DVD-Video Player

SACD 1000

/001 /171 /691

Service
Service
Service

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151200

ServiceManual

CLASS 1
LASER PRODUCT

SUPER AUDIO CD

DVD VIDEO

COMPACT disc DIGITAL VIDEO

COMPACT disc DIGITAL AUDIO

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PHILIPS

1. Technical specifications & connection facilities

1.1 General:

Mains voltage	:	120V (98 - 132V AC) for USA
	:	230V (198 -264V AC) for Europe/Asia
	:	by means of voltage selector
Mains frequency	:	50 Hz - 60Hz
Power consumption mains	:	< 36 W
Power consumption standby	:	< 3 W (remote operatable)
Power off	:	< 0.8W

1.2 Audio performance

1.2.1 Line output audio/video

Output voltage 2 channel mode	:	2Vrms ± 1.5dB
Output voltage 5.1 channel Dolby	:	1.41Vrms ± 1.5dB
Channel unbalance (1kHz)	:	<0.85dB
Crosstalk 1kHz	:	>105dB
Crosstalk 20Hz-20kHz	:	> 95dB
Frequency response 20Hz- 20kHz	:	± 0.1dB max
Signal to noise ratio	:	>100 dB
Dynamic range 1kHz	:	>90dB
Dynamic range 20Hz-20kHz	:	>88dB
Distortion and noise 1kHz	:	>90dB
Distortion and noise20Hz-20kHz	:	>80dB
Intermodulation distortion	:	>87dB
Phase non linearity	:	± 1° max.
Level non linearity	:	± 0.5dB max.
Mute (spin-up, pause, access)	:	>100dB
Outband attenuation:	:	> 50dB above 25kHz

1.2.2 Line output 6 channel

DSD mode stereo +5.1 multi channel (SACD)

Output voltage (1 KHz)	:	2Vrms +/- 0.3V
Channel unbalance	:	<0.5dB
Cut off frequency normal mode (-3dB)	:	40KHz +/- 5KHz
Cut off frequency custom mode (-3dB)	:	50KHz +/- 5KHz
Amplitude linearity (20Hz - 20KHz)	:	+0.1/-1dB max normal mode
	:	+0.1/-0.6 dB max custom mode
Phase linearity (20Hz - 20KHz)	:	tbd
SNR dig. silence; normal mode 20KHz	:	-111 dB (Typical)
	:	>108dB
SNR dig. silence; normal mode A weighted	:	-114 dB (Typical)
	:	>111dB
SNR 1KHz, -160dB normal mode 500KHz	:	-50dB (Typical)
	:	>40dB
SNR 1KHz, -160dB custom mode 500KHz	:	>40dB (Typical)
	:	>30dB
THD 0dB 1KHz	:	98dB (Typical custom mode)
	:	95 dB (Typical normal mode)
THD 0dB 20Hz-20KHz	:	>96dB (custom mode)
	:	>90 dB (normal mode)
Dynamic range -60dB	:	114dB (Typical)
	:	>108 dB
Intermodulation distorsion CCIF	:	108dB (Typical)
	:	>102dB
Low level linearity (-60 to -90 dB)	:	<0.5dB
Interchannel phase	:	<1°
Crosstalk (20Hz-20KHz)	:	100dB (Typical)
	:	>90dB

PCM mode up to 6 channels (DVD/ CDDA):

Output voltage (1 KHz)	:	2Vrms +/- 0.3V
Channel unbalance	:	<0.5dB
Amplitude linearity (20Hz - 20KHz)	:	+0.1/-0.6 dB max
Phase linearity (20Hz - 20KHz)	:	tbd
SNR dig. silence; normal mode 20KHz	:	>108dB
SNR dig. silence; normal mode A weighted	:	>111dB
THD 0dB (1KHz)	:	95 dB typical
THD 0dB (20Hz-20KHz)	:	>90dB
Dynamic range -60dB	:	>108dB
Intermodulation distorsion CCIF	:	105dB (Typical)
	:	>100dB
Low level linearity (-60 to -90 dB)	:	<0.5 dB
Interchannel phase	:	<1°
Crosstalk (20Hz-20KHz)	:	100dB (Typical)
	:	>90dB

1.3 Video performance

1.3.1 CVBS

CVBS output loaded with 75 Ohm
Fully according PQR3 IMS

1.3.2 S-video (Y/C)

Fully according PQR3 IMS
Connector pinning

1 - GND		⏚
2 - GND		⏚
3 - Y	1Vpp ± 0.1V into 75 Ohm	
4 - C	burst 300mVpp +1/-4dB into 75 Ohm	

Aspect ratio switching by DC on C(pin4).
Connector type : 4 pin mini- DIN

1.4 SCART

Fully according PQR3 IMS
Connector implementation according EN50049-1; color = black; dual SCART
Fully according to prEN1057-2-1
Signal switching is P50 controlled; supported features of mode 3 see survey of applicable standards.

1.4.1 SCART II (connected to TV)

Pin signals:

1 - Audio R	1.8V RMS	⊖→
2 - Audio R		←⊖
3 - Audio L	1.8V RMS	⊖→
4 - Audio GND		⏚
5 - Blue/Chroma GND		⏚
6 - Audio L		←⊖
7 - Blue out/ Chroma in	0.7Vpp ± 0.1V into 75 Ohm (*)	→▭

8 - Function switch	<2V = TV >4.5V / <7V = asp. ratio 16:9 DVD >9.5V / <12V = asp. ratio 4:3 DVD	
9 - Green GND		
10- P50 control		
11- Green	0.7Vpp ± 0.1V into 75 Ohm (*)	
12- Nc		
13- Red/Chroma GND		
14- fast switch GND		
15- Red out/ Chroma out	0.7Vpp ± 0.1V into 75 Ohm (*) ± 3dB 0.3Vpp Chroma (burst)	
16- fast switch RGB/ CVBS	or Y <0.4V into 75 Ohm = CVBS >1V / <3V into 75 Ohm = RGB	
17- Y/CVBS GND		
18- fast switching GND		
19- CVBS/Y/RGB sync	1Vpp ± 0.1V into 75 Ohm (*)	
20- CVBS/Y		
21- Shield		

1.4.2 SCART I (connected to AUX)

Pin signals:		
1 - Audio R	1.8V RMS	
2 - Audio R		
3 - Audio L	1.8V RMS	
4 - Audio GND		
5 - Blue/Chroma GND		
6 - Audio L		
7 - Blue in/ Chroma out	± 3dB 0.3Vpp Chroma (burst)	
8 - Function switch		
9 - Green GND		
10- P50 control		
11- Green		
12- Nc		
13- Red/Chroma GND		
14- fast switch GND		
15- Red in/ Chroma in		
16- fast switch RGB/ CVBS or Y		
17- CVBS GND		
18- fast switching GND		
19- CVBS/Y/RGB sync	1Vpp ± 0.1V into 75 Ohm (*)	
20- CVBS/Y		
21- Shield		

(*) for 100% white

1.5 Digital output

1.5.1 Coaxial

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

Remark: DTS audio output mode is only available on 'digital out'

1.5.2 Optical

identical to coaxial

1.6 P50 SYSTEM CONTROL

Via SCART pin nr 10

1.7 Dimensions and weight

Place and height of feet	:	acc. to Philips Harmonisation line
Apparatus tray closed	:	WxDxH : 435 x 330 x 110
Apparatus tray open	:	WxDxH : 435 x 470 x 110
Weight without packaging	:	ca. 9.5 Kg
Weight in packaging	:	ca. 13 Kg

1.8 Laser output power & wavelength

1.8.1 SACD/DVD

Output power	:	7mW
Wavelength	:	650nm

1.8.2 CD

Output power	:	10mW
Wavelength	:	785nm

2. Warnings, laser safety and service hints

2.1 Warning and laser safety

(GB) **WARNING**

All ICs and many other semi-conductors are susceptible to electrostatic discharges (ESD).
Careless handling during repair can reduce life drastically.
When repairing, make sure that you are connected with the same potential as the mass of the set via a wrist wrap with resistance.
Keep components and tools also at this potential.

(NL) **WAARSCHUWING**

Alle IC's en vele andere halfgeleiders zijn gevoelig voor elektrostatische ontladingen (ESD).
Onzorgvuldig behandelen tijdens reparatie kan de levensduur drastisch doen verminderen.
Zorg ervoor dat u tijdens reparatie via een polsband met weerstand verbonden bent met hetzelfde potentiaal als de massa van het apparaat.
Houd componenten en hulpmiddelen ook op ditzelfde potentiaal.

(F) **ATTENTION**

Tous les IC et beaucoup d'autres semi-conducteurs sont sensibles aux décharges statiques (ESD).
Leur longévité pourrait être considérablement écourtée par le fait qu'aucune précaution n'est prise a leur manipulation.
Lors de réparations, s'assurer de bien être relié au même potentiel que la masse de l'appareil et enfiler le bracelet serti d'une résistance de sécurité.
Veiller a ce que les composants ainsi que les outils que l'on utilise soient également a ce potentiel.

(D) **WARNUNG**

Alle IC und viele andere Halbleiter sind empfindlich gegen elektrostatische Entladungen (ESD).
Unsorgfältige Behandlung bei der Reparatur kann die Lebensdauer drastisch vermindern.
Sorgen sie dafür, das Sie im Reparaturfall über ein Pulsarmband mit Widerstand mit dem Massepotential des Gerätes verbunden sind.
Halten Sie Bauteile und Hilfsmittel ebenfalls auf diesem Potential.

(I) **AVVERTIMENTO**

Tutti IC e parecchi semi-conduttori sono sensibili alle scariche statiche (ESD).
La loro longevita potrebbe essere fortemente ridatta in caso di non osservazione della piu grande cauzione alla loro manipolazione.
Durante le riparazioni occorre quindi essere collegato allo stesso potenziale che quello della massa dell'apparecchio tramite un braccialetto a resistenza.
Assicurarsi che i componenti e anche gli utensili con quali si lavora siano anche a questo potenziale.

(GB)

Safety regulations require that the set be restored to its original condition and that parts which are identical with those specified be used.

(NL)

Veiligheidsbepalingen vereisen, dat het apparaat in zijn oorspronkelijke toestand wordt terug gebracht en dat onderdelen, identiek aan de gespecifieerde worden toegepast.

(D)

Bei jeder Reparatur sind die geltenden Sicherheitsvorschriften zu beachten.
Der Originalzustand des Gerats darf nicht verandert werden.
Fur Reparaturen sind Original-Ersatzteile zu verwenden.

(I)

Le norme di sicurezza esigono che l'apparecchio venga rimesso nelle condizioni originali e che siano utilizzati pezzi di ricambiago idetici a quelli specificati.

(F)

Les normes de sécurité exigent que l'appareil soit remis a l'état d'origine et que soient utilisées les pièces de rechange identiques à celles spécifiées.

SHOCK, FIRE HAZARD SERVICE TEST:

CAUTION: After servicing this appliance and prior to returning to customer, measure the resistance between either primary AC cord connector pins (with unit NOT connected to AC mains and its Power switch ON), and the face or Front Panel of product and controls and chassis bottom,
Any resistance measurement less than 1 Megohms should cause unit to be repaired or corrected before AC power is applied, and verified before return to user/customer.
Ref.UL Standard NO.1492.

NOTE ON SAFETY:

Symbol ⚠ : Fire or electrical shock hazard. Only original parts should be used to replace any part with symbol ⚠
Any other component substitution(other than original type), may increase risk or fire or electrical shock hazard.

"Pour votre sécurité, ces documents doivent être utilisés par des spécialistes agrées, seuls habilités à réparer votre appareil en panne."

LASER SAFETY

This unit employs a laser. Only a qualified service person should remove the cover or attempt to service this device, due to possible eye injury.

LASER DEVICE UNIT

Type:	SemiconductorlaserGaAlAs
Wave length:	650 nm (DVD)
	780 nm (VCD/CD)
Output Power:	7 mW (DVD)
	10 mW (VCD/CD)
Beam divergence:	60 degree

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

WARNING

The use of optical instruments with this product will increase eye hazard.
Repair handling should take place as much as possible with a disc loaded inside the player

WARNING LOCATION: INSIDE ON LASER COVERSHIELD

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

Warning for powersupply on position 1005

The primary side of the powersupply including the heatsink carries live mains voltage when the player is connected to the mains even when the player is swiched off !
This primary area is not shielded so it is possible to touch copper tracks and/or components when servicing the player. Service personnel have to take precautions to prevent touching this area or components in this area .
The primary side of the powersupply has been indicated with a lightning stroke and a stripe-marked printed on the printed wiring board

Note:
The screws on the mechanism of the ASD1 module (position 81 in on the exploded view drawing) may never be touched removed or re-adjusted.
Handle the ASD1 module with care when the unit has to be exchanged!
The mechanism of the ASD1 module is very sensative for dropping or shocks.

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2.2 Service hints

2.2.1 Switched Mode Power Supply 1004

This power supply unit is not repairable and must be exchanged completely in case of failure. A new power supply can be ordered with codenumber 3104 129 22150.

2.2.2 SACD module

This module can be repaired as follows:

1. The loader and DVD-M(echanism) is one assembly (VAL6011) item 81. 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 61101 (for Europe and Asia Pacific) and 9305 023 61102 (for USA).
2. The mono board has to be repaired down to component level. Repair handling of the monoboard requires a workshop with sophisticated desoldering tools.

2.2.3 Service positions

SACD module

See also dismantling instructions.
After demounting the DAC PCB 1005 and the dust bracket 241, it is possible to connect the PC connection and to demount the SACD module to service the MONO PCB. After remounting the DAC PCB, the SACD module can be placed on top of the DAC PCB, protected by an insulation plate.

MONO PCB

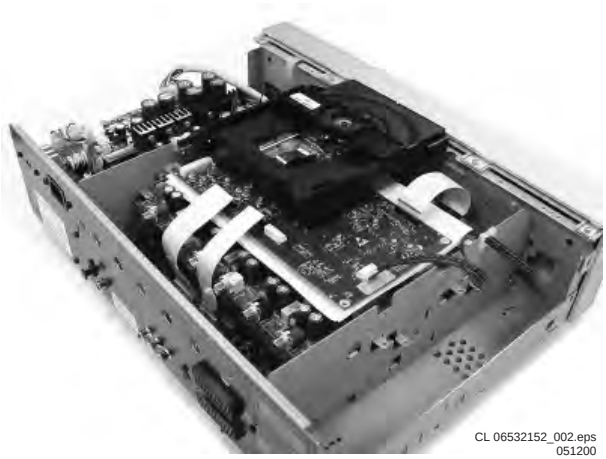

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Figure 2-1

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Figure 2-2

DAC PCB

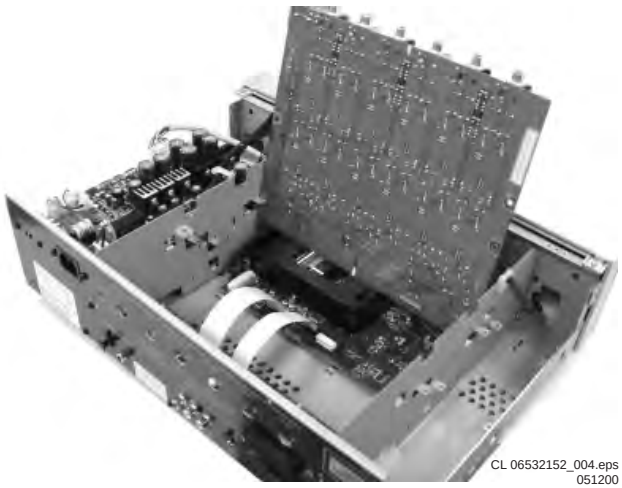

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Figure 2-3

AV PCB

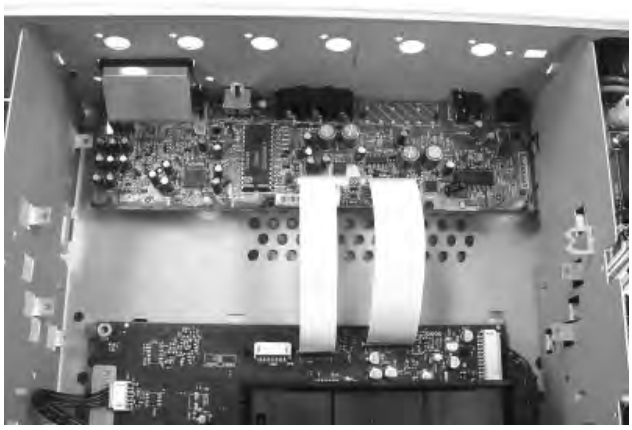

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Figure 2-4

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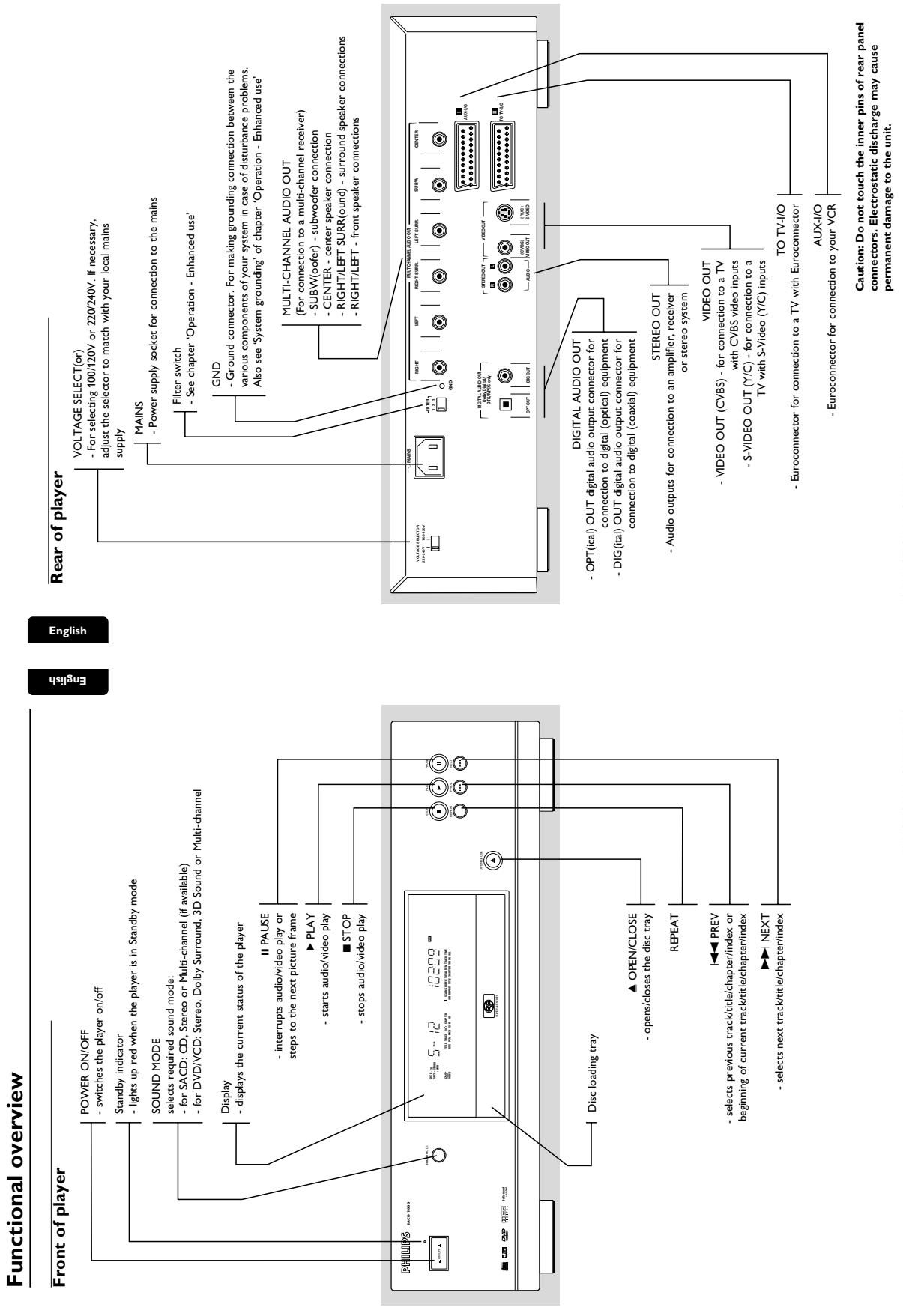
Figure 2-5

3. Directions for use



English

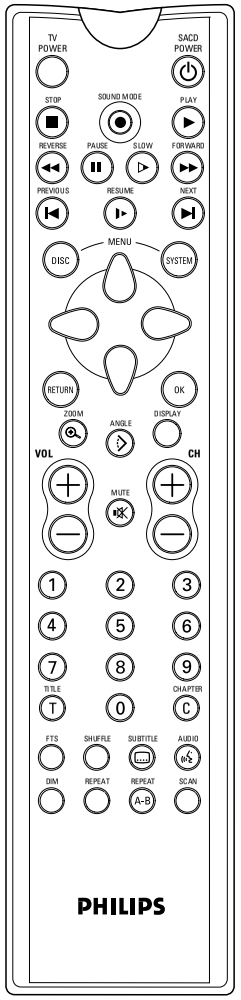
Display

- SACD: Super Audio CD inserted
- CD: Audio CD inserted
- SVCD: Super Video CD inserted
- VCD: Video CD inserted
- •CD / •STEREO / •MCH: indicate the current active sound mode
- DVD VIDEO: DVD video disc inserted
- TITLE: - number of titles on DVD in Stop mode
  - number of current title
- CHAPTER: Number of current chapter
- TRACK: - number of tracks on SACD/CD/VCD in Stop mode
  - number of current track
- TRACK TIME: track time in hours, minutes and seconds
- TOTAL TIME: disc/program time in hours, minutes and seconds
- REM TIME: remaining track time in hours, minutes and seconds when Display mode is set to Remaining time

- ■: playback temporarily interrupted (not active when setting Personal Preferences)
- SCAN: first 10 seconds of each track/chapter are played
- A-B REPEAT: A passage (A-B) is being repeated
- SHUFFLE: tracks/chapters are played in random order
- REPEAT TITLE CHAPTER TRACK ALL: repeat Title/Chapter/Track/All active
- FTS: FTS (Favourite track selection) program available for CD/DVD/VCD/SVCD inserted
- (((: remote control active (flashing)
- DTS: DTS (Digital Theatre Sound) audio on the digital output
- MCH: Sound mode button (for DVD) is set to Multi-channel
- SUR: Sound mode button (for DVD/VCD) is set to Dolby Surround
- 3D: Sound mode button (for DVD/VCD) is set to 3D Sound

English

Remote control



TV POWER
- switches the TV to power/standby

■ STOP
- stops playback

SOUND MODE
- selects required sound mode
  - for SACD: CD, Stereo or Multi-channel (if available)
  - for DVD/VCD: Stereo, Dolby Surround, 3D sound or Multi-channel

▶ PLAY
- starts audio/video play

◀◀ REVERSE
- search backward

II PAUSE
- pause or still frame/step frame

SLOW
- slow motion

▶▶ FORWARD
- search forward

⏮ PREVIOUS
- previous track/title/chapter/index

RESUME
- resumes playback

⏭ NEXT
- next track/title/chapter/index

VOL +/–
- volume up/down in TV mode

MUTE
- mutes the sound in TV mode

CH +/–
- program up/down in TV mode

FTS
- switches FTS function ON/OFF
- displays FTS menu
(FTS = Favourite Track Selection)

SHUFFLE
- playback in random order

SUBTITLE
- subtitle ON/OFF/selects subtitles (DVD/VCD/SVCD only)

AUDIO
- language selection

SACD POWER
- switches the player to power/standby

MENU DISC
- selects DVD-defined menu

MENU SYSTEM
- On-screen Display ON/OFF

▲ ▼ ◀ ▶
- up/down/left/right cursor movement in OSD mode

RETURN
- return to previous menu step

ZOOM
- enlarges video image

ANGLE
- selects DVD camera angle

DISPLAY
- selects elapsed Time display or Remaining Time display

OK
- acknowledge menu selection

0-9
- numerical key pad

T
- selects titles

C
- selects chapters

PLAYER DISPLAY DIM
- adjusts display brightness

REPEAT
- repeats a track or complete disc (CD, VCD, SACD)
- repeats a chapter, title or complete disc (DVD)

REPEAT A-B
- repeats a particular passage (A-B)

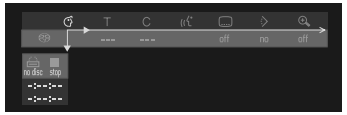
SCAN
- playback of the first 10 seconds of each track, chapter, title

On screen display information

English

Menu bar/Status window

- User preference
- Track/Title
- Chapter
- Subtitle language
- Angle
- Zoom
- Colour
- 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 a status window (see 'Status Window') and a 'Temporary Feedback Field'. Giving 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

English

General notes

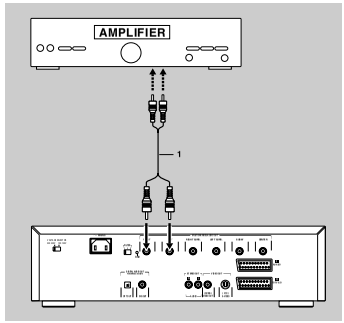
- Depending on your amplifier/receiver/Stereo System there are various ways you could connect the player. These are explained in the chapter below.
- For some connections settings for digital and/or analog output are required. These settings have to be made in the 'Personal Preferences' menu which is only accessible via your TV screen. In these cases you will need to connect the player to the TV as well.
- Please refer to your amplifier/receiver/Stereo System, TV and any other User Manual(s) as necessary to make the optimal connections.

Caution: Do not connect the player's audio output to the phono input of your audio system.

Connecting to audio equipment - analog

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

- Connect the audio Left and Right outputs for Front speaker connection ***(1)*** to the corresponding sockets on your amplifier, receiver or stereo system. For this use the audio cable supplied.

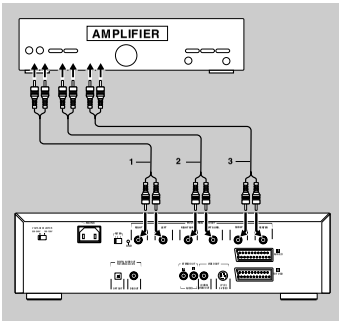


Connecting to a Multi-channel Audio/(Video) receiver with 6 connectors

This 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 ***(1)*** to the corresponding input sockets on your receiver. For this use the audio cable supplied.
2. Connect the audio Left and Right outputs for Surround speaker connection ***(2)*** to the corresponding inputs on your receiver. For this use an optional audio cable.
3. Connect the audio outputs for Center speaker and Subwoofer connection ***(3)*** to the corresponding inputs on your receiver. For this use an optional audio cable.

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



Connecting to an amplifier/receiver equipped with Dolby Pro Logic

For an amplifier/receiver with Dolby Surround, you may connect your SACD player in the same way as described for Dolby Pro Logic.

Dolby Pro Logic sound

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 Analog Output to Dolby Surround in the 'Personal Preferences' menu.

If your amplifier/receiver is equipped with a Dolby Digital decoder

- Connect the player as described in chapter 'Connecting to an Audio/(Video) receiver with multi channel decoder'.

If you connect the player to a TV equipped with a Dolby Pro Logic decoder

- Connect the player to the TV as described in chapter 'Connecting to a TV'.

Connecting to audio equipment - digital

The digital output of the SACD1000 does not provide PCM (Pulse Code Modulation) signals. If your amplifer/receiver can decode only PCM and no multi-channel signals such as Dolby Digital, do not connect your SACD player via the digital input. This could damage your amplifier and/or speakers.

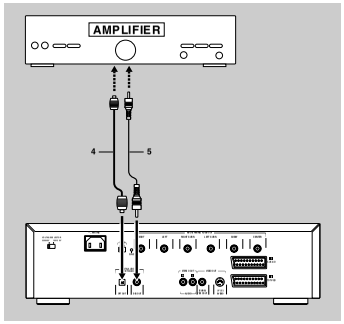
English

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 A/V receiver that supports one or more of the DVD audio formats supported by your SACD player (MPEG 2, Dolby Digital and DTS). For this you can check the receiver manual and the logos on the front of the receiver.

1 Connect the player's digital audio output (optical ***4*** or coaxial ***5***) to the corresponding input on the receiver. For this use the digital audio cable (coaxial) is supplied. Optical is optional.
2 Set Digital Output to ALL in the 'Personal Preferences' menu.



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 analog connections as described in chapter '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.

English

Connecting to a TV

Notes
- Depending on your TV there are various ways you could 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.

1 Connect the Euroconnector (TO TV-I/O ***6***) to the corresponding connector on the TV using the Euroconnector cable supplied.

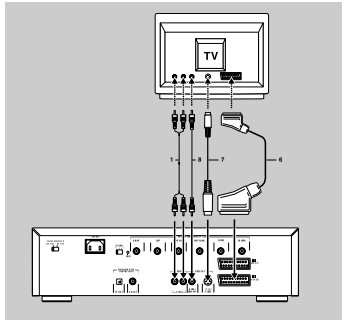
If your TV is not equipped with a Euroconnector you can select one of the following alternative connections:

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.
- 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.



6 Channel settings - DVD only

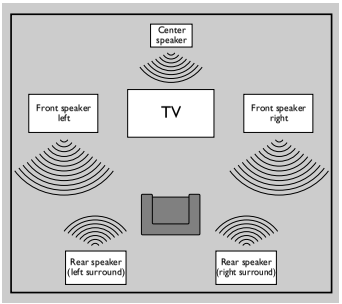
Front speaker
L (Large) : When the front speakers can reproduce low frequency signals below 120Hz
S (Small) : When the front speakers cannot produce low frequency signals below 120Hz

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

Subwoofer
On : When you connect a subwoofer
Off : When a subwoofer is not connected

** 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 as well as the audio from the Euroconnector will contain the center speaker audio.*

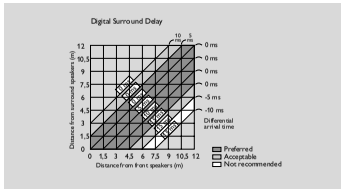


Delay times - DVD only

Your 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:

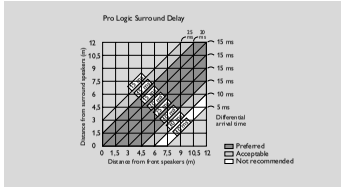
Digital Surround

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. You can adjust the delay time in the "User Preference Settings". See Personal preference - Sound - Speaker Settings. If, however, it is nearer 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.

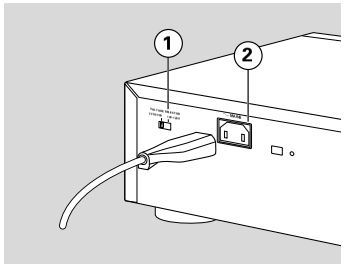


Connecting the power supply

1 Check if the mains voltage as shown on the type plate (on the back of the player) corresponds to your local mains voltage. If not, adjust the voltage selector ***(1)*** to match with your local mains supply.
2 Plug the female end of the power cable supplied into the Power connector MAINS ***(2)*** 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 is still consuming some power. If you wish to disconnect your player completely from the mains, withdraw the plug from the AC Outlet.

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

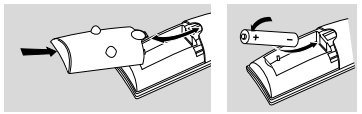


Infra red remote control

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.

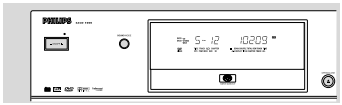
Caution: Do not mix old and new batteries. And never mix different types of batteries (standard, alkaline, etc.)



Remote control device code

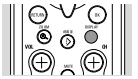
To operate the player via the remote control without response of a second DVD player, you can program both player and remote control to use a second set of remote control codes.
The default system code is Code 1.

Programming the player to respond to Code 2



1 Press **ON/OFF** to switch off the player.
2 Press for 3 seconds simultaneously press **SOUND MODE** and ▲ **OPEN/CLOSE** on the player and press **ON/OFF** to switch the player on again.
➤ The player will now be programmed to respond to Code 2.
➤ When step 1 and 2 are repeated the system code is set to Code 1 again.

Selecting the remote control code



● Simultaneously press **DISPLAY** and 1 or 2 on the remote control to select code 1 or 2.
➤ The remote control will now be set to the remote control code of your choice.
➤ This action can be repeated whenever necessary.

Operation

General explication

About this manual

This manual gives the basic instructions for operating this SACD player.
When playing DVD discs the player may not respond to all operating commands. Some DVD discs are produced in a way that requires specific operation or allows only limited operation during playback. When this occurs, please refer to the instructions in the disc inlay. When a ▬ appears on the TV screen, the operation is not permitted by the player or the disc.

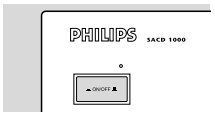
Remote control operation

- Unless otherwise stated, all operations can be carried out with the remote control. Always point the remote control directly at the player, making sure there are no obstructions in the path of the infrared beam.
- When there are corresponding keys on the front panel, they can also be used.

Menu bar operation

- A number of operations can also be carried out via the menu bar on the screen. The menu bar can be called up by pressing any of the following keys on the remote control: MENU SYSTEM, T, C, 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;
  - Colour selection;
  - Video FTS selection;
  - Sound mode;
  - Picture by picture;
  - Slow motion;
  - Fast motion;
  - Time search.
- The various items can be selected with the ◄ ► (left/right cursor) keys or by pressing the relevant keys on the remote control.
- By pressing **MENU SYSTEM** the menu bar will disappear 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), to operate this item are displayed below the icon.
- < or > indicates that more items are available at the left/right hand side of the menu bar. Press ◄ ► (left/right cursor) to select these items.

Switching on



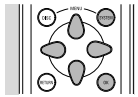
1 If necessary, switch on the TV and select the video input for your SACD player.
2 Press **ON/OFF** on the player front panel or **STANDBY** on the remote control.
➤ The player display lights up.
➤ If the player is connected to the TV the start up screen appears.

English

Personal preferences

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

General operation

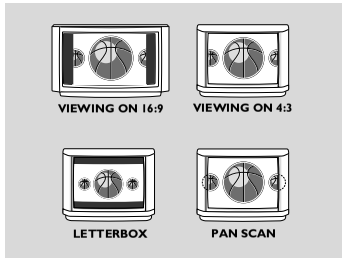


- Press **MENU SYSTEM** on the remote control.
- Select in the menu bar and press ▼ (down cursor).
  ➤ The Personal Preferences menu appears.
- Use the ◄ ► ▲ ▼ (left/right/up/down) keys to toggle through the menus, sub menus and submenu options.
  ➤ When a menu item is selected, the cursor keys (on the 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:

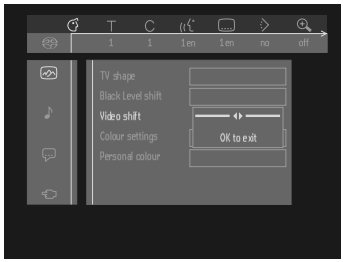
Picture

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.
In this case you can also select between:
Letterbox for a 'wide-screen' picture with black bars top and bottom, or Pan Scan, for a full-height picture with the sides trimmed. Provided this is available on the disc in play. If a disc has Pan Scan, the picture then moves (scans) horizontally to keep the main action on the screen.

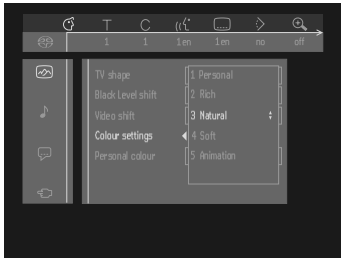


Black level shift (NTSC only)
Adapts the colour dynamics to obtain richer contrasts.
Select ON or OFF.

Video shift
Factory setting is such that the video will be centered on your screen. Use this setting to personalize the position of the picture on your TV by scrolling it to the left or right.



Colour settings
(only when connected via Euroconnector)
You can select one of four predefined sets of colour settings and one set (Personal) which you can define yourself.



Personal colour
(only when connected via Euroconnector)
Allows you to fine-tune the selected colour settings saturation, brightness and contrast.

♪ Sound

Analog output
Select Stereo, Dolby Surround, 3D Sound or Multi-channel. See 'Digital and Analog output Settings for DVD/VCD'. Factory setting is Multi-channel.

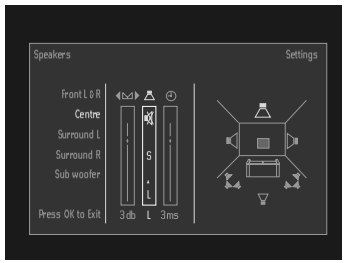
Dolby Surround : Select this setting when using equipment with a Dolby Surround Pro Logic decoder. In this setting the 5.1 audio channels (Dolby Digital, MPEG-2) are downmixed to a Dolby Surround compatible 2-channel output.

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.

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 (Super) Video-CD discs with 2-channel soundtracks. No Dolby Pro Logic decoding is done with (Super) Audio CD discs.

Night Mode
Optimizes the dynamics of the sound with 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. Speaker settings will not be used during playback in SACD Stereo or Multi-channel Sound Mode.



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 to a normal stereo sound.

Language

Select the required Menu, Audio and Subtitle language.
Menu language - The On Screen Menus will be displayed in the language you choose. You can choose from 8 different languages.
Audio language - The sound as well as the DVD disc menu will be in the language you choose provided this 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 choose provided this 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.

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

Features

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 player or the remote control. When selecting Multi-channel make sure your sound mode is set up for Multi-channel reproduction.

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

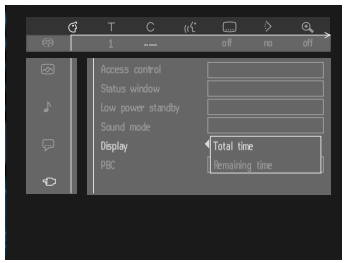
Status Window
Displays the current status of the player and is displayed together with the menu bar. In STOP mode it is displayed together with the 'Temporary Feedback' Field in the default screen. See 'On Screen Display information; Factory setting is ON. Select OFF to suppress display of the Status Window.

Low Power Standby
If this setting is set to ON, the player will go in low-power standby when the Standby button (remote control) is pressed. While in low-power standby, scart AUX-I/O will no longer be available. All external apparatus connected to it will be ignored.

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

Display information

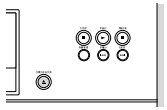
Display
Elapsed time - during playback the elapsed playing time will be displayed.
Remaining time – during playback the remaining playing time will be displayed.
Display setting can be changed during playback with the **DISPLAY** button on the remote control.



Player Display Dim (via remote control)
This feature allows you to set the display brightness. By repeatedly pressing the **DIM** button on the remote control you can select: normal brightness, half brightness and blank display.

Operation - Audio (Super Audio CD and CD)

Loading a SACD or Audio disc



1 Press ▲ **OPEN/CLOSE** on the front of the player. The disc loading tray opens.
2 Lay the disc in the tray, label side up. Make sure it is sitting properly in the correct recess.
3 Gently push the tray, or press ▲ **OPEN/CLOSE**, to close the tray.
➤ READING appears 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 a SACD or Audio disc

SUPER AUDIO CD

COMPACT disc DIGITAL AUDIO

- Press ▶ **PLAY** to start playback.
➤ During playback of Super Audio CDs and audio discs all functions can be operated via the buttons on the remote control and the player front.
➤ If the TV is on, the Super Audio CD or the Audio CD screen appears.
➤ During play, the current track number and its elapsed playing time will be shown on the player display (and on the screen). If a default Display Time setting (Total Time/Remaining Time) is made in the Personal Preferences menu this will be shown during playback. With the **DISPLAY** button 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).

➤ If a default Sound mode (Stereo/Multi-channel) is selected in the Personal Preferences menu and this Sound mode is not availabale on the disc inserted, playback will start in the first available Sound mode on the disc.
➤ Playback will stop at the end of the disc.
- To stop play at any other time, press ■ **STOP**.
➤ The number of tracks and the total playing time will be shown on the player display (and on the screen).

Sound mode - SACD playblack

- Press **SOUND MODE** on the player or the remote control to select the required Sound mode:
Stereo - Super Audio Stereo reproduction.
Multi-channel - Super Audio Multi-channel reproduction.
CD - normal CD stereo reproduction (press ■ **STOP** first, then press **SOUND MODE**).

The sound modes available on the disc are indicated on the display. When selecting Multi-channel make sure your speaker configuration is set up for Multi-channel reproduction.

Pause

- Press **II PAUSE** during play.
- To return to play, press ▶ **PLAY**.

Search

- To search forwards or backwards through the disc at 4x normal speed, press ◀◀ **REVERSE** or ▶▶ **FORWARD** during play.
➤ Search begins, and sound is muted.
- To step up to 8x normal speed, press ◀◀ **REVERSE** or ▶▶ **FORWARD** again.
➤ Search goes to 8x speed.
- To return to 4x normal speed, press ◀◀ **REVERSE** or ▶▶ **FORWARD** again.
- If the TV is on, search speed and direction are indicated on the screen each time ◀◀ **REVERSE** or ▶▶ **FORWARD** is pressed.
- To end the search, press ▶ **PLAY** or ■ **STOP** as desired.
➤ Sound muted in 4x and 8x search.

Moving to another track

- Press ⏭ **NEXT** briefly during play to step forward to the next track.
- Press ⏮ **PREVIOUS** briefly during play to return to the beginning of the current track. Press ⏮ **PREVIOUS** briefly again to step back to the previous track.
- To go directly to any track, enter the track number using the numerical keys **0-9**.

English

Shuffle

- Press **SHUFFLE** during play.
➤ The order of the tracks is changed.
- To return to normal play, press **SHUFFLE** again.

Repeat track/disc

- To repeat the currently playing track, press **REPEAT**.
➤ **REPEAT TRACK** appears on the display.
- To repeat the entire disc, press **REPEAT** a second time.
➤ **REPEAT ALL** appears on the display.
- To exit Repeat mode, press **REPEAT** a third time.

Repeat A-B

To repeat or loop a sequence:
- 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 repeat sequence begins.
- To exit the sequence, press **REPEAT A-B** again.

Scan

Plays the first 10 seconds of each track on the disc.
- Press **SCAN**.
- To continue play at your chosen track, press **SCAN** again or press ▶ **PLAY**.

FTS (Favourite Track Selection) - Audio CD only

- The FTS feature allows you to store your favourite tracks for a particular disc in the player memory.
- Each FTS program can contain 20 tracks.
- Each time an FTS program is played it will be placed on top of the list. When the list is full and a new program is added, the last program in the list will be removed from the list.
- The selections can be called up and played at any time.
- For storing an FTS program On Screen Display operation is required.

Storing an FTS-program

1 Load a disc and go to Stop mode.

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**.
4 Store each track by pressing **OK**.
➤ The track numbers will be added to the list of selected tracks.
➤ The number of tracks and the playing time of the program will be shown on the player display and the audio screen.

When your FTS program is complete, press ▶ **PLAY** to start play, 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 an 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 numerical keys **0-9**.
3 Press **OK**.
➤ The track number will be erased from the list of selected tracks.

Erasing the complete program

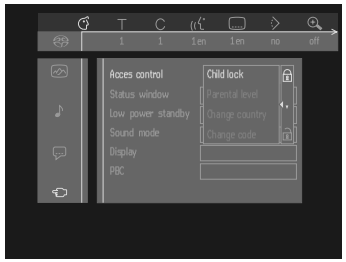
- Use ▼ (down cursor) to select Clear All and press **OK**.
➤ The complete FTS program for the disc will be erased.

Operation - Video (DVD and VCD)

Access control; disc lock (DVD and VCD)

Activating/deactivating the disc lock

1 In Stop mode, select **Access Control** in the Features menu using the ▼/▲ (down/up) keys and press ▶ (right cursor).
2 Enter a 4-digit PIN code of your own choice.
3 Enter the code a second time.
4 Move to **Child lock** using the ▼/▲ (down/up) keys.



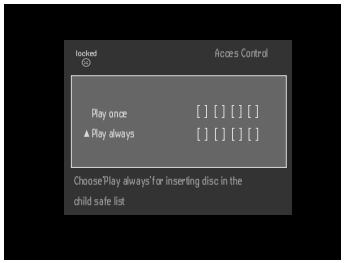
5 Move to 🔓 / 🔒 using the ▶ (right cursor) key.
6 Select 🔒 using the ▼/▲ (down/up) keys.
7 Press **OK** to confirm or ◀ (left cursor) to confirm and press ◀ (left cursor) again to exit the menu.
➤ Now unauthorized discs will not be played unless the 4-digit code is entered.
8 Select 🔓 to deactivate the disc lock.

Note: Reconfirmation of the 4-digit PIN 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.

Authorizing discs

- Insert the disc. See 'Loading a disc'.
➤ The Disc lock dialog will appear. You will be asked to enter your secret code for 'Play Once' or 'Play Always'. If you select 'Play Once', the disc can be played as long as it is in the player and the player is in the ON position. If you select 'Play Always', the disc will become child safe (authorized) and can always be played even if the Disc lock is set to ON.

Notes: The player memory maintains a list of up to 80 authorized ('Child safe') disc titles. A disc will be placed in the list when 'Play Always' is selected in the 'child protect' dialog. Each time a 'child safe' disc is played it will be placed on top of the list When the list is full and a new disc is added, the last disc in the list will be removed from the list.
Double sided DVD discs may have a different ID for each side. In order to make the disc 'child safe', each side has to be authorized.
Multi volume VCD disc may have a different ID for each volume. In order to make the complete set 'child safe', each volume has to be authorized.



Deauthorizing discs

- Insert the disc. See 'Loading a disc'.
➤ Playback starts automatically.
- Press ■ **STOP** while ☺ is visible.
➤ The ☹ will appear and the disc is now deauthorized.

English

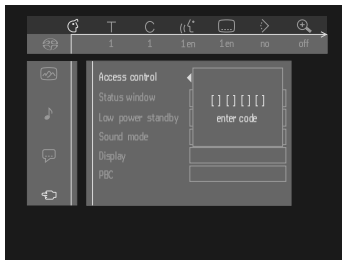
English

Access control; Parental control (DVD-Video only)

Movies on DVD discs 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.

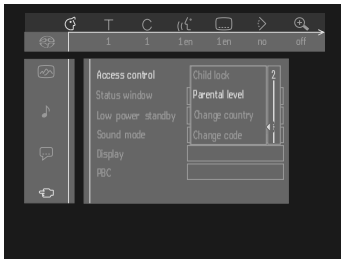
Activating/Deactivating Parental Control

1 In Stop mode, select **Access Control** in the Features menu using the ▼/▲ (down/up) keys and press ▶ (right cursor).



2 Enter your 4-digit PIN code. If necessary enter the code a second time.
3 Move to **Parental Level** using the ▼/▲ (down/up) keys.
4 Move to the Value Adjustment bar using the ▶ (right cursor) key.
5 Then use the ▼/▲ (down/up) keys or the numerical keys **0-9** on the remote control to select a rating from 1 to 8 for the disc inserted.

Rating 0 (displayed as '– –'):
Parental Control 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, play will stop and the 4-digit code has to be entered.



6 Press **OK** or ◀ (left cursor) to confirm and press ◀ (left cursor) again to exit the menu.

Country

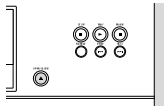
1 In Stop mode, select **Access Control** in the Features menu using the ▼/▲ (down/up) keys and press ▶ (right cursor).
2 Enter your 4-digit Pincode.
3 Move to **Change Country** using the ▼ (down) key.
4 Press the ▶ (right) key.
5 Select a country using ▼/▲ (down/up cursor).
6 Press **OK** or ◀ (left cursor) to confirm and press ◀ (left cursor) again to exit the menu.

Changing the 4-digit code

1 In Stop mode, select **Access Control** in the Features menu using the ▼/▲ (down/up) keys and press ▶ (right cursor).
2 Enter the old code.
3 Move to **Change Code** using the ▼ (down) key.
4 Press the ▶ (right) key.
5 Enter the new 4-digit PIN code.
6 Enter the code a second time and reconfirm with **OK**.
7 Press ◀ (left cursor) to exit the menu.

*Note: If you forgot your code, press ■ **STOP** four times while in the access control PIN code box and exit with **OK**. Access control is now switched off. You can then enter a new code (twice!) as described above.*

Loading DVD or VCD discs



1 Press ▲ **OPEN/CLOSE** on the front of the player. The disc loading tray opens.
2 Lay the disc in the tray, label side up (also when a double sided DVD disc is inserted). Make sure it is sitting properly in the correct recess.
3 Gently push the tray, or press ▲ **OPEN/CLOSE**, to close the tray.
➤ READING appears in the status window and on the player display and playback starts automatically.

Note: If a DVD disc is inserted and 'Disc Lock' is set to ON while the disc inserted is not in the 'child safe' list (not authorized), the PIN code must be entered and/or the disc has to be authorized. (see 'Access Control')

Playing a DVD-video disc

Playing a title

➤ After inserting the disc and closing the tray, playback starts automatically and the status window and the player display show the type of disc loaded as well as information about the disc's contents 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, and press **OK**.
➤ The currently playing title and chapter number are displayed in the menu bar and the player display. The elapsed playing time is shown in the status window and 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 during play the audio format (MPEG 2, Dolby Digital, etc.) of a title changes this will be indicated on the display.

- If required, you can use the **SOUND MODE** key to select Stereo, Dolby Surround, 3D-Sound or Multi-channel reproduction. Play may stop at the end of the Title, this can result in return to menu.
- To stop play at any time, press ■ **STOP**.
➤ The default screen will then appear, giving information about the current status of the player.
- You can resume play from the point at which you stopped by pressing ▶❙ **RESUME**.
➤ The resume feature applies, not only to the disc in the player, but also to the last four discs you have played. Simply reload the disc, press ▶ **PLAY** and when you see the Resume icon ▶❙ on the screen, press ▶ **PLAY** again.

Note: Since it is usual for DVD movies to be released at different times in different regions of the world, all players have region codes and discs can have an optional region code. If you load a disc of a different region code to your player, you will see the region code notice on the screen. The disc will not play, and should be unloaded.

Playing a video CD

Playing a disc

- After inserting the disc and closing the tray, playback starts automatically and the status window and the player display show the type of disc loaded as well as information about the disc's contents 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**.
- The currently playing track number is displayed in the menu bar and the player display. The elapsed playing time is shown in the status window and the player display.

- If required, you can use the **SOUND MODE** key to select Stereo, Dolby Surround or 3D-Sound reproduction.
- To stop play at any time, press ■ **STOP**.
➤ The default screen will then appear.
- You can resume play from the point at which you stopped by pressing ▶❙ **RESUME**. The resume feature applies, not only to the disc in the player, but also to the last four discs you have played. Simply reload the disc, press ▶ **PLAY** and when you see the Resume icon on the screen ▶❙ , press ▶ **PLAY** again.

English

General features

Note: Unless stated otherwise, all operations described are based on remote control operation. A number of operations can also be carried out via the menu bar on the screen. (see 'Menu bar operation')

Moving to another title/track

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

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

Note: 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** twice briefly to step back to the previous chapter/index.
- To go directly to any chapter or index, select **C** (chapter), then enter the chapter or index number using the numerical keys **0-9**.

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

Slow Motion

- Select (Slow motion) in the menu bar.
- Use the ▼ (down) key to enter the Slow Motion menu.
➤ The player will now go into Pause mode.
- Use the ◀ ▶ (left/right) keys to select the required speed: -1, -1/2, -1/4 or -1/8 (backward); +1/8, +1/4, +1/2 or +1 (forward).
- Select 1 to play at normal speed again.
- If ❚❚ **PAUSE** is pressed, the speed will be set to 0.
- To exit slow motion mode, press ▶ **PLAY** and then ▲ (up cursor).

You can also select Slow motion speeds by using the ▷ button on the remote control.

Still Picture and Step Frame

- Select (picture by picture) in the menu bar.
- Use the ▼ (down) key to enter the picture by picture menu.
➤ The player will now go into Pause mode.
- Use ◀ ▶ (left/right) keys to select previous or next picture.
- To exit Picture by picture mode, press ▶ **PLAY**.

You can also step forward by using the ❚❚ **PAUSE** repeatedly on the remote control.

Search

- Select (Fast motion) in the menu bar.
- Use the ▼ (down) key to enter the Fast motion menu.
- Use the ◀ ▶ (left/right) keys to select the required speed: -32, -8 or -4 (reverse); +4, +8, +32 (forward).
- Select 1 to play at normal speed again.
- To exit Fast motion mode, press ▶ **PLAY** and then ▲ (up cursor).

To search forward or backward through diffirent speeds, you can also use ◀◀ or ▶▶.

Repeat

DVD-Video Discs - Repeat chapter/title/disc

- To repeat the currently playing chapter, press **REPEAT**.
➤ **REPEAT CHAPTER** appears on the player display.
- To repeat the currently playing title, press **REPEAT** a second time.
➤ **REPEAT TITLE** appears on the display.
- To 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

- To repeat the currently playing track, press **REPEAT**.
➤ **REPEAT TRACK** appears on the player display.
- To repeat the entire disc, press **REPEAT** a second time.
➤ **REPEAT ALL** appears on display and screen.
- To exit Repeat mode, press **REPEAT** a third time.

Repeat A-B

To repeat or loop a sequence in a title:

- Press **REPEAT A-B** at your chosen starting point.
  ➤ **A** appears on the screen.
- Press **REPEAT A-B** again at your chosen end point.
  ➤ **A-B REPEAT** appears on the display, and the repeat sequence begins.
- To exit the sequence, press **REPEAT A-B**.

Scan

Plays the first 10 seconds of each chapter on the disc.

- Press **SCAN**.
- To continue play at your chosen chapter press **SCAN** again or press ▶ **PLAY**.

Shuffle

DVD-Video discs

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

- Press **SHUFFLE** during play.
  ➤ The shuffle icon appears on the screen for about 2 seconds.
- To return to normal play, press **SHUFFLE** again.

Video CDs

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

- Press **SHUFFLE** during play.
  ➤ The Shuffle icon appears on the screen for about 2 seconds.
- To return to normal play, press **SHUFFLE** again.

Time search

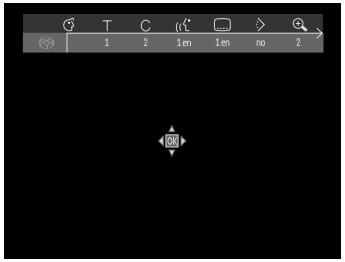
The Time Search function allows you to start playing at any chosen time stamp.

- Select (Time Search) in the menu bar.
- Press ▼ (down cursor).
  ➤ The player will now go into Pause mode.
  ➤ A time edit box appears on the screen showing the elapsed playing time of the current disc.
- Use the digit keys **0-9** 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 play starts from the selected time position.

Zoom

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

- Select (Zoom) in the menu bar.
- Press ▼ ▲ (down/up cursor) to activate the Zoom function and select the required zoom factor; 1.33 or 2 or 4.
  ➤ The player will go into Pause mode.
  ➤ 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: ▲ ▼ ◄ ► and **OK**.
- Use the ▲ ▼ ◄ ► (up/down/left/right) keys to pan all over 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 (Zoom) and select the required zoom factor as described above.
- To exit Zoom mode, press ▶ **PLAY**.
  ➤ Playback will resume.



FTS-Video

- The FTS-Video function allows you to store your favourite titles and chapters (DVD) and favourite tracks (VCD) for a particular disc in the player memory.
- Each FTS program can contain 20 items (titles, chapters).
- Each time an FTS program is played it will be placed on top of the list. When the list is full and a new program is added, the last program in the list will be removed from the list.
- The selections can be called up and played at any time.

Storing a FTS-Video Program

- In Stop mode, select Video FTS in the menu bar.
- Press ▼ (down cursor) to open the menu.
  ➤ The Video FTS menu appears.

Storing titles/tracks

- Press ▼ (down cursor) to select title.
- Use ◄ ► (left/right cursors) 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) 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 cursors) 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 **MENU SYSTEM** to exit the Video FTS menu.

Erasing a title/track FTS-Video Program

- In Stop mode, select Video FTS in the menu bar.
- Use ▼ (down cursor) to select program.
- Use ◄ ► (left/right cursors) to select the required selection number.
- Press **OK** to erase the selection.
- Press ▲ (up cursor) or **MENU SYSTEM** to exit the Video FTS menu.

If you wish to erase all selections:

- In Stop mode, select FTS Video in the menu bar.
- Use ▼ (down cursor) to select Clear all.
- Press **OK**.
  ➤ All selections will now be erased.
- Press ▲ (up cursor) or **MENU SYSTEM** to exit the Video FTS menu.

Switch FTS Video On or Off:

- Select FTS Video in the menu bar and press ▼ (down cursor).
  ➤ The video FTS menu appears.
- Press ◄ ► (left/right cursors) to select On or Off.
- Press ▲ (up cursor) or **MENU SYSTEM** 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

For titles and chapters, selection menus may be included on the disc. The DVD's menu feature allows you to make selections from these menus. Press the appropriate numerical key; or use the ▼, ▲, ▶, ◀ (down/up/right/left) keys to highlight your selection, and press **OK**.

Title menus

- Press **DISC MENU**.
  ➤ If the current title has a menu, this now appears on the screen. If no menu is present in the title, 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** 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. You can then change the camera angle if you wish.

- Use the ▼▲ (down/up) keys to select the required angle in the angle icon.
- To go to any angle directly, enter the angle number using the numerical keys **0-9**.
  ➤ After a small delay, play 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 or ▼▲ (down/up cursors) repeatedly to step through the different languages.
- You can enter the required language number directly using the numerical keys **0-9**.

Subtitles

- Select (Subtitle) in the menu bar.
- Press or ▼▲ (down/up cursors) repeatedly to step through the different subtitles.
- You can enter the required subtitle number directly using the numerical keys **0-9**.

Special VCD-Features

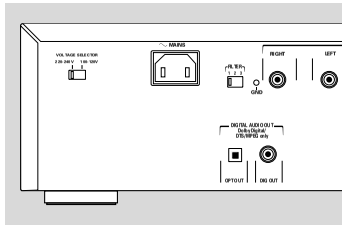
Playback Control (PBC)

- Load a Super Video CD with PBC and press ▶ **PLAY**.
  ➤ The PBC menu appears on the TV screen.
- Go through the menu with the keys indicated on the TV screen until your chosen passage starts to play. If a PBC menu consists of a list of tracks, you can select a track directly.
- Enter your choice with the numerical keys **0-9**.
- Press **RETURN** to go back to the previous menu.

Enhanced use

Filter switch

Not all amplifiers/receivers and speakers can handle the extended frequency response of SACD. Your SACD is equipped with a switchable filter on the rear. The factory setting of this filter is 40 KHz which is safe for all systems. If your system can handle the full frequency range of SACD (check the relevant manuals or, when in doubt, contact your dealer) do the following:



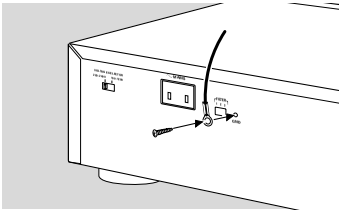
Set the switch to the required output signal.
Position 1 : 40 kHz - output signal on all speakers is set to 40 kHz.
Position 2 : 50 kHz FRONT/40 kHz OTHERS - output signal on front speakers is set to 50 kHz; output signal on all other speakers is set to 40 kHz.
Position 3 : 50 kHz - output signal on all speakers is set to 50 kHz.

Warning: When you are not sure your system is able to handle audio input signals up to 50 KHz do not change the output signal. You may damage your speakers or amplifier/receiver.

System grounding

When your system consists of a lot of components, occasional disturbance problems (like howling noises) may occur. These problems can be solved by grounding the system.

1 Unscrew ground connector GND halfway, connect an earth wire to the connector and tighten the connector again.



2 Connect the earth wire to the ground connector of the next component in the system.
3 If ground connectors are available on the other components of your system, ground the other components in the same way.

Before requesting service

English

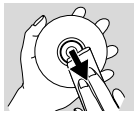
If it appears that the SACD player is faulty, first consult this checklist. It may be that something has been overlooked. Under no circumstances attempt to repair the system yourself; this will invalidate the warranty.

Look for the specific symptom(s). Then perform only the actions listed to remedy the specific symptom(s).

Symptom	Remedy
No power	Check if both plugs of the mains cord are properly connected. Check if there is power at the AC outlet by plugging in another appliance.
No sound	Check audio connections. If using a HiFi amplifier, try another sound source.
Distorted sound from HiFi amplifier	Check to make sure that no audio connections are made to amplifier phono input.
Disc can't be played	Ensure the disc label is upwards. Clean the disc. Check if the disc is defective by trying another disc.
No picture	Check if the TV is switched on. Check the video connection.
Distorted picture	Check the disc for fingerprints and clean with a soft cloth, wiping from centre to edge. Sometimes a small amount of picture distortion may appear. This is not a malfunction.
Completely distorted picture with player menu	The NTSC/PAL switch may be in the wrong status. Press the ■ **STOP** and ▸▸ **FORWARD** buttons simultaneously and keep them pressed while you turn the player ON.
No colour in picture with player menu	The NTSC/PAL switch may be in the wrong status. Press the ■ **STOP** and ▸▸ **FORWARD** buttons simultaneously and keep them pressed while you turn the player ON.
No return to start-up screen when disc is removed	Reset by switching the player OFF, then ON again. Check to see if the program requires another disc to be loaded.
The player does not respond to the remote control	Aim the remote control directly at the sensor on the front of the player. Avoid all obstacles that may interfere with the signal path. Inspect or replace the batteries. Check device code setting. See chapter 'Remote control device code'.
Distorted or black and white picture with DVD or Video CD disc	Use only discs that match the TV system of the TV-set used (PAL/NTSC).
No audio at digital output	Check the digital connections. Check the settings menu to make sure that the digital output is set to on. Check if the audio format of the selected audio language matches your receiver capabilities.
Buttons do not work	Reset by switching the player OFF then ON again.
Audible 'clicks' from player's internal	During operation the relais of the player may be switched, leading to an audible 'click'. This is not a malfunction.

English

Player does not respond to all operating Commands during playback	Operations are not permitted by the disc. Refer to the instructions in the disc inlay.
Disturbance problems (like howling noises) during playback	Ground the system. See 'System grounding'.



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.

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

Diagnostic program

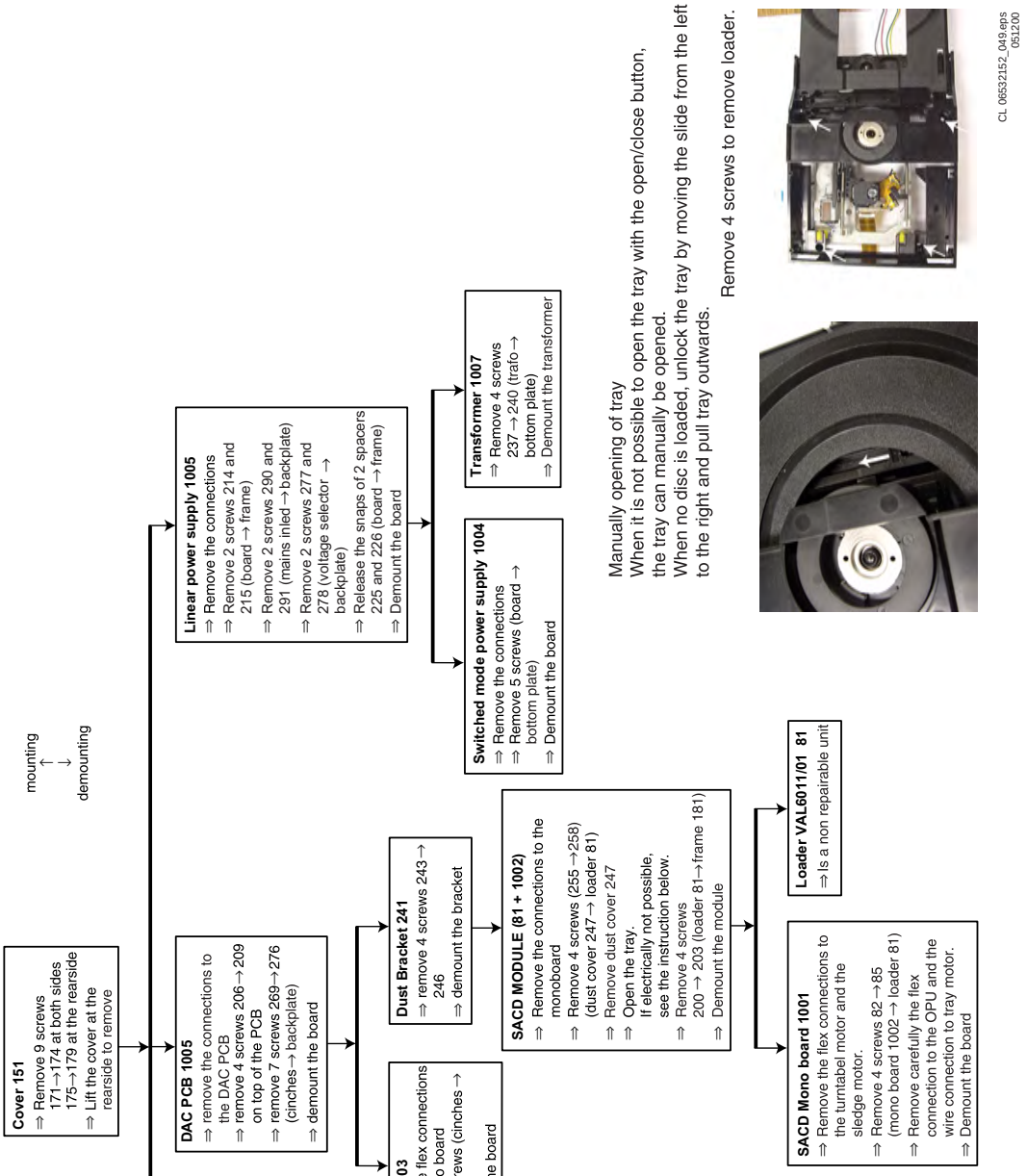
If the player is still faulty you can start the Diagnostic Program in the player.

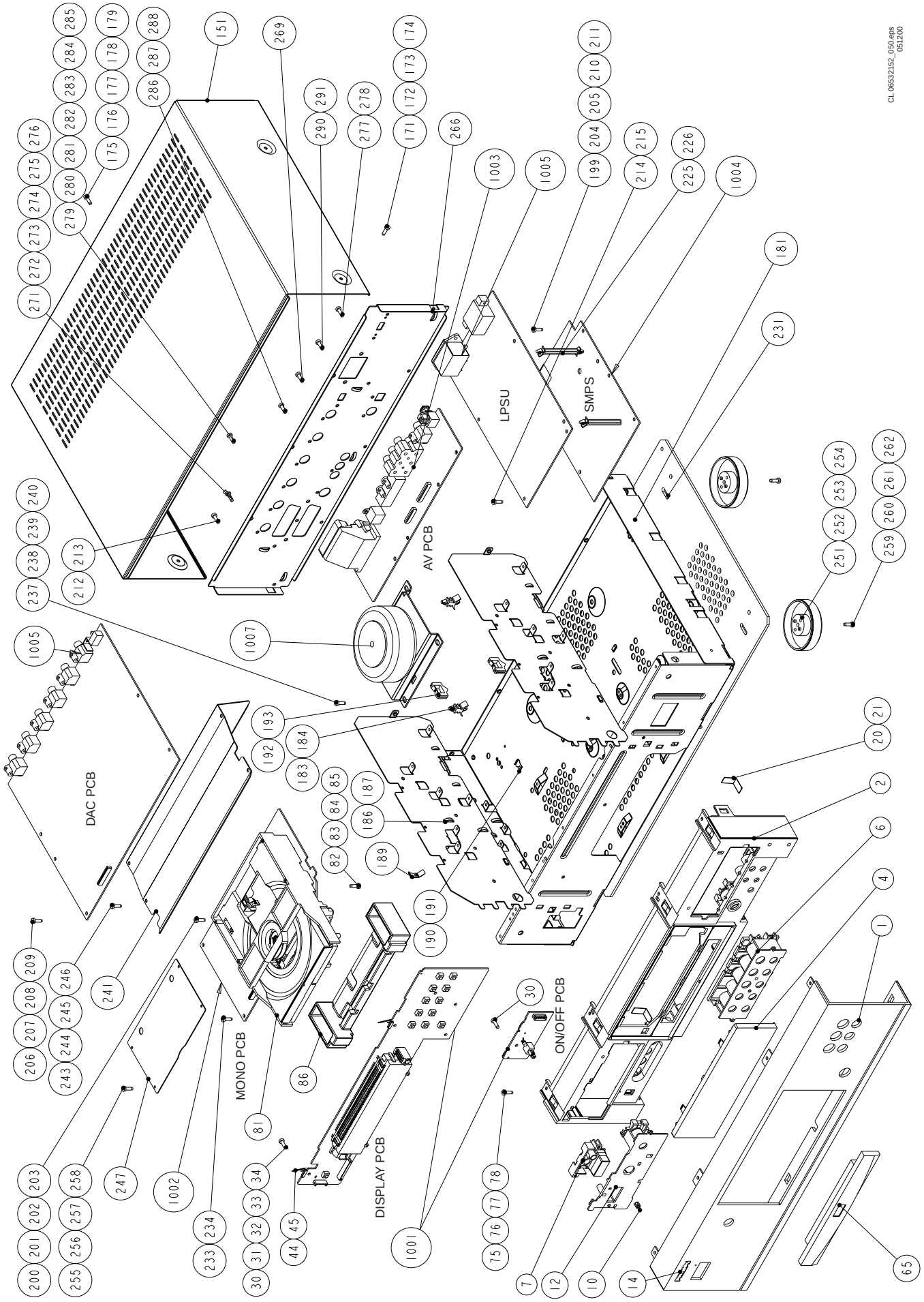
You can operate the Diagnosis Program by following the step-by-step instructions below.

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, reaching zero by the end of the test.
   ➤ After a few minutes, the message on the local display changes from **BUSY** to **ERROR** or to **PASS**.
   ➤ If the message **ERROR** 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 that 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

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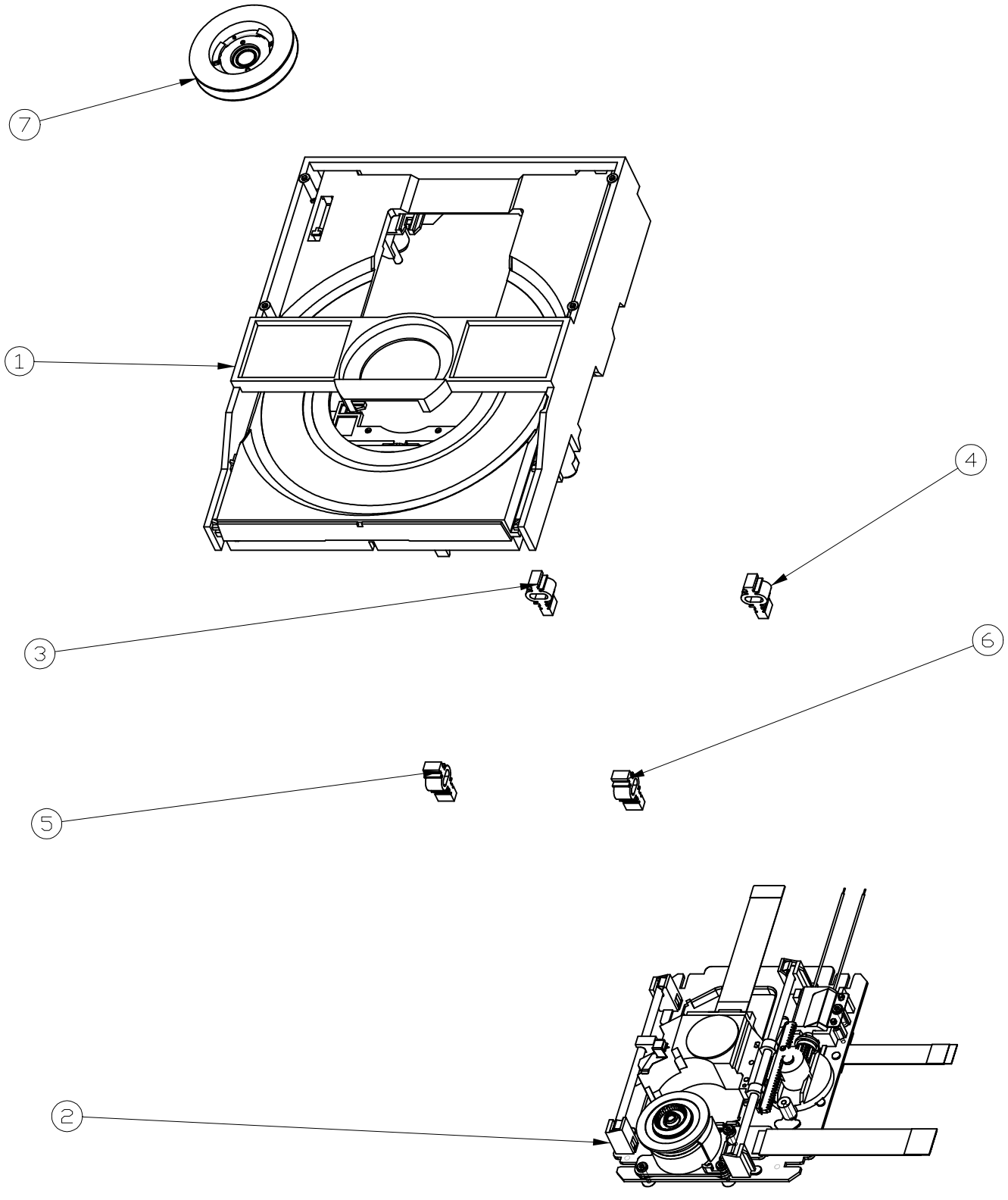
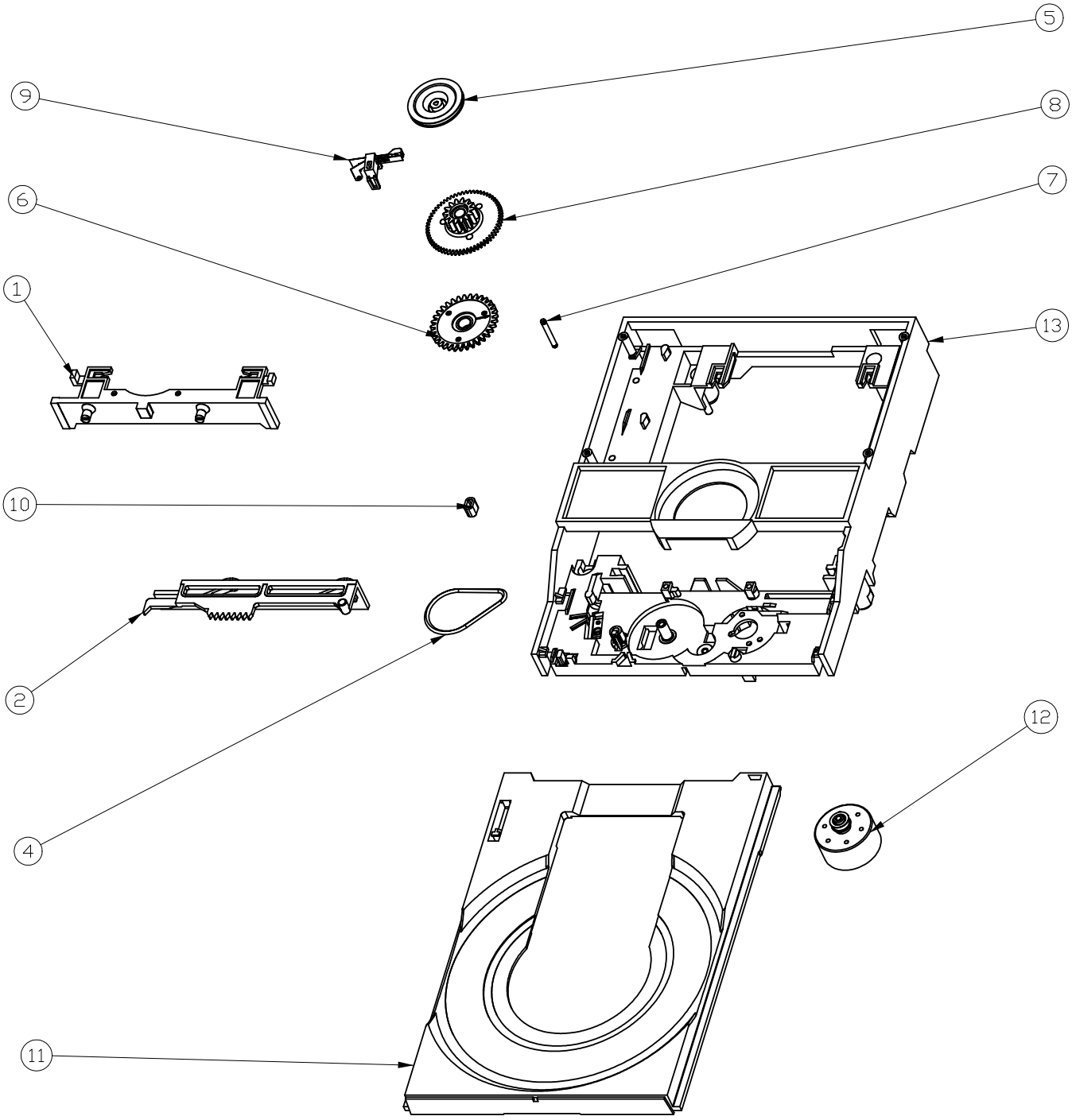
051200
LPSU
SMPS
AV PCB
DAC PCB
MONO PCB
DISPLAY PCB
ON/OFF PCB



	9305 023 61101	VAL6011/01 LOADER COMPLETE (for /001/691)
	9305 023 61102	VAL6011/02 LOADER COMPLETE (for /171)
1	3139 197 60090	GENEVA LP LOADER ASSY
2	9305 022 60101	VAM6001/01
3+4	3139 194 00710	SUSPENSION (YELLOW)
5+6	3139 194 00620	SUSPENSION (BLUE)
7	3139 197 60060	CLAMPER ASSY

CL 06532152_051.eps
071200



4	4822 358 10266	BELT
9	3139 198 80010	SWITCH
10	4822 532 13097	TULE
11	3139194 00270	TRAY
12	3139 197 50060	TRAY MOTOR ASSY

CL06532065-001.eps
180500

5. Diagnostic software, trouble shooting and test instructions

Due to the complexity of the SACD player, the time to find a defect in the player can become long. To reduce this time, the player has been equipped with Diagnostic and Service software (DS). The DS offers functionality to diagnose the SACD1000 player hardware and tests the following:

- Interconnections between components
- Accessibility of components
- Functionality of the audio and video paths

This functionality can be accessed via several interfaces:

1. End user/Dealer script interface
2. Player script interface
3. Menu and command interface

5.1 END USER/DEALER SCRIPT INTERFACE

5.1.1 Description

The End user/Dealer script interface gives a diagnosis on a stand alone SACD player; no other equipment is needed. During this mode, a number of hardware tests (nuclei) are automatically executed to check if the player is faulty. The diagnosis is simply a "fail" or "pass" message. If the message "FAIL" appears on the display, there is apparently a failure in the player. If the message "PASS" appears, the nuclei in this mode have been executed successfully. There can be still a failure in the player because the nuclei in this mode don't cover the complete functionality of the player.

5.1.2 Contents

The End use/Dealer script executes all diagnostic nuclei that do not need any user interaction and are meaningful on a standalone SACD player. The nuclei called in the End user/ Dealer script are the following:

Display Count-down	Nucleus number	Nucleus name
7	104	Host Decoder SDRAM Write Read
6	123	Host Decoder I2C NVRAM
5	500	Front Panel Echo
4	601	Basic Engine Echo
3	1200	Furore SDRAM Low Write Read
2	1201	Furore SDRAM High Write Read
1	1300	DAC Board I2C Test

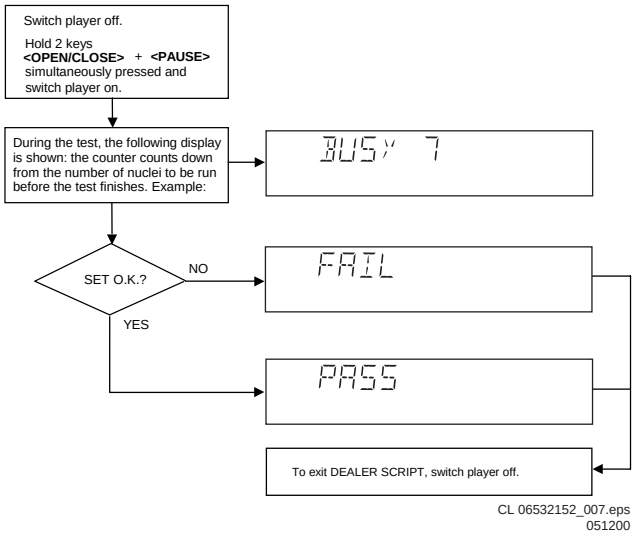


Figure 5-1

5.2 PLAYER SCRIPT INTERFACE

5.2.1 Description

The Player script will give the opportunity to perform a test that will determine which of the SACD player's modules are faulty, to read the error log and to perform an endurance loop test. To successfully perform the tests, the SACD player must be connected to a TV set, a multi-channel amplifier, a set of 6 boxes and an external video source to check the output of a number of nuclei.
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 SACD 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 Structure of the Player Script

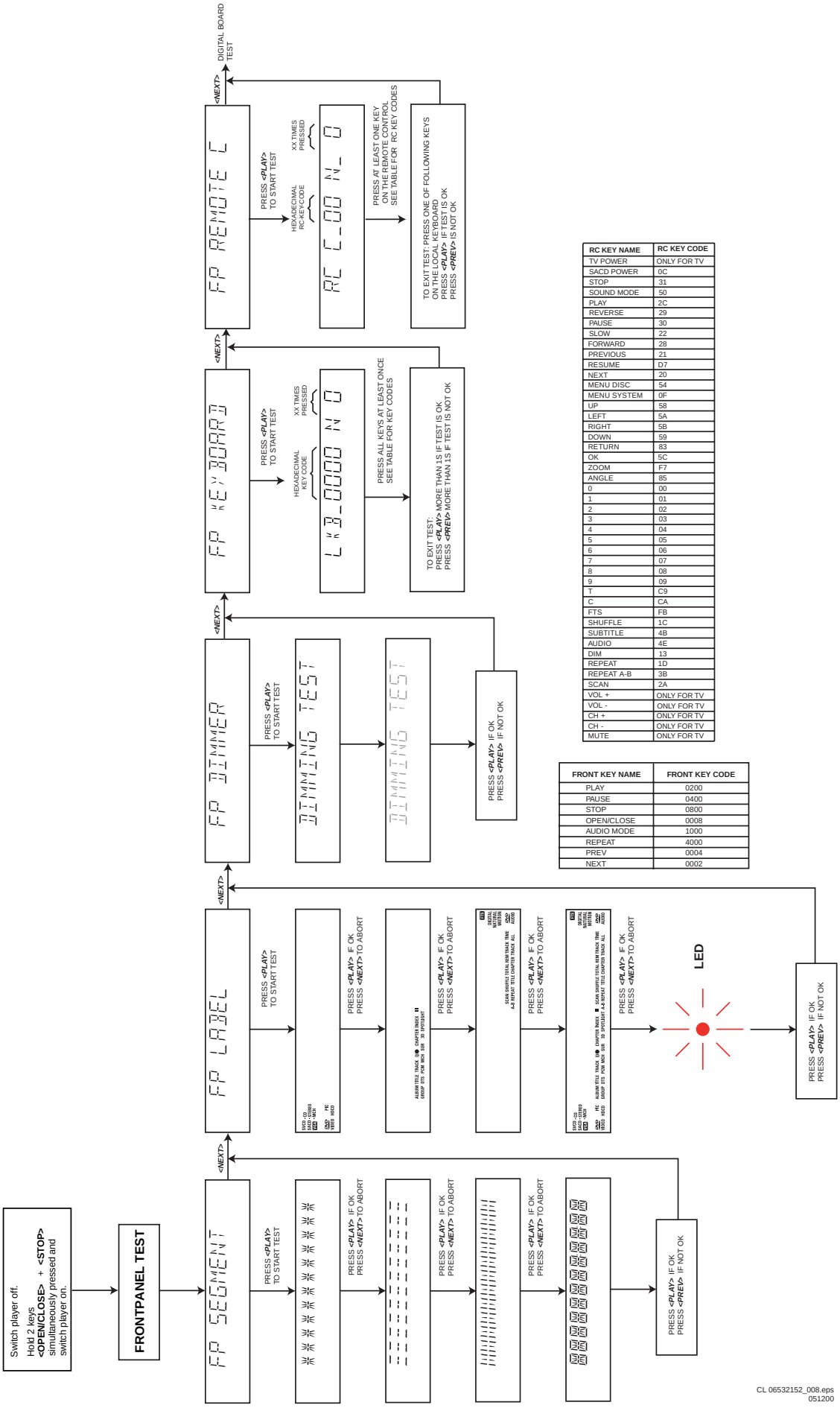
The player script consists of a set of nuclei testing the hardware modules in the SACD player: the Display PWB, the Digital PWB, the Basic Engine, the DAC PWB and the AV PWB.
Nuclei run by the player test need some user interaction; in the next table this interaction is described. The player test is done in two phases:

- 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 information can be useful to determine any errors that occurred recently during normal operation of the DVD player.
- The loop test will perform the same nuclei as the dealer test, but it will loop through the list of nuclei indefinitely.

