

Service Service Service



Service Manual

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1. Revision List

Manual xxxx xxx xxxx.0

- First release.

Manual xxxx xxx xxxx.1

- Added models 42PFL4506H/12 to the manual
- **Chapter 2:** Added new models to [Table 2-1](#).
- **Chapter 6:** Updated table 6-2 Display code overview.

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

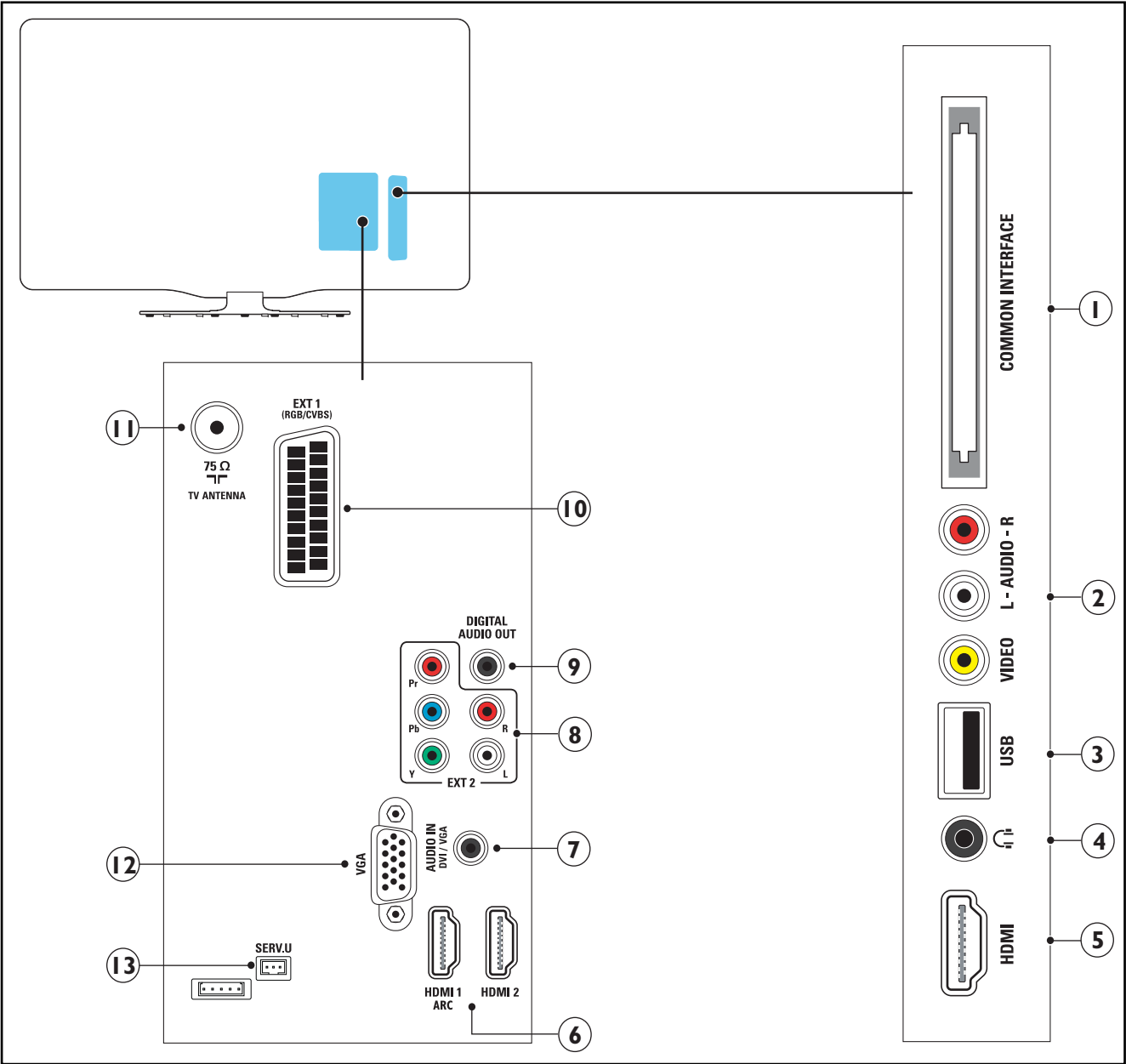
For on-line product support please use the links in. Here is product information available, as well as getting started, user manuals, frequently asked questions and software & drivers.

Table 2-1 Described Model Numbers:

Model Number	Styling	Published in
32PFL4606H/12	Dangerous	3122 785 19090
32PFL4606H/58	Dangerous	3122 785 19090
32PFL4606H/60	Dangerous	3122 785 19090
37PFL4606H/12	Dangerous	3122 785 19090
37PFL4606H/58	Dangerous	3122 785 19090
37PFL4606H/60	Dangerous	3122 785 19090
42PFL4506H/12	Dangerous	3122 785 19091
42PFL4606H/12	Dangerous	3122 785 19090
42PFL4606H/58	Dangerous	3122 785 19090
42PFL4606H/60	Dangerous	3122 785 19090
47PFL4606H/12	Dangerous	3122 785 19090
47PFL4606H/58	Dangerous	3122 785 19090
47PFL4606H/60	Dangerous	3122 785 19090

Note: The given Model Numbers are subject to change.

2.3 Connections



19090_001_110412.eps
110509

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 - Common Interface
68p - See diagram
[CLCARD/MT5135](#).

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



3 - USB2.0

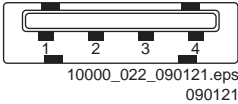


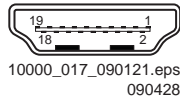
Figure 2-2 USB (type A)

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



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



5 - HDMI: 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	⊥

2.3.2 Rear Connections**6 - HDMI1: Digital Video, Digital Audio - In**See [5 - HDMI: Digital Video, Digital Audio - In](#)**7 - Audio - In: Left / Right, VGA**

Gn - Audio L/R in	0.5 V _{RMS} / 10 kΩ	⊕⊕
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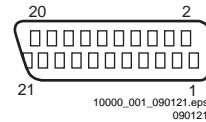
8 - EXT2: Video YPbPr - In, Audio - In

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	⊕⊕

9 - Cinch: Audio - Out

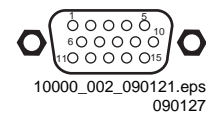
Rd - Audio R	0.5 V _{RMS} / 10 kΩ	⊕⊕
Wh - Audio L	0.5 V _{RMS} / 10 kΩ	⊕⊕

10 - EXT1: Video RGB/YC - In, CVBS - In/Out, Audio - In/Out**Figure 2-4 SCART connector**

1	- Audio R	0.5 V _{RMS} / 1 kΩ	⊕
2	- Audio R	0.5 V _{RMS} / 10 kΩ	⊕
3	- Audio L	0.5 V _{RMS} / 1 kΩ	⊕
4	- Ground Audio	Gnd	⊥
5	- Ground Blue	Gnd	⊥
6	- Audio L	0.5 V _{RMS} / 10 kΩ	⊕
7	- Video Blue/C-out	0.7 V _{PP} / 75 Ω	⊕⊕
8	- Function Select	0 - 2 V: INT 4.5 - 7 V: EXT 16:9 9.5 - 12 V: EXT 4:3	⊕
9	- Ground Green	Gnd	⊥
10	- n.c.		
11	- Video Green	0.7 V _{PP} / 75 Ω	⊕
12	- n.c.		
13	- Ground Red	Gnd	⊥
14	- Ground P50	Gnd	⊥
15	- Video Red/C	0.7 V _{PP} / 75 Ω	⊕
16	- Status/FBL	0 - 0.4 V: INT 1 - 3 V: EXT / 75 Ω	⊕
17	- Ground Video	Gnd	⊥
18	- Ground FBL	Gnd	⊥
19	- Video CVBS	1 V _{PP} / 75 Ω	⊕
20	- Video CVBS/Y	1 V _{PP} / 75 Ω	⊕
21	- Shield	Gnd	⊥

11 - TV ANTENNA - In

Signal input from an antenna, cable or satellite.

12 - PC IN:VGA**Figure 2-5 VGA connector**

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	⊕

13 - Service / UART

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

2.4 Chassis OverviewRefer 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

PCB	PAL M = 3.575612 MHz and PAL N = 3.582056 MHz)	SVGA	800 × 600 (4:3)
PCM	Printed Circuit Board (same as "PWB")	SVHS	Super Video Home System
PDP	Pulse Code Modulation	SW	Software
PFC	Plasma Display Panel	SWAN	Spatial temporal Weighted Averaging Noise reduction
PIP	Power Factor Corrector (or Pre-conditioner)	SXGA	1280 × 1024
PLL	Picture In Picture	TFT	Thin Film Transistor
POD	Phase Locked Loop. Used for e.g. FST tuning systems. The customer can give directly the desired frequency	THD	Total Harmonic Distortion
POR	Point Of Deployment: a removable CAM module, implementing the CA system for a host (e.g. a TV-set)	TMD5	Transmission Minimized Differential Signalling
PSDL	Power On Reset, signal to reset the uP	TS	Transport Stream
PSL	Power Supply for Direct view LED backlight with 2D-dimming	TXT	TeleteXT
PSLS	Power Supply with integrated LED drivers	TXT-DW	Dual Window with TeleteXT
PTC	Power Supply with integrated LED drivers with added Scanning functionality	UI	User Interface
PWB	Positive Temperature Coefficient, non-linear resistor	uP	Microprocessor
PWM	Printed Wiring Board (same as "PCB")	UXGA	1600 × 1200 (4:3)
QRC	Pulse Width Modulation	V	V-sync to the module
QTNR	Quasi Resonant Converter	VESA	Video Electronics Standards Association
QVCP	Quality Temporal Noise Reduction	VGA	640 × 480 (4:3)
RAM	Quality Video Composition Processor	VL	Variable Level out: processed audio output toward external amplifier
RGB	Random Access Memory	VSF	Vestigial Side Band; modulation method
RC	Red, Green, and Blue. The primary color signals for TV. By mixing levels of R, G, and B, all colors (Y/C) are reproduced.	WYSIWYR	What You See Is What You Record: record selection that follows main picture and sound
RC5 / RC6	Remote Control	WXGA	1280 × 768 (15:9)
RESET	Signal protocol from the remote control receiver	XTAL	Quartz crystal
ROM	RESET signal	XGA	1024 × 768 (4:3)
RSDS	Read Only Memory	Y	Luminance signal
R-TXT	Reduced Swing Differential Signalling data interface	Y/C	Luminance (Y) and Chrominance (C) signal
SAM	Red TeleteXT	YPbPr	Component video. Luminance and scaled color difference signals (B-Y and R-Y)
S/C	Service Alignment Mode	YUV	Component video
SCART	Short Circuit		
SCL	Syndicat des Constructeurs d'Appareils Radiorécepteurs et Téléviseurs		
SCL-F	Serial Clock I ² C		
SD	CLock Signal on Fast I ² C bus		
SDA	Standard Definition		
SDA-F	Serial Data I ² C		
SDI	DAta Signal on Fast I ² C bus		
SDRAM	Serial Digital Interface, see "ITU-656"		
SECAM	Synchronous DRAM		
SIF	SEquence Couleur Avec Mémoire. Colour system mainly used in France and East Europe. Colour carriers = 4.406250 MHz and 4.250000 MHz		
SMPS	Sound Intermediate Frequency		
SoC	Switched Mode Power Supply		
SOG	System on Chip		
SOPS	Sync On Green		
SPI	Self Oscillating Power Supply		
S/PDIF	Serial Peripheral Interface bus; a 4-wire synchronous serial data link standard		
SRAM	Sony Philips Digital InterFace		
SRP	Static RAM		
SSB	Service Reference Protocol		
SSC	Small Signal Board		
STB	Spread Spectrum Clocking, used to reduce the effects of EMI		
STBY	Set Top Box		
	STand-BY		

4. Mechanical Instructions

Index of this chapter:

[4.1 Cable Dressing](#)

[4.2 Service Positions](#)

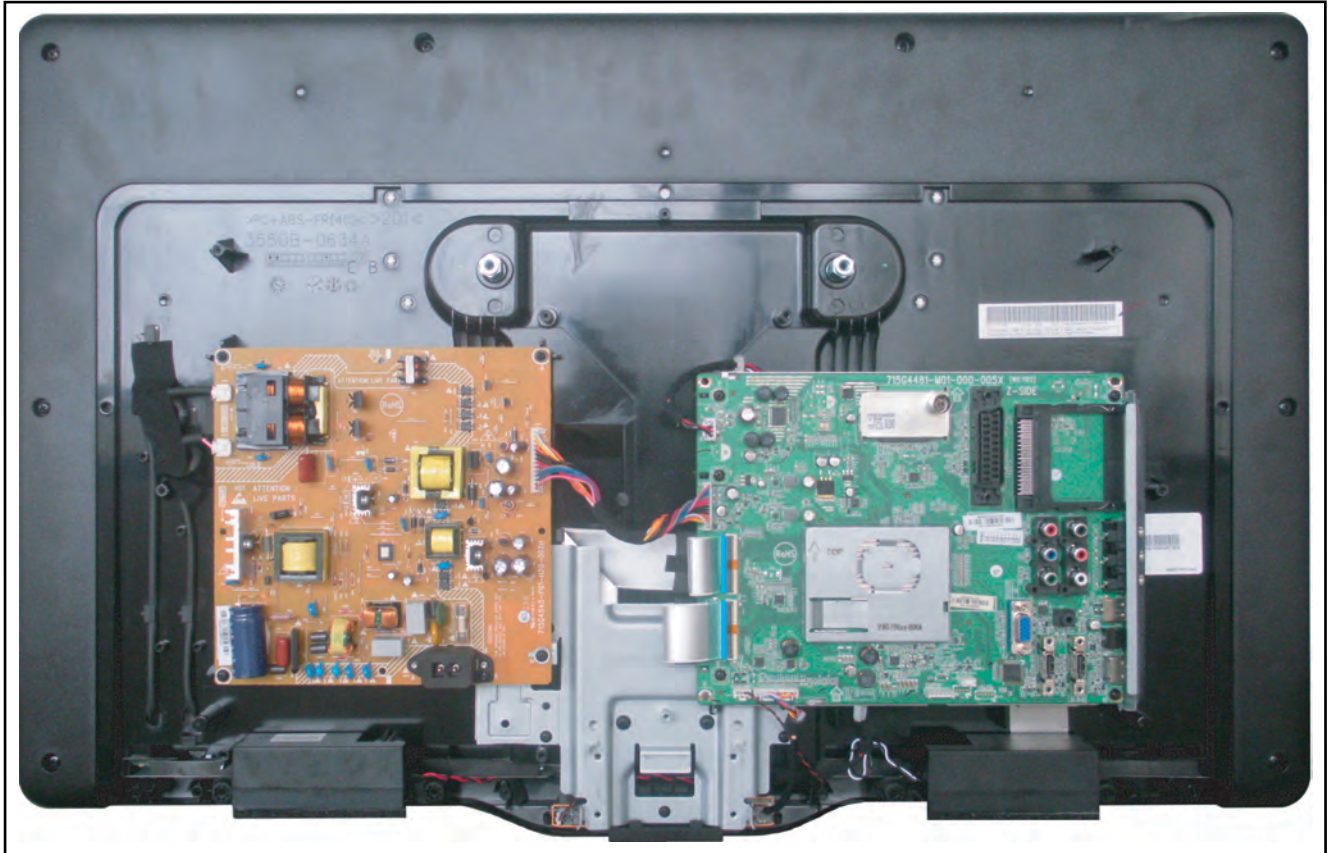
[4.3 Assembly/Panel Removal](#)

[4.4 Set Re-assembly](#)

Notes:

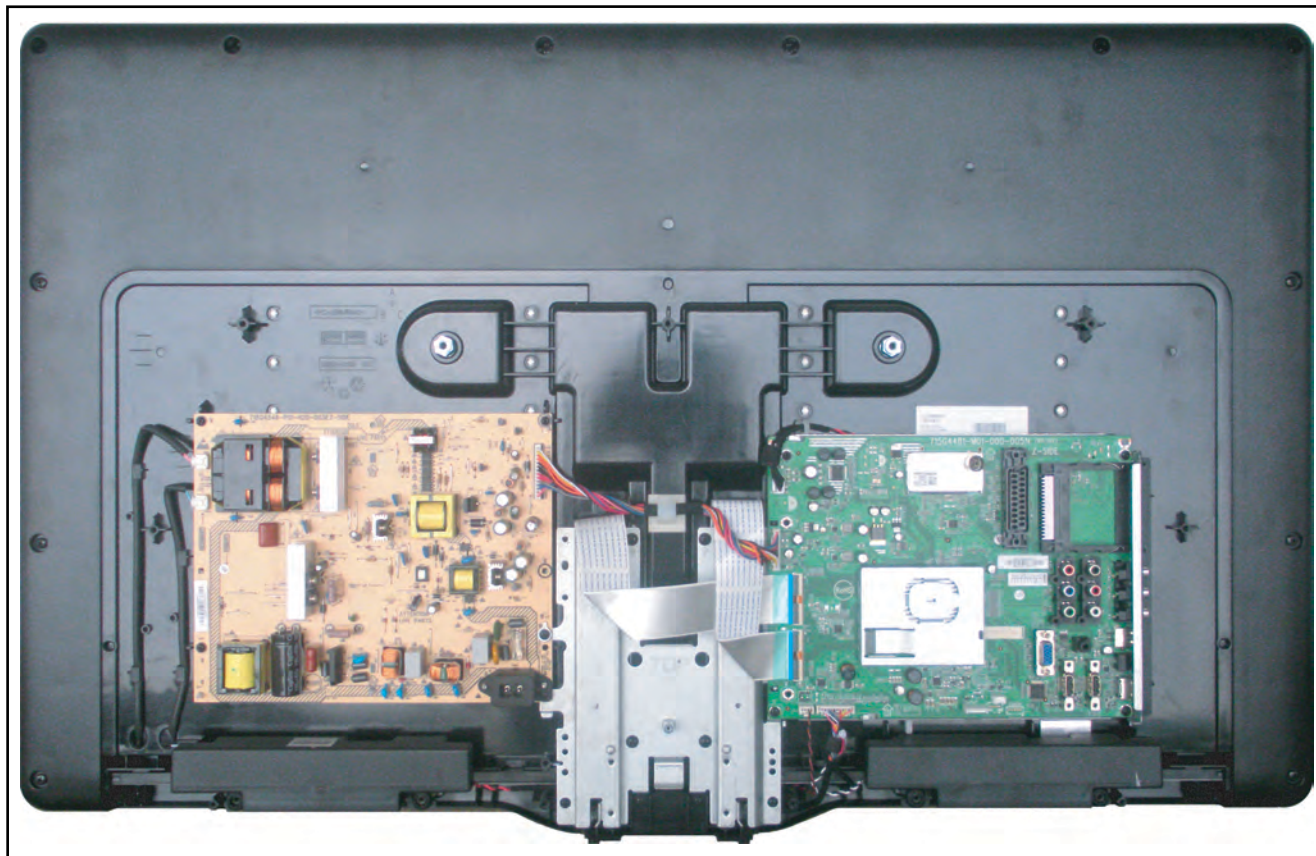
- Figures below can deviate slightly from the actual situation, due to the different set executions.

4.1 Cable Dressing



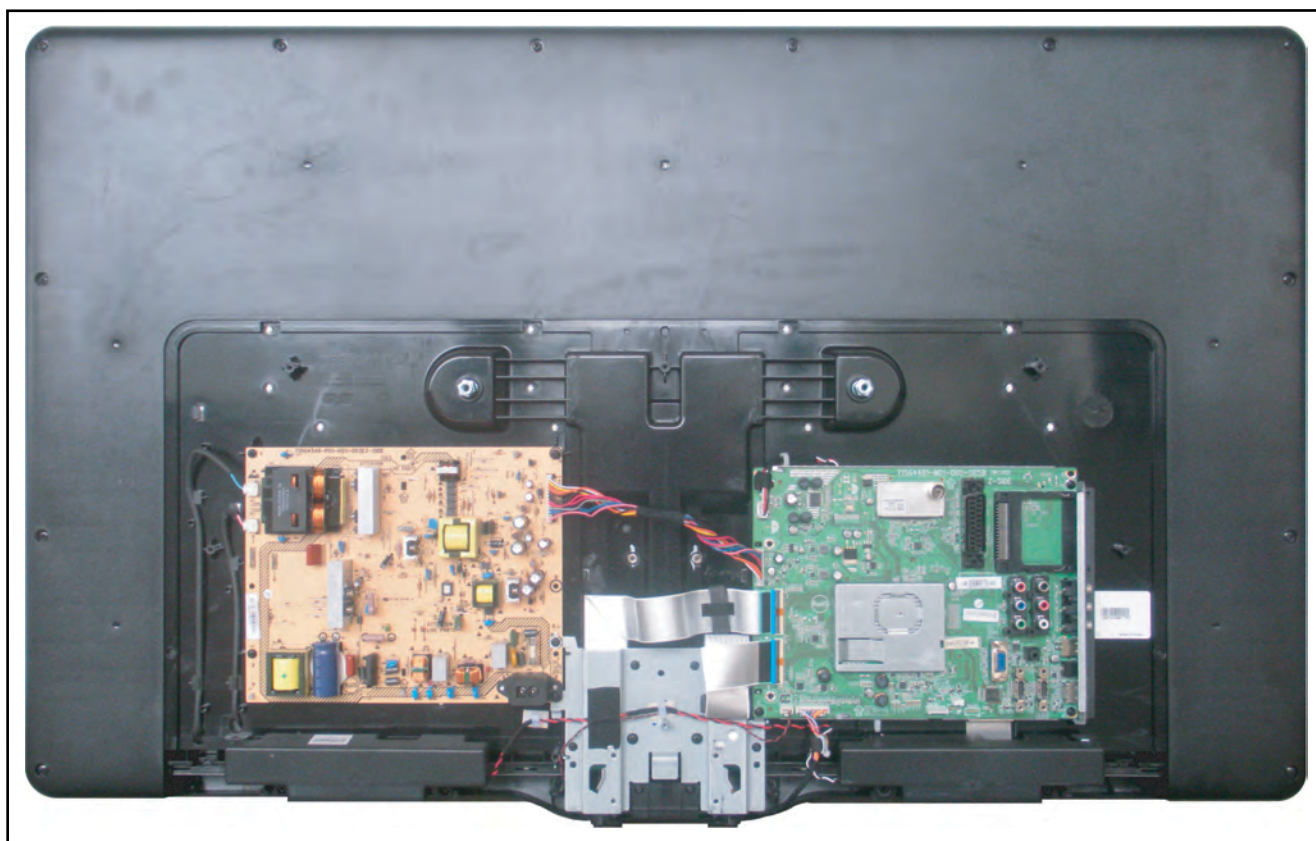
19090_100_110413.eps
110505

Figure 4-1 Cable dressing 32"



19090_101_110413.eps
110505

Figure 4-2 Cable dressing 37"



19090_102_110413.eps
110505

Figure 4-3 Cable dressing 42"

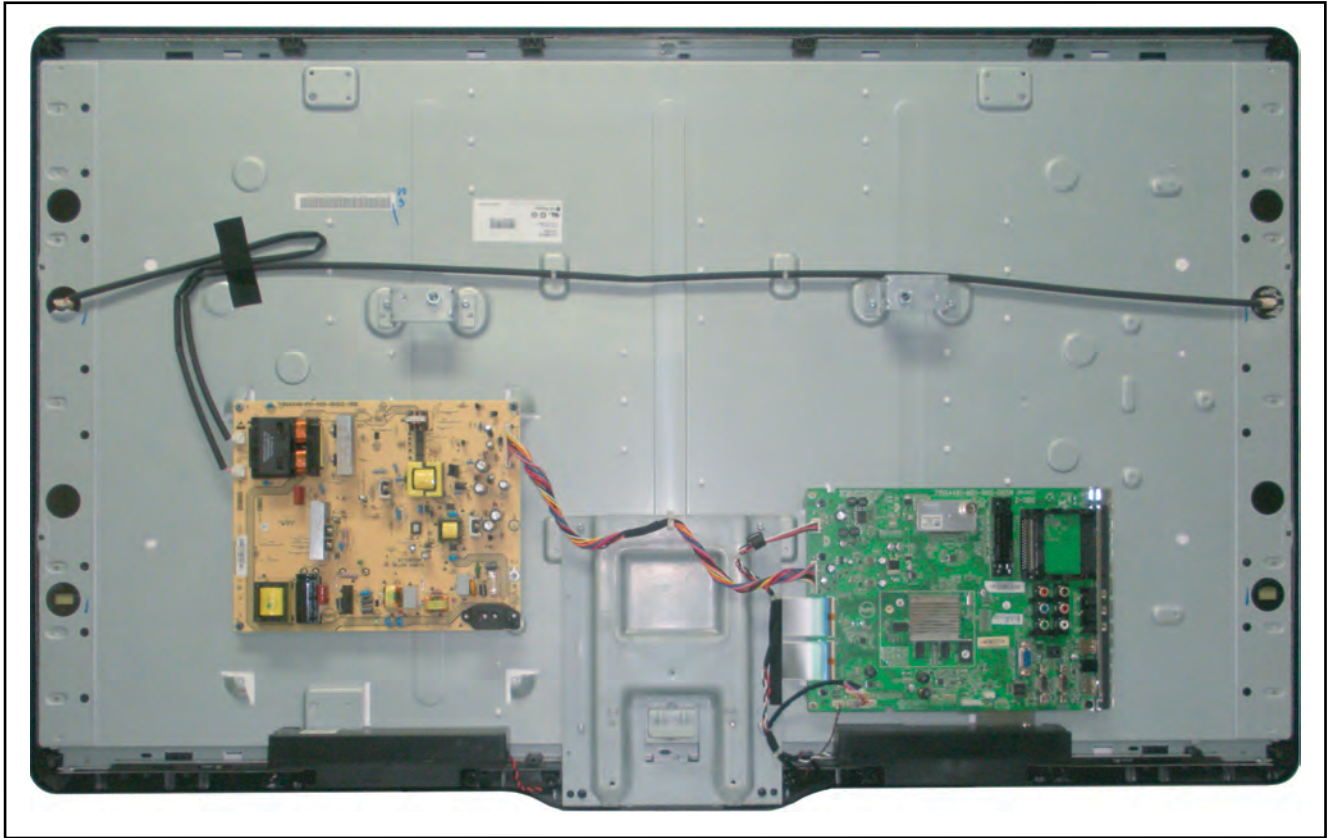
19090_103_110413.eps
110413

Figure 4-4 Cable dressing 47"

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 32PFL4606H/12, but will be similar for other models except 47PFL4606H/xx.

