

Service
Service
Service

Service Manual

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1. Revision List

Manual xxxx xxx xxxx.0

- First release.

Manual xxxx xxx xxxx.1

- **Chapter 7:** Updated Figure [7-3 Power Architecture](#).
- **Chapter 10:** Corrected the drawing [EMC board](#)

Manual xxxx xxx xxxx.2

- **Chapter 5:** Updated the contents [5.4 Service Tools](#).

- **Chapter 7:** Updated Figure [7-2 SSB layout cells \(top view\)](#).
- **Chapter 7:** Updated Figure [7-3 Power Architecture](#).

2. Technical Specs, Diversity, and Connections

Index of this chapter:

[2.1 Technical Specifications](#)

[2.2 Directions for Use](#)

[2.3 Connections](#)

[2.4 Chassis Overview](#)

Notes:

- Figures can deviate due to the different set executions.
- Specifications are indicative (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>

2.1 Technical Specifications

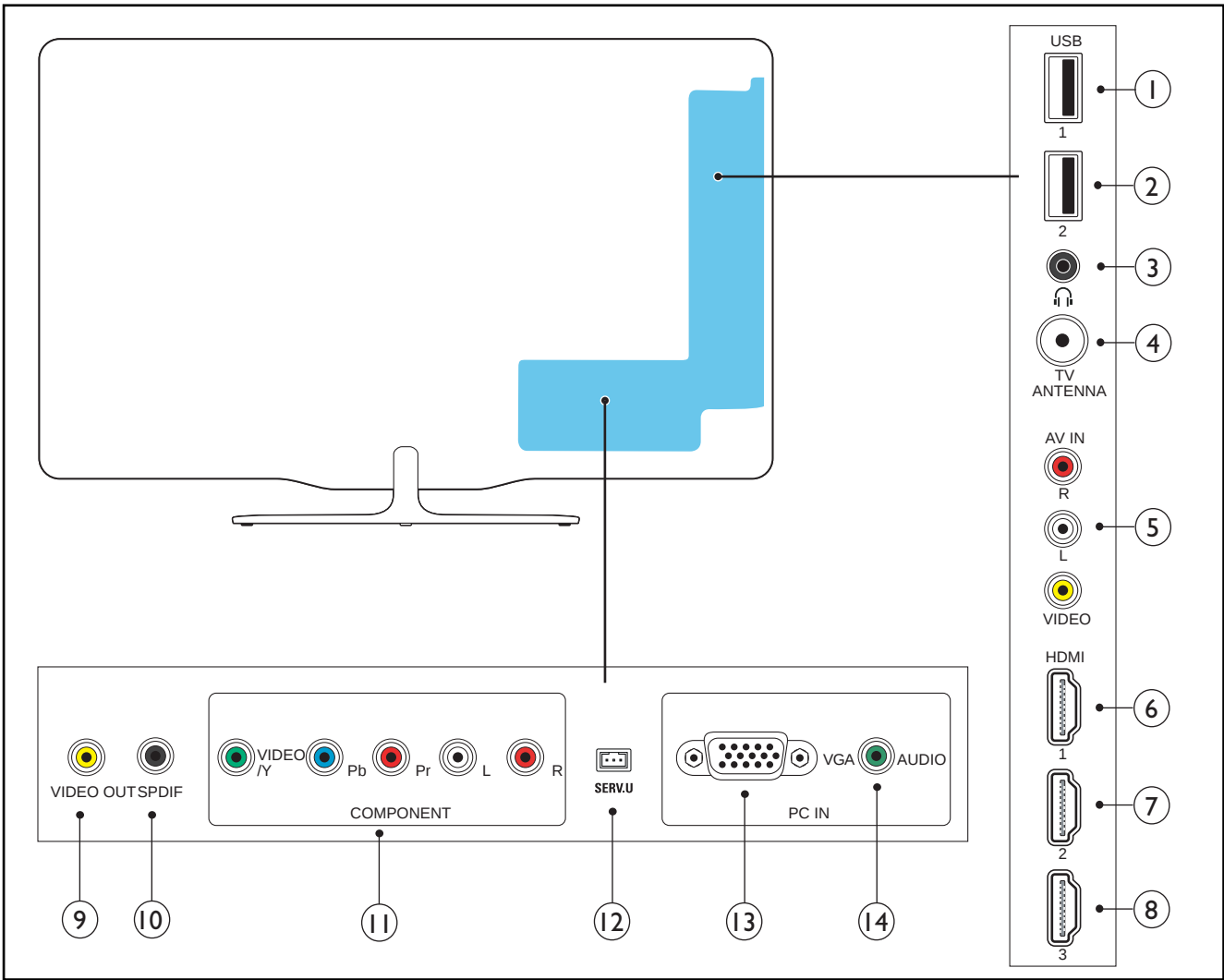
For on-line product support please use the links in. Here is product information available, as well as getting started, user manuals, frequently asked questions and software & drivers.

Table 2-1 Described Model Numbers:

Model Number	Styling	Published in
32PFL5606S/98	Ebony	3122 785 19170
42PFL5606S/98	Ebony	3122 785 19170

Note: The given Model Numbers are subject to change.

2.3 Connections



19170_001_110629.eps
110721

Figure 2-1 Connection overview

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 - USB1 2.0

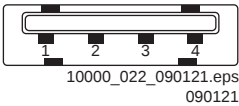
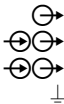


Figure 2-2 USB (type A)

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



2 - USB2 2.0

See [1 - USB1 2.0](#)

3 - Head phone (Output)

Bk - Head phone 80 - 600 Ω / 10 mW



4 - TV ANTENNA - In

Signal input from an antenna, cable or satellite.

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

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



6 - HDMI1: Digital Video, Digital Audio - In

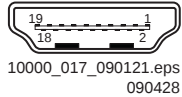


Figure 2-3 HDMI (type A) connector

- 1 - D2+ Data channel
- 2 - Shield Gnd
- 3 - D2- Data channel
- 4 - D1+ Data channel
- 5 - Shield Gnd
- 6 - D1- Data channel
- 7 - D0+ Data channel
- 8 - Shield Gnd
- 9 - D0- Data channel
- 10 - CLK+ Data channel



11 - Shield	Gnd
12 - CLK-	Data channel
13 - 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

**12 - Service / UART**

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

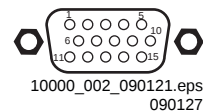
**13 - PC IN:VGA**

Figure 2-4 VGA connector

7 - HDMI2: Digital Video, Digital Audio - InSee [6 - HDMI1: Digital Video, Digital Audio - In](#)**8 - HDMI3: Digital Video, Digital Audio - In**See [6 - HDMI1: Digital Video, Digital Audio - In](#)**2.3.2 Rear Connections****9 - Cinch: Video CVBS - Out**Ye - Video CVBS 1 V_{PP} / 75 Ω**10 - Cinch: S/PDIF - Out**Bk - Coaxial 0.4 - 0.6V_{PP} / 75 Ω**11 - Cinch: Video YPbPr - In, Audio - In**

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



1 - Video Red	0.7 V _{PP} / 75 Ω
2 - Video Green	0.7 V _{PP} / 75 Ω
3 - Video Blue	0.7 V _{PP} / 75 Ω
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

**14 - Audio - In: Left / Right, VGA**Gn - Audio L/R in 0.5 V_{RMS} / 10 kΩ**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](#)

[3.2 Warnings](#)

[3.3 Notes](#)

[3.4 Abbreviation List](#)

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: AG2B033500001) 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: AG1B033500001), then the TV set has been manufactured according to B.O.M. number 1. If the third digit is a "2" (example: AG2B033500001), 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		SDI), is a digitized video format used for broadcast grade video.
DMR	Digital Media Reader: card reader		Uncompressed digital component or digital composite signals can be used.
DMSD	Digital Multi Standard Decoding		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.
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	iTV	Institutional TeleVision; TV sets for hotels, hospitals etc.
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	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
DVB-C	Digital Video Broadcast - Cable	LATAM	Latin America
DVB-T	Digital Video Broadcast - Terrestrial	LCD	Liquid Crystal Display
DVD	Digital Versatile Disc	LED	Light Emitting Diode
DVI(-d)	Digital Visual Interface (d= digital only)	L/L'	Monochrome TV system. Sound carrier distance is 6.5 MHz. L' is Band I, L is all bands except for Band I
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.	LPL	LG.Philips LCD (supplier)
EDID	Extended Display Identification Data (VESA standard)	LS	Loudspeaker
EEPROM	Electrically Erasable and Programmable Read Only Memory	LVDS	Low Voltage Differential Signalling
EMI	Electro Magnetic Interference	Mbps	Mega bits per second
EPG	Electronic Program Guide	M/N	Monochrome TV system. Sound carrier distance is 4.5 MHz
EPLD	Erasable Programmable Logic Device	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
EU	Europe		
EXT	EXternal (source), entering the set by SCART or by cinches (jacks)		
FDS	Full Dual Screen (same as FDW)	MIPS	Microprocessor without Interlocked Pipeline-Stages; A RISC-based microprocessor
FDW	Full Dual Window (same as FDS)		
FLASH	FLASH memory		
FM	Field Memory or Frequency Modulation	MOP	Matrix Output Processor
FPGA	Field-Programmable Gate Array	MOSFET	Metal Oxide Silicon Field Effect Transistor, switching device
FTV	Flat TeleVision		
Gb/s	Giga bits per second	MPEG	Motion Pictures Experts Group
G-TXT	Green TeleteXT	MPIF	Multi Platform InterFace
H	H_sync to the module	MUTE	MUTE Line
HD	High Definition	MTV	Mainstream TV: TV-mode with Consumer TV features enabled (iTV)
HDD	Hard Disk Drive	NC	Not Connected
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.	NICAM	Near Instantaneous Compounded Audio Multiplexing. This is a digital sound system, mainly used in Europe.
HDMI	High Definition Multimedia Interface	NTC	Negative Temperature Coefficient, non-linear resistor
HP	HeadPhone	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)
I	Monochrome TV system. Sound carrier distance is 6.0 MHz	NVM	Non-Volatile Memory: IC containing TV related data such as alignments
I ² C	Inter IC bus	O/C	Open Circuit
I ² D	Inter IC Data bus	OSD	On Screen Display
I ² S	Inter IC Sound bus	OAD	Over the Air Download. Method of software upgrade via RF transmission.
IF	Intermediate Frequency		Upgrade software is broadcasted in TS with TV channels.
IR	Infra Red	OTC	On screen display Teletext and Control; also called Artistic (SAA5800)
IRQ	Interrupt Request	P50	Project 50: communication protocol between TV and peripherals
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.	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)	SVGA	800 × 600 (4:3)
PCB	Printed Circuit Board (same as “PWB”)	SVHS	Super Video Home System
PCM	Pulse Code Modulation	SW	Software
PDP	Plasma Display Panel	SWAN	Spatial temporal Weighted Averaging Noise reduction
PFC	Power Factor Corrector (or Pre- conditioner)	SXGA	1280 × 1024
PIP	Picture In Picture	TFT	Thin Film Transistor
PLL	Phase Locked Loop. Used for e.g. FST tuning systems. The customer can give directly the desired frequency	THD	Total Harmonic Distortion
		TMD5	Transmission Minimized Differential Signalling
POD	Point Of Deployment: a removable CAM module, implementing the CA system for a host (e.g. a TV-set)	TS	Transport Stream
		TXT	TeleteXT
POR	Power On Reset, signal to reset the uP	TXT-DW	Dual Window with TeleteXT
PSDL	Power Supply for Direct view LED backlight with 2D-dimming	UI	User Interface
PSL	Power Supply with integrated LED drivers	uP	Microprocessor
PSLS	Power Supply with integrated LED drivers with added Scanning functionality	UXGA	1600 × 1200 (4:3)
		V	V-sync to the module
PTC	Positive Temperature Coefficient, non-linear resistor	VESA	Video Electronics Standards Association
PWB	Printed Wiring Board (same as “PCB”)	VGA	640 × 480 (4:3)
PWM	Pulse Width Modulation	VL	Variable Level out: processed audio output toward external amplifier
QRC	Quasi Resonant Converter	VSB	Vestigial Side Band; modulation method
QTNR	Quality Temporal Noise Reduction	WYSIWYR	What You See Is What You Record: record selection that follows main picture and sound
QVCP	Quality Video Composition Processor		
RAM	Random Access Memory	WXGA	1280 × 768 (15:9)
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.	XTAL	Quartz crystal
		XGA	1024 × 768 (4:3)
		Y	Luminance signal
		Y/C	Luminance (Y) and Chrominance (C) signal
RC	Remote Control	YPbPr	Component video. Luminance and scaled color difference signals (B-Y and R-Y)
RC5 / RC6	Signal protocol from the remote control receiver	YUV	Component video
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 ² C		
SCL-F	CLock Signal on Fast I ² C bus		
SD	Standard Definition		
SDA	Serial Data I ² C		
SDA-F	DAta Signal on Fast I ² C bus		
SDI	Serial Digital Interface, see “ITU-656”		
SDRAM	Synchronous DRAM		
SECAM	SEquence 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		

4. Mechanical Instructions

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[4.1 Cable Dressing](#)

[4.2 Service Positions](#)

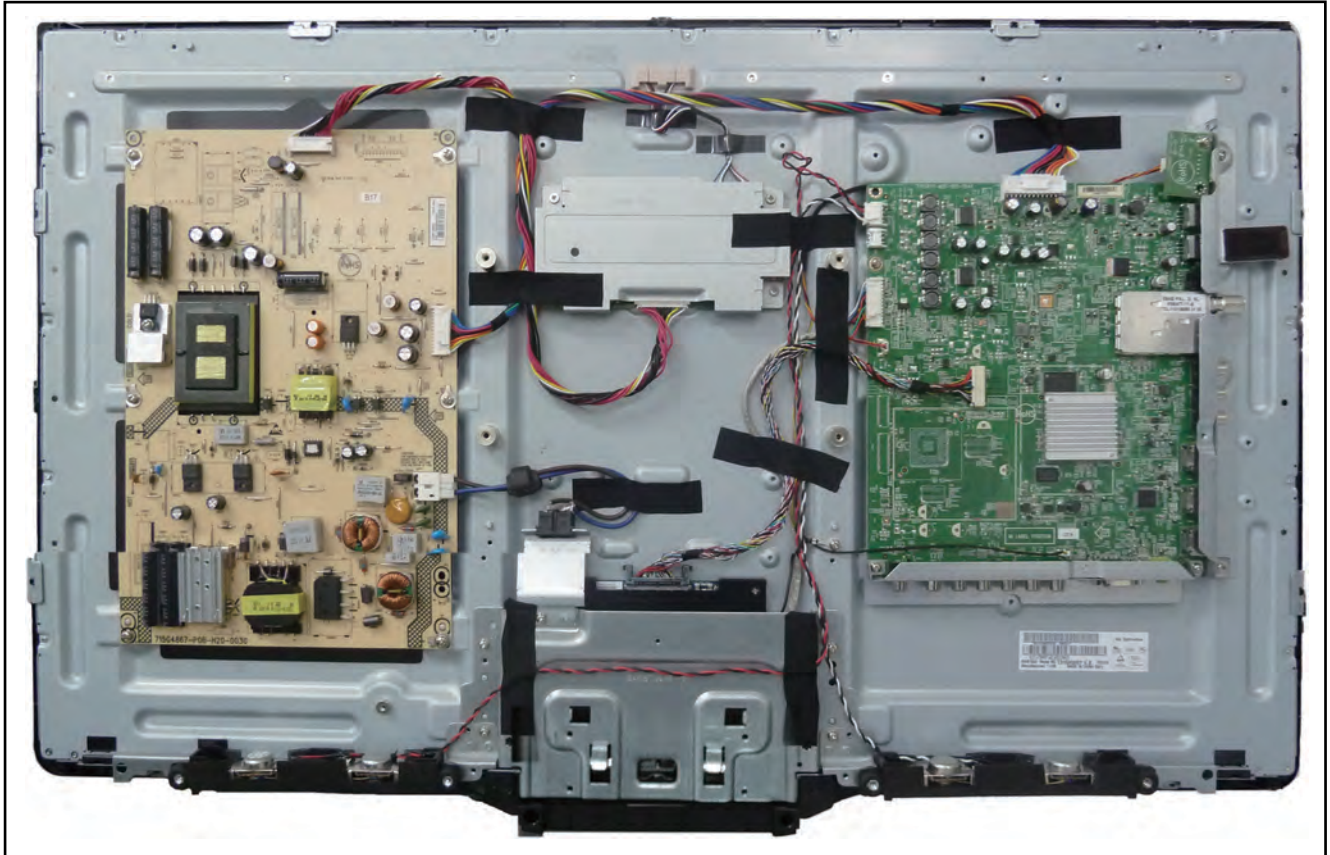
[4.3 Assembly/Panel Removal](#)

[4.4 Set Re-assembly](#)

Notes:

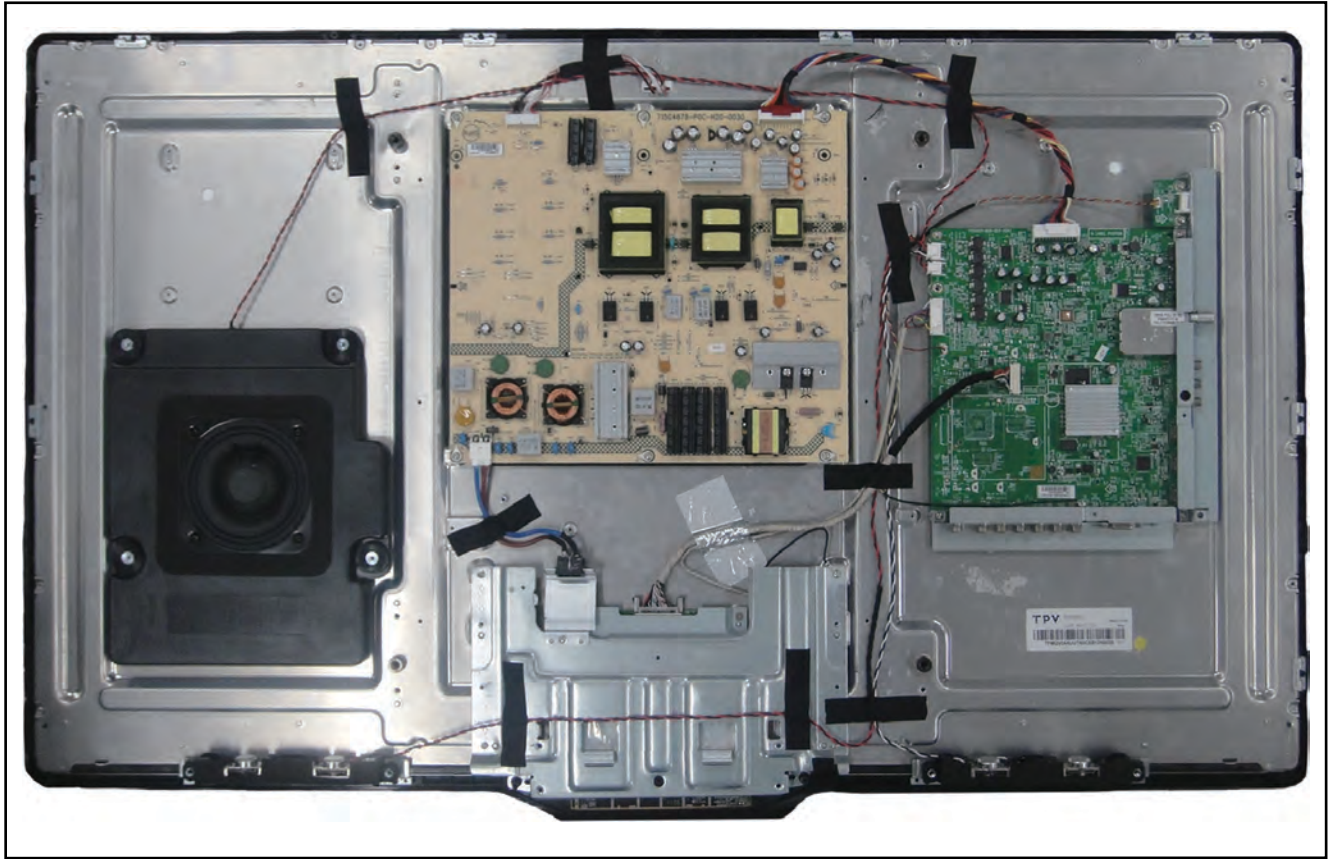
- Figures below can deviate slightly from the actual situation, due to the different set executions.

4.1 Cable Dressing



19170_100_110705.eps
110705

Figure 4-1 Cable dressing 32"



19170_101_110706.eps
110706

Figure 4-2 Cable dressing 42"

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

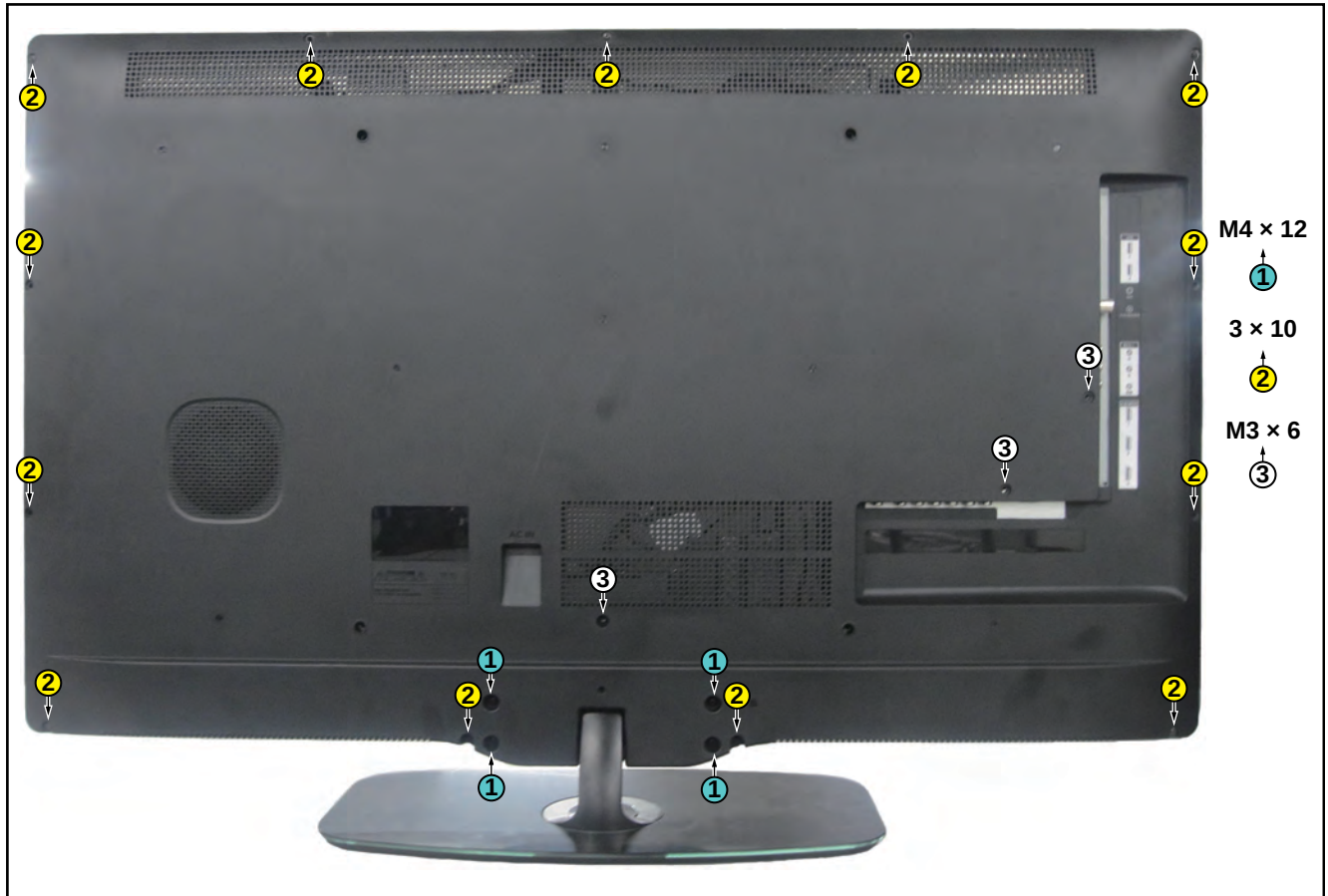
Instructions below apply to the 42PFL5606S/98, but will be similar for other models.

4.3.1 Rear Cover

Refer to [Figure 4-3](#) for details.

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

1. Remove the fixation screws [1], [2] and [3] that secure the rear cover. Refer to [Figure 4-3](#) for details.
2. Lift the rear cover from the TV. Make sure that wires and LVDS cable are not damaged while lifting the rear cover from the set.



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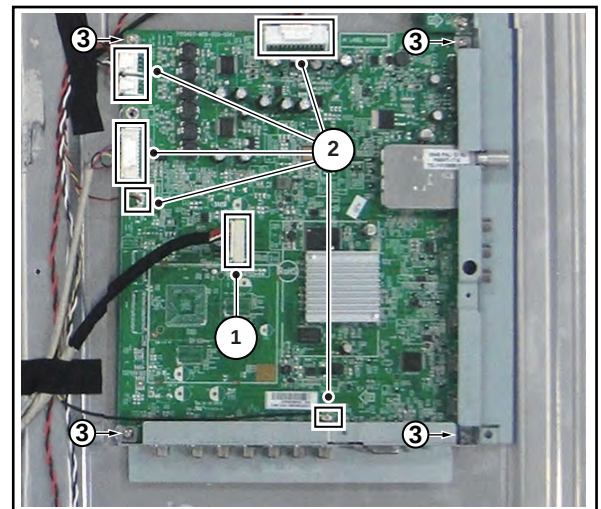
Figure 4-3 Rear cover removal

4.3.2 Small Signal Board (SSB)

Refer to [Figure 4-4](#) 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 cables/Flat Foils connectors that connect to the SSB [1].
Caution: be careful, as these are very fragile connectors!
2. Release the clamps and unplug all other connectors [2].
3. Remove all fixation screws [3] from the SSB.
4. Take out of the SSB. Refer to [Figure 4-4](#) for details.



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Figure 4-4 SSB removal

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. Unplug power connector from the SSB.
2. Unplug all other connectors from the PSU.
3. Remove all fixation screws from the PSU.
4. The PSU can be taken out of the set now.

4.3.4 Speakers

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

When defective, replace both units.

4.3.5 EMC Board

1. Unplug the connector from the EMC board.
2. Remove all fixation screws from the EMC board.

When defective, replace both units.

4.3.6 IR/LED Board

1. Unplug the connectors from the IR/LED board.
2. Release the clips that hold the board and take it out from the bezel.

When defective, replace both units.

4.3.7 LCD Panel

1. Release the LVDS connector from the LCD panel.
2. Take out the speakers, as described earlier.
3. Remove the MEMC board as described earlier.
4. Remove the IR/LED board as described earlier.
5. Release all tapes that fit cables to the back side of the LCD panel.
6. Remove all fixation screws of the sub frames on the sides of the LCD panel.
7. Lift the sub frames, together with the mounted panels from the LCD panel and put it aside.
8. Lift the LCD panel from the front bezel.

When defective, replace the whole unit.

4.4 Set Re-assembly

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

Notes:

- While re-assembling, make sure that all cables are placed and connected in their original position. See [Figure 4-1](#) and [Figure 4-2](#).
- 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](#)
[5.2 Service Modes](#)
[5.3 Stepwise Start-up](#)
[5.4 Service Tools](#)
[5.5 Software Upgrading](#)
[5.6 Error Codes](#)
[5.7 The Blinking LED Procedure](#)
[5.8 Fault Finding and Repair Tips](#)

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: 1kHz left, 400 Hz 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).

Table 5-1 Service mode overview

Service Modes	Description
SAM	Service alignment mode
SDM	Service default Mode
CSM	Customer Service Mode, a 3-page compact status overview of the set. These pages will be written to a dump file on a USB memory stick upon entering CSM-mode
USB software upgradeable	Software upgrading of flash memories MTK-chips MT5301B can be done via USB. The main software can be upgraded via Autorun.upg
NVM-Editor in SAM	NVM-editor provides address and data field editing
Service Data	New Service data in SAM for CTN, Prod. no., and 12NC programming with a virtual keyboard
USB copy/paste in SAM	Channel list, NVM data, Readable info, EDID
UART logging	UART logging is available, however no specification of the output, according to MTK definition.
Blind SAM	Remote control sequence "062598" + "Menu" + "Panel code"
Clear Buffer	RC sequence "062599" + "OK" or via SAM

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).

CSM is a Service Mode that can be enabled by the consumer. 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.
- Solve customer problems without home visit.