Step	Description	Executing nucleus
1	Press OPEN/CLOSE and STOP, and turn on the player.	2
2	Display shows "FP SEGMENT". Press PLAY to execute this nucleus. Otherwise press NEXT and go to step 7.	502
3	Starbursts are visible. Press PLAY.	502
4	Horizontal bars are visible. Press PLAY.	502
5	Vertical bars are visible. Press PLAY.	502
6	All segments are visible. Press PLAY.	502
7	Display shows "FP LABEL". Press PLAY to execute this nucleus. Otherwise press NEXT and go to step 13.	503
8	Labels of the first grid are visible. Press PLAY.	503
9	Labels of the second grid are visible. Press PLAY.	503
10	Labels of the third grid are visible. Press PLAY.	503
11	All labels are visible. Press PLAY.	503
12	Standby LED is on. Press PLAY.	503
13	Display shows "FP DIMMER". Press PLAY to execute this nucleus. Otherwise press NEXT and go to step 15.	518
14	Display shows "DIMMING TEST". Wait until it is dimmed, and press than PLAY.	518
15	Display shows "FP KEYBOARD". Press PLAY to execute this nucleus. Otherwise press NEXT and go to step 17.	505
16	Display shows "LKB_0000 N 0". Press all keys at least one time. Press PLAY for a least one-second to exit this nucleus.	505
17	Display shows "FP REMOTE C". Press PLAY to execute this nucleus. Otherwise press NEXT and go to step 19.	506
18	Display shows "RC C_ N_ 0". Press at least one key of the remote control. Press PLAY to exit this nucleus.	506
19	Display shows "SCART-SW DVD". Press PLAY to execute this nucleus. Otherwise press NEXT.	1408
20	Display shows "COLOUR SETUP". Press PLAY to execute this nucleus. Otherwise press NEXT.	1406
21	Display shows "COLOUR-B ON". Press PLAY to execute this nucleus. Otherwise press NEXT.	120
22	Display shows "PINKNOISE ON". Press PLAY to execute this nucleus. Otherwise press NEXT.	115
23	Display shows "COLOUR-B OFF". Press PLAY to execute this nucleus. Otherwise press NEXT.	121
24	Display shows "PINKNOIS OFF". Press PLAY to execute this nucleus. Otherwise press NEXT.	116
25	Display shows "SINE ON". Press PLAY to execute this nucleus. Otherwise press NEXT and go to step 27.	117
26	Display shows "BUSY". To stop this nucleus, press STOP.	117
27	Display shows "SCART-S PASS". Press PLAY to execute this nucleus. Otherwise press NEXT.	1409
28	Display shows "BE RESET". Press PLAY to execute this nucleus. Otherwise press NEXT.	603
29	Display shows "BE VERSION". Press PLAY to execute this nucleus. Otherwise press NEXT and go to step 31.	602
30	Display shows the version of the basic engine. To stop this nucleus, press PLAY.	602
31	Display shows "BE TRAY OPEN". Press PLAY to execute this nucleus. Otherwise press NEXT.	616
32	Display shows "BE TRAY CLOSE". Press PLAY to execute this nucleus. Otherwise press NEXT.	615
33	Display shows "BE DVD LASER". Press PLAY to execute this nucleus. Otherwise press NEXT.	635
34	Display shows "BE CD LASER". Press PLAY to execute this nucleus. Otherwise press NEXT.	636
35	Display shows "BE LASER OFF". Press PLAY to execute this nucleus. Otherwise press NEXT.	637
36	Display shows "BE FOCUS ON". Press PLAY to execute this nucleus. Otherwise press NEXT.	604
37	Display shows "BE FOCUS OFF". Press PLAY to execute this nucleus. Otherwise press NEXT.	605
38	Display shows "BE DISCM ON". Press PLAY to execute this nucleus. Otherwise press NEXT.	606
39	Display shows "BE DISCM OFF". Press PLAY to execute this nucleus. Otherwise press NEXT.	607
40	Display shows "BE RADIAL ON". Press PLAY to execute this nucleus. Otherwise press NEXT.	608
41	Display shows "BE RADIAL OF". Press PLAY to execute this nucleus. Otherwise press NEXT.	609
42	Display shows "BE SLEDG OUT". Press PLAY to execute this nucleus. Otherwise press NEXT.	611
43	Display shows "BE SLEDGE IN". Press PLAY to execute this nucleus. Otherwise press NEXT.	610
44	Display shows "BE GROOVE IN". Press PLAY to execute this nucleus. Otherwise press NEXT.	612
45	Display shows "BE GROOV MID". Press PLAY to execute this nucleus. Otherwise press NEXT.	613
46	Display shows "BE GROOV OUT". Press PLAY to execute this nucleus. Otherwise press NEXT.	614
47	Display shows "BE RESET". Press PLAY to execute this nucleus. Otherwise press NEXT.	603
48	Display shows "BE TRAY OPEN". Press PLAY to execute this nucleus. Otherwise press NEXT.	616
49	Display shows "BE TRAY CLOSE". Press PLAY to execute this nucleus. Otherwise press NEXT.	615
50	Display shows "ERRORLOG". Press PLAY to execute this nucleus. Otherwise press NEXT and go to step 52.	404
51	Display shows the error codes. With the keys NEXT and PREV it is possible to step through the error codes. To stop this nucleus, press STOP.	404
52	Display shows "PASS", this means the Player Script is finished and the execution of the User Dealer Script is started in an endless loop. The execution of the User Dealer Script will only stop, when an error occurs. The Display shows the error code.	1

Remark

In case of failure, the display shows " FAIL 00000 ". The description of the shown error code can be retrieved in the survey of Nuclei Error Codes (paragraph 5.4). Once an error occurs, it is not possible to continue the player script. Switch off the set and restart the player script. By pressing the NEXT key, it is possible to jump over the failure and to continue the player script.



RC KEY NAME	RC KEY CODE
TV POWER	ONLY FOR TV
SACD POWER	0C
STOP	31
SOUND MODE	50
PLAY	2C
REVERSE	29
PAUSE	30
SLOW	22
FORWARD	28
PREVIOUS	21
RESUME	D7
NEXT	20
MENU DISC	54
MENU SYSTEM	0F
UP	58
LEFT	5A
RIGHT	5B
DOWN	59
RETURN	83
OK	5C
ZOOM	F7
ANGLE	85
0	00
1	01
2	02
3	03
4	04
5	05
6	06
7	07
8	08
9	09
T	C9
C	CA
FTS	FB
SHUFFLE	1C
SUBTITLE	4B
AUDIO	4E
DIM	13
REPEAT	1D
REPEAT A-B	3B
SCAN	2A
VOL +	ONLY FOR TV
VOL -	ONLY FOR TV
CH +	ONLY FOR TV
CH -	ONLY FOR TV
MUTE	ONLY FOR TV

FRONT KEY NAME	FRONT KEY CODE
PLAY	0200
PAUSE	0400
STOP	0800
OPEN/CLOSE	0008
AUDIO MODE	1000
REPEAT	4000
PREV	0004
NEXT	0002

Figure 5-2

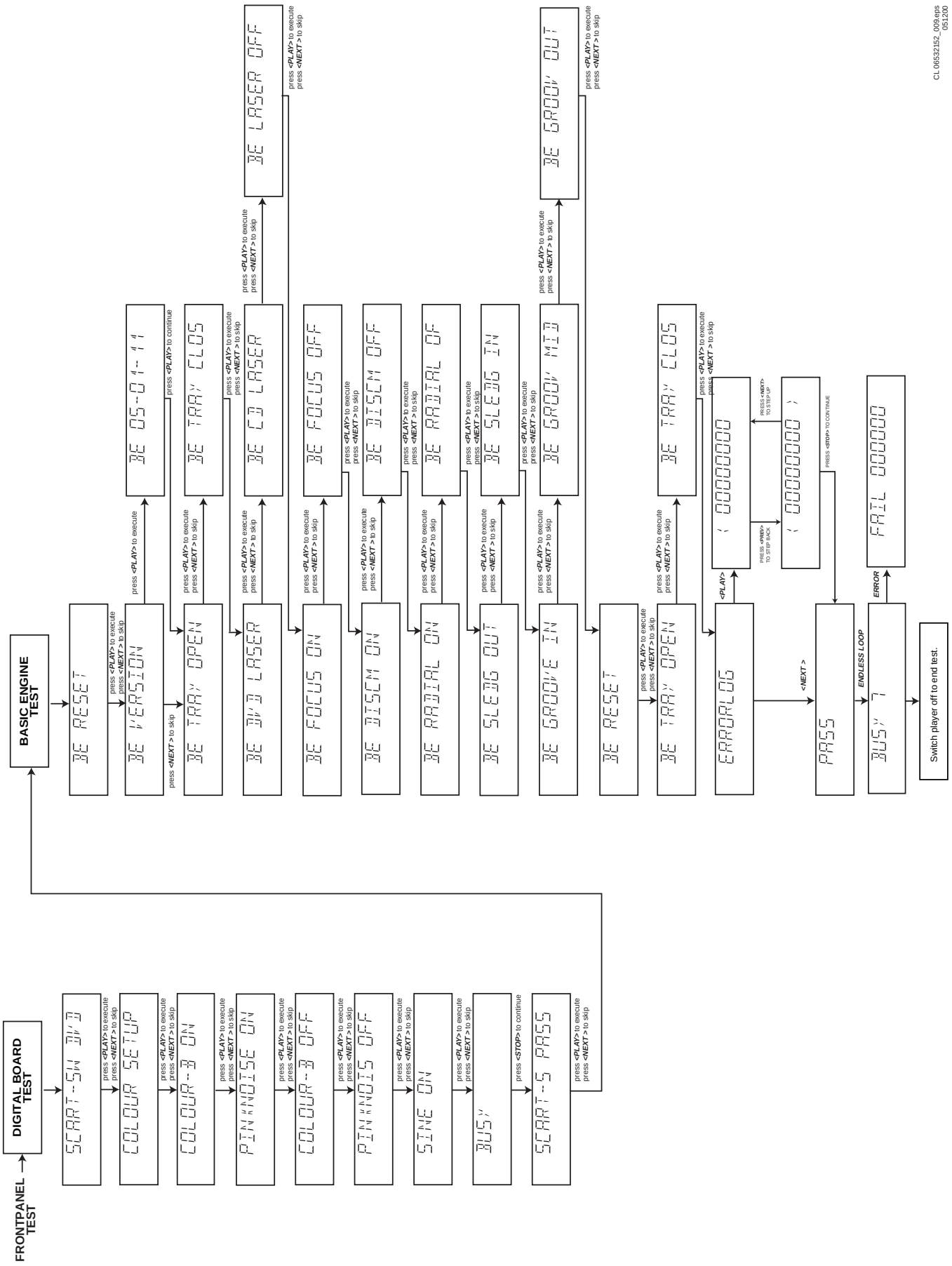

FRONTPANEL TEST
DIGITAL BOARD TEST
START-SW BYP
COLOUR SETUP
COLOUR-B ON
PINNOTSE ON
COLOUR-B OFF
PINNOTS OFF
SINE ON
BUSY
START-S PASS
BASIC ENGINE TEST
BE RESET
BE VERSION
BE TRAY OPEN
BE CD LASER
BE FOCUS ON
BE TESCM ON
BE RADIAL ON
BE SLEDG OUT
BE GROOVE IN
BE RESET
BE TRAY OPEN
EARDRLOG
PASS
BUSY 7
BE 05-04-44
BE TRAY CLOS
BE LASER OFF
BE FOCUS OFF
BE TESCM OFF
BE RADIAL OF
BE SLEDG IN
BE GROOV MID
BE TRAY CLOS
BE GROOV OUT
FAIL 000000
press <PLAY> to execute
press <NEXT> to skip
press <PLAY> to continue
press <STOP> to continue
<NEXT>
ENDLESS LOOP
ERROR
Switch player off to end test.
CL 06532152_009.eps 051200

Figure 5-3

5.2.3 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 nucleui error codes in paragraph 5.4.

UART error codes

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

BE errors

Error Number	Error name	Explanation
0101	S2B_ILL_COMMAND	Parameter(s) not valid for this command. Reason: some communication problem between UART and engine.
0102	S2B_ILL_PARAM	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_LOCK	PLL could not lock in Accessing or Tracking state
0108	SBC_HEADER_TO	Header timeout
0109	S2B_SBC_NOT_FOUND	Requested subcode item could not be found.
010A	S2B_TRAY	Tray could not be opened or closed completely.
010B	S2B_TOC_READ	TOC could not be read within timeout period.
010C	S2B_JUMP	Requested seek could not be performed.
010D	S2B_NON_EXIST_SES	Attempt to access a non-existing session.
010E	S2B_NON_EXIST_BCA	
01F0	S2B_OVERRUN	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_PHASE	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	COMMUNI-CATION	Error in I2C communication. Reason: bad connection between slave processor and main processor.

SSM error codes

Error Code	Error name	Explanation
0006	SP_SYNCERROR	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_EDCERROR	Data coming from disc is damaged. Reason: see SP_SYNCERROR
0008	SP_CONTINUITYERROR	Sequence of sectors coming from disc is incorrect. Reason: see SP_SYNCERROR
0009	DMX_CONTINUITYER-ROR	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_TIMEOUTERROR	Data coming from disc not in time. Reason: damaged disc or engine problem.

5.2.4 Reprogramming of region code

Caution

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

After repair of the mono board, all the customer settings and also the region code might be lost (P0). 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 and the region code change counter must be reset by means of the Diagnostic Software.

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 SACD1000/001(P1): ***<0><0><1> <0><0><0><0><0><0><0><0><0>***
for SACD1000/171(P2): ***<0><0><2> <0><0><0><0><0><0><0><0><0>***
for SACD1000/691(P3): ***<0><0><3> <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 digital board has been reprogrammed.

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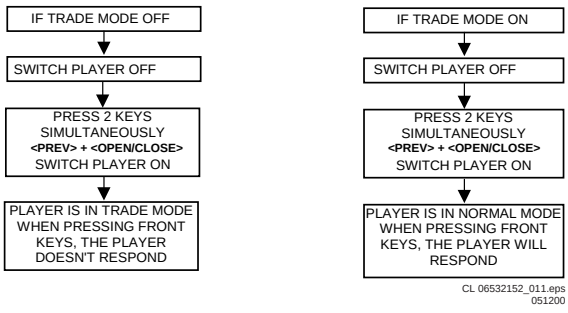
051200

Figure 5-4

5.2.5 Trade mode

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.



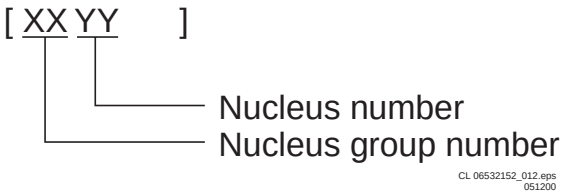
CL 06532152_011.eps
051200

Figure 5-5

5.3 MENU AND COMMAND MODE INTERFACE

5.3.1 NUCLEI NUMERATION

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



CL 06532152_012.eps
051200

Figure 5-6

The following groups are defined:

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

5.3.2 ERROR HANDLING

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

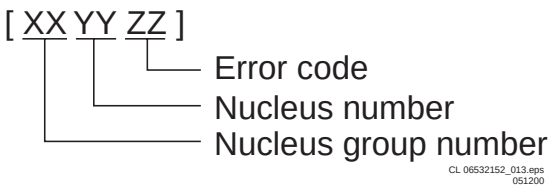


Figure 5-7

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

5.3.3 COMMAND MODE INTERFACE

Set-up physical interface components
Hardware required:
- Service PC
- one free COM port on the Service PC
- special cable to connect DVD 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):

```
SACD1000 Diagnostic Software version 0.4
SDRAM Interconnection test passed
Basic SDRAM test passed

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

CL 06532152_014.eps
051200

Figure 5-8

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
The tables below give an overview of the commands.

Startup

[xx yy] Number	Nuclei
startup	Test the UART of the host decoder by sending a string to the UART.

Host Decoder Tests [01]

[xx yy] Number	Nuclei
100	Checksum Flash Checks the FLASH checksum.
101	Flash Write Access 1 Checks whether the first FLASH can be written. Check if Write enable pin of flash is high. The set must be switched off to restart DSW.
102	Flash Write Access 2 Checks whether the second FLASH can be written. Check if Write enable pin of flash is high. The set must be switched off to restart DSW.
103	Flash Write Read Checks whether we can write to the FLASH. This test is non-destructive. However, this test should be used with great caution. Potential danger exists when power loss occurs when the test is being executed. The contents of the NVRAM are changed during the test and are restored after the test. However, power loss may occur before the original contents are restored. Therefore, this test is not included in scripts. Check if Write enable pin of flash is high. The set must be switched off to restart DSW.
104	SdRam Write Read The following three individual memory tests will be executed: a data bus test, an address bus test, and a device test. The first two test for electrical wiring problems and improperly inserted chips, while the third is intended to detect missing chips and catastrophic failures. As an unintended consequence, the device test will also uncover problems with the control bus wiring.
105	SdRam Write Read Fast The following two individual memory tests will be executed: a data bus test, and an address bus test. The two test for electrical wiring problems and improperly inserted chips.
106	Dram Write Read The following three individual memory tests will be executed: a data bus test, an address bus test, and a device test. The first two test for electrical wiring problems and improperly inserted chips, while the third is intended to detect missing chips and catastrophic failures. As an unintended consequence, the device test will also uncover problems with the control bus wiring. Because the DRAM is not mounted in commercial sets, this test will result in a failure.
107	Dram Write Read Fast The following two individual memory tests will be executed: a data bus test, and an address bus test. The two test for electrical wiring problems and improperly inserted chips. Because the DRAM is not mounted in commercial sets, this test will result in a failure.
108	Version Displays the version number of the Sti5505.
109	Mute On Switches the audio mute of the monoboard on.
110	Mute Off Switches the audio mute of the monoboard off.
111	De-Emphasis On Switches the audio de-emphasis filter in the Sti5505 on.
112	De-Emphasis Off Switches the audio de-emphasis filter in the Sti5505 off.
113	Centre-On-Stereo Pin On Sets the PIO-pin Centre_on_stereo to '1'.
114	Centre-On-Stereo Pin Off Sets the PIO-pin Centre_on_stereo to '0'.

[xx yy] Number	Nuclei
115	Pink Noise On Generates internally on the Sti5505 a pink noise audio signal that will be passed to all the DACs were it is converted to an analogue audio signal.
116	Pink Noise Off Switches off the pink noise audio signal generated with DS_HostdPinkNoiseOn.
117	Sine On Generates a sine signal of 1 kHz on the analogue output. The sine signal digital data are stored in the audio buffer in SDRAM, passed through the audio decoder and without any further processing to the audio DAC were it is converted to an analogue audio signal. To stop the sine, press the STOP key on the local keyboard.
118	Sine Burst 1kHz Generates a sine signal of 1 kHz on the analogue output that lasts about four seconds. The generation of the signal is the same as in DS_HostdSineOn.
119	Sine Burst 12kHz Generates a sine signal of 12kHz on the analogue output that lasts about four seconds. The generation of the signal is the same as in DS_HostdSineOn.
120	Colour-bar On Enables colour bar in the DENC in the Sti5505. To make the colourbar visible on the TV screen via the SCART output, the following commands must also be given: 1406: Colour Setup Normal 1408: Scart Switch DVD
121	Colour-bar Off Disables colour bar in the DENC in the Sti5505.
122	NvramWrR Checks the NVRAM by writing and reading patterns to and from all locations. This test is non-destructive. However, this test should be used with great caution. Potential danger exists when power loss occurs when the test is being executed. The contents of the NVRAM are changed during the test and are restored after the test. However, power loss may occur before the original contents are restored. Therefore, this test is not used in script and menu mode.
123	NvramI2c Checks the interconnection between the I2C controller on the STi5505 and the NVRAM.
124 125 126 127 128 129	Pink Noise On Channel X Generates internally on the Sti5505 a pink noise audio signal that will be passed to the DACs on the DAC board where it is converted to an analogue audio signal. Only one channel at the time will generate a pink noise audio signal. X indicates a channel number. It can be turned off with the nucleus 116. 124 = ch1, ... ,29 = ch6

NVRAM Tests [04]

[xx yy] Number	Nuclei
400	Resets the NVRAM. After the reset of the NVRAM, nucleus 404 will give error 40402: "NVRAM error log is invalid". Introducing an error can rectify this. (E.g. playing a disc upside down). To reset the error log, it is recommended to use nucleus 407.
404	Line1 Error Log Reads the error log from NVRAM. The information is displayed on the local display and is send to the serial port. With the PREV and NEXT key it is possible to step through the logging information on the local display. The STOP key is used to exit this nucleus at any time.
405	Line1 Lifetime Log Ends the lifetime log. The information is displayed on the local display and is send to the serial port. The following statistics will be read from the NVRAM: Power On Time. The time in hours that the SACD player was turned on. Playing Time CDDA and VCD. The time in hours that the disc has been spinning summed up for both playing CDDA and VCD discs. Playing Time DVD. Like above but for DVD discs. Times Tray Open. The total number of times the tray has been opened. With the PREV and NEXT key it is possible to step through the logging information on the local display. The STOP key is used to exit this nucleus at any time.
406	Line1 Application Version Reads the version of the application software from a fixed location in the NVRAM.
407	Line2 Error Log Reset Resets the error log.
408	Line2 Lifetime Log Reset Resets the lifetime log.
409	Line2 Region-Code Reset Resets the region code change counter of the SACD player.

Front Panel Tests [05]

[xx yy] Number	Nuclei
500	Echo Checks the interface between the SACD Monoboard and the slave processor on the front panel by sending an 'echo' command. The I2C connection will be tested.
501	Version Returns the ROM software version and internal ID of the slave processor of the front panel.
502	Segment Checks the local display by lighting four test patterns. The following test patterns are: Show a starburst Light all horizontal segments Light all vertical segments Light all segments User confirmation is necessary after each test pattern.
503	Label Checks the local display and LED of the front panel by lighting all labels and LED in five steps: Light the first label grid. Light the second label grid. Light the third label grid. Light all label grids. Light the LED. User confirmation is necessary after each test pattern.
504	Led Switches the LED on. User confirmation is necessary.
505	Keyboard Checks the local keyboard. The local display gives feedback on the keys that are pressed by showing their code: [LKB_xxxx N_yy]. [xxxx] Means the key-code and is hexadecimal. [yy] means the number of times this key was pressed. All keys must be tested. User confirmation is necessary at the end of the test. However, the PLAY, PREV and NEXT keys are also part of the keyboard test itself. Therefore it is needed to press these keys for one second.
506	Remote-Control Checks the interface between the remote control and the front panel. The local display gives feedback on the remote key that is pressed by showing its code: [RC C_xx N_yy]. [xx] Means the RC-key-code and is hexadecimal. [yy] means the number of times a RC-key was pressed. At least one key must be tested. User confirmation is necessary. The PLAY key confirms that at least one RC-key is tested.
518	Dimmer Dimming test of Display

User confirmation is necessary during the front panel tests. The following keys are used for user feedback:

PLAY for confirming that the test is correct. PREV when the test is not ok. NEXT is pressed in order to abort to the nucleus at any time; the nucleus is not tested successfully. The confirmation can also be send through the serial port for automated verification. Character ‘o’ means 'ok'; character ‘n' means that this nucleus must be aborted; the nucleus is not tested successfully. Any other key will fail the test.

Basic Engine Tests [06]

[xx yy] Number	Nuclei
600	S2B Pass Switch the RS232 port and the S2B port in pass-through mode. The only way to exit this nucleus is via a power off of the player.
601	S2Bengine Checks the S2B interface with the Basic Engine by sending an 'echo' command.
602	Version Returns the version number of the Basic Engine. The version number will also be displayed on the local display. The PLAY key is used to exit this nucleus.
603	Reset Resets the Basic Engine.
604	Focus On Puts the laser of the BE into focus (focus loop).
605	Focus Off Switches the focus loop off.
606	Disc Motor On Switches the disk motor (= spindle motor) on.
607	Disc Motor Off Switches the disk motor (= spindle motor) off.
608	Radial On Closes the radial loop.
609	Radial Off Opens the radial loop.
610	Sledge In Moves the sledge fully inwards.
611	Sledge Out Moves the sledge fully outwards.
612	Grooves In Lets the laser spot jump to the inside limit the disc.
613	Grooves Mid Lets the laser spot jump to the middle of the disc.
614	Grooves Out Let's the laser spot jump to the outside of the disc.
615	Tray In Closes the disc tray.
616	Tray Out Opens the disc tray.
635	DVD Laser On Switches the DVD laser of the BE on.
636	CD Laser On Switches the CD laser of the BE on.
637	Lasers Off Switches the lasers off.

Furore Tests [12]

[xx yy] Number	Nuclei
1200	Write Read SDRam Low The following three individual memory tests will be executed at the lower FURORE SDRAM: a data bus test, an address bus test, and a device test. The first two test for electrical wiring problems and improperly inserted chips, while the third is intended to detect missing chips and catastrophic failures. As an unintended consequence, the device test will also uncover problems with the control bus wiring.
1201	Write Read SDRam High The following three individual memory tests will be executed at the higher FURORE SDRAM: a data bus test, an address bus test, and a device test. The first two test for electrical wiring problems and improperly inserted chips, while the third is intended to detect missing chips and catastrophic failures. As an unintended consequence, the device test will also uncover problems with the control bus wiring.
1202	Write Read Fast SDRam Low The following two individual memory tests will be executed at the lower FURORE SDRAM: a data bus test, and an address bus test. The two test for electrical wiring problems and improperly inserted chips.
1203	Write Read Fast SDRam High The following two individual memory tests will be executed at the higher FURORE SDRAM: a data bus test, and an address bus test. The two test for electrical wiring problems and improperly inserted chips.
1204	Id Gets the revision ID of the FURORE chip.

DAC Board Tests [13]

[xx yy] Number	Nuclei
1300	I2C Checks the interface between the I2C controller on the Hostdecoder and the DAC board.
1301	I2C Enable Enables the I2C interface.
1302	I2C Disable Disables the I2C interface.
1303	Reset Resets the DAC board.
1304	Filter SACD Selects the SACD output filters for the DACs.
1305	Filter Non-SACD Selects the non-SACD output filters for the DACs.
1306	Clock Internal Selects the internal clock of 384 * Fs. (in 44.1kHz mode)
1307	Clock External Selects the external clock. (in non 44.1 kHz mode)
1308	Mute On Switches the mute of the DAC board on.
1309	Mute Off Switches the mute of the DAC board off.
1310	Mode CDDA Switches the DACs into CDDA mode.
1311	Mode DVD48 Switches the DACs into DVD 48 kHz mode.
1312	Mode DVD96 Switches the DACs into DVD96 kHz mode.
1313	Mode DSD Switches the DACs into DSD mode.
1314	Clock Frequency SACD Selects the DAC master clock MCLK for SACD = 384Fs
1315	Clock Frequency CDDA Selects the DAC master clock MCLK for CDDA = 192Fs

Miscellaneous Tests [14]

[xx yy] Number	Nuclei
1400	Clock 11.289 MHz Switches clock A_CLK from the microclock to 11.2896 MHz.
1401	Clock 12.288 MHz Switches clock A_CLK from the microclock to 12.288 MHz.
1402	Clock 24.576 MHz Switches clock A_CLK from the microclock to 24.576 MHz.
1403	Colour Setup I2C Checks the I2C interface with the RGB video processor on the Audio/Video.
1404	Colour Setup High Sets the RGB setting to a high value, changing the intensity.
1405	Colour Setup Low Sets the RGB setting to a low value, changing the intensity.
1406	Colour Setup Normal Sets the RGB setting to a normal value, changing the intensity.
1407	Scart Switch I2C Checks the I2C interface with the scart switch on the Audio/Video board.
1408	Scart Switch Dvd Sets the switch IC on the Audio/Video board to give DVD signal.
1409	Scart Switch Pass Sets the scart IC on the Audio/Video board to pass-through the aux. scart input.

[xx yy] Number	Nuclei
1410	Scart Low Steers pin 16 on the scart connector with the value low (0 to 2 V).
1411	Scart Medium Steers pin 16 on the scart connector with the value medium (4.5 to 7 V).

5.3.4 MENU MODE INTERFACE

Activation

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

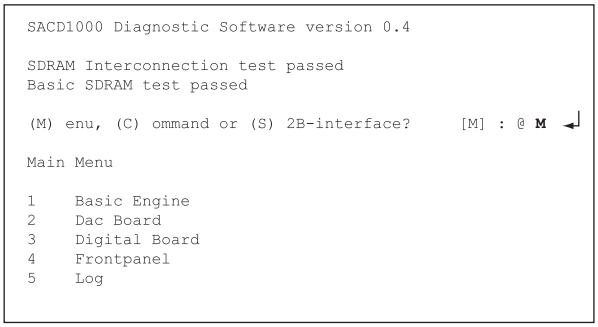


Figure 5-9

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.

Menu structure

The following menu structure is given after starting up the SACD1000 player in menu mode. The symbol → indicates that the current menu choice will invoke the display of a submenu. The number between [ ] mean the nucleus number. These numbers will not be shown on the screen.

Main Menu
1. Basic Engine →
2. Dac Board →
3. Digital Board →
4. Front panel →
5. Log →

Basic Engine Menu
1. Disc Motor →
2. Focus →
3. Grooves →
4. Laser →
5. Radial →
6. Sledge →
7. Tray →
8. Reset [603]
9. S2B Pass [600]
10. S2B Echo [601]
11. Version [602]

Disc Motor Menu
1. On [606]
2. Off [607]

Focus Menu
1. On [604]
2. Off [605]

Grooves Menu
1. Inside of the Disc [612]
2. Middle of the Disc [613]
3. Outside of the Disc [614]

Laser Menu
1. DVD Laser On [635]
2. CD Laser On [636]
3. Lasers Off [637]

Radial Menu
1. On [608]
2. Off [609]

Sledge Menu
1. Move Inwards [610]
2. Move Outwards [611]

Tray Menu
1. Open [616]
2. Close [615]

DAC Board Menu
1. Clock →
2. DAC Mode →
3. Filter SACD →
4. I2C →
5. Mute →
6. Reset [1303]

DAC Clock Menu
1. Clock Internal [1306]
2. Clock External [1307]
3. Clock Frequency SACD [1314]
4. Clock Frequency CDDA [1315]

DAC Mode Menu
1. Mode CDDA [1310]
2. Mode DVD48 [1311]
3. Mode DVD96 [1312]
4. Mode DSD [1313]

DAC Filter Menu
1. Filter SACD [1304]
2. Filter Non-SACD [1305]

DAC IIC Menu
1. I2C Test [1300]
2. I2C Enable Pin On [1301]
3. I2C Enable Pin Off [1302]

DAC Mute Menu
1. Mute On [1308]
2. Mute Off [1309]

Digital Board Menu
1. Furore →
2. Host Decoder →
3. Miscellaneous →

Furore Menu
1. SDRAM Write/Read High [1201]
2. SDRAM Write/Read Low [1200]
3. SDRAM Write/Read Fast High [1203]
4. SDRAM Write/Read Fast Low [1202]
5. Version [1204]

Host Decoder Menu
1. Audio Mute →
2. Centre On Stereo →
3. Colourbar →
4. De-Emphasis →

5. Pink Noise →
6. Sine Generate →
7. Digital Board Version [108]
8. Flash Checksum [100]
9. Flash1 Write Access [101]
10. Flash2 Write Access [102
11. Flash Write/Read [103]
12. Host SDRAM Write/Read [104]
13. Host SDRAM Write/Read Fast [105]
14. Host DRAM Write/Read [106]
15. Host DRAM Write/Read Fast [107]
16. NVRAM I2C [123]
17. NVRAM Write/Read [122]

Audio Mute Menu
1. Audio Mute On [109]
2. Audio Mute Off [110]

Centre On Stereo Menu
1. Centre-On-Stereo Pin On [113]
2. Centre-On-Stereo Pin Off [114]

Colourbar Menu
1. Colourbar On [120]
2. Colourbar Off [121]

De-Emphasis Menu
1. De-Emphasis On [111]
2. De-Emphasis Off [112]

Pink Noise Menu
1. Pink Noise On [115]
2. Pink Noise On Channel 1 [124]
3. Pink Noise On Channel 2 [125]
4. Pink Noise On Channel 3 [126]
5. Pink Noise On Channel 4 [127]
6. Pink Noise On Channel 5 [128]
7. Pink Noise On Channel 6 [129]
8. Pink Noise Off [116]

Sine Generate Menu
1. Sine On [117]
2. Sine Burst 1kHz [118]
3. Sine Burst 12kHz [119]

Miscellaneous Menu
1. Clock 11.289 MHz [1400]
2. Clock 12.288 MHz [1401]
3. Clock 24.576 MHz [1402]
4. Colour Setup I2C [1403]
5. Colour Setup High [1404]
6. Colour Setup Low [1405]
7. Colour Setup Normal [1406]
8. Scart Pin Low [1410]
9. Scart Pin Medium [1411]
10. Scart Switch I2C [1407]
11. Scart Switch DVD [1408]
12. Scart Switch Pass [1409]

Front Panel Menu
1. Echo [500]
2. Dimmer [618]
3. Light Labels [503]
4. Led Test [504]
5. Keyboard [506]
6. Remote Control [506]
7. Segment Test [502]

Log Menu
1. Application Version Read [406]
2. Error Log Read [404]
3. Error Log Reset [407]
4. Lifetime Log Read [405]

5.4 Nuclei Error Codes

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

5.4.1 Host Decoder Nuclei

Error code	Error description
10000	Test succeeded.
10001	Test failed, checksum is wrong.
10100	Test succeeded.
10101	FLASH 1 Write access test failed.
10200	Test succeeded.
10201	FLASH 2 Write access test failed.
10300	Test succeeded.
10301	FLASH write test failed.
10302	FLASH write command failed.
10303	FLASH write test done max. number of times.
10400	Memory tests succeeded.
10401	Memory databus test goes wrong at wire dy.
10402	Memory addressbus test goes wrong at wire ay.
10403	Physical memory device test goes wrong at address 0xYYYYYYYY.
10500	Memory tests succeeded.
10501	Memory databus test goes wrong at wire dy.
10502	Memory addressbus test goes wrong at wire ay.
10503	Physical memory device test goes wrong at address 0xYYYYYYYY.
10600	Memory tests succeeded.
10601	Memory databus test goes wrong at wire dy.
10602	Memory addressbus test goes wrong at wire ay.
10603	Physical memory device test goes wrong at address 0xYYYYYYYY.
10700	Memory tests succeeded.
10701	Memory databus test goes wrong at wire dy.
10702	Memory addressbus test goes wrong at wire ay.
10703	Physical memory device test goes wrong at address 0xYYYYYYYY.
10800	Test succeeded.
10900	Test succeeded.
10901	Muting audio test failed.
11000	Test succeeded.
11001	Demuting audio test failed.
11100	Test succeeded.
11200	Test succeeded.
11300	Test succeeded.
11400	Test succeeded.

Error code	Error description
11500	Test succeeded.
11501	Set-up of I2C failed.
11502	The selection of the clock source failed.
11504	The demute of the audio failed.
11600	Test succeeded.
11601	Set-up of I2C failed.
11602	The mute of the audio failed.
11700	Test succeeded.
11701	Set-up of I2C failed.
11702	The mute of the audio failed.
11703	The demute of the audio failed.
11704	The selection of the clock source failed.
11707	Set-up of front panel failed.
11708	Front panel keyboard access failed.
11800	Test succeeded.
11801	Set-up of I2C failed.
11802	The mute of the audio failed.
11803	The demute of the audio failed.
11804	The selection of the clock source failed.
11900	Test succeeded.
11901	Set-up of I2C failed.
11902	The mute of the audio failed.
11903	The demute of the audio failed.
11904	The selection of the clock source failed.
12000	Test succeeded.
12100	Test succeeded.
12200	Test succeeded.
12201	I2C bus busy before start.
12202	NVRAM I2C access time-out.
12203	No NVRAM I2C access acknowledge.
12204	NVRAM I2C access time-out.
12205	NVRAM I2C Write/Read back failed.
12300	Test succeeded.
12301	I2C bus busy before start.
12302	NVRAM I2C read access time-out.
12303	No NVRAM I2C read acknowledge.
12304	NVRAM I2C read failed.
12400	Test succeeded.
12401	Test failed.
12500	Test succeeded.
12501	Test failed.
12600	Test succeeded.
12601	Test failed.
12700	Test succeeded.
12701	Test failed.
12800	Test succeeded.
12801	Test failed.
12900	Test succeeded.
12901	Test failed.

5.4.2 NVRAM Nuclei

Error code	Error description
40000	Test succeeded.
40001	I2C access failed.
40100	Test succeeded.
40101	I2C access failed.
40102	Invalid input.
40200	Test succeeded.
40201	I2C access failed.
40202	Invalid input.
40400	Test succeeded.
40401	I2C access failed.
40402	Errorlog in NVRAM is corrupt.
40403	Front panel access failed.
40500	Test succeeded.
40501	I2C access failed.
40502	Front panel access failed.
40600	Test succeeded.
40601	I2C access failed.
40700	Test succeeded.
40701	I2C access failed.
40800	Test succeeded.
40801	I2C access failed.
40900	Test succeeded.
40901	I2C access failed.

5.4.3 Front Panel Nuclei

Error code	Error description
50000	Test succeeded.
50001	I2C bus busy.
50002	I2C read access time-out.
50003	No I2C read acknowledges.
50004	I2C read failed.
50005	I2C write access time-out.
50006	No I2C write acknowledges.
50007	I2C write failed.
50008	No echo response from front panel.
50100	Test succeeded.
50101	I2C connection failed.
50200	Test succeeded.
50201	I2C connection failed.
50202	Test failed.
50300	Test succeeded.
50301	I2C connection failed.
50302	Test failed.
50400	Test succeeded.
50401	I2C connection failed.
50402	Test failed.
50500	Test succeeded.
50501	I2C connection failed.

Error code	Error description
50502	Test failed.
50504	Not all keys were pressed.
50600	Test succeeded.
50601	I2C connection failed.
50602	Test failed.
51800	Test succeeded.
51806	I2C connection failed.
51807	Test failed.

5.4.4 Basic Engine Nuclei

Error code	Error description
60000	Test succeeded.
60100	Test succeeded.
60101	Basic Engine returned error number 0xXX.
60102	Parity error from Basic Engine to Serial.
60103	Communication time-out error.
60104	Unexpected response from Basic Engine.
60105	Echo loop could not be closed.
60106	Wrong echo pattern received.
60200	Test succeeded.
60201	Basic Engine returned error number 0xXX.
60202	Parity error from Basic Engine to Serial.
60203	Communication time-out error.
60204	Unexpected response from Basic Engine.
60300	Test succeeded.
60301	Basic-Engine time-out error.
60400	Test succeeded.
60401	Basic Engine returned error number 0xXX.
60402	Parity error from Basic Engine to Serial.
60403	Communication time-out error.
60404	Unexpected response from Basic Engine.
60405	Focus loop could not be closed.
60500	Test succeeded.
60501	Basic Engine returned error number 0xXX.
60502	Parity error from Basic Engine to Serial.
60503	Communication time-out error.
60504	Unexpected response from Basic Engine.
60600	Test succeeded.
60601	Basic Engine returned error number 0xXX.
60602	Parity error from Basic Engine to Serial.
60603	Communication time-out error.
60604	Unexpected response from Basic Engine.
60700	Test succeeded.
60701	Basic Engine returned error number 0xXX.
60702	Parity error from Basic Engine to Serial.
60703	Communication time-out error.
60704	Unexpected response from Basic Engine.
60800	Test succeeded.
60801	Basic Engine returned error number 0xXX.
60802	Parity error from Basic Engine to Serial.
60803	Communication time-out error.
60804	Unexpected response from Basic Engine.
60805	Radial loop could not be closed.

Error code	Error description
60900	Test succeeded.
60901	Basic Engine returned error number 0xXX.
60902	Parity error from Basic Engine to Serial.
60903	Communication time-out error.
60904	Unexpected response from Basic Engine.
61000	Test succeeded.
61001	Basic Engine returned error number 0xXX.
61002	Parity error from Basic Engine to Serial.
61003	Communication time-out error.
61004	Unexpected response from Basic Engine.
61100	Test succeeded.
61101	Basic Engine returned error number 0xXX.
61102	Parity error from Basic Engine to Serial.
61103	Communication time-out error.
61104	Unexpected response from Basic Engine.
61200	Test succeeded.
61201	Basic Engine returned error number 0xXX.
61202	Parity error from Basic Engine to Serial.
61203	Communication time-out error.
61204	Unexpected response from Basic Engine.
61300	Test succeeded.
61301	Basic Engine returned error number 0xXX.
61302	Parity error from Basic Engine to Serial.
61303	Communication time-out error.
61304	Unexpected response from Basic Engine.
61400	Test succeeded.
61401	Basic Engine returned error number 0xXX.
61402	Parity error from Basic Engine to Serial.
61403	Communication time-out error.
61404	Unexpected response from Basic Engine.
61500	Test succeeded.
61501	Basic Engine returned error number 0xXX.
61502	Parity error from Basic Engine to Serial.
61503	Communication time-out error.
61504	Unexpected response from Basic Engine.
61600	Test succeeded.
61601	Basic Engine returned error number 0xXX.
61602	Parity error from Basic Engine to Serial.
61603	Communication time-out error.
61604	Unexpected response from Basic Engine.
63500	Test succeeded.
63501	Basic Engine returned error number 0xXX.
63502	Parity error from Basic Engine to Serial.
63503	Communication time-out error.
63504	Unexpected response from Basic Engine.
63600	Test succeeded.
63601	Basic Engine returned error number 0xXX.
63602	Parity error from Basic Engine to Serial.
63603	Communication time-out error.
63604	Unexpected response from Basic Engine.
63700	Test succeeded.
63701	Basic Engine returned error number 0xXX.
63702	Parity error from Basic Engine to Serial.

Error code	Error description
63703	Communication time-out error.
63704	Unexpected response from Basic Engine.

5.4.5 Furore Nuclei

Error code	Error description
120000	Test succeeded.
120001	Memory databus test goes wrong at wire dy.
120002	Memory addressbus test goes wrong at wire ay.
120003	Physical memory device test goes wrong at address 0xYYYYYYYY.
120100	Test succeeded.
120101	Memory databus test goes wrong at wire dy.
120102	Memory addressbus test goes wrong at wire ay.
120103	Physical memory device test goes wrong at address 0xYYYYYYYY.
120200	Test succeeded.
120201	Memory databus test goes wrong at wire dy.
120202	Memory addressbus test goes wrong at wire ay.
120203	Physical memory device test goes wrong at address 0xYYYYYYYY.
120300	Test succeeded.
120301	Memory databus test goes wrong at wire dy.
120302	Memory addressbus test goes wrong at wire ay.
120303	Physical memory device test goes wrong at address 0xYYYYYYYY.
120400	Test succeeded.

5.4.6 DAC Nuclei

Error code	Error description
130000	Test succeeded.
130001	I2C bus busy before start.
130011	I2C I/O expander bus busy.
130012	I2C I/O expander read access time-out.
130013	I2C I/O expander no read acknowledge.
130014	I2C I/O expander read failed.
130015	I2C I/O expander write access time-out.
130016	I2C I/O expander no write acknowledge.
130017	I2C I/O expander write failed.
130018	I2C I/O expander failed.
130021	I2C DAC_LR device bus busy.
130022	I2C DAC_LR device read access time-out.
130023	I2C DAC_LR device no read acknowledge.
130024	I2C DAC_LR device read failed.
130025	I2C DAC_LR device write access time-out.
130026	I2C DAC_LR device no write acknowledge.
130027	I2C DAC_LR device write failed.
130028	I2C DAC_LR device failed.
130031	I2C DAC_LSRS device bus busy.
130032	I2C DAC_LSRS device read access time-out.
130033	I2C DAC_LSRS device no read acknowledge.
130034	I2C DAC_LSRS device read failed.
130035	I2C DAC_LSRS device write access time-out.
130036	I2C DAC_LSRS device no write acknowledge.
130037	I2C DAC_LSRS device write failed.
130038	I2C DAC_LSRS device failed.
130041	I2C DAC_CLFE device bus busy.
130042	I2C DAC_CLFE device read access time-out.
130043	I2C DAC_CLFE device no read acknowledge.
130044	I2C DAC_CLFE device read failed.
130045	I2C DAC_CLFE device write access time-out.
130046	I2C DAC_CLFE device no write acknowledge.
130047	I2C DAC_CLFE device write failed.
130048	I2C DAC_CLFE device failed.
130100	Test succeeded.
130200	Test succeeded.
130300	Test succeeded.
130301	I2C bus busy before start.
130302	I2C access failed.
130400	Test succeeded.
130401	I2C bus busy before start.
130402	I2C access failed.
130500	Test succeeded.
130501	I2C bus busy before start.
130502	I2C access failed.
130600	Test succeeded.
130601	I2C bus busy before start.
130602	I2C access failed.
130700	Test succeeded.
130701	I2C bus busy before start.
130702	I2C access failed.
130800	Test succeeded.
130801	I2C bus busy before start.
130802	I2C access failed.
130900	Test succeeded.
130901	I2C bus busy before start.
130902	I2C access failed.
131000	Test succeeded.
131001	I2C bus busy before start.
131002	I2C access failed.
131100	Test succeeded.
131101	I2C bus busy before start.
131102	I2C access failed.
131200	Test succeeded.
131201	I2C bus busy before start.
131202	I2C access failed.

Error code	Error description
131300	Test succeeded.
131301	I2C bus busy before start.
131302	I2C access failed.
131400	Test succeeded.
131401	I2C bus busy before start.
131402	I2C access failed.
131500	Test succeeded.
131501	I2C bus busy before start.
131502	I2C access failed.

5.4.7 Miscellaneous Nuclei

Error code	Error description
140000	Test succeeded.
140001	I2C access failed.
140100	Test succeeded.
140101	I2C access failed.
140200	Test succeeded.
140300	Test succeeded.
140301	I2C bus busy.
140302	I2C device write access time-out.
140303	I2C device no write acknowledge.
140304	I2C device write failed.
140400	Test succeeded.
140401	I2C bus busy before start.
140402	I2C access failed.
140403	Setup of SCART switch failed.
140500	Test succeeded.
140501	I2C bus busy before start.
140502	I2C access failed.
140503	Setup of SCART switch failed.
140600	Test succeeded.
140601	I2C bus busy before start.
140602	I2C access failed.
140603	Setup of SCART switch failed.
140700	Test succeeded.
140701	I2C bus busy.
140702	I2C device read access time-out.
140703	I2C device no read acknowledge.
140704	I2C device read failed.
140800	Test succeeded.
140801	Setup of ColourSetup chip failed.
140802	I2C device write failed.
140900	Test succeeded.
140901	Setup of ColourSetup chip failed.
140902	I2C device write failed.
140903	I2C device read failed.
141000	Test succeeded.
141100	Test succeeded.

5.5 Test instructions SACD mono board

5.5.1 General

- Impedance of measuring-equipment should be > 1M(.
- 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 (LVTTL) high : > 3.0V (LVTTL) LOW : < 0.4V (TTL) HIGH: > 4.5V (TTL)
- All voltages marked with “stby” have to stay on during standby.
- Because all clocks are derived from the SACD clock (384FS_in) from the DAC board, this board should always be connected to the mono board.
- The linear power supply is switched on/off by the STB_OUT signal from the mono board to the DAC board.

5.5.2 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	0V
1600-7	F623	GND	0V
1600-8	F623	GND	0V
1600-9	F618	-8Vstby	-8V
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	
1600-11	F636	+12Vstby	90 mA
1600-12	F623	GND	
1600-13	F675	PWR_FAIL	

5.5.3 Reset circuitry

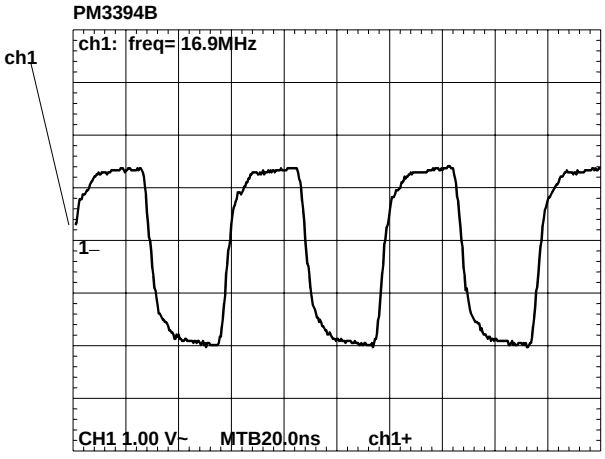
Reset of Sti5505:
In power down mode STB_CONT is high; the clock is disabled in order to reduce the power consumption. When STB_CONT goes low, STB_CONTD goes high and enables the 27 MHz clock.
Check that this clock is present and stable before the RESETn is de-asserted. RESETn is a signal, which allows 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 HD61are 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.

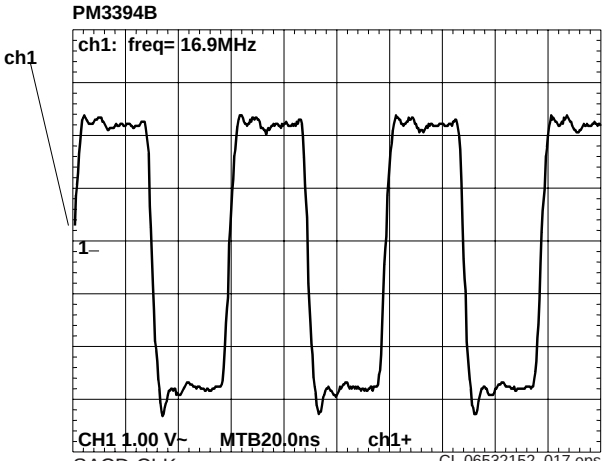
5.5.4 Clock check

The source clock comes from the DAC 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 DAC board should be connected together. On power up the clocks appear on the board. All clocks to be measured have a 0.02% tolerance.

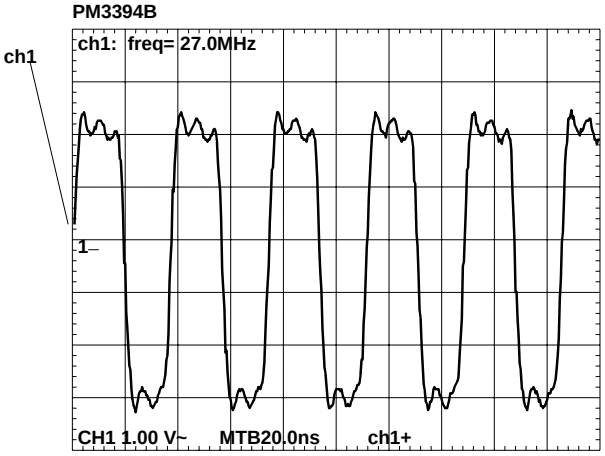
Clockname	Test point	Frequency / level
384Fs_in	F911	16.9344 MHz / 3V3
SACD_CLK	F903	16.9344 MHz / 5V
27M_CLK	F503	27MHz / 5V
PCMCLK_AV	F640	12.288MHz / 3V3
MACE CLOCK	F211	8.46 MHz / 3V3



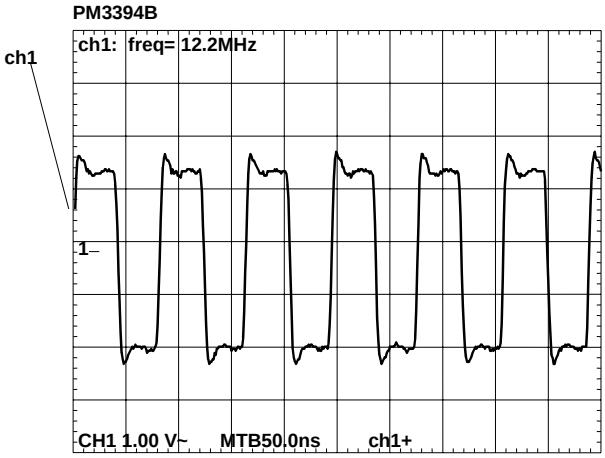
384FS_IN CL 06532152_016.eps 051200



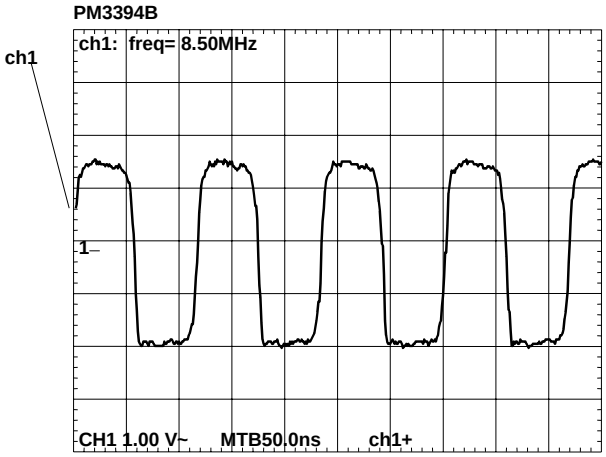
SACD CLK CL 06532152_017.eps 051200

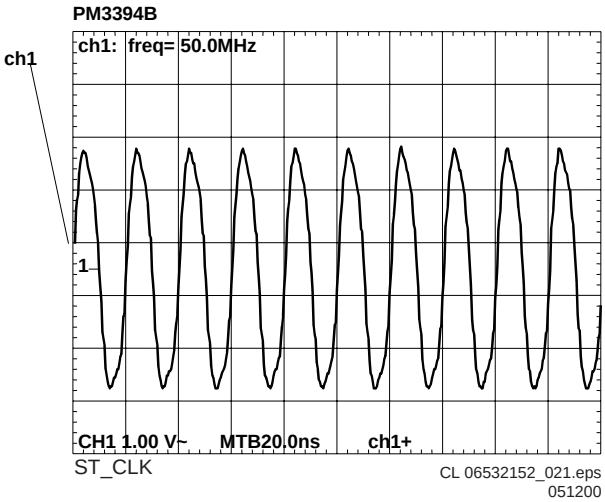


27M_CLK CL 06532152_018.eps 051200



PCM CLK_AV CL 06532152_019.eps 051200





5.5.5 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 SACD power supply, the mono board and the DAC 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 an 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: "SACD1000 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
100	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
104	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
123	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
122	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
500	Echo	Write and read back
501	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.

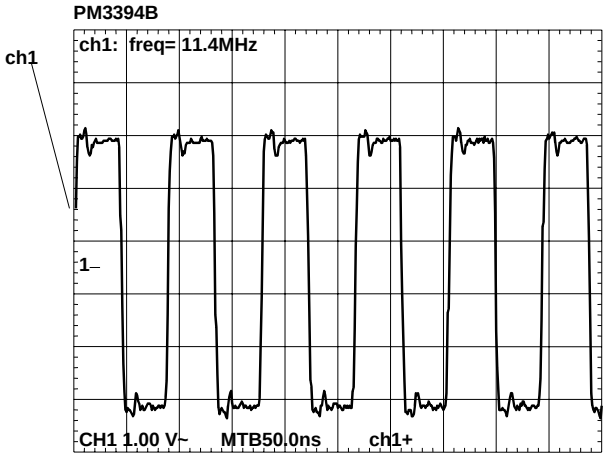
Ref.#	Command Name	Remark
601	S2b Echo	Write and read back

Peripherals

Audio clock select

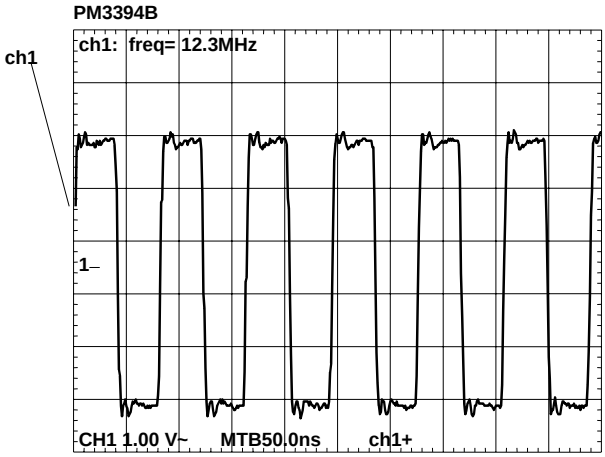
This clock is derived from the SACD CLOCK by the mono board system clocks. The audio PCM_CLK can take 3 values. The Sti5505 PIO's permit to select 3 different frequencies depending on the application. Check those frequencies on F566

Ref.#	Command Name	Frequency	SEL_ACLK2	SEL_ACLK1
1400	Clock 11.289 MHz	11.2896 MHz	0	1
1401	Clock 12.288 MHz	12.288 MHz	1	0
1402	Clock 24.576 MHz	24.576 MHz	1	1



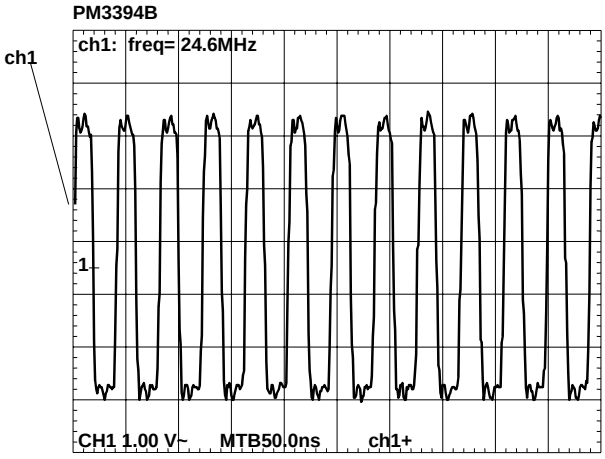
PCM clk 11,298MHz

CL 06532152_022.eps
051200



PCM clk 12.288MHz

CL 06532152_023.eps
051200



PCM clk 24.576MHz

CL 06532152_024.eps
051200

Audio mute

Ref.#	Command Name	MUTE_AV at F625	Remark
109	Mute ON	+4.8V	Audio Mute On
110	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
113	Centre-On-Stereo Pin On	3.3V	Mono
114	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
1301	I2C enable	H = 5V
1302	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. Check at F620 the output voltage with next commands:

Ref.#	Command Name	Remark	Level
1410	Scart Low	No picture	0V ± 0.5V
1411	Scart Medium	16/9 format	6V ± 10%

PCM Audio on I2S bus

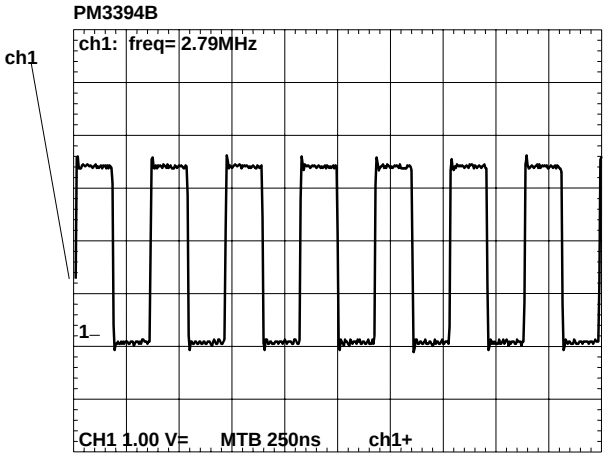
For this test connect the A/V board and the front panel to the monoboard. Don't forget to power up the front panel. The I2S audio signals are measured in 3 different situations: no audio, sine wave is played, pink noise is played.

No audio

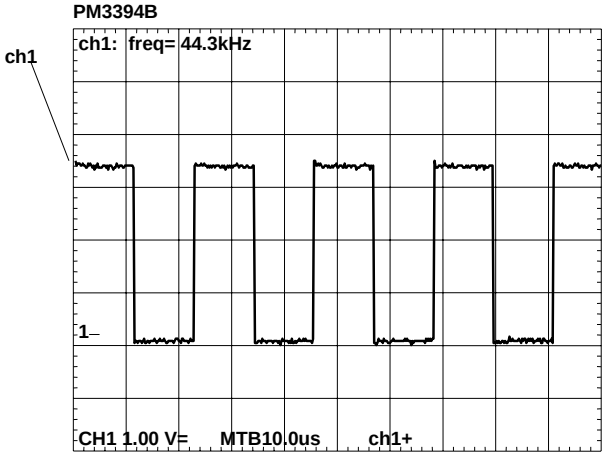
Switch ON the power supplies and check these signals

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

Signal	Test point	type	Level	Frequency
PCM_Ce_Lf_Fur	F659	No signal	LVTTL	N/A
PCM_LsRs_Fur	F504	No signal	LVTTL	N/A
SPDIF	F644	Data stream	TTL	N/A



SCLK_AV CL 06532152_025.eps 051200



LRCLK_AV CL 06532152_026.eps 051200

Sine wave
Generate the sine wave with the following command

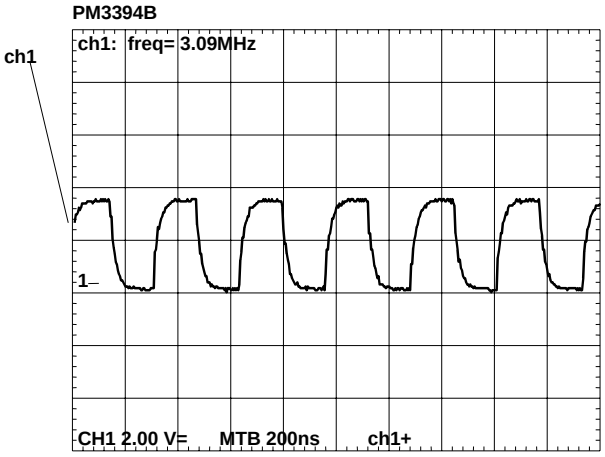
Ref.#	Command Name	Remark
117	Sine ON	Play the sine wave at the audio outputs

Then measure the following signals

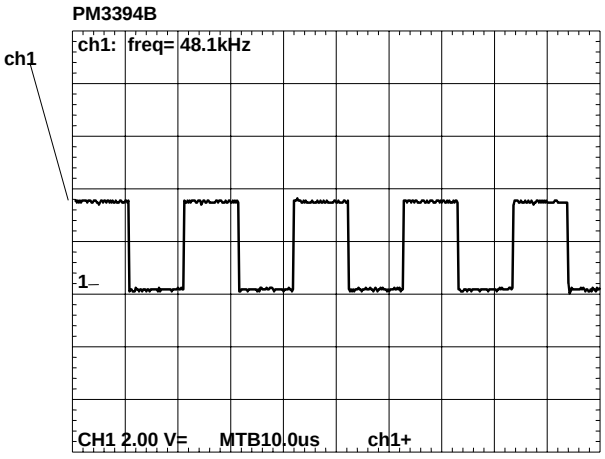
Signal	Test point	type	Level	Frequency
SCLK_AV	F637	Clock	LVTTL	3.072MHz < 0.02%
LRCLK_AV	F641	Clock	LVTTL	48 kHz < 0.02%
PCMCLK_AV	F640	Clock	LVTTL	12.288 MHz < 0.02%
PCMOUT_AV	F638	Data stream	LVTTL	N/A
PCM_Ce_Lf_Fur	F659	No signal	LVTTL	N/A

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

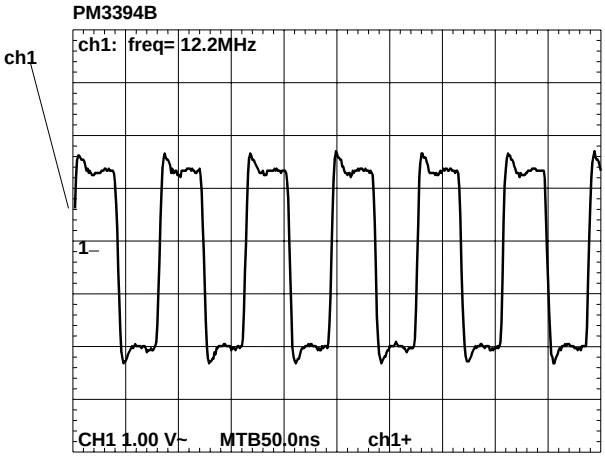
Press “STOP” to switch off the sine wave.



SCLK_AV 3.072MHz CL 06532152_027.eps 051200



LRCLK_AV 48kHz CL 06532152_028.eps 051200



PCM CLK_AV CL 06532152_029.eps 051200

Pink noise
Generate the pink noise with the following command

Ref.#	Command Name	Remark
115	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	LVTTL	3.072MHz < 0.02%
LRCLK_AV	F641	Clock	LVTTL	48 kHz < 0.02%
PCM_CLK_AV	F640	Clock	LVTTL	12.288 MHz < 0.02%
PCMOUT_AV	F638	Data stream	LVTTL	N/A
PCM_Ce_Lf_Fur	F659	Data stream	LVTTL	N/A
PCM_LsRs_Fur	F504	Data stream	LVTTL	N/A
SPDIF	F644	Data stream	TTL	N/A

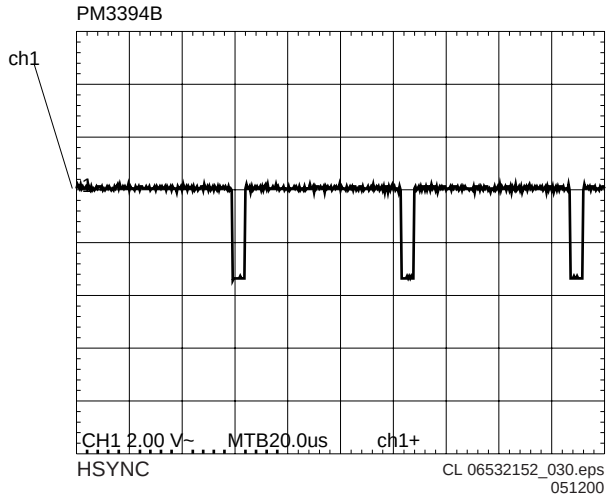
5.5.6 Video

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

Ref.#	Command Name	Remark
120	Colour bar On	8-color bar pattern
121	Colour bar Off	Disable the pattern

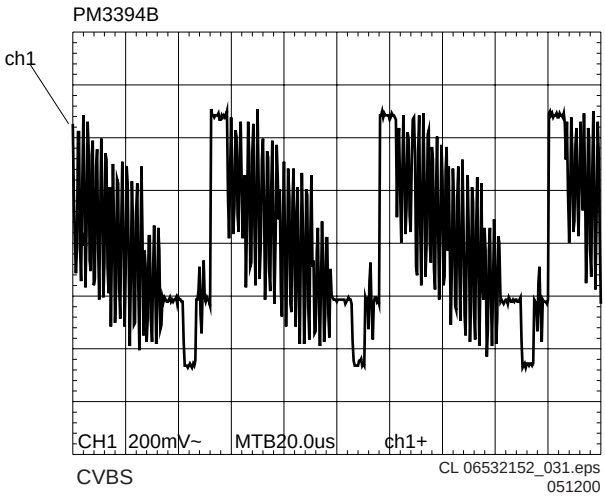
Video Hsync
Measure this output at F656

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

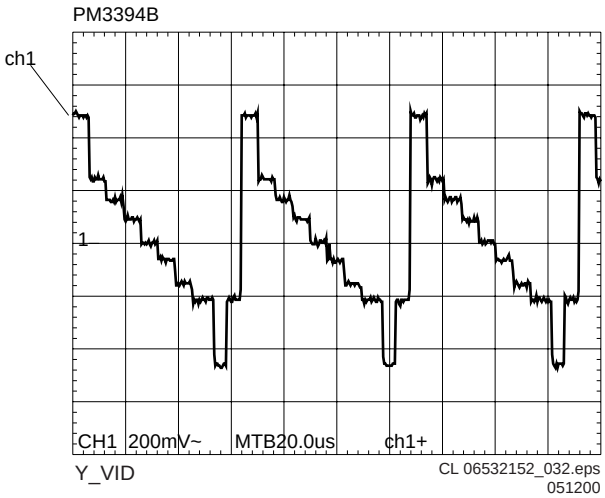


Video signals

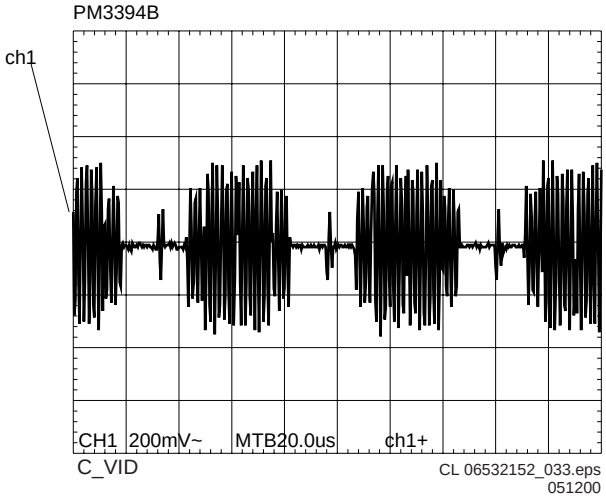
CVBS
Measured at F657



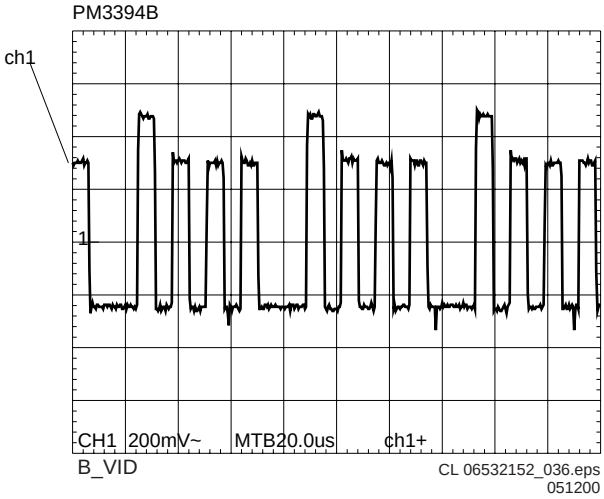
Luminance Y-VID
Measured at F662



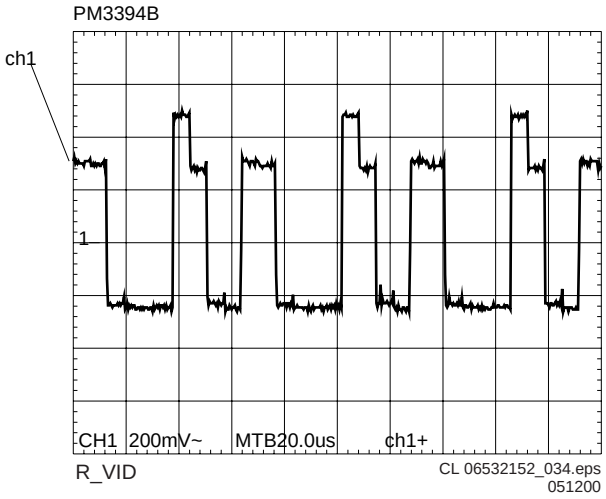
Chrominance C_VID
Measured at F665



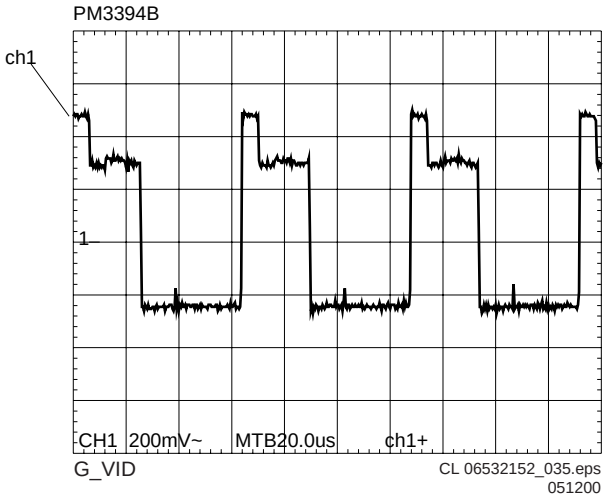
Blue B_VID
Measured at F653



Red R_VID
Measured at F646



Green G_VID
Measured at F649



Switch off the colour bar with the following command:

Ref.#	Command Name	Remark	Value
121	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
1204	DS_FURORE_Id	Check Furore ID
1200	DS_FURORE_Sdram WrRLow	Check full speed SDRAM
1201	DS_FURORE_Sdram WrRHigh	Check full speed SDRAM
1202	DS_FURORE_Sdram WrRLowFast	Check full speed SDRAM
1203	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 DAC board. When you play a pink noise, digital bit stream is coming out of the Furore and is fed to the DAC board.

