2	3847 D2	7003 A1
2218 A2	2825 D2	3264 B2	3848 C2	7100 A2
2219 A3	2826 D2	3265 B2	3849 C1	7101 A2
2220 A2	2829 D2	3266 B2	3851 C3	7103 D1
2221 B3	2830 D2	3267 B2	3852 C3	7104 B3
2222 B2	2834 D1	3268 B2	3901 A1	7106 B2
2223 A2	2902 A1	3269 B2	3903 A2	7107 B3
2224 A2	2911 B1	3274 A2	3904 A2	7108 A2
2225 B2	2913 A1	3277 A2	3915 A2	7111 B1
2226 B2	2916 A1	3279 A2	3920 A1	7401 B2
2227 B3	2917 A1	3280 A3	3921 A1	7500 C1
2228 B2	2921 A3	3281 A3	3923 A2	7501 C1
2229 A3	2923 A2	3282 A3	3925 A2	7701 A1
2230 A2	2928 A1	3285 A3	3927 A1	7702 A2
2231 A3	2929 A1	3286 B2	3932 A1	7801 C1
2232 A2	2934 A1	3287 B2	3933 A1	7804 D3
2233 A2	2937 A1	3288 B3	3935 A1	7807 C1
2234 A3	2941 A2	3289 B3	3937 A1	7808 D2
2237 A3	2942 A2	3290 B2	3939 A1	7812 D3
2404 C3	3000 A1	3291 B2	3940 A2	7813 D2
2405 C3	3003 B1	3292 B3	3948 A1	7902 A2
2406 C2	3004 A1	3293 B3	3949 A1	7905 A2
2407 C2	3006 B1	3315 A2	3955 A2	7906 A1
2409 C2	3009 A1	3320 A2	3956 A2	7910 A1
2410 C2	3011 B1	3400 D2	4003 B1	7912 A1
2411 C2	3012 B1	3401 D2	4004 B1	
2412 C2	3021 A2	3409 C2	4111 B1	
2413 C2	3024 A1	3412 C2	4113 B2	
2414 C3	3025 A1	3414 C2	4115 B3	
2415 C3	3082 B1	3415 C2	4117 B2	
2416 C2	3090 B3	3418 C2	4121 B2	
2417 C2	3092 B1	3422 C2	4203 A2	
2418 C3	3093 B1	3433 C2	4204 A2	



DIGITAL P. C. B. (Top View)



0605 D1	2914 A3	3260 A2	3480 D1	4311 B1
0609 D3	2915 A3	3261 A1	3481 D1	4312 B1
1001 A3	2918 A2	3270 A2	3482 D1	4313 B1
1100 C3	2919 A1	3271 A2	3483 D1	4315 B1
1103 A3	2920 A2	3272 A2	3484 D1	4316 C1
1104 A2	2922 A2	3273 A2	3485 D1	4908 A2
1105 C3	2924 A3	3276 A2	3486 D1	4909 A2
1203 A1	2926 A3	3278 A2	3487 D2	5005 B3
1500 B3	2927 A3	3284 A1	3488 D2	5008 B3
1505 B3	2930 A1	3294 A2	3489 D2	5009 B3
1704 A2	2931 D3	3295 A2	3490 D2	5200 A1
1900 A1	2933 A3	3296 A2	3491 D2	5202 A1
1901 A2	2935 A3	3297 A2	3492 D2	5203 A1
1904 A3	2936 A3	3298 A2	3493 D1	5204 B1
2014 B3	2938 D3	3299 B2	3494 D2	5302 B1
2015 A3	2939 A3	3307 B1	3495 D2	5400 D2
2026 A3	2940 A3	3311 B1	3496 D2	5404 C1
2033 B3	3005 B3	3316 B2	3497 C1	5802 D1
2035 A3	3008 B3	3317 B2	3498 C1	5804 D2
2037 A3	3010 B3	3318 B2	3499 C1	5808 D2
2044 B3	3013 A3	3319 B2	3502 B2	5809 D2
2046 A1	3015 B3	3402 D2	3715 A2	5902 A3
2049 B3	3016 B3	3403 C2	3719 A2	5903 A3
2050 B3	3017 B3	3404 C2	3727 A3	5904 A2
2054 A3	3018 B2	3405 D2	3805 C2	5905 A1
2056 A3	3019 B3	3406 D2	3806 D2	5906 A1
2058 A3	3023 A3	3407 C2	3807 D2	5908 A3
2059 A3	3026 A3	3408 C2	3820 B1	5909 A1
2060 B3	3085 C1	3410 C2	3821 B1	5910 A3
2064 A3	3086 C1	3411 C2	3822 B1	5912 A3
2065 A3	3087 A1	3413 C2	3823 B1	5914 A2
2071 A3	3088 C1	3416 C2	3824 B2	5915 A2
2100 D3	3094 C3	3417 C2	3825 B2	7001 B3
2102 C3	3104 D3	3419 C2	3826 B2	7004 B3
2104 C3	3113 D2	3420 C2	3827 B2	7200 A1
2105 C3	3131 C3	3421 C2	3832 C2	7201 A2
2106 C3	3136 C3	3423 C2	3836 C2	7300 B1
2107 C3	3139 C3	3424 C1	3840 C1	7303 C1
2109 C3	3140 C3	3425 C1	3850 C1	7400 C2
2110 C3	3141 C3	3426 C1	3854 A3	7402 C1
2111 C3	3152 C3	3427 C1	3855 D2	7809 C3
2116 D3	3157 C3	3428 C1	3902 A3	7810 D3
2200 A1	3204 B1	3429 C1	3905 A3	7900 A1
2201 A1	3206 A1	3430 C1	3906 A3	7901 A2
2204 A1	3208 B1	3431 C1	3907 A3	7903 A2
2205 A1	3209 A1	3432 C1	3908 A3	7904 A3
2212 B1	3210 B1	3436 C1	3909 A1	7907 A3
2235 A1	3211 B1	3437 C1	3910 A1	7908 A3
2236 A1	3212 A1	3438 C1	3911 A3	7911 A3
2238 B1	3213 A1	3439 C1	3912 A3	
2308 B1	3214 B1	3440 C1	3913 A1	
2310 B1	3215 B1	3442 D2	3914 A1	
2311 C1	3216 A1	3443 D1	3916 A1	
2400 D2	3217 B1	3444 D1	3917 A2	
2401 D2	3218 B1	3445 D1	3918 A3	
2402 C2	3220 B1	3446 D1	3919 A3	
2403 D2	3221 B1	3447 D2	3922 A2	
2408 D1	3223 A1	3448 D2	3924 A3	
2433 C1	3225 B1	3449 D2	3926 A3	
2435 C2	3228 B1	3450 D2	3929 A2	
2525 B3	3229 B1	3451 D2	3930 A3	
2526 B3	3230 A1	3452 D1	3931 A3	
2700 B3	3231 B1	3453 D2	3934 A3	
2703 A2	3232 A1	3454 D2	3936 A3	
2704 B2	3233 A1	3455 D2	3938 A3	
2705 B2	3234 A1	3456 D2	3941 A3	
2706 A2	3235 B1	3457 D2	3942 A3	
2707 A3	3236 B1	3458 D2	3943 A3	
2711 A2	3237 B2	3459 D2	3944 A3	
2717 A2	3238 B1	3460 D2	3945 A3	
2722 A2	3239 B2	3461 D2	3946 A3	
2723 A2	3240 A1	3462 D2	3947 A3	
2724 A2	3241 B2	3463 D2	3950 A3	
2725 A2	3242 B1	3464 D2	3951 A3	
2728 A2	3243 B2	3465 D2	3952 A3	
2729 A2	3244 B2	3466 D2	3953 A3	
2832 D2	3245 B1	3467 D2	3954 A3	
2833 D2	3246 B2	3468 D2	4001 B3	
2900 A3	3247 B2	3469 D2	4002 B3	
2901 A3	3248 A1	3470 D2	4005 B3	
2903 A3	3249 B2	3471 D2	4119 C1	
2904 A3	3251 B2	3472 D2	4123 D2	
2905 A3	3252 B2	3473 D2	4201 B1	
2906 A3	3254 B2	3474 D1	4202 A1	
2907 A3	3255 B2	3475 D1	4205 A1	
2908 A3	3256 B2	3476 D1	4304 C1	
2909 A3	3257 B1	3477 D1	4307 C1	
2910 A2	3258 B2	3478 D1	4308 B1	
2912 A3	3259 B2	3479 D1	4309 B1	





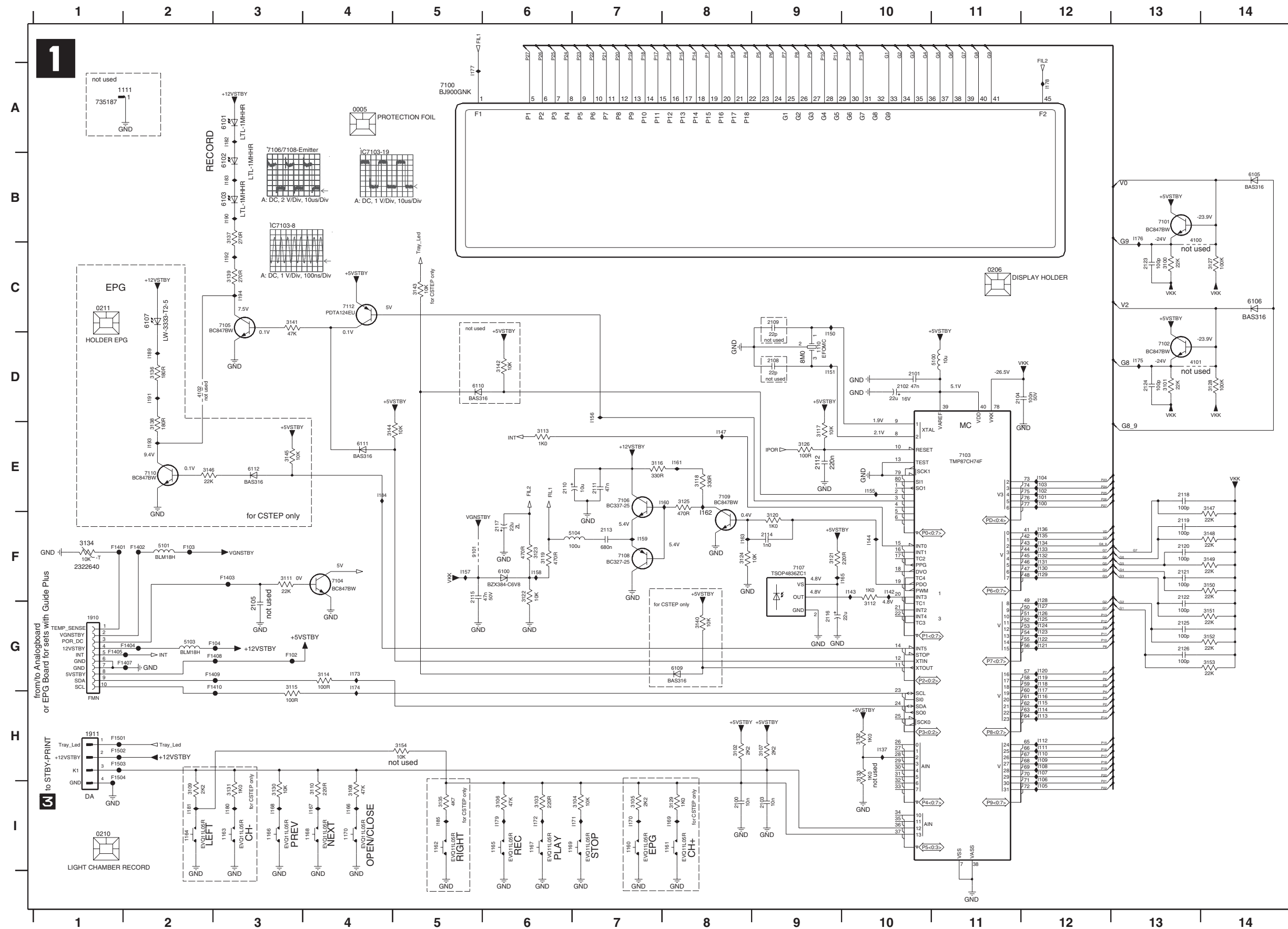






# SCHEMATIC DIAGRAM

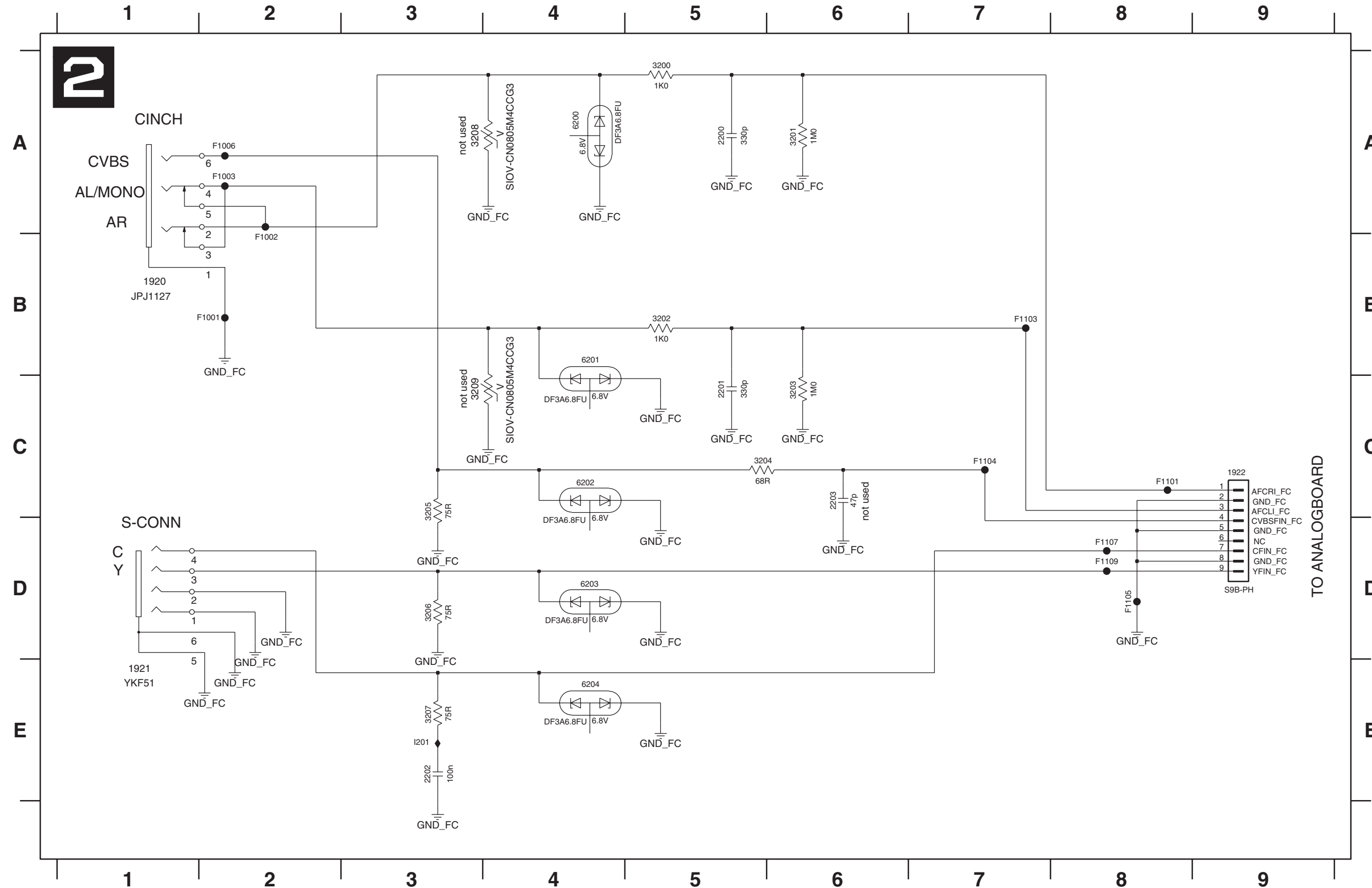
## FRONT: Display Panel



0005 A4	3136 D2	I114 H12
0206 C11	3137 B3	I115 H12
0210 I1	3138 E2	I116 H12
0211 C1	3139 C3	I117 G12
1110 D9	3140 G8	I118 G12
1111 A1	3141 C3	I119 G12
1160 I7	3142 D6	I120 G12
1161 I8	3143 C5	I121 G12
1162 I5	3144 E4	I122 G12
1163 I3	3145 E3	I123 G12
1164 I2	3146 E2	I124 G12
1165 I6	3147 E14	I125 G12
1166 I3	3148 F14	I126 G12
1167 I6	3149 F14	I127 G12
1168 I4	3150 F14	I128 F12
1169 I6	3151 G14	I129 F12
1170 I4	3152 G14	I130 F12
1910 G1	3153 G14	I131 F12
1911 H1	3154 H5	I132 F12
2100 I8	4100 B13	I133 F12
2101 D10	4101 D13	I134 F12
2102 D10	4102 D2	I135 F12
2103 I9	5100 D11	I136 F12
2104 D11	5101 F2	I137 H10
2105 G3	5103 G2	I142 F10
2108 D9	5104 F7	I143 F10
2109 C9	6100 F6	I144 F10
2110 E6	6101 A3	I147 E8
2111 E7	6102 B3	I150 D9
2112 E9	6103 B3	I151 D9
2113 F7	6105 B14	I155 E10
2114 F9	6106 C14	I156 D7
2115 F5	6107 C2	I157 F5
2116 G9	6109 G8	I158 F6
2117 F6	6110 D5	I159 F7
2118 E13	6111 E4	I160 E8
2119 F13	6112 E3	I161 E8
2120 F13	7100 A5	I162 F8
2121 F13	7101 B13	I163 F8
2122 F13	7102 D13	I165 F10
2123 C13	7103 E11	I166 I4
2124 D13	7104 F4	I167 I4
2125 G13	7105 C3	I168 I3
2126 G13	7106 E7	I169 I8
3100 C13	7107 F9	I170 I7
3101 D13	7108 F7	I171 I7
3102 H8	7109 E8	I172 I6
3103 I6	7110 E2	I173 G4
3104 I7	7112 C4	I174 G4
3105 I7	9101 F5	I175 D13
3106 I6	F102 G3	I176 B13
3107 H9	F103 F2	I177 A5
3108 I4	F104 G3	I178 A12
3109 I2	F1401 F1	I179 I6
3110 I4	F1402 F2	I180 I3
3111 F3	F1403 F3	I181 I2
3112 G10	F1404 G2	I182 A3
3113 E6	F1405 G1	I183 B3
3114 G4	F1407 G2	I184 E4
3115 G3	F1408 G3	I185 I5
3116 E7	F1409 G2	I189 D2
3117 E9	F1410 G3	I190 B3
3118 E8	F1501 H1	I191 D2
3119 F6	F1502 H1	I192 C3
3120 F9	F1503 H1	I193 E2
3121 F9	F1504 H1	I194 C3
3122 F6	I100 E12	
3123 F6	I101 E12	
3124 F8	I102 E12	
3125 E8	I103 E12	
3126 E9	I104 E12	
3127 C14	I105 I12	
3128 D14	I106 H12	
3129 I8	I107 H12	
3130 I3	I108 H12	
3131 I3	I109 H12	
3132 H10	I110 H12	
3133 H10	I111 H12	
3134 F1	I112 H12	
3135 I5	I113 H12	

■ SCHEMATIC DIAGRAM

FRONT: Connector (FC)



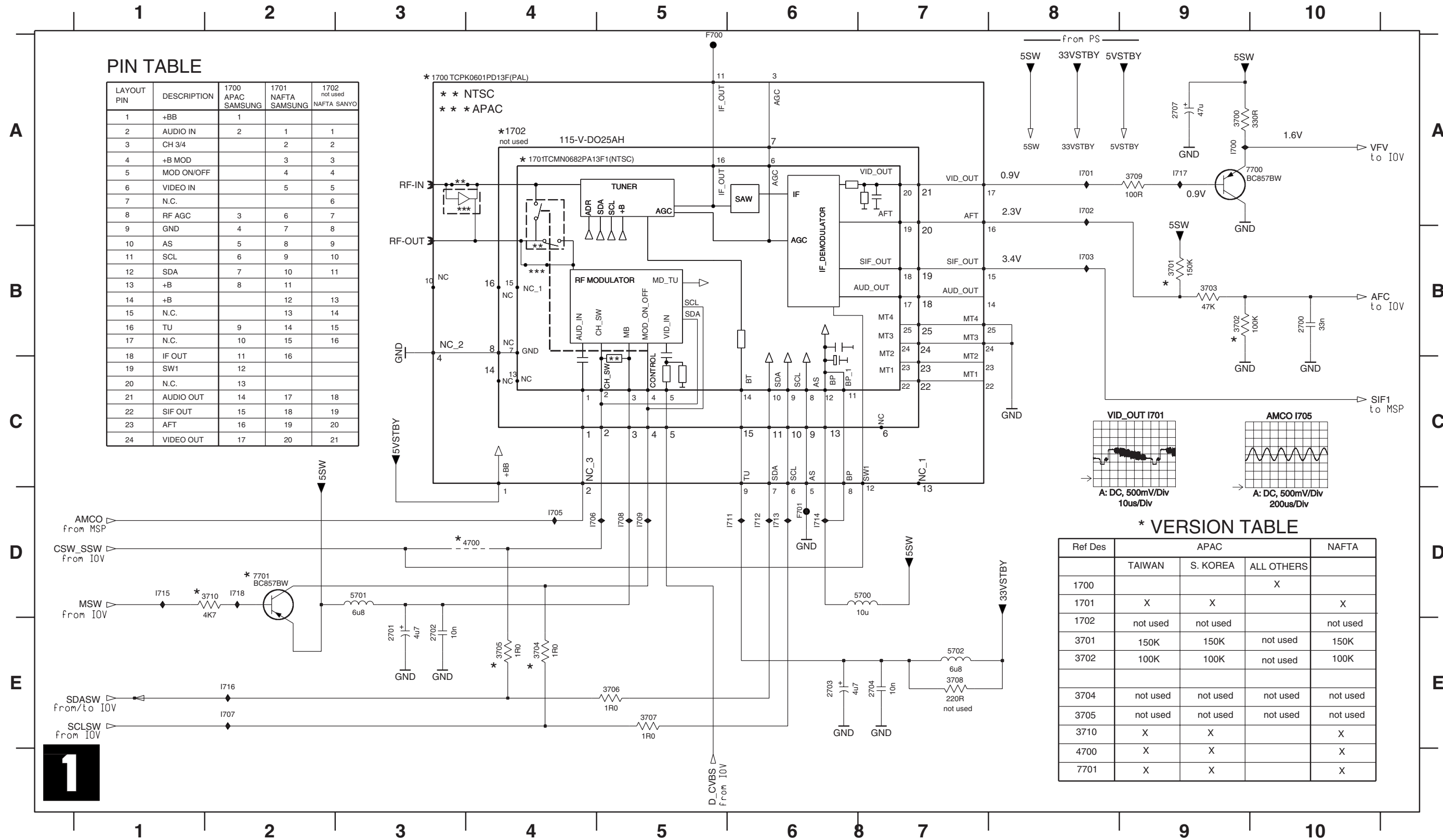
- 1920 B1
- 1921 E1
- 1922 C9
- 2200 A5
- 2201 C5
- 2202 E3
- 2203 C6
- 3200 A5
- 3201 A6
- 3202 B5
- 3203 C6
- 3204 C5
- 3205 C3
- 3206 D3
- 3207 E3
- 3208 A3
- 3209 C3
- 6200 A4
- 6201 B4
- 6202 C4
- 6203 D4
- 6204 E4
- F1001 B2
- F1002 B2
- F1003 A2
- F1006 A2
- F1101 C8
- F1103 C8
- F1104 C8
- F1105 C8
- F1107 D8
- F1109 D8
- I201 E3

■ SCHEMATIC DIAGRAM

U, A models

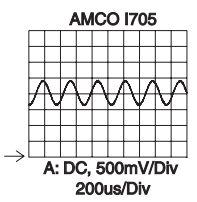
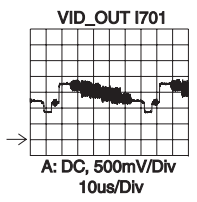
ANALOG: Frontend Video (FV)

1700 A3 1701 A4 1702 A4 2700 B10 2701 E3 2702 E3 2703 E6 2704 E7 2707 A9 3700 A9 3701 B9 3702 B9 3703 B9 3704 E4 3705 E4 3706 E5 3707 E5 3708 E7 3709 A9 3710 D2 4700 D4 5700 D7 5701 D3 5702 E7 7700 A9 7701 D2 F700 A5 F701 D6 I700 A9 I701 A8 I702 A8 I703 B8 I705 D4 I706 D4 I707 E2 I708 D5 I709 D5 I711 D6 I712 D6 I713 D6 I714 D6 I715 D1 I716 E2 I717 A9 I718 D2



PIN TABLE

LAYOUT PIN	DESCRIPTION	1700 APAC SAMSUNG	1701 NAFTA SAMSUNG	1702 not used NAFTA SANYO
1	+BB	1		
2	AUDIO IN	2	1	1
3	CH 3/4		2	2
4	+B MOD		3	3
5	MOD ON/OFF		4	4
6	VIDEO IN		5	5
7	N.C.			6
8	RF AGC	3	6	7
9	GND	4	7	8
10	AS	5	8	9
11	SCL	6	9	10
12	SDA	7	10	11
13	+B	8	11	
14	+B		12	13
15	N.C.		13	14
16	TU	9	14	15
17	N.C.	10	15	16
18	IF OUT	11	16	
19	SW1	12		
20	N.C.	13		
21	AUDIO OUT	14	17	18
22	SIF OUT	15	18	19
23	AFT	16	19	20
24	VIDEO OUT	17	20	21



\* VERSION TABLE

Ref Des	APAC			NAFTA
	TAIWAN	S. KOREA	ALL OTHERS	
1700			X	
1701	X	X		X
1702	not used	not used		not used
3701	150K	150K	not used	150K
3702	100K	100K	not used	100K
3704	not used	not used	not used	not used
3705	not used	not used	not used	not used
3710	X	X		X
4700	X	X		X
7701	X	X		X

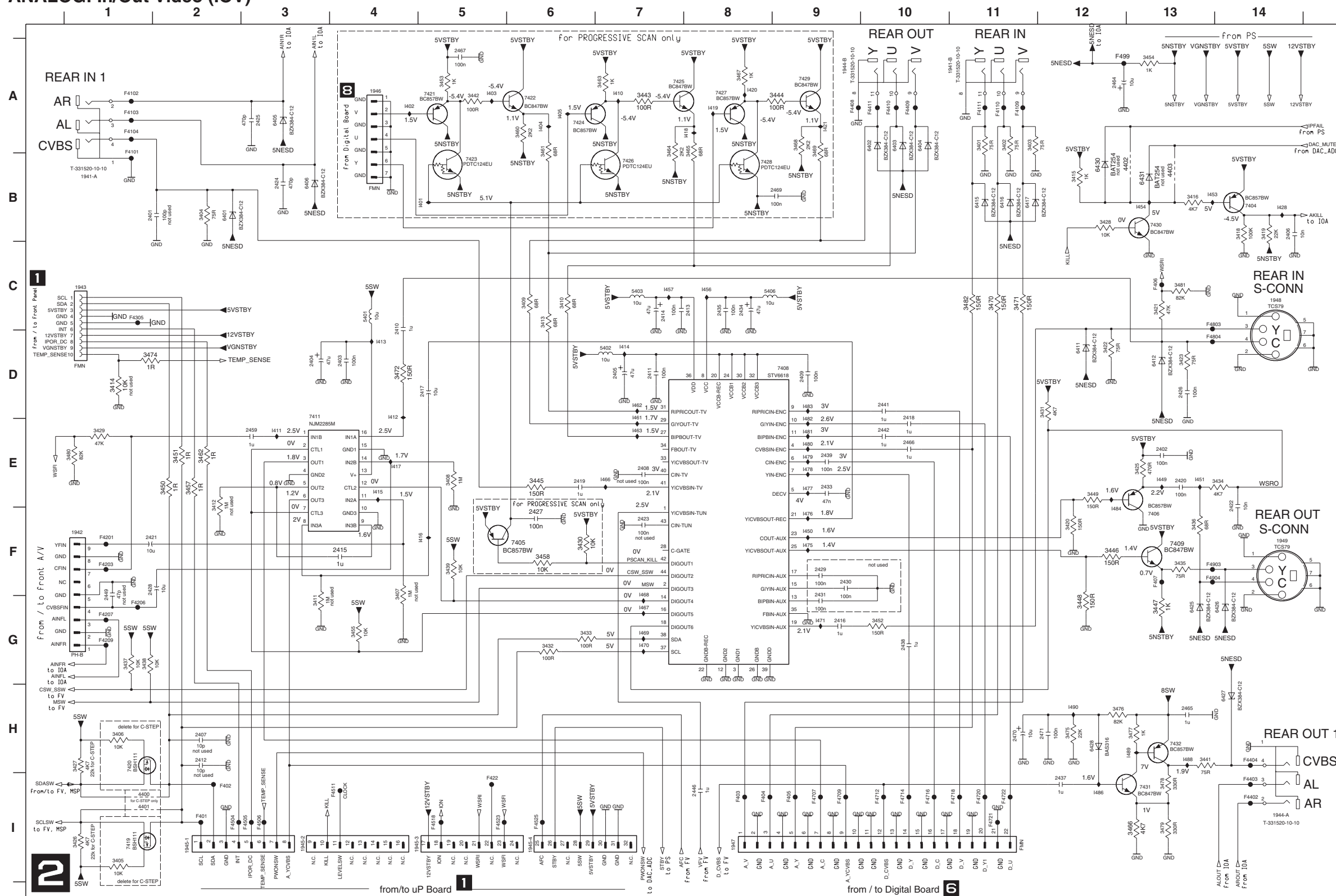
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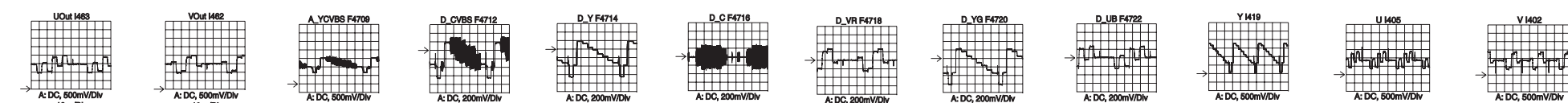
# SCHEMATIC DIAGRAM