4.3.1 Rear Cover

Refer to [Figure 4-5](#) and [Figure 4-6](#) for details.

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

1. Remove fixation screws [1] that secure the base assy, pull out the base assy from the set. Then remove the fixation screws [2], [3], [4] that secure the rear cover. Refer to [Figure 4-5](#) and [Figure 4-6](#) for details.
2. Lift the rear cover from the TV. Make sure that wires and flat foils are not damaged while lifting the rear cover from the set.

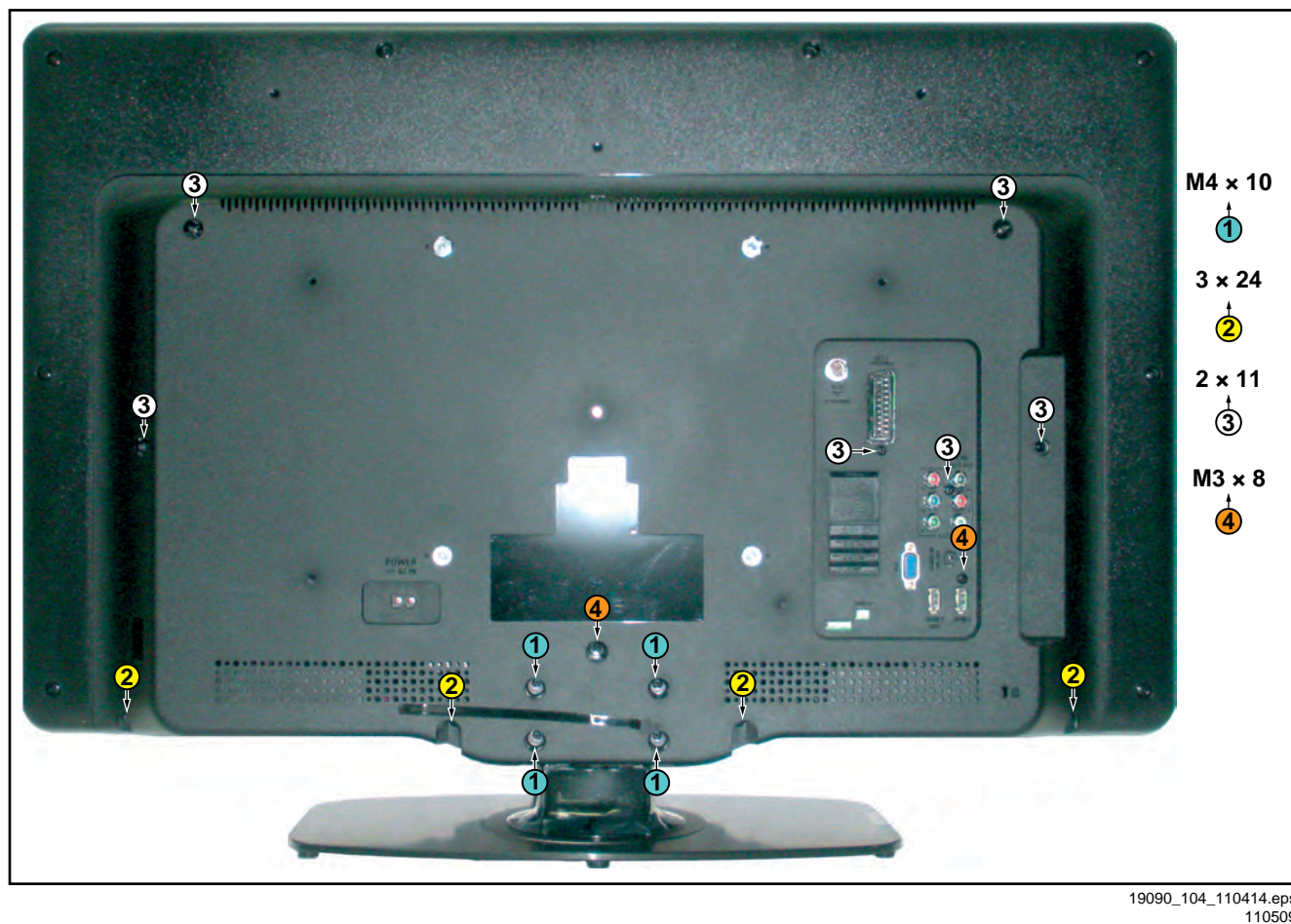
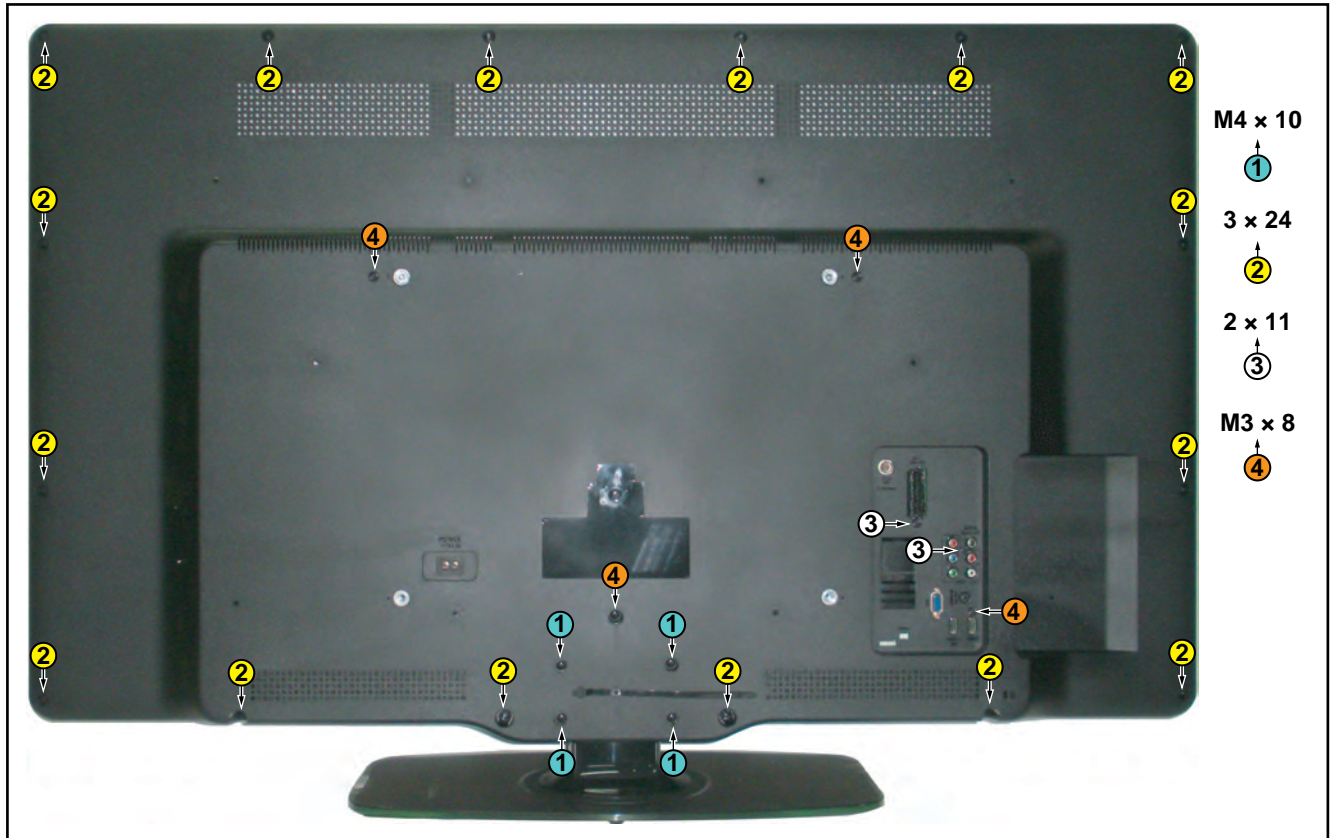


Figure 4-5 Rear cover removal 32"



19090_110_110505.eps
110505

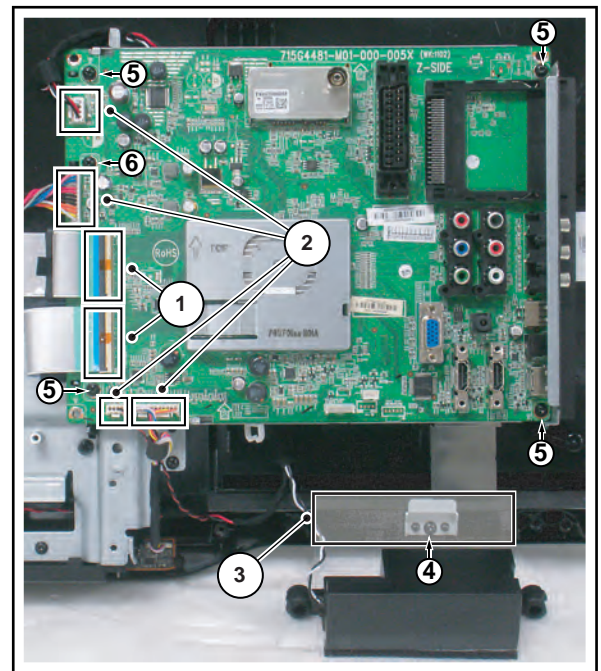
Figure 4-6 Rear cover removal 47"

4.3.2 Small Signal Board (SSB)

Refer to [Figure 4-7](#) and [Figure 4-8](#) for details.

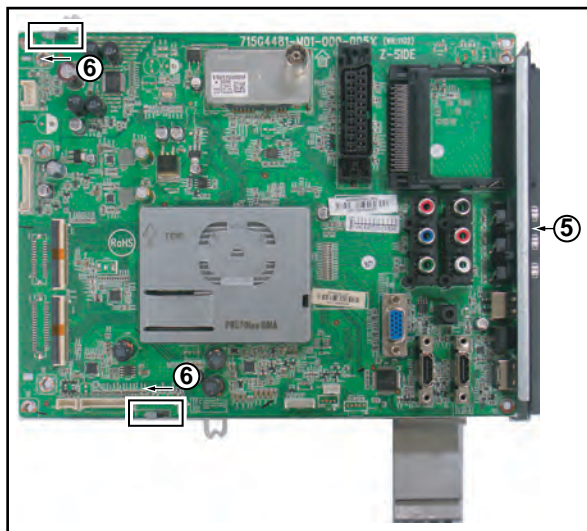
Caution: it is mandatory to remount all different screws at their original position during re-assembly. Failure to do so may result in damaging the SSB.

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



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Figure 4-7 SSB removal [1/2]



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110414

Figure 4-8 SSB removal [2/2]

4.3.3 Power Supply Unit (PSU)

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

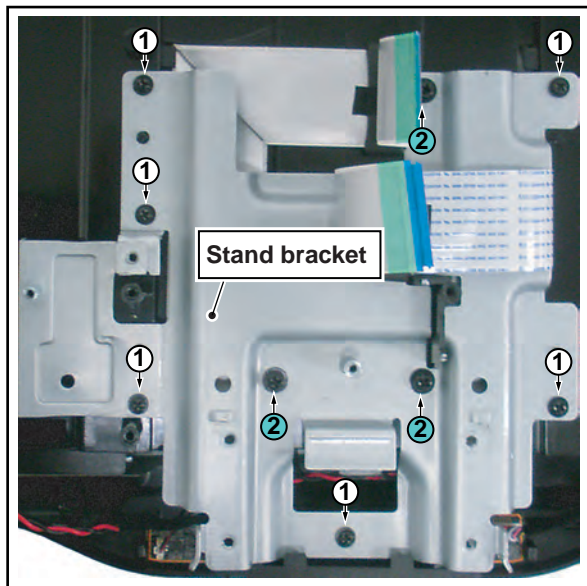
1. Release the Power board cables from their clamps.
2. Unplug power connectors from the SSB, as it is not unplug-able at the PSU itself (soldered connector).
3. Unplug all other connectors from the PSU.
4. Remove all fixation screws from the PSU.
5. The PSU can be taken out of the set now.

4.3.4 Stand bracket removal

Refer to [Figure 4-9](#) for details.

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

1. Remove the fixation screws [1], [2].
2. Take the Stand bracket out.



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110414

Figure 4-9 Stand bracket removal

4.3.5 Speakers

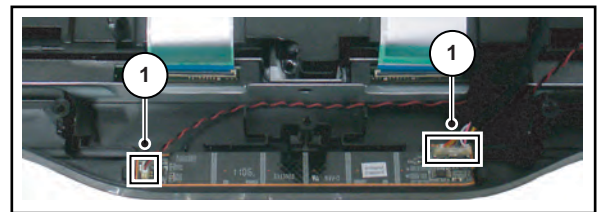
1. Unplug speaker connector from the SSB.
2. Remove the SSB as described earlier.
3. Remove the PSU as described earlier.
4. Remove the Stand bracket as described earlier.
5. Release tapes from the speaker cables.
6. Take the speakers out.

When defective, replace both units.

4.3.6 IR/LED/Keyboard

Refer to [Figure 4-10](#) for details.

1. Remove the stand bracket as described earlier.
 2. Release the connectors [1] from the IR/LED/Keyboard.
 3. **Caution:** The board is fitted to the bezel by double sided tape!
 4. Use the slot type screw driver to detach the IR/LED/Keyboard from the bezel. Be careful not to damage the bezel. Refer to [Figure 4-10](#) for details.
 5. Carefully remove any of the tape residue from the bezel.
- When defective, replace the whole unit.

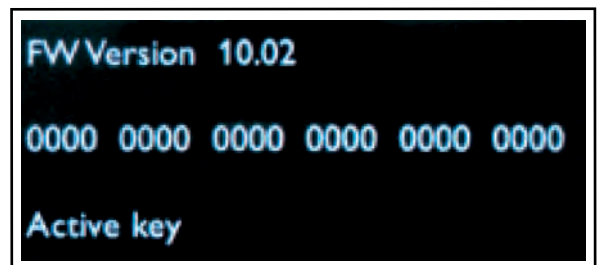


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110414

Figure 4-10 IR/LED/Keyboard removal

Caution: The touch control function needs to be checked when it is replaced.

1. Use test finger with a 8 m.m. diameter to touch centre of key icon on front cover.
2. Press touch key sensitivity test hot key "0 6 2 5 9 0 MENU", check the sensitivity count value of each key (CH +/-, HOME, VOL +/-), when touching key icon on front cover. Refer to [Figure 4-11](#) for details.
3. The value count of each key should be over 100.



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110407

Figure 4-11 Check touch control

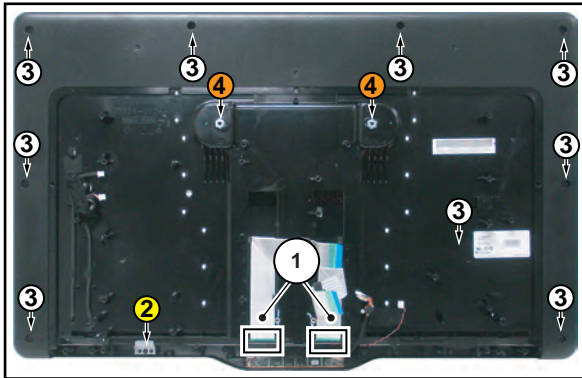
4.3.7 LCD Panel

Refer to [Figure 4-12](#) for details.

1. Remove the SSB as described earlier.
2. Remove the PSU as described earlier.
3. Remove the stand bracket as described earlier.
4. Remove the speakers as described earlier.
5. Release the tapes from the cables of the IR/LED/KEY board.
6. Release the clips from both the LVDS flat foil connectors [1].

Caution: be careful, as these are very fragile cables and connectors! Take the flat foils out of their connectors.

7. Remove the fixation screws [2] at the bottom left of the panel that secure the LCD panel with the bezel. Remove metal clip from its position. Be careful not to break the clicks that secure the metal brackets.
 8. Remove the other fixation screws [3] and [4].
 9. Lift the LCD Panel from the bezel.
- When defective, replace the whole unit.



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Figure 4-12 LCD panel removal

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](#) to [Figure 4-4](#).
- 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: 3 kHz left, 1 kHz right.

5.2 Service Modes

The Service Mode feature is split into four parts:

- Service Default Mode (SDM).
- Service Alignment Mode (SAM).
- Customer Service Mode (CSM).
- Computer Aided Repair Mode (ComPair).

SDM and SAM offer features, which can be used by the Service engineer to repair/align a TV set. Some features are:

- A pre-defined situation to ensure measurements can be made under uniform conditions (SDM).
- Activates the blinking LED procedure for error identification when no picture is available (SDM).
- Make alignments (e.g. White Tone), reset the error buffer (SAM).
- Display information ("SDM" or "SAM" indication in upper right corner of screen, error buffer, software version, operating hours, options and option codes, sub menus).

The CSM is a Service Mode that can be enabled by the consumer. The CSM displays diagnosis information, which the customer can forward to the dealer or call centre. In CSM mode, "CSM", is displayed in the top right corner of the screen. The information provided in CSM and the purpose of CSM is to:

- Increase the home repair hit rate.
- Decrease the number of nuisance calls.
- Solved customers' problem without home visit.

ComPair Mode is used for communication between a computer and a TV on 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.

Display Option Code Selection

When after an SSB or display exchange, the display option code is not set properly, it will result in a TV with "no display". Therefore, it is required to set this display option code after such a repair.

To do so, press the following key sequence on a standard RC transmitter: "062598" directly followed by MENU and "xxx", where "xxx" is a 3 digit decimal value of the panel type: see column "Display Code" in [Table 6-2](#), or see sticker on the side/bottom of the cabinet. When the value is accepted and stored in NVM, the set will switch to Stand-by, to indicate that the process has been completed.

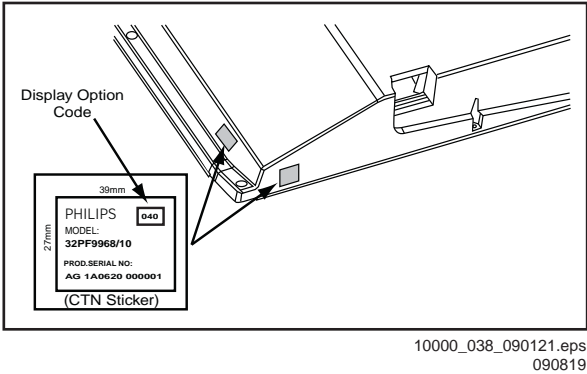


Figure 5-1 Location of Display Option Code sticker

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

5.2.2 Service Default Mode (SDM)

Purpose

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 “input” signal).
 - Hotel or hospital mode.
 - Child lock or parental lock (manual or via V-chip).
 - Skipping, blanking of “Not favourite”, “Skipped” or “Locked” presets/channels.
 - Automatic storing of Personal Preset or Last Status settings.
 - Automatic user menu time-out (menu switches back/OFF automatically).
 - Auto Volume levelling (AVL).

How to Activate SDM

To activate SDM, use the following methods:

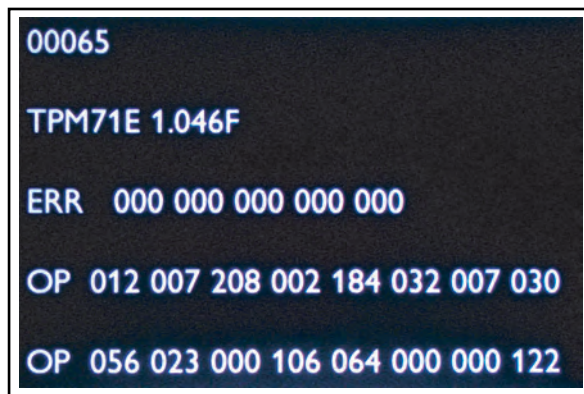
- Press the following key sequence on the RC transmitter: “062596”, directly followed by the “MENU” button.
Note: It is possible that, together with the SDM, the main menu will appear. To switch it “off”, push the “MENU” button again.

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

On Screen Menu

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

- **xxxxx** Operating hours (in decimal).
- **AAAAAB 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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Figure 5-2 SDM menu

How to Navigate

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

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

How to Exit SDM

- Switch the set to “Stand-by” by pressing the standby button on the remote control transmitter or on the television set.
- Via a standard customer RC-transmitter: key in “00”-sequence.

Note: If the TV is switched “off” by a power interrupt while in SDM, the TV will show up in the last status of SDM menu as soon as the power is supplied again. The error buffer will not be cleared.