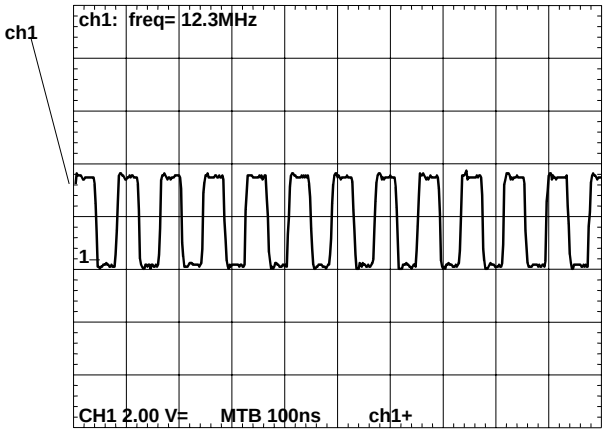
Ref.#	Command Name	Remark
115	Pink Noise ON	Play the pink noise at the audio outputs

Measure the following signals

Signal	Test point	type	Level	Frequency
DSD_PCM(8)	F002	Clock	LVTTL	12.288 MHz < 0.02%
DSD_PCM(6)	F003	Clock	LVTTL	3.072 MHz < 0.02%
DSD_PCM(7)	F004	Clock	LVTTL	48 kHz < 0.02%
DSD_PCM(0)	F005	Data stream	LVTTL	N/A

Signal	Test point	type	Level	Frequency
DSD_PCM(1)	F006	Signal : High	LVTTL	N/A
DSD_PCM(4)	F007	Data stream	LVTTL	N/A
DSD_PCM(5)	F008	Signal : High	LVTTL	N/A
DSD_PCM(2)	F009	Data stream	LVTTL	N/A
DSD_PCM(3)	F010	Signal : High	LVTTL	N/A

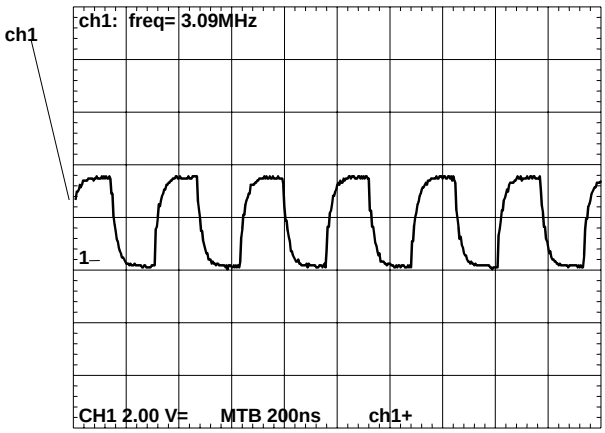
PM3394B



DSD_PCM8

CL 06532152_037.eps
051200

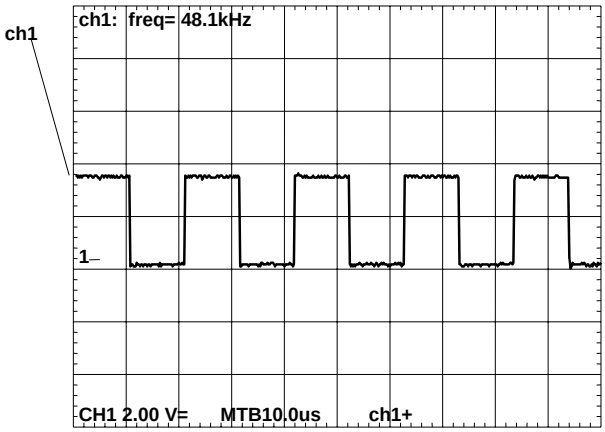
PM3394B



DSD_PCM6

CL 06532152_038.eps
051200

PM3394B



DSD_PCM7

CL 06532152_039.eps
051200

5.5.7 SERVO TESTS

General start-up measurements:

Reset the Basic Engine part

Ref. #	Command Name	Remark
603	BeReset	Reset Basic Engine

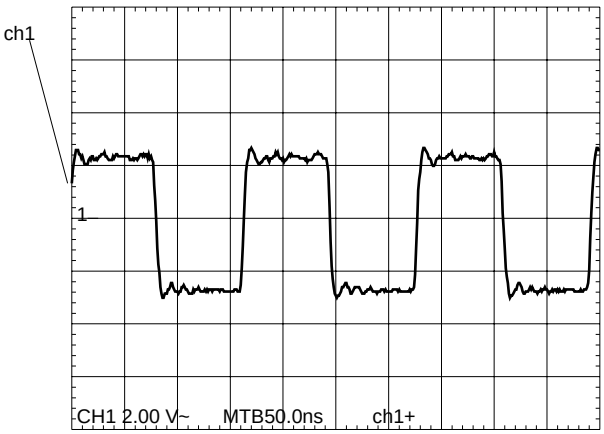
Check Vref

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

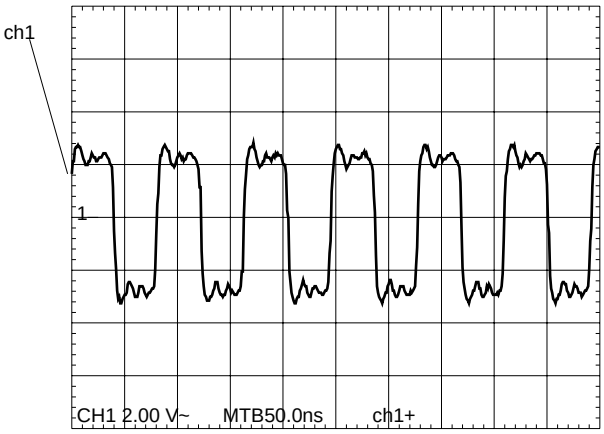
PM3394B



B_BCLK

CL 06532152_040.eps
051200

PM3394B



CL1

CL 06532152_041.eps
051200

Disc Motor:

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

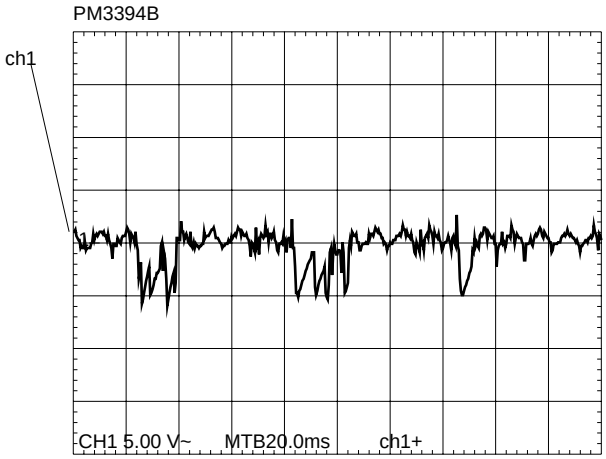
Name	Testpoint	Value
Stby	F357	high
Stby-out	F355	LOW
Moto1	F361	3V±0.3

Switch the Discmotor on/off with next commands:

Ref. #	Command Name	Remark
606	BeDiscmotorOn	Discmotor on
607	BeDiscmotorOff	Discmotor off

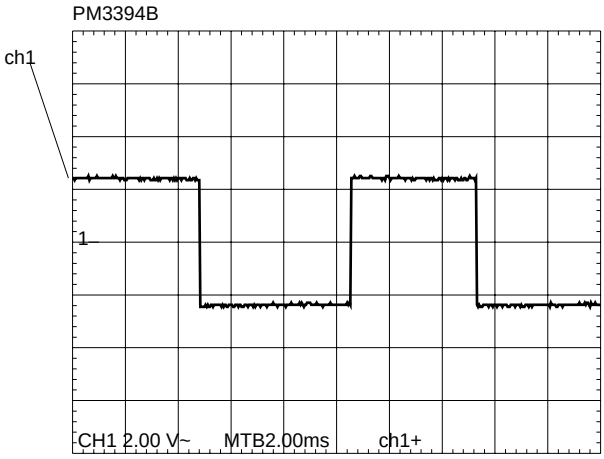
Check the following signals when discmotor has been switched on:

Name	Pin nr.	Frequency
Stby	F357	low
Stby-out	F355	HIGH
Moto1	F361	2V±0.5V
A3	F350	see oscillo-gram
A2	F352	see oscillo-gram
A1	F353	see oscillo-gram



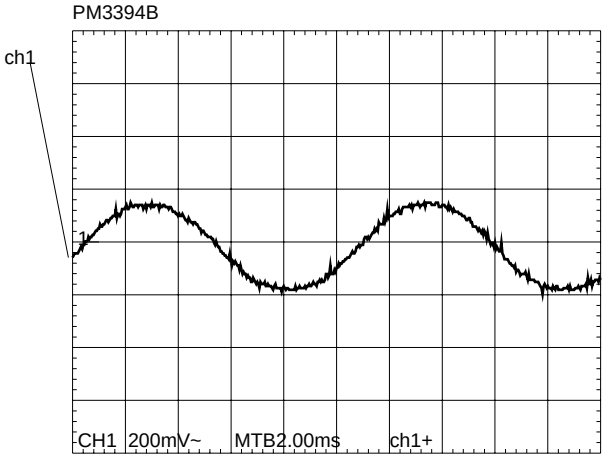
A1-A2-A3 CL 06532152_042.eps 051200

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



T1-T2-T3 CL 06532152_043.eps 051200

VH	F365	3V±0.5V
H1+	F354	see oscillogram
H1-	F359	see oscillogram
H2+	F364	see oscillogram
H2-	F366	see oscillogram
H3+	F367	see oscillogram
H3-	F370	see oscillogram



H1-H2-H3 CL 06532152_044.eps 051200

Switch the discmotor off.

Radial

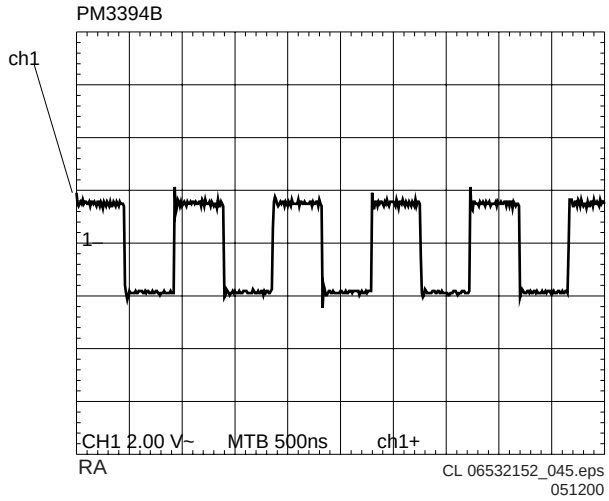
Swith the radial control on/off with the following commands:

Ref. #	Command Name	Remark
608	BeRadialOn	Radial control on
609	BeRadialOff	Radial control off

Check the following signals:

Check for pulse density signal RA at testpoint F227

Name	Testpoint	Value
Rad -	F128	4.3V±0.5V
Rad +	F121	4.3V±0.5V

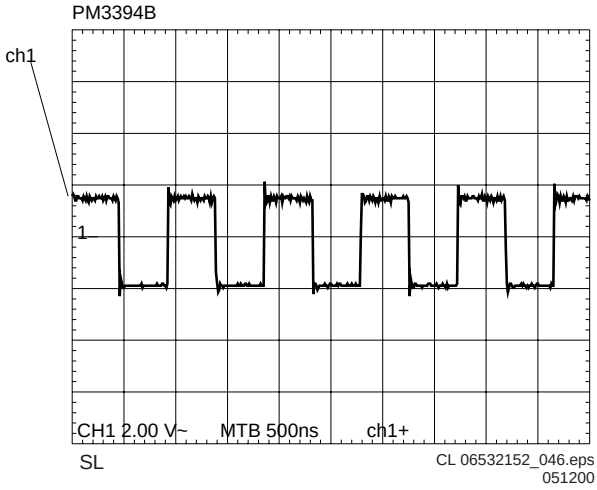


Check if laser is switched on (visual check of laserlight).
Switch the radial control off.

Sledge
Use the following commands to move the sledge:

Ref. #	Command Name	Remark
610	BeSledgeIn	Sledge inwards
611	BeSledgeOut	Sledge outwards

Check pulse density signal SL at testpoint F221



Name	Testpoint	Value
Sl -	F039	4.5V±0.5V
Sl +	F038	4.5V±0.5V

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

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

Measure input sledge control (sledge in home position)

Name	Testpoint	Value
Sinph	F182	1.5V±0.5V
Cosph	F192	1.5V±0.5V

Tray:
To open and close the tray use the following commands:

Ref. #	Command Name	Remark
615	BeTrayIn	Tray in
616	BeTrayOut	Tray out

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

Name	Testpoint	Value
Vo2 -	F116	4.3V±2.0V
Vo2 +	F111	4.3V±2.0V

Measure again the driver outputs while the tray is opening.

Name	Testpoint	Value
Vo2 -	F116	6.0V±1.0V
Vo2 +	F111	2.0V±1.0V

Measure again the driver outputs while the tray is closing

Name	Testpoint	Value
Vo2 -	F116	2.0V±1.0V
Vo2 +	F111	6.0V±1.0V

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

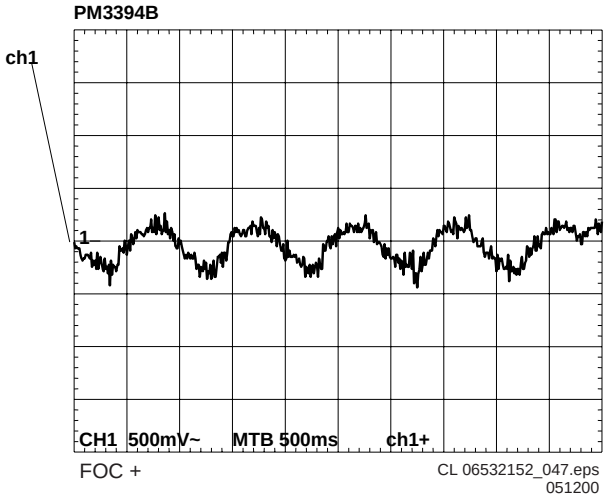
Ref. #	Command Name	Remark
604	BeFocusOn	Focus on
605	BefocusOff	Focus off

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

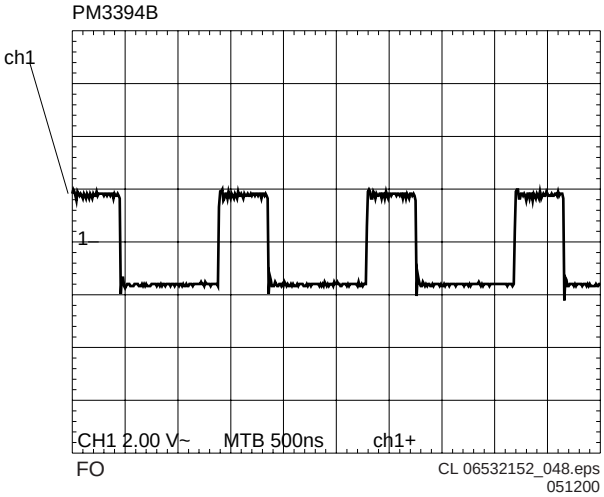
Name	Testpoint	Value
foc -	F124	4.3V±0.5V
foc +	F127	4.3V±0.5V

Switch the focus on
Measure again the driver outputs

Name	Testpoint	Value
Foc - (sawtooth)	F124	1V±0.2V
Foc + (sawtooth)	F127	1V±0.2V



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	2.6V±0.2V
B	F141	2.6V±0.2V
C	F143	2.6V±0.2V
D	F144	2.6V±0.2V
E	F147	2.6V±0.2V
F	F148	2.6V±0.2V

Measure DVDALAS outputs

Name	Testpoint	Value
RFO DC	F146	2.5V ± 0.2V, eyepattern 1Vptp
O1	F155	25mV±10mV
O2	F158	25mV±10mV
O3	F168	25mV±10mV
O4	F165	25mV±10mV
S1	F174	25mV±10mV
S2	F175	25mV±10Mv

5.6 Test instructions Display board

5.6.1 Display board

Introduction
These test instructions are written for all versions of the display PCB 3104 123 42230.
The contents of the PCB can be split up into next blocks:

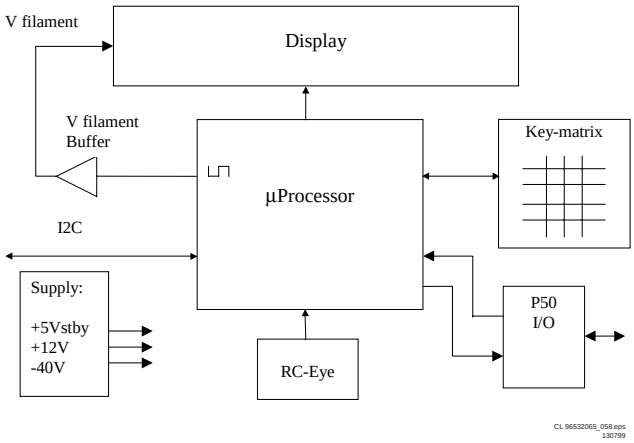


Figure 5-10

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 > 1MΩ.
- To do correct measurements we recommend to use supply 3122 427 21370, which is used in all "second generation B" DVD-players. 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 (processor.

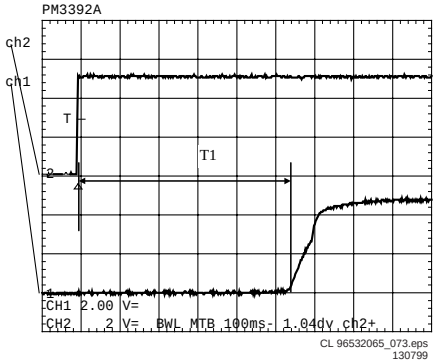


Figure 5-11

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).

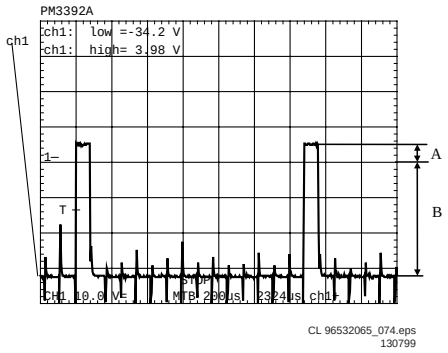


Figure 5-12

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

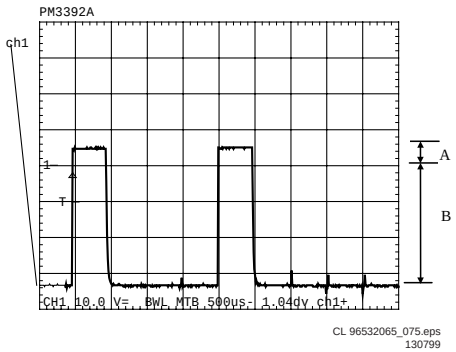


Figure 5-13

Level A:+4V5 ±10%
Level B:-33V ±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.

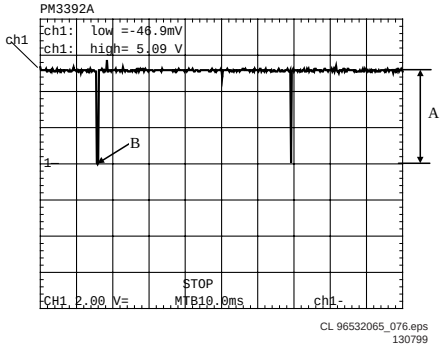


Figure 5-14

Level A: 5.0V ±7%
Level B: 0V ±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 23 of the (P 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 7108, via resistor 3100 and 3104 transistor 7101 is switched on.
2. Check the voltage at the P50 output connector 1118-5: < 200mV.

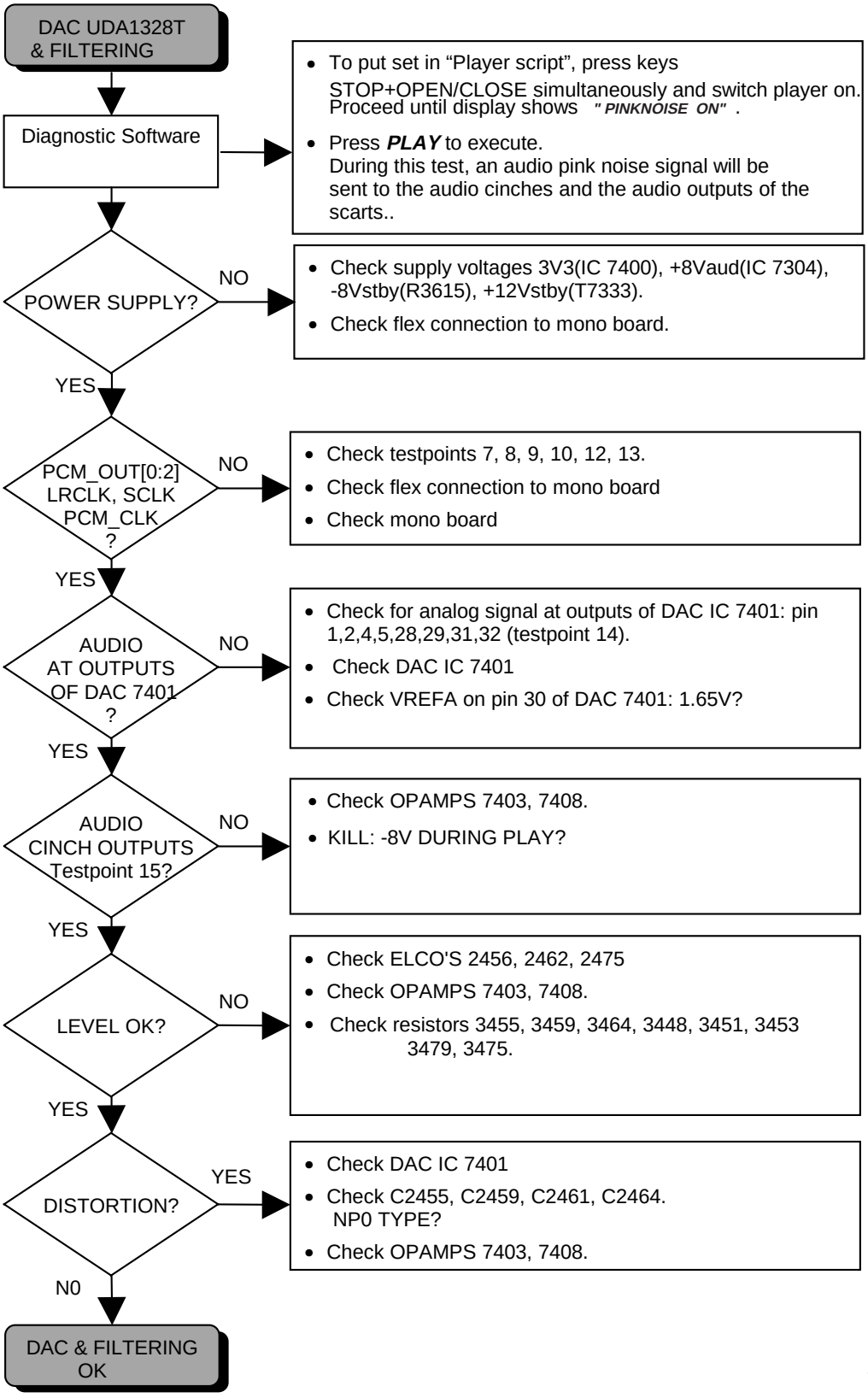
When the reset is released the uP output-pin becomes low and transistor 7101 is switched off.

1. Check the voltage at the P50 output connector 1118-5: 4V9 ±5%.
2. Check also the uP P50 input (uP pin 20): 5V ±5%.
3. Connect the P50 line (connector 1118-5) to ground.
4. Check again the uP P50 input (uP pin 20): <0V3.

5.7 Trouble shooting AV Board

Testing of A/V board can be done using diagnostic software “Player script”.
Mono board is used to generate a sound with the sound tests PINKNOISE ON and SINE ON.
A VIDEO signal is generated with COLOUR-B ON.
Functional control of scart switching is also possible.

AUDIO PART



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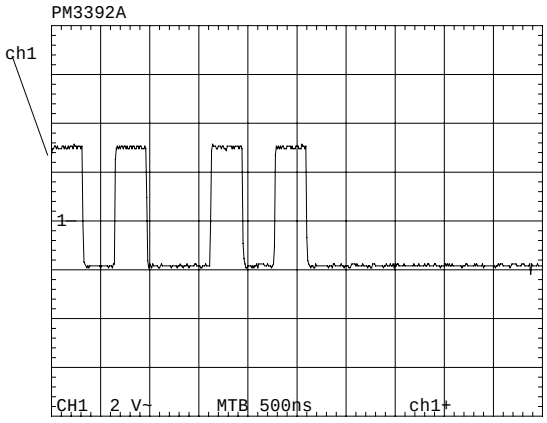
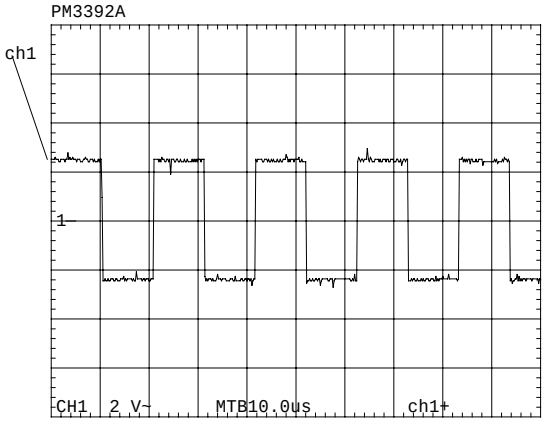
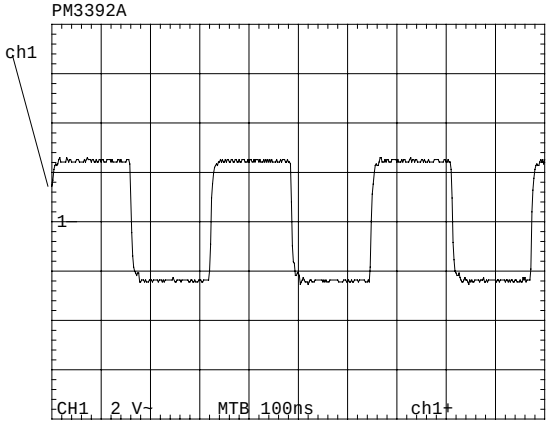


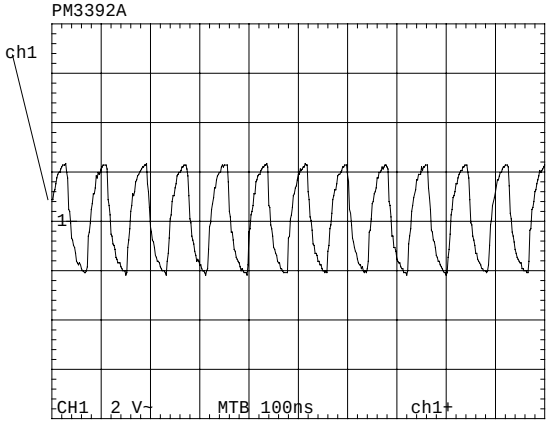
TP 7: PCM_OUT0



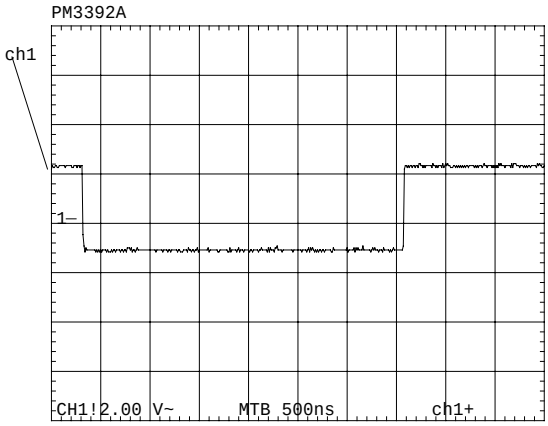
TP8: LRCLK



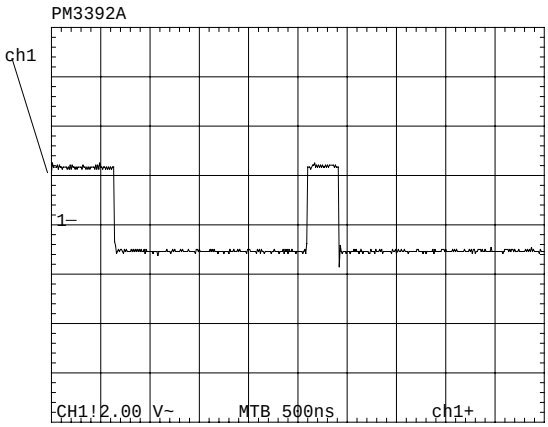
TP9: SCLK



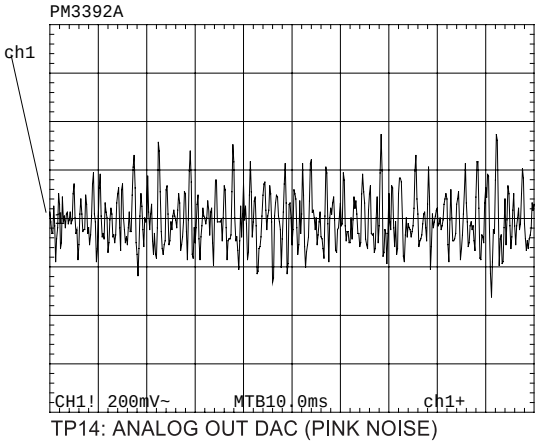
TP10: PCM_CLK



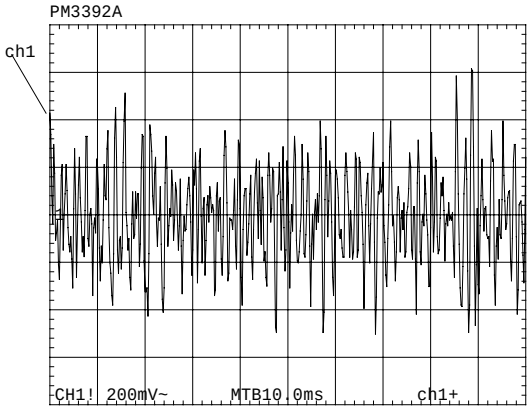
TP12: PCM_OUT2



TP13: PCM_OUT1



TP14: ANALOG OUT DAC (PINK NOISE)



TP15: ANALOG OUT AUDIO CINCH(PINK NOISE)

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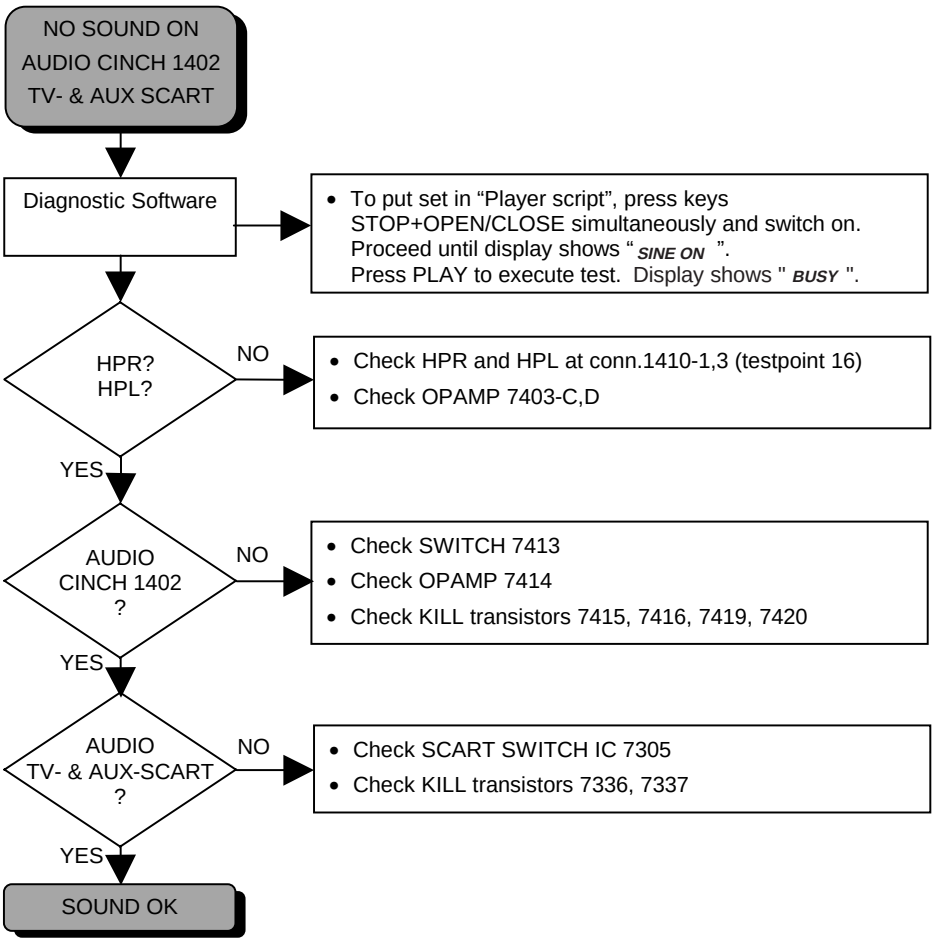
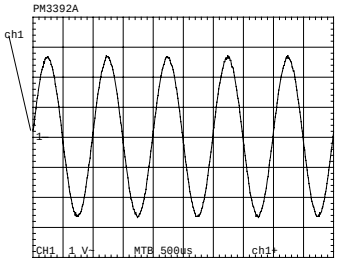
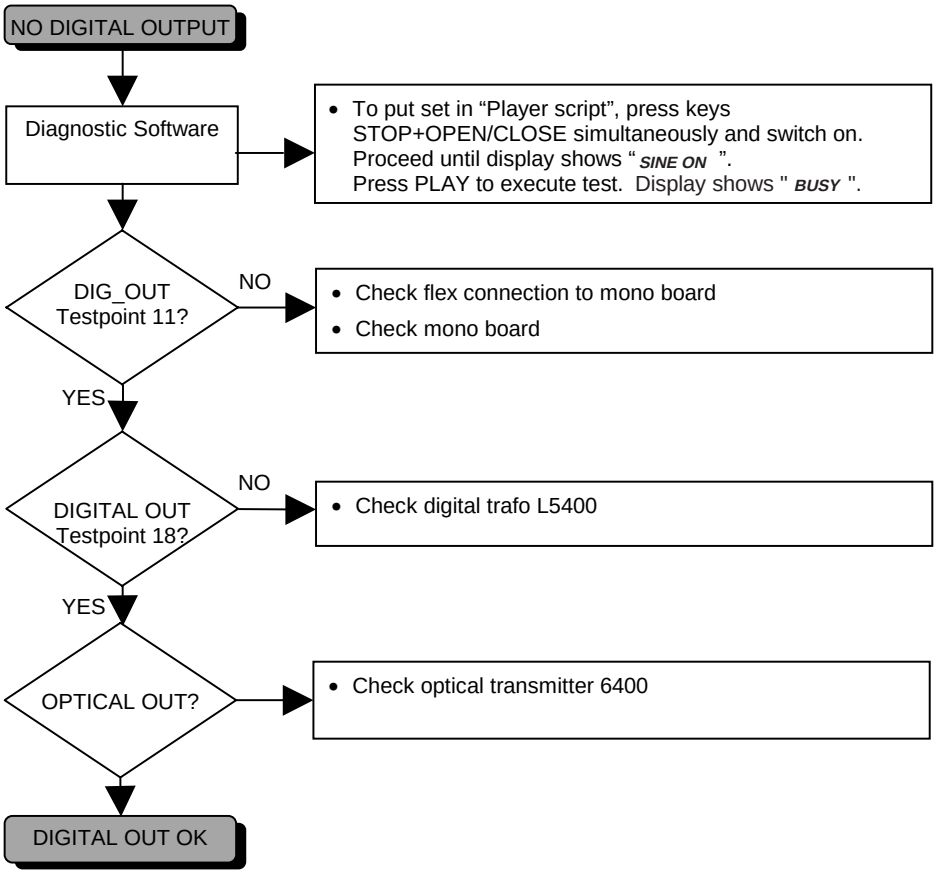
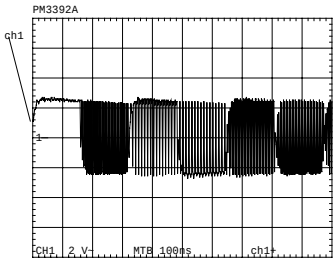
131200



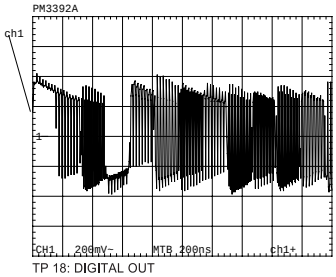


TP 16 : ANALOG OUTPUT AUDIO HP_R & HP_L





TP 11: DIG_OUT



TP 18: DIGITAL OUT

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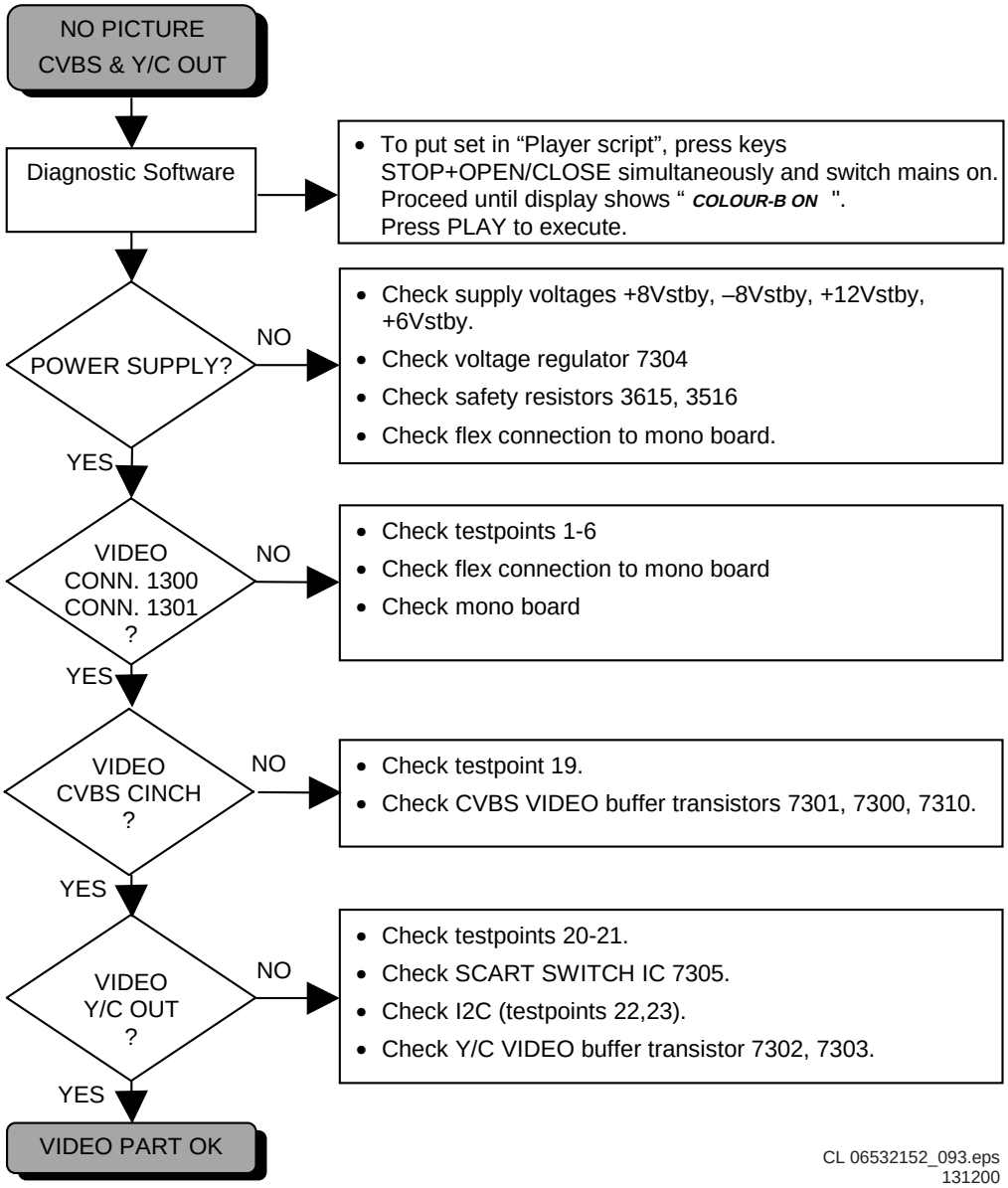
131200

VIDEO PART



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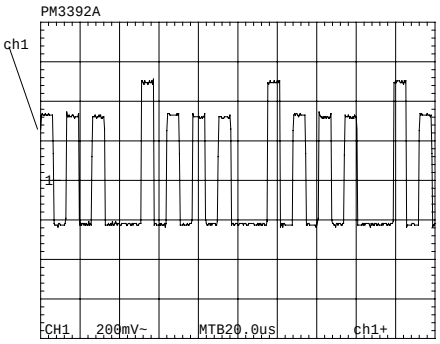
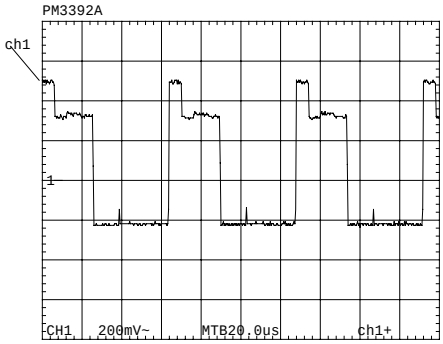
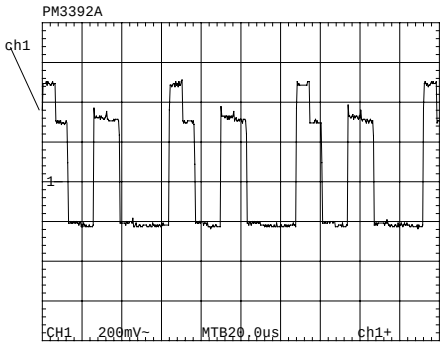
131200



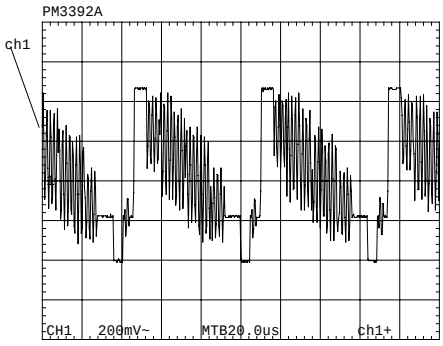
TP 1 : video B



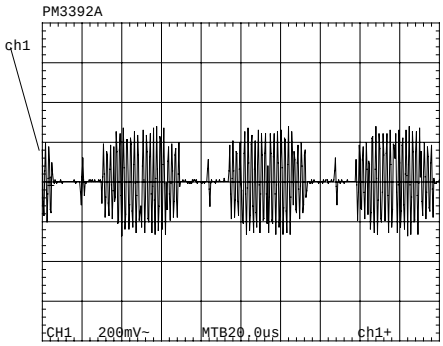
TP 2 : video G



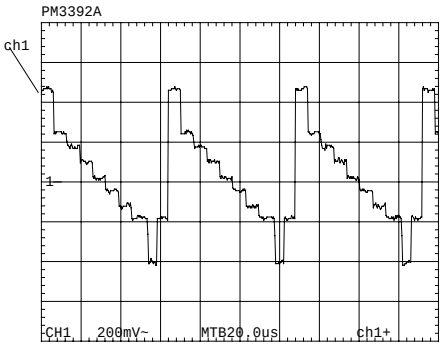
TP 3 : video R



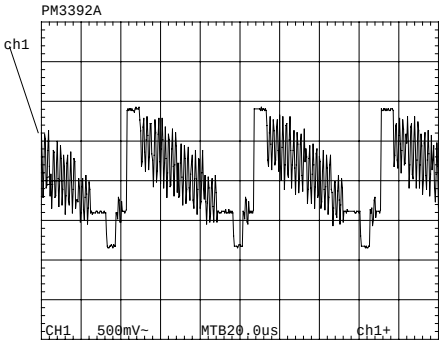
TP 4 : CVBS



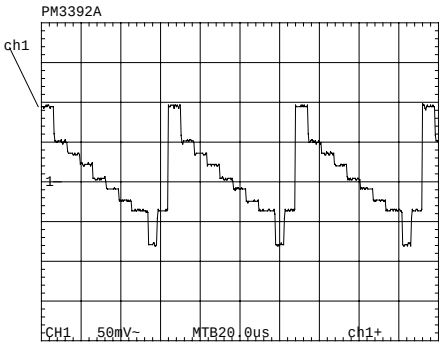
TP 5 : C_ENC



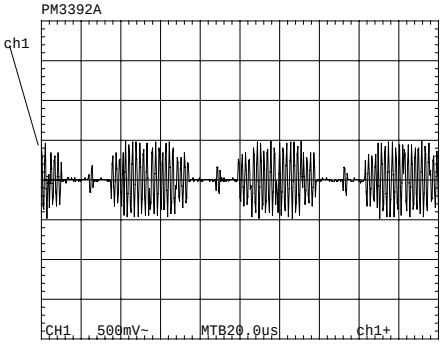
TP 6 : Y_ENC



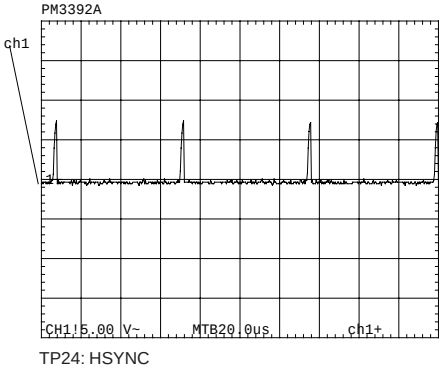
TP 19 : CVBS_OUT



TP20: Y_OUT



TP 21: C_OUT



TP24: HSYNC

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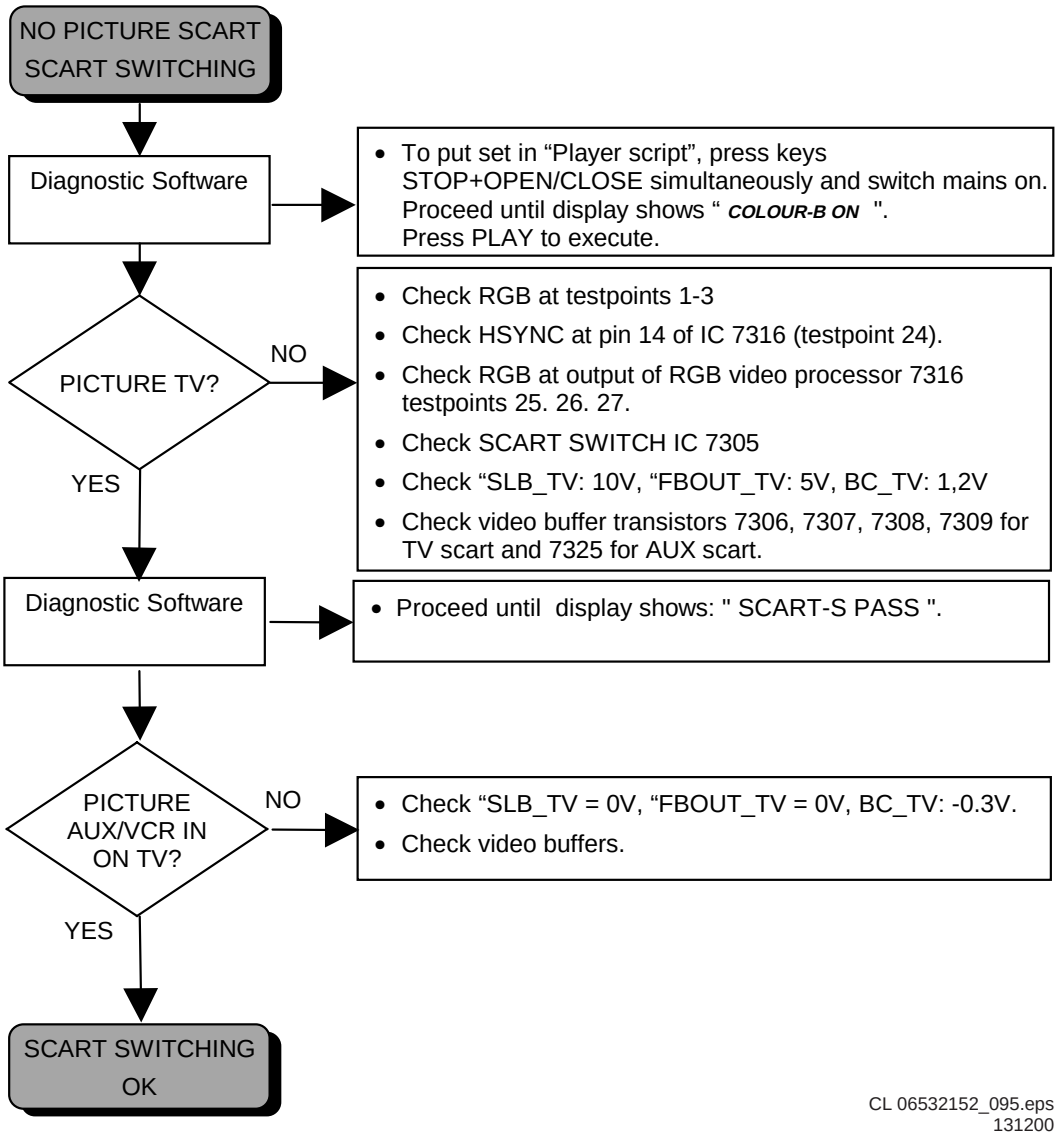

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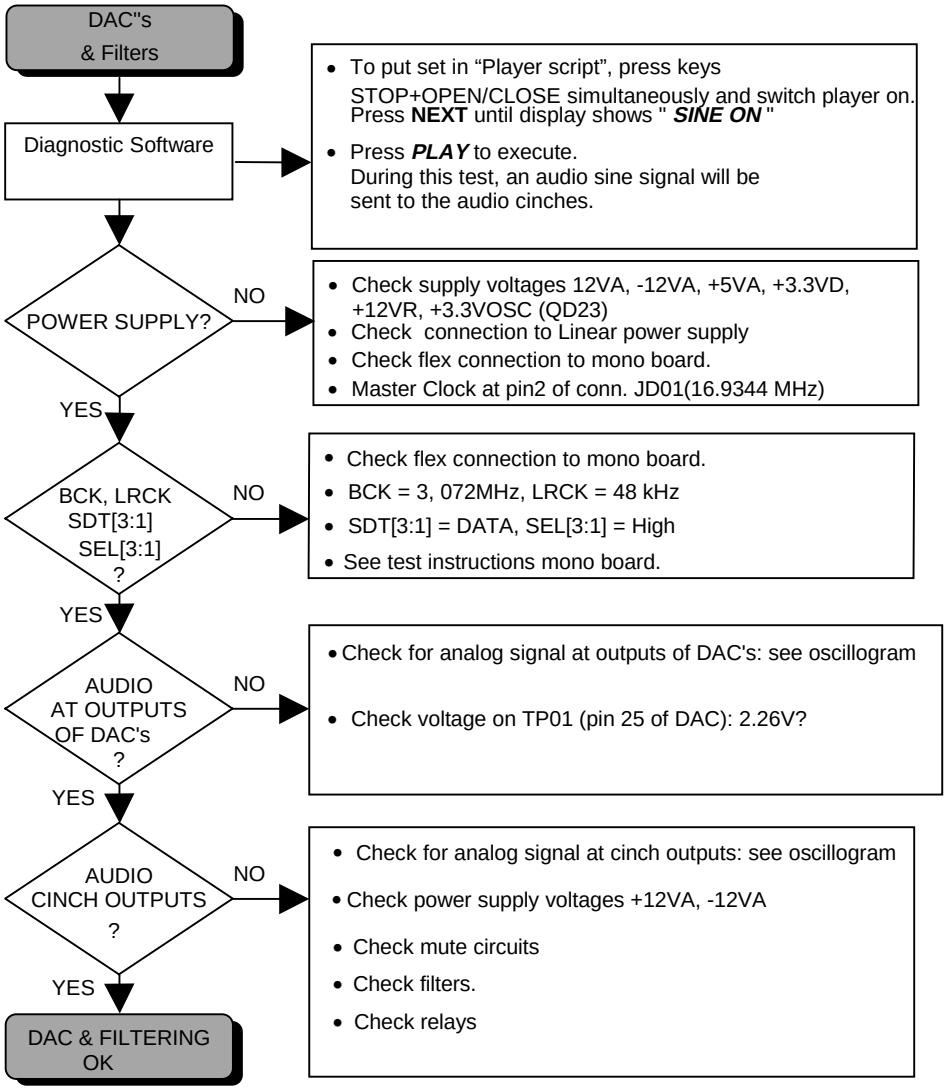
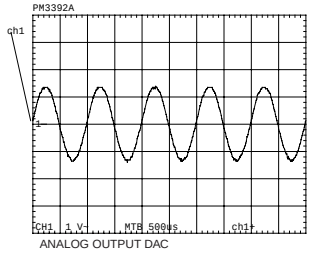
131200

5.8 Trouble shooting DAC Board

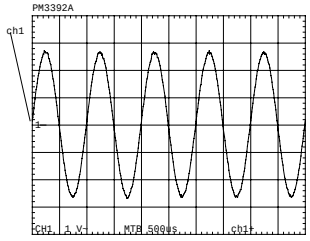
TROUBLESHOOTING DAC BOARD

Testing of DAC board can be done using diagnostic software “Player script”.
Mono board is used to generate a sound with the sound test SINE ON.





ANALOG OUTPUT DAC



ANALOG OUTPUT AUDIO CINCH

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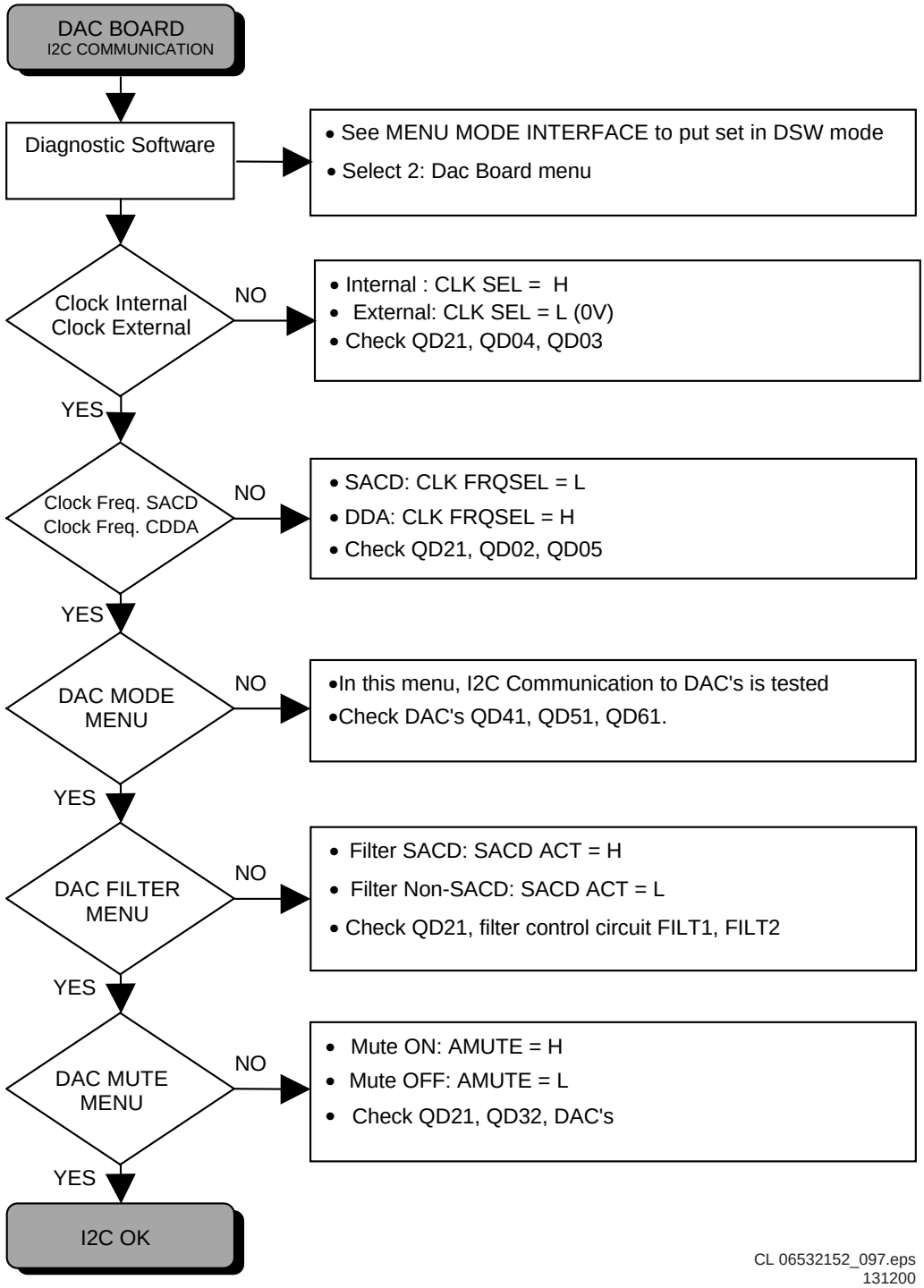
Testing of I2C communication to DAC board can be done using diagnostic software.



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Personal notes:

8. Alignments

No alignments available

9. Circuit-, IC descriptions and list of abbreviations

9.1 SAA7399 (MACE2) General.

Mace2 is a name used for the successor of the ACE1 IC. The term MACE (mini-ACE) is used because MACE2 does not have a decoder on board. Application area's: Mainly CD-R(W) and prototyping of DVD(-ROM) or high speed CD-ROM.
Functions implemented on-board of MACE2:
A further improved digital servo module. Derived from the ACE1 servo module, but with improvements (make the input switchable between diode signal and error signal processing, improved brake).
The 80C51 micro-controller with external ROM.
The OPC. Optimum Power calibration, used for CDR.
The PCS. Position Control Sledge. A way to speed up sledge movement using hall sensors.

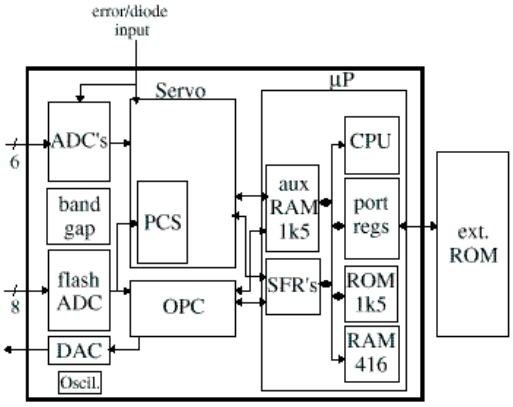


Figure 9-1 Overall block diagram MACE2.

9.2 Features

- Focus and Radial servo loop.
- Built-in access procedure.
- Selectable servo error or servo diode inputs.
- Focus noise performance equivalent to DSICS
- Automatic closed loop gain control available for focus and radial loops
- High speed track crossing velocity measurement > 350 kHz.
- Fast Radial Brake circuitry.
- Sledge motor servo loop, with pulsed sledge support and PCS
- Incorporated micro-controller equivalent to 80C51 --> 66MHz.
- Programmable wait state controller.
- Two embedded RAM's of 416 bytes and 1.5 kB res.
- Optimum Power Calibration Hardware support up to write at N=8.
- Debug facilities.
- Memory mapped interface to sub-modules.
- Programmable clock multiplier.
- 8 Multipurpose I/O lines.
- 5 external interrupt lines.
- External Flash ROM support.
- Sledge stepper motor support.

9.3 The Digital Servo block.

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 offsets, signal amplitudes and loop gains (AGC's) are adjusted 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. The servo in MACE2 takes care of these controls.
The servo inside Mace2 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. So during an access the servo has to control as well the actuator as the sled.

9.4 Functional description servo

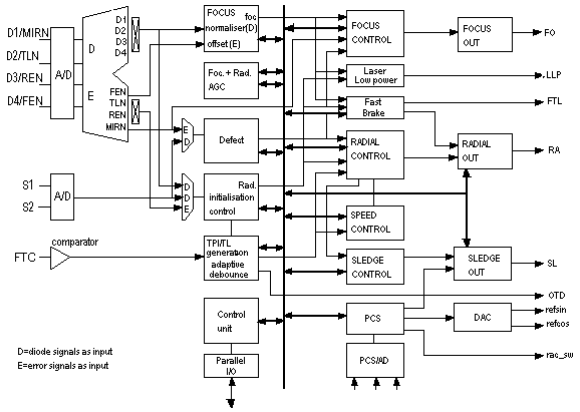


Figure 9-2 Mace2 servo block diagram.

The following functions can be distinguished:
– A to D conversion: a direct AD-conversion of the diode/ error currents.
– Pulse density D to A conversion: Noise shaper output stages.
– Control unit: Provides mainly the communication and on/ off functions.
– Focus normaliser: A partial division of focus and sum signal. Special saturating provisions are included when dividing through very small numbers.
– Initialisation control: Includes the radial normaliser, automatic radial offset compensation and level initialisation for the Track Position Indicator (TPI) for both diode and error input signals.
– TPI/TL generation and adaptive debounce: Generates Track loss (TL) which is protected against disc defects. The TL is made out of the unprotected TPI signal. The debouncer (with improved debounce times) minimises the disturbing effect of HF on the TL and Rp crossovers for the track count circuitry.

- Defect detector: Holds the focus and/or radial control signal on disc dropouts.
- Speed control: Used during access. With radial actuator feed forward.
- Focus control: PID controller with wide range adjustable characteristics.
- Radial control: PID controller with wide range adjustable characteristics.
- Sledge control: PID controller with wide range adjustable characteristics and a pulsed sledge controller.
- Laser Low Power: Switches the laser from write back to read power whenever the device tends to go off-track.

9.5 Input circuits servo

Five out of six of the MACE2 servo inputs can be switched between diode current inputs (for audio and data application) and error signal inputs (for recordable applications).
The analogue signals from the diode pre processor are converted into a digital representation using A/D converters.

9.6 Focus control.

9.6.1 Focus start-up.

To bring the actuator in focus position a triangular shaped voltage is applied to the actuator to perform a search movement. When the lens moves from or to the disc, CA (central aperture) is monitored to reach a certain programmable absolute level. When this value is CA level is reached, the FOK signal becomes true and FEn is passed to the FEn level detector.
At the moment this FEn level is reached the wait for the focus mode is entered and the focus control loop is enabled to detect a sign inversion in the FEn signal.
When this zero crossing in this FEn signal is detected, the loop is closed to function as PID controlled loop and is switched to the PID mode.
During focus start-up a dither signal is added to the output signal of the integrator. It prevents the actuator from hitting its natural resonance. With this technique quantisation, effects are compensated for during start-up.

9.6.2 Focus Position Control loop.

The focus control loop contains a digital PID controller that has 5 parameters available to the user. These coefficients influence the integrating, proportional and differential action of this PID and a digital low pass filter following the PID. The fifth coefficient influences the loop gain.

9.6.3 Dropout detection.

This detector can be influenced by one parameter. The FOK signal will become false and the integrator of the PID will hold if the CA signal drops below this programmable absolute CA level. When the FOK signal becomes false, it is assumed as caused by a black dot in the first place.

9.6.4 Focus Loss detection and Fast restart.

Whenever FOK is false longer than about 2 ms, it is assumed that the focus point is lost. A fast restart procedure is initiated which is capable of restarting the focus loop within 200 to 300 ms depending on the uP-programmed coefficients.

9.6.5 Focus Automatic Gain Control loop.

The loop gain of the focus control loop can be corrected automatically to eliminate tolerances in the focus loop. This gain control injects a signal into the loop that is used to correct the loop gain. Since this decreases the optimal performance, the gain control should only activated shortly (for instance when starting a new disc).

9.7 Radial control.

The MACE2 digital controller includes the following radial servo functions:

9.7.1 Level initialisation:

During start-up an automatic adjustment procedure is activated to set the values of the radial error gain, offset and satellite sum/MIRN signal gain for TPI level generation. The initialisation procedure runs in a radial open loop situation and is < 200 ms. This start-up time period may coincide with the last part of the turntable motor start-up time period.

9.7.2 Automatic gain adjustment:

Because of this initialisation the amplitude of the RE signal is adjusted within _10% around the nominal RE amplitude.
Offset adjustment: The additional offset in RE due to the limited accuracy of the start-up procedure is less than +/- 50nm.

9.7.3 TPI level generation:

The accuracy of the initialisation procedure is such that the duty cycle range of TPI becomes 0.4 < duty cycle < 0.6.

Sledge home:
Sledge moves to reference position at the inner side of the disc with user defined voltage.

Tracking control:
The actuator is controlled using a PID loop filter with user defined coefficients.

Access:
In Mace2 there are two fundamentally different ways to perform an access:

Using the PCS
A more detailed description of this access method is given in an other section.

Using the servo controlled access:
The way it was done in the predecessors of Mace2.This access procedure is divided into 3 different modes, depending on the requested jump size:
access type size access speed
Actuator jump decreasing velocity
Sledge jump maximum power to sledge 1
Controlled sl. jump controlled brake power
The access procedure makes use of a track counting mechanism, a velocity signal based upon the number of tracks passed within a fixed time interval, a velocity setpoint calculated from the number of tracks to go and a user programmable parameter indicating the maximum sledge performance.
If the number of tracks to jump is too large, then the Sledge jump mode is activated, else the actuator jump is performed.
The requested jump size together with the required sledge braking distance at maximum access speed defines the value of the maximum numbers of tracks.
During the actuator jump mode, velocity control with a PI controller is used for the actuator. The sledge is then continuously controlled using the filtered value of the integrator contents of the actuator. All filter parameters (for actuator and sledge) are user programmable.

In the sledge jump mode maximum power (user programmable) is applied to the sledge in the correct direction, while the actuator becomes idle.

Radial Automatic Gain Control loop:
The loop gain of the radial control loop can be corrected automatically to eliminate tolerances in the radial loop. This gain control injects a signal into the loop which is used to correct the loop gain. Since this decreases the optimal performance the gain control should only be activated shortly (for instance when starting a new disc). This gain control differs from the earlier mentioned level initialisation. This level initialisation should be done first. The level initialisation without the gain control reduces tolerances from the front-end only.

9.8 The radial PID.

Since we are dealing with a big variety of applications and drives, the servo controllers in MACE2 should be adjustable within a large frequency range.
In order to read out the track properly -a track consists of sequential ordered data pit's which hold audio, video or ROM data - the focus and radial position controls must follow the moving track within some tenths of a micrometer, despite of disc imperfections and external disturbances.
For instance, a rotating disc causes, due to track eccentricity, track unroundness, or disc skew, track movements up to some millimetres. The control loop reduces this to about one tenth of a micrometer.

9.9 Initialisation control.

Due to optical, electrical and mechanical tolerances in CD players, properties of the servo signals such as offset and gain can vary. In general, without proper signal processing, a simple PID controller function cannot cope with this relatively large offset and gain spreads. Therefore, gain and offset adjustments during manufacture or active control, to compensate for these signal imperfections, become inevitable.
Adjustment procedures in the factory are expensive. So, automatic adjustment procedures have been implemented in order to avoid most of the potentiometer adjustments. In the MACE2 servo automatic adjustments are applied to the radial error signal only.

9.10 The AGC.

The Automatic Gain Control is used in the MACE2 digital servo to adjust the radial and focus bandwidths to a nominal value. Injecting a signal in the loop and measuring the phase of its resulting signal (wobble method) does this.
Principle of the Automatic Gain Control.
The principle of the Automatic Gain Control (AGC) circuit, as used in MACE2, is drawn in the next figure.

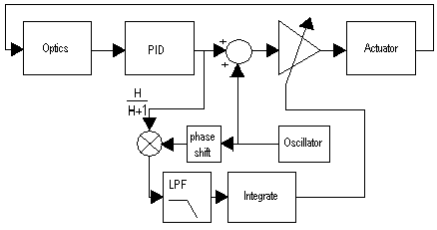


Figure 9-3 Principle of the automatic gain control.

A sine wave signal with a certain frequency is injected in the control loop at the summation point. The resulting signal is measured before the injection point. The injected signal is shaped by H/1+H . This measured signal is multiplied by a phase shifted version of the injected signal. The result of the multiplication is low pass filtered and integrated. (The integrator is started at the nominal gain of the control loop). The result of the integration is fed to the adjustable loop gain. This principle, synchronous detection, is also known as 'wobble method'.

9.11 The Fast brake.

The fast brake is an aid to speed up radial capture after a high-speed jump. It is a separate radial control with a much higher bandwidth. The radial control output can be switched between fast brake mode and original radial control mode. The fast brake helps the radial actuator at the end of a jump to "stick" to the right track. In fast brake mode, the actuator starts to follow the track movements. It's a bit like jumping on a moving train. If you run as fast as the train, you can just step in. After a radial open loop jump the tracks are moving (as a result of eccentricity) at a very high speed underneath the radial actuator. This speed is too high for a normal radial control loop to do radial capture. When the radial control is switched over to fast brake mode for a short term, this moving of the tracks underneath the actuator becomes much slower, (because the actuator follows the track movement), so when you switch back to original radial control, it's much easier to do radial capture.

9.12 The Defect Detector.

Because of the possible earlier mentioned defects (fingerprints, etc) a defect detection circuit is incorporated into the MACE2 servo. If a defect is detected, the radial and focus error signals may be zeroed, resulting in better playability.

9.12.1 Operation:

The defect detector prevents the light spot from going out of focus and going off track due to disc dropout excitations. The defect detector can be switched on and off under software control and can be applied to the focus control only, or both to the focus and radial control.
Whenever this circuit detects a defect, it will hold all radial and focus controls.
The hold signal is generated whenever the reflected light intensity drops rapidly (< 1:5 ms) down to roughly 75% of the actual intensity level. In that case the output of the comparator becomes active and controls the focus and radial signal switch.
This circuit improves the playability of the application (black dot performance, etc) and is programmable to optimise it for specific disc defects. The actions of this circuit can be monitored on the DEFO pin (active high).
An external defect detection circuit can be added by removing the connection between DEFO and DEFI (normal operation) and inserting the external circuitry.
These signals are afflicted with some uncertainties caused by:

- Disc defects like scratches and fingerprints
- The HF information on the disc, which is considered as noise by the detector signals.

9.13 Laser Drive On.

The LDON pin is used to switch the laser drive off and on. It is an open drain output. In case the laser is on, the output has a high impedance. The pin will be automatically driven if the focus control loop is switched on.

9.14 Laser Low Power (LLP).

The LLP output can be used by write-able systems to switch the laser back to read power when the light spot goes off-track while writing discs. To prevent that the neighbour tracks are damaged when the spot goes off-track the laser has to be switched very fast to the safe read power. The laser is not switched off (like LDON does), so the system can carry on reading.
The tracking (radial) and focus error signals are used to disable the laser write power. This is done through the LLPn, active low Laser Low Power, signal. Note that LLPn is a servo output, which is inverted before it is output via the LLP pin, so the LLP pin is active high.
So, if any of the following conditions is true, the laser write power is disabled by the MACE2 servo.

– Off Track, more than a quarter off a track away from the correct one
– ORD, radial error signal too large. Larger than the given setpoint, which should be chosen at a critical write failure level. An adjustable band pass filter first processes the radial error signal.
– OFD, focus error signal too large. Larger than the given setpoint, which should also be chosen with care. An adjustable band pass filter also first processes the focus error signal. All settings of the focus and radial part are independent.
– OTR, prot stat flag which becomes active if ORD becomes active during an actual laser write (LWR) action. This flag is reset only by a status read (RSTAT) command. So until then LLPN stays active.
– OFO, prot stat flag that becomes active if OFD becomes active during an actual laser write action. Same idea as OTR.

This error detection circuit can be switched off (apart from the Off Track detection) by raising the setpoint levels to its maximum value.

9.15 The OPC.

The OPC block in Mace2 is used for the following functions:

- During write actions, it stores Pw samples, which can be evaluated by the microprocessor.
- During OPC read actions, it stores A1, A2 and CALF samples, which are used for calculating the asymmetry and the modulation index.
- The OPC block is used for EFM detection.
- During reading of a disc, it stores A1 and CALF samples, which can be monitored.

Although the OPC block is used for multiple functions, it got it's name from the OPC procedure, which is it's main task.
The OPC (Optimum Power Calibration) procedure is used in CD-R/CD-RW/DVD-RAM applications. It is used to "calibrate" the laser write power in writable systems.
It reads in 3 analogue signals from an analogue pre-processor like AEGER-2 (A1, A2, and CALF) and the actual write power (Pw) from the laser controller and feeds an analogue output signal Alpha0 back to AEGER-2. A1, A2 and CALF represent the max, min and average value of the EFM signal respectively. Alpha0 controls the laser write power. All analogue signals are converted to an 8 bit digital signal. Conversion frequency at 16.9MHz base clock is 88kHz (each channel).

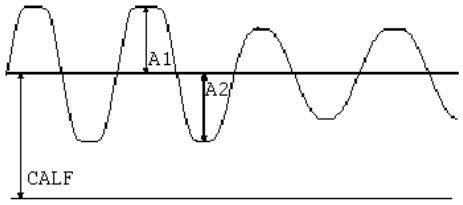


Figure 9-4 Definition of the A1, A2 and CALF signals.

9.16 Definition of terms.

The asymmetry (and modulation index m of the EFM signal are calculated from the analogue inputs:

$$\beta = \frac{A1 - A2}{A1 + A2}$$

$$m = \frac{A1 + A2}{A1 + CALF}$$

9.17 Rough description of the OPC procedure

Basically the OPC procedure tries to find out the optimum laser power to be used on a specific disc. The OPC procedure uses about 15 ATIP frames. These frames are located in the "PCA" area. This is a special part of the disc used only for power calibration. The drive first checks whether there are 15 frames "empty" in the PCA. Next the OPC is performed in these 15 frames.
The OPC operation consists of two stages: A "write" and a "read" stage. First 15 ATIP frames are written (during which the OPC block stores Pw samples), and then the same 15 ATIP frames are read back again, (during which the OPC block stores A1, A2 and CALF samples). During the write stage, random EFMis written in a test area located on the inner side of the disc. During this recording the write power is increased stepwise from a low to a high power level.

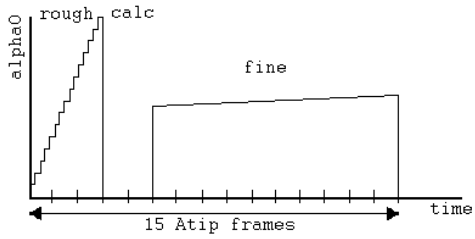


Figure 9-5 Figure 5: OPC write profile.

First during 3 ATIP frames the power is increased in rather big steps (rough OPC). During this action Pw samples are stored into memory. During the rough OPC, the OPC makes 7 steps per ATIP frame. This gives 21 samples into the OPC memory. From these samples, the microprocessor can calculate what's roughly the best alpha0 setting for this typical disc.
After 2 frames of calculations, another 10 ATIP frames are written using smaller steps (fine OPC) around the alpha0 setting, which gave the best result during the rough OPC.
The second stage of the OPC procedure is the "read" phase

in which the pattern recorded in the previous stage is read back.
During this read phase the OPC block stores A1, A2 and CALF samples from exact the same location where during the OPC write phase the Pw samples where stored. The samples for A1, A2, CALF and Pw are listed side by side into memory. After the read back phase the processor calculates at which setting of alpha0 the least jitter is encountered. This setting will be used to write the disc with.

9.18 The OPC top level.

The OPC block as a whole has 5 possible modes:
- Recording mode: This can be either OPC writing (writing EFM test patterns to disc and Alpha0 stepping) or standard write mode (i.e. alpha0 is constant).
- OPC reading: Reading back OPC test patterns from disc.
- Normal read mode: detects the presence of EFM.
- DVD read mode: used for DVD-RAM experiments.
- EFMD only mode: no data being written to the AUX RAM, but the EFM detector and the PW monitor still running. Contents of the QUX RAM remain unchanged.

All actions in the OPC hardware are synchronised to the ATIP frame sync, which can be either generated internally or received from the encoder/decoder during writing. The microprocessor writes data asynchronously to the OPC hardware. The OPC block synchronises this data to the sync either internally generated, or obtained from CDR60.

9.19 The Analogue to Digital converter.

The analogue to digital converter of the OPC is shared with the ADC required by the PCS.

9.20 The digital input filters.

The combined ADC for the OPC and the PCS delivers a multiplexed stream of 8 bit words. A sequential low-pass filter filters this multiplexed stream. The 4 analogue multiplexed input signals from the OPC (A1, A2, CALF and Pw) are filtered by 4 identical LPF's. (One for each channel). This filters can be adapted to various speeds by changing the subsampling factor (i.e. the sample rate of the filter), the cut off frequency scales with the sample frequency. The sample frequency of the filter is equivalent to the OPC timebase frequency, which is the output of the pre-scaler.

9.21 OPC demux.

The OPC demux block demultiplexes the stream supplied by the LPF. This same block also changes the format of the digital data from signed (representation inside the filter) to unsigned (representation in the rest of the OPC). The demultiplexing process introduces one baseclock delay.

9.22 The sequencer.

The OPC sequencer controls the timing of all the hardware actions in the OPC hardware. It generates the OPC timebase and locks it to the ATIP pulse. A programmable pre-scaler generates the OPC timebase.
Dividing the ADC sample clock by 8 derives the input clock of this pre-scaler. (= Identical to the sample rate per channel). The pre-scaler can divide this clock by a number in the range from 1-16. The division factor can be programmed via the OPC ctrl register. The OPC timebase is locked to the selected ATIP source, which can be either an external ATI P sync or an internally generated sync. (Programmable). The OPC timebase clock supplies the sample frequency for the input LPF's, the OPC pre-processor and the EFM detector.
The sequencer controls the timing of all the hardware actions in the OPC hardware. The sequencer is started either by an external ATIP sync or an internally generated sync (programmable).
All data acquisition and alpha0 settings change synchronised to this sync signal (rising edge of the ATIP sync). An exception on this is the switching of the ATIP input itself, which is immediately changed whenever the bit in the OPC ctrl register is changed. When this was latched on the ATIP source itself, it would create a deadlock when there was no ATIPin from CDR-60.

9.23 The Pw monitor

The Pw monitor is used during the "OPC write" and normal write mode. The comparator compares the incoming Pw with two programmable thresholds PW MAX and PW MIN. Both these thresholds can be programmed via the OPC PW register, which contains 4 bits for each threshold.
Internally both 4-bit thresholds PW MAX and PW MIN are extended to 8 bit values. The compare function performs an unsigned compare.
The first threshold is used to detect fingerprints. The second is used to check the correct operation of the laser driver.

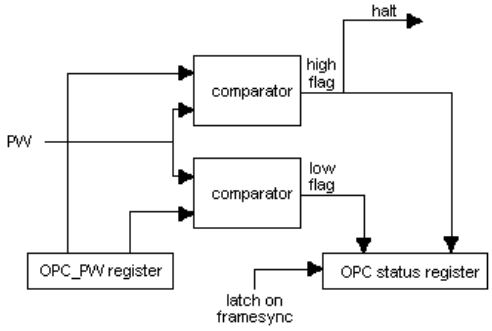


Figure 9-6 OPC PW monitor.

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 / CDROM 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 supplypin 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 serval 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 foucault and double foucault 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.

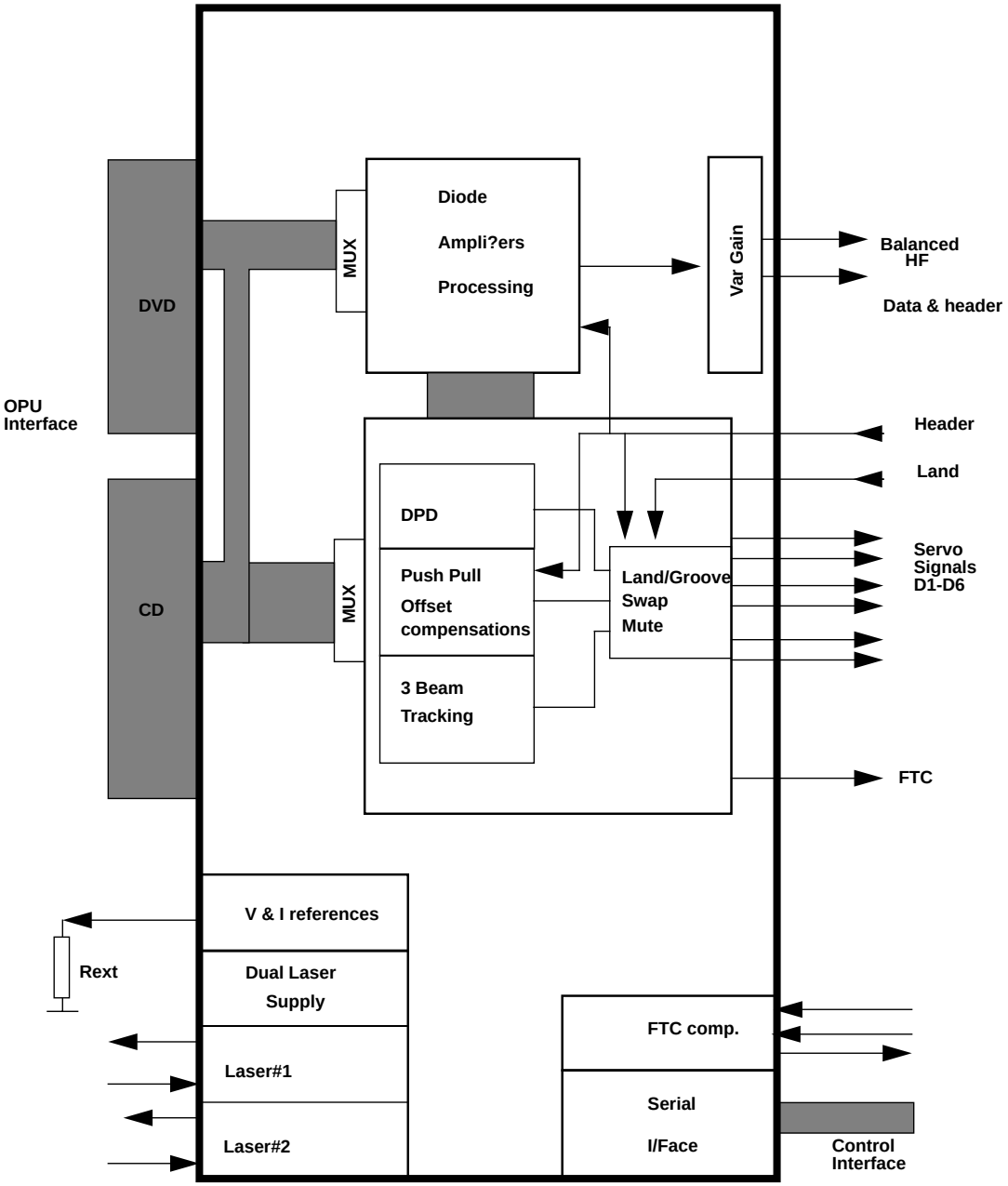
ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
TZA1023	LQFP64	Plastic low pro?le 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

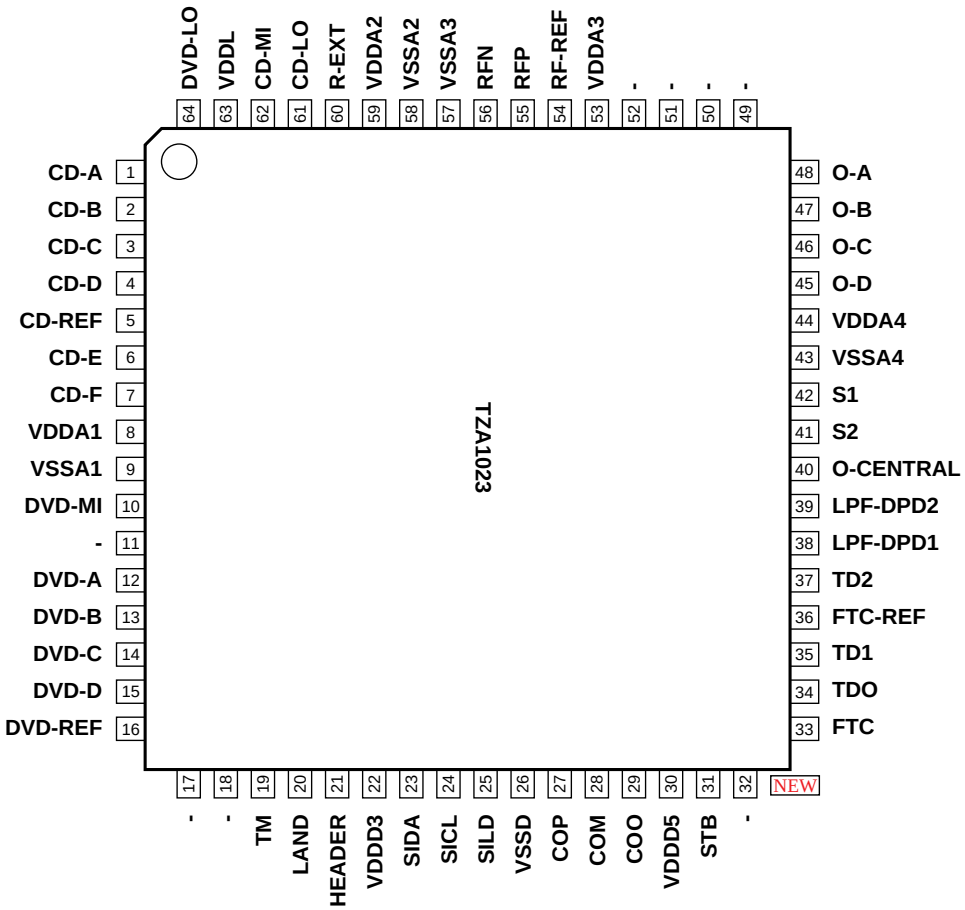


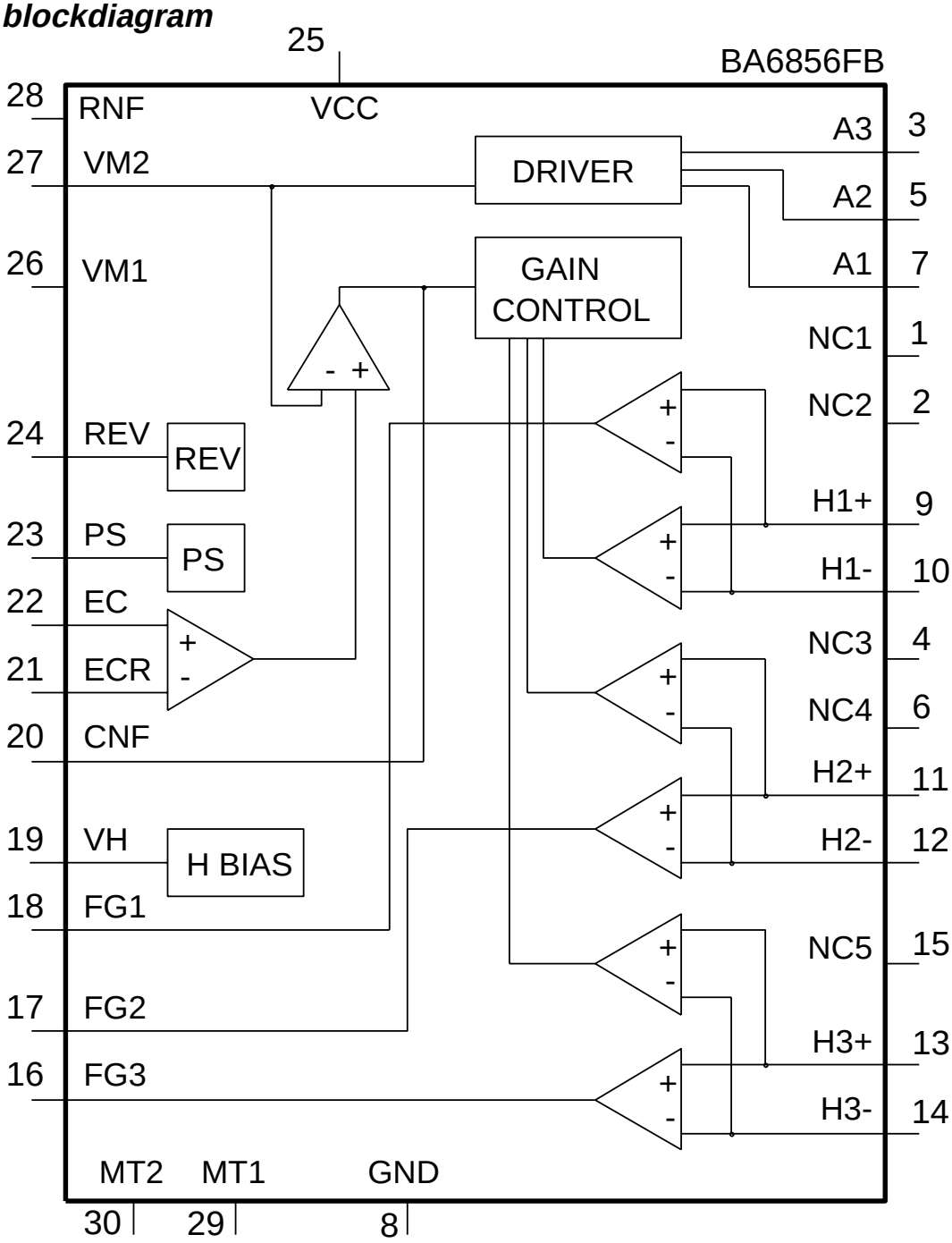
Fig.2 Pin configuration.

BA6856FP: 3 PHASE MOTOR DRIVER FOR DVD PLAYERS

Features

- /3-phase, full-wave pseudo linear driving system
- built-in power save
- built-in therma 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

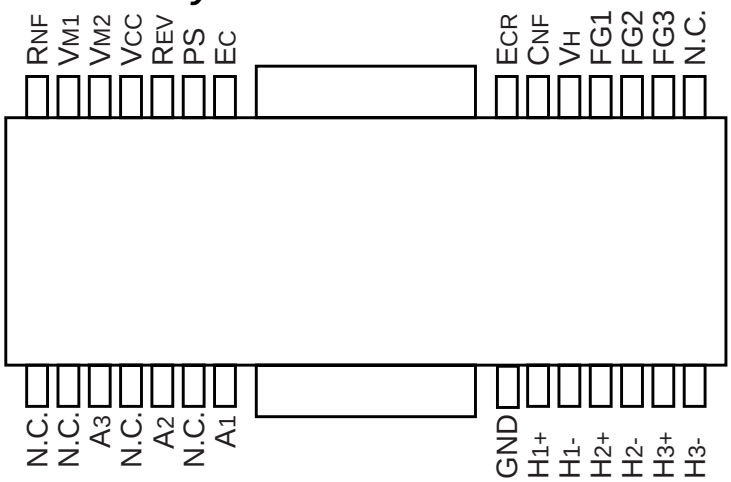
blockdiagram



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 I^{2}C-bus
- On-chip clock multiplier.

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.

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 I^{2}C-bus and the second is a standard 8-bit multiplexed parallel interface. Both of these interfaces provide access to a total of 32 $\times$ 8-bit registers for control and status.

This data sheet contains an 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.

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

ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
SAA7335GP	LQFP100	plastic low pro?le quad ?at package; 100 leads; body 14 × 14 × 1.4 mm	SOT407-1

BLOCK DIAGRAM

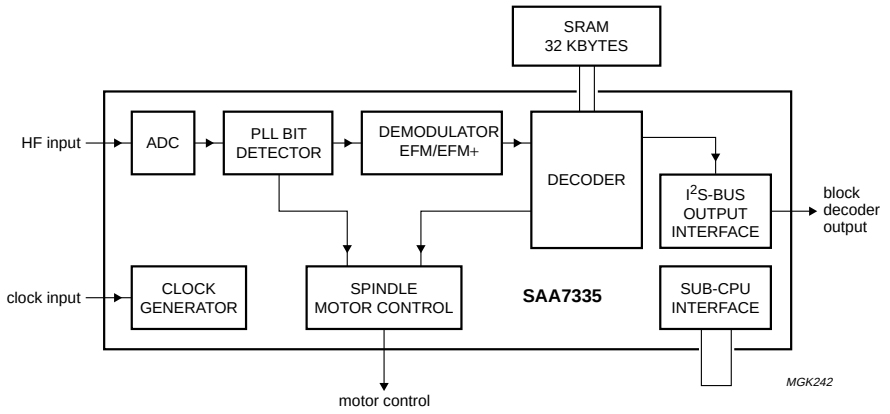


Fig.1 Simplified block diagram.

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_{DDD1}	10	supply	digital supply voltage 1
V_{SSD1}	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_{DDD2}	19	supply	digital supply voltage 2
V_{SSD2}	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^2C-bus serial data input/output
SCL	29	I	sub-CPU I^2C-bus serial clock input
INT	30	O	sub-CPU interrupt output (open-drain)
V_{DDD3}	31	supply	digital supply voltage 3
V_{SSD3}	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)

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_{DDD4}	44	supply	digital supply voltage 4
V_{SSD4}	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^2S-bus sector sync output
FLAG	55	O	I^2S-bus correction ?ag output
DATA	56	O	I^2S-bus serial data output
BCLK	57	I/O	I^2S-bus bit serial clock input/output
WCLK	58	I/O	I^2S-bus word clock input/output
V_{DDD5}	59	supply	digital supply voltage 5
V_{SSD5}	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_{DDD6}	72	supply	digital supply voltage 6
V_{SSD6}	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_{DDD7}	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_{DDD8}	92	supply	digital supply voltage 8
V_{SSD8}	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_{DDD9}	98	supply	digital supply voltage 9
V_{SSD9}	99	supply	digital ground 9
V_{DDA1}	100	supply	analog supply voltage 1

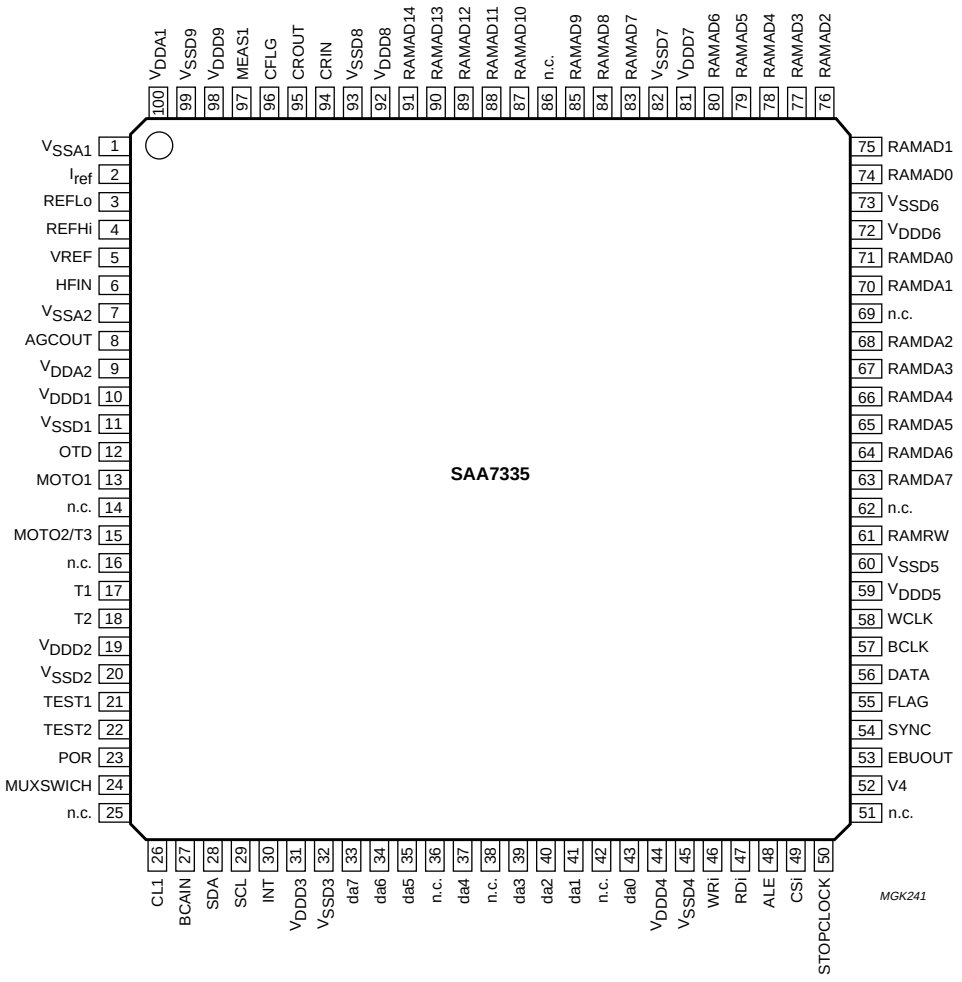


Fig.2 Pin configuration.

FUNCTIONAL DESCRIPTION

Analog front-end

This block converts the HF input to the digital domain using an 8-bit ADC proceeded 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.

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 µBGA, 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 preprograms 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.

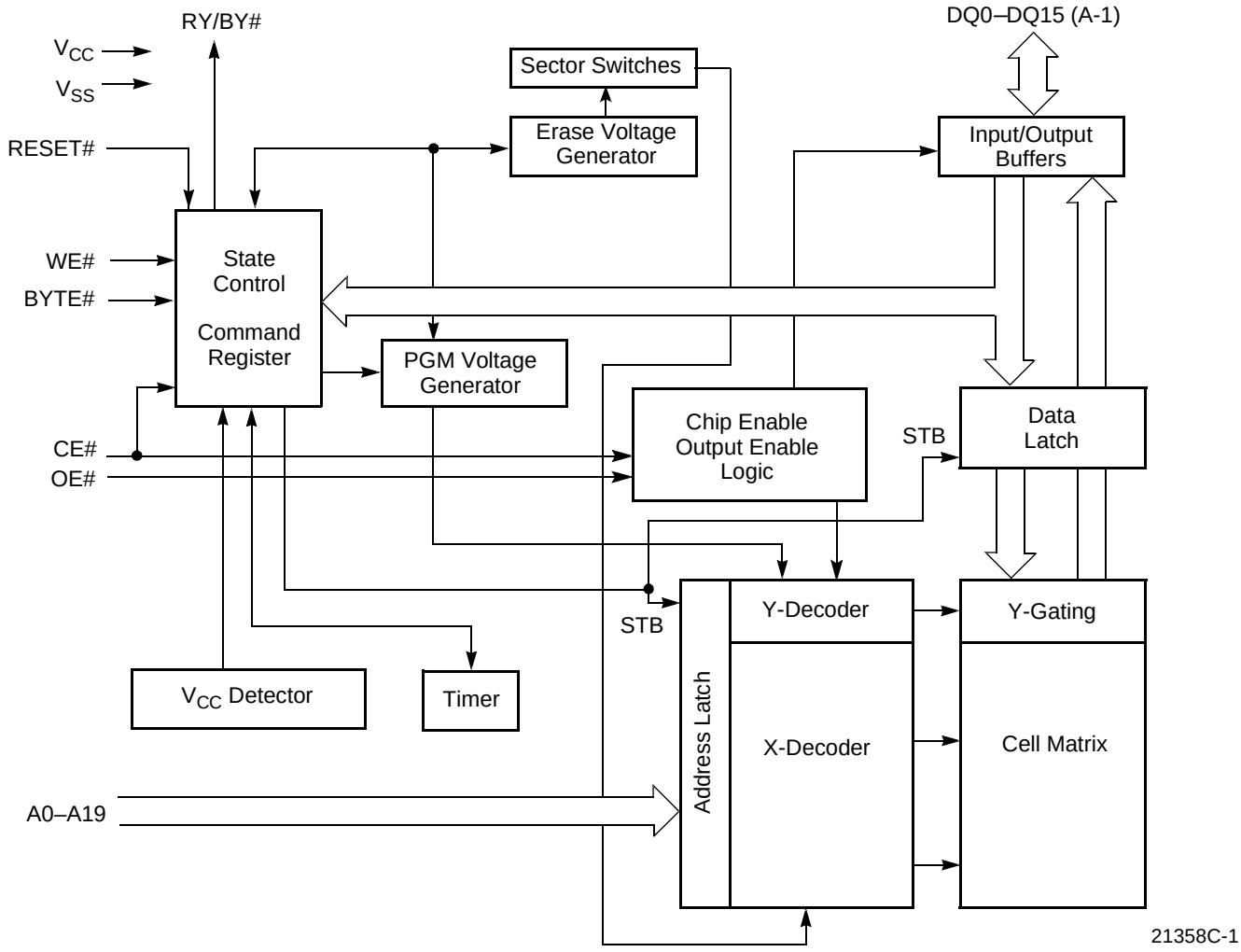
AMD's Flash technology combines years of Flash memory manufacturing experience to produce the highest levels of quality, reliability and cost effectiveness. The device electrically erases all bits within a sector simultaneously via Fowler-Nordheim tunneling. The data is programmed using hot electron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

PRODUCT SELECTOR GUIDE

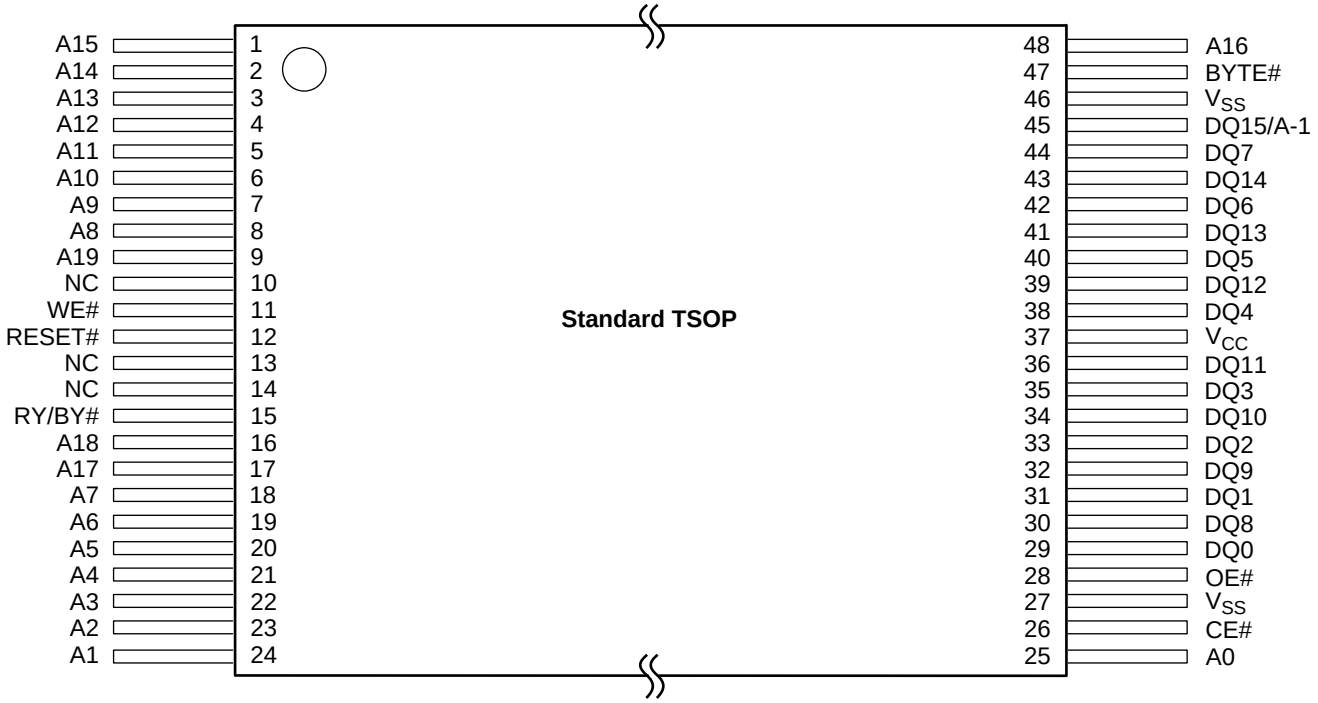
Family Part Number	Am29LV160B		
Ordering Part Number: V_{CC} =3.0–3.6 V	**80R**		
V_{CC} = 2.7–3.6 V		**90**	**120**
Max access time, ns (t_{ACC})	80	90	120
Max CE# access time, ns (t_{CE})	80	90	120
Max OE# access time, ns (t_{OE})	30	35	50

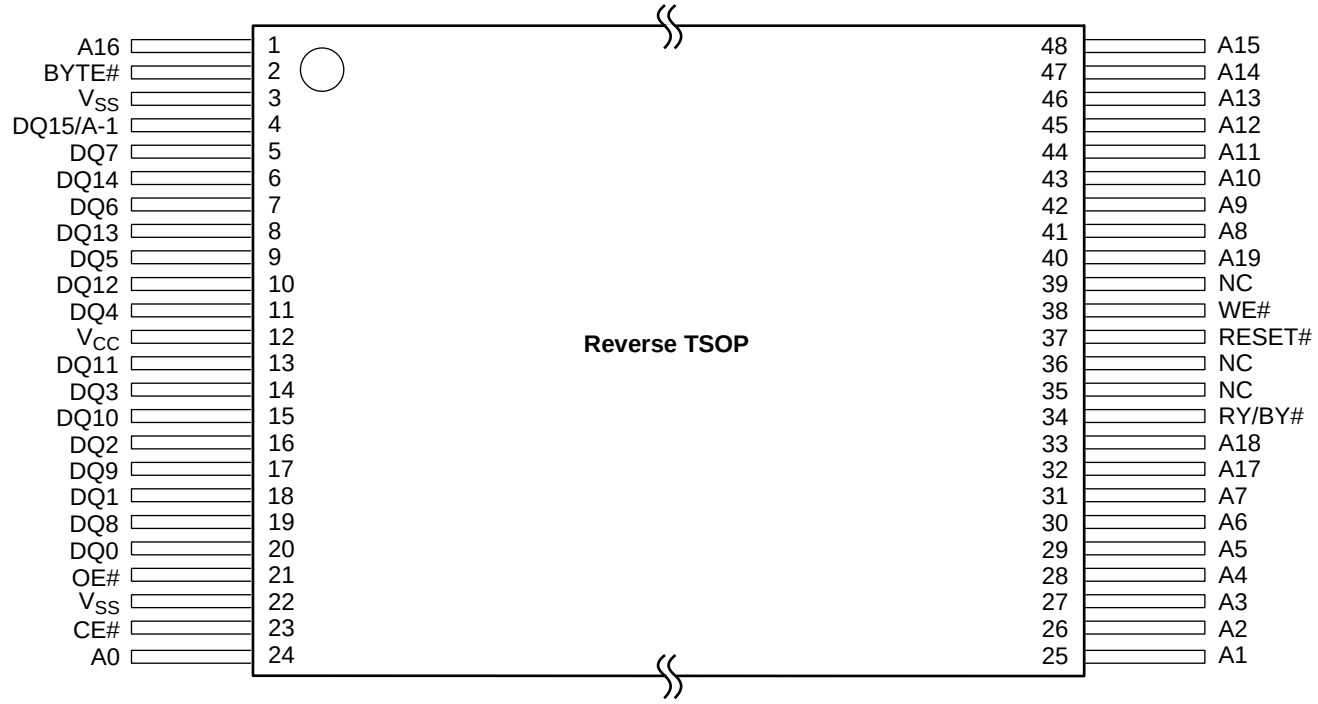
Note: *See "AC Characteristics" for full specifications.*

BLOCK DIAGRAM



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
- LVTTL-compatible inputs and outputs
- Single +3.3V ±0.3V power supply
- Supports CAS latency of 1, 2 and 3

OPTIONS MARKING

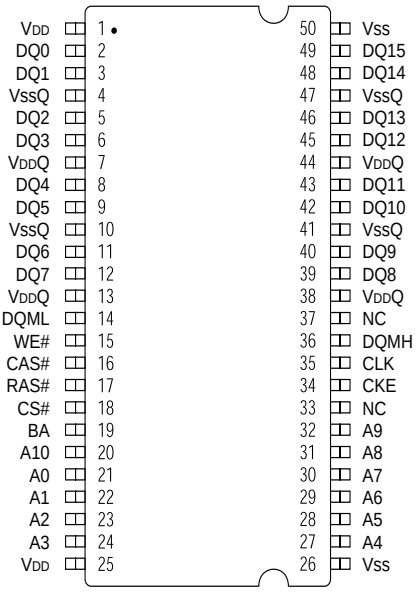
- Configuration
  1 Meg x 16 (512K x 16 x 2 banks) 1M16A1
- Plastic Package - OCPL*
  50-pin TSOP (400 mil) TG
- Timing (Cycle Time)
  6ns (166 MHz) -6
  7ns (143 MHz) -7
  8ns (125 MHz) -8A
- Refresh
  2K or 4K with Self Refresh Mode at 64ms S
- Part Number Example: MT48LC1M16A1TG-7S

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.

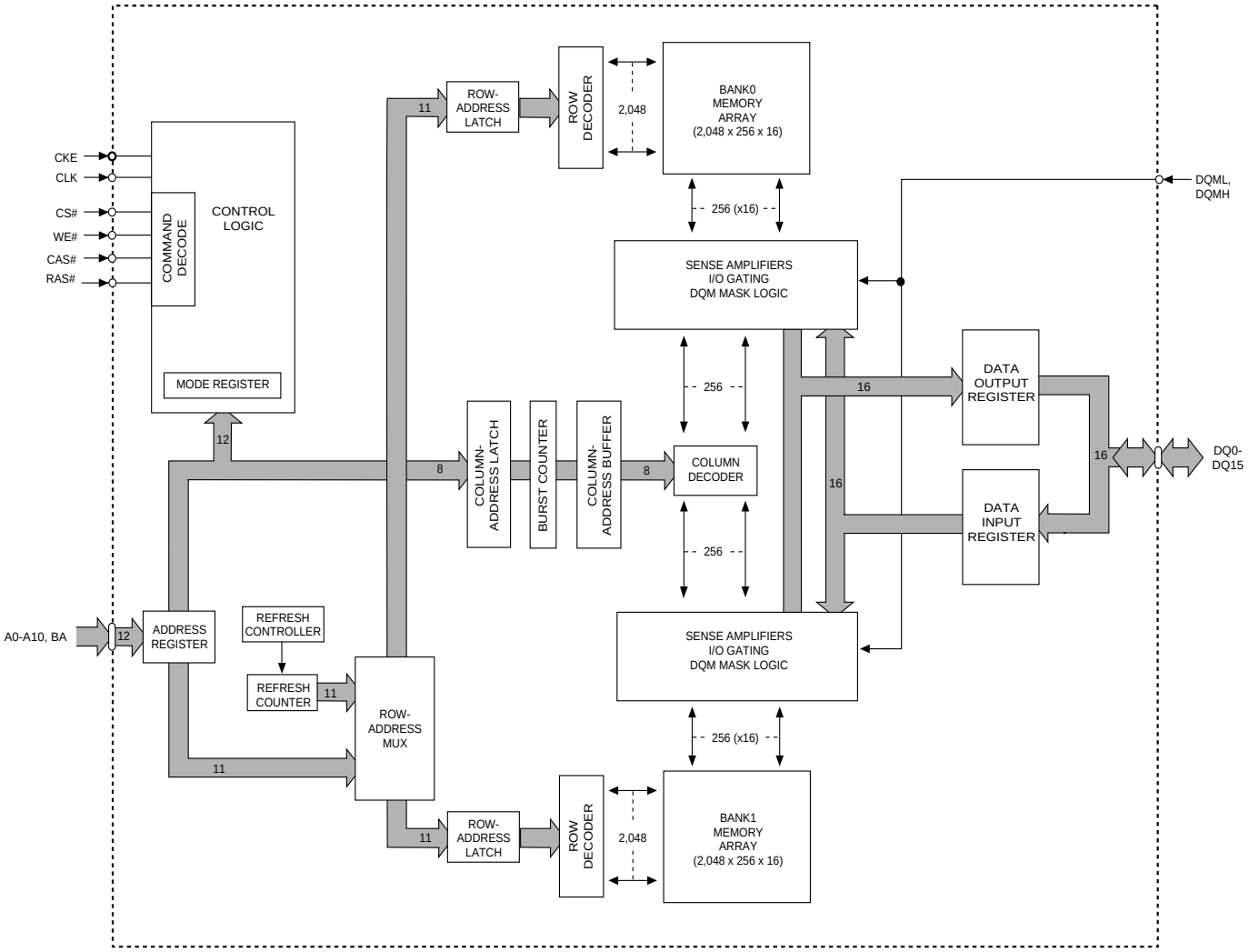
The 1 Meg x 16 SDRAM uses an internal pipelined architecture to achieve high-speed operation. This architecture is compatible with the 2 n rule of prefetch architectures, but it also allows the column address to be changed on every clock cycle to achieve a high-speed, fully random access. Precharging 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 LVTTL-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	$V_{DD}Q$	Supply	DQ Power: Provide isolated power to DQs for improved noise immunity.
4, 10, 41, 47	$V_{SS}Q$	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

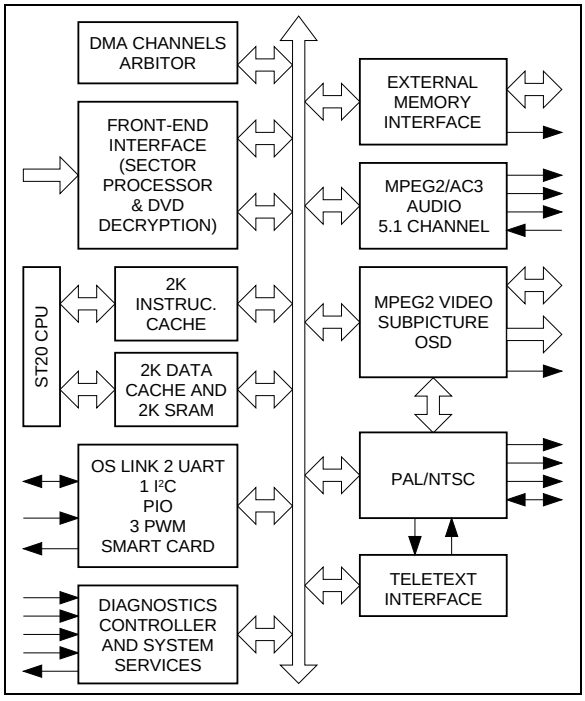
- INTEGRATED 32-BIT RISC HOST CPU
  - 2KBYTES INSTRUCTION CACHE, 2KBYTES DATA CACHE/SRAM
  - 50K DHRYSTONES/SEC (2.1) - 50MHz
- VIDEO DECODER
