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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	:	19" (48 cm), 16:9
	:	20" (51 cm), 4:3
	:	22" (56 cm), 16:9
	:	26" (66 cm), 16:9
Resolution (H × V pixels)	:	640×480 (20")
	:	1366×768 (26")
	:	1440×900 (19")
	:	1680×1050 (22")
Light output (cd/m^2)	:	300 (19", 20", 22")
	:	500 (26")
Contrast ratio	:	800:1 (20", 26")
	:	1000:1 (19", 22")
Typ. response time (ms)	:	12 (20")
	:	8 (26")
	:	5 (19", 22")
Viewing angle (H × V degrees)	:	178×178 (20")
	:	170×160 (19", 22")
	:	160×160 (26")
Tuning system	:	PLL
Colour systems	:	PAL, SECAM
Video playback	:	PAL, SECAM, NTSC
Tuner bands	:	UHF, VHF, S, Hyper

Supported Computer Formats		
60 Hz	:	640×480(max.for 20")
60 Hz	:	800×600 (all exc.20")
60 Hz	:	1024×768(all exc.20")
60 Hz	:	1280×768 (26" only)
60 Hz	:	1280×1024 (26" only)
60 Hz	:	1366×768 (26" only)
50 Hz, 75 Hz	:	1440×900 (26", only)

Supported Video Formats		
60 Hz	:	480i
60 Hz	:	480p
50 Hz	:	576i
50 Hz	:	576p
50 Hz, 60 Hz	:	720p
50 Hz, 60 Hz	:	1080i
50 Hz, 60 Hz	:	1080p (19", 22" only)

1.1.2 Sound

Sound systems	:	Mono
	:	Stereo
Maximum power (W)	:	2 × 3 (19", 20")
	:	2 × 5 (22", 26")

1.1.3 Miscellaneous

Power supply		
- Mains voltage (V_{AC})	:	100 to 240
- Mains frequency (Hz)	:	50, 60
Power consumption (W)	:	~50 (19")
	:	~58 (20")
	:	~53 (22")
	:	~120 (26")
Stand-by (W)	:	< 0.3
Dimensions (W × H × D in mm)	:	475 × 334 × 71 (19")
	:	470 × 406 × 71 (20")
	:	538 × 375 × 71 (22")
	:	671 × 458 × 90 (26")
Weight (kg)	:	? (19")
	:	5.8 (20")
	:	? (22")
	:	7.7 (26")

1.2 Connection Overview

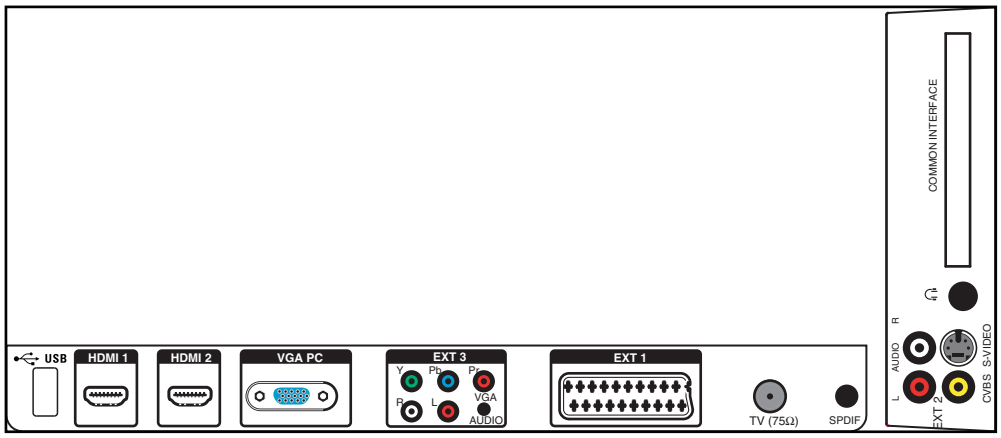

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Figure 1-1 Rear and side I/O connections

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 Side connections

EXT 2: 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

EXT 2: 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

EXT 2: Mini Jack: Audio Head phone - Out

Bk	- Head phone	32 - 600 ohm / 10 mW

EXT 2: Common Interface

68p - See diagram B05

1.2.2 Rear Connections

USB2.0

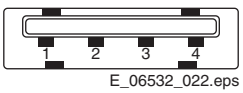

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Figure 1-2 USB (type A)

1	- +5V	
2	- Data (-)	
3	- Data (+)	
4	- Ground	Gnd

HDMI 1 & 2: Digital Video, Digital Audio - In

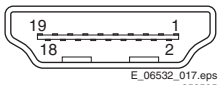

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Figure 1-3 HDMI (type A) connector

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	- n.c.	
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

VGA PC: Video RGB - In and Service UART

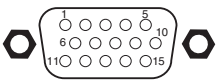

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Figure 1-4 VGA Connector

1	- Video Red	0.7 V_{PP} / 75 ohm
2	- Video Green	0.7 V_{PP} / 75 ohm
3	- Video Blue	0.7 V_{PP} / 75 ohm
4	- n.c.	
5	- Ground	Gnd
6	- Ground Red	Gnd
7	- Ground Green	Gnd
8	- Ground Blue	Gnd
9	- +5V_dc	+5 V
10	- Ground Sync	Gnd
11	- n.c.	
12	- DDC_SDA	DDC data
13	- H-sync	0 - 5 V
14	- V-sync	0 - 5 V
15	- DDC_SCL	DDC clock

EXT 3: 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

EXT 3: Mini Jack: VGA Audio - In

Bk	- Audio L/R	0.5 V_{RMS} / 10 kohm

EXT 1: Video RGB/YC - In, CVBS - In/Out, Audio - In/Out

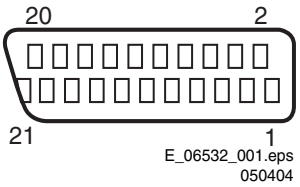

Figure 1-5 SCART connector

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 Audio	Gnd
5	- Ground Blue	Gnd
6	- Audio L	0.5 V_{RMS} / 10 kohm
7	- Video Blue/C-out	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 Green	Gnd
10	- Easylink P50	0 - 5 V / 4.7 kohm
11	- Video Green	0.7 V_{PP} / 75 ohm
12	- n.c.	
13	- Ground Red	Gnd
14	- Ground P50	Gnd
15	- Video Red/C	0.7 V_{PP} / 75 ohm
16	- Status/FBL	0 - 0.4 V: INT 1 - 3 V: EXT / 75 ohm
17	- Ground Video	Gnd
18	- Ground FBL	Gnd
19	- Video CVBS	1 V_{PP} / 75 ohm
20	- Video CVBS/Y	1 V_{PP} / 75 ohm
21	- Shield	Gnd

Aerial - In

-	- IEC-type (EU)	Coax, 75 ohm

Cinch: S/PDIF - Out

Bk	- Coaxial	0.4 - 0.6V_{PP} / 75 ohm

1.3 Chassis Overview

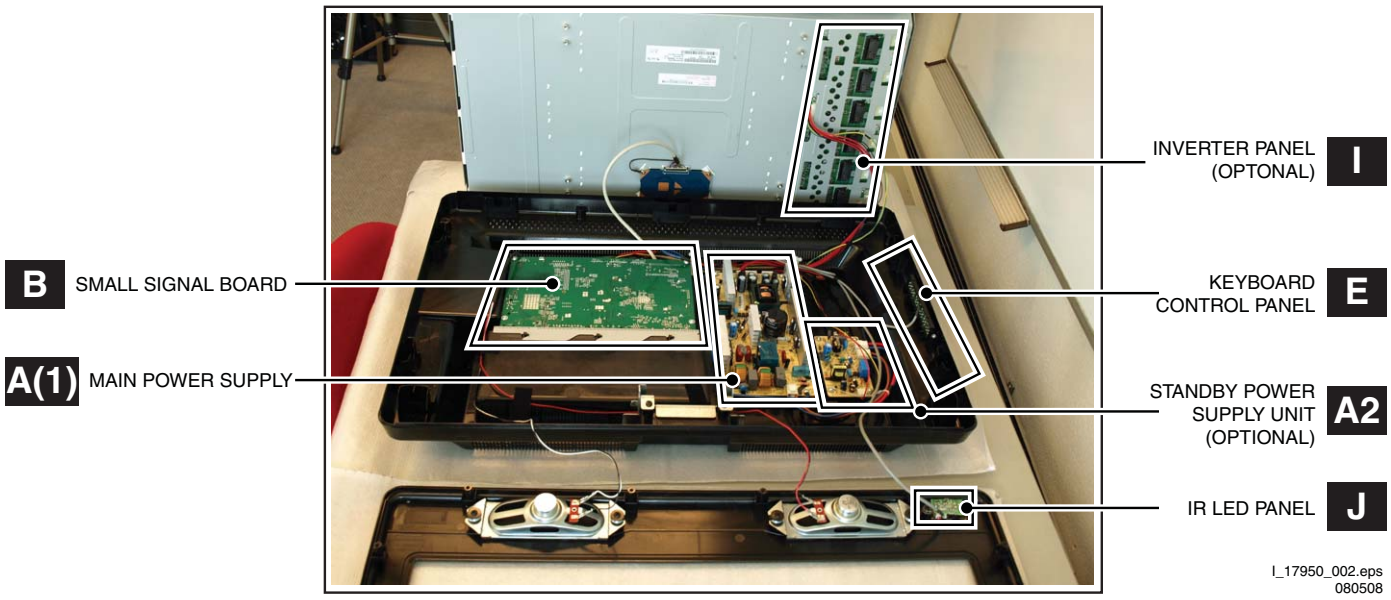

Figure 1-6 PWB/CBA locations (26" model)

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 centre (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.
- Follow the disassemble instructions in described order. They apply mostly to the 26" model unless otherwise specified, but the described method is comparable for the other screen sizes.

4.1 Cable Dressing

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Figure 4-1 Cable dressing (20" model)

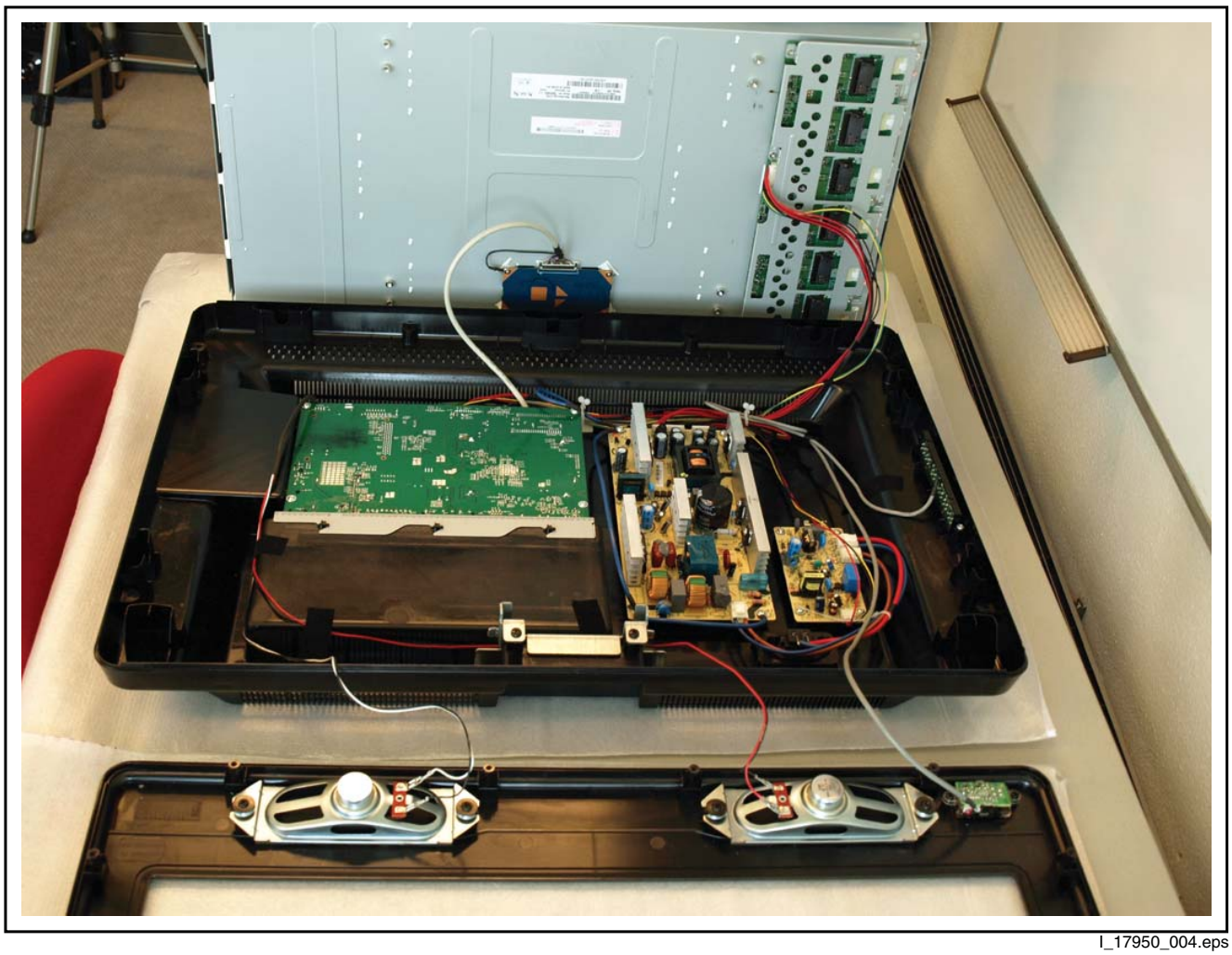

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Figure 4-2 Cable dressing (26" model)

4.2 Service Positions

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

- The buffers from the packaging.
- Foam bars (created for Service).

4.2.1 Foam Bars

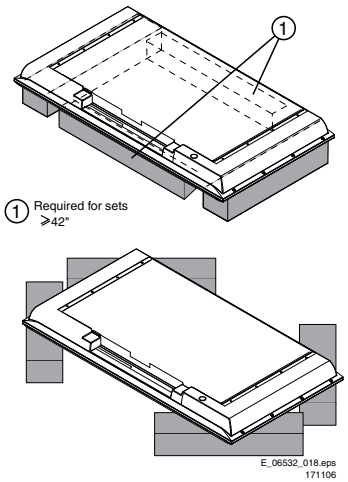

Figure 4-3 Foam bars

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

4.3.1 Stand

1. Refer to next figure.
2. Place the TV set upside down on a table top, using the foam bars (see section “Service Position”).
3. Remove the screws that secure the stand and remove the stand.

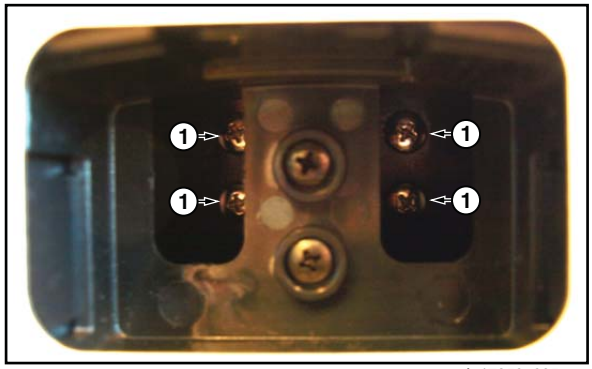

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Figure 4-4 Stand

4.3.2 Rear Cover

Warning: Disconnect the mains power cord before you remove the rear cover.

1. Refer to next figures.
2. Place the TV set upside down on a table top, using the foam bars (see section “Service Positions”).
3. Remove the screws that secure the rear cover. The screws are located at the sides.
   Be careful: Some models (mainly the smaller screen sizes) use latches for securing the rear and front cover together (see figure “Front cover latch location”). **These must be unlocked first before you can open the TV-set!** To open them, use e.g. a (plastic) putty knife. Insert the tool into the gap between the front and rear cover (be extremely careful not to scratch or dent the cabinet when inserting the tool).
   Gently release the internal latches. Note: You will hear little popping sounds as the latches release and the rear cover moves away from the front cover.
4. Now the rear cover could be lifted but the SSB and power supply panel(s) are mounted in the rear cover and still connected to the LCD panel and other boards. **Those cables should be released first!**
5. To release the LVDS cable lift the back cover a few centimetres and move it downwards the set. Now unplug the LVDS connector [2].
   Caution: be careful, as this is a very fragile connector!
6. Remove the screw [3].
7. Now the rear cover can be lifted to gain access to the speaker cables and the IR/LED panel cable. Release the connectors [4].

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Figure 4-5 Front cover latch location [1/2]

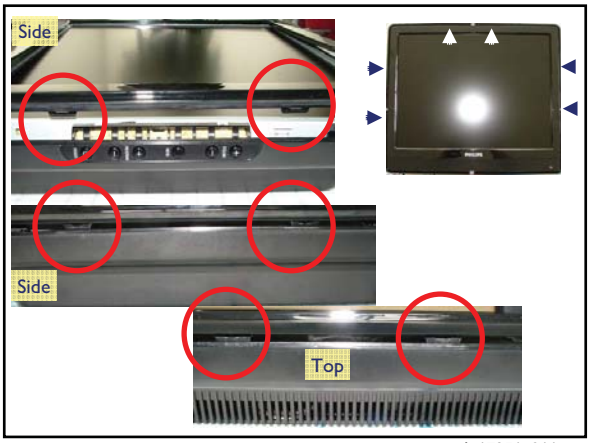

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Figure 4-6 Front cover latch location [2/2]

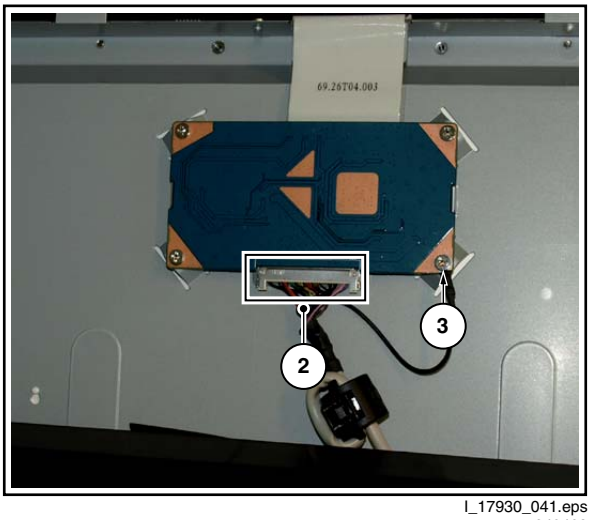

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Figure 4-7 LVDS release

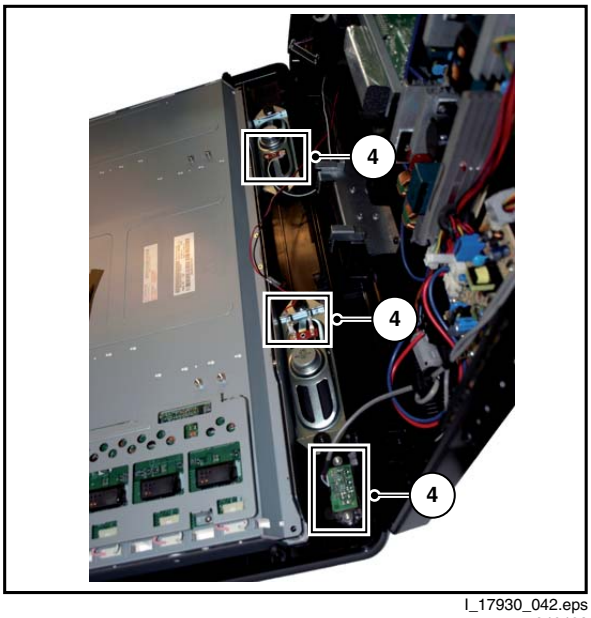

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Figure 4-8 Speaker and IR/LED panel cable release

4.3.3 Keyboard Control Board

1. Refer to next figure.
2. Unscrew two screws[1]
3. Unplug connector [2] and remove the board.

When defective, replace the whole unit

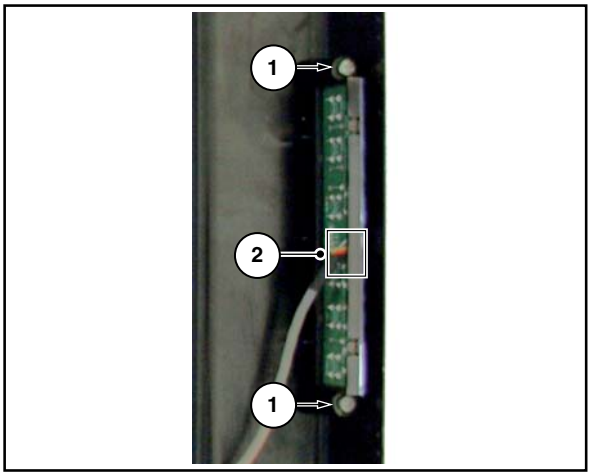

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Figure 4-9 Keyboard control board

4.3.4 IR/LED Board and Speakers

1. Refer to next figure.
2. Remove the screws [1] and remove the IR/LED board.
3. Remove the screws [2] and remove the speakers.

When defective, replace the whole unit.

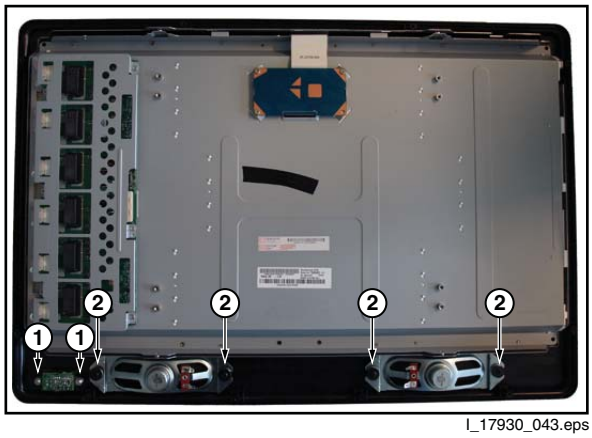

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Figure 4-10 IR/LED Board and Speakers

4.3.5 Power Supply Board

Due to different set executions this chassis is supplied with one or two power supply boards and figures may differ.
Caution: it is absolutely mandatory to remount all different screws and cables at their original position during re-assembly. Failure to do so may result in damaging the power supply.

1. Refer to next figure.
2. Unplug all the connectors [1].
3. Remove the fixation screws [2]
4. Remove the main power supply board.
5. Unplug all the connectors [3].
6. Remove the fixation screws [4]
7. Remove the stand-by power supply board.

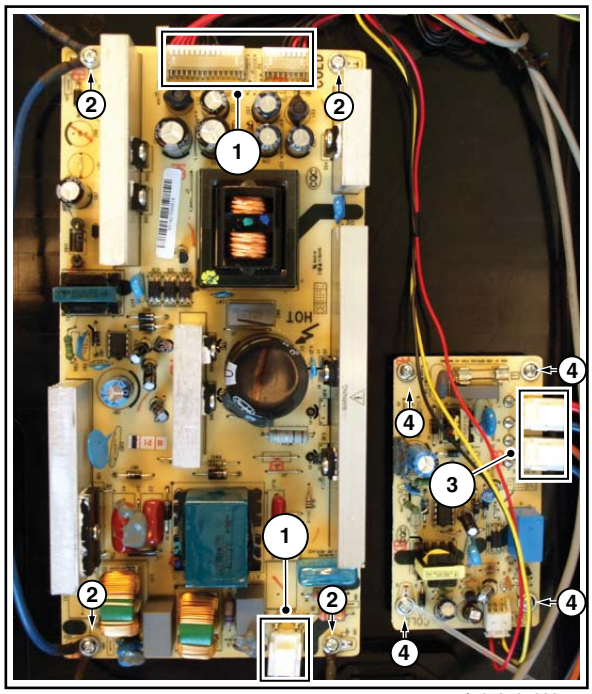

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Figure 4-11 Power Supply Unit(s)

4.3.6 Inverter Board (19", 20", and 22" versions)

Due to different set executions this chassis some versions are supplied with an inverter board. Figures may differ.

1. Refer to next figure.
2. Unplug all connectors [1].
3. Release the clips [2]
4. Take out the inverter board.

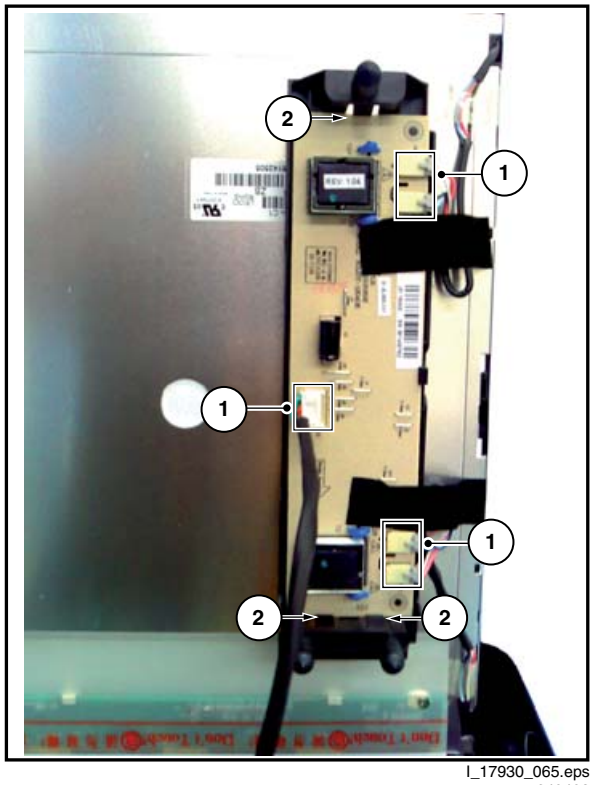

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Figure 4-12 Inverter Board

4.3.7 Small Signal Board (SSB)

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

Removing the SSB

1. See next figures.
2. Remove the screws [1] from the SSB connector plate.
3. Remove the screws [2] from the SSB.
4. On the **outside** of the set, **lift** the rear cover near the tuner connector approximately 3 mm in the indicated direction and keep it lifted, while
5. On the **inside** of the set, **slide** the metal plate in the indicated direction.
6. Gently lift the board from the rear cover.
7. Now unplug the LVDS connector [3].
   Caution: be careful, as this is a very fragile connector!
   Unplug the rest of the cables [4].

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Figure 4-13 SSB connector plate

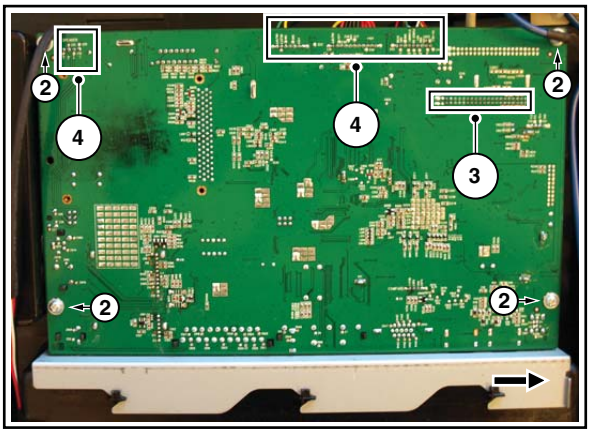

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Figure 4-14 SSB

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 at the SB shields. Make sure, that EMC foams are put correctly on their places.

5. Service Modes, Error Codes, and Fault Finding

Index of this chapter:

5.1 Test Points

This chassis is NOT equipped with test points in the service printing. No test points are mentioned in the service manual.

5.2 Service Modes

The Service Mode feature is split into different parts:
- Service Alignment Mode (SAM).
- Service Default Mode (SDM).
- Customer Service Mode (CSM).

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.

5.2.1 Service Alignment Mode (SAM)

How to Enter

To enter SAM, use the following method:
- Press on the remote control the code “**062596**” directly followed by the “**INFO**” key.

After entering SAM, the following screen is visible, the values can be adjusted according to the requested (see Chapter 8).

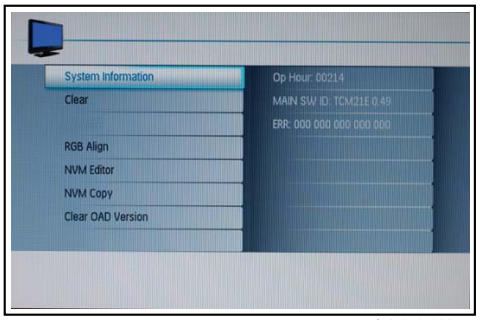

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Figure 5-1 SAM menu, System Information

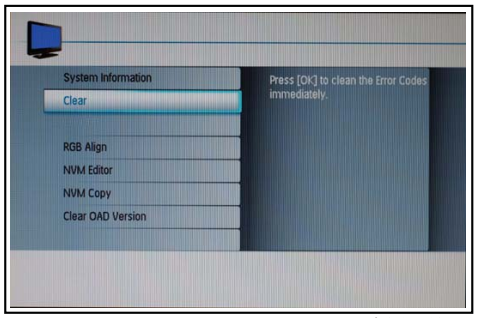

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Figure 5-2 SAM menu, Clear

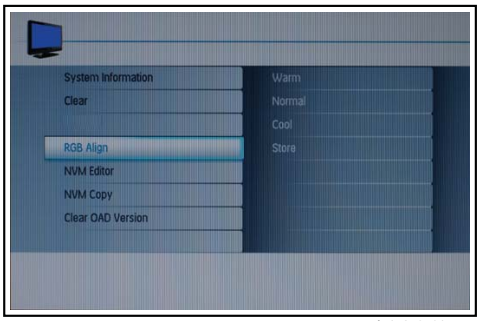

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Figure 5-3 SAM menu, RGB Align

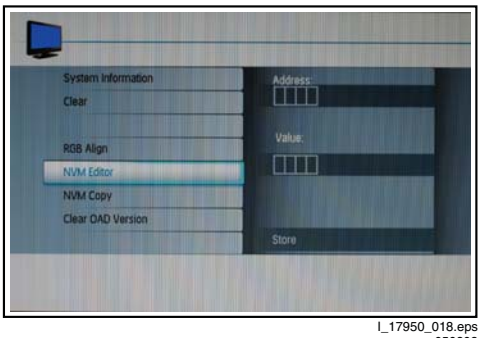

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Figure 5-4 SAM menu, NVM Editor

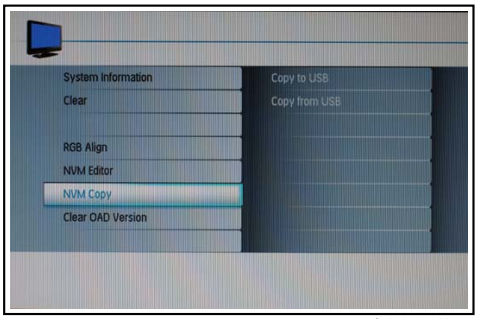

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Figure 5-5 SAM menu, NVM Update

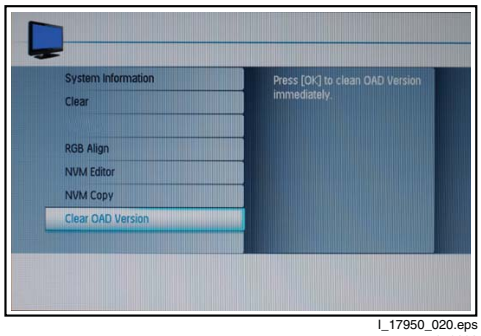

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Figure 5-6 SAM menu, Clear OAD

How to EXIT
Put set in <stand-by> by using the remote control.

5.2.2 Service Default Mode (SDM)

Purpose
- To create a pre-defined setting, to get the same measurements as given in this manual.
- To override SW protections.
- To start the blinking LED procedure.

How to enter
To enter SAM, use the following method:
- Press on the remote control the code "**062596**" directly followed by the "**MENU**" key.

After entering SDM, the following screen is visible.

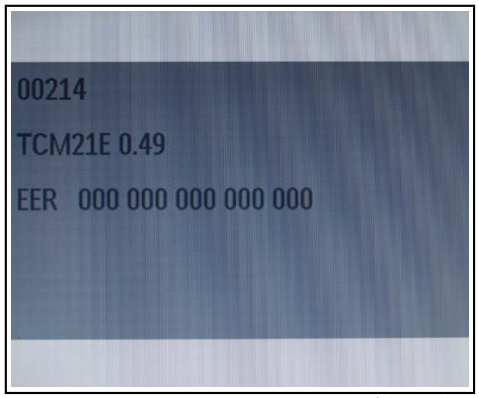

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Figure 5-7 SDM menu

From top to bottom, it gives the following information:
- Operation hours
- Software version
- Error buffer display.

5.2.3 Customer Service Mode (CSM)

Purpose
When a customer is having problems with his TV-set, he can call his dealer or the Customer Help desk. The service technician can then ask the customer to activate the CSM, in order to identify the status of the set. Now, the service technician can judge the severity of the complaint. In many cases, he can advise the customer how to solve the problem, or he can decide if it is necessary to visit the customer. The CSM is a read only mode; therefore, modifications in this mode are not possible.

How to Activate CSM
Key in the code "**123654**" via the standard RC transmitter.

Contents of CSM

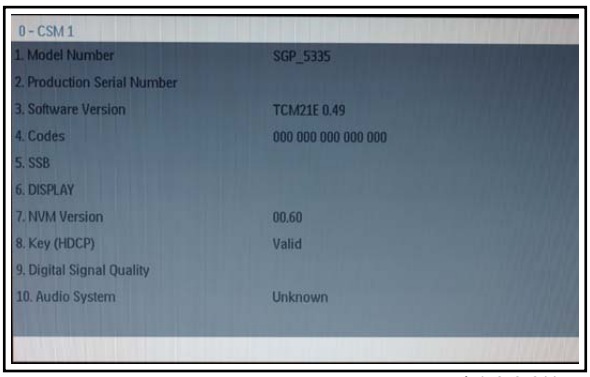

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Figure 5-8 CSM Menu -1-

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Figure 5-9 CSM Menu -2-

Menu Explanation
1. **Model Number.** Type number and region.
2. **Production Serial Number**. Product serial no.
3. **SW Version**. Software cluster and version is displayed (TC = TCL, M2 = MTK2, E = Europe, 0.49 = software version).
4. **Codes.** Error buffer contents.
5. **SSB.** SSB serial number.
6. **DISPLAY.** Display type.
7. **NVM Version**. NVM version.
8. **Key (HDCP) HDMI**. Shows valid or invalid HDCP key when HDMI connected. Else blank.
9. **Digital Signal Quality**. Quality of antenna signal in %.
10. **Audio System**. Audio system (Mono/Stereo/NICAM)
11. n.a.
12. **Video Format.** Video format.
13. **Stand-by µP SW ID**. SW version Stand-by microprocessor.

How to exit
Press "MENU" on the RC-transmitter.

5.2.4 Blinking LED Procedure

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.
Any RC command terminates the sequence. Error code LED blinking is in white colour.

Example: the contents of the error buffer is “013 007 000 000 000”.
After entering SDM, the following occurs:

- 1 long blink of 5 seconds to start the sequence
- 1 medium blink of 3 seconds and then 3 short blinks followed by a pause of 1.5 seconds
- 7 short blinks followed by a pause of 1.5 seconds
- 1 long blink of 1.5 seconds to finish the sequence.

The sequence starts again with 12 short blinks.

5.3 Error Codes

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.