5.2.3 Service Alignment Mode (SAM)

Purpose

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

Specifications

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

How to Activate SAM

To activate SAM, use one of the following methods:

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

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



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Figure 5-3 Example of SAM

Table 5-1 SAM mode overview

Main Menu	Sub-menu 1	Sub-menu 2	Description
System Information	Op Hour		This represents the life timer. The timer counts normal operation hours, but does not count Stand-by hours.
	Main SW ID	e.g. "TPM71E 1.084C"	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. "012 007 208 002 184 032 007 030"	Used to read-out the option bytes. See paragraph 6.4 Option Settings in the Alignments section for a detailed description. Ten codes are possible.
	OP2	e.g. "056 023 000 106 064 000 000 122"	
Clear	Press [OK] to clean the Error Codes immediately		Erases the contents of the error buffer. Select this menu item and press the MENU RIGHT key on the remote control. The content of the error buffer is cleared.
RGB Align	Warm	R Gain	To align the White Tone. See paragraph 6.3 Software Alignments in the Alignments section for a detailed description
		G Gain	
		B Gain	
	Normal	R Gain	
		G Gain	
		B Gain	
	Cool	R Gain	
		G Gain	
		B Gain	
	Store		Store the RGB value
NVM editor	Address		Select and fill the NVM address
	Value		Select and fill the NVM value
	Store		Store the value in the address
Upload to USB	Copy Channel List to USB		To upload several settings from the TV to an USB stick
	Copy NVM to USB		
	Copy Readable Info to USB		
	Copy Edid to USB		
Download from USB	Copy Channel List from USB		To download several settings from the USB stick to the TV
	Copy NVM from USB		
	Copy Readable Info from USB		
	Copy Edid from USB		
Initialize NVM	Press [OK] to Initialize NVM immediately		To initialize a (corrupted) NVM. Be careful, this will erase all settings.
EDID Write Enable	Press [OK] to enable EDID writable immediately		Enable EDID writable
Service Data	Type Number	Press [OK] use key pad edit type number immediately	Use Key pad to edit several service data
	Production Number	Press [OK] use key pad edit production number immediately	
	12NC SSB	Press [OK] use key pad edit SSB immediately	
	12NC PSU	Press [OK] use key pad edit PSU immediately	
	12NC Display	Press [OK] use key pad edit display immediately	
Clear OAD Version	Press [OK] to clean OAD Version immediately		Clean OAD Version

How to Navigate

- In the SAM menu, select menu items with the UP/DOWN keys on the remote control transmitter. The selected item will be indicated. When not all menu items fit on the screen, use the UP/DOWN keys to display the next/previous menu items.
- With the "LEFT/RIGHT" keys, it is possible to:
 - (De) activate the selected menu item.
 - (De) activate the selected sub menu.
 - Change the value of the selected menu item.
- When you press the MENU button twice while in top level SAM, the set will switch to the normal user menu (with the SAM mode still active in the background). To return to the SAM menu press the MENU button.
- The "INFO [i+]" key from the user remote will toggle the OSD "on/off" with "SAM" OSD remaining always "on".
- Press the following key sequence on the remote control transmitter: i062596i directly followed by the MENU button to switch to SDM (do not allow the display to time out between entries while keying the sequence). Remarks: new RC will not have I+ button, but function still remain.

How to Store SAM Settings

To store the settings changed in SAM mode (except the RGB ALIGN settings), leave the top level SAM menu by using the POWER button on the remote control transmitter or the

television set. The mentioned exceptions must be stored separately via the STORE button.

How to Exit SAM

Use one of the following methods:

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

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

5.2.4 Customer Service Mode (CSM)**Purpose**

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

The CSM is a read-only mode; therefore, modifications are not possible in this mode.

Specifications

- Ignore "Service unfriendly modes".

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

How to Activate CSM

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

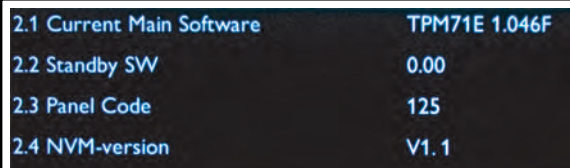
Note: Activation of the CSM is only possible if there is no (user) menu on the screen!



1.1 Set Type	37PFL4606H/12
1.2 Production code	
1.3 Installation date	110221
1.4 Option Code 1	012 007 208 002 184 032 007 030
1.5 Option Code 2	056 023 000 106 064 000 000 122
1.6 SSB	
1.7 Display	
1.8 PSU	

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Figure 5-4 CSM Menu [1/3]



2.1 Current Main Software	TPM71E 1.046F
2.2 Standby SW	0.00
2.3 Panel Code	125
2.4 NVM-version	V1.1

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110418

Figure 5-5 CSM Menu [2/3]



3.1 Signal quality	Analog No
3.2 Child lock	active
3.3 HDCP keys	Valid

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110418

Figure 5-6 CSM Menu [3/3]

Contents of CSM

- **1.1 Set Type** This information is very helpful for a helpdesk/workshop as reference for further diagnosis. In this way, it is not necessary for the customer to look at the rear of the TV-set. Note that if an NVM is replaced or is initialized after corruption, this set type has to be re-written to NVM.
- **1.2 Production code** Displays the production code (the serial number) of the TV. Note that if an NVM is replaced or is initialized after corruption, this production code has to be re-written to NVM.
- **1.3 Installation date** Indicates the date of the first installation of the TV. This date is acquired via time extraction.

- **1.4 Option Code 1** Gives the option codes of option group 1 as set in SAM.
- **1.5 Option Code 2** Gives the option codes of option group 2 as set in SAM.
- **1.6 SSB** Gives an identification of the SSB as stored in NVM. Note that if an NVM is replaced or is initialized after corruption, this identification number has to be re-written to NVM. This identification number is the 12NC number of the SSB.
- **1.7 Display** Displays the 12NC of the display.
- **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 Signal Quality/Present** Analogue/digital signal strength.
- **3.2 Child lock** Not active/active. This is a combined item for locks. If any lock (channel lock, parental lock) is active, the item shall show "active".
- **3.3 HDCP keys** Indicates if the HDMI keys (or HDCP keys) are valid or not. In case these keys are not valid and the customer wants to make use of the HDMI functionality, the SSB has to be replaced.

How to Navigate

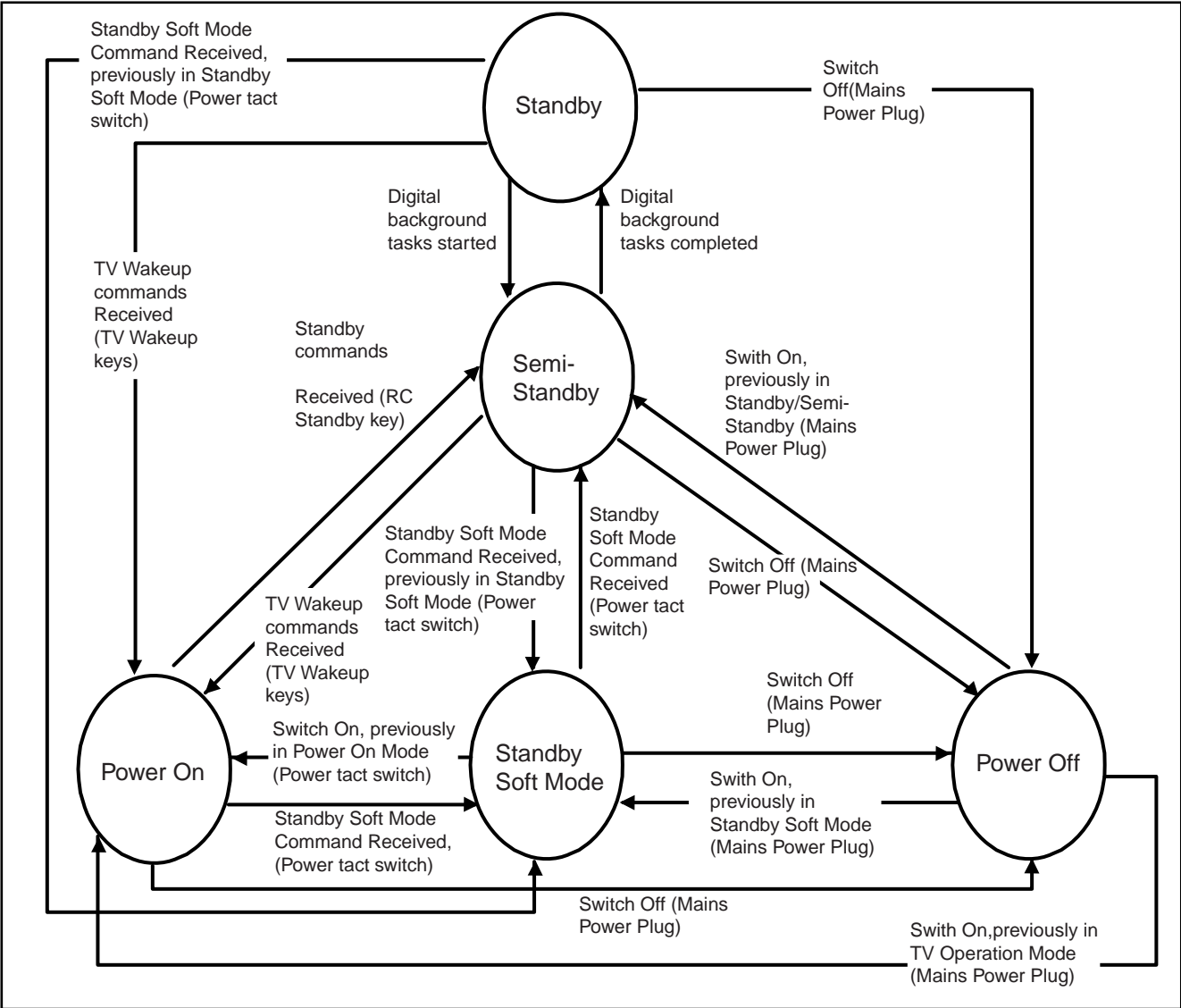
By means of the "CURSOR-DOWN/UP" knob (or the scroll wheel) on the RC-transmitter, can be navigated through the menus.

How to Exit CSM

To exit CSM, use one of the following methods.

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

5.3 Stepwise Start-up



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110401

Figure 5-7 Stepwise Start-up

5.4 Service Tools

5.4.1 ComPair

Introduction

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

1. ComPair helps to quickly get an understanding on how to repair the chassis in a short and effective way.
2. ComPair allows very detailed diagnostics and is therefore capable of accurately indicating problem areas. No knowledge on 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 running correctly) 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 a 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.

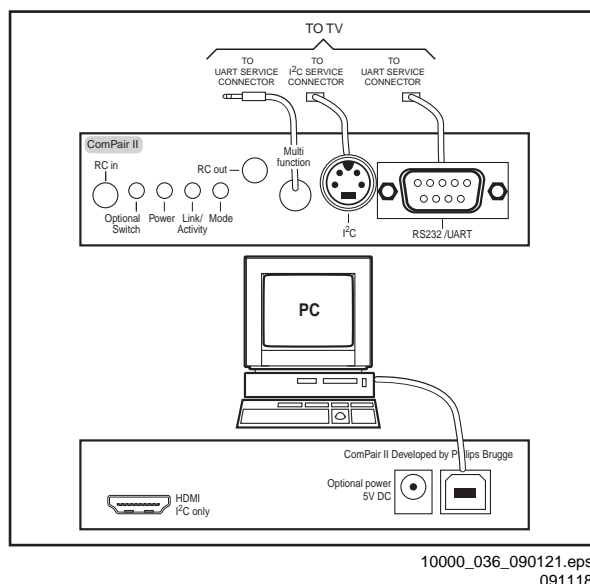


Figure 5-8 ComPair II interface connection

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

How to Order

ComPair II order codes:

- ComPair II interface: 3122 785 91020.
- Software is available via the Philips Service web portal.
- ComPair UART interface cable for TPM7.1x xx.
(using DB9 to 2mm pitch JST connector): 3122 785 90630.

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

Additional cables for VCOM Alignment

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

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

5.5 Software Upgrading

5.5.1 Description

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

5.5.2 Introduction

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

<http://www.philips.com/support>

Preparing a portable memory for software upgrade

The following requirements have to be met:

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

Note:

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

5.5.3 Check the current TV software version

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

1. Press the "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 5-9](#).
Note: If the USB flash drive is not detected after power up, disconnect it and re-insert it.
4. Select [Update] and press OK. See [Figure 5-9](#).

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

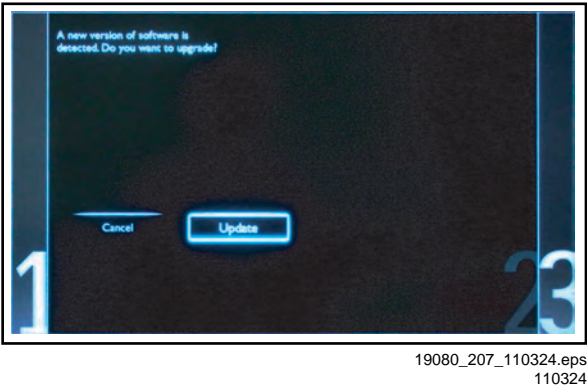


Figure 5-9 Update the TV software [1/3]

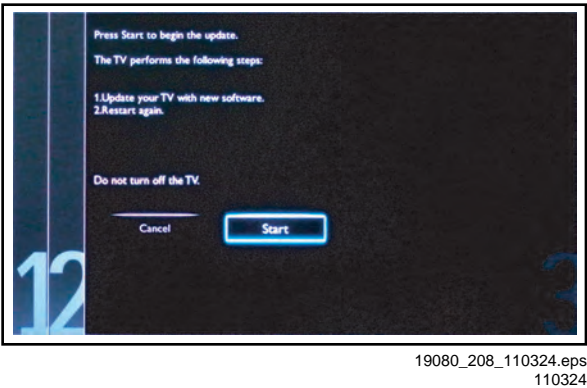


Figure 5-10 Update the TV software [2/3]

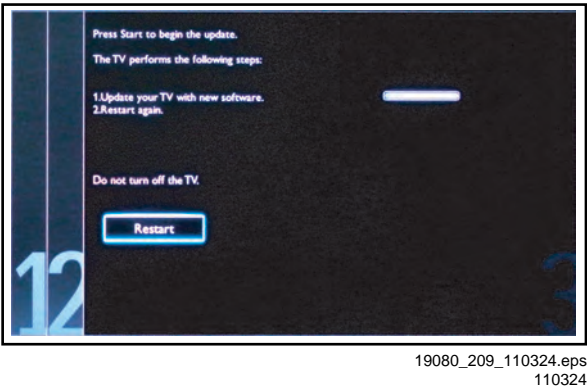


Figure 5-11 Update the TV software [3/3]

Note:

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

5.5.6 Content and Usage of the One-Zip Software File

Below you find a content explanation of the One-Zip file, and instructions on how and when to use it. Only files that are relevant for Service are mentioned here.

- EDID_clustername.zip:** Contains the EDID content of the different EDID NVMs. See ComPair for further instructions.
- FUS_clustername_version.zip:** Contains the "autorun.upg" which is needed to upgrade the TV main software and the software download application.
- NVM_clustername_version.zip:** Default NVM content. Must be programmed via ComPair.

5.5.7 How to Copy NVM Data to/from USB

When copying data to and from a USB memory stick, the folder "repair" is used. When inserting an empty USB memory stick, and downloading data to the stick, the TV will create this folder. When sending data from a USB memory stick to a TV, the intended data must be available in the "repair" folder. Note that when copying EDID data to the TV, all necessary EDID files must be in this folder.

Service mode overview for your reference.

Table 5-2 Service mode overview

Service Modes	Description
USB SW upgradeable	SW-upgrading of flash memories MTK-chips MT5395 can be done via USB. The main SW can be upgraded via Autorun.upg
NVM-Editor in SAM	NVM-editor will function as in the past: Address and Value field is a decimal value via digit entry
Service Data	New Service data in SAM for CTN, Prod. no., 12NC programming with virtual key board
USB copy/paste in SAM	Channel list, NVM data, Readable info, EDID
UART logging	There will be printout available in UART. No specifications of the printout, per MTK provision/definition.
Vcom flicker alignment	"147852" + "OK" (for flickering adjustment). TV to be put to external source other than TV, then adjust with arrow up/down and Left right, the Vcom value in the display will change with the arrow key, one adjusted, press OK and then press menu to exit
Tcon NVM default & Programmer default loading	"42662" + "OK"

5.5.8 How to Copy NVM Data to/from USB

Write NVM Data to USB

- Insert the USB stick into the USB slot while in SAM mode.
- Execute the command "NVM Copy" > "NVM Copy to USB", to copy the NVM data to the USB stick. The NVM filename on the USB stick will be named **"TPM71E_NVM_T2U.BIN"** (this takes a couple of seconds).

Write NVM Data to TV

- First, ensure (via a PC) that the filename on the USB stick has the correct format: "TPM71E_NVM_U2T.BIN".
- Insert the USB stick into the USB slot while in SAM mode.
- Execute the command "NVM Copy" > "NVM Copy from USB" to copy the USB data to NVM (this takes about a minute to complete).

To write an NVM mask to the TV, ensure that the mask has the correct format: "TPM71E_NVM_U2T.MAK" (0x00 to write protect, 0xFF to overwrite).

Important: The file must be located in the **"/Repair"** directory of the USB stick.

5.5.9 How to Copy EDID Data to/from USB

Write EDID Data to USB

1. Insert the USB stick into the USB slot while in SAM mode.
2. Execute the command "NVM Copy" > "EDID Copy to USB", to copy the EDID data to the USB stick. The filename on the USB stick will be named "TPM71E_EDID_T2U.BIN" (this takes a couple of seconds).

Write EDID Data to TV

1. First, ensure (via a PC) that the filename on the USB stick has the correct format: "TPM71E_EDID_U2T.BIN".
2. Insert the USB stick into the USB slot while in SAM mode.
3. Execute the command "NVM Copy" > "EDID Copy from USB" to copy the USB data to EDID (this takes about a minute to complete).

Important: The file must be located in the **"/Repair"** directory of the USB stick.

5.5.10 How to Copy the Channel List to/from USB

Write Channel List Data to USB

1. Insert the USB stick into the USB slot while in SAM mode.
2. Execute the command "Channel list Copy to USB", to copy the channel list data to the USB stick. The filename on the USB stick will be named "TPM71E_CHTB_T2U.BIN" (this takes a couple of seconds).

Write Channel List Data to TV

1. First, ensure (via a PC) that the filename on the USB stick has the correct format: "TPM71E_CHTB_U2T.BIN".
2. Insert the USB stick into the USB slot while in SAM mode.
3. Execute the command "Channel list Copy from USB" to copy the USB data to the TV (this takes about a minute to complete).

Important: The file must be located in the **"/Repair"** directory of the USB stick.

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 Clear the Error Buffer

You can read the error buffer in three ways:

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

5.6.3 Error codes

Errors code information:

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

5.6.4 How to Clear the Error Buffer

The error code buffer is cleared in the following cases:

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

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

5.7 The Blinking LED Procedure

5.7.1 Introduction

The software is capable of identifying different kinds of errors. Because it is possible that more than one error can occur over time, an error buffer is available, which is capable of storing the last five errors that occurred. This is useful if the OSD is not working properly.

Errors can also be displayed by the blinking LED procedure. The method is to repeatedly let the front LED pulse with as many pulses as the error code number, followed by a period of 1.5 seconds in which the LED is "off". Then this sequence is repeated.

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

Example (2): the content of the error buffer is "12 9 6 0 0" After entering SDM, the following occurs.

- 1 long blink of 5 seconds to start the sequence.
- 12 short blinks followed by a pause of 1.5 seconds.
- 9 short blinks followed by a pause of 1.5 seconds.
- 6 short blinks followed by a pause of 1.5 seconds.
- 1 long blink of 1.5 seconds to finish the sequence.
- The sequence starts again with 12 short blinks.

5.7.2 Displaying the Entire Error Buffer

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

5.8 Fault Finding and Repair Tips

Note:

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

5.8.1 NVM Editor

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

Caution:

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

5.8.2 Load Default NVM Values

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

5.8.3 No Picture

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

5.8.4 Unstable Picture via HDMI input

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

5.8.5 No Picture via HDMI input

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

5.8.6 TV Will Not Start-up from Stand-by

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

6.2 Hardware Alignments

Not applicable.

6.3 Software Alignments

Put the set in SAM mode (see Chapter [5. Service Modes, Error Codes, and Fault Finding](#)). The SAM menu will now appear on the screen. Select ALIGNMENTS and go to one of the sub menus. The alignments are explained below.

The following items can be aligned:

- White point

To store the data:

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

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

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

6.3.1 Display adjustment

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

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

Table 6-1 White tone default settings

Picture mode	Screen size	Colour temperature		
		Red	Green	Blue
Normal (9000K)	32"	128	116	98
	37"	128	103	95
	42"	128	113	107
	47"	128	110	96
Cool (11 000K)	32"	128	120	116
	37"	128	107	113
	42"	128	115	125
	47"	128	113	115
Warm (6500K)	32"	128	107	59
	37"	128	96	58
	42"	128	107	68
	47"	128	103	56

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

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 MT5395 ICs (back-end advanced video picture improvement IC which offers motion estimation and compensation features (commercially called HDNM) plus integrated Ambilight control) is made known by the option codes.

Notes:

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

6.4.2 Option Code Overview

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

6.4.3 Display Code Overview

Press the following key sequence on a standard RC transmitter: "062598" directly followed by MENU and "xxx", where "xxx" is a 3 digit decimal value of the panel type: see column "Display Code" in [Table 6-2](#). 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
32PFL4606H/12	LGD LC320WUY-SCA1	124
32PFL4606H/58	LGD LC320WUY-SCA1	124
32PFL4606H/60	LGD LC320WUY-SCA1	124
37PFL4606H/12	LGD LC370WUY-SCA1	125
37PFL4606H/58	LGD LC370WUY-SCA1	125
37PFL4606H/60	LGD LC370WUY-SCA1	125
42PFL4506H/12	LGD LC420WUY-SCA1	126

CTN_ALT BOM#	Panel Type	Display Code
42PFL4606H/12	LGD LC420WUY-SCA1	126
42PFL4606H/58	LGD LC420WUY-SCA1	126
42PFL4606H/60	LGD LC420WUY-SCA1	126
47PFL4606H/12	LGD LC470WUH-SCB2	127
47PFL4606H/58	LGD LC470WUH-SCB2	127
47PFL4606H/60	LGD LC470WUH-SCB2	127

6.5 Reset of Repaired SSB

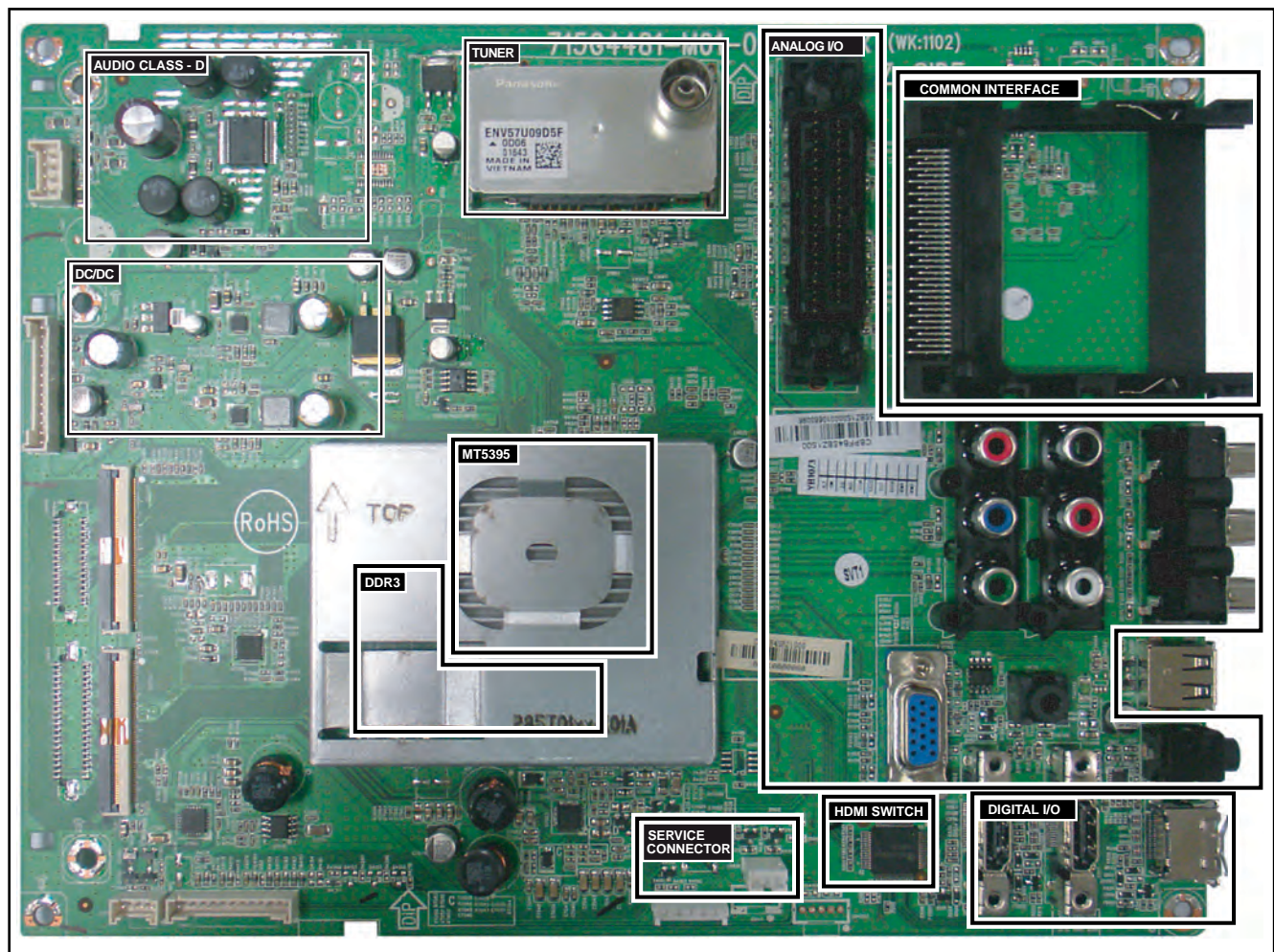
A very important issue towards a repaired SSB from a Service repair shop (SSB repair on component level) implies the reset of the NVM on the SSB.

