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Service Manual

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1. Revision List

Manual xxxx xxx xxxx.0
- First release.

Manual xxxx xxx xxxx.1
- **Chapter 6:** updated Table 6-1, White tone default settings and updated Table 6-2, Display code overview.

Manual xxxx xxx xxxx.2
- **Chapter 2:** Added new models to Table 2-1, Described Model Numbers:, added Design Line Tilt and Thriller HD styling.
- **Chapter 4:** added cable dressing and mechanical information for the news sets.
- **Chapter 6:** updated Table 6-1, White tone default settings and updated Table 6-2, Display code overview.
- **Chapter 7:** Added the power board supply line information and Berlinale and Design Line Tilt main board.
- **Chapter 9:** Added wiring diagram, block diagrams and power diagrams.
- **Chapter 11:** Added Styling Sheets for the new stylings.

Manual xxxx xxx xxxx.3
- **All chapters:** Corrected the Smart Choice styling to Design Line Tilt styling.

Manual xxxx xxx xxxx.4
- **Chapter 2:** Added new models to Table 2-1, Described Model Numbers:, added Design Line Tilt and Thriller HD styling.
- **Chapter 6:** Updated Table 6-2, Display code overview.

2. Technical Specs, Diversity, and Connections

Index of this chapter:

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

2.1 Technical Specifications

For on-line product support please use the links in. Here is product information available, as well as getting started, user manuals, frequently asked questions and software & drivers.

Table 2-1 Described Model Numbers:

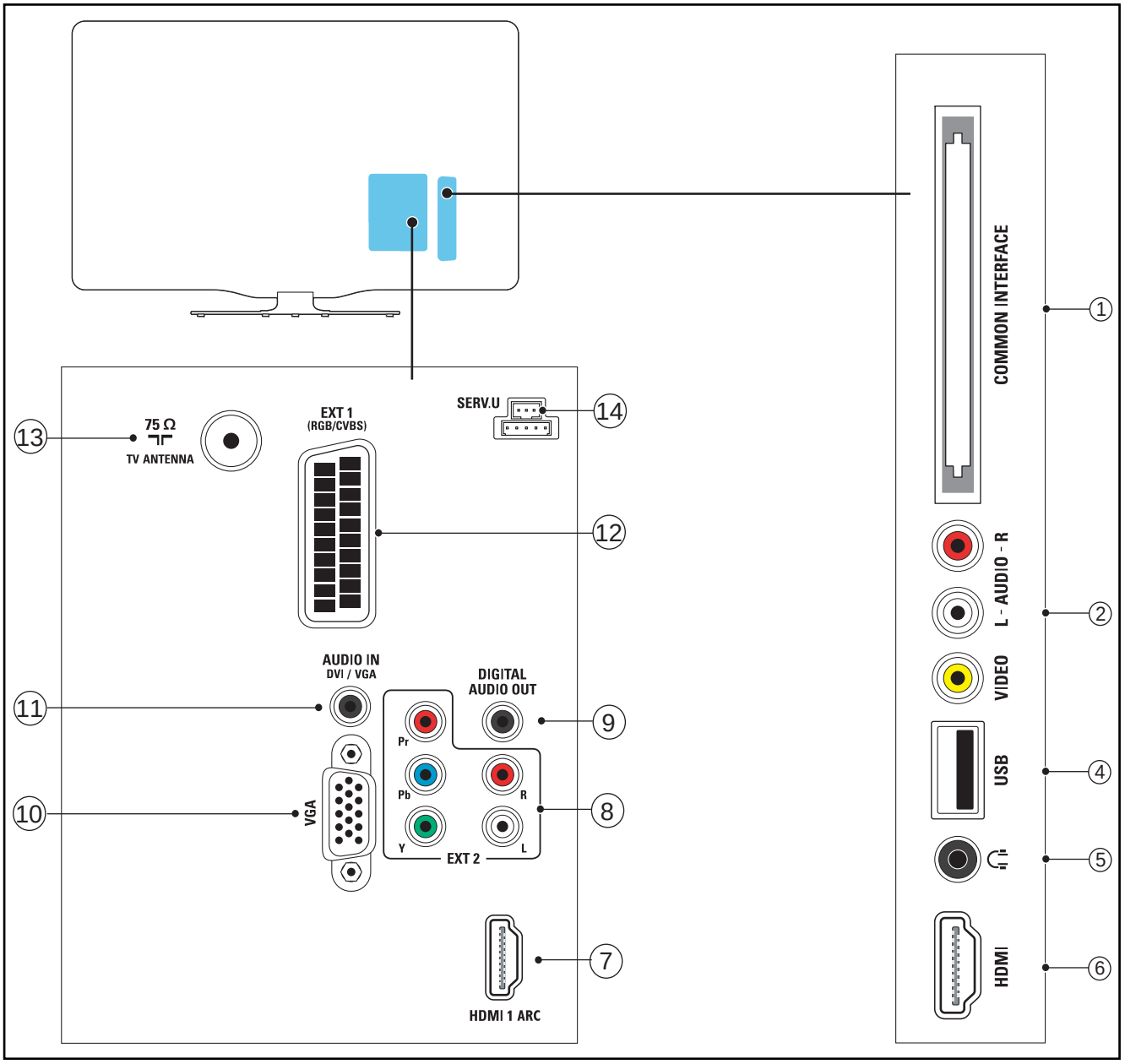
Model Number	Styling	Published in
22PDL4906H/12	Design Line Tilt	3122 785 19082
22PDL4906H/58	Design Line Tilt	3122 785 19082
22PDL4906H/60	Design Line Tilt	3122 785 19082
22PDL4916H/12	Design Line Tilt	3122 785 19082
22PDL4916H/58	Design Line Tilt	3122 785 19082
22PDL4916H/60	Design Line Tilt	3122 785 19082
26PDL4906H/12	Design Line Tilt	3122 785 19082
26PDL4906H/58	Design Line Tilt	3122 785 19082
26PDL4906H/60	Design Line Tilt	3122 785 19082
26PDL4916H/12	Design Line Tilt	3122 785 19082
26PDL4916H/58	Design Line Tilt	3122 785 19082
26PDL4916H/60	Design Line Tilt	3122 785 19082
32PFL3406H/12	Thriller HD	3122 785 19082
32PFL3406H/58	Thriller HD	3122 785 19082
32PFL3505H/12	Thriller	3122 785 19082
32PFL3506H/12	Thriller	3122 785 19082
32PFL3506H/58	Thriller	3122 785 19082
32PFL3506H/60	Thriller	3122 785 19082
32PFL3606H/12	Thriller	3122 785 19080
32PFL3606H/58	Thriller	3122 785 19080
32PFL3606H/60	Thriller	3122 785 19080
32PFL5306H/12	Berlinale	3122 785 19084
32PFL5306H/58	Berlinale	3122 785 19084
32PFL5406H/12	Berlinale	3122 785 19080
32PFL5406H/58	Berlinale	3122 785 19080
32PFL5406H/60	Berlinale	3122 785 19080
32PFL5606H/12	Berlinale	3122 785 19080
32PFL5606H/58	Berlinale	3122 785 19080
32PFL5606H/60	Berlinale	3122 785 19080
42PFL3505H/12	Thriller	3122 785 19082
42PFL3506H/12	Thriller	3122 785 19082
42PFL3506H/58	Thriller	3122 785 19082
42PFL3606H/12	Thriller	3122 785 19080
42PFL3606H/58	Thriller	3122 785 19080
42PFL3606H/60	Thriller	3122 785 19080

Note: The given Model Numbers are subject to change.

2.2 Directions for Use

Directions for use can be downloaded from the following websites:
http://www.philips.com/support
http://www.p4c.philips.com

2.3 Connections



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110331

Figure 2-1 Connection overview (Thriller styling)

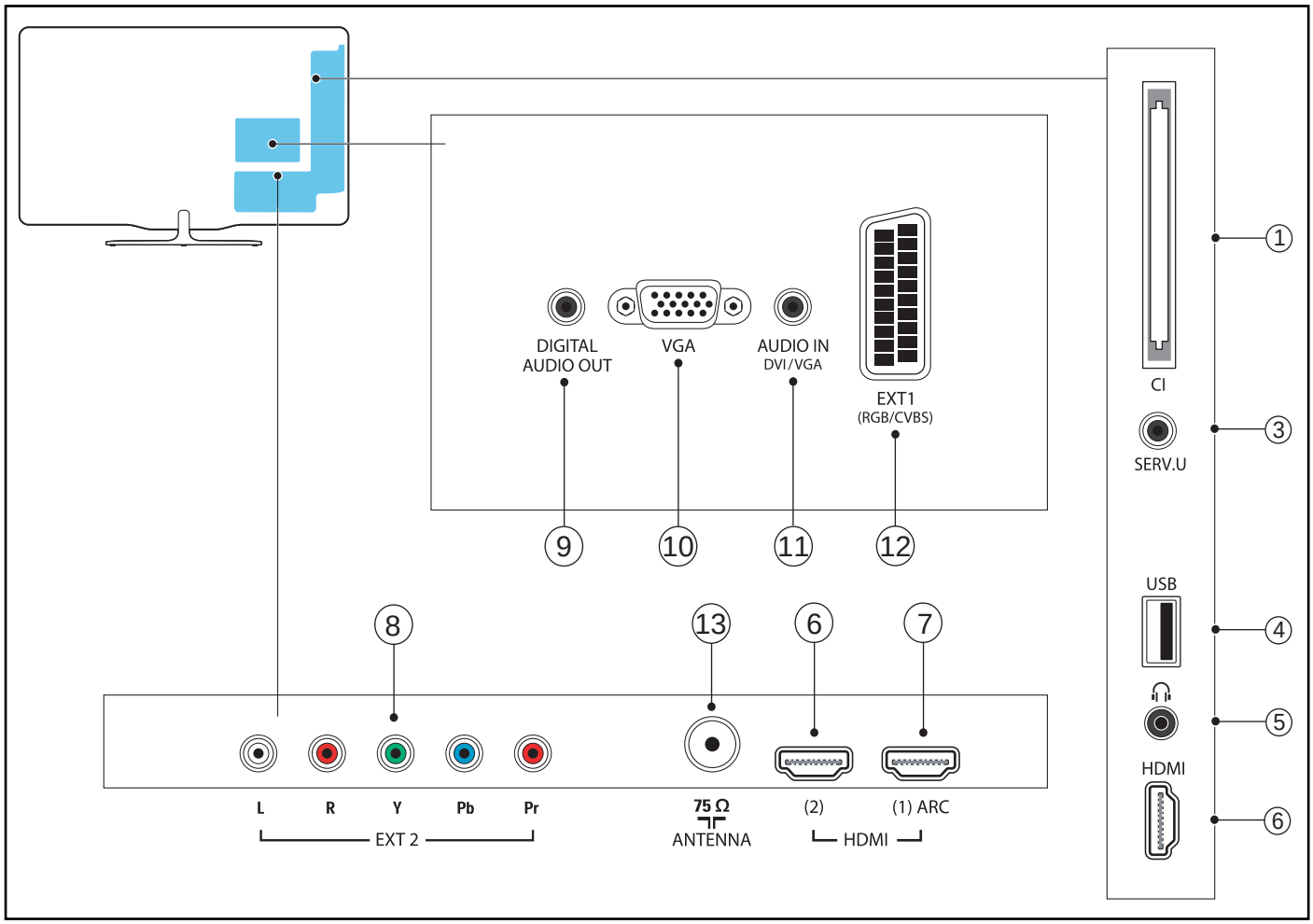

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Figure 2-2 Connection overview (Berlinale Styling)

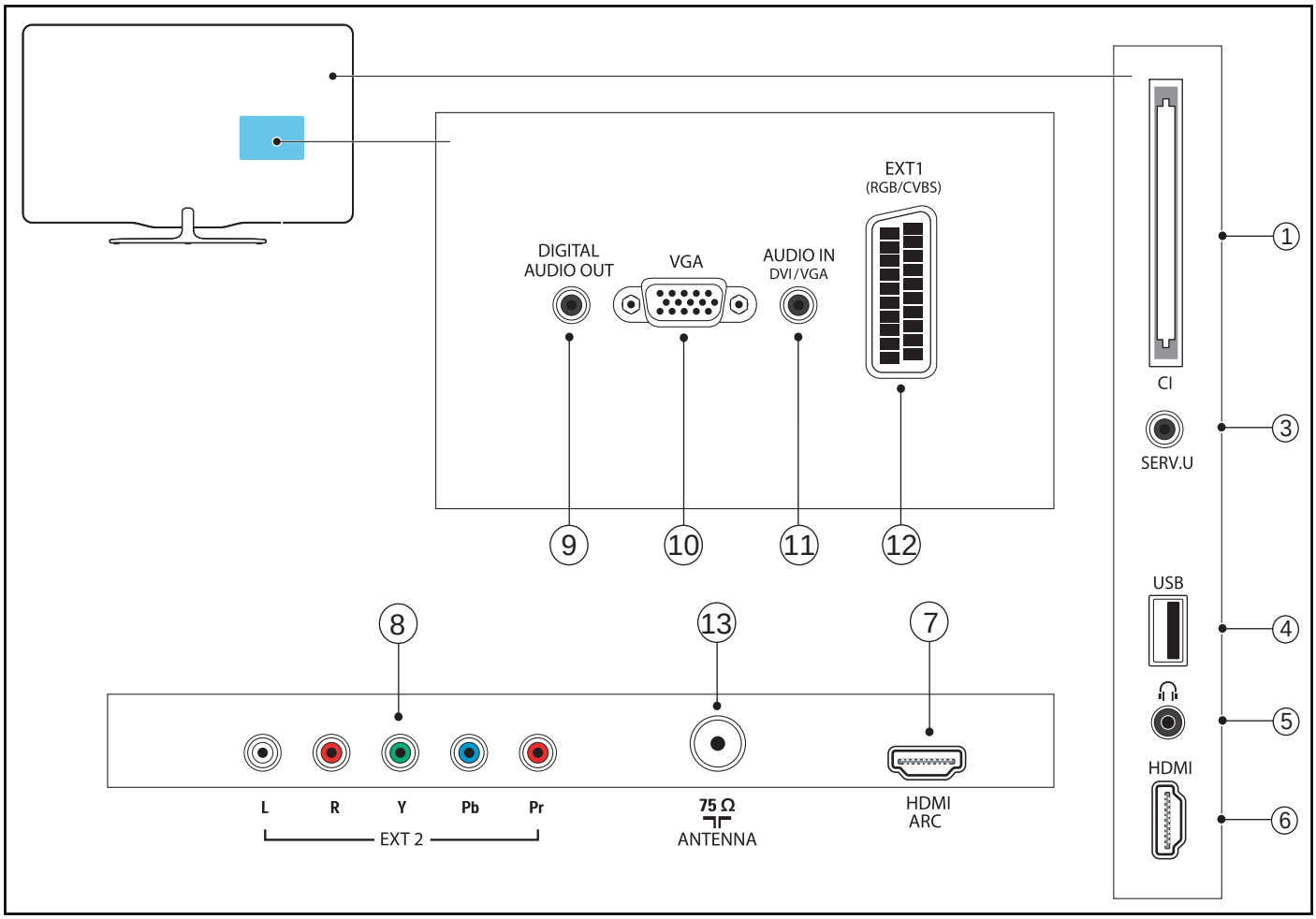

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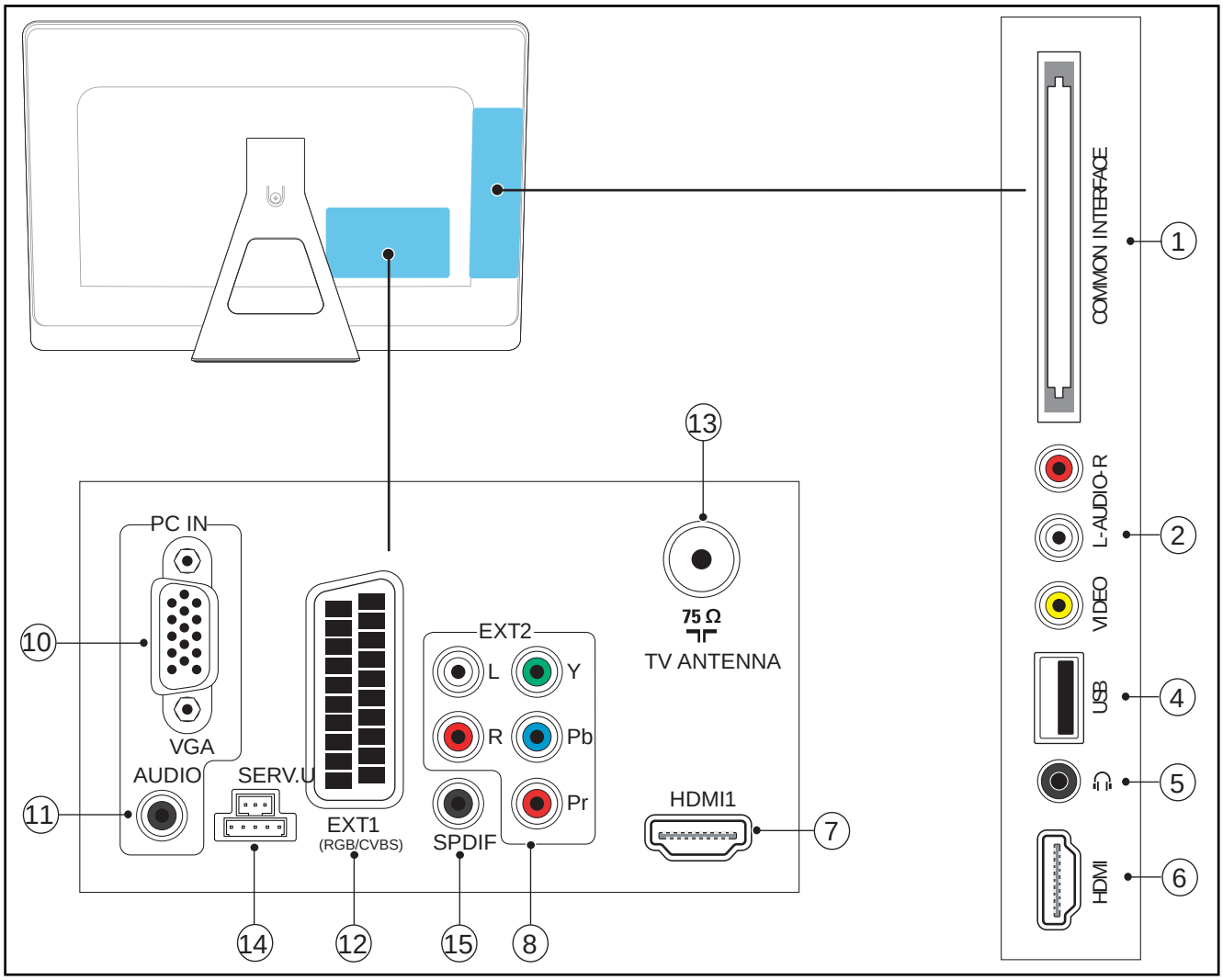
Figure 2-3 Connection overview (Thriller HD Styling)



19082_001_110802.eps
110815

Figure 2-4 Connection overview (Design Line Tilt Styling)

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, Ye= Yellow.

2.3.1 Side Connections

1 - Common Interface
68p - See figure 10-7-14

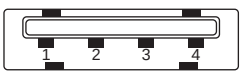
2 - Cinch: Video CVBS - In, Audio - In

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

3 - Service / UART

1	- Ground	Gnd
2	- UART_TX	Transmit
3	- UART_RX	Receive

4 - USB2.0



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090121

Figure 2-5 USB (type A)

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

5 - Head phone (Output)
Bk - Head phone 80 - 600 Ω / 10 mW

6 - HDMI: Digital Video, Digital Audio - In

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090428

Figure 2-6 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	- Easylink/CEC	Control channel	
14	- n.c.		
15	- DDC_SCL	DDC clock	
16	- DDC_SDA	DDC data	
17	- Ground	Gnd	
18	- +5V		
19	- HPD	Hot Plug Detect	
20	- Ground	Gnd	

2.3.2 Rear Connections

7 - HDMI 1: Digital Video - In, Digital Audio with ARC - In/Out

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090428

Figure 2-7 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	- Easylink/CEC	Control channel	
14	- ARC	Audio Return Channel	
15	- DDC_SCL	DDC clock	
16	- DDC_SDA	DDC data	
17	- Ground	Gnd	
18	- +5V		
19	- HPD	Hot Plug Detect	
20	- Ground	Gnd	

8 - EXT2: Video YPbPr - In, Audio - In

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

9 - Cinch: Audio - Out

Rd	- Audio R	0.5 V_{RMS} / 10 kΩ	
Wh	- Audio L	0.5 V_{RMS} / 10 kΩ	

10 - PC IN:VGA

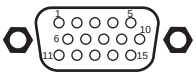

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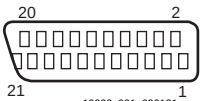
Figure 2-8 VGA connector

1	- Video Red	0.7 V_{PP} / 75 W	
2	- Video Green	0.7 V_{PP} / 75 W	
3	- Video Blue	0.7 V_{PP} / 75 W	
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	- Ground Red	Gnd	
12	- DDC_SDA	DDC data	
13	- H-sync	0 - 5 V	
14	- V-sync	0 - 5 V	
15	- DDC_SCL	DDC clock	

11 - Audio - In: Left / Right, VGA

Gn	- Audio L/R in	0.5 V_{RMS} / 10 kΩ	

12 - EXT1: Video RGB/YC - In, CVBS - In/Out, Audio - In/Out



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090121

Figure 2-9 SCART connector

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

13 - TV ANTENNA - In

Signal input from an antenna, cable or satellite.

14 - Service / UART

1	- Ground	Gnd	
2	- UART_TX	Transmit	
3	- UART_RX	Receive	

15 - Cinch: S/PDIF - Out

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

2.3.3 Bottom Connections

7 - HDMI1: Digital Video, Digital Audio - In

See 6 - HDMI: Digital Video, Digital Audio - In

8 - EXT2: Video YPbPr - In, Audio - In

See 8 - EXT2: Video YPbPr - In, Audio - In

13 - TV ANTENNA - In

See 13 - TV ANTENNA - In

2.4 Chassis Overview

Refer to 9. Block Diagrams for PWB/CBA locations.

3. Precautions, Notes, and Abbreviation List

Index of this chapter:

3.1 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.

3.2 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.

3.3 Notes

3.3.1 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 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.

3.3.2 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 on the Philips Spare Parts Web Portal.

3.3.3 Spare Parts

For the latest spare part overview, consult your Philips Spare Part web portal.

3.3.4 BGA (Ball Grid Array) ICs

Introduction

For more information on how to handle BGA devices, visit this URL: http://www.atyourservice-magazine.com. 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. Where applicable and available, this profile is added to the IC Data Sheet information section in this manual.

3.3.5 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. 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.

3.3.6 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. SN is Lysomice, RJ is Kobierzyce), 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 2010 week 10 / 2010 week 17). The 6 last digits contain the serial number.

Figure 3-1 Serial number (example)

3.3.7 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!

3.3.8 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.

3.4 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
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
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
BDS	Business Display Solutions (iTV)
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
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
DCM	Data Communication Module. Also referred to as System Card or Smartcard (for iTV).
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
EPG	Electronic Program Guide
EPLD	Erasable Programmable Logic Device
EU	Europe
EXT	EXTernal (source), entering the set by SCART or by cinches (jacks)
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
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.
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
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
MHEG	Part of a set of international standards related to the presentation of multimedia information, standardised by the Multimedia and Hypermedia Experts Group. It is commonly used as a language to describe interactive television services
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
MTV	Mainstream TV: TV-mode with Consumer TV features enabled (iTV)
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
OAD	Over the Air Download. Method of software upgrade via RF transmission. Upgrade software is broadcasted in TS with TV channels.
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 (colour carrier = 4.433619 MHz) and South America (colour 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
POD	Point Of Deployment: a removable CAM module, implementing the CA system for a host (e.g. a TV-set)
POR	Power On Reset, signal to reset the uP
PSDL	Power Supply for Direct view LED backlight with 2D-dimming
PSL	Power Supply with integrated LED drivers
PSLS	Power Supply with integrated LED drivers with added Scanning functionality
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
RSDS	Reduced Swing Differential Signalling data interface
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. Colour system mainly used in France and East Europe. Colour 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
SPI	Serial Peripheral Interface bus; a 4-wire synchronous serial data link standard
S/PDIF	Sony Philips Digital InterFace
SRAM	Static RAM
SRP	Service Reference Protocol
SSB	Small Signal Board
SSC	Spread Spectrum Clocking, used to reduce the effects of EMI
STB	Set Top Box
STBY	STand-BY
SVGA	800 × 600 (4:3)
SVHS	Super Video Home System
SW	Software
SWAN	Spatial temporal Weighted Averaging Noise reduction
SXGA	1280 × 1024
TFT	Thin Film Transistor
THD	Total Harmonic Distortion
TMDS	Transmission Minimized Differential Signalling
TS	Transport Stream
TXT	TeleteXT
TXT-DW	Dual Window with TeleteXT
UI	User Interface
uP	Microprocessor
UXGA	1600 × 1200 (4:3)
V	V-sync to the module
VESA	Video Electronics Standards Association
VGA	640 × 480 (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	1280 × 768 (15:9)
XTAL	Quartz crystal
XGA	1024 × 768 (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

4. Mechanical Instructions

Index of this chapter:

Notes:

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

4.1 Cable Dressing

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Figure 4-1 Cable dressing (32" Thriller styling)

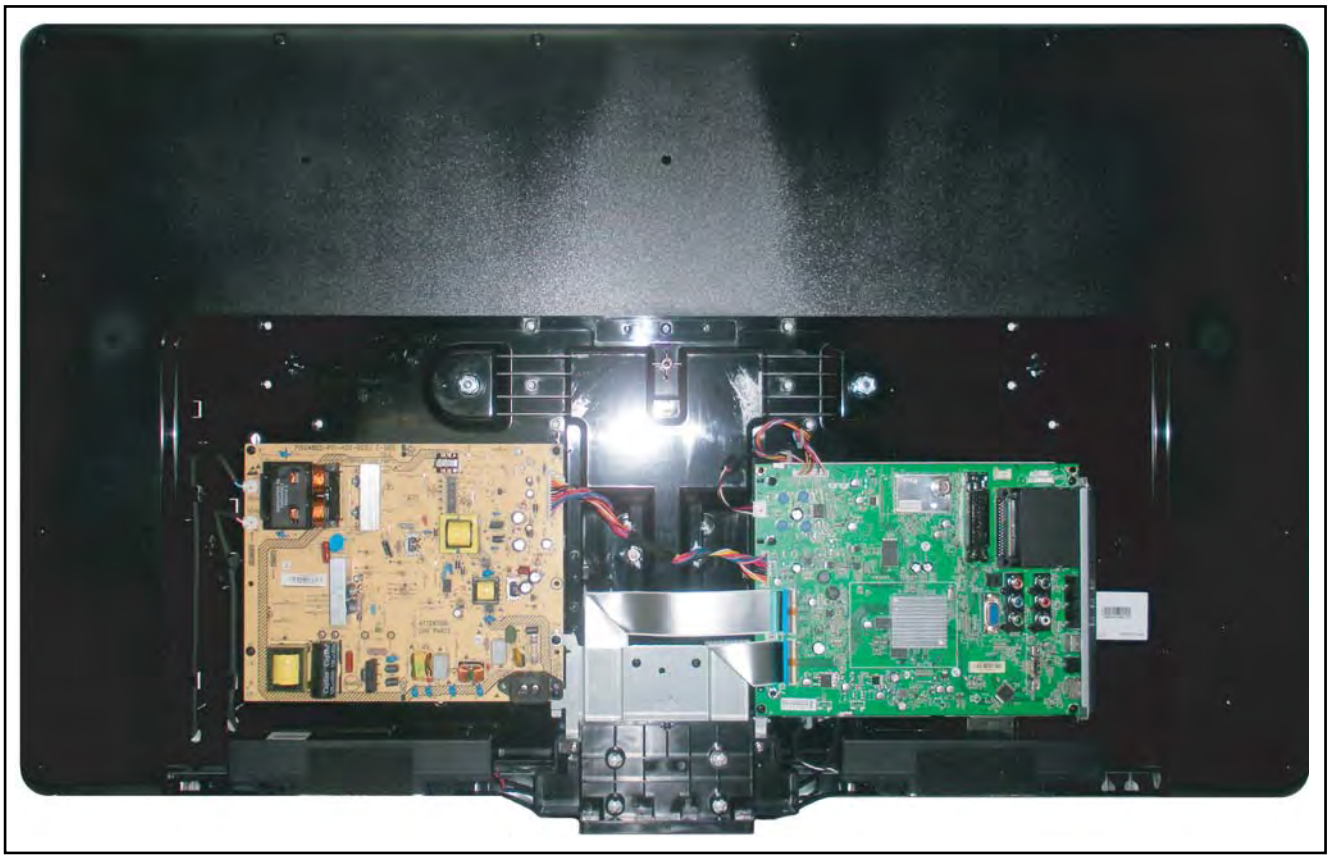

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Figure 4-2 Cable dressing (42" Thriller styling)

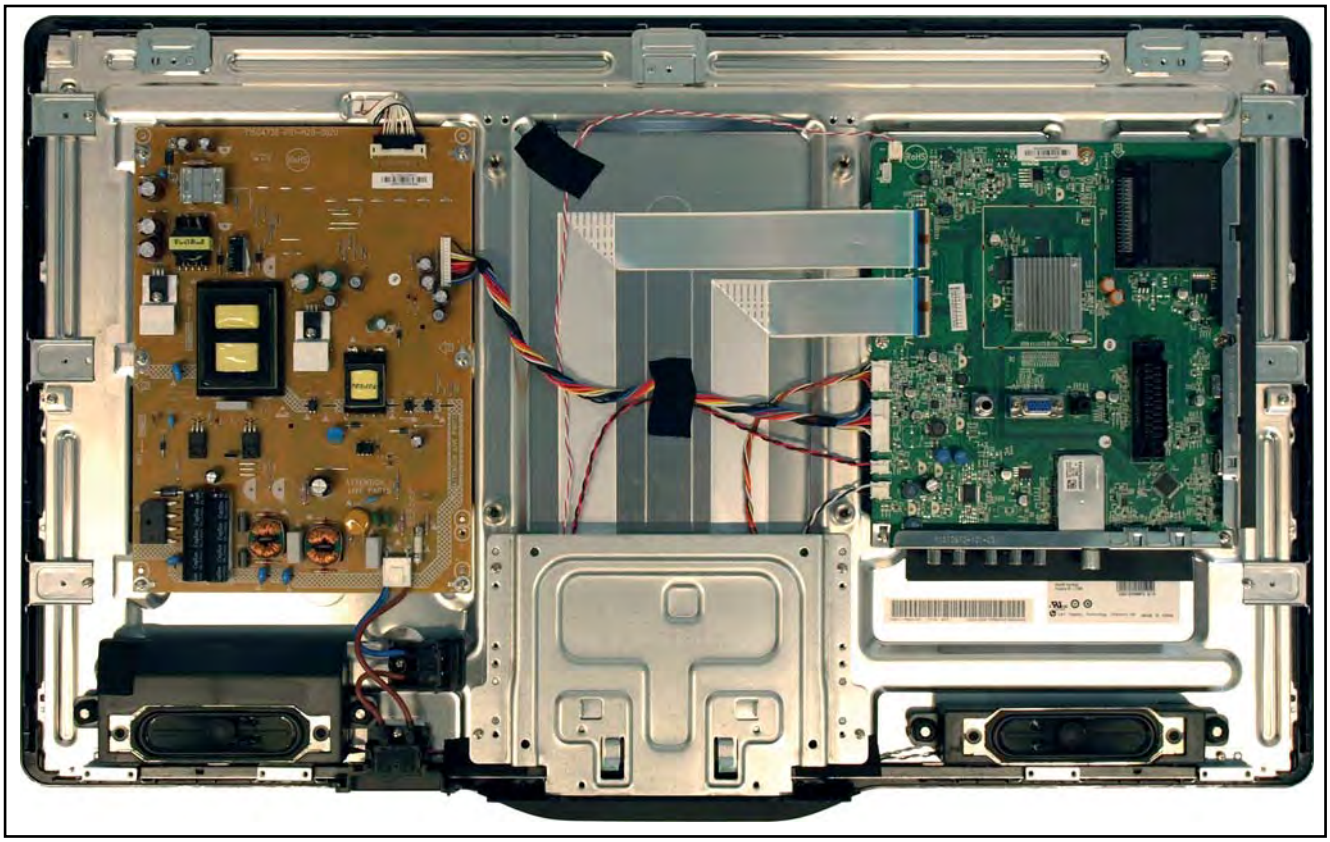

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Figure 4-3 Cable dressing (32" Berlinale styling)

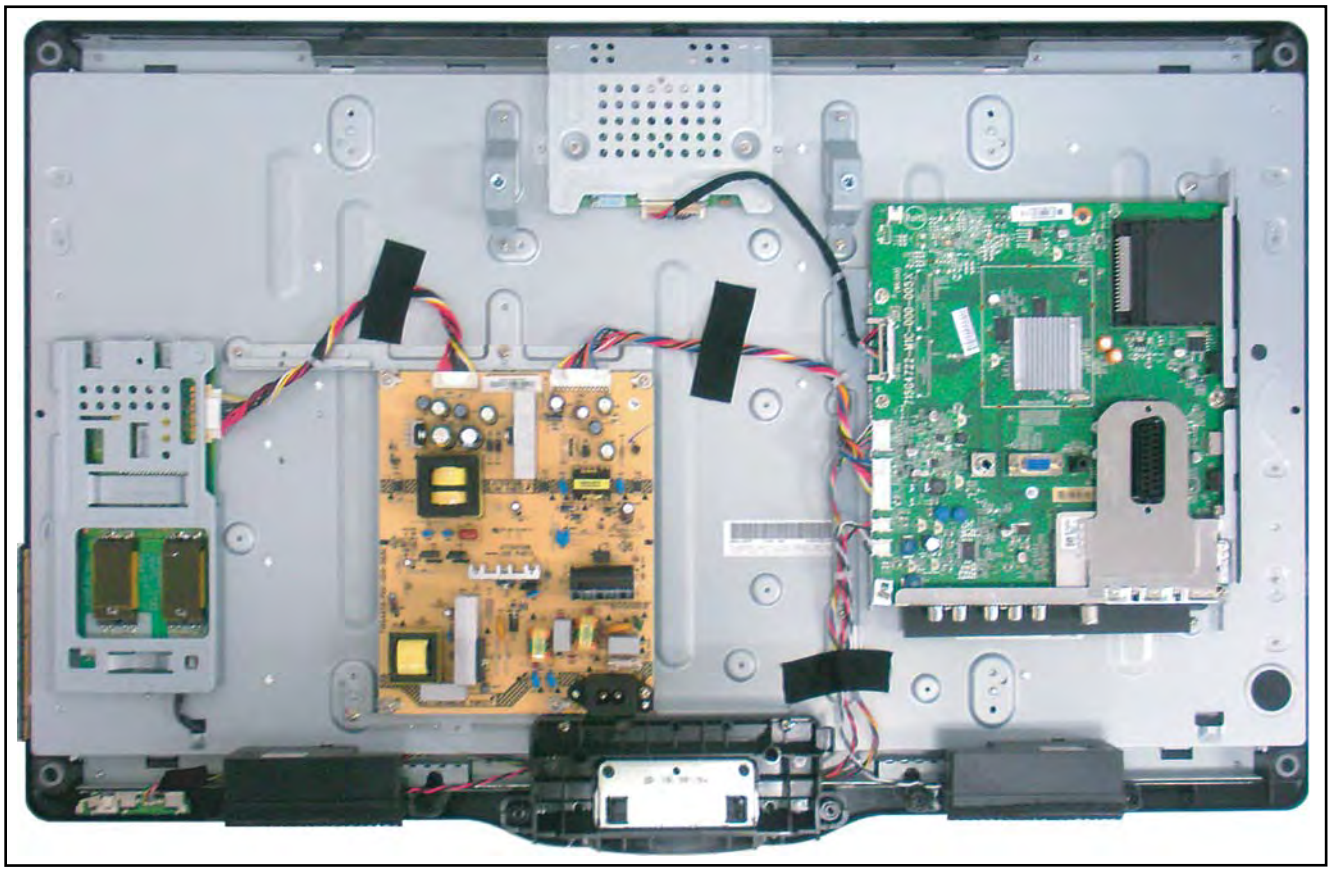

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Figure 4-4 Cable dressing (32" Thriller HD styling)

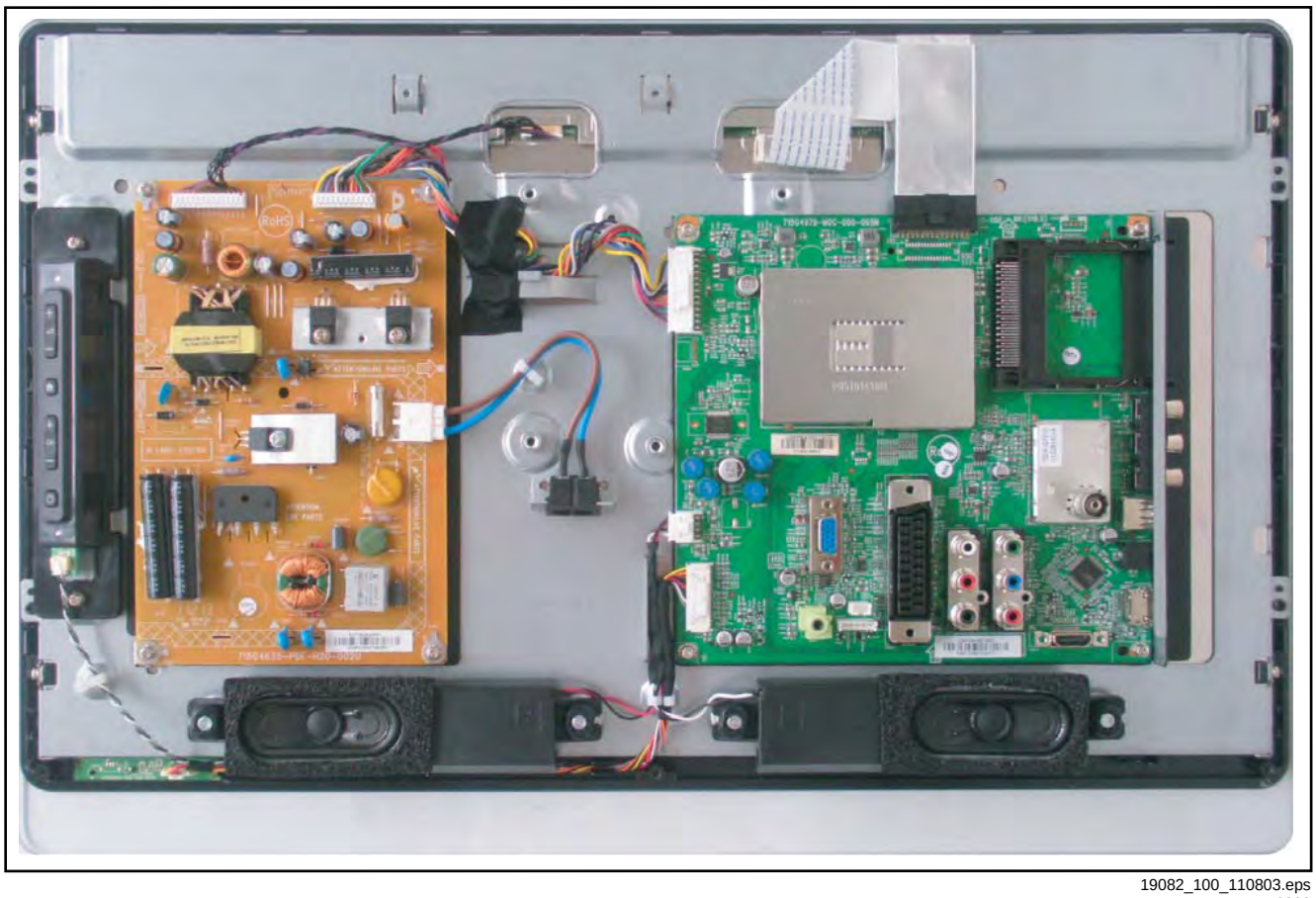

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Figure 4-5 Cable dressing (22" Design Line Tilt styling)

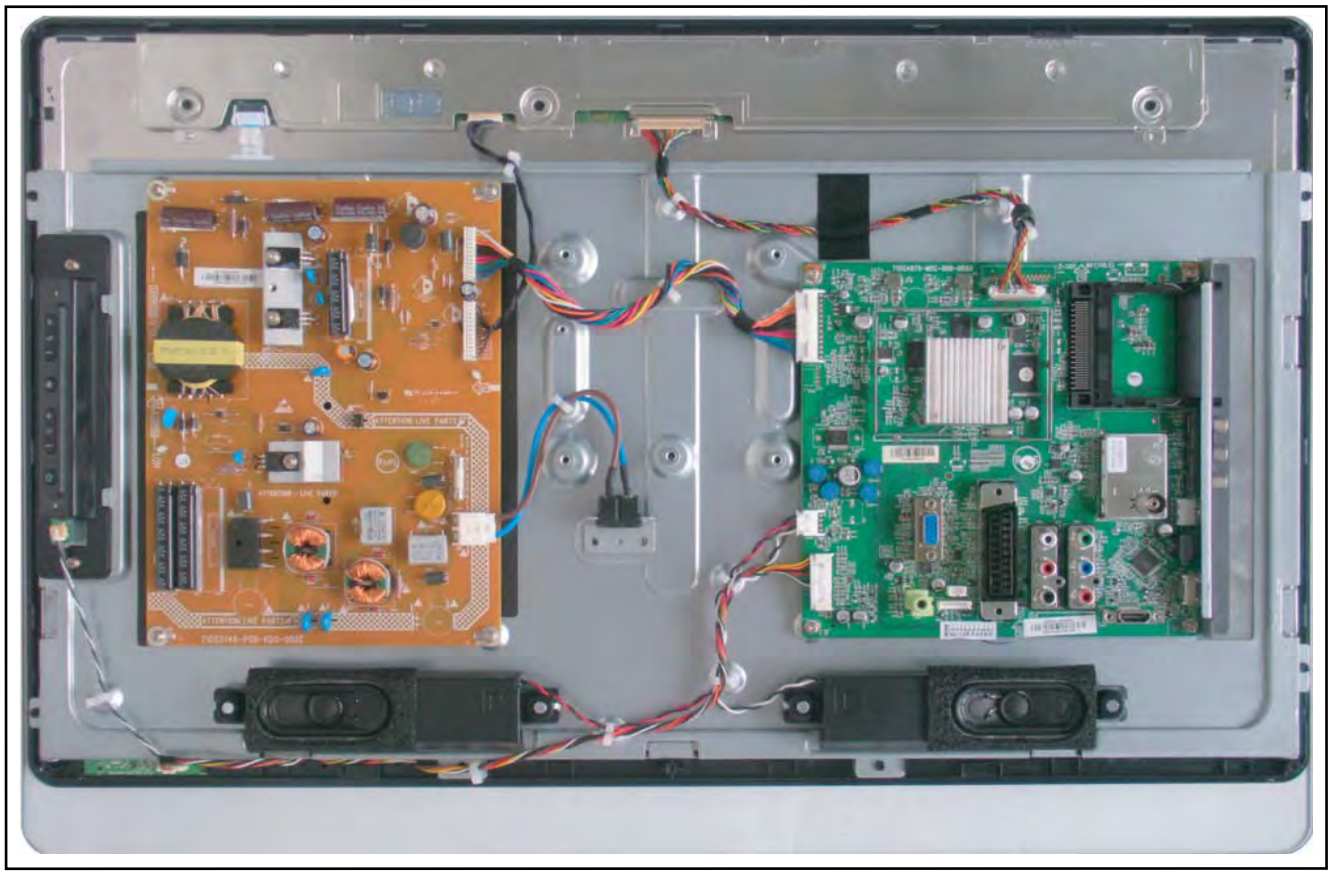

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Figure 4-6 Cable dressing (26" Design Line Tilt styling)

4.2 Service Positions

For easy servicing of a TV set, the set should be put face down on a soft flat surface, foam buffers or other specific workshop tools. Ensure that a stable situation is created to perform measurements and alignments. When using foam bars take care that these always support the cabinet and **never** only the display. **Caution:** Failure to follow these guidelines can seriously damage the display!
Ensure that ESD safe measures are taken.

4.3 Assembly/Panel Removal (Thriller styling)

Instructions below apply to the 32PFL3606H/12, but will be similar for other models.

4.3.1 Rear Cover

Refer to Figure 4-7 for details.
Warning: Disconnect the mains power cord before removing the rear cover.

1. Remove fixation screws [1] that secure the base assy, pull out the base assy from the set. Then remove the fixation screws [2], [3], [4] that secure the rear cover. Refer to Figure 4-7 for details.
2. Lift the rear cover from the TV. Make sure that wires and flat foils are not damaged while lifting the rear cover from the set.

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Figure 4-7 Rear cover removal

4.3.2 Small Signal Board (SSB)

Refer to Figure 4-8 and Figure 4-9 for details.
Caution: it is mandatory to remount all different screws at their original position during re-assembly. Failure to do so may result in damaging the SSB.

1. Release the clips from both the LVDS Flat Foil connectors that connect with the SSB [1].
   Caution: be careful, as these are very fragile connectors! Take the flat foils out of their connectors.
2. Release the clamps and unplug all other connectors [2].
3. Remove the fixation screw from the clamp near the bottom of the SSB, and take the clamp out [3].
4. Release the tape near the bottom side of the set from the LCD panel.
5. Remove all other fixation screws from the SSB [4].
6. Take out the SSB together with its shielding.
7. Remove the screw near the L/R audio connectors [5].
8. The SSB can now be shifted from the side connector cover, then lifted and taken out of the shielding [6]. Refer to Figure 4-9 for details.

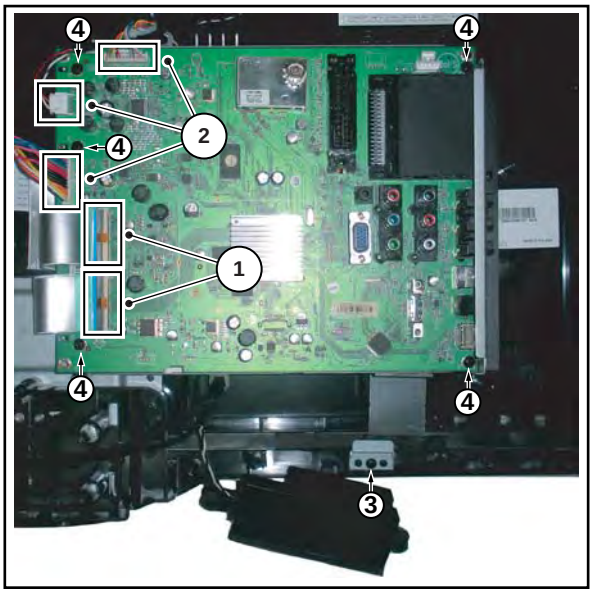

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Figure 4-8 SSB removal [1/2]

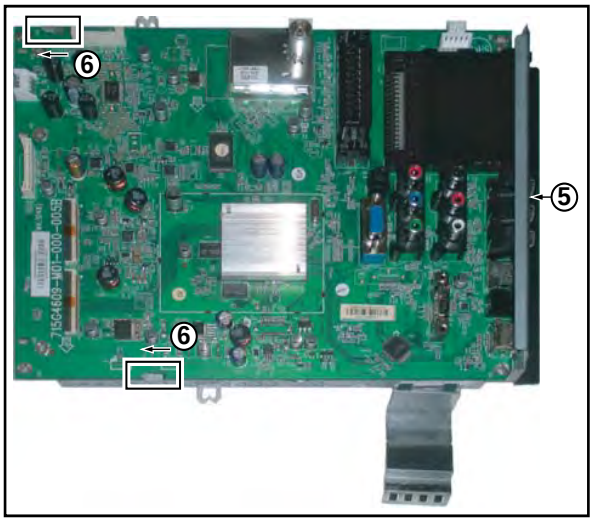

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Figure 4-9 SSB removal [2/2]

4.3.3 Power Supply Unit (PSU)

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

1. Release the Power board cables from their clamps.
2. Unplug power connectors from the SSB, as it is not unplug-able at the PSU itself (soldered connector).
3. Unplug all other connectors from the PSU.
4. Remove all fixation screws from the PSU.
5. The PSU can be taken out of the set now.

4.3.4 Speakers

1. Release the speaker cables from their clamps.
2. Unplug the speaker connector from the SSB.
3. Take the speakers out.

When defective, replace the both units.

4.3.5 Stand removal

Caution: it is mandatory to remount all different screws at their original position during re-assembly. Be sure to put the set in the Service Position.

1. Remove the fixation screws.
2. Take the stand out.

4.3.6 IR/LED Board

Refer to Figure 4-10 for details.

1. Remove the speakers as described earlier.
2. Remove the stand as described earlier.
3. Release the clamps that hold the boards cable.
4. Remove the fixation screws [1], [2] that secure the LCD panel with the bezel.
5. Lift the LCD Panel from the bezel.
6. Gently release the clips that hold the board and take it out from the bezel.
7. Unplug both the connectors from the IR/LED board.

When defective, replace the whole unit.

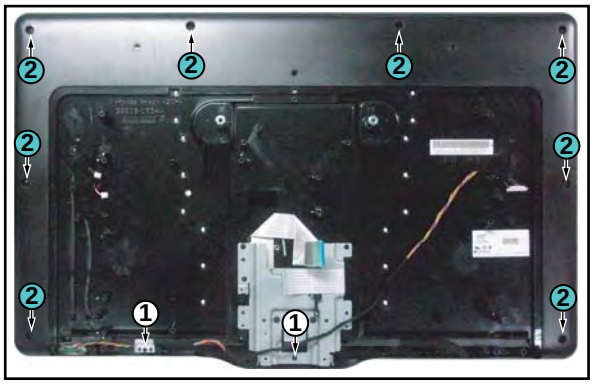

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Figure 4-10 IR/LED removal

4.3.7 Keyboard Control unit

1. Remove the speakers as described earlier.
2. Remove the stand as described earlier.
3. Release the clamps that hold board cable.
4. Remove the fixation screws [1], [2] that secure the LCD panel with the bezel. Refer to Figure 4-10 for details.
5. Lift the LCD Panel from the bezel.
6. Gently release the clips that hold the board and take it out from the bezel.
7. Unplug the connector from the keyboard control panel.

When defective, replace the whole unit.

4.3.8 LCD Panel

1. Remove the SSB as described earlier.
2. Remove the PSU as described earlier.
3. Remove the speakers as described earlier.
4. Remove the stand as described earlier.
5. Release the IR/LED board cable from its clamps and unplug the IR/LED board cable.
6. Remove the fixation screws [1], [2] that secure the LCD panel with the bezel. Refer to Figure 4-10 for details.
7. Lift the LCD Panel from the bezel.
8. Remove the fixation screws that secure the panel with the metal subframe.
9. Release the clips from both the LVDS Flat Foil connectors that connect with the LCD panel.
   Caution: be careful, as these are very fragile connectors! Take the flat foils out of their connectors.

When defective, replace the whole unit.

4.4 Assembly/Panel Removal (Berlinale styling)

Instructions below apply to the 32PFL5606H/12, but will be similar for other models.

4.4.1 Rear Cover

Refer to Figure 4-11 for details.

Warning: Disconnect the mains power cord before removing the rear cover.

1. Remove screw caps [1] that cover VESA screw holes.
2. Remove all fixation screws [2] that secure the rear cover.
3. At the indicated areas [3] the cover is secured by clips. Be very careful with releasing those.
4. Lift the rear cover from the TV. Make sure that wires and flat foils are not damaged while lifting the rear cover from the set.

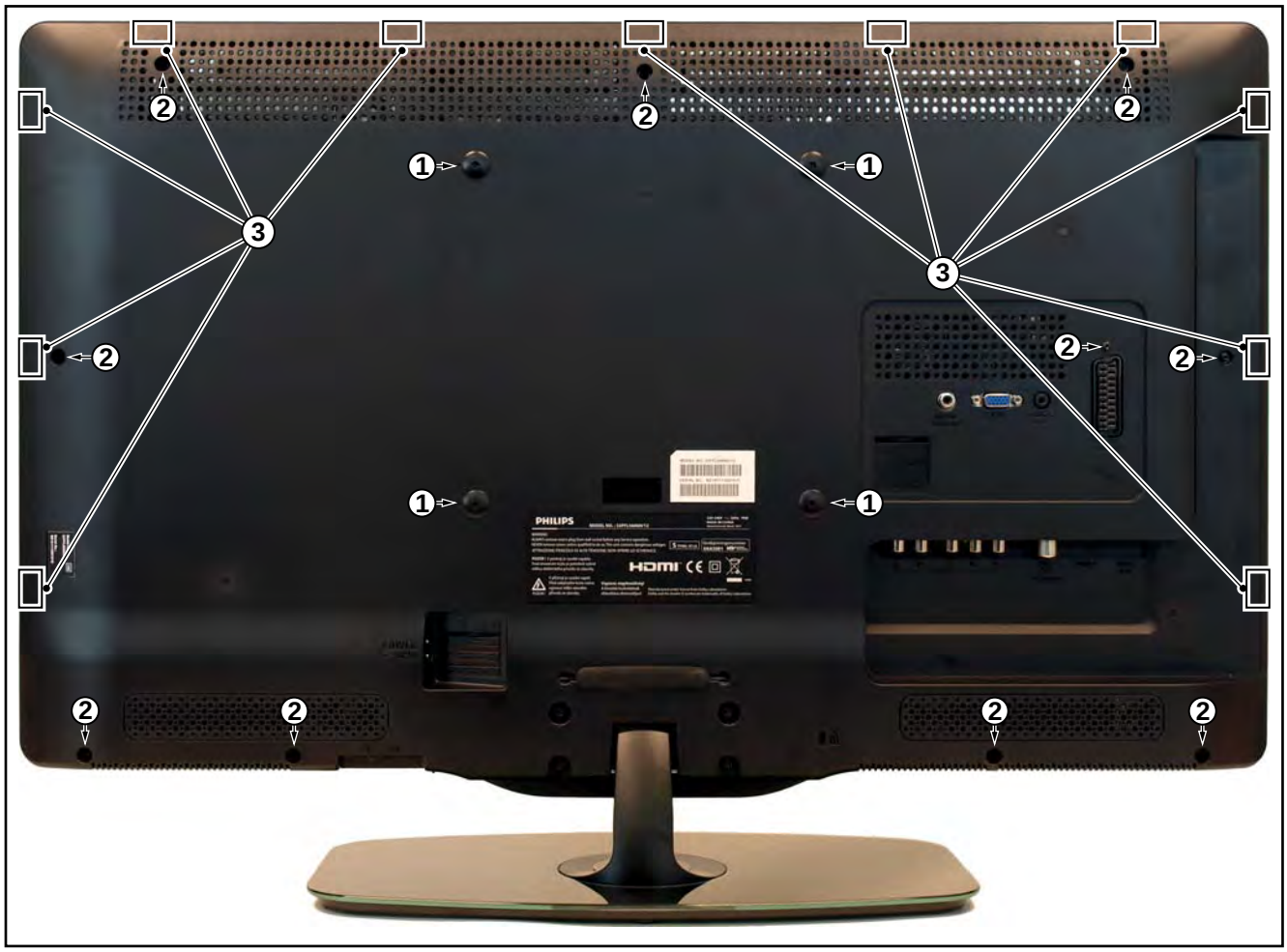

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Figure 4-11 Rear cover removal

4.4.2 Small Signal Board (SSB)

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

1. Release the clips from both the LVDS Flat Foil connectors that connect with the SSB.
   Caution: be careful, as these are very fragile connectors! Take the flat foils out of their connectors.
2. Unplug all other connectors.
3. Remove all fixation screws from the SSB. Note that one screw is located below the upper flat foil cable.
4. Take out the SSB together with side and bottom I/O bracket.
5. Remove the screws between the bottom Y-Pb and L-R audio connectors.
6. Remove the side and bottom I/O bracket from the SSB. Note that these parts are kept in place by very fragile clips. Release those clips gently!

4.4.3 Power Supply Unit (PSU)

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

1. Release the tape from the Power board cables.
2. Unplug power connectors from the SSB, as it is not unplug-able at the PSU itself (soldered connector).
3. Unplug both other connectors from the PSU.
4. Remove all fixation screws from the PSU.
5. The PSU can be taken out of the set now.

When defective, replace the whole unit.

4.4.4 Stand removal

1. Remove the four fixation screws.
2. Take the stand out in a downwards direction.

4.4.5 Stand bracket removal

Refer to Figure 4-12 for details.
Caution: it is mandatory to remount all different screws at their original position during re-assembly. Be sure to put the set in the Service Position.
1. Remove the fixation screws [1], [2].
2. Take the Stand bracket out.
3. Take Cover leading edge out, be careful of the clips.

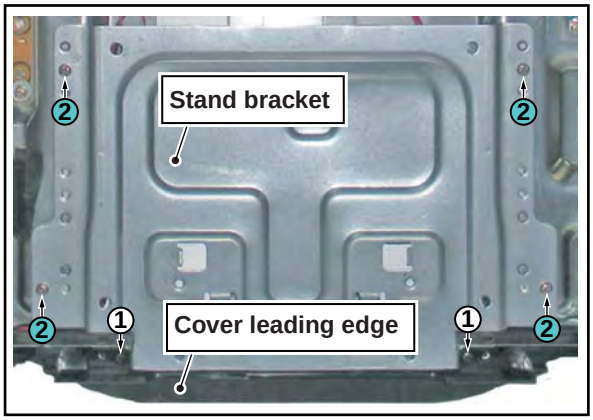

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Figure 4-12 Stand bracket removal

4.4.6 Power switch and mains plug

Refer to Figure 4-13 for details.
1. Unplug the connector from the PSU.
2. The switch and mains inlet can be remove by simply lifting them upwards out of their brackets.
3. The brackets can be removed by removing the fixation screws [1] and take them out of the set.

When defective, replace the power switch and mains plug assembly.

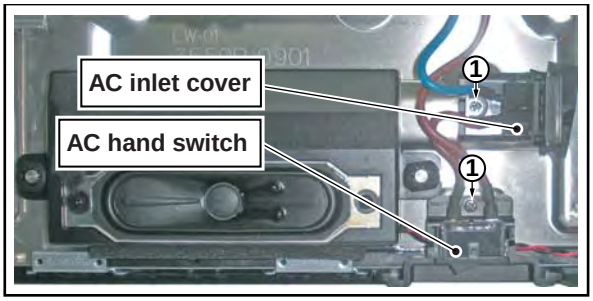

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Figure 4-13 Power switch and mains plug removal

4.4.7 Speakers

1. Unplug the left and right speaker connectors from the SSB.
2. Remove the Stand bracket as described earlier.
3. Remove the Power switch and mains plug as described earlier.
4. Release tapes from the speaker cables.
5. Take the left and right speakers out.

When defective, replace the both units.

4.4.8 IR/LED/Keyboard

Refer to Figure 4-14 for details.
1. Remove the stand bracket as described earlier.
2. Release the connectors [1] from the IR/LED/Keyboard.
3. **Caution:** The board is fitted to the bezel by double sided tape!
4. Use the slot type screw driver to detach the IR/LED/Keyboard from the bezel. Be careful not to damage the bezel. Refer to Figure 4-14 for details.
5. Carefully remove any of the tape residue from the bezel.

When defective, replace the whole unit.

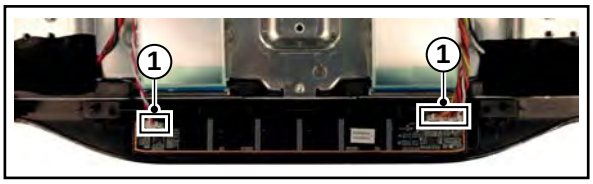

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Figure 4-14 IR/LED/Keyboard removal

Caution: The touch control function needs to be checked when it is replaced.
1. Use test finger with a 8 mm diameter to touch centre of key icon on front cover.
2. Press touch key sensitivity test hot key “0 6 2 5 9 0 MENU”, check the sensitivity count value of each key (CH +/-, HOME, VOL +/-), when touching key icon on front cover. Refer to Figure 4-15 for details.
3. The value count of each key should be over 100.

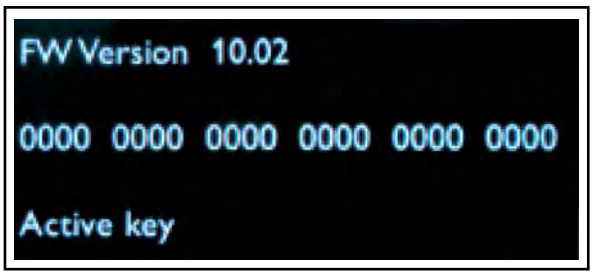

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Figure 4-15 Check touch control

4.4.9 LED Panel

Refer to Figure 4-16 for details.

1. Remove the SSB as described earlier.
2. Remove the PSU as described earlier.
3. Remove the stand as described earlier.
4. Remove the stand bracket as described earlier.
5. Remove the Power switch and mains plug as described earlier.
6. Remove the speakers as described earlier.
7. Release the tapes from the cables of the IR/KEY board.
8. Release the clips from both the LVDS flat foil connectors [1].
   Caution: be careful, as these are very fragile cables and connectors! Take the flat foils out of their connectors.
9. Remove the fixation screws [2] at the top, sides and bottom of the panel that secure the LED panel with the bezel. Remove all metal clips from their position. Be careful not to break the clicks that secure by metal brackets to keep those in position.
10. Lift the LED Panel from the bezel.

When defective, replace the whole unit.

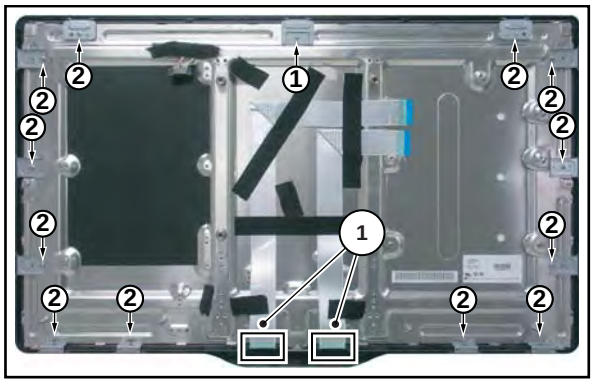

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Figure 4-16 LED panel removal

4.5 Assembly/Panel Removal (Thriller HD styling)

Instructions below apply to the 32PFL3406H/12, but will be similar for other models.

4.5.1 Rear Cover

Refer to Figure 4-17 for details.

Warning: Disconnect the mains power cord before removing the rear cover.

1. Remove all fixation screws [1] and [2] that secure the rear cover.
2. Lift the rear cover from the TV. Make sure that wires are not damaged while lifting the rear cover from the set.

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Figure 4-17 Rear cover removal

4.5.2 Small Signal Board (SSB)

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

1. Release the clips from both the LVDS Flat Foil connectors that connect with the SSB.
   Caution: be careful, as these are very fragile connectors! Take the flat foils out of their connectors.
2. Unplug all other connectors.
3. Remove all fixation screws from the SSB. Note that one screw is located below the upper flat foil cable.
4. Take out the SSB together with side and bottom I/O bracket.
5. Remove the screws between the bottom Y-Pb and L-R audio connectors.
6. Remove the side and bottom I/O bracket from the SSB. Note that these parts are kept in place by very fragile clips. Release those clips gently!

4.5.3 Power Supply Unit (PSU)

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

1. Release the tape from the power board cables.
2. Unplug power connectors from the PSU.
3. Unplug all other connectors from the PSU.
4. Remove all fixation screws from the PSU.
5. The PSU can be taken out of the set now.

When defective, replace the whole unit.

4.5.4 Stand removal

1. Remove the four fixation screws.
2. Take the stand out in a downwards direction.

4.5.5 Speakers

1. Unplug the left and right speaker connectors from the SSB.
2. Remove the stand as described earlier.
3. Release the cable from the clamp.
4. Take the left and right speakers out.

When defective, replace the both units.

4.5.6 IR/LED Board

1. Release the clips that secure the IR/LED board and take the IR/LED board out.
2. Unplug both the connectors from the IR/LED board.

When defective, replace the whole unit.

4.5.7 Keyboard Control unit

1. Remove the speakers as described earlier.
2. Remove the stand as described earlier.
3. Remove the IR/LED board as described earlier.
4. Lift the LCD Panel from the bezel.
5. Gently release the clips that hold the board and take it out from the bezel.
6. Unplug the connector from the keyboard control panel.

When defective, replace the whole unit.

4.5.8 LCD Panel

1. Remove the SSB as described earlier.
2. Remove the PSU as described earlier.
3. Remove the stand as described earlier.
4. Remove the speakers as described earlier.
5. Release the tapes from the cables of the IR/KEY board.
6. Release the clips from both the LVDS connectors.
   Caution: be careful, as these are very fragile cables and connectors! Take the flat foils out of their connectors.
7. Lift the LCD Panel from the bezel.

When defective, replace the whole unit.

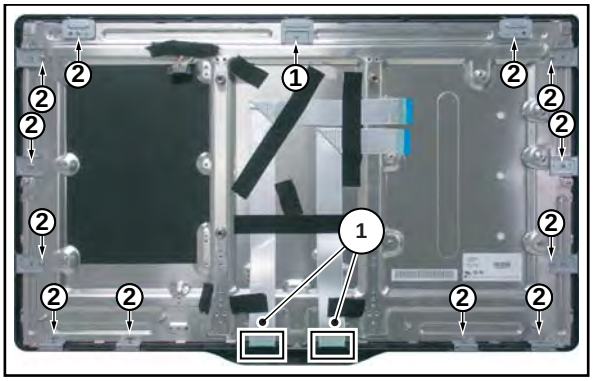

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Figure 4-18 LED panel removal

4.6 Assembly/Panel Removal (Design Line Tilt styling)

Instructions below apply to the 22PDL4906H/12, but will be similar for other models.

4.6.1 Rear Cover

Refer to Figure 4-19 for details.
Warning: Disconnect the mains power cord before removing the rear cover.

1. Remove the fixation screw that secure the base.
2. Remove all fixation screws [1] and [2] that secure the rear cover.
3. At the indicated areas [3] the cover is secured by clips. Be very careful with releasing those.
4. Lift the rear cover from the TV. Make sure that wires and flat foils are not damaged while lifting the rear cover from the set.

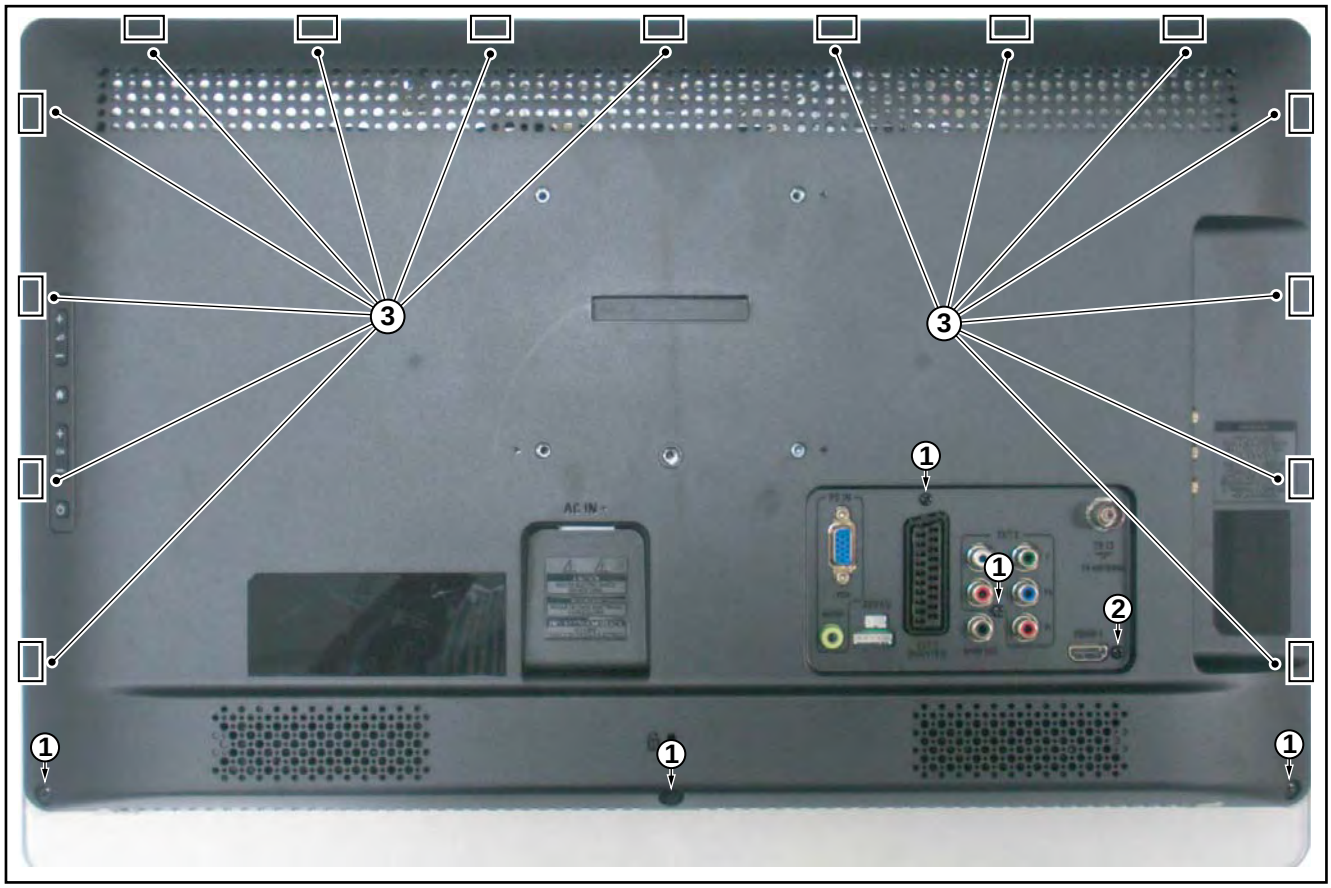

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Figure 4-19 Rear cover removal

4.6.2 Small Signal Board (SSB)

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

1. Release the clips from both the LVDS Flat Foil connectors that connect with the SSB.
   Caution: be careful, as these are very fragile connectors! Take the flat foils out of their connectors.
2. Unplug all other connectors.
3. Remove all fixation screws from the SSB.
4. Remove the screws between the side AV left and right audio connectors.
5. Remove the SSB from the metal bracket.

4.6.3 Power Supply Unit (PSU)

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

1. Release the tape from the power board cables.
2. Unplug power connectors from the SSB, as it is not unplug-able at the PSU itself (soldered connector).
3. Unplug the other connectors from the PSU and the panel.
4. Remove all fixation screws from the PSU.
5. The PSU can be taken out of the set now.

When defective, replace the whole unit.

4.6.4 Speakers

1. Unplug the speaker connector from the SSB.
2. Release the cable from the clamp.
3. Take the left and right speakers out.

When defective, replace the both units.

4.6.5 IR/LED Board

1. Release the clips that secure the IR/LED board and take the IR/LED board out.
2. Unplug the connector from the IR/LED board.

When defective, replace the whole unit.

4.6.6 Keyboard Control unit

1. Remove all fixation screws from the keyboard control panel.
2. Unplug the connector from the keyboard control panel.

When defective, replace the whole unit.

4.6.7 LCD Panel

1. Release the clamps from the IR/LED board cable.
2. Unplug the connector from the IR/LED board.
3. Release the clips from both the LVDS Flat Foil connectors.
   Caution: be careful, as these are very fragile cables and connectors! Take the flat foils out of their connectors.
4. Remove all fixation screws from the bezel.
5. Lift the LCD Panel with the metal frame from the bezel.
6. Remove all fixation screws from the metal frame.
7. Lift the metal frame from the LCD Panel.

When defective, replace the whole unit.

4.7 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 4-1 to Figure 4-6.
- Pay special attention not to damage the EMC foams on the SSB shields. Ensure that EMC foams are mounted correctly.

5. Service Modes, Error Codes, and Fault Finding

Index of this chapter:

5.1 Test Points

As most signals are digital, it will be difficult to measure waveforms with a standard oscilloscope. However, several key ICs are capable of generating test patterns, which can be controlled via ComPair. In this way it is possible to determine which part is defective.

Perform measurements under the following conditions:
- Service Default Mode.
- Video: Colour bar signal.
- Audio: 3 kHz left, 1 kHz right.

5.2 Service Modes

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

SDM and SAM offer features, which can be used by the Service engineer to repair/align a TV set. Some features are:
- A pre-defined situation to ensure measurements can be made under uniform conditions (SDM).
- Activates the blinking LED procedure for error identification when no picture is available (SDM).
- Make alignments (e.g. White Tone), reset the error buffer (SAM).
- Display information (“SDM” or “SAM” indication in upper right corner of screen, error buffer, software version, operating hours, options and option codes, sub menus).

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

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

Note: For the new model range, a new remote control (RC) is used with some renamed buttons. This has an impact on the activation of the Service modes. For instance the old “MENU” button is now called “HOME” (or is indicated by a “house” icon).

5.2.1 General

Next items are applicable to all Service Modes or are general.

Life Timer

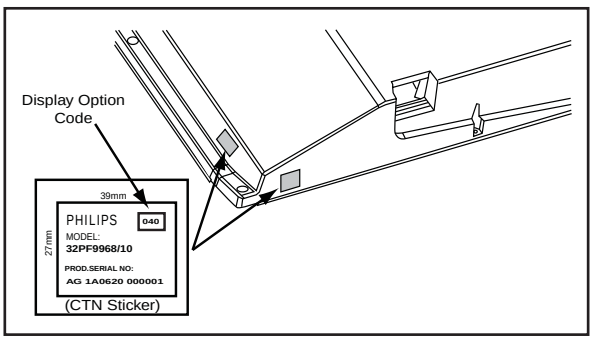
During the life time cycle of the TV set, a timer is kept (called “Op. Hour”). It counts the normal operation hours (not the Stand-by hours). The actual value of the timer is displayed in SDM and SAM in a decimal value. Every two soft-resets increase the hour by + 1. Stand-by hours are not counted.

Software Identification, Version, and Cluster

The software ID, version, and cluster will be shown in the main menu display of SDM, SAM, and CSM.
The screen will show: “AAAAAB-XX.YY”, where:
- AAAAA is the chassis name: TPM61E x.yy. (Thriller) and TPM62E x.yy (Berlinale).
- B is the region indication: E = Europe, A = AP/China, U = NAFTA, L = LATAM.
- XX is the main version number: this is updated with a major change of specification (incompatible with the previous software version). Numbering will go from 01 - 99 and AA - ZZ.
  - If the main version number changes, the new version number is written in the NVM.
  - If the main version number changes, the default settings are loaded.
- YY is the sub version number: this is updated with a minor change (backwards compatible with the previous versions). Numbering will go from 00 - 99.
  - If the sub version number changes, the new version number is written in the NVM.
  - If the NVM is fresh, the software identification, version, and cluster will be written to NVM.

Display Option Code Selection

When after an SSB or display exchange, the display option code is not set properly, it will result in a TV with “no display”. Therefore, it is required to set this display option code after such a repair.
To do so, press the following key sequence on a standard RC transmitter: “062598” directly followed by MENU and “xxx”, where “xxx” is a 3 digit decimal value of the panel type: see column “Display Code” in Table 6-2, or see sticker on the side/bottom of the cabinet. When the value is accepted and stored in NVM, the set will switch to Stand-by, to indicate that the process has been completed.



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090819

Figure 5-1 Location of Display Option Code sticker

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

5.2.2 Service Default Mode (SDM)

Purpose

Set the TV in SDM mode in order to be able to create a predefined setting for measurements to be made. In this platform, a simplified SDM is introduced (without protection override and without tuning to a predefined frequency).

Specifications

- Set linear video and audio settings to 50%, but volume to 25%. Stored user settings are not affected.
- All service-unfriendly modes (if present) are disabled, since they interfere with diagnosing/repairing a set. These service unfriendly modes are:
  - (Sleep) timer.
  - Blue mute/Wall paper.
  - Auto switch “off” (when there is no “ident” signal).
  - Hotel or hospital mode.
  - Child lock or parental lock (manual or via V-chip).
  - Skipping, blanking of “Not favourite”, “Skipped” or “Locked” presets/channels.
  - Automatic storing of Personal Preset or Last Status settings.
  - Automatic user menu time-out (menu switches back/OFF automatically.
  - Auto Volume levelling (AVL).

How to Activate SDM

To activate SDM, use the following methods:

- Press the following key sequence on the RC transmitter: “062596”, directly followed by the “MENU” button.
  Note: It is possible that, together with the SDM, the main menu will appear. To switch it “off”, push the “MENU” button again.

After activating this mode, “SDM” will appear in the upper left corner of the screen (when a picture is available).

On Screen Menu

After activating SDM, the following items are displayed, with SDM in the upper right corner of the screen to indicate that the television is in Service Default Mode. Menu items and explanation:

- **xxxxx** Operating hours (in decimal).
- **AAAAAB-XX.YY** See paragraph Software Identification, Version, and Cluster for the SW name definition.
- **ERR** Shows all errors detected since the last time the buffer was erased in format <xxx> <xxx> <xxx> <xxx> <xxx> (five errors possible).
- **OP** Used to read-out the option bytes. Ten codes (in two rows) are possible.

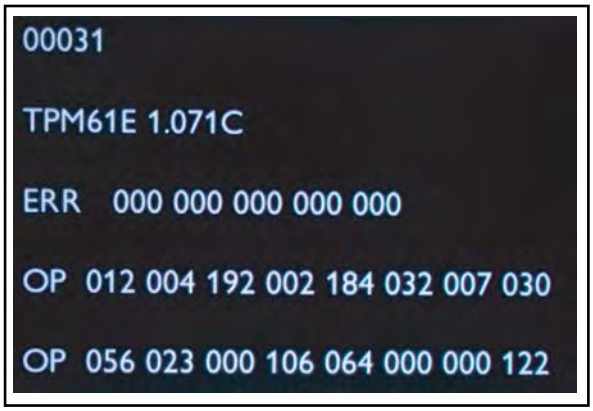

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Figure 5-2 SDM menu

How to Navigate

As this mode is read only, there is not much to navigate. To switch to other modes, use one of the following methods:

- Command MENU from the user remote will enter the normal user menu (brightness, contrast, color, etc...) with “SDM” OSD remaining, and pressing MENU key again will return to the last status of SDM again.
- To prevent the OSD from interfering with measurements in SDM, command “OSD” or “i+” (“STATUS” or “INFO” for NAFTA and LATAM) from the user remote will toggle the OSD “on/off” with “SDM” OSD remaining always “on”.
- Press the following key sequence on the remote control transmitter: “062596” directly followed by the OK button to switch to SAM (do not allow the display to time out between entries while keying the sequence). Remarks: new RC will not have I+ button, but function still remains.

How to Exit SDM

- Switch the set to Stand-by by pressing the standby button on the remote control transmitter or on the television set.
- Via a standard customer RC-transmitter: key in “00”-sequence.
  Note: If the TV is switched “off” by a power interrupt while in SDM, the TV will show up in the last status of SDM menu as soon as the power is supplied again. The error buffer will not be cleared.

5.2.3 Service Alignment Mode (SAM)

Purpose

- To modify the NVM.
- To display/clear the error code buffer.
- To perform alignments.

Specifications

- Operation hours counter (maximum five digits displayed).
- Software version, error codes, and option settings display.
- Error buffer clearing.
- Option settings.
- Software alignments (White Tone).
- NVM Editor.
- Set screen mode to full screen (all content is visible).

How to Activate SAM

To activate SAM, use one of the following methods:

- Press the following key sequence on the remote control transmitter: “062596”, directly followed by the “OK” button. Do not allow the display to time out between entries while keying the sequence.
- Or via ComPair.

After entering SAM, the following items are displayed, with “SAM” in the upper right corner of the screen to indicate that the television is in Service Alignment Mode.