Basically there are six kind of errors:

Code	Description	Detection method	Type
0	no error		
3	µP Control	I^2C-bus	Error log + blinking in SDM
4	General I^2C bus Error	I^2C-bus	Protection + spontaneous
7	Tuner	I^2C-bus	Error log + blinking in SDM
8	Demodulator	I^2C-bus	Error log + blinking in SDM
10	MT8295	I^2C-bus	Error log + blinking in SDM
13	HDMI switch	I^2C-bus	Error log + blinking in SDM

5.4 Fault Finding

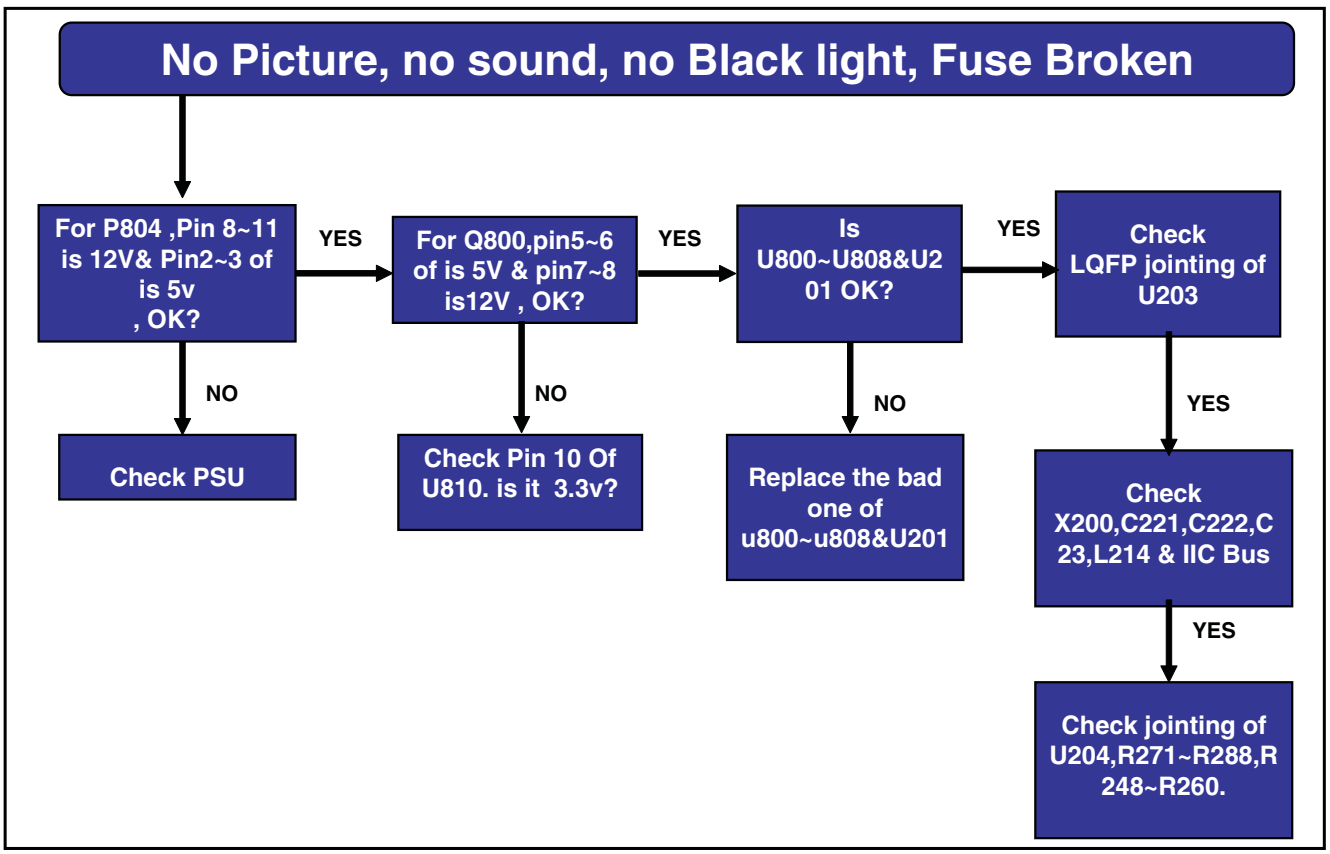

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Figure 5-10 No picture, no sound, no backlight, fuse broken (19", 20", and 22" sets)

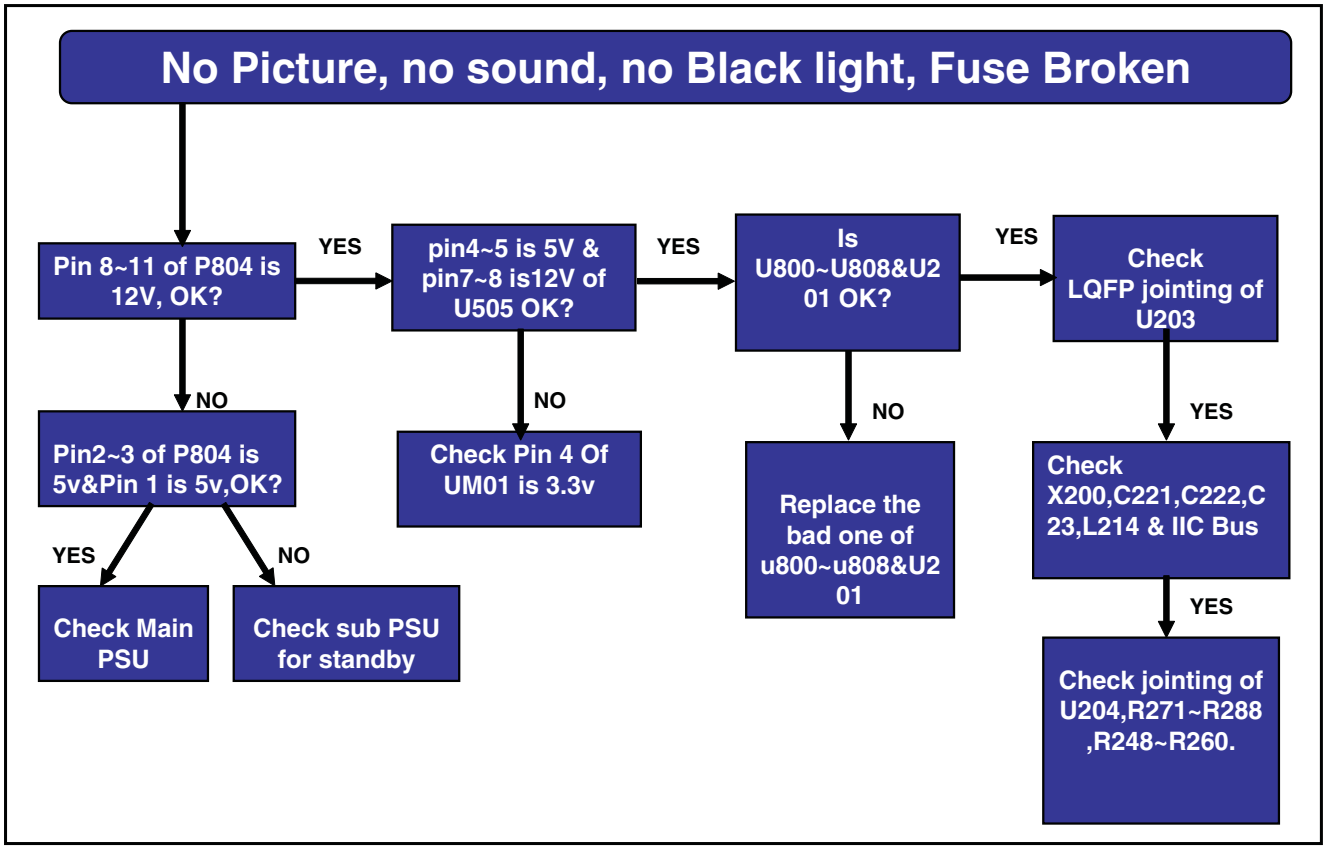

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Figure 5-11 No Picture, no sound, no backlight, fuse broken (26" sets)

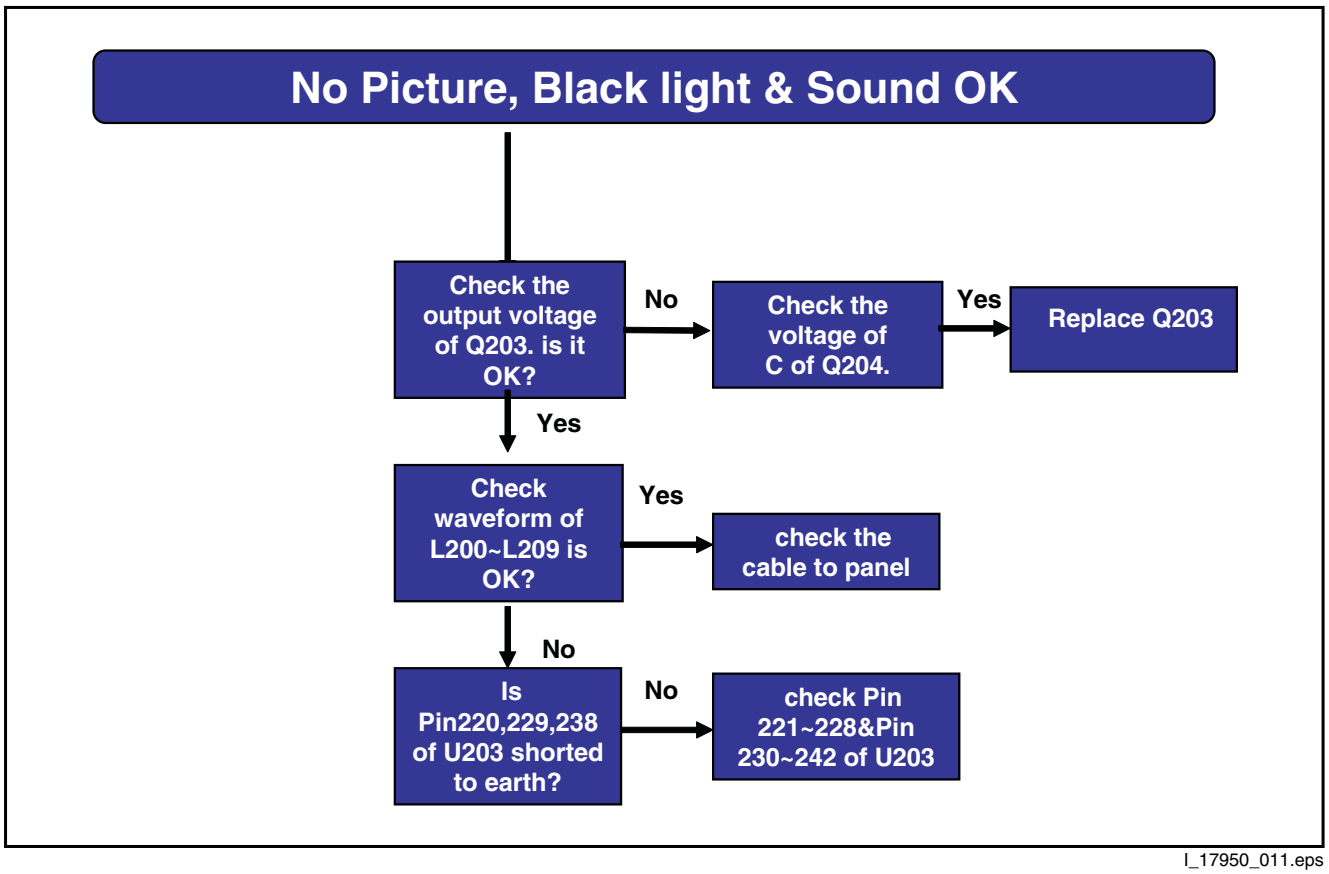

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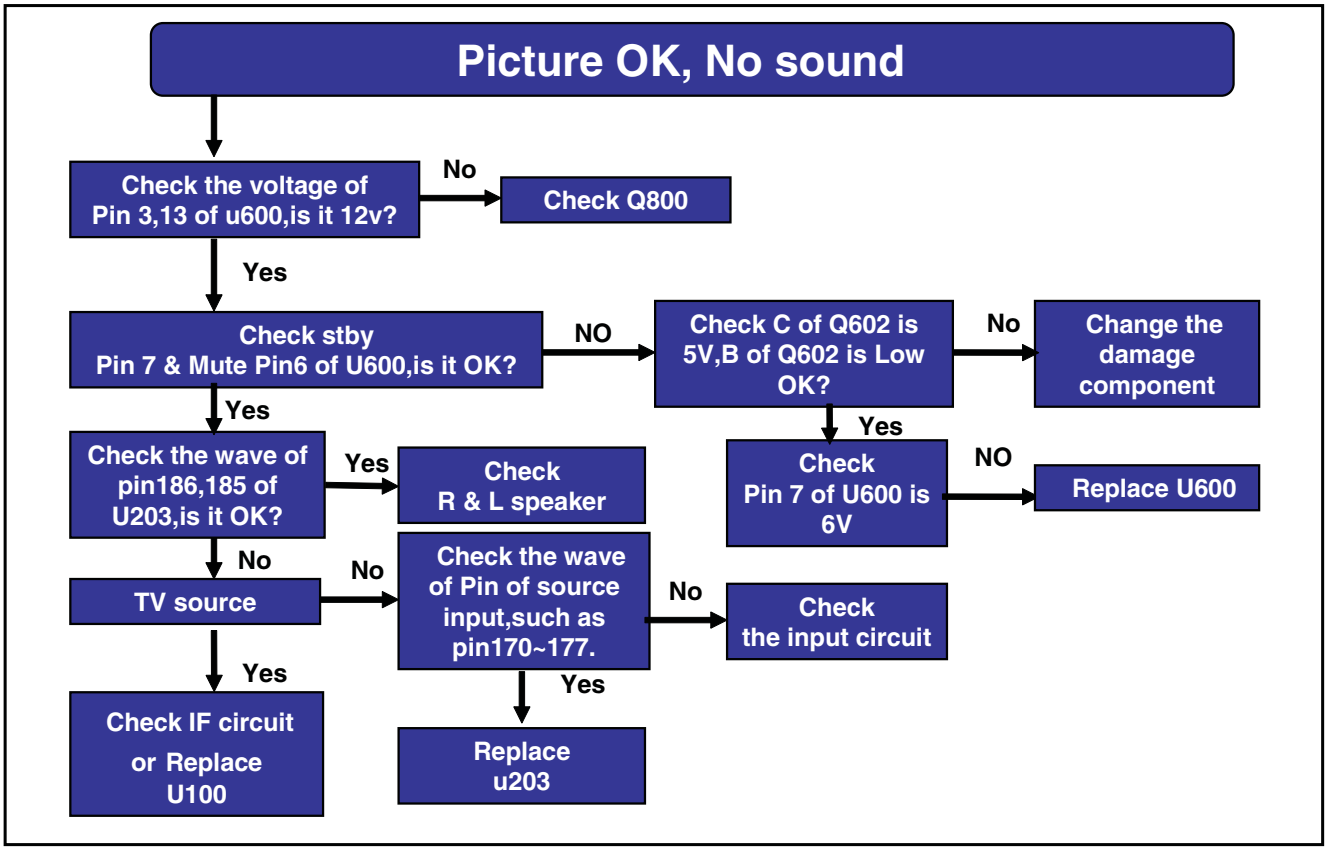
Figure 5-12 No Picture, Backlight & Sound OK



I_17950_012.eps
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Figure 5-13 Picture OK, No sound

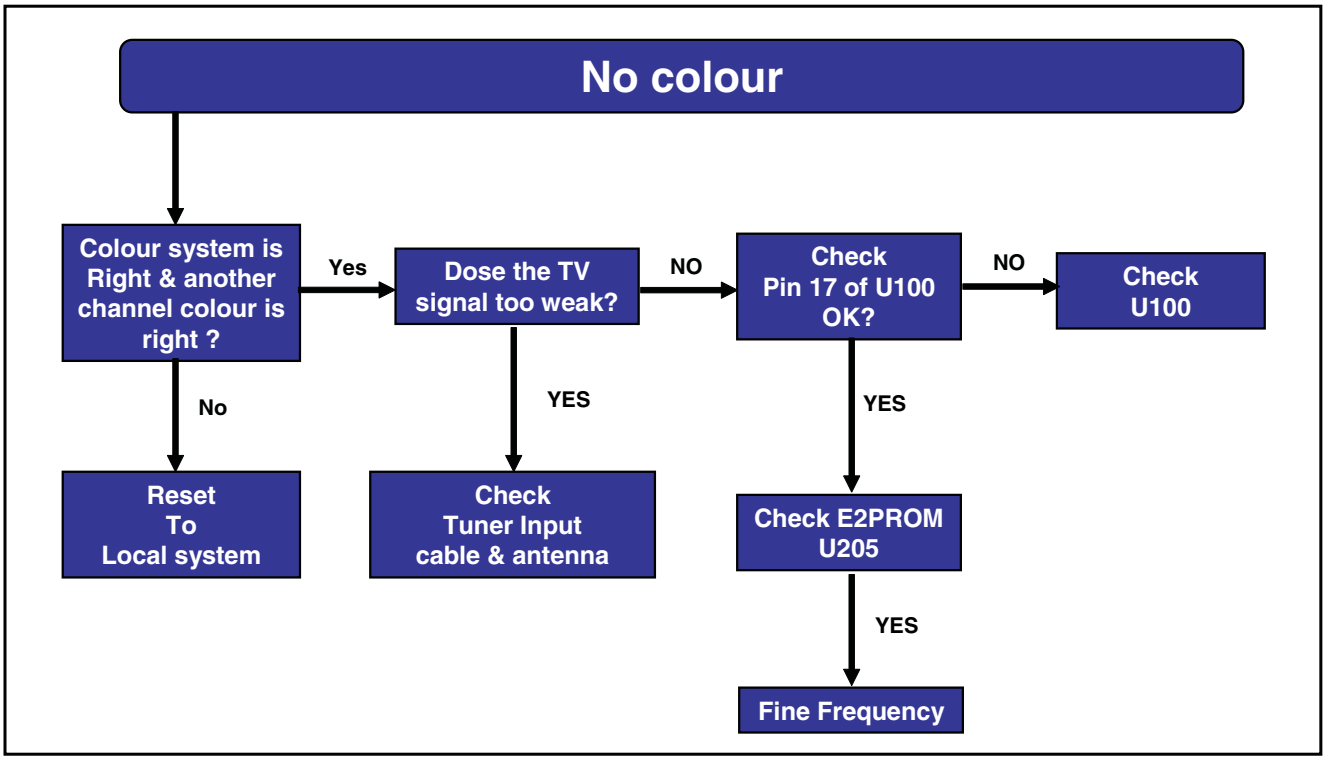

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Figure 5-14 No colour

5.5 Service Tools

5.5.1 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 upgrade 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.

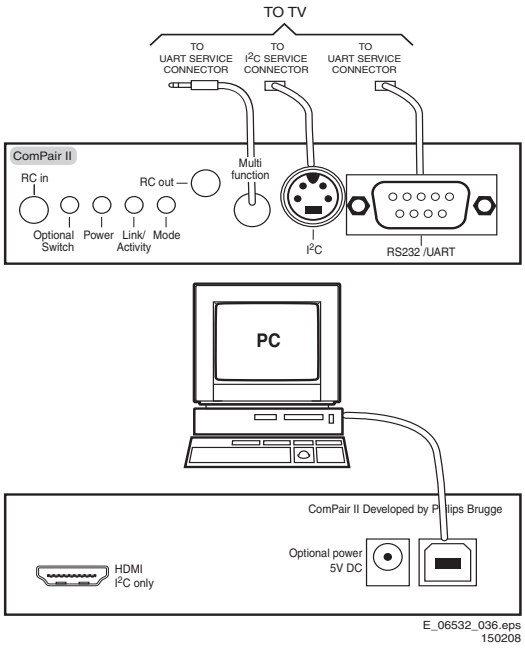


Figure 5-15 ComPair II interface connection

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: 312278591020.
- For latest software see Philips Service website.
- ComPair UART interface cable: 312278591070.

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

5.6 Software Upgrading

5.6.1 Introduction

Software upgrading can be done by ComPair but this feature is a back up solution in case the normal procedure via USB does not work. Please use the USB upgrade method first.
When the software is programmed via USB, you need the UPGRADE.PKG file on the USB stick. This file is available for customers on the Consumer Care website.
When the software is programmed via ComPair, you need a *.BIN file. This file is only available for service workshops on the Servicer Network Support website.

The software upgrade feature does only work with the ComPairII interface.

5.6.2 Main Software Upgrade

In “normal” conditions, so when there is no major problem with the TV, the main software and the default software upgrade application can be upgraded with the “upgrade.pkg”. This software can be downloaded (as ZIP file) from the Philips Service website (an account is required). If named otherwise, rename the unzipped file always to “upgrade.pkg“.

How to upgrade:
1. Copy the “upgrade.pkg” file to the root of your USB stick.
2. Insert the USB stick in the USB connector on the TV while the TV is in “on” mode. The set will restart, and the upgrading will start automatically (see flowchart below). As soon as the programming is finished, you will get the message that you can remove your USB stick and restart the TV-set.

User software upgrade flow chart

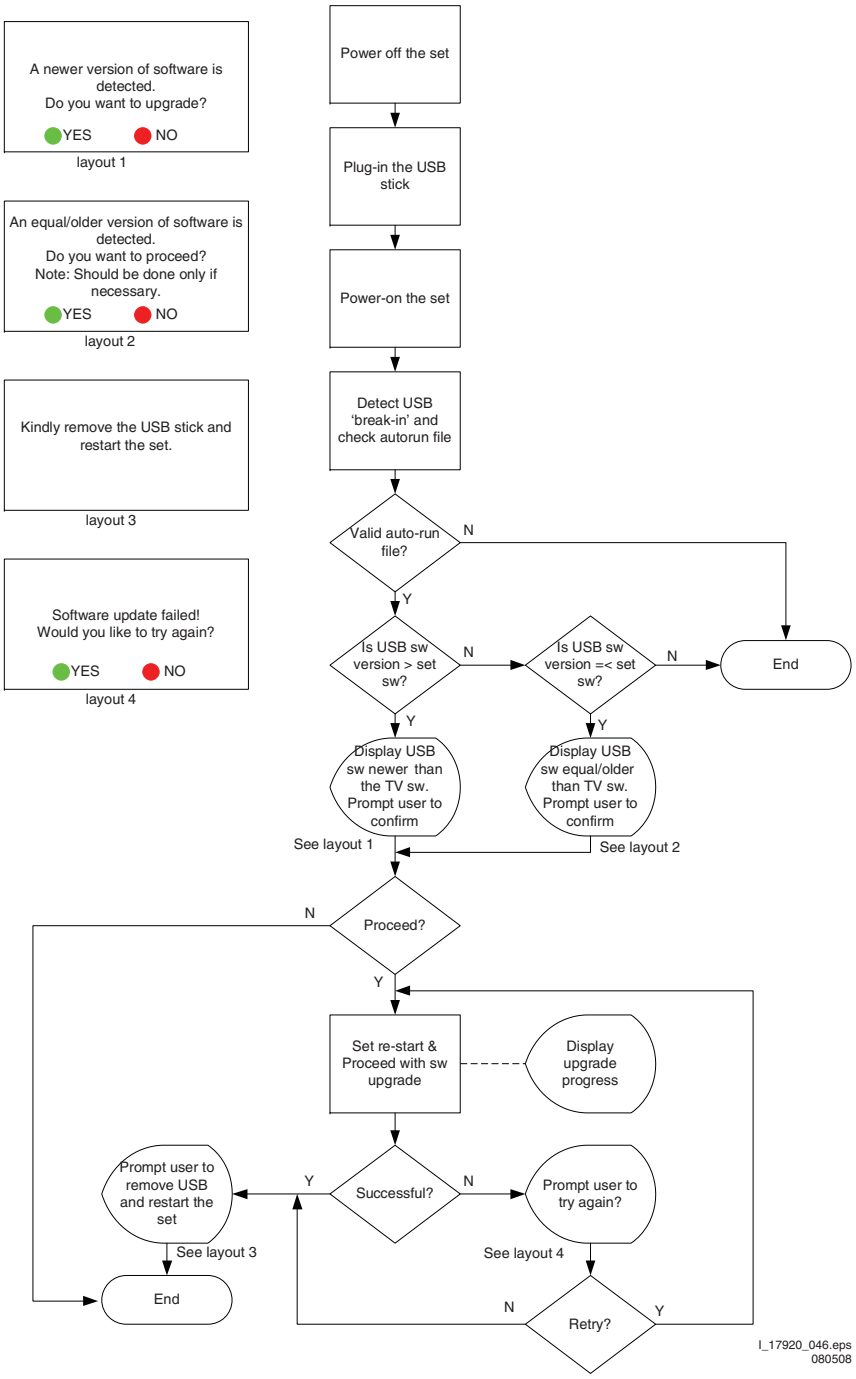
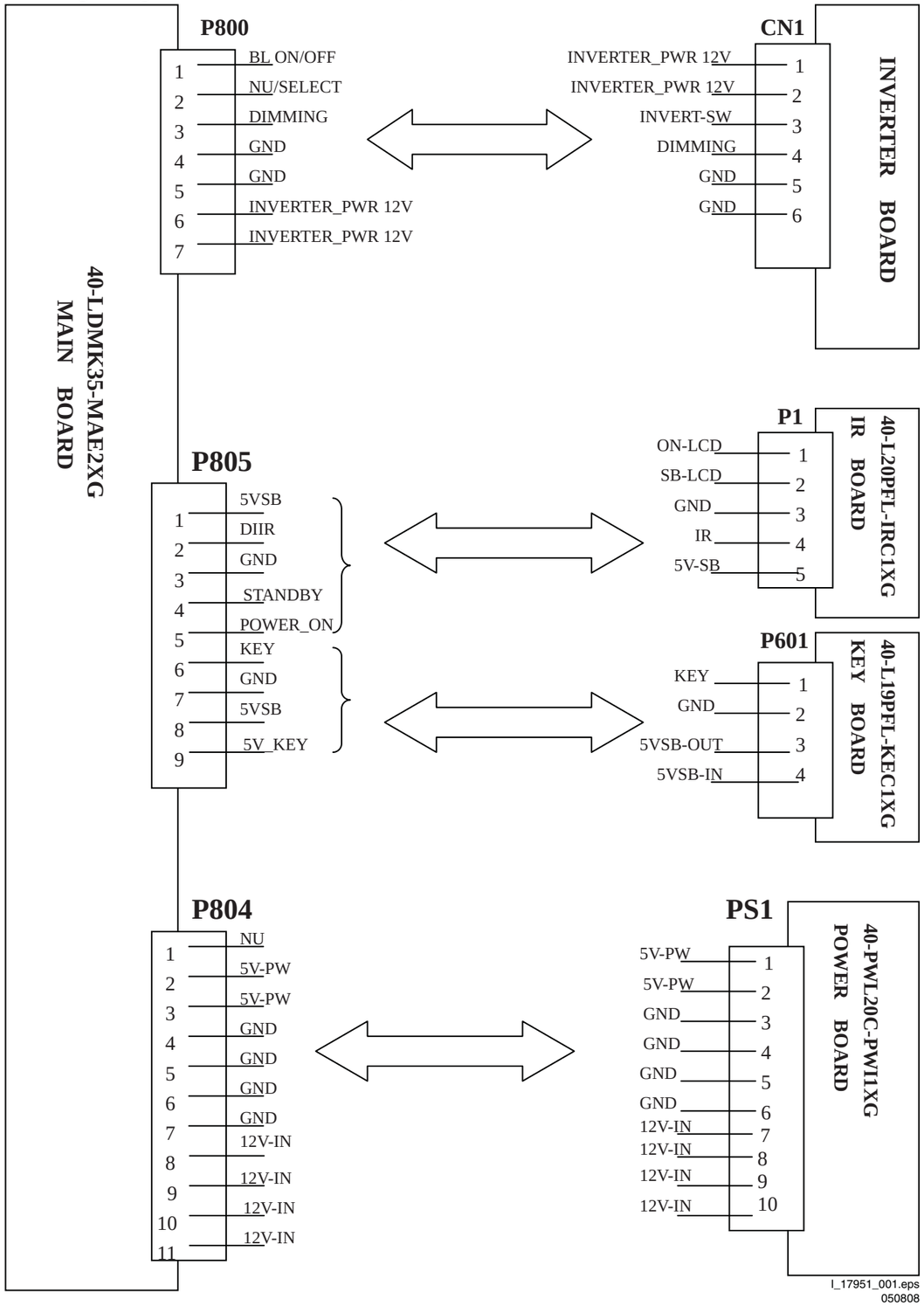


Figure 5-16 SW upgrade flowchart

6. Block Diagrams, Test Point Overview, and Waveforms

Wiring Diagram Of Connector 19", 20", and 22"



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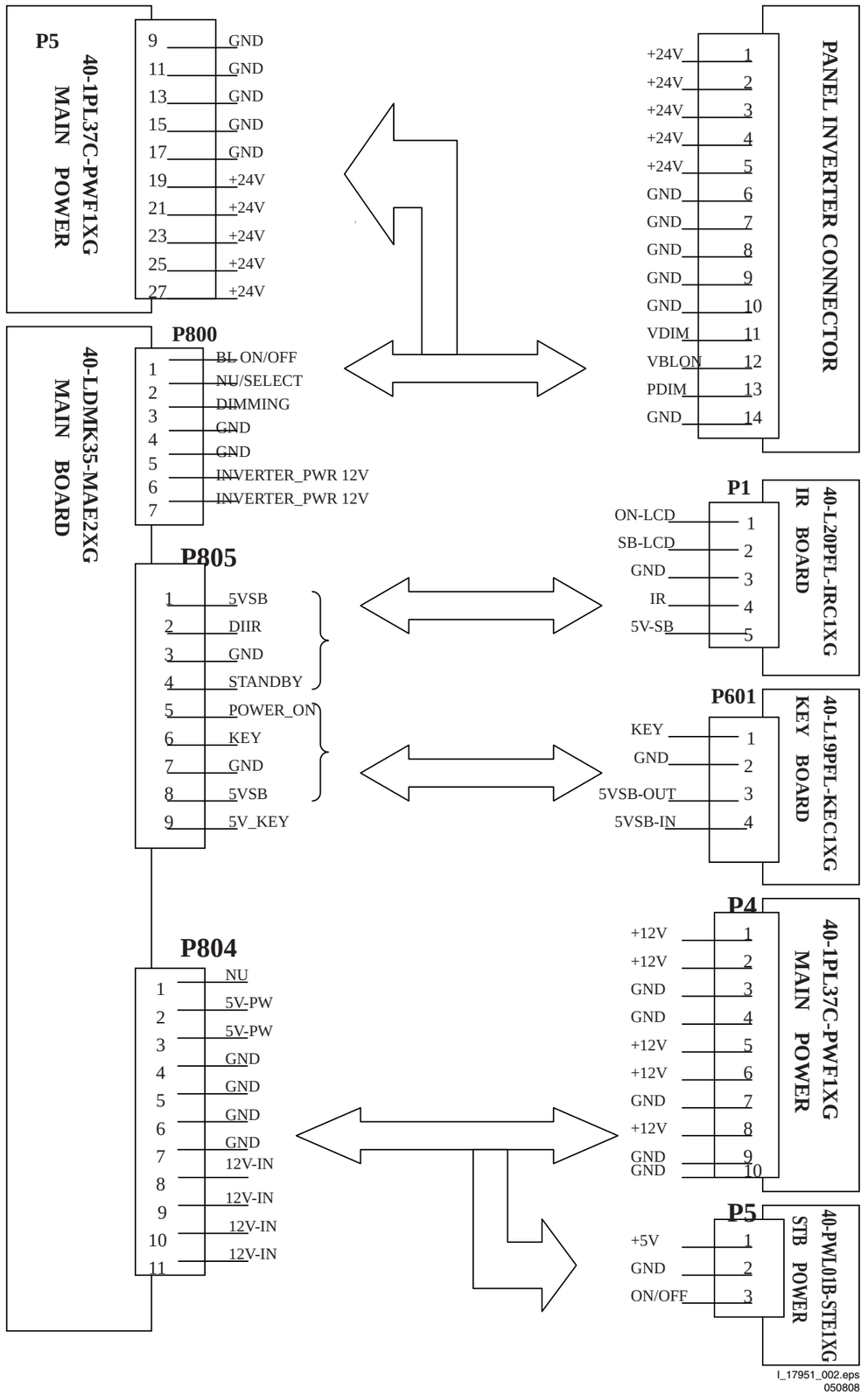
Wiring Diagram Of Connector 26"



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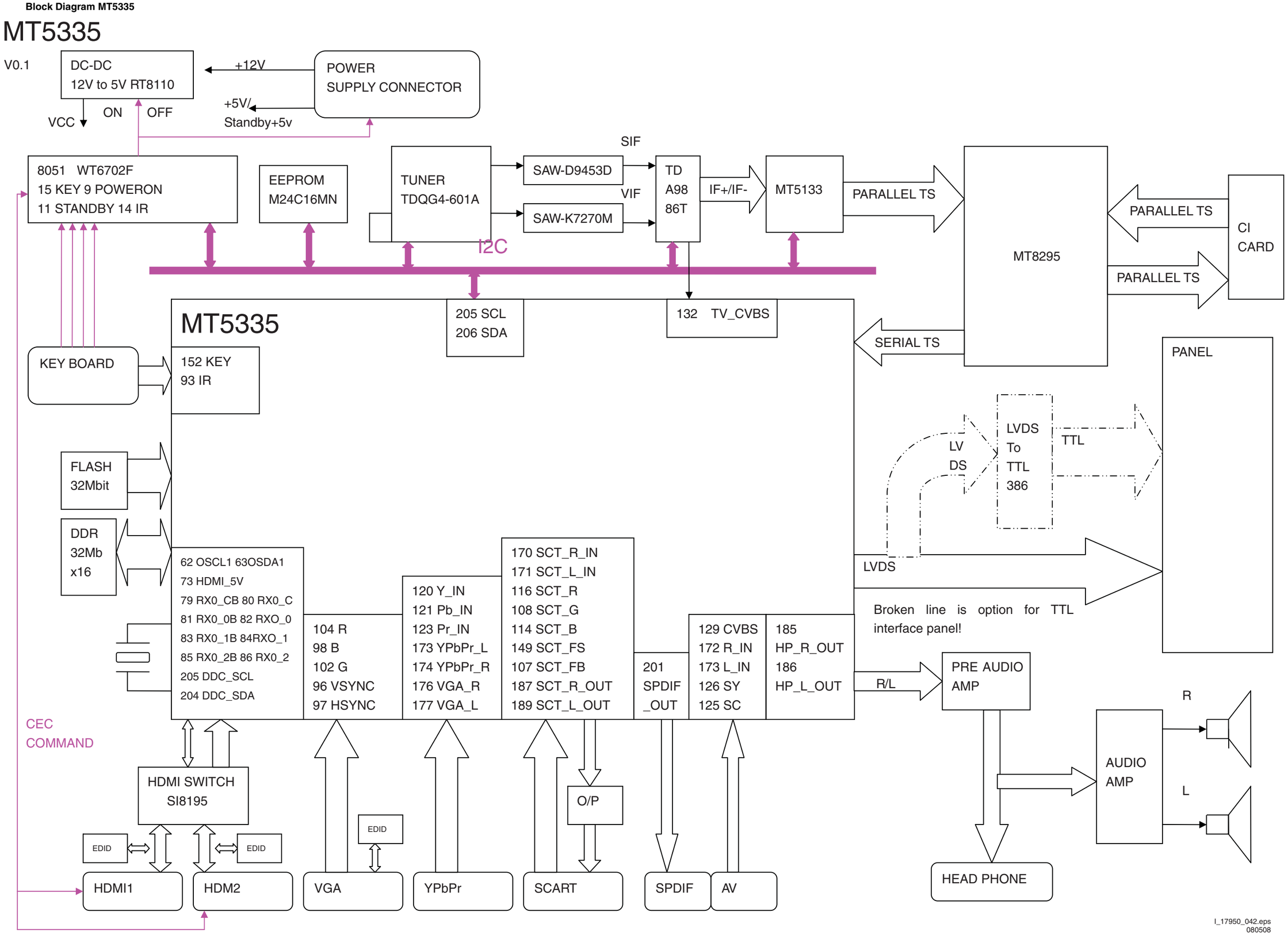
Block Diagram MT5335



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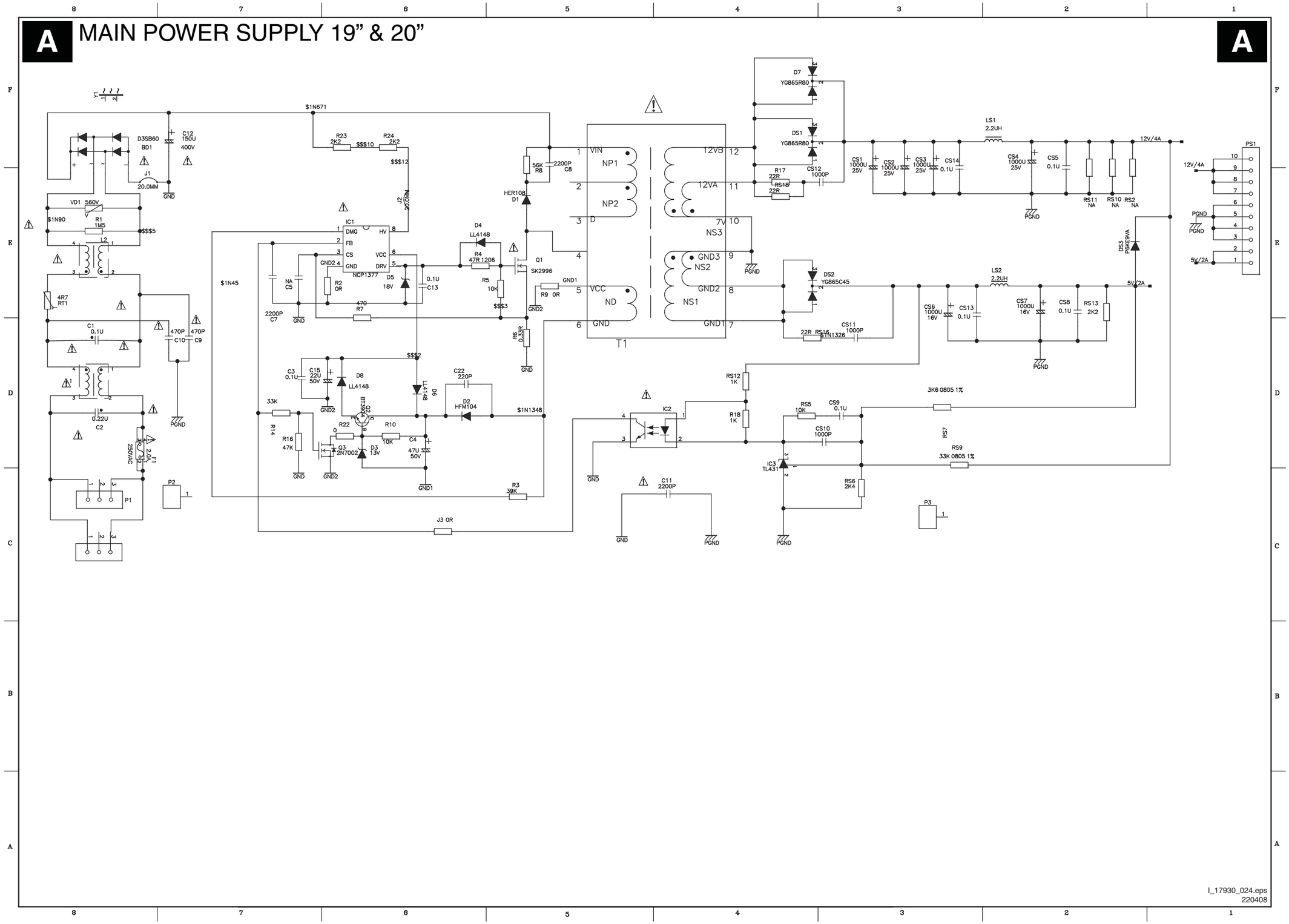
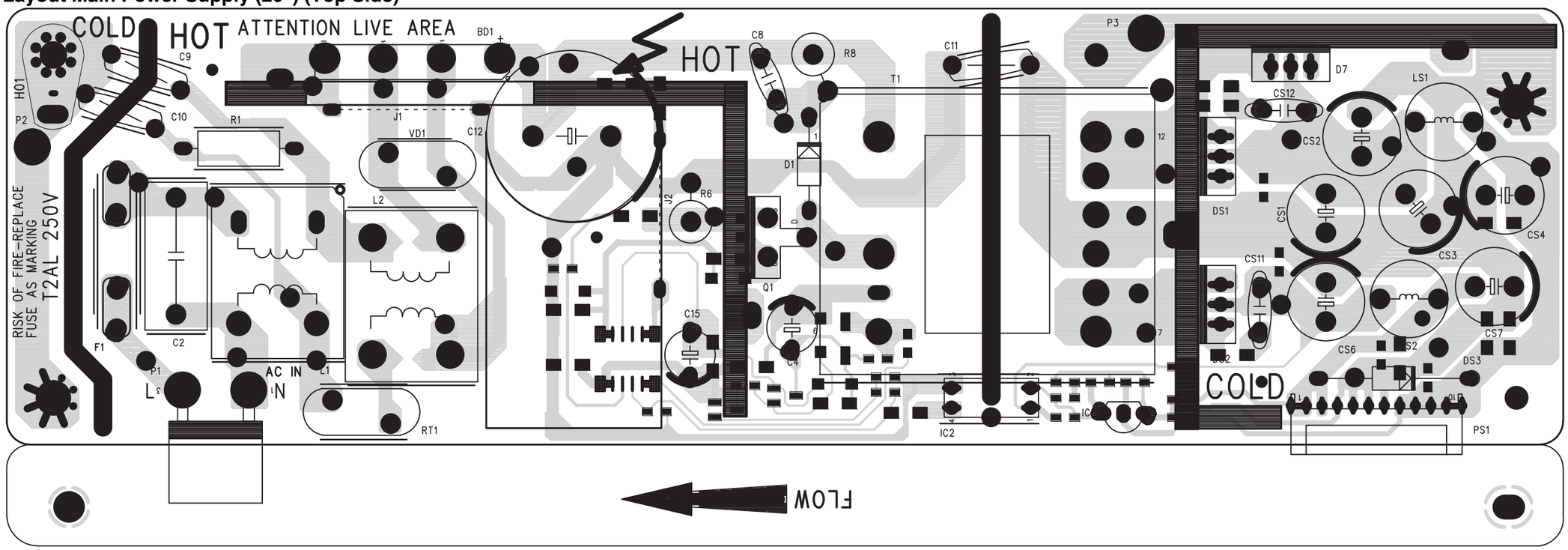
7. Circuit Diagrams and PWB Layouts