A repaired SSB in Service should get the service Set type "00PF0000000000" and Production code "00000000000000". Also the virgin bit has 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. 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.

7.1.3 SSB Cell Layout



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110421

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.

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

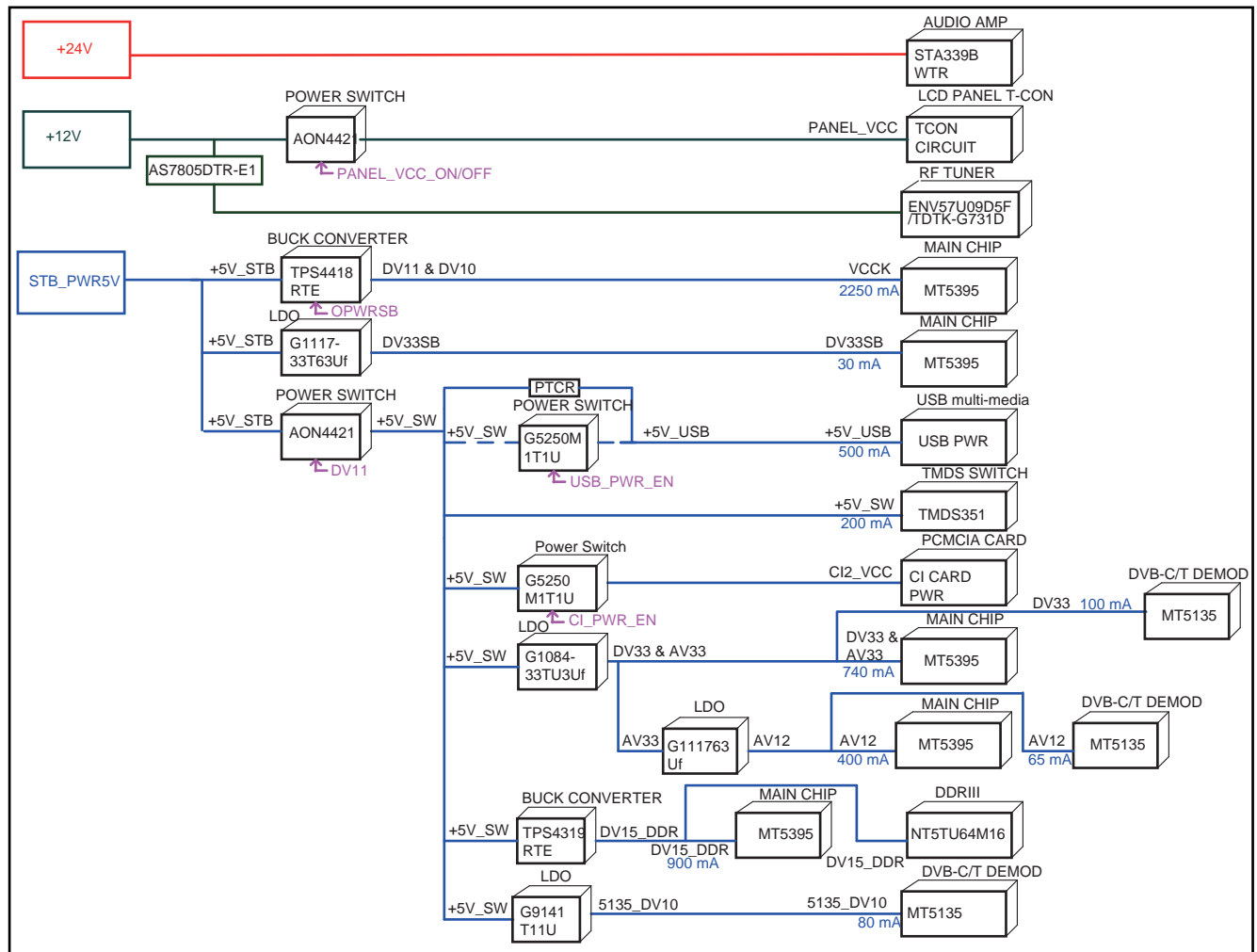
The output voltages to the chassis are:

- +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.

7.3 Power Management



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110509

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 10.
- +12V, input from the power supply for T-con, audio amp in SCART out; 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.: 3.3 V)
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, +5 V SSB Supply
8	13	NA

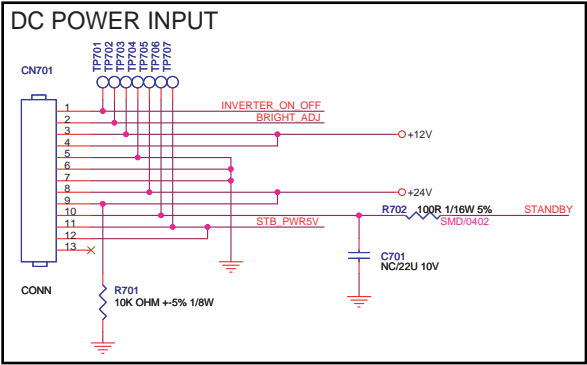


Figure 7-4 System power

7.4.4 Core Power

The 1.1 V power is derived from TPS54418 for MT5395 core power.

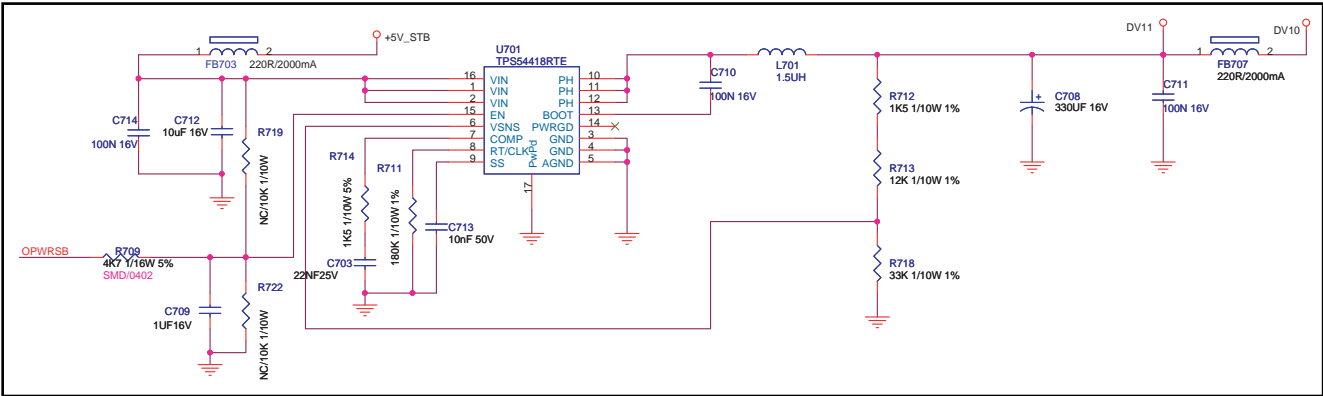


Figure 7-7 Core Power

7.4.2 Digital/Analogue power

The DVDD3V3 and AVDD3V3 are from U702 (G1084), it can provide 5 A output current. FB7006 are for power measurement. FB7006 also is for filtering.

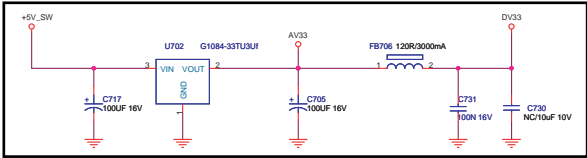


Figure 7-5 Digital/Analogue power

7.4.3 Tuner power

The tuner power is derived from +12V by U752 (AS7805), the power should not drop below 4.75 V for the Panasonic tuner, but it can be 4.9V at least.

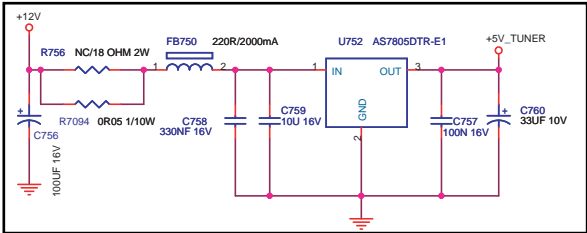
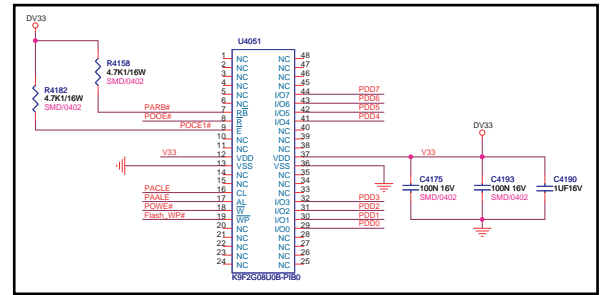


Figure 7-6 Tuner power

7.4.5 Peripheral

This chassis uses 256 MB NAND flash for it's software code. It contains the main software of the TV.

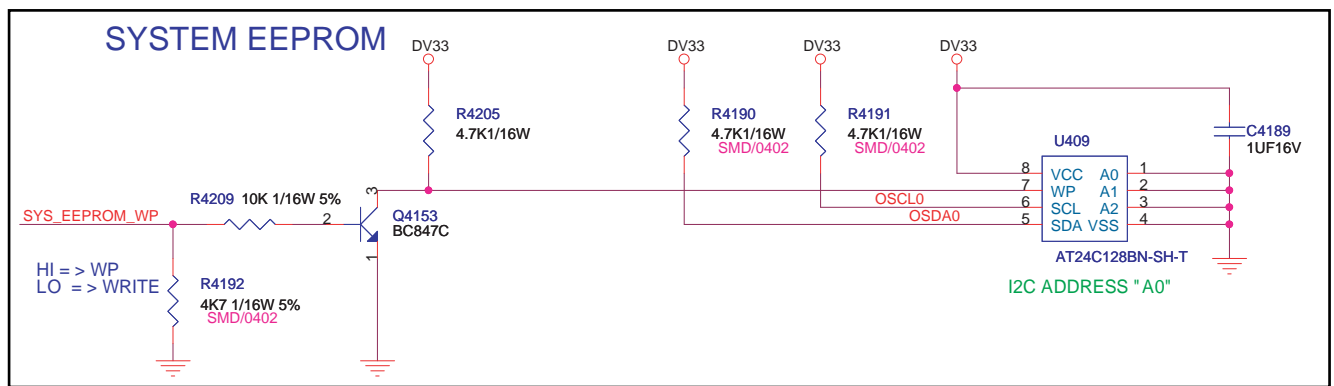


19090_212_110422.eps
110422

Figure 7-8 Peripheral

7.4.6 System EEPROM

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

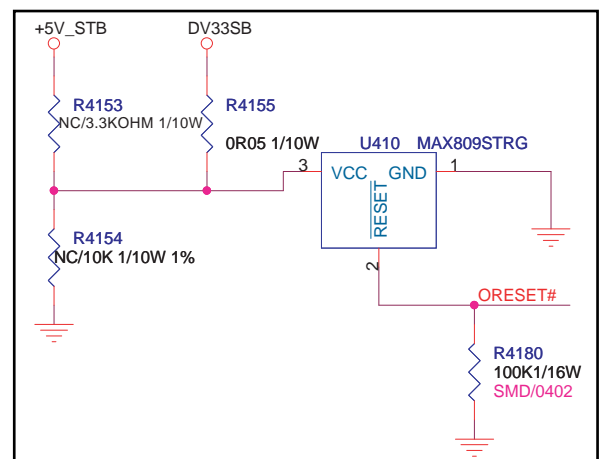


19090_213_110422.eps
110505

Figure 7-9 System EEPROM

7.4.7 Reset IC

The set uses the power 3V3 to reset. When 3V3SB drops below 2.93 V, IC U410 will send a reset to the main processor IC MT5395.



19090_214_110422.eps
110422

Figure 7-10 Reset IC

7.4.8 Audio Amplifier

The platform uses I²S to link the audio amplifier IC, it is using pins 27, 28, 29 and 30 of IC U601.

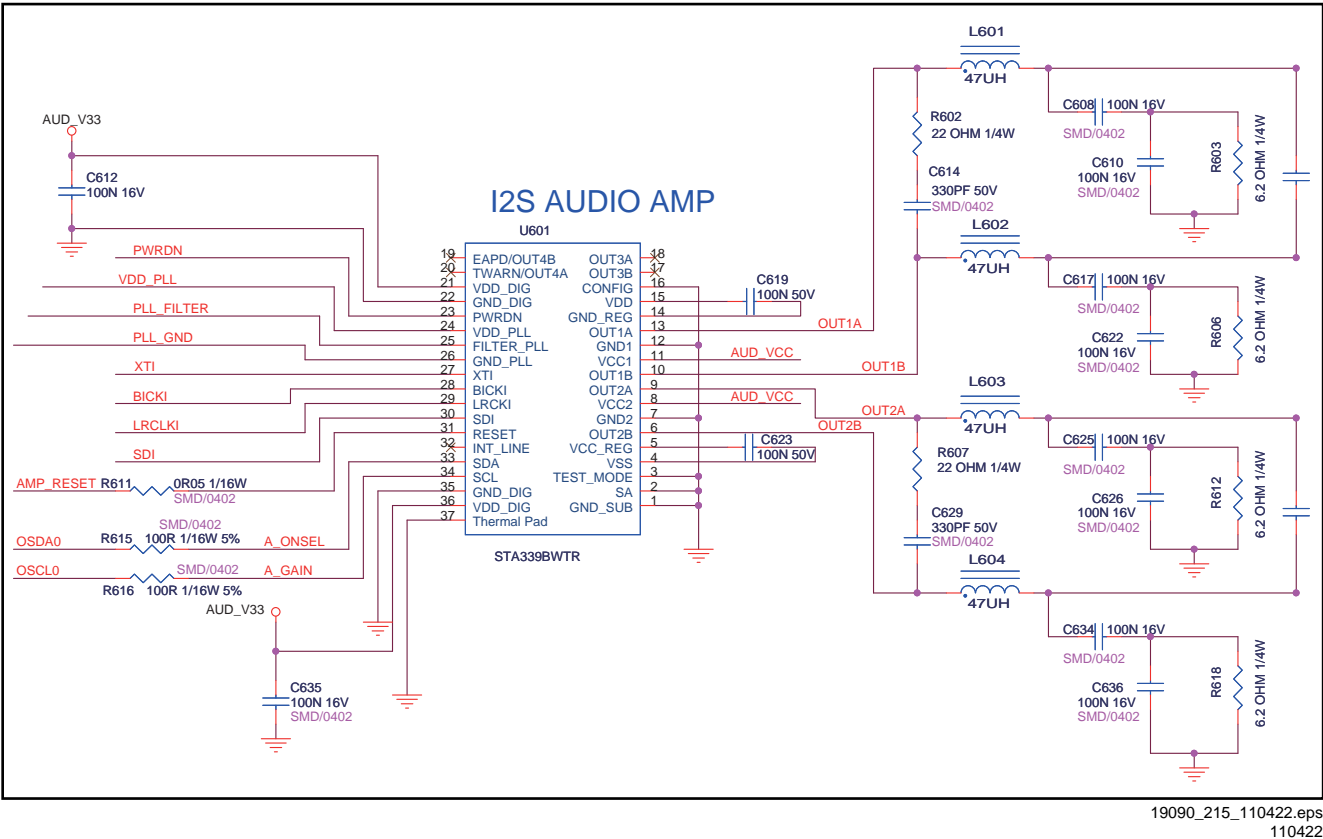


Figure 7-11 Audio Amplifier

7.4.9 Mute circuit

It is DC drop detect circuit. Check +5VSB, if it is dropped, the OFF_MUTE/PWRDN will send out a “high” pulse to turn on the related mute circuit.

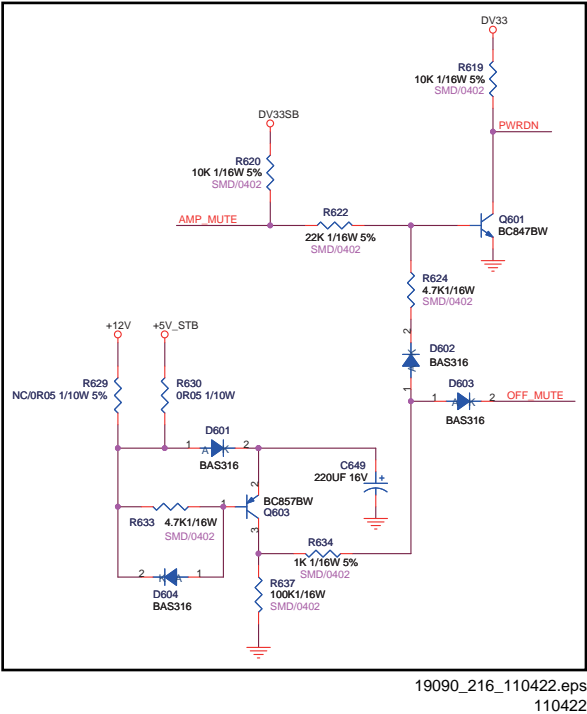


Figure 7-12 Mute circuit

7.4.10 ARC (HDMI)

ARC (audio return channel) is supported on HDMI 1 only. When an ARC command is received from CEC, then IC U502 will be enabled and an SPDIF signal will be available on HDMI 1, pin 14.

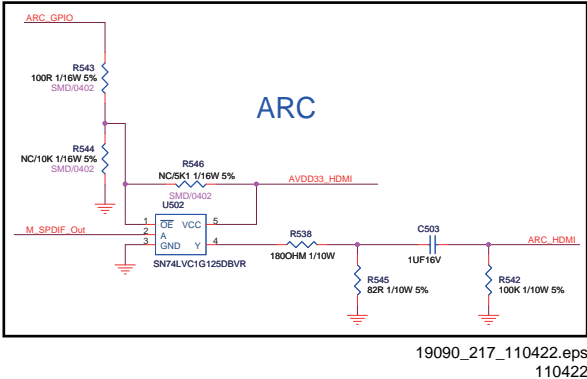


Figure 7-13 ARC (HDMI)

7.4.13 Mini-LVDS output

MT5395 output mini-LVDS to TCON-less panel.

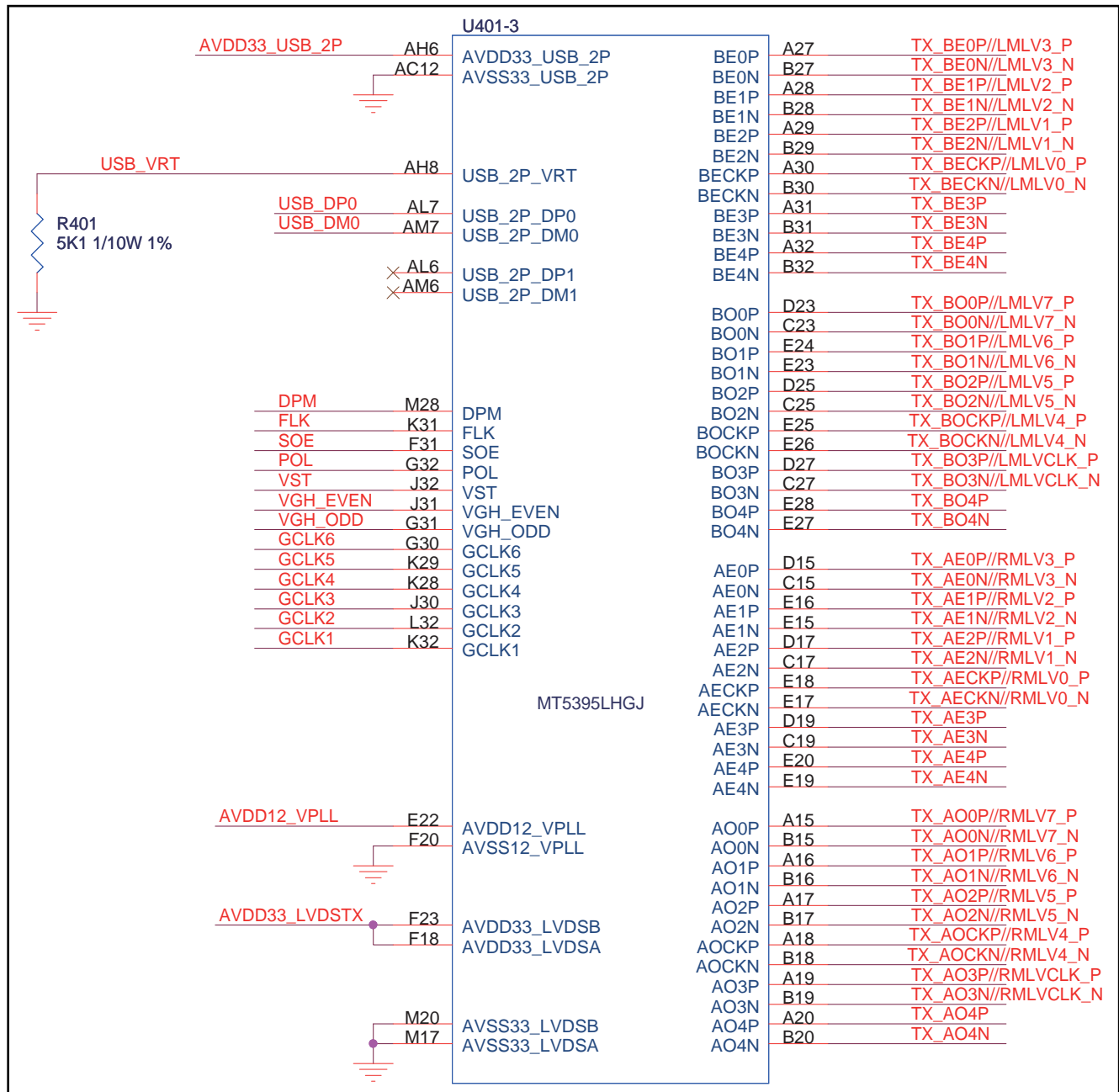
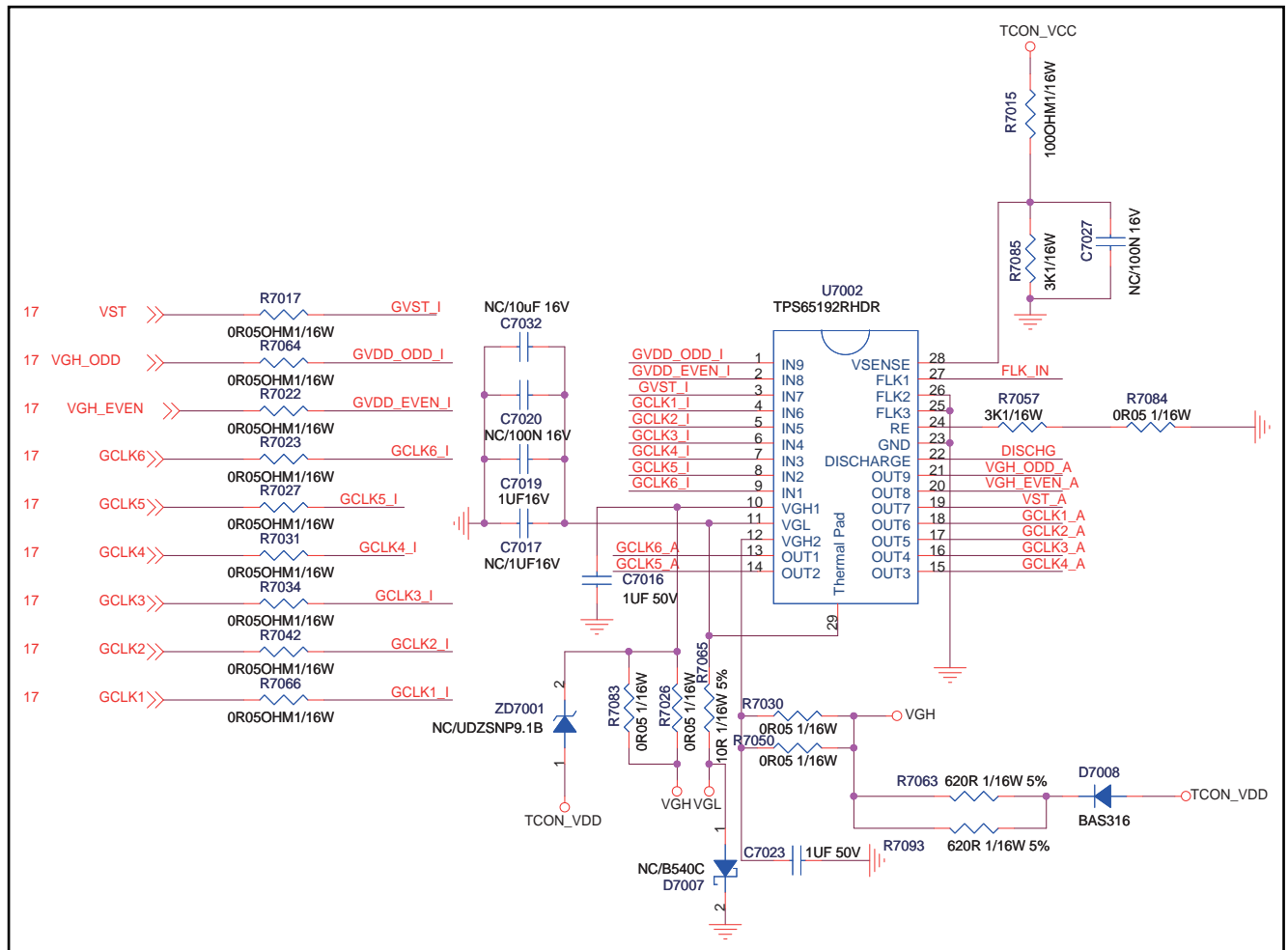
19090_219_110422.eps
110505

Figure 7-15 Mini-LVDS output

7.4.17 Level Shift

IC U7002 supports the level shift function.



