Colour Television **Chassis**

LC8.1E

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Service Manual

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PHILIPS

1. Technical Specifications, Connections, and Chassis Overview

Index of this chapter:

Notes:

- Figures can deviate due to the different set executions.
- Specifications are indicative (subject to change).

1.1 Technical Specifications

1.1.1 Vision

Display type	:	LCD
Screen size	:	32" (82 cm), 16:9
	:	42" (107 cm), 16:9
Resolution (HxV pixels)	:	1366 × 768
Dyn. contrast ratio	:	24000:1
Min. light output (cd/m^2)	:	500
Typ. response time (ms)	:	6
Viewing angle (HxV degrees)	:	176 × 176
Tuning system	:	PLL
Presets/channels	:	99 presets
Tuner bands	:	VHF, UHF, S, H
TV Colour systems	:	PAL B/G, D/K, I
	:	SECAM B/G, D/K, L/L'
Video playback	:	NTSC
	:	PAL
	:	SECAM
Supported computer formats	:	640 × 480
	:	720 × 480
	:	800 × 600
	:	1024 × 768
	:	1280 × 720
Supported video formats	:	480i @ 60 Hz
	:	480p @ 60 Hz
	:	576i @ 50 Hz
	:	576p @ 50 Hz
	:	720p @50, 60 Hz
	:	1080i @ 50, 60 Hz
	:	1080p @ 24, 25, 30, 50, 60 Hz

1.1.2 Sound

Sound systems	:	Nicam Stereo
Maximum power (W_{RMS})	:	2 × 10

1.1.3 Miscellaneous

Power supply:		
- Mains voltage (V_{AC})	:	220 - 240
- Mains frequency (Hz)	:	50 / 60
Ambient conditions:		
- Temperature range (°C)	:	+5 to +35
- Maximum humidity	:	90% R.H.
Power consumption (values are indicative)		
- Normal operation (W)	:	≈ 130 (32")
	:	≈ 200 (42")
- Stand-by (W)	:	< 0.15
Dimensions (W × H × D mm)	:	809 × 544 × 92 (32")
	:	1033 × 667 × 88 (42")
Weight incl. packaging (kg)	:	18 (32")
	:	39 (42")

1.2 Connection Overview

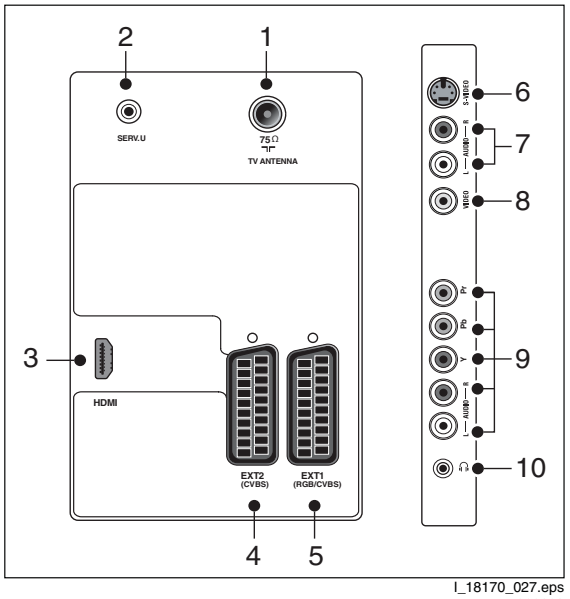

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Figure 1-1 Side and rear I/O connections

Note: The following connector colour abbreviations are used (acc. to DIN/IEC 757): Bk= Black, Bu= Blue, Gn= Green, Gy= Grey, Rd= Red, Wh= White, and Ye= Yellow.

1.2.1 Connections

1 - Aerial - In

-	- IEC-type (EU)	Coax, 75 ohm	⊤

2 - Service Connector (UART)

1	- UART_TX	Transmit	⊖→
2	- Ground	Gnd	⏚
3	- UART_RX	Receive	⊕

3 - HDMI: Digital Video, Digital Audio - In

1	- D2+	Data channel	⊕
2	- Shield	Gnd	⏚
3	- D2-	Data channel	⊕
4	- D1+	Data channel	⊕
5	- Shield	Gnd	⏚
6	- D1-	Data channel	⊕
7	- D0+	Data channel	⊕
8	- Shield	Gnd	⏚
9	- D0-	Data channel	⊕
10	- CLK+	Data channel	⊕
11	- Shield	Gnd	⏚
12	- CLK-	Data channel	⊕
13	- CEC	Control channel	⊕⊖→
14	- n.c.		
15	- DDC_SCL	DDC clock	⊕
16	- DDC_SDA	DDC data	⊕⊖→
17	- Ground	Gnd	⏚
18	- +5V		⊕
19	- HPD	Hot Plug Detect	⊕
20	- Ground	Gnd	⏚

4 - EXT2: CVBS - In/Out, Audio - In/Out

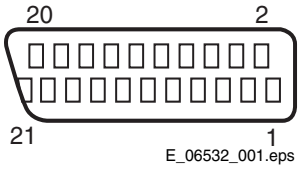

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Figure 1-2 SCART connector

1	- Audio R	0.5 V_{RMS} / 1 kohm	⊖→
2	- Audio R	0.5 V_{RMS} / 10 kohm	⊕
3	- Audio L	0.5 V_{RMS} / 1 kohm	⊖→
4	- Ground	Gnd	⏚
5	- Ground	Gnd	⏚
6	- Audio L	0.5 V_{RMS} / 10 kohm	⊕
7	- n.c.		
8	- Function Select	0 - 2 V: INT 4.5 - 7 V: EXT 16:9 9.5 - 12 V: EXT 4:3	⊕
9	- Ground	Gnd	⏚
10	- n.c.		
11	- n.c		
12	- n.c.		
13	- Ground	Gnd	⏚
14	- Ground	Gnd	⏚
15	- Video/C	0.7 V_{PP} / 75 ohm	⊕
16	- n.c.		
17	- Ground	Gnd	⏚
18	- Ground	Gnd	⏚
19	- Video CVBS	1 V_{PP} / 75 ohm	⊖→
20	- Video CVBS	1 V_{PP} / 75 ohm	⊕
21	- Shield	Gnd	⏚

5 - EXT1: Video RGB - In, CVBS - In/Out, Audio - In/Out

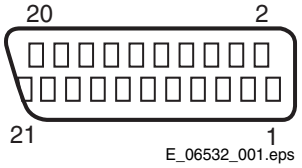

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Figure 1-3 SCART connector

1	- Audio R	0.5 V_{RMS} / 1 kohm	⊖→
2	- Audio R	0.5 V_{RMS} / 10 kohm	⊕
3	- Audio L	0.5 V_{RMS} / 1 kohm	⊖→
4	- Ground	Gnd	⏚
5	- Ground	Gnd	⏚
6	- Audio L	0.5 V_{RMS} / 10 kohm	⊕
7	- Video Blue	0.7 V_{PP} / 75 ohm	⊕
8	- Function Select	0 - 2 V: INT 4.5 - 7 V: EXT 16:9 9.5 - 12 V: EXT 4:3	⊕
9	- Ground	Gnd	⏚
10	- n.c.		
11	- Video Green	0.7 V_{PP} / 75 ohm	⊕
12	- n.c.		
13	- Ground	Gnd	⏚
14	- Ground	Gnd	⏚
15	- Video Red	0.7 V_{PP} / 75 ohm	⊕
16	- Status/FBL	0 - 0.4 V: INT 1 - 3 V: EXT / 75 ohm	⊕
17	- Ground	Gnd	⏚
18	- Ground	Gnd	⏚
19	- Video CVBS	1 V_{PP} / 75 ohm	⊖→
20	- Video CVBS	1 V_{PP} / 75 ohm	⊕
21	- Shield	Gnd	⏚

6 - S-Video (Hosiden): Video Y/C - In

1	- Ground Y	Gnd
2	- Ground C	Gnd
3	- Video Y	1 V_{PP} / 75 ohm
4	- Video C	0.3 V_{PP}P / 75 ohm

7, 8 - Cinch: Video CVBS - In, Audio - In

Ye	- Video CVBS	1 V_{PP} / 75 ohm
Wh	- Audio L	0.5 V_{RMS} / 10 kohm
Rd	- Audio R	0.5 V_{RMS} / 10 kohm

9 - Cinch: Video YPbPr - In, Audio - In

Gn	- Video Y	1 V_{PP} / 75 ohm
Bu	- Video Pb	0.7 V_{PP} / 75 ohm
Rd	- Video Pr	0.7 V_{PP} / 75 ohm
Wh	- Audio L	0.5 V_{RMS} / 10 kohm
Rd	- Audio R	0.5 V_{RMS} / 10 kohm

10 - Head phone - Out

Bk	- Head phone	32 - 600 ohm / 10 mW

1.3 Chassis Overview

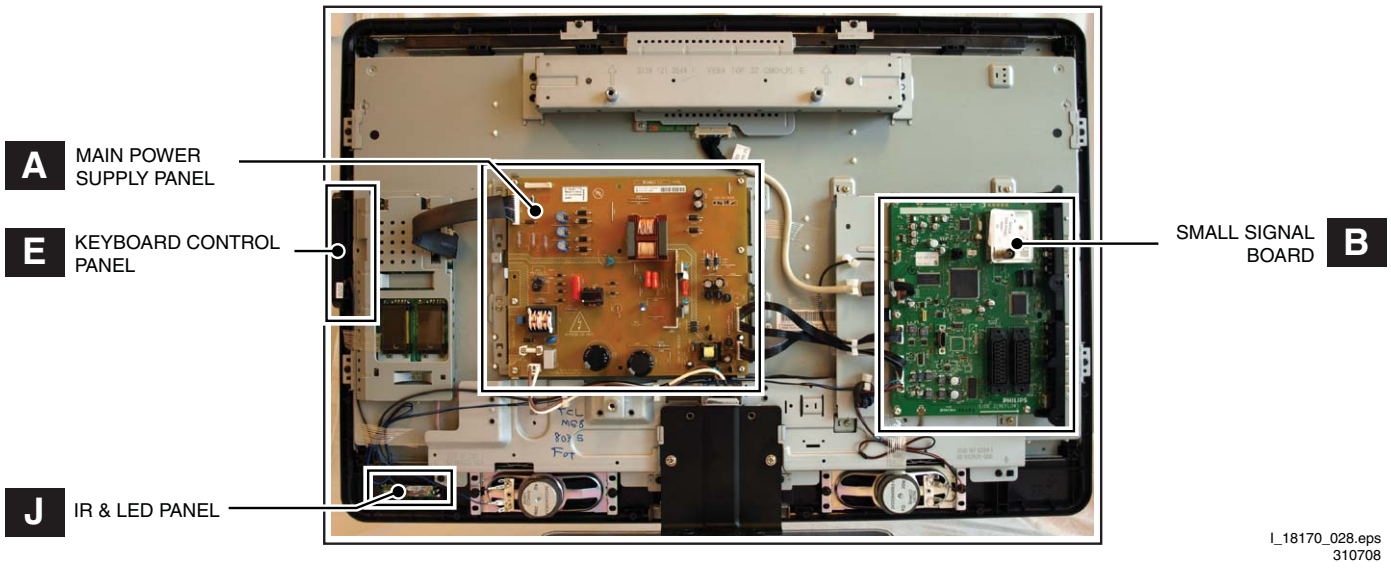

Figure 1-4 PWB/CBA locations

2. Safety Instructions, Warnings, and Notes

Index of this chapter:

2.1 Safety Instructions

Safety regulations require the following **during** a repair:

- Connect the set to the Mains/AC Power via an isolation transformer (> 800 VA).
- Replace safety components, indicated by the symbol ⚠, only by components identical to the original ones. Any other component substitution (other than original type) may increase risk of fire or electrical shock hazard.

Safety regulations require that **after** a repair, the set must be returned in its original condition. Pay in particular attention to the following points:

- Route the wire trees correctly and fix them with the mounted cable clamps.
- Check the insulation of the Mains/AC Power lead for external damage.
- Check the strain relief of the Mains/AC Power cord for proper function.
- Check the electrical DC resistance between the Mains/AC Power plug and the secondary side (only for sets that have a Mains/AC Power isolated power supply):
  1. Unplug the Mains/AC Power cord and connect a wire between the two pins of the Mains/AC Power plug.
  2. Set the Mains/AC Power switch to the “on” position (keep the Mains/AC Power cord unplugged!).
  3. Measure the resistance value between the pins of the Mains/AC Power plug and the metal shielding of the tuner or the aerial connection on the set. The reading should be between 4.5 MΩ and 12 MΩ.
  4. Switch “off” the set, and remove the wire between the two pins of the Mains/AC Power plug.
- Check the cabinet for defects, to prevent touching of any inner parts by the customer.

2.2 Warnings

- All ICs and many other semiconductors are susceptible to electrostatic discharges (ESD ⚠). Careless handling during repair can reduce life drastically. Make sure that, during repair, you are connected with the same potential as the mass of the set by a wristband with resistance. Keep components and tools also at this same potential.
- Be careful during measurements in the high voltage section.
- Never replace modules or other components while the unit is switched “on”.
- When you align the set, use plastic rather than metal tools. This will prevent any short circuits and the danger of a circuit becoming unstable.

2.3 Notes

2.3.1 General

- Measure the voltages and waveforms with regard to the chassis (= tuner) ground (⏚), or hot ground (⏚), depending on the tested area of circuitry. The voltages and waveforms shown in the diagrams are indicative. Measure them in the Service Default Mode (see chapter 5) with a colour bar signal and stereo sound (L: 3 kHz, R: 1 kHz unless stated otherwise) and picture carrier at 475.25 MHz for PAL, or 61.25 MHz for NTSC (channel 3).
- Where necessary, measure the waveforms and voltages with (⊓) and without (⊼) aerial signal. Measure the voltages in the power supply section both in normal operation (⏻) and in stand-by (⏻). These values are indicated by means of the appropriate symbols.

2.3.2 Schematic Notes

- All resistor values are in ohms, and the value multiplier is often used to indicate the decimal point location (e.g. 2K2 indicates 2.2 kΩ).
- Resistor values with no multiplier may be indicated with either an “E” or an “R” (e.g. 220E or 220R indicates 220 Ω).
- All capacitor values are given in micro-farads ($\mu = \times 10^{-6}$), nano-farads ($n = \times 10^{-9}$), or pico-farads ($p = \times 10^{-12}$).
- Capacitor values may also use the value multiplier as the decimal point indication (e.g. 2p2 indicates 2.2 pF).
- An “asterisk” (*) indicates component usage varies. Refer to the diversity tables for the correct values.
- The correct component values are listed in the Spare Parts List. Therefore, always check this list when there is any doubt.

2.3.3 BGA (Ball Grid Array) ICs

Introduction

For more information on how to handle BGA devices, visit this URL: *www.atyourservice.ce.philips.com* (needs subscription, not available for all regions). After login, select “Magazine”, then go to “Repair downloads”. Here you will find Information on how to deal with BGA-ICs.

BGA Temperature Profiles

For BGA-ICs, you **must** use the correct temperature-profile, which is coupled to the 12NC. For an overview of these profiles, visit the website *www.atyourservice.ce.philips.com* (needs subscription, but is not available for all regions)
You will find this and more technical information within the “Magazine”, chapter “Repair downloads”.
For additional questions please contact your local repair help desk.

2.3.4 Lead-free Soldering

Due to lead-free technology some rules have to be respected by the workshop during a repair:

- Use only lead-free soldering tin Philips SAC305 with order code 0622 149 00106. If lead-free solder paste is required, please contact the manufacturer of your soldering equipment. In general, use of solder paste within workshops should be avoided because paste is not easy to store and to handle.
- Use only adequate solder tools applicable for lead-free soldering tin. The solder tool must be able:
  - To reach a solder-tip temperature of at least 400°C.
  - To stabilize the adjusted temperature at the solder-tip.
  - To exchange solder-tips for different applications.
- Adjust your solder tool so that a temperature of around 360°C - 380°C is reached and stabilized at the solder joint. Heating time of the solder-joint should not exceed ~ 4 sec. Avoid temperatures above 400°C, otherwise wear-out of tips will increase drastically and flux-fluid will be destroyed. To avoid wear-out of tips, switch “off” unused equipment or reduce heat.
- Mix of lead-free soldering tin/parts with leaded soldering tin/parts is possible but PHILIPS recommends strongly **to avoid** mixed regimes. If this cannot be avoided, carefully clear the solder-joint from old tin and re-solder with new tin.

2.3.5 Alternative BOM identification

It should be noted that on the European Service website, “Alternative BOM” is referred to as “Design variant”.

The **third digit** in the serial number (example: AG**2**B0335000001) indicates the number of the alternative B.O.M. (Bill Of Materials) that has been used for producing the specific TV set. In general, it is possible that the same TV model on the market is produced with e.g. two different types of displays, coming from two different suppliers. This will then result in sets which have the same CTN (Commercial Type Number; e.g. 28PW9515/12) but which have a different B.O.M. number.
By looking at the third digit of the serial number, one can identify which B.O.M. is used for the TV set he is working with. If the third digit of the serial number contains the number “1” (example: AG**1**B033500001), then the TV set has been manufactured according to B.O.M. number 1. If the third digit is a “2” (example: AG**2**B0335000001), then the set has been produced according to B.O.M. no. 2. ***This is important for ordering the correct spare parts!***
For the third digit, the numbers 1...9 and the characters A...Z can be used, so in total: 9 plus 26= 35 different B.O.M.s can be indicated by the third digit of the serial number.

Identification: The bottom line of a type plate gives a 14-digit serial number. Digits 1 and 2 refer to the production center (e.g. AG is Bruges), digit 3 refers to the B.O.M. code, digit 4 refers to the Service version change code, digits 5 and 6 refer to the production year, and digits 7 and 8 refer to production week (in example below it is 2006 week 17). The 6 last digits contain the serial number.

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Figure 2-1 Serial number (example)

2.3.6 Board Level Repair (BLR) or Component Level Repair (CLR)

If a board is defective, consult your repair procedure to decide if the board has to be exchanged or if it should be repaired on component level.
If your repair procedure says the board should be exchanged completely, do not solder on the defective board. Otherwise, it cannot be returned to the O.E.M. supplier for back charging!

2.3.7 Practical Service Precautions

- **It makes sense to avoid exposure to electrical shock.** While some sources are expected to have a possible dangerous impact, others of quite high potential are of limited current and are sometimes held in less regard.
- **Always respect voltages**. While some may not be dangerous in themselves, they can cause unexpected reactions that are best avoided. Before reaching into a powered TV set, it is best to test the high voltage insulation. It is easy to do, and is a good service precaution.

3. Directions for Use

You can download this information from the following websites:
http://www.philips.com/support
http://www.p4c.philips.com

4. Mechanical Instructions

Index of this chapter:

Notes:

- Figures below can deviate slightly from the actual situation, due to the different set executions.

4.1 Cable Dressing

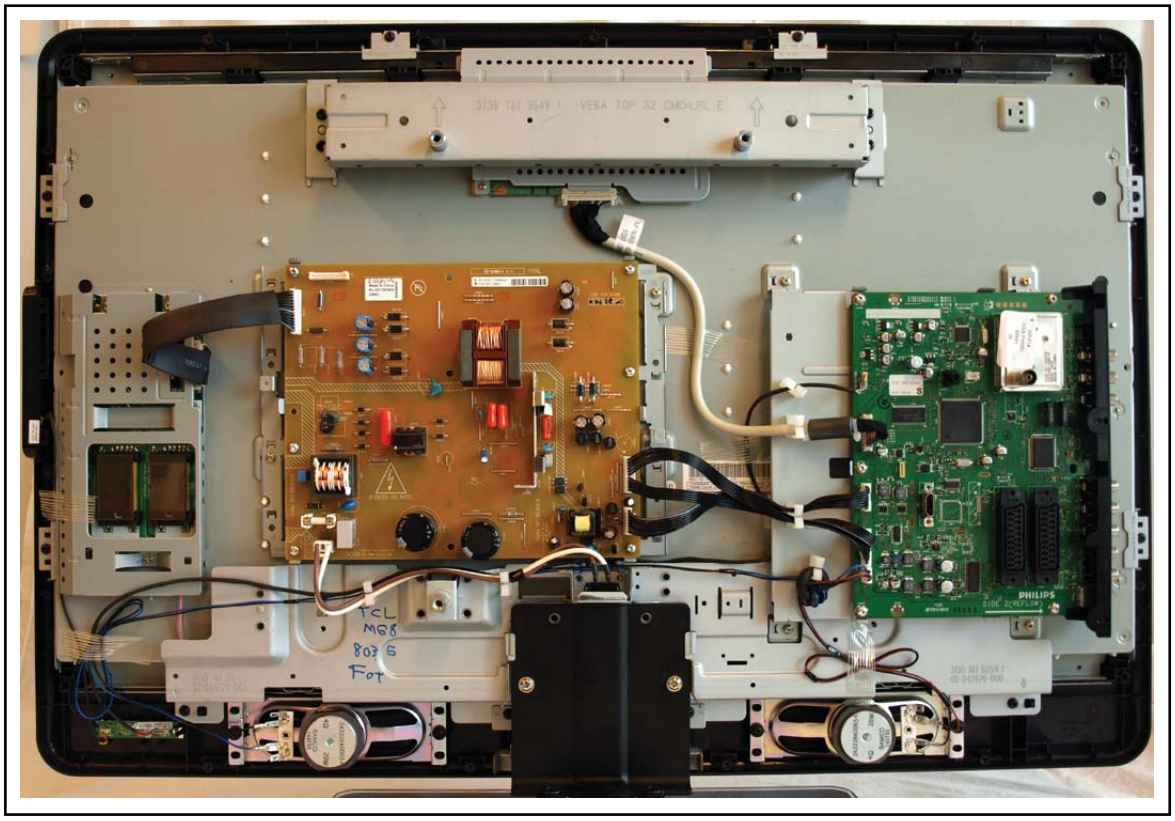

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Figure 4-1 Cable dressing 32" sets

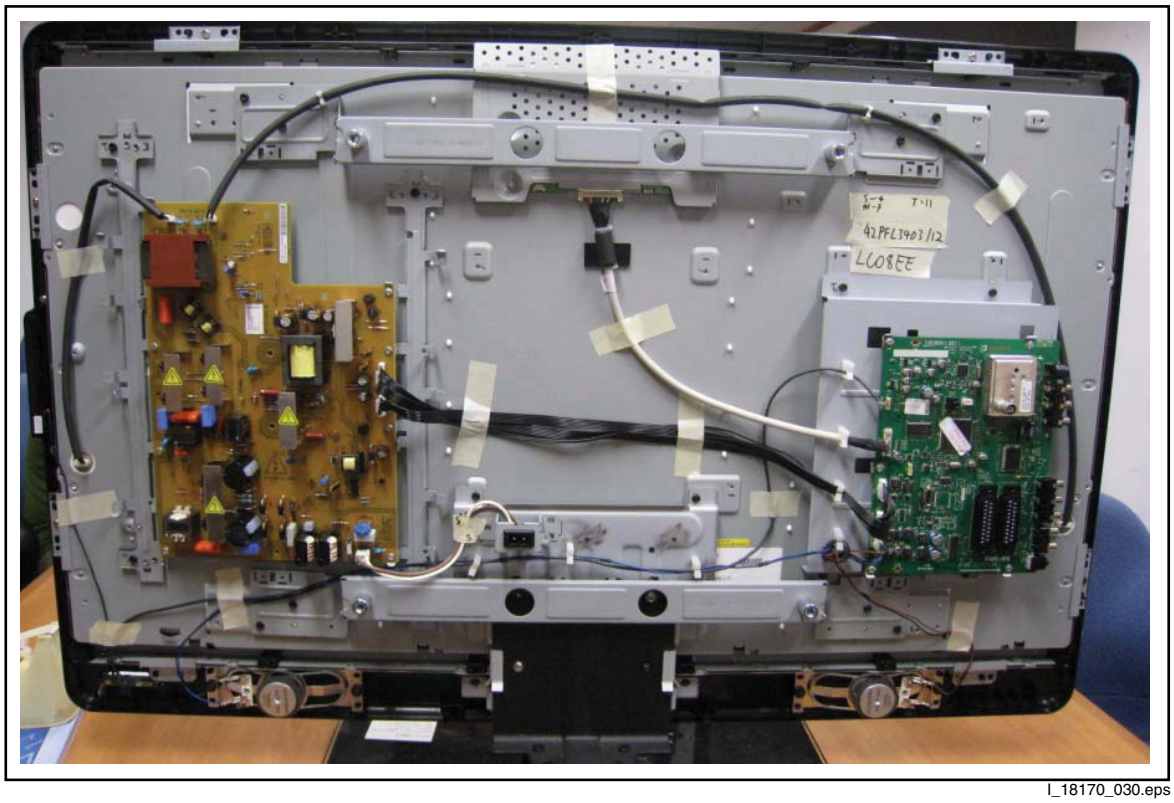

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Figure 4-2 Cable dressing 42" sets

4.2 Service Positions

For easy servicing of this set, there are a few possibilities created:

- The buffers from the packaging (see figure “Rear cover”).
- Foam bars (created for Service).

4.2.1 Foam Bars

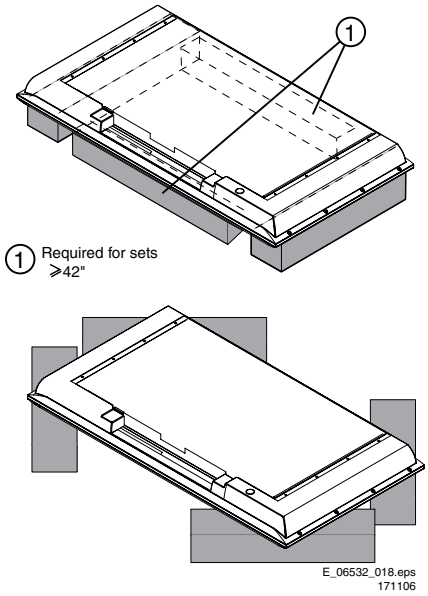

Figure 4-3 Foam bars

The foam bars (order code 3122 785 90580 for two pieces) can be used for all types and sizes of Flat TVs. See figure “Foam bars” for details. Sets with a display of 42" and larger, require **four** foam bars [1]. Ensure that the foam bars are always supporting the cabinet and **never** only the display.
Caution: Failure to follow these guidelines can seriously damage the display!
By laying the TV face down on the (ESD protective) foam bars, a stable situation is created to perform measurements and alignments. By placing a mirror under the TV, you can monitor the screen.

4.3 Assy/Panel Removal MG8 Styling

Pictures are taken from 32” set.

4.3.1 Rear Cover

Warning: Disconnect the mains power cord before you remove the rear cover.
You can remove the backcover without removing the stand.

4.3.2 Speakers

Refer to next figure for details.
1. Unplug the connectors [1].
2. Remove the screws [2] and lift the speaker from the back cover.

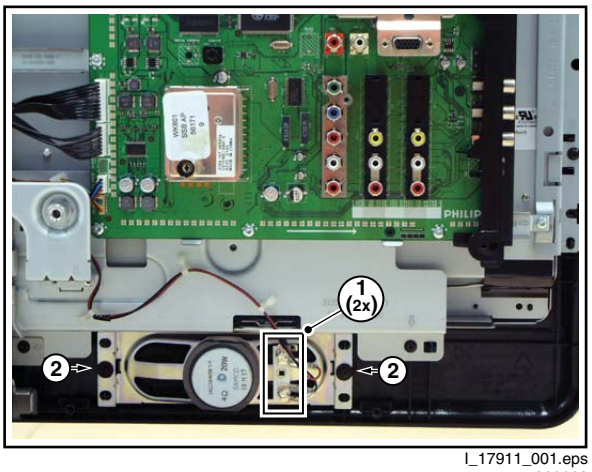

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Figure 4-4 Speakers

4.3.3 IR & LED Panel

Refer to next figure for details.
1. Unplug connectors [1].
2. Release the clips and take the panel out.

When defective, replace the whole unit.

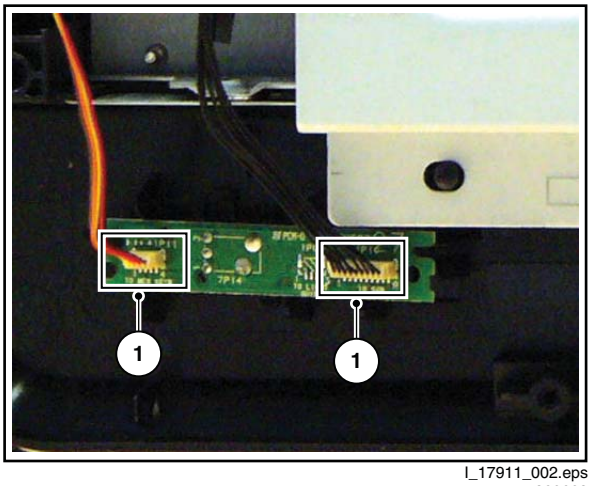

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Figure 4-5 IR & LED Board

4.3.4 Keyboard Control Panel

Refer to next figure for details.
1. Unplug the key board connector from the IR & LED board.
2. Remove the screws [1].
3. Lift the unit and take it out of the set.

When defective, replace the whole unit.

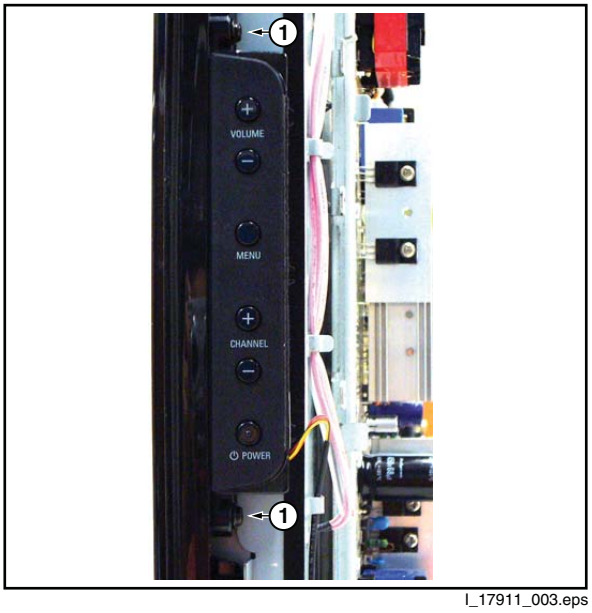

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Figure 4-6 Key Board

4.3.5 Main Power Supply Panel 32"

Refer to next figure for details.
1. Unplug connectors [1].
2. Remove the fixation screws [2].
3. Take the board out.

When defective, replace the whole unit.

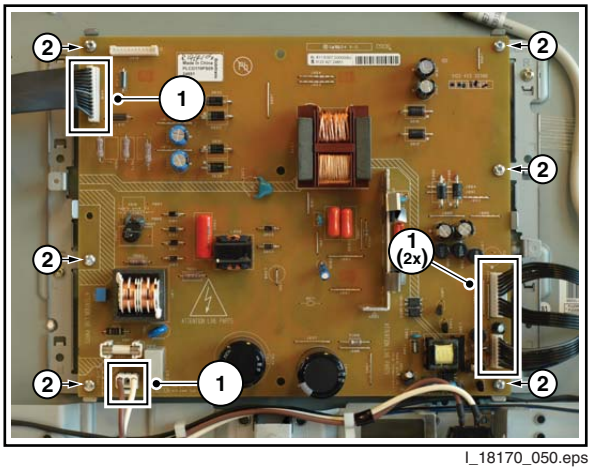

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Figure 4-7 Main Power Supply Panel 32"

4.3.6 Small Signal Board (SSB)

Refer to next figure for details.
Caution: it is mandatory to remount all different screws at their original position during re-assembly. Failure to do so may result in damaging the SSB.

1. Unplug the LVDS connector [1].
   Caution: be careful, as this is a very fragile connector!
2. Unplug the connectors [2].
3. Remove the screws [3].
4. The SSB can now be taken out of the set, together with the side cover.
5. To remove the side cover, push back the clamp [4] using a screw driver.
6. Pull the cover sidewards from the SSB.

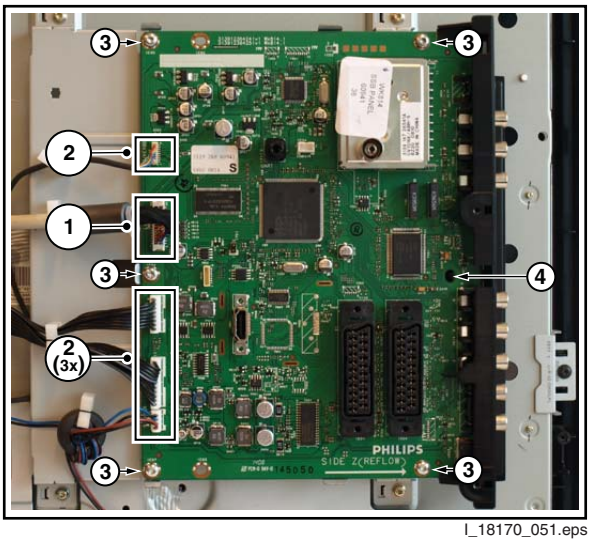

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Figure 4-8 Small Signal Board

4.3.7 LCD Panel

Refer to next figures for details.

1. Remove the stand [1].
2. Unplug the LVDS connector [2].
3. Unplug connectors [3] from
   – Main Power Supply Panel
   – Speakers
   – IR & LED Panel.
4. Remove any adhesive tape [4] that prevents cables being removed from the set.
5. Remove all cables from clamps [5] that prevents them from being removed from the set.
6. Remove the VESA stand [6].
7. Remove the Main Power Supply Panel **together with it's subframe** [7].
8. Remove the Small Signal Board **together with it's subframe** [8].
9. Remove the subframe that holds the stand [9].
10. Remove the clamps that secure the LCD Panel [10] and take the panel out.

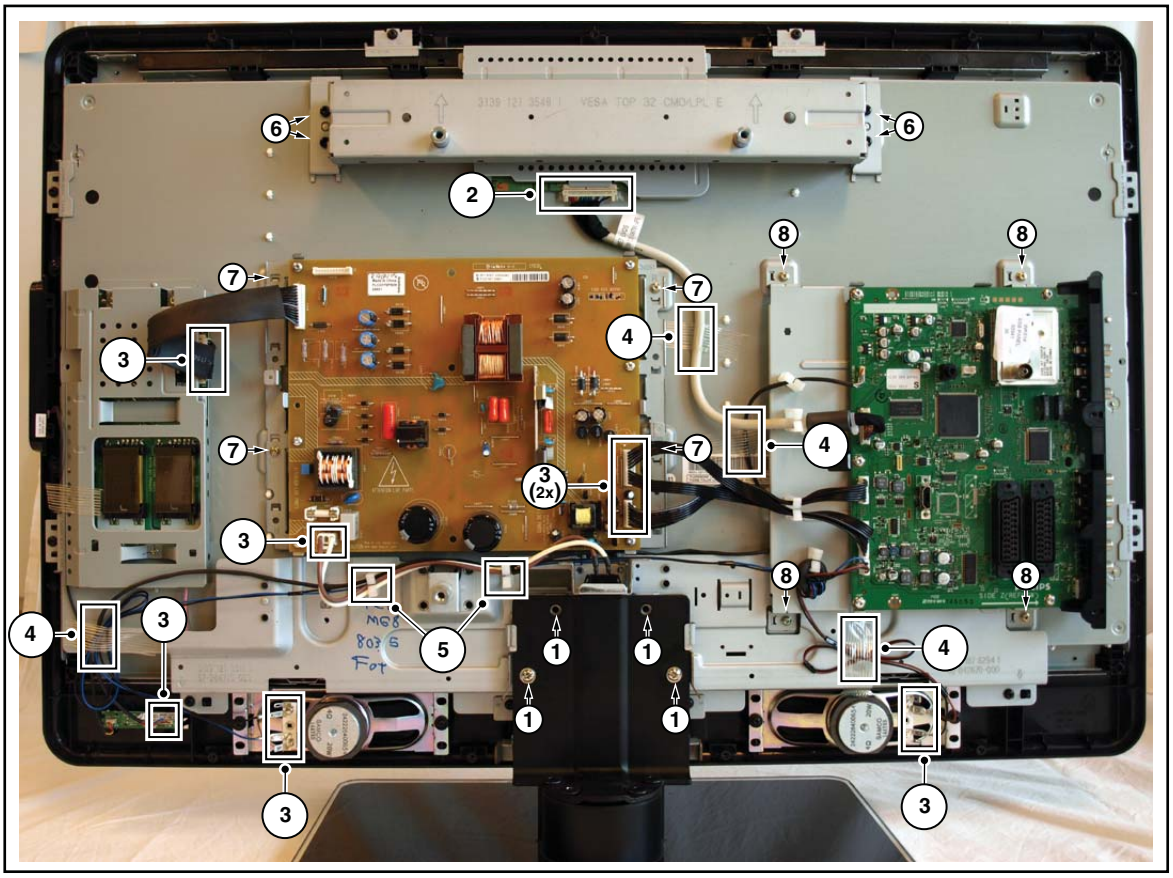

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Figure 4-9 LCD Panel -1-

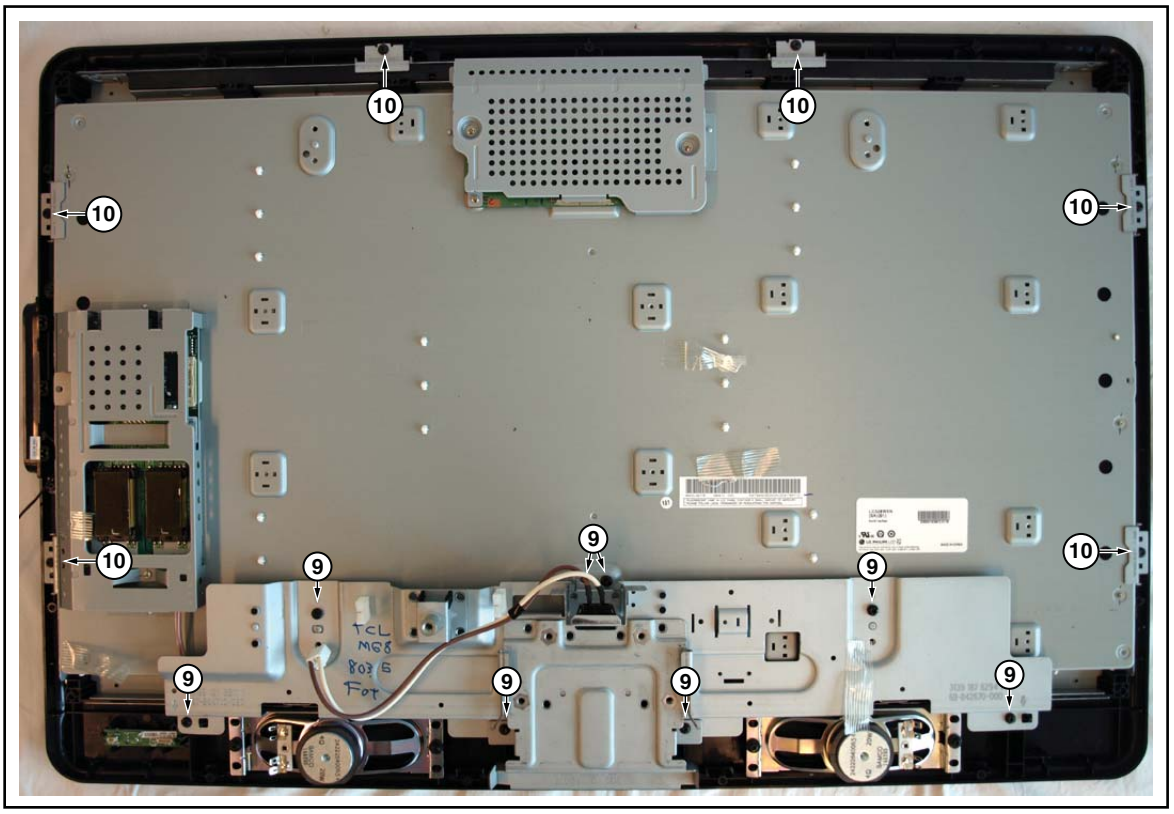

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Figure 4-10 LCD Panel -2-

4.4 Set Re-assembly

To re-assemble the whole set, execute all processes in reverse order.