## U, A models

### ANALOG: In/Out Video (IOV)



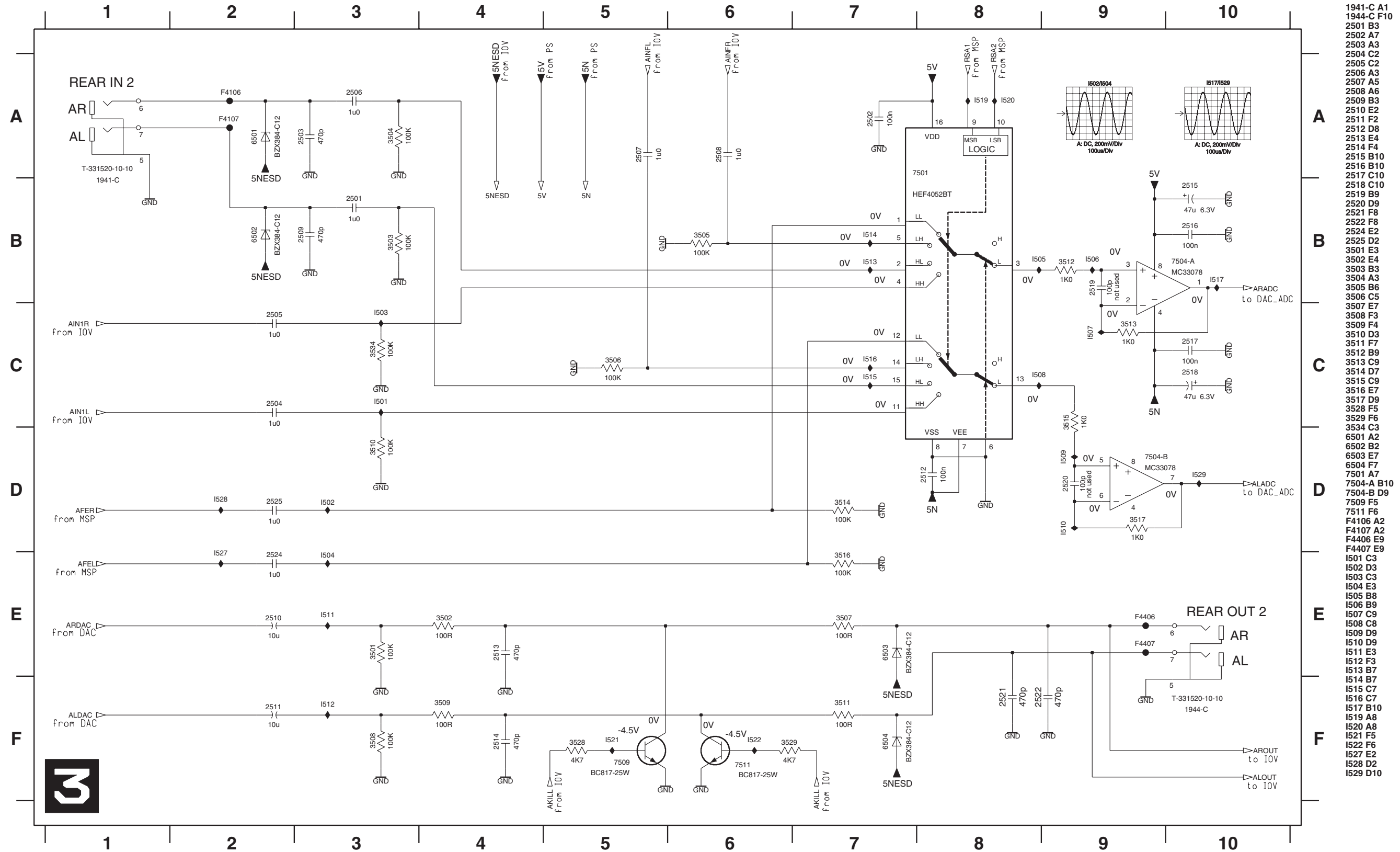
- 1941-A B1
- 1941-B A11
- 1942 F1
- 1943 C1
- 1944-A I14
- 1944-B A9
- 1945-1 I2
- 1946 A4
- 1947 I8
- 1948 C14
- 1949 F14
- 2401 B1
- 2402 E13
- 2403 D4
- 2404 D3
- 2405 D7
- 2406 B14
- 2407 H2
- 2408 E7
- 2409 D9
- 2410 C4
- 2411 D7
- 2412 H2
- 2413 C8
- 2414 C7
- 2415 F4
- 2416 G9
- 2417 D5
- 2418 E10
- 2419 E6
- 2420 E13
- 2421 F1
- 2422 E14
- 2423 F7
- 2424 B3
- 2425 A3
- 2426 D13
- 2427 F6
- 2428 F1
- 2429 F9
- 2430 F9
- 2431 G9
- 2433 E9
- 2434 C8
- 2435 C8
- 2437 I12
- 2438 G10
- 2439 E9
- 2441 D10
- 2442 E10
- 2446 I8
- 2449 F1
- 2459 E3
- 2464 A12
- 2465 H13
- 2466 E10
- 2467 A5
- 2469 B9
- 2470 H11
- 2471 H12
- 3401 A11
- 3402 A11
- 3403 A11
- 3404 B2
- 3405 I1
- 3406 H1
- 3407 F4
- 3408 E5
- 3409 C6
- 3410 C6
- 3411 G3
- 3412 E2
- 3413 C6
- 3414 D1
- 3415 B12
- 3416 B13
- 3418 B14
- 3419 B14
- 3420 F12
- 3421 C13
- 3422 D12
- 3423 D13
- 3425 E13
- 3426 I1
- 3427 H1
- 3428 B12
- 3429 E1
- 3430 F6
- 3431 D12
- 3432 G6
- 3433 G6
- 3434 E14
- 3435 F13
- 3436 F13
- 3437 G1
- 3438 G1
- 3439 F5
- 3441 H13
- 3442 A5
- 3443 A7
- 3444 A9
- 3445 E6
- 3446 F12
- 3447 G13
- 3448 G12
- 3449 E12
- 3450 E2
- 3451 E2
- 3452 G10
- 3453 A5
- 3454 A13
- 3455 G4
- 3457 E2
- 3458 F6
- 3460 A6
- 3461 A6
- 3462 E2
- 3463 A7
- 3464 A7
- 3465 A8
- 3466 I13
- 3467 A8
- 3468 A9
- 3469 A9
- 3470 C11
- 3471 C11
- 3472 D4
- 3473 D4
- 3475 H12
- 3476 H12
- 3477 H13
- 3478 I13
- 3479 I13
- 3480 E1
- 3481 C13
- 3482 C11
- 4000 I1
- 4001 B5
- 4002 B13
- 4003 B13
- 4004 B13
- 4005 A3
- 4006 B3
- 4011 D12
- 4012 D13
- 4015 B11
- 4016 B11
- 4017 B11
- 4018 B11
- 4019 F13
- 4021 D3
- 4029 H1
- 4030 H1
- 4031 H1
- 4032 H1
- 4033 H1
- 4034 H1
- 4035 H1
- 4036 H1
- 4037 H1
- 4038 H1
- 4039 H1
- 4040 H1
- 4041 H1
- 4042 H1
- 4043 H1
- 4044 H1
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- 4053 H1
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- 4055 H1
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- 4070 H1
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- 4191 H1
- 4192 H1
- 4193 H1
- 4194 H1
- 4195 H1
- 4196 H1
- 4197 H1
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- 4199 H1
- 4200 H1



SCHEMATIC DIAGRAM

U, A models

ANALOG: In/Out Audio (IOA)



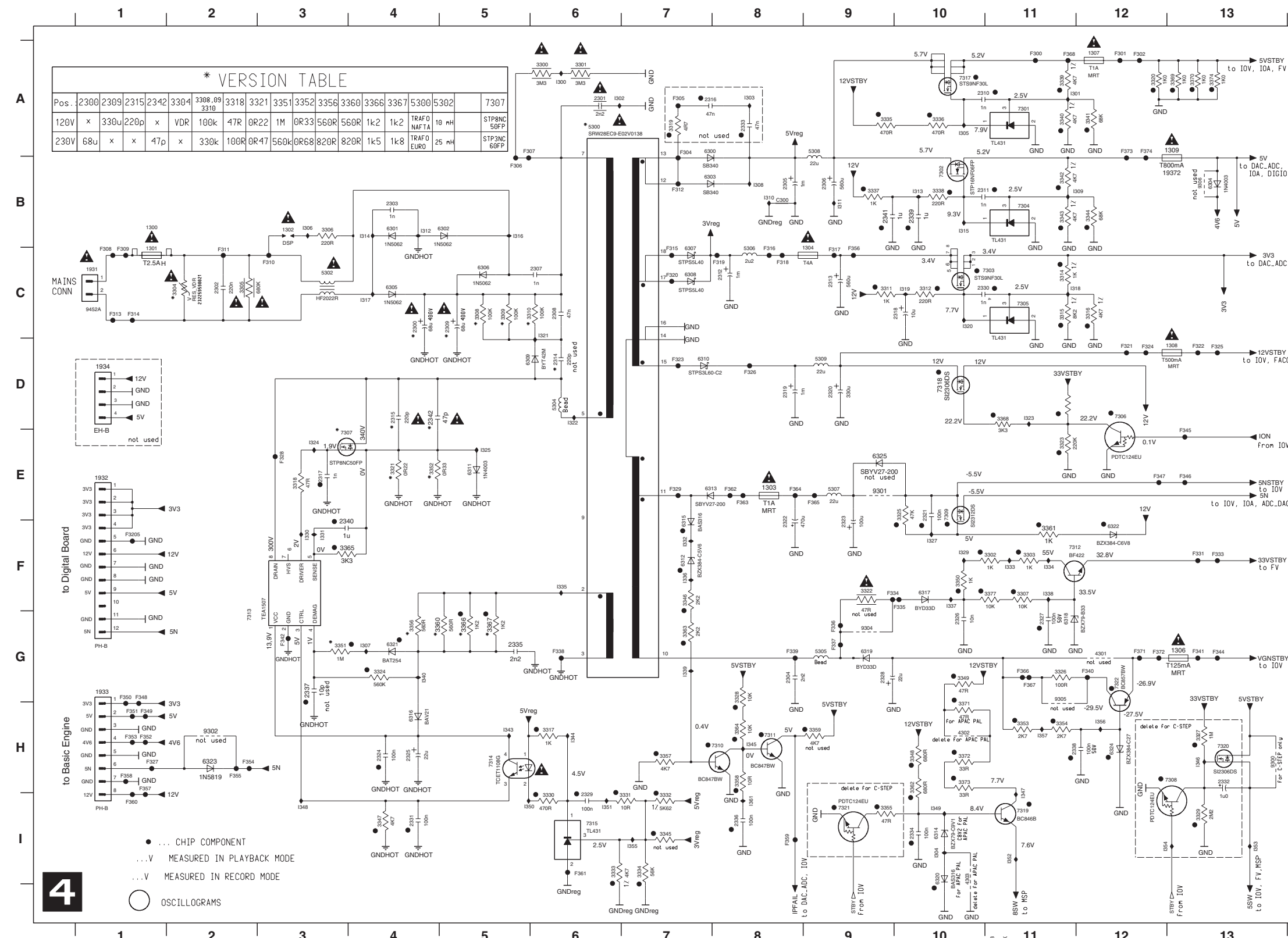
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- 1944-C F10
- 2501 B3
- 2502 A7
- 2503 A3
- 2504 C2
- 2505 C2
- 2506 A3
- 2507 A5
- 2508 A6
- 2509 B3
- 2510 E2
- 2511 F2
- 2512 D8
- 2513 E4
- 2514 F4
- 2515 B10
- 2516 B10
- 2517 C10
- 2518 C10
- 2519 B9
- 2520 D9
- 2521 F8
- 2522 F8
- 2524 E2
- 2525 D2
- 3501 E3
- 3502 E4
- 3503 B3
- 3504 A3
- 3505 B6
- 3506 C5
- 3507 E7
- 3508 F3
- 3509 F4
- 3510 D3
- 3511 F7
- 3512 B9
- 3513 C9
- 3514 D7
- 3515 C9
- 3516 E7
- 3517 D9
- 3528 F5
- 3529 F6
- 3534 C3
- 6501 A2
- 6502 B2
- 6503 E7
- 6504 F7
- 7501 A7
- 7504-A B10
- 7504-B D9
- 7509 F5
- 7511 F6
- F4106 A2
- F4107 A2
- F4406 E9
- F4407 E9
- I501 C3
- I502 D3
- I503 C3
- I504 E3
- I505 B8
- I506 B9
- I507 C9
- I508 C8
- I509 D9
- I510 D9
- I511 E3
- I512 F3
- I513 B7
- I514 B7
- I515 C7
- I516 C7
- I517 B10
- I519 A8
- I520 A8
- I521 F5
- I522 F6
- I527 E2
- I528 D2
- I529 D10



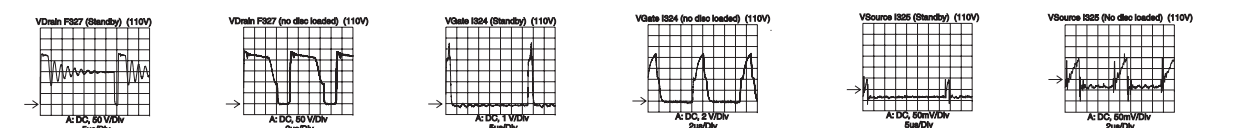
SCHEMATIC DIAGRAM

U, A models

ANALOG: Power Supply (PS)



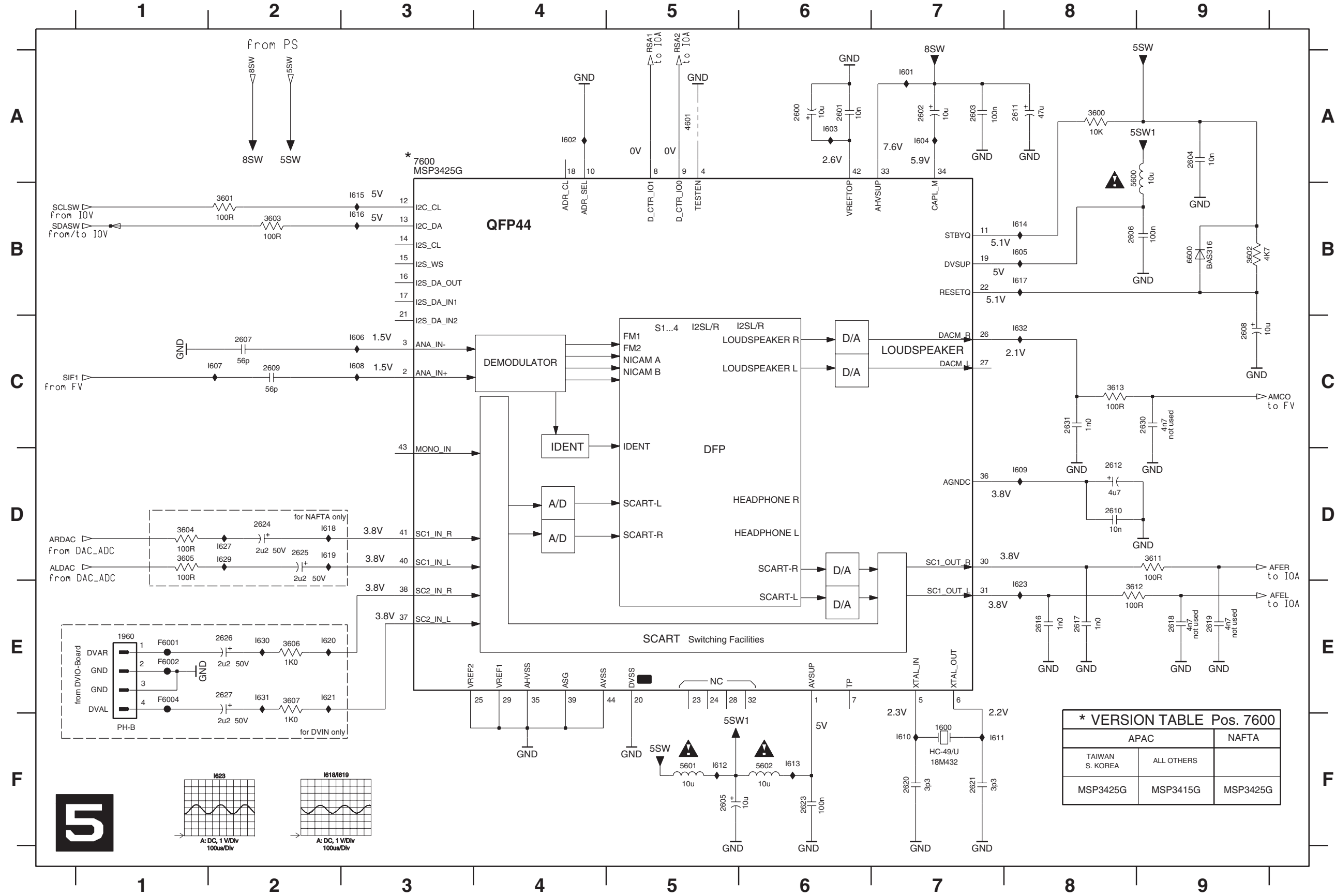
1300 B1	3318 E3	6305 C4	F325 D13	I331 F3
1301 C1	3319 A7	6306 C5	F326 D8	I332 F7
1302 B3	3320 A12	6307 C7	F327 H1	I333 F11
1303 E8	3321 E4	6308 C7	F328 E3	I334 F11
1304 C9	3322 F9	6309 D5	F329 E7	I335 F6
1306 G13	3323 E11	6310 D7	F331 F13	I336 F7
1307 A12	3324 G4	6311 E5	F333 F13	I337 F10
1308 D13	3325 E10	6312 F7	F334 F9	I338 F11
1309 A13	3326 G11	6313 E7	F335 F10	I339 G7
1931 C1	3327 H13	6314 I10	F336 G9	I340 G4
1932 E1	3328 G8	6315 F7	F337 G9	I343 H5
1933 G1	3329 I13	6316 H4	F338 G6	I344 H6
1934 D1	3330 I6	6317 F10	F339 G8	I345 H8
2300 C4	3331 I7	6318 G11	F340 G12	I346 H13
2301 A6	3332 I7	6319 G9	F341 G13	I347 I11
2302 C2	3333 I6	6320 I10	F342 G3	I348 I3
2303 B4	3334 I7	6321 G4	F344 G13	I349 I10
2304 G8	3335 A9	6322 F12	F345 D13	I350 I5
2305 B8	3336 A10	6323 H2	F346 E13	I351 I6
2306 B9	3337 B9	6324 H12	F347 E12	I352 I11
2307 C6	3338 B10	6325 E9	F348 G1	I353 I13
2308 C6	3339 A11	7301 A11	F349 H1	I354 I12
2309 C5	3340 A11	7302 B10	F350 G1	I355 I7
2310 A10	3341 A12	7303 C11	F351 H1	I356 H12
2311 B10	3342 B11	7304 B11	F352 H1	I357 H11
2312 C8	3343 B11	7305 C11	F353 H1	I361 I8
2313 C9	3344 B12	7306 D12	F354 H2	
2314 D6	3345 I7	7307 E3	F355 H2	
2315 D4	3346 F7	7308 H12	F356 C9	
2316 A7	3347 I4	7309 E10	F357 H1	
2317 E3	3348 H10	7310 H7	F358 H1	
2318 C10	3349 G10	7311 H8	F359 I8	
2319 D8	3350 F10	7312 F11	F360 I1	
2320 D9	3351 G3	7313 G2	F361 I6	
2321 E10	3352 E4	7314 H5	F362 E8	
2322 F8	3353 H11	7315 I6	F363 E8	
2323 F9	3354 H11	7317 A10	F364 E8	
2324 H4	3355 I9	7318 D10	F365 E9	
2325 H4	3356 G4	7319 I11	F366 G11	
2326 G10	3357 H7	7320 H13	F367 G11	
2327 G11	3358 H8	7321 I9	F368 A11	
2328 G9	3359 H9	7322 G12	F371 G12	
2329 I6	3360 G5	9300 H13	F372 G12	
2330 C10	3361 F11	9301 E9	F373 A12	
2331 I4	3362 H10	9302 H2	F374 A12	
2332 H13	3363 G7	9304 G9	I300 A6	
2333 A8	3364 H8	9305 G11	I301 A11	
2334 I10	3365 F3	9306 B13	I302 A6	
2335 G5	3366 G5	C300 B8	I303 A8	
2336 I8	3367 G5	F300 A11	I304 I10	
2337 G3	3368 D11	F301 A12	I305 A10	
2338 H11	3369 A13	F302 A12	I306 B3	
2339 B10	3370 A13	F304 A7	I307 G4	
2340 F3	3371 H10	F305 A7	I308 B8	
2341 B9	3372 H10	F306 B5	I309 B12	
2342 D4	3373 H10	F307 A5	I310 B8	
3300 A6	3374 A13	F308 C1	I311 B9	
3301 A6	3377 F11	F309 C1	I312 B4	
3302 F11	4301 G12	F310 C3	I313 B10	
3303 F11	4302 H10	F311 C2	I314 B4	
3304 C2	4303 I10	F312 B7	I315 B10	
3305 C2	5300 A6	F313 C1	I316 B5	
3306 B3	5302 C3	F314 C1	I317 C4	
3307 F11	5304 D6	F315 C7	I318 C11	
3308 C5	5305 G9	F316 C8	I319 C10	
3309 C5	5306 C8	F317 C9	I320 C10	
3310 C6	5307 E9	F318 C8	I321 C6	
3311 C9	5308 A9	F319 C8	I322 D6	
3312 C10	5309 D9	F320 C7	I323 D11	
3313 D11	6300 A7	F3205 F1	I324 E3	
3314 C11	6301 B4	F321 D12	I325 E5	
3315 C11	6302 B5	F322 D13	I327 F10	
3316 C12	6303 B7	F323 D7	I329 F10	
3317 H6	6304 B13	F324 D12	I330 F3	



SCHEMATIC DIAGRAM

U, A models

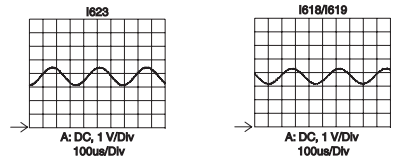
ANALOG: Multi Sound Processing (MSP)



**\* VERSION TABLE Pos. 7600**

APAC		NAFTA
TAIWAN S. KOREA	ALL OTHERS	
MSP3425G	MSP3415G	MSP3425G

- 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 D8
- 2611 A8
- 2612 D8
- 2616 E8
- 2617 E8
- 2618 E9
- 2619 E9
- 2620 F7
- 2621 F7
- 2623 F6
- 2624 D2
- 2625 D2
- 2626 E2
- 2627 E2
- 2630 C9
- 2631 C8
- 3600 A8
- 3601 B2
- 3602 B9
- 3603 B2
- 3604 D1
- 3605 D1
- 3606 E2
- 3607 E2
- 3611 D9
- 3612 E8
- 3613 C8
- 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
- I606 C3
- I607 C2
- I608 C3
- I609 D8
- I610 F7
- I611 F7
- I612 F5
- I613 F6
- I614 B8
- I615 B3
- I616 B3
- I617 B8
- I618 D2
- I619 D2
- I620 E2
- I621 E2
- I622 E8
- I623 E8
- I627 D2
- I629 D2
- I630 E2
- I631 E2
- I632 C8

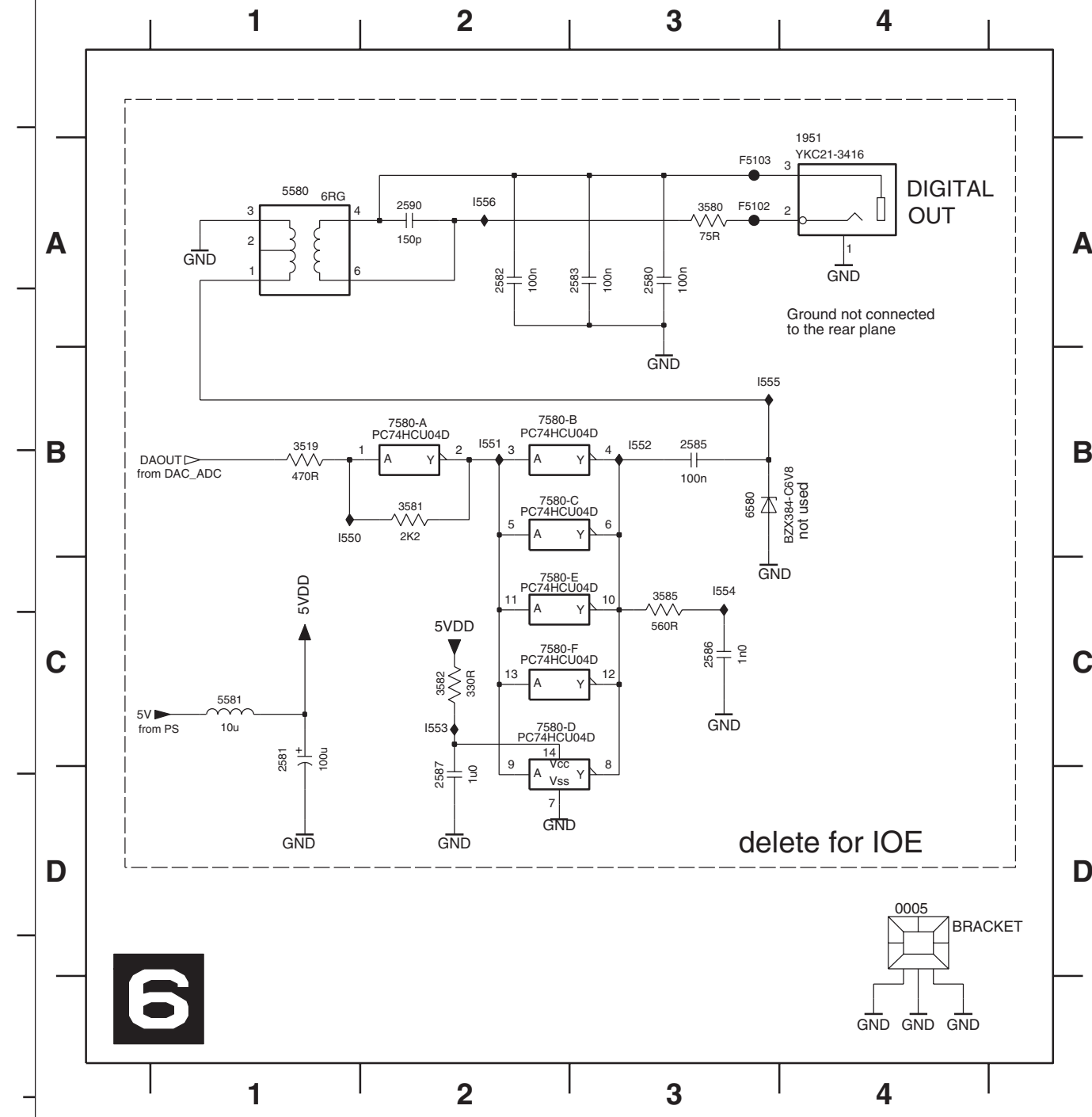


■ SCHEMATIC DIAGRAM

U, A models

ANALOG: Digital In/Out (DIGIO)

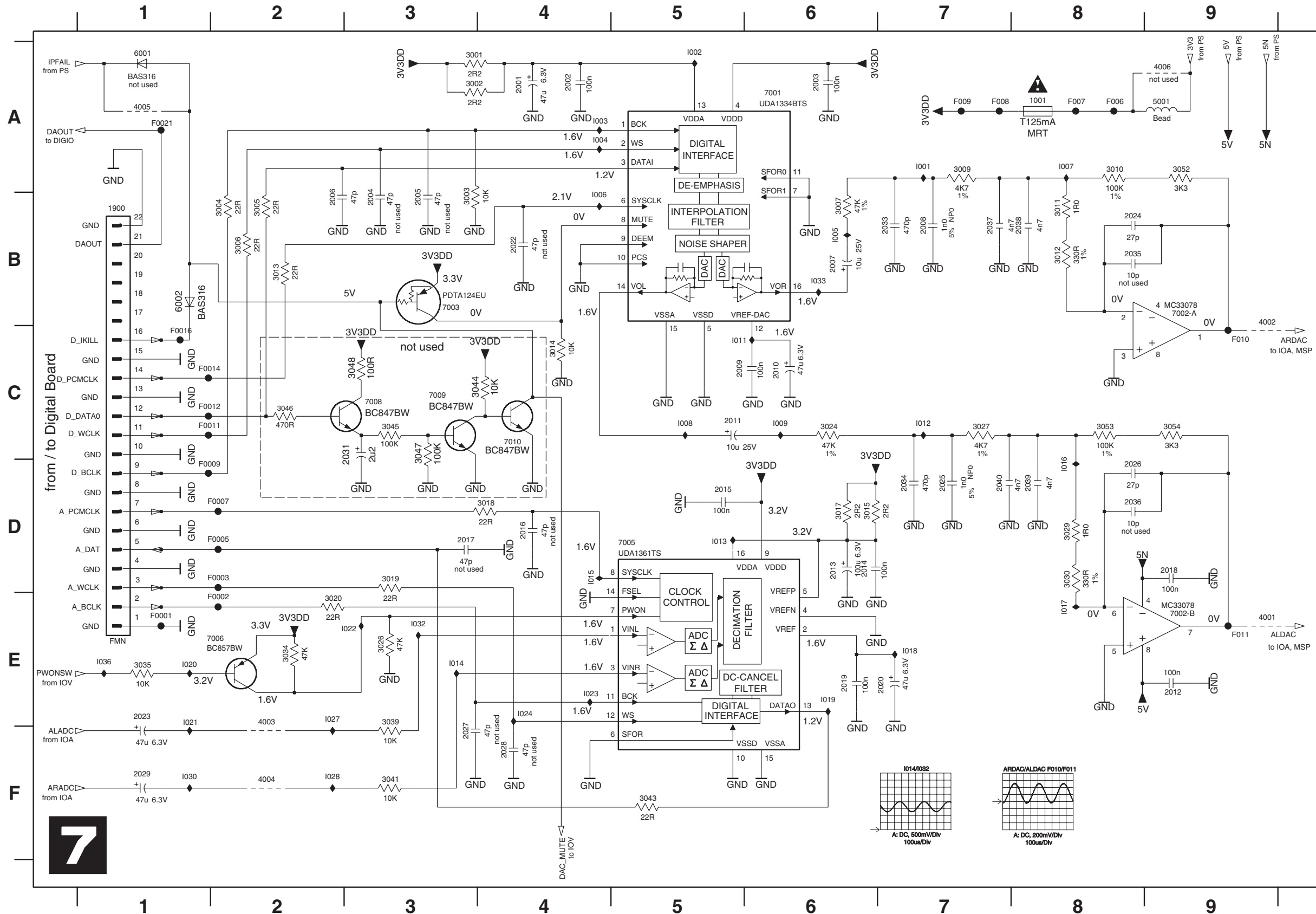
0005 C4	2582 A2	2587 D2	3581 C2	5581 D1	7580-C C2	F5102 A4	I552 B3	I556 A2
1951 A4	2583 A3	2590 A2	3582 C2	6580 C3	7580-D D2	F5103 A4	I553 D2	
2580 A3	2585 B3	3519 B1	3585 C3	7580-A B2	7580-E C2	I550 C1	I554 C3	
2581 D1	2586 C3	3580 A3	5580 A1	7580-B B2	7580-F C2	I551 B2	I555 B3	