19090_222_110422.eps
110505

Figure 7-19 Level Shift

8. IC Data Sheets

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

8.1 Diagram [MT5395 BYPASS/TRAP](#). B05, MT5395LUGJ PBGA-655 (IC U401)

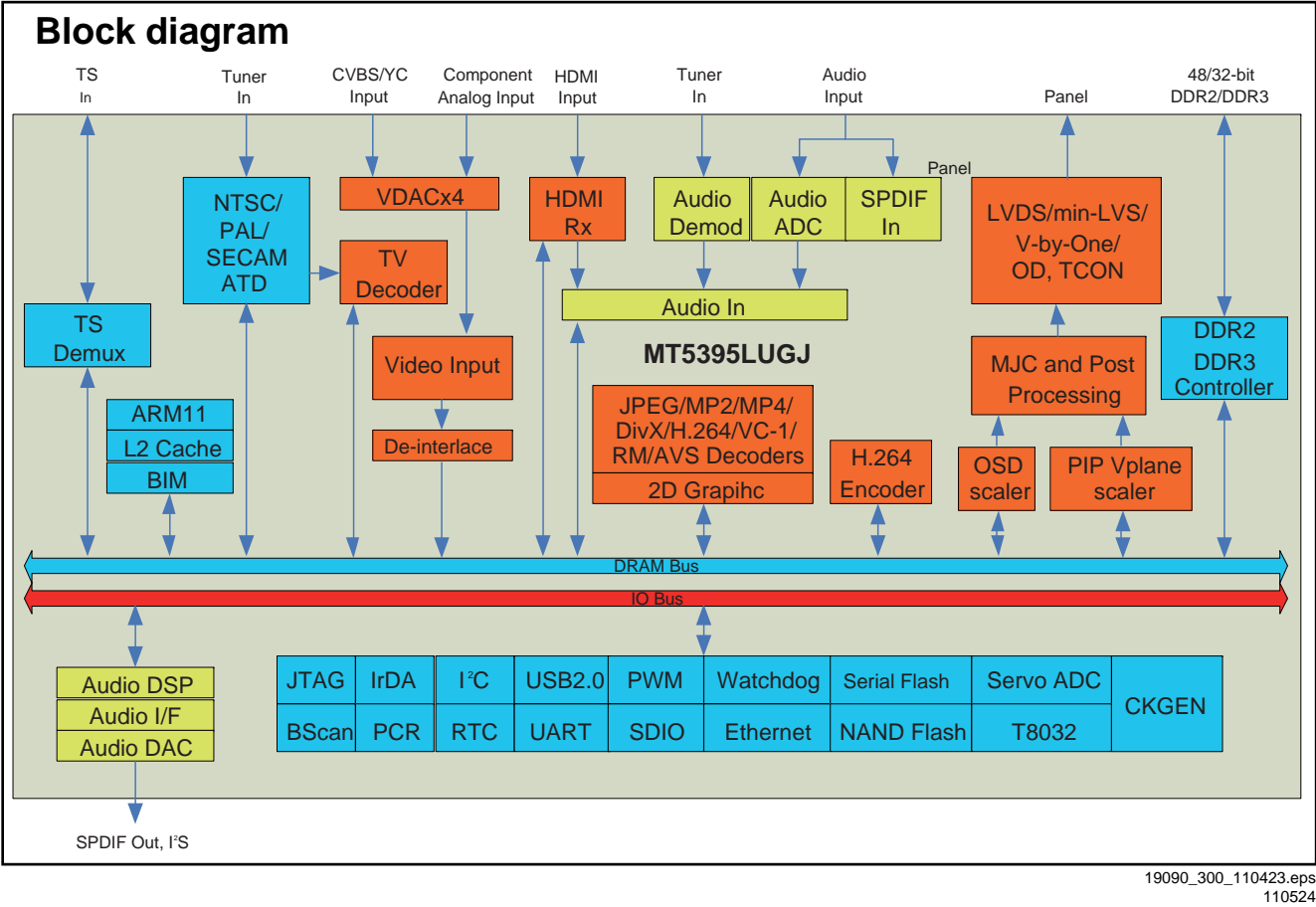


Figure 8-1 Internal block diagram

Pinning information

MT5395LUGJ

LT	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A	BRA3	BRA2	BRA9	BRA12		BRBA1	BRCKE	BRCLK0		BRDOS1#	BRDOS0#		BRDQ11	DVSS	AO0P	AO1P
B	BRBA0	BRA5	BRA7	BRA11		BRA4	BRA10	BRCLK0#		BRDOS1	BRDOS0		BRDQ9	DVSS	AO0N	AO1N
C	BRODT	BRCS#	RVREF	BRA13	BRA6	BRA1	BRBA2	BRDQ8	BRDQ14	BRDQ12	BRDQ0	BRDQ1	BRDQ13	DVSS	AE0N	
D	RVREF	DVSS	REXTDN	VCC2IO	BRA8	BRA0	BRWE#	BRDQ10	BRDQ7	BRDQ3	BRDQ1		BRDQ15	DVSS	AE0P	
E			ARDQ22	ARDQ20	VCC2IO	BRRESE	BRCAS	BRRAS#	BRDQ5	VCC2IO	BRDQ0	BRDQ6	BRDQ4	DVSS	AE1N	AE1P
F	ARDQ3	ARDQ16	ARDQ18			VCC2IO	VCC2IO		DVSS	DVSS			BRDQ2	DVSS		
G	ARDQ52#	ARDQ5	ARDQ2	ARDQ29	ARDQ27		VCC2IO							DVSS		
H	ARDQ53#	ARDQ53	VCC2IO	DVSS	ARDQ25	ARDQ31		MEMTN						DVSS		
J	ARDQ19	ARDQ17				AVDD12_MEMPLL		MEMTP						DVSS		
K	ARDQ21	ARDQ23		DVSS		AVSS12_MEMPLL										
L	ARCLK1#	ARCLK1	VCC2IO	ARDQ24	ARDQ26	ARDQ30	ARDQ28				DVSS	VCCK	DVSS	VCCK	DVSS	VCCK
M			ARODT	ARCAS#	ARCKE						DVSS	VCCK	DVSS	VCCK	DVSS	DVSS
N	ARA13	ARA3	ARA0	DVSS	ARWE#	ARA10					VCCK	VCCK	DVSS	DVSS	DVSS	DVSS
P	ARA9	ARRESE	ARA7	ARA2	ARBA1	ARA12					VCCK	VCCK	DVSS	DVSS	DVSS	DVSS
R			ARA5	ARBA0	ARA11						DVSS	DVSS	DVSS	DVSS	DVSS	DVSS
T	ARCS#	ARRAS#	ARBA2	DVSS	ARA8	ARA6					VCCK	DVSS	DVSS	DVSS	DVSS	DVSS
U	ARDQ4	ARDQ6	VCC2IO	ARA4	ARA1		RVREF				DVSS	DVSS	DVSS	DVSS	DVSS	DVSS
V	ARDQ2	ARDQ0									VCCK	VCCK	DVSS	DVSS	DVSS	DVSS
W	ARDQ1		VCC2IO	DVSS	ARDQ13						DVSS	DVSS	DVSS	DVSS	DVSS	DVSS
Y	ARDQ50#	ARDQ50	ARDQ0	ARDQ11		ARDQ15					VCCK	VCCK	DVSS	DVSS	DVSS	DVSS
AA			ARDQ12	ARDQ14	ARDQ9						VCCK	VCCK	DVSS	DVSS	VCCK	DVSS
AB	ARDQ51#	ARDQ51	ARDQ1	DVSS	ARDQ10	ARDQ8					DVSS	DVSS	VCCK	DVSS	VCCK	DVSS
AC	ARDQ3	ARDQ7	ARDQ5	VCC2IO								AVSS33_USB2P	AVSS33_HDMI		AVSS33_VGA_STB	
AD			DVSS	DVSS	DVSS											
AE	ARCLK0#	ARCLK0		VCC2IO					VCC3IO	VCC3IO				OPCTRL0		
AF	VCC2IO	VCC2IO	VCC2IO					DVSS	VCC3IO	VCC3IO		OPCTRL6	OPWRSB	VGA_SCL		DVSS
AG	VCCK	VCCK	VCCK	VCCK	VCCK			AVDD33_HDMI		PWRSV		OPCTRL1	OIRI	VGA_SDA		ADIN1_SRV
AH	JTDO	JTCK	JTMS	JTDI		AVDD33_USB2P	GPIO3	USB_2P_VRT		GPIO4		OPCTRL3	ORESET#	U0TX		AVDD10_LDO
AJ			JTRST#	POWE#	PDD5	GPIO1		GPIO6	HDMI_SCL	HDMI_CEC	OPCTRL2	OPCTRL5	U0RX			
AK	PAALE	PACLE	POOE#	PDD4	PDD6	GPIO0	GPIO2	GPIO5	HDMI_SDA	HDMI_HPD	AVDD12_HDMI	OPCTRL4	BP	SOG	GP	AVDD33_VGA_STB
AL	POCE0#	PDD0	PDD2		PDD7	USB_2P_DP1	USB_2P_DP0		RX_C	RX_0	RX_1	RX_2	HSYNC		COM	SOY1
AM	PARB#	PDD1	PDD3		POCE1#	USB_2P_DM1	USB_2P_DM0		RX_CB	RX_0B	RX_1B	RX_2B	VSYN		RP	Y1P
LB	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

19090_301_110423.eps
110524

Figure 8-2 Pin configuration [1/2]

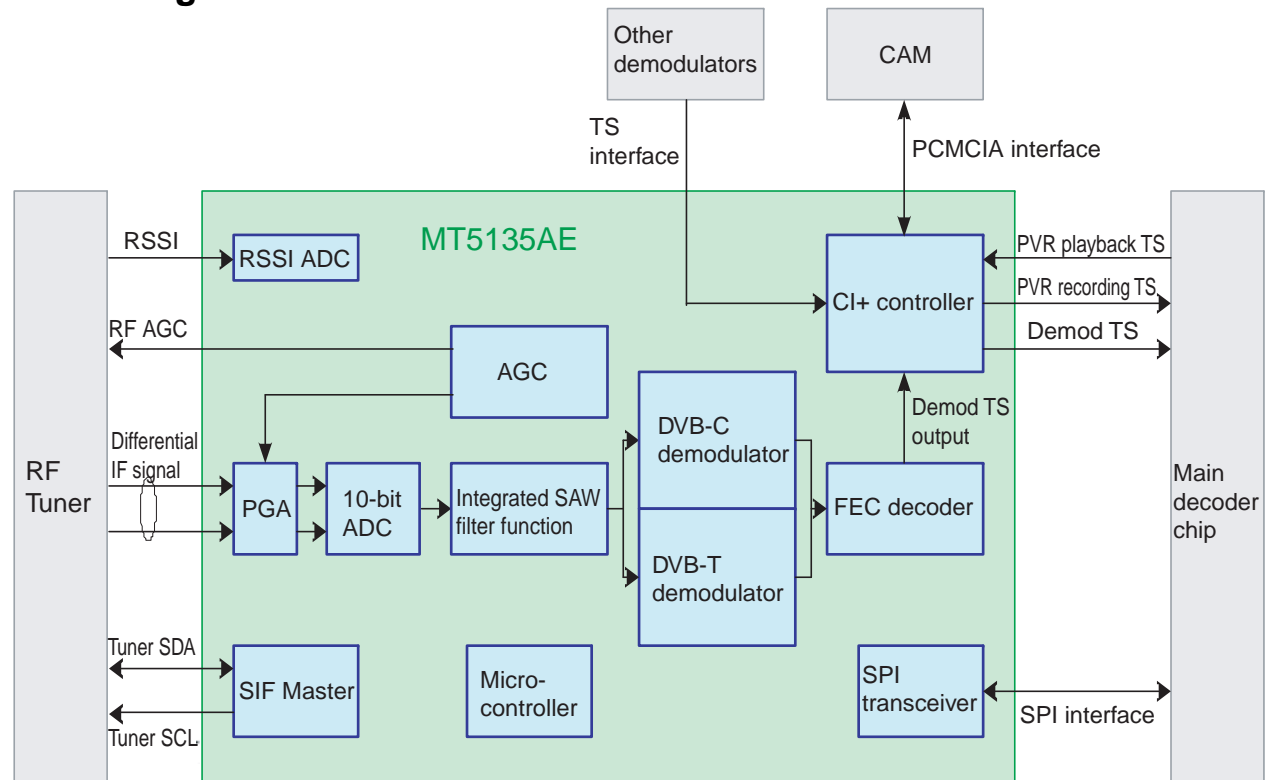
Pinning information																MT5395LUGJ
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	RT
AO2P	AOCKP	AO3P	AO4P	TXPA_E PI	TXP0_V B1	TXP1_V B1	TXP2_V B1	TXP3_V B1	TXPB_E PI	BE0P	BE1P	BE2P	BECKP	BE3P	BE4P	A
AO2N	AOCKN	AO3N	AO4N	TXNA_E PI	TXN0_V B1	TXN1_V B1	TXN2_V B1	TXN3_V B1	TXNB_E PI	BE0N	BE1N	BE2N	BECKN	BE3N	BE4N	B
AE2N		AE3N		HTPDN		BO0N		BO2N		BO3N		GPIO21	GPIO19	GPIO23	GPIO22	C
AE2P		AE3P		LOCKN		BO0P		BO2P		BO3P		GPIO20	GPIO18	LDM_D O	GPIO16	D
AECKN	AECKP	AE4N	AE4P		AVDD1 2_VPLL	BO1N	BO1P	BOCKP	BOCKN	BO4N	BO4P	GPIO15	GPIO17	LDM_C LK	LDM_C S	E
	AVDD3 3_LVDS A	AVSS12 _VB1A	AVSS12 _VPLL	REXT_V B1	AVDD1 2_VB1A	AVDD3 3_LVDS B					DVSS	FSRC_ WR	LDM_DI	SOE	LDM_V SYNC	F
							AVSS12 _VB1B		AVDD1 2_VB1B				GCLK6	VGH_O DD	POL	G
																H
													GCLK3	VGH_E VEN	VST	J
											GCLK4	GCLK5	GPIO13	FLK	GCLK1	K
					VCC3IO	VCC3IO				DVSS	GPIO14	GPIO12	SD_D2	SD_D3	GCLK2	L
AVSS33 _LVDSA		DVSS	AVSS33 _LVDSB		VCC3IO	VCC3IO					DPM		SD_D1			M
DVSS	DVSS	DVSS	DVSS	VCCK		VCC3IO				GPIO9	GPIO10	GPIO11	SD_CLK	SD_CM D	SD_D0	N
DVSS	DVSS	DVSS	DVSS	VCCK							SPI_CL E	CI_INT	SPI_CL K1	SPI_CL K	SPI_DA TA	P
DVSS	DVSS	DVSS	DVSS	DVSS					DVSS	DVSS	PVR_TS SYNC	PVR_TS CLK		PVR_TS DATA0	PVR_TS DATA1	R
DVSS	DVSS	DVSS	VCCK	VCCK						CI_TSV AL	PVR_TS VAL	CI_TSD ATA0				T
DVSS	DVSS	DVSS	DVSS	DVSS	VCCK						CI_TSS YNC	CI_TSC LK	DEM0D _TSDAT A0	DEM0D _RST	DEM0D _TSCCLK	U
DVSS	DVSS	DVSS	DVSS	DVSS	AVSS33 _LD				ALIN	AOSDA TA0	AOSDA TA1	DEM0D _TSVAL	DEM0D _TSSYN C	TUNER _DATA	TUNER _CLK	V
DVSS	DVSS	DVSS	DVSS	DVSS	AVSS33 _REC	AVSS12 _COM						RF_AGC	IF_AGC			W
DVSS	DVSS	DVSS	VCCK	VCCK	AVSS33 _DAC1					AOSDA TA4	AOSDA TA3	AOSDA TA2	AOLRC K	AOBCK	AOMCL K	Y
VCCK	DVSS	VCCK	DVSS	DVSS	AVSS33 _DAC				OPWM0	OPWM2	PHYLED 1	OSDA0	OSCL0	ASPDIF	REXT	AA
VCCK	VCCK	VCCK	DVSS	DVSS	AVSS33 _AADC						PHYLED 0	OSDA1	OSCL1			AB
AVSS12 _RGB		AVSS33 _VDAC	AVSS12 _PLL	AVSS33 _CVBS						AVDD3 3_COM	AVDD3 3_REC	AVDD3 3_LD	U1TX	U1RX	OPWM1	AC
									DVSS	GPIO7	GPIO8		AVDD1 2_COM	TXVN_1	TXVP_1	AD
								DVSS	DVSS	DVSS			AVDD1 2_REC	TXVN_0	TXVP_0	AE
ADIN2_ SRV	ADIN3_ SRV	ADIN5_ SRV	MPXP		AVSS33 _DEMO D	AVDD3 3_IFPG A		DVSS	DVSS	DVSS	DVSS	AVSS12 _REC	AVDD3 3_DAC1	TANA_0	TANA_1	AF
ADIN0_ SRV		AVDD1 2_PLL	MPXN			AVSS33 _XTAL			DVSS	DVSS	AVSS33 _COM	AR2_A DAC	AL2_AD AC	AR1_A DAC	AL1_AD AC	AG
ADIN4_ SRV			AVDD3 3_VDAC			AVDD3 3_CVBS	AVSS12 _DEMO D		VMID_ AADC	DVSS	DVSS	DVSS	AL3_AD AC			AH
COM1	PR1P		VDAC_ OUT1	BYPASS 1	BYPASS 0	CVBS1P	AVDD3 3_DEM OD	LOUTN	LOUTP	AIN4_R _AADC	AVDD3 3_DAC	AVDD3 3_AAD C	AR3_A DAC	AL0_AD AC	AR0_A DAC	AJ
PB1P	AVDD1 2_RGB	PROP	VDAC_ OUT2	SC0	CVBS2P	CVBS_C OM	CVBSOP	AVDD1 2_DEM OD	AVDD3 3_XTAL _STB	AIN1_L _AADC	AIN3_R _AADC	AIN1_R _AADC	DVSS	DVSS	DVSS	AK
	SOY0	COM0		FS_VDA C	SC1		ADCIN N_DEM OD		XTALO	AIN3_L _AADC		AIN5_L _AADC	AIN2_L _AADC	AIN5_R _AADC	AIN2_R _AADC	AL
	Y0P	PB0P		SY0	SY1		ADCINP _DEMO D		XTALI	AIN4_L _AADC		AIN6_L _AADC	AIN0_L _AADC	AIN6_R _AADC	AIN0_R _AADC	AM
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	RB

19090_302_110423.eps
110524

Figure 8-3 Pin configuration [2/2]

8.2 Diagram [CI CARD/MT5135](#) B04, MT5135AE/A LQFP-128 (IC U103)

Block diagram



Pinning information

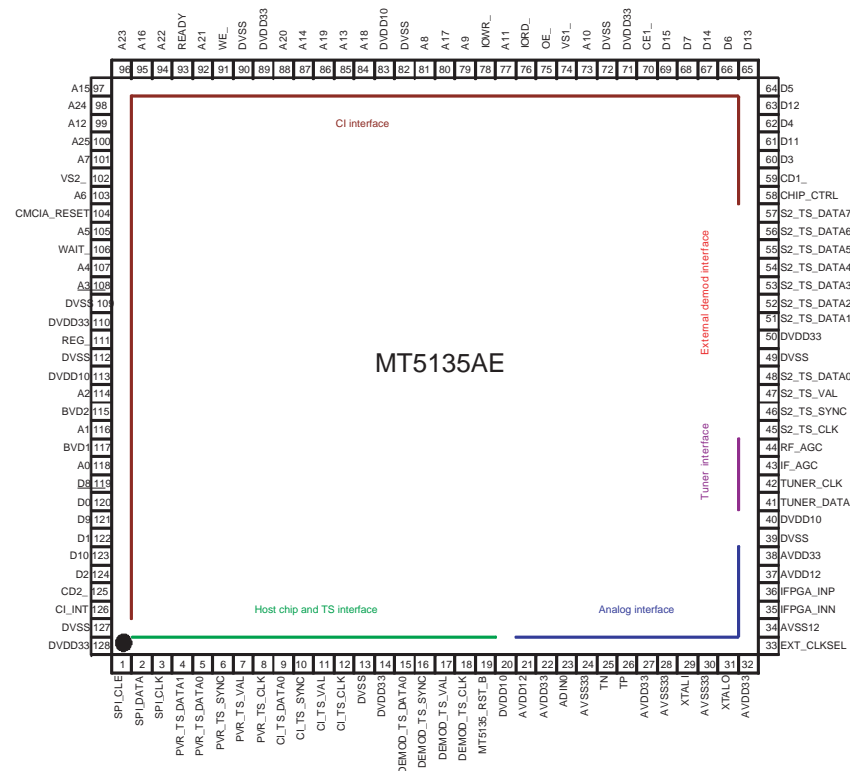
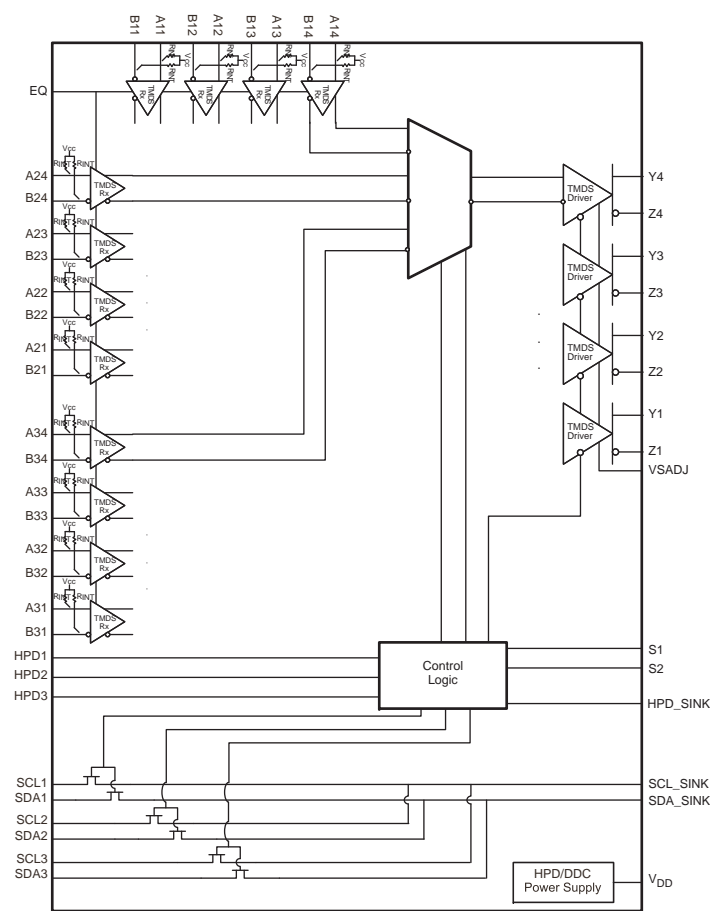
19080_303_110317.eps
110330