Notes:

- While re-assembling, make sure that all cables are placed and connected in their original position. See figure “Cable dressing”.
- Pay special attention not to damage the EMC foams on the SSB shields. Ensure that EMC foams are mounted correctly.

5. Service Modes, Error Codes, and Fault Finding

Index of this chapter:

5.1 Test Points

In the chassis schematics and layout overviews, the test points (Fxxx) are mentioned. In the schematics, test points are indicated with a rectangular box around “Fxxx” or “Ixxx”, in the layout overviews with a “half-moon” sign.
As most signals are digital, it will be difficult to measure waveforms with a standard oscilloscope. Several key ICs are capable of generating test patterns, which can be controlled via ComPair. In this way it is possible to determine which part is defective.

5.2 Service Modes

The Service Mode feature is split into four parts:
- Simplified Service Default Mode (SDM).
- Service Alignment Mode (SAM).
- Customer Service Mode (CSM).
- Computer Aided Repair Mode (ComPair).

SDM and SAM offer features, which can be used by the Service engineer to repair/align a TV set. Some features are:
- Activates the blinking LED procedure for error identification when no picture is available (SDM).
- Make alignments (e.g. white tone), (de)select options, enter options codes, reset the error buffer (SAM).
- Display information (“SAM” indication in upper right corner of screen, error buffer, software version, options and option codes, sub menus).

The CSM is a Service Mode that can be enabled by the consumer. The CSM displays diagnosis information, which the customer can forward to the dealer or call centre. In CSM mode, “CSM”, is displayed in the top right corner of the screen. The information provided in CSM and the purpose of CSM is to:
- Increase the home repair hit rate.
- Decrease the number of nuisance calls.
- Solved customers' problem without home visit.

ComPair Mode is used for communication between a computer and a TV on I^2C /UART level and can be used by a Service engineer to quickly diagnose the TV set by reading out error codes, read and write in NVMs, communicate with ICs and the uP (PWM, registers, etc.), and by making use of a fault finding database. It will also be possible to up and download the software of the TV set via I^2C with help of ComPair. To do this, ComPair has to be connected to the TV set via the compare connector, which will be accessible through the rear of the set (without removing the rear cover).

5.2.1 General

Some items are applicable to all Service Modes or are general. These are listed below.

Software Identification, Version, and Cluster
The software ID, version, and cluster will be shown in the main menu display of SDM, SAM, and CSM.
The screen will show: **“AAAABCD X.YY”**, where:
- **AAAA** is the chassis name: LC81.
- **B** is the region indication: E= Europe, A= AP/China, U=NAFTA, L= LATAM.
- **C** is the display indication: L= LCD, P= Plasma.
- **D** is the language/feature indication: 1= standard, H=1080p full HD.
- **X** is the main version number: this is updated with a major change of specification (incompatible with the previous software version). Numbering will go from 1 - 9 and A - Z.
  – If the main version number changes, the new version number is written in the NVM.
  – If the main version number changes, the default settings are loaded.
- **YY** is the sub version number: this is updated with a minor change (backwards compatible with the previous versions) Numbering will go from 00 - 99.
  – If the sub version number changes, the new version number is written in the NVM.
  – If the NVM is fresh, the software identification, version, and cluster will be written to NVM.

Display Option Code Selection
When after an SSB or display exchange, the display option code is not set properly; it will result in a TV with “no display”. Therefore, it is required to set this display option code after such a repair.
To do so, press the following key sequence on a standard RC transmitter: **“062598”** directly followed by **MENU** the OSD “Panel Selection” will displayed on screen and **“xxx”**, where “xxx” is a 3 digit decimal value of the panel type: see column “Display code” in table “Option code overview” (ch. 8), or see sticker on the side/bottom of the cabinet. When the value is accepted and stored in NVM, the OSD “Panel Selection” will be disappear set remain on, to indicate that the process has been completed.

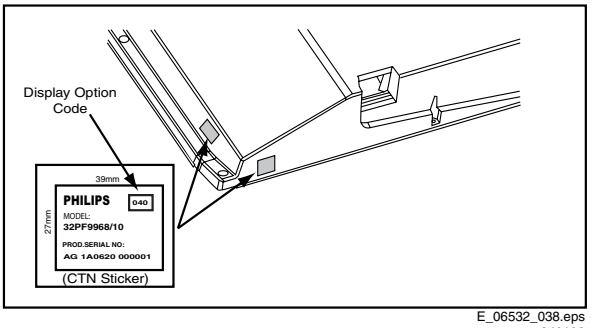

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Figure 5-1 Location of Display Option Code sticker

During this algorithm, the NVM-content must be filtered, because several items in the NVM are TV-related and not SSB related (e.g. Model and Prod. S/N). Therefore, “Model” and “Prod. S/N” data is changed into “See Type Plate”.
In case a call centre or consumer reads “See Type Plate” in CSM mode, he needs to look to the side/bottom sticker to identify the set, for further actions.

5.2.2 Service Default Mode (SDM)

Purpose
This simplified SDM mode in LC8.1E LB chassis is used for Error blinking only.
- Start the blinking LED procedure.

How to Activate
- Press the following key sequence on the remote control transmitter: **“062596”** directly followed by the **MENU**

button (do not allow the display to time out between entries while keying the sequence).

Note:
No SDM "Service" jumpers in this LC08.1E LB chassis.
No SDM "OSD" menu displayed on screen.

How to Exit
Switch the set to STANDBY by pressing the mains button on the remote control transmitter or on the television set.
The error buffer will only be cleared when the "clear" command is used in the SAM menu.

Note:
- If you switch the television set "off" by removing the mains (i.e., unplugging the television), the television set will remain in SDM when mains is re-applied, and the error buffer is not cleared.
- In case the set is in Factory mode by accident (with "F" displayed on screen), by pressing and hold "VOL-" and "CH-" together should leave Factory mode.

5.2.3 Service Alignment Mode (SAM)

Purpose
- To change option settings.
- To display / clear the error code buffer.
- To perform alignments.

Specifications
- Software version, error codes, and option settings display.
- Error buffer clearing.
- Option settings.
- Software alignments (Tuner, White Tone).
- ISP Mode (ComPair Mode) switching.

How to Activate
To activate SAM, use one of the following methods:
- Press the following key sequence on the remote control transmitter: **"062596"** directly followed by the **OSD/ STATUS/INFO/i+** button (it depends on region which button is present on the RC). Do not allow the display to time out between entries while keying the sequence.
- Or via ComPair.

After entering SAM, the following screen is visible, with SAM in the upper right corner of the screen to indicate that the television is in Service Alignment Mode.

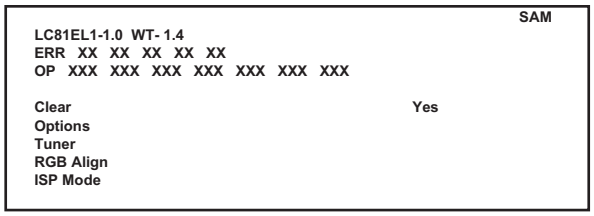

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Figure 5-2 SAM menu

Menu explanation:
1. **AAAABCD-X.YY.** See paragraph "Service Modes" -> "General" -> "Software Identification, Version, and Cluster" for the SW name definition. WT - X.Y. Weltrend standby microprocessor Software Identification and Version.
2. **SAM.** Indication of the Service Alignment Mode.
3. **ERR (ERR or buffer).** Shows all errors detected since the last time the buffer was erased. Five errors possible.
4. **OP (Option Bytes).** Used to read-out the option bytes. See "Options" in the Alignments section for a detailed description. Seven codes are possible.
5. **Clear.** Erases the contents of the error buffer. Select the CLEAR menu item and press the MENU RIGHT key. The content of the error buffer is cleared.
6. **Options.** Used to set the option bits. See "Options" in the "Alignments" chapter for a detailed description.
7. **Tuner.** Used to align the tuner. See "Tuner" in the "Alignments" chapter for a detailed description.
8. **RGB Align.** Used to align the White Tone. See "White Tone" in the "Alignments" chapter for a detailed description.
9. **ISP Mode.** Can be used to switch the television to "In System Programming" mode (ISP), for software uploading via ComPair. Read paragraph "Service Tools" - > "ComPair".

Note: When this mode is selected, the TV will be blocked. Select ISP mode "Off" the TV will be back to normal TV mode.

How to Navigate
- In the SAM menu, select menu items with the MENU UP/ DOWN keys on the remote control transmitter. The selected item will be indicated.
- With the MENU LEFT/RIGHT keys, it is possible to:
  - Activate the selected menu item.
  - Change the value of the selected menu item.
  - Activate the selected sub menu.
- When you press the MENU button twice while in top level SAM, the set will switch to the normal user menu (with the SAM mode still active in the background). To return to the SAM menu press the MENU button twice.

How to Store SAM Settings
To store the settings changed in SAM mode (except the OPTIONS settings), leave the top level SAM menu by using the POWER button on the remote control transmitter or the television set.

How to Exit
Switch the set to STANDBY by pressing the mains button on the remote control transmitter or the television set.

Note:
- When the TV is switched "off" by a power interrupt while in SAM, the TV will show up in "normal operation mode" as soon as the power is supplied again. The error buffer will not be cleared.
- In case the set is in Factory mode by accident (with "F" displayed on screen), by pressing and hold "VOL-" and "CH-" together should leave Factory mode.

5.2.4 Customer Service Mode (CSM)

Purpose
The Customer Service Mode shows error codes and information on the TV's operation settings. A call centre can instruct the customer (by telephone) to enter CSM in order to identify the status of the set. This helps them to diagnose problems and failures in the TV before making a service call. The CSM is a read-only mode; therefore, modifications are not possible in this mode.

Specifications
- Ignore "Service unfriendly modes".
- Line number for every line (to make CSM language independent).
- Set the screen mode to full screen (all contents on screen are viewable).
- After leaving the Customer Service Mode, the original settings are restored.
- Possibility to use "CH+" or "CH-" for channel surfing, or enter the specific channel number on the RC.

How to Activate

To activate CSM, press the following key sequence on the remote control transmitter**: "123654"** (do not allow the display to time out between entries while keying the sequence). Upon entering the Customer Service Mode, the following screen will appear:

```
                                        CSM
1 MODEL :       32PFL5403/12
2 PROD S/N :    AG1A0831123456
3 SW ID :       LC81EL1-1.0  WT - 1.4
4 OP :          3  2  0  255  8  0  1
5 CODES :       0  0  0  0  0
6 SSB :         XXXXXXXXXXXXXX
7 NVM :         1.4
8 DISPLAY :     XXXXXXXXXXXXXX

Page Down :  ◇
```

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Figure 5-3 CSM menu -1- (example)

```
                                        CSM
9 TUNER :       Tuned
10 SYSTEM :     PAL
11 SOUND :      Nicam Stereo
12 HDAU :       No
13 FORMAT :     576I
14 :
15 :
16 :
17 :

Page Up :  ◇
```

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Figure 5-4 CSM menu -2- (example)

Menu Explanation

1. **MODEL.** Type number, e.g. 32PFL5403/12. (*)
2. **PROD S/N.** Product serial no., e.g. AG1A0831123456. (*)
3. **SW ID.** Software cluster and version is displayed.
4. **OP.** Option code information.
5. **CODES.** Error buffer contents.
6. **SSB.** Indication of the SSB factory ID (= 12nc). (*)
7. **NVM.** The NVM software version no.
8. **DISPLAY.** Indication of the display ID (=12 nc).
9. **TUNER.** Indicates the tuner signal condition: "Weak" when signal falls below threshold value, "Medium" when signal is at mid-range, and "Strong" when signal falls above threshold value.
10. **SYSTEM.** Gives information about the video system of the selected transmitter (PAL/SECAM/NTSC).
11. **SOUND.** Gives information about the audio system of the selected transmitter (MONO/STEREO/NICAM).
12. **HDAU.** HDMI audio stream detection. "YES" means audio stream detected. "NO" means no audio stream present. Only displayed when HDMI source is selected.
13. **FORMAT.** Gives information about the video format of the selected transmitter (480i/480p/720p/1080i).
14. **Reserved.**
15. **Reserved.**
16. **Reserved.**
17. **Reserved.**

(*) If an NVM IC is replaced or initialised, the Model Number, Serial Number, and SSB Code Number must be re-written to the NVM. ComPair will foresee in a possibility to do this.

How to Exit

To exit CSM, use one of the following methods:

- Press the MENU button once, or POWER button on the remote control transmitter.
- Press the POWER button on the television set.

5.3 Service Tools

5.3.1 ComPair

Introduction

ComPair (Computer Aided Repair) is a Service tool for Philips Consumer Electronics products and offers the following:

1. ComPair helps you to quickly get an understanding on how to repair the chassis in a short and effective way.
2. ComPair allows very detailed diagnostics and is therefore capable of accurately indicating problem areas. You do not have to know anything about I2C or UART commands yourself, because ComPair takes care of this.
3. ComPair speeds up the repair time since it can automatically communicate with the chassis (when the uP is working) and all repair information is directly available.
4. ComPair features TV software up possibilities.

Specifications

ComPair consists of a Windows based fault finding program and an interface box between PC and the (defective) product. The (new) ComPair II interface box is connected to the PC via an USB cable. For the TV chassis, the ComPair interface box and the TV communicate via a bi-directional cable via the service connector(s).

How to Connect

This is described in the ComPair chassis fault finding database.

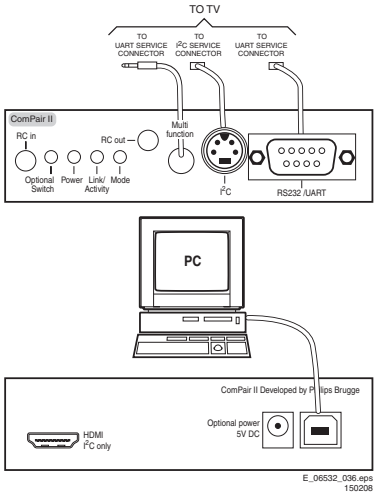

Figure 5-5 ComPair II interface connection

Caution: It is compulsory to connect the TV to the PC as shown in the picture above (with the ComPair interface in between), as the ComPair interface acts as a level shifter. If one connects the TV directly to the PC (via UART), ICs will be blown!

How to Order

ComPair II order codes:

- ComPair II interface: 3122 785 91020.
- The latest ComPair software can be found on the Philips Service website.
- ComPair UART interface cable: 3138 188 75051 (to be used for upgrading the Main software).

In the unlikely event that the Standby software should be upgraded, you will be informed via the appropriate channels (Philips Service website). To upgrade:

- Remove backcover of set.
- Use ComPair I^2C interface cable: 3122 785 90004.
- Use ComPair I^2C adapter cable: 3139 131 03791.

Note: If you encounter any problems, contact your local support desk.

5.3.2 LVDS Tool

Support of the LVDS Tool has been discontinued.

5.4 Error Codes

5.4.1 Introduction

Error codes are required to indicate failures in the TV set. In principle a unique error code is available for every:

- Activated protection.
- Failing I^2C device.
- General I^2C error.

The last errors, stored in the NVM, are shown in the Service menu's. This is called the error buffer.

The error code buffer contains all errors detected since the last time the buffer was erased. The buffer is written from left to right. When an error occurs that is not yet in the error code buffer, it is displayed at the left side and all other errors shift one position to the right.

An error will be added to the buffer if this error differs from any error in the buffer. The last found error is displayed on the left.

An error with a designated error code may never lead to a deadlock situation. This means that it must always be diagnosable (e.g. error buffer via OSD or blinking LED procedure, ComPair to read from the NVM).

In case a failure identified by an error code automatically results in other error codes (cause and effect), only the error code of the MAIN failure is displayed.

Example: In case of a failure of the I^2C bus (CAUSE), the error code for a "General I^2C failure" and "Protection errors" is displayed. The error code for the single devices (EFFECT) is not displayed. All error codes are stored in the same error buffer (TV's NVM) except when the NVM itself is defective.

5.4.2 How to Read the Error Buffer

You can read the error buffer in 2 ways:

- On screen via the SAM/CSM (if you have a picture).
  Example:
  - ERROR: 0 0 0 0 0: No errors detected
  - ERROR: 6 0 0 0 0: Error code 6 is the last and only detected error
  - ERROR: 9 6 0 0 0: Error code 6 was detected first and error code 9 is the last detected (newest) error
- Via the blinking LED procedure (when you have no picture). See "The Blinking LED Procedure".
- Via ComPair.

5.4.3 Error Codes

In case of non-intermittent faults, write down the errors present in the error buffer and clear the error buffer before you begin the repair. This ensures that old error codes are no longer present.

If possible, check the entire contents of the error buffer. In some situations, an error code is only the result of another error and not the actual cause of the problem (for example, a fault in the protection detection circuitry can also lead to a protection).

Table 5-1 Error code overview

Error code	Description	Item no.	Remarks
1	DC Protection of speakers	7C01	1) TV in protection mode 2) Red LED blinking 1 time (Error 1) *Error 1 logged in SAM and CSM mode
2	+12V protection error		1) TV in protection mode 2) Red LED blinking 2 times (Error 2) *No error buffer logged in SAM and CSM mode (protect time very short)
3	I^2C Standby uP	7303	1) TV turn on with picture, but without Sound output from speaker 2) Red LED blinking 3 times & 4 times (Error 3 & 4) *No communication between LOCTOP and WT *First check WT and Second check LOCTOP generical I^2C *Error 3 logged in SAM and CSM mode
4	General I^2C error	7C01	1) TV turn on without Picture & Sound output from speaker 2) Red LED blinking 3 times & 4 times (Error 3 & 4) *No communication between LOCTOP and WT *First check WT and second check LOCTOP generical I^2C *No error buffer logged in SAM and CSM mode
6	I^2C error while communicating with the NVM	7302	1) TV turn on after 3 seconds in Standby mode. 2) Power on TV set (RC) again (wait until TV turn on with blud screen displayed) 3) Input RC sequence (062596 + menu) 4) White LED blink 6 times (Error 6) *No error buffer logged in SAM and CSM mode
7	I^2C error while communicating with the Tuner.	1104	1) TV turn on after 3 seconds in Standby mode. 2) Power on TV set (RC) again. TV with snow (no video) displayed. 3) Input RC sequence (062596 + menu) 4) White LED blink 7 times (Error 7) *Error 7 logged in SAM and CSM mode
8	I^2C error while communicating with the IF Demodulator.	7401	1) TV turn on after 3 seconds in Standby mode 2) Power on TV set (RC again). (wait for 45 seconds, until the system completed the power on state check) 3) Input RC sequence (062596 + menu) 4) White LED blink 8 times (Error 8) *Error 8 logged in SAM and CSM mode

Notes
1. Some of the error codes reported are depending on the option code configurations.
2. This error means: no I^2C device is responding to the particular I^2C bus. Possible causes: SCL/SDA shorted to GND, SCL shorted to SDA, or SCL/SDA open (at uP pin). The internal bus of the NXP (Loctop) platform should not cause the entire system to halt as such an error can be reported.

5.4.4 How to Clear the Error Buffer

The error code buffer is cleared in the following cases:
- By using the CLEAR command in the SAM menu:
  - To enter SAM, press the following key sequence on the remote control transmitter: **"062596"** directly followed by the **OSD/STATUS/INFO/i+** button (do not allow the display to time out between entries while keying the sequence).
  - Make sure the menu item CLEAR is selected. Use the MENU UP/DOWN buttons, if necessary.
  - Press the MENU RIGHT button to clear the error buffer. Press the right button twice (1st is to select the text "Yes" on the right side menu and the 2nd press is to clear the error buffer in NVM the text "CLEARED" will appear).
- If the contents of the error buffer have not changed for 50 hours, the error buffer resets automatically.

Note: If you exit SAM by disconnecting the mains from the television set, the error buffer is not reset.

5.5 The Blinking LED Procedure

5.5.1 Introduction

The software is capable of identifying different kinds of errors. Because it is possible that more than one error can occur over time, an error buffer is available, which is capable of storing the last five errors that occurred. This is useful if the OSD is not working properly.
Errors can also be displayed by the blinking LED procedure. The method is to repeatedly let the front LED pulse with as many pulses as the error code number, followed by a period of 1.5 seconds in which the LED is "off". Then this sequence is repeated.

Example (1): error code 4 will result in four times the sequence LED "on" for 0.25 seconds / LED "off" for 0.25 seconds. After this sequence, the LED will be "off" for 1.5 seconds. Any RC5 command terminates the sequence. Error code LED blinking is in red / White colour (refer to Error codes overview).

Example (2): the content of the error buffer is **"1 2 9 6 0 0"**
After entering SDM, the following occurs:
- 1 long blinks of 5 seconds to start the sequence,
- 12 short blinks followed by a pause of 1.5 seconds,
- 9 short blinks followed by a pause of 1.5 seconds,
- 6 short blinks followed by a pause of 1.5 seconds,
- 1 long blinks of 1.5 seconds to finish the sequence,
- The sequence starts again with 12 short blinks.

5.6 Software Upgrading

In this chassis, the following SW "stacks" is used:
- TV main SW (processor and processor NVM).

5.6.1 TV Main SW Upgrade

For instructions on how to upgrade the TV Main software, refer to ComPair.

5.6.2 Service SSB

It should be noted that in this chassis the HDCP-key is embedded in the main processor. Therefore there is no need for a separate Service-SSB.

5.7 Fault Finding and Repair Tips

Notes:
- It is assumed that the components are mounted correctly with correct values and no bad solder joints.
- Before any fault finding actions, check if the correct options are set.

5.7.1 Load Default NVM Values

It is possible to download default values automatically into the NVM in case a blank NVM is placed or when the NVM first 20 address contents are “FF”. After the default values are downloaded, it is possible to start-up and to start aligning the TV set.
Alternative method:
It is also possible to upload the default values to the NVM with ComPair in case the SW is changed, the NVM is replaced with a new (empty) one, or when the NVM content is corrupted.
After replacing an EEPROM (or with a defective/no EEPROM , default settings should be used to enable the set to start-up and allow the Service Default Mode and Service Alignment Mode to be accessed.

5.7.2 Start-up/Shut-down Flowcharts

On the next pages you will find start-up and shut-down flowcharts, followed by a trouble shooting flowchart, which might be helpful during fault finding.
Please note that some events are only related to PDP sets, and therefore not applicable to this LCD chassis.

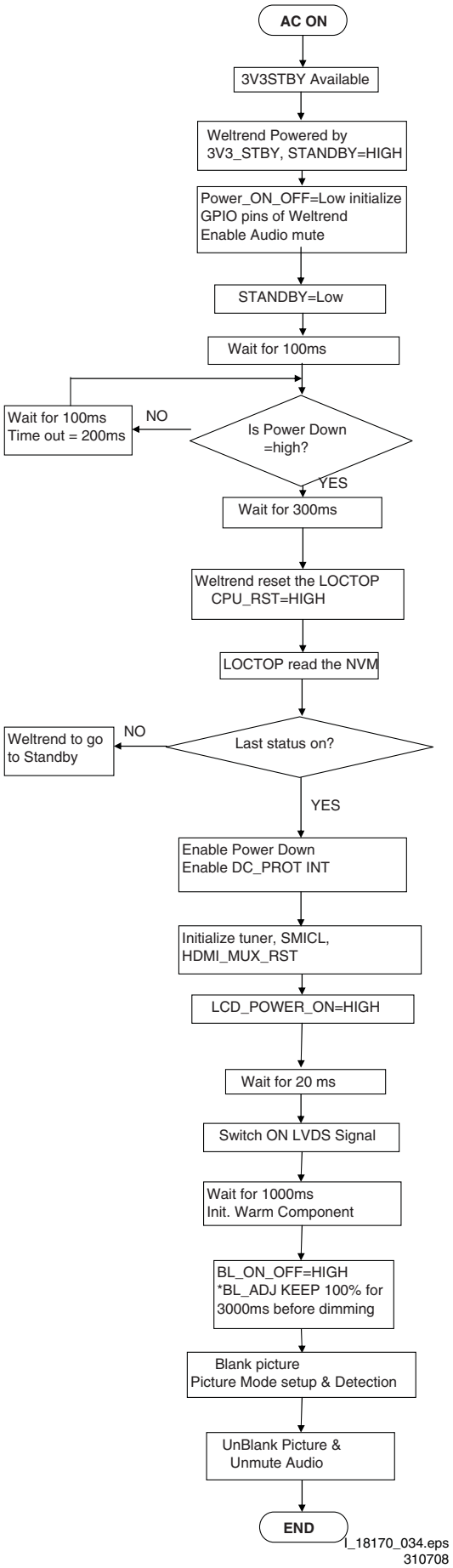

Figure 5-6 Start-up flowchart

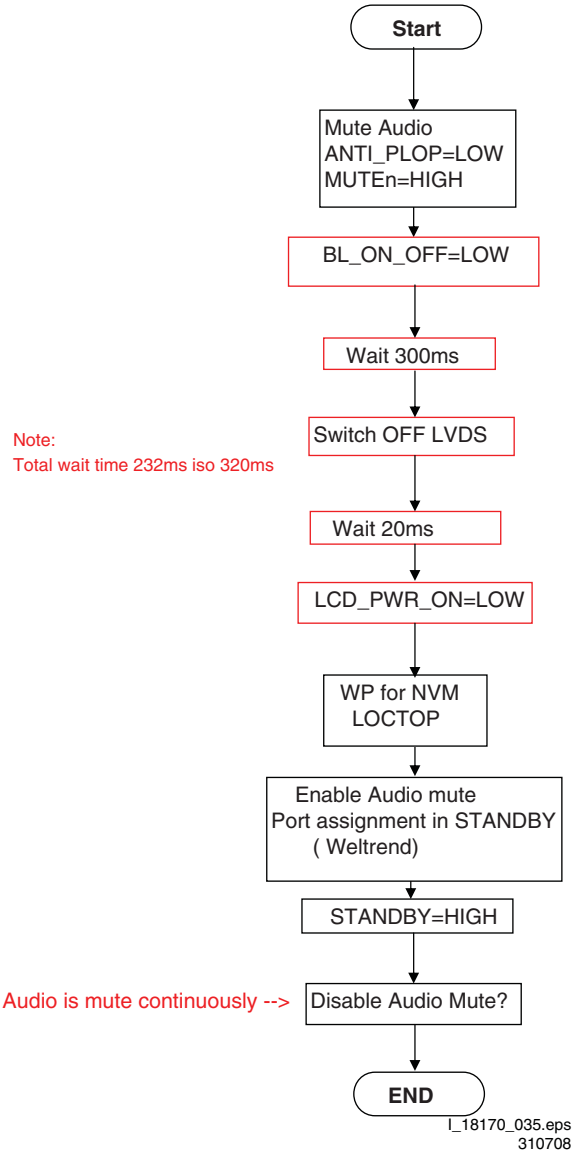

Figure 5-7 Stand-by flowchart

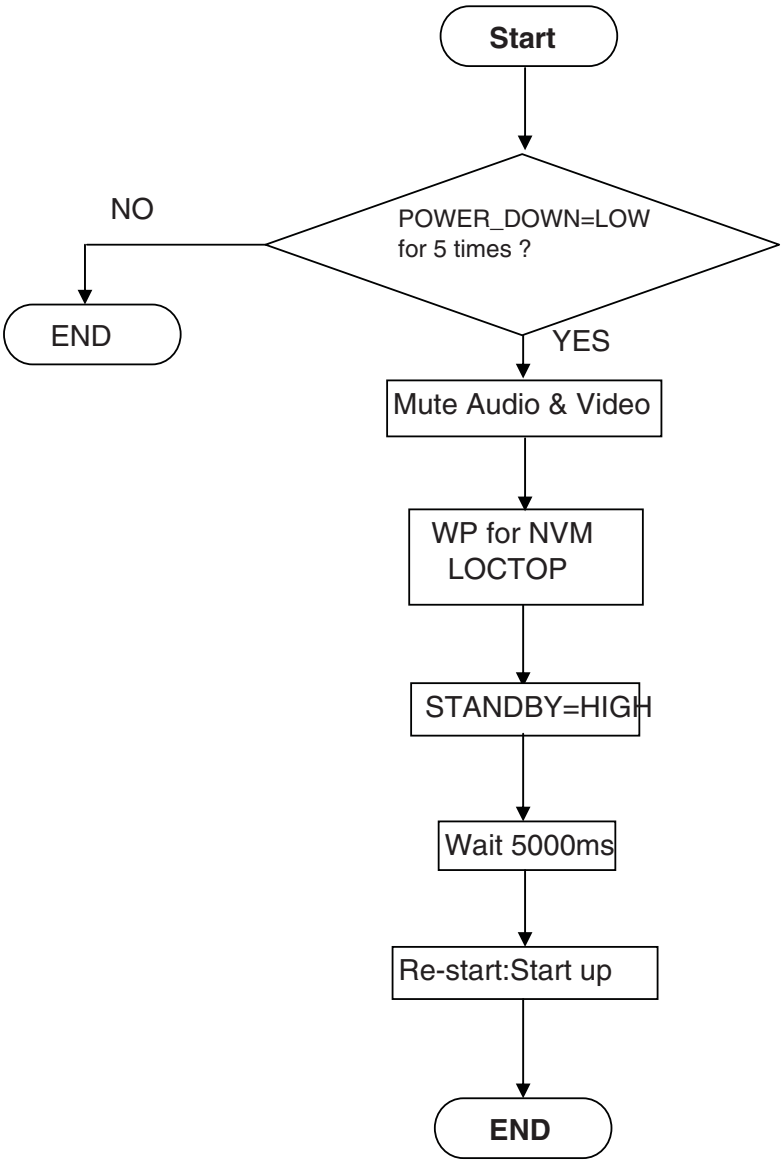

Figure 5-8 Power Down flowchart

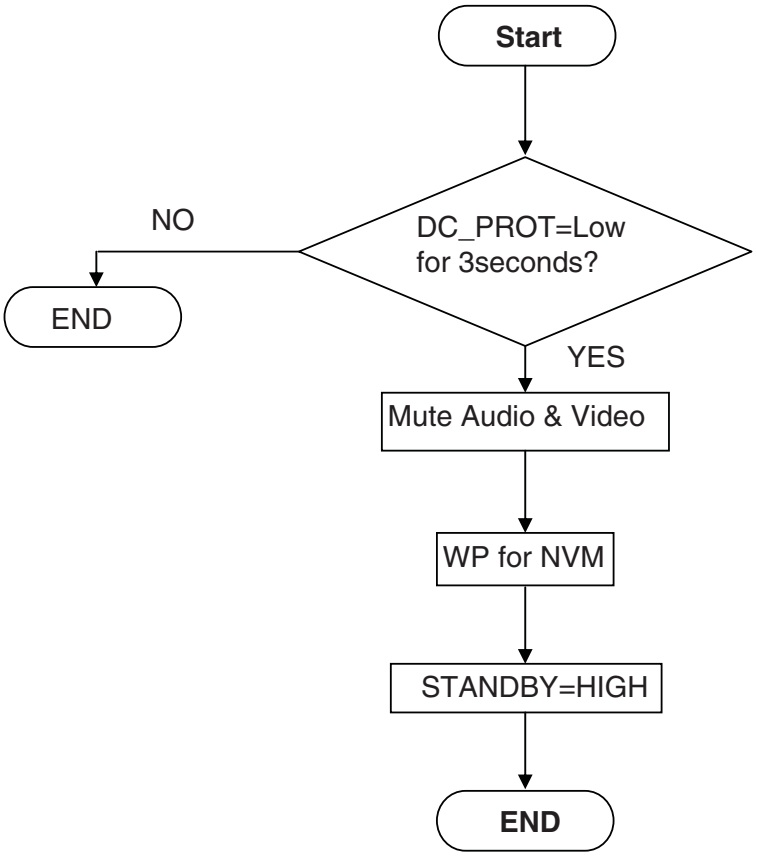

Figure 5-9 DC_PROT flowchart

Personal Notes:

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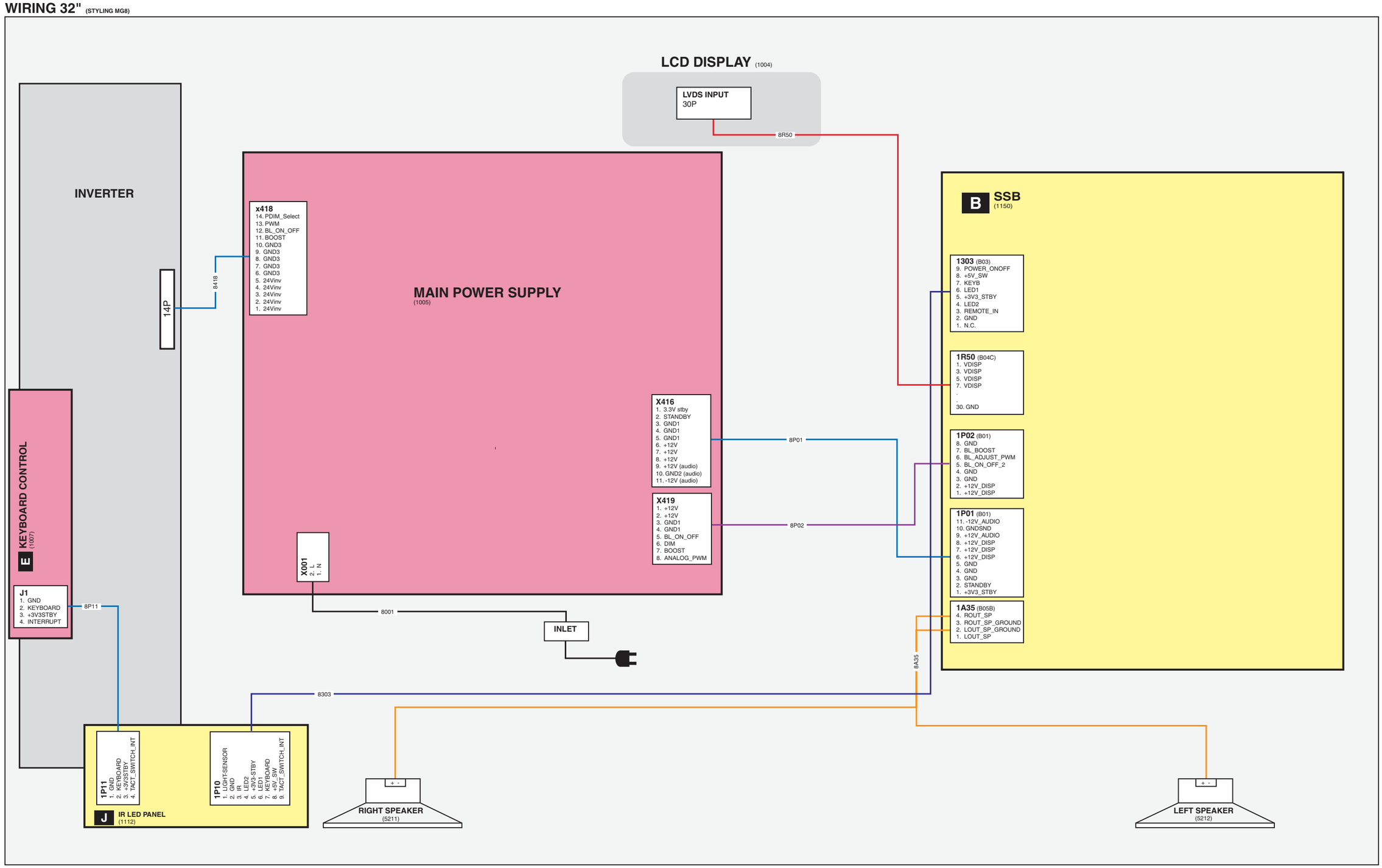
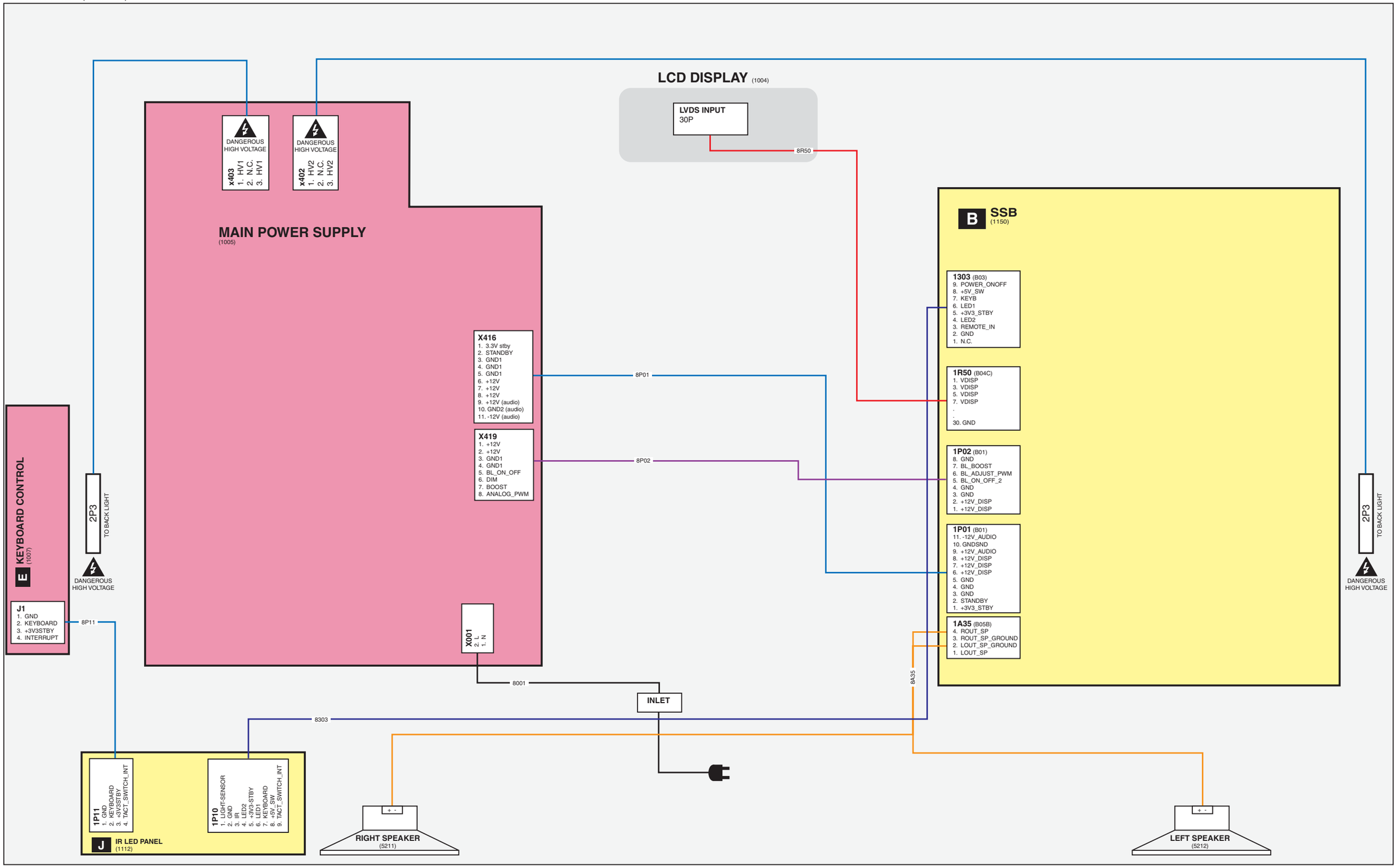
6. Block Diagrams, Test Point Overview, and Waveforms

Wiring Diagram 32" (MG8)



Wiring Diagram 42" (MG8)

WIRING 42" (STYLING MG8)



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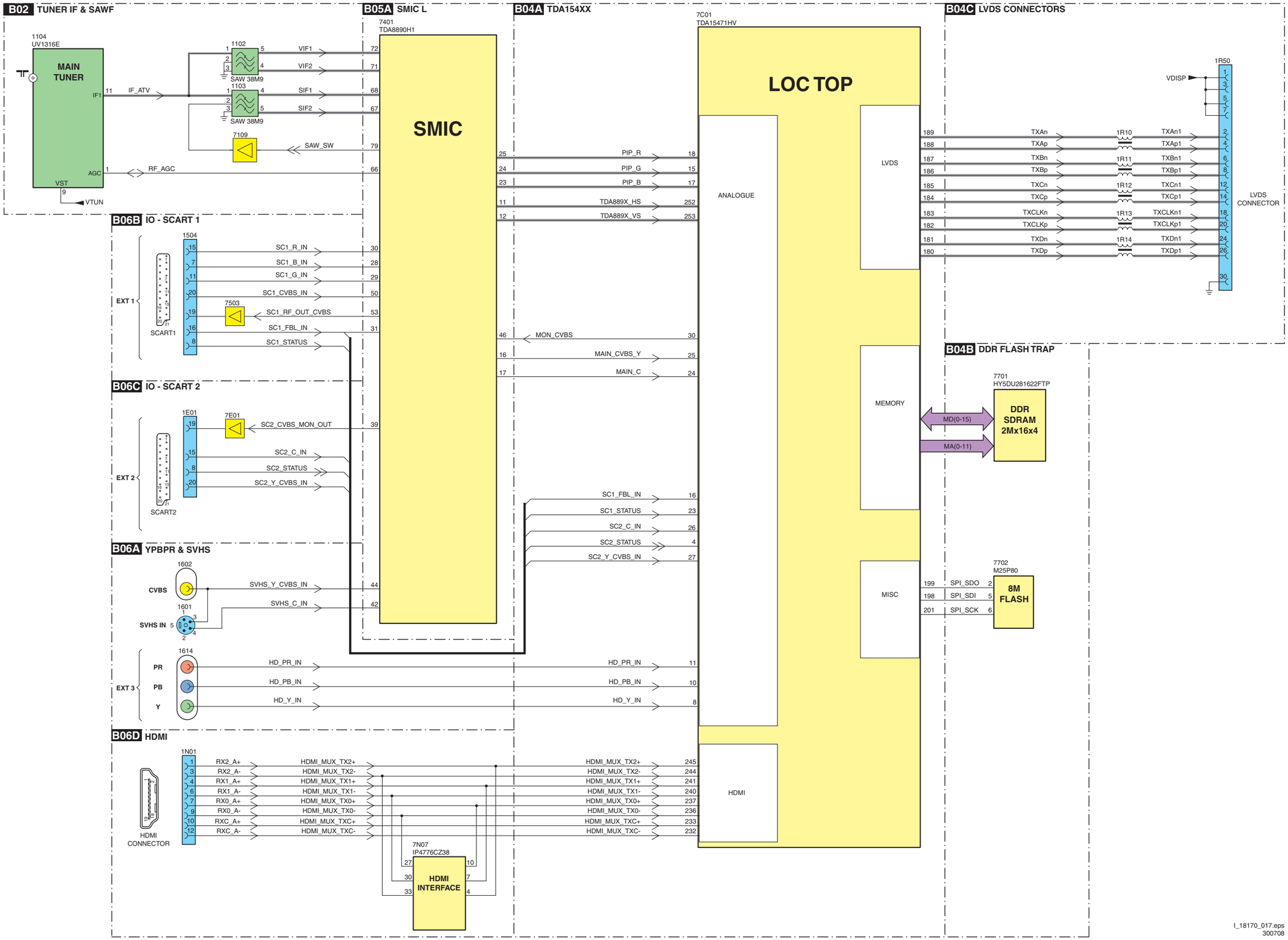
Block Diagram Video

VIDEO



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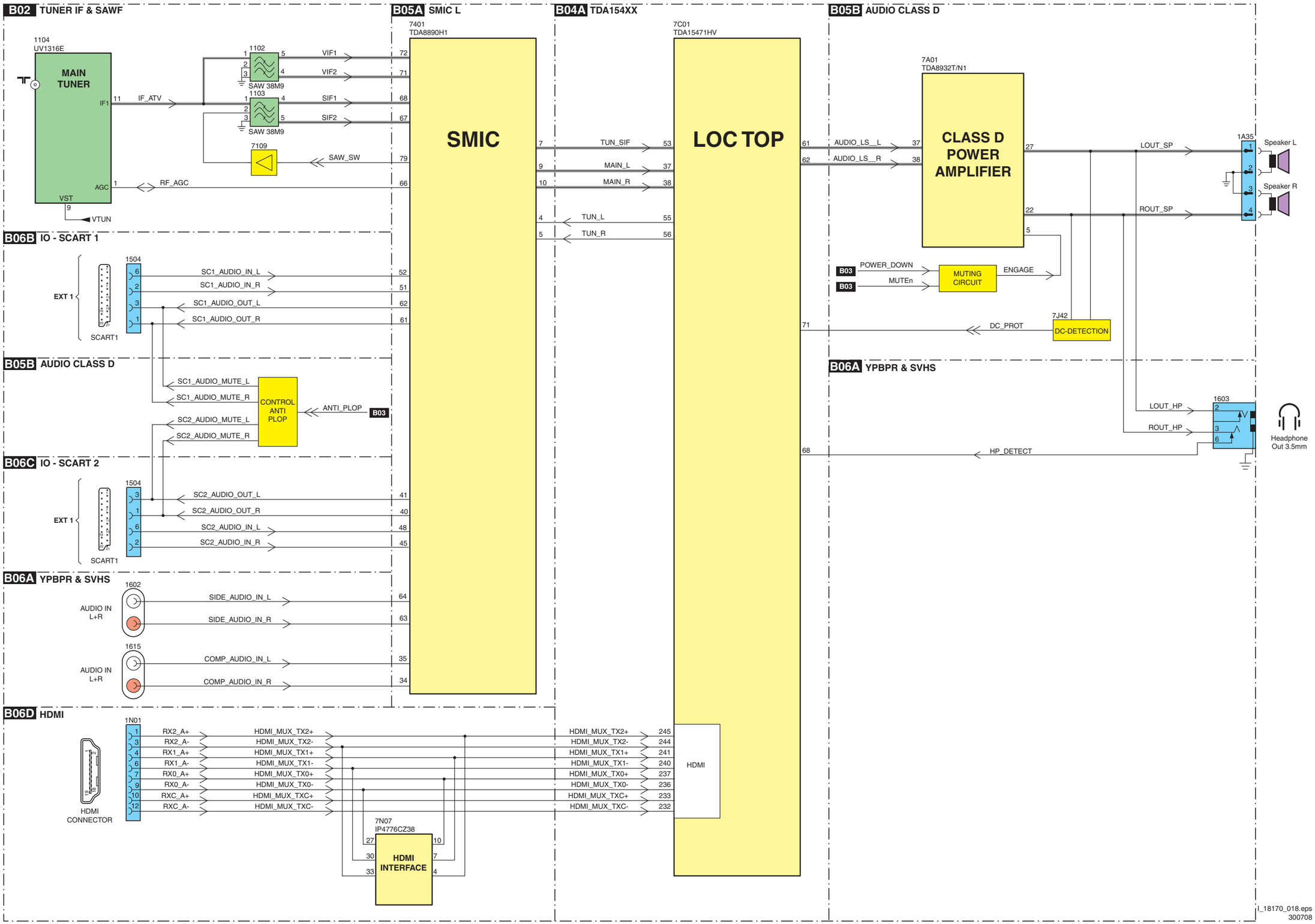
Block Diagram Audio

AUDIO



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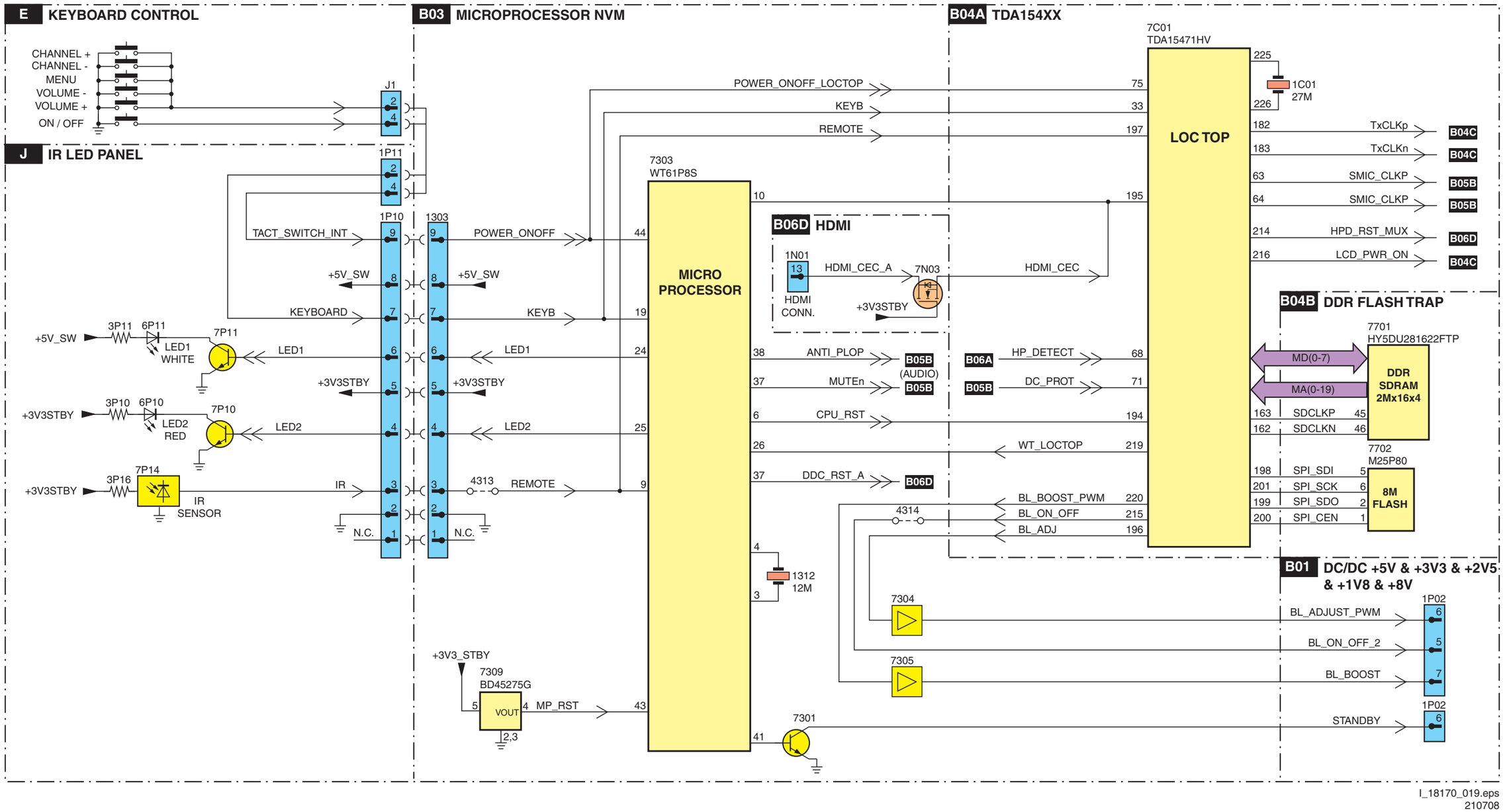
Block Diagram Control & Clock Signals

CONTROL & CLOCK SIGNALS



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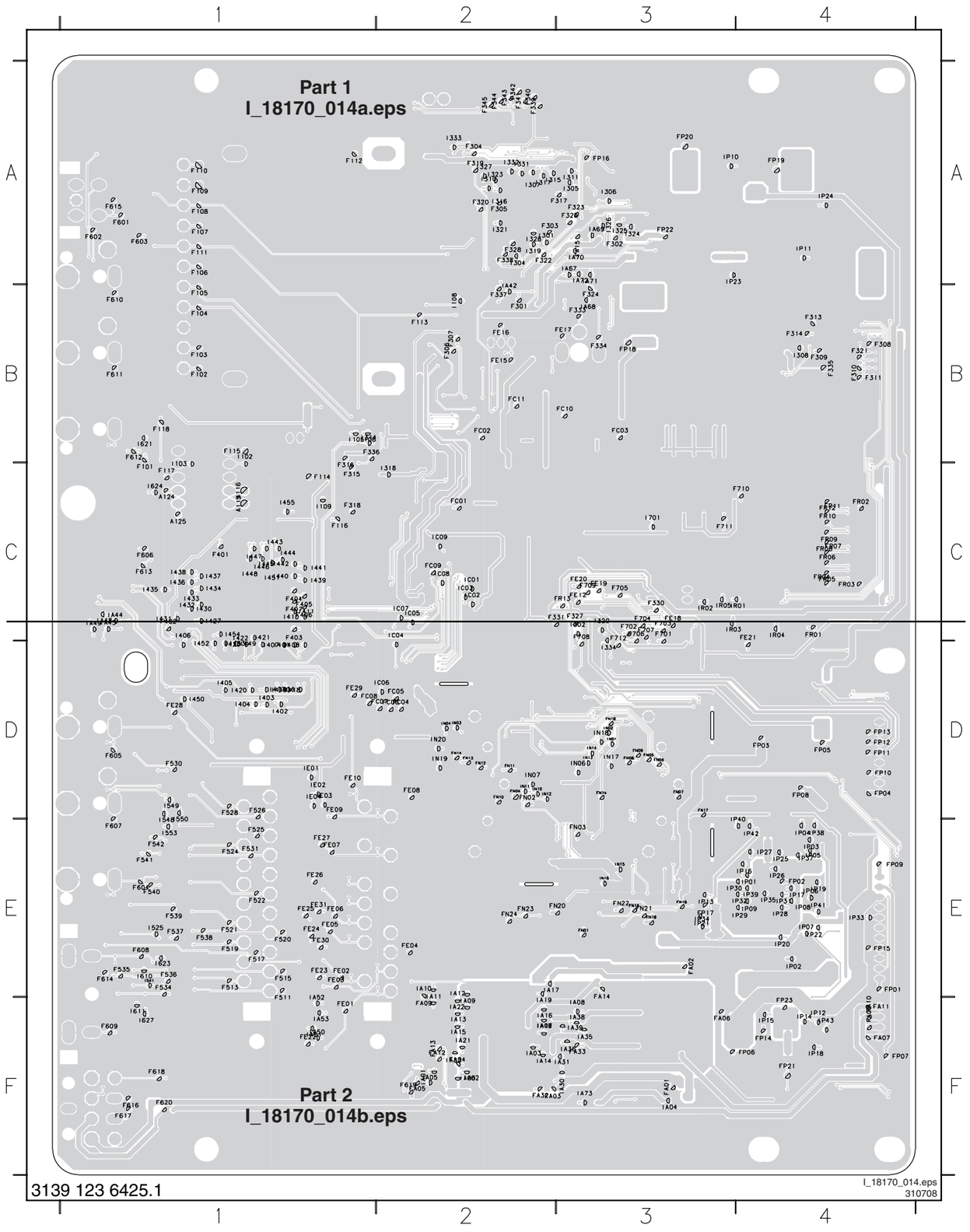
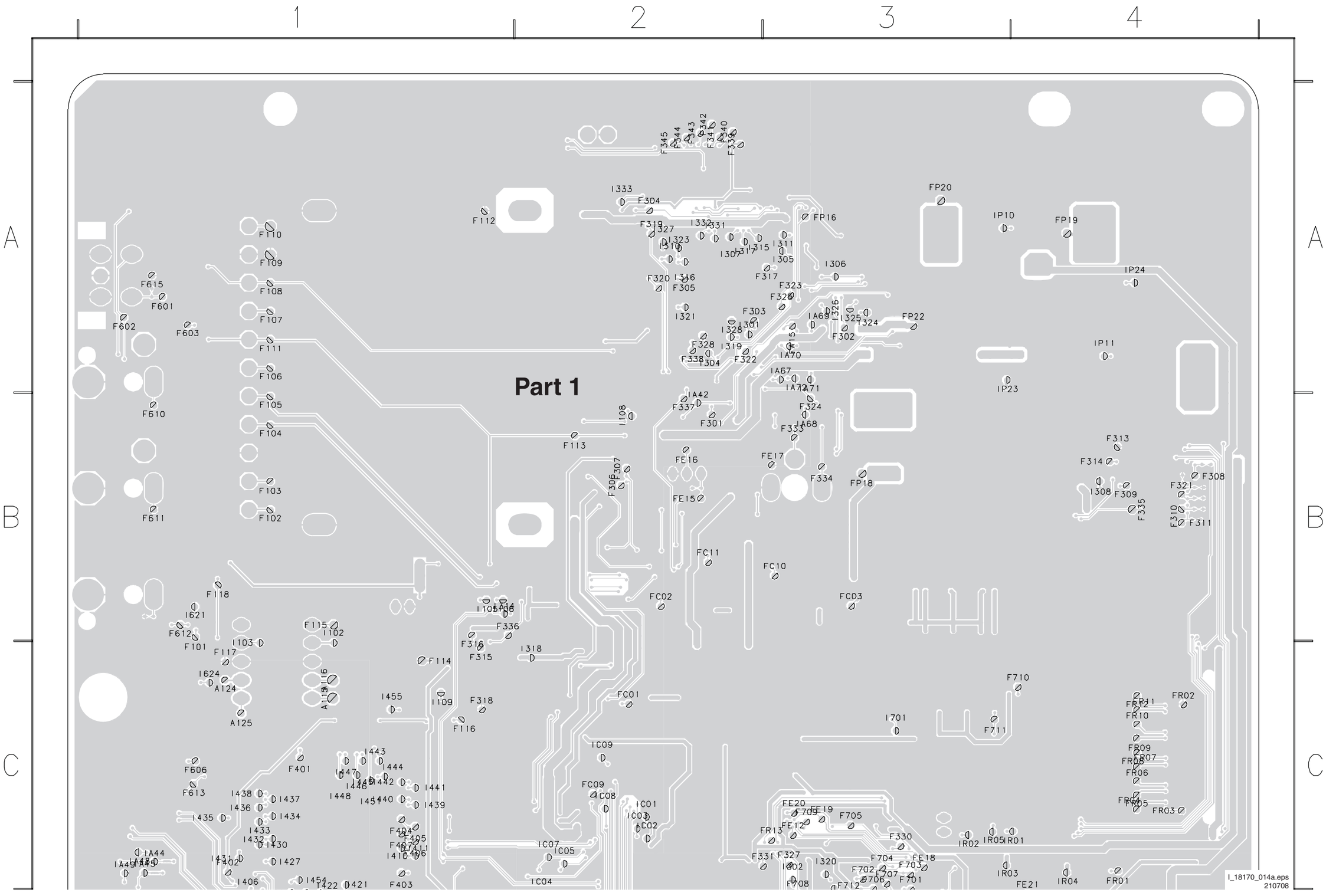
SSB: Test Points (Overview Bottom Side)

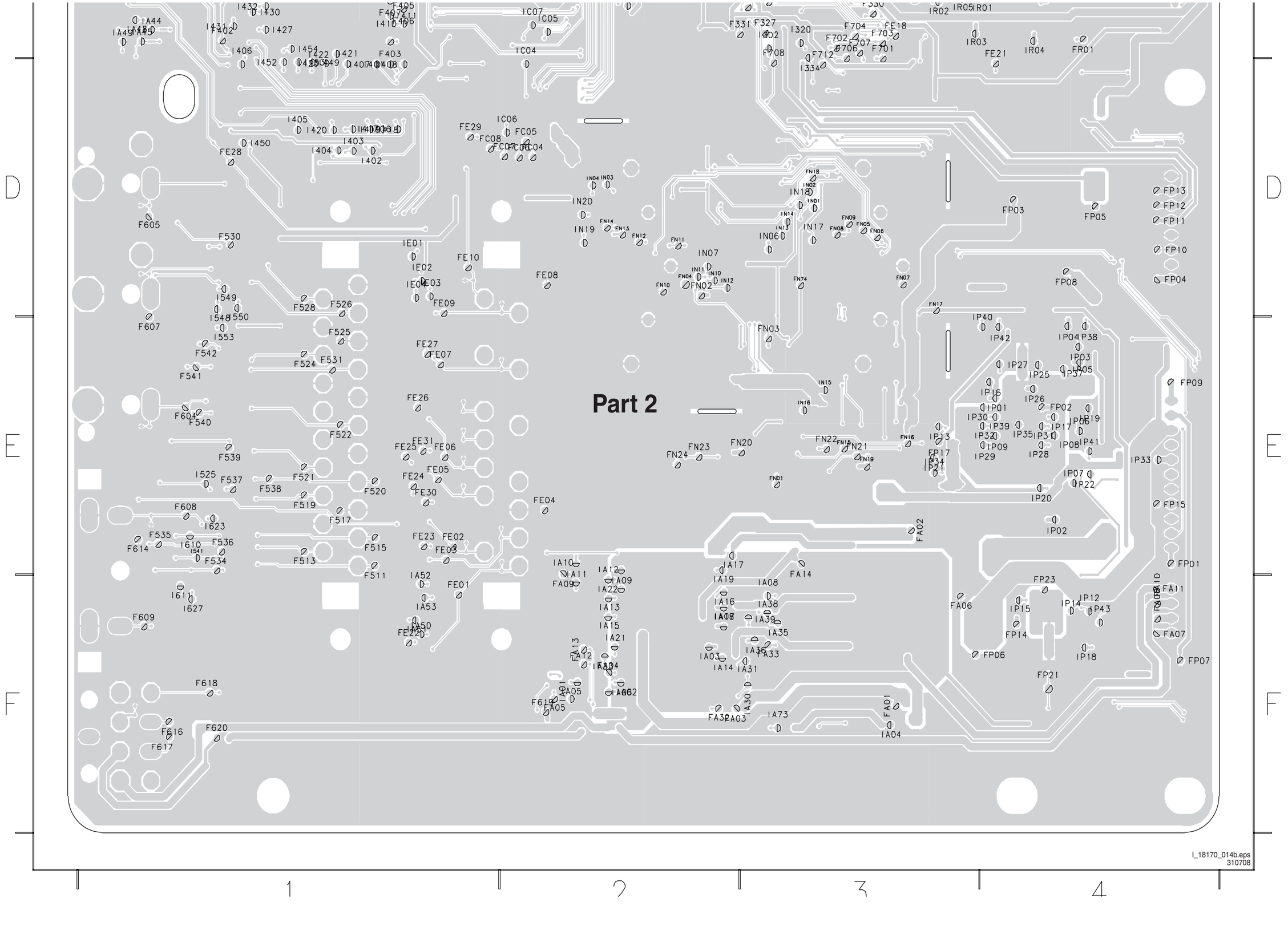


A115	C1	F710	C4	I105	B1	IA50	F1
A116	C1	F711	C3	I106	B1	IA51	F1
A124	C1	F712	C3	I108	B2	IA52	F1
A125	C1	FA01	F3	I109	C1	IA53	F1
F101	C1	FA02	E3	I301	A2	IA67	A3
F102	B1	FA03	F2	I302	C3	IA68	B3
F103	B1	FA04	F2	I304	A2	IA69	A3
F104	B1	FA05	F2	I305	A3	IA70	A3
F105	B1	FA06	F3	I306	A3	IA71	A3
F106	A1	FA07	F4	I307	A2	IA72	A3
F107	A1	FA08	F4	I308	B4	IA73	F3
F108	A1	FA09	F2	I310	A2	IC01	C2
F109	A1	FA10	F4	I311	A3	IC02	C2
F110	A1	FA11	F4	I314	B1	IC03	C2
F111	A1	FA12	F2	I315	A2	IC04	C2
F112	A1	FA13	F2	I316	A2	IC05	C2
F113	B2	FA14	E3	I317	A2	IC06	D2
F114	C1	FA15	A3	I318	C2	IC07	C2
F115	B1	FA32	F2	I319	A2	IC08	C2
F116	C1	FA33	F3	I320	C3	IC09	C2
F117	C1	FC01	C2	I321	A2	IE01	D1
F118	B1	FC02	B2	I323	A2	IE02	D1
F301	B2	FC03	B3	I324	A3	IE03	D1
F302	A3	FC04	D2	I325	A3	IE04	D1
F303	A2	FC05	D2	I326	A3	IN01	D3
F304	A2	FC06	D2	I327	A2	IN02	D3
F305	A2	FC07	D2	I328	A2	IN03	D2
F306	B2	FC08	D1	I331	A2	IN04	D2
F307	B2	FC09	C2	I332	A2	IN06	D3
F308	B4	FC10	B3	I333	A2	IN07	D2
F309	B4	FC11	B2	I334	D3	IN10	D2
F310	B4	FE01	F1	I401	D1	IN11	D2
F311	B4	FE02	E1	I402	D1	IN12	D2
F313	B4	FE03	E1	I403	D1	IN13	D3
F314	B4	FE04	E2	I404	D1	IN14	D3
F315	C1	FE05	E1	I405	D1	IN15	E3
F316	C1	FE06	E1	I406	C1	IN16	E3
F317	A3	FE07	E1	I407	D1	IN17	D3
F318	C1	FE08	D2	I408	D1	IN18	D3
F319	A2	FE09	D1	I410	C1	IN19	D2
F320	A2	FE10	D1	I411	C1	IN20	D2
F321	B4	FE12	C3	I416	D1	IP01	E4
F322	A2	FE15	B2	I417	D1	IP02	E4
F323	A3	FE16	B2	I418	D1	IP03	E4
F324	B3	FE17	B3	I419	D1	IP04	E4
F325	A3	FE18	C3	I420	D1	IP05	E4
F327	C3	FE19	C3	I421	C1	IP06	E4
F328	A2	FE20	C3	I422	C1	IP07	E4
F330	C3	FE21	C4	I423	D1	IP08	E4
F331	C3	FE22	F1	I427	C1	IP09	E4
F333	B3	FE23	E1	I430	C1	IP10	A3
F334	B3	FE24	E1	I431	C1	IP11	A4
F335	B4	FE25	E1	I432	C1	IP12	F4
F336	B1	FE26	E1	I433	C1	IP13	E3
F337	B2	FE27	E1	I434	C1	IP14	F4
F338	A2	FE28	D1	I435	C1	IP15	F4
F339	A2	FE29	D1	I436	C1	IP16	E4
F340	A2	FE30	E1	I437	C1	IP17	E4
F341	A2	FE31	E1	I438	C1	IP18	F4
F342	A2	FN01	E3	I439	C1	IP19	E4
F343	A2	FN02	D2	I440	C1	IP20	E4
F344	A2	FN03	E3	I441	C1	IP21	E3
F345	A2	FN04	D2	I442	C1	IP22	E4
F401	C1	FN05	D3	I443	C1	IP23	A3
F402	C1	FN06	D3	I444	C1	IP24	A4
F403	C1	FN07	D3	I445	C1	IP25	E4
F404	C1	FN08	D3	I446	C1	IP26	E4
F405	C1	FN09	D3	I447	C1	IP27	E4
F406	C1	FN10	D2	I448	C1	IP28	E4
F407	C1	FN11	D2	I449	D1	IP29	E4
F511	F1	FN12	D2	I450	D1	IP30	E3
F513	E1	FN13	D2	I451	C1	IP31	E4
F515	E1	FN14	D2	I452	D1	IP32	E4
F517	E1	FN15	E3	I453	C1	IP33	E4
F519	E1	FN16	E3	I454	C1	IP34	E3
F520	E1	FN17	D3	I455	C1	IP35	E4
F521	E1	FN18	D3	I525	E1	IP37	E4
F522	E1	FN19	E3	I541	E1	IP38	E4
F524	E1	FN20	E3	I548	E1	IP39	E4
F525	E1	FN21	E3	I549	D1	IP40	E4
F526	D1	FN22	E3	I550	E1	IP41	E4
F528	D1	FN23	E2	I553	E1	IP42	E4
F530	D1	FN24	E2	I610	E1	IP43	F4
F531	E1	FN74	D3	I611	F1	IR01	C4
F534	E1	FP01	E4	I621	B1	IR02	C3
F535	E1	FP02	E4	I623	E1	IR03	C3
F536	E1	FP03	D4	I624	C1	IR04	C4
F537	E1	FP04	D4	I627	F1	IR05	C3
F538	E1	FP05	D4	I701	C3		
F539	E1	FP06	F4	IA01	F2		
F540	E1	FP07	F4	IA02	F2		
F541	E1	FP08	D4	IA03	F2		
F542	E1	FP09	E4	IA04	F3		
F601	A1	FP10	D4	IA05	F2		
F602	A1	FP11	D4	IA06	F2		
F603	A1	FP12	D4	IA07	F2		
F604	E1	FP13	D4	IA08	F3		
F605	D1	FP14	F4	IA09	F2		
F606	C1	FP15	E4	IA10	E2		
F607	E1	FP16	A3	IA11	E2		
F608	E1	FP17	E3	IA12	E2		
F609	F1	FP18	B3	IA13	F2		
F610	B1	FP19	A4	IA14	F2		
F611	B1	FP20	A3	IA15	F2		
F612	B1	FP21	F4	IA16	F2		
F613	C1	FP22	A3	IA17	F2		
F614	E1	FP23	F4	IA18	F2		
F615	A1	FR01	C4	IA19	F2		
F616	F1	FR02	C4	IA21	F2		
F617	F1	FR03	C4	IA22	F2		
F618	F1	FR04	C4	IA30	F3		
F619	F2	FR05	C4	IA31	F3		
F620	F1	FR06	C4	IA33	F2		
F701	C3	FR07	C4	IA35	F3		
F702	C3	FR08	C4	IA36	F3		
F703	C3	FR09	C4	IA38	F3		
F704	C3	FR10	C4	IA39	F3		
F705	C3	FR11	C4	IA42	B2		
F706	C3	FR12	C4	IA44	C1		
F707	C3	FR13	C3	IA45	C1		
F708	C3	I102	B1	IA48	C1		
F709	C3	I103	C1	IA49	C1		

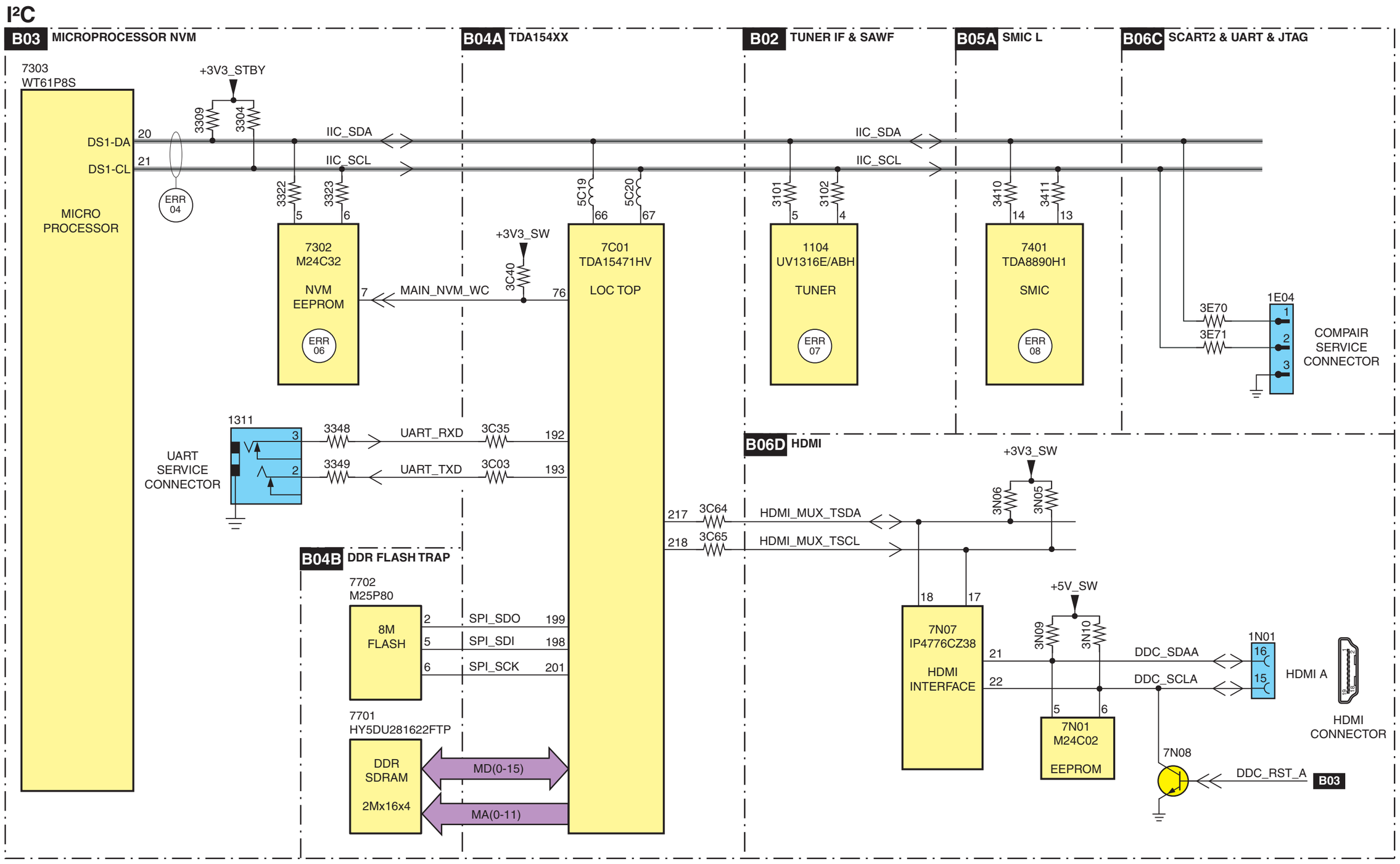
SSB: Test Points (Part 1 Bottom Side)



