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Service
Service



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Service Manual



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PHILIPS

1. Technical Specifications & Connection Facilities

Specifications

PLAYBACK SYSTEM

SACD Stereo
SACD multi-channel
DVD Video
Video CD
S-Video CD
CD (CD-R and CD-RW)
DVD+RW and DVD-R

OPTICAL READOUT SYSTEM

Laser type	Semiconductor AlGaAs
Numerical Aperture	0.60 (DVD) 0.45 (VCD/CD)
Wavelength	650 nm (DVD) 780 nm (VCD/CD)

SACD DISC FORMAT

Medium	Optical Disc
Diameter	12cm (8 cm)

DVD DISC FORMAT

Medium	Optical Disc
Diameter	12cm (8 cm)
Playing time (12 cm)	One layer 2.15 h Dual layer 4 h Two side, single layer 4.30 h Two side, dual layer 8 h

TV STANDARD

	EUROPE	USA
	(PAL/50Hz)	(NTSC/60Hz)
Number of lines	625	525
Playback	Multistandard	(PAL/NTSC)

AUDIO FORMAT

Digital	DSD	Uncompressed Digital
	MPEG	Compressed Digital
	DTS/Dolby Digital	
	PCM	16, 20, 24 bits fs, 44.1, 48, 96 kHz

Analog Sound Stereo

Dolby Surround-compatible downmix from multi-channel sound
Full decoding of Dolby Digital multi-channel surround sound
3D Sound (TruSurround) for virtual 5.1 channel sound on 2 speakers

VIDEO FORMAT

Digital Compression	MPEG2 for DVD, MPEG1 for VCD
DVD	50 Hz 60 Hz
Horiz. resolution	720 pixels 720 pixels
Vertical resolution	576 lines 480 lines
VCD	50 Hz 60 Hz
Horiz. resolution	352 pixels 352 pixels
Vertical resolution	288 lines 240 lines

SACD AUDIO PERFORMANCE

DA Converter	DSD
SACD	fs 2.8224 MHz DC - 100 kHz
Max. output voltage (0dB)	2 V rms
Channel unbalance	< 0.5 dB
Cut-off frequency	
Front L/R, Stereo	50 kHz
Surr. L/R, Center	40 kHz
Signal-Noise (1kHz)	110 dB
Total harmonic distortion (1kHz)	100 dB
Dynamic Range (1kHz)	105 dB
Crosstalk (1kHz)	110 dB

VIDEO PERFORMANCE

Video output	1 Vpp into 75 ohm
S-Video output	Y: 1 Vpp into 75 ohm C: 0.3 Vpp into 75 ohm
Y Pr/Cr Pb/Cb output	Y: 1 Vpp into 75 ohm Pr/Cr Pb/Cb: 0.7 Vpp into 75 ohm
Black Level Shift	On/Off
Video Shift	Left/Right

AUDIO PERFORMANCE (TYPICAL)

DA Converter	24 bits
DVD	fs 96 kHz 4 Hz - 44 kHz fs 48 kHz 4 Hz - 22 kHz
Video CD	fs 48 kHz 4 Hz - 22 kHz
CD	fs 44.1 kHz 4 Hz - 20 kHz
Signal-Noise (1kHz)	< 100 dB
Dynamic Range (1kHz)	< 95 dB
Crosstalk (1kHz)	< 105 dB
Distortion and Noise (1kHz)	< 92 dB

CONNECTIONS

Y Pr/Cr Pb/Cb output (480p)	Cinch 3x (green, blue, red)
Y Pr/Cr Pb/Cb output (480i)	Cinch 3x (green, blue, red)
S-Video output	Mini DIN, 4 pins
Video output	Cinch (yellow) 2x
Audio L+R output	Cinch (white/red)
6 Channel analog output	
Audio Front Left/Right	Cinch (white/red)
Audio Surr. Left/Right	Cinch (white/red)
Audio Centre	Cinch (blue)
Audio Subwoofer	Cinch (black)
Digital Audio Output	1 coaxial, 1 optical IEC958 for CDDA/LPCM IEC1937 for MPEG1/2, Dolby Digital, DTS

POWER SUPPLY (UNIVERSAL)

Power inlet	110-240V, 50/60Hz
Power usage	Approx. 30 Watt
Power usage standby	less than 4 Watt

CABINET

Dimensions	435 x 100 x 321 mm (w x h x d)
Weight	approx. 4.2 kg

PACKAGE CONTENTS

SACD player
AC power cord
Remote Control with batteries
Audio/Video cables
CVBS Video cable
Instructions for use

* typical playing time for movie with 2 spoken languages and 3 subtitle languages
Specifications subject to change without prior notice

2. Safety Instructions, Warnings, Notes, and Service Hints

2.1 Safety Instructions

2.1.1 General Safety

Safety regulations require that during a repair:

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

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

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

2.1.2 Laser Safety

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

Laser Device Unit

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

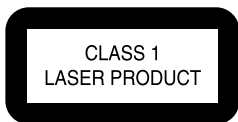


Figure 2-1

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

2.2 Warnings

2.2.1 General

- All ICs and many other semiconductors are susceptible to electrostatic discharges (ESD, ⚡). Careless handling during repair can reduce life drastically. Make sure that, during repair, you are at the same potential as the mass of the set by a wristband with resistance. Keep components and tools at this same potential.
Available ESD protection equipment:
 - Complete kit ESD3 (small tablemat, wristband, connection box, extension cable and earth cable) 4822 310 10671.
 - Wristband tester 4822 344 13999.
- Be careful during measurements in the live voltage section. The primary side of the power supply (pos. 1005), including the heatsink, carries live mains voltage when you connect the player to the mains (even when the player is 'off!'). It is possible to touch copper tracks and/or components in this unshielded primary area, when you service the player. Service personnel must take precautions to prevent touching this area or components in this area. A 'lightning stroke' and a stripe-marked printing on the printed wiring board, indicate the primary side of the power supply.
- Never replace modules, or components, while the unit is 'on'.

2.2.2 Laser

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

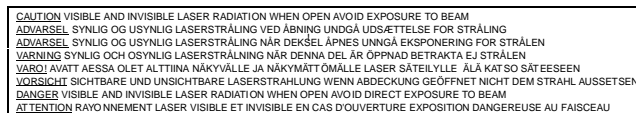


Figure 2-2

2.2.3 Notes

Dolby

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



Figure 2-3

Trusurround

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



Figure 2-4

Video Plus

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



Figure 2-5

Macrovision

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

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

2.3 Service Hints**2.3.1 Switched Mode Power Supply 1005**

This power supply unit has to be repaired down to component level in case of failure.

2.3.2 SACD Module

This module can be repaired as follows:

1. The loader and DVD-Mechanism (VAL6011) is one assembly. This assembly is a not repairable unit and must be exchanged completely in case of failure. A new unit can be ordered with codenumber 9305 023 61104.
2. The mono board has to be repaired down to component level. Repair handling of the monoboard requires a workshop with sophisticated desoldering tools.

2.3.3 ComPair

For assistance with the repair process of the monoboard an electronic fault finding guidance has been developed, this program is called ComPair.

This ComPair program is available on CDROM.

The version of the CDROM for repair of the monoboard is V1.3 or higher and can be ordered with codenumber: 4822 727 21637. This is an update CDROM, so when the ComPair CDROM is used for the first time, one has to install the ComPair Engine CDROM V1.2 first.

The V1.2 CDROM can be ordered with code number 4822 727 21634 and has to be registered after installation. The procedure for registration is explained in the help file of the program and in the CDROM booklet.

The cable to connect the monoboard with a PC can be ordered with codenumber: 3122 785 90017.

All the hardware and software requirements of the systems necessary for working with ComPair is described on the CDROM.

2.3.4 Service Positions**SACD Module**

Refer to dismantling instructions for dismantling of the board. Figures 2-1 to 2-3 shows the service position that are recommended during repairing of the boards.

Mono Board

Figure 2-6

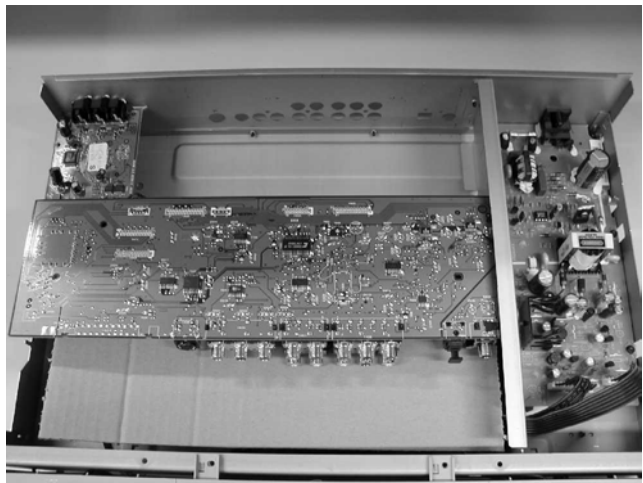
AV Board

Figure 2-7

P-Scan Board

Figure 2-8

3. Directions for Use

Introduction

Reality reproduced: Super Audio CD

The future in digital sound reproduction is no longer limited to a closely simulating of reality. The new audio standard is reality. The human ear is no longer capable of distinguishing audible reality from digital reproduction. At Philips, the future starts today with the Super Audio Compact Disc player. This Super Audio CD player combines superior sound quality with the possibility of playing almost all existing audio and video formats with a single player. Your precious CD collection retains its value!

The Super Audio standard is based on Direct Stream Digital (DSD) technology. This new direct-stream digital format comprises a 1-bit system that has a digital sampling frequency that is 64 times higher than that of conventional audio CD. The results are spectacular: a frequency response of over 50k Hz and a 120dB dynamic range over the entire audible spectrum. Mixed with as many of the original frequencies as possible, the audio information audible for human ears sounds much more natural. All audible frequencies are, after all, embedded in the frequency range as emitted by the sound source. A better reproduction does not exist! For the first time your ears will relive reality.

The next standard: hybrid disc

The Super Audio CD is the evolution of the CD that provides ultra-high-quality sound. Additional features, including multi-channel, can be offered. On the high density (HD) Super Audio CD you may have access to separate areas, containing two-channel stereo and multi-channel. But that is not all! The hybrid version of the SACD guarantees backward compatibility with the installed base of CD and DVD players. In addition to the HD layer, the hybrid disc contains a standard density CD layer with conventional two-channel stereo CD audio information. The two layers are read from the same side of the disc. The HD layer is read by and DVD laser. The bottom reflective layer with conventional CD sound is read by the CD laser through the second, semi-transparent HD layer.



SACD: reality in sound...and vision

This SACD player will not only surprise you with its superior reproduction of almost all existing audio formats. Connected to your TV, your SACD player presents VCD and DVD-video information as perfect digital studio-quality images with truly 3-dimensional digital multi-channel audio. Story sequences can be screened from your own choice of camera angle. You can break down language barriers with sound tracks in as many as eight languages, plus - if available on disc - as many as 16 subtitling languages. Video becomes a new experience. That makes the SACD player an essential component in a state-of-the-art audio-video system.

Super Audio CD

You will recognize Super Audio CDs by the logo. There are three types of Super Audio CDs: single-layer, dual-layer and hybrid discs. Each type may contain two areas of recorded information: a High Quality Stereo area and a High Quality Multi-channel area.

- The single layer disc may contain both information areas.
 - The dual layer disc may contain both information areas but a double amount of information can be stored on the disc, thanks to the second layer.
 - The hybrid disc may contain not only both information areas but also a second, standard CD layer, making it playable on standard CD players.
- Recorded information may vary per area. This is indicated in the disc inlay. Areas can be selected separately before or during playback, while playing Super Audio CDs via the remote control or via the On-Screen Display on your TV.

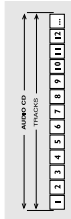


English

English

Audio CD (CDDA)

Audio CDs contain music tracks only. You will recognise these CDs by their logo. You can play them in conventional style through a stereo system using the keys on the remote control and/or front panel, or via the TV using the On-Screen Display (OSD).



Note: - The DTS audio format is only supported on DVD. This product does not support the playback of DTS encoded CDs.

Digital Video

DVD-Video uses state-of-the-art MPEG 2 data compression technology to register an entire movie on a single 5-inch disc. DVD's variable bitrate compression running at up to 9.8 Mbits/second, captures even the most complex images in their original quality. The crystal-clear digital images have a horizontal resolution of over 500 lines, with 720 pixels (picture elements) to each line. The resolution is more than double that of VHS, superior to Laser Disc, and entirely comparable with digital masters made in recording studios. DVD-Video discs conform to either the PAL or NTSC video standard. This dual-standard player can play both types, and presents them in the best possible way on your multi-standard TV screen. As the universal video system of the future, DVD-Video offers optimal images on any TV screen.

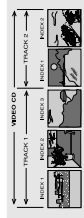
DVD Video

You will recognize DVD-Video discs by the logo. Depending on the material on the disc (a movie, video clips, a drama series, etc.), these discs may have one or more Titles, and each Title may have one or more Chapters. To make access easy and convenient, your player lets you move between Titles and between Chapters.



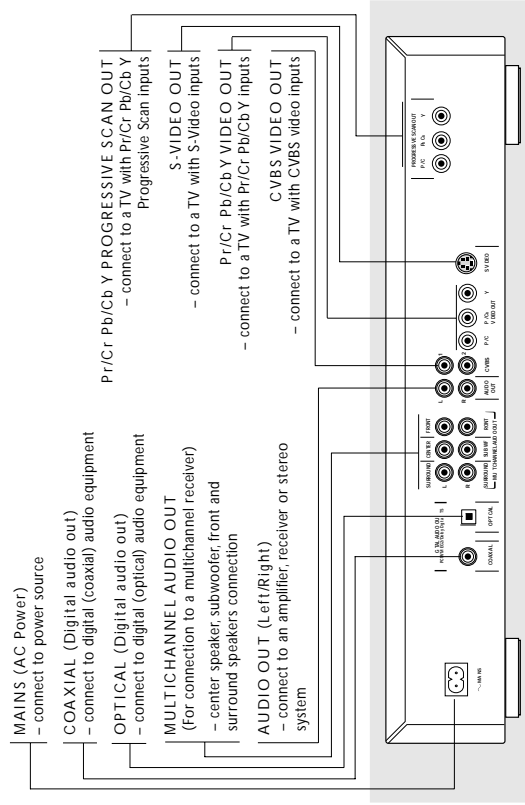
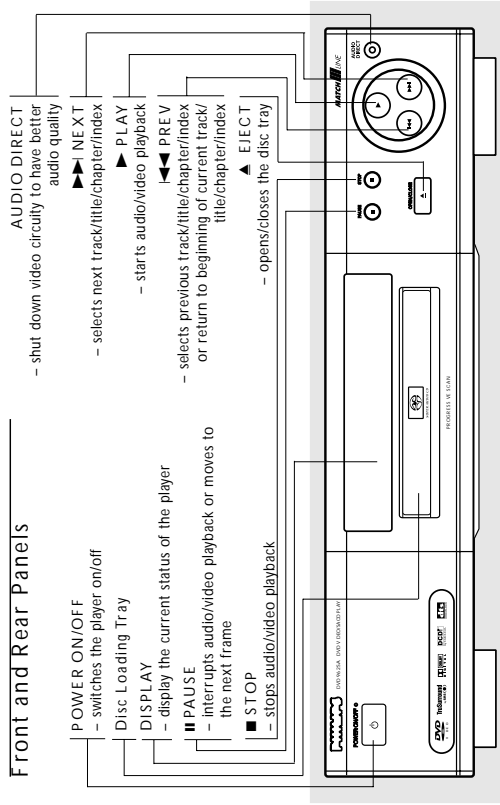
Video CD

You will recognize Video CDs by the logo. Depending on the material on the disc (a movie, video clips, a drama series, etc.), these discs may have one or more tracks, and tracks may have one or more indexes, as indicated on the disc case. To make access easy and convenient, your player lets you move between tracks and between indexes.



Functional Overview

Front and Rear Panels



Caution: Do not touch the inner pins of the jacks on the rear panel. Electrostatic discharge may cause permanent damage to the unit.

English

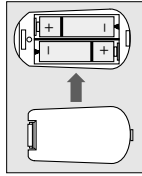
English

Infrared remote control

Loading the batteries

- 1 Open the battery compartment cover
- 2 Insert two AA (LR-6) batteries as indicated inside the battery compartment.
- 3 Close the cover.

Caution: Do not mix old and new batteries. Also never mix different types of batteries (standard, alkaline, etc.).



Unpacking

First check and identify the contents of your SACD player package as listed below:

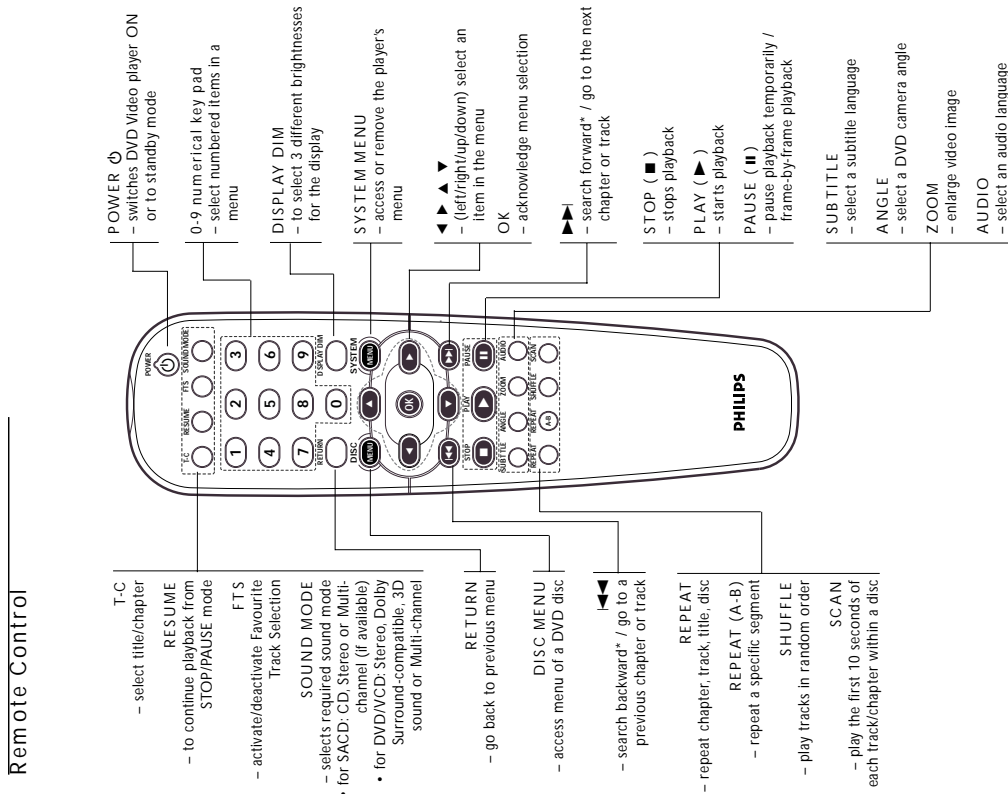
- SACD player
- AC power cord
- Remote Control with batteries
- Audio/Video cables
- CVBS Video cable
- Instructions for use

If any item is damaged or missing, please inform your supplier immediately. Save the packaging materials; you may need them to transport your player in future.

Placement



- Place the player on a firm, flat surface.
- Keep the player away from domestic heating equipment and direct sunlight.
- In a cabinet, allow about 2.5 cm (1 inch) of free space all around the player for adequate ventilation.
- If the SACD player cannot read SACDs/CDS/DVDs/VCDs correctly, use a commonly available cleaning CD/DVD to clean the lens before taking the SACD player to be repaired. Other cleaning methods may destroy the lens. Always keep the tray closed to avoid dust on the lens.
- When it is moved from a cold to a warm environment, allow the SACD player to acclimatize for at least 2 hours in order to avoid damage. When suddenly placed in a warm environment, the lens may cloud over. Playing an SACD/CD/DVD will not be possible then. Wait until moisture evaporates.

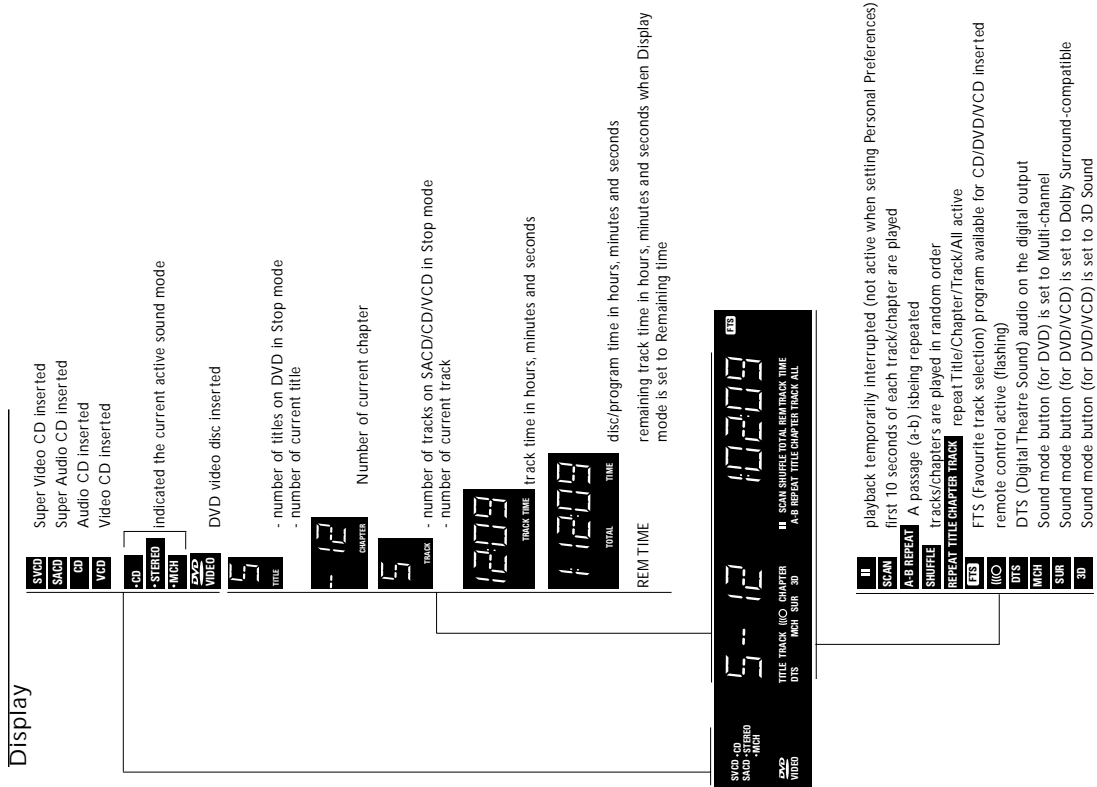


Remote Control

English

English

* Press and hold key for about two seconds



Display

On screen display information

Menu bar/Status window

- Personal Preferences
- Title/Track
- Chapter/Index
- Subtitle language
- Angle
- Zoom
- Video FTS
- Sound
- Picture by Picture
- Slow motion
- Fast motion
- Time search
- Audio language
- Sound Mode



Status window icons

The status window displays the current status of the player and is displayed together with the first part of the menu bar if activated in the Features menu (see Personal Preferences).

- General
- Disc type
- Tray status

Default screen

The default screen is displayed when the player is in STOP mode. It may contain in a status window (see Status Window) and a Temporary Feedback Field, which gives information concerning prohibited actions, playback modes, available angles, etc.



Temporary Feedback Field icons

- Scan
- Repeat All
- Repeat Title
- Repeat Track
- Repeat Chapter
- Shuffle
- Shuffle Repeat
- Repeat A to end
- Repeat A-B
- Current camera angle/number of available camera angles
- Child Lock On
- Child Safe
- Resume
- Action prohibited



Preparation

General Notes

- Depending on your TV and other equipment you wish to connect, there are various ways you could connect the player. Use only one of the connections described below.
- For some connections, settings for digital and/or analogue output are required. These settings have to be made in the 'Personal Preferences' menu which is only accessible via your TV screen. In these cases you will need to connect the player to the TV as well.
- Please refer to the manuals of your TV/VCR, Stereo System or other devices as necessary to make the best connections.

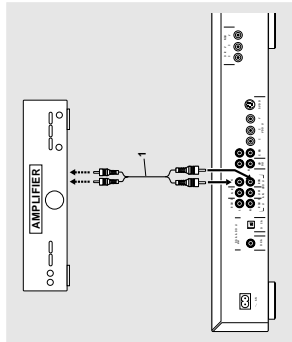
Caution:

- Do not connect the player's audio out jack to the phono in jack of your audio system.

Connecting to audio equipment - analog

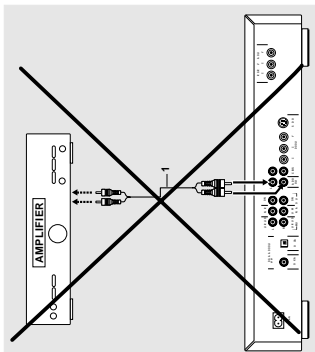
Connecting to an amplifier/receiver equipped with two channel analogue stereo

- Connect the audio Left and Right outputs for Front speaker connection (7) to the corresponding sockets on your amplifier, receiver or stereo system using the audio cable supplied.



Important:

- For the best sound quality with playback of audio CDs and stereo SACDs, always use the left and right connector of the high-quality stereo/Multi-channel audio output. The separate stereo output is intended only for connection to video equipment such as a TV set.

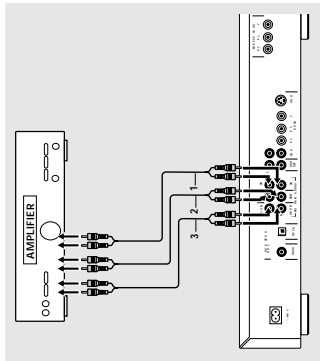


Connecting to a Multi-channel Audio/Video receiver with 6 connectors

The SACD player contains a multi-channel decoder. This enables playback of SACDs recorded in Multi-channel. You only need to select Multi-channel using the Sound Mode key.

- 1 Connect the audio Left and Right outputs for Front speaker connection (7) to the corresponding input sockets on your receiver using the audio cable supplied.
- 2 Connect the audio Left and Right outputs for Surround speaker connection (3) to the corresponding inputs on your receiver using an optional audio cable.
- 3 Subwoofer connection (2) to the corresponding inputs on your receiver using an optional audio cable.

Note
 - If the subwoofer is equipped with its own amplifier, the subwoofer connection should be connected directly to the subwoofer



Connecting to an amplifier/receiver equipped with Dolby Pro Logic

- 1 Connect the audio Left and Right outputs for front speaker connection (1) to the corresponding inputs on the Dolby Pro Logic Audio/Video amplifier/receiver using the audio cable supplied.
 - 2 Set Analogue Output to Dolby Surround-compatible in the 'Personal Preferences' menu.
- If you connect the player to a TV equipped with a Dolby Pro Logic decoder
- Connect the player to the TV as described in the section 'Connecting to a TV - Audio connections as above'.

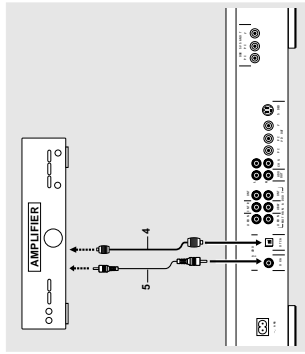
Connecting to audio equipment - digital

The digital output of the SACD player does not provide PCM (Pulse Code Modulation) signals. If your amplifier/receiver can only decode PCM and not multi-channel signals such as Dolby Digital, do not connect your SACD player using the digital input. This could damage your amplifier and/or speakers.

Connecting to an Audio/Video receiver with multi-channel decoder (Dolby Digital, MPEG 2 and DTS)

Digital Multi-channel sound (not for SACD)
 For this you need a multi-channel AV receiver that supports one or more of the DVD audio formats supported by your SACD player (MPEG 2, Dolby Digital and DTS). Check the receiver manual and the logos on front of the receiver.

- 1 Connect the player's digital audio output (optical 4 or coaxial 5) to the corresponding input on the receiver. Use an optional digital (optical 4 or coaxial 5) audio cable.



English

English

- Notes**
- If the audio format of the digital output does not match the capabilities of your receiver, the receiver will produce a strong distorted sound the audio format of the DVD disc in play is displayed in the Status Window when changing the audio format
 - 6 Channel Digital Surround Sound via digital connection can only be obtained if your receiver is equipped with a Digital Multi-channel decoder. If your receiver does not contain a decoder, you can make the analogue connections as described in the section 'Connecting to a Multi-channel Audio/Video receiver with 6 connectors' to obtain 6 Channel Digital Surround Sound
 - SACD Multi-channel sound cannot be obtained via digital connection

Connecting to a TV

- Notes**
- Depending on your TV there are various ways to connect the player. These are shown in the illustration below
 - Please refer to your TV VCR and any other User Manual(s) as necessary to make the optimal connections
 - Do not connect your SACD player via your VCR because the video quality could be distorted by the copy protection system

Component Video (Pr/Cr/Pb/Cb Y) connection

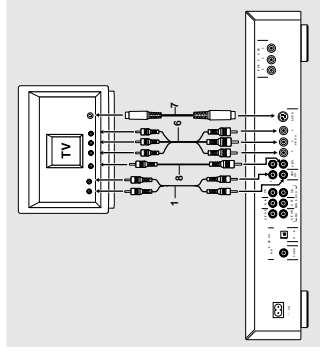
- 1 Connect the Pr/Cr/Pb/Cb Y outputs on the DVD player to the corresponding inputs on the TV using optional Pr/Cr/Pb/Cb Y cable (6).
- 2 Connect the Left and Right audio outputs to the audio left/right inputs on the TV (1).

S-Video (Y/C) connection

- 1 Connect the S-VIDEO OUT (Y/C) socket (7) to the corresponding socket on the TV using an optional S-Video cable.
- 2 If you wish to receive the sound via your TV, connect the STEREO OUT Left and Right output sockets (1) to the corresponding sockets on the TV using the audio cable supplied.

Video CVBS connection

- 1 Connect the VIDEO OUT (CVBS) socket (8) to the corresponding socket on the TV using the video cable supplied.
- 2 If you wish to receive the sound via your TV, connect the STEREO OUT Left and Right output sockets (1) to the corresponding sockets on the TV using the audio cable supplied.

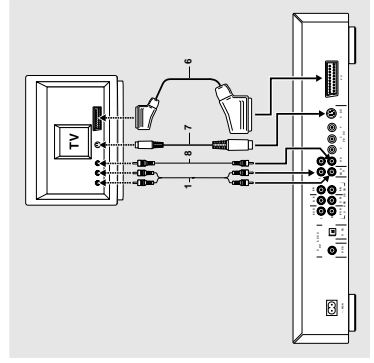


SCART connection

- 1 Connect the SCART to the corresponding connector on the TV using the SCART cable supplied (6).
- 2 If your TV is not equipped with a SCART, you can select one of the following alternative connections:

Video CVBS connection

- 1 Connect the VIDEO OUT (CVBS) socket (8) to the corresponding socket on the TV using the video cable supplied.
- 2 If you wish to receive the sound via your TV, connect the STEREO OUT Left and Right output sockets (1) to the corresponding sockets on the TV using the audio cable supplied.



6 Channel settings

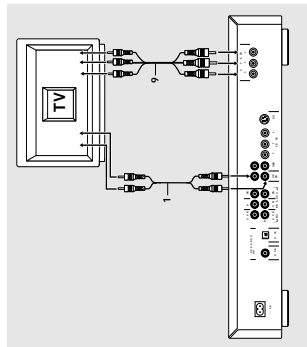
- Front speaker
- L (Large): When the front speakers can reproduce low frequency signals below 120Hz
- S (Small): When the front speakers cannot produce low frequency signals below 120Hz
- Center Speaker
- L (Large): When the center speaker can reproduce low frequency signals below 120Hz
- S (Small): When the center speaker cannot produce low frequency signals below 120Hz
- Off: When the center speaker is not connected
- Surround speakers
- L (Large): When the surround speakers can reproduce low frequency signals below 120Hz
- S (Small): When the surround speakers cannot produce low frequency signals below 120Hz
- Off: When the surround speakers are not connected

Progressive Scan (P/Cr P/b/CbY)

- Progressive Scan provides a flicker free image with the highest effect on film based sources.
- Progressive Scan conversion is capable of 3:2 pulldown for film based content.
- It can double the vertical resolution of the picture to 525 lines every time the picture is refreshed (1/60th of a second).
- It greatly improves the quality of moving images, especially during Slow Motion mode.
- To enjoy the full quality potential offered by this Philips Progressive Scan DVD/SACD player, a Progressive TV is required.
- DCDI by Faroudja computes and tracks the angles of edges and uses this information to optimally fill in the missing pixels.

- 1 Connect the P/Cr P/b/CbY PROGRESSIVE SCAN OUTPUTS on the SACD player to the PROGRESSIVE SCAN INPUTS on the TV using an optional P/Cr P/b/CbY cable (9).
- 2 Connect the Left and Right AUDIO OUTPUTS of the SACD player to the audio left/right inputs on the TV (1).

Note:
 - When a PAL DVD is played, there may not be any output from the Progressive Scan due to copy protection.

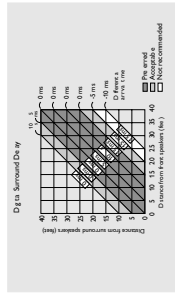


Delay times

The SACD player is set to reproduce correctly synchronized Digital Surround Sound in a listening area where the surround speakers are about 150cm nearer to the listening position than the front speakers, and the center speaker is in line with the front speakers. To adjust for other listening area arrangements, adapt delay times according to the following:

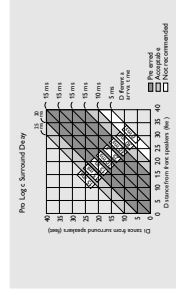
Digital Surround

Measure the distances in centimeters from the front speaker plane and from the surround speaker plane to the listening positioning plane.
 Subtract the surround distance from the front distance and divide by 30. The result is the required Surround Channel delay time in milliseconds.
 If the center speaker is on the front speaker plane, no center speaker delay is needed. If, however, it is nearer to the listening position, measure the distance in centimeters between the front and center speaker planes, and divide by 30. The result is the required Center Channel delay time in milliseconds.



Dolby Pro Logic

If the delay times for Surround Channel and Center Channel are set for Digital Surround mode, the delay times for Dolby Pro Logic mode will automatically be calculated and set.



English

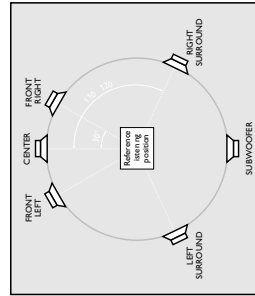
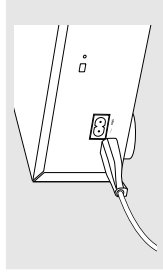
English

Connecting the power supply

- 1 Check if the power voltage as shown on the type plate (on the back of the player) corresponds to your local power voltage.
- 2 Plug the female end of the power cable supplied into the power connector POWER SUPPLY on the rear of the player.
- 3 Plug the male end of the cord into an AC outlet.

Note:
 - When the player is in the STANDBY or OFF position, it will still consume some power.
 - If you wish to disconnect your player completely from the power supply, pull the plug from the AC Outlet.

Caution:
 Only qualified service personnel should remove the cover or attempt to service this device.



- Subwoofer
 - On: When you connect a subwoofer
 - Off: When a subwoofer is not connected
- * Notes:
 - You can use your TV as center speaker. Please refer to your TV User Manual to check if your TV can reproduce low frequency signals below 120Hz. If not, set Center Speaker to S (small)
 - When Center Speaker is selected in the Personal Preferences menu, the sound from both center speaker and audio L/R will contain the center speaker audio.

English

Operation

General Explanation

About this manual
 This manual gives the basic instructions for operating the SACD player.
 Some DVDs require specific operation or allow only limited operation during playback. When this occurs, the symbol \times appears on the TV screen, indicating that the operation is not permitted by the player or the disc.

Remote control operation

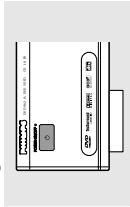
- Unless stated all operations can be performed by the remote control. Always point the remote control directly at the player, making sure there are no obstructions between the remote and the player.
- Corresponding keys on the front panel of the player can also be used.

Menu bar operation

A number of operations can also be performed using the menu bar on the screen. The menu bar can be activated by pressing any of the following keys on the remote control: SYSTEM MENU, TC, Angle, Audio Language, Subtitle Language, Zoom and FTS.

- The following functions can be operated via the menu bar:
- Personal Preferences
 - Track/title selection
 - Chapter selection
 - Audio language selection
 - Subtitle language selection
 - Angle selection
 - Zoom
 - Video FTS selection
 - Sound mode
 - Picture-by-picture
 - Slow motion
 - Fast motion
 - Time search
- The various items can be selected using the \blacktriangleleft (left/right) cursor keys or by pressing the relevant keys on the remote control.
 - By pressing SYSTEM MENU, the menu bar can be removed from the screen.
 - When selecting an item in the menu bar, the selected item will be highlighted and the cursor keys (on the remote control) for operating the function are displayed below the icon.
 - $<$ or $>$ indicates that more items are available at the left/right hand side of the menu bar. Press \blacktriangleleft (left/right) cursor) to select these items.

Switching on



- 1 If necessary, switch on the TV and select the video input for your SACD player.
- 2 Press ON/OFF on the player front panel or STANDBY on the remote control.
 - \rightarrow The player display will light up.
 - \rightarrow If the player is connected to the TV, the start-up screen appears.



English

English

Personal Preferences

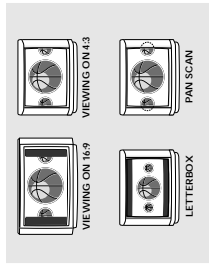
In this mode you can set your personal preferences for a number of player features. Some settings must always be selected. This depends on the type of audio equipment connected. For this see the section 'Connecting to audio equipment'.

General operation:

- 1 Press SYSTEM MENU on the remote control.
- 2 Select \odot in the menu bar and press \blacktriangledown (down cursor).
 - \rightarrow The Personal Preferences menu appears.
- Use the \blacktriangleleft \blacktriangleright (left/right/up/down) keys to toggle through the menus, submenus and submenu options.
 - \rightarrow When a menu item is selected, the cursor keys (on the remote control) to operate the item are displayed next to the item.
- Press OK to confirm and return to the main menu.
- The following items can be adapted:

Picture

- TV Shape
 - If you have a wide screen (16:9) TV, select 16:9. If you have a regular (4:3) TV, select 4:3.
- Letterbox for a wide-screen picture with black bars top and bottom, or Pan Scan for a full-height picture with the sides trimmed. If a disc supports the format, the picture will be shown accordingly.



- Black level shift (NTSC only)
 Select ON for adapting the colour dynamics to obtain richer contrasts.

- Video shift

Use this setting to personalize the position of the picture on your TV by shifting it to the left or right. Use \blacktriangleleft (left/right) keys to shift and OK to exit.

- DCC (On Pr/Cr: Pb/Cb Y Progressive Scan Out only)

Digital Crystal Clear (DCC) allow you to fine-tune the following parameters on the progressive scan component output.

- Gamma - allows you to adjust the intensity of the picture non-linearly. A positive value will allow you to bring out low level detail on dark scene while a negative value will emphasize on contrast.
- Sharpness - allows you to adjust sharpness of the picture.
- Chroma Delay - is where the Chroma (color) and luma (brightness) signal is out of synchrontize. This allows you to adjust the advance delay of the chroma signal to yield a perfectly clear picture.
- DCDI (New Directional Correlation Deinterlacing) - it computes and tracks the angle of edge to fill in the missing pixel on TV screen. Switching DCDI ON will optimize the image quality significantly especially during the slow motion playback.



Sound

- Digital and Analog output Settings for DVD/VCD

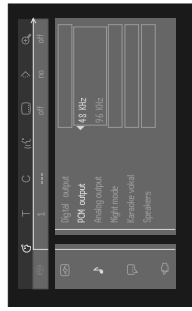
Connected audio system	Digital out	Analog out
Amp filter of TV with two channel analog stereo	OFF	Stereo or 3D Sound
Amp filter of TV with two channel digital stereo	OFF	Dolby Surround
Amp filter with two channel A/V receiver with multi-channel decoder (Dolby Digital, MPEG, DTS)	PCM only	Stereo or 3D Sound Stereo, 3D Sound Dolby Surround Multi-channel
Multi-channel A/V receiver with 6-on connectors	OFF	Multi-channel

- Digital output

Factory setting is ALL. If you connect equipment with a digital input change the setting to ALL or PCM (Pulse Code Modulation - see below) only. Both coaxial and optical outputs are then switched on (not for SACD). If your equipment doesn't include a digital multichannel decoder, set the digital output to PCM. Both coaxial and optical outputs are then switched on. See Digital and Analog output Settings for DVD/VCD above.

- PCM output

PCM (Pulse Code Modulation) is a method of encoding audio information in a digital format. PCM samples analog audio information at a fixed sampling rate and measures the amplitude (volume) of the audio signal with a precision determined by the sampling size. Audio is encoded on CDs in the PCM format with a sampling frequency of 44.1kHz and a 16-bit sample size. A 16-bit sample size can contain 65,536 possible levels of sound volume which corresponds to a dynamic range of 96dB. A DVD can be encoded in PCM with a sampling frequency of up to 96kHz and a 24-bit sample size.



The PCM setting on your player allows you to select the PCM sample-rate frequency of the analog and digital outputs. You can set it to either 48kHz or 96kHz. Factory setting is 48kHz. Note when using digital outputs:

- If you have a digital amplifier with a PCM input of 96kHz connected via digital output, choose this frequency in the menu. Do not choose 48kHz if your amplifier has a digital PCM input of 48kHz since then a strong distorted sound may be produced.
- Due to copy-protection the digital outputs may be muted when 96kHz is selected, while the analog outputs will remain active. Switching the PCM output back to 48kHz will reactivate the digital output.

- Karaoke vocal

Put this setting to ON only when a multi-channel karaoke DVD is being played. The karaoke channels on the disc will then be mixed into a normal stereo sound.

Language

Select the required Menu Audio and Subtitle language. Audio language - The sound will be in the language you select, provided it is available on the disc. In play if not speech will revert to the first spoken language on the disc. You can choose from 16 different languages. Subtitle language - The subtitles will be in the language you select, provided it is available on the disc. In play if not, subtitles will revert to the first subtitle language on the disc. You can choose from 16 different languages. Menu language - The On-Screen Menus will be displayed in the language you select. You can choose from 8 different languages.

Audio language and Subtitle language can also be adapted via the Menu bar on the screen.

Features

- Access Control (DVD/VCD only)

Access Control contains the following features:
Disc Lock - When Disc Lock is set to ON, a 4-digit PIN code must be entered in order to play discs.
Parental control - Allows the conditional presentation of DVD discs containing Parental Control information.

- Status Window

Displays the current status of the player and appears with the menu bar. When disc playback is stopped, it is displayed with the Temporary Feedback field in the default screen. See On-Screen Display information.
The factory setting is ON. Select OFF to suppress display of the Status Window.

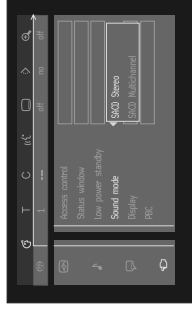


- Low Power Standby

If this setting is set to ON, the player will go in low-power standby when the Stand-by key (remote control) is pressed. While in low-power standby, scalar AUX-I/O will no longer be available.

- Sound Mode (SACD only)

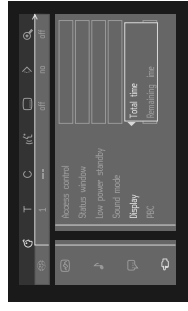
Selection of default SACD Sound Mode: Stereo or Multi-channel. Sound Mode setting can be changed during playback with the Sound Mode button on the remote control. When selecting Multi-channel make sure your sound mode is set up for Multi-channel reproduction.



Display information

- Display

Elapsed time - during playback the elapsed playing time will be displayed.
Remaining time - during playback the remaining playing time will be displayed.
Display setting can be changed during playback using the DISPLAY key on the remote control.



- Player Display Dim (via remote control)

This feature allows you to set the front panel display brightness. By repeatedly pressing the DIM key on the remote control you can select from 3 different brightness levels.

- PBC (Playback Control)

This feature allows you to disable or enable the PBC (Playback Control) menu of VCD discs. See under Special VCD features: Factory setting is ON.

- Analogue output

Select Digital and Analog output settings for DVD/VCD. Select Stereo, Dolby Surround-compatible, 3D, Sound or Multi-channel. Factory setting is Multi-channel. Multi-channel: Select this setting when using a multi-channel audio/video receiver with six inputs. In this mode, the player will perform Dolby Digital 5.1-channel decoding when applicable, and Dolby Pro Logic decoding on DVD-Video and Video-CD discs with 2-channel sound tracks. No Dolby Pro Logic decoding is done with Super Audio CD discs.

Dolby Surround-compatible: Select this setting when using an equipment with a Dolby Surround-compatible Pro Logic decoder. In this setting, the 5.1 audio channels (Dolby Digital, MPEG-2) are downmixed to a Dolby Surround-compatible 2-channel output.

3D-Sound: In a setup without rear speakers (analog stereo output), 3D Sound remixes the six channels of digital surround into a two-speaker output while retaining all of the original audio information. The result is the listening sensation of being surrounded by multiple speakers.

During DVD or Video-CD playback these values can be selected directly with the SOUND MODE key.

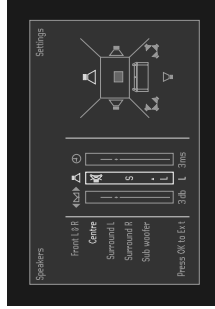
- Night Mode

Optimizes the dynamics of the sound for low-volume playback. This setting can only be used with discs that support the Night Mode feature.

- Speaker settings

Allows you to select speaker settings, volume balance and delay time, and to test the speaker settings.

Speaker settings are only active on the Multi-Channel Audio Out outputs for both DVD and SACD. Speaker settings will not be used during playback in the SACD Stereo mode.

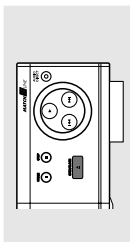


Notes:

- Volume level setting is not applicable for SACD playback.
- To preserve highest sound quality for playback of multichannel SACD, bass filter for speakers will only be activated when ALL speakers are set to small in speaker setting.

Operation - Audio (Super Audio CD and CD)

Loading an SACD or Audio disc



- 1 Press ▲ OPEN/CLOSE on the front of the player to open the disc tray.
 - 2 Load your chosen disc in the tray, label side up. Make sure it is properly inserted in the correct recess.
 - 3 Gently push the tray or press ▲ OPEN/CLOSE, to close the tray.
→ REPEAT will appear on the player display and in the status window (if TV is on).
- If a Super Audio CD is inserted, the Sound Modes available on the disc will be shown on the player display. The current Sound Mode is indicated on both player display (with a bullet) and screen (if TV is on).

Playing an SACD or Audio disc



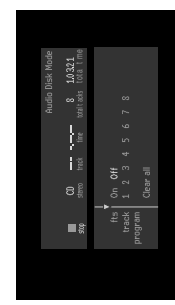
- Press ► PLAY to start playback.
→ During playback of Super Audio CDs and audio discs, all functions can be operated via the keys on the remote control and the front player.
→ If the TV is on, the Super Audio CD or the Audio CD screen will appear.
→ During play, the current track number and its elapsed playing time will be shown on the player display (on the screen). If a default Display Time setting (Total Time/Remaining Time) is made in the Personal Preferences menu, the relevant time will be indicated during playback. With the DISPLAY key on the remote control other time indications can be selected.
→ When playing a Super Audio CD, the currently selected Sound Mode will be indicated on the display with a bullet.
→ At the beginning of each track, the number of front channels and surround channels will be displayed (e.g. 3/2). If a subwoofer channel is present, this will also be displayed (+1).



English

English

Storing a FTS program



- 1 Load a disc and stop playback.
- Shuffle**
Press SHUFFLE during playback.
→ The playing order of the tracks is changed.
→ To return to normal playback, press SHUFFLE again.
- Repeat track/disc**
→ REPEAT TRACK appears on the display.
→ To repeat the entire disc, press REPEAT a second time.
→ REPEAT appears on the display.
→ To exit Repeat mode, press REPEAT a third time.
- Repeat A-B**
To repeat a specific portion of a track:
Press REPEAT A-B at your chosen starting point.
→ A- appears on the player display.
Press REPEAT A-B again at your chosen end point.
→ A-B appears on the display and the sequence begins to play repeatedly.
→ To cancel the sequence and continue playback, press REPEAT A-B.

2 Use ▼ (down cursor) to go to the list of available tracks.
3 Use ◀ and ▶ (left/right cursor) to select tracks from the list.
→ To go directly to any track, enter the track number using the numerical keys (0-9).
→ The track numbers will be added to the list.
→ The number of tracks and the playing times of the programme will be shown on the TV screen and the player display.

When your FTS program is complete, press ► PLAY to start playing; the FTS program will be automatically memorized.

- Press FTS or use the ◀▶ (left/right cursor) to set FTS to ON or OFF.

Erasing a track from a FTS-program

- 1 Use ▼ (down cursor) to go to the list of selected tracks.
 - 2 Use ◀ and ▶ (left/right cursor) to select the track number you wish to erase; to go directly to any track, enter the track number using the numeric keys 0-9.
Press OK.
→ The track number will be erased from the list of selected tracks.
- Erasing the complete program**
Use ▼ (down cursor) to select CLEAR ALL and press OK.
→ The complete FTS Programme for the disc will be erased.

Scanning plays the first 10 seconds of each track on the disc.

- Press SCAN.
- To continue playback at your chosen track, press SCAN again or press ► PLAY.

FTS (Favourite Track Selection) - Audio CD only

- The FTS Programme allows you to store your favourite tracks for a particular disc in the player memory.
- Each FTS Programme can contain 20 tracks.
- Each time a FTS program is played it will be placed at top of the list. When the list is full and a new program is added, the last program on the list will be removed from the list.
- The selections can be called up and played at any time.
- FTS programming is not possible in Audio Direct mode.

Operation - Video (DVD and VCD)

Access control; disc lock (DVD and VCD)

- 1 Activating/deactivating the disc lock in the STOP mode, select ACCESS CONTROL in the features menu \rightarrow using the \blacktriangledown (down/up) keys and press \rightarrow (right cursor).
- 2 Enter a 4-digit code of your own choice.
- 3 Enter the code a second time.
- 4 Move to CHILD LOCK using the \blacktriangledown (down/up) keys



- 5 Move to \rightarrow (right cursor) key
- 6 Select \rightarrow using the \blacktriangledown (down/up) keys.
- 7 Press OK to confirm or \leftarrow (left cursor) to confirm and press \leftarrow (left cursor) again to exit the menu.
 - \rightarrow Now unauthorized discs will not be played unless the 4-digit code is entered.
- 8 Select \rightarrow to deactivate the Disc Lock

- Note: Confirmation of the 4-digit code is necessary when:
- The code is entered for the very first time (see above).
 - The code is changed (see Changing the 4-digit code).
 - The code is cancelled (see Changing the 4-digit code).
 - Both Disc Lock and Parental Control are switched Off and the code is requested.

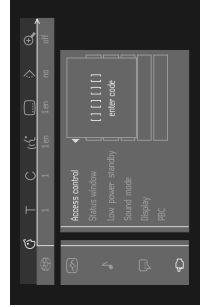
English

English

Access control; Parental control (DVD-Video only)

Movies on DVDs may contain scenes not suitable for children. Therefore, discs may contain Parental Control information which applies to the complete disc or to certain scenes on the disc. These scenes are rated from 1 to 8, and alternative, more suitable scenes are available on the disc. Ratings are country dependent. The Parental Control feature allows you to prevent discs from being played by your children or to have certain discs played with alternative scenes.

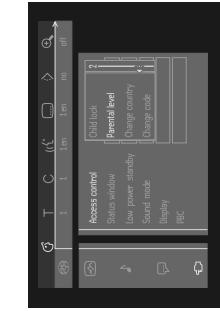
- 1 In STOP mode, select ACCESS CONTROL in the features menu using the \blacktriangledown (down/up) keys and press \rightarrow (right cursor).



- 2 Enter your 4-digit code. If necessary enter the code a second time.
- 3 Move to PARENTAL LEVEL using the \blacktriangledown (down/up) keys.
- 4 Move to Value Adjustment (1-8) using the \rightarrow (right cursor) key.
- 5 Then use the \blacktriangledown (down/up) keys or the numerical keys on the remote control to select a rating from 1 to 8 for the disc inserted.

Rating 0 (displayed as -) is not activated. The Disc will be played in full.

Ratings 1 (child safe) to 8 (adults only):
The disc contains scenes not suitable for children. If you set a rating for the player, all scenes with the same rating or lower will be played. Higher rated scenes will not be played unless an alternative is available on the disc. The alternative must have the same rating or a lower one. If no suitable alternative is found, playback will stop and the 4-digit code has to be entered.



- 6 Press OK or \leftarrow (left cursor) to confirm and press \leftarrow (left cursor) again to exit from the menu.

Country

- 1 In STOP mode, select ACCESS CONTROL in the features menu using the \blacktriangledown (down/up) keys and press \rightarrow (right cursor).
- 2 Enter the 4-digit code.
- 3 Move to CHANGE COUNTRY using the \blacktriangledown (down) key.
- 4 Press the \rightarrow (right) key.
- 5 Select a country using \blacktriangledown (down/up) cursor).
- 6 Press OK or \leftarrow (left cursor) to confirm and press \leftarrow (left cursor) again to exit from the menu.

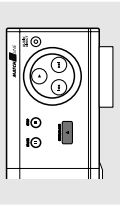
Changing the 4-digit code

- 1 In STOP mode, select ACCESS CONTROL in the features menu using the \blacktriangledown (down/up) keys and press \rightarrow (right cursor).
- 2 Enter the old code.
- 3 Move to CHANGE CODE using the \blacktriangledown (down) key.
- 4 Press the \rightarrow (right) key.
- 5 Enter the new 4-digit code.
- 6 Enter the code a second time and reconfirm by pressing OK.
- 7 Press \leftarrow (left cursor) to exit the menu.

If you forget your 4 digit code

- 1 Press \blacksquare STOP to exit the 'Child Protect' screen.
- 2 Select ACCESS CONTROL in the features menu using the \blacktriangledown (down/up) keys.
- 3 The 4-digit code can be cancelled by pressing \blacksquare STOP four times in the 'Access Control' dialog.
- 4 You can then enter a new code (twice) as described above (Changing the 4 digit code).

Loading DVDs or VCDs



- 1 Press **▲ OPEN/CLOSE** on the front of the player to open the disc tray.
- 2 Load your chosen disc in the tray, label side up. Make sure it is properly inserted in the correct recess.
- 3 Gently push the tray or press **▲ OPEN/CLOSE** to close the tray.

→ **REPEAT** will appear in the status window and on the player display and playback will start automatically.

Note
 - If **Disc Lock** is set to **ON** and the disc inserted is not authorized, the 4-digit code must be entered and/or the disc must be authorized (see **Access Control**).

Playing a DVD-video disc



Playing a title

- After inserting the disc, and closing the tray, playback starts automatically. The status window of the player display shows the type of disc loaded, as well as the disc's information and playing time.
- The disc may invite you to select an item from a menu. If the selections are numbered, press the appropriate numerical key 0-9; if not, use the **▼▲** (down/up/left/right) keys to highlight your selection, then press **OK**.
- The currently-playing title and chapter number will be displayed in the menu bar and the player display. The elapsed playing time will be indicated in the status window and on the player display.
- At the beginning of each title, the number of front channels and surround channels will be displayed (e.g. 3/2). If a subwoofer channel is present, this will also be displayed (+1).
- If the audio format (MPEG, Dolby Digital, etc.) of a title changes during play, this will be indicated on the display. If required, you can use the **SOUND MODE** key to select Stereo, Dolby Surround-compatible, 3D-Sound or Multi-channel reproduction. Play may stop at the end of the title; this can result in returning to menu.

English

English

General features

Note

- Unless stated, all operations described are based on remote control use. Some operations can be carried out using the menu bar on the screen.

Moving to another title/track

When a disc has more than one title or track (which you can see from both menu bar and the player display), you can move to another title as follows:

- Press **T.C** (title), then press **▶ NEXT** briefly during play to select the next title/track.
- Press **T.C** (title), then press **◀ PREVIOUS** briefly during play to return to the beginning of the current title/track. Press **◀ PREVIOUS** briefly again to move back to the previous title/track.
- To go directly to any title or track, press enter the track **T.C** (title), then enter the title number using the numeric keys 0-9.

Notes

- If the number has more than one digit, press the keys in rapid succession.

Moving to another chapter/index

When a title on a disc has more than one chapter or a track has more than one index (which you can see from the player display and on the menu bar), you can move to another chapter/index as follows:

- Press **▶ NEXT** briefly during play to select the next chapter/index.
- Press **◀ PREVIOUS** briefly during play to return to the beginning of the current chapter/index. Press **◀ PREVIOUS** briefly again to move back to the previous chapter/index.
- To go directly to any chapter or index, press **T.C** (chapter), then enter the chapter or index number using the numeric keys 0-9.

Notes

- If the number has more than one digit, press the keys in rapid succession.

Slow Motion

- Select **◀ S** (SLOW MOTION) in the menu bar.
- Use the **▼** (down) keys to enter the **SLOW MOTION** menu.
- Playback will pause.
- Use the **◀▶** (left/right) keys to select the required speed: -1, -1/2, -1/4 or -1/8 (backward), or +1/8, +1/4, +1/2 or +1 (forward).
- Select **1** to play the disc at normal speed again.
- If **1** is pressed, the speed will be set to zero (**PAUSE**).
- To exit slow motion mode, press **▶ PLAY** and **▲** (up cursor).

You can also select Slow motion speeds by using the **▶** key on the remote control.

Still Picture and Step Frame

- Select **4|▶** (STEP BY STEP) in the menu bar.
- Use the **▼** (down) key to enter the step by step menu.
- Playback will pause.
- Use the **◀▶** (left/right) to select the previous or next picture frame.
- To exit step by step playback, press **▶** (PLAY). You can also step forward by pressing **■ PAUSE** repeatedly on the remote control.

Search

- Select **🔍** (FAST MOTION) in the menu bar.
- Use the **▼** (down) keys to enter the **FAST MOTION** menu.
- Use the **◀▶** (left/right) keys to select the required speed: -32, -8 or -4 (backward), or +4, +8, +32 (forward).
- Select **1** to play the disc at normal speed again.
- To exit **FAST MOTION** mode, press **▶ PLAY** and then **▲** (up cursor).
- To search forward or backward through different speeds, you can also hold down **◀** or **▶**.

Repeat

- **DVD-Video Discs** - Repeat chapter/title/disc
 → Repeat **CHAPTER** appears on the player display.
 → Repeat the current title, press **REPEAT** a second time.
 → Repeat **TITLE** appears on the display.
 → Repeat the entire disc, press **REPEAT** a third time.
 → Repeat **ALL** appears on the display.
- To exit Repeat mode, press **REPEAT** a fourth time.
- **Video CDs**
 Repeat track/disc
 → Repeat the current track, press **REPEAT**.
 → Repeat **TRACK** appears on the player display.
 → Repeat the entire disc, press **REPEAT** a second time.
 → Repeat appears on the display and the TV screen.
 → To exit Repeat mode, press **REPEAT** a third time.

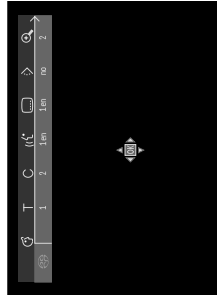
English

English

Zoom

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

- Select **Z** (ZOOM) in the menu bar.
- Press **▲** (down/up) keys to activate the ZOOM function and select the required zoom factor: 1.33 or 2 or 4.
- Playback will pause.
- The selected zoom factor appears below the Zoom icon in the menu bar, and Press OK to pan appears below the menu bar.
- The picture will change accordingly.
- Press OK to confirm the selection.
- The panning icons appear on the screen.
- Use the **◀▶** (left/right/down/up) keys to pan across the screen.
- When OK is pressed only the zoomed picture will be shown on the screen.
- If you wish to zoom at any moment, press **Z**, ZOOM and select the required zoom factor as described above.
- To exit ZOOM mode:
 - Press **▶** PLAY to resume playback.

**Repeat A-B**

To repeat a specific portion of a title:

- Press REPEAT A-B at your chosen starting point.
- **A** appears briefly on the screen.
- Press REPEAT A-B again at your chosen end point.
- **▶** REPEAT A-B appears briefly on the display, and the repeat sequence begins.
- To cancel the sequence and continue playback, press REPEAT A-B.

Scan

Scanning plays the first 10 seconds of each chapter/track on the disc.

- Press SCAN.
- To continue playback at your chosen chapter/track, press SCAN again or press **▶** PLAY.

Shuffle

Video CDs

This shuffles the playing order of chapters within a title, if the title has more than one chapter.

- Press SHUFFLE during playback.
- The shuffle icon will appear on the screen for about 2 seconds.
- To return to normal playback, press SHUFFLE again.

Video CDs

This feature shuffles the playing order of tracks, if the disc has more than one track.

- Press SHUFFLE during playback.
- The shuffle icon will appear on the screen for about 2 seconds.
- To return to normal playback, press SHUFFLE again.

Time search

The Time Search function allows you to start playing at any chosen time on the disc.

- Select **T** (TIME SEARCH) in the menu bar.
- Press **▼** (down cursor).
- Playback will pause.
- A time edit box appears on the screen, showing the elapsed playing time of the current disc.
- Use the numeric keys to enter the required start time.
- Enter hours, minutes and seconds from left to right in the box.
- Each time an item has been entered, the next item will be highlighted.
- Press OK to confirm the start time.
- The time edit box will disappear and playback starts from the selected time on the disc.

**FTS-Video**

- The FTS-Video function allows you to store your favourite titles and chapters (DVD) and favourite tracks and indexes (VCD) for a particular disc in the player memory.
- FTS programme can contain 20 items (titles, chapters etc.).
- A programmed FTS will be placed on top of the list when playback is activated. When the list is full, a new programme will replace the last programme on the list.
- The programme can be selected and played at any time.

Storing a FTS-Video Programme

- While playback is stopped, select VIDEO FTS **✓** in the menu bar.
- Press **▼** (down cursor) to open the menu.
- Press **▲** (left/right) keys to select ON or OFF.
- Press **▲** (up) key or SYSTEM MENU to exit the VIDEO FTS **✓** menu.

Storing titles/tracks

- Press **▼** (down cursor) key to select TITLE.
- Use **◀▶** (left/right) keys to select the required title.
- Press OK if you wish to store the entire title.
- The title number will be added to the list of selections.

Storing chapters

- Press **▼** (down cursor) key on the selected title number.
- The title number will be marked and the highlight moves to the first available chapter number for this title.
- Use **◀▶** (left/right) keys to select the required chapter number.
- Press OK to confirm the selection.
- The title/chapter selection will be added to the list of selections.
- Press OK or SYSTEM MENU to exit the VIDEO FTS **✓** menu.

Erasing an FTS-Video Programme

- While playback is stopped, select VIDEO FTS **✓** in the menu bar.
- Use **▼** (down cursor) key to select PROGRAM.
- Use **◀▶** (left/right) keys to select the required number.
- Press OK to erase the selection.
- Press **▲** (up) key or SYSTEM MENU to exit the VIDEO FTS **✓** menu.

Erasing all selections

- While playback is stopped, select VIDEO FTS **✓** in the menu bar.
- Use **▼** (down cursor) key to select CLEAR ALL.
- Press OK.
- All selections will be erased.
- Press **▲** (up) key or SYSTEM MENU to exit the VIDEO FTS **✓** menu.

Switch FTS Video ON or OFF

- Select VIDEO FTS **✓** in the menu bar and press **▼** (down cursor) key.
- The video FTS menu appears.
- Press **◀▶** (left/right) keys to select ON or OFF.
- Press **▲** (up) key or SYSTEM MENU to exit the VIDEO FTS **✓** menu.

You can also switch FTS Video ON or OFF by using the FTS button on the remote control.



Special DVD-features


Checking the contents of DVD/Video discs:

Menus
DVDs may contain menus to navigate the disc and access special features. To use the menu, press the appropriate numerical key or use the **▶▶▶▶▶** (down/up/left/right) keys to highlight your selection, then press OK.

Title menu


- Press DISC MENU.
- If the current title has a menu, the menu will appear on the screen. Otherwise, the disc menu will be displayed.
- The menu can list camera angles, spoken language and subtitle options, and chapters for the title.
- To remove the title menu, press DISC MENU again.
- **Menu Disc**
Press T-C followed by DISC MENU.
- The disc menu is displayed.
- To remove the disc menu, press DISC MENU again.

Camera Angle

- If the disc contains sequences recorded from different camera angles, the angle icon  appears showing the number of available angles and the angle being shown currently. You can then change the camera angle if you wish.
- Use the **▶▶▶▶▶** (down/up) keys to select the required angle.
- To go to any angle directly, enter the angle number using the numerical keys 0-9.
- After a while, playback changes to the selected angle. The angle icon remains displayed until multiple angles are no longer available.



Changing the audio language

- Select  (AUDIO) in the menu bar.
- Press AUDIO or **▶▶▶▶▶** (down/up) keys repeatedly to see the different languages.
- You can enter the required language number directly using the numerical keys 0-9.



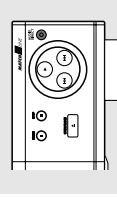
English

English

Enhanced use

Audio Direct Mode

- Audio Direct feature can be activated or deactivated by pressing the AUDIO DIRECT button on front of the player.



This feature will minimise any interaction between the video and audio circuitry thereby allowing maximum audio quality produced from the player.

- 1 Press AUDIO DIRECT button on front of the player.
→ Video section of the SACD player will be switched off and pictures will disappear on the TV screen.
- 2 Press AUDIO DIRECT button again.
→ Pictures will appear on the TV screen.
- The Audio Direct cannot be activated when playing a video disc (e.g. DVD/VIDEO).
- Audio Direct mode will be deactivated whenever the player is switched to standby or off.

When AUDIO DIRECT is switched to ON:

- OSD related keys are disable (e.g. SYSTEM MENU, TITLE, CHAPTER, etc.)
- If a video disc is inserted into the player, audio direct mode will be automatically deactivated and picture will be displayed on the TV screen.

Note

- It is recommended that the Audio Direct mode is turned off before you play any video disc.
- The player will react similar to a CD player. Thus for audio discs (e.g. CDDA SACD) it is possible use **▶▶▶▶▶** NEXT / **◀◀◀◀◀** PREVIOUS keys for track selection.

Cleaning Discs

Some problems occur because the disc inside the player is dirty. To avoid these problems clean your discs regularly in the following way:

- When a disc becomes dirty clean it with a cleaning cloth. Wipe the disc from the centre out, in a straight line.



Caution:

- Do not use solvents such as benzine, thinner, commercially available cleaners, or anti-static spray intended for analog discs.

Diagnostic program

If the player is still faulty you can start the Diagnostic Program in the player.

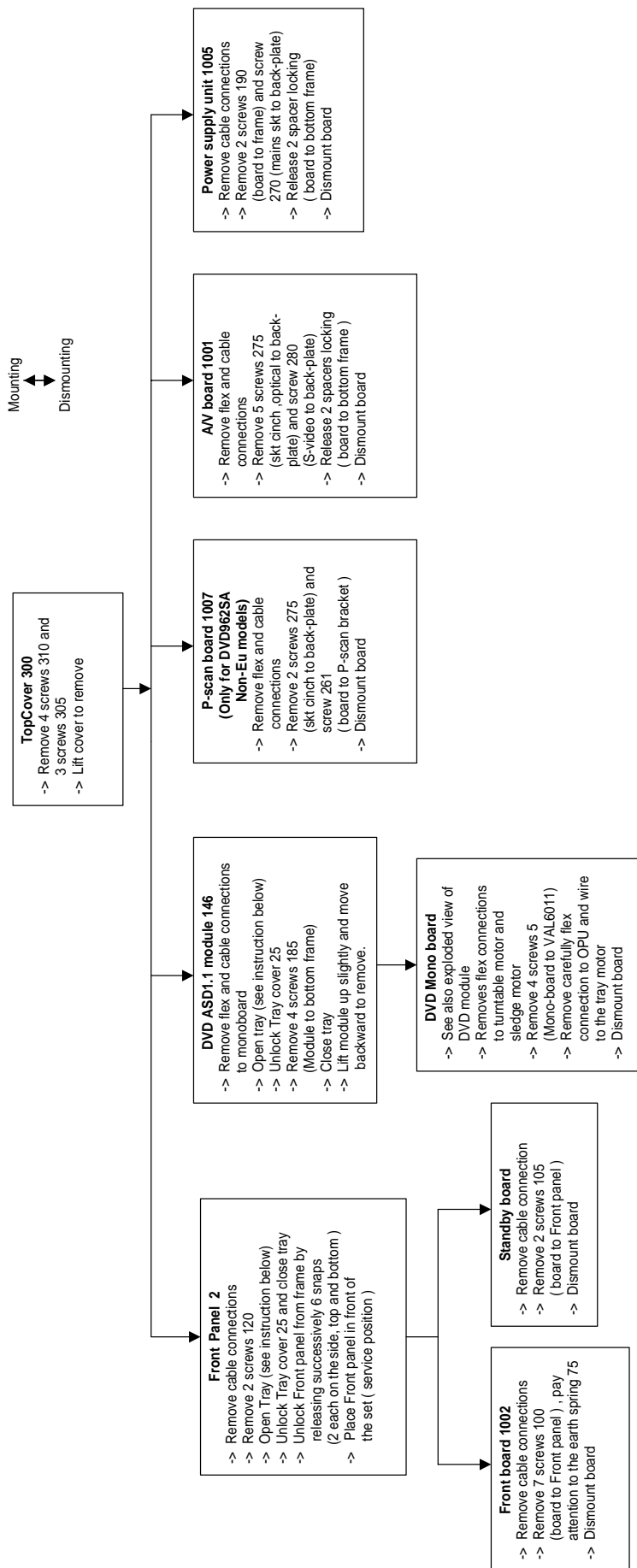
You can operate the Diagnosis Program by following the step-by-step instructions below.

Instructions

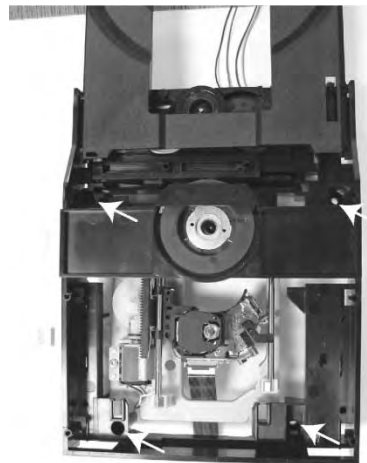
- 1 Switch the player OFF with the ON/OFF button.
- 2 Press the **▶** OPEN/CLOSE and **II** button simultaneously and keep them pressed while you turn the player ON.
→ On the display the message 'BUSY' appears together with a counter that counts down as the test is running.
→ After a few minutes, the message on the local display changes from 'BUSY' to 'FAIL' or to 'PASS'.
→ If the message 'FAIL' appears on the display there is apparently a failure in your player and your player should be repaired.
- 3 Consult your dealer or the Philips Customer Care Centre for the nearest Service Repair Shop in your country. The phone number is given in your warranty booklet.
- 4 If the message 'PASS' appears on the display there is apparently no failure in your player. In this case the failure can be caused by incorrect interpretation of the operating instructions, the use of a wrong disc, or the fact the your player is incorrectly connected. In this case, you should consult your dealer or the Philips Customer Care Centre for further assistance in solving the problem.
- 5 If the problem remains, return to point 3 of this instruction to find the nearest repair shop.
- 6 Switch the player OFF with the ON/OFF button to leave the diagnostic program.

4. Mechanical- and Dismantling Instructions

Dismantling Instructions



DISMANTLING INSTRUCTIONS – DVD962SA / SACD900
See exploded view for item numbers



Remove 4 screws to remove loader.



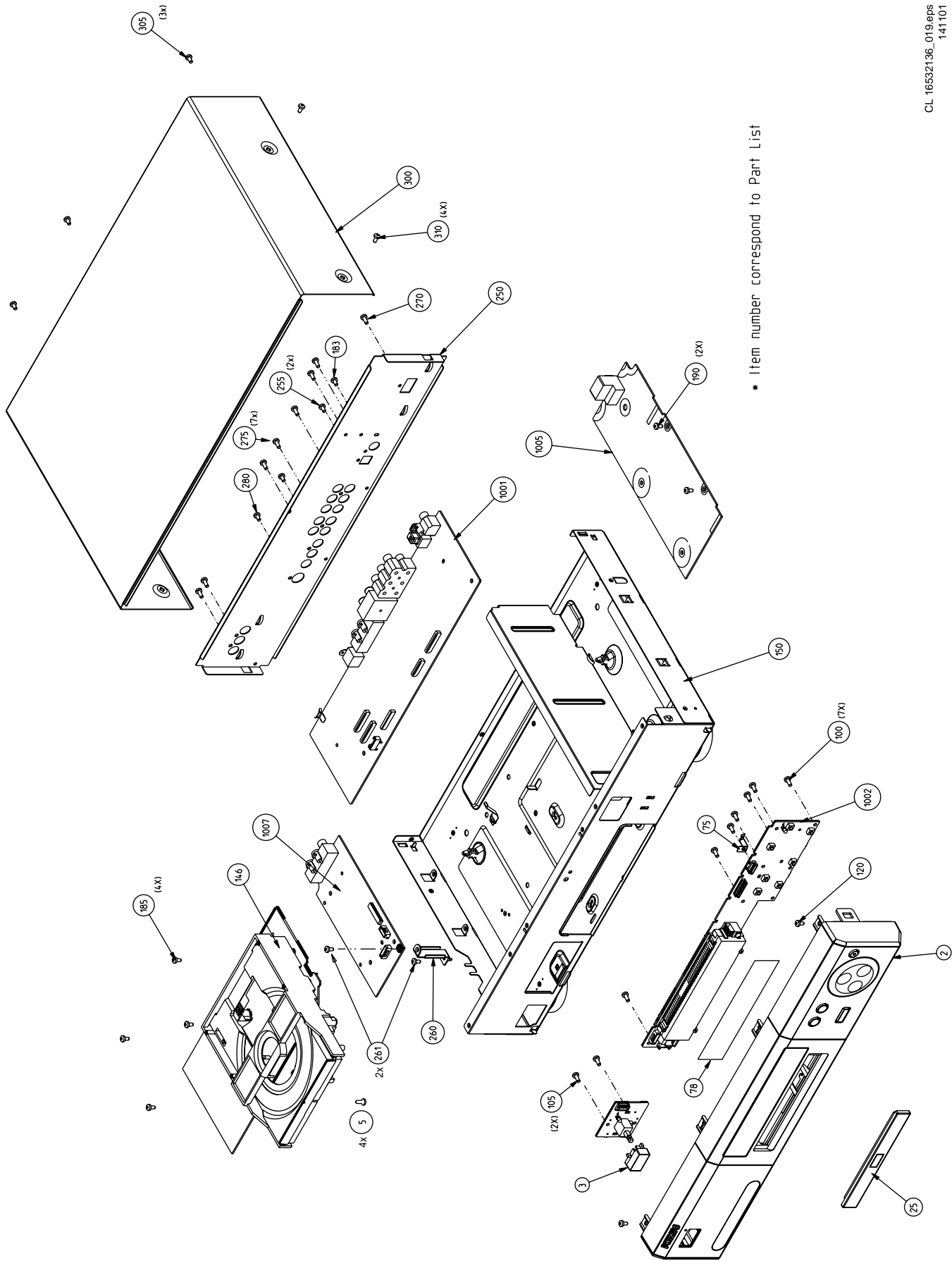
When a disc is loaded, unlock the tray by pushing the slide inwards with a screwdriver and pull tray outwards.



Manually opening of tray

When it is not possible to open the tray with the EJECT button, the tray can manually be opened.
When no disc is loaded, unlock the tray by moving the slide from left to right and pull tray outwards.

Exploded View



* Item number correspond to Part List

5. Diagnostic Software Descriptions and Troubleshooting

5.1 Dealerscript

5.1.2 Contents of Dealer Script

5.1.1 Purpose of Dealer Script

The dealer script can give a diagnosis on a standalone DVD player; no other equipment is needed to perform a number of hardware tests to check if the DVD player is faulty. The diagnosis is simply a "error" or "pass" message; no indication is given of faulty hardware modules. Only tests within the scope of the diagnostic software will be executed hence only faults within this scope can be detected.

The dealer script executes all diagnostic nuclei that do not need any user interaction and are meaningful on a standalone DVD player.

The nuclei called in the dealer script are the following (the number after each nucleus name corresponds with the number being on the local display when the nucleus is executed during the dealer script):

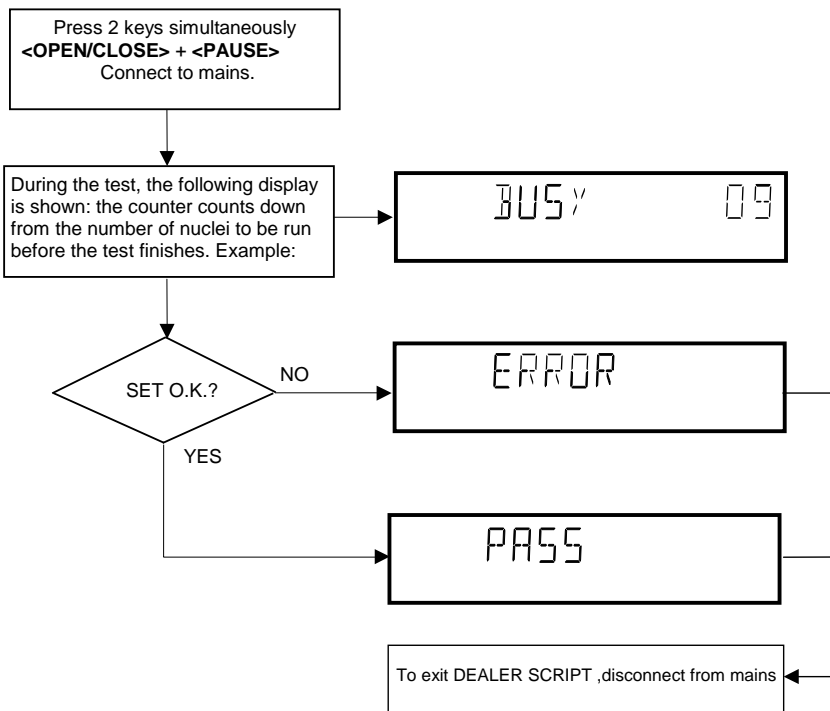
Nucleus

Display Countdown	Nucleus Number	Nucleus Name	Description
9	6	PapChksFl	Calculate and verify checksum of FLASH memory
8	12	PapI2cDisp	Checks the I2C interface with the slave processor on the display board
7	13	PapS2bEcho	Checks the I2C interface to the basic engine
6	11	PapI2cNvram	Checks the I2C interface with the NVRAM
5	15	PapNvramWrR	Pattern test of all locations in the NVRAM
4	16	CompSdramWrR	Pattern test of all locations in the SDRAM(s)
3	63a	FURORE-SdramWrRLow	Check on the Furore Sdram interconnection and write-read test
2	63b	FURORE-SdramWrRHigh	
1	66a	DAC-I2C	Check the I2C communication with the IO expander and the audio DAC on the AV board

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Figure 5-1

Dealer Script



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Figure 5-2

5.2 Player Script

5.2.1 Purpose of Player Script

The Player script will give the opportunity to perform a test that will determine which of the DVD player's modules are faulty, to read the error log and error bits and to perform an endurance loop test. To successfully perform the tests, the DVD player must be connected to a tv set to check the output of a number of nuclei. For DVDv2b a multi-channel amplifier, a set of 6 speakers and an external video source are necessary to test. To be able to check results of certain nuclei, the player script expects some interaction of the user (i.e. to approve a test picture or a test sound). Some nuclei (e.g. nuclei that test functionality of the Basic Engine module) require that the DVD player itself is opened, to enable the user to observe moving parts and approve their movement visually. Only tests within the scope of the diagnostic software will be executed hence only faults within this scope can be detected.

5.2.2 Contents of Player Script

The player script contains all nuclei that are useful on a DVD player that is connected to a tv-set and help to determine which module of the DVD player is faulty, as well as to read out the contents of the error logs.

5.2.3 Structure of Player Script

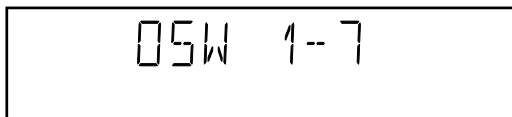
The player script consists of a set of nuclei testing the three hardware modules in the DVD player: the Display PWB, the Digital PWB and the Basic Engine.

Nuclei run by the player test need some user interaction; in the next paragraph this interaction is described. The player test is done in two phases:

1. Interactive tests: this part of the player test depends strongly on user interaction and input to determine nucleus results and to progress through the full test. Reading the error log and error bits information can be useful to determine any errors that occurred recently during normal operation of the DVD player.
2. The loop test will loop through the list of nuclei indefinitely, till the player is reset. The list of nuclei is as follows:
 - PapChksFlash
 - Papl2cNvram
 - CompSdramWrR
 - PapS2bEcho
 - Papl2cDisp

For DSW version 1.6 and above, the DSW version number will be displayed on the local display. Press NEXT to continue to the display test.

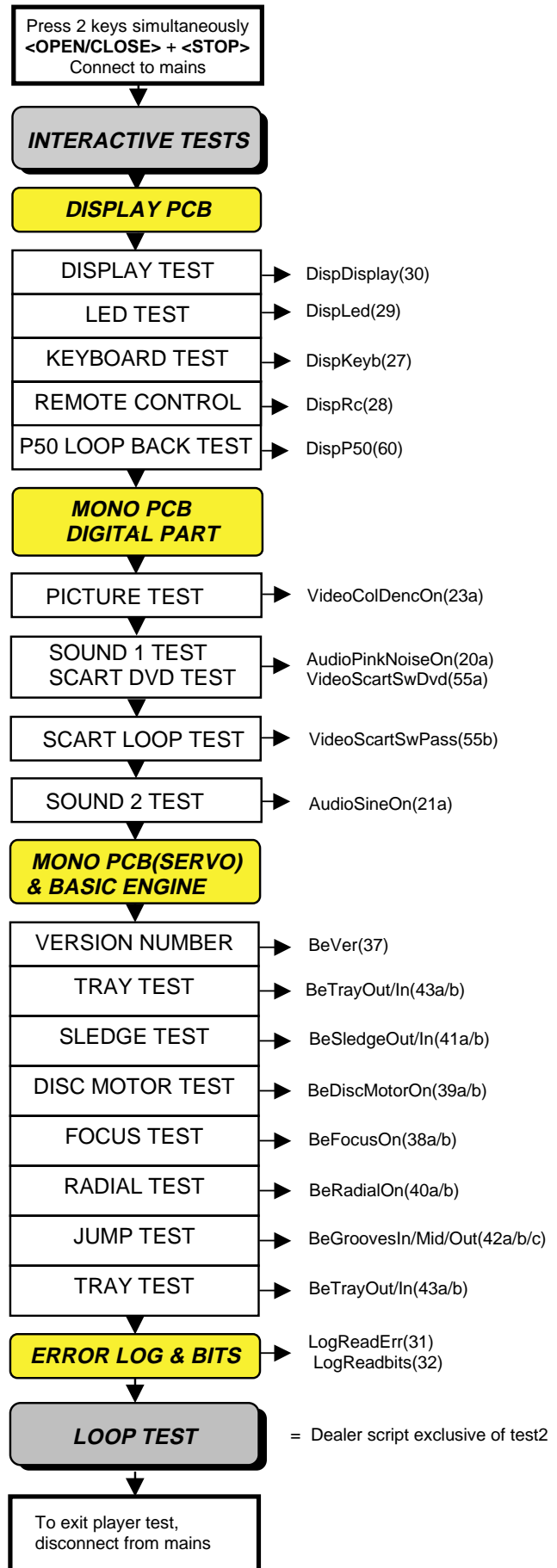
The display should look like the following:



CL 16532136_030.eps
051101

Figure 5-3

5.2.4 Survey



CL 16532136_022.eps
061101

Figure 5-4

5.3 Display PCB

5.3.1 Display Test

The display test is performed by nucleus DispDisplay. By putting a series of test patterns on the local display, the local display is tested. To step through all different patterns, the user must either press PLAY (pattern is ok) or PAUSE (pattern was incorrect) to proceed to the next pattern. The display of patterns is continued in a cyclic manner, shown in Fig. 5-5, until the user presses NEXT. If the user presses NEXT before all display patterns are tested, the DispDisplay nucleus will return FALSE (display test unsuccessful).

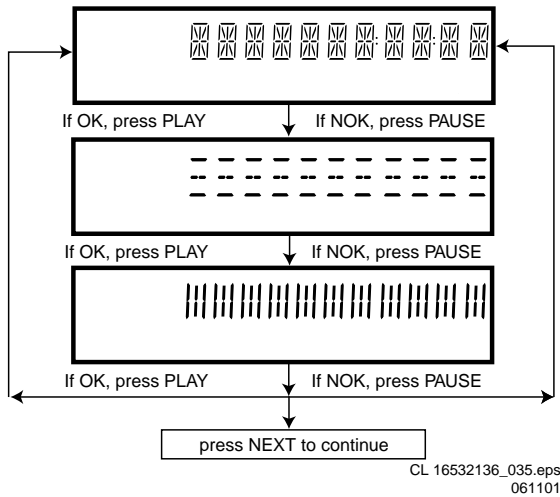


Figure 5-5

5.3.2 LED Test

The LED(s) on the DVD player is (are) tested by nucleus DispLed. The user must check if the LED(s) is (are) lighted; if it is, press PLAY, if it is not, press PAUSE. By pressing NEXT the script will proceed to the next test. If the user presses NEXT before PLAY or PAUSE, the DispLed nucleus will return TRUE (LED test successful).

5.3.3 Keyboard Test

The keyboard of the DVD player is tested by nucleus DispKeyb. The user is expected to press all keys on the local keyboard once. The code of the key pressed is shown on the local display (1 hexadecimal digit) immediately followed by a (hexadecimal) number indicating how many times that key has been pressed. Example of the local display during this test:

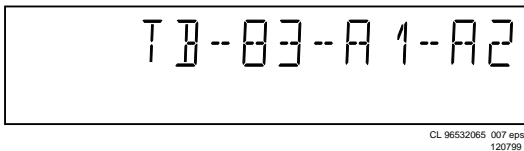


Figure 5-6

The key-codes displayed on the local display will scroll from right to left when the display gets full, the text "tb-" will remain on display.