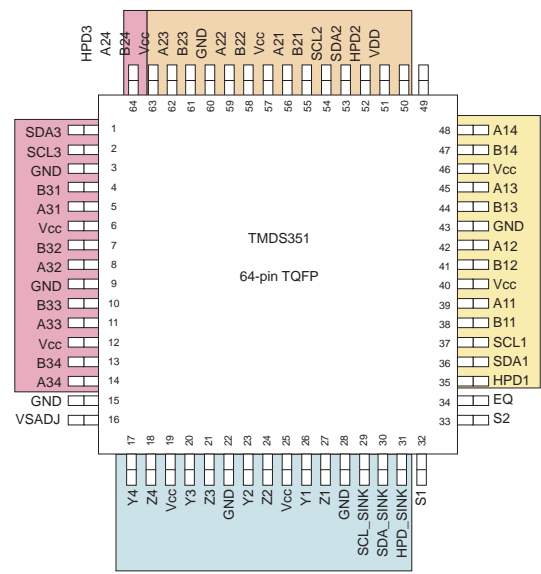
Figure 8-4 Internal block diagram and pin configuration

8.3 Diagram [HDMI1/HDMI2/HDMI3 INPUT B12, TMDS351PAG \(IC U501\)](#)

Block diagram



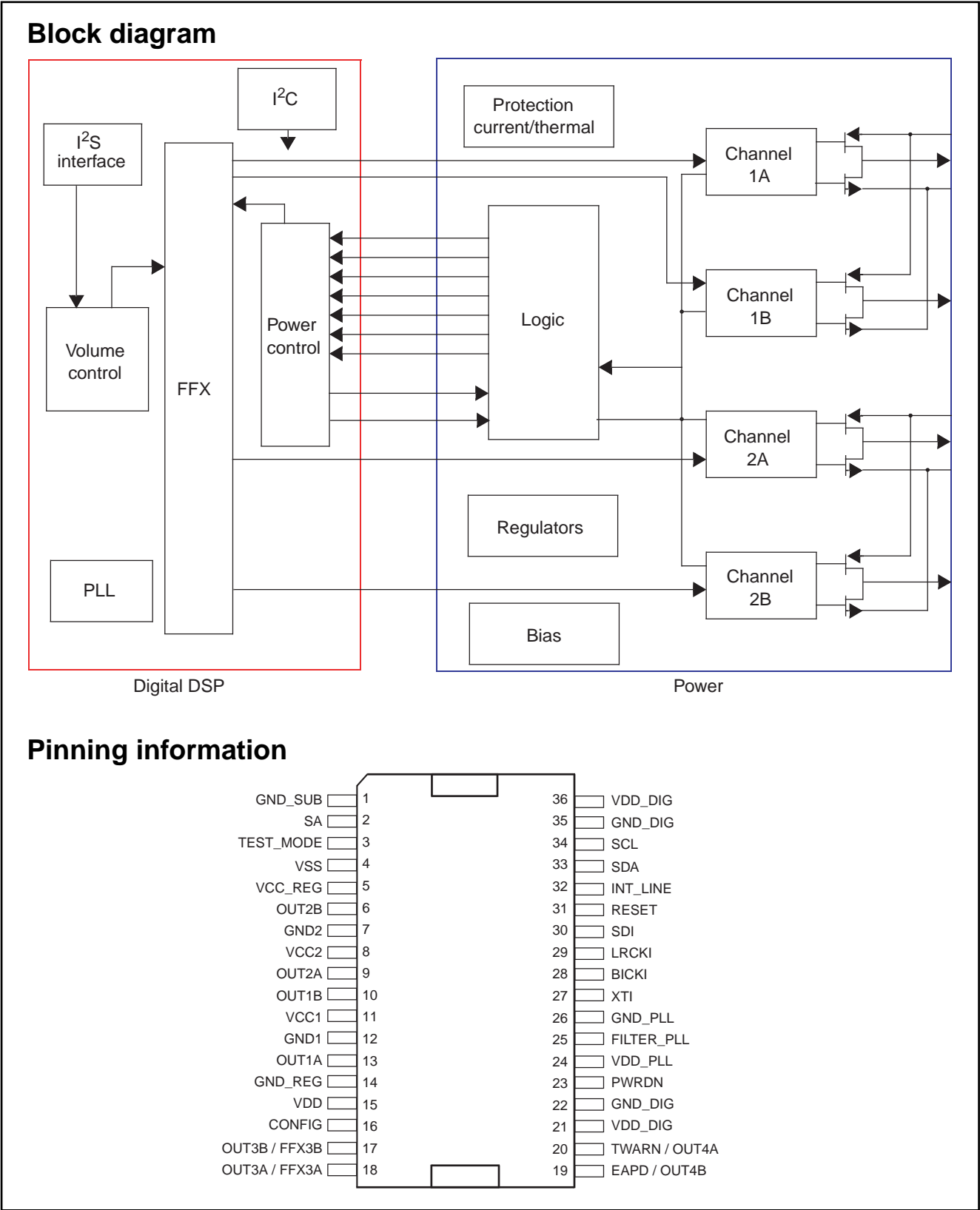
Pinning information



19080_309_110317.eps
110330

Figure 8-5 Internal block diagram and pin configuration

8.4 Diagram [AUDIO AMP/HEADPHONE OUT B13, STA339BWTR \(IC U601\)](#)

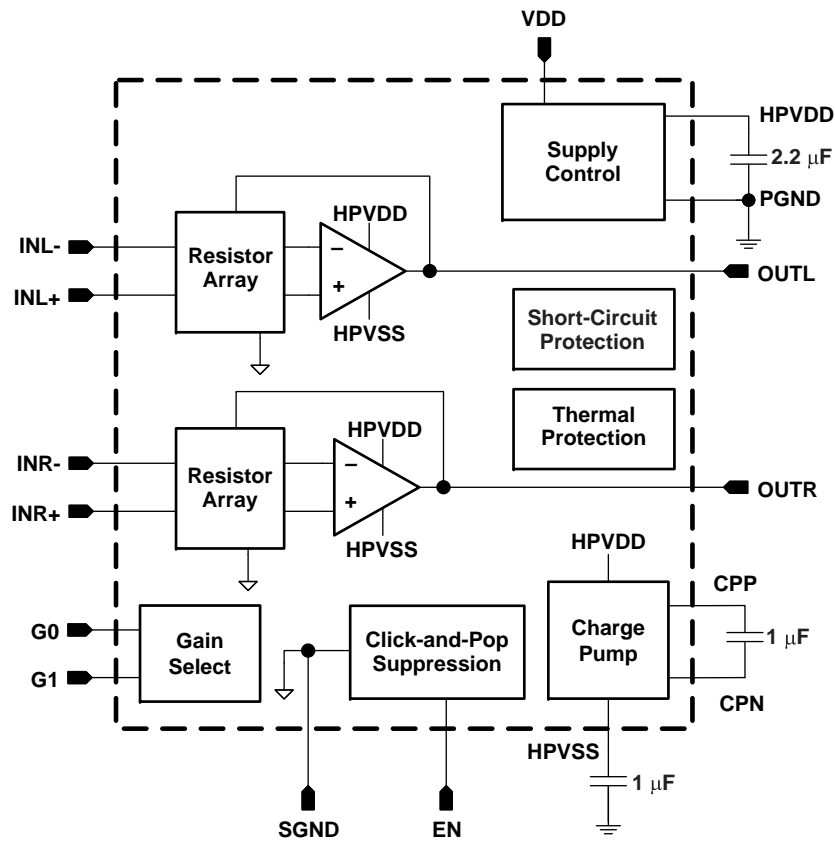


19080_306_110317.eps
110330

Figure 8-6 Internal block diagram and pin configuration

8.5 Diagram [AUDIO AMP/HEADPHONE OUT](#) B13, TPA6132A2RTER 25mW QFN-16 (IC U603)

Block diagram



Pinning information

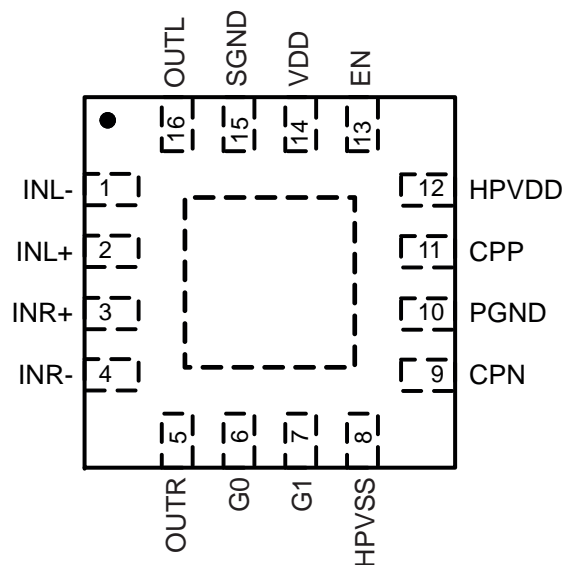
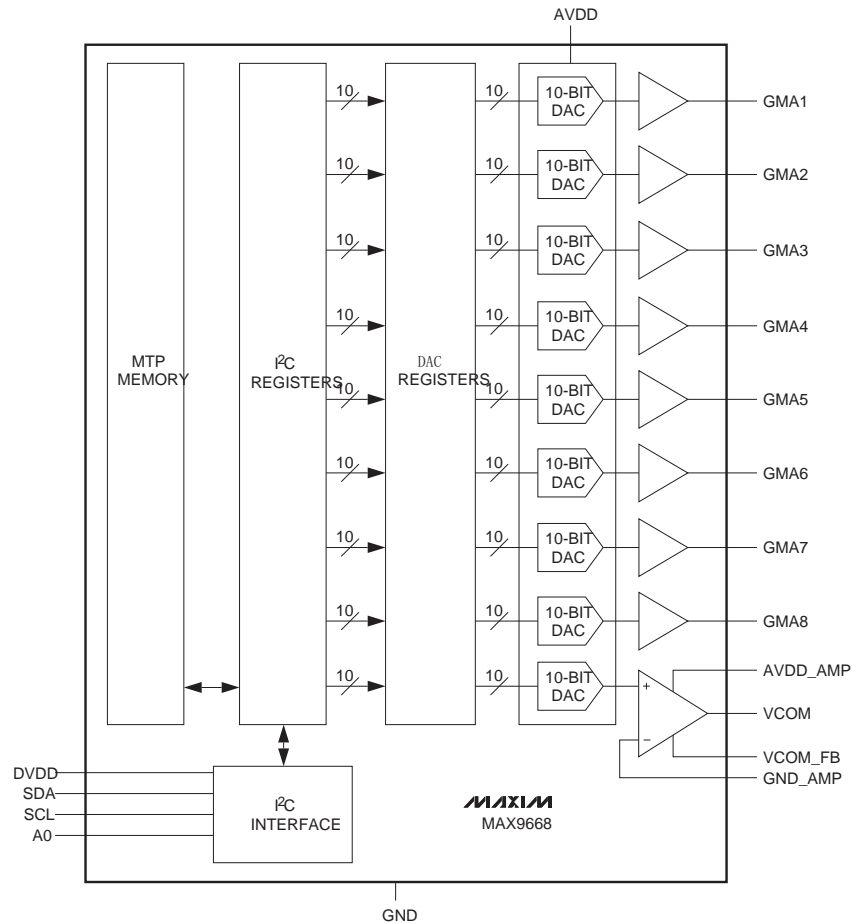
18850_304_100107.eps
100809

Figure 8-7 Internal block diagram and pin configuration

8.6 Diagram [TCON CHIP](#) B15, MAX9668ETP (IC U7001)

Block diagram



Pinning information

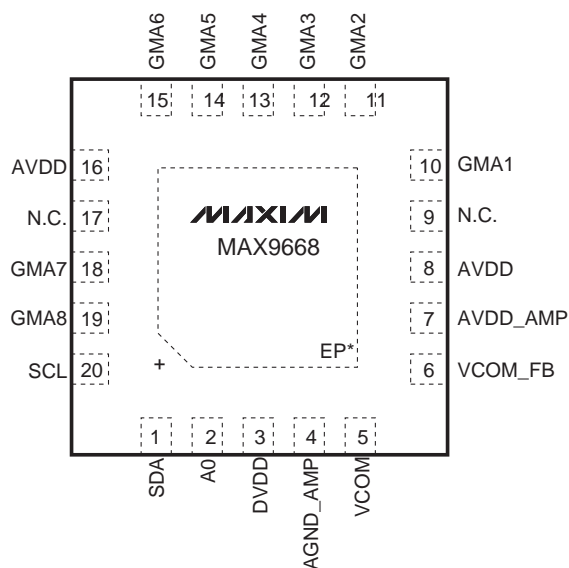
18850_307_100107.eps
100223

Figure 8-8 Internal block diagram and pin configuration

8.7 Diagram [TCON CHIP](#) B15, TPS65192RHDR (IC U7002)

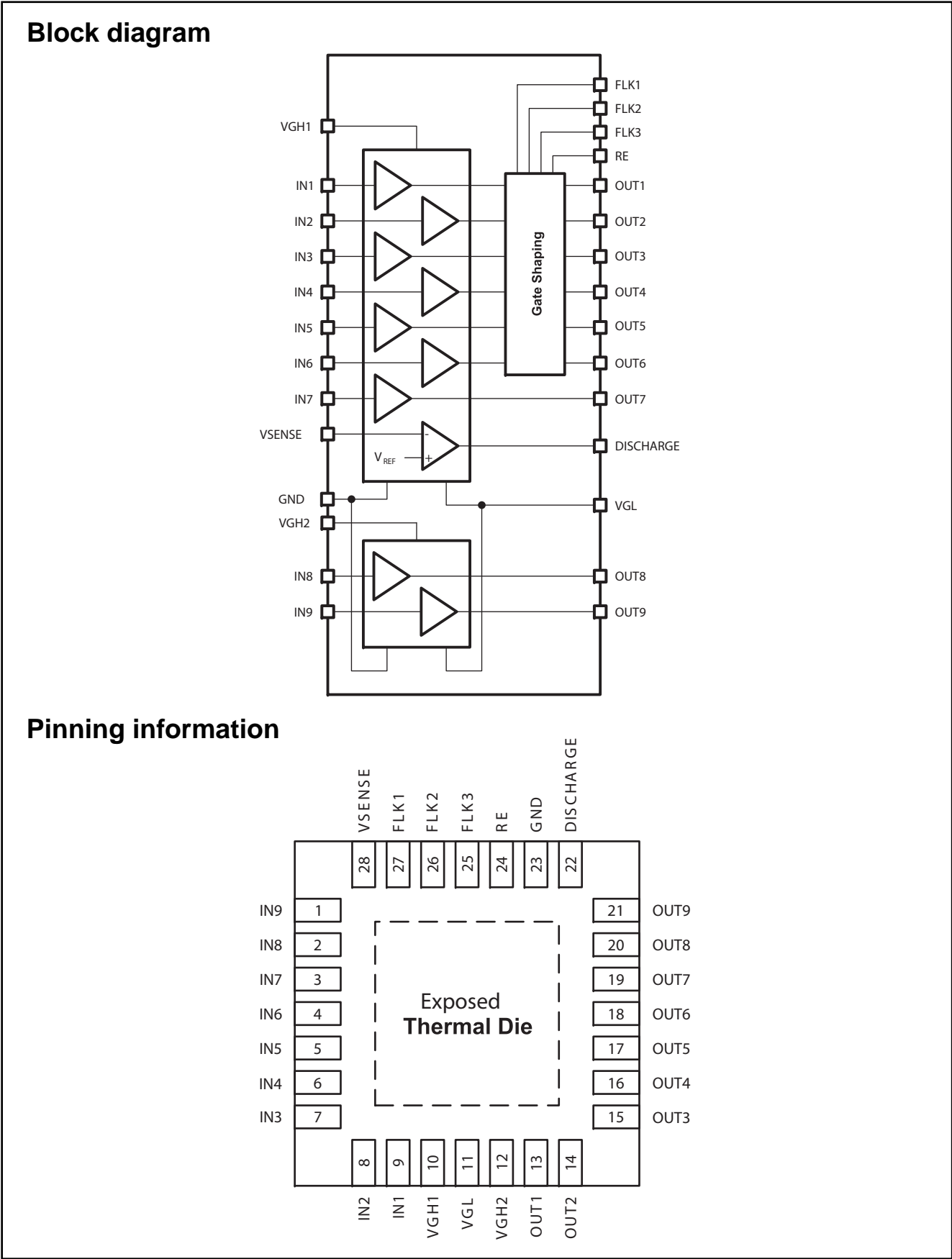
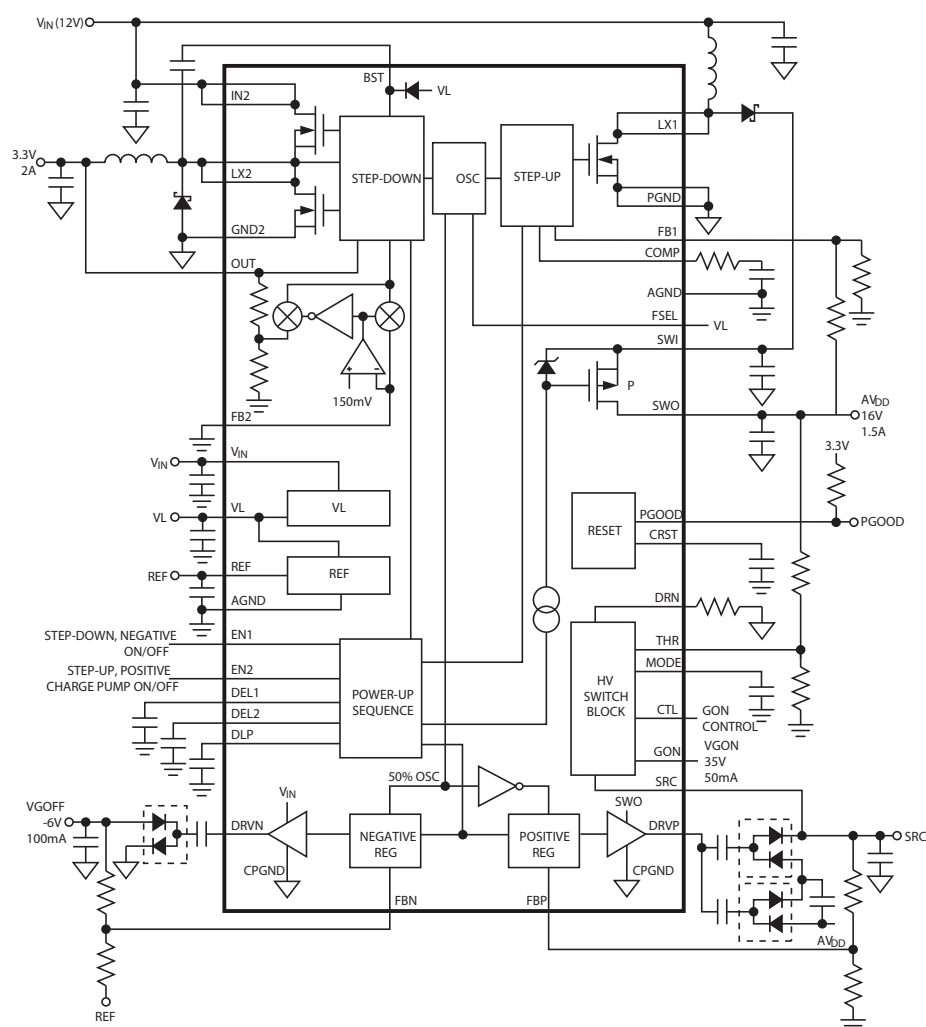


Figure 8-9 Internal block diagram and pin configuration

8.8 Diagram TCON CHIP B15, MAX17113ETL (IC U7003)

Block diagram



Pinning information

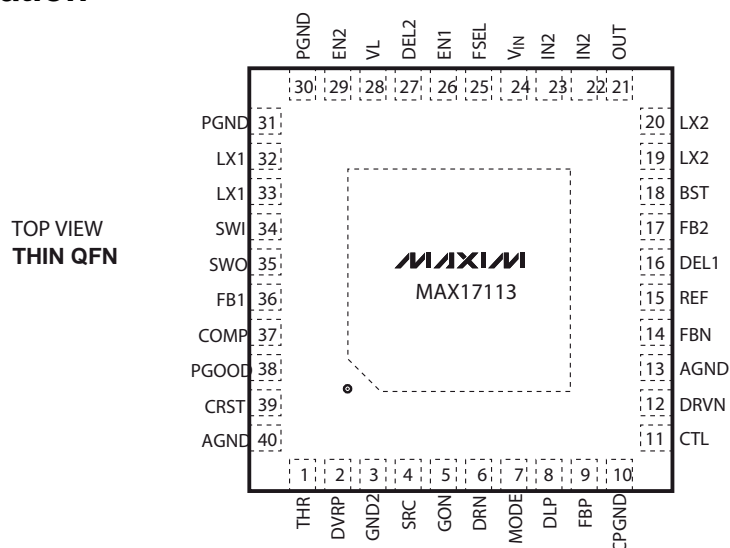
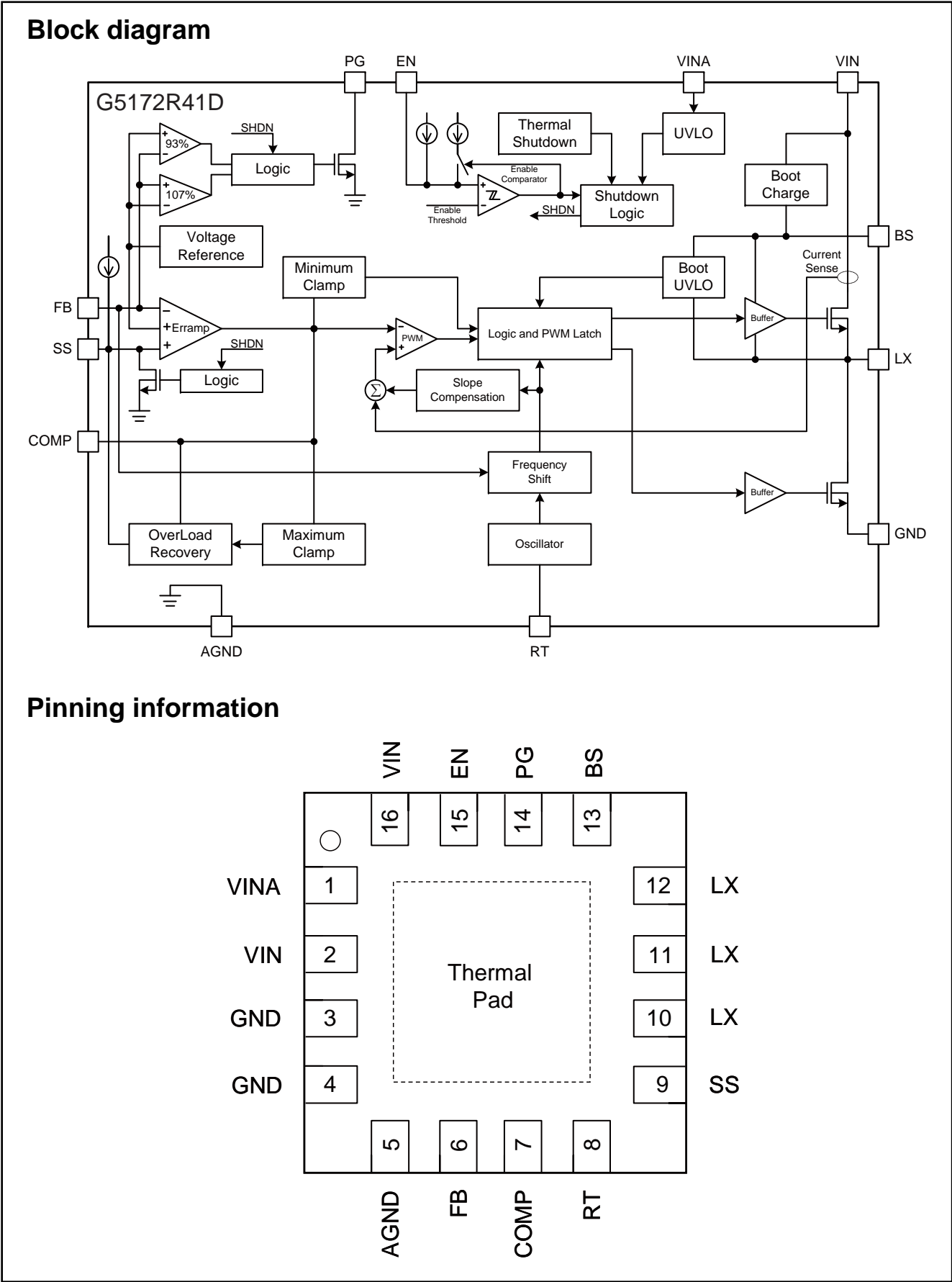