ComPair Mode is used for communication between a computer and a TV on I²C /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 μ P (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 I²C 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 X.YY", where:

- AAAAA is the chassis name.
- B is the region indication: E = Europe, A = AP/China, U = NAFTA, L = LATAM.
- X is the main version number: this is updated with a major change of specification (incompatible with the previous software version). Numbering will go from 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.

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:

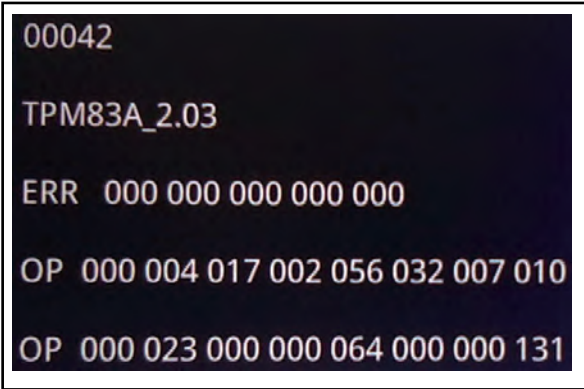
- Press the following key sequence on the RC transmitter: “062596”, directly followed by the “MENU” button.
Note: It is possible that, together with the SDM, the main menu will appear. To switch it “off”, push the “MENU” button again.

After activating this mode, “SDM” will appear in the upper right 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 X.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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110704

Figure 5-1 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, colour, 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: “695260”, directly followed by the “Info” 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 5-2 Example of SAM

Table 5-2 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. "TPM82A 1.02"	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. "012 004 192 002 156 032 007 026"	Option code is hard coded in SW, it cannot be edited in SAM mode. Only to show in SAM system information.
	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	

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: "062596" 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 operation settings of the TV. 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!

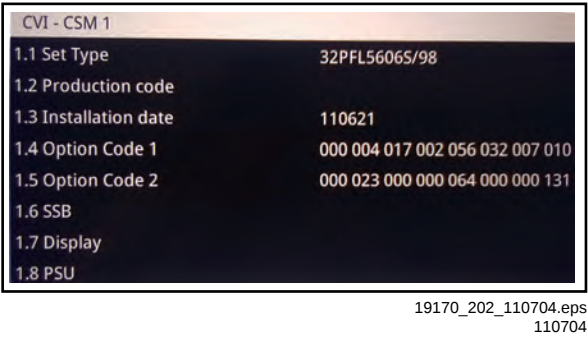


Figure 5-3 CSM Menu [1/3]

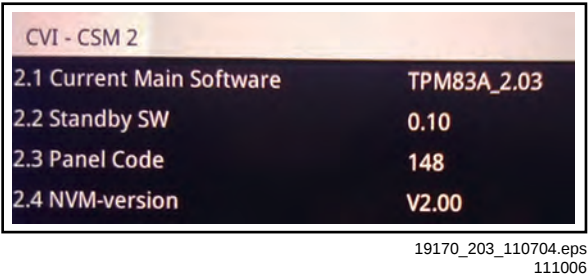


Figure 5-4 CSM Menu [2/3]

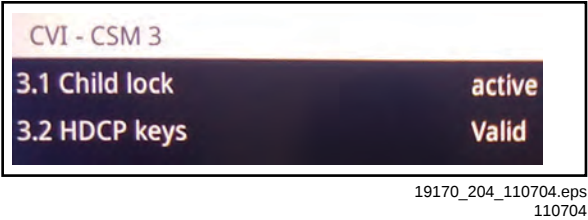


Figure 5-5 CSM Menu [3/3]

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** Displays the 12NC of the NVM.
- **1.8 PSU** Displays the 12NC of the PSU.
- **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 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”.
- **3.2 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.

5.2.5 Blind SAM 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](#). When the value is accepted and stored in NVM, the set will switch to Stand-by, to indicate that the process has been completed.

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

5.4 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 I²C 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 microprocessor 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.

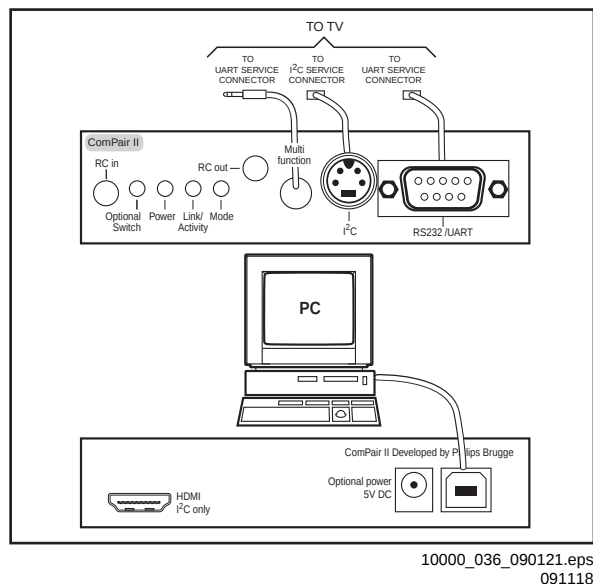


Figure 5-7 ComPair II interface connection

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 TPM8.3x xx.
(using DB9 to 2mm pitch JST connector): 3122 785 90630.

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 "123654" 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 5-8](#).
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 5-8](#).
5. To proceed, in next menu select [Start] and press OK to start software updates. See [Figure 5-9](#).
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 5-10](#).

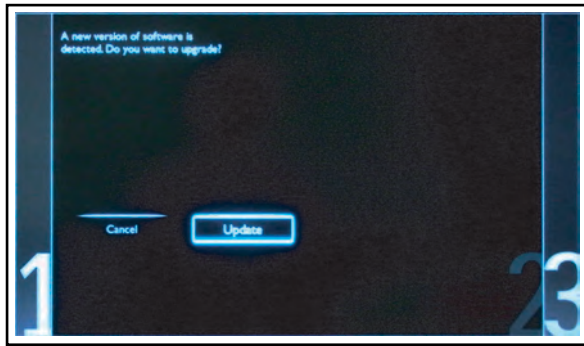
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110324

Figure 5-8 Update the TV software [1/3]

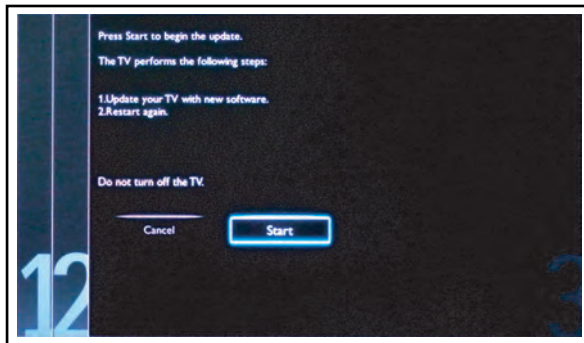
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Figure 5-9 Update the TV software [2/3]

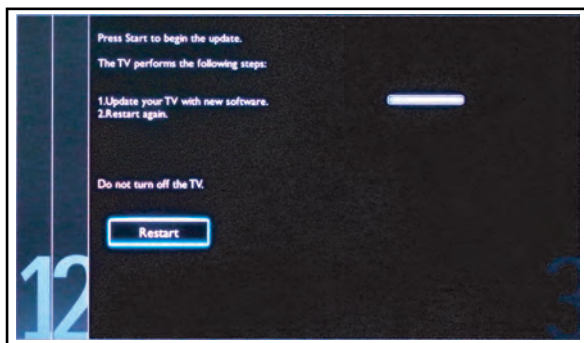
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110324

Figure 5-10 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.

While copying to or from the USB "Repair" Folder to TV, the files need to be named accordingly:

- Channel List: CM_TPM83A_LA_CK.BIN
- EDID 1: HDMI_1_EDID_TPM83A_LA_CK.BIN
- EDID 2: HDMI_2_EDID_TPM83A_LA_CK.BIN
- EDID 3: HDMI_3_EDID_TPM83A_LA_CK.BIN
- VGA_EDID: VAG_EDID_TPM83A_LA_CK.BIN
- NVM: NVM_TPM83A_LA_CK.BIN

For copying EDID data to the TV, all 3 EDID files need to be available in repair directory.

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 I²C device.
- General I²C 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 Read 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 colour.

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 whether the 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 software.

5.8.7 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_CTN name_serial no.txt) will be saved in the root of the USB memory stick.

5.8.8 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!

5.8.9 Display option code

Attention: In case the SSB is replaced, always check the Display 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](#)

[6.2 Hardware Alignments](#)

[6.3 Software Alignments](#)

[6.4 Option Settings](#)

[6.5 Reset of Repaired SSB](#)

6.1 General Alignment Conditions

Perform all electrical adjustments under the following conditions:

- Power supply voltage: 195 - 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.

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

Table 6-1 White tone default settings

Picture mode	Screen size	Colour temperature		
		Red	Green	Blue
Normal (9000K)	32"	128	113	108
	42"	128	125	103
Cool (11000K)	32"	135	128	131
	42"	125	128	117
Warm (6500K)	32"	128	100	75
	42"	128	111	66

6.4 Option Settings

6.4.1 Introduction

The microprocessor communicates with a large number of I²C 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 MT5301B ICs (back-end advanced video picture improvement IC which offers motion estimation and compensation features (commercially called HDNM) is made known by the option codes.

6.4.2 Option Code Overview

Enter SAM mode to check the option codes. They can 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](#). When the value is accepted and stored in NVM, the set will switch to Stand-by, to indicate that the process has been completed.

Table 6-2 Display code overview

CTN_ALT BOM#	Panel Type	Display Code
32PFL5606S/98	AUO T315HW07	148
42PFL5606S/98	TPV TPT420H2-LE5	142

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 (MENU > Setup > TV settings > Reinstall TV > Start now) is to be set. To set all this, you can use the ComPair tool or use the "NVM editor" and "Service Data" 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:
[7.1 Introduction](#)
[7.2 Power Supply](#)
[7.3 Power Management](#)
[7.4 Circuit Description](#)

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.

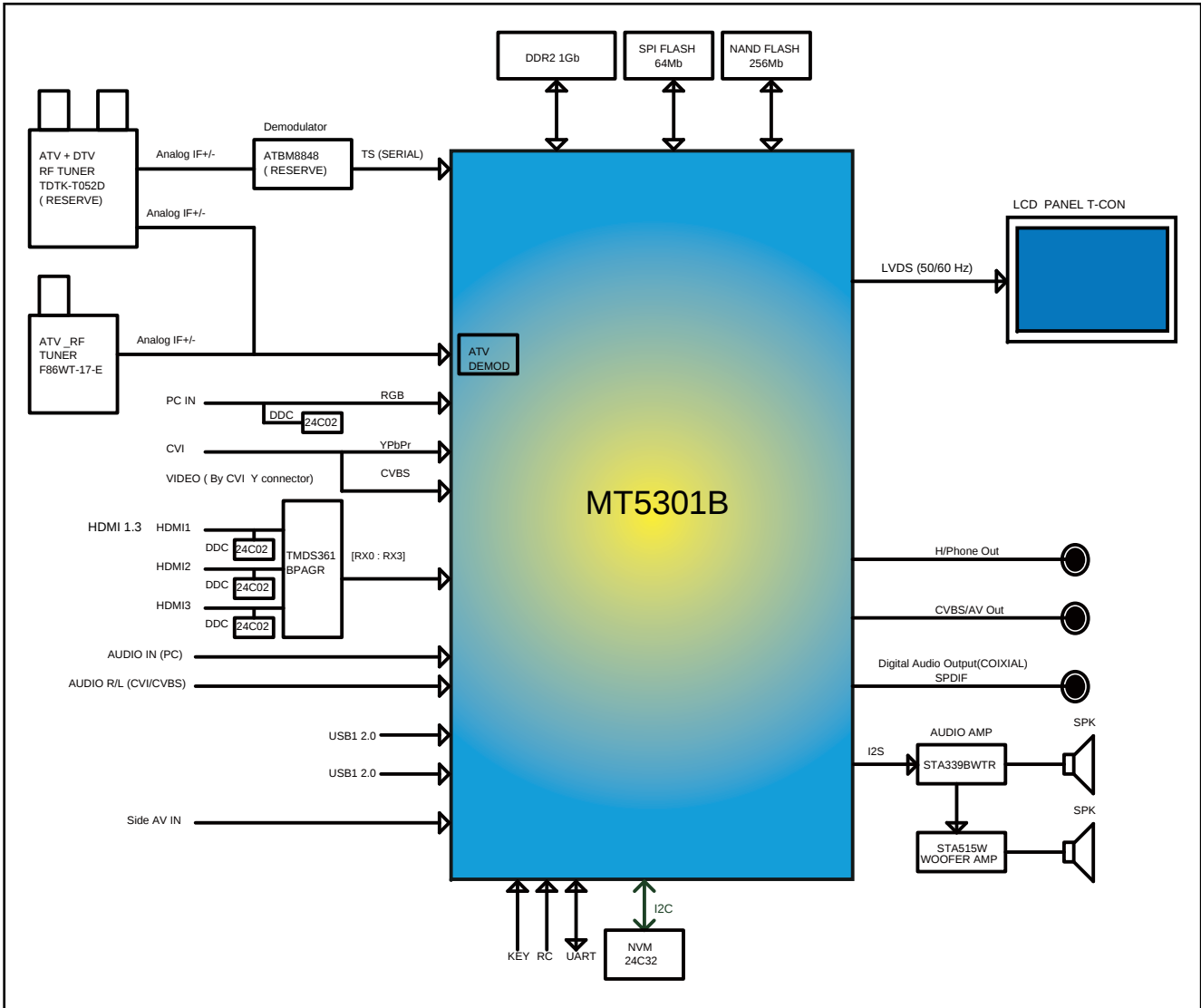
7.1 Introduction

The TPM8.3A LA platform uses MT5301B. It contains decoder and a TV controller offers high integration for advanced applications. It combines a transport de-multiplexer, a high definition video decoder, an audio decoder, a dual-link LVDS/mini-LVDS transmitter, and an NTST/PAL/SECAM TV decoder with a 3D comb filter (NTSC/PAL).

7.1.1 Implementation

- Key components of this chassis are:
- MT5301B System-On-Chip (SOC) TV Processor
 - F86WT-17-E Tuner (analogue)
 - STA515W13TR Head Phone amplifier
 - STA339BWTR audio amplifier
 - TMDS361BPAGR HDMI switch

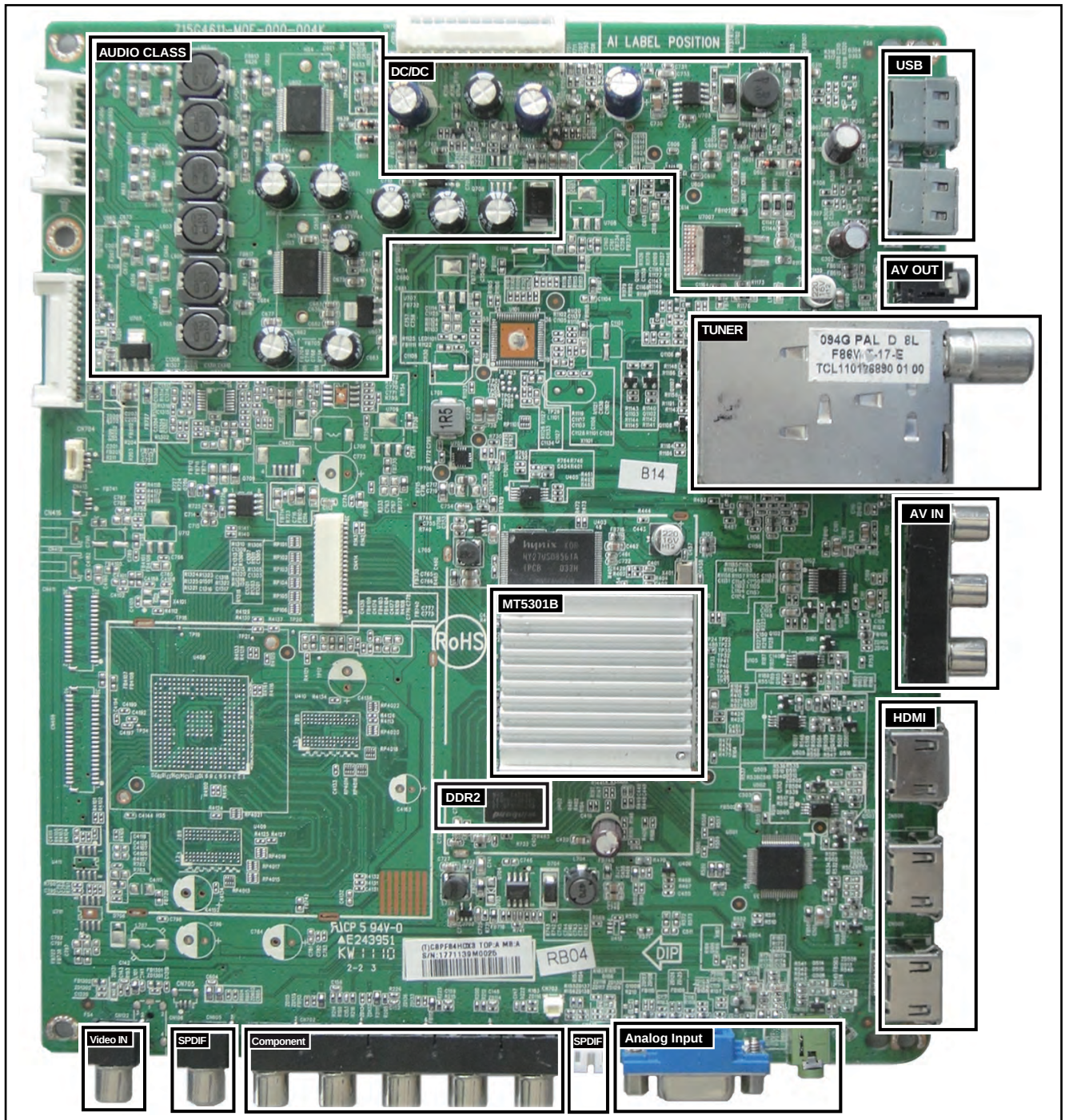
7.1.2 TPM8.3A Architecture Overview



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111006

Figure 7-1 Architecture of TPM8.3A LA

7.1.3 SSB Cell Layout



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111111

Figure 7-2 SSB layout cells (top view)

7.2 Power Supply

7.2.1 Power Supply Unit

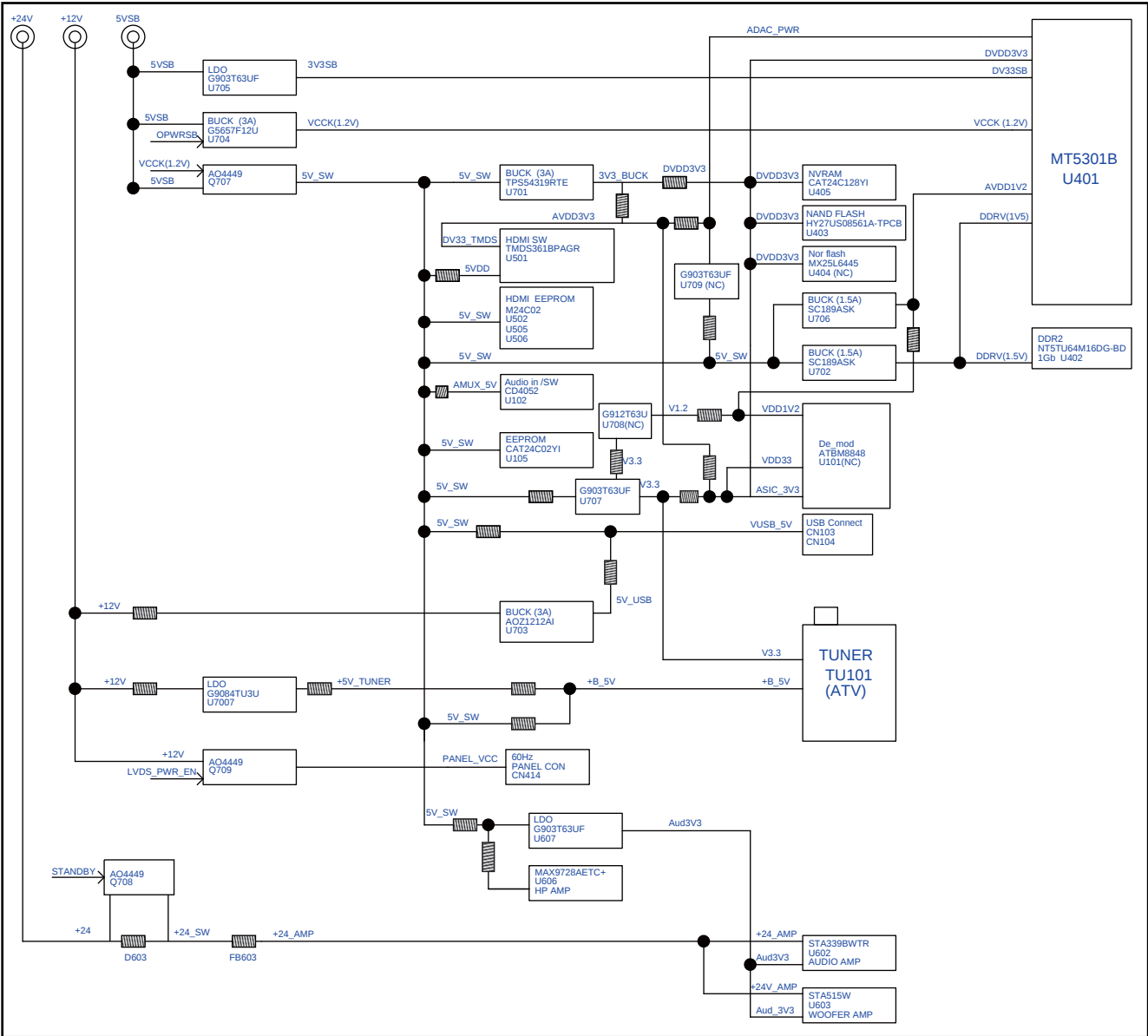
Before checking other parts first check whether fuse on the PSU is not broken. Always replace a defective fuse with one with the correct specifications! This part is available in the regular market.
Consult the Philips Service web portal for the order codes of the boards.

7.3 Power Management

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

7.2.2 Diversity

The diversity in power supply units is mainly determined by the diversity in screen sizes, but please note to always order the correct replacement.



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111107

Figure 7-3 Power Architecture

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 CN701 pin 11 and 12.
- +12V, input from the power supply for panel and tuner; 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 CN701 from power board, to receive the power and signals from the PSU. See [Table 7-1](#) for the correct pinning, The shown test points in [Figure 7-4](#).

Table 7-1 Connector CN701 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.: 0 V, Min.: 3V3)
3	3, 4	+12 V Supply
4	5, 6, 7	Ground
5	8, 9	+24 V Supply
6	10	STANDBY, Standby control (High: Normal, Low: Stand by)
7	11, 12	STB_PWR5V, +5VSB Supply
8	13	LED ON

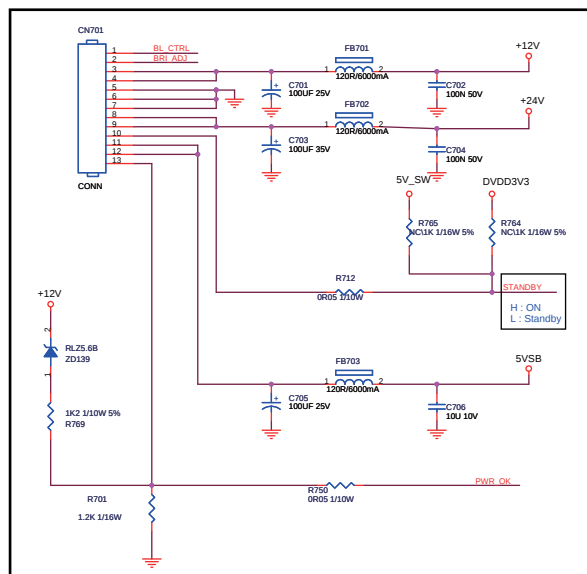


Figure 7-4 System power

7.4.2 Nand flash Memory (U403)

The set uses a 128 MB NAND flash for software code

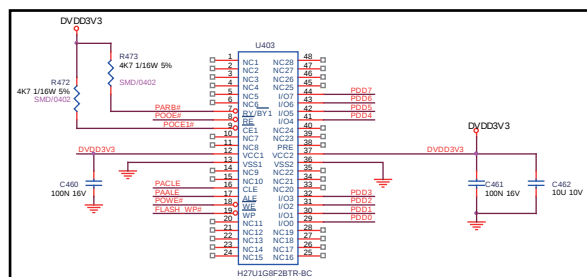


Figure 7-5 Nand flash Memory (U403)

7.4.3 NVM (U405)

The system NVM is a 128 KB IC. It contains all system settings.

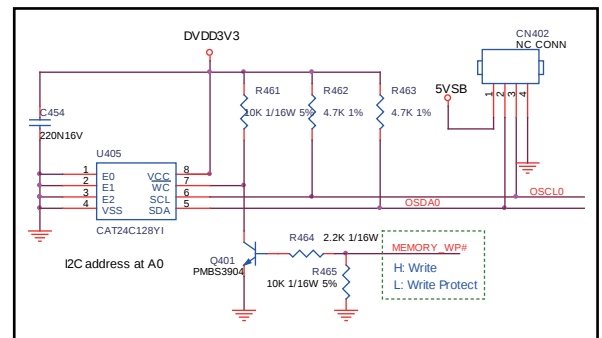


Figure 7-6 NVM (U405)

7.4.4 Reset (U406)

When the input voltage for the MT5301B main processor drops below 2.93 V, a system reset will be enforced by U406.

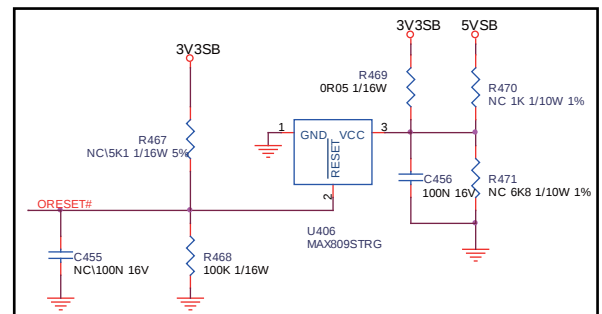


Figure 7-7 Reset (U406)

7.4.5 ARC (HDMI)

ARC (audio return channel) supports HDMI A only, if it gets the ARC command from CEC, then the U412 will be enable and SPDIF will output via HDMI A pin 14.

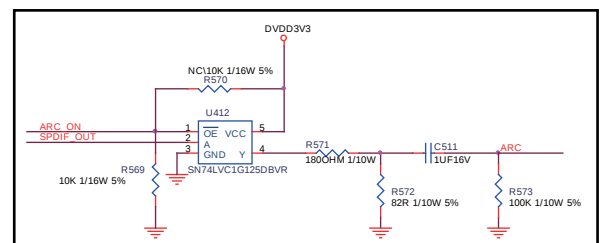


Figure 7-8 ARC (HDMI)

7.4.6 Audio Amplifier (U602)

The platform use I²S to link audio amplifier IC.

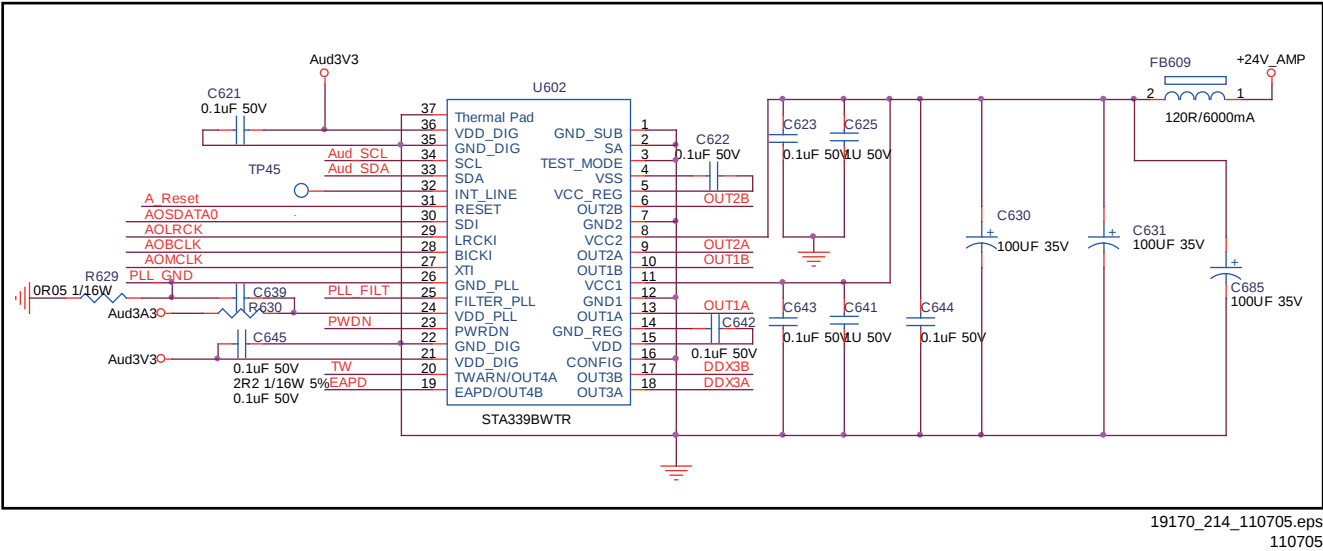


Figure 7-9 Audio Amplifier (U602)

7.4.7 Tuner power

G9084TU3U provides the tuner power of approximately 5 V.