SSB: Test Points (Part 2 Bottom Side)



I2C IC Overview



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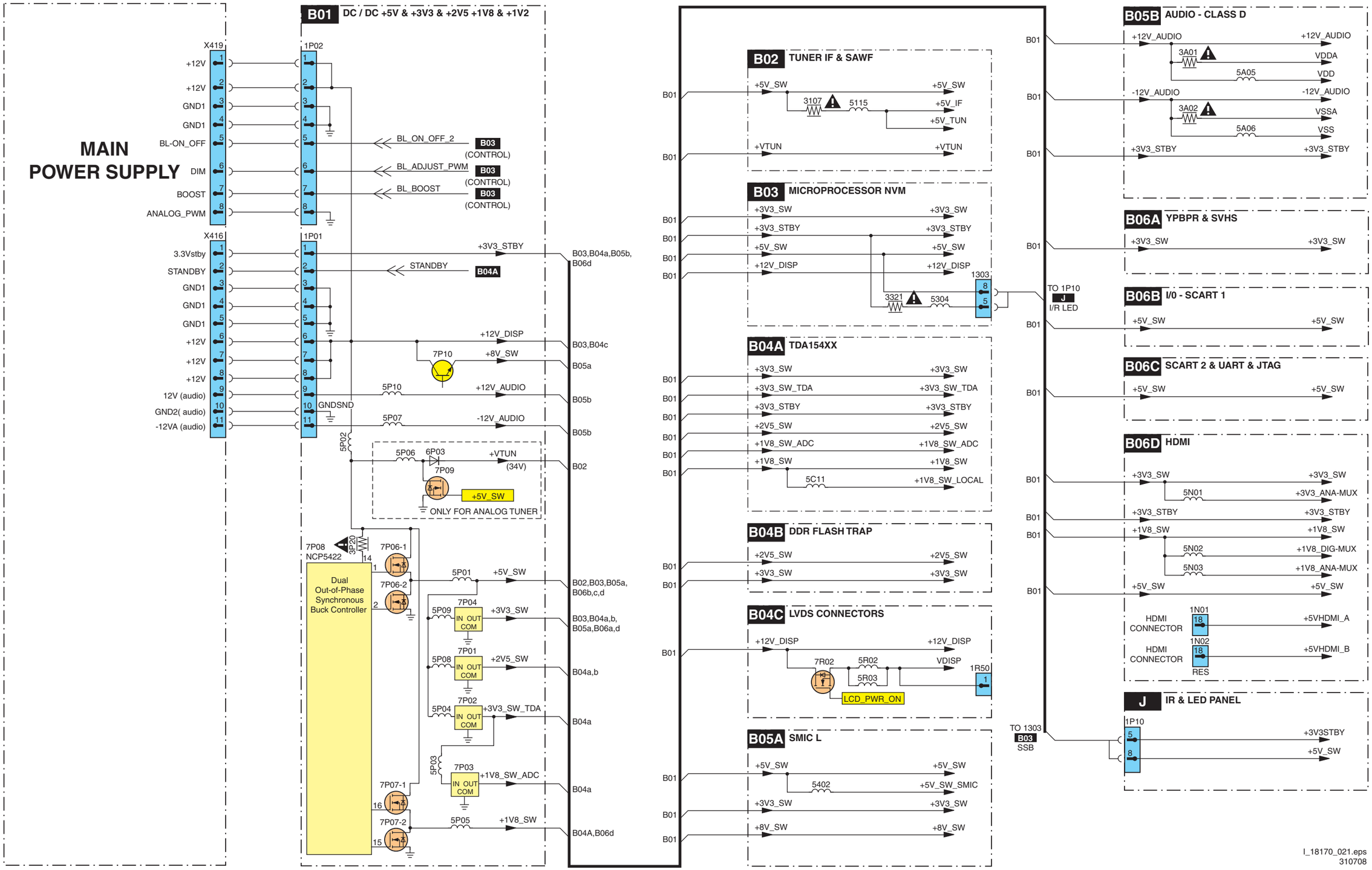
Supply Lines Overview

SUPPLY LINES OVERVIEW



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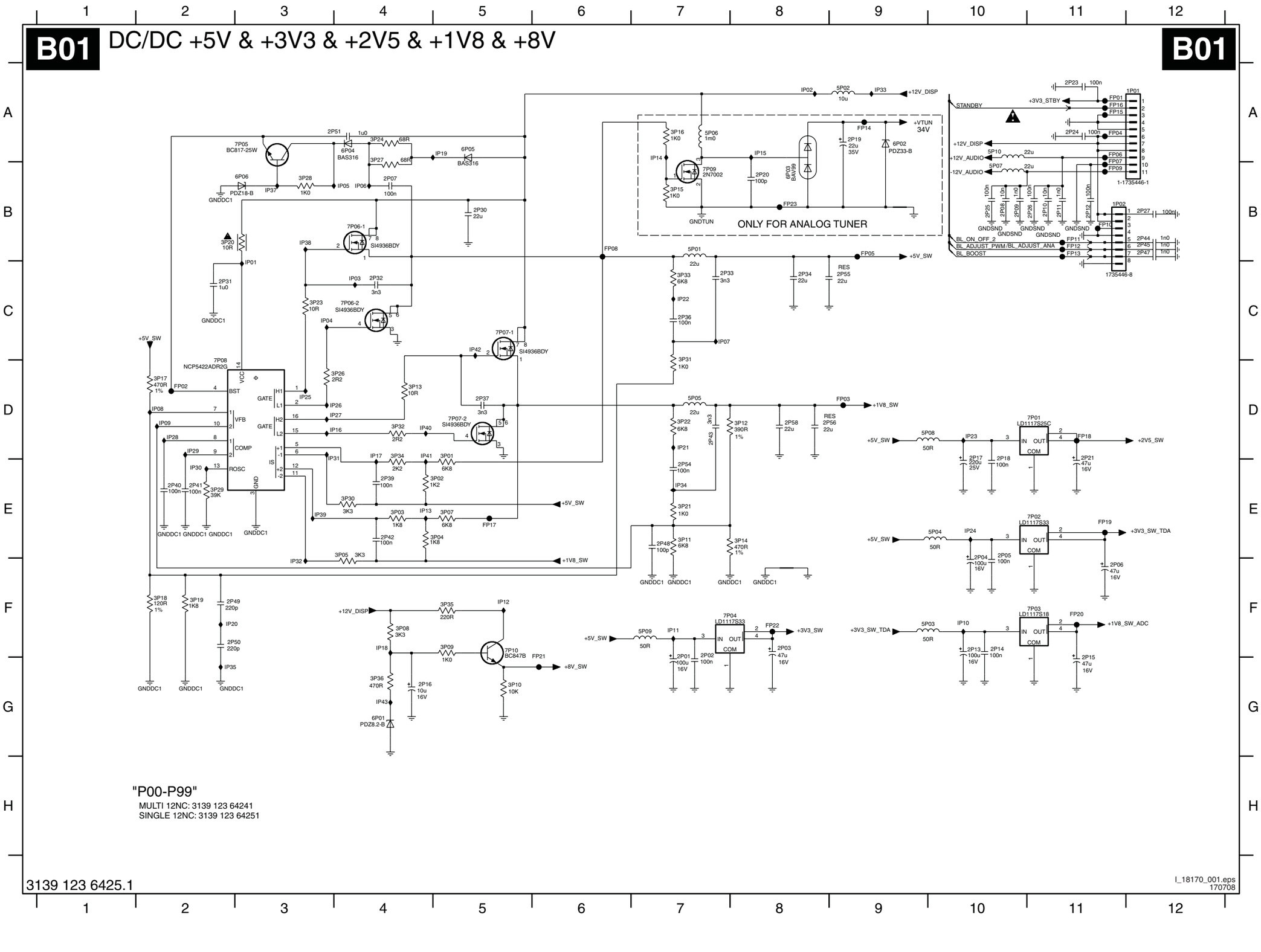
7. Circuit Diagrams and PWB Layouts

SSB: DC/DC



1P01 A12
1P02 B11
2P01 F7
2P02 F7
2P03 F8
2P04 E10
2P05 E10
2P06 F11
2P07 B4
2P08 B10
2P09 B10
2P10 B11
2P11 B11
2P12 B11
2P13 F10
2P14 F10
2P15 F11
2P16 G4
2P17 E10
2P18 D10
2P19 A9
2P20 B8
2P21 D11
2P23 A11
2P24 A11
2P25 B10
2P26 B11
2P27 B12
2P30 B5
2P31 C2
2P32 C4
2P33 C7
2P34 C8
2P36 C7
2P37 D5
2P39 E4
2P40 E2
2P41 E2
2P42 E4
2P43 D7
2P44 B12
2P45 B12
2P47 B12
2P48 E7
2P49 F2
2P50 F2
2P51 A4
2P54 E7
2P55 C9
2P56 D9
2P58 D8
3P01 D5
3P02 E5
3P03 E4
3P04 E5
3P05 E4
3P07 E5
3P08 F4
3P09 F5
3P10 G5
3P11 E7
3P12 D8
3P13 D4
3P14 E8
3P15 B7
3P16 A7
3P17 D2
3P18 F2
3P19 F2
3P20 B2
3P21 E7
3P22 D7
3P23 C3
3P24 A4
3P26 D4
3P27 A4
3P28 B3
3P29 E2
3P30 E4
3P31 C7
3P32 D4
3P33 C7
3P34 D4
3P35 F5
3P36 G4
5P01 B7
5P02 A9
5P03 F10
5P04 E10
5P05 D7
5P06 A7
5P07 B10
5P08 D10
5P09 F7
5P10 A10
6P01 G4
6P02 A9
6P03 B8
6P04 A4
6P05 A5
6P06 B3
7P01 D11
7P02 E11
7P03 F11
7P04 F8
7P05 A3
7P06-1 B4
7P06-2 C4
7P07-1 C5
7P07-2 D5
7P08 D2
7P09 B7
7P10 F5
FP01 A11
FP02 D2
FP03 D9
FP04 A11
FP05 B9
FP06 A11
FP07 B11
FP08 B6
FP09 B11
FP10 B11
FP11 B11
FP12 B11
FP13 B11
FP14 A9
FP15 A11
FP16 A11
FP17 E5
FP18 D11
FP19 E11
FP20 F11
FP21 G6
FP22 F8
FP23 B8
IP01 C3
IP02 A8
IP03 C4
IP04 C3
IP05 B4
IP06 B4
IP07 C7
IP08 D2
IP09 B7
IP10 F10
IP11 F7
IP12 F5
IP13 E4
IP14 A7
IP15 A8
IP16 D4
IP17 D4
IP18 F4
IP19 A5
IP20 F2
IP21 D7
IP22 C7
IP23 D10
IP24 E10
IP25 D3
IP26 D4
IP27 D4
IP28 D2
IP29 D2
IP30 E2
IP31 D4
IP32 F3
IP33 A9
IP34 E7
IP35 G2
IP37 B3
IP38 B3
IP39 E3
IP40 D4
IP41 D4
IP42 C5
IP43 G4

SSB: Tuner IF & SAWF

B02 TUNER IF & SAWF

B02

PROVISION FOR CHINA SOLUTION
RES

SAW FILTERS

*1102
OFWK3953M
38M9

*1103
OFWK9656M
38M9

PEND NEW 12NC FOR TD1316AF/BHPN-5
*
TUNER VV1316

*1104
UV1300

*	EUROPE	AP	CHINA	LATAM
1104	UV1316E	UV1316E	UV1356	UV1336
1102	K3953	K7257M	TBC	M1971M
1103	K9656M	K9362	K9352	-
4101	Y	-	Y	Y
4102	-	Y	-	-
4103	Y	-	-	-
4104	-	Y	Y	-

1102 A7
1103 C7
1104 E1
2101 H3
2102 H3
2103 G5
2104 G5
2105 G6
2106 F7
2109 H11
2110 H11
2111 G4
2112 F7
2113 B3
2114 G3
3101 H4
3102 H4
3103 D2
3104 F4
3105 F7
3107 H10
3108 D2
3109 C3
3110 E7
3111 E7
3112 C2
3113 C3
4101 B5
4102 B5
4103 C6
4104 D6
4106 H6
4107 H6
5101 H4
5102 H4
5111 B2
5115 H11
6101 F7
6103 C3
7109 D2
A115 B8
A116 B8
A124 D8
A125 C8
F101 B2
F102 G1
F103 G2
F104 G2
F105 G2
F106 G2
F107 G2
F108 G3
F109 G3
F110 G3
F111 F6
F112 F1
F113 H11
F114 C5
F115 C3
F116 D2
F117 D6
F118 E8
I102 C5
I103 D6
I105 H6
I106 H6
I108 H11
I109 D2

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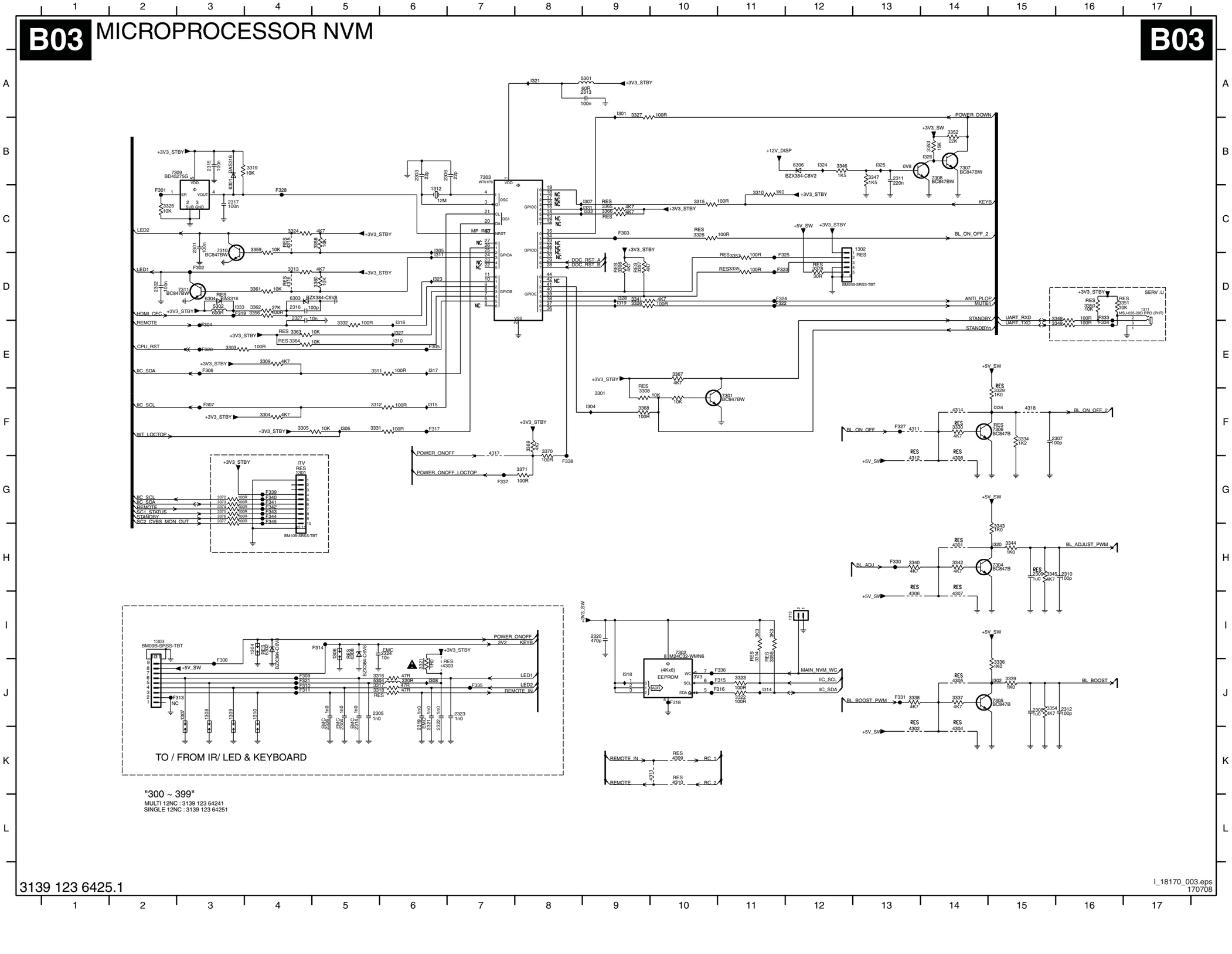
SSB: Micro Processor NVM

B03 MICROPROCESSOR NVM

B03



"300 ~ 399"
MULTI 12NC : 3139 123 64241
SINGLE 12NC : 3139 123 64251

3139 123 6425.1

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170708

SSB: TDA154XX

B04A TDA154XX

B04A

POWER

ANALOG

MEMORY

MISC

AUDIO

HDMI

LVDS

VIA

FOR FACTORY

FOR SERVICE

1C01 G16	3C58-2 B12
1C02 H12	3C58-3 B12
1C03 G1	3C58-4 B12
2C01 H16	3C59-1 B12
2C02 G15	3C59-2 B12
2C03 G15	3C59-3 B12
2C04 E6	3C59-4 B12
2C05 C6	3C60-1 B12
2C06 E6	3C60-2 B12
2C07 I12	3C60-3 B12
2C08 I11	3C60-4 C12
2C09 I10	3C61-1 H4
2C10 I10	3C61-2 H4
2C11 I10	3C61-3 H4
2C12 I9	3C61-4 H4
2C13 I11	3C62-1 F10
2C14 E5	3C62-2 K10
2C15 E5	3C62-3 F12
2C16 H7	3C62-4 G10
2C17 H7	3C63-1 G10
2C18 B3	3C63-2 G10
2C19 B15	3C63-3 G10
2C20 G7	3C63-4 G10
2C21 B4	3C64-1 G13
2C22 B5	3C64-2 G13
2C23 B5	3C64-3 J13
2C28 G4	3C64-4 J13
2C29 G4	3C65-1 J13
2C30 G4	3C65-2 H10
2C31 G4	3C65-3 F12
2C32 B15	3C66 G12
2C33 C6	3C67 G2
2C34 B15	3C68 G2
2C35 D5	3C69 G2
2C36 D6	3C70 H2
2C37 I5	3C71 H2
2C38 B5	3C72 H2
2C39 G4	3C73 G2
2C40 G4	3C74 G2
2C41 G4	3C75 G2
2C42 E5	4C01 K15
2C43 H4	4C02 H12
2C44 B5	4C10 K5
2C45 H4	5C01 A14
2C48 C4	5C02 E3
2C49 J3	5C03 H9
2C50 J3	5C04 I9
2C51 J5	5C05 D3
2C52 E4	5C06 E3
2C53 D5	5C07 B4
2C54 C5	5C08 E3
2C55 D12	5C09 D3
2C56 E12	5C10 D3
2C57 E5	5C11 J15
2C58 K5	5C12 J15
2C59 K5	5C13 E3
2C60 K5	5C14 E3
2C61 J5	5C15 C3
2C62 E4	5C16 D3
2C63 K6	5C17 E3
2C64 K7	5C18 D3
2C65 K7	5C19 F10
2C66 K7	5C20 G10
2C67 E13	6C01 G9
2C68 D5	7C01-1 B7
2C69 D6	7C01-2 F5
2C70 C3	7C01-3 F11
2C71 E6	7C01-4 B15
2C72 D6	7C01-5 A10
2C74 D4	7C01-6 J4
2C75 C6	7C01-7 I10
2C76 E6	7C01-8 E15
2C77 C5	FC01 H7
2C78 K5	FC02 G14
2C80 F10	FC03 D12
2C82 E4	FC04 G1
2C83 G14	FC05 G2
2C84 H4	FC06 G2
2C85 H4	FC07 G2
2C86 E3	FC08 G2
2C87 G2	FC09 B4
2C88 G2	FC10 C4
2C89 E3	FC11 J15
3C01 G10	IC01 H7
3C02 K9	IC02 H8
3C03 G10	IC03 H7
3C04 G12	IC04 G2
3C05 H10	IC05 G2
3C06 G12	IC06 H2
3C07 F10	IC07 H2
3C08 H7	IC08 G6
3C09 G10	IC09 I5
3C10 G10	
3C17 G4	
3C18 G4	
3C19 G4	
3C20 G4	
3C21 H4	
3C23 K6	
3C24 J5	
3C25 J5	
3C26 J5	
3C27 J5	
3C28 F12	
3C29 F12	
3C32 E12	
3C33 D12	
3C34 D12	
3C35 G10	
3C36 G15	
3C37 G16	
3C38 G14	
3C39 H12	
3C40 F14	
3C41 I4	
3C42 H7	
3C50-2 A12	
3C50-3 C12	
3C50-4 D12	
3C51-1 B9	
3C51-2 B9	
3C51-3 B9	
3C51-4 B9	
3C52-1 B10	
3C52-2 B10	
3C52-3 B10	
3C52-4 B10	
3C53-1 B9	
3C53-2 C9	
3C53-3 C9	
3C53-4 C9	
3C54-1 C9	
3C54-2 C9	
3C54-3 C9	
3C54-4 C9	
3C55-1 D12	
3C55-2 C12	
3C55-3 C12	
3C55-4 C12	
3C57-1 A12	
3C57-2 C12	
3C57-3 C12	
3C57-4 C12	
3C58-1 C12	

3139 123 5785.1

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SSB: DDR Flash Trap

B04B DDR FLASH TRAP

B04B

+2V5_SW
2701 10u
2702 470n
2703 470n
2704 470n
2709 470n
2710 470n
2711 470n
2712 470n
2713 470n
+2V5_SW
7701 HY5DU281622FTP-5
VDD
VDDQ
Φ DDR SDRAM 2Mx16x4
MA(0) MA(1) MA(2) MA(3) MA(4) MA(5) MA(6) MA(7) MA(8) MA(9) MA(10) MA(11)
3701 4K7 RES
NC
BA0 BA1 BA
DQM0H DQM0L DM
F711 VREF
SDCLKN SDCLKP CKE CS RAS CAS WE
CLK CLK CKE
RES 2705 470n 3702 4K7 1%
2706 470n 3703 4K7 1%
MD(15) MD(14) MD(13) MD(12) MD(11) MD(10) MD(9) MD(8) MD(7) MD(6) MD(5) MD(4) MD(3) MD(2) MD(1) MD(0)
DQS0H DQS0L
VSS VSSQ
SDCLKN 2707 1n0 I701 3706 220R SDCLKP

+3V3_SW
RES 3708 47K
3709 47K
3710 10K
3711 10K
3712 47K
3713 47K
SPI_CEN TRAP0 RES 3714 10K
SPI_SCK TRAP1 RES 3715 10K
TRAP2 F705 TRAP2 319804000020 I701 3716 1K0
HPD_RST_MUX TRAP3 F708 RES 3717 2K2
TRAP4 TRAP4 F709 3718 4K7
CKE TRAP5 F710 3719 2K2

IO TRAPS CONFIGURATION

TRAP	MODE	NORMAL	VIRGIN
0	3714	OPEN	OPEN
1	3715	OPEN	OPEN
2	1701	OPEN	CLOSED
3	3717	OPEN	OPEN
4	3718	CLOSED	CLOSED
5	3719	CLOSED	CLOSED

F712 5701 600R +3V3_SW
2714 470n
3720 47K 3721 47K 3722 47K
7702 M25P80-VMW6T
SPI_SDI F706 3723 33R
SPI_SCK F702
F704 SPI_CEN
F701
F707 SPI_HOLD
VCC Φ 8M FLASH VSS
D C S W HOLD Q
3724 33R F703 SPI_SDO

1701 B9
2701 B2
2702 B3
2703 B3
2704 B3
2705 D2
2706 D2
2707 F3
2709 B4
2710 B4
2711 B5
2712 B5
2713 B5
2714 E8
3701 C2
3702 D2
3703 D2
3706 F3
3708 A7
3709 A8
3710 A8
3711 A8
3712 A9
3713 A9
3714 B9
3715 B9
3716 B9
3717 C9
3718 C9
3719 C9
3720 E6
3721 E6
3722 E6
3723 E7
3724 E8
5701 D8
7701 B3
7702 E7
F701 F6
F702 E7
F703 E9
F704 F6
F705 B7
F706 E7
F707 F6
F708 C8
F709 C8
F710 C8
F711 D3
F712 D8
I701 F3

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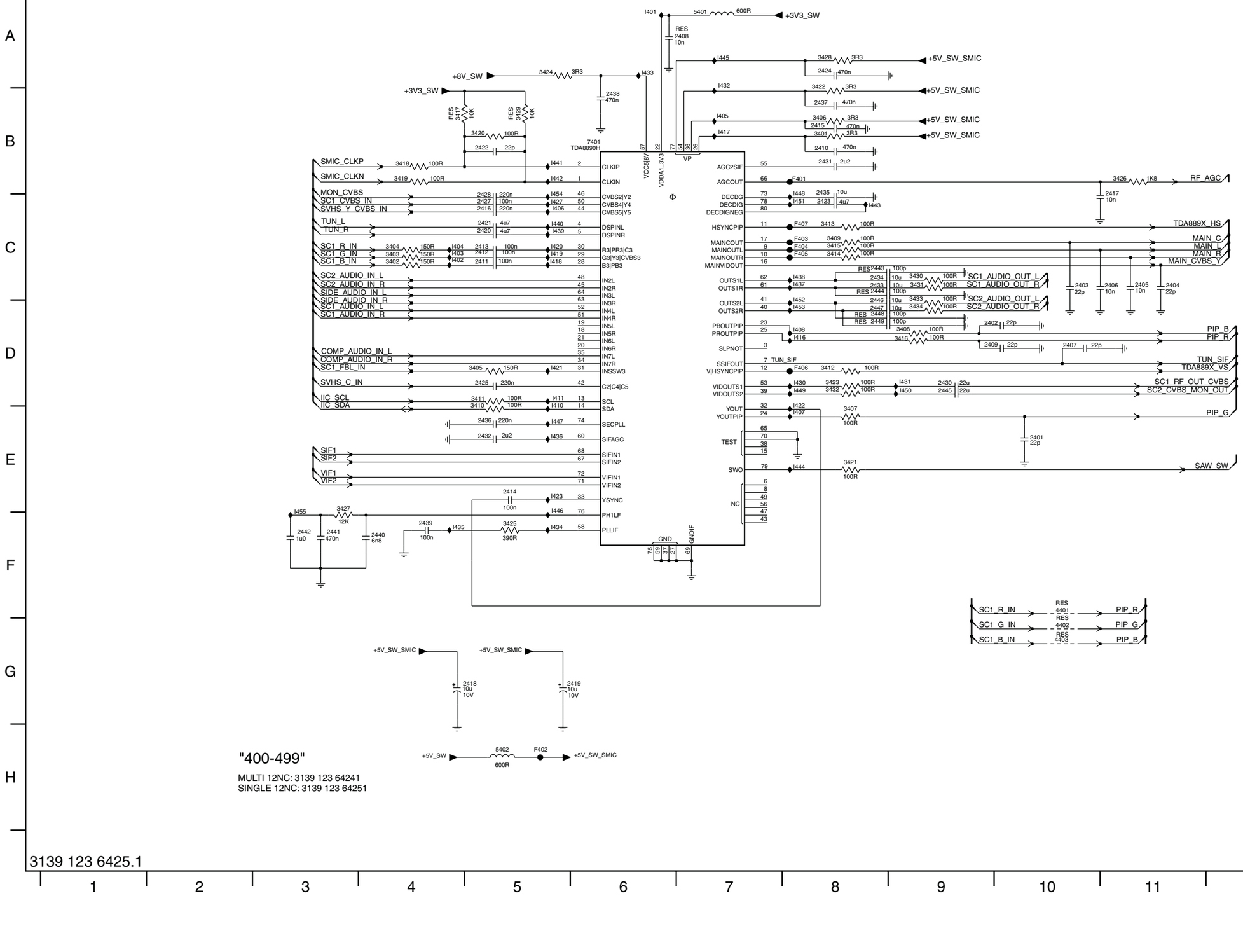
SSB: LVDS Connectors

1R10 B2
1R11 B2
1R12 C2
1R13 D2
1R14 D2
1R50 B6
2R01 B9
2R02 B9
2R03 C8
3R02 C7
3R13 C7
3R17 C8
4R04 B7
4R05 B7
4R06 B8
5R01 A9
5R02 A9
5R03 B9
6R01 C7
7R01 D8
7R02 A8
FR01 A9
FR02 C6
FR03 C4
FR04 C4
FR05 C4
FR06 C4
FR07 C4
FR08 C4
FR09 C4
FR10 D4
FR11 D4
FR12 D4
FR13 D7
IR01 C8
IR02 C7
IR03 B8
IR04 A8
IR05 C8

SSB: SMIC L

B05A SMIC L

B05A



2401 E10 I416 D8
2402 D9 I417 B7
2403 C10 I418 C5
2404 C11 I419 C5
2405 C11 I420 C5
2406 C11 I421 D5
2407 D10 I422 D8
2408 A7 I423 E5
2409 D9 I427 C5
2410 B8 I430 D8
2411 C5 I431 D9
2412 C5 I432 A7
2413 C5 I433 A6
2414 E5 I434 F5
2415 B8 I435 F4
2416 C5 I436 E5
2417 B11 I437 C8
2418 G5 I438 C8
2419 G6 I439 C5
2420 C5 I440 C5
2421 C5 I441 B5
2422 B5 I442 B5
2423 C8 I443 C8
2424 A8 I444 E8
2425 D5 I445 A7
2427 C5 I446 E5
2428 C5 I447 E5
2430 D9 I448 B8
2431 B8 I449 D8
2432 E5 I450 D9
2433 C8 I451 C8
2434 C8 I452 C8
2435 B8 I453 D8
2436 E5 I454 C5
2437 B8 I455 E3
2438 B6
2439 F4
2440 F4
2441 F3
2442 F3
2443 C8
2444 C8
2445 D9
2446 D8
2447 D8
2448 D8
2449 D8
3401 B8
3402 C4
3403 C4
3404 C4
3405 D5
3406 B8
3407 E8
3408 D9
3409 C8
3410 E5
3411 D5
3412 D8
3413 C8
3414 C8
3415 C8
3416 D9
3417 B4
3418 B4
3419 B4
3420 B5
3421 E8
3422 B8
3423 D8
3424 A5
3425 F5
3426 B11
3427 E3
3428 A8
3429 B5
3430 C9
3431 C9
3432 D8
3433 D9
3434 D9
4401 F10
4402 G10
4403 G10
5401 A7
5402 H5
7401 B6
F401 B8
F402 H5
F403 C8
F404 C8
F405 C8
F406 D8
F407 C8
I401 A6
I402 C4
I403 C4
I404 C4
I405 B7
I406 C5
I407 E8
I408 D8
I410 D5
I411 D5

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SSB: Audio Class D

1A35 D15 2A01 A5 2A02 A15 2A03 C13 2A04 A5 2A05 E12 2A08 B15 2A09 C9 2A10 C10 2A11 D7 2A12 D8 2A14 C12 2A15 D7 2A16 D7 2A17 C12 2A18 D10 2A19 D8 2A20 D7 2A21 D11 2A22 D8 2A23 D12 2A24 D8 2A25 E10 2A27 E10 2A28 D12 2A29 E8 2A30 E10 2A31 E11 2A32 F8 2A33 F9 2A34 F10 2A35 D11 2A36 F11 2A40 F8 2A41 F14 2A45 D12 2A60 E1 2A61 F2 2A62 A4 2A63 A4 2A64 A13 2A65 A14 2A66 A2 2A67 D14 2A68 D14 3A01 A5 3A02 A14 3A03 D7 3A04 D8 3A05 E15 3A06 D7 3A07 D7 3A08 D8 3A09 C11 3A10 B12 3A11 D7 3A12 C13 3A13 E8 3A14 C14 3A15 G12 3A16 G13 3A17 E11 3A18 E12 3A19 E7 3A20 D7 3A21 D7 3A22 D10 3A23 E10 3A26 E8 3A27 E13 3A28 F13 3A29 E15 3A30 E15 3A31 F15 3A32 E7 3A33 E7 3A61 D2 3A62 E2 3A63 F2 3A70 E3 3A71 E4 3A72 E4 3A75 G3 3A76 F4 3A77 F4 5A01 E3 5A03 C11 5A04 E11 5A05 A5 5A06 B14 6A51 F3 6A52 G3 7A01 D9 7A05 E15 7A06 E14 7A07 F14 7A52 F2 7A53 F2 7A56 E4 7A57 E4 7A60 F4 7A61 D4 7A62 D4 FA01 A5 FA02 A15 FA03 A5 FA04 D10 FA05 D6 FA06 D6 FA07 D15 FA08 D15 FA09 D6 FA10 D15 FA11 D15 FA12 E6 FA13 E6 FA14 B15 FA15 F1 FA32 E15 FA33 E14 IA01 D7 IA02 D8 IA03 D10 IA04 C12 IA05 D7 IA06 D8 IA07 D10 IA08 E12 IA09 D8 IA10 D7 IA11 D7 IA12 D8 IA13 D8 IA14 E10 IA15 E8 IA16 E10 IA17 E12 IA18 E10 IA19 E8 IA21 E8 IA22 E8 IA30 E14 IA31 E14 IA33 E8 IA35 D11 IA36 D11 IA38 E11 IA39 E11 IA42 E3 IA44 D5 IA45 E5 IA48 D5 IA49 D4 IA50 C5 IA51 D4 IA52 D5 IA53 D4 IA67 F4 IA68 D2 IA69 F2 IA70 F2 IA71 F3 IA72 F5 IA73 C13

B05B AUDIO - CLASS D

B05B

MUTING CIRCUIT

CLASS D POWER AMPLIFIER

TO SPEAKERS

DC-DETECTION

*	LCD	PDP
3A03	10K	6K8
3A04	12K	22K
3A06	10K	6K8
3A07	10K	6K8
3A08	12K	22K
3A11	10K	6K8

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SSB: YPBPR & SVHS

B06A YPBPR & SVHS

B06A

RES 1605
BM05B-SRSS-TBT
SIDE_AUDIO_IN_L
SIDE_AUDIO_IN_R
SVHS_Y_CVBS_IN
SVHS_C_IN

SVHS
1601 MDC-013V1-B
F602
F601
F615
1609
6604 RES
PESD5V0S1BA
RES 2600
3604 75R
3600 100R
F603
RES 2625 33p
SVHS_C_IN

CVBS
YELLOW 1602-1 1
MTJ-032-37BAA-432 NI
3602 100R
F606
SVHS_Y_CVBS_IN
3609 75R
1608
RES 6606 PESD5V0S1BA
RES 2609
RES 2626 33p

RED 1602-3 7
MTJ-032-37BAA-432 NI
F610
3621 10K
I621
2621 2u2
F612
SIDE_AUDIO_IN_R
1616
RES 6621 PESD5V0S1BA
RES 2627 33p
2622 180p
3622 15K
4601
4602

WHITE 1602-2 4
MTJ-032-37BAA-432 NI
F611
3623 10K
I624
2623 2u2
F613
SIDE_AUDIO_IN_L
1617
6622 RES
PESD5V0S1BA
2628 RES 33p
2624 180p
3624 15K

+3V3_SW
3606 10K
HP_DETECT
RES 4609
RC_1
RC_2
RES 4603
RES 4604
RES 4610
GNDSND
F618
F619
F616
F617
F620
LOUT_SP_GROUND
LOUT_HP
ROUT_HP
ROUT_SP_GROUND
RES 4611
RES 4612
4607
4608
4613
4614
RES 4605
RES 4606
1603
NC
MSJ-035-10B B AG PPO
1618
1619
1620
RES 6615 PESD5V0S1BA
RES 6616 PESD5V0S1BA
2613 22n
2615 10n
2614 22n
2616 10n
GNDSND

HEADPHONE

MTJ-032-37BAA-432 NI GREEN
1614-1 1
YELLOW
MTJ-032-37BAA-432 NI BLUE
1614-2 4
WHITE
MTJ-032-37BAA-432 NI RED
1614-3 7
RED
RED 1615-2 4
F614
WHITE
MTJ-032-29BB-32
WHITE 1615-1 2
RED
MTJ-032-29BB-32