Figure 8-10 Internal block diagram and pin configuration

8.9 Diagram [POWER-1](#) B01, G5172R41D TQFN3x3-16 (IC U701)



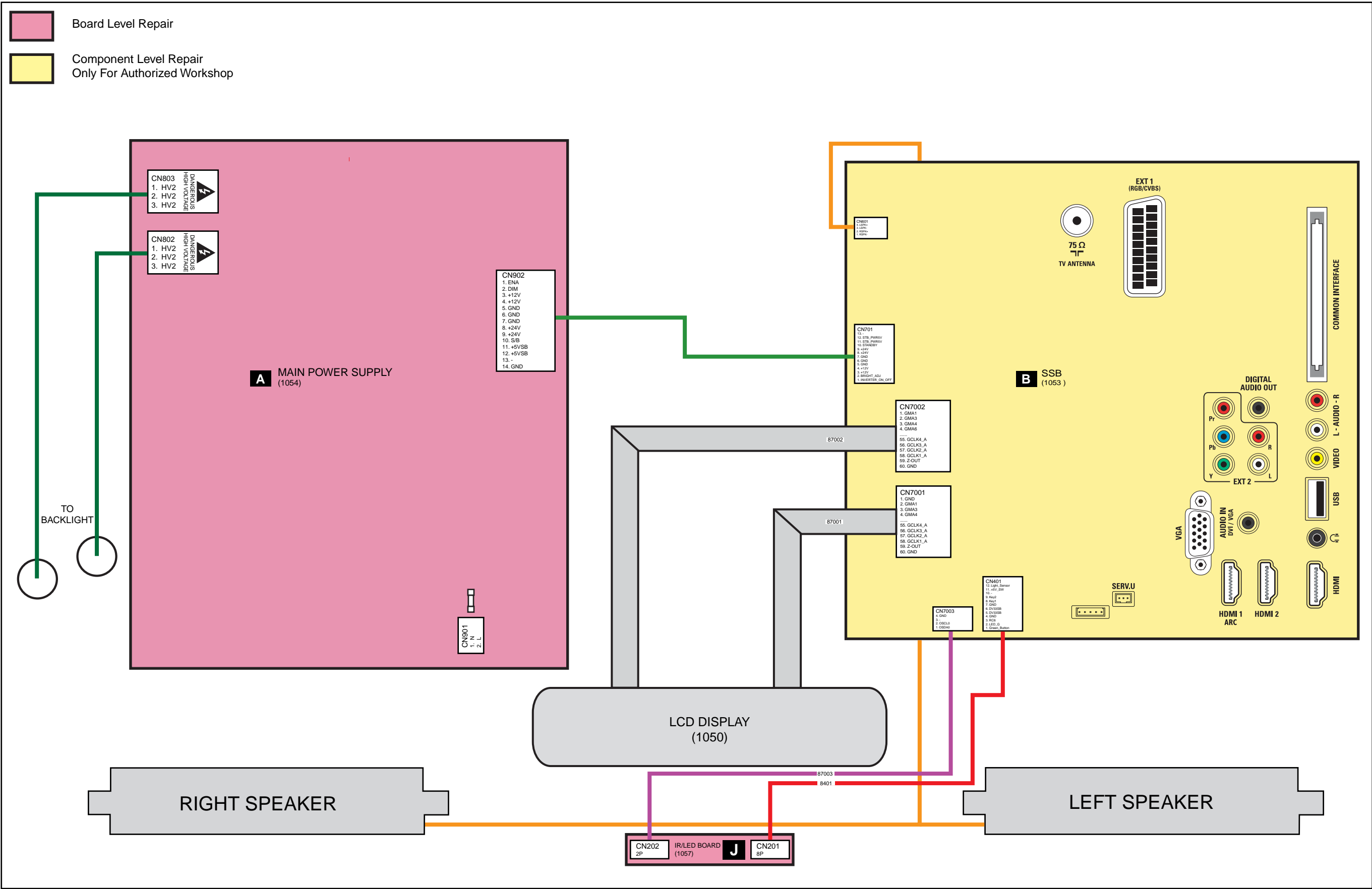
19090_303_110423.eps
110524

Figure 8-11 Internal block diagram and pin configuration

9. Block Diagrams

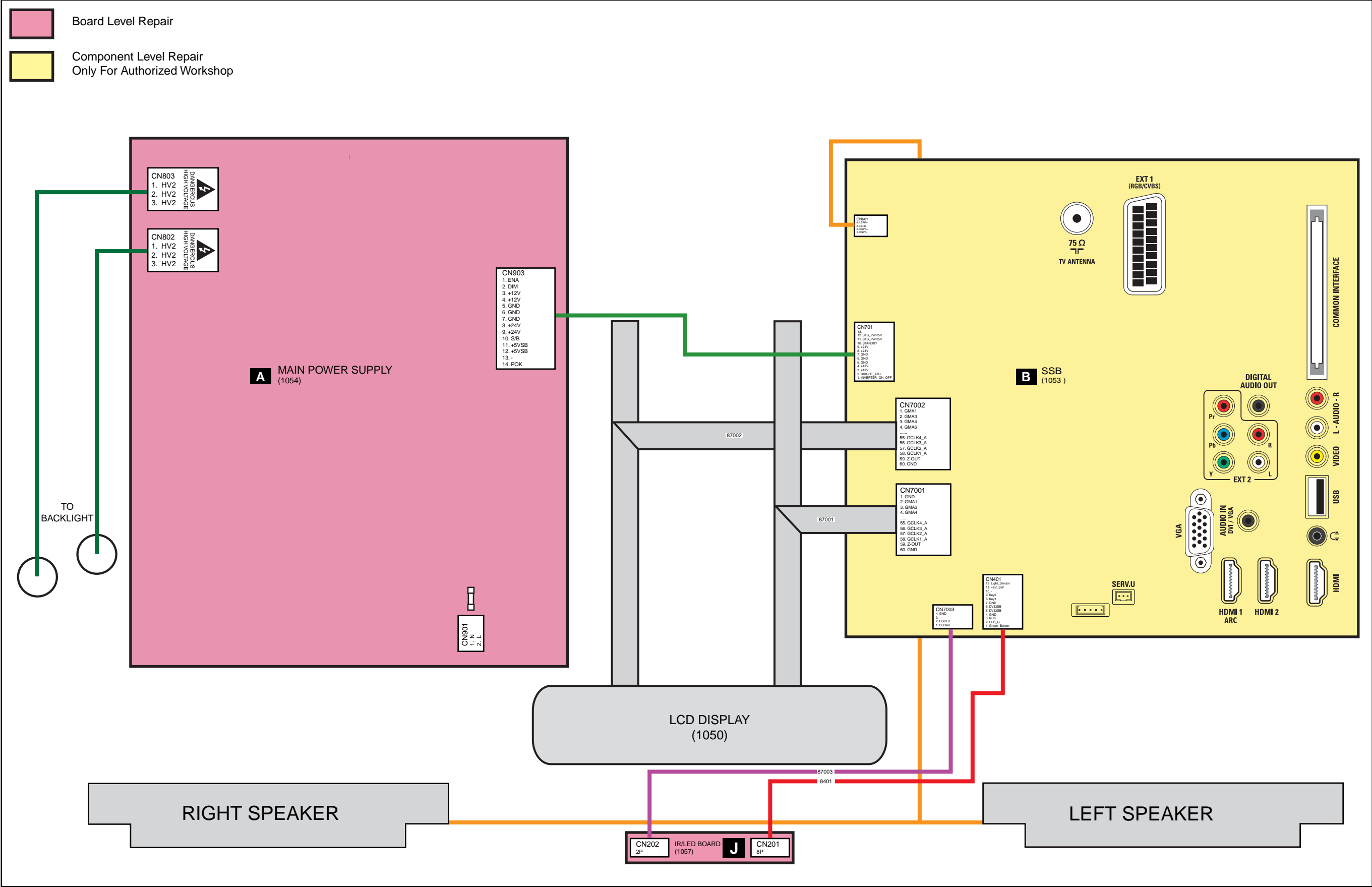
9-1 Wiring diagram 32"

WIRING DIAGRAM 32" (Dangerous)



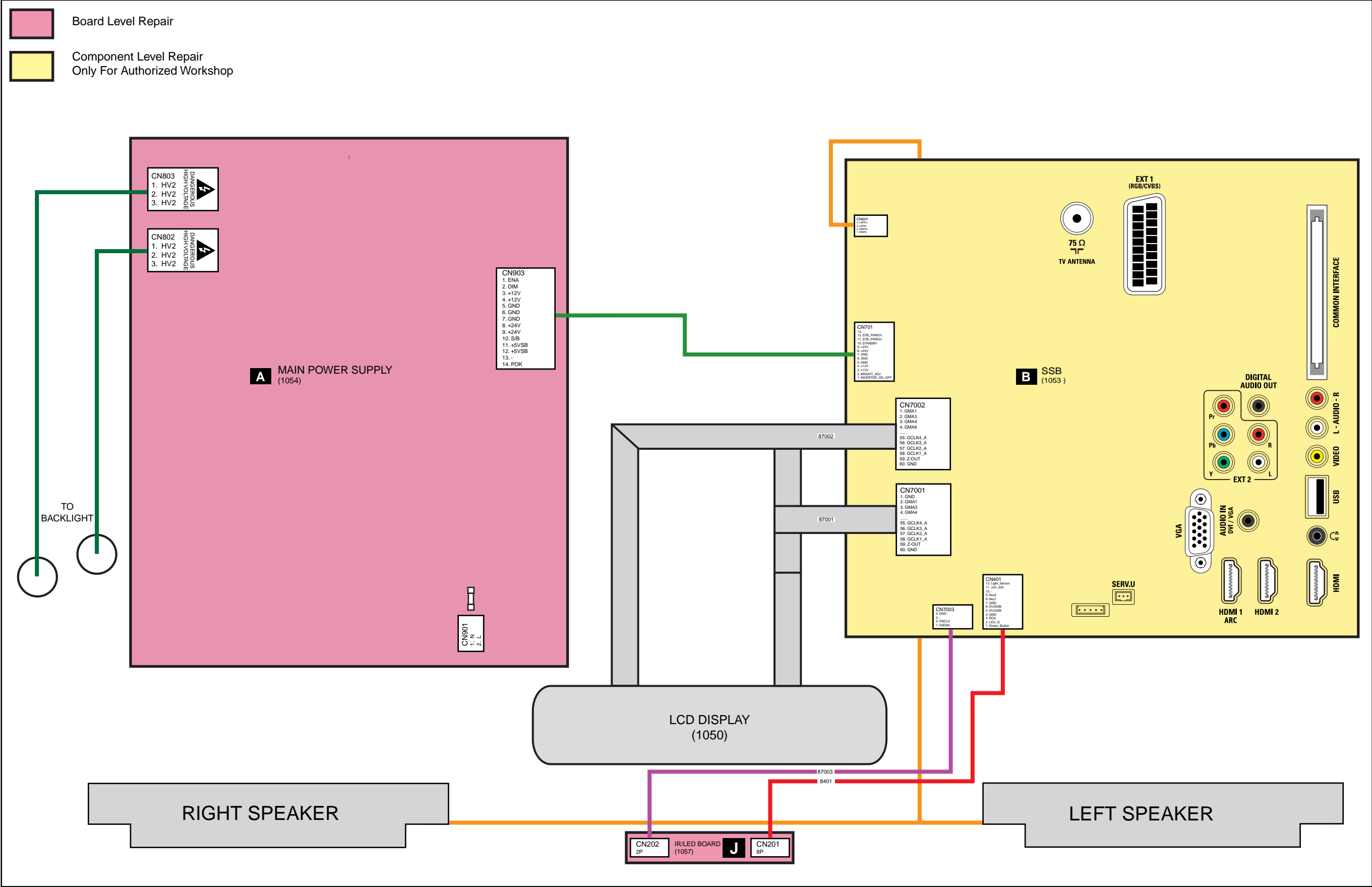
9-2 Wiring diagram 37"

WIRING DIAGRAM 37" (Dangerous)



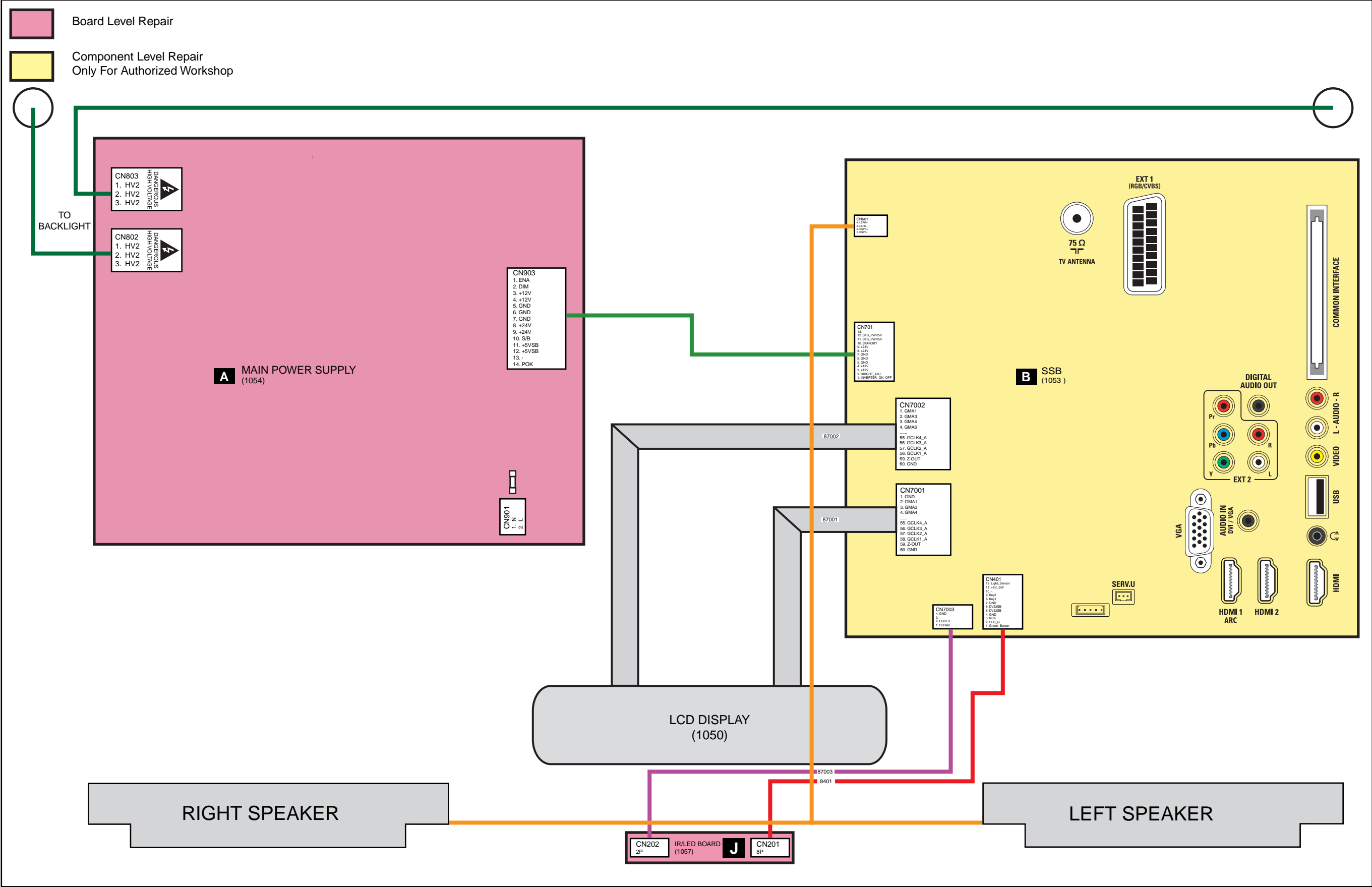
9-3 Wiring diagram 42"

WIRING DIAGRAM 42" (Dangerous)

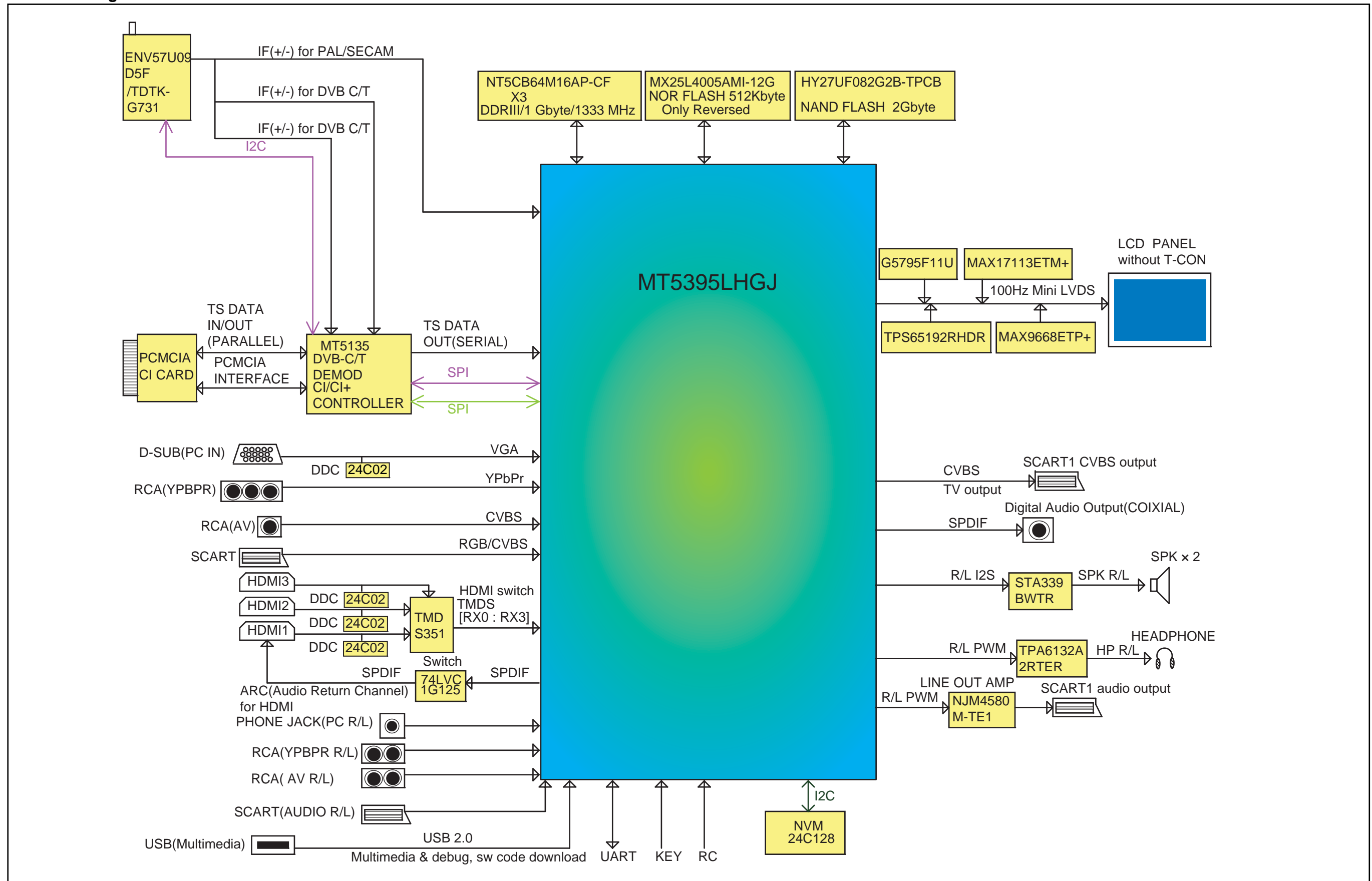


9-4 Wiring diagram 47"

WIRING DIAGRAM 47" (Dangerous)