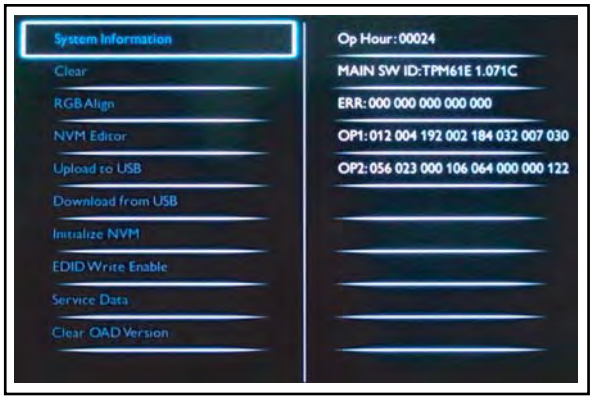

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Figure 5-3 Example of SAM

Table 5-1 SAM mode overview

Main Menu	Sub-menu 1	Sub-menu 2	Description
System Information	Op Hour		This represents the life timer. The timer counts normal operation hours, but does not count Stand-by hours.
	Main SW ID	e.g. “TPM61E 1.071C”	See paragraph Software Identification, Version, and Cluster for the SW name definition.
	ERR	e.g. “000 000 000 000 000”	Shows all errors detected since the last time the buffer was erased. Five errors possible.
	OP1	e.g. “012 004 192 002 184 032 007 030”	Used to read-out the option bytes. See paragraph 6.4 Option Settings in the Alignments section for a detailed description. Ten codes are possible.
	OP2	e.g. “056 023 000 106 064 000 000 122”	
Clear	Press [OK] to clean the Error Codes immediately		Erases the contents of the error buffer. Select this menu item and press the MENU RIGHT key on the remote control. The content of the error buffer is cleared.
RGB Align	Warm	R Gain	To align the White Tone. See paragraph 6.3 Software Alignments in the Alignments section for a detailed description
		G Gain	
		B Gain	
	Normal	R Gain	
		G Gain	
		B Gain	
	Cool	R Gain	
		G Gain	
		B Gain	
	Store		Store the RGB value
NVM editor	Address		Select and fill the NVM address
	Value		Select and fill the NVM value
	Store		Store the value in the address
Upload to USB	Copy Channel List to USB		To upload several settings from the TV to an USB stick
	Copy NVM to USB		
	Copy Readable Info to USB		
	Copy Edid to USB		
Download from USB	Copy Channel List from USB		To download several settings from the USB stick to the TV
	Copy NVM from USB		
	Copy Readable Info from USB		
	Copy Edid from USB		
Initialize NVM	Press [OK] to Initialize NVM immediately		To initialize a (corrupted) NVM. Be careful, this will erase all settings.
EDID Write Enable	Press [OK] to enable EDID writable immediately		Enable EDID writable
Service Data	Type Number	Press [OK] use key pad edit type number immediately	Use Key pad to edit several service data
	Production Number	Press [OK] use key pad edit production number immediately	
	12NC SSB	Press [OK] use key pad edit SSB immediately	
	12NC PSU	Press [OK] use key pad edit PSU immediately	
	12NC Display	Press [OK] use key pad edit display immediately	
Clear OAD Version	Press [OK] to clean OAD Version immediately		Clean OAD Version

How to Navigate

- In the SAM menu, select menu items with the UP/DOWN keys on the remote control transmitter. The selected item will be indicated. When not all menu items fit on the screen, use the UP/DOWN keys to display the next/previous menu items.
- With the “LEFT/RIGHT” keys, it is possible to:
  - (De) activate the selected menu item.
  - (De) activate the selected sub menu.
  - Change the value of the selected menu item.
- When you press the MENU button twice while in top level SAM, the set will switch to the normal user menu (with the SAM mode still active in the background). To return to the SAM menu press the MENU button.
- The “INFO [i+]” key from the user remote will toggle the OSD “on/off” with “SAM” OSD remaining always “on”.
- Press the following key sequence on the remote control transmitter: ì062596î directly followed by the MENU button to switch to SDM (do not allow the display to time out between entries while keying the sequence). Remarks: new RC will not have I+ button, but function still remain.

How to Store SAM Settings

To store the settings changed in SAM mode (except the RGB ALIGN settings), leave the top level SAM menu by using the POWER button on the remote control transmitter or the television set. The mentioned exceptions must be stored separately via the STORE button.

How to Exit SAM

Use one of the following methods:

- Switch the set to STANDBY by pressing the mains button on the remote control transmitter or the television set.
- Via a standard RC-transmitter, key in “00” sequence.

Note: When the TV is switched “off” by a power interrupt while in SAM, the TV will show up in “normal operation mode” as soon as the power is supplied again. The error buffer will not be cleared.

5.2.4 Customer Service Mode (CSM)

Purpose

The Customer Service Mode shows error codes and information on the TV's operation settings.The call centre can instruct the customer (by telephone) to enter CSM in order to identify the status of the set.This helps the call centre to

diagnose problems and failures in the TV set before making a service call.
The CSM is a read-only mode; therefore, modifications are not possible in this mode.

Specifications

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

How to Activate CSM

To activate CSM, press the following key sequence on a standard remote control transmitter: “123654”
(do not allow the display to time out between entries while keying the sequence). After entering the Customer Service Mode, the following items are displayed.

Note: Activation of the CSM is only possible if there is no (user) menu on the screen!

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Figure 5-4 CSM Menu [1/3]

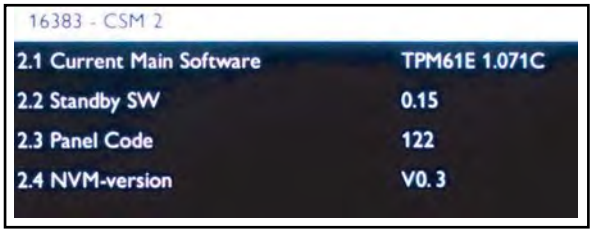

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Figure 5-5 CSM Menu [2/3]

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Figure 5-6 CSM Menu [3/3]

Contents of CSM

- **1.1 Set Type** This information is very helpful for a helpdesk/workshop as reference for further diagnosis. In this way, it is not necessary for the customer to look at the rear of the TV-set. Note that if an NVM is replaced or is initialized after corruption, this set type has to be re-written to NVM.
- **1.2 Production code** Displays the production code (the serial number) of the TV. Note that if an NVM is replaced or is initialized after corruption, this production code has to be re-written to NVM.
- **1.3 Installation date** Indicates the date of the first installation of the TV. This date is acquired via time extraction.
- **1.4 Option Code 1** Gives the option codes of option group 1 as set in SAM.
- **1.5 Option Code 2** Gives the option codes of option group 2 as set in SAM.
- **1.6 SSB** Gives an identification of the SSB as stored in NVM. Note that if an NVM is replaced or is initialized after corruption, this identification number has to be re-written to NVM. This identification number is the 12NC number of the SSB.
- **1.7 Display** 12NC NVM read/write.
- **1.8 PSU** 12NC NVM read/write.
- **2.1 Current Main SW** Displays the built-in main software version. In case of field problems related to software, software can be upgraded. As this software is consumer upgradeable, it will also be published on the Internet.
- **2.2 Standby SW** Displays the built-in stand-by processor software version. Upgrading this software will be possible via USB.
- **2.3 Panel Code** Displays the Display Code number.
- **2.4 NVM version** Detects and displays NVM version.
- **3.1 Signal Quality/Present** Analog/digital signal strength.
- **3.2 Child lock** Not active / active. This is a combined item for locks. If any lock (channel lock, parental lock) is active, the item shall show “active”.
- **3.3 HDCP keys** Indicates if the HDMI keys (or HDCP keys) are valid or not. In case these keys are not valid and the customer wants to make use of the HDMI functionality, the SSB has to be replaced.

How to Navigate

By means of the “CURSOR-DOWN/UP” knob (or the scroll wheel) on the RC-transmitter, can be navigated through the menus.

How to Exit CSM

To exit CSM, use one of the following methods.

- Press the MENU/HOME button on the remote control transmitter.
- Press the POWER button on the remote control transmitter.
- Press the POWER button on the television set.

5.3 Stepwise Start-up

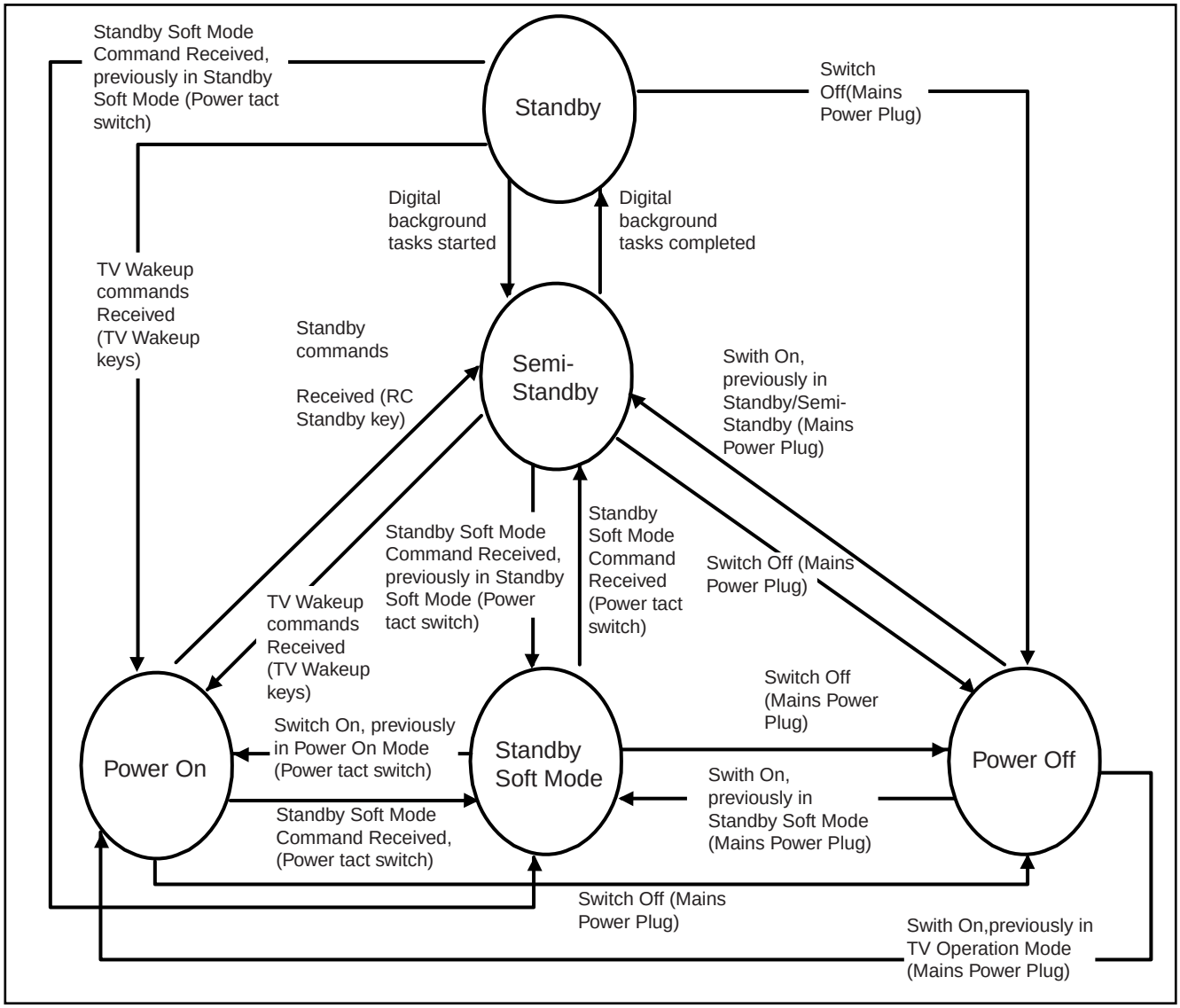

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Figure 5-7 Stepwise Start-up

5.4 Service Tools

5.4.1 ComPair

Introduction

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

1. ComPair helps 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. No knowledge on I^2C or UART commands is necessary, because ComPair takes care of this.
3. ComPair speeds up the repair time since it can automatically communicate with the chassis (when the micro processor is working) and all repair information is directly available.
4. ComPair features TV software up possibilities.

Specifications

ComPair consists of a Windows based fault finding program and an interface box between PC and the (defective) product. The 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).
The ComPair fault finding program is able to determine the problem of the defective television, by a combination of automatic diagnostics and an interactive question/answer procedure.

How to Connect

This is described in the chassis fault finding database in ComPair.

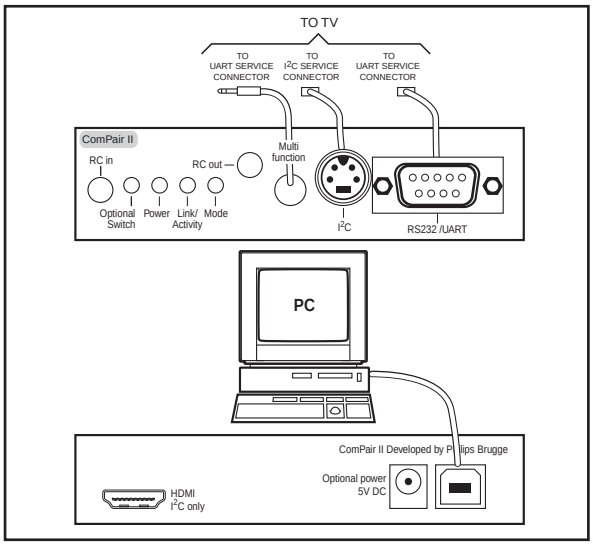

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Figure 5-8 ComPair II interface connection

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 can be blown!

How to Order

ComPair II order codes:

- ComPair II interface: 3122 785 91020.
- Software is available via the Philips Service web portal.
- ComPair UART interface cable for TPM6.1x xx. (using DB9 to 2mm pitch JST connector for Thriller): 3122 785 90630. (using S-VHS to 3.5mm jack connector for Berlinale): 9965 100 07325.

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

Additional cables for VCOM Alignment

- ComPair/I2C interface cable: 3122 785 90004.
- ComPair/VGA adapter cable: 9965 100 09269.

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

5.5 Software Upgrading

5.5.1 Description

It is possible for the user to upgrade the main software via the USB port. This allows replacement of a software image in a stand alone set. A description on how to upgrade the main software can be found in the DFU or on the Philips website.

5.5.2 Introduction

Philips continuously tries to improve its products, and it's recommend that the TV software is updated when updates are available. Software update files can be obtained from the dealer or can be downloaded from the following websites: http://www.philips.com/support

Preparing a portable memory for software upgrade

The following requirements have to be met:

1. A personal computer connected to the Internet.
2. An archive utility that supports the ZIP-format (e.g. WinZip for Windows or StuffIt for Mac OS).
3. A USB flash drive (preferably empty).

Note:

1. Only FAT/DOS-formatted flash drives are supported.
2. Only use software update files that can be found on the http://www.philips.com/support web site.

5.5.3 Check the current TV software version

Before starting the software upgrade procedure, it is advised to check that what the current TV software:

1. Press the "1 2 3 6 5 4" button on the remote control to enter the CSM mode.
2. Use the up/down cursor keys to select "Current Main Software".

If the current software version of the TV is the same as the latest update file found on http://www.philips.com/support, it is not necessary to update the TV software.

5.5.4 Download the latest software

1. Point the web browser to http://www.philips.com/support.
2. Find information and software related to the TV.
3. Select the latest software update file and download it to the PC.
4. Insert a USB flash drive into one of the USB ports of the PC.
5. Decompress the downloaded ZIP file and copy the "autorun.upg" to the root directory of the USB flash drive.

5.5.5 Update the TV software

1. Insert mains power and wait for system to boot completely.
2. Insert the USB flash drive that contains the software update files.
3. The TV will detect the USB flash drive automatically. Then a window jumps out as Figure 5-9.
   Note: If the USB flash drive is not detected after power up, disconnect it and re-insert it.

4. Select [Update] and press OK. See Figure 5-9.
5. To proceed, In next menu select [Start] and press OK to start software updates. See Figure 5-10.
6. Upgrading will now begins and the status of the updating progress will be displayed.
7. When the TV software is updated. Remove your USB flash drive, then select [Restart] and press OK to restart the TV.See Figure 5-11.

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Figure 5-9 Update the TV software [1/3]

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Figure 5-10 Update the TV software [2/3]

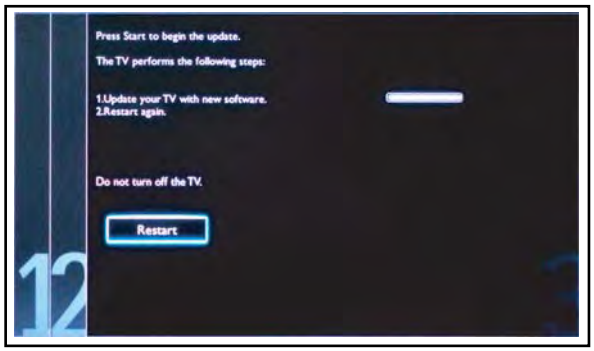

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Figure 5-11 Update the TV software [3/3]

Note:
- Do not remove the USB flash drive during the software update.
- If a power failure occurs during the update, do not remove the USB flash drive from the TV. The TV will continue the software update as soon as the power comes up again.
- If an error occurs during the update retry the procedure or contact the dealer.
- We do not recommend downgrading to an older version.
- Once the upgrade is finished, use the PC to remove the TV software from the USB portable memory.

5.5.6 Content and Usage of the One-Zip Software File

Below you find a content explanation of the One-Zip file, and instructions on how and when to use it. Only files that are relevant for Service are mentioned here.
- **EDID_clustername.zip:** Contains the EDID content of the different EDID NVMs. See ComPair for further instructions.
- **FUS_clustername_version.zip:** Contains the "autorun.upg" which is needed to upgrade the TV main software and the software download application.
- **NVM_clustername_version.zip:** Default NVM content. Must be programmed via ComPair.

5.5.7 How to Copy NVM Data to/from USB

When copying data to and from a USB memory stick, the folder "repair" is used. When inserting an empty USB memory stick, and downloading data to the stick, the TV will create this folder. When sending data from a USB memory stick to a TV, the intended data must be available in the "repair" folder.
Note that when copying EDID data to the TV, all necessary EDID files must be in this folder.
Service mode overview for your reference. Please adapt accordingly:

Table 5-2 Service mode overview

Service Modes	Description
SAM	Service alignment mode
SDM	Service default Mode
CSM	3-page compact CSM pages. There will be CSM dump to USB-stick upon entering CSM-mode
USB SW upgradeable	SW-upgrading of flash memories MTK-chips MT5366 can be done via USB. The main SW can be upgraded via Autorun.upg
NVM-Editor in SAM	NVM-editor will function as in the past: Address and Value field is a decimal value via digit entry
Service Data	New Service data in SAM for CTN, Prod. no., 12NC programming with virtual key board
USB copy/paste in SAM	Channel list, NVM data, Readable info, EDID
UART logging	There will be printout available in UART. No specifications of the printout, per MTK provision/definition.
Vcom flicker alignment	"147852" + "OK" (for flickering adjustment). TV to be put to external source other than TV, then adjust with arrow up/down and Left right, the Vcom value in the display will change with the arrow key, one adjusted, press OK and then press menu to exit
Tcon NVM default & Programmer default loading	"42662" + "OK"
Blind SAM	RC sequence "062598" + "Menu" + "Panel code"
Clear Buffer	RC sequence "062599" + "OK" or via SAM

5.6 Error Codes

5.6.1 Introduction

Error codes are required to indicate failures in the TV set. In principle a unique error code is available for every.
- Activated (SW) protection.
- Failing I^2C device.
- General I^2C error.

The last five errors, stored in the NVM, are shown in the Service menu's. This is called the error buffer.
The error code buffer contains all errors detected since the last time the buffer was erased. The buffer is written from left to right. When an error occurs that is not yet in the error code buffer, it is displayed at the left side and all other errors shift one position to the right.
An error will be added to the buffer if this error differs from any error in the buffer. The last found error is displayed on the left.
An error with a designated error code never leads to a deadlock situation. It must always be diagnosable
(e.g. error buffer via OSD or blinking LED or via ComPair).

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

Errors code information:
- **Error 000:** No problem.
- **Error 011:** I²C bus error. When this error occurs, the TV will not start up due to the blocked bus.
- **Error 012:** Tuner error. There is no I²C communication towards the tuner after start-up.
- **Error 013:** Panel VCC error. This voltage is made in the power supply and results in protection in case of absence.

5.6.2 How to Clear the Error Buffer

You can read the error buffer in three ways:
- On screen via the SAM/SDM/CSM (if you have a picture). Example:
  - **ERROR: 0 0 0 0 0:** No errors detected.
  - **ERROR: 6 0 0 0 0:** Error code 6 is the last and only detected error.
  - **ERROR: 9 6 0 0 0:** Error code 6 was detected first and error code 9 is the last detected (newest) error.
- Via the blinking LED procedure (when you have no picture). See paragraph 5.7 The Blinking LED Procedure.
- Via ComPair.

5.6.3 Error codes

Errors code information:
- **Error 000:** No problem.
- **Error 011:** I²C bus error. When this error occurs, the TV will not start up due to the blocked bus.
- **Error 012:** Tuner error. There is no I²C communication towards the tuner after start-up.
- **Error 013:** Panel VCC error. This voltage is made in the power supply and results in protection in case of absence.

5.6.4 How to Clear the Error Buffer

The error code buffer is cleared in the following cases:
- By using the CLEAR command in the SAM menu.
- By using the following key sequence on the remote control transmitter: “062599” directly followed by the OK button.
- If the contents of the error buffer have not changed for 50 hours, the error buffer resets automatically.

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

5.7 The Blinking LED Procedure

5.7.1 Introduction

The software is capable of identifying different kinds of errors. Because it is possible that more than one error can occur over time, an error buffer is available, which is capable of storing the last five errors that occurred. This is useful if the OSD is not working properly.
Errors can also be displayed by the blinking LED procedure. The method is to repeatedly let the front LED pulse with as many pulses as the error code number, followed by a period of 1.5 seconds in which the LED is “off”. Then this sequence is repeated.
Example (1): error code 4 will result in four times the sequence LED “on” for 0.25 seconds / LED “off” for 0.25 seconds. After this sequence, the LED will be “off” for 1.5 seconds. Any RC command terminates the sequence. Error code LED blinking is in red color.
Example (2): the content of the error buffer is “12 9 6 0 0” After entering SDM, the following occurs.
- 1 long blink of 5 seconds to start the sequence.
- 12 short blinks followed by a pause of 1.5 seconds.
- 9 short blinks followed by a pause of 1.5 seconds.
- 6 short blinks followed by a pause of 1.5 seconds.
- 1 long blink of 1.5 seconds to finish the sequence.
- The sequence starts again with 12 short blinks.

5.7.2 Displaying the Entire Error Buffer

Additionally, the entire error buffer is displayed when Service Mode “SDM” is entered.

5.8 Fault Finding and Repair Tips

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

5.8.1 NVM Editor

In some cases, it can be convenient if one directly can change the NVM contents. This can be done with the “NVM Editor” in SAM mode. With this option, single bytes can be changed.

Caution:
- Do not change these, without understanding the function of each setting, because incorrect NVM settings may seriously hamper the correct functioning of the TV set!
- Always write down the existing NVM settings, before changing the settings. This will enable you to return to the original settings, if the new settings turn out to be incorrect.

5.8.2 Load Default NVM Values

It is possible to upload the default values to the NVM with ComPair in case the SW is changed, the NVM is replaced with a new (empty) one, or when the NVM content is corrupted. After replacing an EEPROM (or with a defective/no EEPROM), default settings should be used to enable the set to start-up and allow the Service Default Mode and Service Alignment Mode to be accessed.

5.8.3 No Picture

When you have no picture, first make sure you have entered the correct display code. See paragraph 6.4 Option Settings for the instructions. See also Table 6-2.

5.8.4 Unstable Picture via HDMI input

Check (via ComPair) if HDMI EDID data is properly programmed.

5.8.5 No Picture via HDMI input

Check if HDCP key is valid. This can be done in CSM.

5.8.6 TV Will Not Start-up from Stand-by

Possible Stand-by Controller failure. Reflash the SW.

5.8.7 Audio Amplifier

The Class D-IC U6006 has a powerpad for cooling. When the IC is replaced it must be ensured that the powerpad is very well pushed to the PWB while the solder is still liquid. This is needed to insure that the cooling is guaranteed, otherwise the Class D-IC could break down in short time.

5.8.8 CSM

When CSM is activated and there is a USB memory stick connected to the TV, the software will dump the complete CSM content to the USB memory stick. The file (Csm.txt) will be saved in the root of the USB memory stick.

5.8.9 Loudspeakers

Make sure that the volume is set to minimum during disconnecting the speakers in the ON-state of the TV. The audio amplifier can be damaged by disconnecting the speakers during ON-state of the set!

5.8.10 Display option code

Attention: In case the SSB is replaced, always check the Panel Code in CSM, even when picture is available. Performance with the incorrect display option code can lead to unwanted side-effects for certain conditions.

6. Alignments

Index of this chapter:

6.1 General Alignment Conditions

Perform all electrical adjustments under the following conditions:

- Power supply voltage: 90 - 264 V_{AC}, 50/ 60 ± 3 Hz.
- Connect the set to the mains via an isolation transformer with low internal resistance.
- Allow the set to warm up for approximately 15 minutes.
- Measure voltages and waveforms in relation to correct ground (e.g. measure audio signals in relation to AUDIO_GND).
  Caution: It is not allowed to use heat sinks as ground.
- Test probe: R_i > 10 MΩ, C_i < 20 pF.
- Use an isolated trimmer/screwdriver to perform alignments.

6.2 Hardware Alignments

Not applicable.

6.3 Software Alignments

Put the set in SAM mode (see Chapter 5. Service Modes, Error Codes, and Fault Finding). The SAM menu will now appear on the screen. Select RGB Align and go to one of the sub menus. The alignments are explained below.
The following items can be aligned:

- White point

To store the data:

- Press OK on the RC **before the cursor is moved to the left**.
- Select “Store” and press OK on the RC.
- Switch the set to stand-by mode.

For the next alignments, supply the following test signals via a video generator to the RF input:

- **EU/AP-PAL models:** a PAL B/G TV-signal with a signal strength of at least 1 mV and a frequency of 475.25 MHz
- **US/AP-NTSC models:** an NTSC M/N TV-signal with a signal strength of at least 1 mV and a frequency of 61.25 MHz (channel 3).
- **LATAM models:** an NTSC M TV-signal with a signal strength of at least 1 mV and a frequency of 61.25 MHz (channel 3).

6.3.1 Display adjustment

You can use the default values. The default values are average values coming from production.

- Enter SAM mode.
- Select a colour temperature (e.g. COOL, NORMAL, or WARM).
- Set the RED, GREEN and BLUE default values according to the values in Table 6-1.
- When finished press OK on the RC, then press STORE to store the aligned values to the NVM.
- Restore the initial picture settings after the alignments.

Table 6-1 White tone default settings

Picture mode	Styling	Screen size	Colour temperature		
			Red	Green	Blue
Normal (9000K)	Thriller	32"	128	121	108
		42"	128	112	112
	Berlinale	32"	128	121	108
	Thriller HD	32"	128	123	108
	Design Line Tilt	22"	128	111	112
		26"	128	108	112
Cool (11000K)	Thriller	32"	128	123	125
		42"	127	111	128
	Berlinale	32"	127	123	123
	Thriller HD	32"	128	125	128
	Design Line Tilt	22"	128	104	120
		26"	127	102	120
Warm (6500K)	Thriller	32"	128	113	70
		42"	128	103	71
	Berlinale	32"	128	110	71
	Thriller HD	32"	128	111	62
	Design Line Tilt	22"	128	90	63
		26"	128	89	65

This group setting of colour temperature will be applied automatically to the TV / VGA / HDMI / AV sources.

6.4 Option Settings

6.4.1 Introduction

The microprocessor communicates with a large number of I^2C ICs in the set. To ensure good communication and to make digital diagnosis possible, the microprocessor has to know which ICs to address. The presence / absence of these MT5366 ICs (back-end advanced video picture improvement IC which offers motion estimation and compensation features (commercially called HDNM) plus integrated Ambilight control) is made known by the option codes.

Notes:

- After changing the option(s), save them by pressing the OK button on the RC before the cursor is moved to the left, select STORE and press OK on the RC.
- The new option setting is only active after the TV is switched “off” / “stand-by” and “on” again with the mains switch (the NVM is then read again).

6.4.2 Option Code Overview

Enter SAM mode to check the option codes. they could not be edited in the NVM.

6.4.3 Display Code Overview

Press 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 6-2. After resetting the Display Code, restart the set immediately.

Table 6-2 Display code overview

CTN_ALT BOM#	Panel Type	Display Code
22PDL4906H/12	LGD LC216EXN-SDA1	135
22PDL4906H/58	LGD LC216EXN-SDA1	135
22PDL4906H/60	LGD LC216EXN-SDA1	135
22PDL4916H/12	LGD LC216EXN-SDA1	135
22PDL4916H/58	LGD LC216EXN-SDA1	135
22PDL4916H/60	LGD LC216EXN-SDA1	135
26PDL4906H/12	LGD LC260EXN-SDA3	136
26PDL4906H/58	LGD LC260EXN-SDA3	136
26PDL4906H/60	LGD LC260EXN-SDA3	136
26PDL4916H/12	LGD LC260EXN-SDA3	136
26PDL4916H/58	LGD LC260EXN-SDA3	136
26PDL4916H/60	LGD LC260EXN-SDA3	136
32PFL3406H/12	LGD LC320WXN-SCA1	134
32PFL3406H/58	LGD LC320WXN-SCA1	134
32PFL3505H/12	LGD LC320WUY-SCB1	122
32PFL3506H/12	LGD LC320WUY-SCB1	122
32PFL3506H/58	LGD LC320WUY-SCB1	122
32PFL3506H/60	LGD LC320WUY-SCB1	122
32PFL3606H/12	LGD LC320WUY-SCB1	122
32PFL3606H/58	LGD LC320WUY-SCB1	122
32PFL3606H/60	LGD LC320WUY-SCB1	122
32PFL5306H/12	LTD LC320EXE-LDN1	128
32PFL5306H/58	LTD LC320EXE-LDN1	128
32PFL5406H/12	LTD LC320EXE-LDN1	128
32PFL5406H/58	LTD LC320EXE-LDN1	128
32PFL5406H/60	LTD LC320EXE-LDN1	128
32PFL5606H/12	LTD LC320EUG-LDN1	129
32PFL5606H/58	LTD LC320EUG-LDN1	129
32PFL5606H/60	LTD LC320EUG-LDN1	129
42PFL3505H/12	LGD LC420WUY-SCB1	123
42PFL3506H/12	LGD LC420WUY-SCB1	123
42PFL3506H/58	LGD LC420WUY-SCB1	123
42PFL3606H/12	LGD LC420WUY-SCB1	123
42PFL3606H/58	LGD LC420WUY-SCB1	123
42PFL3606H/60	LGD LC420WUY-SCB1	123

6.5 Reset of Repaired SSB

A very important issue towards a repaired SSB from a Service repair shop (SSB repair on component level) implies the reset of the NVM on the SSB.
A repaired SSB in Service should get the service Set type “00PF0000000000” and Production code “00000000000000”. Also the virgin bit is to be set. To set all this, you can use the ComPair tool or use the “NVM editor” and “Dealer options” items in SAM (do not forget to “store”).

After a repaired SSB has been mounted in the set (set repair on board level), the type number (CTN) and production code of the TV has to be set according to the type plate of the set. For this, you can use the NVM editor in SAM. The loading of the CTN and production code can also be done via ComPair (Model number programming).

In case of a display replacement, reset the “Operation hours display” to “0”, or to the operation hours of the replacement display.

7. Circuit Descriptions

Index of this chapter:

Notes:

- Only **new** circuits (circuits that are not published recently) are described.
- Figures can deviate slightly from the actual situation, due to different set executions.
- For a good understanding of the following circuit descriptions, please use the wiring, block (see chapter 9. Block Diagrams) and circuit diagrams (see chapter 10. Circuit Diagrams and PWB Layouts).Where necessary, you will find a separate drawing for clarification.

7.1 Introduction

The TPM6.1E LA platform has two stylings, one is 3000 Thriller series and the other is 5000 Berlinale series. Both of them use MT5366/MT5135, for Philips 3000 models it supports decoder and a TV controller offers high integration for advanced applications. It combines a transport de-multiplexer, a high definition video decode, an AC3 decode, a dual-link LVDS/mini-LVDS transmitter, and an NTSC/PAL/SECAM TV decoder with a 3D comb filter (NTSC/PAL). The chips enables consumer electronics manufactures to build high quality, low cost and feature-rich DTV.

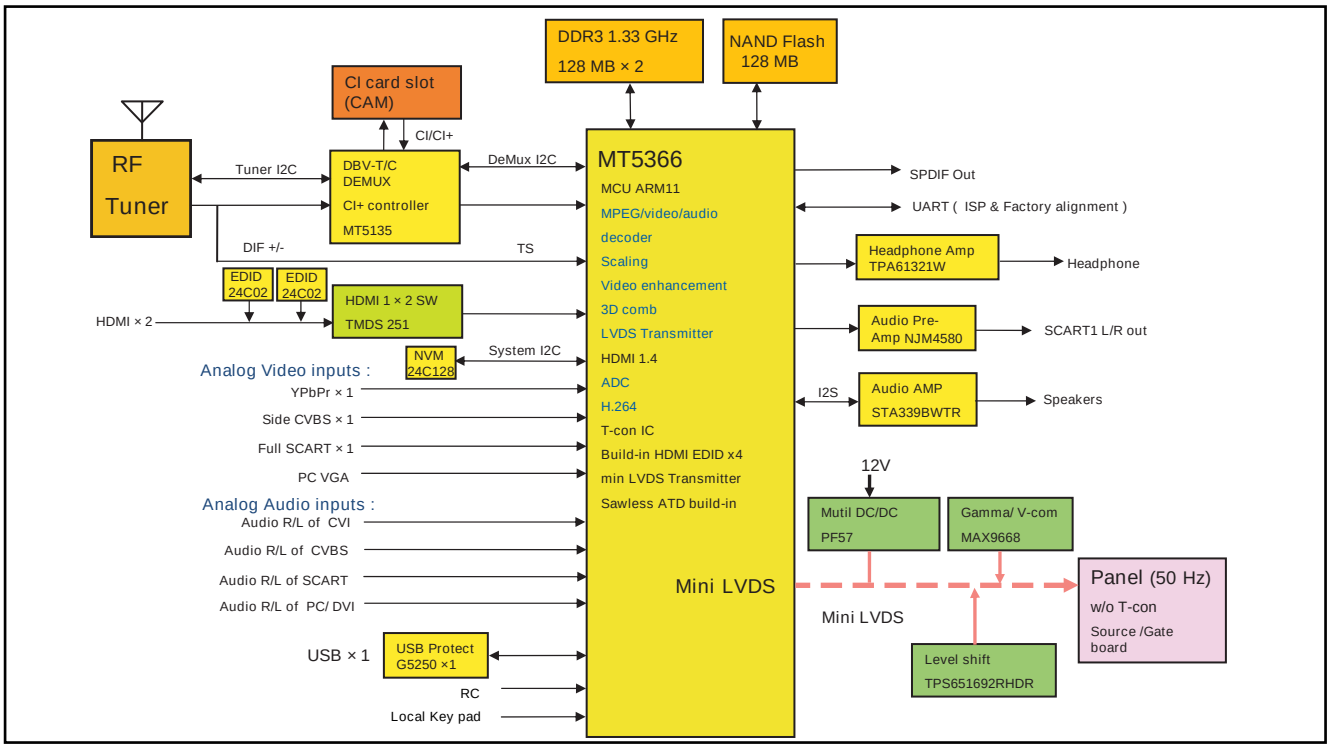
7.1.1 Implementation

Key components of this chassis are:

- MT5366CVGG System-On-Chip (SOC) TV Processor
- TDTK-G731D Tuner (DVB T/C, analogue)
- MT5135AE DVB T/C demodulator
- TMDS251PAGR HDMI Switch for 3000 Thriller series
- TMDS351PAG HDMI Switch for 5000 Berlinale series
- TPA6132A2RTER Earphone R/L output
- STA339BWTR Audio amplifier
- MAX17113ET Multi DC/DC
- MAX9668ETP GAMMA
- TPS65192RHDR Level shifter for 3000 Thriller series
- MAX17119ETI Level shifter for 5000 Berlinale series

7.1.2 TPM6.1E Architecture Overview

For details about the chassis block diagrams refer to chapter 9. Block Diagrams. An overview of the TPM6.1E architecture can be found in Figure 7-1, Figure 7-2 and Figure 7-3.



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110405

Figure 7-1 Architecture of Thriller

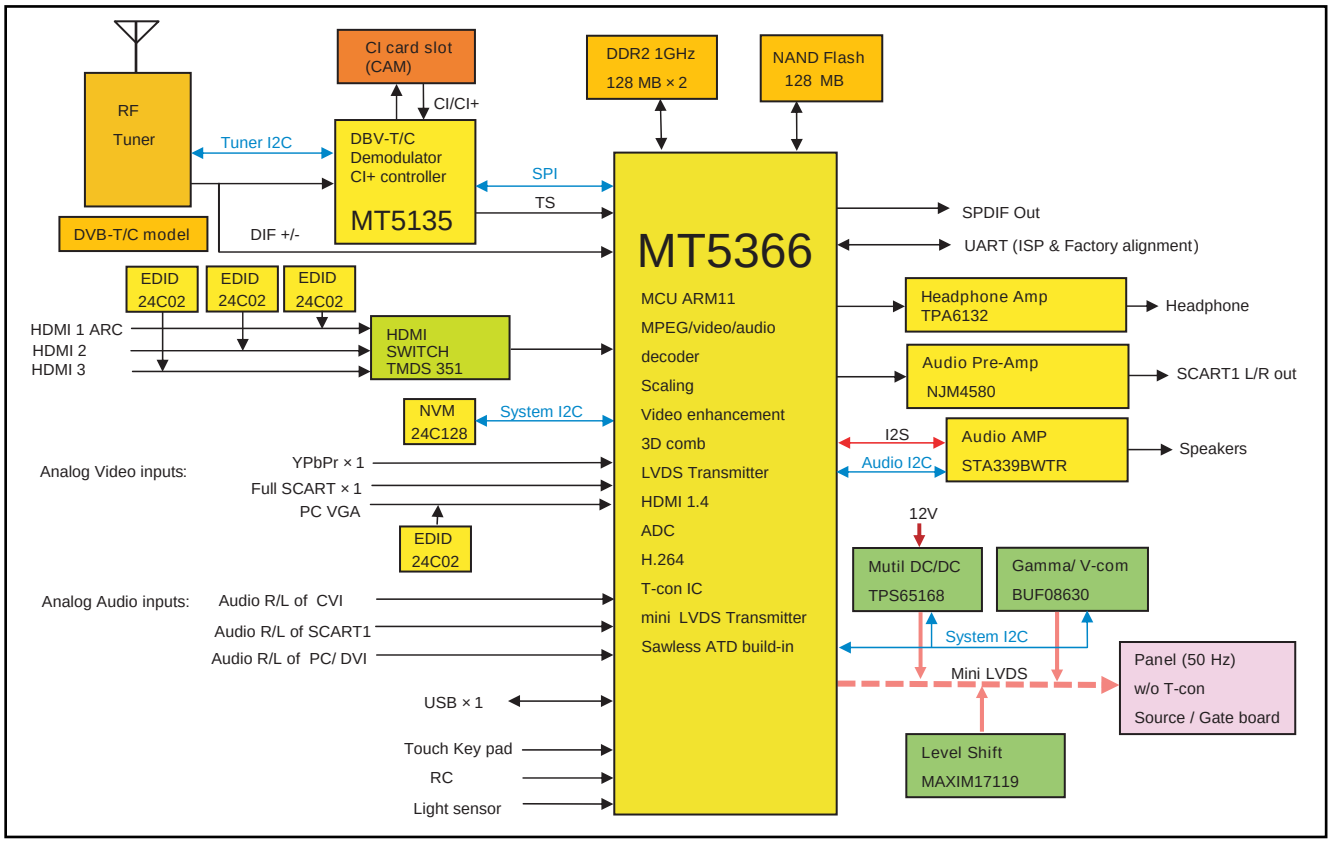

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Figure 7-2 Architecture of Berlinale xxPFL56xx/xx and Thriller HD

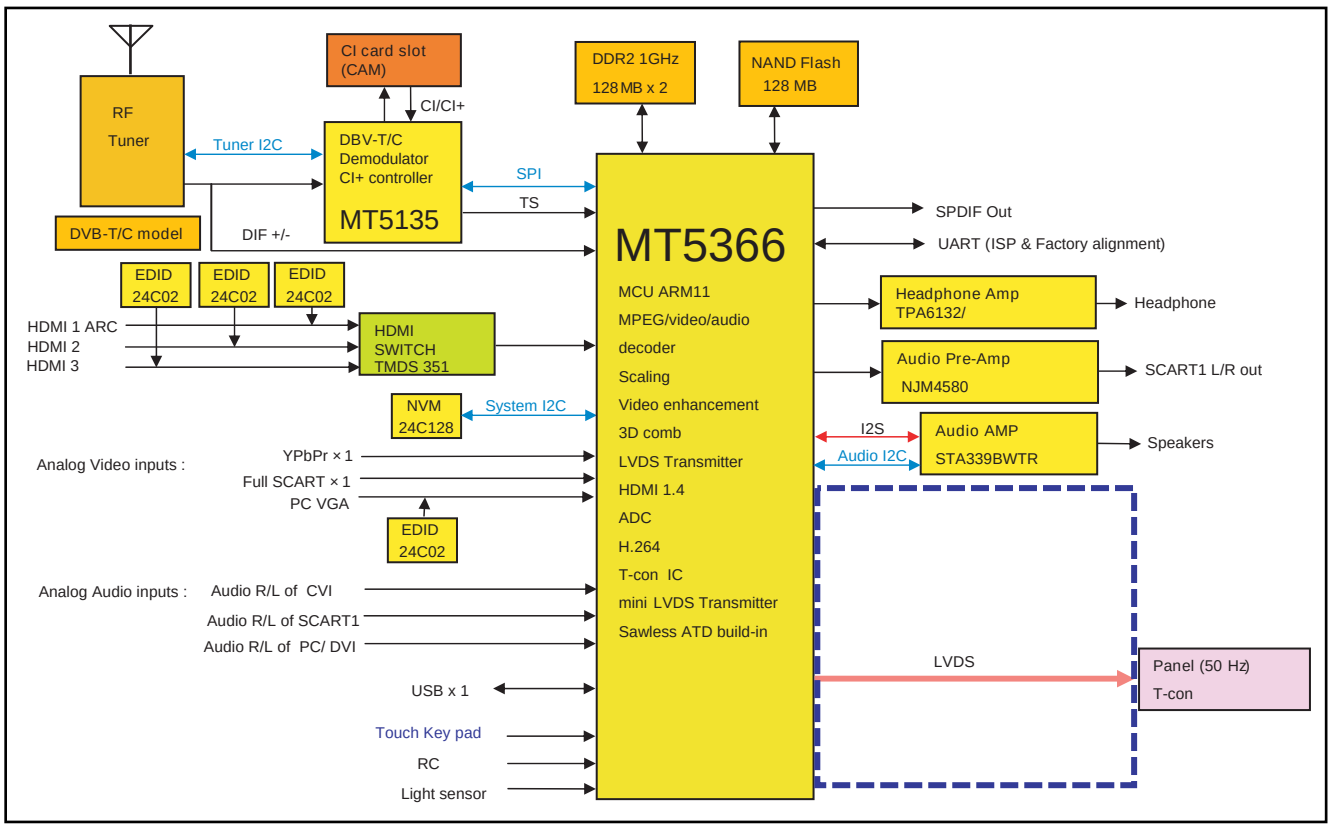

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Figure 7-3 Architecture of Berlinale xxPFL54xx/xx

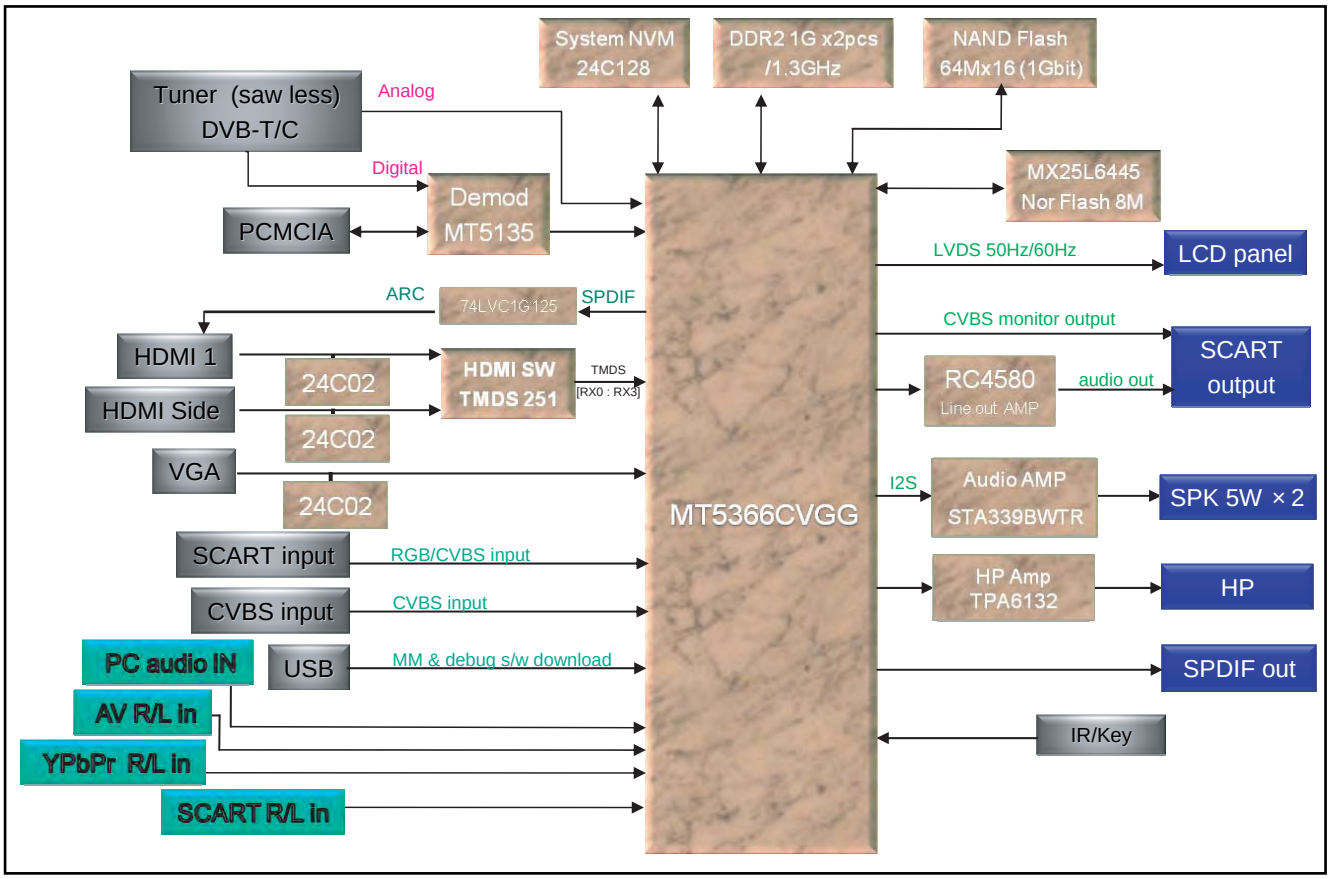

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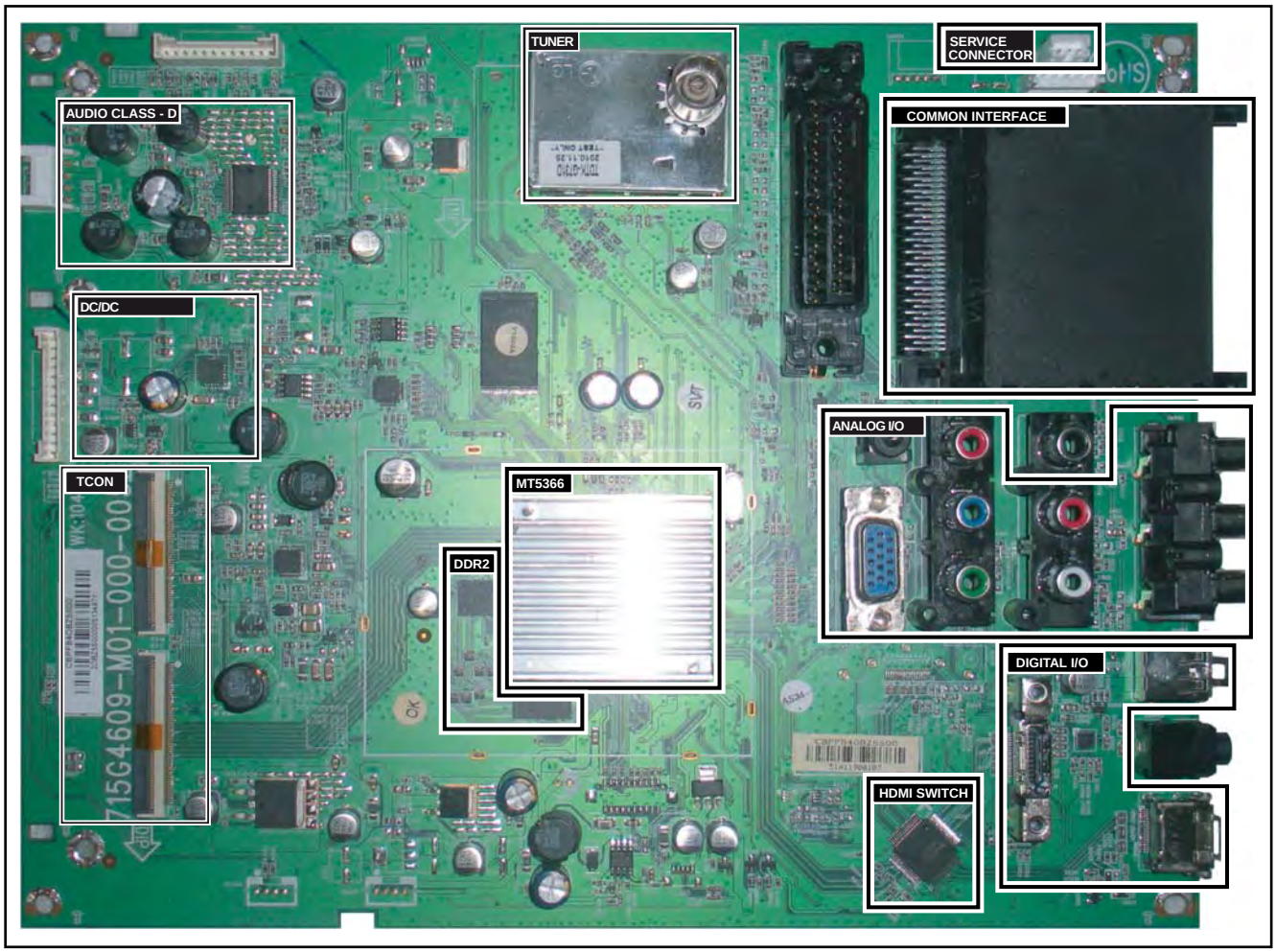
Figure 7-4 Architecture of Design Line Tilt

7.1.3 SSB Cell Layout Thriller



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110401

Figure 7-5 Thriller SSB layout cells (top view)

7.1.4 SSB Cell Layout Berlinale and Thriller HD

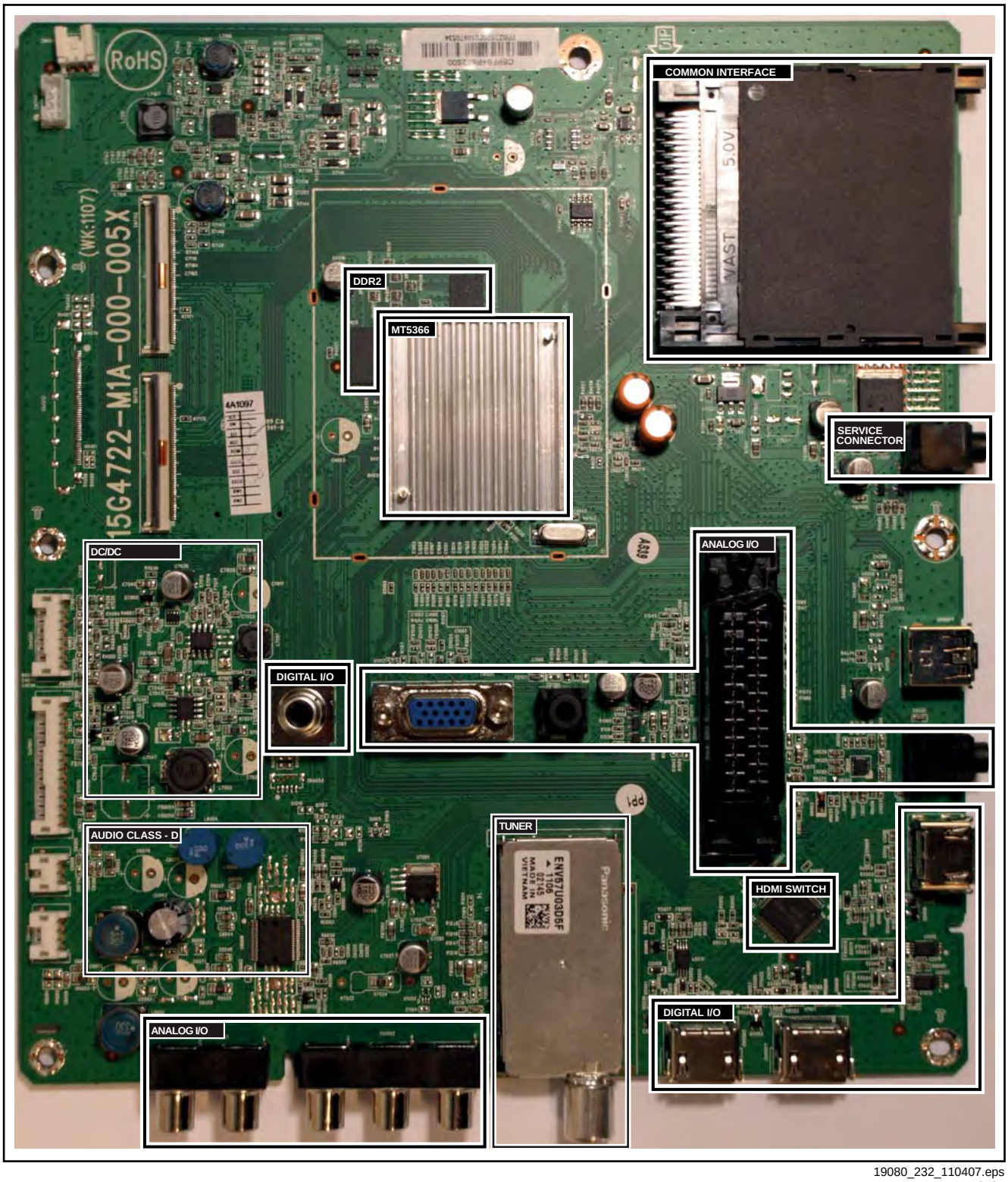

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Figure 7-6 Berlinale and Thriller HD SSB layout cells (top view)

7.1.5 SSB Cell Layout Design Line Tilt

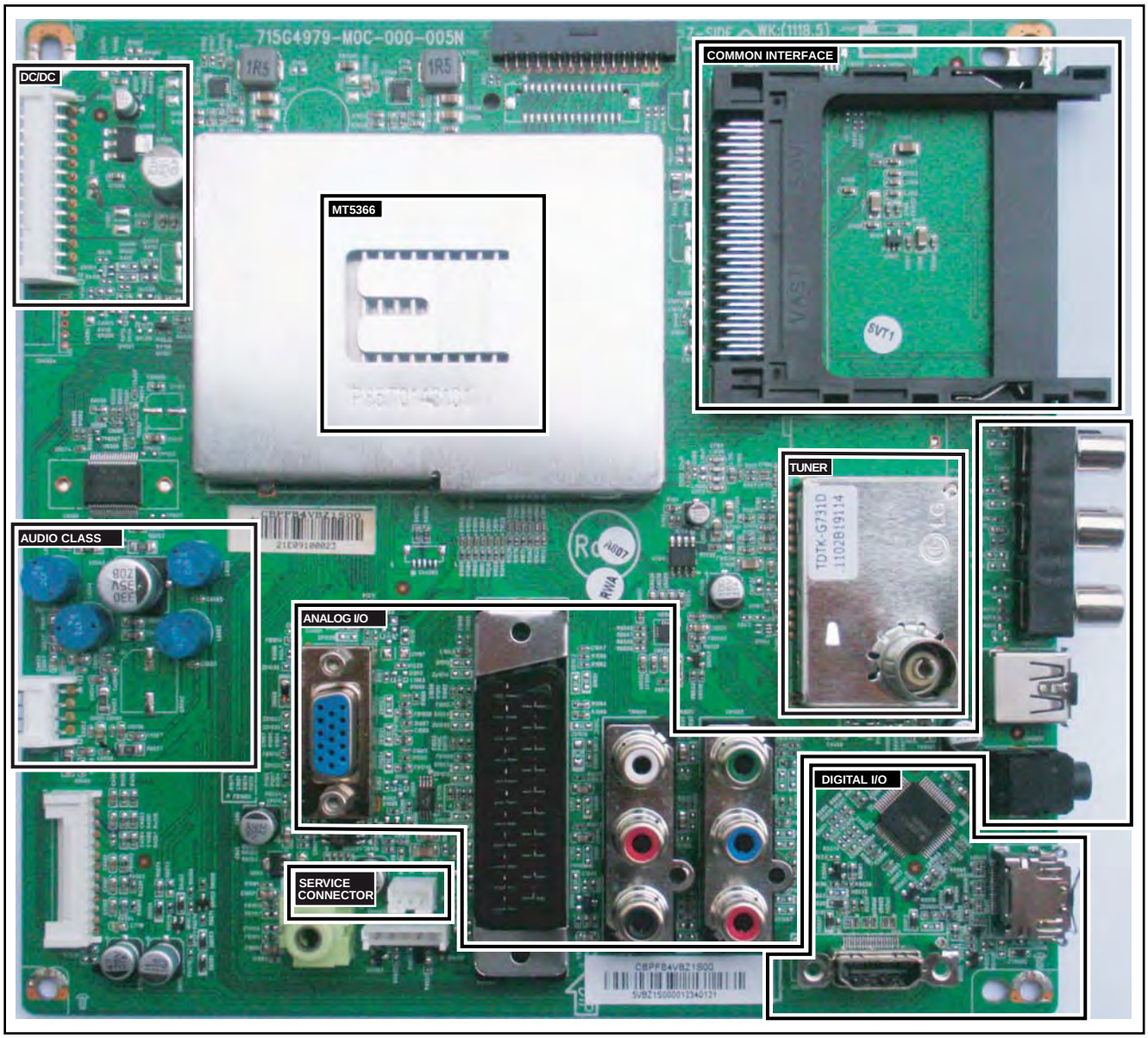

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Figure 7-7 Design Line Tilt SSB layout cells (top view)

7.2 Power Supply

7.2.1 Power Supply Unit

Before checking other parts first check whether fuse on the PSU is not broken. Always replace a defective fuse with one with the correct specifications! This part is available in the regular market.
Consult the Philips Service web portal for the order codes of the boards.

In this manual, no detailed information is available because of design protection issues.

The output voltages to the chassis are:
- +5V / +3V3 - STANDBY (Stand-by mode only)
- +12V (on-mode)
- +24V for audio circuit

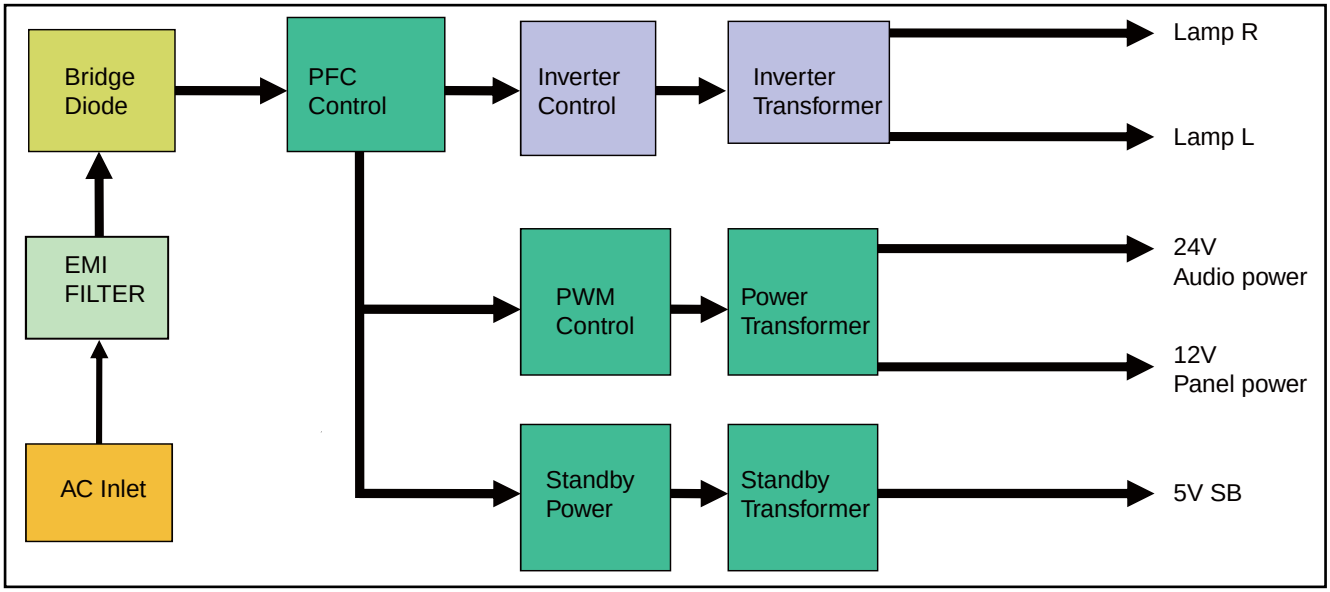

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Figure 7-8 Thriller power board management

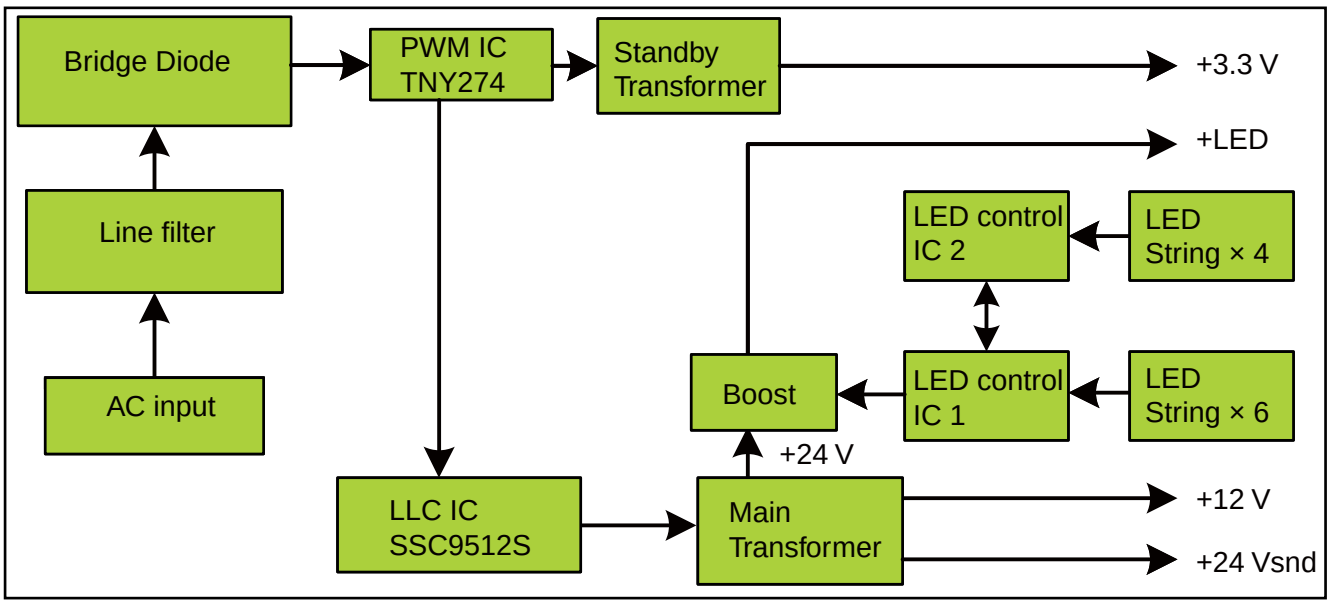

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Figure 7-9 Berlinale xxPFL56xx/xx power board management

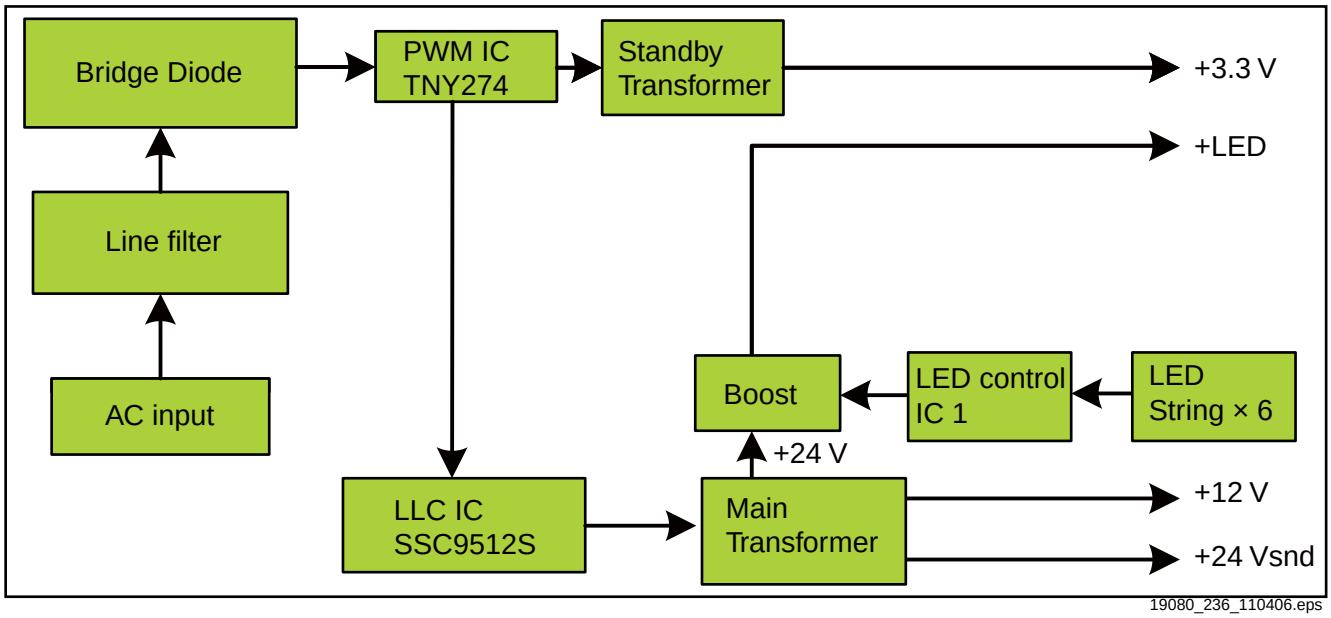

Figure 7-10 Berlinale xxPFL54xx/xx power board management

7.2.2 Diversity

The diversity in power supply units is mainly determined by the diversity in screen sizes.

7.3 Power Management

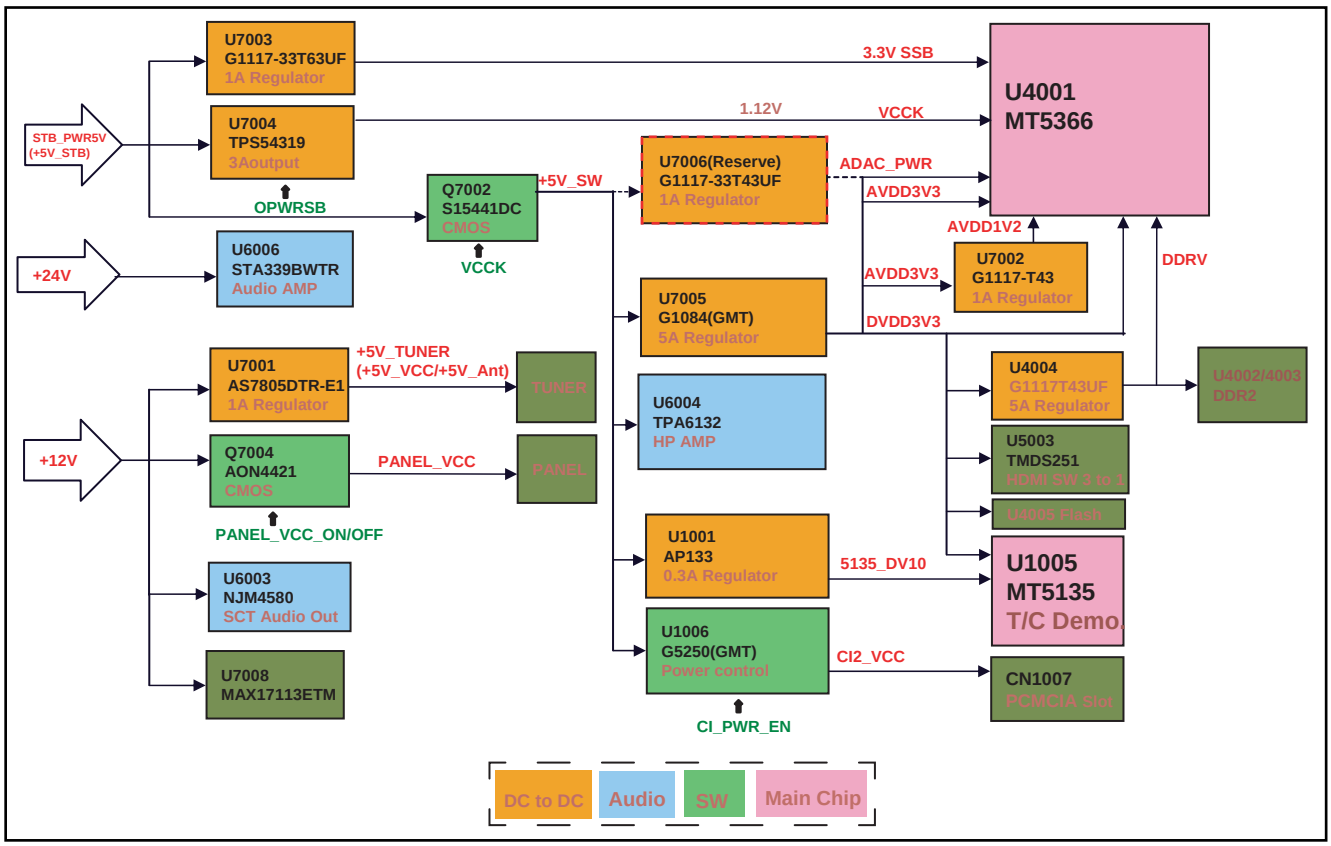

Figure 7-11 Thriller power management

The on-board DC/DC converters deliver the following voltages (depending on set execution):

- +5V-STANDBY, permanent voltage for the Stand-by controller, LED/IR receiver and controls; connector CN7001 pin 10.

- +12V, input from the power supply for Thriller common (active mode); connector CN7001 pins 3 and 4.
- +24V, input from the power supply for audio (in active mode); connector CN7001 pins 8 and 9.

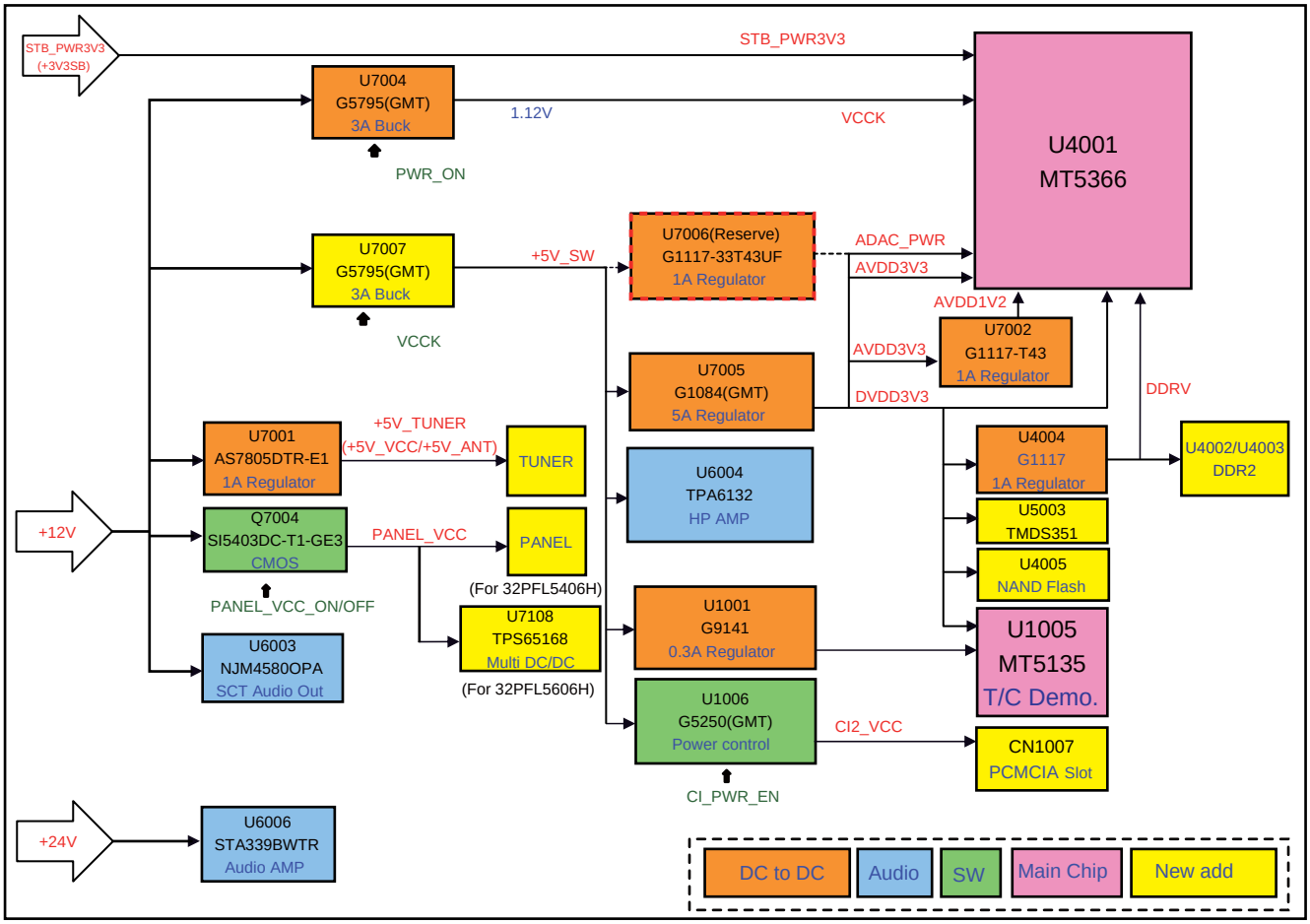

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Figure 7-12 Berlinale and Thriller HD power management

The on-board DC/DC converters deliver the following voltages (depending on set execution):

- +3V3 -STANDBY, permanent voltage for the Stand-by controller, LED/IR receiver and controls; connector CN7001 pin 1.
- +12V, input from the power supply for Berlinale common (active mode); connector CN7001 pins 5 and 6.
- +24V, input from the power supply for audio (in active mode); connector CN7001 pins 7.

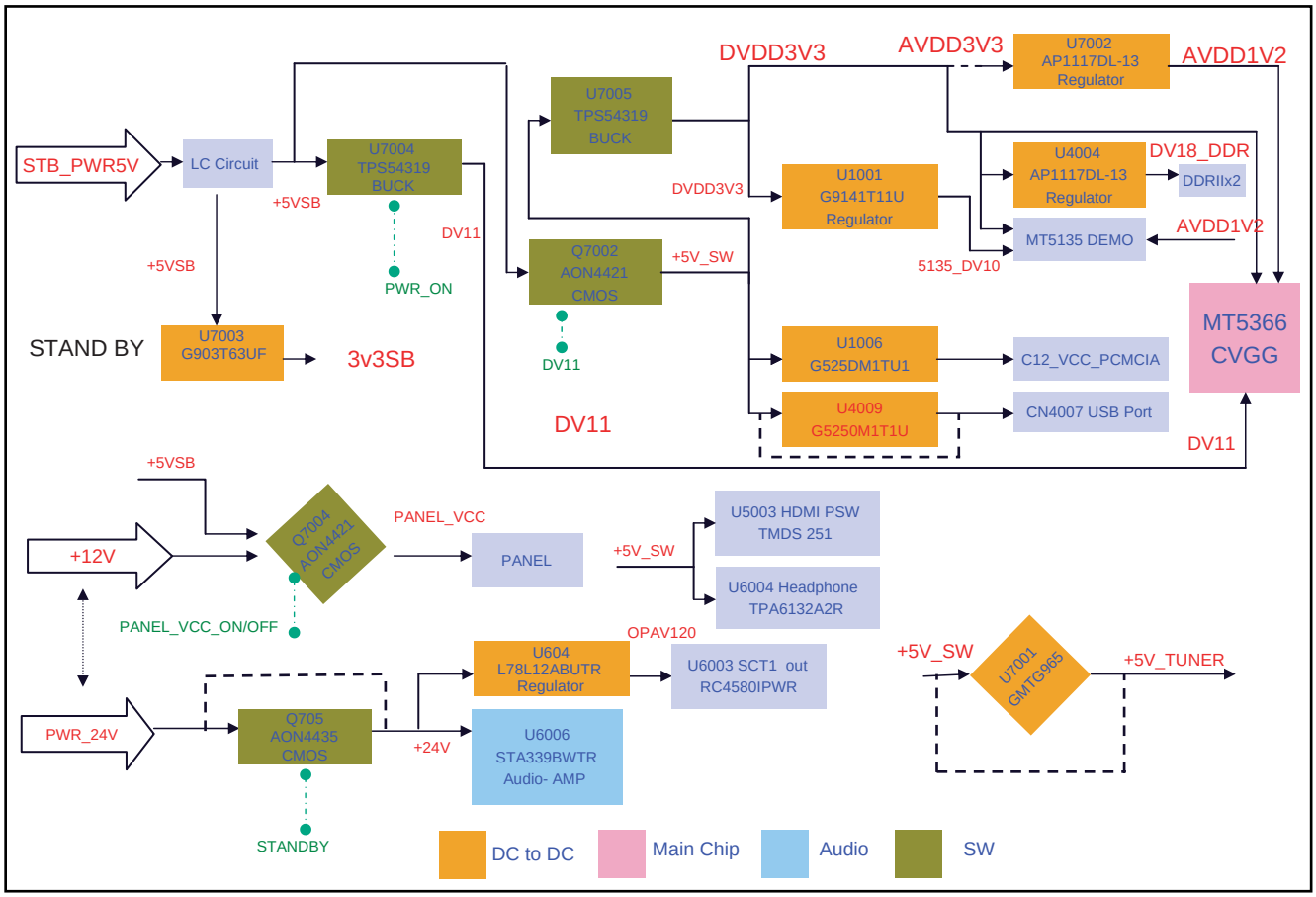

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Figure 7-13 Design Line Tilt power management

The on-board DC/DC converters deliver the following voltages (depending on set execution):

- +5VSB, for standby mode and provide 3.3V, 1V, 1.12V, 1.2V for all ICs; connector CN701 pin 11 and 12.
- +12V, input from the power supply for panel; connector CN701 pins 3 and 4.
- +24V, input from the power supply for audio (in active mode); connector CN701 pins 8 and 9.

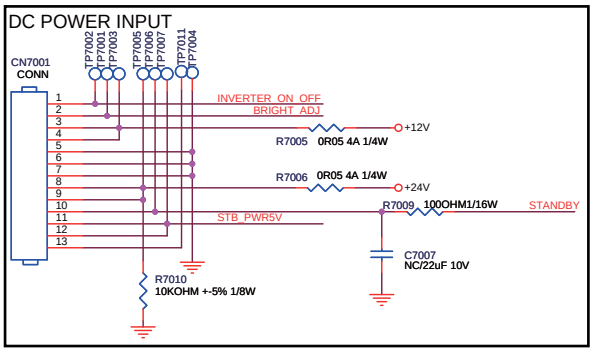
7.4 Circuit Description

7.4.1 System power

The main board power is received at connector CN7001 from power board, to receive the power and signals from the PSU. See Table 7-1 for the correct pining, The shown test points in Figure 7-14.

Table 7-1 Connector CN7001 overview

Item	Pin	Description
1	1	INVERTER_ON_OFF, Inverter board control (Low: ON, High: OFF)
2	2	BRIGHT_ADJ, Inverter bright PWM control (Max: 0V, Min: 3V3)
3	3, 4	+12V Supply
4	5, 6, 7	Ground
5	8, 9	+24V Supply
6	10	STANDBY, Standby control (High: Normal, Low: Stand by)
7	11, 12	STB_PWR5V, +5VSB Supply
8	13	LED ON, LED on power board need a signal to control it by panel turn on needed



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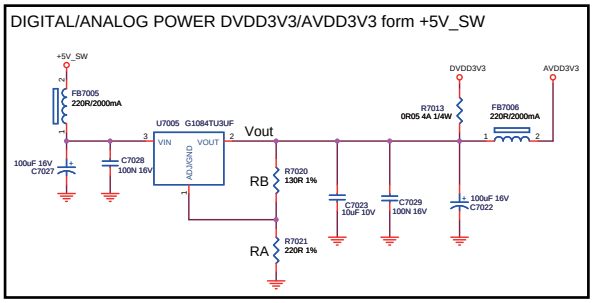
110325

Figure 7-14 System power

7.4.2 Digital/Analog power

The DVDD3V3 and AVDD3V3 are from U7005 (G1084), it can provide 5 A output current. R7013/FB7006 are for power measurement. FB7006 also is for filtering.



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110401

Figure 7-15 Digital/Analog power

7.4.3 Tuner power

The tuner power is derived from +12V by U7001 (AS7805), the power should not drop below 4.75 V for the LG tuner, but it can be 4.9V at least.