Main Power Supply (20")



Layout Main Power Supply (20") (Top Side)



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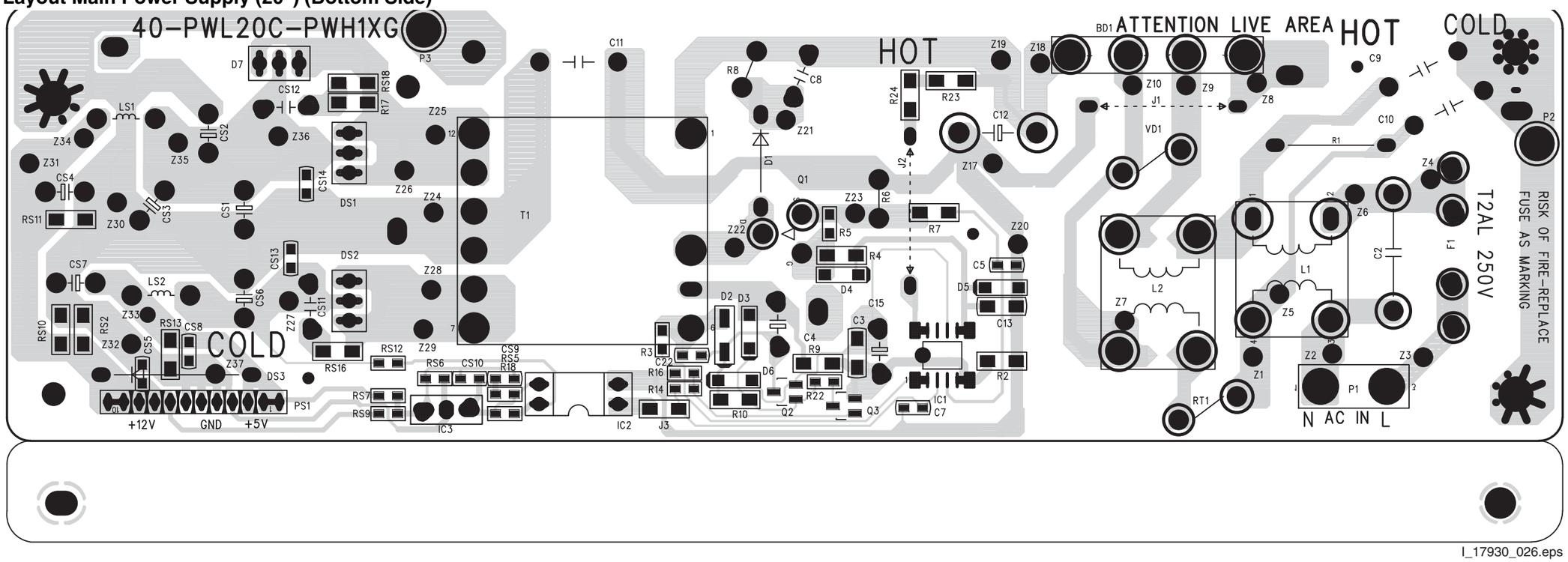
Layout Main Power Supply (20") (Bottom Side)



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220408

Main Power Supply (26")

A1 MAIN POWER SUPPLY 26”

A1

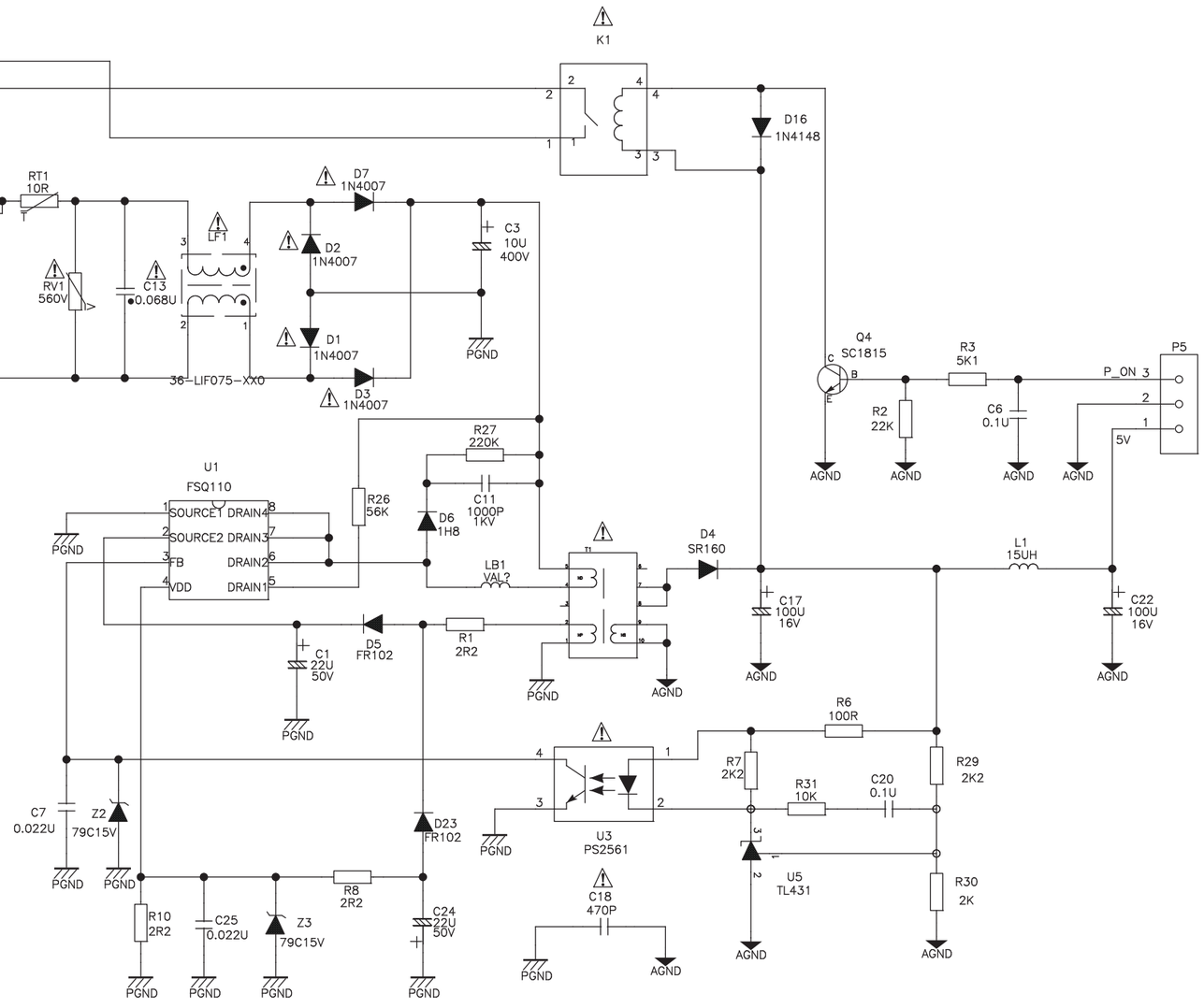
protection section

I_17930_027.eps
220408

Standby Power Supply (26")

A2 STANDBY POWER SUPPLY 26”

A2



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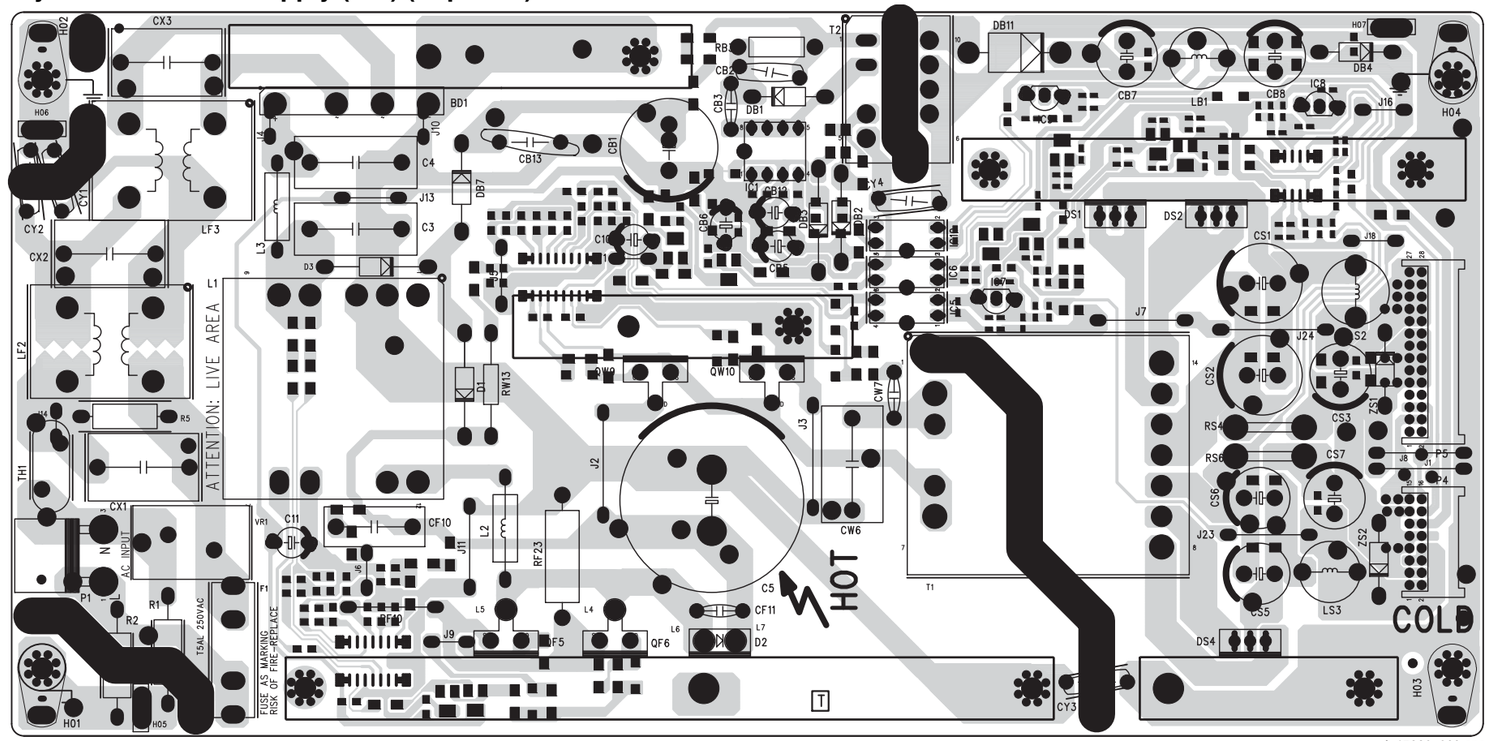
Layout Main Power Supply (26") (Top Side)



I_17930_029.eps
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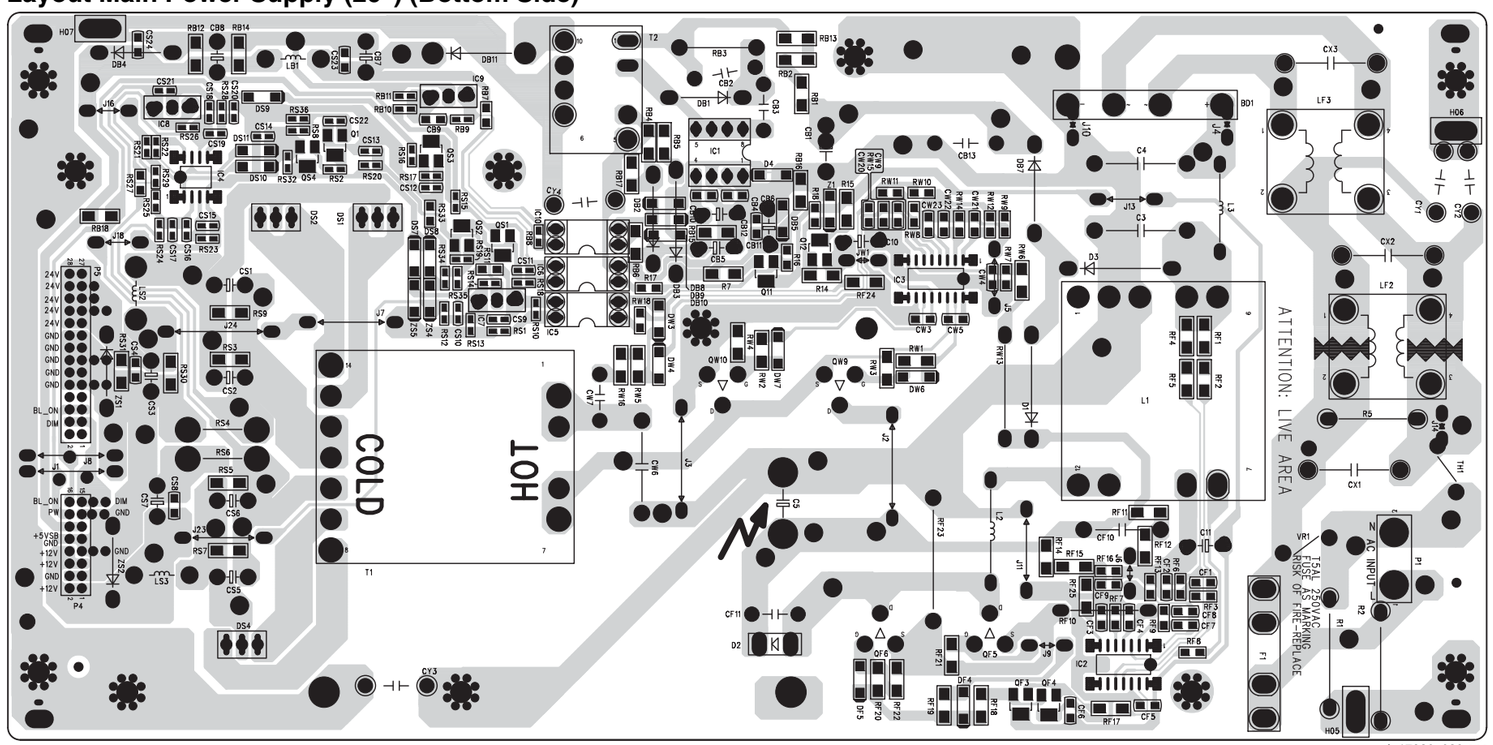
Layout Main Power Supply (26") (Bottom Side)



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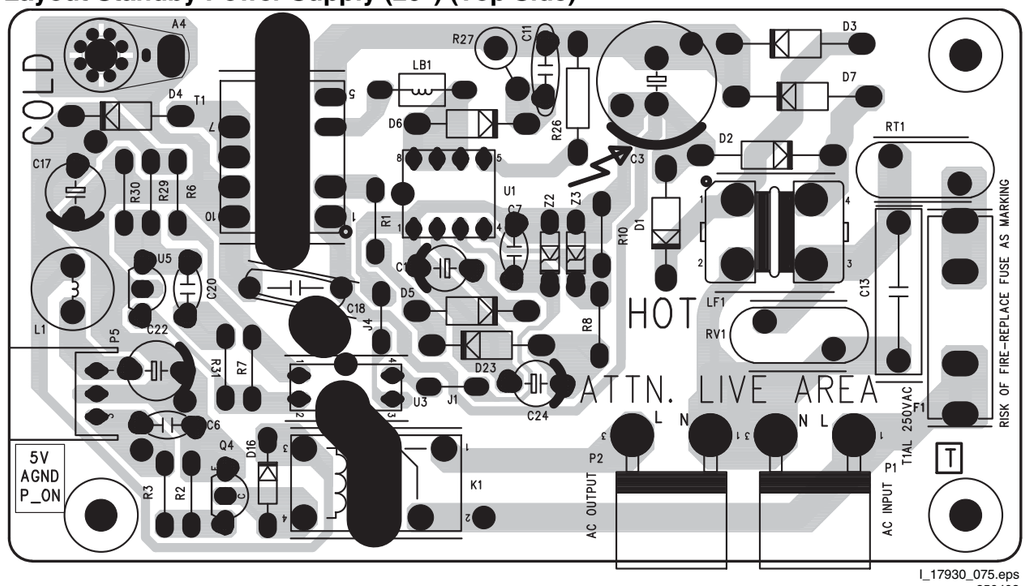
Layout Standby Power Supply (26") (Top Side)



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Personal Notes:

E_06532_012.eps
131004

SSB v1: Tuner

B01 TUNER

B01

Z100

ANTPWR B1 NC/GND1 NC/GND2 NC/RFAGC NC TU GND1 NC1 SCL SDA AS ANALOG_IF IFAGC XTALOUT IFOUT2 IFOUT1

R124 100R FAT_IN-

R125 100R FAT_IN+

R148 0R RF-AGC

R132 NC

R135 4K7 IF_AGC

R127 100R TUNER_SDA0_5V

R126 100R TUNER_SCL0_5V

C125 22P C124 22P C100 1U

L103 120R TUNER_5V

C122 0.1U 6V3 C102 100U

U206 NC/TPS2049

R99 NC L104 NC/120

R97 NC/4K7

R96 NC/100R 5V-TUNER-ON/OF

R95 NC/100R 5V-TUNER-INPUT

C126 NC/0.1U 6V3 C103 NC/100U

TUNER_5V

MT5133-GPIO_AD

C137 0.1U U101 4LVC1G66GV C138 0.1U

R145 12K ATV-IF-AGC D110 LL4148

C139 0.1U 6V3 C2 47U

RF-AGC R149 NC\0R

L108 30R TUNER_5V AV_5V

5V-OUT

R139 6K8 R140 6K8 R141 22K

D103 BA982

Q102 BC847C R100 680K C109 0.01U

R123 0R

D101 BA982

C123 0.01U D102 BA982

R118 NC L100 1UH R113 6K8

X102 IN IN/GND GND OUT1 OUT2

R121 22K R146 12K C119 0.01U

ATV-IF-AGC

R101 330R C111 1500P C110 0.22U C114 0.47U 4M X100 C112 20P

C115 0.1U R114 22K R147 100K C3 0.01U

L102 120R TUNER_5V

C113 0.01U 6V3 C101 100U

BC847C Q100

CVBS_OUT

R129 75R CVBS0

R130 75R C121 47P

R131 0R GND_TUNER

R128 0R C131 0.01U SIFP

L107 120R SIF

C120 1P5 SIFN

C132 0.01U

R116 100R TUNER_SCL0_5V

R115 100R TUNER_SDA0_5V

R93 NC\100R TUNER_SCL0 OSCL0

TUNER_SDA0 OSDA0 R94 NC\100R

CVBS-OUT

U100 TDA9886T

VIF1 VIF2 OP1 FMPLL DEEM AFD DGND AUD TOP SDA SCL SIOMAD

SIF2 SIF1 OP2 AFC VP VPLL AGND CVBS VAGC REF TAGC NC

R106 NC\6K8 R102 NC\180R C127 0.1U Q101 NC\BC847C R107 0R

R105 NC R103 NC\1K5 R104 NC\47R R138 220R

C116 0.01U C117 0.47U 1000P C128

R119 5K6 0.01U C108 C107 390P

R120 NC R112 33R L106 0

C118 1000P D100 BA592

R109 2K2 R110 2K2 C104 0.01U

X101 IN IN/GND GND OUT1 OUT2

R108 5K6

C105 1000P R111 2K2 R117 NC L101 0.56UH

Q103 C124ET R133 33R C106 1000P

AV_5V R828 10K Q105 2N7002 TUNER_SDA0 TUNER_SDA0_5V DV33

AV_5V R829 10K Q104 2N7002 TUNER_SCL0 TUNER_SCL0_5V DV33

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SSB v1: MCU Standby

B02 MCU STANDBY

B02

5V_KEY
NC
R817
R833
10K
R142
STANDBY
5VSB
OIRI
600R
POWER_ON
L821 600R
L822 600R
+3V3SB
35KEY_5V
R819 3K3
KEY_5335
R842 NC
KEY
L811 600R
L823 600R
2N7002/NC Q817
P805

+3V3SB_UP
D801 LL4148
R806 27K
CEC
R805 100R
CEC_IRQ
C819 100P
OSCO
R816 33R
X800 32K7
OSCI
C821 20P
C822 20P

DV33
R22 0R
R10 0R
Q809
2N7002
OSCL0
Q810
2N7002
OSDA0

L820 600R
C871 1U
C823 0.1U
10K
R810

C876 NC\1000P
C875 1000P

+3V3SB_UP
R826 10K
R827 10K
OSCL0_SB
OSDA0_SB

+3V3SB_UP
ISP PORT
C820 0.1U
P802

+3V3SB_UP
R815 4K7
R809 10K
R807 10K

U810
OSCO 1
OSCI 2
VSS 3
NRST 4
PWMI 5
RXD/IRQ3 6
TXD/IRQ2 7
HIN 8
VDD 16
AD0 15
AD3/IR 14
SCL1 13
SDA1 12
SCL2 11
SDA2 10
VIN 9
WT6702F

R822 33R KEY
R830 33R OIRI_MCU
R824 33R
R820 33R
R823 33R STANDBY
R825 33R 3V3SB_EN
R814 33R VSYNC

HDMI_INT R813 33R
SHORT_PROTECT R834 33R
SW_UPDATE_CTL1 R835 0R
HSYNC R812 33R

C802 1U
OPTION for CEC Stand by Function

+3V3SB
Q4 BT3904
R143 10K
OIRI
OIRI_MCU
R144 4K7
GND

+3V3SB_UP
+3V3SB
L809 120R
RT9166 U811
OUT
GND
IN
5VSB
C824 1U
C825 0.1U
C809 100U 6V3
C826 0.1U
C872 100U 6V3

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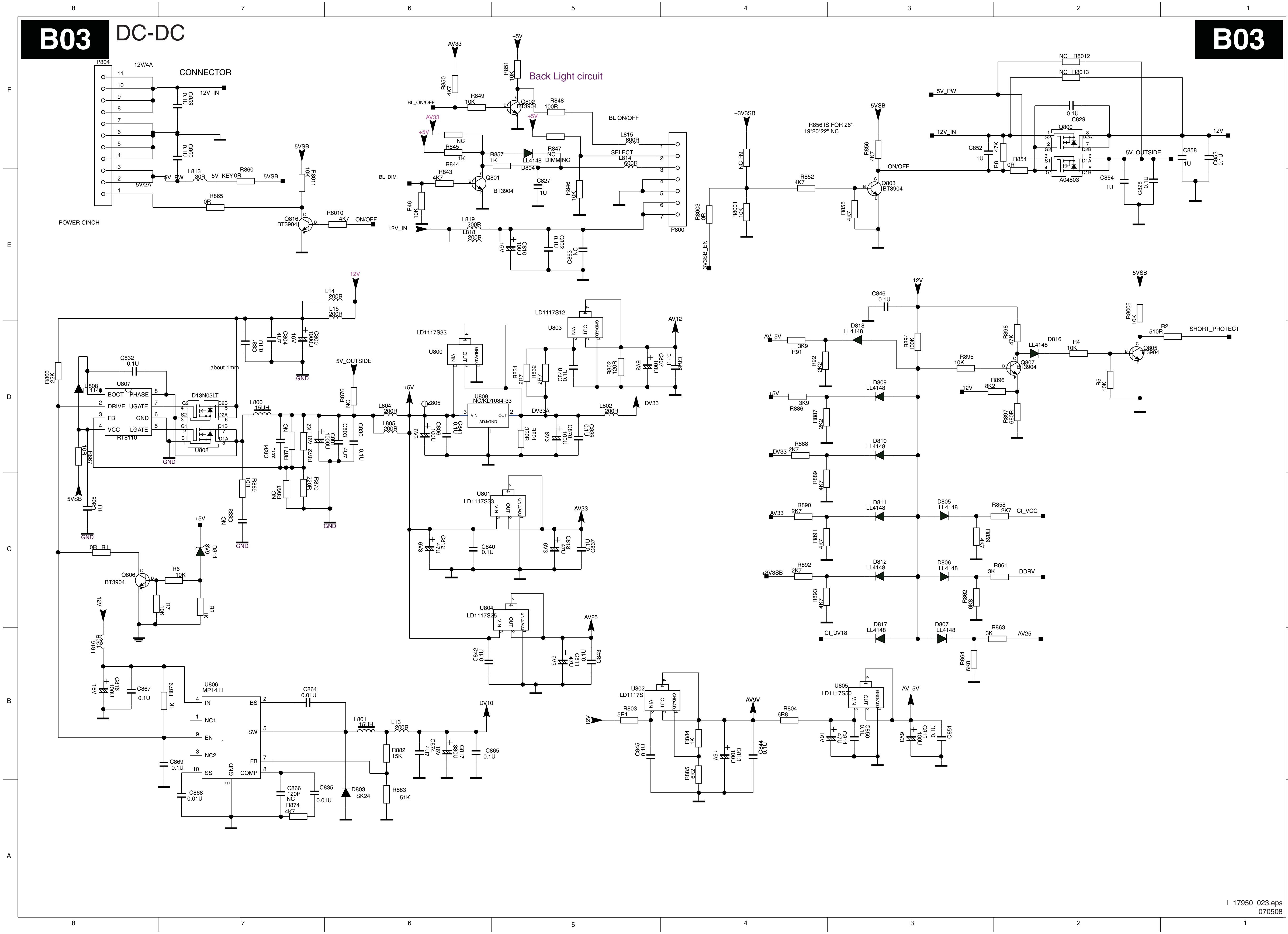
SSB v1: DC / DC



B03
DC-DC
B03
CONNECTOR
POWER CINCH
Back Light circuit
BL ON/OFF
SELECT
DIMMING
12V_IN
5V_PW
5V_OUTSIDE
ON/OFF
SHORT_PROTECT
R856 IS FOR 26"
19"20"22" NC
RT8110
D13N03LT
about 1mm
LD1117S33
LD1117S12
NC/KD1084-33
LD1117S25
LD1117S
LD1117S50
MP1411
CI_VCC
DDRV
AV25
CI_DV18
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SSB v1: Digital Channel Decoder

B04 DIGITAL CHANNEL DECODER

B04

FAT_IN-
FAT_IN+
L506 NC
C527 NC
C513 1000P
C514 1000P
C568 NC/20P
C569 NC/20P
C511 0.22U
C510 0.22U
C512 0.22U
X500 27M
R500 1M
C506 27P
C507 27P
XTALO
XTALI
AVDD33
DVDD12
DVDD33
R536 33R
TS0INDATA7
TS0INDATA6
TS0INDATA5
R535 33R
TS0INDATA4
TS0INDATA3
TS0INDATA2
TS0INDATA1
TS0INDATA0
TS0INVALID
TS0INSYNC
TS0INCLK
33R R542
33R R543
33R R544
33R R545
L510 120R
C504 120P/NC
C505 120P/NC
U502
MT5133
AVSS33_3
AVSS33_2
XTALI
XTALO
AVDD33_2
ALC_IN
VDD1.2
DGND1.2
TSDATA7
TSDATA6
TSDATA5
VDD3.3
ADVDD33_1
REFTOP
VCMEXT
REFBOT
IN+
IN-
AVDD33_1
AVSS33_1
VDD1.2_3
DGND1.2_1
TUNER_SCL
TUNER_SDA
RF_AGC
IF_AGC
VDD3.3_3
GPIO0
/RESET
XTAL_SEL1
XTAL_SEL0
DGND3.3_1
VDD3.3_2
VDD1.2_2
HOST_SDA
HOST_SCL
TSDATA4
TSDATA3
TSDATA2
TSDATA1
TSDATA0
TSERR
TSVAL
TSSYNC
TSCLK
VDD3.3_1
DGND3.3
VDD1.2_1
DV33
R134 10K
R136 10K
R508 0R
R507 0R
TUNER_SCL0
TUNER_SDA0
R151 NC/10K
R150 NC/1K
MT5133-GPIO-AD
MT5131_IF_AGC
1K R506
IF_AGC
CLOSE TO MT5133
C509 0.047U
DVDD33
C508 0.1U
R503 NC
R505 100R
MT5133_RESET
R504 10K
R5010R
OSDA0
OSCL0
R502 0R
SIF_SDA
SIF_SCL

Digital 1.8V Bypass Caps
AV12
DVDD12
L500 600R
C500 1U
C517 0.1U
C519 0.1U
C516 0.1U
C518 0.1U
C515 0.1U

Digital 3.3V Bypass Caps
DV33
DVDD33
L501 600R
C501 1U
C521 0.1U
C523 0.1U
C520 0.1U
C522 0.1U

Analog 3.3V Bypass Caps
AV33
AVDD33
L502 600R
C502 1U
C525 0.1U
C526 0.1U

AV33
ADVDD33_1
L503 600R
C524 0.1U
C503 1U

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SSB v1: DVBT/ CI Decoder

B05 DVBT-CI-DECODER

B05

CLOSE TO CI CONNECTOR

CI_VCC CI_VCC

R517 NC\10K CI_INPACK# R519 NC\10K CI_IOIS16#

R516 10K R518 10K

CI_VCC CI_VCC CI_VCC

R521 10K CI_IREQ# R525 NC CI_VS2# R522 10K CI_WAIT#

+5V +5V +5V

R520 10K CI_CD1# R523 10K CI_VS1# R524 10K CI_CD2#

C559 0.1U C560 0.1U

CI_DV33 CI_AV33

L504 600R

C551 1U C543 0.1U C542 0.1U

CI_DV33

CLOSE TO MT8295

C533 0.1U C531 0.1U C532 0.1U C539 0.1U C538 0.1U C535 0.1U C534 0.1U C537 0.1U C536 0.1U

CI_DV18

C554 1U C540 0.1U C541 0.1U

CI_DV18 CI_AV18

L505 600R

C552 1U C544 0.1U C545 0.1U

DV33 L508 600R CI_DV33 C563 4U7 LD1117S18 U500 VIN VOUT GND/ADJ CI_DV18 C557 4U7

3.3V: 0.2W (60mA)
1.8V: 0.2W
(100mA)

CLOSE TO MT8295

C530 10P TS_CKO

CLOSE TO MT8295

C528 27P C529 27P R509 1M X501 27M

CI_DV33 R511 4K7 CI_GPIO1 R510 4K7 CI_GPIO0 DV33 R548 NC R512 10K 0R R513 MTK_IC_RESET R547 4K7

CLOSE TO MT8295

TS_SYNCO TS_DATAO TS_VALIDO R538 33R R539 33R L511 120R R541 33R

OPWM1 OPWM2 CI_DV33 4K7 R546 4K7 R514

GND CI_RESET_N Z501 CI_GPIO14 Z502

CI_GPIO0 CI_GPIO1 HDMED_WP HPDIN CI_DV33 SOINCLK SOINSYNC SOINVALID SOINDATA0 GND SOINDATA1 SOINDATA2 SOINDATA3 SOINDATA4 CI_DV18 SOINDATA5 SOINDATA6 SOINDATA7 HDMI_SEL PBPIP_SW_IN PWRDN_EN GND CI_CD1# CI_D3 CI_OUTDATA3 CI_D4 CI_OUTDATA4 CI_D5 CI_OUTDATA5 CI_D6 CI_OUTDATA6 CI_D7

U501

CI_WEB CI_DATA2 CI_CEB GPIO9 GPIO8 GPIO7 GND18_1 WP CD2# D2 D10 D1 D9 D0 VCC18_1 D8 A0 BVD1 A1 BVD2 GND33_2 A2 REG# A3 INPACK# A4 WAIT# A5 VCC33_3 RESET A6 VS2#

CI_PDD2 CI_PDD6 CI_PDD7 CI_VCC_EN CI_VPP5_EN CI_VPP33_EN GND CI_IOIS16# CI_CD2# CI_D2 CI_OUTDATA2 CI_D1 CI_OUTDATA1 CI_D0 CI_DV18 CI_OUTDATA0 CI_A0 CI_OUTSYNC CI_A1 CI_OUTVALID CI_A2 CI_REG# CI_A3 CI_INPACK# CI_A4 CI_WAIT# CI_A5 CI_DV33 CI_RESET CI_A6 CI_OUTCLK

MT8295

CI_DV33 CI_OUTDATA7 CI_OUTDATA4 CI_CE2# CI_A10 CI_VS1# CI_OE## CI_IORD# CI_A11 CI_IOWR## GND CI_A9 CI_INSYNC CI_A8 CI_INDATA0 CI_A13 CI_INDATA1 CI_A14 CI_INDATA2 CI_WE## CI_INVALID CI_INDATA3 CI_INDATA4 CI_INDATA5 GND CI_INDATA6 CI_INDATA7 CI_A7

R515 100R CI_INCLK

CLOSE TO CI CONNECTOR

+5V L509 30R CI_VCC L507 30R CI_VPP

C546 0.1U R528 10K/NC R527 47K/NC Q501 NC\A03401A NC\0.1U C558 C550 100U

CI_VCC_EN Q502 NC\C124ET C547 0.1U/NC R526 100K/NC

P500

CI_D3 CI_D4 CI_D5 CI_D6 CI_D7 CI_CE1# CI_A10 CI_OE# CI_A11 CI_A9 CI_A8 CI_A13 CI_A14 CI_WE# CI_IREQ#

CI_CD1# CI_OUTDATA3 CI_OUTDATA4 CI_OUTDATA5 CI_OUTDATA6 CI_OUTDATA7 CI_CE2# CI_VS1# CI_IORD# CI_IOWR# CI_INSYNC CI_INDATA0 CI_INDATA1 CI_INDATA2 CI_INDATA3 CI_INDATA4 CI_INDATA5 CI_INDATA6 CI_INDATA7 CI_VS2# CI_WAIT# CI_RESET CI_REG# CI_OUTVALID CI_OUTSYNC CI_OUTDATA0 CI_OUTDATA1 CI_OUTDATA2 CI_CD2#

CI_VCC CI_VPP CI_INVALID CI_INCLK CI_A12 CI_A7 CI_A6 CI_A5 CI_A4 CI_A3 CI_A2 CI_A1 CI_A0 CI_D0 CI_D1 CI_D2 CI_IOIS16#

C561 10P NC\0R R531

NC\0R R532 CI_INPACK#

CLOSE TO MT8295

CI_CE1## R549 100R CI_CE1# C562 10P

CI_OE## R550 100R CI_OE# C563 10P

CI_WE## R551 100R CI_WE# C564 10P

CI_IORD## R552 100R CI_IORD# C565 10P

CI_IOWR## R553 100R CI_IOWR# C566 10P

CI_VS2# R533 100R CI_OUTCLK C567 10P

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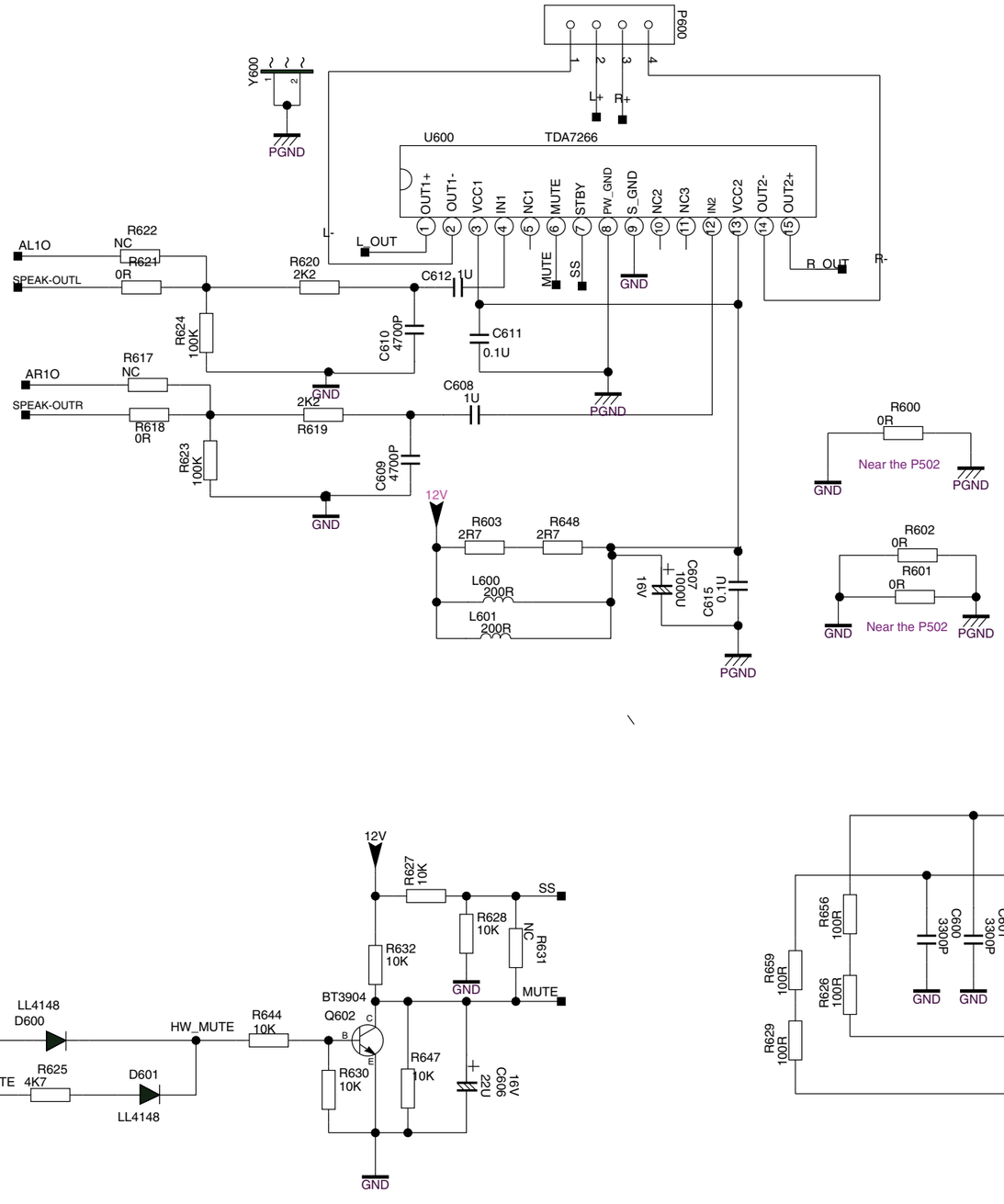
SSB v1: Audio Amplifier

