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2. Complete part numbers and quantities required
3. Description of parts
4. Model number for which part is required
5. Way of shipment
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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 it is return to the user/customer.

Ref. UL Standard No. 1492.

In case of difficulties, do not hesitate to contact the Technical Department at above mentioned address.

1. Technical specifications

SACD/CD

Audio characteristics		Super Audio CD	CD
Channels		6 channels (Max.)	2 channels
Frequency range		2 Hz - 100 kHz	2 Hz - 20 kHz
Frequency characteristics		2 Hz - 50 kHz (-3 dB)	2 Hz - 20 kHz
Dynamic range		114 dB	more than 100 dB
THD (1 kHz)		0.0008 %	0.0013 %
Analog output level		2.0 V	2.0 V
Digital output	Output level (coaxial)	-	0.5 Vp-p (75 ohm)
	Output level (optical)	-	-19 dBm
Format		1 bit DSD	16 bit linear PCM
Sampling frequency		2.8224 MHz	44.1 kHz
Optical readout system			
Laser type		AlGaAs	AlGaAs
Wavelength		650 nm	780 nm

DVD/VCD

Video	Format	MPEG1 (VCD) / MPEG2 (DVD)
	Horizontal	resolution more than 500
Audio	Format	PCM (16/20/24 bit, 48/96 kHz fs) / Dolby Digital / MPEG
	Frequency characteristics	2 Hz - 22 kHz (PCM 48 kHz), 2 Hz - 44 kHz (PCM 96 kHz)
	Dynamic range	114 dB (PCM 24 bit)
	THD (1 kHz)	0.0013 % (PCM 24 bit)
Digital output		PCM, Dolby Digital, DTS, MPEG (F, U version)
Video output		Composite / S / Components

* Audio characteristics are for multi channel output.

Power Supply

N version.....	AC 115/230 V, 60 Hz
S version.....	AC 115/230 V, 60 Hz
F version.....	AC 100 V 50/60 Hz
U version.....	AC 120 V 60 Hz
Power consumption (N version).....	33 W
Power consumption (S, F, U version).....	30 W

Cabinet

Dimensions.....	458 (W) x 126 (H) x 379 (D) mm
Weight.....	11 kg
Operating temperatures.....	+5 °C to +35 °C
Operating humidity.....	5% - 90% (without dew)

Accessories

Remote control unit (RC-12SAS1).....	1
Battery (AAA).....	2
Stereo audio cable.....	3
Audio-Video cable.....	1
Remote control cord.....	1
Users guide.....	1
AC power cord.....	1
Registration card (N, F, U version).....	1

SCART CONNECTOR

SCART II (connected to TV)

Pin	signals:		
1	Output	Audio R	1.8 Vrms
2	Input	Audio R	
3	Output	Audio L	1.8 Vrms
4		Audio GND	
5		Blue/Chroma GND	
6	Input	Audio L	
7	Bi-dir	Blue out/Chroma in	0.7 Vpp +/- 0.1 V into 75 Ohm (*)
8	Output	Function switch	< 2 V = TV > 4.5 V / < 7 V = asp. Ratio 16:9 DVD > 9.5 V / < 12 V = asp. ratio 4:3 DVD
9		Green GND	
10		not connected	
11	Output	Green	0.7 Vpp +/- 0.1 V into 75 Ohm (*)
12		not connected	
13		Red/Chroma GND	
14		fast switch GND	
15	Output	Red out/Chroma out	0.7 Vpp +/- 0.1 V into 75 Ohm (*) +/- 3 dB 0.3 Vpp Chroma (burst)
16	Output	fast switch RGB/CVBS or Y	< 0.4 V into 75 Ohm = CVBS > 1 V / < 3 V into 75 Ohm = RGB
17		Y/CVBS GND	
18		fast switching GND	
19	Output	CVBS/Y/RGB sync	1 Vpp +/- 0.1 V into 75 Ohm (*)
20	Input	CVBS/Y	
21		Shield	

SCART I (connected to AUX)

Pin	signals:		
1	Output	Audio R	1.8 Vrms
2	Input	Audio R	
3	Output	Audio L	1.8 Vrms
4		Audio GND	
5		Blue/Chroma GND	
6	Input	Audio L	
7	Bi-dir	Blue in/Chroma out	+/- 3 dB 0.3 Vpp Chroma (burst)
8	Input	Function switch	
9		Green GND	
10		not connected	
11	Input	Green	
12		not connected	
13		Red/Chroma GND	
14		fast switch GND	
15	Output	Red in/Chroma in	
16	Input	fast switch RGB/CVBS or Y	
17		CVBS GND	
18		fast switching GND	
19	Output	CVBS/Y/RGB sync	1 Vpp +/- 0.1 V into 75 Ohm (*)
20	Input	CVBS/Y	
21		Shield	

(*) for 100% white

2. Warnings and laser safety

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 à 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 à ce que les composants ainsi que les outils que l'on utilise soient également à ce potentiel.

(D) WARNUNG

Alle IC und viele andere Halbleiter sind empfindlich gegen elektrostatische Entladungen (ESD).
Unvorsichtige 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 longevità potrebbe essere fortemente ridotta in caso di non osservazione della più 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 gespecificeerde worden toegepast.

(F)

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

(D)

Bei jeder Reparatur sind die geltenden Sicherheitsvorschriften zu beachten.
Der Originalzustand des Geräts darf nicht verändert werden.
Für 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 ricambio identici a quelli specificati.

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 of fire or electrical shock hazard.

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

2.2 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:	SemiconductorlaserGaAIAs
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 COVERSIELD

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 NÅR DENNA DEL ÄR ÖPPNAD BETRAKTA EJ STRÅLEN
VARO! AVATT AESSA OLET ALTTIINA NÄKYVÄLLE JA NÄKYMÄTTÖMÄLLE LASER SÄTEILYLLE. ÄLÄ KAT SO 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 (PH16)

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 switched off !

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

The primary side of the 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 001M 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 sensitive for dropping or shocks.

3. Service hints, Taking the disc out

3.1 Service hints

3.1.1 Switched Mode Power Supply Unit PZ03

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 QW12922150 (3104 129 22150).

3.1.2 SACD module

This module can be repaired as follows:

1. The loader and DVD-Mechanism 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 QE02361104 (9305 023 61104).
2. The mono board has to be repaired down to component level. Repair handling of the monoboard requires a workshop with sophisticated desoldering tools.

3.1.3 Service positions

SACD module

See also dismantling instructions.

After demounting the DAC PCB PP16 and the dust bracket 023M, 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

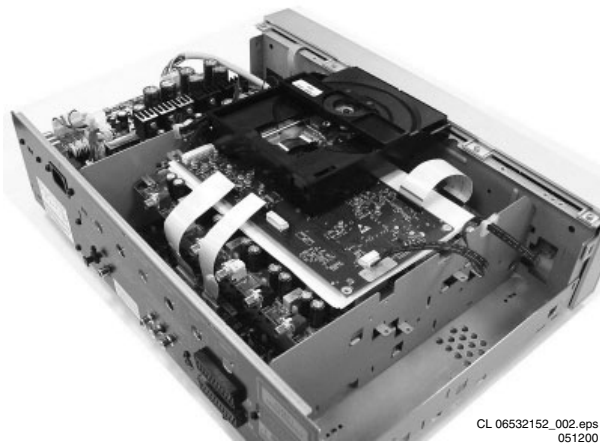


Figure 3-1

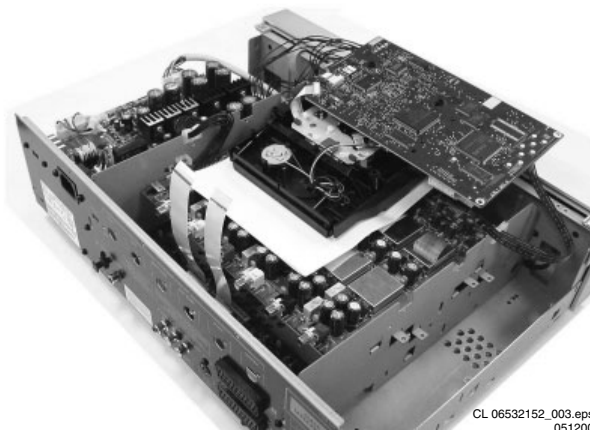


Figure 3-2

DAC PCB

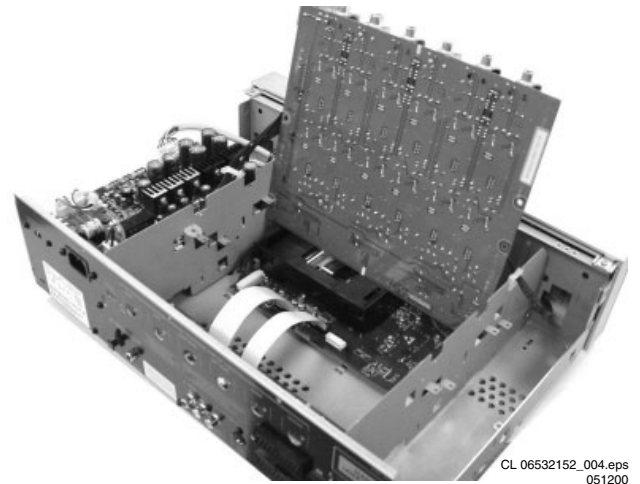


Figure 3-3

AV PCB

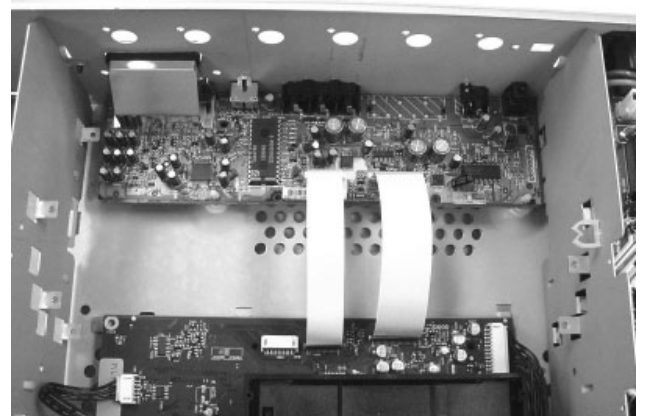


Figure 3-4

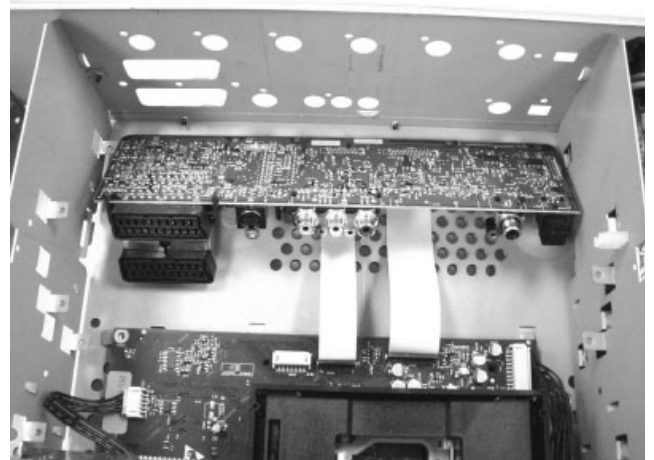
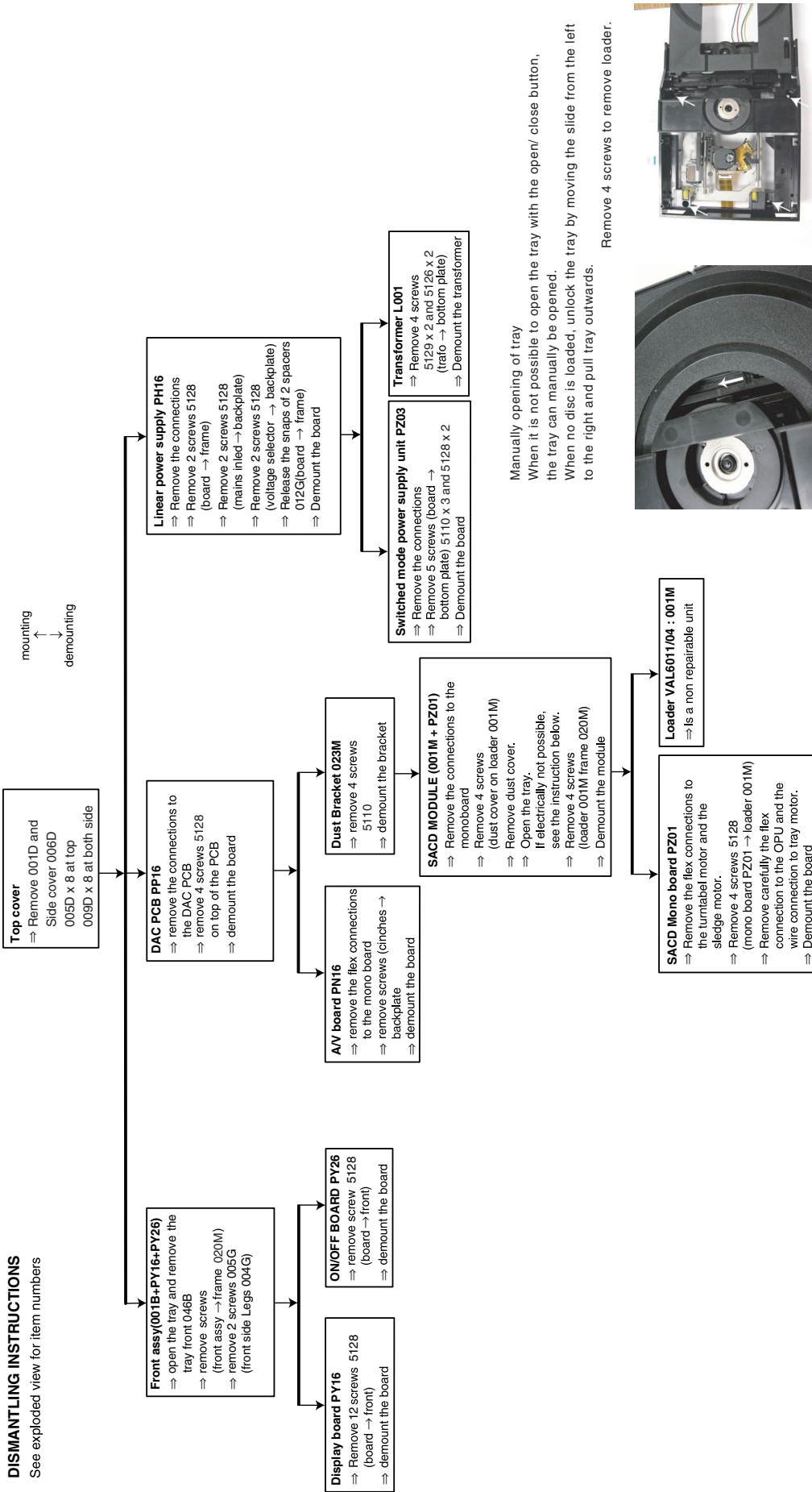


Figure 3-5

3.1.4. Mechanical- and dismantling instructions

DISMANTLING INSTRUCTIONS

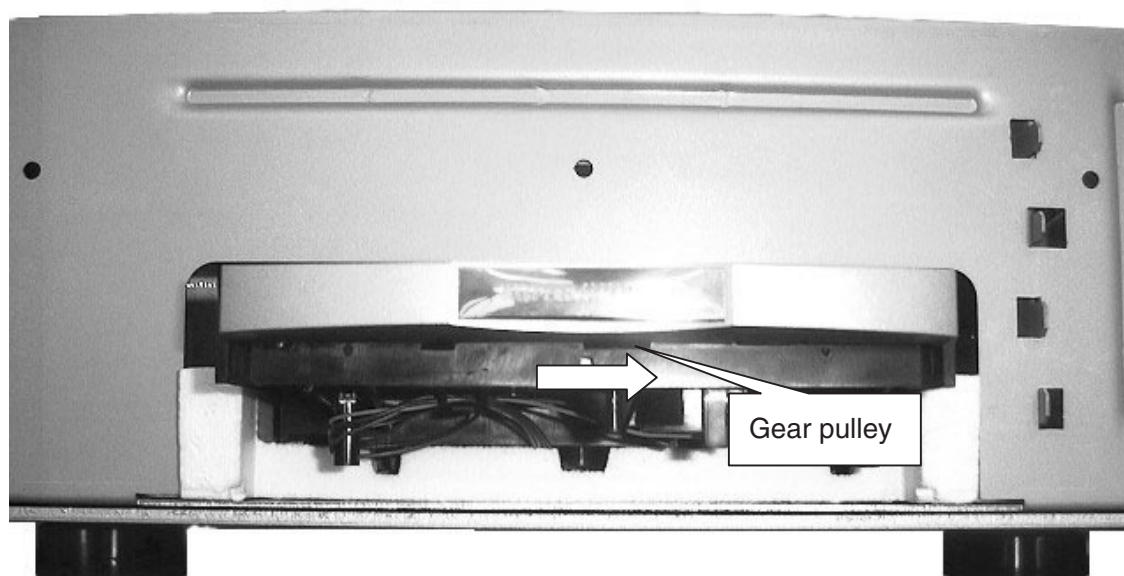
See exploded view for item numbers



3.2 Taking the disc out.

1. Remove the top cover with 8 screws.
2. Remove the both side covers with 8 screws.
3. Remove the 8 screws of front panel and unfasten 2 screws of front legs.
4. Pull out the front panel.
5. Turn right the pulley by your finger or nail. (See fig.1)
6. Then the tray is moved a little. Pull the tray with your hand at this time.

Note: Take care of unhurt gear belt.



4. Installing the software and entering version.

The kind of CD-ROM (software), and explanation

- a) Key reassignment Disc (44444444.016) [**Parts No. *SA12KEYCD**]
- b) Background (PAL) Disc (11111111.008) [**Parts No. *SA12PALCD**]
- c) Background (NTSC) Disc (22222222.008) [**Parts No. *SA12NTSCD**]

Installing necessary CD-ROM for version.

- For /N: Key reassignment Disc (44444444.016) and Background (PAL) Disc (11111111.008)
- For /S: Key reassignment Disc (44444444.016) and Background (PAL) Disc (11111111.008)
- For /U: Key reassignment Disc (44444444.016) and Background (NTSC) Disc (22222222.008)
- For /F: Key reassignment Disc (44444444.016) and Background (NTSC) Disc (22222222.008)

How to installing the software

All software is installed from CD-ROM. These are supplied by another disc, respectively. When disc was put in the player, software is installed automatically. And disc comes out of the player, after finished. The sequence to install is "Key reassignment" first and, next, is "Background".

Entering Version and region code

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

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 <2>, <7>, <4>

The display shows "-----"

Press now successively the following keys

For /N: <0>, <0>, <1>, <0>, <0>, <0>, <0>, <0>, <0>, <0>, <0>

For /U: <0>, <0>, <2>, <0>, <0>, <0>, <0>, <0>, <0>, <0>, <0>

For /S: <0>, <0>, <3>, <0>, <0>, <0>, <0>, <0>, <0>, <0>, <0>

For /F: <0>, <0>, <4>, <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.

How to confirm the software and the version.

11111111.008/ 22222222.008: Displayed on TV screen as background of marantz is OK, after entering version.

If a power supply is turned on, with <STOP> and <NEXT> of a player pushed, a change of NTSC mode and PAL mode can be performed.

44444444.016: Worked <DISPLAY OFF> or <VIDEO OFF> of the player is OK, After entered version.

Version: Looked at "Audio language" or "Subtitle language" in "Personal preferences".

The contents of "Audio language" or "Subtitle language" are as the following table.

/N	/U	/S	/F
English	English	English	Japanese
Español	Español	Español	English
Français	Français	Français	Español
Português	Português	Português	Français
Italiano	Italiano	Russian	Português
Deutsch	Russian	Japanese	Russian
Nederlands	Deutsch	Korean	Korean
Suomeksi	Greek	Chinese	Chinese
Dansk	Japanese	Bahamas Indonesia	Bahamas Indonesia
Norsk	Korean	Khmer	Khmer
Svenska	Chines	Bahamas Malayalam	Bahamas Malayalam
Russian	Quechua	Burmese	Burmese
Greek	Guarani	Nepal	Nepal
Türkçe	Aymara	Thai	Thai
Íslensk	Inupiaq	Vietnamese	Vietnamese
Català		Tibetan	Tibetan

Default setting

Reset of Personal preferences

Turned on power of the player, while depressing <PLAY> and <OPEN/CLOSE> button, reset of personal preferences can be performed.

Setting of menu

	TV mode	Black level shift	Remote control code
/N	PAL	ON	DVD1
/U	NTSC	ON	DVD1
/S	PAL	OFF	DVD1
/F	NTSC	OFF	DVD1

Black level shift is in "PICTURE" of "Personal Preferences". It becomes ON if it resets.

How to change a remote control code is as follows. (CODE DVD1/ CODE DVD2)

By remote controller: Press <DISPLAY> and <1> become code DVD1.

Press <DISPLAY> and <2> become code DVD2.

By player: Turned on power of the player, while depressing <SOUND MODE> and <OPEN/CLOSE> button.

Position of switches

	Voltage Selector (SH02)	Filter (SD71)	RC-6 (SF51)
/N	230V	Position 1	Internal
/U	115V	Position 1	Internal
/S	230V	Position 1	Internal
/F	115V	Position 1	Internal

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 SA-12S1 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

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.

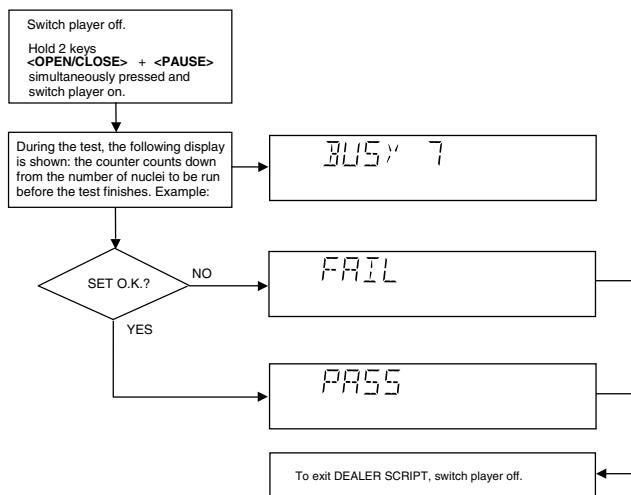
5.2.2 Structure of the Player Script

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.



CL 06532152_007.eps
051200

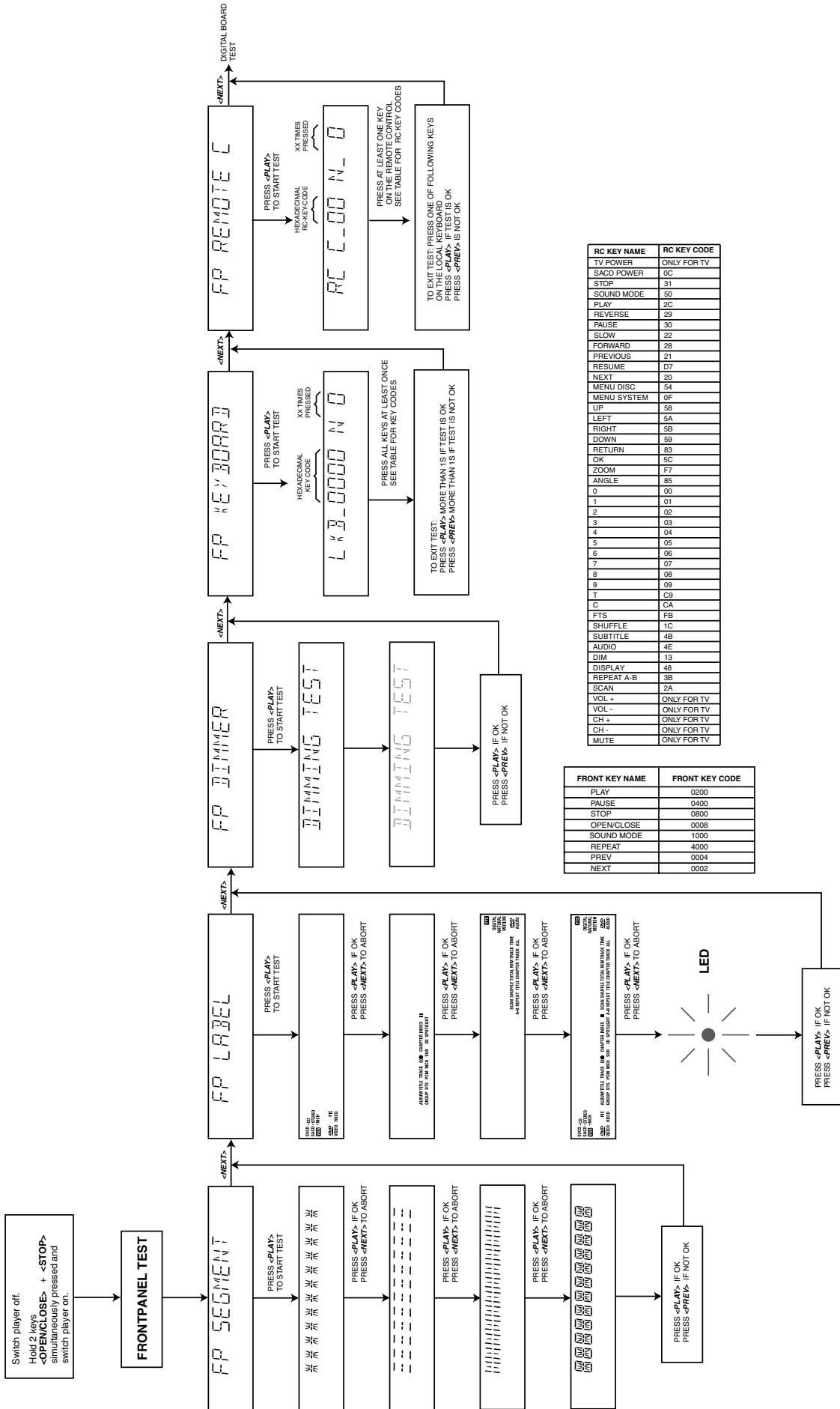
Figure 5-1

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
DISPLAY	48
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
SOUND MODE	1000
REPEAT	4000
PREV	0004
NEXT	0002

Figure 5-2

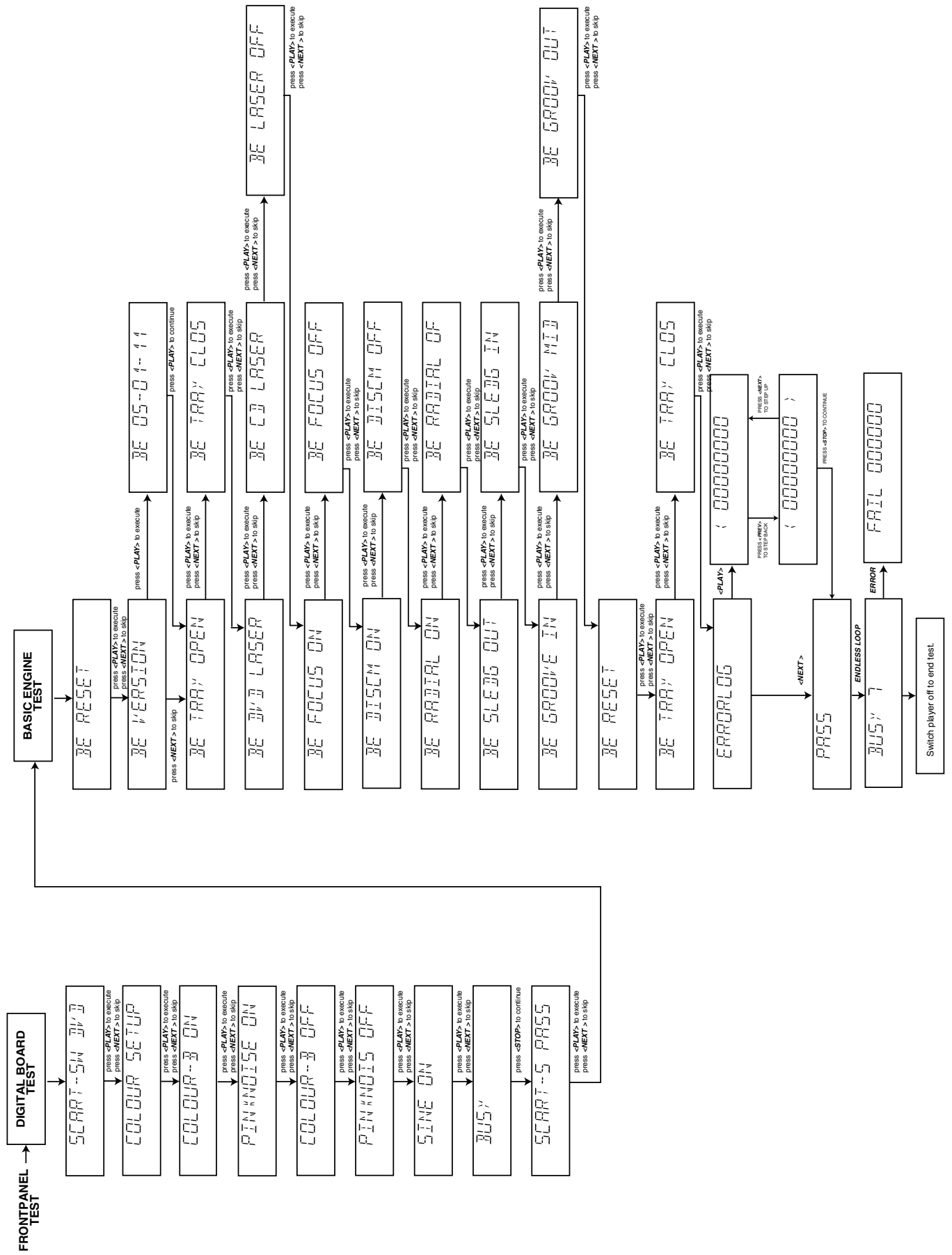


Figure 5-3

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_OVE RFLOW	To many characters were offered in too little time. Reason: system was too busy doing other jobs.
0001	COMMUN- ICATION	Usually a protocol error. Reason: bad connection between engine and processor.

BE errors

Error Number	Error name	Explanation
0101	S2B_ILL_CO MMAND	Parameter(s) not valid for this command. Reason: some communication problem between UART and engine.
0102	S2B_ILL_PAR AM	Command not allowed in this state or unknown. Reason: see S2B_ILL_COMMAND error
0103	S2B_SLEDGE	Sledge could not be moved to home position.
0104	S2B_FOCUS	Focus failure
0105	S2B_MOTOR	Motor could not reach speed within timeout
0106	S2B_RADIAL	Servo didn't get on track after several retries.
0107	S2B_PLL_LO CK	PLL could not lock in Accessing or Tracking state
0108	SBC_HEADE R_TO	Header timeout

Error Number	Error name	Explanation
0109	S2B_SBC_NO T_FOUND	Requested subcode item could not be found.
010A	S2B_TRAY	Tray could not be opened or closed completely.
010B	S2B_TOC_RE AD	TOC could not be read within timeout period.
010C	S2B_JUMP	Requested seek could not be performed.
010D	S2B_NON_EX IST_SES	Attempt to access a non-existing session.
010E	S2B_NON_EX IST_BCA	
01F0	S2B_OVERR UN	Too many bytes received over S2B Reason: see S2B_ILL_COMMAND error
01F1	S2B_COMM_ TO	Not enough bytes are received over S2B Reason: see S2B_ILL_COMMAND error
01F2	S2B_PARITY	Byte received with parity error. Reason: see S2B_ILL_COMMAND error
01F3	S2B_ILL_PHA SE	CMD IDC is not valid, transmission out of sync. Reason: see S2B_ILL_COMMAND error
01F4	S2B_ILL_NR_ OF_BYTES	Byte count has an illegal value. Reason: see S2B_ILL_COMMAND error

SLPH error codes

Error Number	Error name	Explanation
0000	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_SYNCER ROR	System cannot get synchronised with sectors coming from disc. Reason: Usually a damaged disc or the player was dropped/pushed during operation. If not, the engine is malfunctioning.
0007	SP_EDCERR OR	Data coming from disc is damaged. Reason: see SP_SYNCERROR
0008	SP_CONTINU ITYERROR	Sequence of sectors coming from disc is incorrect. Reason: see SP_SYNCERROR
0009	DMX_CONTI NUITYER- 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_TIMEO UTERROR	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 **<2> <7> <4>**
 The display shows: “-----”
 Press now successively the following keys :
 for /N(P1): **<0><0><1> <0><0><0><0><0><0><0><0>**
 for /U(P2): **<0><0><2> <0><0><0><0><0><0><0><0>**
 for /S(P3): **<0><0><3> <0><0><0><0><0><0><0><0>**
 for /F(P4): **<0><0><4> <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.

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.

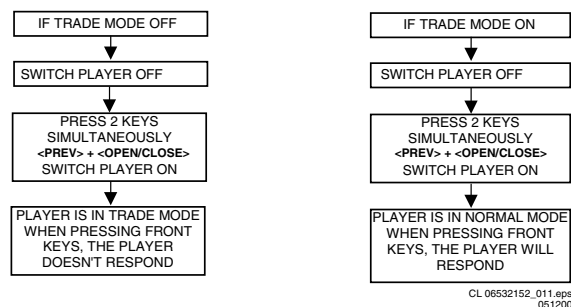


Figure 5-5

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.

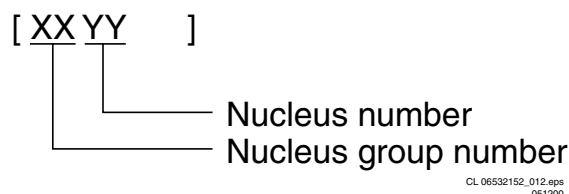


Figure 5-6

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:

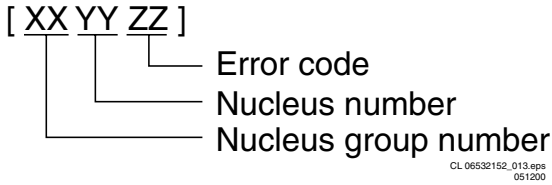


Figure 5-7

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 0.11
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 mono-board on.
110	Mute Off Switches the audio mute of the mono-board 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.

[xx yy] Number	Nuclei
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.

[xx yy] Number	Nuclei
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):

```

SACD1000 Diagnostic Software version 0.11

SDRAM Interconnection test passed
Basic SDRAM test passed

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

Main Menu

1   Basic Engine
2   Dac Board
3   Digital Board
4   Frontpanel
5   Log

```

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 SA-12S1 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 →
- 6. Scripts →

Basic Engine Menu

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

Disc Motor Menu

- 1. Motor On [606]
- 2. Motor Off [607]

Focus Menu

- 1. Focus On [604]
- 2. Focus 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. Dim Test [618]
- 2. Echo [500]
- 3. Light Labels [503]
- 4. Led Test [504]
- 5. Keyboard [506]
- 6. Remote Control [506]
- 7. Segment Test [502]
- 8. Version [501]

Log Menu

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

Script Menu

- 1. User/Dealer Script
- 2. Player Script

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.

Error code	Error description
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 > 1MΩ
Most tests have to be done by software commands.
Together with the software command you will find a Ref.# nbr. This is the number of the diagnostic nucleus used for this test. More detailed information can be found in the description of the command mode interface.
Levels: Most measurements are digital measurements.
The high and low levels in this document got to have next specification: low : < 0.3V (LVTTTL) high : > 3.0V (LVTTTL) LOW : < 0.4V (TTL) HIGH: > 4.5V (TTL)
All 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:

1. Measure the voltages on the pins of the connector 1600 with a multimeter.
2. Also check the following power supplies:

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)

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)

1. Current at the input of the power supply
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 RESETh is de-asserted. RESETh 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 RESETh is asserted.

Reset of Servo:

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

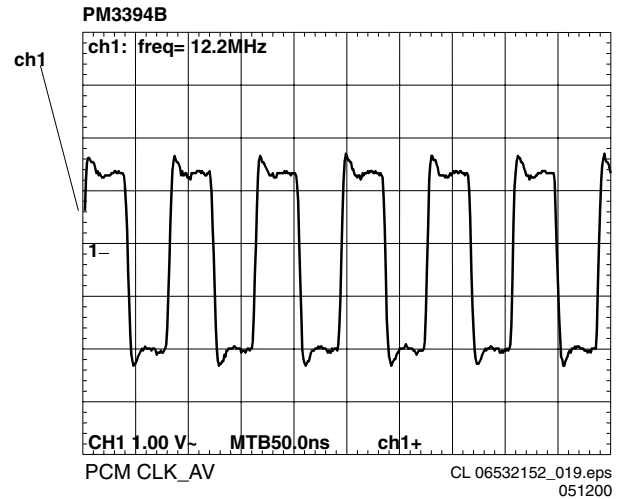
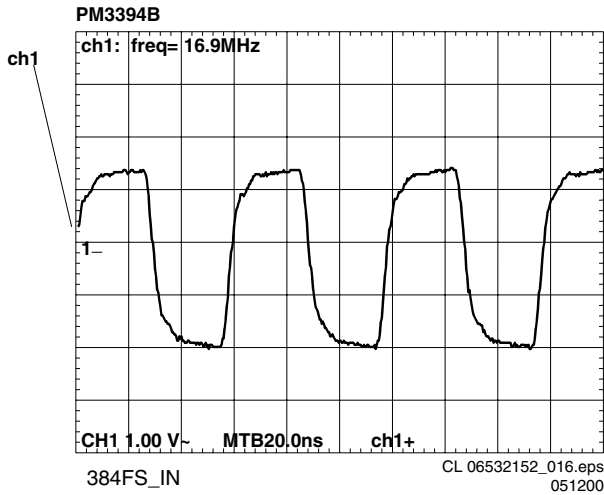
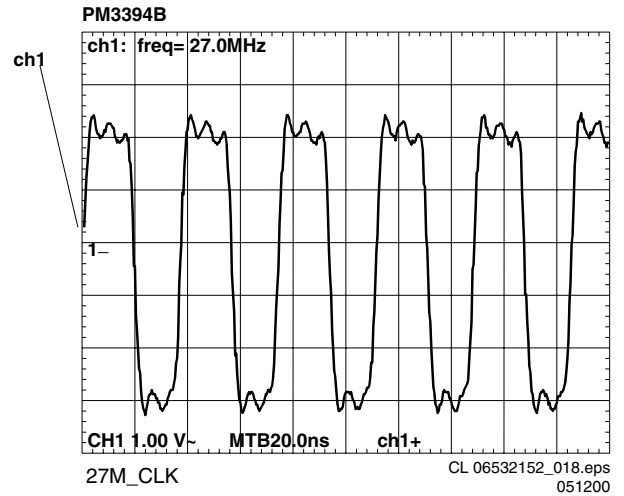
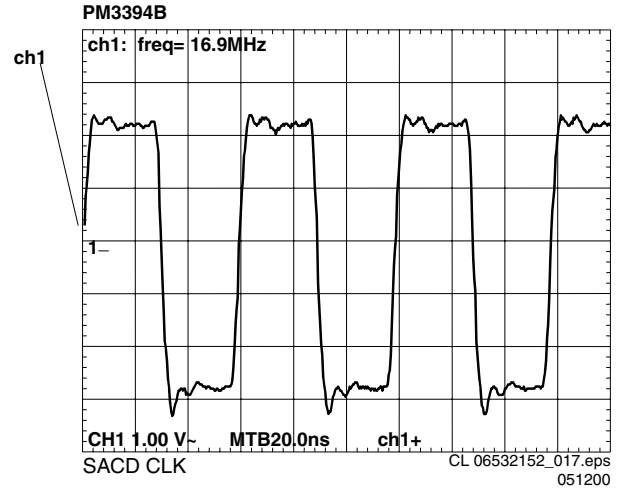
When POR is not working (due to a hang-up situation), an extra reset signal RSTN, coming from the Sti5505 will wake up the Servo circuit.

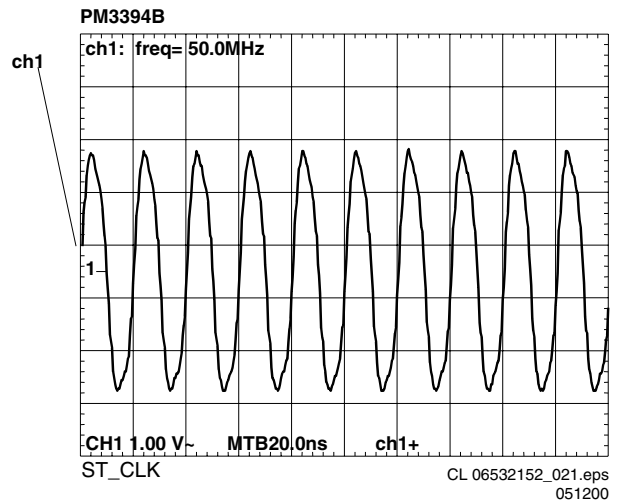
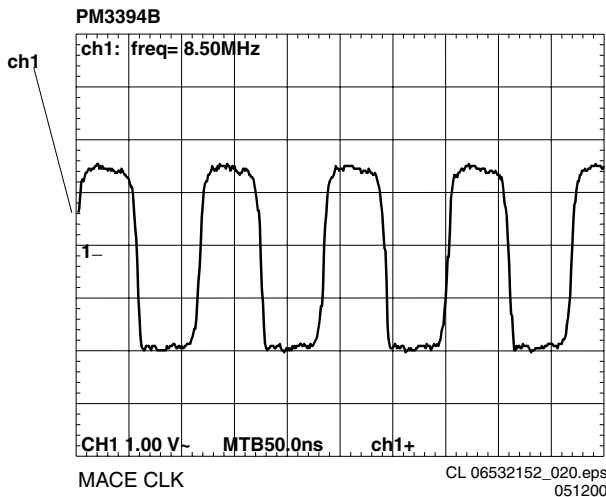
5.5.4 Clock check

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





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.

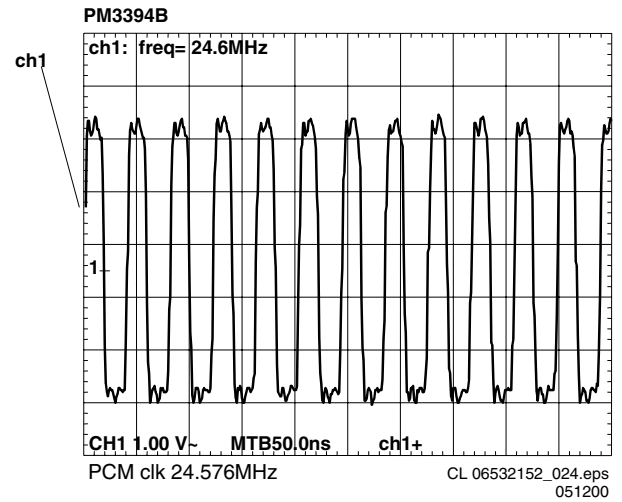
Ref.#	Command Name	Remark
601	S2b Echo	Write and read back

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_AC LK2	SEL_AC LK1
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



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%

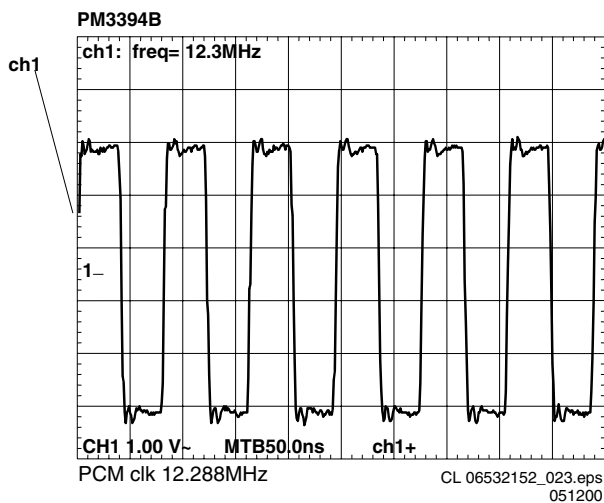
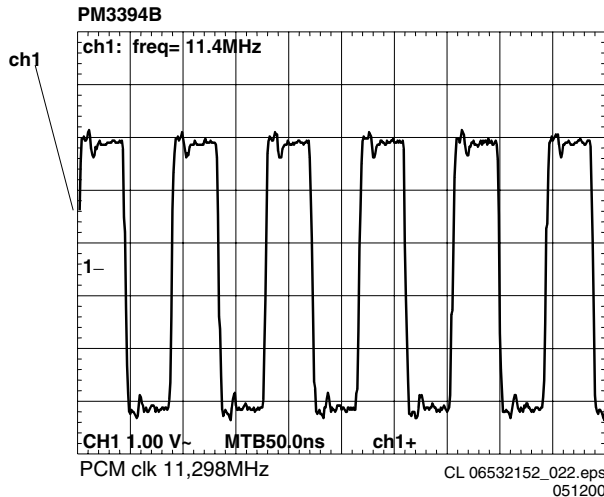
PCM Audio on I2S bus

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

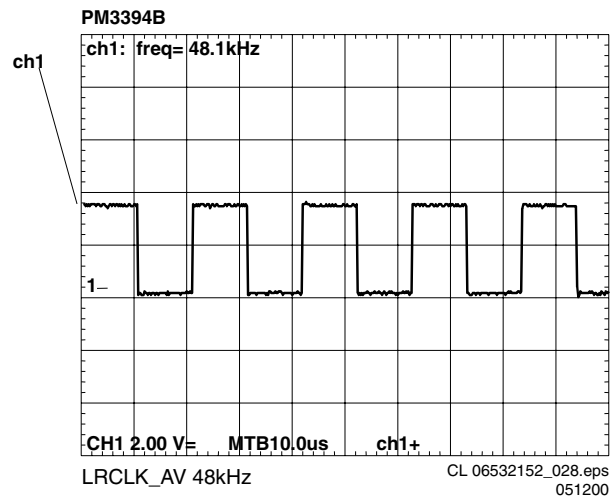
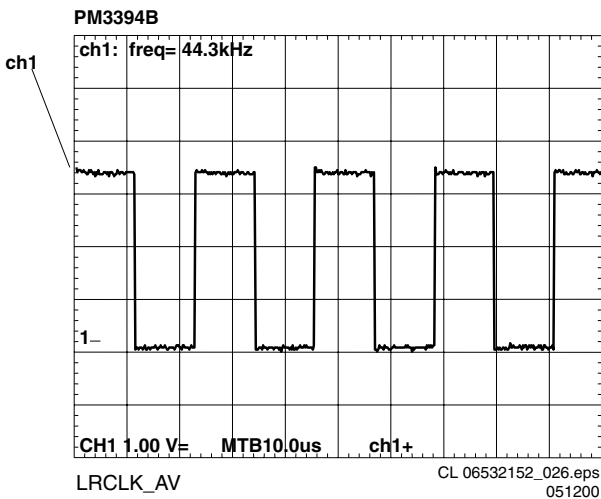
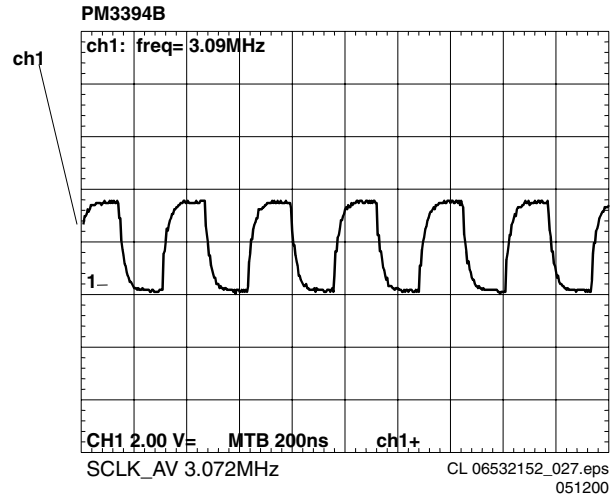
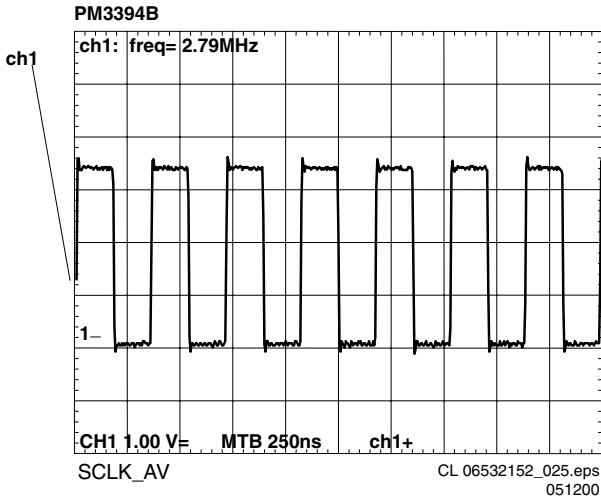
Signal	Test point	type	Level	Frequency
SCLK_AV	F637	Clock	LVTTTL	2.82MHz < 0.02%
LRCLK_AV	F641	Clock	LVTTTL	44.1KHz < 0.02%
PCM_CLK_AV	F640	No signal	LVTTTL	N/A
PCMOUT_AV	F638	No signal	LVTTTL	N/A



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

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.



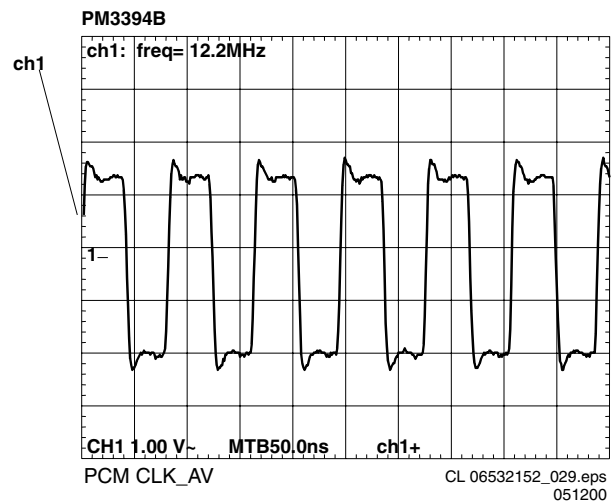
Sine wave

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



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	LVTTTL	3.072MHz < 0.02%
LRCLK_AV	F641	Clock	LVTTTL	48 kHz < 0.02%
PCM_CLK_AV	F640	Clock	LVTTTL	12.288 MHz < 0.02%
PCMOUT_AV	F638	Data stream	LVTTTL	N/A
PCM_Ce_Lf_Fur	F659	Data stream	LVTTTL	N/A
PCM_LsRs_Fur	F504	Data stream	LVTTTL	N/A
SPDIF	F644	Data stream	TTL	N/A

5.5.6 Video

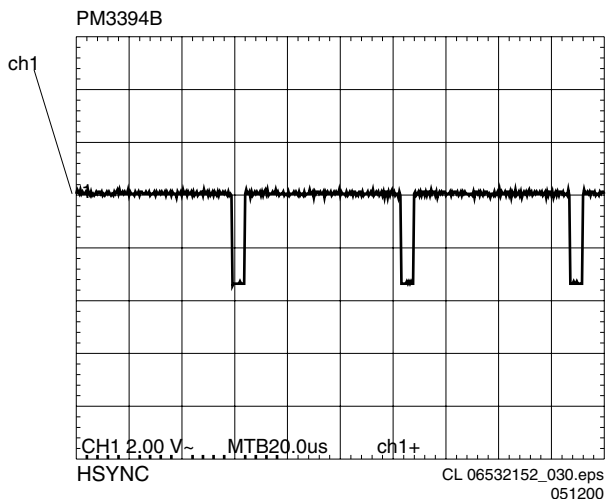
From the diagnostic program, play the 8 colour bar pattern.

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

Video Hsync

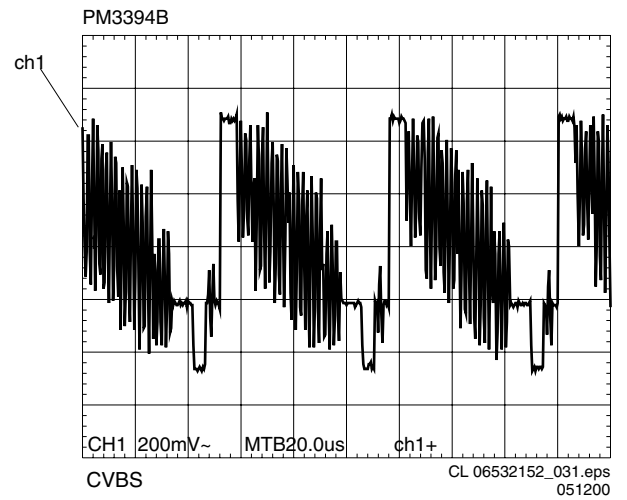
Measure this output at F656

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

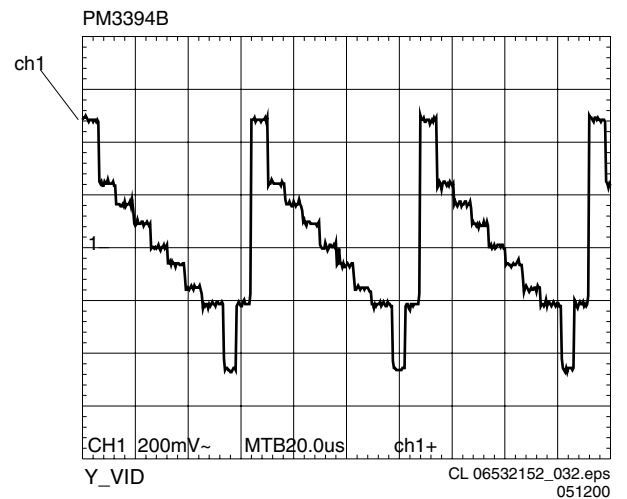


Video signals

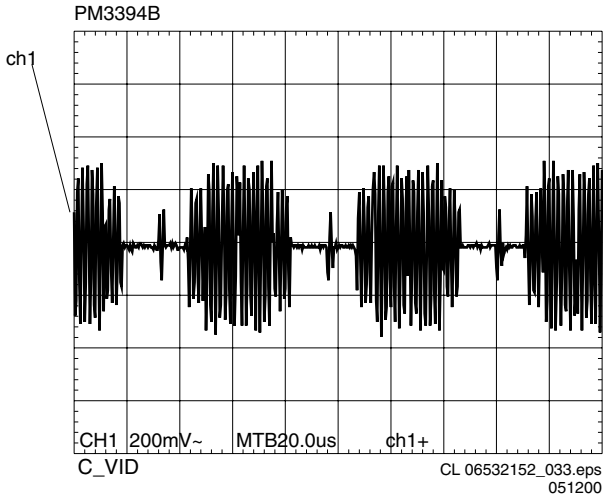
CVBS
Measured at F657



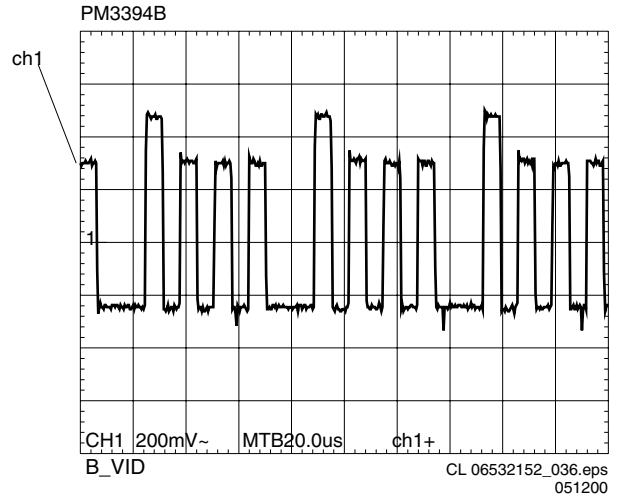
Luminance Y-VID
Measured at F662



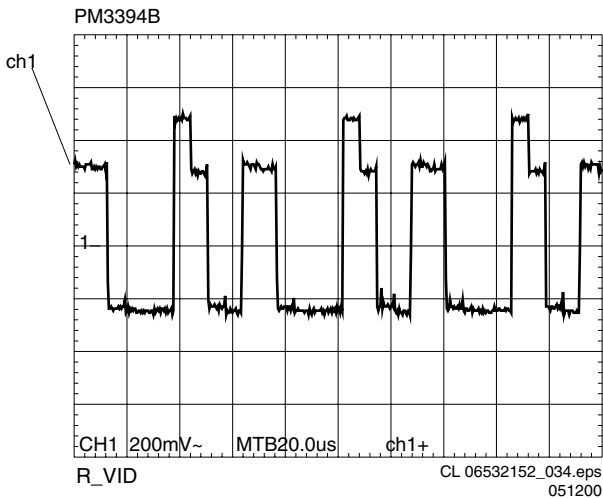
Chrominance C_VID
Measured at F665



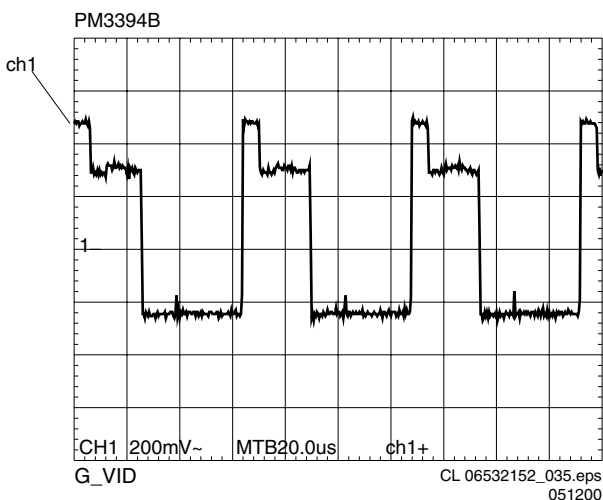
Blue B_VID
Measured at F653



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	LVTTTL	12.288 MHz < 0.02%
DSD_PCM(6)	F003	Clock	LVTTTL	3.072 MHz < 0.02%
DSD_PCM(7)	F004	Clock	LVTTTL	48 kHz < 0.02%
DSD_PCM(0)	F005	Data stream	LVTTTL	N/A

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

5.5.7 SERVO TESTS

General start-up measurements:

Reset the Basic Engine part

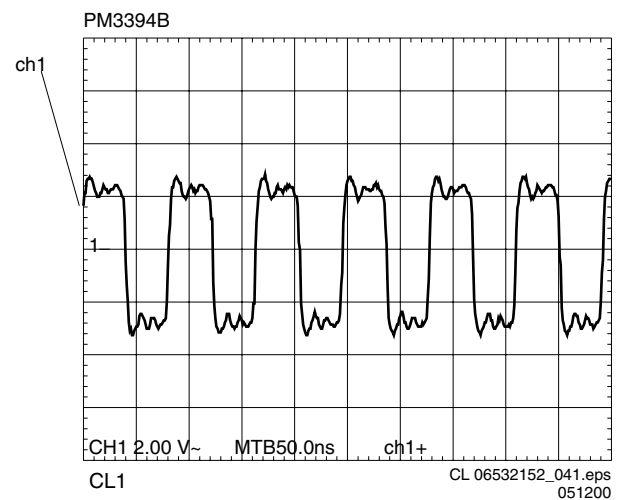
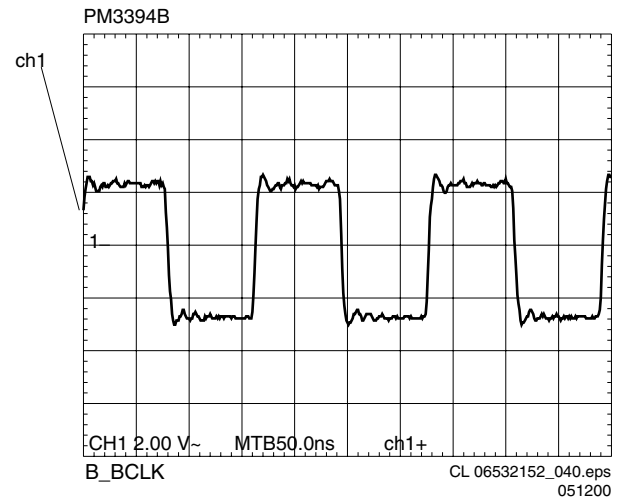
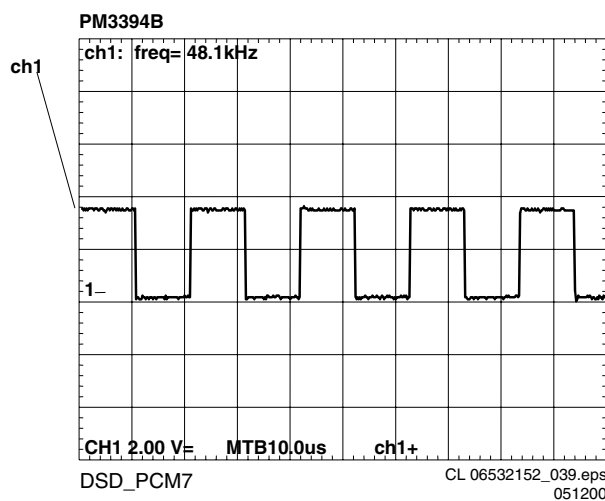
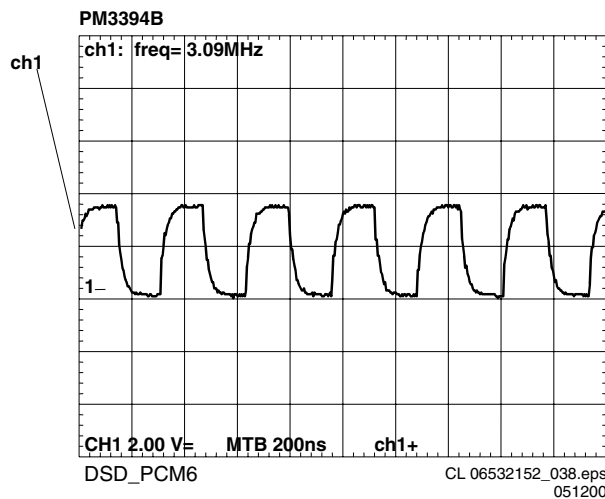
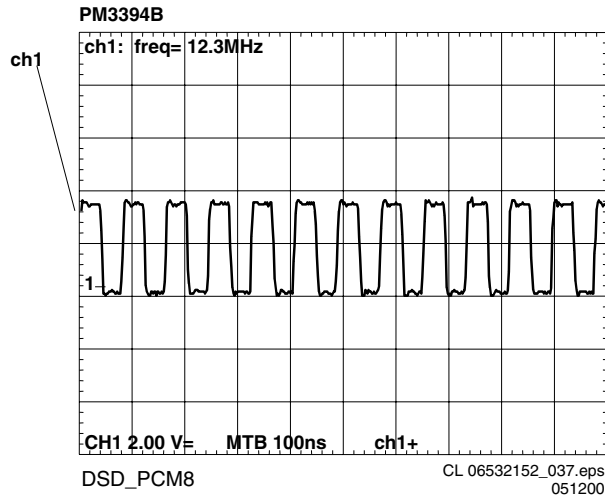
Ref. #	Command Name	Remark
603	BeReset	Reset Basic Engine

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



Disc Motor:

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

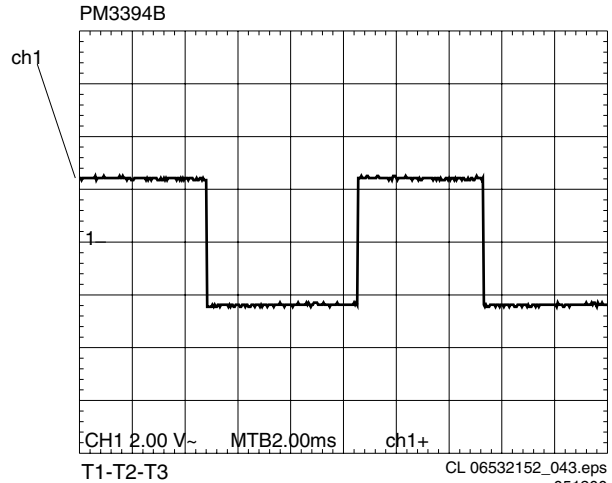
Name	Testpoint	Value
Stby	F357	high
Stby-out	F355	LOW
Moto1	F361	3V±0.3

Switch the Discmotor on/off with next commands:

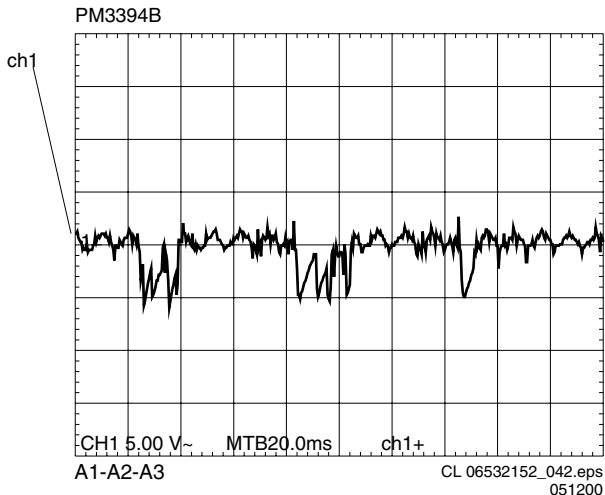
Ref. #	Command Name	Remark
606	BeDiscmotorOn	Discmotor on
607	BeDiscmotorOff	Discmotor off

Check the following signals when discmotor has been switched on:

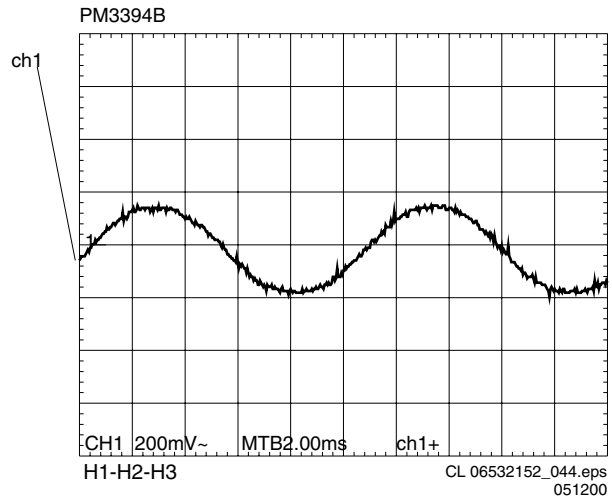
Name	Pin nr.	Frequency
Stby	F357	low
Stby-out	F355	HIGH
Moto1	F361	2V±0.5V
A3	F350	see oscillogram
A2	F352	see oscillogram
A1	F353	see oscillogram



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



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



Switch the discmotor off.

Radial

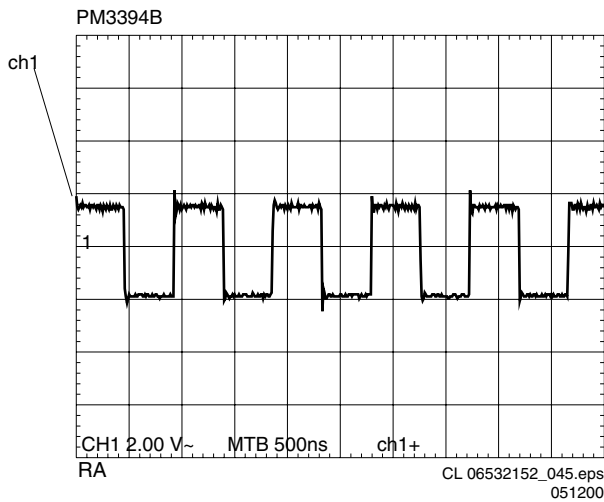
Switch the radial control on/off with the following commands:

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



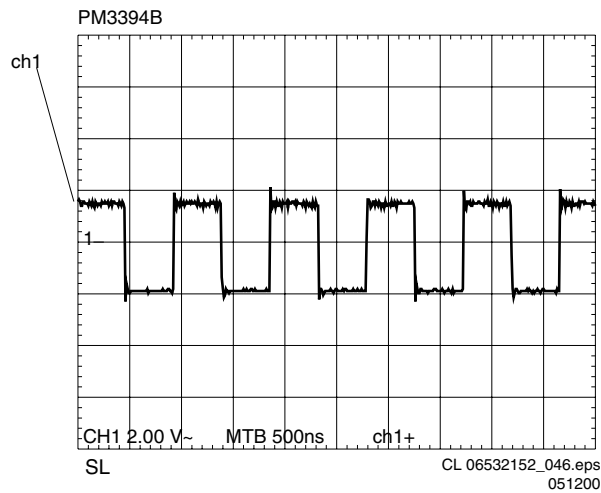
Check if laser is switched on (visual check of laserlight).
Switch the radial control off.

Sledge

Use the following commands to move the sledge:

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

Check pulse density signal SL at testpoint F221



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

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

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

Measure input sledge control (sledge in home position)

Name	Testpoint	Value
Sinph	F182	1.5V±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

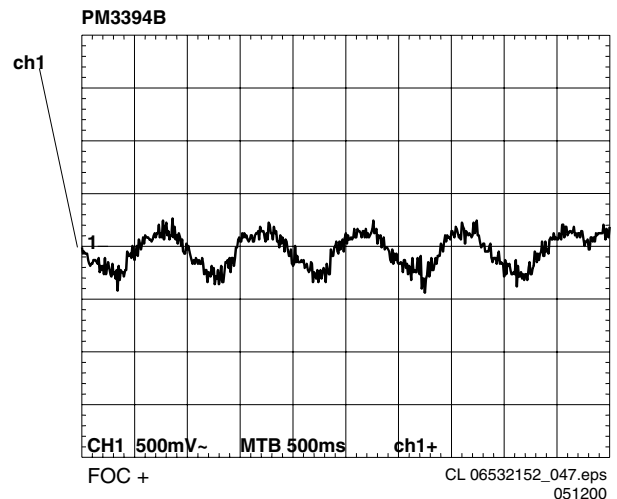
Measure the driver outputs of the BA5938FM for the Focus off.