F609
1613
RES 6614 PESD5V0S1BA
3611 10K
I627
2612 180p
3612 15K
2610 2u2
I611
COMP_AUDIO_IN_R

F608
1611
RES 6613 PESD5V0S1BA
3607 10K
I623
2608 180p
3608 15K
2607 2u2
I610
COMP_AUDIO_IN_L

F604
1607
RES 6611 PESD5V0S1BA
RES 2603
3603 75R
HD_Y_IN

F605
1606
RES 6610 PESD5V0S1BA
RES 2602
3601 75R
HD_PR_IN

F607
1610
RES 6612 PESD5V0S1BA
RES 2606
3605 75R
HD_PB_IN

1601 B6	6604 B7
1602-1 C6	6606 C7
1602-2 D6	6610 E2
1602-3 C6	6611 D2
1603 F5	6612 F2
1605 A6	6613 C2
1606 E2	6614 C2
1607 D2	6615 F7
1608 C7	6616 F7
1609 B7	6621 D7
1610 F2	6622 D7
1611 C2	F601 B7
1613 C2	F602 B7
1614-1 B1	F603 B8
1614-2 C1	F604 D2
1614-3 C1	F605 E2
1615-1 C1	F606 C8
1615-2 C1	F607 E2
1616 D7	F608 C2
1617 D7	F609 C2
1618 F6	F610 C7
1619 F6	F611 D7
1620 F6	F612 C8
2600 B7	F613 D8
2602 E3	F614 C1
2603 D3	F615 B7
2606 E3	F616 E6
2607 C4	F617 E6
2608 C3	F618 E6
2609 C8	F619 E6
2610 C4	F620 F6
2612 C3	I610 C4
2613 F8	I611 C4
2614 F8	I621 C8
2615 F8	I623 C3
2616 F8	I624 D8
2621 C8	I627 C3
2622 D8	
2623 D8	
2624 D8	
2625 B8	
2626 C8	
2627 D7	
2628 E7	
3600 B8	
3601 E4	
3602 C8	
3603 D4	
3604 B8	
3605 E4	
3606 E6	
3607 C3	
3608 C4	
3609 C7	
3611 C3	
3612 C4	
3621 C7	
3622 D8	
3623 D7	
3624 D8	
4601 D6	
4602 D6	
4603 E7	
4604 E7	
4605 F9	
4606 F9	
4607 E8	
4608 E8	
4609 E8	
4610 E8	
4611 E7	
4612 E8	
4613 F8	
4614 F8	

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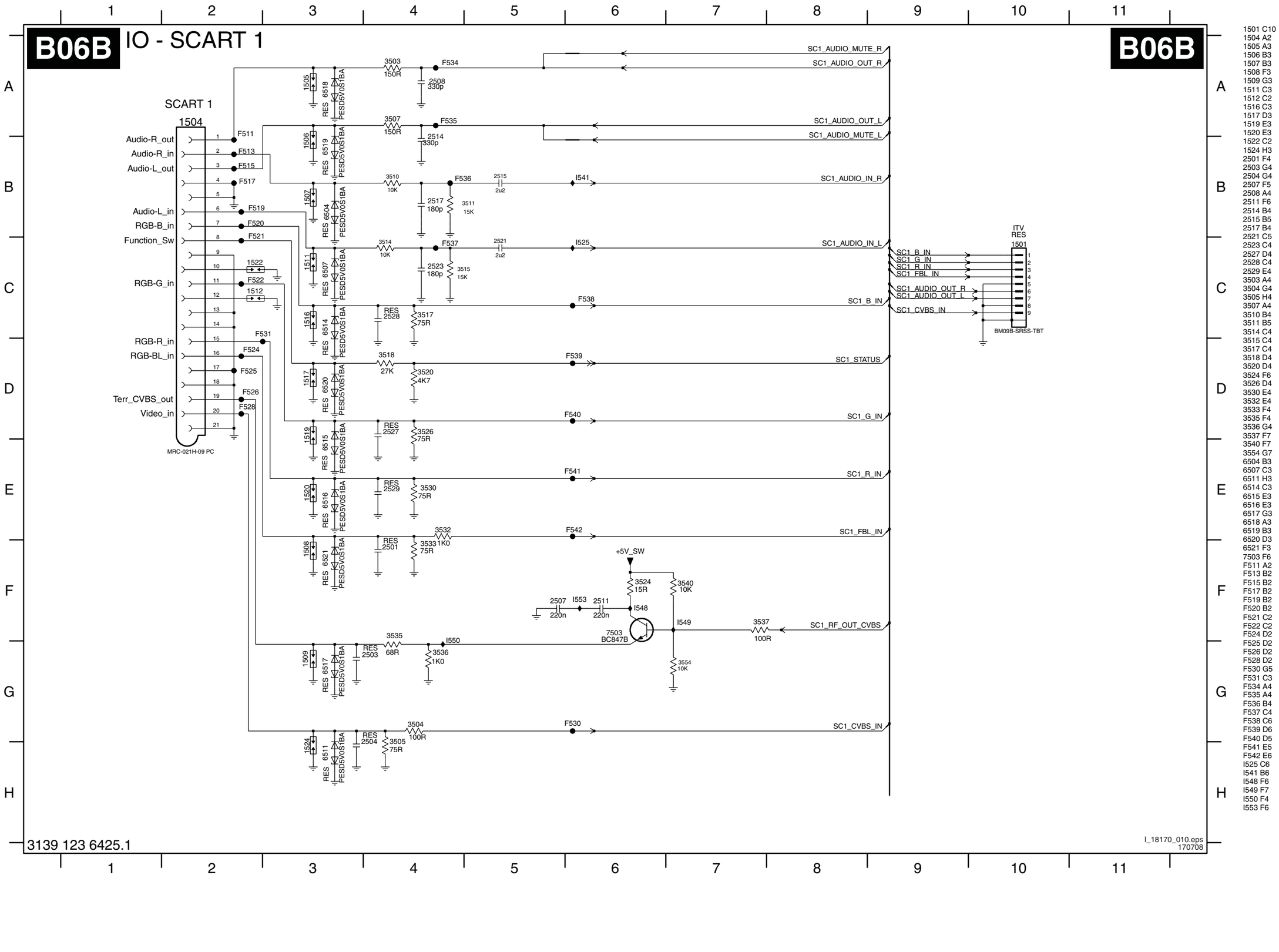
SSB: IO Scart 1



1501 C10
1504 A2
1505 A3
1506 B3
1507 B3
1508 F3
1509 G3
1511 C3
1512 C2
1516 C3
1517 D3
1519 E3
1520 E3
1522 C2
1524 H3
2501 F4
2503 G4
2504 G4
2507 F5
2508 A4
2511 F6
2514 B4
2515 B5
2517 B4
2521 C5
2523 C4
2527 D4
2528 C4
2529 E4
3503 A4
3504 G4
3505 H4
3507 A4
3510 B4
3511 B5
3514 C4
3515 C4
3517 C4
3518 D4
3520 D4
3524 F6
3526 D4
3530 E4
3532 E4
3533 F4
3535 F4
3536 G4
3537 F7
3540 F7
3554 G7
6504 B3
6507 C3
6511 H3
6514 C3
6515 E3
6516 E3
6517 G3
6518 A3
6519 B3
6520 D3
6521 F3
7503 F6
F511 A2
F513 B2
F515 B2
F517 B2
F519 B2
F520 B2
F521 C2
F522 C2
F524 D2
F525 D2
F526 D2
F528 D2
F530 G5
F531 C3
F534 A4
F535 A4
F536 B4
F537 C4
F538 C6
F539 D6
F540 D5
F541 E5
F542 E6
I525 C6
I541 B6
I548 F6
I549 F7
I550 F4
I553 F6

SSB: Scart2 & UART & JTAG

B06C SCART2 & UART & JTAG

SCART2

1E01 MRC-021H-09 PC

FE01 FE02 FE03 FE04 FE05 FE06 FE07 FE08 FE09 FE10

1E25 1E27

3E01 150R FE22 SC2_AUDIO_MUTE_R
3E01 150R FE22 SC2_AUDIO_OUT_R
3E02 150R FE23 SC2_AUDIO_OUT_L
3E02 150R FE23 SC2_AUDIO_MUTE_L
3E03 10K FE30 2E10 2u2 FE24 SC2_AUDIO_IN_R
3E05 10K FE31 2E11 2u2 FE25 SC2_AUDIO_IN_L
3E07 27K FE26 SC2_STATUS
3E09 100R FE27 SC2_C_IN

1E23 1E24 1E26 1E28 1E29 1E30 1E31 1E32
RES 6E01 RES 6E02 RES 6E03 RES 6E04 RES 6E05 RES 6E06 RES 6E07 RES 6E08
PESD5V0S1BA

2E01 330p 2E02 330p 2E03 180p 2E04 180p
3E04 15K 3E06 15K 3E08 4K7 3E10 75R
RES 2E05 47p RES 2E08 47p RES 2E09 100p

+5V_SW
3E11 15R 3E12 10K
2E06 220n IE01 2E07 220n IE02
7E01 BC847B
IE03 3E13 100R FE28 SC2_CVBS_MON_OUT
IE04 3E14 68R 3E15 1K0 3E20 10K
3E16 75R FE29 SC2_Y_CVBS_IN

JTAG INTERFACE

+3V3_STBY
3E16 10K 3E17 10K 3E19 10K 3E25 10K

JTAG_TRSTN FE12
JTAG_TDI FE18
JTAG_TDO FE19
JTAG_TMS FE20
JTAG_TCK
CPU_RST

3E26 33R 3E27 33R 3E28 33R 3E29 33R 3E30 33R 3E31 33R
FE21

1E22 BM08B-SRSS-TBT

1E03 1E05 1E06 1E09 1E10 1E20

RESERVED

SERV.C

1E04 319804000030

FE15 FE16 FE17
3E70 100R 3E71 100R
IIC_SDA IIC_SCL
1E18 1E19
RES 2E12 15p RES 2E13 15p

4.02mm Round Screw Hole

1E90 REF EMC HOLE
1E96 REF EMC HOLE

5mm x 4.02mm Slot Screw Hole

1E92 REF EMC HOLE
1E93 REF EMC HOLE
1E94 REF EMC HOLE
1E95 REF EMC HOLE
1E97 REF EMC HOLE

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1E01 A1 FE27 E4
1E03 B8 FE28 F5
1E04 C6 FE29 G5
1E05 B8 FE30 C4
1E08 B8 FE31 C4
1E09 B8 IE01 F3
1E10 B8 IE02 F4
1E18 C7 IE03 F4
1E19 C7 IE04 F3
1E20 B9
1E22 A9
1E23 A3
1E24 B3
1E25 C1
1E26 C3
1E27 C1
1E28 D3
1E29 D3
1E30 E3
1E31 G2
1E32 G2
1E90 F6
1E92 F8
1E93 F9
1E94 G8
1E95 G9
1E96 G6
1E97 H9
2E01 A4
2E02 B4
2E03 C4
2E04 D4
2E05 E4
2E06 F3
2E07 F4
2E08 G3
2E09 G3
2E10 C4
2E11 C4
2E12 C8
2E13 C8
3E01 A3
3E02 B3
3E03 C3
3E04 C4
3E05 C3
3E06 D4
3E07 D3
3E08 D4
3E09 E4
3E10 E4
3E11 F4
3E12 F4
3E13 F5
3E14 F3
3E15 G3
3E16 A7
3E17 A7
3E18 G3
3E19 A7
3E20 G4
3E21 G3
3E25 A7
3E26 A7
3E27 A7
3E28 A7
3E29 A7
3E30 B7
3E31 B7
3E70 C8
3E71 C8
6E01 A3
6E02 B3
6E03 C3
6E04 D3
6E05 D3
6E06 E3
6E07 G2
6E08 G2
7E01 F4
FE01 A1
FE02 A1
FE03 B1
FE04 B1
FE05 B1
FE06 B1
FE07 C2
FE08 D1
FE09 D2
FE10 D2
FE12 A7
FE15 C7
FE16 C7
FE17 C7
FE18 A7
FE19 A7
FE20 A7
FE21 B8
FE22 A4
FE23 B4
FE24 C4
FE25 C4
FE26 D4

SSB: HDMI

B06D HDMI

B06D

RES FOR SINGLE HDMI

HDMI A

HDMI B

"N00-N99"

MULTI 12NC: 3139 123 64241
SINGLE 12NC: 3139 123 64251

3139 123 6425.1

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1N01 E3
1N02 H3
2N01 B13
2N02 B8
2N03 B13
2N04 E17
2N05 C14
2N06 B9
2N07 B10
2N10 G17
2N17 B14
2N18 B14
2N19 B14
2N29 C14
2N30 C14
2N33 B14
2N39 B14
3N01 F4
3N02 G5
3N03 G4
3N04 I4
3N05 D7
3N06 D7
3N07 J5
3N08 J4
3N09 E16
3N10 E15
3N11 G8
3N12 E14
3N13 G14
3N14 G15
3N15 G16
3N16 J11
3N17 J11
3N18 H11
3N19 H11
3N20 E9
3N21 E9
3N22 E9
3N25 F8
3N26 F7
3N27 G8
3N28 I8
3N29 J8
3N30 C7
3N31 C11
3N32 D11
3N33 G6
3N34 G6
3N35 J6
3N36 J6
3N37 E16
3N38 E17
3N39 G16
3N40 G16
3N41-1 C5
3N41-2 C5
3N41-3 C5
3N41-4 C5
3N42-1 B5
3N42-2 B5
3N42-3 C5
3N42-4 B5
4N03 F10
4N04 G10
4N11 F14
4N12 D9
4N13 D9
4N14 D9
4N15 E15
4N16 E16
4N17 G15
4N18 G15
5N01 C13
5N02 B13
5N03 A13
6N07 F14
6N08 F13
6N09 D14
6N10 D13
7N01 E13
7N02 G14
7N03 D11
7N04 F9
7N05 J4
7N06 G4
7N07 B8
7N08 G5
7N09 J5
7N10 E15
7N11 F16
7N12 G15
7N13 G16
FN01 E14
FN02 B15
FN03 A15
FN04 H11
FN05 F4
FN06 F4
FN07 E4
FN08 F4
FN09 F4
FN10 H4
FN11 I4
FN12 I4
FN13 I4
FN14 I4
FN15 D10
FN16 D12
FN17 E11
FN18 E8
FN19 E14
FN20 G14
FN21 E14
FN22 E15
FN23 G14
FN24 G15
FN74 C15
IN01 G5
IN02 G4
IN03 J5
IN04 J4
IN06 I8
IN07 G8
IN10 H11
IN11 H11
IN12 G8
IN13 E8
IN14 E8
IN15 A13
IN16 C13
IN17 G6
IN18 G6
IN19 J6
IN20 J6

SSB: SRP List Explanation

Example

Net Name	*Diagram*
+12-15V	AP1 (4x)
+12-15V	AP4 (4x)
+12-15V	AP5 (12x)
+12-15V	AP6 (4x)
+12-15V	AP7 (8x)
+12V	AP1 (4x)
+12V_NF	AP1 (2x)
+12VAL	AP1 (2x)
+25VLP	AP1 (4x)
+25VLP	AP2 (1x)
+3V3-STANDBY	AP5 (3x)
+400V-F	AP1 (2x)
+400V-F	AP2 (2x)
+400V-F	AP3 (2x)
+5V2	AP1 (6x)
+5V2	AP2 (1x)
+5V2-NF	AP1 (1x)
+5V2-NF	AP2 (1x)
+5V-SW	AP1 (6x)
+5V-SW	AP2 (1x)
+8V6	AP1 (3x)
+AUX	AP1 (2x)
+AUX	AP2 (1x)
+DC-F	AP1 (2x)
+DC-F	AP3 (2x)
+SUB-SPEAKER	AP5 (1x)
+SUB-SPEAKER	AP6 (2x)
-12-15V	AP1 (4x)
-12-15V	AP4 (6x)
-12-15V	AP5 (14x)
-12-15V	AP6 (6x)
-12-15V	AP7 (8x)
AL-OFF	AP1 (2x)
AUDIO-L	AP4 (1x)
AUDIO-L	AP5 (1x)
AUDIO-PROT	AP5 (3x)
AUDIO-R	AP4 (1x)
AUDIO-R	AP5 (1x)
AUDIO-SW	AP5 (1x)
AUDIO-SW	AP7 (1x)
BOOST	AP1 (2x)
CPROT	AP4 (2x)
CPROT	AP5 (1x)
CPROT-SW	AP5 (1x)
CPROT-SW	AP6 (2x)
-DC-F	AP1 (2x)
-DC-F	AP3 (2x)
DC-PROT	AP1 (1x)
DC-PROT	AP5 (2x)
DIM-CONTROL	AP1 (2x)
FEEDBACK+SW	AP6 (2x)
FEEDBACK-L	AP4 (2x)
FEEDBACK-R	AP4 (2x)
FEEDBACK-SW	AP6 (2x)
GND-AL	AP1 (2x)
GNDHA	AP1 (40x)
GNDHA	AP2 (20x)
GNDHA	AP3 (2x)
GNDHOT	AP3 (2x)
GND-L	AP1 (2x)
GND-L	AP4 (4x)
GND-L	AP5 (34x)
GND-LL	AP4 (7x)
GND-LL	AP5 (1x)
GND-LR	AP4 (7x)
GND-LR	AP5 (1x)
GND-LSW	AP5 (1x)
GND-LSW	AP6 (15x)
GND-S	AP1 (11x)
GND-SA	AP4 (8x)
GND-SA	AP5 (2x)
GND-SA	AP6 (8x)
GND-SA	AP7 (6x)
GNDscrew	AP3 (2x)
GNDscrew	AP5 (2x)
GND-SSB	AP5 (3x)
GND-SSP	AP1 (51x)
GND-SSP	AP2 (15x)
IN+SW	AP6 (2x)
IN-L	AP4 (2x)
IN-R	AP4 (2x)
IN-SW	AP6 (2x)
INV-MUTE	AP4 (1x)
INV-MUTE	AP5 (1x)
INV-MUTE	AP6 (1x)
LEFT-SPEAKER	AP4 (1x)
LEFT-SPEAKER	AP5 (1x)
MUTE	AP4 (2x)
MUTE	AP5 (1x)
MUTE	AP6 (2x)
ON-OFF	AP1 (3x)
OUT	AP6 (1x)
OUT	AP7 (2x)
OUTN	AP6 (1x)
OUTN	AP7 (1x)
POWER-GOOD	AP1 (2x)
POWER-OK-PLATFORM	AP1 (2x)
RIGHT-SPEAKER	AP4 (1x)
RIGHT-SPEAKER	AP5 (1x)
SOUND-ENABLE	AP5 (3x)
STANDBY	AP1 (5x)
STANDBY	AP2 (1x)
-SUB-SPEAKER	AP5 (1x)
-SUB-SPEAKER	AP6 (2x)
V-CLAMP	AP1 (1x)
V-CLAMP	AP3 (2x)

1.1. Introduction

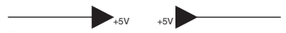
SRP (Service Reference Protocol) is a software tool that creates a list with all references to signal lines. The list contains references to the signals within all schematics of a PWB. It replaces the text references currently printed next to the signal names in the schematics. These printed references are created manually and are therefore not guaranteed to be 100% correct. In addition, in the current crowded schematics there is often none or very little place for these references.
Some of the PWB schematics will use SRP while others will still use the manual references. Either there will be an SRP reference list for a schematic, or there will be printed references in the schematic.

1.2. Non-SRP Schematics

There are several different signals available in a schematic:

1.2.1. Power Supply Lines

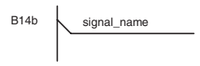
All power supply lines are available in the supply line overview (see chapter 6). In the schematics (see chapter 7) is not indicated where supplies are coming from or going to.
It is however indicated if a supply is incoming (created elsewhere), or outgoing (created or adapted in the current schematic).



Outgoing Incoming

1.2.2. Normal Signals

For normal signals, a schematic reference (e.g. B14b) is placed next to the signals.



1.2.3. Grounds

For normal and special grounds (e.g. GNDHOT or GND3V3 etc.), nothing is indicated.

1.3. SRP Schematics

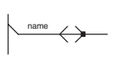
SRP is a tool, which automatically creates a list with signal references, indicating on which schematic the signals are used.
A reference is created for all signals indicated with an SRP symbol, these symbols are:

Power supply line.

Stand alone signal or switching line (used as less as possible).

Signal line into a wire tree.

Switching line into a wire tree.



Bi-directional line (e.g. SDA) into a wire tree.

Signal line into a wire tree, its direction depends on the circuit (e.g. ingoing for PDP, outgoing for LCD sets).

Remarks:

- When there is a black dot on the "signal direction arrow" it is an SRP symbol, so there will be a reference to the signal name in the SRP list.
- All references to normal grounds (Ground symbols without additional text) are not listed in the reference list, this to keep it concise.
- Signals that are not used in multiple schematics, but only once or several times in the same schematic, are included in the SRP reference list, but only with one reference.

Additional Tip:

When using the PDF service manual file, you can very easily search for signal names and follow the signal over all the schematics. In Adobe PDF reader:

- Select the signal name you want to search for, with the "Select text" tool.
- Copy and paste the signal name in the "Search PDF" tool.
- Search for all occurrences of the signal name.
- Now you can quickly jump between the different occurrences and follow the signal over all schematics. It is advised to "zoom in" to e.g. 150% to see clearly, which text is selected. Then you can zoom out, to get an overview of the complete schematic.

PS. It is recommended to use at least Adobe PDF (reader) version 6.x, due to better search possibilities in this version.

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Personal Notes:

SSB: SRP List

Netname	Schematic
+12V_AUDIO	B01 (1x)
+12V_AUDIO	B05B (1x)
+12V_DISP	B01 (3x)
+12V_DISP	B03 (1x)
+12V_DISP	B04C (1x)
+1V8_ANA-MUX	B06D (3x)
+1V8_DIG-MUX	B06D (2x)
+1V8_SW	B01 (2x)
+1V8_SW	B04A (3x)
+1V8_SW	B06D (1x)
+1V8_SW_ADC	B01 (1x)
+1V8_SW_ADC	B04A (2x)
+1V8_SW_LOCAL	B04A (4x)
+2V5_SW	B01 (2x)
+2V5_SW	B04A (2x)
+2V5_SW	B04B (3x)
+3V3_ANA-MUX	B06D (4x)
+3V3_STBY	B01 (1x)
+3V3_STBY	B03 (18x)
+3V3_STBY	B04A (2x)
+3V3_STBY	B05B (3x)
+3V3_STBY	B06C (1x)
+3V3_STBY	B06D (3x)
+3V3_SW	B01 (1x)
+3V3_SW	B03 (2x)
+3V3_SW	B04A (14x)
+3V3_SW	B04B (2x)
+3V3_SW	B05A (2x)
+3V3_SW	B06A (1x)
+3V3_SW	B06D (4x)
+3V3_SW_TDA	B01 (2x)
+3V3_SW_TDA	B04A (6x)
+5V_IF	B02 (4x)
+5V_SW	B01 (6x)
+5V_SW	B02 (1x)
+5V_SW	B03 (8x)
+5V_SW	B05A (1x)
+5V_SW	B06B (1x)
+5V_SW	B06C (1x)
+5V_SW	B06D (7x)
+5V_SW_SMIC	B05A (7x)
+5V_TUN	B02 (2x)
+5VHDMI_A	B06D (3x)
+5VHDMI_B	B06D (3x)
+8V_SW	B01 (1x)
+8V_SW	B05A (1x)
+VTUN	B01 (1x)
+VTUN	B02 (1x)
-12V_AUDIO	B01 (1x)
-12V_AUDIO	B05B (1x)
ANTI_PLOP	B03 (1x)
ANTI_PLOP	B05B (1x)
AUDIO_LS_L	B04A (1x)
AUDIO_LS_L	B05B (1x)
AUDIO_LS_R	B04A (1x)
AUDIO_LS_R	B05B (1x)
BA0	B04A (1x)
BA0	B04B (1x)
BA1	B04A (1x)
BA1	B04B (1x)
BL_ADJ	B03 (1x)
BL_ADJ	B04A (1x)
BL_ADJUST_PWM	B01 (1x)
BL_ADJUST_PWM	B03 (1x)
BL_BOOST	B01 (1x)
BL_BOOST	B03 (1x)
BL_BOOST_PWM	B03 (1x)
BL_BOOST_PWM	B04A (1x)
BL_ON_OFF	B03 (1x)
BL_ON_OFF	B04A (1x)
BL_ON_OFF_2	B01 (1x)
BL_ON_OFF_2	B03 (2x)
CASN	B04A (1x)
CASN	B04B (1x)
CKE	B04A (1x)
CKE	B04B (2x)
COMP_AUDIO_IN_L	B05A (1x)
COMP_AUDIO_IN_L	B06A (1x)
COMP_AUDIO_IN_R	B05A (1x)
COMP_AUDIO_IN_R	B06A (1x)
CPU_RST	B03 (1x)
CPU_RST	B04A (1x)
CPU_RST	B06C (1x)
DC_PROT	B04A (1x)
DC_PROT	B05B (1x)
DDC_RST_A	B03 (1x)
DDC_RST_A	B06D (1x)
DDC_RST_B	B03 (1x)
DDC_RST_B	B06D (1x)
DDC_SCLA	B06D (2x)
DDC_SCLB	B06D (1x)
DDC_SDAA	B06D (2x)
DDC_SDAB	B06D (2x)
DQM0H	B04A (1x)
DQM0H	B04B (1x)
DQM0L	B04A (1x)
DQM0L	B04B (1x)
DQS0H	B04A (1x)
DQS0H	B04B (1x)
DQS0L	B04A (1x)
DQS0L	B04B (1x)
EDID_WC	B06D (2x)
ENGAGE	B05B (2x)
GND107	B04A (2x)
GND110	B04A (2x)
GND47	B04A (2x)
GND60	B04A (2x)
GND78	B04A (2x)
GND86	B04A (2x)
GND97	B04A (3x)
GNDDC1	B01 (13x)
GNDSND	B01 (5x)
GNDSND	B05B (28x)
GNDSND	B06A (2x)
GNDTUN	B01 (1x)
HD_PB_IN	B04A (1x)
HD_PB_IN	B06A (1x)
HD_PR_IN	B04A (1x)
HD_PR_IN	B06A (1x)
HD_Y_IN	B04A (1x)
HD_Y_IN	B06A (1x)
HDMI_CEC	B03 (1x)
HDMI_CEC	B04A (1x)
HDMI_CEC	B06D (4x)
HDMI_CEC_A	B06D (2x)
HDMI_MUX_RST	B04A (1x)
HDMI_MUX_RST	B06D (1x)
HDMI_MUX_TSCL	B04A (1x)
HDMI_MUX_TSCL	B06D (1x)
HDMI_MUX_TSDA	B04A (1x)
HDMI_MUX_TSDA	B06D (1x)
HDMI_MUX_TX0-	B04A (1x)
HDMI_MUX_TX0-	B06D (3x)
HDMI_MUX_TX0+	B04A (1x)
HDMI_MUX_TX0+	B06D (3x)
HDMI_MUX_TX1-	B04A (1x)
HDMI_MUX_TX1-	B06D (3x)
HDMI_MUX_TX1+	B04A (1x)
HDMI_MUX_TX1+	B06D (3x)
HDMI_MUX_TX2-	B04A (1x)
HDMI_MUX_TX2-	B06D (3x)
HDMI_MUX_TX2+	B04A (1x)
HDMI_MUX_TX2+	B06D (3x)
HDMI_MUX_TXC-	B04A (1x)
HDMI_MUX_TXC-	B06D (3x)
HDMI_MUX_TXC+	B04A (1x)
HDMI_MUX_TXC+	B06D (3x)
HP_DETECT	B04A (1x)
HP_DETECT	B06A (1x)
HPD_RST_A	B06D (2x)
HPD_RST_B	B06D (2x)
HPD_RST_MUX	B04A (1x)
HPD_RST_MUX	B04B (1x)
HPD_RST_MUX	B06D (2x)
IF_ATV	B02 (2x)
IIC_SCL	B02 (1x)
IIC_SCL	B03 (3x)
IIC_SCL	B04A (1x)
IIC_SCL	B05A (1x)
IIC_SCL	B06C (1x)
IIC_SCL	B06D (1x)
IIC_SDA	B02 (1x)
IIC_SDA	B03 (3x)
IIC_SDA	B04A (1x)
IIC_SDA	B05A (1x)
IIC_SDA	B06C (1x)
IIC_SDA	B06D (1x)
JTAG_TCK	B04A (1x)
JTAG_TCK	B06C (1x)
JTAG_TDI	B04A (1x)
JTAG_TDI	B06C (1x)
JTAG_TDO	B04A (1x)
JTAG_TDO	B06C (1x)
JTAG_TMS	B04A (1x)
JTAG_TMS	B06C (1x)
JTAG_TRSTN	B04A (1x)
JTAG_TRSTN	B06C (1x)
KEYB	B03 (2x)
KEYB	B04A (1x)
LCD_PWR_ON	B04A (1x)
LCD_PWR_ON	B04C (1x)
LED1	B03 (2x)
LED2	B03 (2x)
LOUT_HP	B05B (1x)
LOUT_HP	B06A (1x)
LOUT_SP	B05B (1x)
LOUT_SP_GROUND	B05B (1x)
LOUT_SP_GROUND	B06A (1x)
MA(0)	B04A (1x)
MA(0)	B04B (1x)
MA(1)	B04A (1x)
MA(1)	B04B (1x)
MA(10)	B04A (1x)
MA(10)	B04B (1x)
MA(11)	B04A (1x)
MA(11)	B04B (1x)
MA(2)	B04A (1x)
MA(2)	B04B (1x)
MA(3)	B04A (1x)
MA(3)	B04B (1x)
MA(4)	B04A (1x)
MA(4)	B04B (1x)
MA(5)	B04A (1x)
MA(5)	B04B (1x)
MA(6)	B04A (1x)
MA(6)	B04B (1x)
MA(7)	B04A (1x)
MA(7)	B04B (1x)
MA(8)	B04A (1x)
MA(8)	B04B (1x)
MA(9)	B04A (1x)
MA(9)	B04B (1x)
MAIN_C	B04A (1x)
MAIN_C	B05A (1x)
MAIN_CVBS_Y	B04A (1x)
MAIN_CVBS_Y	B05A (1x)
MAIN_L	B04A (1x)
MAIN_L	B05A (1x)
MAIN_NVM_WC	B03 (1x)
MAIN_NVM_WC	B04A (1x)
MAIN_R	B04A (1x)
MAIN_R	B05A (1x)
MD(0)	B04A (1x)
MD(0)	B04B (1x)
MD(1)	B04A (1x)
MD(1)	B04B (1x)
MD(10)	B04A (1x)
MD(10)	B04B (1x)
MD(11)	B04A (1x)
MD(11)	B04B (1x)
MD(12)	B04A (1x)
MD(12)	B04B (1x)
MD(13)	B04A (1x)
MD(13)	B04B (1x)
MD(14)	B04A (1x)
MD(14)	B04B (1x)
MD(15)	B04A (1x)
MD(15)	B04B (1x)
MD(2)	B04A (1x)
MD(2)	B04B (1x)
MD(3)	B04A (1x)
MD(3)	B04B (1x)
MD(4)	B04A (1x)
MD(4)	B04B (1x)
MD(5)	B04A (1x)
MD(5)	B04B (1x)
MD(6)	B04A (1x)
MD(6)	B04B (1x)
MD(7)	B04A (1x)
MD(7)	B04B (1x)
MD(8)	B04A (1x)
MD(8)	B04B (1x)
MD(9)	B04A (1x)
MD(9)	B04B (1x)
MON_CVBS	B04A (1x)
MON_CVBS	B05A (1x)
MUTEn	B03 (1x)
MUTEn	B05B (1x)
PIP_B	B04A (1x)
PIP_B	B05A (2x)
PIP_G	B04A (1x)
PIP_G	B05A (2x)
PIP_R	B04A (1x)
PIP_R	B05A (2x)
POWER_DOWN	B03 (1x)
POWER_DOWN	B04A (1x)
POWER_DOWN	B05B (1x)
POWER_ONOFF	B03 (2x)
POWER_ONOFF_LOCTOP	B03 (1x)
POWER_ONOFF_LOCTOP	B04A (1x)
RASN	B04A (1x)
RASN	B04B (1x)
RC_1	B03 (1x)
RC_1	B06A (1x)
RC_2	B03 (1x)
RC_2	B06A (1x)
REMOTE	B03 (3x)
REMOTE	B04A (1x)
REMOTE_IN	B03 (2x)
RF_AGC	B02 (1x)
RF_AGC	B05A (1x)
ROUT_HP	B05B (1x)
ROUT_HP	B06A (1x)
ROUT_SP	B05B (1x)
ROUT_SP_GROUND	B05B (1x)
ROUT_SP_GROUND	B06A (1x)
RX0_A-	B06D (2x)
RX0_A+	B06D (2x)
RX0_B-	B06D (1x)
RX0_B+	B06D (1x)
RX1_A-	B06D (2x)
RX1_A+	B06D (2x)
RX1_B-	B06D (1x)
RX1_B+	B06D (1x)
RX2_A-	B06D (2x)
RX2_A+	B06D (2x)
RX2_B-	B06D (1x)
RX2_B+	B06D (1x)
RXC_A-	B06D (2x)
RXC_A+	B06D (1x)
RXC_B-	B06D (1x)
RXC_B+	B06D (1x)
SAW_SW	B02 (1x)
SAW_SW	B05A (1x)
SC1_AUDIO_IN_L	B05A (1x)
SC1_AUDIO_IN_L	B06B (1x)
SC1_AUDIO_IN_R	B05A (1x)
SC1_AUDIO_IN_R	B06B (1x)
SC1_AUDIO_MUTE_L	B05B (1x)
SC1_AUDIO_MUTE_L	B06B (1x)
SC1_AUDIO_MUTE_R	B05B (1x)
SC1_AUDIO_MUTE_R	B06B (1x)
SC1_AUDIO_OUT_L	B05A (1x)
SC1_AUDIO_OUT_L	B06B (2x)
SC1_AUDIO_OUT_R	B05A (1x)
SC1_AUDIO_OUT_R	B06B (2x)
SC1_B_IN	B05A (2x)
SC1_B_IN	B06B (2x)
SC1_CVBS_IN	B05A (1x)
SC1_CVBS_IN	B06B (2x)
SC1_FBL_IN	B04A (1x)
SC1_FBL_IN	B05A (1x)
SC1_FBL_IN	B06B (2x)
SC1_G_IN	B05A (2x)
SC1_G_IN	B06B (2x)
SC1_R_IN	B05A (2x)
SC1_R_IN	B06B (2x)
SC1_RF_OUT_CVBS	B05A (1x)
SC1_RF_OUT_CVBS	B06B (1x)
SC1_STATUS	B03 (1x)
SC1_STATUS	B04A (1x)
SC1_STATUS	B06B (1x)
SC2_AUDIO_IN_L	B05A (1x)
SC2_AUDIO_IN_L	B06C (1x)
SC2_AUDIO_IN_R	B05A (1x)
SC2_AUDIO_IN_R	B06C (1x)
SC2_AUDIO_MUTE_L	B05B (1x)
SC2_AUDIO_MUTE_L	B06C (1x)
SC2_AUDIO_MUTE_R	B05B (1x)
SC2_AUDIO_MUTE_R	B06C (1x)
SC2_AUDIO_OUT_L	B05A (1x)
SC2_AUDIO_OUT_L	B06C (1x)
SC2_AUDIO_OUT_R	B05A (1x)
SC2_AUDIO_OUT_R	B06C (1x)
SC2_C_IN	B04A (1x)
SC2_C_IN	B06C (1x)
SC2_CVBS_MON_OUT	B03 (1x)
SC2_CVBS_MON_OUT	B05A (1x)
SC2_CVBS_MON_OUT	B06C (1x)
SC2_STATUS	B04A (1x)
SC2_STATUS	B06C (1x)
SC2_Y_CVBS_IN	B04A (1x)
SC2_Y_CVBS_IN	B06C (1x)
SDCLKN	B04A (1x)
SDCLKN	B04B (2x)
SDCLKP	B04A (1x)
SDCLKP	B04B (2x)
SIDE_AUDIO_IN_L	B05A (1x)
SIDE_AUDIO_IN_L	B06A (2x)
SIDE_AUDIO_IN_R	B05A (1x)
SIDE_AUDIO_IN_R	B06A (2x)
SIF1	B02 (1x)
SIF1	B05A (1x)
SIF2	B02 (1x)
SIF2	B05A (1x)
SMIC_CLKN	B04A (1x)
SMIC_CLKN	B05A (1x)
SMIC_CLKP	B04A (1x)
SMIC_CLKP	B05A (1x)
SPI_CEN	B04A (1x)
SPI_CEN	B04B (1x)
SPI_SCK	B04A (1x)
SPI_SCK	B04B (2x)
SPI_SDI	B04A (1x)
SPI_SDI	B04B (1x)
SPI_SDO	B04A (1x)
SPI_SDO	B04B (1x)
STANDBY	B01 (1x)
STANDBY	B03 (2x)
STANDBYn	B03 (1x)
STANDBYn	B05B (1x)
SVHS_C_IN	B05A (1x)
SVHS_C_IN	B06A (2x)
SVHS_Y_CVBS_IN	B05A (1x)
SVHS_Y_CVBS_IN	B06A (2x)
TDA889X_HS	B04A (1x)
TDA889X_HS	B05A (1x)
TDA889X_VS	B04A (1x)
TDA889X_VS	B05A (1x)
TRAP2	B04A (1x)
TRAP2	B04B (1x)
TRAP4	B04A (1x)
TRAP4	B04B (1x)
TUN_L	B04A (1x)
TUN_L	B05A (1x)
TUN_R	B04A (1x)
TUN_R	B05A (1x)
TUN_SIF	B04A (1x)
TUN_SIF	B05A (1x)
TxAn	B04A (1x)
TxAn	B04C (1x)
TxAp	B04A (1x)
TxAp	B04C (1x)
TxBn	B04A (1x)
TxBn	B04C (1x)
TxBp	B04A (1x)
TxBp	B04C (1x)
TxCLKn	B04A (1x)
TxCLKn	B04C (1x)
TxCLKp	B04A (1x)
TxCLKp	B04C (1x)
TxCn	B04A (1x)
TxCn	B04C (1x)
TxCp	B04A (1x)
TxCp	B04C (1x)
TxDn	B04A (1x)
TxDn	B04C (1x)
TxDp	B04A (1x)
TxDp	B04C (1x)
UART_RXD	B03 (1x)
UART_RXD	B04A (1x)
UART_TXD	B03 (1x)
UART_TXD	B04A (1x)
VDD	B05B (3x)
VDDA	B05B (3x)
VDISP	B04C (2x)
VIF1	B02 (1x)
VIF1	B05A (1x)
VIF2	B02 (1x)
VIF2	B05A (1x)
VSS	B05B (3x)
VSSA	B05B (5x)
WEN	B04A (1x)
WEN	B04B (1x)
WT_LOCTOP	B03 (1x)
WT_LOCTOP	B04A (1x)
XTAL_IN	B04A (2x)
XTAL_OUT	B04A (2x)