B06 AUDIO AMPLIFIER

B06



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SSB v1: MT5335 Video Processor

B07 MT5335 VIDEO PROCESSOR

B07

U203

OSDA0 204
OSCL0 205
OSDA1 63
OSCL1 62
BL_DIM 191
OPWM0 202
OPWM1 203
OPWM2 146
VCXO 143
XTALO 144
XTALI 147
AVCC_SRV 145
AVDD33_XTAL 152
ADIN4 151
ADIN3 150
ADIN2 149
ADIN1 148
ADIN0
AVDD33_REG 88
C_XREG 87
ORESET# 71
OPWRSB 72

GPIO_3 207 CI_PDD3
GPIO_4 208 CI_PDD4
GPIO_5 209 CI_PDD5
GPIO_6 59 CI_PDD6
GPIO_7 60 CI_PDD7
GPIO_8 210 CI_POWE#
GPIO_9 211 CI_OEB
GPIO_10 212 CI_ALE
GPIO_11 214 CI_CLE
GPIO_12 215 MT5133_RESE
GPIO_13 216 POWER_ON

OPCTRL0 92 LVDSVDD_EN
OPCTRL1 91 CI_INT
OPCTRL2 76 AMP_MUTE
OPCTRL3 75 BL_ON/OFF
OPCTRL4 90 EDID_PRT
OPCTRL5 89

OPWM1
MTK_IC_RESET
OPWM2
OXTALO
OXTALI
AVCC_SRV
AVDD33_XTAL
KEY
R200 180K
KEY_5335
PANEL_SLT
SCART_FS_IN
PWRDET
AVDD33_REG
C_XREG
ORESET#
SW_UPDATE_CTL
R44 10K
MT5335PKU

DV33
R202 10K
R203 10K
HDMI_INT
Q200 BT3904
R201 4K7
R204 10K
R205 10K
CEC
Q202 BT3904

DV33
R206 1K
PWRDET
D200 LL4148
C201 220U 16V
R208 220R
R209 1K
ORESET#
R210 47K
Q202 BT3904
Adjust the power on timing

R211 NC
X200 60M
TXC
OXTALO
OXTALI
L214 0.82UH
C221 10P
C222 10P
C223 1000P

C_XREG
R207 10R
C203 47U

DV33
Z959
R214 10K
R215 4K7
R216 4K7
Z958
R217 33R
OSCL0
OSDA0
Q206 C124ET
Z956
Z957
C247 0.1U
U205
VCC 8
WC 7
SCL 6
SDA 5
E0/NC 1
E1/NC 2
E2/NC 3
VSS 4
M24C16MN
IIC ADDRESS "A0"
Z960

DV33
R38 10K
R36 10K
R37 NC
R39 4K7
Q1 BT3904
EDID_PRT
R40 NC\0R

DV33
L210 600R
AVCC_SRV
C204 1U
C224 0.1U
DV33
L211 600R
AVDD33_XTAL
C206 1U
C225 0.1U

DV33
L212 600R
AVDD33_REG
C205 1U
C226 0.1U

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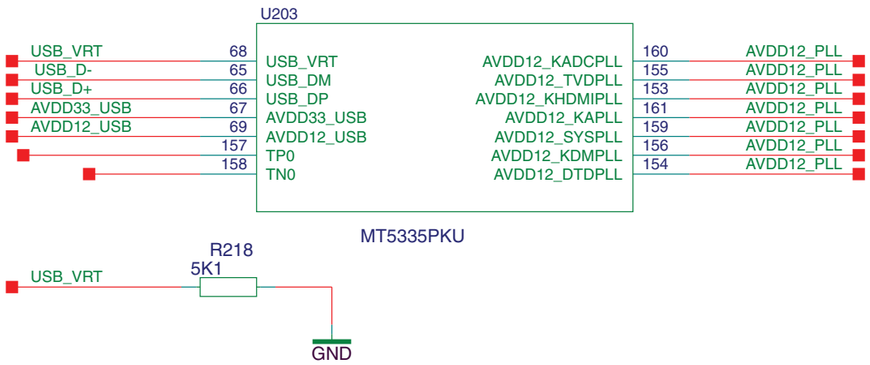
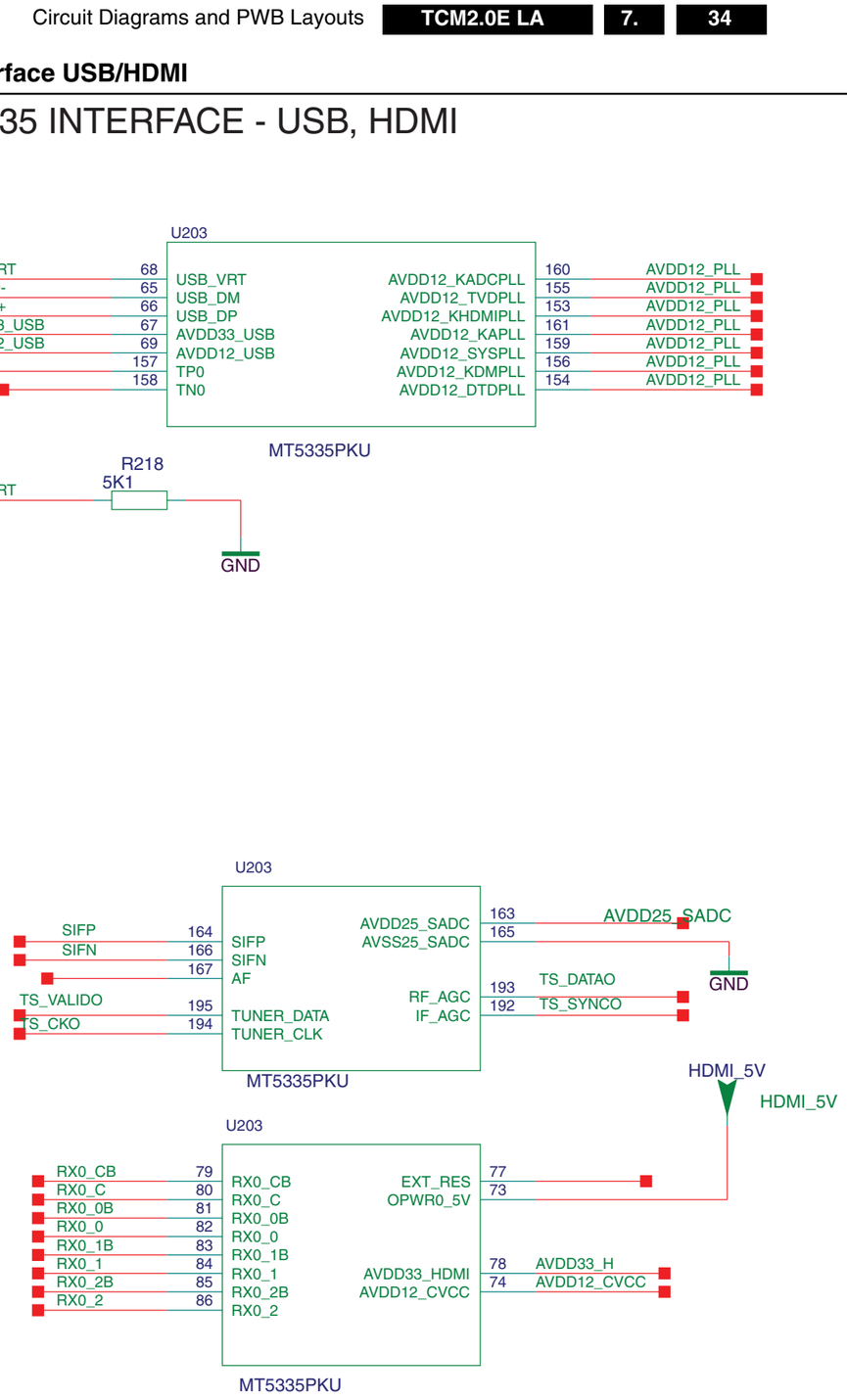
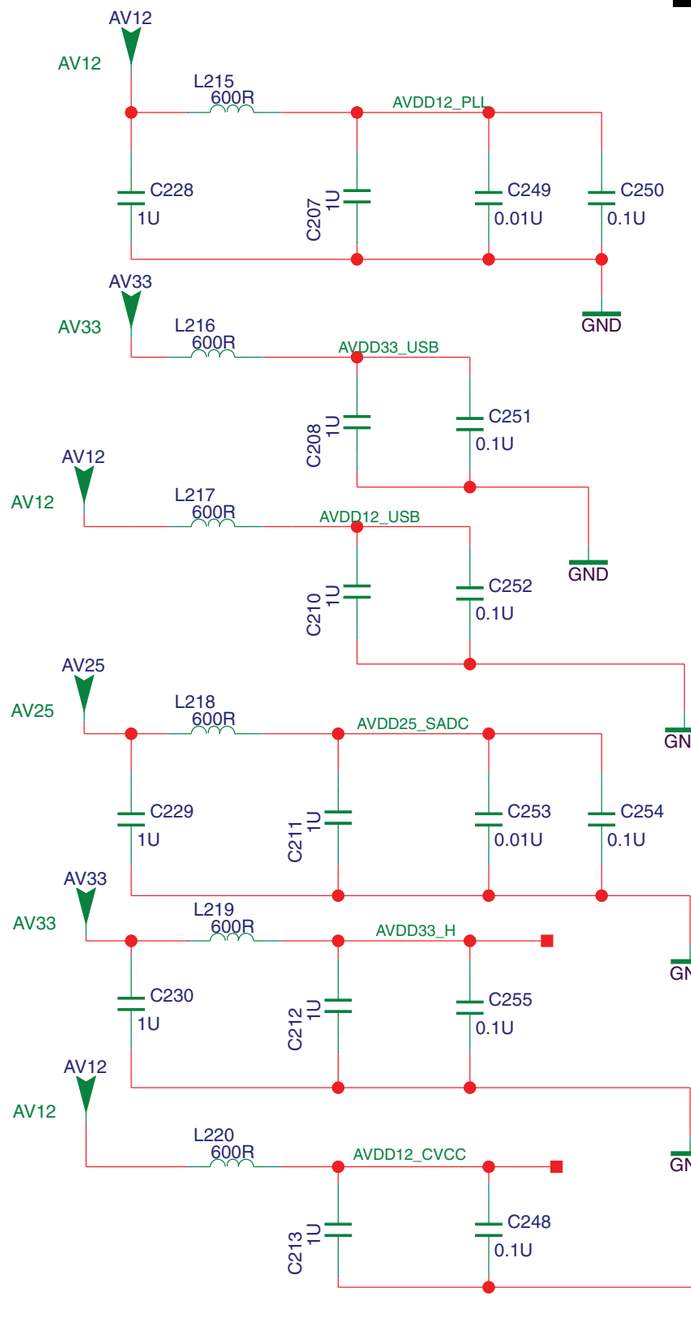
SSB v1: MT5335 Interface USB/HDMI

B08 MT5335 INTERFACE - USB, HDMI

B08







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SSB v1: Interface LVDS TTL

B09 INTERFACE LVDS TTL

B09

U203

MT5335PKU

Footprint is ACM-2012

L200 EXC24C A0N A0P AN00 AP00 C320 C321 10P GND
L201 EXC24C A1N A1P AN11 AP11 C322 C323 10P GND
L202 EXC24C A2N A2P AN22 AP22 C324 C325 10P GND
L203 EXC24C CK1N CK1P CLK11- CLK11+ C326 C327 10P GND
L204 EXC24C A3N A3P AN33 AP33 C328 C329 10P GND
L205 EXC24C A4N A4P AN44 AP44 C330 C331 10P GND
L206 EXC24C A5N A5P AN55 AP55 C332 C333 10P GND
L207 EXC24C A6N A6P AN66 AP66 C334 C335 10P GND
L208 EXC24C CK2N CK2P CLK22- CLK22+ C336 C337 10P GND
L209 EXC24C A7N A7P AN77 AP77 C338 C339 10P GND

P202

0R R213
0R R212
R222 0R
R223 0R
PANEL_CTL1
PANEL_CTL2
VDD_PANEL
C260 0.1U

DV33
R224 1K
R225 390R
R226 390R
R227 390R
R228 120R
R229 750R
R230 6K8
R231 100K
R232 NC
P204
PANEL_SLT
C261 0.1U

5V_OUTSIDE
+5V
R25 NC
R26 NC
R26 FOR 19" 22" PANEL
R25 FOR OTHER +5V SUPPLY PANEL
12V
35KEY_5V
L232 NC/30R
L233 NC/30R
P209

LVDS OUT

Z210
Z212
VDD_PANEL
Q203 AO4459
C209 1U
C202 16V
C258 0.1U
R219 10K
R221 100K
C259 0.1U
LVDSVDD_EN
Q204 C143ZT

AV33
L221 600R
AVDD33_LVDS
C231 1U
C214 1U
C256 0.1U
L222 600R
AVDD33_VPLL
C220 1U
C232 1U
C257 0.1U

GND

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SSB v1: Flash Memory

B10 FLASH MEMORY

B10

U203
POCE0# 252
POOE# 251
PDD0 250
PDD1 249
CI_RB 245
CI_PDD2 248
POCE0_
POOE_
PDD0
PDD1
PARB_
PDD2
U0RX 95
U0TX 94
OIRI 93
JTMS 253
JTRST_ 1
JTCK 256
JTDO 255
JTDI 254
U0RX
U0TX
OIRI_MT5335
JTMS
JTRST#
JTCK
JTDO
JTDI
MT5335PKU

DV33
L223 600R
C240 1U
GND
R289 10K
POCE0#
PDD0
R285 0R
U202
HOLD# 1
VCC 2
NC 3
PO2 4
PO1 5
PO0 6
CS# 7
SO 8
SCLK 16
SI 15
PO6 14
PO5 13
PO4 12
PO3 11
GND 10
WP#/ACC 9
MX25L3205
POOE#
PDD1
DV33
R246 4K7
FRESET#
GND

DV33
R270 10K
R235 1K
TVTREF#1
JTRST#
JTDI
JTMS
JTCK
JTDO
R239 33R
JTAG_DBGRQ
JTAG_DBGACK
P203
R236 10K
R237 10K
R238 10K
GND

+5V
Q3 BT3904
R90 10K
OIRI
OIRI_MT5335
R89 4K7
GND

+5V
C006 100U 6V3
C007 0.1U
GND

AV33
R233 10K
R234 10K
U0TX
U0RX
P201
GND
RS-232

USB_D-
USB_D+
0R R2011
0R R2012
R87 EZJZ1V270RA
R88 EZJZ1V270RA
P200
GND

DV33
C262 0.1U
C263 0.1U
C264 0.1U
C234 1U
C235 1U
GND

DV10
C237 1U
C236 1U
C265 0.1U
C266 0.1U
C267 0.1U
C270 0.1U
C269 0.1U
C268 0.1U
C272 0.1U
C271 0.1U
GND

DDRV_IC
C238 1U
C239 1U
C279 0.1U
C278 0.1U
C277 0.1U
C276 0.1U
C275 0.1U
C274 0.1U
C273 0.1U
GND

DV10
DDRV_IC
U203
VCCK 14
VCCK1 48
VCCK2 57
VCCK3 58
VCCK4 61
DVDD10 70
DVDD10_1 162
VCCK6 213
VCCK5 206
VCCK7 246
VCC2IO 10
VCC2IO1 12
VCC2IO2 16
VCC2IO3 18
VCC2IO4 27
VCC2IO5 30
VCC2IO6 52
VCC2IO7 54
VCC2IO8 55
VCC2IO9 56
VCC3IO_3_2 64
VCC3IO_3_1 197
VCC3IO_3 247
E-PAD 257
DV33
GND
MT5335PKU

DV33
R244 4K7
OPWM2
AOBCK
AOLRCK
R240 4K7
R241 4K7
R242 NC\4K7
GND

Trap MODE	OPWM2	AOBLK	AOLRCK
NORMAL MODE	0	0	0
ICE MODE	0	0	1

TRAP MODE	OPCTRL5	OPCTRL4
CORE RESET 1 US	0	1

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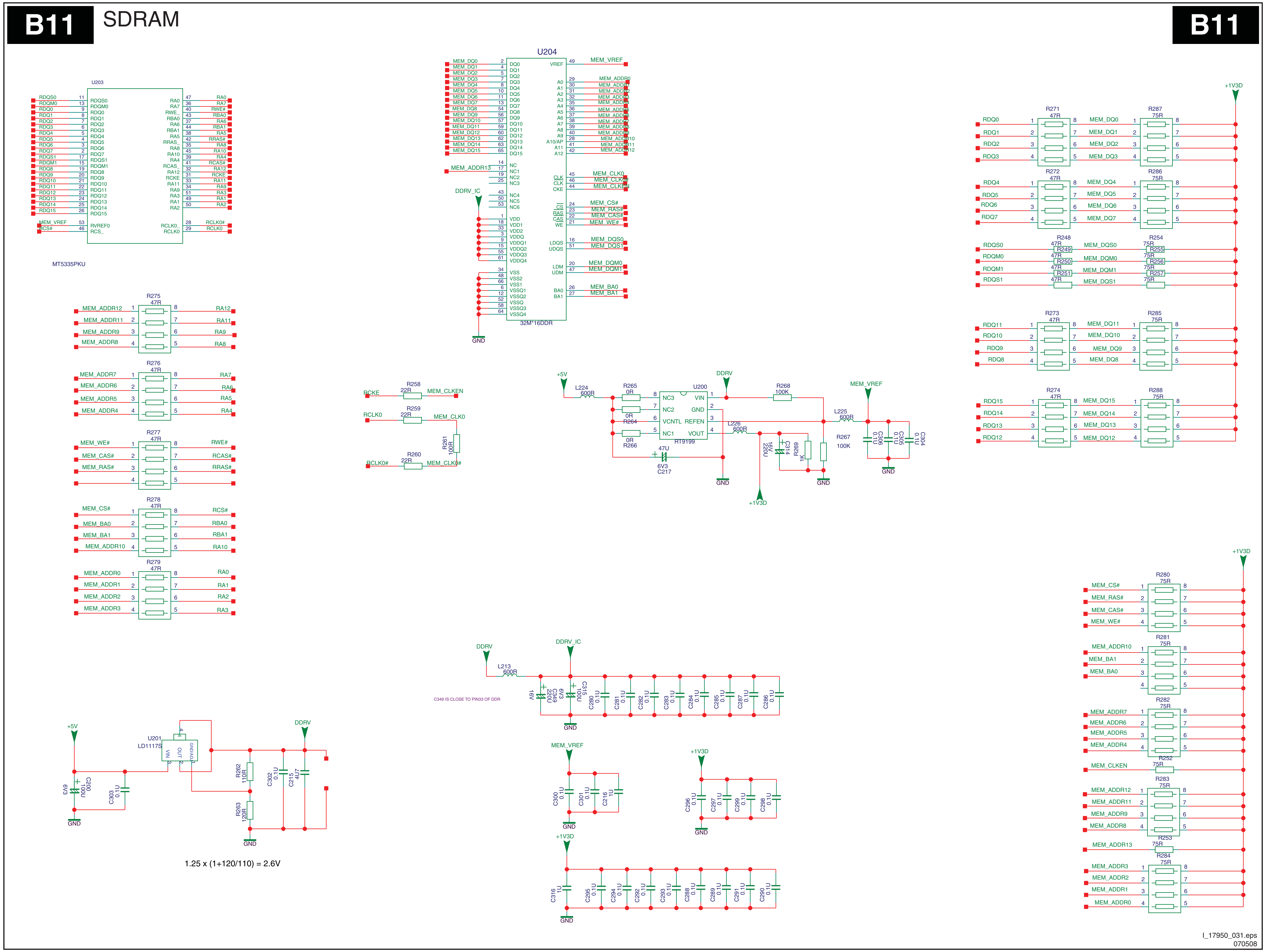
SSB v1: SDRAM


B11
SDRAM
B11
U204
U203
MT5335PKU
32M*16DDR
U200
RT9199
U201
LD1117S
C349 IS CLOSE TO PIN33 OF DDR
1.25 x (1+120/110) = 2.6V
I_17950_031.eps
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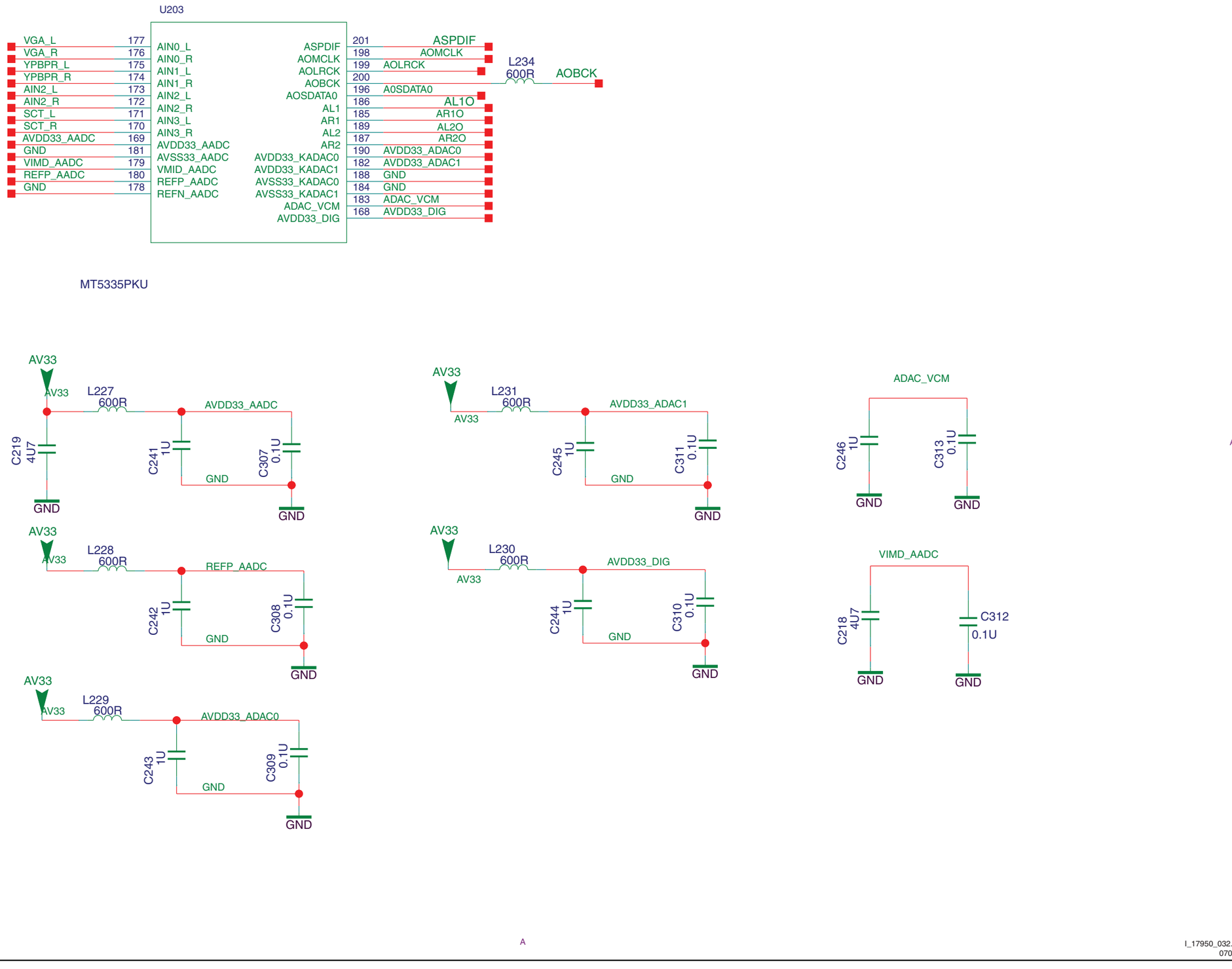
SSB v1: MT5335 Interface VGA

B12 MT5335 INTERFACE - VGA B12



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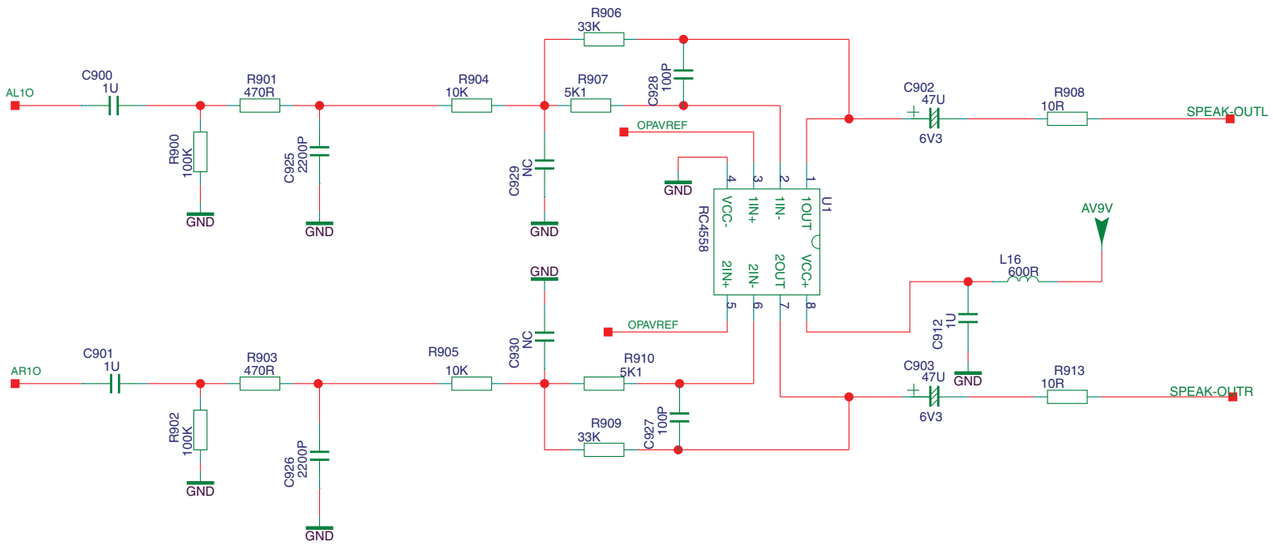
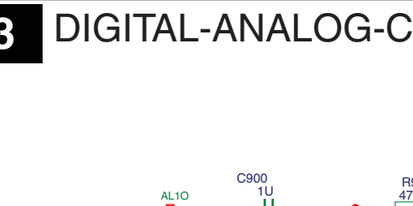
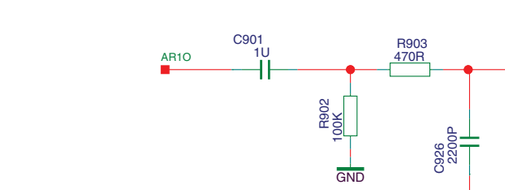
SSB v1: D/A Converter

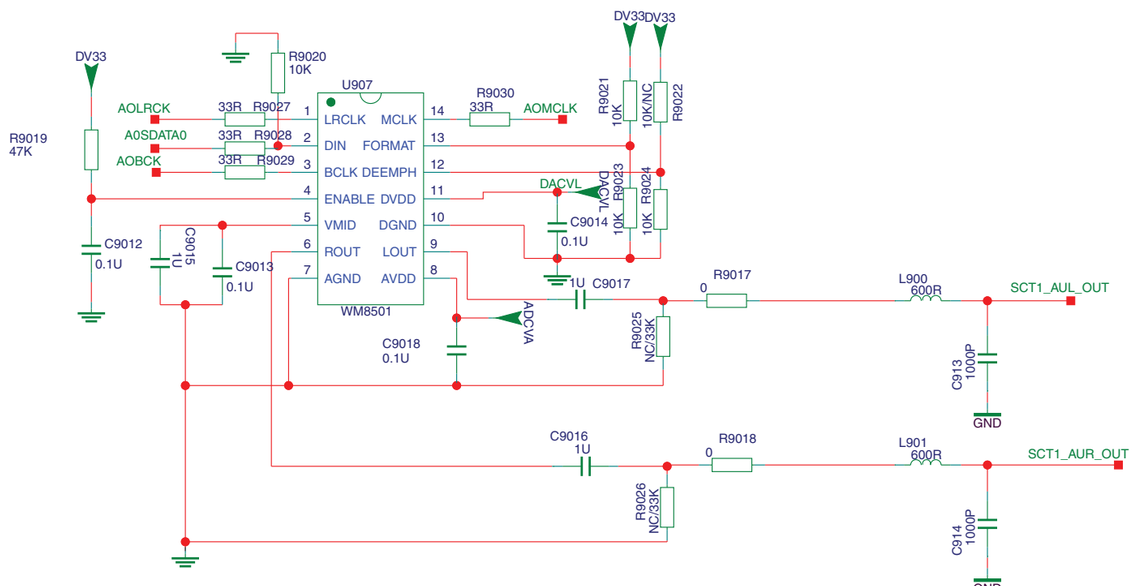
B13 DIGITAL-ANALOG-CONVERTER **B13**







DAC



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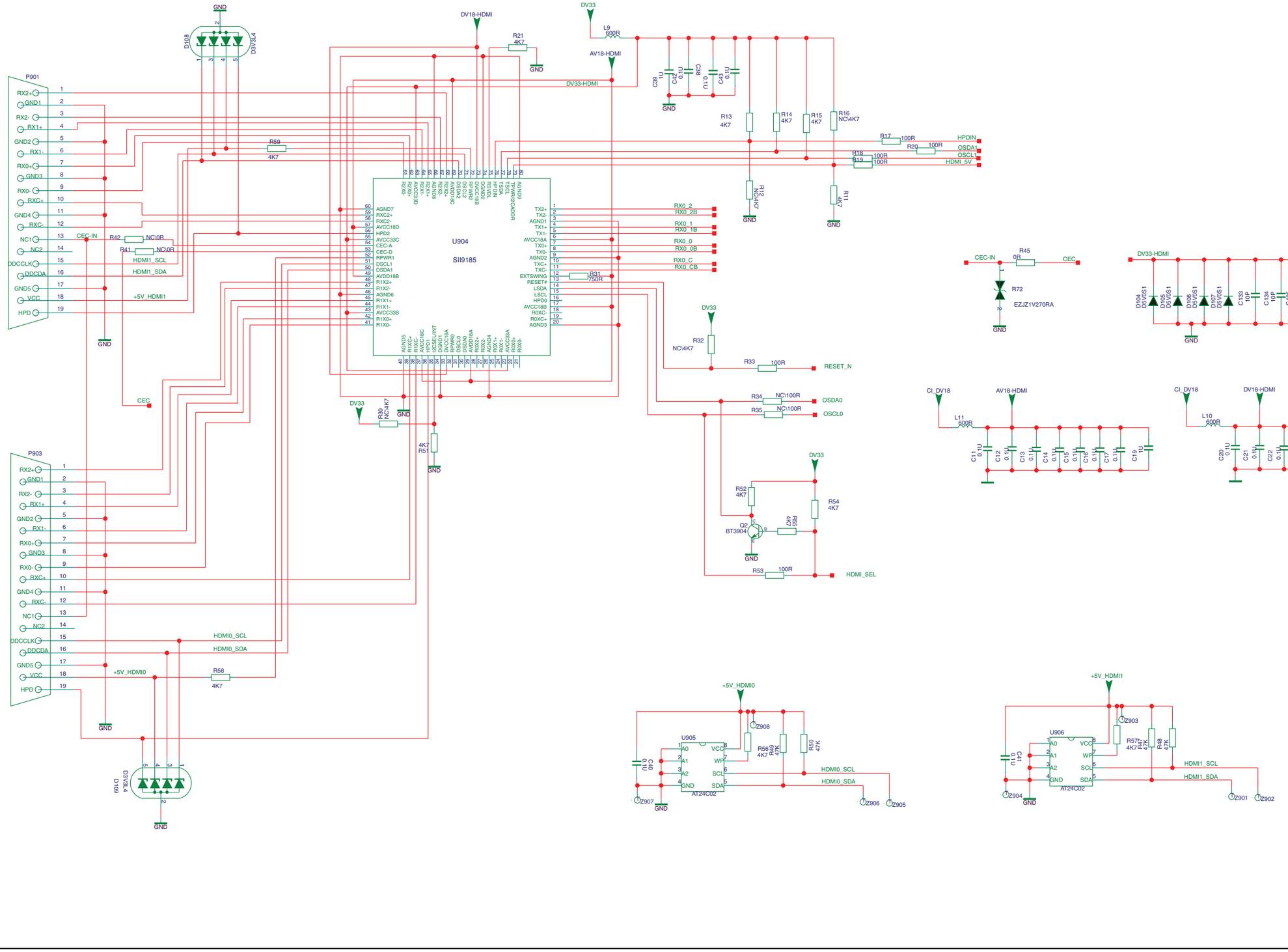
SSB v1: HDMI Switch

B14 HDMI SWITCH **B14**



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SSB v1: I/O Scart

B15 I/O - SCART

B15

P1

SCT1_AUR_OUT
SCT1_AUR_IN
SCT1_AUL_OUT
SCT1_AUL_IN
SCT1_B_IN
SCT1_FS_IN
SCT1_G_IN
SCT1_R_IN
STC1_FB_IN
SCT1_AV_OUT
SCT1_AV_IN

Z921 Z925 Z926 Z924 Z920 Z928 Z923 Z919 Z918 Z922 Z927

R63 R64 EZJZ1V270RA

GND

Nearly Connector

Nearly 5335

SCT1_AV_IN — L903 30R — R968 75R — C967 47P — GND
R970 100R — C968 0.047U — SY0
C969 1U — GND_SV

SCT1_G_IN — L904 30R — R971 75R — C970 16P — R60 EZJZ1V270RA — GND
R969 68R — C971 0.01U — Y0P
R972 100R — C972 0.01U — Y0N

SCT1_B_IN — L905 30R — R975 75R — C973 16P — R61 EZJZ1V270RA — GND
R973 68R — C974 0.01U — PB0P
R974 100R — C975 0.01U — PBR0N

SCT1_R_IN — L906 30R — R976 75R — C976 16P — R62 EZJZ1V270RA — GND
R977 68R — C977 0.01U — PR0P
R978 100R — C978 0.047U — SC0

NEARLY MT5335

STC1_FB_IN — L907 30R — R963 0R — SOY0
C979 470P — R960 75R — R65 EZJZ1V270RA — GND

SCT1_FS_IN — L908 30R — R961 33K — SCART_FS_IN
C980 470P — R962 10K — R66 EZJZ1V270RA — GND

SCT1_AUR_IN — L1 30R — R964 10K — C965 1U — SCT_R
SCT1_AUL_IN — L2 30R — R965 10K — C966 1U — SCT_L
C963 470P — C964 470P — R966 10K — R967 10K — GND

SCT1_AUR_OUT — R67 EZJZ1V270RA
SCT1_AUL_OUT — R68 EZJZ1V270RA — GND

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SSB v1: I/O Side AV, S-Video, Audio

B16 I/O - SIDE AV, SVIDEO, AUDIO B16

AV_5V
L925 10R
R9003 10K
C004 0.01U
C003 1U
GND
CVBS_OUT
R918 0R
D2SA
R919 NC
C001 47U 6V3
R920 1K
BC847C Q815
R9002 10K
R9001 470R
R9004 75R
SCT1_AV_OUT
C002 47P
GND
R924 0R
Q906 BC847C
R921 4K7
R944 4K7
CI_GPIO14
GND
Close to MT5382p
CVBS0
R945 100R
C953 0.047U
Z917
U203
CVBS1 132
CVBS2 130
SY0 129
SC0 128
SY1 127
SC1 126
D2SA 125
136
CVBS0
CVBS1
CVBS2
SY0
SC0
SY1
SC1
D2SA
DVDD25_VADC 139
DVSS25_VADC 140
GND_TUNER 133
GD_CVBS 131
GND_SV 124
AVDD25_VADC 141
AVSS25_VADC 142
AVDD25_REF 137
AVSS25_REF 138
AVDD25_VFE 135
AVSS25_VFE 134
GND 134
MT5335PKU
C920 1U
GND_TUNER
P902
9
7
5
6
8
GND
Z975
Z974
Nearly Connector
L915 30R
R70 EZJZ1V270RA
R947 75R
C958 47P
GND
L916 30R
R69 EZJZ1V270RA
R949 75R
C960 47P
GND
Nearly 5335
R946 100R
C959 0.047U
SY1
R948 100R
C961 0.047U
SC1
AV25
L911 600R
DVDD25_VADC
C916 1U
C954 0.1U
GND
L912 600R
AVDD25_VADC
C917 1U
C955 0.1U
GND
L913 600R
AVDD25_REF
C918 1U
C956 0.1U
GND
L914 600R
AVDD25_VFE
C919 1U
C957 0.1U
GND
Z980
Z981
P902
WHITE 4
RED 3
YELLOW 2
1
GND
L926 30R
L927 30R
R9010 10K
R9009 10K
C9001 1U
C9002 1U
AIN2_L
AIN2_R
C9004 470P
C9003 470P
R9012 10K
R9011 10K
R71 EZJZ1V270RA
GND
Z976
Z978
L928 30R
R9013 100R
C9006 0.047U
CVBS2
R9014 75R
C9007 47P
C915 1U
GND_CVBS
GND