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

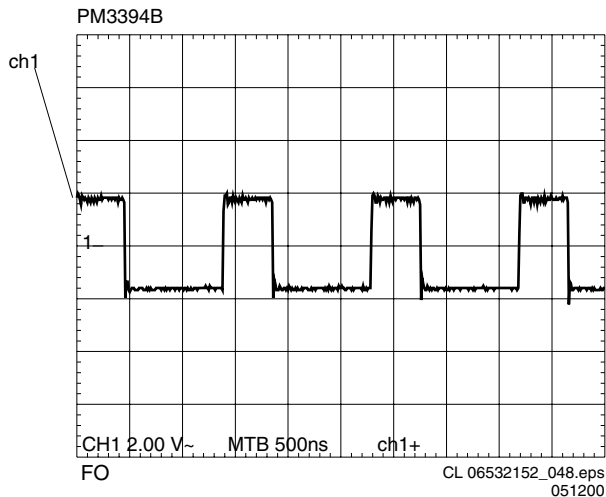
Switch the focus on

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.

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

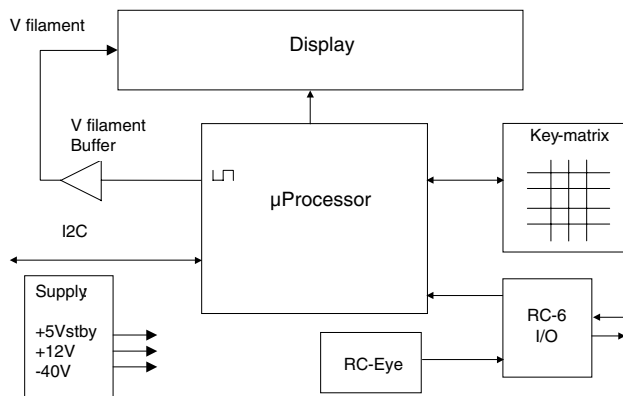


Figure 5-10

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).

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).

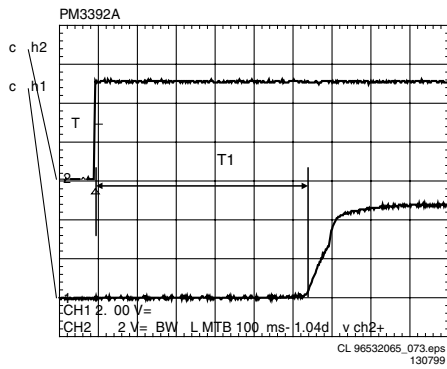


Figure 5-11

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 - G14).

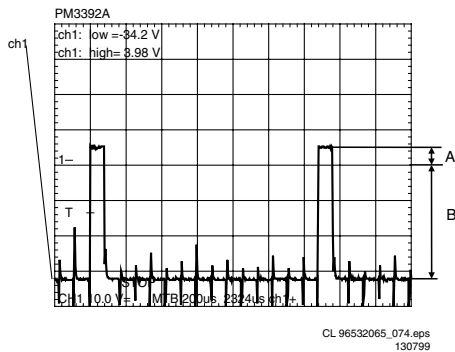


Figure 5-12

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 - P10:

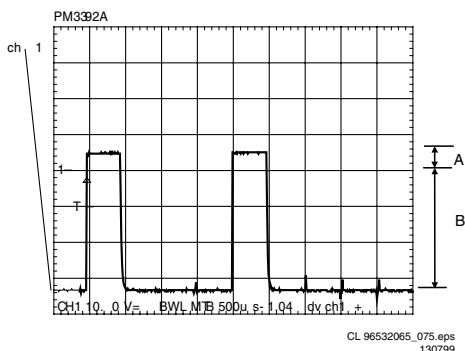


Figure 5-13

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.

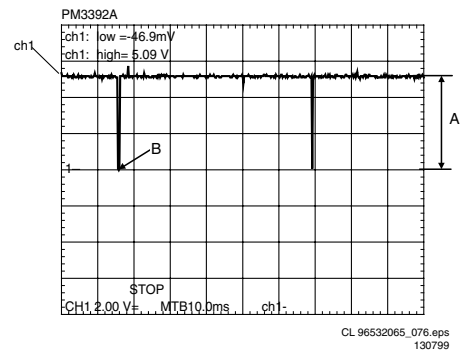


Figure 5-14

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.

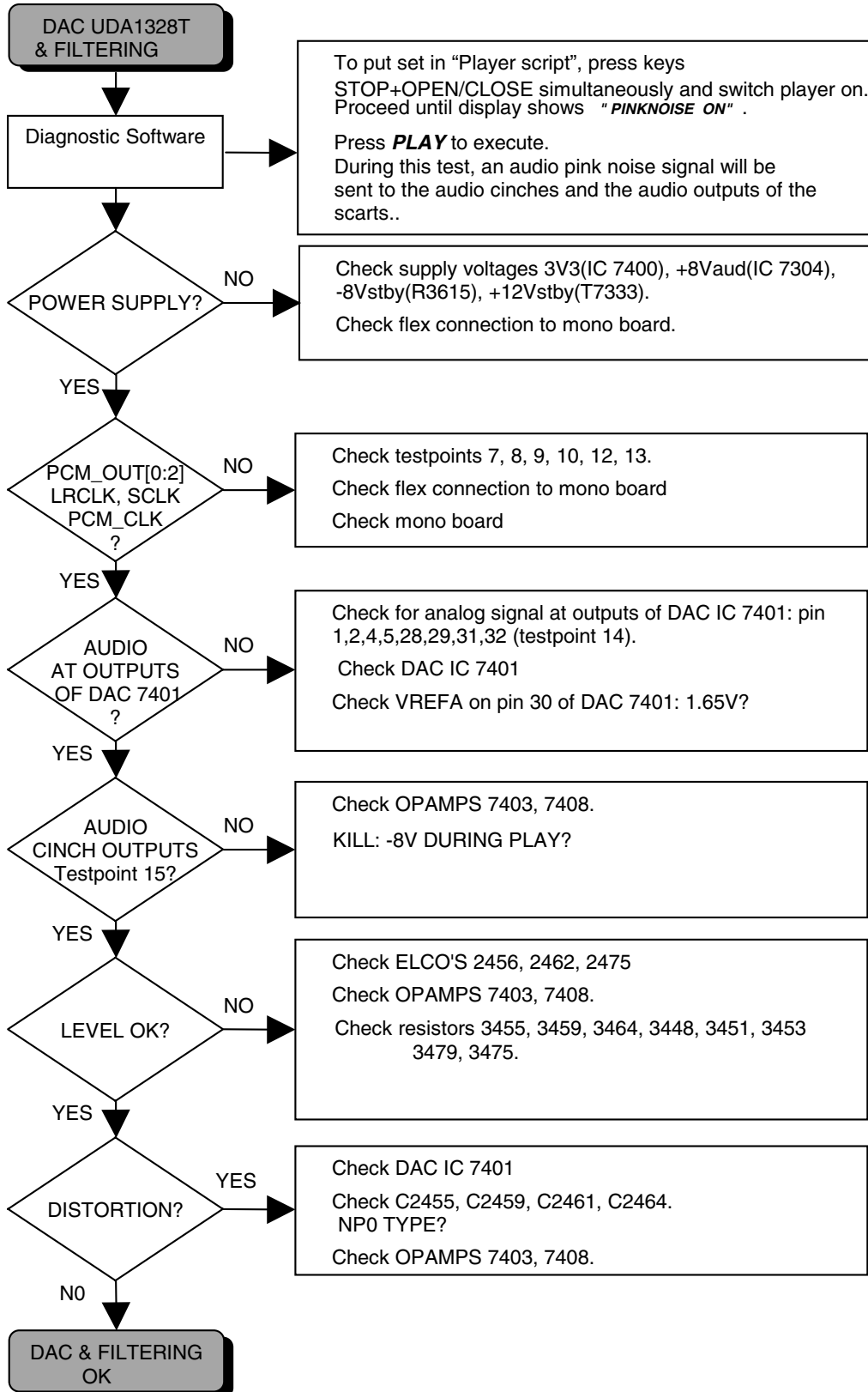
I.R. receiver

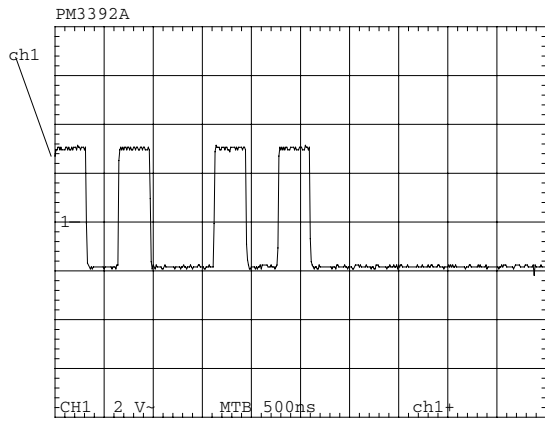
Check at pin 23 of the (P if this line switches from low (< 0.3V) to high (> 4.5V), while pressing a key on a Philips RC5 or RC6 remote control.

5.7 Troubleshooting AV Board

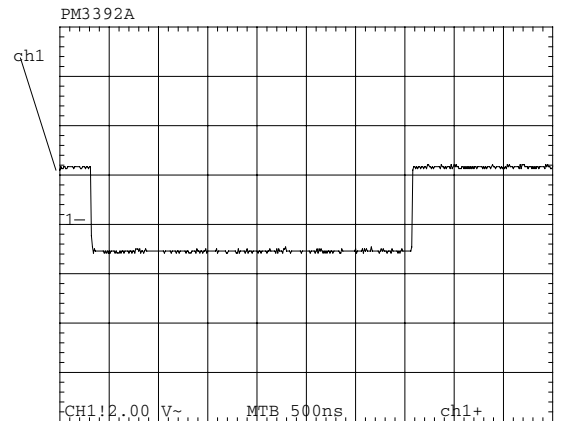
Testing of A/V board can be done using diagnostic software "Player script". Mono board is used to generate a sound with the sound tests PINKNOISE ON and SINE ON. A VIDEO signal is generated with COLOUR-B ON. Functional control of scart switching is also possible.

AUDIO PART

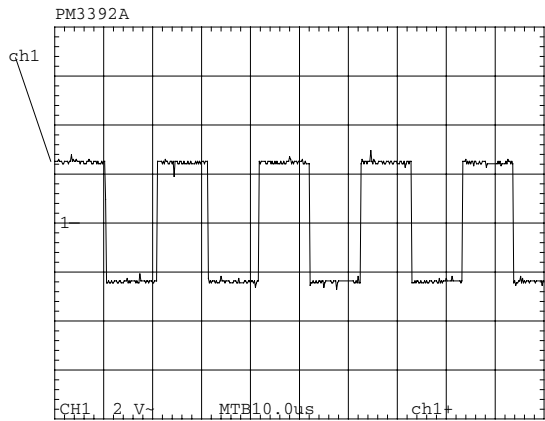




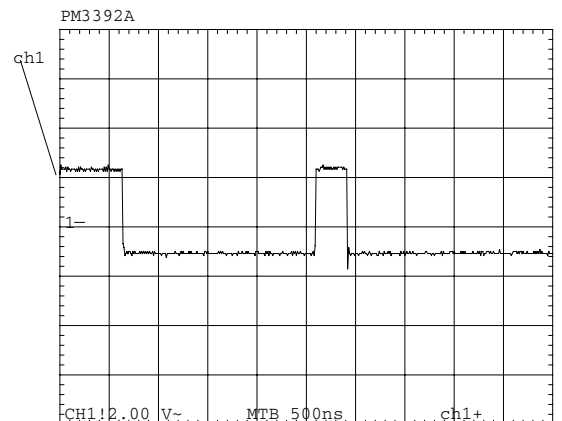
TP 7: PCM_OUT0



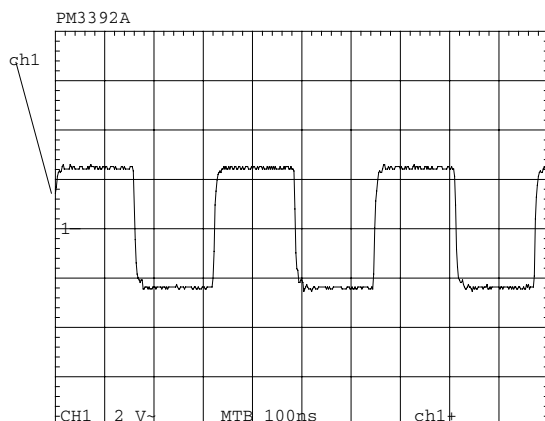
TP12: PCM_OUT2



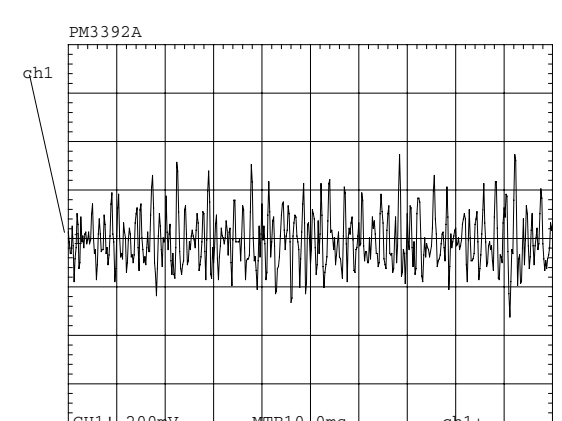
TP8: LRCLK



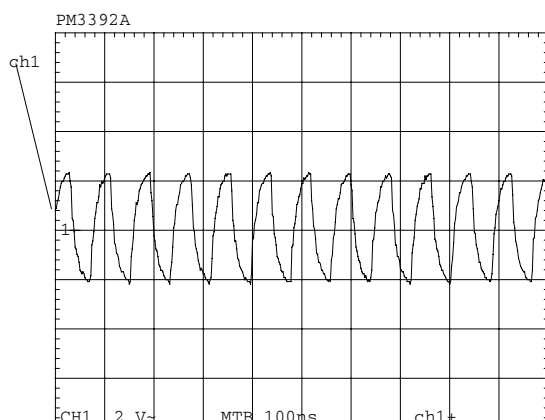
TP13: PCM_OUT1



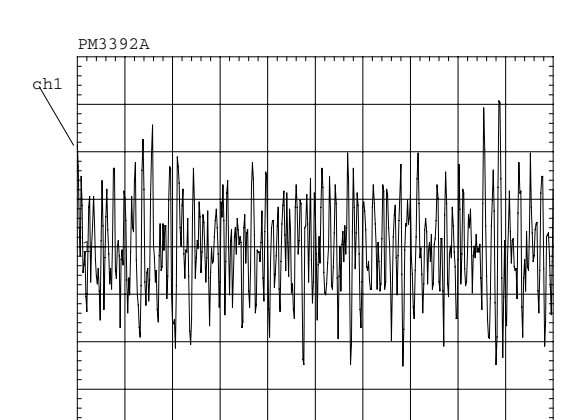
TP9: SCLK



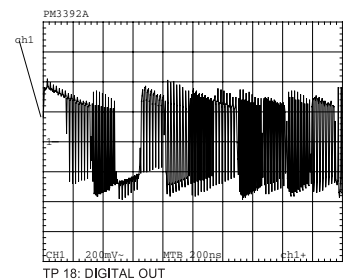
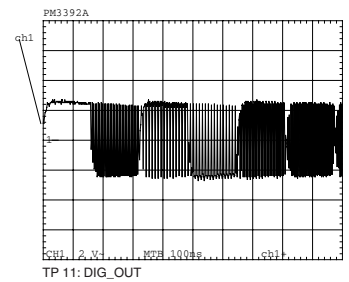
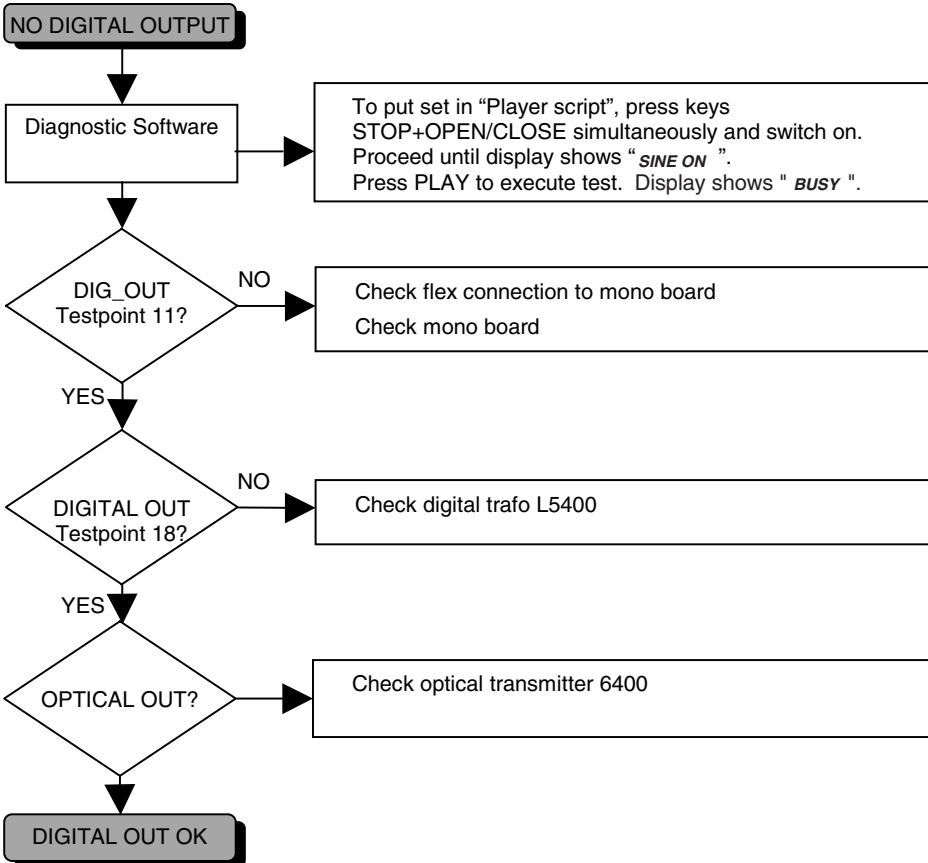
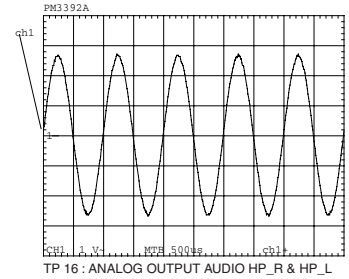
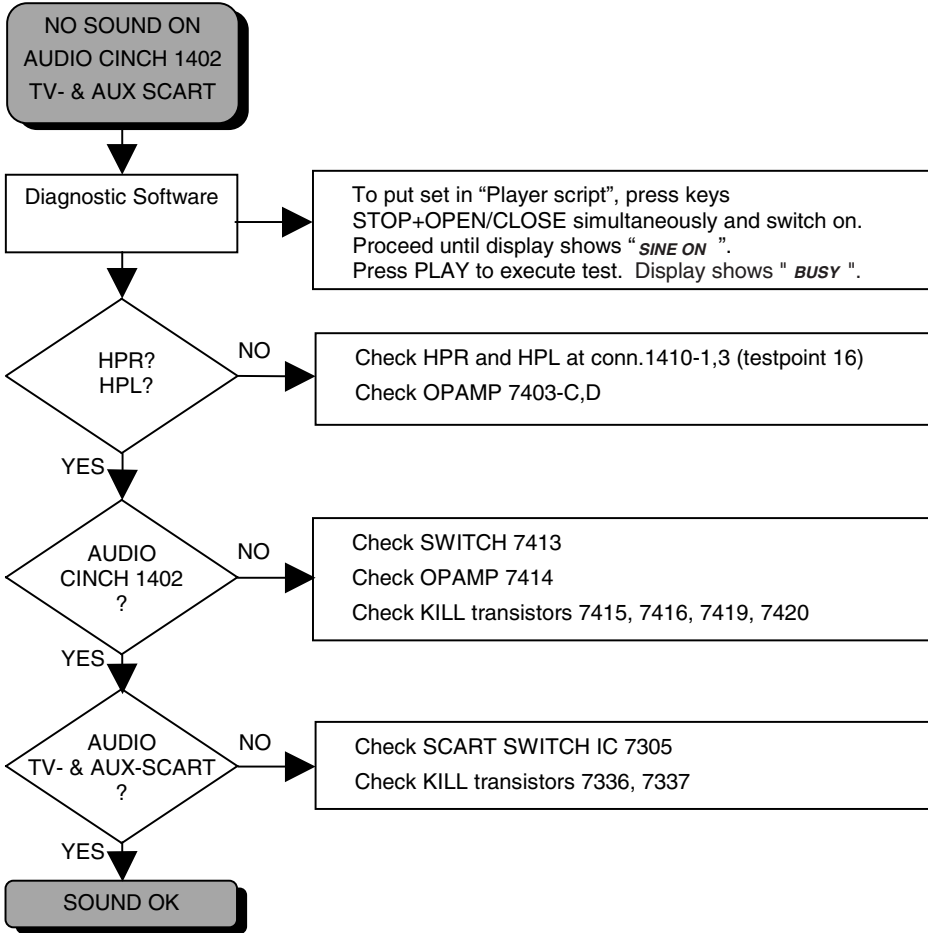
TP14: ANALOG OUT DAC (PINK NOISE)



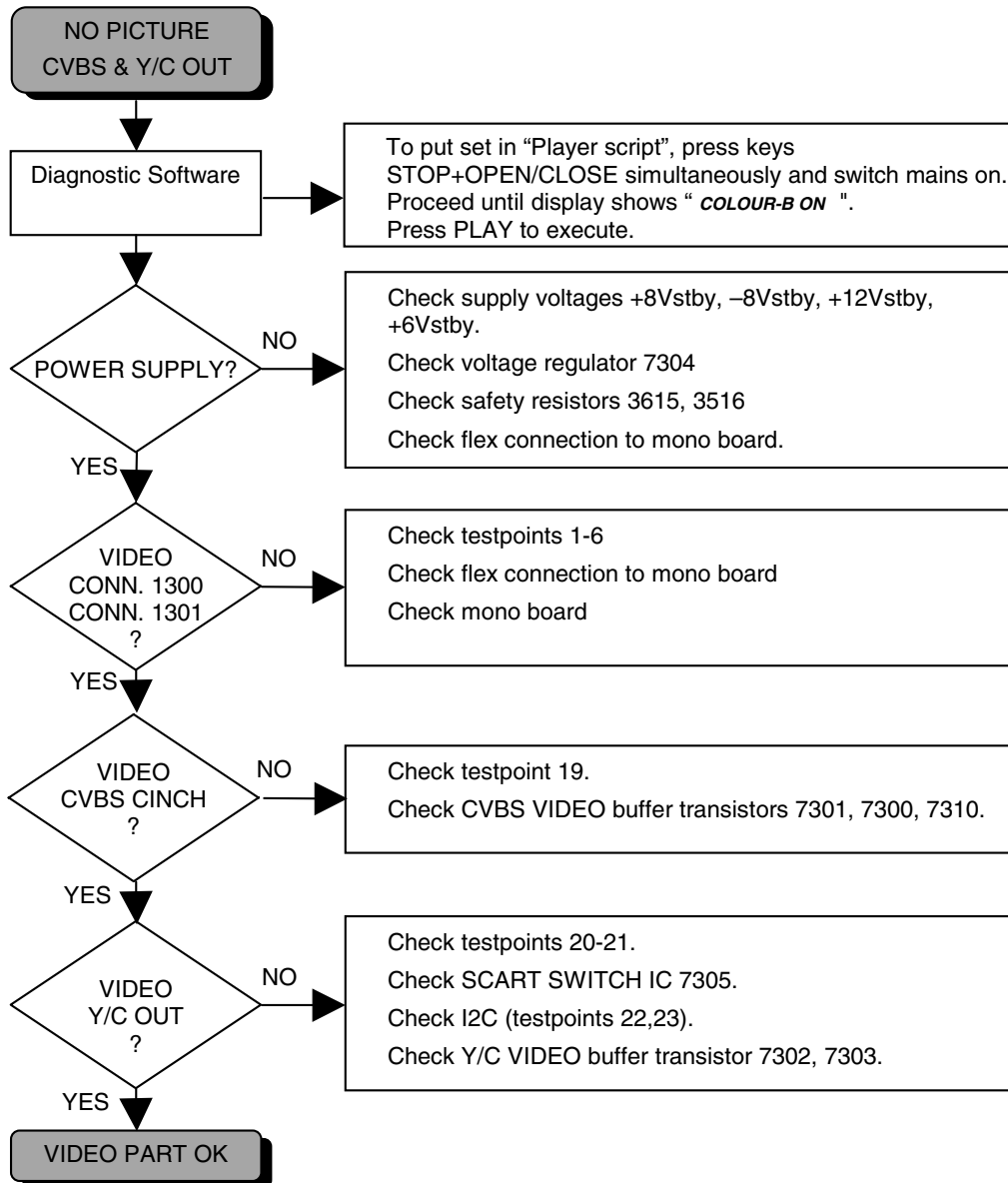
TP10: PCM_CLK

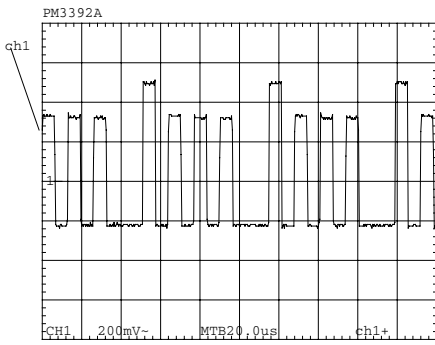


TP15: ANALOG OUT AUDIO CINCH (PINK NOISE)

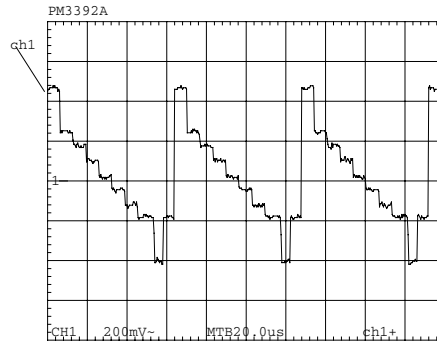


VIDEO PART

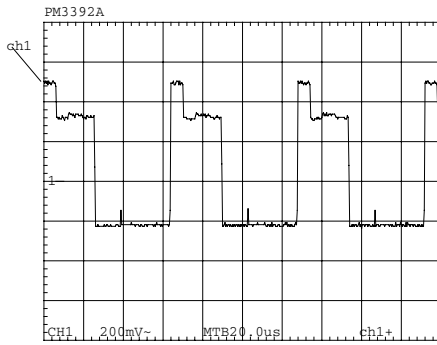




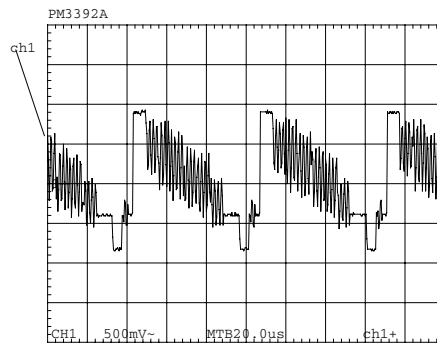
TP 1 : video B



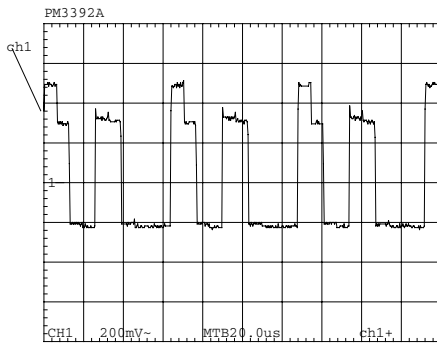
TP 6 : Y_ENC



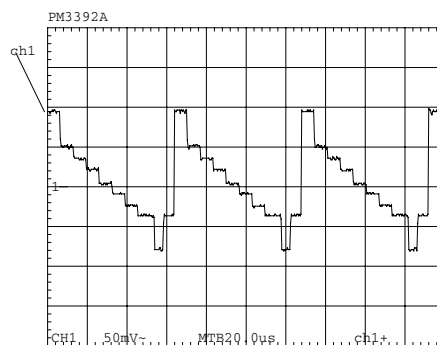
TP 2 : video G



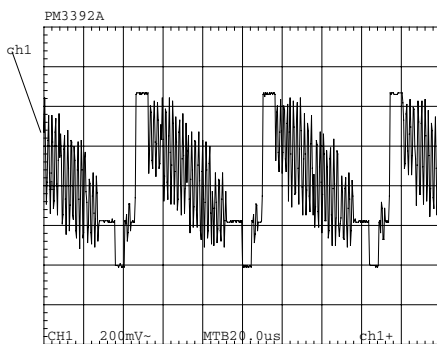
TP 19 : CVBS_OUT



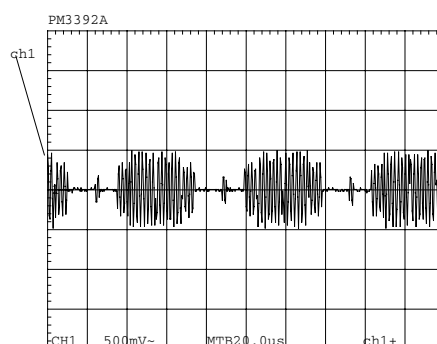
TP 3 : video R



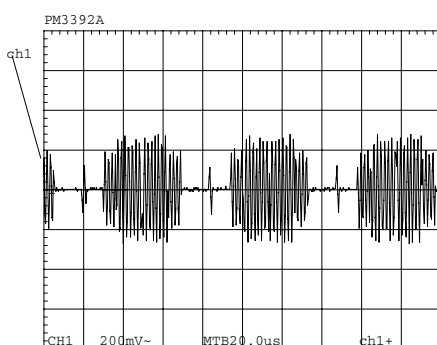
TP 20 : Y_OUT



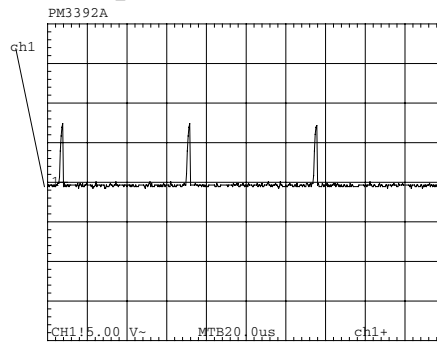
TP 4 : CVBS



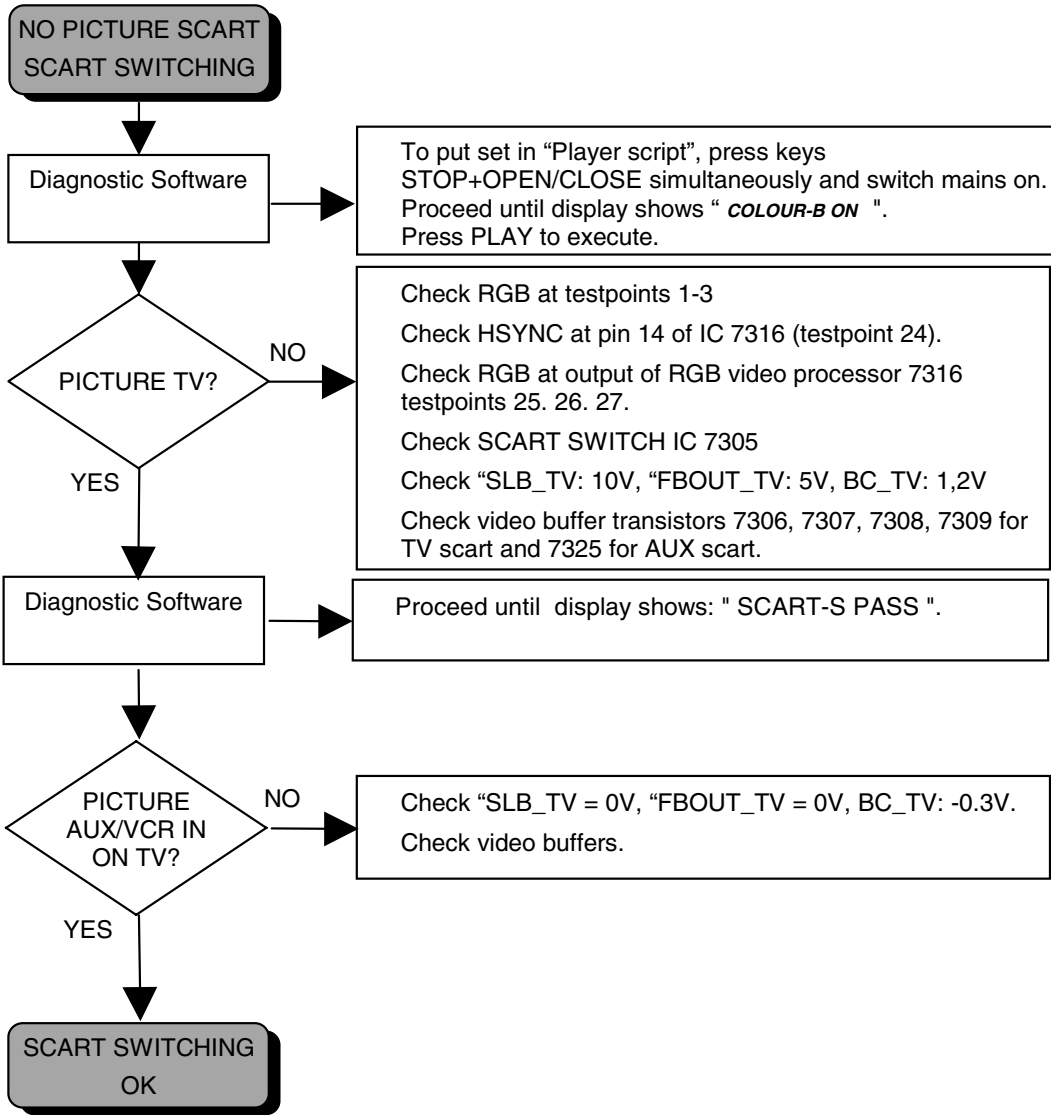
TP 21 : C_OUT



TP 5 : C_ENC



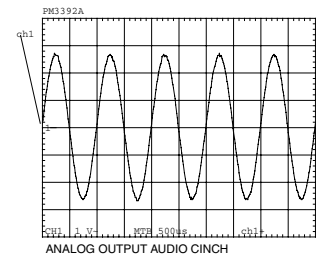
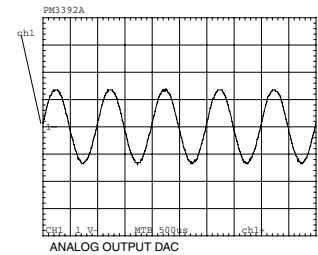
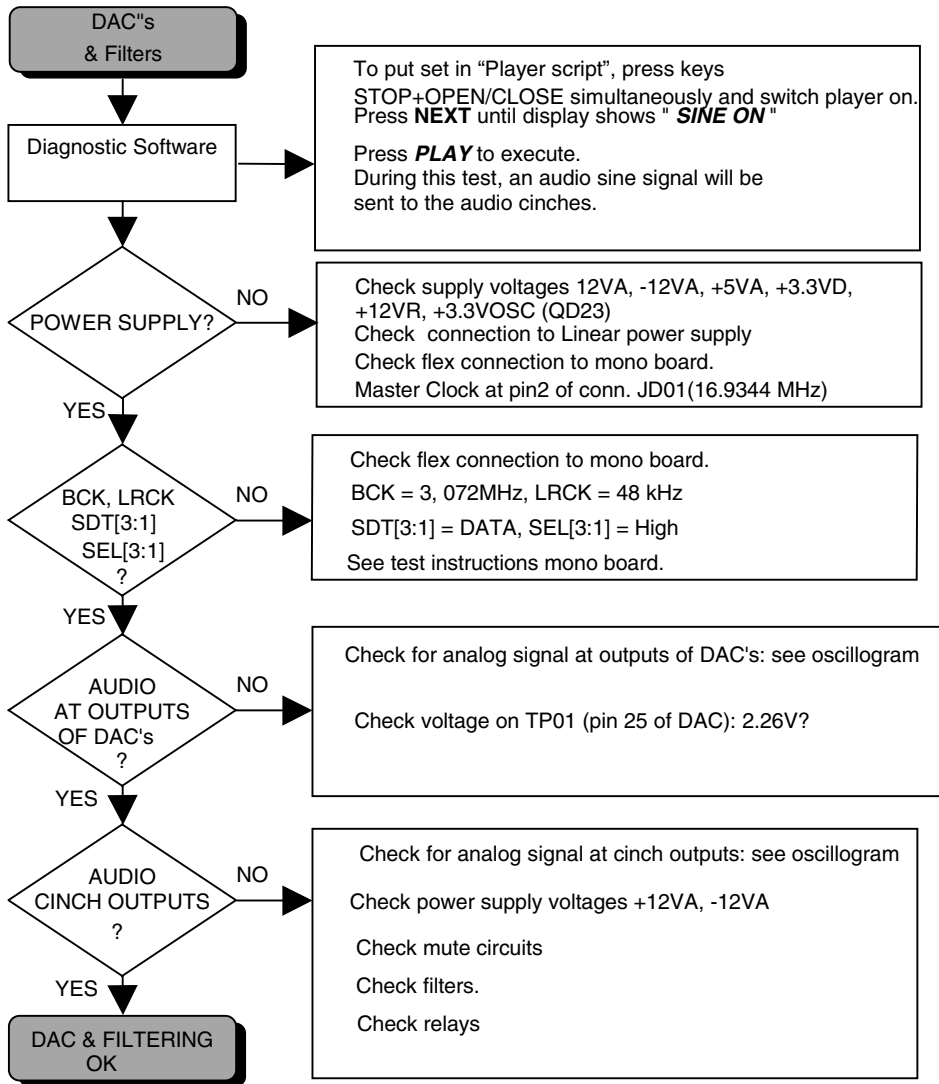
TP 24 : HSYNC



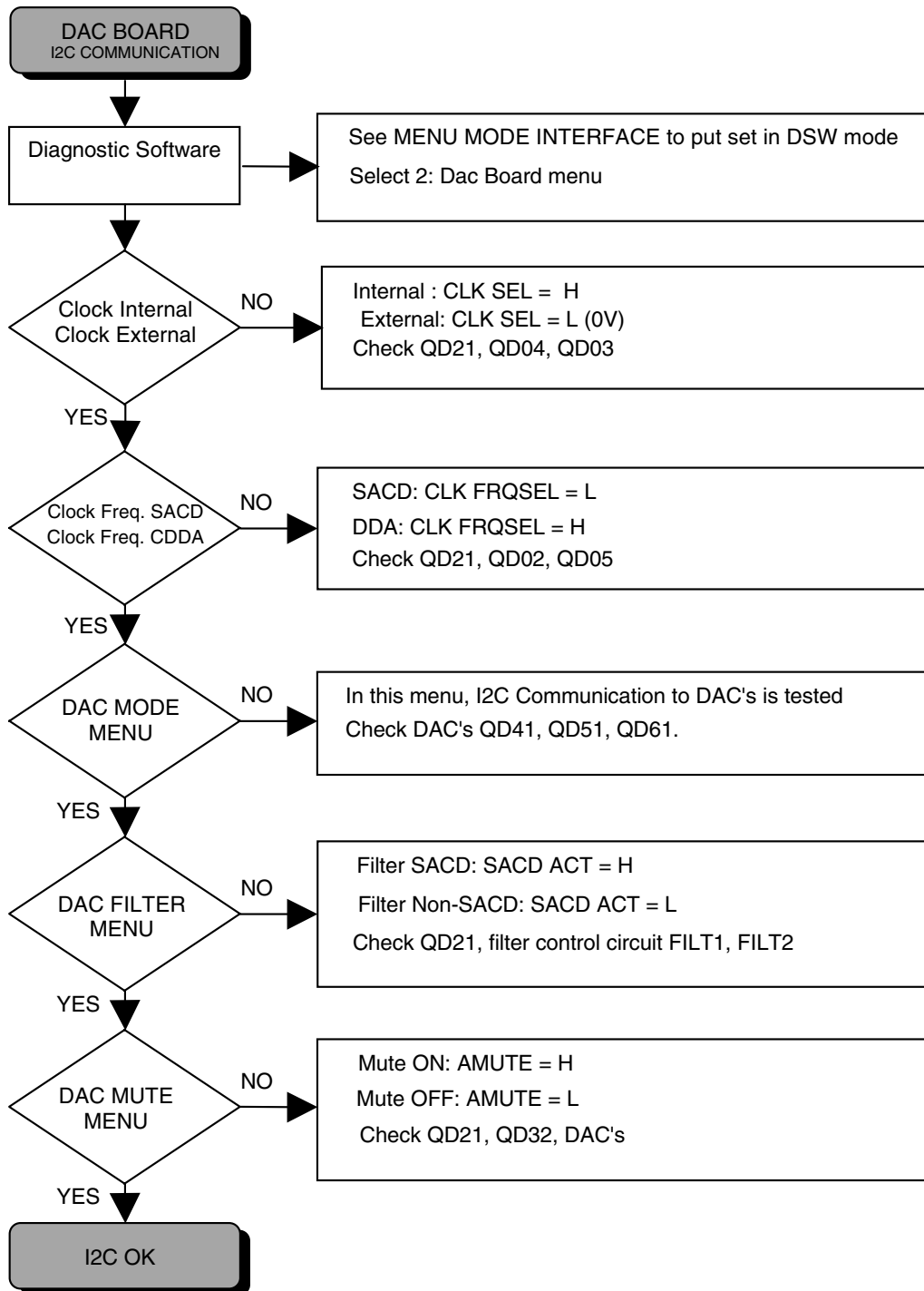
5.8 Trouble shooting DAC Board

TROUBLESHOOTING DAC BOARD

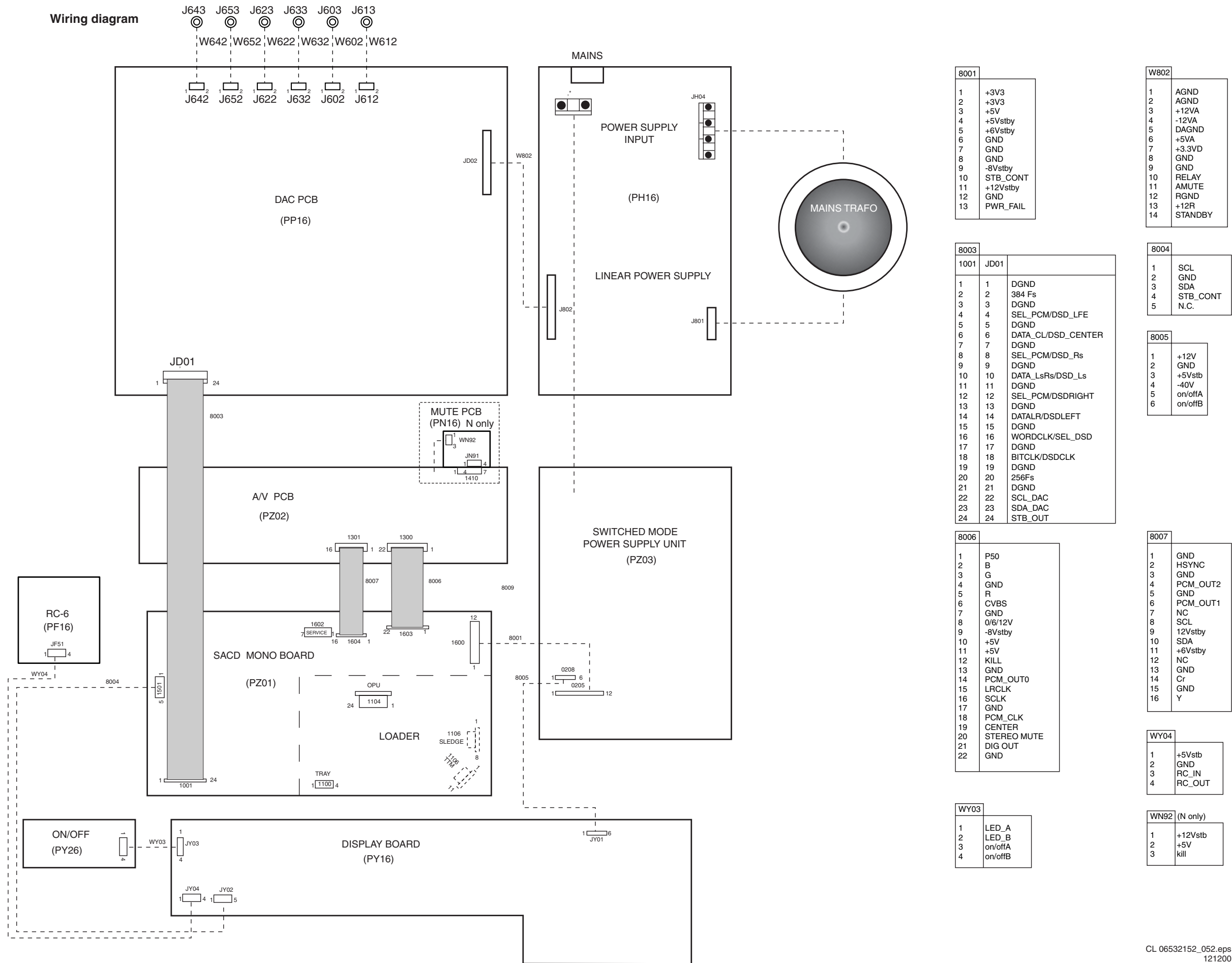
Testing of DAC board can be done using diagnostic software "Player script". Mono board is used to generate a sound with the sound test SINE ON.



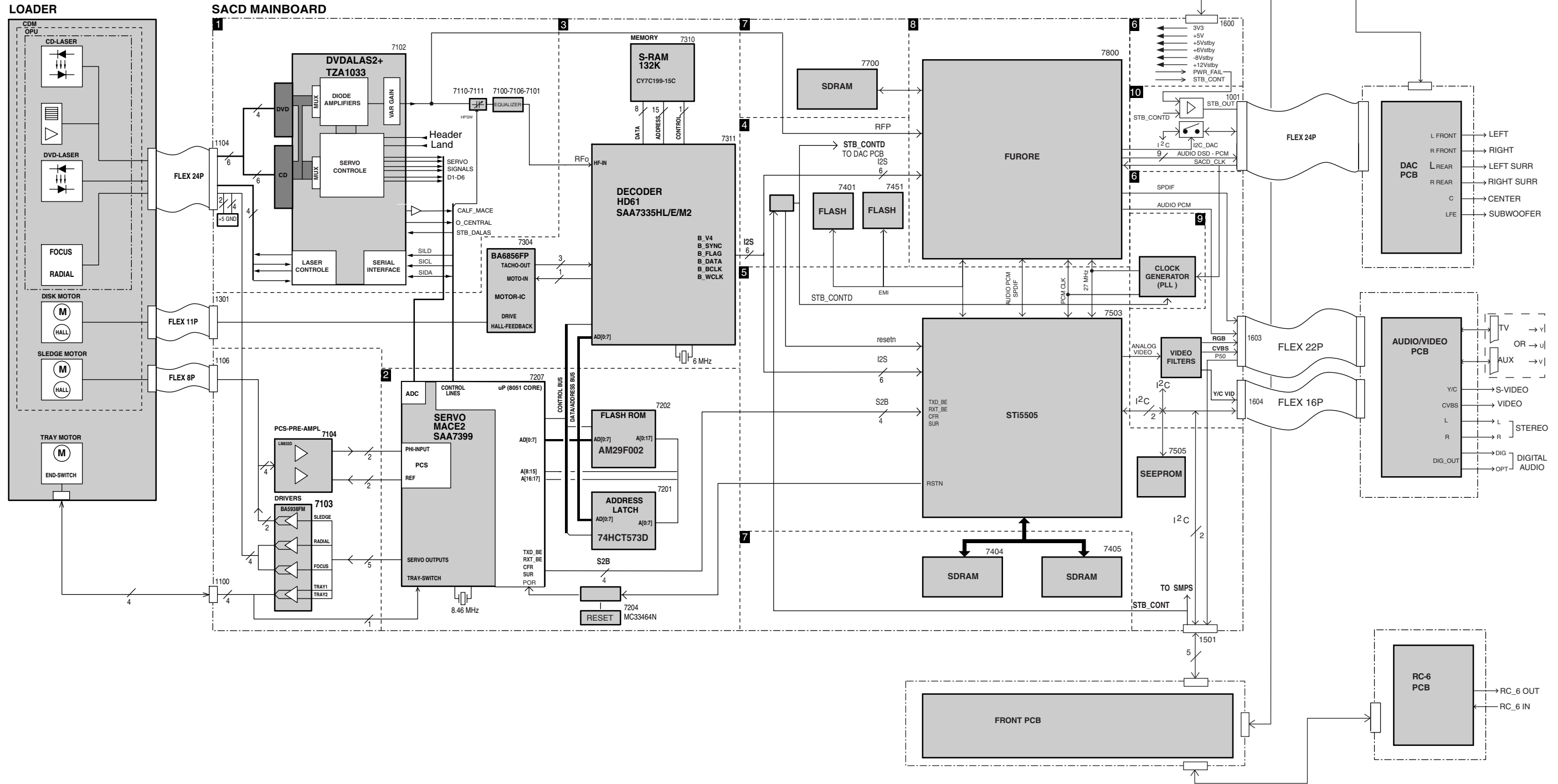
Testing of I2C communication to DAC board can be done using diagnostic software.



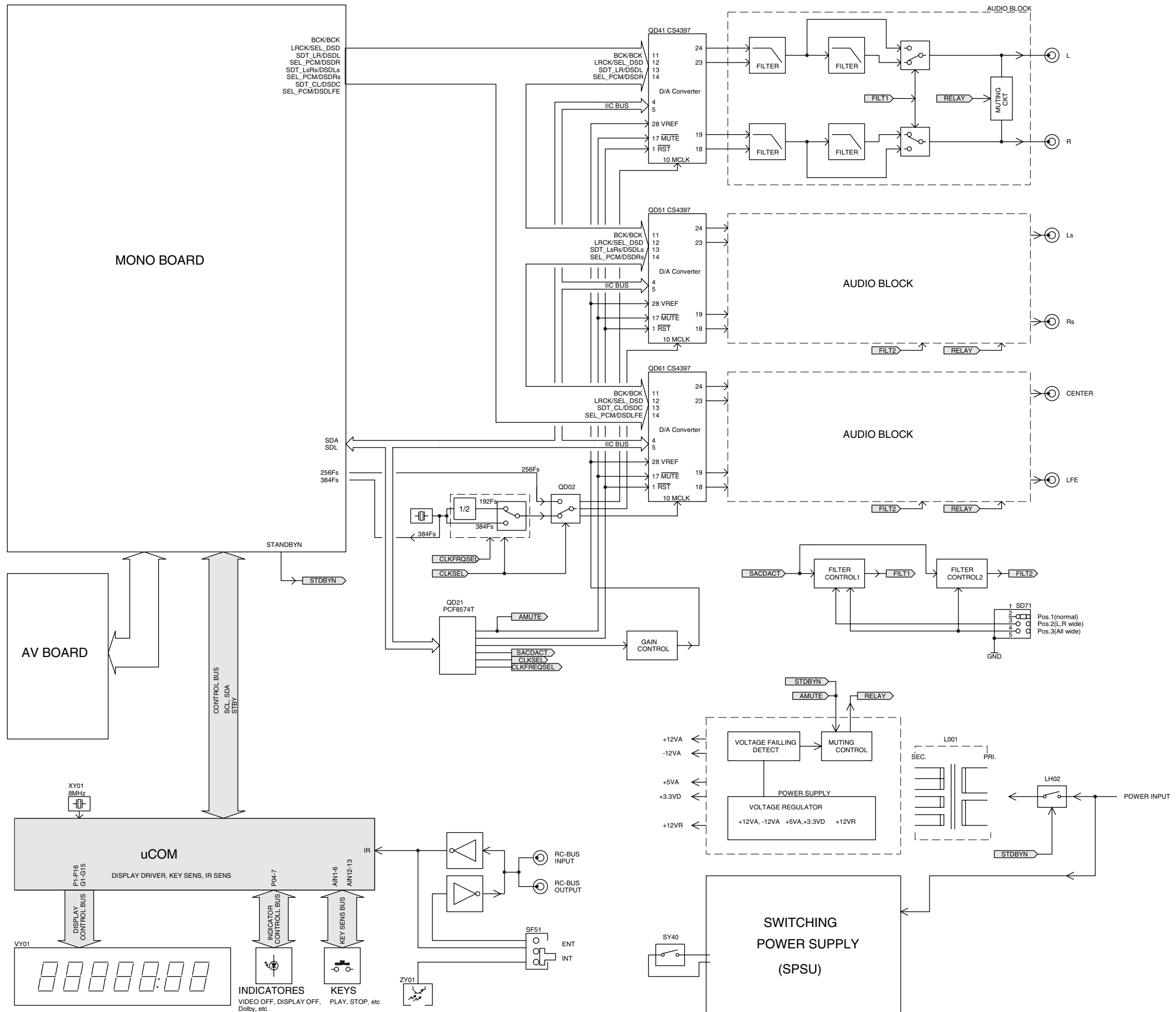
6. Wiring and block diagram



General block diagram

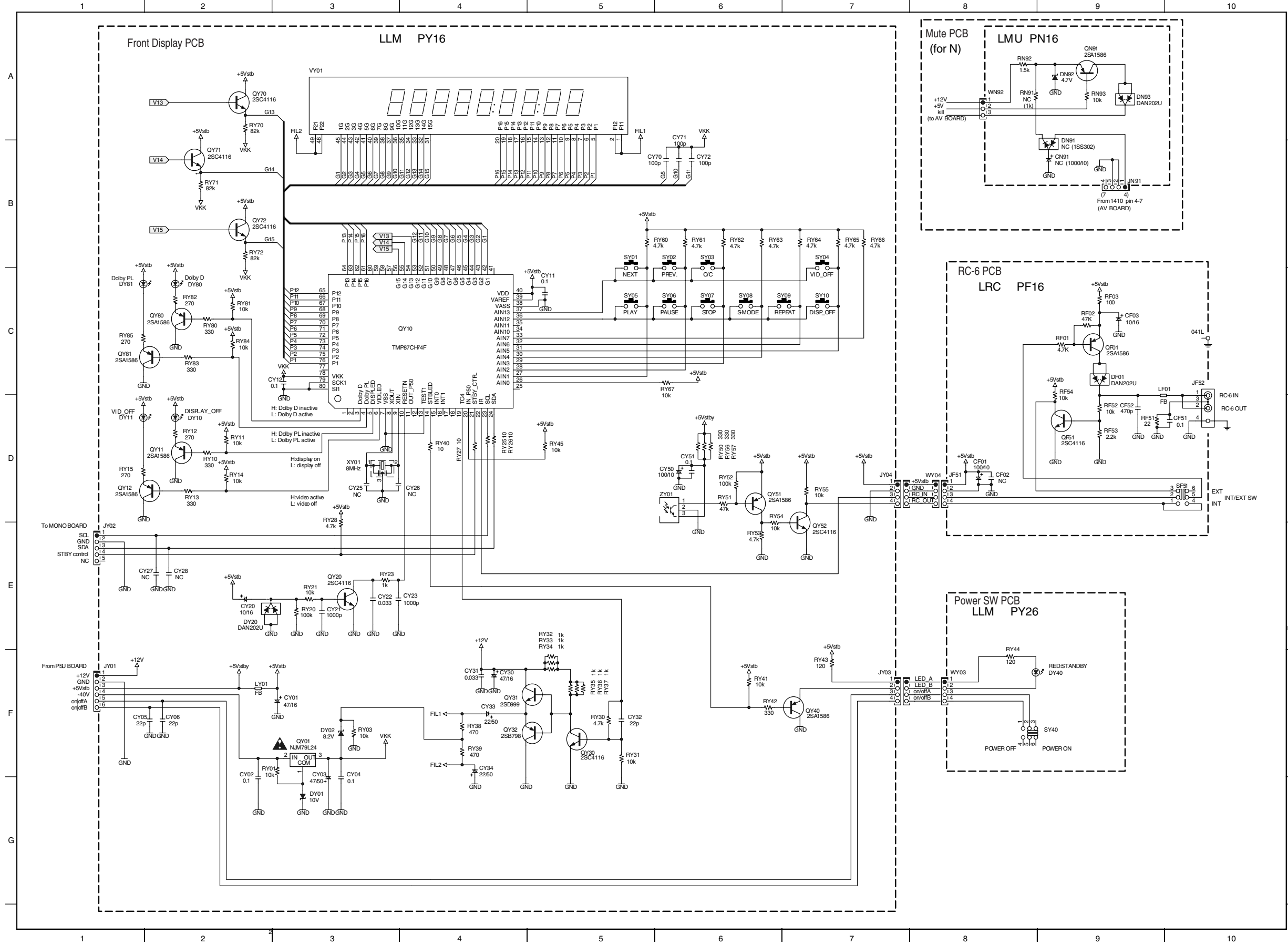


Block diagram DAC PCB



7. Schematic diagram and Parts location

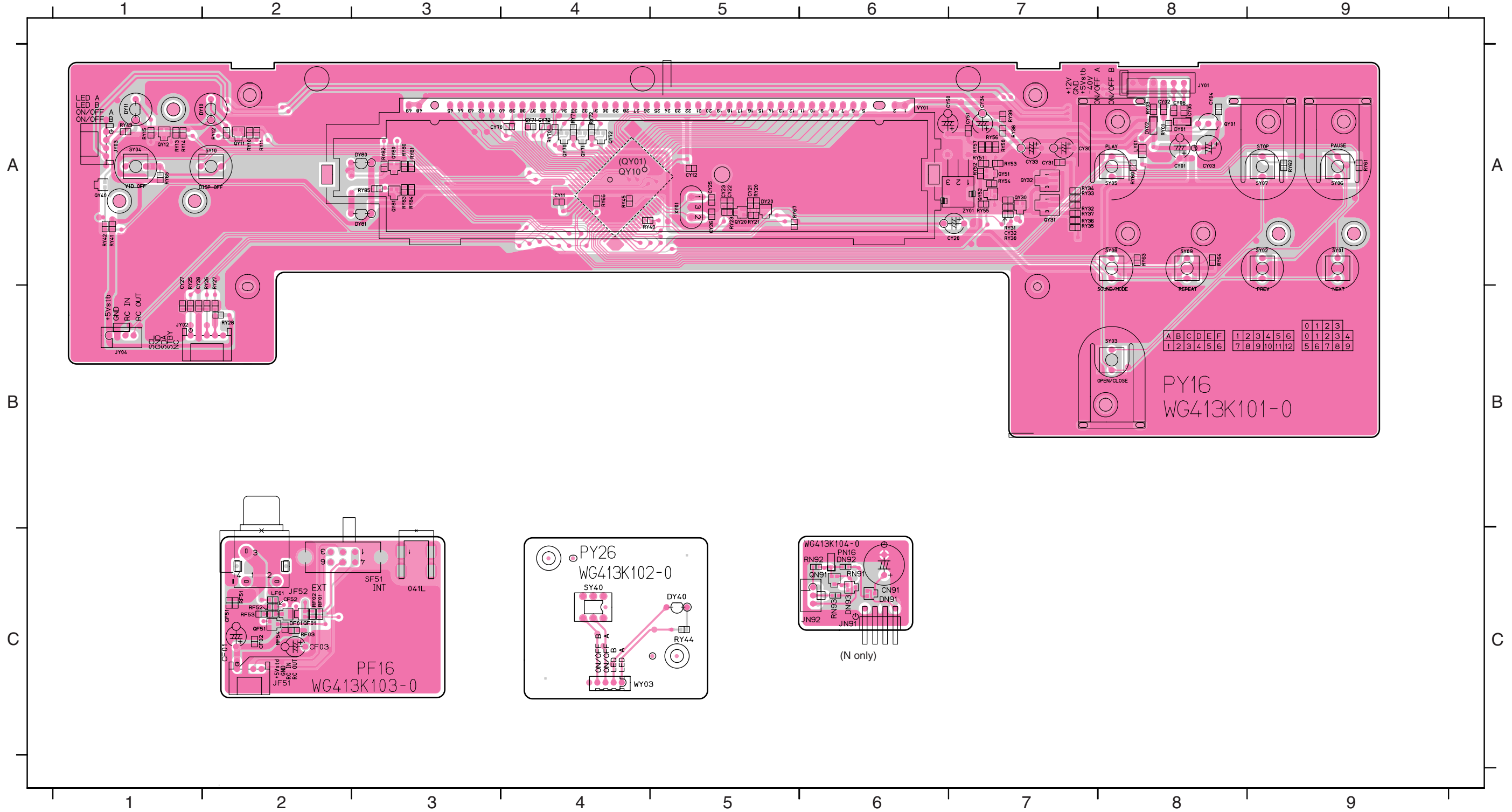
Front Display and Power SW, RC-6, Mute (N only)



CF01	D8	RY40	D4
CF02	D8	RY41	F6
CF03	C9	RY42	F6
CF51	D10	RY43	F7
CF52	D9	RY44	F8
CY01	F3	RY45	D5
CY02	G2	RY50	D6
CY03	G3	RY51	D6
CY04	G3	RY52	D6
CY05	F2	RY53	E6
CY06	F2	RY54	E6
CY11	C5	RY55	D7
CY12	C3	RY56	D6
CY20	E2	RY57	D6
CY21	E3	RY60	B5
CY22	E3	RY61	B6
CY23	E3	RY62	B6
CY25	D3	RY63	B6
CY26	D3	RY64	B7
CY27	E2	RY65	B7
CY28	E2	RY66	B7
CY30	F4	RY67	C6
CY31	F4	RY70	A2
CY32	F5	RY71	B2
CY33	F4	RY72	B2
CY34	F4	RY80	C2
CY50	D6	RY81	C2
CY51	D6	RY82	C2
CY70	B6	RY83	C2
CY71	B6	RY84	C2
CY72	B6	RY85	C1
DF01	C9	SF51	D10
DN91	B9	SY01	B5
DN92	A9	SY02	B6
DN93	A9	SY03	B6
DY01	D1	SY04	B7
DY01	G3	SY05	C5
DY02	F3	SY06	C6
DY10	D2	SY07	C6
DY20	E2	SY08	C6
DY40	F8	SY09	C7
DY80	C2	SY10	C7
DF81	C1	SY40	F8
JF51	D8	VY01	A3
JF52	D10	WN92	A8
JN91	B9	WY03	F8
JY01	F1	XY01	D3
JY02	E1	ZY01	D6
JY03	F7		
JY04	D7		
LF01	D9		
LY01	F2		
QF01	C9		
QF51	D9		
QN91	A9		
QY01	F3		
QY10	C4		
QY11	D2		
QY12	D1		
QY20	E3		
QY30	F5		
QY31	F5		
QY32	F5		
QY40	F7		
QY51	D6		
QY52	E7		
QY70	A2		
QY71	B2		
QY72	B2		
QY80	C2		
QY81	C1		
RF01	C9		
RF02	C9		
RF03	C9		
RF51	D9		
RF52	D9		
RF53	D9		
RF54	D9		
RN91	A8		
RN92	A8		
RN93	A9		
RY01	F3		
RY03	F3		
RY11	D2		
RY12	D2		
RY13	D2		
RY14	D2		
RY15	D1		
RY20	E3		
RY21	E3		
RY23	E3		
RY25	D4		
RY26	D4		
RY27	D4		
RY28	E3		
RY30	F5		
RY31	F5		
RY32	F5		
RY33	F5		
RY34	F5		
RY35	F5		
RY36	F5		
RY37	F5		
RY38	F4		
RY39	F4		

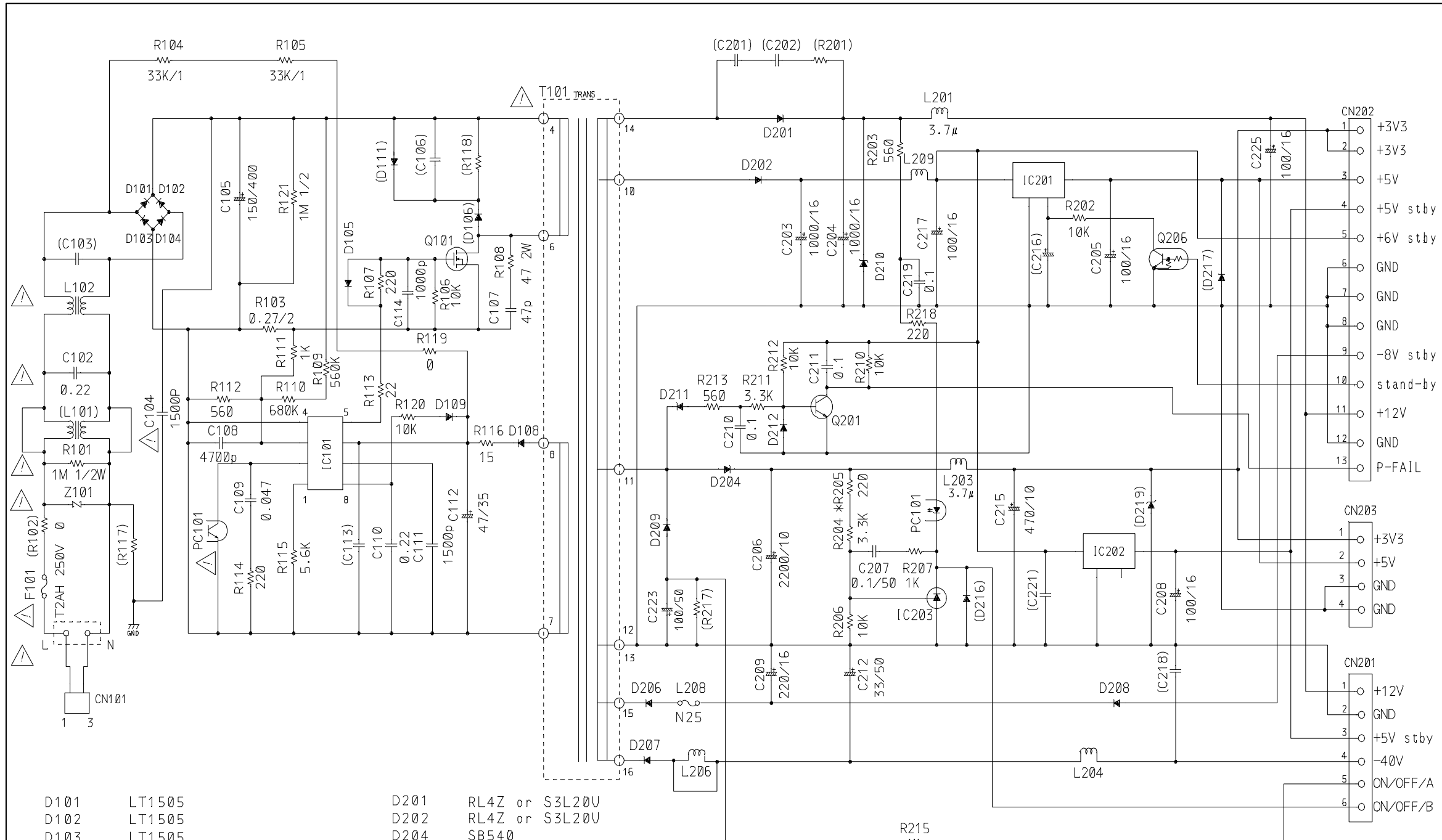
Layout Front Display and Power SW, RC-6, Mute (N only) (bottom view)

CF01B	C21	CY02	A8	CY20	A7	CY28	B1	CY51	A7	DN93	C6	DY80	A3	JY04	B1	QY11	A2	QY51	A7	RF02	C2	RN92	C6	RY13	A1	RY27	B2	RY35	A7	RY42	A1	RY53	A7	RY62	A9	RY71	A4	RY84	A3	SY05	A8	VY01	A6
CF02	C2	CY03	A8	CY21	A5	CY30	A7	CY70	A4	DY01	A8	DY81	A3	LY01	A8	QY12	A1	QY52	A7	RF03	C2	RN93	C6	RY14	A1	RY28	B2	RY36	A7	RY43	A1	RY54	A7	RY63	A8	RY72	A4	RY85	A3	SY06	A9	WY03	C4
CF03	C2	CY04	A8	CY22	A5	CY31	A7	CY71	A4	DY02	A8	JF52	C2	QF01	C2	QY20	A5	QY70	A4	RF51	C2	RY01	A8	RY15	A1	RY30	A7	RY37	A7	RY44	C5	RY55	A7	RY64	A8	RY73	A4	SF51	C3	SY07	A9	XY01	A5
CF51	C2	CY05	A8	CY23	A5	CY32	A7	CY72	A4	DY10	A2	JN91	C6	QF51	C2	QY30	A7	QY71	A4	RF52	C2	RY03	A8	RY20	A5	RY31	A7	RY38	A7	RY45	A4	RY56	A7	RY65	A8	RY78	A3	SY01	A9	SY08	A8	ZY01	A7
CF52	C2	CY06	A8	CY25	A5	CY33	A7	DF01	C2	DY11	A2	JN92	C6	QN91	C6	QY31	A7	QY72	A4	RF53	C2	RY10	A2	RY21	A5	RY32	A7	RY39	A7	RY50	A7	RY57	A7	RY65	A4	RY81	A3	SY02	A9	SY09	A8		
CN91	C6	CY11	A4	CY26	A5	CY34	A7	DN91	C6	DY20	A5	JY02	B2	QY01	A8	QY32	A7	QY81	A3	RF54	C2	RY11	A2	RY25	B1	RY33	A7	RY40	A4	RY51	A7	RY60	A8	RY67	A5	RY82	A3	SY03	B8	SY10	A2		
CY01	A8	CY12	A5	CY27	B1	CY50	A7	DN92	C6	DY40	C5	JY03	A1	QY10	A4	QY40	A1	RF01	C2	RN91	C6	RY12	A2	RY26	B2	RY34	A7	RY41	A1	RY52	A7	RY61	A9	RY70	A4	RY83	A3	SY04	A1	SY40	C4		



Switched mode power supply

SWITCHED MODE POWER SUPPLY UNIT (PZ03) 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