  - FULLY SUPPORTS MPEG-2 MP@ML
  - MEMORY REDUCTION - PAL IN 12MBITS
- SUBPICTURE DECODER
- HIGH PERFORMANCE ON-SCREEN DISPLAY
- AUDIO DECODER
  - 5.1 CHANNEL 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^{TM} 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 I^2C 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

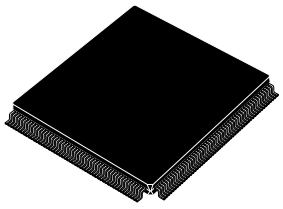
DESCRIPTION

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 periphals (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, subpicture decoder, on-screen display, audio decoder, PAL/NTSC encoder ...),
- embedded peripherals drivers (UART, I^2C, Programmable I/O, Smart Card ...).

I.1 - ST20 32-bit CPU

The ST20 micro-core family has been developped 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/bandwith reduction scheme to offer the user the best bandwidth/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 bandwith reduction mode, the memory usage is the normal three buffers but the bandwith 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 downsampler 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 bandwiths 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.

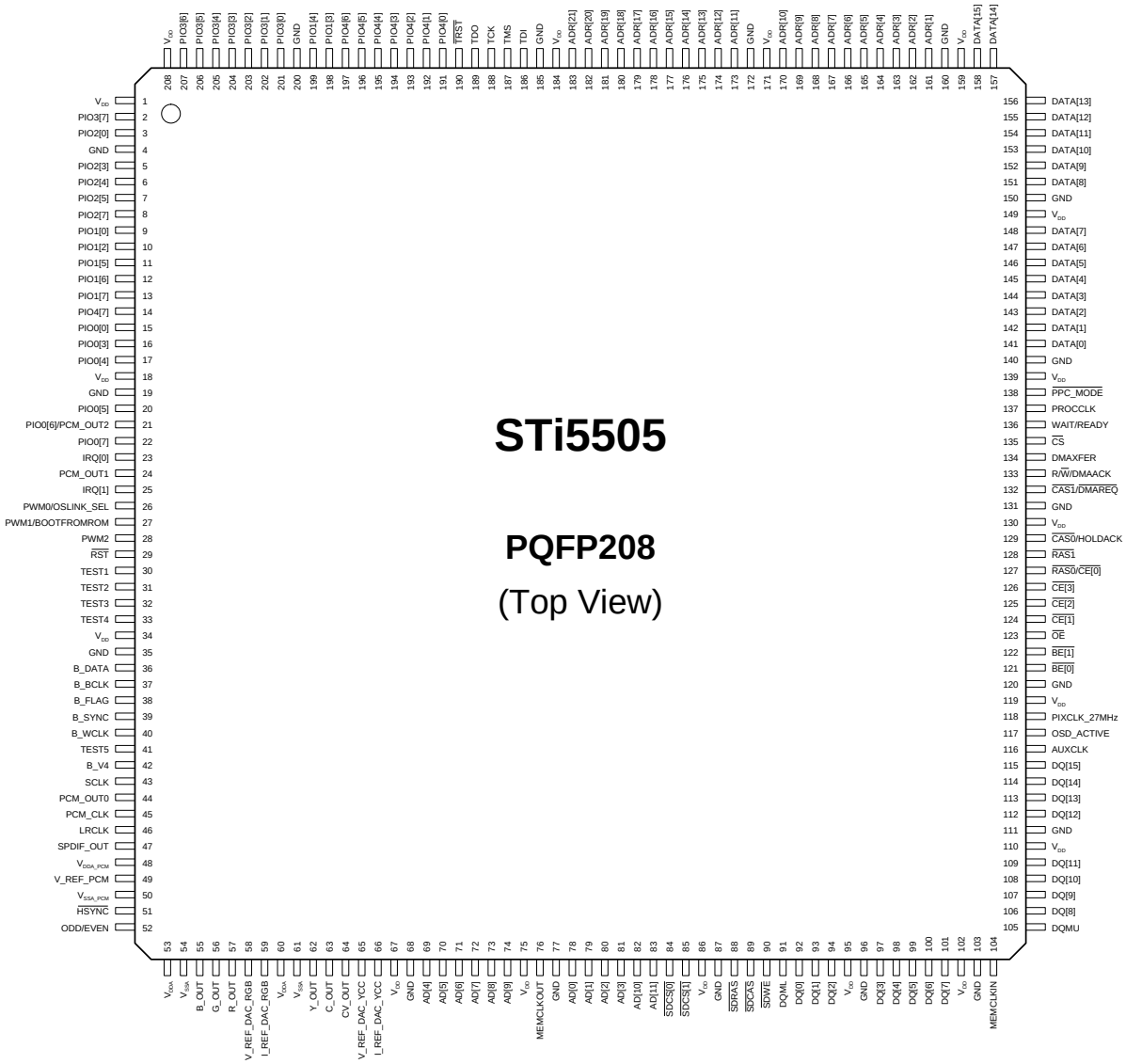
They are :

- two UARTs to interface remote control receivers, DVD front end, modem ...,
- one I^2C 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^2S Data (DVD) or PARA_DATA[2] (DVD//) or Link Data (DVB/DSS)
40	B_WCLK	I/O	I^2S Word Clock or PARA_DATA[6] (DVD//) or NRSS_CLK (DVB/DSS)
37	B_BCLK	I	I^2S 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	$\overline{\text{HSYNC}}$	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^2C Data
10	PIO1 [2]	I/O	General Purpose I/O or I^2C 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	$\overline{\text{TRST}}$	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	$\overline{\text{RST}}$	I	Reset
116	AUXCLK	O	Auxilary 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	$\overline{\text{RAS1}}$/HOLDREQ	O	DRAM RAS or reserved
136	WAIT/READY	I/O	External Wait States or Reserved
133	R/$\overline{\text{W}}$/DMAACK	I/O	DRAM R/$\overline{\text{W}}$ Strobe or Reserved
121, 122	$\overline{\text{BE}}$[0:1]	O	Byte enable
129	$\overline{\text{CAS0}}$/HOLDACK	O/I	DRAM CAS or Reserved
132	$\overline{\text{CAS1}}$/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	PROCCLK	I/O	ST20 Clock or Reserved
127	$\overline{\text{RAS0}}$/$\overline{\text{CE0}}$	O	DRAM RAS or Chip Select for Bank 0
134	DMAXFER	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 I^2C 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 tiner to improve robusters by concealing erros 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 then 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^{TM} 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 comformant 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.

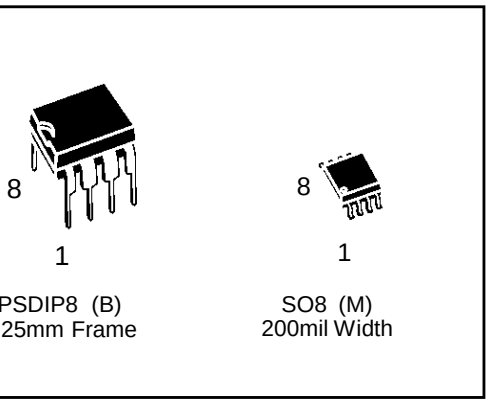
The decoder directly accepts MPEG-2 PES streams as input. The decoder is capable of supporting IEC6958-IEC61937 formatted outputs for AC-3 and MPEG audio, linear PCM (left & right,16, 18, 20 & 24 bits), zero output (Mute mode) and PCM audio.

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***



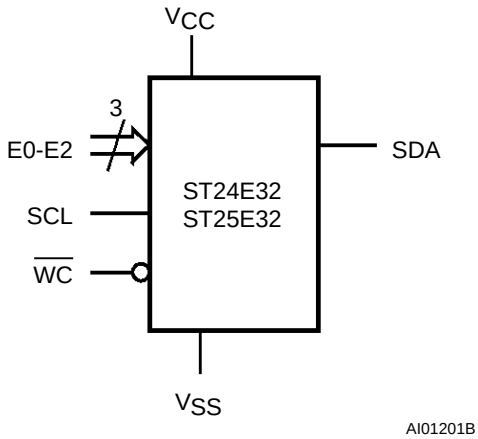
DESCRIPTION

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

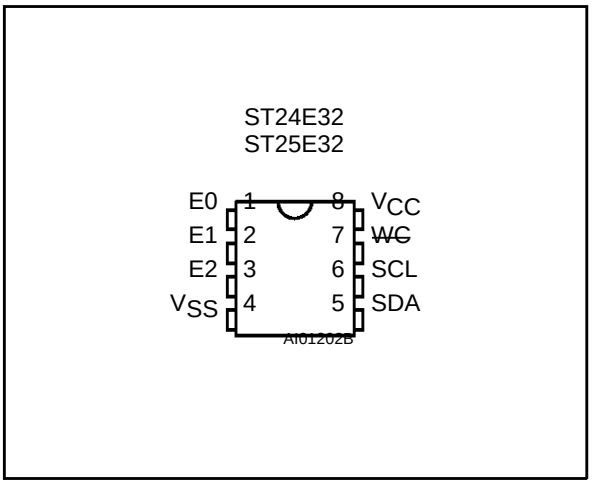


Figure 2B. SO Pin Connections

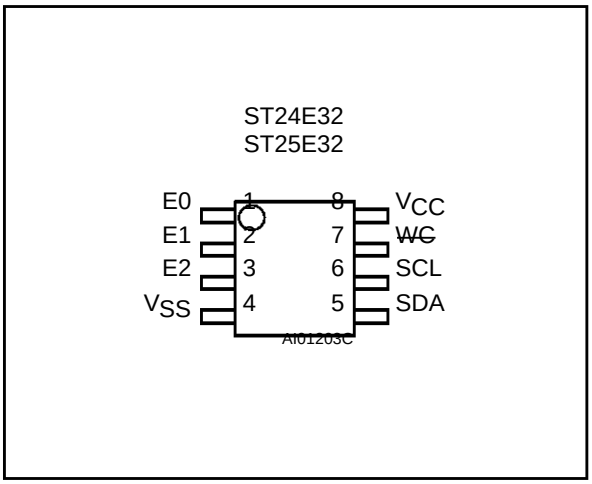


Table 2. Absolute Maximum Ratings (1)

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 I^2C 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 I^2C bus definition. The ST24/25E32 behave as slave devices in the I^2C 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.

9.24 Description of Furore IC

9.24.1 General Description

FURORE-IC is a one-chip design containing all the hardware required for SACD processing. It is intended to interface to the Sti family (Sti5505/Sti5508) DVD video decoders.
The FURORE-IC contains a memory interface to support one 4M*16 SDRAM or one 1M*16 SDRAM device.

9.24.2 Blockdiagram

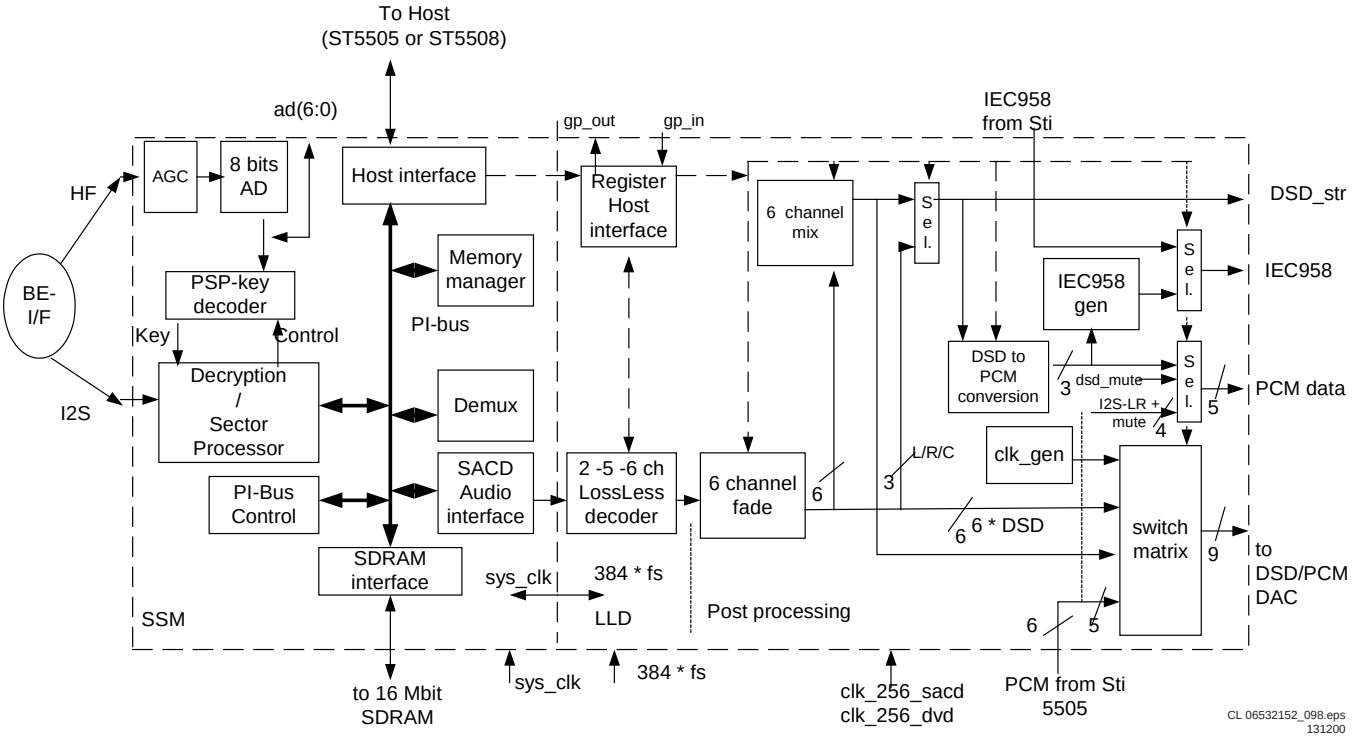


Figure 9-7

9.24.3 Basic Engine Interface

Data input interface.
The Basic Engine Interface is connected to the output of the SAA7335 (HD61)

Analogue HF input
The analogue HF input, coming from the optical pickup unit, is also fed to the Furore IC to extract the copyprotection information "PSP".

9.24.4 SDRAM Interface

The SDRAM interface forms a glueless interface to one 16Mbit 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 doesn't have to be controlled by the host.

9.24.5 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:
- Stereo PCM coming from the Sti5505 via the PCM input on Furore.
- 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 1000 to a digital receiver. No DSD signals are defined for IEC958 therefore the DSD-->PCM converted signal will be transmitted. Following two types of signals are possible on the digital interface:
- IEC958 data coming from Sti5505.
- IEC958 data, Stereo or down mix PCM, derived via a decimation filter from the SACD-DSD signal.

Clock + reset input.
Two different processing clocks are needed in the FURORE-IC:
- Sys_clk: System clock for data processing part, frequency can be 27 MHz or 768 * Fs.
- 384 * Fs: Processing clock for LLD and postprocessing.

RESETn is an asynchronous reset and should be low for at least 1 period of DSD_CLK.

9.24.6 Pin description

General-purpose in/outputs.

Four general purpose input and output signals are available.

IC-Pin_no	Name	Type	Function
1	H_DQ[13]	I/O5	Data bus
2	H_DQ[12]	I/O5	Data bus
3	VCC_IO	IN	3.3V power supply IO
4	GND_IO	IN	Ground
5	H_DQ[11]	I/O5	Data bus
6	H_DQ[10]	I/O5	Data bus
7	H_DQ[9]	I/O5	Data bus
8	H_DQ[8]	I/O5	Data bus
9	H_DQ[7]	I/O5	Data bus
10	H_DQ[6]	I/O5	Data bus
11	H_DQ[5]	I/O5	Data bus
12	H_DQ[4]	I/O5	Data bus
13	VCC_CORE	IN	3.3V power supply Core
14	GND_CORE	IN	Ground(core)
15	H_DQ[3]	I/O5	Data bus
16	H_DQ[2]	I/O5	Data bus
17	H_DQ[1]	I/O5	Data bus
18	H_DQ[0]	I/O5	Data bus
19	VCC_IO	IN	3.3V power supply IO
20	H_procclock	IN	Host processor EMI interface clock
21	GND_IO	IN	Ground
22	H_WAIT	O5	Wait signal
23	H_RWn	IN	READ=1,Write=0
24	H_CSLn	IN	Chip Select, active low
25	H_CSHn	IN	Chip select
26	H_ben(1)	IN	Byte Enable 1
27	H_ben(0)	IN	Byte Enable 0
28	B_V4	IN	Versatile Input Pin (contains Subcode), not used
29	B_SYNC	IN	Sector sync / Absolute time sync
30	B_FLAG	IN	I2S flag (EDC flag)
31	B_BCLK	IN	I2S Bit ClocK
32	B_WCLK	IN	I2S Word CLock
33	B_DATA	IN	I2S Data
34	GP_in_pin(0)	IN	General purpose in
35	GP_in_pin(1)	IN	General purpose in
36	AD[6]	I/O5	
37	AD[5]	I/O5	
38	AD[4]	I/O5	
39	VCC_CORE	IN	3.3V power supply Core
40	GND_CORE	IN	Ground(core)
41	AD[3]	I/O5	
42	AD[2]	I/O5	
43	AD[1]	I/O5	
44	AD[0]	I/O5	Digital out of AD OR digital in for PLL
45	GP_in_pin (2)	IN	General purpose in
46	biasin	APIO	Current input. connect via 15K to VSS
47	vddaagc	VDDCO	VDD of AGC (+ 3.3V)
48	Agcadctstp	APIO	AGC Positive channel test pin
49	vssaagc	VSSCO	Analog ground for AGC.
50	agcinp	APIO	AGC positive input signal, HF in.
51	VCC_IO	IN	3.3V power supply IO
52	GND_IO	In	Ground
53	agcadctstn	APIO	AGC Negative channel test pin
54	vssaadc	VSSCO	VSS of AGC & ADC connected to substrate
55	vddaadc	VDDCO	VDD of ADC (+3.3V)
56	adcrefh	APIO	ADC decoupling high . (via 100nF to VSS)
57	Adcrefm	APIO	ADC decoupling middle . (via 100nF to VSS)

IC-Pin_no	Name	Type	Function
58	adcrefl	APIO	ADC decoupling low. (via 100nF to VSS)
59	vssrefadc	VSSCO	VSS of Reference Ladder of ADC (not to the substrate)
60	PCM_LeRi_in	IN	PCM data Left/Right
61	PCM_CeLf_in	IN	PCM data Centre/LFE
62	PCM_LsRs_in	IN	PCM data lift/Right surround
63	PCM_wclk_in	IN	PCM word clock
64	PCM_dclk_in	IN	PCM data clock
65	VCC_CORE	IN	3.3V power supply Core
66	GND_CORE	IN	Ground(core)
67	GP_in_pin (3)	IN	General purpose in
68	D_ADDR[4]	O5	SDRAM Address bus
69	D_ADDR[5]	O5	SDRAM Address bus
70	GND_IO	IN	Ground
71	D_ADDR[6]	O5	SDRAM Address bus
72	D_ADDR[7]	O5	SDRAM Address bus
73	D_ADDR[8]	O5	SDRAM Address bus
74	D_ADDR[9]	O5	SDRAM Address bus
75	VCC_IO	IN	3.3V power supply IO
76	D_clk	O5	Clock signal needed for SDRAM.
77	GND_IO	IN	Ground
78	D_ADDR[0]	O5	SDRAM Address bus
79	D_ADDR[1]	O5	SDRAM Address bus
80	D_ADDR[2]	O5	SDRAM Address bus
81	D_ADDR[3]	O5	SDRAM Address bus
82	VCC_IO	IN	3.3V power supply IO
83	GND_IO	IN	Ground
84	D_ADDR[10]	O5	SDRAM Address bus
85	D_ADDR[11]	O5	SDRAM Address bus
86	GND_IO	-	Ground.
87	D_RASn	O5	Row Address Select
88	D_CASn	O5	Column Address Select
89	D_Wen	O5	Read/Write
90	D_LDQM	O5	DQ mask enable (lower)
91	VCC_CORE	IN	3.3V power supply Core
92	GND_CORE	IN	Ground(core)
93	D_UDQM	O5	DQ mask enable (Upper)
94	D_DQ[0]	I/O5	Data bus
95	VCC_IO	IN	3.3V power supply IO
96	D_DQ[1]	I/O5	Data bus
97	D_DQ[2]	I/O5	Data bus
98	D_DQ[3]	I/O5	Data bus
99	D_DQ[4]	I/O5	Data bus
100	VCC_IO	IN	3.3V power supply IO
101	GND_IO	IN	Ground
102	D_DQ[5]	I/O5	Data bus
103	D_DQ[6]	I/O5	Data bus
104	D_DQ[7]	I/O5	Data bus
105	D_DQ[8]	I/O5	Data bus
106	D_DQ[9]	I/O5	Data bus
107	D_DQ[10]	I/O5	Data bus
108	D_DQ[11]	I/O5	Data bus
109	D_DQ[12]	I/O5	Data bus
110	VCC_IO	IN	3.3V power supply IO
111	GND_IO	IN	Ground
112	D_DQ[13]	I/O5	Data bus
113	D_DQ[14]	I/O5	Data bus
114	D_DQ[15]	I/O5	Data bus
115	D_ADDR[12]	O5	SDRAM Address bus
116	D_ADDR[13]	O5	SDRAM Address bus
117	VCC_CORE	IN	3.3V power supply Core
118	GND_CORE	IN	Ground(core)

IC-Pin_no	Name	Type	Function
119	DSD_PCM_0	O10	DSD data output signal. On 64 * Fs Stereo : Left channel (channel 0) MCA5/6 : front left (channel 0) OR From PCM switch matrix
120	DSD_PCM_1	O10	Stereo : right channel (channel 1) MCA 5/6 : front right (channel 1) OR From PCM switch matrix
121	DSD_PCM_2	O10	Stereo : mute sequence MCA 5/6 : front centre (channel 2) OR From PCM switch matrix
122	DSD_PCM_3	O10	stereo : mute sequence MCA-5 : mute sequence MCA-6 : LFE channel. (channel 3) OR From PCM switch matrix
123	VCC_IO	IN	3.3V power supply IO
124	GND_IO	IN	Ground
125	DSD_PCM_4	O10	Stereo : mute sequence MCA-5 : left surround (channel 3) MCA-6 : left surround (channel 4) OR From PCM switch matrix
126	DSD_PCM_5	O10	Stereo : mute sequence MCA-5 : right surround (channel 4) MCA-6 : right surround (channel 5) OR From PCM switch matrix
127	DSD_PCM_6	O5	DSD clock signal. OR From PCM switch matrix
128	DSD_PCM_7	O5	DSD stereo or down mix Left OR From PCM switch matrix
129	DSD_PCM_8	O5	DSD stereo or down mix Right OR From PCM switch matrix
130	DSD_str(0)	O10	DSD stereo or downmix on DSD.
131	DSD_str(1)	O10	DSD stereo or downmix on DSD.
132	dsd_clk	O5	DSD clock for DSD stereo signal.
133	VCC_IO	IN	3.3V power supply IO
134	GND_IO	IN	Ground
135	PCM_LeRi_Out	O10	PCM data Left/Right to AV PCB
136	PCM_wclk_Out	O5	PCM word clock
137	fs_256_sacd	IN	256 * Fs audio clock generated for SACD (Fs=44.1Khz)
138	mute_tot	O10	Selectable mute signal from PCM source or internal SACD source.
139	fs_256_dvd	IN	256 * Fs audio clock generated for DVD (Fs=48 kHz)
140	RESETn	IN	Asynchronous Reset
141	D_cke	O5	Clock enable output to SDRAM to enable the power down mode.
142	PCM_clk_Out	O5	256 * fs O10put./384 * Fs O10
143	VCC_CORE	IN	3.3V power supply Core
144	GND_CORE	IN	Ground(core)
145	PCM_mute_in	IN	PCM mute signal.
146	IEC958_in	IN	IEC958 input from Sti5505
147	IEC958_Out	O10	IEC958 O10put
148	VCC_IO	IN	3.3V power supply IO
149	CLK	IN	system Clock 27 Mhz
150	GND_IO	IN	Ground
151	GP_out_pin (0)	O10	General purpose out
152	GP_out_pin (1)	O10	General purpose out
153	GP_out_pin (2)	O10	General purpose out
154	GP_out_pin (3)	O10	General purpose out
155	Prog_clk_sys	O10	Clock divide from system clock.
156	Prog_clk_384	O10	Clock divided from 384 * Fs LLD clock.
157	Pll_lock	O10	Indication that PLL is in lock
158	VCC_IO	IN	3.3V power supply IO
159	clk_384	IN	DSD system clock 384*Fs = 16.934400Hz
160	GND_IO	IN	Ground
161	Pll_sync	O10	Sector sync found.
162	Psp_enable	O10	If '1' PSP circuit is active
163	75hz_pulse	O10	75 Hz pulse to audio interface
164	Ssm_act	O10	Indication new frame is being transmitted
165	Lld_mute	O10	If '1' mute indication from audio interface
166	Play	O10	If '1' Fade circuit is in LLD mode
167	mute_det	O10	Mute 0x69 for all channels detection
168	Fade_busy	O10	Indication that fade in/out is busy
169	Do_grab	O10	Active data out of LLD.
170	VCC_CORE	IN	3.3V power supply Core

IC-Pin_no	Name	Type	Function
171	GND_CORE	IN	Ground(core)
172	PCM_dclk_Out	O5	PCM data clock
173	Tst(1)	IN	internal pull up for both test pins
174	Tst(0)	IN	IC testpins tst(1:0) 11 : Functional behaviour 10 : RAM test 01 : scan shift 00 : scan normal
175	TDI	IN	Boundary scan Data Input.
176	TMS	IN	Boundary scan Mode select
177	TCK	IN	Boundary scan Clock
178	TDO	O10	O10put
179	TRST	IN	Boundary scan Reset.
180	GND_IO	IN	Ground
181	H_IRQn	O5	Interrupt Request, active low
182	H_A22	IN	Data Strobe, active low
183	H_A[21]	IN	Address bus
184	H_A[20]	IN	Address bus
185	H_A[19]	IN	Address bus
186	H_A[18]	IN	Address bus
187	H_A[17]	IN	Address bus
188	H_A[16]	IN	Address bus
189	H_A[15]	IN	Address bus
190	H_A[14]	IN	Address bus
191	H_A[13]	IN	Address bus
192	H_A[12]	IN	Address bus
193	H_A[11]	IN	Address bus
194	H_A[10]	IN	Address bus
195	VCC_CORE	IN	3.3V power supply Core
196	GND_CORE	IN	Ground(core)
197	H_A[9]	IN	Address bus
198	H_A[8]	IN	Address bus
199	H_A[7]	IN	Address bus
200	H_A[6]	IN	Address bus
201	H_A[5]	IN	Address bus
202	H_A[4]	IN	Address bus
203	H_A[3]	IN	Address bus
204	H_A[2]	IN	Address bus
205	H_A[1]	IN	Address bus
206	VCC_IO	IN	3.3V power supply IO
207	H_DQ[15]	I/O5	Data bus
208	H_DQ[14]	I/O5	Data bus

9.25 Circuit description of DAC board

9.25.1 Description

The DAC board has 6 high performance audio outputs. It consists of 3 D/A converters and their appropriate filters, the clock generator part, the filter-control part and the muting-control part (See block diagram).
Key components are D/A converter CS4397 and I2C controller PCF8574.
The DAC board supports DSD and PCM. The digital data are sent from the MONO board to the DAC's QD41,QD51 and QD61 via a flex and connector JD01. The audio signals are sent to the cinches via a 2 or 1 filter stage. In these filter stages discrete opamp's are used.
The DAC board is I2C controlled via the I2C bus from the mono board to the DAC's and I2C controller QD21.
The differences between DSD mode and PCM mode are shown in the table below:
Digital audio data

Pin number	PCM mode	DSD mode
11	BCK	BCK
12	LRCK	SEL_DSD
13	SDT	DSD_L
14	SEL_PCM	DSD_R

MCLK

AUDIO SIGNAL	MCLK
DSD(SACD)	192Fs(8.4672 MHz)
PCM audio (Fs = 44.1 kHz) (CD)	384Fs(16.9344 MHz)
PCM audio (Fs = 32,4896 kHz)	256Fs

9.25.2 Filter setting

The user can select 3 filter settings using switch SD71 at the rear of the set. This is only effective during the playback of SACD discs. See the table below.

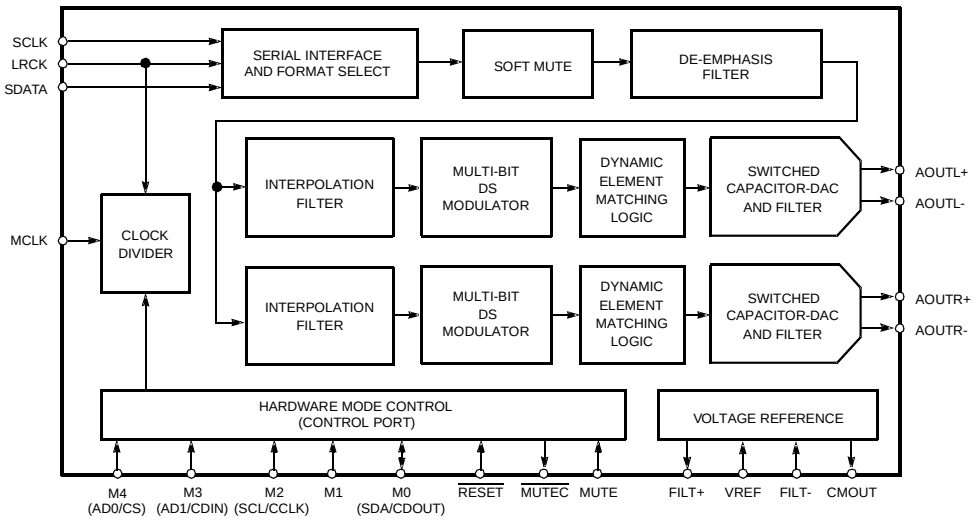
DISCS	Filter switch position		
	Position 1	position 2	position 3
SACD (DSD)	All channels: Normal*	L and R: Custom* Other channels: Normal	All channels: Custom
CD (PCM)	All channels : Custom		

* Normal: output via 1 filter stage (3rd order filter)
- Custom: output via 2 filter stage (6th order filter)

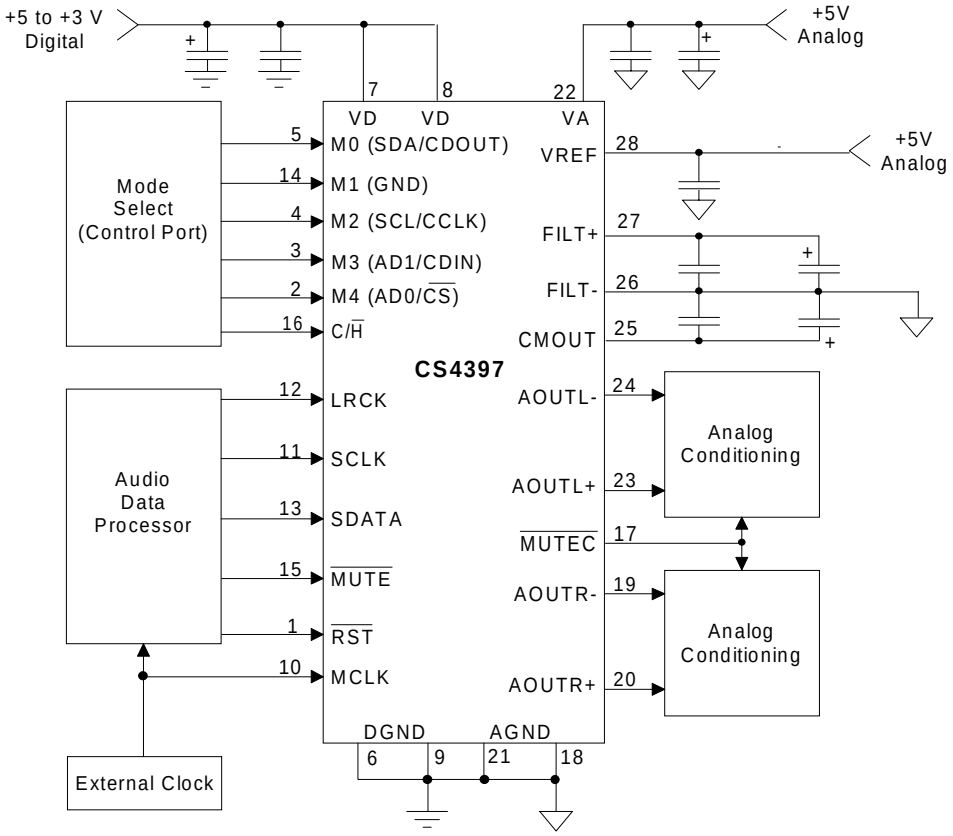
9.25.3 Description of DAC CS4397

CS4397

Block Diagram



Pin Configuration



Typical Connection Diagram - Hardware Mode (Control Port Mode)

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131200

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/CDOUT)	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 rations
13	SDATA(PCM) DSD_L(DSD)	I	PCM mode:Serial audio data DSD mode:Direct Stream Digital audio data (Left)
14	M1(PCM) DSD_R(DSD)	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	MUTEC	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

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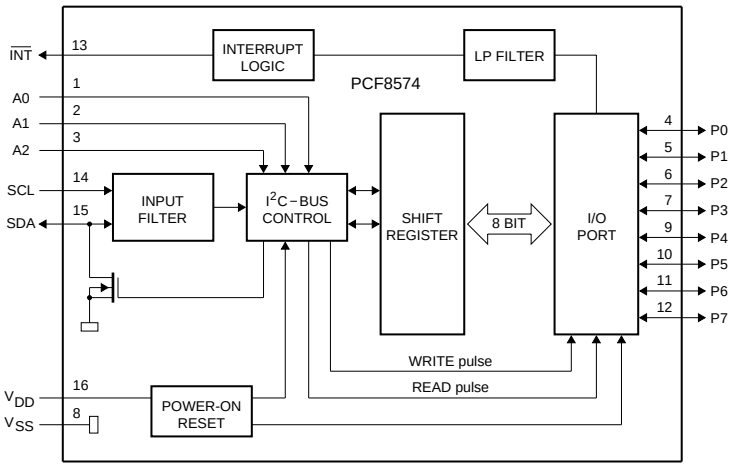
131200

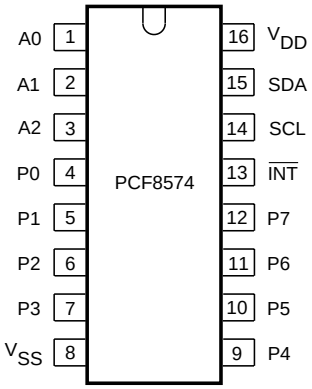
9.25.4 Description of I2C controller PC8574

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
$\overline{INT}$	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

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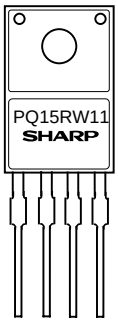
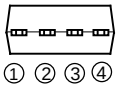
9.26 IC description of Linear power supply

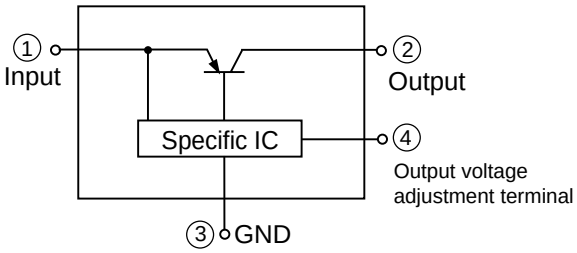
PQ15RW11 **Pin Configuration**



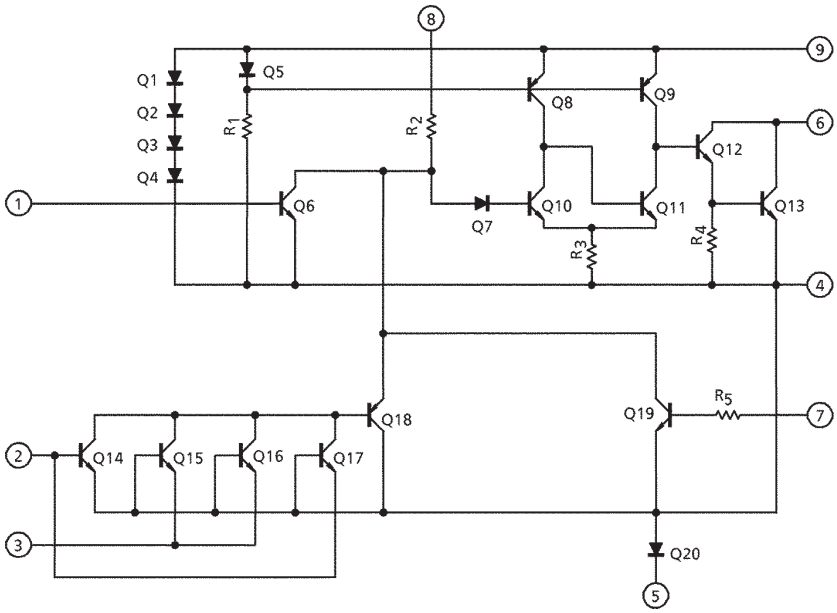


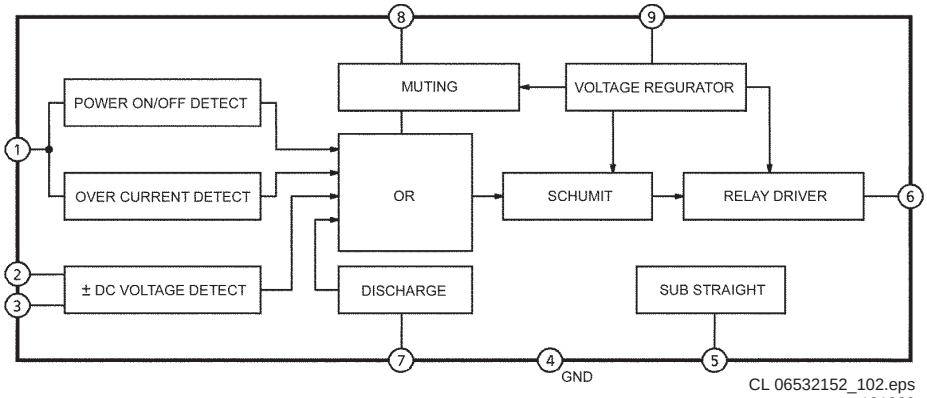
① DC input(Vin)
② DC output(Vo)
③ GND
④ Output voltage adjustment terminal(Vadj)

Block Diagram



TA7317P





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9.27 List of abbreviations

+12VSTBY	+12V power supply present during standby
+3A	Filtered 3V3 power supply to IC7207(MACE servo processor)
+3V3	3V3 power supply
+3V3S	Stabilised 3V3 power supply from IC7605 to MACE (IC7207) circuit
+5V	+5V power supply
+5VA	Filtered +5V: analog power supply for IC7311(HD61 decoder)
+5VB	Filtered +5V: digital power supply for IC7311(HD61 decoder)
+5VC	+5V power supply for IC7202(servo flash eprom)
+5VSTBY	+5V power supply present during standby
+5VX	+5V power supply for IC7105(opamp)
+6VSTBY	+6V power supply present during standby
+9V	Stabilised +9V power supply from IC7109 to IC7103 (Servo power driver)
0_6_12V	Scart switch control signal to A/V board. 0V : loop through (AUX to TV), 6V : play 16:9 format, 12V : play 4:3 format
1.5V	1.5V reference voltage for IC7102 (DVDALAS)
2.0V	2V reference voltage for IC7102 (DVDALAS)
2.5V	2.5V reference voltage for IC7102 (DVDALAS)
27M_CLK	27MHz clock out of the PLL-Master clock for the main processor (IC7503)
384FS_IN	SACD clock from DAC PCB
75HZ_PULSE	75Hz pulse to audio interface indication output
-8VSTBY	-8V power supply present during standby
A[20:1]	System address bus (EMI)
A1_MACE	Amplitude of the "land" reflection relative to the average EFM
AD[11:0]	SDRAM address bus
ALE	Address latch enable (servo processor)
ALPHA0	Generic name for the setpoint of the laser power absorption control
AM[7:0]	Latched low address bus to servo flash
AM[17:8]	High address bus to servo flash
AMD[7:0]	Multiplexed address data bus to servo flash
Ax	Central photodiode signal
B	Central photodiode signal
B_BCLK	Basic engine I2S bit clock
B_DATA	Basic engine I2S data
B_FLAG	Basic engine error flag
B_OUT	Video output blue from Sti5505
B_SYNC	Basic engine sector /abs time sync
B_V4	Basic engine versatile input pin
B_VID	Buffered video output Blue to A/V board
B_WCLK	Basic engine I2S word clock
BE1N_FUR	Upper byte enable of the Furore
BE0N_FUR	Lower byte enable of the Furore
C	Central photodiode signal
C_OUT	Chrominance output from Sti5505
C_VID	Buffered Chrominance output to A/V board
CALF_MACE	Central aperture low frequency control signal to MACE
CAS[1:0]ND	DRAM column address strobe
CASN	SDRAM column address strobe
CE_ROM1N	Chip enable flash eprom IC7401
CE_ROM2N	Chip enable flash eprom IC7451
CE_ROMN	Chip enable ROM memory (flash access)
CENTRE_ON	Control signal from Sti5505 to AV board to switch STEREO OUTPUT cinch to mono.
CFLG	Correction flag output
CFR	Control processor ready to accept data (S2B)
CLK	Clock for SDRAM memory
COSPH	Position Control Sledge in
CPUANALYSE	Control port P3 I/O from Sti5505
CPURESET	Control port P3 I/O to Sti5505
CSH_FUR	FURORE chip select the upper bank
CSI	Chip select input of HD61 (servo)
CSL_FUR	FURORE chip select the lower bank
CSN[2:1]	SDRAM chip select
CTS_SER	Clear to send control signal of service serial interface
CVBS	Buffered composite video output to A/V board
CVBS_OUT	Composite video output from Sti5505
D	Central photodiode signal
D[15:0]	System data bus (EMI)
DO_GRAB	Active data out of LLD (LossLess Decoder). Indication output
DQ[15:0]	SDRAM data bus
DQML	SDRAM data mask enable (Lower)
DQMU	SDRAM data mask enable (Upper)
DSD	Direct Stream Digital
DSD_CLK	DSD clock for DSD stereo signal
DSD_PCM[8:0]	DSD data
DSD_STR[1:0]	DSD stereo or downmix on DSD
DST	Direct Stream Transfer
DVD_LDN	Control signal from MACE to loader supply IC7107
E	Satellite photodiode signal
EMI_IRQN	Interrupt request, active low
ERROROUT	Control port P3 I/O from Sti5505
F	Satellite photodiode signal
FADE_BUSY	Indication that fade in/out is busy
FLASH_OEN	FLASH output enable control signal
FO	Focus actuator output
FOC-	Focus actuator negative connection
FOC+	Focus actuator positive connection
FUR_AD[13:0]	FURORE SDRAM address bus
FUR_CASN	Furore SDRAM column address strobe
FUR_CKE	Furore SDRAM clock enable
FUR_CLK	Furore SDRAM clock
FUR_DQ[15:0]	FURORE SDRAM data bus
FUR_DQMH	FURORE SDRAM data mask enable (Upper)
FUR_DQML	FURORE SDRAM data mask enable (Lower)
FUR_RASN	Furore SDRAM row address strobe
FUR_TDI	Boundary scan test data input FURORE
FUR_TMS	Boundary scan test mode select FURORE
FUR_TRST	Boundary scan test port reset FURORE
FUR_WEN	Furore SDRAM write enable
G_OUT	Video output green from Sti5505
G_VID	Buffered video output Green to A/V board
GND	Ground
GP_IN_PIN[3:0]	Furore general purpose input port
GP_OUT_PIN[3:0]	Furore general purpose output port

HPSW	Control signal to swith HF signal path
HSYNC	Horizontal synchronization output
I2C_DAC	Control signal to enable/disable the I2C bus to the DAC PCB
INT	Interrupt request
KAR_BY_PASS	Karaoke bypass control signal from Sti5505 to AV board.
LD-CD	CD laser out
LD-DVD	DVD laser out
LLD_MUTE	LossLess Decoder Mute, if "1" mute indication from audio interface
LRCLK	PCM Left/Right clock (word clock) to AV board
LRCLK_AV	PCM Left/Right clock (word clock) to AV board
LRCLK_FUR	PCM Left/Right clock (word clock) to the FURORE
LRCLKO	PCM Left/Right clock (word clock) output from STI5505
MON1	CD laser monitor
MON2	DVD laser monitor
MOTO1	Motor control signal
MUTE	Mute control signal
MUTE_AV	Mute control signal to AV board
MUTE_DET	Mute detection, mute 0x69 for all channels detection
O[4:1]	Servo current outputs for focus control
O-CENTRAL	Testpin for offset cancelation
OEND	DRAM output enable
OSLINKIN	Control port P3 I/O to Sti5505
OSLINKOUT	Control port P3 I/O from Sti5505
OTD-HD61	Off track detection
P50	Bi-directional interface used for communication between video equipment
PCM_CELF_FUR	I2S center/subwoofer serial data line
PCM_CLK_FUR	Audio system clock to FURORE
PCM_CLK_ST	Audio system clock to STI5505
PCM_LERI_FUR	I2S left right data line to the FURORE
PCM_LSRS_FUR	I2S left/right surround serial data line
PCM_OUT0	I2S audio serial data out of the STI5505
PCMCLK_AV	I2S audio system clock to A/V PCB
PCMOUT_AV	I2S audio serial output data to A/V PCB
PLAY	If "1" Fade circuit is in LLD mode, indication output
PLL_LOCK	Indication that PLL is in lock
PLL_SYNC	Sector sync found indication
POR	Power on reset
PORN	Power on reset active low
PROG_CLK384	Clock divided from 384*Fs = 16.9344 Hz
PROG_CLKSYS	Clock divide from system clock
PSENn	Program strobe enable (Servo)
PSP	Pit Signal Processing
PSP_ENABLE	If "1" PSP circuit is active, indication output
PWR_FAIL	Power fail control signal from PSU
R_OUT	Video output Red from Sti5505
R_VID	Buffered video output Red to A/V board
RA	Radial actuator control signal from servo processor to power driver
RAC-SW	Radial control switch
RAD-	Radial actuator negative connection
RAD+	Radial actuator positive connection
RAMAD[14:0]	RAM memory address bus (Servo)
RAMDA[7:0]	RAM memory data bus (Servo)
RAMRW	RAM memory read/write control signal (Servo)
RAS[1:0]ND	DRAM row address strobe
RASN	SDRAM row address strobe
RDI	Read enable input of HD61
REFCOS	Position Control Sledge external cosine offset compensation/stepper motor cosine output
REFSIN	Position Control Sledge external sine offset compensation/stepper motor sine output
RESET_I2C	Reset I2C
Rfo	Amplified HF signal to HD61
RFP	Amplified HF signal for PSP recognition
RSTN	System reset
RTS_SER	Ready to send control signal of service serial interface
RWN	Read/Write control signal (EMI)
RXD_BE	Receive data of basic engine serial interface (S2B)
RXD_SER	Receive data of service serial interface
S[2:1]	Servo current outputs for radial tracking
SACD_CLK	SACD clock 16.394 MHz, CLK source of the system
SCART[1:0]	Scart control signals: slow blanking
SCL	I2C bus clock
SCL_DAC	I2C bus clock to DAC PCB
SCLK	PCM I2S serial bit clock
SCLK_AV	PCM I2S serial bit clock to A/V PCB
SCLK_FUR	PCM I2S serial bit clock to the FURORE
SCLKo	PCM I2S serial bit clock output from Sti5505
SDA	I2C bus data
SDA_DAC	I2C bus data to DAC PCB
SEL_ACLK1	Select audio clock 1
SEL_ACLK2	Select audio clock 2
SERVICE	Control signal of service serial interface
SICL	Serial interface clock input
SIDA	Serial interface data input
SILD	Serial interface load
SINPH	Position control sledge in
SL	Sledge actuator control signal from servo processor to power driver
SL-	Sledge actuator negative connection to sledge motor
SL+	Sledge actuator positive connection to sledge motor
SPDIF_AV	Digital audio to the A/V PCB
SPDIF_FUR	Digital audio to the FURORE
SPDIF_OUT	Digital output from STI5505
SSM_ACT	Indication new frame is being transmitted
ST_CLK	STI5505 system clock
ST_TDI	Boundary scan test data input to STI5505
STB_CONT	Standby control signal to power supply
STB_CONTD	Delayed standby control signal - enable or disable the clocks
STB_MUTE	Standby control signal mute
STB_OUT	Standby control signal to DAC PCB
STBY	Standby
SUR	Servo Unit Ready to accept data (S2B0
T[3:1]	Tacho control signals from HD61 to turntable motor driver
TCK	Boundary scan test clock
TDI	Boundary scan test data input
TDO	Boundary scan test data output
TMS	Boundary scan test mode select
TRAY1	Tray motor control signal 1 from servo processor to power driver

TRAY2	Tray motor control signal 2 from servo processor to power driver
TRAYSW	Tray switch control signal to servo processor
TRST	Boundary scan test port reset
TXD_BE	Transmitted data basic engine serial interface (S2B)
TXD_SER	Transmitted data service serial interface
VCC_FUR	Filtered power supply 3V3 to FURORE IC
VCC_LVC00	Filtered power supply 3V3 to IC7400
VCC3V3	Power supply 3V3
VCC5V	Power supply 5V to system clocks
VDD_DRAM	Power supply for DRAM 7450 (option)
VDD_MEM	Power supply for flashes 7401 and 7451
VDD_MEM2	Power supply for SDRAM
VDD_STI	Power supply for ST5505
VDDA_ADC	ADC power supply voltage 3V3 for FURORE
VDDA_AGC	AGC power supply voltage 3V3 for FURORE
VO2-	Tray motor negative connection
VO2+	Tray motor positive connection
V-REF	Reference voltage
VSYNC	Vertical synchronisation
-VVID	Negative reference voltage to video buffers
WAIT	Wait state request
WE	Servo flash Write Enable
WEN	Write enable control signal to SDRAM
WRI	Write enable input of HD61 (Servo)
Y_OUT	Luminance output from Sti5505
Y_VID	Buffered luminance output to A/V board

10. Spare parts list

Mechanical

Various

0001	3104 127 11490	FRONT AL ASSY
0002	3104 127 12140	FRONT ASSY
0004	3104 127 12880	WINDOW ASSY
0006	3104 127 12150	HOLDER RIGHT COMPLETE
0007	3104 127 12270	POWER ON/OFF KNOB ASSY
0010	3104 124 05450	LIGHT CONDUCTOR
0012	3104 127 12160	HOLDER LEFT ASSY
0050	3104 120 00260	SA-CD BADGE
0065	3104 127 11520	TRAY FRONT COMPLETE SA-CD1000
0075	3104 118 90180	TAPTITE SCREW TORX + SPIKES
0076	3104 118 90180	TAPTITE SCREW TORX + SPIKES
0077	3104 118 90180	TAPTITE SCREW TORX + SPIKES
0078	3104 118 90180	TAPTITE SCREW TORX + SPIKES
0081	9305 023 61101	
0086	3104 126 25210	DUST CAP
0151	3104 127 11930	COVER ASSY
0251	3104 127 10740	FOOT SILVER ASSY
0252	3104 127 10740	FOOT SILVER ASSY
0253	3104 127 10740	FOOT SILVER ASSY
0254	3104 127 10740	FOOT SILVER ASSY
0301	3104 128 92800	MAINSCORD EU CLASS 1 NO GROUND
0309	3104 125 23810	USER MANUAL SACD EU (7-LANG)
0316	3104 128 92490	VIDEO CORD SET GOLD PLATED
0318	3104 207 10850	IRT PROD ASSY RC2055/01 PACKED
0320	4822 321 22611	
0321	4822 321 22611	
0322	4822 321 22611	
0323	4822 321 22611	
0324	4822 321 61452	
0325	4822 321 61847	SCART
1002	3104 128 06870	MONOBOARD 4285 ASSY SACD1000
1003	3104 128 06890	A/V BOARD 4225 MOVIE SACD1000
1004	3104 129 22150	PSU SACD1000 SRV1122WW MITSUMI
1007	3104 128 70230	TRAFO ASSY SACD NUVOTEM
8003	3104 157 11860	CWAS FLEX SACD 24 108 32S
8006	3104 157 11190	CWAS FLEX DVD 22 130 32S
8007	3104 157 11200	CWAS FLEX DVD 16 130 32S

Front part

Various

	3104 127 12270	POWER ON/OFF KNOB ASSY

VAL6011

Various

0001	3139 197 60090	GENEVA LP LOADER ASSY
0002	9305 022 60101	VAM6001/01
0003	3139 194 00710	SUSPENSION
0004	3139 194 00710	SUSPENSION
0005	3139 194 00620	SUSPENSION
0006	3139 194 00620	SUSPENSION
0007	3139 197 60060	CLAMPER ASSEMBLY

Loader

Various

0004	4822 358 10266	
0009	3139 198 80010	
0010	4822 532 13097	TULE
0011	3139 194 00270	
0012	3139 197 50060	

PCS PWB

Various

1001	4822 130 11531	SENSOR LT125A

DAC PWB

Various

1001	3104 128 06960	MJI DAC BOARD SACD
1002	3104 128 06970	MJI POWER SUPPLY SACD

Linear PSU

Various

031L	9965 000 06670	M1698-A NEJI TERMINAL

⊣⊢

C101	9965 000 06694	1800pF J 100V APSV
C102	4822 121 70437	1nF 5%
C103	9965 000 05891	APSV 471J 470pF (TP) 100V PP
C104	4822 126 10513	47pF 5% 50V
C105	5322 126 10511	1nF 5% 50V
C111	4822 124 22039	1220 µF 16V
C112	4822 124 22039	1220 µF 16V
C151	9965 000 06694	1800pF J 100V APSV
C152	4822 121 70437	1nF 5%
C153	9965 000 05891	APSV 471J 470pF (TP) 100V PP
C154	4822 126 10513	47pF 5% 50V
C155	5322 126 10511	1nF 5% 50V
C161	4822 124 22039	1220 µF 16V
C162	4822 124 22039	1220 µF 16V
C201	9965 000 06694	1800pF J 100V APSV
C202	4822 121 70437	1nF 5%
C203	9965 000 05891	APSV 471J 470pF (TP) 100V PP
C204	4822 126 10513	47pF 5% 50V
C205	5322 126 10511	1nF 5% 50V
C211	4822 124 22039	1220 µF 16V
C212	4822 124 22039	1220 µF 16V
C251	9965 000 06694	1800pF J 100V APSV
C252	4822 121 70437	1nF 5%
C253	9965 000 05891	APSV 471J 470pF (TP) 100V PP
C254	4822 126 10513	47pF 5% 50V
C255	5322 126 10511	1nF 5% 50V
C261	4822 124 22039	1220 µF 16V
C262	4822 124 22039	1220 µF 16V
C301	9965 000 06697	560pF J 100V APSV
C302	9965 000 03406	150pF J 100V APSV
C303	4822 126 10513	47pF 5% 50V
C317	9965 000 06697	560pF J 100V APSV
C318	5322 126 10511	1nF 5% 50V
C321	4822 124 22039	1220 µF 16V
C322	4822 124 22039	1220 µF 16V
C351	9965 000 06697	560pF J 100V APSV
C352	9965 000 03406	150pF J 100V APSV
C353	4822 126 10513	47pF 5% 50V
C367	9965 000 06697	560pF J 100V APSV
C368	5322 126 10511	1nF 5% 50V
C371	4822 124 22039	1220 µF 16V
C372	4822 124 22039	1220 µF 16V
C401	9965 000 06697	560pF J 100V APSV
C402	9965 000 03406	150pF J 100V APSV
C403	4822 126 10513	47pF 5% 50V
C417	9965 000 06697	560pF J 100V APSV
C418	5322 126 10511	1nF 5% 50V
C421	4822 124 22039	1220 µF 16V
C422	4822 124 22039	1220 µF 16V
C451	9965 000 06697	560pF J 100V APSV
C452	9965 000 03406	150pF J 100V APSV
C453	4822 126 10513	47pF 5% 50V
C467	9965 000 06697	560pF J 100V APSV
C468	5322 126 10511	1nF 5% 50V
C471	4822 124 22039	1220 µF 16V
C472	4822 124 22039	1220 µF 16V
C501	9965 000 06697	560pF J 100V APSV
C502	9965 000 03406	150pF J 100V APSV
C503	4822 126 10513	47pF 5% 50V
C517	9965 000 06697	560pF J 100V APSV
C518	5322 126 10511	1nF 5% 50V
C521	4822 124 22039	1220 µF 16V
C522	4822 124 22039	1220 µF 16V
C551	9965 000 06697	560pF J 100V APSV
C552	9965 000 03406	150pF J 100V APSV
C553	4822 126 10513	47pF 5% 50V
C567	9965 000 06697	560pF J 100V APSV
C568	5322 126 10511	1nF 5% 50V
C571	4822 124 22039	1220 µF 16V
C572	4822 124 22039	1220 µF 16V
C601	4822 124 80123	220µF 16V
C602	4822 124 80123	220µF 16V
C603	9965 000 01344	100pF 100V ECQ-P1101JZ
C611	4822 124 80123	220µF 16V
C612	4822 124 80123	220µF 16V
C613	9965 000 01344	100pF 100V ECQ-P1101JZ
C621	4822 124 80123	220µF 16V
C622	4822 124 80123	220µF 16V
C623	9965 000 01344	100pF 100V ECQ-P1101JZ
C631	4822 124 80123	220µF 16V
C632	4822 124 80123	220µF 16V
C633	9965 000 01344	100pF 100V ECQ-P1101JZ
C641	4822 124 80123	220µF 16V
C642	4822 124 80123	220µF 16V
C643	9965 000 01344	100pF 100V ECQ-P1101JZ
C651	4822 124 80123	220µF 16V
C652	4822 124 80123	220µF 16V
C653	9965 000 01344	100pF 100V ECQ-P1101JZ
C701	9965 000 06694	1800pF J 100V APSV
C702	4822 121 70437	1nF 5%
C703	9965 000 05891	APSV 471J 470pF (TP) 100V PP
C704	4822 126 10513	47pF 5% 50V
C705	5322 126 10511	1nF 5% 50V
C711	4822 124 22039	1220 µF 16V
C712	4822 124 22039	1220 µF 16V
C751	9965 000 06694	1800pF J 100V APSV
C752	4822 121 70437	1nF 5%
C753	9965 000 05891	APSV 471J 470pF (TP) 100V PP
C754	4822 126 10513	47pF 5% 50V
C755	5322 126 10511	1nF 5% 50V
C761	4822 124 22039	1220 µF 16V
C762	4822 124 22039	1220 µF 16V
C801	4822 122 40617	0,1µF 50V
C802	4822 122 40617	0,1µF 50V
C803	4822 124 41458	4700µF 20% 16V
C804	4822 122 40617	0,1µF 50V
C805	4822 124 22039	1220 µF 16V
C806	4822 124 41458	4700µF 20% 16V
C814	4822 122 40617	0,1µF 50V
C815	4822 124 12404	220µF 20% 16V
C816	4822 122 40617	0,1µF 50V
C817	4822 124 90353	100 µF 10V
C818	4822 122 40617	0,1µF 50V
C821	4822 122 40617	0,1µF 50V
C822	4822 122 40617	0,1µF 50V
C823	9965 000 06700	1000µF 25V
C824	9965 000 06700	1000µF 25V
C825	9965 000 06700	1000µF 25V
C826	9965 000 06700	1000µF 25V
C827	4822 124 41535	100µF 25V
C828	4822 124 41535	100µF 25V
C829	4822 124 81144	1000µF 16V
C830	4822 124 81144	1000µF 16V
C841	4822 122 40617	0,1µF 50V
C842	4822 122 40617	0,1µF 50V
C843	4822 124 22723	1000µF 25V
C844	4822 122 40617	0,1µF 50V
C845	4822 124 12404	220µF 20% 16V
C846	4822 122 40617	0,1µF 50V
C851	4822 126 11703	0.01µF
C852	4822 126 11703	0.01µF
C853	4822 126 11703	0.01µF
C854	4822 126 11703	0.01µF

CD01	4822 124 41539	47µF 16V
CD02	4822 126 11687	
CD03	4822 122 33761	22pF 5% 50V
CD04	4822 122 33761	22pF 5% 50V
CD05	4822 126 11687	
CD06	4822 126 11687	
CD07	4822 126 11687	
CD08	9965 000 06692	20pF +-5% CH 50V
CD09	4822 126 11687	
CD11	4822 122 33753	150pF 5% 50V
CD12	4822 122 33753	150pF 5% 50V
CD17	4822 122 33753	150pF 5% 50V
CD18	4822 122 33753	150pF 5% 50V
CD21	4822 126 11687	
CD23	4822 124 22039	1220 µF 16V
CD24	9965 000 06693	47µF 16V ARA
CD41	4822 124 90353	100 µF 10V
CD42	4822 126 11687	
CD43	9965 000 01567	100 µF 10V ARA
CD44	4822 126 11687	
CD45	4822 126 11687	
CD46	9965 000 01567	100 µF 10V ARA
CD47	4822 126 11687	
CD48	4822 124 11947	10µF 20% 16V
CD49	4822 126 11687	
CD51	4822 124 90353	100 µF 10V
CD52	4822 126 11687	
CD53	9965 000 01567	100 µF 10V ARA
CD54	4822 126 11687	
CD55	4822 126 11687	
CD56	9965 000 01567	100 µF 10V ARA
CD57	4822 126 11687	
CD58	4822 124 11947	10µF 20% 16V
CD59	4822 126 11687	
CD61	4822 124 90353	100 µF 10V
CD62	4822 126 11687	
CD63	9965 000 01567	100 µF 10V ARA
CD64	4822 126 11687	
CD65	4822 126 11687	
CD66	9965 000 01567	100 µF 10V ARA
CD67	4822 126 11687	
CD68	4822 124 11947	10µF 20% 16V
CD69	4822 126 11687	
CD71	4822 126 11687	
CD72	4822 126 11687	
CD91	4822 126 11703	0.01µF
CD92	4822 126 11703	0.01µF
CD93	4822 126 11703	0.01µF
CD94	4822 126 11703	0.01µF
CD95	4822 126 11703	0.01µF
CD96	4822 126 11703	0.01µF
CN01	4822 124 41543	1µF 50V
CN02	4822 124 40763	2,2µF 100 V
CN03	4822 124 23649	470µF 25V
CN21	4822 124 80067	4,7µF 20% 63V
CN22	4822 124 22273	0.47µF 50V
CN23	5322 122 32654	63V 22nF PM10 R

D101	4822 130 32362	MA165
D102	4822 130 81324	1SS302-X
D103	4822 130 81324	1SS302-X
D151	4822 130 32362	MA165
D152	4822 130 81324	1SS302-X
D153	4822 130 81324	1SS302-X
D201	4822 130 32362	MA165
D202	4822 130 81324	1SS302-X
D203	4822 130 81324	1SS302-X
D251	4822 130 32362	MA165
D252	4822 130 81324	1SS302-X
D253	4822 130 81324	1SS302-X
D301	4822 130 32362	MA165
D302	4822 130 81324	1SS302-X
D303	4822 130 81324	1SS302-X
D351	4822 130 32362	MA165
D352	4822 130 81324	1SS302-X
D353	4822 130 81324	1SS302-X
D401	4822 130 32362	MA165
D402	4822 130 81324	1SS302-X
D403	4822 130 81324	1SS302-X
D451	4822 130 32362	MA165
D452	4822 130 81324	1SS302-X
D453	4822 130 81324	1SS302-X
D501	4822 130 32362	MA165
D502	4822 130 81324	1SS302-X
D503	4822 130 81324	1SS302-X
D551	4822 130 32362	MA165
D552	4822 130 81324	1SS302-X
D553	4822 130 81324	1SS302-X
D601	4822 130 32362	MA165
D621	4822 130 32362	MA165
D641	4822 130 32362	MA165
D701	4822 130 32362	MA165
D702	4822 130 81324	1SS302-X
D703	4822 130 81324	1SS302-X
D751	4822 130 32362	MA165
D752	4822 130 81324	1SS302-X
D753	4822 130 81324	1SS302-X
D801▲	4822 130 82421	1D3
D802▲	4822 130 82421	1D3
D803▲	4822 130 82421	1D3
D804▲	4822 130 82421	1D3
D821▲	4822 130 82421	1D3
D822▲	4822 130 82421	1D3
D823▲	4822 130 82421	1D3
D824▲	4822 130 82421	1D3
D825	4822 130 80623	MTZ13B
D826	4822 130 80623	MTZ13B
D827	4822 130 32362	MA165
D828	4822 130 32362	MA165
D841▲	4822 130 82421	1D3
D842▲	4822 130 82421	1D3
D843▲	4822 130 82421	1D3
D844▲	4822 130 82421	1D3
DD21	4822 130 83715	1SS301
DD23 ▲	4822 130 82421	1D3
DH01	4822 130 82421	1D3
DN01	4822 130 82421	1D3
DN02	4822 130 82421	1D3
DN03	4822 130 82421	1D3
DN04	4822 130 82421	1D3
DN05	4822 130 82421	1D3
DN06	4822 130 32362	MA165
DN07	4822 130 32362	MA165
DN08	4822 130 33948	MTZJ5.6B
DN20	4822 130 83715	1SS301
DN31	4822 130 32362	MA165
DN32	4822 130 32362	MA165
DN33	4822 130 32362	MA165
F801▲	4822 070 32001	218.200(200MA)
F821▲	4822 070 38001	218.800(800MA)
F822▲	4822 070 38001	218.800(800MA)
F841▲	4822 070 34001	218.400(400MA)
FH01▲	9965 000 06705	T1A H 250V S505
GH0 5▲	9965 000 06706	10NF +-20% F AC250V

L601	4822 116 82487	0R00
L602	9965 000 06669	ED2-12NU
L611	4822 116 82487	0R00
L621	4822 116 82487	0R00
L622	9965 000 06669	ED2-12NU
L631	4822 116 82487	0R00
L641	4822 116 82487	0R00
L642	9965 000 06669	ED2-12NU
L651	4822 116 82487	0R00
LD01	4822 158 60654	BLM31A02
LD02	4822 158 60654	BLM31A02
LD41	9965 000 03109	FB M J2125HM330-T
LD51	9965 000 03109	FB M J2125HM330-T
LD61	9965 000 03109	FB M J2125HM330-T
LH01▲	4822 157 70398	
LH02▲	4822 280 80754	VS-12MB
LN31	9965 000 06669	ED2-12NU
LN32	9965 000 06669	ED2-12NU
LN33	9965 000 06669	ED2-12NU

Q101	4822 130 42843	2SK389
Q102	4822 130 61425	2SC2873
Q103	4822 130 63928	2SA1312(B)
Q104	4822 130 63928	2SA1312(B)
Q105	4822 130 63929	2SC3324(B)
Q106	5322 130 41844	2SK170BL
Q107	4822 130 62649	2SJ74
Q151	4822 130 42843	2SK389
Q152	4822 130 61425	2SC2873
Q153	4822 130 63928	2SA1312(B)
Q154	4822 130 63928	2SA1312(B)
Q155	4822 130 63929	2SC3324(B)
Q156	5322 130 41844	2SK170BL
Q157	4822 130 62649	2SJ74
Q201	4822 130 42843	2SK389
Q202	4822 130 61425	2SC2873
Q203	4822 130 63928	2SA1312(B)
Q204	4822 130 63928	2SA1312(B)
Q205	4822 130 63929	2SC3324(B)
Q206	5322 130 41844	2SK170BL
Q207	4822 130 62649	2SJ74
Q251	4822 130 42843	2SK389
Q252	4822 130 61425	2SC2873
Q253	4822 130 63928	2SA1312(B)
Q254	4822 130 63928	2SA1312(B)
Q255	4822 130 63929	2SC3324(B)
Q256	5322 130 41844	2SK170BL
Q257	4822 130 62649	2SJ74
Q301	4822 130 42843	2SK389
Q302	4822 130 61425	2SC2873
Q303	4822 130 63928	2SA1312(B)