SCHEMATIC DIAGRAM

U, A models

ANALOG: Audio Converter(DAC\_ADC)



1001 A8  
1900 B1  
2001 A4  
2002 A4  
2003 A6  
2004 B3  
2005 B3  
2006 B2  
2007 B6  
2008 B7  
2009 C5  
2010 C6  
2011 C5  
2012 E9  
2013 D6  
2014 D6  
2015 D5  
2016 D4  
2017 D3  
2018 D9  
2019 E6  
2020 E7  
2022 B4  
2023 E1  
2024 B8  
2025 D7  
2026 D8  
2027 F3  
2028 F4  
2029 F1  
2031 C3  
2033 B7  
2034 D7  
2035 B8  
2036 D8  
2037 B7  
2038 B8  
2039 D8  
2040 D7  
3001 A3  
3002 A3  
3003 B3  
3004 B2  
3005 B2  
3006 B2  
3007 B6  
3009 A7  
3010 A8  
3011 B8  
3012 B8  
3013 B2  
3014 C4  
3015 D6  
3017 D6  
3018 D4  
3019 D3  
3020 E2  
3024 C6  
3026 E3  
3027 C7  
3029 D8  
3030 D8  
3034 E2  
3035 E1  
3039 E3  
3041 F3  
3043 F5  
3044 C4  
3045 C3  
3046 C2  
3047 C3  
3048 C3  
3052 A9  
3053 C8  
3054 C9  
4001 E9  
4002 B9

4003 E2  
4004 F2  
4005 A1  
4006 A9  
5001 A9  
6001 A1  
6002 B1  
7001 A6  
7002-A B9  
7002-B E9  
7003 B3  
7005 D5  
7006 E1  
7008 C3  
7009 C3  
7010 C4  
F0001 E1  
F0002 E2  
F0003 D2  
F0005 D2  
F0007 D2  
F0009 D1  
F0011 C1  
F0012 C1  
F0014 C1  
F0016 C1  
F0021 A1  
F006 A8  
F007 A8  
F008 A7  
F009 A7  
F010 C9  
F011 E9  
I001 A7  
I002 A5  
I003 A4  
I004 A4  
I005 B6  
I006 B4  
I007 A8  
I008 C5  
I009 C6  
I011 C5  
I012 C7  
I013 D5  
I014 E3  
I015 D4  
I016 D8  
I017 E8  
I018 E7  
I019 E6  
I020 E1  
I021 E1  
I022 E3  
I023 E4  
I024 E4  
I027 E2  
I028 F2  
I030 F1  
I032 E3  
I033 B6  
I036 E1

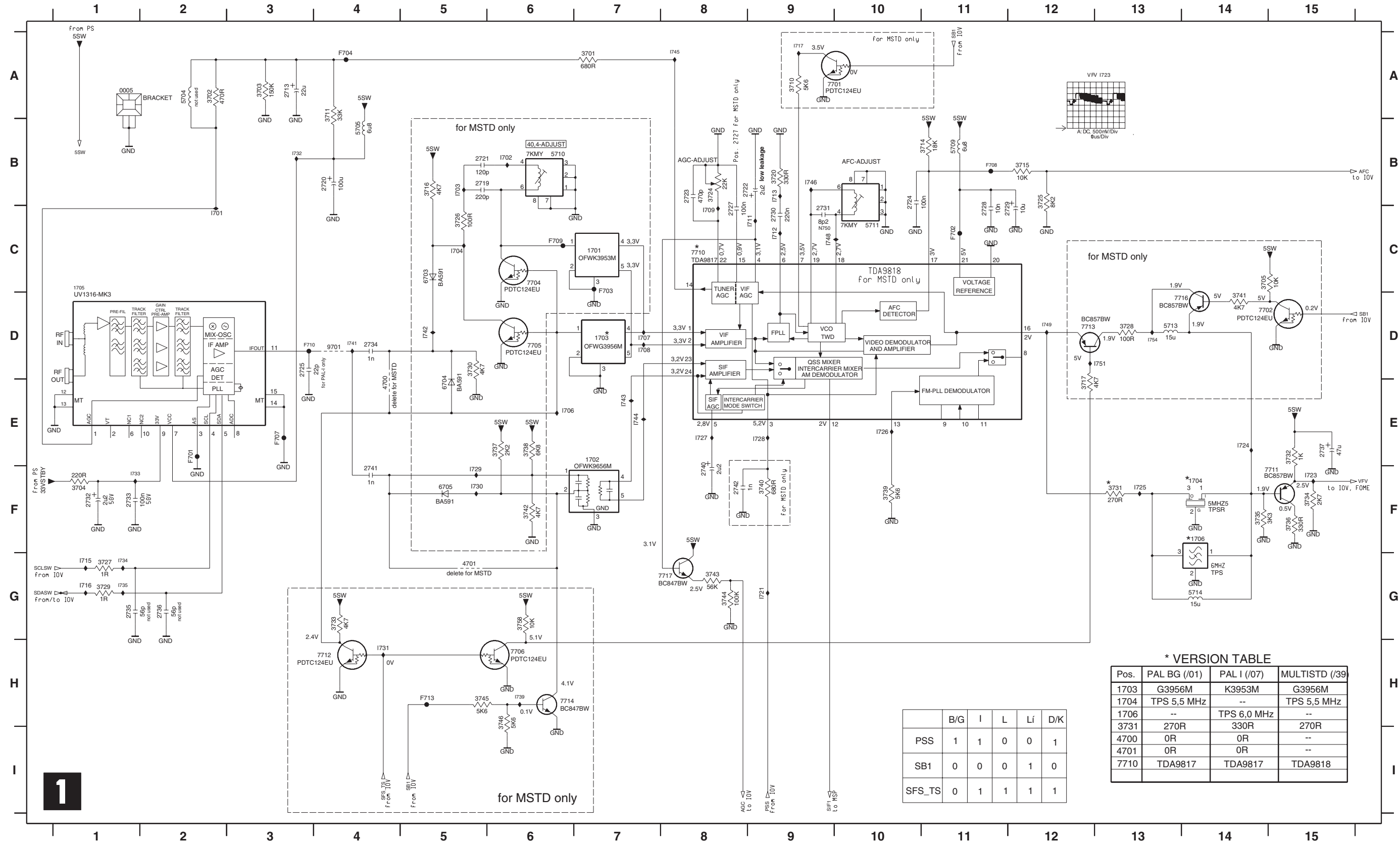


SCHEMATIC DIAGRAM

G model

ANALOG: Frontend Video (FV)

- 0005 A1 1704 F14 2719 B5 2723 B8 2728 C11 2732 F1 2736 G2 2742 F8 3704 F1 3714 B11 3720 B9 3727 G1 3731 F13 3735 F14 3739 F10 3743 G8 3758 G6 5705 B4 5713 D13 6705 F5 7705 D6 7712 H4 7717 G7 F703 D7 F709 C6 I702 B6 I707 D7 I712 C9 I717 A9 I725 F13 I729 F5 I733 F1 I741 D4 I745 A8 I751 D13
- 1701 C7 1705 C1 2720 B4 2724 B10 2729 C12 2733 F1 2737 E15 3701 A7 3705 C14 3715 B12 3724 B8 3728 D13 3732 E15 3736 F15 3740 F9 3744 G8 4700 E4 5709 B11 5714 G14 7701 A10 7706 H6 7713 D12 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 3729 G1 3733 G4 3737 E6 3741 D14 3745 H5 4701 G5 5710 B6 6703 C5 7702 D15 7710 C8 7714 H6 F701 E2 F707 E3 F713 H5 I704 C5 I709 C8 I715 G1 I723 F15 I727 E8 I731 H4 I735 G1 I743 E7 I748 C9
- 1703 D7 2713 A3 2722 B8 2727 C8 2731 C9 2735 G1 2741 F4 3703 A3 3711 A4 3717 E12 3726 C5 3730 D5 3734 F15 3738 E6 3742 F6 3746 H6 5704 A2 5711 C10 6704 E5 7704 C6 7711 F14 7716 D14 F702 C11 F708 B11 I701 B2 I706 E6 I711 C9 I716 G1 I724 E14 I728 E9 I732 B3 I739 H6 I744 E7 I749 D12



\* VERSION TABLE

Pos.	PAL BG (/01)	PAL I (/07)	MULTISTD (/39)
1703	G3956M	K3953M	G3956M
1704	TPS 5,5 MHz	--	TPS 5,5 MHz
1706	--	TPS 6,0 MHz	--
3731	270R	330R	270R
4700	0R	0R	--
4701	0R	0R	--
7710	TDA9817	TDA9817	TDA9818

	B/G	I	L	Lí	D/K
PSS	1	1	0	0	1
SB1	0	0	0	1	0
SFS_TS	0	1	1	1	1

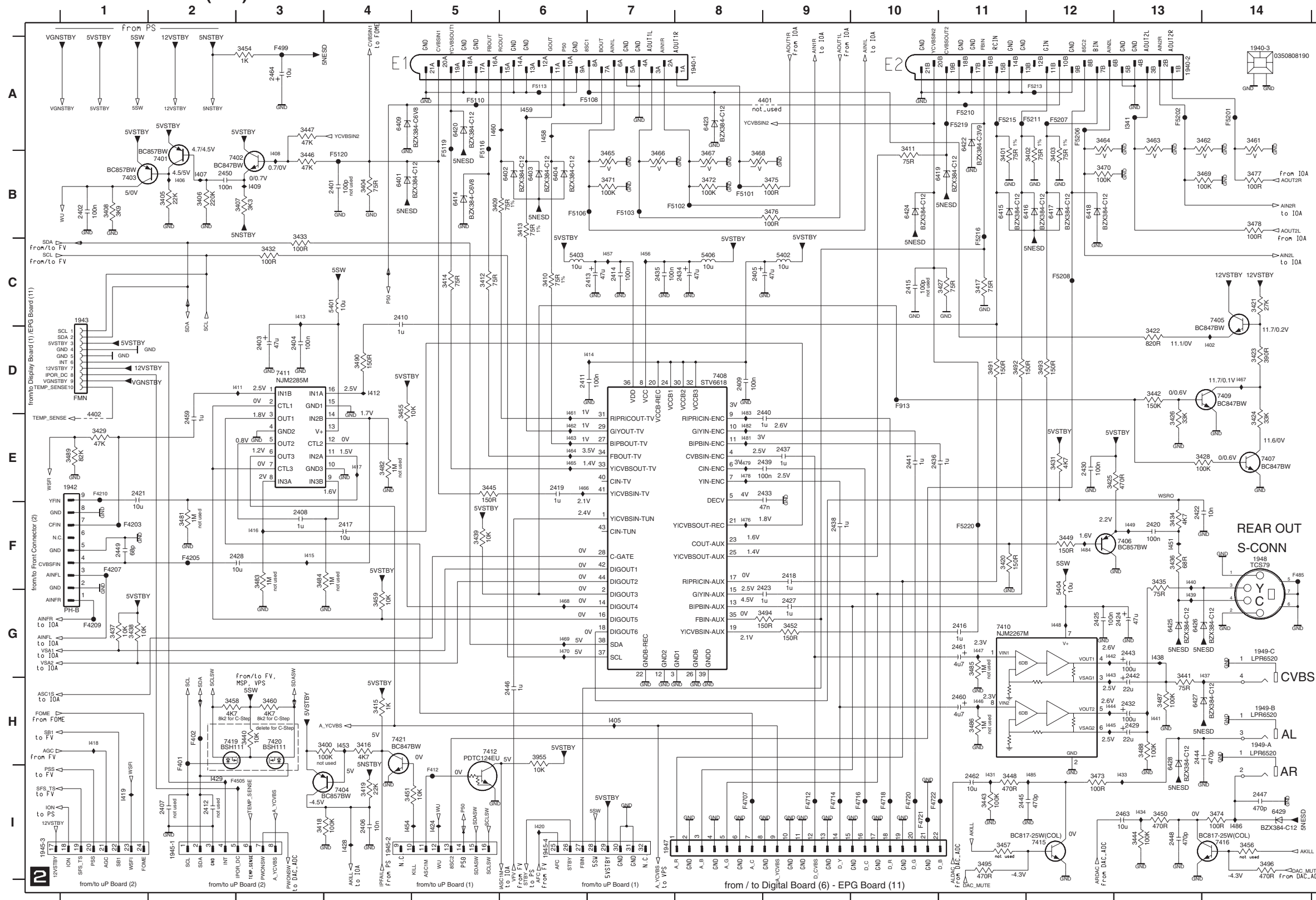
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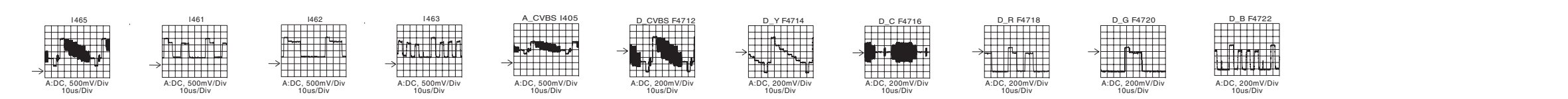
SCHEMATIC DIAGRAM

G model

ANALOG: In/Out Video (IOV)



1940-1 A8	3444 I13	F4714 I9
1940-2 A13	3445 E5	F4716 I10
1940-3 A14	3446 B3	F4718 I10
1942 E1	3447 A3	F4720 I10
1943 C1	3448 I11	F4721 I10
1945-1 I2	3449 F12	F4722 I10
1947 I7	3450 I13	F485 F14
1948 F14	3451 I4	F499 A3
1949-A H14	3452 G9	F5101 B8
1949-B H14	3453 D1	F5102 B9
1949-C G14	3454 A3	F5103 B7
2401 B4	3455 D4	F5106 B6
2402 B1	3456 I14	F5107 A7
2403 D3	3457 I11	F5110 A5
2404 D3	3458 H2	F5113 A6
2405 C8	3459 G4	F5116 A5
2406 I4	3460 H3	F5119 A5
2407 I2	3461 A14	F5120 B4
2408 F3	3462 A14	F5201 A14
2409 D8	3463 A13	F5202 A13
2410 C4	3464 A12	F5206 A12
2411 D6	3465 B7	F5207 A12
2412 I2	3466 B7	F5208 C12
2413 C7	3467 B8	F5210 A11
2414 C7	3468 B8	F5211 A12
2415 C10	3469 B14	F5213 A12
2416 G11	3470 B12	F5215 A11
2417 F4	3471 B7	F5216 B11
2418 F9	3472 B8	F5219 A11
2419 E6	3473 I12	F5220 F11
2420 F13	3474 I14	F913 D10
2421 E1	3475 B9	I341 A13
2422 F13	3476 B9	I402 D14
2423 G9	3477 B14	I405 H7
2424 G13	3478 B14	I406 B2
2425 G2	3481 F2	I408 F2
2426 E4	3482 G9	I409 B3
2428 F3	3483 F3	I409 B3
2429 H13	3484 F3	I411 D3
2430 E12	3485 G11	I412 D4
2432 H13	3486 H11	I413 C3
2433 E9	3487 H13	I414 D7
2434 C8	3488 H13	I415 F3
2435 C7	3489 E1	I416 F3
2436 E10	3490 D4	I417 E4
2437 D9	3491 D11	I419 H11
2438 F9	3492 D11	I419 I11
2439 E9	3493 D12	I420 I6
2440 E9	3494 G9	I424 I5
2441 E10	3495 I11	I428 I4
2442 H13	3496 I14	I429 I2
2443 G13	3955 H6	I431 I11
2444 H13	4401 A9	I433 I13
2445 I11	4402 E1	I434 I13
2446 H6	5401 C4	I436 G14
2447 I14	5402 C9	I438 G13
2448 I13	5403 C6	I439 G13
2449 F1	5404 F12	I440 F13
2450 B2	5406 C8	I441 H13
2459 E2	6401 B4	I442 G12
2460 H11	6402 B6	I443 G12
2461 G11	6403 B6	I444 H12
2462 I11	6404 B6	I445 H12
2463 I13	6409 A4	I457 C7
2464 A3	6414 B5	I458 A6
3400 H4	6415 B11	I459 A6
3401 B11	6416 B12	I459 A6
3402 B12	6417 B12	I459 A6
3403 B12	6418 B12	I459 A6
3404 B4	6419 B11	I459 A6
3405 B2	6420 A5	I459 A6
3406 B2	6422 A11	I459 A6
3407 B3	6423 A9	I459 A6
3408 B1	6424 B10	I459 A6
3409 B5	6425 G13	I459 A6
3410 C6	6426 G13	I459 A6
3411 B10	6427 H13	I459 A6
3412 C5	6428 H13	I459 A6
3413 B6	6429 I14	I459 A6
3414 C5	7401 B2	I459 A6
3415 H4	7402 B3	I459 A6
3416 H4	7403 B1	I459 A6
3417 C11	7404 I4	I459 A6
3418 I3	7405 C14	I459 A6
3419 I4	7406 F13	I459 A6
3420 F11	7407 E14	I459 A6
3421 C14	7408 D8	I459 A6
3422 D13	7409 D14	I459 A6
3423 D14	7410 G11	I459 A6
3424 E14	7411 D3	I459 A6
3425 E12	7412 H5	I459 A6
3426 E13	7415 I12	I459 A6
3427 C11	7416 I14	I459 A6
3428 E14	7419 H2	I459 A6
3429 E1	7420 H3	I459 A6
3431 E12	7421 H4	I459 A6
3432 C3	F401 H2	I459 A6
3433 C3	F402 H2	I459 A6
3434 F13	F412 I5	I459 A6
3435 F13	F4203 F1	I459 A6
3436 F13	F4205 F2	I459 A6
3437 G1	F4207 F1	I459 A6
3438 G1	F4209 G1	I459 A6
3439 F5	F4210 E1	I459 A6
3440 H3	F4505 I3	I459 A6
3441 H13	F4707 I8	I459 A6
3442 D13	F4712 I9	I459 A6
3443 I11	F4712 I9	I459 A6

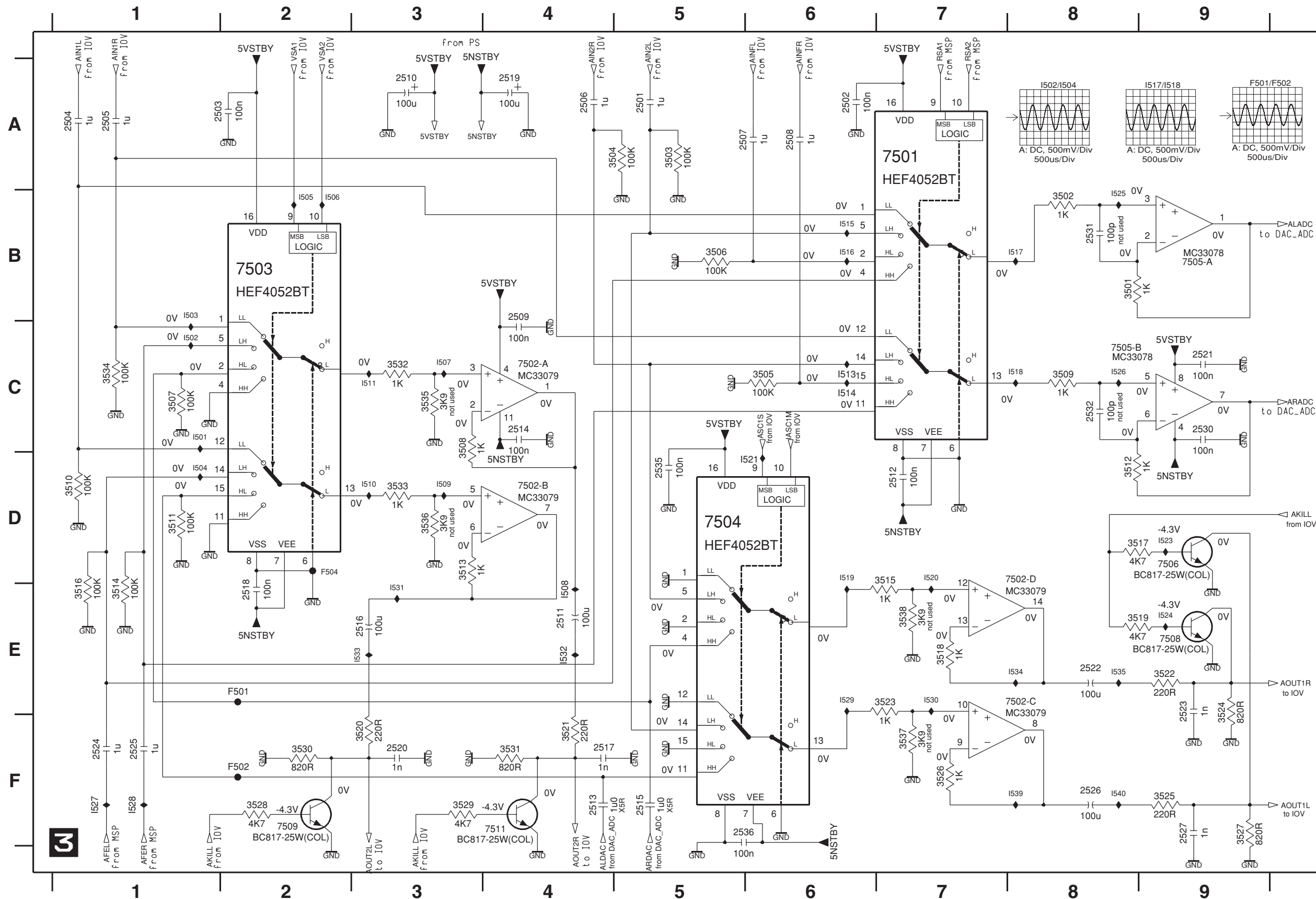




SCHEMATIC DIAGRAM

G model

ANALOG: In/Out Audio (IOA)

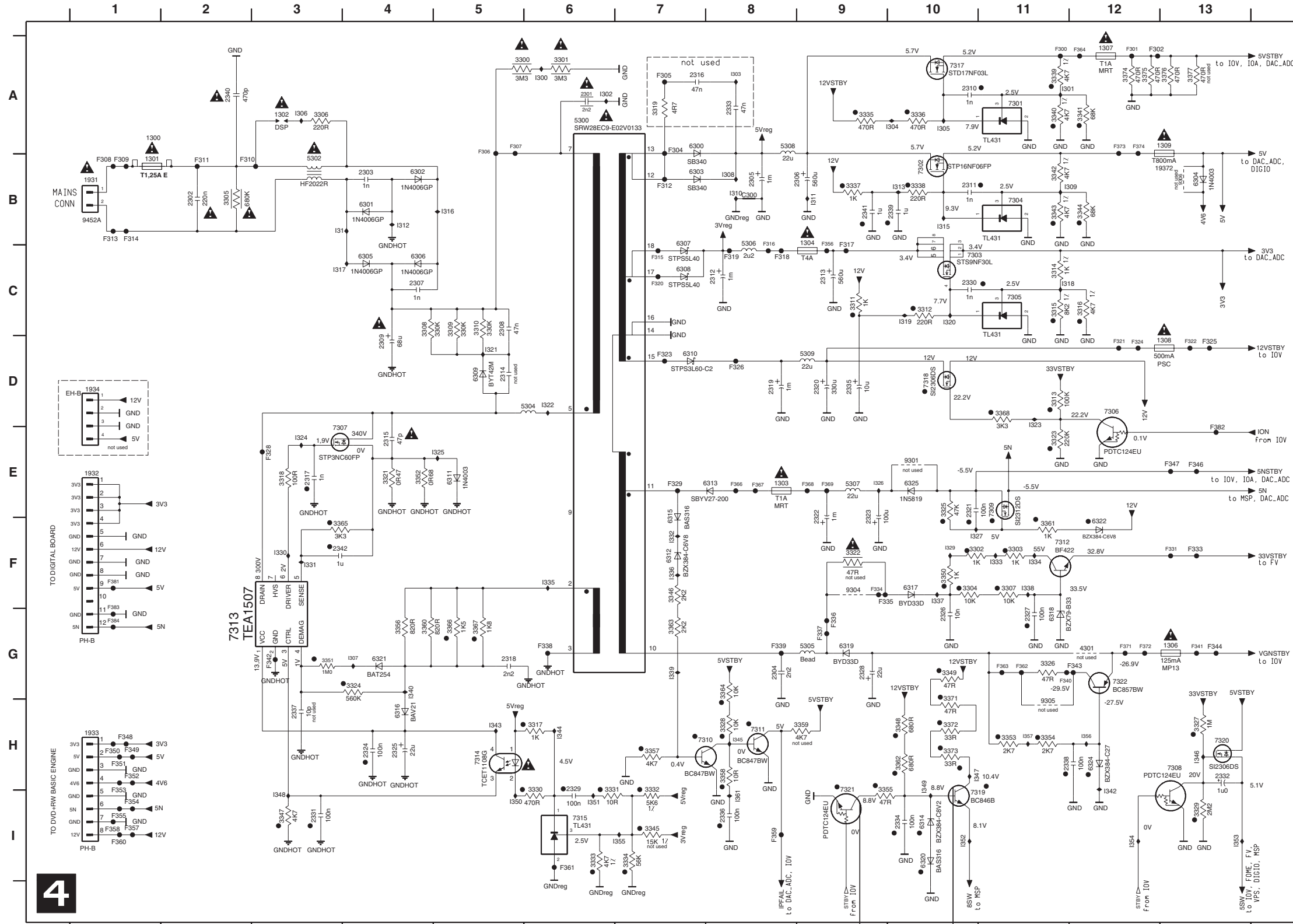


- 2501 A5
- 2502 A6
- 2503 A2
- 2504 A1
- 2505 A1
- 2506 A4
- 2507 A6
- 2508 A6
- 2509 B4
- 2510 A3
- 2511 E4
- 2512 F7
- 2513 F4
- 2514 C4
- 2515 F5
- 2516 E3
- 2517 F4
- 2518 E2
- 2519 A4
- 2520 F3
- 2521 C9
- 2522 E8
- 2523 E9
- 2524 F1
- 2525 F1
- 2526 F8
- 2527 F9
- 2530 C9
- 2531 B8
- 2532 C8
- 2535 D5
- 2536 F5
- 3501 B8
- 3502 B8
- 3503 A5
- 3504 A5
- 3505 C6
- 3506 B5
- 3507 C1
- 3508 C3
- 3509 C8
- 3510 D1
- 3511 D1
- 3512 D8
- 3513 D3
- 3514 E1
- 3515 D7
- 3516 E1
- 3517 D8
- 3518 E7
- 3519 E8
- 3520 F3
- 3521 F4
- 3522 E9
- 3523 E7
- 3524 E9
- 3525 F9
- 3526 F7
- 3527 F9
- 3528 F2
- 3529 F3
- 3530 F2
- 3531 F4
- 3532 C3
- 3533 D3
- 3534 C1
- 3535 C3
- 3536 D3
- 3537 F7
- 3538 E7
- 7501 A7
- 7502-A C4
- 7502-B D4
- 7502-C E7
- 7502-D D7
- 7503 B2
- 7504 D5
- 7505-A B9
- 7505-B C8
- 7506 D9
- 7508 E9
- 7509 F2
- 7511 F4
- F501 E2
- F502 F2
- F504 D2
- I501 C1
- I502 C1
- I503 B1
- I504 D1
- I505 B2
- I506 B2
- I507 C3
- I508 E4
- I509 D3
- I510 D3
- I511 C3
- I512 C6
- I513 C6
- I514 C6
- I515 B6
- I516 B6
- I517 B8
- I518 C8
- I519 D6
- I520 D7
- I521 D7
- I522 D9
- I523 D9
- I524 E9
- I525 B8
- I526 C8
- I527 F1
- I528 F1
- I529 E6
- I530 E7
- I531 E3
- I532 E4
- I533 E3
- I534 E8
- I535 E8
- I539 F8
- I540 F8

SCHEMATIC DIAGRAM

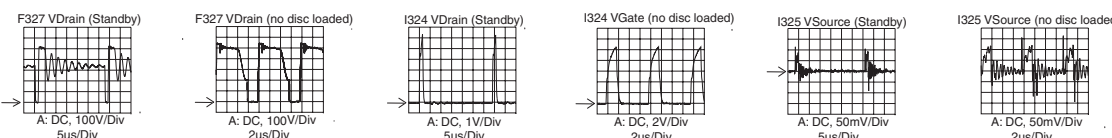
G model

ANALOG: Power Supply (PS)