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SSB v1: MT5335 Interface YPbPr & VGA

B17 MT5335 INTERFACE - YPBPR, VGA

Nearly Connector

Nearly 5335

B17

WHITE
GREEN
RED
BLUE
RED
P907
YPBPR_L_IN
Y_IN
YPBPR_R_IN
PB_IN
PR_IN
VGA_R_IN
VGA_L_IN
R74
EZJZ1V270RA
R77
EZJZ1V270RA
R75
EZJZ1V270RA
R76
EZJZ1V270RA
GND
Y_IN
L4
30R
R982
75R
C731
16P
PB_IN
L5
30R
R985
75R
C727
16P
PR_IN
L6
30R
R988
75R
C724
16P
R984
0R
C728
4700P
SOY1
R981
68R
C730
0.01U
Y1P
R983
100R
C729
0.01U
Y1N
R986
68R
C726
0.01U
PB1P
R987
100R
C725
0.01U
PBR1N
R989
68R
C723
0.01U
PR1P
U203
SOY0
Y0P
Y0N
PB0P
PBR0N
PR0P
SOY1
Y1P
Y1N
PB1P
PBR1N
PR1P
TN1
TP1
DVDD12_VGA
AVSS12_RGBADC
AVDD12_RGBADC
AVSS12_RGBFE
AVDD12_RGBFE
RP
RN
BP
BN
GP
GN
VSYNC
HSYNC
SOG
MT5335PKU
Z939
Z940
AV12
L909
600R
DVDD12_VGA
C987
1U
C988
0.1U
L910
AVDD12_RGBADC
C989
C990
L3
AVDD12_RGBFE
C991
C992
Z929
P904
BLACK
SPDIF_OUT
C732
0.1U
R979
100R
ASPDIF
C993
33P
R980
100R
R73
EZJZ1V270RA
YPBPR_L_IN
YPBPR_R_IN
L8
L7
R990
10K
R991
C719
470P
C722
R992
R993
C721
C720
YPBPR_L
YPBPR_R

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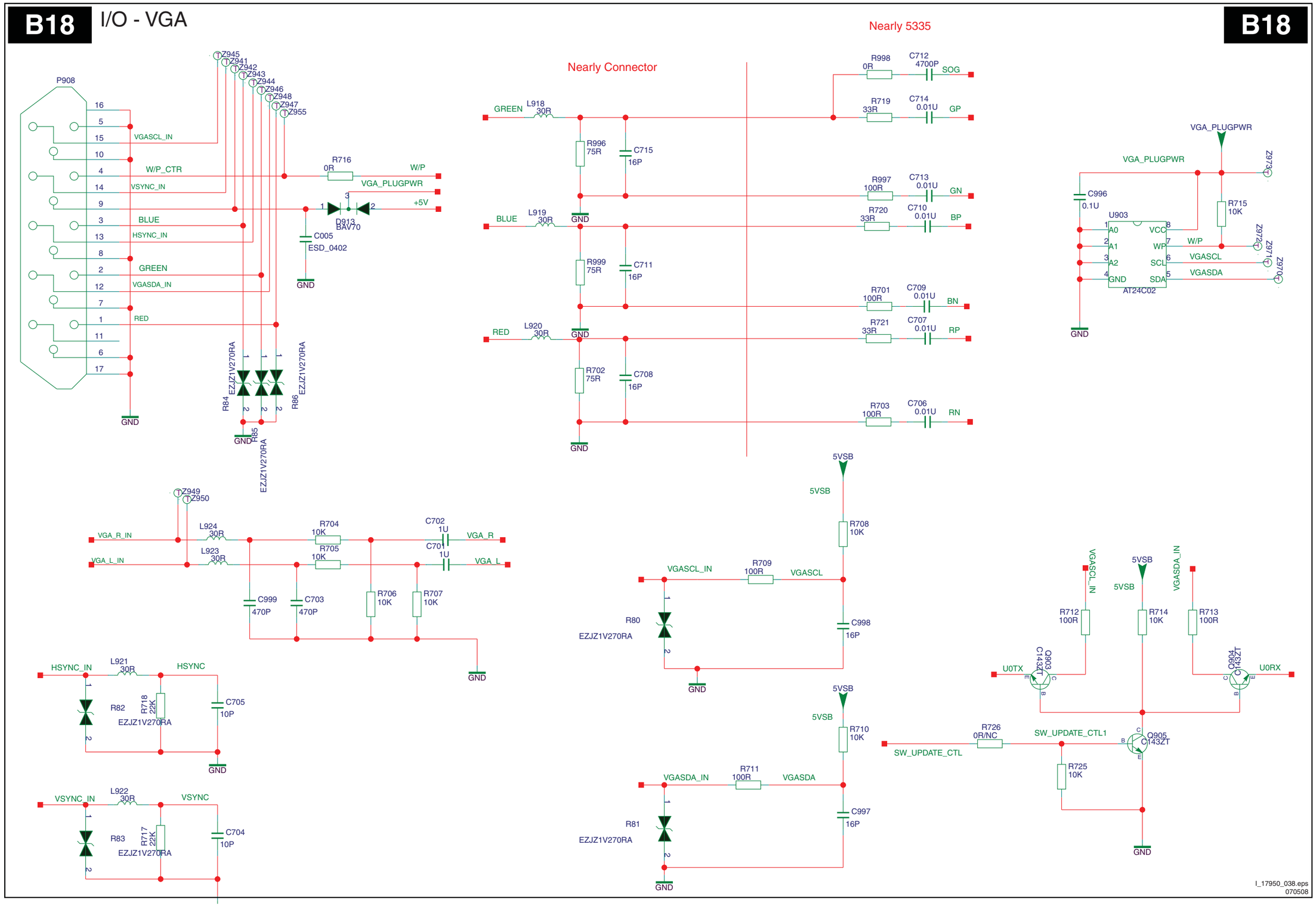
SSB v1: I/O VGA


B18
I/O - VGA
B18
Nearly 5335
Nearly Connector
P908
VGASCL_IN
W/P_CTR
VSYNC_IN
BLUE
HSYNC_IN
GREEN
VGASDA_IN
RED
R716
0R
W/P
VGA_PLUGPWR
+5V
D913
BAV70
C005
ESD_0402
GND
EZJZ1V270RA
R84
R85
R86
Z945
Z941
Z942
Z943
Z944
Z946
Z948
Z947
Z955
Z949
Z950
VGA_R_IN
VGA_L_IN
L924
L923
30R
R704
10K
R705
10K
C702
1U
C701
1U
VGA_R
VGA_L
C999
470P
C703
470P
R706
10K
R707
10K
HSYNC_IN
L921
HSYNC
R82
R718
22K
C705
10P
VSYNC_IN
L922
VSYNC
R83
R717
22K
C704
10P
GREEN
L918
30R
BLUE
L919
RED
L920
R996
75R
C715
16P
R999
75R
C711
16P
R702
75R
C708
16P
R998
0R
C712
4700P
SOG
R719
33R
C714
0.01U
GP
R997
100R
C713
0.01U
GN
R720
33R
C710
0.01U
BP
R701
100R
C709
0.01U
BN
R721
33R
C707
0.01U
RP
R703
100R
C706
0.01U
RN
5VSB
R708
10K
VGASCL_IN
R709
100R
VGASCL
R80
EZJZ1V270RA
C998
16P
R710
10K
VGASDA_IN
R711
100R
VGASDA
R81
EZJZ1V270RA
C997
16P
VGA_PLUGPWR
C996
0.1U
U903
A0
A1
A2
GND
VCC
WP
SCL
SDA
W/P
VGASCL
VGASDA
AT24C02
R715
10K
Z973
Z972
Z971
Z970
VGASCL_IN
VGASDA_IN
R712
100R
R714
10K
R713
100R
U0TX
U0RX
Q903
C1432T
Q904
C1432T
R726
0R/NC
SW_UPDATE_CTL
SW_UPDATE_CTL1
Q905
C1432T
R725
10K
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SSB v1: LVDS Receiver

B19 LVDS RECEIVER

B19

DV33A
DV33A
L929
NC\TTL\600R
DV33A_LVDS_RECEIVER
C2001
C2202
C2004
C2006
C2007
C2015
NC\TTL\0.1U
NC\TTL\0.1U
NC\TTL\0.1U
NC\TTL\0.1U
GND
NC\TTL\0.1U

DV33A_LVDS_RECEIVER
U207
T_B5
T_HSYNC
T_VSYNC
T_DE
T_R6
AN00
AP00
AN11
AP11
AN22
AP22
CLK11-
CLK11+
AN33
AP33
PWRDN
T_CLK
T_R0
RXOUT22
RXOUT23
RXOUT24
GND1
RXOUT25
RXOUT26
RXOUT27
LVDSGND1
RXIN0-
RXIN0+
RXIN1-
RXIN1+
LVDSVCC1
LVDSGND2
RXIN2-
RXIN2+
RXCLKIN-
RXCLKIN+
RXIN3-
RXIN3+
LVDSGND3
PLLGND1
PLLVCC1
PLLGND2
PWRDWN
RXCLKOUT
RXOUT0
GND2
VCC4
RXOUT21
RXOUT20
RXOUT19
GND5
RXOUT18
RXOUT17
RXOUT16
VCC3
RXOUT15
RXOUT14
RXOUT13
GND4
RXOUT12
RXOUT11
RXOUT10
VCC2
RXOUT9
RXOUT8
RXOUT7
GND3
RXOUT6
RXOUT5
RXOUT4
RXOUT3
VCC1
RXOUT2
RXOUT1
T_B4
T_B3
T_B2
T_B1
T_B7
T_B6
T_B0
T_G5
T_G4
T_G3
T_G7
T_G6
T_G2
T_G1
T_G0
T_R5
T_R7
T_R4
T_R3
T_R2
T_R1
V386
GND

R293
NC\TTL\33R
T_R7 R7
T_R6 R6
T_R5 R5
T_R4 R4
R294
NC\TTL\33R
T_R3 R3
T_R2 R2
T_R1 R1
T_R0 R0
R295
NC\TTL\33R
T_G7 G7
T_G6 G6
T_G5 G5
T_G4 G4
R296
NC\TTL\33R
T_G3 G3
T_G2 G2
T_G1 G1
T_G0 G0
R298
NC\TTL\33R
T_B7 B7
T_B6 B6
T_B5 B5
T_B4 B4
R299
NC\TTL\33R
T_B3 B3
T_B2 B2
T_B1 B1
T_B0 B0
R290
NC\TTL\33R
T_DE DE
T_VSYNC D_VSYNC
T_HSYNC D_HSYNC
T_CLK
L239
120R
R292
NC\TTL\33R
CLK
C2011
NC\TTL\16P
GND

VDD_PANEL
P205
C2010
NC\TTL\0.1U
GND
R1 R0
R3 R2
R5 R4
R7 R6
G1 G0
G3 G2
G5 G4
G7 G6
B1 B0
B3 B2
B5 B4
B7 B6
D_HSYNC D_VSYNC
PANEL_CTL2
DE CLK
GND

R23
100R
AN00 AP00
R24
100R
AN11 AP11
R2003
100R
AN22 AP22
R2004
100R
CLK11- CLK11+
R2005
100R
AN33 AP33

DV33A
DV33A
R291
NC\TTL\10K
PWRDN
PWRDN_EN
Q5
C143ZT
GND

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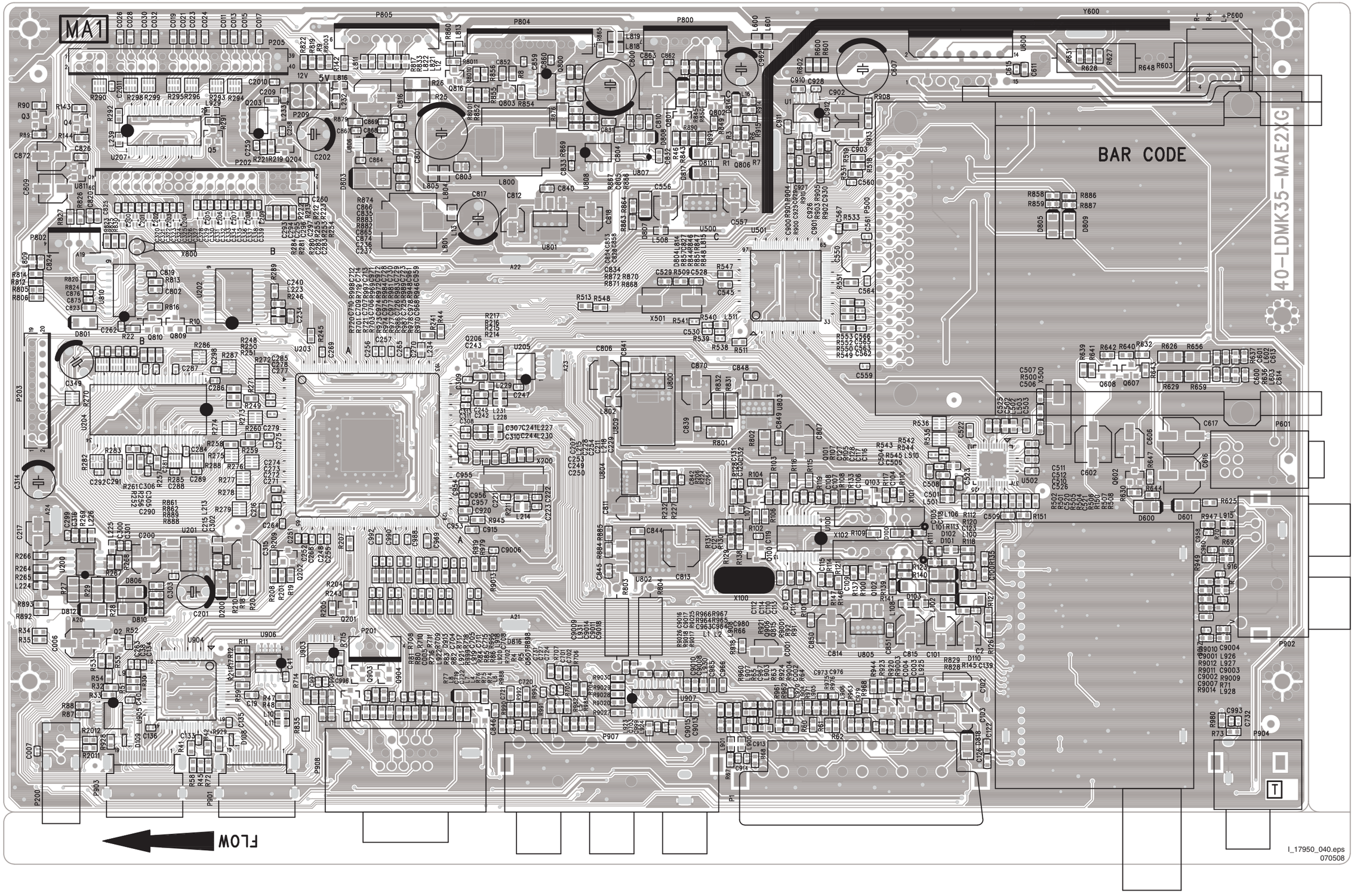
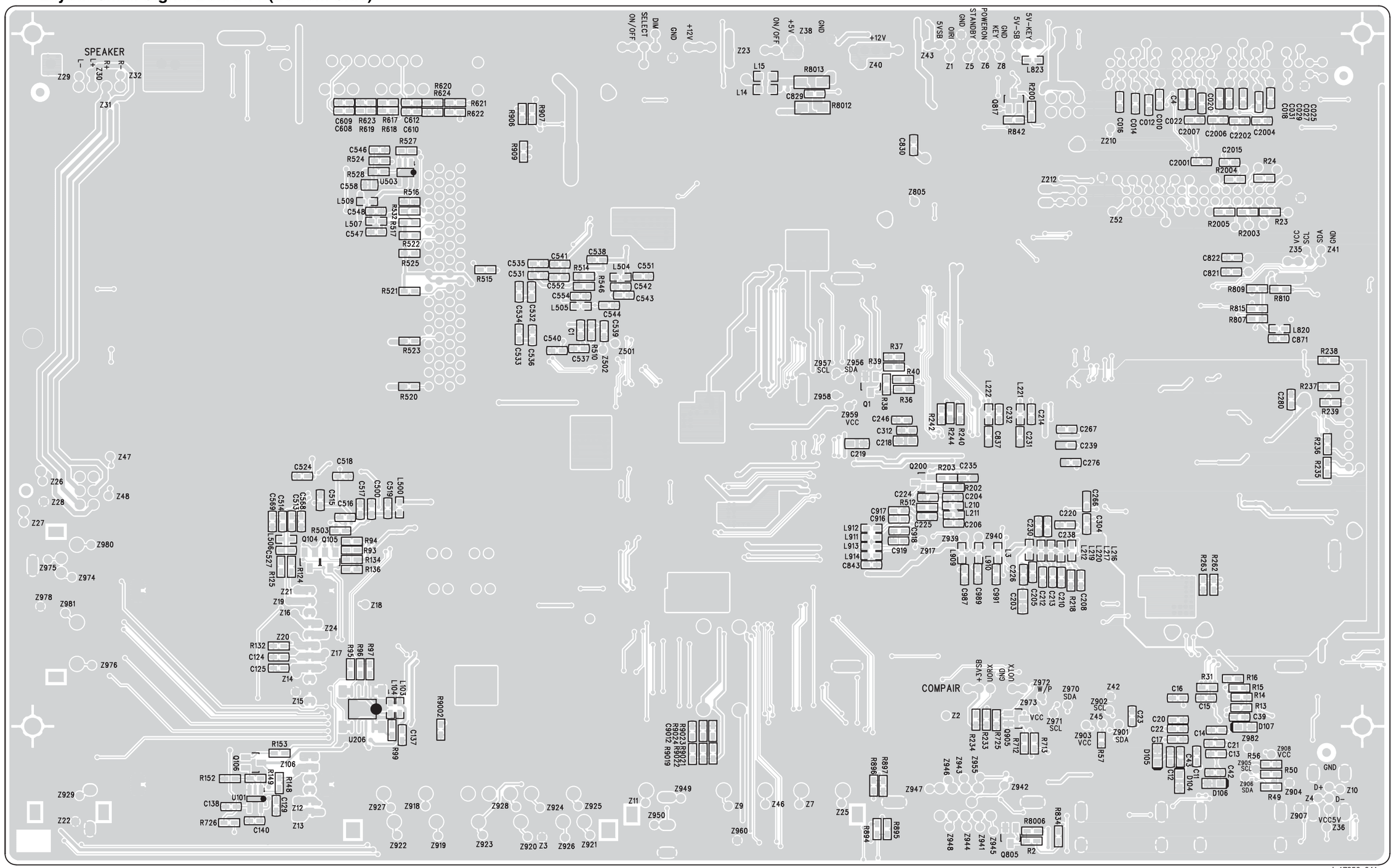
Layout Small Signal Board v1 (Top Side)



Layout Small Signal Board v1 (Bottom Side)



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SSB v2: Tuner

B01 TUNER

B01

Z100

ANTPWR B1 NC/GND1 NC/GND2 NC/RFAGC NC TU GND1 NC1 SCL SDA AS ANALOG_IF IFAGC XTALOUT IFOUT2 IFOUT1

L108 30R TUNER_5V AV_5V

R124 100R FAT_IN-

R125 100R FAT_IN+

R148 0R RF-AGC C129 0.1U

R132 NC

R135 4K7 IF_AGC

R127 100R TUNER_SDA0_5V

R126 100R TUNER_SCL0_5V

C125 22P C124 22P C100 1U

L103 120R TUNER_5V

C122 0.1U C102 100U 6V3

L104 NC/120 TUNER_5V

R99 NC

U206 NC/TPS2049 OUT3 OUT2 OUT1 OC GND IN1 IN2 EN

C126 NC/0.1U C103 NC/100U 6V3

R97 NC/4K7

R96 NC/100R 5V-TUNER-ON/OF

R95 NC/100R 5V-TUNER-INPUT

AV_5V Q105 2N7002 R828 10K TUNER_SDA0 TUNER_SDA0_5V DV33

AV_5V Q104 2N7002 R829 10K TUNER_SCL0 TUNER_SCL0_5V DV33

TUNER_5V C137 0.1U U101 VCC Y Z GND 4LVCTG66GV C138 0.1U MT5133-GPIO_AD

TUNER_5V C140 0.1U R153 0R BC847C Q106

R145 12K ATV-IF-AGC D110 LL4148 C139 0.1U C9 4U7

RF-AGC R149 NC\0R R152 47K

5V-OUT R139 6K8 R140 6K8 R141 22K D103 BA982 R137 220K Q102 BC847C R100 680K C109 0.01U

R123 0R X102 IN IN/GND GND OUT1 OUT2

D101 BA982 D102 BA982 C123 0.01U R118 NC L100 1UH R113 6K8

5V-OUT R121 22K R146 12K C119 0.01U ATV-IF-AGC

R101 330R C111 1500P C110 0.22U C114 0.47U 4M X100 C112 20P C115 0.1U R114 22K R147 NC C3 0.01U

5V-OUT L102 120R TUNER_5V C113 0.01U 6V3 C101 100U

BC847C Q100 CVBS_OUT

R129 75R CVBS0 R130 75R C121 47P R131 0R GND_TUNER

L107 120R SIF R128 0R C131 0.01U SIFP C120 1P5 SIFN C132 0.01U

R116 100R TUNER_SCL0_5V R115 100R TUNER_SDA0_5V R93 NC\100R TUNER_SCL0 OSCL0 TUNER_SDA0 OSDA0 R94 NC\100R

U100 TDA9886T VIF1 VIF2 OP1 FMPLL DEEM AFD DGND AUD TOP SDA SCL SIOMAD SIF2 SIF1 OP2 AFC VP VPLL AGND CVBS VAGC REF TAGC NC

CVBS-OUT R106 NC\6K8 R102 NC\180R C127 0.1U Q101 NC\BC847C R107 0R R105 NC R103 NC\1K5 R104 NC\47R R138 220R

R112 33R L106 0 C118 1000P D100 BA592 R120 NC 5V-OUT R109 2K2 R110 2K2 C104 0.01U X101 IN IN/GND GND OUT1 OUT2 R108 5K6

C105 1000P R111 2K2 R117 NC L101 0.56UH Q103 C124ET R133 33R C106 1000P

R119 5K6 0.01U C108 C107 390P C116 0.01U C117 0.47U 1000P C128

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SSB v2: MCU Standby

B02 MCU STANDBY

B02

5V_KEY
NC
R817
R833
10K
R142
STANDBY
5VSB
OIRI
600R
POWER_ON
L821 600R
L822 600R
+3V3SB
35KEY_5V
R819 3K3
KEY_5335
R842 NC
KEY
L811 600R
L823 600R
2N7002/NC Q817
P805

+3V3SB_UP
D801 LL4148
R806 27K
CEC
R805 100R
CEC_IRQ
C819 100P
OSCO
R816 33R
X800 32K7
OSCI
C821 20P
C822 20P

DV33
R22 0R
R10 0R
Q809
2N7002
OSCL0
Q810
2N7002
OSDA0

L820 600R
C871 1U
C823 0.1U
10K
R810

+3V3SB_UP
R809 10K
R807 10K
R815 4K7
HDMI_INT
SHORT_PROTECT
SW_UPDATE_CTL1
HSYNC
33R R813
33R R834
0R R835
33R R812
C802 1U
OPTION for CEC Stand by Function

U810
OSCO 1
OSCI 2
VSS 3
NRST 4
PWMI 5
RXD/IRQ3 6
CEC_IRQ 7
TXD/IRQ2 8
HIN
OSCO
OSCI
VSS
NRST
PWMI
RXD/IRQ3
TXD/IRQ2
HIN
VDD 16
AD0 15
AD3/IR 14
SCL1 13
SDA1 12
SCL2 11
SDA2 10
VIN 9
WT6702F

C876 NC\1000P
C875 1000P
R822 33R KEY
R830 33R OIRI_MCU
R824 33R
R820 33R
R823 33R STANDBY
R825 33R 3V3SB_EN
R814 33R VSYNC

+3V3SB_UP
R826 10K
R827 10K
OSCL0_SB
OSDA0_SB
+3V3SB_UP
1
2
3
4
ISP PORT
C820 0.1U
P802

+3V3SB
Q4 BT3904
R143 10K
OIRI
OIRI_MCU
R144 4K7
GND

+3V3SB
L809 120R
+3V3SB_UP
RT9166 U811
OUT 2
GND 1
IN 3
5VSB
C824 1U
C825 0.1U
C809 100U 6V3
C826 0.1U
C872 100U 6V3

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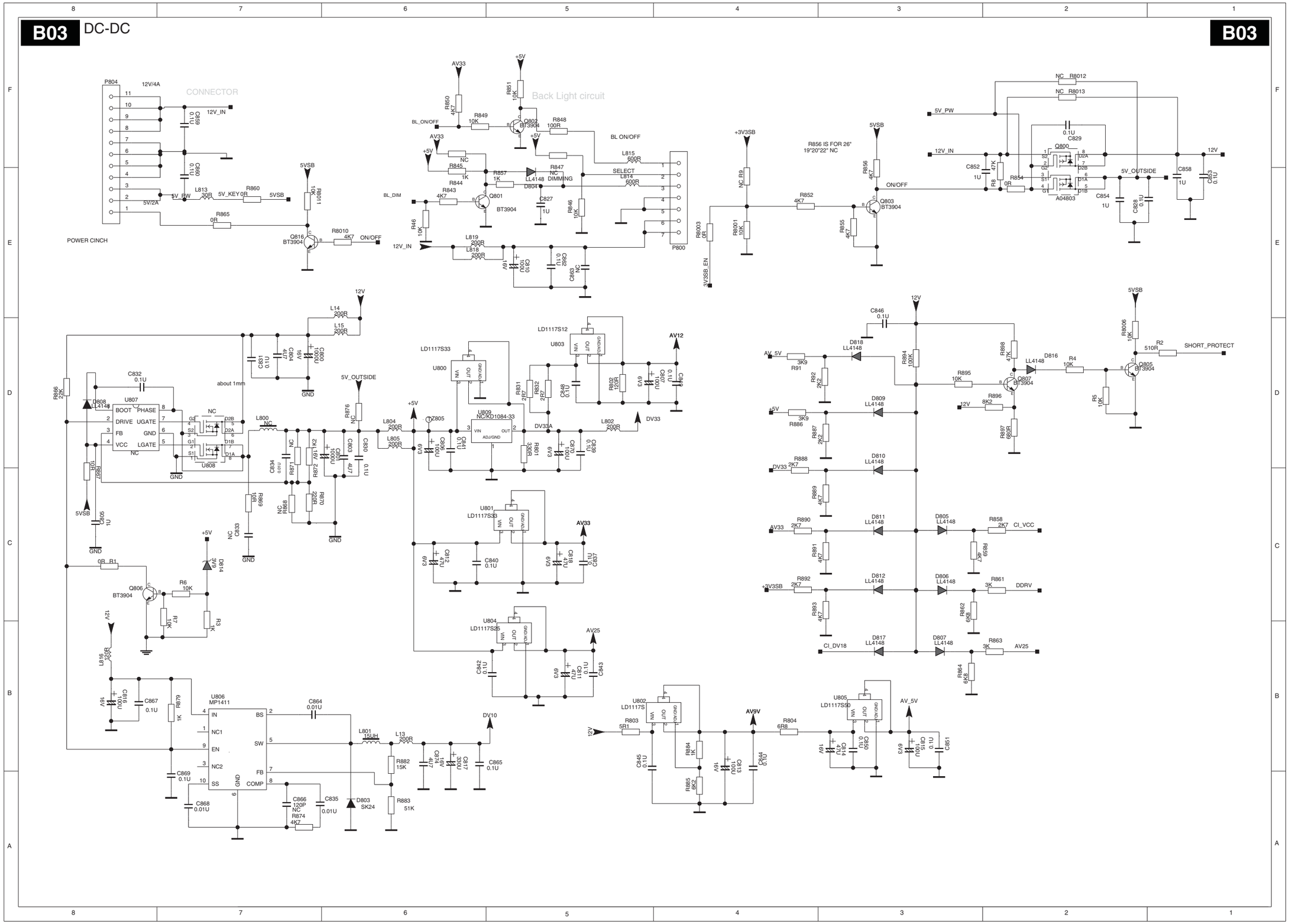
SSB v2: DC / DC

B03 DC-DC

B03



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SSB v2: Digital Channel Decoder

B04 DIGITAL CHANNEL DECODER

B04

FAT_IN-
FAT_IN+
C513 1000P
C514 1000P
C568 NC/20P
C569 NC/20P
L506 NC
C527 NC
C511 0.22U
C510 0.22U
C512 0.22U
R508 0R
R507 0R
TUNER_SCL0
TUNER_SDA0
R134 10K
R136 10K
DV33
R151 NC/10K
R150 NC/1K
MT5133-GPIO-AD
MT5131_IF_AGC
1K R506
IF_AGC
CLOSE TO MT5133
C509 0.047U
DVDD33
X500 27M
R500 1M
C506 27P
C507 27P
U502
XTALO
XTALI
AVDD33
DVDD12
R536 33R
TS0INDATA7
TS0INDATA6
TS0INDATA5
DVDD33
1 AVSS33_2
2 AVSS33_2
3 XTALI
4 XTALO
5 AVDD33_2
6 ALC_IN
7 VDD1.2
8 DGND1.2
9 TSDATA7
10 TSDATA6
11 TSDATA5
12 VDD3.3
13 TSDATA4
14 TSDATA3
15 TSDATA2
16 TSDATA1
17 TSDATA0
18 TSERR
19 TSVAL
20 TSSYNC
21 TSCLK
22 VDD3.3_1
23 DGND3.3
24 VDD1.2_1
48 ADVDD33_1
47 REFTOP
46 VCMEXT
45 REFBOT
44 IN+
43 IN-
42 AVDD33
41 AVSS33_1
40 VDD1.2_3
39 DGND1.2_1
38 TUNER_SCL
37 TUNER_SDA
36 RF_AGC
35 IF_AGC
34 VDD3.3_3
33
32 GPIO0
31 /RESET
30 XTAL_SEL1
29 XTAL_SEL0
28 DGND3.3_1
27 VDD3.3_2
26 VDD1.2_2
25 HOST_SDA
HOST_SCL
C508 0.1U
R503 NC
R505 100R
MT5133_RESET
R504 10K
DVDD33
DVDD12
R501 0R
SIF_SDA
SIF_SCL
OSDA0
OSCL0
R502 0R
MT5133
R535 33R
TS0INDATA4
TS0INDATA3
TS0INDATA2
TS0INDATA1
TS0INDATA0
TS0INVALID
TS0INSYNC
TS0INCLK
33R R542
33R R543
33R R544
33R R545
L510 120R
C504 120P/NC
C505 120P/NC
AV12
L500 600R
Digital 1.8V Bypass Caps
DVDD12
C500 1U
C517 0.1U
C519 0.1U
C516 0.1U
C518 0.1U
C515 0.1U
DV33
L501 600R
Digital 3.3V Bypass Caps
DVDD33
C501 1U
C521 0.1U
C523 0.1U
C520 0.1U
C522 0.1U
AV33
L502 600R
Analog 3.3V Bypass Caps
AVDD33
C502 1U
C525 0.1U
C526 0.1U
ADVDD33_1
L503 600R
C524 0.1U
C503 1U

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SSB v2: DVBT/ CI Decoder

B05 DVBT-CI-DECODER

B05

CLOSE TO CI CONNECTOR

CI_VCC CI_VCC

R517 NC/10K CI_INPACK# R516 10K

R519 NC/10K CI_IOIS16# R518 10K

CI_VCC CI_VCC CI_VCC

R521 10K CI_IREQ# R525 NC CI_VS2# R522 10K CI_WAIT#

+5V +5V +5V

R520 10K CI_CD1# R523 10K CI_VS1# R524 10K CI_CD2#

C559 0.1U C560 0.1U

DV33 L508 600R CI_DV33 LD1117S18 CI_DV18

C555 10U 6V3 U500 C556 10U 6V3

3.3V: 0.2W (60mA)
1.8V: 0.2W
(100mA)

+5V CLOSE TO CI CONNECTOR CI_VPP CI_VCC

C558 1U C546 0.1U R528 10K L509 30R L507 30R

VIN VOUT ENEN# GND FLG RT9711 U505

C548 0.1U C555 10U 6V3 C547 0.1U

CI_VCC_EN R527 0R

CI_DV33 CI_AV33

L504 600R

C551 1U C543 0.1U C542 0.1U

CI_DV33 CLOSE TO MT8295

C533 0.1U C531 0.1U C532 0.1U C539 0.1U C538 0.1U C535 0.1U C534 0.1U C537 0.1U C536 0.1U

CI_DV18 C554 1U C540 0.1U C541 0.1U

CI_DV18 CI_AV18

L505 600R

C552 1U C544 0.1U C545 0.1U

CLOSE TO MT8295

C530 10P TS_CKO

CI_DV33 R511 4K7 CI_GPIO1 R510 4K7 CI_GPIO0

DV33

CLOSE TO MT8295

C528 27P C529 27P

R509 1M X501 27M

NC R548 4K7 R547 4K7

0R R513 MTK_IC_RESET

10K R512

CLOSE TO MT8295

TS_SYNCO TS_DATAO TS_VALIDO

R538 33R R539 33R R540 120R R541 33R

L511 UNEN-ON/OF UNER-INPUT

OPWM1 OPWM2 CI_DV33

4K7 R546 4K7 R514

GND Z501 RESET_N Z502 CI_GPIO14

U501

CI_GPIO0 GPIO0 CI_GPIO1 GPIO1 DMIED_WP GPIO2 HPDIN GPIO3 CI_DV33 VCC33 SOINCLK T0CLK_I SOINSYNC T0SYNC_I SOINVALID T0VALID_I SOINDATA0 T0DATA0_I GND GND33 SOINDATA1 T0DATA1_I SOINDATA2 T0DATA2_I SOINDATA3 T0DATA3_I SOINDATA4 T0DATA4_I CI_DV18 VCC18 SOINDATA5 T0DATA5_I SOINDATA6 T0DATA6_I SOINDATA7 T0DATA7_I HDMI_SEL GPIO4 PBPR_SW_IN GPIO5 PWRDN_EN GPIO6 GND GND18 CI_CD1# CD1# CI_D3 D3 CI_OUTDATA3 D11 CI_D4 D4 CI_OUTDATA4 D12 CI_D5 D5 CI_OUTDATA5 D13 CI_D6 D6 CI_OUTDATA6 D14 CI_D7 D7

CI_WEB WEB CI_DATA2 D2 CI_CEB CEB GPIO9 GPIO9 GPIO8 GPIO8 GPIO7 GPIO7 GND18_1 GND18_1 WP WP CD2# CD2# D2 D2 D10 D10 D1 D1 D9 D9 D0 D0 VCC18_1 VCC18_1 D8 D8 A0 A0 BVD1 BVD1 A1 A1 BVD2 BVD2 GND33_2 GND33_2 A2 A2 REG# REG# A3 A3 INPACK# INPACK# A4 A4 WAIT# WAIT# A5 A5 VCC33_3 VCC33_3 RESET RESET A6 A6 VS2# VS2#

CI_WEB CI_PDD2 CI_DATA2 CI_PDD6 CI_CEB CI_PDD7 GPIO9 CI_VCC_EN GPIO8 CI_VPP3_EN GPIO7 CI_VPP5_EN GND18_1 GND WP CI_IOIS16# CD2# CI_CD2# D2 CI_D2 D10 CI_OUTDATA2 D1 CI_D1 D9 CI_OUTDATA1 D0 CI_D0 VCC18_1 CI_DV18 D8 CI_OUTDATA0 A0 CI_OUTSYNC BVD1 CI_A1 A1 CI_OUTVALID BVD2 GND GND33_2 CI_A2 A2 CI_REG# REG# CI_A3 A3 CI_INPACK# INPACK# CI_A4 A4 CI_WAIT# WAIT# CI_A5 A5 CI_DV33 VCC33_3 CI_RESET RESET CI_A6 A6 CI_OUTCLK VS2#

MT8295

CI_DV33 CI_OUTDATA7 CI_CE1# CI_CE2# CI_VS1# CI_OE# CI_IORD# CI_A11 CI_IOWR# CI_A9 CI_INSYNC CI_INDATA0 CI_A13 CI_INDATA1 CI_A14 CI_INDATA2 CI_IREQ# CI_INVALID CI_INDATA3 CI_INDATA4 CI_INCLK CI_INDATA5 CI_INDATA6 CI_A12 CI_INDATA7 CI_A7

100R R515 CI_INCLK

P500

CI_D3 CI_D4 CI_D5 CI_D6 CI_D7 CI_CE1# CI_A10 CI_OE# CI_A11 CI_A9 CI_A8 CI_A13 CI_A14 CI_WE# CI_IREQ# CI_INVALID CI_INCLK CI_A12 CI_A7 CI_A6 CI_A5 CI_A4 CI_A3 CI_A2 CI_A1 CI_A0 CI_D0 CI_D1 CI_D2 CI_IOIS16#

CI_CD1# CI_OUTDATA3 CI_OUTDATA4 CI_OUTDATA5 CI_OUTDATA6 CI_OUTDATA7 CI_CE2# CI_VS1# CI_IORD# CI_IOWR# CI_INSYNC CI_INDATA0 CI_INDATA1 CI_INDATA2 CI_INDATA3 CI_INDATA4 CI_INDATA5 CI_INDATA6 CI_INDATA7 CI_RESET CI_WAIT# CI_REG# CI_OUTVALID CI_OUTSYNC CI_OUTDATA0 CI_OUTDATA1 CI_OUTDATA2 CI_CD2#