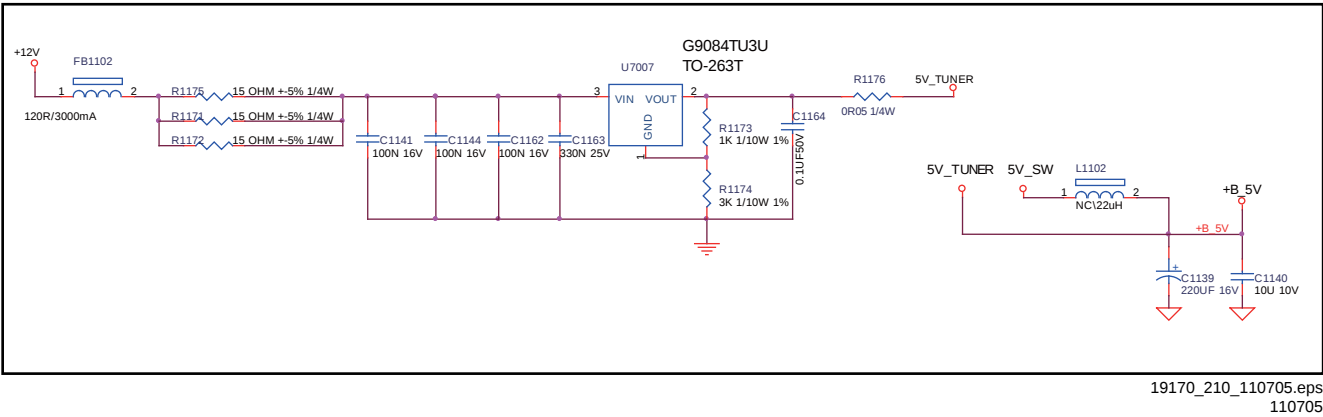


Figure 7-10 Tuner power

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 [MT5301B](#) B08, MT5301B QFP256 (IC U501)

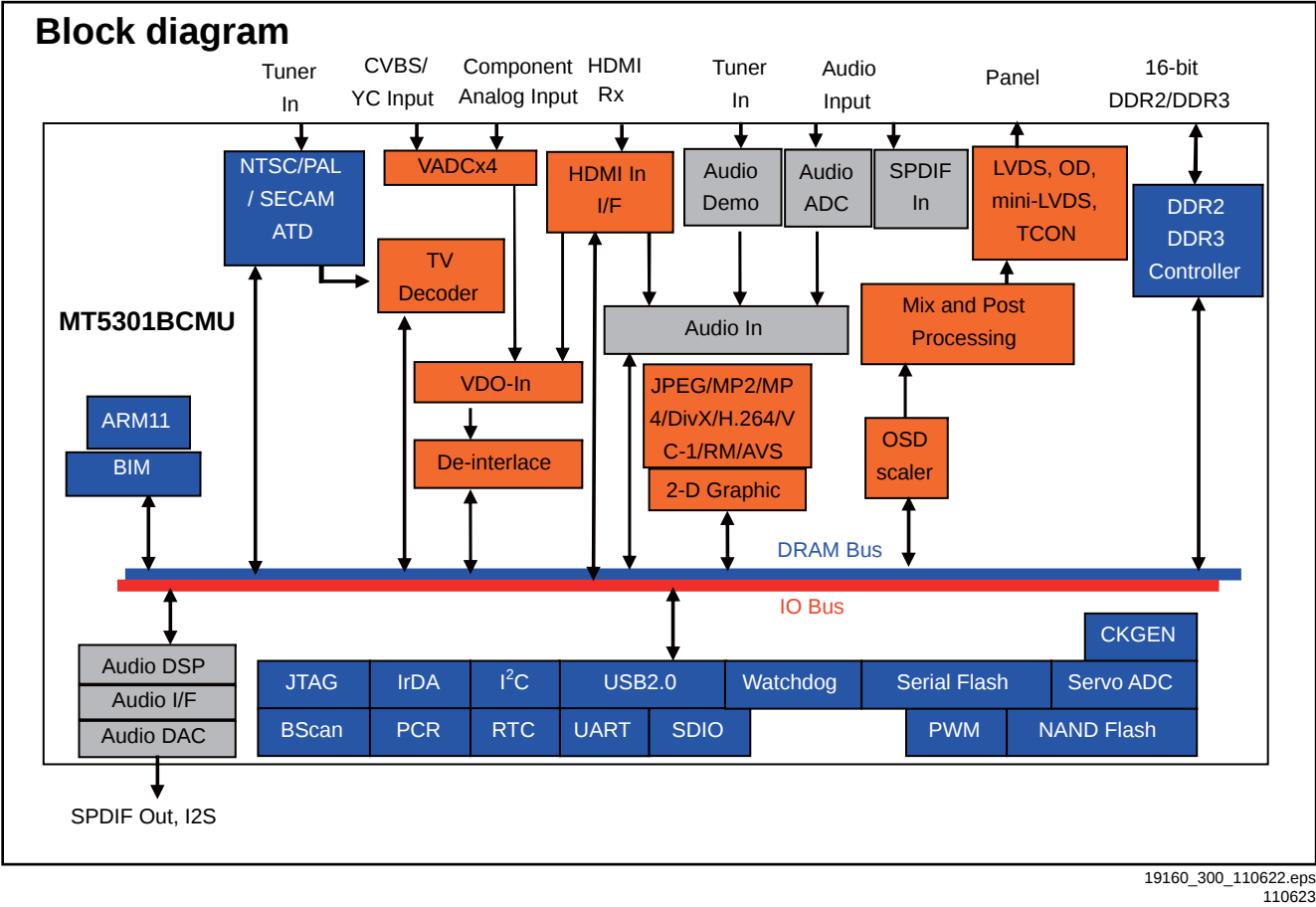


Figure 8-1 Internal block diagram

Pinning information

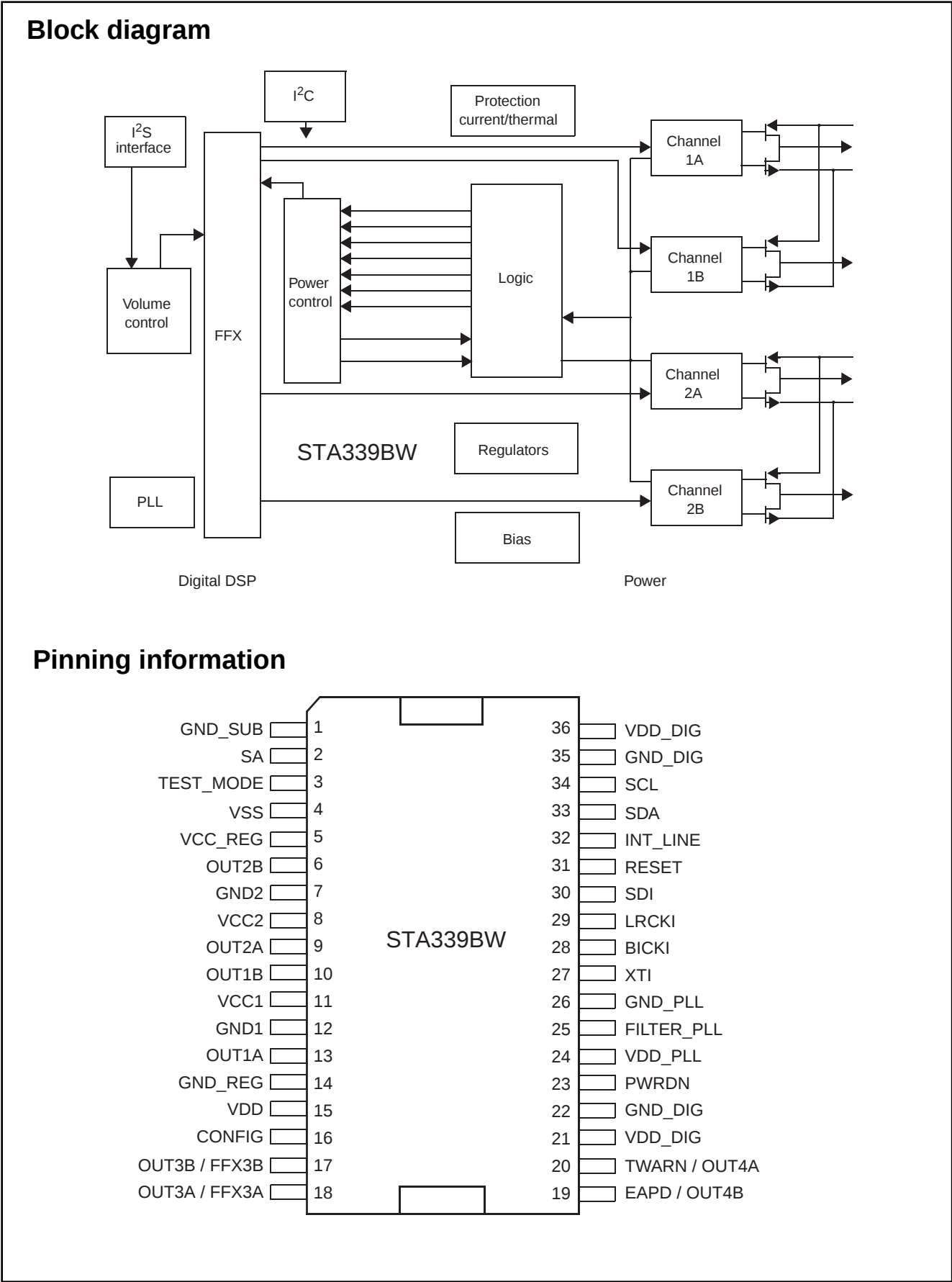
GPIO4	256	192	AVDD33_XTAL_STB
GPIO4	255	191	XTALI
GPIO4	254	190	XTALO
GPIO4	253	189	AVDD33_DEMOD
GPIO4	252	188	AVSS33_DEMOD
GPIO4	251	187	AVSS12_DEMOD
GPIO4	250	186	AVDD33_I2PGA
GPIO4	249	185	ADCINN_DEMOD
GPIO4	248	184	ADCINP_DEMOD
GPIO4	247	183	AVDD12_DEMOD
GPIO4	246	182	AVDD33_CVBS
GPIO4	245	181	CVBSOP
GPIO4	244	180	CVBS_COM
GPIO4	243	179	CVBS1P
GPIO4	242	178	SY0
GPIO4	241	177	SC0
GPIO4	240	176	SY1
GPIO4	239	175	SC1
GPIO4	238	174	AVDD12_PLL
GPIO4	237	173	VCCCK
GPIO4	236	172	FS_VDAC
GPIO4	235	171	AVDD33_VDAC
GPIO4	234	170	VDAC_OUT1
GPIO4	233	169	VDAC_OUT2
GPIO4	232	168	AVSS12_RGB
GPIO4	231	167	AVDD12_RGB
GPIO4	230	166	PROF
GPIO4	229	165	P80P
GPIO4	228	164	COM0
GPIO4	227	163	YOP
GPIO4	226	162	SOY0
GPIO4	225	161	PR1P
GPIO4	224	160	PB1P
GPIO4	223	159	COM1
GPIO4	222	158	Y1P
GPIO4	221	157	SOY1
GPIO4	220	156	RP
GPIO4	219	155	COM
GPIO4	218	154	GP
GPIO4	217	153	SOG
GPIO4	216	152	BP
GPIO4	215	151	HSYNC
GPIO4	214	150	VSYN
GPIO4	213	149	AVDD33_VGA_STB
GPIO4	212	148	AVDD10_LDO
GPIO4	211	147	ADIN4_SVR
GPIO4	210	146	ADIN3_SVR
GPIO4	209	145	ADIN2_SVR
GPIO4	208	144	ADIN1_SVR
GPIO4	207	143	ADIN0_SVR
GPIO4	206	142	VCCCK
GPIO4	205	141	VGA_SCL
GPIO4	204	140	VGA_SDA
GPIO4	203	139	OPWRSB
GPIO4	202	138	OPCTRL1
GPIO4	201	137	OPCTRL0
GPIO4	200	136	OIRI
GPIO4	199	135	U0TX
GPIO4	198	134	U0RX
GPIO4	197	133	AVDD33_PDM_STB
GPIO4	196	132	OPCTRL2
GPIO4	195	131	OPCTRL4
GPIO4	194	130	OPCTRL3
GPIO4	193	129	OPCTRL5
GPIO4	192	128	RESET
GPIO4	191	127	PWRSV
GPIO4	190	126	HDMI_HPD
GPIO4	189	125	HDMI_SCL
GPIO4	188	124	HDMI_SDA
GPIO4	187	123	HDMI_CEC
GPIO4	186	122	AVDD12_HDMI
GPIO4	185	121	RX_2
GPIO4	184	120	RX_2B
GPIO4	183	119	RX_1
GPIO4	182	118	RX_1B
GPIO4	181	117	RX_0
GPIO4	180	116	RX_0B
GPIO4	179	115	RX_C
GPIO4	178	114	RX_CB
GPIO4	177	113	AVDD33_HDMI
GPIO4	176	112	USB_2P_VRT
GPIO4	175	111	AVDD33_USB_2P
GPIO4	174	110	USB_2P_DP0
GPIO4	173	109	USB_2P_DP0
GPIO4	172	108	USB_2P_DP1
GPIO4	171	107	USB_2P_DP1
GPIO4	170	106	USB_2P_DP1
GPIO4	169	105	USB_2P_DP1
GPIO4	168	104	OPWNR
GPIO4	167	103	IRST
GPIO4	166	102	ITDI
GPIO4	165	101	ITMS
GPIO4	164	100	ITCK
GPIO4	163	99	ITDO
GPIO4	162	98	VCCCK
GPIO4	161	97	RECLK0
GPIO4	160	96	RECLK0
GPIO4	159	95	VCCCK
GPIO4	158	94	RD05
GPIO4	157	93	RD05
GPIO4	156	92	VCCCK
GPIO4	155	91	RD03
GPIO4	154	90	RD03
GPIO4	153	89	RD03
GPIO4	152	88	RD03
GPIO4	151	87	VCCCK
GPIO4	150	86	RD04
GPIO4	149	85	RD04
GPIO4	148	84	RD05
GPIO4	147	83	RD05
GPIO4	146	82	VCCCK
GPIO4	145	81	RD04
GPIO4	144	80	RD04
GPIO4	143	79	RD05
GPIO4	142	78	VCCCK
GPIO4	141	77	RD04
GPIO4	140	76	RD04
GPIO4	139	75	RD04
GPIO4	138	74	VCCCK
GPIO4	137	73	RD04
GPIO4	136	72	RD04
GPIO4	135	71	RD04
GPIO4	134	70	RD04
GPIO4	133	69	RD04
GPIO4	132	68	RD04
GPIO4	131	67	RD04
GPIO4	130	66	RD04
GPIO4	129	65	VCCCK
GPIO4	128	64	RCKE/RODT
GPIO4	127	63	RWE//RCS
GPIO4	126	62	RBA2//RBA0
GPIO4	125	61	RBA0//RBA2
GPIO4	124	60	RBA1//RA3
GPIO4	123	59	RA10//RA5
GPIO4	122	58	RA1//RA2
GPIO4	121	57	RA3//RA7
GPIO4	120	56	NC//RESET
GPIO4	119	55	RA5//RA9
GPIO4	118	54	RA7//RA13
GPIO4	117	53	RA12//RA0
GPIO4	116	52	VCCCK
GPIO4	115	51	RA9//RWE
GPIO4	114	50	RRAS//RCAS
GPIO4	113	49	RCS//RA12
GPIO4	112	48	RCAS//RA12
GPIO4	111	47	RA2//RA11
GPIO4	110	46	RA0//RA8
GPIO4	109	45	RA6//RA6
GPIO4	108	44	RA4//RA1
GPIO4	107	43	RA11//RA4
GPIO4	106	42	RA13//RA1
GPIO4	105	41	RA8//RA10
GPIO4	104	40	RODT//RCKE
GPIO4	103	39	AVSS12_MEMPLL
GPIO4	102	38	AVDD12_MEMPLL
GPIO4	101	37	VCCCK
GPIO4	100	36	VCCCK
GPIO4	99	35	VCCCK
GPIO4	98	34	AOON
GPIO4	97	33	AOOP
GPIO4	96	32	AO1N
GPIO4	95	31	AO1P
GPIO4	94	30	AO2N
GPIO4	93	29	AO2P
GPIO4	92	28	AOCKN
GPIO4	91	27	AOCKP
GPIO4	90	26	AO3N
GPIO4	89	25	AO3P
GPIO4	88	24	AO4N
GPIO4	87	23	AO4P
GPIO4	86	22	AO5N
GPIO4	85	21	AO5P
GPIO4	84	20	AVDD33_LVDSA
GPIO4	83	19	AVDD33_LVDSA
GPIO4	82	18	AEON
GPIO4	81	17	AEOP
GPIO4	80	16	AE1N
GPIO4	79	15	AE1P
GPIO4	78	14	AE2N
GPIO4	77	13	AE2P
GPIO4	76	12	AECKN
GPIO4	75	11	AECKP
GPIO4	74	10	AE3N
GPIO4	73	9	AE3P
GPIO4	72	8	AE4N
GPIO4	71	7	AE4P
GPIO4	70	6	AE5N
GPIO4	69	5	AE5P
GPIO4	68	4	AVDD12_VPLL
GPIO4	67	3	VCCCK
GPIO4	66	2	GPIO14
GPIO4	65	1	FSRC_WR

MT5301BCMU

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Figure 8-2 Pin configuration

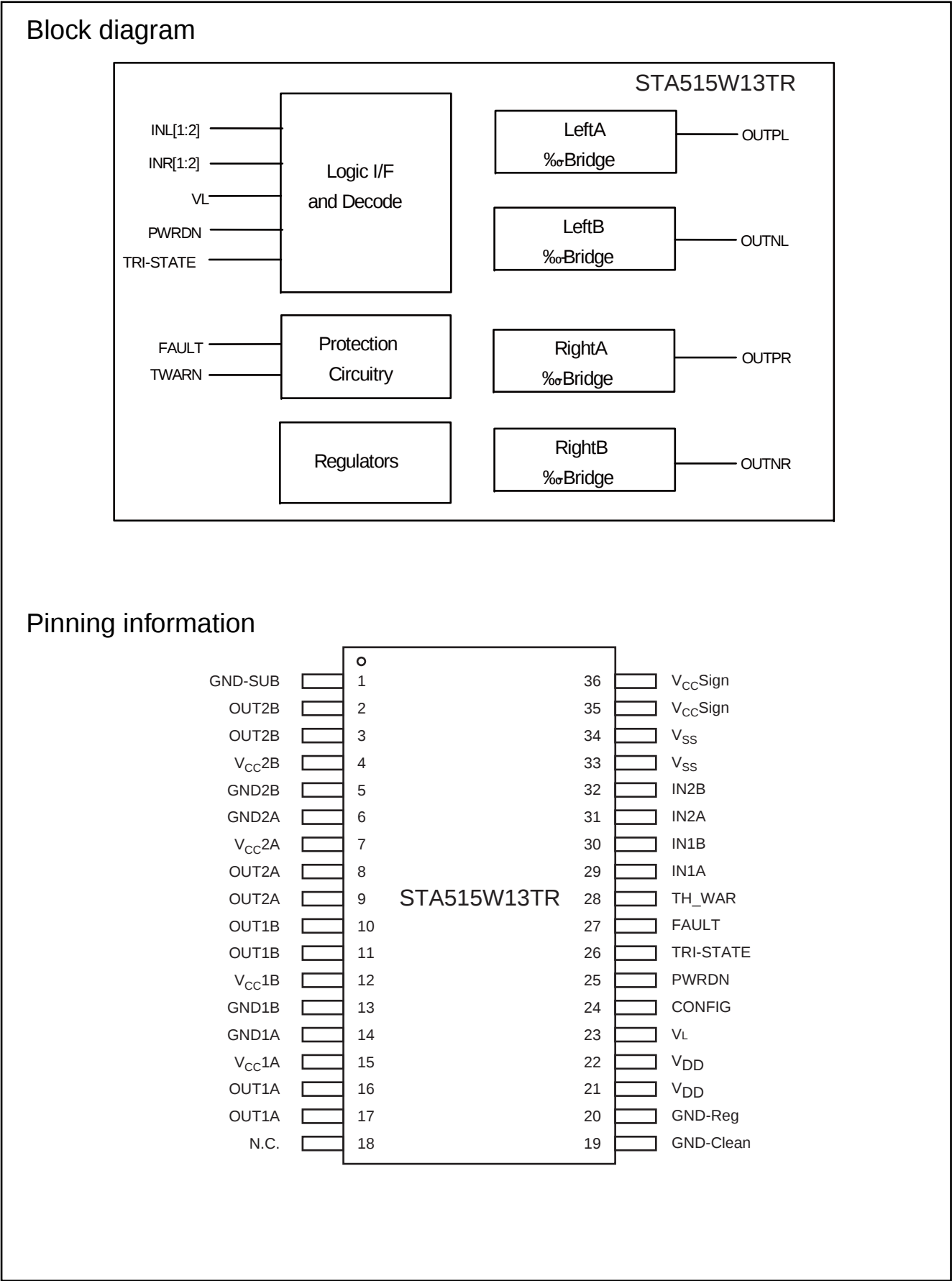
8.2 Diagram [Audio Amplifier & Headphone Out B14, STA339BWTR \(IC U602\)](#)



19170_300_110704.eps
110704

Figure 8-3 Internal block diagram and pin configuration

8.3 Diagram [Audio Amplifier & Headphone Out](#) B14, STA515W13TR (IC U603)



19170_301_110704.eps
110705

Figure 8-4 Internal block diagram and pin configuration

8.4 Diagram [HDMI & HDMI Switch B04, TMD5361BPAGR \(IC U501\)](#)

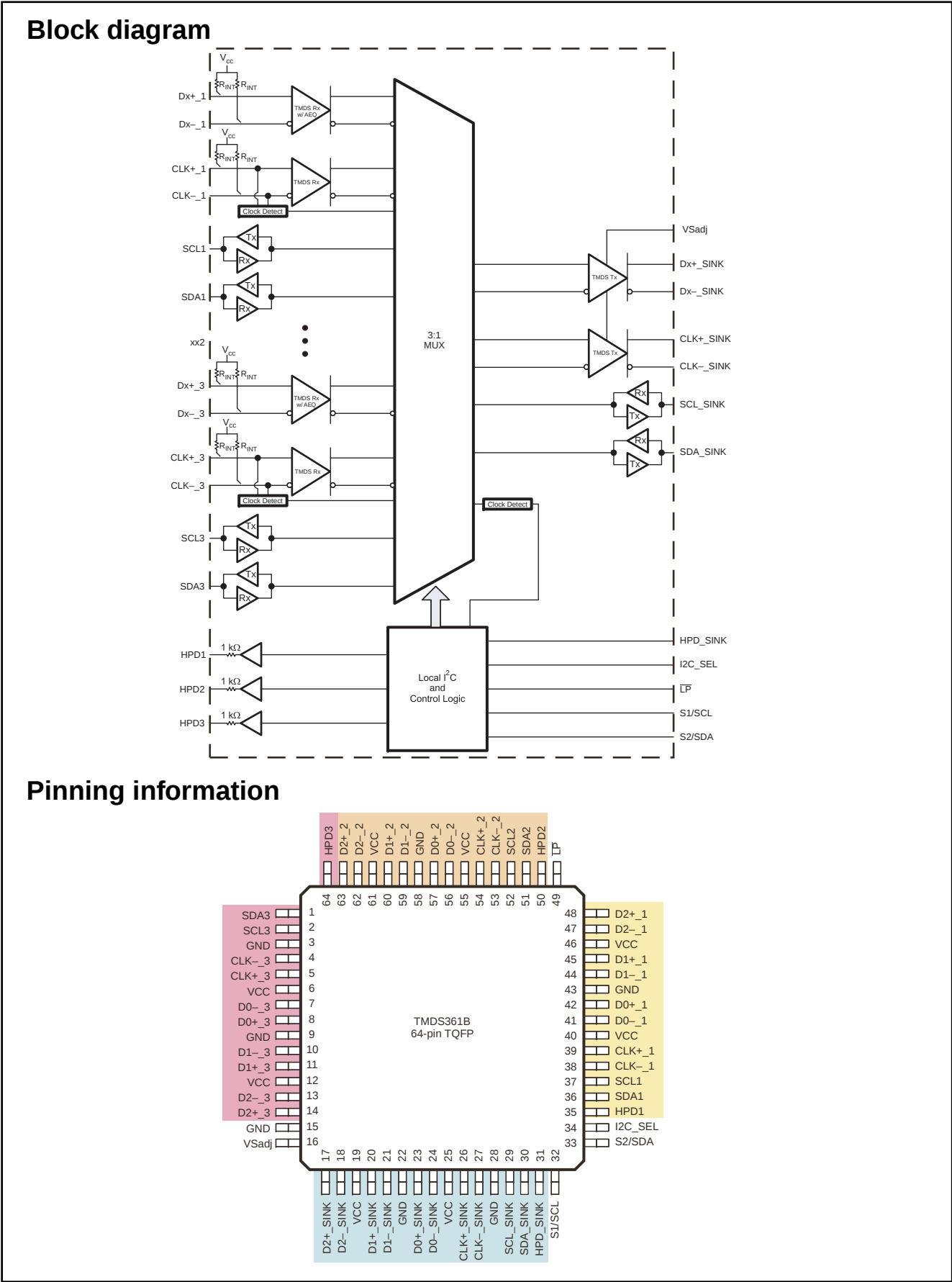
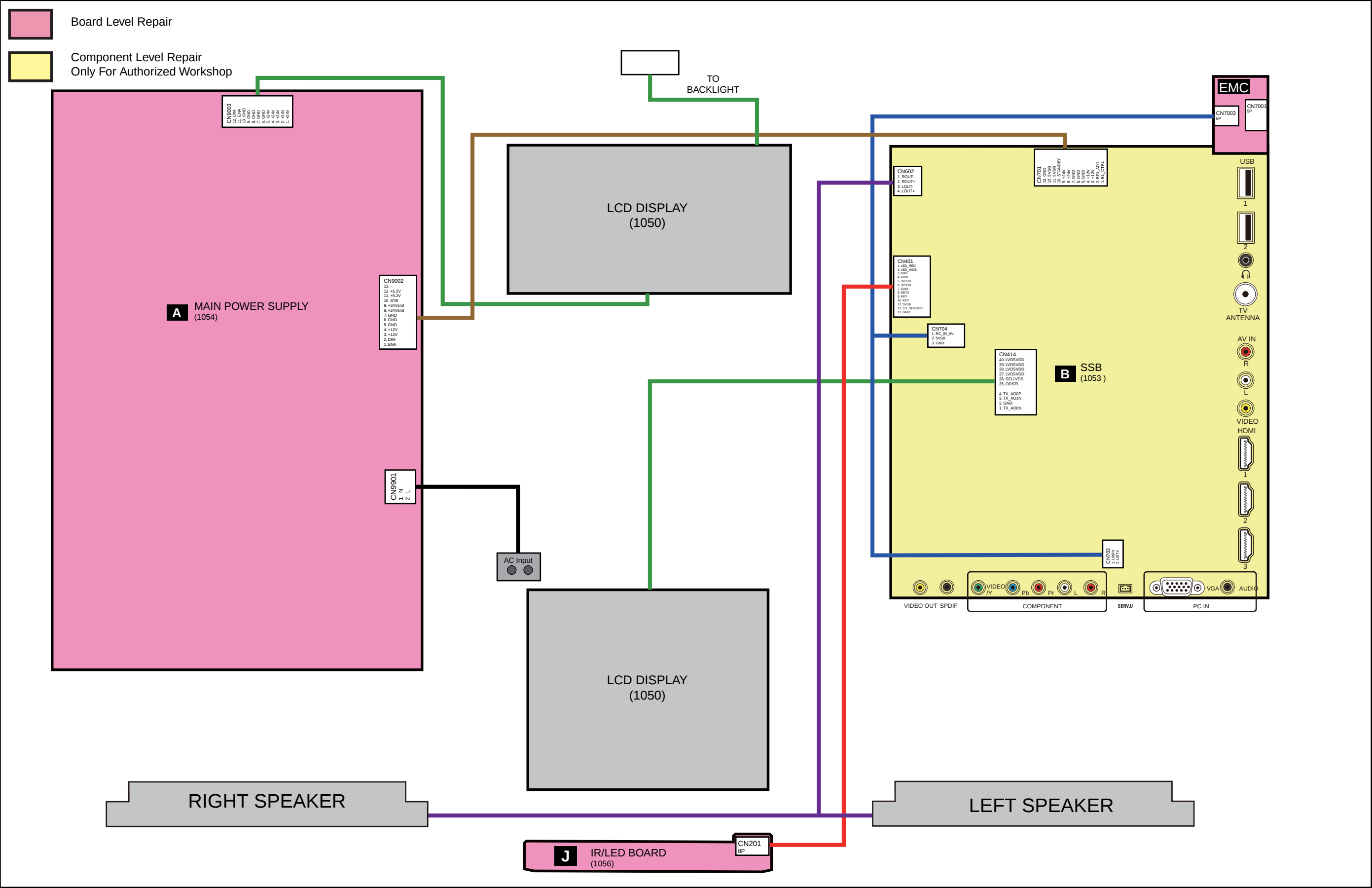