Key ID	Key
0	PLAY
1	NEXT
2	PREVIOUS
3	PAUSE
4	STOP
5	OPEN / CLOSE
6	AUDIO / DIRECT

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Figure 5-7

If any keys are detected more than once (due to hardware error), the key-code is displayed twice (or more), with the second digit increased by 1. If the user does not press all keys minimally once (in any order), the DispKeys nucleus will return FALSE and cause an error in the overall result of the player script. The user can leave the keyboard test by pressing the NEXT key on the local display of the DVD player for at least one full second. The result of the keyboard test is shown on local display as follows:

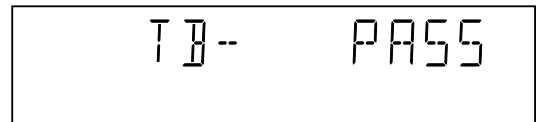


Figure 5-8

Or

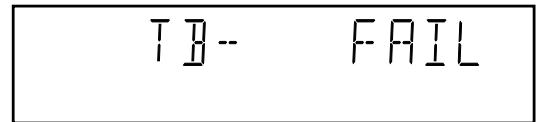


Figure 5-9

Pressing NEXT on the local keyboard again will proceed to the next test.

5.3.4 Remote Control Test

The remote control of the DVD player is tested by nucleus DispRc. The user must press any key on the remote control just once. The codes of the key pressed will be shown on the local display in hexadecimal format. Example:

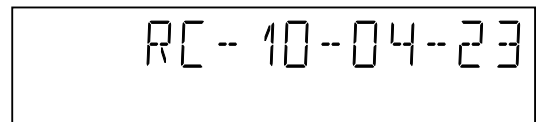


Figure 5-10

In this example 23 is the hexadecimal code of the pressed RC key. The user can leave the remote-control test by pressing NEXT on the local keyboard of the DVD player. The remote control test is successful if a code was received before the user pressed the NEXT key; pressing the NEXT key before pressing a key on the remote control gives an error in the remote control test (note that the remote control test will also fail if a key on the remote control was pressed but no code was received). The remote control test does not check upon the contents of the

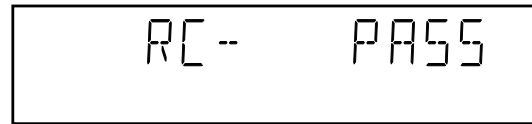
received code, that is it will not be checked if the received code matches the key pressed. If desired, the user can manually check this code by using a code-table for the remote control key-codes.

RC Key id	Hexadecimal code
STANDBY	0C
T-C	C8
RESUME	D7
FTS	FB
SOUND MODE	80
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
0	0
RETURN	83
DISPLAY DIM	13
DISC MENU	54
SYSTEM MENU	82
CURSOR UP	58
CURSOR DOWN	59
CURSOR LEFT	5A
CURSOR RIGHT	5B
OK	5C
PREVIOUS	21
NEXT	20
STOP	31
PLAY	2C
PAUSE	30
SUBTITLE	4B
ANGLE	85
ZOOM	F7
AUDIO	4E
REPEAT	1D
REPEAT A-B	3B
SHUFFLE	1C
SCAN	2A

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Figure 5-11

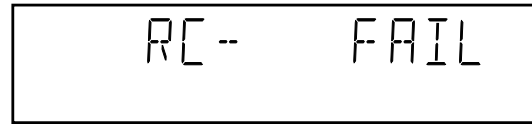
After pressing NEXT, the result of the remote control test is displayed on the local display of the DVD player as follows:



CL 96532065 013 eps
120799

Figure 5-12

Or



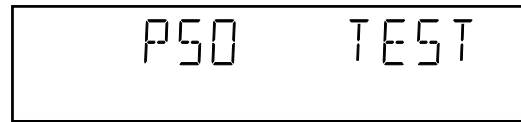
CL 96532065 014 eps
120799

Figure 5-13

Pressing NEXT on the local keyboard again will proceed to the next test.

5.3.5 P50 Loop-Back Test

For the P50 loop-back test, the user must first press a key to decide if the test is to be performed. The display will show the following message:

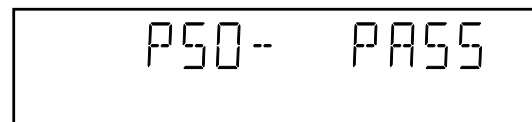


CL 16532007 004 eps
010201

Figure 5-14

If the user presses PAUSE, the P50 test will be skipped. If the user presses PLAY, the P50 test is performed and the result is displayed as follows:

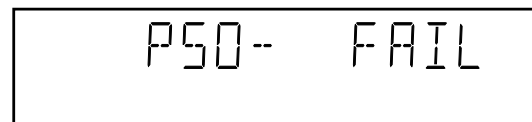
Test successful:



CL 16532007 005 eps
010201

Figure 5-15

Test fails:



CL 16532007 006 eps
010201

Figure 5-16

Press the NEXT key to continue to the next text

5.4 Mono PCB Digital Part

5.4.1 Picture Test

The picture test is performed by putting a predefined picture (colour bar) on the display (nucleus VideoColDencOn) and asking the user for confirmation. The display will show the following message:

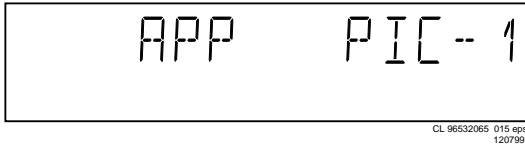


Figure 5-17

By pressing PLAY the user confirms the test, pressing PAUSE will indicate the picture was invisible or incorrect. Pressing NEXT will proceed to the next test

5.4.2 Sound 1 & SCART DVD Test

The first soundtest is performed by starting a pink noise sound that needs confirmation from the user (nucleus AudioPinkNoiseOn); the display will show the following message very shortly:

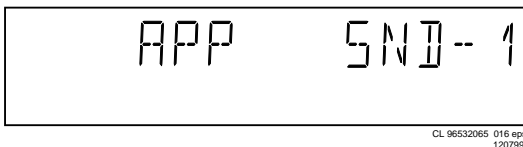


Figure 5-18

After starting up sound 1, SCART loop-trough will be simultaneously active during this test. SCART loop-through will be measured with the aid of an external video source. When entering the SCART loop-through, the local display indicates:

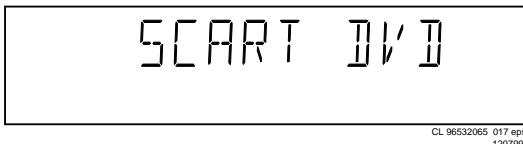


Figure 5-19

On the TV screen a colour bar (generated by nucleus VideoColDencOn) is visual and the internally generated pinknoise is audible. By pressing PLAY the user confirms the test, pressing PAUSE will indicate the sound was inaudible or incorrect. Pressing NEXT will proceed to the next test; if the user presses NEXT without pressing PLAY or PAUSE first, the result of this test will be TRUE (sound ok). By pressing the NEXT button there will be switched over to the external source, this must become now visible on the TV screen (using the SCART). The local display indicates:

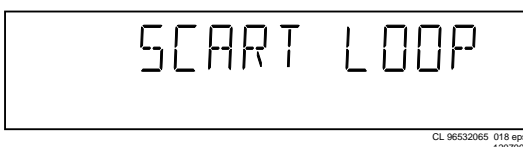


Figure 5-20

The internally generated colour bar is still available on the CVBS and Y/C outputs. And the pinknoise-signal is still available on the cinch audio outputs. By pressing the NEXT button, the internal generated colour bar becomes visual again. The test can be left by pressing the NEXT key for more than one second.

5.4.3 Sound 2 Test

The second soundtest is performed by producing a sine sound (nucleus AudioSineOn). The signal can be stopped by pressing the STOP-key. The display will show the following message:



Figure 5-21

After the audio signal has been stopped, by pressing PLAY the user confirms the test, pressing PAUSE will indicate that something went wrong. Pressing NEXT will proceed to the next; if the user presses NEXT without pressing PLAY or PAUSE first, the result of this test will be TRUE (sound ok).

5.5 Basic Engine

5.5.1 Version Number

In the basic engine tests, the version number of the Basic Engine will be shown first, as the following example:

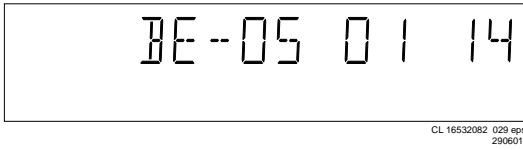


Figure 5-22

By pressing the NEXT key, the Basic Engine tests are started.

5.5.2 Tray Test

First, the tray is tested. The purpose of this test is also to give the user the opportunity to put a disc in the tray of the DVD player. Some tests on the Basic Engine require that a disc (e.g. DVD MPTD test disc) is present in the player. At the end of the Basic Engine tests this tray test will be repeated solely to enable the user to remove the disc in the tray. The local display will look as follows:

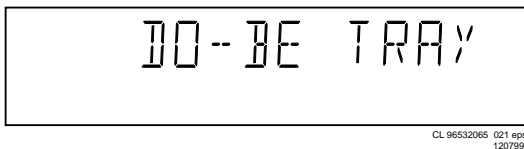


Figure 5-23

By pressing PLAY or PAUSE the user can toggle the position of the tray. Note that this test will not contribute to the test result of the Basic Engine. Pressing NEXT will proceed to the next test, after the tray has been closed by the software if it was open.

5.5.3 Sledge Test (Visual Test)

The second Basic Engine test tests the sledge; the user can move the sledge as many times as desired by using PLAY (nucleus BeSledgeOut) and PAUSE (nucleus BeSledgeIn). Pressing NEXT on the local keyboard proceeds to the next test. Note that this test will not contribute to the test result of the Basic Engine. The local display will look as follows during the sledge test:

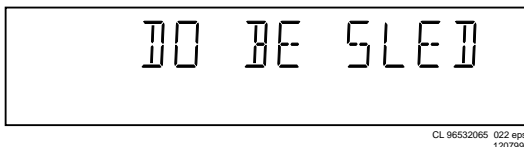


Figure 5-24

5.5.4 Disc Motor Test (Visual Test)

The third Basic Engine test tests the disc motor (nucleus BeDiscMotorOn); the local display looks as follows:

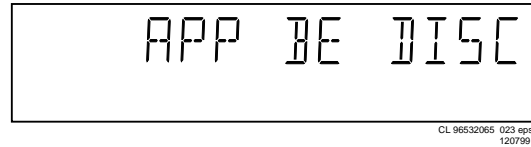


Figure 5-25

By pressing PLAY the user confirms that the disc motor is running; pressing PAUSE indicates the disc motor does not work. Pressing NEXT proceeds to the next test, after a reset of the disc motor (nucleus BeDiscMotorOff). If the user presses NEXT before pressing PLAY or PAUSE, the result of this test will be TRUE (disc motor is running).

5.5.5 Focus Test (Visual Test)

The fourth Basic Engine test tests the focussing; first focussing is turned on by calling nucleus BeFocusOn. The display will look as follows:

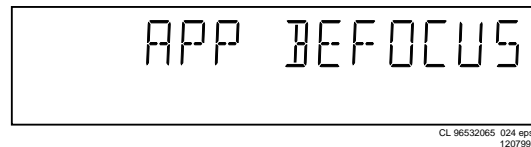


Figure 5-26

By pressing PLAY the user confirms that the focussing was successful; pressing PAUSE indicates a focussing failure. Pressing NEXT proceeds to the next test after a reset of the focussing (nucleus BeFocusOff); if NEXT is pressed before PLAY or PAUSE, the result of this test will be TRUE (focus successful).

5.5.6 Radial Test (Visual & Listening Test)

The fifth Basic Engine test tests the radial functionality (nucleus BeRadialOn); the local display looks as follows:

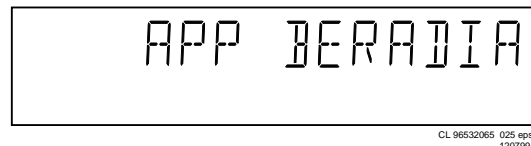


Figure 5-27

By pressing PLAY the user confirms that the radial function worked; pressing PAUSE indicates the function does not work. Pressing NEXT proceeds to the next test, after a reset of the radial (nucleus BeRadialOff). If the user presses NEXT before pressing PLAY or PAUSE, the result of this test will be TRUE (radial successful).

5.5.7 Jump Test (Listening Test)

The sixth and last Basic Engine test tests the jumping by calling nuclei BeGroovesIn, BeGroovesMid and BeGroovesOut. During this test, the local display looks as follows:

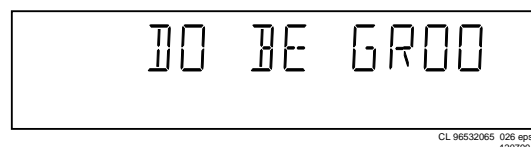


Figure 5-28

The user can switch between the three different types of groove settings by pressing PLAY (forward to next nucleus in the list In-Mid-Out) or PAUSE (backward in the list In-Mid-Out). This is done in a cyclic manner; note that this test will not contribute to the test result of the Basic Engine. Pressing NEXT proceeds to the next test, after the disc motor has been shut off with a call to nucleus BeDiscMotorOff.

5.5.8 Tray Test

As a last action for the Basic Engine tests, the tray test is repeated. The local display will look as follows:

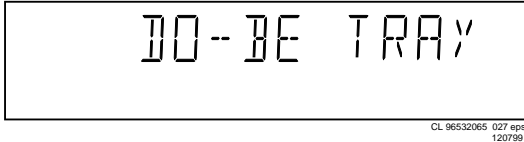


Figure 5-29

This test is meant to give the user the opportunity to remove the disc in the tray. The tray position can be toggled using the PLAY and PAUSE key. The tray will be closed (by the software, if it is open) before proceeding to the next test when the user presses the NEXT key.

5.5.9 Error Log (See Table on Page 28)

Reading the error log and error bits information can be useful to determine any errors that occurred recently during normal operation of the DVD player. Reading the error log is done by nucleus LogReadErr. The display during the errorlog readout looks as follows :

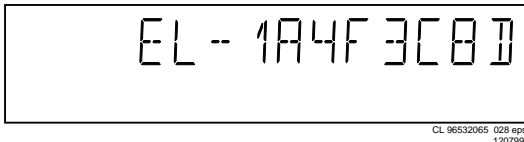


Figure 5-30

By pressing PLAY or PAUSE the user can move forward or backward (respectively) through the logged error codes. The highlighted number indicates which errorcode is currently on display (in the example above, errorcode number 4 is displayed). If "0000" is displayed at all positions, the error log is empty. Display of the logged errors is done in a cyclic manner. The errorcode with the lowest highlighted number is the most recent. By pressing NEXT on the local keyboard, the user can proceed to the next test.

5.5.10 Error Bits

Reading the error bits is done by nucleus LogReadBits. The display during the errorbits readout looks as follows:

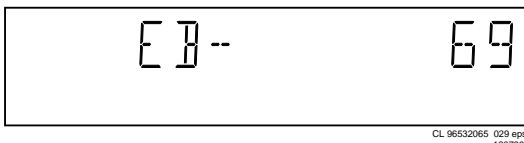


Figure 5-31

Only the set errorbits will be shown by their (decimal) number. Refer to the appropriate documentation for the explanation of each bit number. If the display only shows "EB-0", no error bits were set. By pressing NEXT the user can continue to the next test.

5.6 Loop Test (See Table Below)

At the start of the loop test, the display will show the result of the interactive player test:

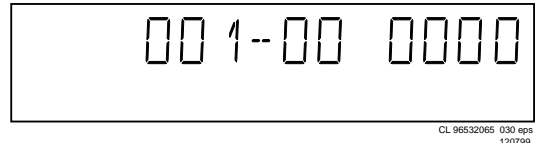


Figure 5-32

The left side of the display contains a 3-digit code, which can have a value between 000 and 111. These values are to be interpreted as follows:

Displayed Value	Indication for each module		
	Basic Engine	Mono PCB	Display PCB
000	ok	ok	ok
001	ok	ok	faulty
010	ok	faulty	ok
011	ok	faulty	faulty
100	faulty	ok	ok
101	faulty	ok	faulty
110	faulty	faulty	ok
111	faulty	faulty	faulty

Figure 5-33

The loop test will perform the same nuclei as the dealer test, but it will loop through the list of nuclei indefinitely. The display of the DVD player will display not only the three digits indicating correct/faulty modules and the last found error code (as mentioned, faults are detected as far as they can be within the scope of the diagnostic software), but also a loop counter indicating how many times the loop has been gone through. Example:

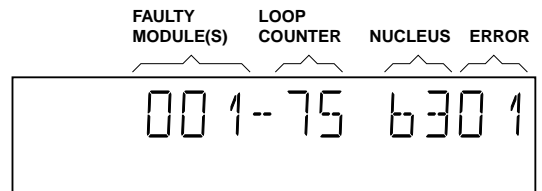


Figure 5-34

The number after the hyphen indicates the number of times the loop test has been performed; the 4 digits at the right side of the display show the last error that was found when running the loop test: the leftmost two digits of this code indicates which nucleus resulted in a fault; the rightmost two digits refer to the faultcode within that nucleus. For further explanation of this error code, refer to chapter 5.8 Nuclei Error Codes.

5.6.1 Errorlog

Explanation:

The application errors will be logged in the NVRAM. The maximum number of error bytes that will be visible is 16. The first word (4 digits) of the byte is the component identification; the last word is the error code. The diagnostics software will present a combination of this component identification plus an error code on the local display (and on the attached terminal). The last reported error is shown as < 00000000, the oldest visible error as 00000000> and the errors in between as < 00000000 >.

The devices that may report errors are the serial controller (UART), the basic engine (BE), the slave processor (SLPH), the SACD Stream Manager (SSM) and the SACD Media Access (SMA). The identification of these components is as follows:

Component name	Component identification
Serial controller (UART)	000A
Engine (BE)	0016
Slave Processor (SLPH)	001A
SACD Stream Manager (SSM)	001C
SACD Media Access (SMA)	002E
Diagnostic software (DS)	Dxxx

The tables in the next chapters list the error code and corresponding problem. The column 'Explanation' holds a more elaborate description and the most likely reason for the error.

Some Examples:

002E0000 (SMA reported a timeout error)
 0016010A (Engine could not fully close or open the tray)
 D0010001 (Flash checksum failed (for other DS errors, see description of nuclei error codes in paragraph 5.4.

UART Error Codes

Error Number	Error name	Explanation
0000	BUF_OVE RFLOW	To many characters were offered in too little time. Reason: system was too busy doing other jobs.
0001	COMMUNI CATION	Usually a protocol error. Reason: bad connection between engine and processor.

BE errors

Error Number	Error name	Explanation
0101	S2B_ILL_CO MMAND	Parameter(s) not valid for this command. Reason: some communication problem between UART and engine.
0102	S2B_ILL_PAR AM	Command not allowed in this state or unknown. Reason: see S2B_ILL_COMMAND error
0103	S2B_SLEDGE	Sledge could not be moved to home position.
0104	S2B_FOCUS	Focus failure
0105	S2B_MOTOR	Motor could not reach speed within timeout
0106	S2B_RADIAL	Servo didn't get on track after several retries.
0107	S2B_PLL_LO CK	PLL could not lock in Accessing or Tracking state
0108	SBC_HEADE R_TO	Header timeout
0109	S2B_SBC_NO T_FOUND	Requested subcode item could not be found.
010A	S2B_TRAY	Tray could not be opened or closed completely.
010B	S2B_TOC_RE AD	TOC could not be read within timeout period.
010C	S2B_JUMP	Requested seek could not be performed.
010D	S2B_NON_EX IST_SES	Attempt to access a non-existing session.
010E	S2B_NON_EX IST_BCA	

Error Number	Error name	Explanation
01F0	S2B_OVERR UN	Too many bytes received over S2B Reason: see S2B_ILL_COMMAND error
01F1	S2B_COMM_ TO	Not enough bytes are received over S2B Reason: see S2B_ILL_COMMAND error
01F2	S2B_PARITY	Byte received with parity error. Reason: see S2B_ILL_COMMAND error
01F3	S2B_ILL_PHA SE	CMD IDC is not valid, transmission out of sync. Reason: see S2B_ILL_COMMAND error
01F4	S2B_ILL_NR_ OF_BYTES	Byte count has an illegal value. Reason: see S2B_ILL_COMMAND error

SLPH Error Codes

Error Number	Error name	Explanation
0000	COMMUNICA TION	Error in I2C communication. Reason: bad connection between slave processor and main processor.

SSM Error Codes

Error Code	Error name	Explanation
0006	SP_SYNCER ROR	System cannot get synchronised with sectors coming from disc. Reason: Usually a damaged disc or the player was dropped/pushed during operation. If not, the engine is malfunctioning.
0007	SP_EDCERR OR	Data coming from disc is damaged. Reason: see SP_SYNCERROR
0008	SP_CONTINU ITYERROR	Sequence of sectors coming from disc is incorrect. Reason: see SP_SYNCERROR
0009	DMX_CONTI NUITYERRO R	Sequence of sectors is incorrect. Reason: problem with buffer RAM
000A	LLD_ERROR	An illegal audio format was offered to the decoder. Reason: unknown audio type on disc or problem with buffer RAM
000B	BCU_ERROR	Internal problem in Furore chip

SMA Error Codes

Error Number	Error name	Explanation
0000	SMA_TIMEO UTERROR	Data coming from disc not in time. Reason: damaged disc or engine problem.

5.6.2 Servicing DVD Loader

The DVD Loader / mechanism, VAL6011, has to be exchanged completely in case of failure. A new mechanism can be ordered with codenumber 9305 023 61104.

5.6.3 Reprogramming of New Mono Boards.

Caution

This information is confidential and may not be distributed. Only a qualified service person should reprogram the mono board.

After reset of NV-memory or repair of the mono board, all the customer settings and also the region code will be lost.

Reprogramming of the mono board will put the player back in the state in which it has left the factory, i.e. with the default settings and the allowed region code.

Reprogramming is limited to 25 times

When the counter reaches 25, reprogramming is not possible anymore

Reprogramming will be done by way of the remote control.

Put the player in stop mode, no disc loaded.

Press the following keys on the remote control:

<PLAY> followed by numerical keys <1> <5> <9>

The display shows: “-----”

Press now successively the following keys :

for SACD 900 /171	: <0><0><3> <0><0><0><0><0><0><0><0><0>
for DVD962SA /001	: <0><0><1> <0><0><0><0><0><0><0><0><0>
for DVD962SA /171	: <0><1><3> <0><0><0><0><0><0><0><0><0>
for DVD962SA /691	: <0><1><4> <0><0><0><0><0><0><0><0><0>

Press <PLAY> again.

The TV screen will become BLUE during a short time to confirm that the mono board has been reprogrammed.

CL 16532136_036.eps
281101

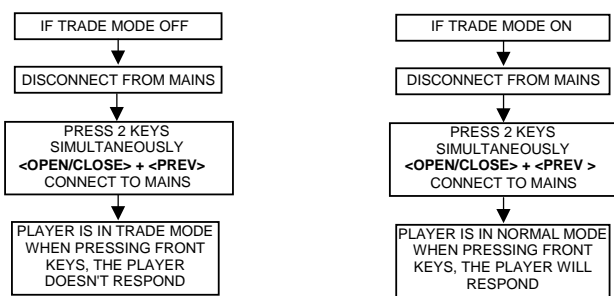
Figure 5-35

5.6.4 Trade Mode

After the player has been powered up for test by the dealer, it would have gone through the Virgin Mode. It is possible to reset the settings made during that mode before the delivery of player to the customer. This can be done as shown in the following diagram:

TRADE MODE

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



CL16532136 037 eps
061101

Figure 5-36

5.7 Menu and Command Mode Interface

5.7.1 Layout of Results Diagnostic Nuclei

Results returned from a Diagnostic Nucleus will be displayed in the following layout:

```
< number >< string > [ok | ER]
```

< number >: is a 4-digit decimal number padded with leading zeros if its value is less than 4 digits. The first 2 digits identify the generating nucleus (or group of nuclei) while the latter 2 digits indicate the error number.

< string >: is a text string containing information about the result of the Diagnostic Nucleus.

< number > and < string > are defined in [SSD_DN] in the output sections of each Nucleus.

Examples:

- 0001Unknown command ER @
- 3100OK @
- 0901Data line X is not connected to the DRAM ER@

5.7.2 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 player to Service PC

The service PC must have a terminal emulation program (e.g. OS2 WarpTerminal or Procomm) 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 player. This special cable will also connect the test pin, which is available on the connector, to ground (i.e. activate test pin).

Code number of PC interface cable: 3122 785 90017

Activation

Switch the player on and the following text will appear on the screen of the terminal (program):

```
DVDv2 Diagnostic Software version 1.7
SDRAM Interconnection test passed
Basic SDRAM test passed

(M) enu, (C) ommand or (S) 2B-interface?   [M] : @ c
DD:>
```

Figure 5-37

The first line indicates that the Diagnostic software has been activated and contains the version number. The next lines are the successful result of the SDRAM interconnection test and the basic SDRAM test. The last line allows the user to choose between the three possible interface forms. If pressing C has made a choice for Command Interface, the prompt ("DD>") will appear. The diagnostic software is now ready to receive commands. The commands that can be given are the numbers of the nuclei.

Command Overview of Nuclei

The following table gives an overview of all available nuclei. The first column contains an identification number, the second contains the name of a nucleus and the last column indicate the description of the nucleus.

Note: User confirmation is necessary during front panel tests

Basic Diagnostic Nuclei

Ref. #	Reference Name	Remark
1	BasicSpAcc	Serial port Access test/ initialization
2a	BasicInterconDram	Data and address bus Interconnection (only for DVDv2A)
2b	BasicInterconSdram	Data and address bus interconnection
3	BasicDramWrR	DRAM Write Read (only for DVDv2A)
4	BasicSdramWrR	SDRAM Write Read
5	BasicSramWrR	SRAM Write Read

Processor and Peripherals

Ref. #	Reference Name	Remark
6	PapChksFl	Checksum FLASH
7a	PapUclkAclkCdda	uClock A_CLK in CD-DA mode
7b	PapUclkAclkDvd	uClock A_CLK in DVD mode
7c	PapUclkAclkDvd96	uClock A_CLK in DVD (96kHz) mode
8a	PapSgsAclkCdda	Internal PLL CLK in CD-DA mode
8b	PapSgsAclkDvd	Internal PLL CLK in DVD mode
8c	PapSgsAclkDvd96	Internal PLL CLK in DVD (96kHz) mode
9	PapDramWrR	DRAM Write Read (only for DVDv2A)
10	PapFlashWrAcc	FLASH Write Access
11	PapI2cNvram	I2C NVRAM access
12	PapI2cDisp	I2C Display PWB
13	PapS2bEcho	S2B Echo
14	PapS2bPass	S2B Pass-through
15	PapNvramWrR	NVRAM Write Read
62	PapChksSum	Show checksums stored in flash
65	FURORE_Id	Check version ID of Furore chip (Only version 1.7)

Components

Ref. #	Reference Name	Remark
16	CompSdramWrR	SDRAM Write Read
63a	FURORE_SdramWrLow	Furore SDRAM interconnection + Write Read (Only version 1.7)
63b	FURORE_SdramWrHigh	Furore SDRAM interconnection + Write Read (Only version 1.7)
64a	FURORE_SdramWrLowFast	Furore SDRAM interconnection (Only version 1.7)
64b	FURORE_SdramWrHighFast	Furore SDRAM interconnection (Only version 1.7)

Audio

Ref. #	Reference Name	Remark
18a	AudioDeemp0On AudioDeempOn (DVD2B)	Audio De-emphasis 0 On Audio De-emphasis On (DVDv2B)
18b	AudioDeemp0Off AudioDeempOff (DVD2B)	Audio De-emphasis 0 Off Audio De-emphasis Off (DVDv2B)
18c	AudioDeemp1On	Audio De-emphasis 1 On (Not for DVDv2B)

Ref. #	Reference Name	Remark
18d	AudioDeemp1Off	Audio De-emphasis 1 Off (Not for DVDv2B)
18e	AudioDeemp0TristateOn (DVD2B)	Audio De-emphasis 0 in tristate/bidirectional mode (DVDv2B)
18f	AudioDeemp0TristateOff (DVD2B)	Audio De-emphasis 0 back in output mode (Off) (DVDv2B)
18g	AudioDeemp1TristateOn (DVD2B)	Audio De-emphasis 1 in tristate/bidirectional mode (DVDv2B)
18h	AudioDeemp1TristateOff (DVD2B)	Audio De-emphasis 1 back in output mode (Off) (DVDv2B)
19a	AudioMuteOn	Audio Mute On
19b	AudioMuteOff	Audio Mute Off
20a	AudioPinkNoiseOn	Audio Pinknoise On
20b	AudioPinkNoiseOff	Audio Pinknoise Off
21a	AudioSineOn	Audio Sine signal On/Off
21b	AudioSineBurst	Audio Sine signal Burst
56a	AudioDeemp0On (DVD2B)	PIO-pins as used in 2A for Deemphasis (DVD2B)
56b	AudioDeemp0Off (DVD2B)	PIO-pins as used in 2A for Deemphasis (DVD2B)
56c	AudioDeemp1On (DVD2B)	PIO-pins as used in 2A for Deemphasis (DVD2B)
56d	AudioDeemp1Off (DVD2B)	PIO-pins as used in 2A for Deemphasis (DVD2B)

Video

Ref. #	Reference Name	Remark
23a	VideoColDencOnPAL	Colourbar (PAL) DENC On
23b	VideoColDencOff	Colourbar DENC Off
23c	VideoColDencOnNTSC	Colourbar (NTSC) DENC On
25a	VideoScartLo	Scart Low
25b	VideoScartMi	Scart Medium
25c	VideoScartHi	Scart High
52	VideoColSetupCom	Colour Setup Communication
53a	VideoColSetupHi	Colour Setup High
53b	VideoColSetupLo	Colour Setup Low
54	VideoScartSwComm	Scart Switch communication
55a	VideoScartSwDvd	Scart Switch Dvd
55b	VideoScartSwPass	Scart Switch Pass-through
57a	VideoScartPinLo	PIO-pins as used in 2A for Scart-switching
57b	VideoScartPinMi	PIO-pins as used in 2A for Scart-switching
57c	VideoScartPinHi	PIO-pins as used in 2A for Scart-switching
61a	VideoColOutRGB (ST5508)	Output RGB from ST5508
61b	VideoColOutYUV (ST5508)	Output YUV from ST5508

Display PWB (Slave Processor)

Ref. #	Reference Name	Remark
26	DispVer	Version number
27	DispKeyb	Keyboard
28	DispRc	Remote Control
29	DispLed	LEDs
30	DispDisplay	Display
60	DispP50	P50 loopback test

Log (Error Logging In NVRAM)

Ref. #	Reference Name	Remark
31	LogReadErr	Read last Errors
32	LogReadBits	Read errors Bits
33	LogReset	Reset

Miscellaneous

Ref. #	Reference Name	Remark
34	MiscReadConfig	Read Configuration area from NVRAM
35	MiscNvramReset	NVRAM Reset
36	MiscNvramMod	Modify NVRAM contents
45a	MiscPalNtscHi	Check if PAL/NTSC line is high (For DVDv2A)
45b	MiscPalNtscLo	Check if PAL/NTSC line is low (For DVDv2A)
46	MiscAppVer	Read version of application software
47a	MiscTrayOpenNr	Read the number of times the tray opened
47b	MiscPowerOnTime	Read the total time the player's power has been on
47c	MiscPlayTimeCddaVcd	Read the Playtime of CDDA and VCD discs
47d	MiscPlayTimeDvd	Read the Playtime of DVD discs

Basic Engine

Ref. #	Reference Name	Remark
37	BeVer	Version number
38a	BeFocusOn	Focus On
38b	BeFocusOff	Focus Off
39a	BeDiscmotorOn	Discmotor On
39b	BeDiscmotorOff	Discmotor Off
40a	BeRadialOn	Radial control On
40b	BeRadialOff	Radial control Off
41a	BeSledgeIn	Sledge Inwards
41b	BeSledgeOut	Sledge Outwards
42a	BeGroovesIn	jump Grooves to Inside
42b	BeGroovesMid	jump Grooves to Middle
42c	BeGroovesOut	jump Grooves to Outside
43a	BeTrayIn	Tray In
43b	BeTrayOut	Tray Out
44	BeReset	Reset Basic Engine
58a	LaserCdOn	CD Laser on
58b	LaserCdOff	CD Laser off
58c	LaserDvdOn	DVD Laser on
58d	LaserDvdOff	DVD Laser off
59	AudioDtsCheckComm	Check I2C communication with Motorola DSP chip

Karaoke

Ref. #	Reference Name	Remark
48a	KaraokeModeOff	Switch Karaoke mode off
48b	KaraokeModeOn	Switch Karaoke mode on
49	KaraokeMicInput	Check path from the microphone input to audio output
50a	KaraokeKeyOn	Set Karaoke Key to the maximum level (1200 cent)
50b	KaraokeKeyOff	Set Karaoke Key to flat octave (0 cent)
51a	KaraokeEchoOn	Set Echo Control function on
51b	KaraokeEchoOff	Set Echo Control function off

SACD2001 AV Board (Only for Version 1.7)

Ref. #	Reference Name	Remark
66a	DAC_I2C	I2C DAC, IO expander
66b	DAC_I2CEnable	Set I2C_ENABLE line on
66c	DAC_I2CDisable	Set I2C_ENABLE line off
67a	DAC_ClockInternal	Route internal clock to DAC
67b	DAC_ClockExternal	Route external clock to DAC
67c	DAC_ClockFrequency SACD	Select external clock as 192*fs
67d	DAC_ClockFrequency CDDA	Select external clock as 384*fs
68a	DAC_DSDDStreamSel	Set DSD_PCM to high
68b	DAC_PCMStreamSel	Set DSD_PCM to low
69a	DAC_BaseNormal	Set BASEMGT to high
69b	DAC_BaseMgt	Set BASEMGT to low
70	DAC_Reset	Reset audio DACs
71a	DAC_ModeCDDA	Set audio DACs to CDDA mode
71b	DAC_ModeDVD48	Set audio DACs to DVD48 mode
71c	DAC_ModeDVD96	Set audio DACs to DVD96 mode
71d	DAC_ModeDSD	Set audio DACs to DSD mode

5.7.3 Menu Mode Interface

Activation

Switch the player on and the following text will appear on the screen of the terminal (program):

```
DVDv2 Diagnostic Software version 1.7

SDRAM Interconnection test passed
Basic SDRAM test passed

(M) enu, (C) ommand or (S) 2B-interface? [M] : @ M ↓

Main Menu

1 Audio -->
2 Basic Engine -->
3 Display PWB -->
4 Processor and Peripheral -->
5 Furore -->
6 DAC -->
7 Log -->
8 Miscellaneous -->
9 Video -->
```

Figure 5-38

The first line indicates that the Diagnostic software has been activated and contains the version number. The next lines are the successful result of the SDRAM interconnection test and the basic SDRAM test. The last line allows the user to choose between the three possible interface forms. If pressing M has made a choice for Menu Interface, the Main Menu will appear.

Layout of Menu and Submenu

The following menu layout will appear after starting up the SACD player in menu mode. The symbol

→ indicates that the current menu choice will invoke the display of a submenu. The number between [] indicates the nucleus number. These numbers will not be shown on the screen.

Menus**MAIN MENU**

1. Audio-->
2. Basic Engine-->
3. Display PWB-->
4. Processor & Peripherals -->
5. Furore-->
6. DAC-->
7. Log-->
8. Miscellaneous-->
9. Video-->

First Level Submenus**AUDIO MENU**

1. Deemphasis-->
2. Mute-->
3. PinkNoise-->
4. SineWave-->

BASIC ENGINE MENU

1. Disc Motor-->
2. Focus-->
3. Grooves-->
4. Radial-->
5. Reset[44]
6. Sledge-->
7. Tray-->
8. Version[37]
9. Laser-->

DISPLAY PWB MENU

1. Display[30]
2. Keyboard[27]
3. LEDs[29]
4. Remote control[28]
5. Version[26]
6. P50[60]

PROCESSOR AND PERIPHERALS MENU

1. Clock-->
2. Flash-->
3. I2C-->
4. S2B-->
5. SDRAM Write/Read[16]

FURIORE

1. SDRAM Write/Read Low[63a]
2. SDRAM Write/Read High[63b]
3. SDRAM Write/Read Fast Low[64a]
4. SDRAM Write/Read Fast High[64b]
5. Version[65]

DAC MENU

1. DAC Reset[70]
2. I2C Test-->
3. Clock-->
4. Stream select-->
5. Base Mgt-->
6. DAC mode-->

LOG MENU

1. Read last errors[31]
2. Read error bits[32]
3. Reset[33]

MISCELLANEOUS MENU

1. NVRam Utils-->
2. 2B Utils-->
3. Statistics Info-->
4. Read Application Version[46]

VIDEO MENU

1. Colourbar-->
2. Scart-->

Second level submenus**DEEMPHASIS MENU**

1. KOK_Bypass On [56a]
2. KOK_Bypass Off [56b]
3. Centre_On On[56c]
4. Centre_On On[56d]
5. KOK_Bypass Tristate On[18e]
6. KOK_Bypass Tristate Off [18f]
7. Centre_On Tristate On [18g]
8. Centre_On Tristate Off[18h]

MUTE MENU

1. Mute On[19a]
2. Mute Off[19b]

PINKNOISE MENU

1. Pinknoise On[20a]
2. Pinknoise Off[20b]

SINEWAVE MENU

1. 1. Audio Sine On[21a]
2. 2. Audio Burst On[21b]

DISC MOTOR MENU

1. Disc Motor On[39a]
2. Disc Motor Off[39b]

FOCUS MENU

1. Focus On[38a]
2. Focus Off[38b]

GROOVES MENU

1. Jump Grooves to Inside[42a]
2. Jump Grooves to Middle[42b]
3. Jump Grooves to Outside[42c]

RADIAL MENU

1. Radial Control On[40a]
2. Radial Control Off[40b]

SLEDGE MENU

1. Sledge Inwards[41a]
2. Sledge Outwards[41b]

TRAY MENU

1. Open Tray[43b]
2. Close Tray[43a]

LASER MENU

1. CD Laser On[58a]
2. CD Laser Off[58b]
3. DVD Laser On[58c]
4. DVD Laser Off[58d]

UCLOCK MENU

1. uClock EXT_CLK in CDDA Mode[7a]
2. uClock EXT_CLK in DVD Mode[7b]
3. uClock EXT_CLK in DVD 96 kHz Mode[7c]

FLASH MENU

1. Checksum FLASH[6]
2. Show Checksum FLASH[62]
3. 1st Flash write access[10a]
4. 2nd Flash write access[10b]

I2C MENU

1. I2C NVRAM Access[11]
2. I2C Display PWB[12]
3. I2C DTS Chip Comm[59]

S2B MENU

1. S2B Echo[13]
2. S2B Pass-through[14]

DAC I2C MENU

1. I2C Test[66a]
2. I2C Enable Pin On[66b]
3. I2C Enable Pin Off[66c]

DAC CLOCK MENU

1. Clock Internal[67a]
2. Clock External[67b]
3. Clock Frequency SACD[67c]
4. Clock Frequency CDDA[67d]

DAC STREAMSEL MENU

1. DSD Stream Select[68a]
2. PCM Stream Select[68b]

DAC BASE MENU

1. Base Normal[69a]
2. Base Management[69b]

DAC CLOCK MENU

1. DAC CDDA Mode[71a]
2. DAC DVD48 Mode[71b]
3. DAC DVD96 Mode[71c]
4. DAC DSD Mode[71d]

NVRAM MENU

1. NVRAM Config[34]
2. NVRAM reset[35]
3. NVRAM Mod[36]
4. NVRAM write/read[15]

2B UTILS MENU

1. I2C Scart Check[54]
2. Scart to DVD[55a]
3. Scart Pass through[55b]
4. VideoColSetupI2C[52]
5. VideoColSetupHi[53a]
6. VideoColSetupLo[53b]

STATISTICS INFO MENU

1. Total Nr of times Tray Open[47a]
2. Total Time Power On[47b]
3. Total Play-time CDDA & VCD[47c]
4. Total Play-time DVD[47d]

VIDEO COLOURBAR MENU

1. Colourbar DENC On (PAL)[23a]
2. Colourbar DENC Off[23b]
3. Colourbar DENC on (NTSC)[23c]
4. ProgressiveScan MPEG On[24a]

SCART MENU

1. Scart Low (0V to 2V)[25a]
2. Scart Medium (4.5V to 7V)[25b]
3. Scart High (9.5V to 12V)[25c]

5.8 Nuclei Error Codes

In the following tables the error description of the error codes will be described.

5.8.1 Audio Nuclei

Error code	Error text
1880	Test successful
1800	Test successful
1900	Test successful
1920	Test successful
2000	Test successful
2020	Test successful
2100	Test successful
2120	Test successful

5.8.2 Basic Engine Nuclei

Error code	Error text
3900	Test successful
3901	"Parity error from Basic Engine to Serial"
3902	"Unexpected response from Basic Engine"
3903	"Communication time-out error"
3904	"Basic Engine returned error number 0xXX"
3921	"Parity error from Basic Engine to Serial"
3922	"Unexpected response from Basic Engine"
3923	"Communication time-out error"
3924	"Basic Engine returned error number 0xXX"
3800	Test successful
3801	"Parity error from Basic Engine to Serial"
3802	"Unexpected response from Basic Engine"
3803	"Communication time-out error"
3804	"Basic Engine returned error number 0xXX"
3805	"Focus loop could not be closed"
3820	Test successful
3821	"Parity error from Basic Engine to Serial"
3822	"Unexpected response from Basic Engine"
3823	"Communication time-out error"
3824	"Basic Engine returned error number 0xXX"
4200	Test successful
4201	"Parity error from Basic Engine to Serial"
4202	"Unexpected response from Basic Engine"
4203	"Communication time-out error"
4204	"Basic Engine returned error number 0xXX"
4205	"Sledge could not be moved to home position"
4206	"Focus loop could not be closed"
4207	"Motor not on speed within time-out"
4208	"Radial loop could not be closed"
4209	"PLL could not lock in accessing or tracking state"
4210	"Subcode or sector information could not be read"
4211	"Requested subcode item could not be found"
4212	"TOC could not be read in time"
4213	"Seek could not be performed"
4220	Test successful
4221	"Parity error from Basic Engine to Serial"
4222	"Unexpected response from Basic Engine"
4223	"Communication time-out error"
4224	"Basic Engine returned error number 0xXX"
4225	"Sledge could not be moved to home position"
4226	"Focus loop could not be closed"
4227	"Motor not on speed within time-out"
4228	"Radial loop could not be closed"
4229	"PLL could not lock in accessing or tracking state"
4230	"Subcode or sector information could not be read"
4231	"Requested subcode item could not be found"
4232	"TOC could not be read in time"
4233	"Seek could not be performed"
4240	Test successful
4241	"Parity error from Basic Engine to Serial"

Error code	Error text
4242	"Unexpected response from Basic Engine"
4243	"Communication time-out error"
4244	"Basic Engine returned error number 0xXX"
4245	"Sledge could not be moved to home position"
4246	"Focus loop could not be closed"
4247	"Motor not on speed within time-out"
4248	"Radial loop could not be closed"
4249	"PLL could not lock in accessing or tracking state"
4250	"Subcode or sector information could not be read"
4251	"Requested subcode item could not be found"
4252	"TOC could not be read in time"
4253	"Seek could not be performed"
4000	Test successful
4001	"Parity error from Basic Engine to Serial"
4002	"Unexpected response from Basic Engine"
4003	"Communication time-out error"
4004	"Basic Engine returned error number 0xXX"
4005	"Radial loop could not be closed"
4020	Test successful
4021	"Parity error from Basic Engine to Serial"
4022	"Unexpected response from Basic Engine"
4023	"Communication time-out error"
4024	"Basic Engine returned error number 0xXX"
4400	Test successful
4401	Test successful
4100	Test successful
4101	"Parity error from Basic Engine to Serial"
4102	"Unexpected response from Basic Engine"
4103	"Communication time-out error"
4104	"Basic Engine returned error number XX"
4120	Test successful
4121	"Parity error from Basic Engine to Serial"
4122	"Unexpected response from Basic Engine"
4123	"Communication time-out error"
4124	"Basic Engine returned error number XX"
4300	Test successful
4301	"Parity error from Basic Engine to Serial"
4302	"Unexpected response from Basic Engine"
4303	"Communication time-out error"
4304	"Basic Engine returned error number 0xXX"
4320	Test successful
4321	"Parity error from Basic Engine to Serial"
4322	"Unexpected response from Basic Engine"
4323	"Communication time-out error"
4324	"Basic Engine returned error number 0xXX"
3700	"Version: X.Y.Z"
3701	"Parity error from Basic Engine to Serial"
3702	"Unexpected response from Basic Engine"
3703	"Communication time-out error"
3704	"Basic Engine returned error number 0xXX"
5800	Test successful

Error code	Error text
5820	Test successful
5840	Test successful
5860	Test successful
5801	"Unexpected response from Basic Engine"

5.8.3 Display PWB Nuclei

Error code	Error text
3000	Test successful
3001	"Disp not responding"
3002	"Disp key no response"
3003	"One or more patterns not correct"
2700	"Disp SACD2001"
2701	"Disp key no response"
2702	"Disp not responding"
2707	"Stop key not pressed"
2708	"Pause key not pressed"
2709	"Play key not pressed"
2710	"Open/close key not pressed"
2713	"Previous key not pressed"
2714	"Next key not pressed"
2715	"More than one key not pressed"
2716	"Audio key not pressed"
2900	Test successful
2901	"Slave not responding"
2902	"Slave keyboard not responding"
2903	"Standby led not working"
2800	Test successful
2801	"Slave display controller not responding"
2802	"Slave keyboard not responding"
2803	"No key press received from remote control"
2600	"The ROM version of the slave processor = 0xXX, and the internal ID = 0xYY"
2601	"I2c bus busy"
2602	"I2c bus not working"
6000	P50 test
6001	"No readback on P50"
6002	"Disp not responding"
6003	"P50 readback error"

5.8.4 Processor & Peripherals Nuclei

Error code	Error text
700	Test successful
720	Test successful
740	Test successful
600	"All checksums are correct"
601	"Following checksum is faulty: BootCode1 Checksum is 0xY2 and is not correct (must be 0xZ2)"
601	"This test is not available when stand-alone compiled"

Error code	Error text
6200	"Checksums = 0xA1, 0xB1, 0xC1, 0xD1"
6201	"This test is not available when stand-alone compiled"
1000	Test successful
1001	Test successful
1020	Test successful
1021	Test successful
1100	Test successful
1104	"NVRAM reply time-out"
1203	"Slave controller not responding"
1204	"Slave response is not correct"
5900	Test successful
5901	"I2c bus busy"
5902	"I2c bus not working"
5904	"DTS chip response not correct"
1300	Test successful
1301	"Parity error from basic engine to serial"
1302	"Parity error from serial to basic engine"
1303	"No communication between serial and basic engine"
1304	"Communication time-out error"
1600	Test successful
1601	"The DVD SDRAM is faulty"

5.8.5 Furore Nuclei

Error code	Error text
6300	Test successful
6301	"Memory databus test goes wrong."
6302	"Memory addressbus test goes wrong."
6303	"Physical memory device test goes wrong."
6320	Test successful
6321	"Memory databus test goes wrong."
6322	"Memory addressbus test goes wrong."
6323	"Physical memory device test goes wrong."
6400	Test successful
6401	"Memory databus test goes wrong."
6402	"Memory addressbus test goes wrong."
6320	Test successful
6321	"Memory databus test goes wrong."
6322	"Memory addressbus test goes wrong."
6500	"FUORE version number: XX.YY"

5.8.6 DAC Nuclei

Error code	Error text
7000	Test successful
7001	"DAC I2C bus busy"
7002	"DAC I2C expander "
6600	Test successful
6601	"DAC I2C bus busy"
6602	"DAC I2C expander "
6604	"DAC I2C DAC_LR "
6605	"DAC I2C DAC_LSRS "
6606	"DAC I2C DAC_CLFE "
6620	Test successful
6640	Test successful
6700	Test successful
6701	"DAC clock internal I2C bus busy"
6702	"DAC clock internal I2C connection failed"
6720	Test successful
6721	"DAC clock external I2C bus busy"
6722	"DAC clock external I2C connection failed"
6740	Test successful
6741	"DAC clock frequency SACD I2C bus busy"
6742	"DAC clock frequency SACD I2C connection failed"
6760	Test successful
6761	"DAC clock frequency CDDA I2C bus busy"
6762	"DAC clock frequency CDDA I2C connection failed"
6800	Test successful
6801	"DAC DSD Stream Select I2C bus busy"
6802	"DAC DSD Stream Select I2C connection failed"
6820	Test successful
6821	"DAC PCM Stream Select I2C bus busy"
6822	"DAC PCM Stream Select I2C connection failed"
6900	Test successful

Error code	Error text
6901	"DAC Base Normal I2C bus busy"
6902	"DAC Base Normal I2C connection failed"
6920	Test successful
6921	"DAC Base Management Select I2C bus busy"
6922	"DAC Base Management I2C connection failed"
7100	Test successful
7101	"DAC mode CDDA I2C bus busy before start"
7102	"DAC mode CDDA I2C connection failed"
7120	Test successful
7121	"DAC mode DVD48 I2C bus busy before start"
7122	"DAC mode DVD48 I2C connection failed"
7140	Test successful
7141	"DAC mode DVD96 I2C bus busy before start"
7142	"DAC mode DVD96 I2C connection failed"
7160	Test successful
7161	"DAC mode DSD I2C bus busy before start"
7162	"DAC mode DSD I2C connection failed"

5.8.7 Log Nuclei

Error code	Error text
7000	Test successful
7001	"DAC I2C bus busy"
7002	"DAC I2C expander "
6600	Test successful
6601	"DAC I2C bus busy"
6602	"DAC I2C expander "
6604	"DAC I2C DAC_LR "
6605	"DAC I2C DAC_LSRS "
6606	"DAC I2C DAC_CLFE "
6620	Test successful
6640	Test successful
6700	Test successful
6701	"DAC clock internal I2C bus busy"
6702	"DAC clock internal I2C connection failed"
6720	Test successful
6721	"DAC clock external I2C bus busy"
6722	"DAC clock external I2C connection failed"
6740	Test successful
6741	"DAC clock frequency SACD I2C bus busy"
6742	"DAC clock frequency SACD I2C connection failed"
6760	Test successful
6761	"DAC clock frequency CDDA I2C bus busy"
6762	"DAC clock frequency CDDA I2C connection failed"
6800	Test successful
6801	"DAC DSD Stream Select I2C bus busy"
6802	"DAC DSD Stream Select I2C connection failed"
6820	Test successful
6821	"DAC PCM Stream Select I2C bus busy"

Error code	Error text
6822	"DAC PCM Stream Select I2C connection failed"
6900	Test successful
6901	"DAC Base Normal I2C bus busy"
6902	"DAC Base Normal I2C connection failed"
6920	Test successful
6921	"DAC Base Management Select I2C bus busy"
6922	"DAC Base Management I2C connection failed"
7100	Test successful
7101	"DAC mode CDDA I2C bus busy before start"
7102	"DAC mode CDDA I2C connection failed"
7120	Test successful
7121	"DAC mode DVD48 I2C bus busy before start"
7122	"DAC mode DVD48 I2C connection failed"
7140	Test successful
7141	"DAC mode DVD96 I2C bus busy before start"
7142	"DAC mode DVD96 I2C connection failed"
7160	Test successful
7161	"DAC mode DSD I2C bus busy before start"
7162	"DAC mode DSD I2C connection failed"

5.8.8 Miscellaneous Nuclei

Error code	Error text
3400	Test successful
3401	"The configuration data could not be read from NVRAM"
3402	"I2C bus busy before start"
3500	"NVRAM is cleared"
3501	"The NVRAM could not be reset."
3502	"I2C bus busy before start"
3600	"NVRAM contents updated."
	"NVRAM contents and configuration checksum updated."
3601	"NVRAM contents could not be updated."
3602	"I2C bus busy before start"
3603	"NVRAM contents could not be read"
3604	"NVRAM not accessible."
3605	"NVRAM checksum could not be updated."
1500	Test successful
1502	"NVRAM access time-out"
1504	"NVRAM fails"
5400	Test successful
5401	"I2c bus busy"
5402	"I2c bus not working"
5403	"Scart switch controller not responding"
5404	"Scart switch controller response not correct"
5500	Test successful
5501	"I2c bus busy"
5502	"I2c bus not working"
5520	Test successful
5521	"I2c bus busy"
5522	"I2c bus not working"
5523	"Scart switch controller not responding"
5200	Test successful
5201	"I2c bus busy"
5202	"I2c bus not working"
5300	Test successful
5301	"I2c bus busy"
5302	"I2c bus not working"
5320	Test successful
5321	"I2c bus busy"
5322	"I2c bus not working"
4700	"Number of times Tray went Open : XX"
4701	The total number of times tray went open could not be read from NVRAM.
4702	I2C bus busy before start
4720	"Total Power On time (minutes) : XX"
4721	The total power-on time could not be read from NVRAM.
4722	I2C bus busy before start
4740	"Total CDDA & VCD disks Play-time (minutes) : XX"
4741	The playtime of CDDA & VCD disks could not be read from NVRAM.

Error code	Error text
4742	I2C bus busy before start
4760	"Total DVD disks Play-time (minutes) : XX"
4761	The playtime of DVD disks could not be read from NVRAM.
4762	I2C bus busy before start
4600	"Version of Application Software : XX"
4601	"The application version could not be read from NVRAM."
4602	"I2C bus busy before start"

5.8.9 Video Nuclei

Error code	Error text
2300	Test successful
2320	Test successful
2340	Test successful
2460	Test successful
2421	"I2c bus busy"
2481	"I2c bus busy"
2401	"I2c bus busy"
2500	Test successful
2501	"I2c bus busy"
2502	"I2c bus not working"
2520	Test successful
2521	"I2c bus busy"
2522	"I2c bus not working"
2540	Test successful
2541	"I2c bus busy"
2542	"I2c bus not working"

5.9 Test instructions SACD Mono Board

5.9.1 General

- Impedance of measuring-equipment should be $> 1M\Omega$.
- Most tests have to be done by software commands. Together with the software command you will find a Ref.# nbr. This is the number of the diagnostic nucleus used for this test. More detailed information can be found in the description of the command mode interface.
- Levels: Most measurements are digital measurements. The high and low levels in this document got to have next specification:

low	: < 0.3V (LVTTTL)
high	: > 3.0V (LVTTTL)
LOW	: < 0.4V (TTL)
HIGH	: > 4.5V (TTL)
- All the supply signal_name with "STBY" are present during standby
- Because all clocks are derived from the SACD clock (384FS_in) from the AV board, this board should always be connected to the mono board.
- The switching mode power supply (SMPS) output is switched on/off by the STB_OUT signal from the mono board to the AV board.

5.9.2 General Start-up Measurements

Supply Check:

Measure the voltages on the pins of the connector 1600 with a multimeter.

pin	TP	Signal_name	Voltage
1600-1	F604	+3V3	+3V3
1600-2	F604	+3V3	+3V3
1600-3	F631	+5V	+5V (0V during standby)
1600-4	F614	+5Vstby	+5V
1600-5	F615	+6Vstby	+6V
1600-6	F623	GND	+5V (0V during standby)
1600-7	F623	GND	0V
1600-8	F623	GND	0V
1600-9	F618	-8Vstby	-5V
1600-10	F634	STB_CONT	0V (+5V during standby)
1600-11	F636	+12Vstby	+12V
1600-12	F623	GND	0V
1600-13	F675	PWR_FAIL	+2.1V (1.4V during standby)

Also check the following power supplies:

Testpoint F608: +3V3 (5%. (Check IC7605 in case of failure)

Testpoint F632: +3V3 (5%. (Check IC7622 in case of failure)

Testpoint F101: +9V (5%. (Check IC7109 in case of failure)

Check the supply currents to be sure that there are no major failures on the board.

Measure the currents flowing toward the mono board using a Tektronix AM503B current probe on the wires between the switch mode power supply and the connector 1600.

pin	TP	Signal_name	measured
1600-1	F605	+3V3	560 mA
1600-2	F605	+3V3	
1600-3	F631	+5V	510 mA
1600-4	F614	+5Vstby	2 mA
1600-5	F615	+6Vstby	< 1 mA
1600-6	F623	GND	
1600-7	F623	GND	
1600-8	F623	GND	
1600-9	F618	-8Vstby	54 mA
1600-10	F634	STB_CONT	

pin	TP	Signal_name	measured
1600-11	F636	+12Vstby	90 mA
1600-12	F623	GND	
1600-13	F675	PWR_FAIL	

5.9.3 Reset Circuitry

Reset of Sti5505:

In power down mode STB_CONT is high; the clock is disabled in order to reduce the power consumption. When STB_CONT goes low, STB_CONTD goes high and enables the 27 MHz clock.

Check that this clock is present and stable before the RESETn is de-asserted. RESETn is a signal, which allows initialising the main processor. We check also that when going from ON mode to stand-by mode, the 27 MHz is held for a certain moment after RESETn is asserted.

Reset of Servo:

The reset for the Servo circuit is given on Power On to the MACE IC 7207 with POR via C2215, R3234 and D6200. The reset signals STB_DALAS for DALAS and PORN for HD61 are generated by MACE IC.

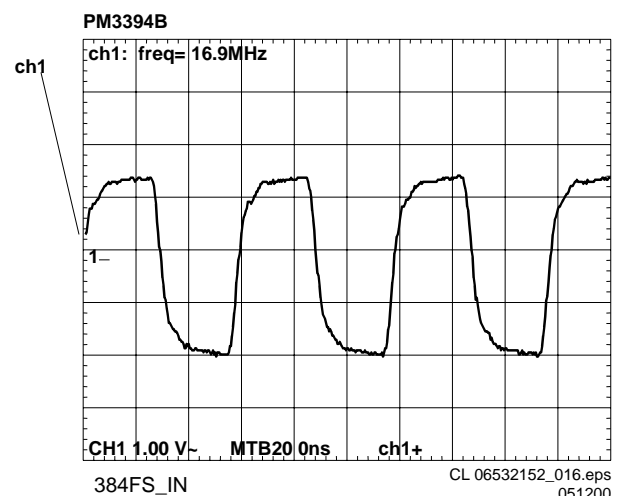
When POR is not working (due to a hang-up situation), an extra reset signal RSTN, coming from the Sti5505 will wake up the Servo circuit.

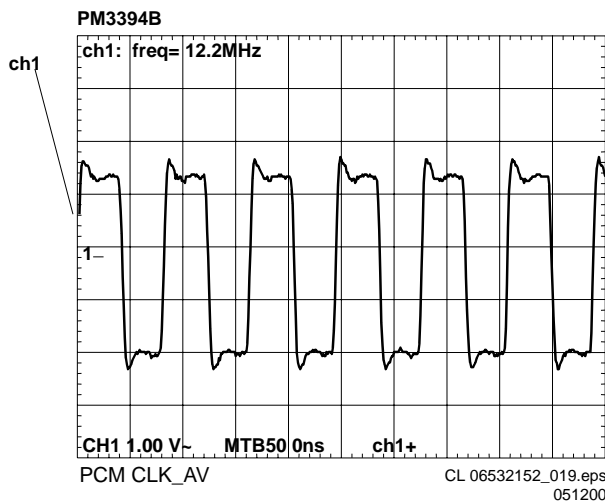
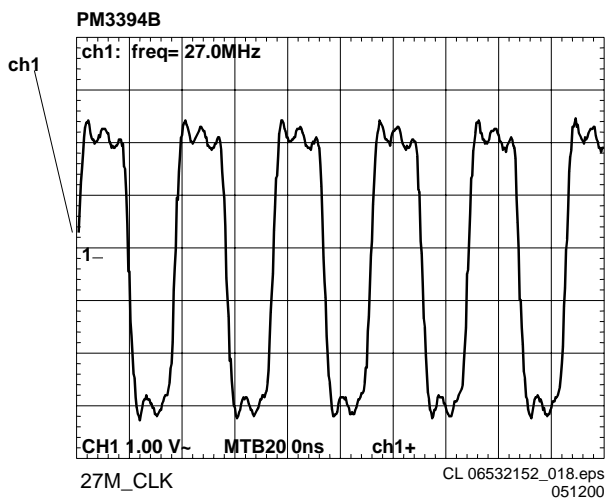
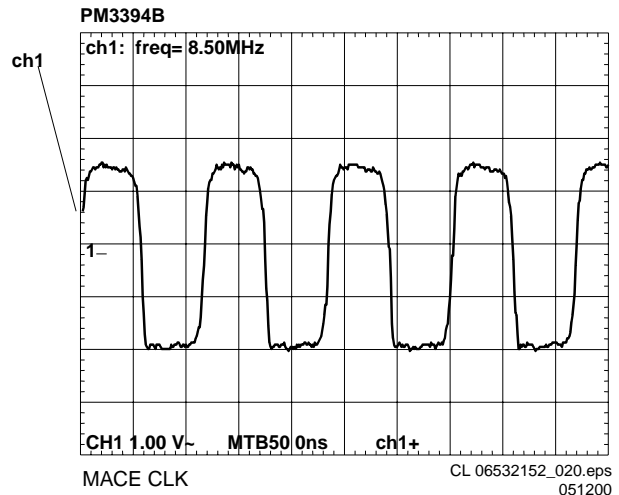
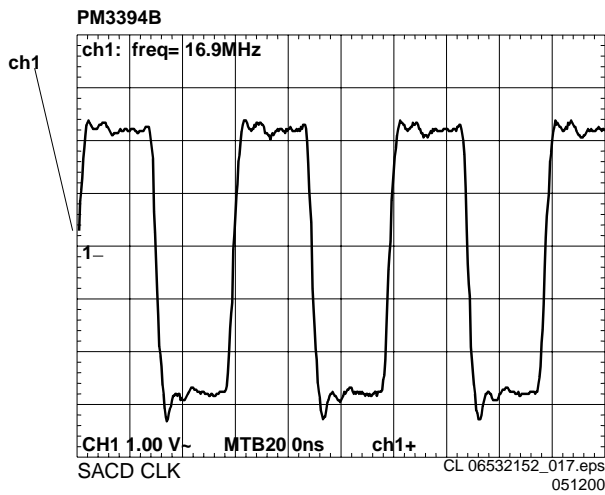
5.9.4 Clock Check

The source clock comes from the AV board. The SACD CLK is a master clock from which all the other clocks are derived. If this one is not present the system cannot start and work.

The SACD power supply, the mono board and the AV board should be connected together. On power up the clocks appear on the board. All clocks to be measured have a 0.02% tolerance.

Clockname	Test point	Frequency / level
384Fs_in	F911	16.9344 MHz / 3V3
SACD_CLK	F903	16.9344 MHz / 5V
27M_CLK	F503	27MHz / 5V
PCMCLK_AV	F640	12.288MHz / 3V3
MACE CLOCK	F211	8.46 MHz / 3V3





5.9.5 Tests with Diagnostic Software Program

The SACD diagnostic program is included in the SACD application software. This program permits to test a lot of functions of the PCB. We group in this part the memory tests, the general serial bus tests and the peripheral tests of the mono board.

Start Up

Conditions

The units required are the switch mode power supply, the mono board and the AV board. This is the minimum set up for the diagnostic program, when testing memories and peripherals. When using the Compair serial cable, pin 1602-2 is directly connected to GND and after powering on, the diagnostic program will be started.

The other end of the service cable is connected to a PC serial port. On the PC you need to open a HyperTerminal and configure it as follows: 19200 b/s, 8 bits data, no parity, 1 stop bit, no control flow.

Start the Diagnostic

When you switch on, the diagnostic checks the serial port in both directions, followed by few other commands. Those are done automatically during power up. The following message is displayed on the HyperTerminal: "**DVDv2 Diagnostic Software version ...**". Then the program is waiting that you select a mode. Getting this screen means the Sti5505 can boot from flash. The program is running and the service interface is functioning. Enter the mode you wish to use. You can use either the Menu mode or the Command mode. In the first mode, the main menu appears, you can navigate into the menu system and you can select the individual command, just type the corresponding number to launch it. In the second mode, just type the Ref.# number to do the test. When a Ref.# command is available in the diagnostic program, it will be explained as follow :

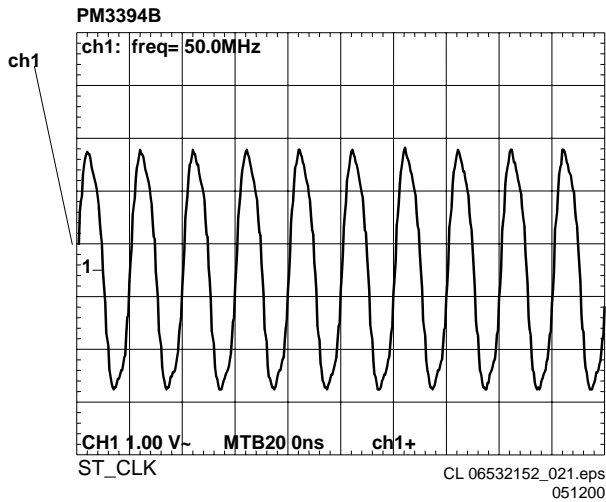
Ref.#	Command Name	Remark

At the end of the test, the diagnostic program will return "OK" if the test is passed. Otherwise an error message will appear.

System Clock

ST_CLK is the system clock and is derived from the 27 MHz by the internal PLL of the Sti5505 (pin137).

Name	Test point	Frequency	Level
ST_CLK	F822	49.95 MHz	TTL



Memories

Flashes

Read flash test:

If you can start the diagnostic that means you are able to read the flashes and the program is running. Then you can normally use the diagnostic program. At this moment you can launch the checksum calculation from the diagnostic program.

Ref.#	Command Name	Remark
6	Checksum FLASH	

If you don't encounter any problem during utilisation of the diagnostic program means the STi5505 is properly connected to the flashes.

SDRAM

Use the diagnostic program for a complete software test of the SDRAM.

Ref.#	Command Name	Remark
16	SDRAM Write Read	Extensive test

I2C Bus Test

EEProm

To access the EEPROM, the I2C bus is used. So writing and reading back to the EEPROM check the chip and the bus.

Ref.#	Command Name	Remark
11	NVRAM I2C	Quick test - Write and read back

The complete EEPROM can also be checked but it takes a lot of time to write and read back at all the locations.

Ref.#	Command Name	Remark
15	NVRAM write read	Extensive test - Write and read-back

Display Board

The mono board accesses to the display board through the I2C bus. You can test this serial bus up to the connector 1501. So connect the display board to the mono board and launch either the following command :

Ref.#	Command Name	Remark
12	I2C Display PWB	Write and read back
26	version	Software version of the slave processor rom

S2B Bus

The S2B is the interface between the digital part and the front end. This bus links the STi5505 and the MACE2. The S2B echo

command permits to check the communication between those devices.

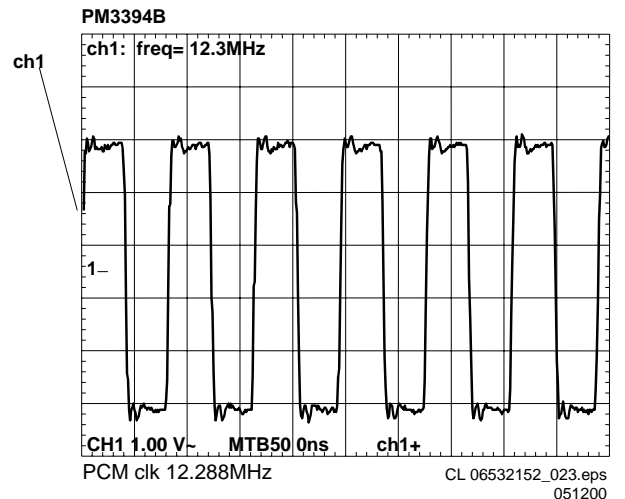
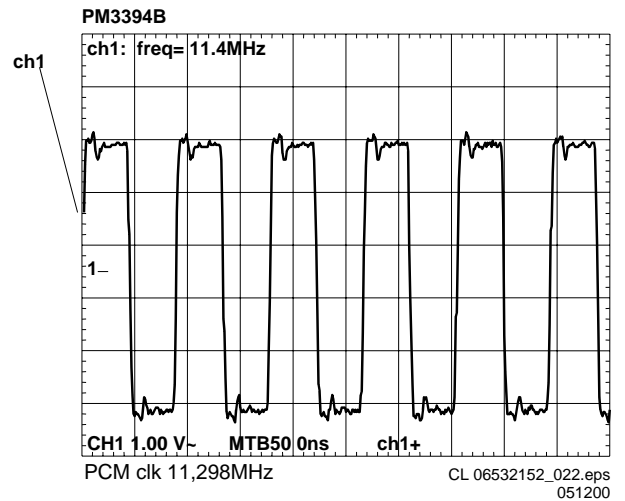
Ref.#	Command Name	Remark
13	S2b Echo	Write and read back

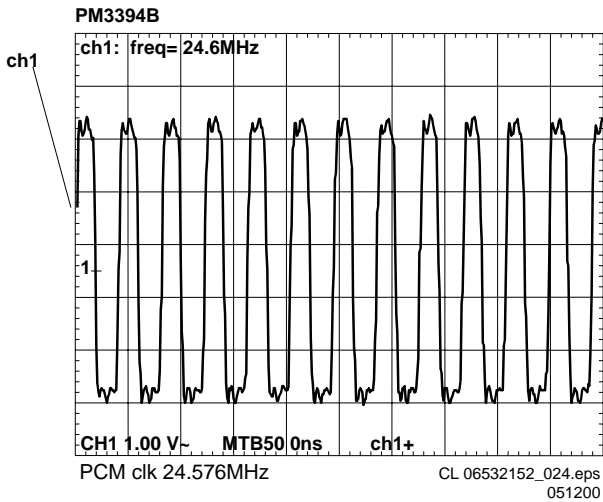
Peripherals

Audio Clock Select

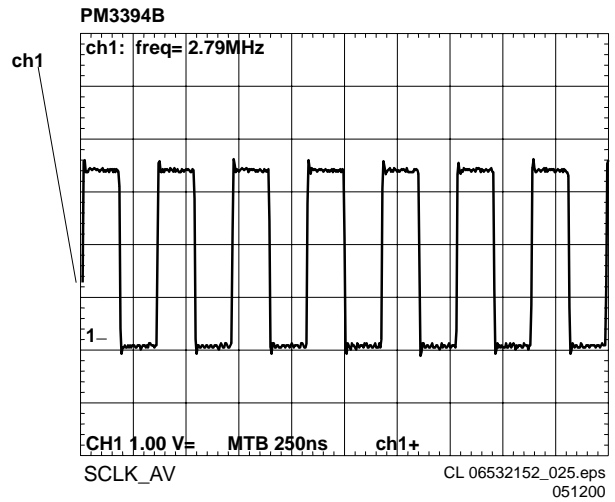
This clock is derived from the SACD CLOCK by the mono board system clocks. The audio PCM_CLK can take 3 values. The STi5505 PIO's permit to select 3 different frequencies depending on the application. Check those frequencies on F566

Ref.#	Command Name	Frequency	SEL_AC LK2	SEL_AC LK1
7a	Clock 11.289 MHz	11.2896 MHz	0	1
7b	Clock 12.288 MHz	12.288 MHz	1	0
7c	Clock 24.576 MHz	24.576 MHz	1	1





Signal	Test point	type	Level	Frequency
PCM_LsRs_Fur	F504	No signal	LVTTL	N/A
SPDIF	F644	Data stream	TTL	N/A



Audio Mute

Ref.#	Command Name	MUTE_AV at F625	Remark
19a	Mute ON	+4.8V	Audio Mute On
19b	Mute OFF	-8V	Audio Mute Off

Center On/Mono

Check whether we can switch between the mono mode and the stereo mode. Measure the level on F633.

Ref.#	Command Name	Center on	Remark
56c	Centre-On-Stereo Pin On	3.3V	Mono
56d	Centre-On-Stereo Pin Off	0V	Stereo

I2C DAC

Check whether you can enable or disable the I2C switch. When driving the I2C_DAC signal measure the corresponding level at F001.

Ref.#	Command Name	level
66b	I2C enable	H = 5V
66c	I2C disable	L = 0V

Slow Blanking

An additional part of the video-path is the scart-switching or slow blanking voltage.

This voltage can be 0V, 6V, 12V. Check at F620 the output voltage with next commands:

Ref.#	Command Name	Remark	Level
25a	Scart Low	No picture	0V 0.5V
25b	Scart Medium	16/9 format	6V 10%
25c	Scart High	4/3 format	12V 10%

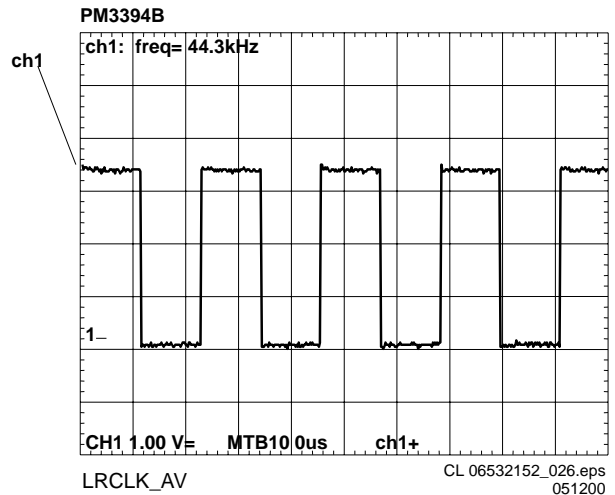
PCM Audio on I2S Bus

For this test connect the A/V board and the front panel to the monoboard. Don't forget to power up the front panel. The I2S audio signals are measured in 3 different situations: no audio, sine wave is played, pink noise is played.

No Audio

Switch ON the power supplies and check these signals

Signal	Test point	type	Level	Frequency
SCLK_AV	F637	Clock	LVTTL	2.82MHz < 0.02%
LRCLK_AV	F641	Clock	LVTTL	44.1KHz < 0.02%
PCM_CLK_AV	F640	No signal	LVTTL	N/A
PCMOUT_AV	F638	No signal	LVTTL	N/A
PCM_Ce_Lf_Fu	F659	No signal	LVTTL	N/A



Sine Wave

Generate the sine wave with the following command

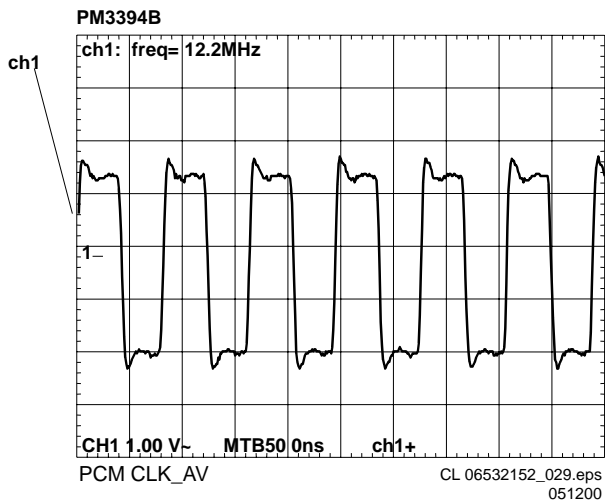
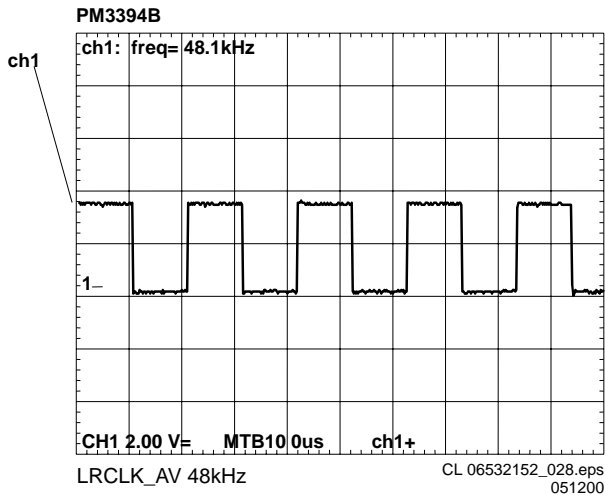
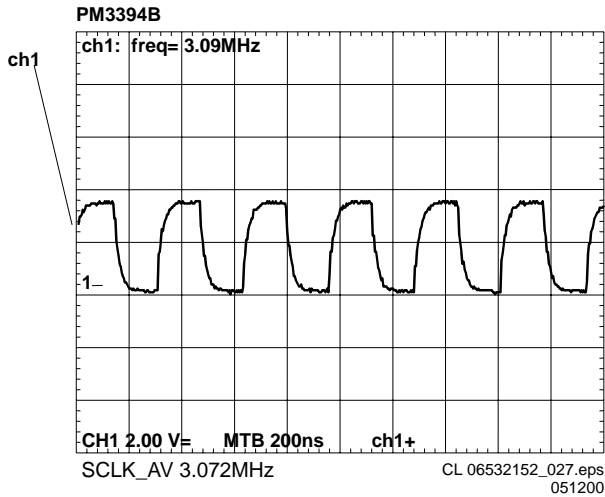
Ref.#	Command Name	Remark
21a	Sine ON	Play the sine wave at the audio outputs

Then measure the following signals

Signal	Test point	type	Level	Frequency
SCLK_AV	F637	Clock	LVTTL	3.072MHz < 0.02%
LRCLK_AV	F641	Clock	LVTTL	48 kHz < 0.02%
PCMCLK_AV	F640	Clock	LVTTL	12.288 MHz < 0.02%
PCMOUT_AV	F638	Data stream	LVTTL	N/A
PCM_Ce_Lf_Fur	F659	No signal	LVTTL	N/A

Signal	Test point	type	Level	Frequency
PCM_LsRs_Fur	F504	No signal	LVTTTL	N/A
SPDIF	F644	Data stream	TTL	N/A

Press "STOP" to switch off the sine wave.



Pink noise
Generate the pink noise with the following command

Ref.#	Command Name	Remark
20a	Pink Noise ON	Play the pink noise at the audio outputs

Then measure the following signals

Signal	Test point	type	Level	Frequency
SCLK_AV	F637	Clock	LVTTTL	3.072MHz < 0.02%
LRCLK_AV	F641	Clock	LVTTTL	48 kHz < 0.02%
PCM_CLK_AV	F640	Clock	LVTTTL	12.288 MHz < 0.02%
PCMOUT_AV	F638	Data stream	LVTTTL	N/A
PCM_Ce_Lf_Fur	F659	Data stream	LVTTTL	N/A
PCM_LsRs_Fur	F504	Data stream	LVTTTL	N/A
SPDIF	F644	Data stream	TTL	N/A

5.9.6 Video

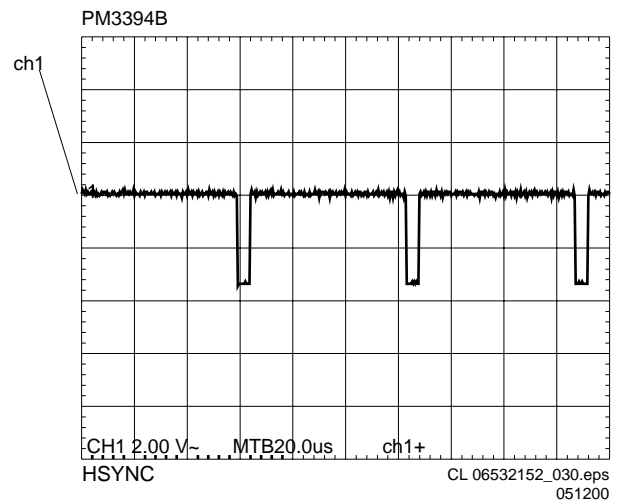
From the diagnostic program, play the 8 colour bar pattern.

Ref.#	Command Name	Remark
23a	Colour bar On	8-color bar pattern
23b	Colour bar Off	Disable the pattern

Video Hsync

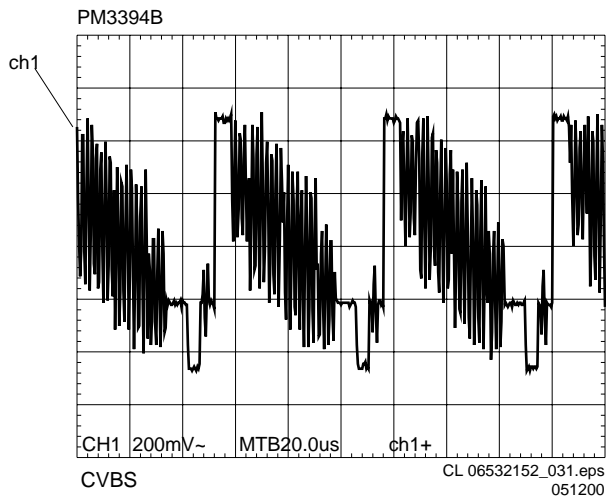
Measure this output at F656

Ref.#	Command Name	Remark	Value
23a	Colour bar On		15.625 kHz 0.02% Vpeak-peak > 3V

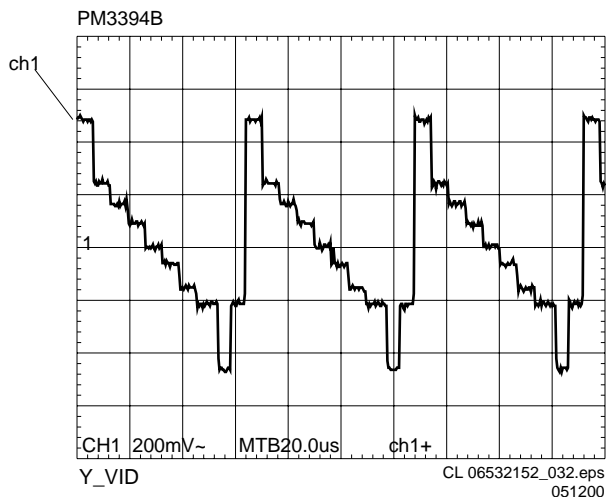


Video signals

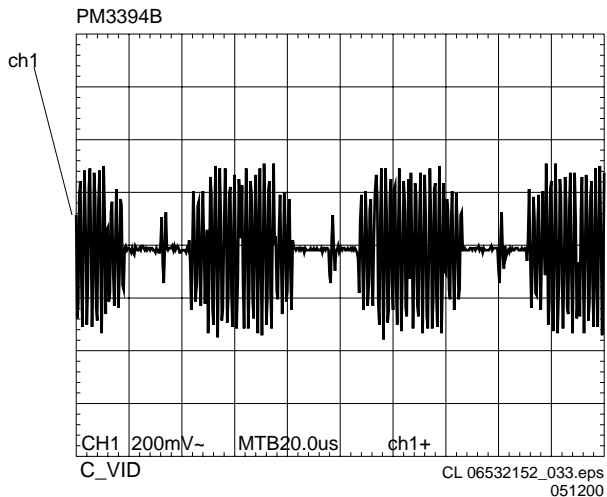
CVBS
Measured at F657



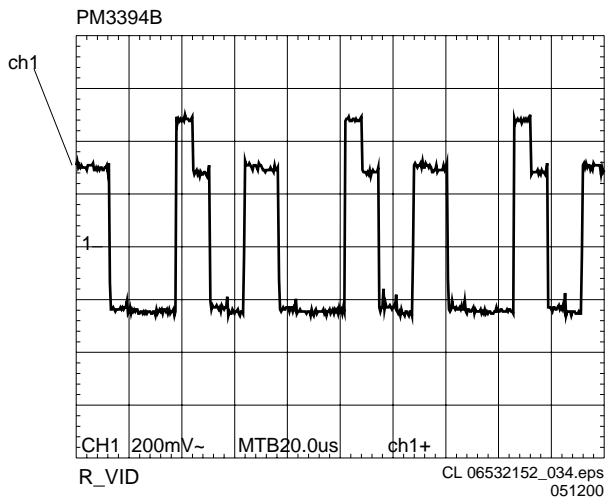
Luminance Y-VID
Measured at F662



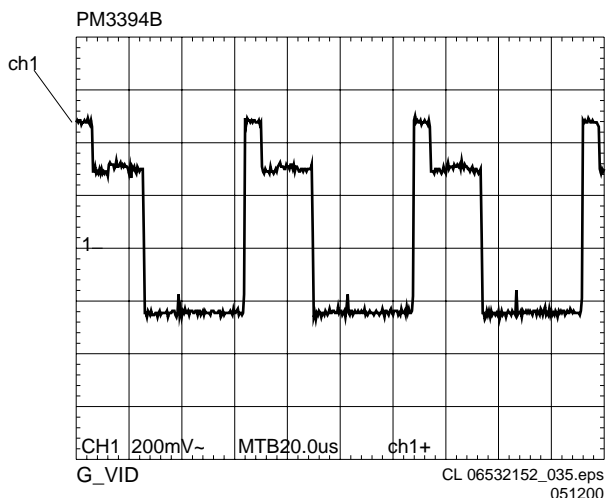
Chrominance C_VID
Measured at F665



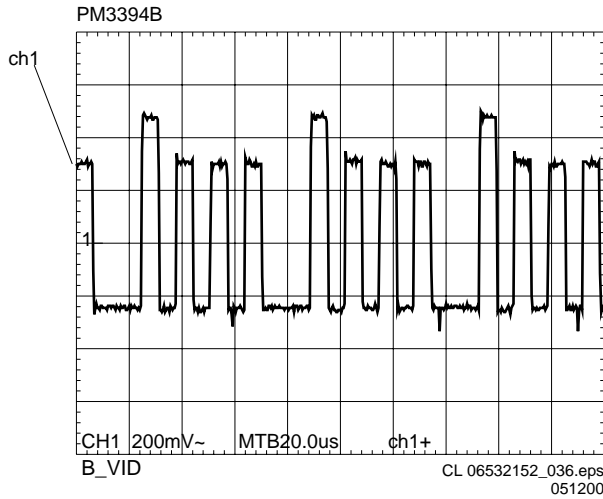
Red R_VID
Measured at F646



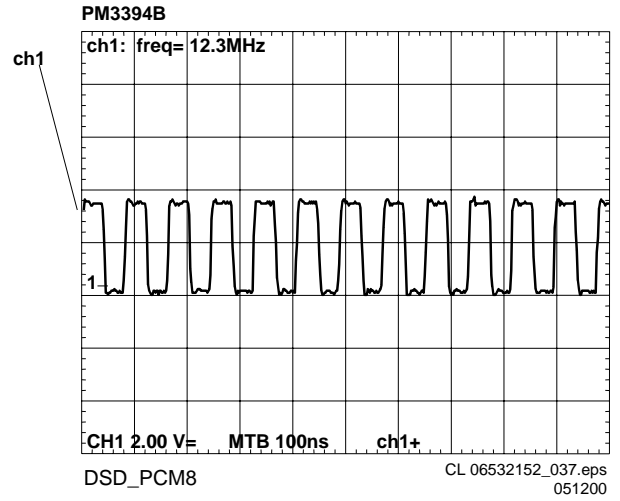
Green G_VID
Measured at F649



Blue_B_VID
Measured at F653



Signal	Test point	type	Level	Frequency
DSD_PCM(5)	F008	Signal : High	LVTTTL	N/A
DSD_PCM(2)	F009	Data stream	LVTTTL	N/A
DSD_PCM(3)	F010	Signal : High	LVTTTL	N/A



Switch off the colour bar with the following command:

Ref.#	Command Name	Remark	Value
23b	Colour bar Off		Disable the pattern

SACD Processor/Furore

With the following commands, the access of the Furore and its SDRAM is checked.