1300 A1	3340 A11	9306 B13	I320 C10
1301 B1	3341 A12	C300 B8	I321 D5
1302 A3	3342 B11	F300 A11	I322 D6
1303 E8	3343 B11	F301 A12	I323 D11
1304 C9	3344 B12	F302 A12	I324 E3
1306 G13	3345 I7	F304 A7	I325 E5
1307 A12	3346 F7	F305 A7	I326 E9
1308 D13	3347 I3	F306 A5	I327 F10
1309 A13	3348 H10	F307 A5	I329 F10
1931 B1	3349 G10	F308 B1	I330 F3
1932 E1	3350 F10	F309 B1	I331 F3
1933 H1	3351 G3	F310 B2	I332 F7
1934 D1	3352 E4	F311 B2	I333 F11
2301 A6	3353 H11	F312 B7	I334 F11
2302 B2	3354 H11	F313 B1	I335 F6
2303 B4	3355 I9	F314 B1	I336 F7
2304 G8	3356 G4	F315 C7	I337 F10
2305 B8	3357 H7	F316 C8	I338 F11
2306 B9	3358 H8	F317 C9	I339 F7
2307 C4	3359 H9	F318 C8	I340 G4
2308 C5	3360 G4	F319 C8	I342 I12
2309 D4	3361 F11	F320 C7	I343 H5
2310 A10	3362 H10	F321 D12	I344 H6
2311 B10	3363 G7	F322 D13	I345 H8
2312 C8	3364 G8	F323 D7	I346 H13
2313 C9	3365 F3	F324 D12	I347 H10
2314 D5	3366 G5	F325 D13	I348 I3
2315 E4	3367 G5	F326 D8	I349 H10
2316 A7	3368 D11	F328 E3	I350 I5
2317 E3	3371 H10	F329 E7	I351 I6
2318 G5	3372 H10	F331 F13	I352 I10
2319 D8	3373 H10	F333 F13	I353 I13
2320 D9	3374 A12	F334 F9	I354 I12
2321 E10	3375 A12	F335 F9	I355 I7
2322 E9	3376 A13	F336 G9	I356 H12
2323 E9	3377 A13	F337 G9	I357 H11
2324 H4	4301 G12	F338 G6	I361 I8
2325 H4	5300 A6	F339 G8	
2326 G10	5302 B3	F340 G11	
2327 G11	5304 D6	F341 G13	
2328 G9	5305 G9	F342 G3	
2329 I6	5306 C8	F343 G12	
2330 C10	5307 E9	F344 G13	
2331 I3	5308 A8	F346 E13	
2332 H13	5309 D9	F347 E13	
2333 A8	6300 A7	F348 H1	
2334 I10	6301 B4	F349 H1	
2335 D9	6302 B4	F350 H1	
2336 I8	6303 B7	F351 H1	
2337 H3	6304 B13	F352 H1	
2338 H11	6305 C4	F353 H1	
2339 B10	6306 C4	F354 I1	
2340 A2	6307 C7	F355 I1	
2341 B9	6308 C7	F356 C9	
2342 F3	6309 D5	F357 I1	
3300 A5	6310 D7	F358 I1	
3301 A6	6311 E5	F359 I8	
3302 F10	6312 F7	F360 I1	
3303 F11	6313 E8	F361 I6	
3304 F10	6314 I10	F362 G11	
3305 B2	6315 E7	F363 G11	
3306 A3	6316 H4	F364 A12	
3307 F11	6317 F10	F366 E8	
3308 C4	6318 G11	F367 E8	
3309 C5	6319 G9	F368 E9	
3310 C5	6320 I10	F369 E9	
3311 C9	6321 G4	F371 G12	
3312 C10	6322 F12	F372 G12	
3313 D11	6324 H12	F373 A12	
3314 C11	6325 E10	F374 A12	
3315 C11	7301 A11	F381 F1	
3316 C12	7302 B10	F382 E13	
3317 H6	7303 C10	F383 G1	
3318 E3	7304 B11	F384 G1	
3319 A7	7305 C11	I300 A6	
3321 E4	7306 D12	I301 A11	
3322 F9	7307 E3	I302 A6	
3323 E11	7308 H13	I303 A8	
3324 G4	7309 E11	I304 A10	
3325 E10	7310 H7	I305 A10	
3326 G11	7311 H8	I306 A3	
3327 H13	7312 F11	I307 G4	
3328 H8	7313 G2	I308 B8	
3329 I13	7314 H5	I309 B12	
3330 I6	7315 I6	I310 B8	
3331 I6	7317 A10	I311 B9	
3332 I7	7318 D10	I312 B4	
3333 I6	7319 I10	I313 B10	
3334 I7	7320 H13	I314 B3	
3335 A9	7321 I9	I315 B10	
3336 A10	7322 G12	I316 B5	
3337 B9	9301 E10	I317 C3	
3338 B10	9304 F9	I318 C11	
3339 A11	9305 H11	I319 C10	

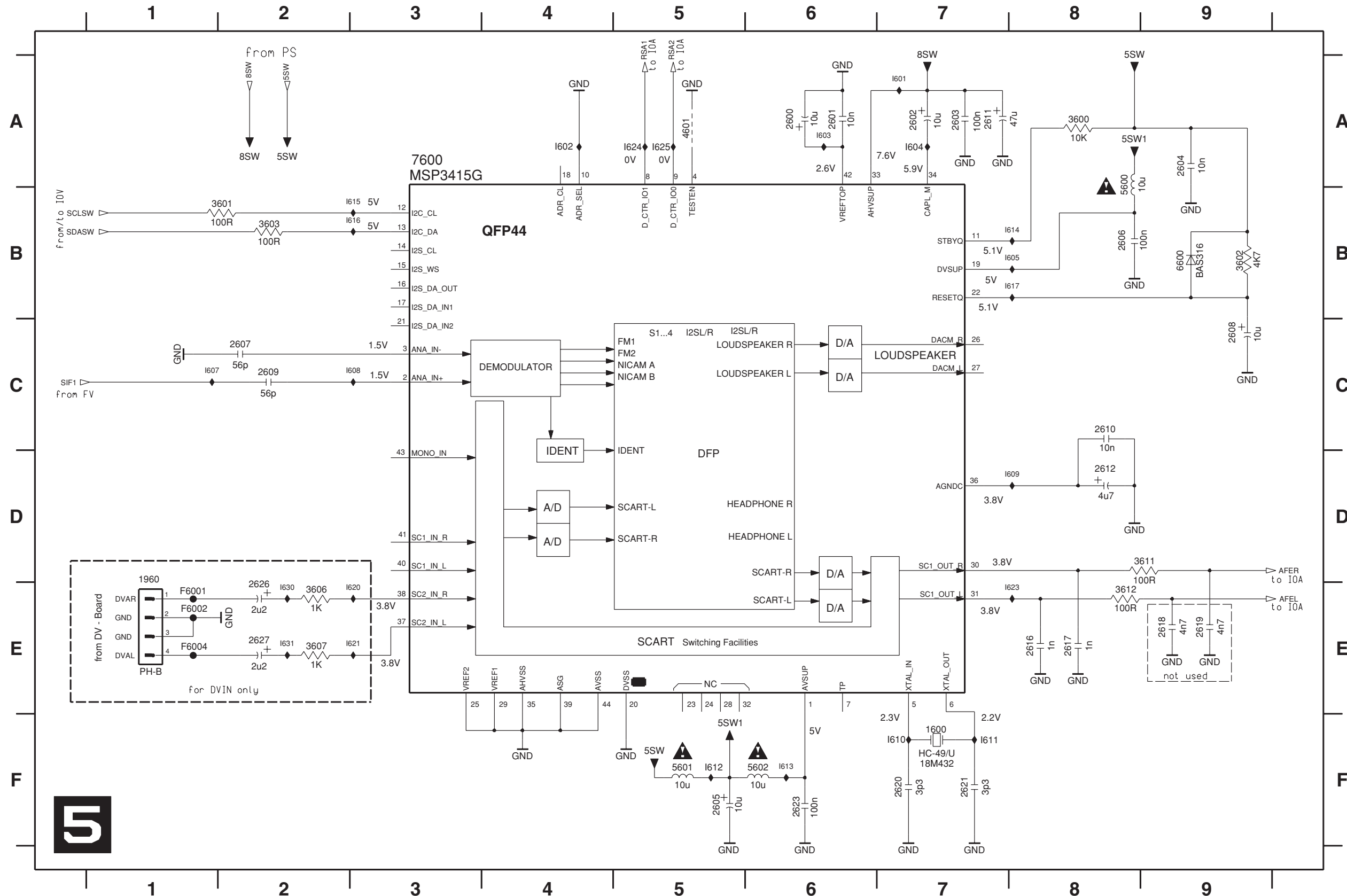
4



■ SCHEMATIC DIAGRAM

G model

ANALOG: Multi Sound Processing (MSP)



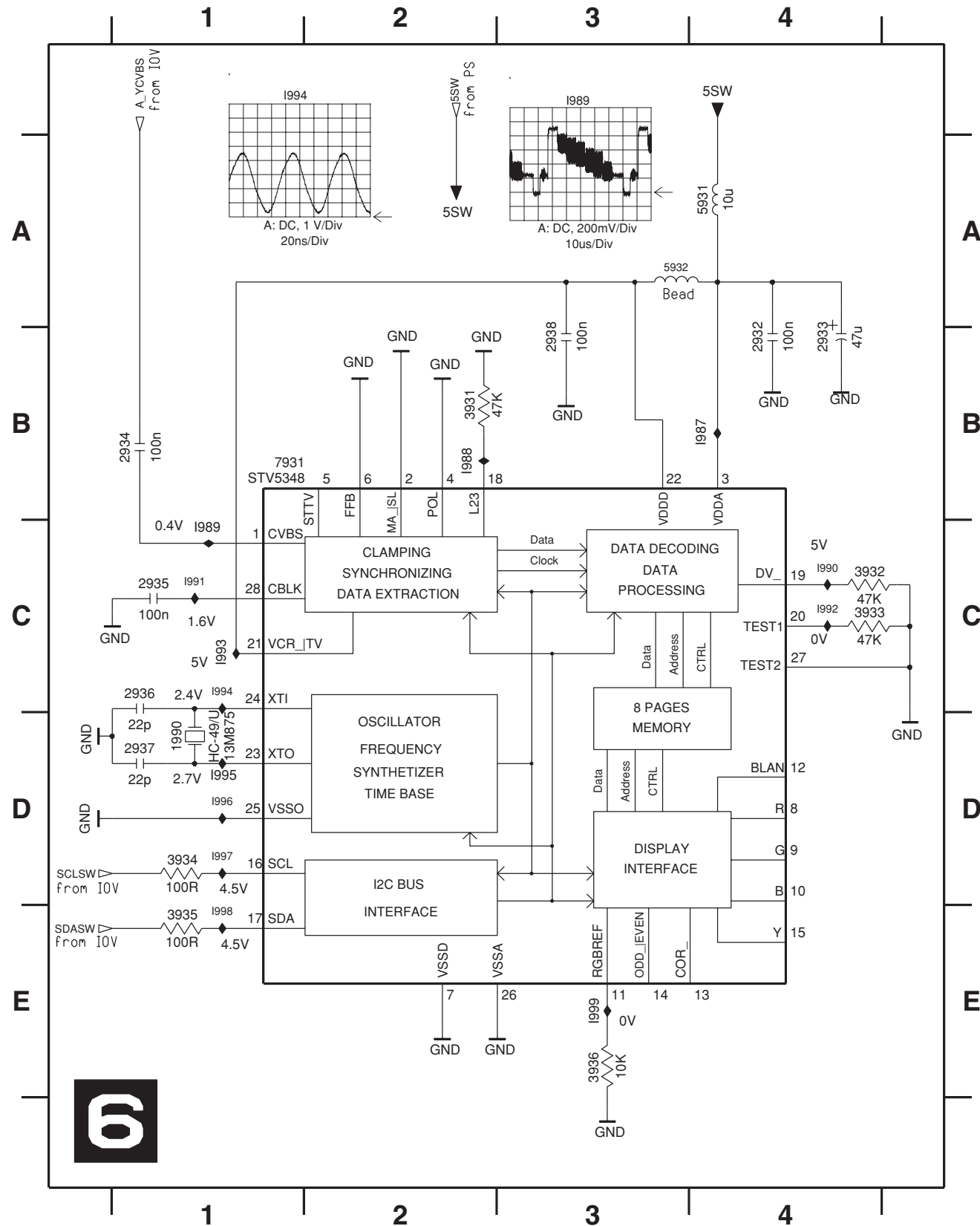
- 1600 F7
- 1960 E1
- 2600 A6
- 2601 A6
- 2602 A7
- 2603 A7
- 2604 A9
- 2605 F5
- 2606 B8
- 2607 C2
- 2608 C9
- 2609 C2
- 2610 C8
- 2611 A7
- 2612 D8
- 2616 E8
- 2617 E8
- 2618 E9
- 2619 E9
- 2620 F7
- 2621 F7
- 2623 F6
- 2626 E2
- 2627 E2
- 3600 A8
- 3601 B2
- 3602 B9
- 3603 B2
- 3606 E2
- 3607 E2
- 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

■ SCHEMATIC DIAGRAM

G model

ANALOG: VPS

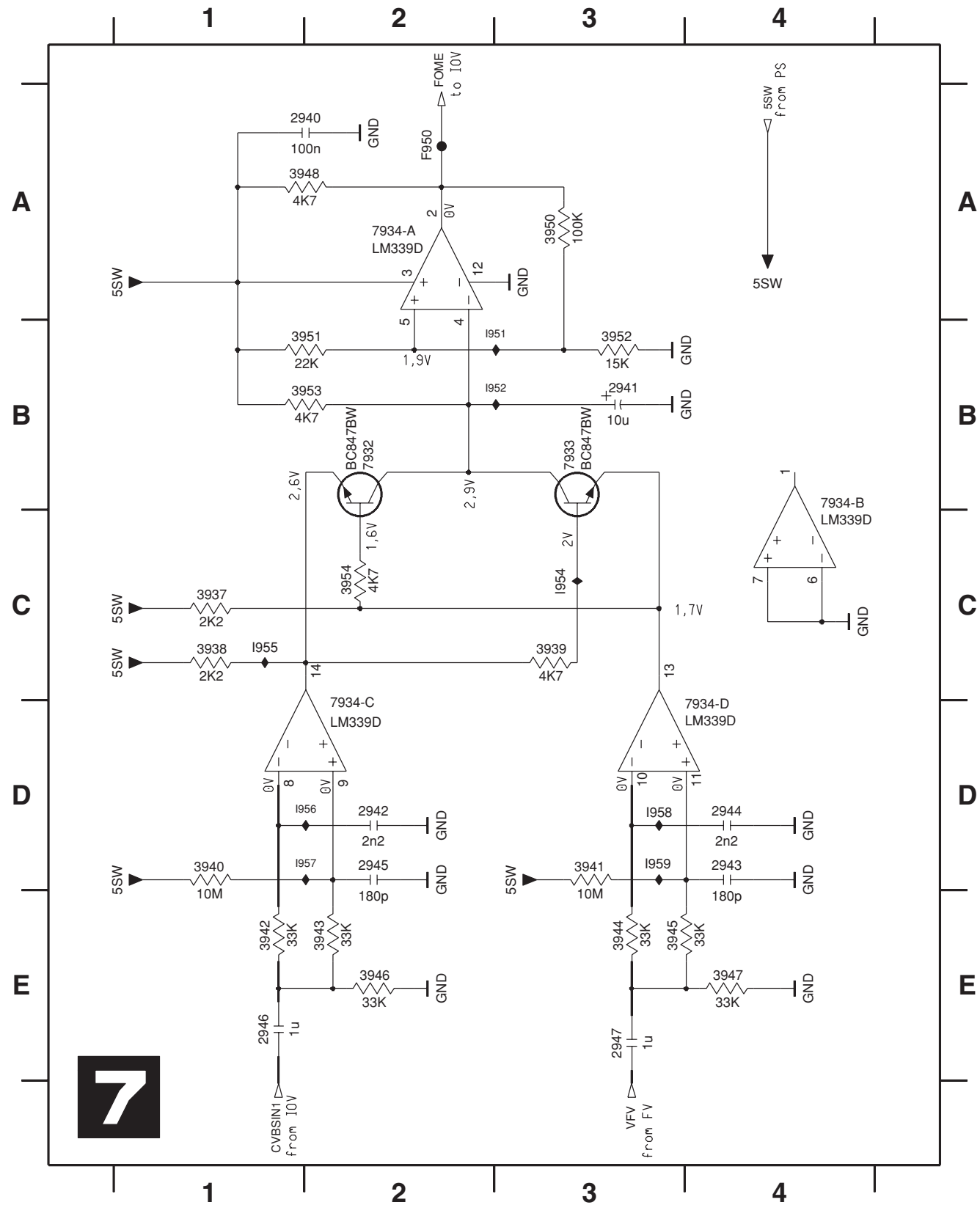
1990 D1	2934 B1	2937 D1	3932 C4	3935 E1	5932 A3	1988 B2	1991 C1	1994 C1	1997 D1
2932 B4	2935 C1	2938 B3	3933 C4	3936 E3	7931 B2	1989 C1	1992 C4	1995 D1	1998 E1
2933 B4	2936 C1	3931 B2	3934 D1	5931 A4	1987 B4	1990 C4	1993 C1	1996 D1	1999 E3



6

ANALOG: 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

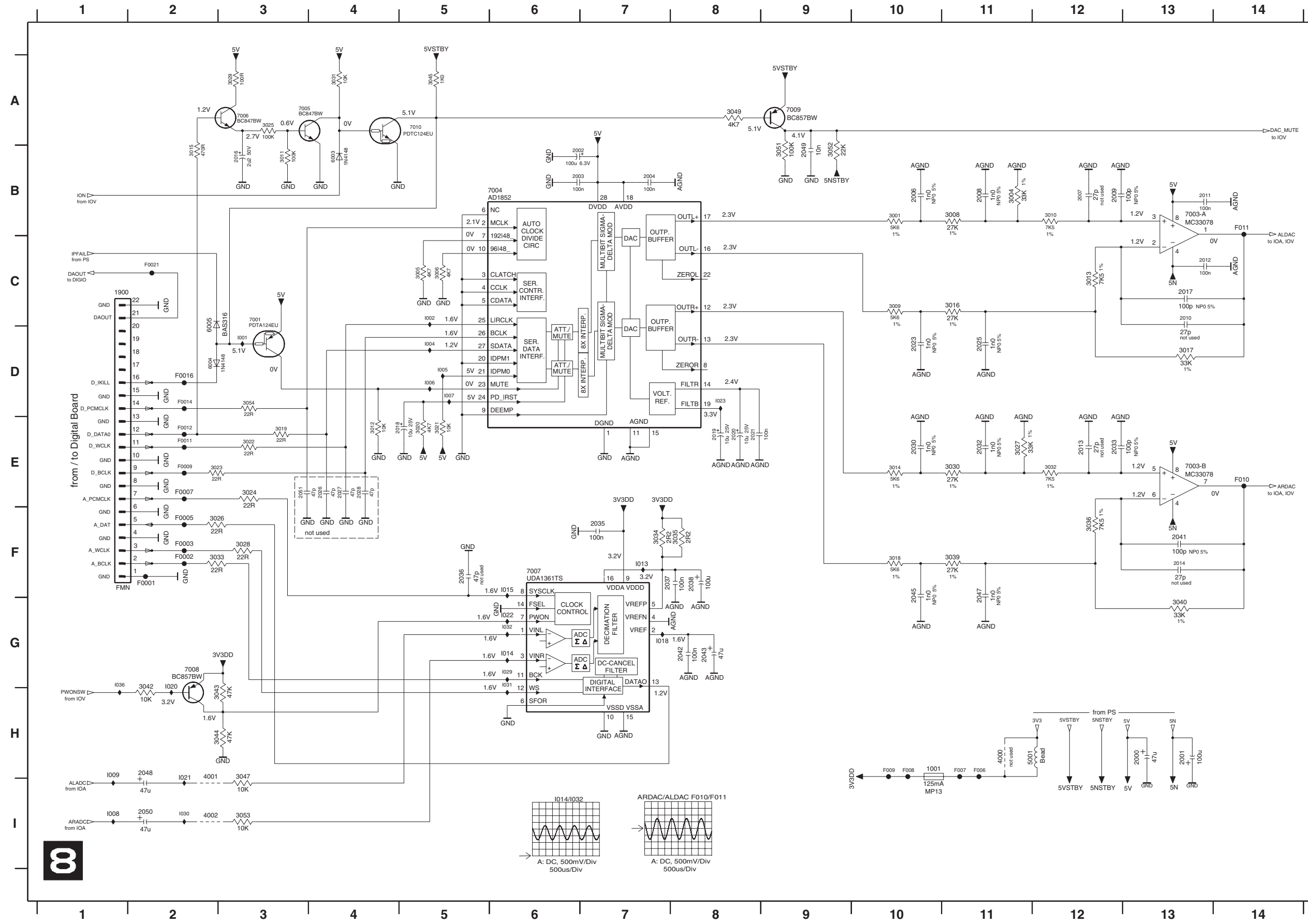


7

SCHEMATIC DIAGRAM

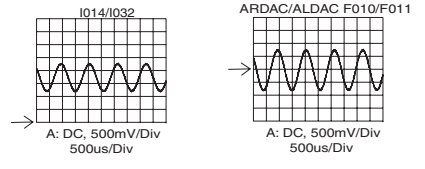
G model

ANALOG: Audio Converter (DAC\_ADC)



- 1001 H10
- 1900 C2
- 2000 H13
- 2001 H13
- 2002 B6
- 2003 B6
- 2004 B7
- 2006 B10
- 2007 B12
- 2008 B11
- 2009 B12
- 2010 C13
- 2011 B13
- 2012 C13
- 2013 E12
- 2014 F13
- 2016 B3
- 2017 C13
- 2018 E5
- 2019 E8
- 2020 E8
- 2021 E8
- 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 F10
- 2047 F11
- 2048 H2
- 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 E5
- 3021 E5
- 3022 E3
- 3023 E2
- 3024 E3
- 3025 A3
- 3026 F2
- 3027 E11
- 3028 F3
- 3029 A3
- 3030 E11
- 3032 E12
- 3033 F2
- 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
- 5001 H11
- 6003 B4
- 6004 D2
- 6005 C2
- 7001 C3
- 7003-A B13
- 7003-B E13
- 7005 A3
- 7006 A3
- 7007 F6
- 7008 G2
- 7009 A9
- 7010 A5
- F0001 F2
- F0002 F2
- F0003 F2
- F0005 F2
- F0007 E2
- F0009 E2
- F0011 E2
- F0012 E2
- F0014 D2
- F0016 D2
- F0021 C2
- F006 H11
- F007 H11
- F008 H10
- F009 H10
- F010 E14
- F011 B14
- I001 D3
- I002 C5
- I004 D5
- I005 D5
- I006 D5
- I007 D5
- I008 I1
- I009 H1
- I013 F7
- I014 G6
- I015 F6
- I018 G7
- I020 G2
- I021 H2
- I022 G6
- I023 D8
- I029 G6
- I030 I2
- I031 G6
- I032 G6
- I036 G1

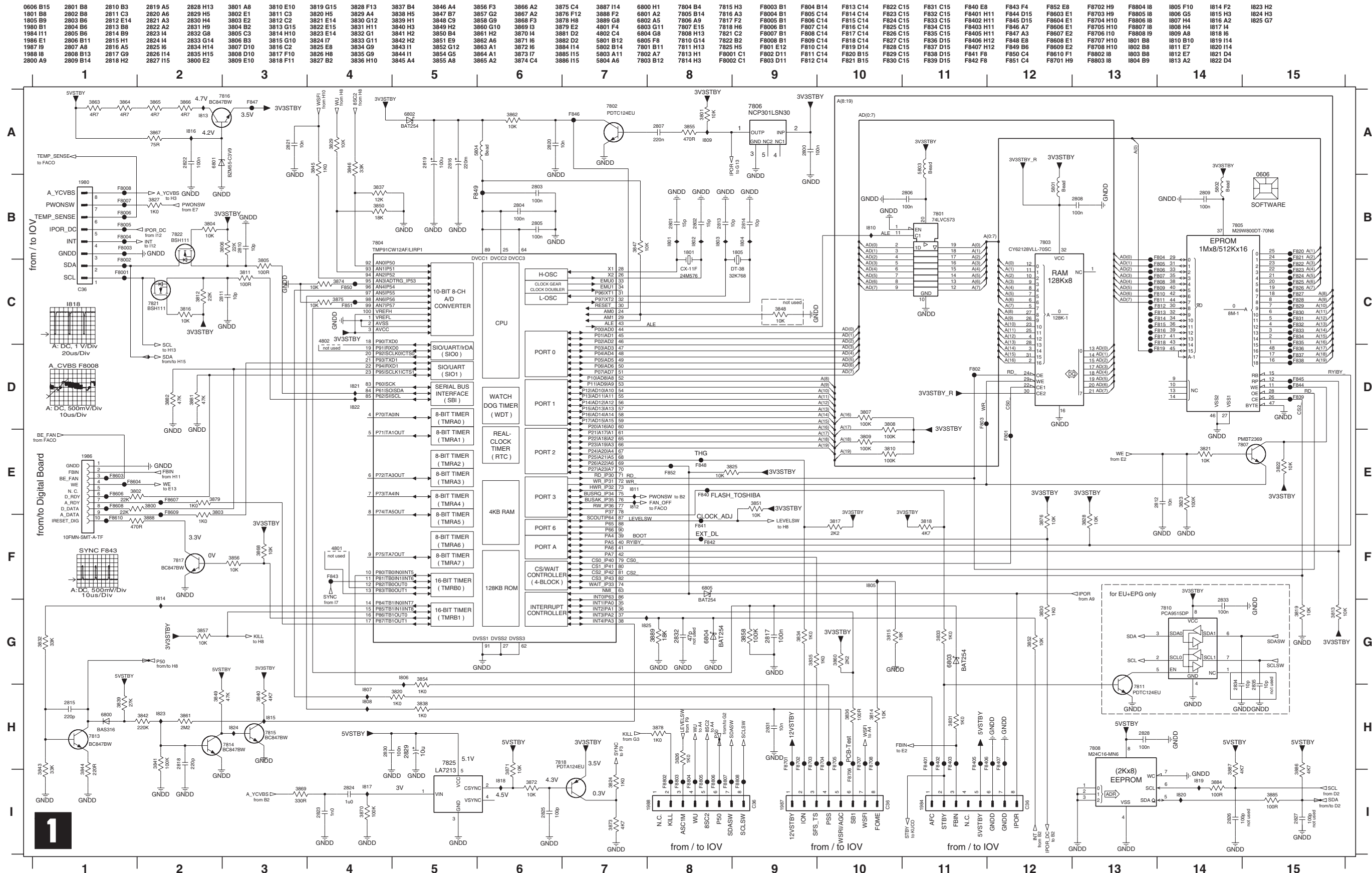
8





# SCHEMATIC DIAGRAM

## UP SUB: Central Controller (CECO)

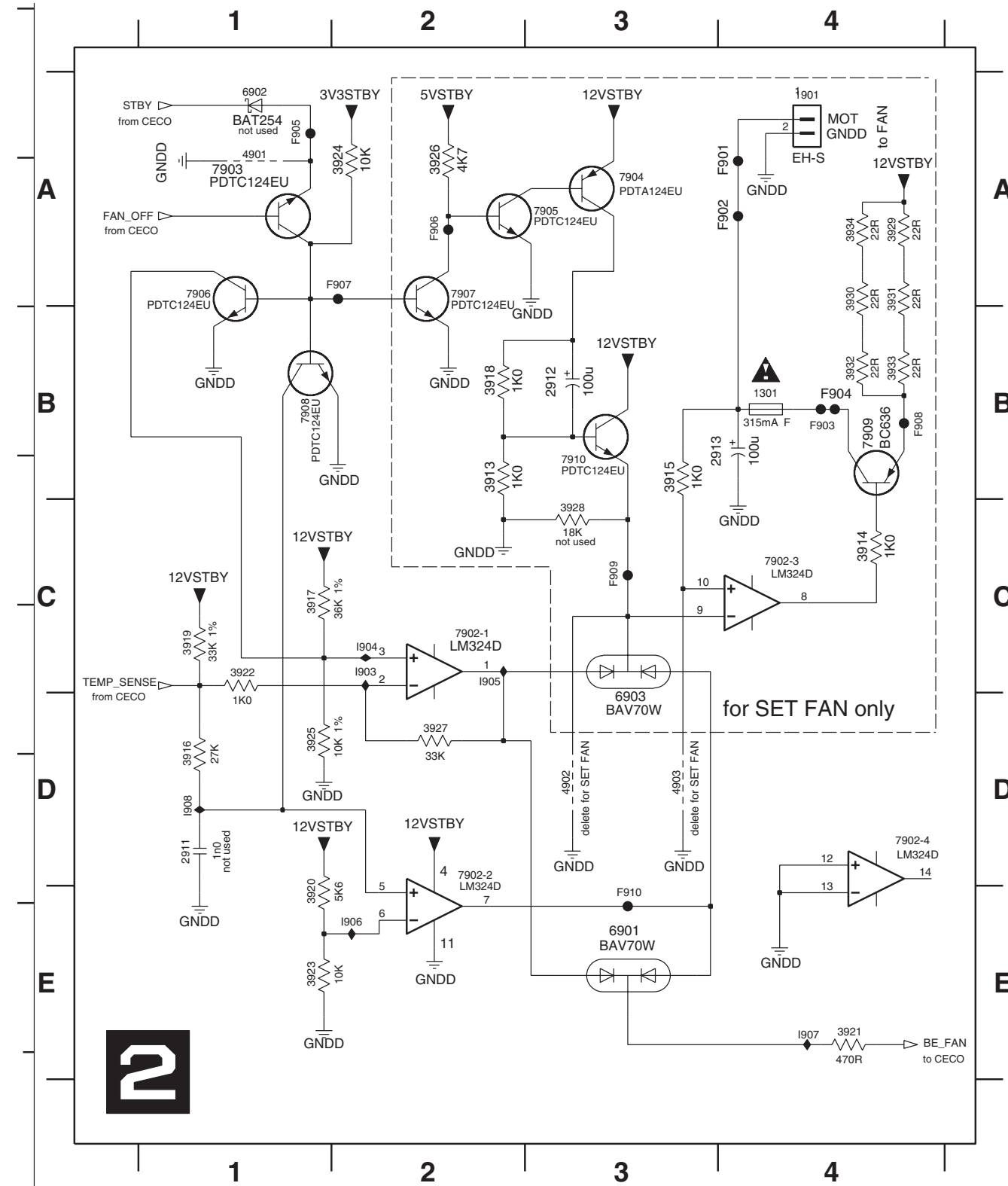




■ SCHEMATIC DIAGRAM

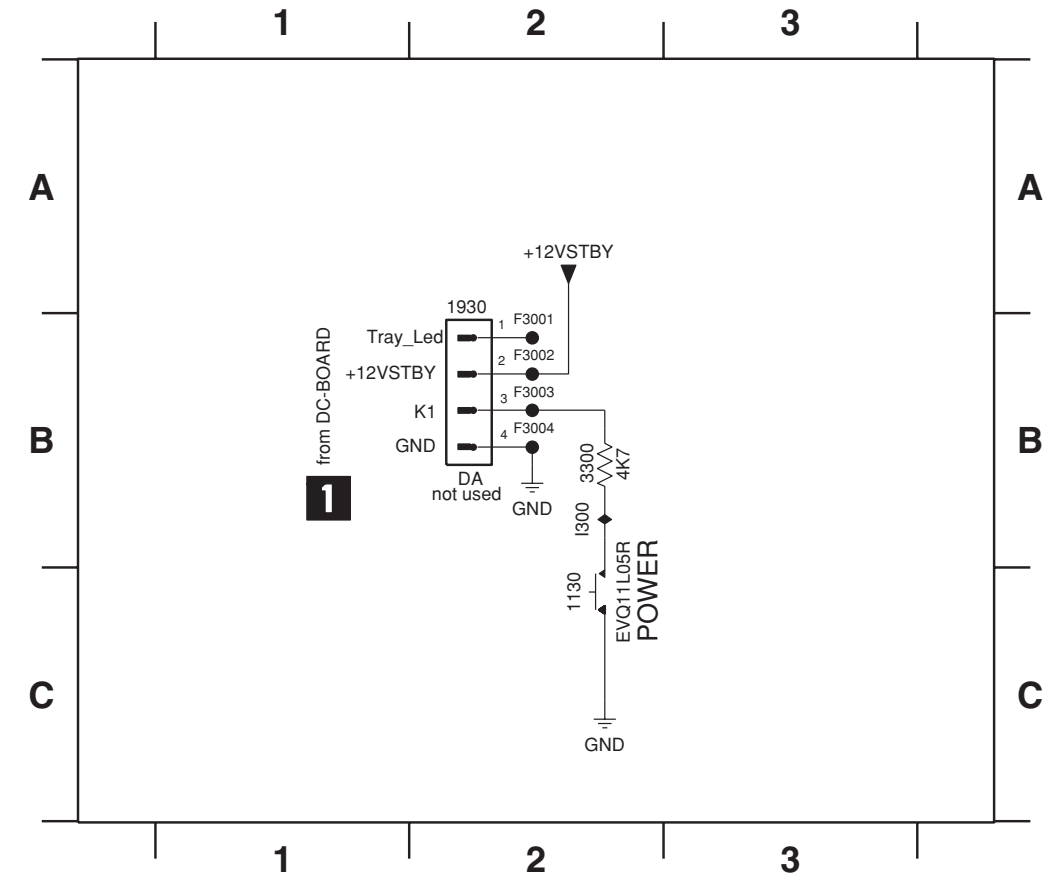
UP SUB: Fan Control (FACO)