Figure 8-5 Internal block diagram and pin configuration

9. Block Diagrams

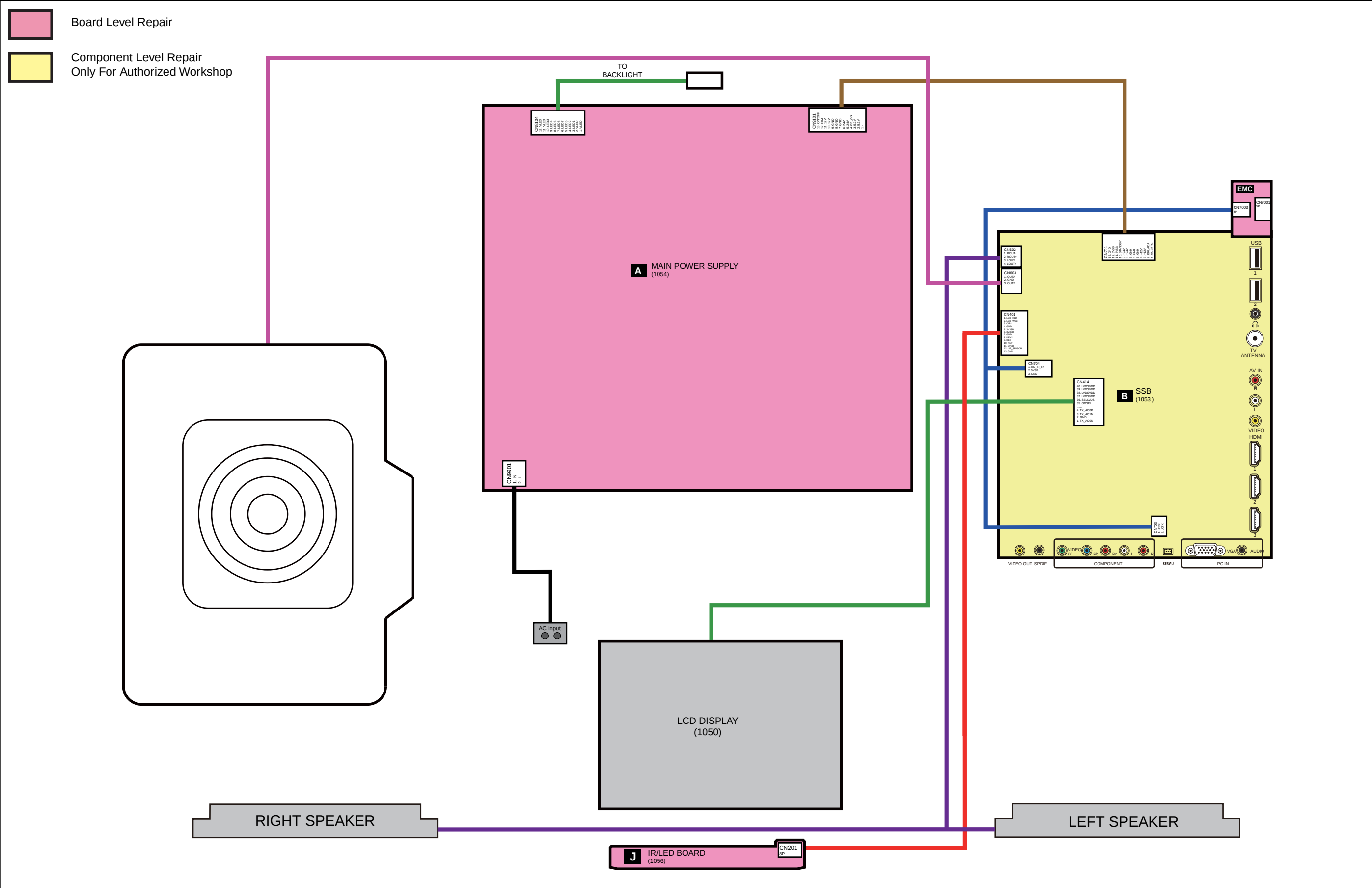
9-1 Wiring diagram 32"

WIRING DIAGRAM 32" (Ebony)

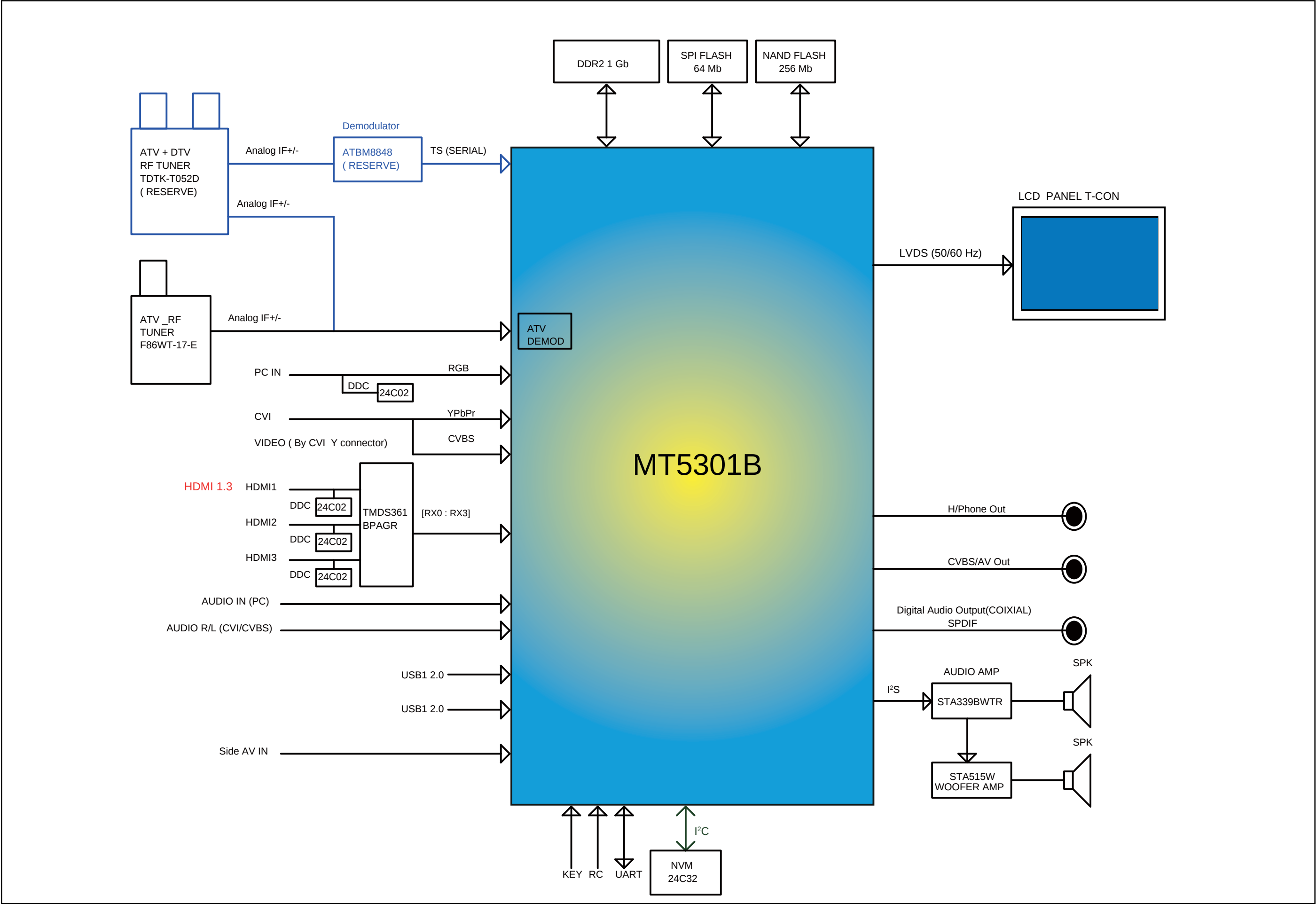


9-2 Wiring diagram 42"

WIRING DIAGRAM 42" (Ebony)



9-3 Block Diagram

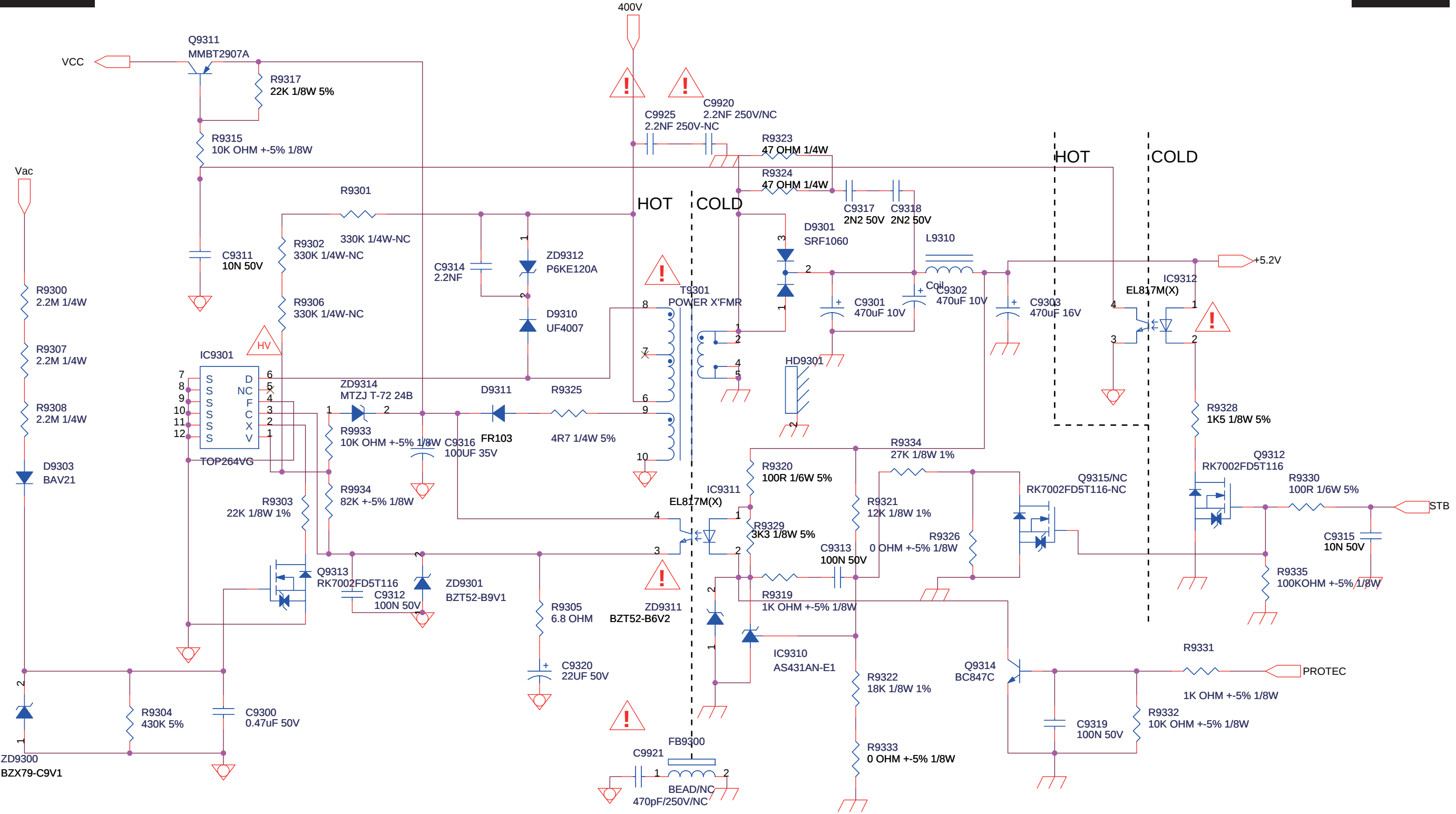


Standby

A02

Standby

A02



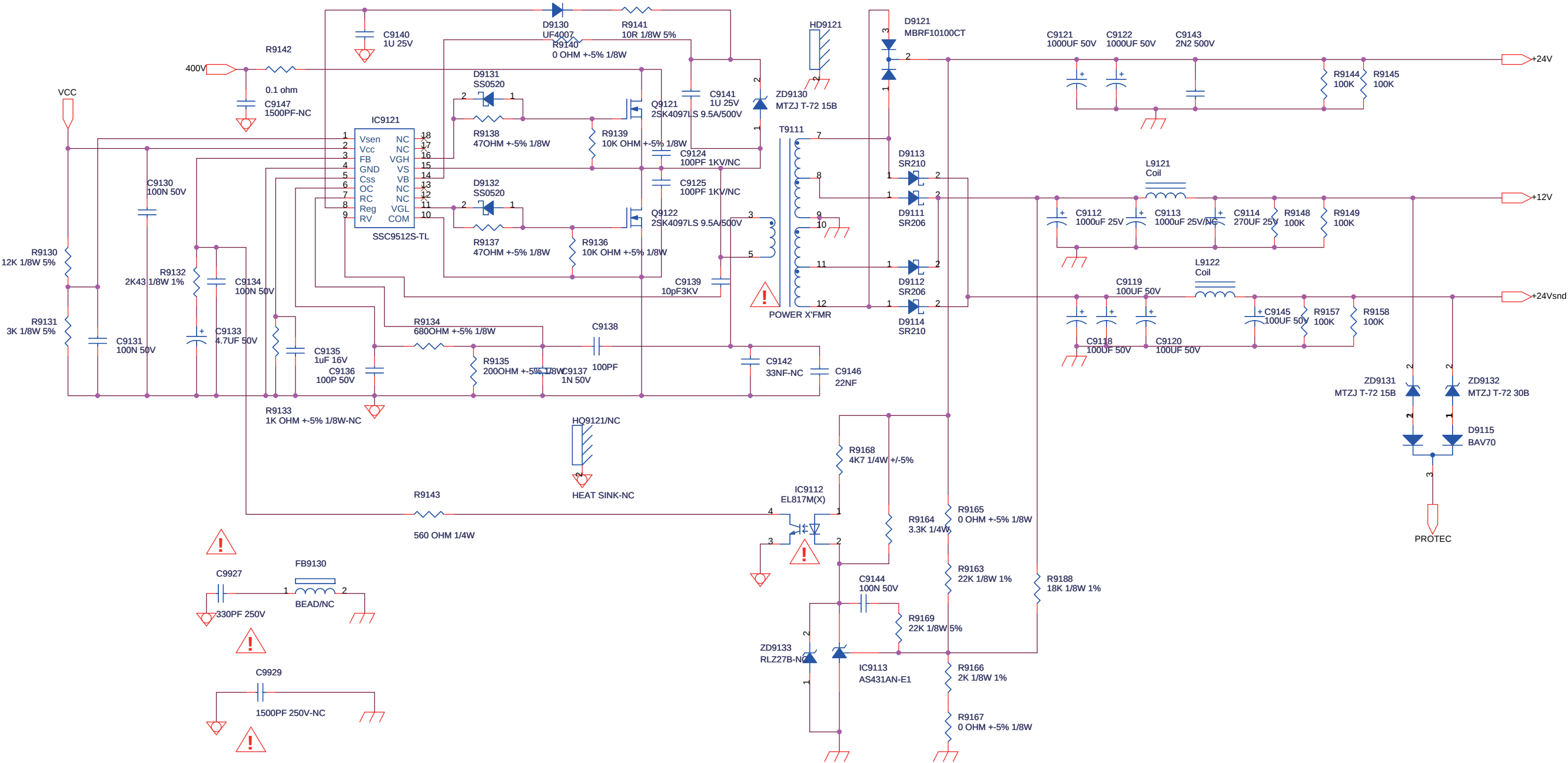
Standby	715G4867	2	2011-09-28
		1	
		1	
		1	