Ref.#	Command Name	Remark
65	DS_FURORE_Id	Check Furore ID
63a	DS_FURORE_Sdram WrRLow	Check full speed SDRAM
63b	DS_FURORE_Sdram WrRHigh	Check full speed SDRAM
64a	DS_FURORE_Sdram WrRLowFast	Check full speed SDRAM
64b	DS_FURORE_Sdram WrRHighFast	Check full speed SDRAM

RF Signal Amplitude

This signal is measured at F851 just at the input of the Furore. When no disc is in the player, we measured 54 mV. Then a disc is inserted and played, at this moment the RF signal increases. We measured 1.05 V amplitude and the level of this input should be between 0.2V and 1.5 V. Then we can play normally a SACD disc.

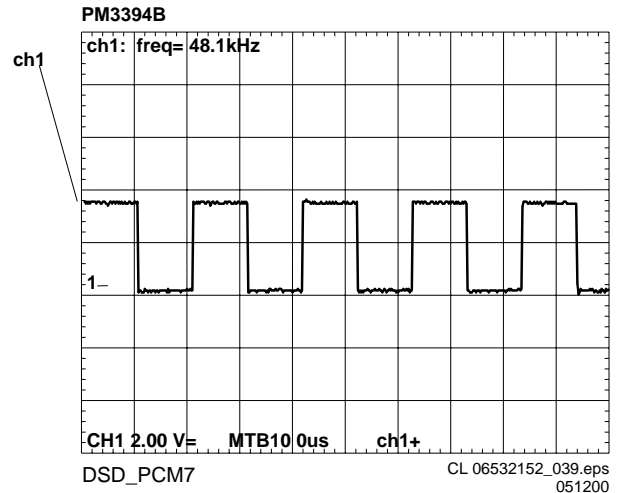
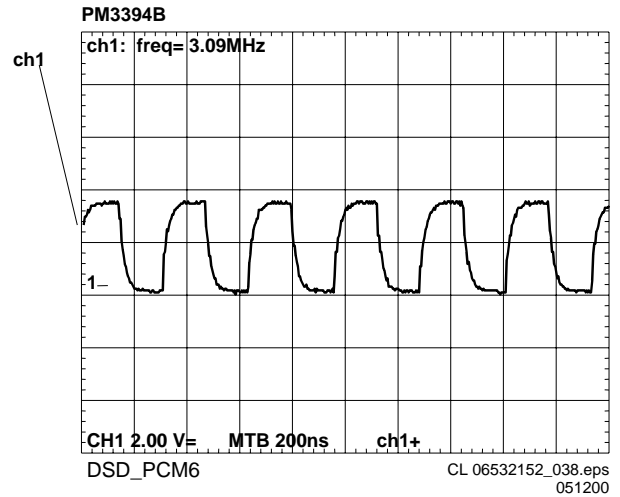
DSD Outputs

With the diagnostic software, we can partially test the DSD_PCM bus toward the AV board. When you play a pink noise, digital bit stream is coming out of the Furore and is fed to the AV board.

Ref.#	Command Name	Remark
20a	Pink Noise ON	Play the pink noise at the audio outputs

Measure the following signals

Signal	Test point	type	Level	Frequency
DSD_PCM(8)	F002	Clock	LVTTTL	12.288 MHz < 0.02%
DSD_PCM(6)	F003	Clock	LVTTTL	3.072 MHz < 0.02%
DSD_PCM(7)	F004	Clock	LVTTTL	48 kHz < 0.02%
DSD_PCM(0)	F005	Data stream	LVTTTL	N/A
DSD_PCM(1)	F006	Signal : High	LVTTTL	N/A
DSD_PCM(4)	F007	Data stream	LVTTTL	N/A



5.9.7 Servo Tests

General Start-up Measurements:

Reset the Basic Engine part

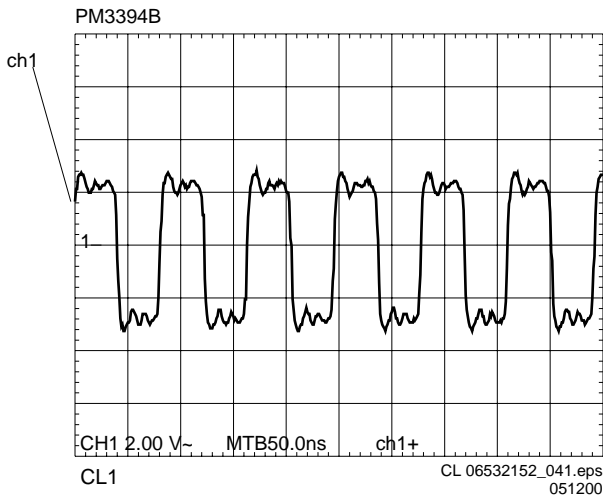
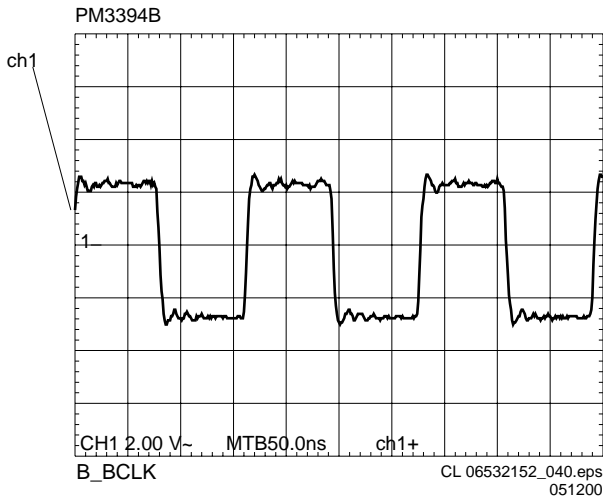
Ref. #	Command Name	Remark
44	BeReset	Reset Basic Engine

Check Vref

Name	Testpoint	Value
Vref	F188	2.5V+/-0.3

Check I2S interface

Name	Testpoint	Value
B_BCLK	F347	6.0MHz +/-0.1
CL1	F337	12.0MHz +/-0.2
B_WCLK	F343	HIGH
Stopclk	F338	HIGH
B_Sync	F344	HIGH
B_V4	F348	HIGH



Disc Motor:

Before switching on the disc motor, check the following test points:

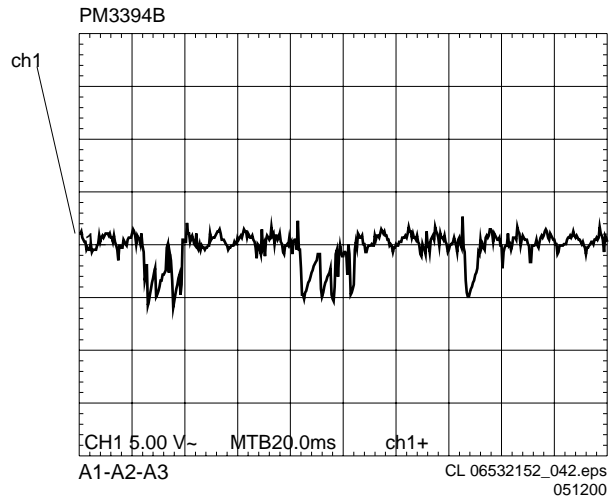
Name	Testpoint	Value
Stby	F357	high
Stby-out	F355	LOW
Moto1	F361	3V0.3

Switch the Discmotor on/off with next commands:

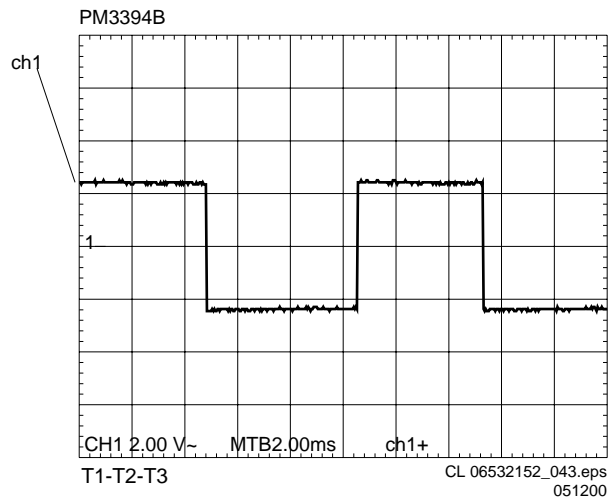
Ref. #	Command Name	Remark
39a	BeDiscmotorOn	Discmotor on
39b	BeDiscmotorOff	Discmotor off

Check the following signals when discmotor has been switched on:

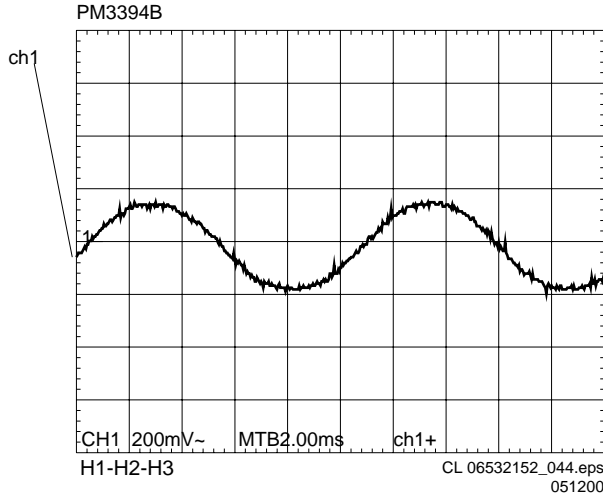
Name	Pin nr.	Frequency
Stby	F357	low
Stby-out	F355	HIGH
Moto1	F361	2V0.5V
A3	F350	see oscillogram
A2	F352	see oscillogram
A1	F353	see oscillogram



T1	F280	see oscillogram
T2	No testpoint present	see oscillogram
T3	F371	see oscillogram



VH	F365	3V0.5V
H1+	F354	see oscillogram
H1-	F359	see oscillogram
H2+	F364	see oscillogram
H2-	F366	see oscillogram
H3+	F367	see oscillogram
H3-	F370	see oscillogram



Switch the discmotor off.

Radial

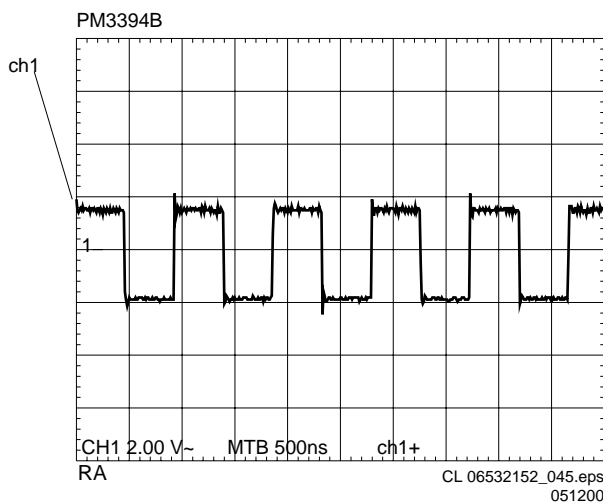
Switch the radial control on/off with the following commands:

Ref. #	Command Name	Remark
40a	BeRadialOn	Radial control on
40b	BeRadialOff	Radial control off

Check the following signals:

Check for pulse density signal RA at testpoint F227

Name	Testpoint	Value
Rad -	F128	4.3V0.5V
Rad +	F121	4.3V0.5V



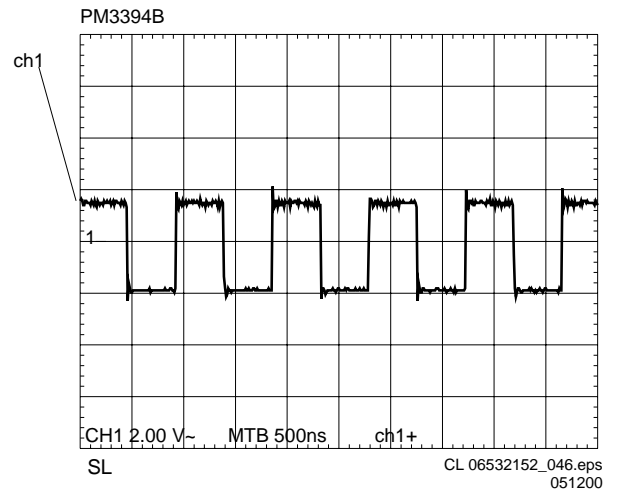
Check if laser is switched on (visual check of laserlight).
Switch the radial control off.

Sledge

Use the following commands to move the sledge:

Ref. #	Command Name	Remark
41a	BeSledgeIn	Sledge inwards
41b	BeSledgeOut	Sledge outwards

Check pulse density signal SL at testpoint F221



Name	Testpoint	Value
SI -	F039	4.5V0.5V
SI +	F038	4.5V0.5V

Measure peak to peak signal on SL- and SL+ while moving sledge outwards.

Name	Testpoint	Value
SI -	F039	10Vptp +/-0.5
SI +	F038	10Vptp +/-0.5

Measure input sledge control (sledge in home position)

Name	Testpoint	Value
Sinph	F182	1.5V0.5V
Cosph	F192	1.5V0.5V

Tray:

To open and close the tray use the following commands:

Ref. #	Command Name	Remark
43a	BeTrayIn	Tray in
43b	BeTrayOut	Tray out

Measure the driver outputs of the BA5938FM for the tray closed.

Name	Testpoint	Value
Vo2 -	F116	4.3V2.0V
Vo2 +	F111	4.3V2.0V

Measure again the driver outputs while the tray is opening.

Name	Testpoint	Value
Vo2 -	F116	6.0V1.0V
Vo2 +	F111	2.0V1.0V

Measure again the driver outputs while the tray is closing

Name	Testpoint	Value
Vo2 -	F116	2.0V1.0V
Vo2 +	F111	6.0V1.0V

Focus

To switch the Focus motor on/off, use the following commands:

Ref. #	Command Name	Remark
38a	BeFocusOn	Focus on
38b	BefocusOff	Focus off

Measure the driver outputs of the BA5938FM for the Focus off.

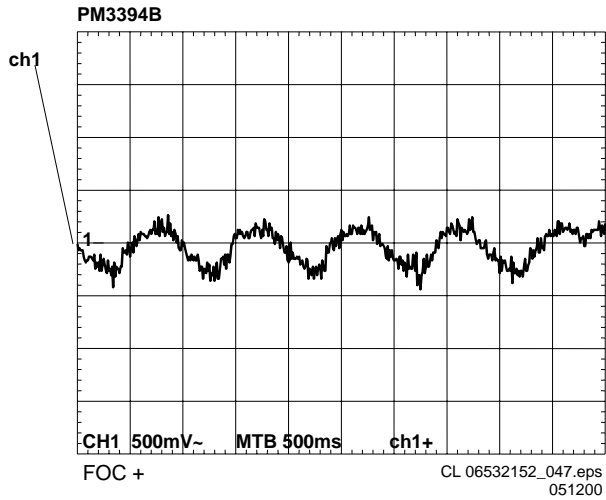
Name	Testpoint	Value
foc -	F124	4.3V0.5V
foc +	F127	4.3V0.5V

Switch the focus on

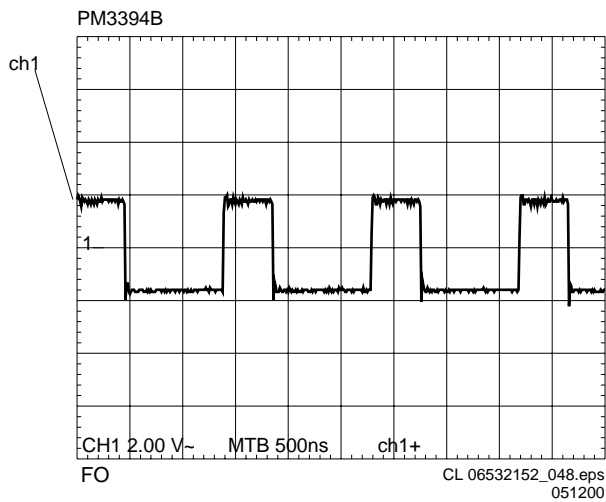
Measure again the driver outputs

Name	Testpoint	Value
Foc - (sawtooth)	F124	1V0.2V
Foc + (sawtooth)	F127	1V0.2V

Name	Testpoint	Value
RFO DC	F146	2.5V 0.2V, eyepattern 1Vptp
O1	F155	25mV10mV
O2	F158	25mV10mV
O3	F168	25mV10mV
O4	F165	25mV10mV
S1	F174	25mV10mV
S2	F175	25mV10Mv



Check for pulse density signal FO at testpoint F234



Check for laserlight.

Switch the focus off

Hf Path

Play DVD test disc.

Measure outputs of diodes A, B, C, D, E, F.

Name	Testpoint	Value
A	F140	2.6V0.2V
B	F141	2.6V0.2V
C	F143	2.6V0.2V
D	F144	2.6V0.2V
E	F147	2.6V0.2V
F	F148	2.6V0.2V

Measure DVDALAS outputs

5.10 Test Instructions Display Board

5.10.1 Display board

Introduction

These test instructions are written for Display PCBAS 3139 248 81401.

The contents of the Display Board can be split up into next blocks:

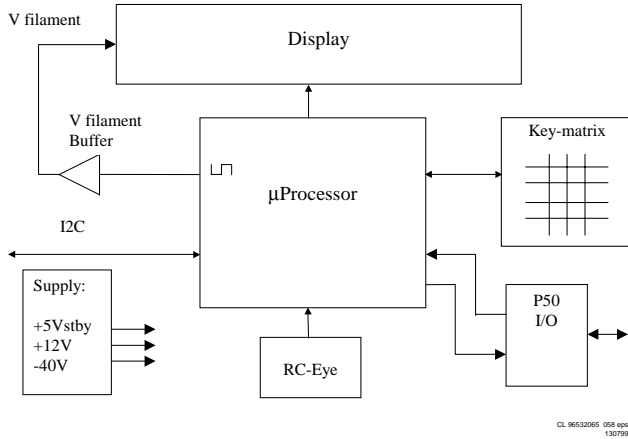


Figure 5-39

Functionality Description:

The essential component of the display PCB is the uP (slave). This slave works on an 8MHz resonator and has a reset circuit that is triggered by the +5Vstby. After the reset pulse, the standby control line will release the reset of the host uP. This host uP will then initialise the slave. In addition, when going to stand-by, the slave will put the host uP in reset. When the slave receives the right IR or key code to leave the standby mode, the reset of the host uP will be released.

Other slave functions are:

- Square signal generator to generate the filament voltage, which is required for an AC FTD.
- Generates the grid and segment scanning for the FTD.
- Generates a scanning grid for the keys (separated from display scanning).
- Has inputs for RC (RC5 and RC6) and P50 (P50 controller is built in).

General

- Oscilloscope measurements have been carried out using a Philips PM3392A.
- Impedance of measuring-equipment should be > 1M Ω .
- To do correct measurements we recommend to use supply 3139 248 70851. Make sure that the main 3.3V has a 0.7A load.

Reset

Check next reset timing with an oscilloscope at pin 10 of the μ processor 7401.

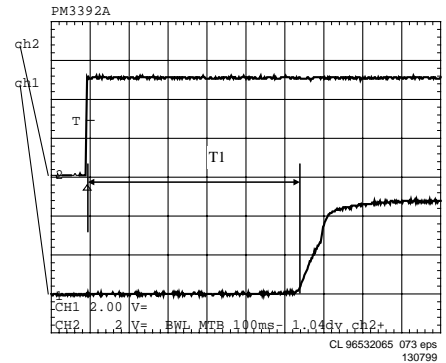


Figure 5-40

Timing: 400msec < T1 > 700msec.
CH1: +5Vstby voltage at power on.
CH2: Voltage at pin 10.

Display Steering

Check next timing and level for all grid-lines (G1 r G14).

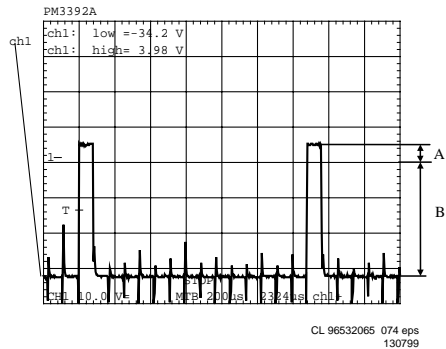


Figure 5-41

1. Check level A: +4V5 \pm 10% for grid lines 1 => 11
2. Check level A: +4V0 \pm 10% for grid lines 12 => 14
3. Check level B: -33V \pm 10%
4. Check timing and levels of segment-lines P1 r P10:

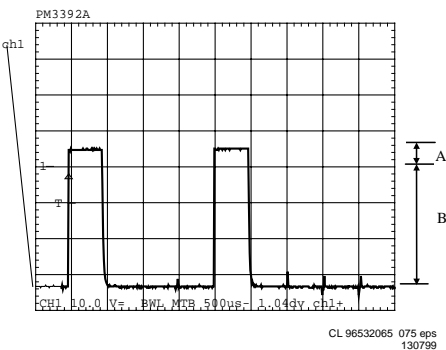


Figure 5-42

Level A: +4V5 \pm 10%
Level B: -33V \pm 10%

The data on these segment lines depend on the characters that are displayed.
The characters can be set by sending I2C commands to the display.
See the Slave URS how to send a display command.

Key-Matrix

Connect a extra 10k(pull-up to pin 36 en 37 of the uP and check next matrix scanning at these pins.

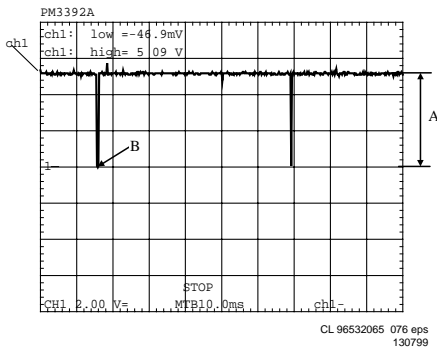


Figure 5-43

Level A: 5.0V \pm 7%

Level B: 0V \pm 200mV

Check matrix scanning from pin 26 until 33 of the uP.
The results should be the same as the diagram above.

I.R. Receiver

Check at pin 22 of 7401 if this line switches from low (< 0.3V) to high (> 4.5V), while pressing a key on a Philips RC5 or RC6 remote control.

P50 Interface

P50 is a bi-directional serial interface, which is used for communication between video equipment. For European sets, this communication goes via pin 10 of the scart-bus. In other regions, it can be a cinch bus at the back of the set.

1. Keep the uP in reset by short-circuiting emitter and collector of transistor 7105, via resistor 3100 and 3107 transistor 7101 is switched on.
2. Check the voltage at the P50 output connector 1108-5: < 200mV.

When the reset is released the uP output-pin becomes low and transistor 7101 is switched off.

1. Check the voltage at the P50 output connector 1108-5: 4V9 \pm 5%.
2. Check also the uP P50 input (uP pin 20): 5V \pm 5%.
3. Connect the P50 line (connector 1108-5) to ground.
4. Check again the uP P50 input (uP pin 20): <0V3.

5.11 Test Instruction Audio/Video Board

These test instructions can be used for all versions of the A/V board which has the following outputs:

- Audio L/R
- 5.1 Audio output
- Subwoofer output
- Optical / Coaxial digital output
- CVBS
- Y/G_vid,U/B_vid,V/R_vid output
- S-video
- Scart output

5.11.1 General

- All the waveforms measurement carried out in these test instruction will be base on the testpoint indicated in the A/V board schematic diagram in the Service manual.
- Impedance of the measuring-equipment should be > 1M Ω
- Most of the tests can be done using either the Diagnostic software "Player script" which can be found in the chapter "Diagnostic Software description and troubleshooting" or the Menu interface using the Service PC with a terminal emulation program (e.g. Window Hyperterminal) where it is possible to control the execution of the Diagnostic Nuclei
- Setup for the measurement will be done in set level with all modules connected as shown in the Wiring Block diagram.

5.11.2 General Start-Up Measurement**Supply Check:**

Before starting the measurement,ensure that all power supply are connected to the A/V board.

Pin nbr	Supply
1405-9	-5V (-Vcc)
1405-10	+5V
1405-11	+5V

The supply currents can be measured using a Tektronics AM503B current probe or equivalent.

Supply	Power consumption (AVG)
+5VA	+5V \pm 3% I = 200mA
+5Vvid	+5V \pm 3% I = 200mA
-5V	-5V \pm 3% I = 200mA

Clock Check

Ensure the present of the clock to the DAC

Clock Name	Testpoint	Frequency
PCM_CLK	I165	11.2896MHz \pm 0.02% tolerance
384FS	I110	16.9344MHz \pm 0.02% tolerance

Audio Mute Check

Measure the Audio mute voltage input at pin 12 of connector 1405

Status	Value
AudioMuteOn	4.7V \pm 10%
AudioMuteOff	-8V \pm 10%

To toggle between ON and OFF,use the following commands:

Ref.#	Command Name	Remarks
19a	AudioMuteOn	Audio Mute On
19b	AudioMuteOff	Audio Mute Off

5.11.3 Audio DAC And Amplifier

Ensure that the Audio mute signal is OFF

To check the DAC and buffer amplifier,send the following commands:

Ref.#	Command Name	Remarks	Audio output
21a	AudioSineOn	Audio Sine signal ON	Sine,1Khz on stereo
----	Press stop button	Audio Sine signal OFF	No waveform
20a	AudioPinkNoiseOn	Audio Pinknoise ON	Pink Noise on 6 channels
20b	AudioPinkNoiseOff	Audio Pinknoise OFF	No waveform

The audio signal (sine or pink noise) will also be present on the digital output (SPDIF).This can be checked by connecting digital signal to an amplifier with digital input.

Check the I2S and audio signal at the following testpoints:

Name	Testpoint
LRCLK	I117
BCLK	I118
PCM_CLK	I165
SDT3	I112
SDT2	I114
SDT1	I116
DIG_OUT	I583
AUDIO L/R OUT	I321 / I322
FRONT L/R OUT	I326 / I328
SURROUND L/R OUT	I333 / I337
CENTRE OUT	I410
SUB WOOFER L/R OUT	I407

All waveforms can be referred to the A/V schematic diagram.

5.11.4 Video Output And Buffer Amplifier

Check DC output-level at all video cinch output : 1.0V DC \pm 10%

Generate a color bar using the following software commands:

Ref.#	Command Name	Remarks
23a	VideoColDencOn	Colour DENC ON
23b	VideoColDencOff	Colourbar DENC OFF

Check the video outputs at the following testpoints:

Name	Testpoint
B_VID	I500 / I553
G_VID	I502 / I554
R_VID	I503 / I555
CVBS out	I562 / I560
S-Video-C out	I566
S-Video-Y out	I565
Y out	I572
U out	I576
V out	I582

All waveforms can be referred to the A/V schematic diagram.

5.11.5 Play and 16/9 Detection

Check DC voltage at S-Video-chroma output (pin 4) with a 6K8 ohm load and Scart connector (pin 8) and change the 0/6/12 input (1405-8) using the following commands:

Ref.#	Command Name	Remarks	Chroma output
25a	VideoScartLo	Sends out 0V 0.5V	<0.1V
25b	VideoScartMi	Sends out 6V 10%	2.0V 10% with load

Ref.#	Command Name	Remarks	Chroma output
			5.0V 10% without load
25c	VideoScartHi	Sends out 12V 10%	<0.1V

5.11.6 Kill Circuit

To check the functionality of the Kill circuitry,the audio outputs has to be present by the following command:

Ref.#	Command Name	Remarks	Audio output
21a	AudioPinkNoiseOn	Audio Pinknoise ON	Pink Noise on 6 channels

Check the audio outputs at the audio cinch of the A/V board : Pink Noise

Activate the Kill circuit by using the following command:

Ref.#	Command Name	Remarks
19a	AudioMuteOn	Audio Mute On

Check the audio outputs at the audio cinch of the A/V board : No waveform

Switch off the kill circuit by using the following command:

Ref.#	Command Name	Remarks
19b	AudioMuteOff	Audio Mute Off

Check the audio outputs at the audio cinch of the A/V board : Pink Noise

5.11.7 Base Management

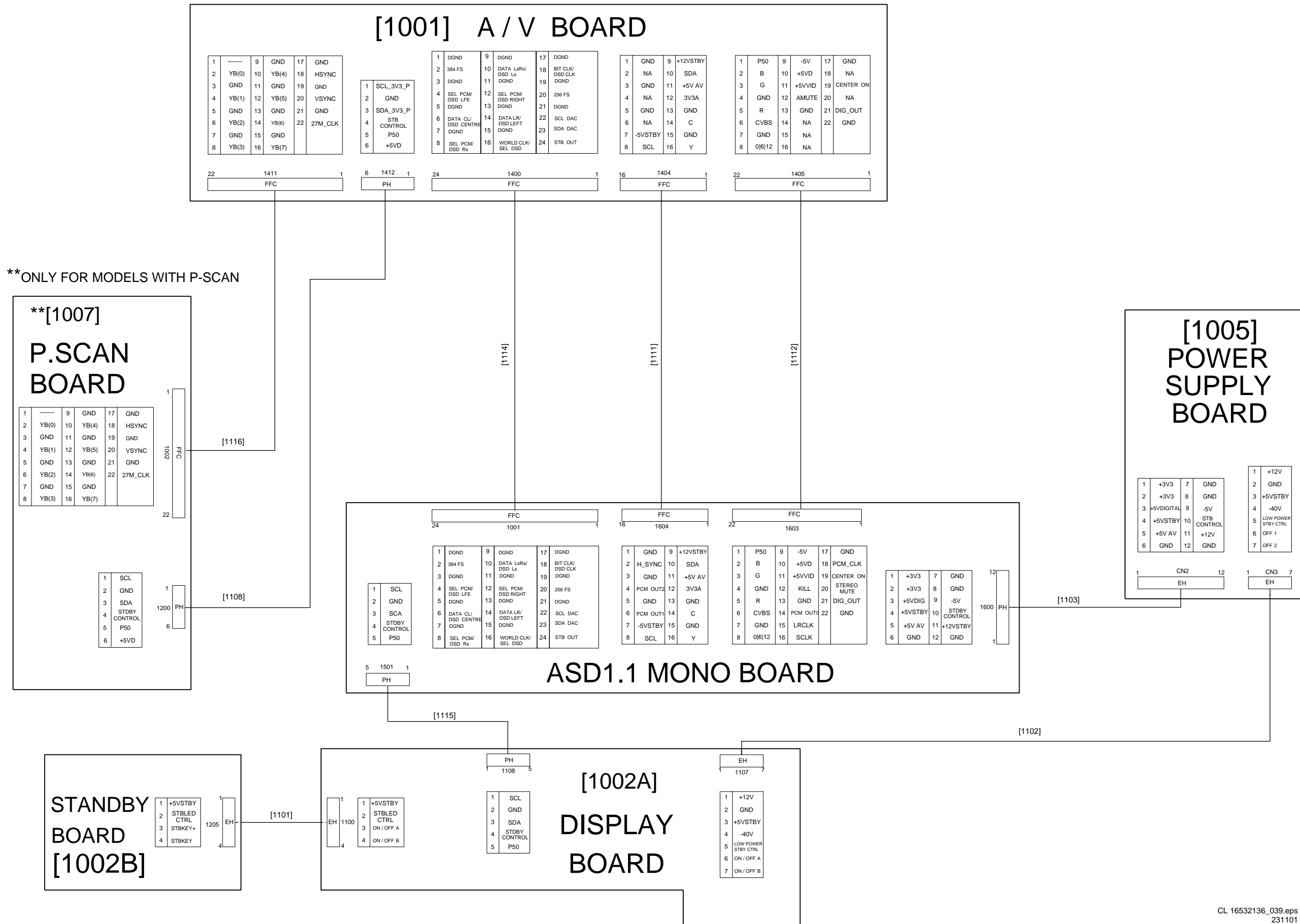
To check the Base management, the audio signal has to be present with the command: AudioPinknoise ON.

Activate the Base management and check the audio Pinknoise amplitude at the Subwoofer audio cinch outputs.

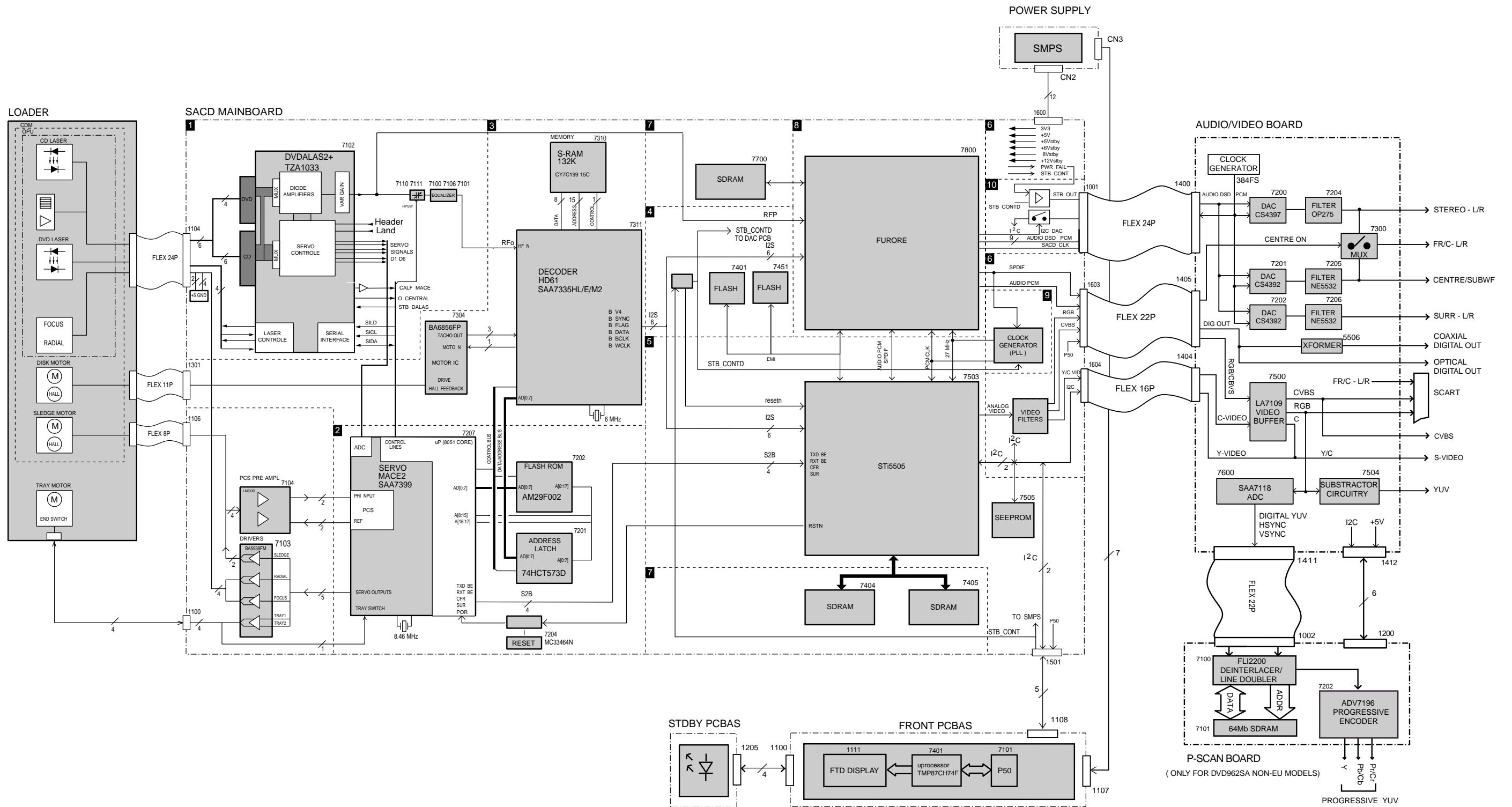
Ref.#	Command Name	Remarks	Subwoofer Output
69a	Base Normal	Base Mgt OFF	Amplitude < 200mVpp
69b	Base Management	Base Mgt ON	Amplitude < 1Vpp

6. Wiring and Block Diagram

Wiring Diagram

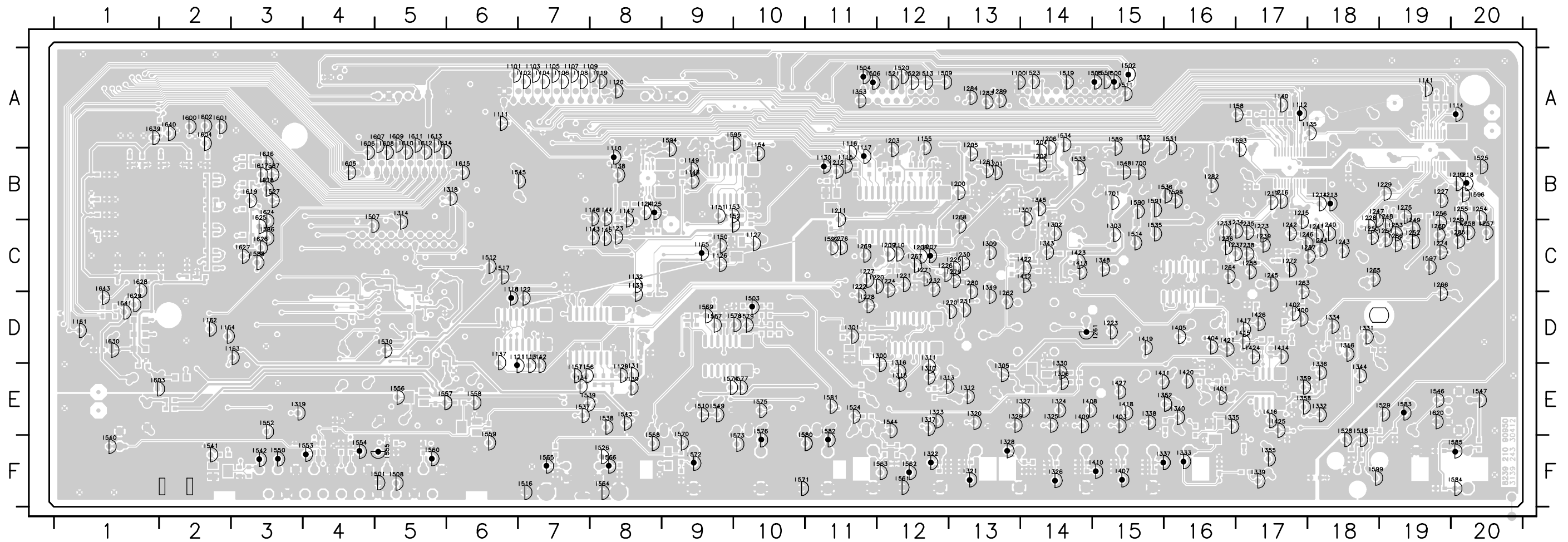


General Block Diagram



Testpoint Overview AV Board: (Bottom Side)

1100	A13	1134	E7	1204	A14	1237	C16	1270	D13	1315	E12	1353	A11	1502	A15	1536	B16	1569	D9	1602	A2
1101	A6	1135	A18	1205	A13	1238	C17	1271	C12	1316	D12	1355	F17	1503	D10	1537	E7	1570	E9	1603	E1
1102	A7	1137	D6	1206	A14	1239	C17	1272	C17	1317	E12	1358	E17	1504	A11	1538	E8	1571	F10	1604	A2
1103	A7	1138	B8	1207	C12	1240	C18	1273	C17	1318	B6	1359	E17	1505	A15	1539	E7	1572	F9	1605	B4
1104	A7	1139	E8	1208	C12	1241	C18	1274	C19	1319	E3	1400	D17	1506	A11	1540	F1	1573	F10	1606	A4
1105	A7	1140	A17	1209	C12	1242	C17	1275	B19	1320	E13	1401	E16	1507	B4	1541	F2	1574	E9	1607	A5
1106	A7	1141	A19	1210	C12	1243	C18	1276	C11	1321	F13	1402	D17	1508	F5	1542	F3	1575	E10	1608	A5
1107	A7	1142	D7	1211	B11	1244	C18	1277	C11	1322	F12	1403	E15	1509	A12	1543	E8	1576	E10	1609	A5
1108	A7	1143	C8	1212	B11	1245	C17	1278	D11	1323	E12	1404	D16	1510	E9	1544	E12	1577	E10	1610	A5
1109	A8	1144	B8	1213	B18	1246	C17	1279	C13	1324	E14	1405	D16	1511	A15	1545	B7	1578	D10	1611	A5
1110	B8	1145	C8	1214	B18	1247	B18	1280	C13	1325	E14	1407	F15	1512	C6	1546	E19	1579	D10	1612	A5
1111	A6	1146	B8	1215	B17	1248	B19	1281	B13	1326	F14	1408	E14	1513	A12	1547	E20	1580	E10	1613	A5
1112	A17	1147	B8	1216	B17	1249	C19	1282	B16	1327	E14	1409	E14	1514	C15	1548	B15	1581	E11	1614	A5
1113	D7	1148	B9	1217	B17	1250	C18	1283	A13	1328	F13	1410	F15	1515	F7	1549	E9	1582	E11	1615	B6
1114	A20	1149	B9	1218	B20	1251	C19	1284	A13	1329	E13	1411	E15	1517	C6	1550	F3	1583	E19	1616	B3
1115	B11	1150	C9	1219	B20	1252	C19	1285	C20	1330	E14	1412	C14	1518	E18	1551	A15	1584	F20	1617	B3
1116	A11	1151	B9	1220	C11	1253	C19	1286	C19	1331	D18	1413	C14	1519	A14	1552	E3	1585	F20	1618	B3
1117	A11	1152	B9	1221	C12	1254	B20	1287	C18	1332	E18	1414	D17	1520	A12	1553	F4	1586	C3	1619	B3
1118	C6	1153	B9	1222	C11	1255	B20	1288	C17	1333	F16	1415	D17	1521	A12	1554	F4	1587	B3	1620	E19
1119	A8	1154	A10	1223	D15	1256	B19	1289	A13	1334	D18	1416	E17	1522	A12	1555	F5	1588	C3	1624	B3
1120	A8	1155	A12	1224	C12	1257	C20	1300	D12	1335	E16	1417	D17	1523	A14	1556	E5	1589	A15	1625	B3
1121	D6	1156	E7	1225	C13	1258	C20	1301	D11	1336	E18	1418	E15	1524	E11	1557	E5	1590	B15	1626	C3
1122	C7	1157	E7	1226	C12	1259	C20	1302	C14	1337	F15	1419	D15	1525	B20	1558	E6	1591	B15	1627	C3
1123	C8	1158	A17	1227	B19	1260	C19	1303	C15	1338	E15	1420	E16	1526	F8	1559	E6	1592	C11	1628	C1
1124	B8	1161	D1	1228	B18	1261	D14	1305	E13	1339	F17	1421	D16	1527	B3	1560	F5	1593	A17	1629	D1
1125	B8	1162	D2	1229	B19	1262	D13	1306	E14	1340	E16	1422	C14	1528	E18	1561	F12	1594	A9	1630	D1
1126	C9	1163	D3	1230	C13	1263	C17	1307	B14	1343	C14	1423	C14	1529	E19	1562	F12	1595	A10	1639	A1
1127	C10	1164	D2	1231	D13	1264	C16	1309	C13	1344	E18	1424	D17	1530	D5	1563	F12	1596	B20	1640	A2
1129	E8	1165	C9	1232	C12	1265	C18	1310	E12	1345	B14	1425	E17	1531	A16	1564	F8	1597	C19	1641	D1
1130	B11	1200	B13	1233	C16	1266	C19	1311	D12	1346	D18	1426	D17	1532	A15	1565	F7	1598	B16	1643	C1
1131	E8	1201	B13	1234	C17	1267	C12	1312	E13	1348	C15	1427	E15	1533	B14	1566	F8	1599	F18	1700	B15
1132	C8	1202	B14	1235	C17	1268	B13	1313	E12	1349	C13	1500	A15	1534	A14	1567	D9	1600	A2	1701	B15
1133	C8	1203	A12	1236	C16	1269	C11	1314	B5	1352	E16	1501	F5	1535	C15	1568	E8	1601	A2		



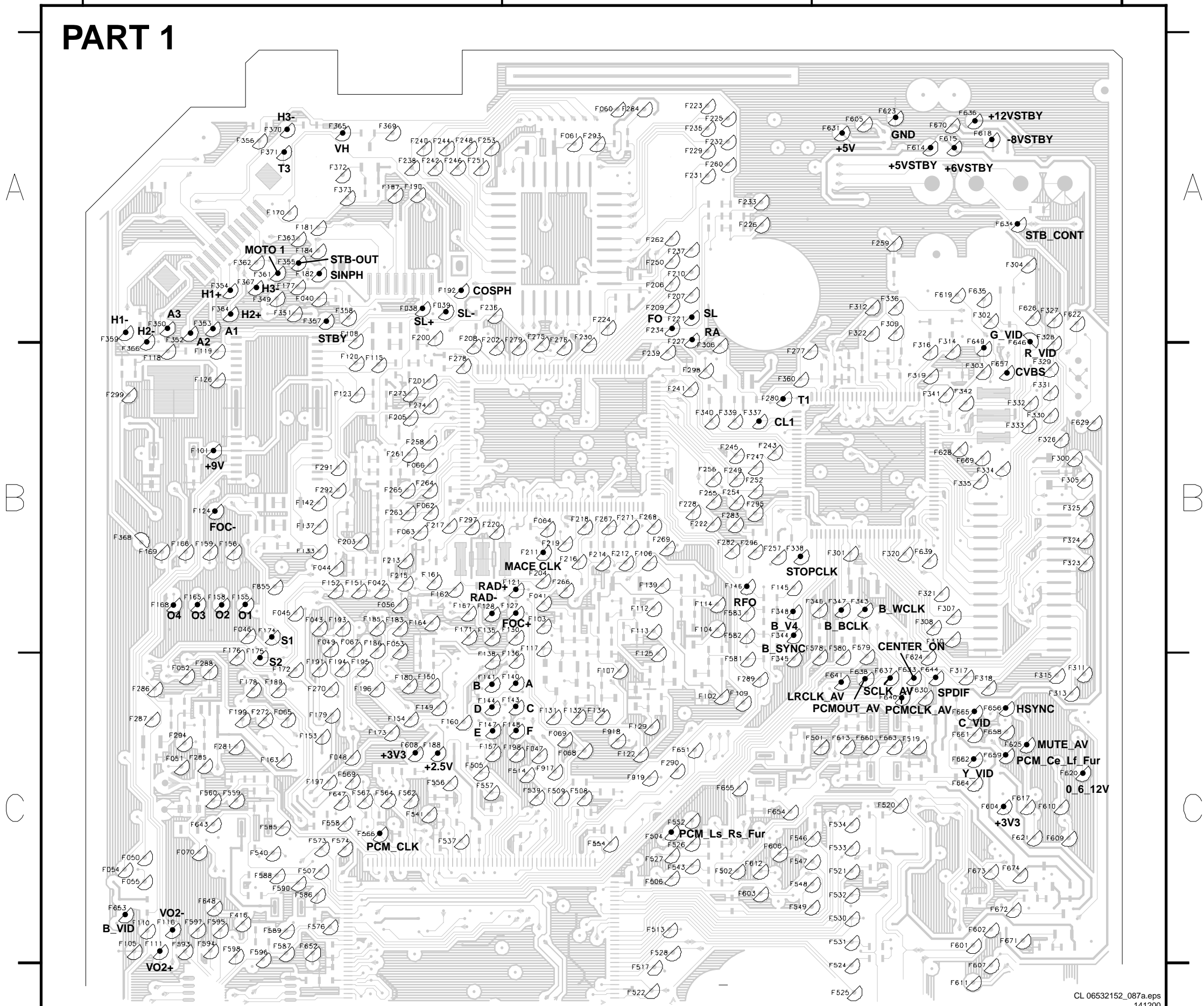
Testpoints Mono Board: (Part 1 Bottom Side)

1

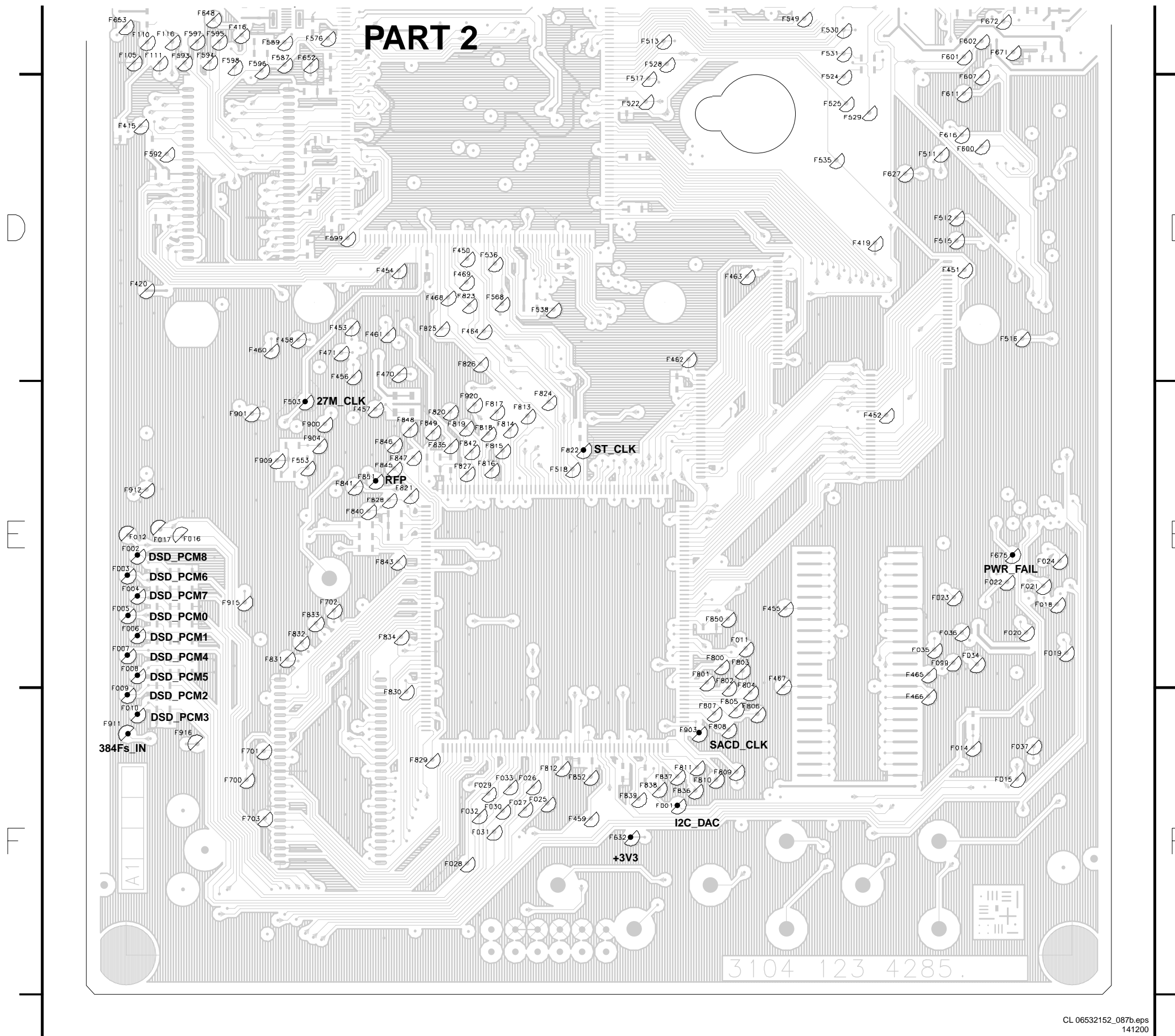
2

3

PART 1

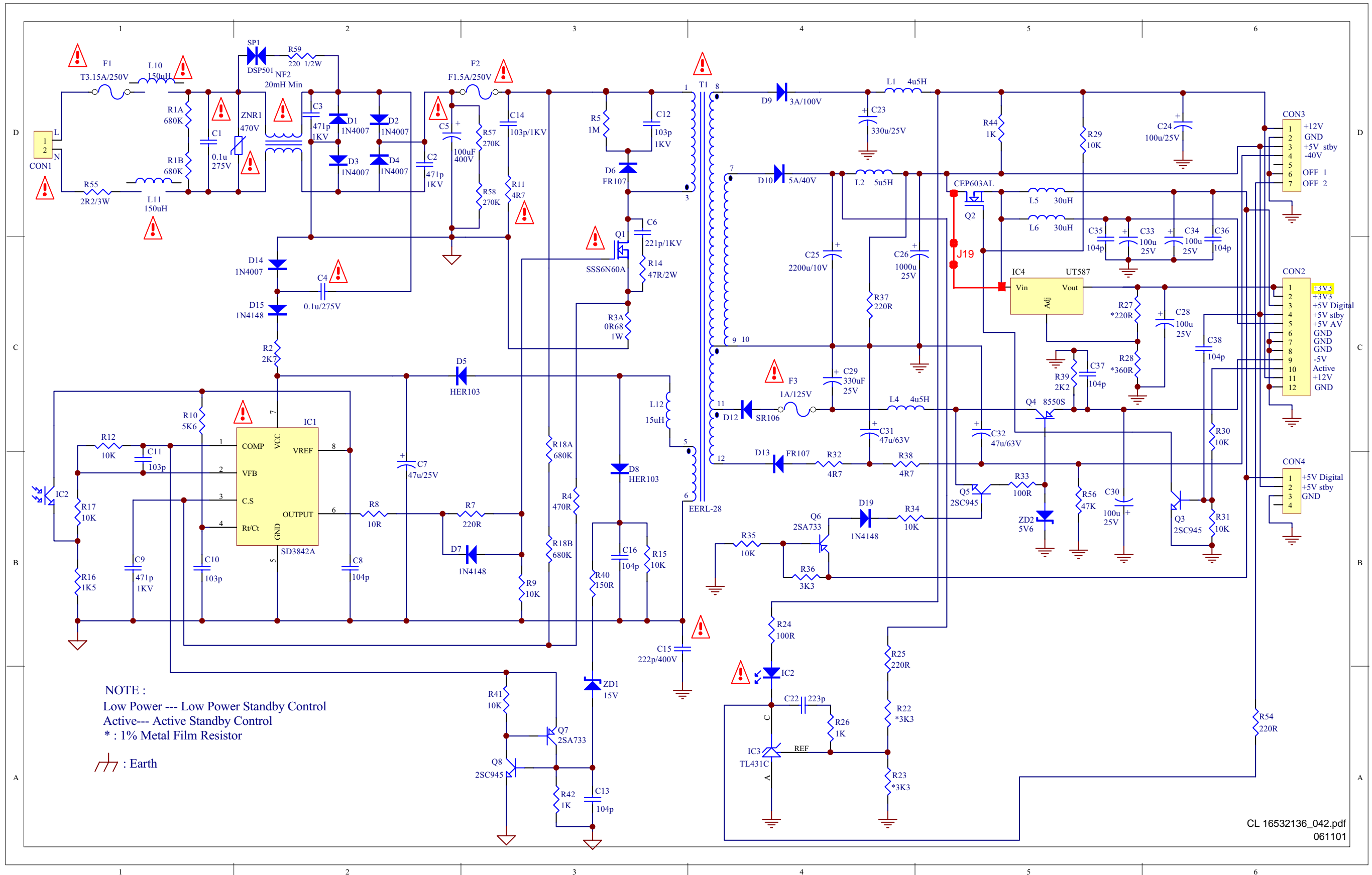


Testpoints Mono Board: (Part 2 Bottom Side)



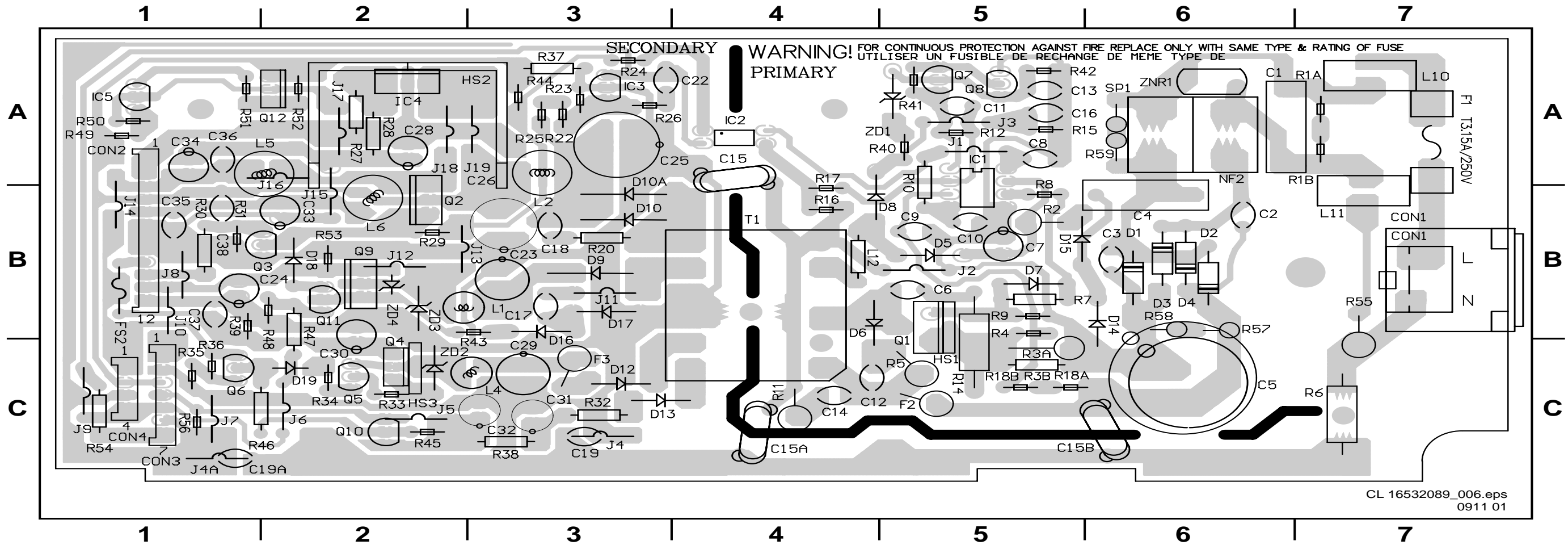
7. Electrical Diagrams and PWB s

Power Supply Unit SACD2001 Wide Range



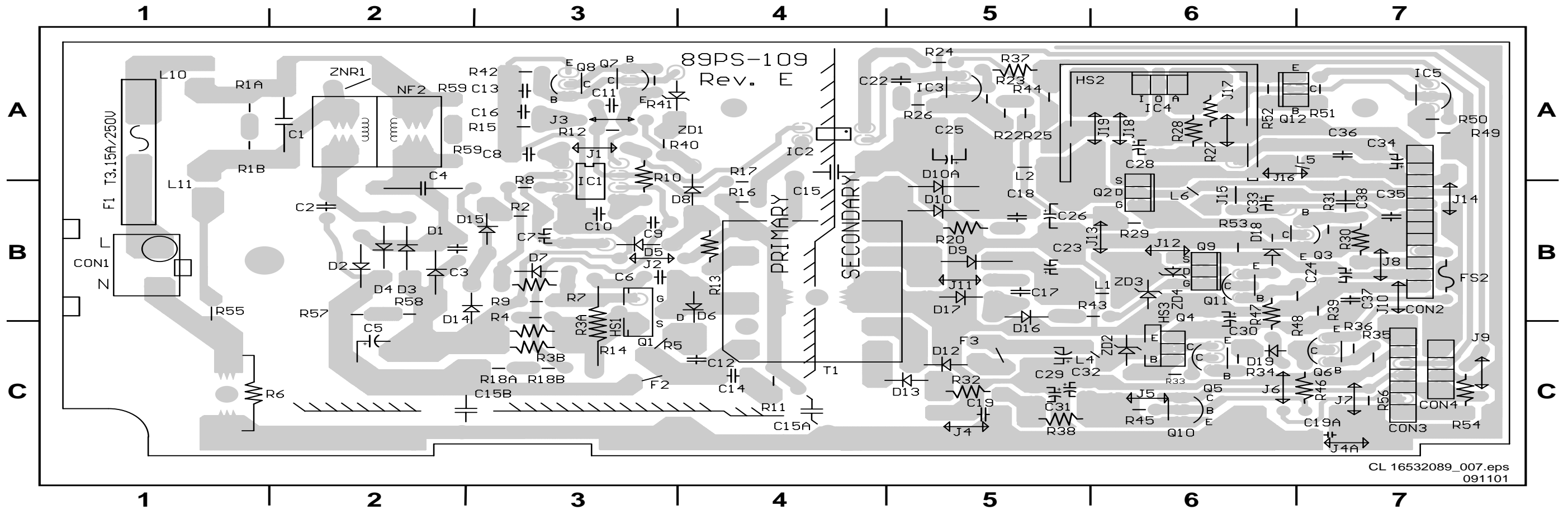
Layout Power Supply Unit (Top Side)

C1	D1	C10	B1	C24	D6	C34	D6	D1	D2	D10	D4	IC1	C2	L6	D5	Q5	B5	R5	D3	R16	B1	R27	C5	R36	B4	R55	D1	ZNR1	D2
C2	D2	C11	B1	C25	C4	C35	D5	D2	D2	D12	C4	IC2	B1	L10	D1	Q6	B4	R7	B3	R17	B1	R28	C5	R37	C4	R56	B5		
C3	D2	C12	D3	C26	C4	C36	D6	D3	D2	D13	B4	IC2	A4	L11	D1	Q7	A3	R8	B2	R18A	C3	R29	D5	R38	B4	R57	D3		
C4	C2	C13	A3	C28	C6	C37	C5	D4	D2	D14	C2	IC3	A4	L12	C3	Q8	A3	R9	B3	R18B	B3	R30	C6	R39	C5	R58	D3		
C5	D2	C14	D3	C29	C4	C38	C6	D5	C2	D15	C2	IC4	C5	NF2	D2	R1A	D1	R10	C1	R22	A4	R31	B6	R40	B3	R59	D2		
C6	D3	C15	B3	C30	B5	CON1	D1	D6	D3	D19	B4	J19	C5	Q1	D3	R1B	D1	R11	D3	R23	A4	R32	B4	R41	A3	SP1	D2		
C7	B2	C16	B3	C31	C4	CON2	C6	D7	B2	F1	D1	L2	D4	Q2	D5	R2	C2	R12	C1	R24	B4	R33	B5	R42	A3	T1	D4		
C8	B2	C22	A4	C32	C5	CON3	D6	D8	B3	F2	D3	L4	C4	Q3	B6	R3A	C3	R14	C3	R25	B4	R34	B4	R44	D5	ZD1	A3		
C9	B1	C23	D4	C33	D6	CON4	B6	D9	D4	F3	C4	L5	D5	Q4	C5	R4	B3	R15	B3	R26	A4	R35	B4	R54	A6	ZD2	B5		



Layout Power Supply Unit (Bottom Side)

C1	A2	C12	C4	C23	B5	C36	A7	D6	B4	D18	B6	IC5	A7	J11	B5	L6	B6	Q9	B6	R7	B3	R18B	C3	R32	C5	R44	A5	R57	B2
C1	A2	C13	A3	C24	B7	C37	B7	D7	B3	D19	C6	J1	A3	J12	B6	L10	A1	Q10	C6	R8	A3	R20	B5	R33	C6	R45	C6	R58	B2
C2	B2	C14	C4	C25	A5	C38	B7	D8	B4	F1	B1	J2	B3	J14	B7	L11	B1	Q11	B6	R9	B3	R22	A5	R34	C6	R46	C7	R59	A2
C3	B2	C15	B4	C26	B5	CON1	B1	D9	B5	F2	C3	J3	A3	J15	B6	NF2	A2	Q12	A6	R10	A3	R23	A5	R35	C7	R47	B6	T1	C4
C4	A2	C15A	C4	C28	A6	CON2	B7	D10	B5	F3	C5	J4	C5	J16	A6	Q1	C3	R1A	A1	R11	C4	R24	A5	R36	C7	R48	C7	ZD1	A4
C5	C2	C15B	C3	C29	C5	CON3	C7	D10A	A5	FS2	B7	J4A	C7	J17	A6	Q2	B6	R1B	A1	R12	A3	R25	A5	R37	A5	R49	A7	ZD2	C6
C6	B3	C16	A3	C30	C6	CON4	C7	D12	C5	HS1	C3	J5	C6	J18	A6	Q3	B7	R2	B3	R13	B4	R26	A5	R38	C5	R50	A7	ZD3	B6
C7	B3	C17	B5	C31	C5	D1	B2	D13	C5	HS2	A6	J6	C6	J19	A6	Q4	B6	R3A	C3	R14	C3	R27	A6	R39	B7	R51	A7	ZD4	B6
C8	A3	C18	B5	C32	C5	D2	B2	D14	B2	HS3	B6	J7	C7	L1	B6	Q5	C6	R3B	C3	R15	A3	R28	A6	R40	A4	R52	A6	ZNR1	A2
C9	B3	C19	C5	C33	B6	D3	B2	D15	B2	IC2	A4	J8	B7	L2	A5	Q6	C7	R4	B3	R16	B4	R29	B6	R41	A3	R53	B6		
C10	B3	C19A	C7	C34	A7	D4	B2	D16	C5	IC3	A5	J9	C7	L4	C5	Q7	A3	R5	C3	R17	A4	R30	B7	R42	A3	R54	C7		
C11	A3	C22	A4	C35	B7	D5	B3	D17	B5	IC4	A6	J10	B7	L5	A7	Q8	A3	R6	C1	R18A	C3	R31	B7	R43	B5	R56	C7		



AV Board: Sys Clk & Control

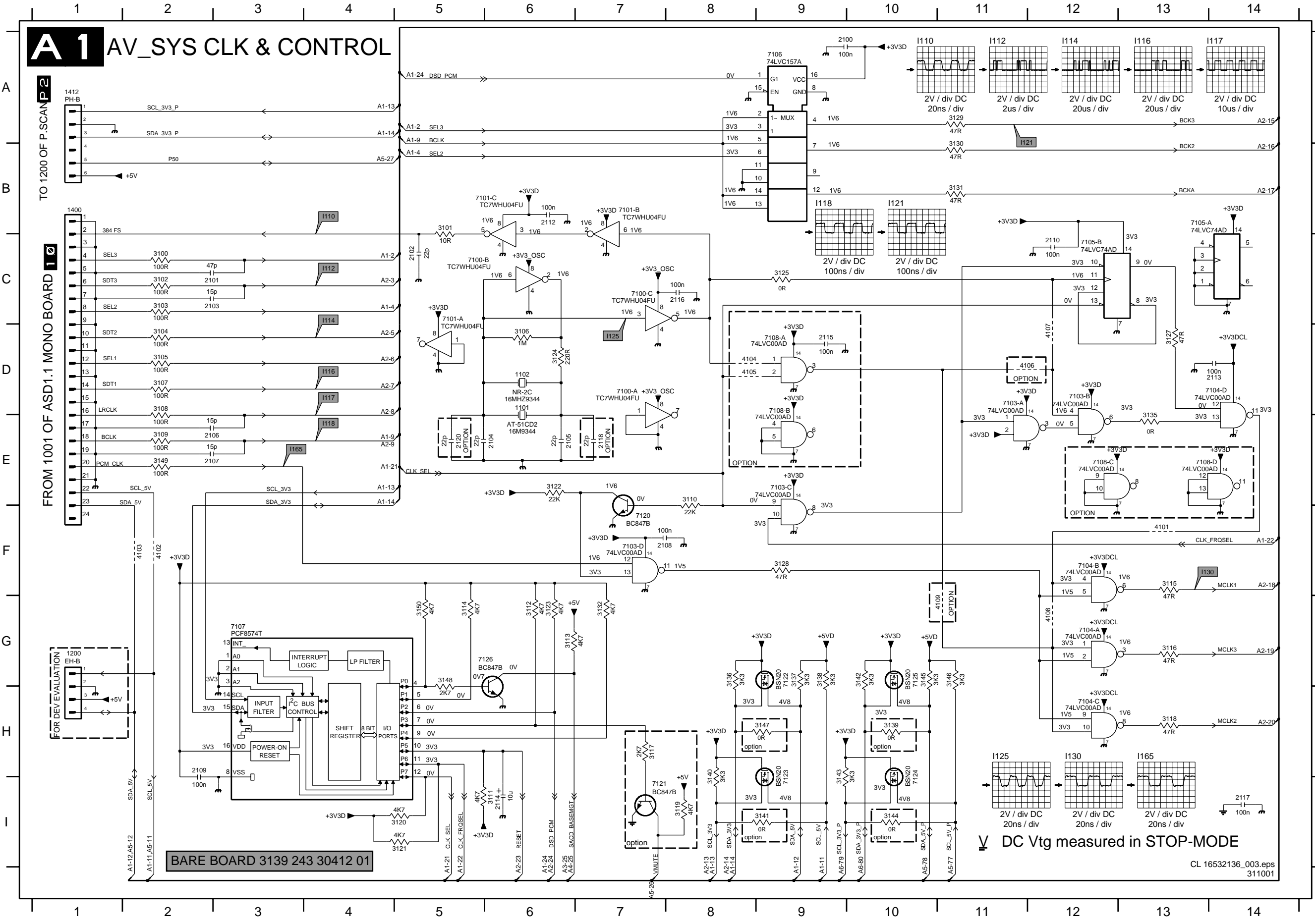
A1 AV_SYS CLK & CONTROL

TO 1200 OF P-SCAN P2

FROM 1001 OF ASD1.1 MONO BOARD I2

FOR DEV EVALUATION

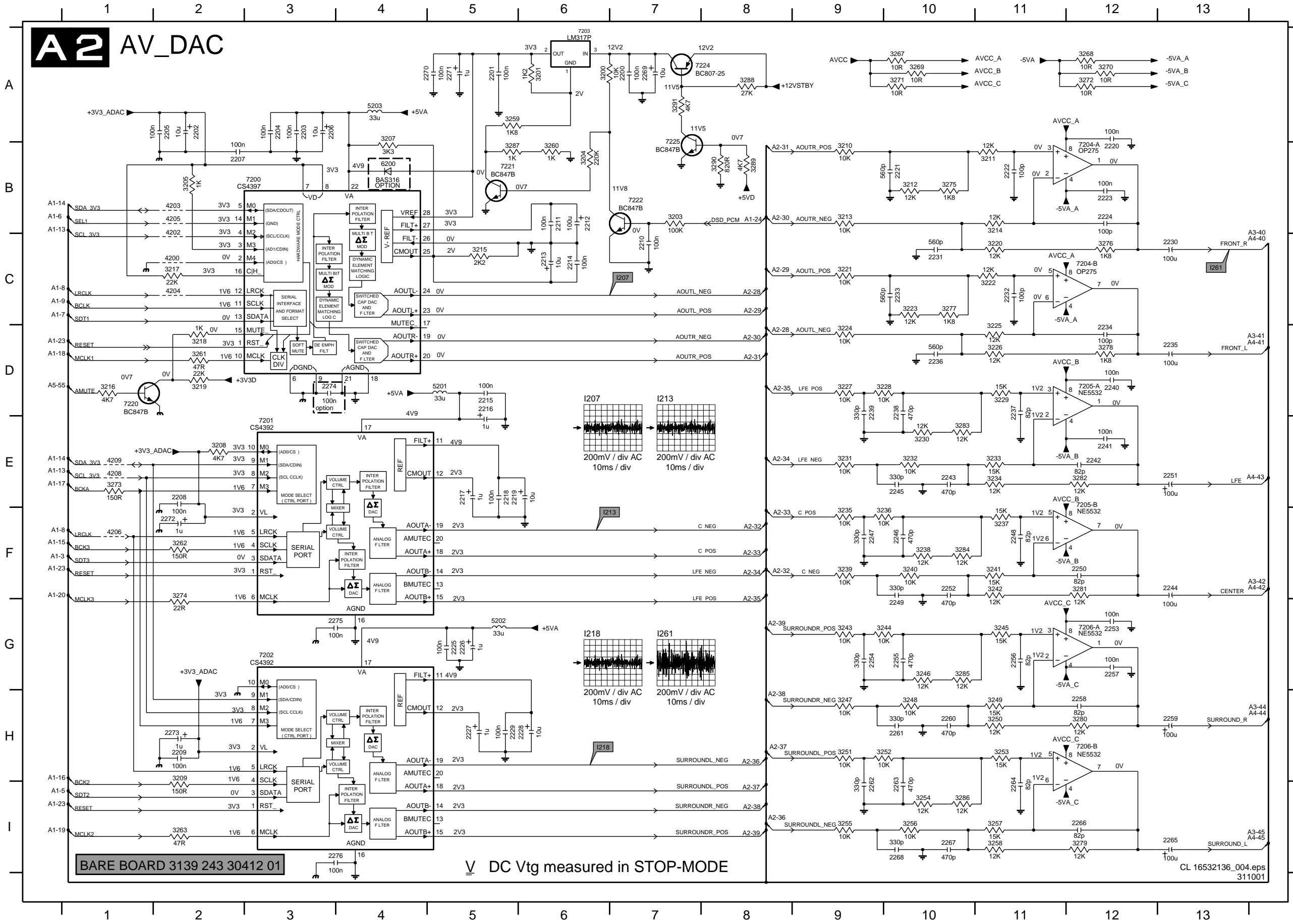
BARE BOARD 3139 243 30412 01



- 1101 D6
- 1102 G1
- 1200 G1
- 1400 B1
- 1412 A1
- 2100 A9
- 2101 C2
- 2102 C5
- 2103 C2
- 2104 E6
- 2105 E6
- 2106 E2
- 2107 E2
- 2108 F7
- 2109 H2
- 2110 C12
- 2112 B6
- 2113 D14
- 2114 I6
- 2115 D9
- 2116 C8
- 2117 H4
- 2118 E7
- 2120 E5
- 3100 C2
- 3101 B5
- 3102 C2
- 3103 C2
- 3104 D2
- 3105 D2
- 3106 D6
- 3107 D2
- 3108 D2
- 3109 E2
- 3110 E8
- 3111 I6
- 3112 G6
- 3113 G6
- 3114 G5
- 3115 F13
- 3116 G13
- 3117 H7
- 3118 H13
- 3119 I8
- 3120 I5
- 3121 I5
- 3122 E6
- 3123 G6
- 3124 D6
- 3125 C9
- 3127 D13
- 3128 F9
- 3129 A11
- 3130 B11
- 3131 B11
- 3132 G7
- 3135 E13
- 3136 G8
- 3137 G9
- 3138 G9
- 3139 H10
- 3140 I8
- 3141 I9
- 3142 G10
- 3143 I9
- 3144 I10
- 3145 G10
- 3146 G11
- 3147 H9
- 3148 G5
- 3149 E2
- 3150 G5
- 4101 F13
- 4102 F2
- 4103 F2
- 4104 D8
- 4105 D8
- 4106 D11
- 4107 D12
- 4108 G12
- 4109 G11
- 7100-A D7
- 7100-B C5
- 7100-C C7
- 7101-A C5
- 7101-B B7
- 7101-C B6
- 7103-A D11
- 7103-B D12
- 7103-C E9
- 7103-D F7
- 7104-A G12
- 7104-B F12
- 7104-C H12
- 7104-D D13
- 7105-A B13
- 7105-B C12
- 7106 A9
- 7107 G3
- 7108-A D9
- 7108-B D9
- 7108-C E12
- 7108-D E13
- 7120 F7
- 7121 I7
- 7122 G9
- 7123 I9
- 7124 I10
- 7125 G10
- 7126 G5

AV Board: DAC

A2 AV_DAC



BARE BOARD 3139 243 30412 01

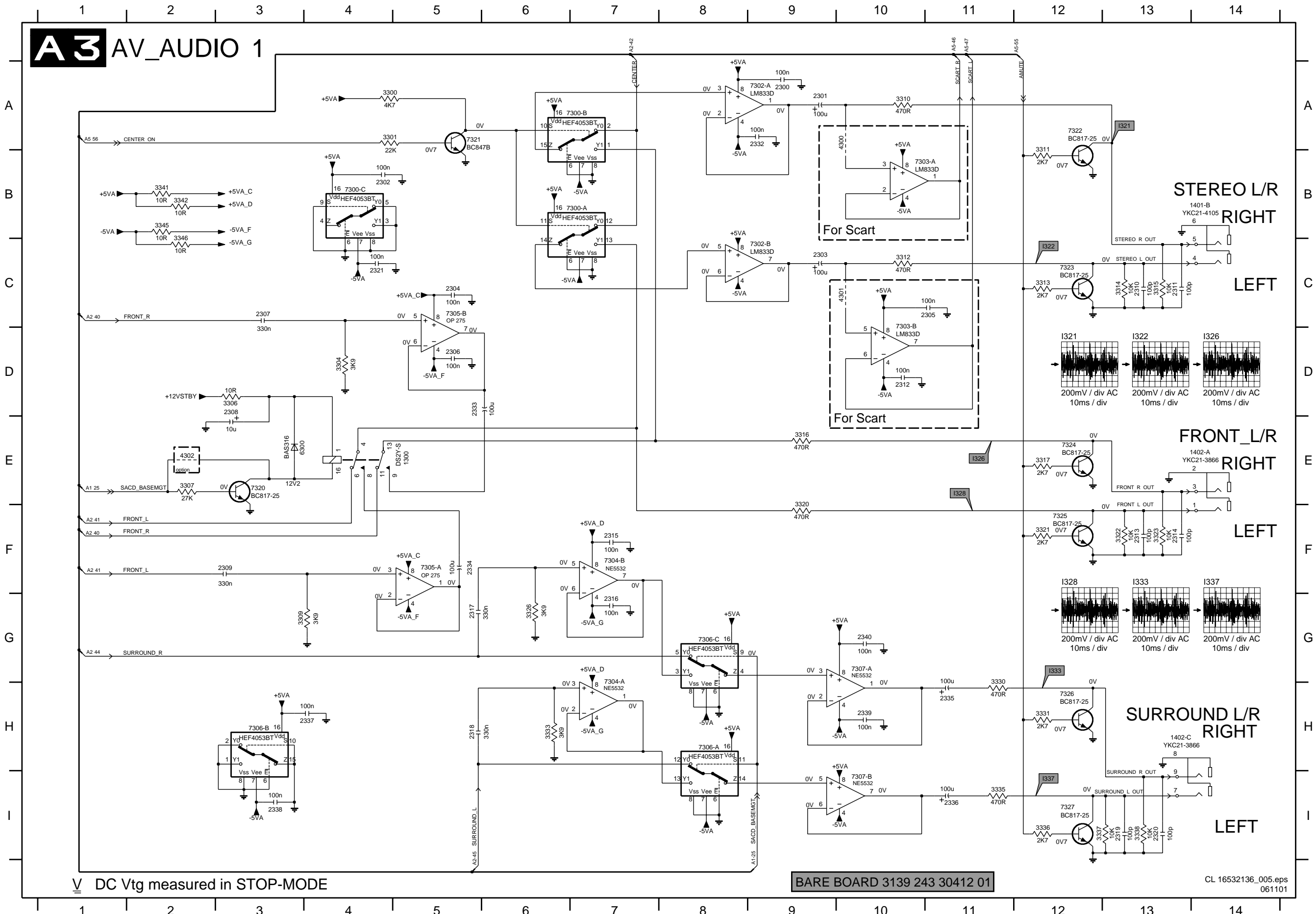
DC Vtg measured in STOP-MODE

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311001

- 2200 A7
- 2201 A5
- 2202 A2
- 2203 A3
- 2204 A3
- 2205 A2
- 2206 A3
- 2207 B2
- 2208 E2
- 2209 H2
- 2210 C7
- 2211 B6
- 2212 B6
- 2213 C6
- 2214 C6
- 2215 D5
- 2216 D5
- 2217 E5
- 2218 E5
- 2219 E5
- 2220 B12
- 2221 B10
- 2222 B11
- 2223 B12
- 2224 B12
- 2225 G5
- 2226 G5
- 2227 H5
- 2228 H6
- 2229 H5
- 2230 C13
- 2231 C10
- 2232 C11
- 2233 C10
- 2234 D12
- 2235 D13
- 2236 D10
- 2237 D11
- 2238 D10
- 2239 D9
- 2240 D12
- 2241 E12
- 2242 E12
- 2243 E10
- 2244 F13
- 2245 E10
- 2246 F10
- 2247 F9
- 2248 F11
- 2249 G10
- 2250 F12
- 2251 E13
- 2252 F10
- 2253 G12
- 2254 G9
- 2255 G10
- 2256 G11
- 2257 G12
- 2258 H12
- 2259 H13
- 2260 H10
- 2261 H10
- 2262 I9
- 2263 I10
- 2264 I11
- 2265 I13
- 2266 I12
- 2267 I10
- 2268 I10
- 2269 A7
- 2270 A5
- 2271 A5
- 2272 F2
- 2273 H2
- 2274 D3
- 2275 G3
- 2276 I3
- 3200 A6
- 3201 A6
- 3203 B7
- 3204 B6
- 3205 B2
- 3207 A4
- 3208 E2
- 3209 H2
- 3210 B9
- 3211 B11
- 3212 B10
- 3213 B9
- 3214 B11
- 3215 C5
- 3216 D1
- 3217 C2
- 3218 D2
- 3219 D2
- 3220 C11
- 3221 C9
- 3222 C11
- 3223 C10
- 3224 D9
- 3225 C11
- 3226 D11
- 3227 D9
- 3228 D10
- 3229 D11
- 3230 E10
- 3231 E9
- 3232 E10
- 3233 E11
- 3234 E11
- 3236 F9
- 3238 F10
- 3237 F11
- 3238 F10
- 3239 F9
- 3240 A7
- 3241 F11
- 3242 F11
- 3243 G9
- 3244 G10
- 3245 G11
- 3246 G10
- 3247 H9
- 3248 H10
- 3249 H11
- 3250 H11
- 3251 H9
- 3252 H10
- 3253 H11
- 3254 I10
- 3255 I9
- 3256 I10
- 3257 I11
- 3258 I11
- 3259 A5
- 3260 B6
- 3261 D2
- 3262 F2
- 3263 I2
- 3267 A10
- 3268 A12
- 3269 A10
- 3270 A12
- 3271 A10
- 3272 A12
- 3273 E1
- 3274 F2
- 3275 B10
- 3276 C12
- 3277 C10
- 3278 D12
- 3279 I12
- 3280 H12
- 3281 F12
- 3282 E12
- 3283 E10
- 3284 F10
- 3285 G10
- 3286 H10
- 3287 B5
- 3288 A8
- 3289 B8
- 3290 B8
- 3291 A7
- 4200 C2
- 4202 C2
- 4203 B2
- 4204 C2
- 4205 B2
- 4206 F1
- 4208 E1
- 4209 E1
- 5201 D5
- 5202 G5
- 5203 A4
- 6200 B4
- 7200 B3
- 7201 E3
- 7202 G3
- 7203 A6
- 7204-A B12
- 7204-B C12
- 7205-A D12
- 7205-B E12
- 7206-A G12
- 7206-B H12
- 7220 D1
- 7221 B5
- 7222 B7
- 7224 A7
- 7225 B7
- A3-40 A4-40
- A3-41 A4-41
- A3-42 A4-42
- A3-44 A4-44
- A3-45 A4-45

AV Board: Audio 1

A3 AV_AUDIO 1



- 1300 E5
- 1401-B B14
- 1402-A E14
- 1402-C H13
- 2300 A9
- 2301 A9
- 2302 B4
- 2303 C9
- 2304 C5
- 2306 C11
- 2306 D5
- 2307 C3
- 2308 D3
- 2309 F3
- 2310 C13
- 2311 C13
- 2312 D10
- 2313 F13
- 2314 F13
- 2315 F7
- 2316 G7
- 2317 G5
- 2318 H5
- 2319 I13
- 2320 I13
- 2321 C4
- 2322 A9
- 2323 D5
- 2324 F5
- 2325 H11
- 2326 I11
- 2327 H4
- 2328 I3
- 2329 H10
- 2330 G10
- 2331 A4
- 2332 A4
- 2333 D3
- 2334 D3
- 2335 G3
- 2336 G6
- 2337 H11
- 2338 I3
- 2339 H2
- 2340 H6
- 2341 I11
- 2342 I12
- 2343 I12
- 2344 I13
- 2345 B2
- 2346 B2
- 2347 C2
- 2348 A10
- 2349 C10
- 2350 E2
- 2351 E3
- 2352 A B7
- 2353 A B7
- 2354 C B4
- 2355 A A9
- 2356 B C9
- 2357 A B10
- 2358 B D10
- 2359 A H7
- 2360 A F7
- 2361 A F5
- 2362 C C5
- 2363 A H8
- 2364 B H3
- 2365 C G8
- 2366 A G10
- 2367 B I10
- 2368 E3
- 2369 A5
- 2370 A12
- 2371 C12
- 2372 E12
- 2373 F12
- 2374 H12
- 2375 I12