1301 B4	3915 B3	3922 C1	3929 A4	4902 D3	7902-3 C4	7908 B1	F905 A1	1904 C2
1901 A4	3916 D1	3923 E1	3930 A4	4903 D3	7902-4 D4	7909 B4	F906 A2	1905 C2
2911 D1	3917 C1	3924 A2	3931 A4	6901 E3	7903 A1	7910 B3	F907 A2	1906 E2
2912 B3	3918 B2	3925 D1	3932 B4	6902 A1	7904 A3	F901 A4	F908 B4	1907 E4
2913 B4	3919 C1	3926 A2	3933 B4	6903 C3	7905 A3	F902 A4	F909 C3	1908 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	



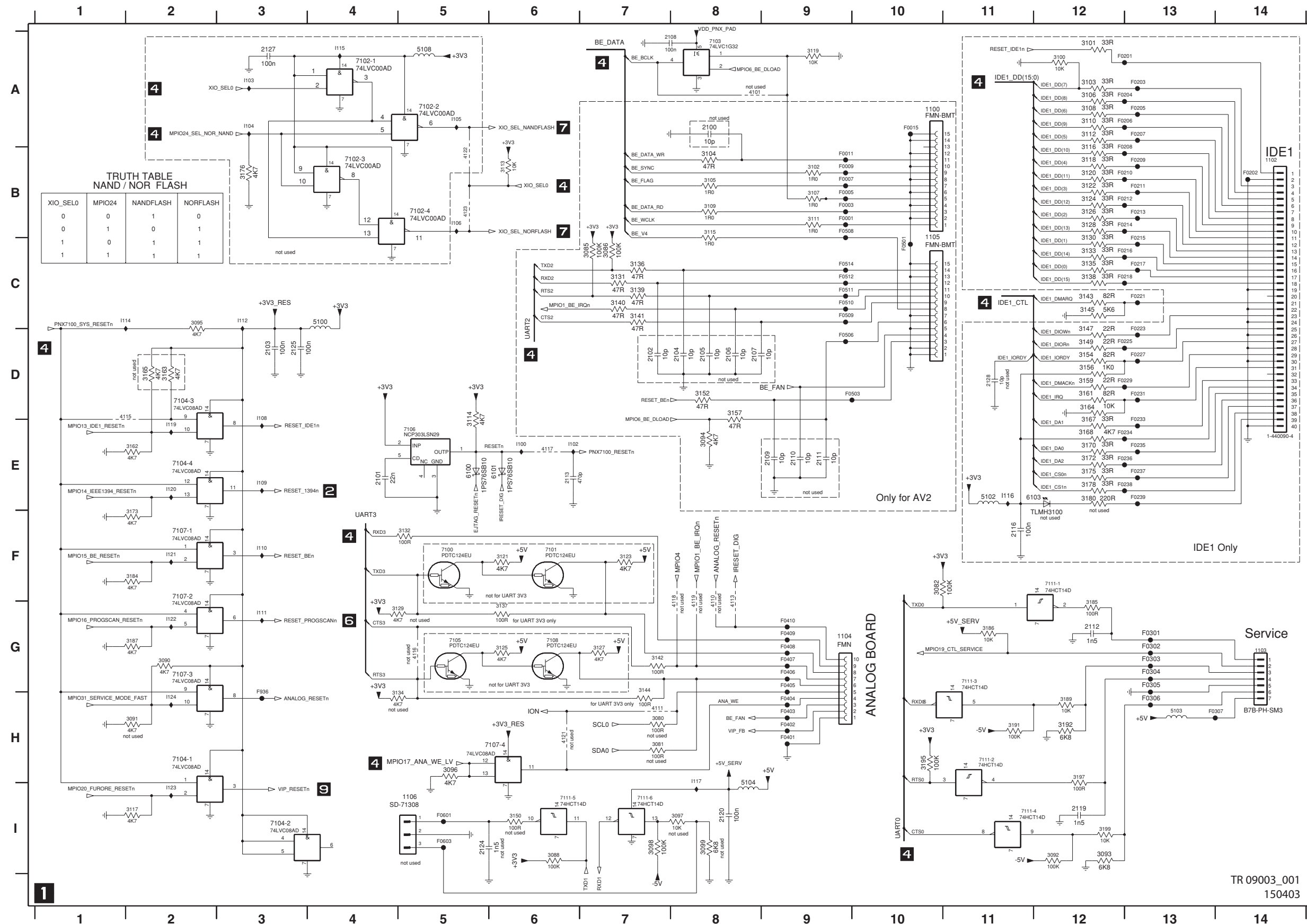
FRONT: Standby

1130 C1	3300 B1	F3002 B1	F3004 B1
1930 A1	F3001 B1	F3003 B1	I300 B1



■ SCHEMATIC DIAGRAM

DIGITAL (Digital Board Chrysalis 2.1): IDE, UARTS, RESET, BE



**TRUTH TABLE  
NAND / NOR FLASH**

XIO_SEL0	MPIO24	NANDFLASH	NORFLASH
0	0	1	0
0	1	0	1
1	0	1	1
1	1	1	1

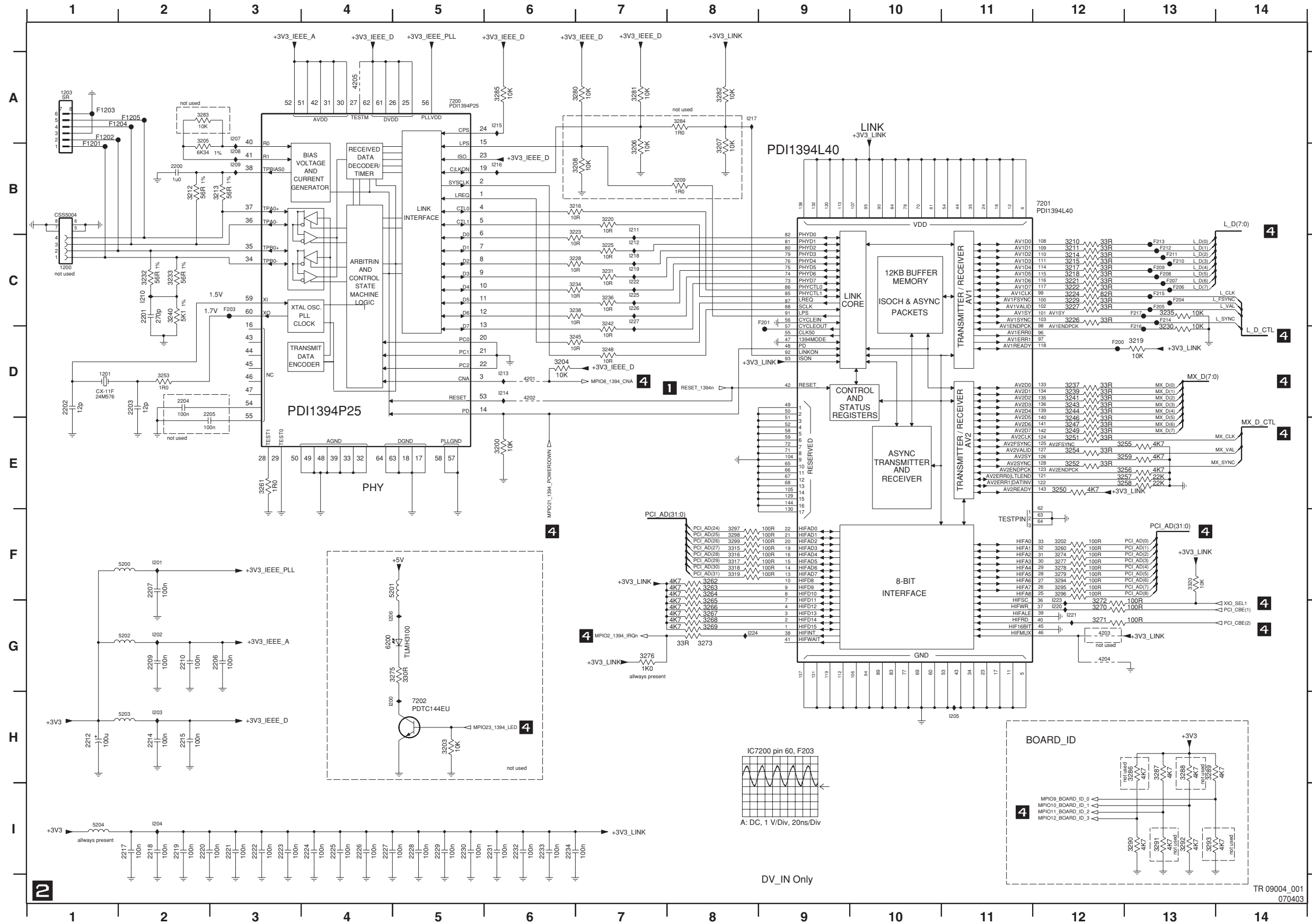
1100 A10	4118 F8
1102 B14	4119 F8
1103 G14	4121 H6
1104 G9	4122 B5
1105 C10	4123 B5
1106 I5	5100 C4
2100 A8	5102 E11
2101 E4	5103 H13
2102 D7	5104 I8
2103 D3	5108 A5
2104 D8	6100 E5
2105 D8	6101 E6
2106 D8	6103 E11
2107 D8	7100 F5
2108 A7	7101 F6
2109 E9	7102-1 A4
2110 E9	7102-2 A5
2111 E9	7102-3 B4
2112 G12	7102-4 B5
2113 E6	7103 A8
2116 F11	7104-1 H2
2119 I12	7104-2 I3
2120 I8	7104-3 D2
2124 I5	7104-4 E2
2125 D3	7105 G5
2127 A3	7106 E5
2128 D11	7107-1 F2
3080 H7	7107-2 F2
3081 H7	7107-3 G2
3082 F10	7107-4 H5
3085 C7	7108 G6
3086 C7	7111-1 F12
3088 I6	7111-2 H11
3090 G2	7111-3 G11
3091 H2	7111-4 H11
3092 I12	7111-5 I6
3093 I12	7111-6 I7
3094 E8	F0001 B9
3095 C2	F0003 B9
3096 H5	F0006 B9
3097 I8	F0007 B9
3098 I7	F0009 B9
3099 I8	F0011 B9
3100 A12	F0015 A10
3101 A12	F0201 A13
3102 B9	F0202 B14
3103 A12	F0203 A13
3104 B8	F0204 A13
3105 B8	F0205 A13
3106 A12	F0206 A13
3107 B9	F0207 A13
3108 A12	F0208 B13
3109 B8	F0209 B13
3110 A12	F0210 B13
3111 B9	F0211 B13
3112 A12	F0212 B13
3113 B6	F0213 B13
3114 D5	F0214 B13
3115 B8	F0215 C13
3116 B12	F0216 C13
3117 I2	F0217 C13
3118 B12	F0218 C13
3119 A9	F0221 C13
3120 B12	F0223 D12
3121 F6	F0225 D13
3122 B12	F0227 D13
3123 F7	F0229 D13
3124 B12	F0231 D13
3125 G8	F0233 E13
3126 B12	F0234 E13
3127 G7	F0235 E13
3128 B12	F0236 E13
3129 G4	F0237 E13
3130 C12	F0238 E13
3131 C7	F0239 E13
3132 F5	F0301 G13
3133 C12	F0302 G13
3134 H4	F0303 G13
3135 C12	F0304 G13
3136 C7	F0305 G13
3137 G6	F0306 H13
3138 C12	F0307 H14
3139 C7	F0401 H9
3140 C7	F0402 H9
3141 C7	F0403 H9
3142 G7	F0404 H9
3143 C12	F0405 G9
3144 C7	F0406 G9
3145 C12	F0407 G9
3147 D12	F0408 G9
3149 D12	F0409 G9
3150 I6	F0410 G9
3152 D8	F0501 C10
3154 D12	F0503 D10
3156 D12	F0506 D9
3157 D8	F0508 B9
3159 D12	F0509 C9
3161 D12	F0510 C9
3162 E2	F0511 C9
3163 D2	F0512 C9
3164 D12	F0514 C9
3165 D2	F0601 I5
3167 E12	F0603 I5
3168 E12	F936 H3
3170 E12	I100 E6
3172 E12	I102 E6
3173 F2	I103 A3
3175 E12	I104 A3
3176 B3	I105 A5
3178 E12	I106 B5
3180 E12	I108 D3
3184 F2	I109 E3
3185 G12	I110 F3
3186 G11	I111 G3
3187 G2	I112 C3
3189 H12	I114 C1
3191 H11	I115 A4
3192 H12	I116 E11
3195 H10	I117 H8
3197 H12	I119 E2
3199 I12	I120 E2
4101 A8	I121 F2
4110 F8	I122 G2
4111 H7	I123 I2
4113 F8	I124 H2
4115 D1	
4116 G5	
4117 E6	

ANALOG BOARD

TR 09003\_001  
150403

# SCHEMATIC DIAGRAM

## DIGITAL (Digital Board Chrysalis 2.1): 1394

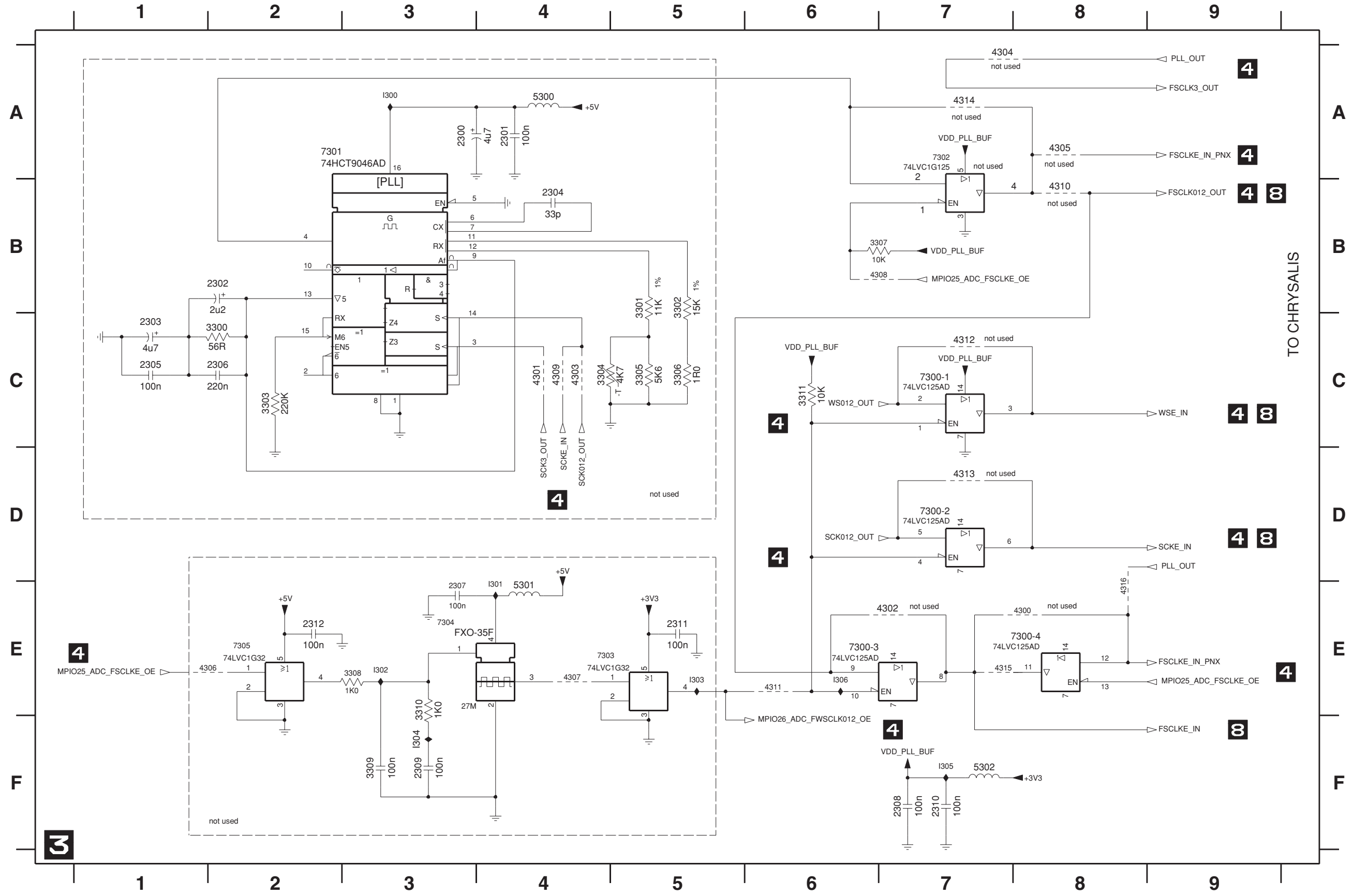


1200 C1	3292 I13
1201 D1	3293 I13
1203 A1	3294 F12
2200 B1	3295 F12
2201 C2	3296 F12
2202 F2	3297 F8
2203 D2	3298 F8
2204 D2	3299 F8
2205 D2	3315 F8
2206 G3	3316 F8
2207 F2	3317 F8
2209 G2	3318 F8
2210 G2	3319 F8
2212 H1	3320 F13
2214 H2	4201 D6
2215 H2	4202 D6
2217 I2	4203 G12
2218 I2	4204 G12
2219 I2	4205 A4
2220 I2	5200 F2
2221 I3	5201 F5
2222 I3	5202 G2
2223 I3	5203 H2
2224 I4	5204 I1
2225 I4	6200 G4
2226 I4	7200 A5
2227 I4	7201 B12
2228 I5	7202 H5
2229 I5	F1201 B1
2230 I5	F1202 A1
2231 I6	F1203 A1
2232 I6	F1204 A2
2233 I6	F1205 A2
2234 I6	F200 D12
3200 E6	F201 C9
3202 F12	F203 C9
3203 H5	F204 C13
3204 D6	F205 C13
3205 A2	F206 C13
3206 B7	F207 C13
3207 B9	F208 C13
3208 B7	F209 C13
3209 B8	F210 C13
3210 C12	F211 C13
3211 C12	F212 C13
3212 B2	F213 C13
3213 B3	F214 C13
3214 C12	F215 C13
3215 C12	F216 D13
3216 B6	F217 C13
3217 C12	I200 H4
3218 C12	I201 F2
3219 D13	I202 G2
3220 B7	I203 H2
3221 C12	I204 I2
3222 C12	I205 H11
3223 B6	I206 G4
3224 C12	I207 A3
3225 C7	I208 B3
3226 C12	I209 B3
3227 C12	I210 C2
3228 C6	I211 B7
3229 C12	I212 C7
3230 D13	I213 D6
3231 C7	I214 D6
3232 C2	I215 A6
3233 C2	I216 B6
3234 C6	I217 A8
3235 C13	I218 C7
3236 C7	I219 C7
3237 D12	I220 G12
3238 C6	I221 G12
3239 D12	I222 C7
3240 C2	I223 G12
3241 D12	I224 G8
3242 C7	I225 C7
3243 D12	I226 C7
3244 D12	I227 C7
3245 D6	
3246 E12	
3247 E12	
3248 D7	
3249 E12	
3250 E12	
3251 E12	
3252 E12	
3253 D2	
3254 E12	
3255 E13	
3256 E13	
3257 E13	
3258 E13	
3259 E13	
3260 F12	
3261 E3	
3262 F8	
3263 F8	
3264 F8	
3265 G8	
3266 G8	
3267 G8	
3268 G8	
3269 G8	
3270 G12	
3271 G12	
3272 G12	
3273 G8	
3274 F12	
3275 G5	
3276 G7	
3277 F12	
3278 F12	
3279 F12	
3280 A7	
3281 A7	
3282 A8	
3283 A2	
3284 A8	
3285 A6	
3286 H13	
3287 H13	
3288 H13	
3289 H13	
3290 I13	
3291 I13	

TR 09004\_001  
070403

■ SCHEMATIC DIAGRAM

DIGITAL (Digital Board Chrysalis 2.1): Audio PLL

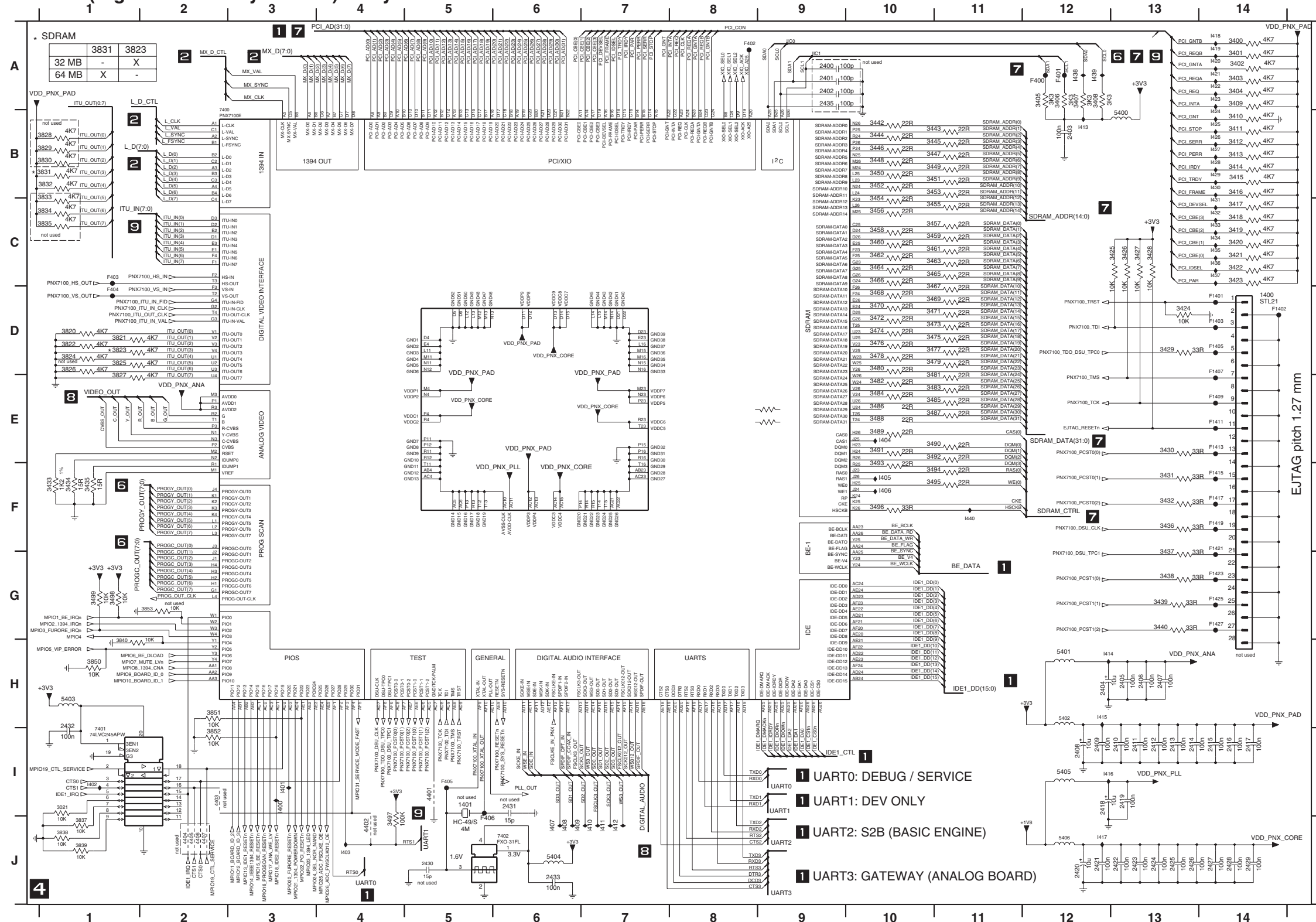


- 2300 A3
- 2301 A4
- 2302 B2
- 2303 C1
- 2304 B4
- 2305 C1
- 2306 C2
- 2307 E3
- 2308 F7
- 2309 F3
- 2310 F7
- 2311 E5
- 2312 E2
- 3300 C2
- 3301 B5
- 3302 B5
- 3303 C2
- 3304 C4
- 3305 C5
- 3306 C5
- 3307 B6
- 3308 E3
- 3309 F3
- 3310 E3
- 3311 C6
- 4300 E8
- 4301 C4
- 4302 E7
- 4303 C4
- 4304 A7
- 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

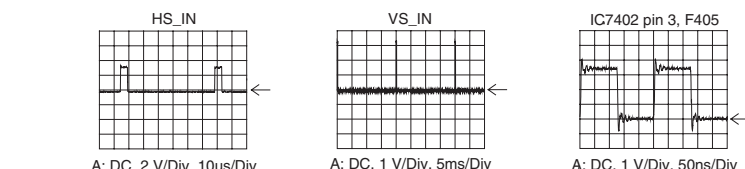


# SCHEMATIC DIAGRAM

## DIGITAL (Digital Board Chrysalis 2.1): Chrysalis

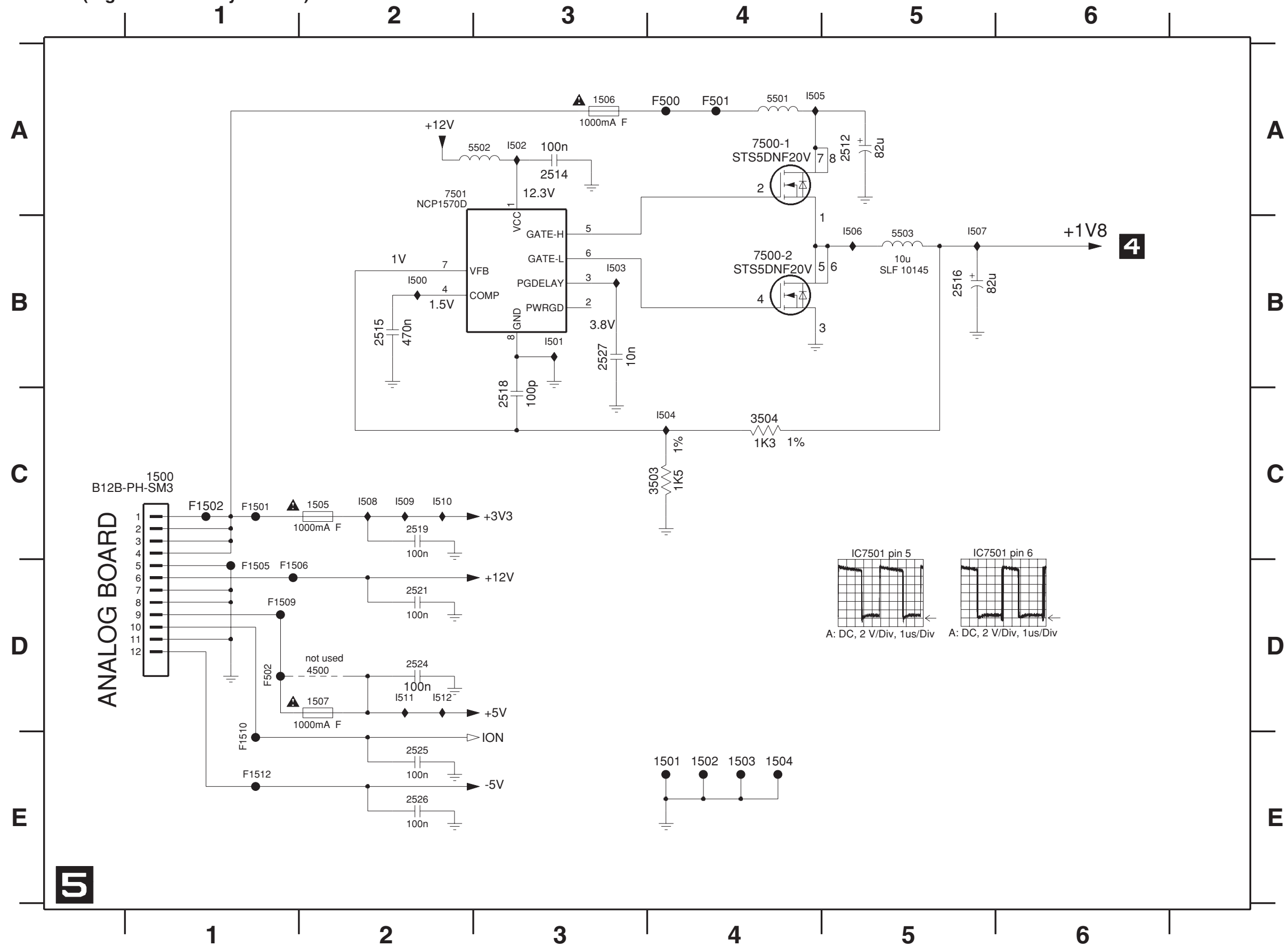


1400 D14	3449 B11	5405 I12
1401 I5	3450 B10	5406 J12
2400 A9	3451 B11	7400 B2
2401 A9	3452 B10	7401 I1
2402 A9	3453 B11	7402 J6
2403 B12	3454 C10	F1401 D14
2404 H12	3455 C11	F1402 D14
2405 H13	3456 C10	F1403 D14
2406 H13	3457 C11	F1405 D14
2407 H13	3458 C10	F1407 D14
2408 I12	3459 C11	F1409 E14
2409 I12	3460 C10	F1411 E14
2410 I13	3461 C11	F1413 E14
2411 I13	3462 C10	F1415 F14
2412 I13	3463 C11	F1417 F14
2413 I13	3464 C10	F1419 F14
2414 I13	3465 C11	F1421 F14
2415 I14	3466 C10	F1423 G14
2416 I14	3467 D11	F1425 H14
2417 I14	3468 D10	F1427 G14
2418 I12	3469 D11	F400 A12
2419 I13	3470 D10	F401 A12
2420 J12	3471 D11	F402 A8
2421 J12	3472 D10	F403 C1
2422 J13	3473 D11	F404 D1
2423 J13	3474 D10	F405 I5
2424 J13	3475 D11	F406 I5
2425 J13	3476 D10	I400 I3
2426 J13	3477 D11	I401 I3
2427 J14	3478 D10	I402 I1
2428 J14	3479 D11	I403 J4
2429 J14	3480 D10	I404 E10
2430 J5	3481 E11	I405 F10
2431 I6	3482 E10	I406 F10
2432 I1	3483 E11	I407 J6
2433 J6	3484 E10	I408 J6
2435 A9	3485 E11	I409 J6
3021 I1	3486 E10	I410 J7
3400 A14	3487 E11	I411 J7
3401 A14	3488 E10	I412 J7
3402 A14	3489 E10	I413 B12
3403 A14	3490 E11	I414 H12
3404 A14	3491 E10	I415 H12
3405 A12	3492 E11	I416 I12
3406 A12	3493 F10	I417 J12
3407 A12	3494 F11	I418 A14
3408 A12	3495 F11	I419 A14
3409 A14	3496 F10	I420 A14
3410 B14	3497 J4	I421 A14
3411 B14	3498 G1	I422 A14
3412 B14	3499 G1	I423 A14
3413 B14	3820 D1	I424 B14
3414 B14	3821 D1	I425 B14
3415 B14	3822 D1	I426 B14
3416 B14	3823 D1	I427 B14
3417 C14	3824 D1	I428 B14
3418 C14	3825 D1	I429 B14
3419 C14	3826 D1	I430 B14
3420 C14	3827 E1	I431 C14
3421 C14	3828 B1	I432 C14
3422 C14	3829 B1	I433 C14
3423 C14	3830 B1	I434 C14
3424 D13	3831 B1	I435 C14
3425 C13	3832 B1	I436 C14
3426 C13	3833 C1	I437 C14
3427 C13	3834 C1	I438 A12
3428 C13	3835 C1	I439 A12
3429 D13	3837 J1	I440 F11
3430 E13	3838 J1	
3431 F13	3839 J1	
3432 F13	3840 H1	
3433 F1	3850 H1	
3434 F1	3851 H2	
3435 F1	3852 I2	
3436 F13	3853 G2	
3437 G13	4401 I5	
3438 G13	4402 J4	
3439 G13	4403 I2	
3440 G13	4404 J2	
3442 B10	4405 J2	
3443 B11	4406 J2	
3444 B10	4407 J2	
3445 B11	5400 B13	
3446 B10	5401 H12	
3447 B11	5402 H12	
3448 B10	5403 H1	
	5404 J6	