Main Power

A03

Main Power

A03



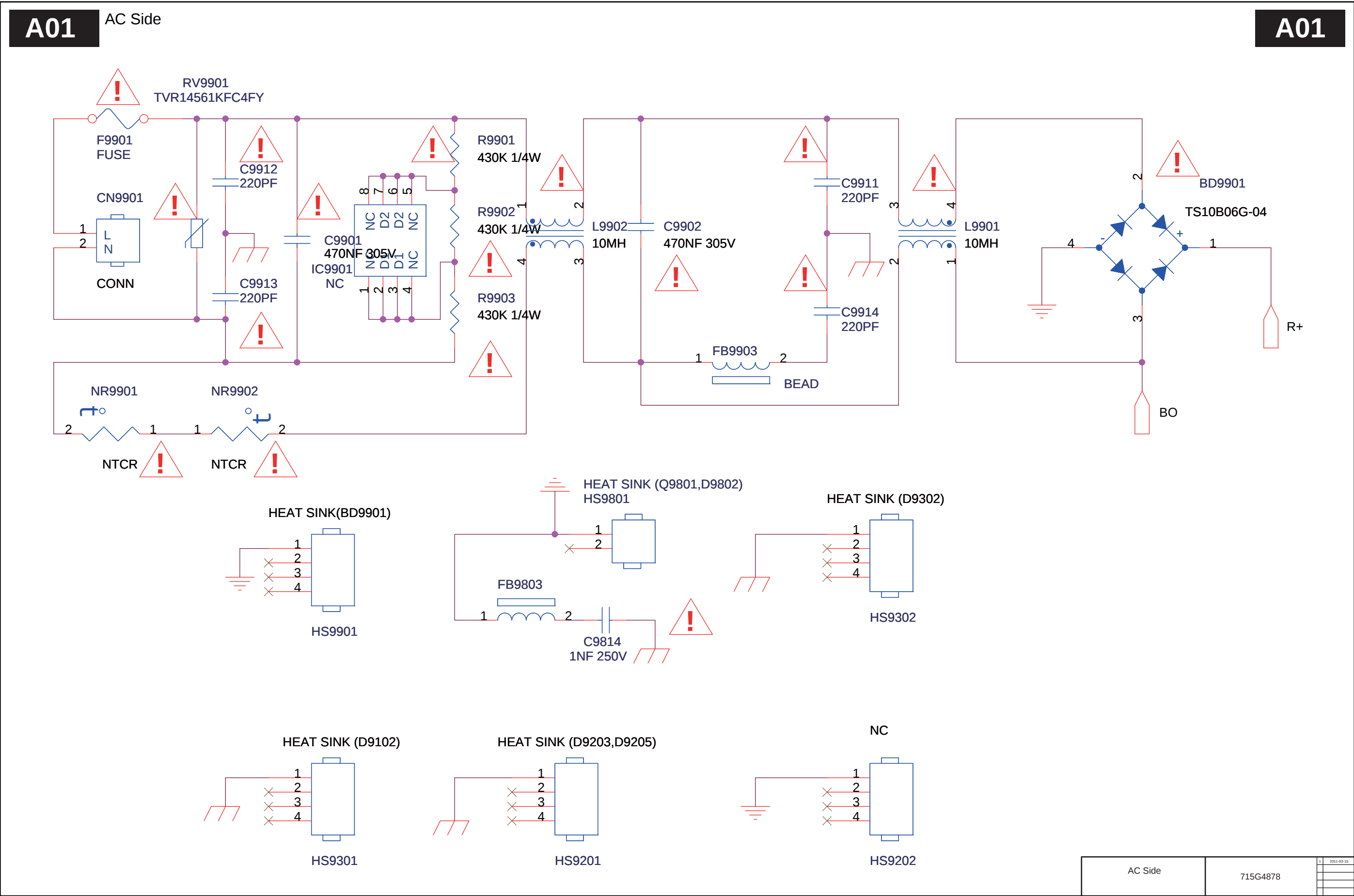
Main Power	715G4867	2	2011-09-26

19170_503_110629.eps
110629

715G4867-P0A-W21-0030

19170_504_110629.eps
110629

10-2 A01 715G4878 PSU 42"
AC Side



AC Side

715G4878

1	2011-03-15

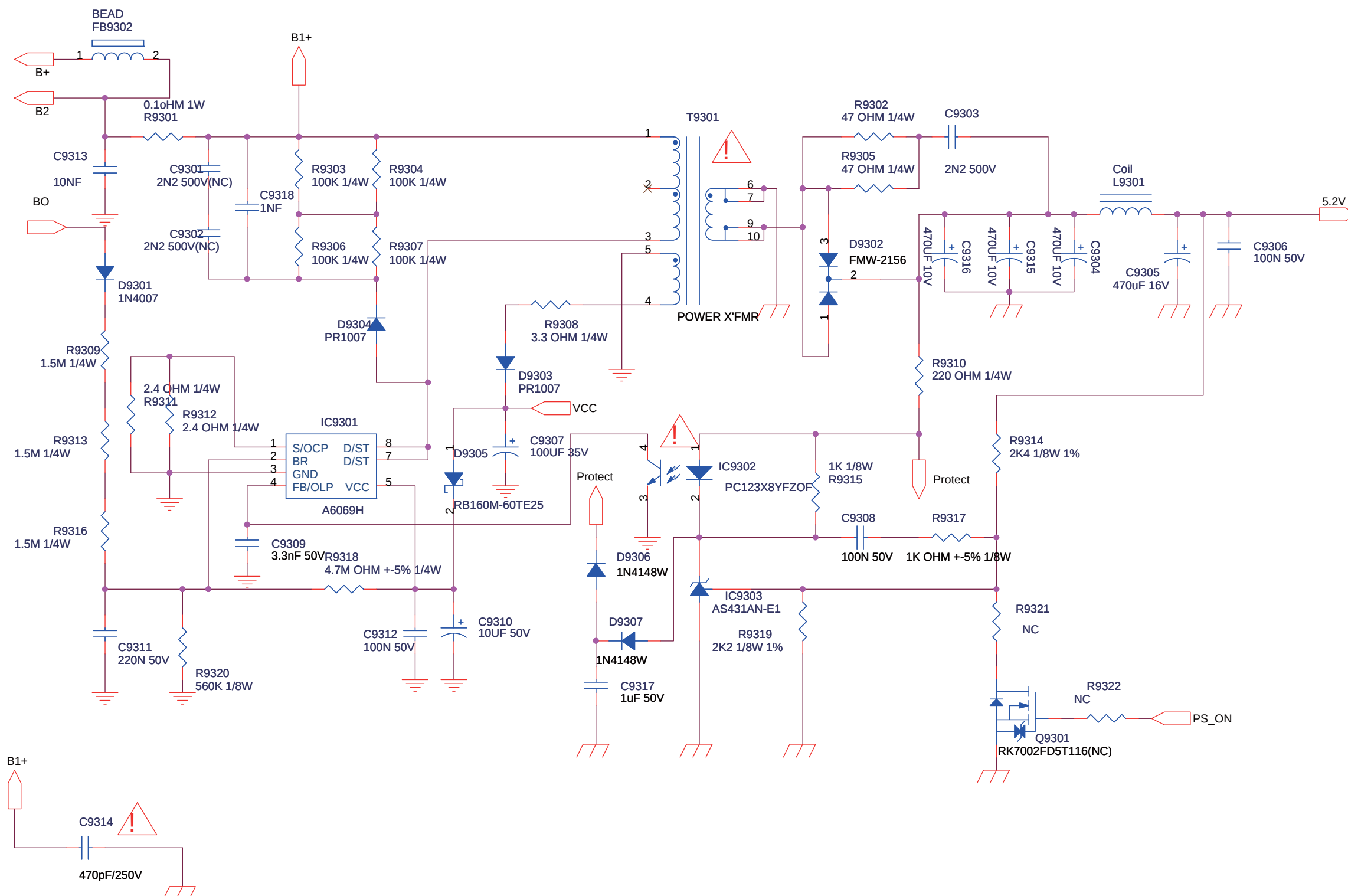
19170_505_110628.eps
110628

Standby

A02

Standby

A02



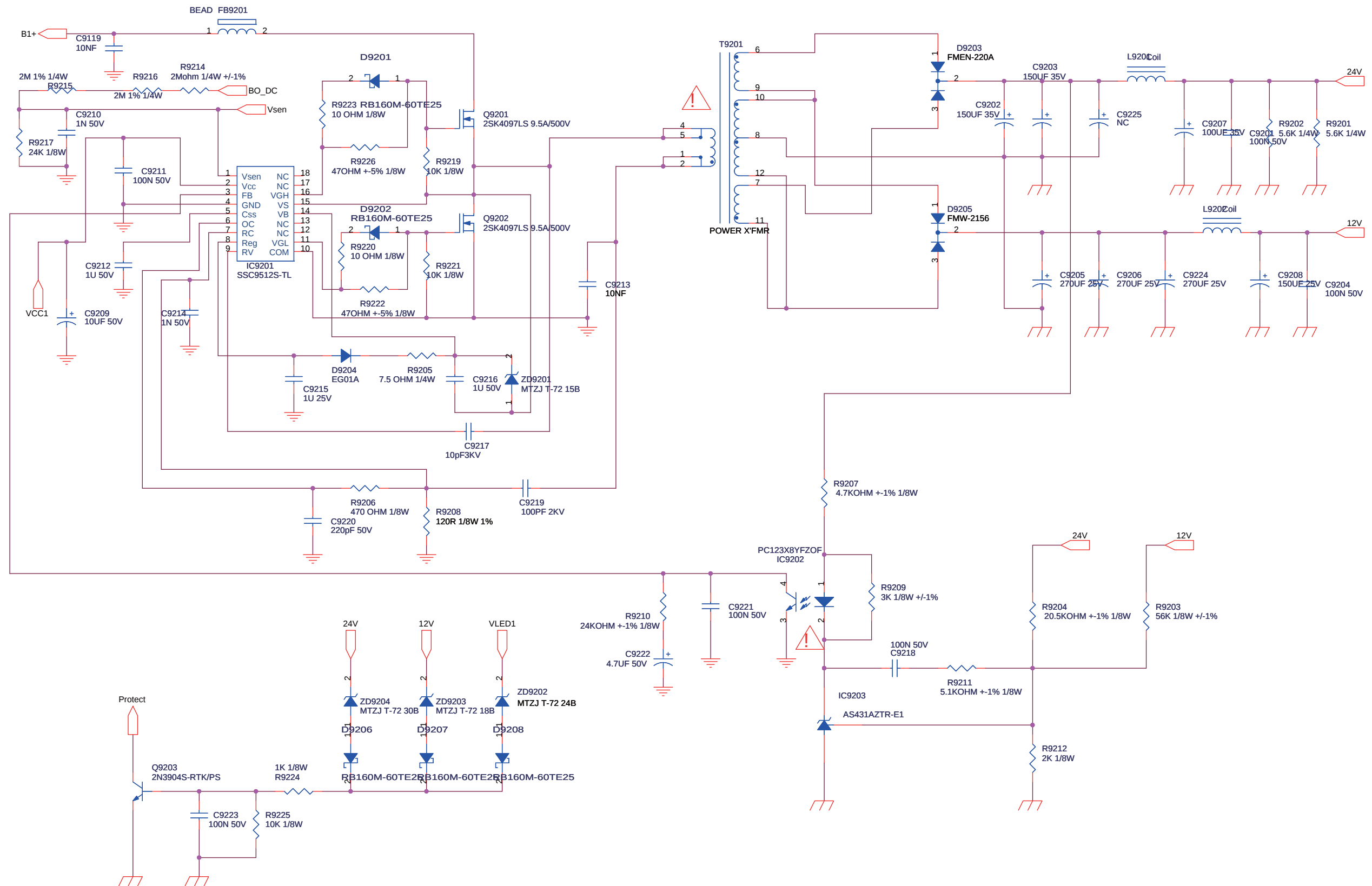
Standby

715G4878

Second Power

A04

A04



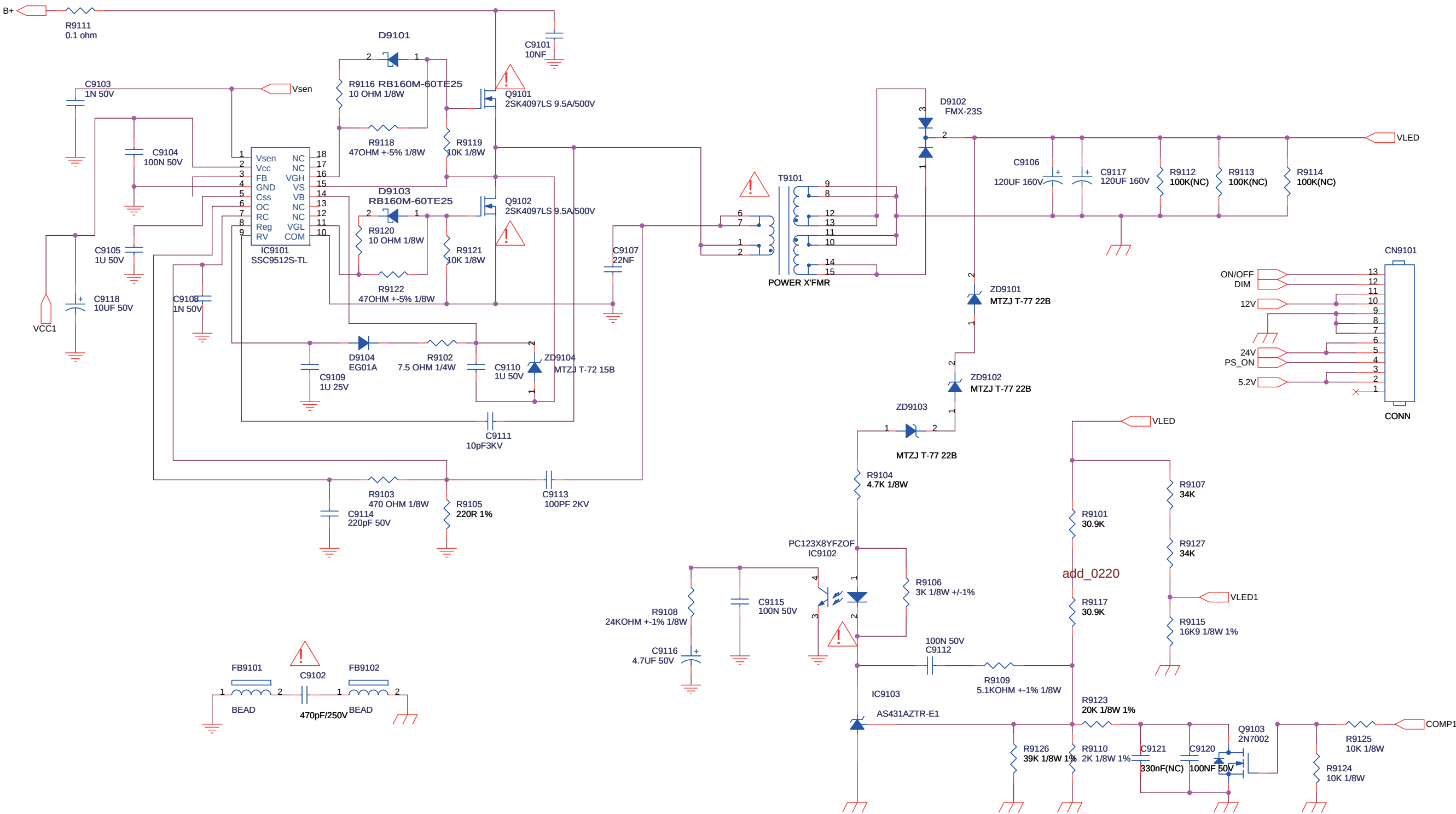
Second Power	715G4878	1	2011-03-15

Main Power

A05

Main Power

A05

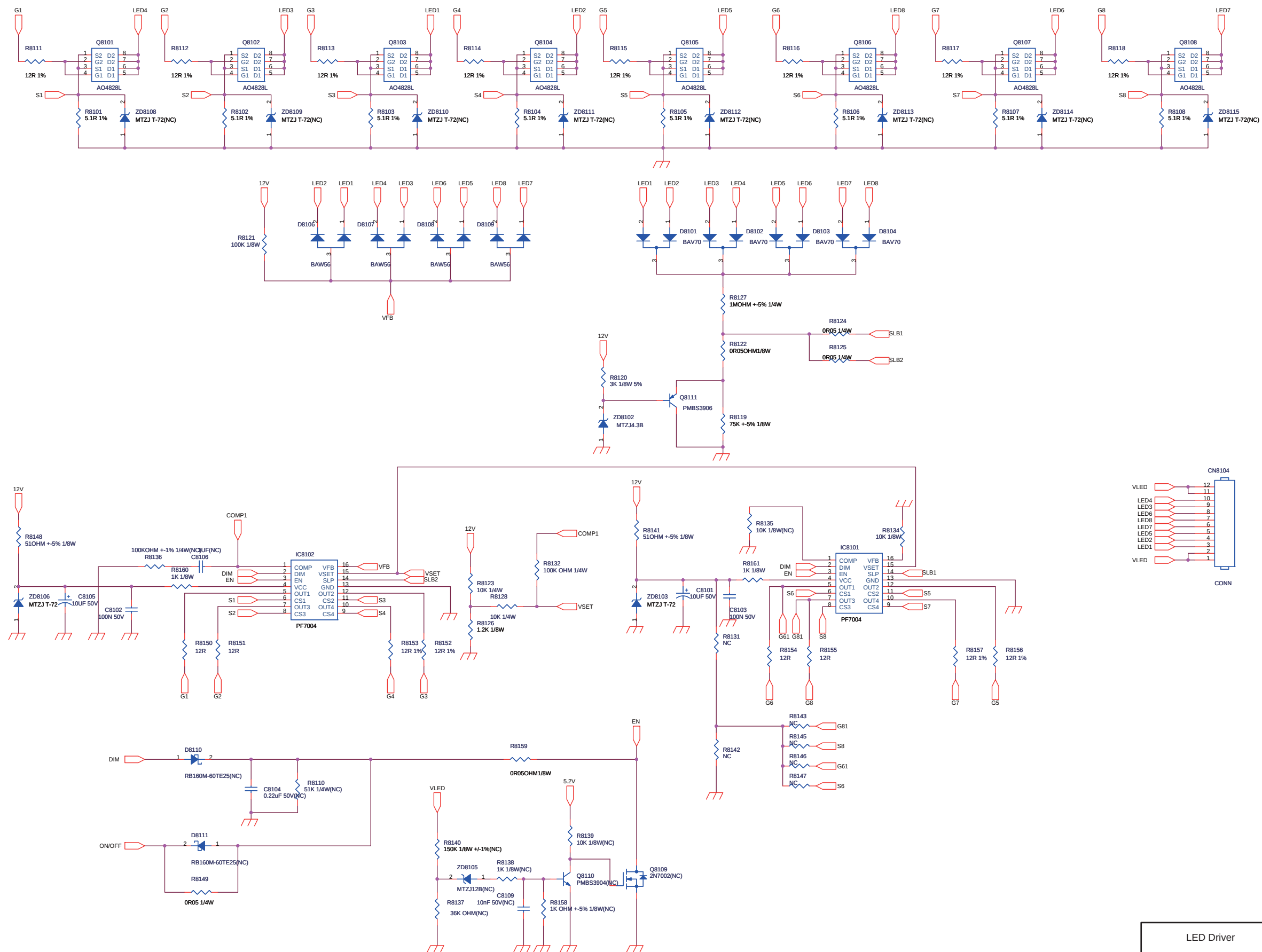


MainPower	715G4878	1	2011-03-15
		2	
		3	
		4	

LED Driver

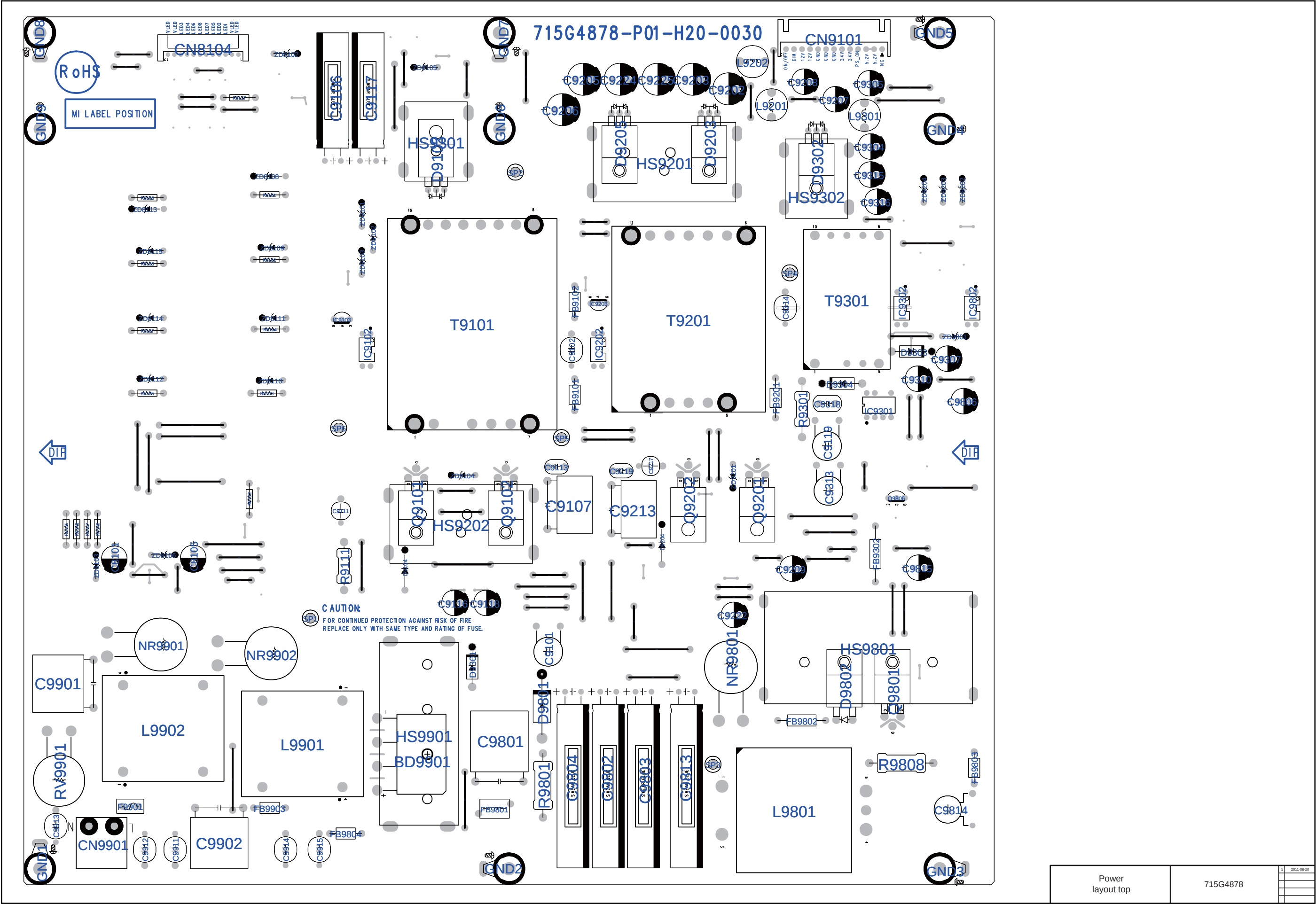
A06

A06

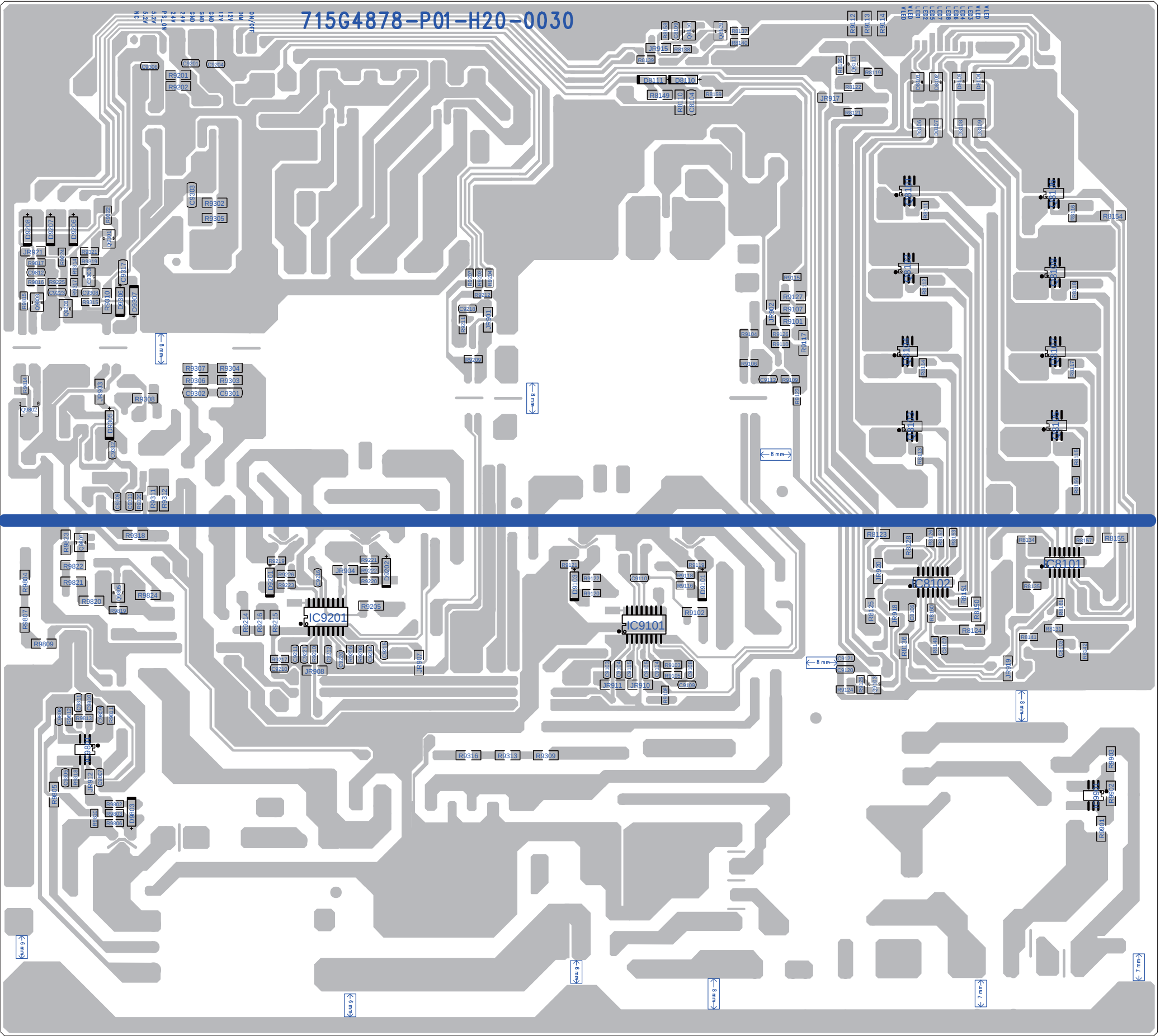


LED Driver	715G4878	1	2011-03-15

Power layout top

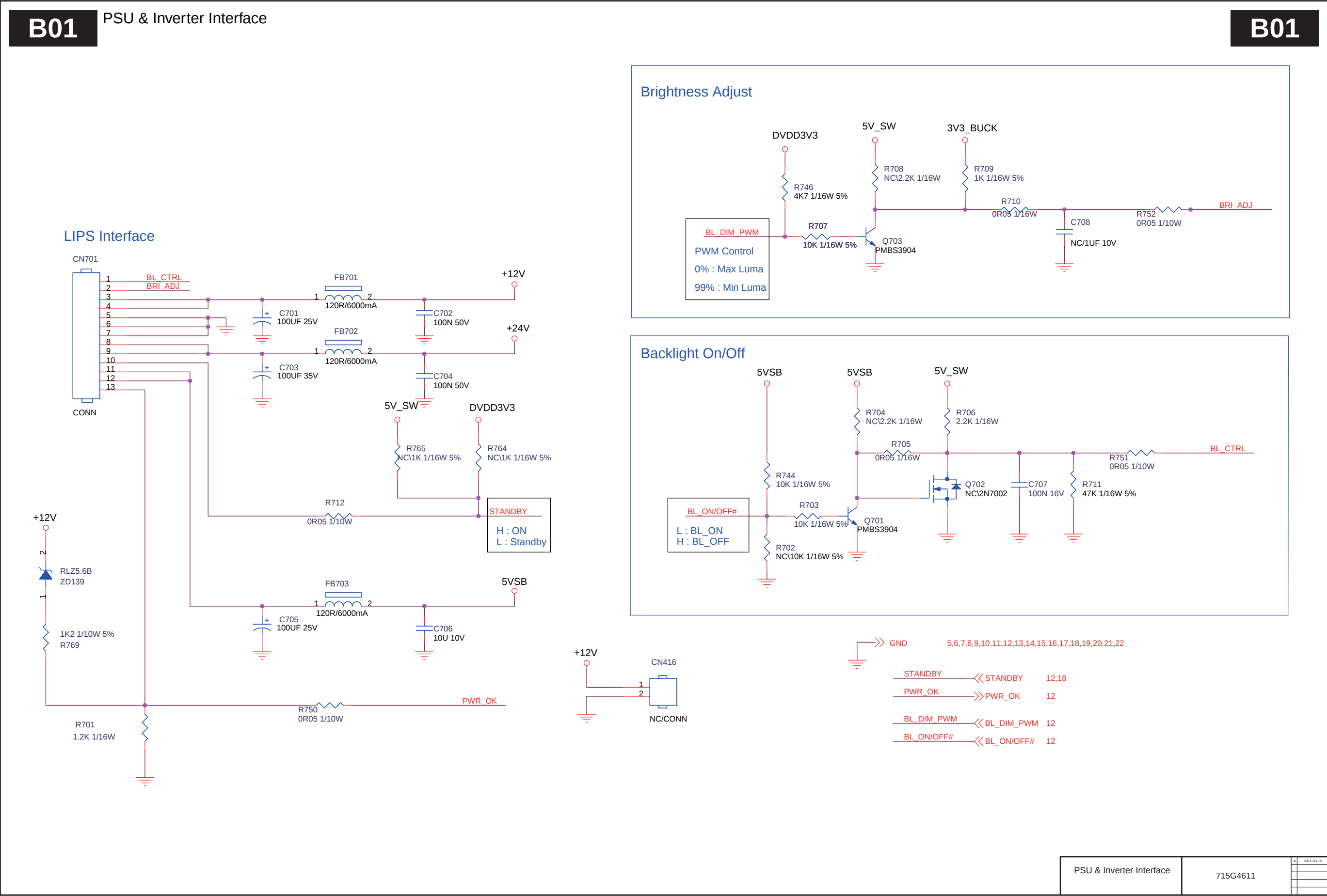


Power layout bottom



Power layout bottom	715G4878	1	2011-06-20

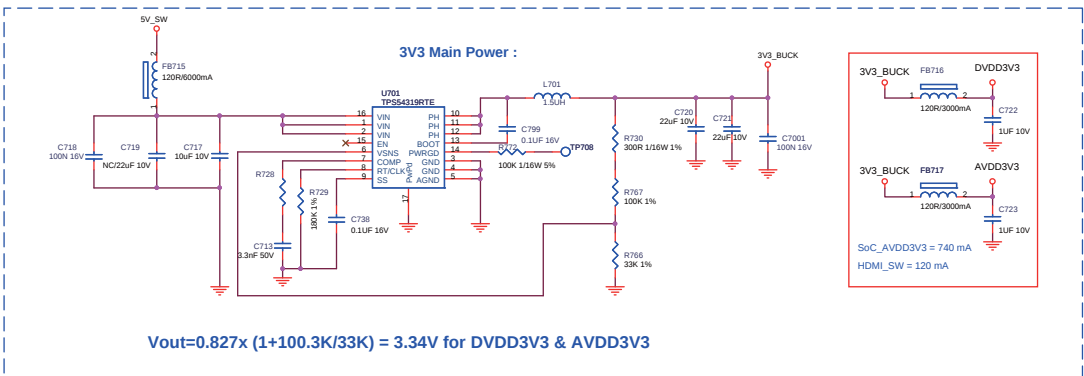
10-3 B 715G4611 SSB
PSU & Inverter Interface



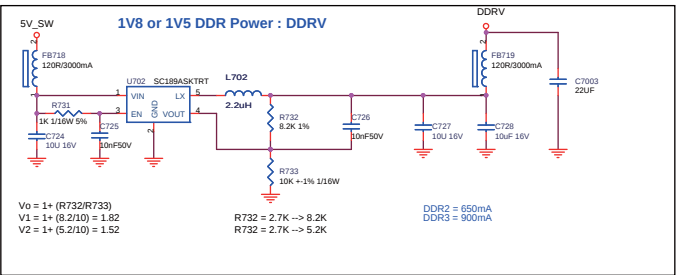
DC-DC BUCK & LDO Regulator

B02

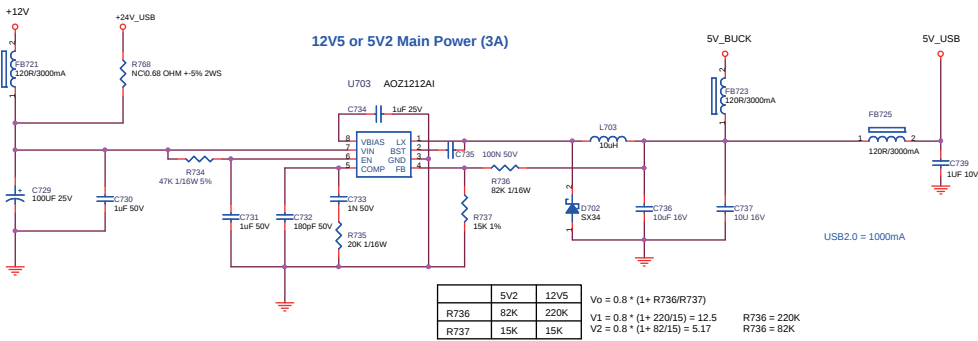
DC-DC BUCK & LDO Regulator



$$V_{out} = 0.827 \times \left(1 + \frac{100.3K}{33K}\right) = 3.34V \text{ for DVDD3V3 \& AVDD3V3}$$

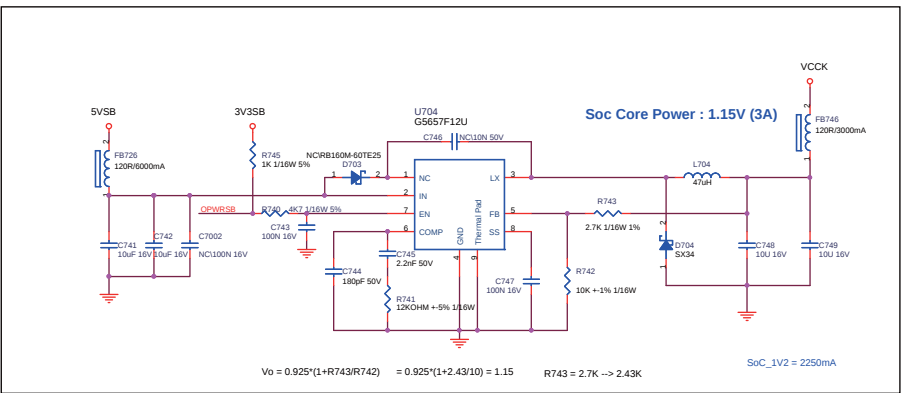


$$V_o = 1 + \left(\frac{R732}{R733}\right)$$
$$V_1 = 1 + \left(\frac{8.2/10}{1}\right) = 1.82$$
$$V_2 = 1 + \left(\frac{5.2/10}{1}\right) = 1.52$$



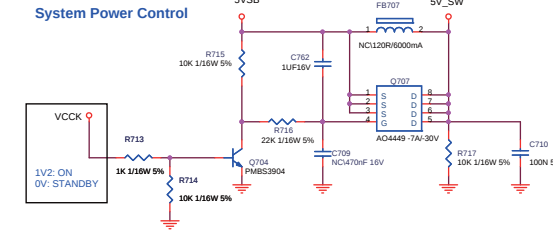
	5V2	12V5
R736	82K	220K
R737	15K	15K

$$V_o = 0.8 \times \left(1 + \frac{R736}{R737}\right)$$
$$V_1 = 0.8 \times \left(1 + \frac{220/15}{1}\right) = 12.5$$
$$V_2 = 0.8 \times \left(1 + \frac{15/15}{1}\right) = 5.17$$

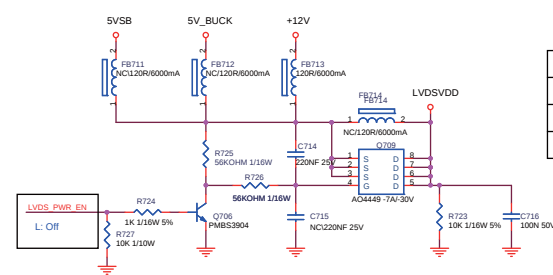


$$V_o = 0.925 \times \left(1 + \frac{R743}{R742}\right) = 0.925 \times \left(1 + \frac{2.43/10}{1}\right) = 1.15$$
$$R743 = 2.7K \rightarrow 2.43K$$

Power MOSFET Switch

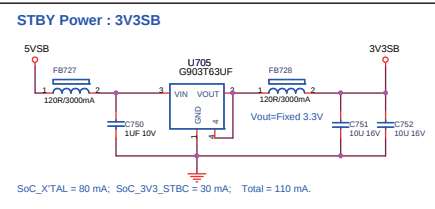


Panel Logic Power Control

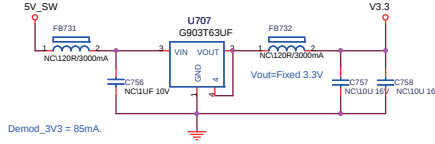


	5V panel	3.2V panel
FB713	NC	YES
FB712	NC	NC
FB711	YES	NC

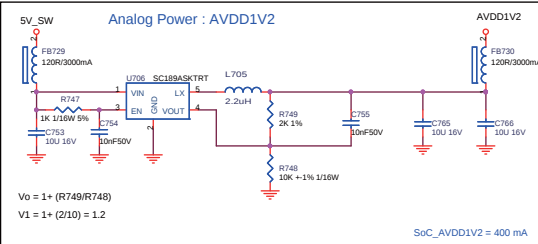
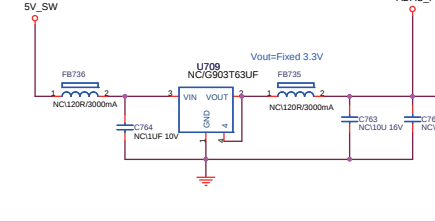
LDO Regulator



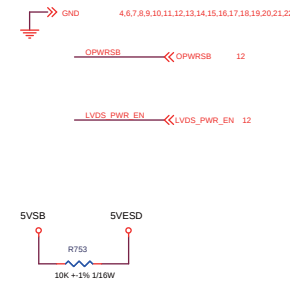
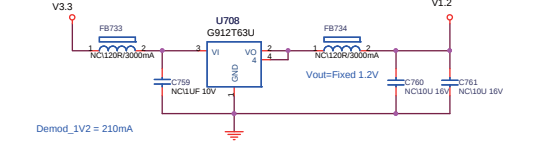
Demod 3V3 Power : V3.3