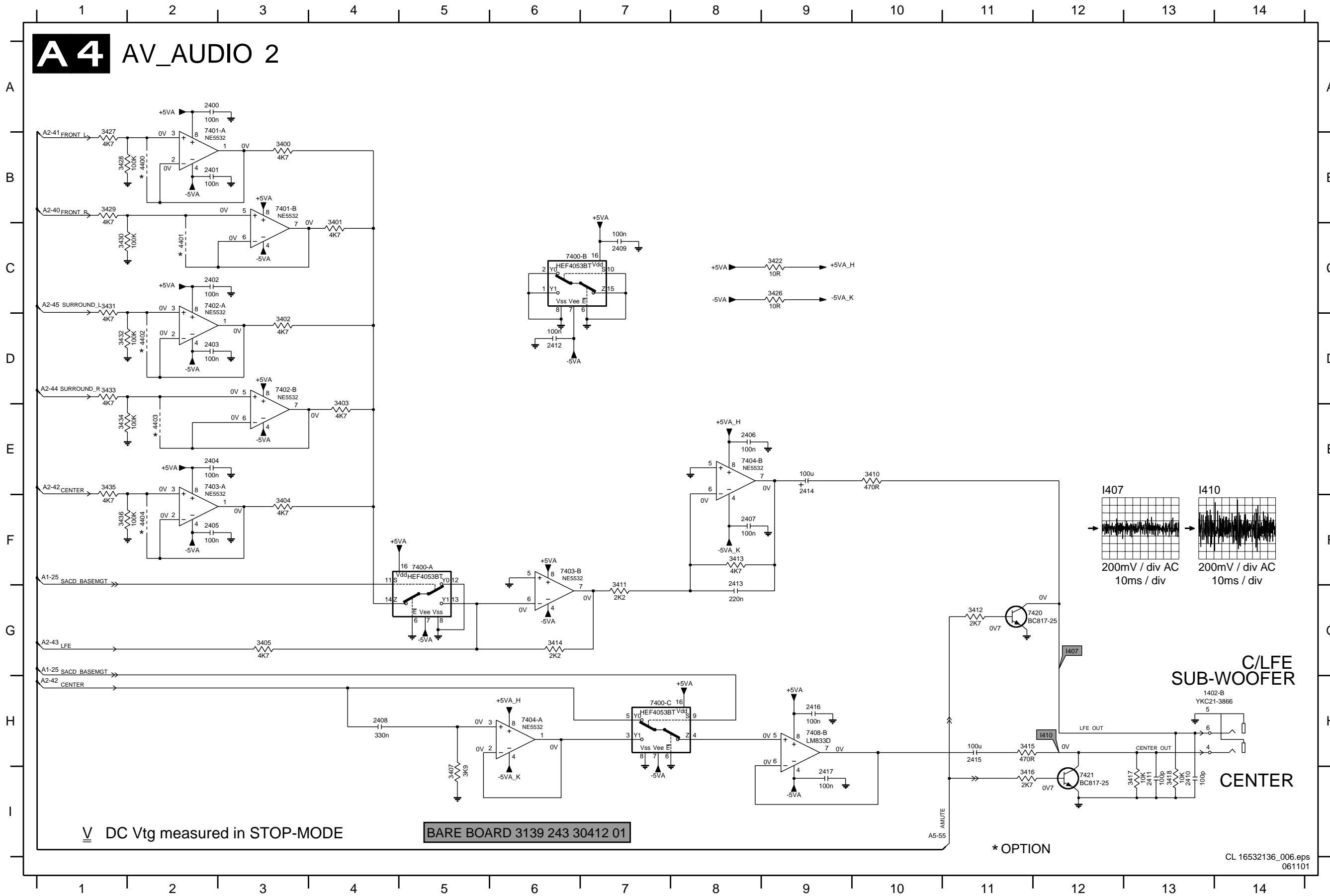
DC Vtg measured in STOP-MODE

BARE BOARD 3139 243 30412 01

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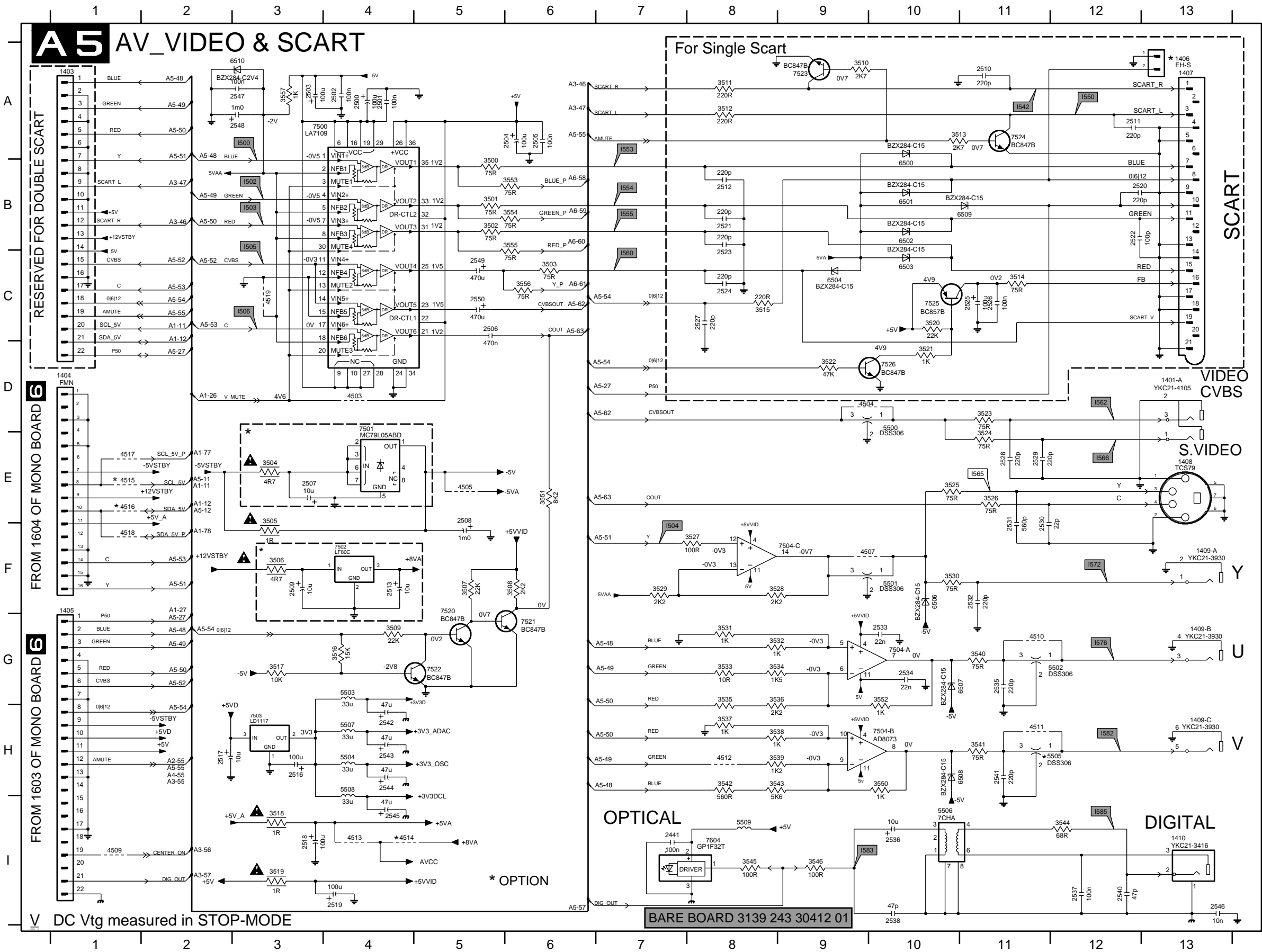
AV Board: Audio 2I

A 4 AV_AUDIO 2

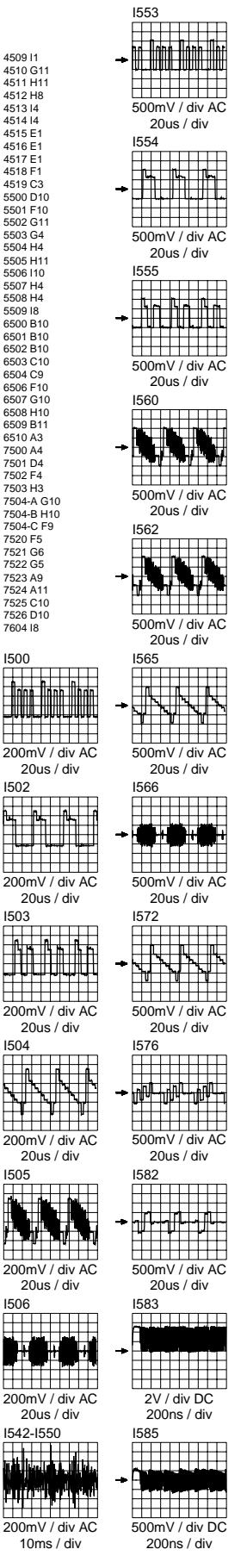


- 1402-B H13
- 2400 A2
- 2401 B2
- 2402 C2
- 2403 D2
- 2404 E2
- 2405 F2
- 2406 G2
- 2407 F8
- 2408 H4
- 2409 C7
- 2410 I13
- 2411 I3
- 2412 D6
- 2413 G8
- 2414 E9
- 2415 H11
- 2416 H9
- 2417 I9
- 3400 B3
- 3401 C4
- 3402 D3
- 3403 E4
- 3404 F3
- 3405 G3
- 3407 I5
- 3410 E10
- 3411 G7
- 3412 G11
- 3413 F8
- 3414 G6
- 3415 H11
- 3416 I11
- 3417 I13
- 3418 I13
- 3422 C9
- 3426 C9
- 3427 B1
- 3428 B1
- 3429 B1
- 3430 C1
- 3431 C1
- 3432 D1
- 3433 D1
- 3434 E1
- 3435 E1
- 3436 F1
- 4400 B2
- 4401 C2
- 4402 D2
- 4403 E2
- 4404 F2
- 7400-A F5
- 7400-B C6
- 7400-C H7
- 7401-A B2
- 7401-B B3
- 7402-A C2
- 7402-B D3
- 7403-A E2
- 7403-B F6
- 7404-A H6
- 7404-B E8
- 7408-B H9
- 7420 G11
- 7421 I2

AV Board: Video & SCART



- 1401-A D13
- 1403 A1
- 1404 D1
- 1405 F1
- 1406 A13
- 1407 A13
- 1408 E13
- 1409-A F13
- 1409-B G13
- 1409-C H13
- 1410 I13
- 2441 I7
- 2500 A4
- 2501 A4
- 2502 A4
- 2503 A3
- 2504 A6
- 2505 A6
- 2506 C5
- 2507 E3
- 2508 E5
- 2509 F3
- 2510 A11
- 2511 A12
- 2512 B8
- 2513 F4
- 2516 H3
- 2517 H2
- 2518 I3
- 2519 H4
- 2520 A3
- 2521 B8
- 2522 B12
- 2523 B8
- 2524 C8
- 2525 C11
- 2526 C11
- 2527 C9
- 2528 B11
- 2529 E11
- 2530 F11
- 2531 F11
- 2532 F11
- 2533 G10
- 2534 G10
- 2535 G11
- 2536 I10
- 2537 I12
- 2538 I10
- 2540 I12
- 2541 H11
- 2542 H4
- 2543 C8
- 2544 H4
- 2545 I4
- 2546 I13
- 2547 A3
- 2548 A3
- 2549 C5
- 2550 C5
- 3501 B5
- 3502 B5
- 3503 C6
- 3504 E3
- 3505 F3
- 3506 F3
- 3507 F5
- 3508 F6
- 3509 G4
- 3510 A9
- 3511 A8
- 3512 A8
- 3513 A10
- 3514 C11
- 3515 C8
- 3516 G4
- 3517 G3
- 3518 I3
- 3519 I3
- 3520 C10
- 3521 D10
- 3522 D9
- 3523 D11
- 3524 E11
- 3525 E10
- 3526 E11
- 3527 F8
- 3528 F8
- 3529 F7
- 3530 F10
- 3531 G8
- 3532 G8
- 3533 G8
- 3534 G8
- 3535 G8
- 3536 G8
- 3537 H8
- 3538 H8
- 3539 H8
- 3540 G11
- 3541 H11
- 3542 H8
- 3543 H8
- 3544 I12
- 3545 I8
- 3546 I9
- 3550 H10
- 3551 E6
- 3552 G10
- 3553 B6
- 3554 B6
- 3555 B6
- 3556 C6
- 3557 A3
- 4503 D4
- 4504 D9
- 4505 E5
- 4507 F9



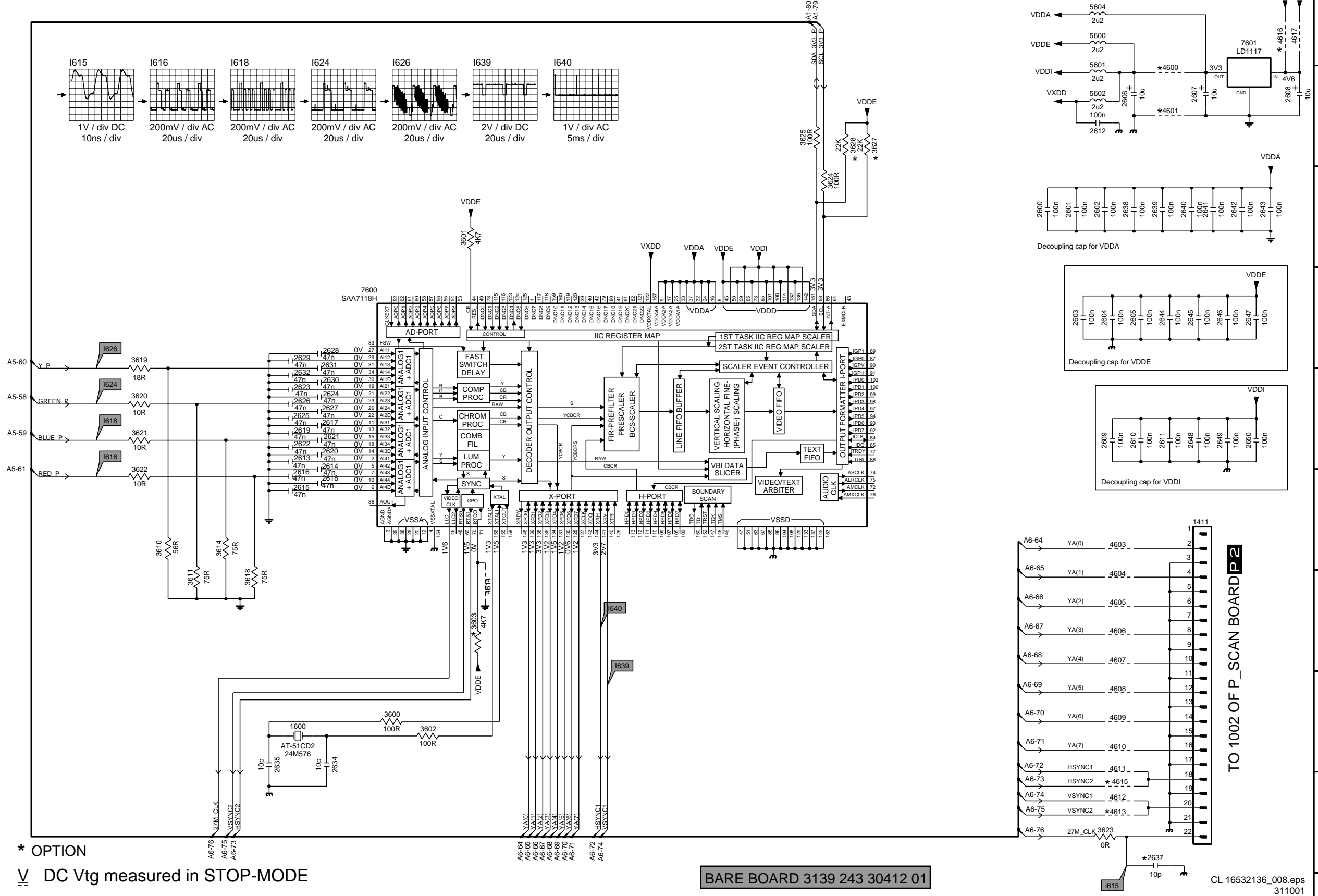
V DC Vtg measured in STOP-MODE

BARE BOARD 3139 243 30412 01

AV Board: Digital YUV

1 2 3 4 5 6 7 8 9 10 11 12 13

A6 AV_DIGITAL YUV

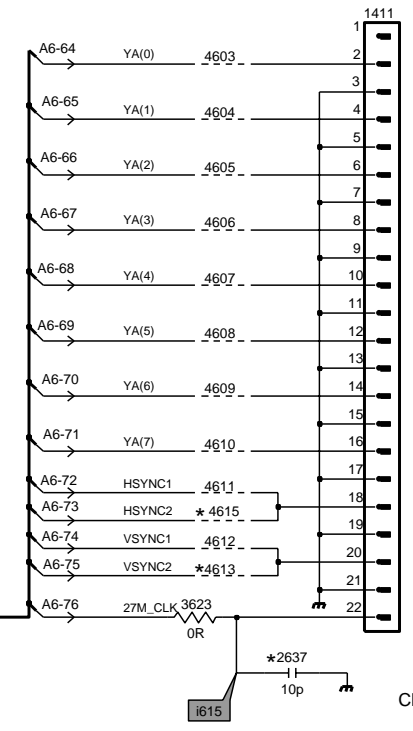
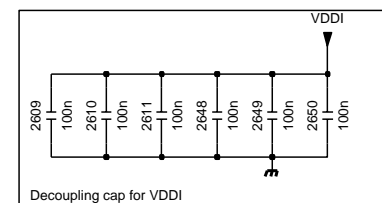
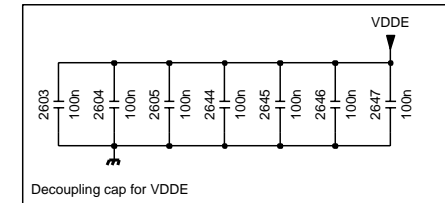
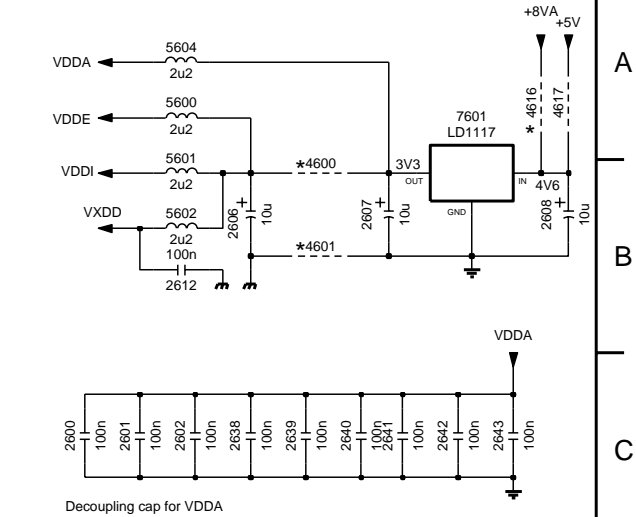


- 1411 F12
- 1600 H3
- 2600 C11
- 2601 C11
- 2602 C11
- 2603 D11
- 2604 D11
- 2605 D12
- 2606 B12
- 2607 B12
- 2608 B13
- 2609 E11
- 2610 E12
- 2611 E12
- 2612 B11
- 2613 E4
- 2614 E4
- 2615 F4
- 2616 E4
- 2617 E4
- 2618 F4
- 2619 E4
- 2620 E4
- 2621 E4
- 2622 E4
- 2623 E4
- 2624 E4
- 2625 E4
- 2626 E4
- 2627 E4
- 2628 D4
- 2629 D4
- 2630 E4
- 2631 D4
- 2632 E4
- 2633 H4
- 2634 H4
- 2635 H3
- 2637 I12
- 2638 C12
- 2639 C12
- 2640 C12
- 2641 C12
- 2642 C12
- 2643 C13
- 2644 D12
- 2645 D12
- 2646 D13
- 2647 D13
- 2648 E12
- 2649 E13
- 2650 E13
- 3600 H4
- 3601 C5
- 3602 H5
- 3603 G5
- 3610 F2
- 3611 G2
- 3613 F3
- 3618 G3
- 3619 D2
- 3620 E2
- 3621 E2
- 3622 F2
- 3623 I11
- 3624 C9
- 3625 B8
- 3627 B9
- 3628 B9
- 4600 B12
- 4601 B12
- 4603 F12
- 4604 G12
- 4605 G12
- 4606 G12
- 4607 G12
- 4608 H12
- 4609 H12
- 4610 H12
- 4611 H12
- 4612 I12
- 4613 I12
- 4614 G5
- 4615 I12
- 4616 A13
- 4617 A13
- 5600 A11
- 5601 B11
- 5602 B11
- 5604 A11
- 5604 B11
- 7600 D4
- 7601 A13

* OPTION
 V DC Vtg measured in STOP-MODE

BARE BOARD 3139 243 30412 01

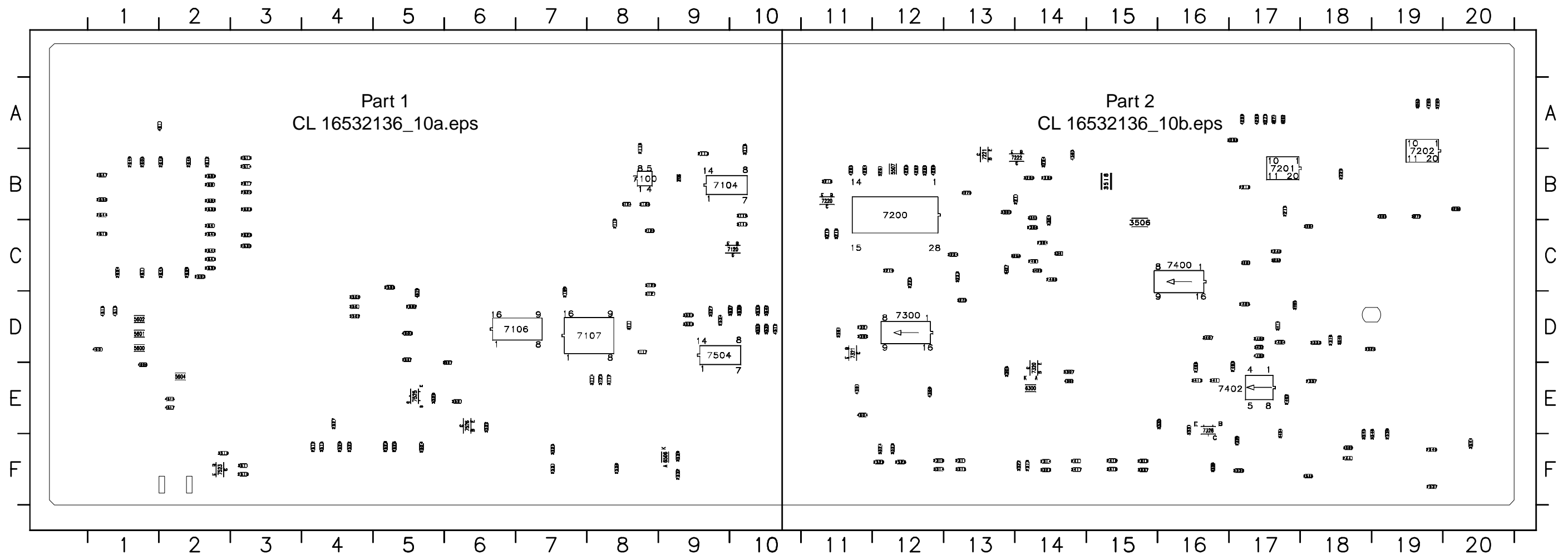
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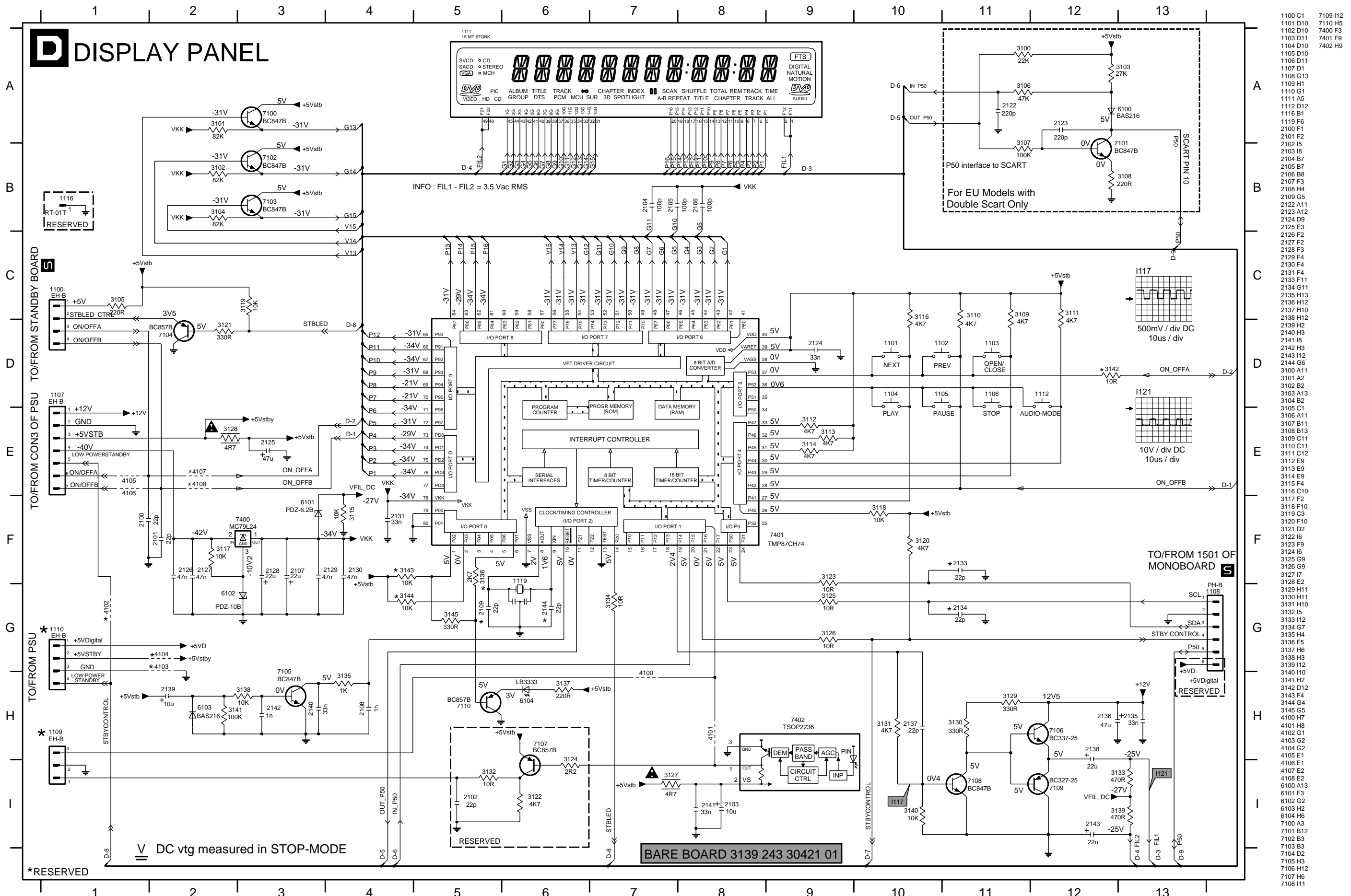
TO 1002 OF P_SCAN BOARD P2

Layout AV Board: (Overview Bottom Side)

2109 D7	2314 F14	2512 F4	2601 B2	2641 C2	3123 E8	3272 B19	3330 F17	3432 D17	3530 F9	4300 E12	5601 D1	7326 E16
2113 B9	2316 D18	2520 F4	2602 B2	2642 C2	3124 B8	3273 A17	3331 E16	3434 E17	3537 D10	4301 E11	5602 D1	7400 C16
2116 A8	2319 F15	2522 F4	2603 C2	2643 C2	3135 B9	3274 A17	3333 D18	3500 D4	3538 D10	4302 E14	5604 E2	7402 E17
2117 D8	2321 D11	2523 F5	2604 C1	2644 B1	3200 B14	3278 D13	3335 E16	3501 D4	3539 D10	4402 D17	6300 E14	7504 D9
2118 C8	2337 E18	2524 F5	2605 B1	2645 C2	3204 B14	3282 C17	3337 F15	3502 D4	3542 D10	4503 D5	6506 F9	7523 F2
2120 C8	2339 F17	2526 F5	2609 C2	2646 B2	3205 B12	3284 C18	3338 F16	3506 C15	3543 D10	4504 E11	7100 B8	7525 E5
2200 B14	2400 C14	2527 E4	2610 C1	2647 B1	3208 A17	3285 B19	3341 C14	3510 F2	3544 F20	4505 B14	7104 B9	7526 E6
2211 B14	2401 C14	2528 F12	2611 C1	2648 B2	3209 A19	3286 B20	3345 B14	3511 F3	3545 F18	4512 D10	7106 D7	
2215 B17	2402 E17	2529 F12	2612 B2	2649 B1	3210 C12	3300 D11	3346 D18	3515 F4	3546 F19	4519 D5	7107 D8	
2218 B17	2403 E17	2530 F8	2613 B3	2650 B1	3216 B11	3301 D11	3402 D17	3518 B15	3550 D10	4600 E1	7120 C10	
2223 C12	2404 D17	2531 F7	2614 B3	3106 B8	3218 C11	3304 C14	3405 D17	3520 E5	3557 E6	4601 D1	7200 B12	
2229 B18	2405 D17	2532 F9	2617 B3	3111 D8	3219 C11	3306 E13	3407 D16	3521 E6	4200 B12	4611 A2	7201 B17	
2240 C17	2406 E16	2534 D9	2620 B3	3112 E8	3223 C13	3307 E14	3411 E16	3522 E6	4202 B12	4613 D1	7202 B19	
2270 B13	2410 F15	2537 F19	2623 B3	3114 E8	3224 C13	3309 B13	3413 E16	3523 F12	4203 B12	4615 D1	7220 B11	
2304 C14	2411 F14	2538 E19	2628 C3	3115 C10	3261 B12	3314 F12	3414 D17	3524 F12	4204 B11	4616 E2	7221 B13	
2306 C14	2441 F18	2540 F19	2630 C3	3116 B10	3262 A17	3315 F13	3417 F14	3525 F7	4205 B11	4617 E2	7222 B14	
2310 F12	2502 D5	2546 F18	2638 B2	3118 B10	3263 A19	3322 F14	3418 F15	3527 D9	4206 A19	5507 B12	7300 D12	
2311 F13	2505 C5	2547 D5	2639 C2	3120 C8	3268 C14	3323 F14	3427 C13	3528 D9	4208 A17	5509 F18	7320 E14	
2313 F14	2510 F3	2600 B2	2640 C2	3121 D8	3269 C17	3326 D18	3428 C14	3529 D9	4209 A17	5600 D1	7321 D11	



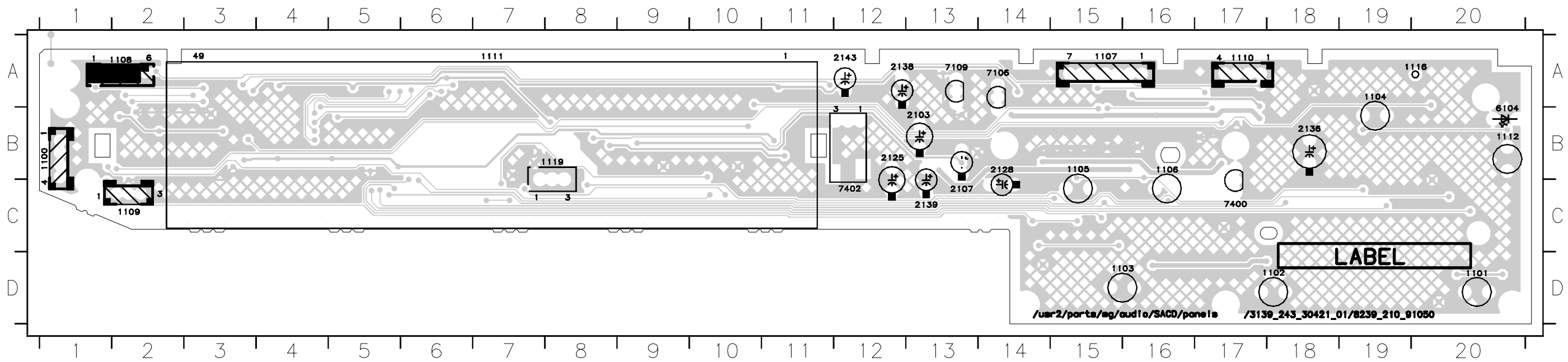
Display Panel



- 1100 C1
- 1101 D10
- 1102 D10
- 1103 D11
- 1104 D10
- 1105 D10
- 1106 D11
- 1107 D1
- 1108 G13
- 1109 H1
- 1110 G1
- 1111 A5
- 1112 D12
- 1116 B1
- 1119 F6
- 2100 F1
- 2101 F2
- 2102 I5
- 2103 I8
- 2104 B7
- 2105 B7
- 2106 B8
- 2107 F3
- 2108 H4
- 2109 G5
- 2122 A11
- 2123 A12
- 2124 D9
- 2125 E3
- 2126 F2
- 2127 F2
- 2128 F3
- 2129 F4
- 2130 F4
- 2131 F4
- 2133 F11
- 2134 G11
- 2135 H13
- 2136 H12
- 2137 H10
- 2138 H12
- 2139 H2
- 2140 H3
- 2141 I8
- 2142 H3
- 2143 I12
- 2144 G6
- 3100 A11
- 3101 A2
- 3102 B2
- 3103 A13
- 3104 B2
- 3105 C1
- 3106 A11
- 3107 B11
- 3108 B13
- 3109 C11
- 3110 C11
- 3111 C12
- 3112 E9
- 3113 E9
- 3114 E9
- 3115 F4
- 3116 C10
- 3117 F2
- 3118 F10
- 3119 C3
- 3120 F10
- 3121 D2
- 3122 I6
- 3123 F9
- 3124 I6
- 3125 G9
- 3126 G9
- 3127 I7
- 3128 E2
- 3129 H11
- 3130 H11
- 3131 H10
- 3132 I5
- 3133 I12
- 3134 G7
- 3135 H4
- 3136 F5
- 3137 H6
- 3138 H3
- 3139 I12
- 3140 I10
- 3141 H2
- 3142 D12
- 3143 F4
- 3144 G4
- 3145 G5
- 4100 H7
- 4101 H8
- 4102 G1
- 4103 G2
- 4104 G2
- 4105 E1
- 4106 E1
- 4107 E2
- 4108 E2
- 6100 A13
- 6101 F3
- 6102 G2
- 6103 H2
- 6104 H6
- 7100 A3
- 7101 B12
- 7102 B3
- 7103 B3
- 7104 D2
- 7105 H3
- 7106 H12
- 7107 H6
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- 7109 H12
- 7110 H5
- 7400 F3
- 7401 F9
- 7402 H9

Layout Display Panel (Top Side)

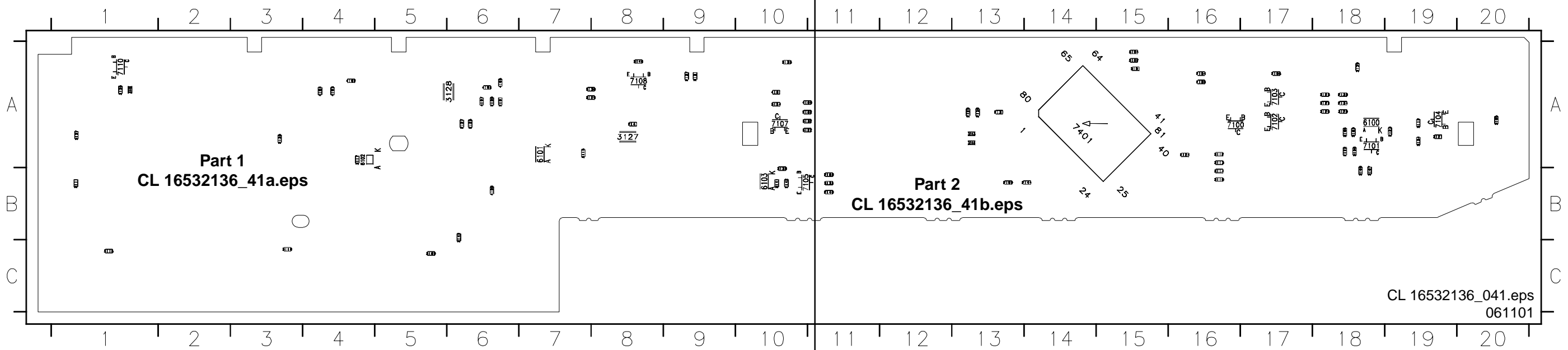
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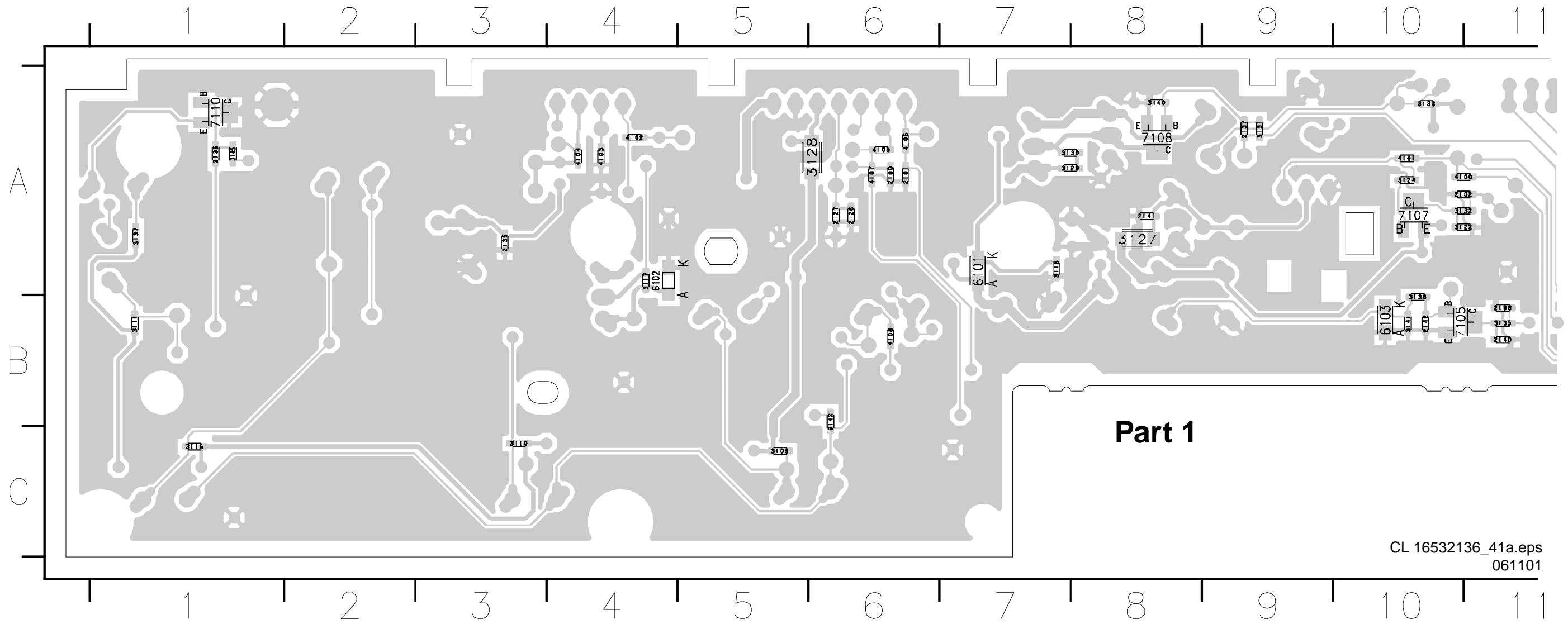
Layout Display Panel (Overview Bottom Side)

2100 A6 2106 A17 2124 A16 2131 A13 2140 B11 3101 A15 3106 A18 3111 B1 3116 C1 3121 A19 3126 A18 3131 A9 3136 A1 3141 B10 4100 A10 4105 A6 6101 A7 7102 A17 7108 A8
 2101 A6 2106 A17 2124 A16 2131 A13 2140 B11 3101 A15 3106 A18 3111 B1 3116 C1 3121 A19 3126 A18 3131 A9 3136 A1 3141 B10 4100 A10 4105 A6 6101 A7 7102 A17 7108 A8
 2102 A10 2106 A17 2124 A16 2131 A13 2140 B11 3101 A15 3106 A18 3111 B1 3116 C1 3121 A19 3126 A18 3131 A9 3136 A1 3141 B10 4100 A10 4105 A6 6101 A7 7102 A17 7108 A8
 2104 A16 2106 A17 2124 A16 2131 A13 2140 B11 3101 A15 3106 A18 3111 B1 3116 C1 3121 A19 3126 A18 3131 A9 3136 A1 3141 B10 4100 A10 4105 A6 6101 A7 7102 A17 7108 A8
 2105 A16 2106 A17 2124 A16 2131 A13 2140 B11 3101 A15 3106 A18 3111 B1 3116 C1 3121 A19 3126 A18 3131 A9 3136 A1 3141 B10 4100 A10 4105 A6 6101 A7 7102 A17 7108 A8

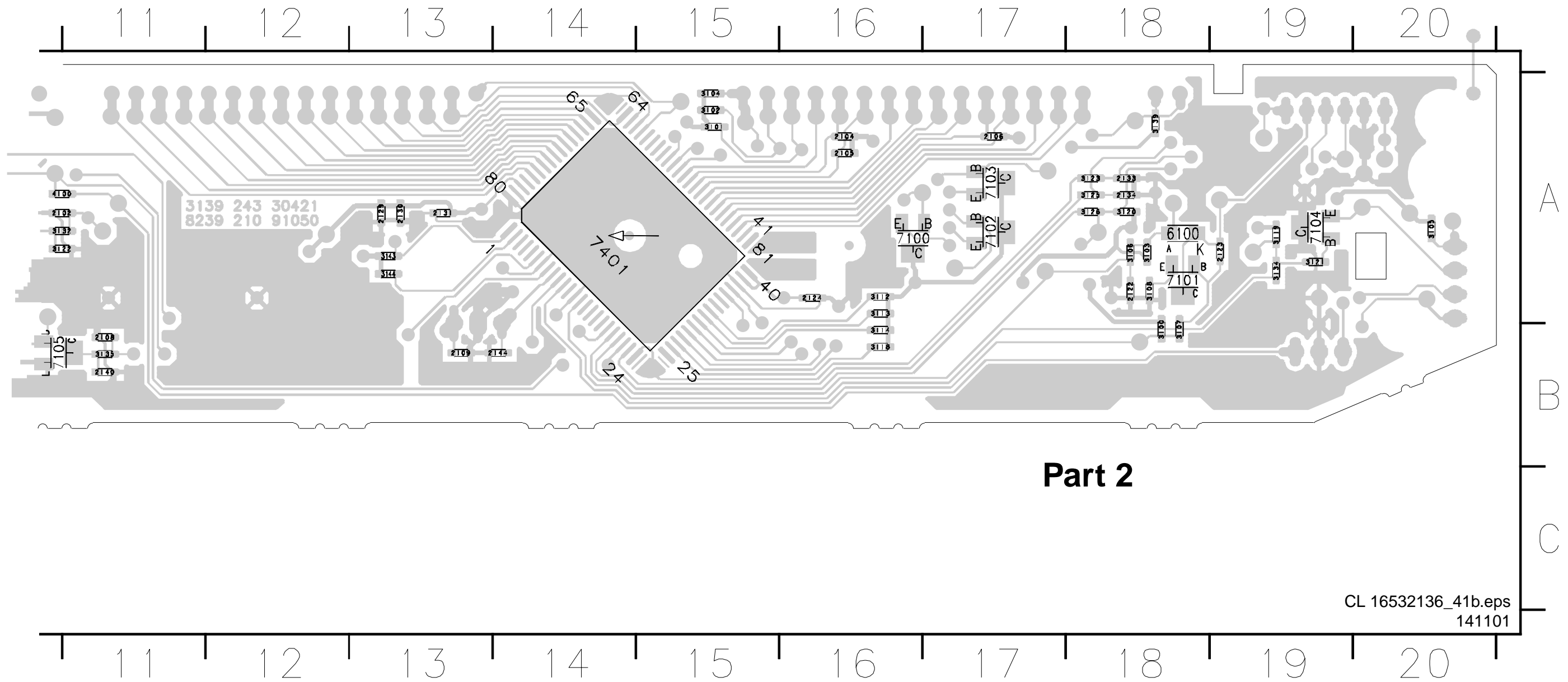


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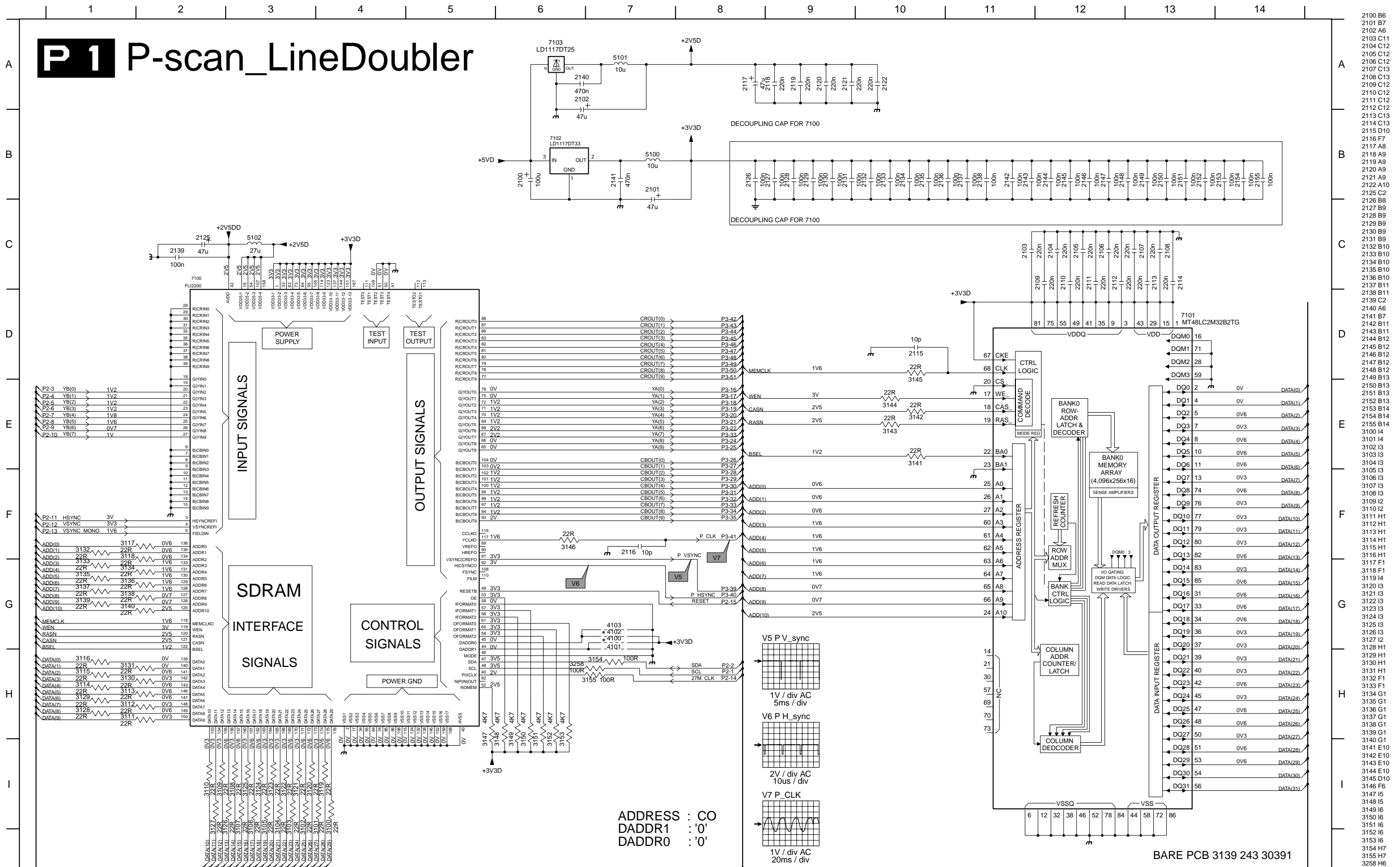
Layout Display Panel (Part 1 Bottom Side)



Layout Display Panel (Part 2 Bottom Side)



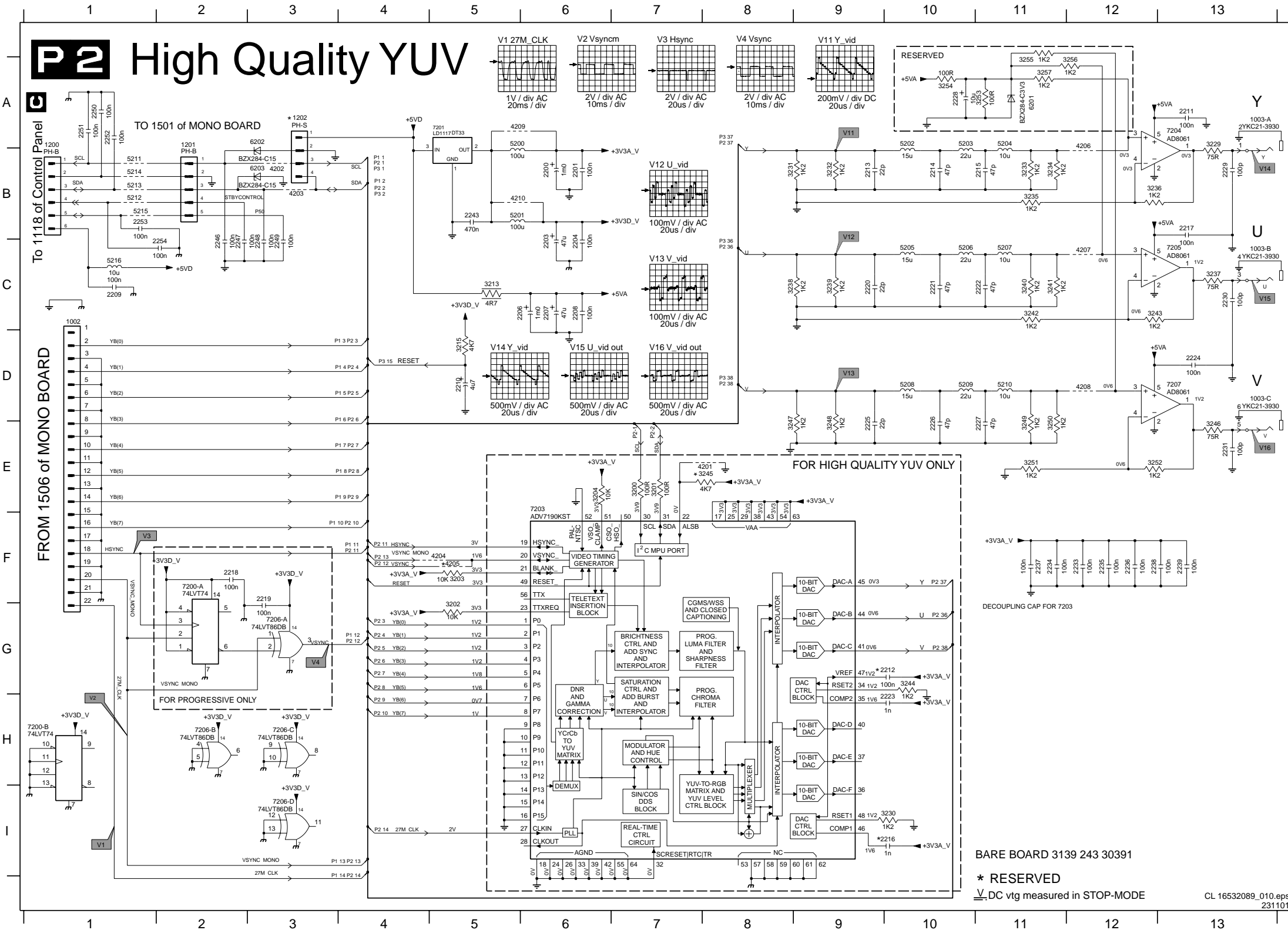
P-Scan Line Doubler



* RESERVED
 V DC vtg measured in STOP-MODE

- 2100 B6
- 2101 B7
- 2102 A6
- 2103 C11
- 2104 C12
- 2105 C12
- 2106 C12
- 2107 C13
- 2108 C13
- 2109 C12
- 2110 C12
- 2111 C12
- 2112 C12
- 2113 C13
- 2114 C13
- 2115 D10
- 2116 F7
- 2117 A8
- 2118 A9
- 2119 A9
- 2120 A9
- 2121 A9
- 2122 A10
- 2125 C2
- 2126 B2
- 2127 B9
- 2128 B9
- 2129 B9
- 2130 B9
- 2131 B9
- 2132 B10
- 2133 B10
- 2134 B10
- 2135 B10
- 2136 B10
- 2137 B11
- 2138 B11
- 2139 C2
- 2140 A6
- 2141 B7
- 2142 B11
- 2143 B11
- 2144 B12
- 2145 B12
- 2146 B12
- 2147 B12
- 2148 B12
- 2149 B13
- 2150 B13
- 2151 B13
- 2152 B13
- 2153 B14
- 2154 B14
- 2155 B14
- 3100 I4
- 3101 I4
- 3102 I3
- 3103 I3
- 3104 I3
- 3105 I3
- 3106 I3
- 3107 I3
- 3108 I3
- 3109 I2
- 3110 I2
- 3111 H1
- 3112 H1
- 3113 H1
- 3114 H1
- 3115 H1
- 3116 H1
- 3117 F1
- 3118 F1
- 3119 I4
- 3120 I3
- 3121 I3
- 3122 I3
- 3123 I3
- 3124 I3
- 3125 I3
- 3126 I3
- 3127 I2
- 3128 H1
- 3129 H1
- 3130 H1
- 3131 H1
- 3132 F1
- 3133 F1
- 3134 G1
- 3135 G1
- 3136 G1
- 3137 G1
- 3138 G1
- 3139 G1
- 3140 G1
- 3141 E10
- 3142 E10
- 3143 E10
- 3144 E10
- 3145 D10
- 3146 F6
- 3147 I5
- 3148 I5
- 3149 I6
- 3150 I6
- 3151 I6
- 3152 I6
- 3153 I6
- 3154 H7
- 3155 H7
- 3258 H6
- 4100 G7
- 4101 G7
- 4102 G7
- 4103 G7
- 5100 B7
- 5101 A7
- 5102 C3

High Quality YUV

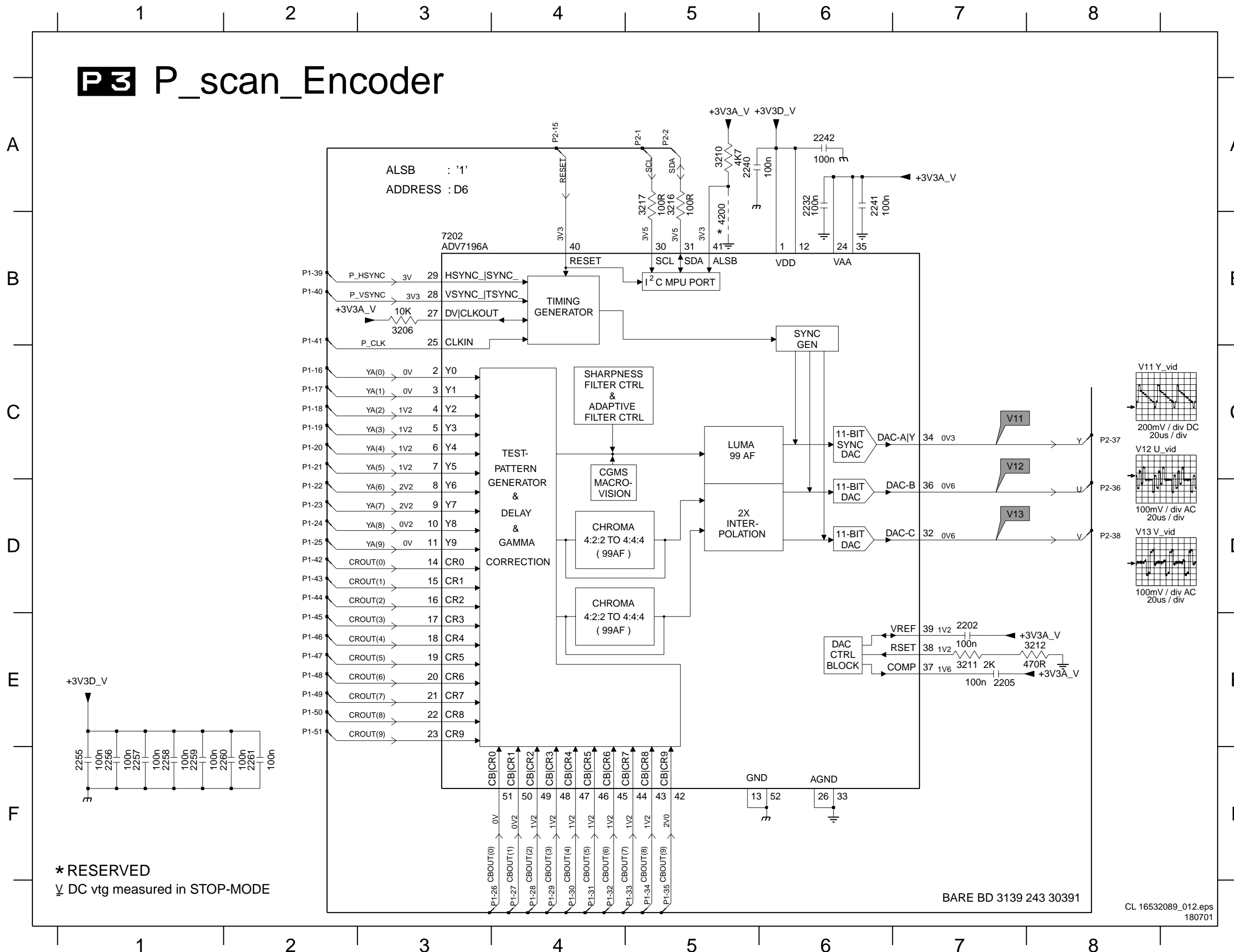


- 1002 C1
- 1003-A A13
- 1003-B C13
- 1003-C D13
- 1200 A1
- 1201 A2
- 1302 A3
- 2200 B6
- 2201 B6
- 2203 C6
- 2204 C6
- 2206 C6
- 2207 C6
- 2208 C6
- 2209 C1
- 2210 D5
- 2211 A13
- 2212 G10
- 2213 B9
- 2214 B10
- 2215 B11
- 2216 I10
- 2217 B13
- 2218 F2
- 2219 F3
- 2220 C9
- 2221 C10
- 2222 C11
- 2223 H10
- 2224 D13
- 2225 E9
- 2226 E10
- 2227 E11
- 2228 A10
- 2229 B13
- 2230 C13
- 2231 E13
- 2232 F12
- 2233 F12
- 2234 F11
- 2235 F12
- 2236 F12
- 2237 F11
- 2238 F12
- 2239 F13
- 2243 B5
- 2244 C2
- 2245 C3
- 2246 C2
- 2247 C2
- 2248 C3
- 2249 C3
- 2250 A1
- 2251 A1
- 2252 A1
- 2253 B1
- 2254 C2
- 3200 E7
- 3201 E7
- 3202 E7
- 3203 F5
- 3204 E6
- 3213 D5
- 3215 D5
- 3219 A13
- 3230 I10
- 3231 B8
- 3232 B9
- 3233 B11
- 3234 B11
- 3235 B11
- 3236 B12
- 3237 C13
- 3238 C8
- 3239 C9
- 3240 C11
- 3241 C11
- 3242 C11
- 3243 C12
- 3244 G10
- 3245 E8
- 3246 E13
- 3247 E8
- 3248 E9
- 3249 E11
- 3250 E11
- 3251 E11
- 3252 E12
- 3253 A11
- 3254 A10
- 3255 A11
- 3256 A12
- 3257 A11
- 4201 E8
- 4202 B3
- 4203 B3
- 4204 F5
- 4205 F5
- 4206 B12
- 4207 C12
- 4208 D12
- 4209 A5
- 4210 B5
- 5200 A5
- 5201 B5
- 5202 A10
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- 5204 A11
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- 5206 C10
- 5207 C11
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- 5215 B1

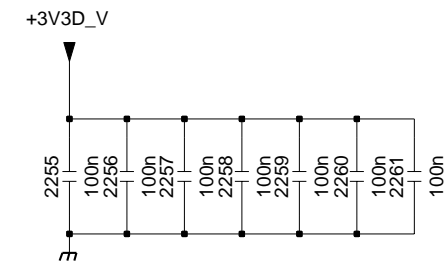
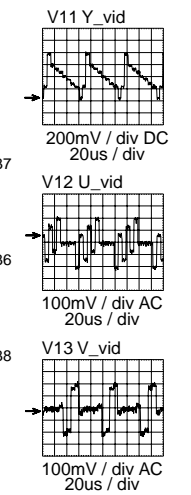
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2213	CER1 0603 NP0 50V 6P8 COL	X	
2214	CER1 0603 NP0 50V 27P COL		X
2215	CER1 0603 NP0 50V 22P COL	X	
2216	CER1 0603 NP0 50V 68P COL		X
2217	CER1 0603 NP0 50V 18P COL		X
2218	CER2 0603 X7R 50V 1N COL		X
2219	CER2 0603 X7R 16V 100N COL	X	
2220	CER1 0603 NP0 50V 6P8 COL	X	
2221	CER1 0603 NP0 50V 27P COL		X
2222	CER1 0603 NP0 50V 22P COL	X	
2223	CER1 0603 NP0 50V 68P COL		X
2224	CER2 0603 X7R 50V 1N COL		X
2225	CER1 0603 NP0 50V 6P8 COL	X	
2226	CER1 0603 NP0 50V 27P COL		X
2227	CER1 0603 NP0 50V 22P COL	X	
2228	CER1 0603 NP0 50V 68P COL		X
2229	CER2 0603 X7R 16V 100N COL	X	
2230	CER1 0603 NP0 50V 6P8 COL	X	
2231	CER1 0603 NP0 50V 27P COL		X
2232	CER1 0603 NP0 50V 22P COL	X	
2233	CER1 0603 NP0 50V 68P COL		X
2234	CER2 0603 X7R 16V 100N COL	X	
2235	CER2 0603 X7R 16V 100N COL	X	
2236	CER2 0603 X7R 16V 100N COL	X	
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P_Scan_Encoder

P3 P_scan_Encoder



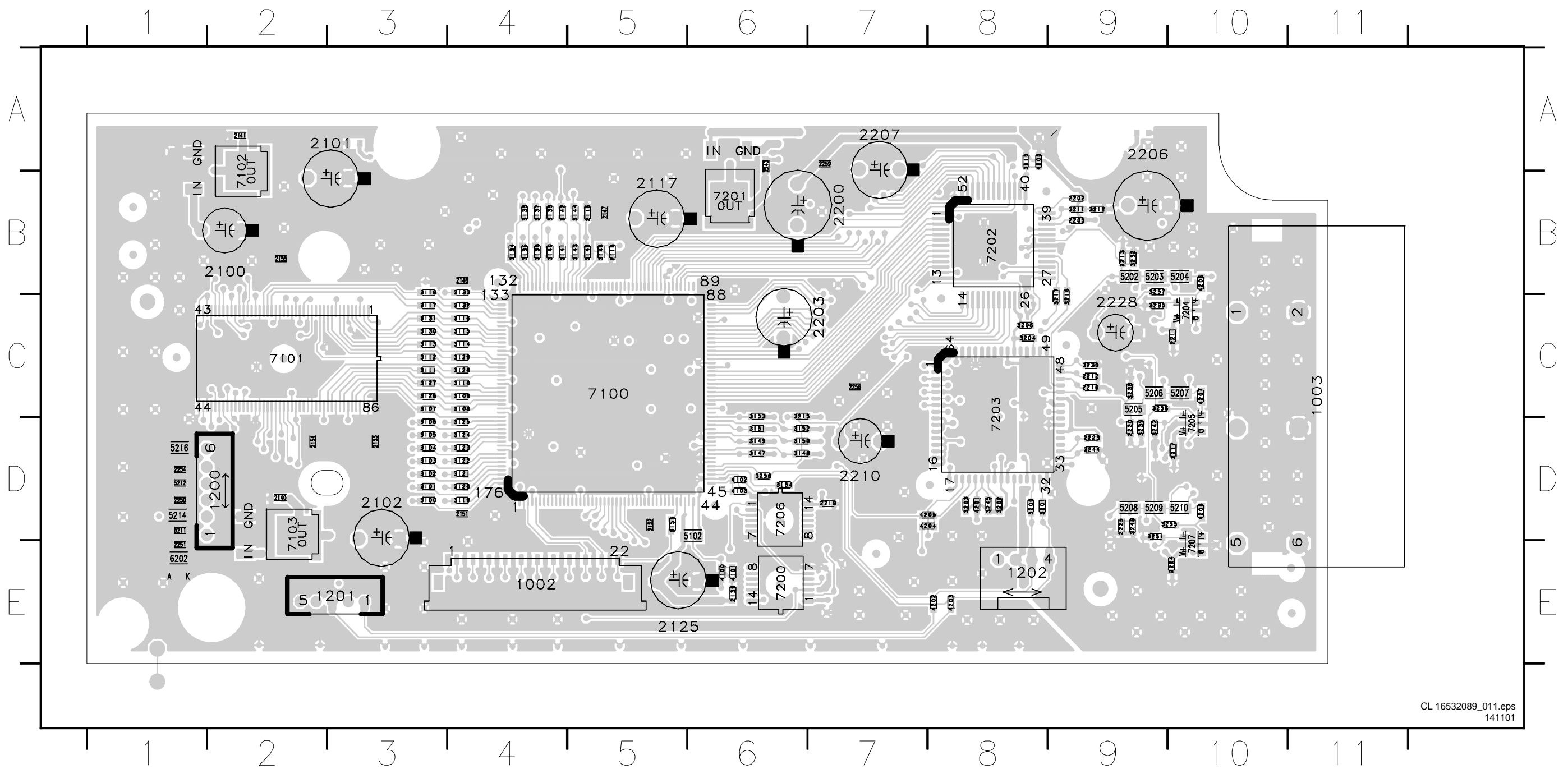
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- 2242 A6
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- 2256 F1
- 2257 F1
- 2258 F1
- 2259 F1
- 2260 F2
- 2261 F2
- 3206 B3
- 3210 A5
- 3211 E7
- 3212 E8
- 3216 A5
- 3217 A5
- 4200 B5
- 7202 B3



* RESERVED
 √ DC vtg measured in STOP-MODE

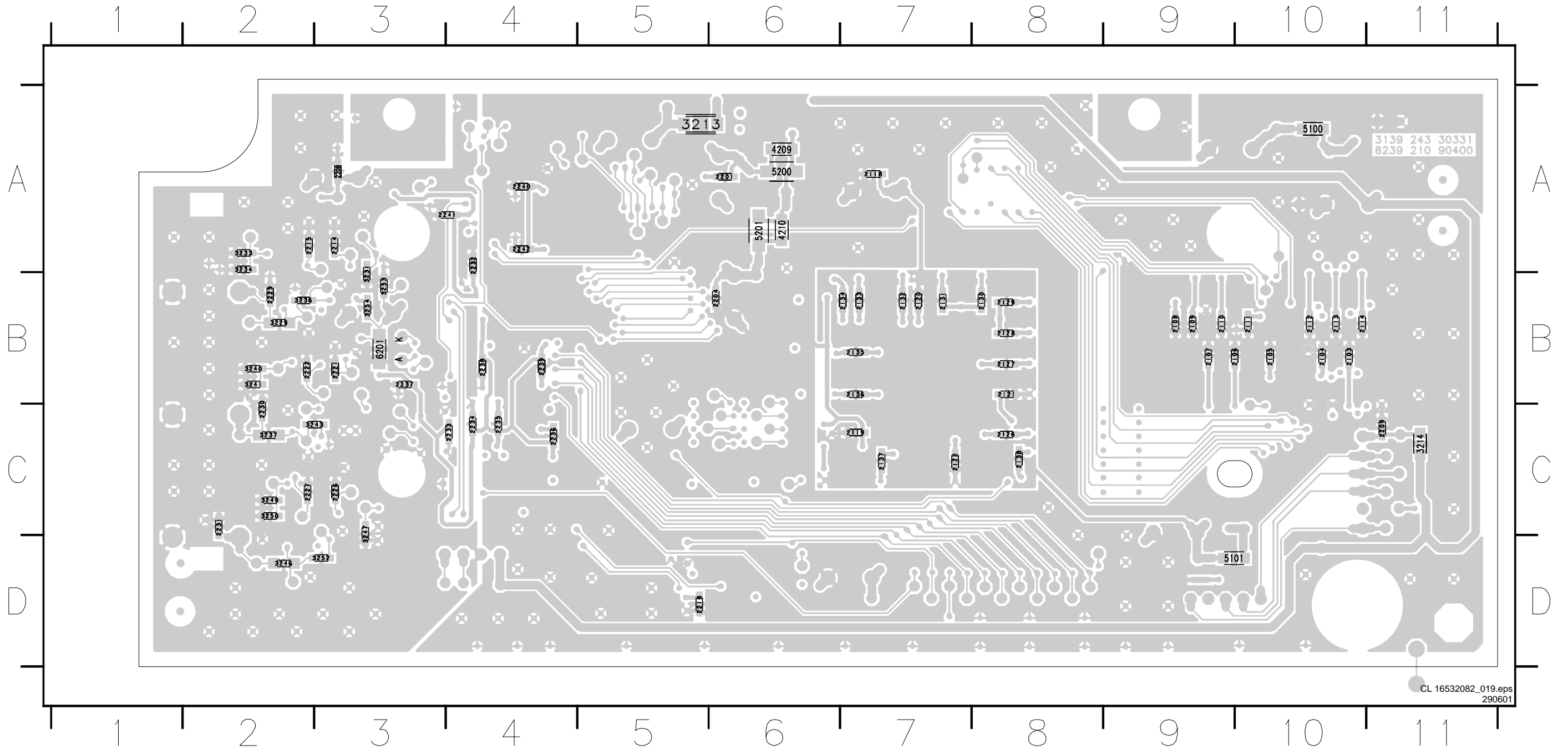
P-Scan Board (Top Side)

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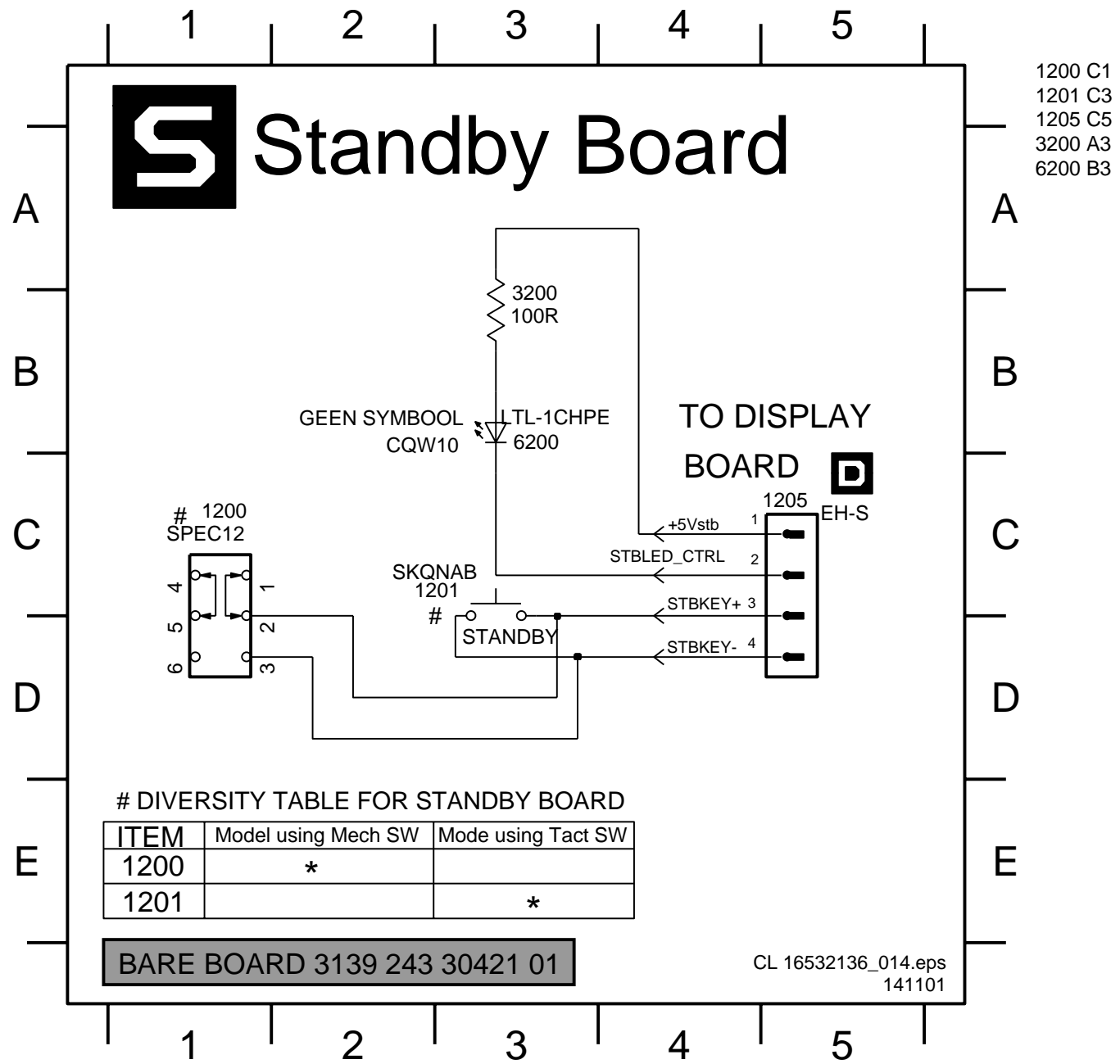


P-Scan Board (Bottom Side)

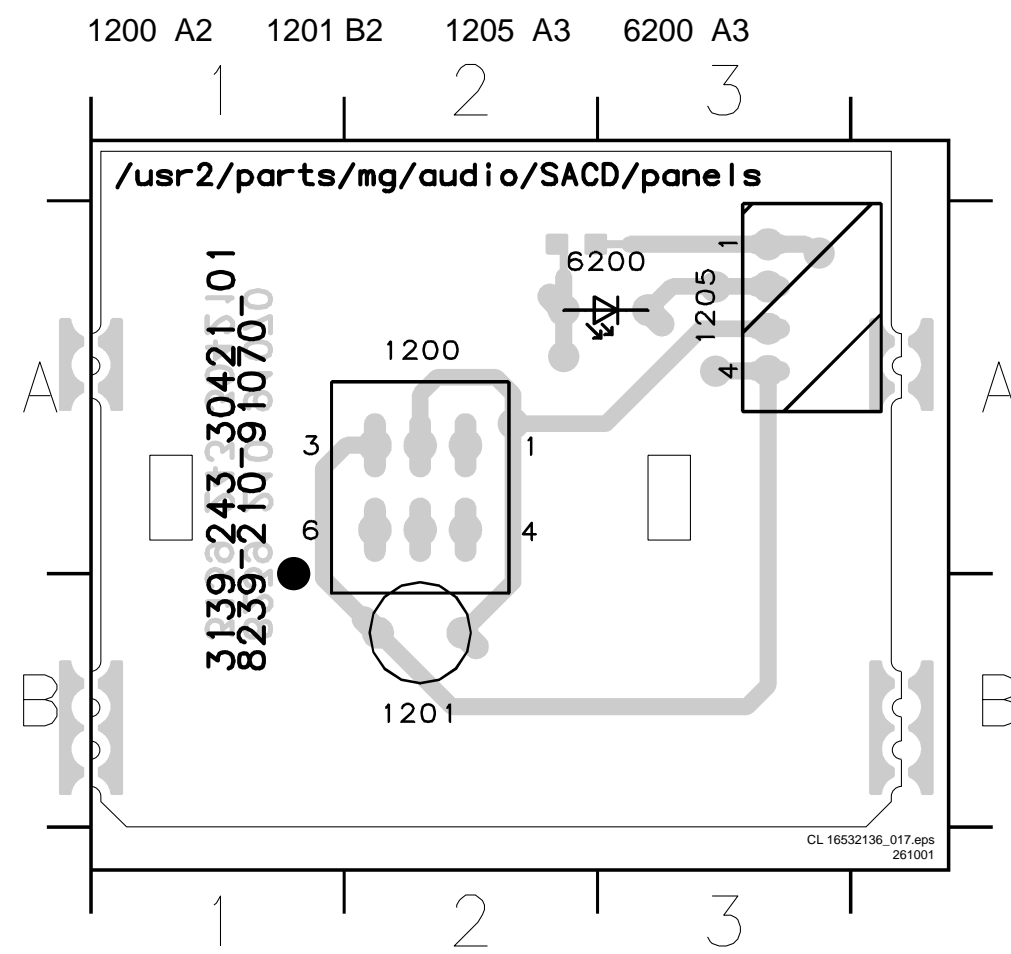
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2104	B10	2112	B10	2126	C8	2134	B7	2209	C11	2229	B2	2237	B3	3229	B2	3243	B3	4209	A6
2105	B10	2113	B10	2127	C8	2135	B7	2214	A3	2230	C2	2238	B4	3231	B3	3246	D2	4210	A6
2106	B10	2114	B10	2128	C8	2136	B7	2215	A2	2231	C2	2239	B4	3233	A2	3247	C3	5100	A10
2107	B9	2118	A7	2129	C8	2137	C7	2218	D5	2232	A4	2240	A4	3234	A2	3249	C2	5101	D9
2108	B9	2119	C7	2130	B8	2138	C8	2221	B3	2233	C4	2241	A4	3236	B2	3250	C2	5200	A6
2109	B9	2120	B7	2131	B7	2201	A6	2222	B2	2234	C4	2242	A4	3237	C2	3252	D3	5201	A6
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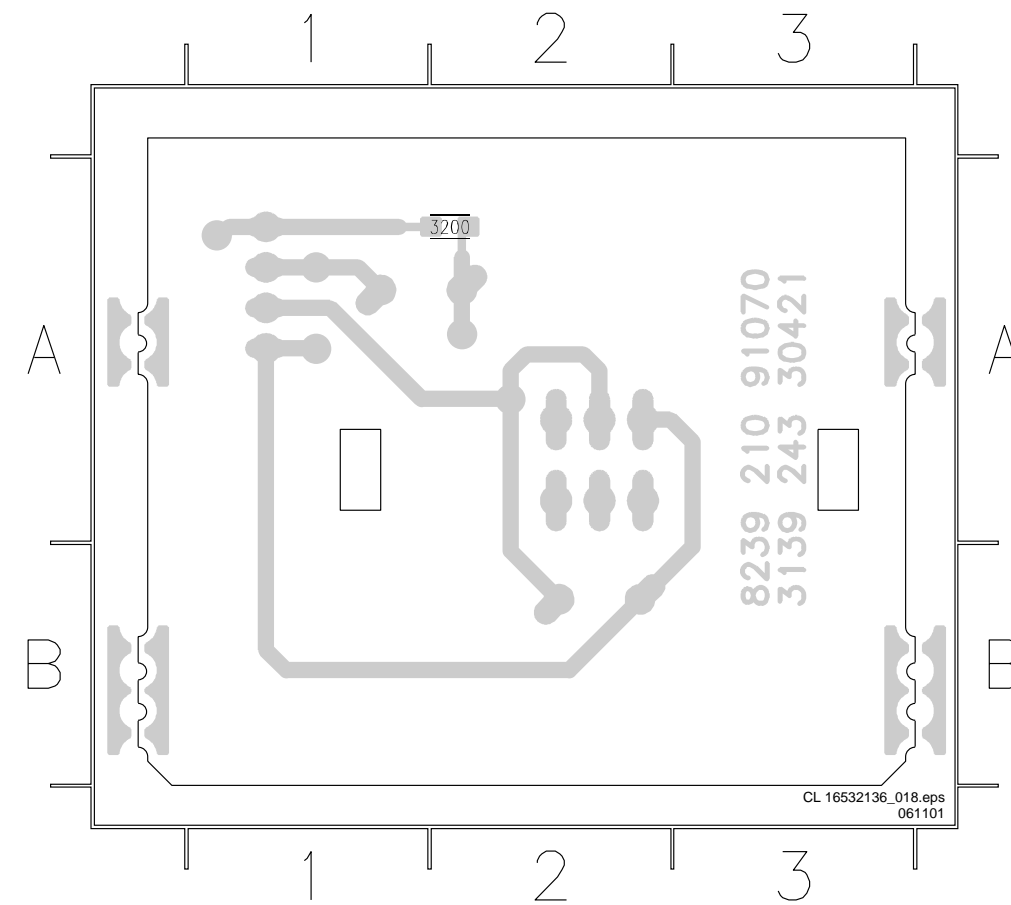
Standby Board



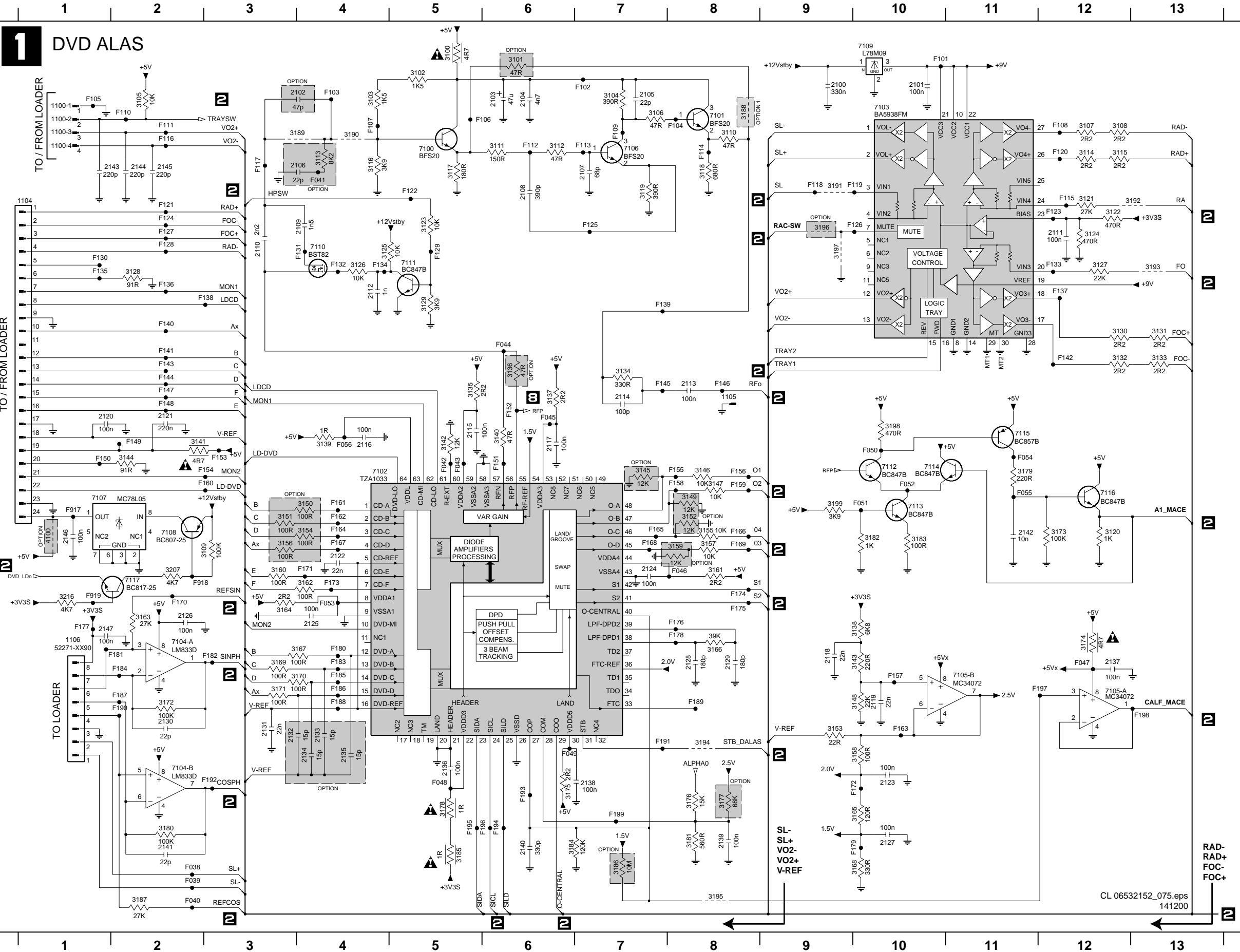
Layout Standby Board (Top Side)



Layout Standby Board (Bottom Side)