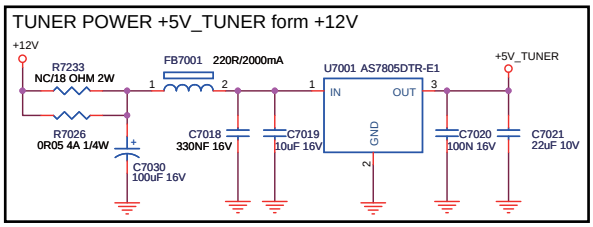

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Figure 7-16 Tuner power

7.4.4 Peripheral

This chassis uses a 128 Mbyte NAND flash for it's software code. It stores the main software of the TV.

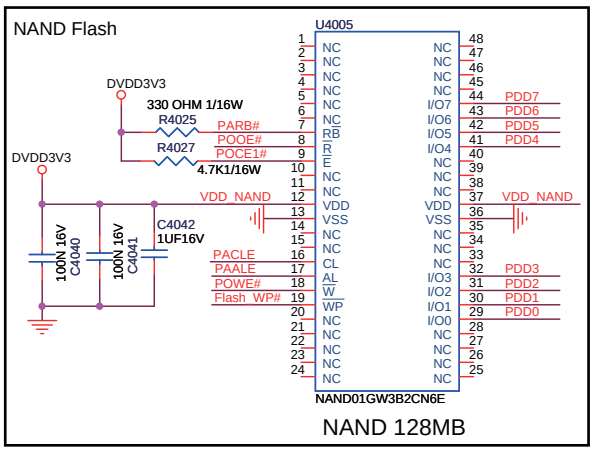

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Figure 7-17 Peripheral

7.4.5 System EEPROM

The EEPROM is 128 Mb, it includes many important data for this TV for example NVM and, adjustment data.

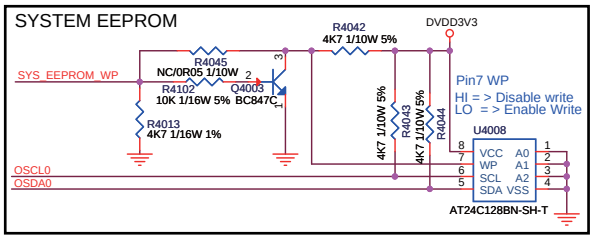

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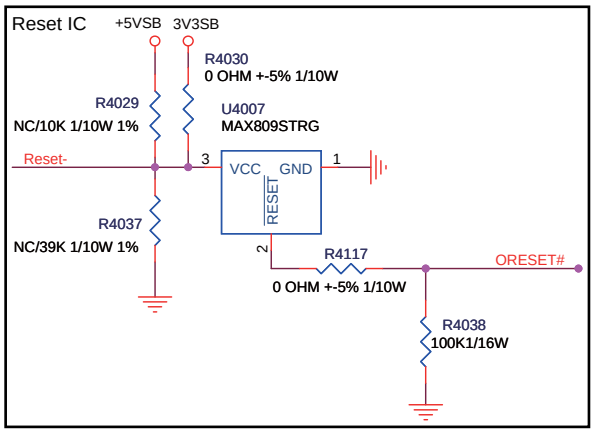
Figure 7-18 System EEPROM

7.4.6 Reset IC

The set uses the power 3V3 to reset. When 3V3SB drops below 2.93 V, IC U4007 will send a reset to the main processor IC MT5366.



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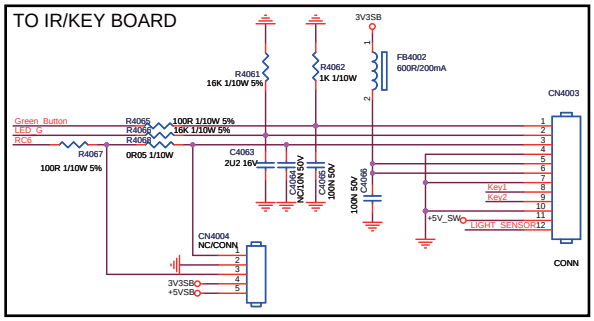
110401

Figure 7-19 Reset IC

7.4.7 Connector to IR/Key board

The CN4003 is taking care of the control signals to the IR/LED/keyboard board.

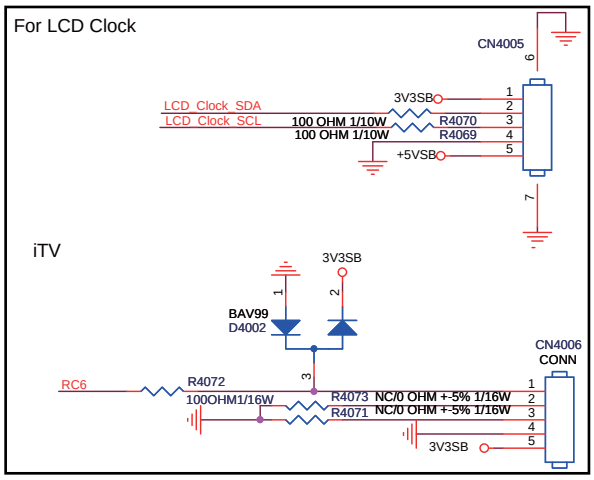


19080_221_110325.eps
110325

Figure 7-20 Connector to IR/Key board

7.4.8 Connectors CN4005 and CN4006

Both connectors CN4005/CN4006 is for iTV purposes only.

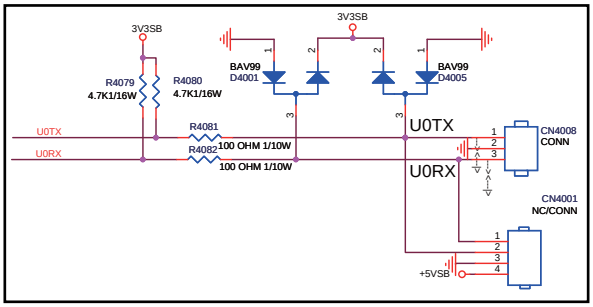


19080_222_110325.eps
110401

Figure 7-21 Connectors CN4005 and CN4006

7.4.9 Connector CN4008

CN4008 is the service connector, CN4001 is for iTV models.



19080_223_110325.eps
110325

Figure 7-22 Connector CN4008

7.4.10 Audio Amplifier

The platform uses I^2S to link the audio amplifier IC, it is using pins 27, 28, 29 and 30 of IC U6006.

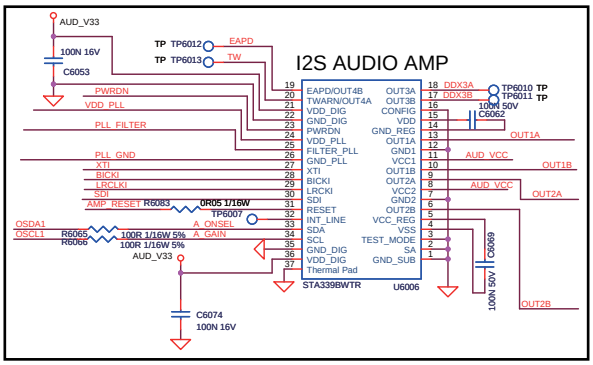


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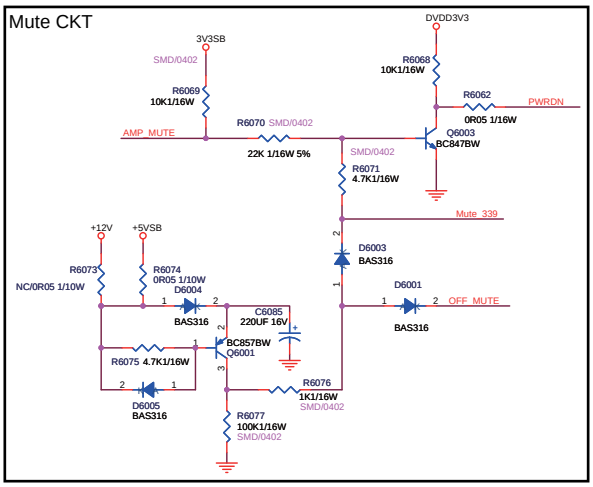
Figure 7-23 Audio Amplifier

7.4.11 Mute circuit

It is DC drop detect circuit. The +5VSB is monitored, when it turned off or will be too low, the OFF_MUTE/Mute_339 will send out a high pulse to turn on the related mute circuit.



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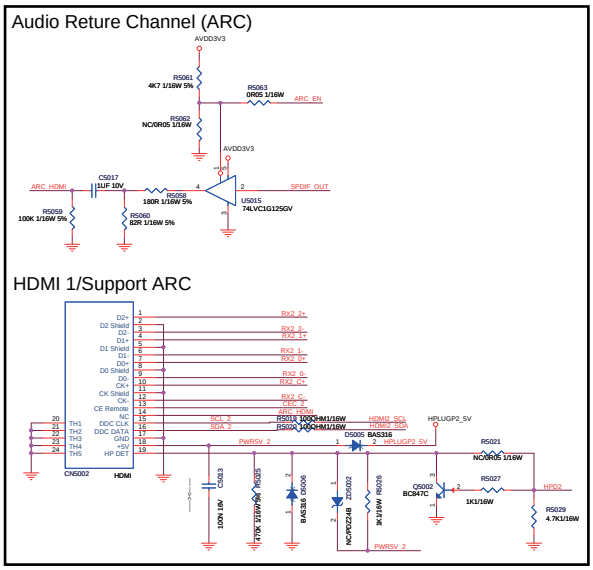
110401

Figure 7-24 Mute circuit

7.4.12 ARC (HDMI)

ARC (audio return channel) is supported on HDMI 1 only. When an ARC command is received from CEC, then IC U5015 will be enabled and an SPDIF signal will be available on HDMI 1, pin 14.



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110401

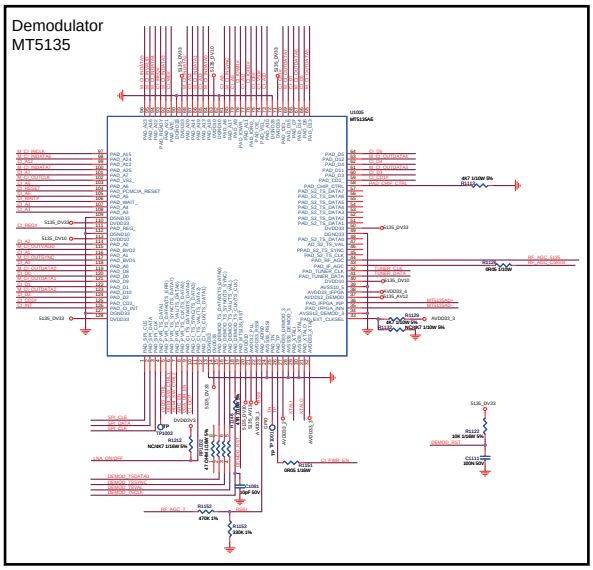
Figure 7-25 ARC (HDMI)

7.4.13 Demodulator

The MT5135AE provides a high performance DVB-T and DVB-C demodulation function, the integrated CI+ controller and interface also reduce the complexity of TS routing.

Overall Features:

- Integrated DVB-T and DVB-C demodulators.
- Integrated CI/CI+ controller and interface.
- On-chip integrated SAW filter function.
- 10-Bit ADC accepting IF or low-IF inputs.
- RSSI measurement.
- Independent RF and IF AGC controls.
- One parallel or serial TS interface accepting output.



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110407

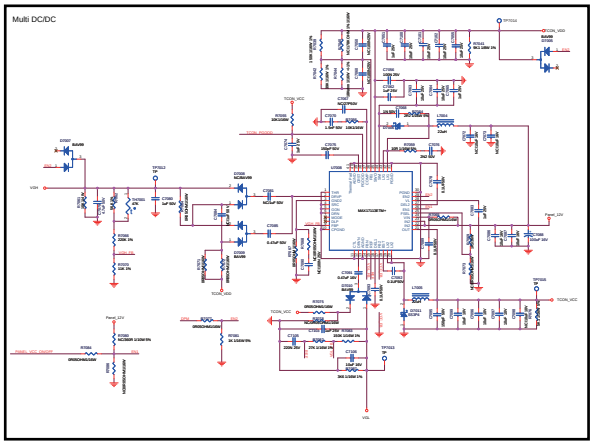
Figure 7-26 Demodulator

7.4.14 Tuner

The tuner covers all bands in VHF and UHF, it includes digital terrestrial (DVB-C,DVB-C), I2C bus control of tuner, address selection, broadcasting system selection.

7.4.15 TCON

IC U7008 provides VGH, VGL, TCON_VDD, TCON_VCC signals for panel control. The enable pins are EN1 and EN2.



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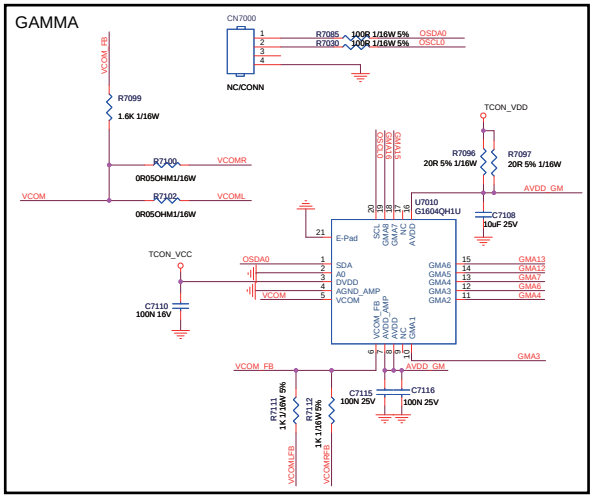
110401

Figure 7-27 TCON

7.4.16 GAMMA

IC U7010 saves gamma data and V-COM data, the data depends on the panel. The gamma data can be auto written 3 times by code initially. It is written via special tooling in the factory via CN7000. V-COM data will be adjusted to nominal values before shipping.



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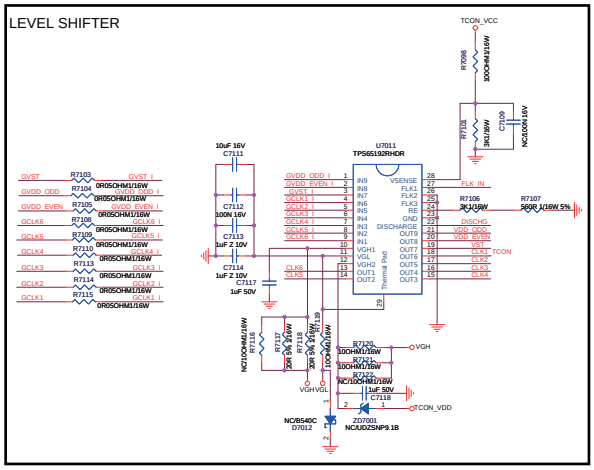
110401

Figure 7-28 GAMMA

7.4.17 Level shift

IC U7011 supports the level shift function.



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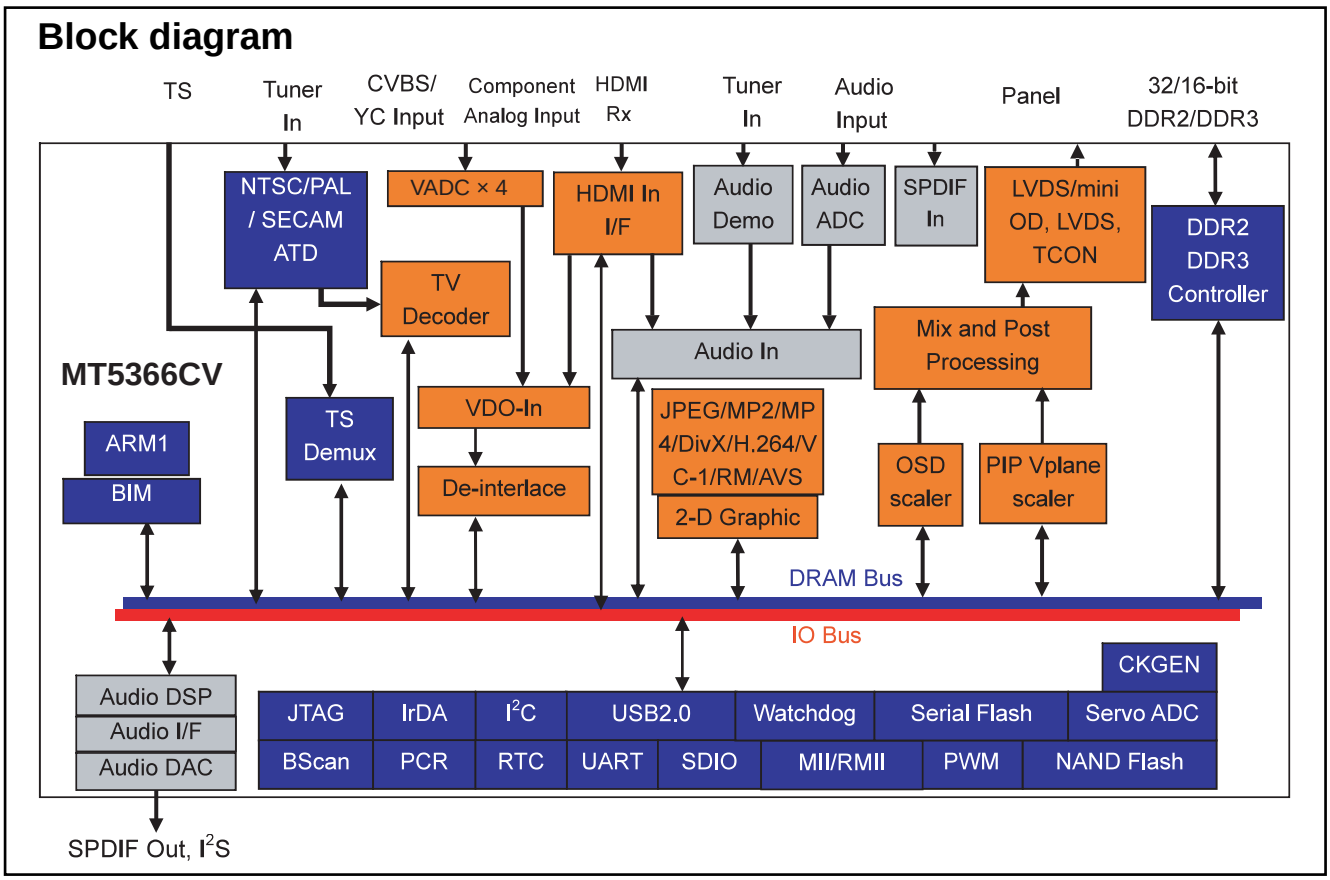
110401

Figure 7-29 Level shift

8. IC Data Sheets

This chapter shows the internal block diagrams and pin configurations of ICs that are drawn as “black boxes” in the electrical diagrams (with the exception of “memory” and “logic” ICs).

8.1 Diagram 10-7-3 Peripheral B03, MT5366CVGG BGA-479 (IC U4001)



19080_300_110316.eps
120102

Figure 8-1 Internal block diagram

Pinning information MT5366CV [1/2]

479	1	2	3	4	5	6	7	8	9	10	11	12
A	VCC2IO	RCS_//RRAS_	RODT//RODT	RWE_//RCS_		RA10//RA7	RA5//RA3		RCLK0//RCLK0	RDQ10//RDQ10		RDQS1//RDQS1
B	VCC2IO	VCC2IO	RRAS_//RCAS_	RCKE//RWE_		RA1//RA13	RA3//RA9		RCLK0_//RCLK0_	RDQ13//RDQ8		RDQS1_//RDQS1_
C	RDQ28//RDQ27	VCC2IO	VCC2IO	RCAS_//RA0	RBA0//RA2	RBA2//RRESET_	RA7//RBA2	MEMTN	DVSS	RDQ8//RDQ14	RDQ15//RDQ12	RDQM0//RDQM0
D	RDQ25//RDQ29	RDQ27//RDQ25	VCC2IO	VCC2IO	RBA1//RA5	RA0//RA12	RA13//RA6	MEMTP	RA9//RCKE		RDQ7//RDQ3	RDQ0//RDQ1
E	RDQM3//RDQM3	RDQ30//RDQ31	RVREF	VCC2IO	VCC2IO	NC//RA8	RA8//RBA0	RA12//RA10	RA2//RBA1	DVSS	RDQ2//RDQ7	RDQ5//RDQ5
F	RDQS2_//RDQS2_	RDQS2//RDQS2			VCC2IO	VCC2IO	RA11//RA11	RA4//RA4	RA6//RA1	DVSS	DVSS	DVSS
G	RDQS3//RDQS3	RDQS3_//RDQS3_	RDQM2//RDQM2	RDQ19//RDQ22	RDQ22//RDQ16	VCC2IO						
H			RDQ31//RDQ28	RDQ20//RDQ20	RDQ17//RDQ18	DVSS		VCC2IO	AVDD12_MEMPLL	AVSS12_MEMPLL	DVSS	DVSS
J	RDQ26//RDQ24	RDQ29//RDQ26	RDQ24//RDQ30	RDQ16//RDQ19	RDQ23//RDQ17	DVSS		VCC2IO				
K	RCLK1//RCLK1	RCLK1_//RCLK1_	RDQ18//RDQ23	RDQ21//RDQ21		DVSS	DVSS	VCC2IO	VCCK	VCCK	VCCK	DVSS
L			DVSS	DVSS	DVSS	DVSS			VCCK	VCCK	VCCK	DVSS
M	VCCK	VCCK	VCCK	VCCK	VCCK	VCCK			DVSS	DVSS	DVSS	DVSS
N	VCCK	VCCK	VCCK	VCCK	VCCK	VCCK			DVSS	DVSS	DVSS	DVSS
P	GPIO22	GPIO21	GPIO20	GPIO19	GPIO18	GPIO16			DVSS	DVSS	DVSS	DVSS
R			JTDO	JTCK	GPIO23	GPIO17	OPWM0		VCCK	DVSS	DVSS	DVSS
T	JTDI	JTRST_	JTMS		OPWM1	OPWM2		VCC3IO	VCCK	VCCK	VCCK	VCCK
U	U1TX	U1RX	OSCL1	OSDA1	GPIO24	GPIO25	GPIO27	VCC3IO				
V			ETRXD1	ETRXD0	ETMDIO	GPIO26	AVSS33_USB_2P	VCC3IO				
W	ETRXCLK	ETTXCLK	ETRXD3	ETRXD2	ETTXEN	ETMDC		AVSS33_VGA_STB	ADIN3_SRV	ADIN4_SRV	VSYNC	HSYNC
Y	ETTXD0	ETTXD1	ETTXD2	ETRXDV	ETTXD3		OPCTRL5	ORESET_		ADIN2_SRV	ADIN5_SRV	VDAC_OUT2
AA			ETCOL	ETPHYCLK		AVDD12_HDMI	AVDD33_VGA_STB	OPCTRL2	ADIN0_SRV		ADIN1_SRV	AVDD10_LDO
AB	AVDD33_USB_2P	USB_2P_DP0			HDMI_SDA	HDMI_CEC	OPCTRL4	U0TX	OPWRSB	COM	SOY1	VGA_SCL
AC	USB_2P_DM0	USB_2P_DP1	USB_2P_VRT	AVSS33_HDMI	HDMI_SCL	HDMI_HPD	U0RX	OIRI	GP	RP	VGA_SDA	SOY0
AD	USB_2P_DM1	RX_CB	RX_0B	RX_1B	RX_2B	PWR5V		OPCTRL0	BP		Y1P	PB1P
AE	AVDD33_HDMI	RX_C	RX_0	RX_1	RX_2	OPCTRL3		OPCTRL1	SOG		COM1	PR1P
LB	1	2	3	4	5	6	7	8	9	10	11	12

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120102

Figure 8-2 Pin configuration [1/2]

Pinning information MT5366CV [2/2]

13	14	15	16	17	18	19	20	21	22	23	24	25	RT
RDQS0_/ /RDQS0_		RDQ12// RDQ11	VCC2IO	AO0P	AO1P	AO2P	AOCKP	AO3P	AO4P	AO5P	TP_VPLL	DVSS	A
RDQS0// RDQS0		RDQ11// RDQ9	VCC2IO	AO0N	AO1N	AO2N	AOCKN	AO3N	AO4N	AO5N		DVSS	B
RDQM1// RDQM1	RDQ14// RDQ15	RDQ9//R DQ13	VCC2IO	AE0N		AE1P	AE2N	AECKP		AE3N	AE4P	AE5N	C
RDQ6//R DQ0	RDQ4//R DQ4	VCC2IO		AE0P		AE1N	AE2P	AECKN		AE3P	AE4N	AE5P	D
RDQ1//R DQ2	RDQ3//R DQ6	VCC2IO	AVSS33_ LVDSA	AVSS33_ LVDSA	AVDD33_ LVDSA	AVDD33_ LVDSA			GPIO9	FSRC_W R	GPIO5	GPIO0	E
	VCC2IO	VCC2IO				AVDD12_ VPLL		GPIO11	GPIO10	GPIO2			F
						AVSS12_ VPLL	GPIO12	GPIO7	GPIO15	GPIO4	GPIO1	GPIO14	G
VCC2IO	VCC2IO					VCC3IO	GPIO6	GPIO8			GPIO13	GPIO3	H
						POWE_	PARB_	POCE0_	OSDA0	OSCL0	PACLE	PAALE	J
DVSS	DVSS	VCCK	VCCK	DVSS		PDD2	PDD3	POOE_	POCE1_	PDD7			K
DVSS	DVSS	VCCK	VCCK	DVSS					PDD1	PDD6	PDD5	PDD4	L
DVSS	DVSS	DVSS	DVSS		VCC3IO	PVR_TS DATA0	PVR_TS SYNC	PVR_TS VAL	SPI_DAT A	PDD0	CI_INT	SPI_CLE	M
DVSS	DVSS	DVSS	DVSS	DVSS	VCC3IO	DEMOD_ TSDATA 0	CI_TSVA L	SPI_CLK	PVR_TS DATA1				N
DVSS	DVSS	DVSS	DVSS	DVSS				CI_TSSY NC	PVR_TS CLK	RF_AGC	CI_TSDA TA0	CI_TSCL K	P
DVSS	DVSS	VCCK	VCCK	VCCK		IF_AGC	AOSDAT A3	AOSDAT A4	DEMOD_ TSSYNC	DEMOD_ RST	DEMOD_ TSVAL	DEMOD_ TSCLK	R
VCCK	VCCK	VCCK	VCCK	VCCK		AOSDAT A2	AOSDAT A0	AOBCK	OSDA2	OSCL2			T
										AOSDAT A1	AOLRCK	AOMCLK	U
						DVSS	ASPDIF	ALIN	AVDD33_ DAC	AVDD33_ DAC1	AR2_AD AC	AR3_AD AC	V
VDAC_O UT1	AVDD33_ CVBS	AVSS33_ VDAC	AVSS33_ CVBS	DVSS		DVSS	DVSS	DVSS	AVSS33_ DAC1	AR1_AD AC			W
	AVSS12_ RGB	CVBS_C OM	AVSS12_ DEMOD		AVSS33_ DEMOD	DVSS	DVSS	DVSS	DVSS	AR0_AD AC	AL3_ADA C	AL2_ADA C	Y
	AVDD33_ VDAC	FS_VDA C		AVSS12_ PLL	VMID_AA DC	AVDD33_ AADC	DVSS	AVSS33_ AADC	AVSS33_ DAC	DVSS	AL1_ADA C	AL0_ADA C	AA
Y0P	PB0P	AVDD12_ PLL	SY1	CVBS0P	AVDD12_ DEMOD	AVDD33_ IFPGA	AIN3_L_ AADC	AIN0_L_ AADC	DVSS	DVSS	DVSS	DVSS	AB
COM0	PR0P	SC1	CVBS2P	CVBS1P	AVDD33_ XTAL_ST B	AVDD33_ DEMOD	AIN5_L_ AADC	AIN4_L_ AADC	AIN6_L_ AADC	DVSS	DVSS	AIN2_R_ AADC	AC
	AVDD12_ RGB	SC0		ADCINP_ DEMOD		XTALO	LOUTN		AIN2_L_ AADC	AIN3_R_ AADC	AIN6_R_ AADC	AIN1_R_ AADC	AD
		SY0		ADCINN_ DEMOD	AVSS33_ XTAL_ST B	XTALI	LOUTP		AIN1_L_ AADC	AIN5_R_ AADC	AIN4_R_ AADC	AIN0_R_ AADC	AE
13	14	15	16	17	18	19	20	21	22	23	24	25	RB

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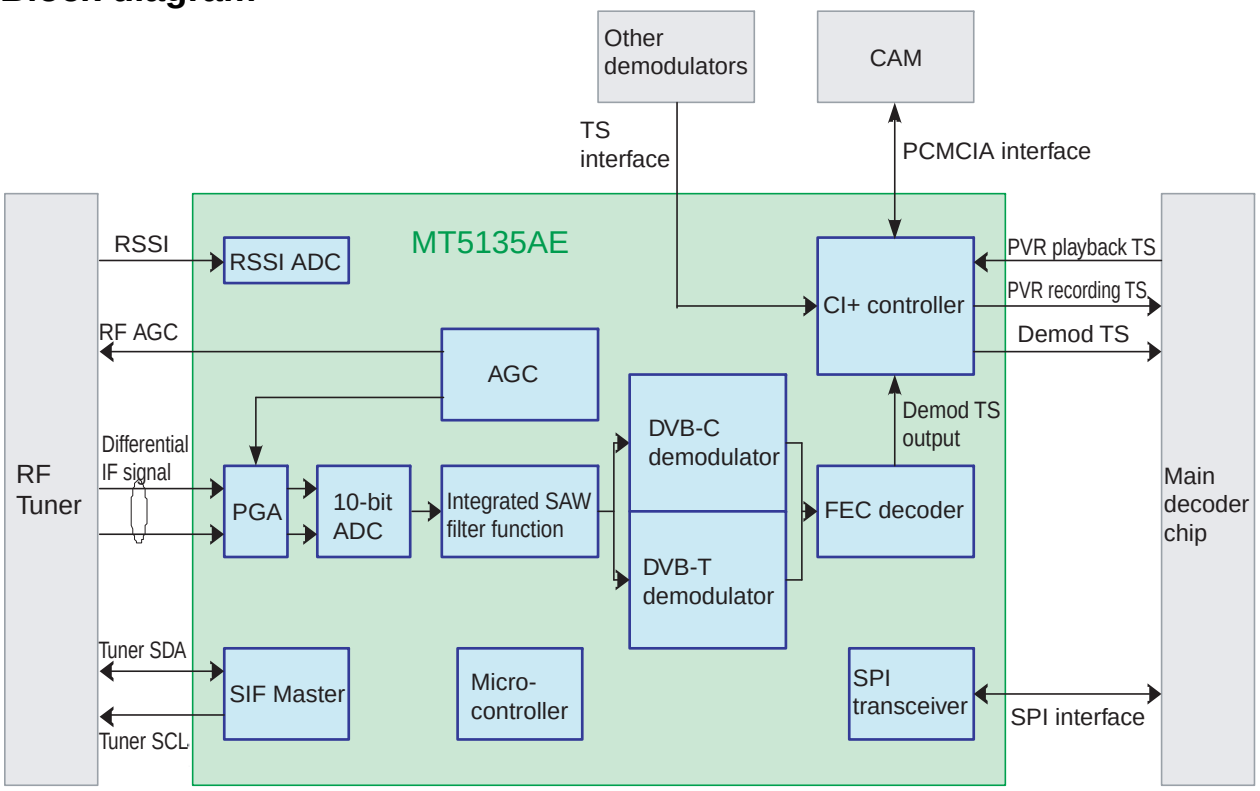
120102

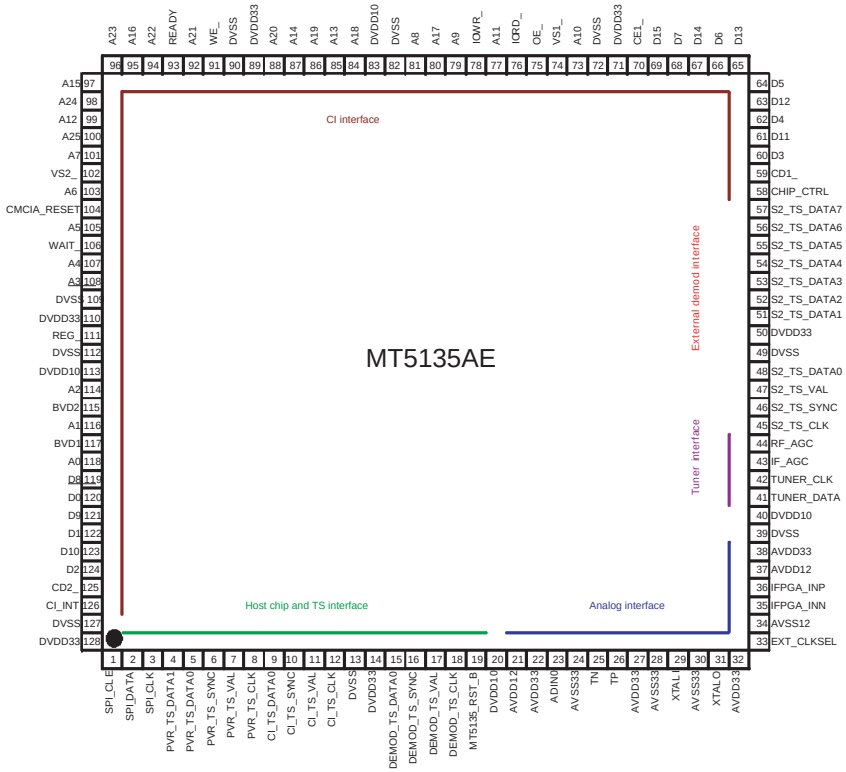
Figure 8-3 Pin configuration [2/2]

8.2 Diagram 10-7-14 DVB T/C Demodulator MT5135 B14, MT5135AE/A LQFP-128 (IC U1005)

Block diagram



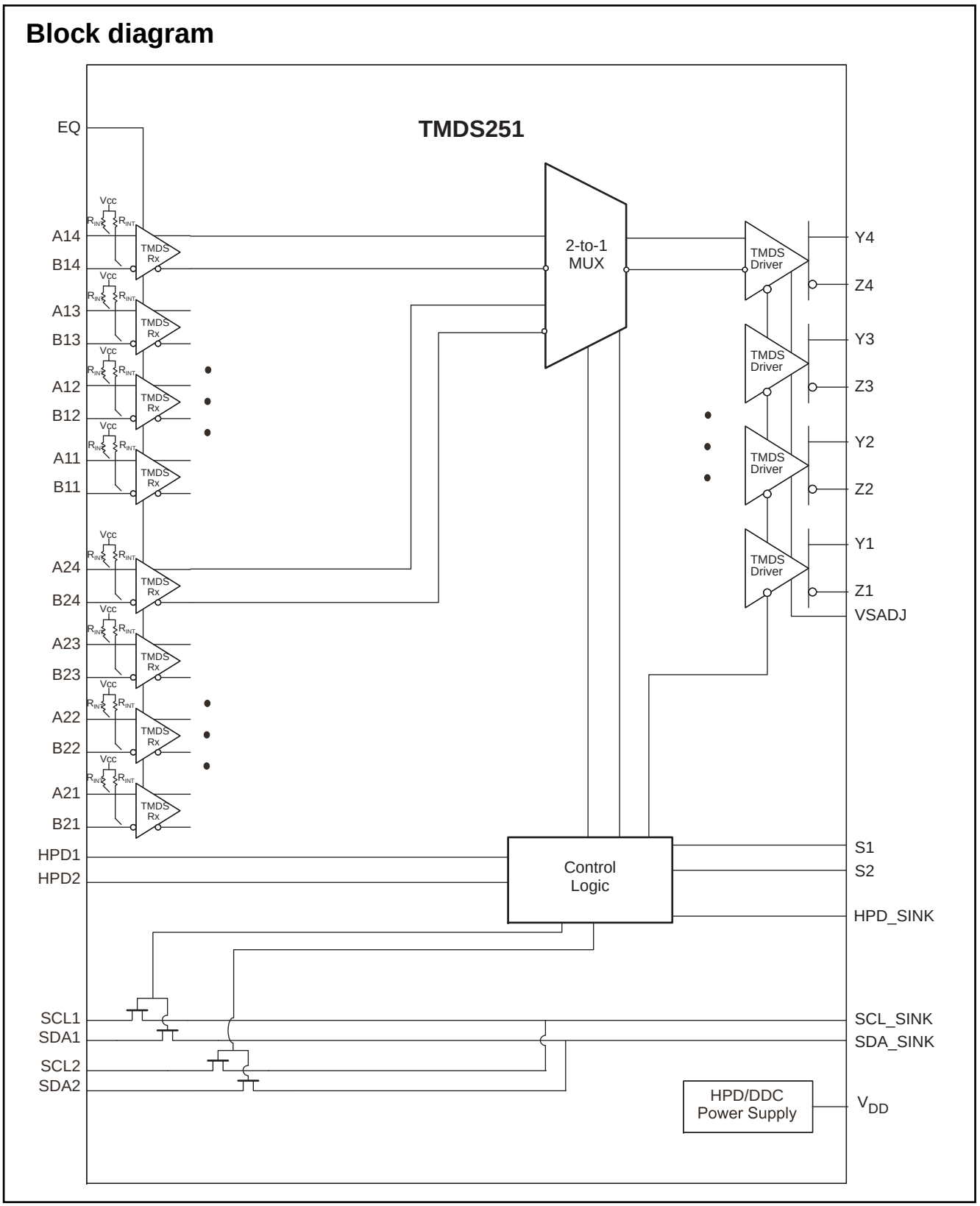
Pinning information



19080_303_110317.eps
110330

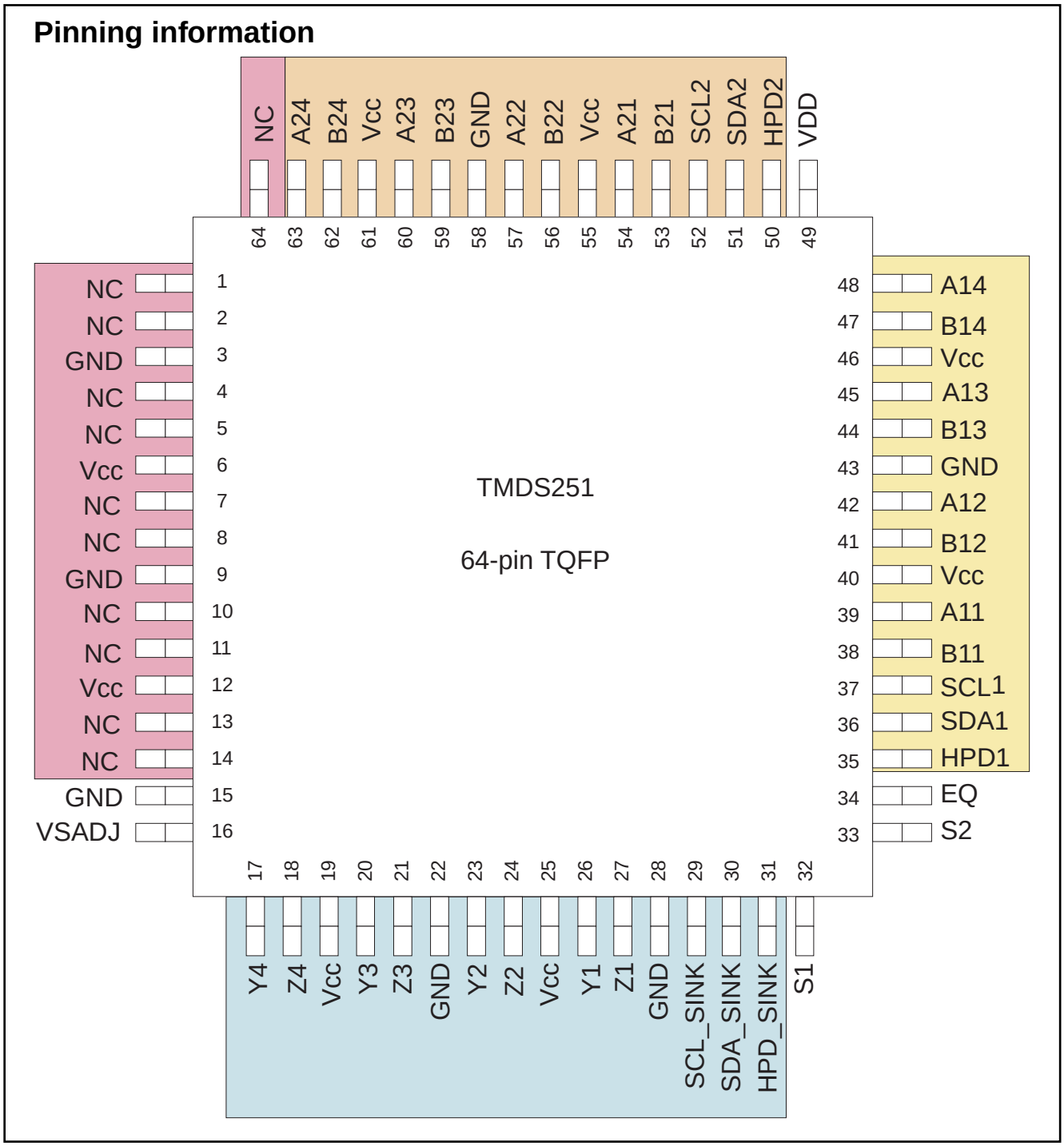
Figure 8-4 Internal block diagram and pin configuration

8.3 Diagram 10-7-13 HDMI Switch/Connector B13, TMDS251PAGR TQFP64 (IC U5003)



19080_304_110317.eps
120102

Figure 8-5 Internal block diagram

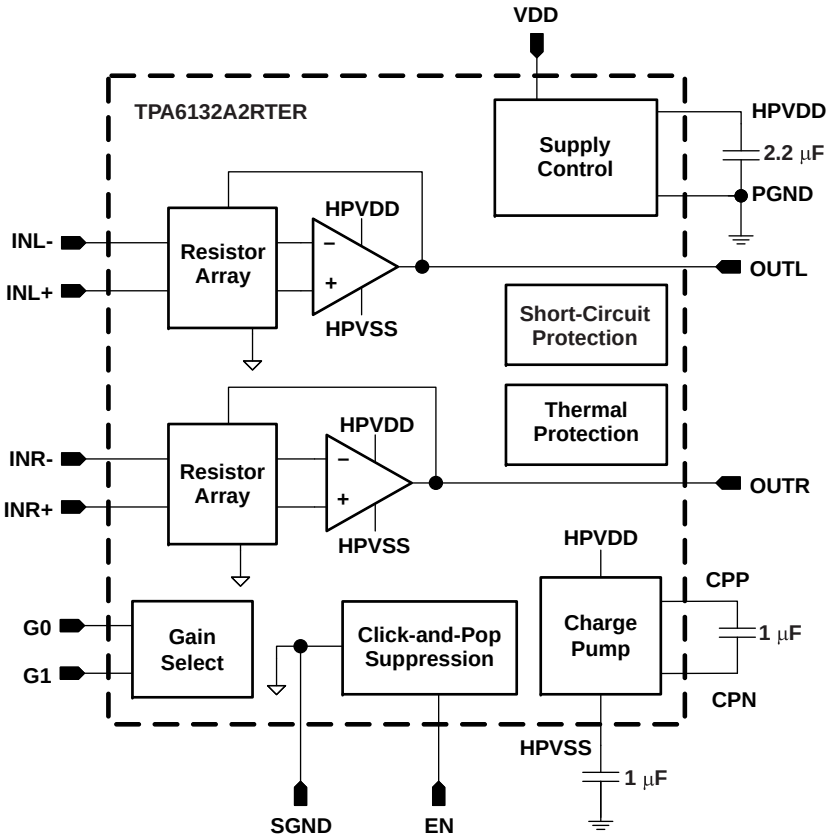


19080_305_110317.eps
110317

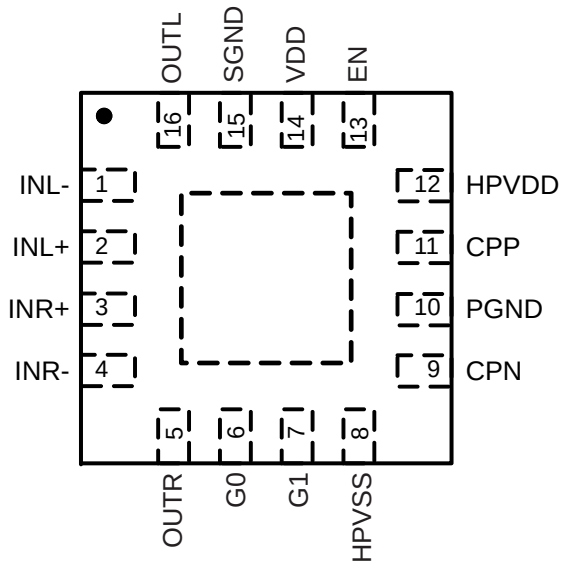
Figure 8-6 Pin configuration

8.4 Diagram 10-7-5 Audio IO/Headphone B05, TPA6132A2RTER 25mW QFN-16 (IC U6004)

Block diagram



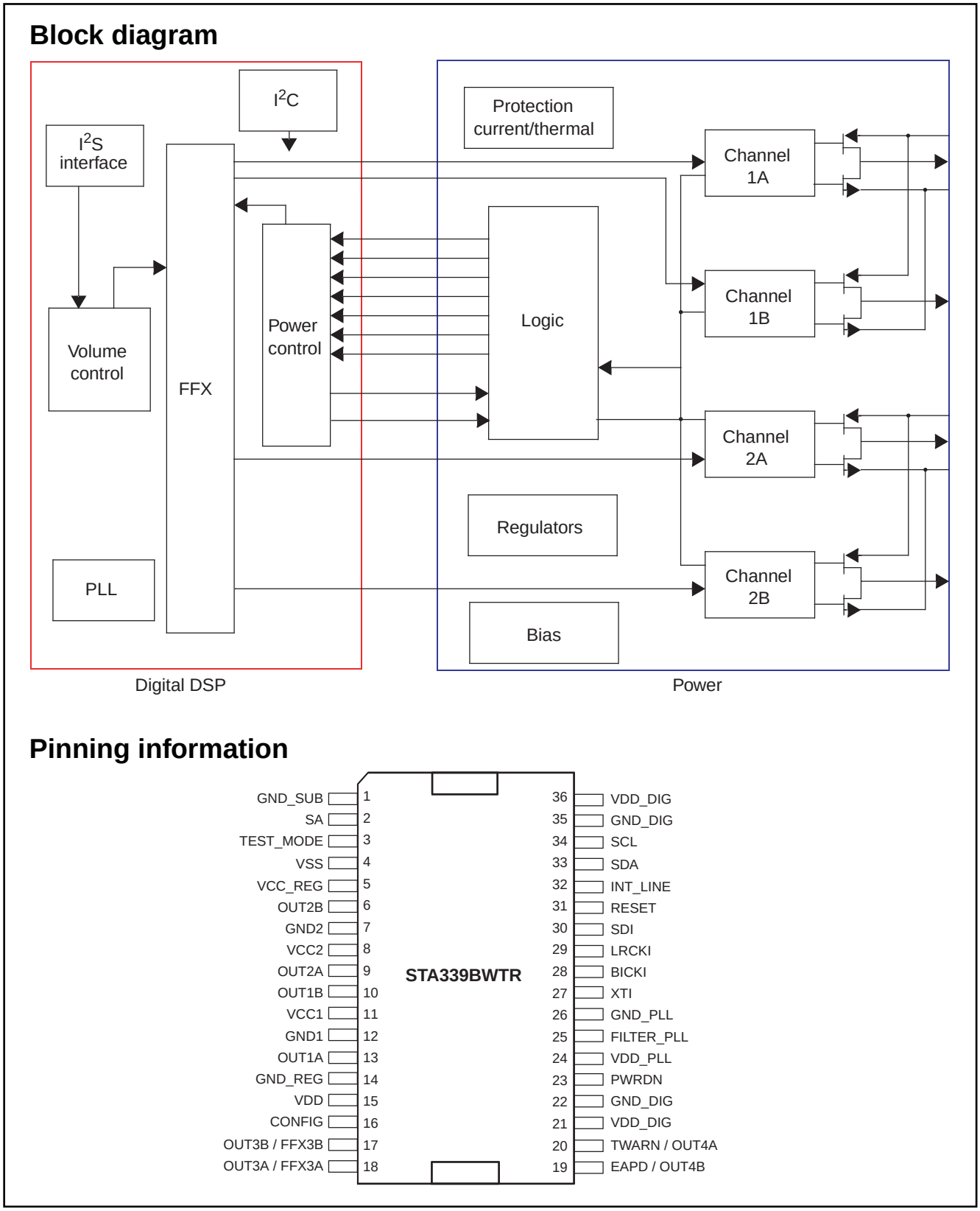
Pinning information



18850_304_100107.eps
120102

Figure 8-7 Internal block diagram and pin configuration

8.5 Diagram 10-7-6 Speaker B06, STA339BWTR (IC U6006)

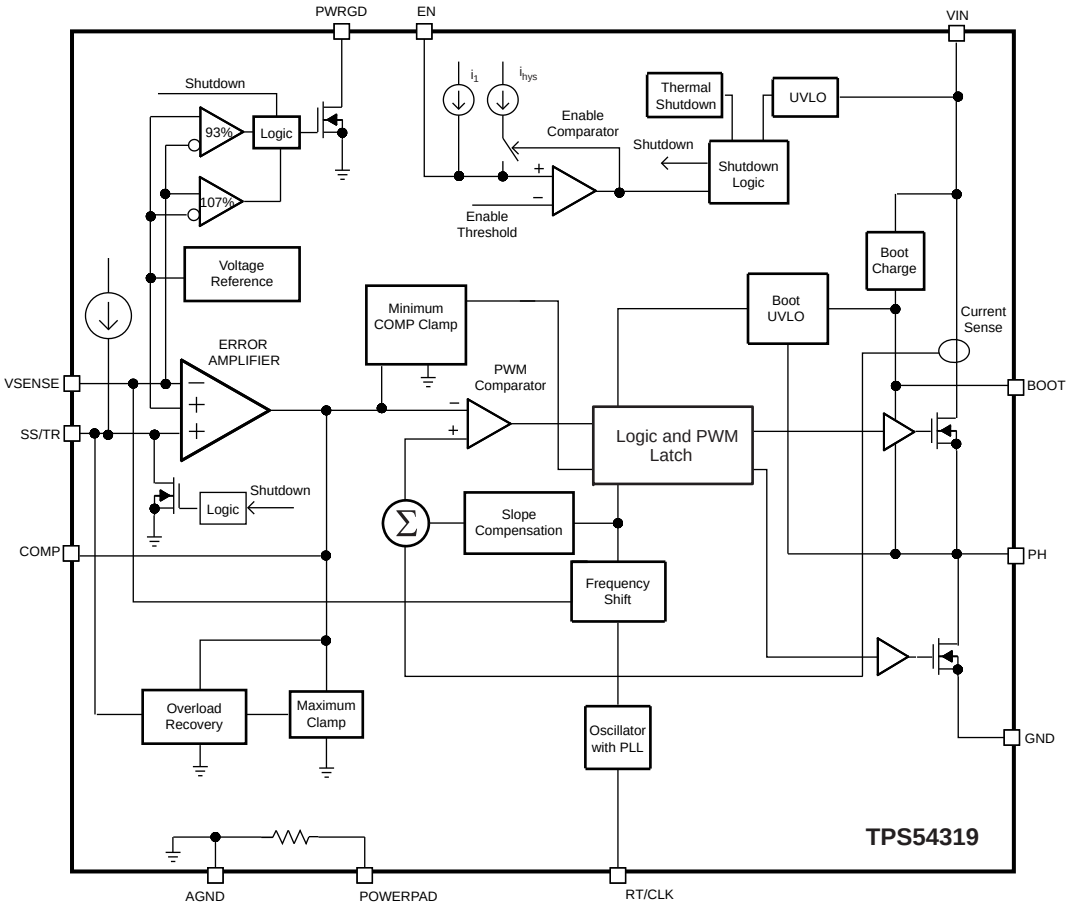


19080_306_110317.eps
120102

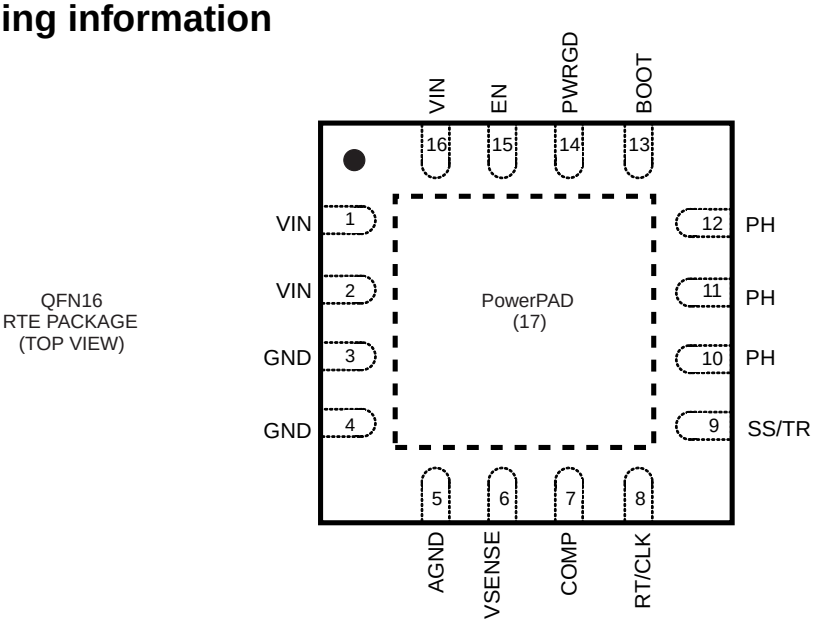
Figure 8-8 Internal block diagram and pin configuration

8.6 Diagram 10-7-1 System Power 1 B01, TPS54319 (IC U7004)

Block diagram



Pinning information

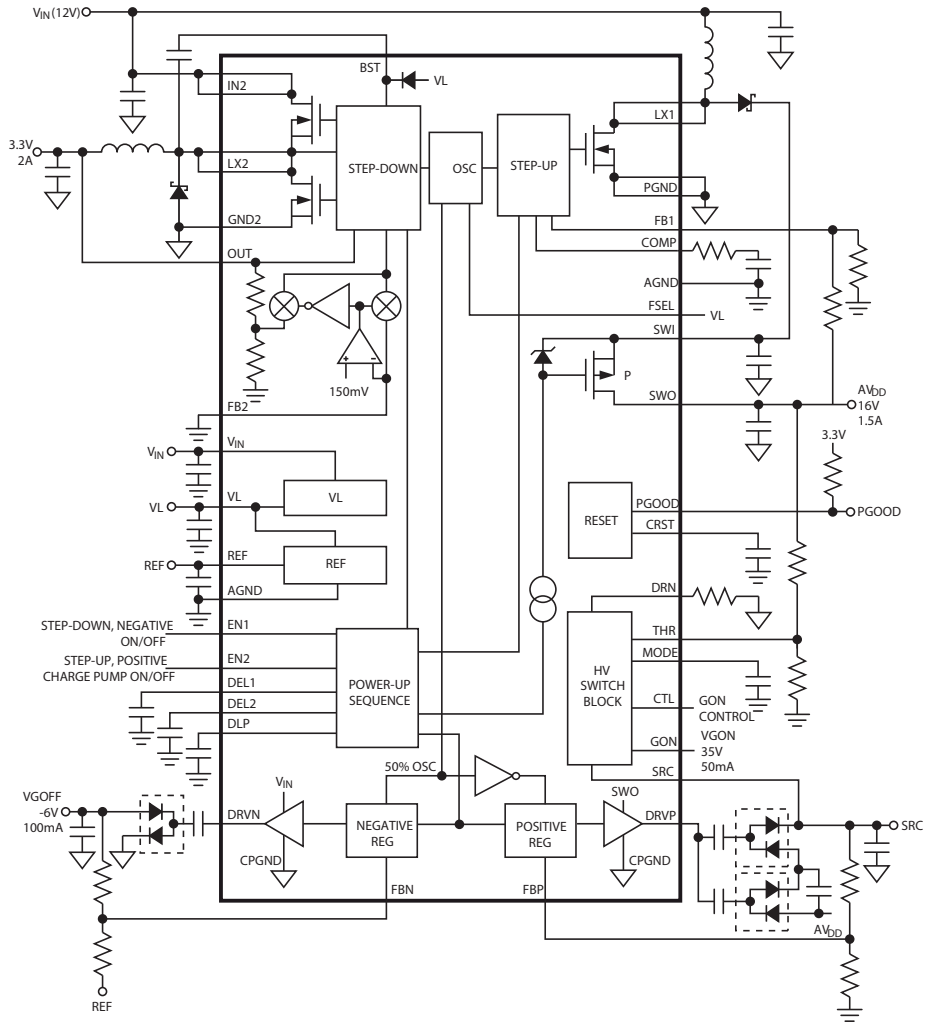


19080_310_110408.eps
120102

Figure 8-9 Internal block diagram and pin configuration

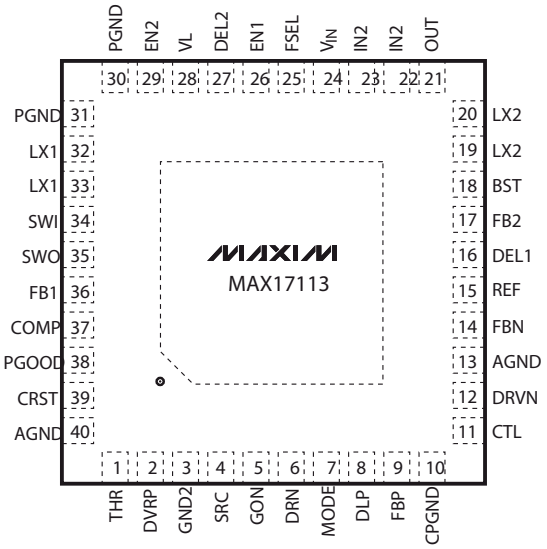
8.7 Diagram 10-7-16 T-con/Power block/Gamma B16, MAX17113ETL (IC U7008)

Block diagram



Pinning information

TOP VIEW
THIN QFN

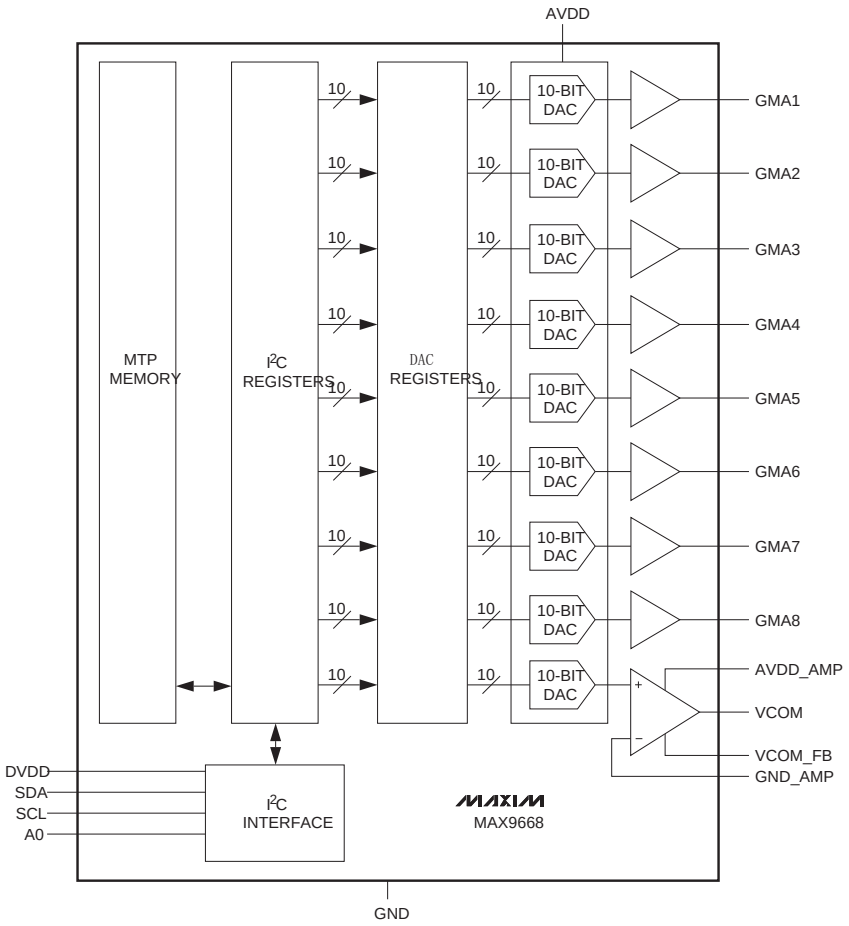


18770_312_100217.eps
100217

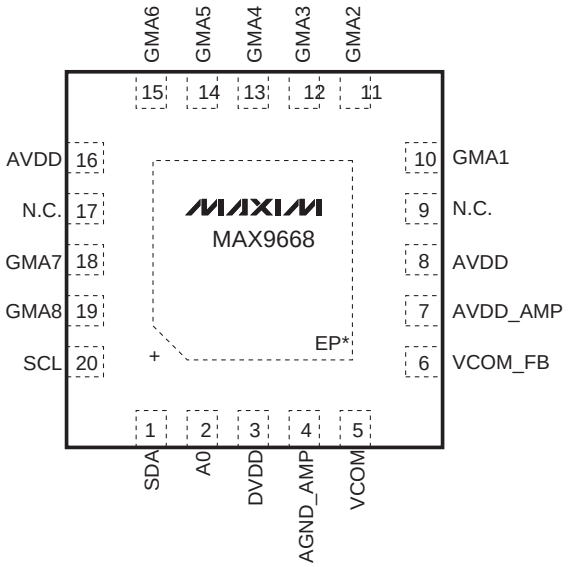
Figure 8-10 Internal block diagram and pin configuration

8.8 Diagram 10-7-16 T-con/Power block/Gamma B16, MAX9668ETP (IC U7010)

Block diagram



Pinning information

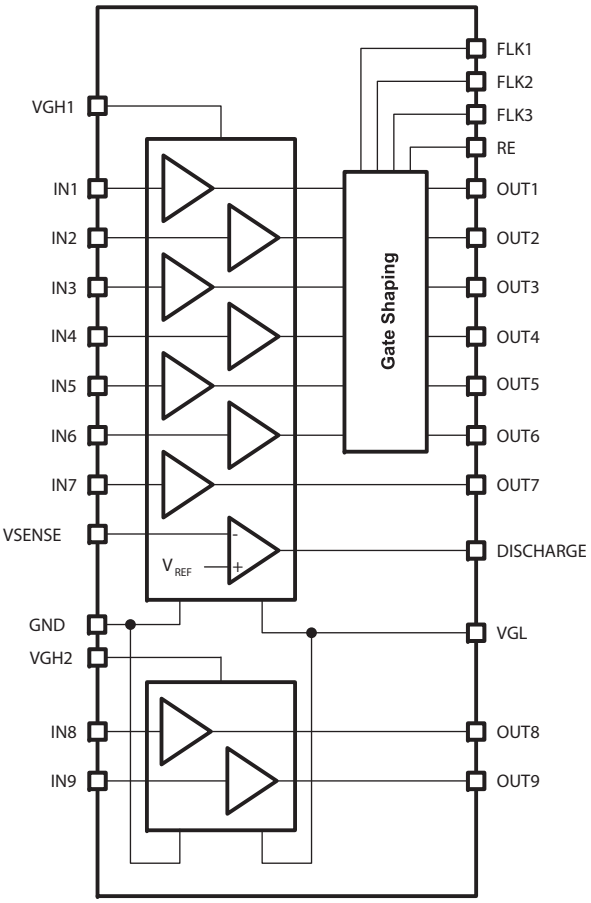


18850_307_100107.eps
100223

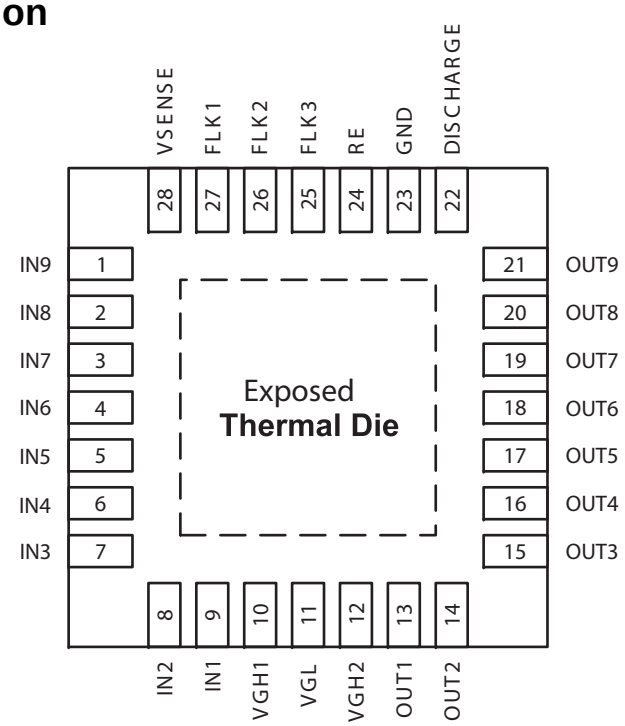
Figure 8-11 Internal block diagram and pin configuration

8.9 Diagram 10-7-16 T-con/Power block/Gamma B16, TPS65192RHDR (IC U7011)

Block diagram



Pinning information

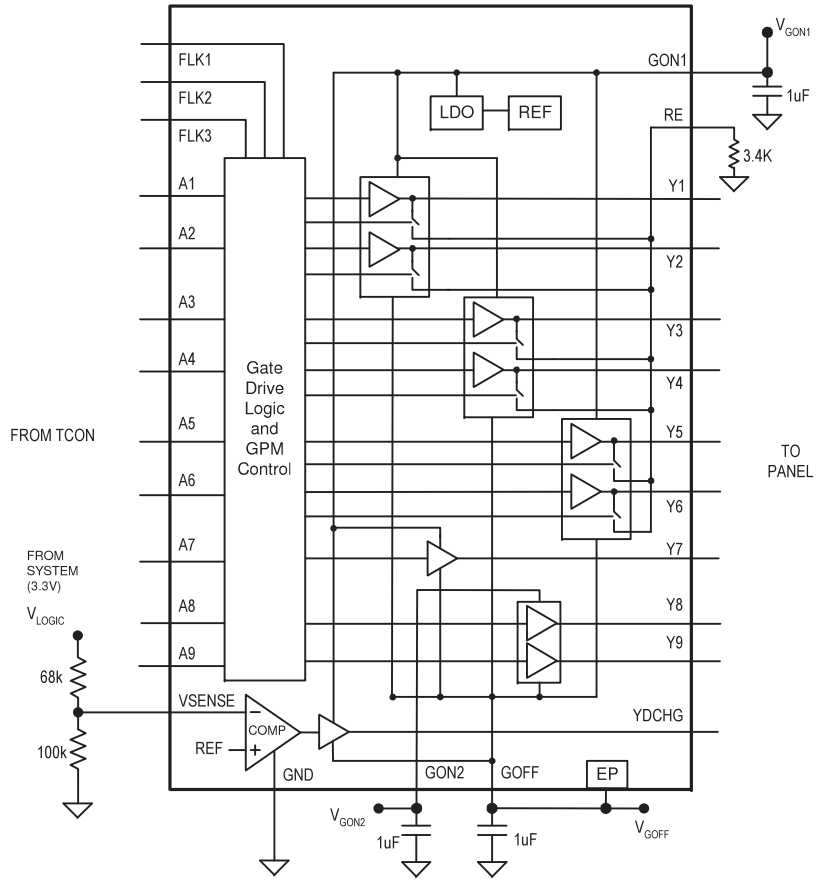


18850_306_100107.eps
100223

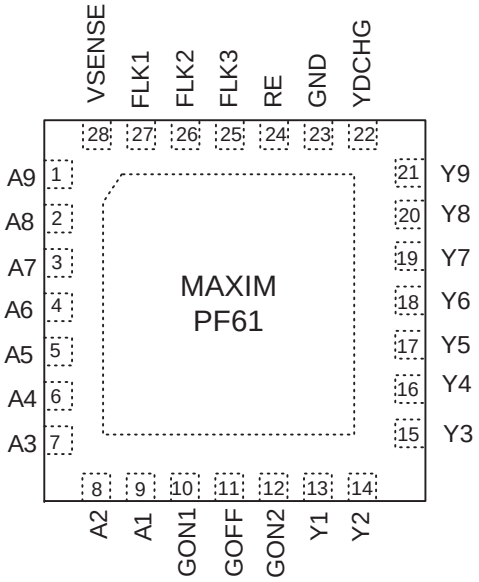
Figure 8-12 Internal block diagram and pin configuration

8.10 Diagram 10-7-16 T-con/Power block/Gamma B16, MAX17119ETI+T (IC U7109)

Block diagram



Pinning information

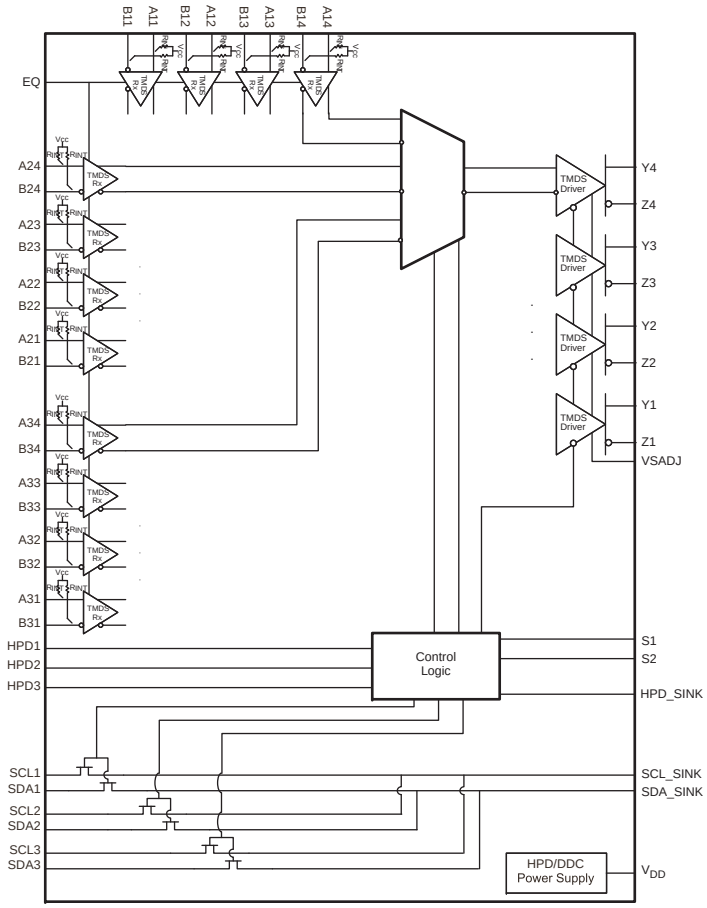


19080_308_110317.eps
110317

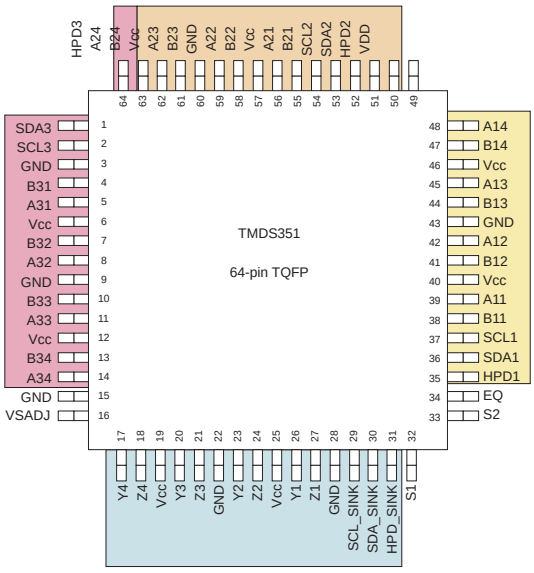
Figure 8-13 Internal block diagram and pin configuration

8.11 Diagram 10-8-13 HDMI Switch B13, TMDS351PAG (IC U5003)

Block diagram



Pinning information



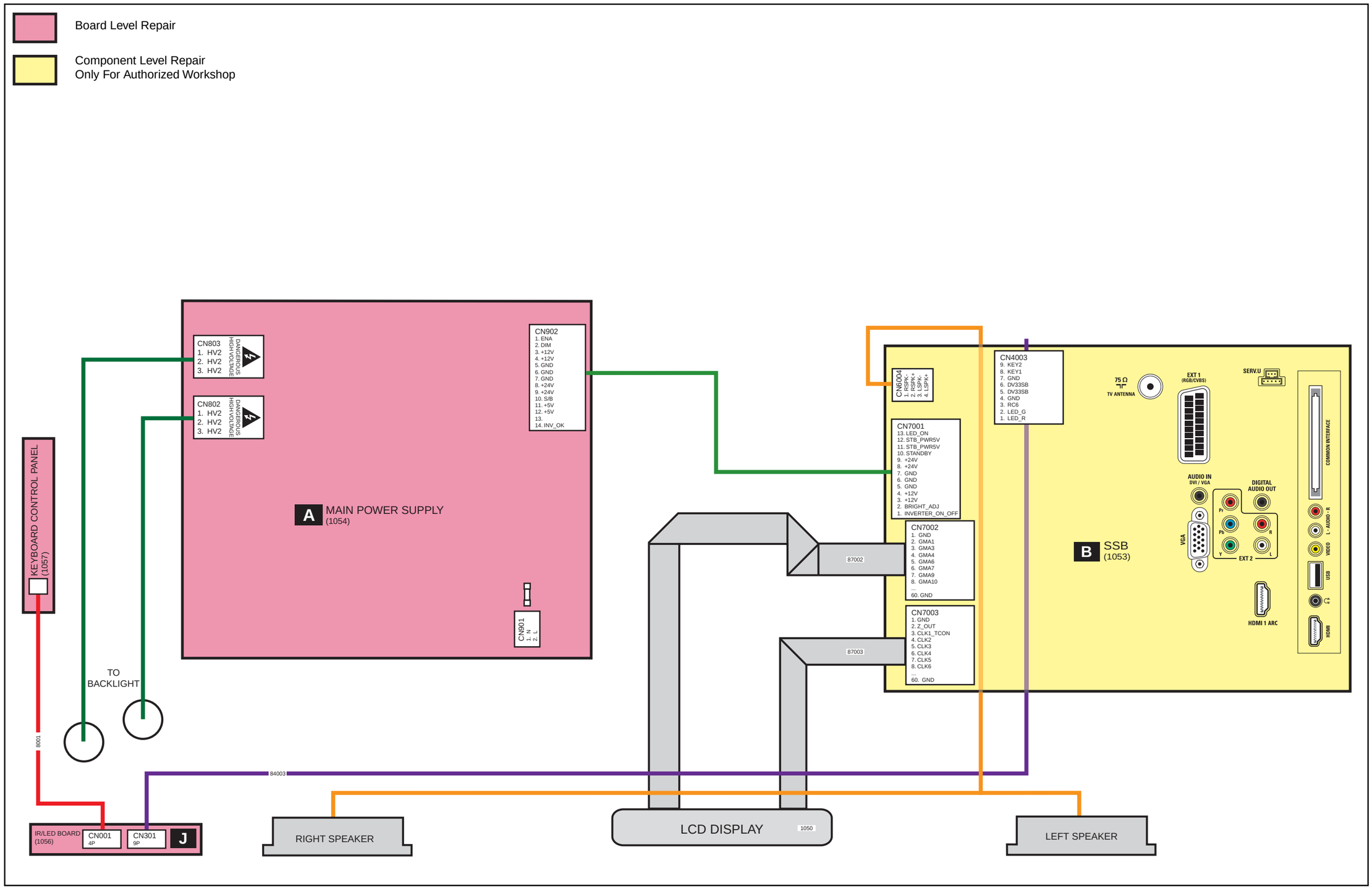
19080_309_110317.eps
110330

Figure 8-14 Internal block diagram and pin configuration

9. Block Diagrams

9.1 Wiring diagram Thriller 32"

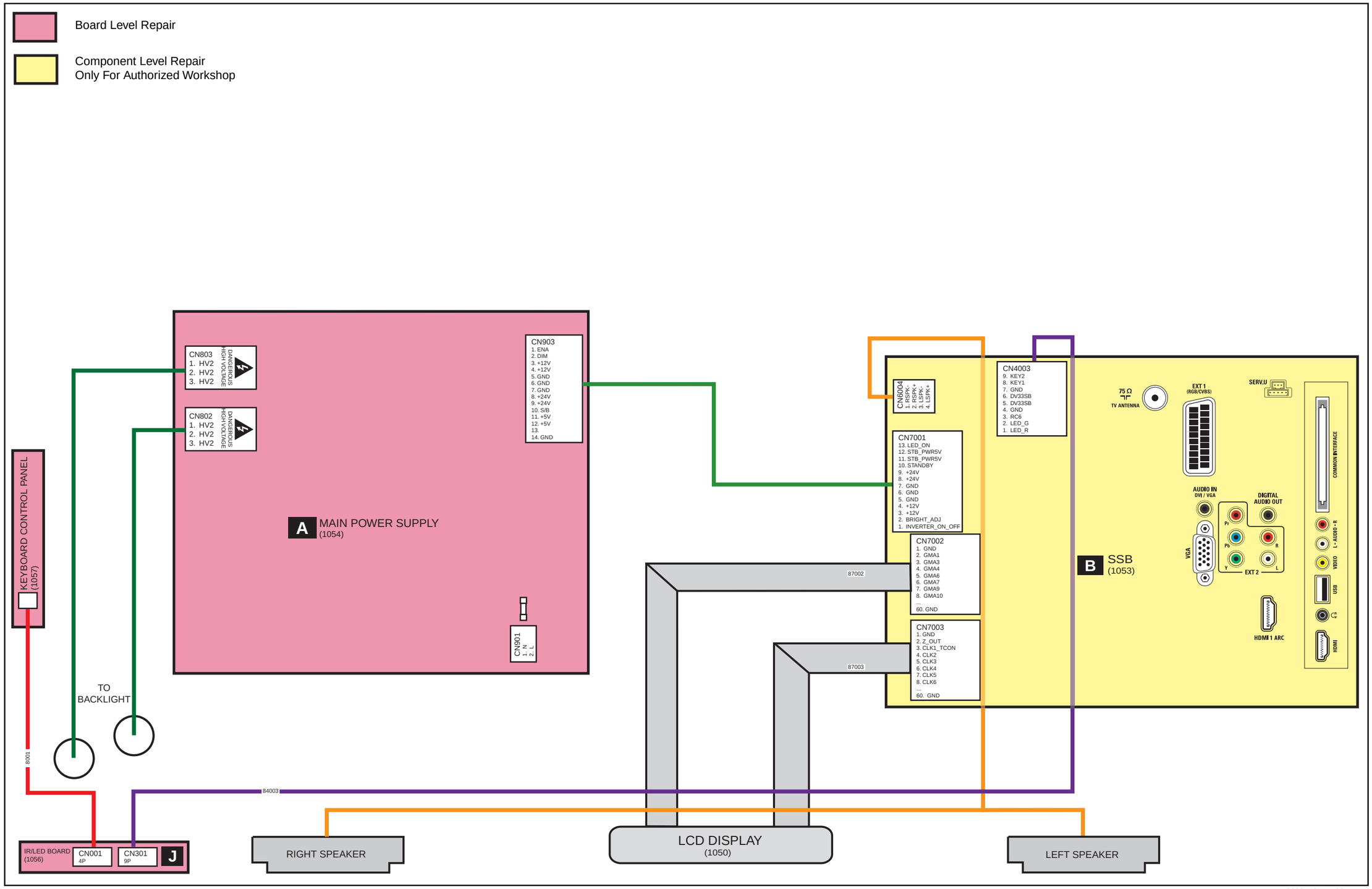
WIRING DIAGRAM 32" (Thriller)