Reserved for ADAC_PWR



Demod 1V2 Power : V1.2

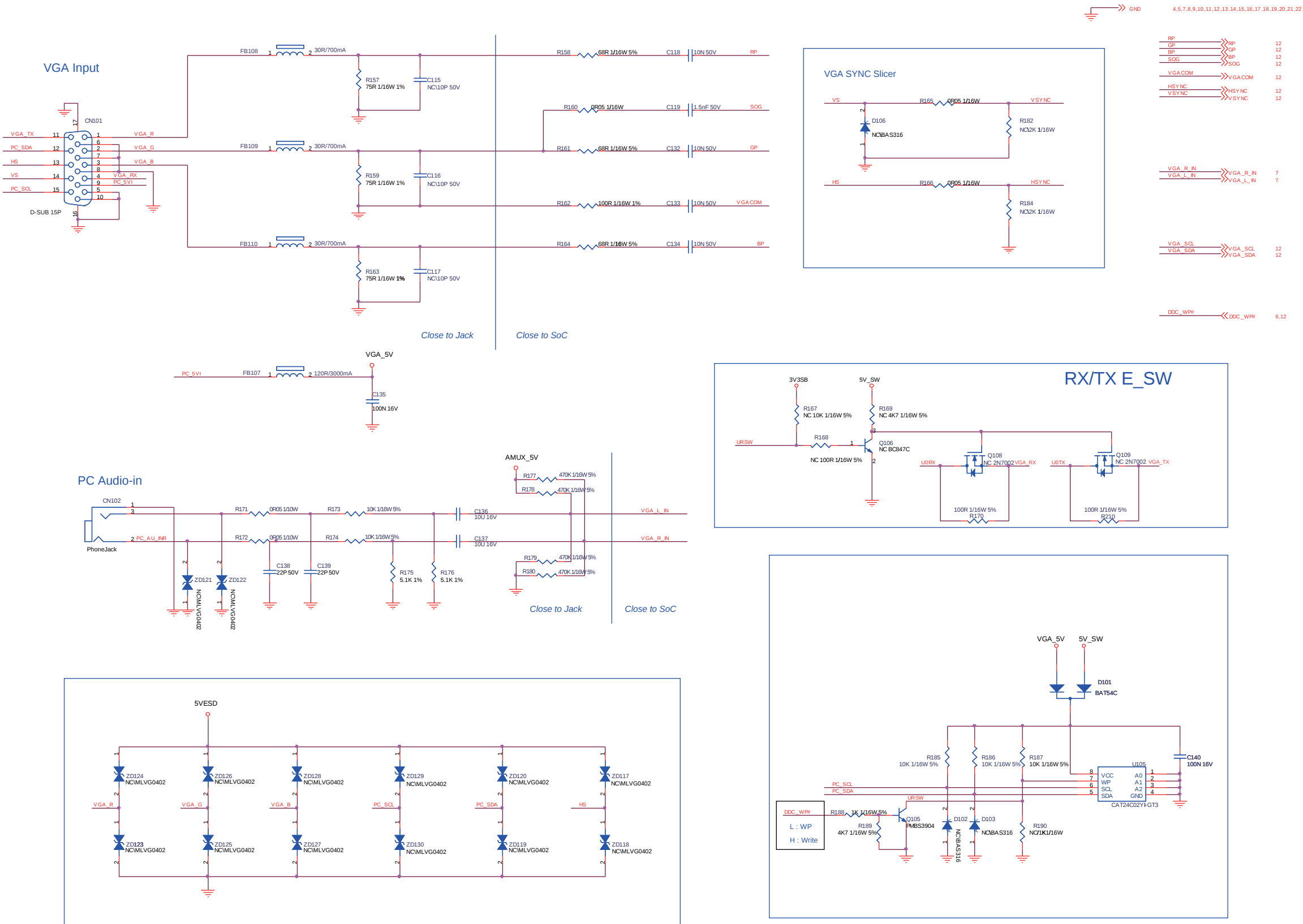


B02

VGA & PC Line-in

B03 VGA & PC Line-in

B03



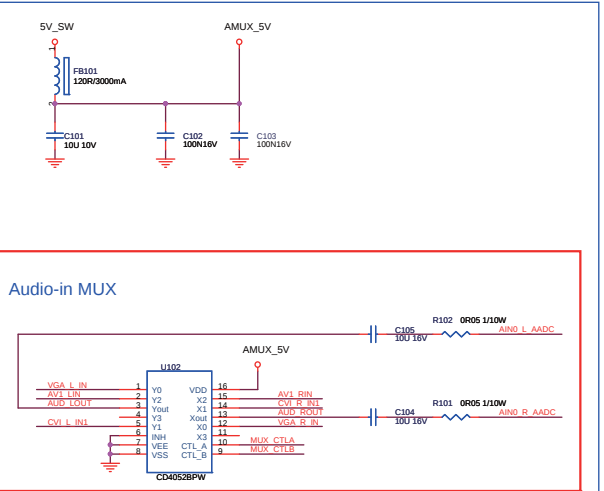
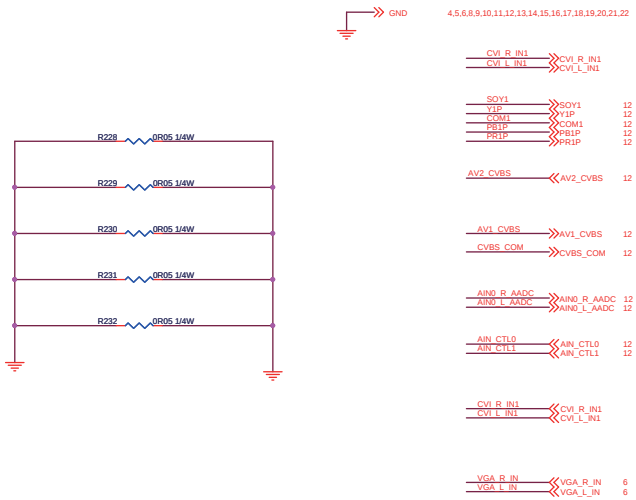
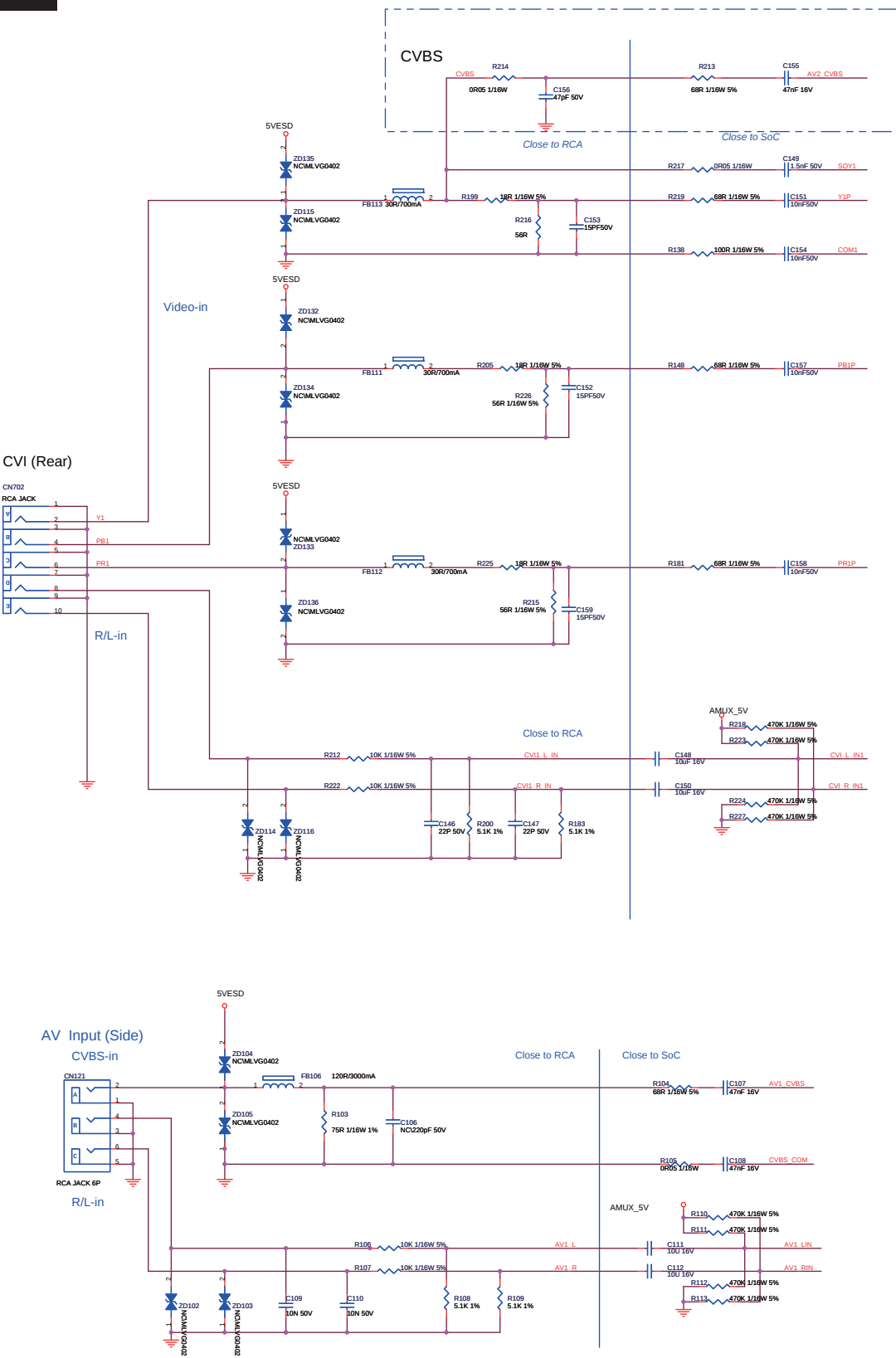
VGA & PC Line-in	715G4611	2	2011-03-02

CVI, AV (side) & Audio-in Multiplexer

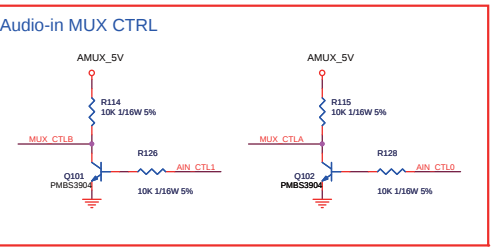
B04

CVI, AV (side) & Audio-in Multiplexer

B04



INHIBIT	CTL_B	CTL_A	
0	0	0	0x, 0y
0	0	1	1x, 1y
0	1	0	2x, 2y
0	1	1	3x, 3y
1	X	X	None



	AIN_CTL1	AIN_CTL0
(Reserved)	0	0
AV1 (Side)	0	1
CVI & rear AV	1	0
PC Line-in	1	1

CVI, AV (side) & Audio-in Multiplexer

715G4611

4	2011-03-12

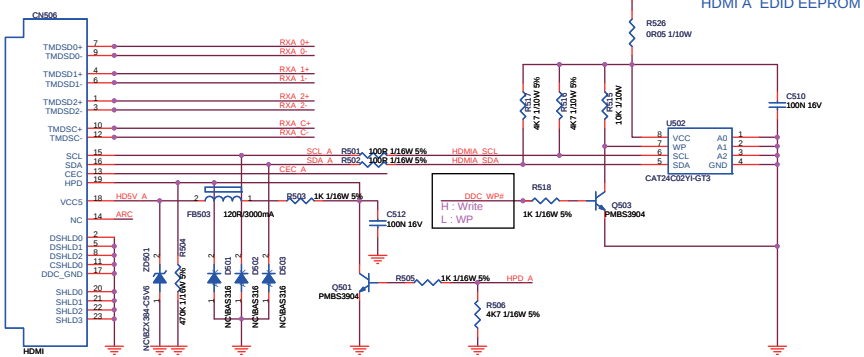
HDMI & HDMI Switch

B05

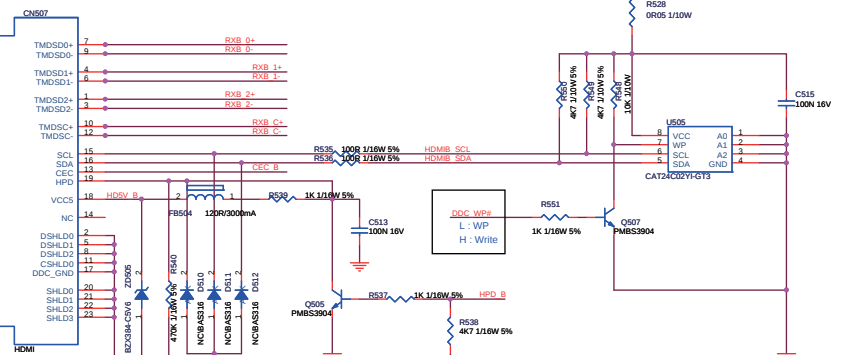
HDMI & HDMI Switch

B05

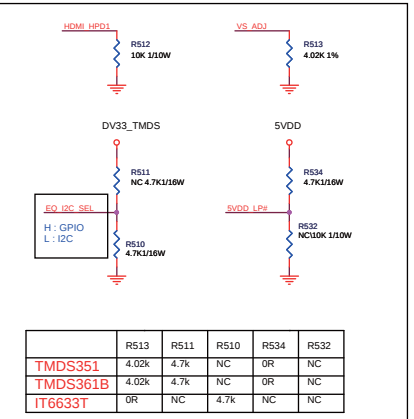
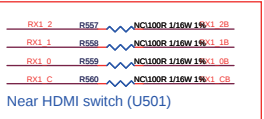
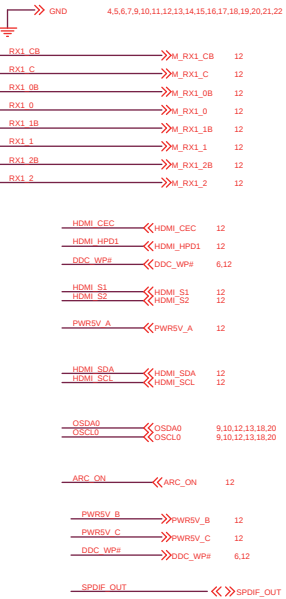
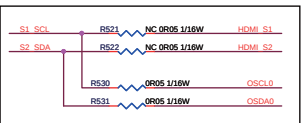
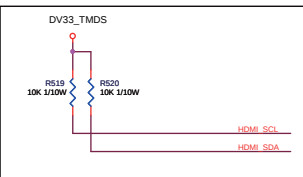
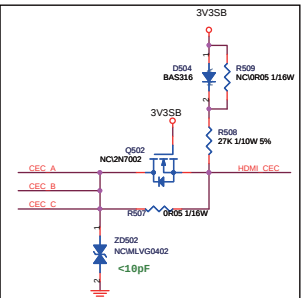
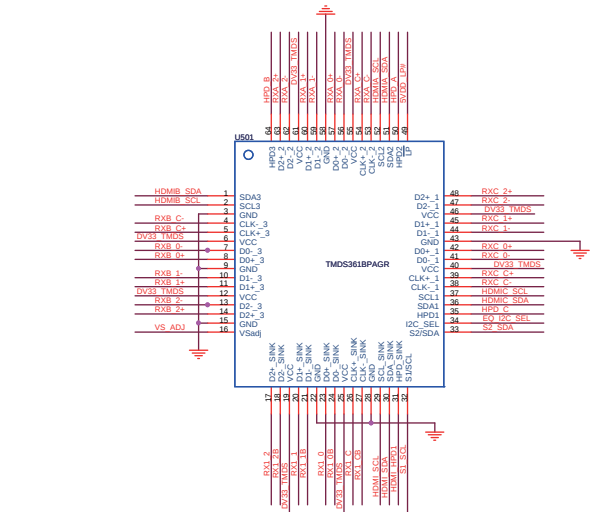
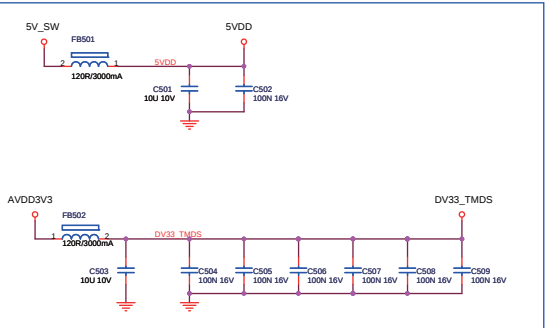
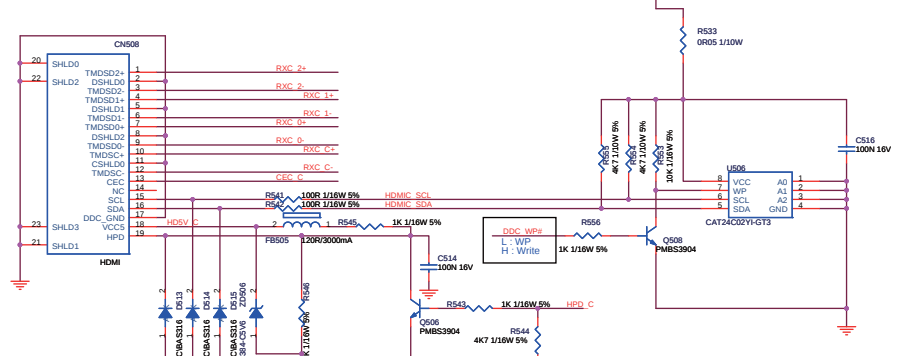
HDMI A



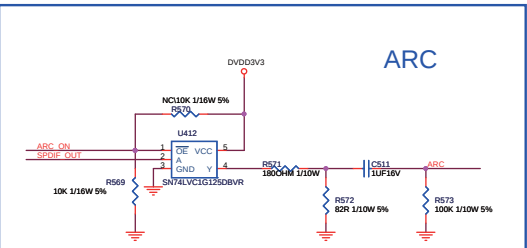
HDMI B



HDMI C



U501	TMDS351	TMDS361B
PIN 32	S1	SCL
PIN 33	S2	SDA
PIN 34	EQ H: 10m EQ L: HDMI 1.3	I2C_SEL H: GPIO I2C_SEL L: I2C
PIN 49	VDD: HPD/IDDC power supply	LPH H: normal mode LPH L: low power state

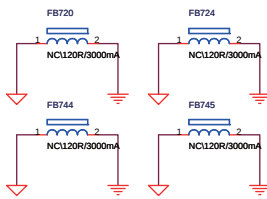
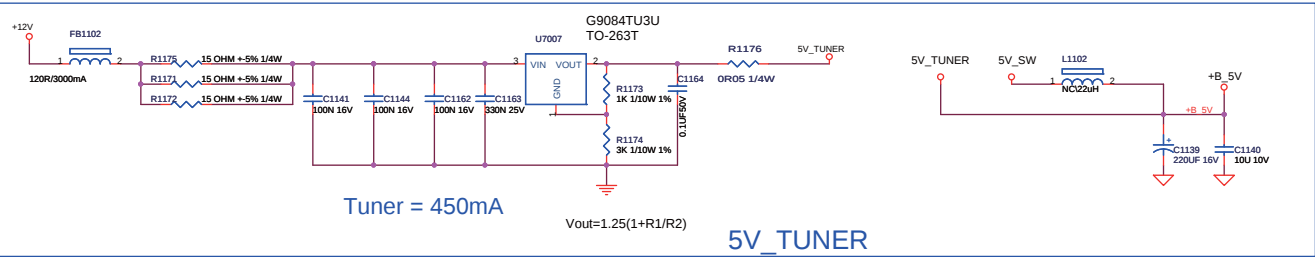


Half NIM Tuner

B06

Half NIM Tuner

B06



GND 4,5,6,7,8,10,11,12,13,14,15,16,17,18,19,20,21,22

RF_AGC_S2T RF_AGC_S2T 12

IF_AGC_S2T IF_AGC_S2T 12

IF_AGC_D2T IF_AGC_D2T 10

OSCL0 OSCL0 8,10,12,13,18,20

OSDA0 OSDA0 8,10,12,13,18,20

TU_SCL TU_SCL 10

TU_SDA TU_SDA 10

DTMB_DVBC_SW DTMB_DVBC_SW 12

T2S_TIF+ T2S_TIF+ 12

T2S_TIF- T2S_TIF- 12

T2D_TIF+ T2D_TIF+ 10

T2D_TIF- T2D_TIF- 10

BST_CTL# BST_CTL# 12

IF_AGC_SW IF_AGC_SW 10

RF_AGC_CTL RF_AGC_CTL 10

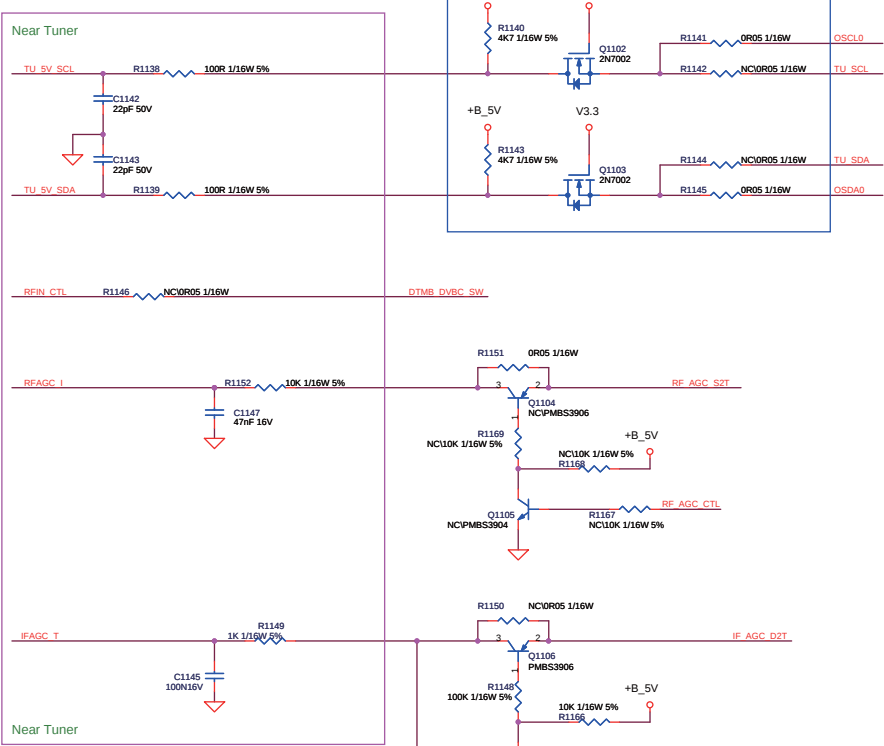
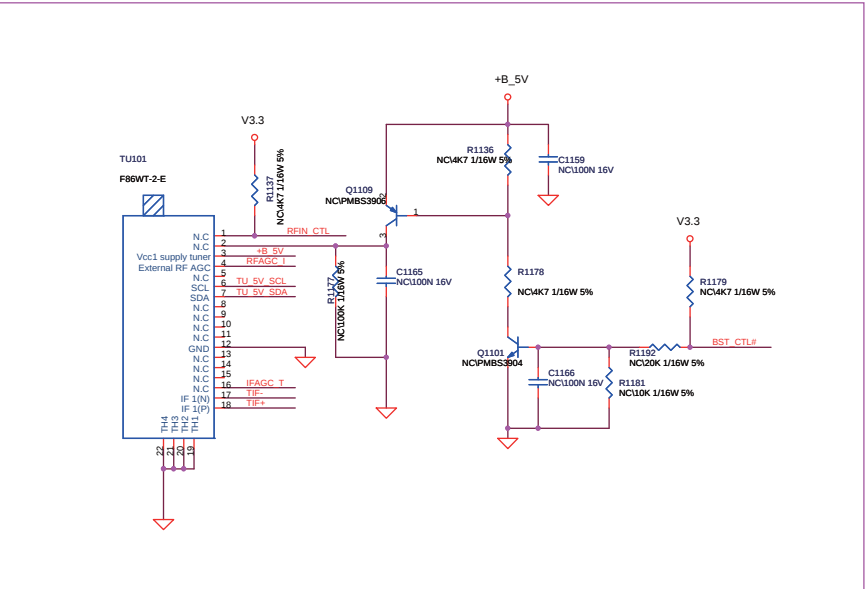
R1130 OR05 1/16W

R1131 OR05 1/16W

R1132 OR05 1/16W

R1133 OR05 1/16W

GND GND_A



T2S_TIF+ T2S_TIF+ 12

T2S_TIF- T2S_TIF- 12

T2D_TIF+ T2D_TIF+ 10

T2D_TIF- T2D_TIF- 10

BST_CTL# BST_CTL# 12

IF_AGC_SW IF_AGC_SW 10

RF_AGC_CTL RF_AGC_CTL 10

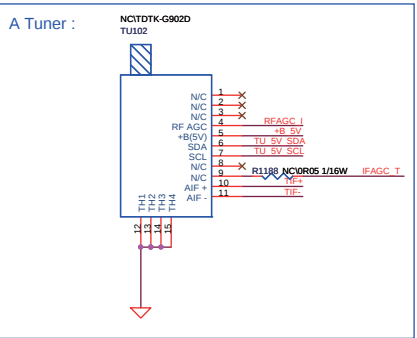
R1130 OR05 1/16W

R1131 OR05 1/16W

R1132 OR05 1/16W

R1133 OR05 1/16W

GND GND_A



For ATV only

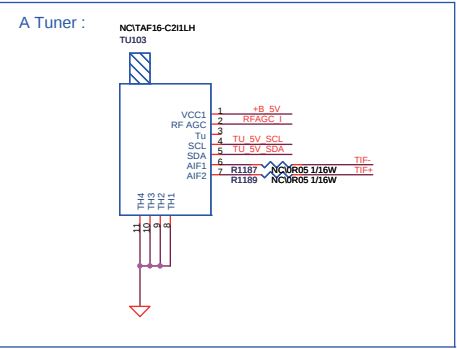
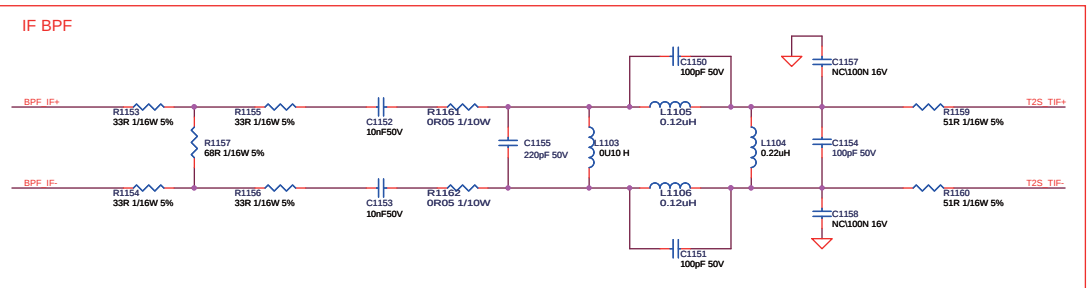
TIF+ R1183 OR05 1/16W BPF IF+

TIF- R1185 OR05 1/16W BPF IF-

For DTV only

TIF+ R1184 OR05 1/16W T2D TIF+

TIF- R1186 OR05 1/16W T2D TIF-



Tuner	R1153 & R1154	R1155 & R1156	R1157	C1155 / L1111	R1159 & R1160
G702D	27R	27R	100R	220pF / 100uH	50R
T032D	OR	OR	NC	NC / NC	460R