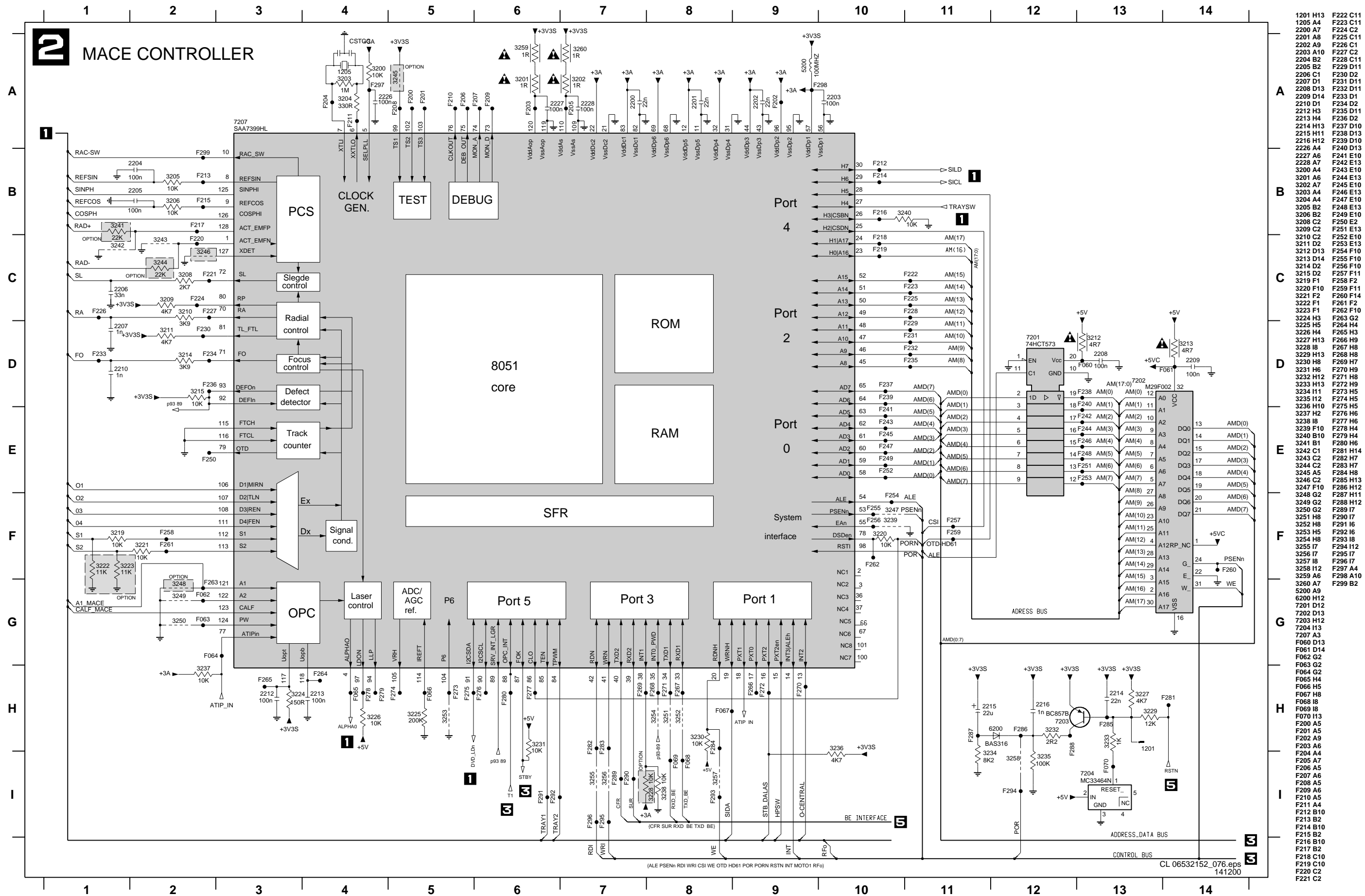
Mono Board: DVD ALAS



1100-1 A1	3162 F4	F138 C3
1100-2 A1	3163 G2	F139 C7
1100-3 A1	3164 F3	F140 C2
1100-4 A1	3165 I10	F141 D2
1104 B1	3166 G8	F142 D12
1105 D8	3167 G4	F143 D2
1106 G1	3168 I10	F144 D2
2100 A3	3169 G3	F145 D7
2101 G4	3170 G4	F146 D8
2102 A4	3171 G3	F147 D2
2103 A6	3172 G2	F148 D2
2104 A6	3173 F12	F149 E2
2105 A7	3174 G12	F150 E1
2106 B4	3175 H6	F151 E6
2107 B7	3176 H8	F152 D6
2108 B6	3177 H8	F153 E3
2109 B4	3178 I5	F154 E3
2110 C3	3179 E11	F155 E8
2111 B12	3180 I2	F156 E8
2112 C4	3181 I8	F157 G10
2113 D8	3182 F10	F158 E8
2114 D7	3183 F10	F159 E8
2115 E5	3184 I6	F160 E3
2116 E4	3185 I5	F161 E4
2117 E6	3186 I7	F162 E4
2118 G9	3187 I2	F163 H10
2119 G10	3188 A8	F164 F4
2120 D1	3189 A4	F165 F7
2121 D2	3190 A4	F166 F8
2122 F4	3191 B9	F167 F4
2123 H10	3192 B13	F168 F7
2124 F7	3193 C13	F169 F8
2125 G4	3194 H8	F170 F2
2126 G2	3195 I8	F171 F4
2127 I10	3196 B9	F172 H10
2128 G8	3197 C9	F173 F4
2129 G8	3198 D10	F174 F8
2130 H2	3199 E9	F175 F8
2131 H3	3207 F2	F176 G8
2132 H3	3216 F1	F177 G1
2133 H4	4100 F1	F178 G8
2134 H4	7100 A5	F179 A10
2135 H4	7101 A8	F180 G4
2136 H5	7102 E4	F181 G2
2137 G12	7103 A10	F182 G3
2138 H7	7104-A G2	F183 G4
2139 I8	7104-B H2	F184 G2
2140 I6	7105-A G12	F185 G4
2141 I2	7105-B G11	F186 G4
2142 F11	7106 A7	F187 G2
2143 B2	7107 E1	F188 G4
2144 B2	7108 F2	F189 G8
2145 B2	7109 A10	F190 H2
2146 F1	7110 C4	F191 H7
2147 G1	7111 C5	F192 H3
3100 A5	7112 E10	F193 H6
3101 A6	7113 E10	F194 I6
3102 A5	7114 E10	F195 I5
3103 A4	7115 E11	F196 I6
3104 A7	7116 E12	F197 G12
3105 A2	7117 F2	F198 H13
3106 A7	F038 I2	F199 I7
3107 A12	F039 I2	F200 I2
3108 F2	F040 I2	F041 B4
3109 F2	F041 B4	F042 E5
3110 A8	F042 E5	F043 E5
3111 A6	F043 E5	F044 D6
3112 A6	F044 D6	F045 D6
3113 B4	F045 D6	F046 F8
3114 B12	F046 F8	F047 G12
3115 B12	F047 G12	F048 H5
3116 B4	F048 H5	F049 H6
3117 B5	F049 H6	F050 E10
3118 B9	F050 E10	F051 E10
3119 B7	F051 E10	F052 E10
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3121 B12	F053 F4	F054 E11
3122 B12	F054 E11	F055 E11
3123 B5	F055 E11	F056 E4
3124 B12	F056 E4	F101 A10
3125 C4	F101 A10	F102 A7
3126 C4	F102 A7	F103 A4
3127 C12	F103 A4	F104 A8
3128 C2	F104 A8	F105 A1
3129 C5	F105 A1	F106 A6
3130 C12	F106 A6	F107 A4
3131 C13	F107 A4	F108 A12
3132 D12	F108 A12	F109 A7
3133 D13	F109 A7	F110 A2
3134 D7	F110 A2	F111 A2
3135 D5	F111 A2	F112 A6
3136 D6	F112 A6	F113 A7
3137 D6	F113 A7	F114 A8
3138 G10	F114 A8	F115 B12
3139 E4	F115 B12	F116 A2
3140 E6	F116 A2	F117 B3
3141 E2	F117 B3	F118 B9
3142 E5	F118 B9	F119 B10
3143 G10	F119 B10	F120 B12
3144 E2	F120 B12	F121 B2
3145 E7	F121 B2	F122 B5
3146 E8	F122 B5	F123 B12
3147 E8	F123 B12	F124 B2
3148 G10	F124 B2	F125 B7
3149 E8	F125 B7	F126 B10
3150 E4	F126 B10	F127 B2
3151 E3	F127 B2	F128 C2
3152 E8	F128 C2	F129 C5
3153 H9	F129 C5	F130 C1
3154 F4	F130 C1	F131 C4
3155 F8	F131 C4	F132 C4
3156 F3	F132 C4	F133 C12
3157 F8	F133 C12	F134 C4
3158 H10	F134 C4	F135 C1
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3161 F8	F137 C12	

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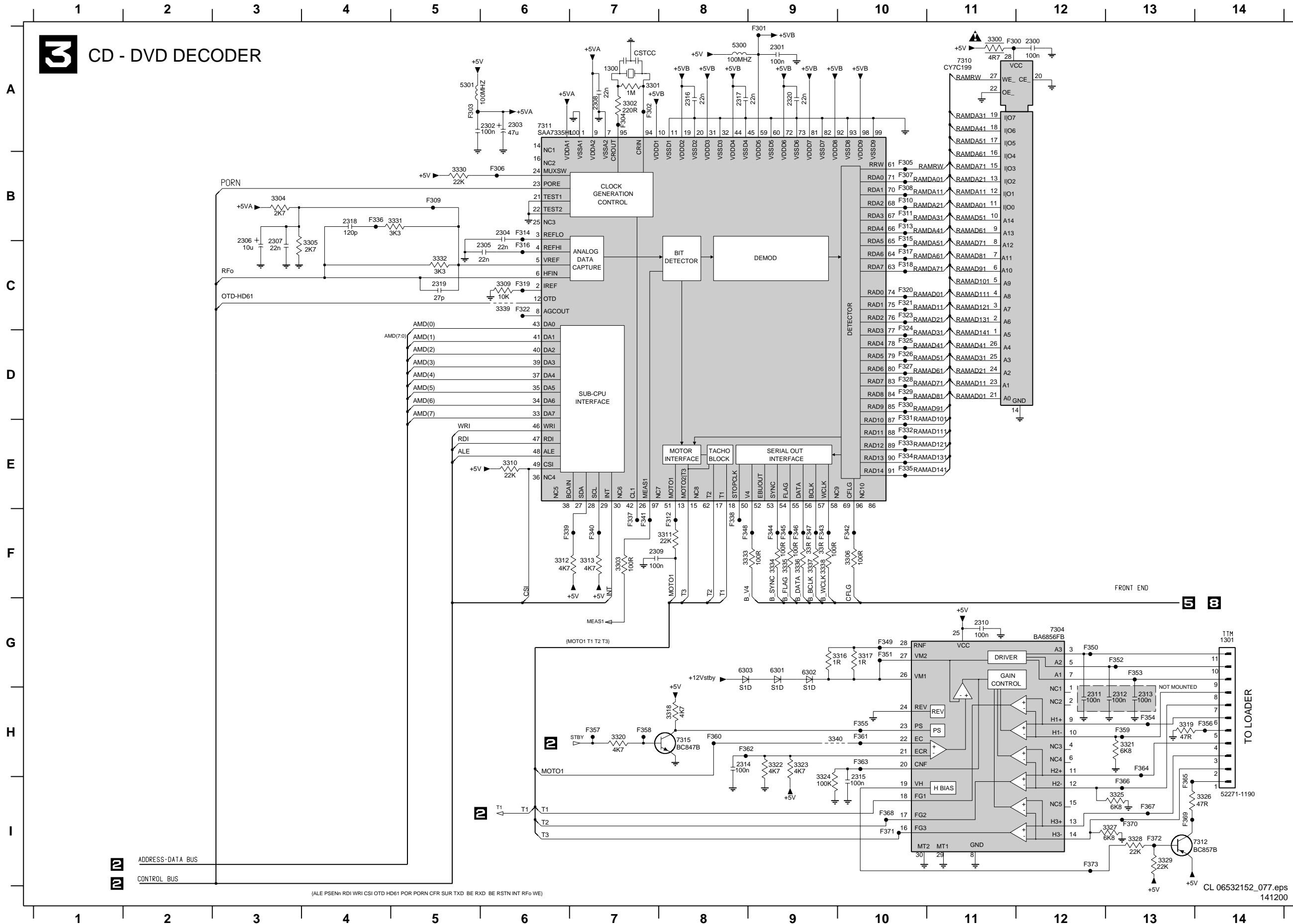
Mono Board: MACE Controller



- 1201 H13
- 1205 A4
- 2200 A7
- 2201 A8
- 2202 A9
- 2203 A10
- 2204 B2
- 2205 B2
- 2206 C1
- 2207 D1
- 2208 D13
- 2209 D14
- 2210 D1
- 2212 H3
- 2213 H4
- 2214 H13
- 2215 H11
- 2216 H12
- 2226 A4
- 2227 A6
- 2228 A7
- 3200 A4
- 3201 A6
- 3202 A7
- 3203 A4
- 3204 A4
- 3205 B2
- 3206 B2
- 3208 C2
- 3209 C2
- 3210 C2
- 3211 D2
- 3212 D13
- 3213 D14
- 3214 D2
- 3215 D2
- 3219 F1
- 3220 F10
- 3221 F2
- 3222 F1
- 3223 F1
- 3224 H3
- 3225 H5
- 3226 H4
- 3227 H13
- 3228 I8
- 3229 H13
- 3230 H8
- 3231 H6
- 3232 H12
- 3233 H13
- 3234 H11
- 3235 H2
- 3236 H10
- 3237 H2
- 3238 I8
- 3239 F10
- 3240 B10
- 3241 B1
- 3242 C1
- 3243 C2
- 3244 C2
- 3245 A5
- 3246 C2
- 3247 F10
- 3248 G2
- 3249 G2
- 3250 G2
- 3251 H8
- 3252 H8
- 3253 H5
- 3254 H8
- 3255 I7
- 3256 I7
- 3257 I8
- 3258 I2
- 3259 A6
- 3260 A7
- 5200 A9
- 6200 H12
- 7201 D12
- 7202 D13
- 7203 H12
- 7204 I13
- 7207 A3
- F060 D13
- F061 D14
- F062 G2
- F063 G2
- F064 G2
- F065 H4
- F066 H5
- F067 H8
- F068 I8
- F069 I8
- F070 H13
- F200 A5
- F201 A5
- F202 A9
- F203 A6
- F204 A4
- F205 A7
- F206 A5
- F207 A6
- F208 A5
- F209 A6
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- F214 B10
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- F216 B10
- F217 B2
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- F219 C10
- F220 C2
- F221 C2
- F222 C11
- F223 C11
- F224 C2
- F225 C11
- F226 C1
- F227 C2
- F228 C11
- F229 D11
- F230 D2
- F231 D11
- F232 D11
- F233 D1
- F234 D2
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- F238 D13
- F239 D10
- F240 D13
- F241 E10
- F242 E13
- F243 E10
- F244 E13
- F245 E10
- F246 E13
- F247 E10
- F248 E13
- F249 E10
- F250 E2
- F251 E13
- F252 E10
- F253 E13
- F254 F10
- F255 F10
- F256 F10
- F257 H11
- F258 F2
- F259 F11
- F260 F14
- F261 F2
- F262 F10
- F263 G2
- F264 H4
- F265 H3
- F266 H9
- F267 H8
- F268 H8
- F269 H7
- F270 H9
- F271 H8
- F272 H9
- F273 H5
- F274 H5
- F275 H5
- F276 H6
- F277 H6
- F278 H4
- F279 H4
- F280 H6
- F281 H14
- F282 H7
- F283 H7
- F284 H8
- F285 H13
- F286 H12
- F287 H11
- F288 H12
- F289 I7
- F290 I7
- F291 I6
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- F296 I7
- F297 A4
- F298 A10
- F299 B2

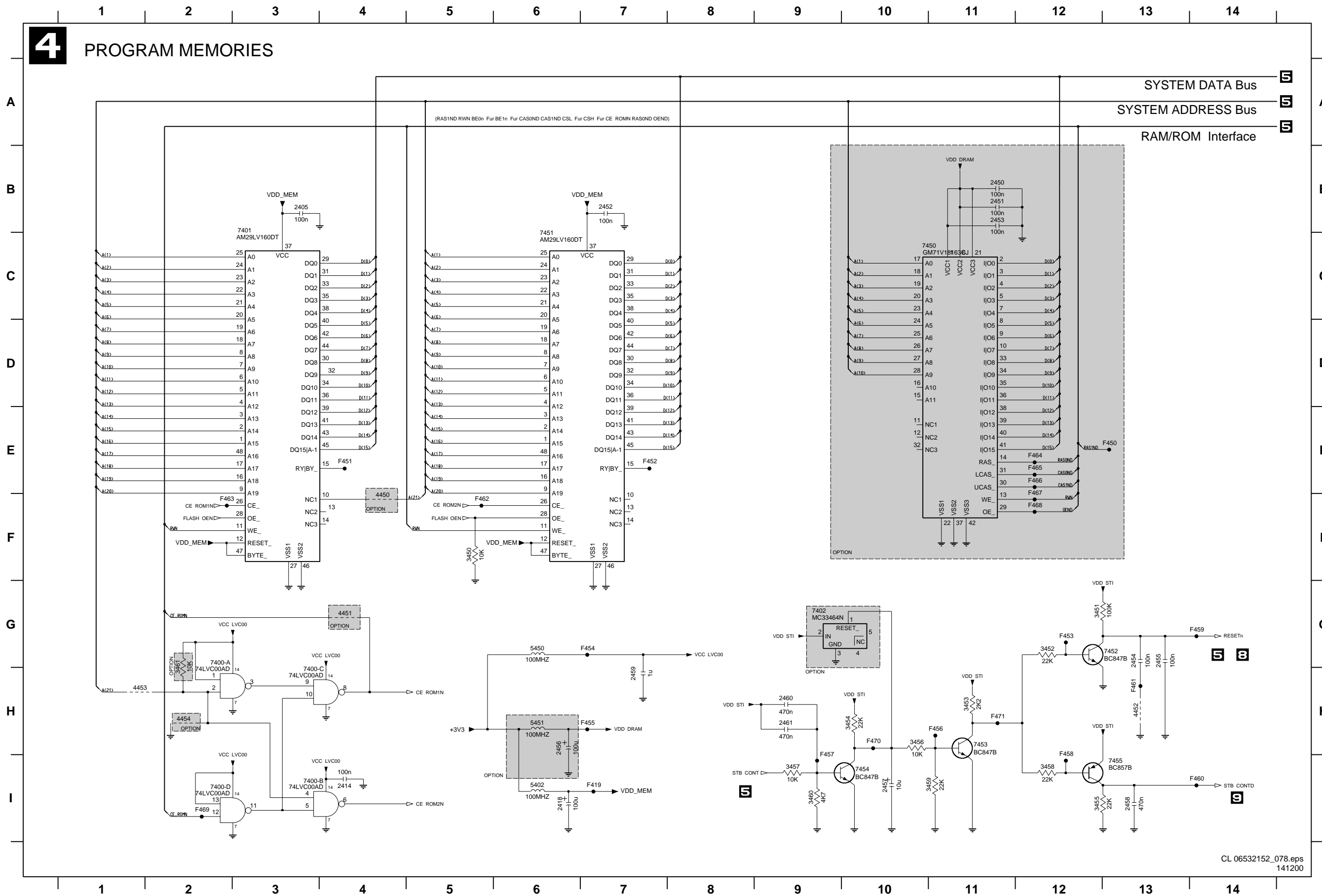
Mono Board: CD - DVD Decoder

3 CD - DVD DECODER



Mono Board: Program Memories

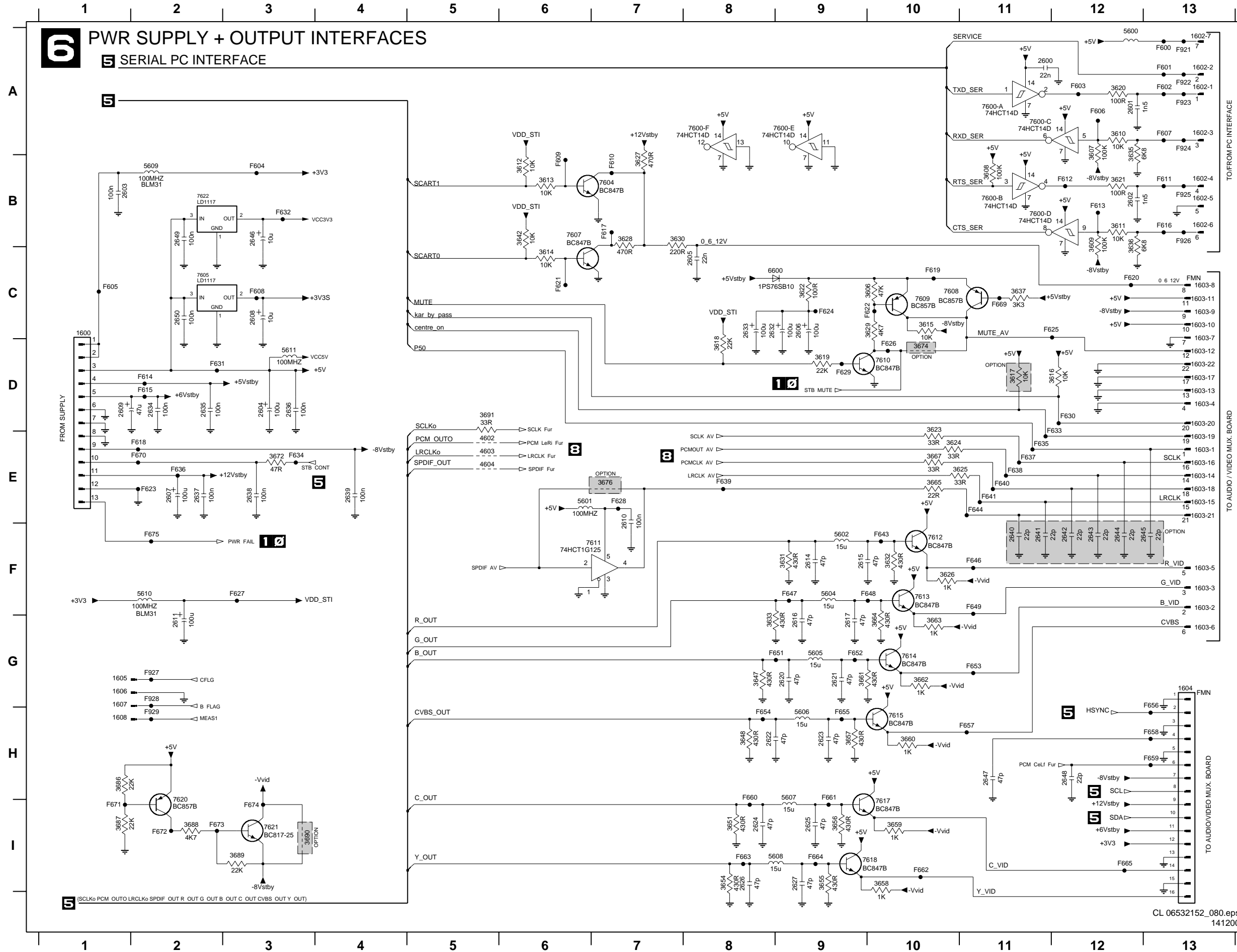
4 PROGRAM MEMORIES



- 2405 B3
- 2414 I4
- 2418 I6
- 2450 B11
- 2451 B11
- 2452 B7
- 2453 B11
- 2454 G13
- 2455 G13
- 2456 H6
- 2457 I10
- 2458 I13
- 2459 H7
- 2460 H9
- 2461 H9
- 3450 F5
- 3451 G12
- 3452 G12
- 3453 H11
- 3454 H10
- 3455 I12
- 3456 H10
- 3457 I9
- 3458 I12
- 3459 I11
- 3460 I9
- 4450 F4
- 4451 G4
- 4452 H13
- 4453 H1
- 4454 H2
- 5402 I6
- 5450 G6
- 5451 H6
- 7400-A G2
- 7400-B I3
- 7400-C H3
- 7400-D I2
- 7401 C3
- 7402 G9
- 7450 C10
- 7451 C6
- 7452 G13
- 7453 H11
- 7454 I10
- 7455 I13
- F419 I7
- F450 E13
- F451 E4
- F452 E7
- F453 G12
- F454 G7
- F455 H7
- F456 H11
- F457 I9
- F458 I12
- F459 G14
- F460 I14
- F461 H13
- F462 F5
- F463 F2
- F464 E12
- F465 E12
- F466 E12
- F467 F12
- F468 F12
- F469 I2
- F470 H10
- F471 H11

Mono Board: Power Supply & Output Interfaces

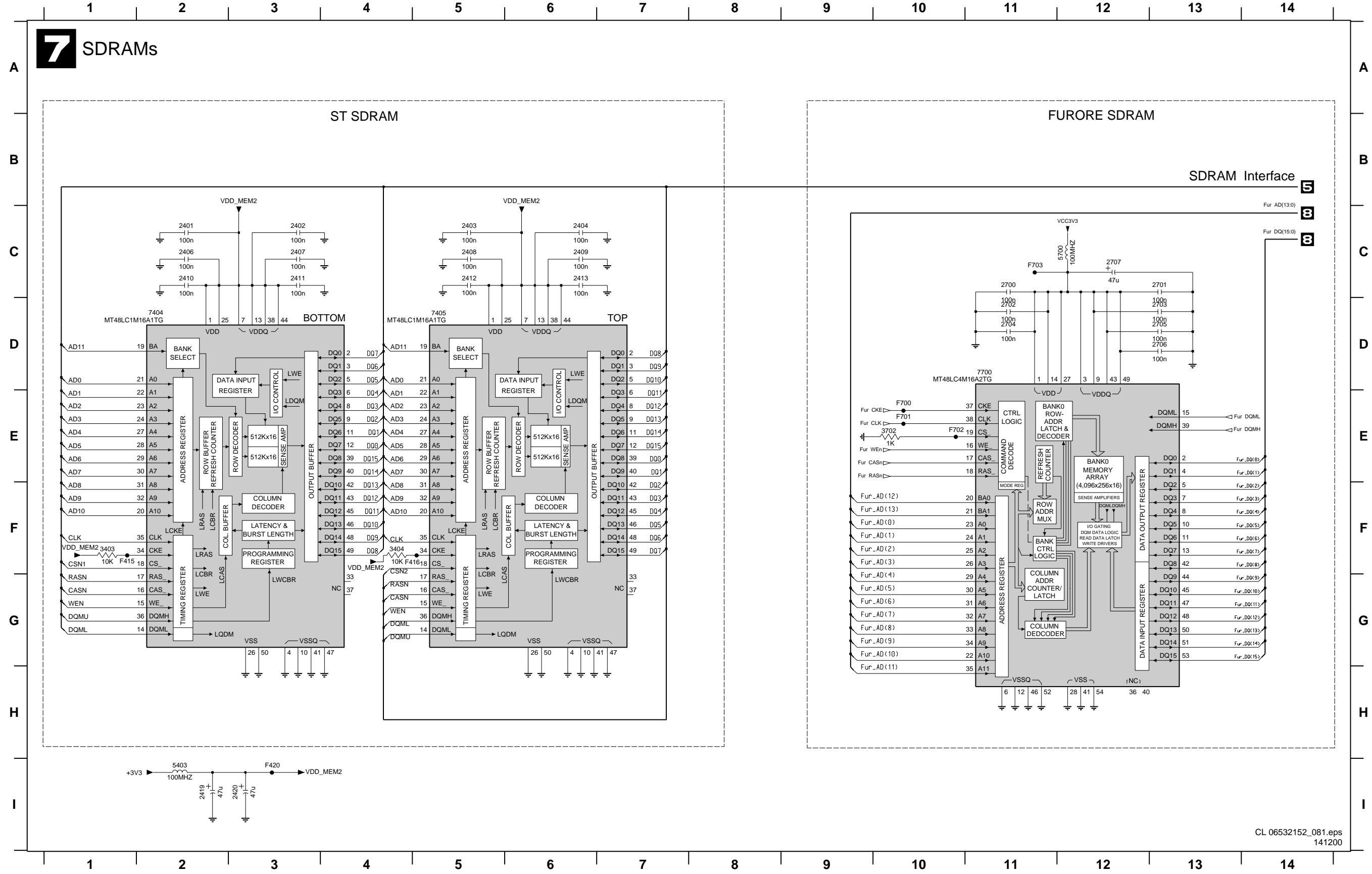
6 PWR SUPPLY + OUTPUT INTERFACES SERIAL PC INTERFACE



1600 C1	3658 I10	F665 I12
1602-1 A13	3659 I10	F669 C11
1602-2 A13	3660 H10	F670 E2
1602-3 A13	3661 G9	F671 I1
1602-4 B13	3662 G10	F672 I2
1602-5 B13	3663 G10	F673 I2
1602-6 B13	3664 G10	F674 I2
1602-7 A13	3665 E10	F675 F2
1603-1 E13	3667 E10	F921 A13
1603-10 C13	3672 E3	F922 A13
1603-11 C13	3674 D10	F923 A13
1603-12 D13	3676 E7	F924 A13
1603-13 D13	3686 H1	F925 B13
1603-14 E13	3687 I1	F926 B13
1603-15 E13	3688 I2	F927 G2
1603-16 E13	3689 I3	F928 G2
1603-17 D13	3690 I3	F929 H2
1603-18 E13	3691 D5	
1603-19 E13	4602 E5	
1603-2 F13	4603 E5	
1603-20 D13	4604 E5	
1603-21 E13	5600 A12	
1603-22 D13	5601 E6	
1603-3 F13	5602 F9	
1603-4 D13	5604 F9	
1603-5 F13	5605 G9	
1603-6 G13	5606 H9	
1603-7 D13	5607 I9	
1603-8 C13	5608 I9	
1603-9 C13	5609 B2	
1604 G13	5610 F2	
1605 G1	5611 D3	
1606 G1	6600 C9	
1607 G1	7600-A A11	
1608 H1	7600-B B11	
1609 A11	7600-C A11	
1610 A12	7600-D B11	
1611 B12	7600-E A9	
1612 B12	7600-F A8	
1613 B1	7604 B7	
1614 D3	7605 C2	
1615 C8	7607 B6	
1616 C9	7608 C10	
1617 E2	7609 C10	
1618 C3	7610 D10	
1619 D1	7611 F6	
1620 E7	7612 F10	
1621 G2	7613 F10	
1622 F9	7614 G10	
1623 F9	7615 H10	
1624 G9	7617 I10	
1625 G9	7618 I9	
1626 G9	7620 H2	
1627 H8	7621 I3	
1628 H9	7622 B2	
1629 I8	F600 A13	
1630 I8	F601 A13	
1631 I8	F602 I8	
1632 I8	F603 A12	
1633 C8	F604 B3	
1634 C8	F605 C1	
1635 D2	F606 A12	
1636 D2	F607 A13	
1637 D3	F608 C3	
1638 E2	F609 B6	
1639 E3	F610 B7	
1640 E4	F611 B13	
1641 F11	F612 B12	
1642 F11	F613 B12	
1643 F12	F614 D2	
1644 F12	F615 D2	
1645 F13	F616 B13	
1646 B3	F617 B7	
1647 H11	F618 E2	
1648 H12	F619 C10	
1649 B2	F620 C12	
1650 C2	F621 C6	
1651 C10	F622 C10	
1652 C10	F623 E2	
1653 A12	F624 C9	
1654 B11	F625 C12	
1655 B12	F626 D10	
1656 A12	F627 F3	
1657 B12	F628 E7	
1658 B6	F629 D9	
1659 B6	F630 D12	
1660 C6	F631 D2	
1661 C10	F632 B3	
1662 D12	F633 E12	
1663 D11	F634 E3	
1664 D8	F635 E11	
1665 D9	F636 E2	
1666 A12	F637 E11	
1667 B12	F638 E11	
1668 C9	F639 E8	
1669 E10	F640 E11	
1670 E10	F641 E11	
1671 E11	F642 E10	
1672 E11	F643 F10	
1673 F10	F644 E11	
1674 B7	F645 F11	
1675 B7	F646 F11	
1676 C10	F647 F9	
1677 C10	F648 F10	
1678 B7	F649 F11	
1679 F9	F651 G9	
1680 F10	F652 G9	
1681 G8	F653 G11	
1682 A12	F654 H8	
1683 B12	F655 H9	
1684 C11	F656 H11	
1685 B6	F657 H11	
1686 G8	F658 H13	
1687 H8	F659 H13	
1688 I8	F660 I8	
1689 I8	F661 I9	
1690 I9	F662 I10	
1691 I8	F663 I8	
1692 H9	F664 I9	

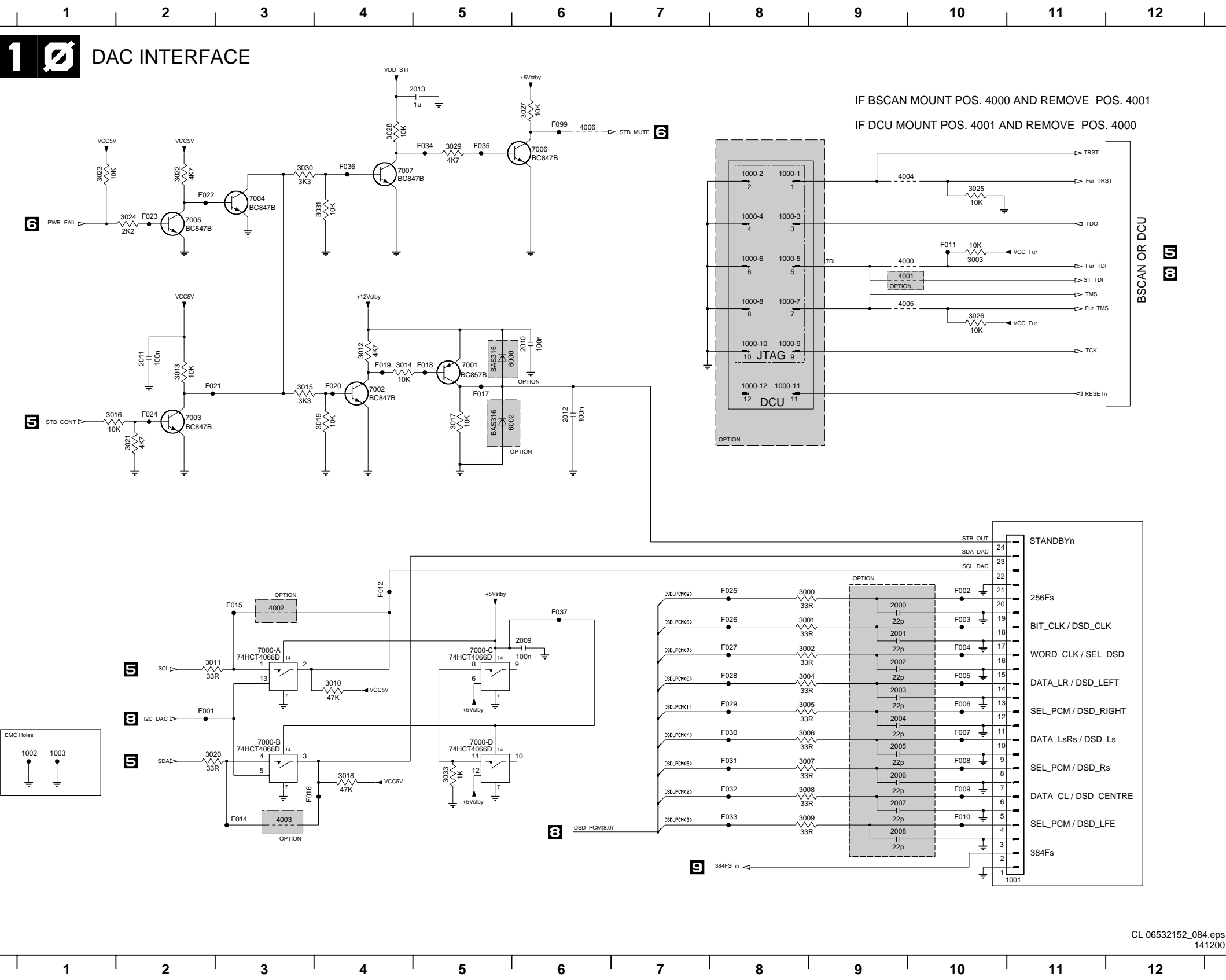
Mono Board: SD RAM s

7 SDRAMs



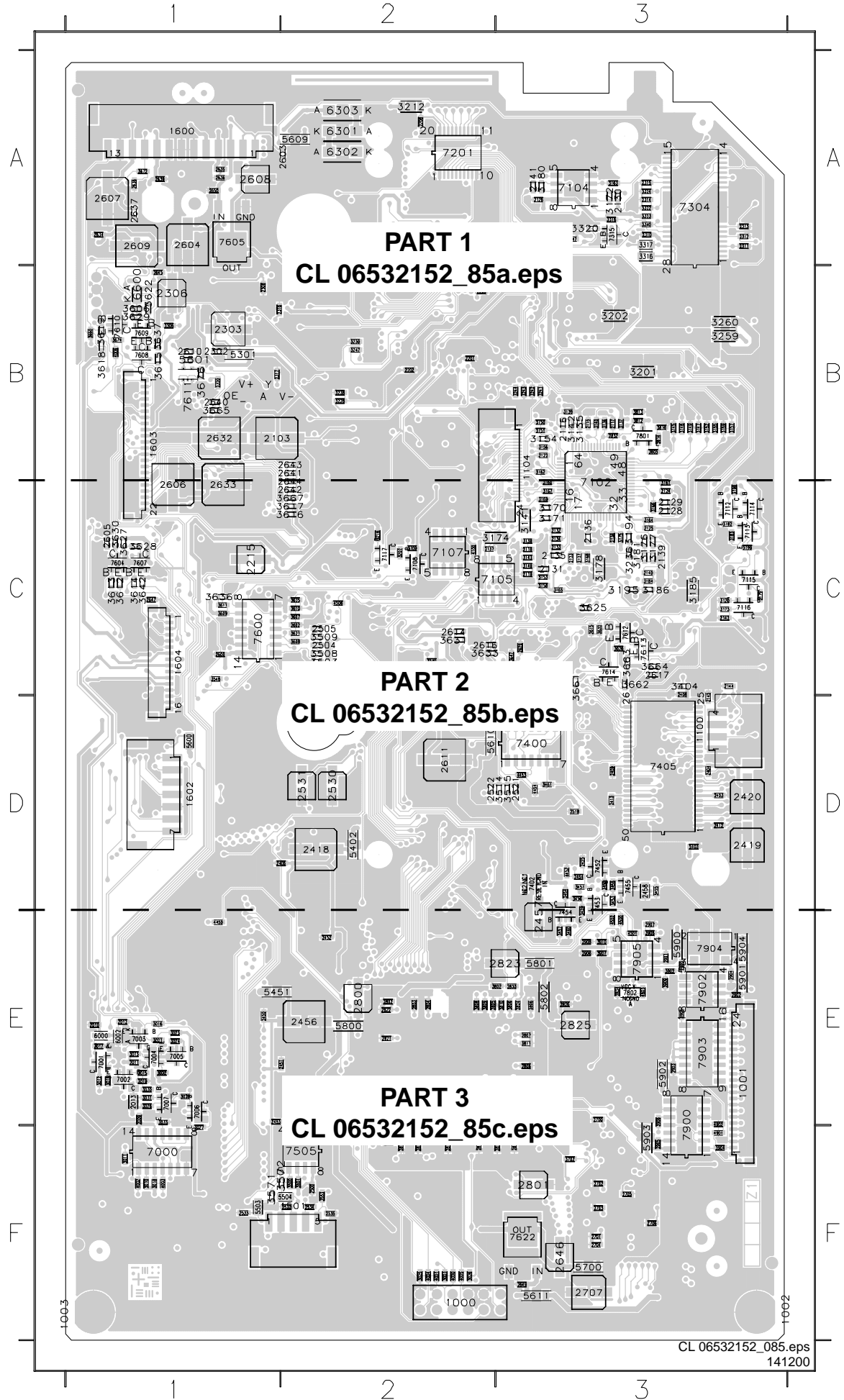
- 2401 C2
- 2402 C3
- 2403 C5
- 2404 C6
- 2406 C2
- 2407 C3
- 2408 C5
- 2409 C6
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- 2411 C3
- 2412 C5
- 2413 C6
- 2419 I2
- 2420 I3
- 2700 C11
- 2701 C13
- 2702 D11
- 2703 D13
- 2704 D11
- 2705 D13
- 2706 D13
- 2707 C12
- 3403 F1
- 3404 F4
- 3702 E10
- 5403 I2
- 5700 C12
- 7404 D2
- 7405 D5
- 7700 D11
- F415 F1
- F416 F4
- F420 I3
- F700 E10
- F701 E10
- F702 E10
- F703 C11

Mono Board: DAC Interface



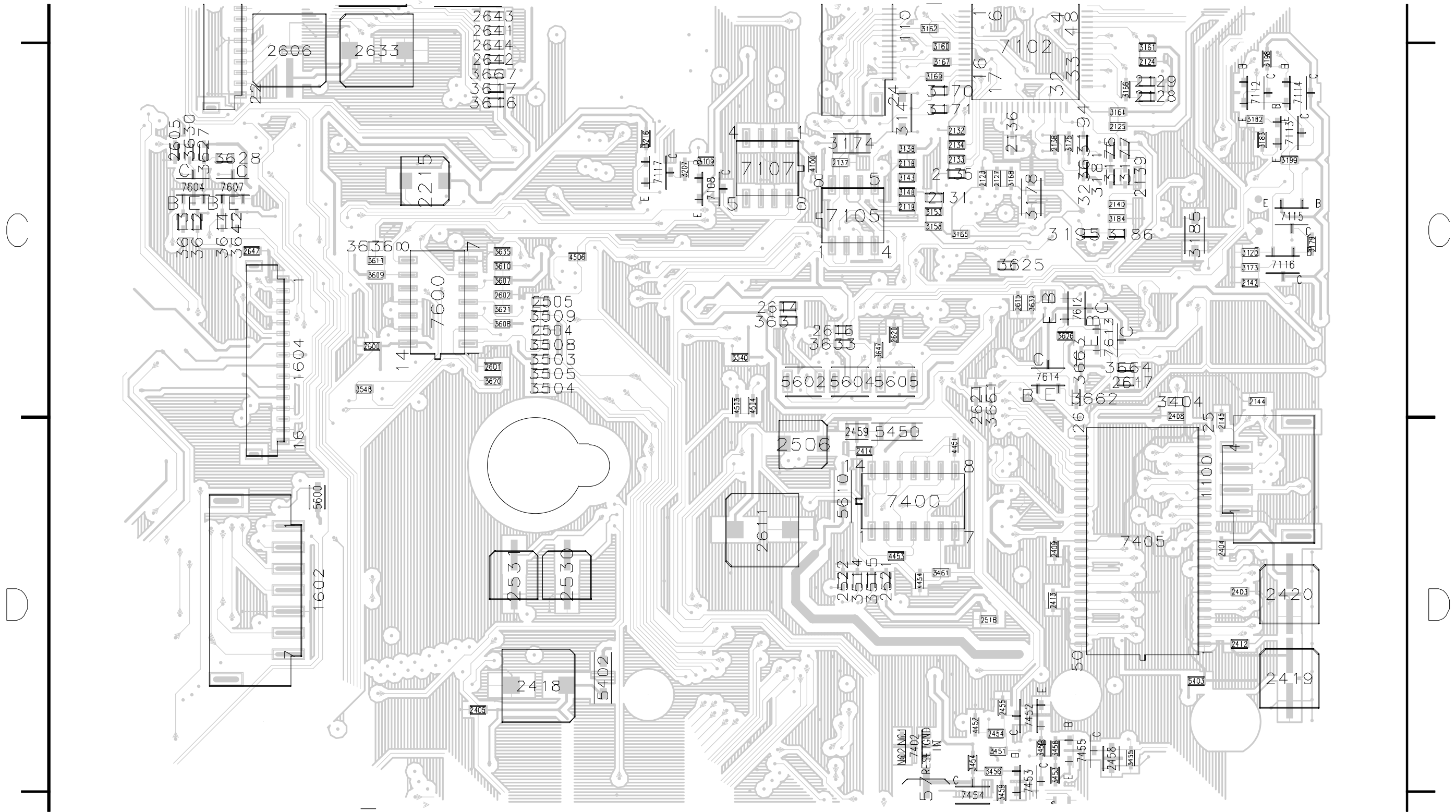
- 1000-1 B8
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- 1000-12 D8
- 1000-2 B8
- 1000-3 B8
- 1000-4 B8
- 1000-5 C8
- 1000-6 C8
- 1000-7 C8
- 1000-8 C8
- 1000-9 D8
- 1001 I10
- 1002 H1
- 1003 H1
- 2000 F9
- 2001 F9
- 2002 G9
- 2003 G9
- 2004 G9
- 2005 H9
- 2006 H9
- 2007 H9
- 2008 H9
- 2009 G6
- 2010 D6
- 2011 D2
- 2012 D6
- 2013 A5
- 3000 F8
- 3001 F8
- 3002 G8
- 3003 C10
- 3004 G8
- 3005 G8
- 3006 G8
- 3007 H8
- 3008 H8
- 3009 H8
- 3010 D4
- 3011 G2
- 3012 D4
- 3013 D2
- 3014 D4
- 3015 D3
- 3016 D1
- 3017 D5
- 3018 H4
- 3019 D4
- 3020 H2
- 3021 E2
- 3022 B2
- 3023 B1
- 3024 B2
- 3025 B10
- 3026 C10
- 3027 A6
- 3028 A4
- 3029 B5
- 3030 B3
- 3031 B4
- 3033 B5
- 4000 C9
- 4001 C9
- 4002 F3
- 4003 H3
- 4004 B9
- 4005 C9
- 4006 A6
- 6000 D5
- 6002 D5
- 7000-A G3
- 7000-B H3
- 7000-C G5
- 7000-D H5
- 7001 D5
- 7002 D4
- 7003 D2
- 7004 B3
- 7005 B2
- 7006 B6
- 7007 B4
- 7008 G2
- 7009 F10
- 7003 F10
- 7004 G10
- 7005 G10
- 7006 G10
- 7007 G10
- 7008 H10
- 7009 H10
- 7010 H10
- 7011 C10
- 7012 F4
- 7014 H3
- 7015 F3
- 7016 H3
- 7017 D5
- 7018 D5
- 7019 D4
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- 7022 B2
- 7023 B2
- 7024 D2
- 7025 F8
- 7026 F8
- 7027 G8
- 7028 G8
- 7029 G8
- 7030 G8
- 7031 H8

Layout Mono Board: (Overview Top Side)



1000
1001
1002
1003
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1005
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1007
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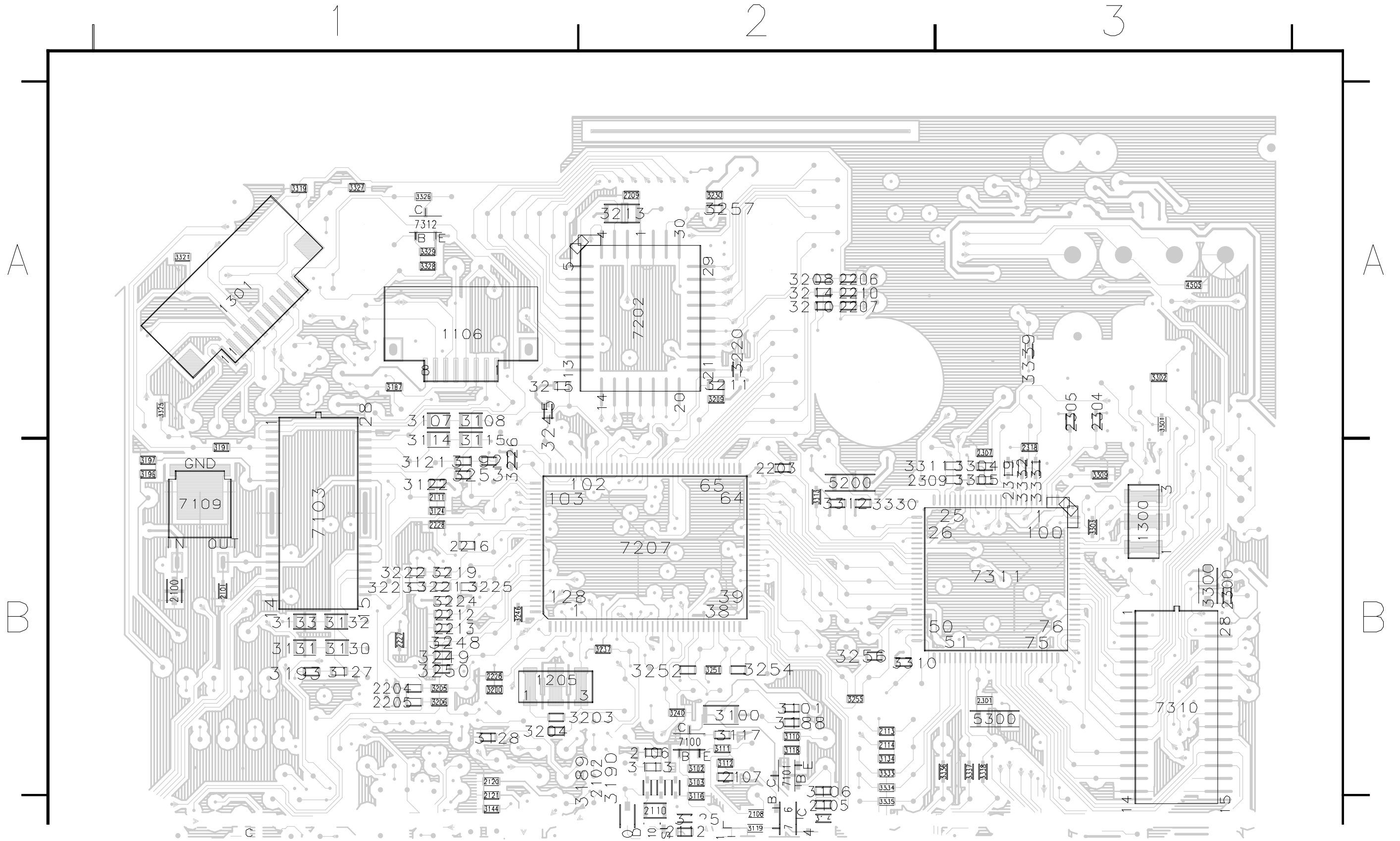
Layout Mono Board: (Part 2 Top Side)



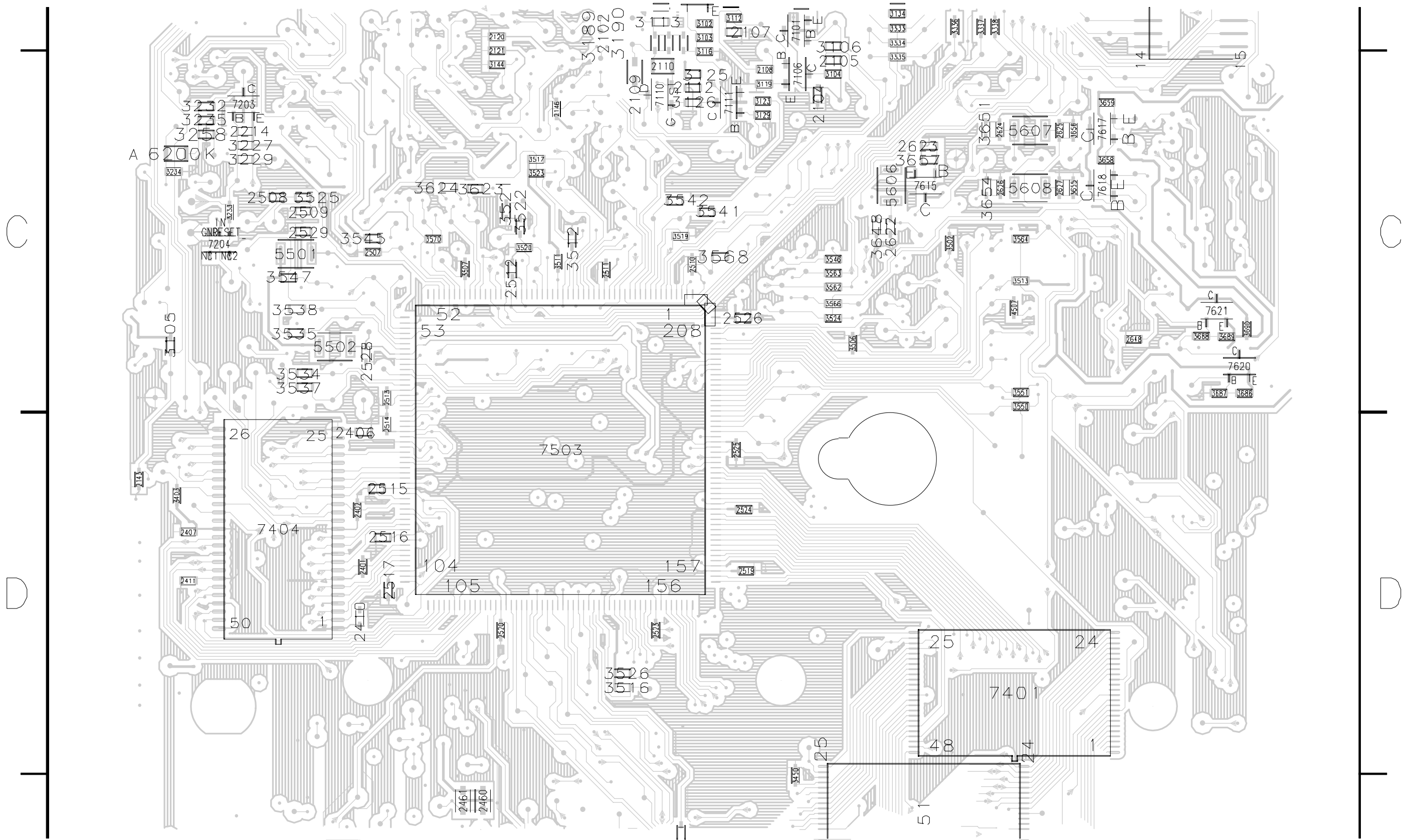
Layout Mono Board: (Part 3 Top Side)



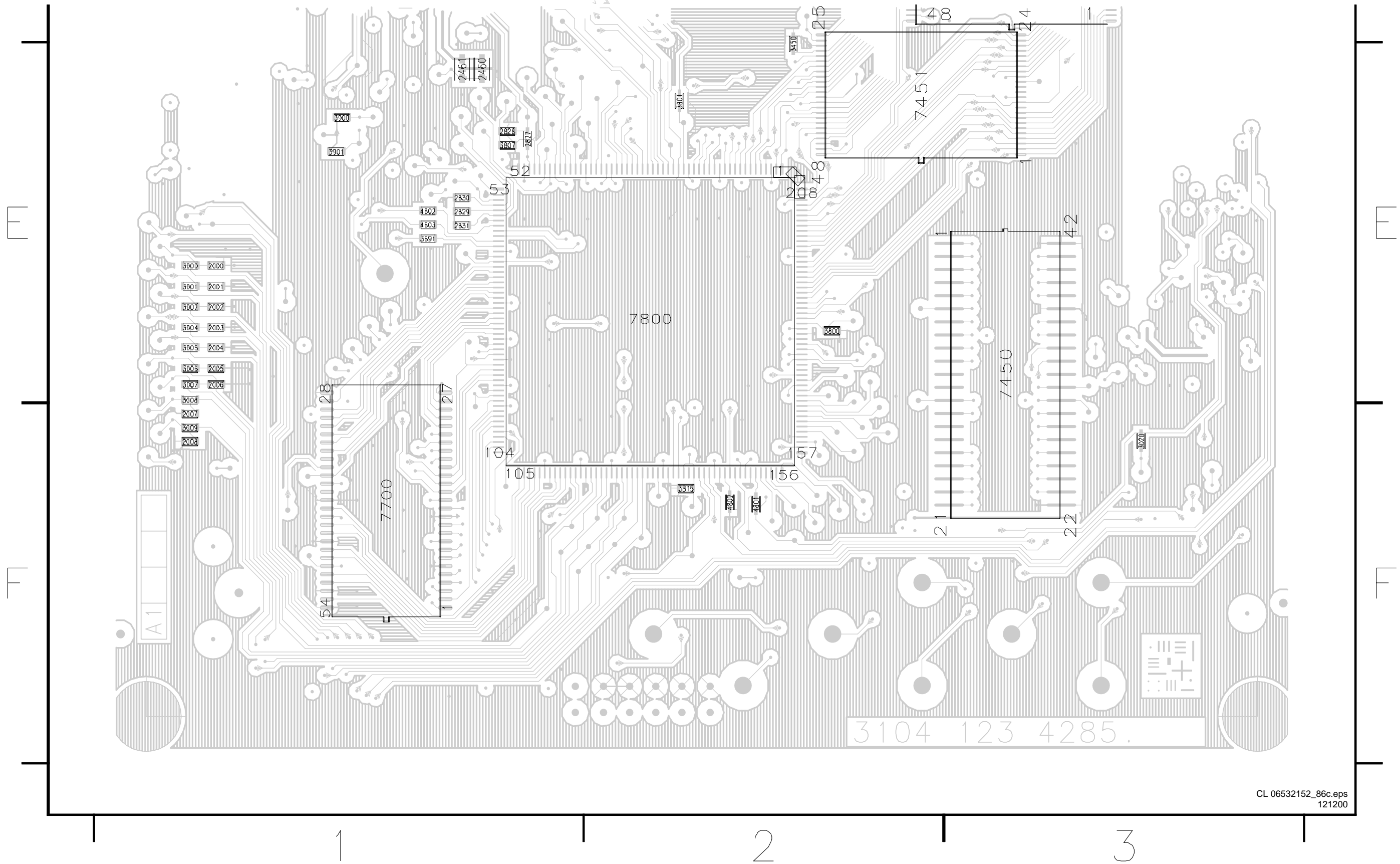
Layout Mono Board: (Part 1 Bottom Side)



Layout Mono Board: (Part 2 Bottom Side)



Layout Mono Board: (Part 3 Bottom Side)



8. Alignments

No alignments available

9. Circuit Descriptions and List of Abbreviations

1. Introduction
2. Power Supply
3. Loader/Monoboard
4. Data Processing
5. Control and Display
6. Abbreviations

Notes:

- Figures can deviate slightly from the actual situation, due to different set executions.
- For a good understanding of the following circuit descriptions, please use the diagrams in chapter 6 and 7. Where necessary, you will find a separate drawing for clarification.

9.1 Introduction

9.1.1 Features

The SACD 900/DVD962SA range is a new model DVD/SACD player and is equipped with:

- Build in MPEG2, AC-3 and DSD decoder,
- 6 channel audio output,
- RGB video output on SCART (Europe only),
- YUV output,
- Progressive scan (for DVD962SA Non-Europe models),
- CD-RW compatible.

9.1.2 Differences

The SACD 900/DVD962SA is derived from the SACD 1000. It has a new Audio/Video board, Front Display board, Progressive scan board (same as used in Step2001 DVD-player) and another Power Supply module (same as used in Step2001 DVD-players).

9.1.3 Modules

The main modules are:

- Power Supply Unit (PSU).
- Mercury 1 Loader - VAL6011
- ASD1.1 Mono Board.
- Audio Video (A/V) Board.
- Front Display Board.
- Progressive Scan Board.

9.1.4 Service

This ASD1.x has the same ComPair connector as in previous DVD generations.

Flashing of the application-SW is not possible with the ComPair cable, except with a CD-R disc. For sets with Mask-ROM software, replace it with a programmed Flash (available via your Philips Service organisation).

9.2 Power Supply Unit

9.2.1 Introduction

This supply is a Switching Mode Power Supply (SMPS), which uses the control IC UC3842 to produce pulses to drive the

power 'switch' (MOSFET). The regulation of the 'duty cycle', controls the supply output, at a fixed switching frequency (approximately 58 kHz, determined by the RC timing components at pin 4).

The UC3842 (item IC1) is a high performance, fixed frequency, current mode controller for DC-to-DC converter applications. This integrated circuit features a:

- trimmed oscillator for precise duty cycle control,
- temperature compensated reference,
- high gain error amplifier,
- current sensing comparator and
- high current totem pole output ideally suited for driving a power MOSFET (item Q1).

Also included are protective features consisting of input and reference under-voltage lockouts each with hysteresis, cycle by cycle current limiting, programmable output dead time and a latch for single pulse metering.

9.2.2 Output Voltages

- +12V_stdby (present during standby).
- +5V_stdby (present during standby).
- +5V_digital (will switch off via Q3 during Standby).
- +5V_AV (will switch off via Q3 during Standby).
- 3V3 (present during standby).
- -5V (will switch off during standby).

9.2.3 Operation

Power Supply

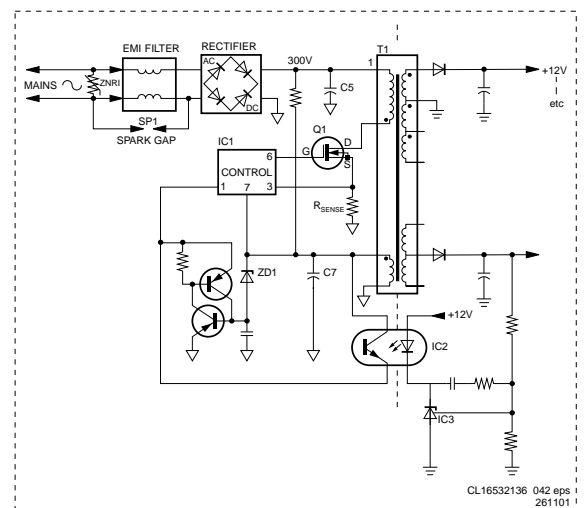


Figure 9-1

Mains Input Circuit

The bridge rectifier (D1-D4) rectifies the mains voltage, after which C5 smoothens this voltage. The DC voltage across this capacitor is the DC input voltage (approximately 300 V), to pin 1 of transformer T1.

The mains input also consists of a (differential mode) lightning protection ZNR1 and a (common mode) lightning protection SP1 (spark gap).

Start-up and Take-over Circuitry

With the mains voltage input, C7 will charge. When this voltage, (at pin 7 of IC1), reaches the start-up threshold of min 14.5 V, the control circuit starts to operate.

After start-up, IC1 requires a maximum sinking current of 17 mA, which the start-up circuitry cannot deliver. Therefore, a take-over circuitry (a coupled winding of transformer T1) is present. The voltage at this point will take over the supply voltage at pin 7 of the IC.

If the take-over circuit does not function, the IC will switch 'off' again at the minimal operating voltage of 8.5 V. The whole operation cycle will repeat itself with audible hiccup sound if take-over is not present.

Secondary Voltage Sensing

The secondary voltage regulating circuit comprises of opto-coupler IC2 (which isolates the error signal from the control IC on the primary side), and a reference component IC3 (TL431). The reference component has two functions:

- a very stable and accurate reference diode
- a high gain amplifier.

TL431

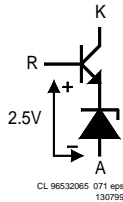


Figure 9-2

When the output voltage increases (due to a reduction in the load), the voltage across R23 increases to above the internal reference voltage of 2.5 V. IC3 will conduct and the current through the opto-coupler will increase. This results in an increase of the voltage at pin 2 of IC1, which will reduce the on time of FET Q1.

In the event of an output voltage decrease (due to an increase in the load), the control circuit will operate in the opposite way.

Primary Current Sensing

The current through FET Q1, will result in a voltage drop across R3A. This line goes to pin 3 of IC1, which is the current sense input. The higher the input voltage, the more the primary current is limited. In this way, the maximum output power of the power supply is limited.

Under-voltage Protection

Two under-voltage lockout comparators are incorporated, to guarantee that IC1 is fully functional before the output stage is enabled. Separate comparators with built-in hysteresis monitor both the supply voltage at pin 7 and the reference voltage at pin 8.

If the supply voltage at pin 7 drops below 10 V (typical), e.g. due to a shorted secondary voltage or excessive load, the drive pulse at pin 6 is disabled and the controller will switch 'off'.

Over-voltage Protection

The over-voltage circuitry (ZD1, Q7, and Q8) is used to detect an over-voltage situation on the secondary side of the transformer.

If, after start-up, the voltage at the zenerdiode ZD1 will exceeds its zener voltage, the internal latch circuit is triggered (via pin 1), the output buffer is disabled, and the SMPS goes into over-voltage protection. Now a complete restart sequence is required.

Note: If the event of the over-voltage situation remains present, the SMPS will go in sequence of protection, start-up, protection and the cycle repeats. This effect is highly audible.

9.3 Loader/Monoboard

SD1.1 Loader Assy

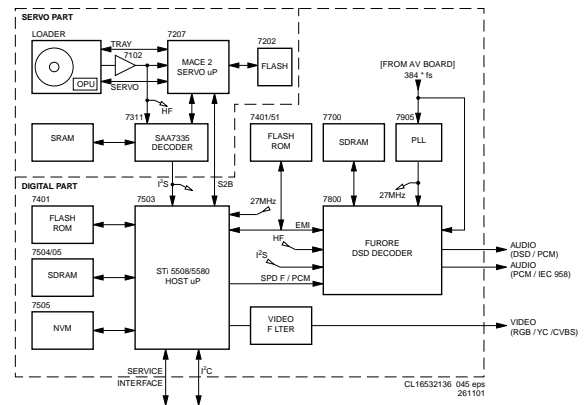


Figure 9-3

9.3.1 The Servo Part

The Optical Unit

The optical unit consists of two lasers, one for CD with a wavelength of 780 nm, and one for DVD with a wavelength of 650 nm. The TZA1033 (item 7102) controls the data from these lasers, and the supply to them.

The Signal Processor TZA1033

The TZA1033 (or DVDALAS2) is an analogue pre-processor and laser supply circuit. It contains data amplifiers and several options for radial tracking and focus control.

It is possible to optimise the dynamic range of this pre-amp/processor combination for the LF servo and RF data paths. The gain in both channels is separately programmable. This will guarantee an optimal playability for all kind of discs.

Also, a dual laser supply is implemented, with fully automatic laser control including stabilisation and an ON/OFF switch, plus a separate supply pin for power efficiency.

The servo signals go to the MACE2 servo processor, while the HF output signal, goes to the SAA7335 decoder (item 7311).

The Servo Processor MACE2

The servo circuit in the MACE2 IC (item 7207), takes care of the servo controls. In a CD system, there are some 12 control loops active. About six of them are needed to adjust the servo error signals, that is once per disc rotation. It also adjusts offsets, signal amplitudes, and loop gains (AGCs), to enlarge system robustness and to avoid expensive potentiometer adjustments in production.

The other six loops determine the laser spot position on the disc in the radial, axial (focus), and tangential directions. It also has to take care that the spot accesses a required position as fast as possible. This access system consists of two parts, namely the actuator and the sled, which are (within a certain range) mechanically and electrically independent. Therefore, during an access, the servo has to control as well the actuator as the sled.

The analogue signals from the diode pre-processor are converted into a digital representation using A/D converters. For the communication between the host processor (STI5505) and the servo processor the S2B bus is used, this supports full-duplex asynchronous communication.

Note: For an extensive description of the MACE2 IC, see Service Manual 3122 785 11010.

The Decoder SAA7335

The SAA7335 (item 7311) is a high-end combined Compact Disc (CD) and Digital Versatile Disc (DVD) compatible decoding device. The device operates with an external 32 KB SRAM for DVD error correction and de-interleaving operations.

This IC decodes EFM or EFM+HF signals directly from the laser pre-amplifier, including analogue front-end, PLL data recovery, demodulation, and error correction.

The analogue front-end input converts the HF input to the digital domain via an 8-bit ADC, preceded by an AGC circuit to obtain the optimum performance from the converter. An external resonator clocks this block. This subsystem recovers the data from the channel stream. It corrects asymmetry, performs noise filtering and equalisation, and finally recovers the bit clock and data from the channel using a digital PLL. The demodulator part detects the frame synchronisation signals and decodes the EFM (14 bit) and EFM+ (16 bit) data and sub-code words into 8-bit symbols. Via the serial output interface, the I²S data (audio and video) go to the DVD decoder STi5505.

The spindle-motor interface provides both motor control signals from the demodulator and, in addition, contains a tachometer loop that accepts tachometer pulses from the motor unit. They drive the motor IC (item 7304).

The SAA7335 has two independent microcontroller interfaces. The first is a serial I²C-bus and the second is a standard 8-bit multiplexed parallel interface. Both of these interfaces provide access to 32 8-bit registers for control and status.

9.3.2 The Digital Part

The Host Processor STi5505

The STi5505 host processor works on 3.3 V (VDD_STI). It comprises the following functions:

- video decoder which supports MPEG1 and MPEG2
- audio decoder which supports AC-3, MPEG1, MPEG2, PCM, 6-channel, virtual surround
- PAL/NTSC video encoder with simultaneously Y/C, CVBS and RGB/YUV outputs
- the video encoder supports Closed Captioning (CC) and MacroVision 7.0/6.1
- full screen On Screen Display (OSD) generator
- on-chip PLLs to generate all necessary clocks (as reference the 27 MHz video clock is used).

Input

Input data comes from the I²S-bus. The front-end interface of this device, accepts DVD, CD and CD-DA information.

Signal Processing

For video, the input data stream is decoded to the appropriate MPEG, Sub Picture, and OSD data streams, after which they are fed to the PAL/NTSC encoder. This cell will convert the digital MPEG/Sub Picture/OSD stream into a standard base band signal and into RGB components. It handles interlaced and non-interlaced data, can perform CC/TXT encoding, and allows MacroVision copy protection.

For audio, the processing cell is a fully compatible Dolby AC-3, MPEG1, MPEG2, PCM decoder, capable of decoding 5.1 and 2 channel streams.

Output

For video, six analogue output pins are available on which CVBS, S-VHS (Y/C), and RGB/YUV signals are present. They go directly to the A/V board.

For audio, the STi5505 has three PCM digital outputs (for 6-channel analogue audio):

- PCM_OUT0: left and right (to pin 60 of FUIRORE IC7800).
- PCM_OUT1: centre and LFE (to pin 61 of FUIRORE IC7800).
- PCM_OUT2: left and right surround (to pin 62 of FUIRORE IC7800).

The FUIRORE SACD processor

General

The FUIRORE-IC is a one-chip design, containing all the hardware that is required for SACD processing. It is intended to interface with the STi-family (STi5505/STi5508) DVD video-decoders.

The FUIRORE-IC contains a memory interface to support an external 16 or 64 Mbit SDRAM. During SACD application, the STi5505 serves as a host, whereby the FUIRORE is controlled via the EMI interface. The FUIRORE processing part is not used during all other play modes. In these modes, the PCM audio signals are fed through the FUIRORE to the appropriate DAC.

Block Diagram

FUIRORE

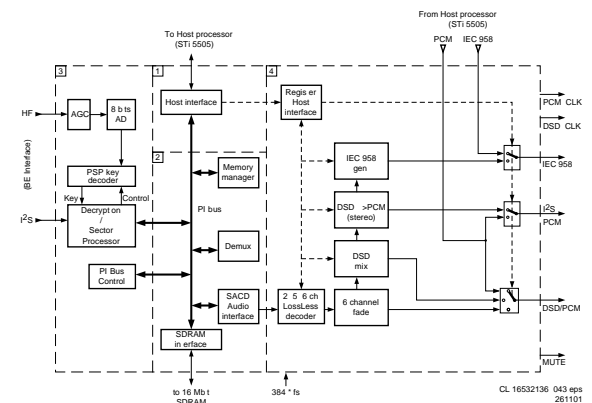


Figure 9-4

We can divide the FUIRORE-IC in four main parts (see block diagram):

1. **Host interface.** This is the link between the host bus and the internal registers and memory bus. It also supplies the general reset signal (HW and SW) and the interrupt signals.
2. **Data processing.** All modules and peripherals in this part are connected to a so-called PI-bus. It is beyond the scope of this manual to go more in detail on this subject.
3. **Copy protection.** On every SACD disc, a PSP-signal is recorded. The player can only play a disc if a valid PSP-signal is detected. This PSP-key is recorded, via a special mechanism, in the EFM-signal on the disc. To detect this key, the analogue HF-signal from the optical pick-up unit is fed directly to the FUIRORE-IC. Via an AGC, the signal is fed to an ADC. The digitised HF signal is then fed to a block where key is encrypted. Control of this process is done via the host interface (sector processor).
4. **DSD decoding and post processing.** In this part, all processing is done to generate a DSD and/or an I²S stream (from the de-multiplexed stream coming from the data processing block), in such a way that it can directly be connected to a DA-converter. All processing is done on $384 * f_s$.

Interfaces

- Basic Engine Interface:
 - **Data input interface.** The Basic Engine Interface (I²S), is connected to the output of the SAA7335 (HD61) high speed CD decoder.
 - **Analogue HF input.** The analogue HF input, coming from the optical pickup unit (OPU), is also fed to the FUIRORE-IC, to extract the copy-protection information (PSP (Pit Signal Processing = invisible data is stored on to disc, which is required to decrypt the encrypted content)).

- **SDRAM Interface:** The SDRAM interface forms a glue less interface to one 16 Mbit (or one 64 Mbit) SDRAM device. The interface takes care for the power-up sequence, mode programming and refreshing of the SDRAM devices. This is hard coded in the interface and does not have to be controlled by the host.
- **Audio data input/output Interface:**
 - **DSD/PCM combined data output.** DSD_PCM: Output intended for a combined 6-channel DSD (SACD) and PCM (DVD-CDDA) DAC. Switching between the PCM data coming from the STi5505, and the internal generated DSD signals, is done in the FURORE IC.
 - **Stereo DSD only output.** DSD_stereo: 2-channel DSD output with stereo down mix in the case of 5- and 6-channel, and normal stereo in case of 2-channel DSD mode.
 - **Stereo PCM data output.** Two possible stereo sources can be selected as stereo PCM output:
 1. Stereo PCM coming from the STi5505 via the PCM input on Furore.
 2. Stereo or down-mix-PCM derived via a decimation filter from the SACD-DSD signal.
 - **Digital audio output interface (IEC958).** The IEC958 format is intended to connect the SACD 900 to a digital receiver. No DSD signals are defined for IEC958, therefore the 'DSD-->PCM converted' signal is transmitted. Following two types of signals are possible on the digital interface:
 1. IEC958 data coming from the STi5505.
 2. IEC958 data (stereo or down-mix-PCM) derived via a decimation filter from the SACD-DSD signal.
 - **Clock + reset input.** Two different processing clocks and a reset pulse are needed:
 1. Sys_clk: System clock for data processing part, frequency can be 27 MHz or $768 * f_s$.
 2. $384 * f_s$: Processing clock for LLD and post processing.
 3. RESETn is an asynchronous reset and should be low for at least 1 period of DSD_CLK.

Memory

SDRAM

The size of the SDRAM is 2 times 16 Mbit or 1 time 64 Mbit (not simultaneously).

The SDRAM (items 7504 and 7505) has the following functions:

- it is used by the MPEG video decoder as a frame buffer,
- it holds the software and the variables used by it.

Flash-ROM

A 2MB Flash-ROM (item 7401) holds the DVD firmware, and is controlled by pin 16 (FLASH_OEN) of the STi5505. It must be able to perform a download (by disk or OS-link) in a Flash-only system.

EEPROM

User settings, player settings, and region code are stored in a 32 Kb I²C EEPROM.

9.4 Data Processing

9.4.1 Audio/Video (A/V) Board

General

This board is the interface panel between the DVD-player and its peripherals. See also block diagram in Chapter 6. This board has some added features compared to the 2nd generation DVD 2B.

The control of the A/V board is done by the I²C-decoder IC7107 (see table below):

Description	Pin	Hi	Lo
CLK_SEL	12	Internal clock	External clock
CLKFREQSEL	11	$384 * f_s$	$192 * f_s$
DAC_RESET	10	Normal	Reset
DSD_PCM	6	DSD stream output	PCM stream output
SACD_ACT	5	SACD	CD
SACD_BASSMGT	4	Configure 0 (LLL1)	Configure 1 (SSS1)
VMUTE	7	Video mute (audio direct)	No video mute
Reserved	9		

Block diagram

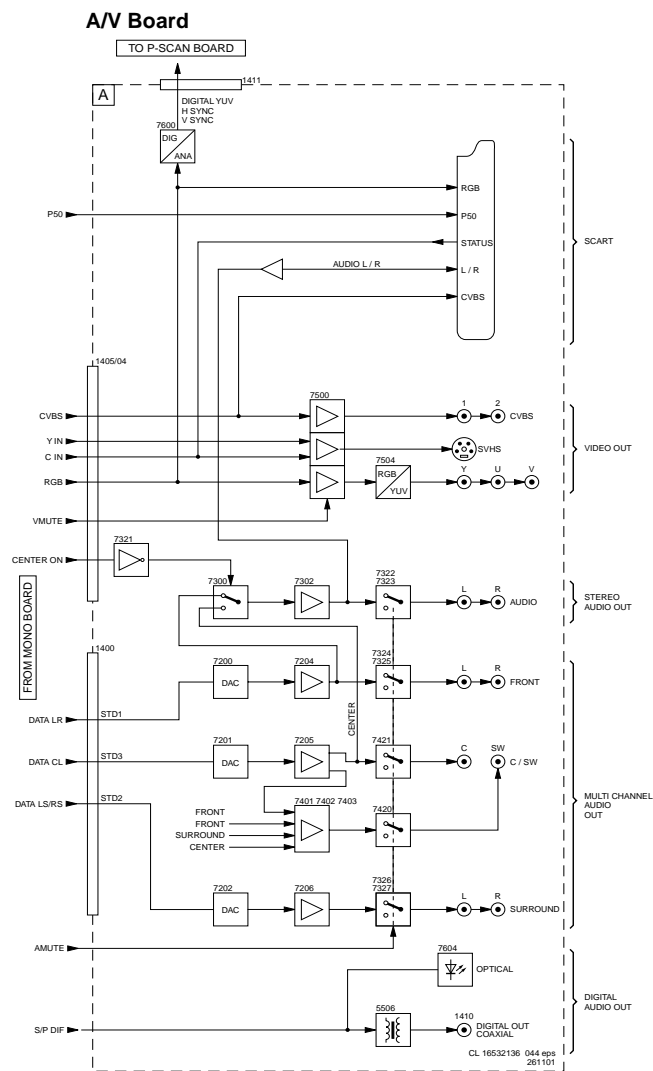


Figure 9-5

Video

The analogue video signals from the SD1.1 Mono Board are fed to video buffer LA7109 (item 7500). Then (for Europe) they

go directly to the SCART plug or the appropriate VIDEO OUT cinch connectors.

The video output from the STi5505 is RGB, YC, and CVBS. To get YUV output, an RGB to YUV conversion matrix (item 7504) is necessary.

It is possible to set the SACD player in 'audio direct' mode. This means that there is no video output from the A/V board. This is indicated by a blue LED on the front panel, and is controlled via the VMUTE control signal from pin 7 of IC7107.

Audio

The digital audio signals are fed to three DACs for the 6-channel audio output:

- 7200 (CS4397) for the front left and right channel,
- 7201 (CS4392) for the centre and subwoofer,
- 7202 (CS4392) for the rear left and right channel.

All these DACs can accept both DSD and PCM data streams from the SD1.1.

Front channels

Due to the gain difference between DSD and PCM in the CS4397, an external circuit (7222, 7221 and 7203) is added to perform hardware attenuation for PCM data. It is controlled via the DSD_PCM control signal (pin 6 of IC7107):

- When this signal is 'low' (= PCM), the voltage at pin 28 is 3.3 V, resulting in 5 dB attenuation.
- When this signal is 'high' (= DSD), the voltage at pin 28 of IC7200 is 5 V, resulting in no attenuation.

After the DAC, the signals are amplified again with 5dB (IC7204) to compensate for the gain loss in the DAC.

Rear channels

All the rear channels have the same gain.

Centre channel

There is a control line from the STi5505, called CENTRE_ON, which is used to switch between the centre channel and front channels for both SACD- and DVD modes (see figure above).

Speaker setting for '6 channel DSD'

The SACD 900 will support two speaker-settings in this mode. This is controlled via the SACD_BASSMGT control signal (pin 4 of IC7107). This will switch a 120 Hz filter 'on' or 'off', for bass enhancement.

This setting is always 'off' when the set is playing PCM-stream.

9.4.2 Progressive Scan Board (if present)

General

The DVD962SA series offer progressive scan YUV outputs (only for non-Europe models).

Block Diagram

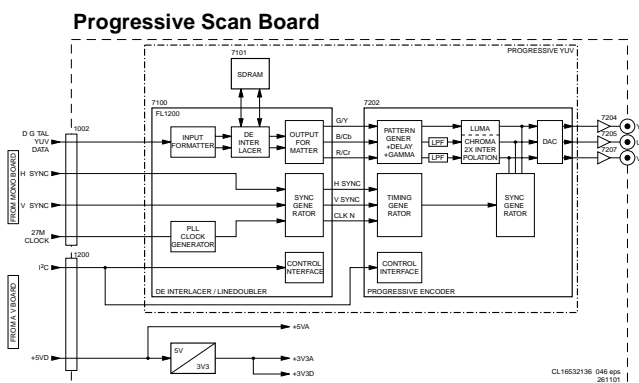


Figure 9-6

Progressive YUV

This creates a picture signal with double the scan lines of a conventional interlaced picture, to create a noticeably sharper and smoother image. It offers higher picture resolution and eliminates virtually all motion artefacts. Even on large screens, the progressive scan lines are barely noticeable and it reduces picture flickering significant.

This board also offers the Digital Crystal Clear feature, which allow you to fine-tune the following parameters:

- Gamma correction,
- Chroma and Luma delay.

9.5 Control and Display Panel

9.5.1 Control

Slave Processor

The most important component on this board is the (slave) microprocessor (item 7401). It works on an 8 MHz resonator (item 1119) and has a RESET circuit (7105), which is triggered by the +5V_{stb}. After the RESET pulse, the STB_CONT line will release the reset of the host microprocessor (see circuit around TS7452 on the Monoboard, diagram 4)

In addition, when going to Standby, the slave processor will reset the host processor. When the slave processor receives the correct IR (or key) code to leave the Standby mode, it resets the host processor.

Other slave processor functions are:

- generation of a scanning grid for the keys,
- generation of the display grid and segment scanning,
- generation of square signal to generate the filament voltage for FTD display,
- inputs for RC5/6 and P50 (P50 controller is build in).

Standby LED

Transistor 7104 drives the Standby LED. When the STBLED signal from the slave processor is 'high', the LED is 'off'.

Key Matrix

When a key on the local keyboard is pressed, the signal at the scanning pins of the microprocessor goes from +5 V to 0 V.

IR Receiver

The IR controller in the slave processor handles both RC5 and RC6 signals. The logic is +5 V for 'high' and 0 V for 'low'.

P50 Interface

P50 (or Easylink) is a bi-directional serial interface for communication between video equipment. For European sets, this communication goes via pin 10 of the SCART connector, while for other regions (when present), this is a cinch connector. The slave processor controls the P50 bus.

9.5.2 Display

FTD Display

The slave processor has an internal square signal generator (42 kHz), to generate the AC filament voltage. TS7106 and 7109 amplify the square signal before it is applied to the display.

The necessary power supply of -32 V is derived from the -40 V signal via voltage regulator 7400.

9.6 Data Sheets

DVDALAS2plus Advanced Analogue DVD Signal Processor and Laser Supply

TZA1033

FEATURES

- Operates with DVD-ROM, DVD-RAM, DVD+RW, DVD-RW, CD-ROM and CD-RW media
- Operates up to 64x CD-ROM and 8x DVD-ROM
- Support for Dual Light pen DVD systems (DVD/CDRW)
- DVD-RAM (C) playback capability
- DVD-RAM Land-Groove servo polarity switching
- 3 different tracking servo strategies:
Conventional 3 beam tracking for CD
Differential Phase Detection (DPD) for DVD-ROM (including option to emulate traditional drop out detection; drop out concealment)
Advanced Push Pull with dynamic offset compensation for DVD-RAM (recorded and unrecorded areas)
- Radial error signal for fast track counting (FTC)
- 2 different strategies to read header data:
- Full bandwidth Push Pull signal
- Left and Right side signal
- Universal photo diode IC interface using internal conversion resistors and offset cancelation
- Flexible adaption to different light pen configurations
- Input buffer amplifiers with low-pass filtering
- RF data amplifier with wide (programmable) bandwidth equivalent to 64xCD / 8x DVD when using equaliser function
- Built-in equalisers cover CAV inner-outer disc range at highest speed.
- Programmable RF gain for DVD-ROM / DVD-RAM / CD-RW / CDRW applications (approx 50dB range)
- Balanced RF-Data signal transfer (single ended still supported)
- Fully automatic laser control including stabilization and an ON/OFF switch, plus a separate supply pin for power efficiency
- Automatic monitor diode polarity selection.
- 3 and 5 V compatible digital interface
- Enhanced signal conditioning in DPD circuit for optimal tracking performance under noisy conditions.

GENERAL DESCRIPTION

The DVDALAS2 is an analogue preprocessor and laser supply circuit for DVD / CD read only players. The device contains data amplifiers, several options for radial tracking and focus control. The preamplifier forms a versatile, programmable interface between dual, voltage output CD/DVD mechanisms to Philips' digital signal processor family for CD and DVD (Gecko, HDR65, Iguano, etc..)

The device contains several options for radial tracking:
Conventional 3 beam tracking for CD;
Differential Phase Detector (DPD) for DVD;
Push Pull for DVD-RAM with flexible L/R weighing to compensate dynamic offsets e.g. beamlanding offset.
A radial error signal is generated to allow fast track count (FTC) during track jumps.

The dynamic range of this preamp/processor combination can be optimized for the LF servo and RF data paths. The gain in both channels can be programmed separately. This will guarantee an optimal playability for all kind of discs.

Several functions are included to allow playback of DVD-RAM(C) discs:

- The header information can be read via the data output path (RF)
- DC offset compensation techniques provide a fast settling after disc errors.
- Radial servo Polarity switch for land/groove
- two settings for focus offset correction for land and groove

The device can accommodate astigmatic, single focault and double focault detectors and can be used with P-type lasers with N- or P-sub monitor diodes. After an initial adjustment, the circuit will maintain control over the laser diode current. With an on-chip reference voltage generator, a constant and stabilized output power is ensured independent of ageing. A separate power supply connection allows the internal power dissipation to be reduced by connecting a low voltage supply.