19080_400_110317.eps
110405

9.2 Wiring diagram Thriller 42"

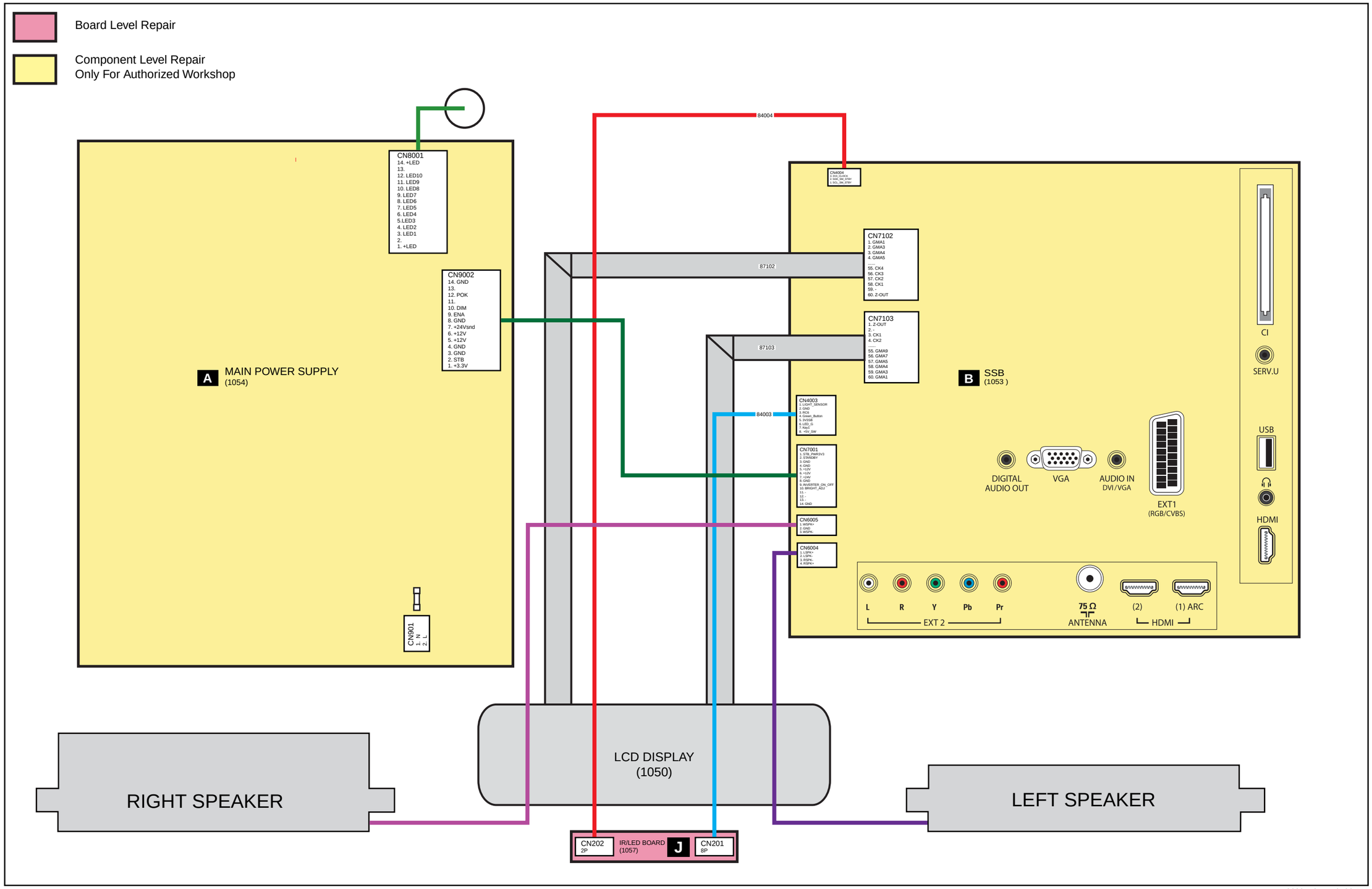
WIRING DIAGRAM 42" (Thriller)



19080_401_110317.eps
110405

9.3 Wiring diagram Berlinale 32"

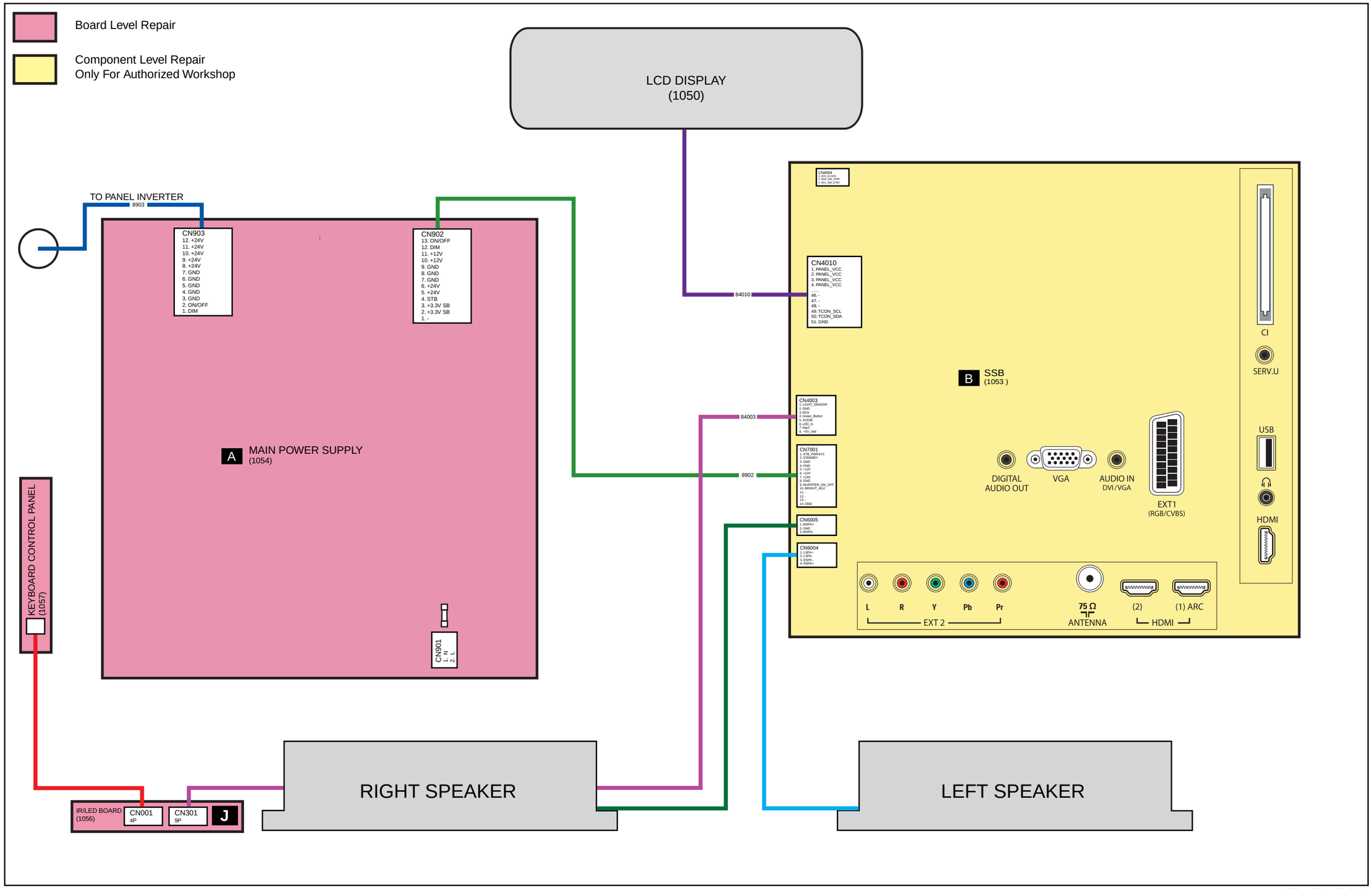
WIRING DIAGRAM 32" (Berlinale)



19080_405_110406.eps
110607

9.4 Wiring diagram Thriller HD 32"

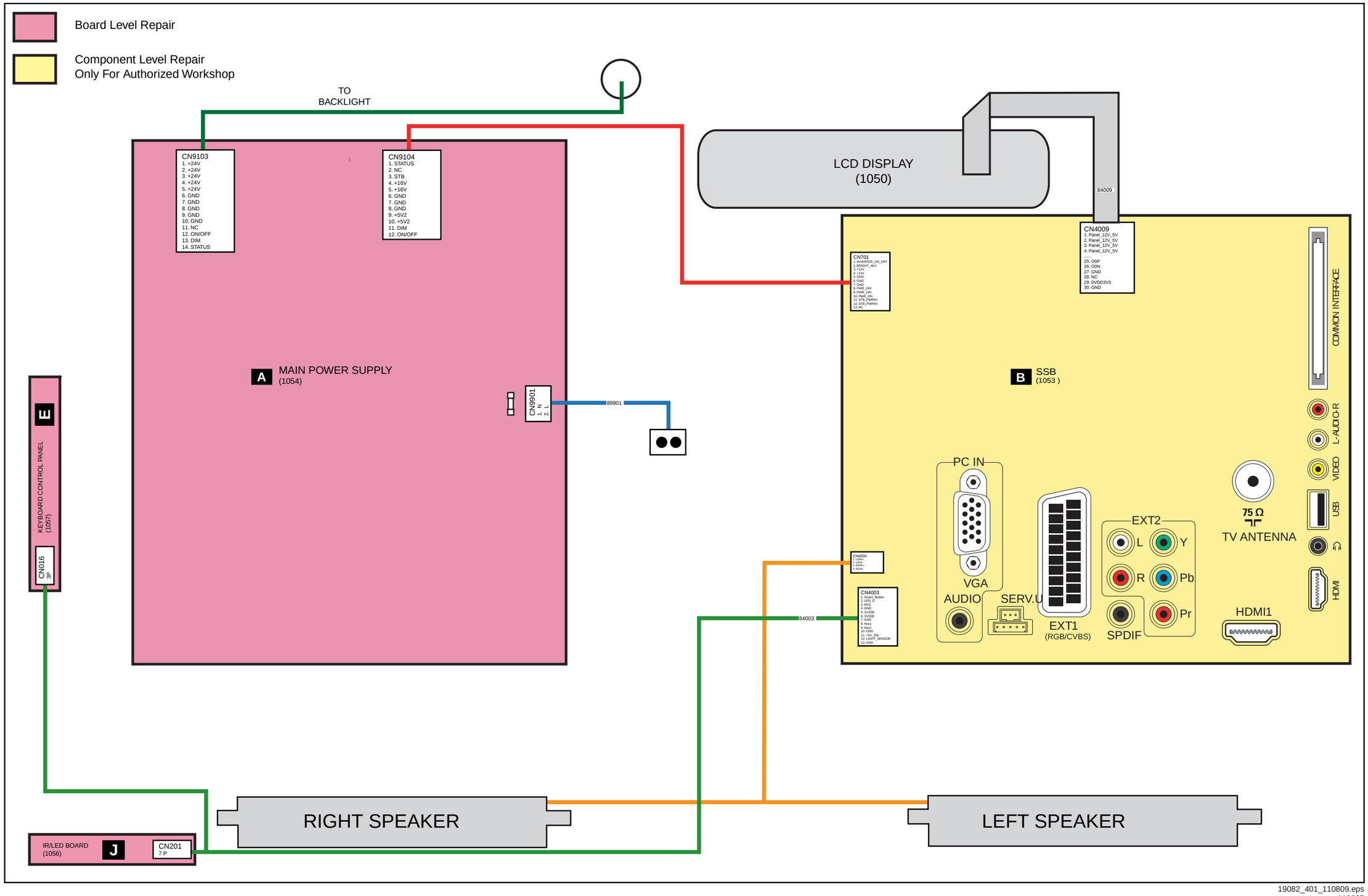
WIRING DIAGRAM 32" (Thriller HD)



19081_400_110610.eps
110811

9.5 Wiring diagram Design Line Tilt 22"

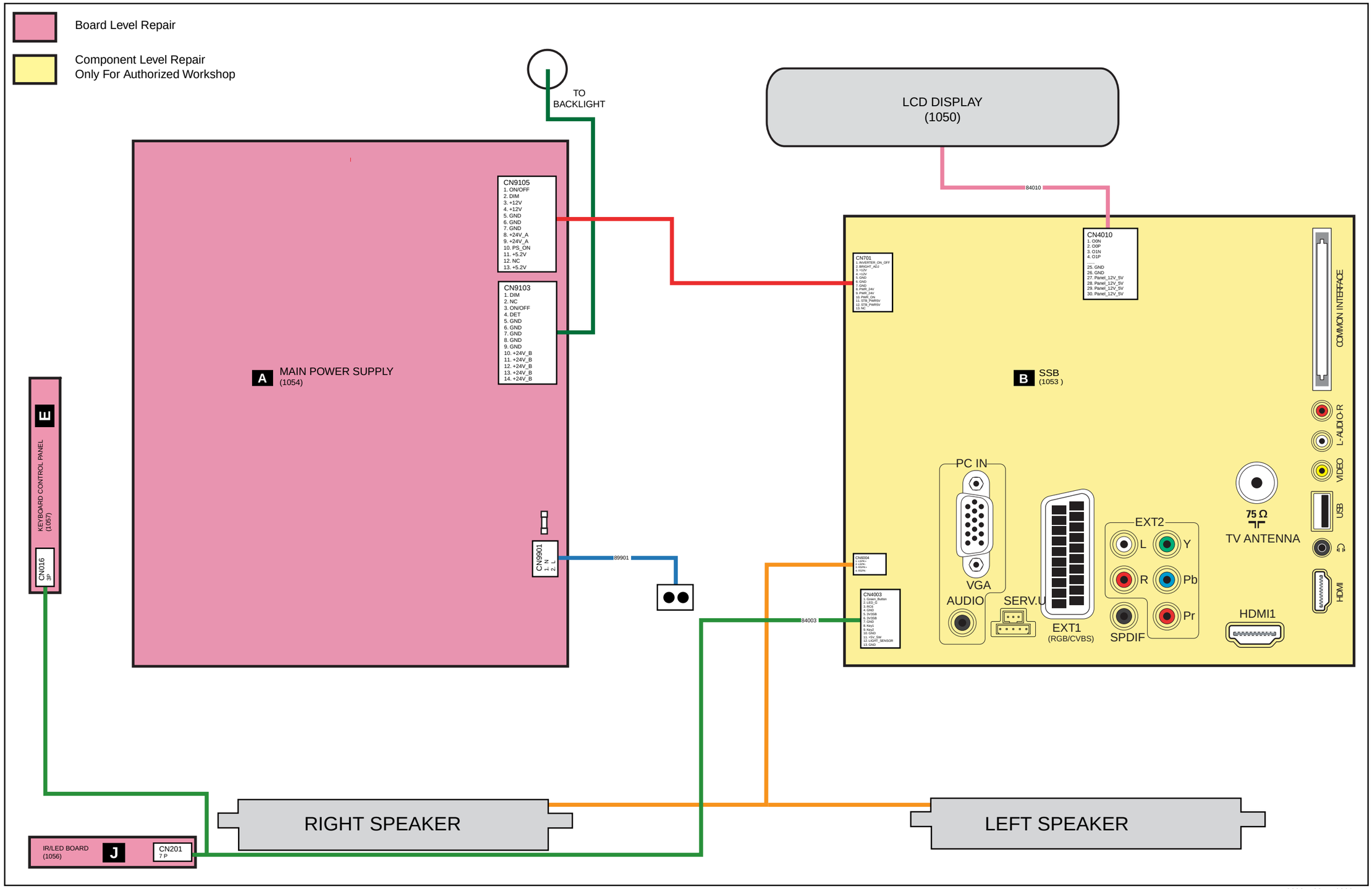
WIRING DIAGRAM 22" (Design Line Tilt)



19082_401_110809.eps
110825

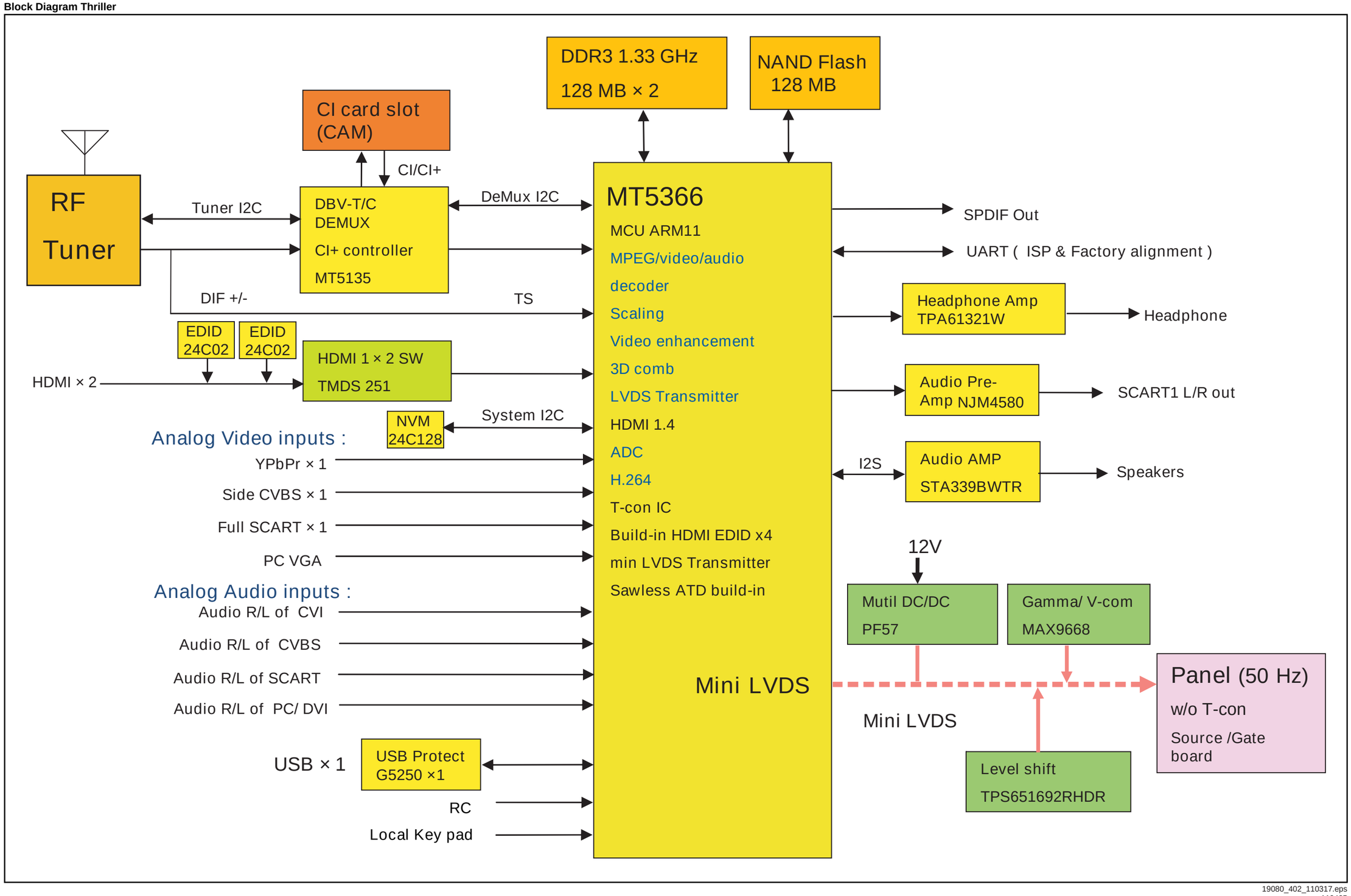
9.6 Wiring diagram Design Line Tilt 26"

WIRING DIAGRAM 26" (Design Line Tilt)



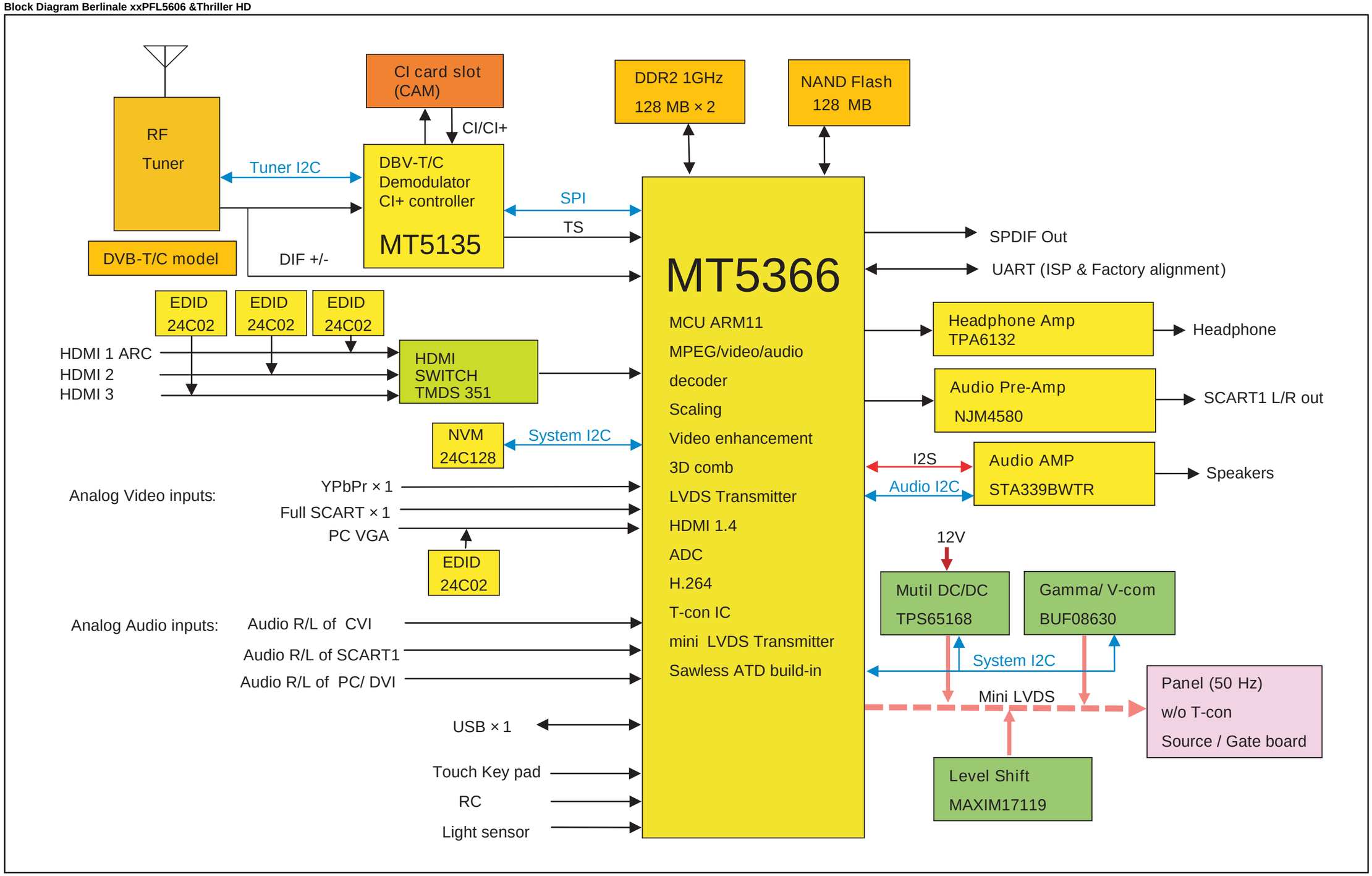
19082_402_110809.eps
110825

9.7 Block Diagram Thriller



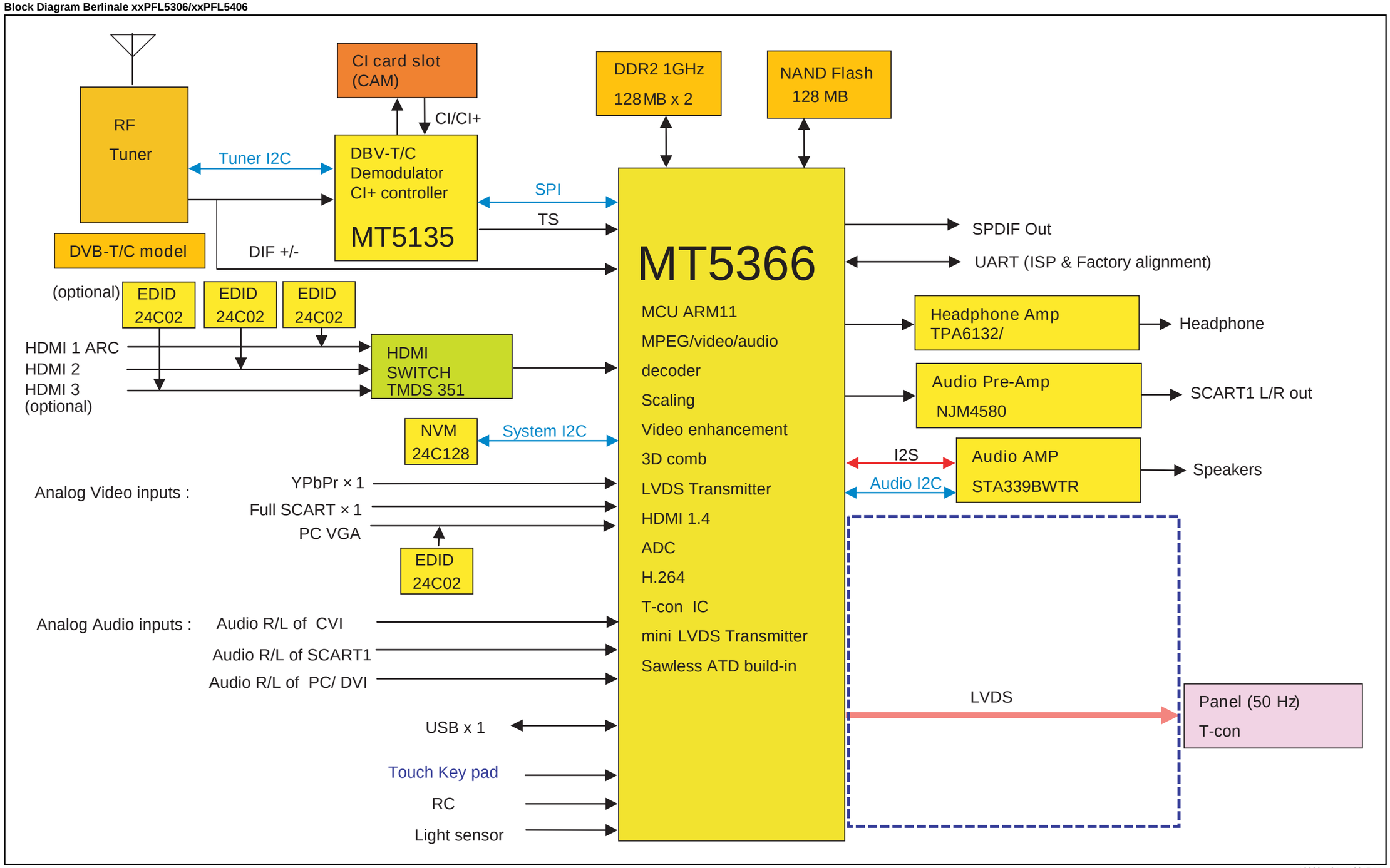
19080_402_110317.eps
110405

9.8 Block Diagram Berlinale xxPFL5606 &Thriller HD



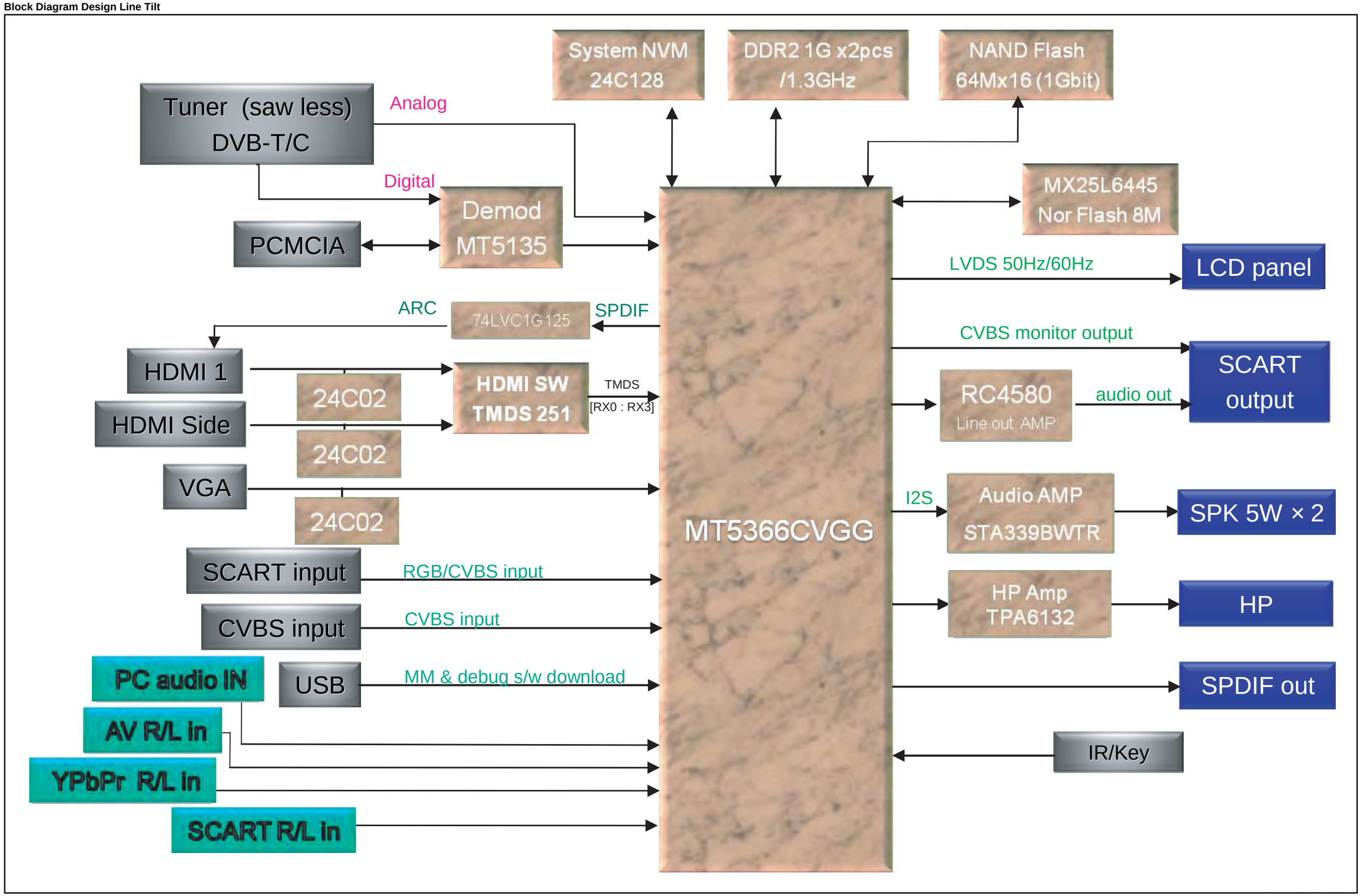
19080_403_110317.eps
120102

9.9 Block Diagram Berlinale xxPFL5306/xxPFL5406



19080_404_110317.eps
120102

9.10 Block Diagram Design Line Tilt



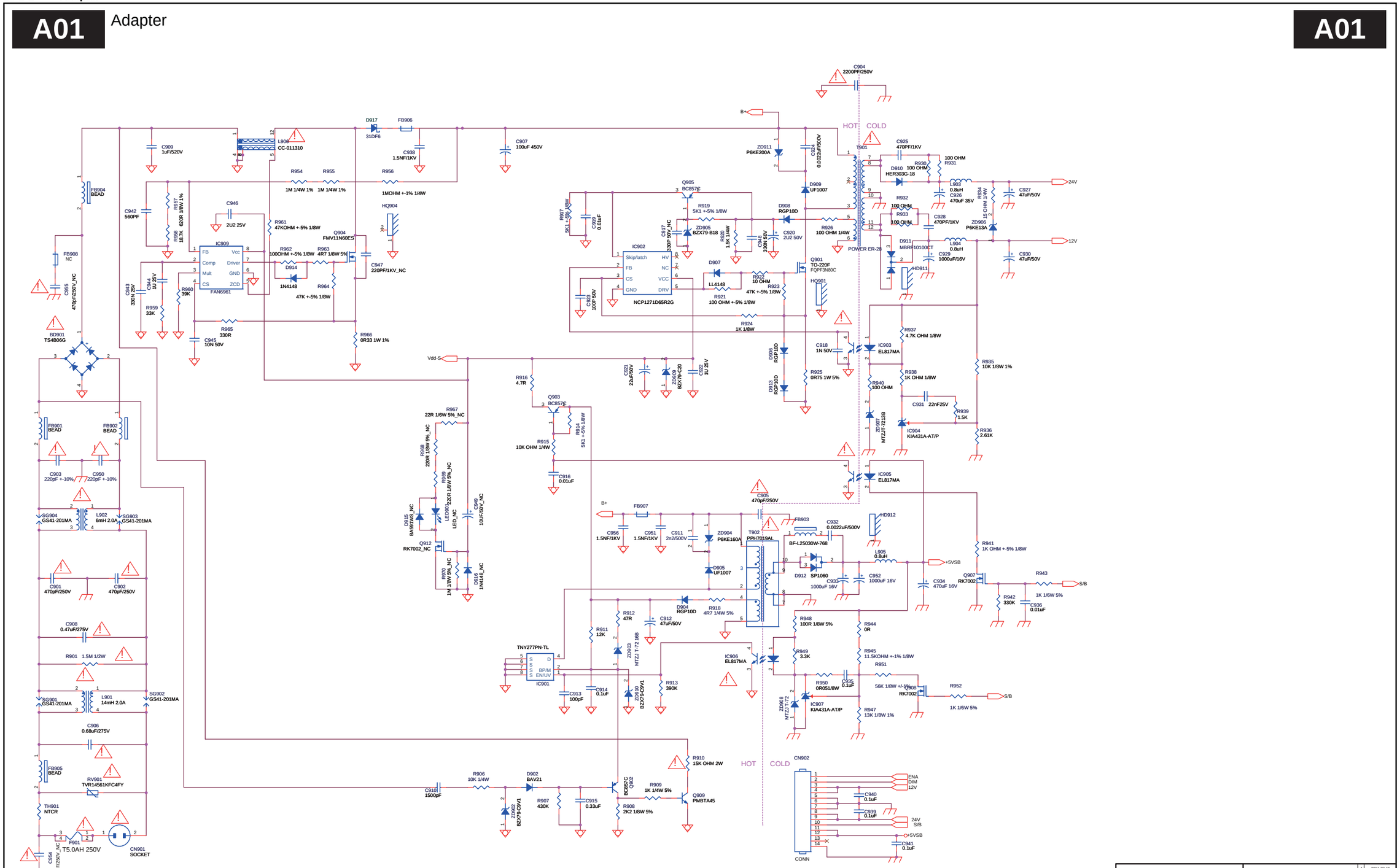
19082_400_110809.eps
110811

10. Circuit Diagrams and PWB Layouts

10.1 A01 715G4801 PSU Thriller 32"

10-1-1 Adapter

A01 Adapter



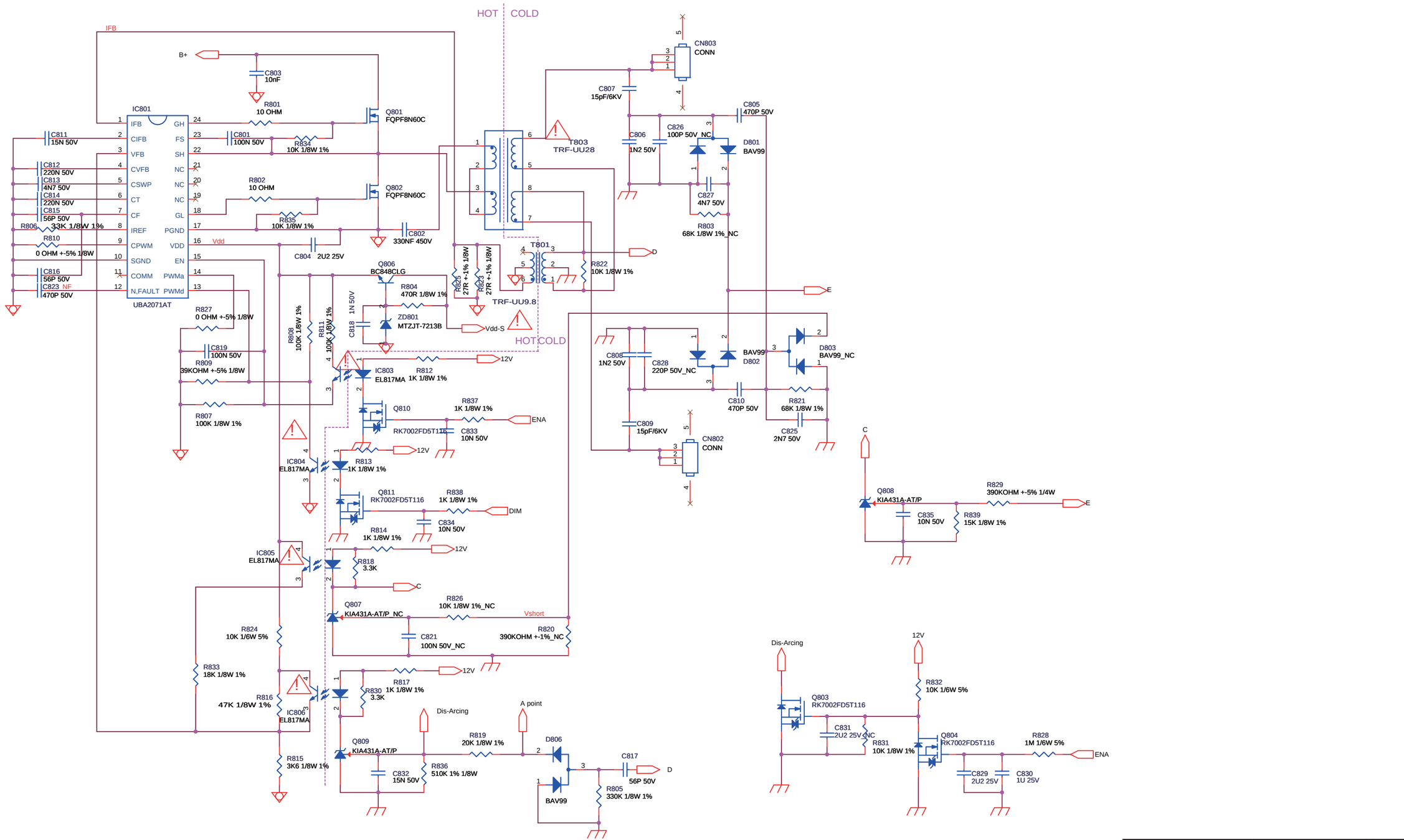
Adapter	715G4801	1 2011-03-16

19080_500_110316.eps
110316

10-1-2 Inverter

A02 Inverter

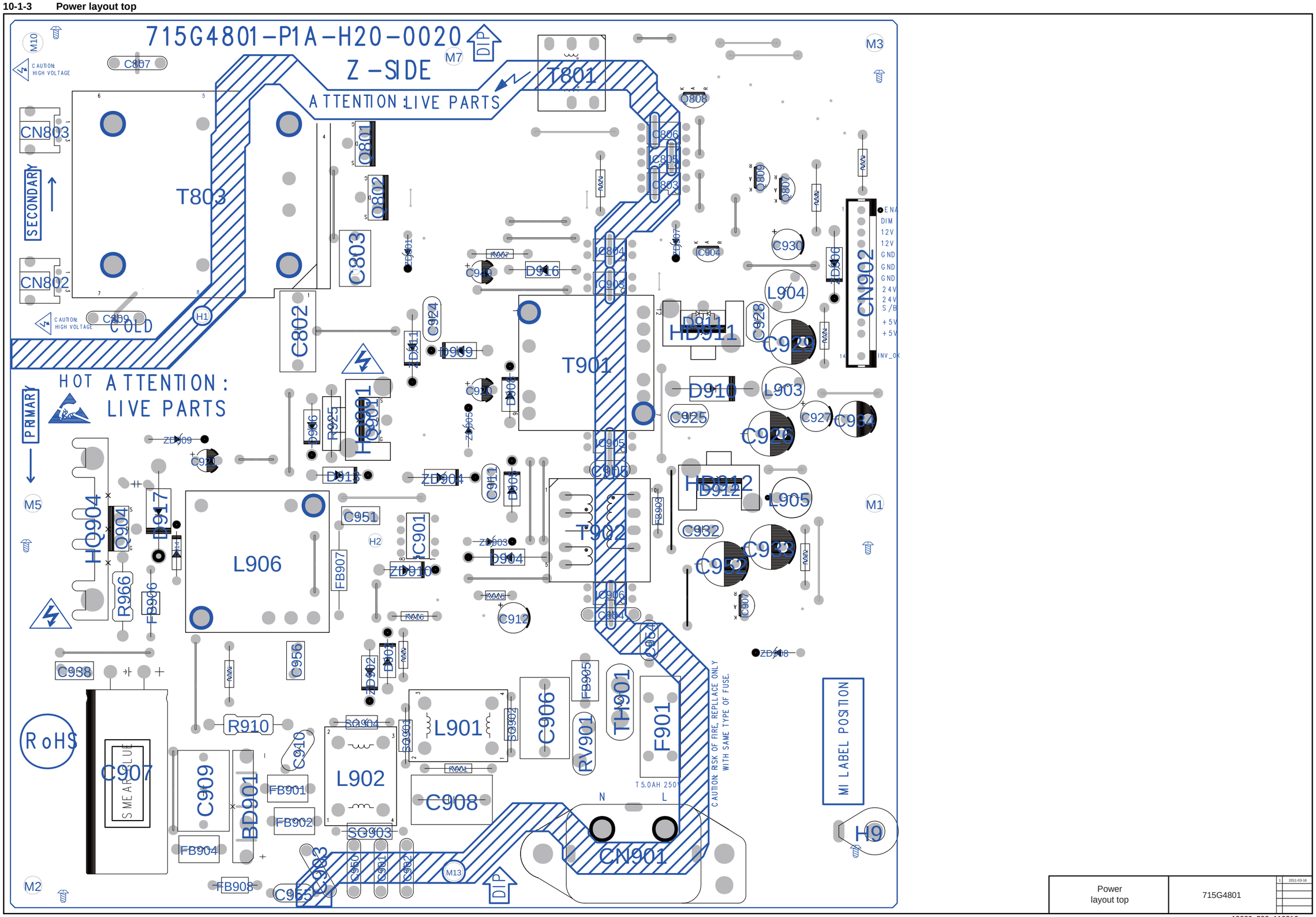
A02



Inverter	715G4801	1 2011-03-16

19080_501_110316.eps
110316

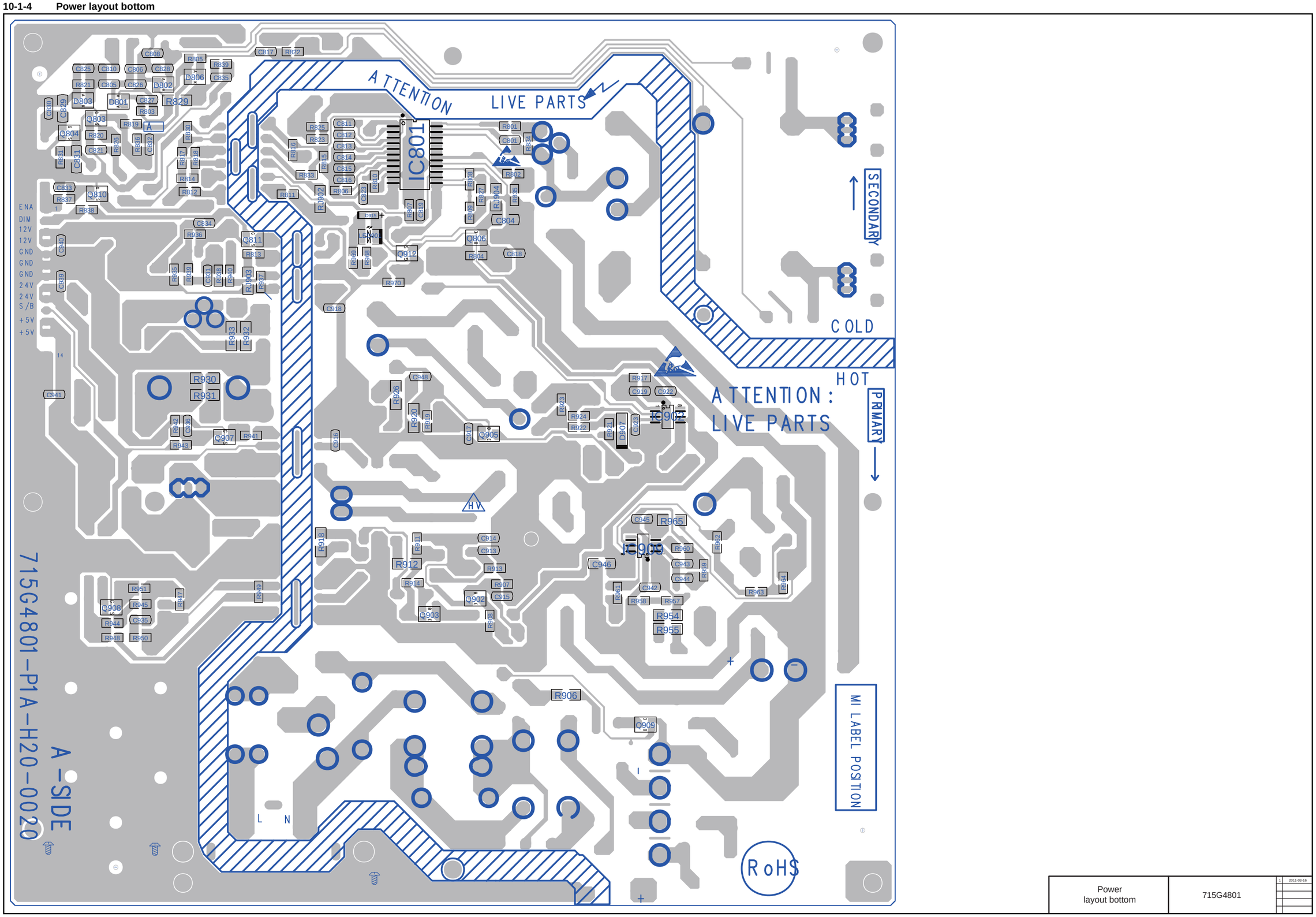
10-1-3 Power layout top



Power layout top	715G4801	1 2011-03-16

19080_502_110316.eps
110316

10-1-4 Power layout bottom



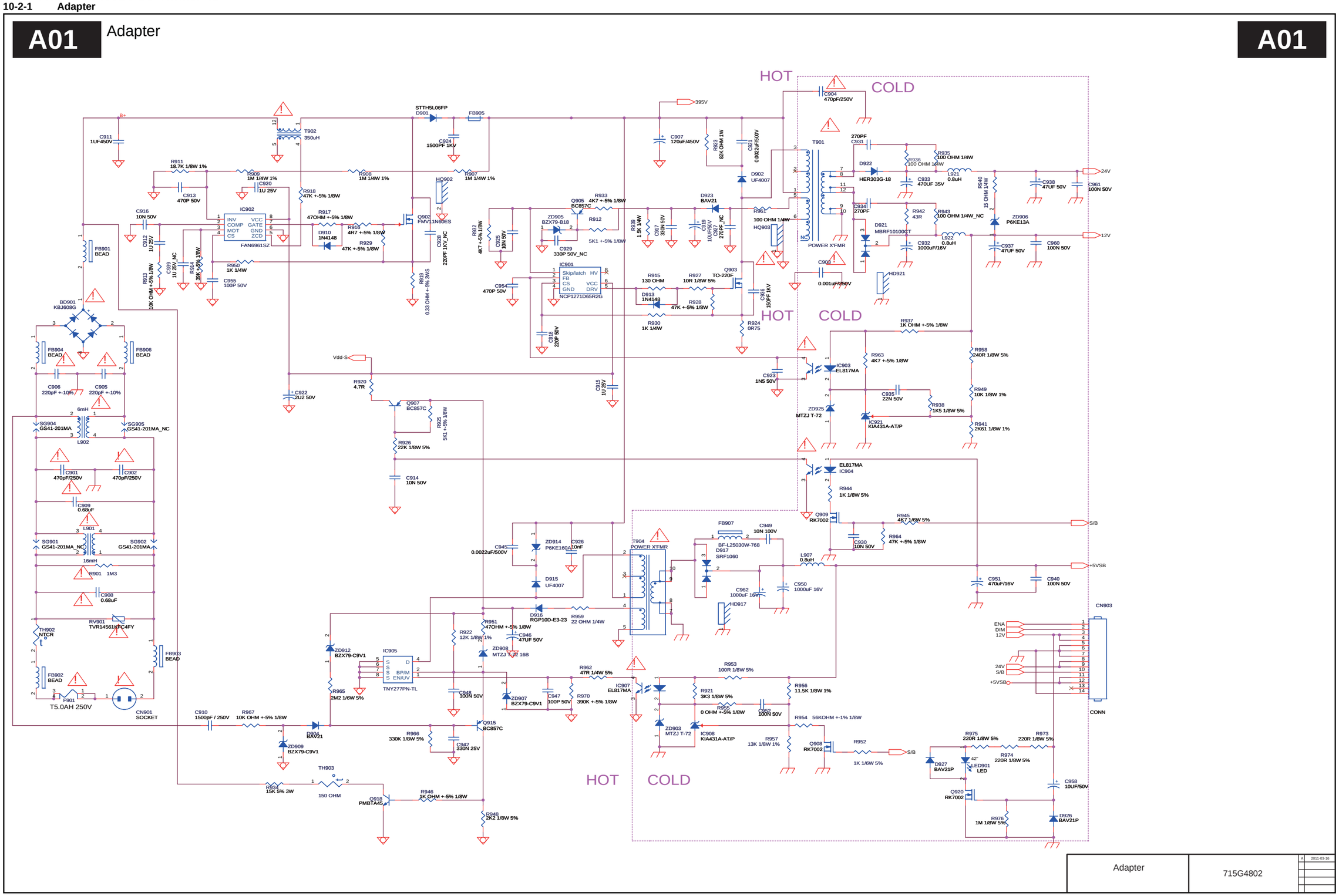
Power layout bottom	715G4801	1 2011-03-16

19080_503_110316.eps
110316

10.2 A01 715G4802 PSU Thriller 42"

10-2-1 Adapter

A01 Adapter

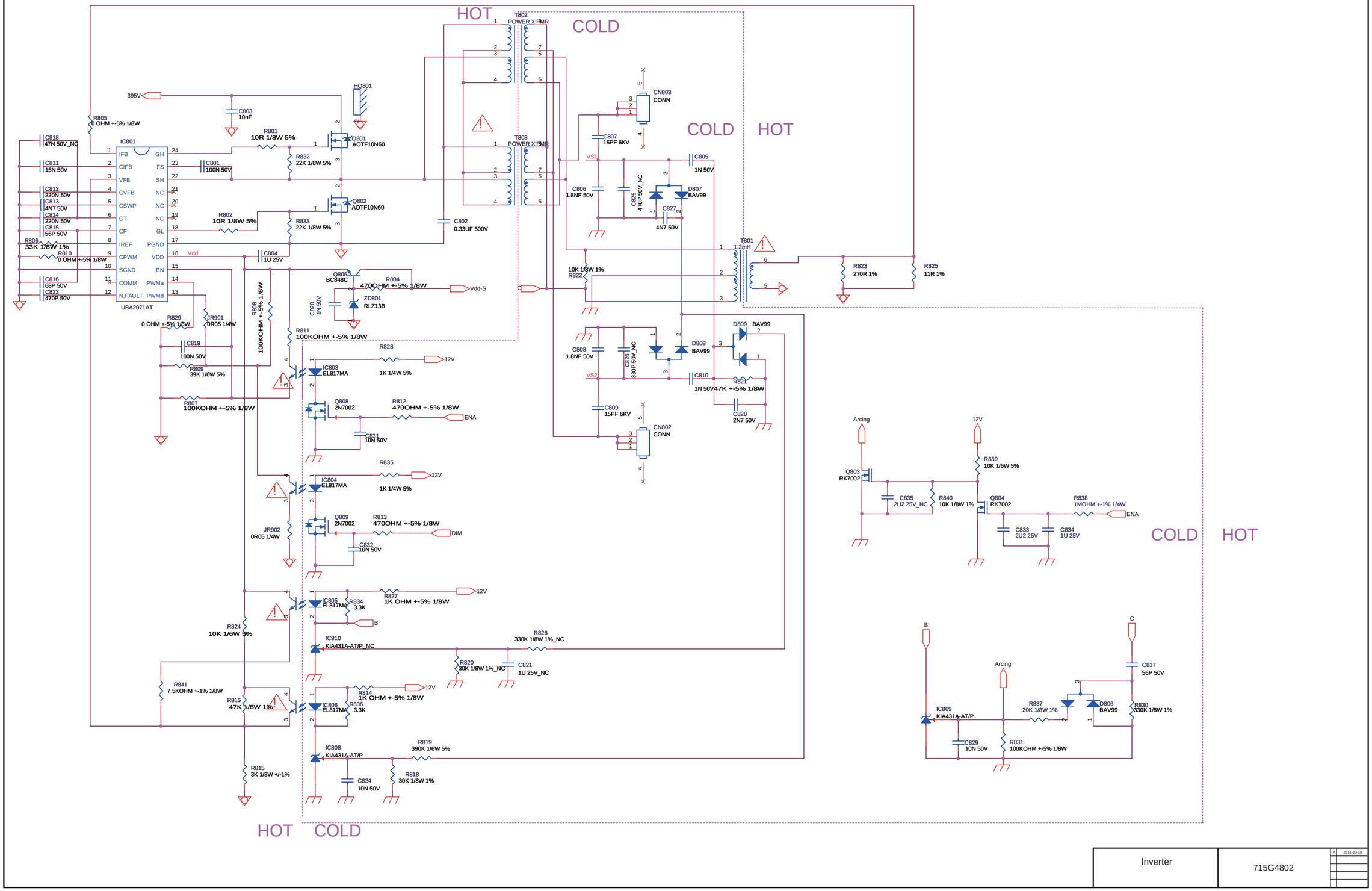


19080_504_110316.eps
110330

10-2-2 Inverter

A02 Inverter

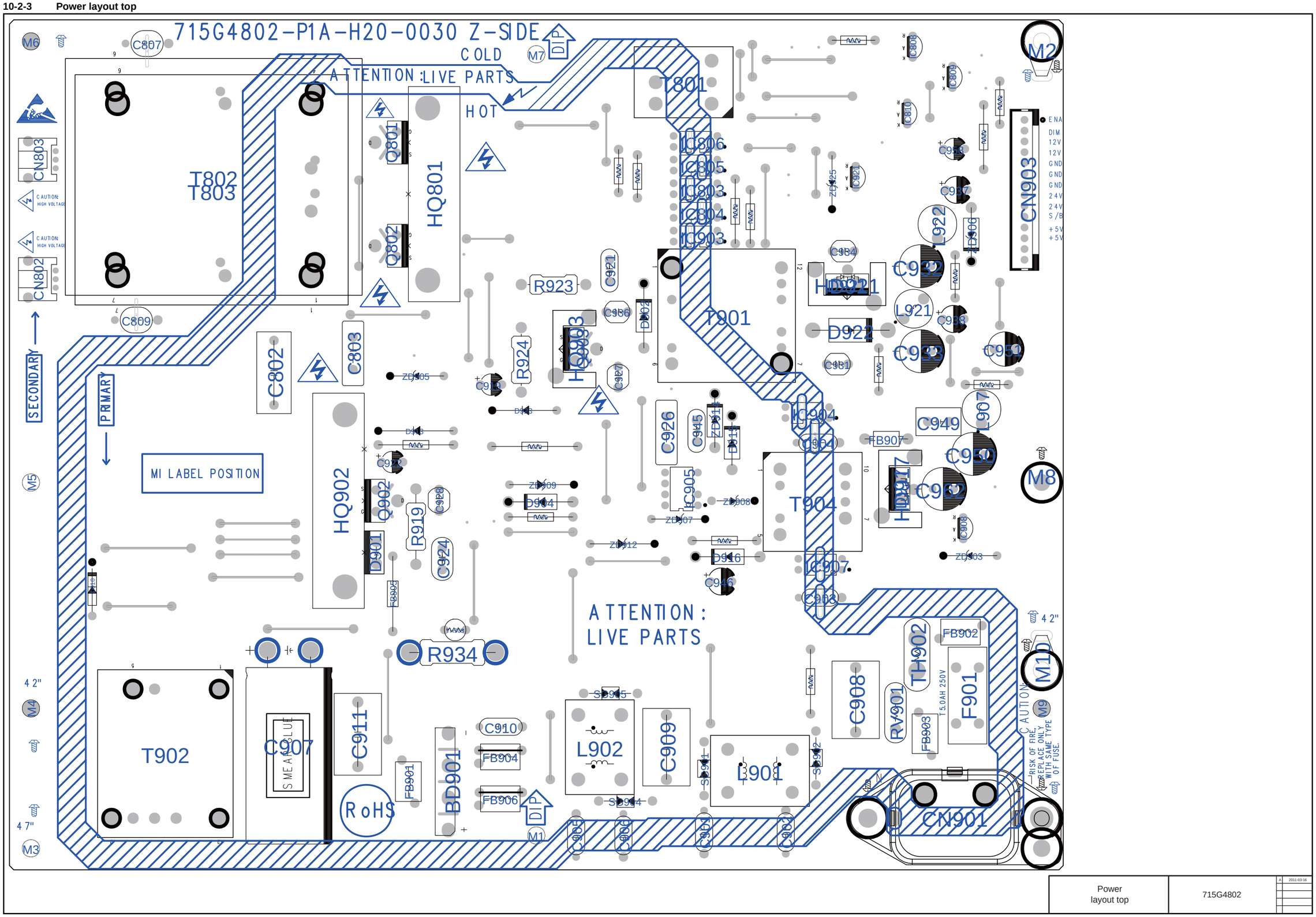
A02



Inverter	715G4802	A 2011-03-16

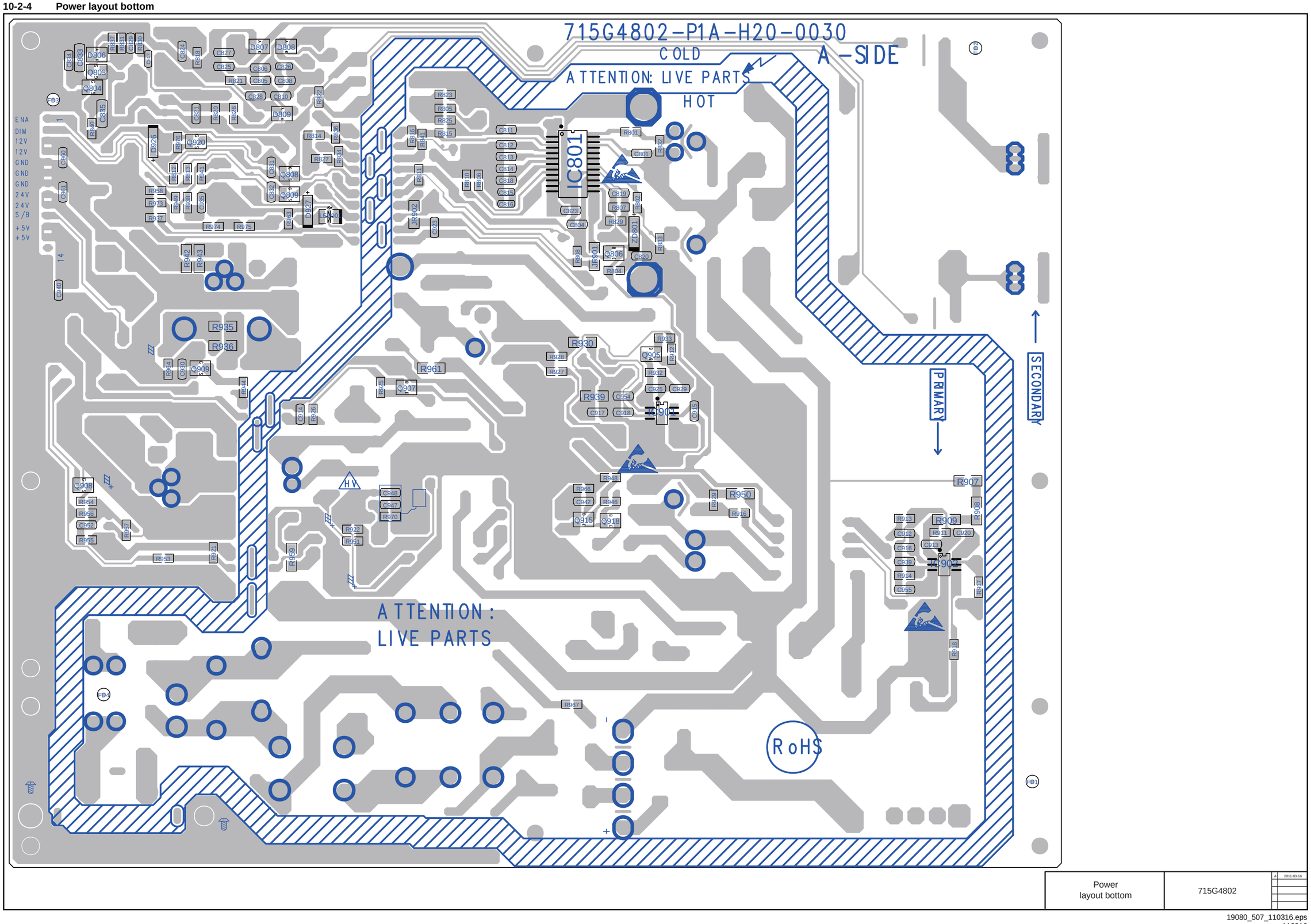
19080_505_110316.eps
110405

10-2-3 Power layout top



19080_506_110316.eps
110316

10-2-4 Power layout bottom

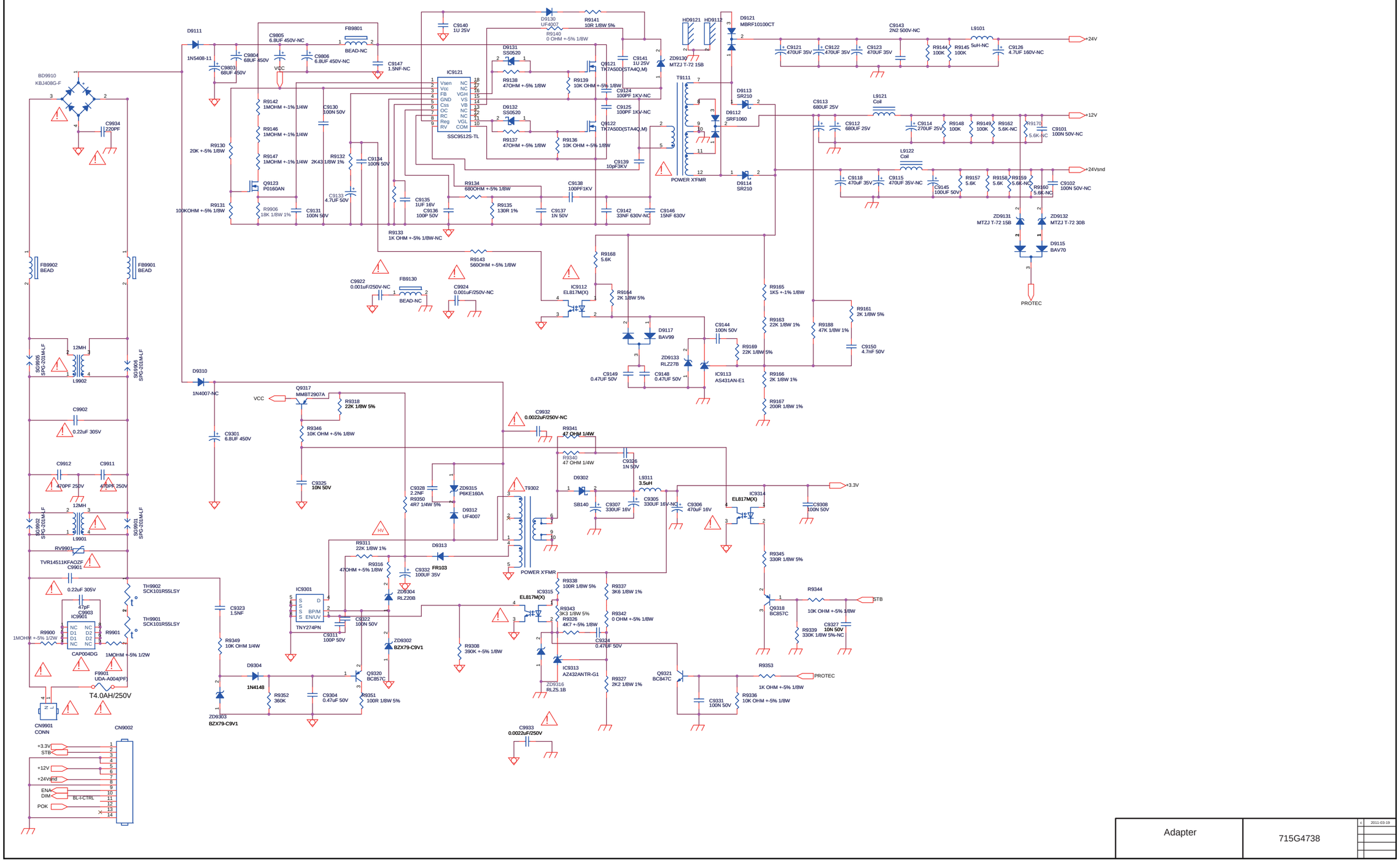


10.3 A01 715G4738 PSU Berlinale

10-3-1 Adapter

A01 Adapter

A01



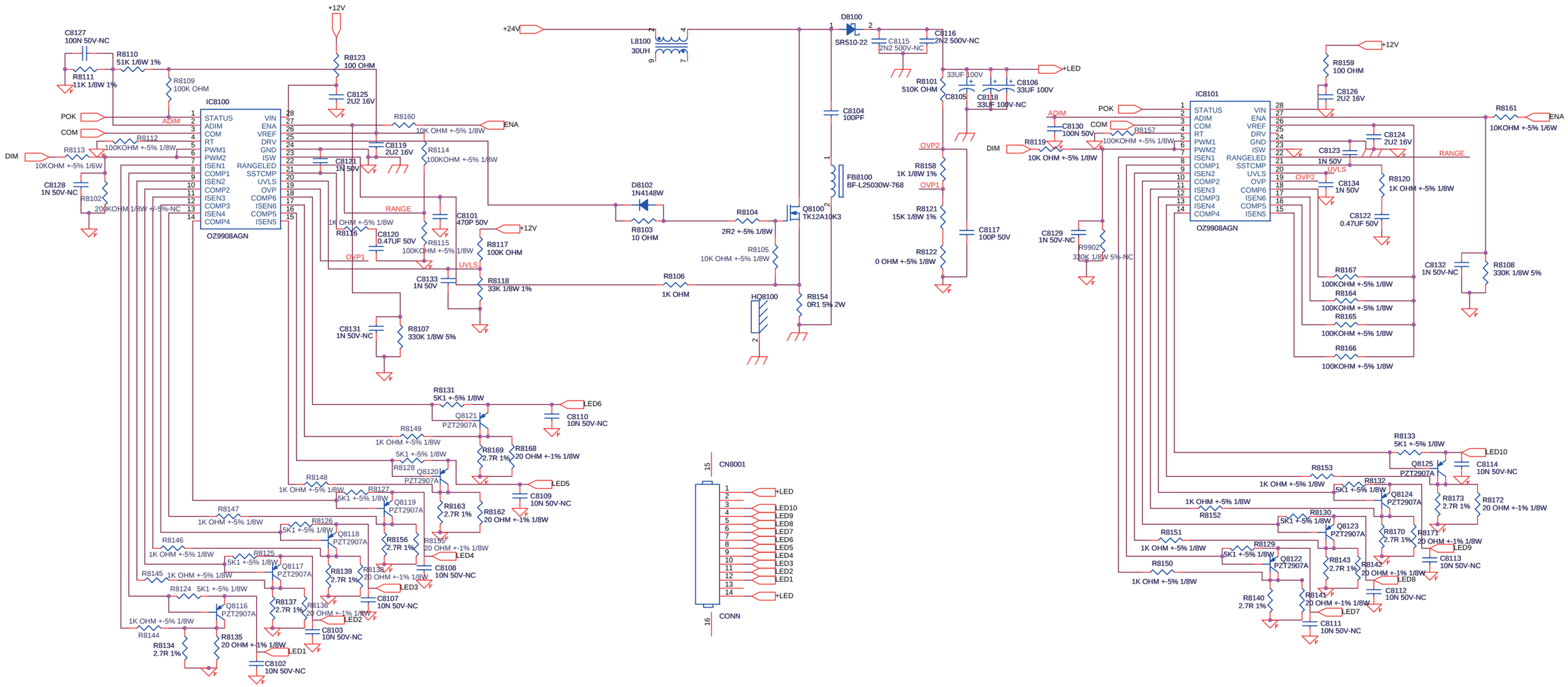
Adapter	715G4738	c 2011-03-19

19080_528_110319.eps
110330

10-3-2 LED

A02 LED

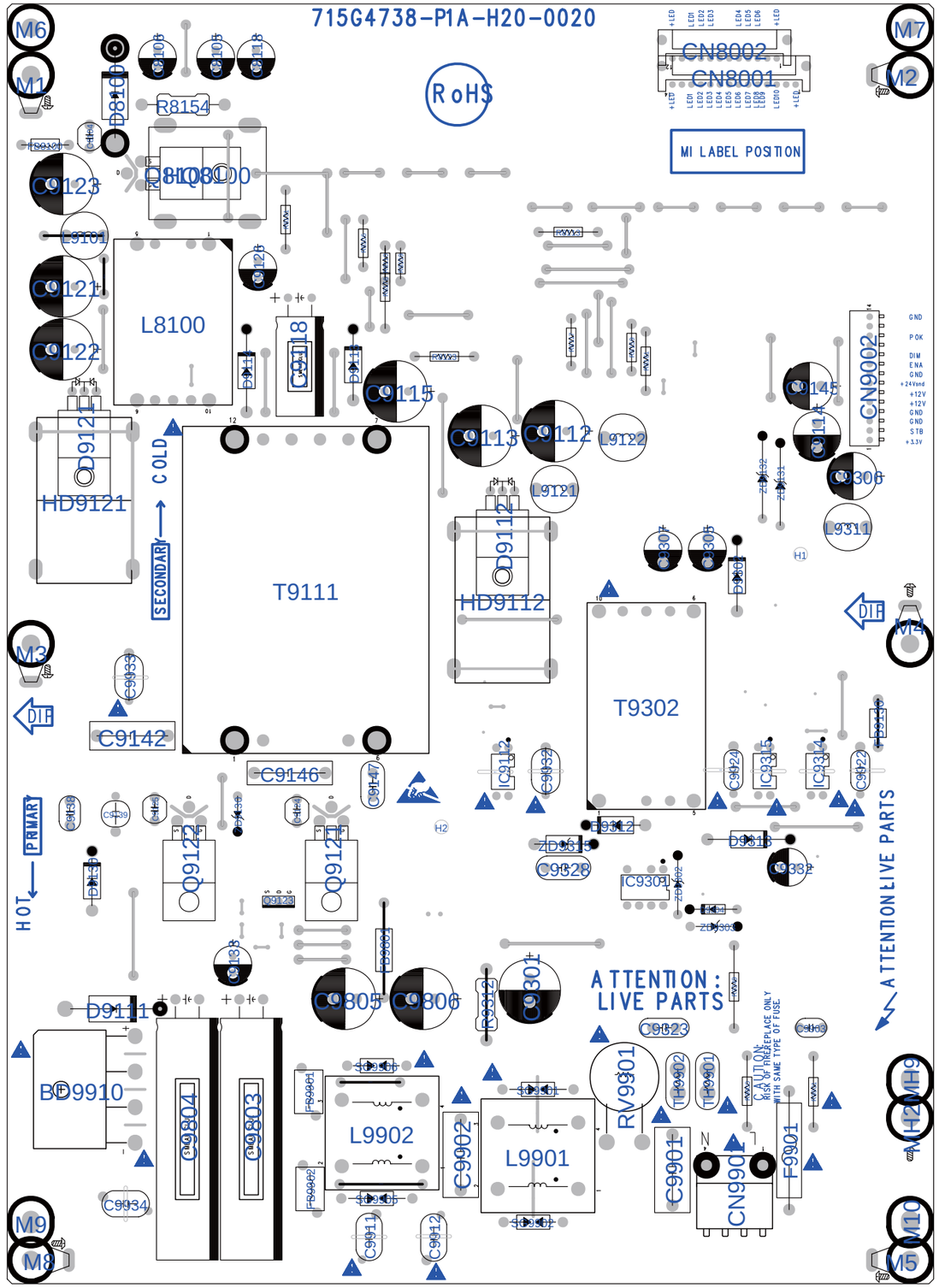
A02



LED	715G4738	C 2011-03-19

19080_529_110319.eps
110331

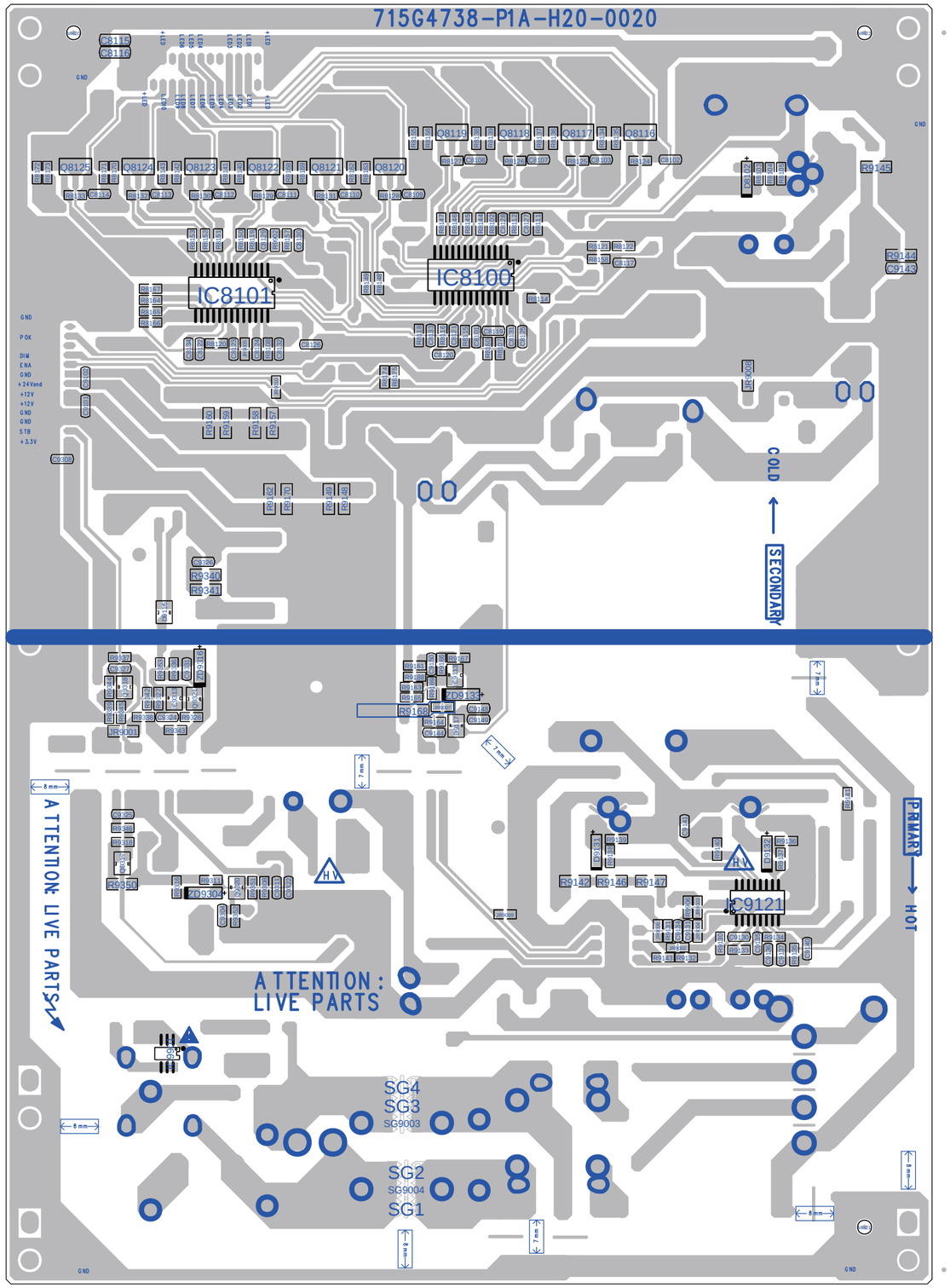
10-3-3 Power layout top



Power layout top	715G4738	c 2011-03-15

19080_530_110319.eps
110319

10-3-4 Power layout bottom



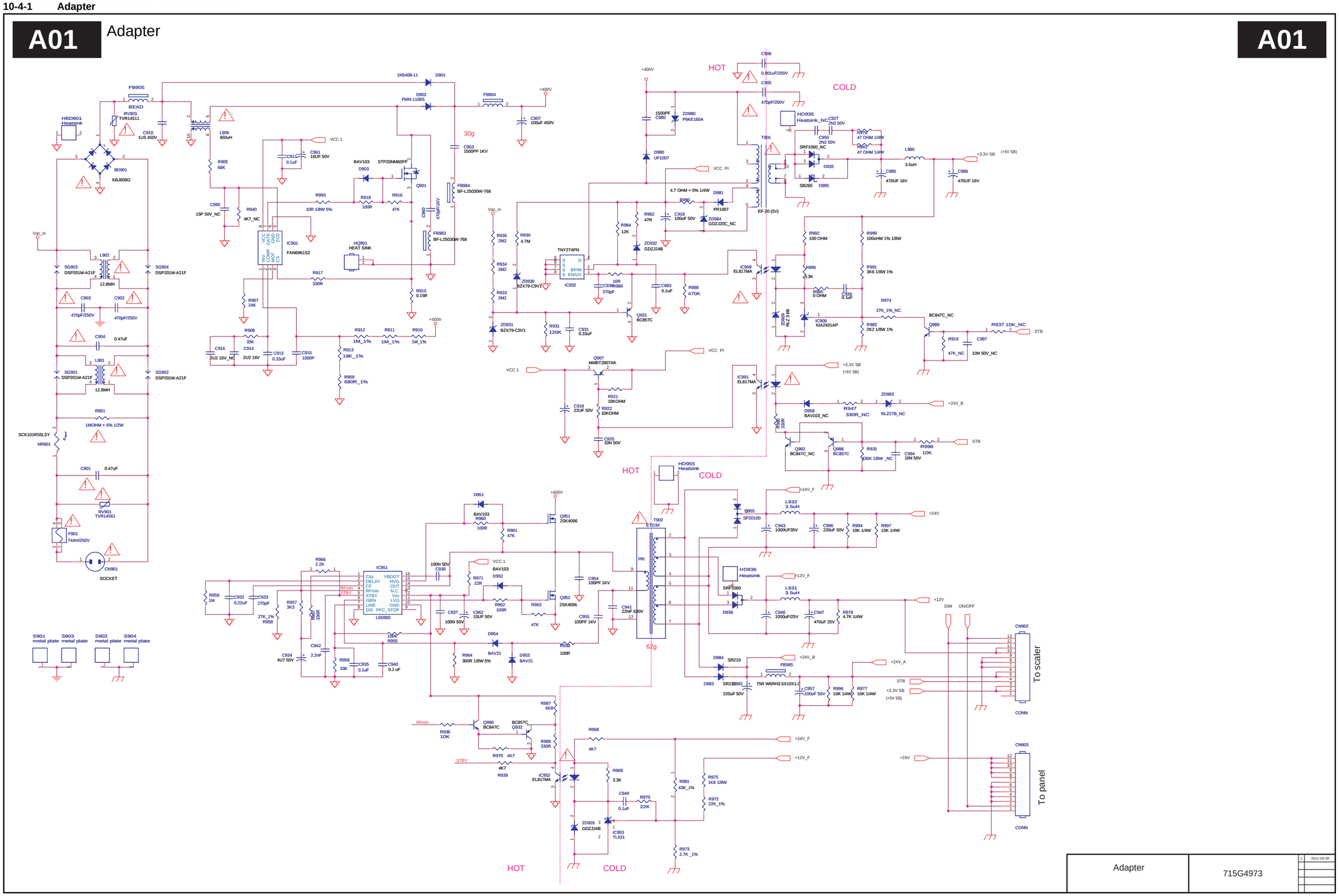
Power layout bottom	715G4738	c 2011-03-19

19080_531_110319.eps
110319

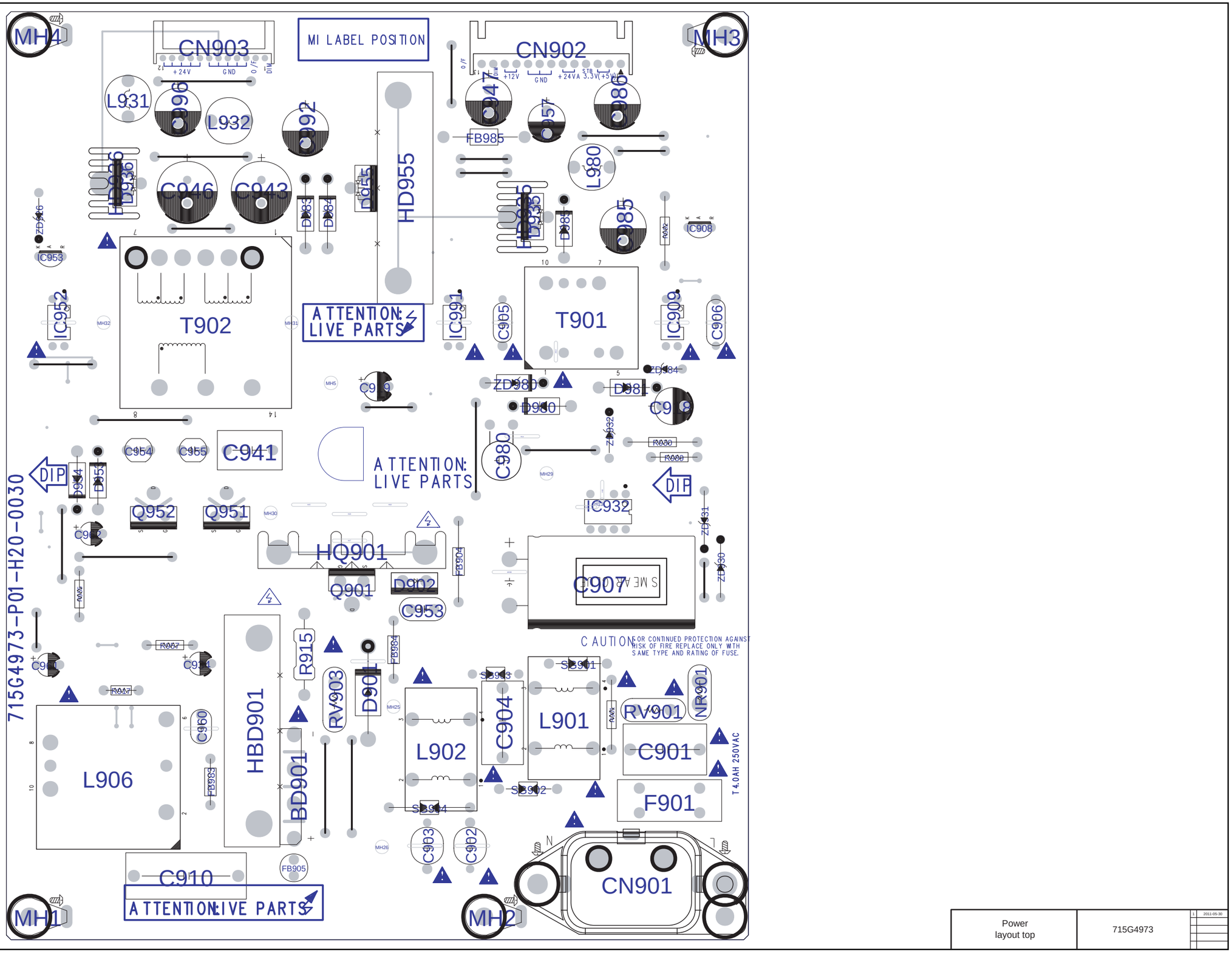
10.4 A01 715G4973 PSU Thriller HD 32"