C561 10P CI_VCC CI_VPP

NC/0R R531 NC/0R R532 CI_INPACK#

CLOSE TO MT8295

CI_CE1## R549 100R CI_CE1# C562 10P

CI_OE## R550 100R CI_OE# C563 10P

CI_WE## R551 100R CI_WE# C564 10P

CI_IORD## R552 100R CI_IORD# C565 10P

CI_IOWR## R553 100R CI_IOWR# C566 10P

CI_VS2# R533 100R CI_OUTCLK C567 10P

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SSB v2: Audio Amplifier

B06 AUDIO AMPLIFIER

P600 1 2 3 4
L+ R+
Y600 1 2
PGND
U600 TDA7266
OUT1+ OUT1- VCC1 IN1 NC1 MUTE STBY PW_GND S_GND NC2 NC3 IN2 VCC2 OUT2- OUT2+
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
L- L_OUT R_OUT R-
MUTE SS GND
AL1O R622 NC R621 0R SPEAK-OUTL
R620 2K2 C612 1U
R624 100K C610 4700P C611 0.1U
AR1O R617 NC SPEAK-OUTR R618 0R
2K2 R619 C608 1U
R623 100K C609 4700P
GND PGND
12V
R603 2R7 R648 2R7
L600 200R L601 200R
C607 1000U 16V C615 0.1U
R600 0R Near the P502 GND PGND
R602 0R R601 0R Near the P502 GND PGND
12V R643 220R Q607 BT3906 R640 4K7
R639 4K7 R641 4K7 Q608 BT3906
C602 1000U 16V GND
LL4148 D600 HW_MUTE R644 10K
R642 1K
AMP_MUTE R625 4K7 D601 LL4148
12V R627 10K SS R628 10K NC R631 MUTE
R632 10K BT3904 Q602 R630 10K R647 10K C606 22U 16V
L602 600R L603 600R HP_L
R656 100R R659 100R R626 100R R629 100R
C600 3300P C601 3300P
0R/NC R636 0R/NC R637
EAR P601 GND HP_R
C614 4700P/NC C613 4700P/NC
R+ R_OUT L+ L_OUT
16V 100U C616 C617 16V 100U

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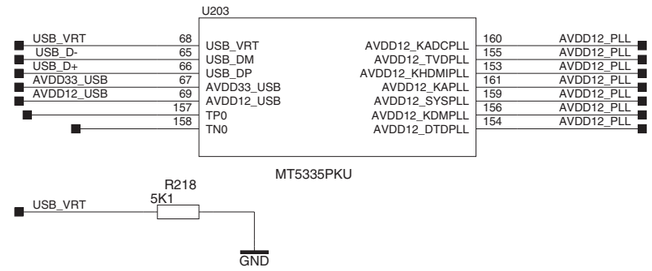
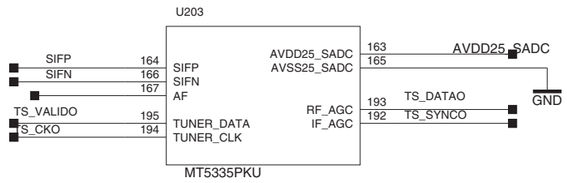
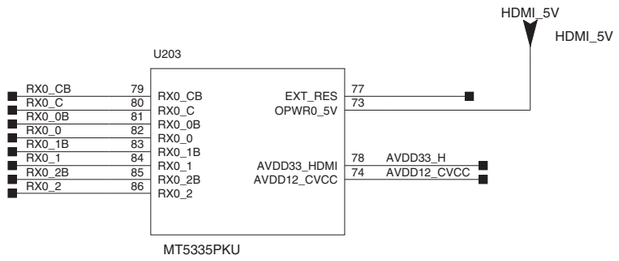
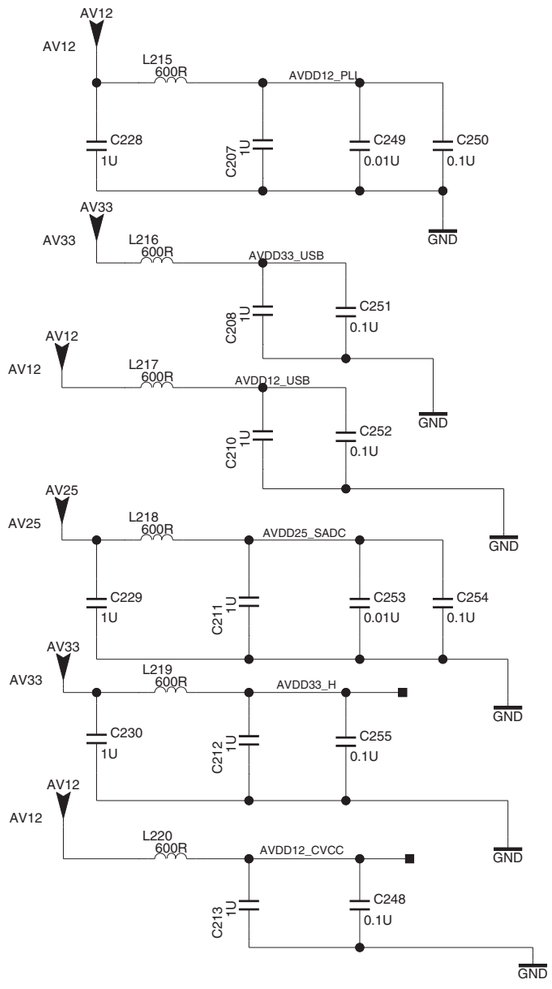
SSB v2: MT5335 Video Processor

B07 MT5335 VIDEO PROCESSOR **B07**









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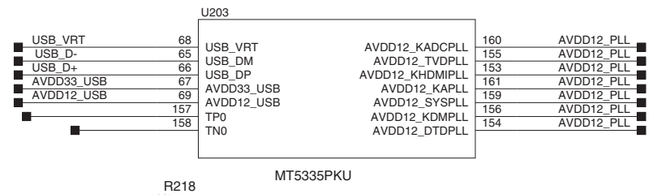
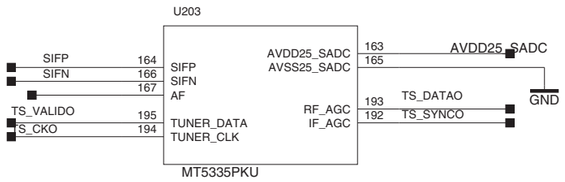
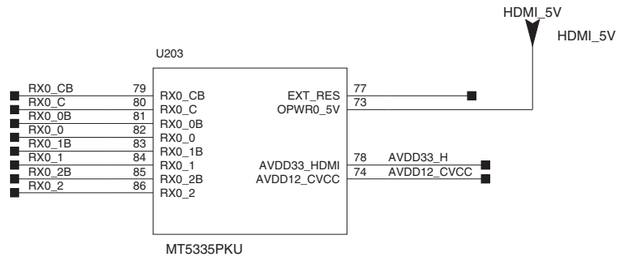
SSB v2: MT5335 Interface USB/HDMI

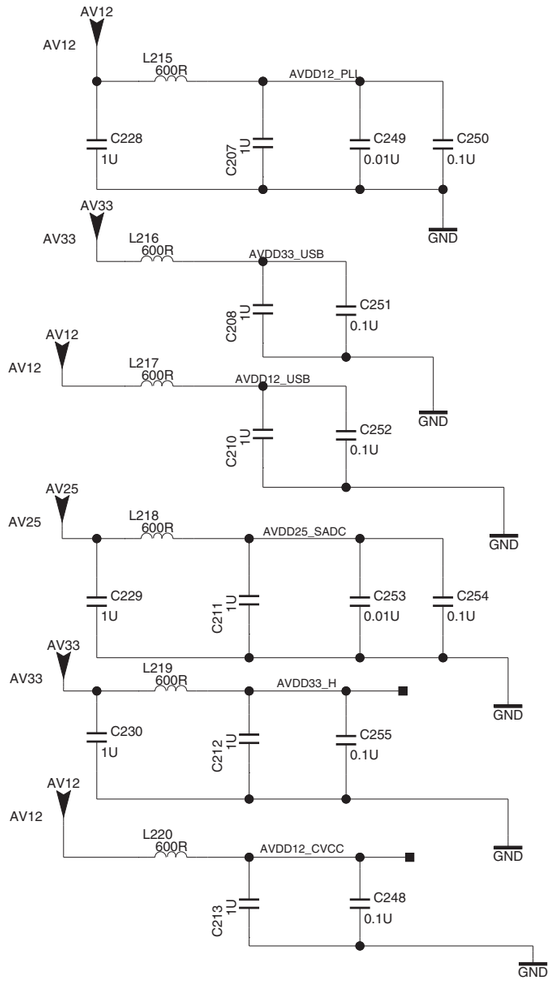
B08 MT5335 INTERFACE - USB, HDMI

B08









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SSB v2: Interface LVDS TTL

B09 INTERFACE LVDS TTL

B09

U203

	244	A0N	AVDD33_LVDSA	220	AVDD33_LVDS
	243	A0P	AVDD33_LVDSB	229	AVDD33_LVDS
A0N	242	A2N	AVDD33_LVDSC	238	AVDD33_LVDS
A0P	241	A2P			
A1N	240	CK1N	AVDD33_VPLL	217	AVDD33_VPLL
A1P	239	CK1P			
A2N	237	A3N	TP2	218	
A2P	236	A3P	TN2	219	CI_POCE1#
CK1N	235	A4N			
CK1P	234	A4P			
A3N	233	A5N			
A3P	232	A5P			
A4N	231	A6N			
A4P	230	A6P			
A5N	228	A7N			
A5P	227	A7P			
A6N	226	CK2N			
A6P	225	CK2P			
CK2N	224	A8N			
CK2P	223	A8P			
A7N	222	A9N			
A7P	221	A9P			

Footprint is ACM-2012

MT5335PKU

L200 EXC24C: A0N, A0P → AN00, AP00 (C320, C321 10P) → GND
L201 EXC24C: A1N, A1P → AN11, AP11 (C322, C323 10P) → GND
L202 EXC24C: A2N, A2P → AN22, AP22 (C324, C325 10P) → GND
L203 EXC24C: CK1N, CK1P → CLK11-, CLK11+ (C326, C327 10P) → GND
L204 EXC24C: A3N, A3P → AN33, AP33 (C328, C329 10P) → GND
L205 NC: A4N, A4P → AN44, AP44 (C330, C331 NC) → GND
L206 NC: A5N, A5P → AN55, AP55 (C332, C333 NC) → GND
L207 NC: A6N, A6P → AN66, AP66 (C334, C335 NC) → GND
L208 NC: CK2N, CK2P → CLK22-, CLK22+ (C336, C337 NC) → GND
L209 NC: A7N, A7P → AN77, AP77 (C338, C339 NC) → GND

P202

	39	40	
AP00	37	38	AN00
AP11	35	36	AN11
AP22	33	34	AN22
CLK11+	31	32	CLK11-
AP33	29	30	AN33
NC_R213	27	28	
NC_R212	25	26	
PANEL_CTL1	23	24	
PANEL_CTL2	21	22	
AP44	19	20	AN44
AP55	17	18	AN55
AP66	15	16	AN66
CLK22+	13	14	CLK22-
AP77	11	12	AN77
	9	10	
	7	8	
	5	6	
	3	4	
	1	2	

GND
NC_R213
NC_R212
AV33 R222 0R
AV33 R223 0R
PANEL_CTL1
PANEL_CTL2
VDD_PANEL
C260 0.1U → GND

DV33
DV33
R224 1K
C261 0.1U
PANEL_SLT
R232 NC
R227 390R
GND

5V_OUTSIDE
+5V
R25 NC
R26 NC
R26 FOR 19" 22" PANEL
R25 FOR OTHER +5V SUPPLY PANEL
12V
12V
35KEY_5V
L232 NC/30R
LVDS OUT
P209
C202 220U 16V
C258 0.1U
R219 10K
C209 1U
R221 100K
C259 0.1U
L233 30R
GND
TZ210
TZ212
Q203 AO4459
VDD_PANEL
LVDSVDD_EN
Q204 C143ZT

AV33
AV33
L221 600R
AVDD33_LVDS
C231 1U
C214 1U
C256 0.1U
AV33
AV33
L222 600R
AVDD33_VPLL
C220 1U
C232 1U
C257 0.1U
GND

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SSB v2: Flash Memory

B10 FLASH MEMORY

B10

U203
MT5335PKU
POCE0# 252
POOE# 251
PDD0 250
PDD1 249
CI_RB 245
CI_PDD2 248
POCE0_
POOE_
PDD0
PDD1
PARB_
PDD2
OIRI
JTMS
JTRST_
JTCK
JTDO
JTDI
U0RX 95
U0TX 94
OIRI_MT5335 93
JTMS 253
JTRST# 1
JTCK 256
JTDO 255
JTDI 254

U202
MX25L3205
HOLD# 1
VCC 2
NC 3
PO2 4
PO1 5
PO0 6
CS# 7
SO 8
SCLK 16
SI 15
PO6 14
PO5 13
PO4 12
PO3 11
GND 10
WP#/ACC 9
L223 600R
C240 1U
R289 10K
R2005 0R
R246 4K7
POCE0#
PDD0
POOE#
PDD1
FRESET#
DV33
GND

AV33
R233 10K
R234 10K
U0TX
U0RX
P201
RS-232
GND

+5V
Q3 BT3904
R90 10K
OIRI
OIRI_MT5335
R89 4K7
GND

+5V
6V3
C006 100U
C007 0.1U
USB_D-
USB_D+
R2011 0R
R2012 0R
R87 EZJZ1V270RA
R88 EZJZ1V270RA
P200
GND

DV33
R270 10K
R235 1K
TVTREFP#1
JTRST#
JTDI
JTMS
JTCK
JTDO
R239 33R
JTAG_DBGRQ
JTAG_DBGACK
P203
R236 10K
R237 10K
R238 10K
GND

DV33
C262 0.1U
C263 0.1U
C264 0.1U
C234 1U
C235 1U
GND

DV10
C237 1U
C236 1U
C265 0.1U
C266 0.1U
C267 0.1U
C270 0.1U
C269 0.1U
C268 0.1U
C272 0.1U
C271 0.1U
GND

DDRV_IC
C238 1U
C239 1U
C279 0.1U
C278 0.1U
C277 0.1U
C276 0.1U
C275 0.1U
C274 0.1U
C273 0.1U
GND

DV33
R244 4K7
R240 4K7
R241 4K7
R242 NC\4K7
OPWM2
AOBCK
AOLRCK
GND

Trap MODE	OPWM2	AOBLK	AOLRCK
NORMAL MODE	0	0	0
ICE MODE	0	0	1

TRAP MODE	OPCTRL5	OPCTRL4
CORE RESET 1 US	0	1

DV10
DDRV_IC
U203
MT5335PKU
VCCK 14
VCCK1 48
VCCK2 57
VCCK3 58
VCCK4 61
DVDD10 70
DVDD10_1 162
VCCK6 213
VCCK5 206
VCCK7 246
VCC2IO 10
VCC2IO1 12
VCC2IO2 16
VCC2IO3 27
VCC2IO4 30
VCC2IO5 52
VCC2IO6 54
VCC2IO7 55
VCC2IO8 56
VCC2IO9
VCC3IO_3_2 64
VCC3IO_3_1 197
VCC3IO_3 247
E-PAD 257
DV33
GND

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090331

SSB v2: SDRAM

B11 SDRAM **B11**

U203
MT5335PKU

U204
32M*16DDR

DDRV_IC

C349 IS CLOSE TO PIN33 OF DDR

1.25 x (1+120/110) = 2.6V

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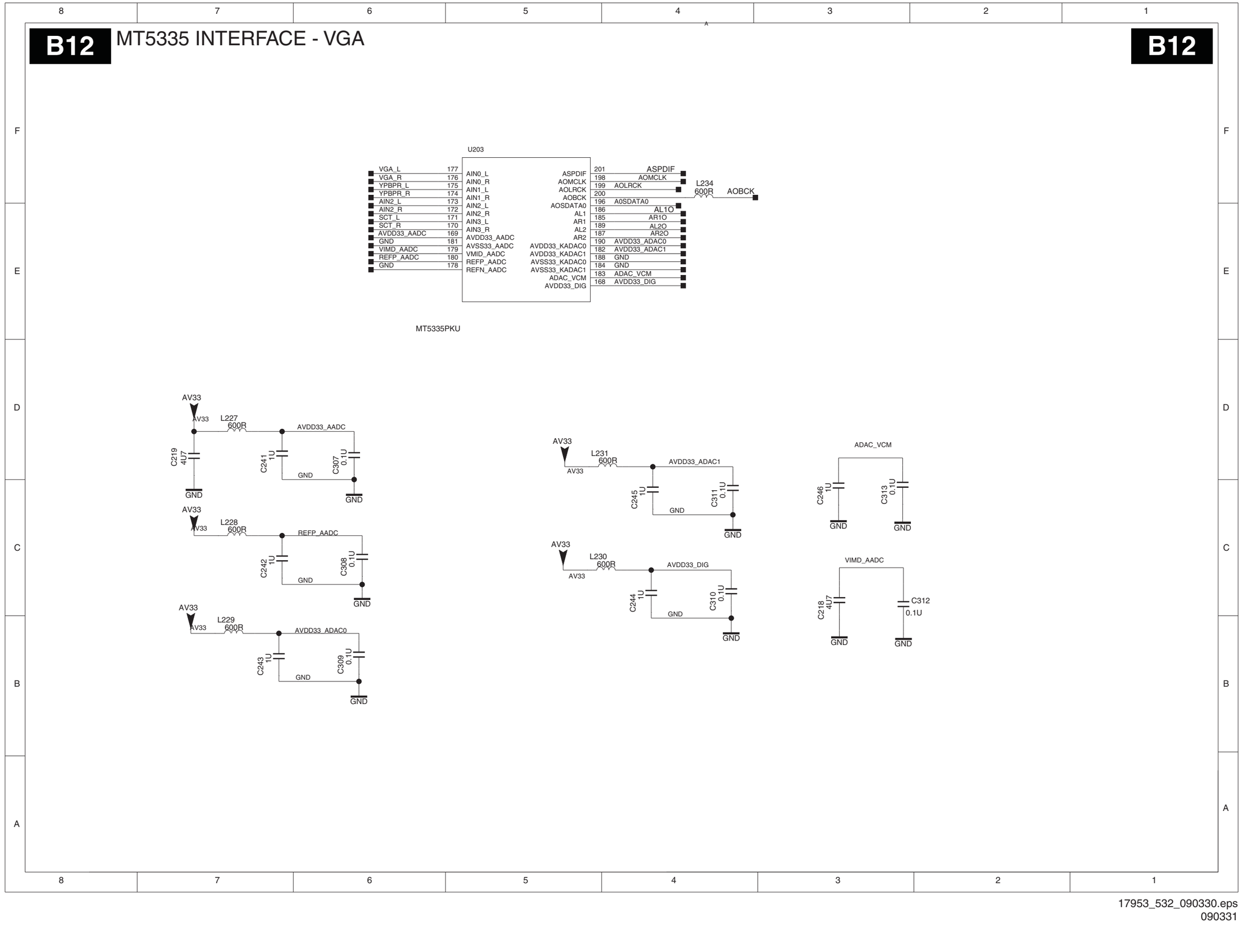
090331

SSB v2: MT5335 Interface VGA

B12 MT5335 INTERFACE - VGA B12



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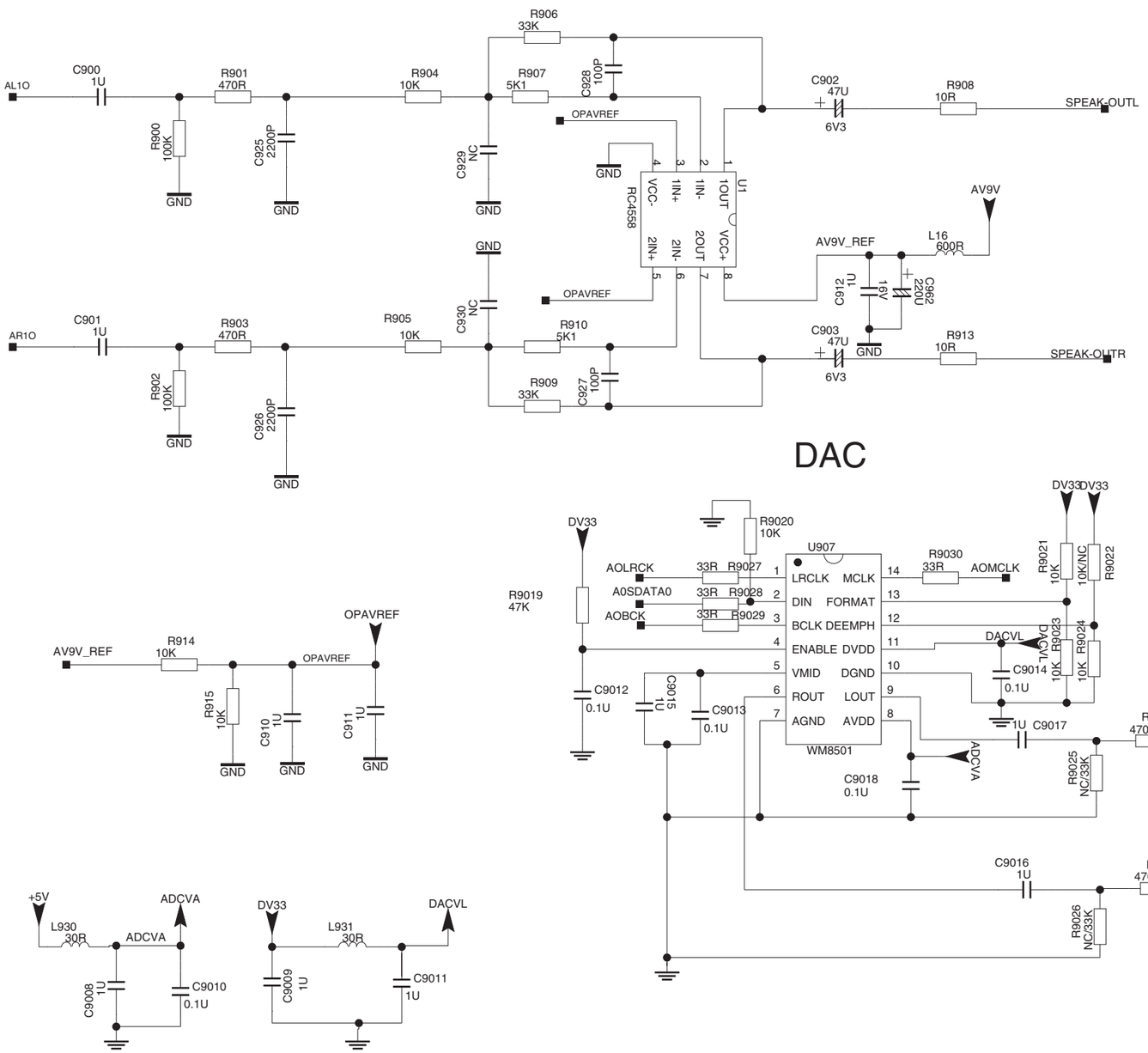
090331

SSB v2: D/A Converter

B13 DIGITAL-ANALOG-CONVERTER **B13**



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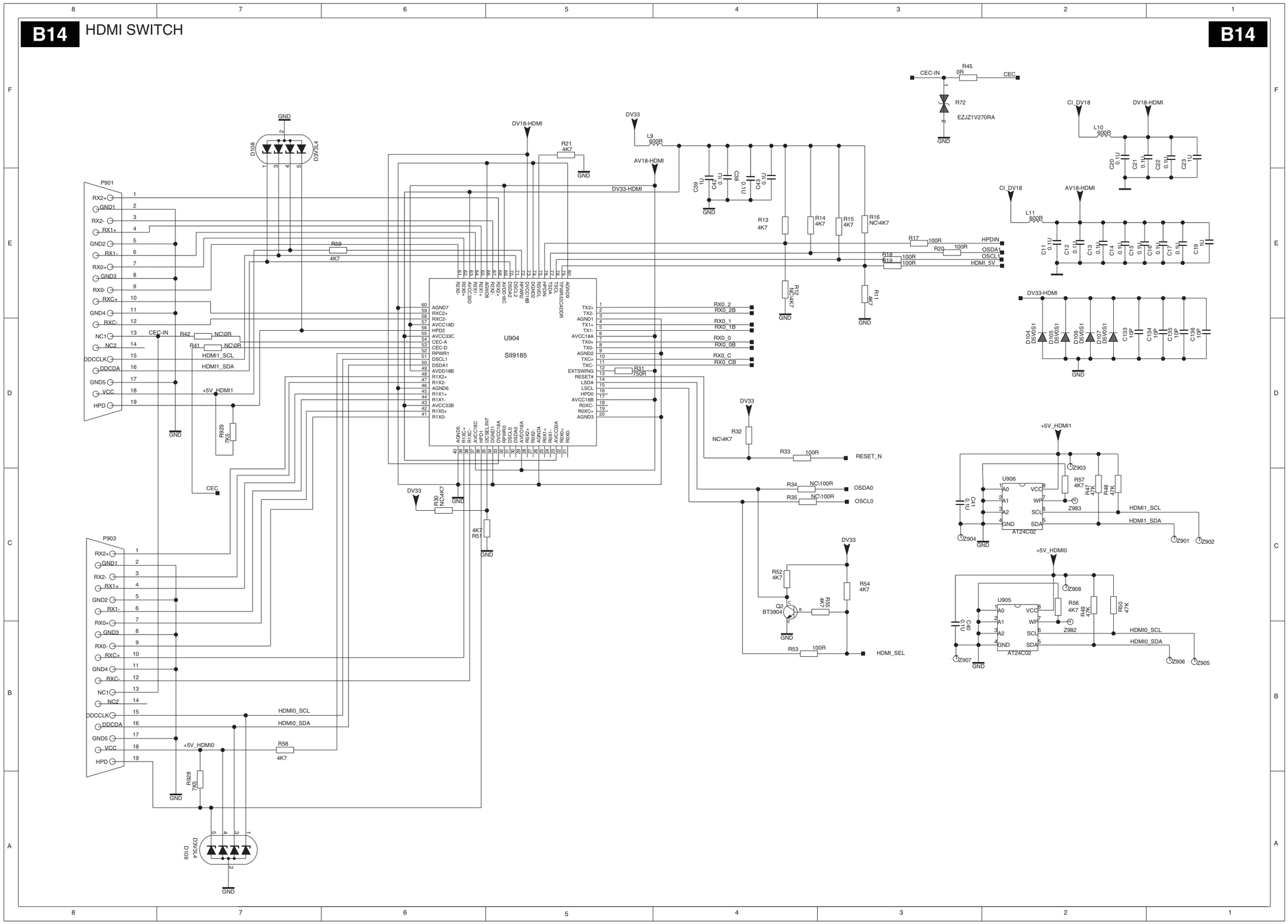
SSB v2: HDMI Switch



SSB v2: I/O Scart

B15 I/O - SCART

B15

P1
AOR 1 SCT1_AUR_OUT
AIR 12 SCT1_AUR_IN
AOL 2 SCT1_AUL_OUT
AGND 13
BGND 3
AIL 14 SCT1_AUL_IN
B 4 SCT1_B_IN
SWITCH 15 SCT1_FS_IN
GGND 5
CLKOUT 16
G 6 SCT1_G_IN
DATA 17
RGND 7
DATAGND 18
R 8 SCT1_R_IN
BLNK 19 STC1_FB_IN
VGND 9
BLNKGND 20
VOUT 10 SCT1_AV_OUT
VIN 21 SCT1_AV_IN
SHIELD 11
Z921 Z925 Z926 Z924 Z920 Z928 Z923 Z919 Z918 Z922 Z927
R63 R64 EZJZ1V270RA
EZJZ1V270RA
GND GND

Nearly Connector

SCT1_AV_IN L903 30R R968 75R C967 47P GND
SCT1_G_IN L904 30R R971 75R C970 16P R60 EZJZ1V270RA GND
SCT1_B_IN L905 30R R975 75R C973 16P R61 EZJZ1V270RA GND
SCT1_R_IN L906 30R R976 75R C976 16P R62 EZJZ1V270RA GND

Nearly 5335

R970 100R C968 0.047U SY0
C969 1U GND_SV
R969 68R C971 0.01U Y0P
R972 100R C972 0.01U Y0N
R973 68R C974 0.01U PB0P
R974 100R C975 0.01U PBR0N
R977 68R C977 0.01U PR0P
R978 100R C978 0.047U SC0

SCT1_AUR_OUT R67 EZJZ1V270RA
SCT1_AUL_OUT R68 EZJZ1V270RA
GND

NEARLY MT5335

STC1_FB_IN L907 30R R963 0R SOY0 C979 470P R960 75R R65 EZJZ1V270RA GND
SCT1_FS_IN L908 30R R961 33K SCART_FS_IN C980 470P R962 10K R66 EZJZ1V270RA GND

SCT1_AUR_IN L1 30R R964 10K C965 1U SCT_R
SCT1_AUL_IN L2 30R R965 10K C966 1U SCT_L
C963 470P C964 470P R966 10K R967 10K GND

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SSB v2: I/O Side AV, S-Video, Audio

B16 I/O - SIDE AV, SVIDEO, AUDIO

B16

Close to MT5382p

AV_5V
10R
L925
R9003
10K
C004
0.01U
C003
1U
GND
CVBS_OUT
R918
0R
D2SA
R919
NC
C001
47U
6V3
R920
1K
BC847C
Q815
R9004
75R
SCT1_AV_OUT
R924
0R
R923
0R
R9002
10K
R9001
470R
C002
47P
Q906
BC847C
R921
4K7
R944
4K7
CI_GPIO14

CVBS0
R945
100R
C953
0.047U
Z917
U203
CVBS1
CVBS2
SY0
SC0
SY1
SC1
D2SA
MT5335PKU
DVDD25_VADC
DVSS25_VADC
GND_TUNER
GD_CVBS
GND_SV
AVDD25_VADC
AVSS25_VADC
AVDD25_REF
AVSS25_REF
AVDD25_VFE
AVSS25_VFE
GND_CVBS
C920
1U
GND_TUNER

P902
Z975
Z974
Nearly Connector
L915
30R
R70
EZJZ1V270RA
R947
75R
C958
47P
Nearly 5335
R946
100R
C959
0.047U
SY1
L916
30R
R69
EZJZ1V270RA
R949
75R
C960
47P
R948
100R
C961
0.047U
SC1

AV25
L911
600R
DVDD25_VADC
C916
1U
C954
0.1U
L912
600R
AVDD25_VADC
C917
1U
C955
0.1U
L913
600R
AVDD25_REF
C918
1U
C956
0.1U
L914
600R
AVDD25_VFE
C919
1U
C957
0.1U

Z980
Z981
P902
WHITE
RED
YELLOW
L926
30R
L927
30R
R9010
10K
R9009
10K
C9001
1U
C9002
1U
AIN2_L
AIN2_R
C9004
470P
C9003
470P
R9012
10K
R9011
10K
R71
EZJZ1V270RA
L928
30R
R9013
100R
C9006
0.047U
CVBS2
Z976
R9014
75R
C9007
47P
C915
1U
GND_CVBS
Z978

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SSB v2: MT5335 Interface YPbPr & VGA

B17 MT5335 INTERFACE - YPbPr, VGA

B17

Nearly Connector

Nearly 5335

WHITE 1 YPBPR_L_IN
GREEN 2 Y_IN 3
RED 4 YPBPR_R_IN
BLUE 5 PB_IN 6
RED PR_IN 7
VGA_R_IN 10
VGA_L_IN 9
P907 8

R74 EZJZ1V270RA
R77 EZJZ1V270RA
GND R75 EZJZ1V270RA
R76 EZJZ1V270RA

Y_IN L4 30R → R982 75R, C731 16P → GND
R984 0R → C728 4700P → SOY1
R981 68R → C730 0.01U → Y1P
R983 100R → C729 0.01U → Y1N

PB_IN L5 30R → R985 75R, C727 16P → GND
R986 68R → C726 0.01U → PB1P
R987 100R → C725 0.01U → PBR1N

PR_IN L6 30R → R988 75R, C724 16P → GND
R989 68R → C723 0.01U → PR1P

U203 MT5335PKU

SOY0	107	SOY0	DVDD12_VGA	117	DVDD12_VGA
Y0P	108	Y0P	AVSS12_RGBADC	113	GND
Y0N	109	Y0N	AVDD12_RGBADC	110	AVDD12_RGBADC
PB0P	114	PB0P	AVSS12_RGBFE	105	GND
PBR0N	115	PBR0N	AVDD12_RGBFE	101	AVDD12_RGBFE
PR0P	116	PR0P			
SOY1	118	SOY1	RP	104	RP
Y1P	119	Y1P	RN	106	RN
Y1N	120	Y1N	BP	98	BP
PB1P	121	PB1P	BN	99	BN
PBR1N	122	PBR1N	GP	102	GP
PR1P	123	PR1P	GN	103	GN
Z939			VSYNC	96	VSYNC
Z940	112	TN1	HSYNC	97	HSYNC
	111	TP1	SOG	100	SOG

AV12 → L909 600R → DVDD12_VGA; C987 1U, C988 0.1U → GND
AV12 → L910 600R → AVDD12_RGBADC; C989 1U, C990 0.1U → GND
AV12 → L3 600R → AVDD12_RGBFE; C991 1U, C992 0.1U → GND

Z929 → P904 2 SPDIF_OUT → C732 0.1U → R979 100R → ASPDIF
BLACK 1 → GND
C993 33P, R980 100R → GND
R73 EZJZ1V270RA

YPBPR_L_IN L8 30R → R990 10K → C721 1U → YPBPR_L
YPBPR_R_IN L7 30R → R991 10K → C720 1U → YPBPR_R
C719 470P, C722 470P, R992 10K, R993 10K → GND

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SSB v2: I/O VGA

B18 I/O - VGA **B18**

P908
VGASCL_IN
W/P_CTR
VSYNC_IN
BLUE
HSYNC_IN
GREEN
VGASDA_IN
RED
R716 0R W/P
VGA_PLUGPWR
+5V
D913 BAV70
C005 ESD_0402
R84 EZJZ1V270RA
R85 EZJZ1V270RA
R86 EZJZ1V270RA
Nearly Connector
GREEN L918 30R
BLUE L919 30R
RED L920 30R
R996 75R
R999 75R
R702 75R
C715 16P
C711 16P
C708 16P
R998 0R C712 4700P SOG
R719 33R C714 0.01U GP
R997 100R C713 0.01U GN
R720 33R C710 0.01U BP
R701 100R C709 0.01U BN
R721 33R C707 0.01U RP
R703 100R C706 0.01U RN
Nearly 5335
VGA_PLUGPWR
C996 0.1U
U903 AT24C02
R715 10K
W/P
VGASCL
VGASDA
R712 100R
R714 10K
R713 100R
Q903 C143ZT
Q904 C143ZT
U0TX
U0RX
SW_UPDATE_CTL1
Q905 C143ZT
R725 10K
Z949 Z950
VGA_R_IN
VGA_L_IN
L924 30R
L923 30R
R704 10K
R705 10K
C702 1U
C701 1U
VGA_R
VGA_L
C999 470P
C703 470P
R706 10K
R707 10K
HSYNC_IN
L921 30R
HSYNC
R82 EZJZ1V270RA
R718 22K
C705 10P
VSYNC_IN
L922 30R
VSYNC
R83 EZJZ1V270RA
R717 22K
C704 10P
R80 EZJZ1V270RA
R709 100R
R708 10K
C998 16P
R81 EZJZ1V270RA
R711 100R
R710 10K
C997 16P
5VSB
GND

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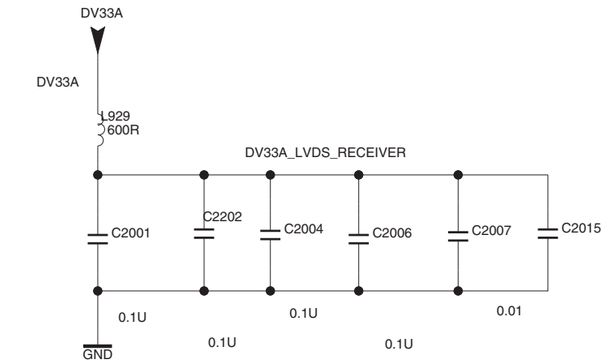
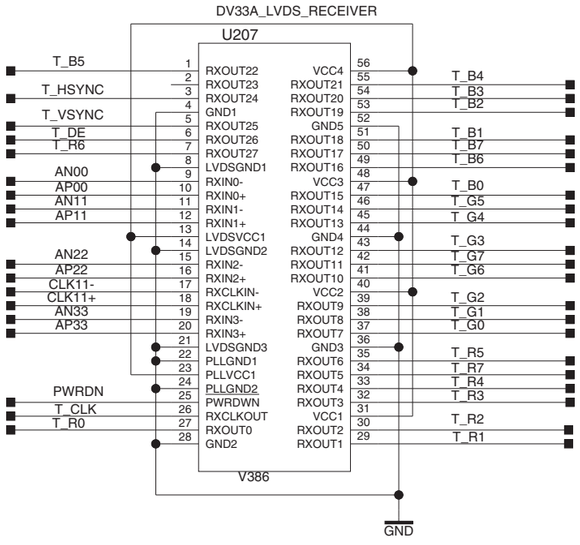
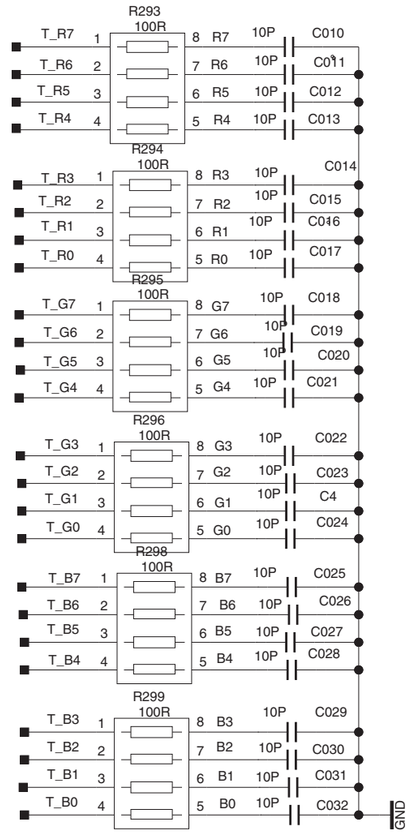
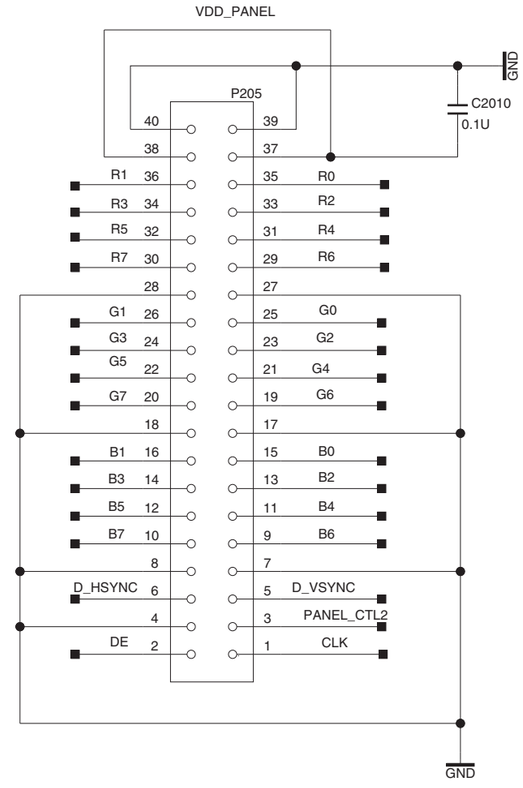
SSB v2: LVDS Receiver