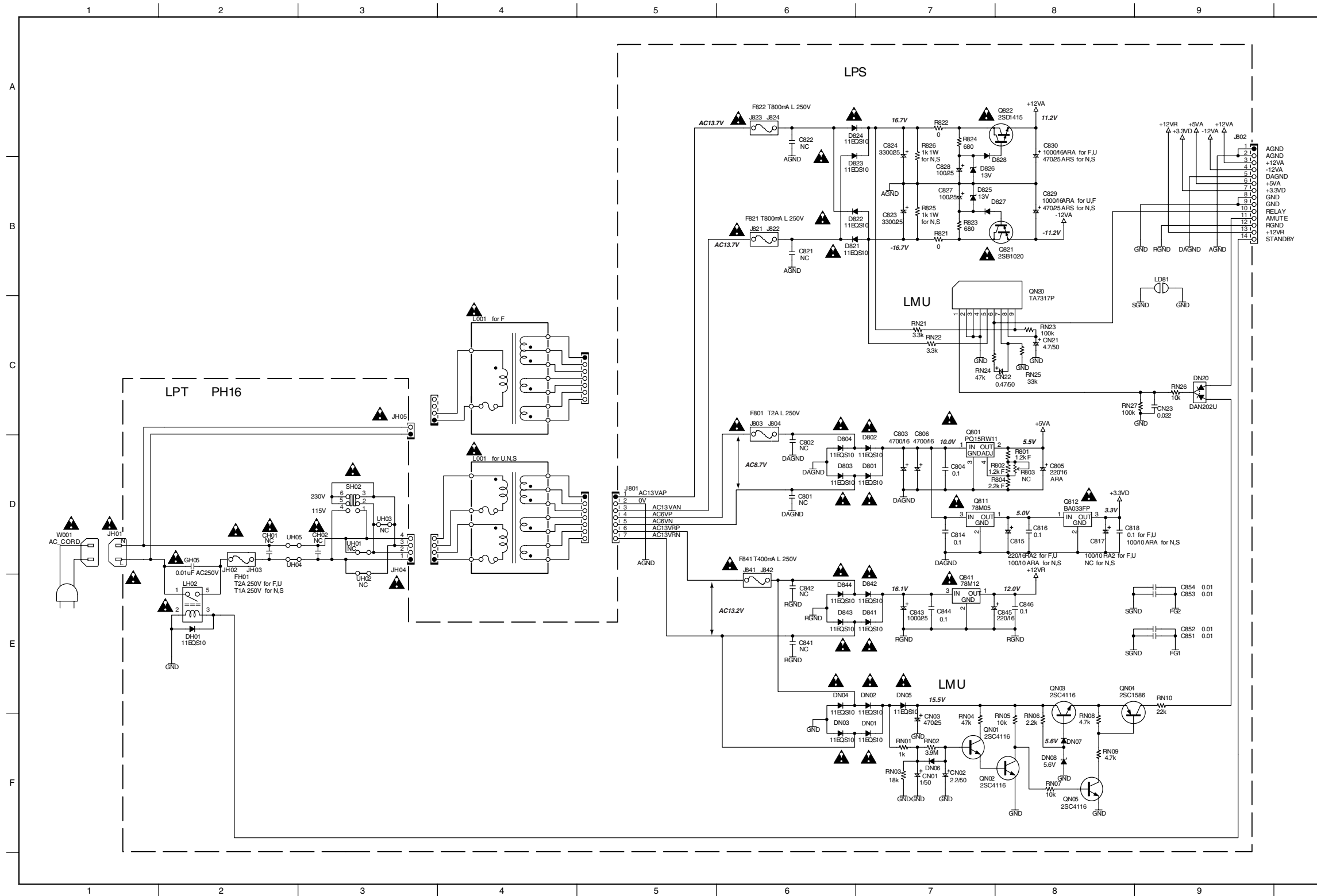
* 調整抵抗 (Adjustable)

symbol	min	typ	max
*R205	0	560	1K

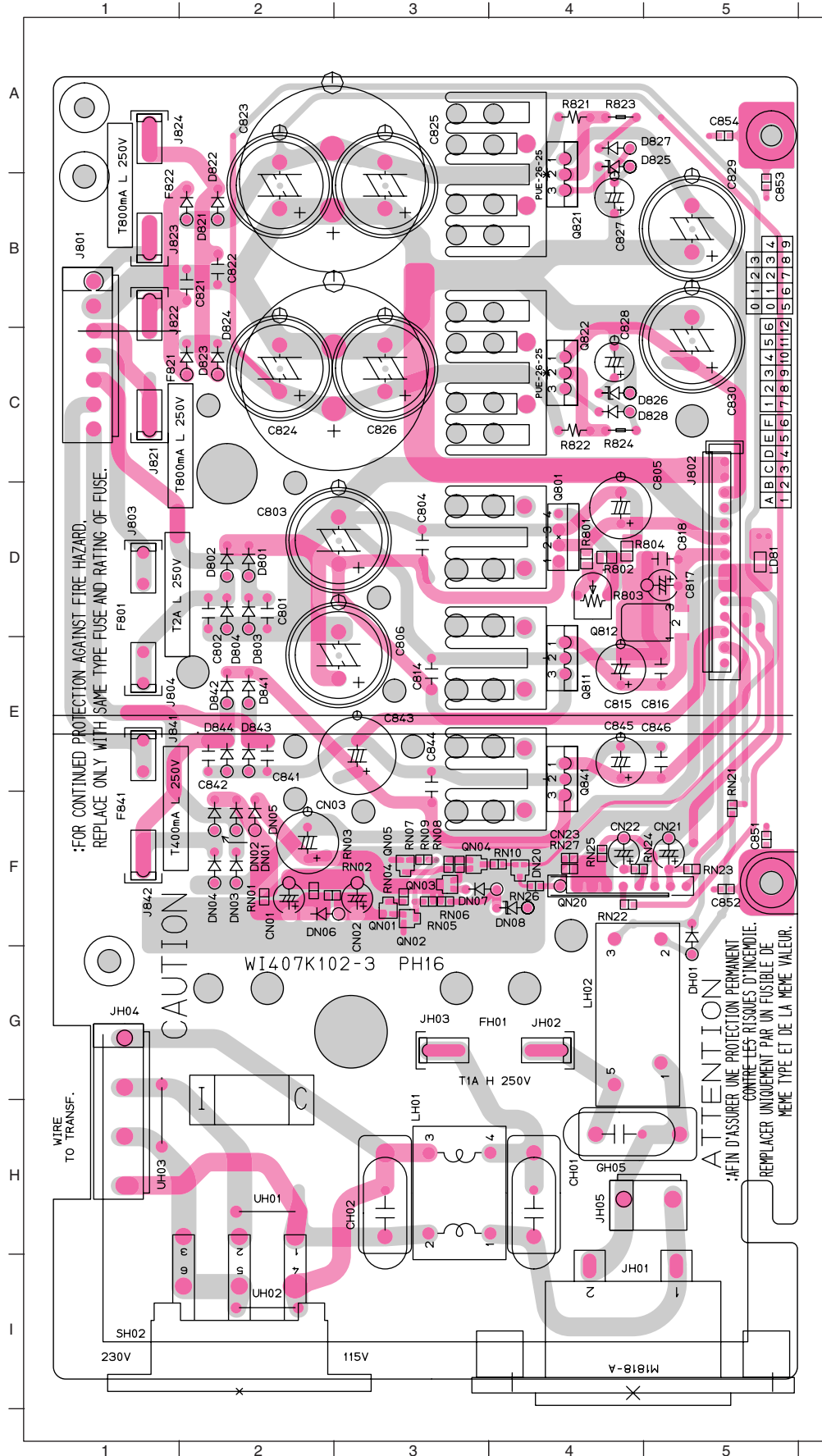
SACD

Power supply

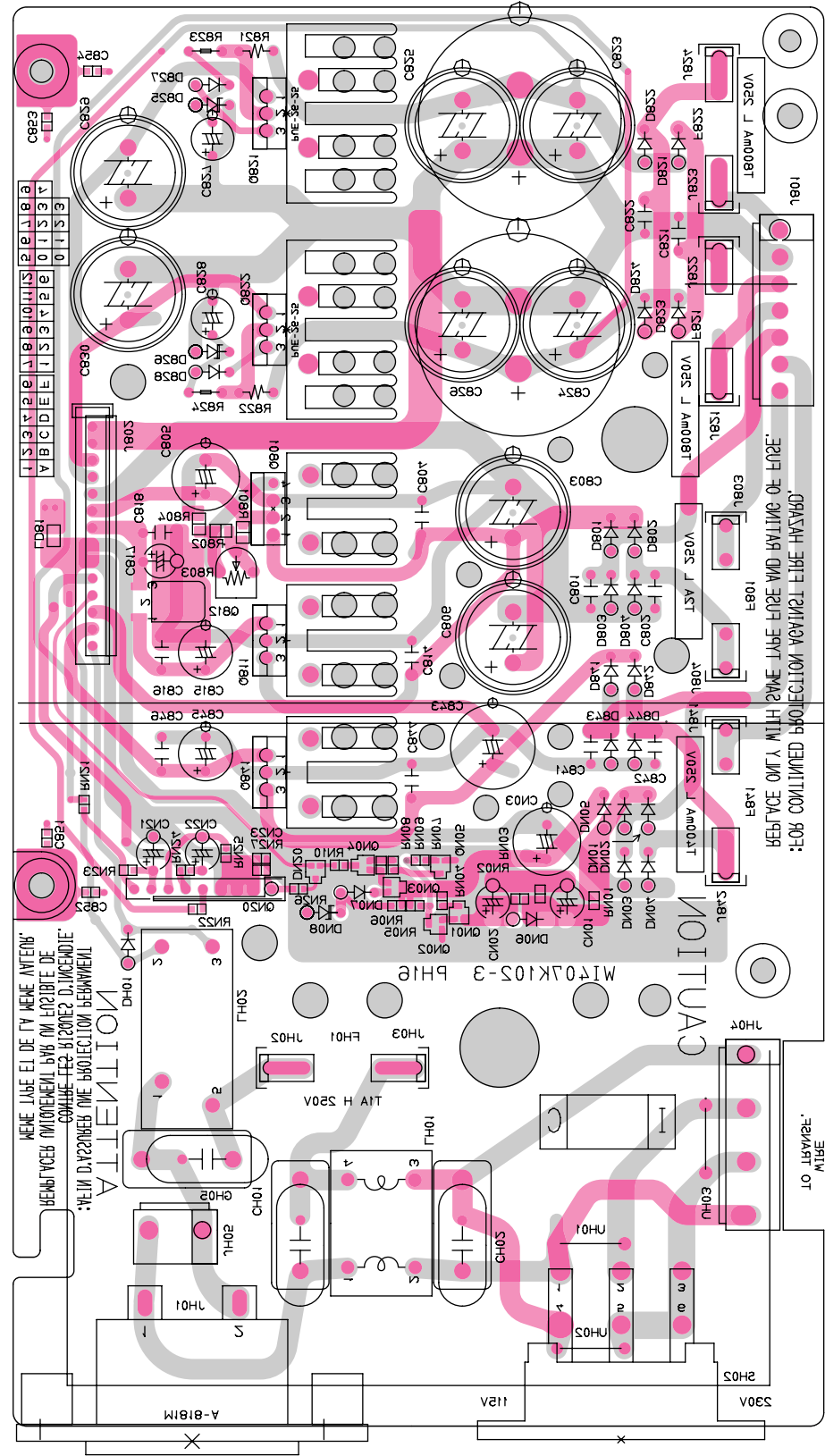
C801	D6	C815	D8	C824	A7	C843	E7	C854	E9	CN22	C8	D822	B6	D841	E7	DN03	E7	F801	D6	JH01	D1	Q801	D7	QN02	F8	R803	D8	R826	A7	RN07	F8	RN24	C7
C802	D6	C816	D8	C827	B7	C844	E7	CH01	D2	CN23	C9	D823	B6	D842	E7	DN03	F6	F821	B6	JH04	D3	Q811	D7	QN03	F8	R804	D8	RN01	F6	RN08	F8	RN25	C8
C803	D7	C817	D8	C828	B7	C845	E8	CH02	D3	D801	D7	D824	A6	D843	E6	DN04	E6	F822	A6	JH05	C3	Q812	D8	QN04	F8	R821	B7	RN02	F6	RN09	F8	RN26	C9
C804	D7	C818	D8	C829	B8	C846	E8	CN01	F6	D802	D7	D825	B7	D844	E6	DN06	F6	F841	E6	L001	C4	Q821	B8	QN05	F8	R822	A7	RN03	F6	RN10	E9	RN27	C9
C805	D8	C821	B6	C830	A8	C851	E9	CN02	F6	D803	D6	D826	B7	DH01	E2	DN07	F8	FH00	D2	L001	D4	Q822	A8	QN20	C7	R823	B7	RN04	F6	RN21	C7	SH02	D3
C806	D7	C822	A6	C841	E6	C852	E9	CN03	F6	D804	D6	D827	B7	DN01	F6	DN08	F8	GH05	D2	LD81	B9	Q841	E7	R801	D8	R824	A7	RN05	F8	RN22	C7	W001	D1
C814	D7	C823	B7	C842	E6	C853	E9	CN21	C8	D821	B6	D828	B7	DN02	E7	DN20	C9	J801	D5	LH02	E2	QN01	F6	R802	D8	R825	B7	RN06	F8	RN23	C8		



Layout Power supply Board



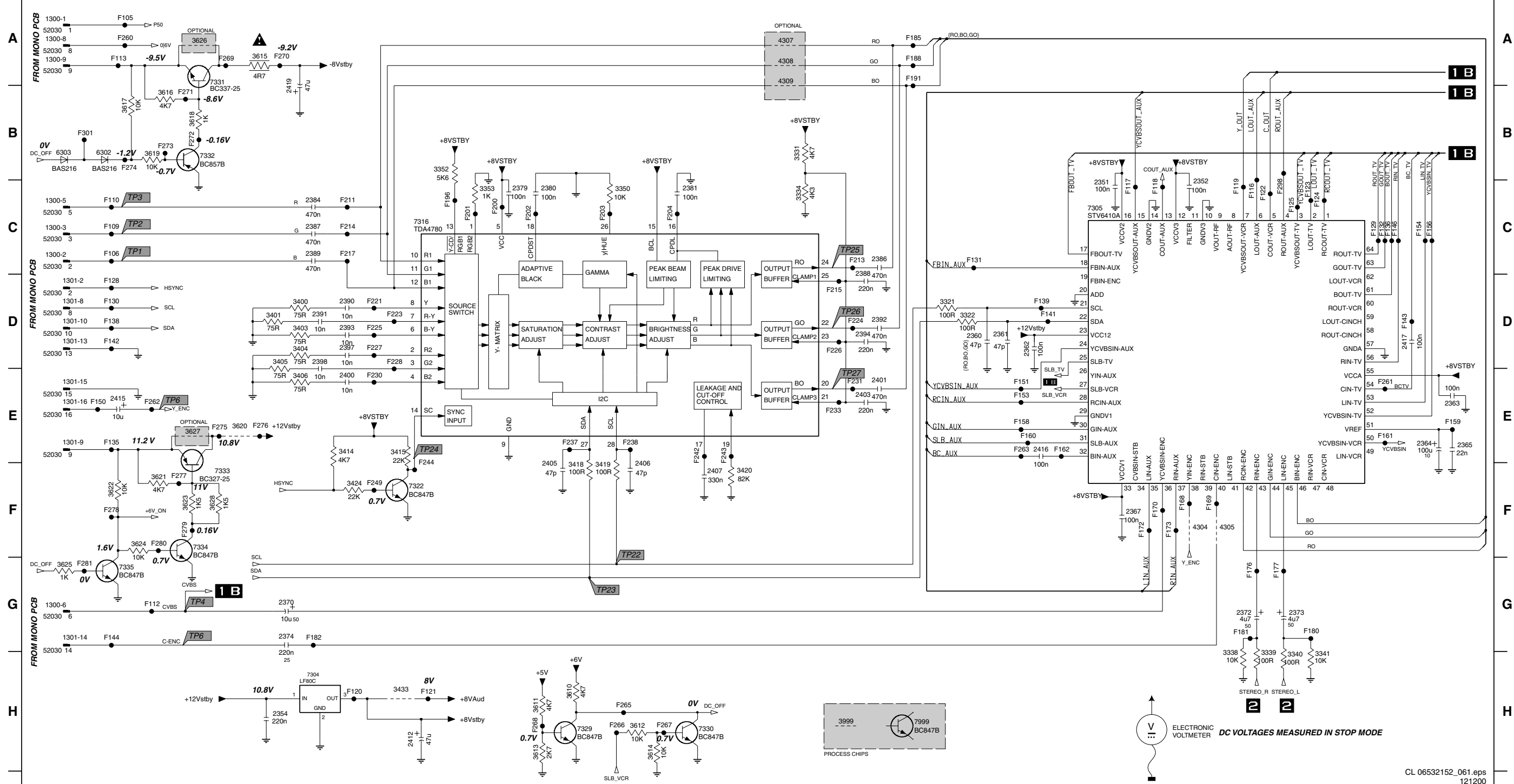
- CN01 F2
- CN02 F3
- CN03 F2
- CN21 F5
- CN22 F4
- CN23 F4
- CH01 H4
- CH02 H3
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- CH02 E2
- CH03 D2
- CH04 D3
- CH05 D3
- CH06 E3
- CH14 E3
- CH15 E4
- CH16 E5
- CH17 D5
- CH18 D5
- CH21 B2
- CH22 B2
- CH23 A2
- CH24 C2
- CH25 A3
- CH26 C3
- CH27 B4
- CH28 C4
- CH29 B5
- CH30 C5
- CH41 E2
- CH42 E2
- CH43 E3
- CH44 E3
- CH45 E4
- CH46 E5
- CH51 F3
- CH52 F3
- CH53 B5
- CH54 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 L4
- 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
- RN01 F2
- RN02 F3
- RN03 F3
- RN04 F3
- RN05 F3
- RN06 F3
- RN10 F4
- RN11 F5
- RN22 F4
- RN23 F5
- RN24 F5
- RN25 F4
- RN26 F4
- RN27 F4
- R801 D4
- R802 D4
- R803 D4
- R804 D4
- R821 A4
- R822 C4
- R823 A4
- R824 C4
- SH02 I1
- UH01 H2
- UH02 H2
- UH03 H1



AV Board (N:Europe): Video control & SCART switch

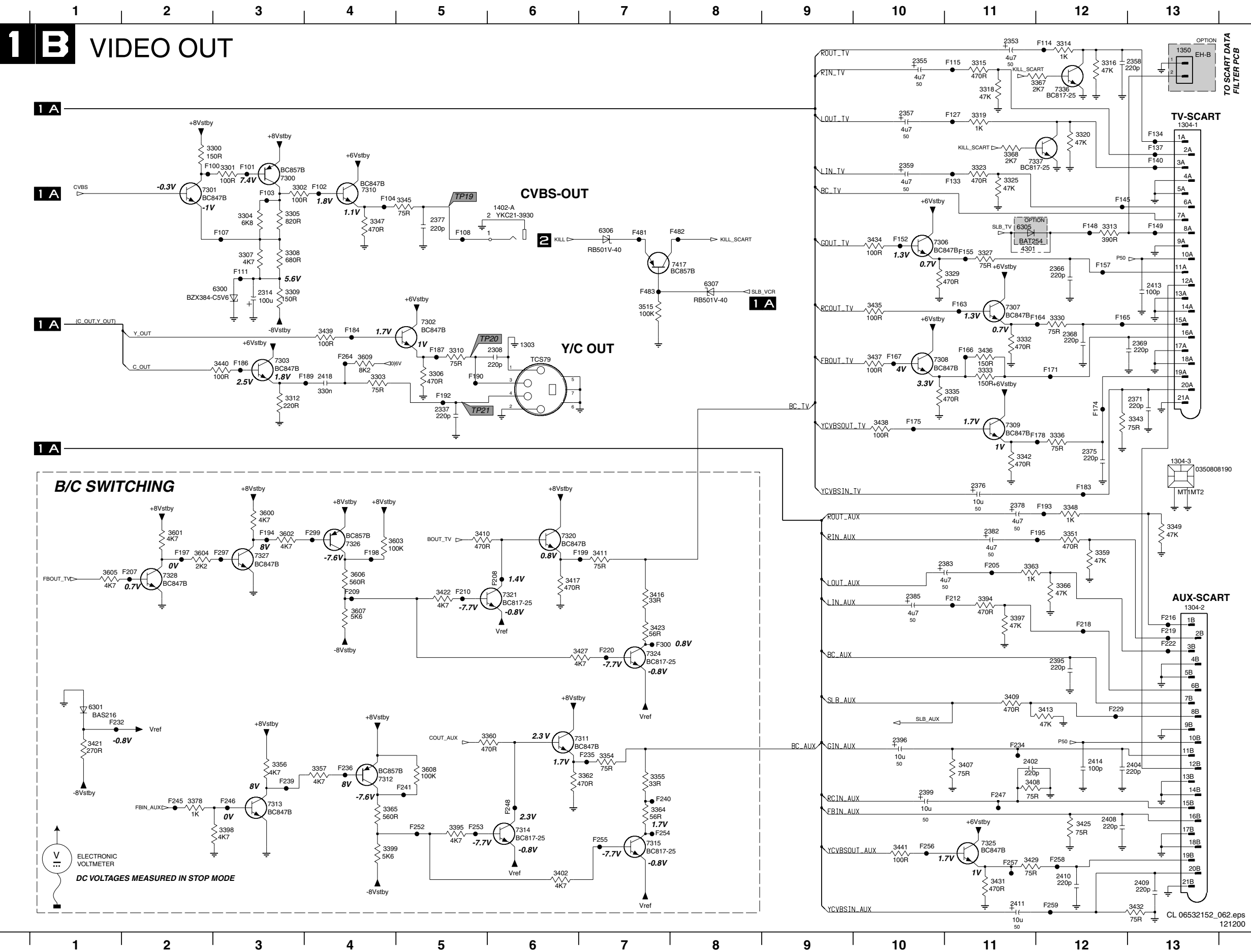
1300-1 A1	1301-14 G1	2360 D10	2373 G14	2389 C3	2401 E9	2419 B3	3350 C7	3414 E4	3612 H7	3621 F2	4304 F13	7316 C4	7999 H10	F118 C12	F129 C15	F142 D1	F158 E11	F173 F12	F196 C5	F215 D9	F230 E4	F260 A1	F270 A3	F279 F2
1300-2 C1	1301-15 E1	2361 D11	2374 G3	2390 D4	2403 E9	3321 D10	3352 B5	3415 E4	3613 H6	3622 F1	4305 F13	7322 F4	F105 A1	F119 C13	F130 D1	F143 D15	F159 E15	F176 G13	F200 C5	F217 C4	F231 E9	F261 E15	F271 B2	F280 F2
1300-3 C1	1301-16 E1	2362 D11	2379 C5	2391 D3	2405 F6	3322 D10	3353 C5	3416 F6	3614 H7	3623 F2	4307 A8	7329 H6	F106 C1	F120 H4	F131 C10	F144 G1	F160 E11	F177 G14	F201 C5	F218 D4	F232 E9	F262 E2	F272 B2	F281 G1
1300-5 C1	1301-2 D1	2363 E15	2380 C6	2392 D9	2406 F7	3331 B8	3400 D3	3419 F6	3615 A3	3624 F1	4308 A8	7330 H7	F109 C1	F121 H5	F132 C15	F146 C15	F161 E15	F180 G14	F202 C6	F233 E6	F263 E11	F273 B2	F282 C14	
1300-6 G1	1301-8 D1	2364 E15	2381 C7	2393 D4	2407 F8	3334 C8	3401 D3	3420 F8	3616 B2	3625 G1	4309 A8	7331 A2	F110 C1	F122 C13	F135 E1	F150 E11	F162 E11	F181 G13	F203 C6	F234 D9	F264 E7	F274 B1	F301 B1	
1300-8 A1	1301-9 E1	2365 E15	2384 C3	2394 D9	2412 H4	3338 H13	3403 D3	3424 F4	3617 B1	3626 A2	4309 A8	7332 B2	F112 G2	F123 C14	F136 C15	F151 E11	F168 F13	F182 G3	F204 C7	F235 D4	F265 H7	F275 E3		
1300-9 A1	2351 C12	2367 F12	2386 G9	2397 D4	2415 E1	3339 H13	3404 D3	3433 H4	3618 B2	3627 E2	6303 B1	7333 F2	F113 A1	F124 C14	F138 D1	F153 E11	F169 F13	F185 A10	F211 C4	F236 D9	F242 E8	F267 H7	F276 E3	
1301-10 D1	2352 C13	2370 G3	2387 C9	2398 D3	2416 E11	3340 H14	3405 D3	3434 H4	3619 B2	3628 F2	7304 H3	7334 F2	F116 C13	F125 C14	F139 D11	F154 C15	F170 F12	F188 A10	F213 C9	F237 D4	F244 F4	F268 H6	F277 F2	
1301-13 D1	2354 H3	2372 G13	2388 D9	2400 E4	2417 D15	3341 H14	3406 E3	3611 H6	3620 E3	3999 H9	7305 C11	7335 G1	F117 C12	F128 D1	F141 D11	F156 C15	F172 F12	F191 A10	F214 C4	F238 D4	F249 F4	F269 A2	F278 F1	

1 A VIDEO CONTROL & SCART SWITCH



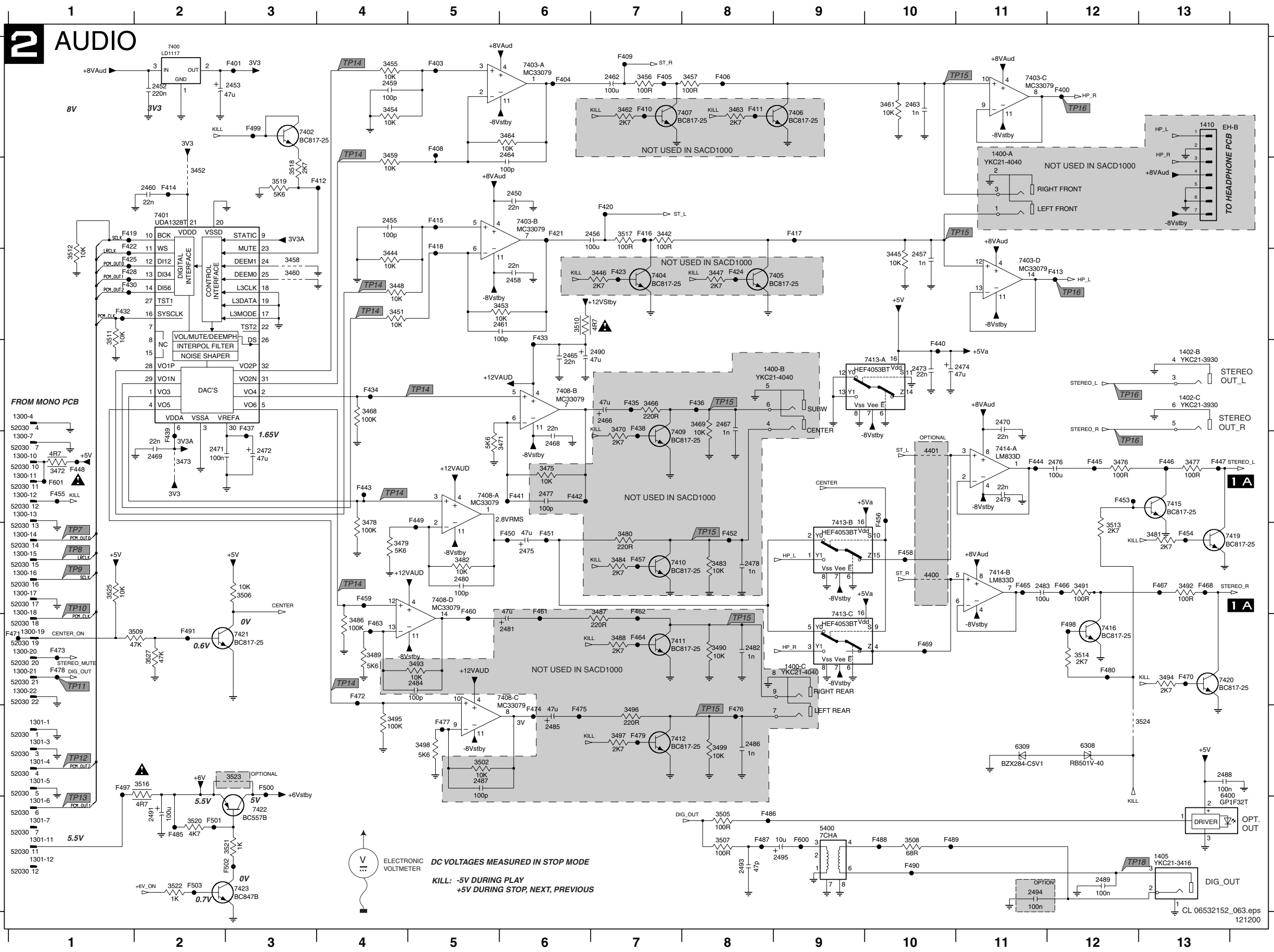
ELECTRONIC VOLTMETER
DC VOLTAGES MEASURED IN STOP MODE

AV Board (N:Europe): Video out



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 C12	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
3314 A12	F133 B11
3315 A13	F134 A12
3316 A12	F137 A13
3318 A11	F140 B13
3319 A11	F145 B12
3320 A12	F148 B12
3323 B11	F149 B13
3325 B11	F152 B10
3327 C11	F155 C11
3329 C11	F157 C12
3330 C12	F163 C11
3332 D11	F164 C12
3333 D11	F165 C12
3335 D11	F166 D11
3336 E12	F167 D10
3342 E11	F171 D12
3343 D13	F174 D12
3345 B5	F175 D10
3347 B4	F178 E12
3348 E12	F183 E12
3349 F13	F184 C4
3351 F12	F185 D3
3354 H7	F187 D5
3355 H7	F189 D4
3356 H3	F190 D5
3357 H4	F192 D5
3359 F12	F193 E12
3360 H6	F194 F3
3362 H7	F195 F12
3363 F11	F197 F2
3364 I7	F198 F4
3365 I4	F199 F7
3366 F12	F205 F11
3367 A12	F207 F2
3368 A11	F208 F6
3378 I2	F209 F4
3394 F11	F210 F5
3395 I5	F212 F11
3397 G11	F216 G13
3398 I3	F218 G12
3399 I4	F219 G13
3402 I6	F220 G7
3407 H11	F222 G13
3408 H11	F229 H12
3409 G11	F232 H1
3410 F5	F234 H11
3411 F7	F235 H7
3413 H12	F236 H4
3416 H7	F239 H3
3417 F6	F240 H7
3421 H1	F241 H5
3422 F5	F245 I2
3423 G7	F246 I3
3425 I2	F247 I11
3427 G7	F248 I6
3429 I11	F252 I5
3431 I11	F253 I5
3432 I13	F254 I7
3434 B10	F255 I7
3435 C10	F256 I10
3436 D11	F257 I11
3437 D10	F258 I12
3438 D10	F264 D4
3439 C4	F269 F3
3440 D3	F296 F4
3441 I10	F300 G7
3515 C7	F481 B7
3600 E3	F482 B8
3601 F2	F483 C7

AV Board (N:Europe): Audio

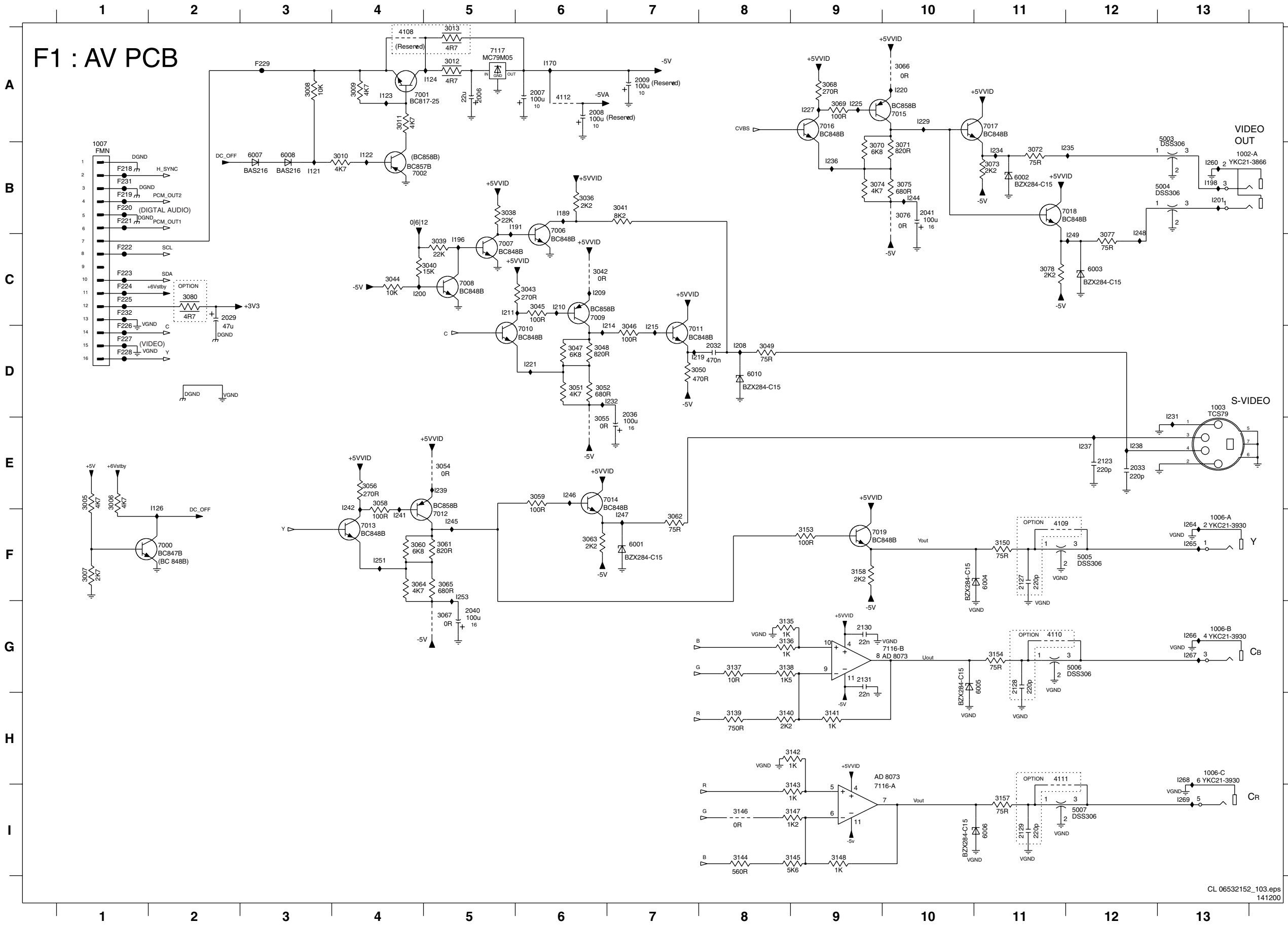


1300-10 E1	3494 G13	F459 F4
1300-11 E1	3495 H4	F460 F5
1300-12 E1	3496 H7	F461 F6
1300-13 E1	3497 H7	F462 F7
1300-14 F1	3498 H5	F463 G4
1300-15 F1	3499 H8	F464 G7
1300-16 F1	3502 H5	F465 F11
1300-17 F1	3505 I8	F466 F12
1300-18 G1	3506 F9	F467 F13
1300-19 G1	3507 I8	F468 F13
1300-20 G1	3508 I10	F469 G10
1300-21 G1	3509 G2	F470 G13
1300-22 G1	3510 C6	F471 G1
1300-4 D1	3511 C1	F472 G4
1300-7 E1	3512 C1	F473 G1
1301-1 H1	3513 F12	F474 H6
1301-11 I1	3514 G12	F475 H6
1301-12 I1	3516 H2	F476 H8
1301-3 H1	3517 B7	F477 H5
1301-4 H1	3518 B3	F478 G1
1301-5 H1	3519 B3	F479 H7
1301-6 I1	3520 I2	F480 G12
1301-7 I1	3521 I3	F485 I2
1400-A A11	3522 I2	F486 I8
1400-B D9	3523 H3	F487 I8
1400-C G9	3524 H13	F488 I10
1402-B D13	3525 F1	F489 I10
1402-C D13	3527 G2	F490 I10
1400 H13	4400 F11	F491 G2
1410 A13	4401 E10	F497 H1
2450 B6	5400 I9	F498 G12
2452 A2	6308 H12	F499 A3
2453 A3	6309 H11	F500 H3
2455 B4	6400 I13	F501 I2
2456 B7	7400 A2	F502 I3
2457 C10	7401 B2	F503 I2
2458 C6	7402 A3	F500 I9
2459 A4	7403-A A6	F600 I9
2460 B2	7403-B B6	F601 E1
2461 C6	7403-C A11	
2462 A7	7403-D C11	
2463 A10	7404 C7	
2464 A6	7405 C8	
2465 D6	7406 A9	
2466 D7	7407 A7	
2467 D8	7408-A E5	
2468 E6	7408-B D6	
2469 E2	7408-C G5	
2470 D11	7408-D F5	
2471 E2	7409 E7	
2472 E3	7410 F7	
2473 D10	7411 G7	
2474 D11	7412 H7	
2475 F6	7413-A D10	
2476 E12	7413-B F9	
2477 E6	7413-C G9	
2478 F8	7414-A E11	
2479 E11	7414-B F11	
2480 F5	7415 E13	
2481 G6	7416 G12	
2482 G8	7419 F13	
2483 F11	7420 G13	
2484 G5	7421 G3	
2485 H6	7422 I3	
2486 H8	7423 I3	
2487 H5	F400 A12	
2488 H13	F401 A3	
2489 I12	F403 A5	
2490 D7	F404 A6	
2491 I2	F405 A7	
2493 I8	F406 A8	
2494 I11	F408 A5	
2495 I9	F409 A7	
3442 B7	F410 A7	
3444 C4	F411 A8	
3445 C10	F412 B4	
3446 C7	F413 C12	
3447 C8	F414 B5	
3448 C4	F415 B5	
3451 C4	F416 B7	
3452 B2	F417 B9	
3453 C6	F418 B5	
3454 A4	F419 B1	
3455 A4	F420 B7	
3456 A7	F421 B6	
3457 A8	F422 B1	
3458 C3	F423 C7	
3459 B4	F424 C8	
3460 C3	F425 C1	
3461 A10	F426 C1	
3462 A7	F430 C1	
3463 A8	F432 C1	
3464 A6	F433 C6	
3466 D7	F434 D4	
3468 D4	F435 D7	
3469 D8	F436 D8	
3470 E7	F437 D3	
3471 E5	F438 D7	
3472 E1	F439 E2	
3473 E2	F440 D10	
3475 E6	F441 E6	
3476 E12	F442 E6	
3477 E13	F443 E4	
3478 E4	F444 E11	
3479 F4	F445 E12	
3480 F7	F446 E13	
3481 F13	F447 E13	
3482 F5	F448 E13	
3483 F8	F449 E5	
3484 F7	F450 F6	
3486 G4	F451 F6	
3487 G7	F452 F8	
3488 G7	F453 E12	
3489 G4	F454 F13	
3490 G8	F455 E1	
3491 F12	F456 E10	
3492 F13	F457 F7	
3493 G5	F458 F10	

ELECTRONIC DC VOLTAGES MEASURED IN STOP MODE
 KILL: -5V DURING PLAY
 +5V DURING STOP, NEXT, PREVIOUS

AV Board (F, S, U): Video

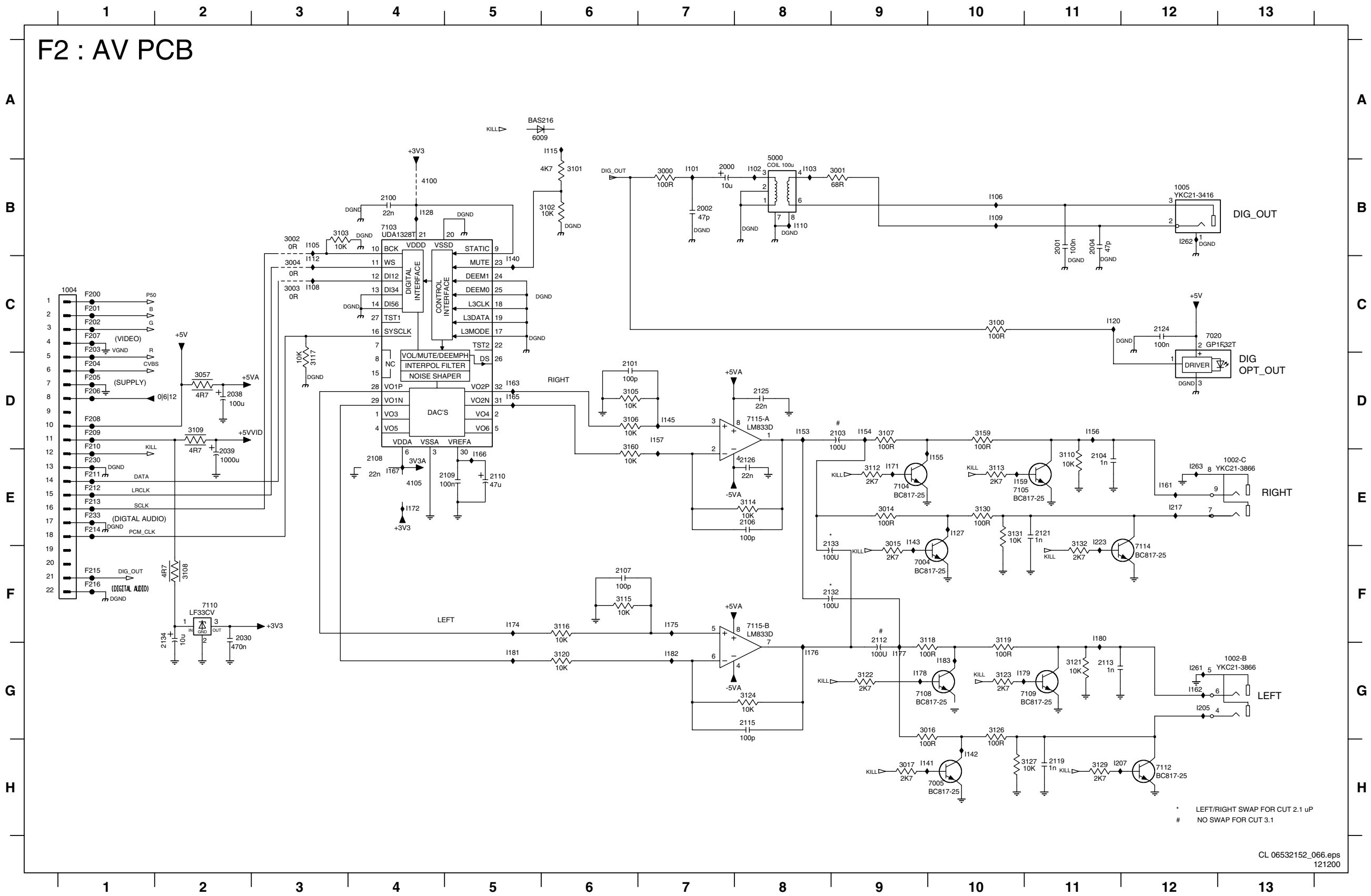
F1 : AV PCB



1002-A B13	7007 C5
1003 D13	7008 C5
1006-A F13	7009 C6
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	I125 E2
3041 B7	I170 A6
3042 C6	I189 B6
3043 C6	I191 B6
3044 C4	I196 C5
3045 C6	I198 B13
3046 D7	I200 C4
3047 D6	I201 B3
3048 D6	I208 D8
3049 D8	I209 C6
3050 D7	I210 C6
3051 D6	I211 C5
3052 D6	I214 D7
3054 E5	I215 D7
3055 E6	I219 D7
3056 E4	I220 A10
3058 E4	I221 D6
3059 E5	I225 A9
3060 F4	I227 A9
3061 F5	I229 A10
3062 F7	I231 D13
3063 F6	I232 D7
3064 F4	I234 B11
3065 F5	I235 B12
3066 A10	I236 B9
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 H13
3142 H9	
3143 I9	
3144 I8	
3145 I9	
3146 I8	
3147 I9	
3148 I9	
3150 F11	
3153 F9	
3154 G11	
3157 I11	
3158 F9	
4108 A4	
4109 F11	
4110 G11	
4111 H11	
4112 A6	
5003 A13	
5004 B12	
5005 F12	
5006 G12	
5007 I12	
6001 F7	
6002 B11	
6003 C12	
6004 F11	
6005 G11	
6006 I11	
6007 B3	
6008 B3	
6010 D8	
7000 F2	
7001 A5	
7002 B4	
7006 B6	

AV Board (F, S, U): Audio

F2 : AV PCB



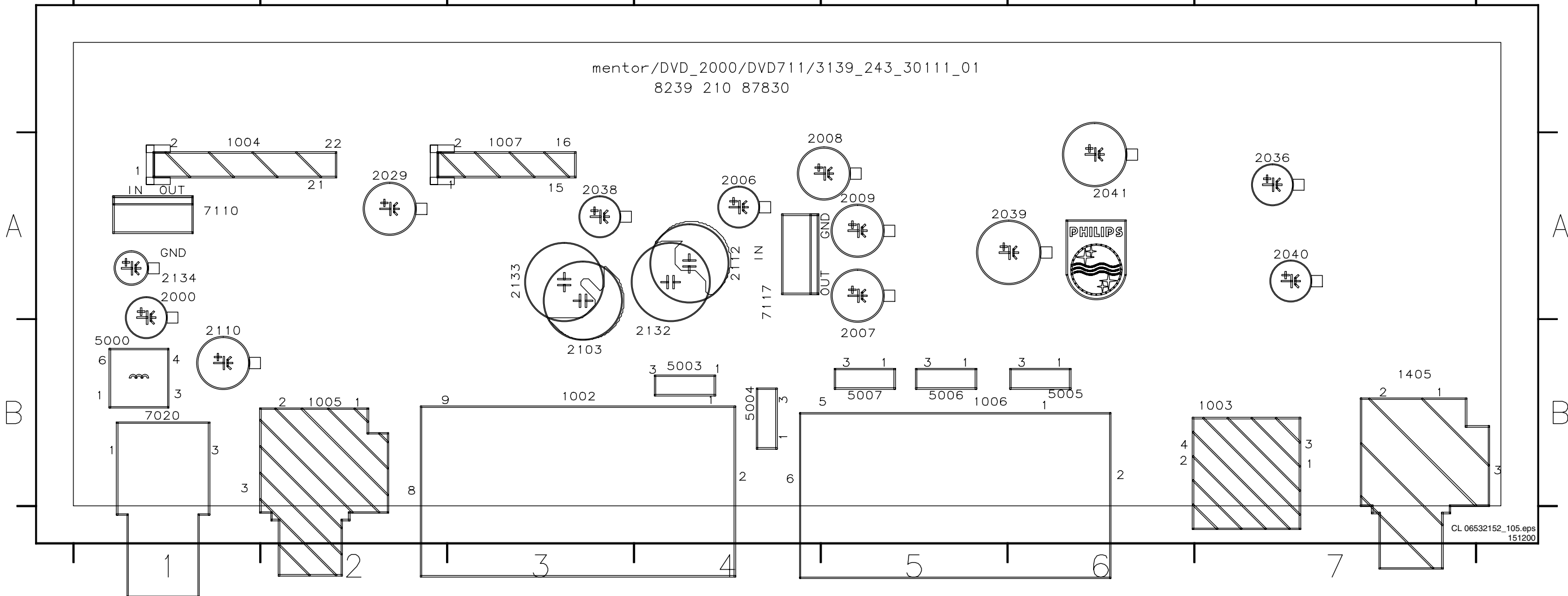
- 1002-B G13
- 1002-C E13
- 1004 C1
- 1005 B12
- 1405 A12
- 2000 B7
- 2001 B11
- 2002 B7
- 2004 B11
- 2030 F2
- 2038 D2
- 2039 E2
- 2100 B4
- 2101 D6
- 2103 D9
- 2104 E11
- 2106 E8
- 2107 F6
- 2108 E4
- 2109 E5
- 2110 E5
- 2112 G9
- 2113 G11
- 2115 G8
- 2119 H11
- 2121 E11
- 2124 C12
- 2125 D8
- 2126 E8
- 2132 F8
- 2133 F8
- 2134 F2
- 2135 A11
- 2136 A12
- 3000 B7
- 3001 B9
- 3002 B3
- 3003 C3
- 3004 C3
- 3014 E9
- 3015 F9
- 3016 G9
- 3017 H9
- 3057 D2
- 3100 C10
- 3101 B6
- 3102 B6
- 3103 B3
- 3105 D6
- 3106 D6
- 3107 D9
- 3108 F2
- 3109 D2
- 3110 E11
- 3112 E9
- 3113 E10
- 3114 E8
- 3115 F6
- 3116 F6
- 3117 D3
- 3118 G9
- 3119 G10
- 3120 G6
- 3121 G11
- 3122 G9
- 3123 G10
- 3124 G8
- 3126 G10
- 3127 H11
- 3129 H11
- 3130 E10
- 3131 E10
- 3132 F11
- 3158 D10
- 3160 E6
- 3161 A10
- 3162 A10
- 4100 B4
- 4105 E4
- 5000 B8
- 6009 A5
- 7004 F9
- 7005 H10
- 7020 C12
- 7103 B4
- 7104 E9
- 7105 E10
- 7108 G9
- 7109 G10
- 7110 F2
- 7112 H12
- 7114 F12
- 7115-A D8
- 7115-B F8
- F200 C1
- F201 C1
- F202 C1
- F203 C1
- F204 D1
- F205 D1
- F206 D1
- F207 C1
- F208 D1
- F209 D1
- F211 E1
- F212 E1
- F213 E1
- F214 E1
- F215 F1
- F216 F1
- F230 E1
- F233 E1
- F235 E1
- F238 E1
- F239 E1
- F240 E1
- F241 E1
- F242 E1
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- F254 E1
- F255 E1
- F256 E1
- F257 E1
- F258 E1
- F259 E1
- F260 E1
- F261 E1
- F262 E1
- F263 E1
- F264 E1
- F265 E1
- F266 E1
- F267 E1
- F268 D1
- F209 D1

Layout AV Board (F, S, U): (top view)

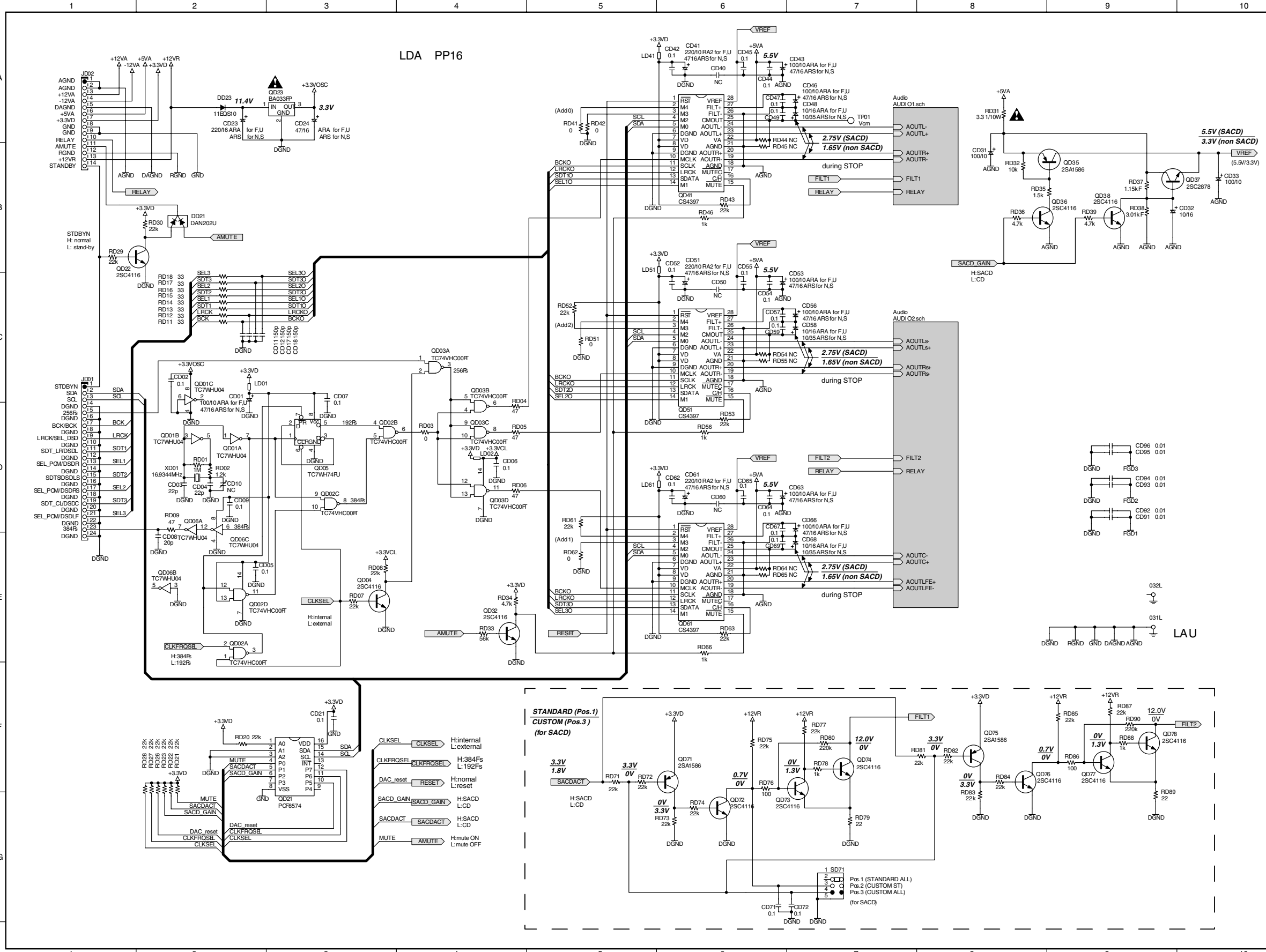
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1003 B7	1006 B5	2000 A1	2008 A5	2036 A7	2040 A7	2110 B1	2133 A3	5003 B4	5006 B5	7110 A1
1004 A1	1007 A3	2006 A4	2009 A5	2038 A3	2041 A6	2112 A4	2134 A1	5004 B4	5007 B5	7117 A4

1 2 3 4 5 6 7

mentor/DVD_2000/DVD711/3139_243_30111_01
8239 210 87830



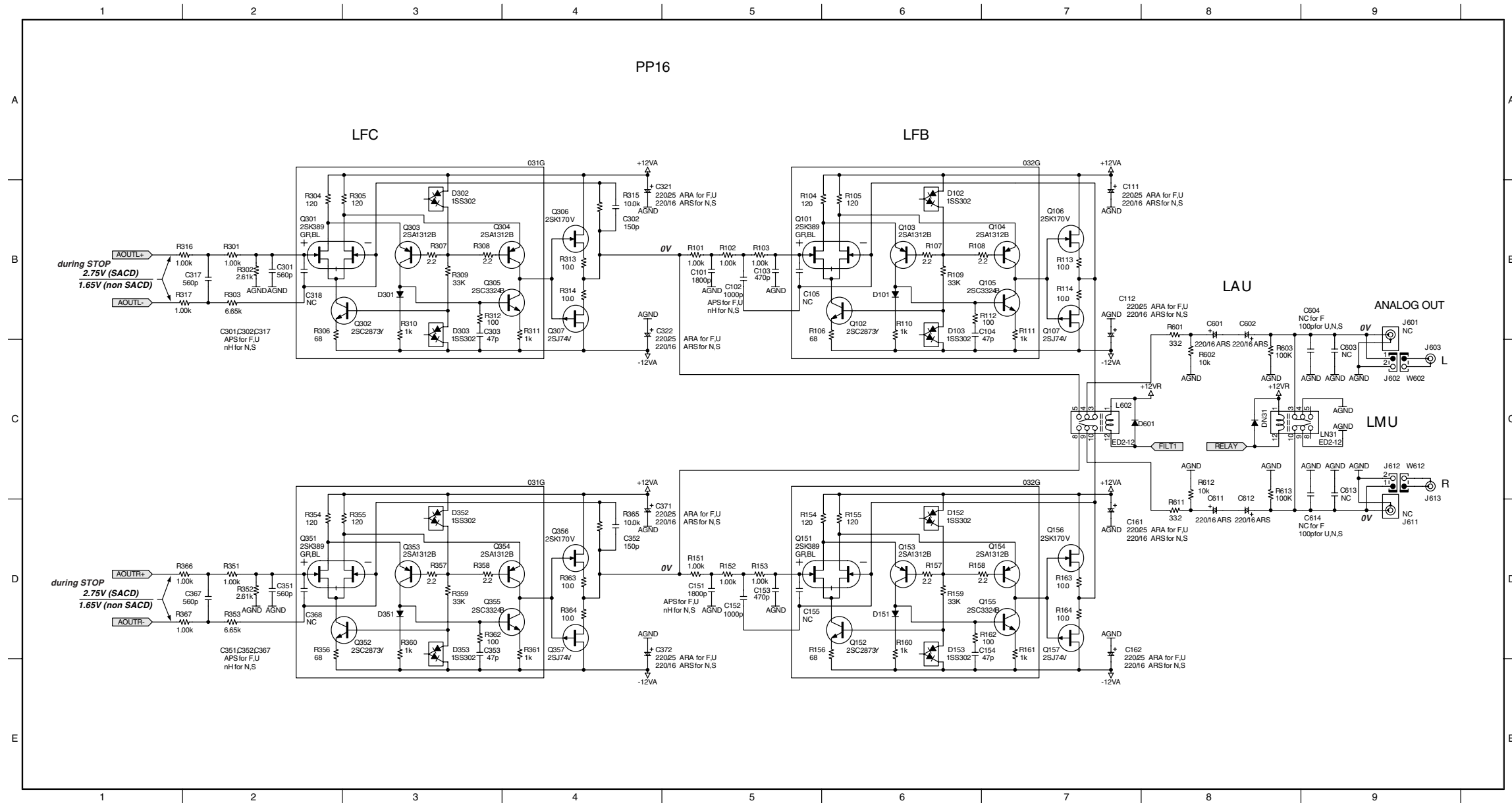
LDA PP16

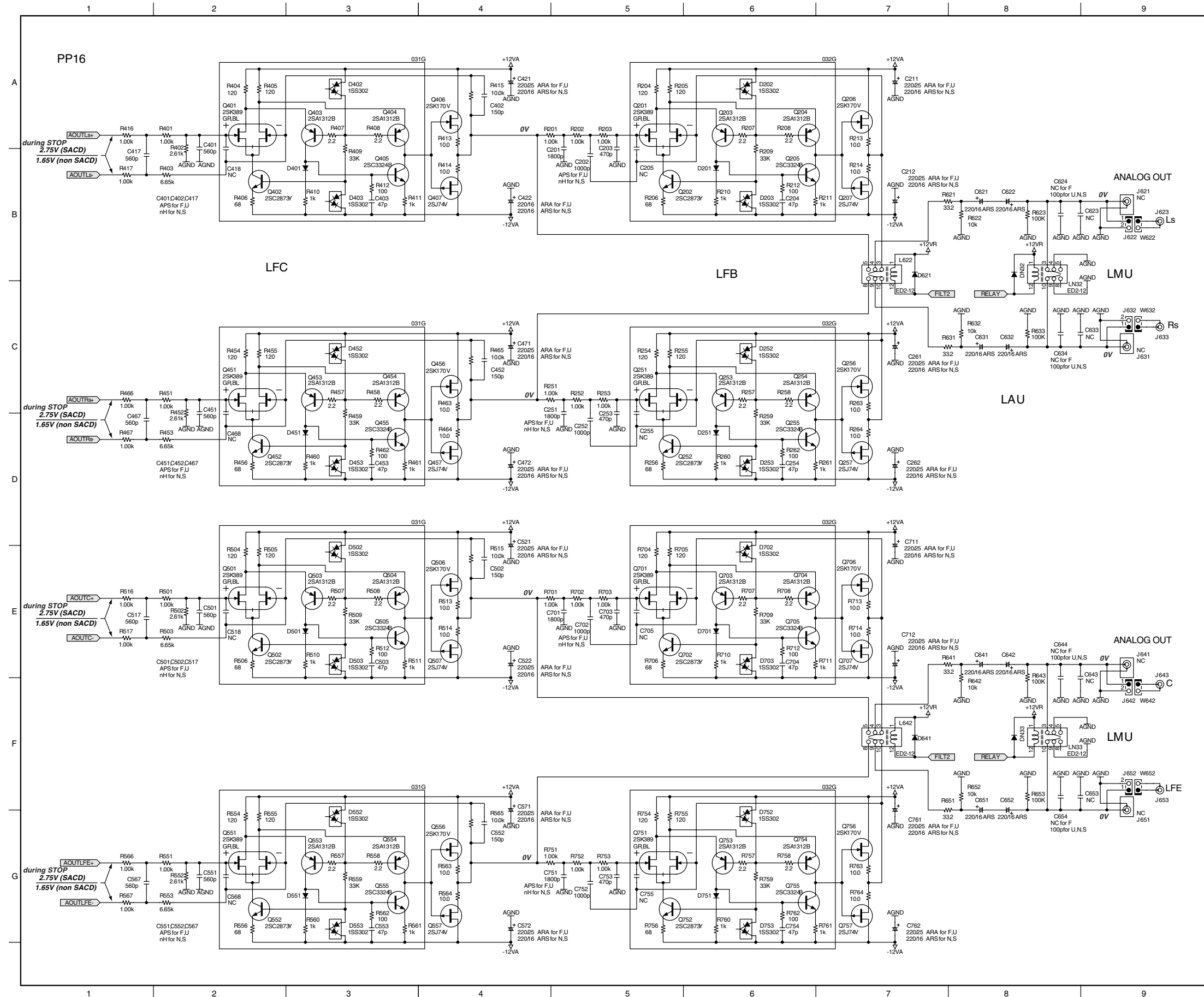


CD01	C2	RD06	D4
CD02	C2	RD07	E3
CD03	D2	RD08	E3
CD04	D2	RD09	E2
CD05	E2	RD11	C2
CD06	D4	RD12	C2
CD07	D3	RD13	C2
CD08	E2	RD14	C2
CD09	D2	RD15	C2
CD11	C2	RD16	C2
CD12	C2	RD17	C2
CD17	C2	RD18	C2
CD18	C2	RD20	F2
CD21	F3	RD23	B1
CD23	A2	RD30	B2
CD24	A3	RD31	A8
CD31	B8	RD32	B8
CD32	B9	RD33	E4
CD33	B10	RD34	E4
CD40	A6	RD35	B8
CD41	A6	RD36	B8
CD42	A6	RD37	B8
CD43	A6	RD38	B8
CD44	A6	RD39	B8
CD45	A6	RD39	B8
CD46	A7	RD41	A5
CD47	A6	RD42	A5
CD48	A7	RD43	B6
CD49	A6	RD44	B6
CD50	C6	RD45	B6
CD51	C6	RD46	B6
CD52	C6	RD51	C5
CD54	C6	RD52	C5
CD55	C6	RD54	C6
CD56	C7	RD55	C6
CD57	C6	RD61	D5
CD58	C7	RD62	E5
CD59	C6	RD63	E6
CD60	D6	RD64	E6
CD61	D6	RD65	E6
CD63	D6	RD66	E6
CD64	D6	RD71	F5
CD65	D6	RD72	F5
CD66	E7	RD73	G6
CD67	D6	RD74	G6
CD68	E7	RD75	F6
CD69	E6	RD76	F6
CD71	G6	RD77	F7
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CD93	D9	RD81	F8
CD94	D9	RD82	F8
CD95	D9	RD83	G8
CD96	D9	RD84	F8
DD21	B2	RD85	F9
DD23	A2	RD86	F9
JD01	D1	RD87	F9
JD02	A1	RD88	F9
LD01	C2	RD89	G9
LD02	D4	SD71	G7
LD41	A6	XD01	D2
LD51	C6		
LD61	D6		
QD01A	D2		
QD01B	D2		
QD01C	D2		
QD02A	E2		
QD02B	D3		
QD02C	D3		
QD02D	E2		
QD03A	C4		
QD03B	D4		
QD03C	D4		
QD03D	D4		
QD04	E3		
QD05	D3		
QD06A	E2		
QD06B	E2		
QD06C	E2		
QD21	F3		
QD23	B1		
QD23	A3		
QD32	E4		
QD35	B9		
QD36	B9		
QD37	B9		
QD38	B10		
QD41	B6		
QD51	C6		
QD61	E6		
QD71	F6		
QD72	G6		
QD73	G7		
QD74	F7		
QD75	F8		
QD76	F8		
QD77	F9		
QD78	F9		
RD01	D2		
RD02	D2		
RD03	D4		
RD04	D4		
RD05	D4		

Audio1

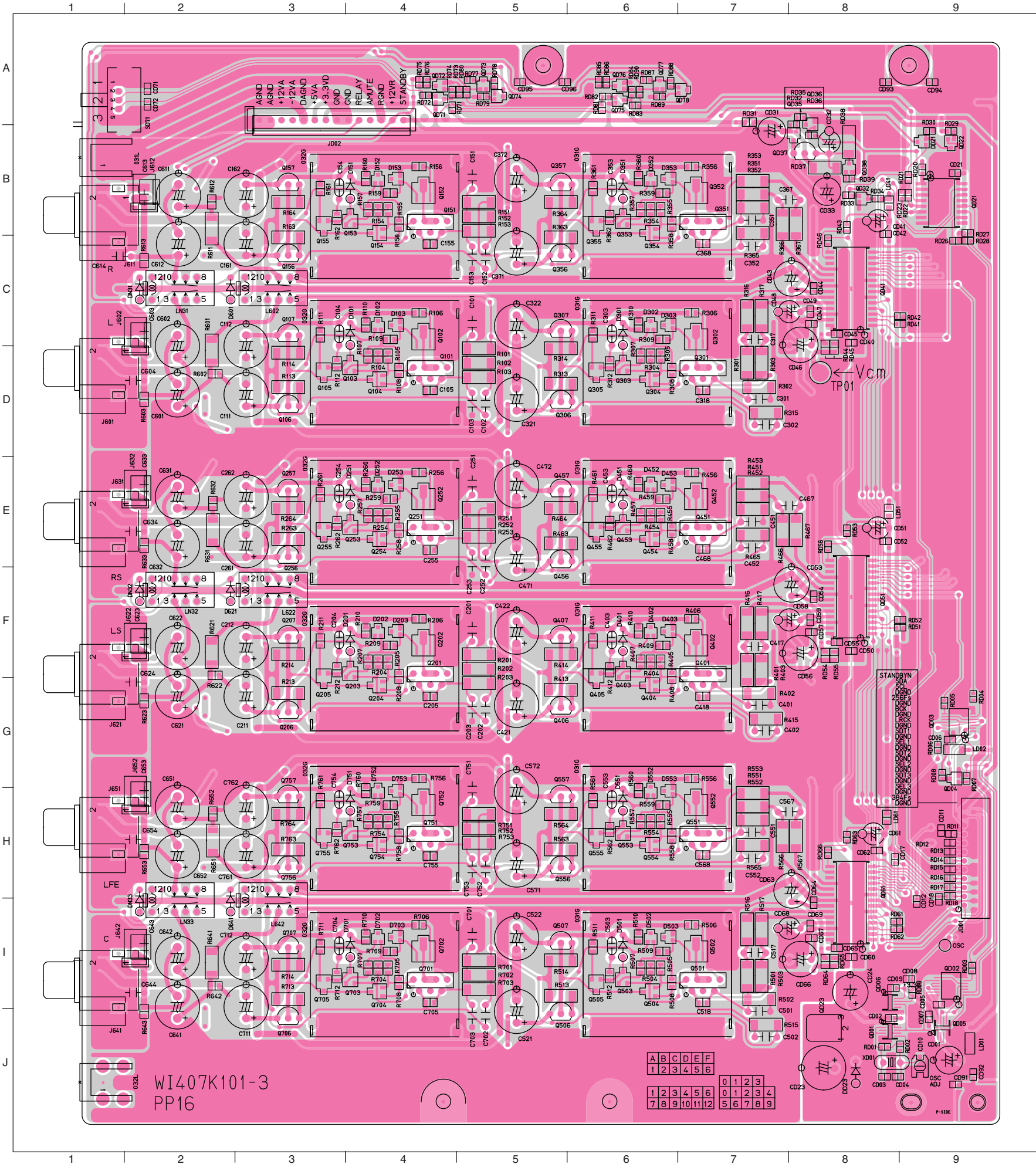
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C102	B5	C155	D5	C322	B4	C602	B8	D103	B6	D353	D3	L602	C7	Q151	D5	Q303	B3	Q356	D4	R108	B7	R153	D5	R162	D6	R307	B3	R316	B1	R358	D3	R367	D2
C103	B5	C161	D7	C351	D2	C603	C9	D151	D6	D601	C7	LN31	C9	Q152	D6	Q304	B4	Q357	D4	R109	B6	R154	D6	R163	D7	R308	B3	R317	B1	R359	D3	R601	B8
C105	B5	C162	D7	C352	D4	C604	C9	D152	D6	DN31	C8	Q101	B5	Q153	D6	Q305	B4	R101	B5	R110	B6	R155	D6	R164	D7	R309	B3	R351	D2	R360	D3	R602	C8
C111	B7	C301	B1	C353	D3	C611	D8	D153	D6	J601	B9	Q102	B6	Q154	D7	Q306	B4	R102	B5	R111	B7	R156	D6	R301	B1	R310	B3	R352	D2	R361	D4	R603	C8
C112	B7	C302	B4	C367	D2	C612	D8	D301	B3	J602	C9	Q103	B6	Q155	D7	Q307	B4	R103	B5	R112	B6	R157	D6	R302	B1	R311	B4	R353	D2	R362	D3	R611	D8
C151	D5	C303	B3	C368	D2	C613	C9	D302	B3	J603	C9	Q104	B7	Q156	D7	Q351	D2	R104	B5	R113	B7	R158	D7	R303	B1	R312	B3	R354	D2	R363	D4	R612	C8
C152	D5	C317	B1	C371	D4	C614	C9	D303	B3	J611	D9	Q105	B7	Q157	D7	Q353	D3	R105	B6	R114	B7	R159	D6	R304	B1	R313	B4	R355	D3	R364	D4	R613	C8
C153	D5	C318	B1	C372	D4	D101	B6	D351	D3	J612	C9	Q106	B7	Q301	B1	Q354	D4	R106	B6	R115	D5	R160	D6	R305	B3	R314	B4	R356	D2	R365	D4		