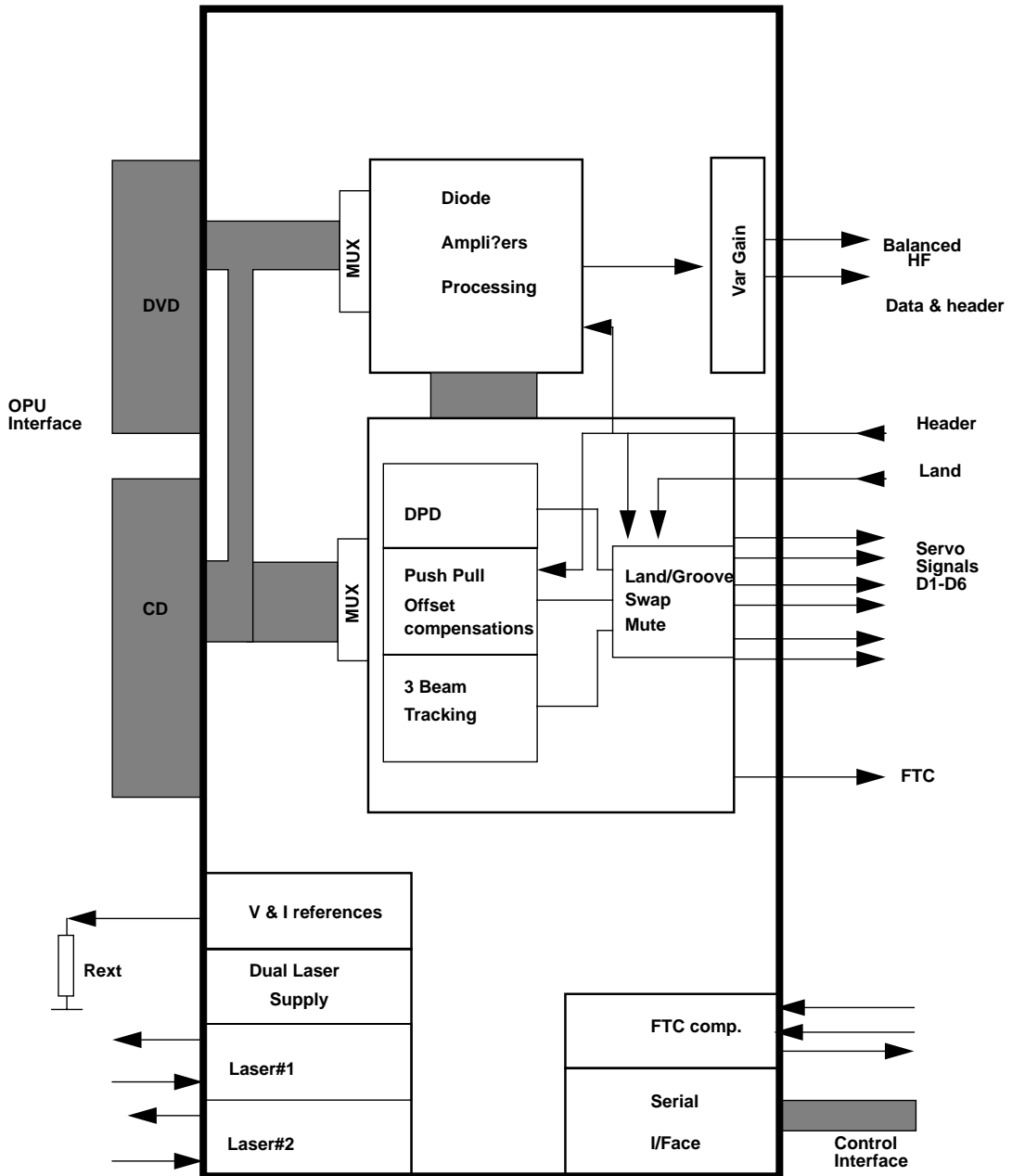
ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
TZA1023	LQFP64	Plastic low profile QFP64; body 10 x 10 x 1.4 mm	SOT314-2

DVDALAS2plus Advanced Analogue DVD
Signal Processor and Laser Supply

TZA1033

DEVICE BLOCK DIAGRAM



**DVDALAS2plus Advanced Analogue DVD
Signal Processor and Laser Supply**

TZA1033

PINNING

Name	Pin	Description
CD-A	1	CD pick up input A
CD-B	2	CD pick up input B
CD-C	3	CD pick up input C
CD-D	4	CD pick up input D
CD-REF	5	CD pick up reference voltage
CD-E	6	CD pick up input E
CD-F	7	CD pick up input F
DVD-A	12	DVD pick up input A
DVD-B	13	DVD pick up input B
DVD-C	14	DVD pick up input C
DVD-D	15	DVD pick up input D
DVD-ref	16	DVD pick up reference voltage
O-A	48	Servo current output for Focus-A
O-B	47	Servo current output for Focus-B
O-C	46	Servo current output for Focus-C
O-D	45	Servo current output for Focus-D
O-central	40	Testpin for offset cancelation
TD2	37	Internally connected
FTC-ref	36	Servo output voltage reference input
S1	42	Servo current output for radial tracking
S2	41	Servo current output for radial tracking
TD1	35	Internally connected
FTC	33	Fast track count voltage output
RFP	55	pos. RF output signal
RFN	56	neg. RF output signal
RF-REF	54	DC Reference signal input RF
LPF-DPD1	38	DPD Low pass bandwidth capacitor, channel pos
LPF-DPD2	39	DPD Low passbandwidth capacitor, channel neg
Land	20	Land/groove toggle input
HEADER	21	Header detector window input
CD-MI	62	CD laser monitor input
DVD-MI	10	DVD laser monitor input
CD-LO	61	CD laser output
DVD-LO	64	DVD laser output
COP	27	Positive inputFTC comparator
COM	28	Inverting inputFTC comparator
COO	29	FTC comparator output

**DVDALAS2plus Advanced Analogue DVD
Signal Processor and Laser Supply**

TZA1033

Name	Pin	Description
SIDA	23	Serial host interface data input
SICL	24	Serial host interface clock input
SILD	25	Serial host interface load
VDDA1	8	Analog Supply voltage 1 (RF input)
VDDA2	59	Analog Supply voltage 2 (RF internal)
VDDA3	53	Analog Supply voltage 3 (RF output stage)
VDDA4	44	Analog Supply voltage 4 (Servo)
VDDD5	30	Digital Supply voltage (5V dig core)
VDDD3	22	Digital Supply voltage (3V I/O pads and FTC comp.)
VDDL	63	Supply voltage for laser
VSSA1	9	Analog Ground 1
VSSA2	58	Analog Ground 2
VSSA3	57	Analog Ground 3
VSSA4	43	Analog Ground 4
VSSD	26	Digital ground
Rext	60	Reference current input (Connect 12k1 to VSSA4)
STB	31	Standby input
TM	19	Testmode input
TDO	34	test data out

DVDALAS2plus Advanced Analogue DVD
Signal Processor and Laser Supply

TZA1033

PINNING

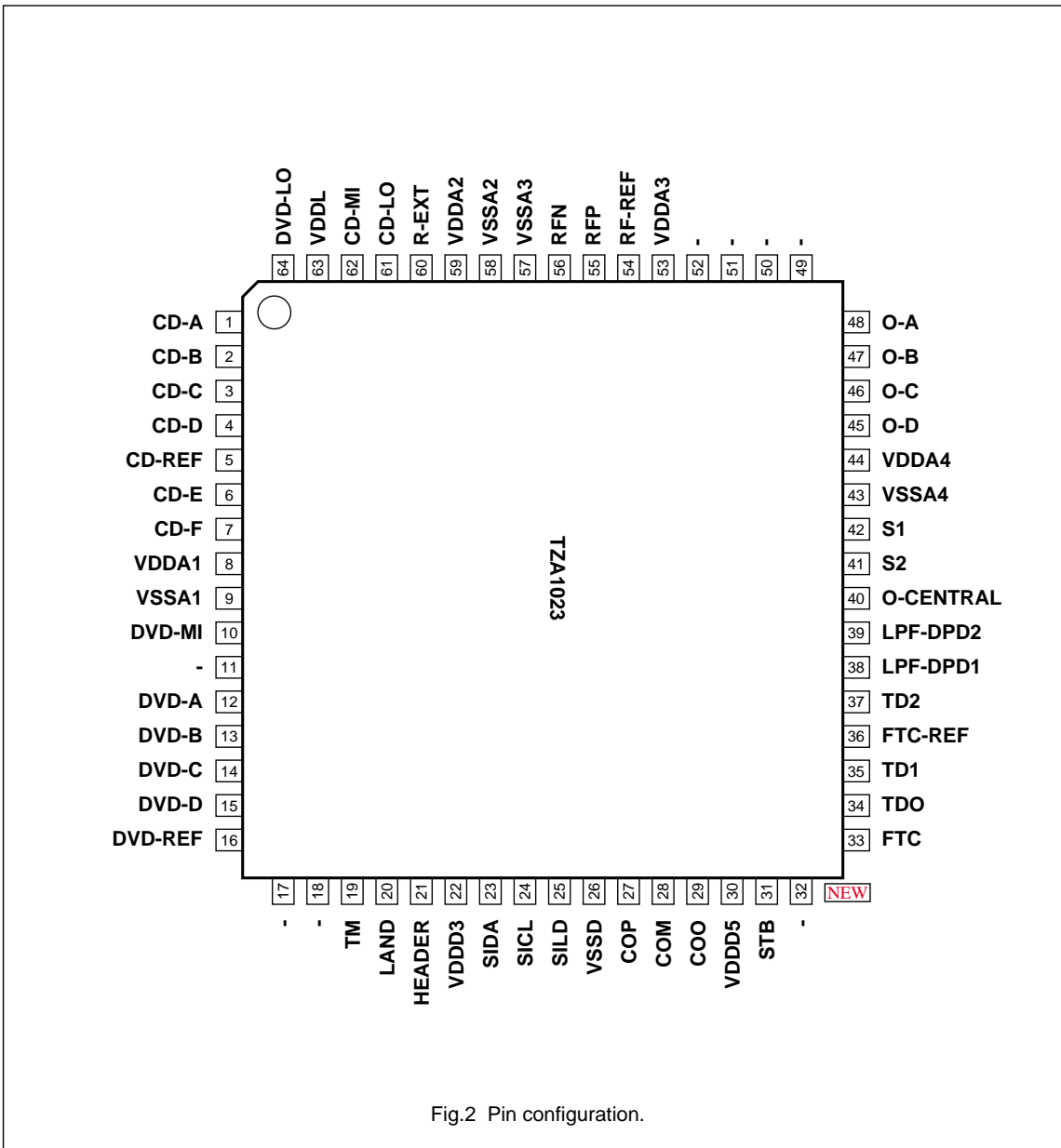


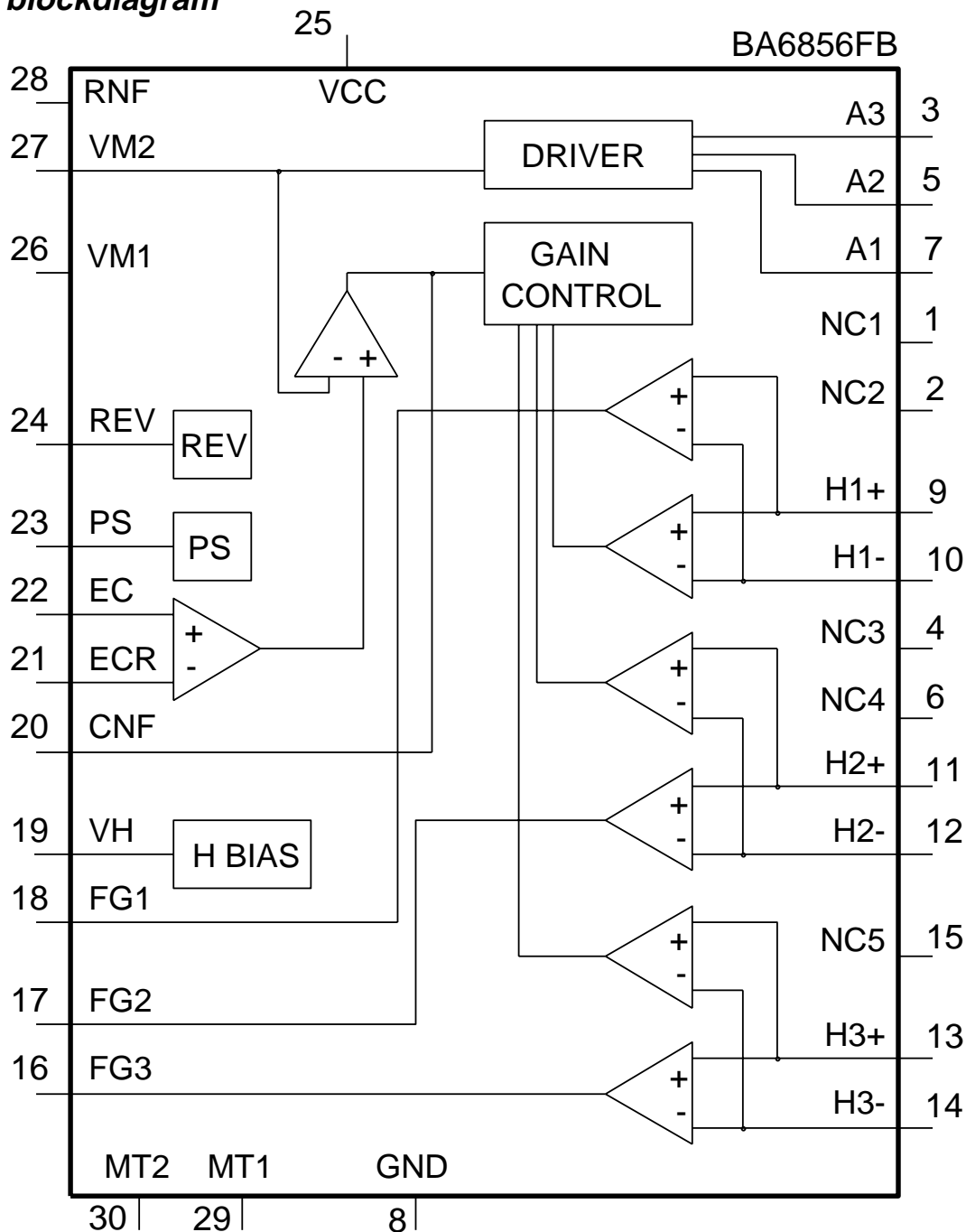
Fig.2 Pin configuration.

BA6856FP: 3 PHASE MOTOR DRIVER FOR DVD PLAYERS

Features

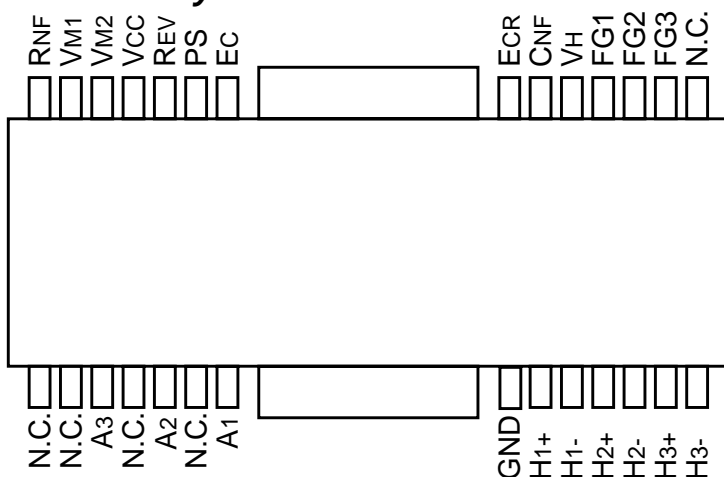
- 1/3-phase, full-wave pseudo linear driving system
- built-in power save
- built-in thermal shut down circuit
- built-in current limit circuit
- built in Hall bias circuit
- built in FG-output (3-phase parallel output)
- with switching function of regular/ reverse rotations

blockdiagram



pin description

PIN No	PIN NAME	DESCRIPTION
1	N.C.	Not connected
2	N.C.	Not connected
3	A ₃	Output 3 for motor
4	N.C.	Not connected
5	A ₂	Output 2 for motor
6	N.C.	Not connected
7	A ₁	Output 1 for motor
8	GND	Ground
9	H ₁ ⁺	Hall input Amp1. positive input
10	H ₁ ⁻	Hall input Amp1. negative input
11	H ₂ ⁺	Hall input Amp2. positive input
12	H ₂ ⁻	Hall input Amp2. negative input
13	H ₃ ⁺	Hall input Amp3. positive input
14	H ₃ ⁻	Hall input Amp3. negative input
15	N.C.	Not connected
16	FG3	FG3 signal output terminal
17	FG2	FG2 signal output terminal
18	FG1	FG1 signal output terminal
19	V _H	Hall Bias
20	C _{NF}	Capacitor connection pin for phase compensation
21	E _{CR}	Torque control standard voltage input terminal
22	E _C	Torque control voltage input terminal
23	PS	POWER SAVE switch
24	R _{EV}	Reverse terminal
25	V _{CC}	Power supply for sinal division
26	V _{M2}	Power supply 2 for driver
27	V _{M1}	Power supply 2 for driver
28	R _{NF}	Power supply for driver division
FIN	FIN	GND

Terminal lay-out

DSP for CD and DVD-ROM systems

SAA7335

FEATURES

- Compatibility with CD-I, CD-ROM, MPEG-video DVD-ROM and DVD-video applications
- Designed for very high playback speeds
- Typical CD-ROM operation up to $n = 12$, DVD-ROM to $n = 1.9$, maximum rates (tbf)
- Matched filtering, quad-pass error correction (C1-C2-C1-C2), overspeed audio playback function included (up to 3 kbytes buffer)
- Lock-to-disc playback, Constant Angular Velocity (CAV), pseudo-Constant Linear Velocity (CLV) and CLV motor control loops
- Interface to 32 kbytes SRAM for DVD error correction and de-interleave
- Sub-code/ header processing for DVD and CD formats
- Programmable HF equalizer
- In DVD mode it is still compatible with Philips block decoders
- Sub-CPU interface can be parallel or fast I²C-bus
- On-chip clock multiplier.



In DVD modes double-pass C1-C2 error correction is used which is capable of correcting up to 5 C1 frame errors and 16 C2 frame errors.

The SAA7335 contains all the functions required to decode an EFM or EFM+ HF signal directly from the laser pre-amplifier, including analog front-end, PLL data recovery, demodulation and error correction. The spindle motor interface provides both motor control signals from the demodulator and, in addition, contains a tachometer loop that accepts tachometer pulses from the motor unit.

The SAA7335 has two independent microcontroller interfaces. The first is a serial I²C-bus and the second is a standard 8-bit multiplexed parallel interface. Both of these interfaces provide access to a total of 32×8 -bit registers for control and status.

This data sheet contains a descriptive overview of the device together with electrical and timing characteristics. For a detailed description of the device refer to the user guide "SAU/UM96018".

Supply of this CD/DVD IC does not convey an implied license under any patent right to use this IC in any CD or DVD application.

GENERAL DESCRIPTION

This device is a high-end combined Compact Disc (CD) and Digital Versatile Disc (DVD) compatible decoding device. The device operates with an external 32 kbytes S-RAM memory for de-interleaving operations. The device provides quad-pass error correction for CD-ROM applications (C1-C2-C1-C2) and operates in lock-to-disk, CAV, pseudo CLV and CLV modes.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	MIN.	TYP.	MAX.	UNIT
V _{DDD}	digital supply voltage	4.5	5.0	5.5	V
I _{DDD}	digital supply current	–	70	300	mA
V _{DDA}	analog supply voltage	4.5	5.0	5.5	V
I _{DDA}	analog supply current	–	70	300	mA
f _{xtal}	crystal input frequency	4	25	tbf	MHz
T _{amb}	operating ambient temperature	–20	–	+70	°C
T _{stg}	storage temperature	–55	–	+125	°C

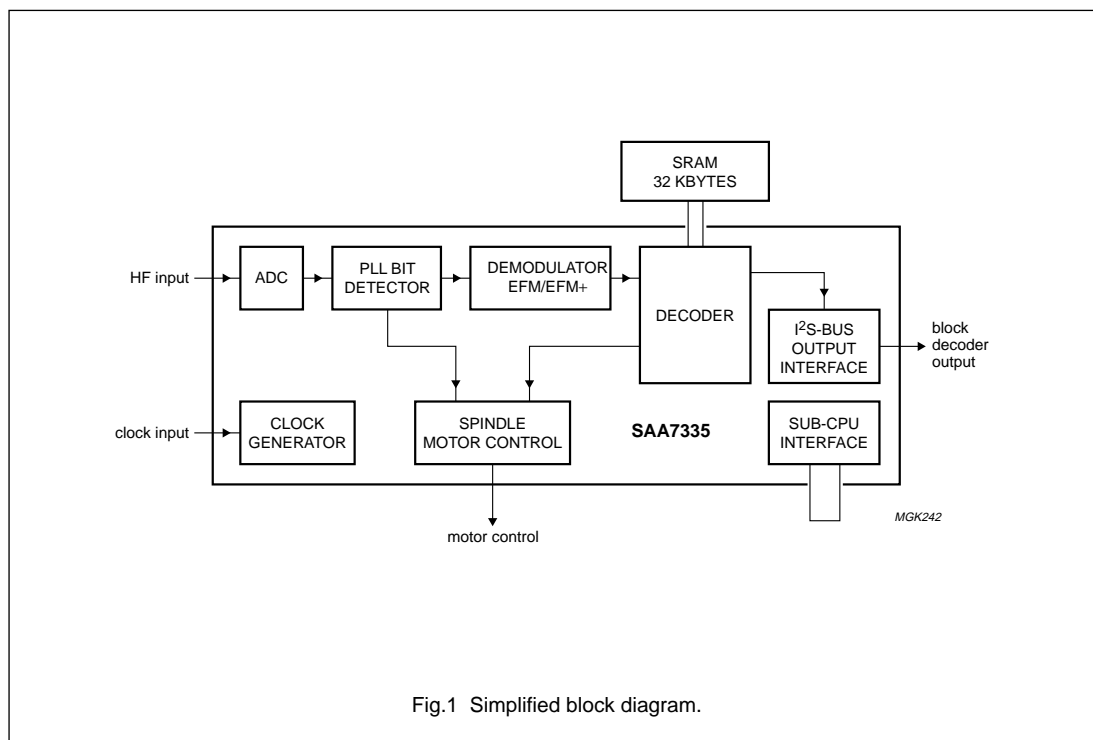
DSP for CD and DVD-ROM systems

SAA7335

ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
SAA7335GP	LQFP100	plastic low profile quad flat package; 100 leads; body 14 × 14 × 1.4 mm	SOT407-1

BLOCK DIAGRAM



DSP for CD and DVD-ROM systems

SAA7335

PINNING

SYMBOL	PIN	TYPE	DESCRIPTION
V _{SSA1}	1	supply	analog ground 1
I _{ref}	2	I	analog current reference input for ADC
REFLo	3	I	analog low reference input for ADC
REFHi	4	I	analog high reference input for ADC
VREF	5	I	analog negative input
HFIN	6	I	analog positive input
V _{SSA2}	7	supply	analog ground 2
AGCOUT	8	O	analog test pin output
V _{DDA2}	9	supply	analog supply voltage 2
V _{DD1}	10	supply	digital supply voltage 1
V _{SS1}	11	supply	digital ground 1
OTD	12	I	off track detect input
MOTO1	13	O	3-state motor control output
n.c.	14	–	not connected, reserved
MOTO2/T3	15	I/O	motor control output/tachometer 3 input
n.c.	16	–	not connected, reserved
T1	17	I	tachometer 1 input
T2	18	I	tachometer 2 input
V _{DD2}	19	supply	digital supply voltage 2
V _{SS2}	20	supply	digital ground 2
TEST1	21	I	test input 1
TEST2	22	I	test input 2
POR	23	I	power-on reset input
MUXSWICH	24	I	use clock multiplier input
n.c.	25	–	not connected, reserved
CL1	26	O	divided clock output
BCAIN	27	I	BCA input
SDA	28	I/O	sub-CPU I ² C-bus serial data input/output
SCL	29	I	sub-CPU I ² C-bus serial clock input
INT	30	O	sub-CPU interrupt output (open-drain)
V _{DD3}	31	supply	digital supply voltage 3
V _{SS3}	32	supply	digital ground 3
da7	33	I/O	sub-CPU data bus bit 7 input/output (parallel)
da6	34	I/O	sub-CPU data bus bit 6 input/output (parallel)
da5	35	I/O	sub-CPU data bus bit 5 input/output (parallel)
n.c.	36	–	not connected, reserved
da4	37	I/O	sub-CPU data bus bit 4 input/output (parallel)
n.c.	38	–	not connected, reserved
da3	39	I/O	sub-CPU data bus bit 3 input/output (parallel)
da2	40	I/O	sub-CPU data bus bit 2 input/output (parallel)

DSP for CD and DVD-ROM systems

SAA7335

SYMBOL	PIN	TYPE	DESCRIPTION
da1	41	I/O	sub-CPU data bus bit 1 input/output (parallel)
n.c.	42	–	not connected, reserved
da0	43	I/O	sub-CPU data bus bit 0 input/output (parallel)
V _{DD4}	44	supply	digital supply voltage 4
V _{SS4}	45	supply	digital ground 4
\overline{WRi}	46	I	sub-CPU write enable input (active LOW)
\overline{RDi}	47	I	sub-CPU read enable input (active LOW)
ALE	48	I	sub-CPU address latch enable input
CSi	49	I	sub-CPU chip select input (active HIGH)
STOPCLOCK	50	O	stop clock output
n.c.	51	–	not connected, reserved
V4	52	O	serial subcode output (for CD)
EBUOUT	53	O	digital audio output
SYNC	54	O	I ² S-bus sector sync output
FLAG	55	O	I ² S-bus correction ?ag output
DATA	56	O	I ² S-bus serial data output
BCLK	57	I/O	I ² S-bus bit serial clock input/output
WCLK	58	I/O	I ² S-bus word clock input/output
V _{DD5}	59	supply	digital supply voltage 5
V _{SS5}	60	supply	digital ground 5
RAMRW	61	O	RAM read/write control output
n.c.	62	–	not connected, reserved
RAMDA7	63	I/O	RAM data bus bit 7 input/output
RAMDA6	64	I/O	RAM data bus bit 6 input/output
RAMDA5	65	I/O	RAM data bus bit 5 input/output
RAMDA4	66	I/O	RAM data bus bit 4 input/output
RAMDA3	67	I/O	RAM data bus bit 3 input/output
RAMDA2	68	I/O	RAM data bus bit 2 input/output
n.c.	69	–	not connected, reserved
RAMDA1	70	I/O	RAM data bus bit 1 input/output
RAMDA0	71	I/O	RAM data bus bit 0 input/output
V _{DD6}	72	supply	digital supply voltage 6
V _{SS6}	73	supply	digital ground 6
RAMAD0	74	O	RAM address bit 0 output
RAMAD1	75	O	RAM address bit 1 output
RAMAD2	76	O	RAM address bit 2 output
RAMAD3	77	O	RAM address bit 3 output
RAMAD4	78	O	RAM address bit 4 output
RAMAD5	79	O	RAM address bit 5 output
RAMAD6	80	O	RAM address bit 6 output
V _{DD7}	81	supply	digital supply voltage 7

DSP for CD and DVD-ROM systems

SAA7335

SYMBOL	PIN	TYPE	DESCRIPTION
V _{SSD7}	82	supply	digital ground 7
RAMAD7	83	O	RAM address bit 7 output
RAMAD8	84	O	RAM address bit 8 output
RAMAD9	85	O	RAM address bit 9 output
n.c.	86	–	not connected, reserved
RAMAD10	87	O	RAM address bit 10 output
RAMAD11	88	O	RAM address bit 11 output
RAMAD12	89	O	RAM address bit 12 output
RAMAD13	90	O	RAM address bit 13 output
RAMAD14	91	O	RAM address bit 14 output
V _{DD8}	92	supply	digital supply voltage 8
V _{SS8}	93	supply	digital ground 8
CRIN	94	I	analog crystal input
CROUT	95	O	analog crystal output
CFLG	96	O	correction statistics output
MEAS1	97	O	front-end telemetry output
V _{DD9}	98	supply	digital supply voltage 9
V _{SS9}	99	supply	digital ground 9
V _{DDA1}	100	supply	analog supply voltage 1

DSP for CD and DVD-ROM systems

SAA7335

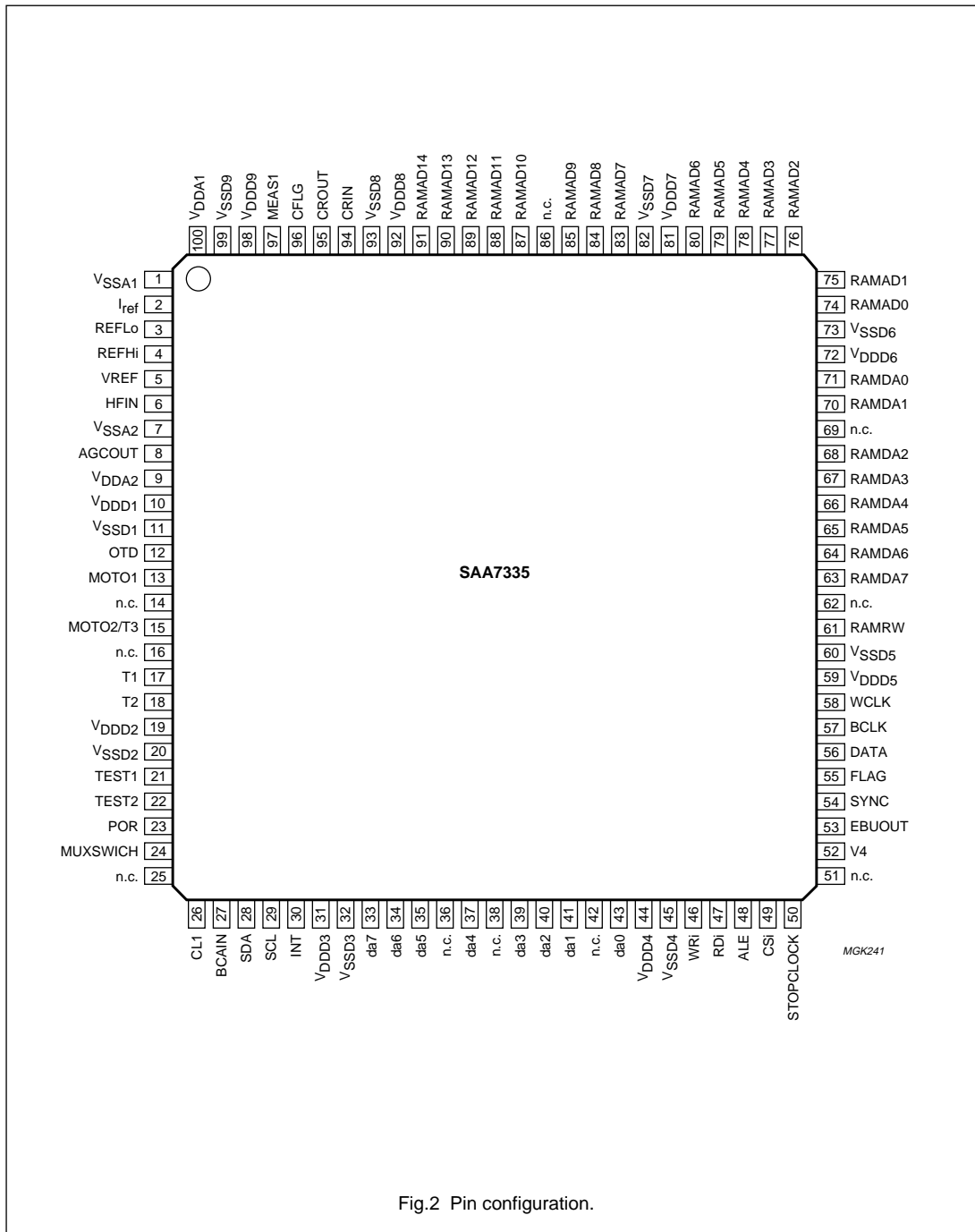


Fig.2 Pin configuration.

 DSP for CD and DVD-ROM systems

SAA7335

FUNCTIONAL DESCRIPTION**Analog front-end**

This block converts the HF input to the digital domain using an 8-bit ADC preceded by an AGC circuit to obtain the optimum performance from the convertor. This block is clocked by ADCCLK which is set by the external crystal frequency plus a flexible clock multiplier and divider block.

PLL and bit detector

This subsystem recovers the data from the channel stream. The block corrects asymmetry, performs noise filtering and equalisation and finally recovers the bit clock and data from the channel using a digital PLL.

The equalizer and the data slicer are programmable.

Digital logic

All the digital system logic is clocked from the master ADC clock (ADCCLK) described above.

Advanced bit detector

The advanced bit detector offers improved data recovery for multi-layer discs and contains two extra detection circuits to increase the margins in the bit recovery block:

1. Adaptive slicer: adds a second stage slicer with higher bandwidth
2. Run length 2 push-back: all T2 run lengths are pushed back to T3, thereby automatically determining the erroneous edge and shifting the transitions on that edge.

Demodulator**FRAME SYNC PROTECTION CD MODE**

This circuit detects the frame synchronization signals. Two synchronization counters are used in the SAA7335:

1. The coincidence counter: this is used to detect the coincidence of successive syncs. It generates a sync coincidence signal if 2 syncs are 588 ± 1 EFM clocks apart.
2. The main counter: this is used to partition the EFM signal into 17-bit words. This counter is reset when:
 - a) A sync coincidence is generated
 - b) A sync is found within ± 6 EFM clocks of its expected position.

The sync coincidence signal is also used to generate the lock signal which will go active HIGH when 1 sync coincidence is found. It will reset to LOW when, during 61 consecutive frames, no sync coincidence is found.

FRAME SYNC PROTECTION DVD MODE

This circuit detects the frame synchronization signals. Two synchronization counters are used in the SAA7335:

1. The coincidence counter: this is used to detect the coincidence of successive syncs. It generates a sync coincidence signal if 2 syncs are 1488 ± 3 EFM+ clocks apart.
2. The main counter: this is used to partition the EFM+ signal into 16-bit words. This counter is reset when:
 - a) A sync coincidence is generated
 - b) A sync is found within ± 10 EFM+ clocks of its expected position.

The sync coincidence signal is also used to generate the lock signal which will go active HIGH when 1 sync coincidence is found. It will reset to LOW when, during 61 consecutive frames, no sync coincidence is found.

EFM/EFM+ demodulation

The 14-bit EFM (16-bit EFM+) data and subcode words are decoded into 8-bit symbols.

 DSP for CD and DVD-ROM systems

SAA7335

Microcontroller interface

The SAA7335 has two microcontroller interfaces, one serial I²C-bus and one parallel (8051 microcontroller compatible).

The two communication modes may be operated at the same time, the modes are described below:

1. Parallel mode: protocol compatible with 8052 multiplexed bus:
 - a) da0 to da7 = address/data bus
 - b) ALE = Address Latch Enable, latches the address information on the bus
 - c) \overline{WRi} = active LOW write signal for write to SAA7335
 - d) \overline{RDi} = active LOW read signal for read from SAA7335
 - e) CSi = active HIGH Chip Select signal (this signal gates the \overline{RDi} and \overline{WRi} signals).
2. I²C-bus mode: I²C-bus protocol where SAA7335 behaves as slave device where:
 - a) SDA = I²C-bus data
 - b) SCL = I²C-bus clock
 - c) I²C-bus slave address (write mode) = 3EH
 - d) I²C-bus slave address (read mode) = 3FH
 - e) Maximum data transfer rate = 400 kbits/s.

MICROCONTROLLER INTERFACE (I²C-BUS MODE)

Bytes are transferred over the interface in single bytes of which there are two types; write data commands and read data commands.

The sequence for a write data command (1 data byte) is as follows:

- Send START condition
- Send address 3EH (write)
- Write command address byte
- Write data byte
- Send STOP condition.

The sequence for a read data command (that reads 1 data byte) is as follows:

- Send START condition
- Send address 3EH (write)
- Write status address byte
- Send STOP condition
- Send START condition
- Send address 3FH (read)
- Read data byte
- Send STOP condition.

READING AND WRITING DATA TO THE SAA7335

The SAA7335 has 32 × 8-bit configuration and status registers as shown in Table 1. Not all locations are currently defined and some remain reserved for future upgrades. These can be written to or read from via the microcontroller interface using either the serial or parallel control bus.

Am29LV160BT/Am29LV160BB

16 Megabit (2 M x 8-Bit/1 M x 16-Bit) CMOS 3.0 Volt-only Sector Erase Flash Memory

DISTINCTIVE CHARACTERISTICS

■ Single power supply operation

- Full voltage range: 2.7 to 3.6 volt read and write operations for battery-powered applications
- Regulated voltage range: 3.0 to 3.6 volt read and write operations and for compatibility with high performance 3.3 volt microprocessors

■ Manufactured on 0.35 μm process technology

■ Supports Common Flash Memory Interface (CFI)

■ High performance

- Full voltage range: access times as fast as 90 ns
- Regulated voltage range: access times as fast as 80 ns

■ Ultra low power consumption (typical values at 5 MHz)

- 200 nA Automatic Sleep mode current
- 200 nA standby mode current
- 10 mA read current
- 20 mA program/erase current

■ Flexible sector architecture

- One 16 Kbyte, two 8 Kbyte, one 32 Kbyte, and thirty-one 64 Kbyte sectors (byte mode)
- One 8 Kword, two 4 Kword, one 16 Kword, and thirty-one 32 Kword sectors (word mode)
- Supports full chip erase
- Sector Protection features:

A hardware method of locking a sector to prevent any program or erase operations within that sector

Sectors can be locked in-system or via programming equipment

Temporary Sector Unprotect feature allows code changes in previously locked sectors

■ Top or bottom boot block configurations available

■ Embedded Algorithms

- Embedded Erase algorithm automatically preprograms and erases the entire chip or any combination of designated sectors
- Embedded Program algorithm automatically writes and verifies data at specified addresses

■ Minimum 100,000 write cycle guarantee per sector

■ Package option

- 48-ball FBGA
- 48-ball μBGA
- 48-pin TSOP
- 44-pin SO

■ Compatibility with JEDEC standards

- Pinout and software compatible with single-power supply Flash
- Superior inadvertent write protection

■ Data# Polling and toggle bits

- Provides a software method of detecting program or erase operation completion

■ Ready/Busy# pin (RY/BY#)

- Provides a hardware method of detecting program or erase cycle completion (not available on 44-pin SO)

■ Erase Suspend/Erase Resume

- Suspends an erase operation to read data from, or program data to, a sector that is not being erased, then resumes the erase operation

■ Hardware reset pin (RESET#)

- Hardware method to reset the device to reading array data

GENERAL DESCRIPTION

The Am29LV160B is a 16 Mbit, 3.0 Volt-only Flash memory organized as 2,097,152 bytes or 1,048,576 words. The device is offered in 48-ball FBGA, 48-ball μ BGA, 44-pin SO, and 48-pin TSOP packages. The word-wide data (x16) appears on DQ15–DQ0; the byte-wide (x8) data appears on DQ7–DQ0. This device is designed to be programmed in-system with the standard system 3.0 volt V_{CC} supply. A 12.0 V V_{PP} or 5.0 V_{CC} are not required for write or erase operations. The device can also be programmed in standard EPROM programmers.

The device offers access times of 80, 90, and 120 ns, allowing high speed microprocessors to operate without wait states. To eliminate bus contention the device has separate chip enable (CE#), write enable (WE#) and output enable (OE#) controls.

The device requires only a **single 3.0 volt power supply** for both read and write functions. Internally generated and regulated voltages are provided for the program and erase operations.

The Am29LV160B is entirely command set compatible with the **JEDEC single-power-supply Flash standard**. Commands are written to the command register using standard microprocessor write timings. Register contents serve as input to an internal state-machine that controls the erase and programming circuitry. Write cycles also internally latch addresses and data needed for the programming and erase operations. Reading data out of the device is similar to reading from other Flash or EPROM devices.

Device programming occurs by executing the program command sequence. This initiates the **Embedded Program** algorithm—an internal algorithm that automatically times the program pulse widths and verifies proper cell margin. The **Unlock Bypass** mode facilitates faster programming times by requiring only two write cycles to program data instead of four.

Device erasure occurs by executing the erase command sequence. This initiates the **Embedded Erase** algorithm—an internal algorithm that automatically pre-programs the array (if it is not already programmed) before executing the erase operation. During erase, the device automatically times the erase pulse widths and verifies proper cell margin.

The host system can detect whether a program or erase operation is complete by observing the RY/BY# pin, or by reading the DQ7 (Data# Polling) and DQ6 (toggle) **status bits**. After a program or erase cycle has been completed, the device is ready to read array data or accept another command.

The **sector erase architecture** allows memory sectors to be erased and reprogrammed without affecting the data contents of other sectors. The device is fully erased when shipped from the factory.

Hardware data protection measures include a low V_{CC} detector that automatically inhibits write operations during power transitions. The **hardware sector protection** feature disables both program and erase operations in any combination of the sectors of memory. This can be achieved in-system or via programming equipment.

The **Erase Suspend/Erase Resume** feature enables the user to put erase on hold for any period of time to read data from, or program data to, any sector that is not selected for erasure. True background erase can thus be achieved.

The **hardware RESET# pin** terminates any operation in progress and resets the internal state machine to reading array data. The RESET# pin may be tied to the system reset circuitry. A system reset would thus also reset the device, enabling the system microprocessor to read the boot-up firmware from the Flash memory.

The device offers two power-saving features. When addresses have been stable for a specified amount of time, the device enters the **automatic sleep mode**. The system can also place the device into the **standby mode**. Power consumption is greatly reduced in both these modes.

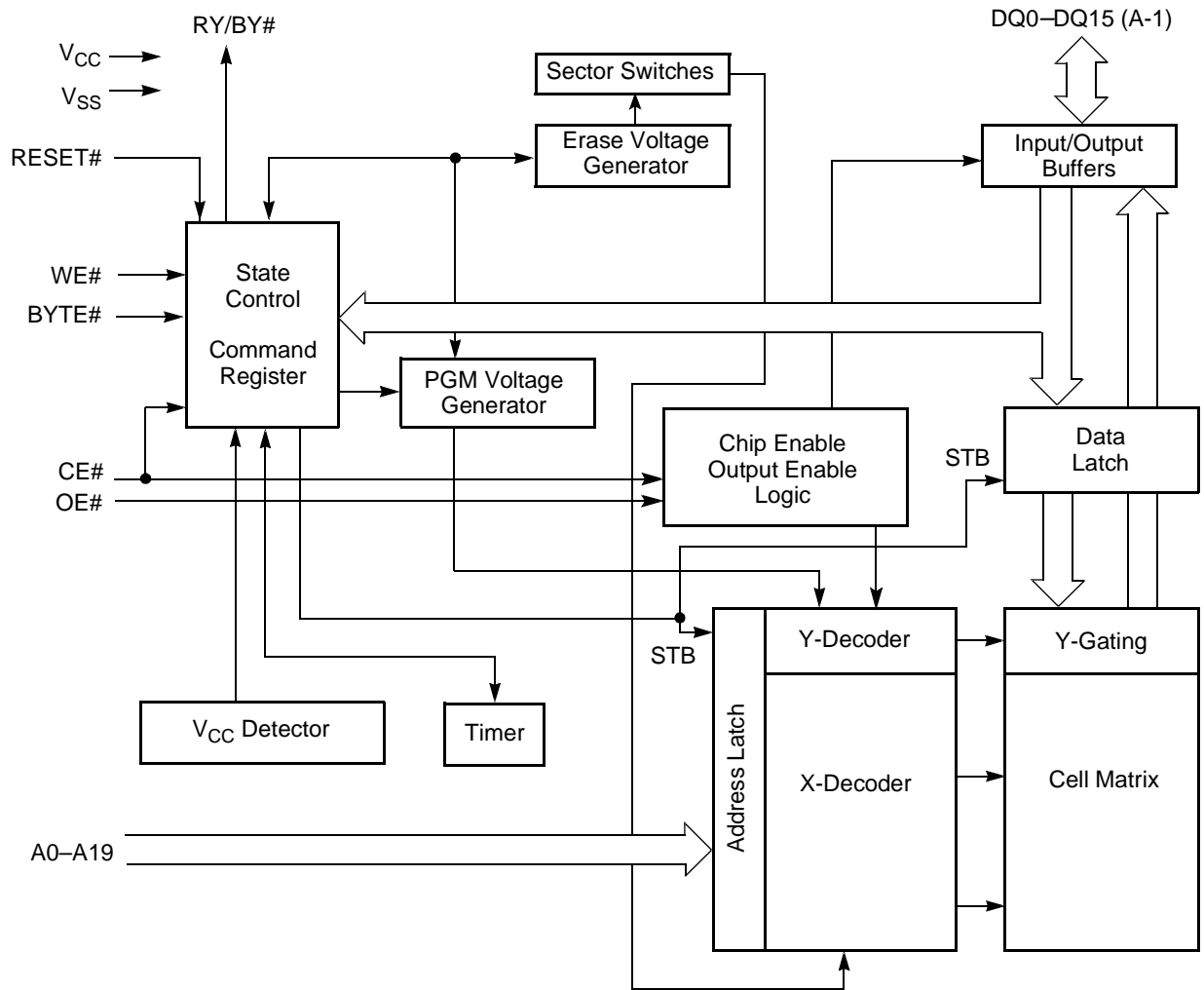
AMD's Flash technology combines years of Flash memory manufacturing experience to produce the highest levels of quality, reliability and cost effectiveness. The device electrically erases all bits within a sector simultaneously via Fowler-Nordheim tunneling. The data is programmed using hot electron injection.

PRODUCT SELECTOR GUIDE

Family Part Number	Am29LV160B		
Ordering Part Number: $V_{CC} = 3.0-3.6\text{ V}$	80R		
$V_{CC} = 2.7-3.6\text{ V}$		90	120
Max access time, ns (t_{ACC})	80	90	120
Max CE# access time, ns (t_{CE})	80	90	120
Max OE# access time, ns (t_{OE})	30	35	50

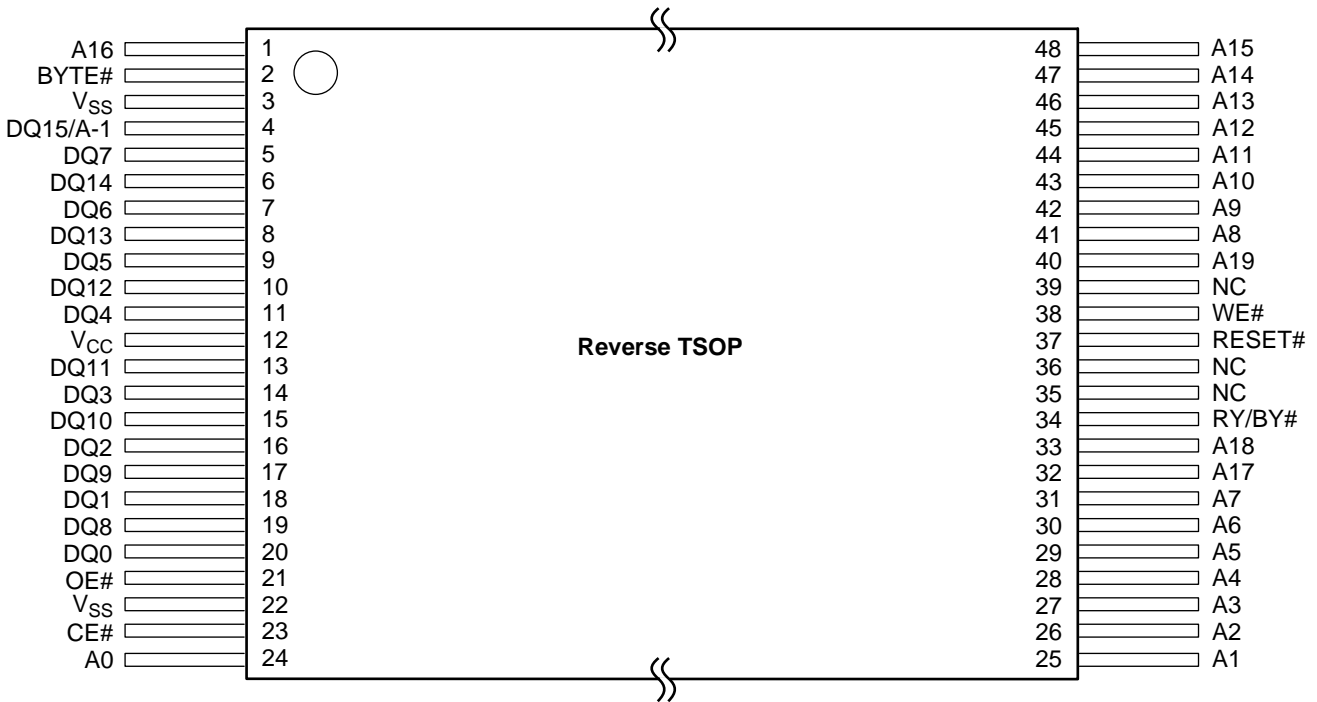
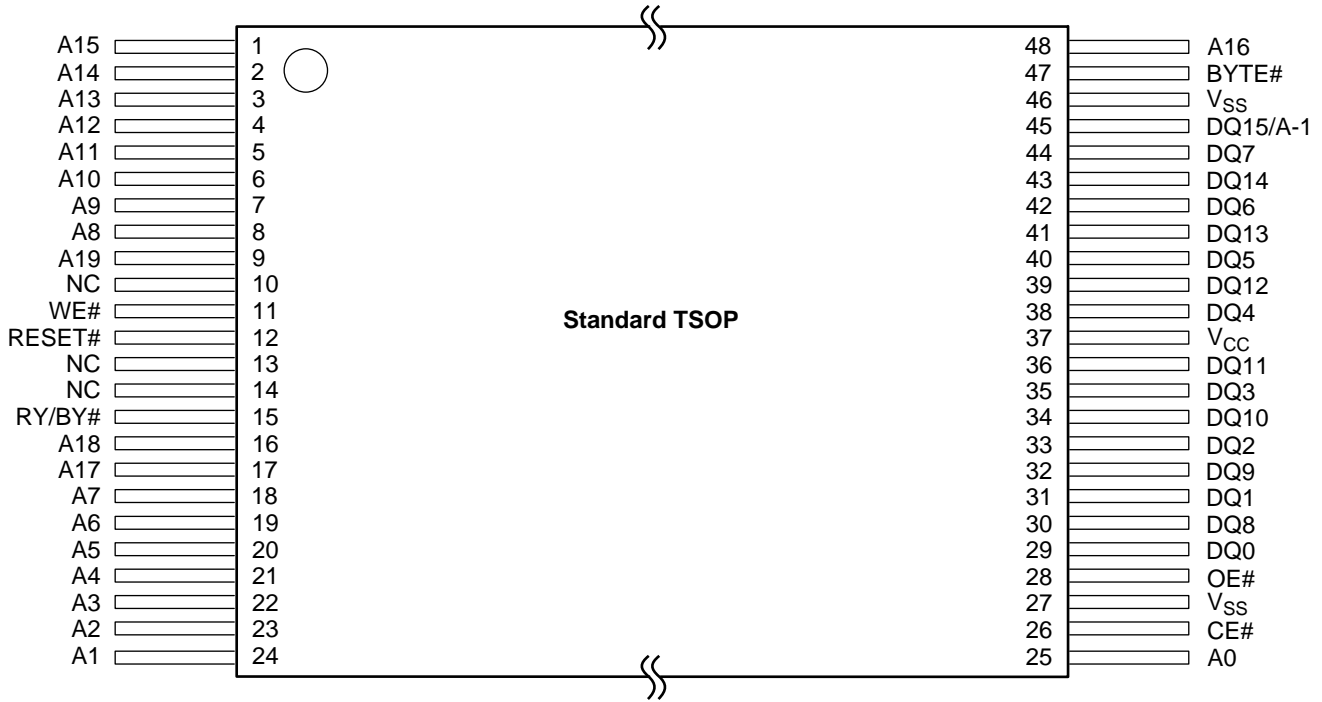
Note: See "AC Characteristics" for full specifications.

BLOCK DIAGRAM



21358C-1

CONNECTION DIAGRAMS



SYNCHRONOUS DRAM

MT48LC1M16A1 S - 512K x 16 x 2 banks

FEATURES

- PC100 functionality
- Fully synchronous; all signals registered on positive edge of system clock
- Internal pipelined operation; column address can be changed every clock cycle
- Internal banks for hiding row access/precharge
1 Meg x 16 - 512K x 16 x 2 banks architecture with 11 row, 8 column addresses per bank
- Programmable burst lengths: 1, 2, 4, 8 or full page
- Auto Precharge Mode, includes CONCURRENT AUTO PRECHARGE
- Self Refresh and Adaptable Auto Refresh Modes
 - 32ms, 2,048-cycle refresh or
 - 64ms, 2,048-cycle refresh or
 - 64ms, 4,096-cycle refresh
- LVTTTL-compatible inputs and outputs
- Single +3.3V $\pm 0.3V$ power supply
- Supports CAS latency of 1, 2 and 3

OPTIONS

- Configuration
1 Meg x 16 (512K x 16 x 2 banks) 1M16A1
- Plastic Package - OCPL*
50-pin TSOP (400 mil) TG
- Timing (Cycle Time)

6ns (166 MHz)	-6
7ns (143 MHz)	-7
8ns (125 MHz)	-8A
- Refresh
2K or 4K with Self Refresh Mode at 64ms S
- Part Number Example: MT48LC1M16A1TG-7S

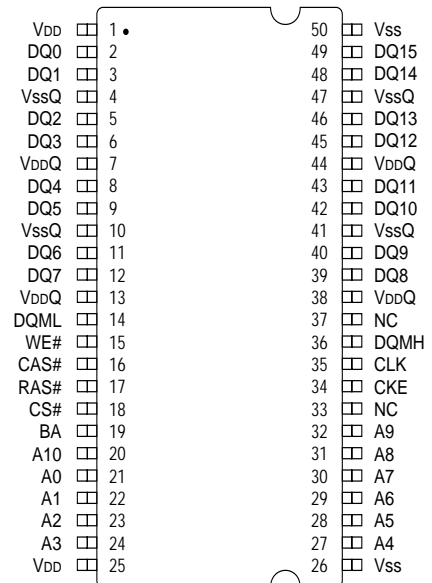
KEY TIMING PARAMETERS

SPEED	CLOCK	ACCESS TIME CL = 3**	SETUP	HOLD
-6	166 MHz	5.5ns	2ns	1ns
-7	143 MHz	5.5ns	2ns	1ns
-8A	125 MHz	6ns	2ns	1ns

*Off-center parting line

**CL = CAS (READ) latency

PIN ASSIGNMENT (Top View) 50-Pin TSOP



Note: The # symbol indicates signal is active LOW.

	1 Meg x 16
Configuration	512K x 16 x 2 banks
Refresh Count	2K or 4K
Row Addressing	2K (A0-A10)
Bank Addressing	2 (BA)
Column Addressing	256 (A0-A7)

16Mb (x16) SDRAM PART NUMBER

PART NUMBER	ARCHITECTURE
MT48LC1M16A1TG S	1 Meg x 16

GENERAL DESCRIPTION

The 16Mb SDRAM is a high-speed CMOS, dynamic random-access memory containing 16,777,216 bits. It is internally configured as a dual 512K x 16 DRAM with a synchronous interface (all signals are registered on the positive edge of the clock signal, CLK). Each of the 512K x 16-bit banks is organized as 2,048 rows by 256 columns by 16 bits. Read and write accesses to the SDRAM are burst oriented; accesses start at a selected location and continue for a programmed number of locations in a programmed

16Mb: x16 SDRAM

GENERAL DESCRIPTION (continued)

sequence. Accesses begin with the registration of an ACTIVE command, which is then followed by a READ or WRITE command. The address bits registered coincident with the ACTIVE command are used to select the bank and row to be accessed (BA selects the bank, A0-A10 select the row). The address bits registered coincident with the READ or WRITE command are used to select the starting column location for the burst access.

The SDRAM provides for programmable READ or WRITE burst lengths of 1, 2, 4 or 8 locations, or the full page, with a burst terminate option. An AUTO PRECHARGE function may be enabled to provide a self-timed row precharge that is initiated at the end of the burst sequence.

The 1 Meg x 16 SDRAM uses an internal pipelined architecture to achieve high-speed operation. This architecture is compatible with the 2 n rule of prefetch architectures,

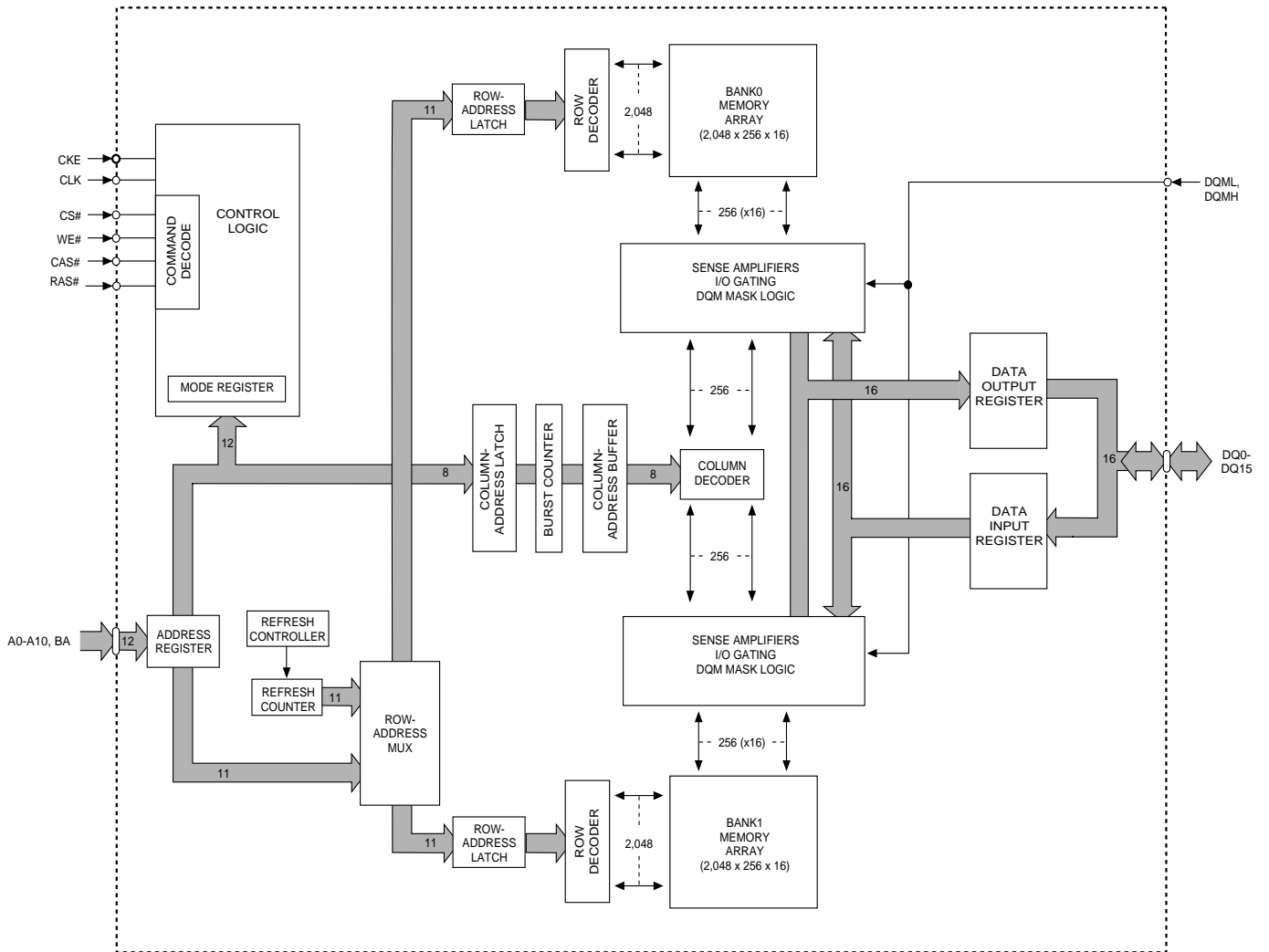
but it also allows the column address to be changed on every clock cycle to achieve a high-speed, fully random access. Precharging one bank while accessing the alternate bank will hide the PRECHARGE cycles and provide seamless, high-speed, random-access operation.

The 1 Meg x 16 SDRAM is designed to operate in 3.3V, low-power memory systems. An auto refresh mode is provided, along with a power-saving, power-down mode. All inputs and outputs are LVTTTL-compatible.

SDRAMs offer substantial advances in DRAM operating performance, including the ability to synchronously burst data at a high data rate with automatic column-address generation, the ability to interleave between internal banks in order to hide precharge time, and the capability to randomly change column addresses on each clock cycle during a burst access.

16Mb: x16
SDRAM

FUNCTIONAL BLOCK DIAGRAM
1 Meg x 16 SDRAM



**16Mb: x16
SDRAM**

PIN DESCRIPTIONS

PIN NUMBERS	SYMBOL	TYPE	DESCRIPTION
35	CLK	Input	Clock: CLK is driven by the system clock. All SDRAM input signals are sampled on the positive edge of CLK. CLK also increments the internal burst counter and controls the output registers.
34	CKE	Input	Clock Enable: CKE activates (HIGH) and deactivates (LOW) the CLK signal. Deactivating the clock provides PRECHARGE POWER-DOWN and SELF REFRESH operations (all banks idle), ACTIVE POWER-DOWN (row ACTIVE in either bank) or CLOCK SUSPEND operation (burst/access in progress). CKE is synchronous except after the device enters power-down and self refresh modes, where CKE becomes asynchronous until after exiting the same mode. The input buffers, including CLK, are disabled during power-down and self refresh modes, providing low standby power. CKE may be tied HIGH.
18	CS#	Input	Chip Select: CS# enables (registered LOW) and disables (registered HIGH) the command decoder. All commands are masked when CS# is registered HIGH. CS# provides for external bank selection on systems with multiple banks. CS# is considered part of the command code.
15, 16, 17	WE#, CAS#, RAS#	Input	Command Inputs: RAS#, CAS# and WE# (along with CS#) define the command being entered.
14, 36	DQML, DQMH	Input	Input/Output Mask: DQM is an input mask signal for write accesses and an output enable signal for read accesses. Input data is masked when DQM is sampled HIGH during a WRITE cycle. The output buffers are placed in a High-Z state (two-clock latency) when DQM is sampled HIGH during a READ cycle. DQML corresponds to DQ0-DQ7; DQMH corresponds to DQ8-DQ15. DQML and DQMH are considered same state when referenced as DQM.
19	BA	Input	Bank Address Inputs: BA defines to which bank the ACTIVE, READ, WRITE or PRECHARGE command is being applied. BA is also used to program the twelfth bit of the Mode Register.
21-24, 27-32, 20	A0-A10	Input	Address Inputs: A0-A10 are sampled during the ACTIVE command (row-address A0-A10) and READ/WRITE command (column-address A0-A7, with A10 defining AUTO PRECHARGE) to select one location out of the 512K available in the respective bank. A10 is sampled during a PRECHARGE command to determine if all banks are to be precharged (A10 HIGH). The address inputs also provide the op-code during a LOAD MODE REGISTER command.
2, 3, 5, 6, 8, 9, 11, 12, 39, 40, 42, 43, 45, 46, 48, 49	DQ0-DQ15	Input/Output	Data I/Os: Data bus.
33, 37	NC	–	No Connect: These pins should be left unconnected.
7, 13, 38, 44	V _{DDQ}	Supply	DQ Power: Provide isolated power to DQs for improved noise immunity.
4, 10, 41, 47	V _{SSQ}	Supply	DQ Ground: Provide isolated ground to DQs for improved noise immunity.
1, 25	V _{DD}	Supply	Power Supply: +3.3V ±0.3V.
26, 50	V _{SS}	Supply	Ground.

STi5505 (Rev. Ax)

DVD BACKEND DECODER WITH INTEGRATED HOST PROCESSOR

PRODUCT PREVIEW

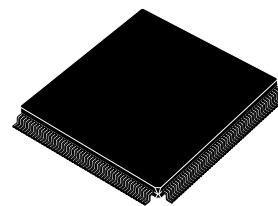
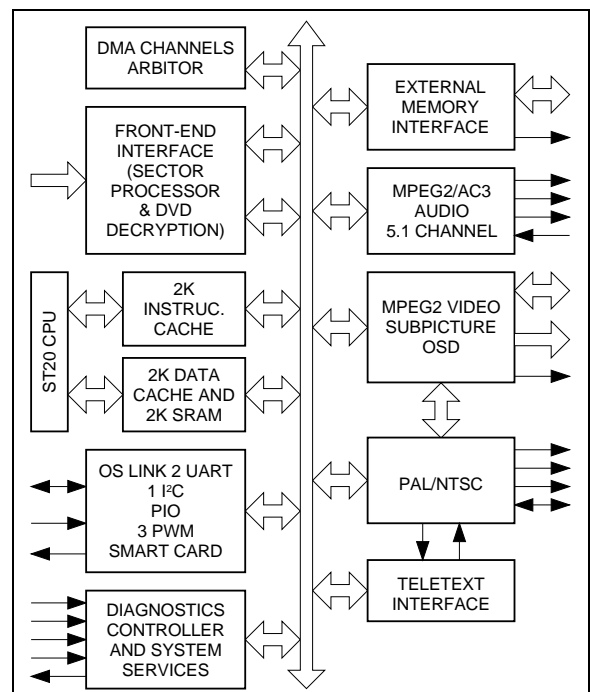
- INTEGRATED 32-BIT RISC HOST CPU
 - 2KBYTES INSTRUCTION CACHE, 2KBYTES DATA CACHE/SRAM
 - 50K DHRYSTONES/SEC (2.1) - 50MHz
- VIDEO DECODER
 - FULLY SUPPORTS MPEG-2 MP@ML
 - MEMORY REDUCTION - PAL IN 12MBITS
- SUBPICTURE DECODER
- HIGH PERFORMANCE ON-SCREEN DISPLAY
- AUDIO DECODER
 - 5.1 CHANNEL DOLBY AC-3® / MULTI CHANNEL MPEG-2 DECODING
 - DOWNMIX TO STEREO OR TO DOLBY PRO-LOGIC COMPATIBLE OUTPUTS FOR MPEG-2 AND AC-3
 - IEC6958 - IEC61937 COMPATIBLE OUTPUT
 - LPCM (DVD) MODE SUPPORTED
 - 6 CHANNELS OUTPUT
- PAL/NTSC ENCODER
 - MACROVISION™ 7.01/6.1 COMPATIBLE
 - TELETEXT, AND CLOSED CAPTION
- HIGH PERFORMANCE SDRAM INTERFACE
- PROGRAMMABLE MEMORY INTERFACE FOR DRAM, ROM, PERIPHERALS ETC.
- FRONT-END CHANNEL IC INTERFACE
 - DVD, VCD AND CD-DA COMPATIBLE
 - DSS - DVB BISTREAMS
 - SERIAL AND PARALLEL INTERFACES
 - HARDWARE SECTOR FILTERING
 - INTEGRATED CSS DECRYPTION AND TRACK BUFFER
- INTEGRATED PERIPHERALS
 - 2 UARTS, 1 I²C CONTROLLER, 3 PWM OUTPUTS, 3 TIMERS, 3 CAPTURE TIMERS, SMART CARD
 - 34 BITS OF PROGRAMMABLE I/O
 - OS LINK
- PROFESSIONAL TOOLSET SUPPORT
 - ANSI C COMPILER AND LIBRARIES
 - OPERATING SYSTEMS SUPPORT
 - ADVANCED DEBUGGING TOOLS
- 208 PIN PQFP PACKAGE

DESCRIPTION

The STi5505 provides a very highly integrated back-end solution for DVD and combo DVD-DVB (Set Top Box) applications. The STi5505 incorporates a host CPU which handles both general application (DVD navigation, CD-DA, VCD, DVB) and drivers of the different embedded peripherals (audio/video, subpicture decoders, OSD, PAL/NTSC encoder...).

The STi5505 offers one of the best cost-effective (memory savings, internal peripherals availability) solution to DVD-DVB applications with rapid time to market (Reference design, DVD-DVB Software Toolkit).

Figure 1 : General Block Diagram



PQFP208 (Plastic Quad Flat Pack)
ORDER CODE : STi5505ACV

I - GENERAL DESCRIPTION

The performance offered by the ST20 CPU and its associated hardware (decoders, encoder, peripherals...) allows an integrated and unified DVD or DVD-DVB software solution.

All the following operations are performed inside the STi5505 :

- application management (DVD Navigation, VCD, CD-DA, DVB-Program Guide ...),
- device data retrieval drivers (demultiplex, stream buffer management ...),
- device presentation drivers (video decoder, sub-picture decoder, on-screen display, audio decoder, PAL/NTSC encoder ...),
- embedded peripherals drivers (UART, I²C, Programmable I/O, Smart Card ...).

I.1 - ST20 32-bit CPU

The ST20 micro-core family has been developed by SGS-THOMSON Microelectronics to provide the tools and building blocks to enable the development of highly integrated application-specific 32-bits device at the lowest cost and fastest time to market.

The STi5505 integrates a ST20 C2 core with the following characteristics :

- 50K Dhrystones/s at 50MHz,
 - 8/16 bits instructions (32 most common instructions in 8 bits),
 - instruction cache 2Kbytes - write back replacement policy,
 - internal SRAM 2Kbytes to ensure fast access to critical code, data, interrupt handler ...
 - data cache 2 Kbytes - write back replacement policy,
- The STi5505's ST20 is provided with advanced debugging tools :

- on-chip real-time emulation,
- debugging with minimal impact on software and performance,
- non intrusive attachment to the host via JTAG (IEEE1149.1),
- no intrusion into the performance of the CPU core,
- no intrusion into user code space by a debug kernel,
- only 40bytes used for breakpoint handler.

I.2 - Video Decoder

The video decoder implemented in the STi5505 uses a patented memory reduction/bandwidth reduction scheme to offer the user the best band-

width/memory size compromise.

The algorithm is lossless and uses "on-the-fly" decoding to reduce the memory requirements to two frame buffers in memory reduction mode.

In this mode, PAL decoding is contained in 12Mbits. When used in bandwidth reduction mode, the memory usage is the normal three buffers but the bandwidth required by the decoder is significantly reduced compared to a classical implementation.

In summary, the features of the decoder are :

- MPEG-2 Main Profile/Main Level (MP@ML) support,
- MPEG-2 program streams, Packet Elementary streams and MPEG-1 system streams support,
- memory reduction architecture allowing sharing of single 16 Mbits SDRAM between MPEG decoding, micro and transport functions - memory expandable to 32 Mbits of SDRAM,
- letter box (16:9) filter,
- pan-scan, horizontal and vertical image resizing,
- automatic error concealment.

I.3 - Subpicture Decoder

The STi5505 has a hardware DVD compliant subpicture decoder. Subpicture units are copied by DMA into subpicture bit buffer.

The subpicture decoder can decode complete subpicture units without any interaction from the ST20.

The main subpicture decoder features are :

- up to 720x480 or 720x576 subpicture area,
- internal LUTs for Sub Picture, Highlight and PCI (4 bits color and contrast outputs),
- internal color LUT (4 bits from SP, HL, PCI to 24 Y,Cr,Cb bits) for SP color inputs to MPEG, OSD, SP mixer.

I.4 - Audio Decoder

The audio decoder cell is a fully compatible Dolby AC-3™ / MPEG-1/MPEG-2 decoder capable of decoding both 5.1 and 2 channel streams compatible with the DVD standard.

Downmix from 5.1 channels is supported for both Dolby and MPEG-2 streams. The output can be sent directly to external DACs or formatted for transmission in accordance with the IE6958 standard.

The decoder can also handle linear PCM in accordance with the DVD standard. An integrated down-sampler is provided for conversion from 96 kHz to 48kHz.

STi5505 (Rev. Ax)

I - GENERAL DESCRIPTION (continued)

The main features of the decoder core are :

- Decodes 5.1 Dolby AC-3 Digital surround,
- Output to 6 channels. Downmix modes : 1, 2, 3 or 4 channels for MPEG and AC-3 streams,
- Karaoke mode for DVD. MPEG-2 capable, AC-3 capable,
- MPEG-1, 2-channel audio decoder layers 1 and 2,
- MPEG-2, 6-channel audio decoder layer 2,
- PCM : transparent. downsampling 96 to 48 kHz,
- Accepts MPEG-2 PES stream format for : MPEG-2, MPEG-1, Dolby AC-3 and Linear PCM,
- IEC6958 Output Interface,
- CD-DA PCM format (subcode output in IEC6958 user data),
- Downmix for Dolby Pro Logic compatible outputs for AC-3 and MPEG-2 (Pro Logic encoder),
- Pro Logic decoder,
- PLL for Internal 44.1 and 48kHz PCM clock generation,
- On chip pink noise generator.

I.5 - High Performance On-Screen Display

The graphics performance of the STi5505 supports the new requirements for intelligent program guides and interactive applications.

The display interface supports up to 256 colors for each OSD region and a transparency feature allows mixing of video with the OSD. Fast access graphics and many other additional features are available and are supported by a graphics library.

Very high system performance is obtained by closely coupling the ST20 RISC processor and cache with the MPEG audio/video core and display memory.

Low latency RISC access and DMA engines allow rapid construction of bit maps.

I.6 - PAL/NTSC Encoder

The STi5505 integrates a PAL/NTSC encoder. It converts the digital MPEG/Sub Picture/OSD stream into a standard analog baseband PAL/NTSC signal and into RGB analog components. Six analog output pins are available on which it is possible to output CVBS, S-VHS (Y/C) and RGB formats.

The encoder handles interlaced and non-interlaced mode.

It can perform Closed Captions, CGMS or Teletext encoding and allows Macrovision 7.01/6.1 copy protection.

The encoder supports both master and slave modes for synchronization.

I.7 - Memory Interfaces

The STi5505 has been designed to minimize system costs by enabling various memory savings. Two kinds of memory interfaces are used on the STi5505 : a programmable External Memory Interface (EMI) and a high performance SDRAM interface.

The External Memory Interface supports several address ranges (memory banks). In each bank, a set of signals are entirely programmable and can be used to map 8/16 bits peripherals such as Front End channel ICs in DVD applications.

The EMI contains a zero glue logic DRAM and a low-cost EPROM interface.

This interface can be programmed to interface very easily peripherals.

The SDRAM memory interface supports gluelessly 125 MHz SDRAMs providing the adequate bandwidths to achieve MPEG decoding and display, OSD drawing and display, and general system use.

Memory savings can be realized on ROM requirements too : the ST20 VL-RISC micro-core has the highest code density of any 32 bit CPU, leading to the lowest cost program ROM.

I.8 - Front-End Interface

The STi5505 's front end interface accepts :

- DVD, VCD and CD-DA sectors,
- DVB-DSS transport stream.

In DVD mode, DVD, VCD and CD-DA information can be input into STi5505 through a serial interface or a generic parallel interface.

In serial mode, data are captured and filtered from I2S and V4 interfaces by an internal sector processor. V4 interface is used to capture VCD and CD-DA subcode information. In parallel mode, sector processor is bypassed.

I - GENERAL DESCRIPTION (continued)

The main features of the DVD interface are :

- DVD, VCD and CD-DA compatible,
- hardware sector filtering,
- subcode error correction for CD-DA,
- integrated CSS decryption,
- integrated track buffer support,
- DMA engine to ST20 memory.

In DVB-DSS mode, DVB-DSS transport stream is input through a serial interface. The STi5505 extracts and descrambles Packet Elementary Streams belonging to one user selected program to be decoded and presented.

The main features of the DVB-DSS interface are :

- descrambling (transport packet and packet elementary streams in DVB mode, transport packet in DSS mode ; up to 32 streams descrambling),
- PID and section filtering,
- clock recovery,
- DMA engine.

In DVB-DSS mode, a high speed digital interface

allows to transfer packets between the Set Top Box and external units, either for recording or playback purposes. This interface provides also full support for an external IEEE1394 connection.

I.9 - Integrated Peripherals

Several peripherals generally used in DVD players or DVD-DVB combos have been integrated into the STi5505.

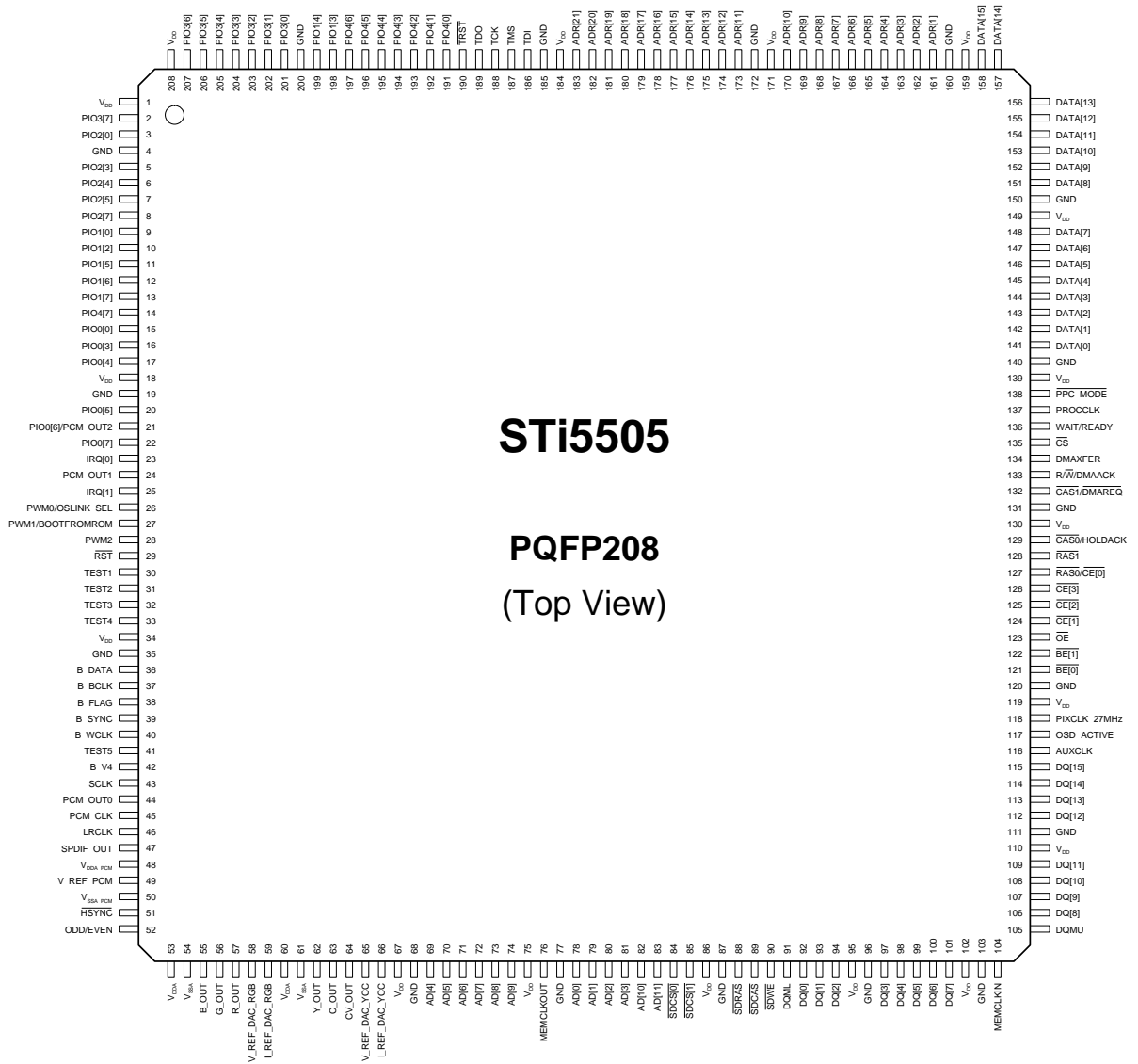
They are :

- two UARTs to interface remote control receivers, DVD front end, modem ...,
- one I²C controller to interface serial memories, remote control receivers, microcontrollers...,
- 2 SmartCard interfaces (ISO7816-3) for DVB-DSS conditionnal access, pay per view ...,
- PWM/timer module for control of system clock,
- 34 programmable I/O pins,
- OS Link interface,
- JTAG with boundary scan for debug.

STi5505 (Rev. Ax)

II - PIN DESCRIPTION

II.1 - Pin Connections



II - PIN DESCRIPTION (continued)

II.2 - Pin List

Pin	Name	Type	Function
-----	------	------	----------

SUPPLIES

1, 18, 34, 67, 75, 86, 95, 102, 110, 119, 130, 139, 149, 159, 171, 184, 208	V _{DD}		Power Supply
4, 19, 35, 68, 77, 87, 96, 103, 111, 120, 131, 140, 150, 160, 172, 185, 200	GND		Ground
53, 60	V _{DDA}		Analog Power Supply for DENC D/A Converters
54, 61	V _{SSA}		Analog Ground for DENC D/A Converters
48	V _{DDA_PCM}		Analog Power Supply for PLL PCM
49	V _{REF_PCM}		Analog Reference for PLL PCM
50	V _{SSA_PCM}		Analog Ground for PLL PCM

FRONT-END INTERFACE

36	B_DATA	I	I ² S Data (DVD) or PARA_DATA[2] (DVD//) or Link Data (DVB/DSS)
40	B_WCLK	I/O	I ² S Word Clock or PARA_DATA[6] (DVD//) or NRSS_CLK (DVB/DSS)
37	B_BCLK	I	I ² S Bit Clock (DVD) or PARA_DATA[3] (DVD//) or Link Bit Clock (DVB/DSS)
38	B_FLAG	I	Error Flag (DVD) or PARA_DATA [4] (DVD//) or Link Sync (DVB/DSS)
39	B_SYNC	I	Sector / Abs Time Sync (DVD) or PARA_DATA[5] (DVD//) or Link Not Valid (DVB/DSS)
42	B_V4	I	Versatile Input Pin (Subcode Input) or PARA_DATA[7] (DVD//) or NRSS_IN (DVB/DSS)

VIDEO OUTPUT INTERFACE

57	R_OUT	O	Red Output
56	G_OUT	O	Green Output
55	B_OUT	O	Blue Output
63	C_OUT	O	Chroma Output
64	CV_OUT	O	Composite Video Output
62	Y_OUT	O	Luma Output
59	I_REF_DAC_RGB	I	DAC Current Reference
66	I_REF_DAC_YCC	I	DAC Current Reference
58	V_REF_DAC_RGB	I	DAC Voltage Reference
65	V_REF_DAC_YCC	I	DAC Voltage Reference
117	OSD_ACTIVE	I/O	OSD Active
118	PIXCLK_27MHz	I	System Clock Input
51	HSYNC	I/O	Horizontal Sync
52	ODD/EVEN	I/O	Vertical Sync

AC-3/MPEG1-2 AUDIO OUTPUT INTERFACE

43	SCLK	O	Serial Bit Clock
44	PCM_OUT0	O	Audio Serial Output Data 0
24	PCM_OUT1	O	Audio Serial Output Data 1
21	PCM_OUT2	O	Audio Serial Output Data 2
45	PCM_CLK	I/O	PCM Clock In or Out
46	LRCLK	O	Left/Right Clock
47	SPDIF_OUT	O	SPDIF Output

STi5505 (Rev. Ax)**II - PIN DESCRIPTION** (continued)**II.2 - Pin List** (continued)

Pin	Name	Type	Function
EXTERNAL INTERRUPTS			
23, 25	IRQ[0:1]	I	External Interrupts
PROGRAMMABLE I/O AND ALTERNATE FUNCTION (see Device Configuration Chapter)			
15	PIO0 [0]	I/O	General Purpose I/O or PARA_SYNC (DVD//Front End) or Sc1Data (Smart Card 1 Data I/O)
16	PIO0 [3]	I/O	General Purpose I/O or PARA_REQ (DVD//Front End) or Sc1Clk (Smart Card 1 Clock)
17	PIO0 [4]	I/O	General Purpose I/O or PARA_STR (DVD//Front End) or Sc1RST (Smart Card 1 Reset)
20	PIO0 [5]	I/O	General Purpose I/O or PARA_DATA[0] (DVD//Front End) or Sc1Cmd V _{CC} (Smart Card 1 Voltage Enable)
21	PIO0 [6]	I/O	General Purpose IO or Sc1DataDir (Smart Card 1 Dir)
22	PIO0 [7]	I/O	General Purpose I/O or PARA_DATA[1] (DVD//Front End) or Sc1Detect(Smart Card 1 Detect)
9	PIO1 [0]	I/O	General Purpose I/O or I ² C Data
10	PIO1 [2]	I/O	General Purpose I/O or I ² C Clock
198, 199	PIO1 [3:4]	I/O	General Purpose IO
11	PIO1 [5]	I/O	General Purpose IO or ASC1 TXD
12	PIO1 [6]	I/O	General Purpose IO or ASC1 RXD
13	PIO1 [7]	I/O	General Purpose IO or ASC3 TXD
3	PIO2 [0]	I/O	General Purpose I/O or Sc0Data (Smart Card 0 Data I/O)
5	PIO2 [3]	I/O	General Purpose I/O or Sc0Clk (Smart Card 0 Clock)
6	PIO2 [4]	I/O	General Purpose I/O or Sc0RST (Smart Card 0 Reset)
7	PIO2 [5]	I/O	General Purpose I/O or Sc0CmdV _{CC} (Smart Card 0 Voltage Enable)
8	PIO2 [7]	I/O	General Purpose I/O or Sc0Detect (Smart Card 0 Detect)
201	PIO3 [0]	I/O	General Purpose IO or OSLink In
202	PIO3 [1]	I/O	General Purpose IO or OSLink Out
203	PIO3 [2]	I/O	General Purpose IO or CPUReset
204	PIO3 [3]	I/O	General Purpose IO or CPU Analyse
205	PIO3 [4]	I/O	General Purpose IO or ErrorOut
206, 207, 2	PIO3 [5:7]	I/O	General Purpose IO
191-197	PIO4 [0:6]	I/O	General Purpose IO
14	PIO4 [7]	I/O	General Purpose IO or ASC3 RXD
JTAG INTERFACE			
188	TCK	I	Test Clock
186	TDI	I	Test Data Input
189	TDO	O	Test Data Input
187	TMS	I	Test Mode Select
190	TRST	I	Test Reset
SYSTEM USE			
28	PWM2	O	PWM2 Output
27	PWM1/BOOTFROMROM	O/I	PWM1 Output or Configuration Oslink Pins
26	PWM0/OSLINK_SEL	O/I	PWM0 Output or Boot from ROM during Reset
29	RST	I	Reset
116	AUXCLK	O	Auxiliary Clock for Any Purpose

II - PIN DESCRIPTION (continued)**II.2 - Pin List** (continued)

Pin	Name	Type	Function
SDRAM INTERFACE			
78-81, 69, 70-74, 82, 83	AD[0:11]	O	SDRAM Address Bus
92-94, 97-101, 106-109, 112-115	DQ[0:15]	I/O	SDRAM Data (Lower Byte)
84, 85	$\overline{\text{SDCS}}[0:1]$	O	SDRAM Chip Selects
89	$\overline{\text{SDCAS}}$	O	SDRAM CAS
88	$\overline{\text{SDRAS}}$	O	SDRAM RAS
90	$\overline{\text{SDWE}}$	O	SDRAM Write Enable
104	MEMCLKIN	I	SDRAM Memory Clock Input
76	MEMCLKOUT	O	SDRAM Memory Clock Output
91	DQML	O	DQ Mask Enable (Lower)
105	DQMU	O	DQ Mask Enable (Upper)
EXTERNAL MEMORY INTERFACE			
161-170, 173-183	ADR[1:21]	I/O	External Memory Address Bus
141-148, 151-158	DATA[0:15]	I/O	External Memory Data Bus
128	$\overline{\text{RAS1}}/\overline{\text{HOLDREQ}}$	O	DRAM RAS or reserved
136	$\overline{\text{WAIT}}/\overline{\text{READY}}$	I/O	External Wait States or Reserved
133	$\overline{\text{R/W}}/\overline{\text{DMAACK}}$	I/O	DRAM R/W Strobe or Reserved
121, 122	$\overline{\text{BE}}[0:1]$	O	Byte enable
129	$\overline{\text{CAS0}}/\overline{\text{HOLDACK}}$	O/I	DRAM CAS or Reserved
132	$\overline{\text{CAS1}}/\overline{\text{DMAREQ}}$	O	DRAM CAS or Reserved
124-126	$\overline{\text{CE}}[1:3]$	O	Chip Select for Banks 1 - 3
135	$\overline{\text{CS}}$	I	Reserved
137	$\overline{\text{PROCCLK}}$	I/O	ST20 Clock or Reserved
127	$\overline{\text{RAS0}}/\overline{\text{CE0}}$	O	DRAM RAS or Chip Select for Bank 0
134	$\overline{\text{DMAFER}}$	I	Reserved
138	$\overline{\text{PPC_MODE}}$	I	Reserved
123	$\overline{\text{OE}}$	I/O	Output Enable or Reserved
SDAV/P1394 INTERFACE			
30	TEST1	I/O	DATA_RX/STROBE_TX (SDAV Mode) or SDAV_CLK (P1394 Mode)
31	TEST2	I/O	STROBE_RX/DATA_TX (SDAV Mode) or DATA_IN/DATA_OUT (P1394 Mode)
32	TEST3	I/O	Direction (SDAV Mode) or DATA_VALID In/Out (P1394 Mode)
MISCELLANEOUS			
41	TEST5	O	NRSS_OUT (DVB/DSS)

STi5505 (Rev. Ax)

III - FUNCTIONAL DESCRIPTION

III.1 - Functional Modules

Figure 1 shows the subsystem modules that make up the STi5505. These modules are outlined below.