Q304	4822 130 63928	2SA1312(B)
Q305	4822 130 63929	2SC3324(B)
Q306	5322 130 41844	2SK170BL
Q307	4822 130 62649	2SJ74
Q351	4822 130 42843	2SK389
Q352	4822 130 61425	2SC2873
Q353	4822 130 63928	2SA1312(B)
Q354	4822 130 63928	2SA1312(B)
Q355	4822 130 63929	2SC3324(B)
Q356	5322 130 41844	2SK170BL
Q357	4822 130 62649	2SJ74
Q401	4822 130 42843	2SK389
Q402	4822 130 61425	2SC2873
Q403	4822 130 63928	2SA1312(B)
Q404	4822 130 63928	2SA1312(B)
Q405	4822 130 63929	2SC3324(B)
Q406	5322 130 41844	2SK170BL
Q407	4822 130 62649	2SJ74
Q451	4822 130 42843	2SK389
Q452	4822 130 61425	2SC2873
Q453	4822 130 63928	2SA1312(B)
Q454	4822 130 63928	2SA1312(B)
Q455	4822 130 63929	2SC3324(B)
Q456	5322 130 41844	2SK170BL
Q457	4822 130 62649	2SJ74
Q501	4822 130 42843	2SK389
Q502	4822 130 61425	2SC2873
Q503	4822 130 63928	2SA1312(B)
Q504	4822 130 63928	2SA1312(B)
Q505	4822 130 63929	2SC3324(B)
Q506	5322 130 41844	2SK170BL
Q507	4822 130 62649	2SJ74
Q551	4822 130 42843	2SK389
Q552	4822 130 61425	2SC2873
Q553	4822 130 63928	2SA1312(B)
Q554	4822 130 63928	2SA1312(B)
Q555	4822 130 63929	2SC3324(B)
Q556	5322 130 41844	2SK170BL
Q557	4822 130 62649	2SJ74
Q701	4822 130 42843	2SK389
Q702	4822 130 61425	2SC2873
Q703	4822 130 63928	2SA1312(B)
Q704	4822 130 63928	2SA1312(B)
Q705	4822 130 63929	2SC3324(B)
Q706	5322 130 41844	2SK170BL
Q707	4822 130 62649	2SJ74
Q751	4822 130 42843	2SK389
Q752	4822 130 61425	2SC2873
Q753	4822 130 63928	2SA1312(B)
Q754	4822 130 63928	2SA1312(B)
Q755	4822 130 63929	2SC3324(B)
Q756	5322 130 41844	2SK170BL
Q757	4822 130 62649	2SJ74
Q801	9965 000 06702	PQ15RW11 3.0 15V VARIABLE REG.
Q811▲	4822 209 73096	NJM78M05FA
Q812	9965 000 03397	BA033FP 3.3V 1A PD=1W VD=0.3V
Q821▲	4822 130 62704	2SB1225
Q822▲	5322 130 41842	BDW93B
Q841▲	4822 209 82828	NJM78M12A
QD0 1	9965 000 06673	TC7WHU04FU
QD0 2	9965 000 04632	IC TC74VHC00FT
QD0 3	9965 000 04632	IC TC74VHC00FT
QD0 4	4822 130 61541	2SC4116(G)
QD0 5	9965 000 06674	TC7WH74FU
QD0 6	9965 000 06673	TC7WHU04FU
QD2 1	5322 209 11578	PCF8574T
QD2 2	4822 130 61541	2SC4116(G)
QD2 3	9965 000 03397	BA033FP 3.3V 1A PD=1W VD=0.3V
QD3 2	4822 130 61541	2SC4116(G)
QD4 1	9965 000 06675	CS4397 24BIT 192KHZ DAC

QD5		
1	9965 000 06675	CS4397 24BIT 192KHZ DAC
QD6		
1	9965 000 06675	CS4397 24BIT 192KHZ DAC
QD7		
1	4822 130 61554	2SA1586(YG)
QD7		
2	4822 130 61541	2SC4116(G)
QD7		
3	4822 130 61541	2SC4116(G)
QD7		
4	4822 130 61541	2SC4116(G)
QD7		
5	4822 130 61554	2SA1586(YG)
QD7		
6	4822 130 61541	2SC4116(G)
QD7		
7	4822 130 61541	2SC4116(G)
QD7		
8	4822 130 61541	2SC4116(G)
QN0		
1	4822 130 61541	2SC4116(G)
QN0		
2	4822 130 61541	2SC4116(G)
QN0		
3	4822 130 61541	2SC4116(G)
QN0		
4	4822 130 61554	2SA1586(YG)
QN0		
5	4822 130 61541	2SC4116(G)
QN2		
0	4822 209 83312	TA7317P TOSJ

R101	9965 000 06695	1k Ω +-1% 1/4W
R102	9965 000 06695	1k Ω +-1% 1/4W
R103	9965 000 06695	1k Ω +-1% 1/4W
R104	4822 051 20121	120Ω 5% 0,1W
R105	4822 051 20121	120Ω 5% 0,1W
R106	4822 117 12521	68Ω 1% 0,1W
R107	4822 051 20228	2Ω2 5% 0,1W
R108	4822 051 20228	2Ω2 5% 0,1W
R109	4822 117 12367	33k 1% 0.10W
R110	4822 051 20102	1k 5% 0,1W
R111	4822 051 20102	1k 5% 0,1W
R112	4822 051 20101	100Ω 5% 0,1W
R113	9965 000 06696	10 Ω +-1% 1/4W
R114	9965 000 06696	10 Ω +-1% 1/4W
R151	9965 000 06695	1k Ω +-1% 1/4W
R152	9965 000 06695	1k Ω +-1% 1/4W
R153	9965 000 06695	1k Ω +-1% 1/4W
R154	4822 051 20121	120Ω 5% 0,1W
R155	4822 051 20121	120Ω 5% 0,1W
R156	4822 117 12521	68Ω 1% 0,1W
R157	4822 051 20228	2Ω2 5% 0,1W
R158	4822 051 20228	2Ω2 5% 0,1W
R159	4822 117 12367	33k 1% 0.10W
R160	4822 051 20102	1k 5% 0,1W
R161	4822 051 20102	1k 5% 0,1W
R162	4822 051 20101	100Ω 5% 0,1W
R163	9965 000 06696	10 Ω +-1% 1/4W
R164	9965 000 06696	10 Ω +-1% 1/4W
R201	9965 000 06695	1k Ω +-1% 1/4W
R202	9965 000 06695	1k Ω +-1% 1/4W
R203	9965 000 06695	1k Ω +-1% 1/4W
R204	4822 051 20121	120Ω 5% 0,1W
R205	4822 051 20121	120Ω 5% 0,1W
R206	4822 117 12521	68Ω 1% 0,1W
R207	4822 051 20228	2Ω2 5% 0,1W
R208	4822 051 20228	2Ω2 5% 0,1W
R209	4822 117 12367	33k 1% 0.10W
R210	4822 051 20102	1k 5% 0,1W
R211	4822 051 20102	1k 5% 0,1W
R212	4822 051 20101	100Ω 5% 0,1W
R213	9965 000 06696	10 Ω +-1% 1/4W
R214	9965 000 06696	10 Ω +-1% 1/4W
R251	9965 000 06695	1k Ω +-1% 1/4W
R252	9965 000 06695	1k Ω +-1% 1/4W
R253	9965 000 06695	1k Ω +-1% 1/4W
R254	4822 051 20121	120Ω 5% 0,1W
R255	4822 051 20121	120Ω 5% 0,1W
R256	4822 117 12521	68Ω 1% 0,1W
R257	4822 051 20228	2Ω2 5% 0,1W
R258	4822 051 20228	2Ω2 5% 0,1W
R259	4822 117 12367	33k 1% 0.10W
R260	4822 051 20102	1k 5% 0,1W
R261	4822 051 20102	1k 5% 0,1W
R262	4822 051 20101	100Ω 5% 0,1W
R263	9965 000 06696	10 Ω +-1% 1/4W
R264	9965 000 06696	10 Ω +-1% 1/4W
R301	9965 000 06695	1k Ω +-1% 1/4W
R302	9965 000 06690	2.61k Ω +-1% 1/4W
R303	9965 000 06691	6.65k Ω +-1% 1/4W
R304	4822 051 20121	120Ω 5% 0,1W
R305	4822 051 20121	120Ω 5% 0,1W
R306	4822 117 12521	68Ω 1% 0,1W
R307	4822 051 20228	2Ω2 5% 0,1W
R308	4822 051 20228	2Ω2 5% 0,1W
R309	4822 117 12367	33k 1% 0.10W
R310	4822 051 20102	1k 5% 0,1W
R311	4822 051 20102	1k 5% 0,1W
R312	4822 051 20101	100Ω 5% 0,1W
R313	9965 000 06696	10 Ω +-1% 1/4W
R314	9965 000 06696	10 Ω +-1% 1/4W
R315	9965 000 06698	10k Ω +-1% 1/4W
R316	9965 000 06695	1k Ω +-1% 1/4W
R317	9965 000 06695	1k Ω +-1% 1/4W
R351	9965 000 06695	1k Ω +-1% 1/4W
R352	9965 000 06690	2.61k Ω +-1% 1/4W
R353	9965 000 06691	6.65k Ω +-1% 1/4W
R354	4822 051 20121	120Ω 5% 0,1W
R355	4822 051 20121	120Ω 5% 0,1W
R356	4822 117 12521	68Ω 1% 0,1W
R357	4822 051 20228	2Ω2 5% 0,1W
R358	4822 051 20228	2Ω2 5% 0,1W
R359	4822 117 12367	33k 1% 0.10W
R360	4822 051 20102	1k 5% 0,1W
R361	4822 051 20102	1k 5% 0,1W
R362	4822 051 20101	100Ω 5% 0,1W
R363	9965 000 06696	10 Ω +-1% 1/4W
R364	9965 000 06696	10 Ω +-1% 1/4W
R365	9965 000 06698	10k Ω +-1% 1/4W
R366	9965 000 06695	1k Ω +-1% 1/4W
R367	9965 000 06695	1k Ω +-1% 1/4W
R401	9965 000 06695	1k Ω +-1% 1/4W
R402	9965 000 06690	2.61k Ω +-1% 1/4W
R403	9965 000 06691	6.65k Ω +-1% 1/4W
R404	4822 051 20121	120Ω 5% 0,1W
R405	4822 051 20121	120Ω 5% 0,1W
R406	4822 117 12521	68Ω 1% 0,1W
R407	4822 051 20228	2Ω2 5% 0,1W
R408	4822 051 20228	2Ω2 5% 0,1W
R409	4822 117 12367	33k 1% 0.10W
R410	4822 051 20102	1k 5% 0,1W
R411	4822 051 20102	1k 5% 0,1W
R412	4822 051 20101	100Ω 5% 0,1W
R413	9965 000 06696	10 Ω +-1% 1/4W
R414	9965 000 06696	10 Ω +-1% 1/4W
R415	9965 000 06698	10k Ω +-1% 1/4W
R416	9965 000 06695	1k Ω +-1% 1/4W
R417	9965 000 06695	1k Ω +-1% 1/4W
R451	9965 000 06695	1k Ω +-1% 1/4W
R452	9965 000 06690	2.61k Ω +-1% 1/4W
R453	9965 000 06691	6.65k Ω +-1% 1/4W
R454	4822 051 20121	120Ω 5% 0,1W
R455	4822 051 20121	120Ω 5% 0,1W
R456	4822 117 12521	68Ω 1% 0,1W
R457	4822 051 20228	2Ω2 5% 0,1W
R458	4822 051 20228	2Ω2 5% 0,1W
R459	4822 117 12367	33k 1% 0.10W
R460	4822 051 20102	1k 5% 0,1W
R461	4822 051 20102	1k 5% 0,1W
R462	4822 051 20101	100Ω 5% 0,1W
R463	9965 000 06696	10 Ω +-1% 1/4W
R464	9965 000 06696	10 Ω +-1% 1/4W
R465	9965 000 06698	10k Ω +-1% 1/4W
R466	9965 000 06695	1k Ω +-1% 1/4W
R467	9965 000 06695	1k Ω +-1% 1/4W
R501	9965 000 06695	1k Ω +-1% 1/4W
R502	9965 000 06690	2.61k Ω +-1% 1/4W
R503	9965 000 06691	6.65k Ω +-1% 1/4W
R504	4822 051 20121	120Ω 5% 0,1W
R505	4822 051 20121	120Ω 5% 0,1W
R506	4822 117 12521	68Ω 1% 0,1W
R507	4822 051 20228	2Ω2 5% 0,1W
R508	4822 051 20228	2Ω2 5% 0,1W
R509	4822 117 12367	33k 1% 0.10W
R510	4822 051 20102	1k 5% 0,1W
R511	4822 051 20102	1k 5% 0,1W
R512	4822 051 20101	100Ω 5% 0,1W
R513	9965 000 06696	10 Ω +-1% 1/4W
R514	9965 000 06696	10 Ω +-1% 1/4W
R515	9965 000 06698	10k Ω +-1% 1/4W
R516	9965 000 06695	1k Ω +-1% 1/4W
R517	9965 000 06695	1k Ω +-1% 1/4W
R551	9965 000 06695	1k Ω +-1% 1/4W
R552	9965 000 06690	2.61k Ω +-1% 1/4W
R553	9965 000 06691	6.65k Ω +-1% 1/4W
R554	4822 051 20121	120Ω 5% 0,1W
R555	4822 051 20121	120Ω 5% 0,1W
R556	4822 117 12521	68Ω 1% 0,1W
R557	4822 051 20228	2Ω2 5% 0,1W
R558	4822 051 20228	2Ω2 5% 0,1W
R559	4822 117 12367	33k 1% 0.10W
R560	4822 051 20102	1k 5% 0,1W
R561	4822 051 20102	1k 5% 0,1W
R562	4822 051 20101	100Ω 5% 0,1W
R563	9965 000 06696	10 Ω +-1% 1/4W
R564	9965 000 06696	10 Ω +-1% 1/4W
R565	9965 000 06698	10k Ω +-1% 1/4W
R566	9965 000 06695	1k Ω +-1% 1/4W
R567	9965 000 06695	1k Ω +-1% 1/4W
R601	9965 000 06687	33.2 Ω +-1% 1/4W
R602	4822 117 10833	10k 1% 0,1W
R603	4822 111 90896	100k 5% 0.1W
R611	9965 000 06687	33.2 Ω +-1% 1/4W
R612	4822 117 10833	10k 1% 0,1W
R613	4822 111 90896	100k 5% 0.1W
R621	9965 000 06687	33.2 Ω +-1% 1/4W
R622	4822 117 10833	10k 1% 0,1W
R623	4822 111 90896	100k 5% 0.1W
R631	9965 000 06687	33.2 Ω +-1% 1/4W
R632	4822 117 10833	10k 1% 0,1W
R633	4822 111 90896	100k 5% 0.1W
R641	9965 000 06687	33.2 Ω +-1% 1/4W
R642	4822 117 10833	10k 1% 0,1W
R643	4822 111 90896	100k 5% 0.1W
R651	9965 000 06687	33.2 Ω +-1% 1/4W
R652	4822 117 10833	10k 1% 0,1W
R653	4822 111 90896	100k 5% 0.1W
R701	9965 000 06695	1k Ω +-1% 1/4W
R702	9965 000 06695	1k Ω +-1% 1/4W
R703	9965 000 06695	1k Ω +-1% 1/4W
R704	4822 051 20121	120Ω 5% 0,1W
R705	4822 051 20121	120Ω 5% 0,1W
R706	4822 117 12521	68Ω 1% 0,1W
R707	4822 051 20228	2Ω2 5% 0,1W
R708	4822 051 20228	2Ω2 5% 0,1W
R709	4822 117 12367	33k 1% 0.10W
R710	4822 051 20102	1k 5% 0,1W
R711	4822 051 20102	1k 5% 0,1W
R712	4822 051 20101	100Ω 5% 0,1W
R713	9965 000 06696	10 Ω +-1% 1/4W
R714	9965 000 06696	10 Ω +-1% 1/4W
R751	9965 000 06695	1k Ω +-1% 1/4W
R752	9965 000 06695	1k Ω +-1% 1/4W
R753	9965 000 06695	1k Ω +-1% 1/4W
R754	4822 051 20121	120Ω 5% 0,1W
R755	4822 051 20121	120Ω 5% 0,1W
R756	4822 117 12521	68Ω 1% 0,1W
R757	4822 051 20228	2Ω2 5% 0,1W
R758	4822 051 20228	2Ω2 5% 0,1W
R759	4822 117 12367	33k 1% 0.10W
R760	4822 051 20102	1k 5% 0,1W
R761	4822 051 20102	1k 5% 0,1W
R762	4822 051 20101	100Ω 5% 0,1W
R763	9965 000 06696	10 Ω +-1% 1/4W
R764	9965 000 06696	10 Ω +-1% 1/4W
R801	9965 000 06703	1.2k Ω +-1% 1/10W
R802	9965 000 06703	1.2k Ω +-1% 1/10W
R804	9965 000 06704	2.2k Ω +-1% 1/10W
R823	4822 116 52228	680Ω 5% 0,5W
R824	4822 116 52228	680Ω 5% 0,5W
RD01	4822 051 30105	1M 5% 0,062W
RD02	4822 051 30221	220Ω 5% 0,062W
RD03	4822 116 82487	0Ω
RD04	4822 051 30479	47Ω 5% 0,062W
RD05	4822 051 30479	47Ω 5% 0,062W
RD06	4822 051 30479	47Ω 5% 0,062W
RD07	4822 051 30223	22k 5% 0,062W
RD08	4822 051 30223	22k 5% 0,062W
RD09	4822 051 30479	47Ω 5% 0,062W
RD11	4822 051 30339	33Ω 5% 0,062W
RD12	4822 051 30339	33Ω 5% 0,062W
RD13	4822 051 30339	33Ω 5% 0,062W
RD14	4822 051 30339	33Ω 5% 0,062W
RD15	4822 051 30339	33Ω 5% 0,062W
RD16	4822 051 30339	33Ω 5% 0,062W
RD17	4822 051 30339	33Ω 5% 0,062W
RD18	4822 051 30339	33Ω 5% 0,062W
RD21	4822 051 30223	22k 5% 0,062W
RD22	4822 051 30223	22k 5% 0,062W
RD26	4822 051 30223	22k 5% 0,062W
RD27	4822 051 30223	22k 5% 0,062W
RD28	4822 051 30223	22k 5% 0,062W
RD29	4822 051 30223	22k 5% 0,062W
RD30	4822 051 30223	22k 5% 0,062W
RD33	4822 051 30563	56k 5% 0,062W
RD34	4822 051 30472	4k7 5% 0,062W
RD41	4822 116 82487	0Ω
RD42	4822 116 82487	0Ω
RD43	4822 051 30223	22k 5% 0,062W
RD44	9965 000 06688	3.24k Ω +-1% 1/10W
RD45	9965 000 06689	2.21k Ω +-1% 1/10W
RD46	4822 051 30102	1k 5% 0,062W
RD51	4822 116 82487	0Ω
RD52	4822 051 30223	22k 5% 0,062W
RD53	4822 051 30223	22k 5% 0,062W

RD54	9965 000 06688	3.24k Ω +-1% 1/10W
RD55	9965 000 06689	2.21k Ω +-1% 1/10W
RD56	4822 051 30102	1k 5% 0,062W
RD61	4822 051 30223	22k 5% 0,062W
RD62	4822 116 82487	0Ω
RD63	4822 051 30223	22k 5% 0,062W
RD64	9965 000 06688	3.24k Ω +-1% 1/10W
RD65	9965 000 06689	2.21k Ω +-1% 1/10W
RD66	4822 051 30102	1k 5% 0,062W
RD71	4822 051 30223	22k 5% 0,062W
RD72	4822 051 30223	22k 5% 0,062W
RD73	4822 051 30223	22k 5% 0,062W
RD74	4822 051 30223	22k 5% 0,062W
RD75	4822 051 30223	22k 5% 0,062W
RD76	4822 051 30101	100Ω 5% 0,062W
RD77	4822 051 30223	22k 5% 0,062W
RD78	4822 051 30102	1k 5% 0,062W
RD79	4822 117 12139	22Ω 5% 0,062W
RD80	4822 117 12891	220k 1% ERJ3Ω
RD81	4822 051 30223	22k 5% 0,062W
RD82	4822 051 30223	22k 5% 0,062W
RD83	4822 051 30223	22k 5% 0,062W
RD84	4822 051 30223	22k 5% 0,062W
RD85	4822 051 30223	22k 5% 0,062W
RD86	4822 051 30101	100Ω 5% 0,062W
RD87	4822 051 30223	22k 5% 0,062W
RD88	4822 051 30102	1k 5% 0,062W
RD89	4822 117 12139	22Ω 5% 0,062W
RD90	4822 117 12891	220k 1% ERJ3Ω
RN01	4822 051 30102	1k 5% 0,062W
RN02	9965 000 06699	3.9M Ω +-5% 1/16W
RN03	4822 116 83819	18k 5% 0.06W
RN04	4822 117 12925	47k 1% 0.063W 0603
RN05	4822 051 30103	10k 5% 0,062W
RN06	4822 051 30222	2k2 5% 0,062W
RN07	4822 051 30103	10k 5% 0,062W
RN08	4822 051 30472	4k7 5% 0,062W
RN09	4822 051 30472	4k7 5% 0,062W
RN10	4822 051 30223	22k 5% 0,062W
RN21	4822 051 30332	3k3 5% 0,062W
RN22	4822 051 30332	3k3 5% 0,062W
RN23	4822 117 13632	100k 1% 0603 0.62W
RN24	4822 117 12925	47k 1% 0.063W 0603
RN25	4822 051 30333	33k 5% 0,062W
RN26	4822 051 30103	10k 5% 0,062W
RN27	4822 117 13632	100k 1% 0603 0.62W
SD71	9965 000 06676	SLIDE SW. SSSF113-S06N1
SH02▲	4822 277 21825	SW 115/220V
XD01	9965 000 06677	16.9344MHz UM-5

AV PWB

Various

1300	4822 265 11154	52030-2210 (22P)
1301	4822 265 11103	52030-1610 (16P)
1303	4822 267 10994	4P, MDIN
1304	2422 033 00334	CON BM EURO H 42P F BK GRND-L
1402	2422 026 05089	CON BM CINCH H 3P F RDWHYE B
1405	4822 267 31729	

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2308	4822 122 33575	220pF 5% 63V CASE
2314	4822 124 41584	100µF 20% 10V
2337	4822 122 33575	220pF 5% 63V CASE
2351	4822 126 14585	100nF 10% 50V
2352	4822 126 14585	100nF 10% 50V
2353	4822 124 40769	4.7µF 20% 100V
2354	4822 126 14076	220nF 25V. P8020
2355	4822 124 40769	4.7µF 20% 100V
2357	4822 124 40769	4.7µF 20% 100V
2358	4822 122 33575	220pF 5% 63V CASE
2359	4822 124 40769	4.7µF 20% 100V
2360	4822 126 13692	47pF 1% 63V
2361	4822 126 13692	47pF 1% 63V
2362	4822 126 14585	100nF 10% 50V
2363	4822 126 14585	100nF 10% 50V
2364	4822 124 41584	100µF 20% 10V
2365	5322 122 32654	63V 22nF PM10 R
2366	4822 122 33575	220pF 5% 63V CASE
2367	4822 126 14585	100nF 10% 50V
2368	4822 122 33575	220pF 5% 63V CASE
2369	4822 122 33575	220pF 5% 63V CASE
2370	4822 124 40248	10µF 20% 63V
2371	4822 122 33575	220pF 5% 63V CASE
2372	4822 124 40769	4.7µF 20% 100V
2373	4822 124 40769	4.7µF 20% 100V
2374	4822 126 14076	220nF 25V. P8020
2375	4822 122 33575	220pF 5% 63V CASE
2376	4822 124 40248	10µF 20% 63V
2377	4822 122 33575	220pF 5% 63V CASE
2378	4822 124 40769	4.7µF 20% 100V
2379	4822 126 14585	100nF 10% 50V
2380	4822 126 14585	100nF 10% 50V
2381	4822 126 14585	100nF 10% 50V
2382	4822 124 40769	4.7µF 20% 100V
2383	4822 124 40769	4.7µF 20% 100V
2384	4822 126 14583	470nF 10% 16V XTR
2385	4822 124 40769	4.7µF 20% 100V
2386	4822 126 14583	470nF 10% 16V XTR
2387	4822 126 14583	470nF 10% 16V XTR
2388	4822 126 14076	220nF 25V. P8020
2389	4822 126 14583	470nF 10% 16V XTR
2390	4822 122 33177	10nF 20% 50V
2391	4822 122 33177	10nF 20% 50V
2392	4822 126 14583	470nF 10% 16V XTR
2393	4822 122 33177	10nF 20% 50V
2394	4822 126 14076	220nF 25V. P8020
2395	4822 122 33575	220pF 5% 63V CASE
2396	4822 124 40248	10µF 20% 63V
2397	4822 122 33177	10nF 20% 50V
2398	4822 122 33177	10nF 20% 50V
2399	4822 124 40248	10µF 20% 63V
2400	4822 122 33177	10nF 20% 50V
2401	4822 126 14583	470nF 10% 16V XTR
2402	4822 122 33575	220pF 5% 63V CASE
2403	4822 126 14076	220nF 25V. P8020
2404	4822 122 33575	220pF 5% 63V CASE
2405	4822 126 13692	47pF 1% 63V
2406	4822 126 13692	47pF 1% 63V
2407	4822 126 14583	470nF 10% 16V XTR
2408	4822 122 33575	220pF 5% 63V CASE
2409	4822 122 33575	220pF 5% 63V CASE
2410	4822 122 33575	220pF 5% 63V CASE
2411	4822 124 40248	10µF 20% 63V
2412	4822 124 40433	47µF 20% 25V
2413	5322 122 32531	100pF 5% 50V
2414	5322 122 32531	100pF 5% 50V
2415	4822 124 40248	10µF 20% 63V
2416	4822 126 14585	100nF 10% 50V
2417	4822 126 14585	100nF 10% 50V
2418	4822 126 14583	470nF 10% 16V XTR
2419	4822 124 40433	47µF 20% 25V
2450	5322 122 32654	63V 22nF PM10 R
2452	4822 126 14076	220nF 25V. P8020
2453	4822 124 40433	47µF 20% 25V
2455	5322 122 32531	100pF 5% 50V
2456	4822 124 22339	100UE 16V
2457	5322 126 10511	1nF 5% 50V
2458	5322 122 32654	63V 22nF PM10 R
2459	5322 122 32531	100pF 5% 50V
2460	5322 122 32654	63V 22nF PM10 R
2461	5322 122 32531	100pF 5% 50V
2462	4822 124 22339	100UE 16V
2463	5322 126 10511	1nF 5% 50V
2464	5322 122 32531	100pF 5% 50V
2465	5322 122 32654	63V 22nF PM10 R
2468	5322 122 32654	63V 22nF PM10 R
2469	5322 122 32654	63V 22nF PM10 R
2470	5322 122 32654	63V 22nF PM10 R
2471	4822 126 14585	100nF 10% 50V
2472	4822 124 40433	47µF 20% 25V
2473	5322 122 32654	63V 22nF PM10 R
2474	4822 124 40433	47µF 20% 25V
2475	4822 124 40433	47µF 20% 25V
2476	4822 124 22339	100UE 16V
2479	5322 122 32654	63V 22nF PM10 R
2480	5322 122 32531	100pF 5% 50V
2483	4822 124 22339	100UE 16V
2488	4822 126 14585	100nF 10% 50V
2489	4822 126 14585	100nF 10% 50V
2490	4822 124 40433	47µF 20% 25V
2491	4822 124 41584	100µF 20% 10V
2493	4822 126 13692	47pF 1% 63V
2495	4822 124 40248	10µF 20% 63V

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3300	4822 117 10353	150Ω 1% 0.1W
3301	4822 051 20101	100Ω 5% 0.1W
3302	4822 051 20101	100Ω 5% 0.1W
3303	4822 117 11927	75Ω 1% 0.1W
3304	4822 117 11507	6k8 1% 0.1W
3305	4822 117 11454	820Ω 1% 0.1W
3306	4822 051 20471	470Ω 5% 0.1W
3307	4822 051 20472	4k7 5% 0.1W
3308	4822 117 10361	680Ω 1% 0.1W
3309	4822 117 10353	150Ω 1% 0.1W
3310	4822 117 11927	75Ω 1% 0.1W
3312	4822 117 11503	220Ω 1% 0.1W
3313	4822 051 20391	390Ω 5% 0.1W
3314	4822 051 10102	1k 2% 0.25W
3315	4822 051 20471	470Ω 5% 0.1W
3316	4822 117 10834	47k 1% 0.1W
3318	4822 117 10834	47k 1% 0.1W
3319	4822 051 10102	1k 2% 0.25W
3320	4822 117 10834	47k 1% 0.1W
3321	4822 051 20101	100Ω 5% 0.1W
3322	4822 051 20101	100Ω 5% 0.1W
3323	4822 051 20471	470Ω 5% 0.1W
3325	4822 117 10834	47k 1% 0.1W
3327	4822 117 11927	75Ω 1% 0.1W
3329	4822 051 20471	470Ω 5% 0.1W
3330	4822 117 11927	75Ω 1% 0.1W
3331	4822 117 11145	4k7 1% 0.1W
3332	4822 051 20471	470Ω 5% 0.1W
3333	4822 117 10353	150Ω 1% 0.1W
3334	4822 117 10357	4k3 1% 0.2W
3335	4822 051 20471	470Ω 5% 0.1W
3336	4822 117 11927	75Ω 1% 0.1W
3338	4822 117 10833	10k 1% 0.1W
3339	4822 051 20101	100Ω 5% 0.1W
3340	4822 051 20101	100Ω 5% 0.1W
3341	4822 117 10833	10k 1% 0.1W
3342	4822 051 20471	470Ω 5% 0.1W
3343	4822 117 11927	75Ω 1% 0.1W
3345	4822 117 11927	75Ω 1% 0.1W
3347	4822 051 20471	470Ω 5% 0.1W
3348	4822 051 10102	1k 2% 0.25W
3349	4822 117 10834	47k 1% 0.1W
3350	4822 117 10833	10k 1% 0.1W
3351	4822 051 20471	470Ω 5% 0.1W
3352	4822 051 20562	5k6 5% 0.1W 0805
3353	4822 051 10102	1k 2% 0.25W
3354	4822 117 11927	75Ω 1% 0.1W
3355	4822 051 20339	33Ω 5% 0.1W
3356	4822 051 20472	4k7 5% 0.1W
3357	4822 051 20472	4k7 5% 0.1W
3359	4822 117 10834	47k 1% 0.1W
3360	4822 051 20471	470Ω 5% 0.1W
3362	4822 051 20471	470Ω 5% 0.1W
3363	4822 051 10102	1k 2% 0.25W
3364	4822 117 11148	56k 1% 0.1W
3365	4822 051 20561	560Ω 5% 0.1W
3366	4822 117 10834	47k 1% 0.1W
3367	4822 117 12955	2k7 1% 0.1W 0805
3368	4822 117 12955	2k7 1% 0.1W 0805
3378	4822 051 10102	1k 2% 0.25W
3394	4822 051 20471	470Ω 5% 0.1W
3395	4822 051 20472	4k7 5% 0.1W
3397	4822 117 10834	47k 1% 0.1W
3398	4822 051 20472	4k7 5% 0.1W
3399	4822 051 20562	5k6 5% 0.1W 0805
3400	4822 117 11927	75Ω 1% 0.1W
3401	4822 117 11927	75Ω 1% 0.1W
3402	4822 051 20472	4k7 5% 0.1W
3403	4822 117 11927	75Ω 1% 0.1W
3404	4822 117 11927	75Ω 1% 0.1W
3405	4822 117 11927	75Ω 1% 0.1W
3406	4822 117 11927	75Ω 1% 0.1W
3407	4822 117 11927	75Ω 1% 0.1W
3408	4822 117 11927	75Ω 1% 0.1W
3409	4822 051 20471	470Ω 5% 0.1W
3410	4822 051 20471	470Ω 5% 0.1W
3411	4822 117 11927	75Ω 1% 0.1W
3413	4822 117 10834	47k 1% 0.1W
3414	4822 051 20472	4k7 5% 0.1W
3415	4822 051 20223	22k 5% 0.1W
3416	4822 051 20339	33Ω 5% 0.1W
3417	4822 051 20471	470Ω 5% 0.1W
3418	4822 051 20101	100Ω 5% 0.1W
3419	4822 051 20101	100Ω 5% 0.1W
3420	4822 117 11149	82k 1% 0.1W
3421	4822 117 11504	270Ω 1% 0.1W
3422	4822 051 20472	4k7 5% 0.1W
3423	4822 117 11148	56k 1% 0.1W
3424	4822 051 20223	22k 5% 0.1W
3425	4822 117 11927	75Ω 1% 0.1W
3427	4822 051 20472	4k7 5% 0.1W
3429	4822 117 11927	75Ω 1% 0.1W
3431	4822 051 20471	470Ω 5% 0.1W
3432	4822 117 11927	75Ω 1% 0.1W
3433	4822 051 20008	0Ω jumper . (0805)
3434	4822 051 20101	100Ω 5% 0.1W
3435	4822 051 20101	100Ω 5% 0.1W
3436	4822 117 10353	150Ω 1% 0.1W
3437	4822 051 20101	100Ω 5% 0.1W
3438	4822 051 20101	100Ω 5% 0.1W
3439	4822 051 20101	100Ω 5% 0.1W
3440	4822 051 20101	100Ω 5% 0.1W
3441	4822 051 20101	100Ω 5% 0.1W
3442	4822 051 20101	100Ω 5% 0.1W
3444	4822 117 10833	10k 1% 0.1W
3445	4822 117 10833	10k 1% 0.1W

3448	4822 051 20332	3k3 5% 0.1W
3451	4822 117 13085	5k6 1% RC12H 0.1W 0805
3452	4822 051 20008	0Ω jumper . (0805)
3453	4822 117 10833	10k 1% 0.1W
3454	4822 117 10833	10k 1% 0.1W
3455	4822 051 20332	3k3 5% 0.1W
3456	4822 051 20101	100Ω 5% 0.1W
3457	4822 051 20101	100Ω 5% 0.1W
3458	4822 051 20008	0Ω jumper . (0805)
3459	4822 117 13085	5k6 1% RC12H 0.1W 0805
3460	4822 051 20008	0Ω jumper . (0805)
3461	4822 117 10833	10k 1% 0.1W
3464	4822 117 10833	10k 1% 0.1W
3468	4822 117 10837	100k 1% 0.1W
3471	4822 051 20562	5k6 5% 0.1W 0805
3472	4822 117 11152	4Ω7 5%
3473	4822 051 20008	0Ω jumper . (0805)
3476	4822 051 20101	100Ω 5% 0.1W
3477	4822 051 20101	100Ω 5% 0.1W
3478	4822 117 10837	100k 1% 0.1W
3479	4822 051 20562	5k6 5% 0.1W 0805
3479	4822 117 11142	2k4 1% 0.1W
3481	4822 117 12955	2k7 1% 0.1W 0805
3482	4822 117 10833	10k 1% 0.1W
3482	4822 117 11146	6k2 1% 0.1W
3486	4822 117 10837	100k 1% 0.1W
3489	4822 051 20562	5k6 5% 0.1W 0805
3491	4822 051 20101	100Ω 5% 0.1W
3492	4822 051 20101	100Ω 5% 0.1W
3494	4822 117 12955	2k7 1% 0.1W 0805
3495	4822 117 10837	100k 1% 0.1W
3498	4822 051 20562	5k6 5% 0.1W 0805
3505	4822 051 20101	100Ω 5% 0.1W
3506	4822 117 10833	10k 1% 0.1W
3507	4822 051 20101	100Ω 5% 0.1W
3508	4822 117 12521	68Ω 1% 0.1W
3509	4822 117 10834	47k 1% 0.1W
3510	4822 117 11152	4Ω7 5%
3513	4822 117 12955	2k7 1% 0.1W 0805
3514	4822 117 12955	2k7 1% 0.1W 0805
3515	4822 117 10837	100k 1% 0.1W
3516	4822 117 11152	4Ω7 5%
3517	4822 051 20101	100Ω 5% 0.1W
3518	4822 117 12955	2k7 1% 0.1W 0805
3519	4822 051 20562	5k6 5% 0.1W 0805
3520	4822 051 20472	4k7 5% 0.1W
3521	4822 051 10102	1k 2% 0.25W
3522	4822 051 10102	1k 2% 0.25W
3524	4822 051 20008	0Ω jumper . (0805)
3525	4822 117 10833	10k 1% 0.1W
3527	4822 117 10834	47k 1% 0.1W
3600	4822 051 20472	4k7 5% 0.1W
3601	4822 051 20472	4k7 5% 0.1W
3602	4822 051 20472	4k7 5% 0.1W
3603	4822 117 10837	100k 1% 0.1W
3604	4822 117 11449	2k2 5% 0.1W 0805
3605	4822 051 20472	4k7 5% 0.1W
3606	4822 051 20561	560Ω 5% 0.1W
3607	4822 051 20562	5k6 5% 0.1W 0805
3608	4822 117 10837	100k 1% 0.1W
3609	4822 051 20822	8k2 5% 0.1W
3610	4822 051 20472	4k7 5% 0.1W
3611	4822 051 20472	4k7 5% 0.1W
3612	4822 117 10833	10k 1% 0.1W
3613	4822 117 12955	2k7 1% 0.1W 0805
3614	4822 117 10833	10k 1% 0.1W
3615	4822 117 11152	4Ω7 5%
3616	4822 051 20472	4k7 5% 0.1W
3617	4822 117 10833	10k 1% 0.1W
3618	4822 117 10361	680Ω 1% 0.1W
3619	4822 117 10833	10k 1% 0.1W
3620	4822 051 10008	0Ω 5% 0.25W
3621	4822 051 20472	4k7 5% 0.1W
3622	4822 117 10833	10k 1% 0.1W
3623	4822 117 11139	1k5 1% 0.1W
3624	4822 117 10833	10k 1% 0.1W
3625	4822 051 10102	1k 2% 0.25W
3628	4822 117 11139	1k5 1% 0.1W
3999	4822 117 12842	
4xxx	4822 051 10008	0Ω 5% 0.25W (1206)
4xxx	4822 051 20008	0Ω 5% 0.25W (0805)

5400	4822 157 70601	100µH (920927085A)

6300	3198 020 55680	DIO REG SM BZX384-C5V6 COL R
6301	4822 130 83757	BAS216
6302	4822 130 83757	BAS216
6303	4822 130 83757	BAS216
6306	9322 154 46685	DIO REC SM RB501V-40 (RHM0) R
6307	9322 154 46685	DIO REC SM RB501V-40 (RHM0) R
6308	9322 154 46685	DIO REC SM RB501V-40 (RHM0) R
6309	4822 130 11383	BZX284-C5V1
6400	4822 130 10845	GP1F32T

7300	4822 130 60373	BC856B
7301	5322 130 60159	BC846B
7302	5322 130 60159	BC846B
7303	5322 130 60159	BC846B
7304	9322 134 86668	LF80C
7305	9322 135 58671	IC SM STV6410AD (ST00) Y
7306	5322 130 60159	BC846B
7307	5322 130 60159	BC846B
7308	5322 130 60159	BC846B
7309	5322 130 60159	BC846B
7310	5322 130 60159	BC846B
7311	5322 130 60159	BC846B
7312	4822 130 60373	BC856B
7313	5322 130 60159	BC846B
7314	4822 130 42804	BC817-25
7315	4822 130 42804	BC817-25
7316	4822 209 16256	TDA4780/V4
7320	5322 130 60159	BC846B
7321	4822 130 42804	BC817-25
7322	5322 130 60159	BC846B
7324	4822 130 42804	BC817-25
7325	5322 130 60159	BC846B
7326	4822 130 60373	BC856B
7327	5322 130 60159	BC846B
7328	5322 130 60159	BC846B
7329	5322 130 60159	BC846B
7330	5322 130 60159	BC846B
7331	4822 130 40981	BC337-25
7332	4822 130 60373	BC856B
7333	4822 130 41246	BC327-25
7334	5322 130 60159	BC846B
7335	5322 130 60159	BC846B
7336	4822 130 42804	BC817-25
7337	4822 130 42804	BC817-25
7400	4822 209 17398	LD1117DT33
7401	4822 209 17423	UAD1328T
7402	4822 130 42804	BC817-25
7403	4822 209 32071	MC33079D
7408	4822 209 32071	MC33079D
7413	5322 209 14481	HEF4053BT
7414	4822 209 30095	LM833D
7415	4822 130 42804	BC817-25
7416	4822 130 42804	BC817-25
7417	4822 130 60373	BC856B
7419	4822 130 42804	BC817-25
7420	4822 130 42804	BC817-25
7421	4822 130 42804	BC817-25
7422	4822 130 44568	BC557B
7423	5322 130 60159	BC846B

Display PWB

Various

0004	3104 124 05420	FTD HOLDER
1100	4822 276 13732	SWITCH TACT PUSH
1102	4822 276 13732	SWITCH TACT PUSH
1106	4822 276 13732	SWITCH TACT PUSH
1107	4822 276 13732	SWITCH TACT PUSH
1108	4822 276 13732	SWITCH TACT PUSH
1109	4822 276 13732	SWITCH TACT PUSH
1110	2422 540 98423	RES CER 8MHz CSTS*MHz 03
1112	4822 276 13732	SWITCH TACT PUSH
1113	2722 171 07718	15-MT67GNK
1114	4822 276 13732	SWITCH TACT PUSH
1116	4822 276 13732	SWITCH TACT PUSH
1160	2422 128 02929	SWI PUSH 2P 0.1A 30V SPPH43 B

2100	4822 122 33575	220pF 5% 63V CASE
2101	4822 122 33575	220pF 5% 63V CASE
2102	5322 122 32531	100pF 5% 50V
2103	5322 122 32531	100pF 5% 50V
2104	5322 122 32531	100pF 5% 50V
2105	4822 126 12105	50V 33nF PM5
2106	4822 124 81286	47µF 20% 16V
2107	4822 126 12105	50V 33nF PM5
2108	4822 126 12105	50V 33nF PM5
2109	4822 126 12105	50V 33nF PM5
2110	4822 126 12105	50V 33nF PM5
2111	4822 126 12105	50V 33nF PM5
2114	5322 122 32658	22pF 5% 50V
2115	5322 122 32658	22pF 5% 50V
2116	4822 126 12105	50V 33nF PM5
2117	4822 124 81286	47µF 20% 16V
2118	5322 122 32658	22pF 5% 50V
2119	5322 122 32658	22pF 5% 50V
2121	5322 122 31647	1nF 10% 63V
2122	4822 126 12105	50V 33nF PM5
2123	4822 124 81286	47µF 20% 16V
2124	3198 028 52290	22µF 20% 50V
2125	5322 122 32658	22pF 5% 50V
2126	4822 124 11947	10µF 20% 16V
2127	4822 126 12105	50V 33nF PM5
2128	5322 122 31647	1nF 10% 63V
2129	3198 028 52290	22µF 20% 50V
2130	3198 028 52290	22µF 20% 50V
2131	3198 028 52290	22µF 20% 50V

3100	4822 051 20223	22k 5% 0.1W
3101	4822 051 20273	27k 5% 0.1W
3102	4822 117 10834	47k 1% 0.1W
3103	4822 117 11149	82k 1% 0.1W
3104	4822 117 10837	100k 1% 0.1W
3106	4822 117 11503	220Ω 1% 0.1W
3108	4822 117 11149	82k 1% 0.1W
3109	4822 051 20472	4k7 5% 0.1W
3110	4822 051 20472	4k7 5% 0.1W
3111	4822 051 20472	4k7 5% 0.1W
3112	4822 051 20472	4k7 5% 0.1W
3113	4822 051 20472	4k7 5% 0.1W
3115	4822 051 20472	4k7 5% 0.1W
3116	4822 117 11149	82k 1% 0.1W
3117	4822 117 11152	4Ω7 5%
3118	4822 117 10833	10k 1% 0.1W
3119	4822 117 10833	10k 1% 0.1W
3120	4822 051 20471	470Ω 5% 0.1W
3121	4822 051 20472	4k7 5% 0.1W
3122	4822 051 20109	10Ω 5% 0.1W
3123	4822 117 10833	10k 1% 0.1W
3125	4822 051 20109	10Ω 5% 0.1W
3130	4822 051 20109	10Ω 5% 0.1W
3131	4822 117 11152	4Ω7 5%
3132	4822 117 13577	330Ω 1% RC12H 0805 1.25W
3133	4822 051 20109	10Ω 5% 0.1W
3134	4822 117 13577	330Ω 1% RC12H 0805 1.25W
3135	4822 117 11503	220Ω 1% 0.1W
3136	4822 051 10102	1k 2% 0.25W
3137	4822 117 10833	10k 1% 0.1W
3138	4822 051 20471	470Ω 5% 0.1W
3139	4822 051 20472	4k7 5% 0.1W
3140	4822 117 10833	10k 1% 0.1W
3142	4822 117 13577	330Ω 1% RC12H 0805 1.25W
3143	4822 117 10833	10k 1% 0.1W
3144	4822 117 10837	100k 1% 0.1W
3150	4822 051 20472	4k7 5% 0.1W
3160	4822 051 20101	100Ω 5% 0.1W
3999	4822 117 12842	

6100	9322 154 46685	DIO REC SM RB501V-40 (RHM0) R
6101	4822 130 10837	UDZS8.2B
6102	3198 020 51090	DIO REG SM BZX384-C10 COL R
6104	4822 130 11397	BAS316
6160	4822 130 83059	TLUR4400

7100	5322 130 60159	BC846B
7101	5322 130 60159	BC846B
7102	5322 130 60159	BC846B
7103	5322 130 60159	BC846B
7104	3104 123 94530	IC ROM SLAVE DVD950
7105	4822 130 40855	BC337
7106	4822 130 41246	BC327-25
7107	5322 130 60159	BC846B
7108	5322 130 60159	BC846B
7109	4822 130 60373	BC856B
7110	9322 155 22667	

7112	4822 209 31257	MC79L24ACP

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

⊣⊢

2009	4822 126 14305	100nF 10% 16V 0603
2010	4822 126 14305	100nF 10% 16V 0603
2011	4822 126 14305	100nF 10% 16V 0603
2012	4822 126 14305	100nF 10% 16V 0603
2013	4822 126 14043	1µF 20% 16V CASE
2100	2222 780 15656	16V 330nF PM10 R
2101	4822 126 14305	100nF 10% 16V 0603
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 0603
2108	4822 126 14315	390pF 5% 50V 0603
2109	2020 552 95697	
2110	2222 861 15222	63V 2N2 PM5
2111	4822 126 14305	100nF 10% 16V 0603
2112	5322 126 11578	1nF 10% 50V 0603
2113	4822 126 14305	100nF 10% 16V 0603
2114	4822 122 31765	100pF 2% 63V
2115	4822 126 14305	100nF 10% 16V 0603
2116	4822 126 14305	100nF 10% 16V 0603
2117	4822 126 14305	100nF 10% 16V 0603
2118	3198 017 42230	0603 50V 22nF COL
2119	3198 017 42230	0603 50V 22nF COL
2120	4822 126 14305	100nF 10% 16V 0603
2121	4822 126 13879	220nF 20% 16V
2122	3198 017 42230	0603 50V 22nF COL
2123	4822 126 14305	100nF 10% 16V 0603
2124	4822 126 14305	100nF 10% 16V 0603
2125	4822 126 14305	100nF 10% 16V 0603
2126	4822 126 14305	100nF 10% 16V 0603
2127	4822 126 14305	100nF 10% 16V 0603
2128	4822 126 14508	180pF 5% 50V 0603
2129	4822 126 14508	180pF 5% 50V 0603
2130	4822 122 33761	22pF 5% 50V
2131	4822 126 14494	22nF 10% 25V 0603
2136	4822 126 14305	100nF 10% 16V 0603
2137	4822 126 14305	100nF 10% 16V 0603
2138	4822 126 14305	100nF 10% 16V 0603
2139	4822 126 14305	100nF 10% 16V 0603
2140	4822 126 14241	0603 50V 330P COL R
2141	4822 122 33761	22pF 5% 50V
2142	5322 126 11583	10nF 10% 50V 0603
2143	4822 126 13883	220pF 5% 50V
2144	4822 126 13883	220pF 5% 50V
2145	4822 126 13883	220pF 5% 50V
2146	4822 126 14305	100nF 10% 16V 0603
2147	4822 126 14305	100nF 10% 16V 0603
2200	4822 126 14494	22nF 10% 25V 0603
2201	4822 126 14494	22nF 10% 25V 0603
2202	4822 126 14494	22nF 10% 25V 0603
2203	4822 126 14305	100nF 10% 16V 0603
2204	4822 126 14305	100nF 10% 16V 0603
2205	4822 126 14305	100nF 10% 16V 0603
2206	4822 126 14549	33nF 16V O6O3
2207	5322 126 11578	1nF 10% 50V 0603
2208	4822 126 14305	100nF 10% 16V 0603
2209	4822 126 14305	100nF 10% 16V 0603
2210	5322 126 11578	1nF 10% 50V 0603
2212	4822 126 14305	100nF 10% 16V 0603
2213	4822 126 14305	100nF 10% 16V 0603
2214	3198 017 42230	0603 50V 22nF COL
2215	4822 124 23237	22µF 6.3V
2216	5322 126 11578	1nF 10% 50V 0603
2226	4822 126 14305	100nF 10% 16V 0603
2227	4822 126 14305	100nF 10% 16V 0603
2228	4822 126 14305	100nF 10% 16V 0603
2300	4822 126 14305	100nF 10% 16V 0603
2301	4822 126 14305	100nF 10% 16V 0603
2302	4822 126 14305	100nF 10% 16V 0603
2303	4822 124 80349	47µF 20% 6.3V
2304	3198 017 42230	0603 50V 22nF COL
2305	3198 017 42230	0603 50V 22nF COL
2306	4822 124 23002	10µF 16V
2307	3198 017 42230	0603 50V 22nF COL
2308	4822 126 14494	22nF 10% 25V 0603
2309	4822 126 14305	100nF 10% 16V 0603
2310	4822 126 14305	100nF 10% 16V 0603
2314	4822 126 14305	100nF 10% 16V 0603
2315	4822 126 14305	100nF 10% 16V 0603
2316	4822 126 14494	22nF 10% 25V 0603
2317	4822 126 14494	22nF 10% 25V 0603
2318	5322 122 33861	120pF 10% 50V
2319	4822 126 11669	27pF
2320	4822 126 14494	22nF 10% 25V 0603
2401	4822 126 14305	100nF 10% 16V 0603
2402	4822 126 14305	100nF 10% 16V 0603
2403	4822 126 14305	100nF 10% 16V 0603
2404	4822 126 14305	100nF 10% 16V 0603
2405	4822 126 14305	100nF 10% 16V 0603
2406	4822 126 14305	100nF 10% 16V 0603
2407	4822 126 14305	100nF 10% 16V 0603
2408	4822 126 14305	100nF 10% 16V 0603
2409	4822 126 14305	100nF 10% 16V 0603
2410	4822 126 14305	100nF 10% 16V 0603
2411	4822 126 14305	100nF 10% 16V 0603
2412	4822 126 14305	100nF 10% 16V 0603
2413	4822 126 14305	100nF 10% 16V 0603
2414	4822 126 14305	100nF 10% 16V 0603
2418	4822 124 12095	100µF 20% 16V
2419	4822 124 80349	47µF 20% 6.3V
2420	4822 124 80349	47µF 20% 6.3V
2452	4822 126 14305	100nF 10% 16V 0603
2454	4822 126 14305	100nF 10% 16V 0603
2455	4822 126 14305	100nF 10% 16V 0603
2457	4822 124 23002	10µF 16V
2458	4822 126 14305	100nF 10% 16V 0603
2458	4822 126 14583	470nF 10% 16V XTR
2459	4822 126 14043	1µF 20% 16V CASE
2460	4822 126 14583	470nF 10% 16V XTR
2461	4822 126 14583	470nF 10% 16V XTR
2500	4822 126 14305	100nF 10% 16V 0603
2504	4822 122 31765	100pF 2% 63V
2505	4822 126 14494	22nF 10% 25V 0603
2506	4822 124 23002	10µF 16V
2507	4822 126 14305	100nF 10% 16V 0603
2508	5322 126 11579	3.3nF 10% 63V
2509	4822 126 14241	0603 50V 330P COL R
2510	4822 126 14305	100nF 10% 16V 0603
2511	4822 126 14305	100nF 10% 16V 0603
2512	4822 126 14305	100nF 10% 16V 0603
2513	4822 126 14305	100nF 10% 16V 0603
2514	4822 126 14305	100nF 10% 16V 0603
2515	4822 126 14305	100nF 10% 16V 0603
2516	4822 126 14305	100nF 10% 16V 0603
2517	4822 126 14305	100nF 10% 16V 0603
2518	4822 126 14305	100nF 10% 16V 0603
2519	4822 126 14305	100nF 10% 16V 0603
2520	4822 126 14305	100nF 10% 16V 0603
2521	4822 126 14305	100nF 10% 16V 0603
2522	4822 126 14305	100nF 10% 16V 0603
2523	4822 126 14305	100nF 10% 16V 0603
2524	4822 126 14305	100nF 10% 16V 0603
2525	4822 126 14305	100nF 10% 16V 0603
2526	4822 126 14305	100nF 10% 16V 0603
2528	4822 126 14305	100nF 10% 16V 0603
2529	4822 126 14305	100nF 10% 16V 0603
2530	3198 030 74780	EL SM 35V 4U7 PM20 COL R
2531	3198 030 74780	EL SM 35V 4U7 PM20 COL R
2532	4822 122 33777	47pF 5% 63V
2533	4822 122 33777	47pF 5% 63V
2534	5322 126 11578	1nF 10% 50V 0603
2535	5322 126 11578	1nF 10% 50V 0603
2600	4822 126 14494	22nF 10% 25V 0603
2601	4822 126 14247	0603 50V 1N5 COL R
2602	4822 126 14247	0603 50V 1N5 COL R
2603	4822 126 14305	100nF 10% 16V 0603
2604	4822 124 12095	100µF 20% 16V
2605	4822 126 14494	22nF 10% 25V 0603
2606	4822 124 12095	100µF 20% 16V
2607	4822 124 12095	100µF 20% 16V
2608	4822 124 23002	10µF 16V
2609	4822 124 80151	47µF 16V
2610	4822 126 14305	100nF 10% 16V 0603
2611	4822 124 12095	100µF 20% 16V
2614	4822 122 33777	47pF 5% 63V
2615	4822 122 33777	47pF 5% 63V
2616	4822 122 33777	47pF 5% 63V
2617	4822 122 33777	47pF 5% 63V
2620	4822 122 33777	47pF 5% 63V
2621	4822 122 33777	47pF 5% 63V
2622	4822 122 33777	47pF 5% 63V
2623	4822 122 33777	47pF 5% 63V
2624	4822 122 33777	47pF 5% 63V
2625	4822 122 33777	47pF 5% 63V
2626	4822 122 33777	47pF 5% 63V
2627	4822 122 33777	47pF 5% 63V
2632	4822 124 12095	100µF 20% 16V
2633	4822 124 12095	100µF 20% 16V
2634	4822 126 14305	100nF 10% 16V 0603
2635	4822 126 14305	100nF 10% 16V 0603
2636	4822 126 14305	100nF 10% 16V 0603
2637	4822 126 14305	100nF 10% 16V 0603
2638	4822 126 14305	100nF 10% 16V 0603
2639	4822 126 14305	100nF 10% 16V 0603
2646	4822 124 23002	10µF 16V
2647	4822 122 33777	47pF 5% 63V
2648	4822 122 33761	22pF 5% 50V
2649	4822 126 14305	100nF 10% 16V 0603
2650	4822 126 14305	100nF 10% 16V 0603
2700	4822 126 14305	100nF 10% 16V 0603
2701	4822 126 14305	100nF 10% 16V 0603
2702	4822 126 14305	100nF 10% 16V 0603
2703	4822 126 14305	100nF 10% 16V 0603
2704	4822 126 14305	100nF 10% 16V 0603
2705	4822 126 14305	100nF 10% 16V 0603
2706	4822 126 14305	100nF 10% 16V 0603
2707	4822 124 80349	47µF 20% 6.3V
2800	4822 124 23002	10µF 16V
2801	4822 124 23002	10µF 16V
2802	4822 126 14305	100nF 10% 16V 0603
2803	4822 126 14305	100nF 10% 16V 0603
2804	4822 126 14305	100nF 10% 16V 0603
2805	4822 126 14305	100nF 10% 16V 0603
2806	4822 126 14305	100nF 10% 16V 0603
2807	4822 126 14305	100nF 10% 16V 0603
2808	4822 126 14305	100nF 10% 16V 0603
2809	4822 126 14305	100nF 10% 16V 0603
2810	4822 126 14305	100nF 10% 16V 0603
2811	4822 126 14305	100nF 10% 16V 0603
2812	4822 126 14305	100nF 10% 16V 0603
2813	4822 126 14305	100nF 10% 16V 0603
2814	4822 126 14305	100nF 10% 16V 0603
2815	4822 126 14305	100nF 10% 16V 0603
2816	4822 126 14305	100nF 10% 16V 0603
2817	4822 126 14305	100nF 10% 16V 0603
2818	4822 126 14305	100nF 10% 16V 0603
2819	4822 126 14305	100nF 10% 16V 0603
2820	4822 126 14305	100nF 10% 16V 0603
2821	4822 126 14305	100nF 10% 16V 0603
2822	4822 126 14305	100nF 10% 16V 0603
2823	4822 124 23002	10µF 16V
2824	4822 126 14305	100nF 10% 16V 0603
2825	4822 124 23002	10µF 16V
2826	4822 126 14305	100nF 10% 16V 0603
2827	5322 126 11583	10nF 10% 50V 0603
2828	4822 126 14225	56pF 5% 50V 0603
2829	4822 126 14305	100nF 10% 16V 0603
2830	4822 126 14305	100nF 10% 16V 0603
2831	4822 126 14305	100nF 10% 16V 0603
2832	4822 126 14238	0603 50V 2N2 COL R
2833	5322 126 11583	10nF 10% 50V 0603
2834	4822 126 14305	100nF 10% 16V 0603
2901	4822 126 14305	100nF 10% 16V 0603
2901	5322 126 11583	10nF 10% 50V 0603
2902	4822 126 14305	100nF 10% 16V 0603
2903	4822 126 14305	100nF 10% 16V 0603
2905	4822 126 14305	100nF 10% 16V 0603
2906	4822 122 33761	22pF 5% 50V
2907	4822 122 33761	22pF 5% 50V

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3000	4822 051 30339	33Ω 5% 0.062W
3001	4822 051 30339	33Ω 5% 0.062W
3002	4822 051 30339	33Ω 5% 0.062W
3003	4822 051 30103	10k 5% 0.062W
3004	4822 051 30339	33Ω 5% 0.062W
3005	4822 051 30339	33Ω 5% 0.062W
3006	4822 051 30339	33Ω 5% 0.062W
3007	4822 051 30339	33Ω 5% 0.062W
3008	4822 051 30339	33Ω 5% 0.062W
3009	4822 051 30339	33Ω 5% 0.062W
3010	4822 117 12925	47k 1% 0.063W 0603
3011	4822 051 30339	33Ω 5% 0.062W
3012	4822 051 30472	4k7 5% 0.062W
3013	4822 051 30103	10k 5% 0.062W
3014	4822 051 30103	10k 5% 0.062W
3015	4822 051 30332	3k3 5% 0.062W
3016	4822 051 30103	10k 5% 0.062W
3017	4822 051 30103	10k 5% 0.062W
3018	4822 117 12925	47k 1% 0.063W 0603
3019	4822 051 30103	10k 5% 0.062W

3020	4822 051 30339	33Ω 5% 0.062W
3021	4822 051 30472	4k7 5% 0.062W
3022	4822 051 30472	4k7 5% 0.062W
3023	4822 051 30103	10k 5% 0.062W
3024	4822 051 30222	2k2 5% 0.062W
3025	4822 051 30103	10k 5% 0.062W
3026	4822 051 30103	10k 5% 0.062W
3027	4822 051 30103	10k 5% 0.062W
3028	4822 051 30103	10k 5% 0.062W
3029	4822 051 30472	4k7 5% 0.062W
3030	4822 051 30332	3k3 5% 0.062W
3031	4822 051 30103	10k 5% 0.062W
3033	4822 051 30102	1k 5% 0.062W
3100	4822 117 11152	4Ω7 5%
3102	5322 117 13034	1k5 1% 0.063W 0603 RC22H
3103	5322 117 13034	1k5 1% 0.063W 0603 RC22H
3104	5322 117 13062	390Ω 1% 0.063W 0603 RC22H
3105	4822 051 30103	10k 5% 0.062W
3106	4822 051 30479	47Ω 5% 0.062W
3107	4822 051 20228	2Ω2 5% 0.1W
3108	4822 051 20228	2Ω2 5% 0.1W
3109	4822 117 13632	100k 1% 0603 0.62W
3110	4822 051 30479	47Ω 5% 0.062W
3111	5322 117 13058	150Ω 1% 0.063W 0603 RC22H
3112	5322 117 13021	47Ω 1% 0.063W 0603 RC22H
3114	4822 051 20228	2Ω2 5% 0.1W
3115	4822 051 20228	2Ω2 5% 0.1W
3116	5322 117 13042	3k9 1% 0.063W 0603 RC22H
3117	4822 051 30181	180Ω 5% 0.062W
3118	4822 051 30681	680Ω 5% 0.062W
3119	5322 117 13062	390Ω 1% 0.063W 0603 RC22H
3120	4822 051 30102	1k 5% 0.062W
3121	4822 051 30273	27k 5% 0.062W
3122	4822 051 30471	470Ω 5% 0.062W