10-4-1 Adapter

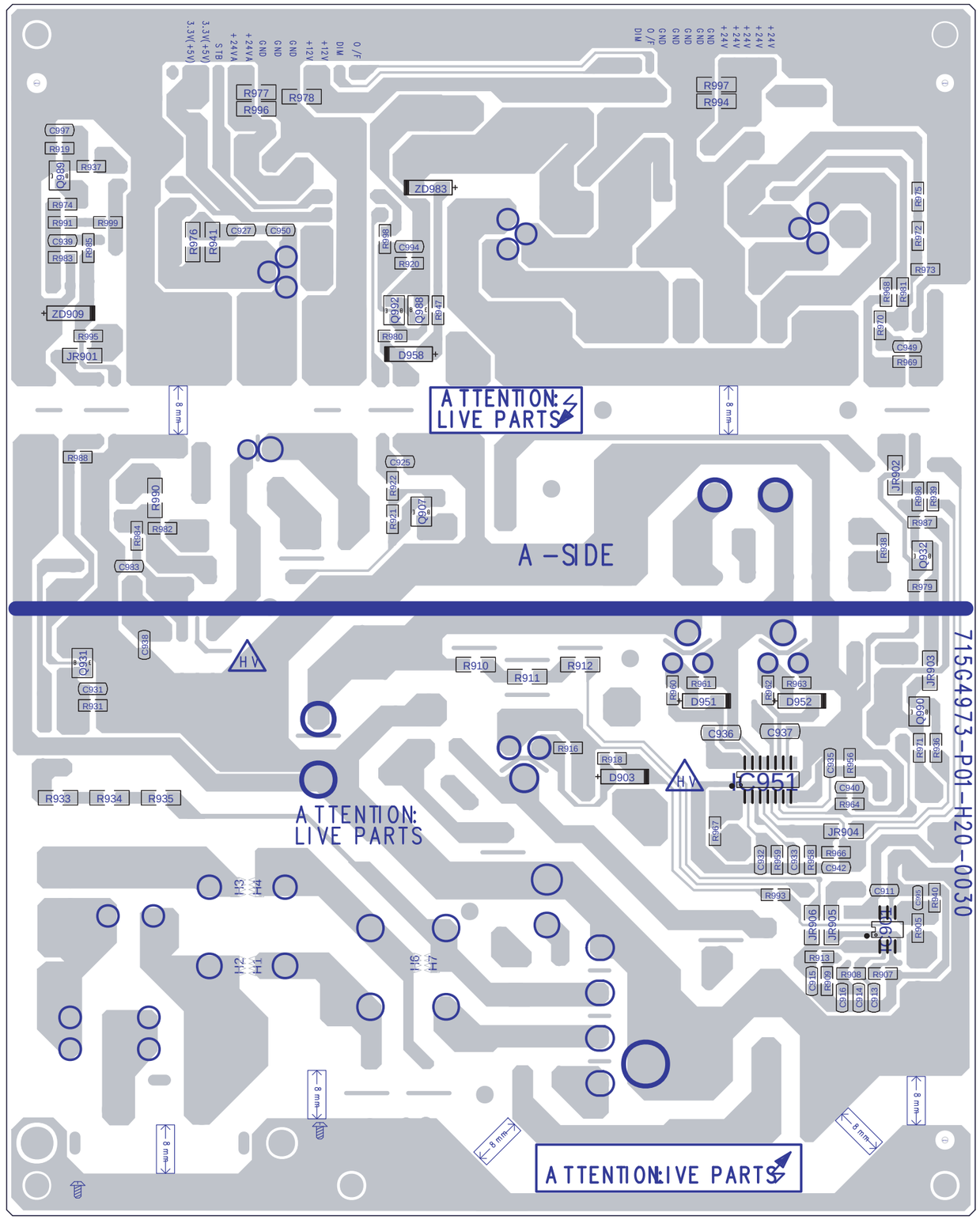
A01 Adapter



10-4-2 Power layout top



10-4-3 Power layout bottom



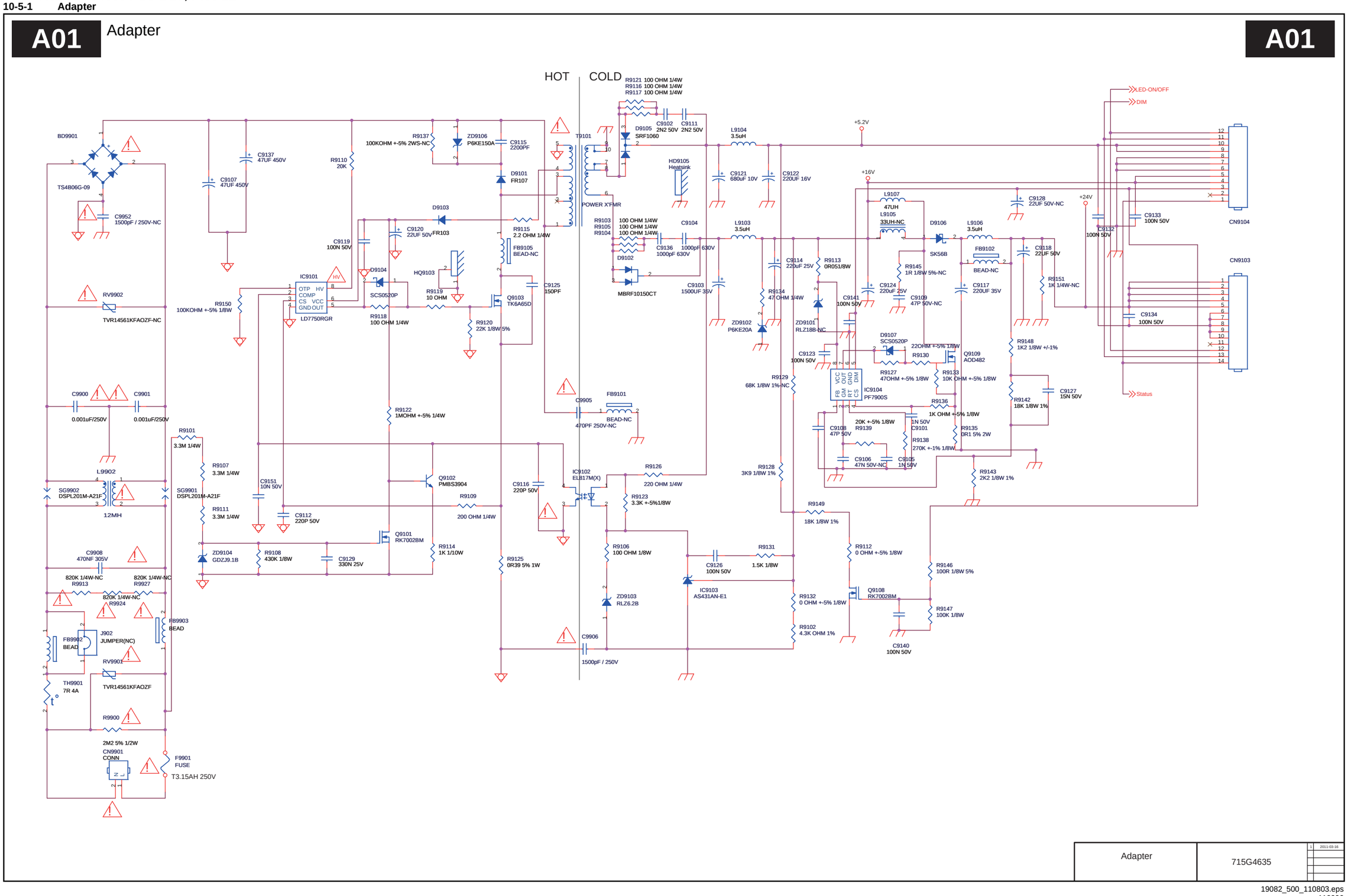
Power layout bottom	715G4973	1 2011-05-30

19081_502_110610.eps
110610

10.5 A01 715G4635 PSU DLT, Pico 22"

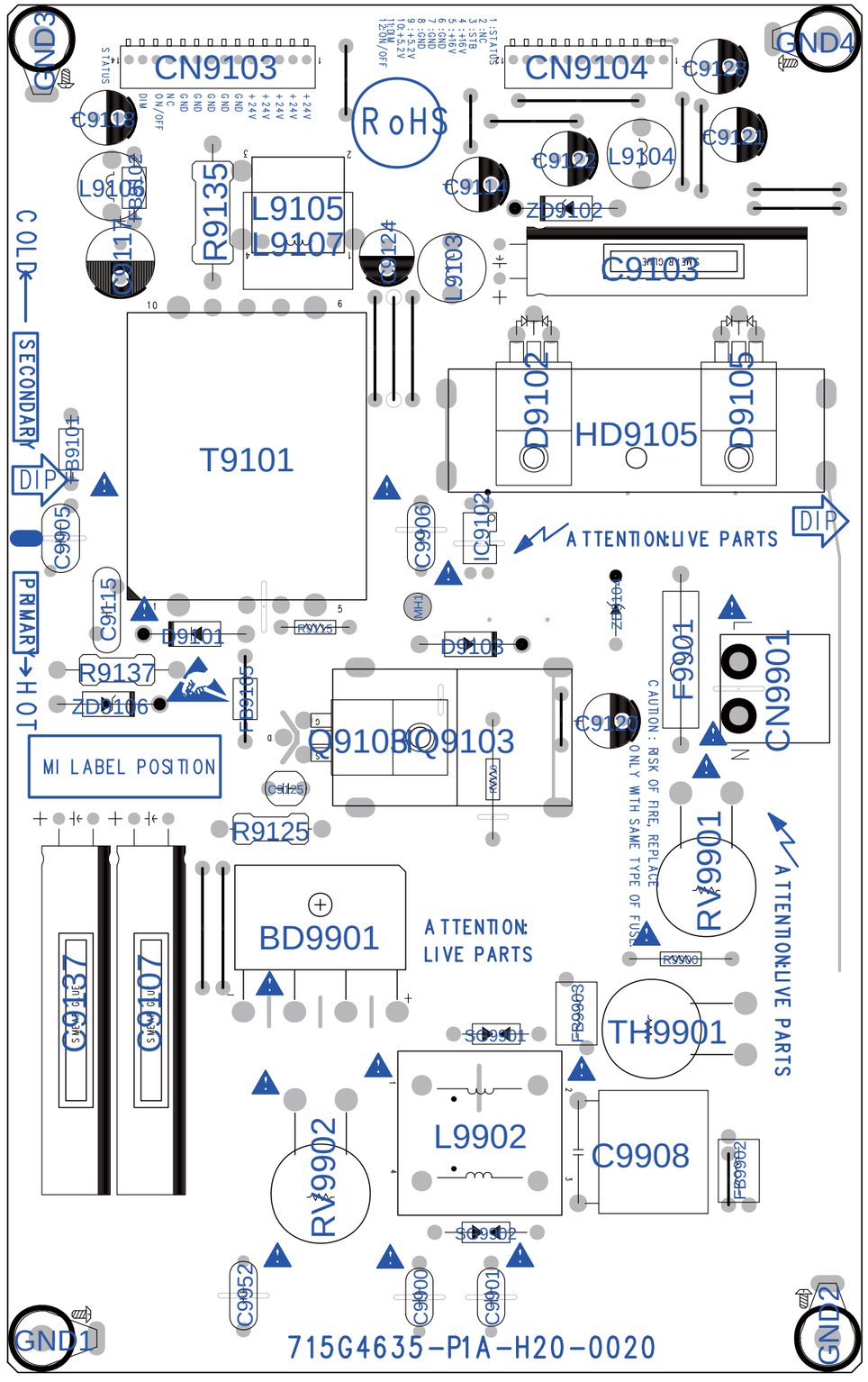
10-5-1 Adapter

A01 Adapter



19082_500_110803.eps
110906

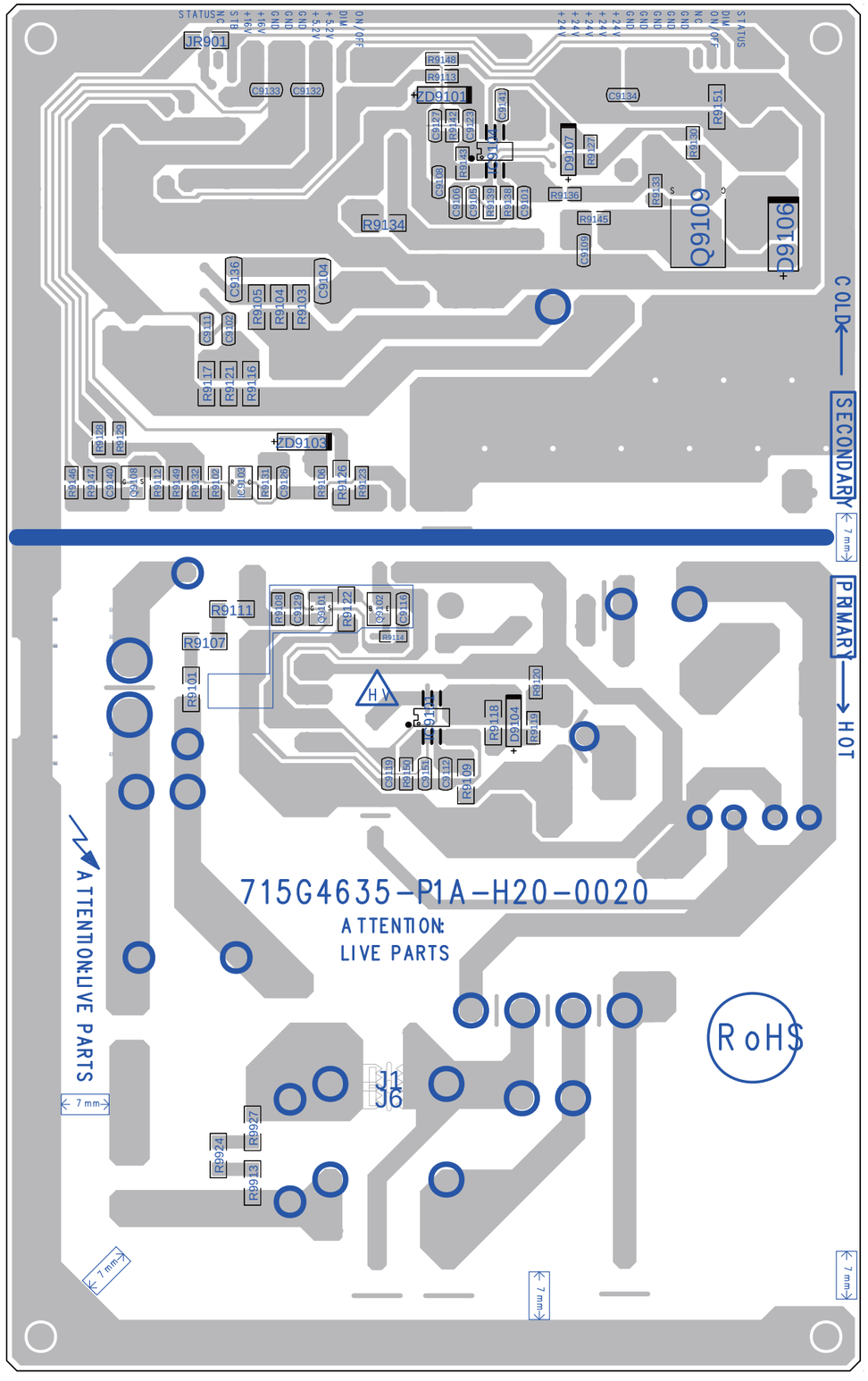
10-5-2 Power layout top



Power layout top	715G4635	1 2011-06-29

19082_501_110803.eps
110803

10-5-3 Power layout bottom



Power layout bottom | 715G4635 | 1 | 2011-06-29

19082_502_110803.eps
110803

10.6 A01 715G5148 PSU DLT, Pico 26"

10-6-1 Power

A01 Power

A01

HOT COLD

T9101 POWER X'FMR

D9183 SR320

FB9185 75R W6 RH 3.5X10X1.0

+24V_A

+24V_B

+5.2V

PS_ON

R9938 330 OHM 1/4W-NC

FB9901 BEAD

BD9901 KBJ408G-F

C9102 47UF 450V

C9103 47UF 450V-NC

C9104 47UF 450V

RV9902 TVR14511KFAOZF-NC

L9905 12MH

SG9904 DSPL201M-A21F

SG9905 DSPL201M-A21F

C9900 470PF 250V

C9920 470PF 250V

R9116 3.3M 1/4W

C9937 220NF

R9118 3.3M 1/4W

L9903 12MH

SG9902 DSPL201M-A21F

SG9901 DSPL201M-A21F

R9117 3.3M 1/4W

RV9901 TVR14561KFAOZF

C9914 220NF

R9961 2M4 5% 1/2W

R9958 820K-NC

R9959 820K-NC

R9960 820K-NC

BEAD FB9902

NTCR NR9901

F9902 FUSE T3.15AH 250V

CN9901 CONN

FB9903 BEAD

RV9903 TVR14561KFAOZF-NC

SG9903 SPARK GAP-NC

R9137 100KOHM +-5% 2WS-NC

ZD9106 P6KE150A

C9115 2200PF

R9110 20K

D9102 FR107

D9105 FR103

C9122 47UF 50V

C9119 100N 50V

C9134 220P 100V(NC)

R9140 2R2 +-5% 1/4W

FB9105 BF-L25030W-768

C9136 100PF

IC9101 OTP HV COMP CS VCC GND OUT LD7750RGR

D9104 1N4148W

R9104 100KOHM +-5% 1/8W

R9139 100 OHM 1/4W

R9120 10 OHM 1/8W

Q9105 TK6A65D

R9141 22K OHM 1/4W

HQ905

R9128 1M 1/4W 5%

C9906 1500pF / 250V

Q9104 PMBS3904

R9109 470 OHM 1/4W

C9116 220P 50V

IC9102 EL817M(X)

C9151 10N 50V

C9118 220P 50V

Q9101 RK7002BM

R9119 1K OHM +-5% 1/8W

R9136 0R36 5% 1W

ZD9104 RLZ6.2B

R9108 430K 5%

C9133 330N 25V

R9101 100 OHM 1/4W

R9102 100 OHM 1/4W

R9103 100 OHM 1/4W

C9101 470PF

D9101 MBRF10200CT

D9103 SRF1060

HD903

C9107 1000UF 50V

C9108 1000UF 50V-NC

L9101 3.5uH

L9102 3.5uH

+24V

C9109 100N 50V

C9158 330UF 35V

C9157 470UF 50V-NC

D9403 SR515

R9133 10R

ZD9102 P6KE27A

C9110 470uF 10V

C9111 470uF 16V

C9113 470PF

R9113 100 OHM 1/4W

R9114 100 OHM 1/4W

R9142 100 OHM 1/4W

R9177 10R

C9156 470UF 50V

ZD9107 P6KE27A

R9149 47K +-5% 1/8W-NC

FB9904 BF-L25030W-768

C9130 100UF 35V

Q9107 AO4421-NC

C9145 2U2 25V-NC

C9143 4.7UF 50V-NC

R9143 47K +-5% 1/8W-NC

R9147 47K OHM 1/4W-NC

Q9106 RK7002BM-NC

C9142 100N 50V-NC

R9151 330K 1/8W 5%-NC

R9115 470OHM +-5% 1/8W

R9123 3K9 1/8W 1%

R9122 68K 1/8W 1%

R9154 30K 1/8W 1%

R9121 1K 1/8W

R9153 0 OHM +-5% 1/8W

Q9108 RK7002BM

C9141 0.1uF 50V

R9145 1K OHM

R9146 1K OHM

R9148 330K 1/8W 5%

C9123 220NF 50V

R9126 2K 1/8W

R9106 100R 1/8W 5%

ZD9103 RLZ6.2B

IC9103 AS431AZTR-E1

R9127 2K4 +/-1% 1/8W

R9150 240 OHM +-1% 1/8W

+24V

D9401 SR215

C9402 0.47uF 50V

C9401 470UF 50V-NC

R9408 4R7 +-5% 1/8W

C9403 100N 50V

IC9401 MP1584EN-C319

C9411 1uF 50V

C9412 1uF 50V

R9406 330K 1/8W

R9409 8.2OHM 1%

R9403 8.2OHM 1%

L9401 47UH

D9402 B360B

C9405 1N5 50V

FB9401 BEAD

FB9905 BF-L25030W-768-NC

+12V

C9407 270UF 25V

C9408 100N 50V

R9402 2K OHM

R9401 10K 1/8W

C9146 100N 50V

C9409 10N 50V

C9410 47P 50V

R9407 30K +-5% 1/8W

R9404 20KOHM +-1% 1/8W

C9406 NC

R9405 1.43KOHM +-1% 1/8W

PS_ON

C9144 100N 50V

CN9103 14P 2.0mm

+24V_B

R9144 0 OHM +-5% 1/8W-NC

DET

ON/OFF

DIM

C9138 100N 50V

CN9105 13P 2.0mm

ON/OFF

DIM

+12V

+24V_A

PS_ON

+5.2V

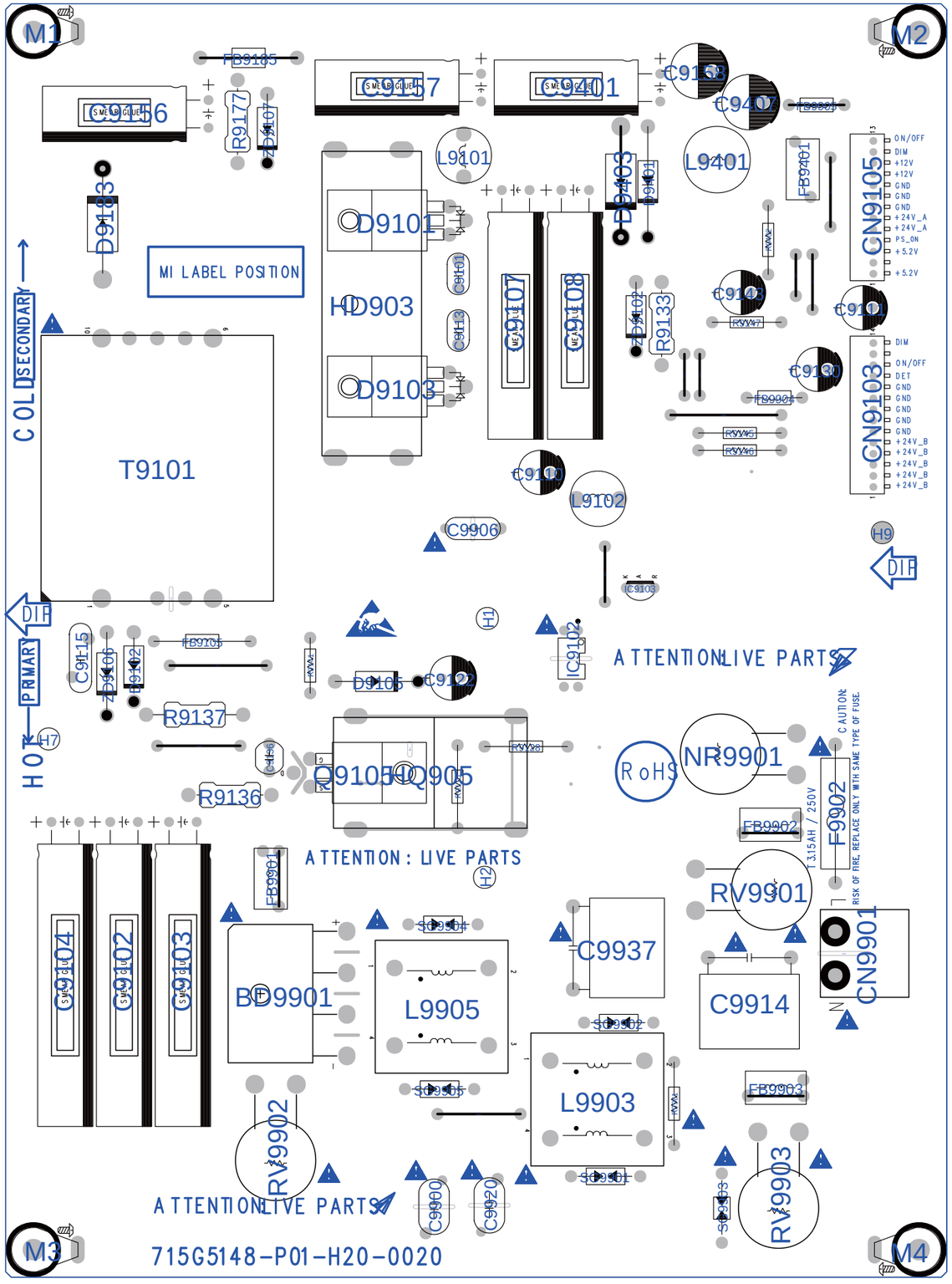
C9139 100N 50V

C9140 100N 50V-NC

Power	715G5148	A 2011-05-23

19082_503_110803.eps
110811

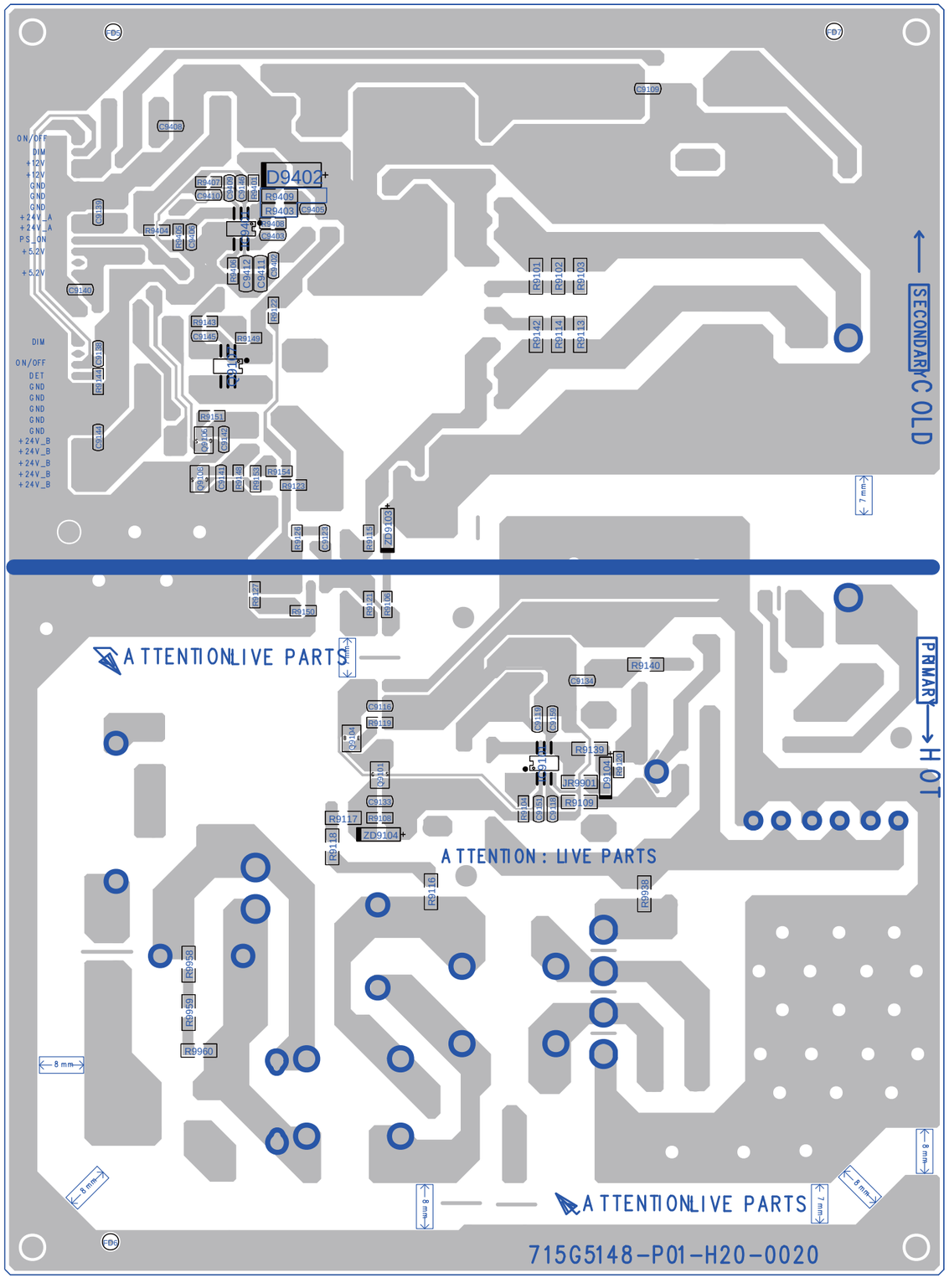
10-6-2 Power layout top



Power layout top	715G5148	A 2011-05-23

19082_504_110803.eps
110803

10-6-3 Power layout bottom



Power layout bottom	715G5148	A	2011-05-23

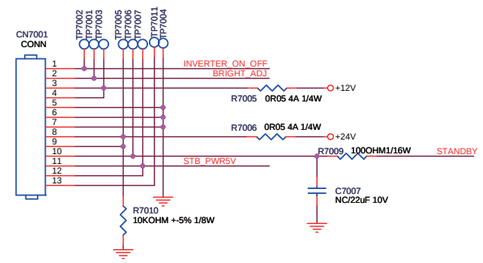
19082_505_110803.eps
110803

10.7 B 715G4609 SSB Thriller
10-7-1 System Power 1

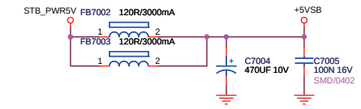
B01 System Power 1

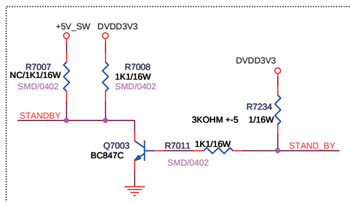
B01

DC POWER INPUT

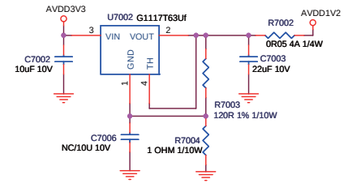


STANDBY POWER +5VSB from STB_PWR5V

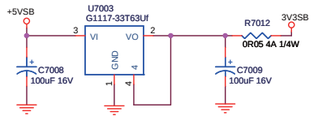




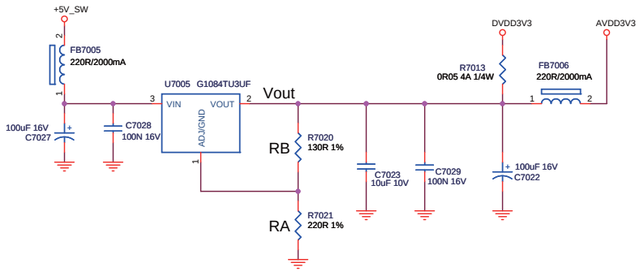
ANALOG POWER AVDD1V2 form AVDD3V3



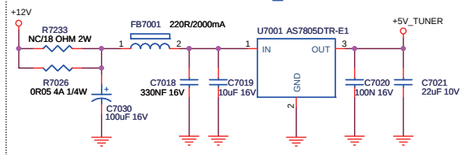
STANDBY POWER 3V3SB form +5VSB



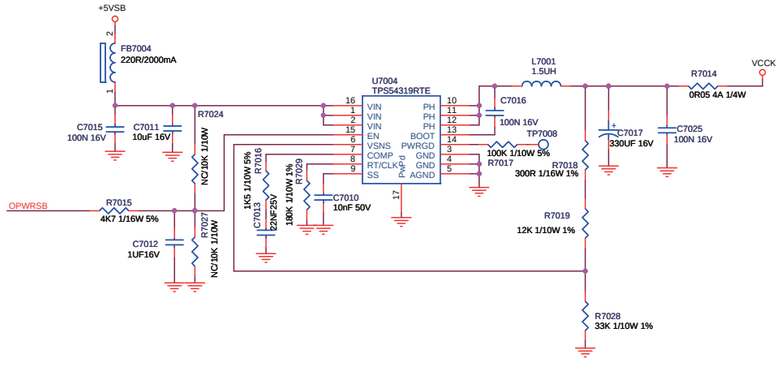
DIGITAL/ANALOG POWER DVDD3V3/AVDD3V3 form +5V_SW



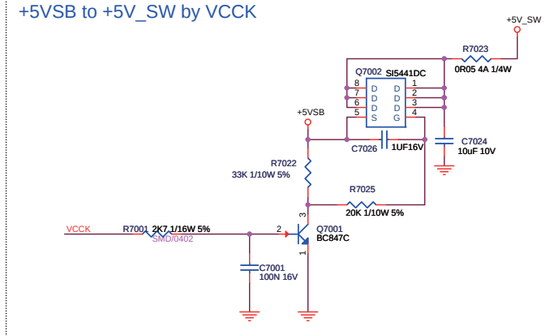
TUNER POWER +5V_TUNER form +12V



CORE POWER VCCK (1.12V/Max. 2.25A) form +5VSB by OPWRSB



+5VSB to +5V_SW by VCCK



System Power 1	715G4609	1 2011-03-16

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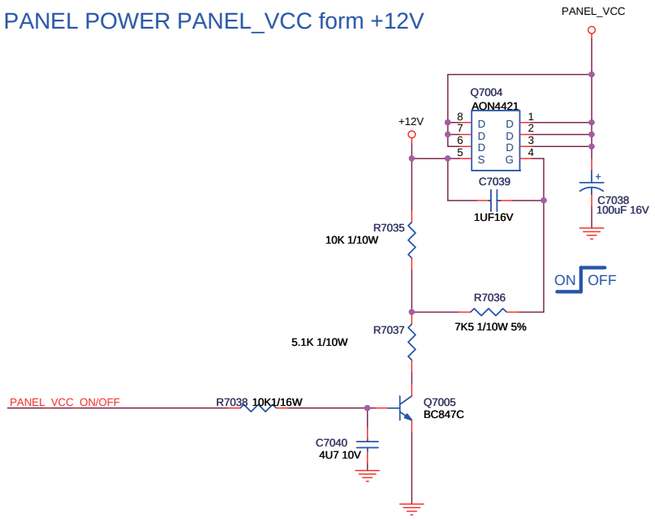
10-7-2 System Power 2

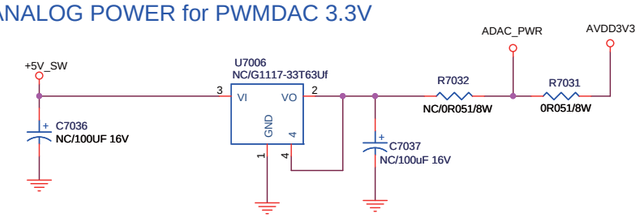
B02 System Power 2

B02

PANEL POWER PANEL_VCC form +12V



ANALOG POWER for PWMDAC 3.3V



System Power 2	715G4609	1 2011-03-16

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110316

10-7-3 Peripheral

B03 Peripheral

B03

MT5366

U4001A

MT5366CHGG

NAND Flash

U4005

NAND01GW3B2CN6E

NAND 128MB

Serial Flash

U4006

NC/MX25L4005AMI-12G

STRAPPING

CN4002

NC/CONN

SYSTEM EEPROM

U4008

AT24C128BN-SH-T

27 MHz CRYSTAL

X4002 27MHz

Reset IC

U4007 MAX809STRG

2nd I2C

3rd I2C

DC Drop Detect Circuit

3.3V IO Power

Analog Power

Core Power

Periperal	715G4609	1	2011-03-16

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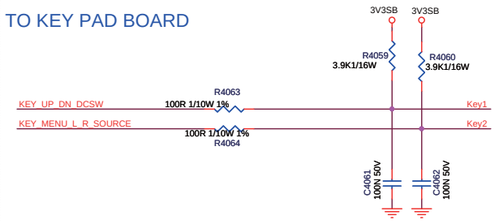
110408

10-7-4 Connector/USB/RS232

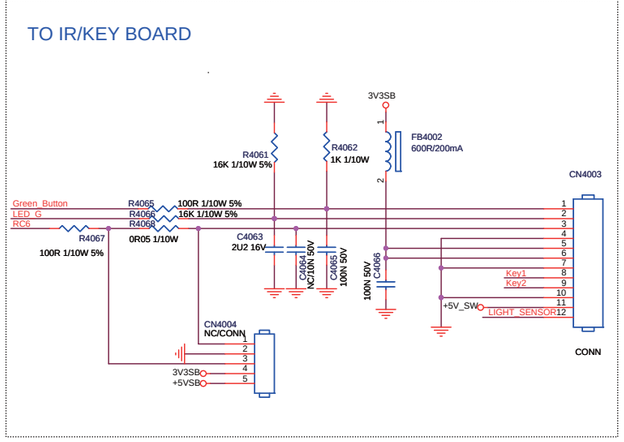
B04 Connector/USB/RS232

B04

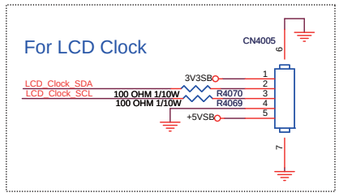
TO KEY PAD BOARD



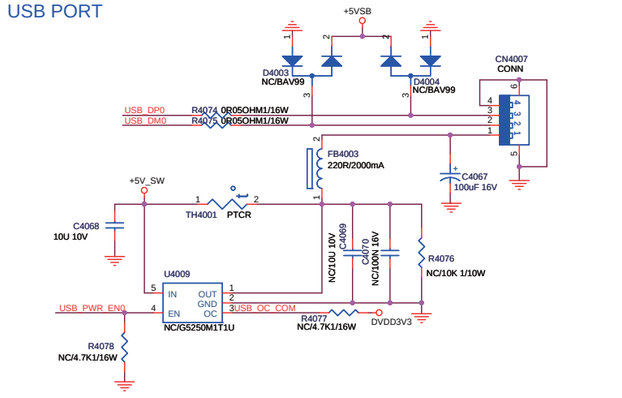
TO IR/KEY BOARD



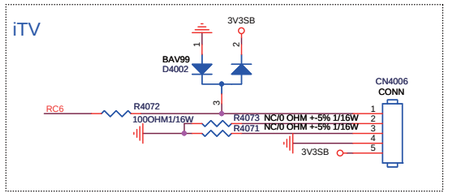
For LCD Clock



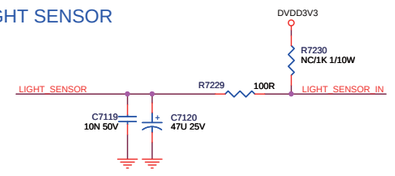
USB PORT



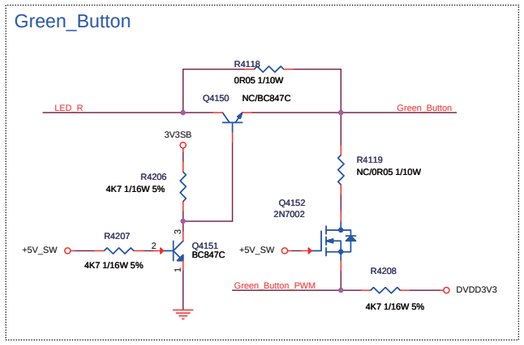
iTV

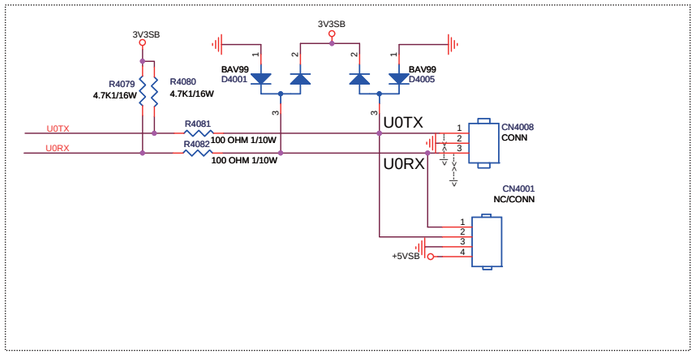


LIGHT SENSOR



Green_Button





Connector/USB/RS232	715G4609	1 2011-03-16

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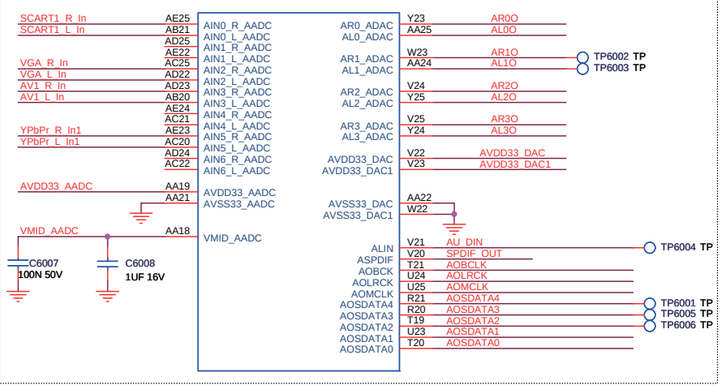
110405

10-7-5 Audio IO/Headphone

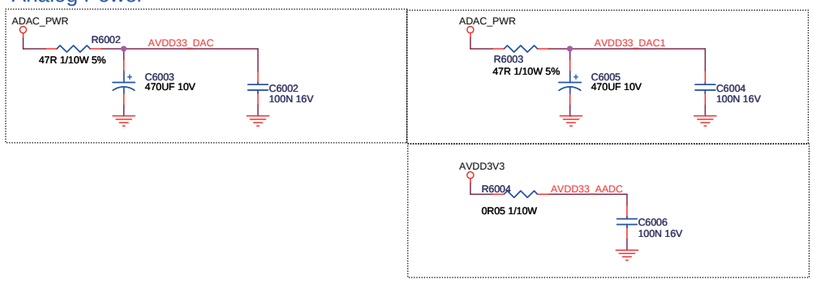
B05 Audio IO/Headphone

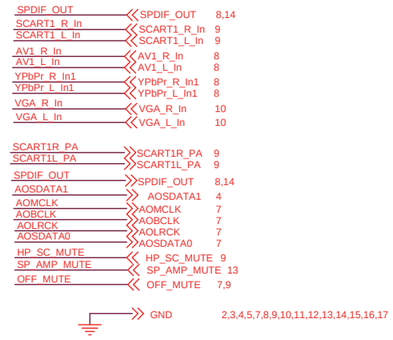
B05

MT5366

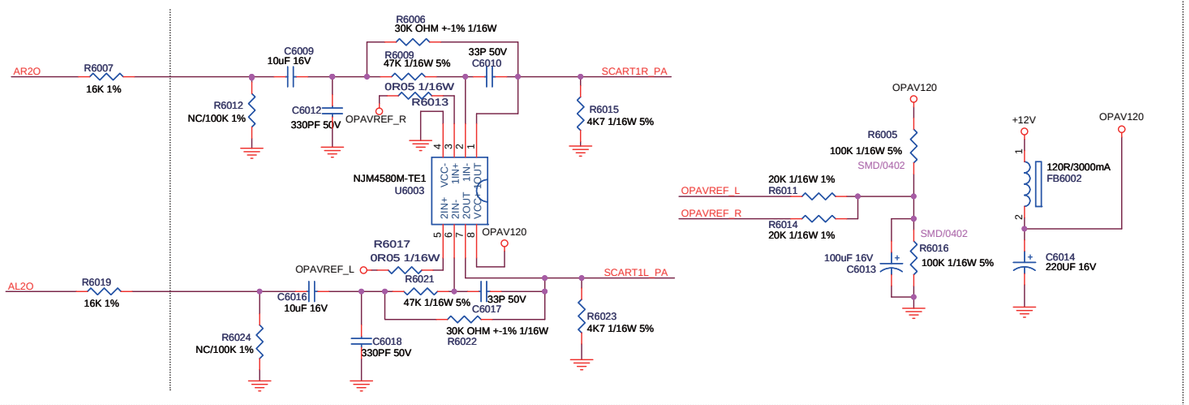


Analog Power

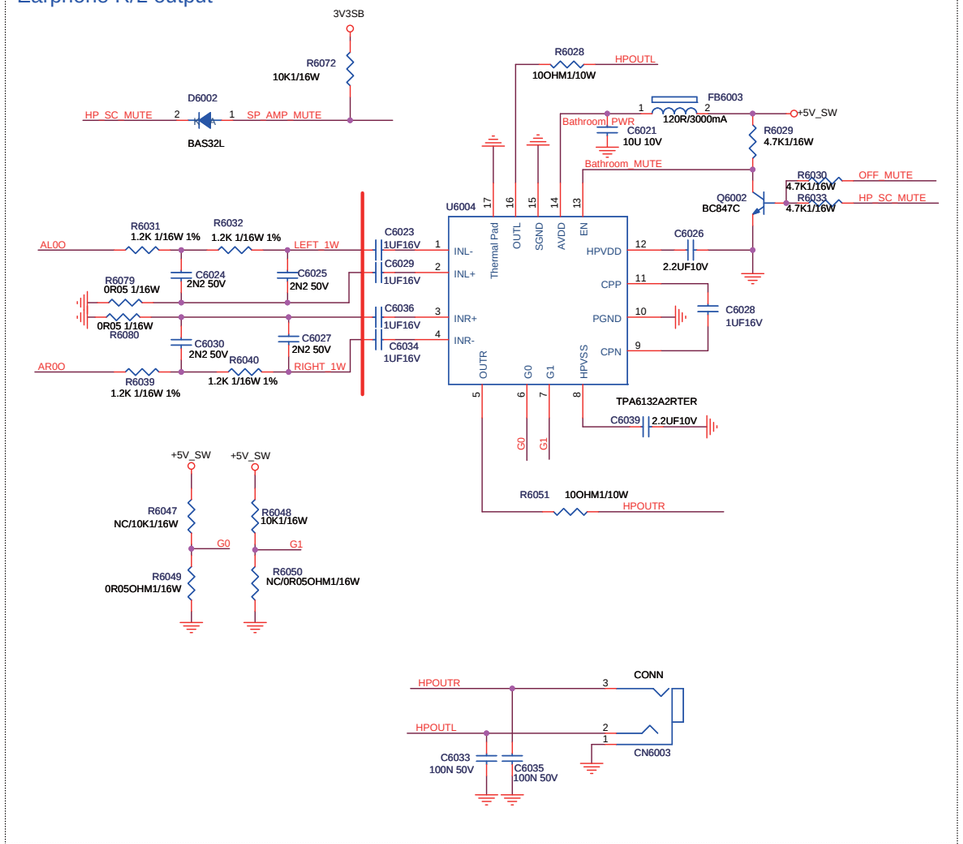




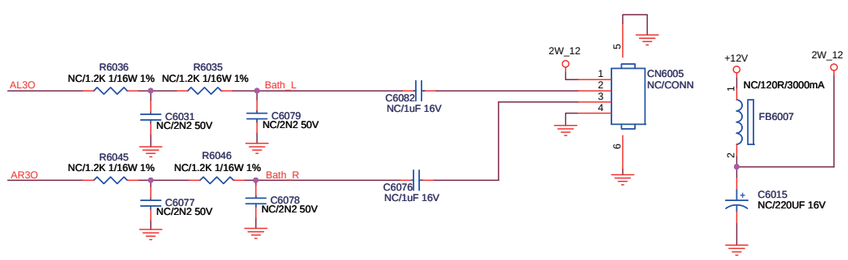
SCT Audio Out



Earphone R/L output



2W Mono Speaker output for BUH



Audio IO/Headphone	715G4609	1 2011-03-16

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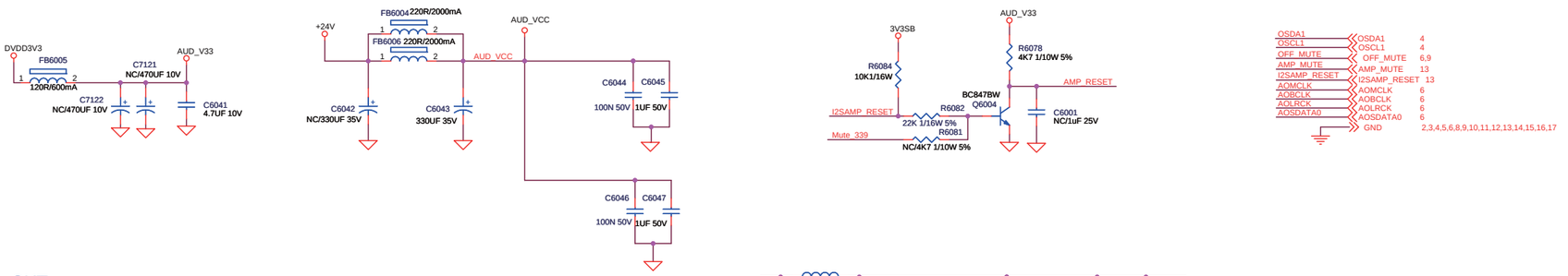
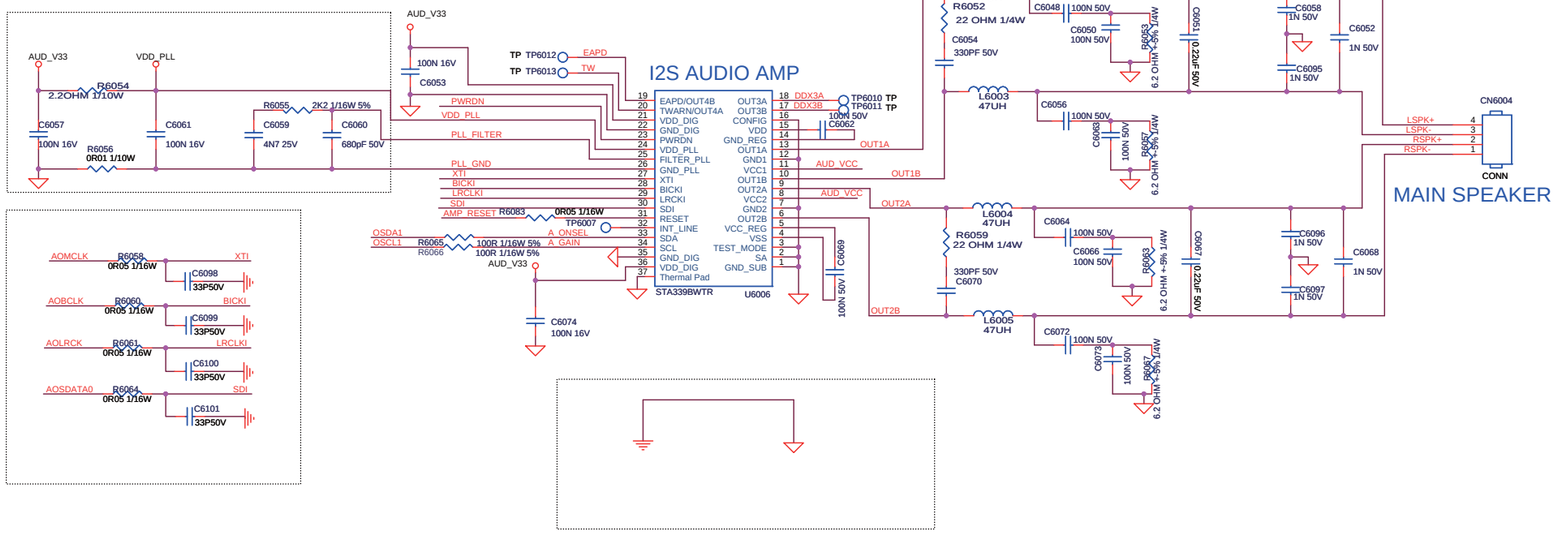
10-7-6 Speaker

B06 Speaker

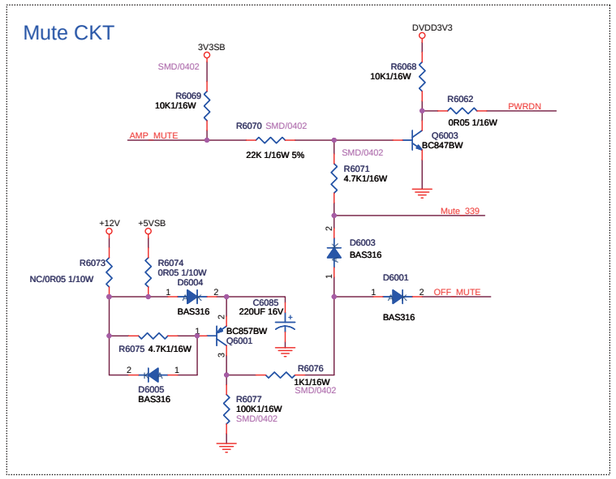
B06



Sound R/L CKT



Mute CKT



Speaker	715G4609	1 2011-03-16

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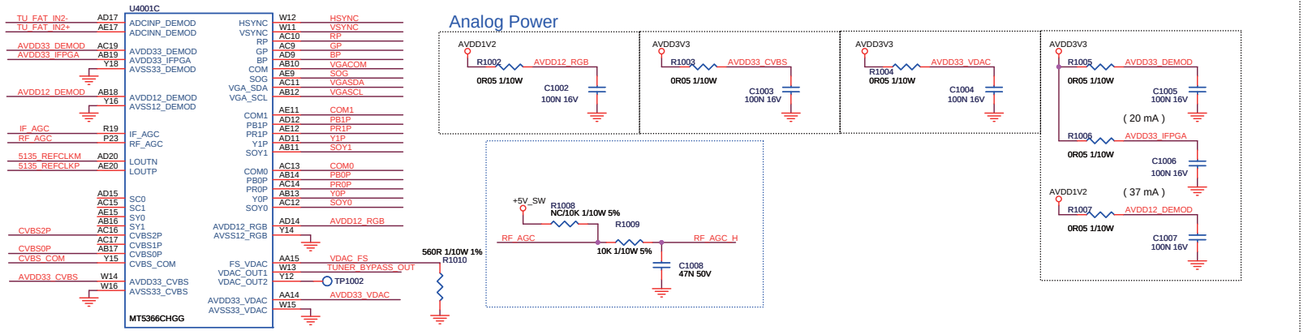
10-7-7 Video IO/SPDIF

B07 Video IO/SPDIF

B07

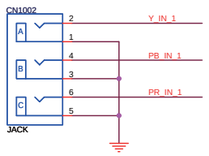
MT5366

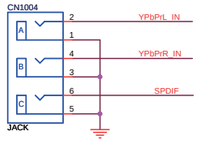


Analog Power

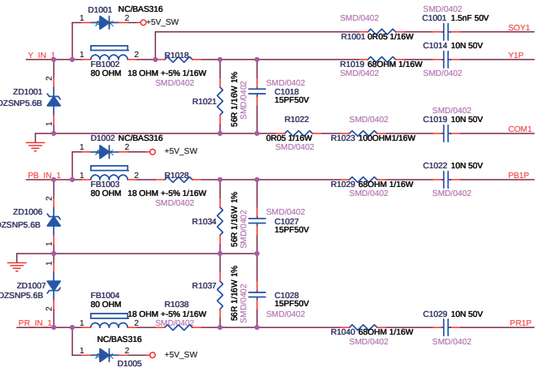
DVBT Only

YPbPr & Audio IN

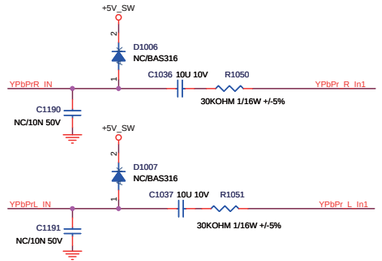




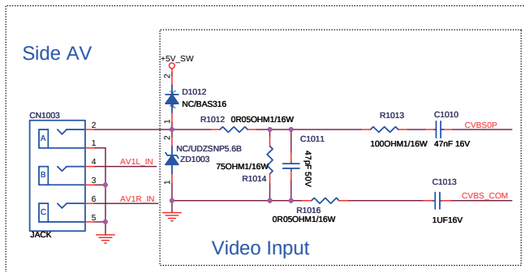
YPBPR IN



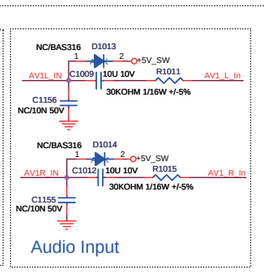
AUDIO IN for YPbPr



Side AV

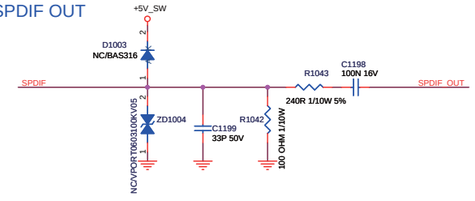


Video Input



Audio Input

SPDIF OUT



Video IO/SPDIF	715G4609	1 2011-03-16

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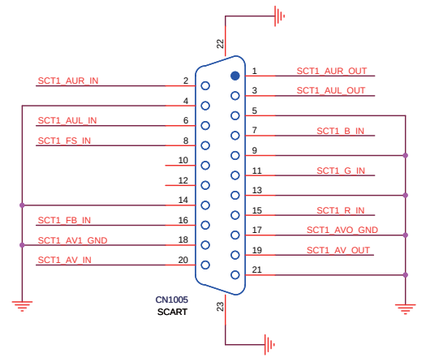
B08 SCART

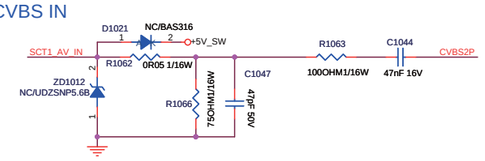
B08

SCART (Full SCART) -- CVBS+SV+RGB+TV OUT

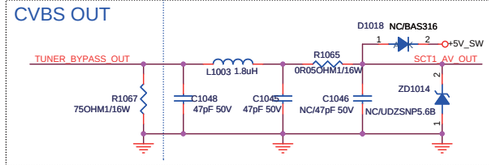


SCART1R_PA — SCART1R_PA 6
SCART1L_PA — SCART1L_PA 6
CVBS2P — CVBS2P 8
SOY0 — SOY0 8
Y0P — Y0P 8
COM0 — COM0 8
PB0P — PB0P 8
PR0P — PR0P 8
SCART_FS0 — SCART_FS0 13
TUNER_BYPASS_OUT — TUNER_BYPASS_OUT 8
SCART1_R_In — SCART1_R_In 6
SCART1_L_In — SCART1_L_In 6
OFF_MUTE — OFF_MUTE 6,7
HP_SC_MUTE — HP_SC_MUTE 6
GND — GND 2,3,4,5,6,7,8,10,11,12,13,14,15,16,17

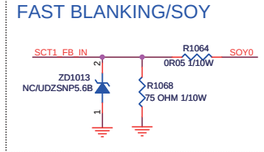
CVBS IN



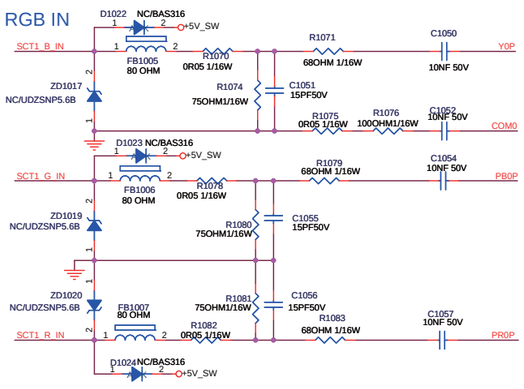
CVBS OUT



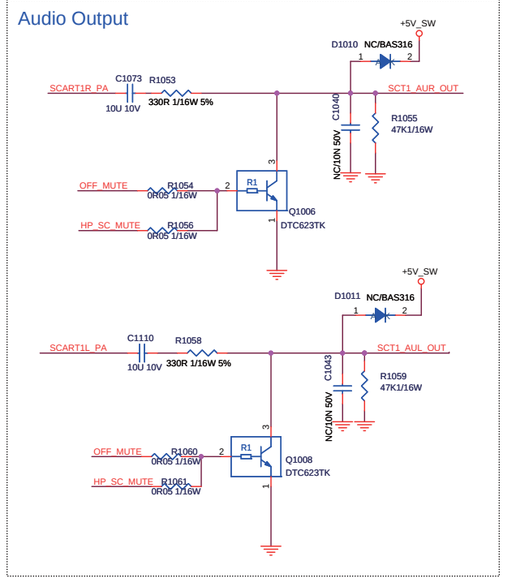
FAST BLANKING/SOY



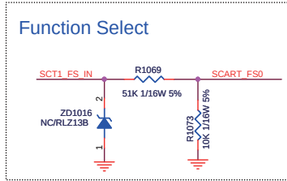
RGB IN



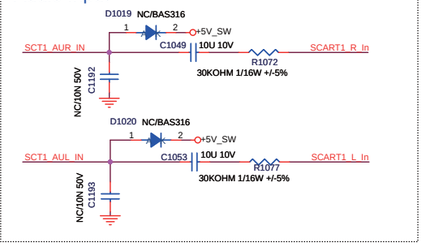
Audio Output



Function Select



Audio Input



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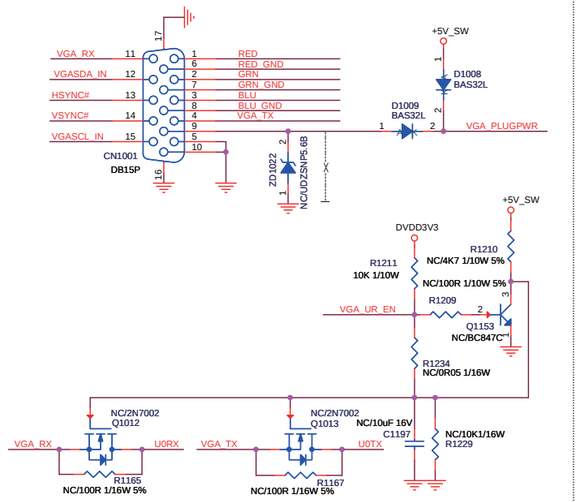
10-7-9 VGA Input

B09 VGA Input

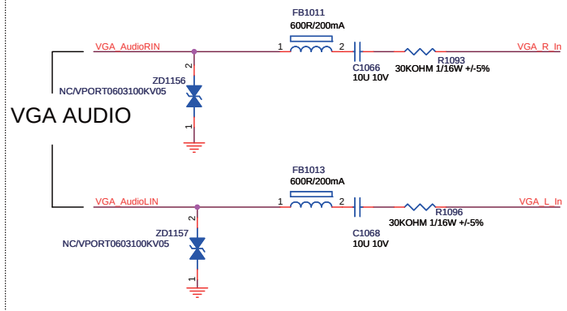
B09

VGA Input

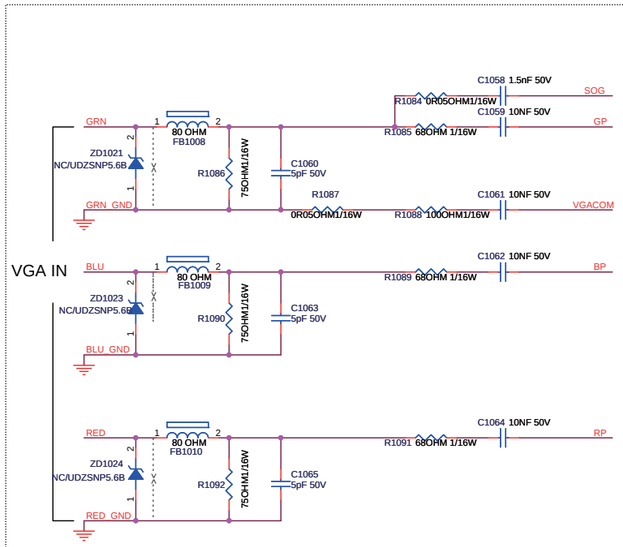


VGA Audio Input

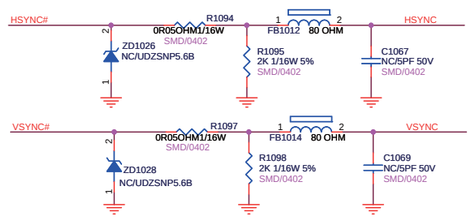
VGA AUDIO



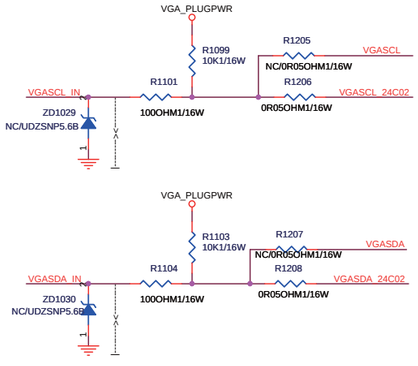
VGA IN



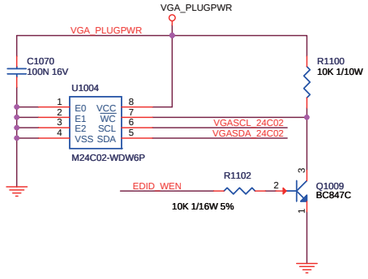
VGA SYNC SLICER



VGA I2C



VGA EDID



VGA_UR_EN	VGA_UR_EN	15	
U0TX	U0TX	4,5	
U0RX	U0RX	4,5	
OSCL0	OSCL0	4,17	
OSDA0	OSDA0	4,17	
VGA_R_In	VGA_R_In	6	
VGA_L_In	VGA_L_In	6	
HSYNC	HSYNC	8	
VSYNC	VSYNC	8	
RP	RP	8	
GP	GP	8	
BP	BP	8	
VGACOM	VGACOM	8	
SOG	SOG	8	
VGASDA	VGASDA	8	
VGASCL	VGASCL	8	
EDID_WEN	EDID_WEN	13,14	
	GND	2,3,4,5,6,7,8,9,11,12,13,14,15,16,17	

VGA Input	715G4609	1 2011-03-16

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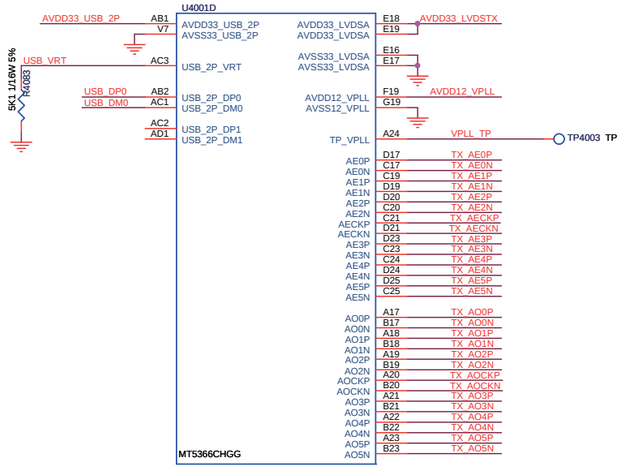
110331

10-7-10 LVDS

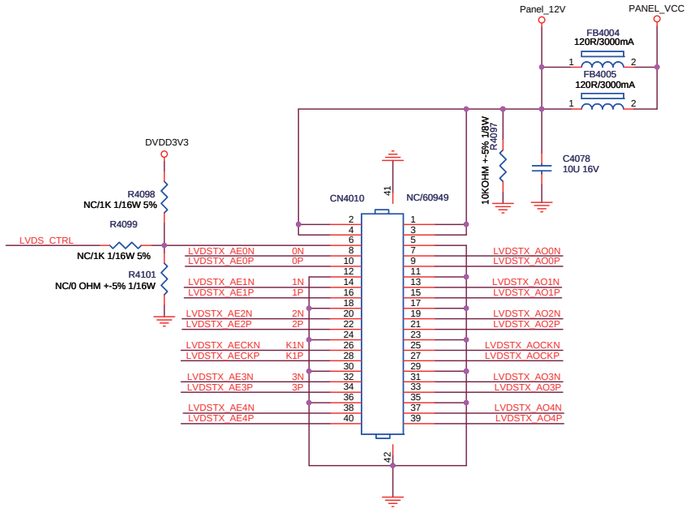
B10 LVDS

B10

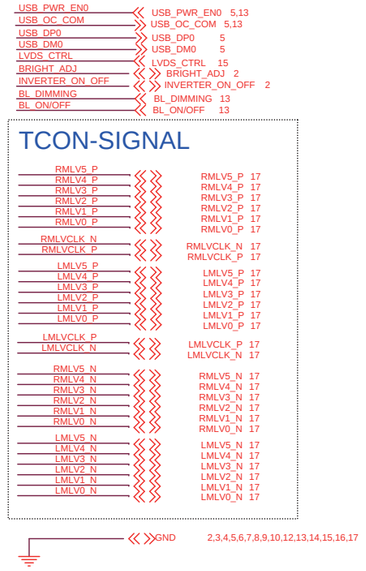
MT5366



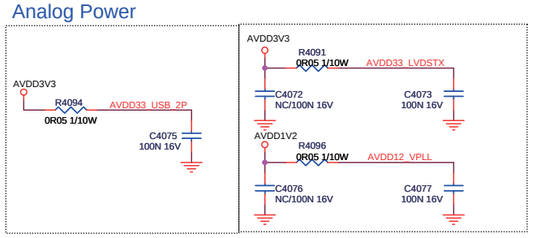
LVDS OUTPUT



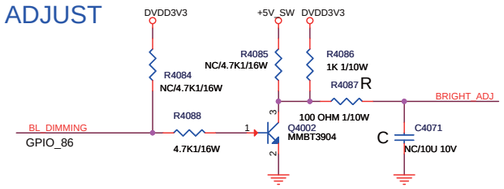
TCON-SIGNAL



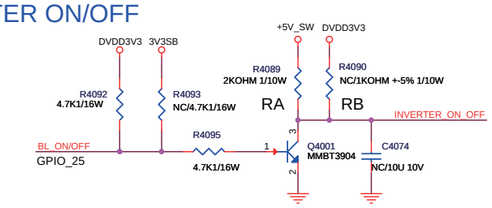
Analog Power



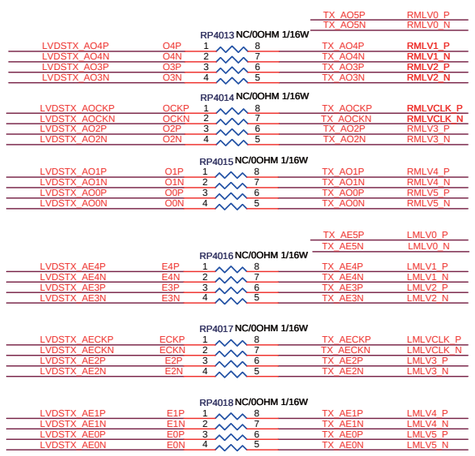
BRIGHT ADJUST



INVERTER ON/OFF



Mini LVDS



LVDS	715G4609	1 2011-03-18

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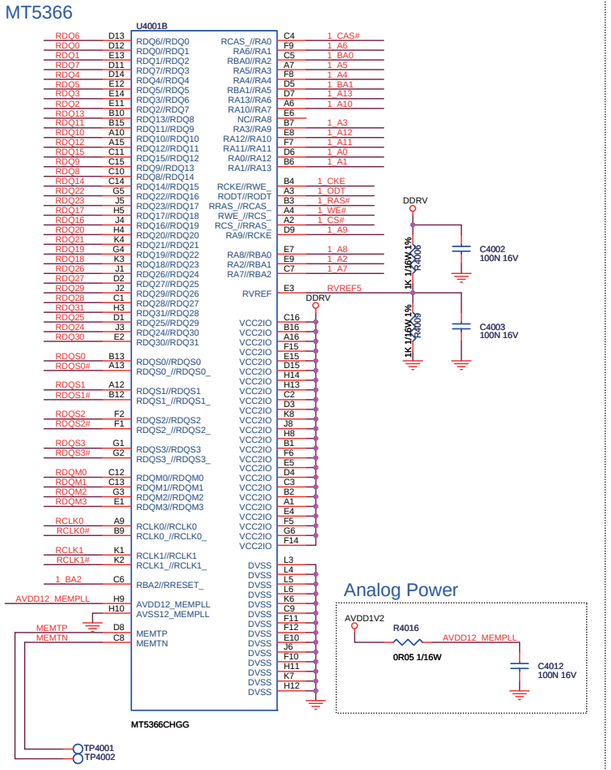
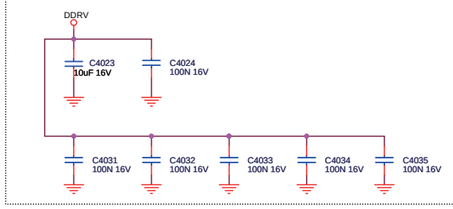
B11 DRAM Interface

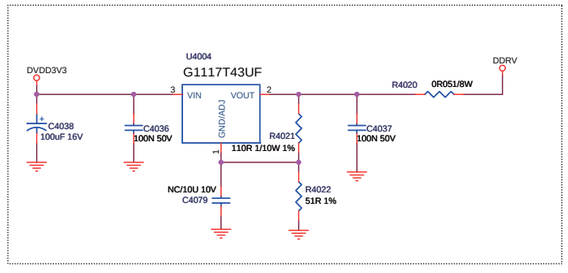
B11

MT5366

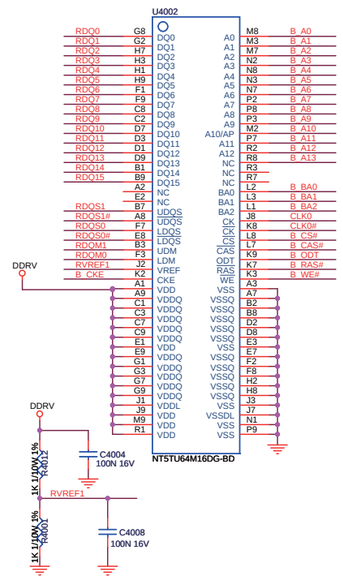


CAPs for DRAM IO Power (Close to MT5366)

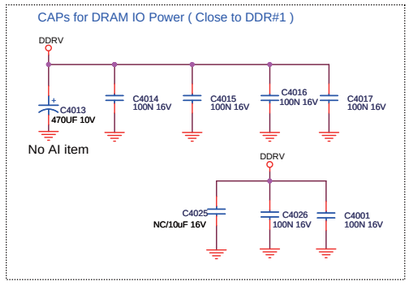




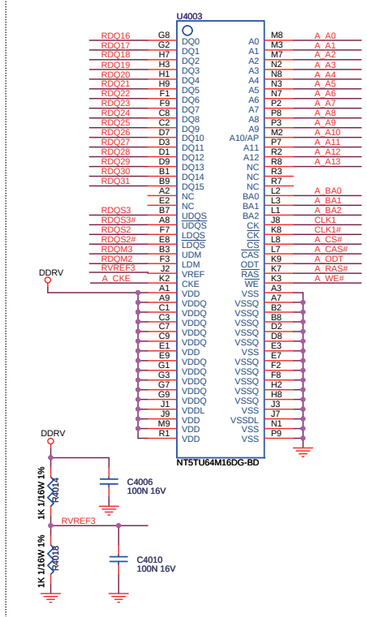
DDR2#1-64Mx16-1066MHz



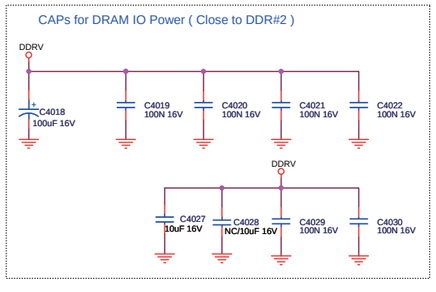
CAPs for DRAM IO Power (Close to DDR#1)



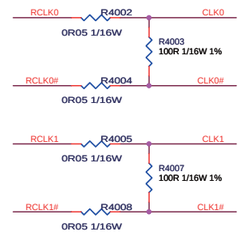
DDR2#2-64Mx16-1066MHz



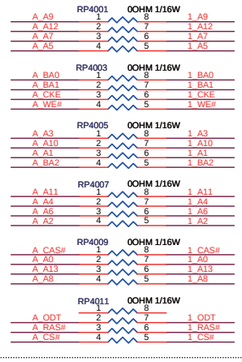
CAPs for DRAM IO Power (Close to DDR#2)



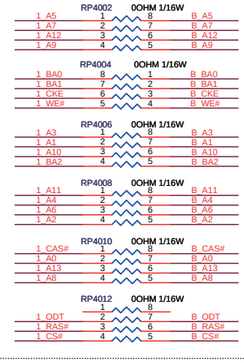
Damping and Termination for CLK



Damping for DDR#1 ADDR/CMD



Damping for DDR#2 ADDR/CMD



GND 2,3,4,5,6,7,8,9,10,11,13,14,15,16,17

DRAM Interface	715G4609	1 2011-03-18

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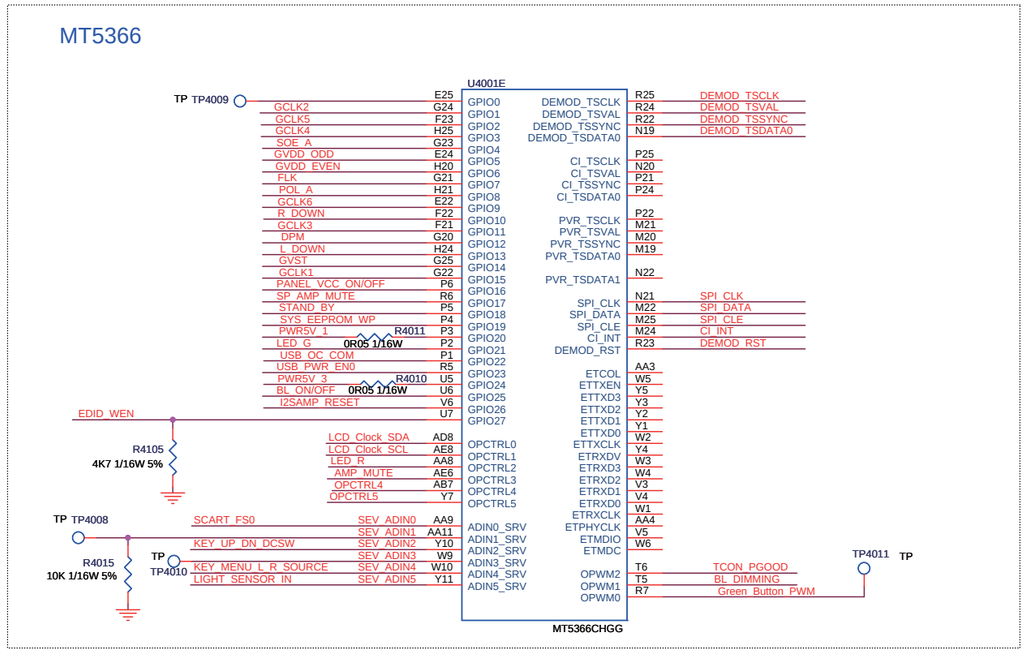
B12 GPIO

B12



DVBT Only

SPI_CLK — SPI_CLK 15
SPI_DATA — SPI_DATA 15
SPI_CLE — SPI_CLE 15
CI_INT — CI_INT 15

ATSC/DVBT Only

DEMOD_RST — DEMOD_RST 15
DEMOD_TSCLK — DEMOD_TSCLK 15
DEMOD_TSVAL — DEMOD_TSVAL 15
DEMOD_TSSYNC — DEMOD_TSSYNC 15
DEMOD_TSDATA0 — DEMOD_TSDATA0 15

SP_AMP_MUTE — SP_AMP_MUTE 6
EDID_WEN — EDID_WEN 10,14
I2SAMP_RESET — I2SAMP_RESET 7

SYS_EEPROM_WP — SYS_EEPROM_WP 4
PANEL_VCC_ON/OFF — PANEL_VCC_ON/OFF 3,17
BL_DIMMING — BL_DIMMING 11
BL_ON/OFF — BL_ON/OFF 11
LED_R — LED_R 5
LED_G — LED_G 5

STAND_BY — STAND_BY 2
KEY_UP_DN_DCSW — KEY_UP_DN_DCSW 5
KEY_MENU_L_R_SOURCE — KEY_MENU_L_R_SOURCE 5
USB_PWR_EN0 — USB_PWR_EN0 5
USB_OC_COM — USB_OC_COM 5