III.1 - CPU

The Central Processing Unit (CPU) on the STi5505 is the ST20-C2 32-bit processor core. It contains instruction processing logic, instruction and data pointers and an operand register. It directly accesses the high speed on-chip SRAM memory, which can store data or programs, and uses the Caches to reduce access time to off chip program and data memory.

The processor can access memory via the general purpose External Memory Interface (EMI) or via the SDRAM EMI which is shared with the MPEG decoder.

III.2 - Memory Subsystem

The STi5505 on-chip SRAM memory system provides 160 Mbytes/s internal data bandwidth, supporting pipelined 2 cycles internal memory access at 25ns cycle times. The STi5505 memory system consists of 2 Kbytes of SRAM, 2Kbytes of instruction cache, a 2Kbytes data cache that can be programmed to be SRAM, and an external memory interface (EMI).

The STi5505 product has 2 Kbytes of on-chip SRAM. The advantage of this is the ability to store time critical code on chip, for instance interrupt routines, software kernels or device drivers, and even frequently used data without these being flushed from the caches.

The instruction and data caches are direct mapped with a write-back system for the data cache and support burst accesses to the external memories for refill and write-back which are effective for increasing performance with page-mode and SDRAM memories.

The STi5505 EMI controls access to the external memory and peripherals while the SDRAM EMI provides access to the SDRAM buffer for the MPEG decoders, ST20 and DMA peripherals.

The STi5505 EMI can access a 16 Mbytes (or greater if DRAM is used) physical address space in each of the four general purpose memory banks, and provides sustained transfer rates of up to 80 Mbytes/s. Peripherals that support an asynchronous data acknowledge are supported as is an external Power PC which can share the bus with the STi5505 and access the SDRAM buffer through the device.

High memory bandwidths up to 200 Mbytes/s can be supported by the SDRAM EMI.

The STi5505 internal memory interconnect provides buffering and arbitration of memory access requests to sustain very high throughput of memory accesses.

III.3 - System Services Module

The STi5505 system services module includes :

- Phase locked loop (PLL) - accepts 27MHz input and generates all the internal high frequency clocks needed for the CPU and the OS-Link.
- test access port - JTAG compatible.
- Diagnostics controller accessed via the JTAG port providing :
 - Bootstrapping during development
 - Hardware breakpoint and watchpoint
 - Real time trace
 - External LSA triggering support.

III.4 - Serial Communications

To facilitate the connection of this system the front end device and other peripherals, two UARTs (ASCs) are included in the device. The UARTs provide an asynchronous serial interface.

The UART can be programmed to support a range of baud rates and data formats, for example, data size, stop bits and parity. Two synchronous serial communications (SSC) interfaces are provided on the device. These can be used for a remote control device for example via an I²C or SPI bus.

III.5 - Interrupt Subsystem

The STi5505 interrupt subsystem supports eight prioritized interrupt levels. Two external interrupt pins are provided. Level assignment logic allows any of the internal or external interrupts to be assigned and, if necessary, share any interrupt level.

III.6 - Front End Interface & DVD Decryption

The front end interface accepts sectors in the case of DVD, MPEG-1 system stream in the case of VCD and PCM data for CD-DA applications on an I2S interface. In the case of VCD and CD-DA disks the subcode information is input via a simple asynchronous serial interface similar to a UART.

The bitstream and subcode stream then pass through a "sector processor" block which handles sector filtering in the case of DVD and sectorizing using the subcode stream for VCD and CD-DA systems.

III - FUNCTIONAL DESCRIPTION (continued)

The block also handles overspeed processing for all systems. The capturing of CD-DA sectors is based on a flywheel timer to improve robustness by concealing errors in the subcode stream. For DVD the data, having had sector headers removed, then passes through a DVD conformant de-cryption stage and is written into any of the system memories using a programmable DMA engine. When a subcode stream is present it is locally buffered, by subcode block and can be read by the CPU for subsequent processing, if required.

III.7 - PWM and counter module

This unit includes three separate pulse width modulator (PWM) generators using a shared counter, and three timer compare and capture channels sharing a second counter.

The counters can be clocked from a pre-scaled internal clock or from a pre-scaled external clock via the capture clock input and the event on which the timer value is captured is also programmable.

The PWM counters are 8-bit with 8-bit registers to set the output high time. The capture/compare counter and the compare and capture registers are 32-bit.

III.8 - Parallel Programmable IO module

40 bits of parallel I/O are provided. 34 of them are connected to actual PIO pins. Each bit is programmable as an output or an input. The output can be configured as a totem pole or open drain driver. Input compare logic is provided which can generate an interrupt on any change on any input bit.

Many pins of the STi5505 device are multi-function and can either be configured as PIO or connected to an internal peripheral signal.

III.9 - MPEG Video decoder

The video decoder is a real-time video compression processor supporting the MPEG-1 and MPEG-2 standards at video rates up to 720 x 480 x 60 Hz and 720 x 576 x 50 Hz. Picture format conversion for display is performed by vertical and horizontal filters. User-defined bitmaps may be superimposed on the display picture through use of the on-screen display function.

III.10 - PAL/NTSC encoder

The digital encoder which is integrated in the STi5505 converts a multiplexed 4:2:2 YUV stream into a standard analog baseband PAL/NTSC signal and into RGB analog components. The encoder can also perform closed-caption, CGMS or teletext encoding

and allows Macrovision™ 7.01/6.1 copy protection.

III.11 - MPEG-2 Audio / Dolby AC-3 Decoder

The audio decoder is a Dolby AC-3 decoder capable of decoding both 5.1 and 2 channel DVD conformant bitstreams. The decoder also handles MPEG-1 (layers 1 & 2) and MPEG-2 layer 2 (6 channels). Downmix to 2 channels is possible for Dolby and MPEG standards with optional pro-logic encoding.

The decoder directly accepts MPEG-2 PES streams as input. The decoder is capable of supporting IEC6958-IEC61937 formatted outputs for AC-3 and MPEG audio, linear PCM (left & right, 16, 18, 20 & 24 bits), zero output (Mute mode) and PCM audio.

ST24E32 ST25E32

32K SERIAL I²C EEPROM with EXTENDED ADDRESSING

NOT FOR NEW DESIGN

- COMPATIBLE with I²C EXTENDED ADDRESSING
- TWO WIRE SERIAL INTERFACE, SUPPORTS 400kHz PROTOCOL
- 1 MILLION ERASE/WRITE CYCLES, OVER the FULL SUPPLY VOLTAGE RANGE
- 40 YEARS DATA RETENTION
- SINGLE SUPPLY VOLTAGE
 - ± 4.5V to 5.5V for ST24E32 version
 - ± 2.5V to 5.5V for ST25E32 version
- WRITE CONTROL FEATURE
- BYTE and PAGE WRITE (up to 32 BYTES)
- BYTE, RANDOM and SEQUENTIAL READ MODES
- SELF TIMED PROGRAMING CYCLE
- AUTOMATIC ADDRESS INCREMENTING
- ENHANCED ESD/LATCH UP PERFORMANCES
- **ST24E32 and ST25E32 are replaced by the M24C32**

DESCRIPTION

The ST24/25E32 are 32K bit electrically erasable programmable memories (EEPROM), organized as 8 blocks of 512 x 8 bits. The ST25E32 operates with a power supply value as low as 2.5V. Both Plastic Dual-in-Line and Plastic Small Outline packages are available.

Table 1. Signal Names

E0 - E2	Chip Enable Inputs
SDA	Serial Data Address Input/Output
SCL	Serial Clock
\overline{WC}	Write Control
V _{CC}	Supply Voltage
V _{SS}	Ground

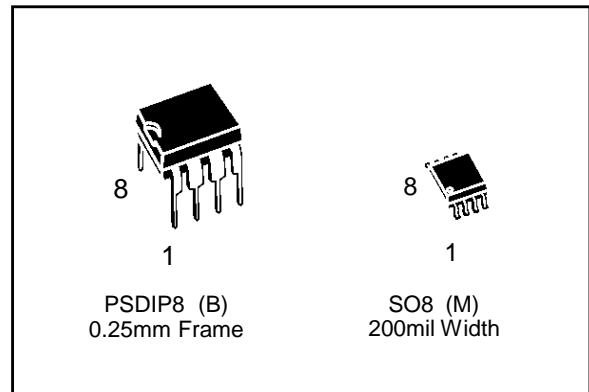
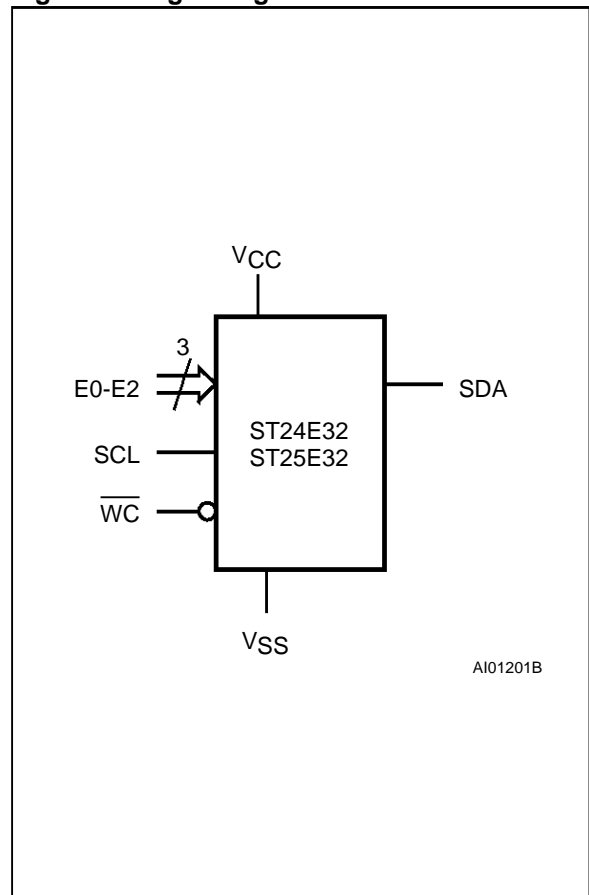


Figure 1. Logic Diagram



ST24E32, ST25E32

Figure 2A. DIP Pin Connections

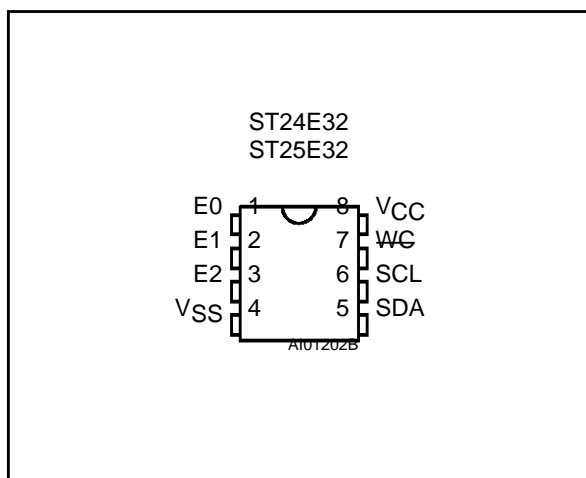
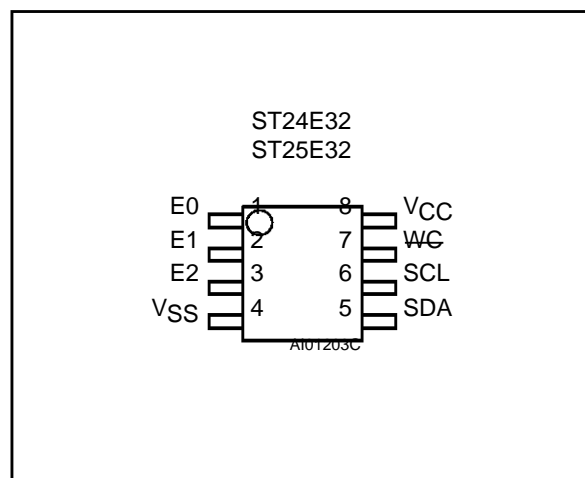


Figure 2B. SO Pin Connections

Table 2. Absolute Maximum Ratings ⁽¹⁾

Symbol	Parameter	Value	Unit	
T _A	Ambient Operating Temperature	±40 to 125	°C	
T _{STG}	Storage Temperature	±65 to 150	°C	
T _{LEAD}	Lead Temperature, Soldering (SO8) (PSDIP8)	40 sec 10 sec	215 260	°C
V _{IO}	Input or Output Voltages	±0.6 to 6.5	V	
V _{CC}	Supply Voltage	±0.3 to 6.5	V	
V _{ESD}	Electrostatic Discharge Voltage (Human Body model) ⁽²⁾	4000	V	
	Electrostatic Discharge Voltage (Machine model) ⁽³⁾	500	V	

Notes: 1. Except for the rating °Operating Temperature Range°, stresses above those listed in the Table °Absolute Maximum Ratings° may cause permanent damage to the device. These are stress ratings only and operation of the device at these or any other conditions above those indicated in the Operating sections of this specification is not implied. Exposure to Absolute Maximum Rating conditions for extended periods may affect device reliability. Refer also to the SGS-THOMSON SURE Program and other relevant quality documents.

2. 100pF through 1500Ω; MIL-STD-883C, 3015.7

3. 200pF through 0Ω; EIAJ IC-121 (condition C)

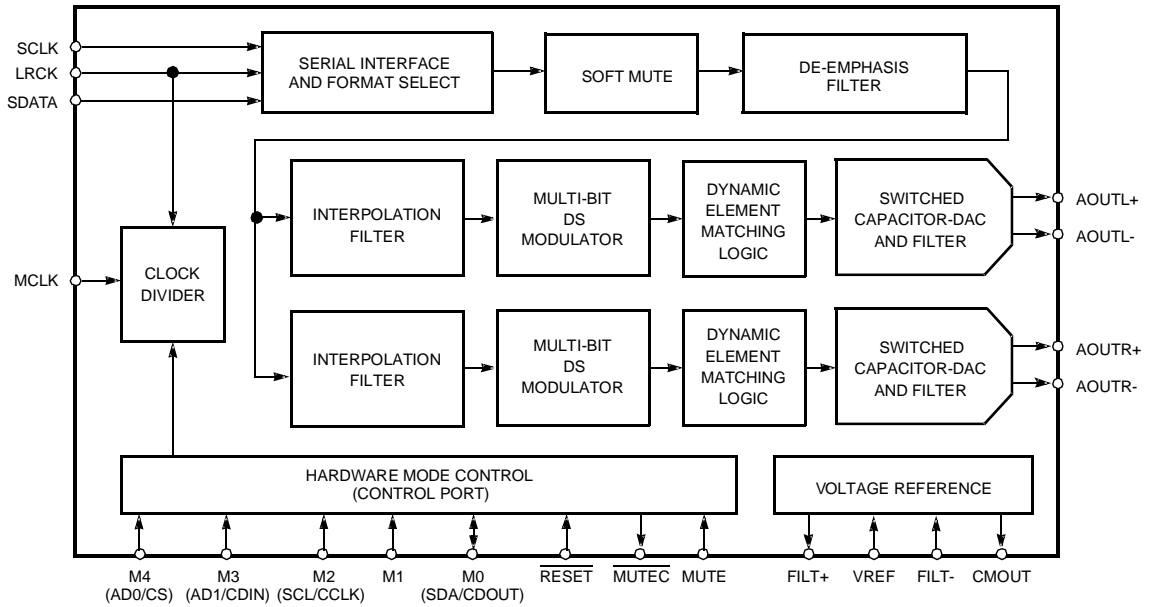
DESCRIPTION (cont'd)

Each memory is compatible with the I²C extended addressing standard, two wire serial interface which uses a bi-directional data bus and serial clock. The ST24/25E32 carry a built-in 4 bit, unique device identification code (1010) corresponding to the I²C bus definition. The ST24/25E32 behave as

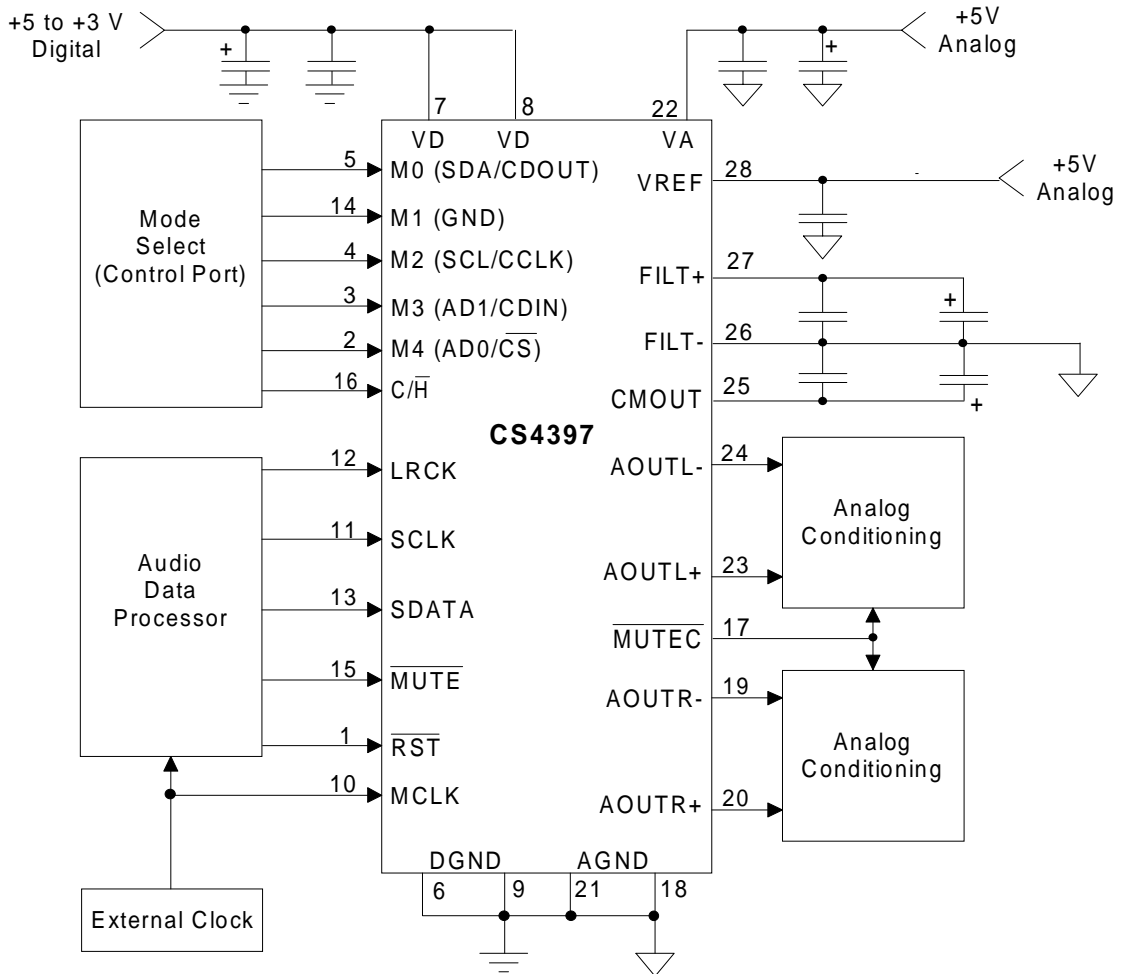
slave devices in the I²C protocol with all memory operations synchronized by the serial clock. Read and write operations are initiated by a START condition generated by the bus master. The START condition is followed by a stream of 4 bits (identification code 1010), 3 bit Chip Enable input to form a 7 bit Device Select, plus one read/write bit and terminated by an acknowledge bit.

CS4397

Block Diagram



Pin Configuration



Typical Connection Diagram - Hardware Mode (Control Port Mode)

Pin Function

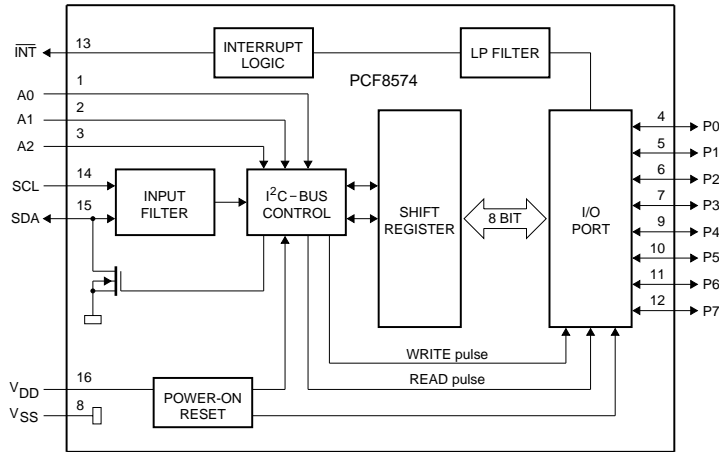
No.	Pin Name	I/O	Description
1	RST	I	Reset input (Low active)
2	M4(AD0/CS)	I	Chip address bit0 for I2C
3	M3(AD1/CDIN)	I	Chip address bit1 for I2C
4	M2(SCL/CCLK))	I	Serial clock for I2C
5	M0(SDA/CDOOUT)	I/O	Serial data for I2C
6	DGND		Digital ground
7	VD		Digital power supply +3.3V
8	VD		Digital power supply +3.3V
9	DGND		Digital ground
10	MCLK	I	Master clock PCM mode:256Fs DSD mode:192Fs (8.4672MHz)
11	SCLK	I	Serial data clock
12	LRCK(PCM) CLKMODE(DSD)	I I	PCM mode:Left/Right channel clock DSD mode:Select MCLK to DSD data rate clock ratios
13	SDATA(PCM) DSD_L(DSD)	I I	PCM mode:Serial audio data DSD mode:Direct Stream Digital audio data (Left)
14	M1(PCM) DSD_R(DSD)	I I	PCM mode:(Low) DSD mode:Direct Stream Digital audio data (Right)
15	MUTE	I	Mute input (Low active)
16	C/H	I	Control port (H) /Hardware (L) mode select
17	MUTE _C	O	Mute control (Low active)
18	AGND		Analog ground
19	AOUTR-	O	Right channel negative Analog out
20	AOUTR+	O	Right channel positive Analog out
21	AND		Analog ground
22	VA		Analog power supply +5.5V
23	AOUTL+	O	Left channel positive Analog out
24	AOUTL-	O	Left channel negative Analog out
25	CMOUT	O	Common mode voltage
26	FILT-	I	Reference ground
27	FILT+	O	Reference filter
28	VREF		Voltage reference input

9.6.1 Description of I²C Controller PC8574

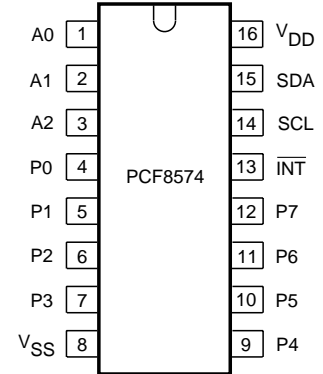
Block Diagram

PC8574

Block Diagram



Pin Configuration



Pin Function

SYMBOL	PIN		DESCRIPTION
	DIP16; SO16	SSOP20	
A0	1	6	address input 0
A1	2	7	address input 1
A2	3	9	address input 2
P0	4	10	quasi-bidirectional I/O 0
P1	5	11	quasi-bidirectional I/O 1
P2	6	12	quasi-bidirectional I/O 2
P3	7	14	quasi-bidirectional I/O 3
V _{SS}	8	15	supply ground
P4	9	16	quasi-bidirectional I/O 4
P5	10	17	quasi-bidirectional I/O 5
P6	11	19	quasi-bidirectional I/O 6
P7	12	20	quasi-bidirectional I/O 7
$\overline{\text{INT}}$	13	1	interrupt output (active LOW)
SCL	14	2	serial clock line
SDA	15	4	serial data line
V _{DD}	16	5	supply voltage
n.c.	-	3	not connected
n.c.	-	8	not connected
n.c.	-	13	not connected
n.c.	-	18	not connected

9.7 Abbreviation list

ADC	Analogue to Digital Converter	NICAM	Near Instantaneous Compounded Audio Multiplexing. This is a digital sound system, mainly used in Europe.
AM	Amplitude Modulation	NTSC	National Television Standard Committee. Colour system mainly used in North America and Japan. Colour carrier NTSC M/N = 3.579545 MHz, NTSC 4.43 = 4.433619 MHz (this is a VCR norm, it is not transmitted off-air)
AP	Asia Pacific	NVM	Non Volatile Memory: IC containing TV related data e.g. alignments
AV	External Audio Video	OC	Open Circuit
BE	Basic Engine	OPU	Optical Pick up Unit
B/G	Monochrome TV system. Sound carrier distance is 5.5 MHz	OSD	On Screen Display
BTSC	Broadcast Television Standard Committee. Multiplex FM stereo sound system, originating from the USA and used e.g. in LATAM and AP-NTSC countries	P50	Project 50 or Easy Link
ComPair	Computer aided rePair	PAL	Phase Alternating Line. Colour system mainly used in West Europe (colour carrier = 4.433619 MHz) and South America (colour carrier PAL M = 3.575612 MHz and PAL N = 3.582056 MHz)
CC	Closed Caption	PCB	Printed Circuit Board (see PWB)
CD-DA	CD Digital Audio	PCM	Pulse Code Modulation
CS	Chip Select	PCM_CLK	Audio system clock for DAC
CVBS	Composite Video Blanking and Synchronisation	PCM_OUTx	Audio serial output data
DAC	Digital to Analogue Converter	PDM	Physical Disc Mark
DAIO	Digital Audio Input Output	PLL	Phase Locked Loop. Used for e.g. FST tuning systems. The customer can give directly the desired frequency
DENC	Digital Encoder	Progressive Scan	Scan mode where all scan lines are displayed in one frame at the same time, creating a double vertical resolution.
D/K	Monochrome TV system. Sound carrier distance is 6.5 MHz	PSP	Pit Signal Processing
DFU	Direction For Use: description for the end user	PWB	Printed Wiring Board (see PCB)
DNR	Dynamic Noise Reduction	RAM	Random Access Memory
DRAM	Dynamic RAM	RC	Remote Control handset
DSD	Direct Stream Digital	RC5	Remote Control system 5, signal from the remote control receiver
DSP	Digital Signal Processing	RGB	Red Green Blue
DTS	Digital Theatre Sound	ROM	Read Only Memory
DVD	Digital Versatile Disc	S2B	Serial to Basic Engine, communication bus between host- and servo processor
EEPROM	Electrically Erasable and Programmable Read Only Memory	SACD	Super Audio Compact Disc
EFM	Eight to Fourteen bit Modulation	SCART	Syndicat des Constructeurs d'Appareils Radiorecepteurs et Televisieurs
EMI	External Memory Interface (STI5505)	SCL	Serial Clock I ² C
EU	Europe	SCLK	Audio serial bit clock
EXT	External (source), entering the set via SCART or Cinch	SDA	Serial Data I ² C
FLASH	Flash memory	SDRAM	Synchronous DRAM
FM	Frequency Modulation	SECAM	SEquence Couleur Avec Memoire. Colour system mainly used in France and East Europe. Colour carriers = 4.406250 MHz and 4.250000 MHz
HP	Headphone	S/PDIF	Sony Philips Digital InterFace
HPF	High Pass Filter	SRAM	Static RAM
HW	Hardware	STBY	Standby
I	Monochrome TV system. Sound carrier distance is 6.0 MHz	SVHS	Super Video Home System
I ² C	Integrated IC bus	SW	Software
I2S	Integrated IC Sound bus	THD	Total Harmonic Distortion
IF	Intermediate Frequency	TXT	Teletext
Interlaced	Scan mode where two fields are used to form one frame. Each field contains half the number of the total amount of lines. The fields are written in 'pairs', causing line flicker.	uP	Microprocessor
IR	Infra Red	VCD	Video CD
IRQ	Interrupt Request	VCR	Video Cassette Recorder
LATAM	Latin America	Y/C	Luminance (Y) and Chrominance (C) signal
LED	Light Emitting Diode	YUV	Component video
L/L'	Monochrome TV system. Sound carrier distance is 6.5 MHz. L' is Band I, L is all bands except for Band I	0/6/12	SCART switch control signal on A/V board. 0 = loop through (AUX to TV), 6 = play 16:9 format, 12 = play 4:3 format
LLD	Loss Less Decoder		
LPCM	Linear Pulse Code Modulation		
LPF	Low Pass Filter		
LRCLK	Left/Right clock		
LS	Loudspeaker		
M/N	Monochrome TV system. Sound carrier distance is 4.5 MHz		
MACE	Mini All Compact Disc Engine		
MPEG	Motion Pictures Experts Group		
NC	Not Connected		

10. Spare Parts List

Mechanical DVD962SA /001

Various

0002	3139 247 54861	FRONT ASSY DVD962SA/00X
0003	3139 247 51641	BUTTON POWER DVD956K PNT PRT
0025	3139 247 54891	TRAY ASSY DVD962SA/00X
0078	3139 243 10161	FILTER FTD SACD900
0150	3139 247 55111	BOTTOM FRAME ASSY SACD900
0250	3139 247 55011	PLATE BACK DVD962SA/00X PPT
0300	3139 247 51691	COVER TOP DVD956K PNT PRT
0350	3139 228 89521	PROD. ASSY RC19237003/01H PKD
0360▲	2422 070 98133	MAINSCORD EUR 1M5 BK B
0365	3103 308 92610	CABLE AUDIO 2X2RCA MALE 1.5MTR
0366	4822 321 61579	VIDEO-CABLE
0372	3111 170 21992	SCART CABLE (L=1.10M) BMS
0375	3139 246 11521	IFU DVD962SA/00X
1001	3139 248 81391	PCBAS AV SACD 2001 EU
1002	3139 248 81401	PCBAS FR SACD900 EU/NON EU
1005▲	3139 248 70851	MODULE PSU BIL STEP2001 H
1101	3104 157 11200	CWAS FLEX DVD 16 130 32S
1102	3104 157 11190	CWAS FLEX DVD 22 130 32S
1104	3139 110 35851	FFC FOIL 24P/180/24P BD 1MMP

Mechanical DVD962SA /171

Various

0002	3139 247 54871	FRONT ASSY DVD962SA/17X
0003	3139 247 51641	BUTTON POWER DVD956K PNT PRT
0025	3139 247 54891	TRAY ASSY DVD962SA/00X
0078	3139 243 10161	FILTER FTD SACD900
0150	3139 247 55111	BOTTOM FRAME ASSY SACD900
0250	3139 247 55091	PLATE BACK DVD962SA/17X PPT
0300	3139 247 51691	COVER TOP DVD956K PNT PRT
0350	3139 228 89521	PROD. ASSY RC19237003/01H PKD
0360▲	2422 070 98152	MAINSCORD 1M79 USA BK B
0365	3103 308 92610	CABLE AUDIO 2X2RCA MALE 1.5MTR
0366	4822 321 61579	VIDEO-CABLE
0375	3139 246 11531	IFU DVD962SA/17X
1001	3139 248 81501	PCBAS DVD962 SA/NON EURO AV
1002	3139 248 81401	PCBAS FR SACD900 EU/NON EU
1005▲	3139 248 70851	MODULE PSU BIL STEP2001 H
1007	3139 248 81121	PCBAS Q50/NON-EURO P.SCAN
1111	3104 157 11200	CWAS FLEX DVD 16 130 32S
1112	3104 157 11190	CWAS FLEX DVD 22 130 32S
1114	3139 110 35851	FFC FOIL 24P/180/24P BD 1MMP
1116	3139 241 00111	FFC FOIL 22P/90/22P BD1MMP FD

Mechanical DVD962SA /691

Various

0002	3139 247 54871	FRONT ASSY DVD962SA/17X
0003	3139 247 51641	BUTTON POWER DVD956K PNT PRT
0025	3139 247 54891	TRAY ASSY DVD962SA/00X
0078	3139 243 10161	FILTER FTD SACD900
0150	3139 247 55111	BOTTOM FRAME ASSY SACD900
0250	3139 247 55091	PLATE BACK DVD962SA/17X PPT
0300	3139 247 51691	COVER TOP DVD956K PNT PRT
0350	3139 228 89521	PROD. ASSY RC19237003/01H PKD
0360▲	2422 070 98151	MAINSCORD EUR 1M5 BK B
0361	3139 128 73010	MAINS PLUG ADAPTER
0365	3103 308 92610	CABLE AUDIO 2X2RCA MALE 1.5MTR
0366	4822 321 61579	VIDEO-CABLE
0375	3139 246 11541	IFU DVD962SA/69X
1001	3139 248 81501	PCBAS DVD962 SA/NON EURO AV
1002	3139 248 81401	PCBAS FR SACD900 EU/NON EU
1005▲	3139 248 70851	MODULE PSU BIL STEP2001 H
1007	3139 248 81121	PCBAS Q50/NON-EURO P.SCAN
1111	3104 157 11200	CWAS FLEX DVD 16 130 32S
1112	3104 157 11190	CWAS FLEX DVD 22 130 32S
1114	3139 110 35851	FFC FOIL 24P/180/24P BD 1MMP
1116	3139 241 00111	FFC FOIL 22P/90/22P BD1MMP FD

Mechanical SACD900 /171

Various

0002	3139 247 54851	FRONT ASSY SACD900/17X
0003	3139 247 52111	BUTTON POWER DVD951 US PNT PRT
0025	3139 247 54881	TRAY ASSY SACD900/17X
0078	3139 243 10161	FILTER FTD SACD900
0150	3139 247 55111	BOTTOM FRAME ASSY SACD900
0250	3139 247 55001	PLATE BACK SACD900/17X PPT
0300	3139 247 51811	COVER TOP DVD951 PNT PRT
0350	3139 228 89521	PROD. ASSY RC19237003/01H PKD
0360▲	2422 070 98134	MAINSCORD USA 1M8 BK B
0365	3103 308 92610	CABLE AUDIO 2X2RCA MALE 1.5MTR
0366	4822 321 61579	VIDEO-CABLE
0375	3139 246 11511	IFU SACD900/17X
1001	3139 248 81371	PCBAS AV SACD 2001 US
1002	3139 248 81401	PCBAS FR SACD900 EU/NON EU
1005▲	3139 248 70851	MODULE PSU BIL STEP2001 H
1101	3104 157 11200	CWAS FLEX DVD 16 130 32S
1102	3104 157 11190	CWAS FLEX DVD 22 130 32S
1104	3139 110 35851	FFC FOIL 24P/180/24P BD 1MMP

VAL 6011/04

Various

0001	9305 023 61104	VAL6011/04
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Front PWB

Various

0002	3139 244 00440	FTD HOLDER DVD711
1100	4822 267 10565	4P
1101	4822 276 13775	SWITCH
1102	4822 276 13775	SWITCH
1103	4822 276 13775	SWITCH
1104	4822 276 13775	SWITCH
1105	4822 276 13775	SWITCH
1106	4822 276 13775	SWITCH
1107	2422 025 11244	CON BM V 07P M 2.50 EH B
1108	4822 267 10637	B5B-PH-K (5P)
1111	3139 240 50231	VFD 15-MT-70GNK
1112	4822 276 13775	SWITCH
1119	2422 540 98518	RES CER 8MHz CSTS*MHz 03 A
1200	2422 128 02939	SWI PUSH 2P 100MA 30V SPEC12 B
1205	4822 267 10567	4P

-II-

2100	4822 122 33761	22pF 5% 50V
2101	4822 122 33761	22pF 5% 50V
2103	4822 124 40248	10µF 20% 63V
2104	4822 122 31765	100pF 2% 63V
2105	4822 122 31765	100pF 2% 63V
2106	4822 122 31765	100pF 2% 63V
2107	3198 028 52290	22µF 20% 50V
2108	3198 016 31020	0603 25V 1nF
2124	4822 126 14549	33nF 16V O6O3
2125	4822 124 80231	47µF 20% 16V
2126	3198 024 44730	47nF 50V
2127	3198 024 44730	47nF 50V
2128	3198 028 52290	22µF 20% 50V
2129	3198 024 44730	47nF 50V
2130	3198 024 44730	47nF 50V
2131	4822 126 14549	33nF 16V O6O3
2133	4822 122 33761	22pF 5% 50V
2134	4822 122 33761	22pF 5% 50V
2135	4822 126 14549	33nF 16V O6O3
2136	4822 124 81286	47µF 20% 16V
2137	4822 122 33761	22pF 5% 50V
2138	4822 124 11946	22µF 20% 16V
2139	4822 124 11947	10µF 20% 16V
2140	4822 126 14549	33nF 16V O6O3
2141	4822 126 14549	33nF 16V O6O3
2142	3198 016 31020	0603 25V 1nF
2143	4822 124 11946	22µF 20% 16V

-III-

3101	4822 117 12864	82k 5% 0.6W
3102	4822 117 12864	82k 5% 0.6W
3104	4822 117 12864	82k 5% 0.6W
3105	4822 051 30221	220Ω 5% 0.062W
3109	4822 051 30472	4k7 5% 0.062W
3110	4822 051 30472	4k7 5% 0.062W
3111	4822 051 30472	4k7 5% 0.062W
3112	4822 051 30472	4k7 5% 0.062W
3113	4822 051 30472	4k7 5% 0.062W
3114	4822 051 30472	4k7 5% 0.062W
3115	4822 051 30103	10k 5% 0.062W
3116	4822 051 30472	4k7 5% 0.062W
3117	4822 051 30103	10k 5% 0.062W
3118	4822 051 30103	10k 5% 0.062W
3119	4822 051 30103	10k 5% 0.062W
3120	4822 051 30472	4k7 5% 0.062W
3121	4822 051 30331	330Ω 5% 0.062W
3123	4822 051 30109	10Ω 5% 0.062W
3125	4822 051 30109	10Ω 5% 0.062W
3126	4822 051 30109	10Ω 5% 0.062W
3127	4822 117 11152	4Ω7 5%
3128	4822 117 11152	4Ω7 5%
3129	4822 051 30331	330Ω 5% 0.062W
3130	4822 051 30331	330Ω 5% 0.062W
3131	4822 051 30472	4k7 5% 0.062W
3133	4822 051 30471	470Ω 5% 0.062W
3134	4822 051 30109	10Ω 5% 0.062W
3135	4822 051 30102	1k 5% 0.062W
3137	4822 051 30221	220Ω 5% 0.062W
3138	4822 051 30103	10k 5% 0.062W
3139	4822 051 30471	470Ω 5% 0.062W
3140	4822 051 30103	10k 5% 0.062W

3141	4822 117 13632	100k 1% 0.62W
3143	4822 051 30103	10k 5% 0.062W
3145	4822 051 30331	330Ω 5% 0.062W
3200	4822 051 30101	100Ω 5% 0.062W



6101	9965 000 04709	UDZ6.2BTE-17
6102	4822 130 11551	UDZS10B
6103	4822 130 83757	BAS216
6104	9322 153 37676	LB3333RT-E7898
6200	4822 130 82978	LTL-16KPE-P



7100	4822 130 60511	BC847B
7102	4822 130 60511	BC847B
7103	4822 130 60511	BC847B
7104	4822 130 60373	BC856B
7105	4822 130 60511	BC847B
7106	4822 130 40981	BC337-25
7108	4822 130 60511	BC847B
7109	4822 130 40854	BC327
7110	4822 130 60373	BC856B
7400	4822 209 31257	MC79L24ACP
7401	9965 000 10841	3104 123 94530 FTD DRIVER U-C
7402	9322 155 22667	

PSU

Various

C1	9965 000 09535	X1 CAP. 300V-0.1UF
C2	9965 000 09478	CERAMIC CAP. 1KV-471PF 10%
C3	9965 000 09478	CERAMIC CAP. 1KV-471PF 10%
C4	9965 000 09535	X1 CAP. 300V-0.1UF
C5	9965 000 09482	ELEC CAP.400V-100UF
C6	9965 000 09477	CERAMIC CAP. 1KV-221PF 10%
C7	9965 000 09481	ELEC CAP 47UF/25V
C8	9965 000 09488	MULTI-LAYER CAP. 50V-104PF 10
C9	9965 000 09478	CERAMIC CAP. 1KV-471PF 10%
D1	4822 130 30799	1N4007G
D2	4822 130 30799	1N4007G
D3	4822 130 30799	1N4007G
D4	4822 130 30799	1N4007G
D5	9965 000 09538	DIODE HER103 (CHENMKO) 1A/200V
D6	9965 000 09537	DIODE FR107 (CHENMKO) 1A/1000V
D7	4822 130 30621	1N4148
D8	9965 000 09538	DIODE HER103 (CHENMKO) 1A/200V
D9	9965 000 01538	DIODE SC 31DQ10 IR 100V 3.3A
F1	9965 000 09543	FUSE 3.15A/250V 5X20MM PIG-TAI
F2	9965 000 09542	FUSE 1.5A/250V 3.6X10MM PIG-TA
F3	9965 000 09544	SG PICO FUSE 1.0A/125V
L1	9965 000 09541	INDUCTOR DIP 5.5MM 4.5UH 20%
L2	9965 000 09473	TX89S-109C 5.5UH
L4	9965 000 09541	INDUCTOR DIP 5.5MM 4.5UH 20%
Q1	9965 000 09586	MOSFET N-CHANNEL 6A/600V TO-22
Q3	9965 000 09584	TRANSISTOR NPN 2SC945 TO-92 P
Q4	9965 000 09585	TRANSISTOR PNP 8550S TO-92 UNI
Q5	9965 000 09584	TRANSISTOR NPN 2SC945 TO-92 P
Q6	4822 130 61867	2SA733
Q7	4822 130 61867	2SA733
Q8	9965 000 09584	TRANSISTOR NPN 2SC945 TO-92 P
R2	9965 000 09576	METAL R 1/4W 2.7K 5%
R4	9965 000 09563	CARBON R 1/8W 470R 5%
R5	9965 000 09570	CARBON R 1/4W 1M 5%
R7	9965 000 09571	CARBON R 1/4W 220R 5%
R8	9965 000 09553	CARBON R 1/8W 10R 5%
R9	9965 000 09558	CARBON R 1/8W 10K 5%
T1	9965 000 09471	TX89S-109A FT ERL-28
C10	9965 000 09531	MYLAR CAP. 100V-103PF 5%

C11	9965 000 09531	MYLAR CAP. 100V-103PF 5%
C12	9965 000 09476	CERAMIC CAP. 1KV-103PF
C13	9965 000 09479	CERAMIC CAP. 50V-104PF 20%
C14	9965 000 09476	CERAMIC CAP. 1KV-103PF
C15	9965 000 09536	Y/C 400V-222PF
C16	9965 000 09479	CERAMIC CAP. 50V-104PF 20%
C22	9965 000 09489	MULTI-LAYER CAP. 50V-223PF 10
C23	9965 000 09486	ELEC CAP 330UF/25V
C24	9965 000 09480	ELEC CAP 100UF/25V
C25	9965 000 09484	ELEC CAP 10V/2200UF
C26	9965 000 09485	ELEC CAP 25V/1000UF
C28	9965 000 09480	ELEC CAP 100UF/25V
C29	9965 000 09486	ELEC CAP 330UF/25V
C30	9965 000 09480	ELEC CAP 100UF/25V
C31	9965 000 09483	ELEC CAP 47UF/63V
C32	9965 000 09483	ELEC CAP 47UF/63V
C33	9965 000 09480	ELEC CAP 100UF/25V
C34	9965 000 09480	ELEC CAP 100UF/25V
C35	9965 000 09487	MULTI-LAYER CAP. 50V-104PF 10
C36	9965 000 09487	MULTI-LAYER CAP. 50V-104PF 10
C37	9965 000 09487	MULTI-LAYER CAP. 50V-104PF 10
C38	9965 000 09487	MULTI-LAYER CAP. 50V-104PF 10
D10	4822 130 82627	SB540
D12	9965 000 09539	DIODE SR106 (CHENMKO) 1A/60V
D13	9965 000 09537	DIODE FR107 (CHENMKO) 1A/1000V
D14	4822 130 30799	1N4007G
D15	4822 130 30621	1N4148
D19	4822 130 30621	1N4148
IC1	9965 000 09545	IC PWM 0.3MA MAX SD3842A DIP-
IC2	9965 000 09548	PHOTOCOUPLER TCET1108G VISHAY
IC3	9965 000 09546	IC REGULATOR KIA431A 1% TO-92
IC4	9965 000 09547	IC LDO REGULATOR UT587 3A TO-2
L10	9965 000 09475	TX89S-109E TOROID INDUCTOR 150
L11	9965 000 09475	TX89S-109E TOROID INDUCTOR 150
L12	9965 000 09540	PEAKING CORE 1/4W 15UH I:530MA
NF2	9965 000 09472	TX89S-109B FT ET-20
R10	9965 000 09573	CARBON R 1/4W 5.6K 5%
R11	9965 000 09575	METAL R 1/4W 4.7R 5%
R12	9965 000 09558	CARBON R 1/8W 10K 5%
R14	9965 000 09578	METAL R 2W 47R 5%
R15	9965 000 09558	CARBON R 1/8W 10K 5%
R16	9965 000 09559	CARBON R 1/8W 1.5K 5%
R17	9965 000 09558	CARBON R 1/8W 10K 5%
R1A	9965 000 09567	CARBON R 1/8W 680K 5%
R1B	9965 000 09567	CARBON R 1/8W 680K 5%
R22	9965 000 09579	METAL R 1/8W 3.3K 1%
R23	9965 000 09579	METAL R 1/8W 3.3K 1%
R24	9965 000 09556	CARBON R 1/8W 100R 5%
R25	9965 000 09560	CARBON R 1/8W 220R 5%
R26	9965 000 09557	CARBON R 1/8W 1K 5%
R27	9965 000 09580	METAL R 1/4W 220R 1%
R28	9965 000 09581	METAL R 1/4W 360R 1%
R29	9965 000 09558	CARBON R 1/8W 10K 5%
R30	9965 000 09569	CARBON R 1/4W 10K 5%
R31	9965 000 09558	CARBON R 1/8W 10K 5%
R32	9965 000 09568	CARBON R 1/4W 4.7R 5%
R33	9965 000 09556	CARBON R 1/8W 100R 5%
R34	9965 000 09558	CARBON R 1/8W 10K 5%
R35	9965 000 09558	CARBON R 1/8W 10K 5%
R36	9965 000 09562	CARBON R 1/8W 3.3K 5%
R37	9965 000 09571	CARBON R 1/4W 220R 5%
R38	9965 000 09568	CARBON R 1/4W 4.7R 5%
R39	9965 000 09561	CARBON R 1/8W 2.2K 5%
R3A	9965 000 09577	METAL R 1W 0.68R 5%
R40	9965 000 09554	CARBON R 1/8W 150R 5%
R41	9965 000 09558	CARBON R 1/8W 10K 5%
R42	9965 000 09557	CARBON R 1/8W 1K 5%
R44	9965 000 09557	CARBON R 1/8W 1K 5%
R54	9965 000 09571	CARBON R 1/4W 220R 5%
R55	9965 000 09582	WIREWOUND R 3W 2.2R 5%
R56	9965 000 09555	CARBON R 1/8W 47K 5%
R57	9965 000 09572	CARBON R 1/4W 270K 5%
R58	9965 000 09572	CARBON R 1/4W 270K 5%
R59	9965 000 09574	CARBON R 1/2W 220R 10%
ZD1	4822 130 34281	BZX79-B15
ZD2	4822 130 31919	HZ6B2



CON1	9965 000 09583	SOCKET 9452 JUNGBECKER
CON2	9965 000 09534	WAFER 2570PS-12P MALE CONnF
CON3	9965 000 09533	WAFER 2570PS-7P MALE CONnF
CON4	9965 000 09532	WAFER 2570PS-4P MALE CONnF



R18A	9965 000 09567	CARBON R 1/8W 680k 5%
R18B	9965 000 09567	CARBON R 1/8W 680k 5%
ZNR1	9965 000 09552	VARISTOR TVR10471 10R/470V TH1

L5,L6 9965 000 09474 TX89S-109D 30μH

AV PWB DVD962SA/001

Various

1102	2422 543 01283	RES XTL 16MHz 9344 NR-2C Y
1300	2422 132 06532	RELAY 2P 12V 2A DS2Y-S B
1400	2422 025 17409	CON BM V 24P F 1.00 FFC 0.3 B
1401	2422 026 05189	CON BM CINCH H 4P F YEWHRD B
1402	2422 026 05088	CON BM CINCH H 6P F B
1404	2422 025 16525	CON BM V 16P F 1.00 FFC 0.3 R
1405	4822 265 11154	52030-2210 (22P)
1407	2422 025 12352	CON BM EURO H 21P F BK GRND-L
1408	2422 026 05188	CON BM MDIN H 3P F TCS7927 B
1409	2422 026 05191	CON BM CINCH H 3P F RDBUGN B
1410	4822 267 31626	
2100	4822 126 14305	100nF 10% 16V
2101	4822 122 33777	47pF 5% 63V
2102	4822 122 33761	22pF 5% 50V
2103	4822 122 33752	15pF 5% 50V
2104	4822 122 33761	22pF 5% 50V
2105	4822 122 33761	22pF 5% 50V
2106	4822 122 33752	15pF 5% 50V
2107	4822 122 33752	15pF 5% 50V
2108	4822 126 14305	100nF 10% 16V
2109	4822 126 14305	100nF 10% 16V
2110	4822 126 14305	100nF 10% 16V
2112	4822 126 14305	100nF 10% 16V
2113	4822 126 14305	100nF 10% 16V
2114	4822 124 11947	10μF 20% 16V
2116	4822 126 14305	100nF 10% 16V
2117	4822 126 14305	100nF 10% 16V
2200	4822 126 14305	100nF 10% 16V
2201	4822 126 14305	100nF 10% 16V
2202	4822 124 11947	10μF 20% 16V
2203	4822 126 14305	100nF 10% 16V
2204	4822 126 14305	100nF 10% 16V
2205	4822 126 14305	100nF 10% 16V
2206	4822 124 11947	10μF 20% 16V
2207	4822 126 14305	100nF 10% 16V
2208	4822 126 14305	100nF 10% 16V
2209	4822 126 14305	100nF 10% 16V
2210	4822 126 14305	100nF 10% 16V
2211	4822 126 14305	100nF 10% 16V
2212	4822 124 41643	100μF 20% 16V
2213	3198 028 41090	10μF 20% 35V
2214	4822 126 14305	100nF 10% 16V
2215	4822 126 14305	100nF 10% 16V
2216	4822 124 21913	1μF 20% 63V
2217	4822 124 21913	1μF 20% 63V
2218	4822 126 14305	100nF 10% 16V
2219	4822 124 11947	10μF 20% 16V
2220	4822 126 14305	100nF 10% 16V
2221	4822 126 14249	560pF 10% 50V
2222	4822 122 31765	100pF 2% 63V
2223	4822 126 14305	100nF 10% 16V
2224	4822 122 31765	100pF 2% 63V
2225	4822 126 14305	100nF 10% 16V

2226	4822 124 21913	1µF 20% 63V	2413	4822 121 42408	220nF 5% 63V	3201	5322 117 13034	1k5 1% 0.063W
2227	4822 124 21913	1µF 20% 63V	2414	4822 124 41643	100µF 20% 16V	3203	4822 117 13632	100k 1% 0.62W
2228	4822 124 11947	10µF 20% 16V	2415	4822 124 22339	100UE 16V	3204	4822 117 12891	220k 1% ERJ3Ω
2229	4822 126 14305	100nF 10% 16V	2416	4822 126 14305	100nF 10% 16V	3205	4822 051 30102	1k 5% 0.062W
2230	2020 012 93792	100µF 16V	2417	4822 126 14305	100nF 10% 16V	3207	4822 051 30332	3k3 5% 0.062W
2231	4822 126 14249	560pF 10% 50V	2441	4822 126 14305	100nF 10% 16V	3208	4822 051 30472	4k7 5% 0.062W
2232	4822 122 31765	100pF 2% 63V	2500	4822 124 41643	100µF 20% 16V	3209	4822 051 30151	150Ω 5% 0.062W
2233	4822 126 14249	560pF 10% 50V	2501	4822 126 14305	100nF 10% 16V	3210	4822 117 12706	10k 1% 0.063W
2234	4822 122 31765	100pF 2% 63V	2502	4822 126 14305	100nF 10% 16V	3211	5322 117 13028	12k 1% 0.063W
2235	2020 012 93792	100µF 16V	2503	4822 124 41643	100µF 20% 16V	3212	5322 117 13028	12k 1% 0.063W
2236	4822 126 14249	560pF 10% 50V	2504	4822 124 41643	100µF 20% 16V	3213	4822 117 12706	10k 1% 0.063W
2237	4822 126 14226	82pF 5% 50V	2505	4822 126 14305	100nF 10% 16V	3214	5322 117 13028	12k 1% 0.063W
2238	4822 126 13881	470pF 5% 50V	2506	3198 017 44740	0603 10V 470nF	3215	4822 051 30222	2k2 5% 0.062W
2239	4822 126 14241	0603 50V 330P	2508	4822 124 40184	1000µF 20% 10V	3216	4822 051 30472	4k7 5% 0.062W
2240	4822 126 14305	100nF 10% 16V	2510	4822 126 13883	220pF 5% 50V	3217	4822 051 30223	22k 5% 0.062W
2241	4822 126 14305	100nF 10% 16V	2511	4822 126 13883	220pF 5% 50V	3218	4822 051 30102	1k 5% 0.062W
2242	4822 126 14226	82pF 5% 50V	2512	4822 126 13883	220pF 5% 50V	3219	4822 051 30223	22k 5% 0.062W
2243	4822 126 13881	470pF 5% 50V	2516	4822 124 41643	100µF 20% 16V	3220	5322 117 13028	12k 1% 0.063W
2244	4822 124 22339	100UE 16V	2517	4822 124 11947	10µF 20% 16V	3221	4822 117 12706	10k 1% 0.063W
2245	4822 126 14241	0603 50V 330P	2518	4822 124 41643	100µF 20% 16V	3222	5322 117 13028	12k 1% 0.063W
2246	4822 126 13881	470pF 5% 50V	2519	4822 124 41643	100µF 20% 16V	3223	5322 117 13028	12k 1% 0.063W
2247	4822 126 14241	0603 50V 330P	2520	4822 126 13883	220pF 5% 50V	3224	4822 117 12706	10k 1% 0.063W
2248	4822 126 14226	82pF 5% 50V	2521	4822 126 13883	220pF 5% 50V	3225	5322 117 13028	12k 1% 0.063W
2249	4822 126 14241	0603 50V 330P	2522	4822 122 31765	100pF 2% 63V	3226	5322 117 13028	12k 1% 0.063W
2250	4822 126 14226	82pF 5% 50V	2523	4822 126 13883	220pF 5% 50V	3227	4822 117 12706	10k 1% 0.063W
2251	4822 124 41643	100µF 20% 16V	2524	4822 126 13883	220pF 5% 50V	3228	4822 117 12706	10k 1% 0.063W
2252	4822 126 13881	470pF 5% 50V	2525	4822 124 41643	100µF 20% 16V	3229	5322 117 13033	15k 1% 0.063W
2253	4822 126 14305	100nF 10% 16V	2526	4822 126 14305	100nF 10% 16V	3230	5322 117 13028	12k 1% 0.063W
2254	4822 126 14241	0603 50V 330P	2527	4822 126 13883	220pF 5% 50V	3231	4822 117 12706	10k 1% 0.063W
2255	4822 126 13881	470pF 5% 50V	2528	4822 126 13883	220pF 5% 50V	3232	4822 117 12706	10k 1% 0.063W
2256	4822 126 14226	82pF 5% 50V	2529	4822 126 13883	220pF 5% 50V	3233	5322 117 13033	15k 1% 0.063W
2257	4822 126 14305	100nF 10% 16V	2530	4822 126 13883	220pF 5% 50V	3234	5322 117 13028	12k 1% 0.063W
2258	4822 126 14226	82pF 5% 50V	2531	3198 016 36810	0603 25V 680P	3235	4822 117 12706	10k 1% 0.063W
2259	4822 124 41643	100µF 20% 16V	2532	4822 126 13883	220pF 5% 50V	3236	4822 117 12706	10k 1% 0.063W
2260	4822 126 13881	470pF 5% 50V	2533	4822 126 14494	22nF 10% 25V	3237	5322 117 13033	15k 1% 0.063W
2261	4822 126 14241	0603 50V 330P	2534	4822 126 14494	22nF 10% 25V	3238	5322 117 13028	12k 1% 0.063W
2262	4822 126 14241	0603 50V 330P	2535	4822 126 13883	220pF 5% 50V	3239	4822 117 12706	10k 1% 0.063W
2263	4822 126 13881	470pF 5% 50V	2536	4822 124 11947	10µF 20% 16V	3240	4822 117 12706	10k 1% 0.063W
2264	4822 126 14226	82pF 5% 50V	2537	4822 126 14305	100nF 10% 16V	3241	5322 117 13033	15k 1% 0.063W
2265	4822 124 41643	100µF 20% 16V	2538	4822 122 33777	47pF 5% 63V	3242	5322 117 13028	12k 1% 0.063W
2266	4822 126 14226	82pF 5% 50V	2540	4822 122 33777	47pF 5% 63V	3243	4822 117 12706	10k 1% 0.063W
2267	4822 126 13881	470pF 5% 50V	2541	4822 126 13883	220pF 5% 50V	3244	4822 117 12706	10k 1% 0.063W
2268	4822 126 14241	0603 50V 330P	2542	4822 124 80231	47µF 20% 16V	3245	5322 117 13033	15k 1% 0.063W
2269	4822 124 11947	10µF 20% 16V	2543	4822 124 80231	47µF 20% 16V	3246	5322 117 13028	12k 1% 0.063W
2270	4822 126 14305	100nF 10% 16V	2544	4822 124 80231	47µF 20% 16V	3247	4822 117 12706	10k 1% 0.063W
2271	4822 124 22651	1.0µF 20% 50V	2545	4822 124 80231	47µF 20% 16V	3248	4822 117 12706	10k 1% 0.063W
2272	4822 124 22651	1.0µF 20% 50V	2546	5322 126 11583	10nF 10% 50V	3249	5322 117 13033	15k 1% 0.063W
2273	4822 124 22651	1.0µF 20% 50V	2547	4822 126 14305	100nF 10% 16V	3250	5322 117 13028	12k 1% 0.063W
2275	4822 126 14305	100nF 10% 16V	2548	4822 124 40184	1000µF 20% 10V	3251	4822 117 12706	10k 1% 0.063W
2276	4822 126 14305	100nF 10% 16V	2549	4822 124 80791	470µF 16V 20%	3252	4822 117 12706	10k 1% 0.063W
2300	4822 126 14305	100nF 10% 16V	2550	4822 124 80791	470µF 16V 20%	3253	5322 117 13033	15k 1% 0.063W
2301	4822 124 41643	100µF 20% 16V				3254	5322 117 13028	12k 1% 0.063W
2302	4822 126 14305	100nF 10% 16V				3255	4822 117 12706	10k 1% 0.063W
2303	4822 124 41643	100µF 20% 16V				3256	4822 117 12706	10k 1% 0.063W
2304	4822 126 14305	100nF 10% 16V				3257	5322 117 13033	15k 1% 0.063W
2305	4822 126 14305	100nF 10% 16V				3258	5322 117 13028	12k 1% 0.063W
2306	4822 126 14305	100nF 10% 16V				3259	5322 117 13037	2k2 1% 0.063W
2307	5322 121 42661	330nF 5% 63V	3100	4822 051 30101	100Ω 5% 0.062W	3260	5322 117 13018	1k0 1% 0.063W
2308	4822 124 11947	10µF 20% 16V	3103	4822 051 30101	100Ω 5% 0.062W	3261	4822 051 30479	47Ω 5% 0.062W
2309	5322 121 42661	330nF 5% 63V	3104	4822 051 30101	100Ω 5% 0.062W	3262	4822 051 30151	150Ω 5% 0.062W
2310	4822 122 31765	100pF 2% 63V	3105	4822 051 30101	100Ω 5% 0.062W	3263	4822 051 30479	47Ω 5% 0.062W
2311	4822 122 31765	100pF 2% 63V	3106	4822 051 30105	1M 5% 0.062W	3267	4822 051 30109	10Ω 5% 0.062W
2312	4822 126 14305	100nF 10% 16V	3107	4822 051 30101	100Ω 5% 0.062W	3268	4822 051 30109	10Ω 5% 0.062W
2313	4822 122 31765	100pF 2% 63V	3108	4822 051 30101	100Ω 5% 0.062W	3269	4822 051 30109	10Ω 5% 0.062W
2314	4822 122 31765	100pF 2% 63V	3109	4822 051 30101	100Ω 5% 0.062W	3270	4822 051 30109	10Ω 5% 0.062W
2315	4822 126 14305	100nF 10% 16V	3110	4822 051 30223	22k 5% 0.062W	3271	4822 051 30109	10Ω 5% 0.062W
2316	4822 126 14305	100nF 10% 16V	3111	4822 051 30472	4k7 5% 0.062W	3272	4822 051 30109	10Ω 5% 0.062W
2317	5322 121 42661	330nF 5% 63V	3112	4822 051 30472	4k7 5% 0.062W	3273	4822 051 30151	150Ω 5% 0.062W
2318	5322 121 42661	330nF 5% 63V	3113	4822 051 30472	4k7 5% 0.062W	3274	4822 117 12139	22Ω 5% 0.062W
2319	4822 122 31765	100pF 2% 63V	3114	4822 051 30472	4k7 5% 0.062W	3275	4822 117 12903	1k8 1% 0.063W
2320	4822 122 31765	100pF 2% 63V	3115	4822 051 30479	47Ω 5% 0.062W	3276	4822 117 12903	1k8 1% 0.063W
2321	4822 126 14305	100nF 10% 16V	3116	4822 051 30479	47Ω 5% 0.062W	3277	4822 117 12903	1k8 1% 0.063W
2322	4822 126 14305	100nF 10% 16V	3118	4822 051 30479	47Ω 5% 0.062W	3278	4822 117 12903	1k8 1% 0.063W
2333	4822 124 22339	100UE 16V	3120	4822 051 30472	4k7 5% 0.062W	3279	5322 117 13028	12k 1% 0.063W
2334	4822 124 22339	100UE 16V	3121	4822 051 30472	4k7 5% 0.062W	3280	5322 117 13028	12k 1% 0.063W
2335	4822 124 41643	100µF 20% 16V	3122	4822 051 30223	22k 5% 0.062W	3281	5322 117 13028	12k 1% 0.063W
2336	4822 124 41643	100µF 20% 16V	3123	4822 051 30472	4k7 5% 0.062W	3282	5322 117 13028	12k 1% 0.063W
2337	4822 126 14305	100nF 10% 16V	3124	4822 051 30221	220Ω 5% 0.062W	3283	5322 117 13028	12k 1% 0.063W
2338	4822 126 14305	100nF 10% 16V	3125	4822 051 30008	0Ω jumper	3284	5322 117 13028	12k 1% 0.063W
2339	4822 126 14305	100nF 10% 16V	3127	4822 051 30479	47Ω 5% 0.062W	3285	5322 117 13028	12k 1% 0.063W
2340	4822 126 14305	100nF 10% 16V	3128	4822 051 30479	47Ω 5% 0.062W	3286	5322 117 13028	12k 1% 0.063W
2400	4822 126 14305	100nF 10% 16V	3129	4822 051 30479	47Ω 5% 0.062W	3287	5322 117 13018	1k0 1% 0.063W
2401	4822 126 14305	100nF 10% 16V	3130	4822 051 30479	47Ω 5% 0.062W	3288	4822 051 30273	27k 5% 0.062W
2402	4822 126 14305	100nF 10% 16V	3131	4822 051 30479	47Ω 5% 0.062W	3289	4822 051 30472	4k7 5% 0.062W
2403	4822 126 14305	100nF 10% 16V	3132	4822 051 30472	4k7 5% 0.062W	3290	4822 117 12968	820Ω 5% 0.62W
2404	4822 126 14305	100nF 10% 16V	3135	4822 051 30008	0Ω jumper	3291	4822 051 30472	4k7 5% 0.062W
2405	4822 126 14305	100nF 10% 16V	3136	4822 051 30332	3k3 5% 0.062W	3300	4822 051 30472	4k7 5% 0.062W
2406	4822 126 14305	100nF 10% 16V	3137	4822 051 30332	3k3 5%			

3312	4822 051 30471	470Ω 5% 0.062W
3313	4822 051 30272	2k7 5% 0.062W
3314	4822 051 30103	10k 5% 0.062W
3315	4822 051 30103	10k 5% 0.062W
3316	4822 051 30471	470Ω 5% 0.062W
3317	4822 051 30272	2k7 5% 0.062W
3320	4822 051 30471	470Ω 5% 0.062W
3321	4822 051 30272	2k7 5% 0.062W
3322	4822 051 30103	10k 5% 0.062W
3323	4822 051 30103	10k 5% 0.062W
3326	4822 051 30392	3k9 5% 0.063W
3330	4822 051 30471	470Ω 5% 0.062W
3331	4822 051 30272	2k7 5% 0.062W
3333	4822 051 30392	3k9 5% 0.063W
3335	4822 051 30471	470Ω 5% 0.062W
3336	4822 051 30272	2k7 5% 0.062W
3337	4822 051 30103	10k 5% 0.062W
3338	4822 051 30103	10k 5% 0.062W
3341	4822 051 30109	10Ω 5% 0.062W
3342	4822 051 30109	10Ω 5% 0.062W
3345	4822 051 30109	10Ω 5% 0.062W
3346	4822 051 30109	10Ω 5% 0.062W
3400	4822 051 30472	4k7 5% 0.062W
3401	4822 051 30472	4k7 5% 0.062W
3402	4822 051 30472	4k7 5% 0.062W
3403	4822 051 30472	4k7 5% 0.062W
3404	4822 051 30472	4k7 5% 0.062W
3405	4822 051 30472	4k7 5% 0.062W
3407	4822 051 30392	3k9 5% 0.063W
3410	4822 051 30471	470Ω 5% 0.062W
3411	4822 051 30222	2k2 5% 0.062W
3412	4822 051 30272	2k7 5% 0.062W
3413	4822 051 30472	4k7 5% 0.062W
3414	4822 051 30222	2k2 5% 0.062W
3415	4822 051 30471	470Ω 5% 0.062W
3416	4822 051 30272	2k7 5% 0.062W
3417	4822 051 30103	10k 5% 0.062W
3418	4822 051 30103	10k 5% 0.062W
3422	4822 051 30109	10Ω 5% 0.062W
3426	4822 051 30109	10Ω 5% 0.062W
3427	4822 051 30472	4k7 5% 0.062W
3428	4822 117 13632	100k 1% 0.62W
3429	4822 051 30472	4k7 5% 0.062W
3430	4822 117 13632	100k 1% 0.62W
3431	4822 051 30472	4k7 5% 0.062W
3432	4822 117 13632	100k 1% 0.62W
3433	4822 051 30472	4k7 5% 0.062W
3434	4822 117 13632	100k 1% 0.62W
3435	4822 051 30472	4k7 5% 0.062W
3436	4822 117 13632	100k 1% 0.62W
3500	4822 051 30759	75Ω 5% 0.062W
3501	4822 051 30759	75Ω 5% 0.062W
3502	4822 051 30759	75Ω 5% 0.062W
3503	4822 051 30759	75Ω 5% 0.062W
3505	4822 117 11151	1Ω 5%
3507	4822 051 30223	22k 5% 0.062W
3508	4822 051 30222	2k2 5% 0.062W
3509	4822 051 30223	22k 5% 0.062W
3510	4822 051 30272	2k7 5% 0.062W
3511	4822 051 30221	220Ω 5% 0.062W
3512	4822 051 30221	220Ω 5% 0.062W
3513	4822 051 30272	2k7 5% 0.062W
3514	4822 051 30759	75Ω 5% 0.062W
3515	4822 051 30221	220Ω 5% 0.062W
3516	4822 051 30153	15k 5% 0.062W
3517	4822 051 30103	10k 5% 0.062W
3518	4822 117 11151	1Ω 5%
3519	4822 117 11151	1Ω 5%
3520	4822 051 30223	22k 5% 0.062W
3521	4822 051 30102	1k 5% 0.062W
3522	4822 117 12925	47k 1% 0.063W
3523	4822 051 30759	75Ω 5% 0.062W
3524	4822 051 30759	75Ω 5% 0.062W
3525	4822 051 30759	75Ω 5% 0.062W
3526	4822 051 30759	75Ω 5% 0.062W
3527	4822 051 30101	100Ω 5% 0.062W
3528	5322 117 13037	2k2 1% 0.063W
3529	5322 117 13037	2k2 1% 0.063W
3530	4822 051 30759	75Ω 5% 0.062W
3531	5322 117 13018	1k0 1% 0.063W
3532	5322 117 13018	1k0 1% 0.063W
3533	4822 051 30109	10Ω 5% 0.062W
3534	5322 117 13034	1k5 1% 0.063W
3535	4822 117 12968	820Ω 5% 0.62W
3536	5322 117 13037	2k2 1% 0.063W
3537	5322 117 13018	1k0 1% 0.063W
3538	5322 117 13018	1k0 1% 0.063W
3539	5322 117 13036	1k2 1% 0.063W
3540	4822 051 30759	75Ω 5% 0.062W
3541	4822 051 30759	75Ω 5% 0.062W
3542	4822 051 30561	560Ω 5% 0.062W
3543	5322 117 13031	5k6 1% 0.063W
3544	4822 051 30689	68Ω 5% 0.063W
3545	4822 051 30101	100Ω 5% 0.062W

3546	4822 051 30101	100Ω 5% 0.062W
3550	5322 117 13018	1k0 1% 0.063W
3551	4822 117 12902	8k2 1% 0.063W
3552	5322 117 13018	1k0 1% 0.063W
3553	4822 051 30759	75Ω 5% 0.062W
3554	4822 051 30759	75Ω 5% 0.062W
3555	4822 051 30759	75Ω 5% 0.062W
3556	4822 051 30759	75Ω 5% 0.062W
3557	4822 051 30102	1k 5% 0.062W

5201	2422 535 94092	IND FXD SM 0805 33U
5202	2422 535 94092	IND FXD SM 0805 33U
5203	2422 535 94092	IND FXD SM 0805 33U
5501	4822 242 10756	DSS306-92Y5S221M100
5503	2422 535 94092	IND FXD SM 0805 33U
5504	2422 535 94092	IND FXD SM 0805 33U
5506	4822 157 70601	100μH (920927085A)
5507	2422 535 94092	IND FXD SM 0805 33U
5508	2422 535 94092	IND FXD SM 0805 33U
5509	4822 157 11074	100μH



6300	4822 130 11397	BAS316
6500	4822 130 11522	UDZ15B
6501	4822 130 11522	UDZ15B
6502	4822 130 11522	UDZ15B
6503	4822 130 11522	UDZ15B
6504	4822 130 11522	UDZ15B
6506	4822 130 11522	UDZ15B
6507	4822 130 11522	UDZ15B
6508	4822 130 11522	UDZ15B
6509	4822 130 11522	UDZ15B
6510	9340 548 42115	PDZ2.4B



7100	9965 000 06673	TC7WHU04FU
7101	9965 000 06673	TC7WHU04FU
7103	9352 499 60118	IC SM 74LVC00AD
7104	9352 499 60118	IC SM 74LVC00AD
7105	4822 209 17441	74LVC74AD
7106	4822 209 17455	74LVC157AD
7107	5322 209 11578	PCF8574T
7120	4822 130 60511	BC847B
7122	9965 000 04199	BSN20
7123	9965 000 04199	BSN20
7126	4822 130 60511	BC847B
7200	9965 000 06675	CS4397 24BIT 192KHZ DAC
7201	9322 171 68668	IC SM CS4392-KZ
7202	9322 171 68668	IC SM CS4392-KZ
7203	9322 124 43668	IC SM LM317MDT (ST00) R
7204	9322 179 99668	OPA2228U
7205	9352 202 10118	IC SM NE5532AD8
7206	9352 202 10118	IC SM NE5532AD8
7220	4822 130 60511	BC847B
7221	4822 130 60511	BC847B
7222	4822 130 60511	BC847B
7224	5322 130 60845	BC807-25
7225	4822 130 60511	BC847B
7300	5322 209 14481	HEF4053BT
7302	4822 209 30095	LM833D
7303	4822 209 30095	LM833D
7304	9352 202 10118	IC SM NE5532AD8
7305	9322 067 00668	IC SM OP275GS (ANA0) R
7306	5322 209 14481	HEF4053BT
7307	9352 202 10118	IC SM NE5532AD8
7320	4822 130 42804	BC817-25
7321	4822 130 60511	BC847B
7322	4822 130 42804	BC817-25
7323	4822 130 42804	BC817-25
7324	4822 130 42804	BC817-25
7325	4822 130 42804	BC817-25
7326	4822 130 42804	BC817-25
7327	4822 130 42804	BC817-25
7400	5322 209 14481	HEF4053BT
7401	9352 202 10118	IC SM NE5532AD8
7402	9352 202 10118	IC SM NE5532AD8
7403	9352 202 10118	IC SM NE5532AD8
7404	9352 202 10118	IC SM NE5532AD8
7408	9352 202 10118	IC SM NE5532AD8
7420	4822 130 42804	BC817-25
7421	4822 130 42804	BC817-25
7500	9322 165 60668	IC SM LA7109 (TSAJ) R
7503	4822 209 17398	LD1117DT33
7504	9322 141 80668	AD8073JR
7520	4822 130 60511	BC847B
7521	4822 130 60511	BC847B
7522	4822 130 60511	BC847B
7523	4822 130 60511	BC847B

7524	4822 130 60511	BC847B
7525	4822 130 60373	BC856B
7526	4822 130 60511	BC847B
7604	9322 155 28667	OPT FIB CON GP1FA550TZ

AV PWB DVD962SA /171 /691

Various

1102	2422 543 01283	RES XTL 16MHz 9344 NR-2C Y
1300	2422 132 06532	RELAY 2P 12V 2A DS2Y-S B
1400	2422 025 17409	CON BM V 24P F 1.00 FFC 0.3 B
1401	2422 026 05189	CON BM CINCH H 4P F YEWHRD B
1402	2422 026 05088	CON BM CINCH H 6P F B
1404	2422 025 16525	CON BM V 16P F 1.00 FFC 0.3 R
1405	4822 265 11154	52030-2210 (22P)
1408	2422 026 05188	CON BM MDIN H 3P F TCS7927 B
1409	2422 026 05191	CON BM CINCH H 3P F RDBUGN B
1410	4822 267 31626	
1411	4822 265 11154	52030-2210 (22P)
1412	2422 025 08149	CON BM V 6P M 2.00 PH B
1600	2422 543 01255	RES XTL SM 24MHz 576 30P AT-51R



2100	4822 126 14305	100nF 10% 16V
2101	4822 122 33777	47pF 5% 63V
2102	4822 122 33761	22pF 5% 50V
2103	4822 122 33752	15pF 5% 50V
2104	4822 122 33761	22pF 5% 50V
2105	4822 122 33761	22pF 5% 50V
2106	4822 122 33752	15pF 5% 50V
2107	4822 122 33752	15pF 5% 50V
2108	4822 126 14305	100nF 10% 16V
2109	4822 126 14305	100nF 10% 16V
2110	4822 126 14305	100nF 10% 16V
2112	4822 126 14305	100nF 10% 16V
2113	4822 126 14305	100nF 10% 16V
2114	4822 124 11947	10μF 20% 16V
2116	4822 126 14305	100nF 10% 16V
2117	4822 126 14305	100nF 10% 16V
2200	4822 126 14305	100nF 10% 16V
2201	4822 126 14305	100nF 10% 16V
2202	4822 124 11947	10μF 20% 16V
2203	4822 126 14305	100nF 10% 16V
2204	4822 126 14305	100nF 10% 16V
2205	4822 126 14305	100nF 10% 16V
2206	4822 124 11947	10μF 20% 16V
2207	4822 126 14305	100nF 10% 16V
2208	4822 126 14305	100nF 10% 16V
2209	4822 126 14305	100nF 10% 16V
2210	4822 126 14305	100nF 10% 16V
2211	4822 126 14305	100nF 10% 16V
2212	4822 124 41643	100μF 20% 16V DIM:6.3X11MM
2213	3198 028 41090	10μF 20% 35V
2214	4822 126 14305	100nF 10% 16V
2215	4822 126 14305	100nF 10% 16V
2216	4822 124 21913	1μF 20% 63V
2217	4822 124 21913	1μF 20% 63V
2218	4822 126 14305	100nF 10% 16V
2219	4822 124 11947	10μF 20% 16V
2220	4822 126 14305	100nF 10% 16V
2221	4822 126 14249	560pF 10% 50V
2222	4822 122 31765	100pF 2% 63V
2223	4822 126 14305	100nF 10% 16V
2224	4822 122 31765	100pF 2% 63V
2225	4822 126 14305	100nF 10% 16V
2226	4822 124 21913	1μF 20% 63V
2227	4822 124 21913	1μF 20% 63V
2228	4822 124 11947	10μF 20% 16V

2242	4822 126 14226	82pF 5% 50V	2503	4822 124 41643	100µF 20% 16V	3106	4822 051 30105	1M 5% 0.062W
2243	4822 126 13881	470pF 5% 50V			DIM:6.3X11MM	3107	4822 051 30101	100Ω 5% 0.062W
2244	4822 124 22339	100UE 16V	2504	4822 124 41643	100µF 20% 16V	3108	4822 051 30101	100Ω 5% 0.062W
2245	4822 126 14241	0603 50V 330P COL R			DIM:6.3X11MM	3109	4822 051 30101	100Ω 5% 0.062W
2246	4822 126 13881	470pF 5% 50V	2505	4822 126 14305	100nF 10% 16V	3110	4822 051 30223	22k 5% 0.062W
2247	4822 126 14241	0603 50V 330P COL R	2506	3198 017 44740	0603 10V 470nF COL	3111	4822 051 30472	4k7 5% 0.062W
2248	4822 126 14226	82pF 5% 50V	2508	4822 124 40184	1000µF 20% 10V	3112	4822 051 30472	4k7 5% 0.062W
2249	4822 126 14241	0603 50V 330P COL R	2516	4822 124 41643	100µF 20% 16V	3113	4822 051 30472	4k7 5% 0.062W
2250	4822 126 14226	82pF 5% 50V			DIM:6.3X11MM	3114	4822 051 30472	4k7 5% 0.062W
2251	4822 124 41643	100µF 20% 16V	2517	4822 124 11947	10µF 20% 16V	3115	4822 051 30479	47Ω 5% 0.062W
		DIM:6.3X11MM	2518	4822 124 41643	100µF 20% 16V	3116	4822 051 30479	47Ω 5% 0.062W
2252	4822 126 13881	470pF 5% 50V			DIM:6.3X11MM	3118	4822 051 30479	47Ω 5% 0.062W
2253	4822 126 14305	100nF 10% 16V	2519	4822 124 41643	100µF 20% 16V	3120	4822 051 30472	4k7 5% 0.062W
2254	4822 126 14241	0603 50V 330P COL R			DIM:6.3X11MM	3121	4822 051 30472	4k7 5% 0.062W
2255	4822 126 13881	470pF 5% 50V	2528	4822 126 13883	220pF 5% 50V	3122	4822 051 30223	22k 5% 0.062W
2256	4822 126 14226	82pF 5% 50V	2529	4822 126 13883	220pF 5% 50V	3123	4822 051 30472	4k7 5% 0.062W
2257	4822 126 14305	100nF 10% 16V	2530	4822 126 13883	220pF 5% 50V	3124	4822 051 30221	220Ω 5% 0.062W
2258	4822 126 14226	82pF 5% 50V	2531	3198 016 36810	0603 25V 680P COL R	3125	4822 051 30008	0Ω jumper
2259	4822 124 41643	100µF 20% 16V	2532	4822 126 13883	220pF 5% 50V	3127	4822 051 30479	47Ω 5% 0.062W
		DIM:6.3X11MM	2533	4822 126 14494	22nF 10% 25V	3128	4822 051 30479	47Ω 5% 0.062W
2260	4822 126 13881	470pF 5% 50V	2534	4822 126 14494	22nF 10% 25V	3129	4822 051 30479	47Ω 5% 0.062W
2261	4822 126 14241	0603 50V 330P COL R	2535	4822 126 13883	220pF 5% 50V	3130	4822 051 30479	47Ω 5% 0.062W
2262	4822 126 14241	0603 50V 330P COL R	2536	4822 124 11947	10µF 20% 16V	3131	4822 051 30479	47Ω 5% 0.062W
2263	4822 126 13881	470pF 5% 50V	2537	4822 126 14305	100nF 10% 16V	3132	4822 051 30472	4k7 5% 0.062W
2264	4822 126 14226	82pF 5% 50V	2538	4822 122 33777	47pF 5% 63V	3135	4822 051 30008	0Ω jumper
2265	4822 124 41643	100µF 20% 16V	2540	4822 122 33777	47pF 5% 63V	3136	4822 051 30332	3k3 5% 0.062W
		DIM:6.3X11MM	2541	4822 126 13883	220pF 5% 50V	3137	4822 051 30332	3k3 5% 0.062W
2266	4822 126 14226	82pF 5% 50V	2542	4822 124 80231	47µF 20% 16V	3138	4822 051 30332	3k3 5% 0.062W
2267	4822 126 13881	470pF 5% 50V	2543	4822 124 80231	47µF 20% 16V	3140	4822 051 30332	3k3 5% 0.062W
2268	4822 126 14241	0603 50V 330P COL R	2544	4822 124 80231	47µF 20% 16V	3142	4822 051 30332	3k3 5% 0.062W
2269	4822 124 11947	10µF 20% 16V	2545	4822 124 80231	47µF 20% 16V	3143	4822 051 30332	3k3 5% 0.062W
2270	4822 126 14305	100nF 10% 16V	2546	5322 126 11583	10nF 10% 50V	3145	4822 051 30332	3k3 5% 0.062W
2271	4822 124 22651	1.0µF 20% 50V	2549	4822 124 80791	470µF 16V 20% 105C	3146	4822 051 30332	3k3 5% 0.062W
2272	4822 124 22651	1.0µF 20% 50V			DXH=8X11.5	3148	4822 051 30272	2k7 5% 0.062W
2273	4822 124 22651	1.0µF 20% 50V	2550	4822 124 80791	470µF 16V 20% 105C	3149	4822 051 30101	100Ω 5% 0.062W
2275	4822 126 14305	100nF 10% 16V			DXH=8X11.5	3150	4822 051 30472	4k7 5% 0.062W
2276	4822 126 14305	100nF 10% 16V	2600	4822 126 14305	100nF 10% 16V	3200	4822 051 30103	10k 5% 0.062W
2300	4822 126 14305	100nF 10% 16V	2601	4822 126 14305	100nF 10% 16V	3201	5322 117 13034	1k5 1% 0.063W
2301	4822 124 41643	100µF 20% 16V	2602	4822 126 14305	100nF 10% 16V	3203	4822 117 13632	100k 1% 0.62W
		DIM:6.3X11MM	2603	4822 126 14305	100nF 10% 16V	3204	4822 117 12891	220k 1% ERJ3Ω
2302	4822 126 14305	100nF 10% 16V	2604	4822 126 14305	100nF 10% 16V	3205	4822 051 30102	1k 5% 0.062W
2303	4822 124 41643	100µF 20% 16V	2605	4822 126 14305	100nF 10% 16V	3207	4822 051 30332	3k3 5% 0.062W
		DIM:6.3X11MM	2606	4822 124 11947	10µF 20% 16V	3208	4822 051 30472	4k7 5% 0.062W
2304	4822 126 14305	100nF 10% 16V	2607	4822 124 11947	10µF 20% 16V	3209	4822 051 30151	150Ω 5% 0.062W
2306	4822 126 14305	100nF 10% 16V	2608	4822 124 11947	10µF 20% 16V	3210	4822 117 12706	10k 1% 0.063W
2307	5322 121 42661	330nF 5% 63V	2609	4822 126 14305	100nF 10% 16V	3211	5322 117 13028	12k 1% 0.063W
2308	4822 124 11947	10µF 20% 16V	2610	4822 126 14305	100nF 10% 16V	3212	5322 117 13028	12k 1% 0.063W
2309	5322 121 42661	330nF 5% 63V	2611	4822 126 14305	100nF 10% 16V	3213	4822 117 12706	10k 1% 0.063W
2310	4822 122 31765	100pF 2% 63V	2612	4822 126 14305	100nF 10% 16V	3214	5322 117 13028	12k 1% 0.063W
2311	4822 122 31765	100pF 2% 63V	2613	3198 024 44730	47nF 50V	3215	4822 051 30222	2k2 5% 0.062W
2313	4822 122 31765	100pF 2% 63V	2614	3198 024 44730	47nF 50V	3216	4822 051 30472	4k7 5% 0.062W
2314	4822 122 31765	100pF 2% 63V	2615	3198 024 44730	47nF 50V	3217	4822 051 30223	22k 5% 0.062W
2315	4822 126 14305	100nF 10% 16V	2616	3198 024 44730	47nF 50V	3218	4822 051 30102	1k 5% 0.062W
2316	4822 126 14305	100nF 10% 16V	2617	3198 024 44730	47nF 50V	3219	4822 051 30223	22k 5% 0.062W
2317	5322 121 42661	330nF 5% 63V	2618	3198 024 44730	47nF 50V	3220	5322 117 13028	12k 1% 0.063W
2318	5322 121 42661	330nF 5% 63V	2619	3198 024 44730	47nF 50V	3221	4822 117 12706	10k 1% 0.063W
2319	4822 122 31765	100pF 2% 63V	2620	3198 024 44730	47nF 50V	3222	5322 117 13028	12k 1% 0.063W
2320	4822 122 31765	100pF 2% 63V	2621	3198 024 44730	47nF 50V	3223	5322 117 13028	12k 1% 0.063W
2321	4822 126 14305	100nF 10% 16V	2622	3198 024 44730	47nF 50V	3224	4822 117 12706	10k 1% 0.063W
2322	4822 126 14305	100nF 10% 16V	2623	3198 024 44730	47nF 50V	3225	5322 117 13028	12k 1% 0.063W
2323	4822 124 22339	100UE 16V	2624	3198 024 44730	47nF 50V	3226	5322 117 13028	12k 1% 0.063W
2334	4822 124 22339	100UE 16V	2625	3198 024 44730	47nF 50V	3227	4822 117 12706	10k 1% 0.063W
2335	4822 124 41643	100µF 20% 16V	2626	3198 024 44730	47nF 50V	3228	4822 117 12706	10k 1% 0.063W
		DIM:6.3X11MM	2627	3198 024 44730	47nF 50V	3229	5322 117 13033	15k 1% 0.063W
2336	4822 124 41643	100µF 20% 16V	2628	3198 024 44730	47nF 50V	3230	5322 117 13028	12k 1% 0.063W
		DIM:6.3X11MM	2629	3198 024 44730	47nF 50V	3231	4822 117 12706	10k 1% 0.063W
2337	4822 126 14305	100nF 10% 16V	2630	3198 024 44730	47nF 50V	3232	4822 117 12706	10k 1% 0.063W
2338	4822 126 14305	100nF 10% 16V	2631	3198 024 44730	47nF 50V	3233	5322 117 13033	15k 1% 0.063W
2339	4822 126 14305	100nF 10% 16V	2632	3198 024 44730	47nF 50V	3234	5322 117 13028	12k 1% 0.063W
2340	4822 126 14305	100nF 10% 16V	2634	4822 122 33741	10pF 10% 50V	3235	4822 117 12706	10k 1% 0.063W
2400	4822 126 14305	100nF 10% 16V	2635	4822 122 33741	10pF 10% 50V	3236	4822 117 12706	10k 1% 0.063W
2401	4822 126 14305	100nF 10% 16V	2638	4822 126 14305	100nF 10% 16V	3237	5322 117 13033	15k 1% 0.063W
2402	4822 126 14305	100nF 10% 16V	2639	4822 126 14305	100nF 10% 16V	3238	5322 117 13028	12k 1% 0.063W
2403	4822 126 14305	100nF 10% 16V	2640	4822 126 14305	100nF 10% 16V	3239	4822 117 12706	10k 1% 0.063W
2404	4822 126 14305	100nF 10% 16V	2641	4822 126 14305	100nF 10% 16V	3240	4822 117 12706	10k 1% 0.063W
2405	4822 126 14305	100nF 10% 16V	2642	4822 126 14305	100nF 10% 16V	3241	5322 117 13033	15k 1% 0.063W
2406	4822 126 14305	100nF 10% 16V	2643	4822 126 14305	100nF 10% 16V	3242	5322 117 13028	12k 1% 0.063W
2407	4822 126 14305	100nF 10% 16V	2644	4822 126 14305	100nF 10% 16V	3243	4822 117 12706	10k 1% 0.063W
2408	5322 121 42661	330nF 5% 63V	2645	4822 126 14305	100nF 10% 16V	3244	4822 117 12706	10k 1% 0.063W
2409	4822 126 14305	100nF 10% 16V	2646	4822 126 14305	100nF 10% 16V	3245	5322 117 13033	15k 1% 0.063W
2410	4822 122 31765	100pF 2% 63V	2647	4822 126 14305	100nF 10% 16V	3246	5322 117 13028	12k 1% 0.063W
2411	4822 122 31765	100pF 2% 63V	2648	4822 126 14305	100nF 10% 16V	3247	4822 117 12706	10k 1% 0.063W
2412	4822 126 14305	100nF 10% 16V	2649	4822 126 14305	100nF 10% 16V	3248	4822 117 12706	10k 1% 0.063W
2413	4822 121 42408	220nF 5% 63V	2650	4822 126 14305	100nF 10% 16V	3249	5322 117 13033	15k 1% 0.063W
2414	4822 124 41643	100µF 20% 16V				3250	5322 117 13028	12k 1% 0.063W
		DIM:6.3X11MM				3251	4822 117 12706	10k 1% 0.063W
2415	4822 124 22339	100UE 16V				3252	4822 117 12706	10k 1% 0.063W
2416	4822 126 14305	100nF 10% 16V				3253	5322 117 13033	15k 1% 0.063W
2417	4822 126 14305	100nF 10% 16V				3254	5322 117 13028	12k 1% 0.063W
2441	4822 126 14305	100nF 10% 16V				3255	4822 117 12706	10k 1% 0.063W
2500	4822 124 41643	100µF 20% 16V				3256	48	