3123	4822 051 30103	10k 5% 0.062W
3124	4822 051 30471	470Ω 5% 0.062W
3125	4822 051 30103	10k 5% 0.062W
3126	4822 051 30103	10k 5% 0.062W
3127	4822 051 30223	22k 5% 0.062W
3128	2322 704 69109	
3129	4822 051 30392	3k9 5% 0.063W 0603
3130	4822 051 20228	2Ω2 5% 0.1W
3131	4822 051 20228	2Ω2 5% 0.1W
3132	4822 051 20228	2Ω2 5% 0.1W
3133	4822 051 20228	2Ω2 5% 0.1W
3134	5322 117 13047	330Ω 1% 0.063W 0603 RC22H
3135	4822 117 13613	2Ω2 5% 0603
3137	4822 117 13613	2Ω2 5% 0603
3138	5322 117 13053	6k8 1% 0.063W 0603 RC22H
3139	4822 117 12917	1Ω 5% 0.062W CASE0603
3140	4822 051 30479	47Ω 5% 0.062W
3141	4822 117 11152	4Ω7 5%
3142	5322 117 13028	12k 1% 0.063W 0603 RC22H
3143	5322 117 13043	220Ω 1% 0.063W 0603 RC22H
3144	2322 704 69109	
3146	4822 051 30103	10k 5% 0.062W
3147	4822 051 30103	10k 5% 0.062W
3148	5322 117 13022	22k 1% 0.063W 0603 RC22H
3153	4822 117 12139	22Ω 5% 0.062W
3155	4822 051 30103	10k 5% 0.062W
3157	4822 051 30103	10k 5% 0.062W
3158	5322 117 13017	100Ω 1% 0.063W 0603 RC22H
3160	4822 051 30101	100Ω 5% 0.062W
3161	4822 117 13613	2Ω2 5% 0603
3162	4822 051 30101	100Ω 5% 0.062W
3163	4822 051 30273	27k 5% 0.062W
3164	4822 117 13613	2Ω2 5% 0603
3165	5322 117 13063	120Ω 1% 0.063W 0603 RC22H
3166	4822 051 30393	39k 5% 0.062W
3167	4822 051 30101	100Ω 5% 0.062W
3168	5322 117 13047	330Ω 1% 0.063W 0603 RC22H
3169	4822 051 30101	100Ω 5% 0.062W
3170	4822 051 30101	100Ω 5% 0.062W
3171	4822 051 30101	100Ω 5% 0.062W
3172	4822 117 13632	100k 1% 0603 0.62W
3173	4822 117 13632	100k 1% 0603 0.62W
3174	4822 117 11152	4Ω7 5%
3175	4822 117 13613	2Ω2 5% 0603
3176	4822 051 30153	15k 5% 0.062W
3178	4822 117 11151	1Ω 5%
3179	4822 051 30221	220Ω 5% 0.062W
3180	4822 117 13632	100k 1% 0603 0.62W
3181	4822 051 30561	560Ω 5% 0.062W
3182	5322 117 13018	1k0 1% 0.063W 0603 RC22H
3183	5322 117 13017	100Ω 1% 0.063W 0603 RC22H
3184	2322 704 61204	
3185	4822 117 11151	1Ω 5%
3187	4822 051 30273	27k 5% 0.062W
3189	4822 051 30008	0Ω jumper
3190	4822 051 30008	0Ω jumper
3191	4822 051 30008	0Ω jumper
3192	4822 051 30008	0Ω jumper
3193	4822 051 30008	0Ω jumper
3194	4822 051 30008	0Ω jumper
3195	4822 051 30008	0Ω jumper
3197	4822 051 30008	0Ω jumper
3198	5322 117 13049	470Ω 1% 0.063W 0603 RC22H
3199	5322 117 13042	3k9 1% 0.063W 0603 RC22H
3200	4822 051 30103	10k 5% 0.062W
3201	4822 117 11151	1Ω 5%
3202	4822 117 11151	1Ω 5%
3203	4822 051 30105	1M 5% 0.062W
3204	4822 051 30331	330Ω 5% 0.062W
3205	4822 051 30103	10k 5% 0.062W
3206	4822 051 30103	10k 5% 0.062W
3207	4822 051 30472	4k7 5% 0.062W
3208	4822 051 30272	2k7 5% 0.062W
3209	4822 051 30472	4k7 5% 0.062W
3210	4822 051 30392	3k9 5% 0.063W 0603
3211	4822 051 30472	4k7 5% 0.062W
3212	4822 117 11152	4Ω7 5%
3213	4822 117 11152	4Ω7 5%
3214	4822 051 30392	3k9 5% 0.063W 0603
3215	4822 051 30103	10k 5% 0.062W
3216	4822 051 30472	4k7 5% 0.062W
3219	4822 051 30103	10k 5% 0.062W
3220	4822 051 30103	10k 5% 0.062W
3221	4822 051 30103	10k 5% 0.062W
3224	4822 051 30151	150Ω 5% 0.062W
3225	2322 704 62004	
3226	4822 051 30103	10k 5% 0.062W
3227	4822 051 30472	4k7 5% 0.062W
3229	4822 051 30123	12k 5% 0.062W
3230	4822 051 30103	10k 5% 0.062W
3231	4822 051 30103	10k 5% 0.062W
3232	4822 117 13613	2Ω2 5% 0603
3233	4822 051 30102	1k 5% 0.062W
3234	4822 117 12902	8k2 1% 0.063W 0603
3235	4822 117 13632	100k 1% 0603 0.62W
3236	4822 051 30472	4k7 5% 0.062W
3237	4822 051 30103	10k 5% 0.062W
3238	4822 051 30103	10k 5% 0.062W
3239	4822 051 30008	0Ω jumper
3240	4822 051 30103	10k 5% 0.062W
3242	4822 051 30008	0Ω jumper
3243	4822 051 30008	0Ω jumper
3246	4822 051 30008	0Ω jumper
3247	4822 051 30008	0Ω jumper
3249	4822 051 30008	0Ω jumper
3250	4822 051 30008	0Ω jumper
3251	4822 051 30008	0Ω jumper
3252	4822 051 30008	0Ω jumper
3253	4822 051 30008	0Ω jumper
3254	4822 051 30008	0Ω jumper
3255	4822 051 30008	0Ω jumper
3256	4822 051 30008	0Ω jumper
3257	4822 051 30008	0Ω jumper
3258	4822 051 30008	0Ω jumper
3259	4822 117 11151	1Ω 5%
3260	4822 117 11151	1Ω 5%
3300	4822 117 11152	4Ω7 5%
3301	4822 051 30105	1M 5% 0.062W
3302	4822 051 30221	220Ω 5% 0.062W
3304	4822 051 30272	2k7 5% 0.062W
3305	4822 051 30272	2k7 5% 0.062W
3309	4822 051 30103	10k 5% 0.062W
3310	4822 051 30223	22k 5% 0.062W
3311	4822 051 30223	22k 5% 0.062W
3312	4822 051 30472	4k7 5% 0.062W
3313	4822 051 30472	4k7 5% 0.062W
3316	4822 051 20108	1Ω 5% 0.1W
3317	4822 051 20108	1Ω 5% 0.1W
3318	4822 051 30472	4k7 5% 0.062W
3319	4822 051 30479	47Ω 5% 0.062W
3320	4822 051 30472	4k7 5% 0.062W
3321	4822 051 30682	6k8 5% 0.062W
3322	5322 117 13026	4k7 1% 0.063W 0603 RC22H
3323	5322 117 13026	4k7 1% 0.063W 0603 RC22H
3324	4822 117 13632	100k 1% 0603 0.62W
3325	4822 051 30682	6k8 5% 0.062W
3326	4822 051 30479	47Ω 5% 0.062W
3327	4822 051 30682	6k8 5% 0.062W
3328	4822 051 30223	22k 5% 0.062W
3329	4822 051 30223	22k 5% 0.062W
3330	4822 051 30223	22k 5% 0.062W
3331	4822 051 30332	3k3 5% 0.062W
3332	4822 051 30332	3k3 5% 0.062W
3333	4822 051 30101	100Ω 5% 0.062W
3334	4822 051 30101	100Ω 5% 0.062W
3335	4822 051 30101	100Ω 5% 0.062W
3336	4822 051 30339	33Ω 5% 0.062W
3337	4822 051 30339	33Ω 5% 0.062W
3338	4822 051 30101	100Ω 5% 0.062W
3339	4822 051 30008	0Ω jumper
3340	4822 051 30008	0Ω jumper
3403	4822 051 30103	10k 5% 0.062W
3404	4822 051 30103	10k 5% 0.062W
3450	4822 051 30103	10k 5% 0.062W
3451	4822 117 13632	100k 1% 0603 0.62W
3452	4822 051 30223	22k 5% 0.062W
3453	4822 051 30222	2k2 5% 0.062W
3454	4822 051 30223	22k 5% 0.062W
3455	4822 051 30223	22k 5% 0.062W
3455	4822 117 13632	100k 1% 0603 0.62W
3456	4822 051 30103	10k 5% 0.062W
3457	4822 051 30103	10k 5% 0.062W
3458	4822 051 30223	22k 5% 0.062W
3459	4822 051 30223	22k 5% 0.062W
3460	4822 051 30472	4k7 5% 0.062W
3500	4822 051 30332	3k3 5% 0.062W
3501	4822 051 30332	3k3 5% 0.062W
3502	4822 051 30103	10k 5% 0.062W
3503	4822 051 30103	10k 5% 0.062W
3504	4822 051 30103	10k 5% 0.062W
3505	4822 051 30103	10k 5% 0.062W
3506	4822 051 30103	10k 5% 0.062W
3508	4822 051 30689	68Ω 5% 0.063W 0603 RC21 RST SM
3509	4822 051 30103	10k 5% 0.062W
3511	4822 051 30332	3k3 5% 0.062W
3512	4822 051 30332	3k3 5% 0.062W
3513	4822 051 30103	10k 5% 0.062W
3514	4822 051 30103	10k 5% 0.062W
3515	4822 051 30103	10k 5% 0.062W
3516	4822 051 30103	10k 5% 0.062W
3517	4822 051 30332	3k3 5% 0.062W
3519	4822 051 30103	10k 5% 0.062W
3520	4822 051 30103	10k 5% 0.062W
3521	4822 051 30103	10k 5% 0.062W
3522	4822 051 30103	10k 5% 0.062W
3523	4822 051 30332	3k3 5% 0.062W
3524	4822 051 30101	100Ω 5% 0.062W
3525	4822 051 30103	10k 5% 0.062W
3526	4822 051 30103	10k 5% 0.062W
3534	4822 051 30103	10k 5% 0.062W
3535	4822 051 30153	15k 5% 0.062W
3537	4822 051 30331	330Ω 5% 0.062W
3538	4822 051 30681	680Ω 5% 0.062W
3541	4822 051 30479	47Ω 5% 0.062W
3542	4822 051 30479	47Ω 5% 0.062W
3545	4822 051 30221	220Ω 5% 0.062W
3546	4822 051 30101	100Ω 5% 0.062W
3548	4822 051 30008	0Ω jumper
3550	4822 051 30101	100Ω 5% 0.062W
3551	4822 051 30101	100Ω 5% 0.062W
3564	4822 051 30008	0Ω jumper
3570	4822 051 30101	100Ω 5% 0.062W
3571	4822 051 30689	68Ω 5% 0.063W 0603 RC21 RST SM
3572	4822 051 30689	68Ω 5% 0.063W 0603 RC21 RST SM
3605	4822 051 30008	0Ω jumper
3606	4822 117 12925	47k 1% 0.063W 0603
3607	4822 117 13632	100k 1% 0603 0.62W
3608	4822 117 13632	100k 1% 0603 0.62W
3609	4822 117 13632	100k 1% 0603 0.62W
3610	4822 051 30103	10k 5% 0.062W
3611	4822 051 30103	10k 5% 0.062W
3612	4822 051 30103	10k 5% 0.062W
3613	4822 051 30103	10k 5% 0.062W
3614	4822 051 30103	10k 5% 0.062W
3615	4822 051 30103	10k 5% 0.062W
3616	4822 051 30103	10k 5% 0.062W
3618	4822 051 30223	22k 5% 0.062W
3619	4822 051 30223	22k 5% 0.062W
3620	4822 051 30101	100Ω 5% 0.062W
3621	4822 051 30101	100Ω 5% 0.062W
3622	4822 051 30101	100Ω 5% 0.062W
3623	4822 051 30339	33Ω 5% 0.062W
3624	4822 051 30339	33Ω 5% 0.062W

3625	4822 051 30339	33Ω 5% 0.062W
3626	4822 051 30102	1k 5% 0.062W
3627	4822 051 30471	470Ω 5% 0.062W
3628	4822 051 30471	470Ω 5% 0.062W
3629	4822 051 30472	4k7 5% 0.062W
3630	4822 051 30221	220Ω 5% 0.062W
3631	2322 704 64301	RST SM 0603 RC22H 430Ω PM1 R
3632	2322 704 64301	RST SM 0603 RC22H 430Ω PM1 R
3633	2322 704 64301	RST SM 0603 RC22H 430Ω PM1 R
3635	4822 051 30682	6k8 5% 0.062W
3636	4822 051 30682	6k8 5% 0.062W
3637	4822 051 30332	3k3 5% 0.062W
3642	4822 051 30103	10k 5% 0.062W
3647	2322 704 64301	RST SM 0603 RC22H 430Ω PM1 R
3648	2322 704 64301	RST SM 0603 RC22H 430Ω PM1 R
3651	2322 704 64301	RST SM 0603 RC22H 430Ω PM1 R
3654	2322 704 64301	RST SM 0603 RC22H 430Ω PM1 R
3655	2322 704 64301	RST SM 0603 RC22H 430Ω PM1 R
3656	2322 704 64301	RST SM 0603 RC22H 430Ω PM1 R
3657	2322 704 64301	RST SM 0603 RC22H 430Ω PM1 R
3658	4822 051 30102	1k 5% 0.062W
3659	4822 051 30102	1k 5% 0.062W
3660	4822 051 30102	1k 5% 0.062W
3661	2322 704 64301	RST SM 0603 RC22H 430Ω PM1 R
3662	4822 051 30102	1k 5% 0.062W
3663	4822 051 30102	1k 5% 0.062W
3664	2322 704 64301	RST SM 0603 RC22H 430Ω PM1 R
3665	4822 117 12139	22Ω 5% 0.062W
3667	4822 051 30339	33Ω 5% 0.062W
3672	4822 051 30479	47Ω 5% 0.062W
3686	4822 051 30223	22k 5% 0.062W
3687	4822 051 30223	22k 5% 0.062W
3688	4822 051 30472	4k7 5% 0.062W
3689	4822 051 30223	22k 5% 0.062W
3691	4822 051 30339	33Ω 5% 0.062W
3702	4822 051 30102	1k 5% 0.062W
3800	4822 051 30479	47Ω 5% 0.062W
3801	4822 051 30339	33Ω 5% 0.062W
3802	4822 051 30331	330Ω 5% 0.062W
3805	4822 051 30479	47Ω 5% 0.062W
3806	4822 051 30153	15k 5% 0.062W
3807	4822 051 30682	6k8 5% 0.062W
3808	4822 051 30332	3k3 5% 0.062W
3809	4822 051 30332	3k3 5% 0.062W
3810	4822 051 30332	3k3 5% 0.062W
3811	4822 051 30332	3k3 5% 0.062W
3812	5322 117 13042	3k9 1% 0.063W 0603 RC22H
3813	5322 117 13042	3k9 1% 0.063W 0603 RC22H
3814	4822 051 30181	180Ω 5% 0.062W
3814	4822 051 30339	33Ω 5% 0.062W
3816	4822 051 30101	100Ω 5% 0.062W
3900	4822 051 30103	10k 5% 0.062W
3901	4822 051 30103	10k 5% 0.062W
3902	4822 051 30339	33Ω 5% 0.062W
3903	4822 051 30339	33Ω 5% 0.062W
3904	4822 051 30331	330Ω 5% 0.062W
3904	4822 051 30339	33Ω 5% 0.062W
3905	4822 051 30221	220Ω 5% 0.062W
3906	4822 051 30339	33Ω 5% 0.062W
3907	2322 704 65609	RST SM 0603 RC22H 56Ω PM1 R
3907	4822 051 30339	33Ω 5% 0.062W
3908	4822 051 30339	33Ω 5% 0.062W
3908	4822 051 30479	47Ω 5% 0.062W
3909	4822 051 30332	3k3 5% 0.062W
3910	2322 704 65609	RST SM 0603 RC22H 56Ω PM1 R

5000	4822 157 11717	BLM31P500SPT
5200	4822 157 11717	BLM31P500SPT
5300	4822 157 11717	BLM31P500SPT
5301	4822 157 11717	BLM31P500SPT
5402	4822 157 11717	BLM31P500SPT
5403	4822 157 11499	BLM11P600SPT
5450	4822 157 11717	BLM31P500SPT
5501	4822 157 70299	2.2µH (NL322522T-2R2J)
5502	4822 157 70299	2.2µH (NL322522T-2R2J)
5503	4822 157 71206	BLM21A601SPT
5504	4822 157 71206	BLM21A601SPT
5600	4822 157 71206	BLM21A601SPT
5601	4822 157 11499	BLM11P600SPT
5602	4822 157 10547	15µH 5%
5604	4822 157 10547	15µH 5%
5605	4822 157 10547	15µH 5%
5606	4822 157 10547	15µH 5%
5607	4822 157 10547	15µH 5%
5608	4822 157 10547	15µH 5%
5609	4822 157 11717	BLM31P500SPT
5610	4822 157 11717	BLM31P500SPT
5611	4822 157 11717	BLM31P500SPT
5700	4822 157 11717	BLM31P500SPT
5800	4822 157 11717	BLM31P500SPT
5801	4822 157 11717	BLM31P500SPT
5802	4822 157 11717	BLM31P500SPT
5900	4822 157 11717	BLM31P500SPT
5901	4822 157 11717	BLM31P500SPT
5902	4822 157 11717	BLM31P500SPT
5903	4822 157 11717	BLM31P500SPT

6200	4822 130 11397	BAS316
6301	9322 128 69685	S1D
6302	9322 128 69685	S1D
6303	9322 128 69685	S1D
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
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	
7202	3104 123 85860	AM29F002T/4.3.13
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
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
7404	9322 144 59668	IC SM MT48LC1M16A1TG-7S (MRN)R
7405	9322 144 59668	IC SM MT48LC1M16A1TG-7S (MRN)R
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

DVD1000/171

Various

0001	3104 127 11490	FRONT AL ASSY
0002	3104 127 12140	FRONT ASSY
0004	3104 127 12880	WINDOW ASSY
0006	3104 127 12150	HOLDER RIGHT COMPLETE
0007	3104 127 12270	POWER ON/OFF KNOB ASSY
0012	3104 127 12160	HOLDER LEFT ASSY
0050	3104 120 00260	SA-CD BADGE
0065	3104 127 11520	TRAY FRONT COMPLETE SA-CD1000
0075	3104 118 90180	TAPTITE SCREW TORX + SPIKES
0076	3104 118 90180	TAPTITE SCREW TORX + SPIKES
0077	3104 118 90180	TAPTITE SCREW TORX + SPIKES
0078	3104 118 90180	TAPTITE SCREW TORX + SPIKES
0081	9305 023 61101	
0081	9305 023 61102	VAL6011/02
0086	3104 126 25210	DUST CAP
0151	3104 127 11930	COVER ASSY
0251	3104 127 10740	FOOT SILVER ASSY
0252	3104 127 10740	FOOT SILVER ASSY
0253	3104 127 10740	FOOT SILVER ASSY
0254	3104 127 10740	FOOT SILVER ASSY
0301	3104 128 92810	MAINSCORD US CLASS 1 NO GROUND
0309	3104 125 23800	USER MANUAL SACD USA (4-LANG)
0316	3104 128 92490	VIDEO CORD SET GOLD PLATED
0318	3104 207 10850	IRT PROD ASSY RC2055/01 PACKED
0320	4822 321 22611	
0321	4822 321 22611	
0322	4822 321 22611	
0323	4822 321 22611	
0324	4822 321 61452	
0326	3104 128 92770	GOLD PLATED YUV-CINCH CABLE
0370	4822 321 61849	
1002	3104 128 06870	MONOBOARD 4285 ASSY SACD1000
1003	3139 248 80720	PCBAS AV DVD711 SACD
1004	3104 129 22150	PSU SACD1000 SRV1122WW MITSUMI
1007	3104 128 70230	TRAFO ASSY SACD NUVOTEM
8003	3104 157 11860	CWAS FLEX SACD 24 108 32S
8006	3104 157 11960	CWAS FLEX DVD 22 180 32S
8007	3104 157 11950	CWAS FLEX DVD 16 180 32S

SACD1000/691

Various

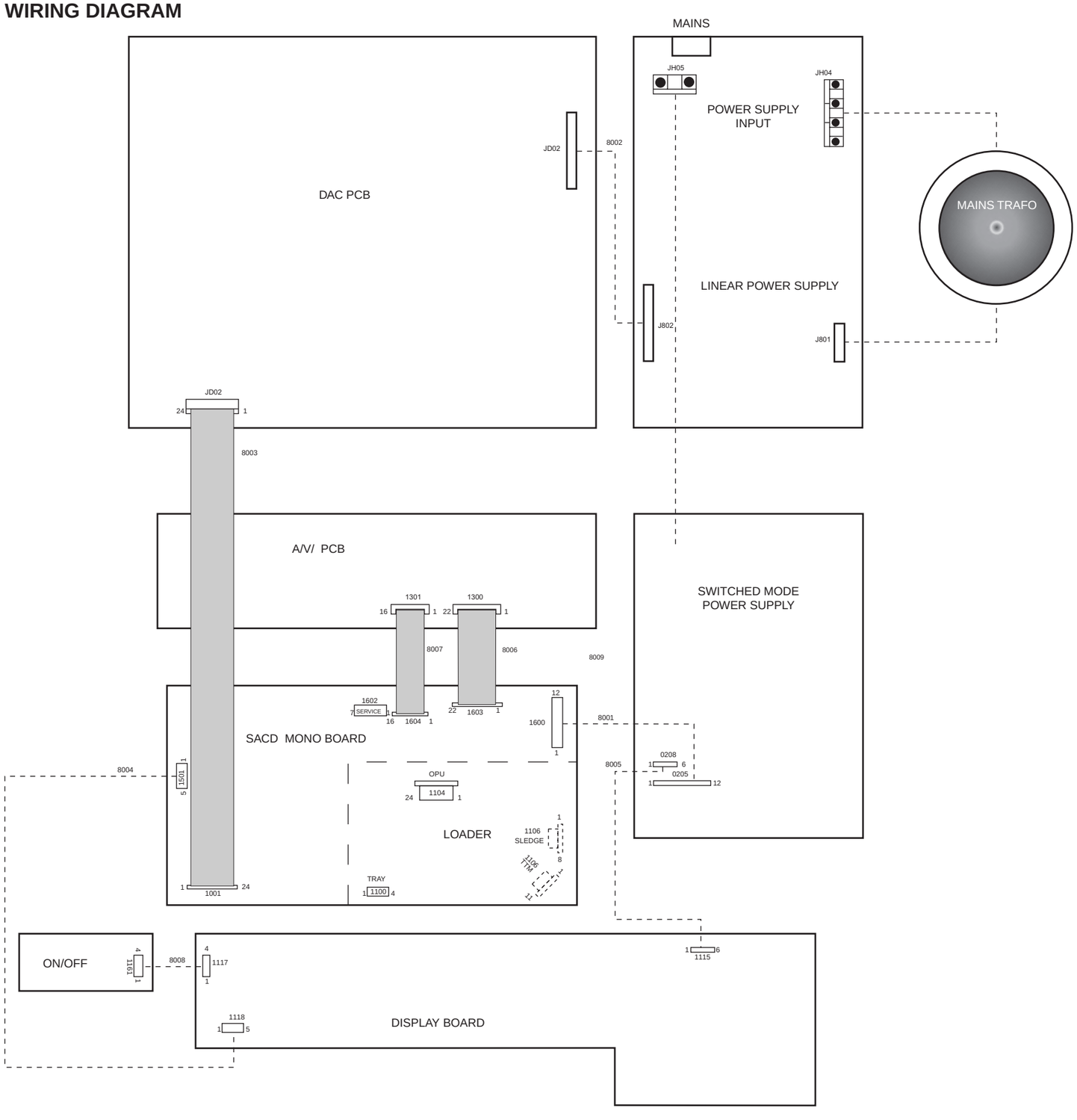
0001	3104 127 11490	FRONT AL ASSY
0002	3104 127 12140	FRONT ASSY
0004	3104 127 12880	WINDOW ASSY

0006	3104 127 12150	HOLDER RIGHT COMPLETE
0007	3104 127 12270	POWER ON/OFF KNOB ASSY
0010	3104 124 05450	LIGHT CONDUCTOR
0012	3104 127 12160	HOLDER LEFT ASSY
0050	3104 120 00260	SA-CD BADGE
0065	3104 127 11520	TRAY FRONT COMPLETE SA-CD1000
0075	3104 118 90180	TAPTITE SCREW TORX + SPIKES
0076	3104 118 90180	TAPTITE SCREW TORX + SPIKES
0077	3104 118 90180	TAPTITE SCREW TORX + SPIKES
0078	3104 118 90180	TAPTITE SCREW TORX + SPIKES
0081	9305 023 61101	
0086	3104 126 25210	DUST CAP
0151	3104 127 11930	COVER ASSY
0251	3104 127 10740	FOOT SILVER ASSY
0252	3104 127 10740	FOOT SILVER ASSY
0253	3104 127 10740	FOOT SILVER ASSY
0254	3104 127 10740	FOOT SILVER ASSY
0301	3104 128 92800	MAINSCORD EU CLASS 1 NO GROUND
0309	3104 125 23800	USER MANUAL SACD USA (4-LANG)
0316	3104 128 92490	VIDEO CORD SET GOLD PLATED
0318	3104 207 10850	IRT PROD ASSY RC2055/01 PACKED
0320	4822 321 22611	
0321	4822 321 22611	
0322	4822 321 22611	
0323	4822 321 22611	
0324	4822 321 61452	
0326	3104 128 92770	GOLD PLATED YUV-CINCH CABLE
0370	4822 321 61849	
1002	3104 128 06870	MONOBOARD 4285 ASSY SACD1000
1003	3139 248 80720	PCBAS AV DVD711 SACD
1004	3104 129 22150	PSU SACD1000 SRV1122WW MITSUMI
1007	3104 128 70230	TRAFO ASSY SACD NUVOTEM
8003	3104 157 11860	CWAS FLEX SACD 24 108 32S
8006	3104 157 11960	CWAS FLEX DVD 22 180 32S
8007	3104 157 11950	CWAS FLEX DVD 16 180 32S

6. Wiring and block diagram

Wiring diagram

WIRING DIAGRAM



8001	
1	+3V3
2	+3V3
3	+5V
4	+5Vstby
5	+6Vstby
6	GND
7	GND
8	GND
9	-8Vstby
10	STB_CONT
11	+12Vstby
12	GND
13	PWR_FAIL

8002	
1	AGND
2	AGND
3	+12VA
4	-12VA
5	DAGND
6	+5VA
7	+5VAD
8	GND
9	GND
10	RELAY
11	AMUTE
12	RGND
13	+12R
14	STANDBY

8003		
1001	JD02	
1	24	DGND
2	23	384 Fs
3	22	DGND
4	21	SEL_PCM/DSD_LFE
5	20	DGND
6	19	DATA_CL/DSD_CENTER
7	18	DGND
8	17	SEL_PCM/DSD_Rs
9	16	DGND
10	15	DATA_LsRs/DSD_Ls
11	14	DGND
12	13	SEL_PCM/DSDRIGHT
13	12	DGND
14	11	DATALR/DSDLEFT
15	10	DGND
16	9	WORDCLK/SEL_DSD
17	8	DGND
18	7	BITCLK/DSDCLK
19	6	DGND
20	5	256Fs
21	4	DGND
22	3	SCL_DAC
23	2	SDA_DAC
24	1	STB_OUT

8004	
1	SCL
2	GND
3	SDA
4	STB_CONT
5	P50

8005	
1	+12V
2	GND
3	+5Vstb
4	-40V
5	on/offA
6	on/offB

8006	
1	P50
2	B
3	G
4	GND
5	R
6	CVBS
7	GND
8	0/6/12V
9	-8Vstby
10	+5V
11	+5V
12	KILL
13	GND
14	PCM_OUT0
15	LRCLK
16	SCLK
17	GND
18	PCM_CLK
19	CENTER
20	STEREO MUTE
21	DIG OUT
22	GND

8007	
1	GND
2	HSYNC
3	GND
4	PCM_OUT2
5	GND
6	PCM_OUT1
7	NC
8	SCL
9	12Vstby
10	SDA
11	+6Vstby
12	NC
13	GND
14	Cr
15	GND
16	Y

8008	
1	LED+
2	LED-
3	on/offA
4	on/offB

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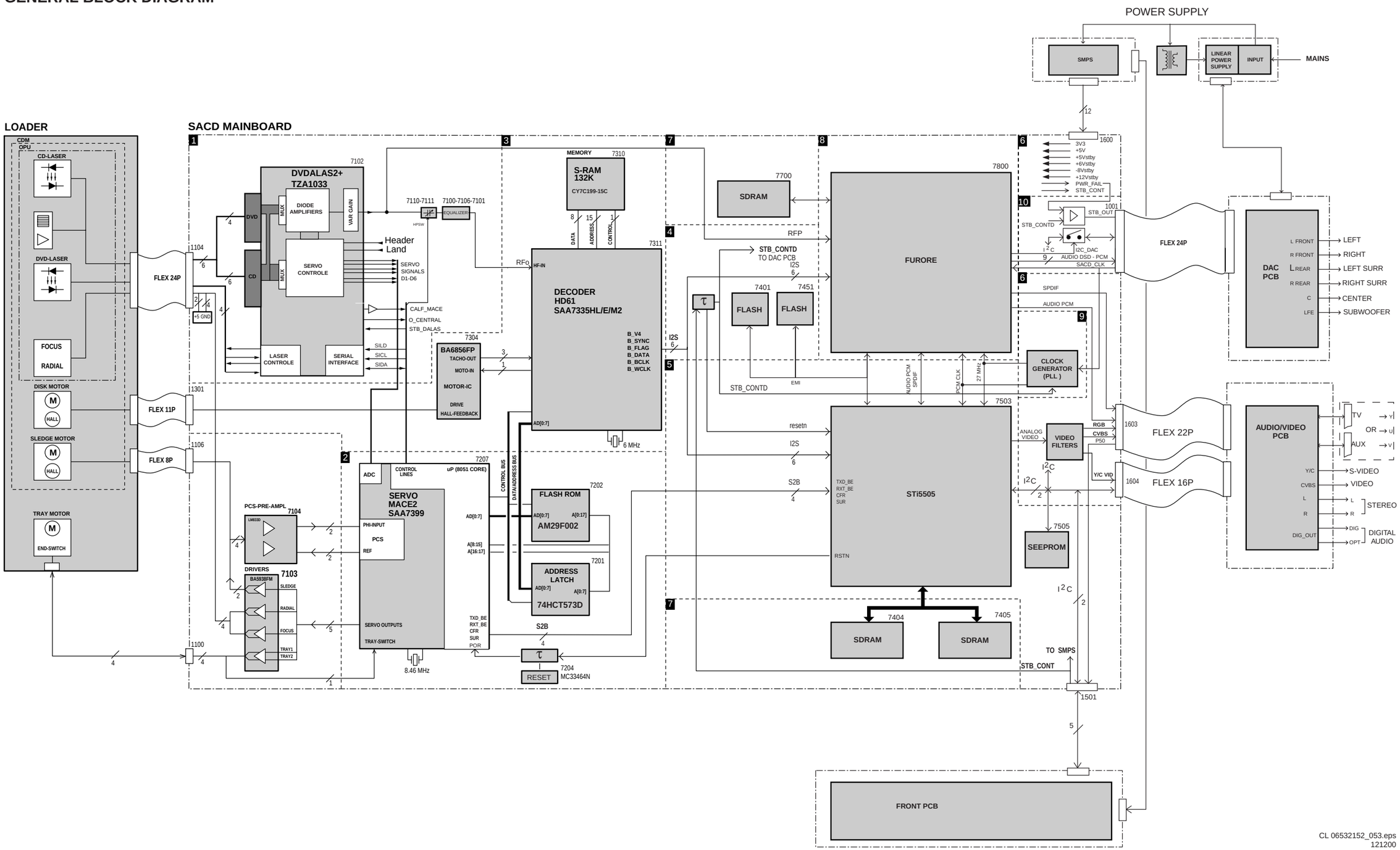
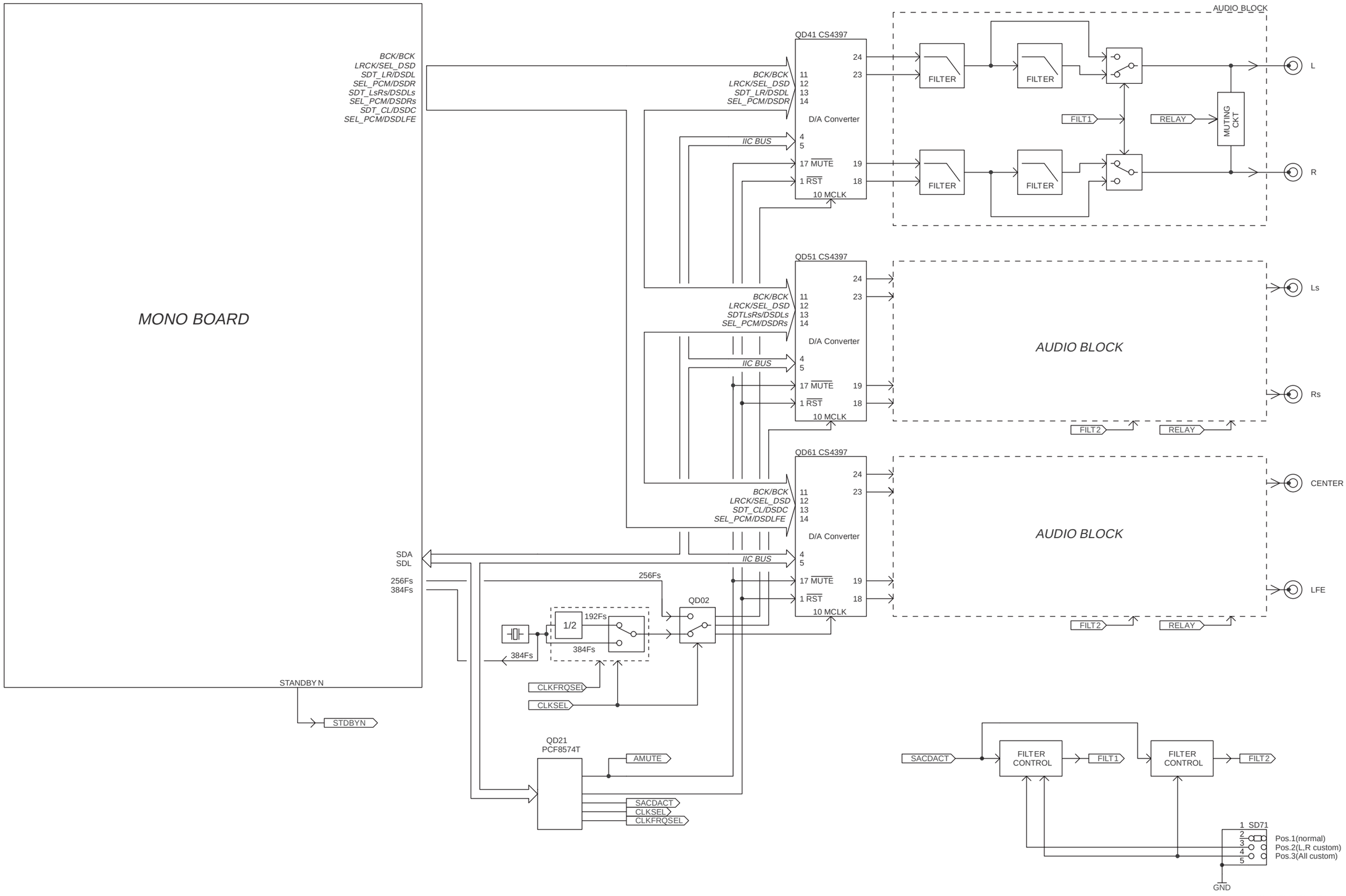
General block diagram

GENERAL BLOCK DIAGRAM



Block diagram DAC PCB

BLOCKDIAGRAM DAC PCB



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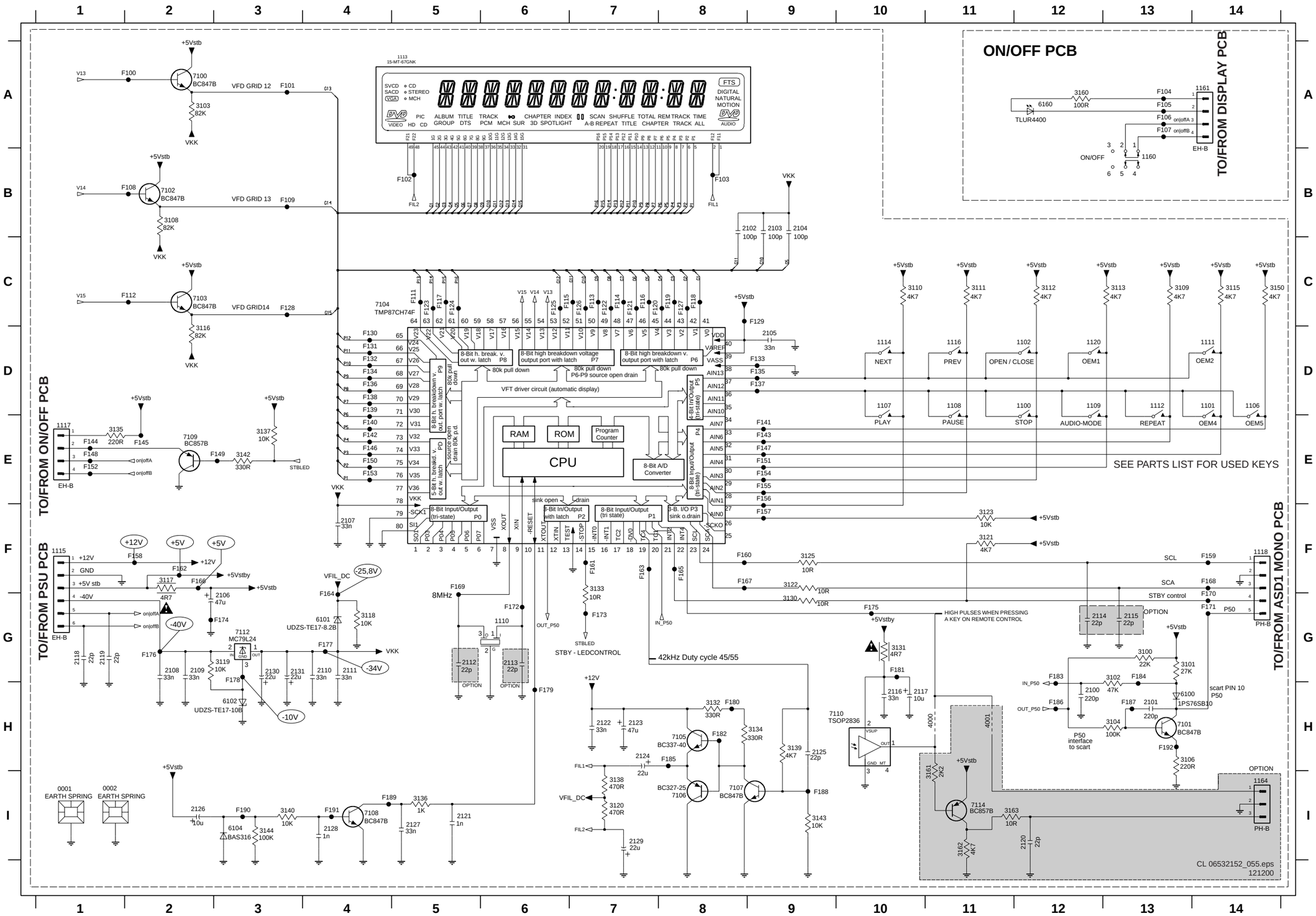
7. Electrical diagrams and PWB's

Display & on / off panel

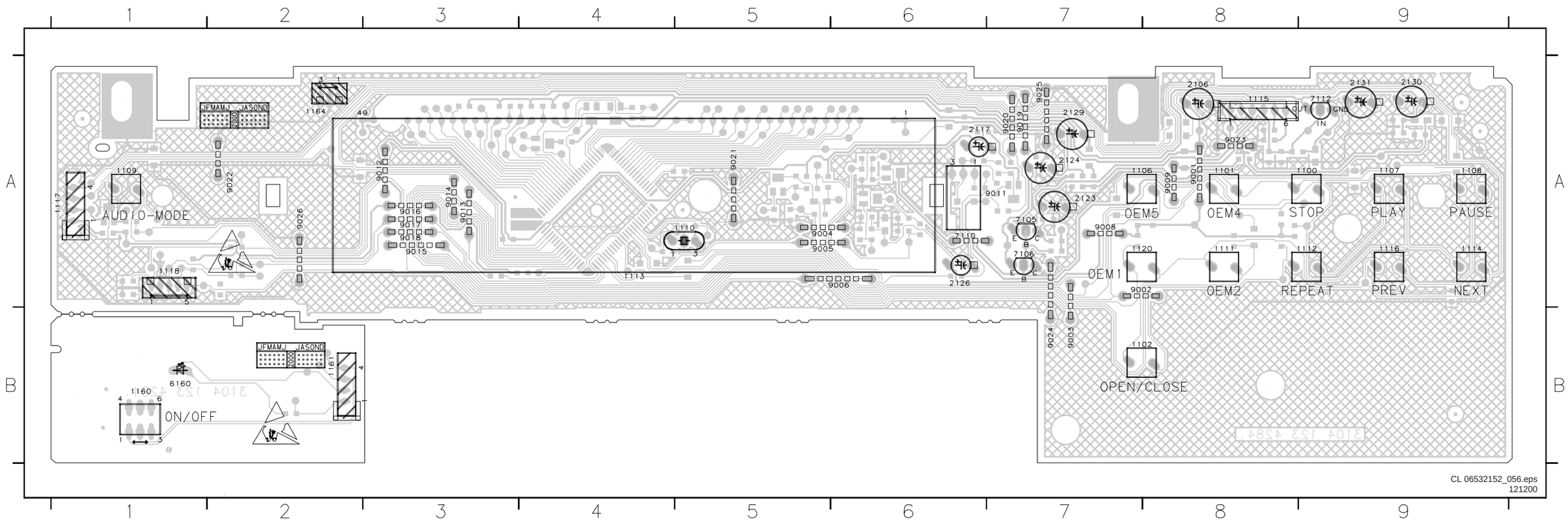


0001 I1	F102 B5
0002 I1	F103 B8
1100 D12	F104 A13
1101 D14	F105 A13
1102 D12	F106 A13
1106 D14	F107 A13
1107 D10	F108 B2
1108 D11	F109 B3
1109 D12	F111 C5
1110 G6	F112 C2
1111 D14	F113 C7
1112 D13	F114 C7
1113 A5	F115 C6
1114 D10	F116 C7
1115 F1	F117 C5
1116 D11	F118 C8
1117 E1	F119 C8
1118 F14	F120 C7
1120 D12	F121 C7
1160 B13	F122 C7
1161 A14	F123 C5
1164 I14	F124 C5
2100 H12	F125 C6
2101 H13	F126 C7
2102 B9	F127 C8
2103 B9	F128 C3
2104 B9	F129 C9
2105 D9	F130 D4
2106 G3	F131 D4
2107 F4	F132 D4
2108 G2	F133 D9
2109 G2	F134 D4
2110 G4	F135 D9
2111 G4	F136 D4
2112 G5	F137 D9
2113 G6	F138 D4
2114 G12	F139 D4
2115 G13	F140 E4
2116 H10	F141 E9
2117 H10	F142 E4
2118 G1	F143 E9
2119 G1	F144 E1
2120 I12	F145 E2
2121 I5	F146 E4
2122 H7	F147 E9
2123 H7	F148 E1
2124 H7	F149 E3
2125 H9	F150 E4
2126 I2	F151 E9
2127 I5	F152 E1
2128 I4	F153 E4
2129 I7	F154 E9
2130 G3	F155 E9
2131 G3	F156 E9
3100 G13	F157 F9
3101 G13	F158 F2
3102 G13	F159 F14
3103 A2	F160 F8
3104 H13	F161 F7
3106 H13	F162 F2
3108 B2	F163 F7
3109 C13	F164 F4
3110 C10	F165 F8
3111 C11	F166 F2
3112 C12	F167 F8
3113 C13	F168 F14
3115 C14	F169 F5
3116 C2	F170 G14
3117 F2	F171 G14
3118 G4	F172 G6
3119 G3	F173 G7
3120 I7	F174 G3
3121 F11	F175 G10
3122 F9	F176 G2
3123 F11	F177 G4
3125 F9	F178 G3
3130 G9	F179 H6
3131 G10	F180 H8
3132 H8	F181 G10
3133 F7	F182 H8
3134 H9	F183 G12
3135 E1	F184 G13
3136 I5	F185 H8
3137 E3	F186 H12
3138 I7	F187 H13
3139 H9	F188 I9
3140 I3	F189 I4
3142 E3	F190 I3
3143 I9	F191 I4
3144 I3	F192 H13
3150 C14	
3160 A12	
3161 I11	
3162 I11	
3163 I11	
4000 H11	
4001 H11	
6100 H13	
6101 G4	
6102 H3	
6104 I3	
6160 A12	
7100 A2	
7101 H13	
7102 B2	
7103 C2	
7104 C4	
7105 H8	
7106 I8	
7107 I8	
7108 I4	
7109 E2	
7110 H10	
7112 G3	
7114 I11	
F100 A2	
F101 A3	

Layout Display & on / off panel (top view)

DISPLAY & ON/OFF PANEL TOP VIEW

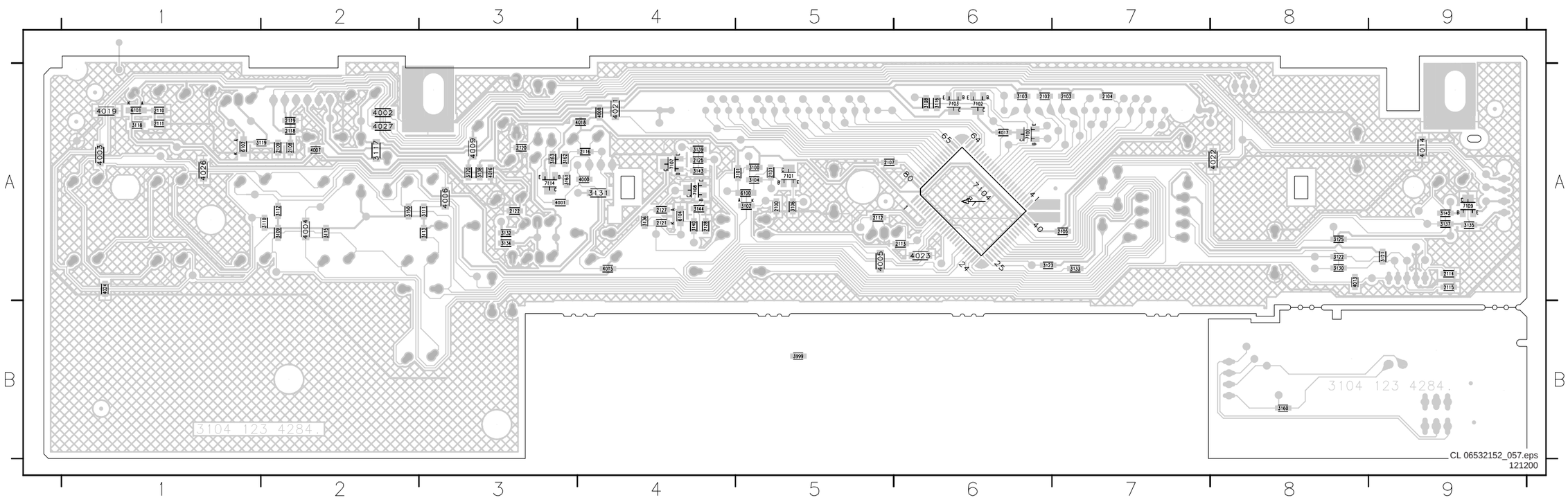
1100 A9 1101 A8 1102 B7 1106 A7 1107 A9 1108 A9 1109 A1 1110 A5 1111 A8 1112 A9 1113 A4 1114 A9 1115 A8 1116 A9 1117 A1 1118 A1 1120 A7 1160 B1 1161 B2 1164 A2 2106 A8 2117 A6 2123 A7 2124 A7 2126 A6 2129 A7 2130 A9 2131 A9 6160 B1 7105 A7 7106 A7 7110 A6 7112 A9 9001 A8 9002 A7 9003 A7 9004 A5 9005 A5 9006 A6 9008 A7 9009 A8 9011 A6 9012 A3 9013 A3 9014 A3 9015 A3 9016 A3 9017 A3 9018 A3 9019 A7 9020 A7 9021 A5 9022 A2 9023 A8 9024 A7 9025 A7 9026 A2



Layout Display & on / off panel (bottom view)

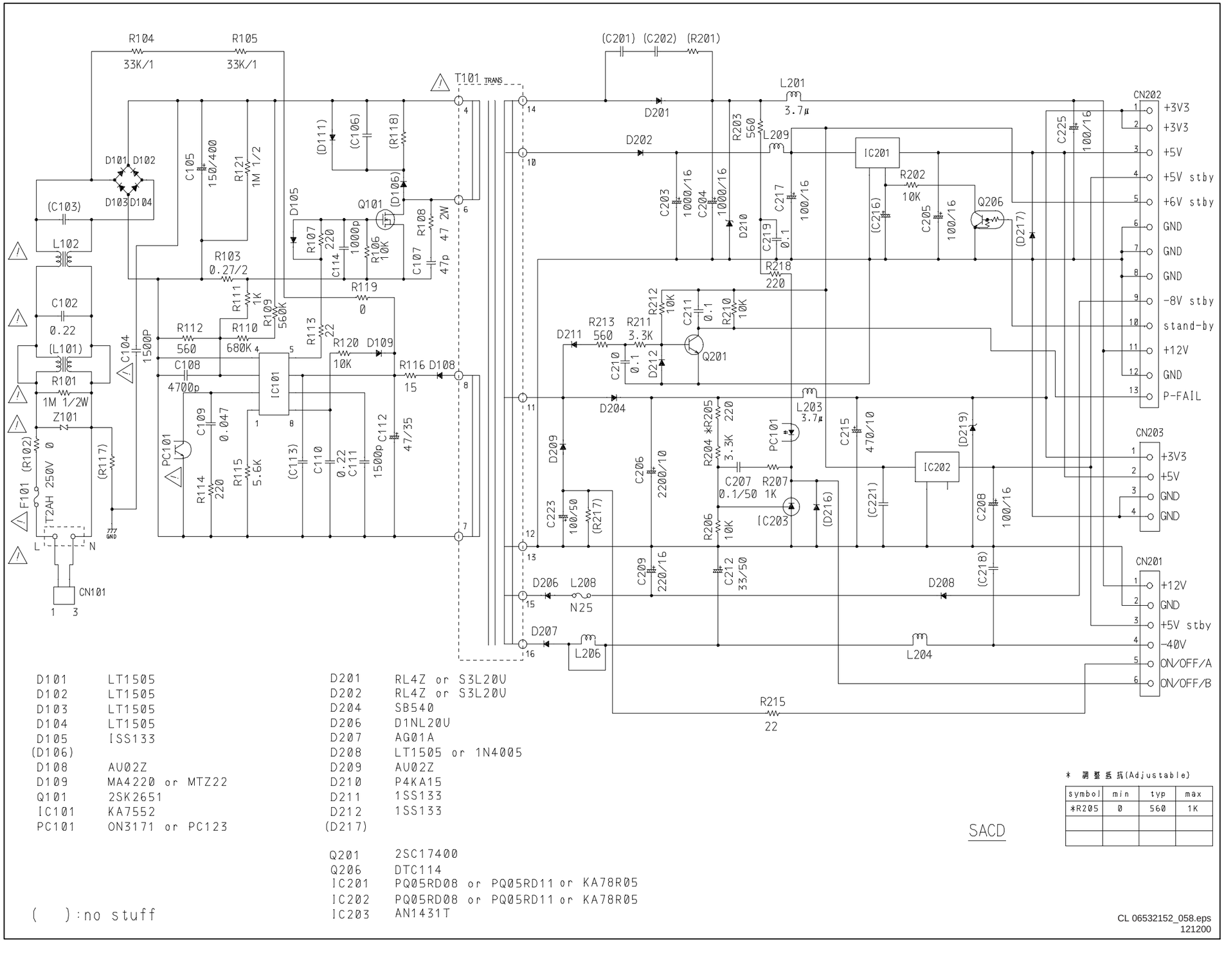
DISPLAY & ON/OFF PANEL BOTTOM VIEW

2100 A5 2101 A5 2102 A6 2103 A7 2104 A7
2105 A7 2107 A5 2108 A2 2109 A2 2110 A1
2111 A1 2112 A5 2113 A6 2114 A9 2115 A9
2116 A4 2118 A2 2119 A2 2120 A3 2121 A4
2122 A3 2125 A4 2127 A4 2128 A4 3100 A5
3101 A5 3102 A5 3103 A6 3104 A5 3106 A5
3108 A6 3109 A2 3110 A2 3111 A3 3112 A2
3113 A3 3115 A2 3116 A6 3117 A2 3118 A1
3119 A2 3120 A3 3121 A9 3122 A8 3123 A6
3125 A8 3130 A8 3131 A4 3132 A3 3133 A7
3134 A3 3135 A9 3136 A4 3137 A9 3138 A3
3139 A4 3140 A4 3142 A9 3143 A4 3144 A4
3150 A2 3160 B8 3161 A3 3162 A3 3163 A3
3999 B5 4000 A4 4001 A3 4002 A2 4003 A1
4004 A2 4005 A5 4006 A3 4007 A2 4008 A4
4009 A3 4013 A8 4014 A9 4015 A4 4016 A3
4017 A6 4018 A4 4019 A1 4021 A4 4022 A8
4023 A6 4024 A1 4026 A1 4027 A2 6100 A5
6101 A1 6102 A1 6104 A4 7100 A6 7101 A5
7102 A6 7103 A6 7104 A6 7107 A4 7108 A4
7109 A9 7114 A3



Switched mode power supply

SWITCHED MODE POWER SUPPLY
FOR ORIENTATION ONLY



D101	LT1505
D102	LT1505
D103	LT1505
D104	LT1505
D105	ISS133
(D106)	
D108	AU02Z
D109	MA4220 or MTZ22
Q101	2SK2651
IC101	KA7552
PC101	ON3171 or PC123

D201	RL4Z or S3L20U
D202	RL4Z or S3L20U
D204	SB540
D206	D1NL20U
D207	AG01A
D208	LT1505 or 1N4005
D209	AU02Z
D210	P4KA15
D211	1SS133
D212	1SS133
(D217)	
Q201	2SC17400
Q206	DTC114
IC201	PQ05RD08 or PQ05RD11 or KA78R05
IC202	PQ05RD08 or PQ05RD11 or KA78R05
IC203	AN1431T

( ) : no stuff

SACD

＊ 調整抵抗(Adjustable)

symbol	min	typ	max
＊R205	0	560	1K

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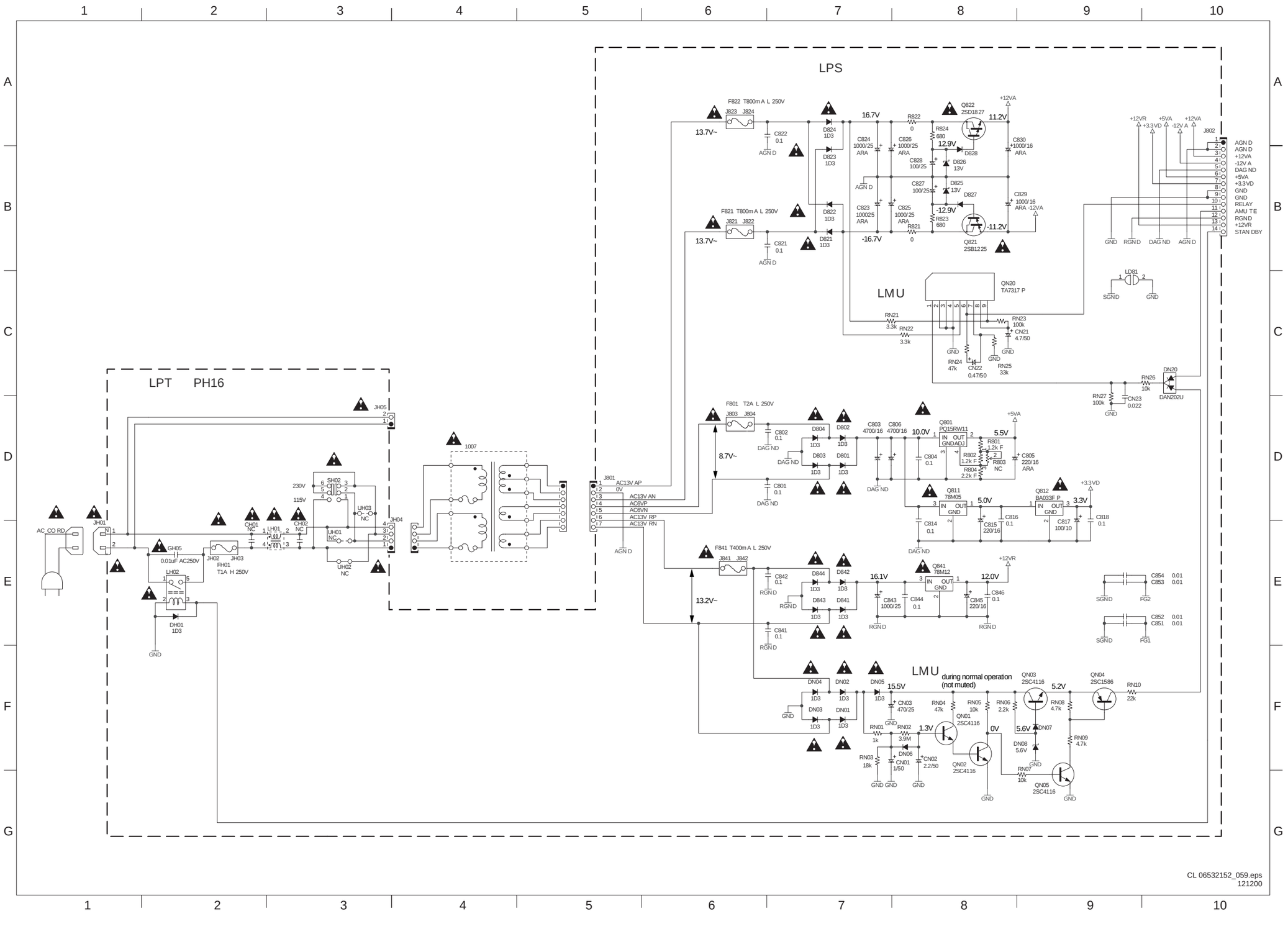
121200

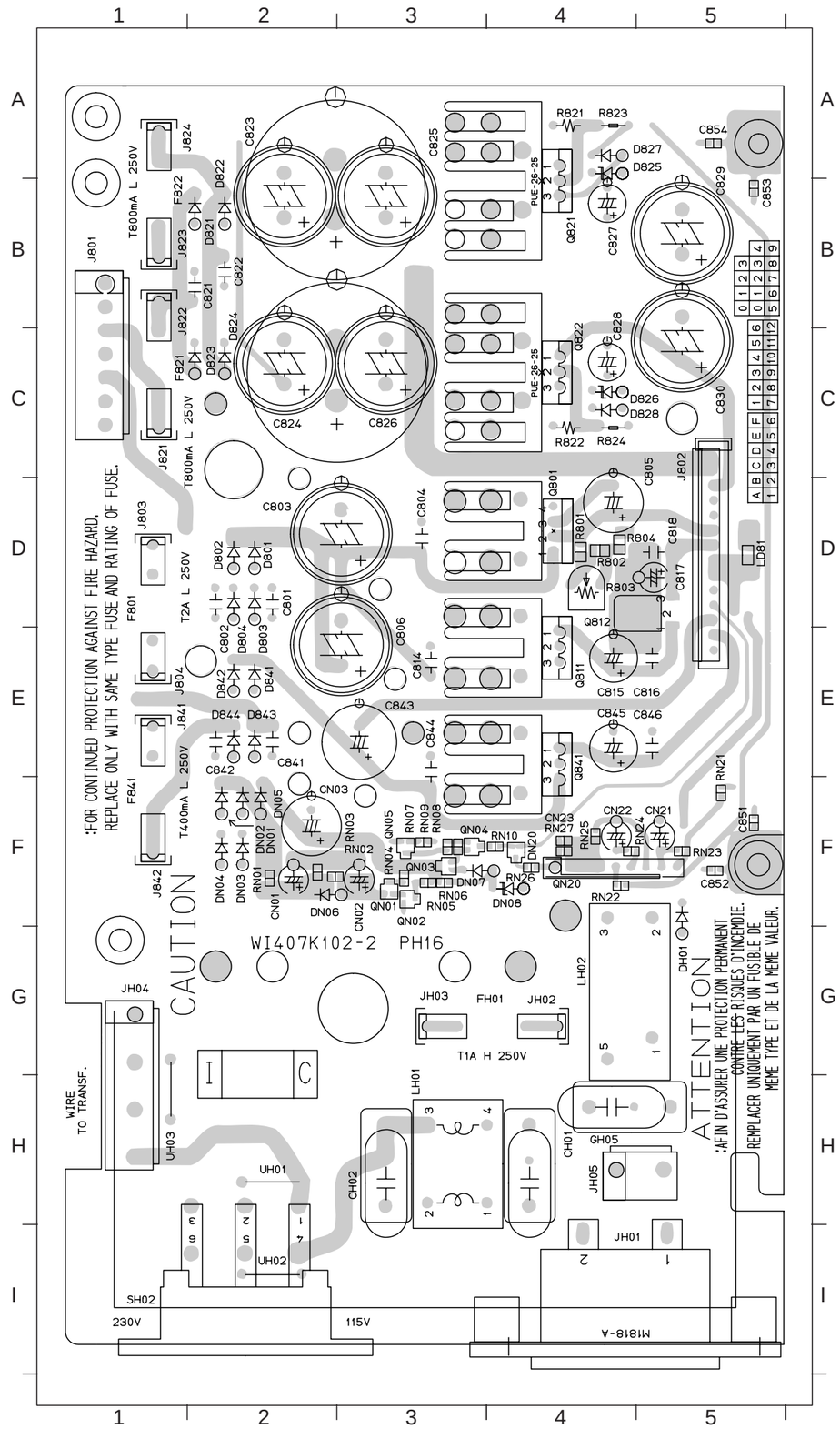
LPSU-L2-2N

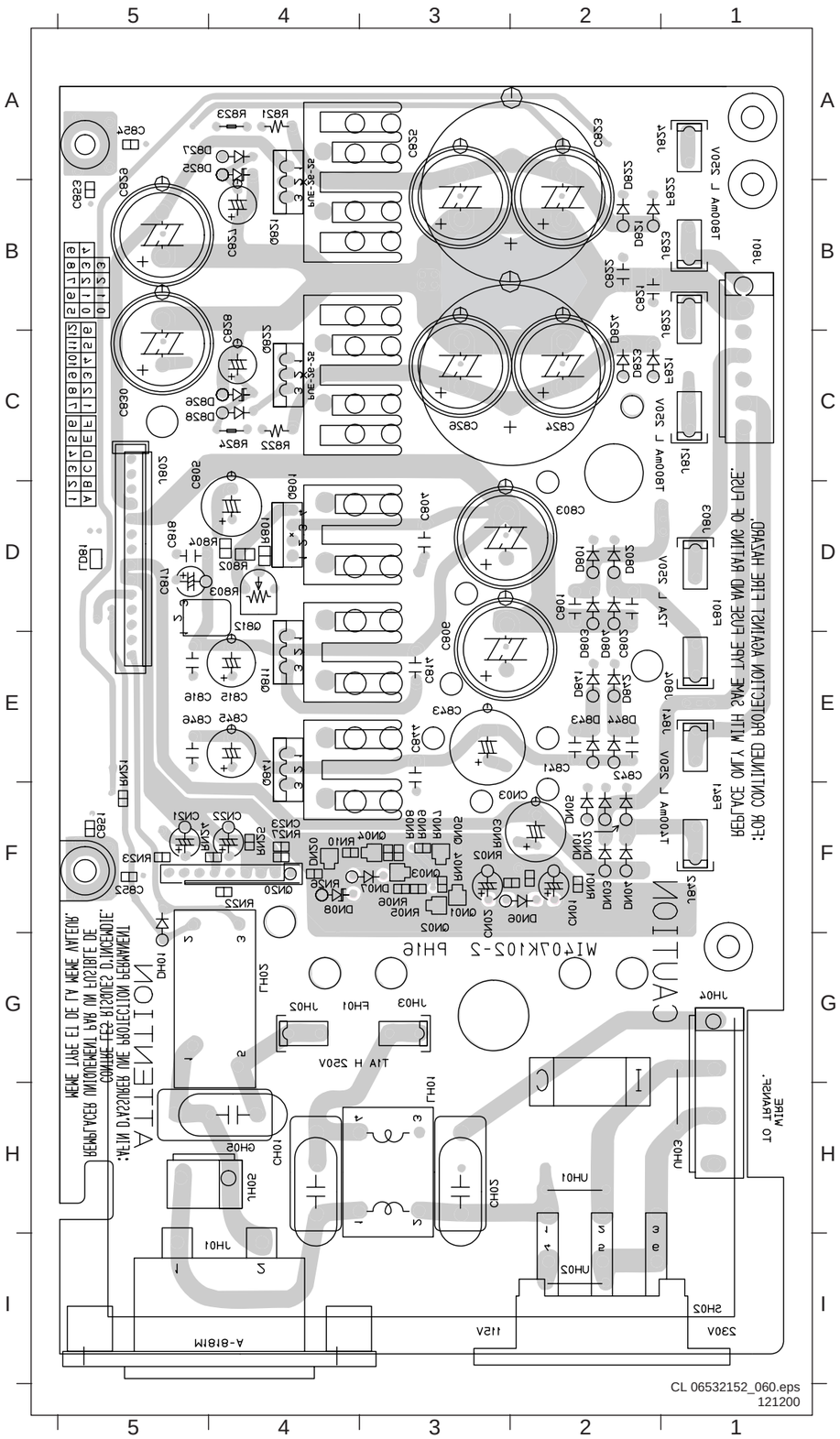
LPSU-L2-2N

CH01 E2 CH02 E3 CN01 F8 CN02 F8 CN03 F8
CN21 C8 CN22 C8 CN23 D9 C801 D7 C802 D7
C803 D7 C804 D8 C805 D8 C806 D7 C814 D8
C815 D8 C816 D8 C817 D9 C818 D9 C821 B7
C822 A7 C823 B7 C824 B7 C825 B8 C826 B8
C827 B8 C828 B8 C829 B8 C830 B8 C841 E7
C842 E7 C843 E7 C844 E8 C845 E8 C846 E8
C851 E10 C852 E10 C853 E10 C854 E10 DH01 E2
DN01 F7 DN02 F7 DN03 F7 DN04 F7 DN05 F7
DN06 F8 DN07 F9 DN08 F9 DN20 C10 D801 D7
D802 D7 D803 D7 D804 D7 D821 B7 D822 B7
D823 B7 D824 A7 D825 B8 D826 B8 D827 B8
D828 B8 D841 E7 D842 E7 D843 E7 D844 E7
FH01 E2 F801 D6 F821 B6 F822 A6 F841 E6
GH05 E2 JH01 E1 JH02 E2 JH03 E2 JH04 E4
JH05 D4 J801 D5 J802 A10 J803 D6 J804 D6
J821 B6 J822 B6 J823 A6 J824 A6 J841 E6
J842 E6 LH01 E3 LH02 E2 QN01 F8 QN02 F8
QN03 F9 QN04 F9 QN05 G9 QN20 C8 Q801 D8
Q811 D8 Q812 D9 Q821 B8 Q822 A8 Q841 E8
RN01 F7 RN02 F8 RN03 F7 RN04 F8 RN05 F8
RN06 F8 RN07 G9 RN08 F9 RN09 F9 RN10 F9
RN21 C8 RN22 C8 RN23 C8 RN24 C8 RN25 C8
RN26 C10 RN27 D9 R801 D8 R802 D8 R803 D8
R804 D8 R821 B8 R822 A8 R823 B8 SH02 D3
UH01 E3 UH02 E3 UH03 D3



Layout LPSU-L2-2N





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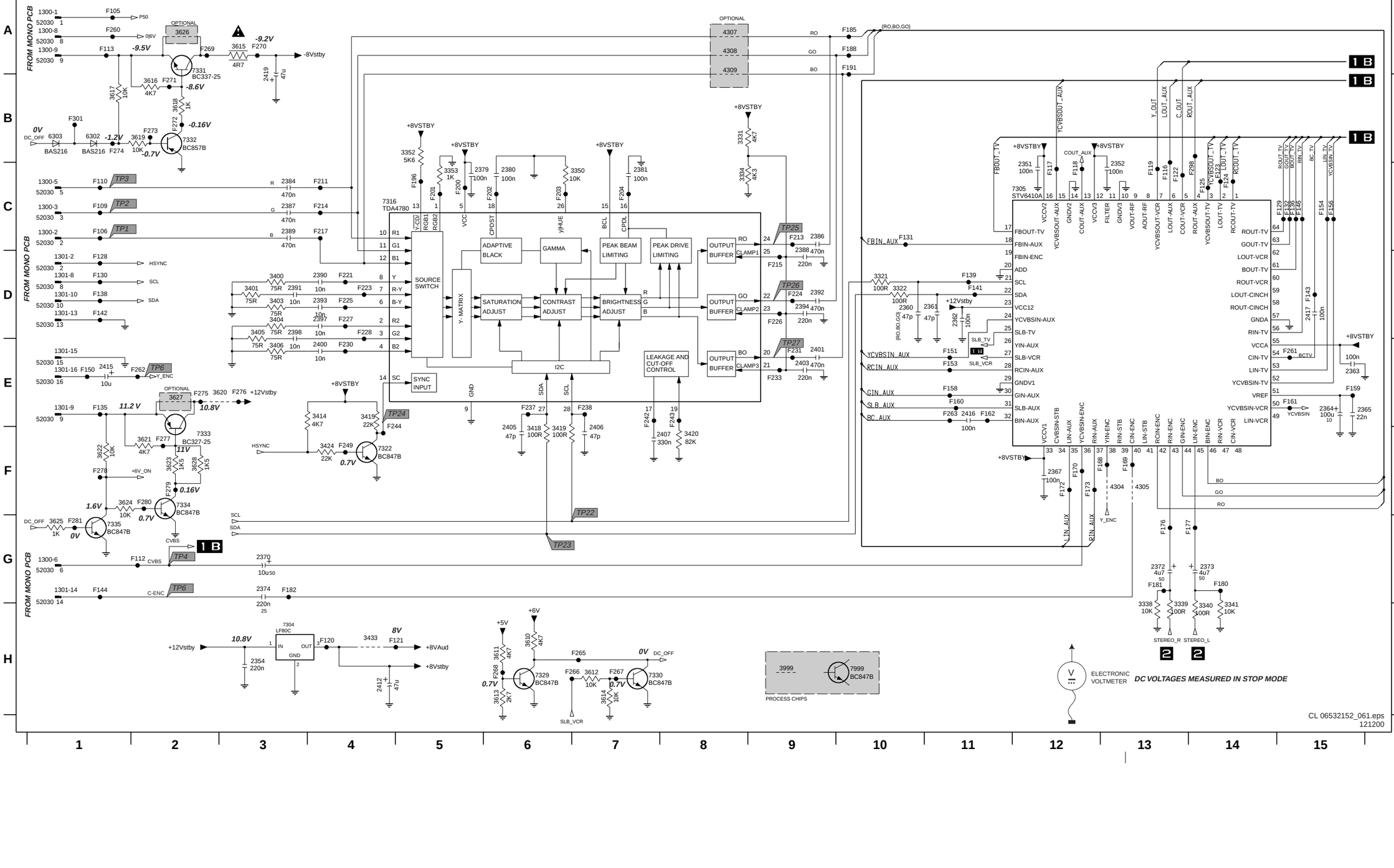
121200

CN01 F2	RN01 F2
CN02 F3	RN02 F3
CN03 F2	RN03 F3
CN21 F5	RN04 F3
CN22 F4	RN05 F3
CN23 F4	RN06 F3
CH01 H4	RN07 F3
CH02 H3	RN08 F3
C801 D2	RN09 F3
C802 E2	RN10 F4
C803 D2	RN21 F5
C804 D3	RN22 F4
C805 D5	RN23 F5
C806 E3	RN24 F5
C814 E3	RN25 F4
C815 E4	RN26 F4
C816 E5	RN27 F4
C817 D5	R801 D4
C818 D5	R802 D4
C821 B2	R803 D4
C822 B2	R804 D4
C823 A2	R821 A4
C824 C2	R822 C4
C825 A3	R823 A4
C826 C3	R824 C4
C827 B4	SH02 I1
C828 C4	UH01 H2
C829 B5	UH02 I2
C830 C5	UH03 H1
C841 E2	
C842 E2	
C843 E3	
C844 E3	
C845 E4	
C846 E5	
C851 F5	
C852 F5	
C853 B5	
C854 A5	
DN01 F2	
DN02 F2	
DN03 F2	
DN04 F2	
DN05 F2	
DN06 F3	
DN07 F3	
DN08 F4	
DN20 F4	
DH01 G5	
D801 D2	
D802 D2	
D803 E2	
D804 E2	
D821 B2	
D822 B2	
D823 C2	
D824 C2	
D825 A4	
D826 C4	
D827 A4	
D828 C4	
D841 E2	
D842 E2	
D843 E2	
D844 E2	
FH01 G3	
F801 D1	
F821 C1	
F822 B1	
F841 F1	
GH05 H4	
JH01 I4	
JH02 G4	
JH03 G3	
JH04 G1	
JH05 H4	
J801 B1	
J802 C5	
J803 D1	
J804 E1	
J821 C1	
J822 B2	
J823 B2	
J824 A1	
J841 E1	
J842 F1	
LH01 H3	
LH02 G4	
LD81 D5	
QN01 F3	
QN02 F3	
QN03 F3	
QN04 F3	
QN05 F3	
QN20 F4	
Q801 D4	
Q811 E4	
Q812 D4	
Q821 B4	
Q822 C4	
Q841 E4	

AV Board (Europe): Video control & SCART switch

1 A VIDEO CONTROL & SCART SWITCH



AV Board (Europe): Video out

1 B VIDEO OUT

1 A

CVBS -0.3V 7301 BC847B -1V 7.4V 1.8V 1.1V TP19 CVBS-OUT 1402-A YKC21-3930

2 KILL 6306 RB501V-40 F481 F482 7417 BC857B KILL_SCART F483 3515 100K 6307 RB501V-40 SLB_VCR

1 A

(C_OUT,Y_OUT) Y_OUT C_OUT 7303 BC847B 1.8V 2.5V 7302 BC847B 1.7V 1V TP20 TP21 1303 TCS79 Y/C OUT

1 A

B/C SWITCHING

FBOUT_TV 7328 BC847B 0.7V 7327 BC847B 8V 0V BC857B 7326 -7.6V 7310 BC847B 1.1V 7320 BC847B 0.8V 7321 BC817-25 1.4V -7.7V -0.8V Vref 7324 BC817-25 0.8V -7.7V -0.8V Vref

6301 BAS216 F232 -0.8V Vref 3421 270R -8Vstby

FBIN_AUX 7313 BC847B 0V 8V 7312 BC857B -7.6V 7311 BC847B 2.3V 1.7V 7314 BC817-25 -0.8V -7.7V Vref 7315 BC817-25 1.7V -0.8V -7.7V Vref

ELECTRONIC VOLTMETER

DC VOLTAGES MEASURED IN STOP MODE

BC_TV

ROUT_TV RIN_TV LOUT_TV LIN_TV BC_TV GOUT_TV RCOUT_TV FBOUT_TV YCVBSOUT_TV 7306 BC847B 1.3V 0.7V 7307 BC847B 7308 BC847B 4V 3.3V 7309 BC847B 1.7V 1V 7336 BC817-25 7337 BC817-25 7325 BC847B KILL_SCART SLB_TV BAT254 4301 OPTION 6305 EH-B 1350 TO SCART DATA FILTER PCB TV-SCART 1304-1

YCVBSIN_TV ROUT_AUX RIN_AUX LOUT_AUX LIN_AUX BC_AUX SLB_AUX GIN_AUX RCIN_AUX FBIN_AUX YCVBSOUT_AUX YCVBSIN_AUX AUX-SCART 1304-2 1304-3 0350808190 MT1MT2

CL 06532152_062.eps 121200

1303 D6	3602 F3		
1304-1 A13	3603 F4		
1304-2 F13	3604 F2		
1304-3 E13	3605 F1		
1350 A13	3606 F4		
1402-A B6	3607 F4		
2308 D6	3608 H5		
2314 C3	3609 D4		
2337 D5	4301 C11		
2353 A11	6300 C3		
2355 A10	6301 H1		
2357 A10	6305 B11		
2358 A13	6306 B7		
2359 B10	6307 C8		
2366 C12	7300 B3		
2368 C12	7301 B2		
2369 C13	7302 C5		
2371 D13	7303 D3		
2375 E12	7306 B10		
2376 E11	7307 C11		
2377 B5	7308 D10		
2378 E11	7309 D11		
2382 F11	7310 B4		
2383 F11	7311 H6		
2385 F10	7312 H4		
2395 G12	7313 I3		
2396 H10	7314 I6		
2399 H10	7315 I7		
2402 H11	7320 F6		
2404 H13	7321 F6		
2408 I12	7324 G7		
2409 I13	7325 I11		
2410 I12	7326 F4		
2411 I11	7327 F3		
2413 C13	7328 F2		
2414 H12	7336 A12		
2418 D4	7337 B11		
3300 A3	7417 C8		
3301 B3	F100 B2		
3302 B3	F101 B3		
3303 D4	F102 B4		
3304 B3	F103 B3		
3305 B3	F104 B4		
3306 D5	F107 B3		
3307 C3	F108 B5		
3308 C3	F111 C3		
3309 C3	F114 A12		
3310 D5	F115 A11		
3312 D3	F127 A11		
3313 B12	F133 B11		
3314 A12	F134 A13		
3315 A11	F137 A13		
3316 A12	F140 B13		
3318 A11	F145 B12		
3319 A11	F148 B12		
3320 A12	F149 B13		
3323 B11	F152 B10		
3325 B11	F155 C11		
3327 C11	F157 C12		
3329 C11	F163 C11		
3330 C12	F164 C12		
3332 D11	F165 C12		
3333 D11	F166 D11		
3335 D11	F167 D10		
3336 E12	F171 D12		
3342 E11	F174 D12		
3343 D13	F175 D10		
3345 B5	F178 E12		
3347 B4	F183 E12		
3348 E12	F184 C4		
3349 F13	F186 D3		
3351 F12	F187 D5		
3354 H7	F189 D4		
3355 H7	F190 D5		
3356 H3	F192 D5		
3357 H4	F193 E12		
3359 F12	F194 F3		
3360 H6	F195 F12		
3362 H7	F197 F2		
3363 F11	F198 F4		
3364 I7	F199 F7		
3365 I4	F205 F11		
3366 F12	F207 F2		
3367 A12	F208 F6		
3368 A11	F209 F4		
3378 I2	F210 F5		
3394 F11	F212 F11		
3395 I5	F216 G13		
3397 G11	F218 G12		
3398 I3	F219 G13		
3399 I4	F220 G7		
3402 I6	F222 G13		
3407 H11	F229 H12		
3408 H11	F232 H1		
3409 G11	F234 H11		
3410 F5	F235 H7		
3411 F7	F236 H4		
3413 H12	F239 H3		
3416 F7	F240 H7		
3417 F6	F241 H5		
3421 H1	F245 I2		
3422 F5	F246 I3		
3423 G7	F247 I11		
3425 I12	F248 I6		
3427 G7	F252 I5		
3429 I11	F253 I5		
3431 I11	F254 I7		
3432 I13	F255 I7		
3434 B10	F256 I10		
3435 C10	F257 I11		
3436 D11	F258 I12		
3437 D10	F259 I12		
3438 D10	F264 D4		
3439 C4	F297 F3		
3440 D3	F299 F4		
3441 I10	F300 G7		
3515 C7	F481 B7		
3600 E3	F482 B8		
3601 F2	F483 C7		

AV Board (Europe): Audio

2 AUDIO

NOT USED IN SACD1000

FROM MONO PCB

TO HEADPHONE PCB

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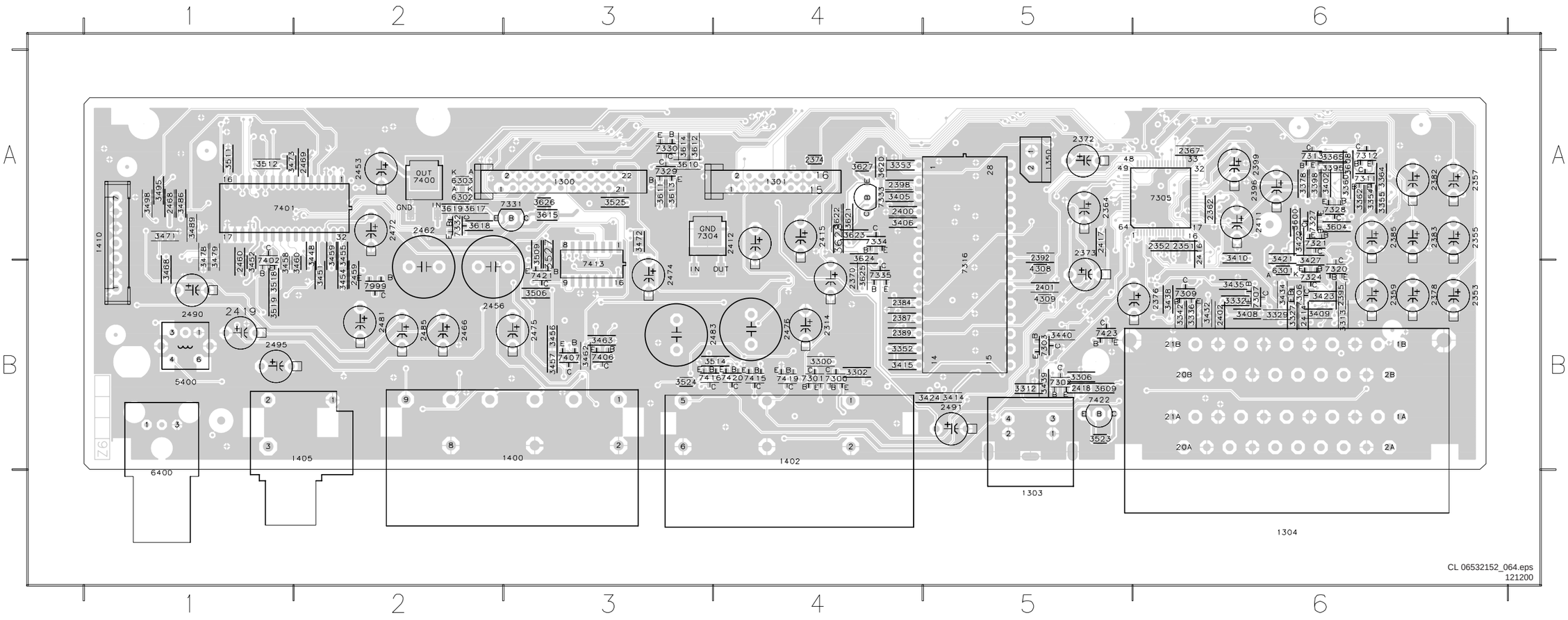
121200

Layout AV Board (Europe) (top view)

1300	A3	2352	A6	2374	A4	2396	A6	2417	A5	2472	A2	3302	B4	3354	A6	3406	A4	3432	B6	3456	B3	3478	A1	3518	B1	3611	A3	3623	A4	6303	A2	7311	A6	7331	A3	7415	B4
1301	A4	2353	B6	2376	B5	2398	A4	2418	B5	2474	B3	3306	B5	3355	A6	3408	B6	3434	B6	3457	B3	3479	A1	3519	B1	3612	A3	3624	A4	6400	B1	7312	A6	7332	A2	7416	B3
1303	B5	2355	B6	2378	B6	2399	A6	2419	B1	2475	B2	3312	B5	3360	A6	3409	B6	3435	B6	3458	B1	3486	A1	3523	B5	3613	A3	3625	B4	7300	B4	7313	A6	7333	A4	7419	B4
1304	B6	2357	A6	2382	A6	2400	A4	2453	A2	2476	B4	3313	B6	3362	A6	3410	B6	3438	B6	3459	B2	3488	A1	3524	B3	3614	A3	3626	A3	7301	B4	7316	A5	7334	A4	7420	B4
1350	A5	2359	B6	2383	B6	2401	B5	2456	B3	2481	B2	3327	B6	3364	A6	3414	B5	3439	B5	3460	B1	3490	A1	3525	A3	3615	A3	3627	A4	7302	B5	7320	B6	7335	B4	7421	B3
1400	B2	2362	A6	2384	B4	2402	B6	2459	B2	2483	B3	3329	B6	3365	A6	3415	B4	3440	B5	3462	B3	3498	A1	3527	A3	3617	A2	3628	A4	7303	B5	7321	A6	7400	A2	7422	B5
1402	B4	2364	A5	2385	A6	2411	A6	2460	B1	2485	B2	3332	B6	3378	A6	3421	B6	3448	A2	3463	B3	3506	B3	3600	A6	3618	A2	4308	A5	7304	B3	7324	B6	7401	A1	7423	B5
1405	B2	2367	A6	2387	B4	2412	A4	2462	B2	2490	B1	3336	B6	3395	A6	3422	A6	3451	B2	3468	B1	3509	A3	3604	A6	3619	A2	4309	B5	7305	A6	7327	A6	7402	B1	7999	B2
1410	A1	2370	B4	2389	B4	2414	B6	2466	B2	2491	B5	3342	B6	3398	A6	3423	B6	3452	B1	3471	A1	3511	A1	3608	A6	3620	A4	5400	B1	7306	B6	7328	A6	7406	B3		
2314	B4	2372	A5	2392	A5	2415	A4	2468	A1	2495	B2	3352	B4	3402	A6	3424	B4	3454	B2	3472	A3	3512	A1	3609	B5	3621	A4	6301	B6	7307	B6	7329	A3	7407	B3		
2351	B6	2373	B5	2395	B6	2416	B6	2469	A1	3300	B4	3353	A4	3405	A4	3427	A6	3455	A2	3473	A1	3514	B4	3610	A3	3622	A4	6302	A2	7309	B6	7330	A3	7413	B3		



Layout AV Board (Europe) (bottom view)

2308 B2 2337 B2 2354 A3 2358 B1 2360 A1 2361 A1 2363 A1 2365 A2 2366 B1 2368 B1 2369 B1
2371 B1 2375 B1 2377 B3 2379 A2 2380 B2 2381 B2 2386 A2 2388 A2 2390 B2 2391 A2 2393 A2
2394 A2 2397 A2 2403 B2 2404 B1 2405 A2 2406 A2 2407 B2 2408 B1 2409 B2 2410 B1 2413 B1
2450 B5 2452 A5 2455 B5 2457 B4 2458 A5 2461 B6 2463 B4 2464 B5 2465 B6 2467 B5 2470 A4
2471 A5 2473 B4 2477 A6 2478 B4 2479 B4 2480 A6 2482 B5 2484 A6 2486 B5 2487 A6 2488 B6
2489 B5 2493 B6 2494 B5 3301 B3 3303 B2 3304 B3 3305 B3 3307 B3 3308 B3 3309 B3 3310 B2
3314 B1 3315 A1 3316 B1 3318 B1 3319 A1 3320 B1 3321 A1 3322 A1 3323 B1 3325 B1 3330 B1
3331 B2 3333 B1 3334 B2 3335 B1 3338 A2 3339 B2 3340 B2 3341 B2 3343 B1 3345 B3 3347 B3
3348 B1 3349 B1 3350 A2 3351 A1 3356 A1 3357 A1 3359 A1 3363 A1 3366 B1 3367 B1 3368 B1
3394 A1 3397 B1 3399 A1 3400 B2 3401 A3 3403 A2 3404 B1 3407 B1 3411 B1 3413 B1 3416 B1
3417 B1 3418 A2 3419 A2 3420 B2 3425 B1 3429 B1 3431 B1 3433 B4 3436 B1 3437 A1 3441 B1
3442 B4 3444 A5 3445 B4 3446 B4 3447 B4 3453 A6 3461 B4 3464 B5 3466 B5 3469 B5 3470 B4
3475 B6 3476 B3 3477 B3 3480 B4 3481 B3 3482 A6 3483 B4 3484 B4 3487 B5 3488 B5 3490 B5
3491 B4 3492 B4 3493 A6 3494 B5 3496 B5 3497 B5 3499 B5 3502 A6 3505 B6 3507 B6 3508 B6
3510 B6 3513 B3 3515 B4 3516 B2 3517 B4 3520 B2 3521 B2 3522 B2 3601 A1 3602 A1 3603 A1
3605 A1 3606 B1 3607 A1 3616 A5 3999 B6 4301 A1 4304 A1 4305 A1 4307 A2 4400 A4 4401 B4
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7326 B1 7336 B1 7337 B1 7403 B1 7404 B1 7405 B1 7407 B1 7408 B1 7409 B1 7410 B1 7411 B1
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7408 A6 7409 B4 7410 B4 7411 B4 7412 B4 7414 B4 7417 B4 7308 B5 7310 B5 7322 B5 7325 B5
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7412 B5 7414 B5 7417 B5 7308 B6 7310 B6 7322 B6 7325 B6 7326 B6 7336 B6 7337 B6 7403 B6
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7336 B8 7337 B8 7403 B8 7404 B8 7405 B8 7407 B8 7408 B8 7409 B8 7410 B8 7411 B8 7412 B8
7414 B8 7417 B8 7308 B9 7310 B9 7322 B9 7325 B9 7326 B9 7336 B9 7337 B9 7403 B9 7404 B9
7405 B9 7407 B9 7408 B9 7409 B9 7410 B9 7411 B9 7412 B9 7414 B9 7417 B9 7308 B10 7310 B10
7322 B10 7325 B10 7326 B10 7336 B10 7337 B10 7403 B10 7404 B10 7405 B10 7407 B10 7408 B10
7409 B10 7410 B10 7411 B10 7412 B10 7414 B10 7417 B10 7308 B11 7310 B11 7322 B11 7325 B11
7326 B11 7336 B11 7337 B11 7403 B11 7404 B11 7405 B11 7407 B11 7408 B11 7409 B11 7410 B11
7411 B11 7412 B11 7414 B11 7417 B11 7308 B12 7310 B12 7322 B12 7325 B12 7326 B12 7336 B12
7337 B12 7403 B12 7404 B12 7405 B12 7407 B12 7408 B12 7409 B12 7410 B12 7411 B12 7412 B12
7414 B12 7417 B12 7308 B13 7310 B13 7322 B13 7325 B13 7326 B13 7336 B13 7337 B13 7403 B13
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7308 B14 7310 B14 7322 B14 7325 B14 7326 B14 7336 B14 7337 B14 7403 B14 7404 B14 7405 B14
7407 B14 7408 B14 7409 B14 7410 B14 7411 B14 7412 B14 7414 B14 7417 B14 7308 B15 7310 B15
7322 B15 7325 B15 7326 B15 7336 B15 7337 B15 7403 B15 7404 B15 7405 B15 7407 B15 7408 B15
7409 B15 7410 B15 7411 B15 7412 B15 7414 B15 7417 B15 7308 B16 7310 B16 7322 B16 7325 B16
7326 B16 7336 B16 7337 B16 7403 B16 7404 B16 7405 B16 7407 B16 7408 B16 7409 B16 7410 B16
7411 B16 7412 B16 7414 B16 7417 B16 7308 B17 7310 B17 7322 B17 7325 B17 7326 B17 7336 B17
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7414 B17 7417 B17 7308 B18 7310 B18 7322 B18 7325 B18 7326 B18 7336 B18 7337 B18 7403 B18
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7409 B20 7410 B20 7411 B20 7412 B20 7414 B20 7417 B20 7308 B21 7310 B21 7322 B21 7325 B21
7326 B21 7336 B21 7337 B21 7403 B21 7404 B21 7405 B21 7407 B21 7408 B21 7409 B21 7410 B21
7411 B21 7412 B21 7414 B21 7417 B21 7308 B22 7310 B22 7322 B22 7325 B22 7326 B22 7336 B22
7337 B22 7403 B22 7404 B22 7405 B22 7407 B22 7408 B22 7409 B22 7410 B22 7411 B22 7412 B22
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7404 B28 7405 B28 7407 B28 7408 B28 7409 B28 7410 B28 7411 B28 7412 B28 7414 B28 7417 B28
7308 B29 7310 B29 7322 B29 7325 B29 7326 B29 7336 B29 7337 B29 7403 B29 7404 B29 7405 B29
7407 B29 7408 B29 7409 B29 7410 B29 7411 B29 7412 B29 7414 B29 7417 B29 7308 B30 7310 B30
7322 B30 7325 B30 7326 B30 7336 B30 7337 B30 7403 B30 7404 B30 7405 B30 7407 B30 7408 B30
7409 B30 7410 B30 7411 B30 7412 B30 7414 B30 7417 B30 7308 B31 7310 B31 7322 B31 7325 B31
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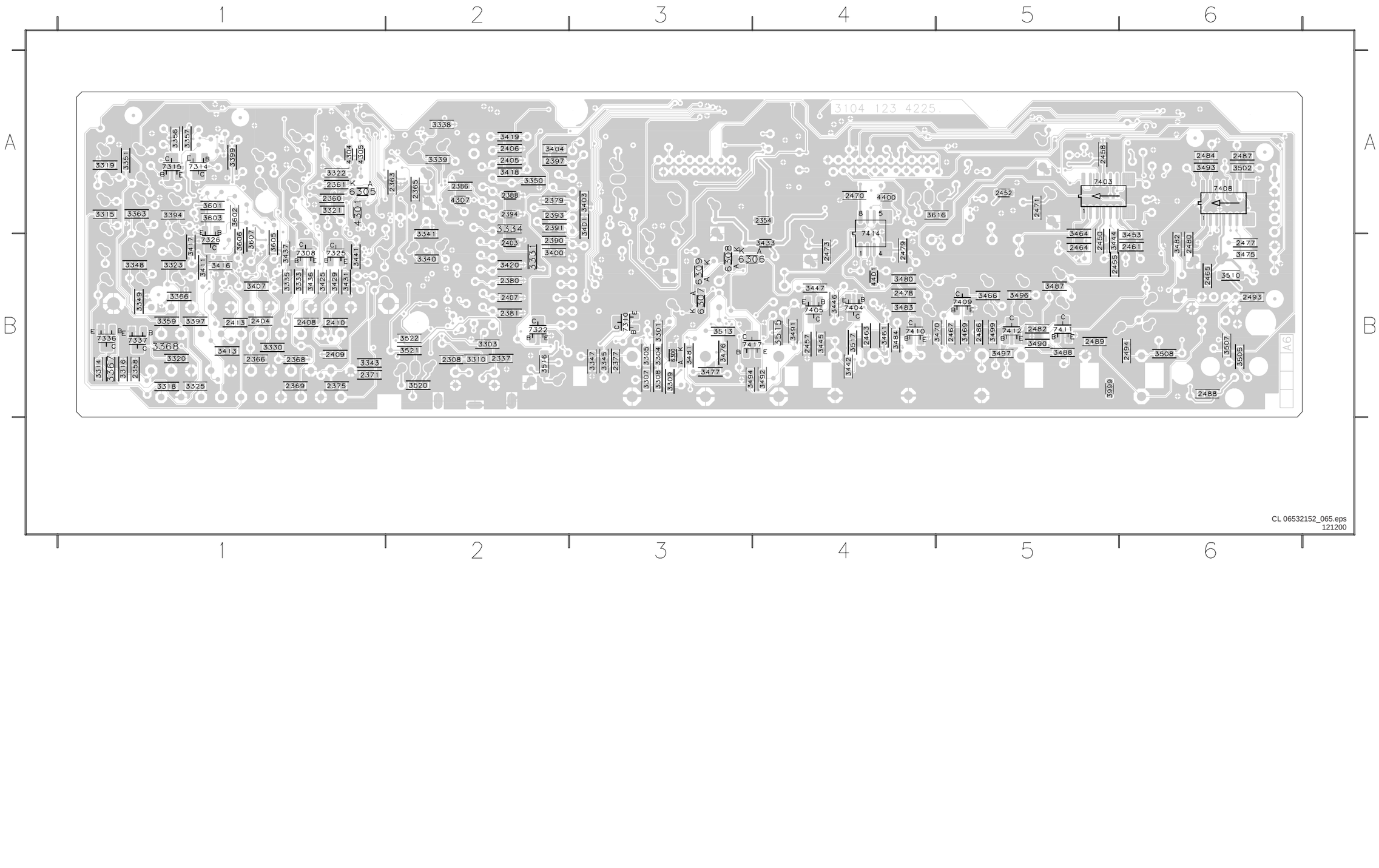
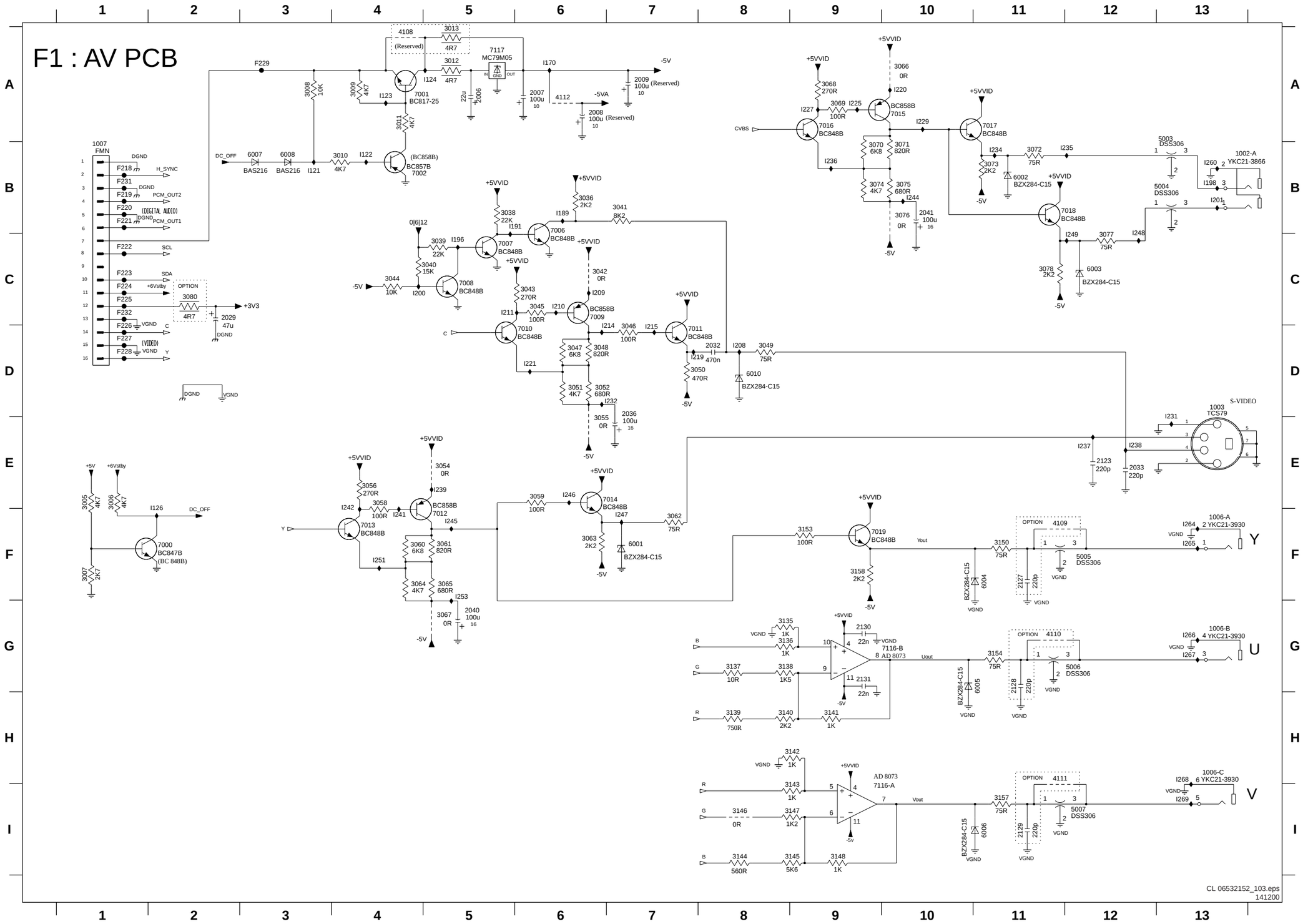


AV Board (US + AP): Video

F1 : AV PCB



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1006-B G13	7010 D6
1006-C H13	7011 D7
1007 B1	7012 F5
2006 A5	7013 F4
2007 A6	7014 E6
2008 A6	7015 A10
2009 A7	7016 A9
2029 C2	7017 A11
2032 D8	7018 B11
2033 E12	7019 F9
2036 D7	7116-A I9
2040 G5	7116-B G10
2041 B10	7117 A5
2123 E12	F218 B1
2127 F11	F219 B1
2128 G11	F220 B1
2129 I11	F221 B1
2130 G9	F222 C1
2131 G9	F223 C1
3005 E1	F224 C1
3006 E1	F225 C1
3007 F1	F226 D1
3008 A3	F227 D1
3009 A4	F228 D1
3010 B4	F229 A3
3011 A4	F231 B1
3012 A5	F232 C1
3013 A5	I121 B3
3036 B6	I122 B4
3038 B5	I123 A4
3039 C5	I124 A5
3040 C5	I126 E2
3041 B7	I170 A6
3042 C6	I189 B6
3043 C6	I191 B6
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3046 D7	I200 C4
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3055 E6	I219 D7
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3060 F4	I227 A9
3061 F5	I229 A10
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3063 F6	I232 D7
3064 F4	I234 B11
3065 F5	I235 B12
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3067 G5	I237 E12
3068 A9	I238 E12
3069 A9	I239 E5
3070 B9	I241 F4
3071 B10	I242 E4
3072 B11	I244 B10
3073 B11	I245 F5
3074 B9	I246 E6
3075 B10	I247 F7
3076 B10	I248 B12
3077 C12	I249 C12
3078 C11	I251 F4
3080 C2	I253 F5
3135 G8	I260 B13
3136 G8	I264 F13
3137 G8	I265 F13
3138 G8	I266 G13
3139 H8	I267 G13
3140 H8	I268 H13
3141 H9	I269 I13
3142 H9	
3143 I9	
3144 I8	
3145 I9	
3146 I8	
3147 I9	
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4112 A6	
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5007 I12	
6001 F7	
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6003 C12	
6004 F11	
6005 G11	
6006 I11	
6007 B3	
6008 B3	
6010 D8	
7000 F2	
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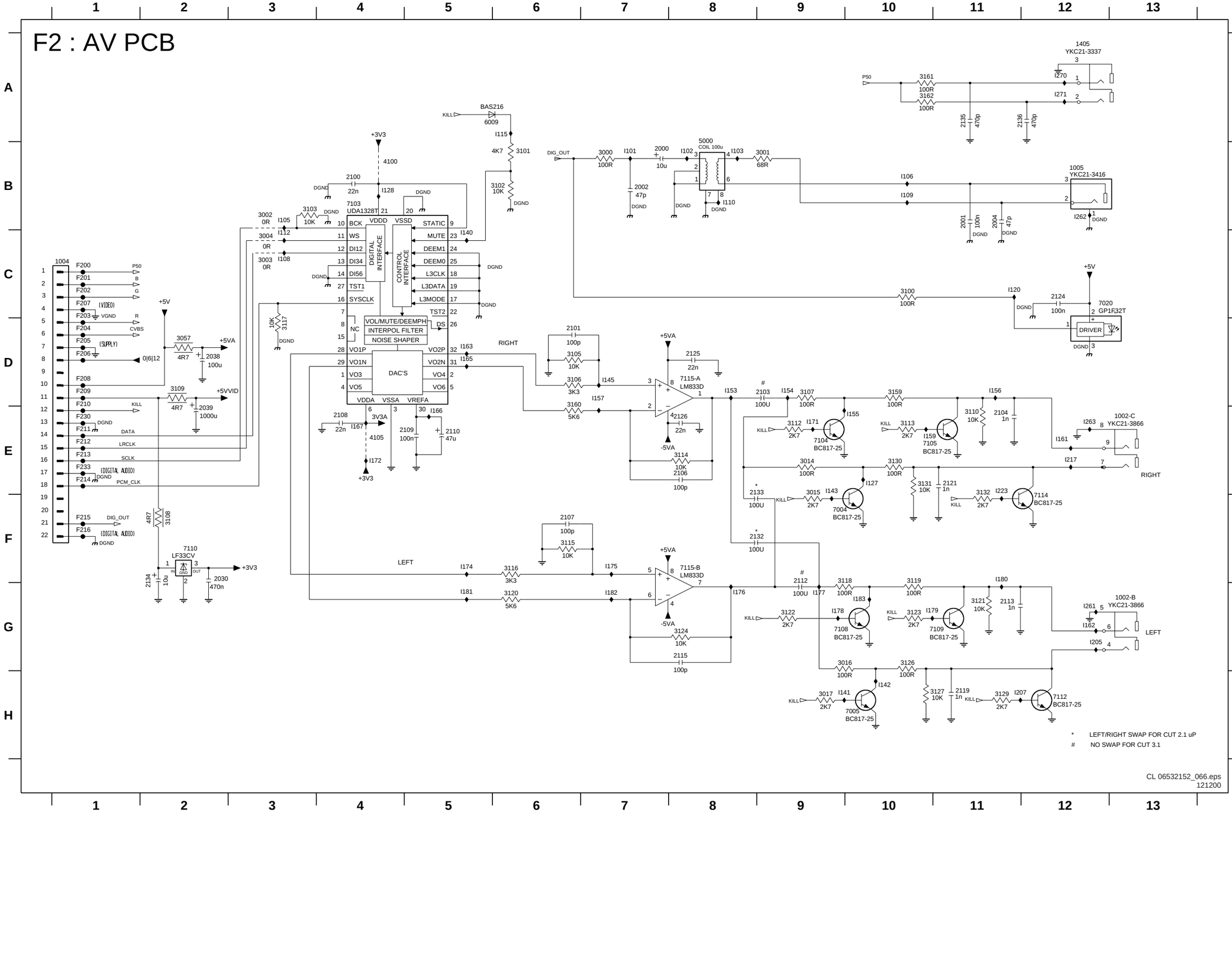
7006 B6	

AV Board (US + AP): Audio

F2 : AV PCB



Layout AV Board (US + AP) (top view)

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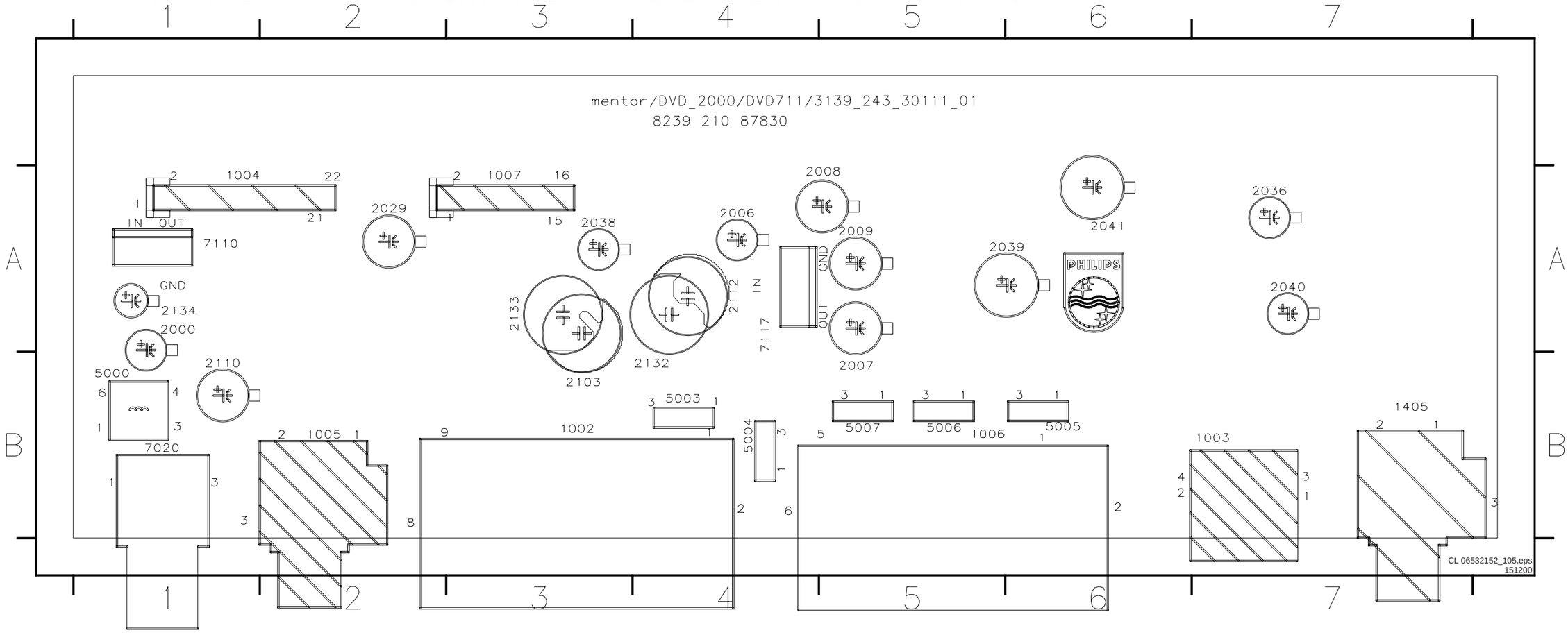

Layout AV Board (US + AP) (bottom view)

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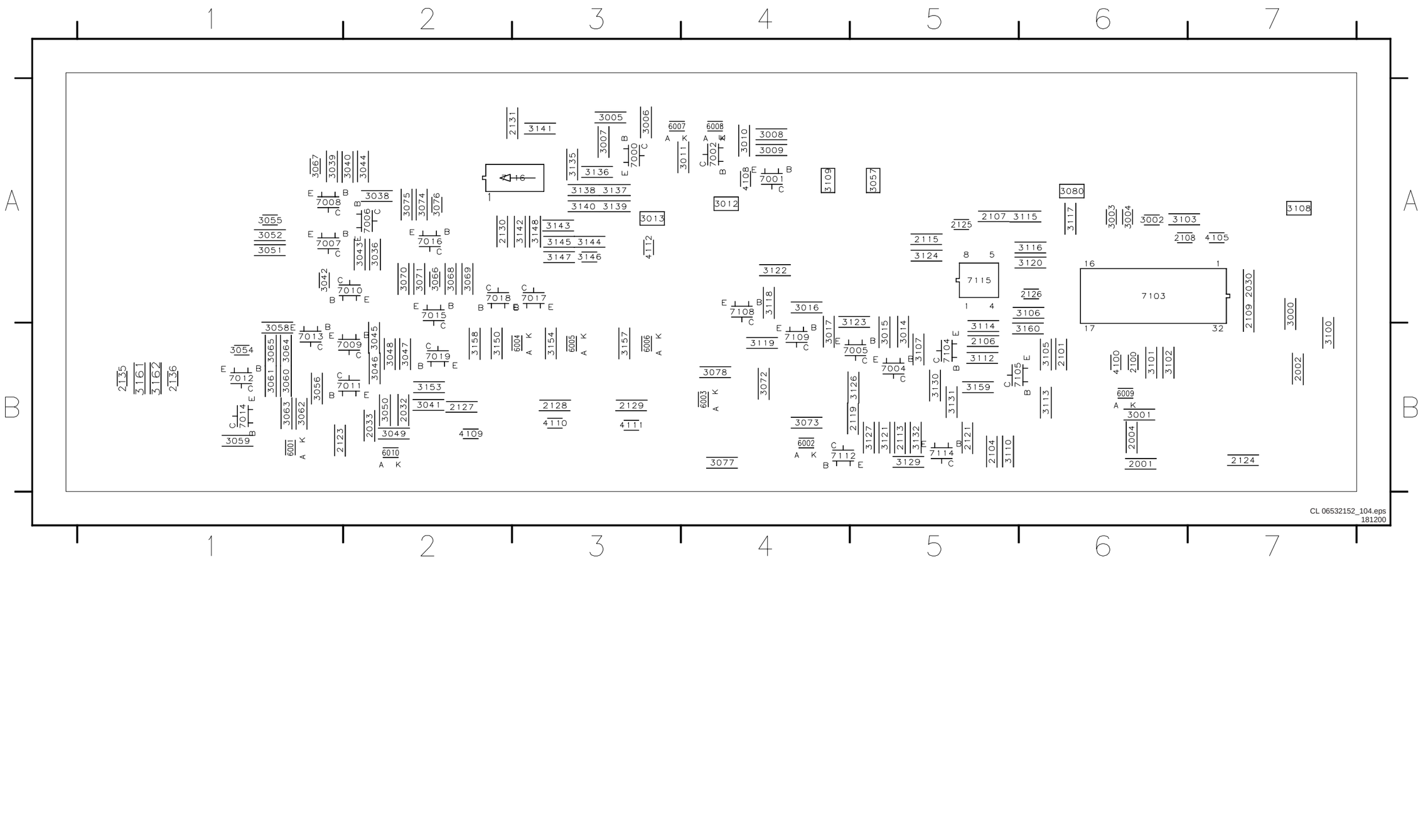
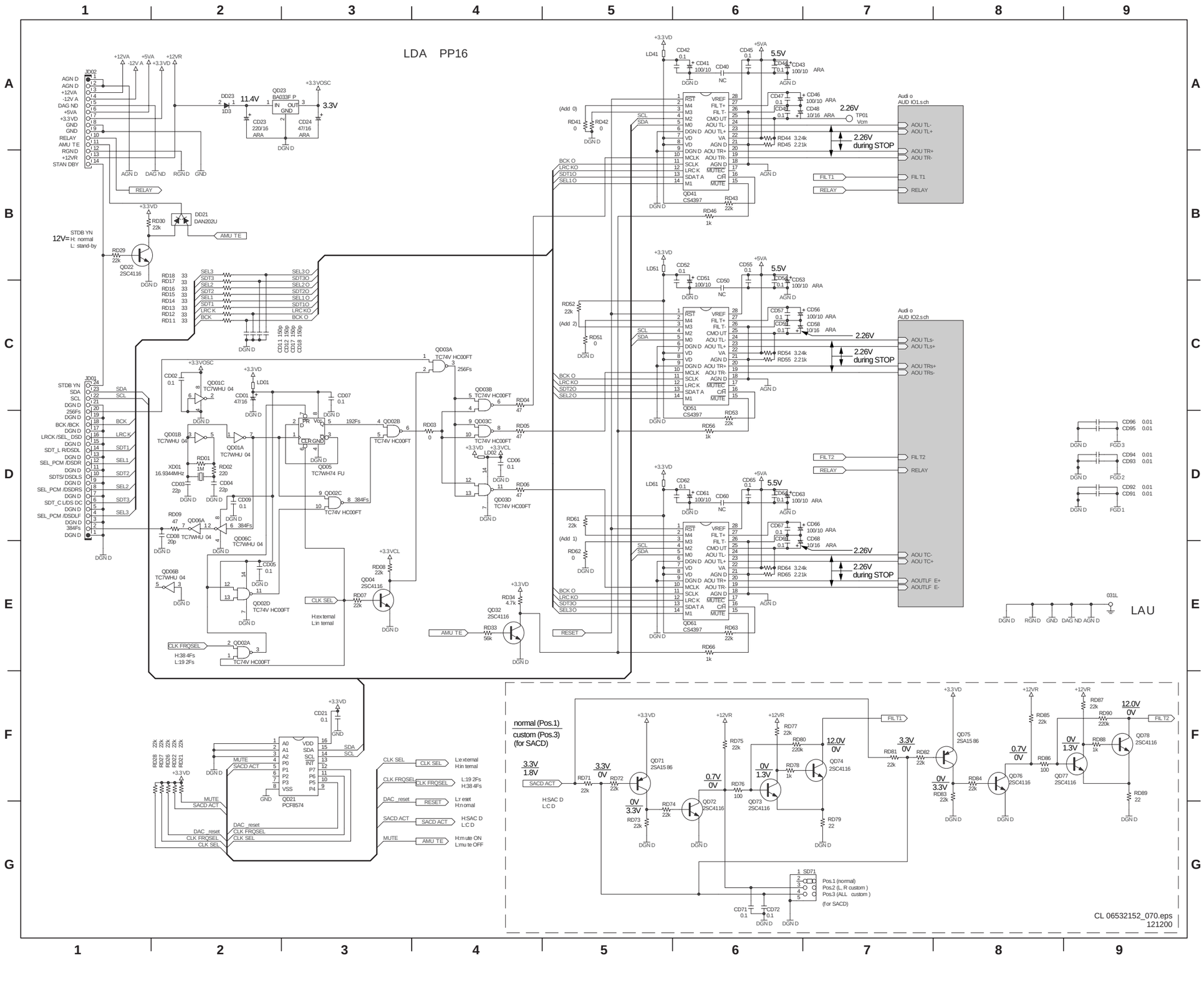
2002	B7	2115	A5	2136	B1	3012	A4	3044	A2	3058	B1	3071	A2	3105	B6	3119	B4	3136	A3	3150	B2	4110	B3	7000	A3	7014	B1	7115	A5
2004	B6	2119	B5	3000	A7	3013	A3	3045	B2	3059	B1	3072	B4	3106	A6	3120	A6	3137	A3	3153	B2	4111	B3	7001	A4	7015	A2	7116	A3
2030	A7	2121	B5	3001	B6	3014	B5	3046	B2	3060	B1	3073	B4	3107	B5	3121	B5	3138	A3	3154	B3	4112	A3	7002	A4	7016	A2		
2032	B2	2123	B1	3002	A6	3015	B5	3047	B2	3061	B1	3074	A2	3108	A7	3122	A4	3139	A3	3157	B3	6001	B1	7004	B5	7017	A3		
2033	B2	2124	B7	3003	A6	3016	A4	3048	B2	3062	B1	3075	A2	3109	A4	3123	A5	3140	A3	3158	B2	6002	B4	7005	B5	7018	A2		
2100	B6	2125	A5	3004	A6	3017	B4	3049	B2	3063	B1	3076	A2	3110	B5	3124	A5	3141	A3	3159	B5	6003	B4	7006	A2	7019	B2		
2101	B6	2126	A6	3005	A3	3036	A2	3050	B2	3064	B1	3077	B4	3112	B5	3126	B5	3142	A3	3160	B6	6004	B3	7007	A1	7103	A6		
2104	B5	2127	B2	3006	A3	3038	A2	3051	A1	3065	B1	3078	B4	3113	B6	3127	B5	3143	A3	3161	B1	6005	B3	7008	A1	7104	B5		
2106	B5	2128	B3	3007	A3	3039	A1	3052	A1	3066	A2	3080	A6	3114	B5	3129	B5	3144	A3	3162	B1	6006	B3	7009	B2	7105	B5		
2107	A5	2129	B3	3008	A4	3040	A2	3054	B1	3067	A1	3100	B7	3115	A6	3130	B5	3145	A3	4100	B6	6007	A3	7010	A2	7108	A4		
2108	A6	2130	A2	3009	A4	3041	B2	3055	A1	3068	A2	3101	B6	3116	A6	3131	B5	3146	A3	4105	A7	6008	A4	7011	B2	7109	B4		
2109	A7	2131	A3	3010	A4	3042	A1	3056	B1	3069	A2	3102	B6	3117	A6	3132	B5	3147	A3	4108	A4	6009	B6	7012	B1	7112	B4		



DAC-L2N

DAC-L2N

LDA PP16



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CD63	D6	RD90	F9
CD64	D6	SD71	G7
CD65	D6	XD01	D2
CD66	D6	031L	E9
CD67	D6		
CD68	D6		
CD69	D6		
CD71	G6		
CD72	G6		
CD91	D9		
CD92	D9		
CD93	D9		
CD94	D9		
CD95	D9		
CD96	D9		
DD21	B2		
DD23	A2		
JD01	C1		
JD02	A1		
LD01	C2		
LD02	D4		
LD41	A5		
LD51	B5		
LD61	D5		
QD01A	D2		
QD01B	D2		
QD01C	C2		
QD02A	E2		
QD02B	D3		
QD02C	D3		
QD02D	E2		
QD03A	C4		
QD03B	C4		
QD03C	D4		
QD03D	D4		
QD04	E3		
QD05	D3		
QD06A	D2		
QD06B	E2		
QD06C	D2		
QD21	F3		
QD22	B1		
QD23	A2		
QD32	E4		
QD41	B6		
QD51	C6		
QD61	E6		
QD71	F5		
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QD73	F6		
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QD77	F9		
QD78	F9		
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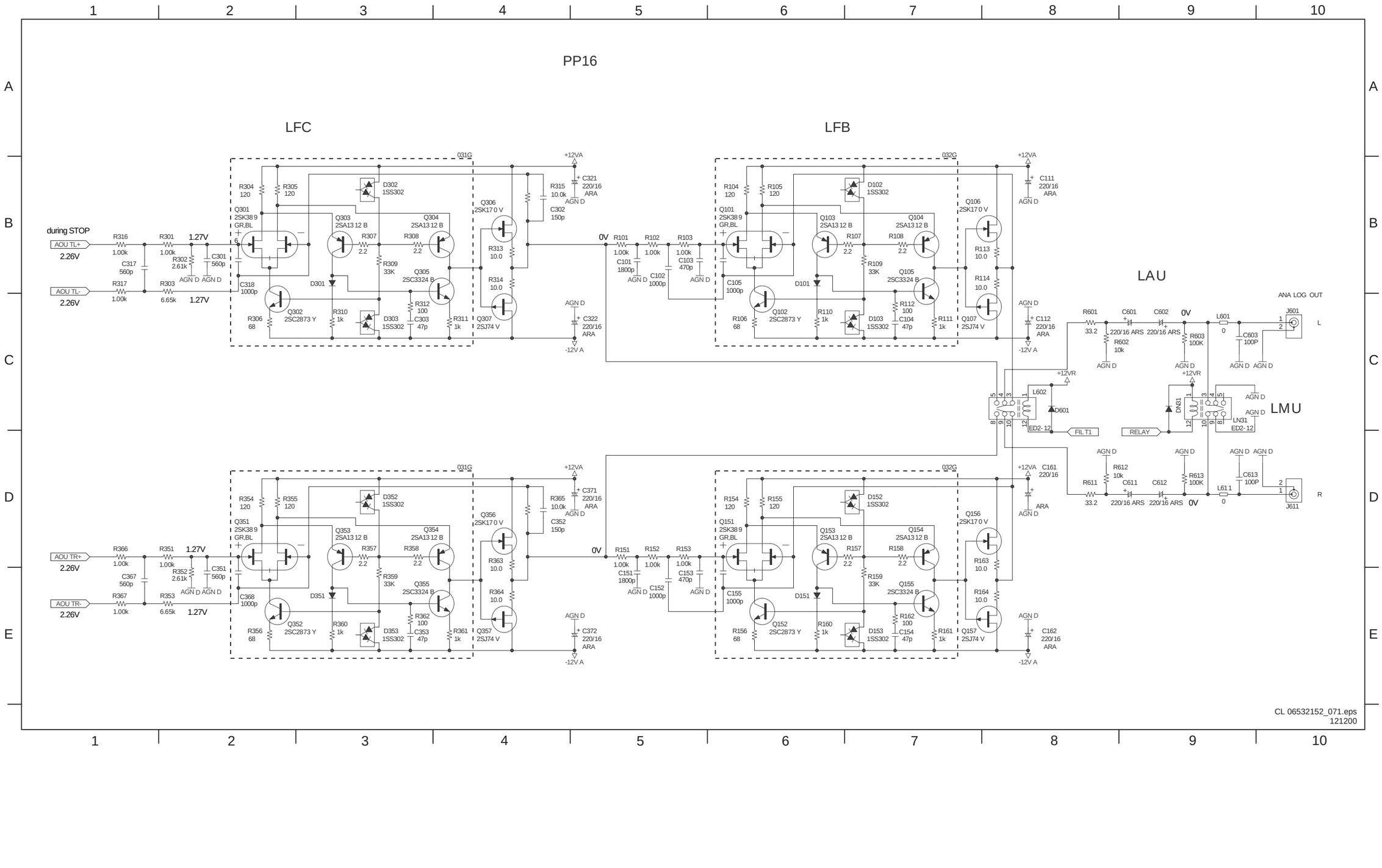
RD02	D2		
RD03	D4		
RD04	C4		
RD05	D4		
RD06	D4		
RD07	E3		
RD08	E3		
RD09	D2		
RD11	C2		
RD12	C2		
RD13	C2		
RD14	C2		
RD15	C2		
RD16	C2		
RD17	C2		
RD18	B2		
RD21	F2		
RD22	F2		
RD26	F2		
RD27	F2		
RD28	F2		
RD29	B1		
RD30	B1		

Audio1-L2N

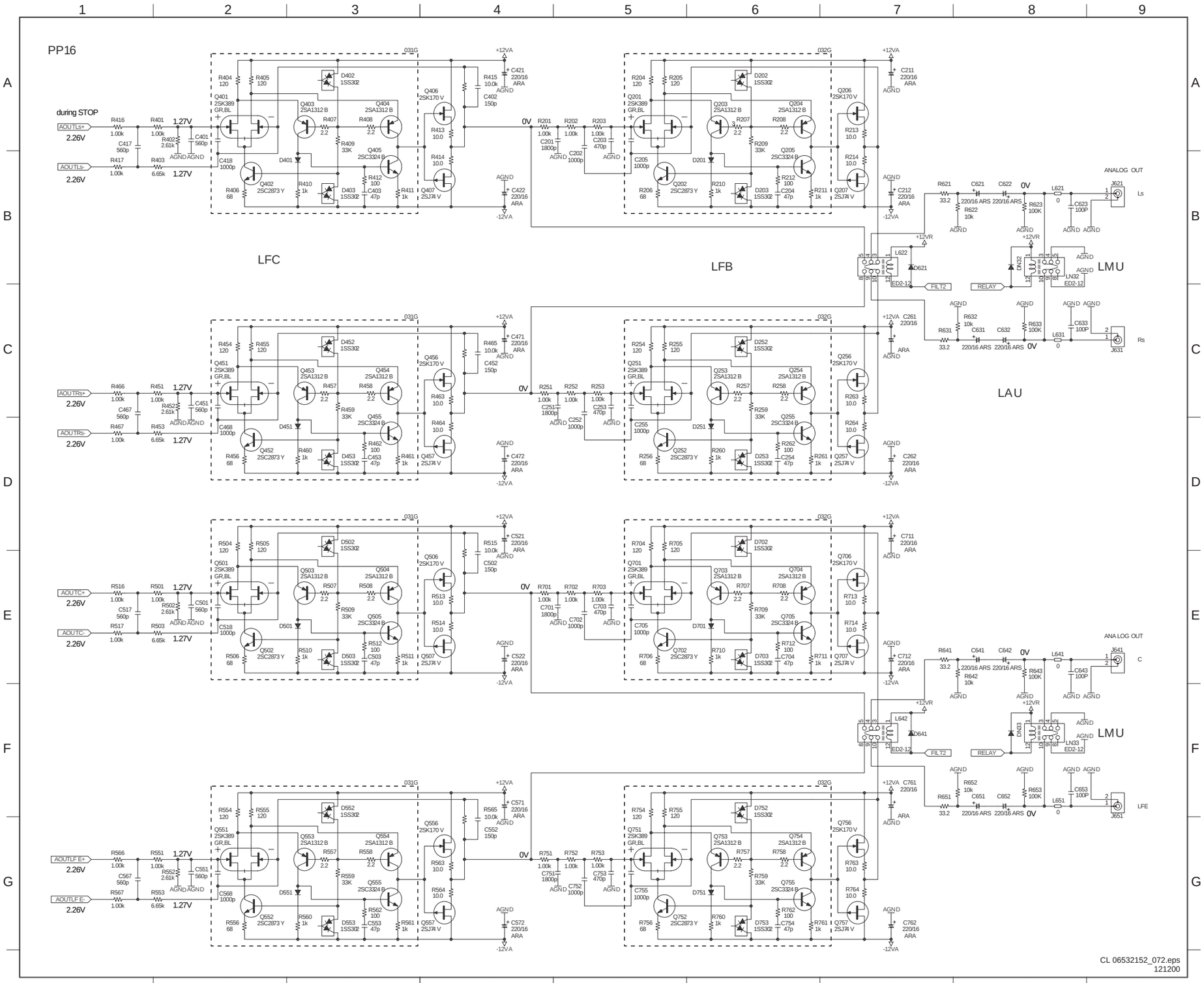
AUDIO1-L2N

C101	B5	C161	D8	C367	E1	D102	B7	J601	C10	Q107	B8	Q305	B4	R103	B5	R151	D5	R163	D8
C102	B5	C162	E8	C368	E2	D103	C7	J611	D10	Q151	D6	Q306	B4	R104	B6	R152	D5	R164	E8
C103	B5	C301	B2	C371	D5	D151	E6	LN31	C9	Q152	E6	Q307	C4	R105	B6	R153	D5	R301	B2
C104	C7	C302	B4	C372	E5	D152	D7	L601	C9	Q153	D6	Q351	D2	R106	C6	R154	D6	R302	B2
C105	B6	C303	C3	C601	C9	D153	E7	L602	C8	Q154	D7	Q352	E2	R107	B7	R155	D6	R303	B2
C111	B8	C317	B1	C602	C9	D301	B3	L611	D9	Q155	E7	Q353	D3	R108	B7	R156	E6	R304	B2
C112	C8	C318	B2	C603	C9	D302	B3	Q101	B6	Q156	D8	Q354	D4	R109	B7	R157	D7	R305	B2
C151	E5	C321	B5	C611	D9	D303	C3	Q102	C6	Q157	E7	Q355	E4	R110	C6	R158	D7	R306	C2
C152	E5	C322	C5	C612	D9	D351	E3	Q103	B6	Q301	B2	Q356	D4	R111	C7	R159	E7	R307	B3
C153	E5	C351	E2	C613	D9	D352	D3	Q104	B7	Q302	C2	Q357	E4	R112	C7	R160	E6	R308	B3
C154	E7	C352	D4	DN31	C9	D353	E3	Q105	B7	Q303	B3	R101	B5	R113	B8	R161	E7	R309	B3
C155	E6	C353	E3	D101	B6	D601	C8	Q106	B8	Q304	B4	R102	B5	R114	B8	R162	E7	R310	C3



Audio2-L2N

AUDIO2-L2N



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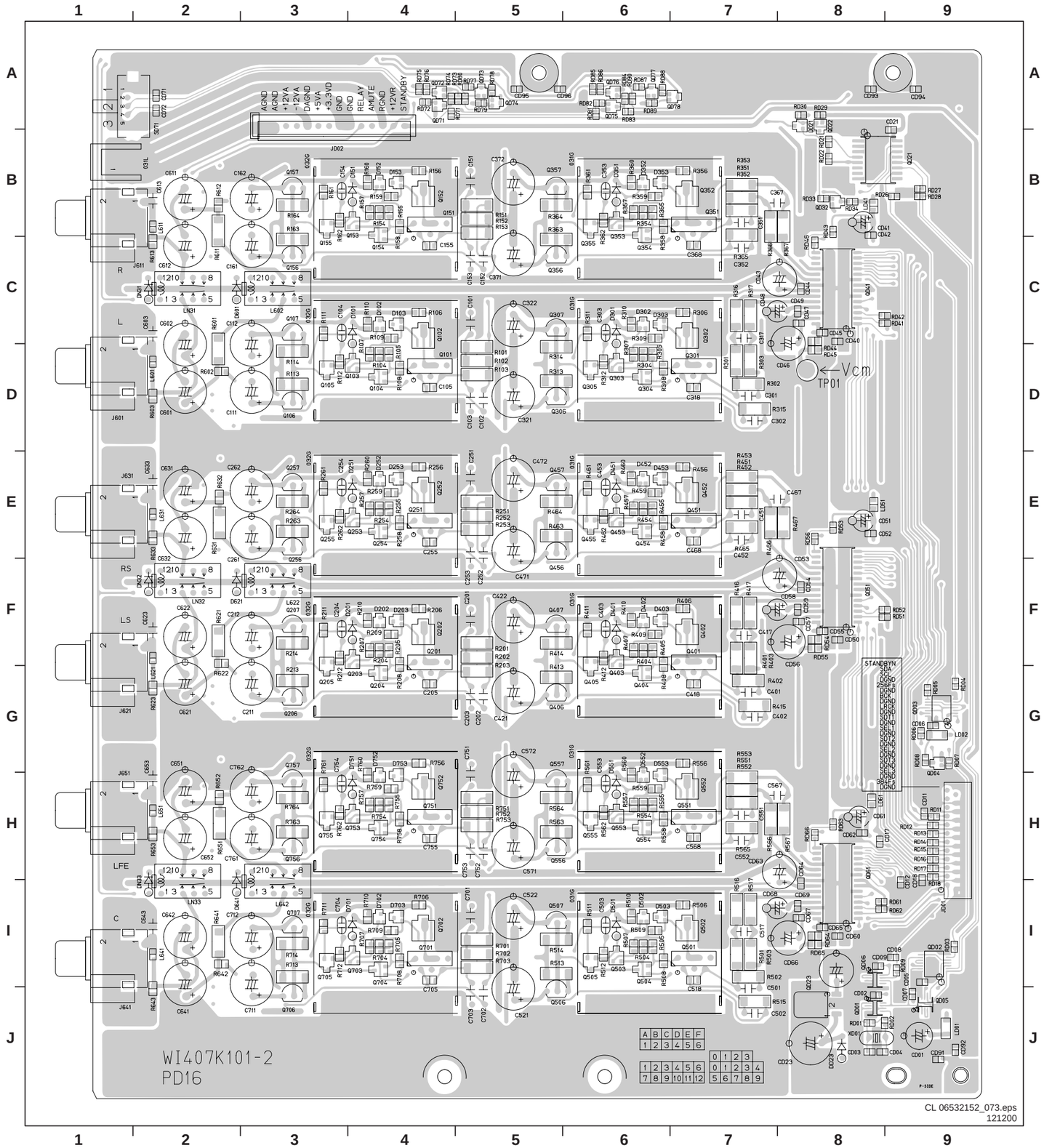
C202	A5	Q256	C7	R514	E4
C203	A5	Q257	D7	R515	E4