Tuner	Ext. Demod.	Scaler IC
G702D	NA	MT5301B
T032D	ATBM8848	MT5301D

Half NIM Tuner

715G4611

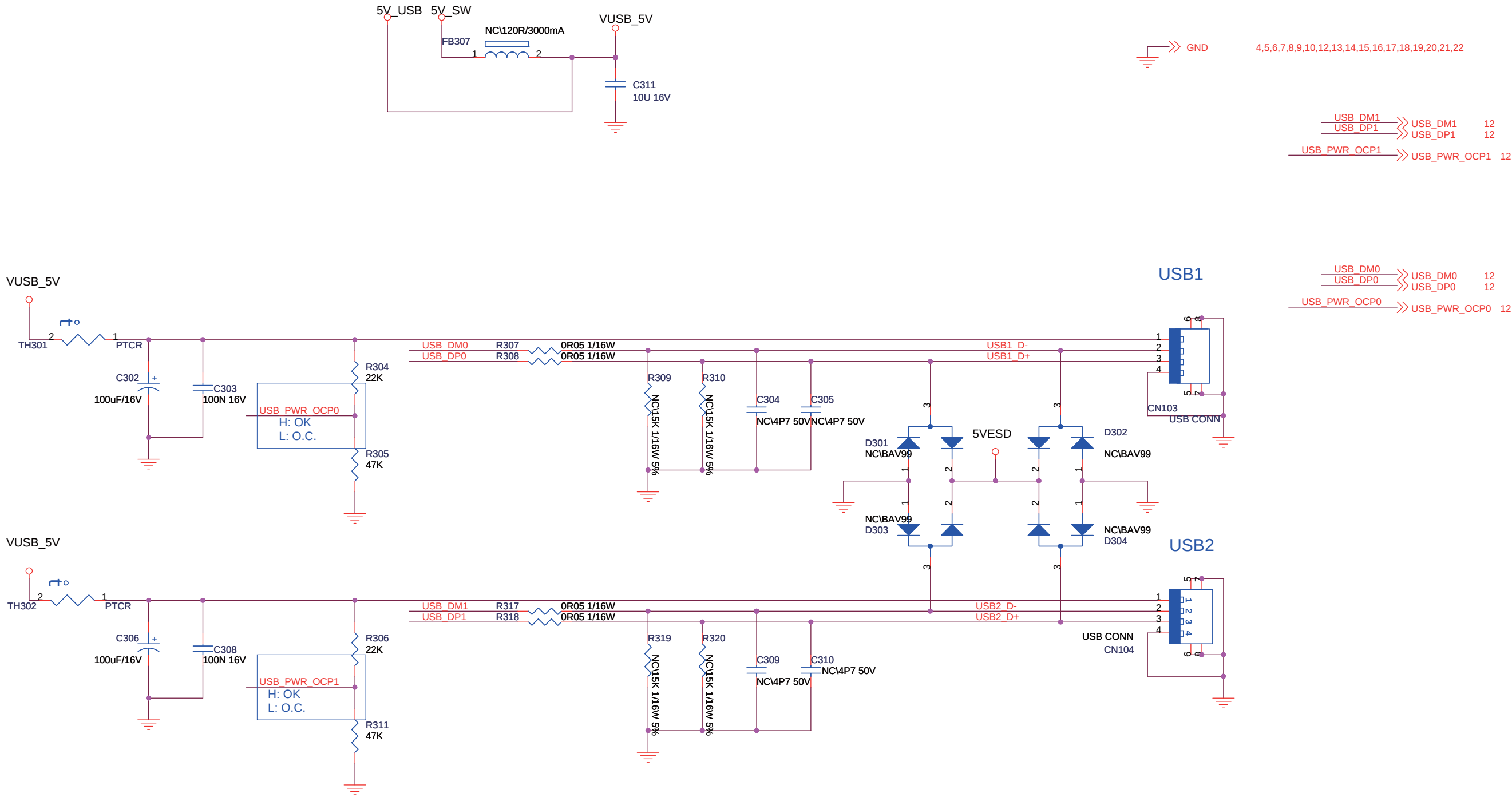
4	2011-03-12
5	
6	
7	

USB1 & USB2

B07

USB1 & USB2

B07



USB1 & USB2

715G4611

4	2011-03-12

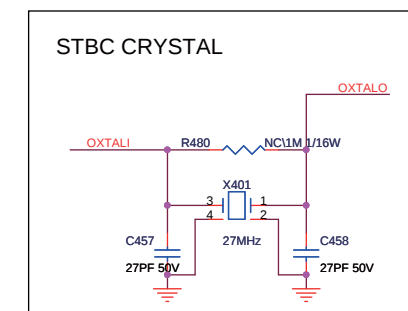
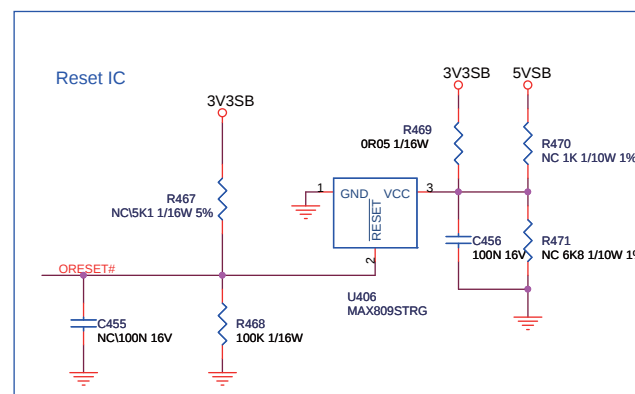
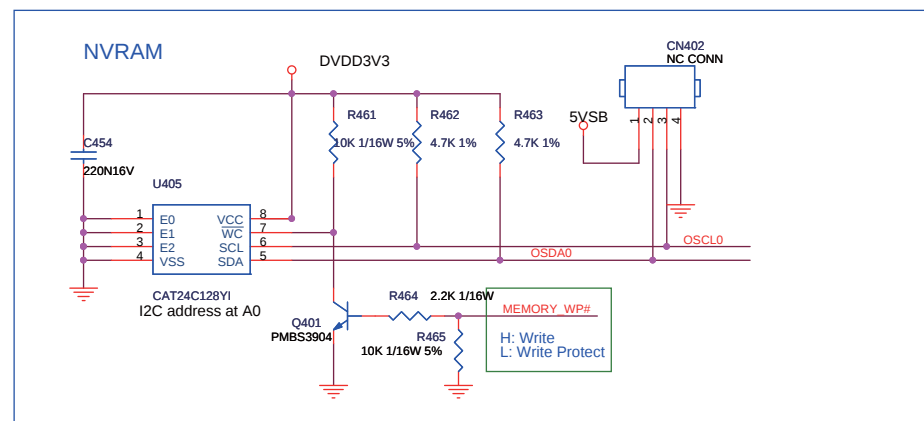
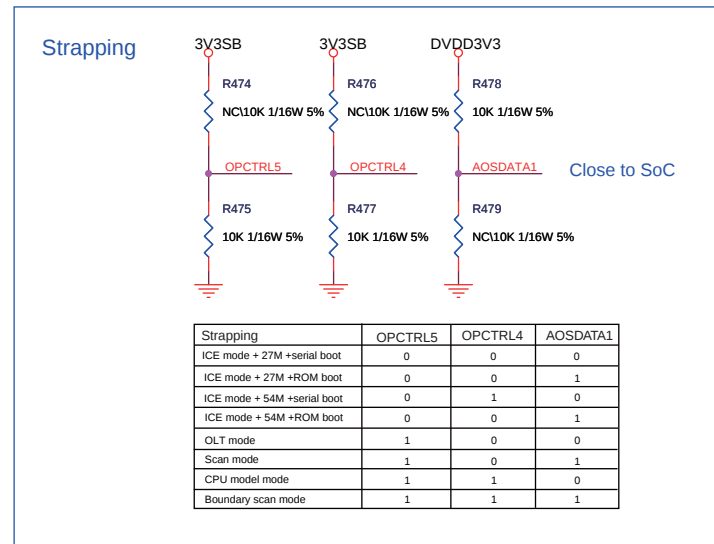
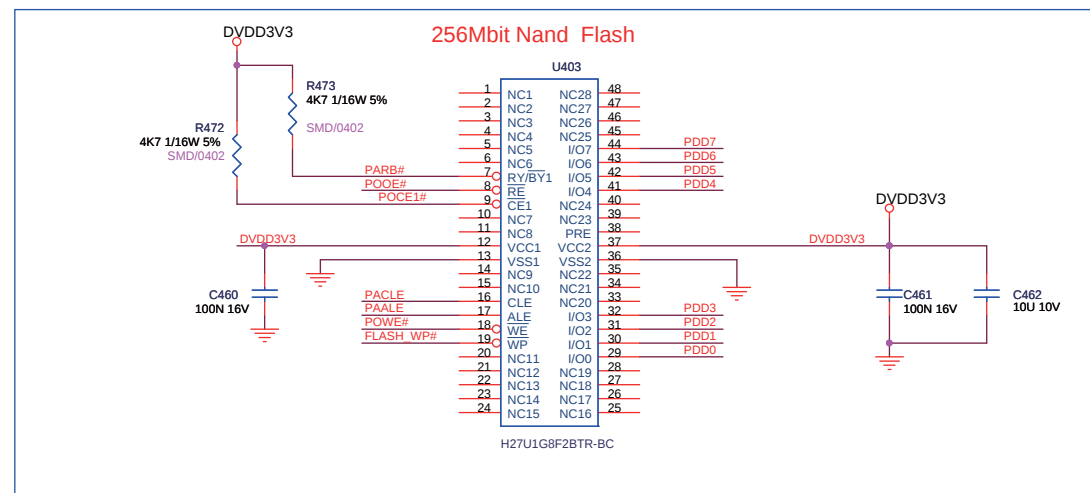
B08



SoC Peripheral

B09

B09



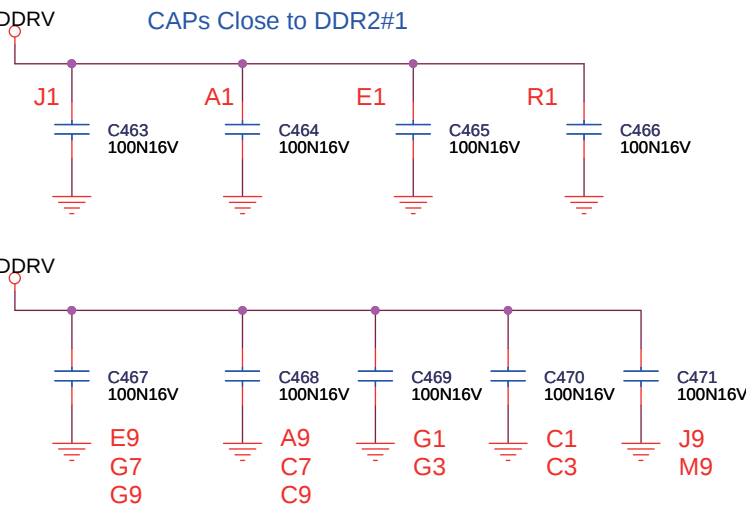
MEMORY_WP#		12
POCEE0#	POCEE0#	12
POCEE#	POCEE#	12
PDD7	PDD7	12
PDD6	PDD6	12
PDD5	PDD5	12
PDD4	PDD4	12
PDD3	PDD3	12
PDD2	PDD2	12
PDD1	PDD1	12
PDD0	PDD0	12
POWE#	POWE#	12
PAALE	PAALE	12
PACLE	PACLE	12
POCEL1#	POCEL1#	12
PARB#	PARB#	12
ORESET#	ORESET#	12
OPCTRL4	OPCTRL4	12
OPCTRL5	OPCTRL5	12
AOSDATA1	AOSDATA1	12
OXTALI	OXTALI	12
OXTALO	OXTALO	12
OSDA0	OSDA0	8,9,10,12,18,20
OSCL0	OSCL0	8,9,10,12,18,20

DDR2

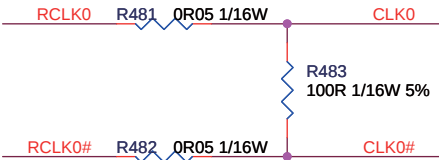
B10 DDR2

B10

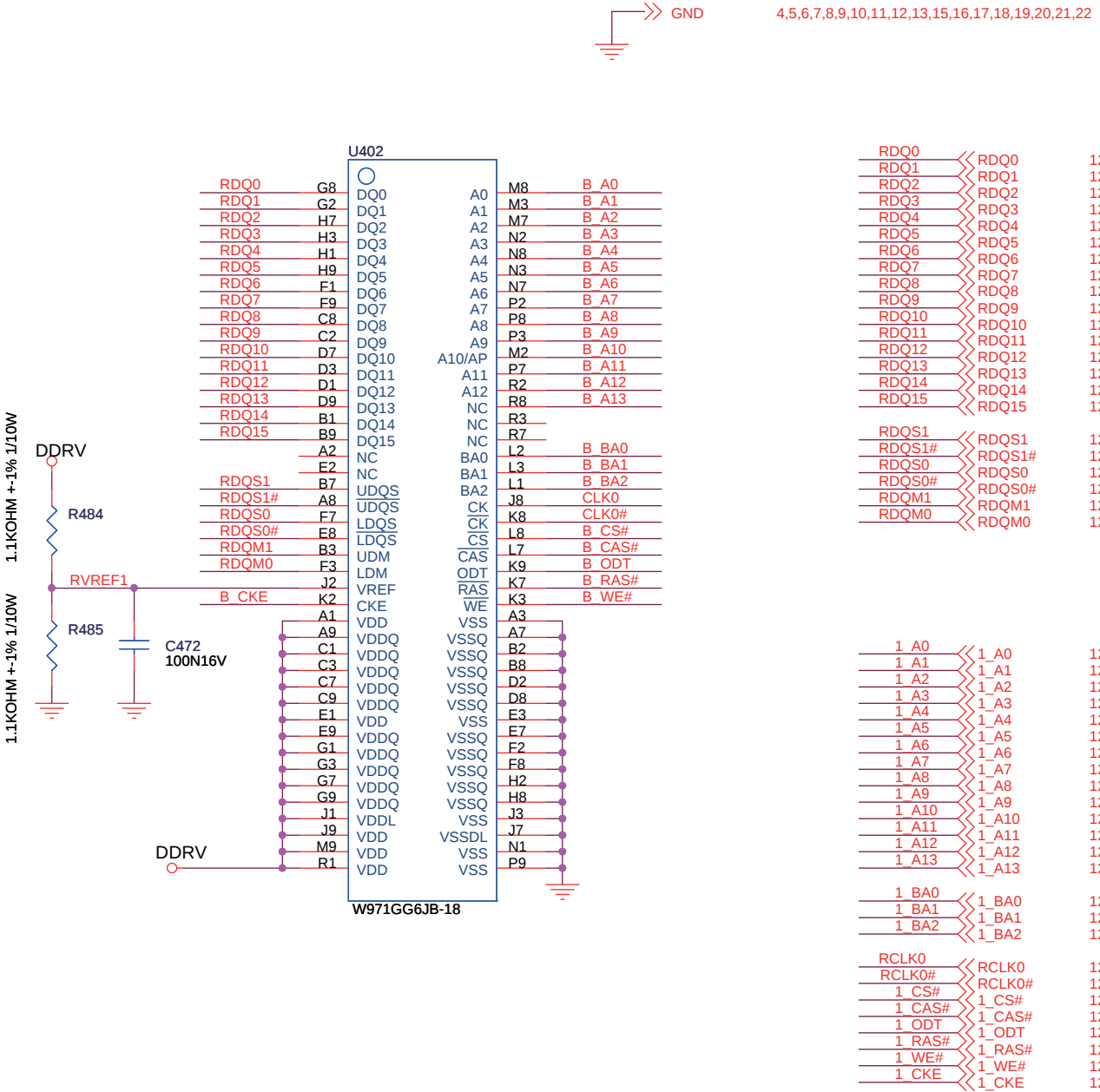
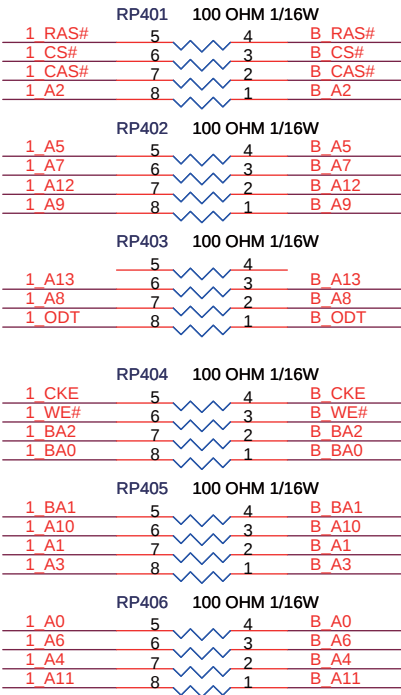
DDR2#1-64Mx16-1066MHz



Damping & Termination for CLK



Damping for DDR2#1 ADDR/CMD



DDR2

715G4611

4 2011-03-12

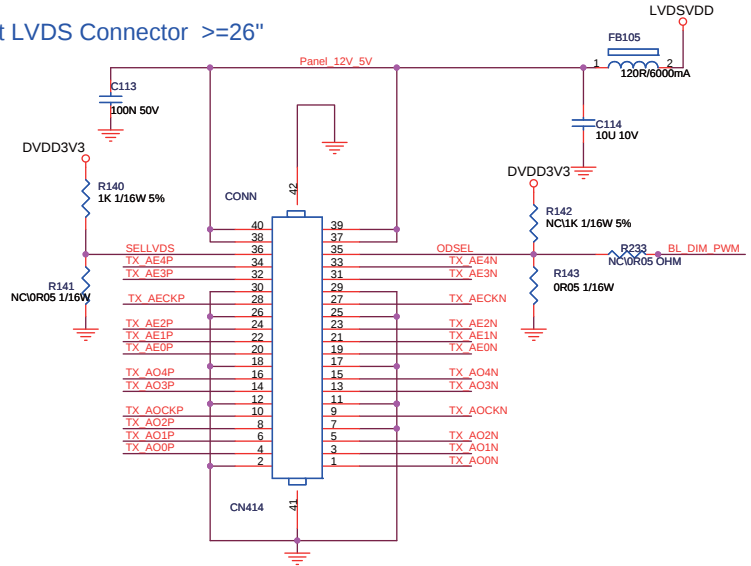
LVDS, JTAG & UART

B11

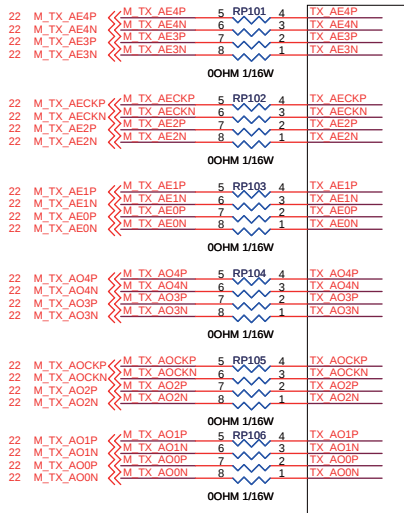
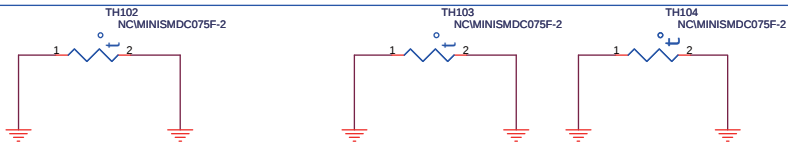
LVDS, JTAG & UART

B11

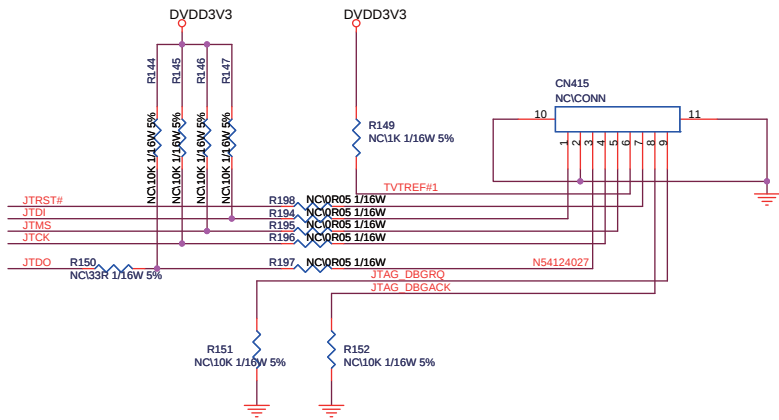
FHD 8/10-Bit LVDS Connector >=26"



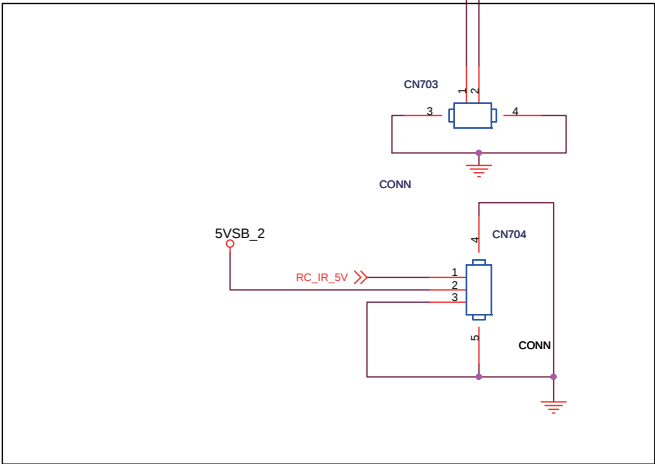
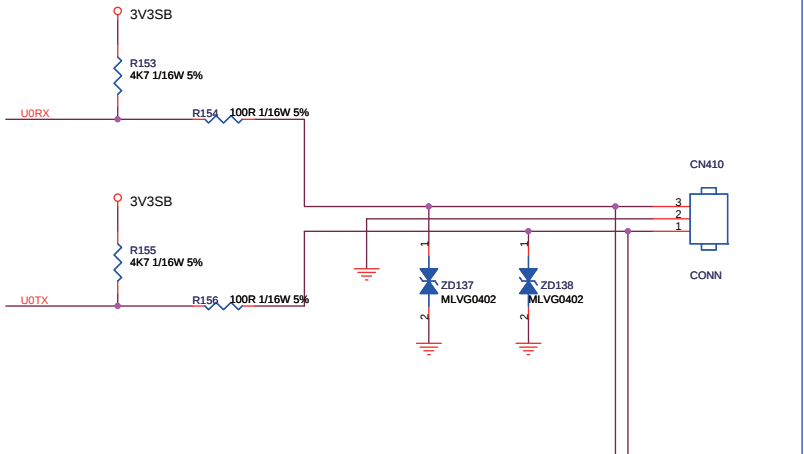
EMI



JTAG (ICE) Debug



UART Debug Tool (STBY)



GND 4,5,6,7,8,9,10,11,12,13,14,16,17,18,19,20,21,22

TX_AE0P TX_AE0P 12
TX_AE0N TX_AE0N 12
TX_AE1P TX_AE1P 12
TX_AE1N TX_AE1N 12
TX_AE2P TX_AE2P 12
TX_AE2N TX_AE2N 12
TX_AE3P TX_AE3P 12
TX_AE3N TX_AE3N 12
TX_AE4P TX_AE4P 12
TX_AE4N TX_AE4N 12

TX_AO0P TX_AO0P 12
TX_AO0N TX_AO0N 12
TX_AO1P TX_AO1P 12
TX_AO1N TX_AO1N 12
TX_AO2P TX_AO2P 12
TX_AO2N TX_AO2N 12
TX_AO3P TX_AO3P 12
TX_AO3N TX_AO3N 12
TX_AO4P TX_AO4P 12
TX_AO4N TX_AO4N 12

JTRST# JTRST# 12
JTDI JTDI 12
JTMS JTMS 12
JTCK JTCK 12
JTDO JTDO 12

TX_AE0P TX_AE0P 12
TX_AE0N TX_AE0N 12
TX_AE1P TX_AE1P 12
TX_AE1N TX_AE1N 12
TX_AE2P TX_AE2P 12
TX_AE2N TX_AE2N 12
TX_AE3P TX_AE3P 12
TX_AE3N TX_AE3N 12
TX_AE4P TX_AE4P 12
TX_AE4N TX_AE4N 12

TX_AO0P TX_AO0P 12
TX_AO0N TX_AO0N 12
TX_AO1P TX_AO1P 12
TX_AO1N TX_AO1N 12
TX_AO2P TX_AO2P 12
TX_AO2N TX_AO2N 12
TX_AO3P TX_AO3P 12
TX_AO3N TX_AO3N 12
TX_AO4P TX_AO4P 12
TX_AO4N TX_AO4N 12

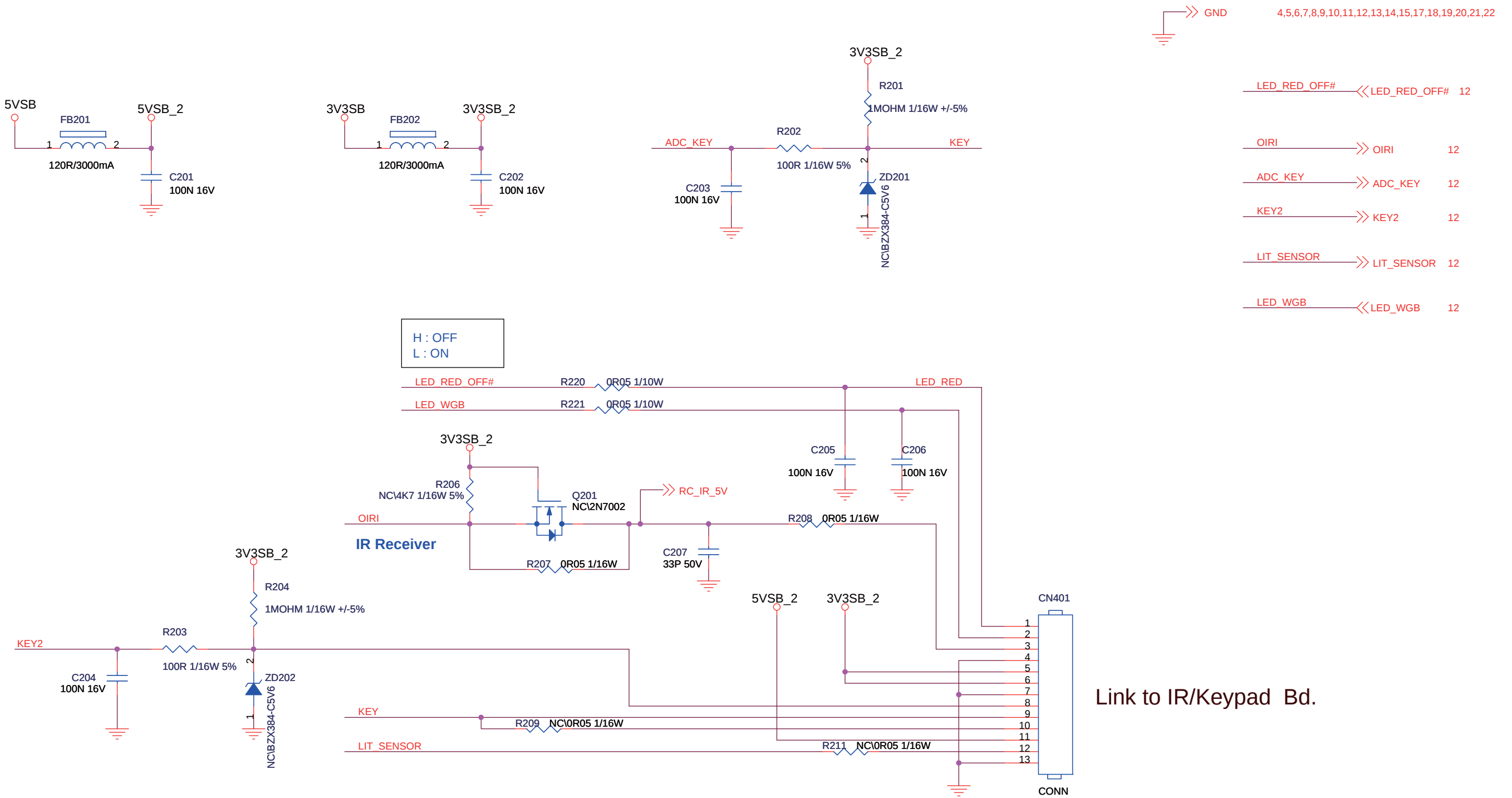
U0RX U0RX 6,12
U0TX U0TX 6,12

OSDA0 OSDA0 8,9,10,12,13,18,20
OSCL0 OSCL0 8,9,10,12,13,18,20

IR & Keypad Interface

B12 IR & Keypad Interface

B12



AV Out & SPDIF Out

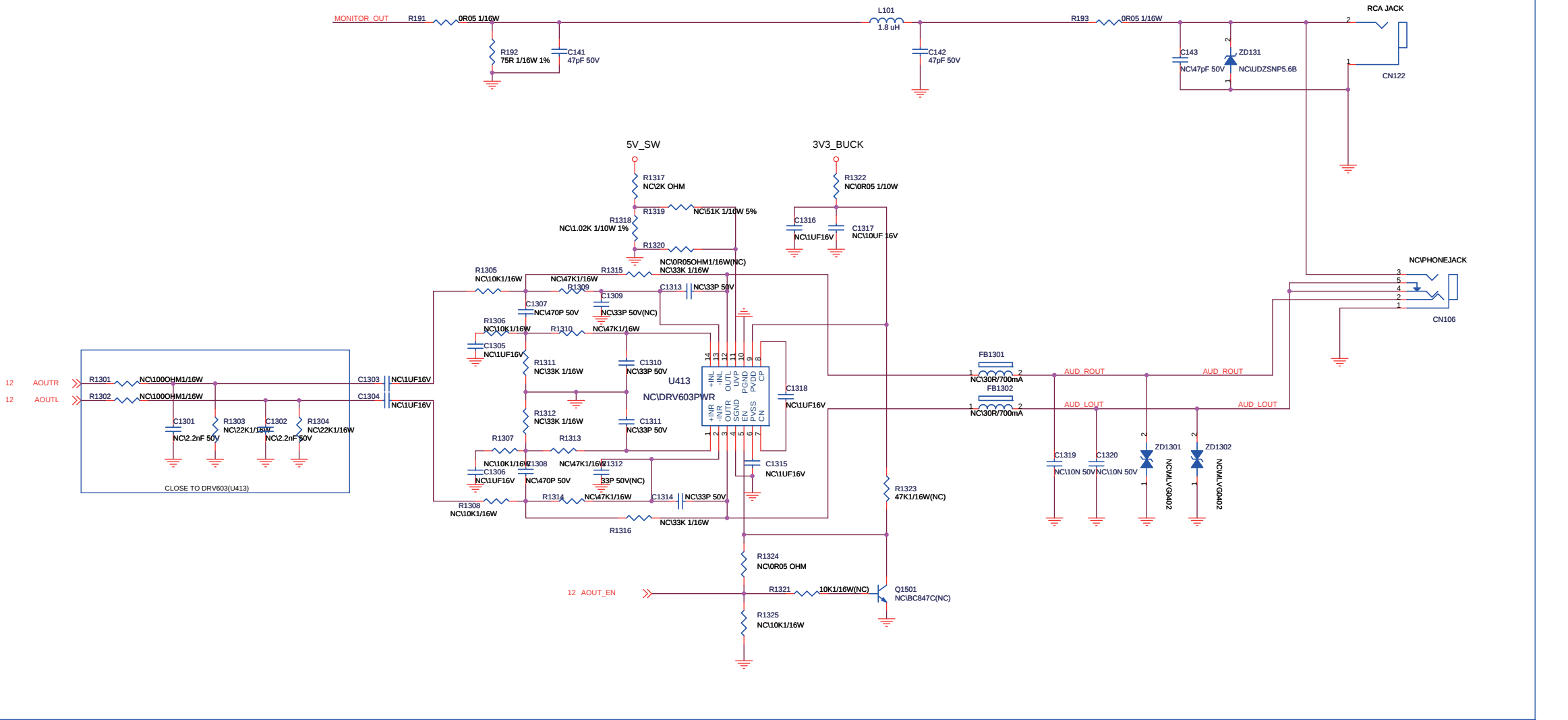
B13

AV Out & SPDIF Out

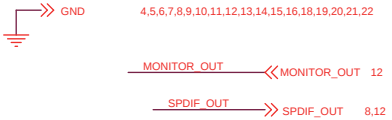
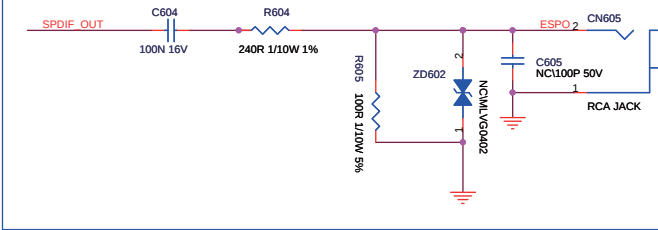
B13