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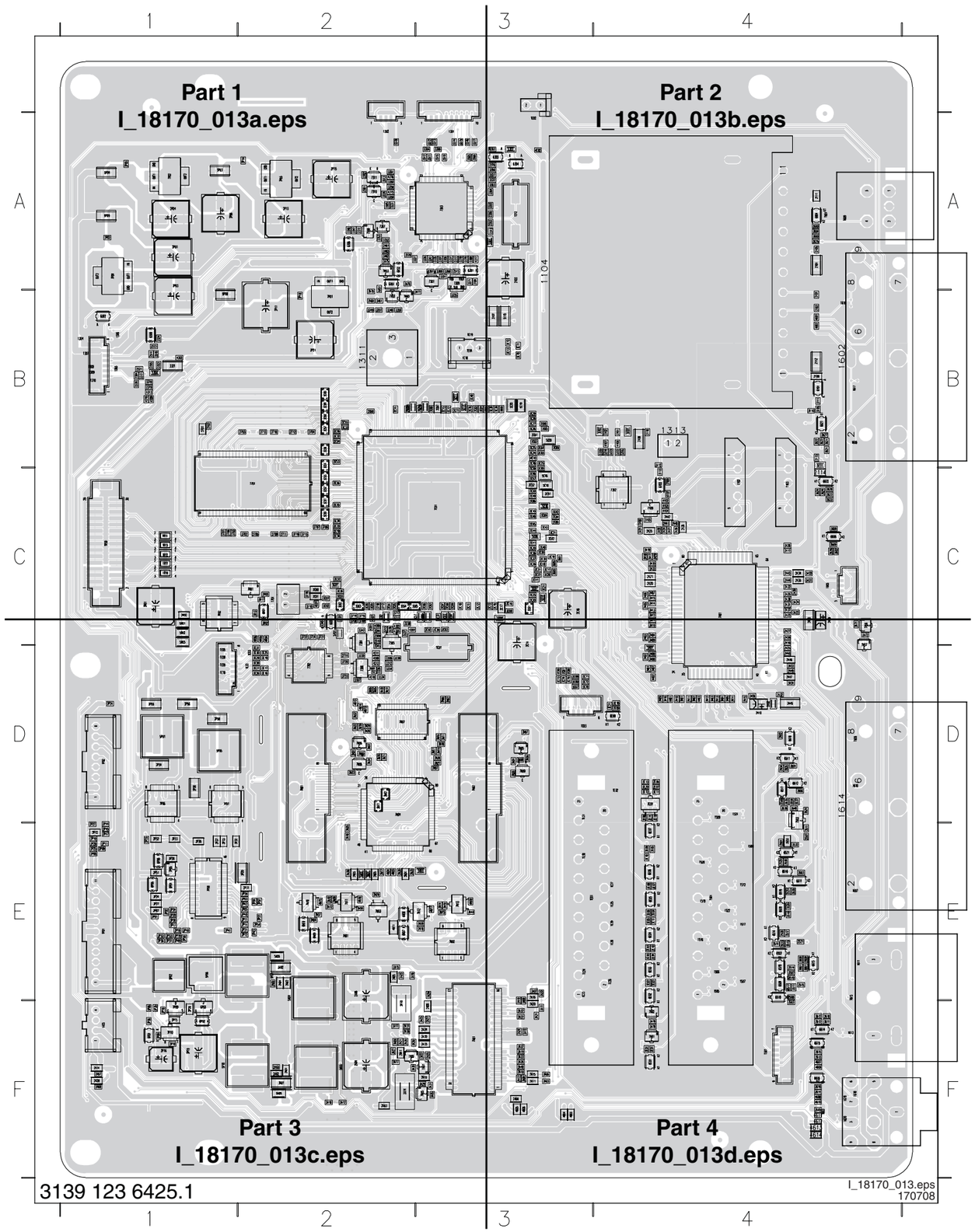
210708

Layout Small Signal Board (Overview Top Side)



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1103	C4	2317	A3	2624	C4	2C29	C3	2P02	A1	3326	A3	3503	F4	3A31	F3	3E15	D4	3P33	E1	5C08	C3	7305	C2
1104	A3	2319	B1	2625	A4	2C30	C3	2P03	A1	3327	A2	3504	D4	3A32	F3	3E16	D2	3P34	E1	5C09	B3	7306	D2
1301	A3	2320	B4	2626	C4	2C31	C3	2P04	A1	3328	A2	3505	D4	3A33	F3	3E17	D2	3P35	F1	5C10	C3	7307	A2
1302	A2	2321	B1	2627	B4	2C32	C2	2P05	A1	3329	D2	3507	E4	3A61	B2	3E18	D4	3P36	F1	5C11	B3	7308	A2
1303	B1	2322	B1	2628	C4	2C33	C2	2P06	A1	3330	D2	3510	E4	3A62	A2	3E19	D2	3R02	C2	5C12	C3	7309	A3
1311	B2	2323	B1	2701	B1	2C34	C2	2P07	E1	3331	A2	3511	E4	3A63	A2	3E20	D4	3R13	C2	5C13	B3	7310	A2
1312	A3	2324	B1	2702	B1	2C35	C2	2P08	E1	3332	A3	3514	E4	3A70	B2	3E21	D4	3R17	C2	5C14	B3	7311	A2
1313	B4	2326	B1	2703	B2	2C36	C2	2P09	E1	3334	D2	3515	E4	3A71	C4	3E25	D2	4101	C4	5C15	B2	7401	C4
1501	F4	2327	A3	2704	B2	2C37	C3	2P10	E1	3335	A3	3517	E4	3A72	C4	3E26	D2	4102	C4	5C16	C3	7503	D4
1504	E4	2401	D4	2705	C2	2C38	C3	2P11	E1	3336	C2	3518	E4	3A75	A2	3E27	D2	4103	C4	5C17	C2	7701	C2
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1614	D4	2420	C4	2A14	F1	2C59	C3	2P33	E1	3355	B4	3607	E4	3C21	C3	3N13	E3	4316	A2	5R03	C1	7N05	D3
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1C01	D3	2430	C4	2A22	F3	2C67	B3	2P43	E2	3363	A3	3624	C4	3C32	B2	3N21	D2	4603	F3	6308	B1	7N13	E3
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1E08	D1	2437	C4	2A30	F3	2C75	B3	2P51	E1	3370	A3	3710	C2	3C39	B3	3N30	D2	4610	F4	6517	D4	7P07	D1
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2112	B4	2527	E4	2C06	C3	2E11	E4	3306	A3	3416	D4	3A10	F2	3C71	D3	3P13	E1	5111	B4	6E06	E4		
2113	B4	2528	E4	2C07	C3	2E12	B3	3307	A3	3417	C4	3A11	F3	3C72	D3	3P14	E2	5115	B3	6E07	E4		
2114	C4	2529	E4	2C08	C3	2E13	B3	3308	A3	3418	C4	3A12	F2	3C73	D3	3P15	F1	5301	A3	6E08	D4		
2301	A2	2600	A4	2C09	C3	2N01	E2	3309	A3	3419	C4	3A13	F3	3C74	D3	3P16	F1	5302	A3	6N07	E2		
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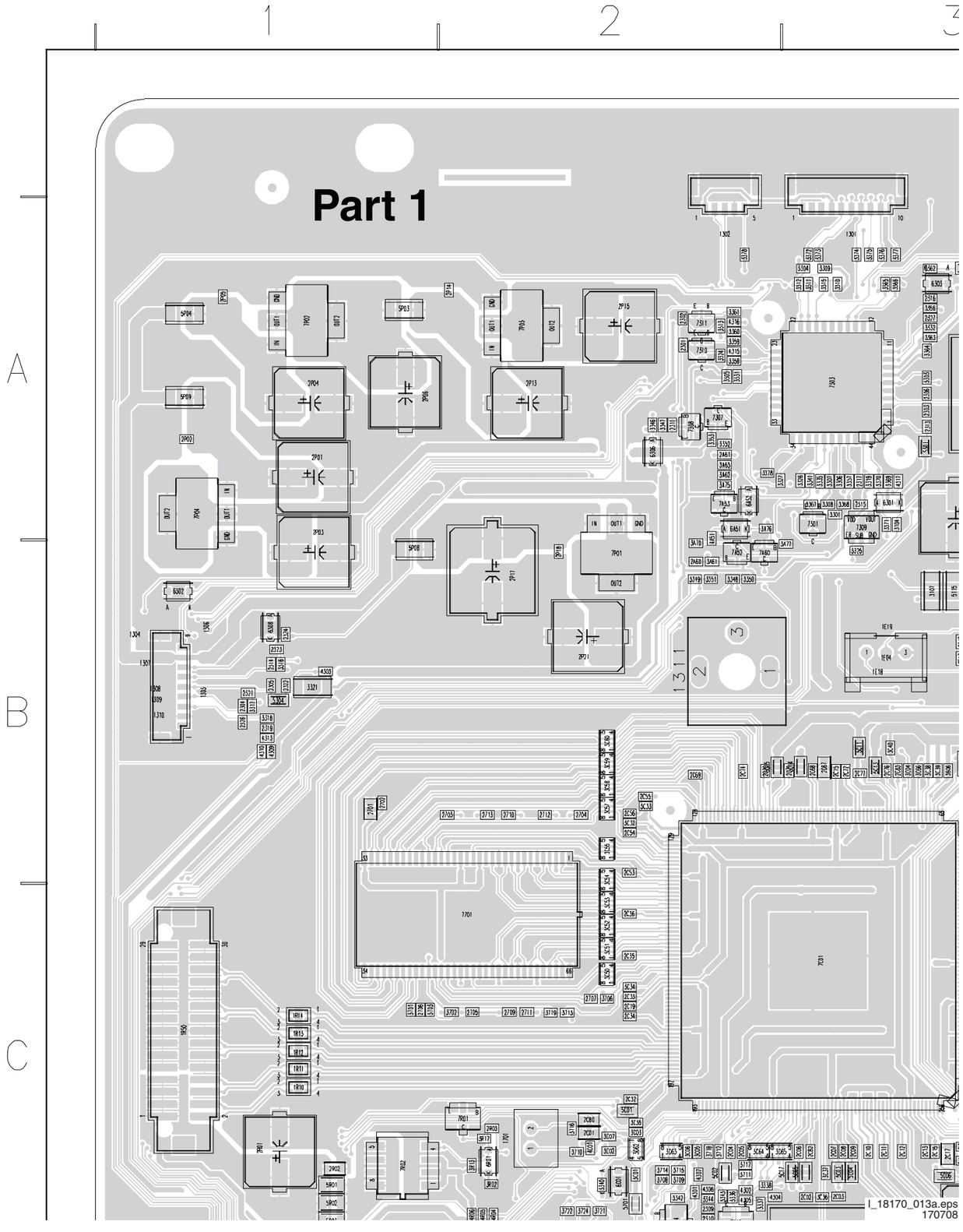
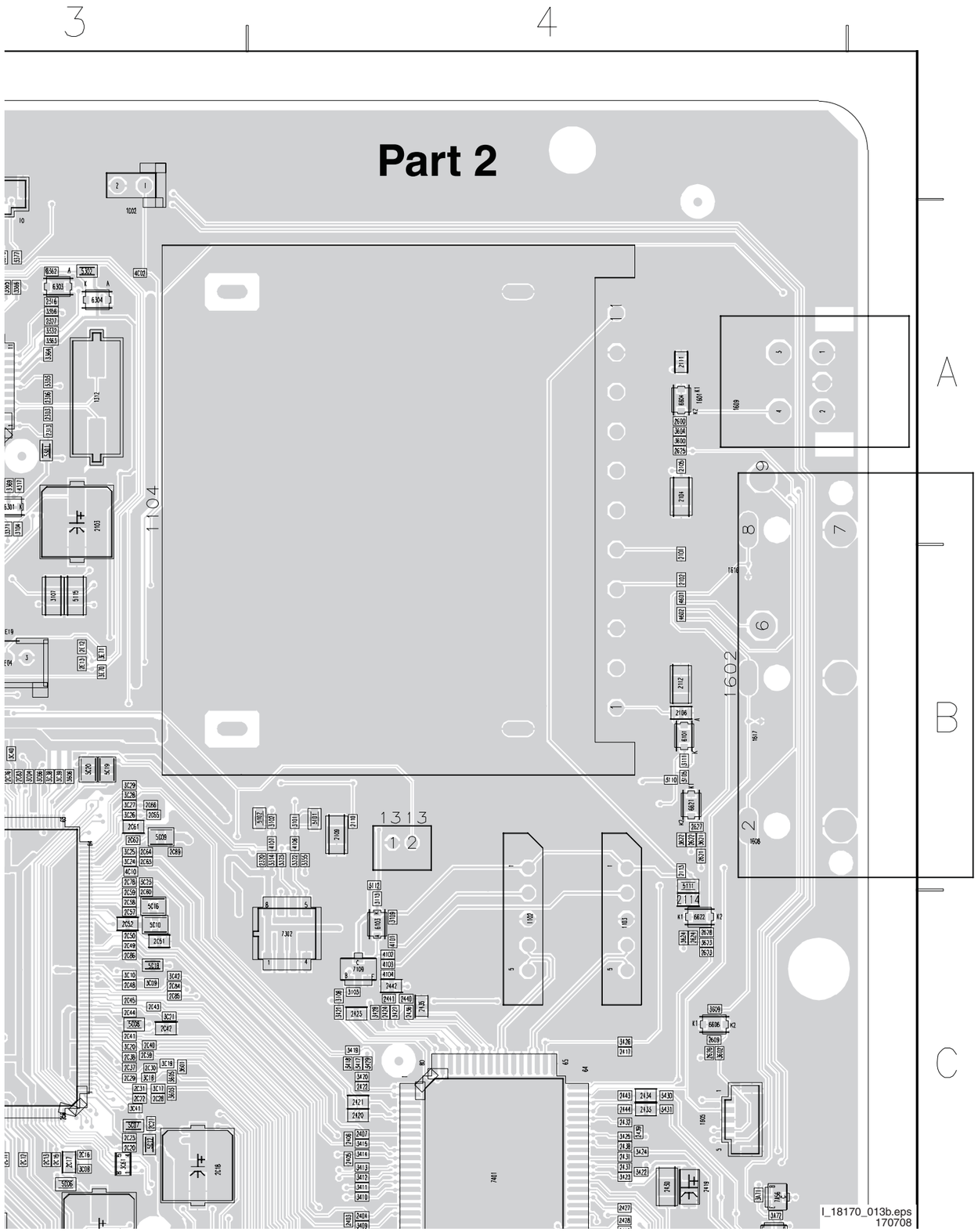
2315	A3	2622	B4	2C23	C3	2N39	E2	3324	A2	3433	D4	3A29	F3	3E13	D4	3P31	E1	5C06	C3	7303	A3		

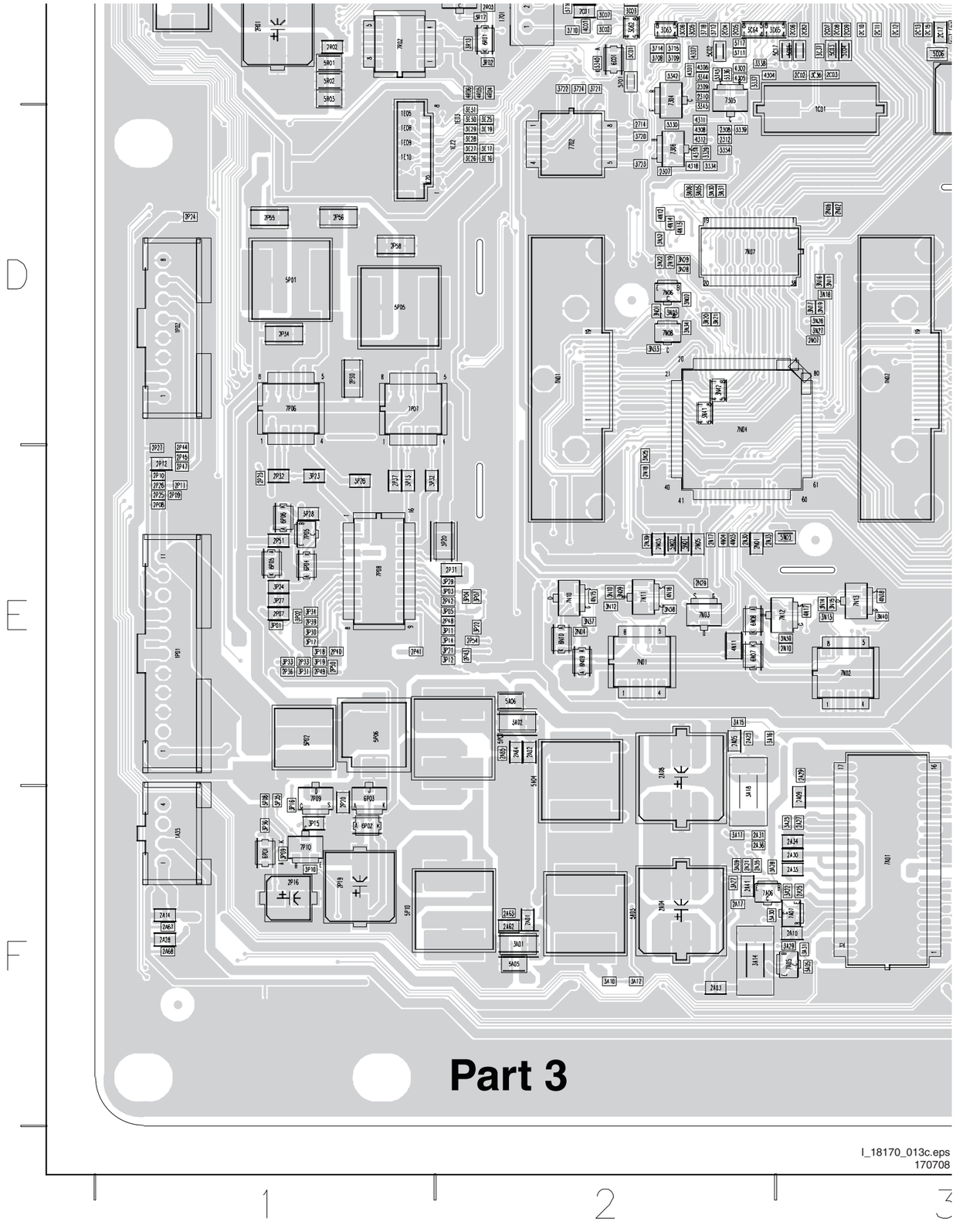
Layout Small Signal Board (Part 1 Top Side)



Layout Small Signal Board (Part 2 Top Side)



Layout Small Signal Board (Part 3 Top Side)



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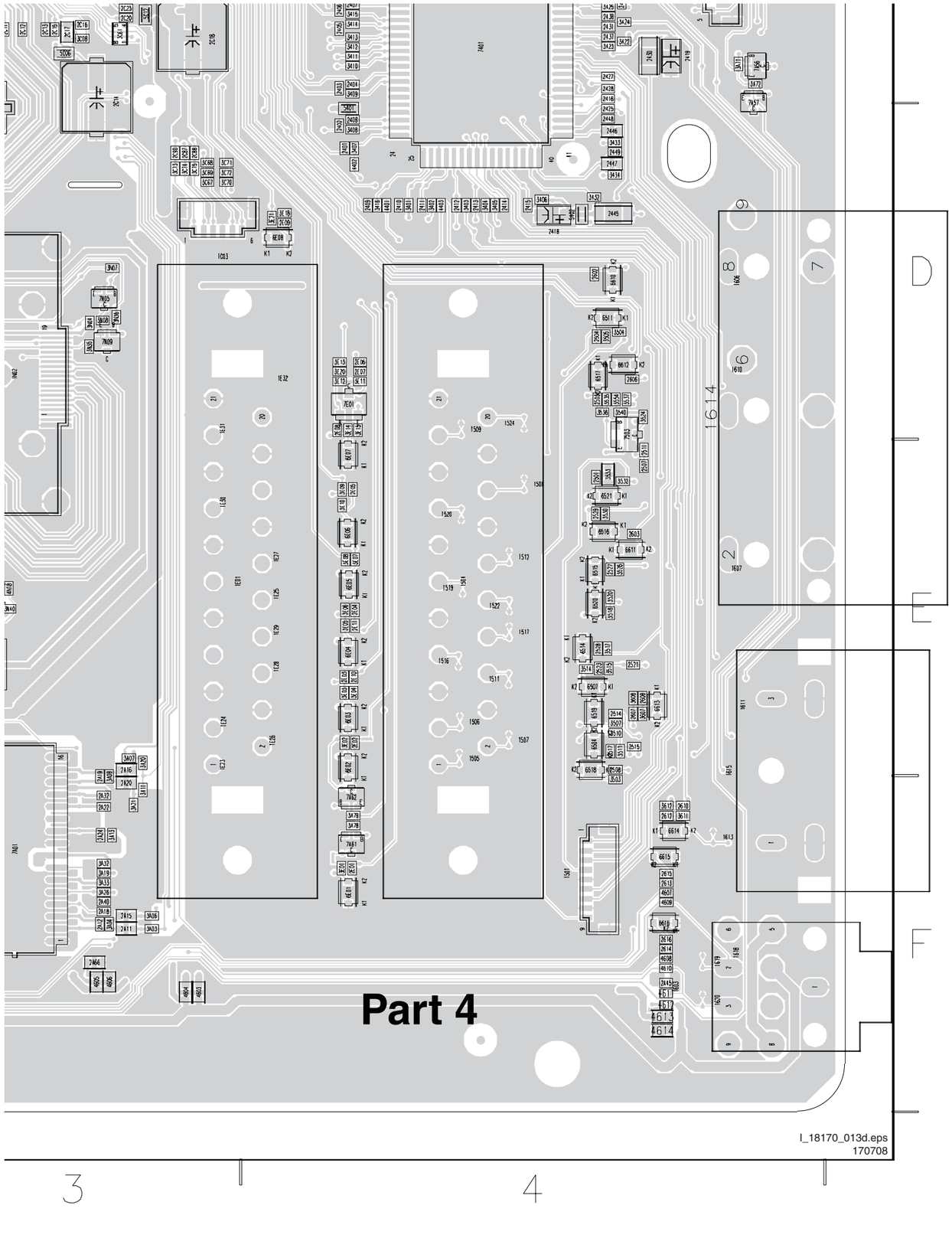
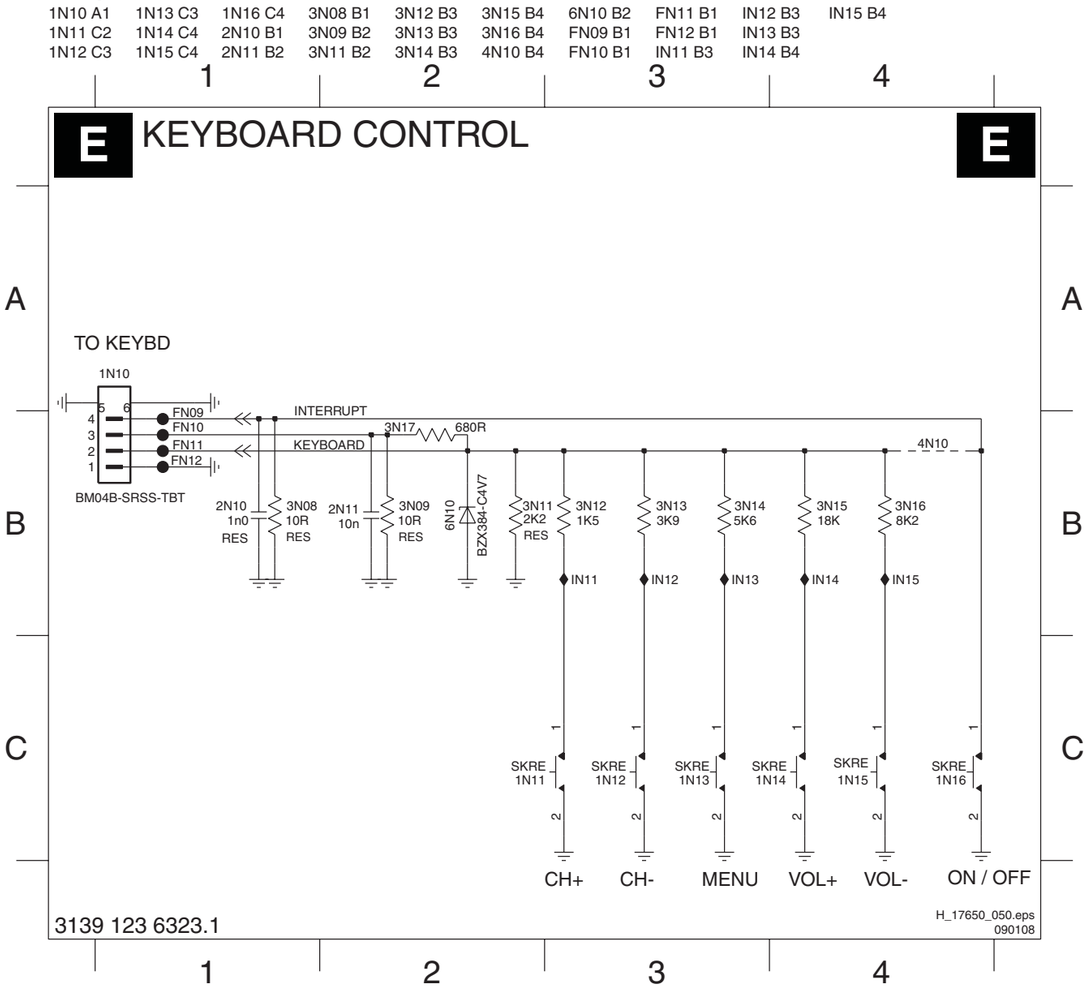
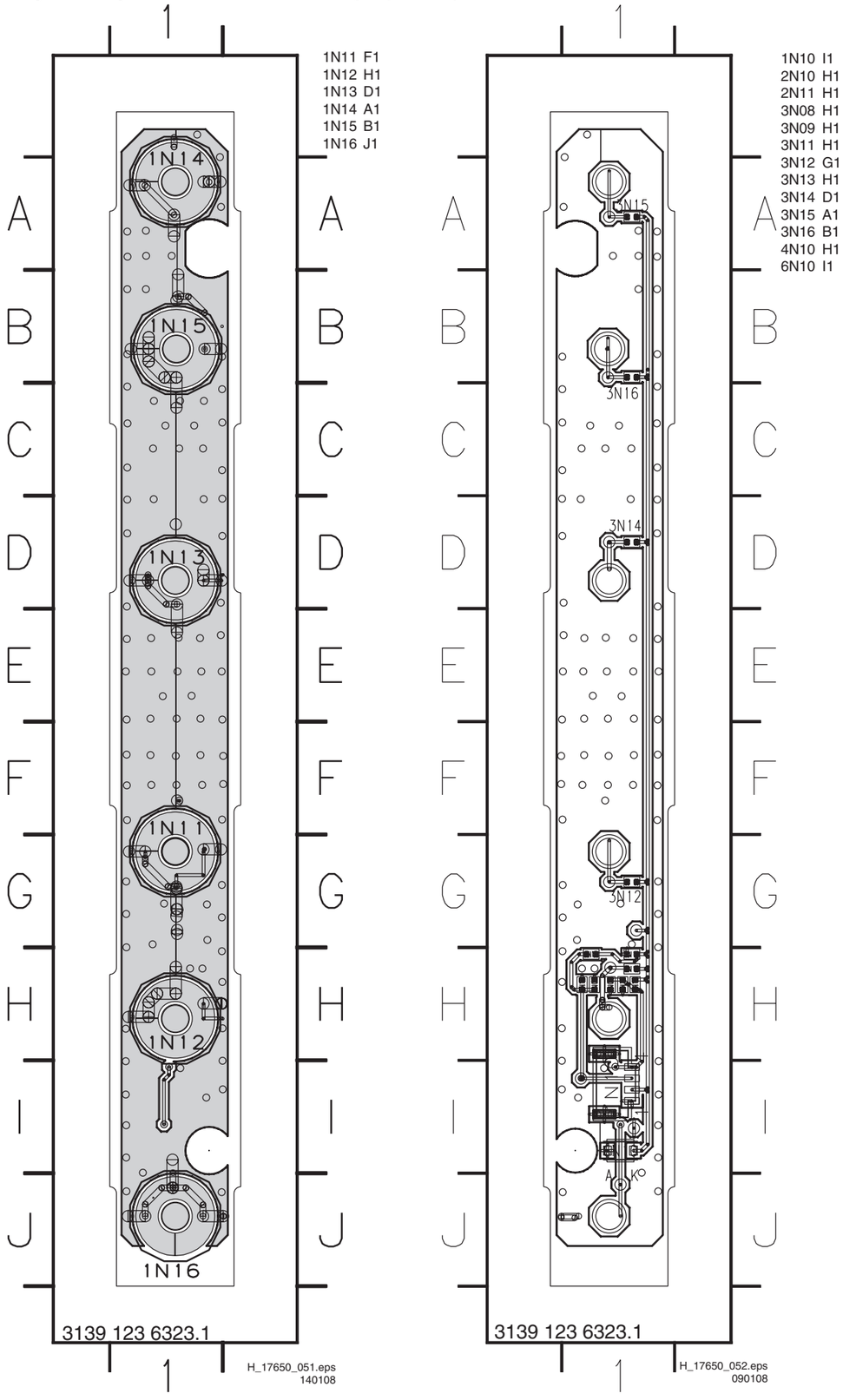
Layout Small Signal Board (Part 4 Top Side)



Keyboard Control Panel



Layout Keyboard Control Panel (Top Side)



IR & LED Panel

IR & LED PANEL

TO ME8 LIGHT GUIDE
1P09
BM03B-SRSS-TBT
RES
+3V3STBY

"WHITE"
+5V_SW
3P11 1K8
IP10
6P11
19-113/T7D-CS2T2B2-3T

"RED"
+3V3STBY
3P10 1K8
IP11
6P10
SML-512

3P13 270R
3P12 270R
IP22
6P12
TSML1020
RES
SAME LOCATION WITH 7012

IP12
4P01 RES
4P02 (RES FOR BDS)
IP13

TO ME8 SSB
1P10
BM09B-SRSS-TBT
FP10
FP20
FP11
FP12
FP13
FP14
FP15
FP16
FP17
+3V3STBY
+5V_SW
LIGHT_SENSOR
IR
LED2
LED1
KEYBOARD
TACT_SWITCH_INT

LED1
3P15 10K
IP14
3P27 10K
7P11 BC847BW

IP15
7P10 BC847BW
3P14 10K
3P28 10K
LED2

FROM ME8 KEYB
1P11
BM04B-SRSS-TBT
FP18
+3V3STBY
KEYBOARD
TACT_SWITCH_INT
+3V3STBY +3V3STBY
3P08 680R RES
3P07 680R RES

IR
LIGHT_SENSOR

"IR RECEIVER"
7P14
GP1UE260RKVF
VS
OUT
GND
+3V3STBY
3P16 100R
IP16
3P19 6K8
2P10 10u
IP20
3P23 100K
3P17 100R

+5V_SW
3P09 10K RES
2P11 10u
2P12 10u
2P13 10u
3P25 33K
3P20 10K
IP19
3P24 10K

+5V_SW
7P13 BC847BW
IP17

"LIGHT SENSOR"
+5V_SW +5V_SW
7P12
TEMT6000X01
3P18 100K
IP18
3P21 150K
IP21
3P26 150K
3P22 10K

3139 123 6327.3
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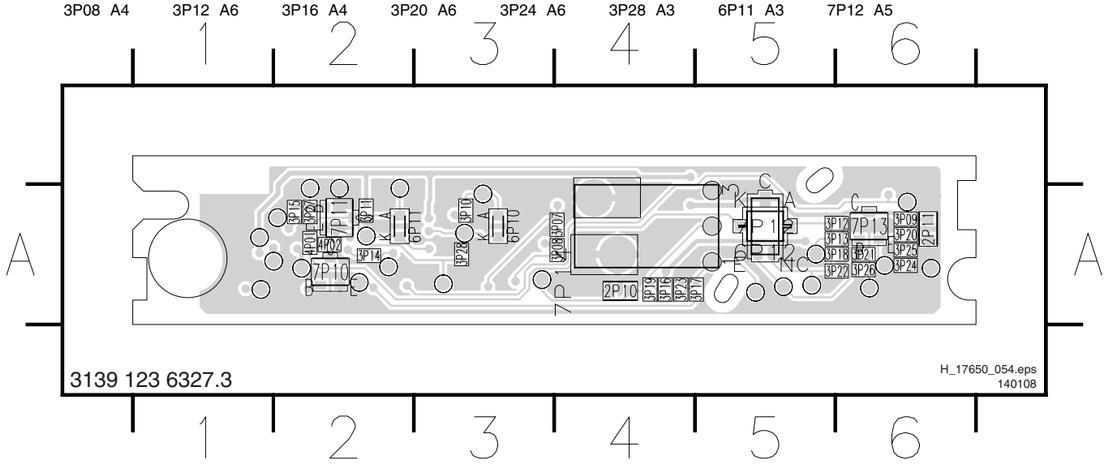
1P09 A1
1P10 B1
1P11 C1
2P10 E5
2P11 E5
2P12 E6
2P13 E6
3P07 C3
3P08 C2
3P09 D6
3P10 A7
3P11 A5
3P12 A6
3P13 A6
3P14 B6
3P15 B4
3P16 D4
3P17 E5
3P18 D8
3P19 E4
3P20 E6
3P21 E8
3P22 E8
3P23 E4
3P24 E7
3P25 E6
3P26 E8
3P27 B5
3P28 B6
4P01 B5
4P02 B6
6P10 A7
6P11 A5
6P12 A6
7P10 B7
7P11 B5
7P12 D8
7P13 E7
7P14 E3
FP10 B1
FP11 B1
FP12 B1
FP13 B1
FP14 B1
FP15 B1
FP16 B1
FP17 B1
FP18 C1
FP20 B1
IP10 A5
IP11 A7
IP12 B5
IP13 B7
IP14 B4
IP15 B6
IP16 D5
IP17 E7
IP18 E8
IP19 E7
IP20 E4
IP21 E8
IP22 A6

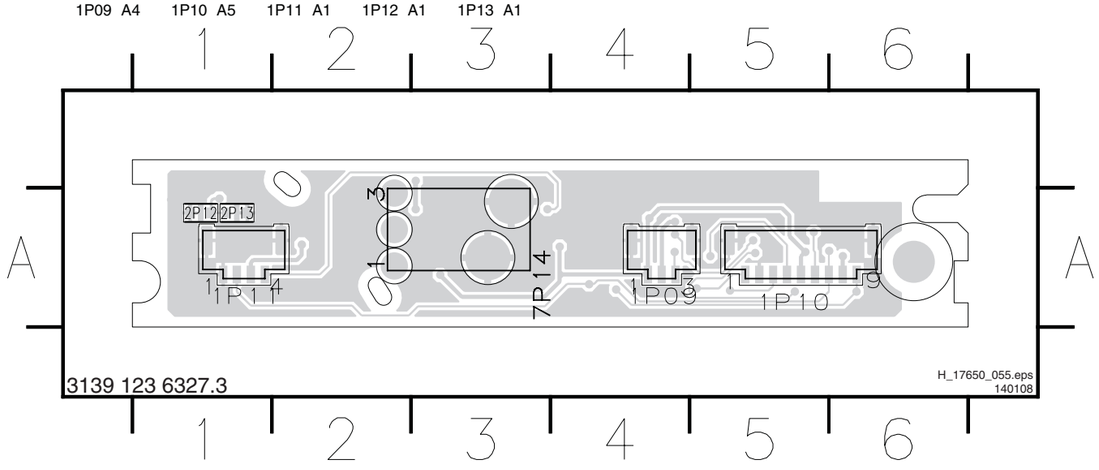
Layout IR & LED Panel (Top Side)

2P10 A4	3P09 A6	3P13 A6	3P17 A5	3P21 A6	3P25 A6	4P01 A2	6P12 A5	7P13 A6
2P11 A6	3P10 A3	3P14 A2	3P18 A6	3P22 A6	3P26 A6	4P02 A2	7P10 A2	7P14 A4
3P07 A4	3P11 A2	3P15 A2	3P19 A4	3P23 A4	3P27 A2	6P10 A3	7P11 A2	
3P08 A4	3P12 A6	3P16 A4	3P20 A6	3P24 A6	3P28 A3	6P11 A3	7P12 A5	



Layout IR & LED Panel (Bottom Side)

1P09 A4	1P10 A5	1P11 A1	1P12 A1	1P13 A1



Personal Notes:

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8. Alignments

Index of this chapter:

Note: Figures below can deviate slightly from the actual situation, due to the different set executions.

General: The Service Alignment Mode (SAM) is described in chapter 5. Menu navigation is done with the CURSOR UP, DOWN, LEFT or RIGHT keys of the remote control transmitter.