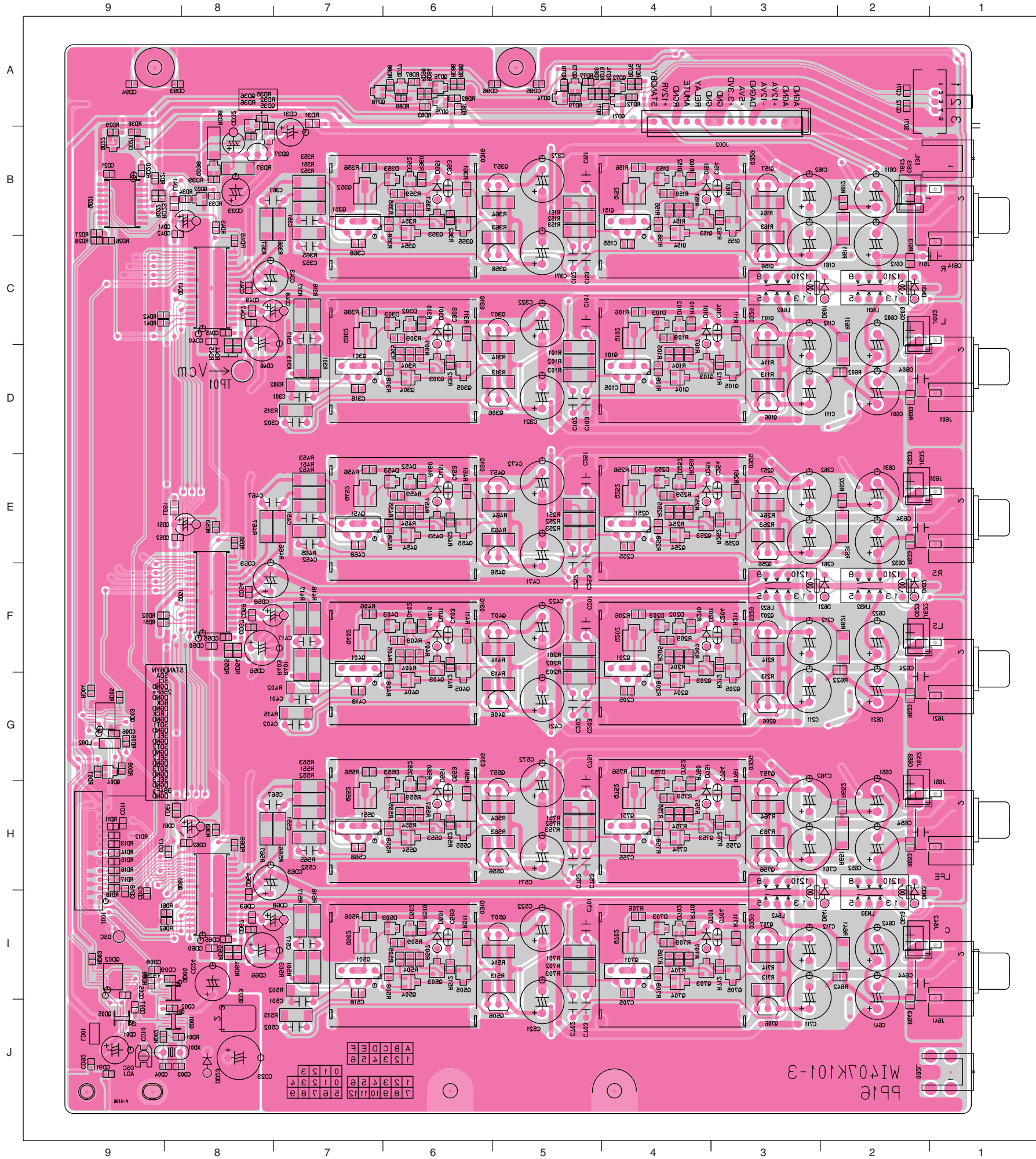
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C205	A5	L622	B7	R452	C2
C211	A7	LN32	B8	R453	D2
C212	B7	LN33	F8	R454	C2
C251	C5	Q201	A5	R455	C2
C251	D4	Q202	B5	R456	D2
C252	D5	Q203	A6	R457	C3
C253	C5	Q204	A6	R458	C3
C254	D6	Q205	B6	R459	C3
C255	C5	Q206	A7	R460	D3
C261	C7	Q207	B7	R461	D3
C262	D7	Q251	C5	R462	D3
C401	A2	Q252	D5	R463	C4
C402	A4	Q253	C6	R464	D4
C403	B3	Q254	C6	R465	C4
C417	B1	Q255	D6	R466	C1
C418	B2	Q256	C7	R467	D1
C421	A4	Q257	D7	R501	E2
C422	B4	Q401	A2	R502	E2
C451	C2	Q402	B2	R503	E2
C452	C4	Q403	A3	R504	E2
C453	D3	Q404	A3	R505	E2
C467	D1	Q405	B3	R506	E2
C468	C2	Q406	A4	R507	E3
C471	C4	Q407	B4	R508	E3
C472	D4	Q451	C2	R509	E3
C501	E2	Q452	D2	R510	E3
C502	E4	Q453	C3	R511	E3
C503	E3	Q454	C3	R512	E3
C517	E1	Q455	D3	R513	E4
C522	E4	Q456	C4	R514	E4
C551	G2	Q457	D4	R515	E4
C552	G4	Q501	E2	R516	E1
C553	G3	Q502	E2	R517	E1
C567	G1	Q503	E3	R551	G2
C568	G2	Q504	E3	R552	G2
C571	G4	Q505	E3	R553	G2
C572	G4	Q506	E4	R554	G2
C621	B8	Q507	E4	R555	G2
C622	B8	Q551	G2	R556	G2
C623	B8	Q552	G2	R557	G3
C631	C8	Q553	G3	R558	G3
C632	C8	Q554	G3	R559	G3
C633	C8	Q555	G3	R560	G3
C634	C8	Q556	G4	R561	G3
C641	E8	Q557	G4	R562	G3
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C643	E8	Q702	E5	R564	G4
C644	E8	Q703	E5	R565	G4
C651	F8	Q704	E6	R566	G1
C652	F8	Q705	E6	R567	G1
C653	F8	Q706	E7	R621	B8
C654	F8	Q707	E7	R622	B8
C701	E5	Q751	G5	R623	B8
C702	E5	Q752	G5	R631	C8
C703	E5	Q753	G6	R632	C8
C704	E6	Q754	G6	R633	C8
C711	D7	Q755	G6	R641	E8
C712	E7	Q756	G7	R642	E8
C751	G5	Q757	G7	R643	E8
C752	G5	R201	A5	R651	F8
C753	G5	R202	A5	R652	F8
C754	G6	R203	A5	R653	F8
C755	G5	R204	A5	R701	E5
C761	G7	R205	A5	R702	E5
C762	G7	R206	B5	R703	E5
C924	B8	R207	A6	R704	E5
D201	B6	R208	A6	R705	E5
D202	A6	R209	A6	R706	E5
D203	B6	R210	B6	R707	E6
D251	D6	R211	B6	R708	E6
D252	C6	R212	B6	R709	E6
D253	D6	R213	A7	R710	E6
D401	B3	R214	B7	R711	E6
D402	A3	R251	C5	R712	E6
D403	B3	R252	C5	R713	E7
D451	D3	R253	C5	R714	E7
D452	C3	R254	C5	R751	G5
D453	D3	R255	C5	R752	G5
D461	F7	R256	D5	R753	G5
D502	E3	R257	C6	R754	G5
D503	E3	R258	C6	R755	G5
D551	G3	R259	C6	R756	G5
D552	G3	R260	D6	R757	G6
D553	G3	R261	D6	R758	G6
D621	B7	R262	D6	R759	G6
D701	E6	R263	C7	R760	G6
D702	E6	R264	D7	R761	G6
D703	E6	R401	A2	R762	G6
D751	G6	R402	A2	R763	G7
D752	G6	R403	B2	R764	G7
D753	G6	R404	A2		
DN32	B8	R405	A2		
DN33	F8	R406	B2		
J621	B9	R407	A3		
J622	B9	R408	A3		
J623	B9	R409	B3		
J631	C9	R410	B3		
J632	C9	R411	B3		
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J641	E9	R413	A4		
J642	F9	R414	B4		

Layout DAC board (top view)



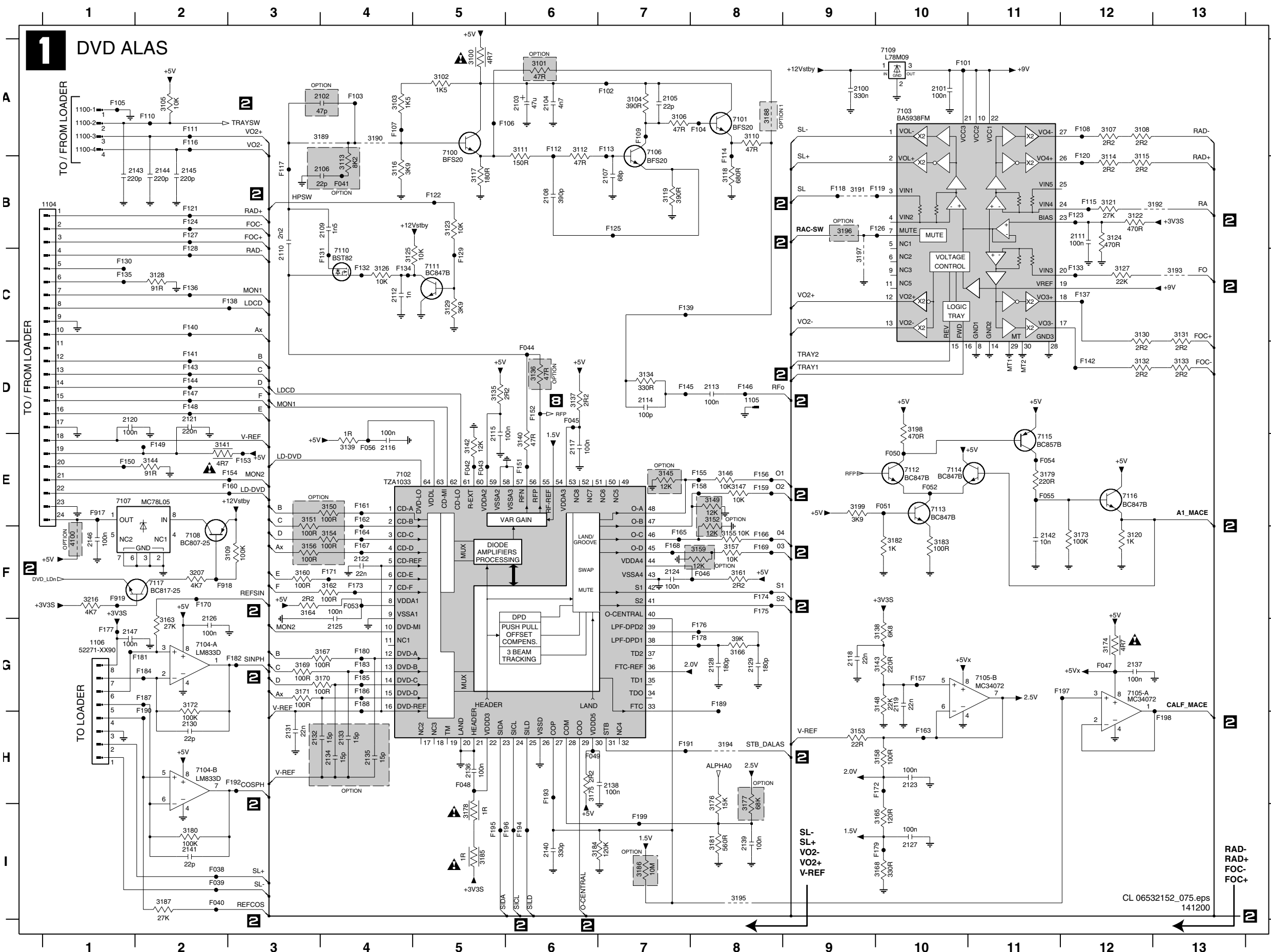
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CD03 J8	C572 G5	QD35 A8	RD30 B9	R354 B6	R761 H3
CD04 J9	C601 D2	QD36 A8	RD31 A7	R355 B6	R762 H3
CD05 J9	C602 C2	QD37 B7	RD32 A8	R356 B7	R763 H3
CD06 G9	C603 D2	QD38 B8	RD33 B8	R357 B6	R764 H3
CD07 J9	C604 D2	QD41 C8	RD34 B8	R358 B6	SD71 A2
CD08 I9	C611 B2	QD51 F8	RD35 A8	R359 B6	RD36 A8
CD09 I8	C612 C2	QD61 H8	RD36 A8	R360 B6	Q31L B2
CD10 J9	C613 B2	QD71 A4	RD37 B8	R361 B6	Q32L J2
CD11 H9	C614 C1	QD72 A4	RD38 A8	R362 B6	
CD12 I9	C621 G2	QD73 A5	RD39 B8	R363 B5	
CD17 H8	C622 F2	QD74 A5	RD41 C9	R364 B5	
CD18 I9	C623 F2	QD75 A6	RD42 C9	R365 C7	
CD21 B9	C624 F2	QD76 A6	RD43 B8	R366 C7	
CD23 J8	C631 E2	QD77 A6	RD44 D8	R367 C8	
CD24 I8	C632 E2	QD78 A6	RD45 D8	R401 F7	
CD31 A7	C633 E2	Q101 D4	RD46 C8	R402 G7	
CD32 A8	C634 E2	Q102 C4	RD51 F9	R403 F7	
CD33 B8	C641 J2	Q103 D4	RD52 F9	R404 F6	
CD40 C8	C642 I2	Q104 D4	RD53 E8	R405 F6	
CD41 B8	C643 I2	Q105 D3	RD54 F8	R406 F7	
CD42 B8	C644 I2	Q106 D3	RD55 F8	R407 F6	
CD43 C7	C651 H2	Q107 C3	RD56 E8	R408 F6	
CD44 C8	C652 H2	Q151 B4	RD61 I9	R409 F6	
CD45 C8	C653 H2	Q152 B4	RD62 I9	R410 F6	
CD46 D8	C654 H2	Q153 B3	RD63 H8	R411 F6	
CD47 C8	C701 I5	Q154 B4	RD64 I9	R412 F6	
CD48 C7	C702 J5	Q155 B3	RD65 I8	R413 F5	
CD49 C8	C703 J5	Q156 C3	RD66 H8	R414 F5	
CD50 F8	C704 I3	Q157 B3	RD71 A4	R415 G7	
CD51 E8	C705 I4	Q201 F4	RD72 A4	R416 F7	
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CD55 F8	C752 H5	Q205 G3	RD76 A4	R453 E7	
CD56 F8	C753 H5	Q206 G3	RD77 A5	R454 E6	
CD57 F8	C754 G4	Q207 F3	RD78 A5	R455 E6	
CD58 F8	C755 H4	Q251 E4	RD79 A5	R456 E7	
CD59 F8	C761 H2	Q252 E4	RD80 A5	R457 E6	
CD60 I8	C762 G2	Q253 E4	RD81 A6	R458 E6	
CD61 H8	DD21 B9	Q254 E4	RD82 A6	R459 E6	
CD62 H8	DD23 J8	Q255 E3	RD83 A6	R460 E6	
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CD71 A2	D152 B4	Q306 D5	R101 D5	R501 I7	
CD72 A2	D153 B4	Q307 C5	R102 D5	R502 I7	
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CD92 J9	D202 F4	Q352 B7	R104 D4	R504 I6	
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C152 C5	D403 F6	Q451 E7	R153 B5	R517 I7	
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C162 B2	D502 I6	Q456 F5	R158 B4	R555 H6	
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C255 E4	D752 G4	Q554 H6	R206 F4	R567 H8	
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C302 D7	J601 D1	Q701 I4	R210 F4	R611 C2	
C303 C6	J602 C2	Q702 I4	R211 F3	R612 B2	
C317 C7	J611 C2	Q703 I4	R212 F3	R613 C2	
C318 D7	J612 B2	Q704 I4	R213 F3	R621 F2	
C321 D5	J621 G2	Q705 I3	R214 F3	R623 G2	
C322 C5	J622 F2	Q706 J3	R251 E5	R622 F2	
C351 B7	J631 E1	Q707 I3	R252 E5	R631 E2	
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C353 B6	J641 J1	Q752 H4	R254 E4	R633 E2	
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C371 C5	J652 G2	Q755 H3	R257 E4	R643 J2	
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C401 G7	LD02 G9	Q757 H3	R259 E4	R652 H2	
C402 G7	LD41 B8	RD01 J8	R260 E4	R653 H2	
C403 F6	LD51 E8	RD02 J9	R261 E3	R701 I5	
C417 F7	LD61 H8	RD03 I9	R262 E3	R702 I5	
C418 G7	LN31 C2	RD04 G9	R263 E3	R703 I5	
C421 G5	LN32 F2	RD05 G9	R264 E3	R704 I4	
C422 F5	LN33 H2	RD06 G9	R301 D7	R705 I4	
C451 E7	L601 D2	RD07 G9	R302 D7	R706 I4	
C452 E7	L602 C3	RD08 G9	R303 D7	R707 I4	
C453 E6	L611 B2	RD09 I9	R304 D6	R708 I4	
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C471 F5	L631 E2	RD13 H9	R307 D6	R711 I3	
C472 E5	L641 I2	RD14 H9	R308 D6	R712 I3	
C501 J7	L642 I3	RD15 H9	R309 C6	R713 I3	
C502 J7	L651 H2	RD16 H9	R310 C6	R714 I3	
C503 I6	OD01 J8	RD17 H9	R311 C6	R751 H5	
C517 I7	OD02 I9	RD18 H9	R312 D6	R752 H5	
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C521 J5	OD04 G9	RD21 B9	R314 D5	R754 H4	
C522 I5	OD05 J9	RD22 B9	R315 D7	R755 H4	
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C552 H7	OD21 B9	RD26 C9	R317 C7	R757 H4	
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Layout DAC board (Bottom view)



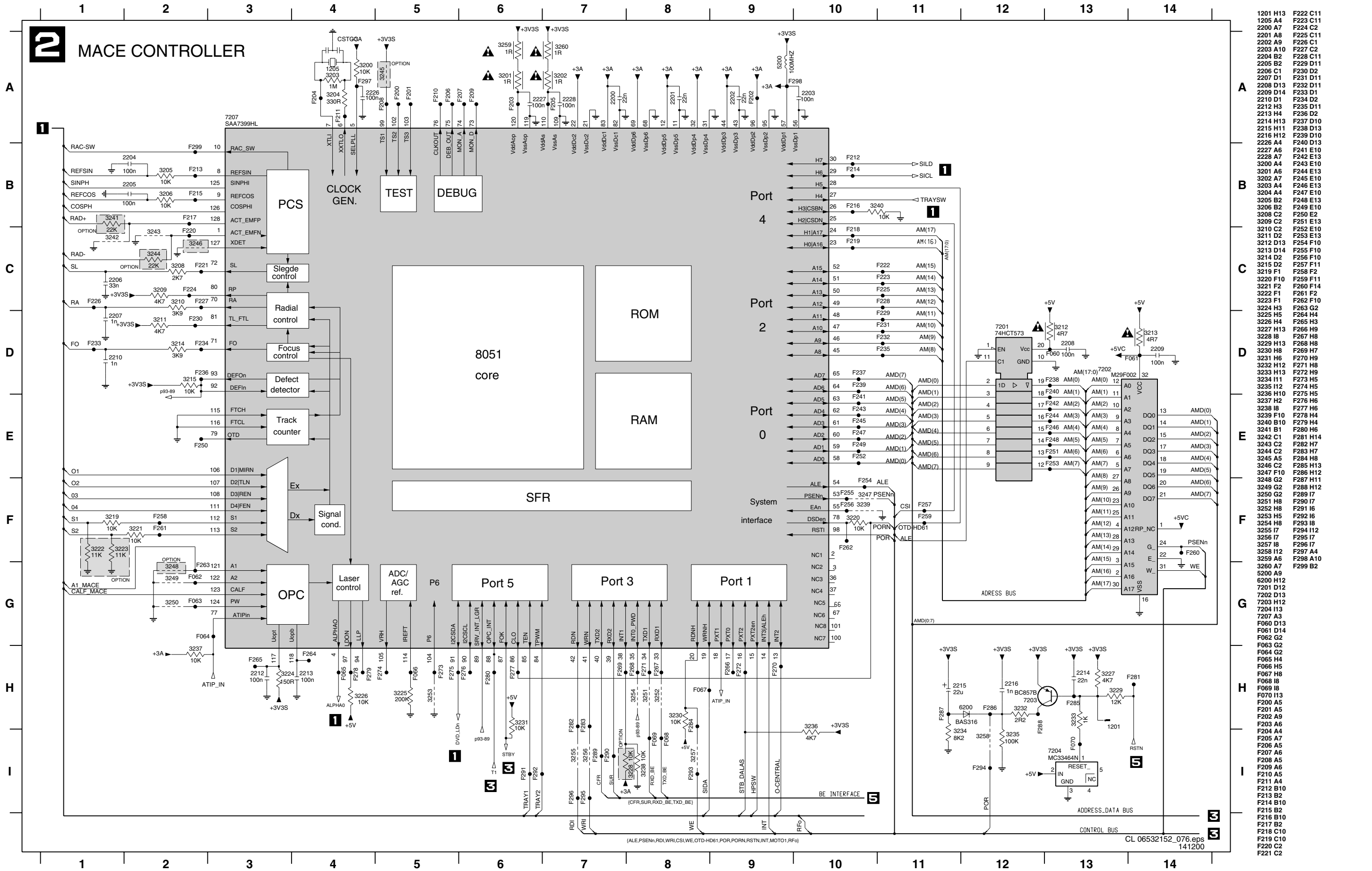
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CD03 J8	C572 G5	QD35 A8	RD30 B9	R354 B6	R761 H3
CD04 J9	C601 D2	QD36 A8	RD31 A7	R355 B6	R762 H3
CD05 I9	C602 C2	QD37 B7	RD32 A8	R356 B7	R763 H3
CD06 G9	C603 C2	QD38 B8	RD33 B8	R357 B6	R764 H3
CD07 J9	C604 D2	QD41 C8	RD34 B8	R358 B6	SD71 A2
CD08 I9	C611 B2	QD51 F8	RD35 A8	R359 B6	R360 B6
CD09 I8	C612 C2	QD61 H8	RD36 A8	R361 B6	031L B2
CD10 J9	C613 B2	QD71 A4	RD37 B8	R362 B6	032L J2
CD11 I9	C514 C1	QD72 A4	RD38 A8	R363 B6	
CD12 I9	C621 G2	QD73 A5	RD39 B8	R364 B5	
CD17 H8	C622 F2	QD74 A5	RD41 C9	R365 C7	
CD18 I9	C623 F2	QD75 A6	RD42 C9	R366 C7	
CD21 B9	C624 F2	QD76 A6	RD43 B8	R367 C8	
CD23 J8	C631 E2	QD77 A6	RD44 D8	R401 F7	
CD24 I8	C632 E2	Q107 D4	RD45 D8	R402 G7	
CD31 A7	C633 E2	Q101 A6	RD46 C8	R403 F7	
CD32 A8	C634 E2	Q102 C4	RD51 F9	R404 F6	
CD33 B8	C641 J2	Q103 D4	RD52 F9	R405 F6	
CD40 C8	C642 I2	Q104 D4	RD53 E8	R406 F7	
CD41 B8	C643 I2	Q105 D3	RD54 F8	R407 F6	
CD42 B8	C644 I2	Q106 D3	RD55 F8	R408 F6	
CD43 C7	C651 H2	Q107 C3	RD56 E8	R409 F6	
CD44 C8	C652 H2	Q151 B4	RD61 I9	R410 F6	
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CD46 D8	C654 H2	Q153 B3	RD63 H8	R412 F6	
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CD56 F8	C753 H5	Q206 G3	RD77 A5	R455 E6	
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CD58 F8	C755 H4	Q251 E4	RD79 A5	R457 E6	
CD59 F8	C761 H2	Q252 E4	RD80 A5	R458 E6	
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CD61 H8	DD21 B9	Q254 E4	RD82 A6	R460 E6	
CD62 H8	DD23 J8	Q255 E3	RD83 A6	R461 E6	
CD63 H7	DN31 C2	Q301 D7	RD84 A6	R462 E6	
CD64 H8	DN32 F2	Q302 C7	RD85 A6	R463 E5	
CD65 I8	DN33 H2	Q303 D6	RD86 A6	R464 E5	
CD66 I8	D101 C4	Q304 D6	RD87 A6	R465 E7	
CD67 I8	D102 C4	Q305 D6	RD88 A6	R466 E7	
CD68 I7	D103 C4	Q306 D5	RD89 A6	R467 E8	
CD69 I8	D151 B4	Q306 D5	R101 D5	R501 I7	
CD71 A2	D152 B4	Q307 C5	R102 D5	R502 I7	
CD72 A2	D153 B4	Q351 B7	R103 D5	R503 I7	
CD91 J9	D201 F3	Q352 B7	R104 D4	R504 I6	
CD92 J9	D202 F4	Q353 B6	R105 D4	R505 I6	
CD93 A8	D203 F4	Q354 B6	R106 C4	R506 I7	
CD94 A8	D251 E4	Q355 B6	R107 D4	R507 I6	
CD95 A5	D252 E4	Q356 C5	R108 D4	R508 I6	
CD96 A5	D253 E4	Q357 B5	R109 C4	R509 I6	
C101 C5	D301 C6	Q401 F7	R110 C4	R510 I6	
C102 D5	D302 C6	Q402 F7	R111 C3	R511 I6	
C103 D5	D303 C6	Q403 G6	R112 D3	R512 I6	
C104 C3	D351 B6	Q404 G6	R113 D3	R513 I5	
C105 D4	D352 B6	Q405 G6	R114 D3	R514 I5	
C111 D2	D401 F6	Q406 G5	R151 B5	R515 J7	
C112 C2	D402 F6	Q407 F5	R152 B5	R516 I7	
C115 B5	D403 F6	Q451 E7	R153 B5	R517 I7	
C152 C5	D451 E6	Q452 E7	R154 B4	R551 H7	
C153 C5	D452 E6	Q453 E6	R155 B4	R552 H7	
C154 B3	D453 E6	Q454 E6	R156 B4	R553 H7	
C155 C4	D501 I6	Q455 E6	R157 B4	R554 H6	
C161 C2	D502 I6	Q456 F5	R158 B4	R555 H6	
C162 B2	D503 I6	Q501 I7	R159 B4	R556 G7	
C201 F5	D551 G6	Q502 I7	R161 B3	R557 H6	
C202 G5	D552 G6	Q503 I6	R162 B3	R558 H6	
C203 G5	D553 G6	Q504 I6	R163 B3	R559 H6	
C204 F3	D601 C2	Q505 I6	R164 B3	R560 G6	
C205 G4	D621 F2	Q506 J5	R201 F5	R561 H6	
C211 G3	D701 I4	Q507 I5	R202 F5	R562 H6	
C212 G3	D702 I4	Q551 H7	R203 F5	R563 H5	
C213 F2	D703 I4	Q552 H7	R204 F4	R564 H5	
C251 E5	D751 G4	Q553 H6	R205 F4	R565 H7	
C252 F5	D752 G4	Q554 H6	R206 F4	R566 H7	
C253 F5	D753 G4	Q555 H6	R207 F4	R601 C2	
C254 E3	D754 G4	Q556 H5	R208 F4	R602 D2	
C255 E4	D755 G4	Q557 G5	R209 F4	R603 D2	
C261 E2	J001 I9	Q701 I4	R210 F4	R611 C2	
C262 E2	J002 A3	Q702 I4	R211 F3	R612 B2	
C301 D7	J601 D1	Q703 I4	R212 F3	R613 C2	
C302 D7	J602 C2	Q704 I4	R213 F3	R621 F2	
C303 C6	J603 C2	Q705 I3	R214 F3	R622 F2	
C317 C7	J612 B2	Q706 J3	R251 E5	R623 G2	
C318 D7	J621 G2	Q707 I3	R252 E5	R631 E2	
C321 D5	J622 F2	Q751 H4	R253 E5	R632 E2	
C322 C5	J631 E1	Q752 H4	R254 E4	R633 E2	
C351 B7	J642 I2	Q753 H4	R255 E4	R641 I2	
C352 C7	J651 H1	Q754 H4	R256 E4	R642 I2	
C353 B6	J652 G2	Q755 H3	R257 E4	R643 J2	
C367 B7	LD01 G9	Q756 H3	R258 E4	R651 H2	
C368 C7	LD04 G9	Q757 H3	R259 E4	R652 H2	
C371 C5	LD41 B8	RD01 J8	R260 E4	R653 H2	
C372 B5	LD51 E8	RD02 J9	R261 E3	R701 I5	
C401 G7	LD61 H8	RD03 I9	R262 E3	R702 I5	
C402 G7	LD62 H8	RD04 G9	R263 E3	R703 I5	
C403 F6	LD63 H8	RD05 G9	R264 E3	R704 I4	
C417 F7	LN31 C2	RD06 G9	R301 D7	R705 I4	
C418 G7	LN32 F2	RD07 G9	R302 D7	R706 I4	
C421 G5	LN33 H2	RD08 G9	R303 D7	R707 I4	
C422 F5	L601 D2	RD09 I9	R304 D6	R708 I4	
C423 E7	L602 C3	RD10 I9	R305 D6	R709 I4	
C452 E7	L611 B2	RD11 H9	R306 C7	R710 I4	
C453 E6	L622 F2	RD12 H9	R307 D6	R711 I3	
C467 E8	L621 G2	RD13 H9	R308 D6	R712 I3	
C468 E7	L622 F2	RD14 H9	R309 C6	R713 I3	
C471 F5	L631 E2	RD15 H9	R310 C6	R714 I3	
C472 E5	L641 I2	RD16 H9	R311 C6	R751 H5	
C501 J7	L642 I3	RD17 H9	R312 D6	R752 H5	
C502 J7	L651 H2	RD18 H9	R313 D5	R753 H5	
C503 I6	QD01 J8	RD19 H9	R314 D5	R754 H4	
C517 I7	QD02 J8	RD20 B9	R315 D7	R755 H4	
C518 I7	QD03 G9	RD21 B9	R316 C7	R756 G4	
C521 J5	QD04 G9	RD22 B9	R317 C7	R757 H4	
C522 I5	QD05 J9	RD23 B9	R318 C7	R758 H4	
C551 H7	QD06 I8	RD24 B9	R351 B7		
C552 H7	QD21 B9	RD25 C9			
C553 G6	QD22 B9	RD26 C9			
C567 H7		RD27 C9			

Mono board: DVD ALAS



1100-1 A1	3162 F4	F138 C3
1100-2 A1	3163 G2	F139 C7
1100-3 A1	3164 F3	F140 C2
1100-4 A1	3165 I10	F141 D2
1104 B1	3166 G8	F142 D12
1105 D8	3167 G4	F143 D2
1106 G1	3168 I10	F144 D2
2100 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 D2
2112 C4	3181 H10	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	3200 F2	F176 G8
2132 H3	3201 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 I6	7104-B H2	F184 G2
2140 I6	7105-A G12	F185 G4
2141 I2	7105-B G11	F186 G4
2142 F11	7106 A7	F187 G2
2143 B2	7107 E1	F188 G4
2144 B2	7108 F2	F189 G8
2145 B2	7109 A10	F190 H2
2146 F1	7110 C4	F191 H7
2147 G1	7111 C5	F192 H3
3100 A5	7112 E10	F193 H6
3101 A6	7113 E10	F194 I6
3102 A5	7114 E10	F195 I5
3103 A4	7115 E11	F196 I6
3104 A7	7116 E2	F197 H12
3105 A2	7117 F2	F198 G13
3106 A7	7118 I2	F199 I7
3107 A12	7119 I2	F200 E1
3108 A12	7120 I2	F201 F2
3109 F2	7121 B4	F202 E5
3110 A8	7122 E5	F203 E5
3111 A6	7123 E5	F204 D6
3112 A6	7124 D6	F205 D6
3113 B4	7125 D6	F206 F8
3114 B12	7126 F8	F207 G12
3115 B12	7127 G12	F208 H5
3116 B5	7128 H5	F209 H6
3117 B5	7129 H6	F210 E10
3118 B8	7130 E10	F211 E10
3119 B7	7131 E10	F212 E10
3120 F12	7132 F4	F213 F4
3121 B12	7133 F4	F214 E11
3122 B12	7134 E11	F215 E11
3123 B5	7135 E11	F216 E4
3124 B12	7136 E4	F217 A10
3125 C4	7137 A10	F218 A7
3126 C4	7138 A7	F219 A7
3127 C12	7139 A8	F220 A8
3128 C2	7140 A8	F221 A1
3129 C5	7141 A1	F222 A6
3130 C12	7142 A6	F223 A7
3131 C13	7143 A7	F224 A7
3132 D12	7144 A12	F225 B2
3133 D13	7145 A7	F226 B10
3134 D7	7146 A2	F227 B2
3135 D5	7147 A2	F228 C2
3136 D6	7148 A6	F229 C5
3137 D6	7149 A7	F230 C1
3138 G10	7150 A8	F231 C4
3139 E4	7151 B12	F232 C4
3140 E6	7152 B12	F233 C12
3141 E2	7153 B3	F234 C4
3142 E5	7154 B9	F235 C1
3143 G10	7155 B10	F236 C2
3144 E2	7156 B12	F237 F8
3145 E7	7157 B2	F238 H10
3146 E8	7158 B5	F239 C1
3147 E8	7159 B12	F240 C2
3148 G10	7160 B10	F241 C5
3149 E8	7161 B7	F242 C1
3150 E4	7162 B10	F243 C4
3151 E3	7163 B2	F244 C4
3152 E8	7164 C2	F245 C1
3153 H9	7165 C5	F246 F3
3154 F4	7166 C1	F247 F3
3155 F8	7167 C4	F248 F3
3156 F3	7168 C4	F249 F8
3157 F8	7169 C12	F250 F3
3158 H10	7170 C4	F251 F3
3159 F8	7171 C1	F252 F3
3160 F3	7172 C2	F253 F3
3161 F8	7173 F3	F254 F3

Mono board: MACE controller

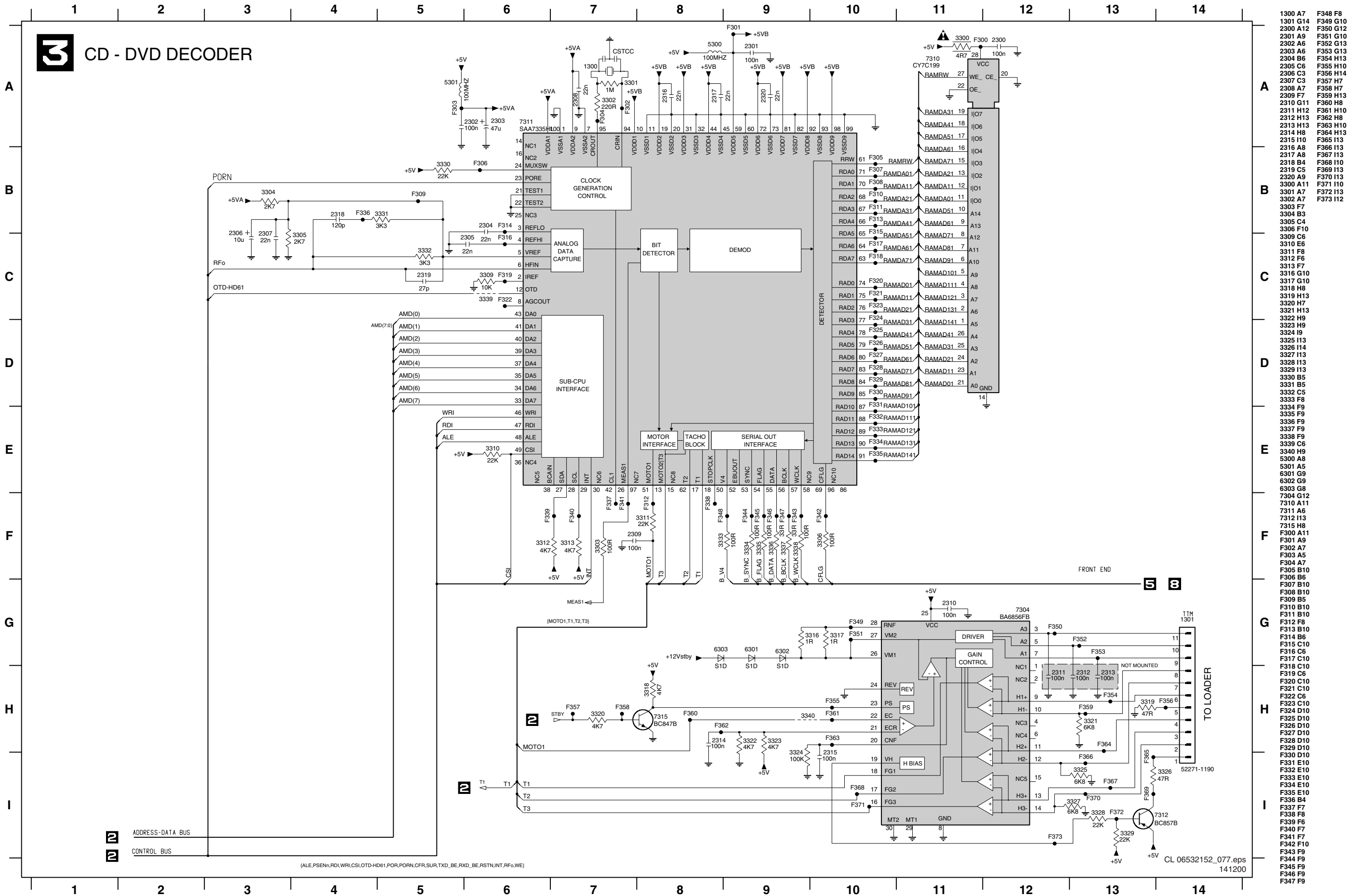


1201	H13	F222	C11
1205	A4	F223	C11
2200	A7	F224	C2
2201	A8	F225	C11
2202	A9	F226	C1
2203	A10	F227	C2
2204	B2	F228	C11
2205	B2	F229	D11
2206	C1	F230	D2
2207	D1	F231	D11
2208	D13	F232	D11
2209	D14	F233	D1
2210	D1	F234	D2
2212	H3	F235	D11
2213	H4	F236	D2
2214	H13	F237	D10
2215	H11	F238	D13
2216	H12	F239	D10
2226	A4	F240	D13
2227	A6	F241	E10
2228	A7	F242	E13
3200	A4	F243	E10
3201	A6	F244	E13
3202	A7	F245	E10
3203	A4	F246	E13
3204	A4	F247	E10
3205	B2	F248	E13
3206	B2	F249	E10
3208	C2	F250	E2
3209	C2	F251	E13
3210	C2	F252	E10
3211	D2	F253	E13
3212	D13	F254	F10
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	H1	F262	F10
3224	H3	F263	G2
3225	H5	F264	H4
3226	H4	F265	H3
3227	H13	F266	H9
3228	H8	F267	H8
3229	H13	F268	H8
3230	H8	F269	H7
3231	H6	F270	H9
3232	H12	F271	H8
3233	H13	F272	H9
3234	H11	F273	H5
3235	H2	F274	H5
3236	H10	F275	H5
3237	H2	F276	H6
3238	H8	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	C2	F289	H7
3251	H8	F290	H7
3252	H8	F291	I6
3253	H5	F292	I6
3254	H8	F293	H4
3255	I7	F294	H12
3256	I7	F295	I7
3257	I8	F296	I7
3258	I2	F297	A4
3259	A6	F298	A10
5200	A9	F299	B2

(ALE, PSEN, RD1, WR1, CS1, WE, OTD, HD61, POR, PORN, RSTN, INT, MOTO1, RF6)

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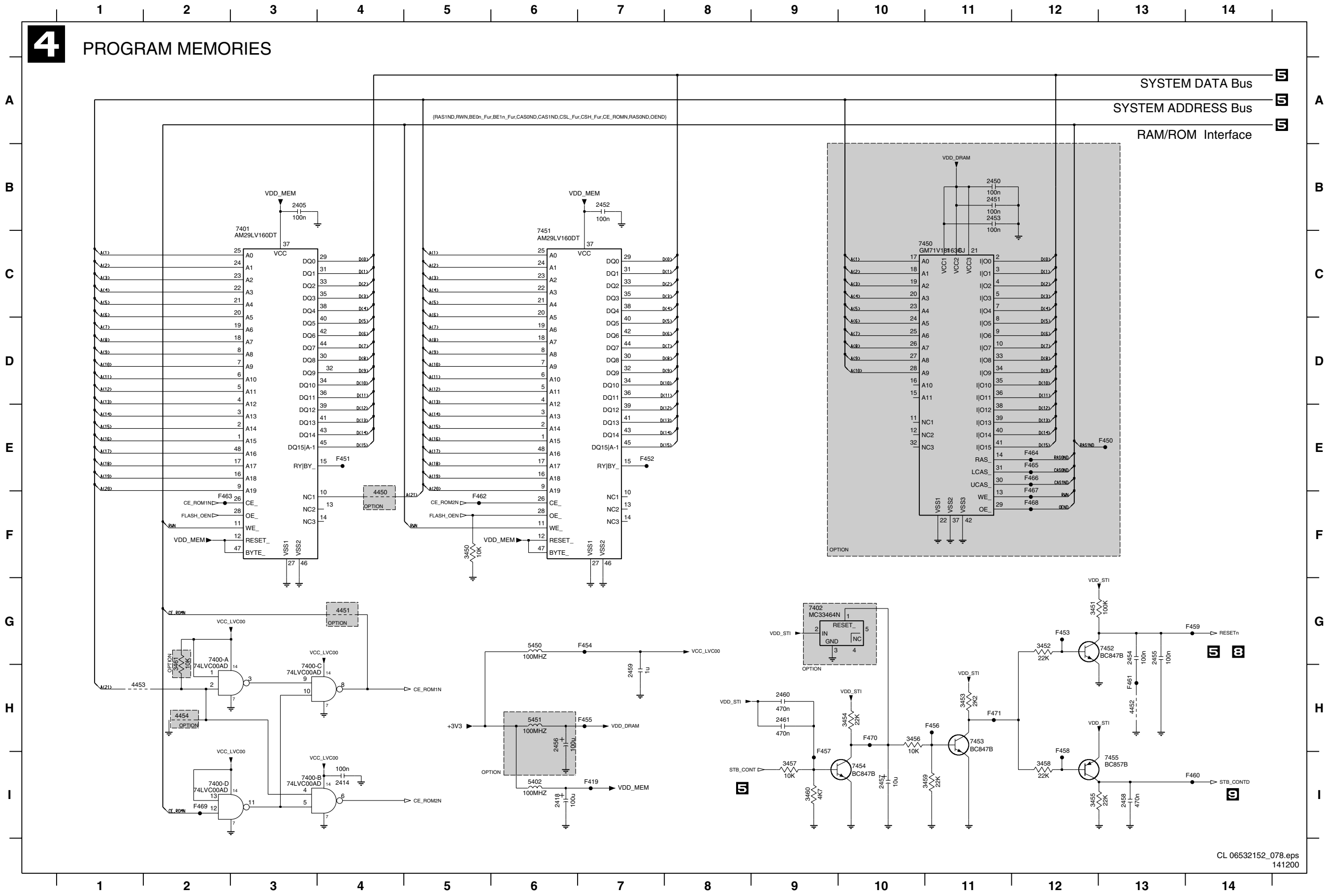
Mono board: CD - DVD decoder



- 1300 A7
- 1301 G14
- 2300 A12
- 2301 A9
- 2302 A6
- 2303 A6
- 2304 B6
- 2305 C6
- 2306 C3
- 2307 C3
- 2308 A7
- 2309 F7
- 2310 G11
- 2311 H12
- 2312 H13
- 2313 H13
- 2314 H8
- 2315 I10
- 2316 A8
- 2317 A8
- 2318 B4
- 2319 C5
- 2320 A9
- 3000 A11
- 3001 A7
- 3002 A7
- 3003 F7
- 3004 B3
- 3005 C4
- 3006 F10
- 3009 C6
- 3310 E6
- 3311 F8
- 3312 F6
- 3313 F7
- 3316 G10
- 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
- 3334 F9
- 3335 F9
- 3336 F9
- 3337 F9
- 3338 F9
- 3339 C6
- 3340 H8
- 5300 A8
- 5301 A5
- 6301 G9
- 6302 G9
- 6303 G8
- 7304 G12
- 7310 A11
- 7311 A6
- 7312 I13
- 7315 H8
- F300 A11
- F301 A9
- F302 A7
- F303 A5
- F304 A7
- F305 B10
- F306 B6
- F307 B10
- F308 B10
- F309 B5
- F310 B10
- F311 B10
- F312 F8
- F313 B10
- F314 B6
- F315 C10
- F316 C6
- F317 C10
- F318 C10
- F319 C6
- F320 C10
- F321 C10
- F322 C6
- F323 C10
- F324 D10
- F325 D10
- F326 D10
- F327 D10
- F328 D10
- F329 D10
- F330 D10
- F331 E10
- F332 E10
- F333 E10
- F334 E10
- F335 E10
- F336 B4
- F337 F7
- F338 F8
- F339 F6
- F340 F7
- F341 F7
- F342 F10
- F343 F9
- F344 F9
- F345 F9
- F346 F9
- F347 F9
- F348 F8
- F349 G10
- F350 G12
- F351 G10
- F352 G13
- F353 G13
- F354 H13
- F355 H10
- F356 H14
- F357 H7
- F358 H7
- F359 H13
- F360 H8
- F361 H10
- F362 H8
- F363 H10
- F364 H13
- F365 I13
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- F372 I13
- F373 I12

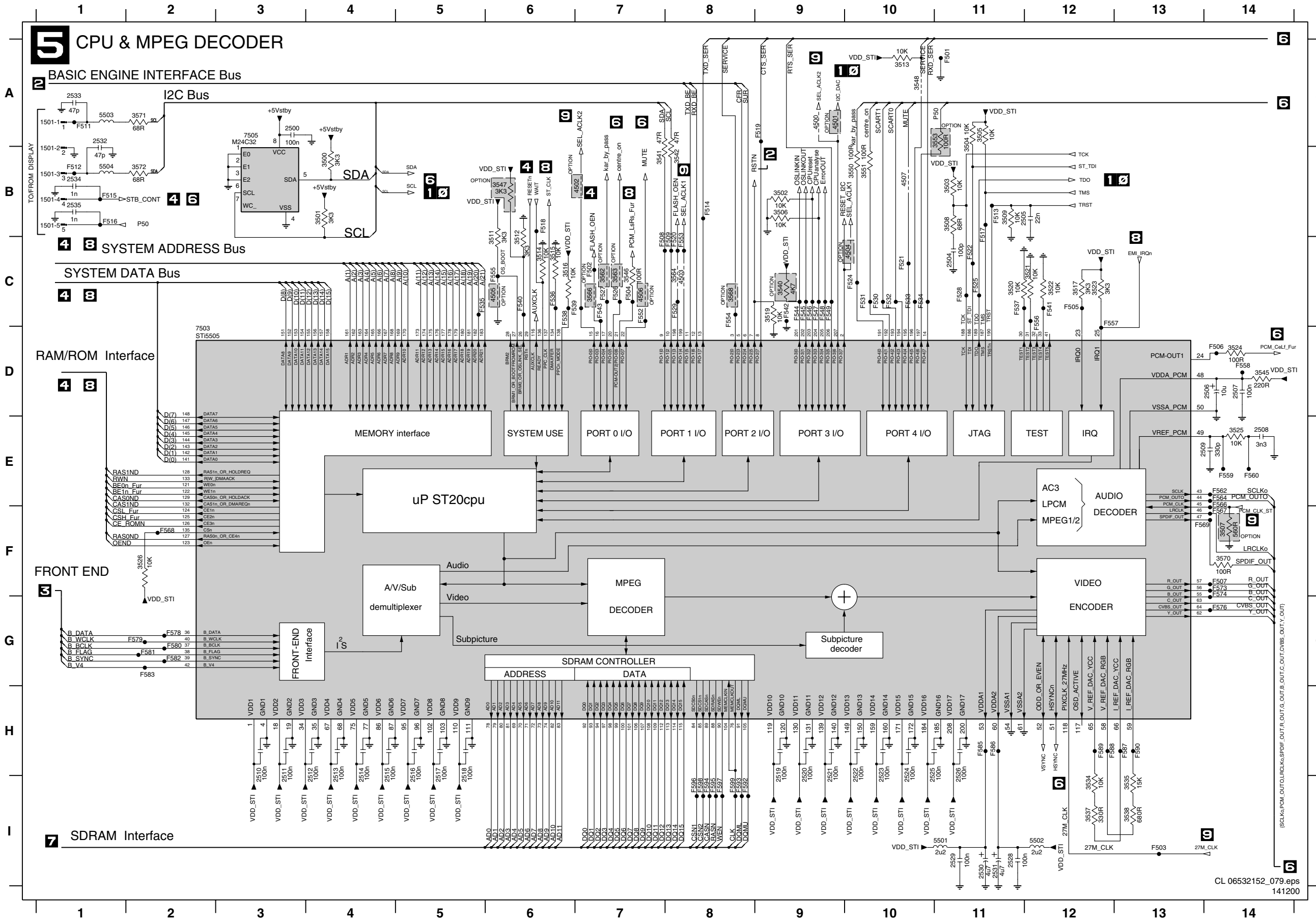
Mono board: Program memories

4 PROGRAM MEMORIES



- 2405 B3
- 2414 I4
- 2418 I6
- 2450 B11
- 2451 B11
- 2452 B7
- 2453 B11
- 2454 G13
- 2455 G13
- 2456 H6
- 2457 I10
- 2458 I13
- 2459 H7
- 2460 H9
- 2461 H9
- 3450 F5
- 3451 G12
- 3452 G12
- 3453 H11
- 3454 H10
- 3455 I12
- 3456 H10
- 3457 I9
- 3458 I12
- 3459 I11
- 3460 I9
- 3461 G2
- 4450 F4
- 4451 G4
- 4452 H13
- 4453 H1
- 4454 H2
- 5402 I6
- 5403 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

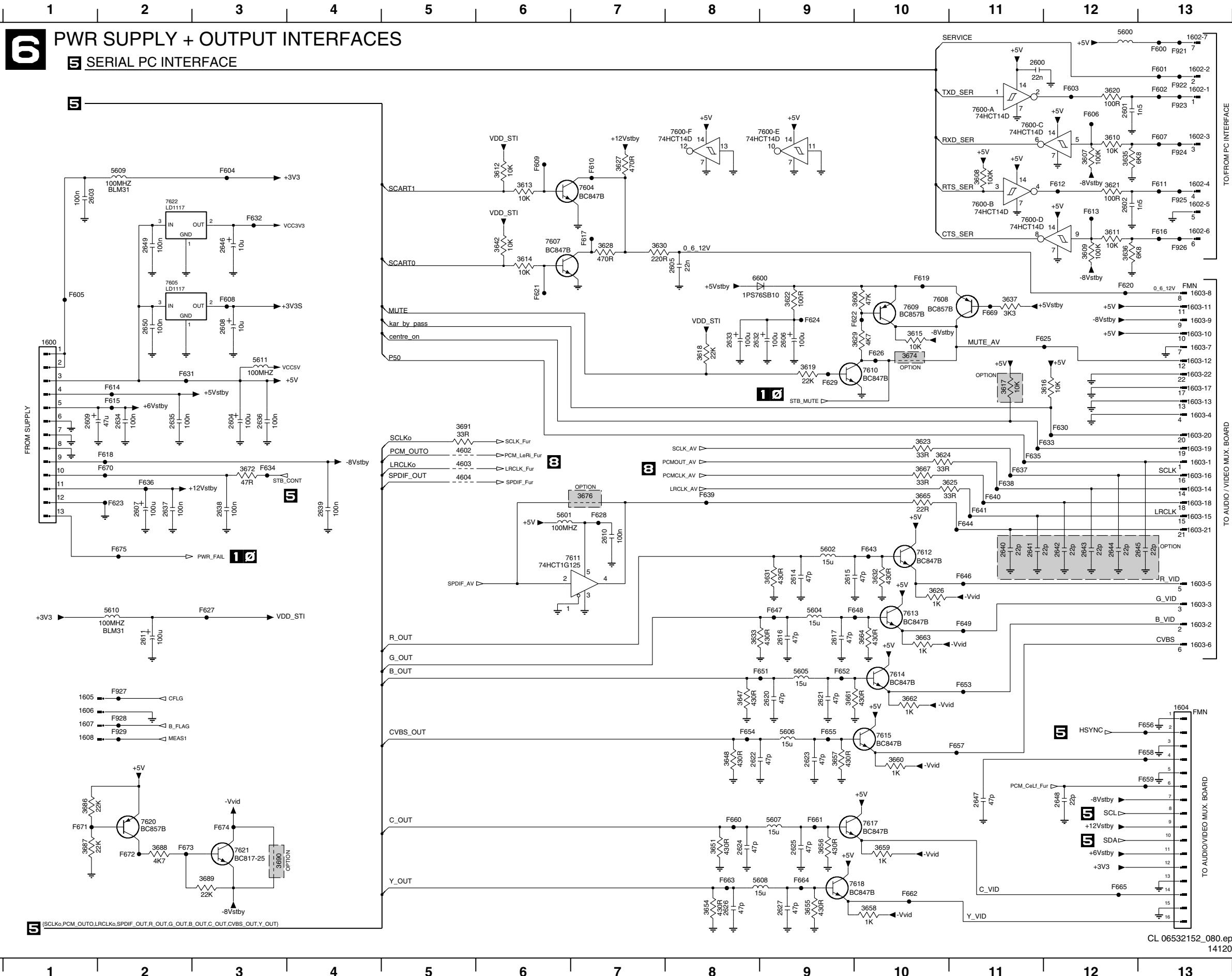
Mono board: CPU & MPEG decoder



1501-1 A1	F520 C8
1501-2 B1	F521 C10
1501-3 B1	F522 C11
1501-4 B1	F523 C10
1501-5 B1	F524 C11
2500 A3	F526 C7
2504 C11	F527 C7
2505 B12	F528 C11
2506 D14	F529 C8
2507 D14	F530 C10
2508 E14	F531 C10
2509 E14	F532 C10
2510 H3	F533 C10
2511 H3	F534 C10
2512 H4	F535 C5
2513 H4	F536 C6
2514 H4	F537 C11
2515 H4	F538 C6
2516 H5	F539 C7
2517 H5	F540 C6
2518 H5	F541 C12
2519 H9	F542 C9
2520 H9	F543 C7
2521 H9	F544 C9
2522 H10	F545 C9
2523 H10	F546 C9
2524 H10	F547 C9
2525 H11	F548 C9
2526 H11	F549 C9
2528 H11	F552 C7
2529 H11	F553 C8
2530 H11	F554 C8
2531 H11	F555 C6
2532 A1	F556 C12
2533 B1	F557 C12
2535 B1	F558 D14
2535 B4	F559 E14
3500 B4	F560 E14
3501 B4	F562 E14
3502 B9	F564 E14
3503 B11	F566 F14
3504 A11	F567 F14
3505 A11	F568 F2
3506 B9	F569 F13
3507 F14	F573 F14
3508 C11	F574 G14
3509 H11	F576 G14
3511 C6	F578 G2
3512 C6	F579 G2
3513 A10	F580 G2
3514 C6	F581 G2
3515 C6	F582 G2
3516 C6	F583 G2
3517 C12	F585 H11
3519 C9	F586 H11
3520 C11	F587 H11
3521 C12	F588 H12
3522 C12	F589 H12
3523 C12	F590 H13
3524 D14	F592 I8
3525 E14	F593 I8
3526 F2	F594 I8
3534 I12	F595 I8
3535 I13	F596 I8
3537 I12	F597 I8
3538 I13	F598 I8
3540 C9	F599 I8
3541 B7	
3542 B8	
3545 D14	
3546 C7	
3547 B6	
3548 A10	
3550 B10	
3551 B10	
3552 A11	
3556 C7	
3563 C7	
3564 C8	
3566 C7	
3568 C8	
3570 F14	
3571 A2	
3572 B2	
4500 A9	
4501 A9	
4502 B7	
4503 C8	
4504 C10	
4505 C6	
4506 C7	
4507 B10	
5501 I11	
5502 I12	
5503 A1	
5504 B1	
7503 D2	
7505 A3	
F501 A11	
F502 C7	
F503 I13	
F504 C7	
F505 C12	
F506 D14	
F507 F14	
F508 C7	
F509 C9	
F511 A1	
F512 B1	
F513 B11	
F514 B8	
F515 B1	
F516 B1	
F517 B11	
F518 B6	
F519 A9	

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141200

Mono board: Power supply & output interfaces

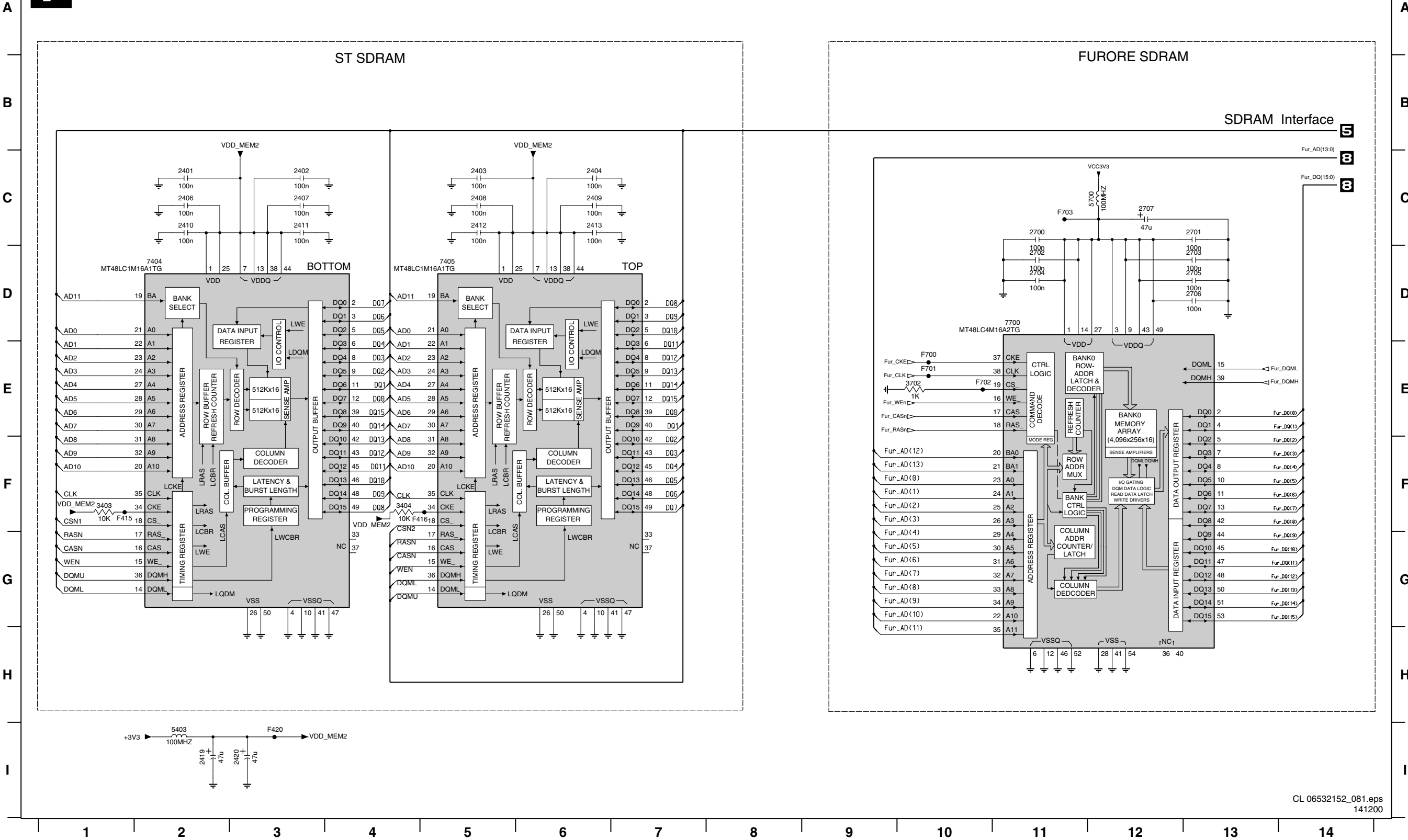


1600 C1	3658 I10	F665 I12
1602-1 A13	3659 I10	F669 C11
1602-2 A13	3660 H10	F670 E2
1602-3 A13	3661 G9	F671 I1
1602-4 B13	3662 G10	F672 I2
1602-5 B13	3663 G10	F673 I2
1602-6 B13	3664 G10	F674 I3
1602-7 A13	3665 E10	F675 F2
1603-1 E13	3667 E10	F921 A13
1603-10 C13	3672 E3	F922 A13
1603-11 C13	3674 D10	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 H1	7600-A A11	
1608 H1	7600-B B11	
2600 A11	7600-C A11	
2601 A12	7601 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 H10	
2620 G9	7618 I9	
2621 G9	7620 H2	
2622 H8	7621 I3	
2623 H9	7622 B2	
2624 I8	7600 A13	
2625 I9	7601 A13	
2626 I8	7602 A13	
2627 I9	7603 A12	
2632 C8	7604 B3	
2633 C8	7605 C1	
2634 D2	7606 A12	
2635 D2	7607 A13	
2636 D3	7608 C3	
2637 E2	7609 B6	
2638 E3	7610 B7	
2639 E4	7611 B13	
2640 F11	7612 B12	
2641 F11	7613 B12	
2642 F12	7614 D2	
2643 F12	7615 D2	
2644 F12	7616 B13	
2645 F13	7617 B7	
2646 B3	7618 E2	
2647 H11	7619 C10	
2648 H12	7620 C12	
2649 B2	7621 C6	
2650 C2	7622 C10	
3606 C10	7623 E2	
3607 A12	7624 C9	
3608 B11	7625 C12	
3609 B12	7626 D10	
3610 A12	7627 F3	
3611 B12	7628 E7	
3612 B6	7629 D9	
3613 B6	7630 D12	
3614 C6	7631 D2	
3615 C10	7632 B3	
3616 D12	7633 E12	
3617 D11	7634 E3	
3618 D8	7635 E11	
3619 D9	7636 E2	
3620 A12	7637 E11	
3621 B12	7638 E11	
3622 C9	7639 E8	
3623 E10	7640 E11	
3624 E10	7641 E11	
3625 E11	7642 E10	
3626 F10	7643 E11	
3627 B7	7644 E11	
3628 B7	7647 F9	
3629 C10	7648 F10	
3630 B7	7649 F11	
3631 F9	7651 G9	
3632 F10	7652 G9	
3633 G8	7653 G11	
3635 A12	7654 H8	
3636 B12	7655 H9	
3637 C11	7656 H13	
3642 B6	7657 H11	
3647 G8	7658 H13	
3648 H8	7659 H13	
3651 I8	7660 I8	
3654 I8	7661 I8	
3655 I9	7662 I10	
3656 I9	7663 I8	
3657 H9	7664 I9	

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141200

Mono board: SD RAM's

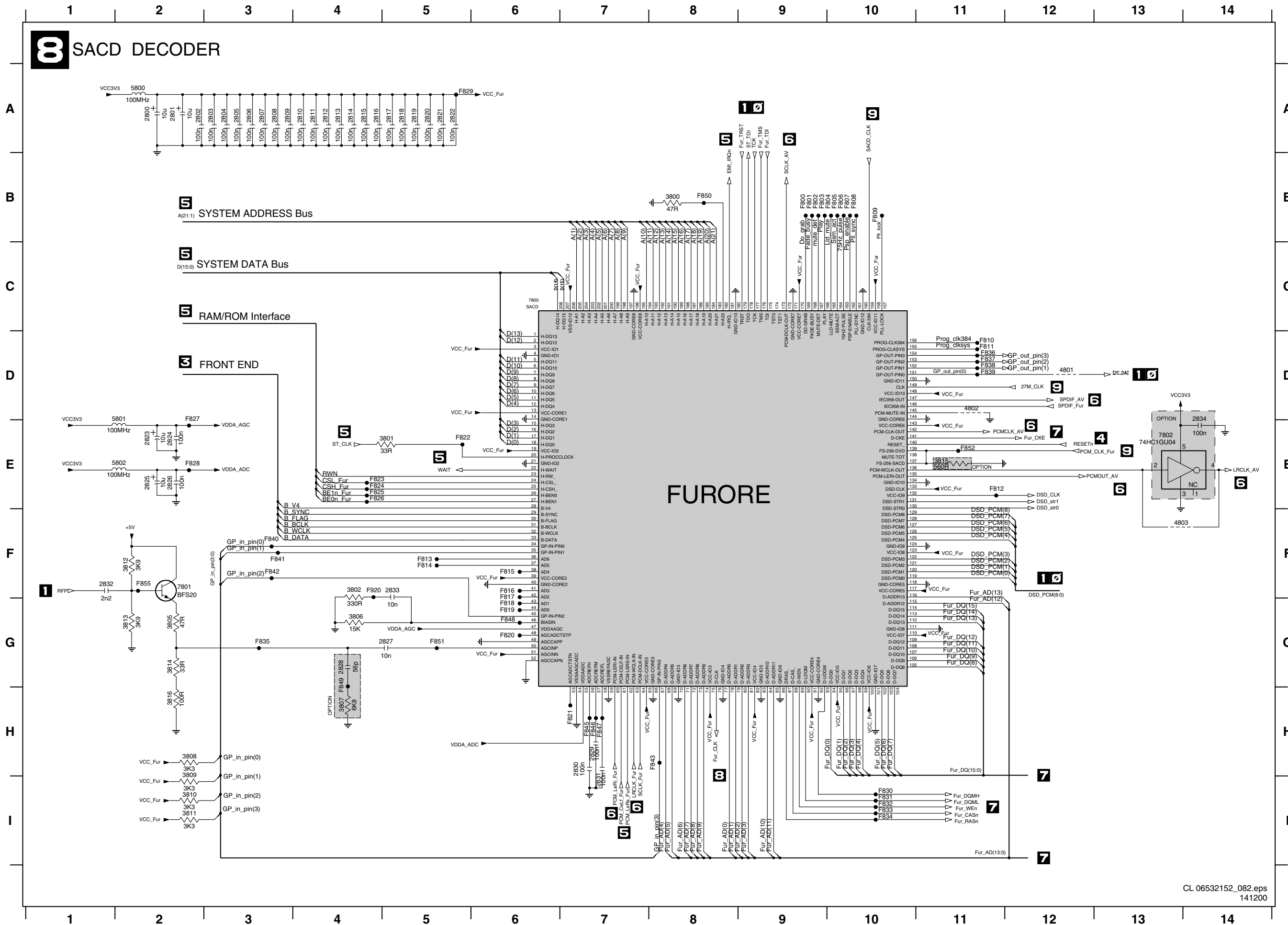
7 SDRAMs



- 2401 C2
- 2402 C3
- 2403 C5
- 2404 C6
- 2405 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



- 2800 A2
- 2801 A2
- 2802 A2
- 2803 A3
- 2804 A3
- 2805 A3
- 2806 A3
- 2807 A3
- 2808 A3
- 2809 A3
- 2810 A4
- 2811 A4
- 2812 A4
- 2813 A4
- 2814 A4
- 2815 A4
- 2816 A4
- 2817 A5
- 2818 A5
- 2819 A5
- 2820 A5
- 2821 A5
- 2822 A5
- 2823 E2
- 2824 E2
- 2825 E2
- 2826 E2
- 2827 G5
- 2828 G4
- 2829 H7
- 2830 H7
- 2831 I7
- 2832 F1
- 2833 F5
- 2834 E14
- 3800 B8
- 3801 E5
- 3802 F4
- 3805 G2
- 3806 G4
- 3807 H4
- 3808 H2
- 3809 I2
- 3810 I2
- 3811 I2
- 3812 F2
- 3813 G2
- 3814 G2
- 3815 E11
- 3816 H2
- 4801 D11
- 4802 D11
- 4803 F13
- 5800 A2
- 5801 E2
- 5802 E2
- 7800 C6
- 7801 F2
- 7802 E13
- F800 B9
- F801 B9
- F802 B9
- F803 B9
- F804 B10
- F805 B10
- F806 B10
- F807 B10
- F808 B10
- F809 B10
- F810 D11
- F811 D11
- F812 E11
- F813 F5
- F814 F5
- F815 F6
- F816 F6
- F817 G6
- F818 G6
- F819 G6
- F820 G6
- F821 H7
- F822 E5
- F823 E4
- F824 E4
- F825 E4
- F826 E4
- F827 E2
- F828 E2
- F829 A5
- F830 I10
- F831 I10
- F832 I10
- F833 I10
- F834 I10
- F835 G3
- F836 D11
- F837 D11
- F838 D11
- F839 D11
- F840 F3
- F841 F3
- F842 F3
- F843 H8
- F845 H7
- F846 H7
- F847 H7
- F848 G6
- F849 G4
- F850 B8
- F851 G5
- F852 E11
- F855 F2
- F920 F4