■ SCHEMATIC DIAGRAM

DIGITAL (Digital Board Chrysalis 2.1): 4.8V Power

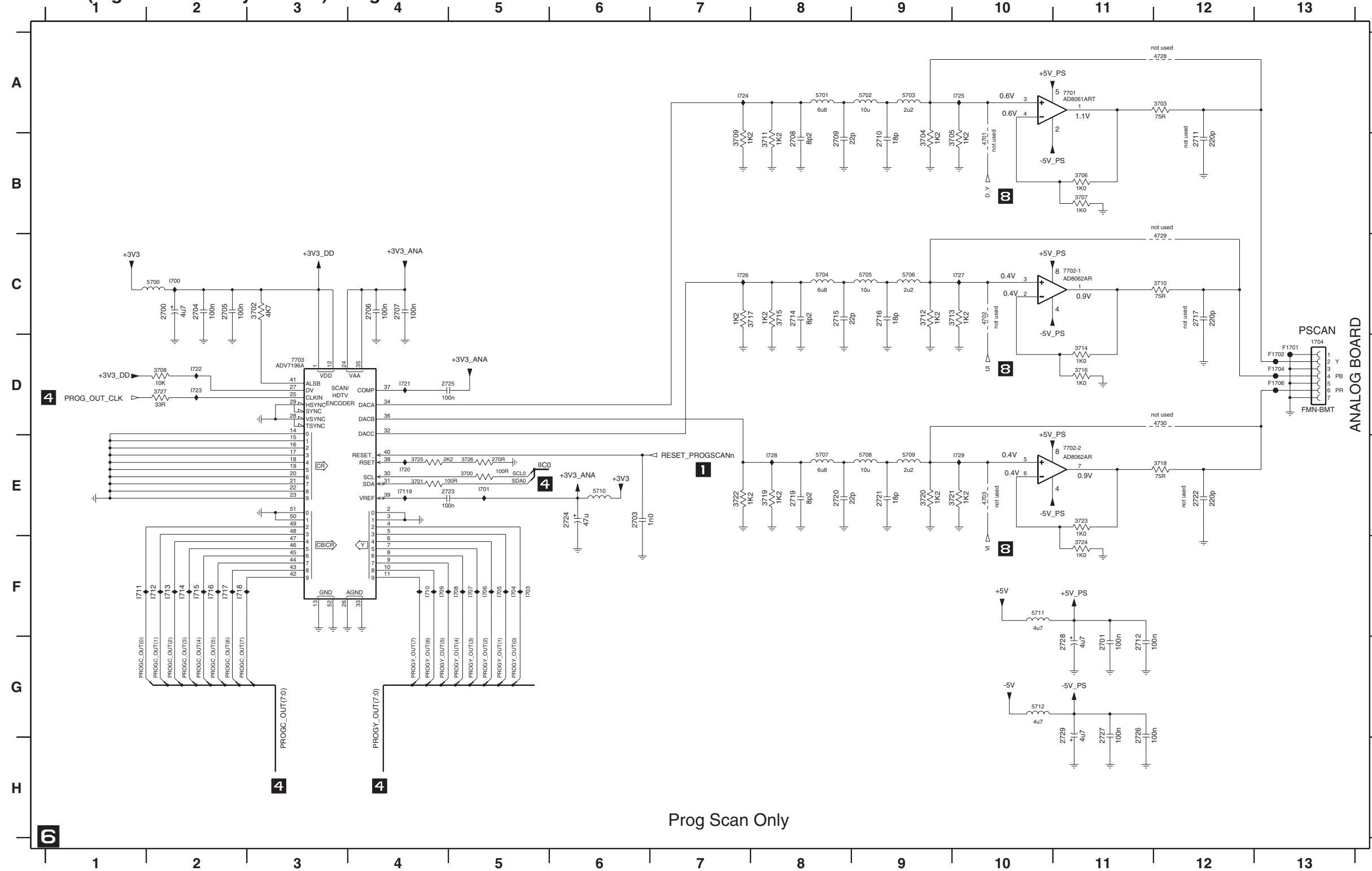


- 1506 A3
- 1507 D2
- 2512 A5
- 2514 A3
- 2515 B2
- 2516 B5
- 2518 C3
- 2519 C2
- 2521 D2
- 2524 D2
- 2525 E2
- 2526 E2
- 2527 B3
- 3503 C4
- 3504 C4
- 4500 D2
- 5501 A4
- 5502 A3
- 5503 B5
- 7500-1 A4
- 7500-2 B4
- 7501 A2
- F1501 C1
- F1502 C1
- F1505 D1
- F1506 D1
- F1509 D1
- F1510 E1
- F1512 E1
- 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

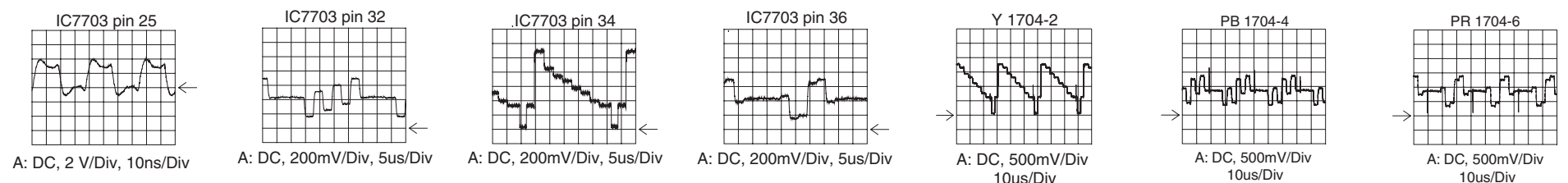


■ SCHEMATIC DIAGRAM

DIGITAL (Digital Board Chrysalis 2.1): Prog. scan DAC

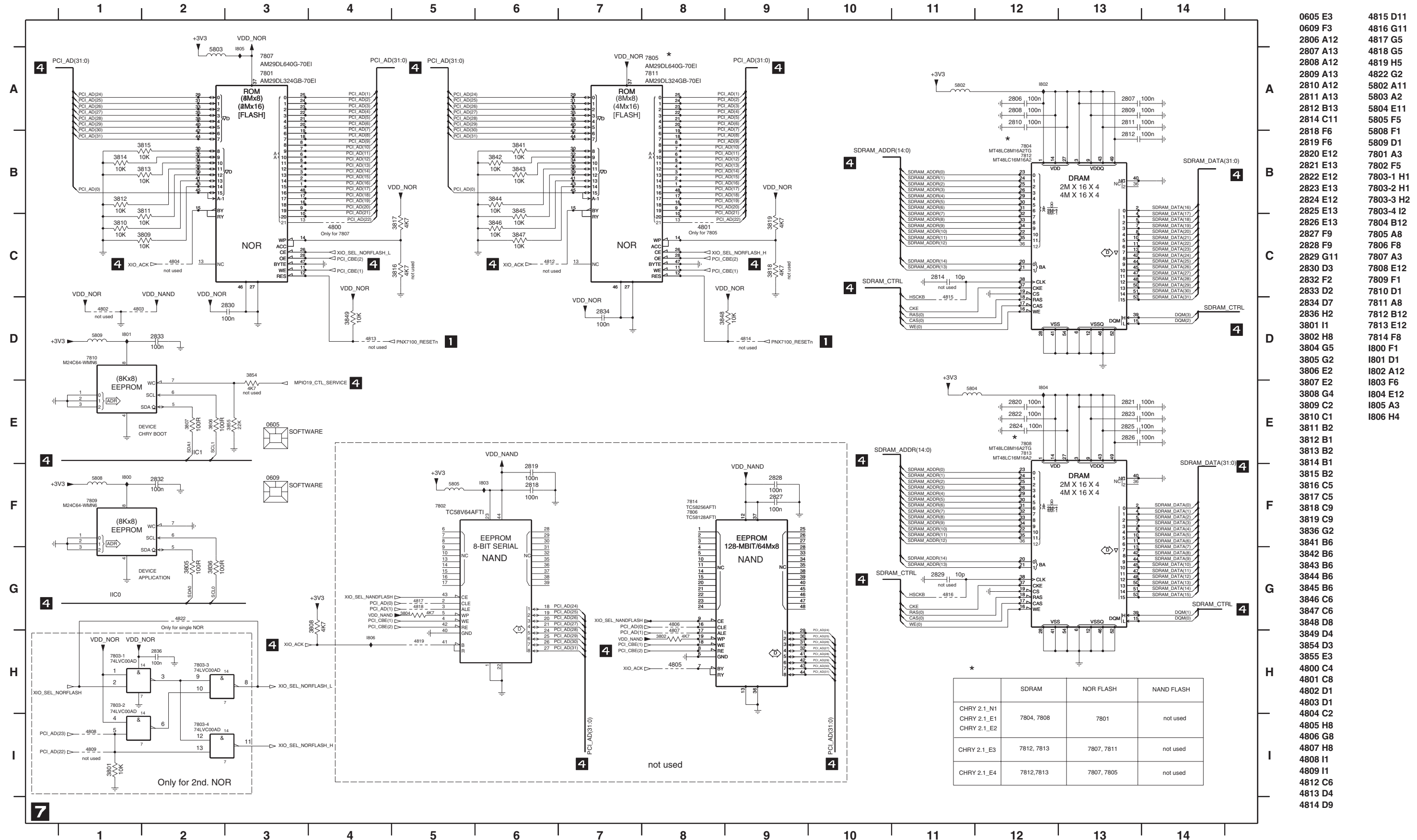


- 1704 D13
- 2700 C2
- 2701 G11
- 2703 E6
- 2704 C2
- 2705 C2
- 2706 C4
- 2707 C4
- 2708 B8
- 2709 B8
- 2710 B9
- 2711 B12
- 2712 G11
- 2714 C8
- 2715 C8
- 2716 C9
- 2717 C12
- 2719 E8
- 2720 E8
- 2721 E9
- 2722 E12
- 2723 E4
- 2724 E6
- 2725 D4
- 2726 G11
- 2727 G11
- 2728 G11
- 2729 G11
- 3700 E5
- 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 D11
- 3717 C7
- 3718 E12
- 3719 E8
- 3720 E9
- 3721 E10
- 3722 E7
- 3723 E11
- 3724 F11
- 3725 E4
- 3726 E5
- 3727 D2
- 4701 B10
- 4702 C10
- 4703 E10
- 4728 A12
- 4729 C12
- 4730 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
- 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
- I712 F2
- I713 F2
- I714 F2
- I715 F2
- I716 F2
- I717 F2
- I718 F2
- I720 E4
- I721 D4
- I722 D2
- I723 D2
- I724 A7
- I725 A10
- I726 C7
- I727 C10
- I728 E8
- I729 E10



# SCHEMATIC DIAGRAM

## DIGITAL (Digital Board Chrysalis 2.1): Flash SDRAM EEPROM

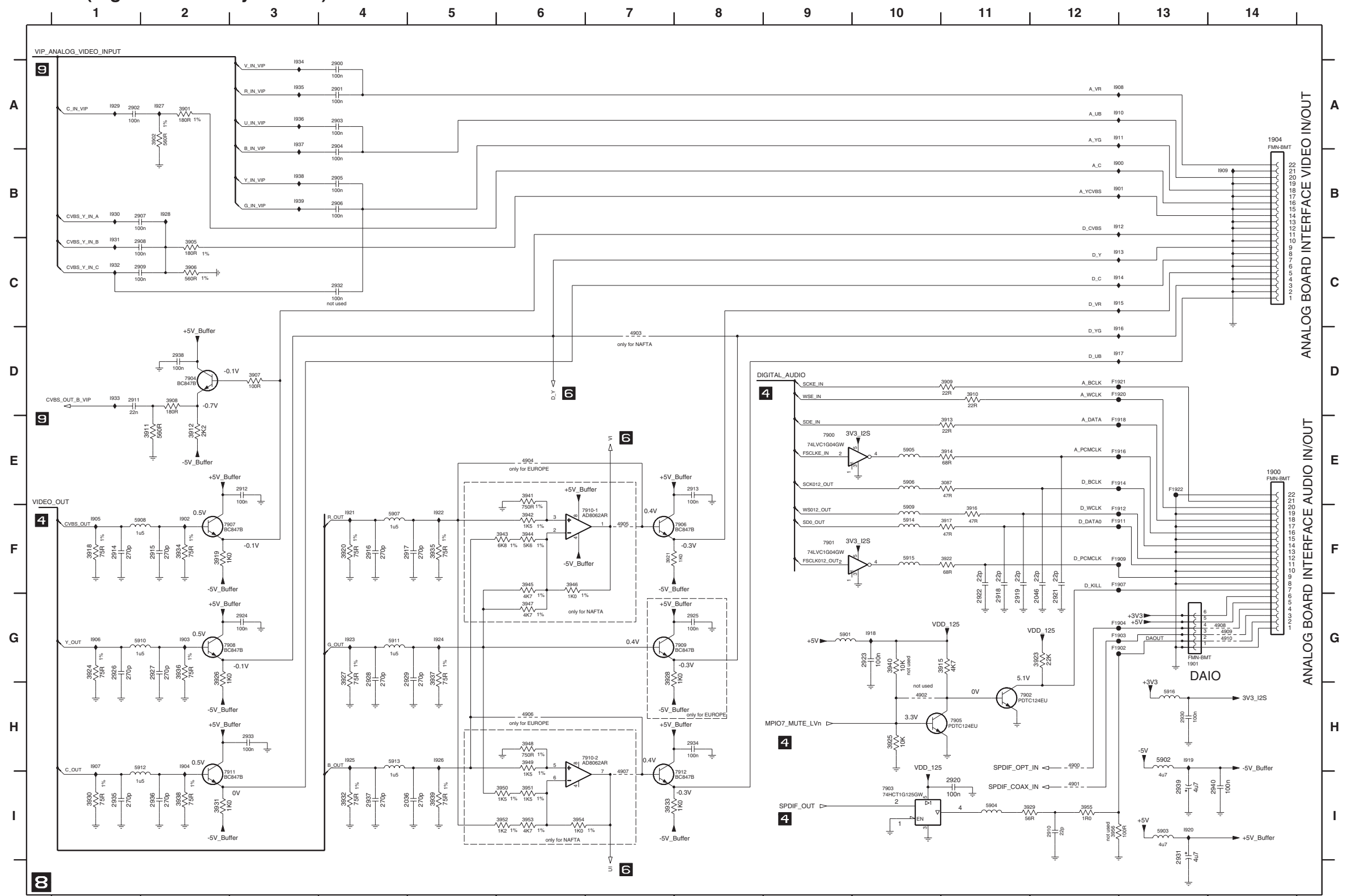


- 0605 E3
- 0609 F3
- 2806 A12
- 2807 A13
- 2808 A12
- 2809 A13
- 2810 A12
- 2811 A13
- 2812 B13
- 2814 C11
- 2818 F6
- 2819 F6
- 2820 E12
- 2821 E13
- 2822 E12
- 2823 E13
- 2824 E12
- 2825 E13
- 2826 E13
- 2827 F9
- 2828 F9
- 2829 G11
- 2830 D3
- 2832 F2
- 2833 D2
- 2834 D7
- 2836 H2
- 3801 I1
- 3802 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
- 4802 A11
- 5803 A2
- 5804 A11
- 5805 A2
- 5808 F1
- 5809 D1
- 7801 A3
- 7802 F5
- 7803-1 H1
- 7803-2 H1
- 7803-3 H2
- 7803-4 I2
- 7804 B2
- 7805 A8
- 7806 F8
- 7807 A3
- 7808 E12
- 7809 F1
- 7810 D1
- 7811 A8
- 7812 B12
- 7813 E12
- 7814 F8
- 1800 F1
- 1801 D1
- 1802 A12
- 1803 F6
- 1804 E12
- 1805 A3
- 1806 H4

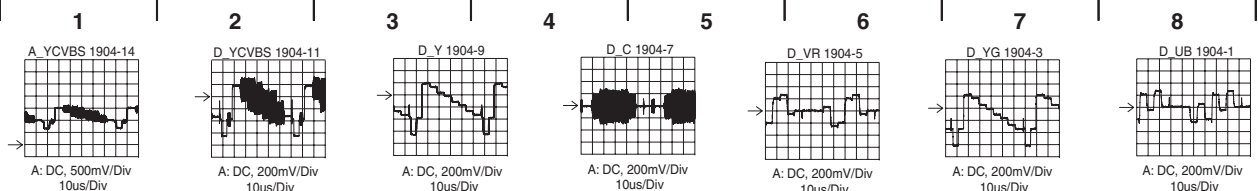
	SDRAM	NOR FLASH	NAND FLASH
CHRY 2.1_N1			
CHRY 2.1_E1	7804, 7808	7801	not used
CHRY 2.1_E2			
CHRY 2.1_E3	7812, 7813	7807, 7811	not used
CHRY 2.1_E4	7812,7813	7807, 7805	not used

# SCHEMATIC DIAGRAM

## DIGITAL (Digital Board Chrysalis 2.1): VIDEO IO

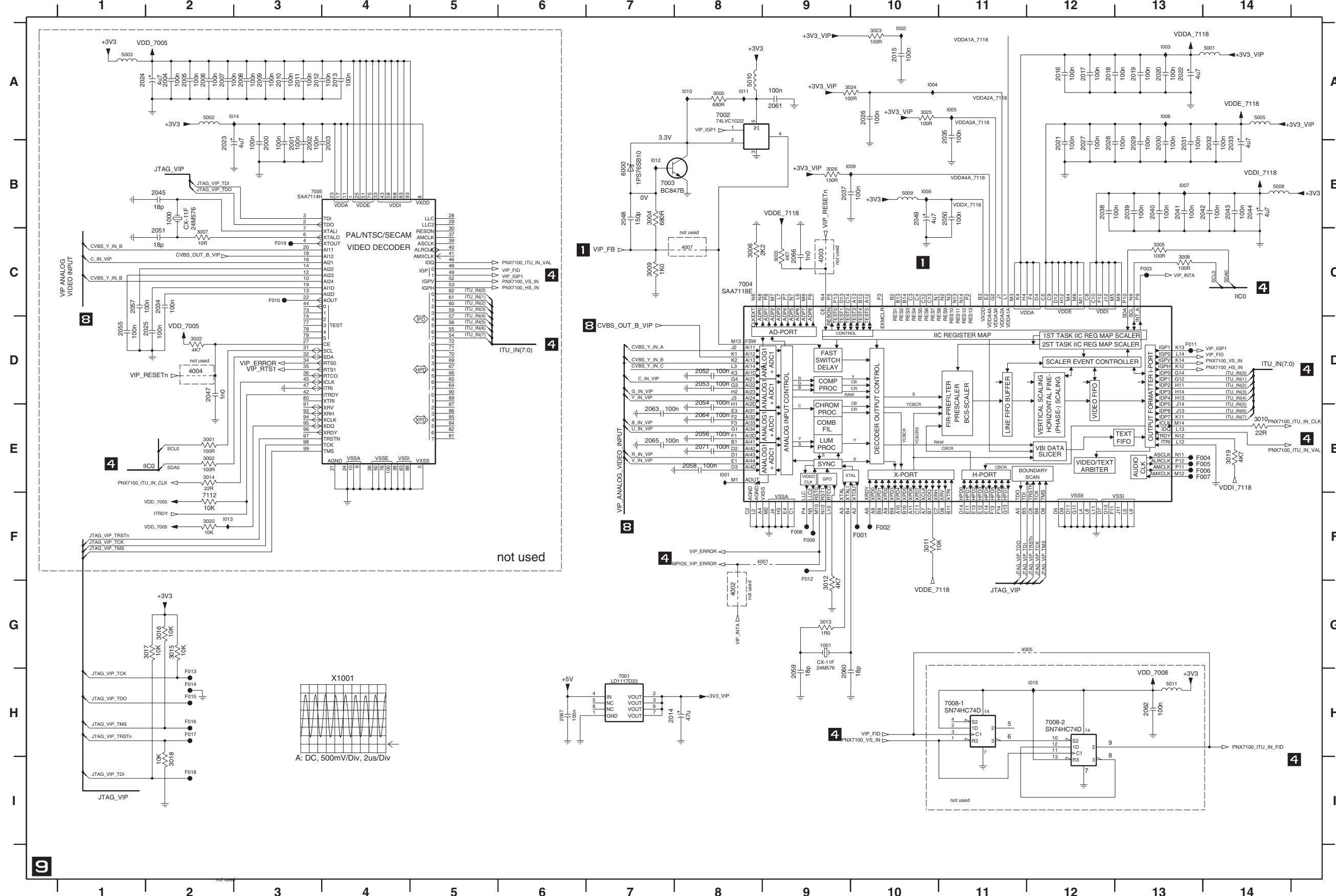


1900 E14	3943 F6	I917 D12
1901 G13	3944 F6	I918 G10
1904 A14	3945 F6	I919 H13
2036 I5	3946 F6	I920 I13
2046 G12	3947 G6	I921 F4
2900 A4	3948 H6	I922 F5
2901 A4	3949 H6	I923 G4
2902 A1	3950 I6	I924 G5
2903 A4	3951 I6	I925 H4
2904 A4	3952 I6	I926 H5
2905 B4	3953 I6	I927 A2
2906 B4	3954 I6	I928 B2
2907 B1	3955 I12	I929 A1
2908 C1	3956 I12	I930 B1
2909 C1	4900 H12	I931 C1
2910 I12	4901 I12	I932 C1
2911 D1	4902 H10	I933 D1
2912 E3	4903 D7	I934 A3
2913 E8	4904 E6	I935 A3
2914 F1	4905 F7	I936 A3
2915 F2	4906 H6	I937 A3
2916 F4	4907 I7	I938 B3
2917 F5	4908 G14	I939 B3
2918 G11	4909 G14	
2919 G11	4910 G14	
2920 I11	5901 G9	
2921 G12	5902 H13	
2922 G11	5903 I13	
2923 G10	5904 I11	
2924 G3	5905 E10	
2925 G8	5906 E10	
2926 G1	5907 F4	
2927 G2	5908 F1	
2928 G4	5909 F10	
2929 G5	5910 G1	
2930 H13	5911 G4	
2931 I13	5912 H1	
2932 C4	5913 H4	
2933 H3	5914 F10	
2934 H8	5915 F10	
2935 I1	5916 H13	
2936 I2	7900 E9	
2937 I4	7901 F9	
2938 D2	7902 H11	
2939 I13	7903 I10	
2940 I14	7904 D2	
3087 E11	7905 H11	
3901 A2	7906 F8	
3902 A2	7907 F2	
3905 C2	7908 G2	
3906 C2	7909 G8	
3907 D3	7910-1 F6	
3908 D2	7910-2 H6	
3909 D11	7911 I2	
3910 D11	7912 I8	
3911 E2	F1902 G12	
3912 E2	F1903 G12	
3913 E11	F1904 G12	
3914 E11	F1907 F12	
3915 G11	F1909 F12	
3916 F11	F1911 F12	
3917 F11	F1912 F12	
3918 F1	F1914 E12	
3919 F2	F1916 E12	
3920 F4	F1918 E12	
3921 F7	F1920 D12	
3922 F11	F1921 D12	
3923 G12	F1922 E13	
3924 G1	I900 B12	
3925 H10	I901 B2	
3926 G2	I902 F2	
3927 G4	I903 G2	
3928 G7	I904 H2	
3929 I11	I905 F1	
3930 I1	I906 G1	
3931 I2	I907 H1	
3932 I4	I908 A2	
3933 I7	I909 B14	
3934 F2	I910 A12	
3935 F5	I911 A12	
3936 G2	I912 B12	
3937 G5	I913 C12	
3938 I2	I914 C12	
3939 I5	I915 C12	
3940 G10	I916 D12	
3941 E6		
3942 F6		



# SCHEMATIC DIAGRAM

## DIGITAL (Digital Board Chrysalis 2.1): VIPs

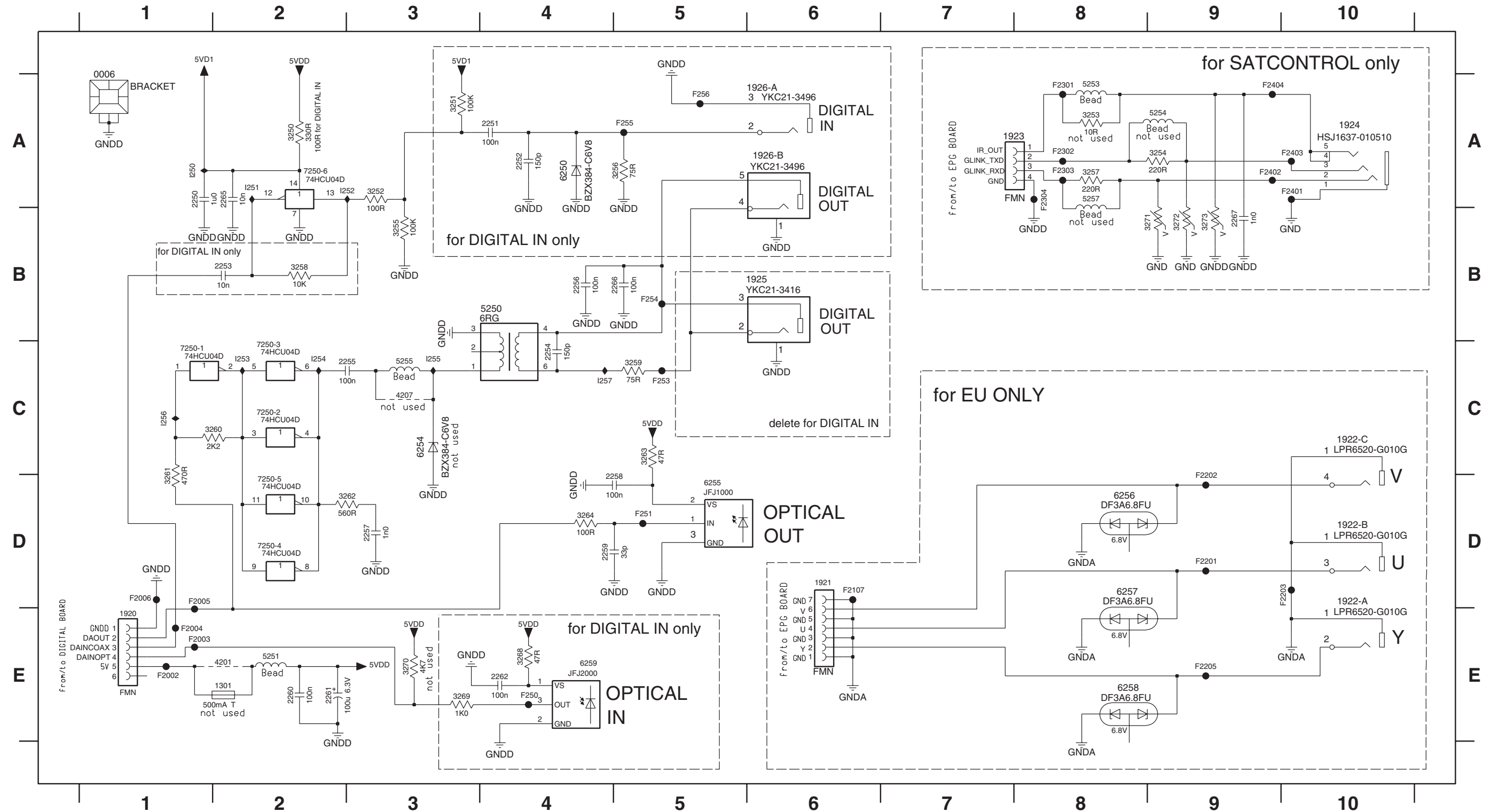


- 1000 B2
- 1001 G9
- 2000 B3
- 2001 B3
- 2002 B3
- 2003 B4
- 2004 A2
- 2005 A2
- 2006 A2
- 2007 A2
- 2008 A3
- 2009 A3
- 2010 A3
- 2011 A3
- 2012 A3
- 2013 A4
- 2014 H7
- 2015 A10
- 2016 A12
- 2017 A12
- 2018 A12
- 2019 A13
- 2020 A13
- 2021 B12
- 2022 A13
- 2023 B2
- 2024 A1
- 2025 D2
- 2026 A10
- 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
- 2065 E7
- 2066 C9
- 2067 H6
- 2071 E8
- 3000 A8
- 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 H3
- 6000 B7
- 7001 H7
- 7002 A8
- 7003 B7
- 7004 C8
- 7005 B4
- 7008-1 H11
- 7008-2 H12
- 7112 F2
- F001 F10
- F002 F10
- F003 C13
- F004 E14
- F005 E14
- F006 E14
- F007 E14
- F008 F9
- F009 F9
- F010 C3
- F011 D13
- F012 G9
- F013 H2
- F014 H2
- F015 H2
- F016 H2
- F017 H2
- F018 I2
- F019 C3
- I001 E8
- I002 A10
- I003 A13
- I004 A10
- I005 A11
- I006 A13
- I007 B13
- I008 B10
- I010 A8
- I011 A8
- I012 B7
- I013 F2
- I014 A3
- I015 H12

# SCHEMATIC DIAGRAM

## IOE (In/Out Extension Board)

0006 A1	1922-C C10	2250 A1	2256 B4	2262 E4	3252 A3	3258 B2	3264 D4	3273 B9	5254 A9	6256 D8	7250-3 C2	F2004 E1	F2203 D10	F2401 A10	F253 C5	I252 A3
1301 E2	1923 A8	2251 A4	2257 D3	2265 A2	3253 A8	3259 C5	3268 E4	4201 E2	5255 C3	6257 D8	7250-4 D2	F2005 D1	F2205 E9	F2402 A9	F254 B5	I253 C2
1920 E1	1924 A10	2252 A4	2258 D5	2266 B5	3254 A9	3260 C2	3269 E3	4207 C3	5257 A8	6258 E8	7250-5 D2	F2006 D1	F2301 A8	F2403 A10	F255 A5	I254 C2
1921 D6	1925 B5	2253 B2	2259 D4	2267 B9	3255 B3	3261 D1	3270 E3	5250 B4	6250 A4	6259 E4	7250-6 A2	F2107 D6	F2302 A8	F2404 A9	F256 A5	I255 C3
1922-A D10	1926-A A6	2254 C4	2260 E2	3250 A2	3256 A5	3262 D3	3271 B9	5251 E2	6254 C3	7250-1 C1	F2002 E1	F2201 D9	F2303 A8	F250 E4	I250 A1	I256 C1
1922-B D10	1926-B A6	2255 C3	2261 E2	3251 A3	3257 A8	3263 C5	3272 B9	5253 A8	6255 D5	7250-2 C2	F2003 E1	F2202 D9	F2304 A8	F251 D5	I251 A2	I257 C4





# PARTS LIST

## ■ ELECTRICAL PARTS

### ■ WARNING

- Components having special characteristics are marked  $\triangle$  and must be replaced with parts having specifications equal to those originally installed.