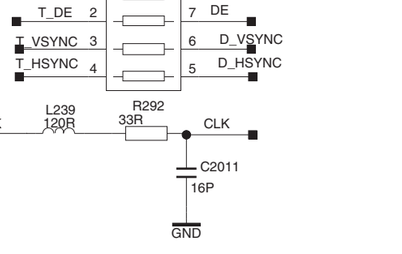
B19 LVDS RECEIVER **B19**

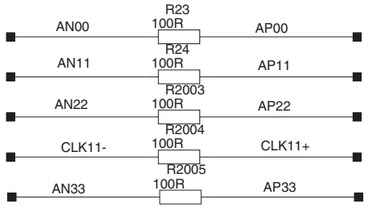


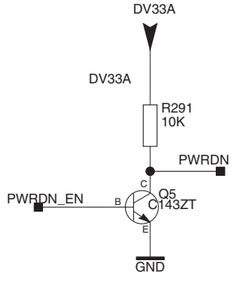












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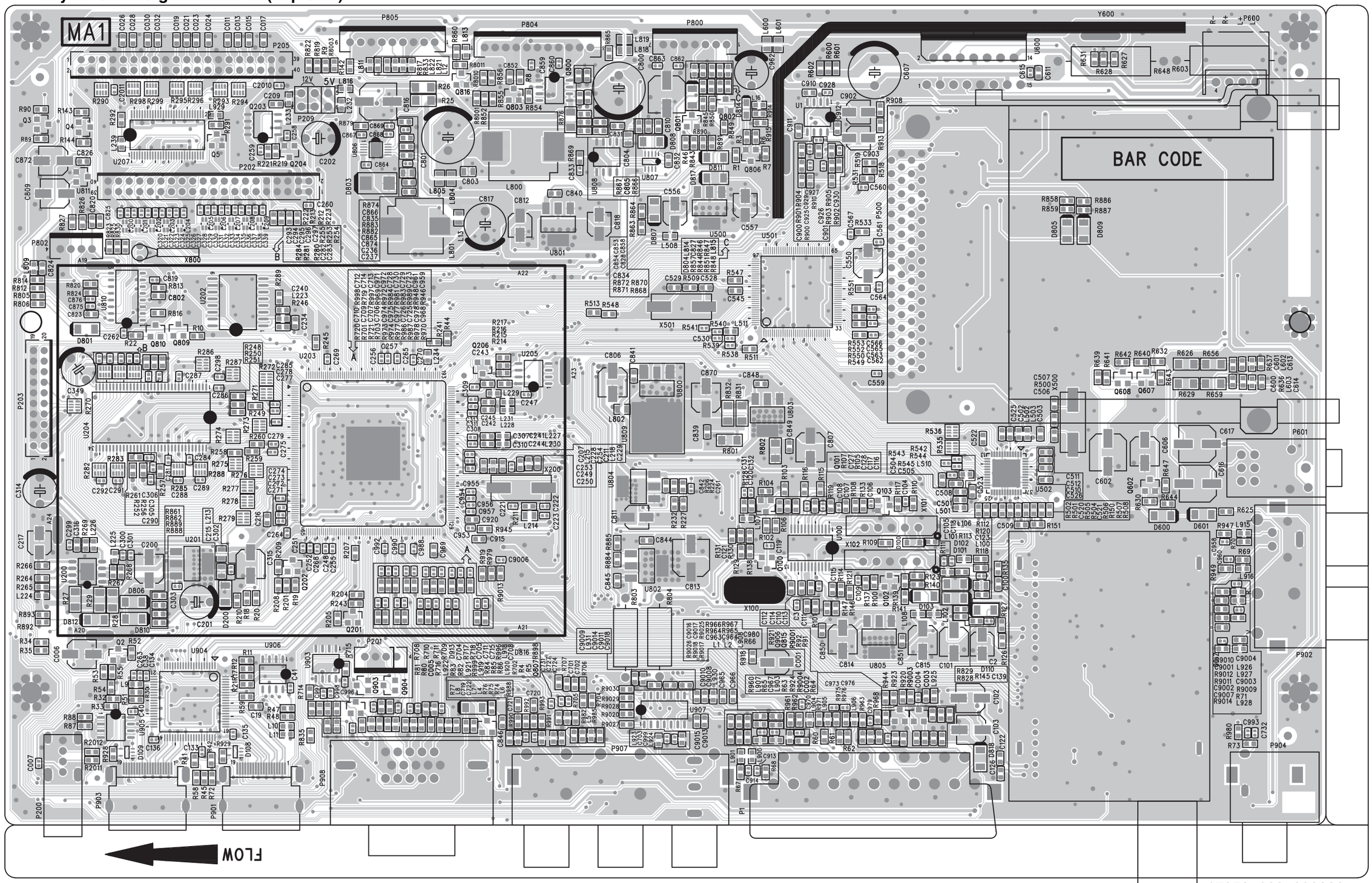
Layout Small Signal Board v2 (Top Side)



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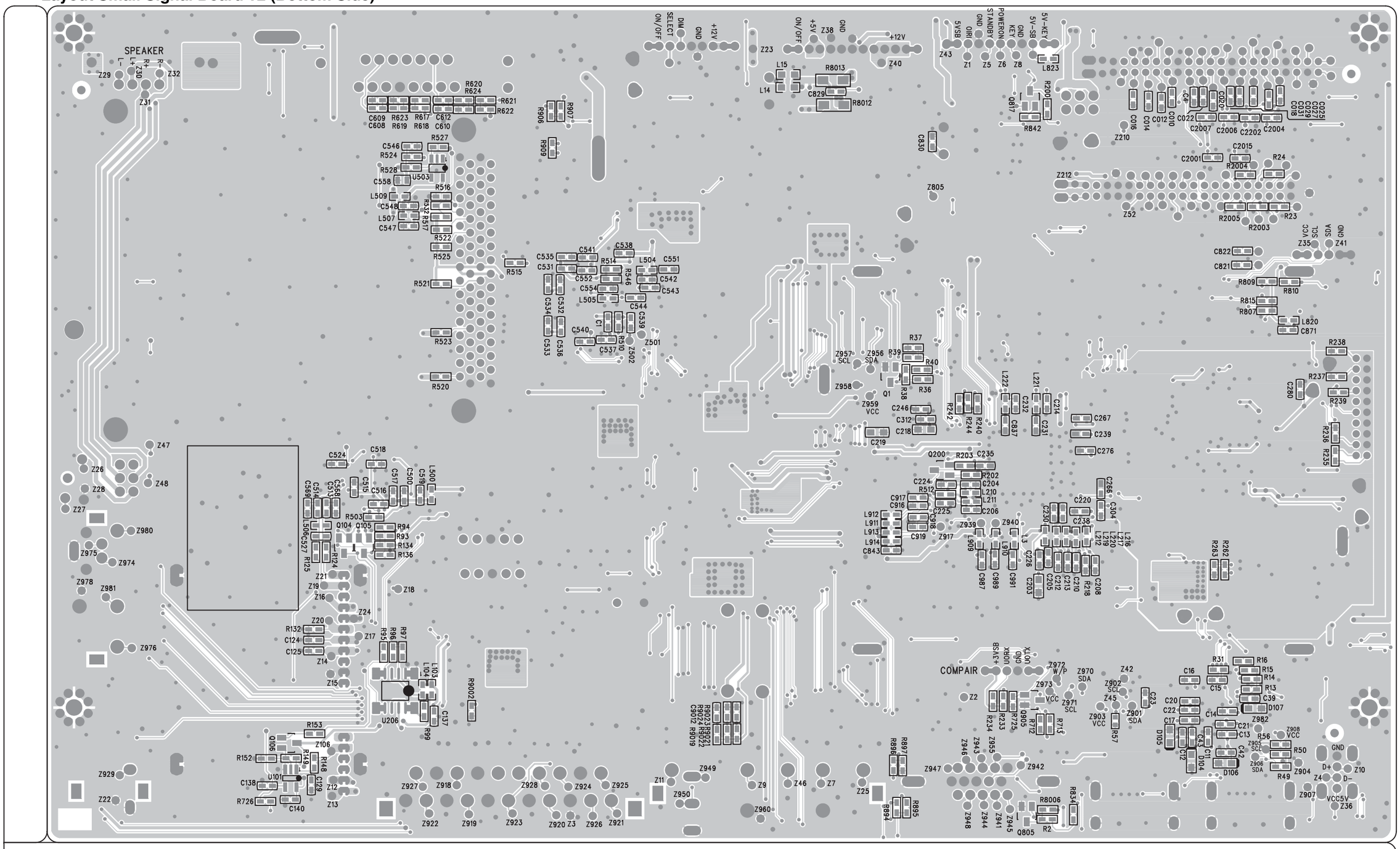
Layout Small Signal Board v2 (Bottom Side)



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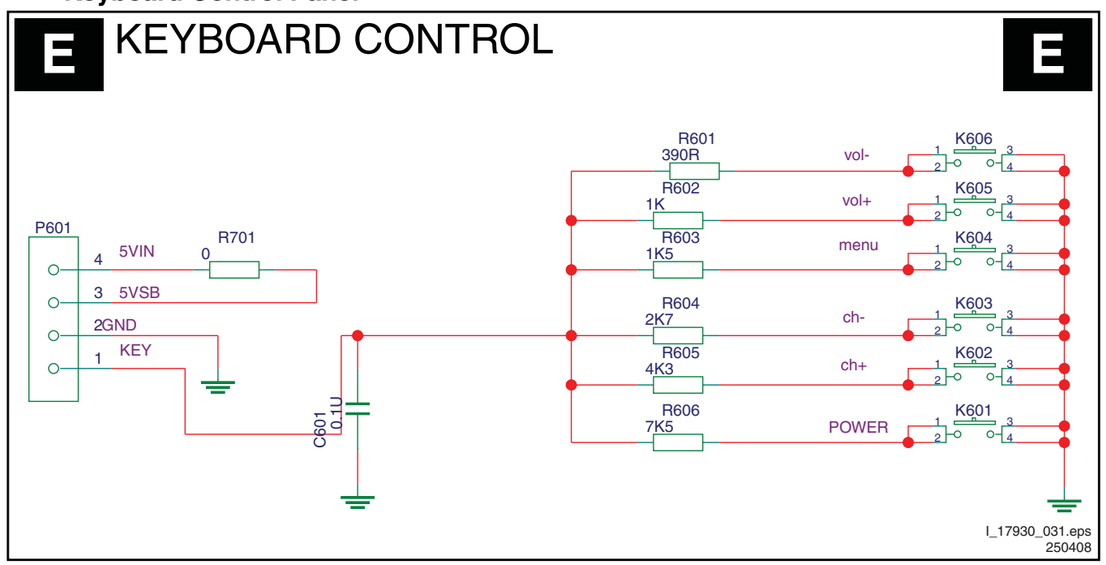
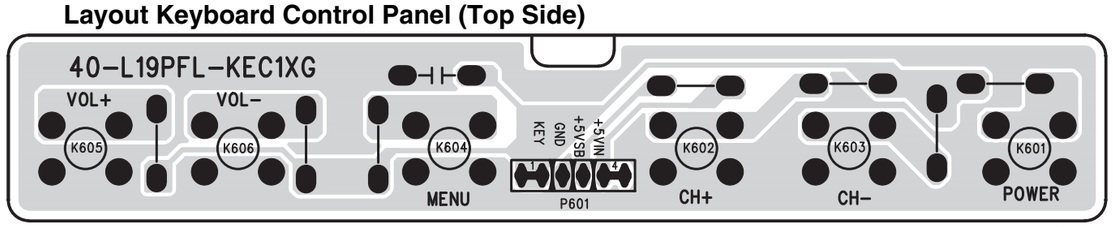
Keyboard Control Panel



Layout Keyboard Control Panel (Top Side)



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Inverter Panel

I INVERTER

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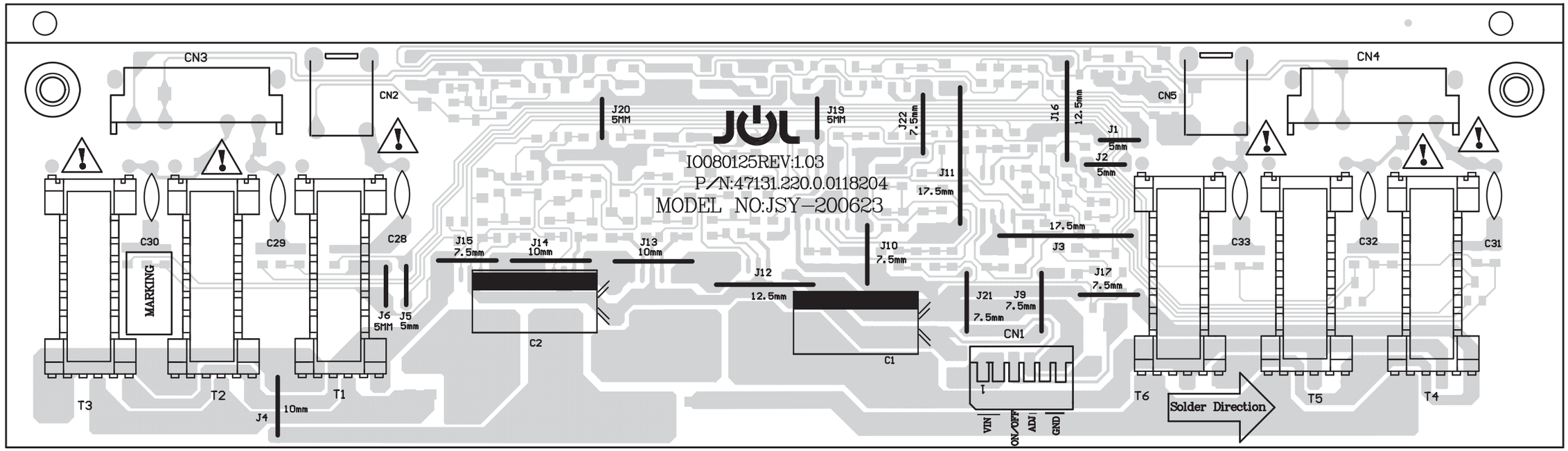
Layout Inverter Panel (Top Side)



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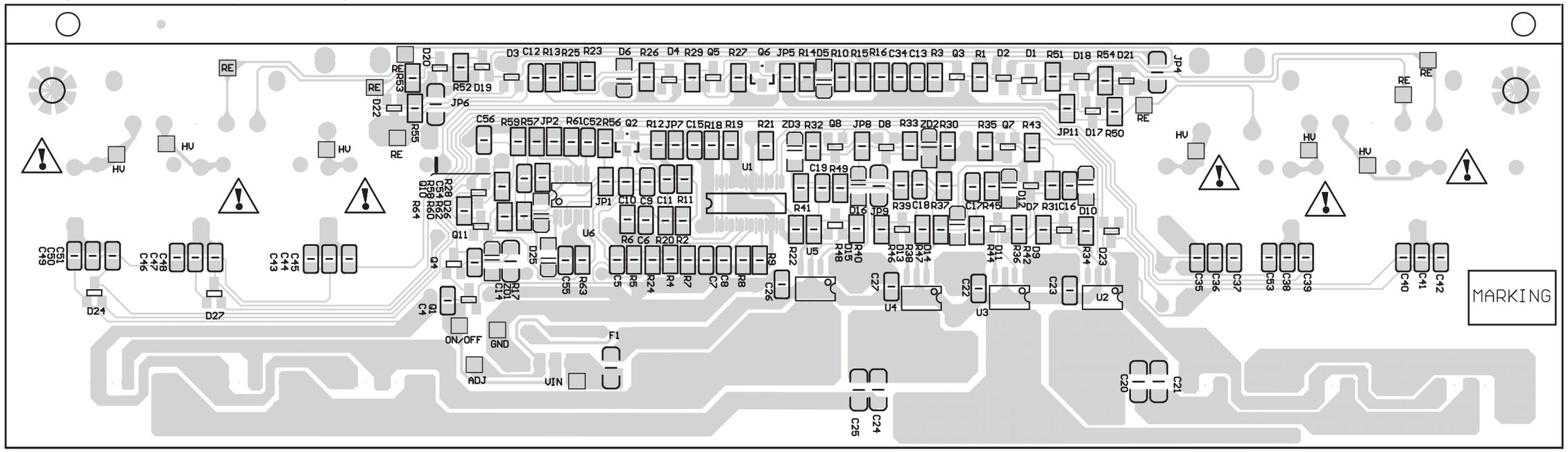
Layout Inverter Panel (Bottom Side)



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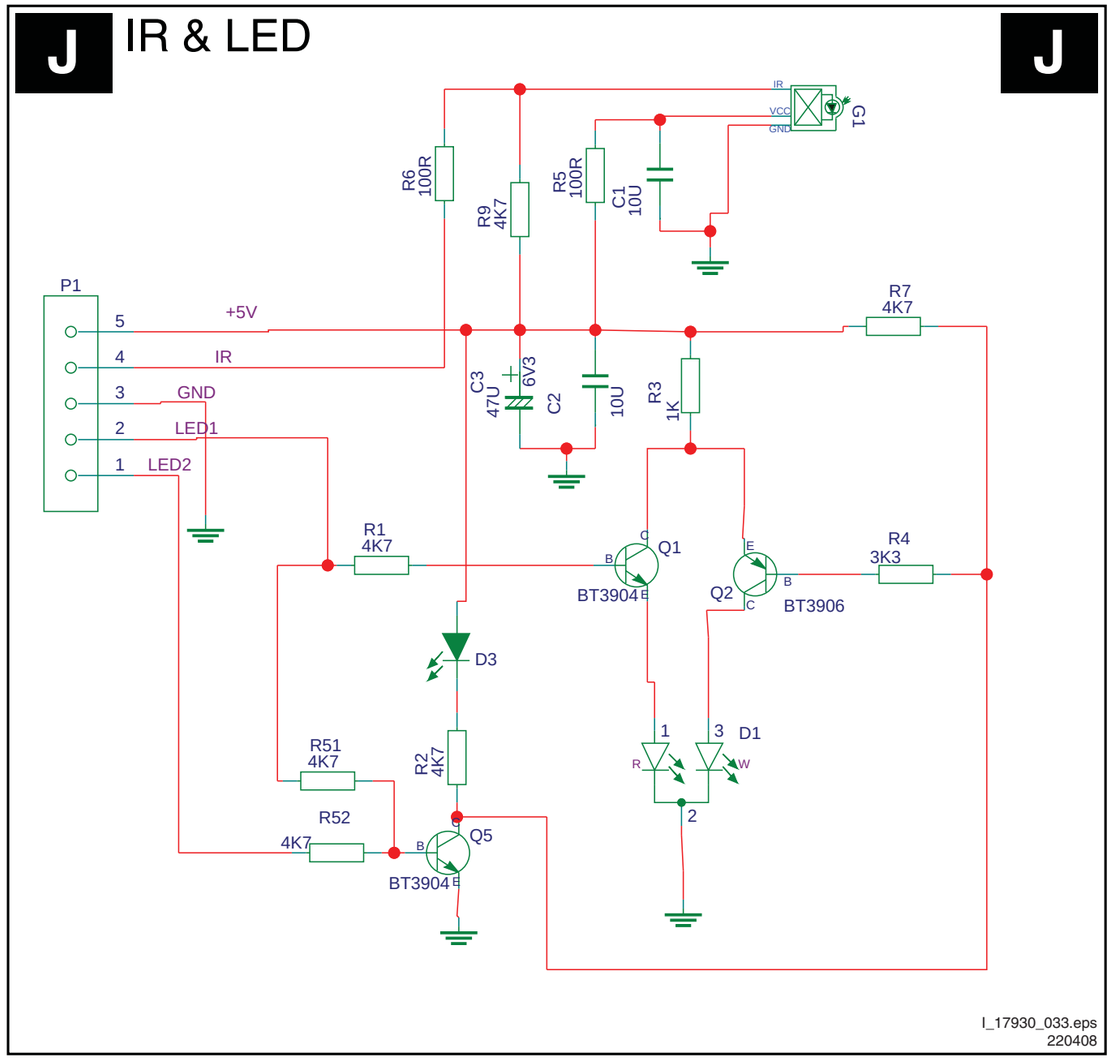
IR LED Panel



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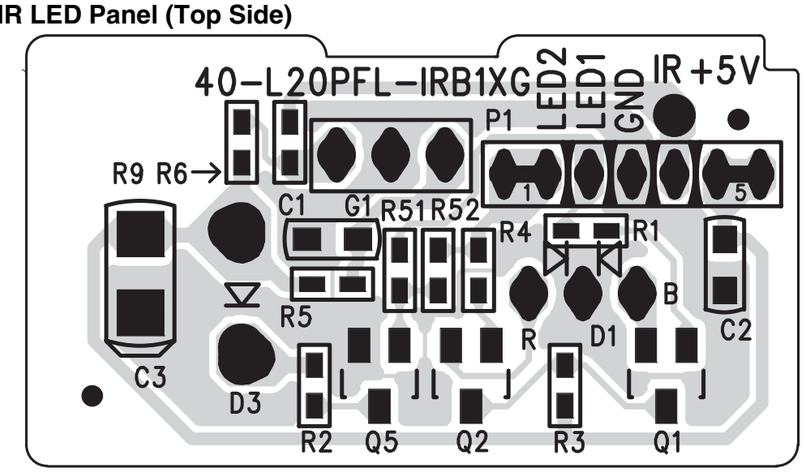
Layout IR LED Panel (Top Side)



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220408

Personal Notes:

E_06532_012.eps
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8. Alignments

Index of this chapter:

Note:
The Service Modes are described in chapter 5. Menu navigation is done with the CURSOR UP, DOWN, LEFT or RIGHT keys of the remote control transmitter.

8.1 Electrical Alignments

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 60 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: R_i > 10 MΩ, C_i < 20 pF.
- Use an isolated trimmer/screwdriver to perform alignments.

8.2 Hardware Alignments

Not applicable.

8.3 Software Alignments

8.3.1 White Balance Adjustment (VGA Mode)

Only VGA input requires colour temperature adjustment as all other inputs or relative ones. Both WARM and COOL colour coordinates are also relatives to NORMAL colour temperature mode ones.
Equipment requirements: Colour analyser (e.g Minolta CA-210).
Pre conditions:

- Picture Preset: Standard.
- Black Expand: Off.
- Tone: Normal.
- Dynamic Contrast: Off.

Colour Temp Alignment
Apply a 1366×768@50Hz signal with white pattern, set “brightness” at 100%, and “contrast” at 50%. Adjust the R, G, and B sub-gain for the screen centre.
The 1931 CIE chromaticity (x, y) co-ordinates shall be:

Table 8-1 Alignment for 19", 20", and 22" with colour analyser

	Cool (9000K)	Normal (8000K)	Warm (6500K)
x (70 IRE)	0.289 +/- 0.003	0.296 +/- 0.003	0.314 +/- 0.003
y (70 IRE)	0.291 +/- 0.003	0.299 +/- 0.003	0.319 +/- 0.003

Table 8-2 Alignment for 26" with a colour analyser

	Cool (11000K)	Normal (9000K)	Warm (6500K)
x (70 IRE)	0.278 +/- 0.003	0.289 +/- 0.003	0.314 +/- 0.003
y (70 IRE)	0.278 +/- 0.003	0.291 +/- 0.003	0.319 +/- 0.003

8.3.2 Display Code

When after an SSB or display exchange, the display option code is not set properly; it will result in a TV with “no display” or strange resolution.
Therefore, it is required to set this display option code after such a repair.
To do so, press (slowly) the following key sequence on a standard RC transmitter: **“062598”** directly followed by **“MENU**” and **“xxx”**, where “xxx” is a 3 digit decimal value of the panel type: see column “Display code” in table below.
When ready, the set will go to stand-by.
After this, perform a cold start.

LCD Panel:	Display Code:
AUO 19”	096
CMO 19” - M190Z1-L01	094
LG 20” - LC201V02-SDD1	093
AUO 22”	097
CMO 22” - M220Z1-L03	022
AUO 26” - T260XW03 V3	030
AUO 26” VM	098
CMO 26”	095

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.

9.1 Introduction

This chassis is a digital derivative from the TCM1.0E LA chassis and supports DVB-T reception. It uses the Mediatek MT5335 main chip. It processes the following input/output signals:

- Analog and digital RF signals (PAL B/G, D/K, I, SECAM B/G, D/K, L/L', DVB-T)
- SCART input signals (CVBS & RGB)
- CMP input signals (YPbPr)
- VGA input signals
- HDMI input signals, v1.2 compliant, with HDCP, audio included as EIA-861B standard
- S-Video input
- Headphone output
- SPDIF output.

The platform is also designed for the lowest power consumption in off/stand-by mode (<0.3W) to fulfil new Philips CE environment policy requirement.
The MT5335 is surrounded by a tuner, a video demodulator, a HDMI interface, SDR and flash memory, an audio amplifier, and optionally a stand-by microprocessor (26"). For the smaller set versions also the inverter board is serviceable.

For the block diagram, refer also to chapter 6 "Block diagrams, Test Point Overviews, and Waveforms".

9.2 Block Diagram

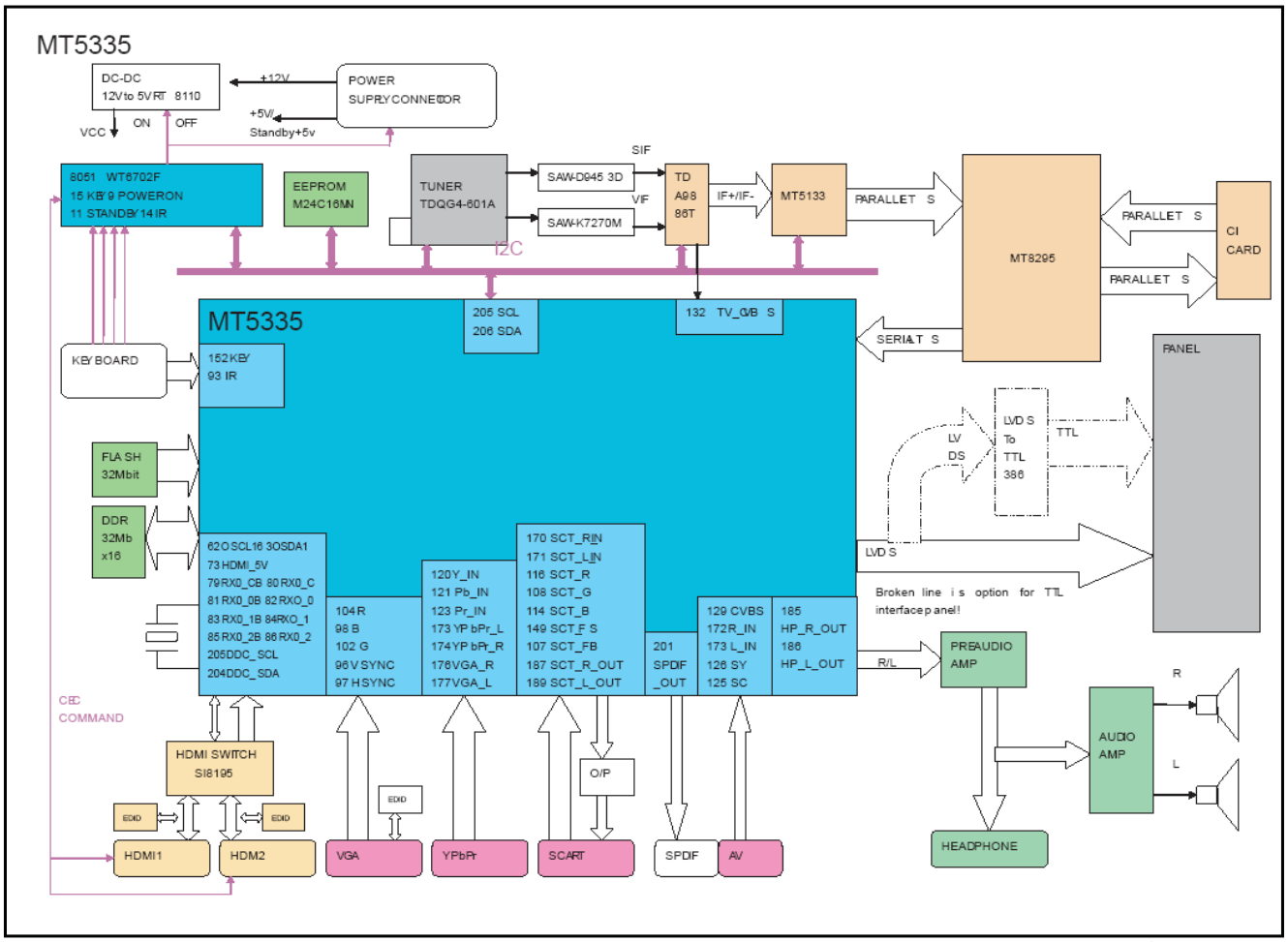

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Figure 9-1 Block diagram

9.3 Abbreviation List

0/6/12	SCART switch control signal on A/V board. 0 = loop through (AUX to TV), 6 = play 16 : 9 format, 12 = play 4 : 3 format
1080i	1080 visible lines, interlaced
1080p	1080 visible lines, progressive scan
2DNR	Spatial (2D) Noise Reduction
3DNR	Temporal (3D) Noise Reduction
AARA	Automatic Aspect Ratio Adaptation: algorithm that adapts aspect ratio to remove horizontal black bars; keeps 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
ANR	Automatic Noise Reduction: one of the algorithms of Auto TV
AP	Asia Pacific
AR	Aspect Ratio: 4 by 3 or 16 by 9
ASF	Auto Screen Fit: algorithm that adapts aspect ratio to remove horizontal black bars without discarding video information
ATSC	Advanced Television Systems Committee, the digital TV standard in the USA
ATV	See Auto TV
Auto TV	A hardware and software control system that measures picture content, and adapts image parameters in a dynamic way
AV	External Audio Video
AVC	Audio Video Controller
AVIP	Audio Video Input Processor
B/G	Monochrome TV system. Sound carrier distance is 5.5 MHz
BLR	Board-Level Repair
BTSC	Broadcast Television Standard Committee. Multiplex FM stereo sound system, originating from the USA and used e.g. in LATAM and AP-NTSC countries
B-TXT	Blue TeleteXT
C	Centre channel (audio)
CEC	Consumer Electronics Control bus: remote control bus on HDMI connections
CL	Constant Level: audio output to connect with an external amplifier
CLR	Component Level Repair
COLUMBUS	COlor LUMinance Baseband Universal Sub-system
ComPair	Computer aided rePair
CP	Connected Planet / Copy Protection
CSM	Customer Service Mode
CTI	Color Transient Improvement: manipulates steepness of chroma transients
CVBS	Composite Video Blanking and Synchronization
DAC	Digital to Analogue Converter
DBE	Dynamic Bass Enhancement: extra low frequency amplification
DDC	See “E-DDC”
D/K	Monochrome TV system. Sound carrier distance is 6.5 MHz
DFI	Dynamic Frame Insertion
DFU	Directions For Use: owner's manual
DMR	Digital Media Reader: card reader
DMSD	Digital Multi Standard Decoding
DNM	Digital Natural Motion
DNR	Digital Noise Reduction: noise reduction feature of the set
DRAM	Dynamic RAM
DRM	Digital Rights Management
DSP	Digital Signal Processing
DST	Dealer Service Tool: special remote control designed for service technicians
DTCP	Digital Transmission Content Protection; A protocol for protecting digital audio/video content that is traversing a high speed serial bus, such as IEEE-1394
DVB-C	Digital Video Broadcast - Cable
DVB-T	Digital Video Broadcast - Terrestrial
DVD	Digital Versatile Disc
DVI(-d)	Digital Visual Interface (d= digital only)
E-DDC	Enhanced Display Data Channel (VESA standard for communication channel and display). Using E-DDC, the video source can read the EDID information form the display.
EDID	Extended Display Identification Data (VESA standard)
EEPROM	Electrically Erasable and Programmable Read Only Memory
EMI	Electro Magnetic Interference
EPLD	Erasable Programmable Logic Device
EU	Europe
EXT	EXTernal (source), entering the set by SCART or by cinches (jacks)
FBL	Fast BLanking: DC signal accompanying RGB signals
FDS	Full Dual Screen (same as FDW)
FDW	Full Dual Window (same as FDS)
FLASH	FLASH memory
FM	Field Memory or Frequency Modulation
FPGA	Field-Programmable Gate Array
FTV	Flat TeleVision
Gb/s	Giga bits per second
G-TXT	Green TeleteXT
H	H_sync to the module
HD	High Definition
HDD	Hard Disk Drive
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
HP	HeadPhone
I	Monochrome TV system. Sound carrier distance is 6.0 MHz
I^2C	Inter IC bus
I^2D	Inter IC Data bus
I^2S	Inter IC Sound bus
IF	Intermediate Frequency
Interlaced	Scan mode where two fields are used to form one frame. Each field contains

	half the number of the total amount of lines. The fields are written in “pairs”, causing line flicker.
IR	Infra Red
IRQ	Interrupt Request
ITU-656	The ITU Radio communication Sector (ITU-R) is a standards body subcommittee of the International Telecommunication Union relating to radio communication. ITU-656 (a.k.a. SDI), is a digitized video format used for broadcast grade video. Uncompressed digital component or digital composite signals can be used. The SDI signal is self-synchronizing, uses 8 bit or 10 bit data words, and has a maximum data rate of 270 Mbit/s, with a minimum bandwidth of 135 MHz.
ITV	Institutional TeleVision; TV sets for hotels, hospitals etc.
JOP	Jaguar Output Processor
LS	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 to the customer's preferences
LATAM	Latin America
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
LORE	LOcal REgression approximation noise reduction
LPL	LG.Philips LCD (supplier)
LS	Loudspeaker
LVDS	Low Voltage Differential Signalling
Mbps	Mega bits per second
M/N	Monochrome TV system. Sound carrier distance is 4.5 MHz
MIPS	Microprocessor without Interlocked Pipeline-Stages; A RISC-based microprocessor
MOP	Matrix Output Processor
MOSFET	Metal Oxide Silicon Field Effect Transistor, switching device
MPEG	Motion Pictures Experts Group
MPIF	Multi Platform InterFace
MUTE	MUTE Line
NC	Not Connected
NICAM	Near Instantaneous Compounded Audio Multiplexing. This is a digital sound system, mainly used in Europe.
NTC	Negative Temperature Coefficient, non-linear resistor
NTSC	National Television Standard Committee. Color system mainly used in North America and Japan. Color 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 such as alignments
O/C	Open Circuit
OSD	On Screen Display
OTC	On screen display Teletext and Control; also called Artistic (SAA5800)
P50	Project 50: communication protocol between TV and peripherals
PAL	Phase Alternating Line. Color system mainly used in West Europe (color carrier= 4.433619 MHz) and South America (color carrier PAL M= 3.575612 MHz and PAL N= 3.582056 MHz)
PCB	Printed Circuit Board (same as “PWB”)
PCM	Pulse Code Modulation
PDP	Plasma Display Panel
PFC	Power Factor Corrector (or Pre-conditioner)
PIP	Picture In Picture
PLL	Phase Locked Loop. Used for e.g. FST tuning systems. The customer can give directly the desired frequency
POR	Power On Reset, signal to reset the uP
Progressive Scan	Scan mode where all scan lines are displayed in one frame at the same time, creating a double vertical resolution.
PTC	Positive Temperature Coefficient, non-linear resistor
PWB	Printed Wiring Board (same as “PCB”)
PWM	Pulse Width Modulation
QRC	Quasi Resonant Converter
QTNR	Quality Temporal Noise Reduction
QVCP	Quality Video Composition Processor
RAM	Random Access Memory
RGB	Red, Green, and Blue. The primary color signals for TV. By mixing levels of R, G, and B, all colors (Y/C) are reproduced.
RC	Remote Control
RC5 / RC6	Signal protocol from the remote control receiver
RESET	RESET signal
ROM	Read Only Memory
R-TXT	Red TeleteXT
SAM	Service Alignment Mode
S/C	Short Circuit
SCART	Syndicat des Constructeurs d'Appareils Radiorécepteurs et Téléviseurs
SCL	Serial Clock I^2C
SCL-F	CLock Signal on Fast I^2C bus
SD	Standard Definition
SDA	Serial Data I^2C
SDA-F	DAta Signal on Fast I^2C bus
SDI	Serial Digital Interface, see “ITU-656”
SDRAM	Synchronous DRAM
SECAM	SEequence Couleur Avec Mémoire. Color system mainly used in France and East Europe. Color carriers= 4.406250 MHz and 4.250000 MHz
SIF	Sound Intermediate Frequency
SMPS	Switched Mode Power Supply
SoC	System on Chip
SOG	Sync On Green
SOPS	Self Oscillating Power Supply
S/PDIF	Sony Philips Digital InterFace
SRAM	Static RAM
SRP	Service Reference Protocol
SSB	Small Signal Board
STBY	STand-BY
SVGA	800x600 (4:3)
SVHS	Super Video Home System
SW	Software
SWAN	Spatial temporal Weighted Averaging Noise reduction
SXGA	1280x1024
TFT	Thin Film Transistor
THD	Total Harmonic Distortion
TMDS	Transmission Minimized Differential Signalling
TXT	TeleteXT
TXT-DW	Dual Window with TeleteXT
UI	User Interface
uP	Microprocessor
UXGA	1600x1200 (4:3)

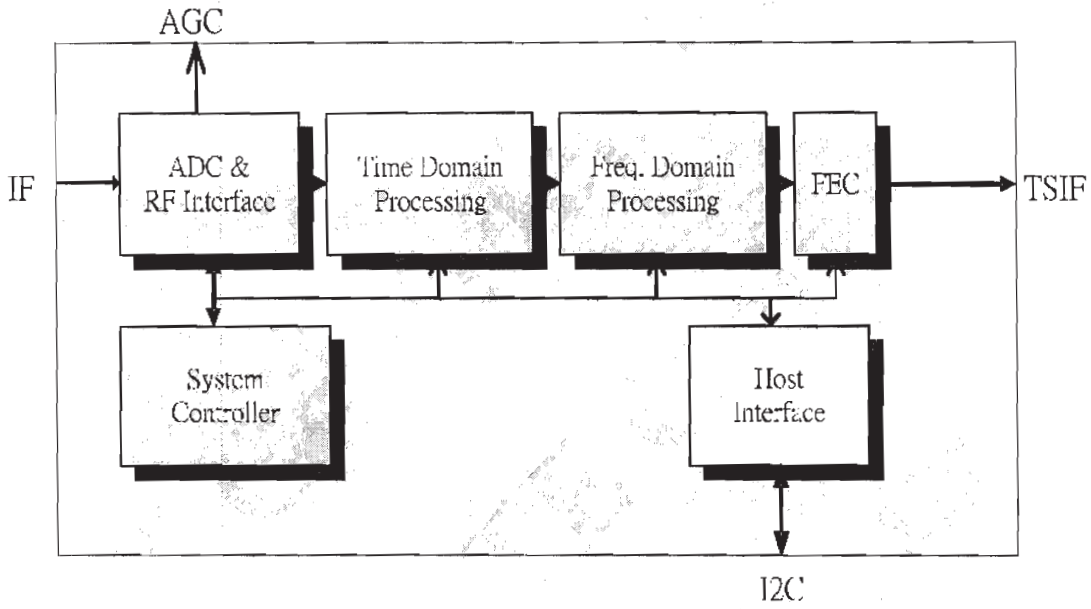
V	V-sync to the module
VCR	Video Cassette Recorder
VESA	Video Electronics Standards Association
VGA	640x480 (4:3)
VL	Variable Level out: processed audio output toward external amplifier
VSB	Vestigial Side Band; modulation method
WYSIWYR	What You See Is What You Record: record selection that follows main picture and sound
WXGA	1280x768 (15:9)
XTAL	Quartz crystal
XGA	1024x768 (4:3)
Y	Luminance signal
Y/C	Luminance (Y) and Chrominance (C) signal
YPbPr	Component video. Luminance and scaled color difference signals (B-Y and R-Y)
YUV	Component video

9.4 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).