3260	5322 117 13018	1k0 1% 0.063W
3261	4822 051 30479	47Ω 5% 0.062W
3262	4822 051 30151	150Ω 5% 0.062W
3263	4822 051 30479	47Ω 5% 0.062W
3267	4822 051 30109	10Ω 5% 0.062W
3268	4822 051 30109	10Ω 5% 0.062W
3269	4822 051 30109	10Ω 5% 0.062W
3270	4822 051 30109	10Ω 5% 0.062W
3271	4822 051 30109	10Ω 5% 0.062W
3272	4822 051 30109	10Ω 5% 0.062W
3273	4822 051 30151	150Ω 5% 0.062W
3274	4822 117 12139	22Ω 5% 0.062W
3275	4822 117 12903	1k8 1% 0.063W
3276	4822 117 12903	1k8 1% 0.063W
3277	4822 117 12903	1k8 1% 0.063W
3278	4822 117 12903	1k8 1% 0.063W
3279	5322 117 13028	12k 1% 0.063W
3280	5322 117 13028	12k 1% 0.063W
3281	5322 117 13028	12k 1% 0.063W
3282	5322 117 13028	12k 1% 0.063W
3283	5322 117 13028	12k 1% 0.063W
3284	5322 117 13028	12k 1% 0.063W
3285	5322 117 13028	12k 1% 0.063W
3286	5322 117 13028	12k 1% 0.063W
3287	5322 117 13018	1k0 1% 0.063W
3288	4822 051 30273	27k 5% 0.062W
3289	4822 051 30472	4k7 5% 0.062W
3290	4822 117 12968	820Ω 5% 0.62W
3291	4822 051 30472	4k7 5% 0.062W
3300	4822 051 30472	4k7 5% 0.062W
3301	4822 051 30223	22k 5% 0.062W
3304	4822 051 30392	3k9 5% 0.063W
3306	4822 051 30109	10Ω 5% 0.062W
3307	4822 051 30273	27k 5% 0.062W
3309	4822 051 30392	3k9 5% 0.063W
3310	4822 051 30471	470Ω 5% 0.062W
3311	4822 051 30272	2k7 5% 0.062W
3312	4822 051 30471	470Ω 5% 0.062W
3313	4822 051 30272	2k7 5% 0.062W
3314	4822 051 30103	10k 5% 0.062W
3315	4822 051 30103	10k 5% 0.062W
3316	4822 051 30471	470Ω 5% 0.062W
3317	4822 051 30272	2k7 5% 0.062W
3320	4822 051 30471	470Ω 5% 0.062W
3321	4822 051 30272	2k7 5% 0.062W
3322	4822 051 30103	10k 5% 0.062W
3323	4822 051 30103	10k 5% 0.062W
3326	4822 051 30392	3k9 5% 0.063W
3330	4822 051 30471	470Ω 5% 0.062W
3331	4822 051 30272	2k7 5% 0.062W
3333	4822 051 30392	3k9 5% 0.063W
3335	4822 051 30471	470Ω 5% 0.062W
3336	4822 051 30272	2k7 5% 0.062W
3337	4822 051 30103	10k 5% 0.062W
3338	4822 051 30103	10k 5% 0.062W
3341	4822 051 30109	10Ω 5% 0.062W
3342	4822 051 30109	10Ω 5% 0.062W
3345	4822 051 30109	10Ω 5% 0.062W
3346	4822 051 30109	10Ω 5% 0.062W
3400	4822 051 30472	4k7 5% 0.062W
3401	4822 051 30472	4k7 5% 0.062W
3402	4822 051 30472	4k7 5% 0.062W
3403	4822 051 30472	4k7 5% 0.062W
3404	4822 051 30472	4k7 5% 0.062W
3405	4822 051 30472	4k7 5% 0.062W
3407	4822 051 30392	3k9 5% 0.063W
3410	4822 051 30471	470Ω 5% 0.062W
3411	4822 051 30222	2k2 5% 0.062W
3412	4822 051 30272	2k7 5% 0.062W
3413	4822 051 30472	4k7 5% 0.062W
3414	4822 051 30222	2k2 5% 0.062W
3415	4822 051 30471	470Ω 5% 0.062W
3416	4822 051 30272	2k7 5% 0.062W
3417	4822 051 30103	10k 5% 0.062W
3418	4822 051 30103	10k 5% 0.062W
3422	4822 051 30109	10Ω 5% 0.062W
3426	4822 051 30109	10Ω 5% 0.062W
3427	4822 051 30472	4k7 5% 0.062W
3428	4822 117 13632	100k 1% 0.62W
3429	4822 051 30472	4k7 5% 0.062W
3430	4822 117 13632	100k 1% 0.62W
3431	4822 051 30472	4k7 5% 0.062W
3432	4822 117 13632	100k 1% 0.62W
3433	4822 051 30472	4k7 5% 0.062W
3434	4822 117 13632	100k 1% 0.62W
3435	4822 051 30472	4k7 5% 0.062W
3436	4822 117 13632	100k 1% 0.62W
3500	4822 051 30759	75Ω 5% 0.062W
3501	4822 051 30759	75Ω 5% 0.062W
3502	4822 051 30759	75Ω 5% 0.062W
3503	4822 051 30759	75Ω 5% 0.062W
3505	4822 117 11151	1Ω 5%
3507	4822 051 30223	22k 5% 0.062W
3508	4822 051 30222	2k2 5% 0.062W

3509	4822 051 30223	22k 5% 0.062W
3516	4822 051 30153	15k 5% 0.062W
3517	4822 051 30103	10k 5% 0.062W
3518	4822 117 11151	1Ω 5%
3519	4822 117 11151	1Ω 5%
3523	4822 051 30759	75Ω 5% 0.062W
3524	4822 051 30759	75Ω 5% 0.062W
3525	4822 051 30759	75Ω 5% 0.062W
3526	4822 051 30759	75Ω 5% 0.062W
3527	4822 051 30101	100Ω 5% 0.062W
3528	5322 117 13037	2k2 1% 0.063W
3529	5322 117 13037	2k2 1% 0.063W
3530	4822 051 30759	75Ω 5% 0.062W
3531	5322 117 13018	1k0 1% 0.063W
3532	5322 117 13018	1k0 1% 0.063W
3533	4822 051 30109	10Ω 5% 0.062W
3534	5322 117 13034	1k5 1% 0.063W
3535	4822 117 12968	820Ω 5% 0.62W
3536	5322 117 13037	2k2 1% 0.063W
3537	5322 117 13018	1k0 1% 0.063W
3538	5322 117 13018	1k0 1% 0.063W
3539	5322 117 13036	1k2 1% 0.063W
3540	4822 051 30759	75Ω 5% 0.062W
3541	4822 051 30759	75Ω 5% 0.062W
3542	4822 051 30561	560Ω 5% 0.062W
3543	5322 117 13031	5k6 1% 0.063W
3544	4822 051 30689	68Ω 5% 0.063W
3545	4822 051 30101	100Ω 5% 0.062W
3546	4822 051 30101	100Ω 5% 0.062W
3550	5322 117 13018	1k0 1% 0.063W
3551	4822 117 12902	8k2 1% 0.063W
3552	5322 117 13018	1k0 1% 0.063W
3553	4822 051 30759	75Ω 5% 0.062W
3554	4822 051 30759	75Ω 5% 0.062W
3555	4822 051 30759	75Ω 5% 0.062W
3556	4822 051 30759	75Ω 5% 0.062W
3557	4822 051 30102	1k0 1% 0.063W
3600	4822 051 30008	0Ω jumper
3601	4822 051 30472	4k7 5% 0.062W
3602	4822 051 30008	0Ω jumper
3610	4822 051 30569	56Ω 5% 0.062W
3611	4822 051 30759	75Ω 5% 0.062W
3614	4822 051 30759	75Ω 5% 0.062W
3618	4822 051 30759	75Ω 5% 0.062W
3619	2322 702 60189	RST SM RC21 18Ω PM5 R
3620	4822 051 30109	10Ω 5% 0.062W
3621	4822 051 30109	10Ω 5% 0.062W
3622	4822 051 30109	10Ω 5% 0.062W
3623	4822 051 30008	0Ω jumper
3624	4822 051 30101	100Ω 5% 0.062W
3625	4822 051 30101	100Ω 5% 0.062W
~		
5201	2422 535 94092	IND FXD SM 0805 33U PM10 R
5202	2422 535 94092	IND FXD SM 0805 33U PM10 R
5203	2422 535 94092	IND FXD SM 0805 33U PM10 R
5501	4822 242 10756	DSS306-92Y5S221M100
5503	2422 535 94092	IND FXD SM 0805 33U PM10 R
5504	2422 535 94092	IND FXD SM 0805 33U PM10 R
5506	4822 157 70601	100μH (920927085A)
5507	2422 535 94092	IND FXD SM 0805 33U PM10 R
5508	2422 535 94092	IND FXD SM 0805 33U PM10 R
5509	4822 157 11074	100μH
5600	4822 157 10586	2.2μH 10% 0805
5601	4822 157 10586	2.2μH 10% 0805
5602	4822 157 10586	2.2μH 10% 0805
5604	4822 157 10586	2.2μH 10% 0805
▶		
6300	4822 130 11397	BAS316
6506	4822 130 11522	UDZ15B
6507	4822 130 11522	UDZ15B
6508	4822 130 11522	UDZ15B
⊖		
7100	9965 000 06673	TC7WHU04FU
7101	9965 000 06673	TC7WHU04FU
7103	9352 499 60118	IC SM 74LVC00AD (PHSE) R
7104	9352 499 60118	IC SM 74LVC00AD (PHSE) R
7105	4822 209 17441	74LVC74AD

7106	4822 209 17455	74LVC157AD
7107	5322 209 11578	PCF8574T
7120	4822 130 60511	BC847B
7122	9965 000 04199	BSN20
7123	9965 000 04199	BSN20
7124	9965 000 04199	BSN20
7125	9965 000 04199	BSN20
7126	4822 130 60511	BC847B
7200	9965 000 06675	CS4397 24BIT 192KHZ DAC
7201	9322 171 68668	IC SM CS4392-KZ (CILO) R
7202	9322 171 68668	IC SM CS4392-KZ (CILO) R
7203	9322 124 43668	IC SM LM317MDT (ST00) R
7204	9322 179 99668	IC SM OPA2228U (BBOO) R
7205	9352 202 10118	IC SM NE5532AD8 (PHSE) R
7206	9352 202 10118	IC SM NE5532AD8 (PHSE) R
7220	4822 130 60511	BC847B
7221	4822 130 60511	BC847B
7222	4822 130 60511	BC847B
7224	5322 130 60845	BC807-25
7225	4822 130 60511	BC847B
7300	5322 209 14481	HEF4053BT
7302	4822 209 30095	LM833D
7304	9352 202 10118	IC SM NE5532AD8 (PHSE) R
7305	9322 067 00668	IC SM OP275GS (ANA0) R
7306	5322 209 14481	HEF4053BT
7307	9352 202 10118	IC SM NE5532AD8 (PHSE) R
7320	4822 130 42804	BC817-25
7321	4822 130 60511	BC847B
7322	4822 130 42804	BC817-25
7323	4822 130 42804	BC817-25
7324	4822 130 42804	BC817-25
7325	4822 130 42804	BC817-25
7326	4822 130 42804	BC817-25
7327	4822 130 42804	BC817-25
7400	5322 209 14481	HEF4053BT
7401	9352 202 10118	IC SM NE5532AD8 (PHSE) R
7402	9352 202 10118	IC SM NE5532AD8 (PHSE) R
7403	9352 202 10118	IC SM NE5532AD8 (PHSE) R
7404	9352 202 10118	IC SM NE5532AD8 (PHSE) R
7408	9352 202 10118	IC SM NE5532AD8 (PHSE) R
7420	4822 130 42804	BC817-25
7421	4822 130 42804	BC817-25
7500	9322 165 60668	IC SM LA7109 (TSAJ) R
7503	4822 209 17398	LD1117DT33
7504	9322 141 80668	AD8073JR
7520	4822 130 60511	BC847B
7521	4822 130 60511	BC847B
7522	4822 130 60511	BC847B
7600	9352 688 32557	IC SM SAA7118HV/1 (PHSE) Y
7601	4822 209 17398	LD1117DT33

AV PWB SACD900 /171

Various

1102	2422 543 01283	RES XTL 16MHz 9344 NR-2C Y
1300	2422 132 06532	RELAY 2P 12V 2A DS2Y-S B
1400	2422 025 17409	CON BM V 24P F 1.00 FFC 0.3 B
1401	2422 026 05189	CON BM CINCH H 4P F YEWHRD B
1402	2422 026 05088	CON BM CINCH H 6P F B
1404	2422 025 16525	CON BM V 16P F 1.00 FFC 0.3 R
1405	4822 265 11154	52030-2210 (22P)
1408	2422 026 05188	CON BM MDIN H 3P F TCS7927 B
1409	2422 026 05191	CON BM CINCH H 3P F RDBUGN B
1410	4822 267 31626	
- -		
2100	4822 126 14305	100nF 10% 16V
2101	4822 122 33777	47pF 5% 63V
2102	4822 122 33761	22pF 5% 50V
2103	4822 122 33752	15pF 5% 50V
2104	4822 122 33761	22pF 5% 50V
2105	4822 122 33761	22pF 5% 50V
2106	4822 122 33752	15pF 5% 50V

2107	4822 122 33752	15pF 5% 50V	2303	4822 124 41643	100µF 20% 16V	3101	4822 051 30109	10Ω 5% 0.062W
2108	4822 126 14305	100nF 10% 16V			DIM:6.3X11MM	3102	4822 051 30101	100Ω 5% 0.062W
2109	4822 126 14305	100nF 10% 16V	2304	4822 126 14305	100nF 10% 16V	3103	4822 051 30101	100Ω 5% 0.062W
2110	4822 126 14305	100nF 10% 16V	2306	4822 126 14305	100nF 10% 16V	3104	4822 051 30101	100Ω 5% 0.062W
2112	4822 126 14305	100nF 10% 16V	2307	5322 121 42661	330nF 5% 63V	3105	4822 051 30101	100Ω 5% 0.062W
2113	4822 126 14305	100nF 10% 16V	2308	4822 124 11947	10µF 20% 16V	3106	4822 051 30105	1M 5% 0.062W
2114	4822 124 11947	10µF 20% 16V	2309	5322 121 42661	330nF 5% 63V	3107	4822 051 30101	100Ω 5% 0.062W
2116	4822 126 14305	100nF 10% 16V	2310	4822 122 31765	100pF 2% 63V	3108	4822 051 30101	100Ω 5% 0.062W
2117	4822 126 14305	100nF 10% 16V	2311	4822 122 31765	100pF 2% 63V	3109	4822 051 30101	100Ω 5% 0.062W
2200	4822 126 14305	100nF 10% 16V	2313	4822 122 31765	100pF 2% 63V	3110	4822 051 30223	22k 5% 0.062W
2201	4822 126 14305	100nF 10% 16V	2314	4822 122 31765	100pF 2% 63V	3111	4822 051 30472	4k7 5% 0.062W
2202	4822 124 11947	10µF 20% 16V	2315	4822 126 14305	100nF 10% 16V	3112	4822 051 30472	4k7 5% 0.062W
2203	4822 126 14305	100nF 10% 16V	2316	4822 126 14305	100nF 10% 16V	3113	4822 051 30472	4k7 5% 0.062W
2204	4822 126 14305	100nF 10% 16V	2317	5322 121 42661	330nF 5% 63V	3114	4822 051 30472	4k7 5% 0.062W
2205	4822 126 14305	100nF 10% 16V	2318	5322 121 42661	330nF 5% 63V	3115	4822 051 30479	47Ω 5% 0.062W
2206	4822 124 11947	10µF 20% 16V	2319	4822 122 31765	100pF 2% 63V	3116	4822 051 30479	47Ω 5% 0.062W
2207	4822 126 14305	100nF 10% 16V	2320	4822 122 31765	100pF 2% 63V	3118	4822 051 30479	47Ω 5% 0.062W
2208	4822 126 14305	100nF 10% 16V	2321	4822 126 14305	100nF 10% 16V	3120	4822 051 30472	4k7 5% 0.062W
2209	4822 126 14305	100nF 10% 16V	2332	4822 126 14305	100nF 10% 16V	3121	4822 051 30472	4k7 5% 0.062W
2210	4822 126 14305	100nF 10% 16V	2333	4822 124 22339	100UE 16V	3122	4822 051 30223	22k 5% 0.062W
2211	4822 126 14305	100nF 10% 16V	2334	4822 124 22339	100UE 16V	3123	4822 051 30472	4k7 5% 0.062W
2212	4822 124 41643	100µF 20% 16V	2335	4822 124 41643	100µF 20% 16V	3124	4822 051 30221	220Ω 5% 0.062W
		DIM:6.3X11MM			DIM:6.3X11MM	3125	4822 051 30008	0Ω jumper
2213	3198 028 41090	10µF 20% 35V	2336	4822 124 41643	100µF 20% 16V	3127	4822 051 30479	47Ω 5% 0.062W
2214	4822 126 14305	100nF 10% 16V			DIM:6.3X11MM	3128	4822 051 30479	47Ω 5% 0.062W
2215	4822 126 14305	100nF 10% 16V	2337	4822 126 14305	100nF 10% 16V	3129	4822 051 30479	47Ω 5% 0.062W
2216	4822 124 21913	1µF 20% 63V	2338	4822 126 14305	100nF 10% 16V	3130	4822 051 30479	47Ω 5% 0.062W
2217	4822 124 21913	1µF 20% 63V	2339	4822 126 14305	100nF 10% 16V	3131	4822 051 30479	47Ω 5% 0.062W
2218	4822 126 14305	100nF 10% 16V	2340	4822 126 14305	100nF 10% 16V	3132	4822 051 30472	4k7 5% 0.062W
2219	4822 124 11947	10µF 20% 16V	2400	4822 126 14305	100nF 10% 16V	3135	4822 051 30008	0Ω jumper
2220	4822 126 14305	100nF 10% 16V	2401	4822 126 14305	100nF 10% 16V	3136	4822 051 30332	3k3 5% 0.062W
2221	4822 126 14249	560pF 10% 50V	2402	4822 126 14305	100nF 10% 16V	3137	4822 051 30332	3k3 5% 0.062W
2222	4822 122 31765	100pF 2% 63V	2403	4822 126 14305	100nF 10% 16V	3138	4822 051 30332	3k3 5% 0.062W
2223	4822 126 14305	100nF 10% 16V	2404	4822 126 14305	100nF 10% 16V	3140	4822 051 30332	3k3 5% 0.062W
2224	4822 122 31765	100pF 2% 63V	2405	4822 126 14305	100nF 10% 16V	3148	4822 051 30272	2k7 5% 0.062W
2225	4822 126 14305	100nF 10% 16V	2406	4822 126 14305	100nF 10% 16V	3149	4822 051 30101	100Ω 5% 0.062W
2226	4822 124 21913	1µF 20% 63V	2407	4822 126 14305	100nF 10% 16V	3150	4822 051 30472	4k7 5% 0.062W
2227	4822 124 21913	1µF 20% 63V	2408	5322 121 42661	330nF 5% 63V	3200	4822 051 30103	10k 5% 0.062W
2228	4822 124 11947	10µF 20% 16V	2409	4822 126 14305	100nF 10% 16V	3201	5322 117 13034	1k5 1% 0.063W
2229	4822 126 14305	100nF 10% 16V	2410	4822 122 31765	100pF 2% 63V	3203	4822 117 13632	100k 1% 0.62W
2230	2020 012 93792	100µF 16V	2411	4822 122 31765	100pF 2% 63V	3204	4822 117 12891	220k 1% ERJ3Ω
2231	4822 126 14249	560pF 10% 50V	2412	4822 126 14305	100nF 10% 16V	3205	4822 051 30102	1k 5% 0.062W
2232	4822 122 31765	100pF 2% 63V	2413	4822 121 42408	220nF 5% 63V	3207	4822 051 30332	3k3 5% 0.062W
2233	4822 126 14249	560pF 10% 50V	2414	4822 124 41643	100µF 20% 16V	3208	4822 051 30472	4k7 5% 0.062W
2234	4822 122 31765	100pF 2% 63V			DIM:6.3X11MM	3209	4822 051 30151	150Ω 5% 0.062W
2235	2020 012 93792	100µF 16V	2415	4822 124 22339	100UE 16V	3210	4822 117 12706	10k 1% 0.063W
2236	4822 126 14249	560pF 10% 50V	2416	4822 126 14305	100nF 10% 16V	3211	5322 117 13028	12k 1% 0.063W
2237	4822 126 14226	82pF 5% 50V	2417	4822 126 14305	100nF 10% 16V	3212	5322 117 13028	12k 1% 0.063W
2238	4822 126 13881	470pF 5% 50V	2441	4822 126 14305	100nF 10% 16V	3213	4822 117 12706	10k 1% 0.063W
2239	4822 126 14241	0603 50V 330P COL R	2500	4822 124 41643	100µF 20% 16V	3214	5322 117 13028	12k 1% 0.063W
2240	4822 126 14305	100nF 10% 16V			DIM:6.3X11MM	3215	4822 051 30222	2k2 5% 0.062W
2241	4822 126 14305	100nF 10% 16V	2501	4822 126 14305	100nF 10% 16V	3216	4822 051 30472	4k7 5% 0.062W
2242	4822 126 14226	82pF 5% 50V	2502	4822 126 14305	100nF 10% 16V	3217	4822 051 30223	22k 5% 0.062W
2243	4822 126 13881	470pF 5% 50V	2503	4822 124 41643	100µF 20% 16V	3218	4822 051 30102	1k 5% 0.062W
2244	4822 124 22339	100UE 16V			DIM:6.3X11MM	3219	4822 051 30223	22k 5% 0.062W
2245	4822 126 14241	0603 50V 330P COL R	2504	4822 124 41643	100µF 20% 16V	3220	5322 117 13028	12k 1% 0.063W
2246	4822 126 13881	470pF 5% 50V			DIM:6.3X11MM	3221	4822 117 12706	10k 1% 0.063W
2247	4822 126 14241	0603 50V 330P COL R	2505	4822 126 14305	100nF 10% 16V	3222	5322 117 13028	12k 1% 0.063W
2248	4822 126 14226	82pF 5% 50V	2506	3198 017 44740	0603 10V 470nF COL	3223	5322 117 13028	12k 1% 0.063W
2249	4822 126 14241	0603 50V 330P COL R	2508	4822 124 40184	1000µF 20% 10V	3224	4822 117 12706	10k 1% 0.063W
2250	4822 126 14226	82pF 5% 50V	2516	4822 124 41643	100µF 20% 16V	3225	5322 117 13028	12k 1% 0.063W
2251	4822 124 41643	100µF 20% 16V			DIM:6.3X11MM	3226	5322 117 13028	12k 1% 0.063W
		DIM:6.3X11MM	2517	4822 124 11947	10µF 20% 16V	3227	4822 117 12706	10k 1% 0.063W
2252	4822 126 13881	470pF 5% 50V	2518	4822 124 41643	100µF 20% 16V	3228	4822 117 12706	10k 1% 0.063W
2253	4822 126 14305	100nF 10% 16V			DIM:6.3X11MM	3229	5322 117 13033	15k 1% 0.063W
2254	4822 126 14241	0603 50V 330P COL R	2519	4822 124 41643	100µF 20% 16V	3230	5322 117 13028	12k 1% 0.063W
2255	4822 126 13881	470pF 5% 50V			DIM:6.3X11MM	3231	4822 117 12706	10k 1% 0.063W
2256	4822 126 14226	82pF 5% 50V	2528	4822 126 13883	220pF 5% 50V	3232	4822 117 12706	10k 1% 0.063W
2257	4822 126 14305	100nF 10% 16V	2529	4822 126 13883	220pF 5% 50V	3233	5322 117 13033	15k 1% 0.063W
2258	4822 126 14226	82pF 5% 50V	2530	4822 126 13883	220pF 5% 50V	3234	5322 117 13028	12k 1% 0.063W
2259	4822 124 41643	100µF 20% 16V	2531	3198 016 36810	0603 25V 680P COL R	3235	4822 117 12706	10k 1% 0.063W
		DIM:6.3X11MM	2532	4822 126 13883	220pF 5% 50V	3236	4822 117 12706	10k 1% 0.063W
2260	4822 126 13881	470pF 5% 50V	2533	4822 126 14494	22nF 10% 25V	3237	5322 117 13033	15k 1% 0.063W
2261	4822 126 14241	0603 50V 330P COL R	2534	4822 126 14494	22nF 10% 25V	3238	5322 117 13028	12k 1% 0.063W
2262	4822 126 14241	0603 50V 330P COL R	2535	4822 126 13883	220pF 5% 50V	3239	4822 117 12706	10k 1% 0.063W
2263	4822 126 13881	470pF 5% 50V	2536	4822 124 11947	10µF 20% 16V	3240	4822 117 12706	10k 1% 0.063W
2264	4822 126 14226	82pF 5% 50V	2537	4822 126 14305	100nF 10% 16V	3241	5322 117 13033	15k 1% 0.063W
2265	4822 124 41643	100µF 20% 16V	2538	4822 122 33777	47pF 5% 63V	3242	5322 117 13028	12k 1% 0.063W
		DIM:6.3X11MM	2540	4822 122 33777	47pF 5% 63V	3243	4822 117 12706	10k 1% 0.063W
2266	4822 126 14226	82pF 5% 50V	2541	4822 126 13883	220pF 5% 50V	3244	4822 117 12706	10k 1% 0.063W
2267	4822 126 13881	470pF 5% 50V	2542	4822 124 80231	47µF 20% 16V	3245	5322 117 13033	15k 1% 0.063W
2268	4822 126 14241	0603 50V 330P COL R	2543	4822 124 80231	47µF 20% 16V	3246	5322 117 13028	12k 1% 0.063W
2269	4822 124 11947	10µF 20% 16V	2544	4822 124 80231	47µF 20% 16V	3247	4822 117 12706	10k 1% 0.063W
2270	4822 126 14305	100nF 10% 16V	2545	4822 124 80231	47µF 20% 16V	3248	4822 117 12706	10k 1% 0.063W
2271	4822 124 22651	1.0µF 20% 50V	2546	5322 126 11583	10nF 10% 50V	3249	5322 117 13033	15k 1% 0.063W
2272	4822 124 22651	1.0µF 20% 50V	2549	4822 124 80791	470µF 16V 20% 105C	3250	5322 117 13028	12k 1% 0.063W
2273	4822 124 22651	1.0µF 20% 50V			DXH=8X11.5	3251	4822 117 12706	10k 1% 0.063W
2275	4822 126 14305	100nF 10% 16V	2550	4822 124 80791	470µF 16V 20% 105C	3252	4822 117 12706	10k 1% 0.063W
2276	4822 126 14305	100nF 10% 16V			DXH=8X11.5	325		

3259	5322 117 13037	2k2 1% 0.063W	3508	4822 051 30222	2k2 5% 0.062W	7224	5322 130 60845	BC807-25
3260	5322 117 13018	1k0 1% 0.063W	3509	4822 051 30223	22k 5% 0.062W	7225	4822 130 60511	BC847B
3261	4822 051 30479	47Ω 5% 0.062W	3516	4822 051 30153	15k 5% 0.062W	7300	5322 209 14481	HEF4053BT
3262	4822 051 30151	150Ω 5% 0.062W	3517	4822 051 30103	10k 5% 0.062W	7302	4822 209 30095	LM833D
3263	4822 051 30479	47Ω 5% 0.062W	3518	4822 117 11151	1Ω 5%	7304	9352 202 10118	IC SM NE5532AD8 (PHSE) R
3267	4822 051 30109	10Ω 5% 0.062W	3519	4822 117 11151	1Ω 5%	7305	9322 067 00668	IC SM OP275GS (ANA0) R
3268	4822 051 30109	10Ω 5% 0.062W	3523	4822 051 30759	75Ω 5% 0.062W	7306	5322 209 14481	HEF4053BT
3269	4822 051 30109	10Ω 5% 0.062W	3524	4822 051 30759	75Ω 5% 0.062W	7307	9352 202 10118	IC SM NE5532AD8 (PHSE) R
3270	4822 051 30109	10Ω 5% 0.062W	3525	4822 051 30759	75Ω 5% 0.062W	7320	4822 130 42804	BC817-25
3271	4822 051 30109	10Ω 5% 0.062W	3526	4822 051 30759	75Ω 5% 0.062W	7321	4822 130 60511	BC847B
3272	4822 051 30109	10Ω 5% 0.062W	3527	4822 051 30101	100Ω 5% 0.062W	7322	4822 130 42804	BC817-25
3273	4822 051 30151	150Ω 5% 0.062W	3528	5322 117 13037	2k2 1% 0.063W	7323	4822 130 42804	BC817-25
3274	4822 117 12139	22Ω 5% 0.062W	3529	5322 117 13037	2k2 1% 0.063W	7324	4822 130 42804	BC817-25
3275	4822 117 12903	1k8 1% 0.063W	3530	4822 051 30759	75Ω 5% 0.062W	7325	4822 130 42804	BC817-25
3276	4822 117 12903	1k8 1% 0.063W	3531	5322 117 13018	1k0 1% 0.063W	7326	4822 130 42804	BC817-25
3277	4822 117 12903	1k8 1% 0.063W	3532	5322 117 13018	1k0 1% 0.063W	7327	4822 130 42804	BC817-25
3278	4822 117 12903	1k8 1% 0.063W	3533	4822 051 30109	10Ω 5% 0.062W	7400	5322 209 14481	HEF4053BT
3279	5322 117 13028	12k 1% 0.063W	3534	5322 117 13034	1k5 1% 0.063W	7401	9352 202 10118	IC SM NE5532AD8 (PHSE) R
3280	5322 117 13028	12k 1% 0.063W	3535	4822 117 12968	820Ω 5% 0.62W	7402	9352 202 10118	IC SM NE5532AD8 (PHSE) R
3281	5322 117 13028	12k 1% 0.063W	3536	5322 117 13037	2k2 1% 0.063W	7403	9352 202 10118	IC SM NE5532AD8 (PHSE) R
3282	5322 117 13028	12k 1% 0.063W	3537	5322 117 13018	1k0 1% 0.063W	7404	9352 202 10118	IC SM NE5532AD8 (PHSE) R
3283	5322 117 13028	12k 1% 0.063W	3538	5322 117 13018	1k0 1% 0.063W	7408	9352 202 10118	IC SM NE5532AD8 (PHSE) R
3284	5322 117 13028	12k 1% 0.063W	3539	5322 117 13036	1k2 1% 0.063W	7420	4822 130 42804	BC817-25
3285	5322 117 13028	12k 1% 0.063W	3540	4822 051 30759	75Ω 5% 0.062W	7421	4822 130 42804	BC817-25
3286	5322 117 13028	12k 1% 0.063W	3541	4822 051 30759	75Ω 5% 0.062W	7500	9322 165 60668	IC SM LA7109 (TSAJ) R
3287	5322 117 13018	1k0 1% 0.063W	3542	4822 051 30561	560Ω 5% 0.062W	7503	4822 209 17398	LD1117DT33
3288	4822 051 30273	27k 5% 0.062W	3543	5322 117 13031	5k6 1% 0.063W	7504	9322 141 80668	AD8073JR
3289	4822 051 30472	4k7 5% 0.062W	3544	4822 051 30689	68Ω 5% 0.063W	7520	4822 130 60511	BC847B
3290	4822 117 12968	820Ω 5% 0.62W	3545	4822 051 30101	100Ω 5% 0.062W	7521	4822 130 60511	BC847B
3291	4822 051 30472	4k7 5% 0.062W	3546	4822 051 30101	100Ω 5% 0.062W	7522	4822 130 60511	BC847B
3300	4822 051 30472	4k7 5% 0.062W	3550	5322 117 13018	1k0 1% 0.063W	7604	9322 155 28667	OPT FIB CON GP1FA550TZ (SRP)JL
3301	4822 051 30223	22k 5% 0.062W	3551	4822 117 12902	8k2 1% 0.063W			
3304	4822 051 30392	3k9 5% 0.063W	3552	5322 117 13018	1k0 1% 0.063W			
3306	4822 051 30109	10Ω 5% 0.062W	3553	4822 051 30759	75Ω 5% 0.062W			
3307	4822 051 30273	27k 5% 0.062W	3554	4822 051 30759	75Ω 5% 0.062W			
3309	4822 051 30392	3k9 5% 0.063W	3555	4822 051 30759	75Ω 5% 0.062W			
3310	4822 051 30471	470Ω 5% 0.062W	3556	4822 051 30759	75Ω 5% 0.062W			
3311	4822 051 30272	2k7 5% 0.062W						
3312	4822 051 30471	470Ω 5% 0.062W						
3313	4822 051 30272	2k7 5% 0.062W						
3314	4822 051 30103	10k 5% 0.062W						
3315	4822 051 30103	10k 5% 0.062W						
3316	4822 051 30471	470Ω 5% 0.062W						
3317	4822 051 30272	2k7 5% 0.062W						
3320	4822 051 30471	470Ω 5% 0.062W						
3321	4822 051 30272	2k7 5% 0.062W						
3322	4822 051 30103	10k 5% 0.062W						
3323	4822 051 30103	10k 5% 0.062W						
3326	4822 051 30392	3k9 5% 0.063W						
3330	4822 051 30471	470Ω 5% 0.062W						
3331	4822 051 30272	2k7 5% 0.062W						
3333	4822 051 30392	3k9 5% 0.063W						
3335	4822 051 30471	470Ω 5% 0.062W						
3336	4822 051 30272	2k7 5% 0.062W						
3337	4822 051 30103	10k 5% 0.062W						
3338	4822 051 30103	10k 5% 0.062W						
3341	4822 051 30109	10Ω 5% 0.062W						
3342	4822 051 30109	10Ω 5% 0.062W						
3345	4822 051 30109	10Ω 5% 0.062W						
3346	4822 051 30109	10Ω 5% 0.062W						
3400	4822 051 30472	4k7 5% 0.062W						
3401	4822 051 30472	4k7 5% 0.062W						
3402	4822 051 30472	4k7 5% 0.062W						
3403	4822 051 30472	4k7 5% 0.062W						
3404	4822 051 30472	4k7 5% 0.062W						
3405	4822 051 30472	4k7 5% 0.062W						
3407	4822 051 30392	3k9 5% 0.063W						
3410	4822 051 30471	470Ω 5% 0.062W						
3411	4822 051 30222	2k2 5% 0.062W						
3412	4822 051 30272	2k7 5% 0.062W						
3413	4822 051 30472	4k7 5% 0.062W						
3414	4822 051 30222	2k2 5% 0.062W						
3415	4822 051 30471	470Ω 5% 0.062W						
3416	4822 051 30272	2k7 5% 0.062W						
3417	4822 051 30103	10k 5% 0.062W						
3418	4822 051 30103	10k 5% 0.062W						
3422	4822 051 30109	10Ω 5% 0.062W						
3426	4822 051 30109	10Ω 5% 0.062W						
3427	4822 051 30472	4k7 5% 0.062W						
3428	4822 117 13632	100k 1% 0.62W						
3429	4822 051 30472	4k7 5% 0.062W						
3430	4822 117 13632	100k 1% 0.62W						
3431	4822 051 30472	4k7 5% 0.062W						
3432	4822 117 13632	100k 1% 0.62W						
3433	4822 051 30472	4k7 5% 0.062W						
3434	4822 117 13632	100k 1% 0.62W						
3435	4822 051 30472	4k7 5% 0.062W						
3436	4822 117 13632	100k 1% 0.62W						
3500	4822 051 30759	75Ω 5% 0.062W						
3501	4822 051 30759	75Ω 5% 0.062W						
3502	4822 051 30759	75Ω 5% 0.062W						
3503	4822 051 30759	75Ω 5% 0.062W						
3505	4822 117 11151	1Ω 5%						
3507	4822 051 30223	22k 5% 0.062W						
5201	2422 535 94092	IND FXD SM 0805 33U PM10 R	5201	2422 535 94092	IND FXD SM 0805 33U PM10 R			
5202	2422 535 94092	IND FXD SM 0805 33U PM10 R	5203	2422 535 94092	IND FXD SM 0805 33U PM10 R			
5203	2422 535 94092	IND FXD SM 0805 33U PM10 R	5501	4822 242 10756	DSS306-92Y5S221M100			
5501	4822 242 10756	DSS306-92Y5S221M100	5503	2422 535 94092	IND FXD SM 0805 33U PM10 R			
5503	2422 535 94092	IND FXD SM 0805 33U PM10 R	5504	2422 535 94092	IND FXD SM 0805 33U PM10 R			
5504	2422 535 94092	IND FXD SM 0805 33U PM10 R	5506	4822 157 70601	100μH (920927085A)			
5506	4822 157 70601	100μH (920927085A)	5507	2422 535 94092	IND FXD SM 0805 33U PM10 R			
5507	2422 535 94092	IND FXD SM 0805 33U PM10 R	5508	2422 535 94092	IND FXD SM 0805 33U PM10 R			
5508	2422 535 94092	IND FXD SM 0805 33U PM10 R	5509	4822 157 11074	100μH			
5509	4822 157 11074	100μH						
6300	4822 130 11397	BAS316						
6506	4822 130 11522	UDZ15B						
6507	4822 130 11522	UDZ15B						
6508	4822 130 11522	UDZ15B						
7100	9965 000 06673	TC7WHU04FU						
7101	9965 000 06673	TC7WHU04FU						
7103	9352 499 60118	IC SM 74LVC00AD (PHSE) R						
7104	9352 499 60118	IC SM 74LVC00AD (PHSE) R						
7105	4822 209 17441	74LVC74AD						
7106	4822 209 17455	74LVC157AD						
7107	5322 209 11578	PCF8574T						
7120	4822 130 60511	BC847B						
7122	9965 000 04199	BSN20						
7123	9965 000 04199	BSN20						
7126	4822 130 60511	BC847B						
7200	9965 000 06675	CS4397 24BIT 192KHZ DAC						
7201	9322 171 68668	IC SM CS4392-KZ (CILO) R						
7202	9322 171 68668	IC SM CS4392-KZ (CILO) R						
7203	9322 124 43668	IC SM LM317MDT (ST00) R						
7204	9322 179 99668	IC SM OPA2228U (BBOO) R						
7205	9352 202 10118	IC SM NE5532AD8 (PHSE) R						
7206	9352 202 10118	IC SM NE5532AD8 (PHSE) R						
7220	4822 130 60511	BC847B						
7221	4822 130 60511	BC847B						
7222	4822 130 60511	BC847B						

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2140	3198 017 44740	0603 10V 470nF COL
2141	3198 017 44740	0603 10V 470nF COL
2142	4822 126 14305	100nF 10% 16V
2143	4822 126 14305	100nF 10% 16V
2144	4822 126 14305	100nF 10% 16V
2145	4822 126 14305	100nF 10% 16V
2146	4822 126 14305	100nF 10% 16V
2147	4822 126 14305	100nF 10% 16V
2148	4822 126 14305	100nF 10% 16V
2149	4822 126 14305	100nF 10% 16V
2150	4822 126 14305	100nF 10% 16V
2151	4822 126 14305	100nF 10% 16V
2152	4822 126 14305	100nF 10% 16V
2153	4822 126 14305	100nF 10% 16V
2154	4822 126 14305	100nF 10% 16V
2155	4822 126 14305	100nF 10% 16V
2200	4822 124 40184	1000µF 20% 10V
2201	4822 126 14305	100nF 10% 16V
2202	4822 126 14305	100nF 10% 16V
2203	4822 124 81286	47µF 20% 16V
2204	4822 126 14305	100nF 10% 16V
2205	4822 126 14305	100nF 10% 16V
2206	4822 124 40184	1000µF 20% 10V
2207	4822 124 81286	47µF 20% 16V
2208	4822 126 14305	100nF 10% 16V
2209	4822 126 14305	100nF 10% 16V
2210	4822 124 40769	4.7µF 20% 100V
2211	4822 126 14305	100nF 10% 16V
2213	4822 126 13956	68pF 5% 63V CASE
2214	4822 122 33761	22pF 5% 50V
2215	4822 126 14507	18pF 5% 50V
2217	4822 126 14305	100nF 10% 16V
2218	4822 126 14305	100nF 10% 16V
2219	4822 126 14305	100nF 10% 16V
2220	4822 126 13956	68pF 5% 63V CASE
2221	4822 122 33761	22pF 5% 50V
2222	4822 126 14507	18pF 5% 50V
2224	4822 126 14305	100nF 10% 16V
2225	4822 126 13956	68pF 5% 63V CASE
2226	4822 122 33761	22pF 5% 50V
2227	4822 126 14507	18pF 5% 50V
2229	4822 122 31765	100pF 2% 63V
2230	4822 122 31765	100pF 2% 63V
2231	4822 122 31765	100pF 2% 63V
2232	4822 126 14305	100nF 10% 16V
2240	4822 126 14305	100nF 10% 16V
2241	4822 126 14305	100nF 10% 16V
2242	4822 126 14305	100nF 10% 16V
2243	3198 017 44740	0603 10V 470nF COL
2247	4822 122 31765	100pF 2% 63V
2249	4822 122 31765	100pF 2% 63V
2250	4822 122 31765	100pF 2% 63V
2253	4822 122 31765	100pF 2% 63V
2254	4822 122 31765	100pF 2% 63V
2255	4822 126 14305	100nF 10% 16V
2256	4822 126 14305	100nF 10% 16V
2257	4822 126 14305	100nF 10% 16V
2258	4822 126 14305	100nF 10% 16V
2259	4822 126 14305	100nF 10% 16V
2260	4822 126 14305	100nF 10% 16V
2261	4822 126 14305	100nF 10% 16V



3100	4822 117 12139	22Ω 5% 0.062W
3101	4822 117 12139	22Ω 5% 0.062W
3102	4822 117 12139	22Ω 5% 0.062W
3103	4822 117 12139	22Ω 5% 0.062W
3104	4822 117 12139	22Ω 5% 0.062W
3105	4822 117 12139	22Ω 5% 0.062W
3106	4822 117 12139	22Ω 5% 0.062W
3107	4822 117 12139	22Ω 5% 0.062W
3108	4822 117 12139	22Ω 5% 0.062W
3109	4822 117 12139	22Ω 5% 0.062W
3110	4822 117 12139	22Ω 5% 0.062W
3111	4822 117 12139	22Ω 5% 0.062W
3112	4822 117 12139	22Ω 5% 0.062W
3113	4822 117 12139	22Ω 5% 0.062W
3114	4822 117 12139	22Ω 5% 0.062W
3115	4822 117 12139	22Ω 5% 0.062W
3116	4822 117 12139	22Ω 5% 0.062W
3117	4822 117 12139	22Ω 5% 0.062W
3118	4822 117 12139	22Ω 5% 0.062W
3119	4822 117 12139	22Ω 5% 0.062W
3120	4822 117 12139	22Ω 5% 0.062W
3121	4822 117 12139	22Ω 5% 0.062W
3122	4822 117 12139	22Ω 5% 0.062W
3123	4822 117 12139	22Ω 5% 0.062W
3124	4822 117 12139	22Ω 5% 0.062W
3125	4822 117 12139	22Ω 5% 0.062W
3126	4822 117 12139	22Ω 5% 0.062W
3127	4822 117 12139	22Ω 5% 0.062W
3128	4822 117 12139	22Ω 5% 0.062W

3129	4822 117 12139	22Ω 5% 0.062W
3130	4822 117 12139	22Ω 5% 0.062W
3131	4822 117 12139	22Ω 5% 0.062W
3132	4822 117 12139	22Ω 5% 0.062W
3133	4822 117 12139	22Ω 5% 0.062W
3134	4822 117 12139	22Ω 5% 0.062W
3135	4822 117 12139	22Ω 5% 0.062W
3136	4822 117 12139	22Ω 5% 0.062W
3137	4822 117 12139	22Ω 5% 0.062W
3138	4822 117 12139	22Ω 5% 0.062W
3139	4822 117 12139	22Ω 5% 0.062W
3140	4822 117 12139	22Ω 5% 0.062W
3141	4822 117 12139	22Ω 5% 0.062W
3142	4822 117 12139	22Ω 5% 0.062W
3143	4822 117 12139	22Ω 5% 0.062W
3144	4822 117 12139	22Ω 5% 0.062W
3145	4822 117 12139	22Ω 5% 0.062W
3146	4822 117 12139	22Ω 5% 0.062W
3147	4822 051 30472	4k7 5% 0.062W
3148	4822 051 30472	4k7 5% 0.062W
3149	4822 051 30472	4k7 5% 0.062W
3150	4822 051 30472	4k7 5% 0.062W
3151	4822 051 30472	4k7 5% 0.062W
3152	4822 051 30472	4k7 5% 0.062W
3153	4822 051 30472	4k7 5% 0.062W
3154	4822 051 30101	100Ω 5% 0.062W
3155	4822 051 30101	100Ω 5% 0.062W
3206	4822 051 30103	10k 5% 0.062W
3210	4822 051 30472	4k7 5% 0.062W
3211	2322 704 62002	RST SM 2k PM1 R
3212	4822 051 30471	470Ω 5% 0.062W
3213	4822 117 11152	4Ω7 5%
3215	4822 051 30472	4k7 5% 0.062W
3216	4822 051 30101	100Ω 5% 0.062W
3217	4822 051 30101	100Ω 5% 0.062W
3229	4822 051 30759	75Ω 5% 0.062W
3231	5322 117 13036	1k2 1% 0.063W
3232	5322 117 13036	1k2 1% 0.063W
3233	5322 117 13036	1k2 1% 0.063W
3234	5322 117 13036	1k2 1% 0.063W
3235	5322 117 13036	1k2 1% 0.063W
3236	5322 117 13036	1k2 1% 0.063W
3237	4822 051 30759	75Ω 5% 0.062W
3238	5322 117 13036	1k2 1% 0.063W
3239	5322 117 13036	1k2 1% 0.063W
3240	5322 117 13036	1k2 1% 0.063W
3241	5322 117 13036	1k2 1% 0.063W
3242	5322 117 13036	1k2 1% 0.063W
3243	5322 117 13036	1k2 1% 0.063W
3246	4822 051 30759	75Ω 5% 0.062W
3247	5322 117 13036	1k2 1% 0.063W
3248	5322 117 13036	1k2 1% 0.063W
3249	5322 117 13036	1k2 1% 0.063W
3250	5322 117 13036	1k2 1% 0.063W
3251	5322 117 13036	1k2 1% 0.063W
3252	5322 117 13036	1k2 1% 0.063W
3258	4822 051 30101	100Ω 5% 0.062W
4xxx	4822 051 10008	0Ω 5% 0.25W (1206)
4xxx	4822 051 20008	0Ω 5% 0.25W (0805)



5100	4822 157 71593	10µH 10%
5101	4822 157 71593	10µH 10%
5102	4822 157 11828	22U 20% SM 0805
5202	4822 157 11876	6.8µH 10% 0805
5203	4822 157 71593	10µH 10%
5204	4822 157 10586	2.2µH 10% 0805
5205	4822 157 11876	6.8µH 10% 0805
5206	4822 157 71593	10µH 10%
5207	4822 157 10586	2.2µH 10% 0805
5208	4822 157 11876	6.8µH 10% 0805
5209	4822 157 71593	10µH 10%
5210	4822 157 10586	2.2µH 10% 0805
5211	4822 157 11074	100µH
5212	4822 157 11074	100µH
5213	4822 157 11074	100µH
5214	4822 157 11716	BLM21P300SPT
5215	4822 157 11074	100µH
5216	4822 157 11716	BLM21P300SPT



7100	9322 169 18671	IC SM FLI2200 (SAGE) Y
7101	9322 166 71668	IC SM MT48LC2M32B2TG-6 (MRNO)R
7102	4822 209 17398	LD1117DT33
7103	9322 160 50668	IC SM LD1117DT25 (ST00) R
7200	9352 092 60118	IC SM 74LV7T4DB (PHSE) R
7201	4822 209 17398	LD1117DT33
7202	9322 169 28671	IC SM ADV7196A (ANA0) Y

7204	9322 167 49685	IC SM AD8061ART (ANA0) R
7205	9322 167 49685	IC SM AD8061ART (ANA0) R
7206	9352 092 90118	IC SM 74LV7T4DB (PHSE) R
7207	9322 167 49685	IC SM AD8061ART (ANA0) R

Mono PWB

Various

1001	2422 025 16957	CON BM V 24P F 1.00 FFC 0.3 R
1104	2422 025 15963	CON BM H 24P F 0.50 FFC SMD R
1106	2422 025 16158	CON BM H 8P F 1.00 FFC 0.3 R
1205	2422 540 98428	RES CER SM 8M467 CSTCC8.46MHz R
1300	2422 540 98426	RES CER SM 6MHz CSTCC6.00MHz R
1301	4822 267 51454	CONN. 11P FEMALE
1603	2422 025 16389	CON BM V 22P F 1.00 FFC 0.3 R
1604	2422 025 16388	CON BM V 16P F 1.00 FFC 0.3 R

-II-

2009	4822 126 14305	100nF 10% 16V
2010	4822 126 14305	100nF 10% 16V
2011	4822 126 14305	100nF 10% 16V
2012	4822 126 14305	100nF 10% 16V
2013	4822 126 14043	1µF 20% 16V CASE
2100	2222 780 15656	16V 330nF PM10 R
2101	4822 126 14305	100nF 10% 16V
2103	4822 124 80151	47µF 16V
2104	4822 126 13193	4.7nF 10% 63V
2105	4822 122 33761	22pF 5% 50V
2107	4822 126 13956	68pF 5% 63V CASE
2108	4822 126 14315	390pF 5% 50V
2109	2020 552 95697	
2110	2222 861 15222	63V 2N2 PM5
2111	4822 126 14305	100nF 10% 16V
2112	5322 126 11578	1nF 10% 50V
2113	4822 126 14305	100nF 10% 16V
2114	4822 122 31765	100pF 2% 63V
2115	4822 126 14305	100nF 10% 16V
2116	4822 126 14305	100nF 10% 16V
2117	4822 126 14305	100nF 10% 16V
2118	3198 017 42230	0603 50V 22nF COL
2119	3198 017 42230	0603 50V 22nF COL
2120	4822 126 14305	100nF 10% 16V
2121	4822 126 13879	22nF 20% 16V
2122	3198 017 42230	0603 50V 22nF COL
2123	4822 126 14305	100nF 10% 16V
2124	4822 126 14305	100nF 10% 16V
2125	4822 126 14305	100nF 10% 16V
2126	4822 126 14305	100nF 10% 16V
2127	4822 126 14305	100nF 10% 16V
2128	4822 126 14508	180pF 5% 50V
2129	4822 126 14508	180pF 5% 50V
2130	4822 122 33761	22pF 5% 50V
2131	4822 126 14494	22nF 10% 25V
2136	4822 126 14305	100nF 10% 16V
2137	4822 126 14305	100nF 10% 16V
2138	4822 126 14305	100nF 10% 16V
2139	4822 126 14305	100nF 10% 16V
2140	4822 126 14241	0603 50V 330P COL R
2141	4822 122 33761	22pF 5% 50V
2142	5322 126 11583	10nF 10% 50V
2143	4822 126 13883	220pF 5% 50V
2144	4822 126 13883	220pF 5% 50V
2145	4822 126 13883	220pF 5% 50V
2146		

2215	4822 124 23237	22µF 6.3V	2611	4822 124 12095	100µF 20% 16V	3014	4822 051 30103	10k 5% 0.062W
2216	5322 126 11578	1nF 10% 50V	2614	4822 122 33777	47pF 5% 63V	3015	4822 051 30103	10k 5% 0.062W
2226	4822 126 14305	100nF 10% 16V	2615	4822 122 33777	47pF 5% 63V	3015	4822 051 30332	3k3 5% 0.062W
2227	4822 126 14305	100nF 10% 16V	2616	4822 122 33777	47pF 5% 63V	3016	4822 051 30103	10k 5% 0.062W
2228	4822 126 14305	100nF 10% 16V	2617	4822 122 33777	47pF 5% 63V	3017	4822 051 30103	10k 5% 0.062W
2300	4822 126 14305	100nF 10% 16V	2620	4822 122 33777	47pF 5% 63V	3018	4822 117 12925	47k 1% 0.063W
2301	4822 126 14305	100nF 10% 16V	2621	4822 122 33777	47pF 5% 63V	3019	4822 051 30103	10k 5% 0.062W
2302	4822 126 14305	100nF 10% 16V	2622	4822 122 33777	47pF 5% 63V	3020	4822 051 30339	33Ω 5% 0.062W
2303	4822 124 80349	47µF 20% 6.3V	2623	4822 122 33777	47pF 5% 63V	3021	4822 051 30472	4k7 5% 0.062W
2304	3198 017 42230	0603 50V 22nF COL	2624	4822 122 33777	47pF 5% 63V	3022	4822 051 30472	4k7 5% 0.062W
2305	3198 017 42230	0603 50V 22nF COL	2625	4822 122 33777	47pF 5% 63V	3023	4822 051 30103	10k 5% 0.062W
2306	4822 124 23002	10µF 16V	2626	4822 122 33777	47pF 5% 63V	3024	4822 051 30222	2k2 5% 0.062W
2307	3198 017 42230	0603 50V 22nF COL	2627	4822 122 33777	47pF 5% 63V	3025	4822 051 30103	10k 5% 0.062W
2308	4822 126 14494	22nF 10% 25V	2632	4822 124 12095	100µF 20% 16V	3026	4822 051 30103	10k 5% 0.062W
2309	4822 126 14305	100nF 10% 16V	2633	4822 124 12095	100µF 20% 16V	3027	4822 051 30103	10k 5% 0.062W
2310	4822 126 14305	100nF 10% 16V	2634	4822 126 14305	100nF 10% 16V	3028	4822 051 30103	10k 5% 0.062W
2314	4822 126 14305	100nF 10% 16V	2635	4822 126 14305	100nF 10% 16V	3029	4822 051 30472	4k7 5% 0.062W
2315	4822 126 14305	100nF 10% 16V	2636	4822 126 14305	100nF 10% 16V	3030	4822 051 30103	10k 5% 0.062W
2316	4822 126 14494	22nF 10% 25V	2637	4822 126 14305	100nF 10% 16V	3030	4822 051 30332	3k3 5% 0.062W
2317	4822 126 14494	22nF 10% 25V	2638	4822 126 14305	100nF 10% 16V	3031	4822 051 30103	10k 5% 0.062W
2318	5322 122 33861	120pF 10% 50V	2639	4822 126 14305	100nF 10% 16V	3033	4822 051 30102	1k 5% 0.062W
2319	4822 126 11669	27pF	2646	4822 124 23002	10µF 16V	3100	4822 117 11152	4Ω 7 5%
2320	4822 126 14494	22nF 10% 25V	2647	4822 122 33777	47pF 5% 63V	3102	5322 117 13034	1k5 1% 0.063W
2401	4822 126 14305	100nF 10% 16V	2648	4822 122 33761	22pF 5% 50V	3103	5322 117 13034	1k5 1% 0.063W
2402	4822 126 14305	100nF 10% 16V	2649	4822 126 14305	100nF 10% 16V	3104	5322 117 13062	390Ω 1% 0.063W
2403	4822 126 14305	100nF 10% 16V	2650	4822 126 14305	100nF 10% 16V	3105	4822 051 30103	10k 5% 0.062W
2404	4822 126 14305	100nF 10% 16V	2700	4822 126 14305	100nF 10% 16V	3106	4822 051 30479	47Ω 5% 0.062W
2405	4822 126 14305	100nF 10% 16V	2701	4822 126 14305	100nF 10% 16V	3107	4822 051 20228	2Ω 2 5% 0.1W
2406	4822 126 14305	100nF 10% 16V	2702	4822 126 14305	100nF 10% 16V	3108	4822 051 20228	2Ω 2 5% 0.1W
2407	4822 126 14305	100nF 10% 16V	2703	4822 126 14305	100nF 10% 16V	3109	4822 117 13632	100k 1% 0.62W
2408	4822 126 14305	100nF 10% 16V	2704	4822 126 14305	100nF 10% 16V	3110	4822 051 30479	47Ω 5% 0.062W
2409	4822 126 14305	100nF 10% 16V	2705	4822 126 14305	100nF 10% 16V	3111	5322 117 13058	150Ω 1% 0.063W
2410	4822 126 14305	100nF 10% 16V	2706	4822 126 14305	100nF 10% 16V	3112	5322 117 13021	47Ω 1% 0.063W
2411	4822 126 14305	100nF 10% 16V	2707	4822 124 80349	47µF 20% 6.3V	3114	4822 051 20228	2Ω 2 5% 0.1W
2412	4822 126 14305	100nF 10% 16V	2800	4822 124 23002	10µF 16V	3115	4822 051 20228	2Ω 2 5% 0.1W
2413	4822 126 14305	100nF 10% 16V	2801	4822 124 23002	10µF 16V	3116	5322 117 13042	3k9 1% 0.063W
2414	4822 126 14305	100nF 10% 16V	2802	4822 126 14305	100nF 10% 16V	3117	4822 051 30181	180Ω 5% 0.062W
2418	4822 124 12095	100µF 20% 16V	2803	4822 126 14305	100nF 10% 16V	3118	4822 051 30681	680Ω 5% 0.062W
2419	4822 124 80349	47µF 20% 6.3V	2804	4822 126 14305	100nF 10% 16V	3119	5322 117 13062	390Ω 1% 0.063W
2420	4822 124 80349	47µF 20% 6.3V	2805	4822 126 14305	100nF 10% 16V	3120	4822 051 30102	1k 5% 0.062W
2452	4822 126 14305	100nF 10% 16V	2806	4822 126 14305	100nF 10% 16V	3121	4822 051 30273	27k 5% 0.062W
2454	4822 126 14305	100nF 10% 16V	2807	4822 126 14305	100nF 10% 16V	3122	4822 051 30471	470Ω 5% 0.062W
2455	4822 126 14305	100nF 10% 16V	2808	4822 126 14305	100nF 10% 16V	3123	4822 051 30103	10k 5% 0.062W
2457	4822 124 23002	10µF 16V	2809	4822 126 14305	100nF 10% 16V	3124	4822 051 30471	470Ω 5% 0.062W
2458	4822 126 14305	100nF 10% 16V	2810	4822 126 14305	100nF 10% 16V	3125	4822 051 30103	10k 5% 0.062W
2458	4822 126 14583	470nF 10% 16V XTR	2811	4822 126 14305	100nF 10% 16V	3126	4822 051 30103	10k 5% 0.062W
2459	4822 126 14043	1µF 20% 16V CASE	2812	4822 126 14305	100nF 10% 16V	3127	4822 051 30223	22k 5% 0.062W
2460	4822 126 14583	470nF 10% 16V XTR	2813	4822 126 14305	100nF 10% 16V	3128	2322 704 69109	
2461	4822 126 14583	470nF 10% 16V XTR	2814	4822 126 14305	100nF 10% 16V	3129	4822 051 30392	3k9 5% 0.063W
2500	4822 126 14305	100nF 10% 16V	2815	4822 126 14305	100nF 10% 16V	3130	4822 051 20228	2Ω 2 5% 0.1W
2504	4822 122 31765	100pF 2% 63V	2816	4822 126 14305	100nF 10% 16V	3131	4822 051 20228	2Ω 2 5% 0.1W
2505	4822 126 14494	22nF 10% 25V	2817	4822 126 14305	100nF 10% 16V	3132	4822 051 20228	2Ω 2 5% 0.1W
2506	4822 124 23002	10µF 16V	2818	4822 126 14305	100nF 10% 16V	3133	4822 051 20228	2Ω 2 5% 0.1W
2507	4822 126 14305	100nF 10% 16V	2819	4822 126 14305	100nF 10% 16V	3134	5322 117 13047	330Ω 1% 0.063W
2508	5322 126 11579	3.3nF 10% 63V	2820	4822 126 14305	100nF 10% 16V	3135	4822 117 13613	2Ω 2 5%
2509	4822 126 14241	0603 50V 330P COL R	2821	4822 126 14305	100nF 10% 16V	3137	4822 117 13613	2Ω 2 5%
2510	4822 126 14305	100nF 10% 16V	2822	4822 126 14305	100nF 10% 16V	3138	5322 117 13053	6k8 1% 0.063W
2511	4822 126 14305	100nF 10% 16V	2823	4822 124 23002	10µF 16V	3139	4822 117 12917	1Ω 5% 0.062W
2512	4822 126 14305	100nF 10% 16V	2824	4822 126 14305	100nF 10% 16V	3140	4822 051 30479	47Ω 5% 0.062W
2513	4822 126 14305	100nF 10% 16V	2825	4822 124 23002	10µF 16V	3141	4822 117 11152	4Ω 7 5%
2514	4822 126 14305	100nF 10% 16V	2826	4822 126 14305	100nF 10% 16V	3142	5322 117 13028	12k 1% 0.063W
2515	4822 126 14305	100nF 10% 16V	2827	5322 126 11583	10nF 10% 50V	3143	5322 117 13043	220Ω 1% 0.063W
2516	4822 126 14305	100nF 10% 16V	2828	4822 126 14225	56pF 5% 50V	3144	2322 704 69109	
2517	4822 126 14305	100nF 10% 16V	2829	4822 126 14305	100nF 10% 16V	3146	4822 051 30103	10k 5% 0.062W
2518	4822 126 14305	100nF 10% 16V	2830	4822 126 14305	100nF 10% 16V	3147	4822 051 30103	10k 5% 0.062W
2519	4822 126 14305	100nF 10% 16V	2831	4822 126 14305	100nF 10% 16V	3148	5322 117 13022	22k 1% 0.063W
2520	4822 126 14305	100nF 10% 16V	2832	4822 126 14238	0603 50V 2N2 COL R	3153	4822 117 12139	2Ω 2 5% 0.062W
2521	4822 126 14305	100nF 10% 16V	2833	5322 126 11583	10nF 10% 50V	3155	4822 051 30103	10k 5% 0.062W
2522	4822 126 14305	100nF 10% 16V	2834	4822 126 14305	100nF 10% 16V	3157	4822 051 30103	10k 5% 0.062W
2523	4822 126 14305	100nF 10% 16V	2901	4822 126 14305	100nF 10% 16V	3158	5322 117 13017	100Ω 1% 0.063W
2524	4822 126 14305	100nF 10% 16V	2901	5322 126 11583	10nF 10% 50V	3160	4822 051 30101	100Ω 5% 0.062W
2525	4822 126 14305	100nF 10% 16V	2902	4822 126 14305	100nF 10% 16V	3161	4822 117 13613	2Ω 2 5%
2526	4822 126 14305	100nF 10% 16V	2903	4822 126 14305	100nF 10% 16V	3162	4822 051 30101	100Ω 5% 0.062W
2528	4822 126 14305	100nF 10% 16V	2905	4822 126 14305	100nF 10% 16V	3163	4822 051 30273	27k 5% 0.062W
2529	4822 126 14305	100nF 10% 16V	2906	4822 122 33761	22pF 5% 50V	3164	4822 117 13613	2Ω 2 5%
2530	3198 030 74780	EL SM 35V 4U7 PM20 COL R	2907	4822 122 33761	22pF 5% 50V	3165	5322 117 13063	120Ω 1% 0.063W
2531	3198 030 74780	EL SM 35V 4U7 PM20 COL R				3166	4822 051 30393	39k 5% 0.062W
2532	4822 122 33777	47pF 5% 63V				3167	4822 051 30101	100Ω 5% 0.062W
2533	4822 122 33777	47pF 5% 63V				3168	5322 117 13047	330Ω 1% 0.063W
2534	5322 126 11578	1nF 10% 50V				3169	4822 051 30101	100Ω 5% 0.062W
2535	5322 126 11578	1nF 10% 50V				3170	4822 051 30101	100Ω 5% 0.062W
2600	4822 126 14494	22nF 10% 25V				3171	4822 051 30101	100Ω 5% 0.062W
2601	4822 126 14247	0603 50V 1N5 COL R				3172	4822 117 13632	100k 1% 0.62W
2602	4822 126 14247	0603 50V 1N5 COL R				3173	4822 117 13632	100k 1% 0.62W
2603	4822 126 14305	100nF 10% 16V				3174	4822 117 11152	4Ω 7 5%
2604	4822 124 12095	100µF 20% 16V				3175	4822 117 13613	2Ω 2 5%
2605	4822 126 14494	22nF 10% 25V				3176	4822 051 30153	15k 5% 0.062W
2606	4822 124 12095	100µF 20% 16V				3178	4822 117 11151	1Ω 5%
2607	4822 124 12095	100µF 20% 16V				3179	4822 051 30221	220Ω 5% 0.062W
2608	4822 124 23002	10µF 16V				3180	4822 117 13632	100k 1% 0.62W

3185	4822 117 11151	1Ω 5%	3334	4822 051 30101	100Ω 5% 0.062W	3648	2322 704 64301	RST SM 430Ω PM1 R
3187	4822 051 30273	27k 5% 0.062W	3335	4822 051 30101	100Ω 5% 0.062W	3651	2322 704 64301	RST SM 430Ω PM1 R
3189	4822 051 30008	0Ω jumper	3336	4822 051 30339	33Ω 5% 0.062W	3654	2322 704 64301	RST SM 430Ω PM1 R
3190	4822 051 30008	0Ω jumper	3337	4822 051 30339	33Ω 5% 0.062W	3655	2322 704 64301	RST SM 430Ω PM1 R
3191	4822 051 30008	0Ω jumper	3338	4822 051 30101	100Ω 5% 0.062W	3656	2322 704 64301	RST SM 430Ω PM1 R
3192	4822 051 30008	0Ω jumper	3339	4822 051 30008	0Ω jumper	3657	2322 704 64301	RST SM 430Ω PM1 R
3193	4822 051 30008	0Ω jumper	3340	4822 051 30008	0Ω jumper	3658	4822 051 30102	1k 5% 0.062W
3194	4822 051 30008	0Ω jumper	3403	4822 051 30103	10k 5% 0.062W	3659	4822 051 30102	1k 5% 0.062W
3195	4822 051 30008	0Ω jumper	3404	4822 051 30103	10k 5% 0.062W	3660	4822 051 30102	1k 5% 0.062W
3197	4822 051 30008	0Ω jumper	3450	4822 051 30103	10k 5% 0.062W	3661	2322 704 64301	RST SM 430Ω PM1 R
3198	5322 117 13049	470Ω 1% 0.063W	3451	4822 117 13632	100k 1% 0.62W	3662	4822 051 30102	1k 5% 0.062W
3199	5322 117 13042	3k9 1% 0.063W	3452	4822 051 30223	22k 5% 0.062W	3663	4822 051 30102	1k 5% 0.062W
3200	4822 051 30103	10k 5% 0.062W	3453	4822 051 30222	2k2 5% 0.062W	3664	2322 704 64301	RST SM 430Ω PM1 R
3201	4822 117 11151	1Ω 5%	3454	4822 051 30223	22k 5% 0.062W	3665	4822 117 12139	22Ω 5% 0.062W
3202	4822 117 11151	1Ω 5%	3455	4822 051 30223	22k 5% 0.062W	3667	4822 051 30339	33Ω 5% 0.062W
3203	4822 051 30105	1M 5% 0.062W	3455	4822 117 13632	100k 1% 0.62W	3672	4822 051 30479	4k7 5% 0.062W
3204	4822 051 30331	330Ω 5% 0.062W	3456	4822 051 30103	10k 5% 0.062W	3686	4822 051 30223	22k 5% 0.062W
3205	4822 051 30103	10k 5% 0.062W	3457	4822 051 30103	10k 5% 0.062W	3687	4822 051 30223	22k 5% 0.062W
3206	4822 051 30103	10k 5% 0.062W	3458	4822 051 30223	22k 5% 0.062W	3688	4822 051 30472	4k7 5% 0.062W
3207	4822 051 30472	4k7 5% 0.062W	3459	4822 051 30223	22k 5% 0.062W	3689	4822 051 30223	22k 5% 0.062W
3208	4822 051 30272	2k7 5% 0.062W	3460	4822 051 30472	4k7 5% 0.062W	3691	4822 051 30339	33Ω 5% 0.062W
3209	4822 051 30472	4k7 5% 0.062W	3462	4822 051 30101	100Ω 5% 0.062W	3702	4822 051 30102	1k 5% 0.062W
3210	4822 051 30392	3k9 5% 0.063W	3500	4822 051 30332	3k3 5% 0.062W	3800	4822 051 30479	47Ω 5% 0.062W
3211	4822 051 30472	4k7 5% 0.062W	3501	4822 051 30332	3k3 5% 0.062W	3801	4822 051 30339	33Ω 5% 0.062W
3212	4822 117 11152	4Ω7 5%	3502	4822 051 30103	10k 5% 0.062W	3802	4822 051 30331	330Ω 5% 0.062W
3213	4822 117 11152	4Ω7 5%	3503	4822 051 30103	10k 5% 0.062W	3805	4822 051 30479	47Ω 5% 0.062W
3214	4822 051 30392	3k9 5% 0.063W	3504	4822 051 30103	10k 5% 0.062W	3806	4822 051 30153	15k 5% 0.062W
3215	4822 051 30103	10k 5% 0.062W	3505	4822 051 30103	10k 5% 0.062W	3807	4822 051 30682	6k8 5% 0.062W
3216	4822 051 30472	4k7 5% 0.062W	3506	4822 051 30103	10k 5% 0.062W	3808	4822 051 30332	3k3 5% 0.062W
3219	4822 051 30103	10k 5% 0.062W	3508	4822 051 30689	68Ω 5% 0.063W	3809	4822 051 30332	3k3 5% 0.062W
3220	4822 051 30103	10k 5% 0.062W	3509	4822 051 30103	10k 5% 0.062W	3810	4822 051 30332	3k3 5% 0.062W
3221	4822 051 30103	10k 5% 0.062W	3511	4822 051 30332	3k3 5% 0.062W	3811	4822 051 30332	3k3 5% 0.062W
3224	4822 051 30151	150Ω 5% 0.062W	3512	4822 051 30332	3k3 5% 0.062W	3812	5322 117 13042	3k9 1% 0.063W
3225	2322 704 62004		3513	4822 051 30103	10k 5% 0.062W	3813	5322 117 13042	3k9 1% 0.063W
3226	4822 051 30103	10k 5% 0.062W	3514	4822 051 30103	10k 5% 0.062W	3814	4822 051 30181	180Ω 5% 0.062W
3227	4822 051 30472	4k7 5% 0.062W	3515	4822 051 30103	10k 5% 0.062W	3814	4822 051 30339	33Ω 5% 0.062W
3229	4822 051 30123	12k 5% 0.062W	3516	4822 051 30103	10k 5% 0.062W	3815	4822 051 30561	560Ω 5% 0.062W
3230	4822 051 30103	10k 5% 0.062W	3517	4822 051 30332	3k3 5% 0.062W	3816	4822 051 30101	100Ω 5% 0.062W
3231	4822 051 30103	10k 5% 0.062W	3519	4822 051 30103	10k 5% 0.062W	3900	4822 051 30103	10k 5% 0.062W
3232	4822 117 13613	2Ω2 5%	3520	4822 051 30103	10k 5% 0.062W	3901	4822 051 30103	10k 5% 0.062W
3233	4822 051 30102	1k 5% 0.062W	3521	4822 051 30103	10k 5% 0.062W	3902	4822 051 30339	33Ω 5% 0.062W
3234	4822 117 12902	8k2 1% 0.063W	3522	4822 051 30103	10k 5% 0.062W	3903	4822 051 30339	33Ω 5% 0.062W
3235	4822 117 13632	100k 1% 0.62W	3523	4822 051 30332	3k3 5% 0.062W	3904	4822 051 30331	330Ω 5% 0.062W
3236	4822 051 30472	4k7 5% 0.062W	3524	4822 051 30101	100Ω 5% 0.062W	3904	4822 051 30339	33Ω 5% 0.062W
3237	4822 051 30103	10k 5% 0.062W	3525	4822 051 30103	10k 5% 0.062W	3905	4822 051 30221	220Ω 5% 0.062W
3238	4822 051 30103	10k 5% 0.062W	3526	4822 051 30103	10k 5% 0.062W	3906	4822 051 30339	33Ω 5% 0.062W
3239	4822 051 30008	0Ω jumper	3534	4822 051 30103	10k 5% 0.062W	3907	2322 704 65609	RST SM 56Ω PM1 R
3240	4822 051 30103	10k 5% 0.062W	3535	4822 051 30153	15k 5% 0.062W	3907	4822 051 30339	33Ω 5% 0.062W
3242	4822 051 30008	0Ω jumper	3537	4822 051 30331	330Ω 5% 0.062W	3908	4822 051 30339	33Ω 5% 0.062W
3243	4822 051 30008	0Ω jumper	3538	4822 051 30681	680Ω 5% 0.062W	3908	4822 051 30479	47Ω 5% 0.062W
3246	4822 051 30008	0Ω jumper	3541	4822 051 30479	47Ω 5% 0.062W	3909	4822 051 30332	3k3 5% 0.062W
3247	4822 051 30008	0Ω jumper	3542	4822 051 30479	47Ω 5% 0.062W	3910	2322 704 65609	RST SM 56Ω PM1 R
3249	4822 051 30008	0Ω jumper	3545	4822 051 30221	220Ω 5% 0.062W			
3250	4822 051 30008	0Ω jumper	3546	4822 051 30101	100Ω 5% 0.062W			
3251	4822 051 30008	0Ω jumper	3548	4822 051 30008	0Ω jumper			
3252	4822 051 30008	0Ω jumper	3550	4822 051 30101	100Ω 5% 0.062W	5000	4822 157 11717	BLM31P500SPT
3253	4822 051 30008	0Ω jumper	3551	4822 051 30101	100Ω 5% 0.062W	5200	4822 157 11717	BLM31P500SPT
3254	4822 051 30008	0Ω jumper	3564	4822 051 30008	0Ω jumper	5300	4822 157 11717	BLM31P500SPT
3255	4822 051 30008	0Ω jumper	3570	4822 051 30101	100Ω 5% 0.062W	5301	4822 157 11717	BLM31P500SPT
3256	4822 051 30008	0Ω jumper	3571	4822 051 30689	68Ω 5% 0.063W	5402	4822 157 11717	BLM31P500SPT
3257	4822 051 30008	0Ω jumper	3572	4822 051 30689	68Ω 5% 0.063W	5403	4822 157 11499	BLM11P600SPT
3258	4822 051 30008	0Ω jumper	3605	4822 051 30008	0Ω jumper	5450	4822 157 11717	BLM31P500SPT
3259	4822 117 11151	1Ω 5%	3606	4822 117 12925	47k 1% 0.063W	5501	4822 157 70299	2.2μH (NL322522T-2R2J)
3260	4822 117 11151	1Ω 5%	3607	4822 117 13632	100k 1% 0.62W	5502	4822 157 70299	2.2μH (NL322522T-2R2J)
3300	4822 117 11152	4Ω7 5%	3608	4822 117 13632	100k 1% 0.62W	5503	4822 157 71206	BLM21A601SPT
3301	4822 051 30105	1M 5% 0.062W	3609	4822 117 13632	100k 1% 0.62W	5504	4822 157 71206	BLM21A601SPT
3302	4822 051 30221	220Ω 5% 0.062W	3610	4822 051 30103	10k 5% 0.062W	5600	4822 157 71206	BLM21A601SPT
3303	4822 051 30101	100Ω 5% 0.062W	3611	4822 051 30103	10k 5% 0.062W	5601	4822 157 11499	BLM11P600SPT
3304	4822 051 30272	2k7 5% 0.062W	3612	4822 051 30103	10k 5% 0.062W	5602	4822 157 10547	15μH 5%
3305	4822 051 30272	2k7 5% 0.062W	3613	4822 051 30103	10k 5% 0.062W	5604	4822 157 10547	15μH 5%
3306	4822 051 30101	100Ω 5% 0.062W	3614	4822 051 30103	10k 5% 0.062W	5605	4822 157 10547	15μH 5%
3309	4822 051 30103	10k 5% 0.062W	3615	4822 051 30103	10k 5% 0.062W	5606	4822 157 10547	15μH 5%
3310	4822 051 30223	22k 5% 0.062W	3616	4822 051 30103	10k 5% 0.062W	5607	4822 157 10547	15μH 5%
3311	4822 051 30223	22k 5% 0.062W	3618	4822 051 30223	22k 5% 0.062W	5608	4822 157 10547	15μH 5%
3312	4822 051 30472	4k7 5% 0.062W	3619	4822 051 30223	22k 5% 0.062W	5609	4822 157 11717	BLM31P500SPT
3313	4822 051 30472	4k7 5% 0.062W	3620	4822 051 30101	100Ω 5% 0.062W	5610	4822 157 11717	BLM31P500SPT
3316	4822 051 20108	1Ω 5% 0.1W	3621	4822 051 30101	100Ω 5% 0.062W	5611	4822 157 11717	BLM31P500SPT
3317	4822 051 20108	1Ω 5% 0.1W	3622	4822 051 30101	100Ω 5% 0.062W	5700	4822 157 11717	BLM31P500SPT
3318	4822 051 30472	4k7 5% 0.062W	3623	4822 051 30339	33Ω 5% 0.062W	5800	4822 157 11717	BLM31P500SPT
3319	4822 051 30479	47Ω 5% 0.062W	3624	4822 051 30339	33Ω 5% 0.062W	5801	4822 157 11717	BLM31P500SPT
3320	4822 051 30472	4k7 5% 0.062W	3625	4822 051 30339	33Ω 5% 0.062W	5802	4822 157 11717	BLM31P500SPT
3321	4822 051 30682	6k8 5% 0.062W	3626	4822 051 30102	1k 5% 0.062W	5900	4822 157 11717	BLM31P500SPT
3322	5322 117 13026	4k7 1% 0.063W	3627	4822 051 30471	470Ω 5% 0.062W	5901	4822 157 11717	BLM31P500SPT
3323	5322 117 13026	4k7 1% 0.063W	3628	4822 051 30471	470Ω 5% 0.062W	5902	4822 157 11717	BLM31P500SPT
3324	4822 117 13632	100k 1% 0.62W	3629	4822 051 30472	4k7 5% 0.062W	5903	4822 157 11717	BLM31P500SPT
3325	4822 051 30682	6k8 5% 0.062W	3630	4822 051 30221	220Ω 5% 0.062W			
3326	4822 051 30479	47Ω 5% 0.062W	3631	2322 704 64301	RST SM 430Ω PM1 R			
3327	4822 051 30682	6k8 5% 0.062W	3632	2322 704 64301	RST SM 430Ω PM1 R			
3328	4822 051 30223	22k 5% 0.062W	3633	2322 704 64301	RST SM 430Ω PM1 R			
3329	4822 051 30223	22k 5% 0.062W	3635	4822 051 30682	6k8 5% 0.062W	6200	4822 130 11397	BAS316
3330	4822 051 30223	22k 5% 0.062W	3636	4822 051 30682	6			

6600 4822 130 11528 1PS76SB10



7000	9337 144 60118	IC SM 74HCT4066D (PHSE) R
7001	4822 130 60373	BC856B
7002	5322 130 60159	BC846B
7003	5322 130 60159	BC846B
7004	5322 130 60159	BC846B
7005	5322 130 60159	BC846B
7006	5322 130 60159	BC846B
7007	5322 130 60159	BC846B
7100	5322 130 42718	BFS20
7101	5322 130 42718	BFS20
7102	9352 637 37518	TZA1033HL
7103	4822 209 17229	BA5938FM
7104	4822 209 30095	LM833D
7105	4822 209 32073	MC34072D
7106	5322 130 42718	BFS20
7107	4822 209 33411	MC78L05ACD
7108	5322 130 60845	BC807-25
7109	4822 209 15083	AN78M09
7109	9322 136 29668	L78M09CDT
7110	5322 130 60803	BST72A
7111	5322 130 60159	BC846B
7112	5322 130 60159	BC846B
7113	5322 130 60159	BC846B
7114	5322 130 60159	BC846B
7115	4822 130 60373	BC856B
7116	5322 130 60159	BC846B
7117	4822 130 42804	BC817-25
7201	9351 869 80118	74HCT573DB
7202	3104 123 85860	AM29F002T/5.1.14
7203	4822 130 60373	BC856B
7204	9322 139 67685	IC SM MC33464N-45A (MOTA) R
7207	9352 636 60557	SAA7399HL/M2A
7304	4822 209 16877	BA6856FP
7304	9322 139 85668	BA6665FM
7310	4822 209 15899	CY7C199-15C
7311	9352 637 83557	IC SM SAA7335HL/E/M2 (PHSE) Y
7312	4822 130 60373	BC856B
7315	5322 130 60159	BC846B
7400	9352 499 60118	IC SM 74LVC00AD (PHSE) R
7401	3104 123 86520	AM29LV160DT-90EC/V0.78
7402	4822 209 16318	MC33464N-30A
7404	9322 144 59668	IC SM MT48LC1M16A1TG-7S (MRN)R
7405	9322 144 59668	IC SM MT48LC1M16A1TG-7S (MRN)R
7451	3104 123 86520	AM29LV160DT-90EC/V0.78
7452	5322 130 60159	BC846B
7453	5322 130 60159	BC846B
7454	5322 130 60159	BC846B
7455	4822 130 60373	BC856B
7503	9322 151 16671	STI5505AVC
7505	4822 209 17377	M24C32-WMN6/PROG
7505	8204 056 05580	M24C32-WMN6TNKSA
7600	5322 209 71568	PC74HCT14T
7604	5322 130 60159	BC846B
7605	4822 209 17398	LD1117DT33
7607	5322 130 60159	BC846B
7608	4822 130 60373	BC856B
7609	4822 130 60373	BC856B
7610	5322 130 60159	BC846B
7611	9352 456 80115	
7612	5322 130 60159	BC846B
7613	5322 130 60159	BC846B
7614	5322 130 60159	BC846B
7615	5322 130 60159	BC846B
7617	5322 130 60159	BC846B
7618	5322 130 60159	BC846B
7620	4822 130 60373	BC856B
7621	4822 130 42804	BC817-25
7622	4822 209 17398	LD1117DT33
7700	9322 144 96668	IC SM MT48LC4M16A2TG-8E (MRN)R
7800	9352 680 19557	SAA7331HL/M1
7801	5322 130 42718	BFS20
7802	9352 611 78118	74HC1GU04GW
7900	4822 209 90752	74HCT04D
7902	9322 153 36668	IC SM ICS302M-3 (ICSI) R
7903	9322 151 72668	IC SM ICS601M-01T (MICL) R
7905	9322 151 71668	IC SM MK2703STR (MICL) R