### ABBREVIATIONS IN THIS LIST ARE AS FOLLOWS:

C.A.EL.CHP : CHIP ALUMI.ELECTROLYTIC CAP	L.EMIT : LIGHT EMITTING MODULE
C.CE : CERAMIC CAP	LED.DSPLY : LED DISPLAY
C.CE.ARRAY : CERAMIC CAP ARRAY	LED.INFRD : LED,INFRARED
C.CE.CHP : CHIP CERAMIC CAP	MODUL.RF : MODULATOR,RF
C.CE.ML : MULTILAYER CERAMIC CAP	PHOT.CPL : PHOTO COUPLER
C.CE.M.CHP : CHIP MULTILAYER CERAMIC CAP	PHOT.INTR : PHOTO INTERRUPTER
C.CE.SAFTY : RECOGNIZED CERAMIC CAP	PHOT.RFLCT : PHOTO REFLECTOR
C.CE.TUBLR : CERAMIC TUBULAR CAP	PIN.TEST : PIN,TEST POINT
C.CE.SMI : SEMI CONDUCTIVE CERAMIC CAP	PLST.RIVET : PLASTIC RIVET
C.EL : ELECTROLYTIC CAP	R.ARRAY : RESISTOR ARRAY
C.MICA : MICA CAP	R.CAR. : CARBON RESISTOR
C.ML.FLM : MULTILAYER FILM CAP	R.CAR.CHP : CHIP RESISTOR
C.MP : METALLIZED PAPER CAP	R.CAR.FP : FLAME PROOF CARBON RESISTOR
C.MYLAR : MYLAR FILM CAP	R.FUS : FUSABLE RESISTOR
C.MYLAR.ML : MULTILAYER MYLAR FILM CAP	R.MTL.CHP : CHIP METAL FILM RESISTOR
C.PAPER : PAPER CAPACITOR	R.MTL.FLM : METAL FILM RESISTOR
C.PLS : POLYSTYRENE FILM CAP	R.MTL.OXD : METAL OXIDE FILM RESISTOR
C.POL : POLYESTER FILM CAP	R.MTL.PLAT : METAL PLATE RESISTOR
C.POLY : POLYETHYLENE FILM CAP	RSNR.CE : CERAMIC RESONATOR
C.PP : POLYPROPYLENE FILM CAP	RSNR.CRYS : CRYSTAL RESONATOR
C.TNTL : TANTALUM CAP	R.TW.CEM : TWIN CEMENT FIXED RESISTOR
C.TNTL.CHP : CHIP TANTALUM CAP	R.WW : WIRE WOUND RESISTOR
C.TRIM : TRIMMER CAP	SCR.BND.HD : BIND HEAD B-TITE SCREW
CN : CONNECTOR	SCR.BW.HD : BW HEAD TAPPING SCREW
CN.BS.PIN : CONNECTOR,BASE PIN	SCR.CUP : CUP TITE SCREW
CN.CANNON : CONNECTOR,CANNON	SCR.TERM : SCREW TERMINAL
CN.DIN : CONNECTOR,DIN	SCR.TR : SCREW,TRANSISTOR
CN.FLAT : CONNECTOR,FLAT CABLE	SUPRT.PCB : SUPPORT,P.C.B.
CN.POST : CONNECTOR,BASE POST	SURG.PRTCT : SURGE PROTECTOR
COIL.MX.AM : COIL,AM MIX	SW.TACT : TACT SWITCH
COIL.AT.FM : COIL,FM ANTENNA	SW.LEAF : LEAF SWITCH
COIL.DT.FM : COIL,FM DETECT	SW.LEVER : LEVER SWITCH
COIL.MX.FM : COIL,FM MIX	SW.MICRO : MICRO SWITCH
COIL.OUTPT : OUTPUT COIL	SW.PUSH : PUSH SWITCH
DIOD.ARRAY : DIODE ARRAY	SW.RT.ENC : ROTARY ENCODER
DIODE.BRG : DIODE BRIDGE	SW.RT.MTR : ROTARY SWITCH WITH MOTOR
DIODE.CHP : CHIP DIODE	SW.RT : ROTARY SWITCH
DIODE.VAR : VARACTOR DIODE	SW.SLIDE : SLIDE SWITCH
DIOD.Z.CHP : CHIP ZENER DIODE	TERM.SP : SPEAKER TERMINAL
DIODE.ZENR : ZENER DIODE	TERM.WRAP : WRAPPING TERMINAL
DSCR.CE : CERAMIC DISCRIMINATOR	THRMST.CHP : CHIP THERMISTOR
FER.BEAD : FERRITE BEADS	TR.CHP : CHIP TRANSISTOR
FER.CORE : FERRITE CORE	TR.DGT : DIGITAL TRANSISTOR
FET.CHP : CHIP FET	TR.DGT.CHP : CHIP DIGITAL TRANSISTOR
FL.DSPLY : FLUORESCENT DISPLAY	TRANS : TRANSFORMER
FLTR.CE : CERAMIC FILTER	TRANS.PULS : PULSE TRANSFORMER
FLTR.COMB : COMB FILTER MODULE	TRANS.PWR : POWER TRANSFORMER ASS'Y
FLTR.LC.RF : LC FILTER,EMI	TUNER.AM : TUNER PACK,AM
GND.MTL : GROUND PLATE	TUNER.FM : TUNER PACK,FM
GND.TERM : GROUND TERMINAL	TUNER.PK : FRONT-ENDTUNER PACK
HOLDER.FUS : FUSE HOLDER	VR : ROTARY POTENTIOMETER
IC.PRTCT : IC PROTECTOR	VR.MTR : POTENTIOMETER WITH MOTOR
JUMPER.CN : JUMPER CONNECTOR	VR.SW : POTENTIOMETER WITH ROTARY SW
JUMPER.TST : JUMPER,TEST POINT	VR.SLIDE : SLIDE POTENTIOMETER
L.DTCT : LIGHT DETECTING MODULE	VR.TRIM : TRIMMER POTENTIOMETER

Note) Those parts marked with “#” are not included in the P.C.B. ass'y.

## P.C.B. FRONT & P.C.B. ANALOG

Schm Ref.	PART NO.	Description	Remarks	Markets	
*	AAX55440	P. C. B.	FRONT DC1 AL/DRX2	3103 608 51281	
*	1110	AAX56450	RSNR. CRYS	8MHz EFOMC8004T4 A	2422 540 98461
*	1130	AAX55630	SW. TACT	1P 20mA 15V EVQ11	2422 128 02842
*	1165-70	AAX55630	SW. TACT	1P 20mA 15V EVQ11	2422 128 02842
*	1920	AAX56100	JACK. PIN	3P F JPJ1127 B	2422 026 05301
*	1921	AAX55470	SOCKET	4P F YKF51	2422 026 05307
	2102	UR837220	C. EL	22uF 16V	
	2110	UR847100	C. EL	10uF 25V	
	2113	UA655680	C. MYLAR	0.68uF 50V	
	2116	UR837220	C. EL	22uF 16V	
	2117	UR867220	C. EL	22uF 50V	
*	6100	AAX55680	DIODE	BZX384-C6V8 COL R	3198 020 56880
*	6101-03	AAX55320	LED	VS LTL-1MHHR	9322 190 44676
*	7100	AAX56430	FL. DSPLY	BJ900GNK 100*25	2722 171 07736
	7100		FL. DSPLY	HUA-09SS47T (SMGK)	2722 171 07744 (※)
*	7103	AAX54860	IC	TMP87C874F/LDCP1	3103 165 13731
*	7106	AAX55850	TR	BC337-25 (COL) A	3198 020 43530
*	7107	AAX56440	CN. PHOT. SN	TSOP4836ZC1 (VISH)L	9322 185 97667
*	7108	AAX55840	TR	BC327-25 (COL) A	3198 020 43430
*	AAX55400	P. C. B.	ANALOG	3103 608 51013	G
*	AAX55390	P. C. B.	ANALOG	3103 608 50934	U
*	AAX55380	P. C. B.	ANALOG	3103 608 50475	A
* $\triangle$	1001	AAX56020	FUSE	125mA 250V IEC A	2422 086 10769 UA
* $\triangle$	1001	AAX56040	FUSE	125mA 65V MP13 A	2422 086 10919 G
* $\triangle$	1300	AAX56030	FUSE	1.25A 250V IEC B	2422 086 10899 G
* $\triangle$	1300	AAX55970	FUSE	2.5A 250V IEC B	2422 086 00206 UA
*	1302	AAX55570	SURG. PRTCT	DSP-301N-A21F A	2422 549 43073
* $\triangle$	1303	AAX55980	FUSE	1A 250V IEC	2422 086 10418
* $\triangle$	1303		FUSE	1A 250V IEC	2422 086 10779 (※)
* $\triangle$	1304	AAX55990	FUSE	4A 250V IEC	2422 086 10424
* $\triangle$	1304		FUSE	4A 250V IEC	2422 086 10786 (※)
* $\triangle$	1306	AAX56020	FUSE	125mA 250V IEC	2422 086 10769 UA
* $\triangle$	1306	AAX56040	FUSE	125mA 65V MP13	2422 086 10919 G
* $\triangle$	1307	AAX55980	FUSE	1A 250V IEC	2422 086 10418
* $\triangle$	1307		FUSE	1A 250V IEC	2422 086 10779 (※)
* $\triangle$	1308	AAX56000	FUSE	500mA 250V IEC	2422 086 10498 UA
* $\triangle$	1308		FUSE	500mA 250V IEC	2422 086 10776 UA (※)
* $\triangle$	1308	AAX56010	FUSE	500mA 65V MP50	2422 086 10582 G
* $\triangle$	1308		FUSE	500mA 65V PSC	2422 086 10951 G (※)
* $\triangle$	1309	AAX56060	FUSE	800mA 250V IEC	2422 086 10516
* $\triangle$	1309		FUSE	800mA 250V IEC	2422 086 10778 (※)
*	1600	AAX56470	RSNR. CRYS	18.432MHz 12P HC49	2422 543 00781
*	1700	AAX55760	TUNER. PK	V+U PLL IEC BG1DK	2422 542 90125 A
*	1701	AAX56150	FLTR	38.9MHz OFWK39	9322 042 72682 G
*	1701	AAX55770	TUMOD	V+U PLL F MN B	2422 542 90139 U
*	1702	AAX56140	FLTR	38.9MHz OFWK9656M	2422 549 44341
*	1703	AAX56130	FLTR	38.9MHz OFWG3956M	2422 549 42068
*	1704	AAX56120	FLTR	5.5MHz TPS*MB BS	2422 549 41595
*	1704		FLTR	5.5MHz TPSR*MBQ2	2422 549 44611 (※)
*	1705	AAX55780	TUNER. PK	V+U PLL IEC BG	3139 147 17001

\*: New Parts

Note) Those parts marked with (※) are alternative parts.



**P.C.B. ANALOG**

Schm Ref.	PART NO.	Description	Remarks	Markets		
	1705	TUNER. PK	UV1316K/A 1 G U-3	3139 147 17751	(※)	
* ⚠	1931	AAX54610	SOCKET. POW	2422 030 00371		
	1940	AAX22260	CN	2422 033 00334	G	
*	1941	AAX56090	JACK. PIN	2422 026 05291	UA	
*	1944	AAX56090	JACK. PIN	2422 026 05291	UA	
*	1945	AAX55370	P. C. B.	3103 608 51002	U	
*	1945	AAX55360	P. C. B.	3103 608 50584	G	
*	1945	AAX55350	P. C. B.	3103 608 50574	A	
*	1948	AAX55460	SOCKET	2422 026 04905		
*	1949	AAX56110	JACK. PIN	2422 026 05308	G	
*	1949	AAX55460	SOCKET	2422 026 04905	UA	
*	1990	AAX56460	RSNR. CRYST	2422 543 00779		
	2000	UR817470	C. EL	47uF 6.3V		
	2001	UR818100	C. EL	100uF 6.3V	G	
	2001	UR817470	C. EL	47uF 6.3V	UA	
	2002	UR818100	C. EL	100uF 6.3V		
	2007	UR847100	C. EL	10uF 25V	UA	
	2010	UR817470	C. EL	47uF 6.3V	UA	
	2011	UR847100	C. EL	10uF 25V	UA	
	2013	UR818100	C. EL	100uF 6.3V	UA	
	2018-20	UR847100	C. EL	10uF 25V		
	2020	UR817470	C. EL	47uF 6.3V	UA	
*	2023	AAX54640	C. EL. BP	100uF 16V	2020 009 90097	UA
*	2023	AAX54630	C. EL. BP	47uF 16V	2020 009 90094	UA
*	2023	AAX54650	C. EL. BP	100uF 16V	2022 036 00005	UA
*	2029	AAX54640	C. EL. BP	100uF 16V	2020 009 90097	UA
*	2029	AAX54630	C. EL. BP	47uF 16V	2020 009 90094	UA
*	2029	AAX54650	C. EL. BP	100uF 16V	2022 036 00005	UA
	2038	UR818100	C. EL	100uF 6.3V		
	2043	UR817470	C. EL	47uF 6.3V		
*	2048	AAX54640	C. EL. BP	100uF 16V	2020 009 90097	
*	2048	AAX54630	C. EL. BP	47uF 16V	2020 009 90094	
*	2048	AAX54650	C. EL. BP	100uF 16V	2022 036 00005	
*	2050	AAX54640	C. EL. BP	100uF 16V	2020 009 90097	
*	2050	AAX54630	C. EL. BP	47uF 16V	2020 009 90094	
*	2050	AAX54650	C. EL. BP	100uF 16V	2022 036 00005	G
* ⚠	2300	AAX55550	C. EL	68uF 400V	2222 151 90053	UA
* ⚠	2301	AAX56330	C. CE. SAFTY	220pF 250V	2020 554 90201	
*	2302	AAX56390	C. POL. SAFT	0.22uF 275V	2222 336 29146	
*	2303	AAX56350	C. CE. SAFTY	1000pF 500V	3198 019 41020	
	2304		C. POL. SAFT	2200pF 400V	2222 370 65222	(not used)
	2305	UR839100	C. EL	1000uF 16V		
*	2306	AAX55540	C. EL	560uF 6.3V	2020 021 91528	
*	2307	AAX56350	C. CE. SAFTY	1000pF 500V	3198 019 41020	
*	2308	AAX56380	C. POL. SAFT	0.047uF 250V	2022 318 00108	
	2308		C. POL. SAFT	0.047uF 250V	2222 365 45473	(※)
* ⚠	2309	AAX55550	C. EL	68uF 400V	2222 151 90053	G
* ⚠	2309	AAX55560	C. EL	330uF 200V	2222 152 90004	U
	2312	UR839100	C. EL	1000uF 16V		
*	2313	AAX55540	C. EL	560uF 6.3V	2020 021 91528	
* ⚠	2315	AAX56340	C. CE. SAFTY	47pF 1KV	2020 558 90511	G
* ⚠	2315	AAX56370	C. CE. SAFTY	220pF 1KV	3198 019 62210	U
*	2318	AAX56360	C. CE. SAFTY	2200pF 500V	3198 019 42220	

\* New Parts

Note) Those parts marked with (※) are alternative parts.

**P.C.B. ANALOG**

Schm Ref.	PART NO.	Description	Remarks	Markets
2318	UR847100	C. EL	10uF 25V	UA
2319	UR839100	C. EL	1000uF 16V	
2320	UR838330	C. EL	330uF 16V	
2322	UR839100	C. EL	1000uF 16V	
2323	UR818100	C. EL	100uF 6.3V	
2325	UR867220	C. EL	22uF 50V	
* 2326	AAX56400	C. POL. SAFT	0.01uF 250V	2222 370 35103
2328	UR867220	C. EL	22uF 50V	
2332	UR866100	C. EL	1uF 50V	
* 2335	AAX56360	C. CE. SAFTY	2200pF 500V	3198 019 42220 UA
2335	UR847100	C. EL	10uF 25V	
* 2340	AAX56320	C. CE. SAFTY	470pF 250V	2020 554 90169
* 2342	AAX56340	C. CE. SAFTY	47pF 1KV	2020 558 90511 A
2403-05	UR817470	C. EL	47uF 6.3V	
2413-14	UR817470	C. EL	47uF 6.3V	
* 2417	AAX54620	C. EL. BP	10uF 16V	2020 009 90074
2421	AAX54620	C. EL. BP	10uF 16V	2020 009 90074
2424	UR817470	C. EL	47uF 6.3V	
* 2428	AAX54620	C. EL. BP	10uF 16V	2020 009 90074
2429	UR837220	C. EL	22uF 16V	
2432	UR818100	C. EL	100uF 6.3V	
2434	UR817470	C. EL	47uF 6.3V	
⚠ 2442	UR837220	C. EL	22uF 16V	
2443	UR818100	C. EL	100uF 6.3V	
2460-61	UR866470	C. EL	4.7uF 50V	
* 2462	AAX54620	C. EL. BP	10uF 16V	2020 009 90074
* 2463	AAX54620	C. EL. BP	10uF 16V	2020 009 90074
2464	UR847100	C. EL	10uF 25V	
2470	UR847100	C. EL	10uF 25V	
2510	UR818100	C. EL	100uF 6.3V	UA
* 2510	AAX54620	C. EL. BP	10uF 16V	2020 009 90074 UA
* 2511	AAX54640	C. EL. BP	100uF 16V	2020 009 90097 G
* 2511	AAX54620	C. EL. BP	10uF 16V	2020 009 90074 UA
* 2511	AAX54650	C. EL. BP	100uF 16V	2022 036 00005 G
2515	UR817470	C. EL	47uF 6.3V	UA
* 2516	AAX54640	C. EL. BP	100uF 16V	2020 009 90097
* 2516	AAX54650	C. EL. BP	100uF 16V	2022 036 00005
2518	UR817470	C. EL	47uF 6.3V	UA
2519	UR818100	C. EL	100uF 6.3V	
* 2522	AAX54640	C. EL. BP	100uF 16V	2020 009 90097
* 2522	AAX54650	C. EL. BP	100uF 16V	2022 036 00005
* 2526	AAX54640	C. EL. BP	100uF 16V	2020 009 90097
* 2526	AAX54650	C. EL. BP	100uF 16V	2022 036 00005
2600	UR847100	C. EL	10uF 25V	
2602	UR847100	C. EL	10uF 25V	
2605	UR847100	C. EL	10uF 25V	
2608	UR847100	C. EL	10uF 25V	
2611	UR837470	C. EL	47uF 16V	
2612	UR866470	C. EL	4.7uF 50V	
2624	UR866220	C. EL	2.2uF 50V	U
2625	UR866220	C. EL	2.2uF 50V	U
2626	UR866220	C. EL	2.2uF 50V	
2627	UR866220	C. EL	2.2uF 50V	

\* New Parts

Note) Those parts marked with (※) are alternative parts.

DRX-2

## P.C.B. ANALOG

Schm Ref.	PART NO.	Description	Remarks	Markets
2701	UR866470	C. EL	4. 7uF 50V	UA
2703	UR866470	C. EL	4. 7uF 50V	UA
2707	UR817470	C. EL	47uF 6. 3V	UA
2713	UR837220	C. EL	22uF 16V	
2720	UR818100	C. EL	100uF 6. 3V	
2722	UR866220	C. EL	2. 2uF 50V	
2722	UR866220	C. EL	2. 2uF 50V	
2729	UR847100	C. EL	10uF 25V	
2732	UR866220	C. EL	2. 2uF 50V	
2737	UR817470	C. EL	47uF 6. 3V	
2740	UR866220	C. EL	2. 2uF 50V	
2933	UR817470	C. EL	47uF 6. 3V	
2941	UR847100	C. EL	10uF 25V	
* 3300-01	AAX56630	R. MTL. OXD	3. 3 Ω	2322 242 13335
* 3304	AAX55960	VARISTOR	1mA/495V MAX 850V	2322 595 90021 U
* 3305	AAX56640	R. MTL. OXD	680K Ω	2322 242 13684
* 3306	AAX56650	R. MTL. FLM	220 Ω	3198 013 02210
* 3321	AAX56610	R. MTL. FLM	0. 47 Ω	2322 193 14477 G
* 3321	AAX56590	R. MTL. FLM	0. 22 Ω	2322 193 14227 U
* 3352	AAX56620	R. MTL. FLM	0. 68 Ω	2322 193 14687 G
* 3352	AAX56600	R. MTL. FLM	0. 33 Ω	2322 193 14337 U
* 3461-68	AAX55950	VARISTOR	1mA/6V4 MAX 21V R	2122 551 00031 G
3461-68		VARISTOR	1mA/6V4 MAX 21V R	2322 574 10402 G (※)
* 3724	AAX56580	VR	22K Ω H RH063MC A	2120 368 90124 VR
* 5300	AAX56560	TRANS. PWR	SRW28EC9-E01V0	2422 531 02546 GA
5300		TRANS. PWR	CT286D8 B	3128 138 40782 GA (※)
* 5300	AAX56550	TRANS. PWR	SRW28EC9-E02V0* B	2422 531 02545 U
5300		TRANS. PWR	CT286D8 B	3128 138 40792 U (※)
* 5302	AAX56240	FILTER	25mH 0A4 HF2022R Y	2422 549 44509 GA
* 5302	AAX56250	FILTER	10mH 0A7 HF2022R Y	2422 549 44512 U
* 5710	AAX56300	COIL. VAR	7KMY 77MHZ8 B	2422 549 44162
* 5711	AAX56310	COIL. VAR	7KLY 77MHZ8 B	2422 549 45833
* 6003-04	AAX55640	DIODE	1N4148 (COL) A	3198 010 10010
* 6300	AAX55710	DIODE	SB340L-7024 (VISH)	9322 161 76682
* 6301	AAX55750	DIODE	1N4006GP A (VISH)	9338 386 60673
* 6301-02	AAX55660	DIODE	MED POW MAINS REC	3198 010 10120 UA
* 6302	AAX55750	DIODE	1N4006GP A (VISH)	9338 386 60673
* 6303	AAX55710	DIODE	SB340L-7024 (VISH)	9322 161 76682
* 6304	AAX55740	DIODE	1N4003 A (VISH) A	9334 515 80673
* 6305-06	AAX55750	DIODE	1N4006GP A (VISH)	9338 386 60673 G
* 6305-06	AAX55660	DIODE	MED POW MAINS REC	3198 010 10120 UA
* 6307	AAX55710	DIODE	SB540L-7024 (VISH)	9322 161 76682
6307		DIODE	STPS5L40-C2 (ST00)	9322 184 68682 (※)
6307		DIODE	SB540-F74 (PAJI) B	9322 198 67682 (※)
* 6308	AAX55710	DIODE	SB540L-7024 (VISH)	9322 161 76682
6308		DIODE	STPS5L40-C2 (ST00)	9322 184 68682 (※)
6308		DIODE	SB540-F74 (PAJI) B	9322 198 67682 (※)
* 6309	AAX55700	DIODE	BYT42M A (VISH) A	9322 126 71673
* 6310	AAX55710	DIODE	SB360L-7024 (VISH)	9322 161 76682
6310		DIODE	STPS3L60-C2 (ST00)	9322 184 68682 (※)
* 6311	AAX55740	DIODE	1N4003 A (VISH) A	9334 515 80673
* 6313	AAX55690	DIODE	SBYV27-200 A (VISH)	9322 103 46673
6313		DIODE	UF202G A (PAJI) A	9322 199 50673 (※)

\* New Parts

Note) Those parts marked with (※) are alternative parts.

P.C.B. ANALOG

Schm Ref.	PART NO.	Description	Remarks	Markets
* 6314	AAX55730	DIODE	BZX79-C9V1 A	9331 177 80133 UA
* 6316	AAX55650	DIODE	BAV21 (COL) A	3198 010 10070
* 6317	AAX55700	DIODE	BYT42M A (VISH) A	9322 126 71673
6317		DIODE	PG102R A (PAJI) A	9322 196 45673 (※)
6317		DIODE	BYD33D A (PHSE) A	9337 234 00133 (※)
* 6318	AAX55670	DIODE	BZX79-B33 A COL A	3198 010 53390
* 6319	AAX55700	DIODE	BYT42M A (VISH) A	9322 126 71673
6319		DIODE	PG102R A (PAJI) A	9322 196 45673 (※)
6319		DIODE	BYD33D A (PHSE) A	9337 234 00133 (※)
* 6323	AAX55720	DIODE	1N5819 (ST00) A	9322 180 19673 UA
* 6325	AAX55720	DIODE	1N5819 (ST00) A	9322 180 19673
* 7001	AAX55180	IC	UDA1334BTS/N2	9352 668 47118 UA
* 7002	AAX54930	IC	MC33078D (ST00) R	9322 146 10668 UA
* 7003	AAX54930	IC	MC33078D (ST00) R	9322 146 10668
* 7004	AAX54940	IC	AD1852JRS (ANA0) R	9322 148 78668
* 7005	AAX55190	IC	UDA1361TS/N1	9352 670 99118 UA
* 7007	AAX55190	IC	UDA1361TS/N1	9352 670 99118
* 7301	AAX54890	IC	TL431ACZ S (ST00)	9322 086 97676
* 7302	AAX54750	FET	STP16NF06FP (ST00)	9322 186 61687
* 7303	AAX54700	FET	SI4936ADY (VISH) R	9322 160 70668
7303		FET	STS9NF30L (ST00) R	9322 183 38668 (※)
* 7304	AAX54890	IC	TL431ACZ S (ST00)	9322 086 97676
* 7305	AAX54890	IC	TL431ACZ S (ST00)	9322 086 97676
* 7307	AAX54690	FET	STP3NC60FP (ST00)	9322 157 37687
* 7307	AAX54710	FET	STP8NC50FP (ST00)	9322 160 72687 U
* 7309	AAX54730	FET	SI2312DS (VISH) R	9322 180 12685
* 7312	AAX55830	TR	TRA SIG BF422	3198 020 43010
* 7313	AAX55200	IC	TEA1507P/N1	9352 673 56112
* 7314	AAX56160	PHOT.CPL	LTV817BM-V (LITO)	9322 153 43682
7314		PHOT.CPL	TCET1108(G) (VISH)	9322 154 23667 (※)
* 7315	AAX54890	IC	TL431ACZ S (ST00)	9322 086 97676
* 7317	AAX54740	FET	STS9NF30L (ST00) R	9322 183 38668 UA
* 7317	AAX54770	FET	STD17NF03L-1	9322 191 71687
* 7318	AAX54720	FET	SI2306DS (VISH) R	9322 163 75685
* 7319	AAX55860	TR	BC846B (PHSE) R	9335 895 60215
* 7320	AAX54720	FET	SI2306DS (VISH) R	9322 163 75685
* 7408	AAX54970	IC	STV6618 (ST00) R	9322 173 41668
* 7410	AAX54980	IC	NJM2267M (JRC0) R	9322 174 76668
* 7411	AAX54990	IC	NJM2285M (JRC0) R	9322 179 71668
* 7501	AAX55090	IC	HEF4052BT (PHSE) R	9333 729 50653
* 7502	AAX55120	IC	MC33079D (M0TA) R	9339 586 20668
* 7503	AAX55090	IC	HEF4052BT (PHSE) R	9333 729 50653
* 7504	AAX54930	IC	MC33078D (ST00) R	9322 146 10668 UA
* 7504	AAX55090	IC	HEF4052BT (PHSE) R	9333 729 50653
* 7505	AAX54930	IC	MC33078D (ST00) R	9322 146 10668
* 7600	AAX55030	IC	MSP3425G-QG-B8V3	9322 186 86671 U
* 7600	AAX55040	IC	MSP3415G-QG-B8V3	9322 186 87668 G
* 7710	AAX55170	IC	TDA9818T/V1	9352 606 11118
* 7931	AAX54920	IC	STV5348D (ST00) R	9322 137 02668
* 7934	AAX55110	IC	LM339D (ST00) R	9339 476 70668

\* New Parts

Note) Those parts marked with (※) are alternative parts.