AV_OUT (CVBS +R/L)

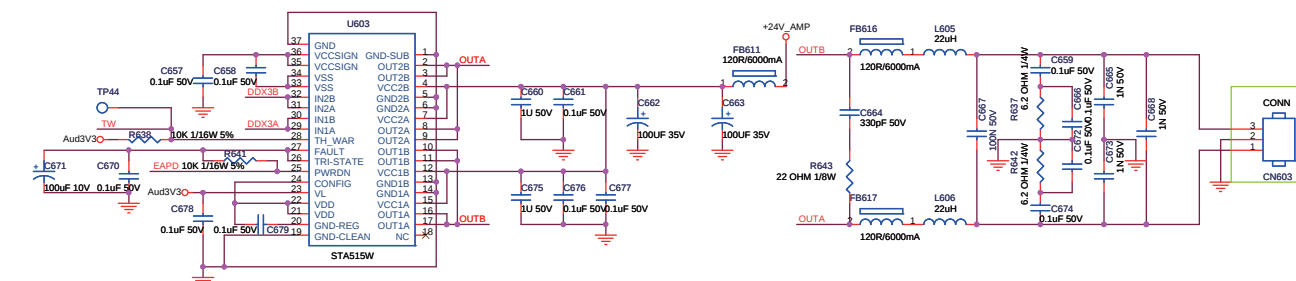
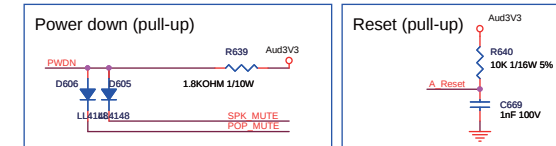
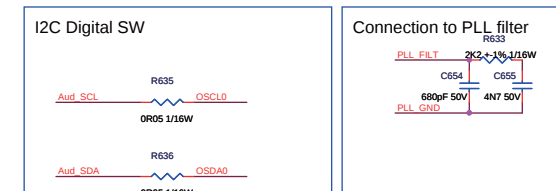
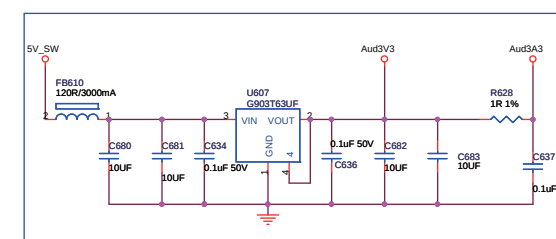
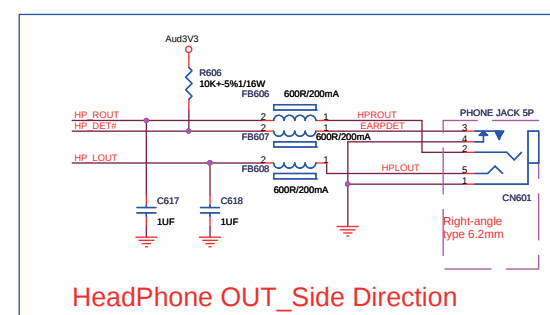
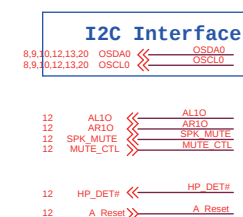
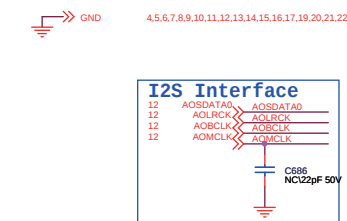
CVBS OUT



SPDIF OUT



B14



715G4611-M0E-000-0040

CN701

AI LABEL POSITION

X3 X4

CN104

CN103

CN601

TU101

CN121

CN507

CN506

CN508

CN102

CN101

CN410

CN702

CN505

CN106

CN122

RoHS

MI LABEL POSITION

DIP

U701

U702

U703

U704

U705

U706

U707

U708

U709

U710

U711

U712

U713

U714

U715

U716

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U1064

U1065

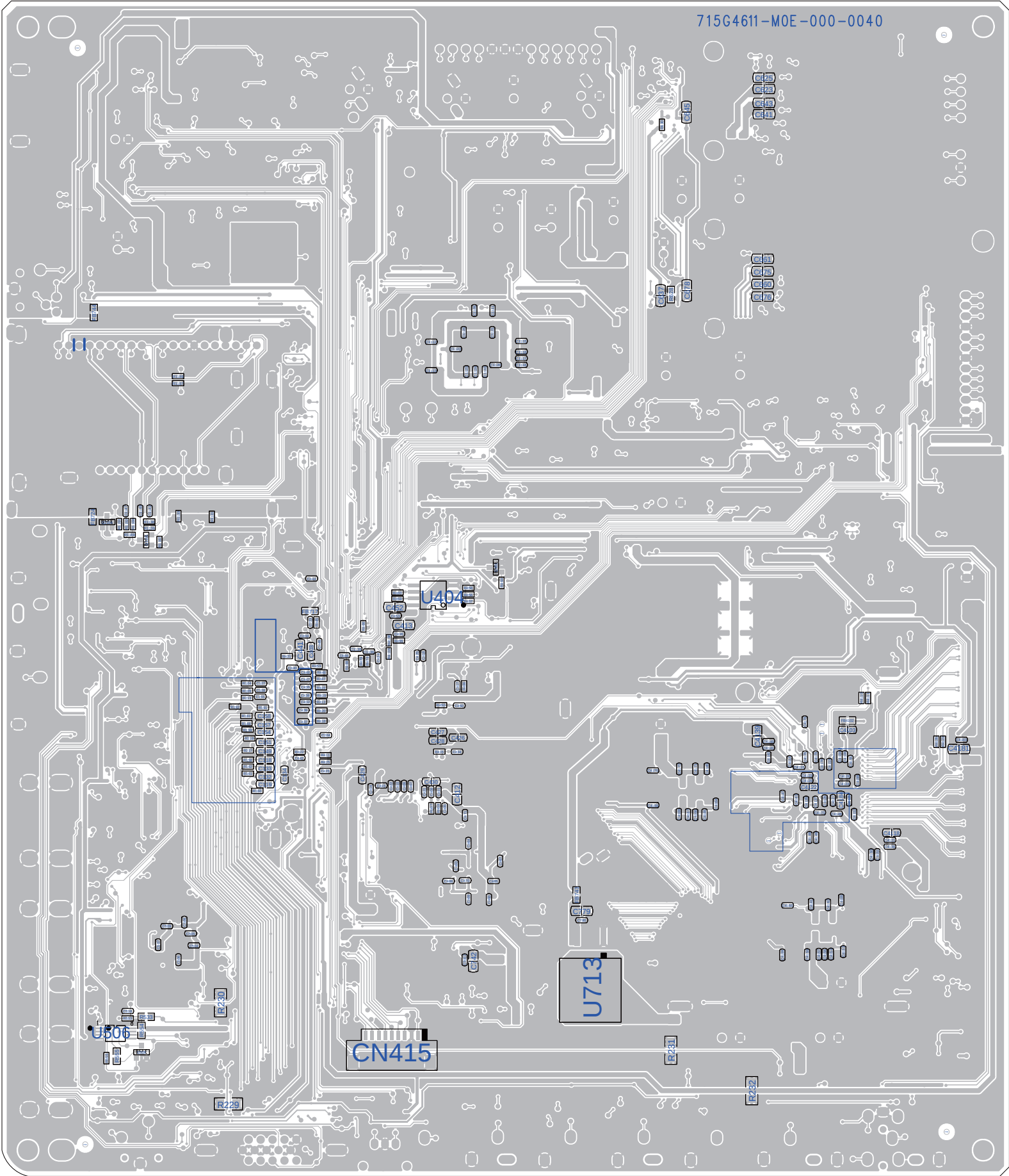
U1066

U1067

U1068

19170_527_110629.eps
110629

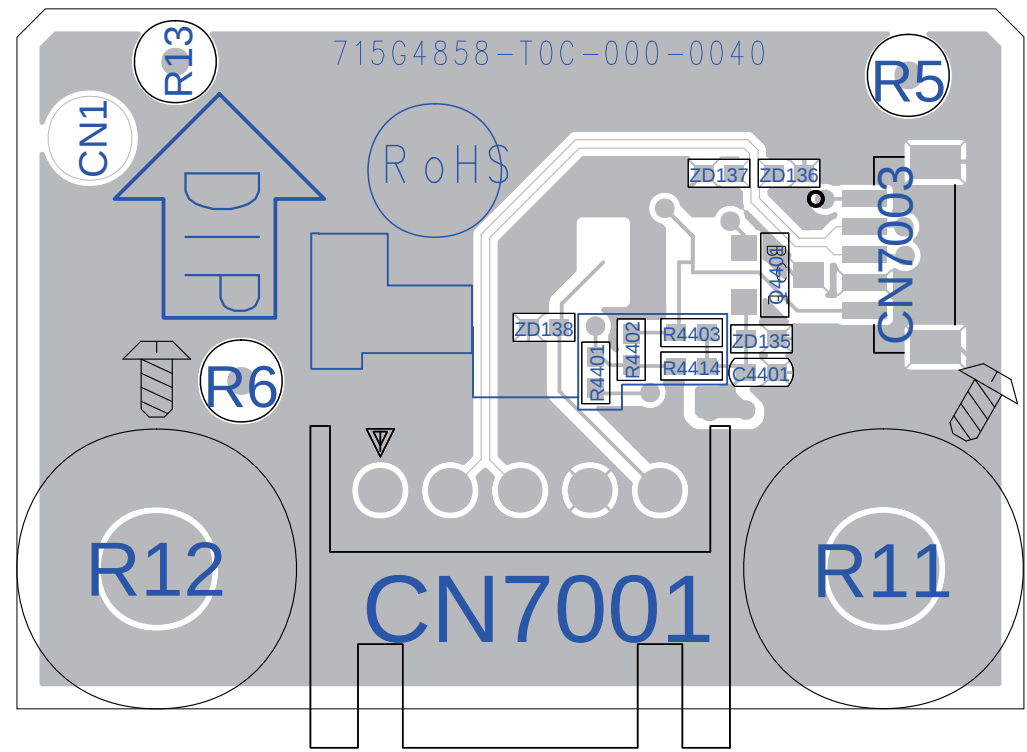
SSB layout bottom



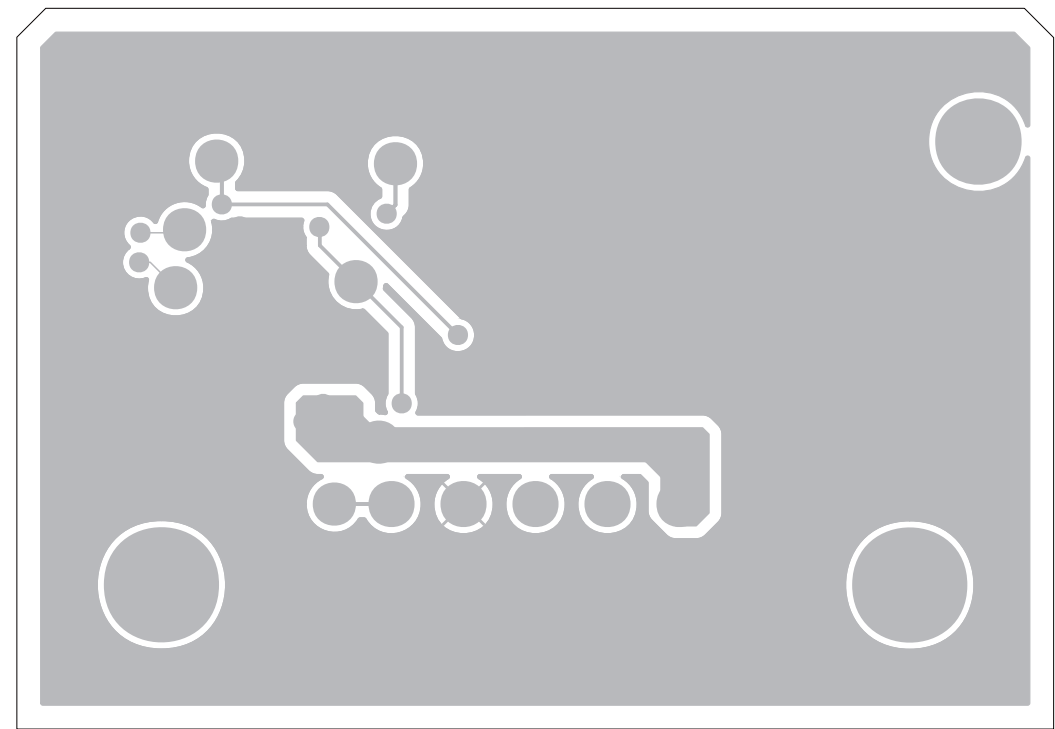
SSB layout bottom	715G4611	1	2011-09-21

EMC board layout

Layout EMC Board (Top Side)

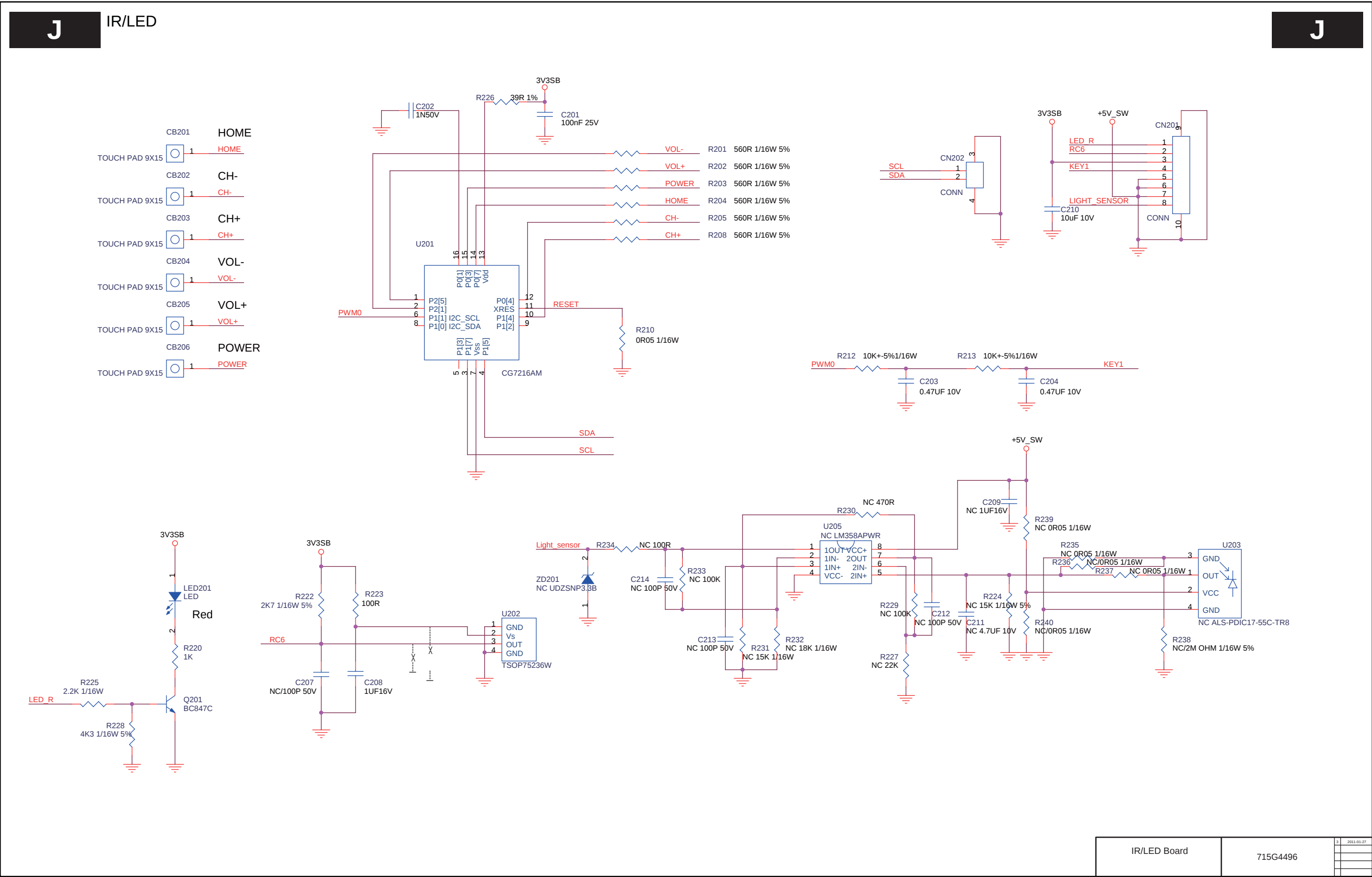


Layout EMC Board (Bottom Side)



EMC board layout top/bottom	715G4858	1	2011-06-21

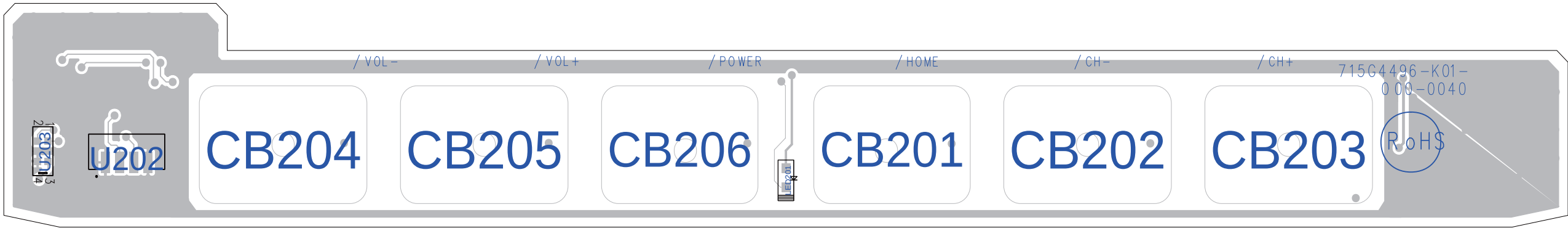
10-5 J 715G4496 IR/LED
IR/LED board



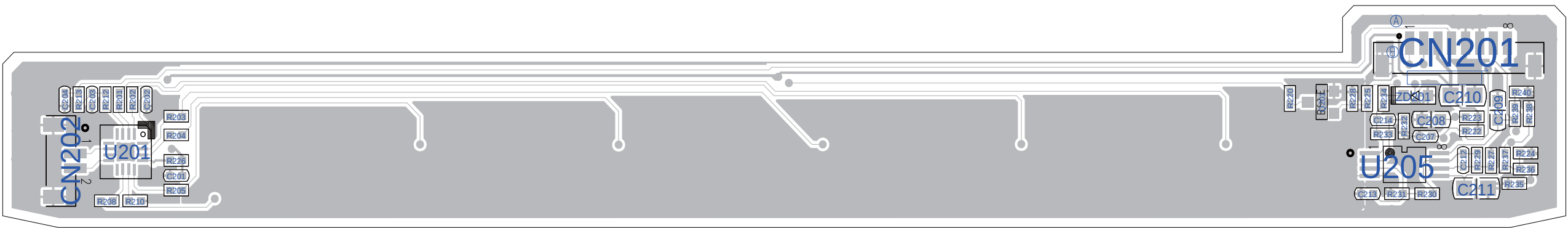
IR/LED Board	715G4496	3	2011-01-27

IR/LED board layout

Layout IR/LED Board (Top Side)



Layout IR/LED Board (Bottom Side)

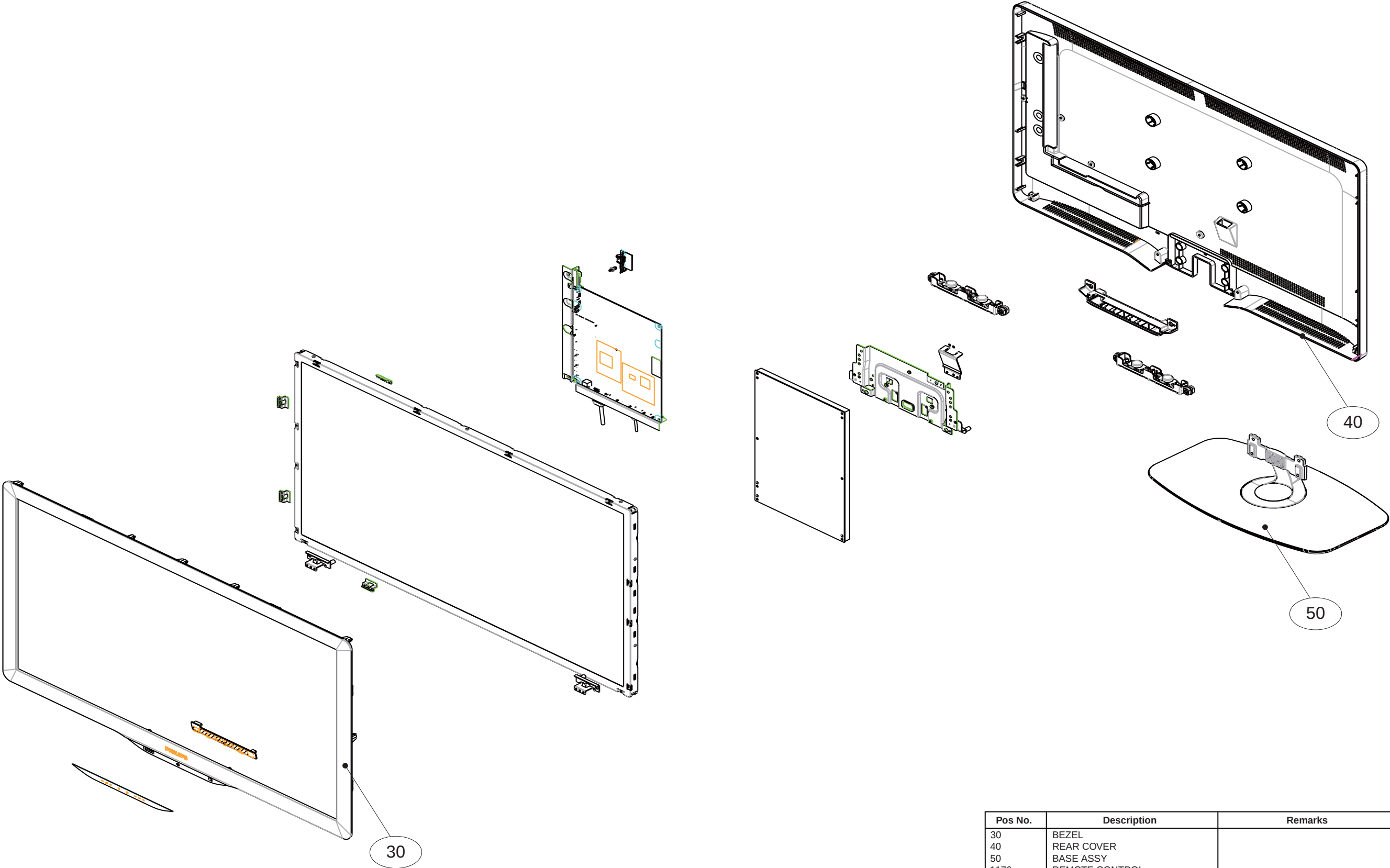


IR/LED board layout top/bottom	715G4496	1	2011-06-21

11. Styling Sheets

11-1 Ebony 32"

Ebony 32"

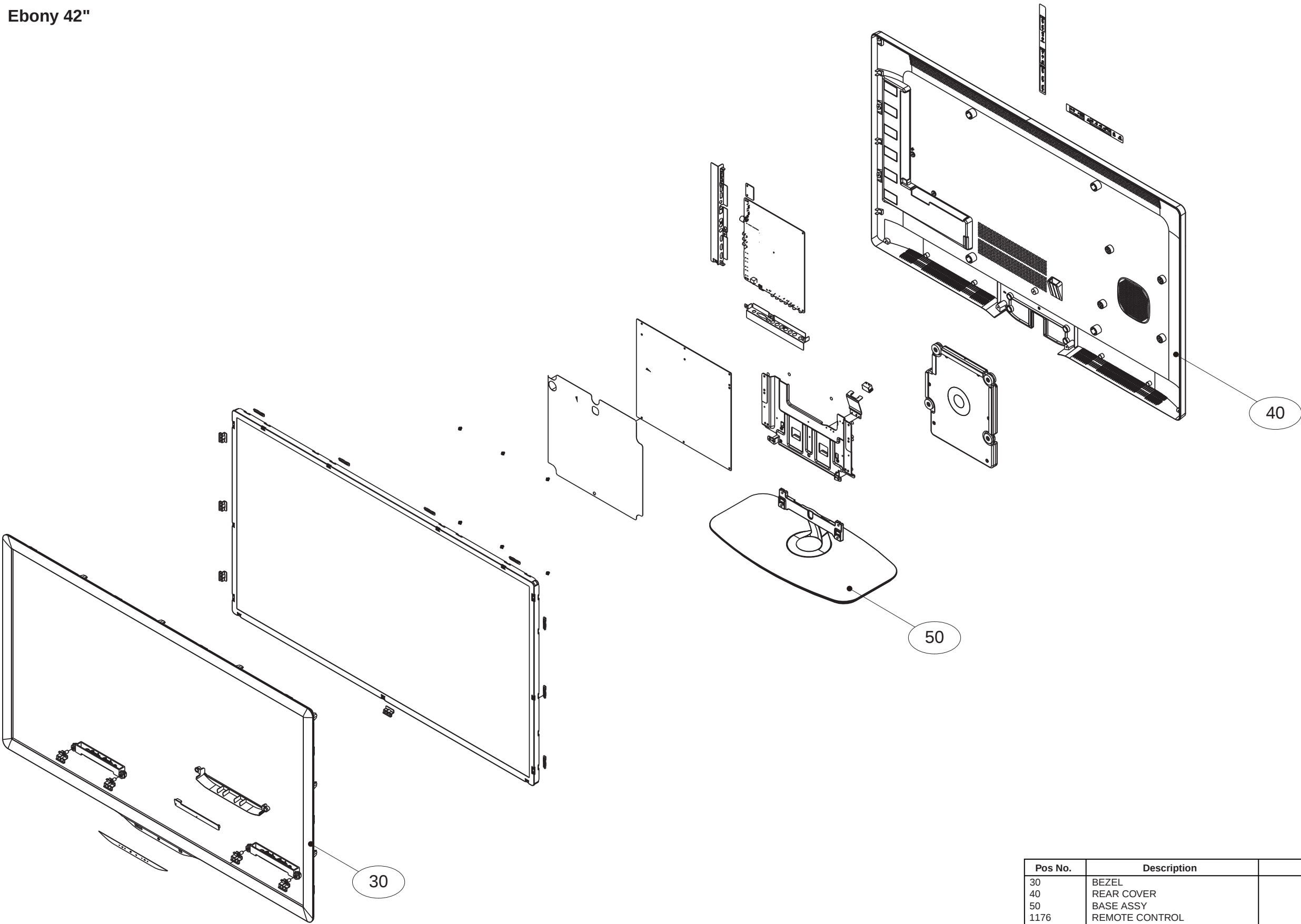


Pos No.	Description	Remarks
30	BEZEL	
40	REAR COVER	
50	BASE ASSY	
1176	REMOTE CONTROL	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

11-2 Ebony 42"

Ebony 42"



Pos No.	Description	Remarks
30	BEZEL	
40	REAR COVER	
50	BASE ASSY	
1176	REMOTE CONTROL	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9