8.1 General Alignment Conditions

Perform all electrical adjustments under the following conditions:

- Power supply voltage (depends on region):
  - AP-NTSC: 120 VAC or 230 VAC / 50 Hz (± 10%).
  - AP-PAL-multi: 120 - 230 VAC / 50 Hz (± 10%).
  - EU: 230 VAC / 50 Hz (± 10%).
  - LATAM-NTSC: 120 - 230 VAC / 50 Hz (± 10%).
  - US: 120 VAC / 60 Hz (± 10%).
- Connect the set to the mains via an isolation transformer with low internal resistance.
- Allow the set to warm up for approximately 15 minutes.
- Measure voltages and waveforms in relation to correct ground (e.g. measure audio signals in relation to AUDIO_GND).
  Caution: It is not allowed to use heatsinks as ground.
- Test probe: Ri > 10 Mohm, Ci < 20 pF.
- Use an isolated trimmer/screwdriver to perform alignments.

8.2 Hardware Alignments

There are no hardware alignments foreseen for this chassis, but below find an overview of the most important DC voltages on the SSB. These can be used for checking proper functioning of the DC/DC converters.

Table 8-1 DC voltages

Description	Test Point	Specifications (V)			Diagram
		Min.	Typ.	Max.	
+VTUN	FP14	30	33	36	B01_DC-DC
+12V_AUDIO	FP06	11.40	12.00	12.60	B01_DC-DC
-12V_AUDIO	FP09	-11.40	-12.00	-12.60	B01_DC-DC
+12V_DISP	FP04	11.40	12.00	12.60	B01_DC-DC
+3V3_STBY	FP01	3.20	3.30	3.40	B01_DC-DC
+5V_SW	FP05	4.90	5.16	5.42	B01_DC-DC
+2V5_SW	FP18	2.40	2.50	2.60	B01_DC-DC
+1V8_SW	FP03	1.70	1.80	1.90	B01_DC-DC
+3V3_SW_TDA	FP19	3.10	3.30	3.50	B01_DC-DC
+1V8_SW_ADC	FP20	1.70	1.80	1.90	B01_DC-DC
+3V3_SW	FP22	3.10	3.30	3.50	B01_DC-DC
+8V_SW	FP21	7.60	8.00	8.40	B01_DC-DC
+5V_IF	F133	4.75	5.00	5.25	B02_Tuner IF & SAWF
+5V_TUN	F111	4.75	5.00	5.25	B02_Tuner IF & SAWF
+5V_SW_SMIC	F402	4.75	5.00	5.25	B05A_SMIC L
VDDA	FA01	11.40	12.00	12.60	B05B_Audio - CLASS D
VDD	FA03	11.40	12.00	12.60	B05B_Audio - CLASS D
VSSA	FA02	-11.40	-12.00	-12.60	B05B_Audio - CLASS D
VSS	FA14	-11.40	-12.00	-12.60	B05B_Audio - CLASS D
+5VHDMI_A	FN08	4.75	5.00	5.25	B06B_HDMI
+5VHDMI_B	FN13	4.75	5.00	5.25	B06B_HDMI
+1V8_ANA-MUX	FN03	1.70	1.80	1.90	B06B_HDMI
+1V8_DIG-MUX	FN02	1.70	1.80	1.90	B06B_HDMI
+3V3_ANA-MUX	FN74	3.10	3.30	3.50	B06B_HDMI

8.3 Software Alignments

With the software alignments of the Service Alignment Mode (SAM) the Tuner and RGB settings can be aligned.
To store the data: Use the RC button “Menu” to switch to the main menu and next, switch to “Stand-by” mode.

8.3.1 Tuner Adjustment (RF AGC Take Over Point)

Purpose: To keep the tuner output signal constant as the input signal amplitude varies.
The LC8.1E LB chassis comes with the UV1316E analogue tuner. No alignment is necessary, as the AGC alignment is done automatically (standard value: “15”). However in case of problems use the following method (use multimeter and RF generator):

- Apply a 70 dB (1mv) RF signal with a Philips standard circuit pattern to antenna input.
- Adjust AGC (via SAM menu: TUNER -> AGC), until voltage on pin 1 is 3.3 +0.5/-1.0 V.
- Store settings and exit SAM.

8.3.2 RGB Alignment

In RGB Alignment menu there are three items White Tone, ADC Gain & Align ADC to perform the colour temperature alignment for the RF and the input source calibration.
Before alignment, choose “TV MENU” -> “Picture” and set:

- “Brightness” to “50”.
- “Colour” to “50”.
- “Contrast” to “100”.

White Tone Alignment:

- Activate SAM.
- Select “RGB Align.” -> “White Tone” and choose a colour temperature.
- Use a 100% white screen as input signal and set the following values:
  - All “White point” values initial to “255”.

In case you have a colour analyser:

- Measure with a calibrated (phosphor- independent) colour analyser (e.g. Minolta CA-210) in the centre of the screen. Consequently, the measurement needs to be done in a dark environment.
- Adjust the correct x,y coordinates (while holding one of the White point registers R, G or B on “256”) by means of decreasing the value of one or two other white points to the correct x,y coordinates (see table “White D alignment values”). Tolerance: dx: ± 0.004, dy: ± 0.004.
- Repeat this step for the other colour Temperatures that need to be aligned.
- When finished return to the SAM root menu and press STANDBY on the RC to store the aligned values to the NVM.

Table 8-2 White D alignment values

Value	Cool (11000 K)	Normal (9000 K)	Warm (6500 K)
x	0.278	0.289	0.314
y	0.278	0.291	0.319

If you do **not** have a colour analyser, you can use the default values. This is the next best solution. The default values are average values coming from production (statistics).

- Set the RED, GREEN and BLUE default values per temperature according to the values in the “Tint settings” table.
- When finished return to the SAM root menu and press STANDBY on the RC to store the aligned values to the NVM.

Table 8-3 Tint settings 32"

Colour Temp.	R	G	B
Cool	120	126	128
Normal	128	128	128
Warm	128	120	126

Table 8-4 Tint settings 42"

Colour Temp.	R	G	B
Cool	127	120	124
Normal	127	115	114
Warm	127	110	96

ADC Alignment (external source)
When the grey scale displayed is not uniformity, use the following alignment method. This is to calibrate the input source to perform better output display.
Two Input Source need to be calibrated:
1. RGB (via Scart 1)
2. YPbPr (Component Input)

Instructions:
- Apply a standard 100% colour bar to input source (1) & (2).
- Activate SAM.
- Cursor down to item “RGB Align” and select “Align ADC”.
- Select “Yes” with the Left Key to start calibration.
- Power Off the set and calibrated values will be stored.

Note: The “In Progress” message indicates calibration in progress.
The “Done” message will be displayed when completed successfully.

8.4 Option Settings

8.4.1 Introduction

The microprocessor communicates with a large number of I^2C ICs in the set. To ensure good communication and to make digital diagnosis possible, the microprocessor has to know which ICs to address. The presence/absence of these specific ICs (or functions) is made known by the option codes.

Notes:
- After changing the option(s), save them with the STORE command.
- The new option setting becomes active after the TV is switched “off” and “on” again with the mains switch (the EAROM is then read again).

8.4.2 How To Set Option Codes

When the NVM is replaced, all options will require resetting. To be certain that the factory settings are reproduced exactly, you must set all option numbers. You can find the correct option numbers in table “Option Codes OP1...OP7” below.

How to Change Options Codes
An option code (or “option byte”) represents eight different options (bits). When you change these numbers directly, you can set all options very quickly. All options are controlled via seven option bytes (OP1... OP7).
Activate SAM and select “Options”. Now you can select the option byte (OP1 to OP7) with the CURSOR UP/ DOWN keys, and enter the new 3 digit (decimal) value. For the correct factory default settings, see the next table “Option codes OP1...OP7“. For more detailed information, see the second table “Option codes at bit level“. If an option is set (value “1”), it represents a certain decimal value.
When all the correct options (bits) are set, the sum of the decimal values of each Option Byte (OP) will give the option code.

Table 8-5 Option code overview

Sets 12NC	Sets Type	Panel Type	Panel Code (Dec)	Option Byte (Dec)						
				1	2	3	4	5	6	7
8670 000 42116	32PFL3403/12	LPL- LC320WXN-SAB1	136	3	2	0	255	8	0	1
8670 000 42115	42PFL3403/12	LPL- LC420WXE-SAA1	138	3	2	0	255	8	0	0

Option Bit Overview
Below find an overview of the Option Codes on **bit** level.

Table 8-6 Option codes at bit level (OP1-OP7)

Option Byte & Bit	Dec. Value	Option Name	Description
Byte OP1			
Bit 7 (MSB)	128	OPC_BBE	ON = BBE is available OFF = BBE is not available
Bit 6	64	RESERVED	RESERVED
Bit 5	32	RESERVED	RESERVED
Bit 4	16	FSRV_OPC_OPTION_CHECK_14	ON = NVM Integrity check enable OFF = NVM Integrity check disable
Bit 3	8	OPC_UK_PNP	ON = UK PNP is available OFF = UK PNP is not available
Bit 2	4	OPC_VIRGIN_MODE	ON = Virgin Mode (PNP) is available OFF = Virgin Mode (PNP) is not available
Bit 1	2	OPC_ACI	ON = ACI is available OFF = ACI is not available
Bit 0 (LSB)	1	OPC_ATS	ON = ATS is available OFF = ATS is not available
Byte OP2			
Bit 7 (MSB)	128	RESERVED	RESERVED
Bit 6	64	RESERVED	RESERVED
Bit 5	32	RESERVED	RESERVED
Bit 4	16	RESERVED	RESERVED
Bit 3	8	RESERVED	RESERVED
Bit 2	4	RESERVED	RESERVED
Bit 1	2	OPC_WSSB	ON = WSS is available OFF = WSS is not available
Bit 0 (LSB)	1	RESERVED	RESERVED
Byte OP3			
Bit 7 (MSB)	128	RESERVED	RESERVED
Bit 6	64	RESERVED	RESERVED
Bit 5	32	RESERVED	RESERVED
Bit 4	16	RESERVED	RESERVED
Bit 3	8	RESERVED	RESERVED
Bit 2	4	RESERVED	RESERVED
Bit 1	2	RESERVED	RESERVED
Bit 0 (LSB)	1	RESERVED	RESERVED
Byte OP4			
Bit 7 (MSB)	128	OPC_HDMI2	Must be set to 1, no optional control
Bit 6	64	OPC_HDMI1	Must be set to 1, no optional control
Bit 5	32	OPC_VGA	Must be set to 1, no optional control
Bit 4	16	OPC_SVHS3	Must be set to 1, no optional control
Bit 3	8	OPC_AV3	Must be set to 1, no optional control
Bit 2	4	OPC_CVI	Must be set to 1, no optional control
Bit 1	2	OPC_SVHS2	Must be set to 1, no optional control
Bit 0 (LSB)	1	OPC_AV2	Must be set to 1, no optional control
Byte OP5			
Bit 7 (MSB)	128	RESERVED	RESERVED
Bit 6	64	RESERVED	RESERVED
Bit 5	32	RESERVED	RESERVED
Bit 4	16	RESERVED	RESERVED
Bit 3	8	OPC_SYS_RECVRY	ON = System Recovery is available OFF = System Recovery is not available
Bit 2	4	RESERVED	RESERVED
Bit 1	2	RESERVED	RESERVED
Bit 0 (LSB)	1	RESERVED	RESERVED
Byte OP6			
Bit 7 (MSB)	128	RESERVED	RESERVED
Bit 6	64	RESERVED	RESERVED
Bit 5	32	RESERVED	RESERVED
Bit 4	16	RESERVED	RESERVED
Bit 3	8	RESERVED	RESERVED
Bit 2	4	RESERVED	RESERVED
Bit 1	2	RESERVED	RESERVED
Bit 0 (LSB)	1	RESERVED	RESERVED
Byte OP7			
Bit 7 (MSB)	128	RESERVED	RESERVED
Bit 6	64	FSRV_PCE_OPTION_OP76	ON= Smart Clock enable OFF= Smart Clock disable
Bit 5	32	RESERVED	RESERVED
Bit 4	16	RESERVED	RESERVED
Bit 3	8	RESERVED	RESERVED
Bit 2	4	RESERVED	RESERVED
Bit 1	2	Cabinet Profile_1	0 = LC08EE_37_42inch_MG8 1 = LC08EE_32inch_MG8 2 = Reserved
Bit 0 (LSB)	1	Cabinet Profile_0	

9. Circuit Descriptions, Abbreviation List, and IC Data Sheets

Index of this chapter:

Notes:

- Only **new** circuits (circuits that are not published recently) are described.
- Figures can deviate slightly from the actual situation, due to different set executions.
- For a good understanding of the following circuit descriptions, please use the Wiring, Block (chapter 6) and Circuit Diagrams (chapter 7). Where necessary, you will find a separate drawing for clarification.

9.1 Introduction

The LC8.1E LB chassis (development name “LC08EE”) is a new chassis using an NXP “LOC-TOP” chipset. It covers screen sizes of 32" and 42" with the “MG8” styling.

Main key components are:

- NXP TDA1547 “LOC-TOP” LCD TV controller
- NXP TDA8890 “LOC-TOP” Versatile Video processor
- Weltrend WT61P8S microprocessor
- NXP TDA8932 Class-D Audio processor
- UV1316E tuner.

Refer to figure “LC08EE Architecture” for details.

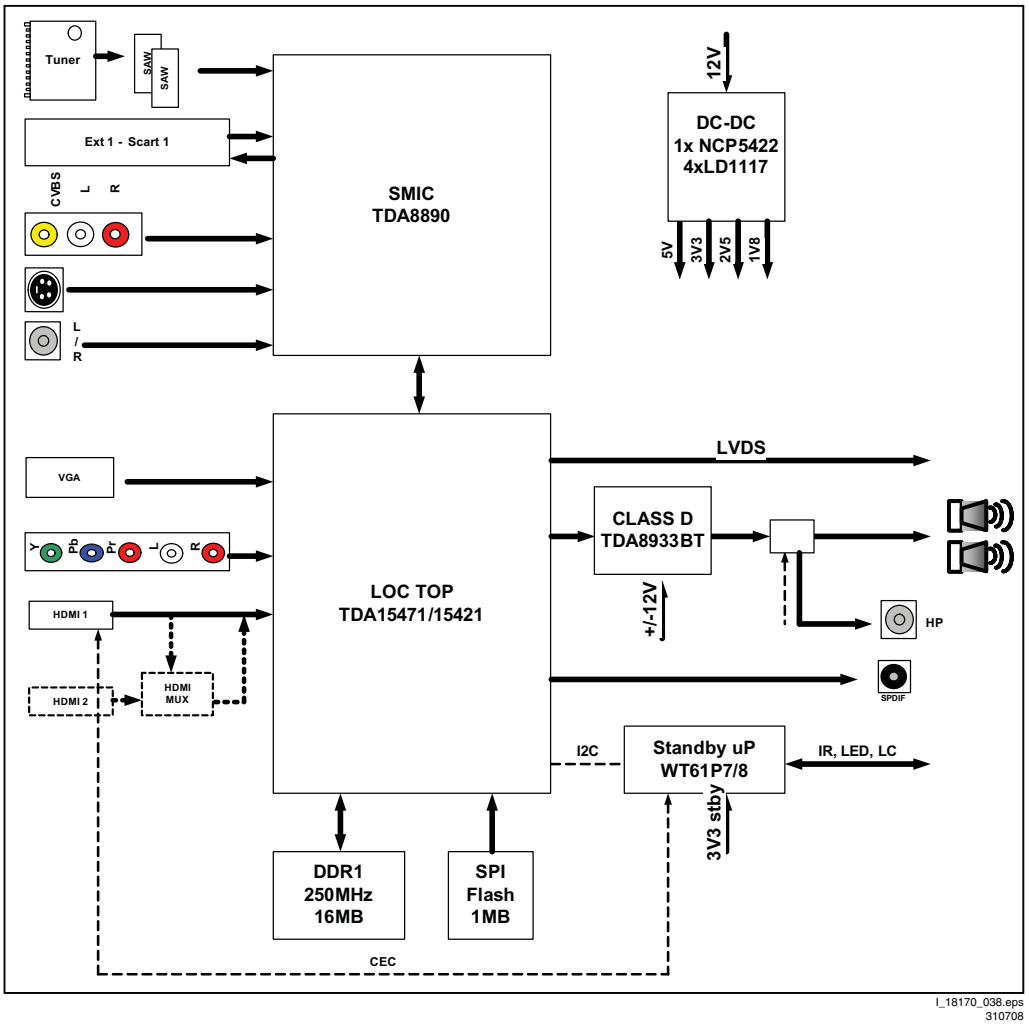

Figure 9-1 LC08EE Architecture

9.1.1 SSB Cell Layout

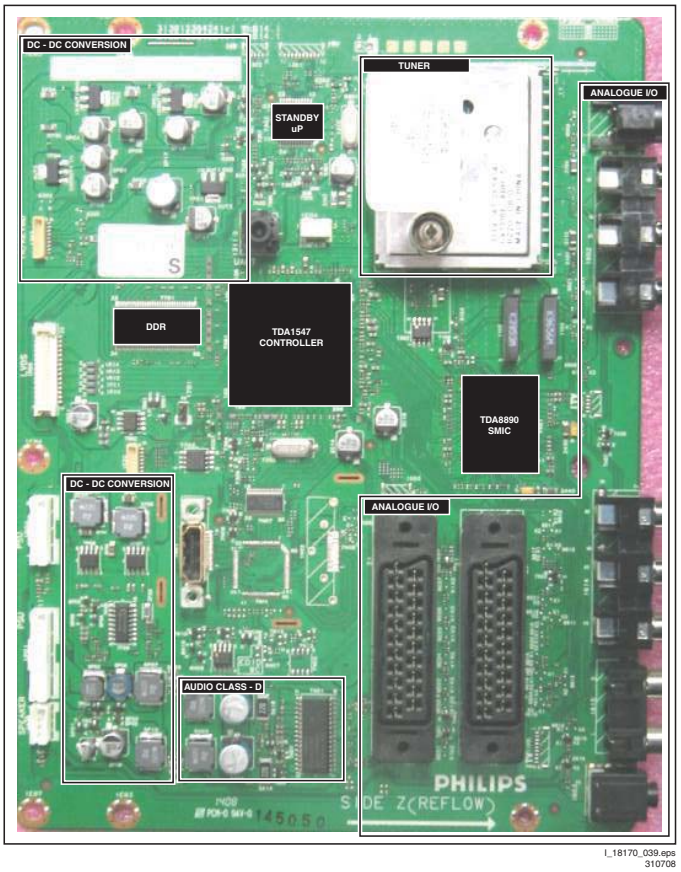

Figure 9-2 SSB top view

9.2 LCD Power Supply

The Power Supply Unit (PSU) in this chassis is a Bobitrans Power Solutions buy-in unit and is a black-box for Service. When defective, a new panel must be ordered and the defective panel must be returned for repair, unless the main fuse of the unit is broken. Always replace the fuse with one with the correct specifications! This part is commonly available in the regular market.

Different PSUs are used in this chassis:

- 32" sets use a “Bobitrans” PLCD170PS09 B unit.
- 42" sets use an “Bobitrans” LIPS250PS02 unit.

9.2.1 32" sets

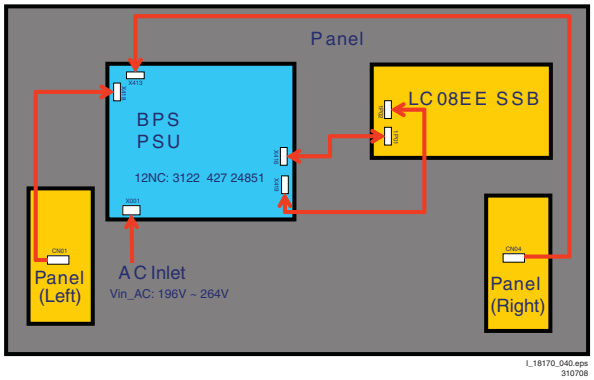

Figure 9-3 32” PSU connectivity

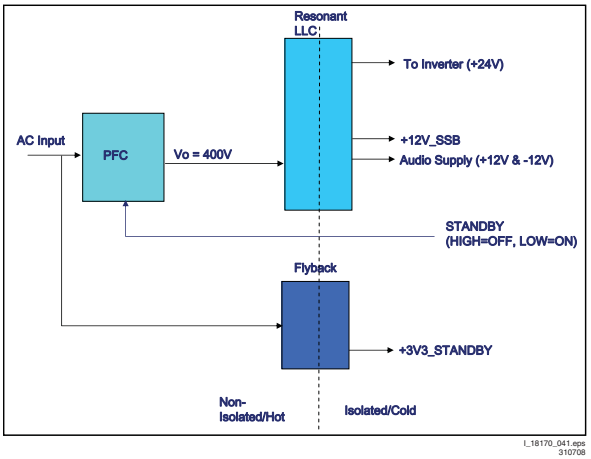

Figure 9-4 32” PSU block diagram

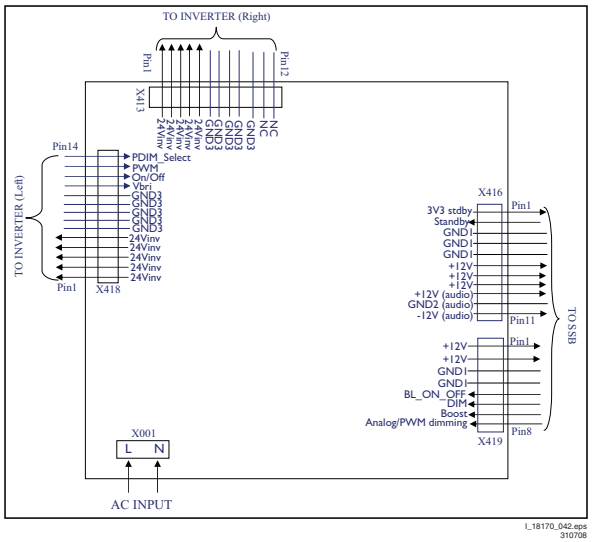

Figure 9-5 32" PSU interface diagram

9.2.2 42" sets

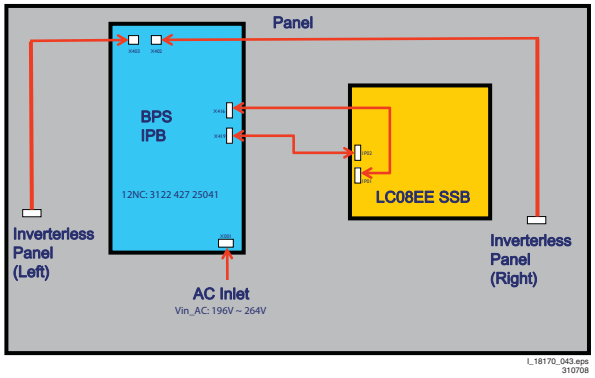

Figure 9-6 42" PSU connectivity

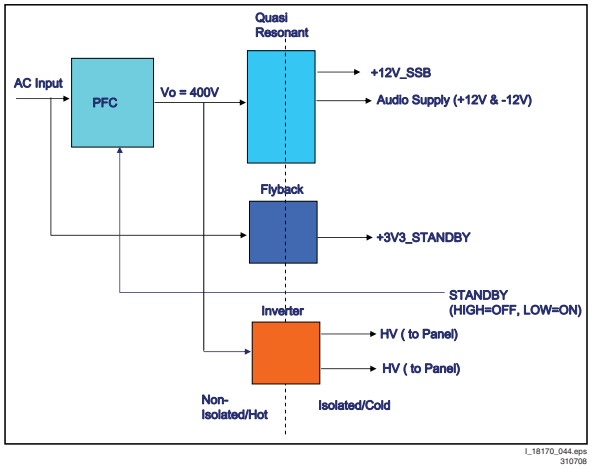

Figure 9-7 42" PSU block diagram

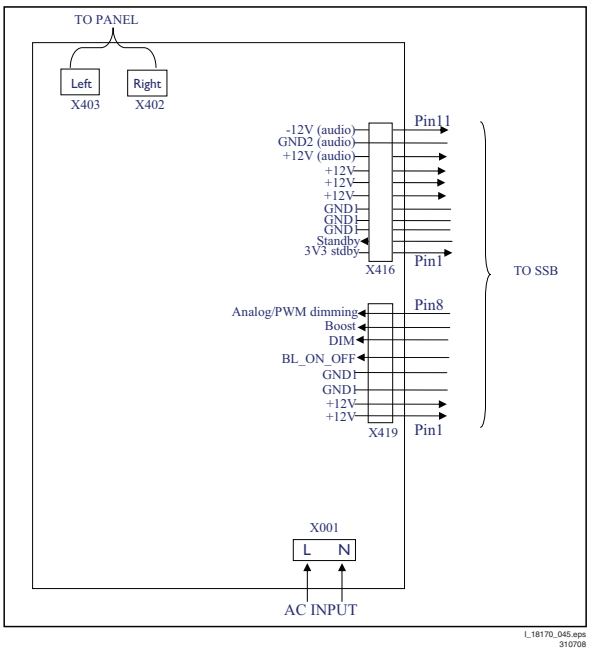

Figure 9-8 42" PSU interface diagram

9.3 DC/DC converters

On-board DC-DC converters convert the +12 V coming from the PSU and deliver the following voltages:

- +3.3 V(+3V3_STBY)
- +1.8 V(+1V8_SW)
- +5 V (+5V_SW)
- +3.3 V (+3V3_SW)
- +2.5 V (+2V5_SW)
- +3.3 V (+3V3_SW_TDA)
- +1.8 V (+1V8_SW_ADC)
- +33 V (+VTUN_33V)
- +8 V (+8V_SW)

The following diagram shows the power supply architecture of the SSB:

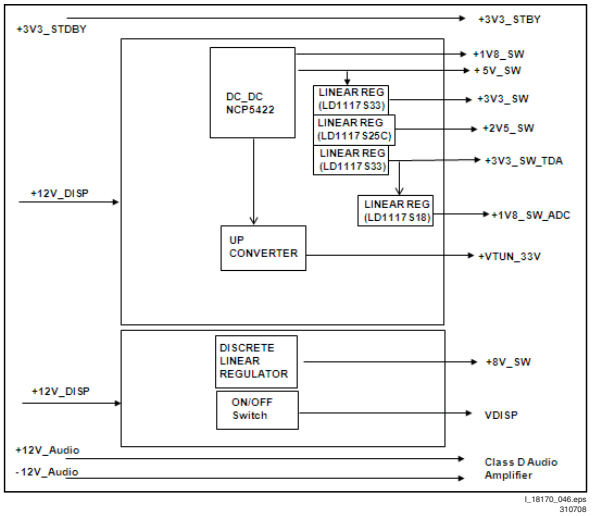

Figure 9-9 Power Supply Architecture

9.4 Front-End

This chassis uses the UV1316E analogue tuner.

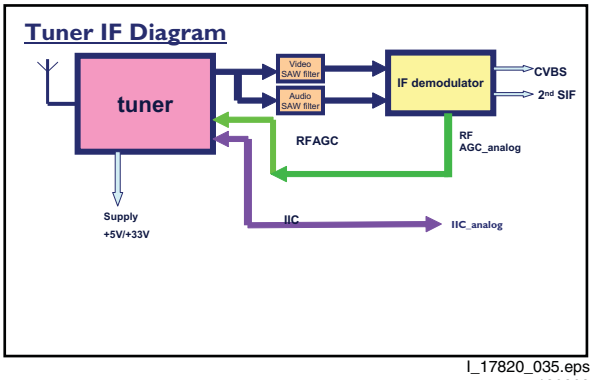

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Figure 9-10 Tuner IF diagram

While receiving analogue signals, the signal coming from the tuner is fed to the IF demodulator (through the SAW filters) and then passed to the NXP TDA8890H1 LOC-TOP Front-End Signal Processor.

9.4.1 Video IF Amplifier

The IF-filter is integrated in a SAW (Surface Acoustic Wave) filter. One for filtering IF-video (item 1102) and one for IF-audio (item 1103). The video IF filter can be switched to another standard, what makes it suitable for applications in multi-standard platforms (implemented in non-EU applications). If implemented, switching is done by the microcontroller via SAW_SW. In table “SAW filter switching” is explained how to address the different system standards.

Table 9-1 SAW filter switching

Region	SAW_SW	System
AP	1	B/G, D/K, I
	0	M/N

The pin assignment of all analogue tuners is equal and can be found in table “Pin assignment analogue tuners”.

Table 9-2 Pin assignment analogue tuners

Pin number	Description	DC voltage (V)
1	RF AGC voltage	3.3 - 4.5 (weak or no signal) < 3.3 (strong signal)
2	n.c.	
3	I^2C-bus address select	0
4	SCL	0 to 3.3
5	SDA	0 to 3.3
6	n.c.	
7	supply voltage	5 ±0.25
8	n.c.	
9	fixed tuning voltage	33
10	n.c.	
11	TV IF output	

9.5 Video/Audio Processing

The video and audio processing is handled by the NXP “LOC-TOP” TDA8890H1 front-end signal processor in cooperation with the NXP “LOC-TOP” TDA15471HV video/audio processor. For the applications, see figures “Block diagram video processing” and “Block diagram audio processing”.

The TDA8890H1 features:

- Multi-standard vision IF circuit with alignment-free PLL demodulator
- Internal (switchable) time-constant for the IF-AGC circuit
- Switchable group delay correction and sound trap (with switchable centre frequency) for the demodulated CVBS signal
- Separate SIF (Sound IF) input for single reference QSS (Quasi Split Sound) demodulation
- AM demodulator without extra reference circuit
- SSIF output is available for interfacing with a stereo sound decoder
- Audio switch circuit with 7 base band stereo sound inputs
- Audio switch circuit 3 stereo outputs
- Video switch with 4 external CVBS inputs
- Video switch with 3 CVBS outputs
- YPRPB outputs (YOUTPIP/PBOUTPIP/PROUTPIP), for back-end PIP processing
- Linear RGB/YPBPR input with fast insertion
- Video identification circuit
- One reference (24.576 MHz) clock required
- Indication of the Signal-to-Noise ratio of the incoming CVBS signal
- Horizontal synchronization with alignment-free horizontal oscillator
- Vertical count-down circuit to generate vertical timing signals.

The TDA15471HV features:

- Graphics and Video Input Ports
- HDMI receiver
- 3D Video Decoder
- Field-proven Multi-standard TV sound decoder
- Audio processor
- Analog sound interface
- Digital audio input and output interface
- High Quality Video Processing
- Pip and PoP
- High Quality Video Scaling Engine
- Embedded OSD and VBI Controller
- Embedded DDR/SDRAM controller
- Programmable Digital Output for LCD
- Powerful 32-bit RISC CPU.

9.5.1 Video/Audio Application

“Block diagram video processing” and “Block diagram audio processing” shows the video/audio signal flow.

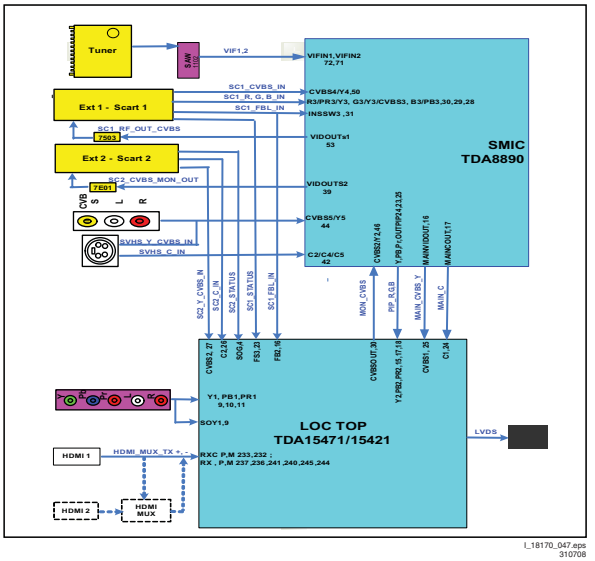

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Figure 9-11 Block diagram video processing

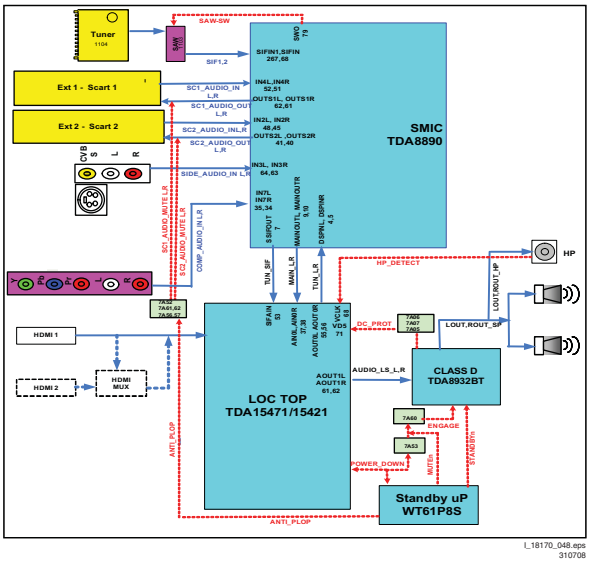


Figure 9-12 Block diagram audio processing

9.5.2 Audio Amplifier

The audio amplifier is an integrated class-D amplifier (TDA8932T, item 7A01). It combines a good performance with a high efficiency, resulting in a big reduction in heat generation.

Principle

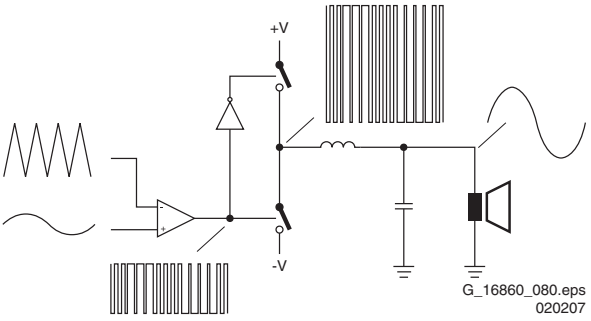


Figure 9-13 Principle Class-D Amplifier

The Class D amplifier works by varying the duty cycle of a Pulse Width Modulated (PWM) signal.
By comparing the input voltage to a triangle wave, the amplifier increases duty cycle to increase output voltage, and decreases duty cycle to decrease output voltage.
The output transistors of a Class D amplifier switch from 'full off' to 'full on' (saturated) and then back again, spending very little time in the linear region in between. Therefore, very little power is lost to heat. If the transistors have a low 'on' resistance (RDS(ON)), little voltage is dropped across them, further reducing losses.
A Low Pass Filter at the output passes only the average of the output wave, which is an amplified version of the input signal. In order to keep the distortion low, negative feedback is applied.

The **advantage** of Class D is increased efficiency (= less heat dissipation). Class D amplifiers can drive the same output power as a Class AB amplifier using less supply current.
The **disadvantage** is the large output filter. The main reason for this filter is that the switching waveform results in maximum current flow. This causes more loss in the load, which causes lower efficiency. An LC filter with a cut-off frequency less than the Class D switching frequency, allows the switching current to flow through the filter instead of the load, thus reducing the overall loss and increasing the efficiency.

DC-protection

A DC-detection circuit is foreseen to protect the speakers. It is built around three transistors (items 7A05 to 7A07) and generates a protection signal (DC_PROT) to the microprocessor in case of a DC failure in the Class D amplifiers.

9.6 HDMI

9.6.1 Introduction

Note: Text below is an excerpt from the ”HDMI Specification” that is issued by the HDMI founders (see *http://www.hdmi.org*).

The High-Definition Multimedia Interface is developed for transmitting digital signals from audiovisual sources to television sets, projectors and other video displays.
HDMI can carry high quality multi-channel audio data and can carry all standard and high-definition consumer electronics video formats. Content protection technology is available. HDMI can also carry control and status information in both directions.

HDMI is backward compatible with DVI (1.0). Compared with DVI, HDMI offers extra:

- YUV 4:4:4 (3 × 8-bit) or 4:2:2 (up to 2 × 12-bit), where DVI offers only RGB 4:4:4 (3 × 8 bit).
- Digital audio in CD quality (16-bit, 32/44.1/48 kHz), higher quality available (8 channels, 192 kHz).
- Remote control via CEC bus (Consumer Electronics Control): allows user to control all HDMI devices with the TV's remote control and menus.
- Smaller connector (SCART successor).
- Less cables: e.g. from 10 audio/9 video cables to 3 HDMI cables.

9.6.2 Implementation

The HDMI implementation is built around the IP4776CZ38 HDMI Interface for host-interface protection, which features:

- Integrated high-level ESD protection, level shifting and backdrive protection
- All TMDS lines with integrated rail-to-rail clamping diodes with downstream ESD protection of ±8 kV according to IEC 61000-4-2, level 4 standard
- Bidirectional level shifting N-channel FETs provided for DDC clock and data channels
- TMDS lines with ≤0.05 pF matching of capacitance between the TMDS pairs
- Ultra low line capacitance of 0.7 pF per channel
- HDMI 1.3 compliant
- Backdrive protection.

Refer to figure “HDMI implementation” for details.

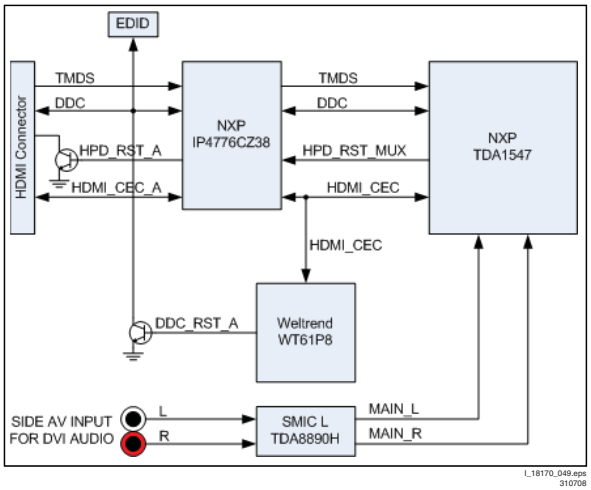


Figure 9-14 HDMI implementation

The description of the lines is as follows:

- TMDS (Time Minimized Differential Signal): the actual HDMI signal
- DDC (Digital Data Channel): the bus used by the source to read EDID data in the EEPROM and HDCP authentification
- HPD_RST_A (Hotplug Detect Reset signal): used to pull-down the HPD signal level at the connector when switching in/out of HDMI mode; the duration of the pulse is around 500-550 ms
- DDC_RST_A has the same behaviour as the HPD_RST_A signal. It is used to pull-down the I^2C clock line to prevent some problems with certain video graphic cards
- HDMI_CEC_A is the Consumer Electronic Control remote control signal bus.