Mono board: System clocks

9 SYSTEM CLOCKS

A

B

C

D

E

F

G

H

A

B

C

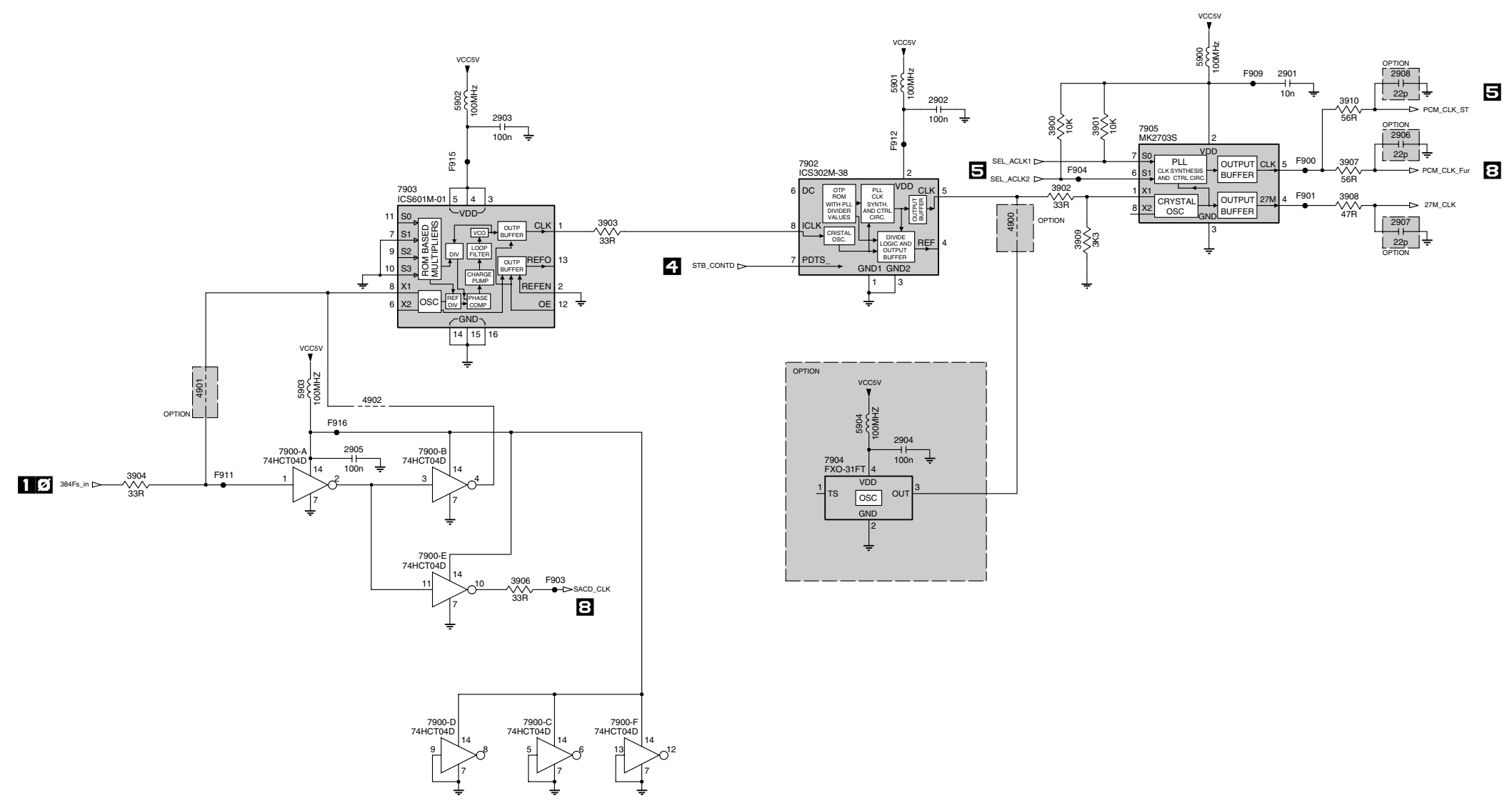
D

E

F

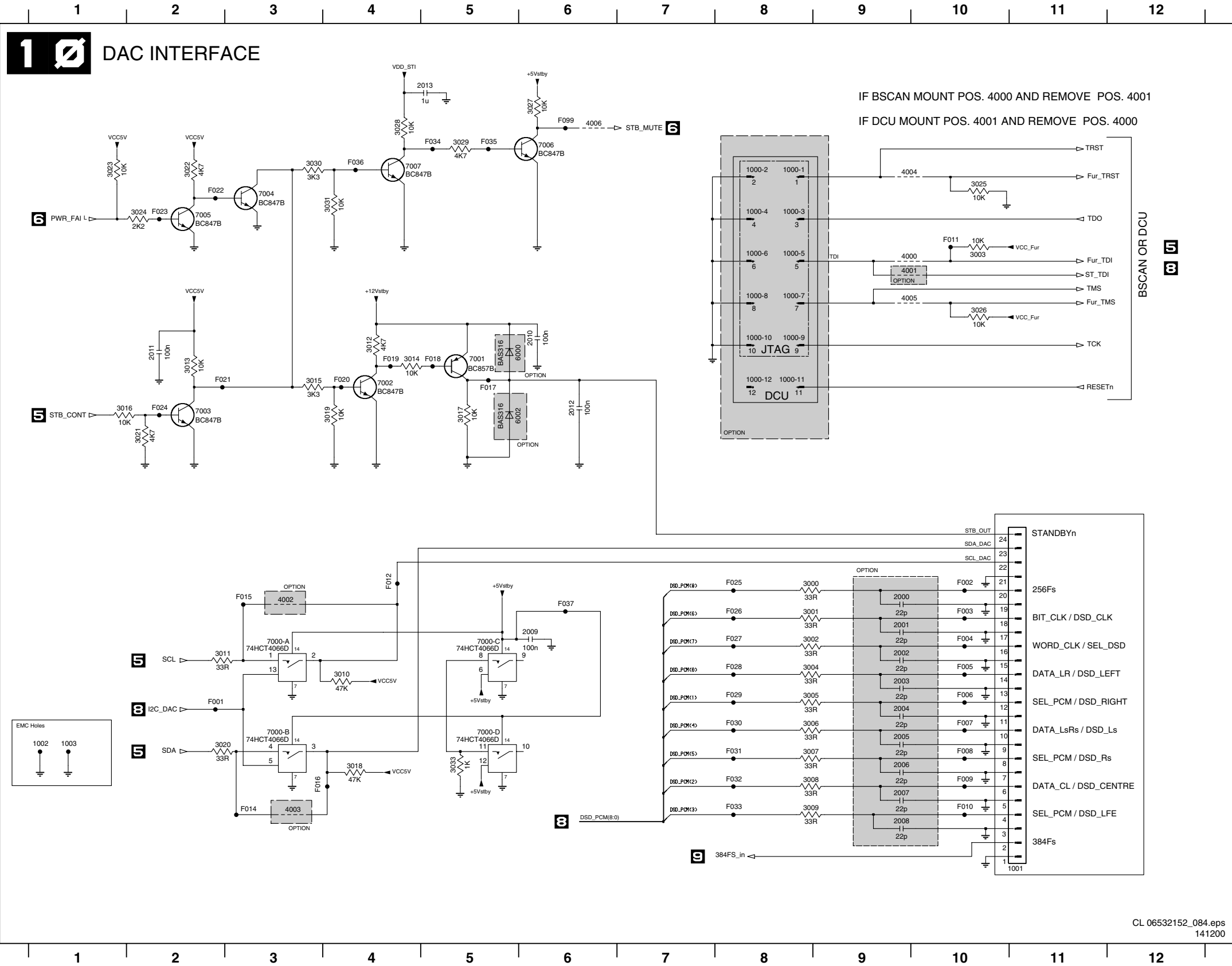
G

H



- 2801 B11
- 2902 C9
- 2903 C5
- 2904 E8
- 2905 E4
- 2906 C12
- 2907 D12
- 2908 B12
- 3900 C10
- 3901 C10
- 3902 C10
- 3903 D6
- 3904 F2
- 3906 F5
- 3907 C12
- 3908 C12
- 3909 D10
- 3910 C12
- 4900 C9
- 4901 E3
- 4902 E4
- 5900 B11
- 5901 B8
- 5902 B5
- 5903 E3
- 5904 E8
- 7900-A E3
- 7900-B E4
- 7900-C H5
- 7900-D H4
- 7900-E F4
- 7900-F H6
- 7902 C7
- 7903 C4
- 7904 E8
- 7905 C10
- F900 C12
- F901 C12
- F903 F5
- F904 C10
- F909 B11
- F911 F3
- F912 C8
- F915 C5
- F916 E4

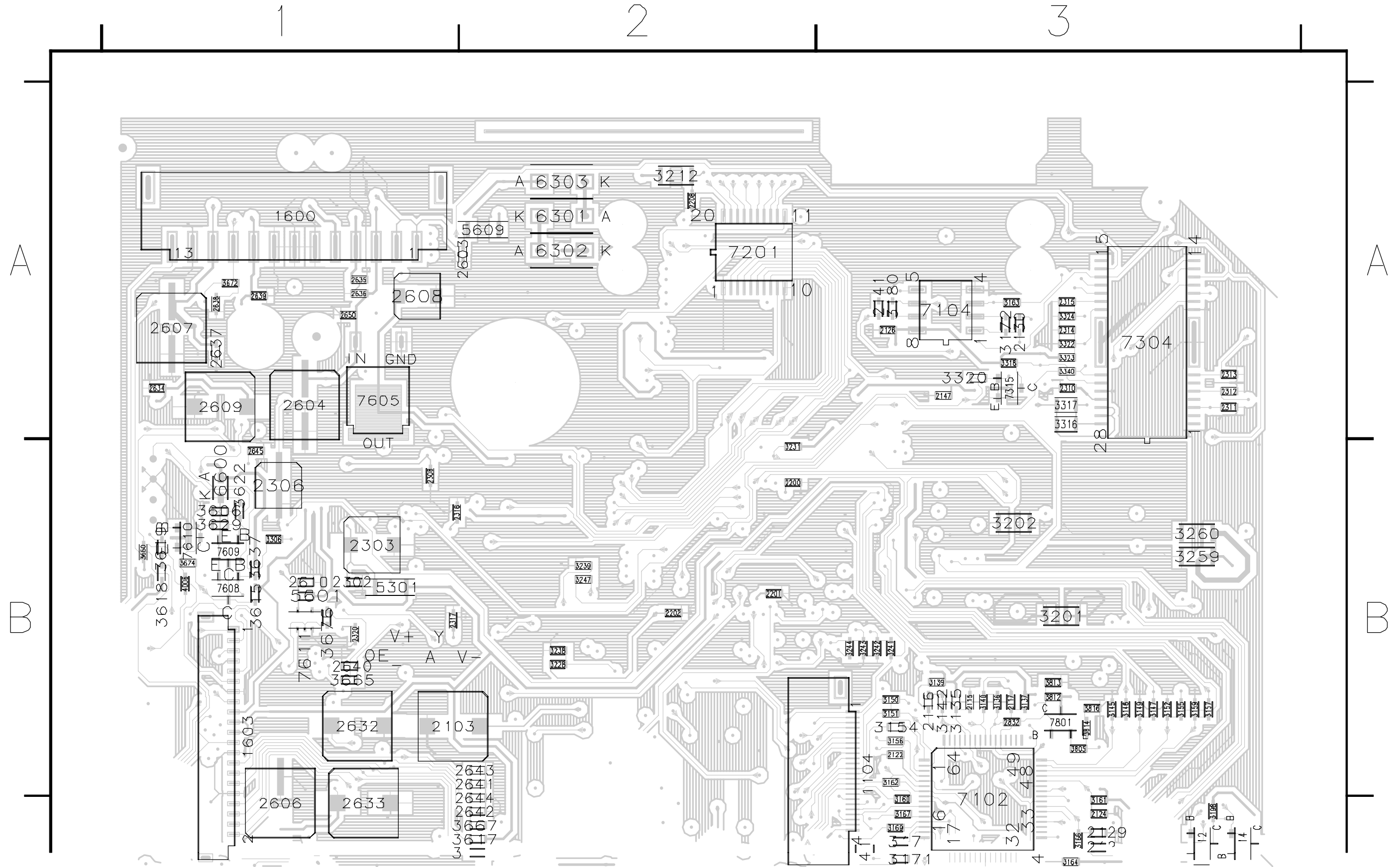
Mono board: DAC interface



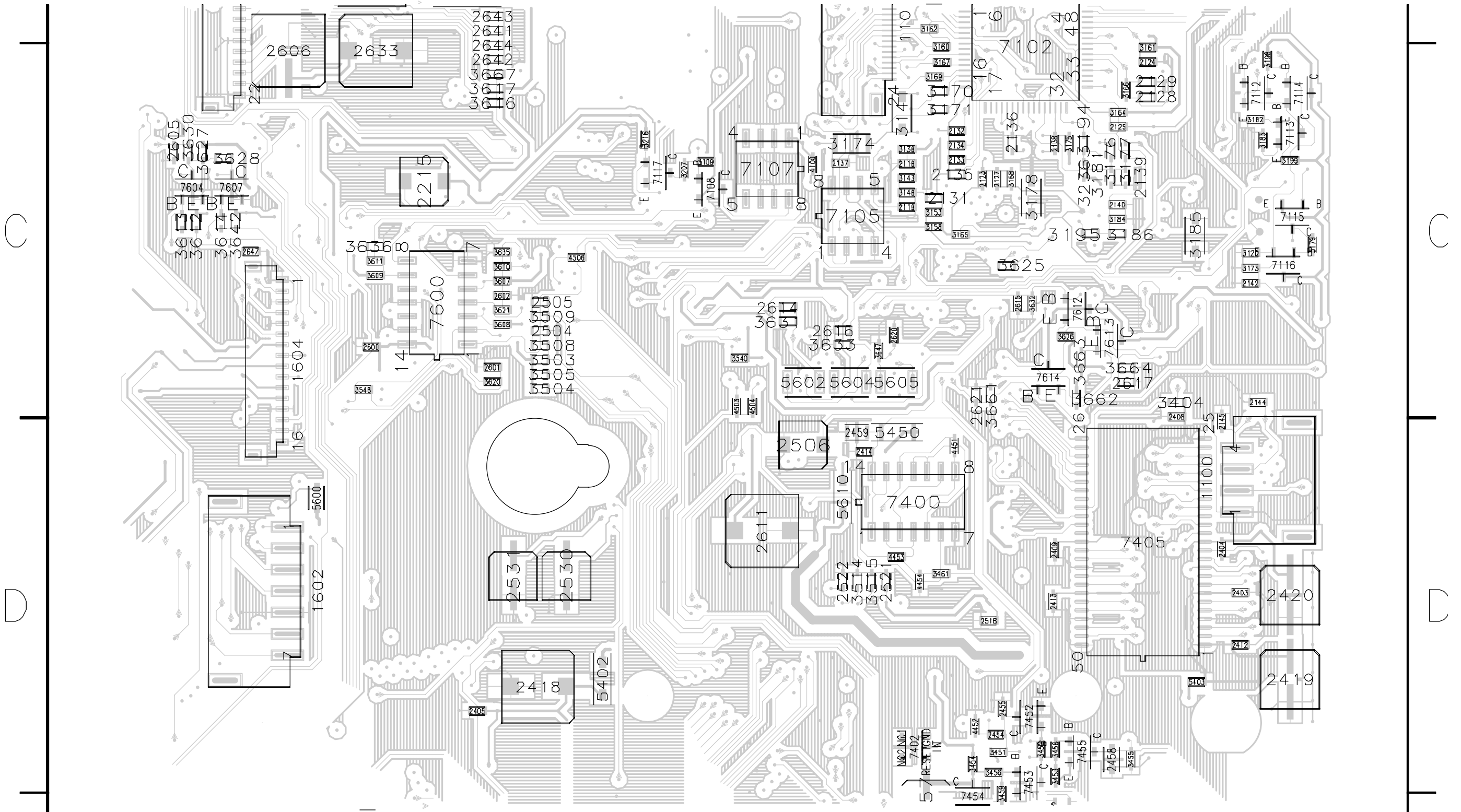
- 1000-1 B8
- 1000-10 D8
- 1000-11 D8
- 1000-12 D8
- 1000-2 B8
- 1000-3 B8
- 1000-4 B8
- 1000-5 C8
- 1000-6 C8
- 1000-7 C8
- 1000-8 C8
- 1000-9 D8
- 1001 I10
- 1002 H1
- 1003 H1
- 2000 F9
- 2001 F9
- 2002 G9
- 2003 G9
- 2004 G9
- 2005 H9
- 2006 H9
- 2007 H9
- 2008 H9
- 2009 G6
- 2010 D6
- 2011 D2
- 2012 D6
- 2013 A5
- 3000 F8
- 3001 F8
- 3002 G8
- 3003 C10
- 3004 G8
- 3005 G8
- 3006 G8
- 3007 H8
- 3008 H8
- 3009 H8
- 3010 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
- F032 H8
- F033 H8
- F034 B5
- F035 B5
- F036 B4
- F037 F6
- F099 A6

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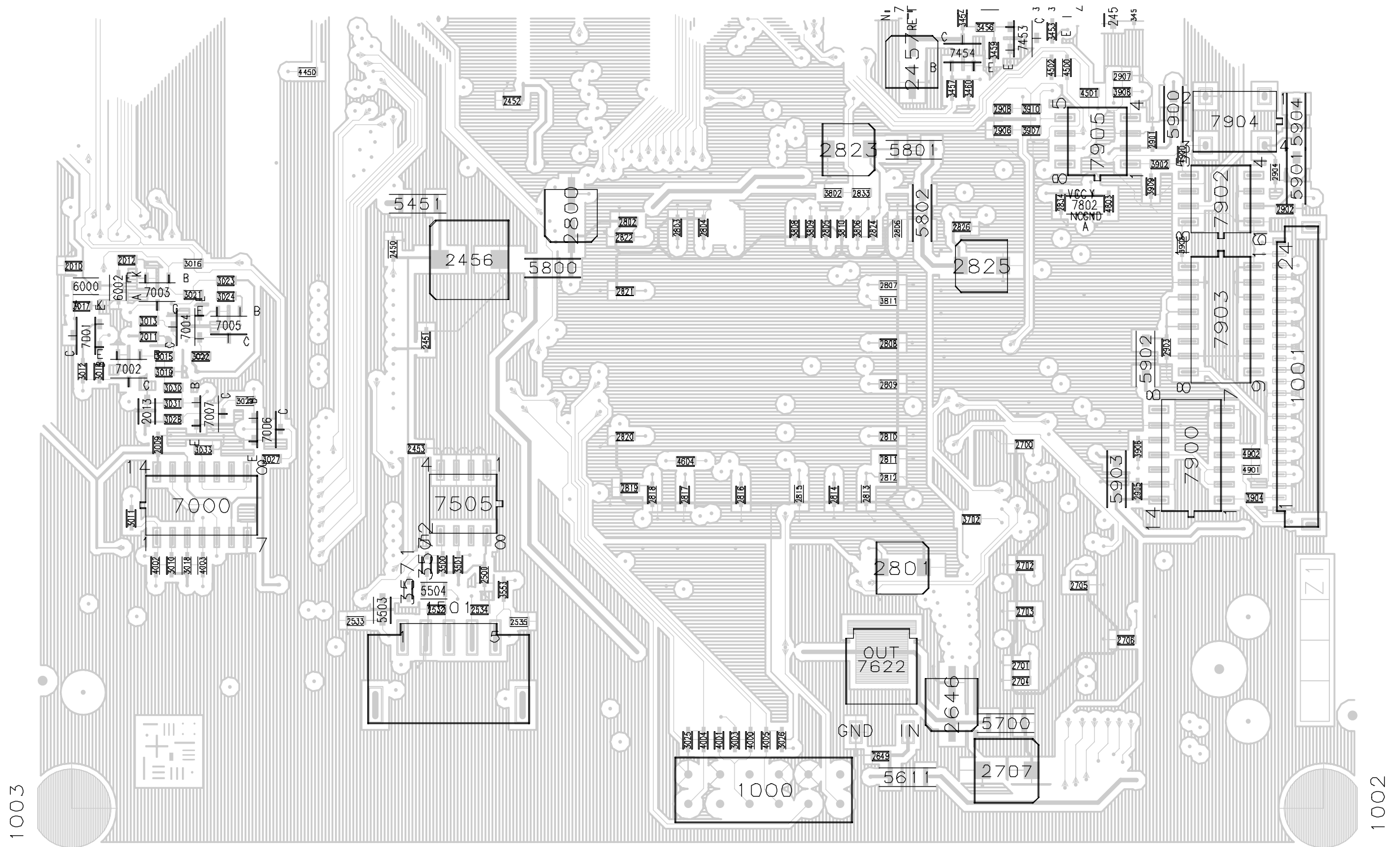
Layout Mono board: (Part 1 top side)



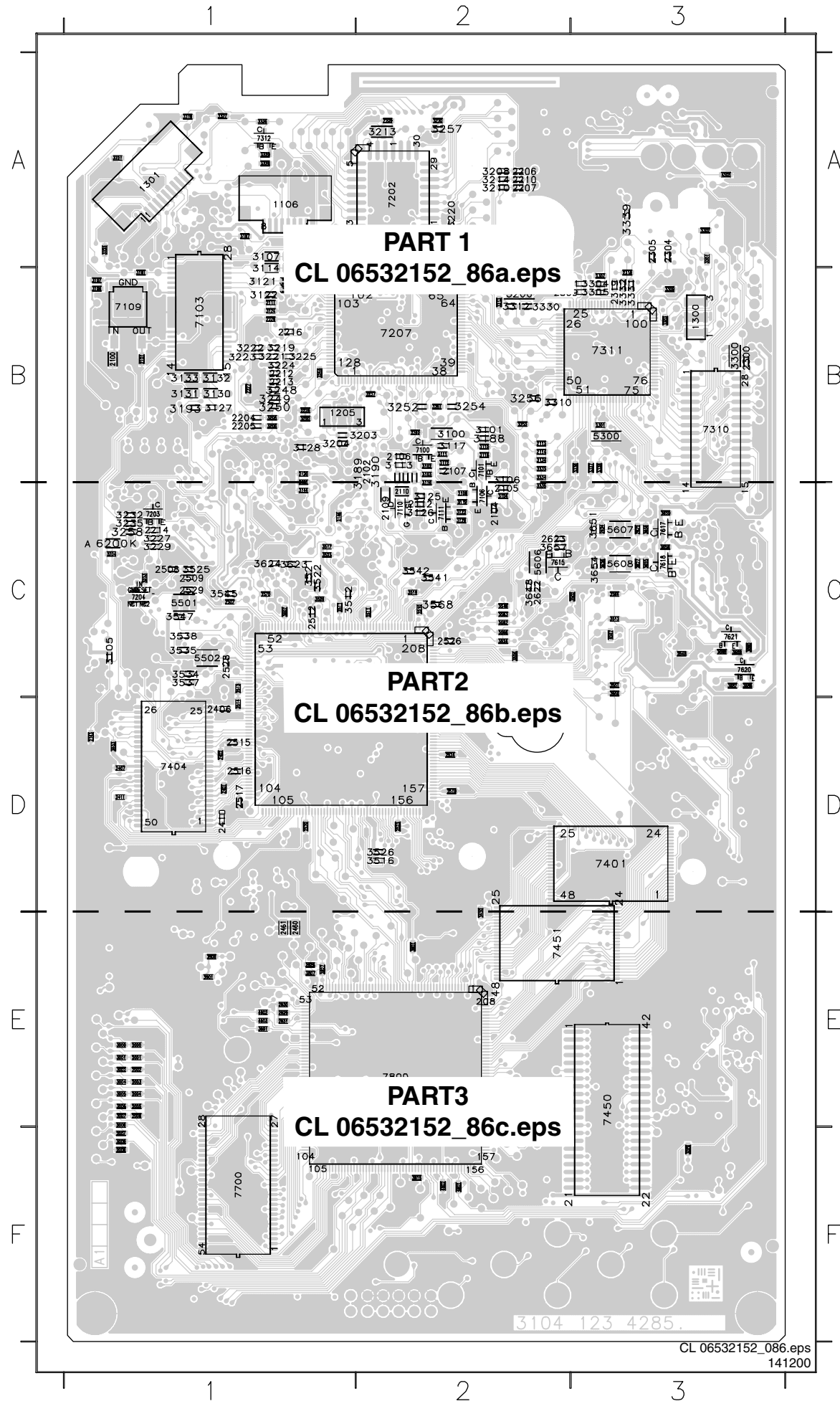
Layout Mono board: (Part 2 top side)



Layout Mono board: (Part 3 top side)



Layout Mono board: (overview bottom side)



1	2	3	A	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	A	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	B	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	C	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	D	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	E	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	F	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100

Layout Mono board: (Part 1 bottom side)

1

2

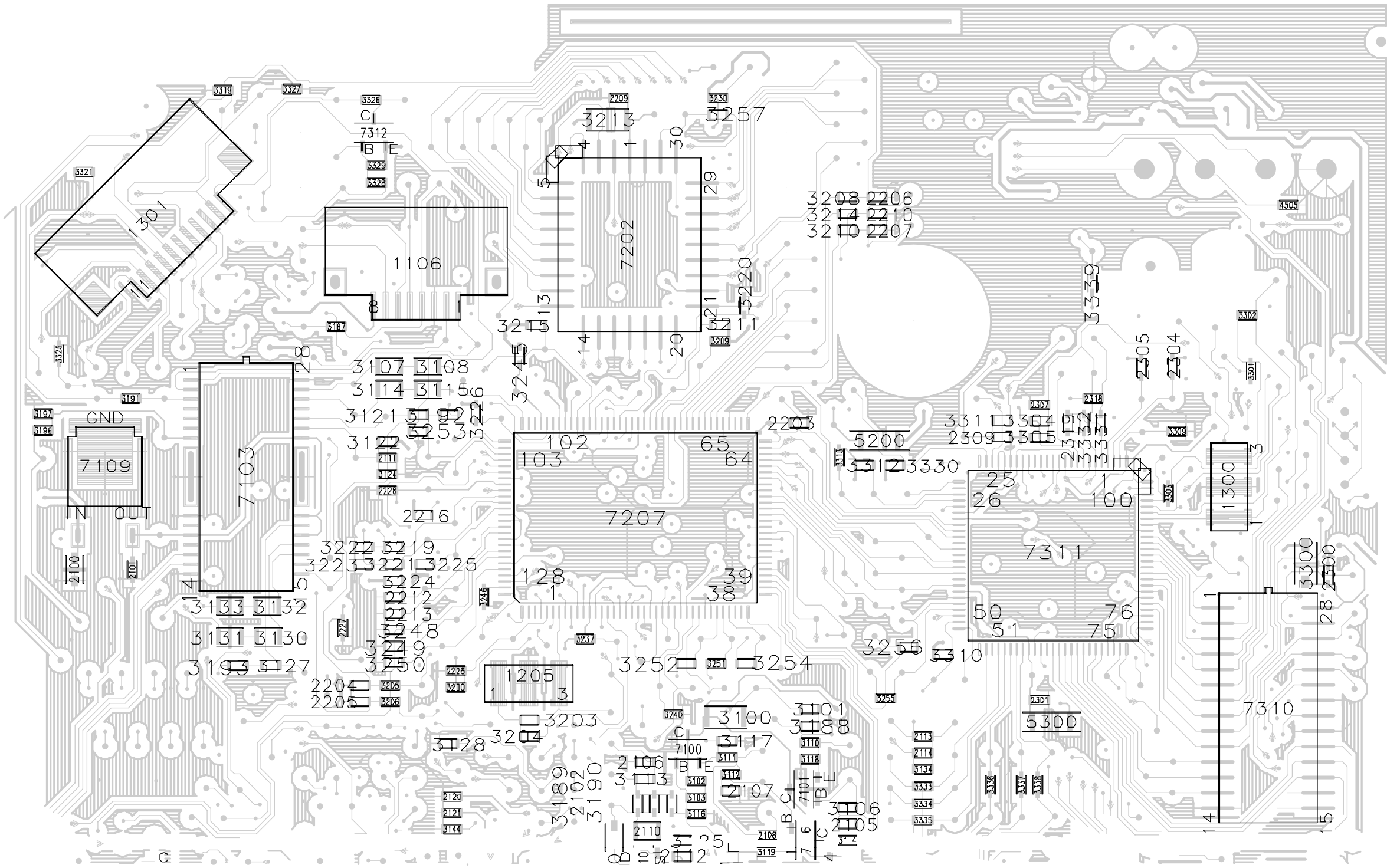
3

A

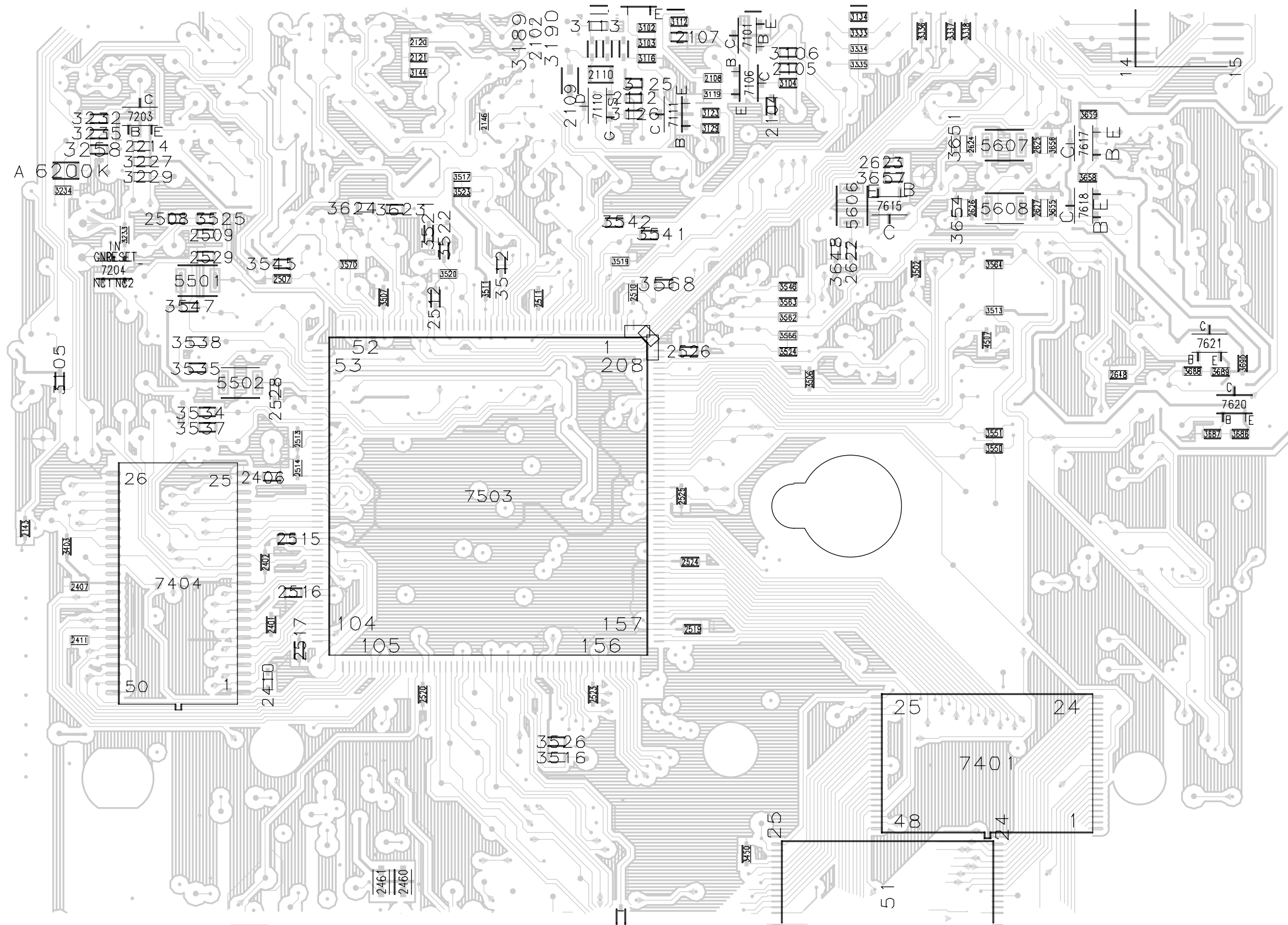
A

B

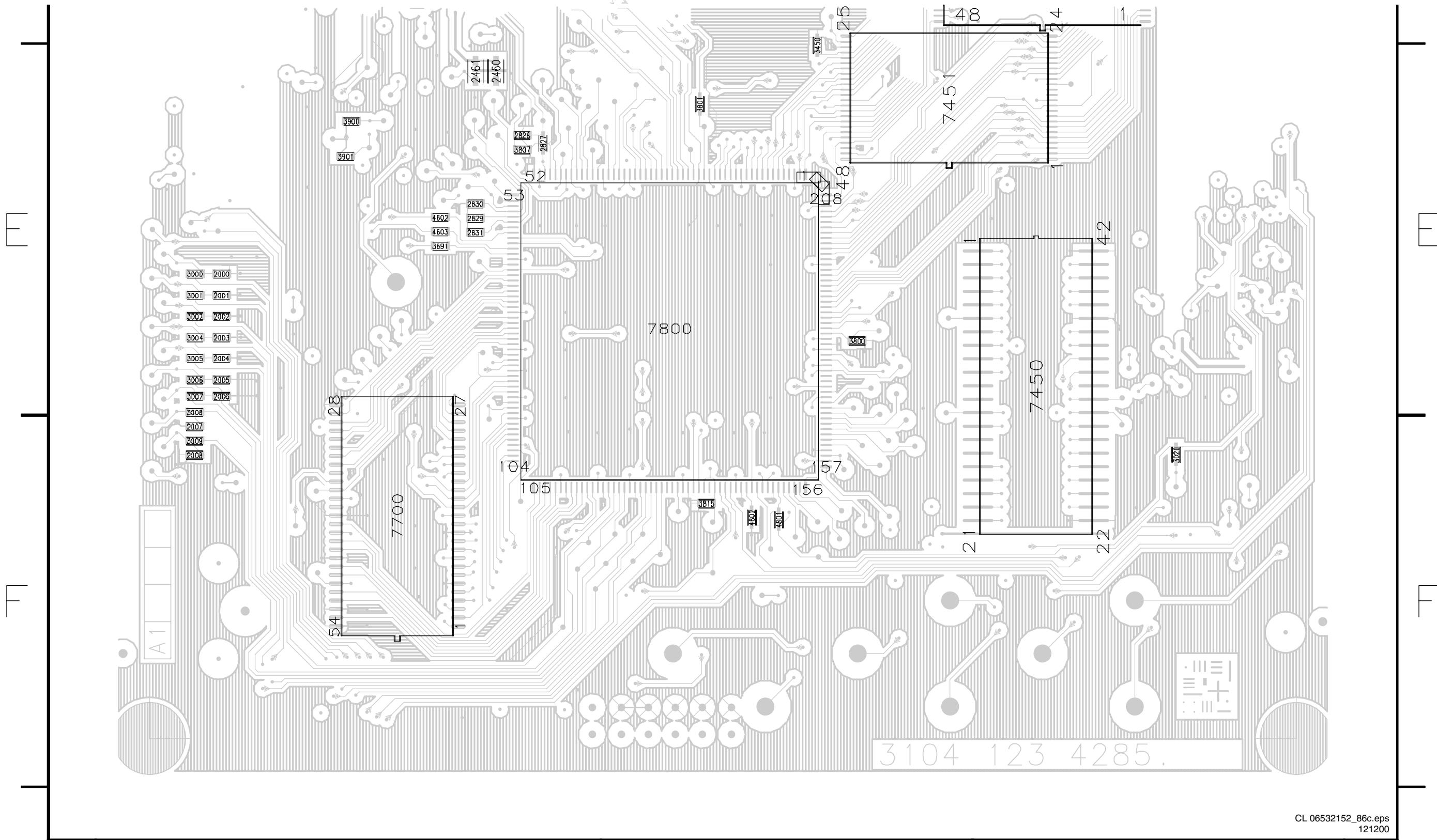
B



Layout Mono board: (Part 2 bottom side)



Layout Mono board: (Part 3 bottom side)



1

2

3

PART 1

A

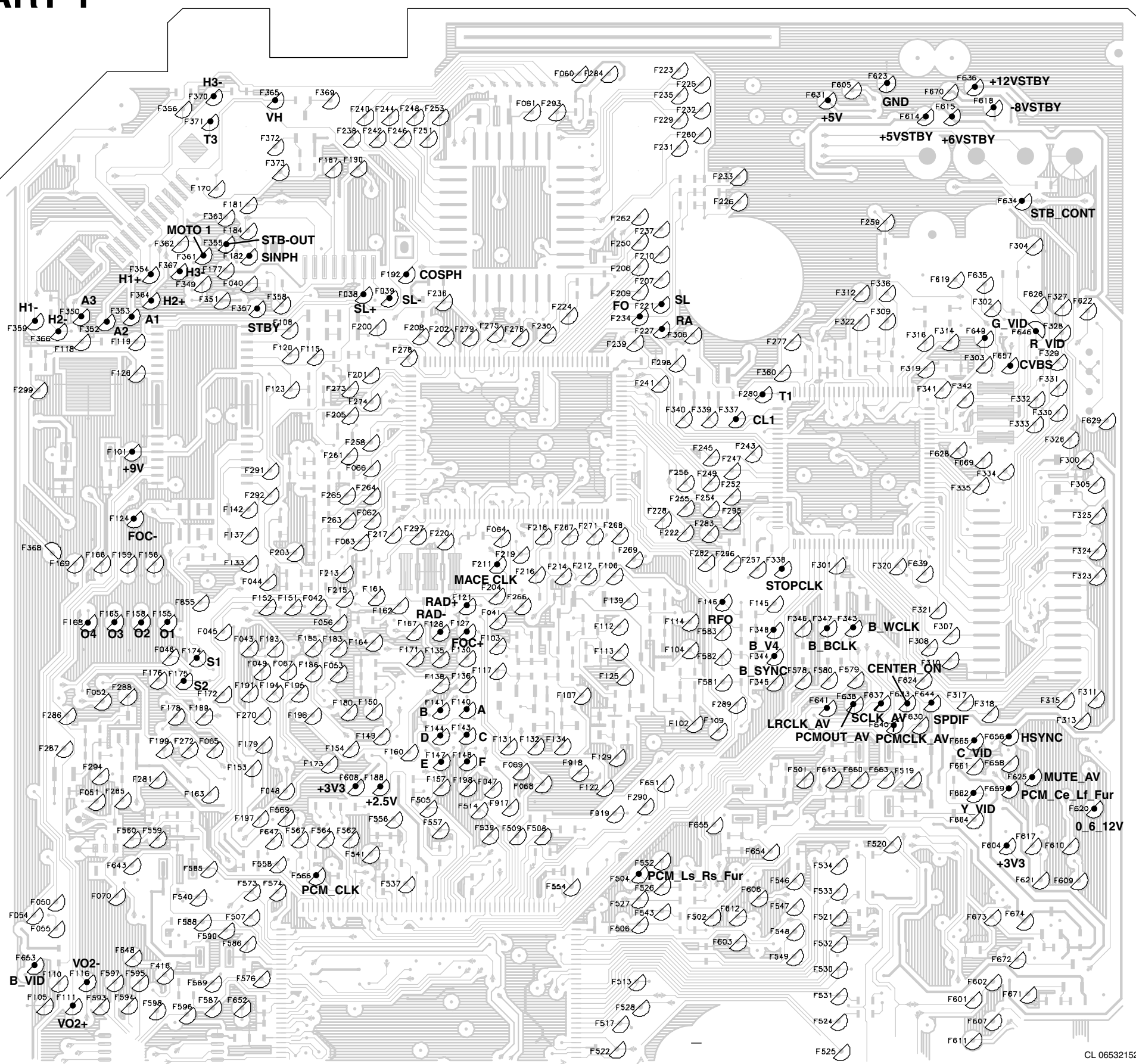
A

B

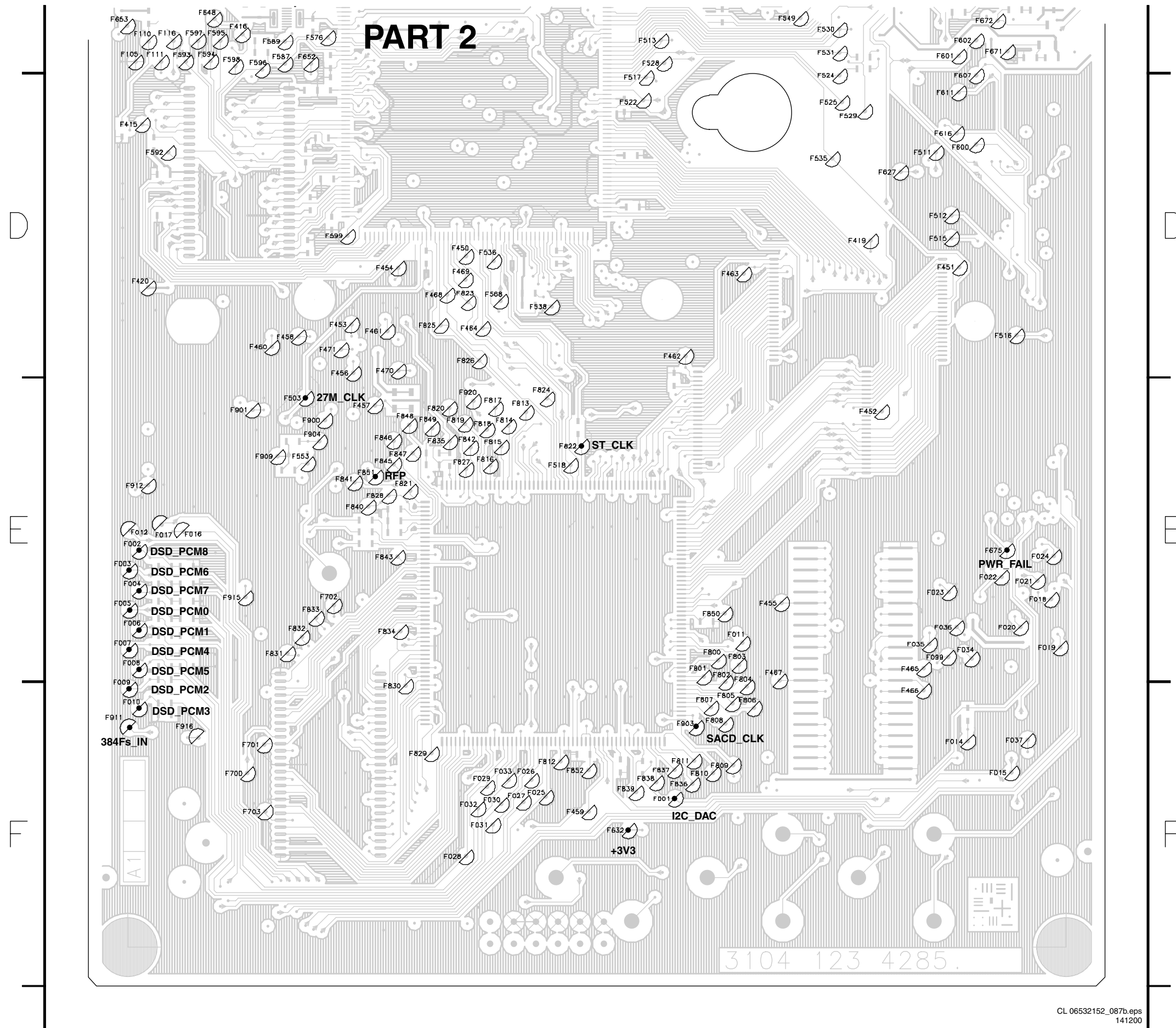
B

C

C

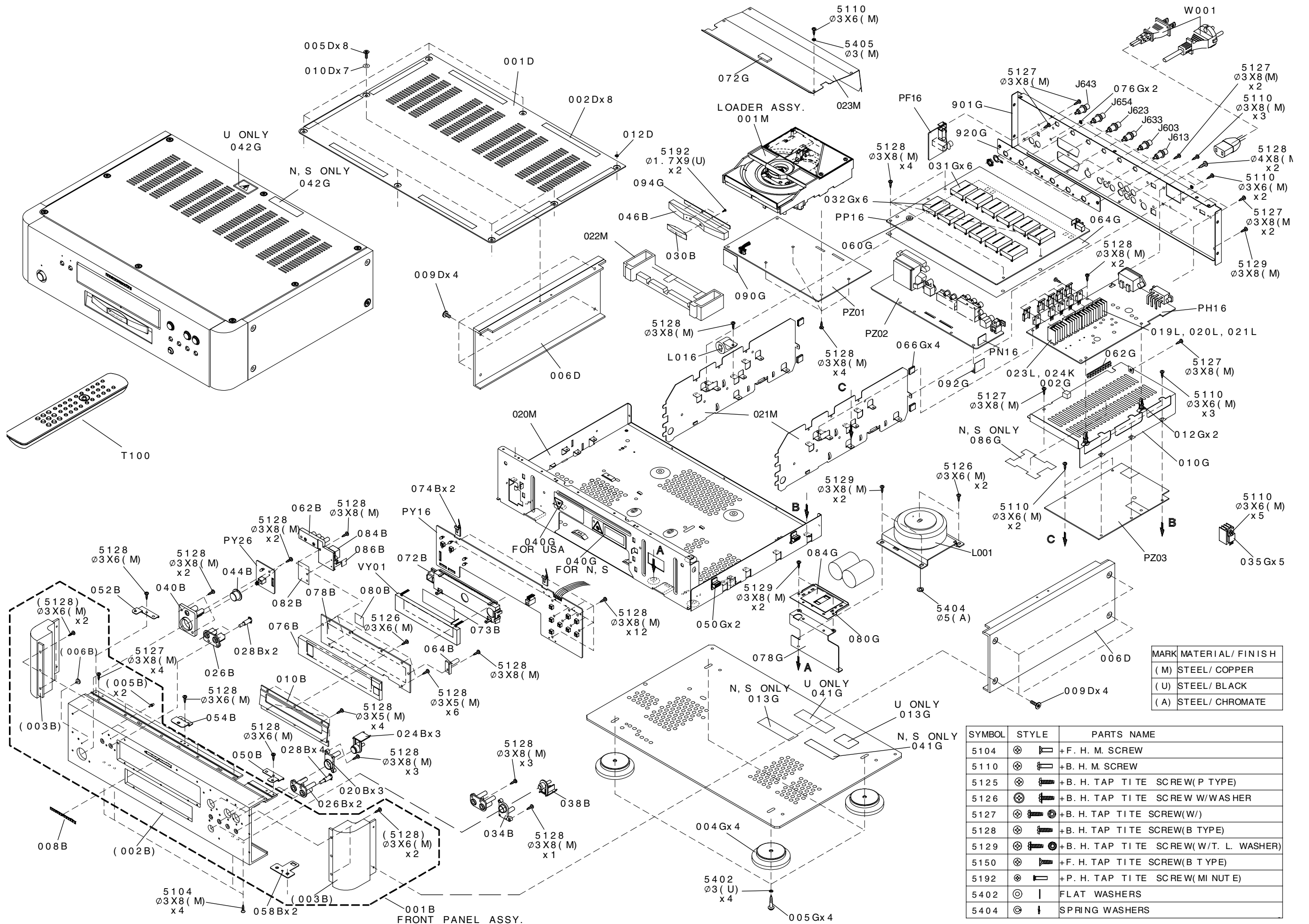


Layout Mono board: (Part 2 Test points)



3104 123 4285.

8. Exploded view and Parts list



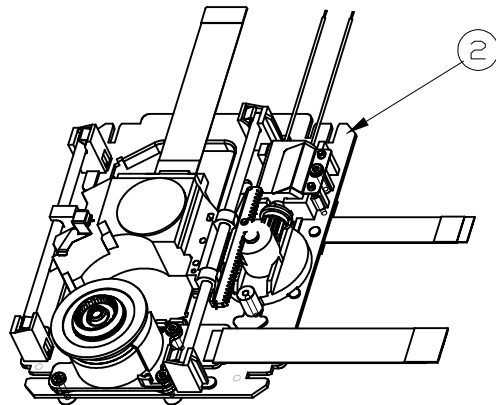
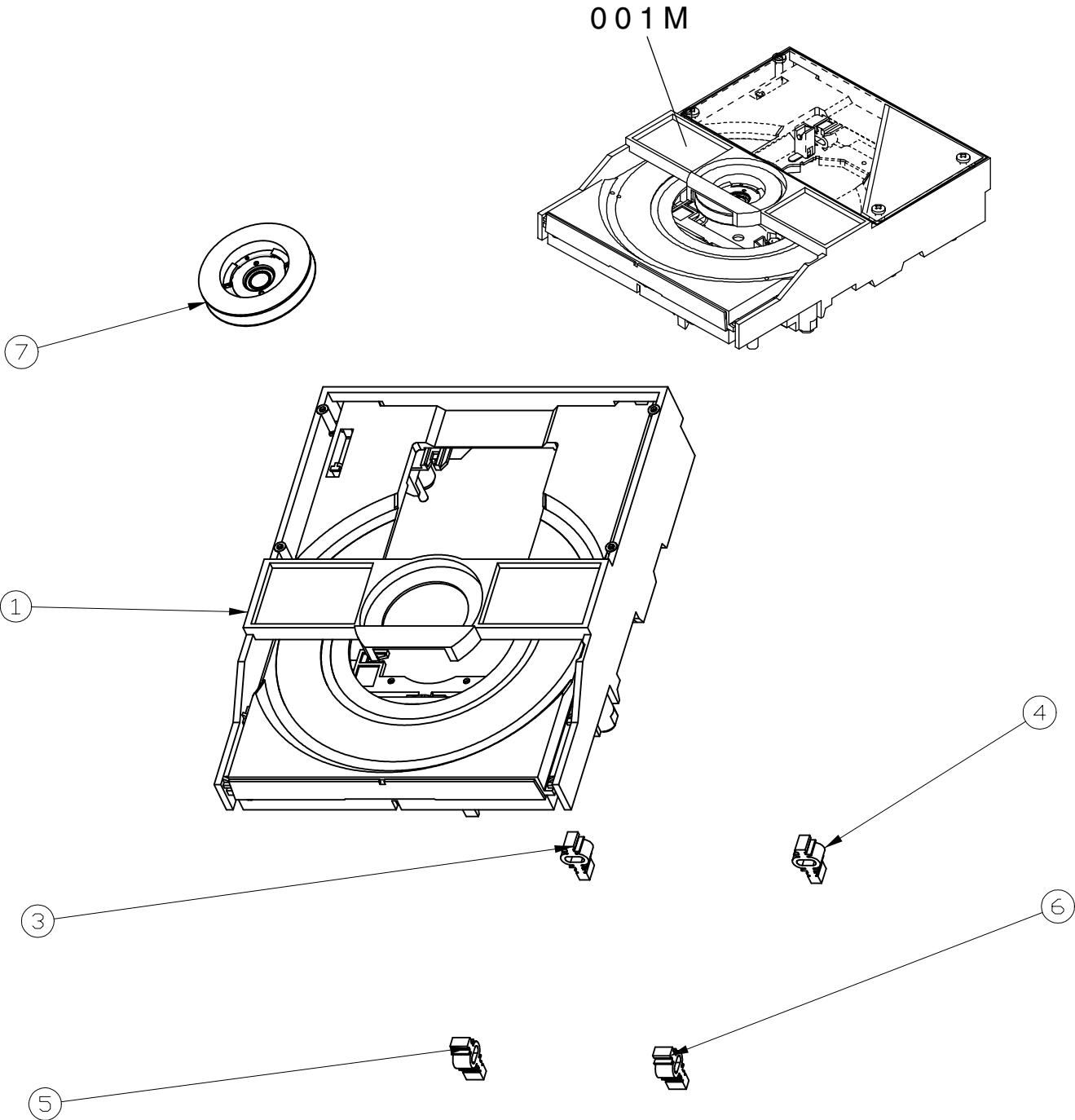
MARK	MATERIAL/ FINISH
(M)	STEEL/ COPPER
(U)	STEEL/ BLACK
(A)	STEEL/ CHROMATE

SYMBOL	STYLE	PARTS NAME
5104		+F. H. M. SCREW
5110		+B. H. M. SCREW
5125		+B. H. TAP TITE SCREW (P TYPE)
5126		+B. H. TAP TITE SCREW W/WASHER
5127		+B. H. TAP TITE SCREW(W/)
5128		+B. H. TAP TITE SCREW(B TYPE)
5129		+B. H. TAP TITE SCREW(W/T. L. WASHER)
5150		+F. H. TAP TITE SCREW(B TYPE)
5192		+P. H. TAP TITE SCREW(MI NUT E)
5402		FLAT WASHERS
5404		SPRING WASHERS

POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)	POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
002B	F		FRONT PANEL GOLD HAIR	413K248120	▲ L001	F		MAINS TRANSF. 100V 50/60Hz	TS58001020
002B	N, S	9965 000 10828	FRONT PANEL GOLD BLAST	413K248110	▲ L001	N, S, U	3104 128 70230	MAINS TRANSF. 115/230V	TS58001010
002B	U		FRONT PANEL BLACK BLAST	413K248010	L011		9965 000 10839	FERRITE CORE	FC50160040
003B	GOLD	9965 000 10825	ESCUTCHEON	413K063110	L012		9965 000 10840	TRCN-16-8-13 FOR JH05-SPSU	FC50270040
003B	BLACK		SIDE CORNER GOLD		L013		4822 526 10691	FERRITE CORE	FC50160030
			ESCUTCHEON	413K063010	L014		4822 526 10691	TFCK-16-8-13 FOR L001 SEC.	FC50160030
			SIDE CORNER BLACK		L015		9965 000 06824	FERRITE CORE	FC90280010
005B		4822 381 11893	LENS FOR LED	269J355010	L016		4822 526 10691	HF70SH28X2X10 FOR FFC	FC50160030
006B		9965 000 10823	LENS FOR STANDBY	230K355010				FERRITE CORE	FC50160030
008B	GOLD	9965 000 01554	MARANTZ BADGE GOLD	313J251110				TFCK-1608013 CN202 MONO	FC90280010
008B	BLACK	9965 000 01553	MARANTZ BADGE BLACK	313J251010				FERRITE CORE	FC90280010
010B	GOLD	9965 000 10829	FRONT PANEL	413K248130				TFCK16-8-13 FOR WY04	FC50160030
			SUB PANEL AL GL						
010B	BLACK		FRONT PANEL	413K248030					
			SUB PANEL AL BL						
020B	GOLD	9965 000 10832	BUSHING PLAY BUTTON GL	413K259110	▲ PZ03		3104 129 22150	POWER SUPPLY UNIT	QW12922150
020B	BLACK		BUSHING BUTTON BL	413K259010	▲ 0025		8204 056 06810	FUSE 2A GMD-2	QC05606810
024B	GOLD	9965 000 10835	BUTTON PLAY GL	413K270110				FOR POWER SUPPLY UNIT	
024B	BLACK		BUTTON PLAY BL	413K270010					
026B	GOLD		BUSHING	413K259130					
			NEXT/PREV. BUTTON GL		001T	F		PACKING	
026B	BLACK		BUSHING	413K259030	001T	N	9965 000 10838	USER GUIDE	413K851110
			NEXT/PREV. BUTTON BL		001T	S		USER GUIDE	413K851310
028B	GOLD	9965 000 10837	BUTTON NEXT/PREV.GL	413K270130	001T	U		USER GUIDE	413K851350
028B	BLACK		BUTTON NEXT/PREV.BL	413K270030	001T	U		USER GUIDE	413K851250
030B		9965 000 06862	ESCUTCHEON (SACD LOGO)	392K063160	T100		9965 000 10851	REMOTE CONTROLLER	ZK413K0010
034B	GOLD	9965 000 10833	BUSHING	413K259120				RC-12S1SA	
			OPEN/CLOSE BUTTON GL		▲ W001	F	4822 321 11337	MAINS CORD	ZC01802080
034B	BLACK		BUSHING	413K259020				MITY DC-302-J 125V 12A	
			OPEN/CLOSE BUTTON BL		▲ W001	N	4822 321 11033	MAINS CORD	ZC01803080
038B	GOLD	9965 000 10836	BUTTON OPEN/CLOSE GL	413K270120	▲ W001	S		2P 10A 250V CLASS2	ZC01804100
038B	BLACK		BUTTON OPEN/CLOSE BL	413K270020	▲ W001	U		MAINS CORD	ZC01803100
040B	GOLD	9965 000 10834	BUSHING POWER GL	413K259140				250V 10A FOR UK	
040B	BLACK		BUSHING POWER BL	413K259040				MAINS CORD	
044B	GOLD	4822 410 11276	BUTTON POWER GL	176J270150				10A 125V UL/GSA	
044B	BLACK	4822 410 11275	BUTTON POWER BL	176J270050					
046B	GOLD	9965 000 10826	TRAY ESCUTCHEON GL	413K063120					
046B	BLACK		TRAY ESCUTCHEON BL	413K063020					
076B	GOLD	9965 000 10827	WINDOW FOR GL	413K158110					
076B	BLACK		WINDOW FOR BL	413K158010					
001D	GOLD	9965 000 10831	TOP LID GOLD	413K257110					
001D	BLACK		TOP LID BLACK	413K257010					
005D	GOLD	4822 502 14462	SCR.THINHEAD 3X5NI	318K010020					
005D	BLACK	4822 502 14461	SCR.THINHEAD 3X4BL	318K010030					
006D	GOLD	9965 000 10830	SIDE PANEL GOLD	413K249110					
006D	BLACK		SIDE PANEL BLACK	413K249010					
009D	GOLD	4822 502 14425	SCR.THINHED 3X8NI	323S010020					
009D	BLACK	4822 502 21693	SCR.THINHED 3X7BL	323S010030					
010D			INSULATOR FOR TOP LID	256J120010					
004G		4822 462 11116	LEG GOLD BLAST	163J057410					
005G		9965 000 10824	SCREW FOR LEG	413K010010					
001M		9305 023 61104	VAL6011/04	QE02361104					
			LOADER COMPLETE						
022M		3104 126 25210	DUST CAP	QW12625210					
J603		9965 000 10849	TERMINAL EW-2560T-LH-W	YT02011290					
			L-CH						
J613		9965 000 10848	TERMINAL EW-2560T-LH-R	YT02011280					
			R-CH						
J623		9965 000 10849	TERMINAL EW-2560T-LH-W	YT02011290					
			LS-CH						
J633		9965 000 10848	TERMINAL EW-2560T-LH-R	YT02011280					
			RS-CH						
J643		9965 000 10850	TERMINAL EW-2560T-LH-B	YT02011300					
			C-CH						
J653		9965 000 10850	TERMINAL EW-2560T-LH-B	YT02011300					
			LEE-CH						
					001S			NOT STANDARD	
					002S			SPEAR PARTS	
					008S			PACKING CASE	413K801010
								CUSHION	413K809010
								ACCESSORY BOX	413K801210

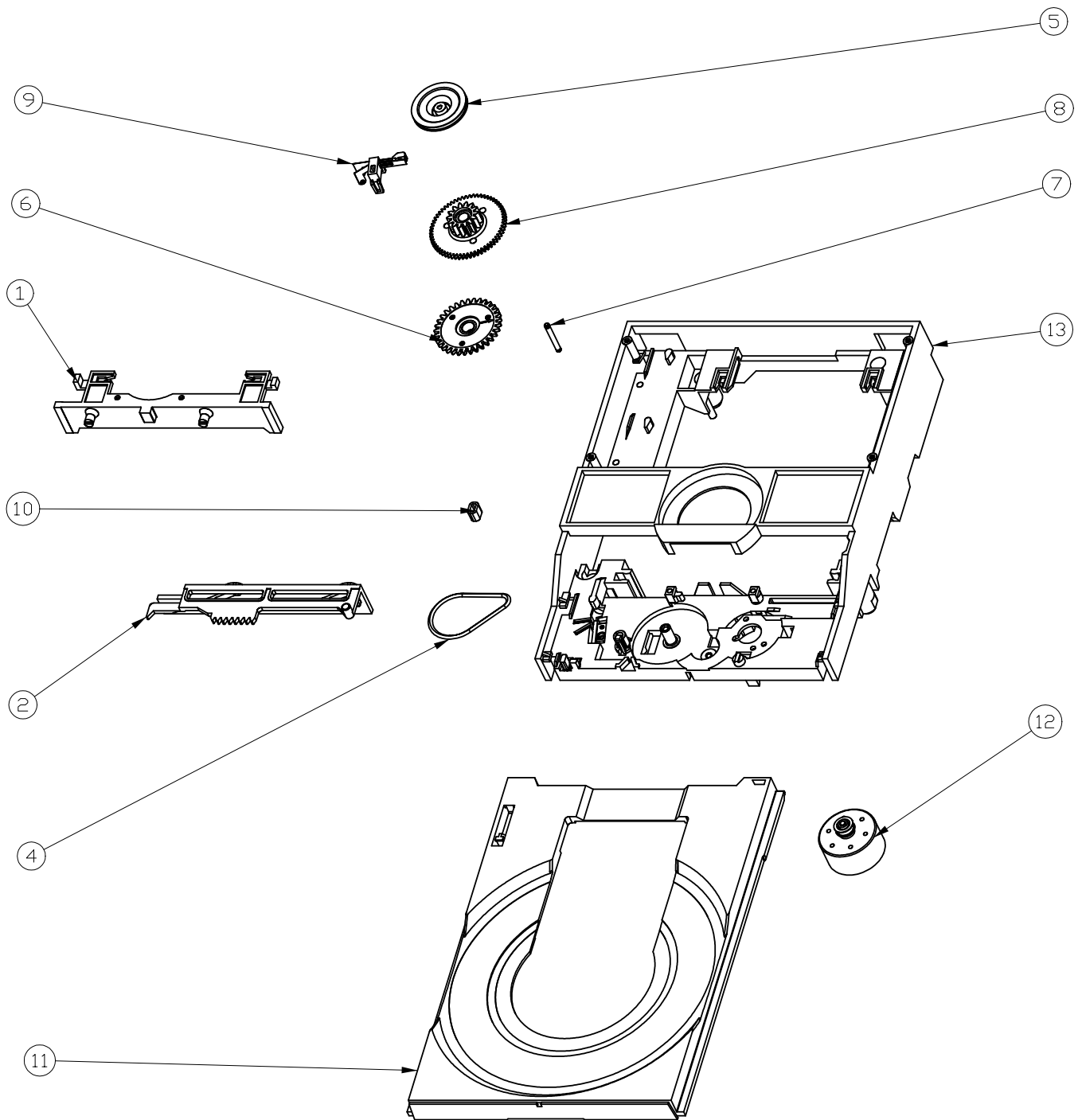
NOTE : *nsp* PART IS LISTED FOR REFERENCE ONLY, MARANTZ WILL NOT SUPPLY THESE PARTS.

001M



POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
001M		9305 023 61104	VAL6011/04 LOADER COMPLETE	QE02361104
1	nsp		MECH. UNIT, GENEVA LP LOADER ASSY	nsp
2	nsp		VAM6001/01	nsp
3		3139 194 00710	SUSPENSION (YELLOW)	QT19400710
4		3139 194 00710	SUSPENSION (YELLOW)	QT19400710
5		3139 194 00620	SUSPENSION (BLUE)	QT19400620
6		3139 194 00620	SUSPENSION (BLUE)	QT19400620
7		3139 197 60060	CLAMPER ASSY	QT19760060

NOTE : "nsp" PART IS LISTED FOR REFERENCE ONLY, MARANTZ WILL NOT SUPPLY THESE PARTS.



POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJ)
4		4822 358 10266	BELT, DRIVING	QP35810266
9		3139 198 80010	SWITCH, OTHERS	QT19880010
10		4822 532 13097	RING, RUBBER	QP53213097
11		3139 194 00270	TRAY, PLASTIC	QT19400270
12		3139 197 50060	MOTOR ASSY DC <=37.5W	QT19750060

NOTE : "nsp" PART IS LISTED FOR REFERENCE ONLY, MARANTZ WILL NOT SUPPLY THESE PARTS.

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.

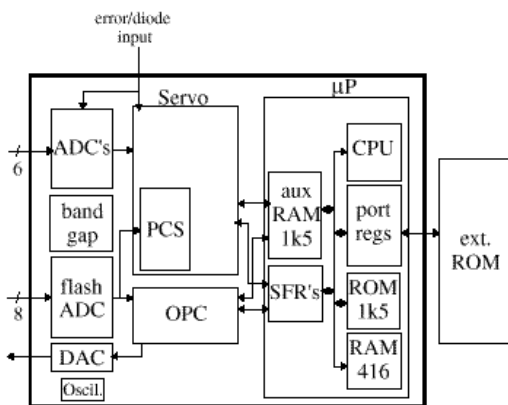


Figure 9-1 Overall block diagram MACE2.

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

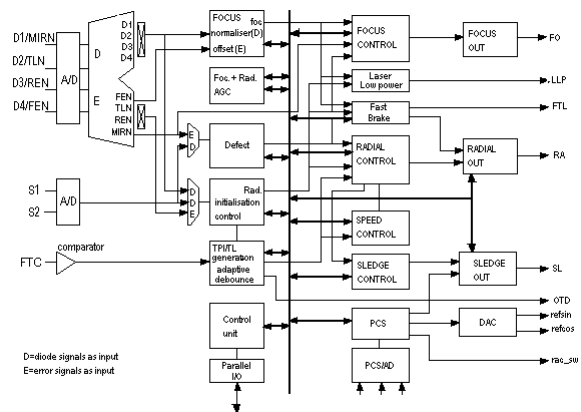


Figure 9-2 Mace2 servo block diagram.

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 be 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 $\pm 10\%$ 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 $\pm 50\text{nm}$.

9.7.3 TPI level generation:

The accuracy of the initialisation procedure is such that the duty cycle range of TPI becomes $0.4 < \text{duty cycle} < 0.6$.

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.

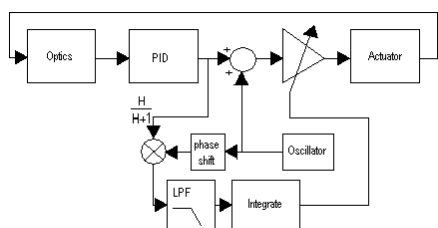


Figure 9-3 Principle of the automatic gain control.

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 DEF1 (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).

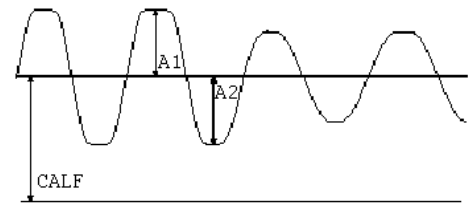


Figure 9-4 Definition of the A1, A2 and CALF signals.

9.16 Definition of terms.

The asymmetry (β) 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 EFM is 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.

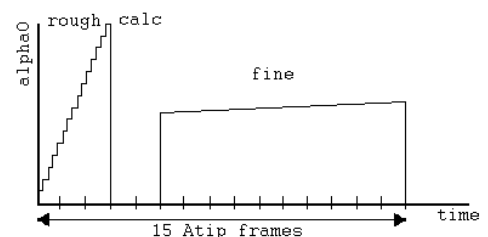


Figure 9-5 Figure 5: OPC write profile.

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 were 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 ATIP 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.

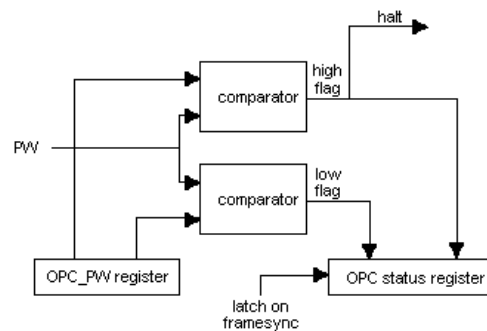


Figure 9-6 OPC PW monitor.

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

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

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

The header information can be read via the data output path (RF)

DC offset compensation techniques provide a fast settling after disc errors.