9.4.1 Diagram B, MT5133

Block Diagram



Pin Configuration

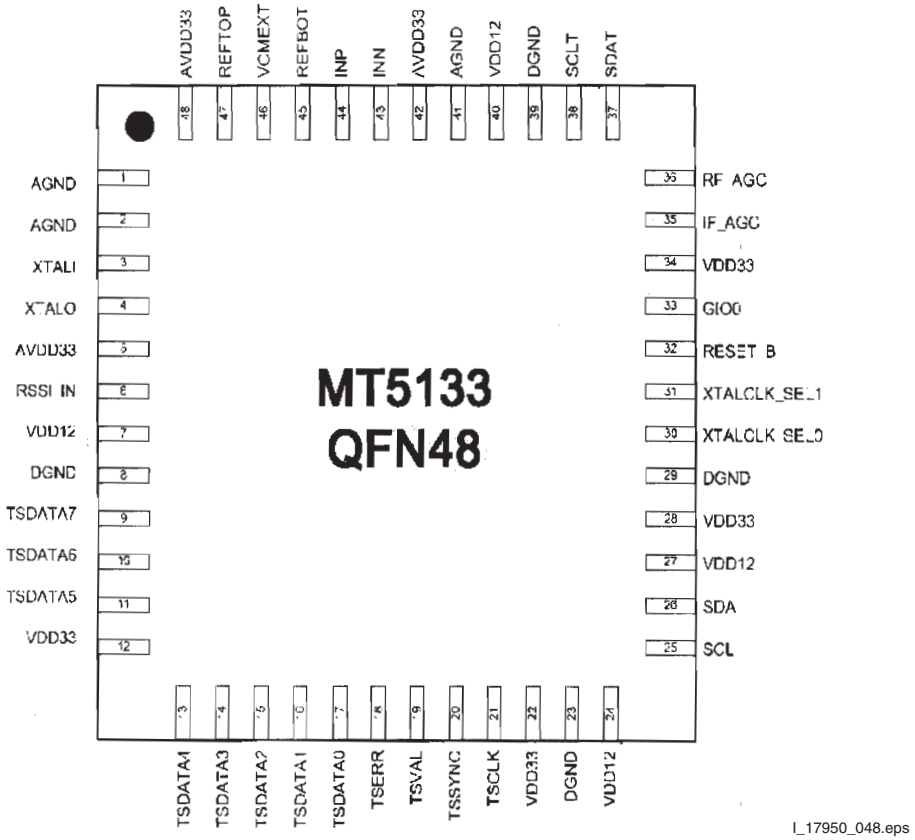


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Figure 9-2 Block diagram & pin configuration

9.4.2 Diagram B, MT5335

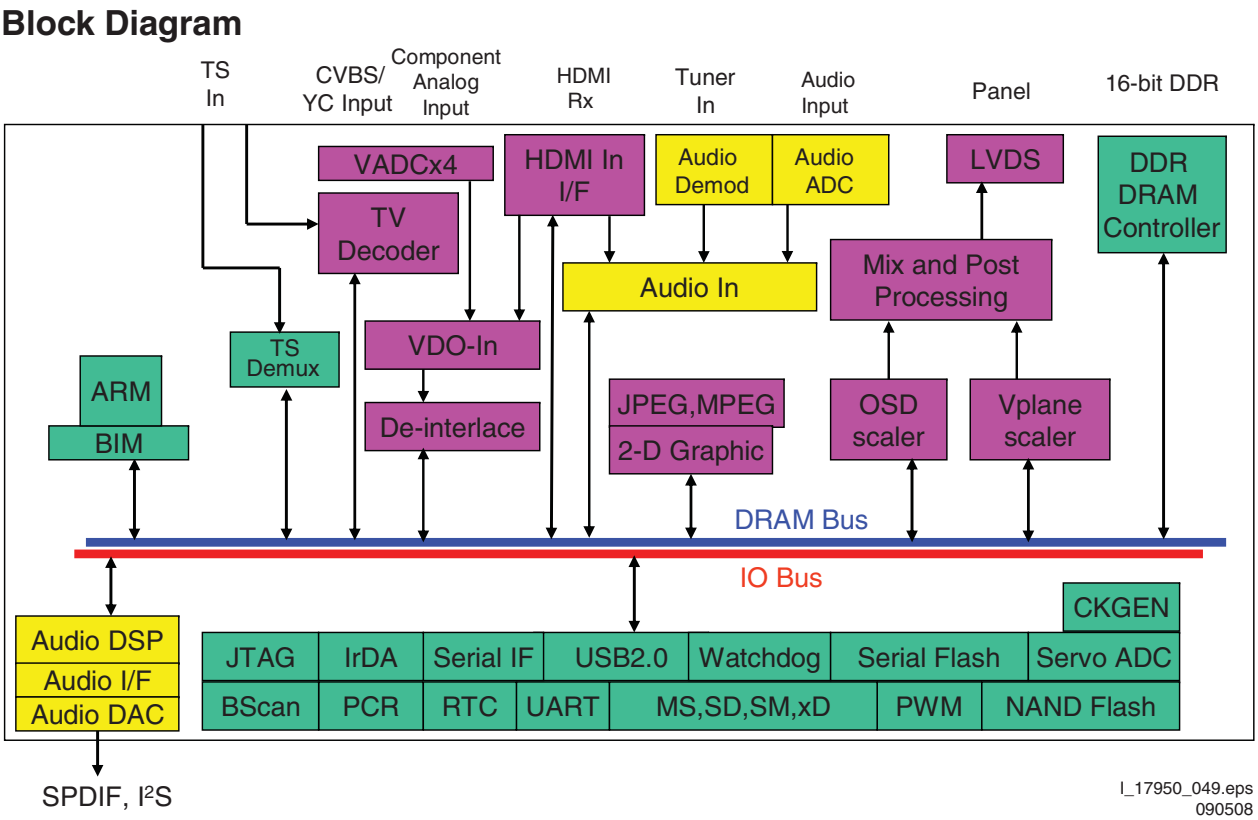


Figure 9-3 Block diagram

9.4.3 Diagram B, MT8295

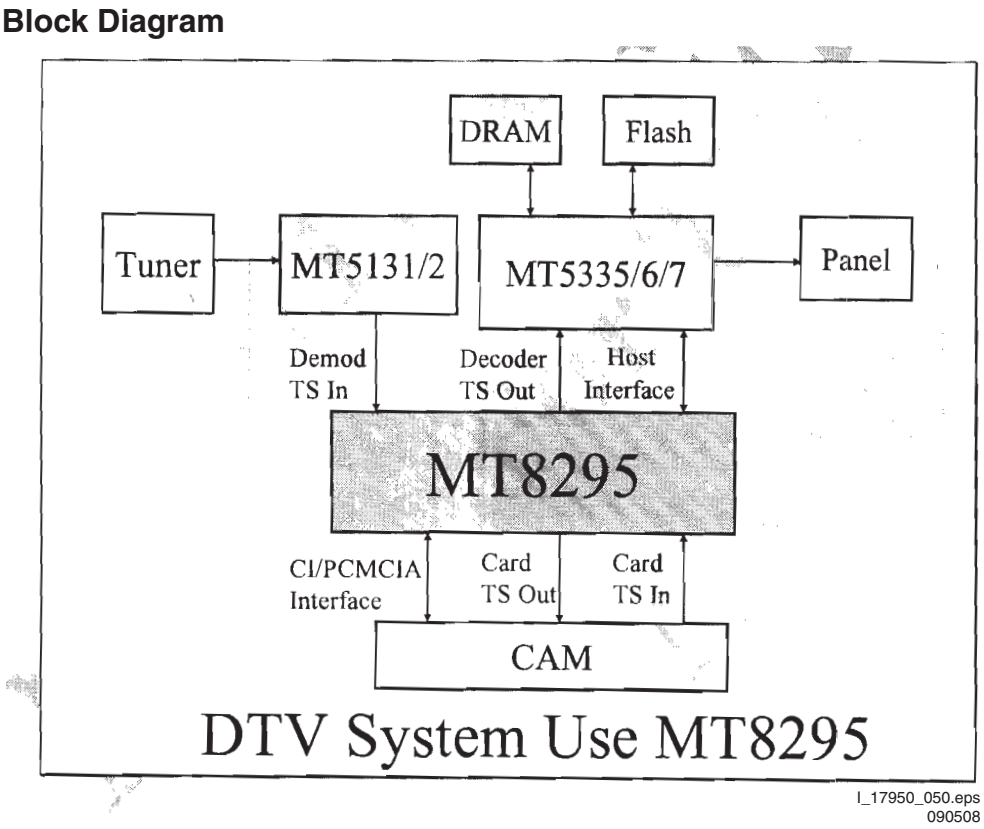


Figure 9-4 Block diagram

9.4.4 Diagram B, SIL9185

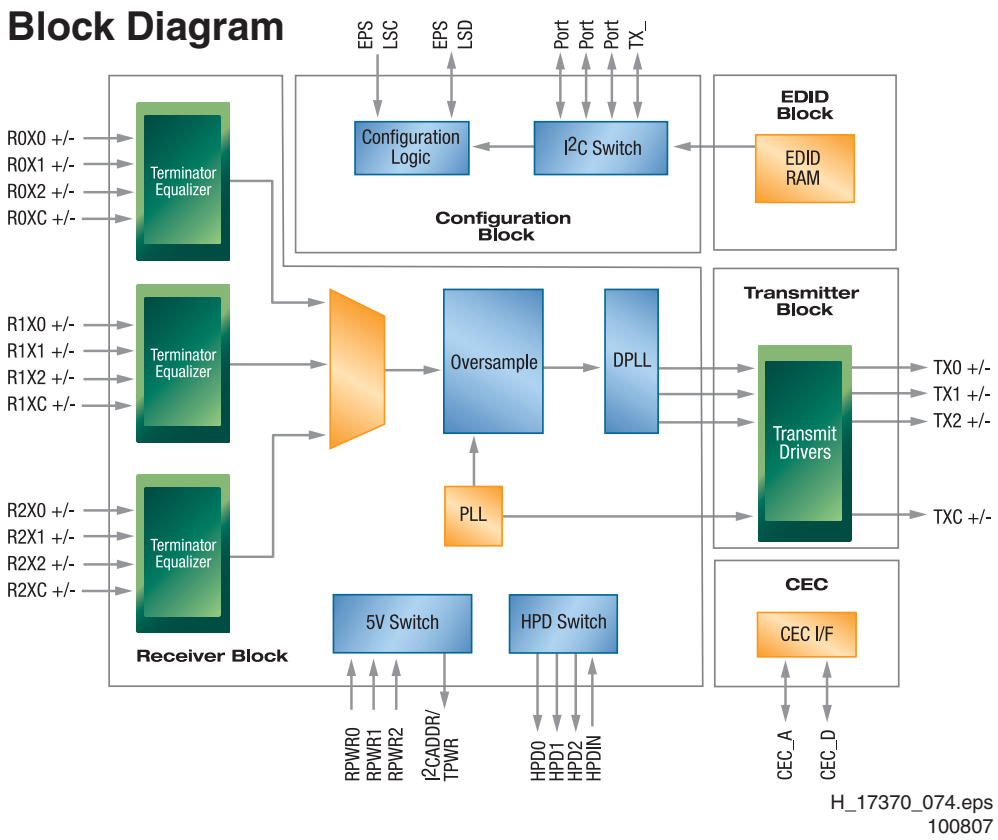


Figure 9-5 Block diagram

9.4.5 Diagram B, TDA9886

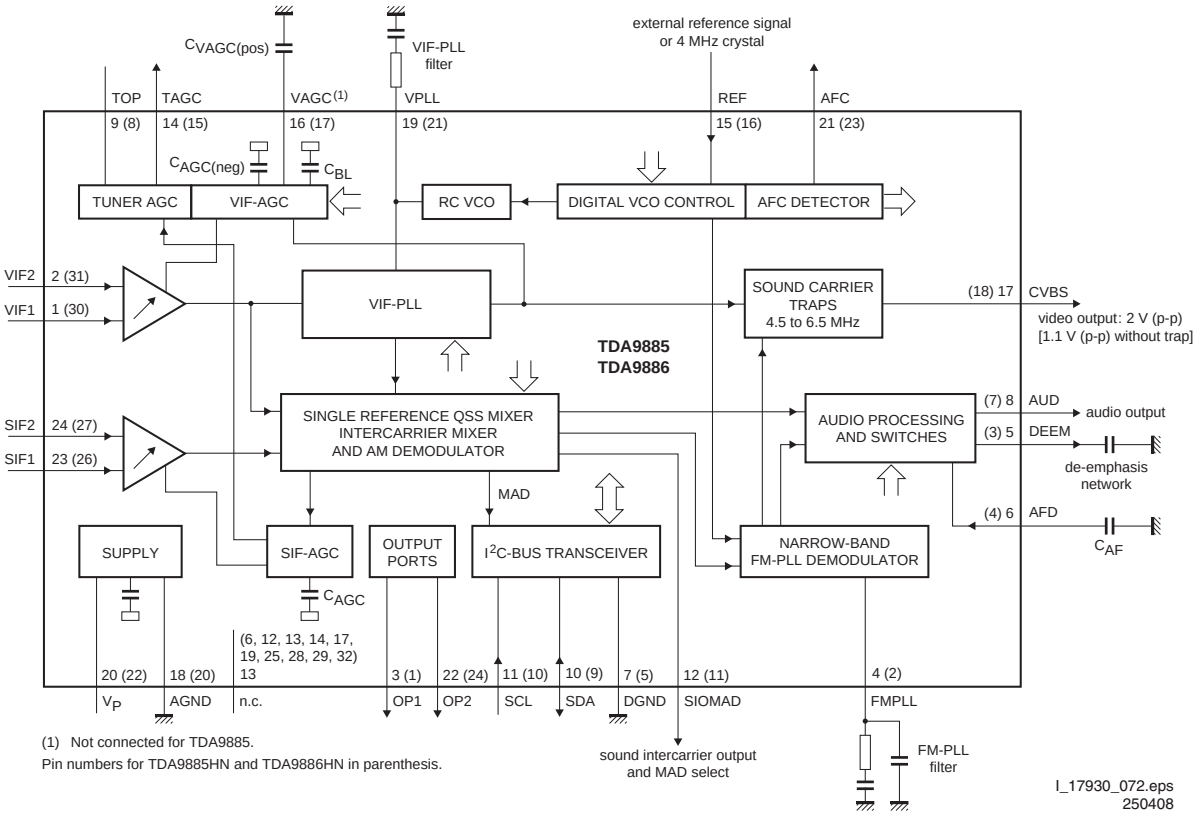
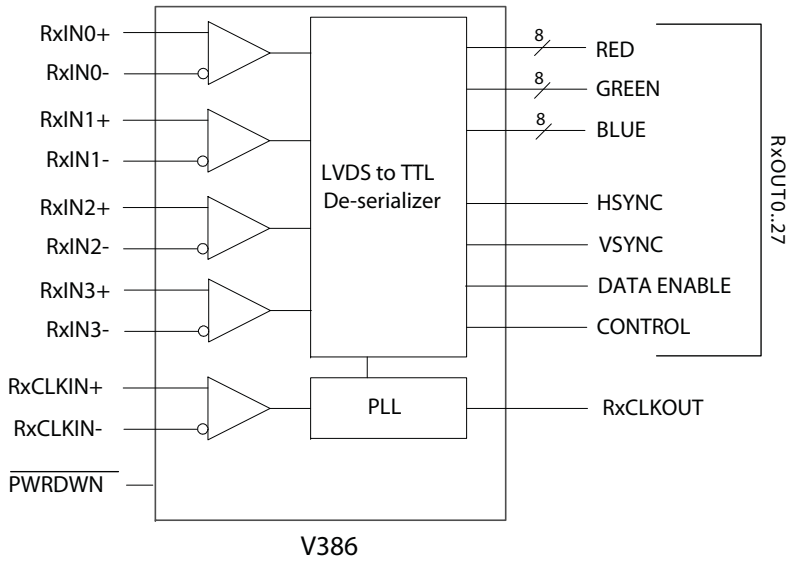


Figure 9-6 Block diagram

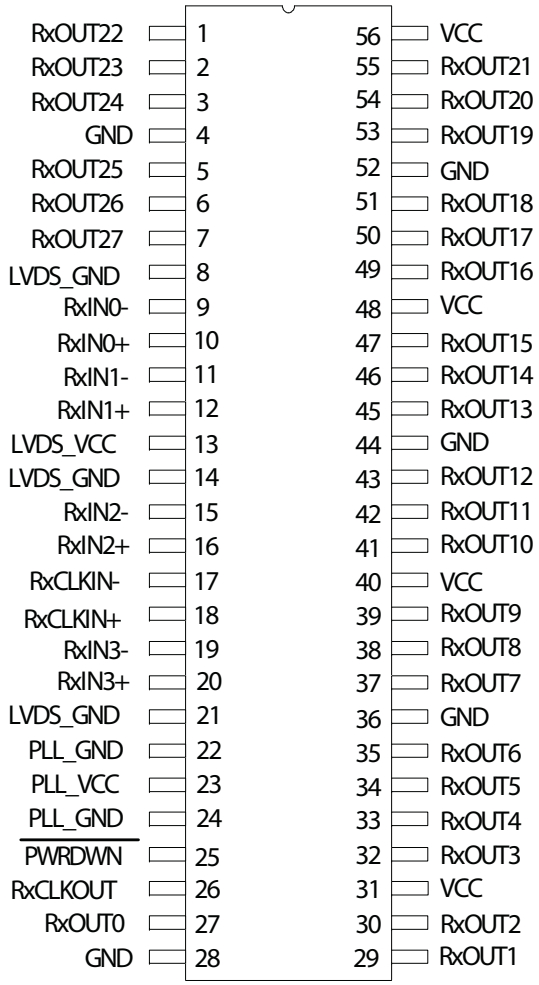
9.4.6 Diagram B, V386

Block Diagram



V386

Pin Configuration



56-pin TSSOP
V386

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090508

Figure 9-7 Block diagram & pin configuration

9.4.7 Diagram B, WM8501

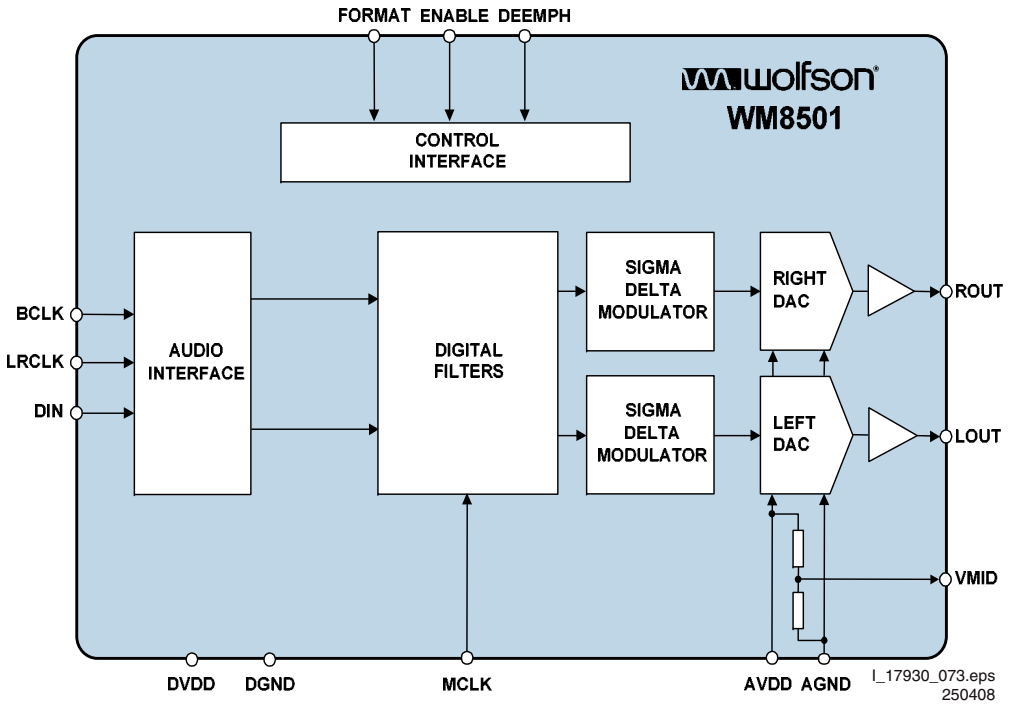
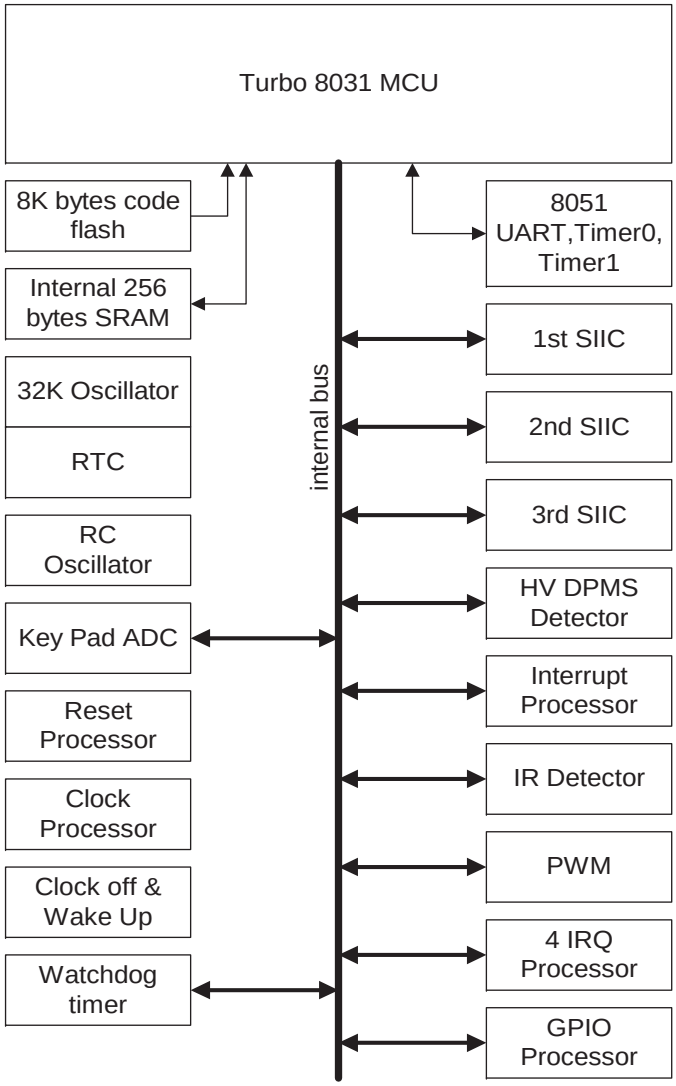


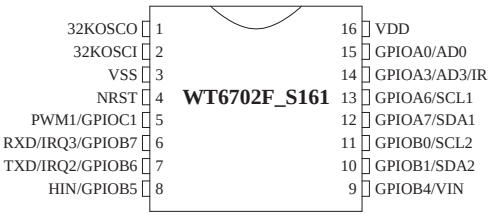
Figure 9-8 Block diagram

9.4.8 Diagram B, WT6702

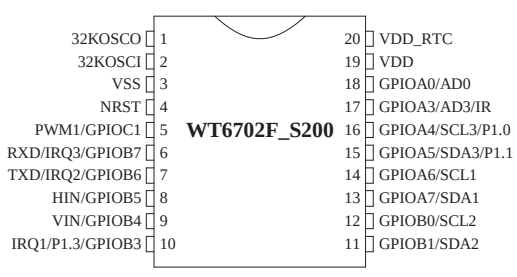
Block Diagram



Pin Configuration



Package Type	Package Outline
SOP 16 pin	150mil
SOP 20 pin	300mil
SSOP 20 pin	150mil
SOP 24 pin	300mil



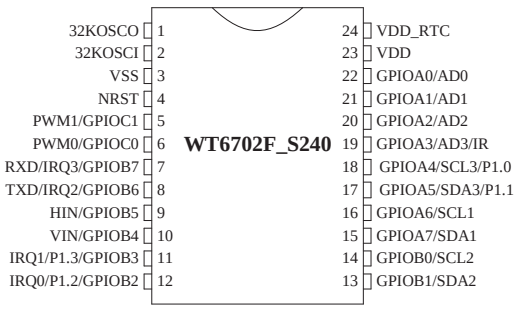


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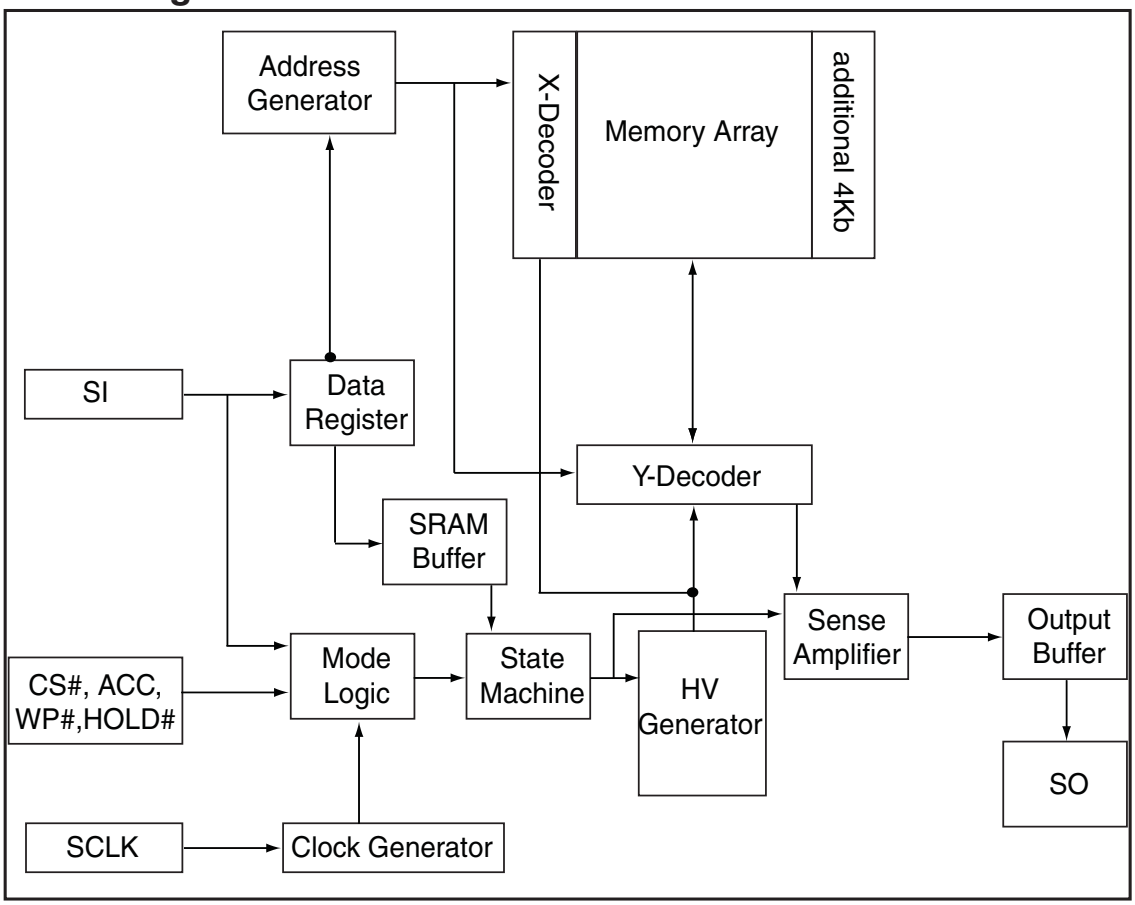
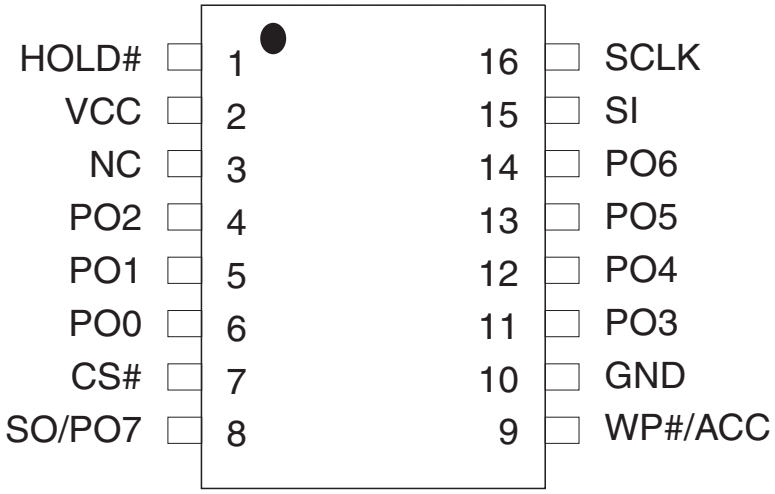
Figure 9-9 Block diagram & pin configuration

9.4.9 Diagram B, MX25L3205

Block Diagram



Pin Configuration



16-PIN SOP (300 mil)

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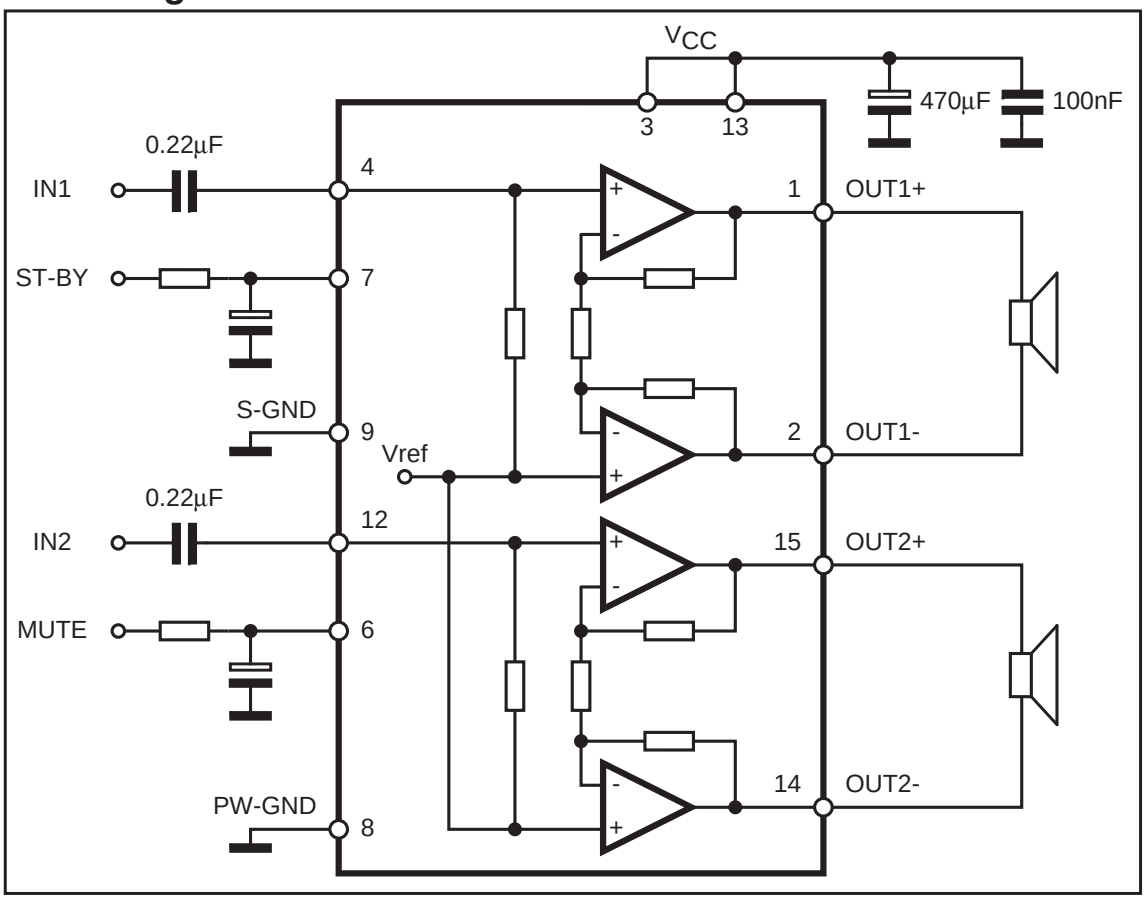
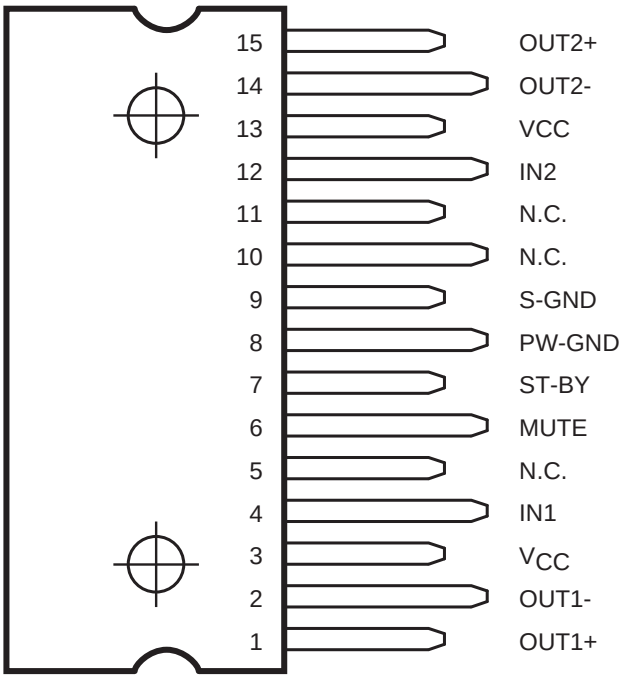
Figure 9-10 Block diagram & pin configuration

9.4.10 Diagram B, TDA7266

Block Diagram



Pin Configuration



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090508

Figure 9-11 Block diagram & 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:
19PFL5403/60	ME8	3122 785 17952
19PFL5403D/10	ME8	3122 785 17951
19PFL5403S/60	ME8	3122 785 17951
20HFL3330D/10	MG8	3122 785 17951
20PFL3403D/10	MG8	3122 785 17950
22PFL5403/60	ME8	3122 785 17952
22PFL5403D/10	ME8	3122 785 17951
22PFL5403S/60	ME8	3122 785 17952
26PFL3403D/10	MG8	3122 785 17951
26PFL5403/60	ME8	3122 785 17952
26PFL5403D/10	ME8	3122 785 17950
26PFL5403S/60	ME8	3122 785 17952

11. Revision List

Manual xxxx xxx xxxx.0

- First release.

Manual xxxx xxx xxxx.1

- **All Chapters:** Sets added (see table chapter 10).
- **Frontpage:** Styling ME8 added.
- **Chapter 5:** In SAM mode, item “Options” removed.
- **Chapter 5:** Error 11 removed from error code overview.
- **Chapter 6:** Wiring diagrams added.
- **Chapter 8:** Display option codes added.
- **Chapter 9:** Block diagram added.
- **Chapter 10:** CTN overview added.

Manual xxxx xxx xxxx.2

- **All Chapters:** Added Russian sets (xxPFLxxxx/60).
- **Chapter 5:** Some textual changes in ComPair section.
- **Chapter 9:** Abbreviation list updated.

Manual xxxx xxx xxxx.3

- **Chapter 7:** Added the schematics and layouts of SSB version 2 (U503 in diagram SSBv2, B05 DVBT/CI decoder).