DRX-2

**P.C.B. UP SUB & P.C.B. DIGITAL**

**P.C.B. DIGITAL & P.C.B. IOE**

Schm Ref.	PART NO.	Description	Remarks	Markets
*	AAX55370	P. C. B.	UP SUB AL N1/CHR	U
*	AAX55360	P. C. B.	UP SUB AL E1	G
*	AAX55350	P. C. B.	UP SUB AL N2	A
*	1801	AAX56480	RSNR. CRYST	
*	1805	AAX56490	RSNR. CRYST	
*	2816	AAX55580	C.EL. SUPER	
*	2819	UR818100	C.EL	
*	2829	UR847100	C.EL	
*	7801	AAX55150	IC	
*	7803	AAX55020	IC	
*	7803	IC		(※)
*	7804	AAX54850	IC	
*	7805	AAX55280	IC	G
*	7805	AAX55300	IC	U
*	7805	AAX55290	IC	A
*	7806	AAX54950	IC	
*	7808	AAX54910	IC	
*	7825	AAX55000	IC	
*	7902	AAX55130	IC	
*	AAX55430	P. C. B.	DIGITAL CHRYSALIS	G
*	AAX55420	P. C. B.	DIGITAL CHRYSALIS	UA
*	1001	AAX56500	RSNR. CRYST	
*	1201	AAX56480	RSNR. CRYST	
*	1505	AAX56050	FUSE	
*	1506	AAX56050	FUSE	
*	1507	AAX56050	FUSE	
*	7001	AAX54900	IC	
*	7002	AAX55240	IC	
*	7004	AAX55210	IC	
*	7103	AAX55240	IC	
*	7104	AAX29520	IC	
*	7106	AAX55060	IC	
*	7107	AAX29520	IC	
*	7111	AAX55100	IC	
*	7200	AAX55230	IC	
*	7201	AAX55220	IC	
*	7300	AAX55160	IC	
*	7400	AAX55250	IC	
*	7401	AAX55140	IC	
*	7402	AAX56510	OSC. CRYST	
*	7500	AAX54760	FET	
*	7501	AAX55050	IC	
*	7701	AAX55070	IC	UA
*	7702	AAX54880	IC	UA
*	7703	AAX54960	IC	UA
*	7801	IC		(not used)
*	7801	AAX55270	IC	
*	7804	AAX55010	IC	
*	7804	IC		(※)
*	7808	AAX55010	IC	

\* New Parts  
 (Note) Those parts marked with (※) are alternative parts.

Schm Ref.	PART NO.	Description	Remarks	Markets
7808		IC	K4S281632E	(※)
7809	AAX46690	IC	M24C64-WMNG	
7810	AAX46690	IC	M24C64-WMNG	
*	7810	AAX55260	IC	
*	7900	AAX54870	IC	
*	7901	AAX54870	IC	
*	7903	AAX29510	IC	G
*	7910	AAX54880	IC	UA
	AAX55340	P. C. B.	IOE AL N1	
*	1925	AAX56080	JACK. PIN	
*	2261	UR818100	C.EL	
*	5250	AAX55870	TRANS	
*	6255	AAX47710	CN. PHOT. SN	
*	7250	AAX50370	IC	

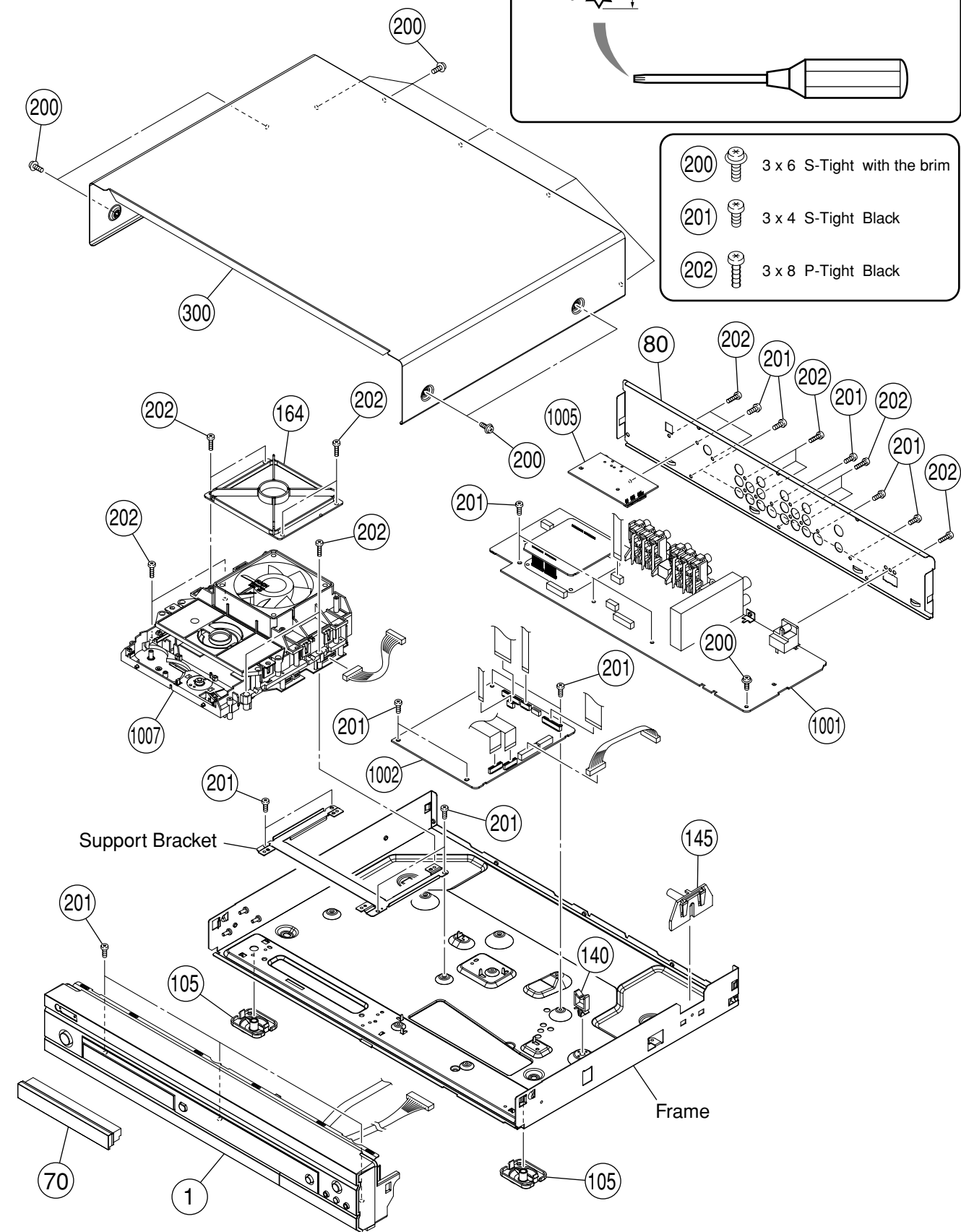
\* New Parts  
 (Note) Those parts marked with (※) are alternative parts.



■ EXPLODED VIEW

When disassembling, use the special screw driver with tip shape in figure.

T10 2.7 mm



- 200 3 x 6 S-Tight with the brim
- 201 3 x 4 S-Tight Black
- 202 3 x 8 P-Tight Black

■ MECHANICAL PARTS

Ref. No.	PART NO.	Description	Remarks	Markets
*	1	AAX56200 FRONT PANEL UNIT	YVDR0002/00	3139 247 59621 G
*	1	AAX56210 FRONT PANEL UNIT	YVDR0002/17	3139 247 59881 U
*	1	AAX56220 FRONT PANEL UNIT	YVDR0002/75	3139 247 60061 A
*	70	AAX55890 TRAY LID	YVDR0002/00	3139 247 59641 G ☆1
*	70	AAX55880 TRAY LID	YVDR0002/17	3139 247 59631 U ☆1
*	70	AAX55900 TRAY LID	YVDR0002/75	3139 247 60021 A ☆1
*	80	AAX56270 REAR PANEL	YVDR0002/00 PPT	3139 247 59661 G
*	80	AAX56280 REAR PANEL	YVDR0002/17 PPT	3139 247 59951 U
*	80	AAX56260 REAR PANEL	DVDR75 AP PPT	3139 247 57941 A
*	105	AAX56410 FOOT ASS'Y		3103 607 50492 G
*	105	AAX56420 FOOT ASS'Y		3139 247 59961 UA
*	140	AAX56290 SADDLE WIRE NY6/6 14.7MM B		2422 015 16892
*	141	AAX55530 CABLE CLAMP		3143 027 50351
*	145	AAX55940 SCREW SAFETY HOLDER		3103 604 00291
*	164	AAX56230 BRACKET FAN CROSS		3103 604 00731
*	200	AAX55450 PW HEAD TORX S-TIGHT SCREW	3x6-8 MFZN2BL	3139 110 40611
*	200	AAX53440 PW HEAD TORX S-TIGHT SCREW	3x6-8 MFN133	3104 120 40081
*	201	AAX55930 PAN HEAD TORX S-TIGHT SCREW	3x4 MFZN2BL	3141 010 40591
*	202	AAX53520 PAN HEAD TORX P-TIGHT SCREW	3x8 MFZN2BL	2511 076 50012
*	203	AAX55920 PAN HEAD TORX P-TIGHT SCREW	3x15 MFZN2BL	2511 077 00046
*	300	AAX55800 TOP COVER	YVDR0002/00 PPT	3139 247 59671 G
*	300	AAX55810 TOP COVER	YVDR0002/17 PPT	3139 247 59941 UA
*	△ 1001	AAX55400 P.C.B. ASS'Y	ANALOG E1/DRX2	3103 608 51013 G
*	△ 1001	AAX55390 P.C.B. ASS'Y	ANALOG N4	3103 608 50934 U
*	△ 1001	AAX55380 P.C.B. ASS'Y	ANALOG AL N2	3103 608 50475 A
*	1002	AAX55430 P.C.B. ASS'Y	DIGITAL CHRYSALIS2.1_E1	3103 608 50613 G
*	1002	AAX55420 P.C.B. ASS'Y	DIGITAL CHRYSALIS2.1_N1	3103 608 50314 UA
*	1005	AAX55340 P.C.B. ASS'Y	IOE	3103 608 50523
*	1007	AAX54680 DVDR MECHANISM	VAE8020/15 (PHOS)	9305 025 82015

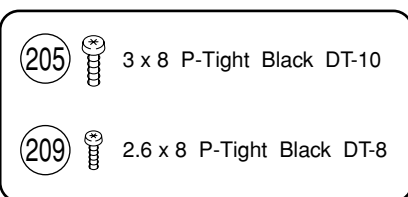
\* New Parts

☆1 The TRAY LID consists of the following two components.


1. COVER TRAY.... The print on this external part varies depending on destinations.
2. HOLDER LID ..... This part is used to install the lid to the tray. There is no variation depending on destinations.




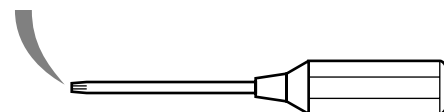
## EXPLODED VIEW (FRONT PANEL UNIT)



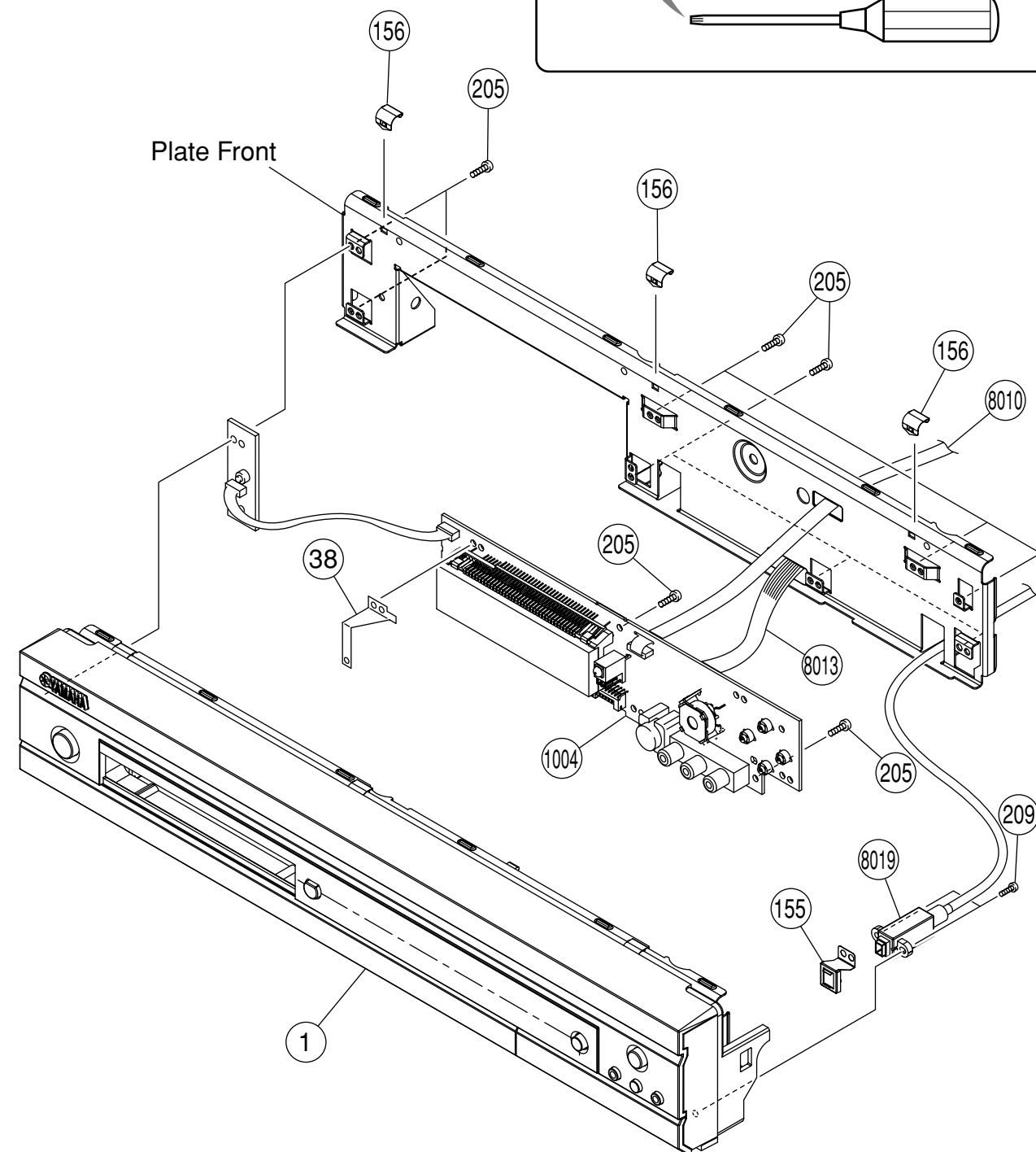
When disassembling, use the special screw driver with tip shape in figure.

T10  2.7 mm for screws 205

T8  2.2 mm for screws 209



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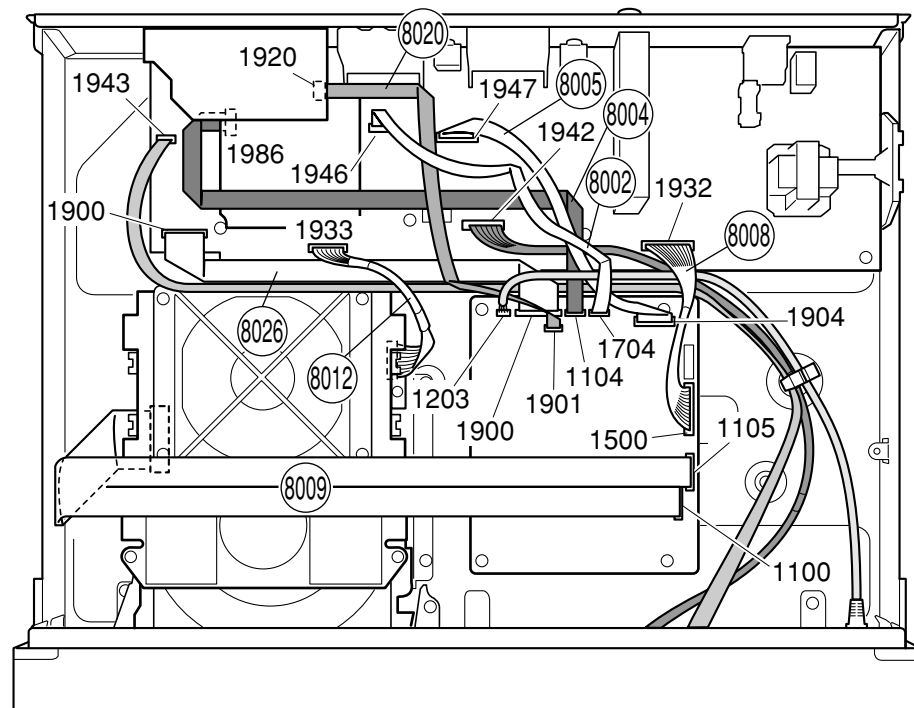
## MECHANICAL PARTS (FRONT PANEL UNIT)

Ref. No.	PART NO.	Description	Remarks	Markets	
*	1	AA556180 FRONT PANEL ASS'Y	YVDR0002/00	3139 247 59781	G
*	1	AA556170 FRONT PANEL ASS'Y	YVDR0002/17	3139 247 59651	U
*	1	AA556190 FRONT PANEL ASS'Y	YVDR0002/75	3139 247 60051	A
*	38	AA555600 SPRING ESD		3103 601 20291	
*	155	AA555610 SPRING I-LINK		3103 601 20212	
*	156	AA555620 SPRING GROUND		3103 601 20231	
*	205	AA553520 PAN HEAD TORX P-TIGHT SCREW	3x8 MFZN2BL	2511 076 50012	
*	209	AA555910 PAN HEAD TORX P-TIGHT SCREW	2.5x8 MFZN2BL	2511 076 50047	
*	1004	AA554440 P.C.B. ASS'Y	FRONT	3103 608 51281	
*	8010	AA554820 FFC 10-POL-A-TYP 650MM (AB-D)	10P 650mm	3103 601 00281	
*	8013	AA55480 KR 9POL GESCH 370MM	9P 370mm	3103 601 00311	
*	8019	AA55310 IEEE 1394 Chrysalis 350mm	350mm	3103 601 00361	

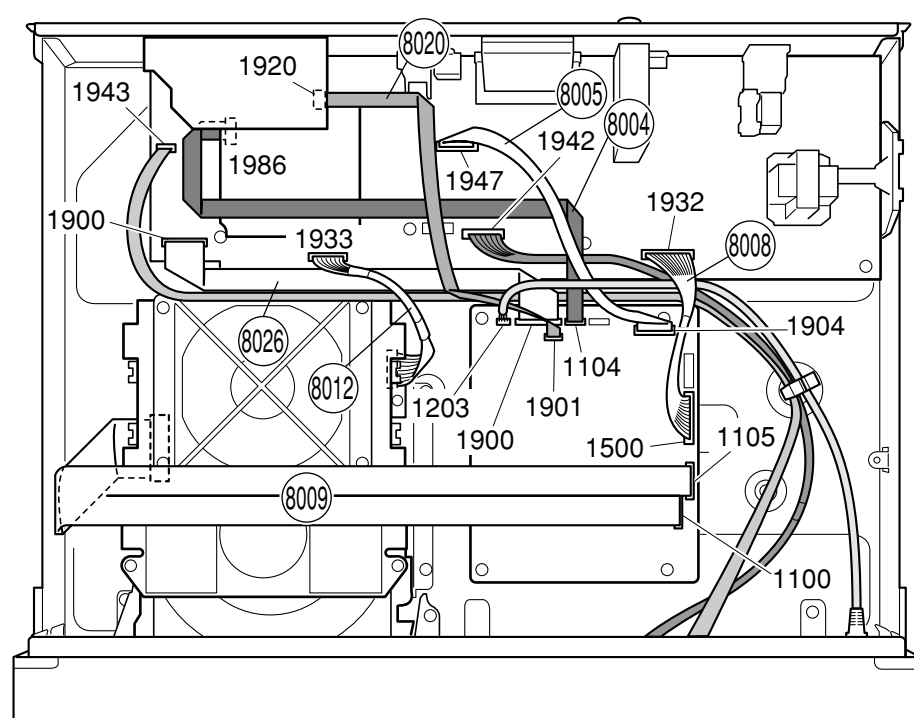
※ New Parts

■ WIRING

U, A models



G model



■ WIRING CABLE PARTS

Ref. No.	PART NO.	Description	Remarks	Markets
* 8002	AAX54780	FFC 7P 240mm	3103 60 100201	UA
* 8004	AAX54790	FFC 10P 350mm	3103 601 00221	
* 8005	AAX54800	FFC 22P 210mm	3103 601 00231	
* 8008	AAX55500	CABLE 12P 130mm	3103 601 00441	
* 8009	AAX54810	FFC 30P/15P-15P 494mm	3103 601 00272	
* 8012	AAX55490	CABLE 8P 125mm	3103 601 00401	
* 8020	AAX54830	FFC 6P 245mm	3103 601 00371	
* 8026	AAX54840	FFC 22P 245mm	3103 601 00431	

\*: New Parts

1

# DVDR MECHANISM

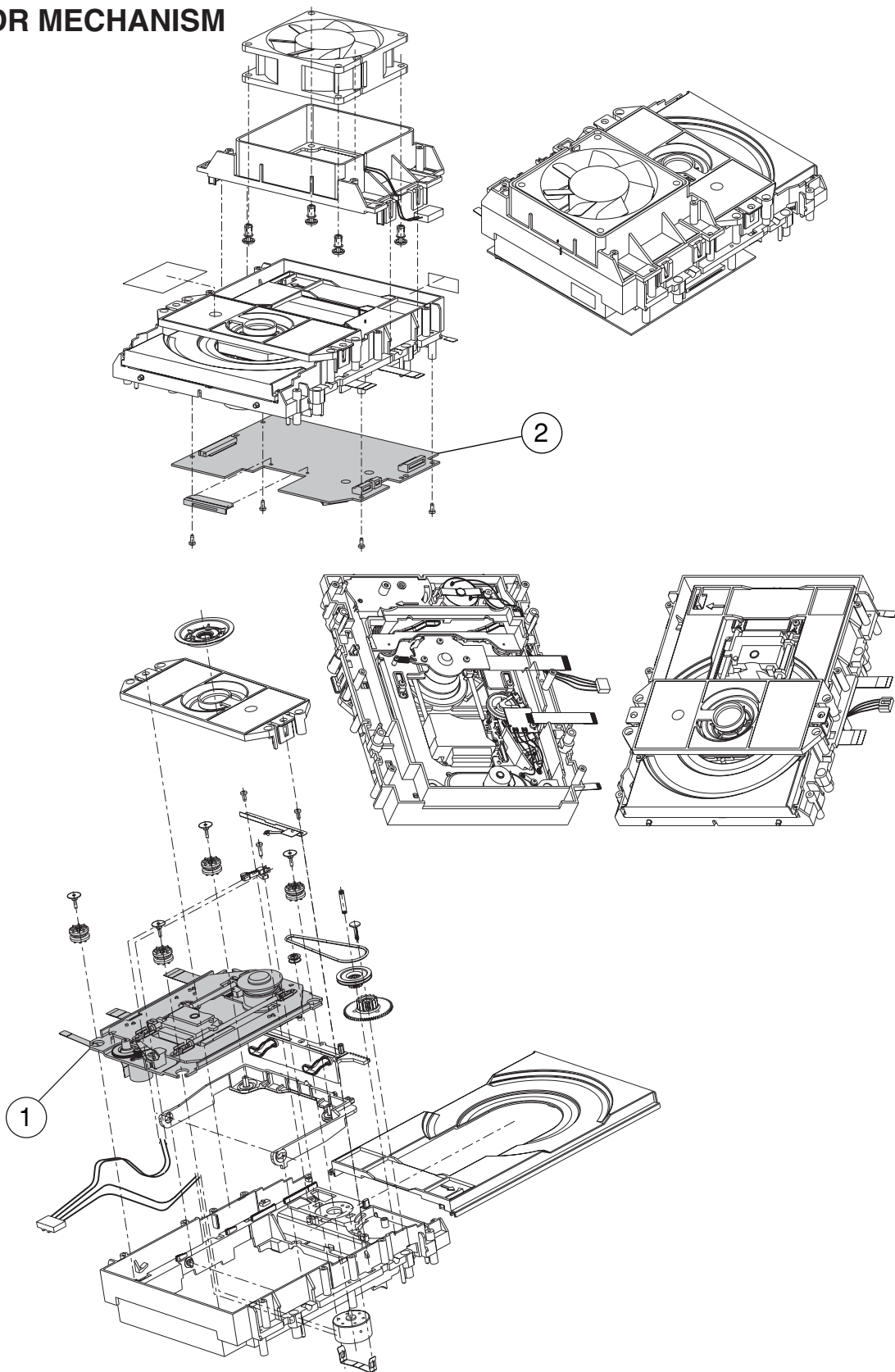
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\*

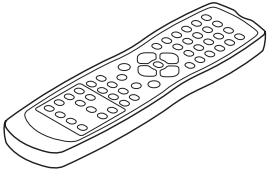
Ref. No.	PART NO.	Description	Remarks	Markets
1	AAX55820	TRAVERSE UNIT	DVDM/15, LADIC M4, OPU6411, Plastic lens	9305 022 82015
2	AAX55410	P.C.B. ASS'Y	SERVO	3104 128 08861

\* New Parts

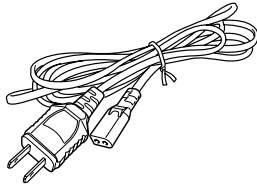
DRX-2

## ■ ACCESSORIES

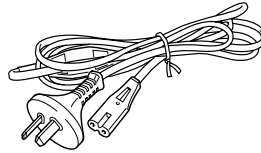
350



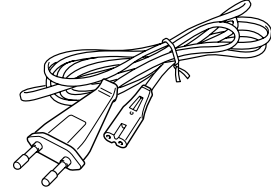
351 (U model)



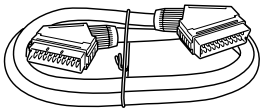
351 (A model)



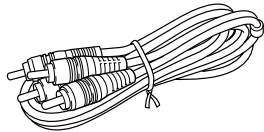
351 (G model)



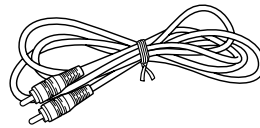
352 (G model)



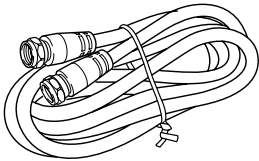
355 (U, A models)



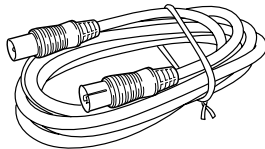
356 (U, A models)



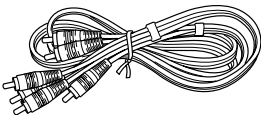
357 (U model)



357 (A, G model)



360 (U, A models)



365 (U, A models)



Ref. No.	PART NO.	Description	Remarks	Markets		
350	AAX44180	REMOTE CONTROL	3139 238 02431			
*	351	AAX56520	POWER CABLE	1.5m	2422 070 98133	G
*	351	AAX56530	POWER CABLE	1.8m	2422 070 98134	U
*	351	AAX56540	POWER CABLE	1.5m	2422 070 98248	A
*	352	AAX55590	SCART CABLE	1.5m 21P BK	2422 076 00532	G
	355	AAX21980	AUDIO PIN CABLE	RD/WH 1.5m 1pc	3103 308 92611	UA
	356	AAX22970	VIDEO CABLE	YE 1.5m 1pc	3104 108 45432	UA
*	357	AAX55330	RF CABLE FOR PAL	1.5m	3103 140 25022	GA
	357	AAX44010	RF CABLE FOR NAFTA	1.5m	3104 128 90403	U
*	360	AAX56070	PIN CABLE	1.5m 3P GR/BU/RE	2422 076 00525	UA
	365	AAX43980	DVD+RW DISC	4.7GB	9082 100 01504	UA
		BATTERIES				

\* New Parts

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## ■ TEST DISCs & PC Interface Cable

### (1) TEST DISC 1 LPV12.01

purpose = test for layer change of tracks.

how to use = playing back track from 28 through 31 (included).

judge = check if playing back is properly done without a hung-up.

2

### (2) TEST DISC 2 DVD+R blank disc type Ricoh 4X

purpose = test for recordability.

how to use = record 1 minute, press [STOP], press [OPEN/CLOSE] and then play back.

judge = check if playing back is properly done without a hung-up.

### (3) TEST DISC 3 CR-RW low reflection audio disc

purpose = test for playability.

how to use = record a few audio tracks and then playback 1 audio track for 1 minute.  
The disc can be used multiple times until the disc is full.

judge = check if playing back ( for 1 minute) is properly done.

3

4

	Item	Part No.	Remarks	
*	TEST DISC 1	LPV12.01	AAX55790 (7104 099 91851)	purchase locally ☆1
*	TEST DISC 2	DVD+R Blank Disc Type Ricoh 4X	AAX54670 (7104 099 94261)	
*	TEST DISC 3	CR-RW Low Reflection Audio Disc	AAX54660 (7104 099 96581)	
*		PC INTERFACE CABLE	AAX57390 (3122 785 90017)	

\* New Parts

☆1 Available in local market with less expensive price.

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# DRX-2

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