Radial servo Polarity switch for land/groove

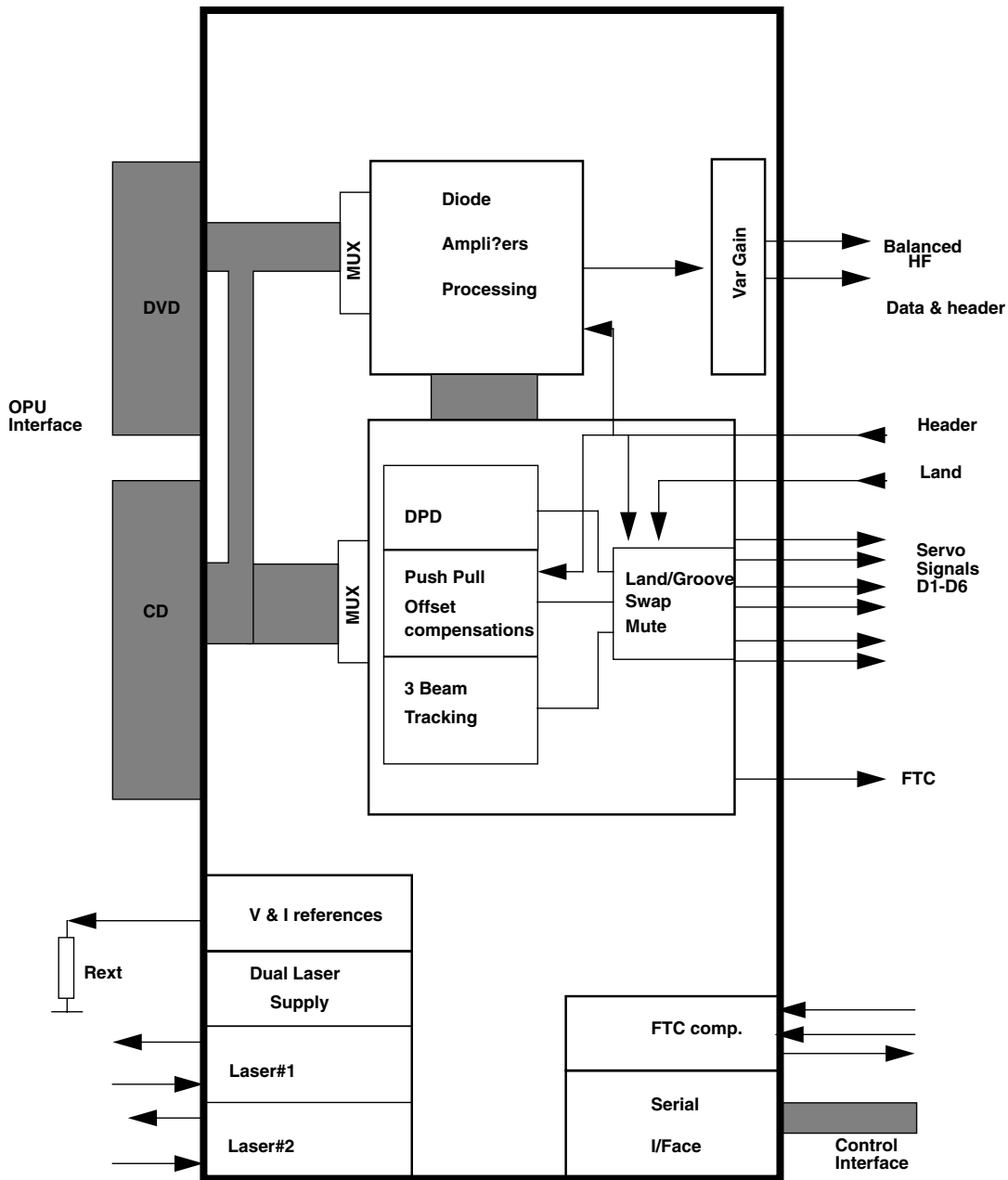
two settings for focus offset correction for land and groove

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

ORDERING INFORMATION

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

DEVICE BLOCK DIAGRAM



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

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

PINNING

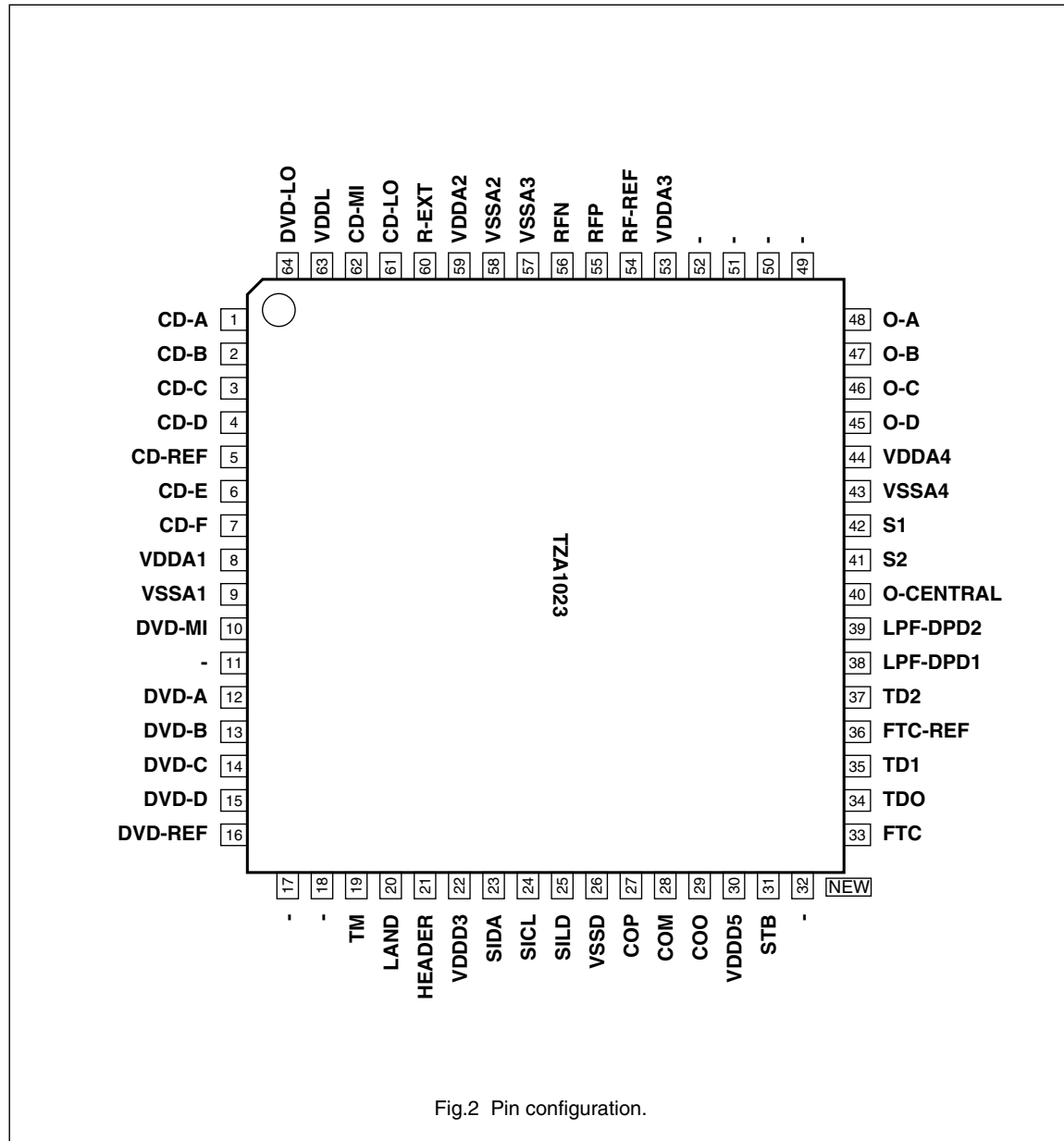


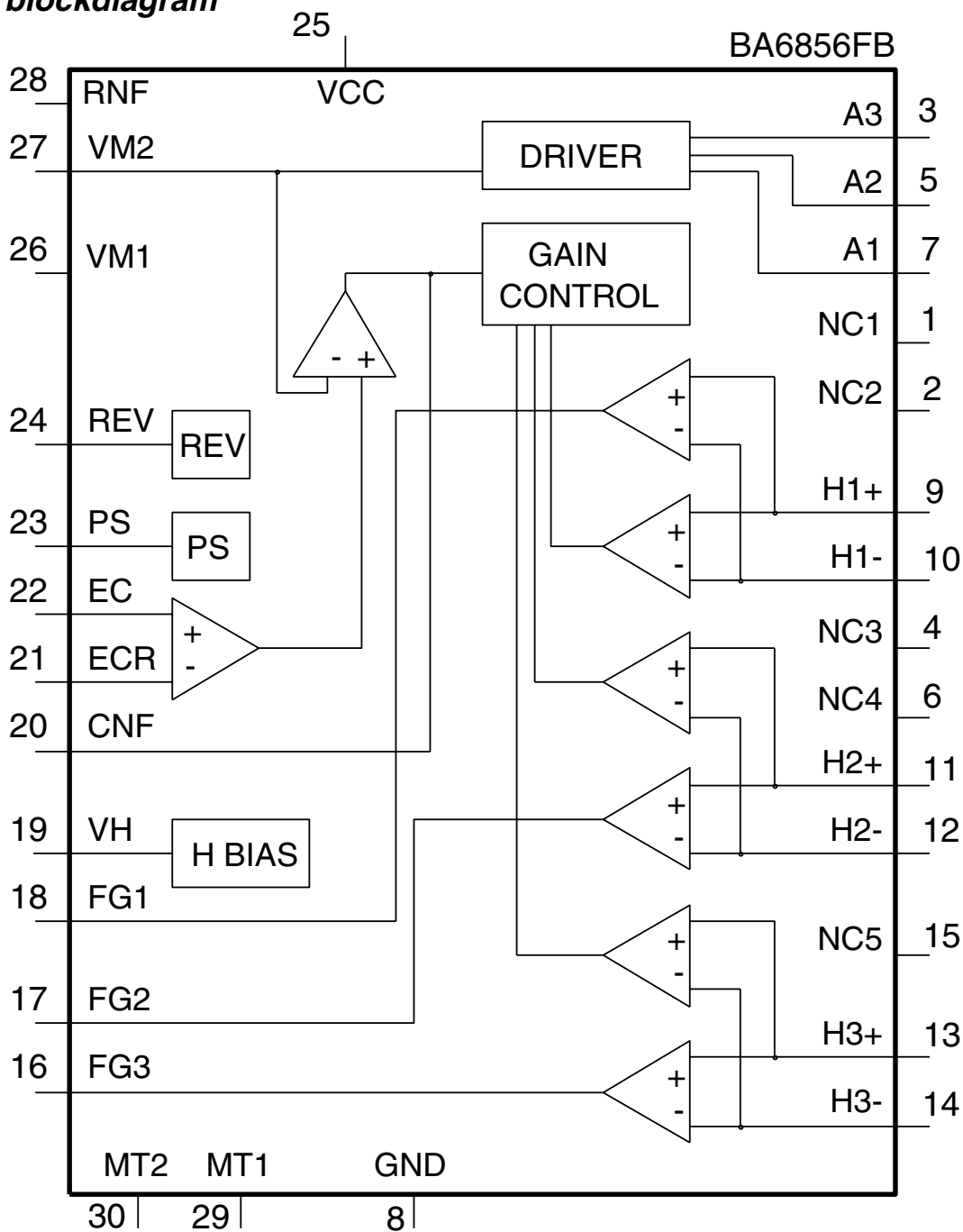
Fig.2 Pin configuration.

BA6856FP: 3 PHASE MOTOR DRIVER FOR DVD PLAYERS

Features

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

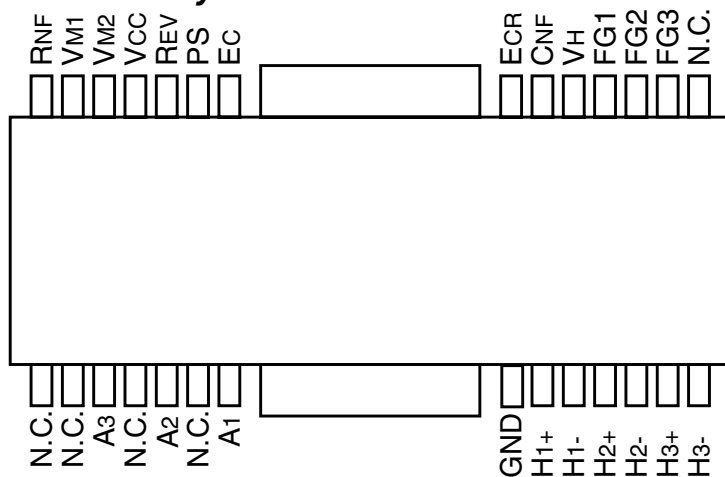
blockdiagram



pin description

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

Terminal lay-out



FEATURES

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



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

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

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

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

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

GENERAL DESCRIPTION

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

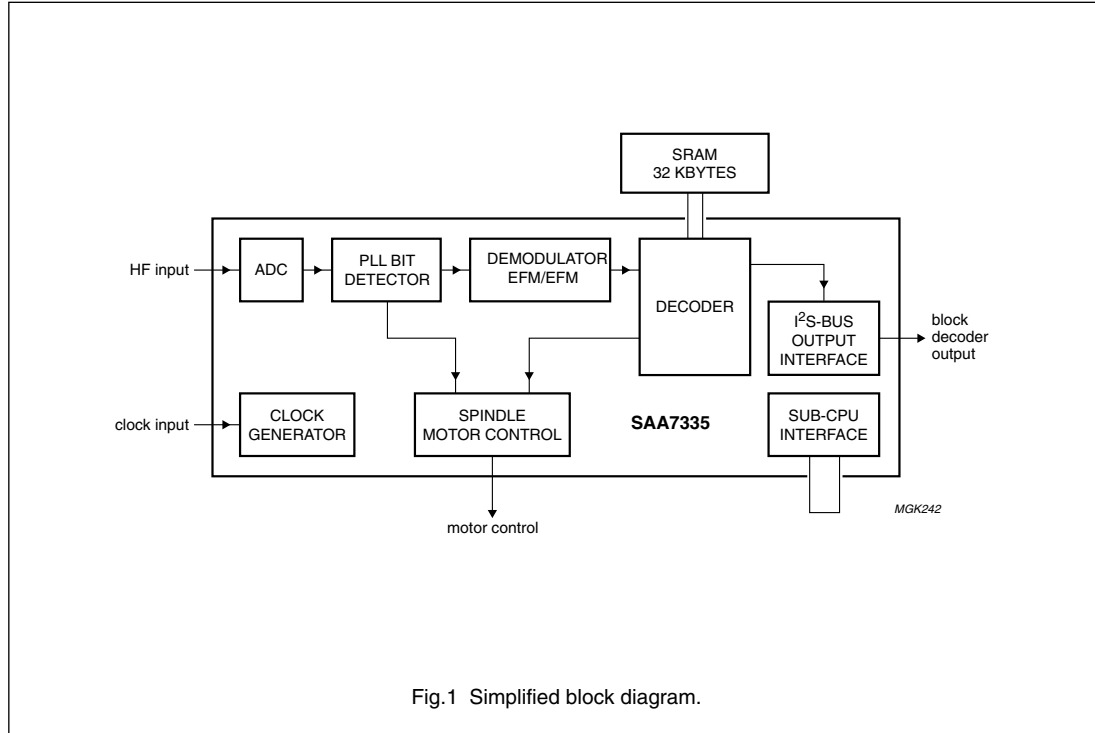
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MIN.	TYP.	MAX.	UNIT
V _{DDD}	digital supply voltage	4.5	5.0	5.5	V
I _{DDD}	digital supply current	–	70	300	mA
V _{DDA}	analog supply voltage	4.5	5.0	5.5	V
I _{DDA}	analog supply current	–	70	300	mA
f _{xtal}	crystal input frequency	4	25	tbt	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 profile quad flat package; 100 leads; body 14 x 14 x 1.4 mm	SOT407-1

BLOCK DIAGRAM



PINNING

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

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

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

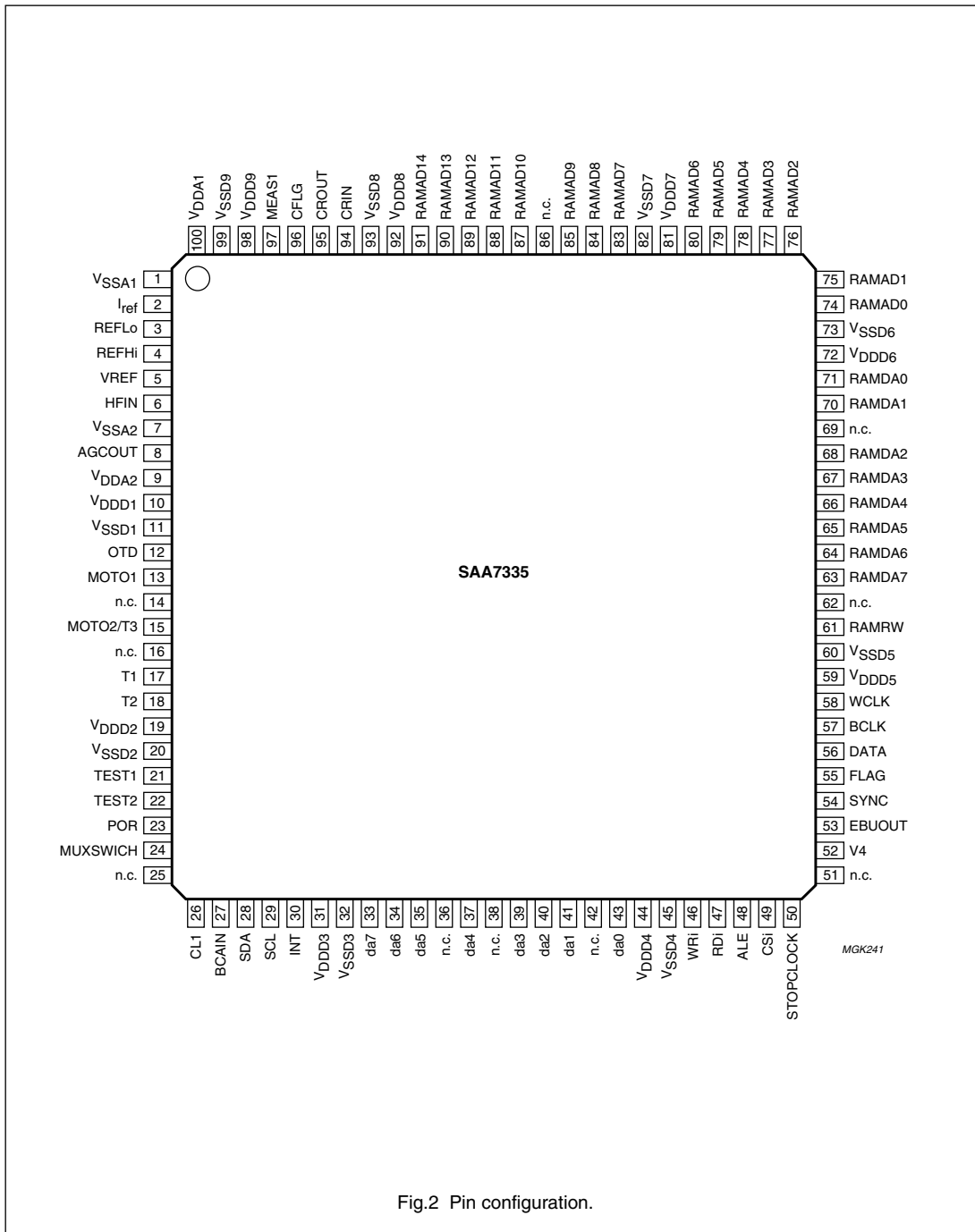


Fig.2 Pin configuration.

FUNCTIONAL DESCRIPTION

Analog front-end

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

PLL and bit detector

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

The equalizer and the data slicer are programmable.

Digital logic

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

Advanced bit detector

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

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

Demodulator

FRAME SYNC PROTECTION CD MODE

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

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

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

FRAME SYNC PROTECTION DVD MODE

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

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

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

EFM/EFM+ demodulation

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

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 x 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 μ m 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 BGA
- 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 BGA, 44-pin SO, and 48-pin TSOP packages. The word-wide data (x16) appears on DQ15–DQ0; the byte-wide (x8) data appears on DQ7–DQ0. This device is designed to be programmed in-system with the standard system 3.0 volt V_{CC} supply. A 12.0 V V_{PP} or 5.0 V_{CC} are not required for write or erase operations. The device can also be programmed in standard EPROM programmers.

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

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

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

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

Device erasure occurs by executing the erase command sequence. This initiates the **Embedded Erase** algorithm—an internal algorithm that automatically 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.

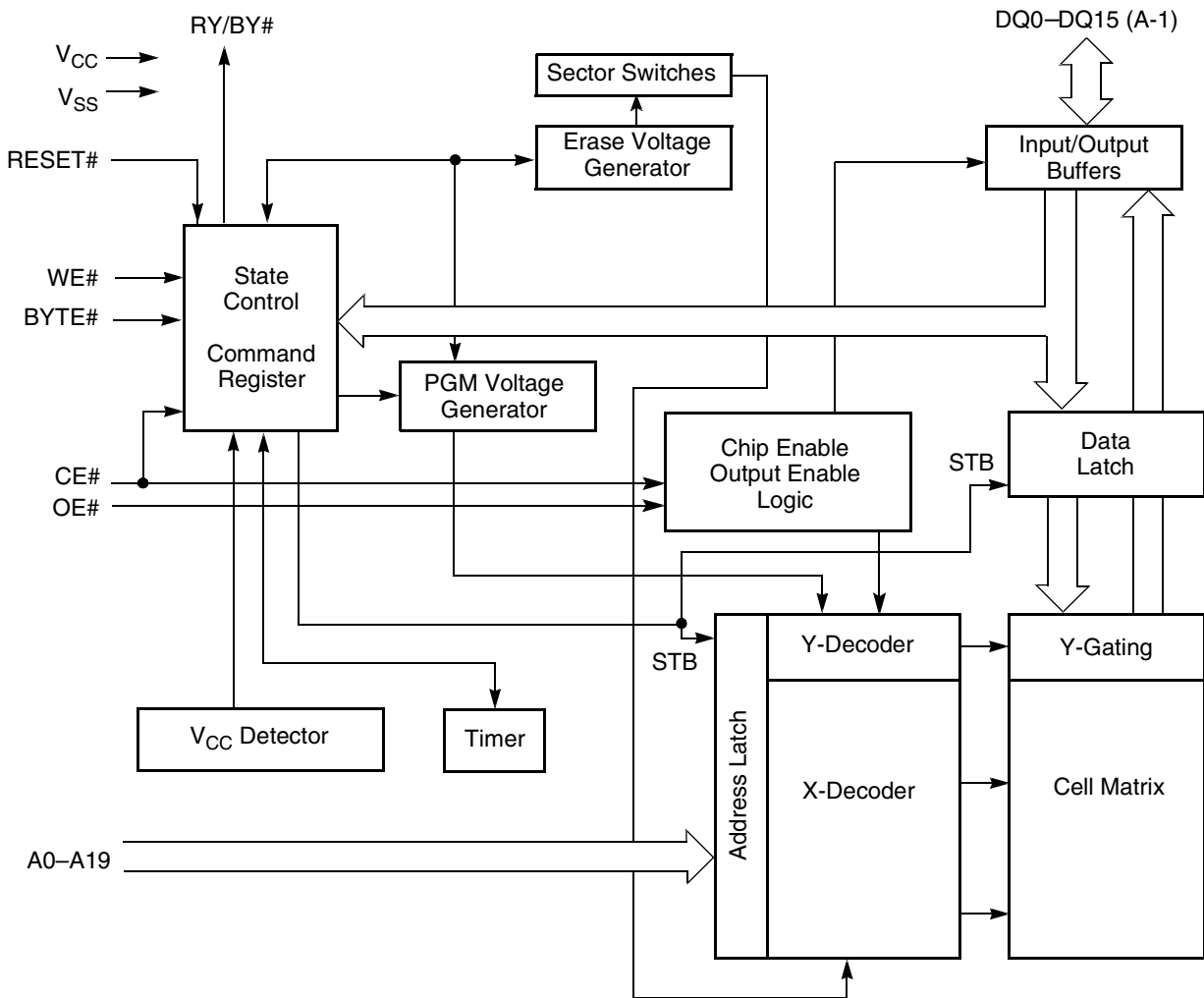
AMD's Flash technology combines years of Flash memory manufacturing experience to produce the highest levels of quality, reliability and cost effectiveness. The device electrically erases all bits within a sector simultaneously via Fowler-Nordheim tunneling. The data is programmed using hot electron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

PRODUCT SELECTOR GUIDE

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

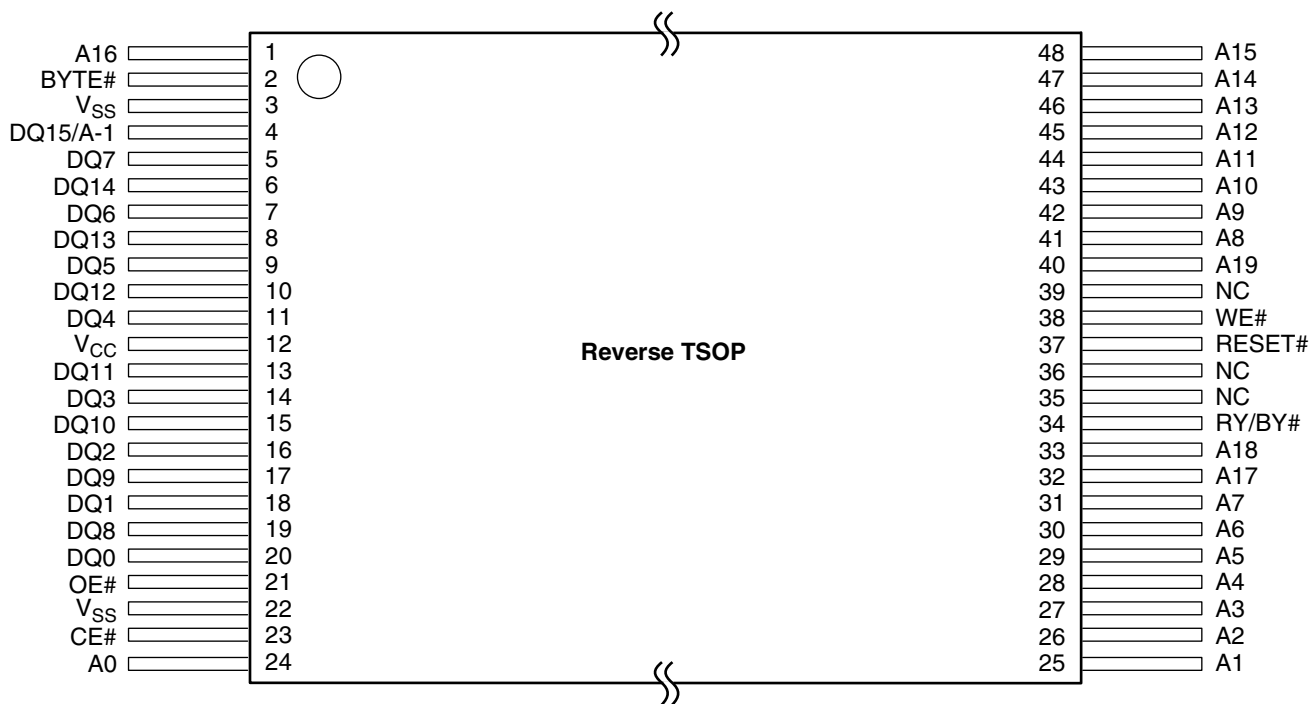
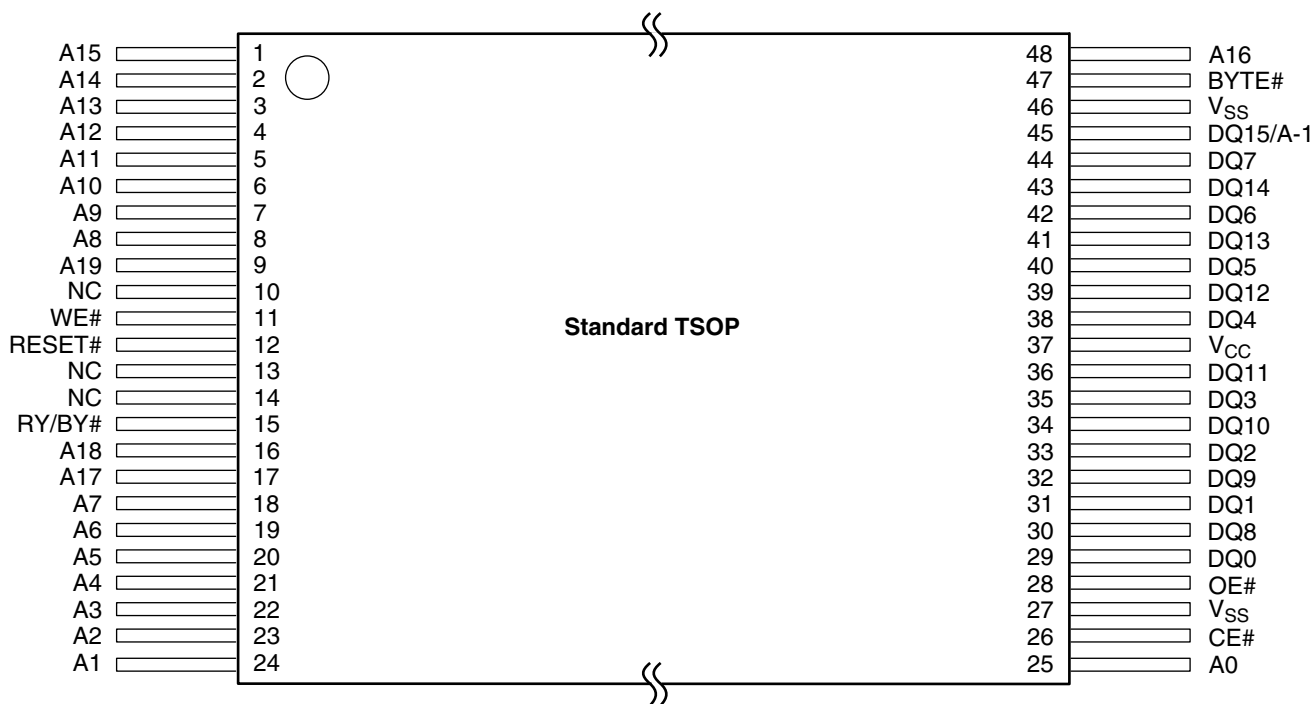
Note: See "AC Characteristics" for full specifications.

BLOCK DIAGRAM



21358C-1

CONNECTION DIAGRAMS



SYNCHRONOUS DRAM

MT48LC1M16A1 S - 512K x 16 x 2 banks

FEATURES

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

OPTIONS

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

MARKING

1M16A1

TG

-6

-7

-8A

S

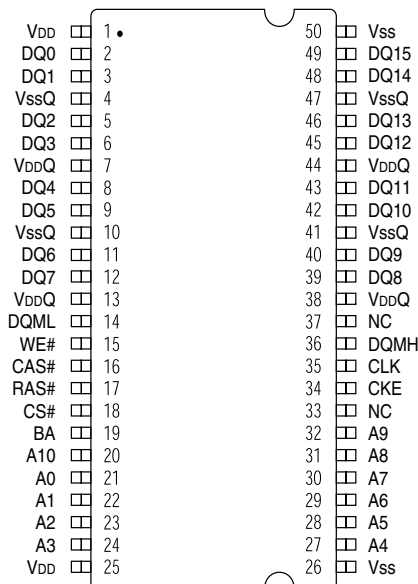
KEY TIMING PARAMETERS

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

GENERAL DESCRIPTION (continued)

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

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

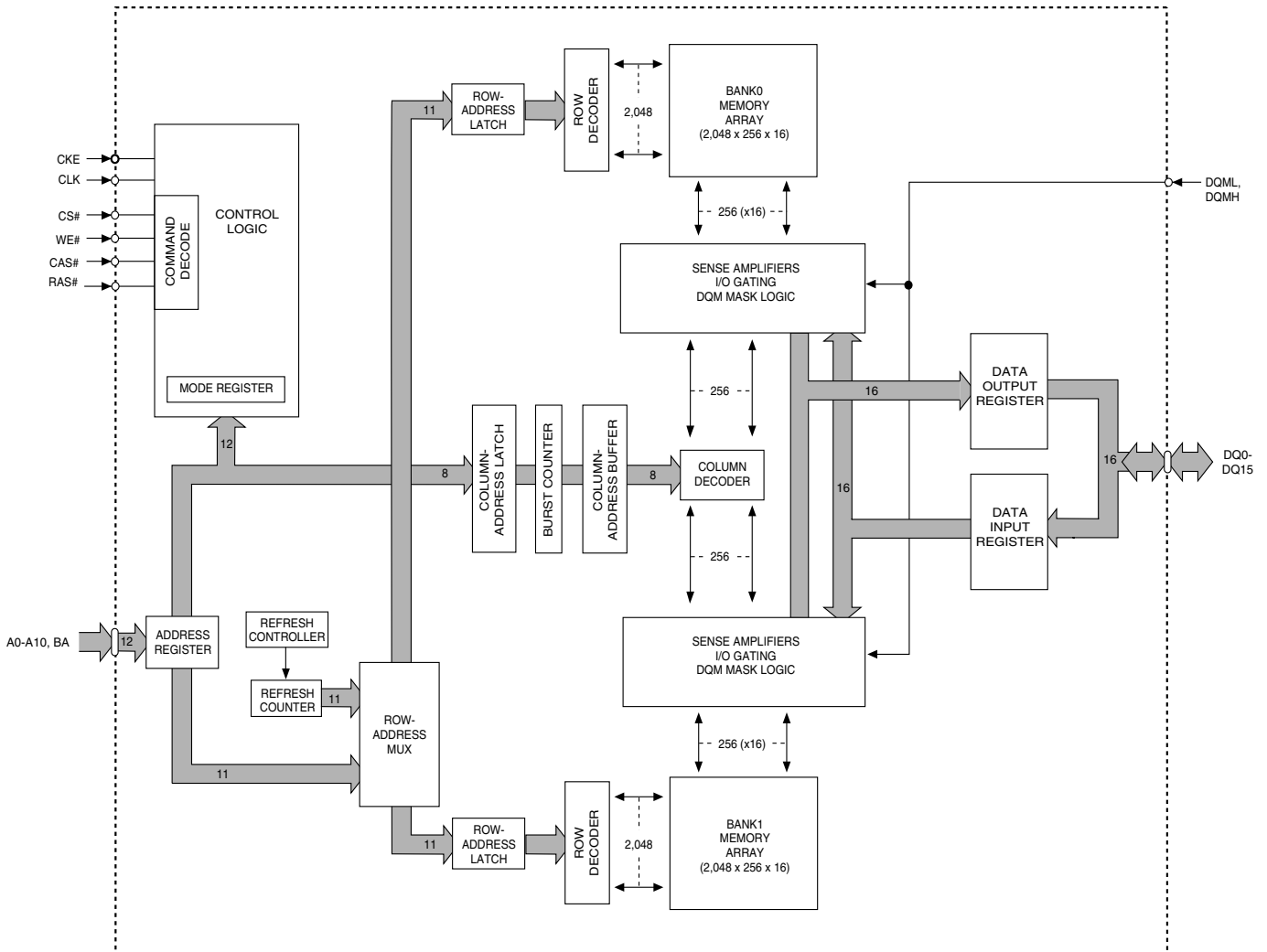
The 1 Meg x 16 SDRAM uses an internal pipelined architecture to achieve high-speed operation. This architecture is compatible with the 2 n rule of prefetch architectures,

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

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

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

FUNCTIONAL BLOCK DIAGRAM
1 Meg x 16 SDRAM



PIN DESCRIPTIONS

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

STi5505 (Rev. Ax)

DVD BACKEND DECODER WITH INTEGRATED HOST PROCESSOR

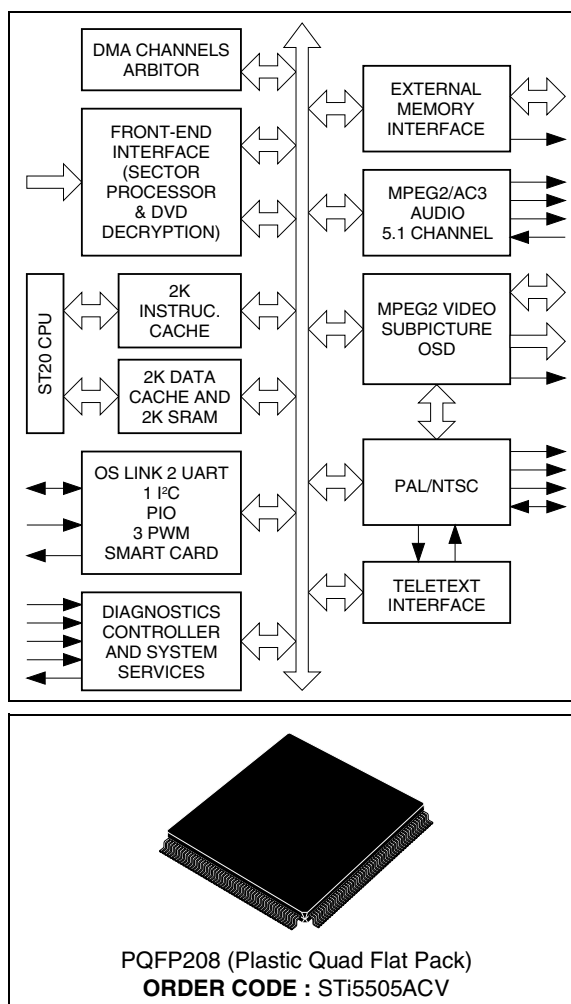
PRODUCT PREVIEW

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

DESCRIPTION

The STi5505 provides a very highly integrated back-end solution for DVD and combo DVD-DVB (Set Top Box) applications. The STi5505 incorporates a host CPU which handles both general application (DVD navigation, CD-DA, VCD, DVB) and drivers of the different embedded peripherals (audio/video, subpicture decoders, OSD, PAL/NTSC encoder...). The STi5505 offers one of the best cost-effective (memory savings, internal peripherals availability) solution to DVD-DVB applications with rapid time to market (Reference design, DVD-DVB Software Toolkit).

Figure 1 : General Block Diagram



I - GENERAL DESCRIPTION

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

All the following operations are performed inside the STi5505 :

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

I.1 - ST20 32-bit CPU

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

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

- 50K Dhrystones/s at 50MHz,
- 8/16 bits instructions (32 most common instructions in 8 bits),
- instruction cache 2Kbytes - write back replacement policy,
- internal SRAM 2Kbytes to ensure fast access to critical code, data, interrupt handler ...
- data cache 2 Kbytes - write back replacement policy,

The STi5505's ST20 is provided with advanced debugging tools :

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

I.2 - Video Decoder

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

width/memory size compromise.

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

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

In summary, the features of the decoder are :

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

I.3 - Subpicture Decoder

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

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

The main subpicture decoder features are :

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

I.4 - Audio Decoder

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

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

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

I - GENERAL DESCRIPTION (continued)

The main features of the decoder core are :

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

I.5 - High Performance On-Screen Display

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

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

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

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

I.6 - PAL/NTSC Encoder

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

The encoder handles interlaced and non-interlaced mode.

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

The encoder supports both master and slave modes for synchronization.

I.7 - Memory Interfaces

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

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

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

This interface can be programmed to interface very easily peripherals.

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

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

I.8 - Front-End Interface

The STi5505 's front end interface accepts :

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

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

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

I - GENERAL DESCRIPTION (continued)

The main features of the DVD interface are :

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

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

The main features of the DVB-DSS interface are :

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

In DVB-DSS mode, a high speed digital interface

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

I.9 - Integrated Peripherals

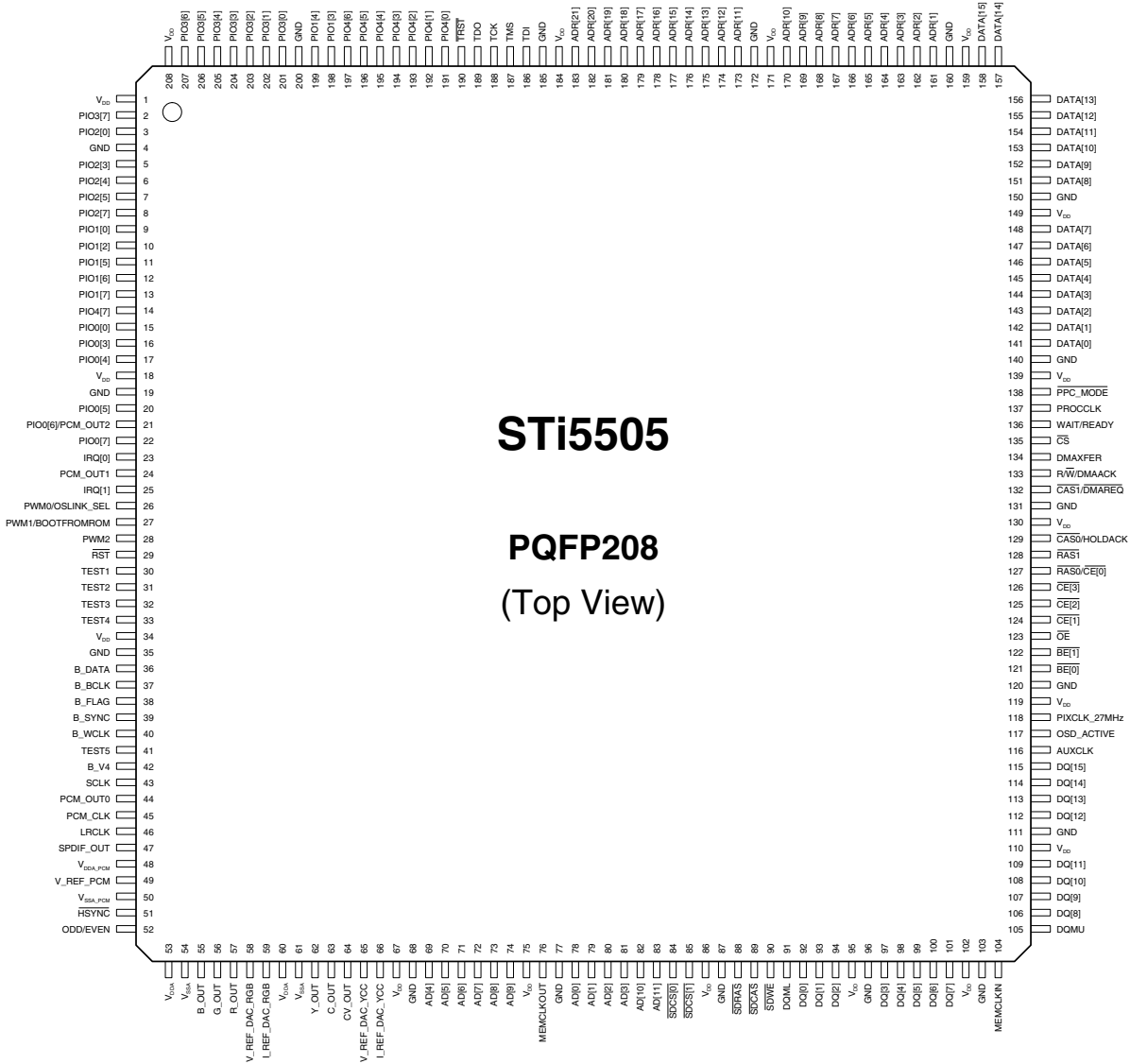
Several peripherals generally used in DVD players or DVD-DVB combos have been integrated into the STi5505.

They are :

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

II - PIN DESCRIPTION

II.1 - Pin Connections



II - PIN DESCRIPTION (continued)

II.2 - Pin List

Pin	Name	Type	Function
SUPPLIES			
1, 18, 34, 67, 75, 86, 95, 102, 110, 119, 130, 139, 149, 159, 171, 184, 208	V _{DD}		Power Supply
4, 19, 35, 68, 77, 87, 96, 103, 111, 120, 131, 140, 150, 160, 172, 185, 200	GND		Ground
53, 60	V _{DDA}		Analog Power Supply for DENC D/A Converters
54, 61	V _{SSA}		Analog Ground for DENC D/A Converters
48	V _{DDA_PCM}		Analog Power Supply for PLL PCM
49	V _{REF_PCM}		Analog Reference for PLL PCM
50	V _{SSA_PCM}		Analog Ground for PLL PCM
FRONT-END INTERFACE			
36	B_DATA	I	I ² S Data (DVD) or PARA_DATA[2] (DVD//) or Link Data (DVB/DSS)
40	B_WCLK	I/O	I ² S Word Clock or PARA_DATA[6] (DVD//) or NRSS_CLK (DVB/DSS)
37	B_BCLK	I	I ² S Bit Clock (DVD) or PARA_DATA[3] (DVD//) or Link Bit Clock (DVB/DSS)
38	B_FLAG	I	Error Flag (DVD) or PARA_DATA [4] (DVD//) or Link Sync (DVB/DSS)
39	B_SYNC	I	Sector / Abs Time Sync (DVD) or PARA_DATA[5] (DVD//) or Link Not Valid (DVB/DSS)
42	B_V4	I	Versatile Input Pin (Subcode Input) or PARA_DATA[7] (DVD//) or NRSS_IN (DVB/DSS)
VIDEO OUTPUT INTERFACE			
57	R_OUT	O	Red Output
56	G_OUT	O	Green Output
55	B_OUT	O	Blue Output
63	C_OUT	O	Chroma Output
64	CV_OUT	O	Composite Video Output
62	Y_OUT	O	Luma Output
59	I_REF_DAC_RGB	I	DAC Current Reference
66	I_REF_DAC_YCC	I	DAC Current Reference
58	V_REF_DAC_RGB	I	DAC Voltage Reference
65	V_REF_DAC_YCC	I	DAC Voltage Reference
117	OSD_ACTIVE	I/O	OSD Active
118	PIXCLK_27MHz	I	System Clock Input
51	HSYNC	I/O	Horizontal Sync
52	ODD/EVEN	I/O	Vertical Sync
AC-3/MPEG1-2 AUDIO OUTPUT INTERFACE			
43	SCLK	O	Serial Bit Clock
44	PCM_OUT0	O	Audio Serial Output Data 0
24	PCM_OUT1	O	Audio Serial Output Data 1
21	PCM_OUT2	O	Audio Serial Output Data 2
45	PCM_CLK	I/O	PCM Clock In or Out
46	LRCLK	O	Left/Right Clock
47	SPDIF_OUT	O	SPDIF Output

II - PIN DESCRIPTION (continued)

II.2 - Pin List (continued)

Pin	Name	Type	Function
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EXTERNAL INTERRUPTS

23, 25	IRQ[0:1]	I	External Interrupts
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PROGRAMMABLE I/O AND ALTERNATE FUNCTION (see Device Configuration Chapter)

15	PIO0 [0]	I/O	General Purpose I/O or PARA_SYNC (DVD//Front End) or Sc1Data (Smart Card 1 Data I/O)
16	PIO0 [3]	I/O	General Purpose I/O or PARA_REQ (DVD//Front End) or Sc1Clk (Smart Card 1 Clock)
17	PIO0 [4]	I/O	General Purpose I/O or PARA_STR (DVD//Front End) or Sc1RST (Smart Card 1 Reset)
20	PIO0 [5]	I/O	General Purpose I/O or PARA_DATA[0] (DVD//Front End) or Sc1Cmd V _{CC} (Smart Card 1 Voltage Enable)
21	PIO0 [6]	I/O	General Purpose IO or Sc1DataDir (Smart Card 1 Dir)
22	PIO0 [7]	I/O	General Purpose I/O or PARA_DATA[1] (DVD//Front End) or Sc1Detect (Smart Card 1 Detect)
9	PIO1 [0]	I/O	General Purpose I/O or I ² C Data
10	PIO1 [2]	I/O	General Purpose I/O or I ² C Clock
198, 199	PIO1 [3:4]	I/O	General Purpose IO
11	PIO1 [5]	I/O	General Purpose IO or ASC1 TXD
12	PIO1 [6]	I/O	General Purpose IO or ASC1 RXD
13	PIO1 [7]	I/O	General Purpose IO or ASC3 TXD
3	PIO2 [0]	I/O	General Purpose I/O or Sc0Data (Smart Card 0 Data I/O)
5	PIO2 [3]	I/O	General Purpose I/O or Sc0Clk (Smart Card 0 Clock)
6	PIO2 [4]	I/O	General Purpose I/O or Sc0RST (Smart Card 0 Reset)
7	PIO2 [5]	I/O	General Purpose I/O or Sc0CmdV _{CC} (Smart Card 0 Voltage Enable)
8	PIO2 [7]	I/O	General Purpose I/O or Sc0Detect (Smart Card 0 Detect)
201	PIO3 [0]	I/O	General Purpose IO or OSLink In
202	PIO3 [1]	I/O	General Purpose IO or OSLink Out
203	PIO3 [2]	I/O	General Purpose IO or CPUReset
204	PIO3 [3]	I/O	General Purpose IO or CPU Analyse
205	PIO3 [4]	I/O	General Purpose IO or ErrorOut
206, 207, 2	PIO3 [5:7]	I/O	General Purpose IO
191-197	PIO4 [0:6]	I/O	General Purpose IO
14	PIO4 [7]	I/O	General Purpose IO or ASC3 RXD

JTAG INTERFACE

188	TCK	I	Test Clock
186	TDI	I	Test Data Input
189	TDO	O	Test Data Input
187	TMS	I	Test Mode Select
190	TRST	I	Test Reset

SYSTEM USE

28	PWM2	O	PWM2 Output
27	PWM1/BOOTFROMROM	O/I	PWM1 Output or Configuration Oslink Pins
26	PWM0/OSLINK_SEL	O/I	PWM0 Output or Boot from ROM during Reset
29	RST	I	Reset
116	AUXCLK	O	Auxiliary Clock for Any Purpose

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

Pin	Name	Type	Function
SDRAM INTERFACE			
78-81, 69, 70-74, 82, 83	AD[0:11]	O	SDRAM Address Bus
92-94, 97-101, 106-109, 112-115	DQ[0:15]	I/O	SDRAM Data (Lower Byte)
84, 85	SDCS[0:1]	O	SDRAM Chip Selects
89	SDCAS	O	SDRAM CAS
88	SDRAS	O	SDRAM RAS
90	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	RAS1/HOLDREQ	O	DRAM RAS or reserved
136	WAIT/READY	I/O	External Wait States or Reserved
133	R/W/DMAACK	I/O	DRAM R/W Strobe or Reserved
121, 122	BE[0:1]	O	Byte enable
129	CAS0/HOLDACK	O/I	DRAM CAS or Reserved
132	CAS1/DMAREQ	O	DRAM CAS or Reserved
124-126	CE[1:3]	O	Chip Select for Banks 1 - 3
135	CS	I	Reserved
137	PROCCLK	I/O	ST20 Clock or Reserved
127	RAS0/CE0	O	DRAM RAS or Chip Select for Bank 0
134	DMAFER	I	Reserved
138	PPC_MODE	I	Reserved
123	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)
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III - FUNCTIONAL DESCRIPTION

III.1 - Functional Modules

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

III.1 - CPU

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

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

III.2 - Memory Subsystem

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

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

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

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

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

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

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

III.3 - System Services Module

The STi5505 system services module includes :

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

III.4 - Serial Communications

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

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

III.5 - Interrupt Subsystem

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

III.6 - Front End Interface & DVD Decryption

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

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

III - FUNCTIONAL DESCRIPTION (continued)

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

III.7 - PWM and counter module

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

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

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

III.8 - Parallel Programmable IO module

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

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

III.9 - MPEG Video decoder

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

III.10 - PAL/NTSC encoder

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

and allows Macrovision™ 7.01/6.1 copy protection.

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

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

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

ST24E32 ST25E32

32K SERIAL I²C EEPROM with EXTENDED ADDRESSING

NOT FOR NEW DESIGN

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

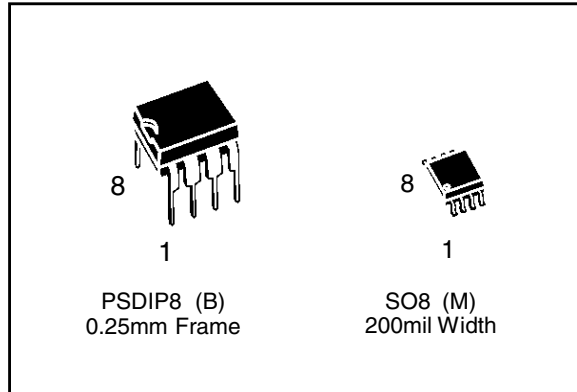
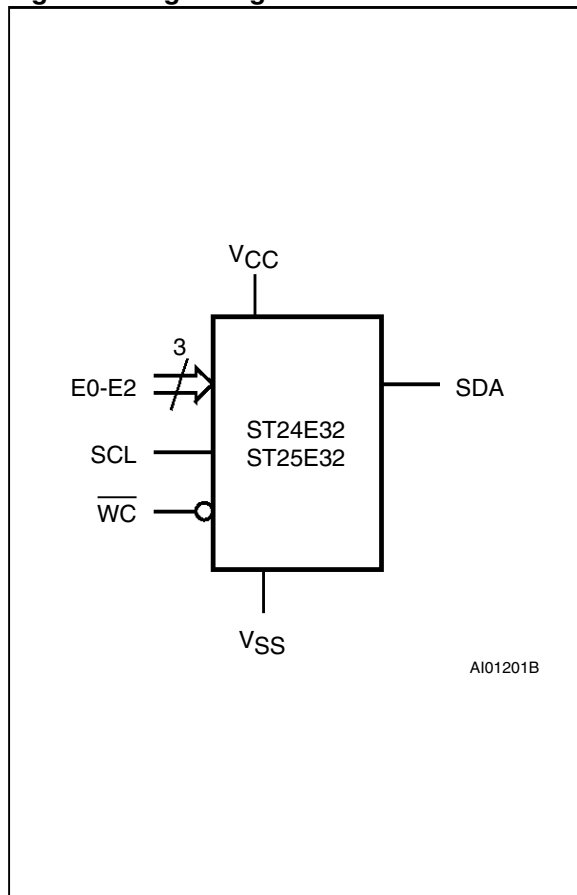


Figure 1. Logic Diagram



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
$\overline{\text{WC}}$	Write Control
V _{CC}	Supply Voltage
V _{SS}	Ground

Figure 2A. DIP Pin Connections

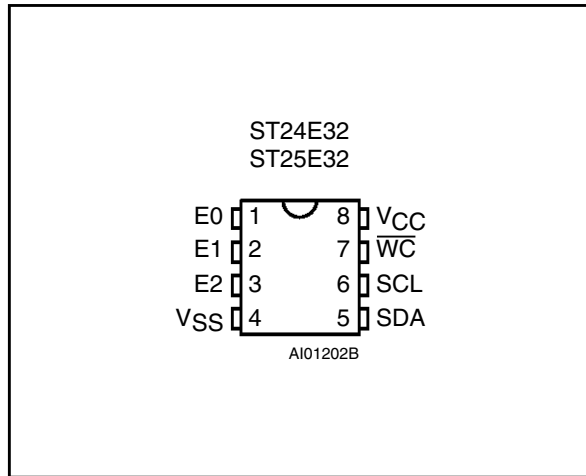


Figure 2B. SO Pin Connections

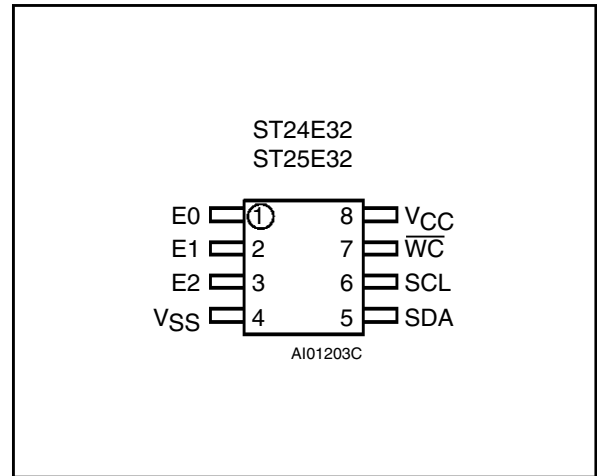


Table 2. Absolute Maximum Ratings ⁽¹⁾

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 1500 ; MIL-STD-883C, 3015.7
 3. 200pF through 0 ; EIAJ IC-121 (condition C)

DESCRIPTION (cont'd)

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

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

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

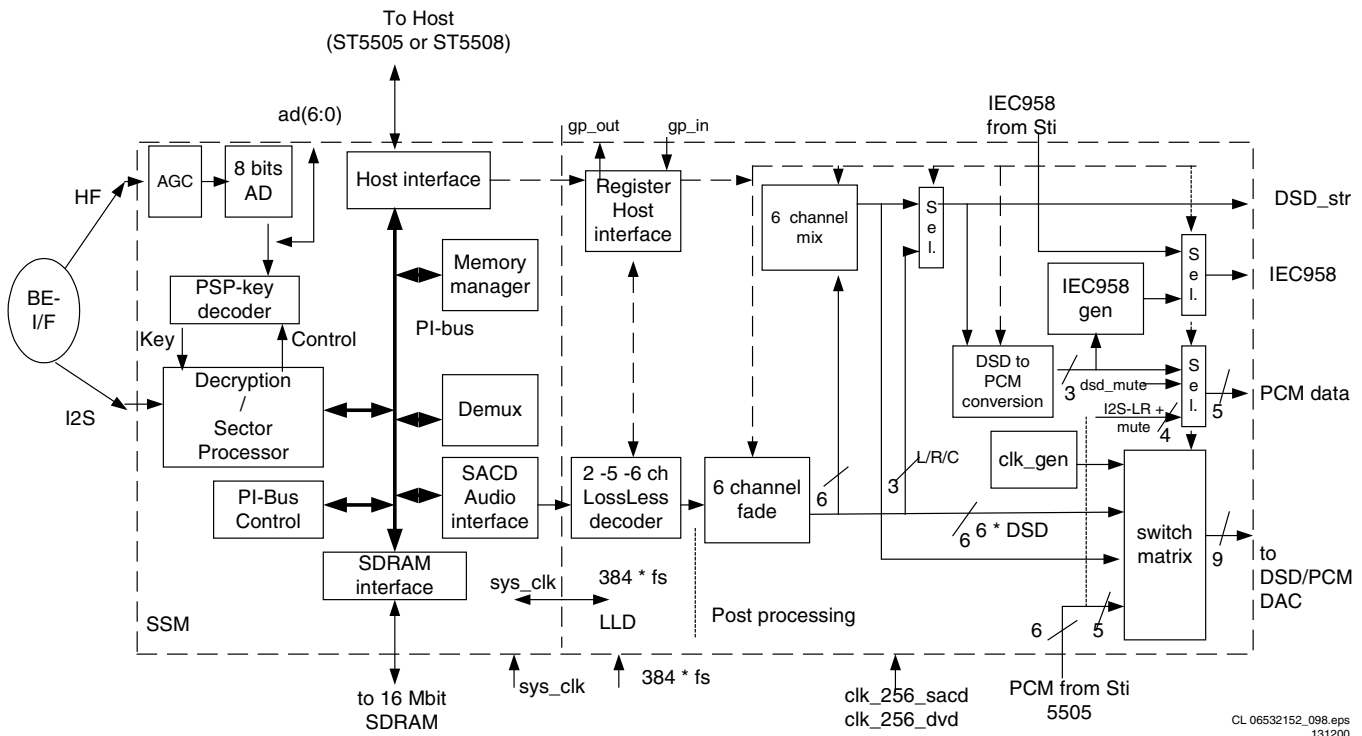


Figure 9-7

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 SA12S1 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_procclk	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	Agcadtstp	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	agcadtstn	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.

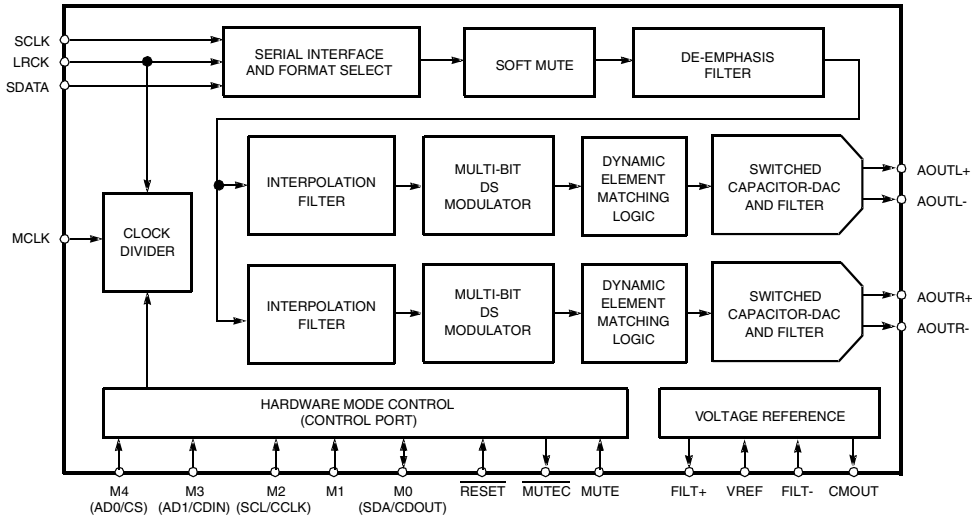
DISCS	Filter switch position		
	Position 1	position 2	position 3
SACD (DSD)	All channels: Normal*	L and R: Custom* Other channels: Normal	All channels: Custom
CD (PCM)	All channels : Custom		

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

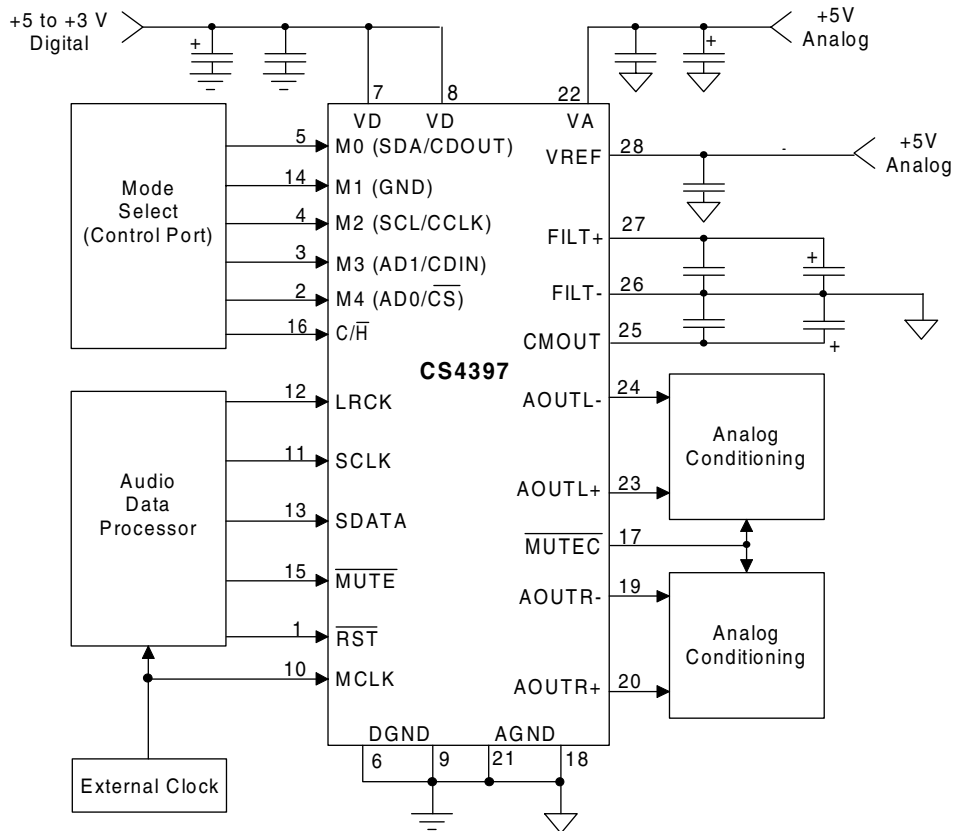
9.25.3 Description of DAC CS4397

CS4397

Block Diagram



Pin Configuration



Typical Connection Diagram - Hardware Mode (Control Port Mode)

Pin Function

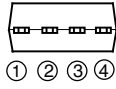
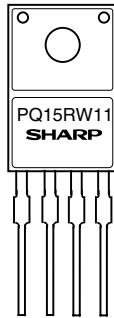
No.	Pin Name	I/O	Description
1	RST	I	Reset input (Low active)
2	M4(AD0/CS)	I	Chip address bit0 for I2C
3	M3(AD1/CDIN)	I	Chip address bit1 for I2C
4	M2(SCL/CCLK)	I	Serial clock for I2C
5	M0(SDA/CDOUT)	I/O	Serial data for I2C
6	DGND		Digital ground
7	VD		Digital power supply +3.3V
8	VD		Digital power supply +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 I	PCM mode:Serial audio data DSD mode:Direct Stream Digital audio data (Left)
14	M1(PCM) DSD_R(DSD)	I I	PCM mode:(Low) DSD mode:Direct Stream Digital audio data (Right)
15	MUTE	I	Mute input (Low active)
16	C/H	I	Control port (H) /Hardware (L) mode select
17	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

9.26 IC description of Linear power supply

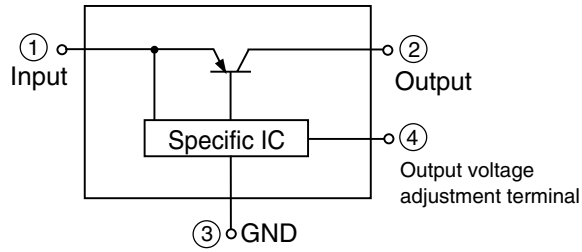
PQ15RW11

Pin Configuration

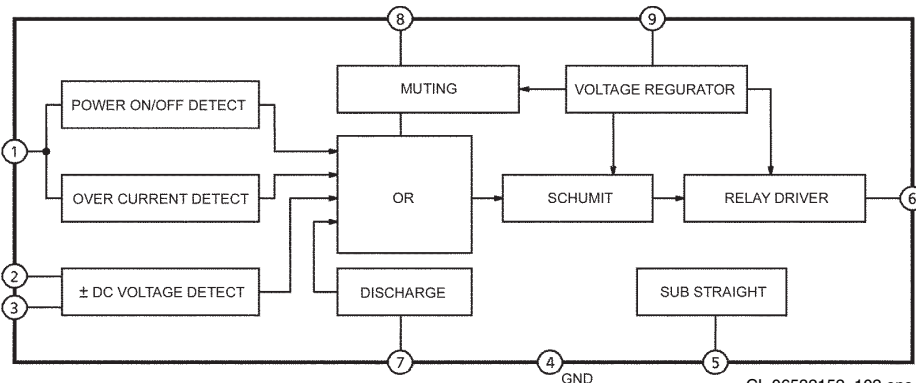
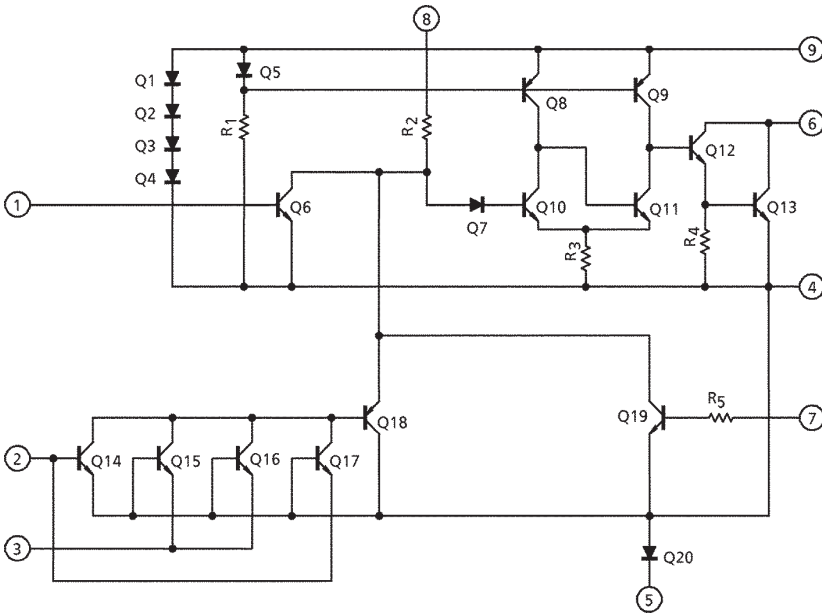


- ① DC input(V_{in})
- ② DC output(V_o)
- ③ GND
- ④ Output voltage adjustment terminal(V_{adj})

Block Diagram



TA7317P



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131200

9.27 List of abbreviations

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

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

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 St5505
Y_VID	Buffered luminance output to A/V board

POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
			MONO (PZ01) CIRCUIT BOARD MONO-CAPACITORS	
2009		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2010		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2011		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2012		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2013		4822 126 14043	1µF +80-20% Y5V 16V 0805	QP12614043
2100		2222 780 15656	330n16V 0805 X7R CER	QL78015656
2101		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2103		4822 124 80151	47µF 16V	QP12480151
2104		4822 126 13193	4.7nF 10% X7R 63V	QP12613193
2105		4822 122 33761	22pF 5%NPO 50V	QP12233761
2107		4822 126 13956	68pF 5% NPO 63V CASE 0603	QP12613956
2108		4822 126 14315	390pF 5% NPO 50V 0603	QP12614315
2109		2020 552 95697		QV55295697
2110		2222 861 15222	2n2 63V CER 0805 NPO PM5	QL86115222
2111		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2112		5322 126 11578	1nF 10% X7R 50V 0603	QQ12611578
2113		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2114		4822 122 31765	100pF 2% NPO 63V	QP12231765
2115		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2116		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2117		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2118		3198 017 42230	22n 50V CER 0603 Y5VCOL	QG01742230
2119		3198 017 42230	22n 50V CER 0603 Y5VCOL	QG01742230
2120		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2121		4822 126 13879	220nF +80-20% 16V	QP12613879
2122		3198 017 42230	22n 50V CER 0603 Y5VCOL	QG01742230
2123		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2124		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2125		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2126		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2127		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2128		4822 126 14508	180pF 5% 50V 0603 NPO	QP12614508
2129		4822 126 14508	180pF 5% 50V 0603 NPO	QP12614508
2130		4822 122 33761	22pF 5%NPO 50V	QP12233761
2131		4822 126 14494	22nF 10% X7R 25V 0603	QP12614494
2136		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2137		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2138		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2139		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2140		4822 126 14241	330p 50V 0603 NPO CER	QP12614241
2141		4822 122 33761	22pF 5%NPO 50V	QP12233761
2142		5322 126 11583	10nF 10% X7R 50V 0603 CER	QP12611583
2143		4822 126 13883	220pF 5% 50V	QP12613883
2144		4822 126 13883	220pF 5% 50V	QP12613883
2145		4822 126 13883	220pF 5% 50V	QP12613883
2146		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2147		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2200		4822 126 14494	22nF 10% X7R 25V 0603	QP12614494
2201		4822 126 14494	22nF 10% X7R 25V 0603	QP12614494
2202		4822 126 14494	22nF 10% X7R 25V 0603	QP12614494
2203		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2204		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2205		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2206		4822 126 14549	33N 16V X7R O6O3	QP12614549
2207		5322 126 11578	1nF 10% X7R 50V 0603	QQ12611578
2208		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2209		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2210		5322 126 11578	1nF 10% X7R 50V 0603	QQ12611578
2212		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2213		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2214		3198 017 42230	22n 50V CER 0603 Y5VCOL	QG01742230
2215		4822 124 23237	22µF 6.3V	QP12423237
2216		5322 126 11578	1nF 10% X7R 50V 0603	QQ12611578
2226		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2227		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2228		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2300		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305

POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
2301		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2302		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2303		4822 124 80349	47µF 20% 6.3V	QP12480349
2304		3198 017 42230	22n 50V CER 0603 Y5VCOL	QG01742230
2305		3198 017 42230	22n 50V CER 0603 Y5VCOL	QG01742230
2306		4822 124 23002	10µF 16V	QP12423002
2307		3198 017 42230	22n 50V CER 0603 Y5VCOL	QG01742230
2308		4822 126 14494	22nF 10% X7R 25V 0603	QP12614494
2309		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2310		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2314		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2315		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2316		4822 126 14494	22nF 10% X7R 25V 0603	QP12614494
2317		4822 126 14494	22nF 10% X7R 25V 0603	QP12614494
2318		5322 122 33861	120pF 10% 50V	QQ12233861
2319		4822 126 11669	27pF	QP12611669
2320		4822 126 14494	22nF 10% X7R 25V 0603	QP12614494
2401		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2402		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2403		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2404		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2405		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2406		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2407		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2408		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2409		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2410		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2411		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2412		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2413		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2414		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2418		4822 124 12095	100µF 20% 16V	QP12412095
2419		4822 124 80349	47µF 20% 6.3V	QP12480349
2420		4822 124 80349	47µF 20% 6.3V	QP12480349
2452		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2454		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2455		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2457		4822 124 23002	10µF 16V	QP12423002
2458		4822 126 14583	47µF 10% 16V XTR 0805	QP12614583
2459		4822 126 14043	1µF +80-20% Y5V 16V 0805	QP12614043
2500		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2504		4822 122 31765	100pF 2%NPO 63V	QP12231765
2505		4822 126 14494	22nF 10% X7R 25V 0603	QP12614494
2506		4822 124 23002	10µF 16V	QP12423002
2507		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2508		5322 126 11579	3.3nF 10%X7R 63V	QQ12611579
2509		4822 126 14241	330p 50V 0603 NPO CER	QP12614241
2510		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2511		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2512		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2513		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2514		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2515		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2516		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2517		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2518		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2519		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2520		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2521		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2522		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2523		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2524		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2525		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2526		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2528		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2529		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2530		3198 030 74780	4µ7 35V ELCAP SMPM20	QG03074780
2531		3198 030 74780	4µ7 35V ELCAP SMPM20	QG03074780
2532		4822 122 33777	47pF 5%NPO 63V	QP12233777
2533		4822 122 33777	47pF 5%NPO 63V	QP12233777

NOTE : *nsp* PART IS LISTED FOR REFERENCE ONLY, MARANTZ WILL NOT SUPPLY THESE PARTS.

POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)	POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
			MONO-CAPACITORS						
2534		5322 126 11578	1nF 10% X7R 50V 0603	QQ12611578	2822		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2535		5322 126 11578	1nF 10% X7R 50V 0603	QQ12611578	2823		4822 124 23002	10µF 16V	QP12423002
2600		4822 126 14494	22nF 10% X7R 25V 0603	QP12614494	2824		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2601		4822 126 14247	1n5 50V 0603 X7R COL R CER	QP12614247	2825		4822 124 23002	10µF 16V	QP12423002
2602		4822 126 14247	1n5 50V 0603 X7R COL R CER	QP12614247	2826		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2603		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305	2827		5322 126 11583	10nF 10% X7R 50V 0603 CER	QQ12611583
2604		4822 124 12095	100µF 20% 16V	QP12412095	2829		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2605		4822 126 14494	22nF 10% X7R 25V 0603	QP12614494	2830		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2606		4822 124 12095	100µF 20% 16V	QP12412095	2831		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2607		4822 124 12095	100µF 20% 16V	QP12412095	2832		4822 126 14238	2n2 50V 0603 X7R COL R CER	QP12614238
2608		4822 124 23002	10µF 16V	QP12423002	2833		5322 126 11583	10nF 10% X7R 50V 0603 CER	QQ12611583
2609		4822 124 80151	47µF 16V	QP12480151	2901		5322 126 11583	10nF 10% X7R 50V 0603 CER	QQ12611583
2610		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305	2902		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2611		4822 124 12095	100µF 20% 16V	QP12412095	2903		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2614		4822 122 33777	47pF 5%NP0 63V	QP12233777	2905		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305
2615		4822 122 33777	47pF 5%NP0 63V	QP12233777	2910		4822 124 12397	330µF 20% 6.3V	QP12412397
2616		4822 122 33777	47pF 5%NP0 63V	QP12233777					
2617		4822 122 33777	47pF 5%NP0 63V	QP12233777					
2620		4822 122 33777	47pF 5%NP0 63V	QP12233777	3000		4822 051 30339	33R00 5% 0.062W	QP05130339
2621		4822 122 33777	47pF 5%NP0 63V	QP12233777	3001		4822 051 30339	33R00 5% 0.062W	QP05130339
2622		4822 122 33777	47pF 5%NP0 63V	QP12233777	3002		4822 051 30339	33R00 5% 0.062W	QP05130339
2623		4822 122 33777	47pF 5%NP0 63V	QP12233777	3003		4822 051 30103	10k00 5% 0.062W	QP05130103
2624		4822 122 33777	47pF 5%NP0 63V	QP12233777	3004		4822 051 30339	33R00 5% 0.062W	QP05130339
2625		4822 122 33777	47pF 5%NP0 63V	QP12233777	3005		4822 051 30339	33R00 5% 0.062W	QP05130339
2626		4822 122 33777	47pF 5%NP0 63V	QP12233777	3006		4822 051 30339	33R00 5% 0.062W	QP05130339
2627		4822 122 33777	47pF 5%NP0 63V	QP12233777	3007		4822 051 30339	33R00 5% 0.062W	QP05130339
2632		4822 124 12095	100µF 20% 16V	QP12412095	3008		4822 051 30339	33R00 5% 0.062W	QP05130339
2633		4822 124 12095	100µF 20% 16V	QP12412095	3009		4822 051 30339	33R00 5% 0.062W	QP05130339
2634		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305	3010		4822 117 12925	47k 1% 0.063W 0603	QP11712925
2635		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305	3011		4822 051 30339	33R00 5% 0.062W	QP05130339
2636		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305	3012		4822 051 30472	4k70 5% 0.062W	QP05130472
2637		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305	3013		4822 051 30103	10k00 5% 0.062W	QP05130103
2638		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305	3014		4822 051 30103	10k00 5% 0.062W	QP05130103
2639		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305	3015		4822 051 30103	10k00 5% 0.062W	QP05130103
2646		4822 124 23002	10µF 16V	QP12423002	3016		4822 051 30103	10k00 5% 0.062W	QP05130103
2647		4822 122 33777	47pF 5%NP0 63V	QP12233777	3017		4822 051 30103	10k00 5% 0.062W	QP05130103
2648		4822 122 33761	22pF 5%NP0 50V	QP12233761	3018		4822 117 12925	47k 1% 0.063W 0603	QP11712925
2649		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305	3019		4822 051 30103	10k00 5% 0.062W	QP05130103
2650		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305	3020		4822 051 30339	33R00 5% 0.062W	QP05130339
2700		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305	3021		4822 051 30472	4k70 5% 0.062W	QP05130472
2701		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305	3025		4822 051 30103	10k00 5% 0.062W	QP05130103
2702		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305	3026		4822 051 30103	10k00 5% 0.062W	QP05130103
2703		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305	3027		4822 051 30103	10k00 5% 0.062W	QP05130103
2704		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305	3028		4822 051 30103	10k00 5% 0.062W	QP05130103
2705		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305	3029		4822 051 30472	4k70 5% 0.062W	QP05130472
2706		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305	3030		4822 051 30103	10k00 5% 0.062W	QP05130103
2707		4822 124 80349	47µF 20% 6.3V	QP12480349	3031		4822 051 30103	10k00 5% 0.062W	QP05130103
2800		4822 124 23002	10µF 16V	QP12423002	3033		4822 051 30102	1k00 5% 0.062W	QP05130102
2801		4822 124 23002	10µF 16V	QP12423002	3100		4822 117 11152	4R7 5%	QP11711152
2802		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305	3102		5322 117 13034	1k5 1% 0.063W 0603 RC22H	QQ11713034
2803		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305	3103		5322 117 13034	1k5 1% 0.063W 0603 RC22H	QQ11713034
2804		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305	3104		5322 117 13062	390R 1% 0.063W 0603 RC22H	QQ11713062
2805		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305	3105		4822 051 30103	10k00 5% 0.062W	QP05130103
2806		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305	3106		4822 051 30479	47R00 5% 0.062W	QP05130479
2807		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305	3107		4822 051 20228	2R20 5% 0.1W	QP05120228
2808		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305	3108		4822 051 20228	2R20 5% 0.1W	QP05120228
2809		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305	3109		4822 117 13632	100k 1% 0603 0.62W	QP11713632
2810		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305	3110		4822 051 30479	47R00 5% 0.062W	QP05130479
2811		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305	3111		5322 117 13058	150R 1% 0.063W 0603 RC22H	QQ11713058
2812		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305	3112		5322 117 13021	47R 1% 0.063W 0603 RC22H	QQ11713021
2813		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305	3114		4822 051 20228	2R20 5% 0.1W	QP05120228
2814		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305	3115		4822 051 20228	2R20 5% 0.1W	QP05120228
2815		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305	3116		5322 117 13042	3k9 1% 0.063W 0603 RC22H	QQ11713042
2816		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305	3117		4822 051 30181	180R00 5% 0.062W	QP05130181
2817		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305	3118		4822 051 30681	680R00 5% 0.062W	QP05130681
2818		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305	3119		5322 117 13062	390R 1% 0.063W 0603 RC22H	QQ11713062
2819		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305	3120		4822 051 30102	1k00 5% 0.062W	QP05130102
2820		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305	3121		4822 051 30273	27k00 5% 0.062W	QP05130273
2821		4822 126 14305	100nF 10% X7R 16V 0603 CER	QP12614305	3122		4822 051 30471	470R00 5% 0.062W	QP05130471
					3123		4822 051 30103	10k00 5% 0.062W	QP05130103

NOTE : "nsp" PART IS LISTED FOR REFERENCE ONLY, MARANTZ WILL NOT SUPPLY THESE PARTS.

POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJJ)	POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJJ)
			MONO-RESISTORS						
3124		4822 051 30471	470R00 5% 0.062W	QP05130471	3206		4822 051 30103	10k00 5% 0.062W	QP05130103
3125		4822 051 30103	10k00 5% 0.062W	QP05130103	3207		4822 051 30472	4k70 5% 0.062W	QP05130472
3126		4822 051 30103	10k00 5% 0.062W	QP05130103	3208		4822 051 30272	2k70 5% 0.062W	QP05130272
3127		4822 051 30223	22k00 5% 0.062W	QP05130223	3209		4822 051 30472	4k70 5% 0.062W	QP05130472
3128		2322 704 69109		QH70469109	3210		4822 051 30392	3k9 5% 0.063W 0603	QP05130392
3129		4822 051 30392	3k9 5% 0.063W 0603	QP05130392	3211		4822 051 30472	4k70 5% 0.062W	QP05130472
3130		4822 051 20228	2R20 5% 0.1W	QP05120228	3212		4822 117 11152	4R7 5%	QP11711152
3131		4822 051 20228	2R20 5% 0.1W	QP05120228	3213		4822 117 11152	4R7 5%	QP11711152
3132		4822 051 20228	2R20 5% 0.1W	QP05120228	3214		4822 051 30392	3k9 5% 0.063W 0603	QP05130392
3133		4822 051 20228	2R20 5% 0.1W	QP05120228	3215		4822 051 30103	10k00 5% 0.062W	QP05130103
3134		5322 117 13047	330R 1% 0.063W 0603 RC22H	QQ11713047	3216		4822 051 30472	4k70 5% 0.062W	QP05130472
3135		4822 117 13613	2R2 5% 0603	QP11713613	3219		4822 051 30103	10k00 5% 0.062W	QP05130103
3137		4822 117 13613	2R2 5% 0603	QP11713613	3220		4822 051 30103	10k00 5% 0.062W	QP05130103
3138		5322 117 13053	6k8 1% 0.063W 0603 RC22H	QQ11713053	3221		4822 051 30103	10k00 5% 0.062W	QP05130103
3139		4822 117 12917	1R 5% 0.062W CASE0603	QP11712917	3222		4822 051 30151	150R00 5% 0.062W	QP05130151
3140		4822 051 30479	47R00 5% 0.062W	QP05130479	3225		2322 704 62004		QH70462004
3141		4822 117 11152	4R7 5%	QP11711152	3226		4822 051 30103	10k00 5% 0.062W	QP05130103
3142		5322 117 13028	12k 1% 0.063W 0603 RC22H	QQ11713028	3227		4822 051 30472	4k70 5% 0.062W	QP05130472
3143		5322 117 13043	220R 1% 0.063W 0603 RC22H	QQ11713043	3229		4822 051 30123	12k00 5% 0.062W	QP05130123
3144		2322 704 69109		QH70469109	3230		4822 051 30103	10k00 5% 0.062W	QP05130103
3146		4822 051 30103	10k00 5% 0.062W	QP05130103	3231		4822 051 30103	10k00 5% 0.062W	QP05130103
3147		4822 051 30103	10k00 5% 0.062W	QP05130103	3232		4822 117 13613	2R2 5% 0603	QP11713613
3148		5322 117 13022	22k 1% 0.063W 0603 RC22H	QQ11713022	3233		4822 051 30102	1k00 5% 0.062W	QP05130102
3153		4822 117 12139	22R 5% 0.062W	QP11712139	3234		4822 117 12902	8K2 1% 0.063W 0603	QP11712902
3155		4822 051 30103	10k00 5% 0.062W	QP05130103	3235		4822 117 13632	100k 1% 0603 0.62W	QP11713632
3157		4822 051 30103	10k00 5% 0.062W	QP05130103	3236		4822 051 30472	4k70 5% 0.062W	QP05130472
3158		5322 117 13017	100R 1% 0.063W 0603 RC22H	QQ11713017	3237		4822 051 30103	10k00 5% 0.062W	QP05130103
3160		4822 051 30101	100R00 5% 0.062W	QP05130101	3238		4822 051 30103	10k00 5% 0.062W	QP05130103
3161		4822 117 13613	2R2 5% 0603	QP11713613	3239		4822 051 30008	0R00 JUMPER	QP05130008
3162		4822 051 30101	100R00 5% 0.062W	QP05130101	3240		4822 051 30103	10k00 5% 0.062W	QP05130103
3163		4822 051 30273	27k00 5% 0.062W	QP05130273	3242		4822 051 30008	0R00 JUMPER	QP05130008
3164		4822 117 13613	2R2 5% 0603	QP11713613	3246		4822 051 30008	0R00 JUMPER	QP05130008
3165		5322 117 13063	120R 1% 0.063W 0603 RC22H	QQ11713063	3247		4822 051 30008	0R00 JUMPER	QP05130008
3166		4822 051 30393	39k00 5% 0.062W	QP05130393	3249		4822 051 30008	0R00 JUMPER	QP05130008
3167		4822 051 30101	100R00 5% 0.062W	QP05130101	3250		4822 051 30008	0R00 JUMPER	QP05130008
3168		5322 117 13047	330R 1% 0.063W 0603 RC22H	QQ11713047	3251		4822 051 30008	0R00 JUMPER	QP05130008
3169		4822 051 30101	100R00 5% 0.062W	QP05130101	3252		4822 051 30008	0R00 JUMPER	QP05130008
3170		4822 051 30101	100R00 5% 0.062W	QP05130101	3253		4822 051 30008	0R00 JUMPER	QP05130008
3171		4822 051 30101	100R00 5% 0.062W	QP05130101	3254		4822 051 30008	0R00 JUMPER	QP05130008
3172		4822 117 13632	100k 1% 0603 0.62W	QP11713632	3255		4822 051 30008	0R00 JUMPER	QP05130008
3173		4822 117 13632	100k 1% 0603 0.62W	QP11713632	3256		4822 051 30008	0R00 JUMPER	QP05130008
3174		4822 117 11152	4R7 5%	QP11711152	3257		4822 051 30008	0R00 JUMPER	QP05130008
3175		4822 117 13613	2R2 5% 0603	QP11713613	3258		4822 051 30008	0R00 JUMPER	QP05130008
3176		4822 051 30153	15K00 5% 0.062W	QP05130153	3259		4822 117 11151	1R 5%	QP11711151
3178		4822 117 11151	1R 5%	QP11711151	3260		4822 117 11151	1R 5%	QP11711151
3179		4822 051 30221	220R00 5% 0.062W	QP05130221	3300		4822 117 11152	4R7 5%	QP11711152
3180		4822 117 13632	100k 1% 0603 0.62W	QP11713632	3301		4822 051 30105	1M00 5% 0.062W	QP05130105
3181		4822 051 30561	560R00 5% 0.062W	QP05130561	3302		4822 051 30221	220R00 5% 0.062W	QP05130221
3182		5322 117 13018	1k0 1% 0.063W 0603 RC22H	QQ11713018	3303		4822 051 30101	100R00 5% 0.062W	QP05130101
3183		5322 117 13017	100R 1% 0.063W 0603 RC22H	QQ11713017	3304		4822 051 30272	2k70 5% 0.062W	QP05130272
3184		2322 704 61204		QH70461204	3305		4822 051 30272	2k70 5% 0.062W	QP05130272
3185		4822 117 11151	1R 5%	QP11711151	3306		4822 051 30101	100R00 5% 0.062W	QP05130101
3187		4822 051 30273	27k00 5% 0.062W	QP05130273	3309		4822 051 30103	10k00 5% 0.062W	QP05130103
3189		4822 051 30008	0R00 JUMPER	QP05130008	3310		4822 051 30223	22k00 5% 0.062W	QP05130223
3190		4822 051 30008	0R00 JUMPER	QP05130008	3311		4822 051 30223	22k00 5% 0.062W	QP05130223
3191		4822 051 30008	0R00 JUMPER	QP05130008	3312		4822 051 30472	4k70 5% 0.062W	QP05130472
3192		4822 051 30008	0R00 JUMPER	QP05130008	3313		4822 051 30472	4k70 5% 0.062W	QP05130472
3193		4822 051 30008	0R00 JUMPER	QP05130008	3316		4822 051 20108	1R00 5% 0.1W	QP05120108
3194		4822 051 30008	0R00 JUMPER	QP05130008	3317		4822 051 20108	1R00 5% 0.1W	QP05120108
3195		4822 051 30008	0R00 JUMPER	QP05130008	3318		4822 051 30472	4k70 5% 0.062W	QP05130472
3197		4822 051 30008	0R00 JUMPER	QP05130008	3319		4822 051 30479	47R00 5% 0.062W	QP05130479
3198		5322 117 13049	470R 1% 0.063W 0603 RC22H	QQ11713049	3320		4822 051 30472	4k70 5% 0.062W	QP05130472
3199		5322 117 13042	3k9 1% 0.063W 0603 RC22H	QQ11713042	3321		4822 051 30682	6k80 5% 0.062W	QP05130682
3200		4822 051 30103	10k00 5% 0.062W	QP05130103	3322		5322 117 13026	4k7 1% 0.063W 0603 RC22H	QQ11713026
3201		4822 117 11151	1R 5%	QP11711151	3323		5322 117 13026	4k7 1% 0.063W 0603 RC22H	QQ11713026
3202		4822 117 11151	1R 5%	QP11711151	3324		4822 117 13632	100k 1% 0603 0.62W	QP11713632
3203		4822 051 30105	1M00 5% 0.062W	QP05130105	3325		4822 051 30682	6k80 5% 0.062W	QP05130682
3204		4822 051 30331	330R00 5% 0.062W	QP05130331	3326		4822 051 30479	47R00 5% 0.062W	QP05130479
3205		4822 051 30103	10k00 5% 0.062W	QP05130103	3327		4822 051 30682	6k80 5% 0.062W	QP05130682

NOTE : *nsp* PART IS LISTED FOR REFERENCE ONLY, MARANTZ WILL NOT SUPPLY THESE PARTS.

POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJ)	POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJ)
			MONO-RESISTORS						
3328		4822 051 30223	22k00 5% 0.062W	QP05130223	3609		4822 117 13632	100k 1% 0603 0.62W	QP11713632
3329		4822 051 30223	22k00 5% 0.062W	QP05130223	3610		4822 051 30103	10k00 5% 0.062W	QP05130103
3330		4822 051 30223	22k00 5% 0.062W	QP05130223	3611		4822 051 30103	10k00 5% 0.062W	QP05130103
3331		4822 051 30332	3k30 5% 0.062W	QP05130332	3612		4822 051 30103	10k00 5% 0.062W	QP05130103
3332		4822 051 30332	3k30 5% 0.062W	QP05130332	3613		4822 051 30103	10k00 5% 0.062W	QP05130103
3333		4822 051 30101	100R00 5% 0.062W	QP05130101	3614		4822 051 30103	10k00 5% 0.062W	QP05130103
3334		4822 051 30101	100R00 5% 0.062W	QP05130101	3615		4822 051 30103	10k00 5% 0.062W	QP05130103
3335		4822 051 30101	100R00 5% 0.062W	QP05130101	3616		4822 051 30103	10k00 5% 0.062W	QP05130103
3336		4822 051 30339	33R00 5% 0.062W	QP05130339	3618		4822 051 30223	22k00 5% 0.062W	QP05130223
3337		4822 051 30339	33R00 5% 0.062W	QP05130339	3619		4822 051 30223	22k00 5% 0.062W	QP05130223
3338		4822 051 30101	100R00 5% 0.062W	QP05130101	3620		4822 051 30101	100R00 5% 0.062W	QP05130101
3339		4822 051 30008	0R00 JUMPER	QP05130008	3621		4822 051 30101	100R00 5% 0.062W	QP05130101
3340		4822 051 30008	0R00 JUMPER	QP05130008	3622		4822 051 30101	100R00 5% 0.062W	QP05130101
3403		4822 051 30103	10k00 5% 0.062W	QP05130103	3623		4822 051 30339	33R00 5% 0.062W	QP05130339
3404		4822 051 30103	10k00 5% 0.062W	QP05130103	3624		4822 051 30339	33R00 5% 0.062W	QP05130339
3450		4822 051 30103	10k00 5% 0.062W	QP05130103	3625		4822 051 30339	33R00 5% 0.062W	QP05130339
3451		4822 117 13632	100k 1% 0603 0.62W	QP11713632	3626		4822 051 30102	1k00 5% 0.062W	QP05130102
3452		4822 051 30223	22k00 5% 0.062W	QP05130223	3627		4822 051 30471	470R00 5% 0.062W	QP05130471
3453		4822 051 30222	2k20 5% 0.062W	QP05130222	3628		4822 051 30471	470R00 5% 0.062W	QP05130471
3454		4822 051 30223	22k00 5% 0.062W	QP05130223	3629		4822 051 30472	4k70 5% 0.062W	QP05130472
3455		4822 051 30223	22k00 5% 0.062W	QP05130223	3630		4822 051 30221	220R00 5% 0.062W	QP05130221
3456		4822 051 30103	10k00 5% 0.062W	QP05130103	3631		2322 704 64301	0603 RC22H 430R PM1 R	QH70464301
3457		4822 051 30103	10k00 5% 0.062W	QP05130103	3632		2322 704 64301	0603 RC22H 430R PM1 R	QH70464301
3458		4822 051 30223	22k00 5% 0.062W	QP05130223	3633		2322 704 64301	0603 RC22H 430R PM1 R	QH70464301
3459		4822 051 30223	22k00 5% 0.062W	QP05130223	3635		4822 051 30682	6k80 5% 0.062W	QP05130682
3460		4822 051 30472	4k70 5% 0.062W	QP05130472	3636		4822 051 30682	6k80 5% 0.062W	QP05130682
3462		4822 051 30101	100R00 5% 0.062W	QP05130101	3637		4822 051 30332	3k30 5% 0.062W	QP05130332
3500		4822 051 30332	3k30 5% 0.062W	QP05130332	3642		4822 051 30103	10k00 5% 0.062W	QP05130103
3501		4822 051 30332	3k30 5% 0.062W	QP05130332	3647		2322 704 64301	0603 RC22H 430R PM1 R	QH70464301
3502		4822 051 30103	10k00 5% 0.062W	QP05130103	3648		2322 704 64301	0603 RC22H 430R PM1 R	QH70464301
3503		4822 051 30103	10k00 5% 0.062W	QP05130103	3651		2322 704 64301	0603 RC22H 430R PM1 R	QH70464301
3504		4822 051 30103	10k00 5% 0.062W	QP05130103	3654		2322 704 64301	0603 RC22H 430R PM1 R	QH70464301
3505		4822 051 30103	10k00 5% 0.062W	QP05130103	3655		2322 704 64301	0603 RC22H 430R PM1 R	QH70464301
3506		4822 051 30103	10k00 5% 0.062W	QP05130103	3656		2322 704 64301	0603 RC22H 430R PM1 R	QH70464301
3508		4822 051 30689	68R 5% 0.063W 0603 RC21	QP05130689	3657		2322 704 64301	0603 RC22H 430R PM1 R	QH70464301
3509		4822 051 30103	10k00 5% 0.062W	QP05130103	3658		4822 051 30102	1k00 5% 0.062W	QP05130102
3511		4822 051 30332	3k30 5% 0.062W	QP05130332	3659		4822 051 30102	1k00 5% 0.062W	QP05130102
3512		4822 051 30332	3k30 5% 0.062W	QP05130332	3660		4822 051 30102	1k00 5% 0.062W	QP05130102
3513		4822 051 30103	10k00 5% 0.062W	QP05130103	3661		2322 704 64301	0603 RC22H 430R PM1 R	QH70464301
3514		4822 051 30103	10k00 5% 0.062W	QP05130103	3662		4822 051 30102	1k00 5% 0.062W	QP05130102
3515		4822 051 30103	10k00 5% 0.062W	QP05130103	3663		4822 051 30102	1k00 5% 0.062W	QP05130102
3516		4822 051 30103	10k00 5% 0.062W	QP05130103	3664		2322 704 64301	0603 RC22H 430R PM1 R	QH70464301
3517		4822 051 30332	3k30 5% 0.062W	QP05130332	3665		4822 117 12139	22R 5% 0.062W	QP11712139
3519		4822 051 30103	10k00 5% 0.062W	QP05130103	3667		4822 051 30339	33R00 5% 0.062W	QP05130339
3520		4822 051 30103	10k00 5% 0.062W	QP05130103	3672		4822 051 30479	47R00 5% 0.062W	QP05130479
3521		4822 051 30103	10k00 5% 0.062W	QP05130103	3686		4822 051 30223	22k00 5% 0.062W	QP05130223
3522		4822 051 30103	10k00 5% 0.062W	QP05130103	3687		4822 051 30223	22k00 5% 0.062W	QP05130223
3523		4822 051 30332	3k30 5% 0.062W	QP05130332	3688		4822 051 30472	4k70 5% 0.062W	QP05130472
3524		4822 051 30101	100R00 5% 0.062W	QP05130101	3689		4822 051 30223	22k00 5% 0.062W	QP05130223
3525		4822 051 30103	10k00 5% 0.062W	QP05130103	3691		4822 051 30339	33R00 5% 0.062W	QP05130339
3526		4822 051 30103	10k00 5% 0.062W	QP05130103	3702		4822 051 30102	1k00 5% 0.062W	QP05130102
3534		4822 051 30103	10k00 5% 0.062W	QP05130103	3800		4822 051 30479	47R00 5% 0.062W	QP05130479
3535		4822 051 30153	15K00 5% 0.062W	QP05130153	3801		4822 051 30339	33R00 5% 0.062W	QP05130339
3537		4822 051 30331	330R00 5% 0.062W	QP05130331	3802		4822 051 30331	330R00 5% 0.062W	QP05130331
3538		4822 051 30681	680R00 5% 0.062W	QP05130681	3805		4822 051 30479	47R00 5% 0.062W	QP05130479
3541		4822 051 30479	47R00 5% 0.062W	QP05130479	3806		4822 051 30153	15K00 5% 0.062W	QP05130153
3542		4822 051 30479	47R00 5% 0.062W	QP05130479	3808		4822 051 30332	3k30 5% 0.062W	QP05130332
3545		4822 051 30221	220R00 5% 0.062W	QP05130221	3809		4822 051 30332	3k30 5% 0.062W	QP05130332
3546		4822 051 30101	100R00 5% 0.062W	QP05130101	3810		4822 051 30332	3k30 5% 0.062W	QP05130332
3548		4822 051 30008	0R00 JUMPER	QP05130008	3811		4822 051 30332	3k30 5% 0.062W	QP05130332
3550		4822 051 30101	100R00 5% 0.062W	QP05130101	3812		5322 117 13042	3k9 1% 0.063W 0603 RC22H	QQ11713042
3551		4822 051 30101	100R00 5% 0.062W	QP05130101	3813		5322 117 13042	3k9 1% 0.063W 0603 RC22H	QQ11713042
3564		4822 051 30008	0R00 JUMPER	QP05130008	3814		4822 051 30339	33R00 5% 0.062W	QP05130339
3570		4822 051 30101	100R00 5% 0.062W	QP05130101	3815		4822 051 30561	560R00 5% 0.062W	QP05130561
3571		4822 051 30689	68R 5% 0.063W 0603 RC21	QP05130689	3816		4822 051 30101	100R00 5% 0.062W	QP05130101
3572		4822 051 30689	68R 5% 0.063W 0603 RC21	QP05130689	3900		4822 051 30103	10k00 5% 0.062W	QP05130103
3606		4822 117 12925	47k 1% 0.063W 0603	QP11712925	3901		4822 051 30103	10k00 5% 0.062W	QP05130103
3607		4822 117 13632	100k 1% 0603 0.62W	QP11713632	3902		4822 051 30339	33R00 5% 0.062W	QP05130339
3608		4822 117 13632	100k 1% 0603 0.62W	QP11713632	3903		4822 051 30339	33R00 5% 0.062W	QP05130339
					3904		4822 051 30339	33R00 5% 0.062W	QP05130339

NOTE : "nsp" PART IS LISTED FOR REFERENCE ONLY, MARANTZ WILL NOT SUPPLY THESE PARTS.

POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJJ)	POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJJ)
MONO-RESISTORS					MONO-RESISTORS				
3906		4822 051 30339	33R00 5% 0.062W	QP05130339	7453		4822 130 60511	BC847B	QP13060511
3907		2322 704 65609	0603 RC22H 56R PM1 R	QH70465609	7454		4822 130 60511	BC847B	QP13060511
3908		4822 051 30479	47R00 5% 0.062W	QP05130479	7455		4822 130 60373	BC856B	QP13060373
3909		4822 051 30332	3k30 5% 0.062W	QP05130332	7503		9322 151 16671	IC STI5505AVC	QA15116671
3910		2322 704 65609	0603 RC22H 56R PM1 R	QH70465609	7505		9322 156 81668	IC M24C32-WMN6TNKSA	QA15681668
4000		4822 051 30008	0R00 JUMPER	QP05130008	7600		5322 209 71568	IC PC74HCT14T	QQ20971568
4004		4822 051 30008	0R00 JUMPER	QP05130008	7604		4822 130 60511	BC847B	QP13060511
4005		4822 051 30008	0R00 JUMPER	QP05130008	7605		4822 209 17398	IC LD1117DT33	QP20917398
4006		4822 051 30008	0R00 JUMPER	QP05130008	7607		4822 130 60511	BC847B	QP13060511
4452		4822 051 30008	0R00 JUMPER	QP05130008	7608		4822 130 60373	BC856B	QP13060373
4453		4822 051 30008	0R00 JUMPER	QP05130008	7609		4822 130 60373	BC856B	QP13060373
4500		4822 051 30008	0R00 JUMPER	QP05130008	7610		4822 130 60511	BC847B	QP13060511
4503		4822 051 30008	0R00 JUMPER	QP05130008	7611		9352 456 80115		QB45680115
4507		4822 051 30008	0R00 JUMPER	QP05130008	7612		4822 130 60511	BC847B	QP13060511
4602		4822 051 30008	0R00 JUMPER	QP05130008	7613		4822 130 60511	BC847B	QP13060511
4603		4822 051 30008	0R00 JUMPER	QP05130008	7614		4822 130 60511	BC847B	QP13060511
4604		4822 051 30008	0R00 JUMPER	QP05130008	7615		4822 130 60511	BC847B	QP13060511
4801		4822 051 30008	0R00 JUMPER	QP05130008	7617		4822 130 60511	BC847B	QP13060511
4802		4822 051 30008	0R00 JUMPER	QP05130008	7618		4822 130 60511	BC847B	QP13060511
4803		4822 051 30008	0R00 JUMPER	QP05130008	7620		4822 130 60373	BC856B	QP13060373
4902		4822 051 30008	0R00 JUMPER	QP05130008	7621		4822 130 42804	BC817-25	QP13042804
MONO-SEMICONDUCTORS					MONO-SEMICONDUCTORS				
6200		4822 130 11397	DIODE BAS316	QP13011397	7622		4822 209 17398	IC LD1117DT33	QP20917398
6301		9322 128 69685	DIODE S1D	QA12869685	7700		9322 144 96668	IC SM MT48LC4M16A2TG-8E	QA14496668
6302		9322 128 69685	DIODE S1D	QA12869685	7800		9352 680 19557	IC SAA7331HLM1	QB68019557
6303		9322 128 69685	DIODE S1D	QA12869685	7801		5322 130 42718	BFS20	QQ13042718
6600		4822 130 11528	DIODE 1PS76SB10	QP13011528	7900		4822 209 90752	IC 74HCT04D	QP20990752
7000		9337 144 60118	IC SM 74HCT4066D (PHSE) R	QN14460118	7902		9322 153 36668	IC ICS302M-3	QA15336668
7001		4822 130 60373	BC856B	QP13060373	7903		9322 151 72668	IC ICS601M-01T	QA15172668
7002		4822 130 60511	BC847B	QP13060511	7905		9322 151 71668	IC MK2703STR	QA15171668
7003		4822 130 60511	BC847B	QP13060511	MONO-MISCELLANEOUS				
7006		4822 130 60511	BC847B	QP13060511	1001		2422 025 16957	FFC CON BM V 24P F 1.00 0.3	QU02516957
7007		4822 130 60511	BC847B	QP13060511	1104		2422 025 15963	FFC CON BM H 24P F 0.50	QU02515963
7100		5322 130 42718	BFS20	QQ13042718	1106		2422 025 16158	FFC CON BM H 8P F 1.00 0.3	QU02516158
7101		5322 130 42718	BFS20	QQ13042718	1205		2422 540 98428	RES CER 8M467	QU54098428
7102		9352 637 37518	IC TZA1033HL	QB63737518	1300		2422 540 98426	RES CER 6MHZ	QU54098426
7103		4822 209 17229	BA5938FM	QP20917229	1301		4822 267 51454	CONN. 11P FEMALE	QP26751454
7104		4822 209 30095	IC LM833D	QP20930095	1603		2422 025 16389	FFC CON BM V 22P F 1.00 0.3	QU02516389
7105		4822 209 32073	IC MC34072D	QP20932073	1604		2422 025 16388	FFC CON BM V 16P F 1.00 0.3	QU02516388
7106		5322 130 42718	BFS20	QQ13042718	5200		4822 157 11717	BLM31P500SPT	QP15711717
7107		4822 209 33411	IC MC78L05ACD	QP20933411	5300		4822 157 11717	BLM31P500SPT	QP15711717
7108		5322 130 60845	BC807-25	QQ13060845	5301		4822 157 11717	BLM31P500SPT	QP15711717
7109		4822 209 15083	IC AN78M09	QP20915083	5402		4822 157 11717	BLM31P500SPT	QP15711717
7110		5322 130 60803	BST72A	QQ13060803	5403		4822 157 11499	BLM11P600SPT	QP15711499
7111		4822 130 60511	BC847B	QP13060511	5450		4822 157 11717	BLM31P500SPT	QP15711717
7112		4822 130 60511	BC847B	QP13060511	5501		4822 157 70299	2.2µH (NL322522T-2R2J)	QP15770299
7113		4822 130 60511	BC847B	QP13060511	5502		4822 157 70299	2.2µH (NL322522T-2R2J)	QP15770299
7114		4822 130 60511	BC847B	QP13060511	5503		4822 157 71206	BLM21A601SPT	QP15771206
7115		4822 130 60373	BC856B	QP13060373	5504		4822 157 71206	BLM21A601SPT	QP15771206
7116		4822 130 60511	BC847B	QP13060511	5600		4822 157 71206	BLM21A601SPT	QP15771206
7117		4822 130 42804	BC817-25	QP13042804	5601		4822 157 11499	BLM11P600SPT	QP15711499
7201		9351 869 80118	IC DISPLAY, LCD	*D86980118	5602		4822 157 70298	15µH (NL322522T-150J)	QP15770298
7202		3104 123 85860	IC AM29F002T/5.1.14	QW12385860	5604		4822 157 70298	15µH (NL322522T-150J)	QP15770298
7203		4822 130 60373	BC856B	QP13060373	5605		4822 157 70298	15µH (NL322522T-150J)	QP15770298
7204		9322 139 67685	IC SM MC33464N-45A	QA13967685	5606		4822 157 70298	15µH (NL322522T-150J)	QP15770298
7207		4822 209 17231	IC SAA7399HL	QP20917231	5607		4822 157 70298	15µH (NL322522T-150J)	QP15770298
7304		4822 209 16877	BA6856FP	QP20916877	5608		4822 157 70298	15µH (NL322522T-150J)	QP15770298
7310		4822 209 15899	IC CY7C199-15C	QP20915899	5609		4822 157 11717	BLM31P500SPT	QP15711717
7311		9352 622 13557	IC SAA7335HL	QB62213557	5610		4822 157 11717	BLM31P500SPT	QP15711717
7312		4822 130 60373	BC856B	QP13060373	5611		4822 157 11717	BLM31P500SPT	QP15711717
7315		4822 130 60511	BC847B	QP13060511	5700		4822 157 11717	BLM31P500SPT	QP15711717
7400		9352 499 60118	IC SM 74LVC00AD	QB49960118	5800		4822 157 11717	BLM31P500SPT	QP15711717
7402		4822 209 16318	IC MC33464N-30A	QP20916318	5801		4822 157 11717	BLM31P500SPT	QP15711717
7404		9322 144 59668	IC SM MT48LC1M16A1TG-7S	QA14459668	5802		4822 157 11717	BLM31P500SPT	QP15711717
7405		9322 144 59668	IC SM MT48LC1M16A1TG-7S	QA14459668	5900		4822 157 11717	BLM31P500SPT	QP15711717
7452		4822 130 60511	BC847B	QP13060511	5901		4822 157 11717	BLM31P500SPT	QP15711717

NOTE : *nsp* PART IS LISTED FOR REFERENCE ONLY, MARANTZ WILL NOT SUPPLY THESE PARTS.

POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MUJ)	POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MUJ)
5902		4822 157 11717	BLM31P500SPT	QP15711717	2413	N	5322 122 32531	100pF 5%NP0 50V	QQ12232531
5903		4822 157 11717	BLM31P500SPT	QP15711717	2414	N	5322 122 32531	100pF 5%NP0 50V	QQ12232531
			AV (PZ02) CIRCUIT BOARD [N Only] AV-CAPACITORS		2415	N	4822 124 40248	10µF 20% 63V	QP12440248
2308	N	4822 122 33575	220pF 5% NP0 63V CASE 0805	QP12233575	2416	N	4822 126 14585	100nF 10% X7R 0805 50V	QP12614585
2314	N	4822 124 41584	100µF 20% 10V	QP12441584	2417	N	4822 126 14585	100nF 10% X7R 0805 50V	QP12614585
2337	N	4822 122 33575	220pF 5% NP0 63V CASE 0805	QP12233575	2418	N	2222 780 15656	330N 16V 0805 X7R CER	QL78015656
2351	N	4822 126 14585	100nF 10% X7R 0805 50V	QP12614585	2419	N	4822 124 40433	47µF 20% 25V	QP12440433
2352	N	4822 126 14585	100nF 10% X7R 0805 50V	QP12614585	2450	N	5322 122 32654	22n 63V 0805 X7R CER	QQ12232654
2353	N	4822 124 40769	4.7µF 20% 100V	QP12440769	2452	N	4822 126 14076	220N 25V. P8020	QP12614076
2354	N	4822 126 14076	220N 25V. P8020	QP12614076	2453	N	4822 124 40433	47µF 20% 25V	QP12440433
2355	N	4822 124 40769	4.7µF 20% 100V	QP12440769	2455	N	5322 122 32531	100pF 5%NP0 50V	QQ12232531
2357	N	4822 124 40769	4.7µF 20% 100V	QP12440769	2456	N	4822 124 22339	100µF 16V	QP12422339
2358	N	4822 122 33575	220pF 5% NP0 63V CASE 0805	QP12233575	2457	N	5322 126 10511	1nF 5%NP0 50V	QQ12610511
2359	N	4822 124 40769	4.7µF 20% 100V	QP12440769	2458	N	5322 122 32654	22n 63V 0805 X7R CER	QQ12232654
2360	N	4822 126 13692	47pF 1% NP0 63V	QP12613692	2459	N	5322 122 32531	100pF 5%NP0 50V	QQ12232531
2361	N	4822 126 13692	47pF 1% NP0 63V	QP12613692	2460	N	5322 122 32654	22n 63V 0805 X7R CER	QQ12232654
2362	N	4822 126 14585	100nF 10% X7R 0805 50V	QP12614585	2461	N	5322 122 32531	100pF 5%NP0 50V	QQ12232531
2363	N	4822 126 14585	100nF 10% X7R 0805 50V	QP12614585	2462	N	4822 124 22339	100µF 16V	QP12422339
2364	N	4822 124 41584	100µF 20% 10V	QP12441584	2463	N	5322 126 10511	1nF 5%NP0 50V	QQ12610511
2365	N	5322 122 32654	22n 63V 0805 X7R CER	QQ12232654	2464	N	5322 122 32531	100pF 5%NP0 50V	QQ12232531
2366	N	4822 122 33575	220pF 5% NP0 63V CASE 0805	QP12233575	2465	N	5322 122 32654	22n 63V 0805 X7R CER	QQ12232654
2367	N	4822 126 14585	100nF 10% X7R 0805 50V	QP12614585	2468	N	5322 122 32654	22n 63V 0805 X7R CER	QQ12232654
2368	N	4822 122 33575	220pF 5% NP0 63V CASE 0805	QP12233575	2469	N	5322 122 32654	22n 63V 0805 X7R CER	QQ12232654
2369	N	4822 122 33575	220pF 5% NP0 63V CASE 0805	QP12233575	2470	N	5322 122 32654	22n 63V 0805 X7R CER	QQ12232654
2370	N	4822 124 40248	10µF 20% 63V	QP12440248	2471	N	4822 126 14585	100nF 10% X7R 0805 50V	QP12614585
2371	N	4822 122 33575	220pF 5% NP0 63V CASE 0805	QP12233575	2472	N	4822 124 40433	47µF 20% 25V	QP12440433
2372	N	4822 124 40769	4.7µF 20% 100V	QP12440769	2473	N	5322 122 32654	22n 63V 0805 X7R CER	QQ12232654
2373	N	4822 124 40769	4.7µF 20% 100V	QP12440769	2474	N	4822 124 40433	47µF 20% 25V	QP12440433
2374	N	4822 126 14076	220N 25V. P8020	QP12614076	2475	N	4822 124 40433	47µF 20% 25V	QP12440433
2375	N	4822 122 33575	220pF 5% NP0 63V CASE 0805	QP12233575	2476	N	4822 124 22339	100µF 16V	QP12422339
2376	N	4822 124 40248	10µF 20% 63V	QP12440248	2479	N	5322 122 32654	22n 63V 0805 X7R CER	QQ12232654
2377	N	4822 122 33575	220pF 5% NP0 63V CASE 0805	QP12233575	2480	N	5322 122 32531	100pF 5% NP0 50V	QQ12232531
2378	N	4822 124 40769	4.7µF 20% 100V	QP12440769	2483	N	4822 124 22339	100µF 16V	QP12422339
2379	N	4822 126 14585	100nF 10% X7R 0805 50V	QP12614585	2488	N	4822 126 14585	100nF 10% X7R 0805 50V	QP12614585
2380	N	4822 126 14585	100nF 10% X7R 0805 50V	QP12614585	2489	N	4822 126 14585	100nF 10% X7R 0805 50V	QP12614585
2381	N	4822 126 14585	100nF 10% X7R 0805 50V	QP12614585	2490	N	4822 124 40433	47µF 20% 25V	QP12440433
2382	N	4822 124 40769	4.7µF 20% 100V	QP12440769	2491	N	4822 124 41584	100µF 20% 10V	QP12441584
2383	N	4822 124 40769	4.7µF 20% 100V	QP12440769	2493	N	4822 126 13692	47pF 1% NP0 63V	QP12613692
2384	N	4822 126 14583	470nF 10% 16V XTR 0805	QP12614583	2495	N	4822 124 40248	10µF 20% 63V	QP12440248
2385	N	4822 124 40769	4.7µF 20% 100V	QP12440769				AV-RESISTORS	
2386	N	4822 126 14583	470nF 10% 16V XTR 0805	QP12614583	3300	N	4822 117 10353	150R 1% 0.1W	QP11710353
2387	N	4822 126 14583	470nF 10% 16V XTR 0805	QP12614583	3301	N	4822 117 11373	100R 1% RC12H 0805	QP11711373
2388	N	4822 126 14076	220N 25V. P8020	QP12614076	3302	N	4822 117 11373	100R 1% RC12H 0805	QP11711373
2389	N	4822 126 14583	470nF 10% 16V XTR 0805	QP12614583	3303	N	4822 117 11927	75R 1% 0.1W	QP11711927
2390	N	4822 122 33177	10nF 20% X7R 50V	QP12233177	3304	N	4822 117 11507	6k8 1% 0.1W	QP11711507
2391	N	4822 122 33177	10nF 20% X7R 50V	QP12233177	3305	N	4822 117 11454	820R 1% 0.1W	QP11711454
2392	N	4822 126 14583	470nF 10% 16V XTR 0805	QP12614583	3306	N	4822 051 20471	470R00 5% 0.1W	QP05120471
2393	N	4822 122 33177	10nF 20% NP0 50V	QP12233177	3307	N	4822 051 20472	4k70 5% 0.1W	QP05120472
2394	N	4822 126 14076	220N 25V. P8020	QP12614076	3308	N	4822 117 10361	680R 1% 0.1W	QP11710361
2395	N	4822 122 33575	220pF 5% NP0 63V CASE 0805	QP12233575	3309	N	4822 117 10353	150R 1% 0.1W	QP11710353
2396	N	4822 124 40248	10µF 20% 63V	QP12440248	3310	N	4822 117 11927	75R 1% 0.1W	QP11711927
2397	N	4822 122 33177	10nF 20% X7R 50V	QP12233177	3312	N	4822 117 11503	220R 1% 0.1W	QP11711503
2398	N	4822 122 33177	10nF 20% X7R 50V	QP12233177	3313	N	4822 051 20391	390R00 5% 0.1W	QP05120391
2399	N	4822 124 40248	10µF 20% 63V	QP12440248	3314	N	4822 051 10102	1k00 2% 0.25W	QP05110102
2400	N	4822 122 33177	10nF 20% X7R 50V	QP12233177	3315	N	4822 051 20471	470R00 5% 0.1W	QP05120471
2401	N	4822 126 14583	470nF 10% 16V XTR 0805	QP12614583	3316	N	4822 117 10834	47k 1% 0.1W	QP11710834
2402	N	4822 122 33575	220pF 5% NP0 63V CASE 0805	QP12233575	3318	N	4822 117 10834	47k 1% 0.1W	QP11710834
2403	N	4822 126 14076	220N 25V. P8020	QP12614076	3319	N	4822 051 10102	1k00 2% 0.25W	QP05110102
2404	N	4822 122 33575	220pF 5% NP0 63V CASE 0805	QP12233575	3320	N	4822 117 10834	47k 1% 0.1W	QP11710834
2405	N	4822 126 13692	47pF 1% NP0 63V	QP12613692	3321	N	4822 117 11373	100R 1% RC12H 0805	QP11711373
2406	N	4822 126 13692	47pF 1% NP0 63V	QP12613692	3322	N	4822 117 11373	100R 1% RC12H 0805	QP11711373
2407	N	2222 780 15656	330N 16V 0805 X7R CER	QL78015656	3323	N	4822 051 20471	470R00 5% 0.1W	QP05120471
2408	N	4822 122 33575	220pF 5% NP0 63V CASE 0805	QP12233575	3325	N	4822 117 10834	47k 1% 0.1W	QP11710834
2409	N	4822 122 33575	220pF 5% NP0 63V CASE 0805	QP12233575	3327	N	4822 117 11927	75R 1% 0.1W	QP11711927
2410	N	4822 122 33575	220pF 5% NP0 63V CASE 0805	QP12233575	3329	N	4822 051 20471	470R00 5% 0.1W	QP05120471
2411	N	4822 124 40248	10µF 20% 63V	QP12440248	3330	N	4822 117 11927	75R 1% 0.1W	QP11711927
2412	N	4822 124 40433	47µF 20% 25V	QP12440433	3331	N	4822 117 11145	4k70 1% 0.1W	QP11711145
					3332	N	4822 051 20471	470R00 5% 0.1W	QP05120471
					3333	N	4822 117 10353	150R 1% 0.1W	QP11710353

NOTE : *nsp* PART IS LISTED FOR REFERENCE ONLY, MARANTZ WILL NOT SUPPLY THESE PARTS.

POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJJ)	POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJJ)
			AV-RESISTORS						
3334	N	4822 117 10357	4K3 1% 0.2W	QP11710357	3437	N	4822 117 11373	100R 1% RC12H 0805	QP11711373
3335	N	4822 051 20471	470R00 5% 0.1W	QP05120471	3438	N	4822 117 11373	100R 1% RC12H 0805	QP11711373
3336	N	4822 117 11927	75R 1% 0.1W	QP11711927	3439	N	4822 117 11373	100R 1% RC12H 0805	QP11711373
3338	N	4822 117 10833	10k 1% 0.1W	QP11710833	3440	N	4822 117 11373	100R 1% RC12H 0805	QP11711373
3339	N	4822 117 11373	100R 1% RC12H 0805	QP11711373	3441	N	4822 117 11373	100R 1% RC12H 0805	QP11711373
3340	N	4822 117 11373	100R 1% RC12H 0805	QP11711373	3442	N	4822 117 11373	100R 1% RC12H 0805	QP11711373
3341	N	4822 117 10833	10k 1% 0.1W	QP11710833	3444	N	4822 117 10833	10k 1% 0.1W	QP11710833
3342	N	4822 051 20471	470R00 5% 0.1W	QP05120471	3445	N	4822 117 10833	10k 1% 0.1W	QP11710833
3343	N	4822 117 11927	75R 1% 0.1W	QP11711927	3448	N	4822 117 10833	10k 1% 0.1W	QP11710833
3345	N	4822 117 11927	75R 1% 0.1W	QP11711927	3451	N	4822 117 10833	10k 1% 0.1W	QP11710833
3347	N	4822 051 20471	470R00 5% 0.1W	QP05120471	3452	N	4822 051 20008	0R00 JUMP. (0805)	QP05120008
3348	N	4822 051 10102	1k00 2% 0.25W	QP05110102	3453	N	4822 117 10833	10k 1% 0.1W	QP11710833
3349	N	4822 117 10834	47k 1% 0.1W	QP11710834	3454	N	4822 117 10833	10k 1% 0.1W	QP11710833
3350	N	4822 117 10833	10k 1% 0.1W	QP11710833	3455	N	4822 117 10833	10k 1% 0.1W	QP11710833
3351	N	4822 051 20471	470R00 5% 0.1W	QP05120471	3456	N	4822 117 11373	100R 1% RC12H 0805	QP11711373
3352	N	4822 051 20562	5K6 5% 0.1W 0805	QP05120562	3457	N	4822 117 11373	100R 1% RC12H 0805	QP11711373
3353	N	4822 051 10102	1k00 2% 0.25W	QP05110102	3458	N	4822 051 20008	0R00 JUMP. (0805)	QP05120008
3354	N	4822 117 11927	75R 1% 0.1W	QP11711927	3459	N	4822 117 10833	10k 1% 0.1W	QP11710833
3355	N	4822 051 20339	33R00 5% 0.1W	QP05120339	3460	N	4822 051 20008	0R00 JUMP. (0805)	QP05120008
3356	N	4822 051 20472	4k70 5% 0.1W	QP05120472	3461	N	4822 117 10833	10k 1% 0.1W	QP11710833
3357	N	4822 051 20472	4k70 5% 0.1W	QP05120472	3464	N	4822 117 10833	10k 1% 0.1W	QP11710833
3359	N	4822 117 10834	47k 1% 0.1W	QP11710834	3468	N	4822 117 10837	100k 1% 0.1W	QP11710837
3360	N	4822 051 20471	470R00 5% 0.1W	QP05120471	3471	N	4822 051 20562	5K6 5% 0.1W 0805	QP05120562
3362	N	4822 051 20471	470R00 5% 0.1W	QP05120471	3472	N	4822 117 11152	4R7 5%	QP11711152
3363	N	4822 051 10102	1k00 2% 0.25W	QP05110102	3473	N	4822 051 20008	0R00 JUMP. (0805)	QP05120008
3364	N	2322 734 65609	56R 0805 RC12H PM1 R	QH73465609	3476	N	4822 117 11373	100R 1% RC12H 0805	QP11711373
3365	N	4822 051 20561	560R00 5% 0.1W	QP05120561	3477	N	4822 117 11373	100R 1% RC12H 0805	QP11711373
3366	N	4822 117 10834	47k 1% 0.1W	QP11710834	3478	N	4822 117 10837	100k 1% 0.1W	QP11710837
3367	N	4822 117 12955	2k7 1% 0.1W 0805	QP11712955	3479	N	4822 117 13085	5K6 1% RC12H 0.1W 0805	QP11713085
3368	N	4822 117 12955	2k7 1% 0.1W 0805	QP11712955	3481	N	4822 117 12955	2k7 1% 0.1W 0805	QP11712955
3378	N	4822 051 10102	1k00 2% 0.25W	QP05110102	3482	N	4822 117 10833	10k 1% 0.1W	QP11710833
3394	N	4822 051 20471	470R00 5% 0.1W	QP05120471	3486	N	4822 117 10837	100k 1% 0.1W	QP11710837
3395	N	4822 051 20472	4k70 5% 0.1W	QP05120472	3489	N	4822 051 20562	5K6 5% 0.1W 0805	QP05120562
3397	N	4822 117 10834	47k 1% 0.1W	QP11710834	3491	N	4822 117 11373	100R 1% RC12H 0805	QP11711373
3398	N	4822 051 20472	4k70 5% 0.1W	QP05120472	3492	N	4822 117 11373	100R 1% RC12H 0805	QP11711373
3399	N	4822 051 20562	5K6 5% 0.1W 0805	QP05120562	3494	N	4822 117 12955	2k7 1% 0.1W 0805	QP11712955
3400	N	4822 117 11927	75R 1% 0.1W	QP11711927	3495	N	4822 117 10837	100k 1% 0.1W	QP11710837
3401	N	4822 117 11927	75R 1% 0.1W	QP11711927	3498	N	4822 051 20562	5K6 5% 0.1W 0805	QP05120562
3402	N	4822 051 20472	4k70 5% 0.1W	QP05120472	3505	N	4822 117 11373	100R 1% RC12H 0805	QP11711373
3403	N	4822 117 11927	75R 1% 0.1W	QP11711927	3506	N	4822 117 10833	10k 1% 0.1W	QP11710833
3404	N	4822 117 11927	75R 1% 0.1W	QP11711927	3507	N	4822 117 11373	100R 1% RC12H 0805	QP11711373
3405	N	4822 117 11927	75R 1% 0.1W	QP11711927	3508	N	4822 117 12521	68R 1% 0.1W	QP11712521
3406	N	4822 117 11927	75R 1% 0.1W	QP11711927	3509	N	4822 117 10834	47k 1% 0.1W	QP11710834
3407	N	4822 117 11927	75R 1% 0.1W	QP11711927	3510	N	4822 117 11152	4R7 5%	QP11711152
3408	N	4822 117 11927	75R 1% 0.1W	QP11711927	3513	N	4822 117 12955	2k7 1% 0.1W 0805	QP11712955
3409	N	4822 051 20471	470R00 5% 0.1W	QP05120471	3514	N	4822 117 12955	2k7 1% 0.1W 0805	QP11712955
3410	N	4822 051 20471	470R00 5% 0.1W	QP05120471	3515	N	4822 117 10837	100k 1% 0.1W	QP11710837
3411	N	4822 117 11927	75R 1% 0.1W	QP11711927	3516	N	4822 117 11152	4R7 5%	QP11711152
3413	N	4822 117 10834	47k 1% 0.1W	QP11710834	3517	N	4822 117 11373	100R 1% RC12H 0805	QP11711373
3414	N	4822 051 20472	4k70 5% 0.1W	QP05120472	3518	N	4822 117 12955	2k7 1% 0.1W 0805	QP11712955
3415	N	4822 051 20223	22k00 5% 0.1W	QP05120223	3519	N	4822 051 20562	5K6 5% 0.1W 0805	QP05120562
3416	N	4822 051 20339	33R00 5% 0.1W	QP05120339	3520	N	4822 051 20472	4k70 5% 0.1W	QP05120472
3417	N	4822 051 20471	470R00 5% 0.1W	QP05120471	3521	N	4822 051 10102	1k00 2% 0.25W	QP05110102
3418	N	4822 117 11373	100R 1% RC12H 0805	QP11711373	3522	N	4822 051 10102	1k00 2% 0.25W	QP05110102
3419	N	4822 117 11373	100R 1% RC12H 0805	QP11711373	3524	N	4822 051 20008	0R00 JUMP. (0805)	QP05120008
3420	N	4822 117 11149	82k 1% 0.1W	QP11711149	3525	N	4822 117 10833	10k 1% 0.1W	QP11710833
3421	N	4822 117 11504	270R 1% 0.1W	QP11711504	3527	N	4822 117 10834	47k 1% 0.1W	QP11710834
3422	N	4822 051 20472	4k70 5% 0.1W	QP05120472	3600	N	4822 051 20472	4k70 5% 0.1W	QP05120472
3423	N	2322 734 65609	0805 RC12H 56R PM1 R	QH73465609	3601	N	4822 051 20472	4k70 5% 0.1W	QP05120472
3424	N	4822 051 20223	22k00 5% 0.1W	QP05120223	3602	N	4822 051 20472	4k70 5% 0.1W	QP05120472
3425	N	4822 117 11927	75R 1% 0.1W	QP11711927	3603	N	4822 117 10837	100k 1% 0.1W	QP11710837
3427	N	4822 051 20472	4k70 5% 0.1W	QP05120472	3604	N	4822 117 11449	2k2 5% 0.1W 0805	QP11711449
3429	N	4822 117 11927	75R 1% 0.1W	QP11711927	3605	N	4822 051 20472	4k70 5% 0.1W	QP05120472
3431	N	4822 051 20471	470R00 5% 0.1W	QP05120471	3606	N	4822 051 20561	560R00 5% 0.1W	QP05120561
3432	N	4822 117 11927	75R 1% 0.1W	QP11711927	3607	N	4822 051 20562	5K6 5% 0.1W 0805	QP05120562
3433	N	4822 051 20008	0R00 JUMP. (0805)	QP05120008	3608	N	4822 117 10837	100k 1% 0.1W	QP11710837
3434	N	4822 117 11373	100R 1% RC12H 0805	QP11711373	3609	N	4822 051 20822	8K20 5% 0.1W	QP05120822
3435	N	4822 117 11373	100R 1% RC12H 0805	QP11711373	3610	N	4822 051 20472	4k70 5% 0.1W	QP05120472
3436	N	4822 117 10353	150R 1% 0.1W	QP11710353	3611	N	4822 051 20472	4k70 5% 0.1W	QP05120472
					3612	N	4822 117 10833	10k 1% 0.1W	QP11710833

NOTE : *nsp* PART IS LISTED FOR REFERENCE ONLY, MARANTZ WILL NOT SUPPLY THESE PARTS.

POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
AV-RESISTORS				
3613	N	4822 117 12955	2k7 1% 0.1W 0805	QP11712955
3614	N	4822 117 10833	10k 1% 0.1W	QP11710833
3615	N	4822 117 11152	4R7 5%	QP11711152
3616	N	4822 051 20472	4k70 5% 0.1W	QP05120472
3617	N	4822 117 10833	10k 1% 0.1W	QP11710833
3618	N	4822 117 10361	680R 1% 0.1W	QP11710361
3619	N	4822 117 10833	10k 1% 0.1W	QP11710833
3620	N	4822 051 10008	0R00 5% 0.25W	QP05110008
3621	N	4822 051 20472	4k70 5% 0.1W	QP05120472
3622	N	4822 117 10833	10k 1% 0.1W	QP11710833
3623	N	4822 117 11139	1k5 1% 0.1W	QP11711139
3624	N	4822 117 10833	10k 1% 0.1W	QP11710833
3625	N	4822 051 10102	1k00 2% 0.25W	QP05110102
3628	N	4822 117 11139	1k5 1% 0.1W	QP11711139
3999	N	4822 117 12842		QP11712842
4301	N	4822 051 20008	0R00 JUMP. (0805)	QP05120008
4304	N	4822 051 20008	0R00 JUMP. (0805)	QP05120008
4305	N	4822 051 20008	0R00 JUMP. (0805)	QP05120008
AV-SEMICONDUCTORS				
6300	N	3198 020 55680	DIODE REG SM BZX384-C5V6	QG02055680
6301	N	4822 130 83757	DIODE BAS216	QP13083757
6302	N	4822 130 83757	DIODE BAS216	QP13083757
6303	N	4822 130 83757	DIODE BAS216	QP13083757
6306	N	9322 154 46685	DIODE REC SM RB501V-40	QA15446685
6307	N	9322 154 46685	DIODE REC SM RB501V-40	QA15446685
6308	N	9322 154 46685	DIODE REC SM RB501V-40	QA15446685
6309	N	4822 130 11383	DIODE BZX284-C5V1	QP13011383
6400	N	4822 130 10845	OPT FIB CON GP1F32T	QP13010845
6400	N	9322 155 28667	OPT FIB CON GP1FA550TZ	QA15528667
7300	N	4822 130 60373	BC856B	QP13060373
7301	N	4822 130 60511	BC847B	QP13060511
7302	N	4822 130 60511	BC847B	QP13060511
7303	N	4822 130 60511	BC847B	QP13060511
7304	N	9322 134 86668	IC LF80C	QA13486668
7305	N	9322 135 58671	IC SM STV6410AD (ST00) Y	QA13558671
7306	N	4822 130 60511	BC847B	QP13060511
7307	N	4822 130 60511	BC847B	QP13060511
7308	N	4822 130 60511	BC847B	QP13060511
7309	N	4822 130 60511	BC847B	QP13060511
7310	N	4822 130 60511	BC847B	QP13060511
7311	N	4822 130 60511	BC847B	QP13060511
7312	N	4822 130 60373	BC856B	QP13060373
7313	N	4822 130 60511	BC847B	QP13060511
7314	N	4822 130 42804	BC817-25	QP13042804
7315	N	4822 130 42804	BC817-25	QP13042804
7316	N	4822 209 16256	IC TDA4780/V4	QP20916256
7320	N	4822 130 60511	BC847B	QP13060511
7321	N	4822 130 42804	BC817-25	QP13042804
7322	N	4822 130 60511	BC847B	QP13060511
7324	N	4822 130 42804	BC817-25	QP13042804
7325	N	4822 130 60511	BC847B	QP13060511
7326	N	4822 130 60373	BC856B	QP13060373
7327	N	4822 130 60511	BC847B	QP13060511
7328	N	4822 130 60511	BC847B	QP13060511
7329	N	4822 130 60511	BC847B	QP13060511
7330	N	4822 130 60511	BC847B	QP13060511
7331	N	4822 130 40981	BC337-25	QP13040981
7332	N	4822 130 60373	BC856B	QP13060373
7333	N	4822 130 41246	BC327-25	QP13041246
7334	N	4822 130 60511	BC847B	QP13060511
7335	N	4822 130 60511	BC847B	QP13060511
7336	N	4822 130 42804	BC817-25	QP13042804
7337	N	4822 130 42804	BC817-25	QP13042804
7400	N	4822 209 17398	IC LD1117DT33	QP20917398
7401	N	4822 209 17423	IC UAD1328T	QP20917423
7402	N	4822 130 42804	BC817-25	QP13042804

POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
7403	N	4822 209 32071	IC MC33079D	QP20932071
7408	N	4822 209 32071	IC MC33079D	QP20932071
7413	N	5322 209 14481	IC HEF4053BT	QQ20914481
7414	N	4822 209 30095	IC LM833D	QP20930095
7415	N	4822 130 42804	BC817-25	QP13042804
7416	N	4822 130 42804	BC817-25	QP13042804
7417	N	4822 130 60373	BC856B	QP13060373
7419	N	4822 130 42804	BC817-25	QP13042804
7420	N	4822 130 42804	BC817-25	QP13042804
7421	N	4822 130 42804	BC817-25	QP13042804
7422	N	4822 130 44568	BC557B	QP13044568
7423	N	4822 130 60511	BC847B	QP13060511
AV-MISCELLANEOUS				
1300	N	4822 265 11154	52030-2210 (22P)	QP26511154
1301	N	4822 265 11103	52030-1610 (16P)	QP26511103
1303	N	4822 267 10994	4P, MDIN	QP26710994
1304	N	2422 033 00334	CON BM EURO H 42P F BK GRND-L	QU03300334
1402	N	2422 026 05089	CON BM CINCH H 3P F RDWHY B	QU02605089
1405	N	4822 267 31626		QP26731626
5400	N	4822 157 70601	100µH (920927085A)	QP15770601
AV (PZ02) CIRCUIT BOARD [F, S, U Only]				
AV-CAPACITORS				
2000	F,U,S	3198 028 41090	10µF 20% 35V	QG02841090
2001	F,U,S	4822 126 14585	100nF 10% X7R 0805 50V	QP12614585
2002	F,U,S	4822 126 13692	47pF 1% NP0 63V	QP12613692
2004	F,U,S	4822 126 13692	47pF 1% NP0 63V	QP12613692
2006	F,U,S	4822 124 41796	22µF 20% 16V	QP12441796
2007	F,U,S	4822 124 23432	100µF 20% 10V	QP12423432
2029	F,U,S	4822 124 81286	47µF 20% 16V	QP12481286
2030	F,U,S	4822 126 13482	470nF +80%-20% 16V	QP12613482
2032	F,U,S	4822 126 13482	470nF +80%-20% 16V	QP12613482
2033	F,U,S	4822 122 33575	220pF 5% NP0 63V CASE 0805	QP12233575
2036	F,U,S	4822 124 40207	100µF 20% 25V	QP12440207
2038	F,U,S	4822 124 41584	100µF 20% 10V	QP12441584
2039	F,U,S	4822 124 40184	1000µF 20% 10V	QP12440184
2040	F,U,S	4822 124 40207	100µF 20% 25V	QP12440207
2041	F,U,S	4822 124 41643	100µF 20% 16V DIM:6,3X11MM	QP12441643
2100	F,U,S	5322 122 32654	22n 63V 0805 X7R CER	QQ12232654
2101	F,U,S	5322 122 32531	100pF 5%NP0 50V	QQ12232531
2103	F,U,S	4822 124 22339	100µF 16V	QP12422339
2104	F,U,S	5322 122 31647	1nF 10%X7R 63V	QQ12231647
2106	F,U,S	5322 122 32531	100pF 5%NP0 50V	QQ12232531
2107	F,U,S	5322 122 32531	100pF 5%NP0 50V	QQ12232531
2108	F,U,S	5322 122 32654	22n 63V 0805 X7R CER	QQ12232654
2109	F,U,S	4822 126 14585	100nF 10% X7R 0805 50V	QP12614585
2110	F,U,S	4822 124 81286	47µF 20% 16V	QP12481286
2112	F,U,S	4822 124 22339	100µF 16V	QP12422339
2113	F,U,S	5322 122 31647	1nF 10%X7R 63V	QQ12231647
2115	F,U,S	5322 122 32531	100pF 5%NP0 50V	QQ12232531
2119	F,U,S	5322 122 31647	1nF 10%X7R 63V	QQ12231647
2121	F,U,S	5322 122 31647	1nF 10%X7R 63V	QQ12231647
2123	F,U,S	4822 122 33575	220pF 5% NP0 63V CASE 0805	QP12233575
2124	F,U,S	4822 126 14585	100nF 10% X7R 0805 50V	QP12614585
2125	F,U,S	5322 122 32654	22n 63V 0805 X7R CER	QQ12232654
2126	F,U,S	5322 122 32654	22n 63V 0805 X7R CER	QQ12232654
2130	F,U,S	5322 122 32654	22n 63V 0805 X7R CER	QQ12232654
2131	F,U,S	5322 122 32654	22n 63V 0805 X7R CER	QQ12232654
2134	F,U,S	4822 124 11947	10µF 20% 16V	QP12411947
AV-RESISTORS				
3000	F,U,S	4822 117 11373	100R 1% RC12H 0805	QP11711373
3001	F,U,S	4822 117 12521	68R 1% 0.1W	QP11712521
3002	F,U,S	4822 051 20008	0R00 JUMP. (0805)	QP05120008
3003	F,U,S	4822 051 20008	0R00 JUMP. (0805)	QP05120008
3004	F,U,S	4822 051 20008	0R00 JUMP. (0805)	QP05120008

NOTE : *nsp* PART IS LISTED FOR REFERENCE ONLY, MARANTZ WILL NOT SUPPLY THESE PARTS.

POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJJ)	POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJJ)
AV-RESISTORS									
3005	F,U,S	4822 051 20472	4k70 5% 0.1W	QP05120472	3118	F,U,S	4822 117 11373	100R 1% RC12H 0805	QP11711373
3006	F,U,S	4822 051 20472	4k70 5% 0.1W	QP05120472	3119	F,U,S	4822 117 11373	100R 1% RC12H 0805	QP11711373
3007	F,U,S	4822 117 12955	2k7 1% 0.1W 0805	QP11712955	3120	F,U,S	4822 117 10833	10k 1% 0.1W	QP11710833
3008	F,U,S	4822 117 10833	10k 1% 0.1W	QP11710833	3121	F,U,S	4822 117 10833	10k 1% 0.1W	QP11710833
3009	F,U,S	4822 051 20472	4k70 5% 0.1W	QP05120472	3122	F,U,S	4822 117 12955	2k7 1% 0.1W 0805	QP11712955
3010	F,U,S	4822 051 20472	4k70 5% 0.1W	QP05120472	3123	F,U,S	4822 117 12955	2k7 1% 0.1W 0805	QP11712955
3011	F,U,S	4822 051 20472	4k70 5% 0.1W	QP05120472	3124	F,U,S	4822 117 10833	10k 1% 0.1W	QP11710833
3012	F,U,S	4822 117 11152	4R7 5%	QP11711152	3126	F,U,S	4822 117 11373	100R 1% RC12H 0805	QP11711373
3014	F,U,S	4822 117 11373	100R 1% RC12H 0805	QP11711373	3127	F,U,S	4822 117 10833	10k 1% 0.1W	QP11710833
3015	F,U,S	4822 117 12955	2k7 1% 0.1W 0805	QP11712955	3129	F,U,S	4822 117 12955	2k7 1% 0.1W 0805	QP11712955
3016	F,U,S	4822 117 11373	100R 1% RC12H 0805	QP11711373	3130	F,U,S	4822 117 11373	100R 1% RC12H 0805	QP11711373
3017	F,U,S	4822 117 12955	2k7 1% 0.1W 0805	QP11712955	3131	F,U,S	4822 117 10833	10k 1% 0.1W	QP11710833
3036	F,U,S	4822 117 11449	2k2 5% 0.1W 0805	QP11711449	3132	F,U,S	4822 117 12955	2k7 1% 0.1W 0805	QP11712955
3038	F,U,S	4822 051 20223	22k00 5% 0.1W	QP05120223	3135	F,U,S	5322 117 12487	1k RC12G 1% 0.125W	QQ11712487
3039	F,U,S	4822 051 20223	22k00 5% 0.1W	QP05120223	3136	F,U,S	5322 117 12487	1k RC12G 1% 0.125W	QQ11712487
3040	F,U,S	4822 116 83933	15K 1% 0.1W	QP11683933	3137	F,U,S	4822 117 12635	10R 1% 0.125W	QP11712635
3041	F,U,S	4822 051 20822	8K20 5% 0.1W	QP05120822	3138	F,U,S	4822 117 11139	1k5 1% 0.1W	QP11711139
3042	F,U,S	4822 051 20008	0R00 JUMP. (0805)	QP05120008	3139	F,U,S	4822 117 11931	750R 1% 0.1W	QP11711931
3043	F,U,S	4822 117 11504	270R 1% 0.1W	QP11711504	3140	F,U,S	2120 108 92619	2k2 SM0805 ERJ6EN PM1	*E10892619
3044	F,U,S	4822 117 10833	10k 1% 0.1W	QP11710833	3141	F,U,S	5322 117 12487	1k RC12G 1% 0.125W	QQ11712487
3045	F,U,S	4822 117 11373	100R 1% RC12H 0805	QP11711373	3142	F,U,S	5322 117 12487	1k RC12G 1% 0.125W	QQ11712487
3046	F,U,S	4822 117 11373	100R 1% RC12H 0805	QP11711373	3143	F,U,S	5322 117 12487	1k RC12G 1% 0.125W	QQ11712487
3047	F,U,S	4822 117 11507	6k8 1% 0.1W	QP11711507	3144	F,U,S	4822 117 11953	560R 1% 0.1W	QP11711953
3048	F,U,S	4822 117 11454	820R 1% 0.1W	QP11711454	3145	F,U,S	2120 108 92625	5K6 0805 ERJ6EN PM1	*E10892625
3049	F,U,S	4822 117 11927	75R 1% 0.1W	QP11711927	3146	F,U,S	4822 051 20008	0R00 JUMP. (0805)	QP05120008
3050	F,U,S	4822 051 20471	470R00 5% 0.1W	QP05120471	3147	F,U,S	2120 108 92616	1k2 0805 ERJ6EN PM1	*E10892616
3051	F,U,S	4822 051 20472	4k70 5% 0.1W	QP05120472	3148	F,U,S	5322 117 12487	1k RC12G 1% 0.125W	QQ11712487
3052	F,U,S	4822 117 10361	680R 1% 0.1W	QP11710361	3150	F,U,S	4822 117 11927	75R 1% 0.1W	QP11711927
3054	F,U,S	4822 051 20008	0R00 JUMP. (0805)	QP05120008	3153	F,U,S	4822 117 11373	100R 1% RC12H 0805	QP11711373
3055	F,U,S	4822 051 20008	0R00 JUMP. (0805)	QP05120008	3154	F,U,S	4822 117 11927	75R 1% 0.1W	QP11711927
3056	F,U,S	4822 117 11504	270R 1% 0.1W	QP11711504	3157	F,U,S	4822 117 11927	75R 1% 0.1W	QP11711927
3057	F,U,S	4822 117 11152	4R7 5%	QP11711152	3158	F,U,S	4822 117 11449	2k2 5% 0.1W 0805	QP11711449
3058	F,U,S	4822 117 11373	100R 1% RC12H 0805	QP11711373	3159	F,U,S	4822 117 11373	100R 1% RC12H 0805	QP11711373
3059	F,U,S	4822 117 11373	100R 1% RC12H 0805	QP11711373	3160	F,U,S	4822 117 10833	10k 1% 0.1W	QP11710833
3060	F,U,S	4822 117 11507	6k8 1% 0.1W	QP11711507	4100	F,U,S	4822 051 20008	0R00 JUMP. (0805)	QP05120008
3061	F,U,S	4822 117 11454	820R 1% 0.1W	QP11711454	4105	F,U,S	4822 051 20008	0R00 JUMP. (0805)	QP05120008
3062	F,U,S	4822 117 11927	75R 1% 0.1W	QP11711927	4112	F,U,S	4822 051 20008	0R00 JUMP. (0805)	QP05120008
3063	F,U,S	4822 117 11449	2k2 5% 0.1W 0805	QP11711449	AV-SEMICONDUCTORS				
3064	F,U,S	4822 051 20472	4k70 5% 0.1W	QP05120472	6001	F,U,S	4822 130 11087	DIODE BZX284-C15	QP13011087
3065	F,U,S	4822 117 10361	680R 1% 0.1W	QP11710361	6002	F,U,S	4822 130 11087	DIODE BZX284-C15	QP13011087
3066	F,U,S	4822 051 20008	0R00 JUMP. (0805)	QP05120008	6003	F,U,S	4822 130 11087	DIODE BZX284-C15	QP13011087
3067	F,U,S	4822 051 20008	0R00 JUMP. (0805)	QP05120008	6004	F,U,S	4822 130 11087	DIODE BZX284-C15	QP13011087
3068	F,U,S	4822 117 11504	270R 1% 0.1W	QP11711504	6005	F,U,S	4822 130 11087	DIODE BZX284-C15	QP13011087
3069	F,U,S	4822 117 11373	100R 1% RC12H 0805	QP11711373	6006	F,U,S	4822 130 11087	DIODE BZX284-C15	QP13011087
3070	F,U,S	4822 117 11507	6k8 1% 0.1W	QP11711507	6007	F,U,S	4822 130 83757	DIODE BAS216	QP13083757
3071	F,U,S	4822 117 11454	820R 1% 0.1W	QP11711454	6008	F,U,S	4822 130 83757	DIODE BAS216	QP13083757
3072	F,U,S	4822 117 11927	75R 1% 0.1W	QP11711927	6009	F,U,S	4822 130 83757	DIODE BAS216	QP13083757
3073	F,U,S	4822 117 11449	2k2 5% 0.1W 0805	QP11711449	6010	F,U,S	4822 130 11087	DIODE BZX284-C15	QP13011087
3074	F,U,S	4822 051 20472	4k70 5% 0.1W	QP05120472					
3075	F,U,S	4822 117 10361	680R 1% 0.1W	QP11710361					
3076	F,U,S	4822 051 20008	0R00 JUMP. (0805)	QP05120008	7000	F,U,S	4822 130 60511	BC847B	QP13060511
3077	F,U,S	4822 117 11927	75R 1% 0.1W	QP11711927	7001	F,U,S	4822 130 42804	BC817-25	QP13042804
3078	F,U,S	4822 117 11449	2k2 5% 0.1W 0805	QP11711449	7002	F,U,S	4822 130 60373	BC856B	QP13060373
3100	F,U,S	4822 117 11373	100R 1% RC12H 0805	QP11711373	7004	F,U,S	4822 130 42804	BC817-25	QP13042804
3101	F,U,S	4822 051 20472	4k70 5% 0.1W	QP05120472	7005	F,U,S	4822 130 42804	BC817-25	QP13042804
3102	F,U,S	4822 117 10833	10k 1% 0.1W	QP11710833	7006	F,U,S	4822 130 60511	BC847B	QP13060511
3103	F,U,S	4822 117 10833	10k 1% 0.1W	QP11710833	7007	F,U,S	4822 130 60511	BC847B	QP13060511
3105	F,U,S	4822 117 10833	10k 1% 0.1W	QP11710833	7008	F,U,S	4822 130 60511	BC847B	QP13060511
3106	F,U,S	4822 117 10833	10k 1% 0.1W	QP11710833	7009	F,U,S	4822 130 60373	BC856B	QP13060373
3107	F,U,S	4822 117 11373	100R 1% RC12H 0805	QP11711373	7010	F,U,S	4822 130 60511	BC847B	QP13060511
3108	F,U,S	4822 117 11152	4R7 5%	QP11711152	7011	F,U,S	4822 130 60511	BC847B	QP13060511
3109	F,U,S	4822 117 11152	4R7 5%	QP11711152	7012	F,U,S	4822 130 60373	BC856B	QP13060373
3110	F,U,S	4822 117 10833	10k 1% 0.1W	QP11710833	7013	F,U,S	4822 130 60511	BC847B	QP13060511
3112	F,U,S	4822 117 12955	2k7 1% 0.1W 0805	QP11712955	7014	F,U,S	4822 130 60511	BC847B	QP13060511
3113	F,U,S	4822 117 12955	2k7 1% 0.1W 0805	QP11712955	7015	F,U,S	4822 130 60373	BC856B	QP13060373
3114	F,U,S	4822 117 10833	10k 1% 0.1W	QP11710833	7016	F,U,S	4822 130 60511	BC847B	QP13060511
3115	F,U,S	4822 117 10833	10k 1% 0.1W	QP11710833	7017	F,U,S	4822 130 60511	BC847B	QP13060511
3116	F,U,S	4822 117 10833	10k 1% 0.1W	QP11710833	7018	F,U,S	4822 130 60511	BC847B	QP13060511
3117	F,U,S	4822 117 10833	10k 1% 0.1W	QP11710833	7019	F,U,S	4822 130 60511	BC847B	QP13060511

NOTE : *nsp* PART IS LISTED FOR REFERENCE ONLY, MARANTZ WILL NOT SUPPLY THESE PARTS.

POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
AV-SEMICONDUCTORS				
7020	F,U,S	9322 155 28667	OPT FIB CON GP1FA550TZ	QA15528667
7103	F,U,S	4822 209 17423	IC UAD1328T	QP20917423
7104	F,U,S	4822 130 42804	BC817-25	QP13042804
7105	F,U,S	4822 130 42804	BC817-25	QP13042804
7108	F,U,S	4822 130 42804	BC817-25	QP13042804
7109	F,U,S	4822 130 42804	BC817-25	QP13042804
7110	F,U,S	4822 209 16978	IC LF33CV	QP20916978
7112	F,U,S	4822 130 42804	BC817-25	QP13042804
7114	F,U,S	4822 130 42804	BC817-25	QP13042804
7115	F,U,S	4822 209 30095	IC LM833D	QP20930095
7116	F,U,S	9322 141 80668	IC AD8073JR	QA14180668
7117	F,U,S	4822 209 72684	IC L7905CV	QP20972684
AV-MISCELLANEOUS				
1002	F,U,S	2422 026 05202	SOC CINCH H 6P F RDWHYE B	QU02605202
1003	F,U,S	2422 026 05188	CON BM MDIN H 3P F TCS7927 B	QU02605188
1004	F,U,S	4822 265 11154	52030-2210 (22P)	QP26511154
1005	F,U,S	4822 267 31626		QP26731626
1006	F,U,S	2422 026 05191	CON BM CINCH H 3P F RDBUGN B	QU02605191
1007	F,U,S	2422 025 16525	FFC CON BM V 16P F 1.00 0.3	QU02516525
5000	F,U,S	4822 157 70601	100µH (920927085A)	QP15770601
5003	F,U,S	4822 242 10756	DSS306-92Y5S221M100	QP24210756
5004	F,U,S	4822 242 10756	DSS306-92Y5S221M100	QP24210756
5005	F,U,S	4822 242 10756	DSS306-92Y5S221M100	QP24210756
5006	F,U,S	4822 242 10756	DSS306-92Y5S221M100	QP24210756
5007	F,U,S	4822 242 10756	DSS306-92Y5S221M100	QP24210756
SWITCHED MODE POWER SUPPLY UNIT (PZ03)				
▲ PZ03		3104 129 22150	POWER SUPPLY UNIT	QW12922150

NOTE : "nsp" PART IS LISTED FOR REFERENCE ONLY, MARANTZ WILL NOT SUPPLY THESE PARTS.

POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)	POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
			PF16-RC-6 IN / OUT CIRCUIT BOARD		R823		RES. 680 ±5% 1/6W		GD05681160
			PF16-CAPACITORS		R824		RES. 680 ±5% 1/6W		GD05681160
CF01		4822 124 90353	ELECT. 100µF M 10V RA-2	OA10701020	R825	N	9965 000 10842	METAL 1k ±5% 1W	NK05102010
CF03		4822 124 90352	ELECT. 10µF M 16V RA-2	OA10601620	R825	S	9965 000 10842	METAL 1k ±5% 1W	NK05102010
CF51		4822 126 11687	CER. 0.1µF GRM39F104Z16	DK98104200	R826	N	9965 000 10842	METAL 1k ±5% 1W	NK05102010
CF52		4822 126 11568	CER. 470pF GR39	DK96471300	R826	S	9965 000 10842	METAL 1k ±5% 1W	NK05102010
			PF16-RESISTORS		RN01		4822 051 30102	CHIP 1k ±5% 1/16W	NN05102610
RF01		4822 051 30472	CHIP 4.7k ±5% 1/16W	NN05472610	RN02		9965 000 06699	CHIP 3.9M ±5% 1/16W	NN05395610
RF02		4822 117 12925	CHIP 47k ±5% 1/16W	NN05473610	RN03		4822 116 83819	CHIP 18k ±5% 1/16W	NN05183610
RF03		4822 051 30101	CHIP 100 ±5% 1/16W	NN05101610	RN04		4822 117 12925	CHIP 47k ±5% 1/16W	NN05473610
RF51		4822 117 12139	CHIP 22 ±5% 1/16W	NN05220610	RN05		4822 051 30103	CHIP 10k ±5% 1/16W	NN05103610
RF52		4822 051 30103	CHIP 10k ±5% 1/16W	NN05103610	RN06		4822 051 30222	CHIP 2.2k ±5% 1/16W	NN05222610
RF53		4822 051 30222	CHIP 2.2k ±5% 1/16W	NN05222610	RN07		4822 051 30103	CHIP 10k ±5% 1/16W	NN05103610
RF54		4822 051 30103	CHIP 10k ±5% 1/16W	NN05103610	RN08		4822 051 30472	CHIP 4.7k ±5% 1/16W	NN05472610
			PF16-SEMICONDUCTORS		RN09		4822 051 30472	CHIP 4.7k ±5% 1/16W	NN05472610
DF01		4822 130 83715	CHIP DIODE 1SS301 DAN202U	HZ21005000	RN10		4822 051 30223	CHIP 22k ±5% 1/16W	NN05223610
QF01		4822 130 61554	CHIP TRS. 2SA1586 Y G	HX115862B0	RN21		4822 051 30332	CHIP 3.3k ±5% 1/16W	NN05332610
QF51		4822 130 61541	CHIP TRS. 2SC4116	HX341162B0	RN22		4822 051 30332	CHIP 3.3k ±5% 1/16W	NN05332610
			PF16-SEMICONDUCTORS		RN23		4822 117 13632	CHIP 100k ±5% 1/16W	NN05104610
JF52		4822 267 41009	TERMINAL 2P RCA PIN JACK	YT02020890	RN24		4822 117 12925	CHIP 47k ±5% 1/16W	NN05473610
LF01		4822 157 10416	BLM11B102S 1608 EMI FILTER	FN31010030	RN25		4822 051 30333	CHIP 33k ±5% 1/16W	NN05333610
SF51		4822 277 21559	SLIDE SW. INT/EXT	SS02021150	RN26		4822 051 30103	CHIP 10k ±5% 1/16W	NN05103610
			PH16-POWER SUPPLY CIRCUIT BOARD		RN27		4822 117 13632	CHIP 100k ±5% 1/16W	NN05104610
			PH16-CAPACITORS				PH16-SEMICONDUCTORS		
C803		4822 124 41458	ELECT. 4700µF 16V RA2	OA47801620	▲ D801		9965 000 09763	DIODE SHOTTKY 11EQS10 1A 100V	HD20055100
C805		4822 124 22039	ELECT. 220µF 16V ARA	OA22701650	▲ D804				
C806		4822 124 41458	ELECT. 4700µF 16V RA2	OA47801620	▲ D821				
C815	F	4822 124 12404	ELECT. 220µF M 16V RA-2	OA22701620	▲ D823		9965 000 09763	DIODE SHOTTKY 11EQS10 1A 100V	HD20055100
C815	N	9965 000 01567	ELECT. 100µF 10V ARA	OA10701050	▲ D824				
C815	S	9965 000 01567	ELECT. 100µF 10V ARA	OA10701050	D825		4822 130 80623	ZENER DIODE 13V	HD31301000
C815	U	4822 124 12404	ELECT. 220µF M 16V RA-2	OA22701620	D826		4822 130 80623	ZENER DIODE 13V	HD31301000
C817	F	4822 124 90353	ELECT. 100µF M 10V RA-2	OA10701020	D827		4822 130 32362	DIODE 1SS176 MA165 1SS254 30V 0.1A	HD20002000
C817	U	4822 124 90353	ELECT. 100µF M 10V RA-2	OA10701020	D828		4822 130 32362	DIODE 1SS176 MA165 1SS254 30V 0.1A	HD20002000
C818	N	9965 000 01567	ELECT. 100µF 10V ARA	OA10701050	▲ D841				
C818	S	9965 000 01567	ELECT. 100µF 10V ARA	OA10701050	▲ D844				
C823		9965 000 00605	ELECT. 3300µF 25V ±20% HIFI	OB33802510	DH01		9965 000 09763	DIODE SHOTTKY 11EQS10 1A 100V	HD20055100
C824		9965 000 00605	ELECT. 3300µF 25V ±20% HIFI	OB33802510	▲ DN01				
C827		4822 124 41535	ELECT. 100µF M 25V RA-2	OA10702520	▲ DN05		9965 000 09763	DIODE SHOTTKY 11EQS10 1A 100V	HD20055100
C828		4822 124 41535	ELECT. 100µF M 25V RA-2	OA10702520	DN06		4822 130 32362	DIODE 1SS176 MA165 1SS254 30V 0.1A	HD20002000
C829	F	4822 124 11574	ELECT. 1000µF M 16V ARA	OA10801650	DN07		4822 130 32362	DIODE 1SS176 MA165 1SS254 30V 0.1A	HD20002000
C829	N	9965 000 10843	ELECT. 470µF 25V ARS	OA47702540	DN08		4822 130 33948	ZENER DIODE 5.6V	HD30561000
C829	S	9965 000 10843	ELECT. 470µF 25V ARS	OA47702540	DN20		4822 130 83715	CHIP DIODE 1SS301 DAN202U	HZ21005000
C829	U	4822 124 11574	ELECT. 1000µF M 16V ARA	OA10801650	▲ Q801		9965 000 06702	IC PQ15RW11 3.0 15V VARIABLE	HC38915320
C830	F	4822 124 11574	ELECT. 1000µF M 16V ARA	OA10801650	▲ Q811		4822 209 73096	IC NJM78M05FA	HC38505090
C830	N	9965 000 10843	ELECT. 470µF 25V ARS	OA47702540	▲ Q812		9965 000 03397	IC BA033FP 3.3V 1A PD=1W	HC96J33210
C830	S	9965 000 10843	ELECT. 470µF 25V ARS	OA47702540	Q821		4822 130 11604	TRS. 2SB1020	HT21020100
C830	U	4822 124 11574	ELECT. 1000µF M 16V ARA	OA10801650	Q822		4822 130 11605	TRS. 2SD1415	HT41415100
C843		4822 124 22723	ELECT. 1000µF M 25V RA-2	OA10802520	▲ Q841		4822 209 82828	IC NJM78M12FA	HC38512090
C845		4822 124 12404	ELECT. 220µF M 16V RA-2	OA22701620	QN01		4822 130 61541	CHIP TRS. 2SC4116	HX341162B0
C851		4822 126 11703	CER. 0.01µF	DK98103300	QN02		4822 130 61541	CHIP TRS. 2SC4116	HX341162B0
C852		4822 126 11703	CER. 0.01µF	DK98103300	QN03		4822 130 61541	CHIP TRS. 2SC4116	HX341162B0
C853		4822 126 11703	CER. 0.01µF	DK98103300	QN04		4822 130 61554	CHIP TRS. 2SA1586 Y G	HX115862B0
C854		4822 126 11703	CER. 0.01µF	DK98103300	QN05		4822 130 61541	CHIP TRS. 2SC4116	HX341162B0
CN01		4822 124 41543	ELECT. 1µF M 50V RA-2	OA10505020	QN20		4822 209 83312	IC TA7317P	HC10042050
CN02		4822 124 40763	ELECT. 2.2µF M 50V RA-2	OA22505020	▲ F801		4822 070 32001	FUSE T2A 250V BS LISTED	FS10200850
CN03		4822 124 23649	ELECT. 470µF 25V M RA-2	OA47702520	▲ F821		4822 070 38001	FUSE T800mA 250V BS LISTED	FS10080850
CN21		4822 124 80067	ELECT. 4.7µF M 50V RA-2	OA47505020					
CN22		4822 124 22273	ELECT. 0.47µF M 50V RA-2	OA47405020					
CN23		5322 122 32654	CER. 0.022µF ±10% XTR 16V	DK96223200					
			PH16-RESISTORS						
R801		9965 000 06703	CHIP 1.2k ±1% 1/10W	NI01122110					
R802		9965 000 06703	CHIP 1.2k ±1% 1/10W	NI01122110					
R804		9965 000 06704	CHIP 2.2k ±1% 1/10W	NI01222110					

NOTE : "nsp" PART IS LISTED FOR REFERENCE ONLY, MARANTZ WILL NOT SUPPLY THESE PARTS.

POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MUJ)	POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MUJ)
▲ F822		4822 070 38001	FUSE T800mA 250V BS LISTED	FS10080850	C212	U	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
▲ F841		4822 070 34001	FUSE T400MA 250V BS LISTED	FS10040850	C251	F		FILM 1800pF 100V PP APSV	OF15182540
▲ FH01	F	4822 070 32001	FUSE T2A 250V BS LISTED	FS10200850	C251	N	9965 000 10845	FILM 1800pF J 100V NH	OF15182550
▲ FH01	N	9965 000 06705	FUSE T1A H 250V BUSS MANN S505	FS10100950	C251	S	9965 000 10845	FILM 1800pF J 100V NH	OF15182550
▲ FH01	S	9965 000 06705	FUSE T1A H 250V BUSS MANN S505	FS10100950	C251	U		FILM 1800pF 100V PP APSV	OF15182540
▲ FH01	U	4822 070 32001	FUSE T2A 250V BS LISTED	FS10200850	C252		4822 121 70437	FILM 1000pF J 100V APSV	OF15102540
▲ GH05		4822 121 43732	FILM CAP. 0.01µF M 250V AC	DF77103500	C253		9965 000 05891	FILM 470pF 100V PP APSV	OF15471540
▲ JH01		9965 000 06707	JACK 2P AC INLET M1818-A	YJ04002510	C261	F	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
▲ JH04			PLUG 4PIN B4P7-VH	YP04000930	C261	N	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
▲ JH05		4822 265 20359	PLUG CONNECTOR 2P	YP04000760	C261	S	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
▲ LH02		4822 280 80754	RELAY VS-12MB.TV-5 UL/CSA/SEMKO	LY10120380	C261	U	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
▲ SH02		4822 277 21825	SLIDE SW. SDKGA4 SEMKO	SS02021510	C261	U	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
			PN16-MUTE CIRCUIT BOARD [N Only]		C301	F		FILM 560pF ±5% 100V OFC LEAD APF	OF55561540
DN92	N	5322 130 11288	CHIP DIODE MA8047-M 4.7V	HZ30471000	C301	N	9965 000 10846	FILM 560pF J 100V NH	OF15561550
DN93	N	4822 130 83715	CHIP DIODE 1SS301 DAN202U	HZ21005000	C301	S	9965 000 10846	FILM 560pF J 100V NH	OF15561550
QN91	N	4822 130 61554	CHIP TRS. 2SA1586 Y G	HX115862B0	C301	U		FILM 560pF ±5% 100V OFC LEAD APF	OF55561540
RN92	N	4822 051 30152	CHIP 1.5kΩ ±5% 1/16W	NN05152610	C302	F		FILM 150pF ±5% 100V OFC LEAD APF	OF55151540
RN93	N	4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610	C302	N	9965 000 10844	FILM 150pF J 100V NH	OF15151550
			PP16-DAC CIRCUIT BOARD		C302	S	9965 000 10844	FILM 150pF J 100V NH	OF15151550
			PP16-CAPACITORS		C302	U		FILM 150pF ±5% 100V OFC LEAD APF	OF55151540
C101	F		FILM 1800pF 100V PP APSV	OF15182540	C302	N	9965 000 10844	FILM 150pF J 100V NH	OF15151550
C101	N	9965 000 10845	FILM 1800pF J 100V NH	OF15182550	C302	S	9965 000 10844	FILM 150pF J 100V NH	OF15151550
C101	S	9965 000 10845	FILM 1800pF J 100V NH	OF15182550	C302	U		FILM 150pF ±5% 100V OFC LEAD APF	OF55151540
C101	U		FILM 1800pF 100V PP APSV	OF15182540	C317	F		FILM 560pF ±5% 100V OFC LEAD APF	OF55561540
C102		4822 121 70437	FILM 1000pF J 100V APSV	OF15102540	C317	N	9965 000 10846	FILM 560pF J 100V NH	OF15561550
C103		9965 000 05891	FILM 470pF 100V PP APSV	OF15471540	C317	S	9965 000 10846	FILM 560pF J 100V NH	OF15561550
C111	F	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550	C317	U		FILM 560pF ±5% 100V OFC LEAD APF	OF55561540
C111	N	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640	C321	F	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C111	S	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640	C321	N	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C111	U	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550	C321	S	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C112	F	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550	C321	U	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C112	N	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640	C322	F	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C112	S	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640	C322	N	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C112	U	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550	C322	S	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C151	F		FILM 1800pF 100V PP APSV	OF15182540	C322	U	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C151	N	9965 000 10845	FILM 1800pF J 100V NH	OF15182550	C351	F		FILM 560pF ±5% 100V OFC LEAD	OF55561540
C151	S	9965 000 10845	FILM 1800pF J 100V NH	OF15182550	C351	N	9965 000 10846	FILM 560pF J 100V NH	OF15561550
C151	U		FILM 1800pF 100V PP APSV	OF15182540	C351	S	9965 000 10846	FILM 560pF J 100V NH	OF15561550
C152		4822 121 70437	FILM 1000pF J 100V APSV	OF15102540	C351	U		FILM 560pF ±5% 100V OFC LEAD APF	OF55561540
C153		9965 000 05891	FILM 470pF 100V PP APSV	OF15471540	C352	F		FILM 150pF ±5% 100V OFC LEAD APF	OF55151540
C161	F	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550	C352	N	9965 000 10844	FILM 150pF J 100V NH	OF15151550
C161	N	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640	C352	S	9965 000 10844	FILM 150pF J 100V NH	OF15151550
C161	S	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640	C352	U		FILM 150pF ±5% 100V OFC LEAD APF	OF55151540
C161	U	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550	C367	F		FILM 560pF ±5% 100V OFC LEAD APF	OF55561540
C162	F	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550	C367	N	9965 000 10846	FILM 560pF J 100V NH	OF15561550
C162	N	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640	C367	S	9965 000 10846	FILM 560pF J 100V NH	OF15561550
C162	S	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640	C367	U		FILM 560pF ±5% 100V OFC LEAD APF	OF55561540
C162	U	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550	C371	F	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C201	F		FILM 1800pF 100V PP APSV	OF15182540	C371	N	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C201	N	9965 000 10845	FILM 1800pF J 100V NH	OF15182550	C371	S	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C201	S	9965 000 10845	FILM 1800pF J 100V NH	OF15182550	C371	U	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C201	U		FILM 1800pF 100V PP APSV	OF15182540	C372	F	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C202		4822 121 70437	FILM 1000pF J 100V APSV	OF15102540	C372	N	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C203		9965 000 05891	FILM 470pF 100V PP APSV	OF15471540	C372	S	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C211	F	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550	C372	U	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C211	N	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640	C372	N	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C211	S	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640	C372	S	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C211	U	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550	C372	U	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C212	F	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550					
C212	N	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640					
C212	S	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640					

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POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJJ)	POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJJ)
C401	F		FILM 560pF ±5% 100V OFC LEAD APF	OF55561540				OFC LEAD APF	
C401	N	9965 000 10846	FILM 560pF J 100V NH	OF15561550	C521	F	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C401	S	9965 000 10846	FILM 560pF J 100V NH	OF15561550	C521	N	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C401	U		FILM 560pF ±5% 100V OFC LEAD APF	OF55561540	C521	S	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C402	F		FILM 150pF ±5% 100V OFC LEAD APF	OF55151540	C521	U	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C402	N	9965 000 10844	FILM 150pF J 100V NH	OF15151550	C522	F	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C402	S	9965 000 10844	FILM 150pF J 100V NH	OF15151550	C522	N	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C402	U		FILM 150pF ±5% 100V OFC LEAD APF	OF55151540	C522	S	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C417	F		FILM 560pF ±5% 100V OFC LEAD APF	OF55561540	C522	U	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C417	N	9965 000 10846	FILM 560pF J 100V NH	OF15561550	C551	F		FILM 560pF ±5% 100V OFC LEAD APF	OF55561540
C417	S	9965 000 10846	FILM 560pF J 100V NH	OF15561550	C551	N	9965 000 10846	FILM 560pF J 100V NH	OF15561550
C417	U		FILM 560pF ±5% 100V OFC LEAD APF	OF55561540	C551	S	9965 000 10846	FILM 560pF J 100V NH	OF15561550
C421	F	4822 124 90051	ELECT. 220µF M 25V ARA	OA22702550	C551	U		FILM 560pF ±5% 100V OFC LEAD APF	OF55561540
C421	N	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640	C552	F		FILM 150pF ±5% 100V OFC LEAD APF	OF55151540
C421	S	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640	C552	N	9965 000 10844	FILM 150pF J 100V NH	OF15151550
C421	U	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550	C552	S	9965 000 10844	FILM 150pF J 100V NH	OF15151550
C422	F	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550	C552	U		FILM 150pF ±5% 100V OFC LEAD APF	OF55151540
C422	N	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640	C567	F		FILM 560pF ±5% 100V OFC LEAD APF	OF55561540
C422	S	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640	C567	N	9965 000 10846	FILM 560pF J 100V NH	OF15561550
C422	U	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550	C567	S	9965 000 10846	FILM 560pF J 100V NH	OF15561550
C451	F		FILM 560pF ±5% 100V OFC LEAD APF	OF55561540	C567	U		FILM 560pF ±5% 100V OFC LEAD APF	OF55561540
C451	N	9965 000 10846	FILM 560pF J 100V NH	OF15561550	C571	F	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C451	S	9965 000 10846	FILM 560pF J 100V NH	OF15561550	C571	N	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C451	U		FILM 560pF ±5% 100V OFC LEAD APF	OF55561540	C571	S	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C452	F		FILM 150pF ±5% 100V OFC LEAD APF	OF55151540	C571	U	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C452	N	9965 000 10844	FILM 150pF J 100V NH	OF15151550	C572	N	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C452	S	9965 000 10844	FILM 150pF J 100V NH	OF15151550	C572	S	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C452	U		FILM 150pF ±5% 100V OFC LEAD APF	OF55151540	C572	U	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550
C467	F		FILM 560pF ±5% 100V OFC LEAD APF	OF55561540	C601		4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C467	N	9965 000 10846	FILM 560pF J 100V NH	OF15561550	C602		4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C467	S	9965 000 10846	FILM 560pF J 100V NH	OF15561550	C604	N	8220 200 62290	FILM 100pF J 100V	OF15101550
C467	U		FILM 560pF ±5% 100V OFC LEAD APF	OF55561540	C604	S	8220 200 62290	FILM 100pF J 100V	OF15101550
C471	F	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550	C604	U	9965 000 01344	FILM 100pF J 100V APSV	OF15101540
C471	N	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640	C611		4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C471	S	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640	C612		4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C471	U	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550	C614	N	8220 200 62290	FILM 100pF J 100V	OF15101550
C472	F	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550	C614	S	8220 200 62290	FILM 100pF J 100V	OF15101550
C472	N	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640	C614	U	9965 000 01344	FILM 100pF J 100V APSV	OF15101540
C472	S	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640	C621		4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C472	U	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550	C622		4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C501	F		FILM 560pF ±5% 100V OFC LEAD APF	OF55561540	C624	N	8220 200 62290	FILM 100pF J 100V	OF15101550
C501	N	9965 000 10846	FILM 560pF J 100V NH	OF15561550	C624	S	8220 200 62290	FILM 100pF J 100V	OF15101550
C501	S	9965 000 10846	FILM 560pF J 100V NH	OF15561550	C624	U	9965 000 01344	FILM 100pF J 100V APSV	OF15101540
C501	U		FILM 560pF ±5% 100V OFC LEAD APF	OF55561540	C631		4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C502	F		FILM 150pF ±5% 100V OFC LEAD APF	OF55151540	C632		4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C502	N	9965 000 10844	FILM 150pF J 100V NH	OF15151550	C634	N	8220 200 62290	FILM 100pF J 100V	OF15101550
C502	S	9965 000 10844	FILM 150pF J 100V NH	OF15151550	C634	S	8220 200 62290	FILM 100pF J 100V	OF15101550
C502	U		FILM 150pF ±5% 100V OFC LEAD APF	OF55151540	C634	U	9965 000 01344	FILM 100pF J 100V APSV	OF15101540
C517	F		FILM 560pF ±5% 100V OFC LEAD APF	OF55561540	C641		4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C517	N	9965 000 10846	FILM 560pF J 100V NH	OF15561550	C642		4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
C517	S	9965 000 10846	FILM 560pF J 100V NH	OF15561550	C644	N	8220 200 62290	FILM 100pF J 100V	OF15101550
C517	U		FILM 560pF ±5% 100V	OF55561540	C644	S	8220 200 62290	FILM 100pF J 100V	OF15101550
					C644	U	9965 000 01344	FILM 100pF J 100V APSV	OF15101540
					C651		4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
					C652		4822 124 80123	ELECT. 220µF 16V ARS	OA22701640
					C654	N	8220 200 62290	FILM 100pF J 100V	OF15101550
					C654	S	8220 200 62290	FILM 100pF J 100V	OF15101550
					C654	U	9965 000 01344	FILM 100pF J 100V APSV	OF15101540
					C701	F		FILM 1800pF 100V PP APSV	OF15182540
					C701	N	9965 000 10845	FILM 1800pF J 100V NH	OF15182550
					C701	S	9965 000 10845	FILM 1800pF J 100V NH	OF15182550

NOTE : *nsp* PART IS LISTED FOR REFERENCE ONLY, MARANTZ WILL NOT SUPPLY THESE PARTS.

POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)	POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
C701	U		FILM 1800pF 100V PP APSV	OF15182540	CD47		4822 126 11687	CER. 0.1µF GRM39F104Z16	DK98104200
C702		4822 121 70437	FILM 1000pF J 100V APSV	OF15102540	CD48	F	4822 124 22237	ELECT. 10µF 16V ARA	OA10601650
C703		9965 000 05891	FILM 470pF 100V PP APSV	OF15471540	CD48	N	4822 124 80543	ELECT. 10µF 35V ARS	OA10603540
C711	F	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550	CD48	S	4822 124 80543	ELECT. 10µF 35V ARS	OA10603540
C711	N	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640	CD48	U	4822 124 22237	ELECT. 10µF 16V ARA	OA10601650
C711	S	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640	CD49		4822 126 11687	CER. 0.1µF GRM39F104Z16	DK98104200
C711	U	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550					
C712	F	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550	CD51	F	9965 000 01318	ELECT. 220µF M 10V RA-2	OA22701020
C712	N	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640	CD51	N	4822 124 40433	ELECT. 47µF M 16V ARS	OA47601640
C712	S	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640	CD51	S	4822 124 40433	ELECT. 47µF M 16V ARS	OA47601640
C712	U	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550	CD51	U	9965 000 01318	ELECT. 220µF M 10V RA-2	OA22701020
C751	F		FILM 1800pF 100V PP APSV	OF15182540	CD52		4822 126 11687	CER. 0.1µF GRM39F104Z16	DK98104200
C751	N	9965 000 10845	FILM 1800pF J 100V NH	OF15182550	CD53	F	9965 000 01567	ELECT. 100µF 10V ARA	OA10701050
C751	S	9965 000 10845	FILM 1800pF J 100V NH	OF15182550	CD53	N	4822 124 40433	ELECT. 47µF M 16V ARS	OA47601640
C751	U		FILM 1800pF 100V PP APSV	OF15182540	CD53	S	4822 124 40433	ELECT. 47µF M 16V ARS	OA47601640
C752		4822 121 70437	FILM 1000pF J 100V APSV	OF15102540	CD53	U	9965 000 01567	ELECT. 100µF 10V ARA	OA10701050
C753		9965 000 05891	FILM 470pF 100V PP APSV	OF15471540	CD54		4822 126 11687	CER. 0.1µF GRM39F104Z16	DK98104200
C761	F	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550	CD55		4822 126 11687	CER. 0.1µF GRM39F104Z16	DK98104200
C761	N	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640	CD56	F	9965 000 01567	ELECT. 100µF 10V ARA	OA10701050
C761	S	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640	CD56	N	4822 124 40433	ELECT. 47µF M 16V ARS	OA47601640
C761	U	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550	CD56	S	4822 124 40433	ELECT. 47µF M 16V ARS	OA47601640
C762	F	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550	CD56	U	9965 000 01567	ELECT. 100µF 10V ARA	OA10701050
C762	N	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640	CD57		4822 126 11687	CER. 0.1µF GRM39F104Z16	DK98104200
C762	S	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640	CD58	F	4822 124 22237	ELECT. 10µF 16V ARA	OA10601650
C762	U	4822 124 90051	ELECT. 220µF M 25 V ARA	OA22702550	CD58	N	4822 124 80543	ELECT. 10µF 35V ARS	OA10603540
					CD58	S	4822 124 80543	ELECT. 10µF 35V ARS	OA10603540
CD01	F	9965 000 01567	ELECT. 100µF 10V ARA	OA10701050	CD58	U	4822 124 22237	ELECT. 10µF 16V ARA	OA10601650
CD01	N	4822 124 40433	ELECT. 47µF M 16V ARS	OA47601640	CD59		4822 126 11687	CER. 0.1µF GRM39F104Z16	DK98104200
CD01	S	4822 124 40433	ELECT. 47µF M 16V ARS	OA47601640	CD61	F	9965 000 01318	ELECT. 220µF M 10V RA-2	OA22701020
CD01	U	9965 000 01567	ELECT. 100µF 10V ARA	OA10701050	CD61	N	4822 124 40433	ELECT. 47µF M 16V ARS	OA47601640
CD02		4822 126 11687	CER. 0.1µF GRM39F104Z16	DK98104200	CD61	S	4822 124 40433	ELECT. 47µF M 16V ARS	OA47601640
CD03		9965 000 05913	CER. 22pF ±2.0% 50V	DD942203A0	CD61	U	9965 000 01318	ELECT. 220µF M 10V RA-2	OA22701020
CD04		9965 000 05913	CER. 22pF ±2.0% 50V	DD942203A0	CD62		4822 126 11687	CER. 0.1µF GRM39F104Z16	DK98104200
CD05		4822 126 11687	CER. 0.1µF GRM39F104Z16	DK98104200	CD63	F	9965 000 01567	ELECT. 100µF 10V ARA	OA10701050
CD06		4822 126 11687	CER. 0.1µF GRM39F104Z16	DK98104200	CD63	N	4822 124 40433	ELECT. 47µF M 16V ARS	OA47601640
CD07		4822 126 11687	CER. 0.1µF GRM39F104Z16	DK98104200	CD63	S	4822 124 40433	ELECT. 47µF M 16V ARS	OA47601640
CD08		9965 000 06692	CER. 20pF CH	DD95200300	CD63	U	9965 000 01567	ELECT. 100µF 10V ARA	OA10701050
CD09		4822 126 11687	CER. 0.1µF GRM39F104Z16	DK98104200	CD64		4822 126 11687	CER. 0.1µF GRM39F104Z16	DK98104200
CD11		4822 122 33753	CER. 150pF ±5% CG 50V GR39	DD95151300	CD65		4822 126 11687	CER. 0.1µF GRM39F104Z16	DK98104200
CD12		4822 122 33753	CER. 150pF ±5% CG 50V GR39	DD95151300	CD66	F	9965 000 01567	ELECT. 100µF 10V ARA	OA10701050
CD17		4822 122 33753	CER. 150pF ±5% CG 50V GR39	DD95151300	CD66	N	4822 124 40433	ELECT. 47µF M 16V ARS	OA47601640
CD18		4822 122 33753	CER. 150pF ±5% CG 50V GR39	DD95151300	CD66	S	4822 124 40433	ELECT. 47µF M 16V ARS	OA47601640
CD21		4822 126 11687	CER. 0.1µF GRM39F104Z16	DK98104200	CD66	U	9965 000 01567	ELECT. 100µF 10V ARA	OA10701050
CD23	F	4822 124 22039	ELECT. 220µF 16V ARA	OA22701650	CD67		4822 126 11687	CER. 0.1µF GRM39F104Z16	DK98104200
CD23	N	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640	CD68	F	4822 124 22237	ELECT. 10µF 16V ARA	OA10601650
CD23	S	4822 124 80123	ELECT. 220µF 16V ARS	OA22701640	CD68	N	4822 124 80543	ELECT. 10µF 35V ARS	OA10603540
CD23	U	4822 124 22039	ELECT. 220µF 16V ARA	OA22701650	CD68	S	4822 124 80543	ELECT. 10µF 35V ARS	OA10603540
CD24	F	4822 124 22241	ELECT. 47µF 16V ARA	OA47601650	CD68	U	4822 124 22237	ELECT. 10µF 16V ARA	OA10601650
CD24	N	4822 124 40433	ELECT. 47µF M 16V ARS	OA47601640	CD69		4822 126 11687	CER. 0.1µF GRM39F104Z16	DK98104200
CD24	S	4822 124 40433	ELECT. 47µF M 16V ARS	OA47601640	CD71		4822 126 11687	CER. 0.1µF GRM39F104Z16	DK98104200
CD24	U	4822 124 22241	ELECT. 47µF 16V ARA	OA47601650	CD72		4822 126 11687	CER. 0.1µF GRM39F104Z16	DK98104200
CD31		4822 124 90353	ELECT. 100µF M 10V RA-2	OA10701020	CD91			CER. 0.01µF	DK98103300
CD32		4822 124 90352	ELECT. 10µF M 16V RA-2	OA10601620	CD96				
CD33		4822 124 90353	ELECT. 100µF M 10V RA-2	OA10701020					
CD41	F	9965 000 01318	ELECT. 220µF M 10V RA-2	OA22701020				PP16-RESISTORS	
CD41	N	4822 124 40433	ELECT. 47µF M 16V ARS	OA47601640	R104		4822 051 20121	CHIP 120Ω ±5% 1/10W	NI05121110
CD41	S	4822 124 40433	ELECT. 47µF M 16V ARS	OA47601640	R105		4822 051 20121	CHIP 120Ω ±5% 1/10W	NI05121110
CD41	U	9965 000 01318	ELECT. 220µF M 10V RA-2	OA22701020	R106		4822 117 12521	CHIP 68Ω ±5% 1/10W	NI05680110
CD42		4822 126 11687	CER. 0.1µF GRM39F104Z16	DK98104200	R107		4822 051 20228	CHIP 2.2Ω ±5% 1/10W	NI05022110
CD43	F	9965 000 01567	ELECT. 100µF 10V ARA	OA10701050	R108		4822 051 20228	CHIP 2.2Ω ±5% 1/10W	NI05022110
CD43	N	4822 124 40433	ELECT. 47µF M 16V ARS	OA47601640	R109		4822 117 12367	CHIP 33kΩ ±1% 1/10W	NI01333110
CD43	S	4822 124 40433	ELECT. 47µF M 16V ARS	OA47601640	R110		4822 051 20102	CHIP 1kΩ ±5% 1/10W	NI05102110
CD43	U	9965 000 01567	ELECT. 100µF 10V ARA	OA10701050	R111		4822 051 20102	CHIP 1kΩ ±5% 1/10W	NI05102110
CD44		4822 126 11687	CER. 0.1µF GRM39F104Z16	DK98104200	R112		4822 051 20101	CHIP 100Ω ±5% 1/10W	NI05101110
CD45		4822 126 11687	CER. 0.1µF GRM39F104Z16	DK98104200	R154		4822 051 20121	CHIP 120Ω ±5% 1/10W	NI05121110
CD46	F	9965 000 01567	ELECT. 100µF 10V ARA	OA10701050	R155		4822 051 20121	CHIP 120Ω ±5% 1/10W	NI05121110
CD46	N	4822 124 40433	ELECT. 47µF M 16V ARS	OA47601640	R156		4822 117 12521	CHIP 68Ω ±5% 1/10W	NI05680110
CD46	S	4822 124 40433	ELECT. 47µF M 16V ARS	OA47601640	R157		4822 051 20228	CHIP 2.2Ω ±5% 1/10W	NI05022110
CD46	U	9965 000 01567	ELECT. 100µF 10V ARA	OA10701050	R158		4822 051 20228	CHIP 2.2Ω ±5% 1/10W	NI05022110

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POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)	POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
R159		4822 117 12367	CHIP 33kΩ ±1% 1/10W	NI01333110	R512		4822 051 20101	CHIP 100Ω ±5% 1/10W	NI05101110
R160		4822 051 20102	CHIP 1kΩ ±5% 1/10W	NI05102110	R554		4822 051 20121	CHIP 120Ω ±5% 1/10W	NI05121110
R161		4822 051 20102	CHIP 1kΩ ±5% 1/10W	NI05102110	R555		4822 051 20121	CHIP 120Ω ±5% 1/10W	NI05121110
R162		4822 051 20101	CHIP 100Ω ±5% 1/10W	NI05101110	R556		4822 117 12521	CHIP 68Ω ±5% 1/10W	NI05680110
R204		4822 051 20121	CHIP 120Ω ±5% 1/10W	NI05121110	R557		4822 051 20228	CHIP 2.2Ω ±5% 1/10W	NI05022110
R205		4822 051 20121	CHIP 120Ω ±5% 1/10W	NI05121110	R558		4822 051 20228	CHIP 2.2Ω ±5% 1/10W	NI05022110
R206		4822 117 12521	CHIP 68Ω ±5% 1/10W	NI05680110	R559		4822 117 12367	CHIP 33kΩ ±1% 1/10W	NI01333110
R207		4822 051 20228	CHIP 2.2Ω ±5% 1/10W	NI05022110	R560		4822 051 20102	CHIP 1kΩ ±5% 1/10W	NI05102110
R208		4822 051 20228	CHIP 2.2Ω ±5% 1/10W	NI05022110	R561		4822 051 20102	CHIP 1kΩ ±5% 1/10W	NI05102110
R209		4822 117 12367	CHIP 33kΩ ±1% 1/10W	NI01333110	R562		4822 051 20101	CHIP 100Ω ±5% 1/10W	NI05101110
R210		4822 051 20102	CHIP 1kΩ ±5% 1/10W	NI05102110	R602		4822 117 10833	CHIP 10kΩ ±5% 1/10W	NI05103110
R211		4822 051 20102	CHIP 1kΩ ±5% 1/10W	NI05102110	R603		4822 111 90896	CHIP 100kΩ ±5% 1/10W	NI05104110
R212		4822 051 20101	CHIP 100Ω ±5% 1/10W	NI05101110	R612		4822 117 10833	CHIP 10kΩ ±5% 1/10W	NI05103110
R254		4822 051 20121	CHIP 120Ω ±5% 1/10W	NI05121110	R613		4822 111 90896	CHIP 100kΩ ±5% 1/10W	NI05104110
R255		4822 051 20121	CHIP 120Ω ±5% 1/10W	NI05121110	R622		4822 117 10833	CHIP 10kΩ ±5% 1/10W	NI05103110
R256		4822 117 12521	CHIP 68Ω ±5% 1/10W	NI05680110	R623		4822 111 90896	CHIP 100kΩ ±5% 1/10W	NI05104110
R257		4822 051 20228	CHIP 2.2Ω ±5% 1/10W	NI05022110	R632		4822 117 10833	CHIP 10kΩ ±5% 1/10W	NI05103110
R258		4822 051 20228	CHIP 2.2Ω ±5% 1/10W	NI05022110	R633		4822 111 90896	CHIP 100kΩ ±5% 1/10W	NI05104110
R259		4822 117 12367	CHIP 33kΩ ±1% 1/10W	NI01333110	R642		4822 117 10833	CHIP 10kΩ ±5% 1/10W	NI05103110
R260		4822 051 20102	CHIP 1kΩ ±5% 1/10W	NI05102110	R643		4822 111 90896	CHIP 100kΩ ±5% 1/10W	NI05104110
R261		4822 051 20102	CHIP 1kΩ ±5% 1/10W	NI05102110	R652		4822 117 10833	CHIP 10kΩ ±5% 1/10W	NI05103110
R262		4822 051 20101	CHIP 100Ω ±5% 1/10W	NI05101110	R653		4822 111 90896	CHIP 100kΩ ±5% 1/10W	NI05104110
R304		4822 051 20121	CHIP 120Ω ±5% 1/10W	NI05121110	R704		4822 051 20121	CHIP 120Ω ±5% 1/10W	NI05121110
R305		4822 051 20121	CHIP 120Ω ±5% 1/10W	NI05121110	R705		4822 051 20121	CHIP 120Ω ±5% 1/10W	NI05121110
R306		4822 117 12521	CHIP 68Ω ±5% 1/10W	NI05680110	R706		4822 117 12521	CHIP 68Ω ±5% 1/10W	NI05680110
R307		4822 051 20228	CHIP 2.2Ω ±5% 1/10W	NI05022110	R707		4822 051 20228	CHIP 2.2Ω ±5% 1/10W	NI05022110
R308		4822 051 20228	CHIP 2.2Ω ±5% 1/10W	NI05022110	R708		4822 051 20228	CHIP 2.2Ω ±5% 1/10W	NI05022110
R309		4822 117 12367	CHIP 33kΩ ±1% 1/10W	NI01333110	R709		4822 117 12367	CHIP 33kΩ ±1% 1/10W	NI01333110
R310		4822 051 20102	CHIP 1kΩ ±5% 1/10W	NI05102110	R710		4822 051 20102	CHIP 1kΩ ±5% 1/10W	NI05102110
R311		4822 051 20102	CHIP 1kΩ ±5% 1/10W	NI05102110	R711		4822 051 20102	CHIP 1kΩ ±5% 1/10W	NI05102110
R312		4822 051 20101	CHIP 100Ω ±5% 1/10W	NI05101110	R712		4822 051 20101	CHIP 100Ω ±5% 1/10W	NI05101110
R354		4822 051 20121	CHIP 120Ω ±5% 1/10W	NI05121110	R754		4822 051 20121	CHIP 120Ω ±5% 1/10W	NI05121110
R355		4822 051 20121	CHIP 120Ω ±5% 1/10W	NI05121110	R755		4822 051 20121	CHIP 120Ω ±5% 1/10W	NI05121110
R356		4822 117 12521	CHIP 68Ω ±5% 1/10W	NI05680110	R756		4822 117 12521	CHIP 68Ω ±5% 1/10W	NI05680110
R357		4822 051 20228	CHIP 2.2Ω ±5% 1/10W	NI05022110	R757		4822 051 20228	CHIP 2.2Ω ±5% 1/10W	NI05022110
R358		4822 051 20228	CHIP 2.2Ω ±5% 1/10W	NI05022110	R758		4822 051 20228	CHIP 2.2Ω ±5% 1/10W	NI05022110
R359		4822 117 12367	CHIP 33kΩ ±1% 1/10W	NI01333110	R759		4822 117 12367	CHIP 33kΩ ±1% 1/10W	NI01333110
R360		4822 051 20102	CHIP 1kΩ ±5% 1/10W	NI05102110	R760		4822 051 20102	CHIP 1kΩ ±5% 1/10W	NI05102110
R361		4822 051 20102	CHIP 1kΩ ±5% 1/10W	NI05102110	R761		4822 051 20102	CHIP 1kΩ ±5% 1/10W	NI05102110
R362		4822 051 20101	CHIP 100Ω ±5% 1/10W	NI05101110	R762		4822 051 20101	CHIP 100Ω ±5% 1/10W	NI05101110
R404		4822 051 20121	CHIP 120Ω ±5% 1/10W	NI05121110	RD01		4822 051 30105	CHIP 1MΩ ±5% 1/16W	NN05105610
R405		4822 051 20121	CHIP 120Ω ±5% 1/10W	NI05121110	RD02		4822 051 30221	CHIP 220Ω ±5% 1/16W	NN05221610
R406		4822 117 12521	CHIP 68Ω ±5% 1/10W	NI05680110	RD03		4822 116 82487	CHIP 0Ω ±5% 1/16W	NN05000610
R407		4822 051 20228	CHIP 2.2Ω ±5% 1/10W	NI05022110	RD04		4822 051 30479	CHIP 47Ω ±5% 1/16W	NN05470610
R408		4822 051 20228	CHIP 2.2Ω ±5% 1/10W	NI05022110	RD05		4822 051 30479	CHIP 47Ω ±5% 1/16W	NN05470610
R409		4822 117 12367	CHIP 33kΩ ±1% 1/10W	NI01333110	RD06		4822 051 30479	CHIP 47Ω ±5% 1/16W	NN05470610
R410		4822 051 20102	CHIP 1kΩ ±5% 1/10W	NI05102110	RD07		4822 051 30223	CHIP 22kΩ ±5% 1/16W	NN05223610
R411		4822 051 20102	CHIP 1kΩ ±5% 1/10W	NI05102110	RD08		4822 051 30223	CHIP 22kΩ ±5% 1/16W	NN05223610
R412		4822 051 20101	CHIP 100Ω ±5% 1/10W	NI05101110	RD09		4822 051 30479	CHIP 47Ω ±5% 1/16W	NN05470610
R454		4822 051 20121	CHIP 120Ω ±5% 1/10W	NI05121110	RD11				
R455		4822 051 20121	CHIP 120Ω ±5% 1/10W	NI05121110			4822 051 30339	CHIP 33Ω ±5% 1/16W	NN05330610
R456		4822 117 12521	CHIP 68Ω ±5% 1/10W	NI05680110	RD18				
R457		4822 051 20228	CHIP 2.2Ω ±5% 1/10W	NI05022110	RD20				
R458		4822 051 20228	CHIP 2.2Ω ±5% 1/10W	NI05022110			4822 051 30223	CHIP 22kΩ ±5% 1/16W	NN05223610
R459		4822 117 12367	CHIP 33kΩ ±1% 1/10W	NI01333110	RD30				
R460		4822 051 20102	CHIP 1kΩ ±5% 1/10W	NI05102110	RD31		4822 051 20338	FUSIBLE 3.3Ω ±5% 1/10W	NH85033110
R461		4822 051 20102	CHIP 1kΩ ±5% 1/10W	NI05102110	RD32		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610
R462		4822 051 20101	CHIP 100Ω ±5% 1/10W	NI05101110	RD33		4822 051 30563	CHIP 56kΩ ±5% 1/16W	NN05563610
R504		4822 051 20121	CHIP 120Ω ±5% 1/10W	NI05121110	RD34		4822 051 30472	CHIP 4.7kΩ ±5% 1/16W	NN05472610
R505		4822 051 20121	CHIP 120Ω ±5% 1/10W	NI05121110	RD35		4822 051 30152	CHIP 1.5kΩ ±5% 1/16W	NN05152610
R506		4822 117 12521	CHIP 68Ω ±5% 1/10W	NI05680110	RD36		4822 051 30472	CHIP 4.7kΩ ±5% 1/16W	NN05472610
R507		4822 051 20228	CHIP 2.2Ω ±5% 1/10W	NI05022110	RD39		4822 051 30472	CHIP 4.7kΩ ±5% 1/16W	NN05472610
R508		4822 051 20228	CHIP 2.2Ω ±5% 1/10W	NI05022110	RD41		4822 116 82487	CHIP 0Ω ±5% 1/16W	NN05000610
R509		4822 117 12367	CHIP 33kΩ ±1% 1/10W	NI01333110	RD42		4822 116 82487	CHIP 0Ω ±5% 1/16W	NN05000610
R510		4822 051 20102	CHIP 1kΩ ±5% 1/10W	NI05102110	RD43		4822 051 30223	CHIP 22kΩ ±5% 1/16W	NN05223610
R511		4822 051 20102	CHIP 1kΩ ±5% 1/10W	NI05102110	RD46		4822 051 30102	CHIP 1kΩ ±5% 1/16W	NN05102610
					RD51		4822 116 82487	CHIP 0Ω ±5% 1/16W	NN05000610

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POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)	POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
Q406		5322 130 41844	F.E.T. 2SK170 V LANK	HF201701H0	L642		9965 000 06669	RELAY ED2-12NU	LY20120620
Q407		4822 130 62649	F.E.T. 2SJ74 V LANK	HF100741H0	LD01		4822 158 60654	FERRITE CORE BLM31A02	FC90030070
Q451		4822 130 42843	F.E.T. 2SK389 GR OR BL	HF203892A0				CHIP INDUCTOR	
Q452		4822 130 61425	CHIP TRS. 2SC2873 Y	HX328731B0	LD02		4822 158 60654	FERRITE CORE BLM31A02	FC90030070
Q453		4822 130 63928	CHIP TRS. 2SA1312 B	HX113121B0				CHIP INDUCTOR	
Q454		4822 130 63928	CHIP TRS. 2SA1312 B	HX113121B0	LD41		9965 000 03109	FERRITE CORE	FC90020100
Q455		4822 130 63929	CHIP TRS. 2SC3324 B	HX333241B0				FB M J2125HM330-T	
Q456		5322 130 41844	F.E.T. 2SK170 V LANK	HF201701H0	LD51		9965 000 03109	FERRITE CORE	FC90020100
Q457		4822 130 62649	F.E.T. 2SJ74 V LANK	HF100741H0				FB M J2125HM330-T	
Q501		4822 130 42843	F.E.T. 2SK389 GR OR BL	HF203892A0	LD61		9965 000 03109	FERRITE CORE	FC90020100
Q502		4822 130 61425	CHIP TRS. 2SC2873 Y	HX328731B0	LN31		9965 000 06669	RELAY ED2-12NU	LY20120620
Q503		4822 130 63928	CHIP TRS. 2SA1312 B	HX113121B0	LN32		9965 000 06669	RELAY ED2-12NU	LY20120620
Q504		4822 130 63928	CHIP TRS. 2SA1312 B	HX113121B0	LN33		9965 000 06669	RELAY ED2-12NU	LY20120620
Q505		4822 130 63929	CHIP TRS. 2SC3324 B	HX333241B0	SD71		9965 000 06676	SLIDE SW. SSSF113-S06N1	SS01030300
Q506		5322 130 41844	F.E.T. 2SK170 V LANK	HF201701H0	XD01		9965 000 06677	CRYSTAL 16.9344MHZ UM-5	JX16001270
Q507		4822 130 62649	F.E.T. 2SJ74 V LANK	HF100741H0					
Q551		4822 130 42843	F.E.T. 2SK389 GR OR BL	HF203892A0				PY16-FRONT CIRCUIT BOARD	
Q552		4822 130 61425	CHIP TRS. 2SC2873 Y	HX328731B0				PY16-CAPACITORS	
Q553		4822 130 63928	CHIP TRS. 2SA1312 B	HX113121B0	CY01		4822 124 41539	ELECT. 47µF M 16V RA-2	OA47601620
Q554		4822 130 63928	CHIP TRS. 2SA1312 B	HX113121B0	CY02		9965 000 08352	CER. 0.1µF 50V F	DK98104300
Q555		4822 130 63929	CHIP TRS. 2SC3324 B	HX333241B0	CY03		4822 124 22276	ELECT. 47µF M 50V RA-2	OA47605020
Q556		5322 130 41844	F.E.T. 2SK170 V LANK	HF201701H0	CY04		9965 000 08352	CER. 0.1µF 50V F	DK98104300
Q557		4822 130 62649	F.E.T. 2SJ74 V LANK	HF100741H0	CY05		4822 122 33761	CER. 22pF ±5% CG 50V GR39	DD95220300
Q701		4822 130 42843	F.E.T. 2SK389 GR OR BL	HF203892A0	CY06		4822 122 33761	CER. 22pF ±5% CG 50V GR39	DD95220300
Q702		4822 130 61425	CHIP TRS. 2SC2873 Y	HX328731B0	CY11		4822 126 11687	CER. 0.1µF GRM39F104Z16	DK98104200
Q703		4822 130 63928	CHIP TRS. 2SA1312 B	HX113121B0	CY12		9965 000 08352	CER. 0.1µF 50V F	DK98104300
Q704		4822 130 63928	CHIP TRS. 2SA1312 B	HX113121B0	CY20		4822 124 90352	ELECT. 10µF M 16V RA-2	OA10601620
Q705		4822 130 63929	CHIP TRS. 2SC3324 B	HX333241B0	CY21		5322 126 11578	CER. 1000pF ±10% B 50V	DK96102300
Q706		5322 130 41844	F.E.T. 2SK170 V LANK	HF201701H0	CY22		4822 126 12105	CER. 0.033µF ± 10%	DK96333200
Q707		4822 130 62649	F.E.T. 2SJ74 V LANK	HF100741H0	CY23		5322 126 11578	CER. 1000pF ±10% B 50V	DK96102300
Q751		4822 130 42843	F.E.T. 2SK389 GR OR BL	HF203892A0	CY30		4822 124 41539	ELECT. 47µF M 16V RA-2	OA47601620
Q752		4822 130 61425	CHIP TRS. 2SC2873 Y	HX328731B0	CY31		4822 126 12105	CER. 0.033µF ± 10%	DK96333200
Q753		4822 130 63928	CHIP TRS. 2SA1312 B	HX113121B0	CY32		4822 122 33761	CER. 22pF ±5% CG 50V GR39	DD95220300
Q754		4822 130 63928	CHIP TRS. 2SA1312 B	HX113121B0	CY33		4822 124 90362	ELECT. 22µF M 50V RA-2	OA22605020
Q755		4822 130 63929	CHIP TRS. 2SC3324 B	HX333241B0	CY34		4822 124 90362	ELECT. 22µF M 50V RA-2	OA22605020
Q756		5322 130 41844	F.E.T. 2SK170 V LANK	HF201701H0	CY50		4822 124 90353	ELECT. 100µF M 10V RA-2	OA10701020
Q757		4822 130 62649	F.E.T. 2SJ74 V LANK	HF100741H0	CY51		4822 126 11687	CER. 0.1µF GRM39F104Z16	DK98104200
QD01		9965 000 06673	IC TC7WHU04FU	HC008005K0	CY70		4822 122 31765	CER. 100pF ±5% CG 50V GR39	DD95101300
QD02		9965 000 04632	IC TC74VHC00FS	HC005105K0	CY71		4822 122 31765	CER. 100pF ±5% CG 50V GR39	DD95101300
QD03		9965 000 04632	IC TC74VHC00FS	HC005105K0	CY72				
QD04		4822 130 61541	CHIP TRS. 2SC4116	HX341162B0				PY16-RESISTORS	
QD05		9965 000 06674	IC TC7WH74FU	HC007905K0	RY01		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610
QD06		9965 000 06673	IC TC7WHU04FU	HC008005K0	RY03		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610
			TRIPLE INVERTER		RY10		4822 051 30331	CHIP 330Ω ±5% 1/16W	NN05331610
QD21		5322 209 11578	IC PCF8574T I/O EXPANDER	HC10068490	RY11		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610
QD22		4822 130 61541	CHIP TRS. 2SC4116	HX341162B0	RY12		4822 116 83829	CHIP 270Ω ±5% 1/16W	NN05271610
QD23		9965 000 03397	IC BA033FP 3.3V 1A PD=1W	HC96J33210	RY13		4822 051 30331	CHIP 330Ω ±5% 1/16W	NN05331610
QD32		4822 130 61541	CHIP TRS. 2SC4116	HX341162B0	RY14		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610
QD35		4822 130 61554	CHIP TRS. 2SA1586 Y G	HX115862B0	RY15		4822 116 83829	CHIP 270Ω ±5% 1/16W	NN05271610
QD36		4822 130 61541	CHIP TRS. 2SC4116	HX341162B0	RY20		4822 117 13632	CHIP 100kΩ ±5% 1/16W	NN05104610
QD37		4822 130 43818	TRS. 2SC2878 A OR B RANK	HT328782A0	RY21		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610
QD38		4822 130 61541	CHIP TRS. 2SC4116	HX341162B0	RY23		4822 051 30102	CHIP 1kΩ ±5% 1/16W	NN05102610
QD41		9965 000 06675	IC CS4397 24BIT 192kHz DAC	HC10008880	RY25		4822 051 30109	CHIP 10Ω ±5% 1/16W	NN05100610
QD51		9965 000 06675	IC CS4397 24BIT 192kHz DAC	HC10008880	RY26		4822 051 30109	CHIP 10Ω ±5% 1/16W	NN05100610
QD61		9965 000 06675	IC CS4397 24BIT 192kHz DAC	HC10008880	RY27		4822 051 30109	CHIP 10Ω ±5% 1/16W	NN05100610
QD71		4822 130 61554	CHIP TRS. 2SA1586 Y G	HX115862B0	RY28		4822 051 30472	CHIP 4.7kΩ ±5% 1/16W	NN05472610
QD72		4822 130 61541	CHIP TRS. 2SC4116	HX341162B0	RY30		4822 051 30472	CHIP 4.7kΩ ±5% 1/16W	NN05472610
QD73		4822 130 61541	CHIP TRS. 2SC4116	HX341162B0	RY31		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610
QD74		4822 130 61541	CHIP TRS. 2SC4116	HX341162B0	RY32				
QD75		4822 130 61554	CHIP TRS. 2SA1586 Y G	HX115862B0	RY37		4822 051 30102	CHIP 1kΩ ±5% 1/16W	NN05102610
QD76		4822 130 61541	CHIP TRS. 2SC4116	HX341162B0	RY38		4822 051 30471	CHIP 470Ω ±5% 1/16W	NN05471610
QD77		4822 130 61541	CHIP TRS. 2SC4116	HX341162B0	RY39		4822 051 30471	CHIP 470Ω ±5% 1/16W	NN05471610
QD78		4822 130 61541	CHIP TRS. 2SC4116	HX341162B0	RY40		4822 051 30109	CHIP 10Ω ±5% 1/16W	NN05100610
			PP16-MISCELLANEOUS		RY41		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610
L602		9965 000 06669	RELAY ED2-12NU	LY20120620	RY42		4822 051 30331	CHIP 330Ω ±5% 1/16W	NN05331610
L622		9965 000 06669	RELAY ED2-12NU	LY20120620	RY43		4822 051 30121	CHIP 120Ω ±5% 1/16W	NN05121610
					RY45		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610

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POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
RY50		4822 051 30331	CHIP 330Ω ±5% 1/16W	NN05331610
RY51		4822 117 12925	CHIP 47kΩ ±5% 1/16W	NN05473610
RY52		4822 117 13632	CHIP 100kΩ ±5% 1/16W	NN05104610
RY53		4822 051 30472	CHIP 4.7kΩ ±5% 1/16W	NN05472610
RY54		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610
RY55		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610
RY56		4822 051 30331	CHIP 330Ω ±5% 1/16W	NN05331610
RY57		4822 051 30331	CHIP 330Ω ±5% 1/16W	NN05331610
RY60 }		4822 051 30472	CHIP 4.7kΩ ±5% 1/16W	NN05472610
RY66				
RY67		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610
RY70		4822 117 12864	CHIP 82kΩ ±5% 1/16W	NN05823610
RY71		4822 117 12864	CHIP 82kΩ ±5% 1/16W	NN05823610
RY72		4822 117 12864	CHIP 82kΩ ±5% 1/16W	NN05823610
RY80		4822 051 30331	CHIP 330Ω ±5% 1/16W	NN05331610
RY81		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610
RY82		4822 116 83829	CHIP 270Ω ±5% 1/16W	NN05271610
RY83		4822 051 30331	CHIP 330Ω ±5% 1/16W	NN05331610
RY84		4822 051 30103	CHIP 10kΩ ±5% 1/16W	NN05103610
RY85		4822 116 83829	CHIP 270Ω ±5% 1/16W	NN05271610
			PY16-SEMICONDUCTORS	
DY01		9965 000 07640	CHIP DIODE UDZ-10B	HZ30009210
DY02		9965 000 01598	CHIP DIODE UDZS8.2B MA8082-M	HZ30821000
DY10		4822 130 80326	L.E.D. LT3D8B RED 3O	HI10062320
DY11		4822 130 80326	L.E.D. LT3D8B RED 3O	HI10062320
DY20		4822 130 83715	CHIP DIODE 1SS301 DAN202U	HZ21005000
DY80		4822 130 80326	L.E.D. LT3D8B RED 3O	HI10062320
DY81		4822 130 80326	L.E.D. LT3D8B RED 3O	HI10062320
▲ QY01		9965 000 04975	IC NJM79L24A:0.1A-24V	HC39124090
QY10		9965 000 10841	MICROPROCESSOR TMP87CH74F FL DRIVER	HU413KT000
QY11		4822 130 61554	CHIP TRS. 2SA1586 Y G	HX115862B0
QY12		4822 130 61554	CHIP TRS. 2SA1586 Y G	HX115862B0
QY20		4822 130 61541	CHIP TRS. 2SC4116	HX341162B0
QY30		4822 130 61541	CHIP TRS. 2SC4116	HX341162B0
QY31		4822 130 43954	CHIP TR.(2SD) 2SD999	HX409992A0
QY32		4822 130 42734	CHIP TR.(2SB) 2SB798 DL DK	HX207982A0
QY40		4822 130 61554	CHIP TRS. 2SA1586 Y G	HX115862B0
QY51		4822 130 61554	CHIP TRS. 2SA1586 Y G	HX115862B0
QY52		4822 130 61541	CHIP TRS. 2SC4116	HX341162B0
QY70		4822 130 61541	CHIP TRS. 2SC4116	HX341162B0
QY71		4822 130 61541	CHIP TRS. 2SC4116	HX341162B0
QY72		4822 130 61541	CHIP TRS. 2SC4116	HX341162B0
QY80		4822 130 61554	CHIP TRS. 2SA1586 Y G	HX115862B0
QY81		4822 130 61554	CHIP TRS. 2SA1586 Y G	HX115862B0
			PY16-MISCELLANEOUS	
LY01		9965 000 03109	FERRITE CORE FB M J2125HM330-T	FC90020100
SY01 }		4822 276 13408	PUSH SW. SKHVBF 260GF RED	SP01012030
SY10				
VY01		2722 171 07718	DISPLAY UNIT FTD 15-MT-67GNK	HQ31209410
XY01		2422 540 98518	CER. VIB. CSTS MG 8MHz 15pF	FQ08004060
ZY01		9965 000 06833	PHOTO UNIT RPM6936-H4	HW10008210
			PY26-POWER SW. CIRCUIT BOARD	
DY40		4822 130 80326	L.E.D. LT3D8B RED 3O	HI10062320
RY44		4822 051 30121	CHIP 120Ω ±5% 1/16W	NN05121610
SY40		9965 000 10847	PUSH SW. SPPH430100	SP02022310

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