PWR5V_3 — PWR5V_3 14
PWR5V_1 — PWR5V_1 14
SCART_FS0 — SCART_FS0 9
OPCTRL4 — OPCTRL4 4
OPCTRL5 — OPCTRL5 4
LCD_Clock_SCL — LCD_Clock_SCL 5
LCD_Clock_SDA — LCD_Clock_SDA 5
TCON_PGOOD — TCON_PGOOD 17
Green_Button_PWM — Green_Button_PWM 5
DPM — DPM 17
FLK — FLK 17
POL_A — POL_A 17
SOE_A — SOE_A 17
GVDD_ODD — GVDD_ODD 17
GVDD_EVEN — GVDD_EVEN 17
GVST — GVST 17
GCLK1 — GCLK1 17
GCLK2 — GCLK2 17
GCLK3 — GCLK3 17
GCLK4 — GCLK4 17
GCLK5 — GCLK5 17
GCLK6 — GCLK6 17
LIGHT_SENSOR_IN — LIGHT_SENSOR_IN 5
AMP_MUTE — AMP_MUTE 7
L_DOWN — L_DOWN 17
R_DOWN — R_DOWN 17
GND — 2,3,4,5,6,7,8,9,10,11,12,14,15,16,17

GPIO	715G4609	1 2011-03-18

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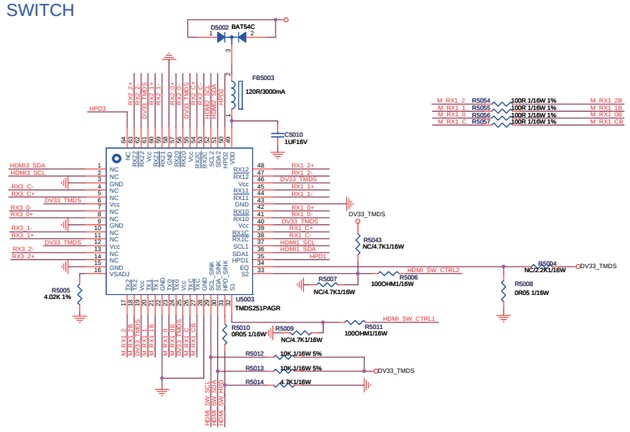
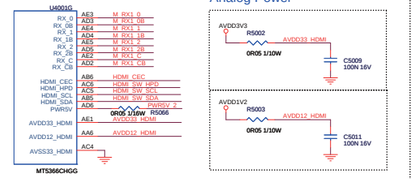
B13 HDMI Switch/Connector

B13

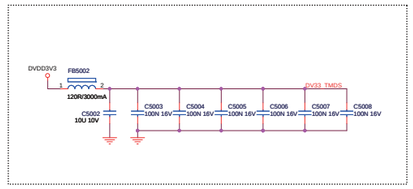
HDMI SWITCH

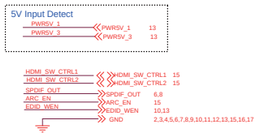


MT5366

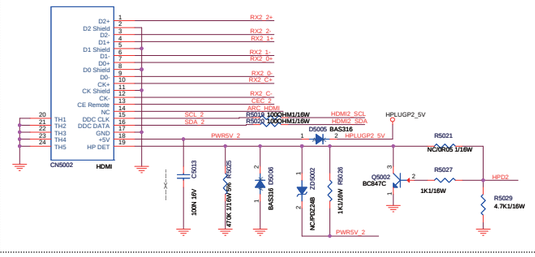


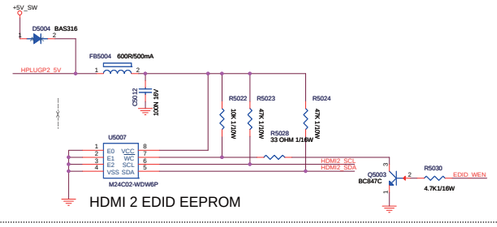
Analog Power





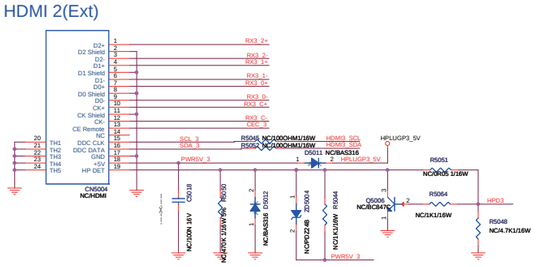
HDMI 1/Support ARC

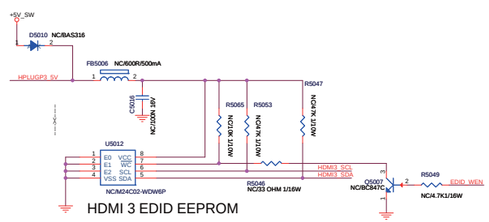




HDMI 2 EDID EEPROM

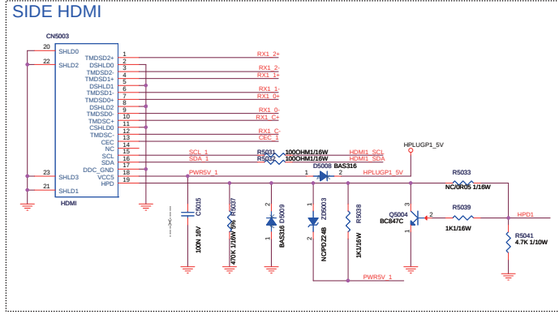
HDMI 2(Ext)

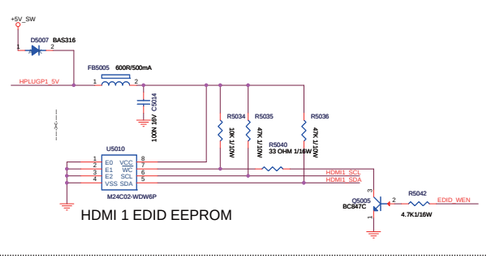




HDMI 3 EDID EEPROM

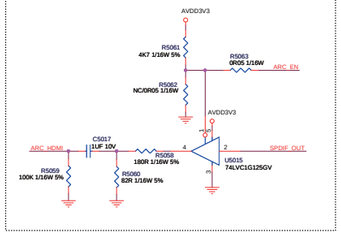
SIDE HDMI

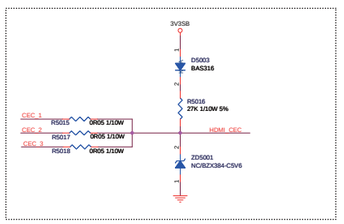




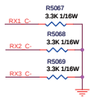
HDMI 1 EDID EEPROM

Audio Reture Channel (ARC)

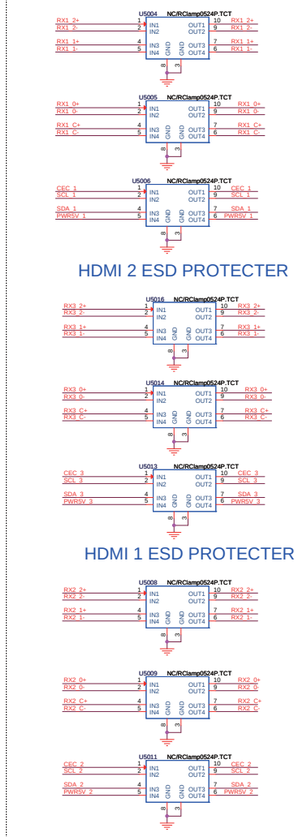




CLK pull down resistance



SIDE HDMI ESD PROTECTER



HDMI Switch/Connector	715G4609	1 2011-03-18

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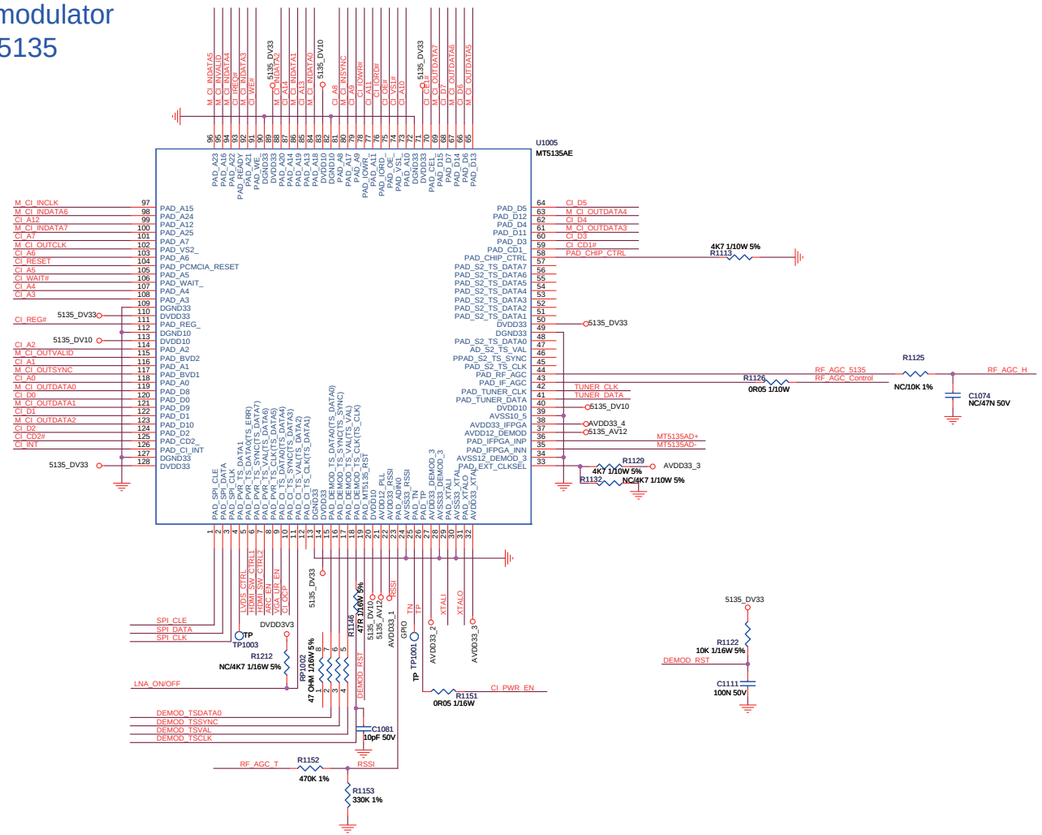
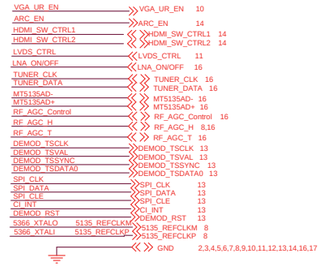
10-7-14 DVB T/C Demodulator MT5135

B14 DVB T/C Demodulator MT5135

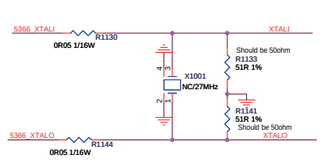
B14

Demodulator MT5135

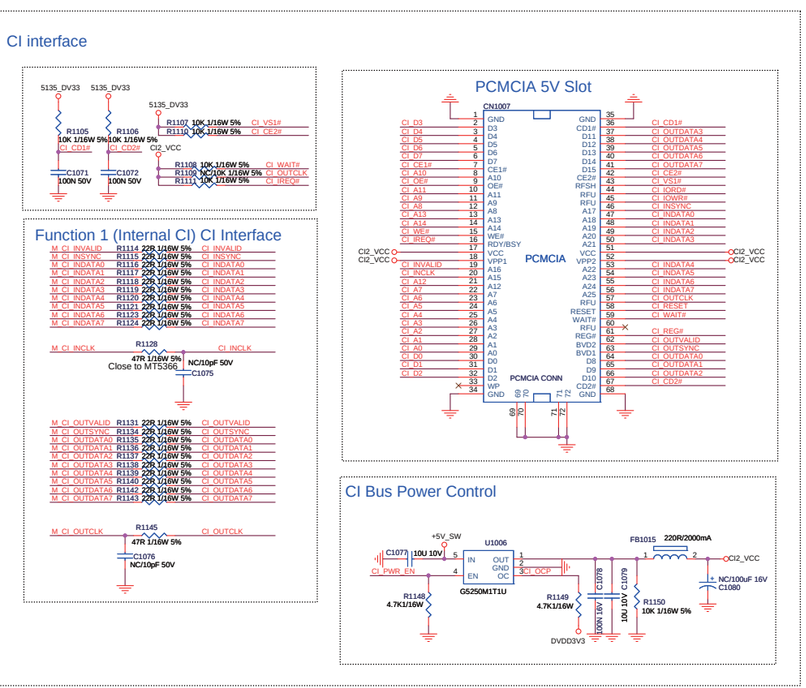


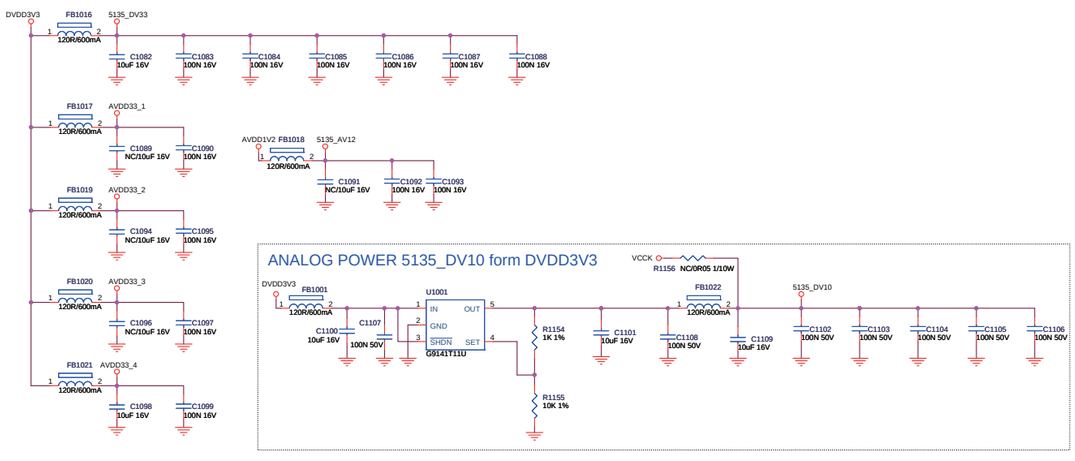


DEMODULATOR 27 MHz Crystal



CI interface





DVB T/C_Demodulator MT5135	715G4609	1 2011-03-18

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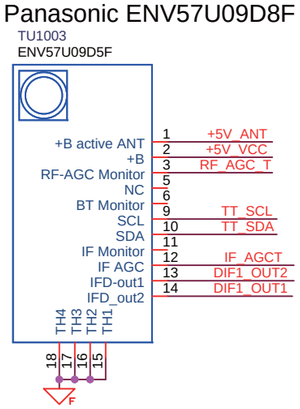
B15 DVB T/C Tuner

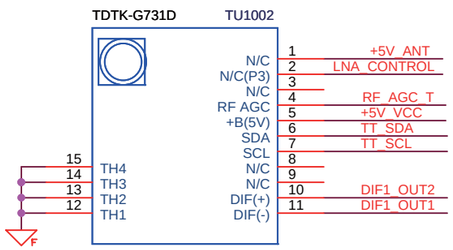
B15

Tuner

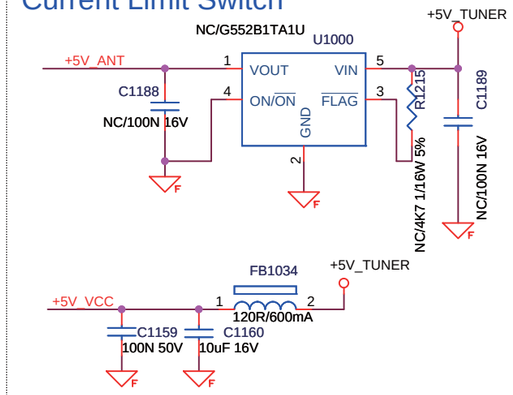
Panasonic ENV57U09D8F



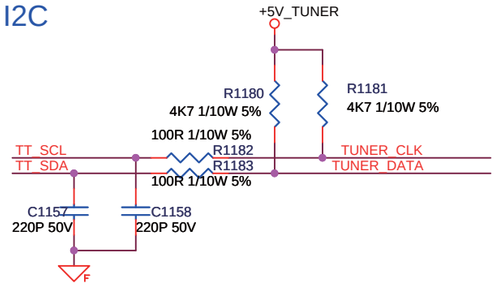
LG TDTK-G731(7mm)



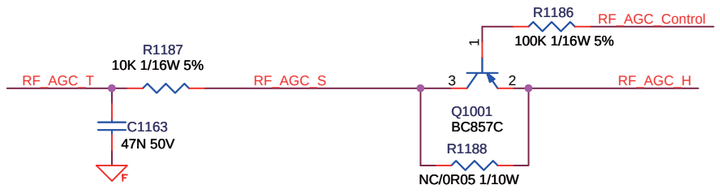
Current Limit Switch



I2C

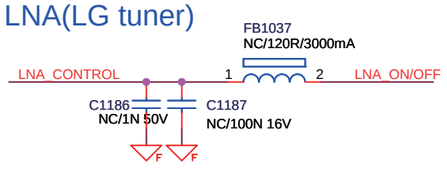


RF AGC

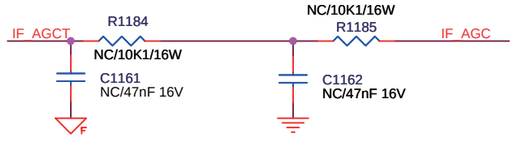


GND

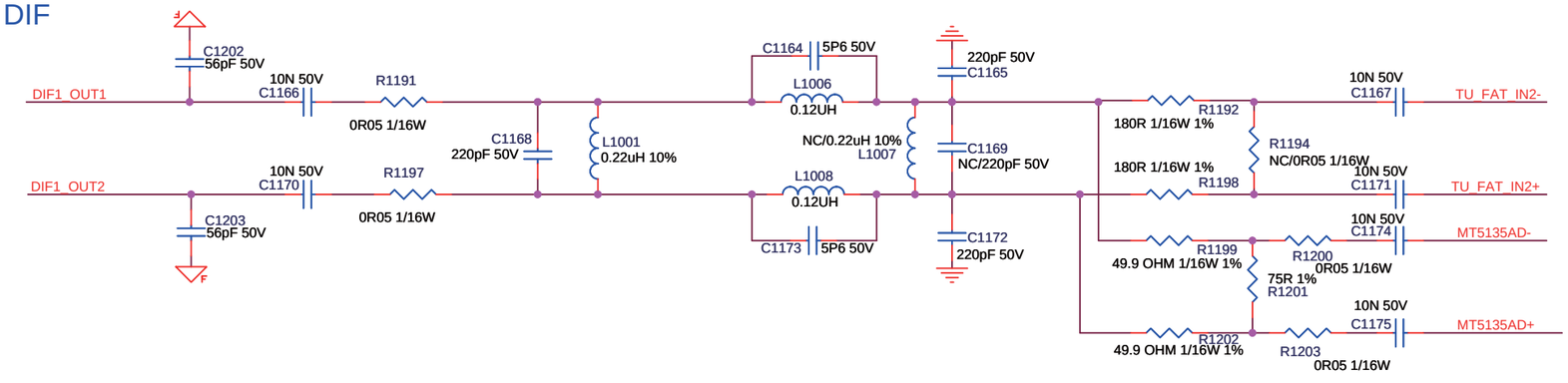
LNA(LG tuner)



IF AGC (Panasion tuner)



DIF



DVB T/C Tuner	715G4609	1 2011-03-18

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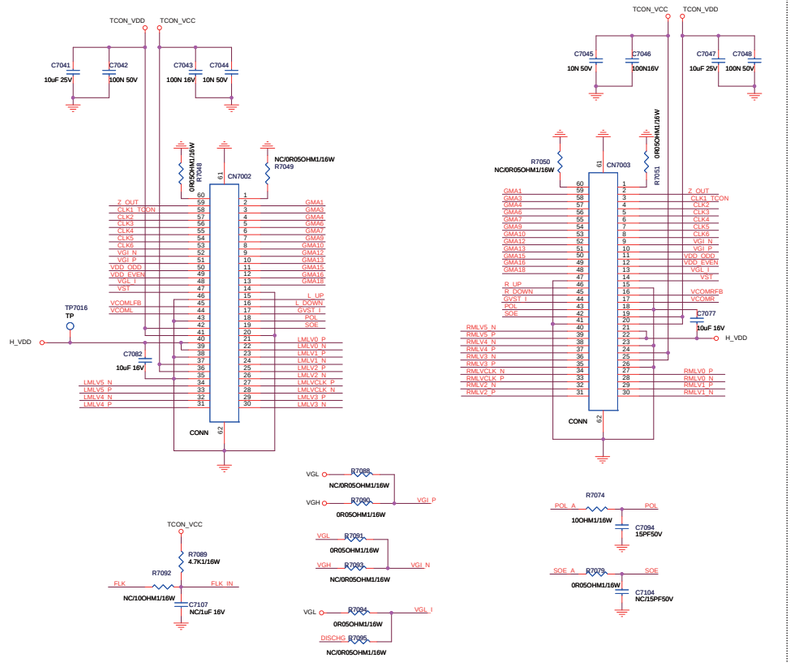
10-7-16 **T-con/Power block/Gamma**

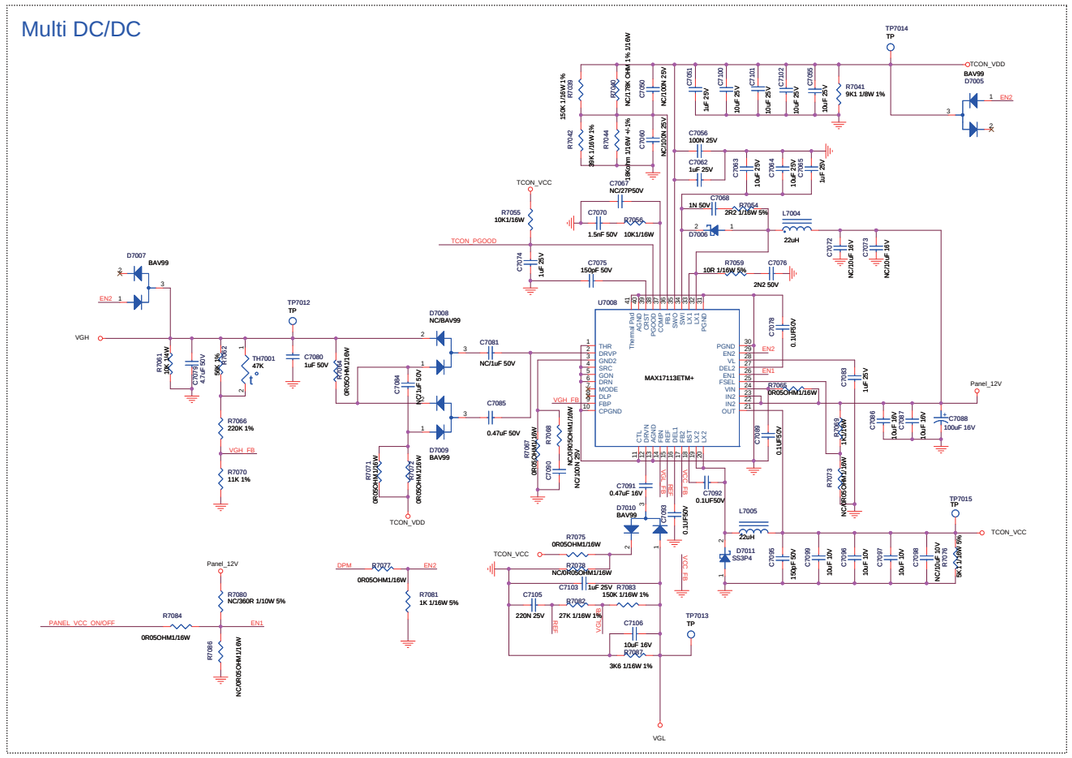
B16 TCON/POWER BLOCK/GAMMA

B16

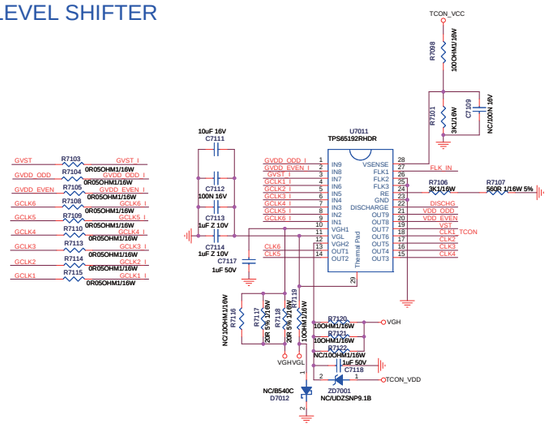
T-Con Connector



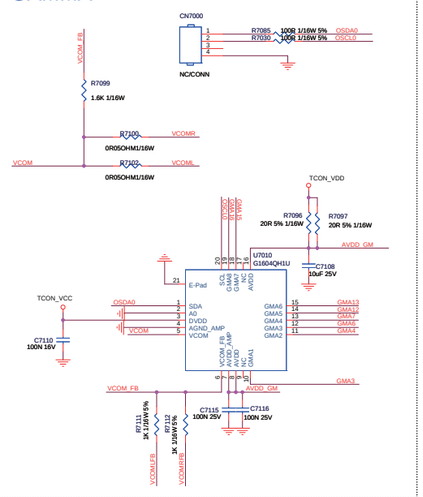
Multi DC/DC



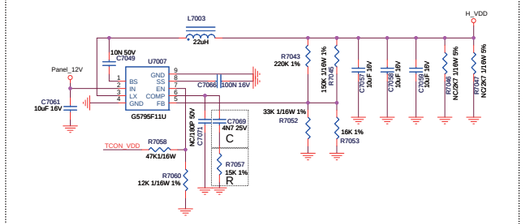
LEVEL SHIFTER



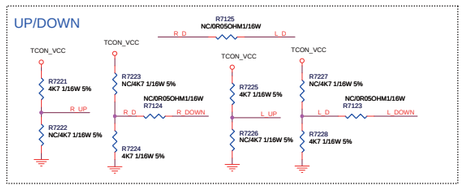
GAMMA

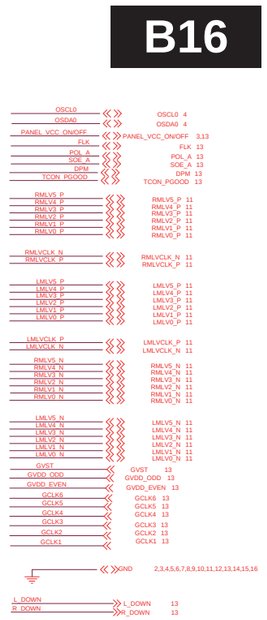


Half VDD from Panel_12V by TCON_VDD



UP/DOWN





TCON/POWER BLOCK/GAMMA	715G4609	1 2011-03-18

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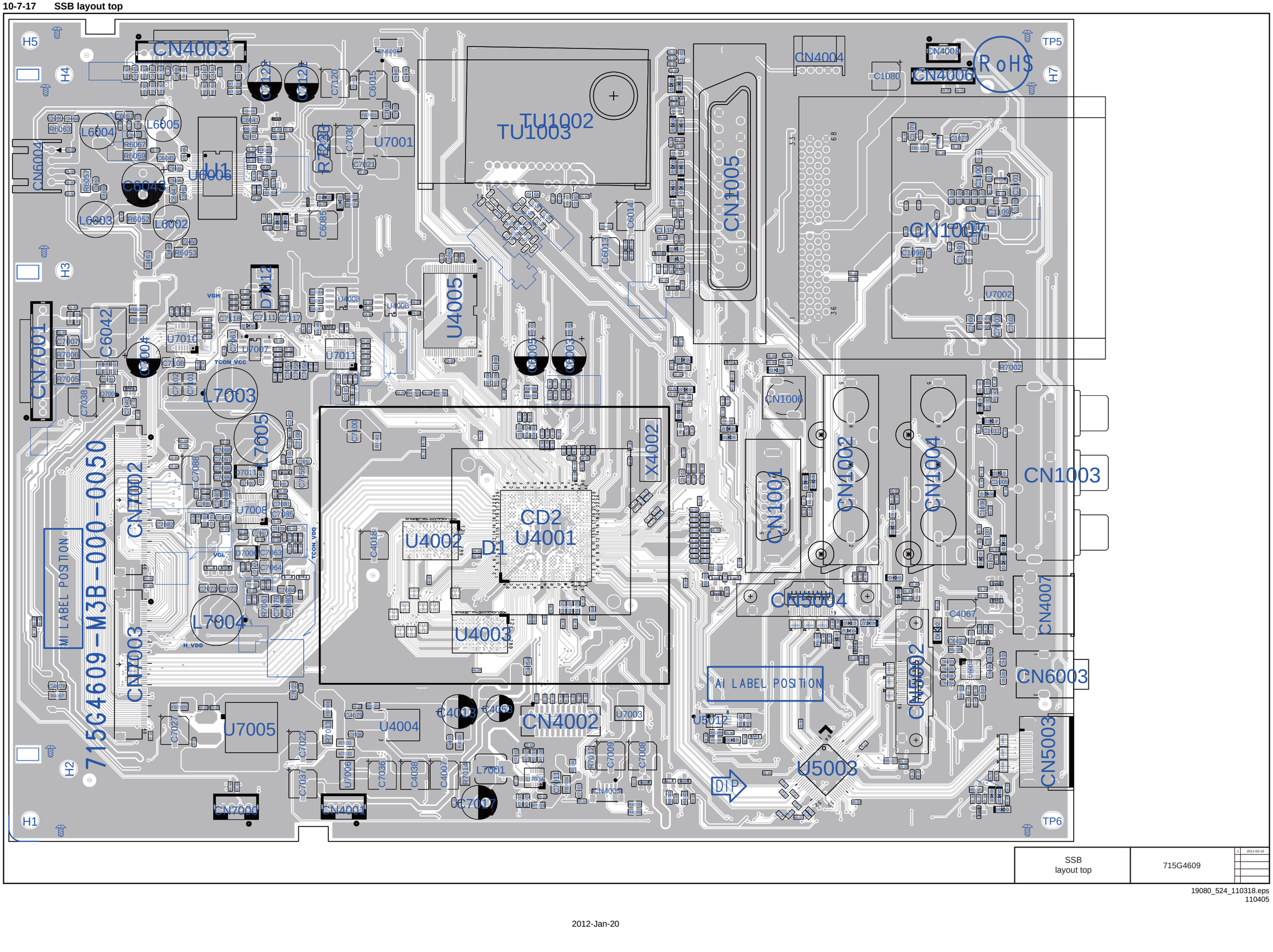
10-7-17 SSB layout top



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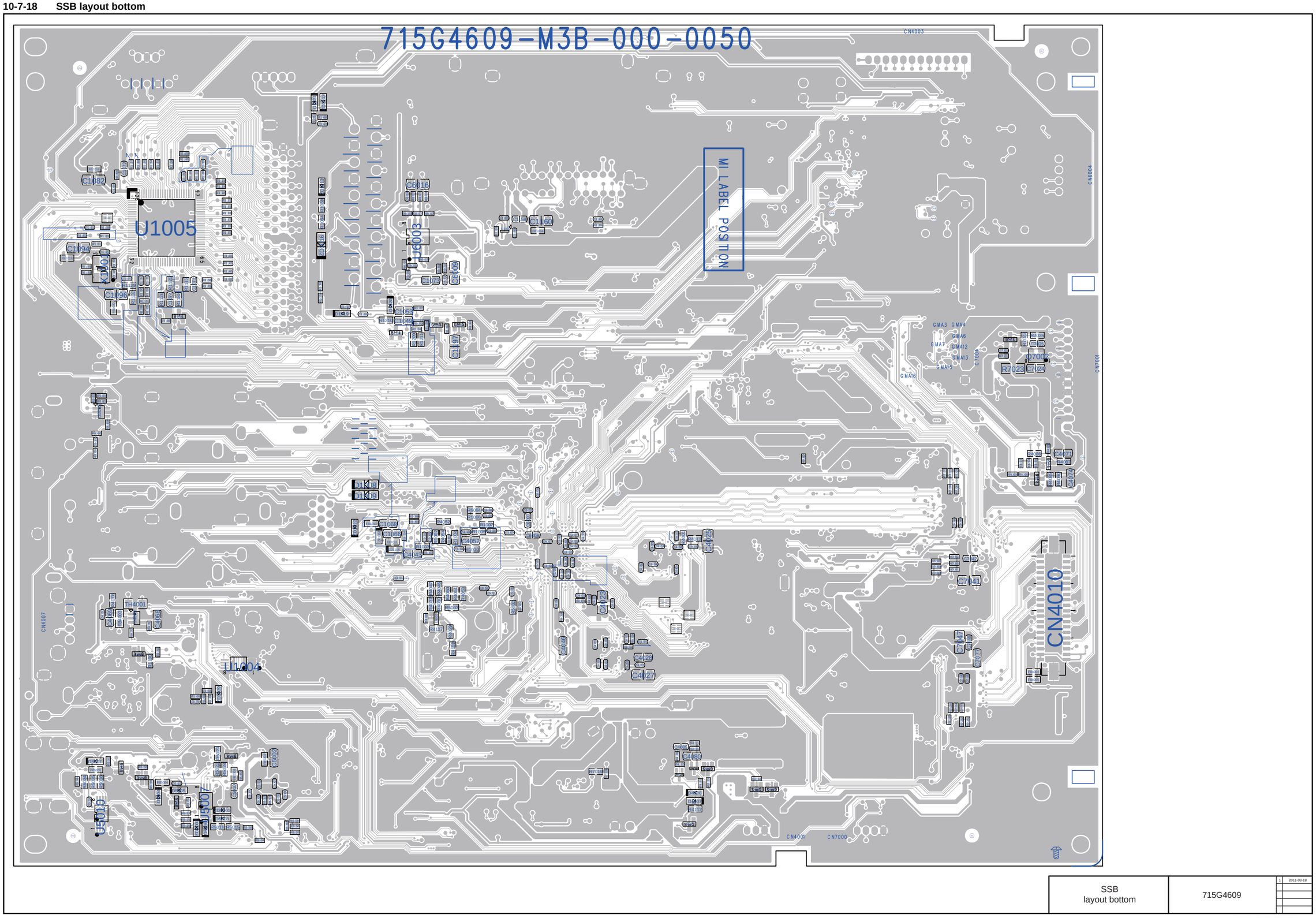
10-7-18 SSB layout bottom



SSB layout bottom	715G4609	1 2011-03-18

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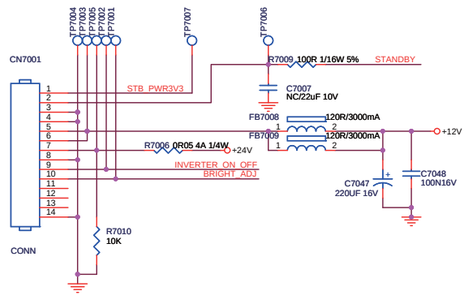
10.8 B 715G4722 SSB Berlinale
10-8-1 System Power 1

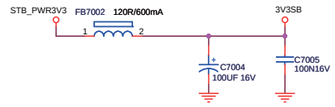
B01 System Power 1

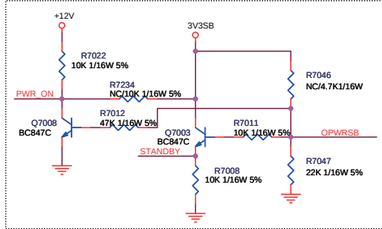
B01

DC POWER INPUT

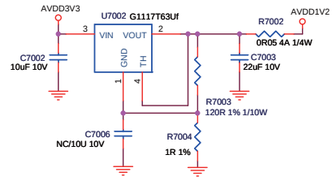


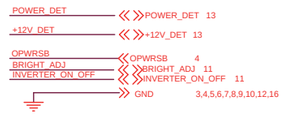
STANDBY POWER 3V3SB from STB_PWR3V3

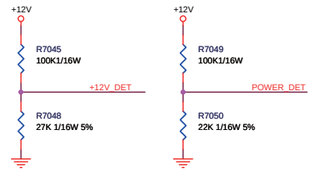




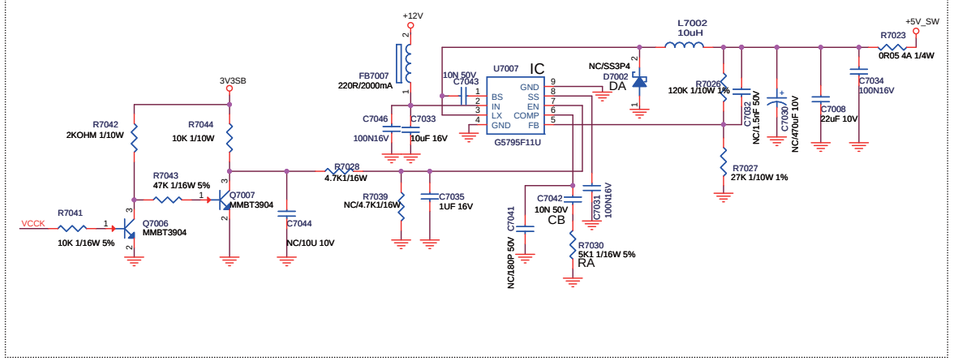
ANALOG POWER AVDD1V2 from AVDD3V3



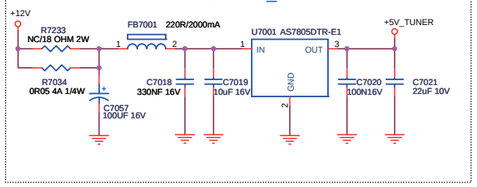




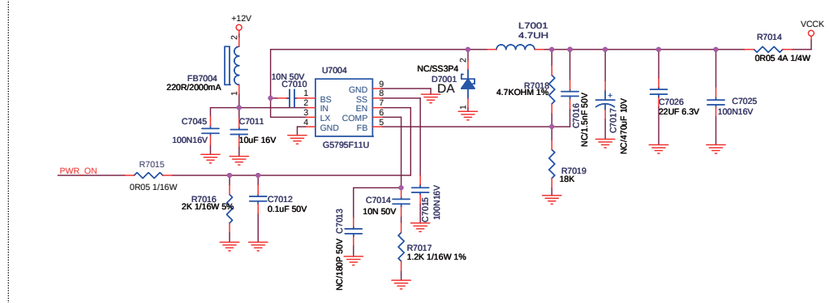
+12V to +5V_SW by VCCK

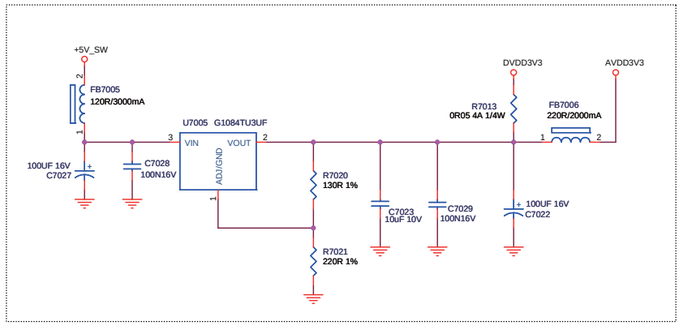


TUNER POWER +5V_TUNER from +12V



CORE POWER VCCK (1.12V/Max. 2.25A) from +12V by PWR_ON





System Power 1	715G4722	18 2011-03-19

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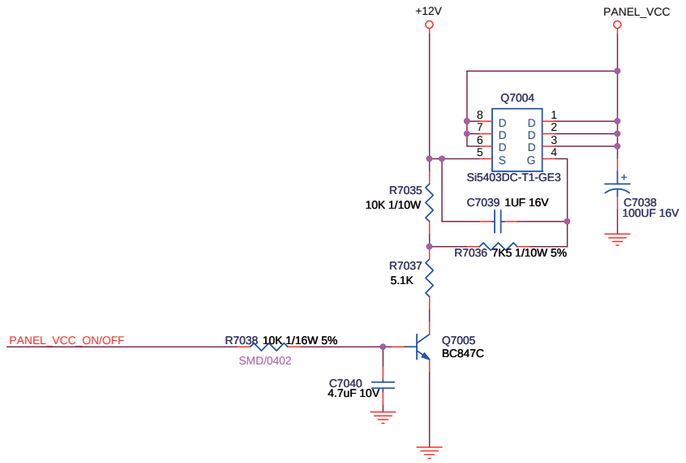
10-8-2 System Power 2

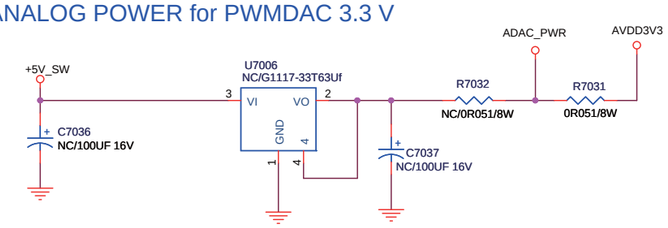
B02 System Power 2

B02

PANEL POWER PANEL_VCC from +12 V



ANALOG POWER for PWMDAC 3.3 V



System Power 2	715G4722	18 2011-03-19

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10-8-3 Peripheral

B03 Peripheral

B03

MT5366

U4001A

JTCK R4 JTDI T1 JTDO R3 JTMS T3 JTRST# T2 → JTCK JTDI JTDO JTMS JTRST_

OSDA0 J22 OSCL0 J23 → OSDA0 OSCL0

OSDA1 U4 OSCL1 U3 → OSDA1 OSCL1

OSDA2 T22 OSCL2 T23 → OSDA2 OSCL2

OXTALI AE19 OXTALO AD19 → XTALI XTALO

AVDD33_XTAL_STB AC18 AE18 → AVDD33_XTAL_STB AVSS33_XTAL_STB

AVDD33_REG_STB AA7 W8 → AVDD33_VGA_STB AVSS33_VGA_STB

AVDD12_PLL AB15 AA17 → AVDD12_PLL AVSS12_PLL

AVDD10_LDO AA12 → AVDD10_LDO

A25 B25 Y21 V22 AB22 AA23 AB23 AC23 AB24 AA20 Y20 W20 V19 W19 M9 H6 N9 L12 L13 L14 P9 R10 W21 AC24 AB25 M11 M12 M13 M14 M15 M16 N11 N12 N13 N14 N15 N16 P11 P12 P13 P14 P15 P16 R11 R12 R13 R14 K12 K13 M10 N10 P10 K14 K17 L17 N17 P17 W17 V19 → DVSS

U0TX AB8 AC7 U0RX → U0TX U0RX

U1RX U2 U1 U1TX → TCON_I2C_ON_OFF KEY_I2C_ON_OFF

TP4024 TP TP4025 TP

DVDD3V3

POWE_ K21 POE0_ K22 POCE1 J21 POCE0_ K23 PDD7 L23 PDD6 L24 PDD5 L26 PDD4 K20 PDD3 K19 PDD2 L22 PDD1 M23 PDD0 J20 PARB_ J24 PACLE J25 PAALE → POWE# POCE1# POCE0# PDD7 PDD6 PDD5 PDD4 PDD3 PDD2 PDD1 PDD0 PARB# PACLE PAALE

OPWRSB AB9 → OPWRSB

ORESET_ Y8 → ORESET#

OIRI AC8 → RC6

FSRC_WR E23 → FSRC_WR

VCC3IO T8 M18 H19 V8 U8 N18

VCCK M1 M2 M3 M4 M5 N1 N2 N3 N4 N5 N6 K10 K11 K9 L9 R9 K15 K16 L10 T9 T10 T11 T12 T13 T14 T15 T16 L11 L15 R15 L16 R16 R17 T17

MT5366CHGG

10K 1/10W R4023

4.7K 1/10W 5% R4107 R4108

4.7K1/16W R4028

3V3SB R4104 1.3K 1% C4043 4.7uF 10V

C4042 1uF 16V

NAND Flash

U4005

NC NC NC NC NC NC NC NC NC NC NC NC NC NC NC NC NC NC NC NC NC NC NC NC

I/O7 I/O6 I/O5 I/O4 I/O3 I/O2 I/O1 I/O0

CE RE WP ALE CLE VDD VSS

PDD7 PDD6 PDD5 PDD4 PDD3 PDD2 PDD1 PDD0 VDD_NAND PACLE PAALE POWE# Flash_WP# PARB#

NAND01GW3B2CN6E

NAND 128MB

330R 1/16W 5% R4025 R4027 4.7K/16W

C4040 100N16V C4041 100N16V

Reset IC

3V3SB R4030 0R05 1/10W U4007 GND Vcc RESET AZ809ANSTR-E1 R4038 100K1/16W

TCON_SCL 11,17 TCON_SDA 11,17 OSDA1 7 OSCL1 7 RC6 5 U0TX 5,10 U0RX 5,10 OPWRSB 2 OPCTRL4 13 OPCTRL5 13 AOSDATA1 6 SYS_EEPROM_WP 13 GND 2,3,5,6,7,8,9,10,12,16

OSDA0 14 OSCL0 14 KEY_SDA 5 KEY_SCL 5

Serial Flash

DVDD3V3 R4026 4.7K1/16W R4100 4.7K1/16W R4103 4.7K1/16W R4024 4.7K1/16W

U4006 CE VCC SO HOLD WP SCK GND SI

POCE0# PDD7 Flash_WP# POOE# PDD6

NC/MX25L4005AMI-12G C4039 NC/100N16V

CN4002

TVTREF#1 JTRST# JTDI JTMS JTCK JTDO R4039 33 OHM 1/16W JTAG_DBGRQ JTAG_DBGACK

10K 1/16W 5% R4031 R4032 R4033 R4034 R4035 R4036 1K 1/16W 5%

R4040 10K 1/16W 5% R4041 10K 1/16W 5%

NC/CONN

TCON_I2C ON_OFF

TCON_I2C_ON_OFF TCON_SCL Q4150 2N7002 Q4156 2N7002 OSCL0

TCON_SDA Q4151 2N7002 Q4157 2N7002 OSDA0 C4161 NC/10uF 10V R4230 NC/100K 1/16W 5%

KEY_I2C ON_OFF

KEY_I2C_ON_OFF KEY_SCL Q4158 2N7002 Q4159 2N7002 OSCL0

KEY_SDA Q4160 2N7002 Q4161 2N7002 OSDA0 C4162 NC/10uF 10V R4231 NC/100K 1/16W 5%

SYSTEM EEPROM

SYS_EEPROM_WP R4045 NC/0R05 1/10W R4102 10K 1/16W 5% Q4003 BC847C R4013 4K7 1/16W 1%

R4042 4K7 1/10W 5% DVDD3V3 R4043 4K7 1/10W 5% R4044 4K7 1/10W 5%

OSCL0 OSDA0

U4008 VCC A0 WP A1 SCL A2 SDA VSS

AT24C128BN-SH-T

27 MHz CRYSTAL

X4002 27MHz OXTALI OXTALO C4045 27P 50V C4044 27P 50V

2nd I2C

DVDD3V3 DVDD3V3 R4048 4K7 1/10W 5% R4049 4K7 1/10W 5% OSDA1 OSCL1

3rd I2C

DVDD3V3 DVDD3V3 R4057 4K7 1/10W 5% R4058 4K7 1/10W 5% OSDA2 OSCL2

STRAPPING

3V3SB R4046 NC/10K 1/10W 5% OPCTRL5 R4047 10K 1/10W

R4050 NC/10K 1/10W 5% OPCTRL4 R4051 10K 1/10W

DVDD3V3 R4055 10K 1/10W 5% AOSDATA1 R4056 NC/10K 1/10W

3.3V IO Power

DVDD3V3 C4046 4.7uF 10V C4047 100N16V C4048 100N16V

Analog Power

3V3SB R4052 0R05 1/10W C4052 10uF 10V C4049 100N16V

3V3SB R4053 0R05 1/10W AVDD33_REG_STB C4050 100N16V

AVDD1V2 R4054 0R05 1/10W AVDD12_PLL C4051 100N16V

Core Power

VCCK C4053 NC/100UF 25V C4054 4.7uF 10V C4055 100N16V C4056 100N16V C4057 100N16V C4058 100N16V C4059 100N16V C4060 100N16V

Peripheral	715G4722	18	2011-03-19

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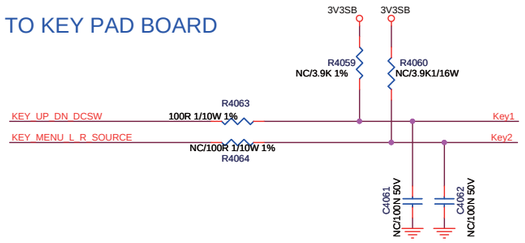
10-8-4 Connector/USB/RS232

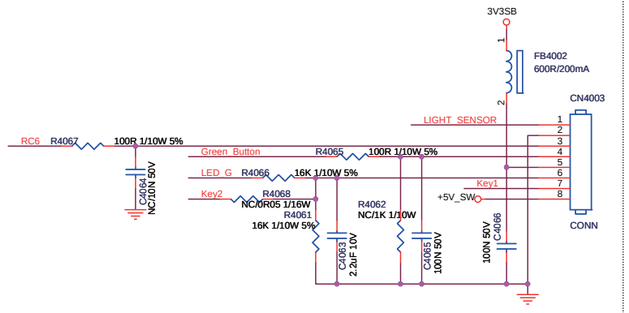
B04 Connector/USB/RS232

B04

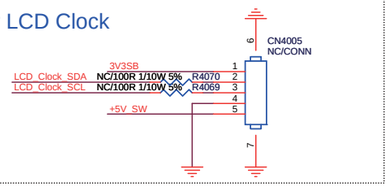
TO KEY PAD BOARD

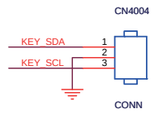


TO IR/KEY BOARD

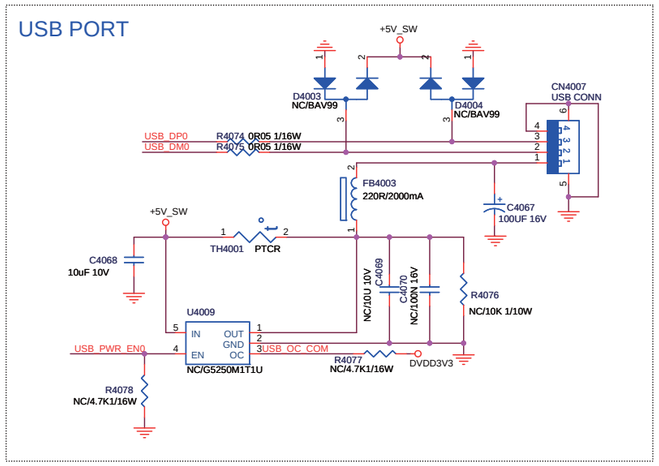


For LCD Clock

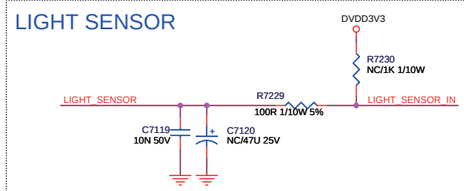




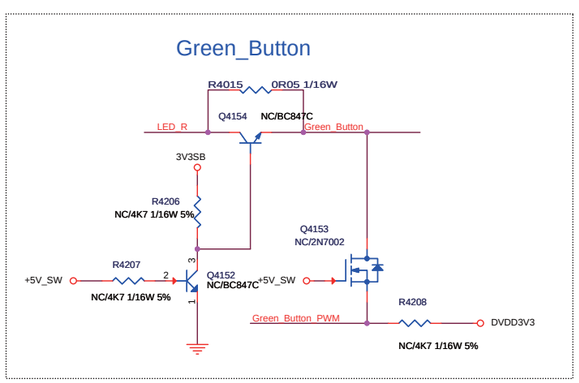
USB PORT

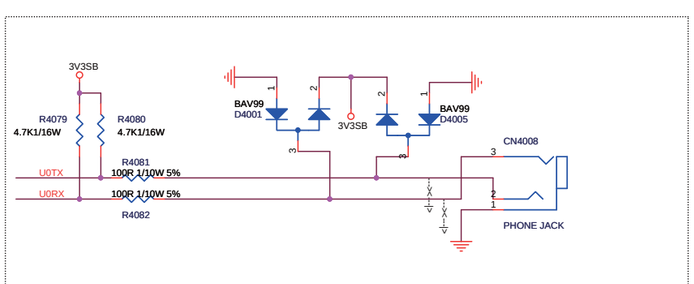


LIGHT SENSOR



Green_Button





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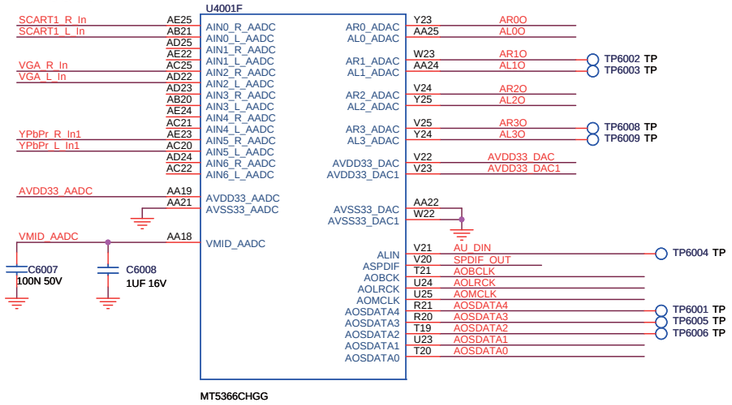
10-8-5 Audio IO/SPDIF/Headphone

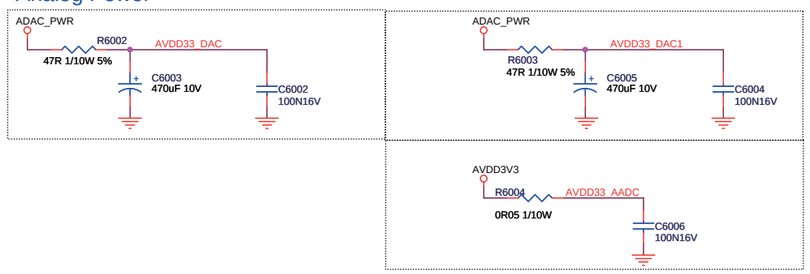
B05 Audio IO/SPDIF/Headphone

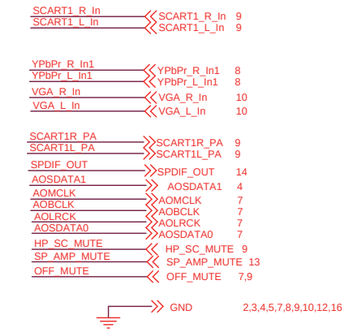
B05

MT5366

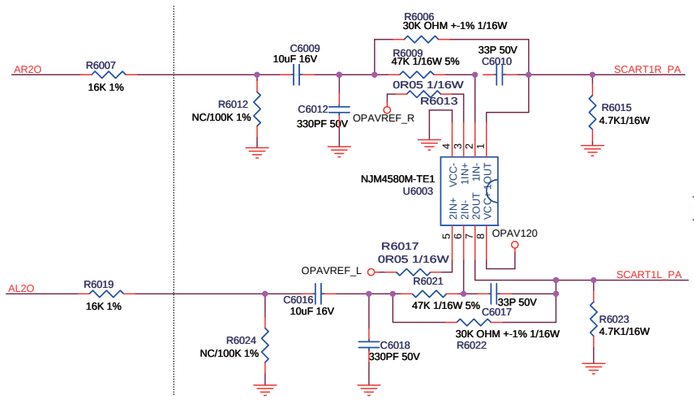


Analog Power

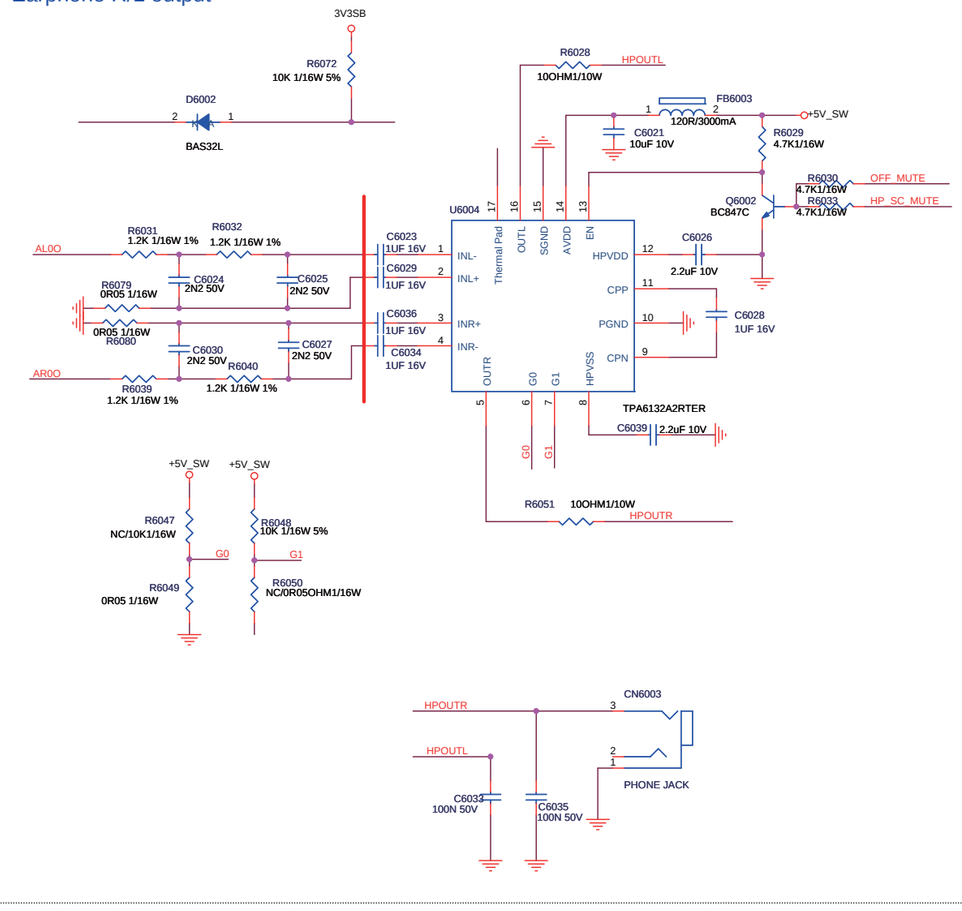




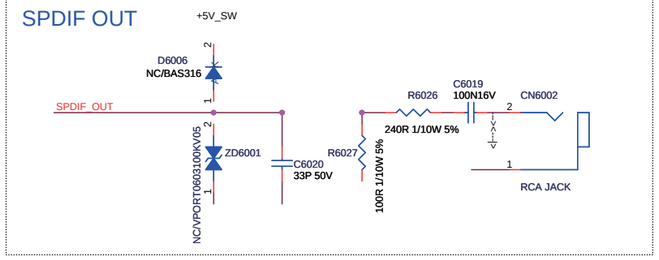
SCT Audio Out



Earphone R/L output



SPDIF OUT



Audio IO/SPDIF/Headphone	715G4722	2011-03-19

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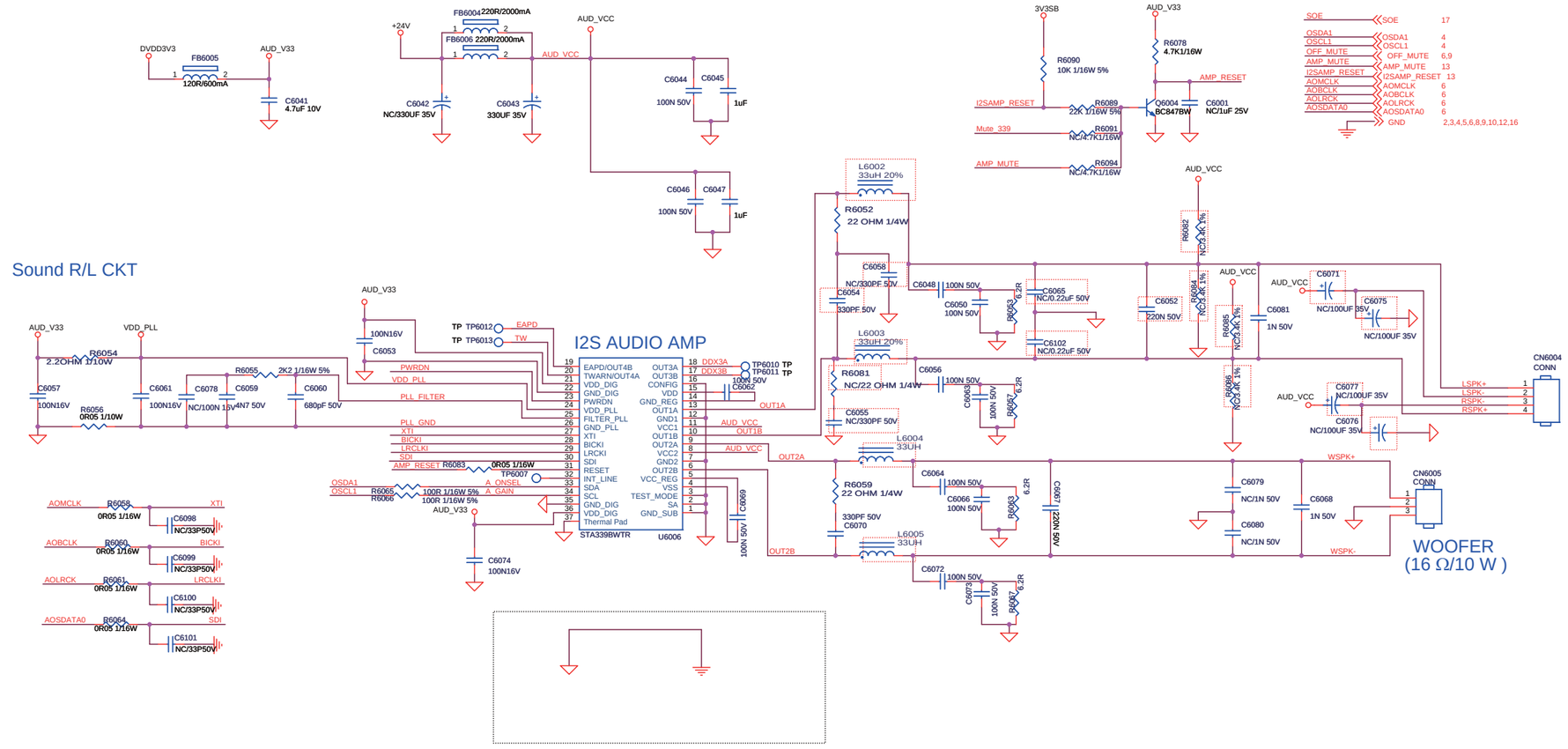
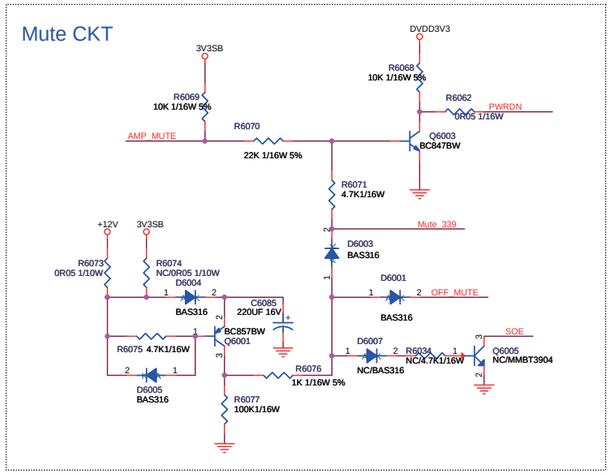
10-8-6 Speaker/Sound woofer

B06 Speaker/Sound woofer

B06





Speaker/Sound woofer	715G4722	10 2011-03-19

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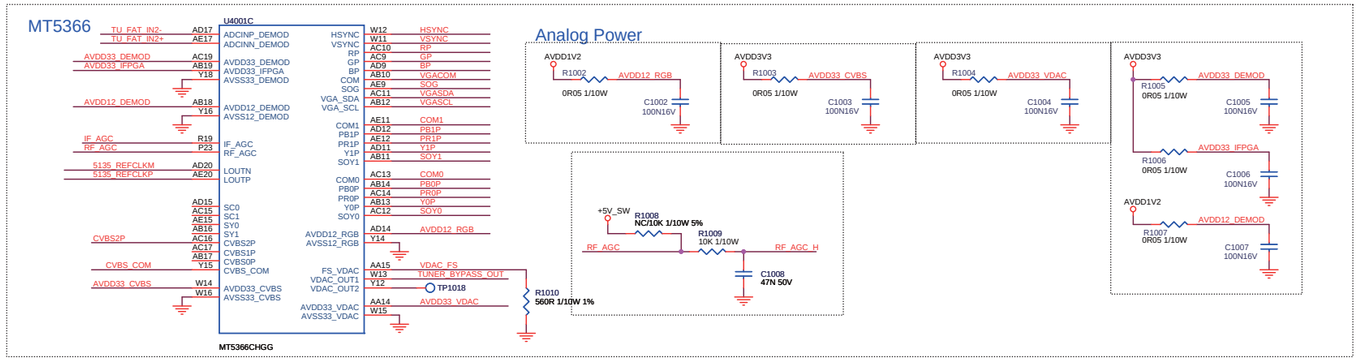
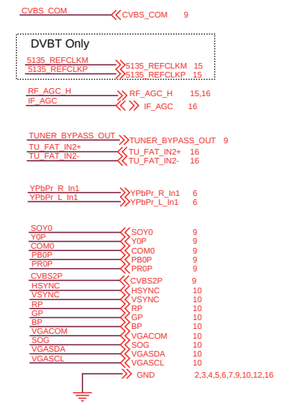
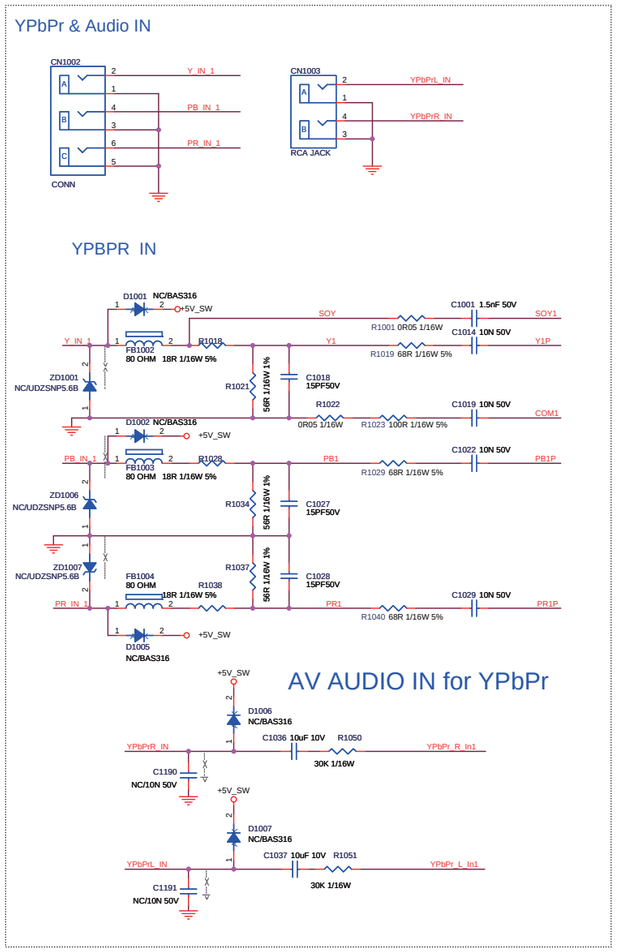
10-8-7 Video IO/YPbPr

B07 Video IO/YPbPr

B07







Video IO/YPbPr	715G4722	18 2011-03-19

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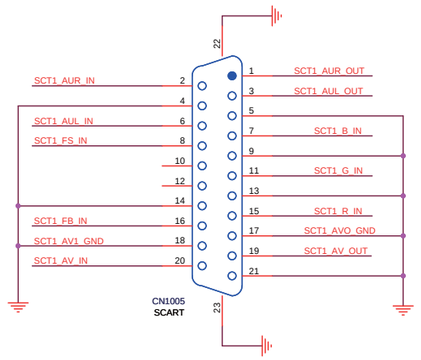
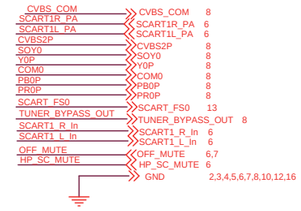
10-8-8 Scart

B08 SCART

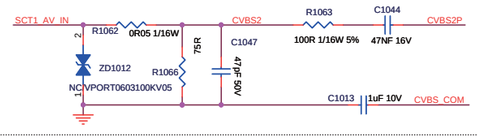
B08

SCART (Full SCART) -- CVBS+SV+RGB+TV OUT

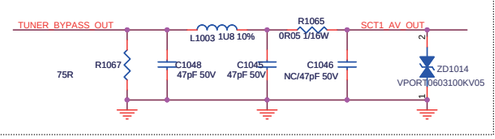




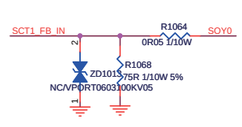
CVBS IN



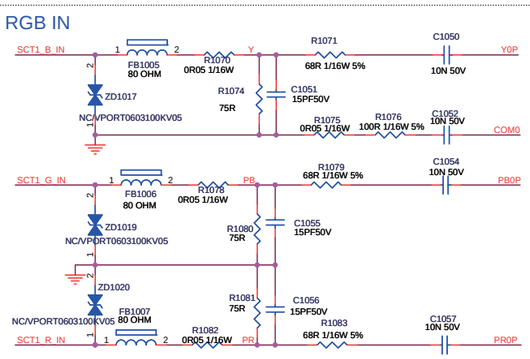
CVBS OUT



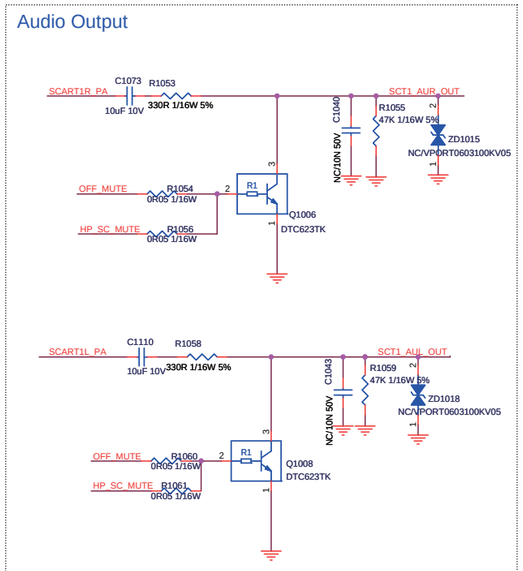
FAST BLANKING/SOY



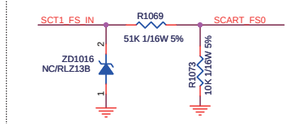
RGB IN



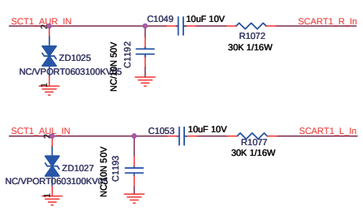
Audio Output



Function Select



Audio Input



SCART	715G4722	18 2011-03-19

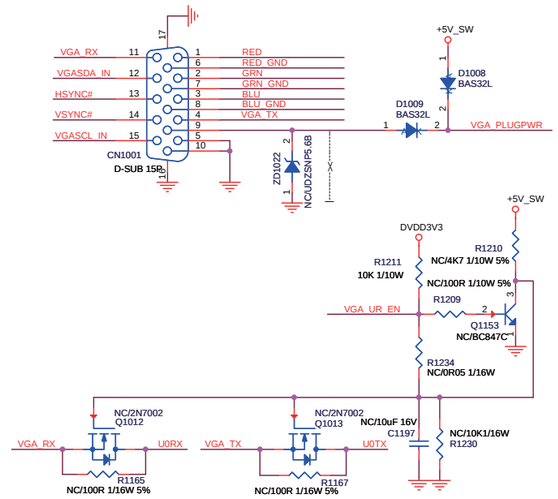
19080_539_110319.eps
110331

10-8-9 VGA Input

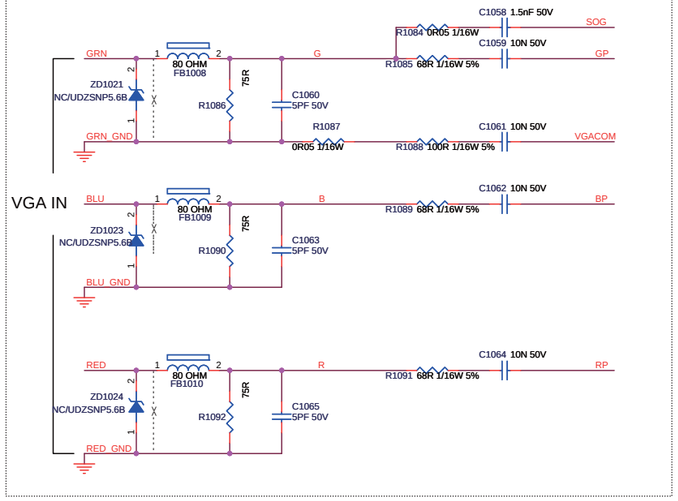
B09 VGA Input

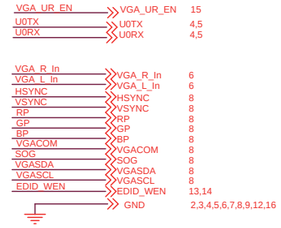
B09

VGA Input

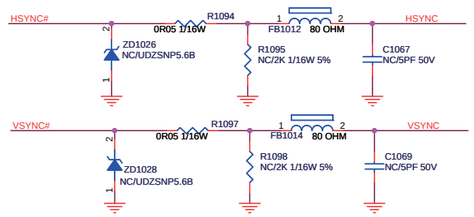


VGA IN

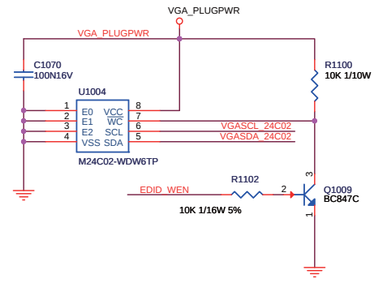




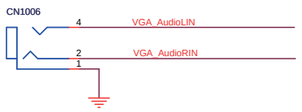
VGA SYNC SLICER



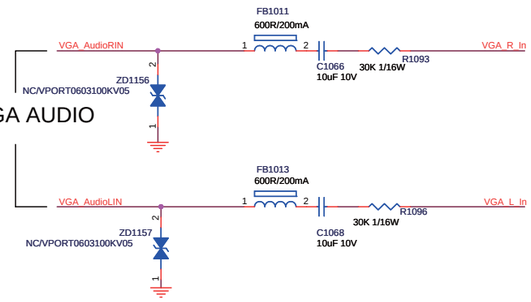
VGA EDID



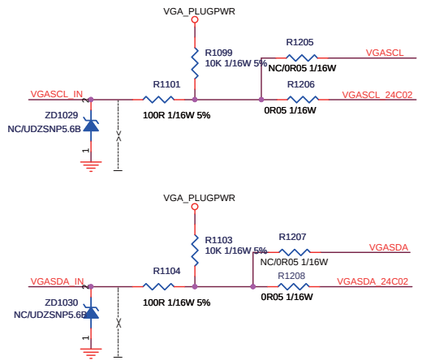
VGA Audio Input



VGA AUDIO



VGA I2C



VGA Input	715G4722	1B 2011-03-19

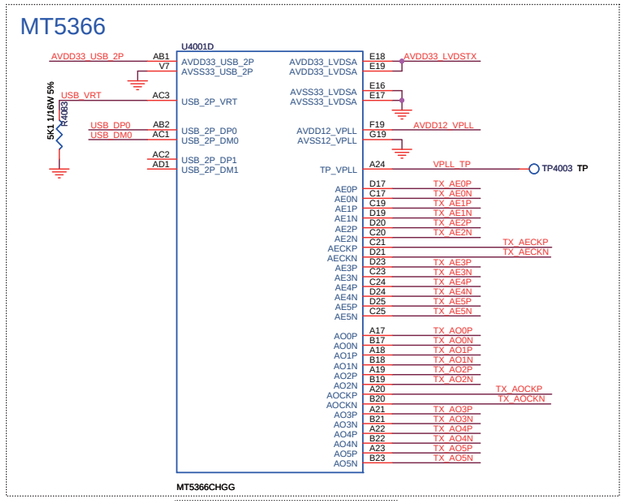
19080_540_110319.eps
110331

10-8-10 LVDS

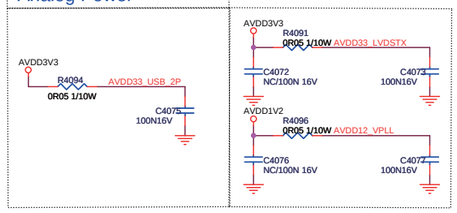
B10 LVDS

B10

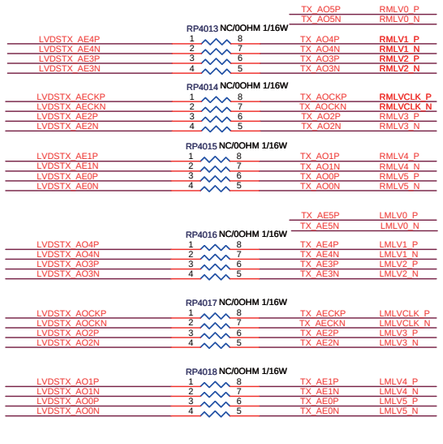
MT5366



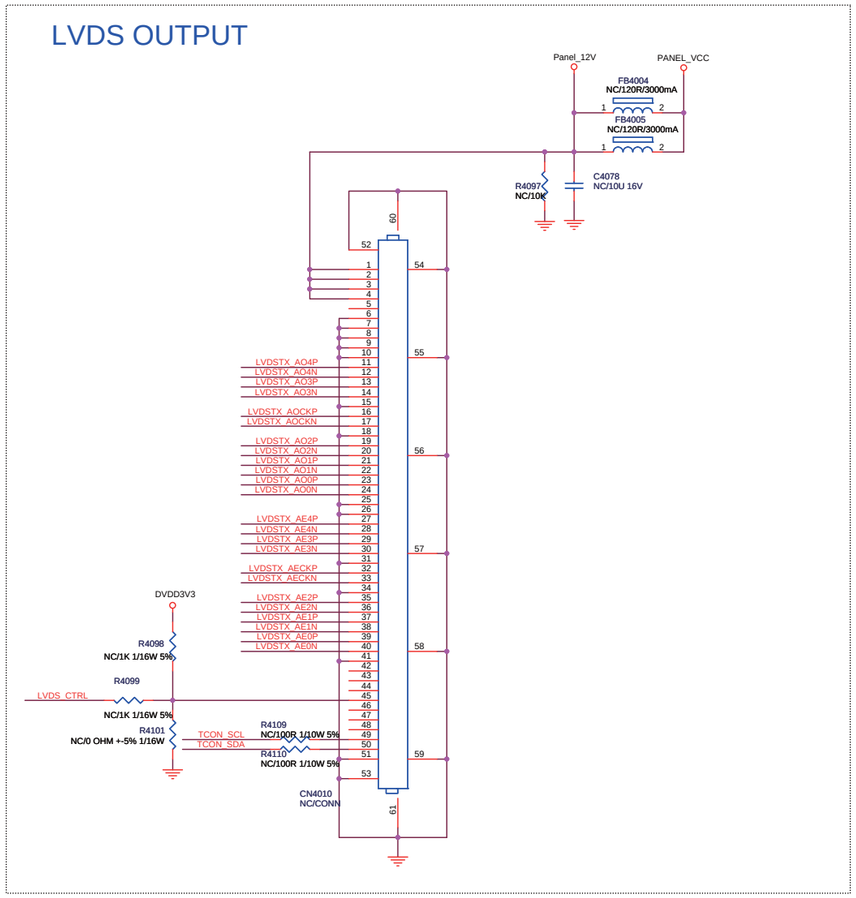
Analog Power

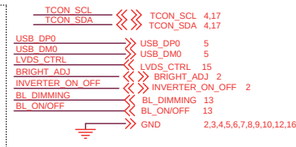


Mini LVDS

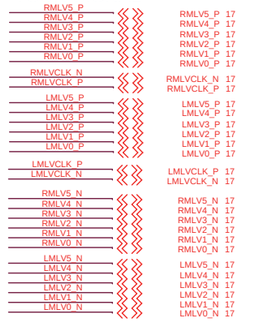


LVDS OUTPUT

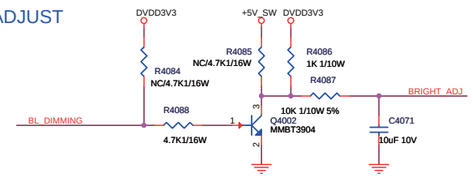




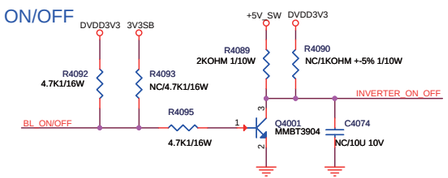
TCON-SIGNAL



BRIGHT ADJUST



INVERTER ON/OFF



LVDS	715G4722	18 2011-03-19

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110405

B11 DRAM Interface

B11

MT5366

U4001B

MT5366CHGG

Analog Power

DDR2#1-64Mx16-1066MHz

U4002

K4T1G164QF-BCF8

DDR2#2-64Mx16-1066MHz

U4003

K4T1G164QF-BCF8

Damping and Termination for CLK

Damping for DDR#1 ADDR/CMD

Damping for DDR#2 ADDR/CMD

CAPs for DRAM IO Power

CAPs for DRAM IO Power

CAPs for DRAM IO Power (

DDR2_DDRV= 1.8V

U4004 G1117T43UF

GND 2,3,4,5,6,7,8,9,10,16

DRAM Interface	715G4722	18 2011-03-19

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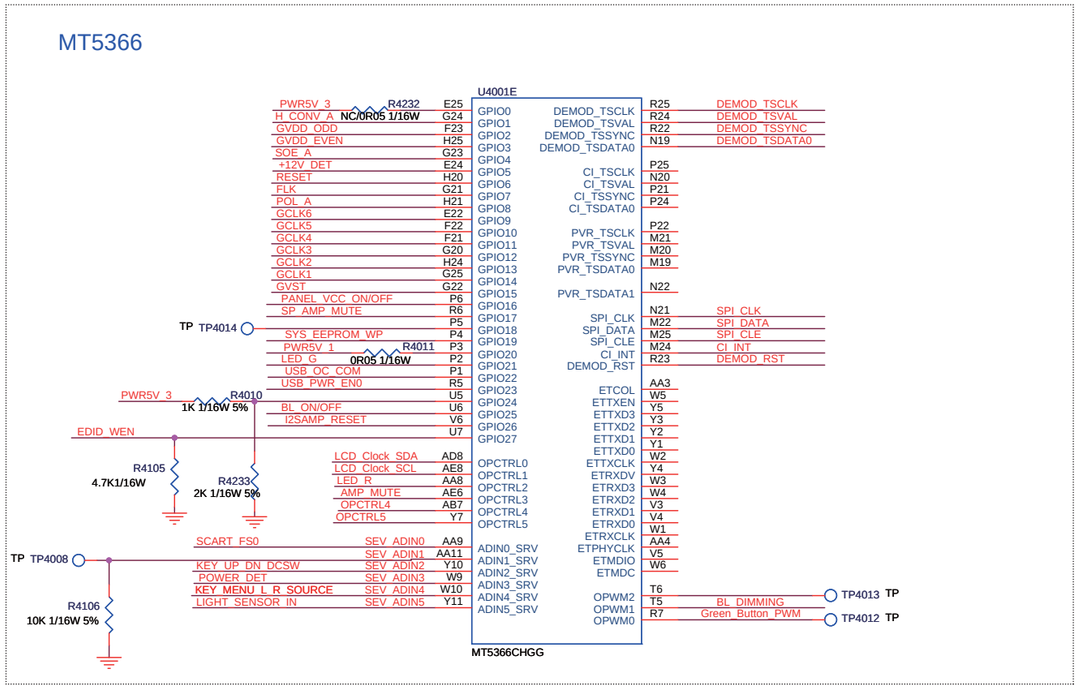
110405