C204	B6	Q401	A2	R516	E1
C205	A5	Q402	B2	R517	E1
C211	A7	Q403	A3	R551	G2
C212	B7	Q404	A3	R552	G2
C251	C5	Q405	B3	R553	G2
C252	C5	Q406	A4	R554	F2
C253	C5	Q407	B4	R555	F2
C254	D6	Q451	C2	R556	G2
C255	C5	Q452	D2	R557	G3
C261	C7	Q453	C3	R558	G3
C262	D7	Q454	C3	R559	G3
C401	A2	Q455	D3	R560	G3
C402	A4	Q456	C4	R561	G3
C403	B3	Q457	D4	R562	G3
C417	A1	Q501	E2	R563	G4
C418	B2	Q502	E2	R564	G4
C421	A4	Q503	E3	R565	G4
C422	B4	Q504	E3	R566	G1
C451	C2	Q505	E3	R567	G1
C452	C4	Q506	E4	R621	B7
C453	D3	Q507	E4	R622	B8
C467	C1	Q551	G2	R623	B8
C468	D2	Q552	G2	R631	C7
C471	C4	Q553	G3	R632	C8
C472	D4	Q554	G3	R633	C8
C501	E2	Q555	G3	R641	E7
C502	E4	Q556	G4	R642	E8
C503	E3	Q557	G4	R643	E8
C517	E1	Q701	E5	R651	F7
C518	E2	Q702	E5	R652	F8
C521	D4	Q703	E6	R653	F8
C522	E4	Q704	E6	R701	E4
C551	G2	Q705	E6	R702	E5
C552	G4	Q706	E7	R703	E5
C553	G3	Q707	E7	R704	D5
C567	G1	Q751	G5	R705	D5
C568	G2	Q752	G5	R706	E5
C571	F4	Q753	G6	R707	E6
C572	G4	Q754	G6	R708	E6
C621	B8	Q755	G6	R709	E6
C622	B8	Q756	G7	R710	E6
C623	B8	Q757	G7	R711	E6
C631	C8	R201	A4	R712	E6
C632	C8	R202	A5	R713	E7
C633	C8	R203	A5	R714	E7
C641	E8	R204	A5	R751	G4
C642	E8	R205	A5	R752	G5
C643	E8	R206	B5	R753	G5
C651	F8	R207	A6	R754	F5
C652	F8	R208	A6	R755	F5
C653	F8	R209	A6	R756	G5
C701	E5	R210	B6	R757	G6
C702	E5	R211	B6	R758	G6
C703	E5	R212	B6	R759	G6
C704	E6	R213	A7	R760	G6
C705	E5	R214	B7	R761	G6
C711	D7	R251	C4	R762	G6
C712	E7	R252	C5	R763	G7
C751	G5	R253	C5	R764	G7
C752	G5	R254	C5		
C753	G5	R255	C5		
C754	G6	R256	D5		
C755	G5	R257	C6		
C761	F7	R258	C6		
C762	G7	R259	C6		
DN32	B8	R260	D6		
DN33	F8	R261	D6		
D201	B6	R262	D6		
D202	A6	R263	C7		
D203	B6	R264	D7		
D251	D6	R401	A2		
D252	C6	R402	A2		
D253	D6	R403	B2		
D401	B3	R404	B2		
D402	A3	R405	B2		
D403	B3	R406	B2		
D451	D3	R407	A3		
D452	C3	R408	A3		
D453	D3	R409	A3		
D501	E3	R410	B3		
D502	D3	R411	B3		
D503	E3	R412	B3		
D551	G3	R413	A4		
D552	F3	R414	B4		
D553	G3	R415	A4		
D621	B7	R416	A1		
D641	F7	R417	B1		
D701	E6	R451	C2		
D702	D6	R452	C2		
D703	E6	R453	C2		
D751	G6	R454	C2		
D752	F6	R455	C2		
D753	G6	R456	D2		
J621	B9	R457	C3		
J631	C9	R458	C3		
J641	E9	R459	C3		
J651	F9	R460	D3		
LN32	B8	R461	D3		
LN33	F8	R462	D3		
L621	B8	R463	C4		
L622	B7	R464	D4		
L631	C8	R465	C4		
L641	E8	R466	C1		
L642	F7	R467	D1		
L651	F8	R501	E2		
Q201	A5	R502	E2		
Q202	B5	R503	E2		
Q203	A6	R504	D2		
Q204	A6	R505	D2		
Q205	B6	R506	E2		
Q206	A7	R507	E3		
Q207	B7	R508	E3		
Q251	C5	R509	E3		
Q252	D5	R510	E3		
Q253	C6	R511	E3		
Q254	C6	R512	E3		

Layout DAC board (top view)



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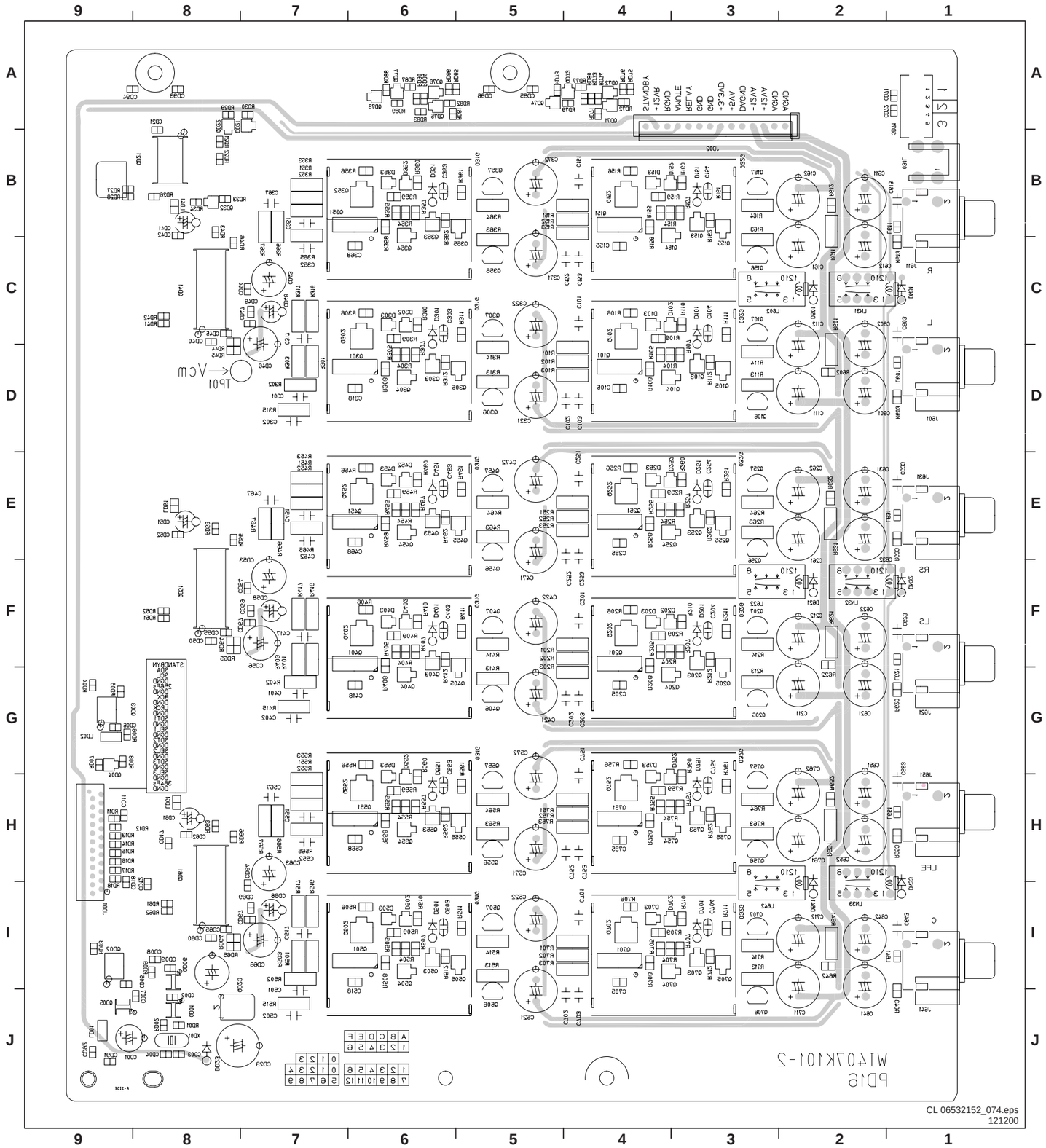
CD02	J8	C602	C2	Q104	D4	RD66	H8	R414	F5
CD03	J8	C603	C2	Q105	D3	RD71	A4	R415	G7
CD04	J9	C611	B2	Q106	D3	RD72	A4	R416	F7
CD05	I9	C612	C2	Q107	C3	RD73	A4	R417	F7
CD06	G9	C613	B2	Q151	B4	RD74	A4	R451	E7
CD07	J9	C621	G2	Q152	B4	RD75	A4	R452	E7
CD08	I9	C622	F2	Q153	B3	RD76	A4	R453	E7
CD09	I8	C623	F2	Q154	B4	RD77	A5	R454	E6
CD11	I9	C631	E2	Q155	B3	RD78	A5	R455	E6
CD12	I9	C632	E2	Q156	C3	RD79	A5	R456	E7
CD17	H8	C633	E2	Q157	B3	RD80	A5	R457	E6
CD18	I9	C641	J2	Q201	F4	RD81	A6	R458	E6
CD21	A9	C642	I2	Q202	F4	RD82	A6	R459	E6
CD23	J8	C643	I2	Q203	F4	RD83	A6	R460	E6
CD24	I8	C651	H2	Q204	F4	RD84	A6	R461	E6
CD40	C8	C652	H2	Q205	G3	RD85	A6	R462	E6
CD41	B8	C653	H2	Q206	G3	RD86	A6	R463	E5
CD42	B8	C701	I5	Q207	F3	RD87	A6	R464	E5
CD43	C7	C702	J5	Q251	E4	RD88	A6	R465	E7
CD44	C8	C703	J5	Q252	E4	RD89	A6	R466	E7
CD45	C8	C704	I3	Q253	E4	RD90	A6	R467	E8
CD46	D8	C705	I4	Q254	E4	RD101	D5	R501	I7
CD47	C8	C711	J3	Q255	E3	RD102	D5	R502	I7
CD48	C7	C712	I3	Q256	E3	RD103	D5	R503	I7
CD49	C8	C751	G5	Q257	E3	RD104	D4	R504	I6
CD50	F8	C752	H5	Q301	D7	RD105	D4	R505	I6
CD51	E8	C753	H5	Q302	C7	RD106	C4	R506	I7
CD52	E8	C754	G3	Q303	D6	RD107	D4	R507	I6
CD53	F8	C755	H4	Q304	D6	RD108	D4	R508	I6
CD54	F8	C761	H2	Q305	D6	RD109	C4	R509	I6
CD55	F8	C762	G2	Q306	D5	RD110	C4	R510	I6
CD56	F8	DD21	A8	Q307	C5	RD111	C3	R511	I6
CD57	F8	DD23	J8	Q351	B7	RD112	D3	R512	I6
CD58	F8	DN31	C2	Q352	B7	RD113	D3	R513	I5
CD59	F8	DN32	F2	Q353	B6	RD114	D3	R514	I5
CD60	I8	DN33	H2	Q354	B6	RD151	B5	R515	J7
CD61	H8	D101	C4	Q355	B6	RD152	B5	R516	I7
CD62	H8	D102	C4	Q356	C5	RD153	B5	R517	I7
CD63	H7	D103	C4	Q357	B5	RD154	B4	R551	H7
CD64	H8	D151	B4	Q401	F7	RD155	B4	R552	H7
CD65	I8	D152	B4	Q402	F7	RD156	B4	R553	H7
CD66	I8	D153	B4	Q403	G6	RD157	B4	R554	H6
CD67	I8	D201	F3	Q404	G6	RD158	B4	R555	H6
CD68	I7	D202	F4	Q405	G6	RD159	B4	R556	G7
CD69	I8	D203	F4	Q406	G5	RD160	B4	R557	H6
CD71	A2	D251	E4	Q407	F5	RD161	B3	R558	H6
CD72	A2	D252	E4	Q451	E7	RD162	B3	R559	H6
CD91	J9	D253	E4	Q452	E7	RD163	B3	R560	G6
CD92	J9	D301	C6	Q453	E6	RD164	B3	R561	H6
CD93	A8	D302	C6	Q454	E6	RD201	F5	R562	H6
CD94	A9	D303	C6	Q455	E6	RD202	F5	R563	H5
CD95	A5	D351	B6	Q456	F5	RD203	F5	R564	H5
CD96	A5	D352	B6	Q457	E5	RD204	F4	R565	H7
C101	C5	D353	B6	Q501	I7	RD205	F4	R566	H7
C102	D5	D401	F6	Q502	I7	RD206	F4	R567	H8
C103	D5	D402	F6	Q503	I6	RD207	F4	R601	C2
C104	C3	D403	F6	Q504	I6	RD208	F4	R602	D2
C105	D4	D451	E6	Q505	I6	RD209	F4	R603	D2
C111	D2	D452	E6	Q506	J5	RD210	F4	R611	C2
C112	C2	D453	E6	Q507	I5	RD211	F3	R612	B2
C151	B5	D501	I6	Q551	H7	RD212	F3	R613	C2
C152	C5	D502	I6	Q552	H7	RD213	F3	R621	F2
C153	C5	D503	I6	Q553	H6	RD214	F3	R622	F2
C154	B3	D551	G6	Q554	H6	RD251	E5	R623	G2
C155	C4	D552	G6	Q555	H6	RD252	E5	R631	E2
C161	C2	D553	G6	Q556	H5	RD253	E5	R632	E2
C162	B2	D601	C2	Q557	G5	RD254	E4	R633	E2
C201	F5	D621	F2	Q701	I4	RD255	E4	R641	I2
C202	G5	D641	I2	Q702	I4	RD256	E4	R642	I2
C203	G5	D701	I4	Q703	I4	RD257	E4	R643	J2
C204	F3	D702	I4	Q704	I4	RD258	E4	R651	H2
C205	G4	D703	I4	Q705	I3	RD259	E4	R652	H2
C211	G3	D751	G4	Q706	J3	RD260	E4	R653	H2
C212	F2	D752	G4	Q707	I3	RD261	E3	R701	I5
C251	E5	D753	G4	Q751	H4	RD262	E3	R702	I5
C252	F5	JD01	I9	Q752	H4	RD263	E3	R703	I5
C253	F5	JD02	A3	Q753	H4	RD264	E3	R704	I4
C254	E3	J601	D1	Q754	H4	RD301	D7	R705	I4
C255	E4	J611	C2	Q755	H3	RD302	D7	R706	I4
C261	E2	J621	G2	Q756	H3	RD303	D7	R707	I4
C262	E2	J631	E1	Q757	H3	RD304	D6	R708	I4
C301	D7	J641	J1	RD01	J8	RD305	D6	R709	I4
C302	D7	J651	H1	RD02	J9	RD306	C7	R710	I4
C303	C6	LD01	J9	RD03	I9	RD307	D6	R711	I3
C317	C7	LD02	G9	RD04	G9	RD308	D6	R712	I3
C318	D7	LD41	B8	RD05	G9	RD309	C6	R713	I3
C321	D5	LD51	E8	RD06	G9	RD310	C6	R714	I3
C322	C5	LD61	H8	RD07	G9	RD311	C6	R751	H5
C351	B7	LN31	C2	RD08	G9	RD312	D6	R752	H5
C352	C7	LN32	F2	RD09	I9	RD313	D5	R753	H5
C353	B6	LN33	H2	RD11	H9	RD314	D5	R754	H4
C367	B7	L601	D2	RD12	H9	RD315	D7	R755	H4
C368	C7	L602	C3	RD13	H9	RD316	C7	R756	G4
C371	C5	L611	B2	RD14	H9	RD317	C7	R757	H4
C372	B5	L621	G2	RD15	H9	RD351	B7	R758	H4
C401	G7	L622	F2	RD16	H9	RD352	B7	R759	H4
C402	G7	L631	E2	RD17	H9	RD353	B7	R760	G4
C403	F6	L641	I2	RD18	H9	RD354	B6	R761	H3
C417	F7	L642	I3	RD21	B8	RD355	B6	R762	H3
C418	G7	L651	H2	RD22	B8	RD356	B7	R763	H3
C421	G5	QD01	J8	RD26	B9	RD357	B6	R764	H3
C422	F5	QD02	I9	RD27	B9	RD358	B6	SD71	A2
C451	E7	QD03	G9	RD28	B9	RD359	B6	XD01	J8
C452	E7	QD04	G9	RD29	A8	RD360	B6	031L	B2
C453	E6	QD05	J9	RD30	A8	RD361	B6		
C467	E8	QD06	I8	RD33	B8	RD362	B6		
C468	E7	QD21	B9	RD34	B8	RD363	B5		
C471	F5	QD22	A8	RD41	C9	RD364	B5		
C472	E5	QD23	J8	RD42	C9	R365	C7		
C501	J7	QD32	B8	RD43	B8	R366	C7		
C502	J7	QD41	C8	RD44	D8	R367	C8		
C503	I6	QD51	F8	RD45	D8	R401	F7		
C517	I7	QD61	H8	RD46	C8	R402	G7		
C518	I7	QD71	A4	RD51	F9	R403	F7		
C521	J5	QD72	A4	RD52	F9	R404	F6		
C522	I5	QD73	A5	RD53	E8	R405	F6		
C551	H7	QD74	A5	RD54	F8	R406	F7		
C552	H7	QD75	A6	RD55	F8	R407	F6		
C553	G6	QD76	A6	RD56	E8	R408	F6		
C567	H7	QD77	A6	RD61	I9	R409	F6		
C568	H7	QD78	A6	RD62	I9	R410	F6		
C571	H5	Q101	D4	RD63	H8	R411	F6		
C572	G5	Q102	C4	RD64	I8	R412	F6		

Layout DAC board (Bottom view)



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CD02	J8	C602	C2	Q104	D4	RD66	H8	R414	F5
CD03	J8	C603	C2	Q105	D3	RD71	A4	R415	G7
CD04	J9	C611	B2	Q106	D3	RD72	A4	R416	F7
CD05	I9	C612	C2	Q107	C3	RD73	A4	R417	F7
CD06	G9	C613	B2	Q151	B4	RD74	A4	R451	E7
CD07	J9	C621	G2	Q152	B4	RD75	A4	R452	E7
CD08	I9	C622	F2	Q153	B3	RD76	A4	R453	E7
CD09	I8	C623	F2	Q154	B4	RD77	A5	R454	E6
CD11	I9	C631	E2	Q155	B3	RD78	A5	R455	E6
CD12	I9	C632	E2	Q156	C3	RD79	A5	R456	E7
CD17	H8	C633	E2	Q157	B3	RD80	A5	R457	E6
CD18	I9	C641	J2	Q201	F4	RD81	A6	R458	E6
CD21	A9	C642	I2	Q202	F4	RD82	A6	R459	E6
CD23	J8	C643	I2	Q203	F4	RD83	A6	R460	E6
CD24	I8	C651	H2	Q204	F4	RD84	A6	R461	E6
CD40	C8	C652	H2	Q205	G3	RD85	A6	R462	E6
CD41	B8	C653	H2	Q206	G3	RD86	A6	R463	E5
CD42	B8	C701	I5	Q207	F3	RD87	A6	R464	E5
CD43	C7	C702	J5	Q251	E4	RD88	A6	R465	E7
CD44	C8	C703	J5	Q252	E4	RD89	A6	R466	E7
CD45	C8	C704	I3	Q253	E4	RD90	A6	R467	E8
CD46	D8	C705	I4	Q254	E4	R101	D5	R501	I7
CD47	C8	C711	J3	Q255	E3	R102	D5	R502	I7
CD48	C7	C712	I3	Q256	E3	R103	D5	R503	I7
CD49	C8	C751	G5	Q257	E3	R104	D4	R504	I6
CD50	F8	C752	H5	Q301	D7	R105	D4	R505	I6
CD51	E8	C753	H5	Q302	C7	R106	C4	R506	I7
CD52	E8	C754	G3	Q303	D6	R107	D4	R507	I6
CD53	F8	C755	H4	Q304	D6	R108	D4	R508	I6
CD54	F8	C761	H2	Q305	D6	R109	C4	R509	I6
CD55	F8	C762	G2	Q306	D5	R110	C4	R510	I6
CD56	F8	DD21	A8	Q307	C5	R111	C3	R511	I6
CD57	F8	DD23	J8	Q351	B7	R112	D3	R512	I6
CD58	F8	DN31	C2	Q352	B7	R113	D3	R513	I5
CD59	F8	DN32	F2	Q353	B6	R114	D3	R514	I5
CD60	I8	DN33	H2	Q354	B6	R151	B5	R515	J7
CD61	H8	D101	C4	Q355	B6	R152	B5	R516	I7
CD62	H8	D102	C4	Q356	C5	R153	B5	R517	I7
CD63	H7	D103	C4	Q357	B5	R154	B4	R551	H7
CD64	H8	D151	B4	Q401	F7	R155	B4	R552	H7
CD65	I8	D152	B4	Q402	F7	R156	B4	R553	H7
CD66	I8	D153	B4	Q403	G6	R157	B4	R554	H6
CD67	I8	D201	F3	Q404	G6	R158	B4	R555	H6
CD68	I7	D202	F4	Q405	G6	R159	B4	R556	G7
CD69	I8	D203	F4	Q406	G5	R160	B4	R557	H6
CD71	A2	D251	E4	Q407	F5	R161	B3	R558	H6
CD72	A2	D252	E4	Q451	E7	R162	B3	R559	H6
CD91	J9	D253	E4	Q452	E7	R163	B3	R560	G6
CD92	J9	D301	C6	Q453	E6	R164	B3	R561	H6
CD93	A8	D302	C6	Q454	E6	R201	F5	R562	H6
CD94	A9	D303	C6	Q455	E6	R202	F5	R563	H5
CD95	A5	D351	B6	Q456	F5	R203	F5	R564	H5
CD96	A5	D352	B6	Q457	E5	R204	F4	R565	H7
C101	C5	D353	B6	Q501	I7	R205	F4	R566	H7
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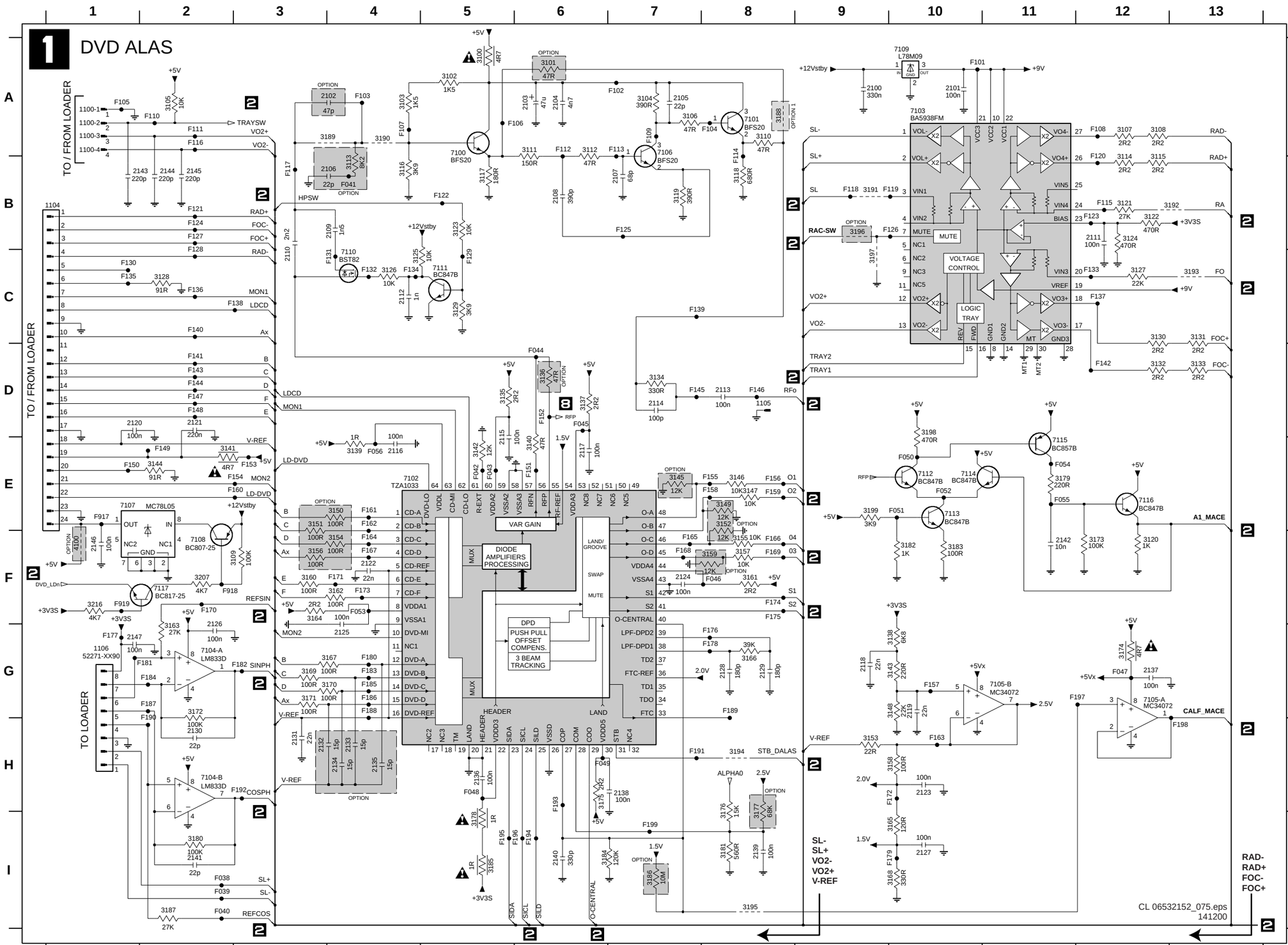
C105	D4	D451	E6	Q505	I6	R209	F4	R603	D2
C111	D2	D452	E6	Q506	J5	R210	F4	R611	C2
C112	C2	D453	E6	Q507	I5	R211	F3	R612	B2
C151	B5	D501	I6	Q551	H7	R212	F3	R613	C2
C152	C5	D502	I6	Q552	H7	R213	F3	R621	F2
C153	C5	D503	I6	Q553	H6	R214	F3	R622	F2
C154	B3	D551	G6	Q554	H6	R251	E5	R623	G2
C155	C4	D552	G6	Q555	H6	R252	E5	R631	E2
C161	C2	D553	G6	Q556	H5	R253	E5	R632	E2
C162	B2	D601	C2	Q557	G5	R254	E4	R633	E2
C201	F5	D621	F2	Q701	I4	R255	E4	R641	I2
C202	G5	D641	I2	Q702	I4	R256	E4	R642	I2
C203	G5	D701	I4	Q703	I4	R257	E4	R643	J2
C204	F3	D702	I4	Q704	I4	R258	E4	R651	H2
C205	G4	D703	I4	Q705	I3	R259	E4	R652	H2
C211	G3	D751	G4	Q706	J3	R260	E4	R653	H2
C212	F2	D752	G4	Q707	I3	R261	E3	R701	I5
C251	E5	D753	G4	Q751	H4	R262	E3	R702	I5
C252	F5	JD01	I9	Q752	H4	R263	E3	R703	I5
C253	F5	JD02	A3	Q753	H4	R264	E3	R704	I4
C254	E3	J601	D1	Q754	H4	R301	D7	R705	I4
C255	E4	J611	C2	Q755	H3	R302	D7	R706	I4
C261	E2	J621	G2	Q756	H3	R303	D7	R707	I4
C262	E2	J631	E1	Q757	H3	R304	D6	R708	I4
C301	D7	J641	J1	RD01	J8	R305	D6	R709	I4
C302	D7	J651	H1	RD02	J9	R306	C7	R710	I4
C303	C6	LD01	J9	RD03	I9	R307	D6	R711	I3
C317	C7	LD02	G9	RD04	G9	R308	D6	R712	I3
C318	D7	LD41	B8	RD05	G9	R309	C6	R713	I3
C321	D5	LD51	E8	RD06	G9	R310	C6	R714	I3
C322	C5	LD61	H8	RD07	G9	R311	C6	R751	H5
C351	B7	LN31	C2	RD08	G9	R312	D6	R752	H5
C352	C7	LN32	F2	RD09	I9	R313	D5	R753	H5
C353	B6	LN33	H2	RD11	H9	R314	D5	R754	H4
C367	B7	L601	D2	RD12	H9	R315	D7	R755	H4
C368	C7	L602	C3	RD13	H9	R316	C7	R756	G4
C371	C5	L611	B2	RD14	H9	R317	C7	R757	H4
C372	B5	L621	G2	RD15	H9	R351	B7	R758	H4
C401	G7	L622	F2	RD16	H9	R352	B7	R759	H4
C402	G7	L631	E2	RD17	H9	R353	B7	R760	G4
C403	F6	L641	I2	RD18	H9	R354	B6	R761	H3
C417	F7	L642	I3	RD21	B8	R355	B6	R762	H3
C418	G7	L651	H2	RD22	B8	R356	B7	R763	H3
C421	G5	QD01	J8	RD26	B9	R357	B6	R764	H3
C422	F5	QD02	I9	RD27	B9	R358	B6	SD71	A2
C451	E7	QD03	G9	RD28	B9	R359	B6	XD01	J8
C452	E7	QD04	G9	RD29	A8	R360	B6	031L	B2
C453	E6	QD05	J9	RD30	A8	R361	B6		
C467	E8	QD06	I8	RD33	B8	R362	B6		
C468	E7	QD21	B9	RD34	B8	R363	B5		
C471	F5	QD22	A8	RD41	C9	R364	B5		
C472	E5	QD23	J8	RD42	C9	R365	C7		
C501	J7	QD32	B8	RD43	B8	R366	C7		
C502	J7	QD41	C8	RD44	D8	R367	C8		
C503	I6	QD51	F8	RD45	D8	R401	F7		
C517	I7	QD61	H8	RD46	C8	R402	G7		
C518	I7	QD71	A4	RD51	F9	R403	F7		
C521	J5	QD72	A4	RD52	F9	R404	F6		
C522	I5	QD73	A5	RD53	E8	R405	F6		
C551	H7	QD74	A5	RD54	F8	R406	F7		
C552	H7	QD75	A6	RD55	F8	R407	F6		
C553	G6	QD76	A6	RD56	E8	R408	F6		
C567	H7	QD77	A6	RD61	I9	R409	F6		
C568	H7	QD78	A6	RD62	I9	R410	F6		
C571	H5	Q101	D4	RD63	H8	R411	F6		
C572	G5	Q102	C4	RD64	I8	R412	F6		

Mono board: DVD ALAS



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1100-2 A1	3163 G2	F139 C7
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1105 D8	3167 G4	F143 D2
1106 G1	3168 I10	F144 D2
2100 A9	3169 G3	F145 D7
2101 A10	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 I10
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
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2147 G1	7111 C5	F192 H3
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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	F917 E1
3108 A12	F040 I2	F918 F2
3109 F2	F041 B4	F919 F1
3110 A8	F042 E5	
3111 A6	F043 E5	
3112 A6	F044 D6	
3113 B4	F045 D6	
3114 B12	F046 F8	
3115 B12	F047 G12	
3116 B4	F048 H5	
3117 B5	F049 H6	
3118 B8	F050 E10	
3119 B7	F051 E10	
3120 F12	F052 E10	
3121 B12	F053 F4	
3122 B12	F054 E11	
3123 B5	F055 E11	
3124 B12	F056 E4	
3125 C4	F101 A10	
3126 C4	F102 A7	
3127 C12	F103 A4	
3128 C2	F104 A8	
3129 C5	F105 A1	
3130 C12	F106 A6	
3131 C13	F107 A4	
3132 D12	F108 A12	
3133 D13	F109 A7	
3134 D7	F110 A2	
3135 D5	F111 A2	
3136 D6	F112 A6	
3137 D6	F113 A7	
3138 G10	F114 A8	
3139 E4	F115 B12	
3140 E6	F116 A2	
3141 E2	F117 B3	
3142 E5	F118 B9	
3143 G10	F119 B10	
3144 E2	F120 B12	
3145 E7	F121 B2	
3146 E8	F122 B5	
3147 E8	F123 B12	
3148 G10	F124 B2	
3149 E8	F125 B7	
3150 E4	F126 B10	
3151 E3	F127 B2	
3152 E8	F128 C2	
3153 H9	F129 C5	
3154 F4	F130 C1	
3155 F8	F131 C4	
3156 F3	F132 C4	
3157 F8	F133 C12	
3158 H10	F134 C4	
3159 F8	F135 C1	
3160 F3	F136 C2	
3161 F8	F137 C12	

Mono board: MACE controller

2 MACE CONTROLLER

PCS
Sledge control
Radial control
Focus control
Defect detector
Track counter
Ex
Dx
Signal cond.
OPC
Laser control
ADC/ AGC ref.
P6
Port 5
Port 3
Port 1
CLOCK GEN.
TEST
DEBUG
8051 core
ROM
RAM
SFR
Port 4
Port 2
Port 0
System interface
ADRESS BUS
ADDRESS_DATA BUS
CONTROL BUS
BE_INTERFACE
{CFR,SUR,RXD_BE,TXD_BE}
{ALE,PSENn,RDI,WRI,CSI,WE,OTD-HD61,POR,PORN,RSTN,INT,MOTO1,RFo}

CL 06532152_076.eps
141200

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1205 A4 F223 C11
2200 A7 F224 C2
2201 A8 F225 C11
2202 A9 F226 C1
2203 A10 F227 C2
2204 B2 F228 C11
2205 B2 F229 D11
2206 C1 F230 D2
2207 D1 F231 D11
2208 D13 F232 D11
2209 D14 F233 D1
2210 D1 F234 D2
2212 H3 F235 D11
2213 H4 F236 D2
2214 H13 F237 D10
2215 H11 F238 D13
2216 H12 F239 D10
2226 A4 F240 D13
2227 A6 F241 E10
2228 A7 F242 E13
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3201 A6 F244 E13
3202 A7 F245 E10
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3205 B2 F248 E13
3206 B2 F249 E10
3208 C2 F250 E2
3209 C2 F251 E13
3210 C2 F252 E10
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3213 D14 F255 F10
3214 D2 F256 F10
3215 D2 F257 F11
3219 F1 F258 F2
3220 F10 F259 F11
3221 F2 F260 F14
3222 F1 F261 F2
3223 F1 F262 F10
3224 H3 F263 G2
3225 H5 F264 H4
3226 H4 F265 H3
3227 H13 F266 H9
3228 I8 F267 H8
3229 H13 F268 H8
3230 H8 F269 H7
3231 H6 F270 H9
3232 H12 F271 H8
3233 H13 F272 H9
3234 I11 F273 H5
3235 I12 F274 H5
3236 H10 F275 H5
3237 H2 F276 H6
3238 I8 F277 H6
3239 F10 F278 H4
3240 B10 F279 H4
3241 B1 F280 H6
3242 C1 F281 H14
3243 C2 F282 H7
3244 C2 F283 H7
3245 A5 F284 H8
3246 C2 F285 H13
3247 F10 F286 H12
3248 G2 F287 H11
3249 G2 F288 H12
3250 G2 F289 I7
3251 H8 F290 I7
3252 H8 F291 I6
3253 H5 F292 I6
3254 H8 F293 I8
3255 I7 F294 I12
3256 I7 F295 I7
3257 I8 F296 I7
3258 I12 F297 A4
3259 A6 F298 A10
3260 A7 F299 B2
5200 A9
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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 I13
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F202 A9
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F204 A4
F205 A7
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F212 B10
F213 B2
F214 B10
F215 B2
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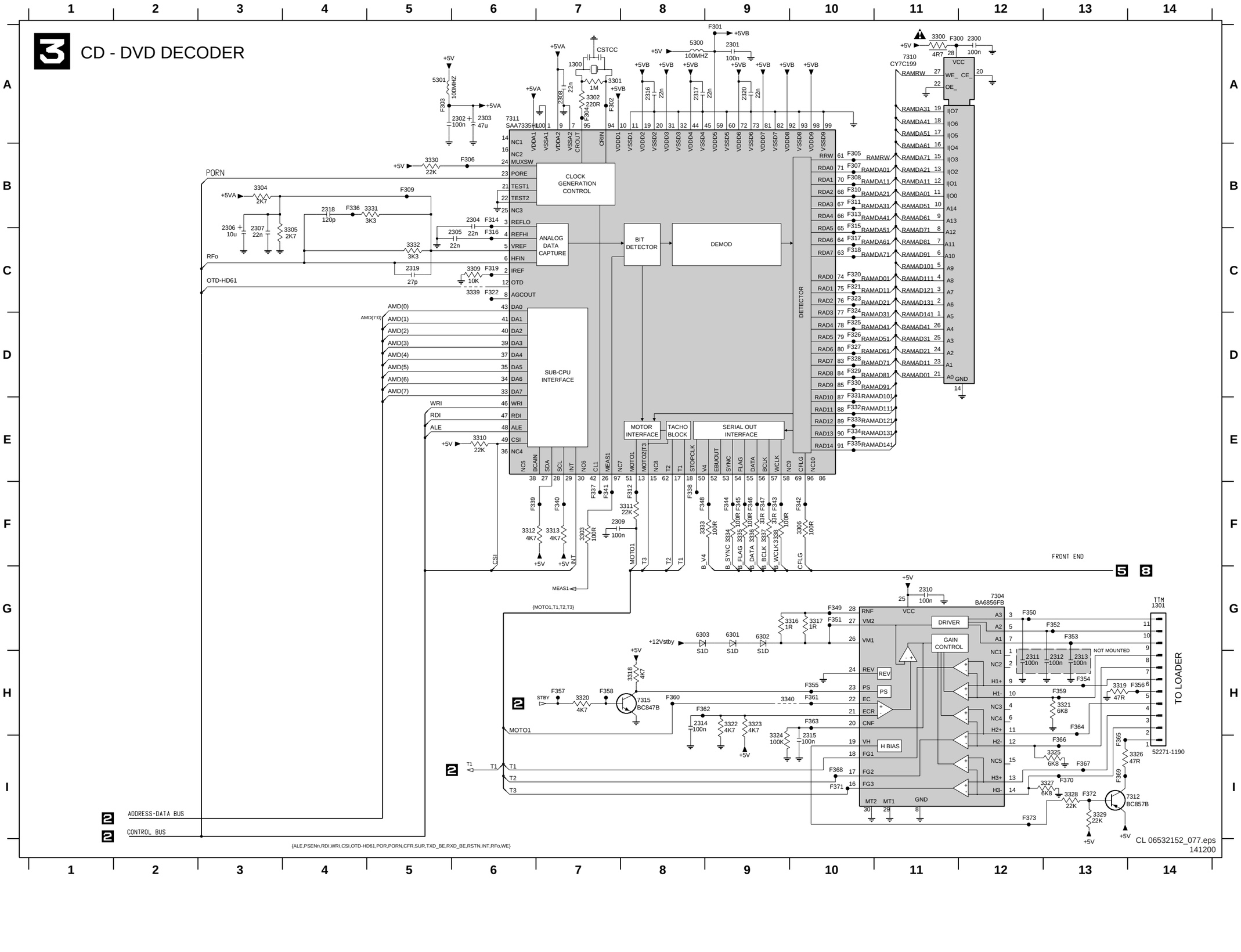
F219 C10
F220 C2
F221 C2

Mono board: CD - DVD decoder

3 CD - DVD DECODER



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2307 C3 F357 H7
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2314 H8 F364 H13
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2316 A8 F366 I13
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2318 B4 F368 I10
2319 C5 F369 I13
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3306 F10
3309 C6
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3312 F6
3313 F7
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3317 G10
3318 H8
3319 H13
3320 H7
3321 H13
3322 H9
3323 H9
3324 I9
3325 I13
3326 I14
3327 I13
3328 I13
3329 I13
3330 B5
3331 B5
3332 C5
3333 F8
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3337 F9
3338 F9
3339 C6
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5301 A5
6301 G9
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6303 G8
7304 G12
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7311 A6
7312 I13
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F307 B10
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F342 F10
F343 F9
F344 F9
F345 F9
F346 F9
F347 F9

Mono board: Program memories

4 PROGRAM MEMORIES

SYSTEM DATA Bus 5

SYSTEM ADDRESS Bus 5

RAM/ROM Interface 5

{RAS1ND,RWN,BE0n_Fur,BE1n_Fur,CAS0ND,CAS1ND,CSL_Fur,CSH_Fur,CE_ROMN,RAS0ND,OEND}

VDD_MEM 2405 100n

7401 AM29LV160DT

A(1:20) D(0:15) F451 RY|BY_ 4450 OPTION A(21) F463 CE_ROM1N FLASH_OEN RWN VDD_MEM RESET_ BYTE_ VSS1 VSS2

VDD_MEM 2452 100n

7451 AM29LV160DT

A(1:20) D(0:15) F452 RY|BY_ A(21) F462 CE_ROM2N FLASH_OEN 3450 10K RWN VDD_MEM RESET_ BYTE_ VSS1 VSS2

VDD_DRAM 2450 100n 2451 100n 2453 100n

7450 GM71V18163CJ

A(1:10) I|O(0:15) RAS_ LCAS_ UCAS_ WE_ OE_ NC1 NC2 NC3 VCC1 VCC2 VCC3 VSS1 VSS2 VSS3

F450 RAS1ND F464 RAS0ND F465 CAS1ND F466 CAS0ND F467 RWN F468 OEND

OPTION

CE_ROMN 4451 OPTION

VCC_LVC00 OPTION 3461 10K 7400-A 74LVC00AD 4453 A(21) 4454 OPTION CE_ROM1N

7400-C 74LVC00AD CE_ROM1N

7400-D 74LVC00AD F469 CE_ROMN CE_ROM2N

7400-B 74LVC00AD 100n 2414 CE_ROM2N

5450 100MHZ F454 VCC_LVC00 2459 1u

+3V3 5451 100MHZ F455 VDD_DRAM OPTION 2456 100u

5402 100MHZ F419 VDD_MEM 2418 100u

7402 MC33464N RESET_ IN GND NC OPTION VDD_STI

2460 470n 2461 470n STB_CONT 5

3454 22K F457 3457 10K 3460 4K7 7454 BC847B F470 2457 10u

3456 10K F456 3459 22K 3453 2K2 7453 BC847B F471

3451 100K F453 3452 22K 7452 BC847B F459 RESETn 5 8

2454 100n 2455 100n F461 4452

F458 3458 22K 7455 BC857B F460 STB_CONTD 9

3455 22K 2458 470n

CL 06532152_078.eps
141200

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
3461 G2
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: CPU & MPEG decoder

5 CPU & MPEG DECODER

2 BASIC ENGINE INTERFACE Bus

I2C Bus

4 8 SYSTEM ADDRESS Bus

SYSTEM DATA Bus

4 8 RAM/ROM Interface

MEMORY interface

SYSTEM USE

PORT 0 I/O

PORT 1 I/O

PORT 2 I/O

PORT 3 I/O

PORT 4 I/O

JTAG

TEST

IRQ

uP ST20cpu

A/V/Sub demultiplexer

Audio

Video

Subpicture

MPEG DECODER

Subpicture decoder

AC3 LPCM MPEG1/2 AUDIO DECODER

VIDEO ENCODER

FRONT-END Interface

I^2S

FRONT END

3

SDRAM CONTROLLER

ADDRESS

DATA

7 SDRAM Interface

TO/FROM DISPLAY

M24C32

SDA

SCL

+5Vstby

VDD_STI

PCM-OUT1

VDDA_PCM

VSSA_PCM

VREF_PCM

PCM_CeLf_Fur

PCM_OUTO

PCM_CLK_ST

LRCLKo

SPDIF_OUT

R_OUT

G_OUT

B_OUT

C_OUT

CVBS_OUT

Y_OUT

TCK

ST_TDI

TDO

TMS

TRST

EMI_IRQn

B_DATA

B_WCLK

B_BCLK

B_FLAG

B_SYNC

B_V4

RAS1ND

RWN

BE0n_Fur

BE1n_Fur

CAS0ND

CAS1ND

CSI_Fur

CSH_Fur

CE_ROMN

RAS0ND

OEND

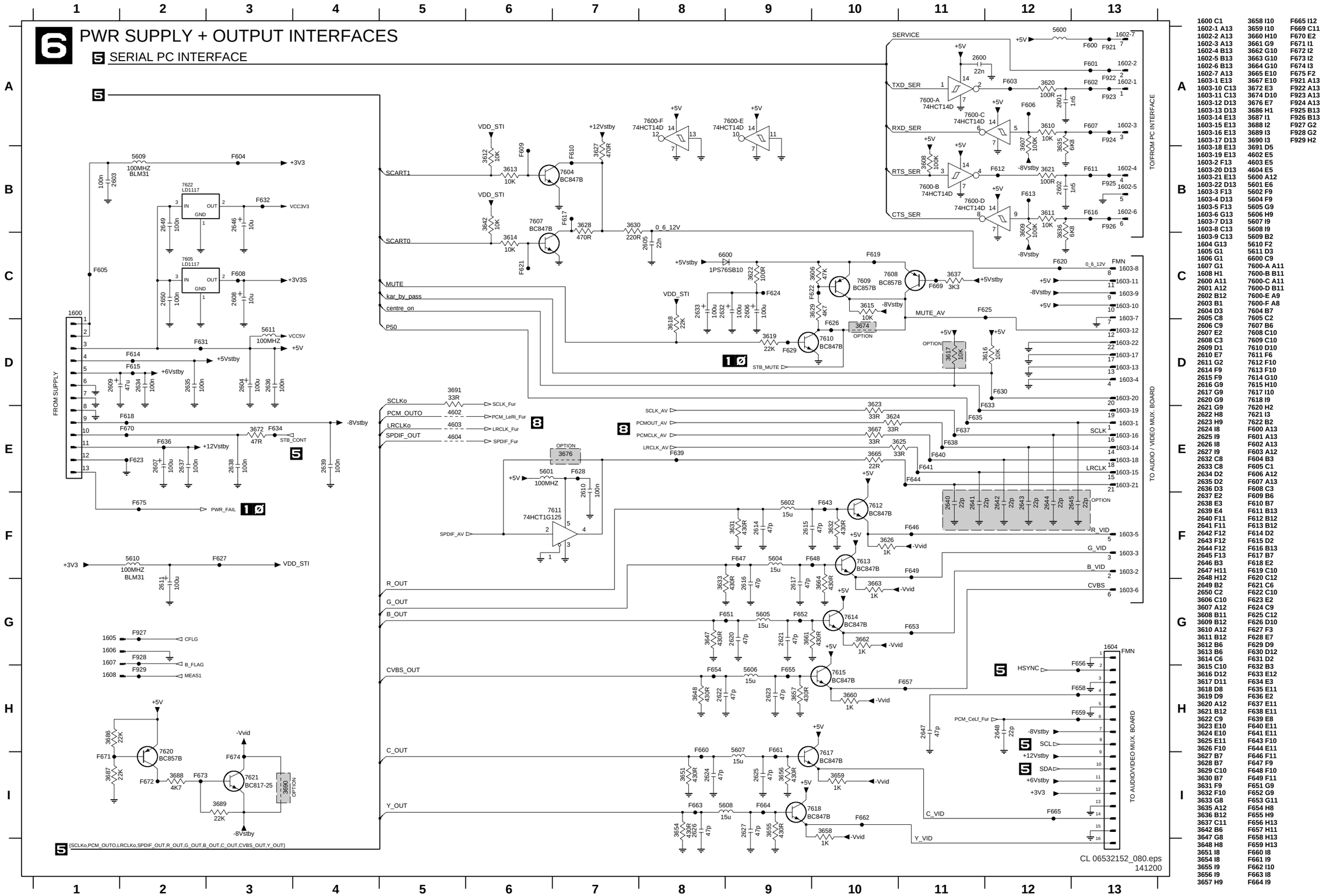
CL 06532152_079.eps
141200

1501-1 A1	F520 C8	2504 C11	F557 C12
1501-2 B1	F521 C10	2505 B12	F558 C14
1501-3 B1	F522 C11	2506 D14	F559 C14
1501-4 B1	F524 C10	2507 D14	F560 C14
1501-5 B1	F525 C11	2508 E14	F562 C14
2500 A3	F526 C7	2509 E14	F564 C14
2504 C11	F527 C7	2510 H3	F566 C14
2505 B12	F528 C11	2511 H3	F567 C14
2506 D14	F529 C8	2512 H4	F569 C14
2507 D14	F530 C10	2513 H4	F573 C14
2508 E14	F531 C10	2514 H4	F574 C14
2509 E14	F532 C10	2515 H4	F576 C14
2510 H3	F533 C10	2516 H5	F578 C2
2511 H3	F534 C10	2517 H5	F579 C2
2512 H4	F535 C5	2518 H5	F580 C2
2513 H4	F536 C6	2519 H9	F581 C2
2514 H4	F537 C11	2520 H9	F582 C2
2515 H4	F538 C6	2522 H9	F583 C2
2516 H5	F539 C7	2523 H10	F585 C14
2517 H5	F540 C6	2524 H10	F586 C14
2518 H5	F541 C12	2525 H11	F587 C14
2519 H9	F542 C9	2526 H11	F588 C14
2520 H9	F543 C7	2528 I11	F589 C14
2521 H9	F544 C9	2529 I11	F590 C14
2522 H10	F545 C9	2530 I11	F592 C14
2523 H10	F546 C9	2531 I11	F593 C14
2524 H10	F547 C9	2532 A1	F595 C14
2525 H11	F548 C9	2533 A1	F596 C14
2526 H11	F549 C9	2534 B1	F597 C14
2528 I11	F552 C7	3500 B4	F598 C14
2529 I11	F553 C8	3501 B4	F599 C14
2530 I11	F554 C8	3502 B9	F501 A11
2531 I11	F555 C6	3503 B11	F502 C7
2532 A1	F556 C12	3504 A11	F503 I13
2533 A1	F557 C12	3505 A11	F504 C7
2534 B1	F558 D14	3506 B9	F505 C12
2535 B1	F559 E14	3507 F14	F506 D14
3500 B4	F560 E14	3508 B11	F507 F14
3501 B4	F562 E14	3509 B11	F508 C7
3502 B9	F564 E14	3511 C6	F509 C8
3503 B11	F566 F14	3512 C6	F511 A1
3504 A11	F567 F14	3513 A10	F512 B1
3505 A11	F568 F2	3514 C6	F513 B11
3506 B9	F569 F13	3515 C6	F514 B8
3507 F14	F573 F14	3516 C6	F515 B1
3508 B11	F574 G14	3517 C12	F516 B1
3509 B11	F576 G14	3519 C9	F517 B11
3511 C6	F578 G2	3520 C11	F518 B6
3512 C6	F579 G2	3521 C12	F519 A9
3513 A10	F580 G2	3522 C12	
3514 C6	F581 G2	3523 C12	
3515 C6	F582 G2	3524 D14	
3516 C6	F583 G2	3525 E14	
3517 C12	F585 H11	3526 F2	
3519 C9	F586 H11	3534 I12	
3520 C11	F587 H13	3535 I13	
3521 C12	F588 H12	3537 I12	
3522 C12	F589 H12	3538 I13	
3523 C12	F590 H13	3540 C9	
3524 D14	F592 I8	3541 B7	
3525 E14	F593 I8	3542 B8	
3526 F2	F594 I8	3545 D14	
3534 I12	F595 I8	3546 C7	
3535 I13	F596 I8	3547 B6	
3537 I12	F597 I8	3548 A10	
3538 I13	F598 I8	3550 B10	
3540 C9	F599 I8	3551 B10	
3541 B7		3553 A11	
3542 B8		3562 C7	
3545 D14		3563 C7	
3546 C7		3564 C8	
3547 B6		3566 C7	
3548 A10		3568 C8	
3550 B10		3570 F14	
3551 B10		3571 A2	
3553 A11		3572 B2	
3562 C7		4500 A9	
3563 C7		4501 A9	
3564 C8		4502 B7	
3566 C7		4503 C8	
3568 C8		4504 C10	
3570 F14		4505 C6	
3571 A2		4506 C7	
3572 B2		4507 B10	
4500 A9		5501 I11	
4501 A9		5502 I12	
4502 B7		5503 A1	
4503 C8		5504 B1	
4504 C10		7503 D2	
4505 C6		7505 A3	
4506 C7		F501 A11	
4507 B10		F502 C7	
5501 I11		F503 I13	
5502 I12		F504 C7	
5503 A1		F505 C12	
5504 B1		F506 D14	
7503 D2		F507 F14	
7505 A3		F508 C7	
F501 A11		F509 C8	
F502 C7		F511 A1	
F503 I13		F512 B1	
F504 C7		F513 B11	
F505 C12		F514 B8	
F506 D14		F515 B1	
F507 F14		F516 B1	
F508 C7		F517 B11	
F509 C8		F518 B6	
F511 A1		F519 A9	
F512 B1			
F513 B11			
F514 B8			
F515 B1			
F516 B1			
F517 B11			
F518 B6			
F519 A9			

Mono board: Power supply & output interfaces

6 PWR SUPPLY + OUTPUT INTERFACES

5 SERIAL PC INTERFACE



CL 06532152_080.eps
141200

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 I3
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	
2600 A11	7600-C A11	
2601 A12	7600-D B11	
2602 B12	7600-E A9	
2603 B1	7600-F A8	
2604 D3	7604 B7	
2605 C8	7605 C2	
2606 C9	7607 B6	
2607 E2	7608 C10	
2608 C3	7609 C10	
2609 D1	7610 D10	
2610 E7	7611 F6	
2611 G2	7612 F10	
2614 F9	7613 F10	
2615 F9	7614 G10	
2616 G9	7615 H10	
2617 G9	7617 I10	
2620 G9	7618 I9	
2621 G9	7620 H2	
2622 H8	7621 I3	
2623 H9	7622 B2	
2624 I8	F600 A13	
2625 I9	F601 A13	
2626 I8	F602 A13	
2627 I9	F603 A12	
2632 C8	F604 B3	
2633 C8	F605 C1	
2634 D2	F606 A12	
2635 D2	F607 A13	
2636 D3	F608 C3	
2637 E2	F609 B6	
2638 E3	F610 B7	
2639 E4	F611 B13	
2640 F11	F612 B12	
2641 F11	F613 B12	
2642 F12	F614 D2	
2643 F12	F615 D2	
2644 F12	F616 B13	
2645 F13	F617 B7	
2646 B3	F618 E2	
2647 H11	F619 C10	
2648 H12	F620 C12	
2649 B2	F621 C6	
2650 C2	F622 C10	
3606 C10	F623 E2	
3607 A12	F624 C9	
3608 B11	F625 C12	
3609 B12	F626 D10	
3610 A12	F627 F3	
3611 B12	F628 E7	
3612 B6	F629 D9	
3613 B6	F630 D12	
3614 C6	F631 D2	
3615 C10	F632 B3	
3616 D12	F633 E12	
3617 D11	F634 E3	
3618 D8	F635 E11	
3619 D9	F636 E2	
3620 A12	F637 E11	
3621 B12	F638 E11	
3622 C9	F639 E8	
3623 E10	F640 E11	
3624 E10	F641 E11	
3625 E11	F643 F10	
3626 F10	F644 E11	
3627 B7	F646 F11	
3628 B7	F647 F9	
3629 C10	F648 F10	
3630 B7	F649 F11	
3631 F9	F651 G9	
3632 F10	F652 G9	
3633 G8	F653 G11	
3635 A12	F654 H8	
3636 B12	F655 H9	
3637 C11	F656 H13	
3642 B6	F657 H11	
3647 G8	F658 H13	
3648 H8	F659 H13	
3651 I8	F660 I8	
3654 I8	F661 I9	
3655 I9	F662 I10	
3656 I9	F663 I8	
3657 H9	F664 I9	

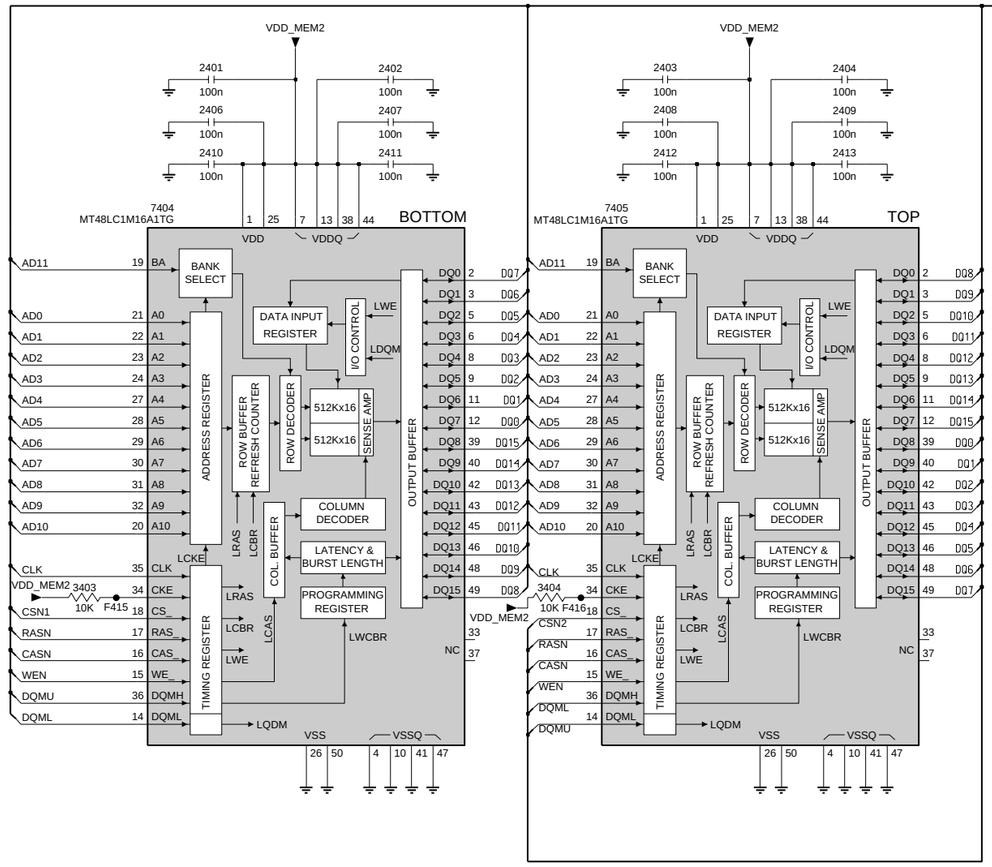
Mono board: SD RAM's

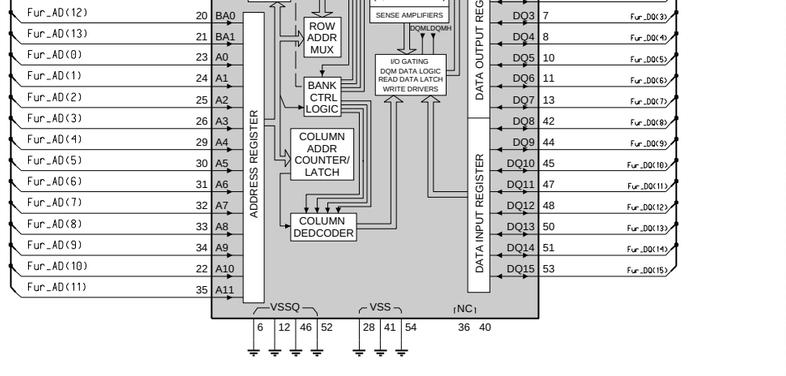
7 SDRAMs

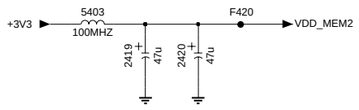
ST SDRAM

FURORE SDRAM

SDRAM Interface 5







CL 06532152_081.eps
141200

2401 C2
2402 C3
2403 C5
2404 C6
2406 C2
2407 C3
2408 C5
2409 C6
2410 C2
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: SACD decoder

8 SACD DECODER

FURORE

SYSTEM ADDRESS Bus A(21:1)

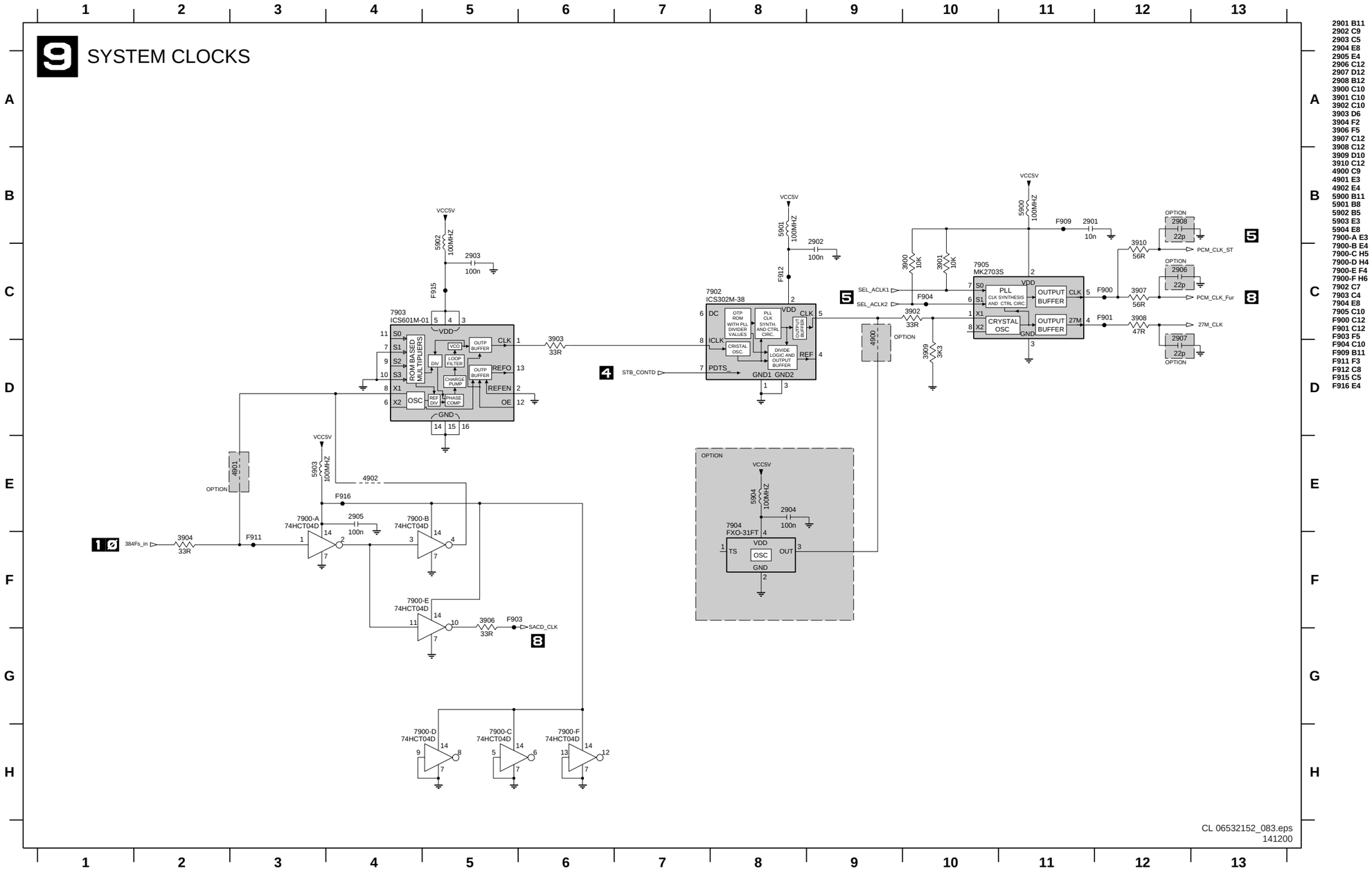
SYSTEM DATA Bus D(15:0)

RAM/ROM Interface

FRONT END

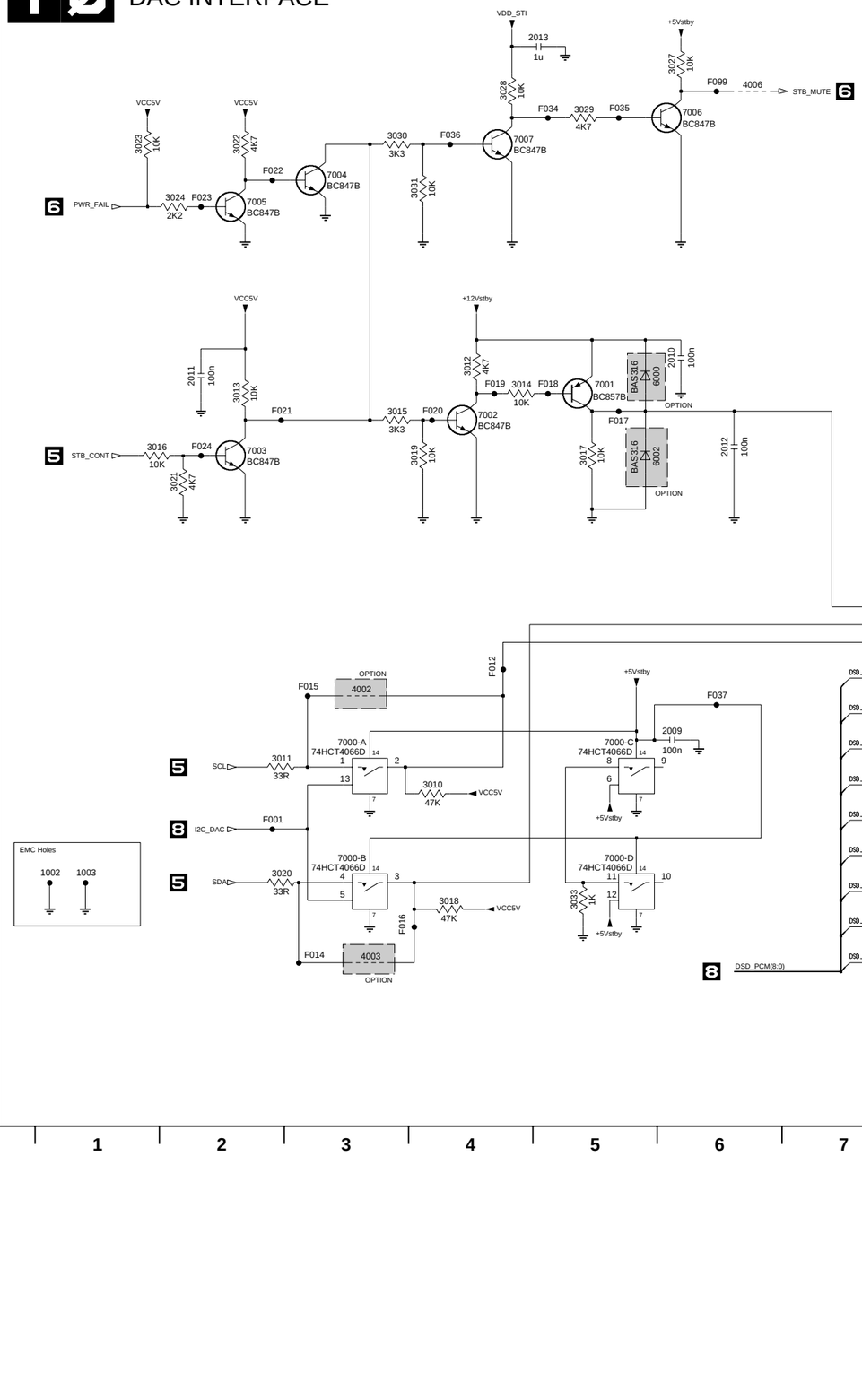
CL 06532152_082.eps
141200

Mono board: System clocks



Mono board: DAC interface

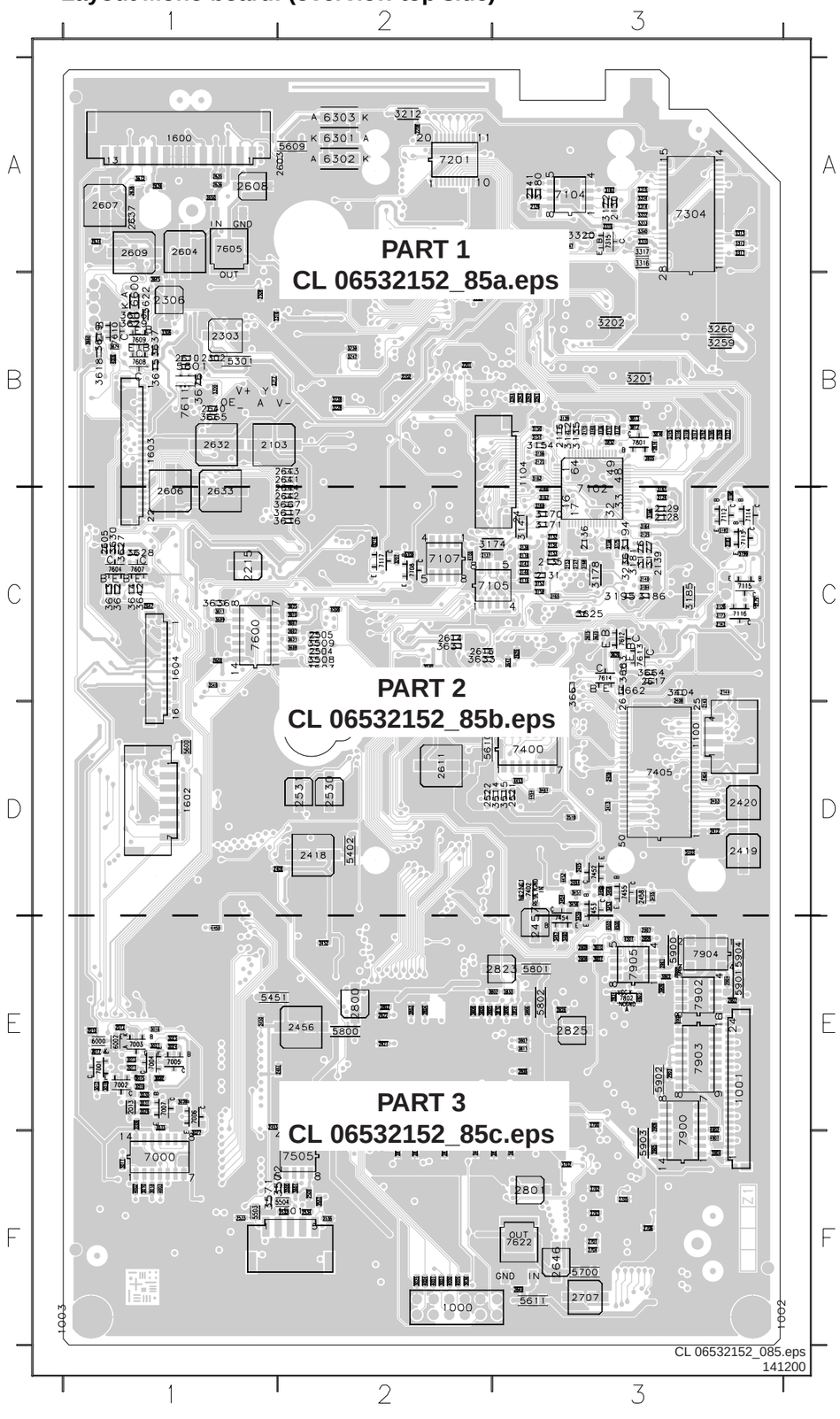
10 DAC INTERFACE



CL 06532152_084.eps
141200

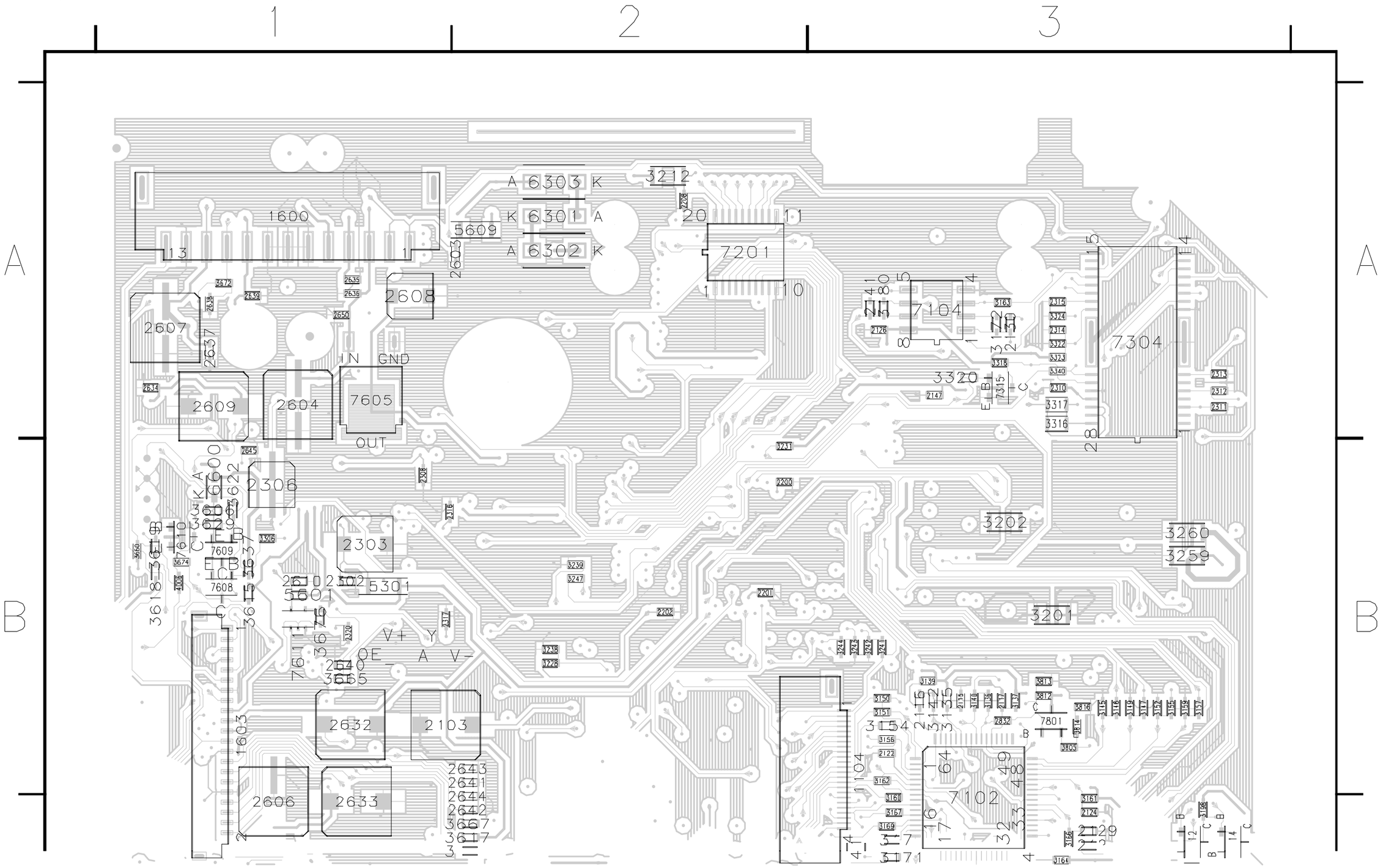
1000-1 B8 **F032 H8**
1000-10 D8 **F033 H8**
1000-11 D8 **F034 B5**
1000-12 D8 **F035 B5**
1000-2 B8 **F036 B4**
1000-3 B8 **F037 F6**
1000-4 B8 **F099 A6**
1000-5 C8
1000-6 C8
1000-7 C8
1000-8 C8
1000-9 D8
1001 I10
1002 H1
1003 H1
2000 F9
2001 F9
2002 G9
2003 G9
2004 G9
2005 H9
2006 H9
2007 H9
2008 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 G4
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 H5
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
F001 G2
F002 F10
F003 F10
F004 G10
F005 G10
F006 G10
F007 G10
F008 H10
F009 H10
F010 H10
F011 C10
F012 F4
F014 H3
F015 F3
F016 H3
F017 D5
F018 D5
F019 D4
F020 D4
F021 D2
F022 B2
F023 B2
F024 D2
F025 F8
F026 F8
F027 G8
F028 G8
F029 G8
F030 G8
F031 H8

Layout Mono board: (overview top side)

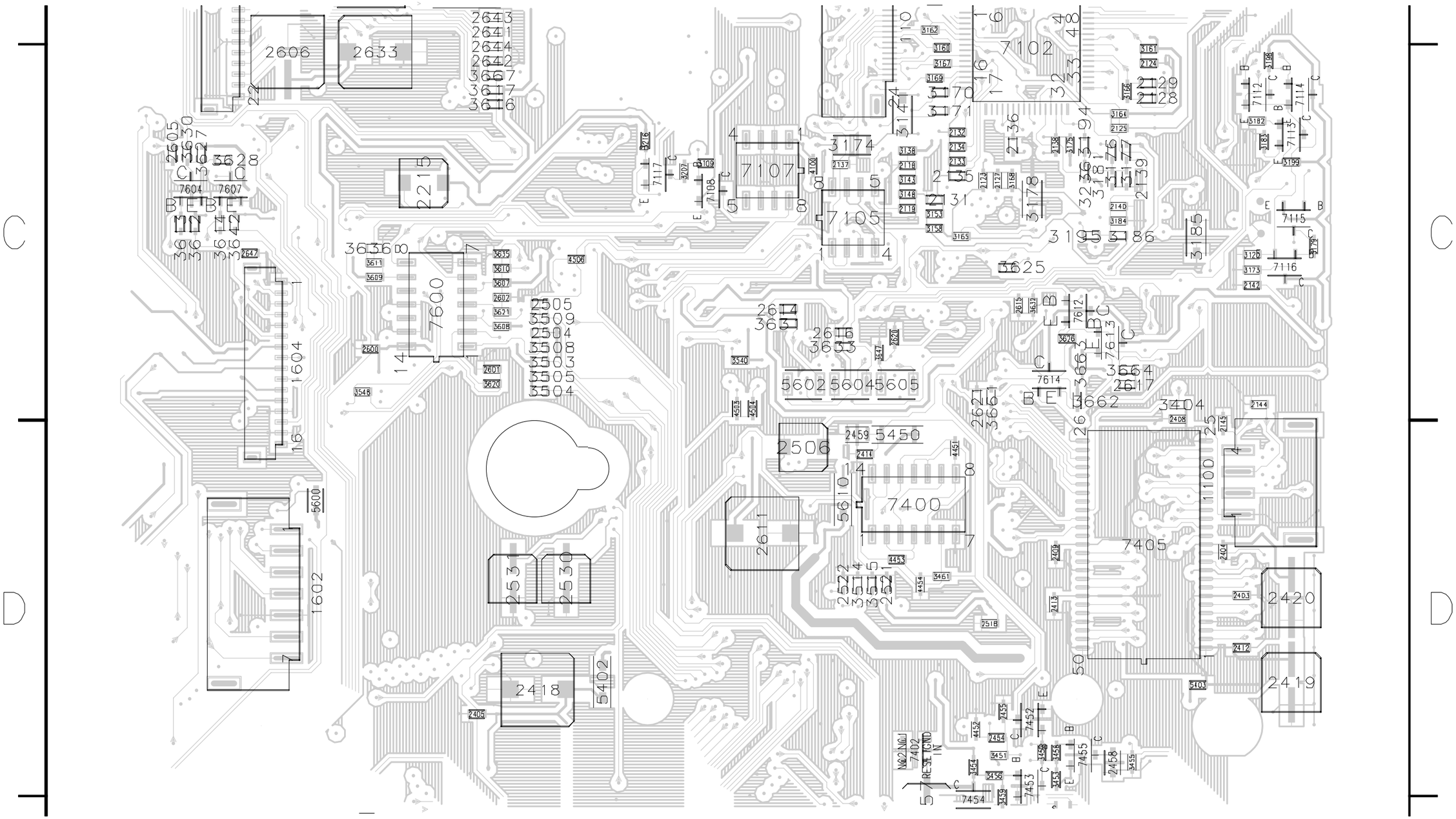


1001	E3	2642	C2	3180	A3	3910	E3
1100	D3	2643	B2	3181	C3	4000	F2
1104	B3	2644	C2	3182	C3	4001	F2
1501	F2	2645	B1	3183	C3	4002	F1
1600	A1	2646	F3	3184	C3	4003	F1
1602	D1	2647	C1	3185	C3	4004	F2
1603	B1	2649	F3	3186	C3	4005	F2
1604	C1	2650	A1	3194	C3	4006	B1
2009	E1	2700	E3	3195	C3	4100	C2
2010	E1	2701	F3	3198	C3	4450	E1
2011	F1	2702	F3	3199	C3	4451	D3
2012	E1	2703	F3	3201	B3	4452	D3
2013	E1	2704	F3	3202	B3	4453	D3
2103	E1	2705	F3	3207	C2	4454	D3
2115	B3	2706	F3	3212	A2	4500	E3
2116	B3	2707	F3	3216	C2	4501	E3
2117	B3	2800	E2	3228	B2	4502	E3
2118	C3	2801	F3	3231	B2	4503	C2
2119	C3	2802	E2	3236	C3	4504	C2
2122	B3	2803	E2	3238	B2	4506	C2
2123	C3	2804	E2	3239	B2	4604	F2
2124	C3	2805	E2	3241	B3	4803	E3
2125	C3	2806	E2	3242	B3	4901	E3
2126	A3	2807	E3	3243	B3	4901	F3
2127	C3	2808	E3	3244	B3	4902	E3
2128	C3	2809	E3	3247	B2	5301	B1
2129	C3	2810	E3	3259	B3	5402	D2
2130	A3	2811	F3	3260	B3	5403	D3
2131	C3	2812	F3	3306	B1	5450	D3
2132	C3	2813	F3	3316	A3	5451	F1
2133	C3	2814	F3	3317	A3	5503	F2
2134	C3	2815	F3	3318	A3	5504	F2
2135	C3	2816	F2	3320	A3	5600	D1
2136	C3	2817	F2	3322	A3	5601	B1
2137	C2	2818	F2	3323	A3	5602	C2
2138	C3	2819	F2	3324	A3	5604	C3
2139	C3	2820	E2	3340	A3	5605	C3
2140	C3	2821	E2	3404	C3	5609	A2
2141	A3	2822	E2	3451	D3	5610	D2
2142	C3	2823	E3	3452	D3	5611	F3
2144	D3	2824	E3	3453	D3	5700	F2
2145	D3	2825	E3	3454	D3	5800	E2
2147	A3	2826	E3	3455	D3	5801	E3
2200	B2	2832	B3	3456	D3	5802	E3
2201	B2	2833	E3	3457	D3	5900	E3
2202	B2	2834	E3	3458	D3	5901	E3
2208	A2	2901	E3	3459	E3	5902	E3
2215	C1	2902	E3	3460	E3	5903	E3
2302	B1	2903	E3	3461	D3	5904	E3
2303	B1	2904	E3	3500	F2	6000	E1
2306	B1	2905	E3	3501	F2	6001	E1
2308	B1	2906	E3	3503	C2	6301	A2
2310	A3	2907	E3	3504	C2	6302	A2
2311	A3	2908	E3	3505	C2	6303	A2
2312	A3	3003	F2	3508	C2	6600	B1
2313	A3	3010	F1	3509	C2	7000	F1
2314	A3	3011	F1	3514	D3	7001	E1
2315	A3	3012	E1	3515	D3	7002	E1
2316	B1	3013	E1	3540	C2	7003	E1
2317	B1	3014	E1	3548	C2	7004	E1
2320	B1	3015	E1	3553	F2	7005	E1
2403	D3	3016	E1	3571	F1	7006	E1
2404	D3	3017	E1	3572	F2	7007	E1
2405	D2	3018	E1	3606	B1	7102	C3
2408	C3	3019	E1	3607	C2	7104	A3
2409	D3	3021	E1	3608	C2	7105	C3
2412	D3	3022	E1	3609	C1	7107	C2
2413	D3	3023	E1	3610	C2	7108	C2
2414	D3	3024	E1	3611	C1	7112	C3
2418	D2	3025	F2	3612	C1	7113	C3
2419	D3	3026	F2	3613	C1	7114	C3
2420	D3	3027	E1	3614	C1	7115	C3
2450	E1	3028	E1	3615	B1	7116	C3
2451	E2	3029	E1	3616	C2	7117	C2
2452	F2	3030	E1	3617	C2	7201	A2
2453	E1	3031	E1	3618	B1	7304	A3
2454	D3	3033	E1	3619	B1	7315	A3
2455	D3	3109	C2	3620	C2	7400	D3
2456	F2	3120	C3	3621	C2	7402	D3
2457	E3	3135	B3	3622	B1	7405	D3
2458	D3	3136	B3	3625	C3	7452	D3
2459	E3	3137	B3	3626	C3	7453	D3
2500	E2	3138	B3	3627	C1	7454	E3
2504	C2	3139	B3	3628	C1	7455	D3
2505	C2	3140	B3	3629	B1	7505	F2
2506	D2	3141	C3	3630	C1	7600	C1
2518	D3	3142	B3	3631	C2	7604	C1
2521	D3	3143	C3	3632	C3	7605	A1
2522	D2	3145	B3	3633	C2	7607	C1
2530	D2	3146	B3	3635	C2	7608	B1
2531	F2	3147	B3	3636	C1	7609	B1
2532	F2	3148	C3	3637	B1	7610	B1
2533	F1	3149	B3	3642	C1	7611	B1
2534	F2	3150	B3	3647	C3	7612	C3
2535	F2	3151	B3	3660	B1	7613	C3
2600	C1	3152	B3	3661	C3	7614	C3
2601	C2	3153	C3	3662	C3	7622	F3
2602	C2	3154	B3	3663	C3	7801	B3
2603	A2	3155	B3	3664	C3	7802	E3
2604	A1	3156	B3	3665	B1	7900	E3
2605	C1	3157	B3	3667	A2	7902	E3
2606	C1	3158	B3	3672	A1	7903	E3
2607	A1	3159	B3	3674	B1	7904	E3
2608	A1	3160	C3	3676	B1	7905	E3
2609	A1	3161	C3	3702	E3		
2610	B1	3162	B3	3802	E3		
2611	D2	3163	A3	3805	B3		
2614	C2	3164	C3	3806	E3		
2615	C3	3165	C3	3808	E3		
2616	C2	3166	C3	3809	E3		
2617	C3	3167	C3	3810	E3		
2620	C3	3168	C3	3811	E3		
2621	C3	3169	C3	3812	B3		
2632	B1	3170	C3	3813	B3		
2633	C1	3171	C3	3814	B3		
2634	A1	3172	A3	3816	B3		
2635	A1	3173	C3	3902	E3		
2636	A1	3174	C3	3903	E3		
2637	A1	3175	C3	3904	E3		
2638	A1	3176	C3	3906	E3		
2639	A1	3177	C3	3907	E3		
2640	B1	3178	C3	3908	E3		
2641	B2	3179	C3	3909	E3		

Layout Mono board: (Part 1 top side)



Layout Mono board: (Part 2 top side)



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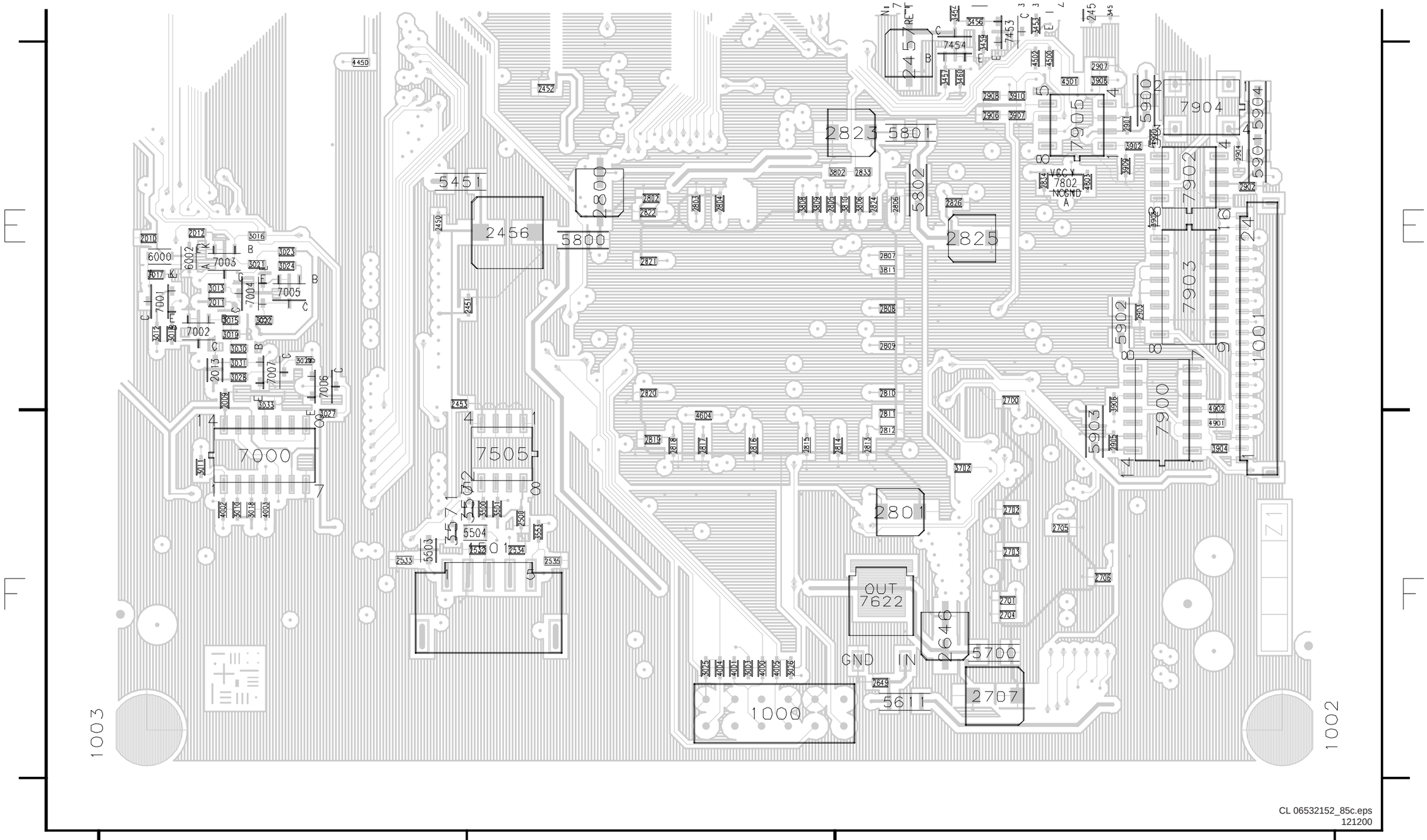
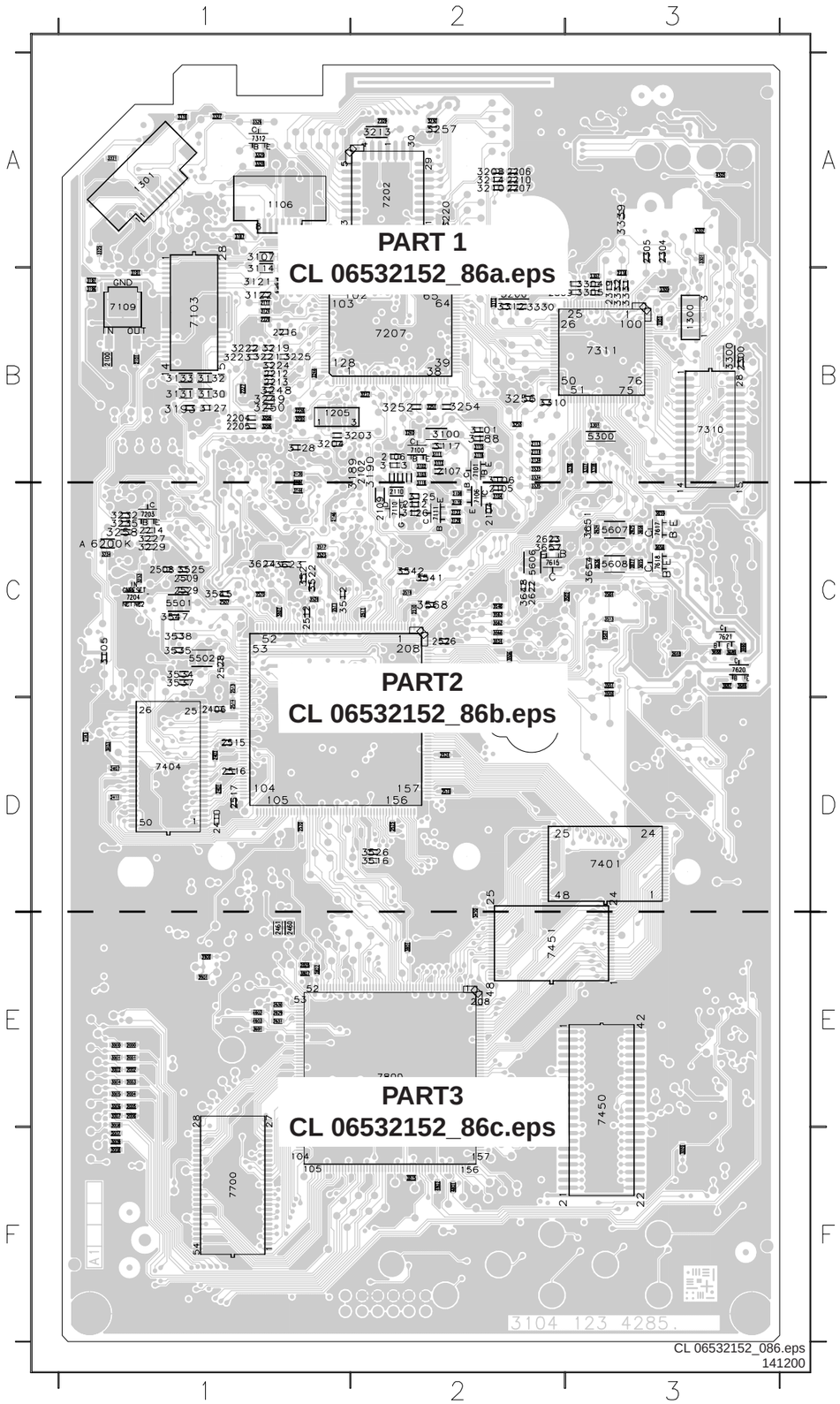
Layout Mono board: (Part 3 top side)



Layout Mono board: (overview bottom side)



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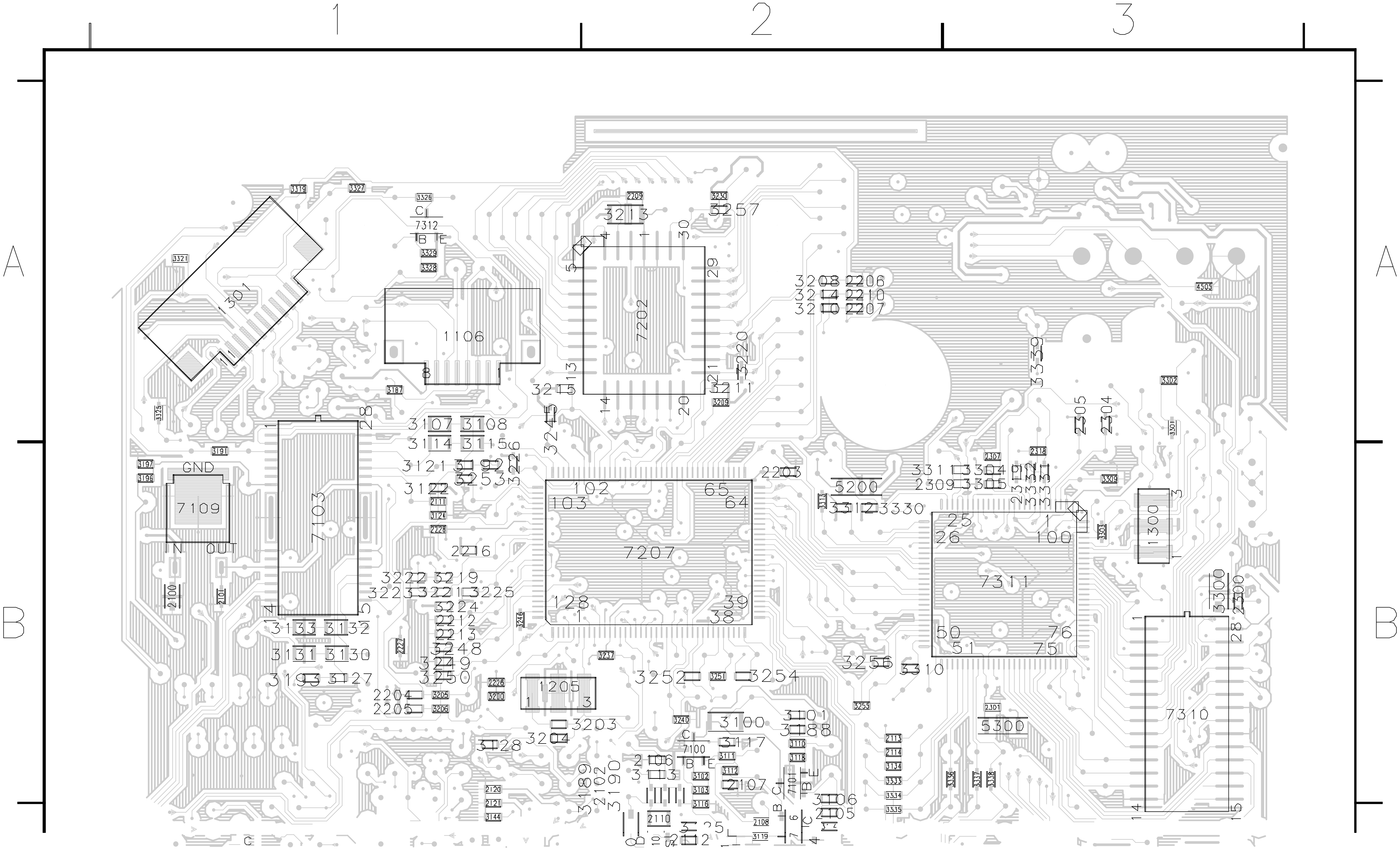
1205	B1	3124	B1	3566	C2
1300	B3	3125	C2	3568	C2
1301	A1	3126	C2	3570	C1
2000	F1	3127	B1	3623	C1
2001	F1	3128	B1	3624	C1
2002	F1	3129	C2	3648	C2
2003	F1	3130	B1	3651	C3
2004	F1	3131	B1	3654	C3
2005	F1	3132	B1	3655	C3
2006	F1	3133	B1	3656	C3
2007	F1	3134	B2	3657	C2
2008	F1	3144	C1	3658	C3
2100	B1	3187	A1	3659	C3
2101	B1	3188	B2	3686	C3
2102	B2	3189	B2	3687	C3
2104	C2	3190	B2	3688	C3
2105	C2	3191	B1	3689	C3
2106	B2	3192	B1	3690	C3
2107	B2	3193	B1	3691	F1
2108	C2	3196	B1	3800	E2
2109	C2	3197	B1	3801	E2
2110	C2	3200	B1	3807	F1
2111	B1	3203	B2	3815	F2
2112	B2	3204	B1	3900	F1
2113	B2	3205	B1	3901	F1
2114	B2	3206	B1	4505	A3
2120	B1	3208	A2	4507	C3
2121	C1	3209	A2	4602	F1
2143	D1	3210	A2	4603	F1
2146	C1	3211	A2	4801	F2
2203	B2	3213	A2	4802	F2
2204	B1	3214	A2	5200	B2
2205	B1	3215	A1	5300	B3
2206	A2	3219	B1	5501	C1
2207	A2	3220	A2	5502	C1
2209	A2	3221	B1	5606	C2
2210	A2	3222	B1	5607	C3
2212	B1	3223	B1	5608	C3
2213	B1	3224	B1	6200	C1
2214	C1	3225	B1	7100	B2
2216	B1	3226	B1	7101	B2
2226	B1	3227	C1	7102	B1
2227	B1	3229	C1	7105	C2
2228	B1	3230	A2	7109	B1
2300	B3	3232	C1	7110	C2
2301	B3	3233	C1	7111	C2
2304	A3	3234	C1	7202	A2
2305	A3	3235	C1	7203	C1
2307	B3	3237	B2	7204	C1
2309	B2	3240	B2	7207	B2
2318	B3	3245	A1	7310	B3
2319	B3	3246	B1	7311	B3
2401	D1	3248	B1	7312	A1
2402	D1	3249	B1	7401	D3
2406	D1	3250	B1	7404	D1
2407	D1	3251	B2	7450	E3
2410	D1	3252	B2	7451	E2
2411	D1	3253	B1	7503	D1
2460	F1	3254	B2	7615	C2
2461	F1	3255	B2	7617	C3
2507	C1	3256	B2	7618	C3
2508	C1	3257	A2	7620	C3
2509	C1	3258	C1	7621	C3
2510	C2	3300	B3	7700	F1
2511	C2	3301	A3	7800	E2
2512	C1	3302	A3		
2513	C1	3303	B3		
2514	D1	3304	B3		
2515	D1	3305	B3		
2516	D1	3309	B3		
2517	D1	3310	B2		
2519	D2	3311	B2		
2520	D1	3312	B2		
2523	D2	3313	B2		
2524	D2	3319	A1		
2525	D2	3321	A1		
2526	C2	3325	A1		
2528	C1	3326	A1		
2529	C1	3327	A1		
2622	C2	3328	A1		
2623	C2	3329	A1		
2624	C2	3330	B2		
2625	C2	3331	B3		
2626	C2	3332	B3		
2627	C2	3333	B2		
2648	C2	3334	B2		
2827	F1	3335	C2		
2828	F1	3336	B3		
2829	F1	3337	B3		
2830	F1	3338	B3		
2831	F1	3339	A3		
3000	F1	3403	D1		
3001	F1	3450	E2		
3002	F1	3502	C3		
3004	F1	3506	C2		
3005	F1	3507	C1		
3006	F1	3511	C1		
3007	F1	3512	C1		
3008	F1	3513	C3		
3009	F1	3516	D2		
3020	F1	3517	C1		
3100	B2	3519	C2		
3101	B2	3520	C1		
3102	B2	3521	C1		
3103	B2	3522	C1		
3104	C2	3523	C1		
3105	C1	3524	C2		
3106	B2	3525	C1		
3107	A1	3526	D2		
3108	A1	3534	C1		
3110	B2	3535	C1		
3111	B2	3537	C1		
3112	B2	3538	C1		
3113	B2	3541	C2		
3114	B1	3542	C2		
3115	B1	3545	C1		
3116	C2	3546	C2		
3117	B2	3547	C1		
3118	B2	3550	C3		
3119	C2	3551	C3		
3121	B1	3562	C2		
3122	B1	3563	C2		

Layout Mono board: (Part 1 bottom side)



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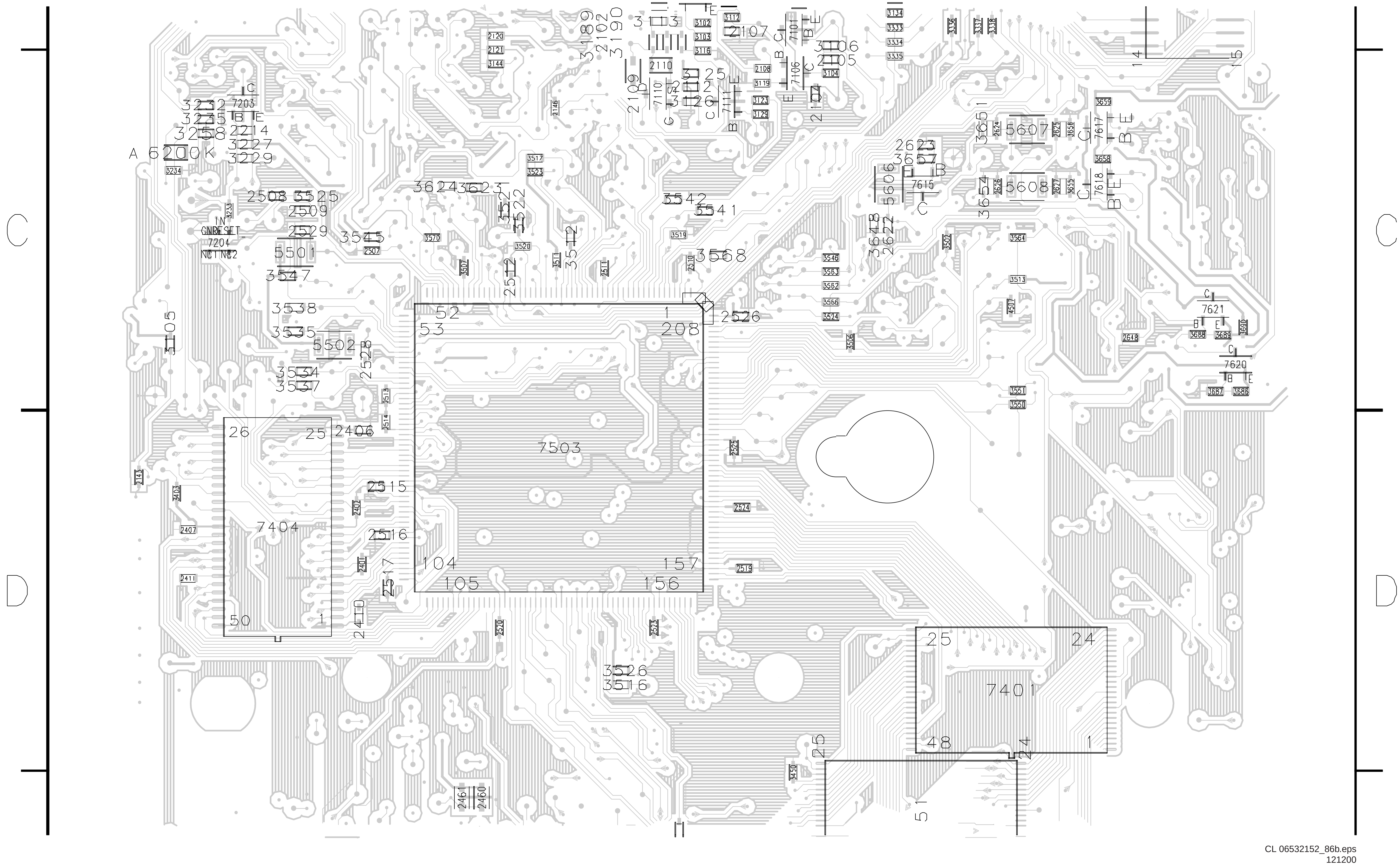
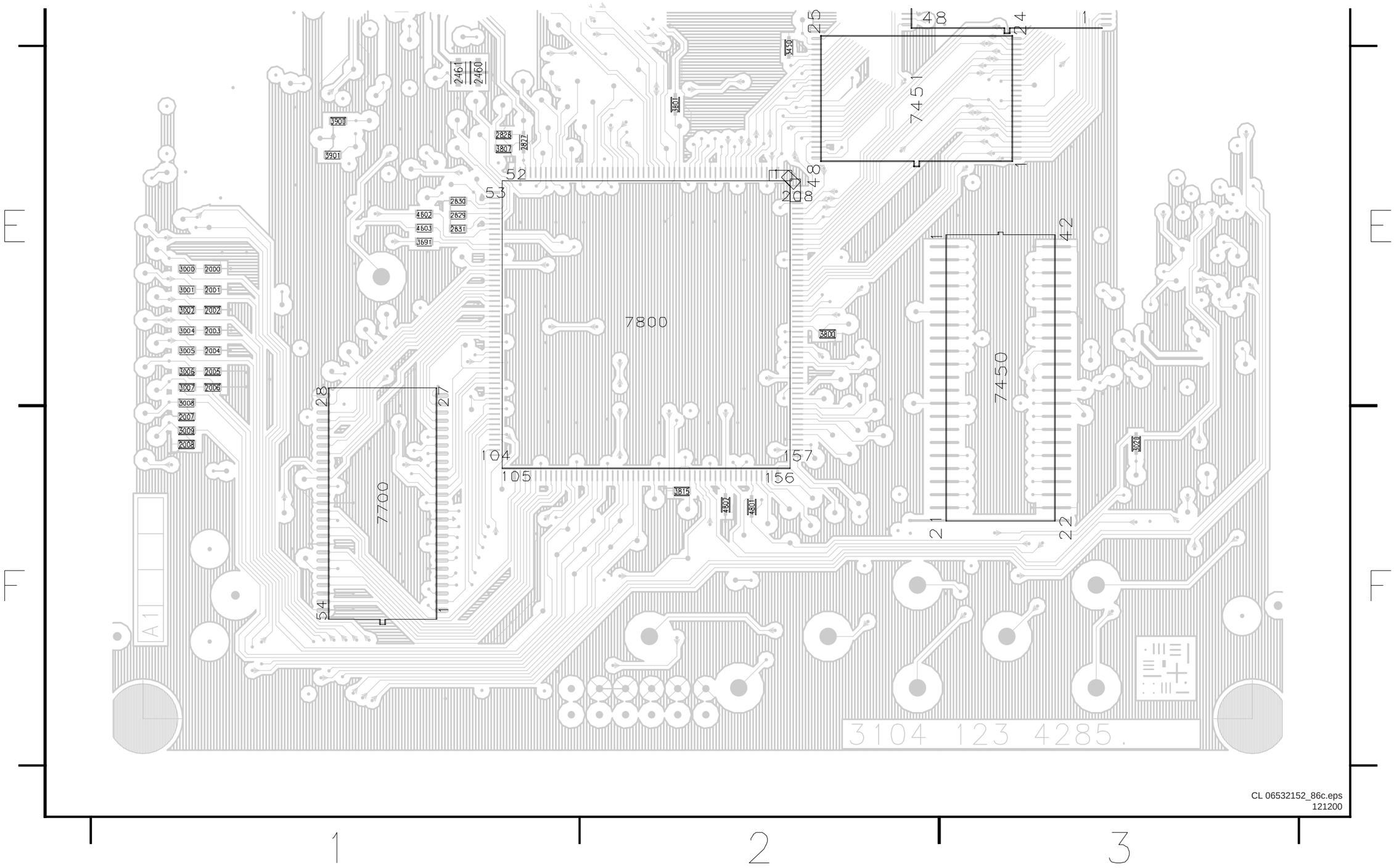
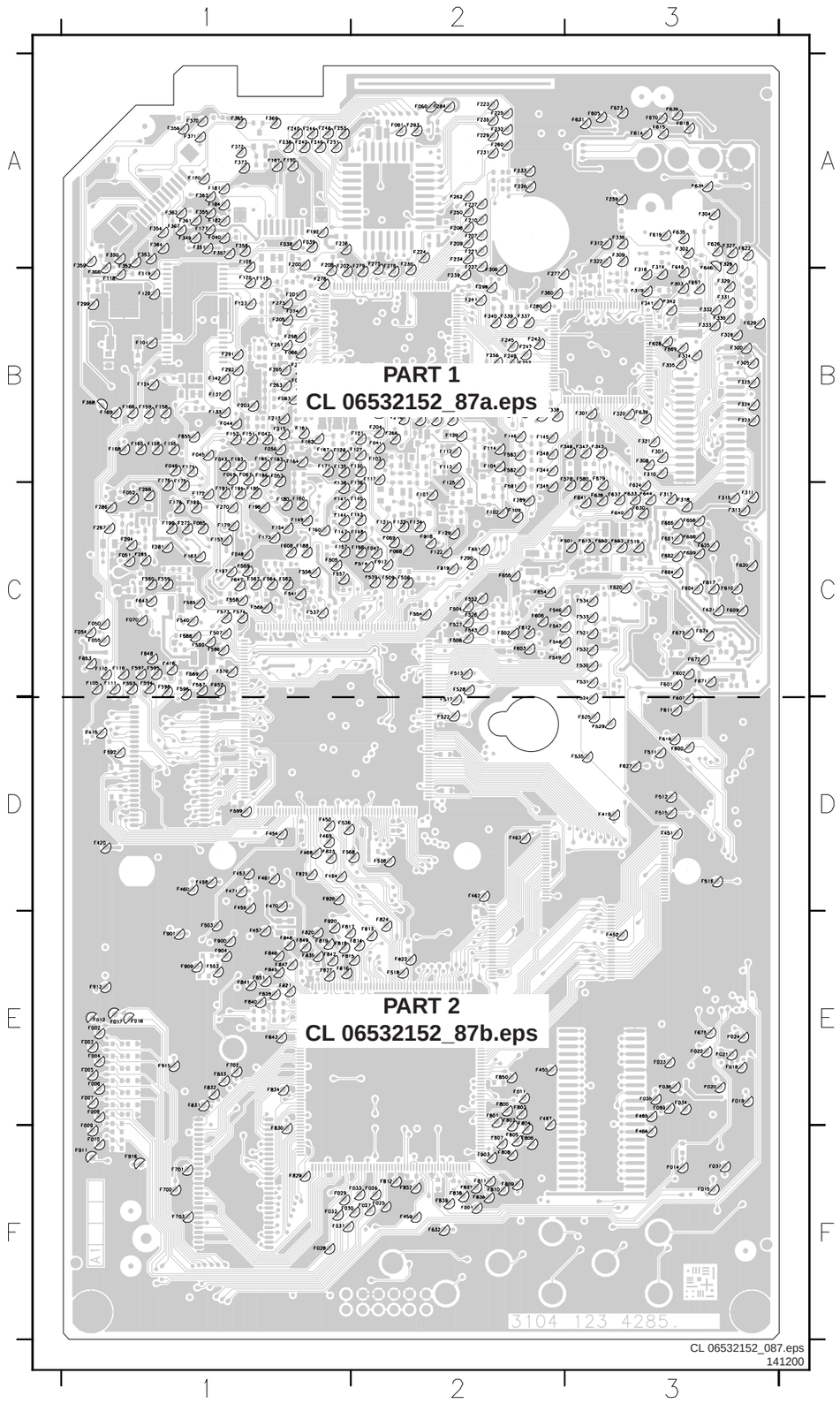
Layout Mono board: (Part 2 bottom side)



Layout Mono board: (Part 3 bottom side)



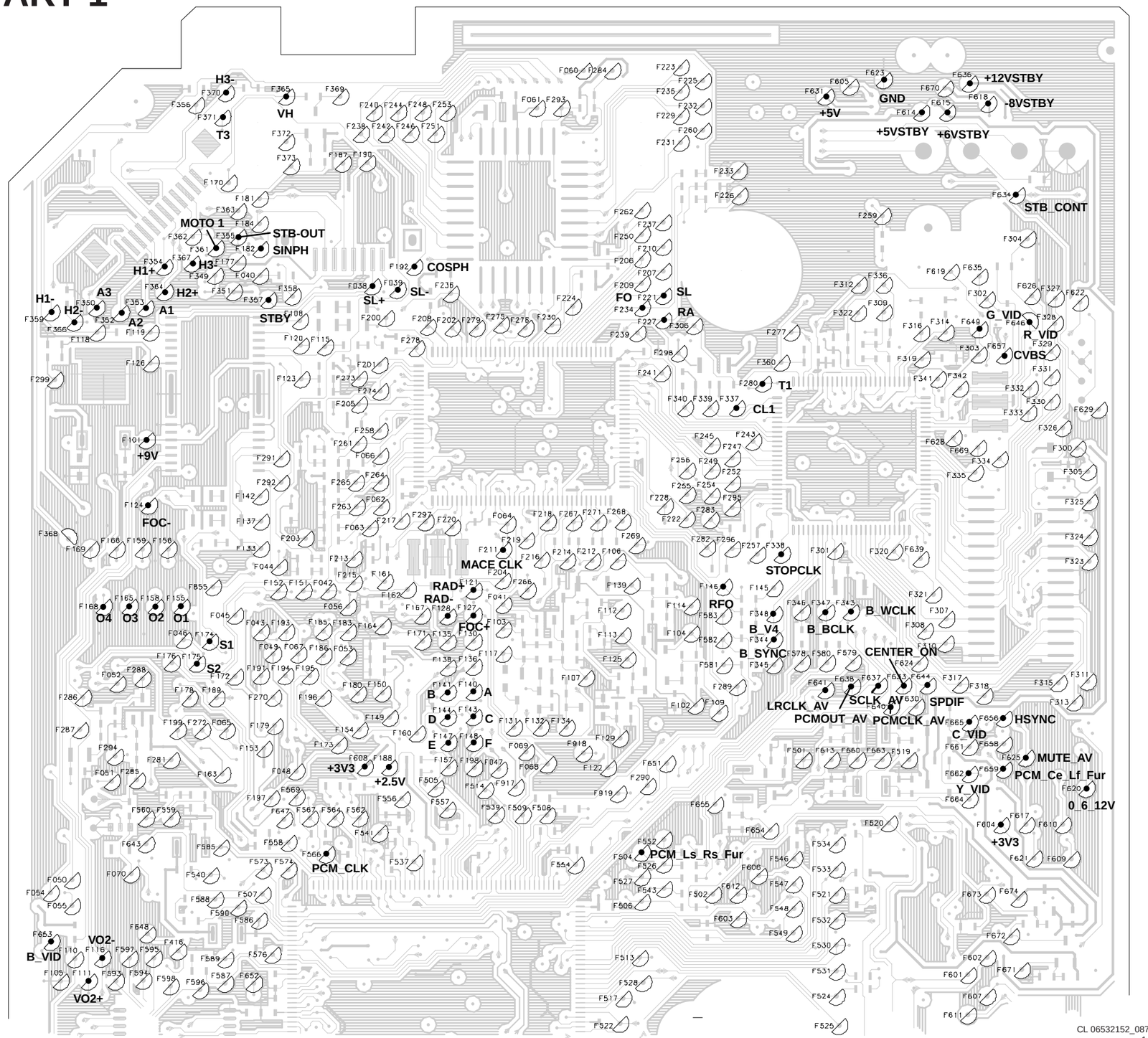
Layout Mono board: (overview testpoints)



F001	E2	F157	C1	F280	B2	F505	C1	F643	C1
F002	E1	F158	B1	F281	C1	F506	C2	F644	C3
F003	E1	F159	B1	F282	B2	F507	C1	F646	A3
F004	E1	F160	C1	F283	B2	F508	C2	F647	C1
F005	E1	F161	B1	F284	A2	F509	C2	F648	C1
F006	E1	F162	B1	F285	C1	F511	D3	F649	B3
F007	E1	F163	C1	F286	C1	F512	D3	F651	C2
F008	E1	F164	B1	F287	C1	F513	C2	F652	C1
F009	F1	F165	B1	F288	C1	F514	C2	F653	C1
F010	F1	F166	B1	F289	C2	F515	D3	F654	C2
F011	E2	F167	B1	F290	C2	F516	D3	F655	C2
F012	F1	F168	B1	F291	B1	F517	E2	F656	C3
F014	E3	F169	B1	F292	B1	F518	E2	F657	B3
F015	F3	F170	A1	F293	A2	F519	C3	F658	C3
F016	F1	F171	B1	F294	C1	F520	C3	F659	C3
F017	F1	F172	C1	F295	B2	F521	C3	F660	C3
F018	E3	F173	C1	F296	B2	F522	D2	F661	C3
F019	E3	F174	B1	F297	B1	F524	D3	F662	C3
F020	E3	F175	C1	F298	B2	F525	D3	F663	C3
F021	E3	F176	C1	F299	B1	F526	C2	F664	C3
F022	E3	F177	A1	F300	B3	F527	C2	F665	C3
F023	E3	F178	C1	F301	B3	F528	B3	F669	B3
F024	F3	F179	C1	F302	B3	F529	D3	F670	A3
F025	F2	F180	C1	F303	B3	F530	C3	F671	C3
F026	F2	F181	A1	F304	A3	F531	C3	F672	C3
F027	F2	F182	A1	F305	B3	F532	C3	F673	C3
F028	F1	F183	B1	F306	B2	F533	C3	F674	C3
F029	F1	F184	A1	F307	B3	F534	C3	F675	E3
F030	F2	F185	B1	F308	B3	F535	D3	F700	F1
F031	F1	F186	B1	F309	A3	F536	D1	F701	F1
F032	F1	F187	A1	F310	B3	F537	C1	F702	F1
F033	F2	F188	C1	F311	C3	F538	D2	F703	F1
F034	E3	F189	C1	F312	A3	F539	C2	F800	E2
F035	E3	F190	A1	F313	C3	F540	C1	F801	E2
F036	E3	F191	C1	F314	B3	F541	C1	F802	E2
F037	F3	F192	A1	F315	C3	F542	A3	F803	E2
F038	A1	F193	B1	F316	B3	F543	C2	F804	F2
F039	A1	F194	C1	F317	C3	F544	A3	F805	F2
F040	A1	F195	C1	F318	C3	F545	A3	F806	F2
F041	B2	F196	C1	F319	B3	F546	C2	F807	F2
F042	B1	F197	C1	F320	B3	F547	C2	F808	F2
F043	B1	F198	C2	F321	B3	F548	C2	F809	F2
F044	B1	F199	C1	F322	A3	F549	C2	F810	F2
F045	B1	F200	A1	F323	B3	F552	C2	F811	F2
F046	B1	F201	B1	F324	B3	F553	E1	F812	F2
F047	C2	F202	B1	F325	B3	F554	C2	F813	E2
F048	C1	F203	B1	F326	B3	F555	A3	F814	E2
F049	B1	F204	B2	F327	A3	F556	C1	F815	E2
F050	C1	F205	D1	F328	A3	F557	C1	F816	E1
F051	C1	F206	A2	F329	B3	F558	C1	F817	E1
F052	C1	F207	A2	F330	B3	F559	C1	F818	E1
F053	B1	F208	B1	F331	B3	F560	C1	F819	E1
F054	C1	F209	A2	F332	B3	F562	C1	F820	E1
F055	C1	F210	A2	F333	B3	F564	C1	F821	E1
F056	B1	F211	B2	F334	B3	F566	C1	F822	E2
F060	A2	F212	B2	F335	B3	F567	C1	F823	D1
F061	A2	F213	B1	F336	A3	F568	D2	F824	E2
F062	B1	F214	B2	F337	B2	F569	C1	F825	D1
F063	B1	F215	B1	F338	B2	F573	C1	F826	E1
F064	B2	F216	B2	F339	B2	F574	C1	F827	E1
F065	C1	F217	B1	F340	B2	F576	C1	F828	E1
F066	B1	F218	B2	F341	B3	F578	C3	F829	F1
F067	B1	F219	B2	F342	B3	F579	C3	F830	F1
F068	C2	F220	B1	F343	B3	F580	C3	F831	E1
F069	C2	F221	A2	F344	B2	F581	C2	F832	E1
F070	C1	F222	B2	F345	C2	F582	B2	F833	E1
F099	E3	F223	A2	F346	B3	F583	B2	F834	E1
F101	B1	F224	A2	F347	B3	F585	C1	F835	E1
F102	C2	F225	A2	F348	B2	F586	C1	F836	F2
F103	B2	F226	A2	F349	A1	F587	C1	F837	F2
F104	B2	F227	A2	F350	A1	F588	C1	F838	F2
F105	C1	F228	B2	F351	A1	F589	C1	F839	F2
F106	B2	F229	A2	F352	A1	F590	C1	F840	E1
F107	C2	F230	B2	F353	A1	F592	D1	F841	E1
F108	A1	F231	A2	F354	A1	F593	C1	F842	E1
F109	C2	F232	A2	F355	A1	F594	C1	F843	E1
F110	C1	F233	A2	F356	A1	F595	C1	F845	E1
F111	C1	F234	A2	F357	A1	F596	C1	F846	E1
F112	B2	F235	A2	F358	A1	F597	C1	F847	E1
F113	B2	F236	A1	F359	A1	F598	C1	F848	E1
F114	B2	F237	A2	F360	B2	F599	C1	F849	E1
F115	B1	F238	A1	F361	A1	F600	D3	F850	E2
F116	C1	F239	B2	F362	A1	F601	C3	F851	E1
F117	B2	F240	A1	F363	A1	F602	C3	F852	F2
F118	B1	F241	B2	F364	A1	F603	C2	F855	B1
F119	B1	F242	A1	F365	A1	F604	C3	F900	E1
F120	B1	F243	B2	F366	A1	F605	A3	F901	E1
F121	B2	F244	A1	F367	A1	F606	C2	F903	F2
F122	C2	F245	B2	F369	A1	F607	D3	F904	E1
F123	B1	F246	A1	F370	A1	F608	C1	F909	E1
F124	B1	F247	B2	F371	A1	F609	C3	F911	E1
F125	C2	F248	A1	F372	A1	F610	C3	F912	E1
F126	B1	F249	B2	F373	A1	F611	D3	F915	E1
F127	B2	F250	A2	F415	D1	F612	C2	F916	F1
F128	B1	F251	A1	F416	C1	F613	C3	F917	C2
F129	C2	F252	B2	F419	D3	F614	A3	F918	C2
F130	B2	F253	A1	F420	D1	F615	A3	F919	C2
F131	C2	F254	B2	F450	D1	F616	D3	F920	E1
F132	C2	F255	B2	F451	D3	F617	C3	F921	F2
F133	B1	F256	B2	F452	E3	F618	C3	F922	F2
F134	C2	F257	B2	F453	D1	F619	A3	F923	F3
F135	B1	F258	B1	F454	D1	F620	C3	F924	F2
F136	C2	F259	A3	F455	E2	F621	C3	F925	F3
F137	B1	F260	A2	F456	D1	F622	A3	F926	F3
F138	C1	F261	B1	F457	E1	F623	A3	F927	F2
F139	B2	F262	A2	F458	D1	F624	C3	F928	E1
F140	C2	F263	B1	F459	F2	F625	C3	F929	F2
F141	C1	F264	B1	F460	D1	F626	A3		
F142	C1	F265	B1	F461	D1	F627	B3		
F143	C2	F266	B2	F462	D2	F628	B3		
F144	C1	F267	B2	F463	D2	F629	B3		
F145	B2	F268	B2	F464	D1	F630	C3		
F146	B2	F269	B2	F465	E3	F631	A3		
F147	C1	F270	C1	F466	E3	F632	F2		
F148	C2	F271	B2	F467	E2	F633	C3		
F149	C1	F272	C1	F468	D1	F634	A3		
F150	C1	F273	B1	F469	D1	F635	A3		
F151	C1	F274	B1	F470	D1	F636	C3		
F152	B1	F275	B2	F471	D1	F637	C3		
F153	C1	F276	B2	F501	C3	F638	C3		
F154	C1	F277	B2	F502	C2	F639	B3		
F155	B1	F278	B1	F503	E1	F640	C3		
F156	B1	F279	B2	F504	C2	F641	C3		

Layout Mono board: (Part 1 Test points)

PART 1



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Layout Mono board: (Part 2 Test points)