It should be noted that in this chassis the HDCP-key is embedded in the main processor (no need for a separate Service-SSB).

9.7 Abbreviation List

1080i	1080 visible lines, interlaced
1080p	1080 visible lines, progressive scan
2CS	2 Carrier Sound
2DNR	Spatial (2D) Noise Reduction
3DNR	Temporal (3D) Noise Reduction
480i	480 visible lines, interlaced
480p	480 visible lines, progressive scan
AARA	Automatic Aspect Ratio Adaptation: algorithm that adapts aspect ratio to remove horizontal black bars; keeping up the original aspect ratio
ACI	Automatic Channel Installation: algorithm that installs TV channels directly from a cable network by means of a predefined TXT page
ADC	analogue to Digital Converter
AFC	Automatic Frequency Control: control signal used to tune to the correct frequency
AGC	Automatic Gain Control: algorithm that controls the video input of the feature box
AM	Amplitude Modulation
AUO	Acer Unipack Optronics
AP	Asia Pacific
AR	Aspect Ratio: 4 by 3 or 16 by 9
ASD	Automatic Standard Detection
AV	Audio Video
B/G	Monochrome TV system. Sound carrier distance is 5.5 MHz
BTSC	Broadcast Television System Committee
CAM	Conditional Access Module
CBA	Circuit Board Assembly (or PWB)
CEC	Consumer Electronics Control bus; remote control bus on HDMI connections
CI	Common Interface; E.g PCMCIA slot for a CAM in a set top box
CL	Constant Level: audio output to connect with an external amplifier
CLUT	Colour Look Up Table
ComPair	Computer aided rePair
COFDM	Coded Orthogonal Frequency Division Multiplexing; A multiplexing technique that distributes the data to be transmitted over many carriers
CSM	Customer Service Mode
CVBS	Composite Video Blanking and Synchronisation
CVBS-MON	CVBS monitor signal
CVBS-TER-OUT	CVBS terrestrial out
CVI	Component Video Input
DAC	Digital to analogue Converter
DBE	Dynamic Bass Enhancement: extra low frequency amplification
DDC	Display Data Channel; is a part of the "Plug and Play" feature
DFU	Directions For Use: owner's manual
DNR	Dynamic Noise Reduction
DRAM	Dynamic RAM
DSP	Digital Signal Processing
DST	Dealer Service Tool: special (European) remote control designed for service technicians
DTS	Digital Theatre Sound
DVB(T)	Digital Video Broadcast; An MPEG2 based standard for transmitting digital audio and video. T= Terrestrial
DVD	Digital Versatile Disc
DVI	Digital Visual Interface
DW	Double Window
ED	Enhanced Definition: 480p, 576p
EDID	Extended Display Identification Data (VESA standard)
EEPROM	Electrically Erasable and Programmable Read Only Memory
EMC	Electro Magnetic Compatibility
EU	EUrope
EXT	EXTernal (source), entering the set by SCART or by cinches (jacks)
FBL	Fast Blanking: DC signal accompanying RGB signals
FBL-TXT	Fast Blanking Teletext
FET	Field Effect Transistor
FLASH	FLASH memory
FM	Field Memory / Frequency Modulation
FMR	FM Radio
FRC	Frame Rate Converter
FTV	Flat TeleVision
H	H_sync to the module
HD	High Definition: 720p, 1080i, 1080p
HDCP	High-bandwidth Digital Content Protection; A "key" encoded into the HDMI/DVI signal that prevents video data piracy. If a source is HDCP coded and connected via HDMI/DVI without the proper HDCP decoding, the picture is put into a "snow vision" mode or changed to a low resolution. For normal content distribution, the source and the display device must be enabled for HDCP "software key" decoding

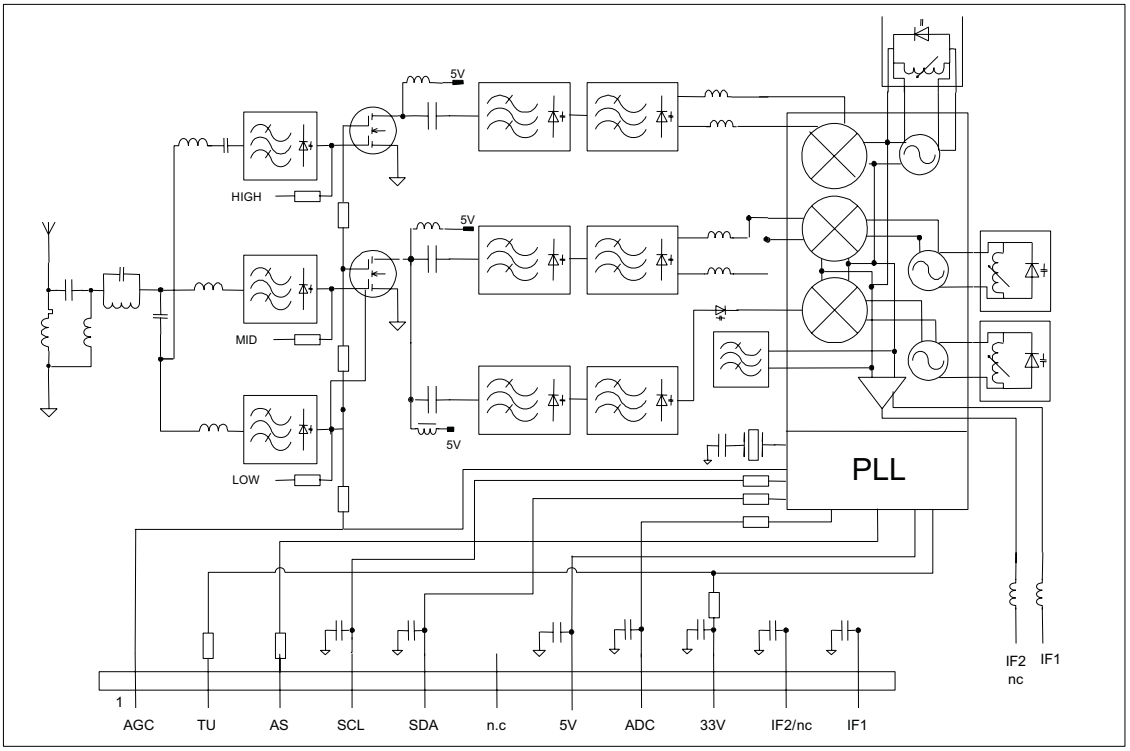
HDMI	High Definition Multimedia Interface, digital audio and video interface
HP	Head Phone
I	Monochrome TV system. Sound carrier distance is 6.0 MHz
I2C	Integrated IC bus
I2S	Integrated IC Sound bus
IBO(Z)	Intelligent Bolt On module. Z= Zapper; module for DVB reception.
IC	Integrated Circuit
IF	Intermediate Frequency
IR	Infra Red
IRQ	Interrupt ReQuest
Last Status	The settings last chosen by the customer and read and stored in RAM or in the NVM. They are called at start-up of the set to configure it according the customers wishes
LATAM	LATin AMerica
LC08	Philips chassis name for LCD TV 2008 project
LCD	Liquid Crystal Display
LED	Light Emitting Diode
L/L'	Monochrome TV system. Sound carrier distance is 6.5 MHz. L' is Band I, L is all bands except for Band I
LPL	LG Philips LCD
LS	Loud Speaker
LVDS	Low Voltage Differential Signalling, data transmission system for high speed and low EMI communication.
M/N	Monochrome TV system. Sound carrier distance is 4.5 MHz
MOSFET	Metal Oxide Semiconductor Field Effect Transistor
MPEG	Motion Pictures Experts Group
MSP	Multi-standard Sound Processor: ITT sound decoder
MUTE	MUTE Line
NAFTA	North American Free Trade Association: Trade agreement between Canada, USA and Mexico
NC	Not Connected
NICAM	Near Instantaneous Compounded Audio Multiplexing. This is a digital sound system, used mainly in Europe.
NTSC	National Television Standard Committee. Colour system used mainly in North America and Japan. Colour carrier NTSC M/N = 3.579545 MHz, NTSC 4.43 = 4.433619 MHz (this is a VCR norm, it is not transmitted off-air)
NVM	Non Volatile Memory: IC containing TV related data (for example, options)
O/C	Open Circuit
ON/OFF LED	On/Off control signal for the LED
OAD	Over the Air Download
OSD	On Screen Display
PAL	Phase Alternating Line. Colour system used mainly in Western Europe (colour carrier = 4.433619 MHz) and South America (colour carrier PAL M = 3.575612 MHz and PAL N = 3.582056 MHz)
PC	Personal Computer
PCB	Printed Circuit Board (or PWB)
PDP	Plasma Display Panel
PIG	Picture In Graphic
PIP	Picture In Picture
PLL	Phase Locked Loop. Used, for example, in FST tuning systems. The customer can directly provide the desired frequency
PSU	Power Supply Unit
PWB	Printed Wiring Board (or PCB)
PWM	Pulse Width Modulation
RAM	Random Access Memory
RC	Remote Control transmitter
RC5 (6)	Remote Control system 5 (6), the signal from the remote control receiver
RF	Radio Frequency
RGB	Red, Green, and Blue. The primary colour signals for TV. By mixing levels of R, G, and B, all colours (Y/C) are reproduced.
RGBHV	Red, Green, Blue, Horizontal sync, and Vertical sync
ROM	Read Only Memory
SAM	Service Alignment Mode
SC	SandCastle: two-level pulse derived from sync signals
SC1-OUT	SCART output of the MSP audio IC
SC2-OUT	SCART output of the MSP audio IC
S/C	Short Circuit
SCL	Clock signal on I2C bus
SD	Standard Definition: 480i, 576i
SDA	Data signal on I2C bus
SDI	Samsung Display Industry
SDM	Service Default Mode
SDRAM	Synchronous DRAM
SECAM	SEequence Couleur Avec Memoire. Colour system used mainly in France and Eastern Europe. Colour carriers = 4.406250 MHz and 4.250000 MHz
SIF	Sound Intermediate Frequency
SMPS	Switch Mode Power Supply
SND	SouND
SOPS	Self Oscillating Power Supply
S/PDIF	Sony Philips Digital InterFace
SRAM	Static RAM
SSB	Small Signal Board
STBY	Stand-by
SVHS	Super Video Home System
SW	Sub Woofer / SoftWare / Switch
THD	Total Harmonic Distortion
TXT	TeleteXT
UART	Universal Asynchronous Receiver/ Transmitter
uP	Microprocessor
VL	Variable Level out: processed audio output toward external amplifier
TXT	TeleteXT
VBI	Vertical Blanking Interval
VESA	Video Electronics Standards Association
VGA	Video Graphics Array
WD	Watch Dog
WYSIWYR	What You See Is What You Record: record selection that follows main picture and sound
XTAL	Quartz crystal
YPbPr	Component video (Y= Luminance, Pb/ Pr= Colour difference signals B-Y and R-Y, other amplitudes w.r.t. to YUV)
Y/C	Video related signals: Y consists of luminance signal, blanking level and sync; C consists of colour signal.
Y-OUT	Luminance-signal
YUV	Baseband component video (Y= Luminance, U/V= Colour difference signals)

9.8 IC Data Sheets

This section shows the internal block diagrams and pin layouts of ICs that are drawn as "black boxes" in the electrical diagrams (with the exception of "memory" and "logic" ICs).

9.8.1 Diagram B02, Type UV1316E (IC1104), Tuner

Block Diagram



Pin Configuration

SYMBOL	PIN	DESCRIPTION
AGC	1	Automatic Gain Control Voltage
TU	2	Tuning voltage monitor (output)
AS	3	I ^{2}C-Bus Address Select
SCL	4	I ^{2}C-Bus Serial Clock
SDA	5	I ^{2}C-Bus Serial Data
n.c.	6	Not Connected
V_s	7	Supply Voltage +5V
ADC	8	ADC Input (5)
V_{ST}	9	Fixed tuning Supply Voltage +33V
I.F out 2 / d.n.c	10	Symmetrical I.F output 2 / Do not connect for asymmetrical
I.F out 1	11	Asymmetrical I.F Output / Symmetrical I.F output 1
GND	M1,M2,M3,M4	Mounting Tags (Ground)

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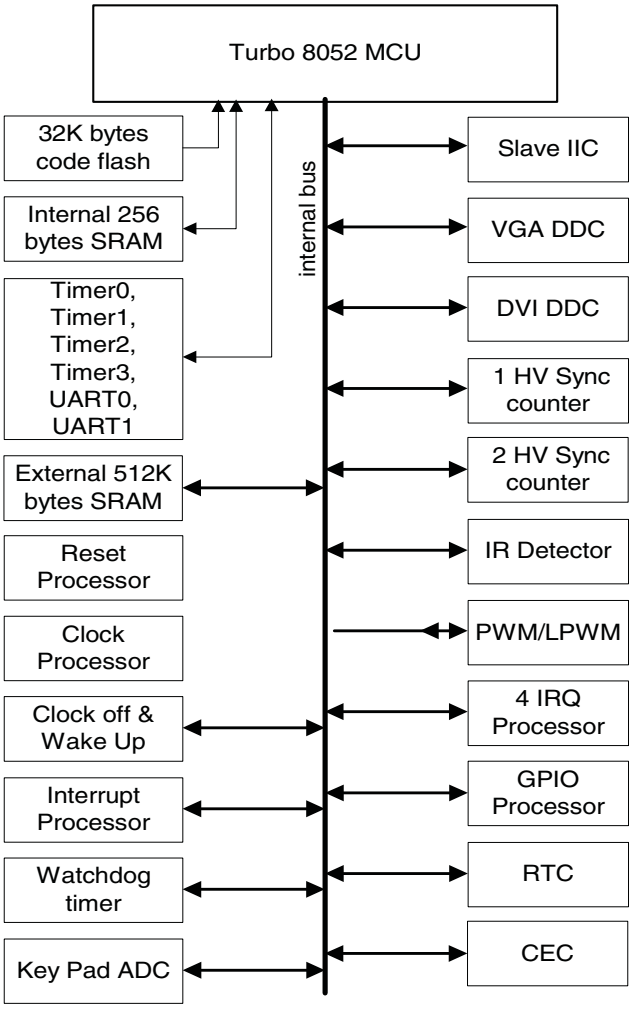
Figure 9-15 Internal block diagram and pin configuration

9.8.2 Diagram B03, Type WT61P8S (IC7303), Weltrend Microprocessor

Block Diagram



Pin Configuration

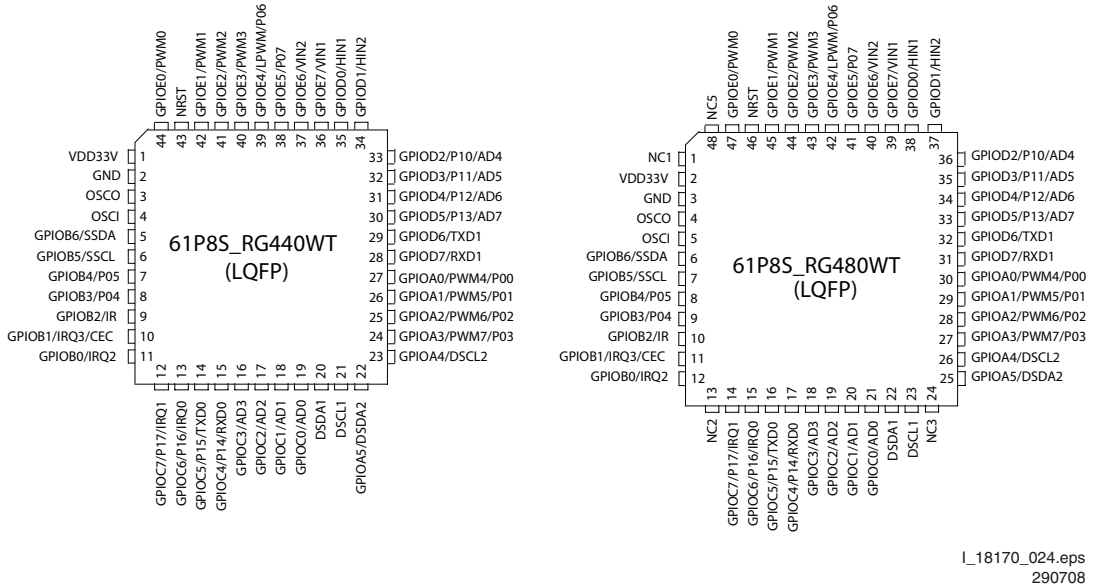
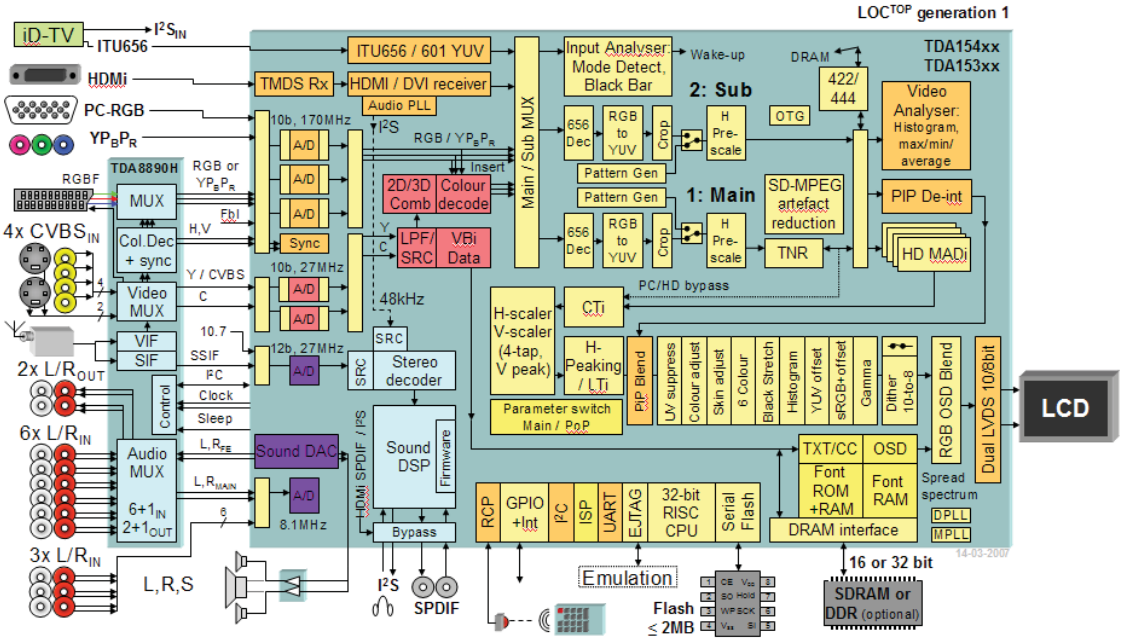


Figure 9-16 Internal block diagram and pin configuration

9.8.3 Diagram B04A, Type TDA15471HV (IC7C01), LOC-TOP Video/Audio Processor

Block Diagram



Pin Configuration

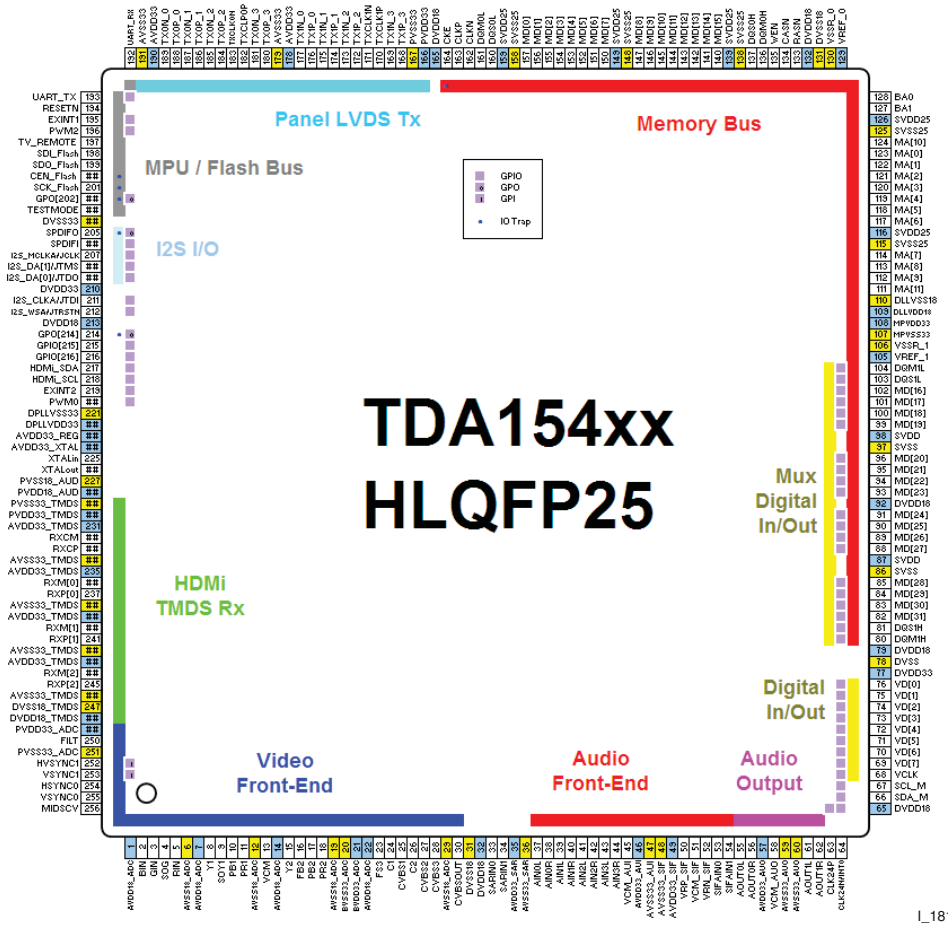


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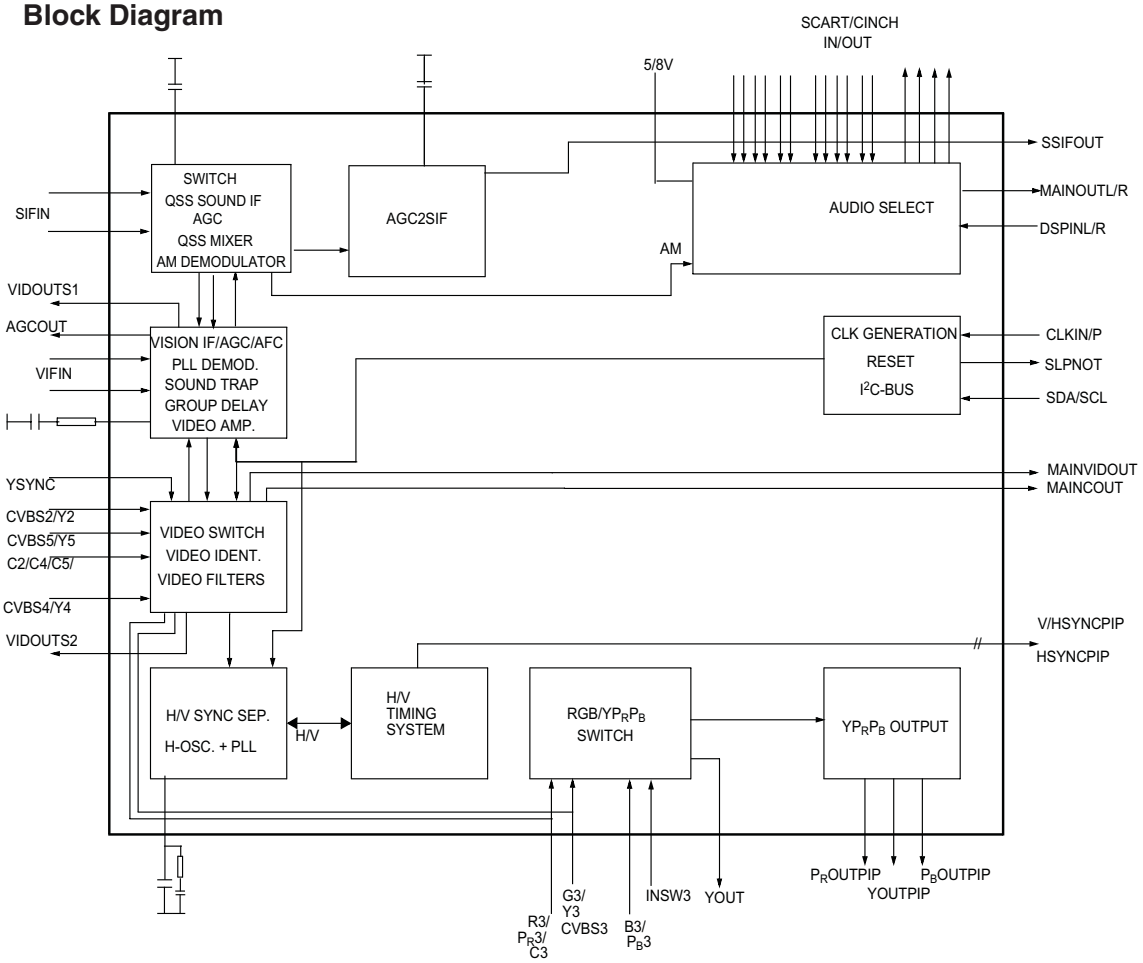
Figure 9-17 Internal block diagram and pin configuration

9.8.4 Diagram B05A, Type TDA8890H1 (IC7401), Versatile Front-End Signal Processor

Block Diagram



Pin Configuration

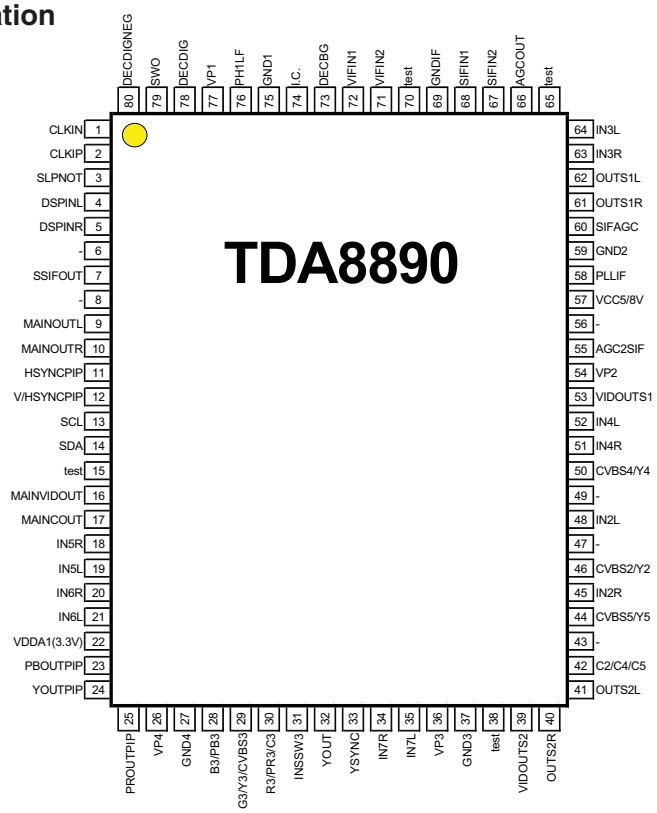


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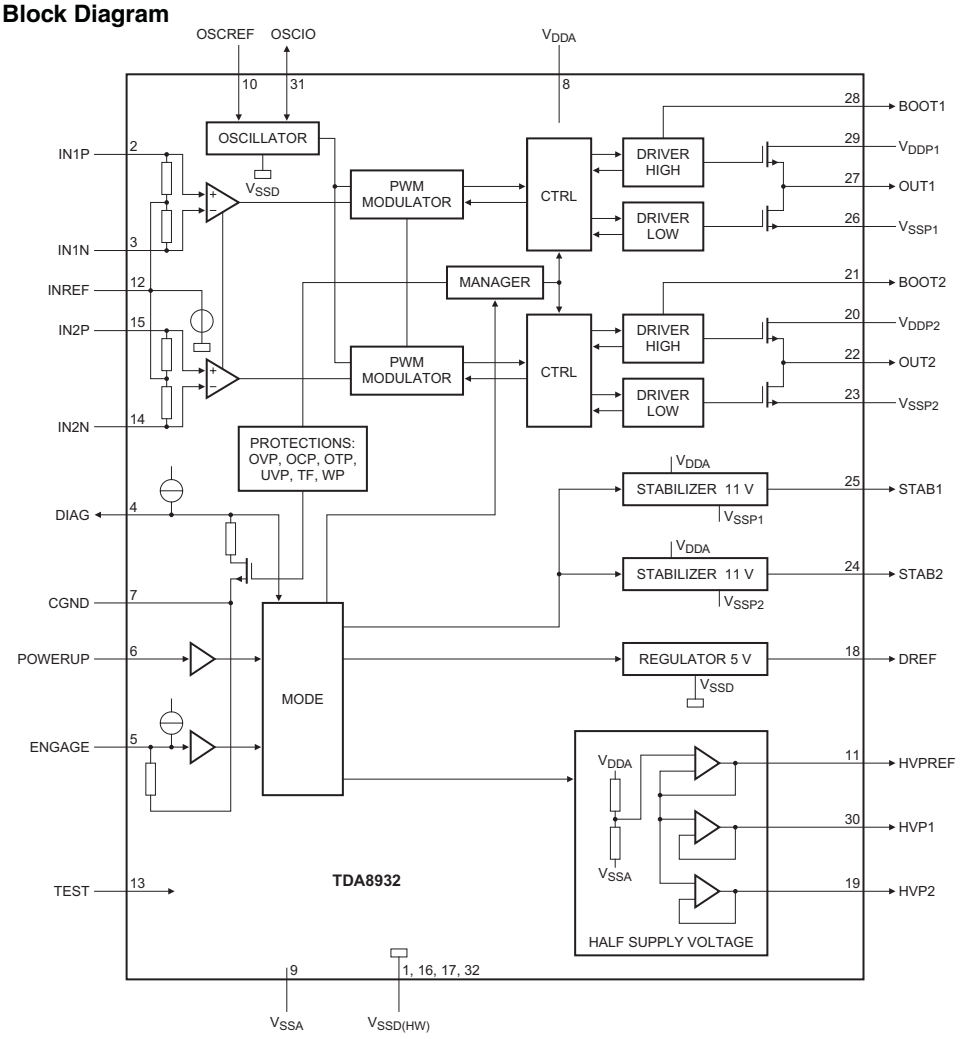
Figure 9-18 Internal block diagram and pin configuration

9.8.5 Diagram B05B, Type TDA8932BT (IC7A01), Audio Amplifier

Block Diagram



Pin Configuration

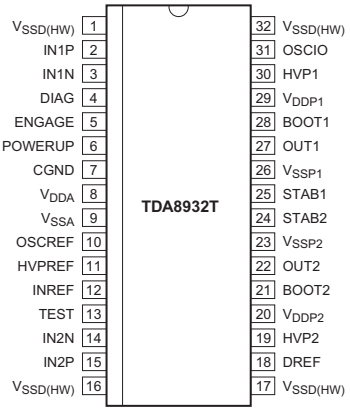


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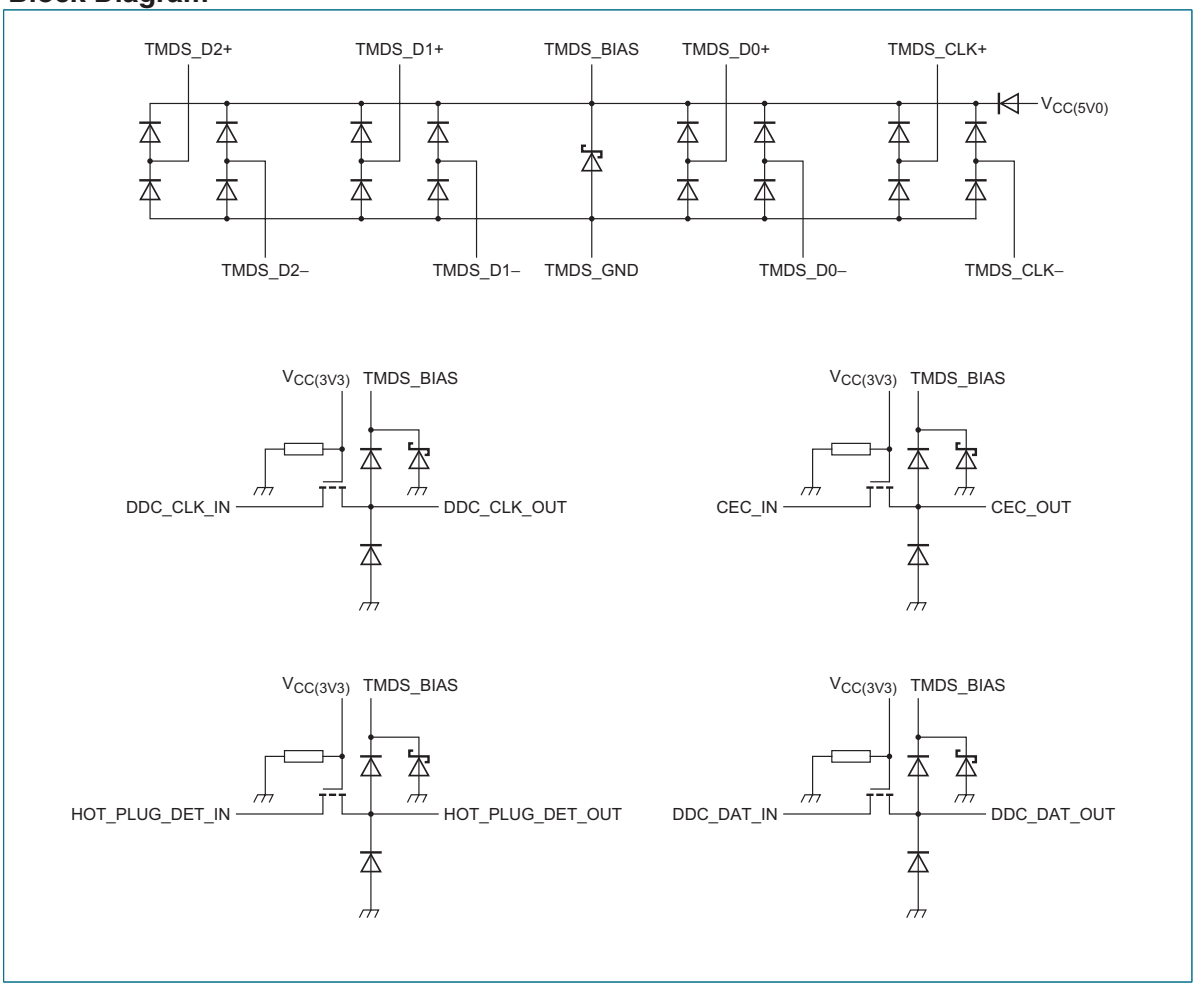
Figure 9-19 Internal block diagram and pin configuration

9.8.6 Diagram B06D, Type IP4776 (IC7N07), HDMI Interface

Block Diagram



Pin Configuration

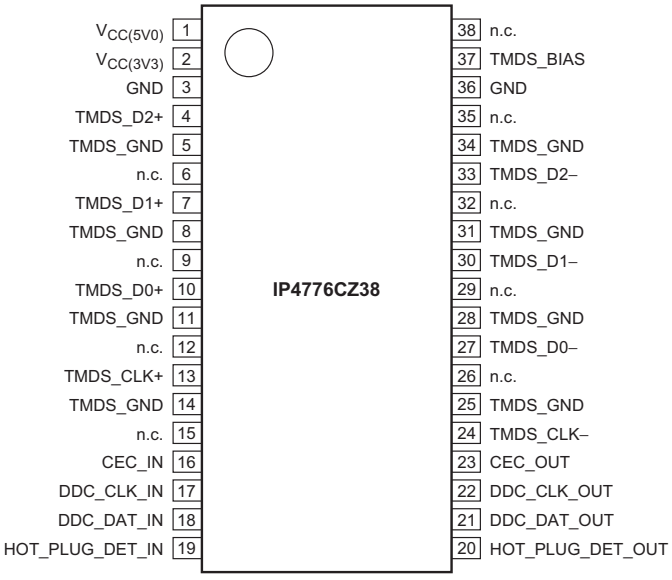


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Figure 9-20 Internal block diagram and pin configuration

10. Spare Parts List & CTN Overview

For the latest spare part overview, please consult the Philips Service website.

Table 10-1 Sets described in this manual:

CTN	Styling	Published in:
32PFL3403/12	MG8	3122 785 18170
32PFL3403/60	MG8	3122 785 18171
32PFL3403S/60	MG8	3122 785 18171
42PFL3403/12	MG8	3122 785 18170
42PFL3403/60	MG8	3122 785 18171
42PFL3403S/60	MG8	3122 785 18171

11. Revision List

Manual xxxx xxx xxxx.0

- First release.

Manual xxxx xxx xxxx.1

- **All chapters:** Added 4 sets (See table chapter 10).
- **Chapter 5:** "LLLLL" removed from SAM explanations.