B12 MII/GPIO/ServAD

B12



DVBT Only

SPI_CLK — SPI_CLK 15
SPI_DATA — SPI_DATA 15
SPI_CLE — SPI_CLE 15
CI_INT — CI_INT 15

ATSC/DVBT Only

DEMOD_RST — DEMOD_RST 15
DEMOD_TSCLK — DEMOD_TSCLK 15
DEMOD_TSVAL — DEMOD_TSVAL 15
DEMOD_TSSYNC — DEMOD_TSSYNC 15
DEMOD_TSDATA0 — DEMOD_TSDATA0 15

SP_AMP_MUTE — SP_AMP_MUTE 6
EDID_WEN — EDID_WEN 10,14
I2SAMP_RESET — I2SAMP_RESET 7

SYS_EEPROM_WP — SYS_EEPROM_WP 4
PANEL_VCC_ON/OFF — PANEL_VCC_ON/OFF 3
BL_DIMMING — BL_DIMMING 11
BL_ON/OFF — BL_ON/OFF 11
LED_R — LED_R 5
LED_G — LED_G 5
Green_Button_PWM — Green_Button_PWM 5

KEY_UP_DN_DCSW — KEY_UP_DN_DCSW 5
KEY_MENU_L_R_SOURCE — KEY_MENU_L_R_SOURCE 5
USB_PWR_EN0 — USB_PWR_EN0 5
USB_OC_COM — USB_OC_COM 5
PWR5V_3 — PWR5V_3 14
PWR5V_1 — PWR5V_1 14
SCART_FS0 — SCART_FS0 9
OPCTRL4 — OPCTRL4 4
OPCTRL5 — OPCTRL5 4
LCD_Clock_SCL — LCD_Clock_SCL 5
LCD_Clock_SDA — LCD_Clock_SDA 5

+12V_DET — +12V_DET 2

POL_A — POL_A 17
SOE_A — SOE_A 17

H_CONV_A — H_CONV_A 17

GVST — GVST 17
GVDD_ODD — GVDD_ODD 17
GVDD_EVEN — GVDD_EVEN 17
GCLK6 — GCLK6 17
GCLK5 — GCLK5 17
GCLK4 — GCLK4 17
GCLK3 — GCLK3 17
GCLK2 — GCLK2 17
GCLK1 — GCLK1 17
FLK — FLK 17
RESET — RESET 17

LIGHT_SENSOR_IN — LIGHT_SENSOR_IN 5
AMP_MUTE — AMP_MUTE 7

GND — 2,3,4,5,6,7,8,9,10,12,16

POWER_DET — POWER_DET 2

MII/GPIO/ServAD	715G4722	18 2011-03-19

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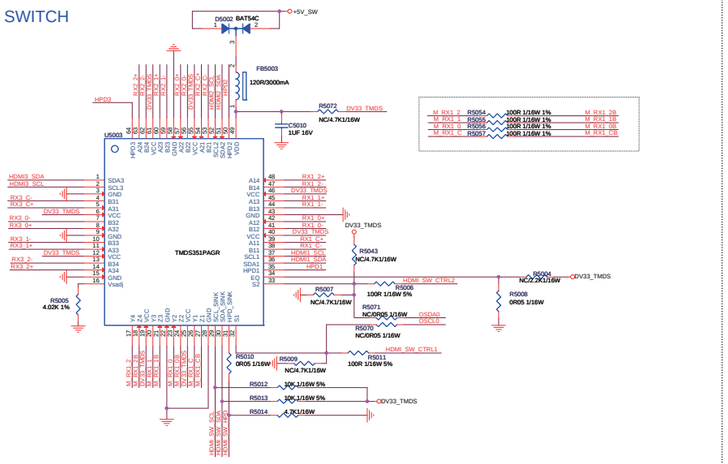
110405

10-8-13 HDMI Switch

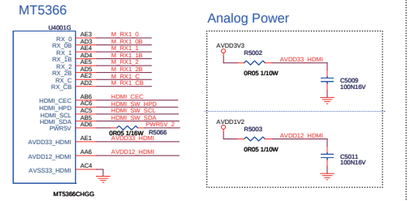
B13 HDMI Switch

B13

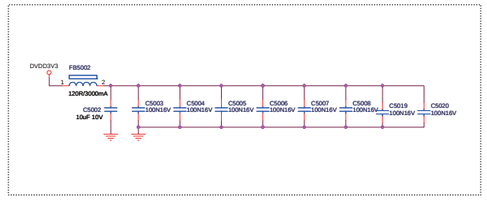
HDMI SWITCH

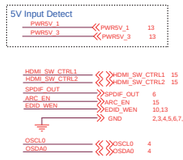


MT5366

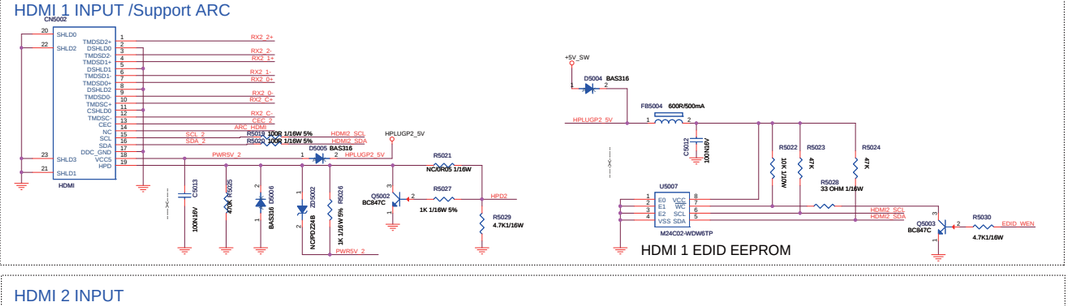


Analog Power



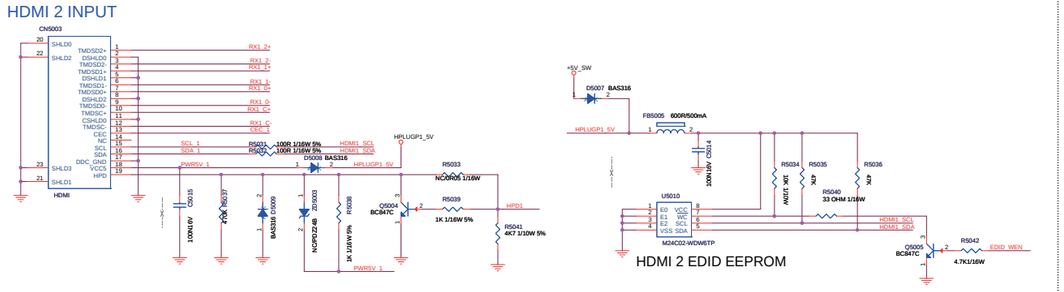


HDMI 1 INPUT /Support ARC



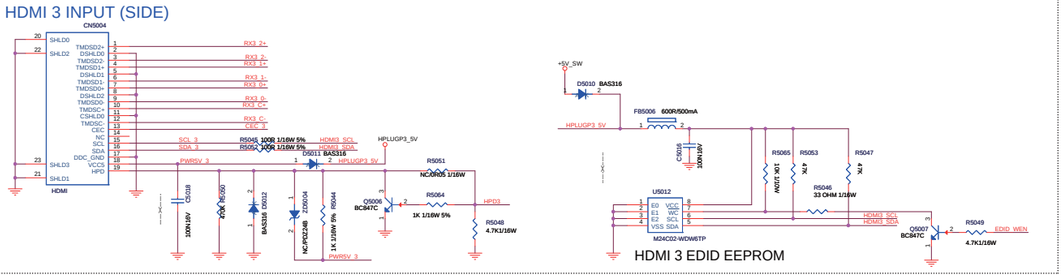
HDMI 1 EDID EEPROM

HDMI 2 INPUT



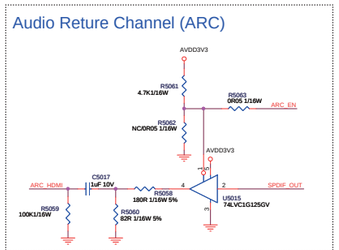
HDMI 2 EDID EEPROM

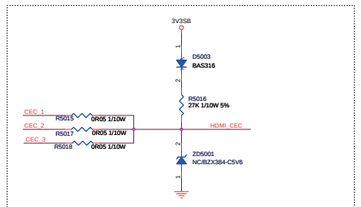
HDMI 3 INPUT (SIDE)



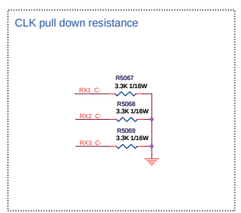
HDMI 3 EDID EEPROM

Audio Reture Channel (ARC)

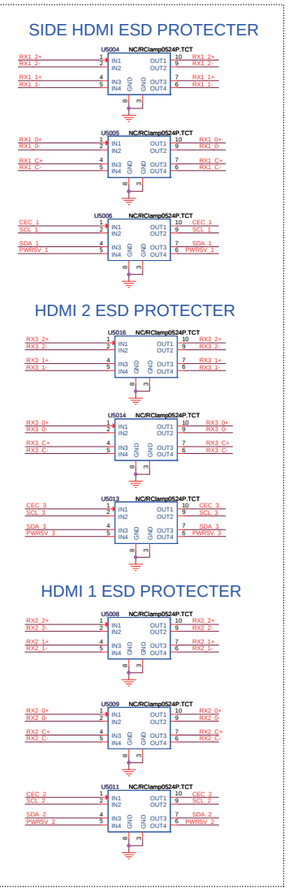




CLK pull down resistance



SIDE HDMI ESD PROTECTER



HDMI 2 ESD PROTECTER

HDMI 1 ESD PROTECTER

HDMI Switch	715G4722	18	2011-03-19

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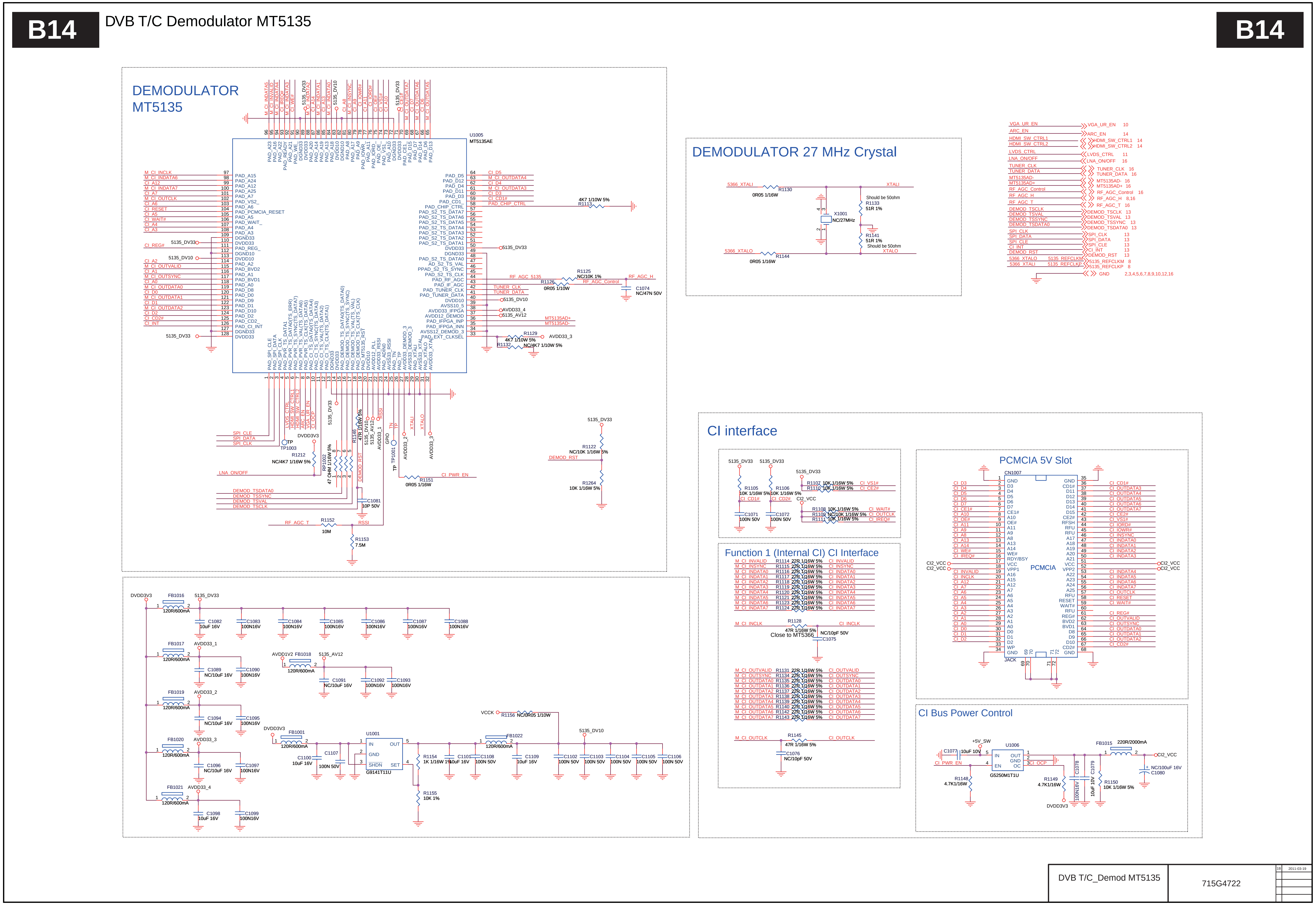
10-8-14 DVB T/C Demodulator MT5135



19080_545_110319.eps
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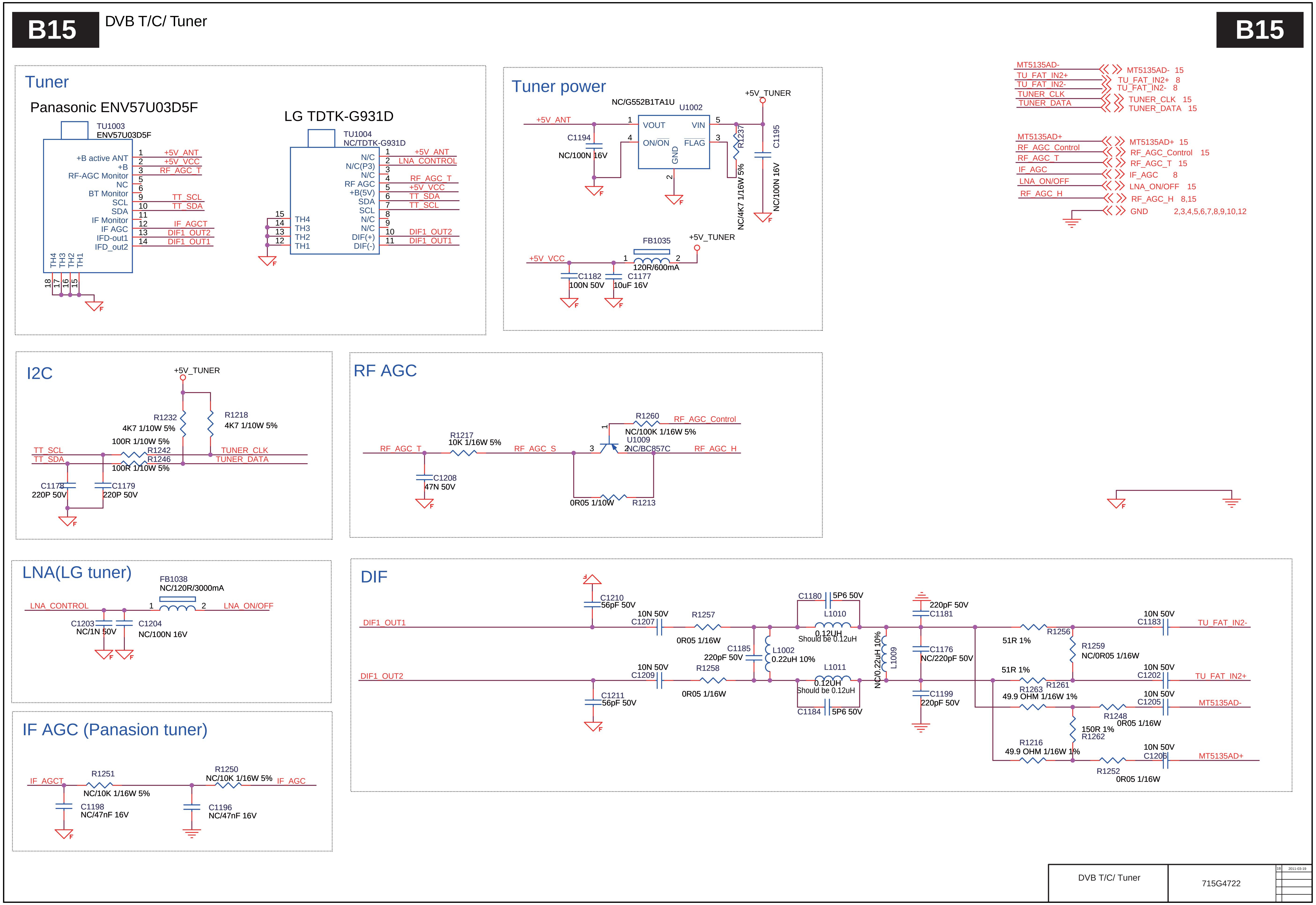
10-8-15 DVB T/C Tuner


B15
DVB T/C/ Tuner
B15
Tuner
Panasonic ENV57U03D5F
TU1003
ENV57U03D5F
LG TDTK-G931D
TU1004
NC/TDTK-G931D
Tuner power
NC/G552B1TA1U
U1002
+5V_TUNER
FB1035
120R/600mA
C1182
100N 50V
C1177
10uF 16V
C1194
NC/100N 16V
NC/4K7 1/16W 5%
NC/100N 16V
I2C
R1232
4K7 1/10W 5%
R1218
4K7 1/10W 5%
R1242
R1246
100R 1/10W 5%
C1178
220P 50V
C1179
220P 50V
RF AGC
R1217
10K 1/16W 5%
R1260
NC/100K 1/16W 5%
U1009
NC/BC857C
C1208
47N 50V
0R05 1/10W
R1213
LNA(LG tuner)
FB1038
NC/120R/3000mA
C1203
NC/1N 50V
C1204
NC/100N 16V
IF AGC (Panasion tuner)
R1251
NC/10K 1/16W 5%
R1250
NC/10K 1/16W 5%
C1198
NC/47nF 16V
C1196
NC/47nF 16V
DIF
DVB T/C/ Tuner
715G4722

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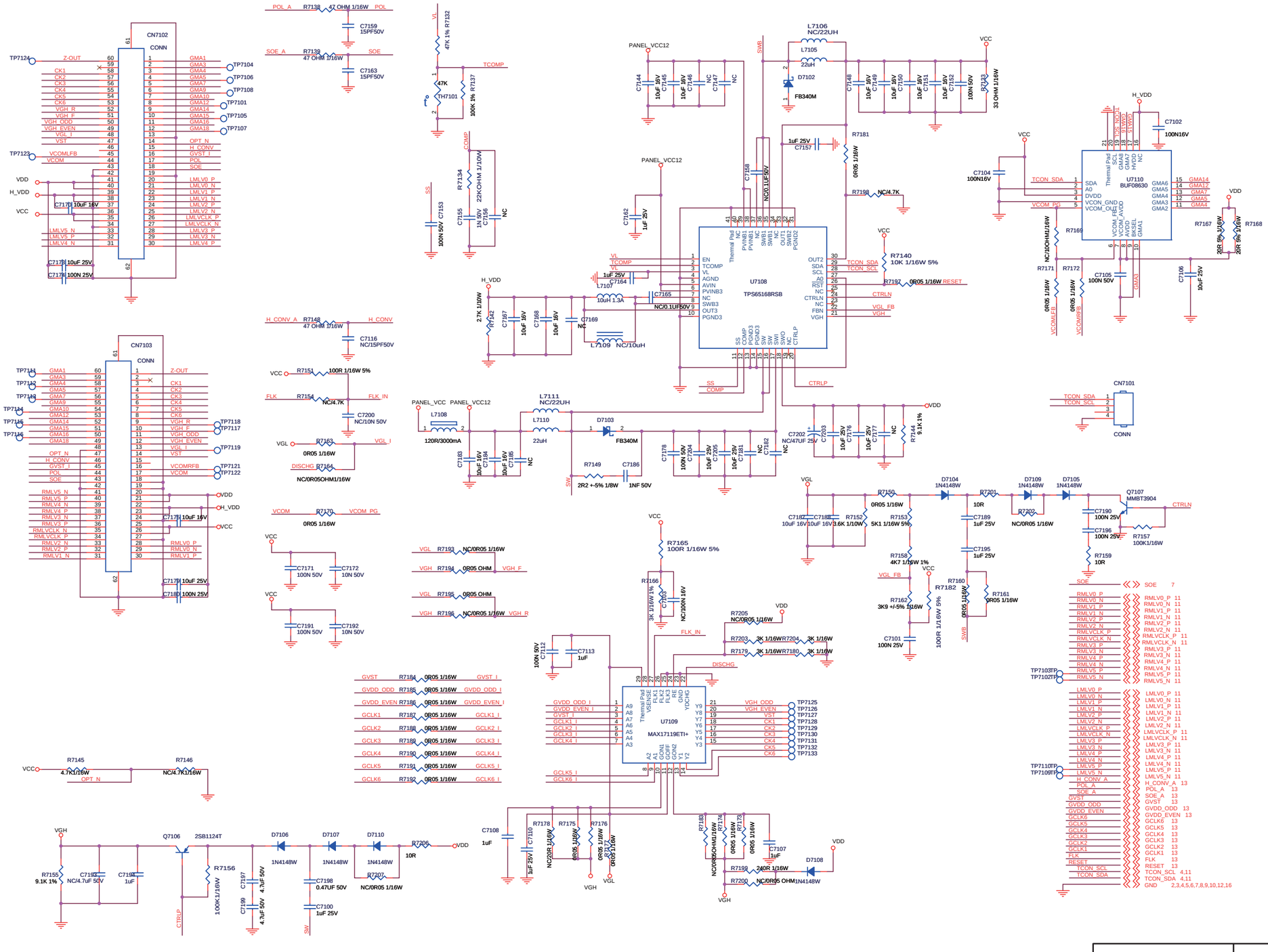
110405

B16 TCON/POWER BLOCK/GAMMA

B16



TCON/POWER BLOCK/GAMMA	715G4722	18 2011-03-19

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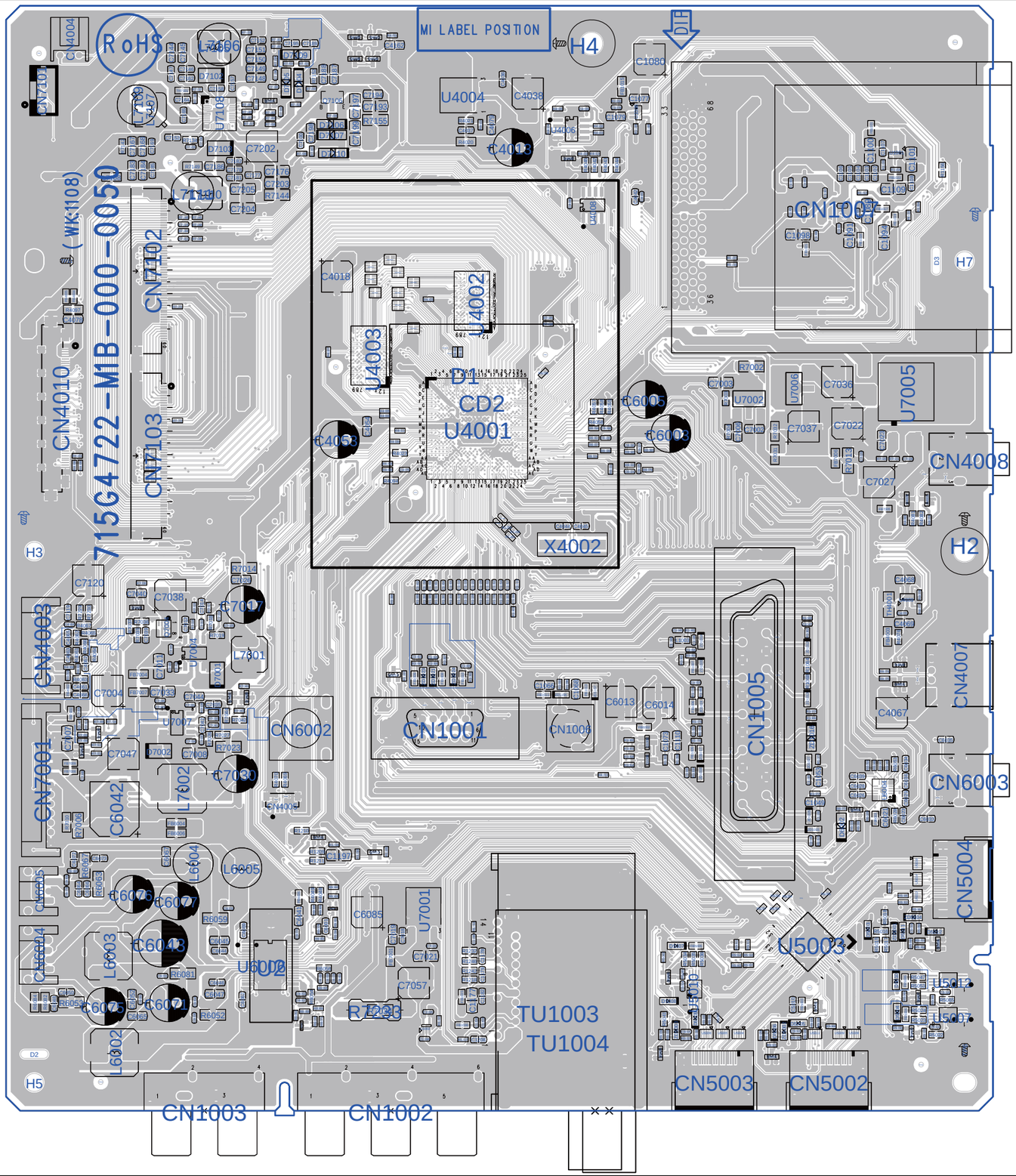
10-8-17 SSB layout top



SSB layout top	715G4722	18	2011-03-19

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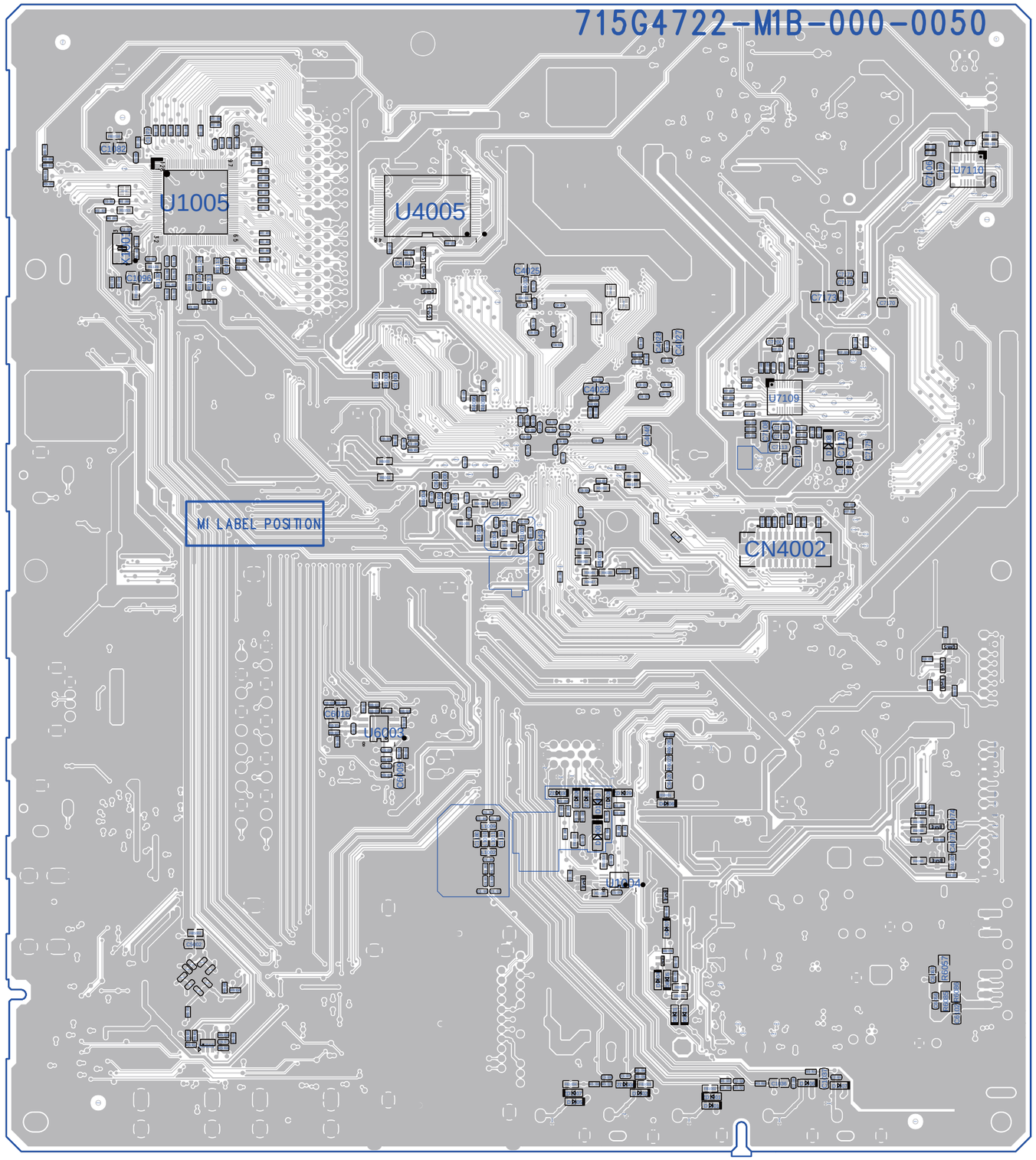
10-8-18 SSB layout bottom



SSB layout bottom	715G4722	1B 2011-03-19

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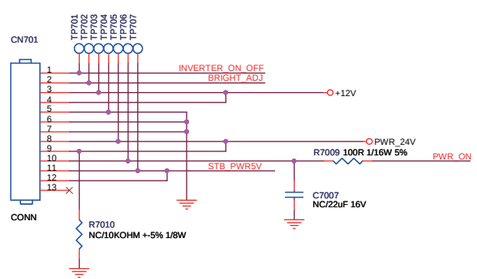
110319

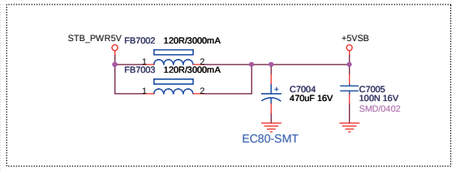
10.9 B 715G4979 SSB Design Line Tilt, Pico

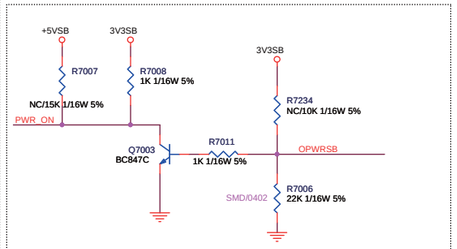
10-9-1 System Power 1

B01 System Power 1 **B01**

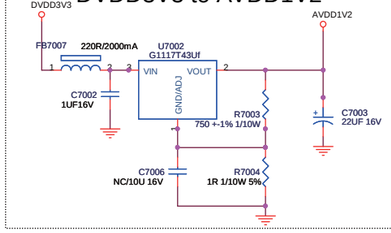
DC POWER INPUT



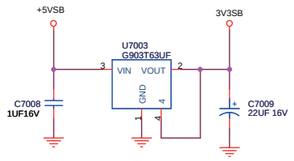


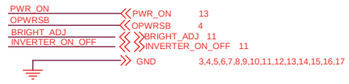


DVDD3V3 to AVDD1V2

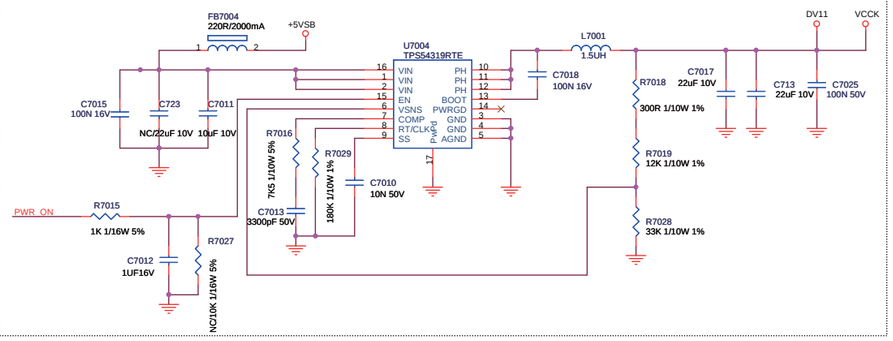


+5VSB to 3V3SB

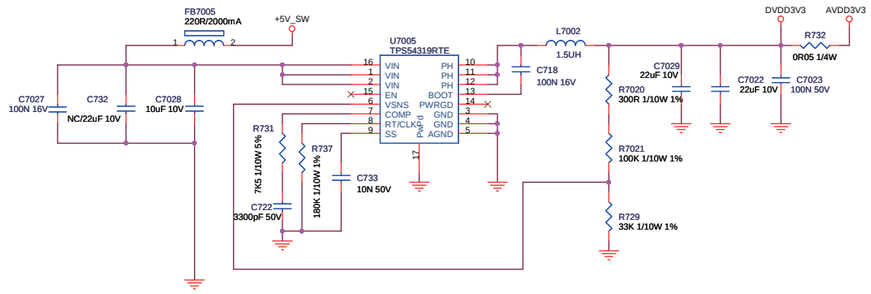




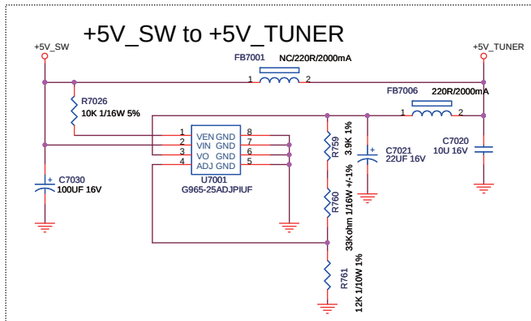
CORE POWER VCCK (1.12V/Max. 2.25A) form +5VSB by PWR_ON



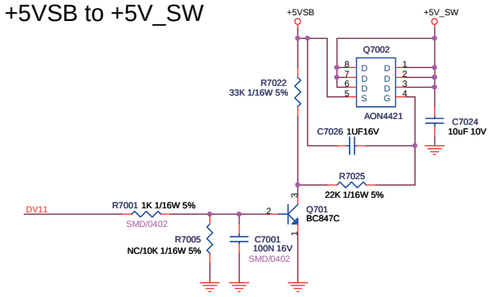
DIGITAL/ANALOG POWER DVDD3V3/AVDD3V3 form +5V_SW



+5V_SW to +5V_TUNER



+5VSB to +5V_SW



System Power 1	715G4979	1. 2011-06-09

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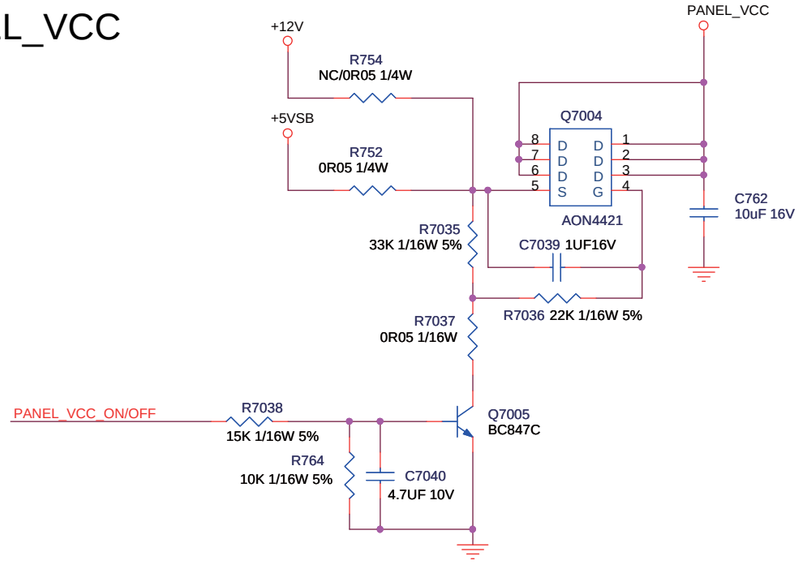
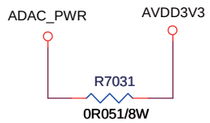
B02 System Power 2

B02

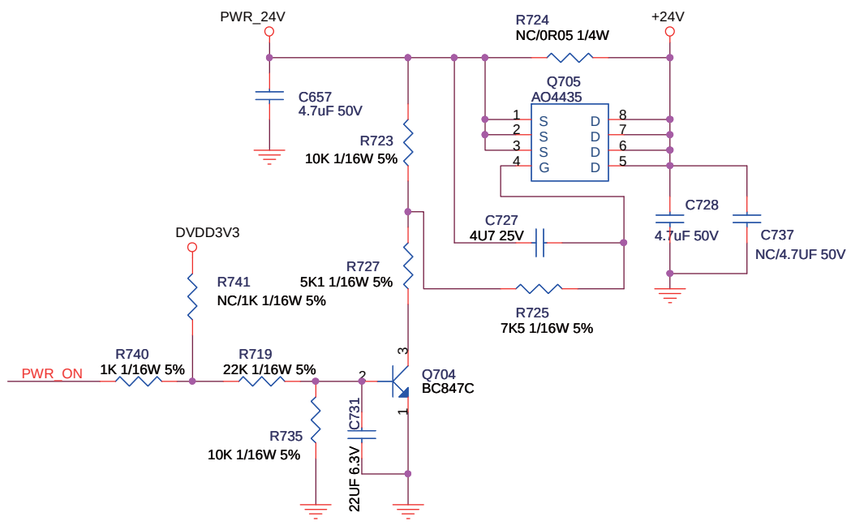
PANEL_VCC



AVDD3V3 to ADAC_PWR



PWR to 24V or 16V for AUDIO



PWR_ON — PWR_ON 2

PANEL_VCC_ON/OFF — PANEL_VCC_ON/OFF 13,17

GND — GND 2,4,5,6,7,8,9,10,11,12,13,14,15,16,17

System Power 2	715G4979	1 2011-06-09

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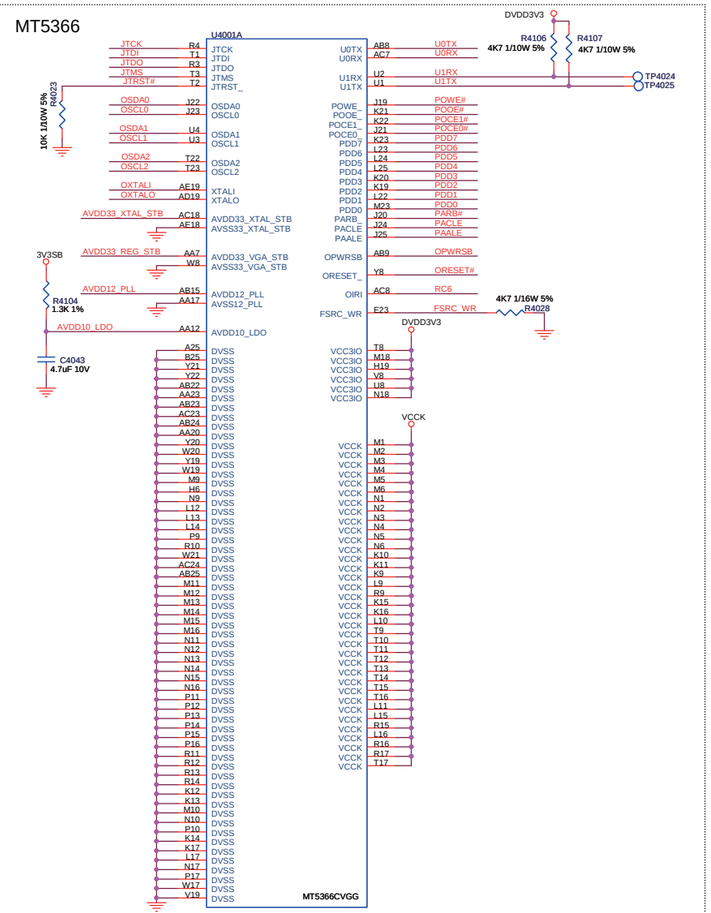
110811

10-9-3 Peripheral

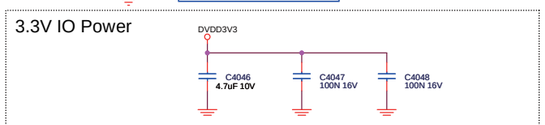
B03 Peripheral

B03

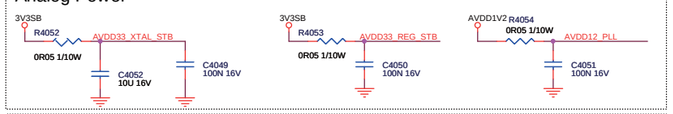
MT5366



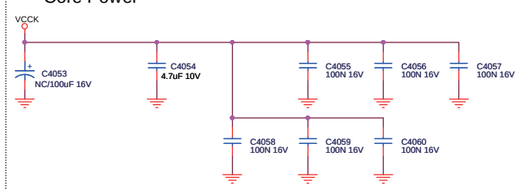
3.3V IO Power

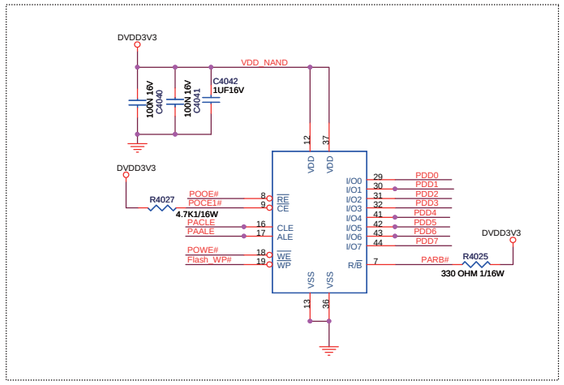


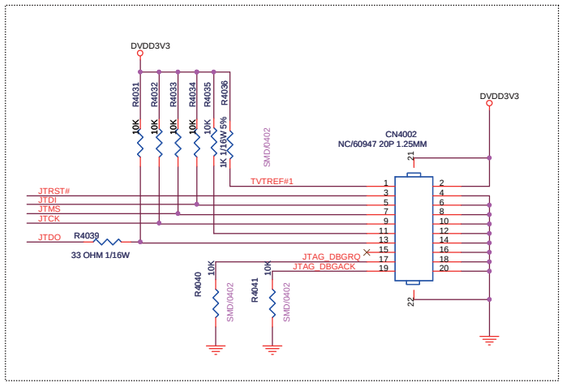
Analog Power



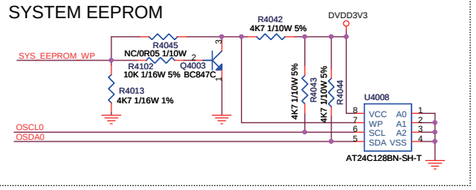
Core Power



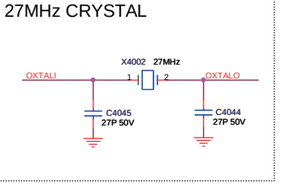




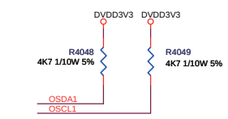
SYSTEM EEPROM



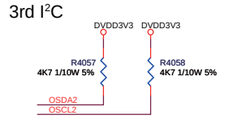
27MHz CRYSTAL



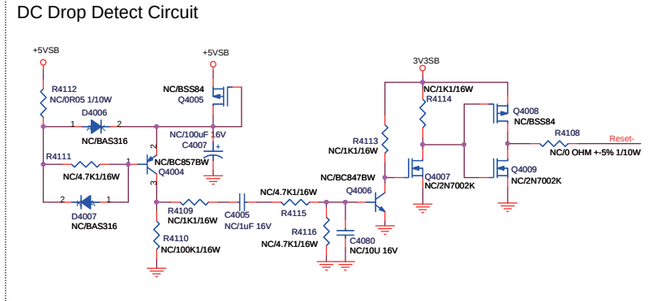
2nd I²C

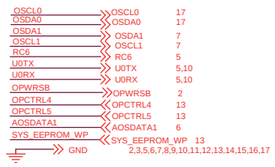


3rd I²C

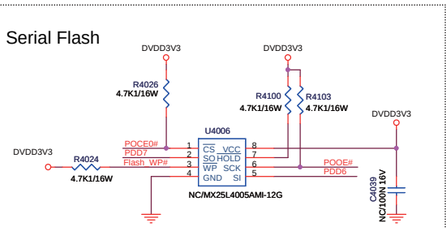


DC Drop Detect Circuit

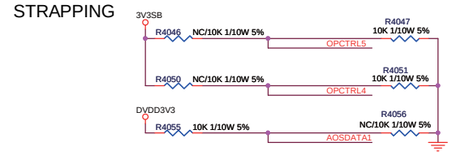


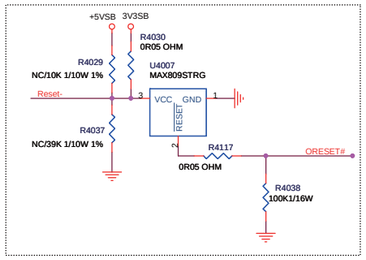


Serial Flash



STRAPPING





Peripheral	715G4979	1 2011-06-09

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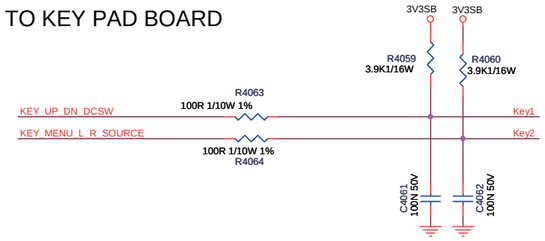
10-9-4 Connector/USB/RS232

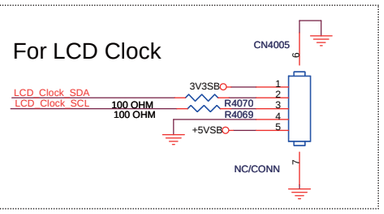
B04 Connector/USB/RS232

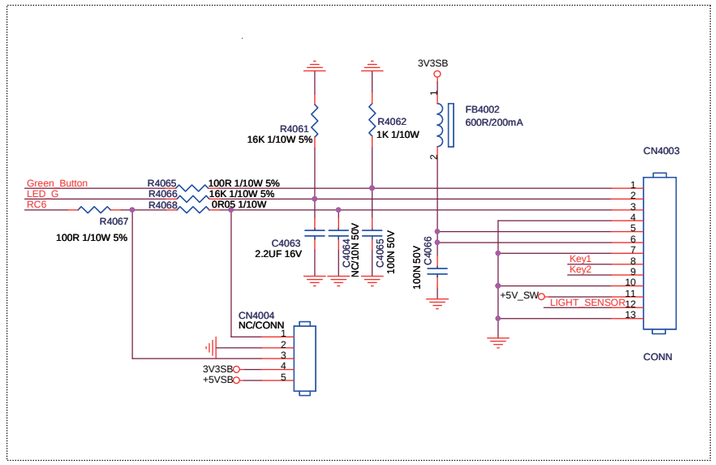
B04

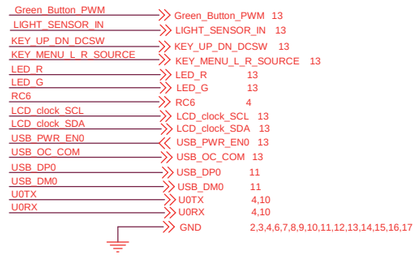
TO KEY PAD BOARD



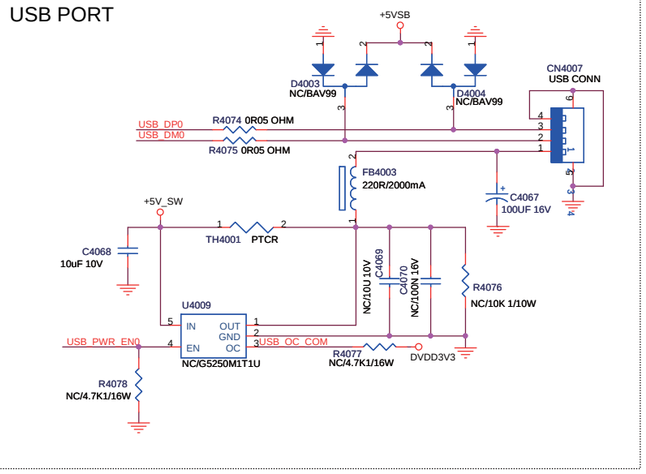
For LCD Clock



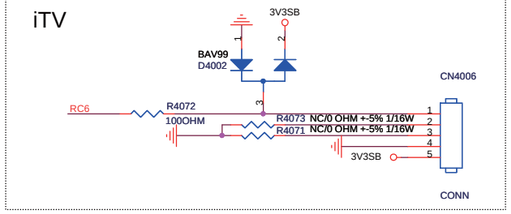




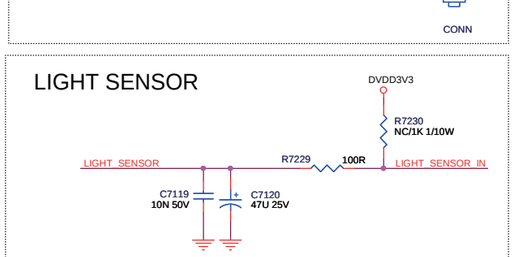
USB PORT



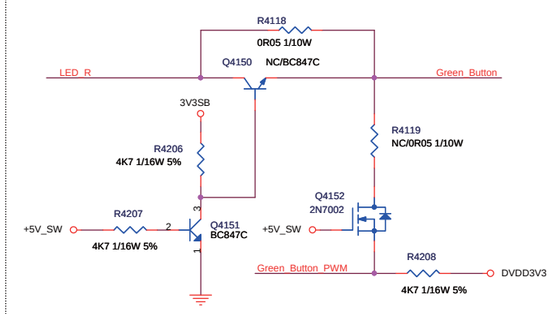
iTV

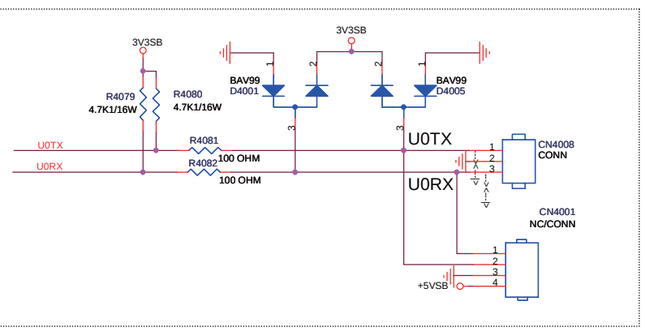


LIGHT SENSOR



Green_Button





Connector/USB/RS232	715G4979	1 2011-06-09

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110804

10-9-5 Audio IO/Headphone

B05 Audio IO/Headphone

B05

MT5366

U4001F

SCART1_R_In AE25
SCART1_L_In AB21
AD25
AE22
VGA_R_In AC25
VGA_L_In AD22
AV1_R_In AD23
AV1_L_In AB20
AE24
AC21
YPbPr_R_In1 AE23
YPbPr_L_In1 AC20
AD24
AC22
AVDD33_AADC AA19
AA21
VMID_AADC AA18

AIN0_R_AADC
AIN0_L_AADC
AIN1_R_AADC
AIN1_L_AADC
AIN2_R_AADC
AIN2_L_AADC
AIN3_R_AADC
AIN3_L_AADC
AIN4_R_AADC
AIN4_L_AADC
AIN5_R_AADC
AIN5_L_AADC
AIN6_R_AADC
AIN6_L_AADC
AVDD33_AADC
AVSS33_AADC
VMID_AADC

AR0_ADAC Y23 AR0O
AL0_ADAC AA25 AL0O
AR1_ADAC W23 AR1O
AL1_ADAC AA24 AL1O
AR2_ADAC V24 AR2O
AL2_ADAC Y25 AL2O
AR3_ADAC V25 AR3O
AL3_ADAC Y24 AL3O
AVDD33_DAC V22 AVDD33_DAC
AVDD33_DAC1 V23 AVDD33_DAC1
AVSS33_DAC AA22
AVSS33_DAC1 W22
ALIN V21 AU_DIN
ASPDIF V20 SPDIF_OUT
AOBCK T21 AOBCLK
AOLRCK U24 AOLRCK
AOMCLK U25 AOMCLK
AOSDATA4 R21 AOSDATA4
AOSDATA3 R20 AOSDATA3
AOSDATA2 T19 AOSDATA2
AOSDATA1 U23 AOSDATA1
AOSDATA0 T20 AOSDATA0

TP6002 TP6003 TP6004 TP6001 TP6005 TP6006

C6007 100N 50V
C6008 1UF 16V

MT5366CVGG

Analog Power

ADAC_PWR
R6002 47R 1/10W 5%
AVDD33_DAC
C6003 330UF 6.3V
C6002 100N 16V

ADAC_PWR
R6003 47R 1/10W 5%
AVDD33_DAC1
C6005 330UF 6.3V
C6004 100N 16V

AVDD3V3
R6004 0R05 1/10W
AVDD33_AADC
C6006 100N 16V

SPDIF_OUT — SPDIF_OUT 8,14
SCART1_R_In — SCART1_R_In 9
SCART1_L_In — SCART1_L_In 9
AV1_R_In — AV1_R_In 8
AV1_L_In — AV1_L_In 8
YPbPr_R_In1 — YPbPr_R_In1 8
YPbPr_L_In1 — YPbPr_L_In1 8
VGA_R_In — VGA_R_In 10
VGA_L_In — VGA_L_In 10
SCART1R_PA — SCART1R_PA 9
SCART1L_PA — SCART1L_PA 9
SPDIF_OUT — SPDIF_OUT 8,14
AOSDATA1 — AOSDATA1 4
AOMCLK — AOMCLK 7
AOBCLK — AOBCLK 7
AOLRCK — AOLRCK 7
AOSDATA0 — AOSDATA0 7
HP_SC_MUTE — HP_SC_MUTE 9
SP_AMP_MUTE — SP_AMP_MUTE 13
OFF_MUTE — OFF_MUTE 7,9
GND 2,3,4,5,7,8,9,10,11,12,13,14,15,16,17

SCT Audio Out

AR2O R6007 16K 1%
C6009 10uF 16V
R6006 30K OHM +-1% 1/16W
R6009 47K 1/16W 5%
33P 50V C6010
SCART1R_PA
R6012 NC/100K 1%
C6012 330PF 50V
OPAVREF_R
0R05 1/16W R6013
R6015 4K7 1/16W 5%

NJM4580M-TE1 U6003
VCC- 1IN+ 1IN- 1OUT VCC+ 2OUT 2IN- 2IN+

OPAVREF_L
R6017 0R05 1/16W
R6021
OPAV120
AL2O R6019 16K 1%
C6016 10uF 16V
47K 1/16W 5%
33P 50V C6017
SCART1L_PA
R6024 NC/100K 1%
C6018 330PF 50V
30K OHM +-1% 1/16W R6022
R6023 4K7 1/16W 5%

OPAV120
R6005 100K1/16W SMD/0402
20K OHM 1/16W 1%
OPAVREF R6011
OPAVREF_R R6014 20K OHM 1/16W 1%
SMD/0402
R6016 100K 1/16W 5%
100UF 16V C6013

+24V
U604 L78L12ABUTR
IN GND OUT
C606 22UF 35V
C601 100N 50V
C603 4.7UF 16V

OPAV120

Earphone R/L output

3V3SB
R6072 10K
HP_SC_MUTE
D6002 BAS32L
SP_AMP_MUTE

R6028 10OHM1/10W
HPOUTL
FB6003 120R/3000mA
+5V_SW
Bathroom_PWR
C6021 10uF 10V
R6029 4.7K1/16W
Bathroom_MUTE
R6030 4.7K1/16W
OFF_MUTE
HP_SC_MUTE
Q6002 BC847C
4.7K1/16W R6033

U6004
INL- INL+ INR+ INR- OUTR
Thermal Pad OUTL SGND AVDD EN HPVDD CPP PGND CPN HPVSS G0 G1
TPA6132A2RTER

AL0O R6031 1.2K 1/16W 1%
R6032 1.2K 1/16W 1%
C6023 1UF16V
C6029 1UF16V
C6024 2N2 50V
C6025 2N2 50V
R6079 0R05 1/16W
R6080 0R05 1/16W
C6030 2N2 50V
C6027 2N2 50V
C6036 1UF16V
C6034 1UF16V
AR0O R6039 1.2K 1/16W 1%
R6040 1.2K 1/16W 1%
C6026 2.2uF 10V
C6028 1UF16V
C6039 2.2uF 10V

+5V_SW
R6047 NC/10K1/16W
R6048 10K
G0
G1
R6049 0R05 OHM
R6050 NC/0R05OHM1/16W

R6051 10OHM1/10W
HPOUTR

HPOUTR
HPOUTL
C6033 100N 50V
C6035 100N 50V
PHONE JACK
CN6003

2W Mono Speaker output for BUH

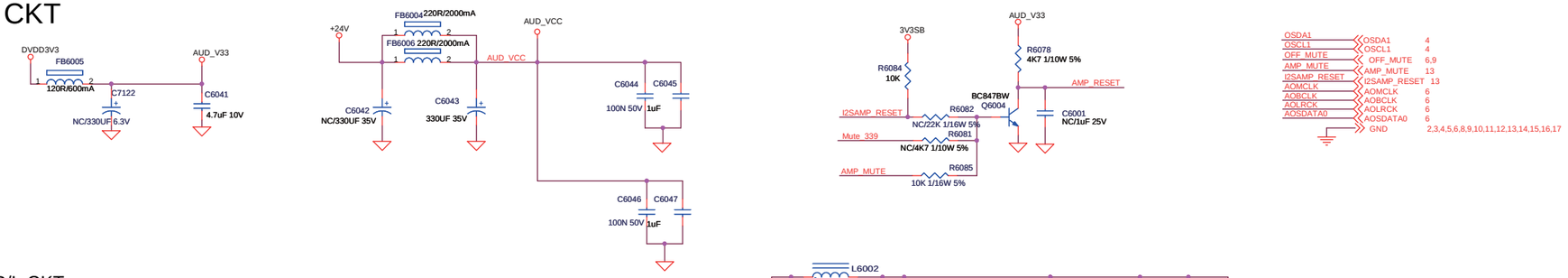
AL3O R6036 NC/1.2K 1/16W 1%
R6035 NC/1.2K 1/16W 1%
Bath_L
C6031 NC/2N2 50V
C6079 NC/2N2 50V
C6082 NC/1uF 16V
AR3O R6045 NC/1.2K 1/16W 1%
R6046 NC/1.2K 1/16W 1%
Bath_R
C6077 NC/2N2 50V
C6078 NC/2N2 50V
C6076 NC/1uF 16V
Bath_PWR
CN6005 NC/CONN

+24V
NC/120R/3000mA
FB6008
+12V
NC/120R/3000mA
FB6007
Bath_PWR
C6015 NC/220UF 16V

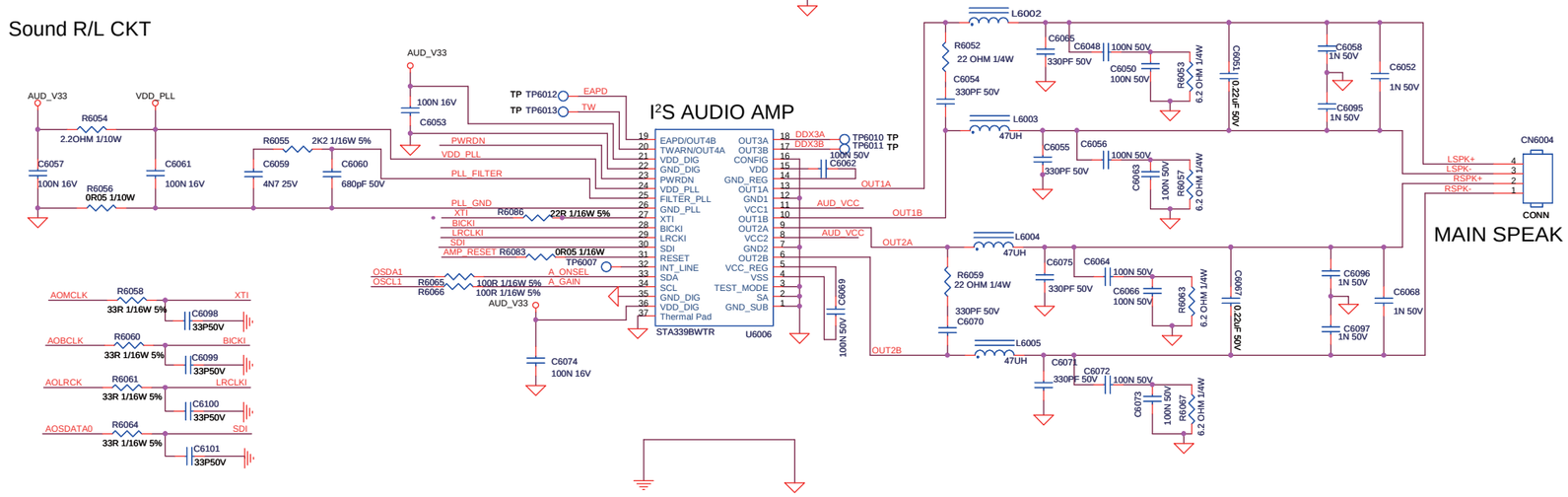
B06 Speaker

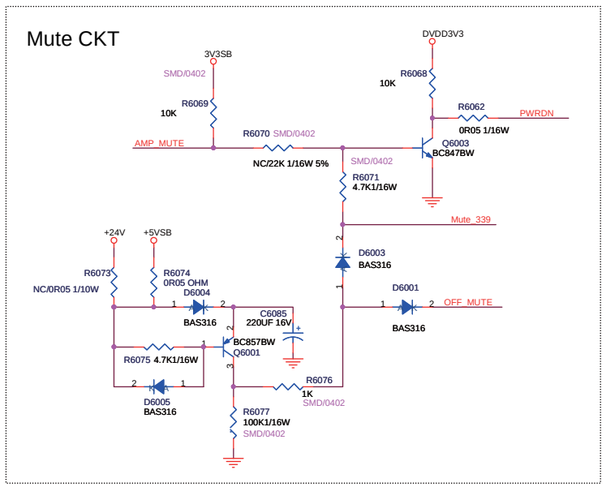
B06

Main Speak CKT



Sound R/L CKT





Speaker	715G4979	1 2011-06-09

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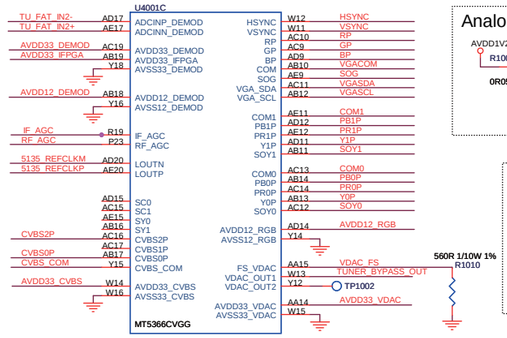
10-9-7 Video IO/SPDIF

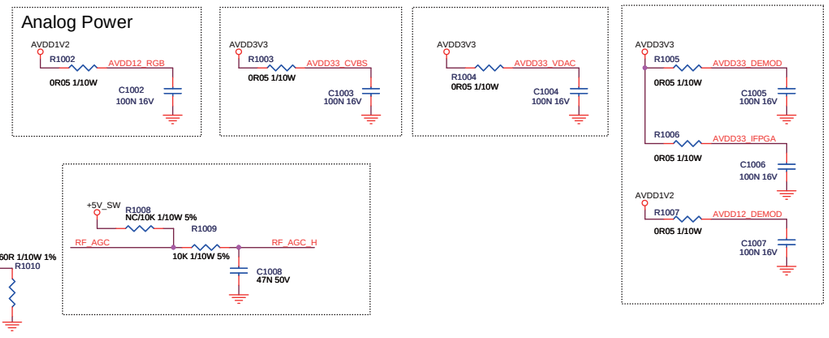
B07 Video IO/SPDIF

B07

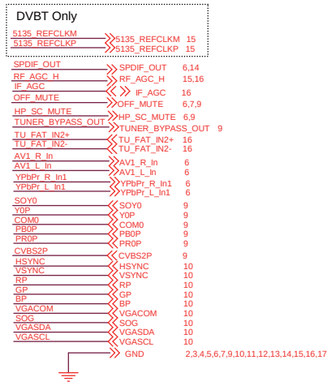
MT5366



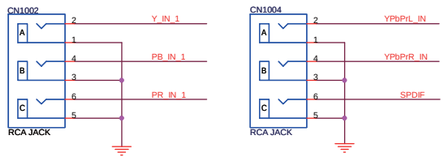
Analog Power



DVBT Only

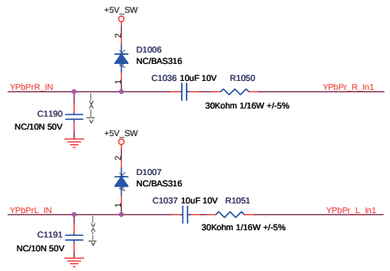


YPbPr & Audio IN

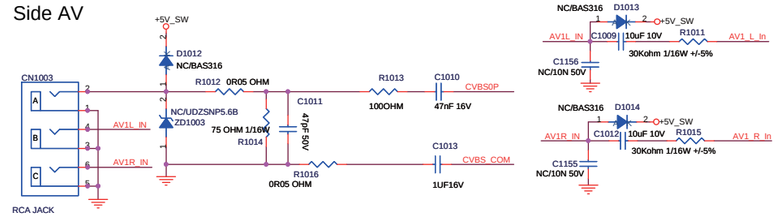


YPBPR IN

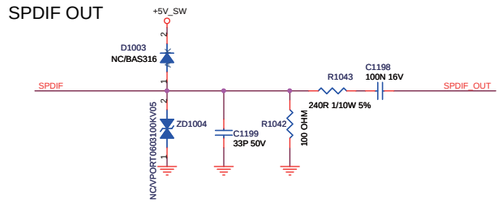
AUDIO IN for YPbPr



Side AV



SPDIF OUT



Video IO/SPDIF	715G4979	1 2011-06-09

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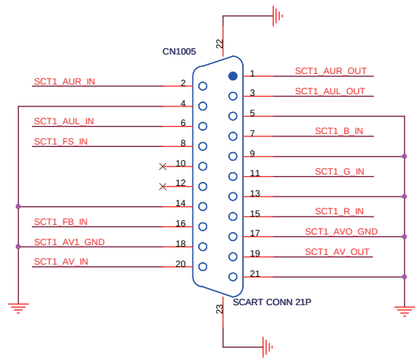
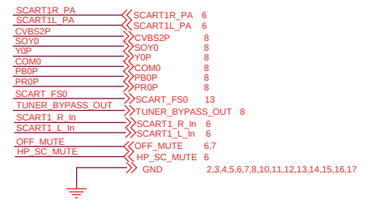
110811

B08 SCART

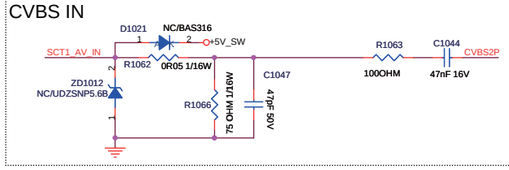
B08

SCART (Full SCART) -- CVBS+SV+RGB+TV OUT

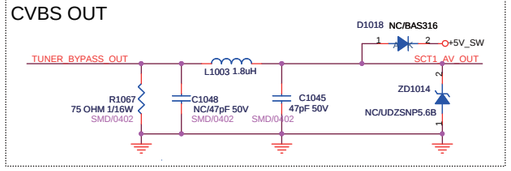




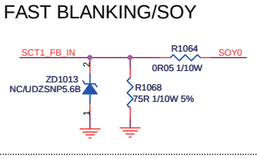
CVBS IN



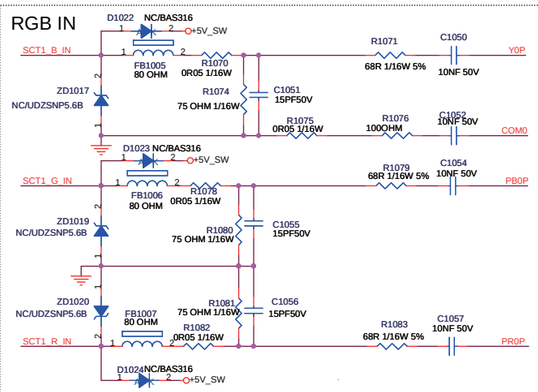
CVBS OUT



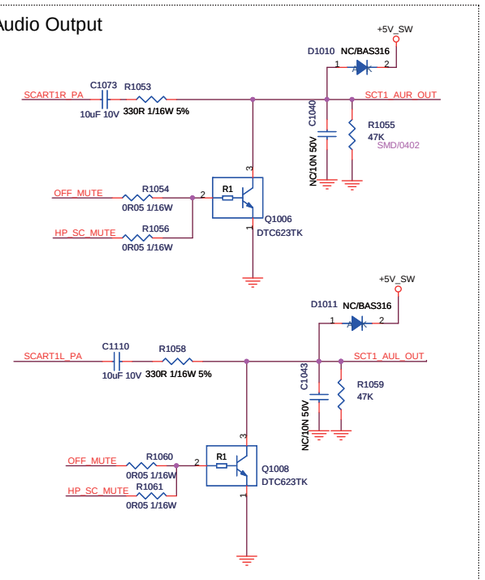
FAST BLANKING/SOY



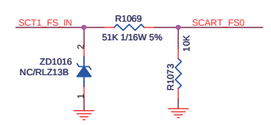
RGB IN



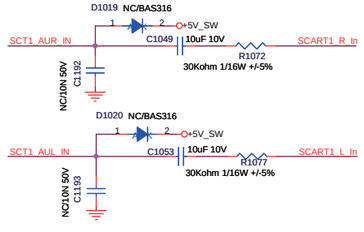
Audio Output



Function Select



Audio Input



SCART	715G4979	1 2011-06-09

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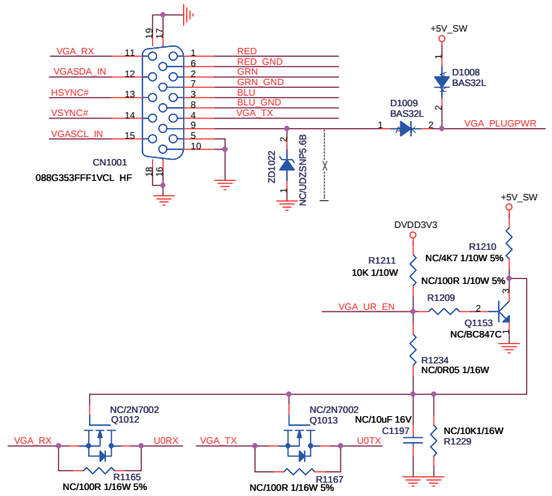
10-9-9 VGA Input

B09 VGA Input

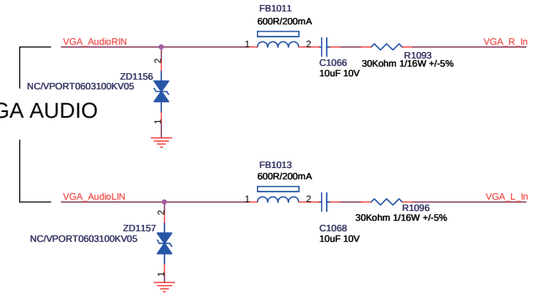
B09

VGA Input

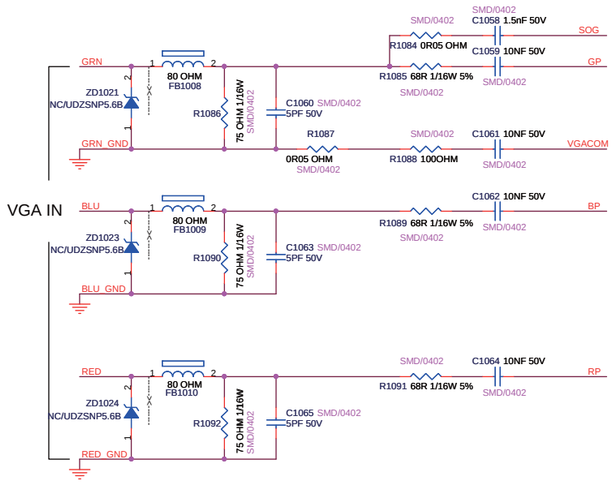


VGA Audio Input

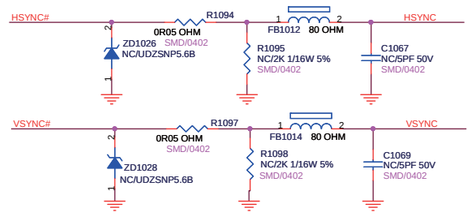
VGA AUDIO



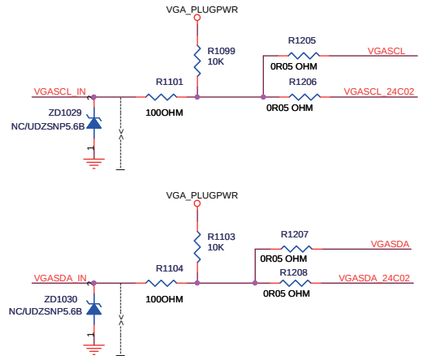
VGA IN



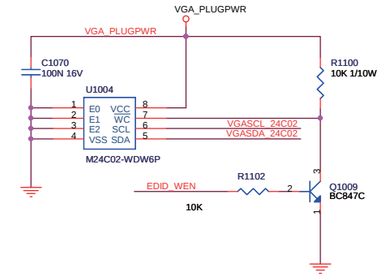
VGA SYNC SLICER

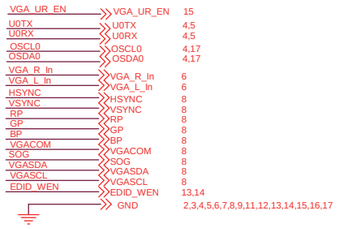


VGA I2C



VGA EDID





VGA Input	715G4979	1 2011-06-09

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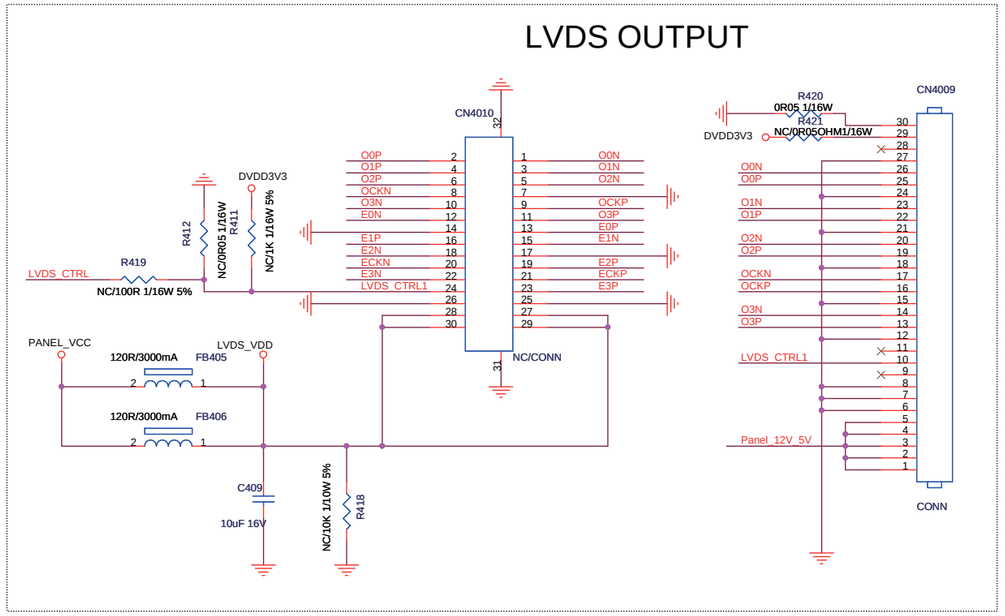
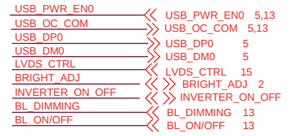
B10 LVDS

B10

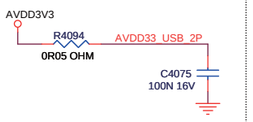
MT5366

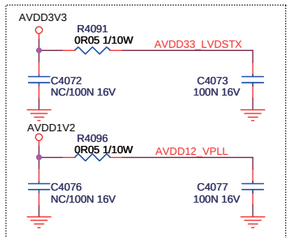
LVDS OUTPUT



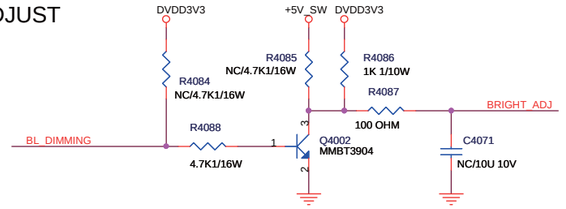


Analog Power

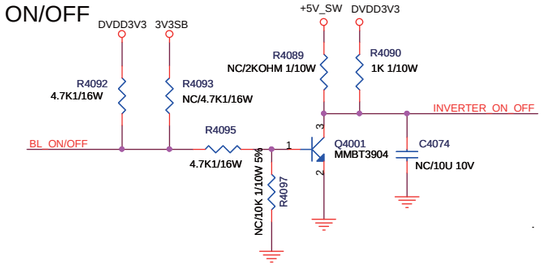




BRIGHT ADJUST



INVERTER ON/OFF



LVDS	715G4979	1 2011-06-09

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B11 DRAM Interface

B11

MT5366

U4001B

MT5366CVGG

TP4001
TP4002

Analog Power

AVDD1V2 (4 mA) R4016 0R05 1/16W AVDD12_MEMPLL C4012 100N 16V

CAPs for DRAM IO Power (Close to MT5366)

DDRV
C4023 10uF 16V
C4024 100N 16V
C4031 100N 16V
C4032 100N 16V
C4033 100N 16V
C4034 100N 16V
C4035 100N 16V

DDR2_DDRV= 1.8V

U4004 G1117T43UF
DVDD3V3
C4038 100UF 16V
C4036 100N 50V
R4021 110R 1/10W 1%
C4037 100N 50V
R4020 0R051/8W
DDRV
NC/10uF 10V C4079
R4022 51R 1%
1.25 x (1+51/110) = 1.8295V

DDR2#1-64Mx16-1066MHz

U4002
H5PS1G63EFR-G7C

DDRV
C4004 100N 16V
C4008 100N 16V
RVREF1

CAPs for DRAM IO Power (Close to DDR#1)

C4013 330UF 6.3V
C4014 100N 16V
C4015 100N 16V
C4016 100N 16V
C4017 100N 16V
C4025 NC/10uF 16V
C4026 100N 16V
C4001 100N 16V

DDR2#2-64Mx16-1066MHz

U4003
H5PS1G63EFR-G7C

DDRV
C4006 100N 16V
C4010 100N 16V
RVREF3

CAPs for DRAM IO Power (Close to DDR#2)

C4018 100UF 16V
C4019 100N 16V
C4020 100N 16V
C4021 100N 16V
C4022 100N 16V
C4027 10uF 16V
C4028 NC/10uF 16V
C4029 100N 16V
C4030 100N 16V

Damping and Termination for CLK

	Close to MT5366	Close to DRAM
RCLK0	R4002 0R05 1/16W	CLK0
RCLK0#	R4004 0R05 1/16W	CLK0#
RCLK1	R4005 0R05 1/16W	CLK1
RCLK1#	R4008 0R05 1/16W	CLK1#

R4003 100R 1/16W 1%
R4007 100R 1/16W 1%

包地

Damping for DDR#1 ADDR/CMD

RP4001 0OHM 1/16W
A_A9 A_A12 A_A7 A_A5 — 1_A9 1_A12 1_A7 1_A5

RP4003 0OHM 1/16W
A_BA0 A_BA1 A_CKE A_WE# — 1_BA0 1_BA1 1_CKE 1_WE#

RP4005 0OHM 1/16W
A_A3 A_A10 A_A1 A_BA2 — 1_A3 1_A10 1_A1 1_BA2

RP4007 0OHM 1/16W
A_A11 A_A4 A_A6 A_A2 — 1_A11 1_A4 1_A6 1_A2

RP4009 0OHM 1/16W
A_CAS# A_A0 A_A13 A_A8 — 1_CAS# 1_A0 1_A13 1_A8

RP4011 0OHM 1/16W
A_ODT A_RAS# A_CS# — 1_ODT 1_RAS# 1_CS#

Damping for DDR#2 ADDR/CMD

RP4002 0OHM 1/16W
1_A5 1_A7 1_A12 1_A9 — B_A5 B_A7 B_A12 B_A9

RP4004 0OHM 1/16W
1_BA0 1_BA1 1_CKE 1_WE# — B_BA0 B_BA1 B_CKE B_WE#

RP4006 0OHM 1/16W
1_A3 1_A1 1_A10 1_BA2 — B_A3 B_A1 B_A10 B_BA2

RP4008 0OHM 1/16W
1_A11 1_A4 1_A6 1_A2 — B_A11 B_A4 B_A6 B_A2

RP4010 0OHM 1/16W
1_CAS# 1_A0 1_A13 1_A8 — B_CAS# B_A0 B_A13 B_A8

RP4012 0OHM 1/16W
1_ODT 1_RAS# 1_CS# — B_ODT B_RAS# B_CS#

GND 2,3,4,5,6,7,8,9,10,11,13,14,15,16,17

DRAM Interface	715G4979	1 2011-06-09

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B12 GPIO

B12

MT5366

+24V

R4209
100K 1/16W 5%

TP TP4009 PWR_DETECT

R4210
15K 1/16W 5%

U4001E

E25	GPIO0	DEMOD_TSCLK	R25	DEMOD_TSCLK
G24	GPIO1	DEMOD_TSVAL	R24	DEMOD_TSVAL
F23	GPIO2	DEMOD_TSSYNC	R22	DEMOD_TSSYNC
H25	GPIO3	DEMOD_TSDATA0	N19	DEMOD_TSDATA0
G23	GPIO4			
E24	GPIO5	CI_TSCLK	P25	
H20	GPIO6	CI_TSVAL	N20	
G21	GPIO7	CI_TSSYNC	P21	
H21	GPIO8	CI_TSDATA0	P24	
E22	GPIO9			
F22	GPIO10	PVR_TSCLK	P22	
F21	GPIO11	PVR_TSVAL	M21	
G20	GPIO12	PVR_TSSYNC	M20	
H24	GPIO13	PVR_TSDATA0	M19	
G25	GPIO14			
G22	GPIO15	PVR_TSDATA1		
P6	GPIO16			
R6	GPIO17	SPI_CLK	N21	SPI_CLK
P5	GPIO18	SPI_DATA	M22	SPI_DATA
P4	GPIO19	SPI_CLE	M25	SPI_CLE
P3	GPIO20	CI_INT	M24	CI_INT
P2	GPIO21	DEMOD_RST	R23	DEMOD_RST
P1	GPIO22			
R5	GPIO23	ETCOL	AA3	
U5	GPIO24	ETTXEN	W5	
U6	GPIO25	ETTXD3	Y5	
V6	GPIO26	ETTXD2	Y3	
U7	GPIO27	ETTXD1	Y2	
		ETTXD0	Y1	
AD8	OPCTRL0	ETTXCLK	W2	
AE8	OPCTRL1	ETRXDV	Y4	
AA8	OPCTRL2	ETRXD3	W3	
AE6	OPCTRL3	ETRXD2	W4	
AB7	OPCTRL4	ETRXD1	V3	
Y7	OPCTRL5	ETRXD0	V4	
		ETRXCLK	W1	
AA9	ADIN0_SRV	ETPHYCLK	AA4	
AA11	ADIN1_SRV	ETMDIO	V5	
Y10	ADIN2_SRV	ETMDC	W6	
W9	ADIN3_SRV			
W10	ADIN4_SRV	OPWM2	T6	
Y11	ADIN5_SRV	OPWM1	T5	BL_DIMMING
		OPWM0	R7	Green_Button_PWM

MT5366CVGG

PANEL_VCC_ON/OFF
SP_AMP_MUTE
SYS_EEPROM_WP
PWR5V_1 R4011 0R05 1/16W
LED_G
USB_OC_COM
USB_PWR_EN0
BL_ON/OFF
I2SAMP_RESET
EDID_WEN
LCD_Clock_SDA
LCD_Clock_SCL
LED_R
AMP_MUTE
OPCTRL4
OPCTRL5
SCART_FS0
KEY_UP_DN_DCSW
KEY_MENU_L_R_SOURCE
LIGHT_SENSOR_IN

R4105
4K7 1/16W 5%

TP TP4008

R4015
10K 1/16W 5%

TP TP4010

TP TP4011

DVBT Only

SPI_CLK → SPI_CLK 15
SPI_DATA → SPI_DATA 15
SPI_CLE → SPI_CLE 15
CI_INT → CI_INT 15

ATSC/DVBT Only

DEMOD_RST → DEMOD_RST 15
DEMOD_TSCLK → DEMOD_TSCLK 15
DEMOD_TSVAL → DEMOD_TSVAL 15
DEMOD_TSSYNC → DEMOD_TSSYNC 15
DEMOD_TSDATA0 → DEMOD_TSDATA0 15

SP_AMP_MUTE → SP_AMP_MUTE 6
EDID_WEN → EDID_WEN 10,14
I2SAMP_RESET → I2SAMP_RESET 7

SYS_EEPROM_WP → SYS_EEPROM_WP 4
PANEL_VCC_ON/OFF → PANEL_VCC_ON/OFF 3,17
BL_DIMMING → BL_DIMMING 11
BL_ON/OFF → BL_ON/OFF 11
LED_R → LED_R 5
LED_G → LED_G 5

KEY_UP_DN_DCSW → KEY_UP_DN_DCSW 5
KEY_MENU_L_R_SOURCE → KEY_MENU_L_R_SOURCE 5
USB_PWR_EN0 → USB_PWR_EN0 5
USB_OC_COM → USB_OC_COM 5

PWR5V_1 → PWR5V_1 14
SCART_FS0 → SCART_FS0 9
OPCTRL4 → OPCTRL4 4
OPCTRL5 → OPCTRL5 4
LCD_Clock_SCL → LCD_Clock_SCL 5
LCD_Clock_SDA → LCD_Clock_SDA 5

Green_Button_PWM → Green_Button_PWM 5

LIGHT_SENSOR_IN → LIGHT_SENSOR_IN 5
AMP_MUTE → AMP_MUTE 7

GND 2,3,4,5,6,7,8,9,10,11,12,14,15,16,17

GPIO	715G4979	1 2011-06-09

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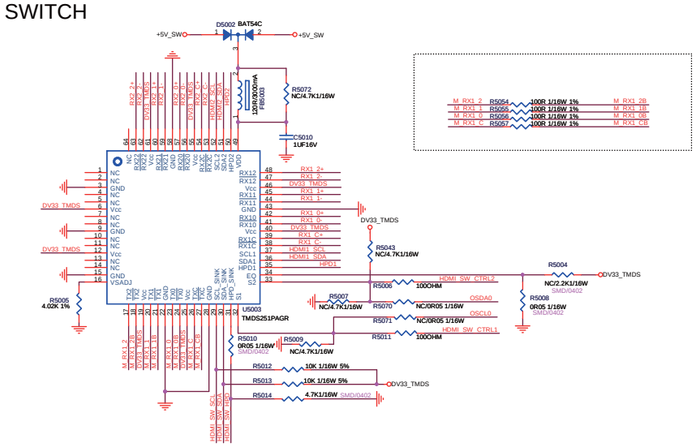
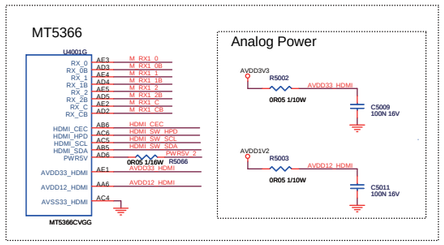
B13 HDMI Switch/Connector

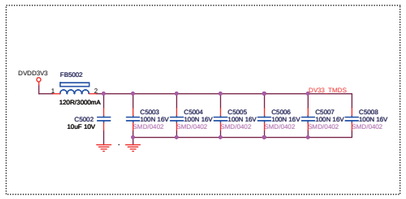
B13

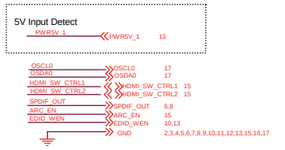
HDMI SWITCH



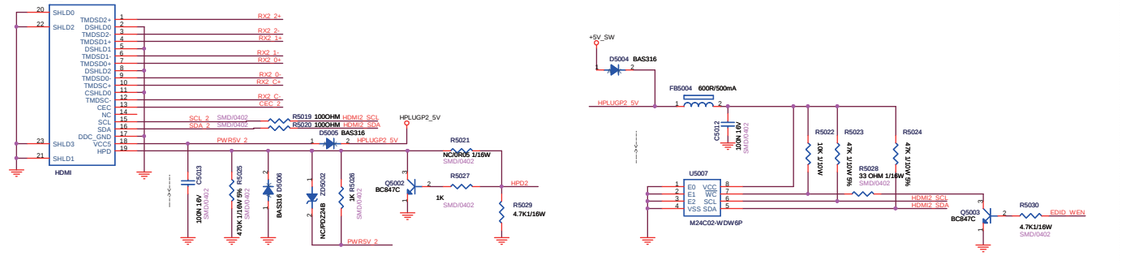
MT5366



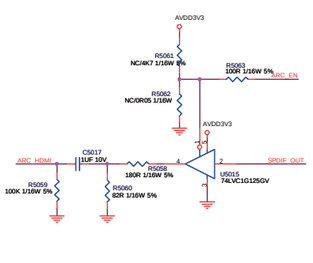




SIDE HDMI



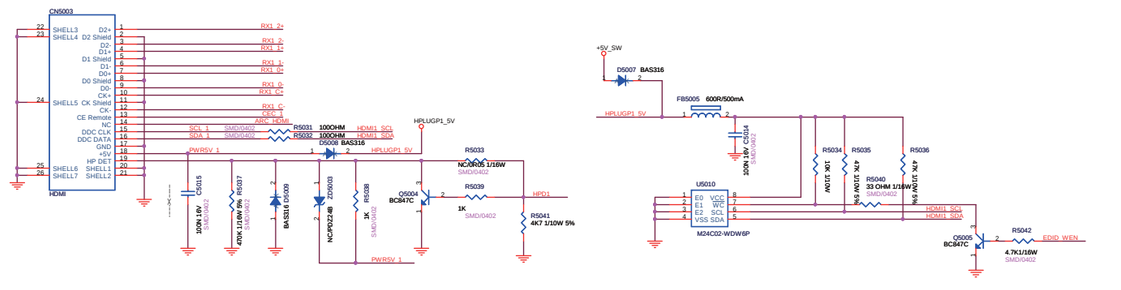
Audio Return Channel (ARC)

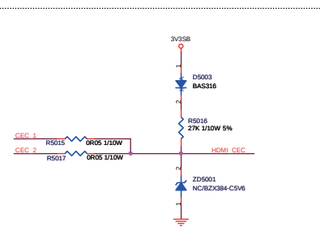


CLK pull down resistance

SIDE HDMI ESD PROTECTER

HDMI 1/Support ARC





HDMI 1 ESD PROTECTER

HDMI Switch/Connector	715G4979	1 2011-06-09

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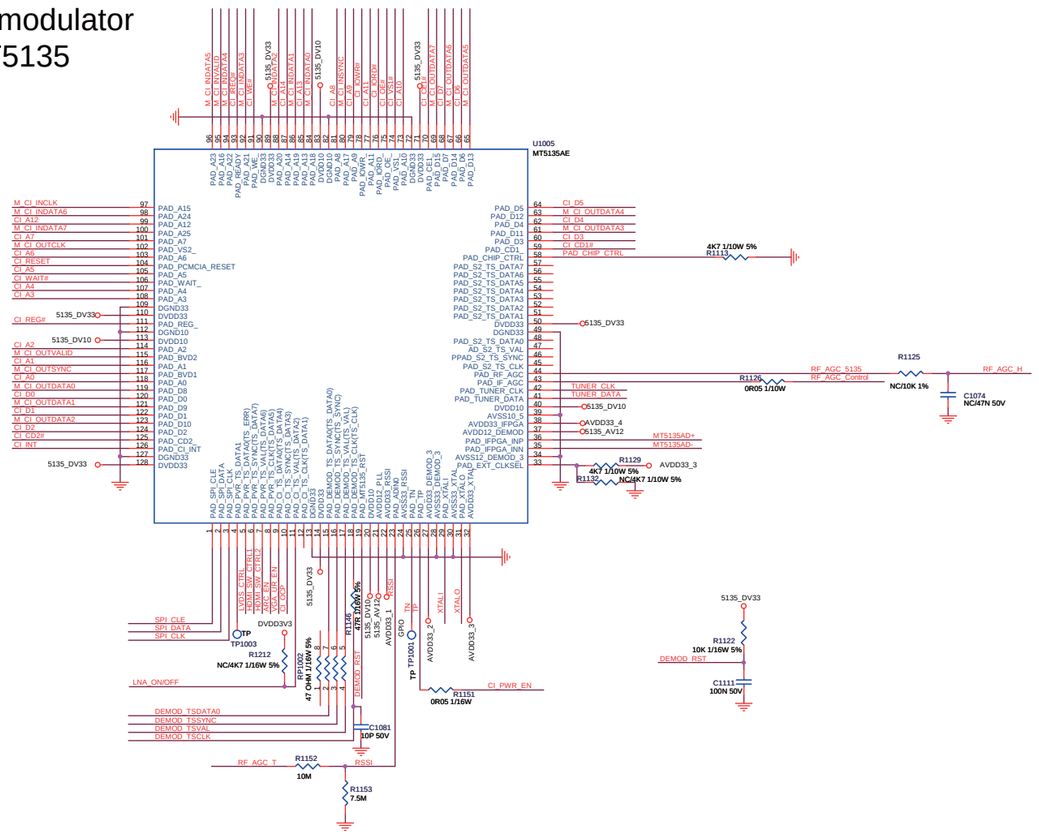
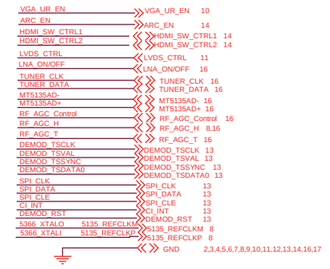
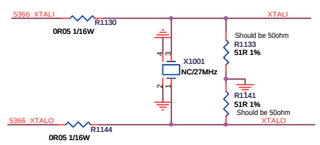
B14 DVB T/C Demodulator MT5135 B14

Demodulator MT5135

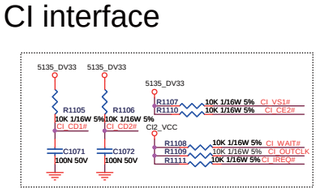




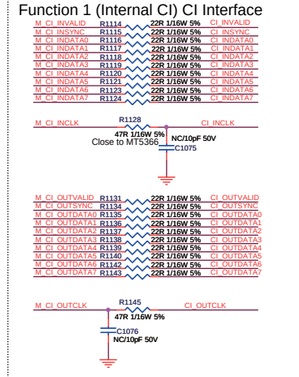
Demodulator 27 MHz Crystal



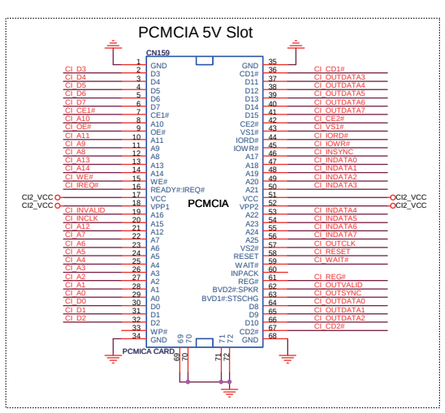
CI interface



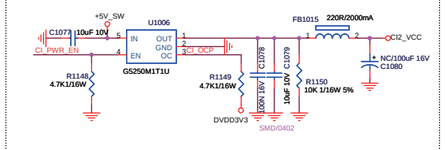
Function 1 (Internal CI) CI Interface



PCMCIA 5V Slot



CI Bus Power Control



DVB T/C Demodulator MT5135	715G4979	1 2011-06-09

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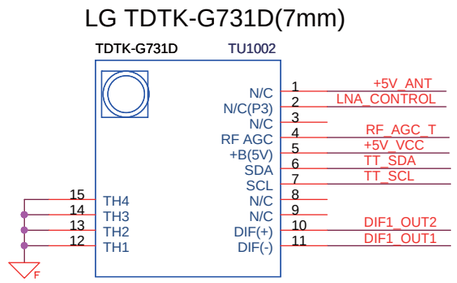
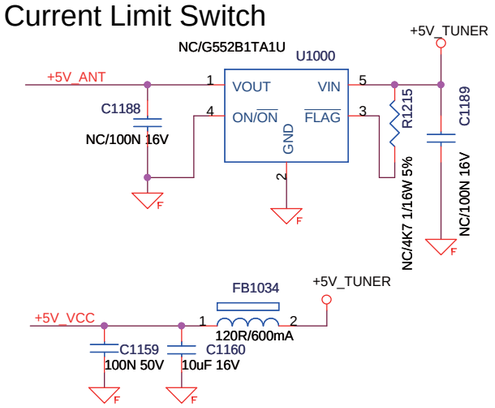
B15 DVB T/C Tuner

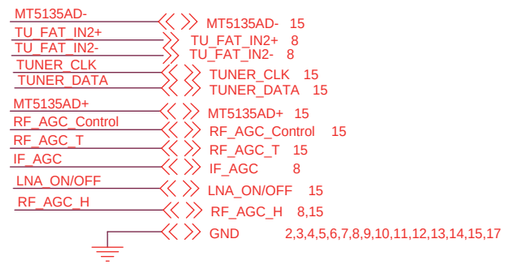
B15

Tuner

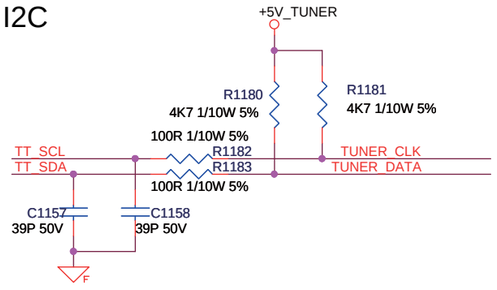


Current Limit Switch

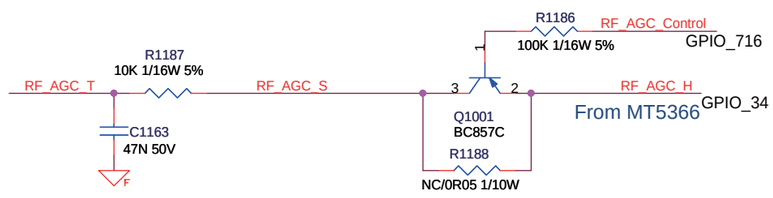




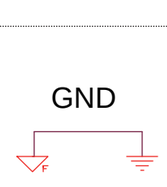
I2C



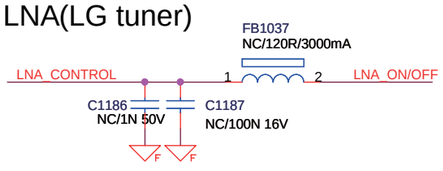
RF AGC



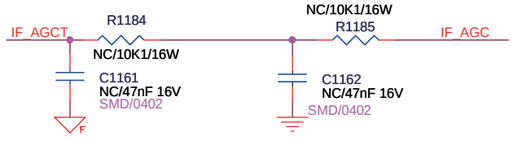
GND



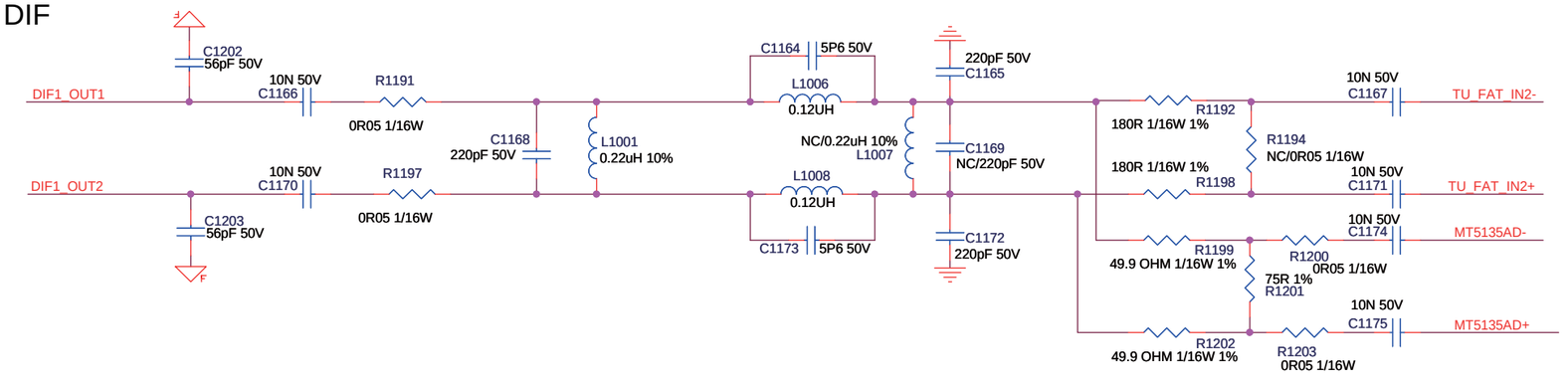
LNA(LG tuner)



IF AGC (Panasion tuner)



DIF



DVB T/C Tuner	715G4979	1 2011-06-09

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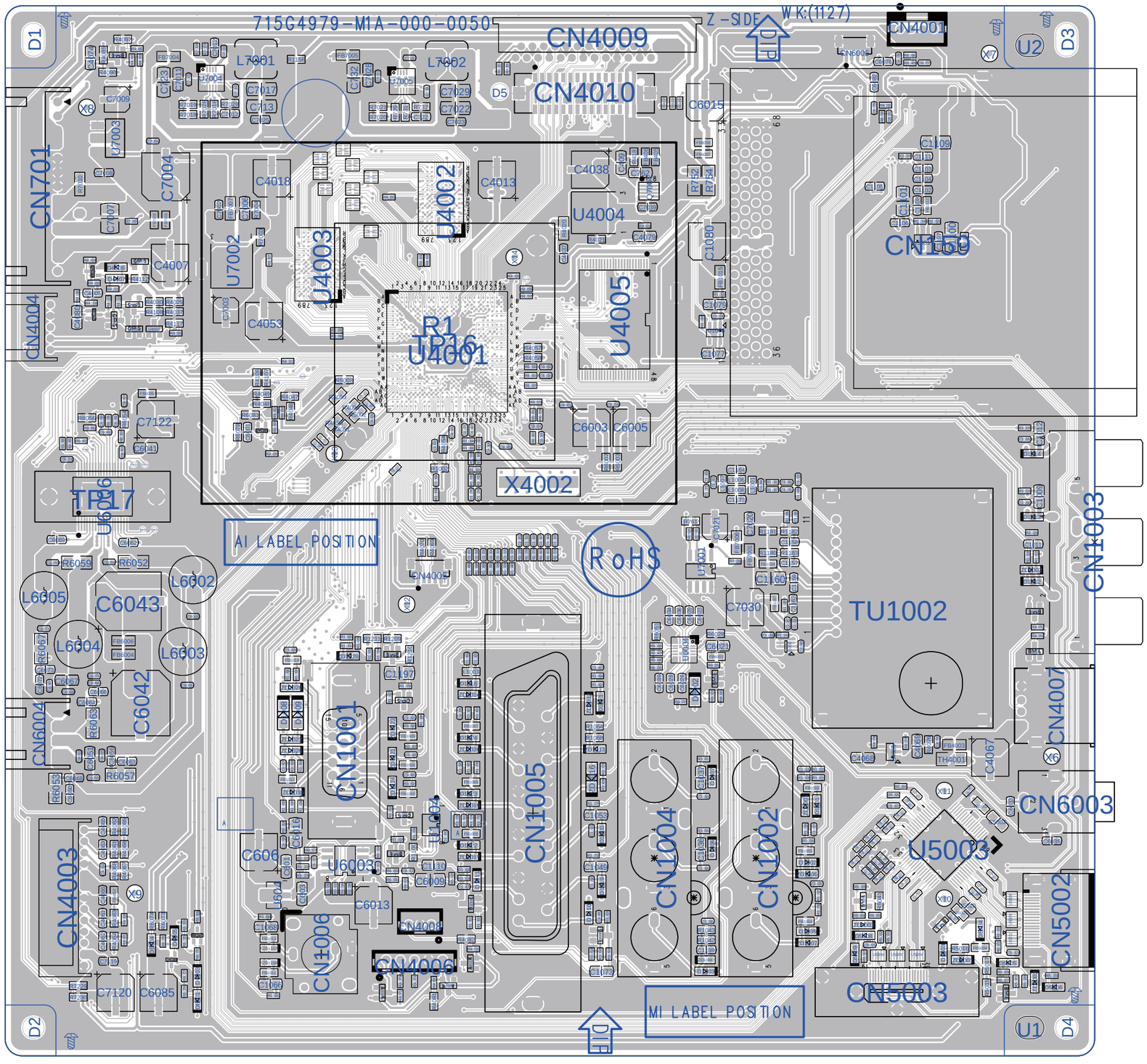
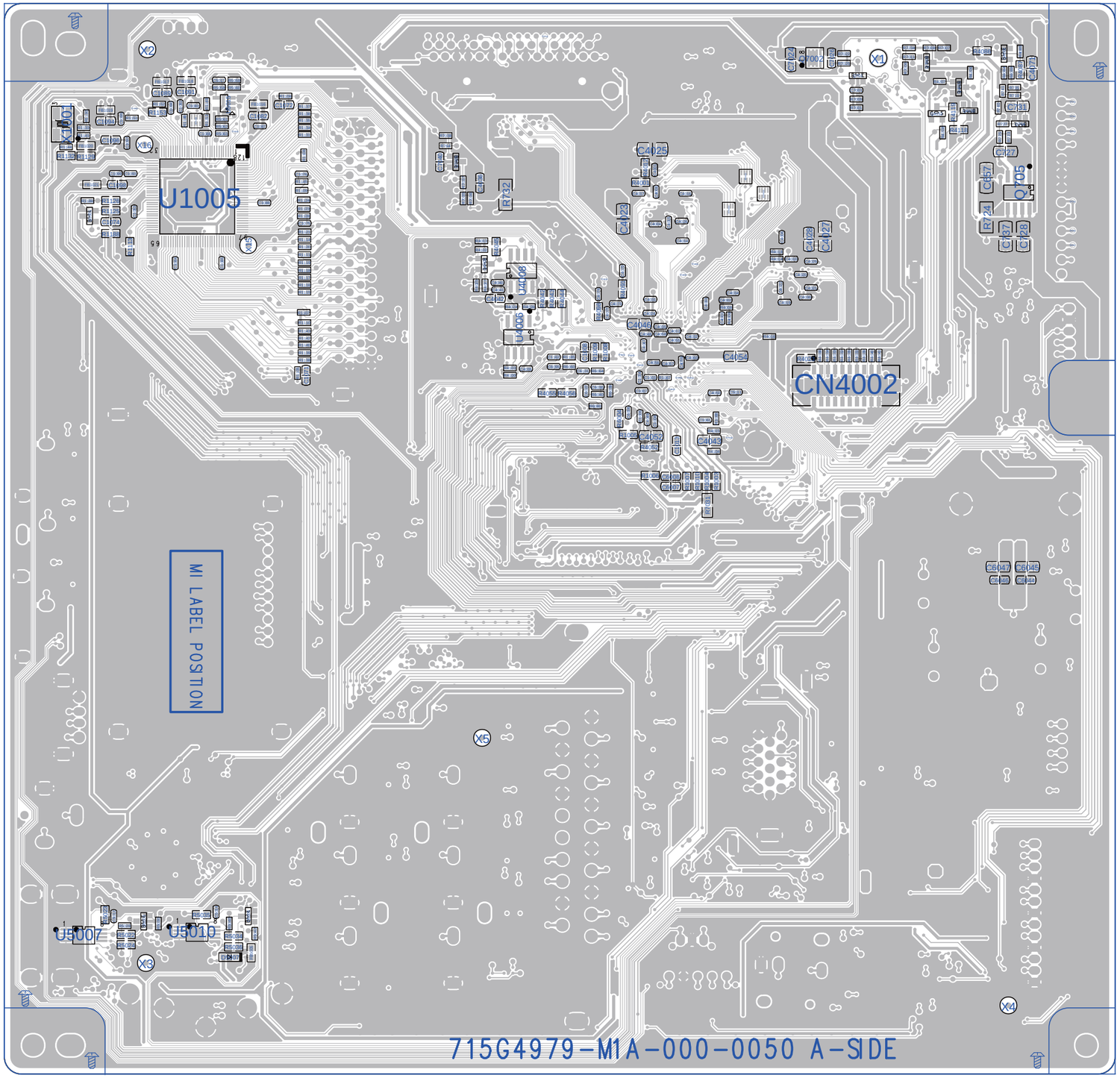
110812

10-9-16 SSB layout top



10-9-17 SSB layout bottom



SSB layout bottom	715G4979	1	2011-06-09

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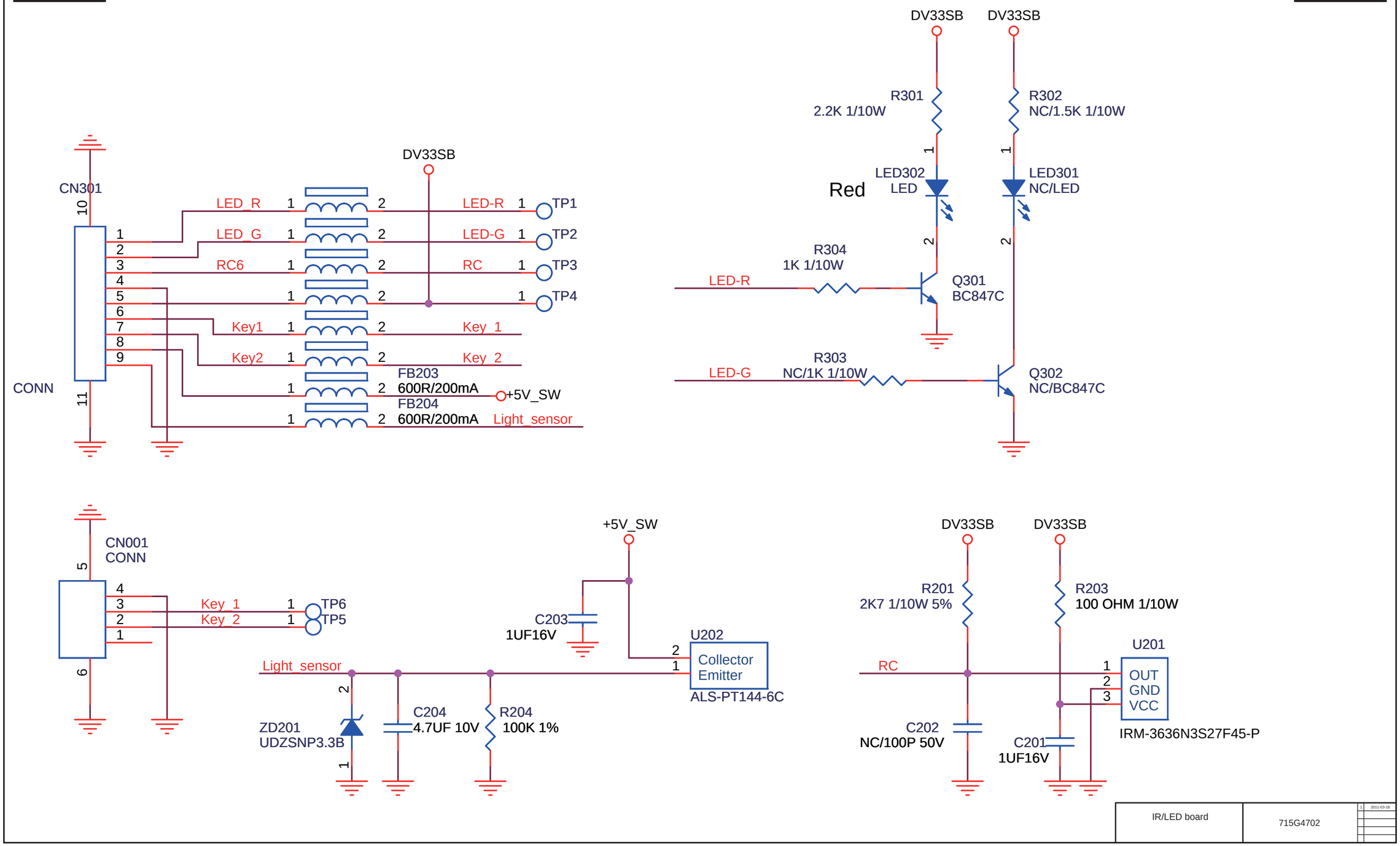
10.10 J 715G4702 IR Thriller

10-10-1 IR/LED board

J IR/LED board

J



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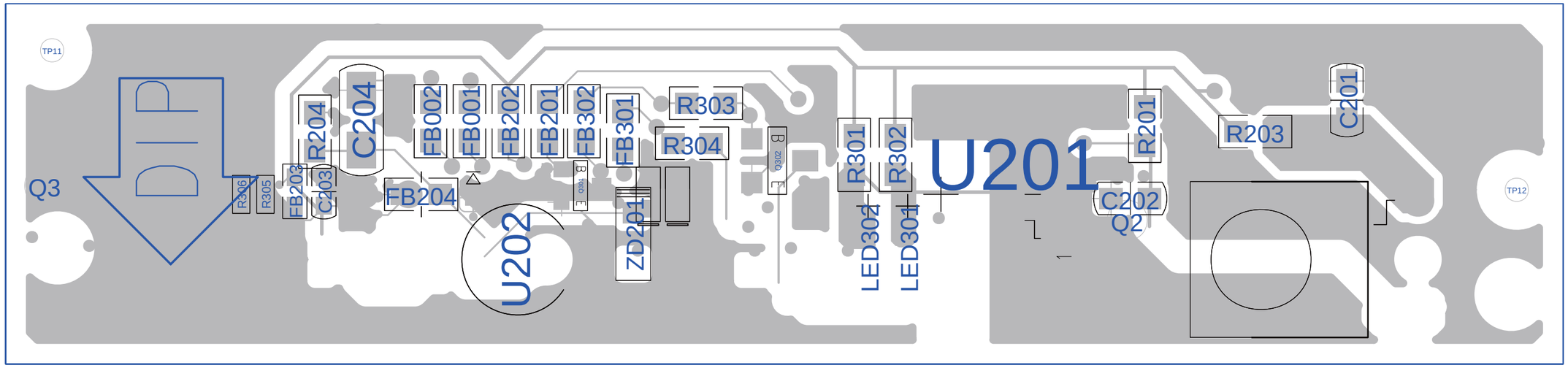
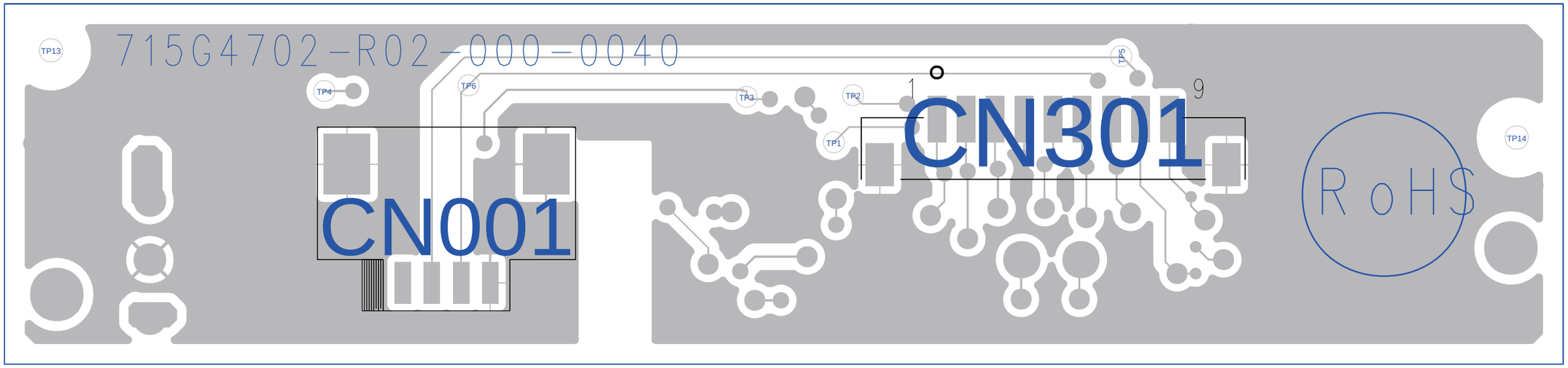
110318

10-10-2 IR/LED board layout

Layout IR/LED Board (Top Side)



Layout IR/LED Board (Bottom Side)



IR/LED board layout top/bottom	715G4702	1 2011-03-18

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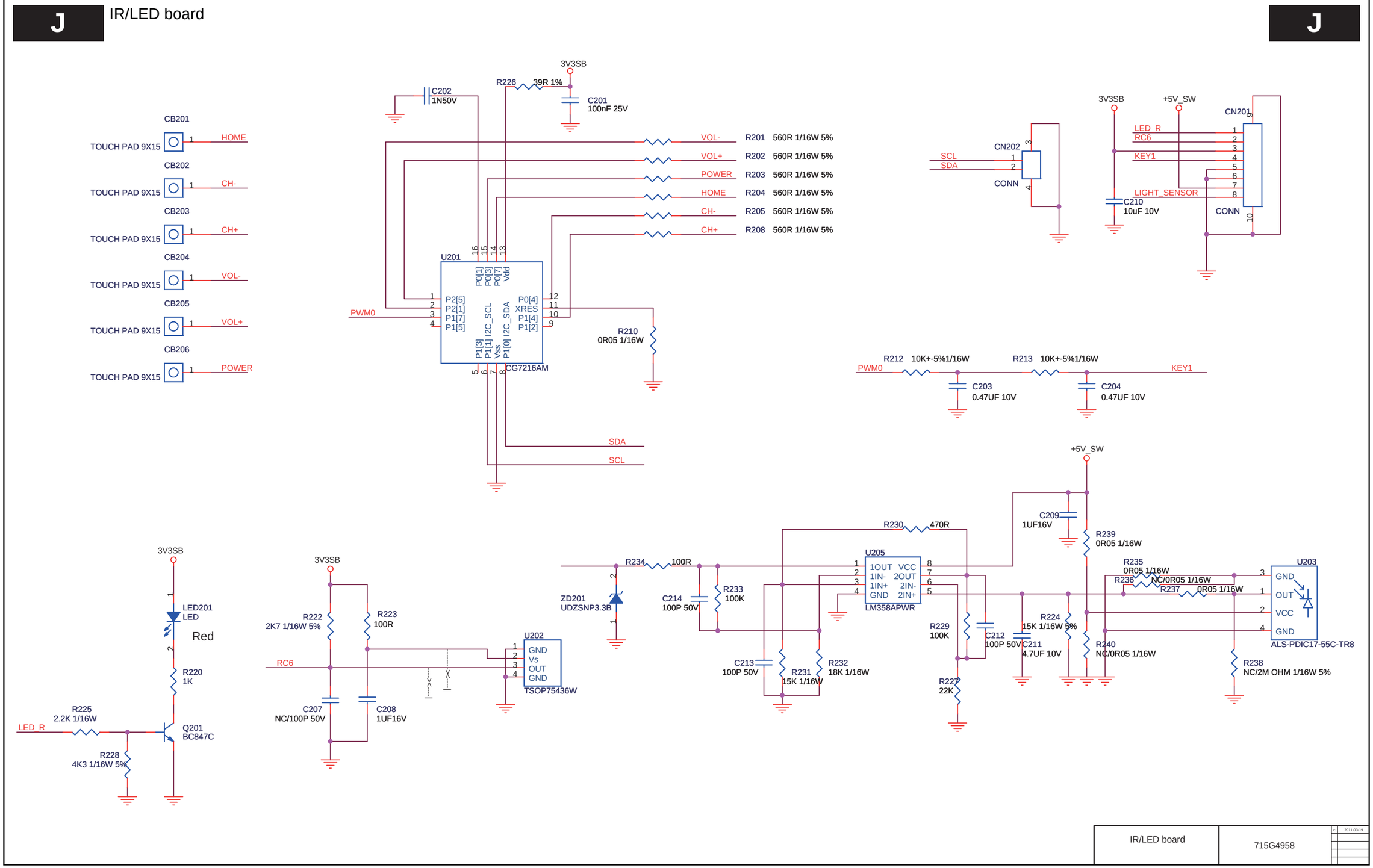
110406

10.11 J 715G4958 IR Berlinale

10-11-1 IR/LED board

J IR/LED board



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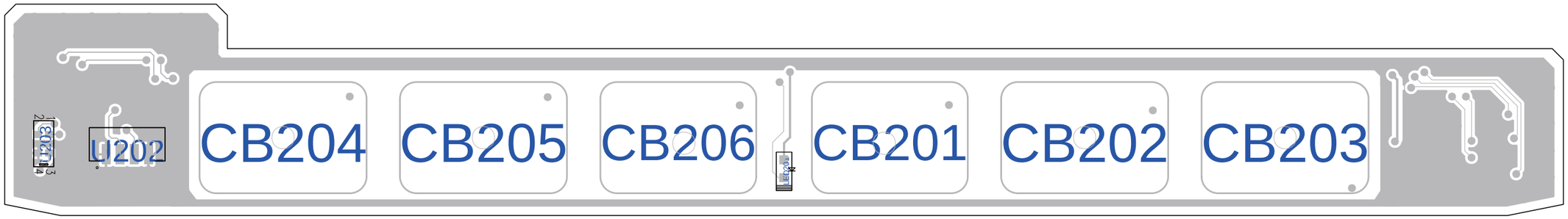
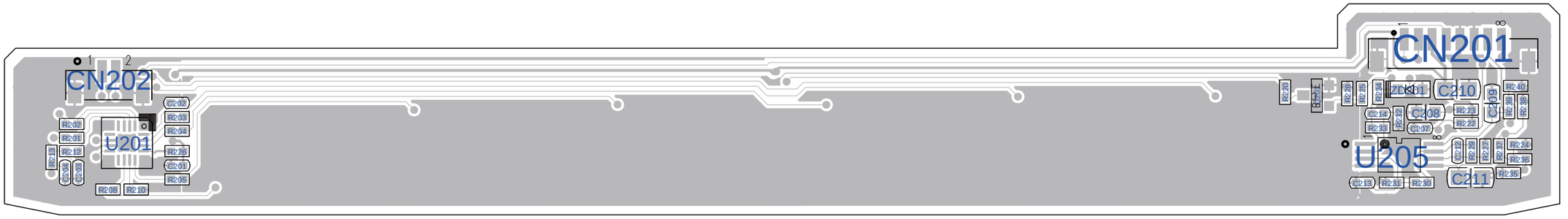
110319

10-11-2 IR/LED board layout

Layout IR/LED Board (Top Side)



Layout IR/LED Board (Bottom Side)



IR/LED board layout top/bottom	715G4958	C 2011-03-19

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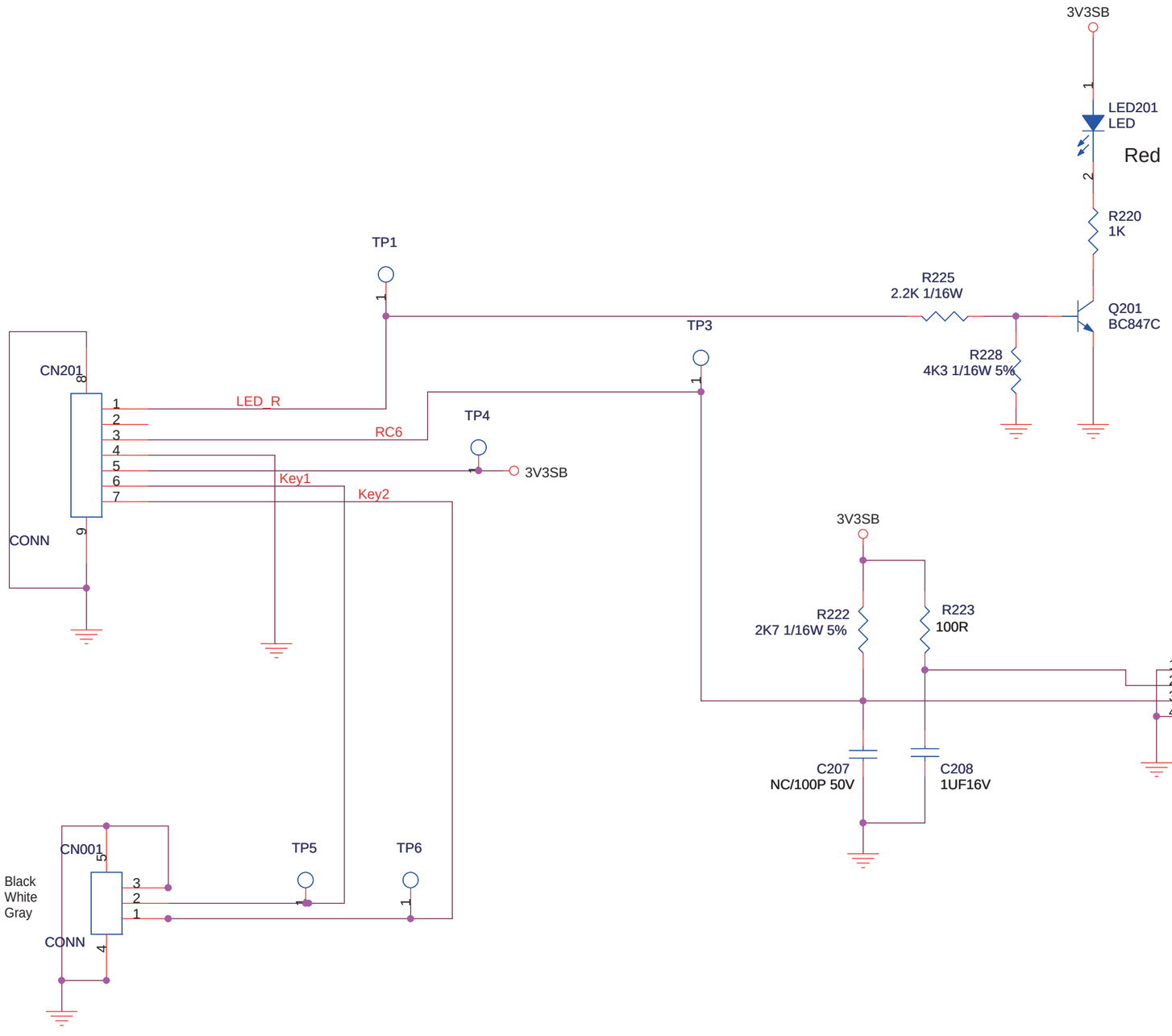
110319

10.12 J 715G5045 IR/LED Design Line Tilt

10-12-1 IR/Key board

J IR/LED J



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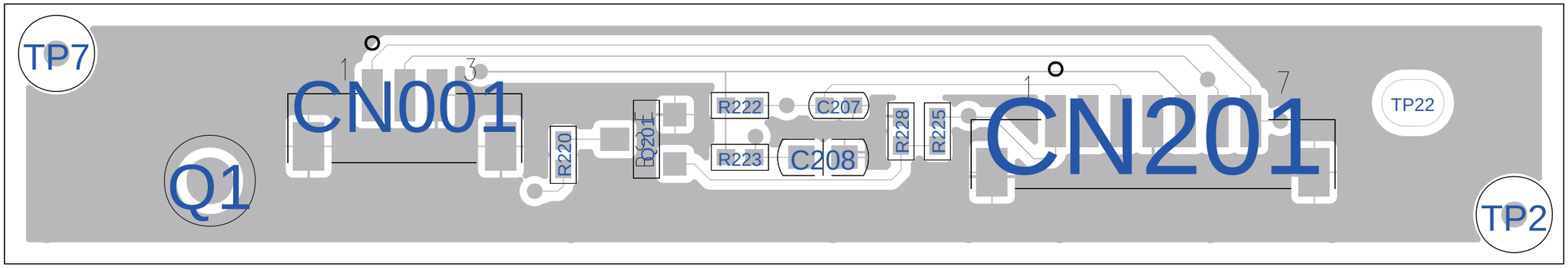
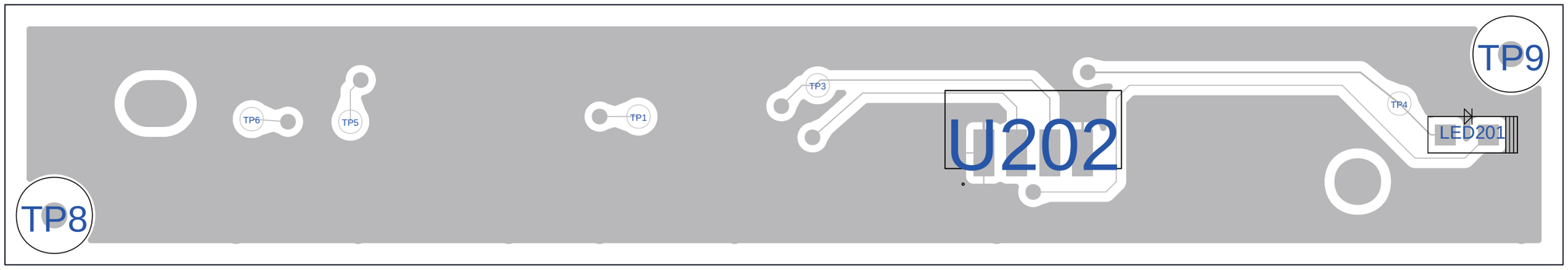
10-12-2 IR/Key board layout

Layout IR/Key Board (Top Side)



Layout IR/Key Board (Bottom Side)



IR/Key board layout top/bottom	715G5045	C 2011-03-10

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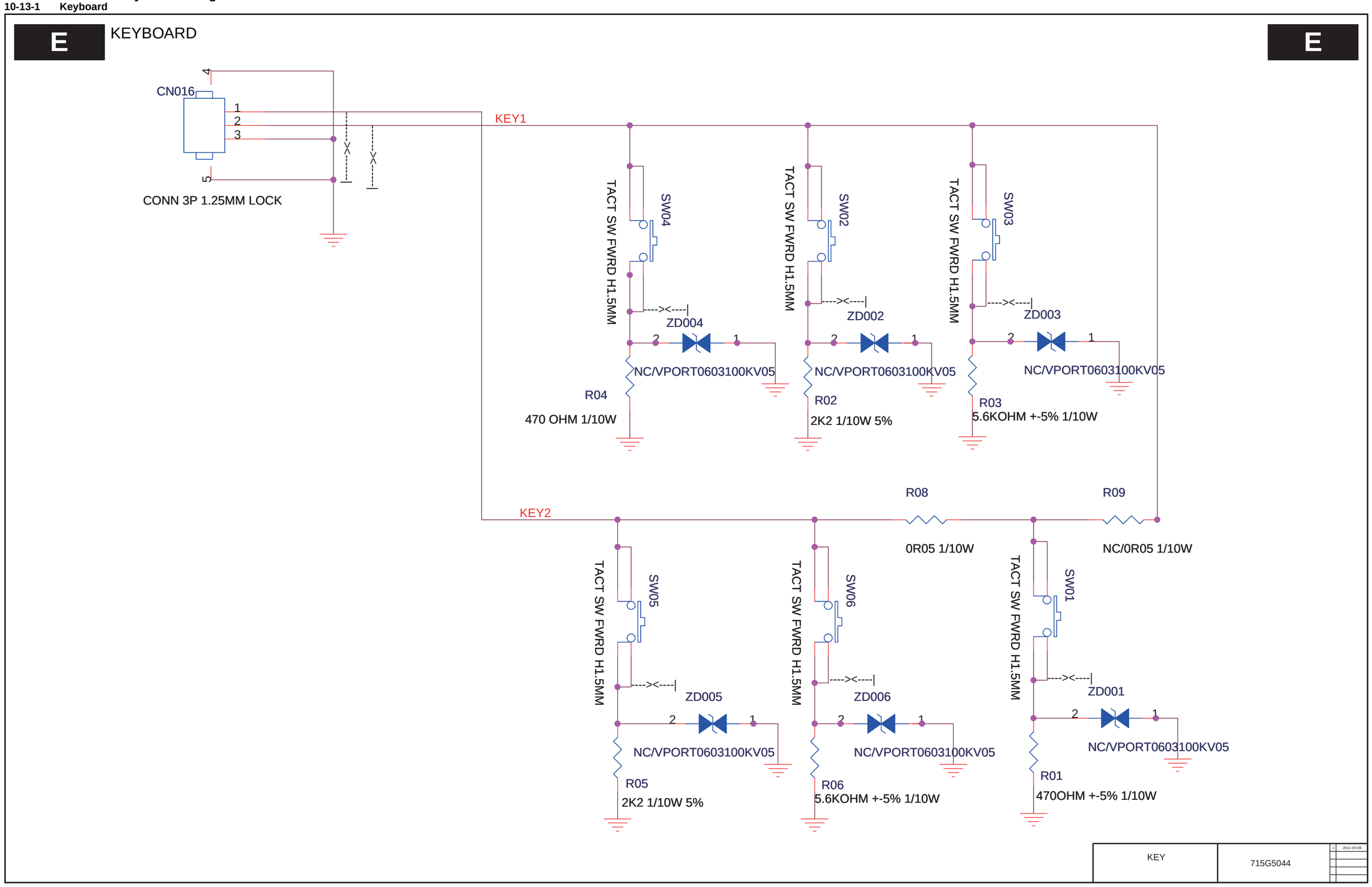
10.13 E 715G5044 Keyboard Design Line Tilt

10-13-1 Keyboard



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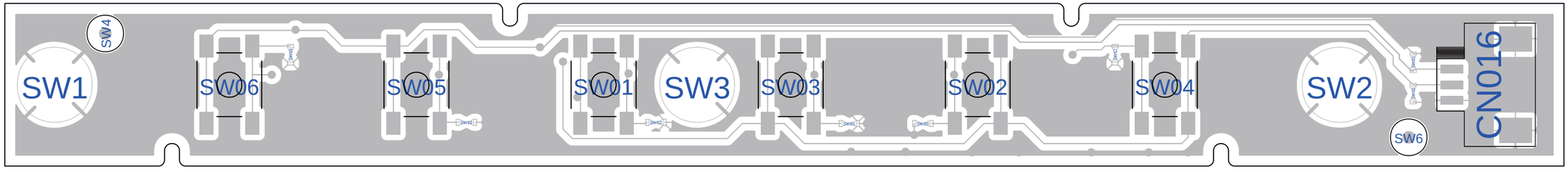
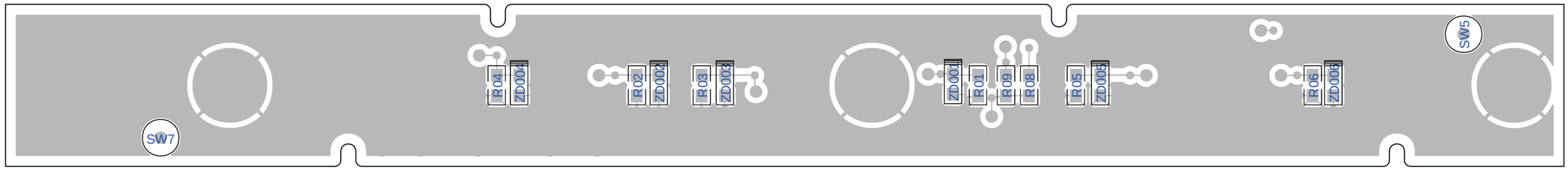
10-13-2 Keyboard layout

Layout Key Board (Top Side)



Layout Key Board (Bottom Side)



KEY board layout top/bottom	715G5044	1 2011-03-09

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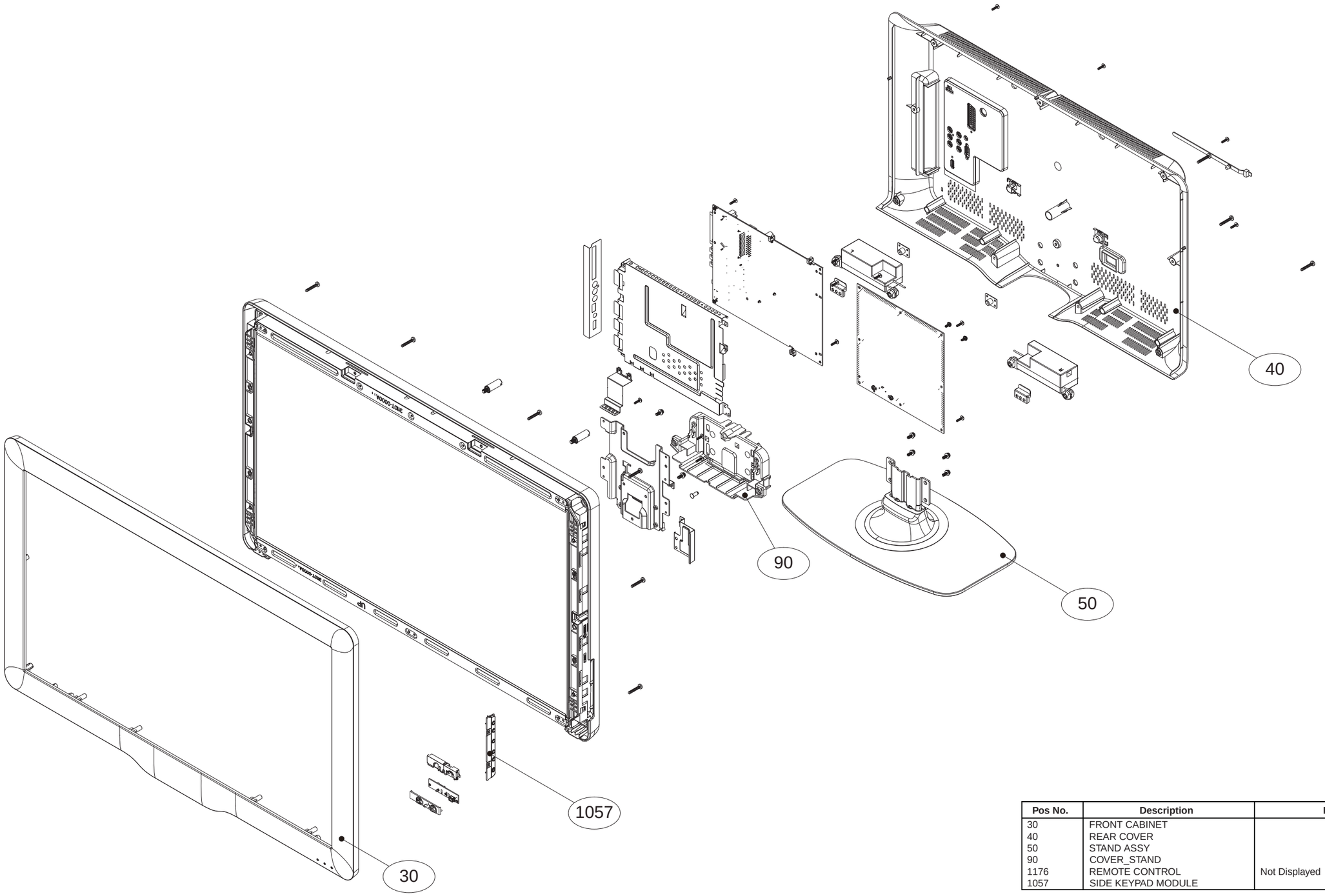
11. Styling Sheets

11.1 Thriller 32"

Thriller 32"



Pos No.	Description	Remarks
30	FRONT CABINET	
40	REAR COVER	
50	STAND ASSY	
90	COVER_STAND	
1176	REMOTE CONTROL	Not Displayed
1057	SIDE KEYPAD MODULE	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

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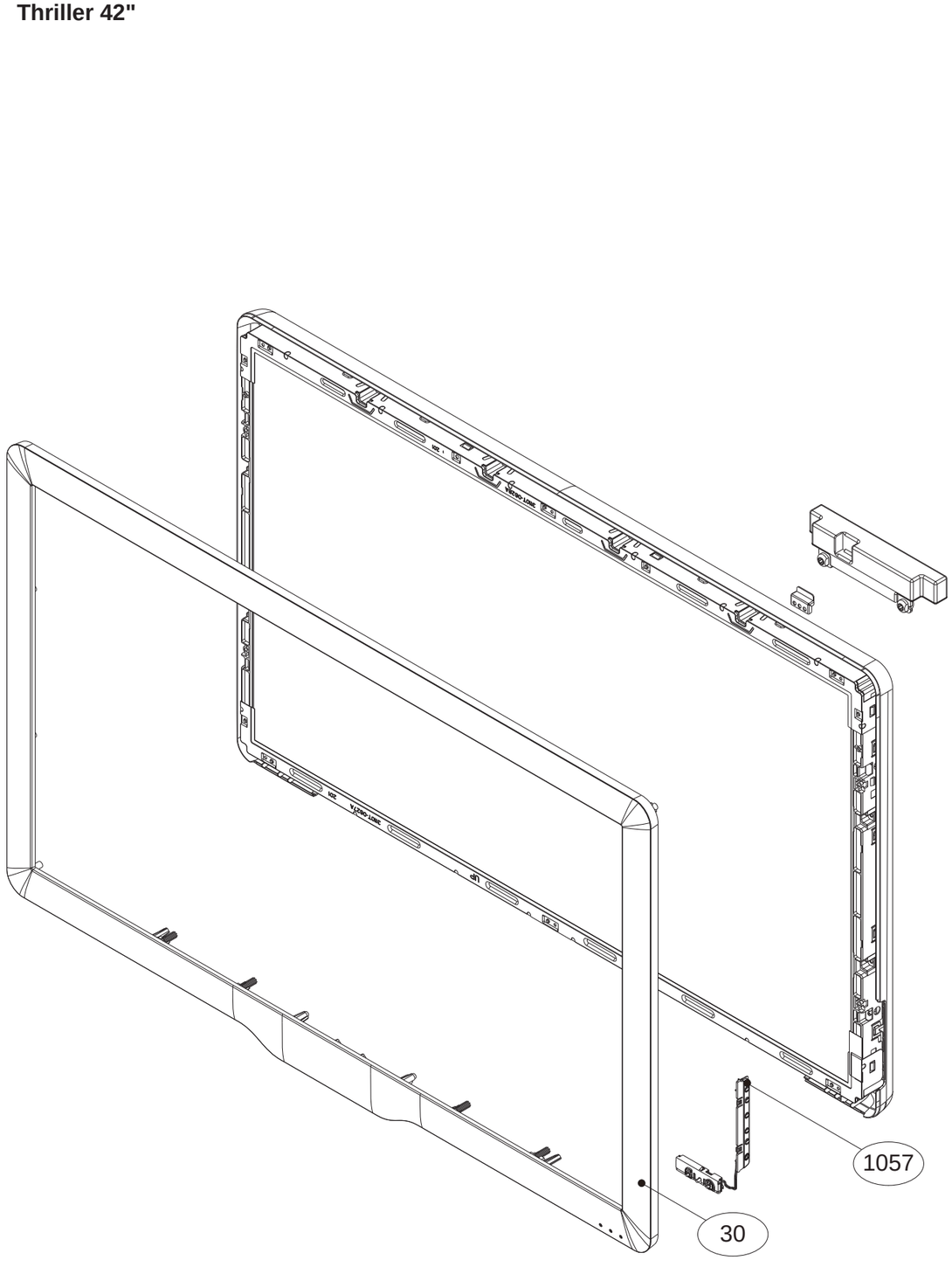
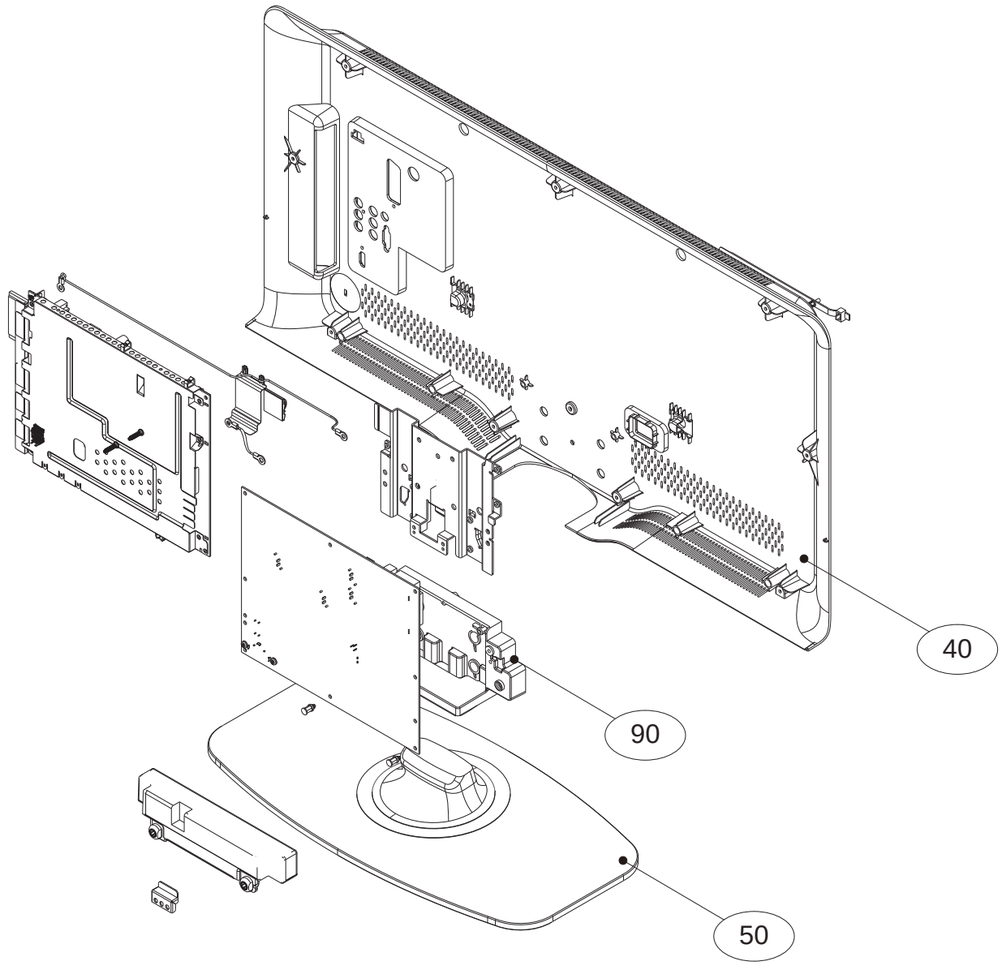
11.2 Thriller 42"

Thriller 42"





Pos No.	Description	Remarks
30	FRONT CABINET	
40	REAR COVER	
50	STAND ASSY	
90	COVER_STAND	
1176	REMOTE CONTROL	Not Displayed
1057	SIDE KEYPAD MODULE	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

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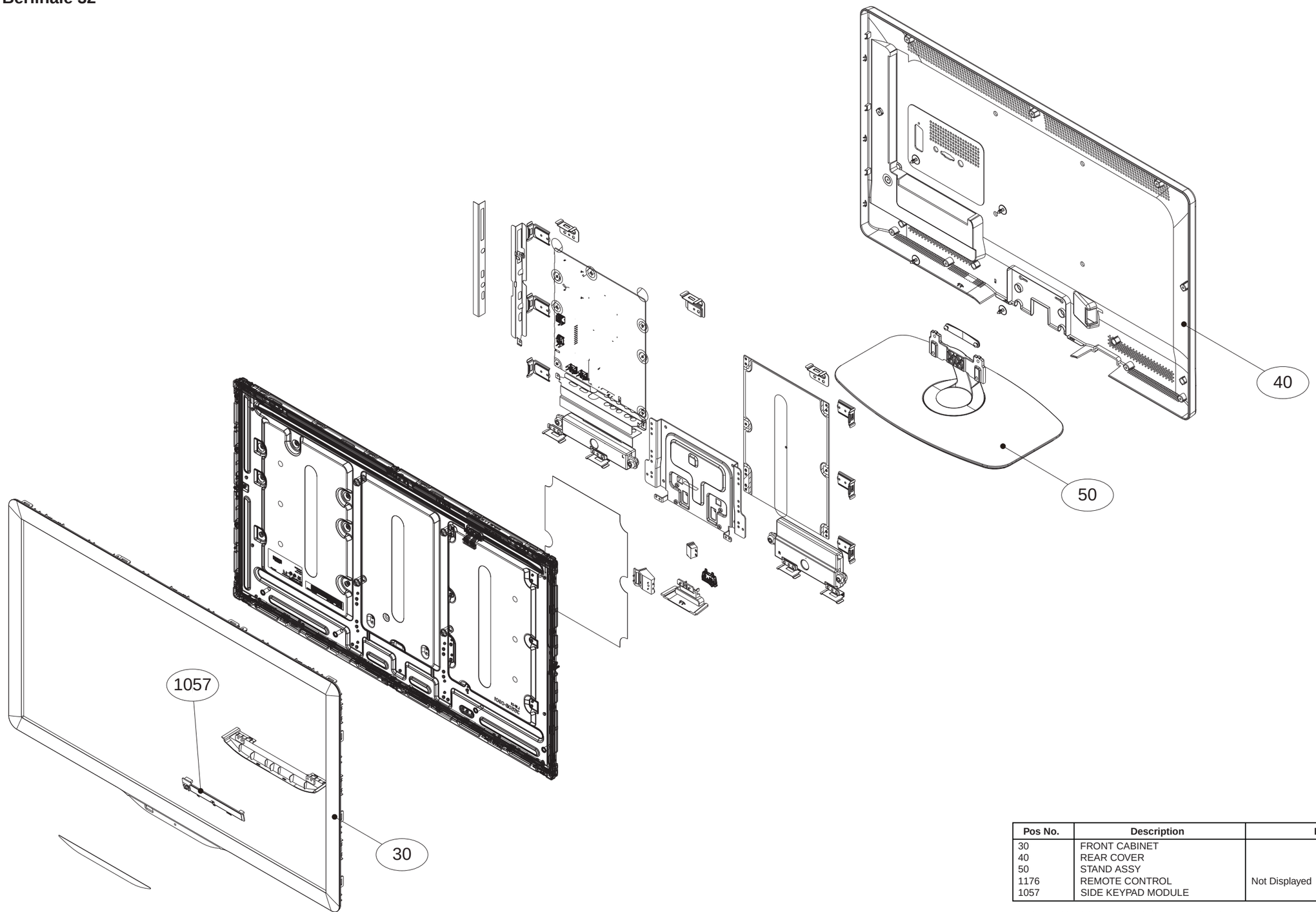
11.3 Berlinale 32"

Berlinale 32"



Pos No.	Description	Remarks
30	FRONT CABINET	
40	REAR COVER	
50	STAND ASSY	
1176	REMOTE CONTROL	Not Displayed
1057	SIDE KEYPAD MODULE	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

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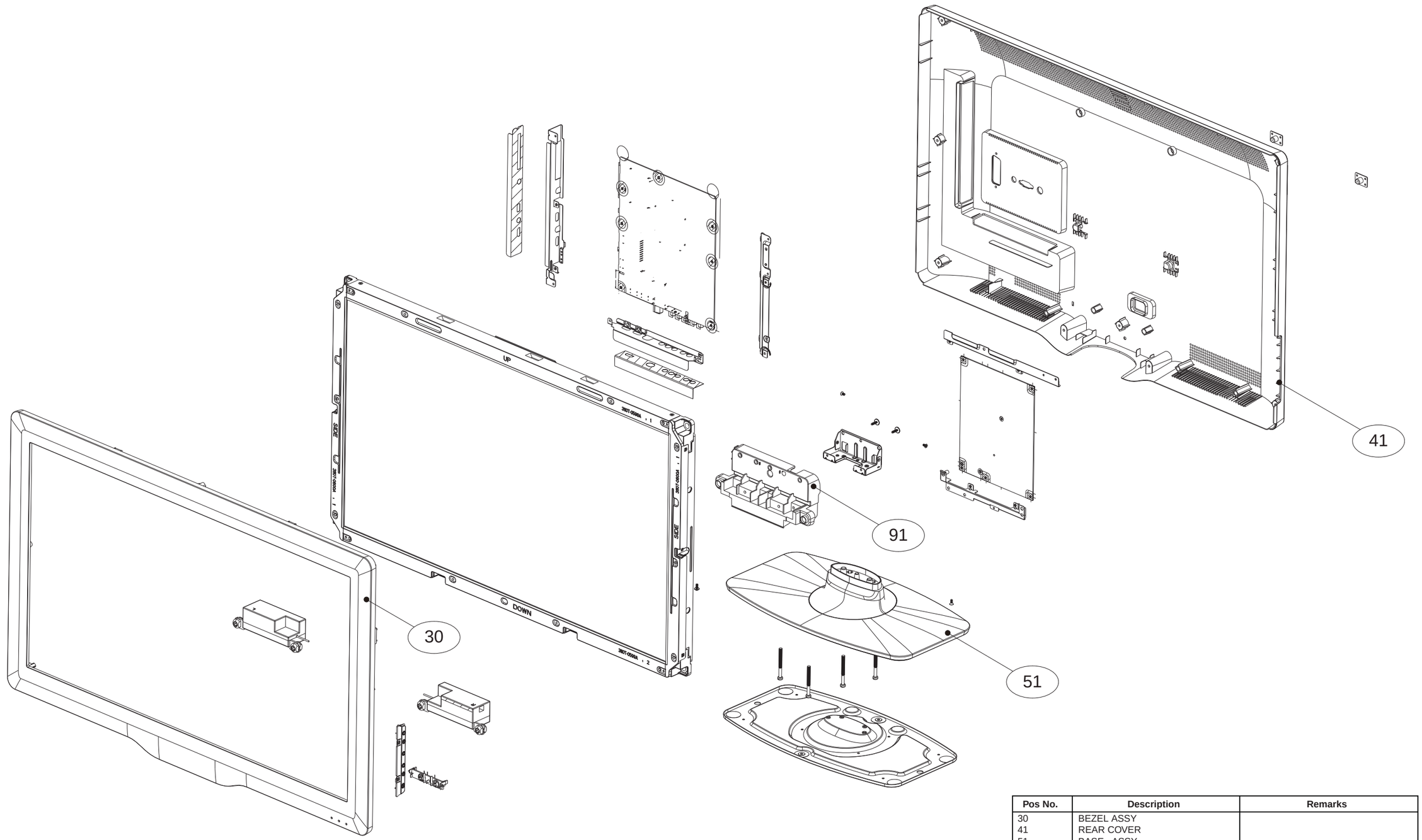
110825

11.4 Thriller HD 32"

Thriller HD 32"



Pos No.	Description	Remarks
30	BEZEL ASSY	
41	REAR COVER	
51	BASE _ASSY	
91	BASE _NECK	
1176	REMOTE CONTROL	Not Displayed

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

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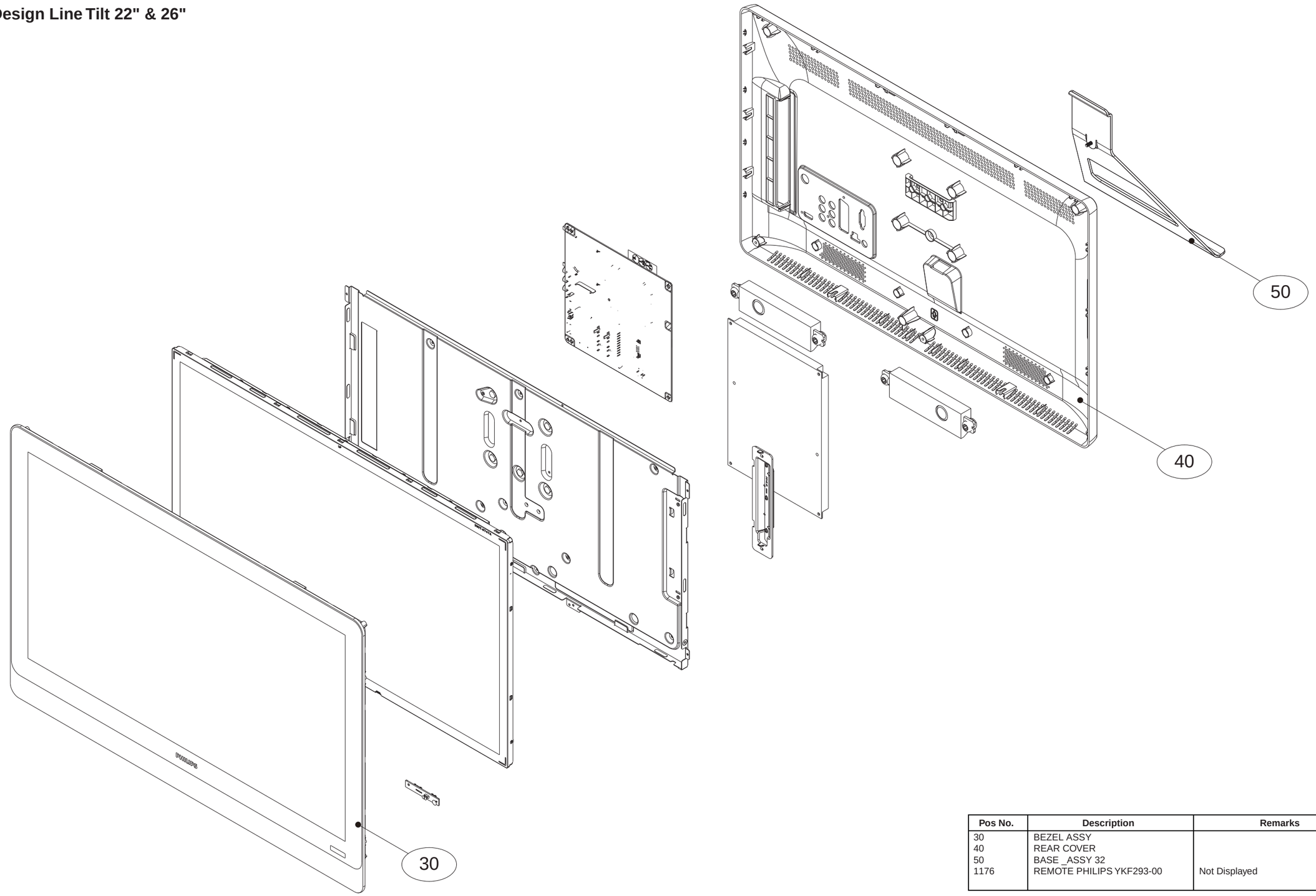
11.5 Design Line Tilt 22" & 26"

Design Line Tilt 22" & 26"



Pos No.	Description	Remarks
30	BEZEL ASSY	
40	REAR COVER	
50	BASE _ASSY 32	
1176	REMOTE PHILIPS YKF293-00	Not Displayed

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

19082_800_110810.eps
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