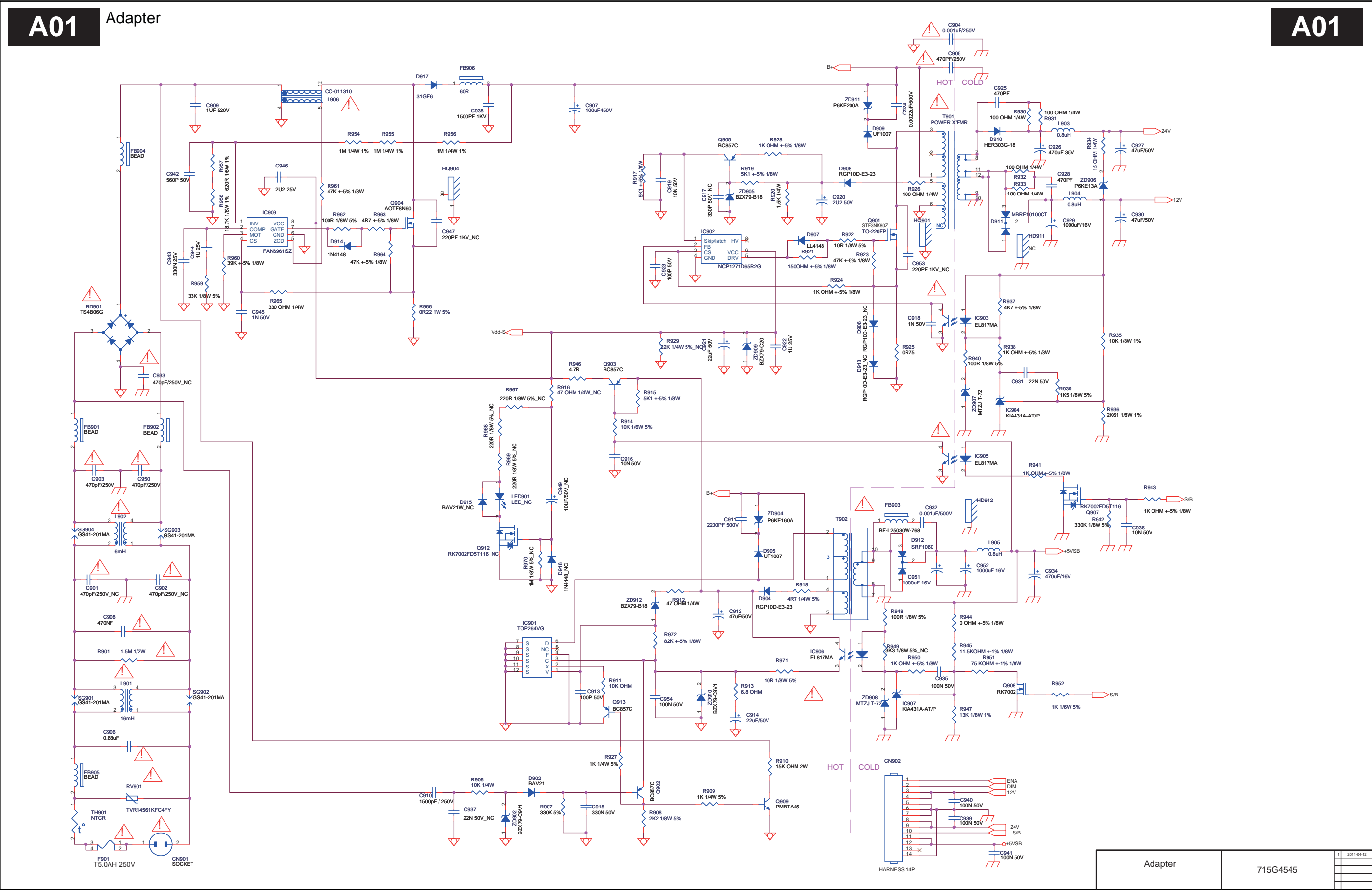


9-5 Block Diagram



10. Circuit Diagrams and PWB Layouts

10-1 A01 715G4545 PSU 32"
Adapter

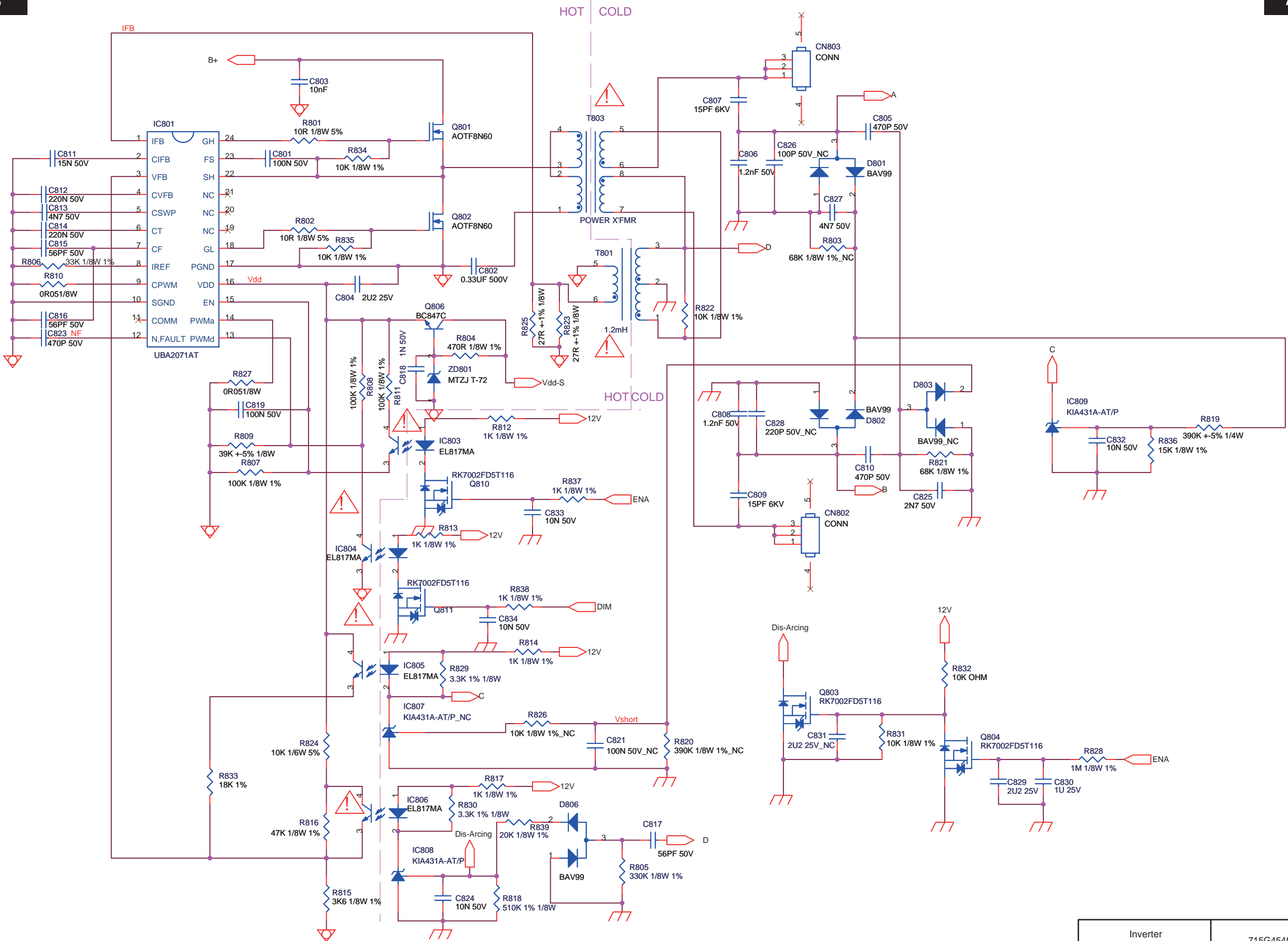


Inverter

A02

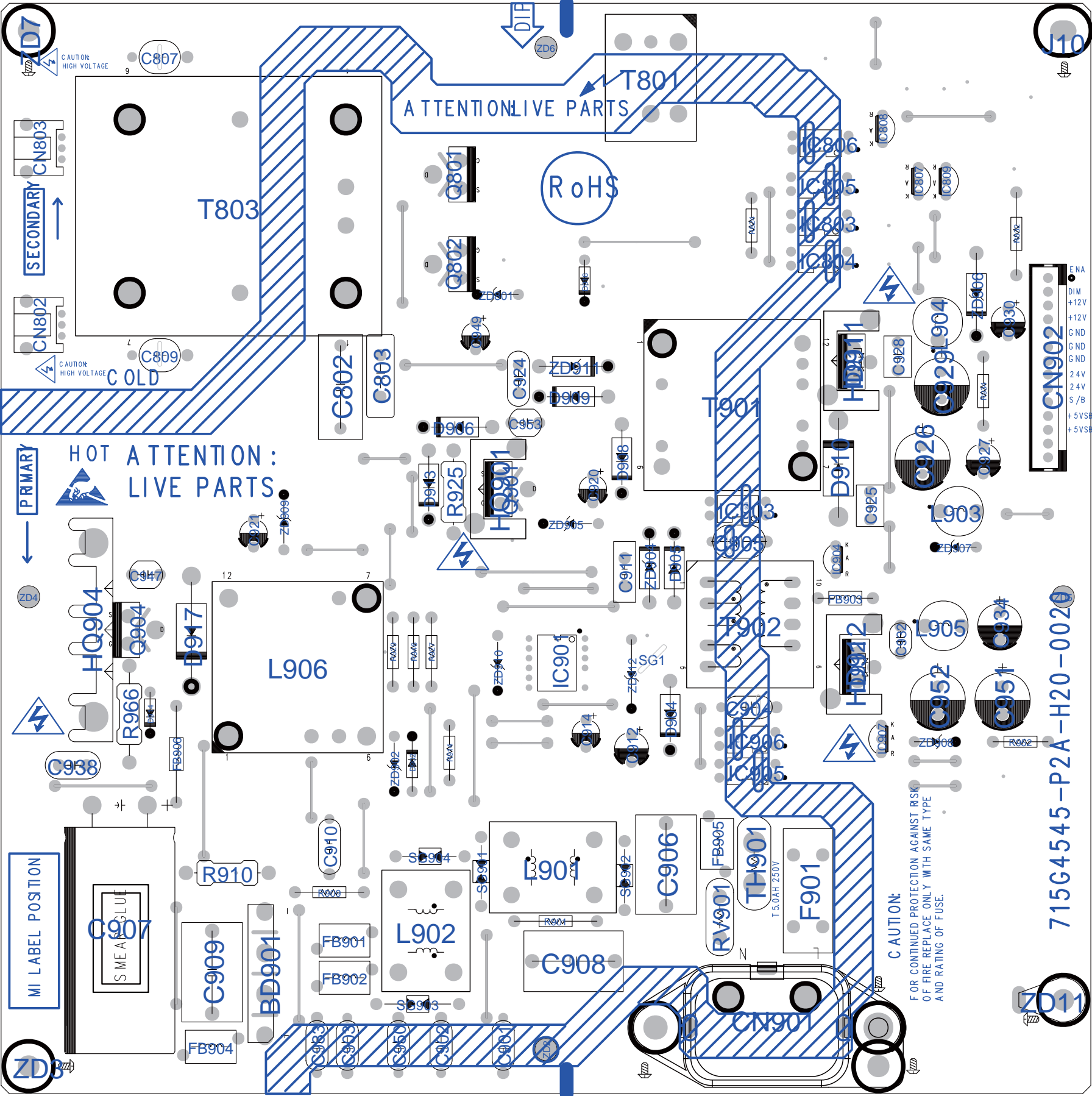
Inverter

A02



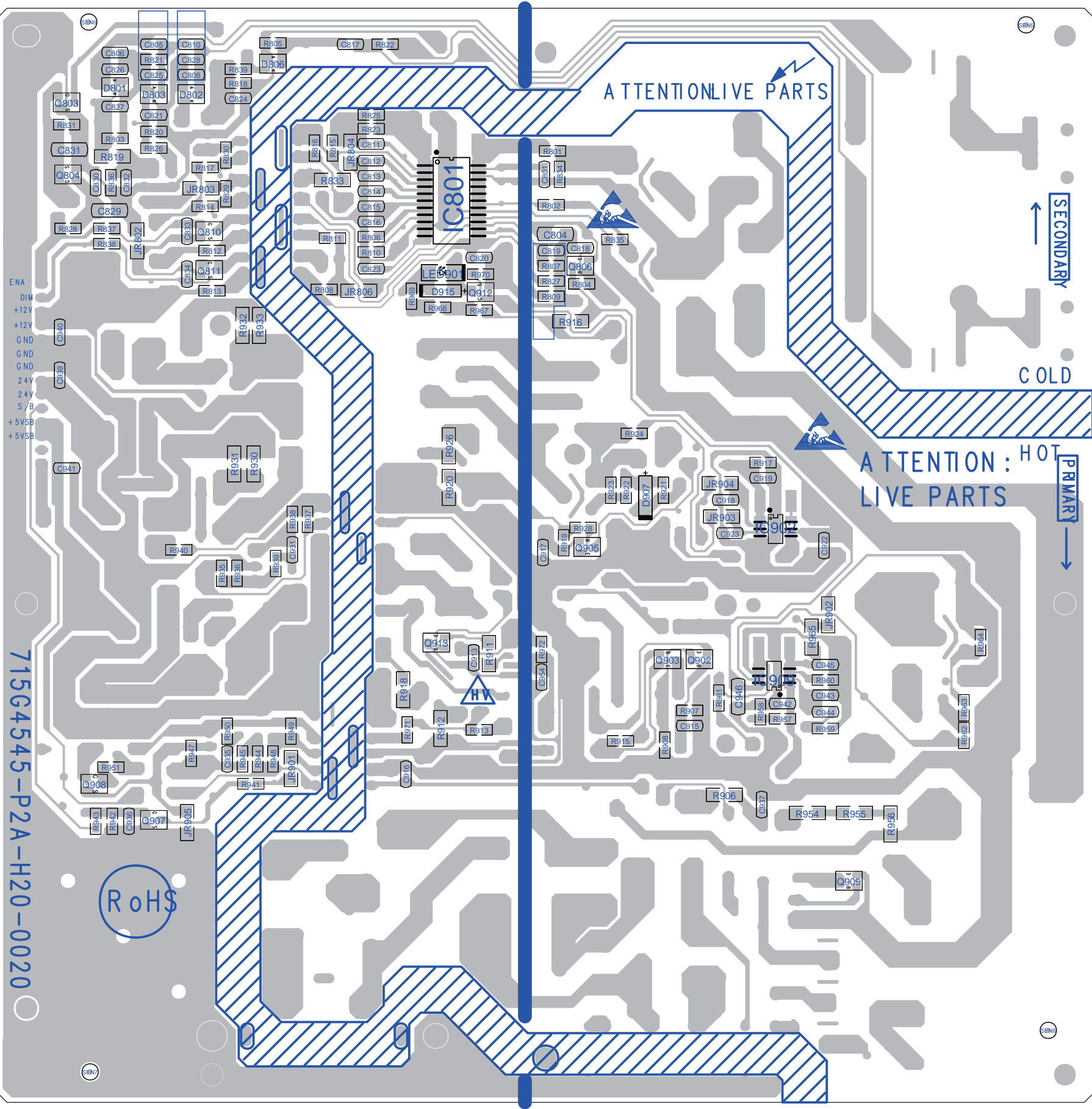
Inverter	715G4545	1	2011-08-12
		2	
		3	
		4	

Power layout top



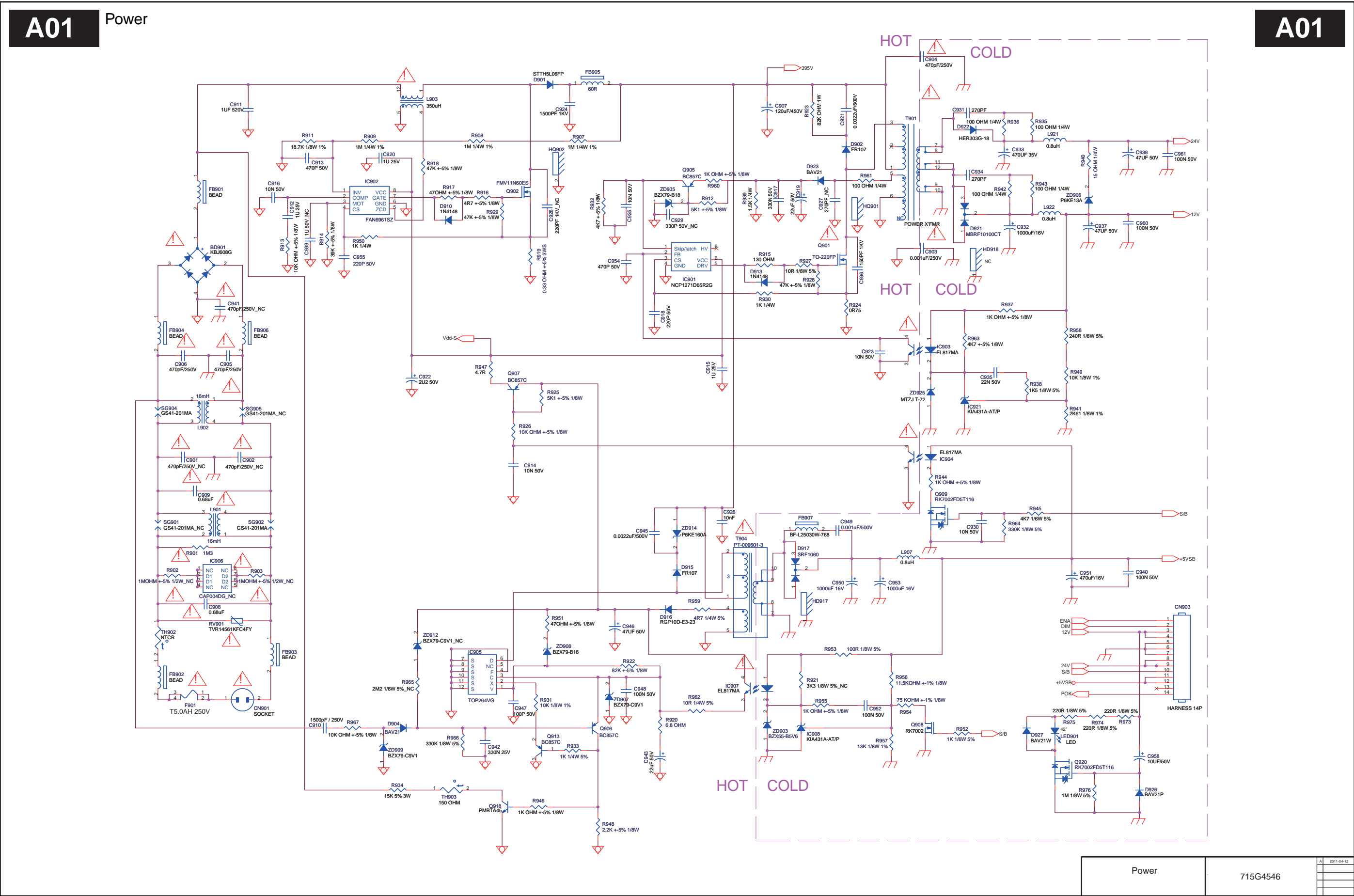
Power layout top	715G4545	1	2011-04-12
		2	
		3	
		4	

Power layout bottom



Power layout bottom	715G4545	1	2011-04-12

10-2 A01 715G4546 PSU 37", 42" and 47"
Power

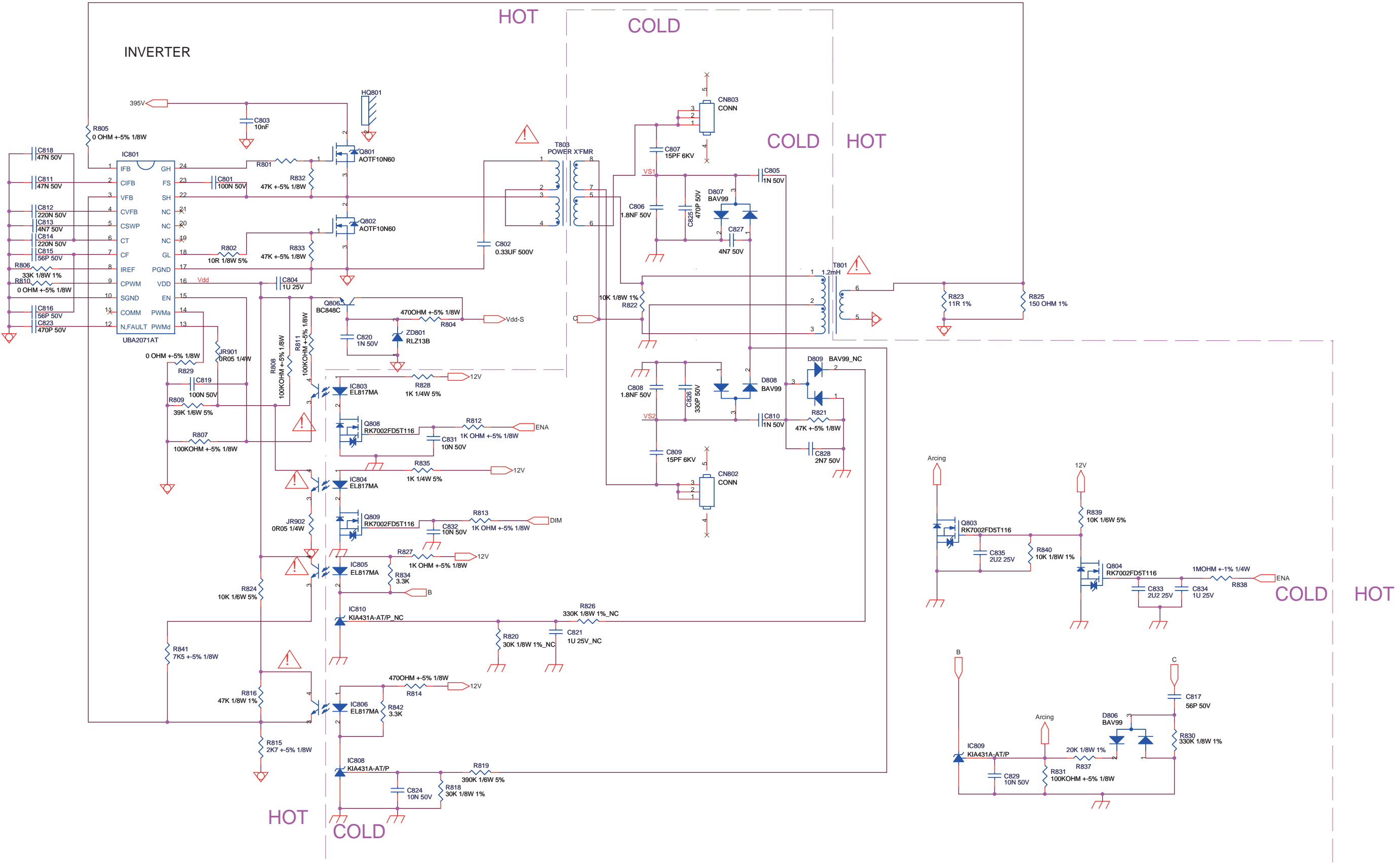


Inverter

A02

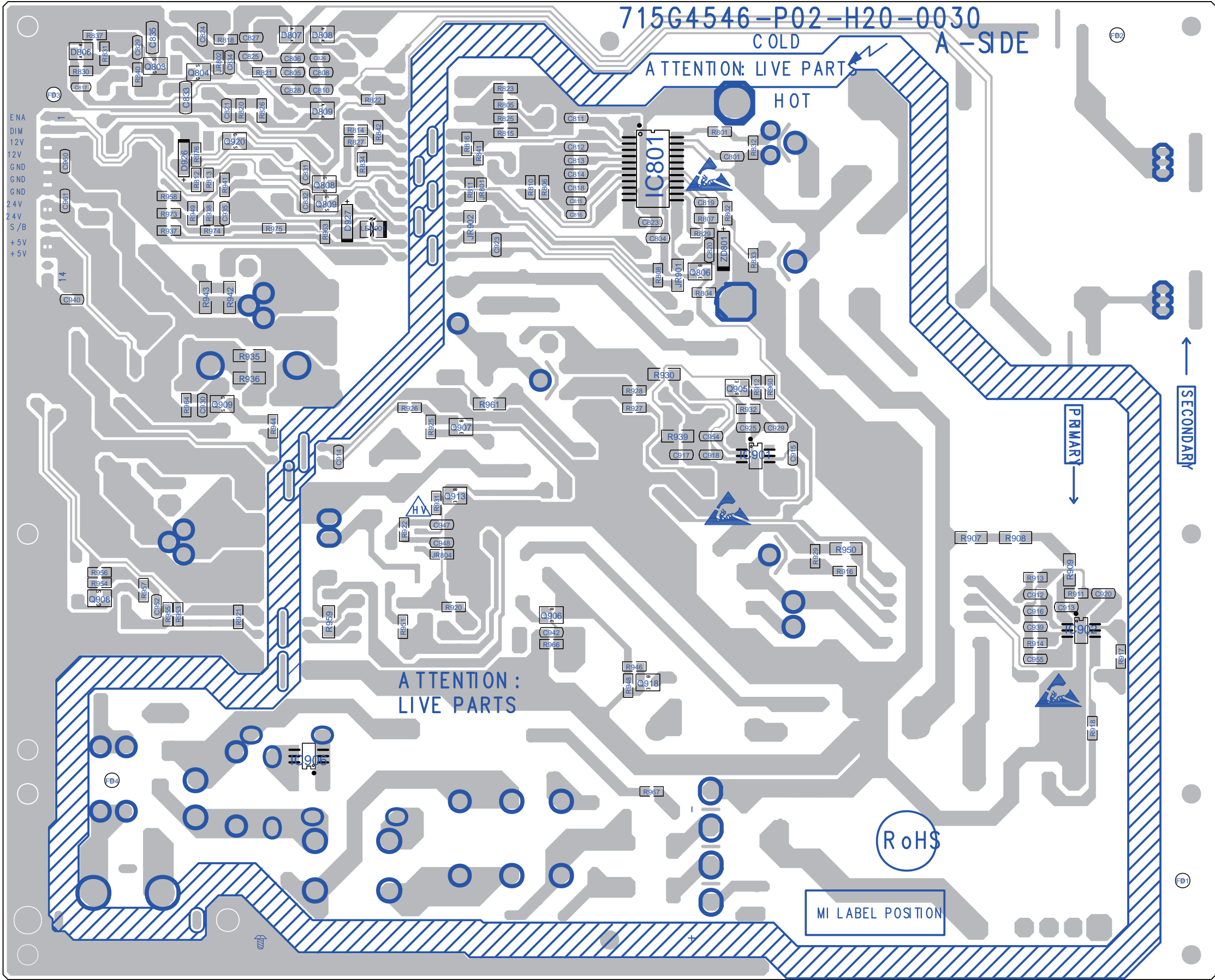
Inverter

A02



Inverter	715G4546	A	2011-04-12
		B	
		C	

Power layout bottom



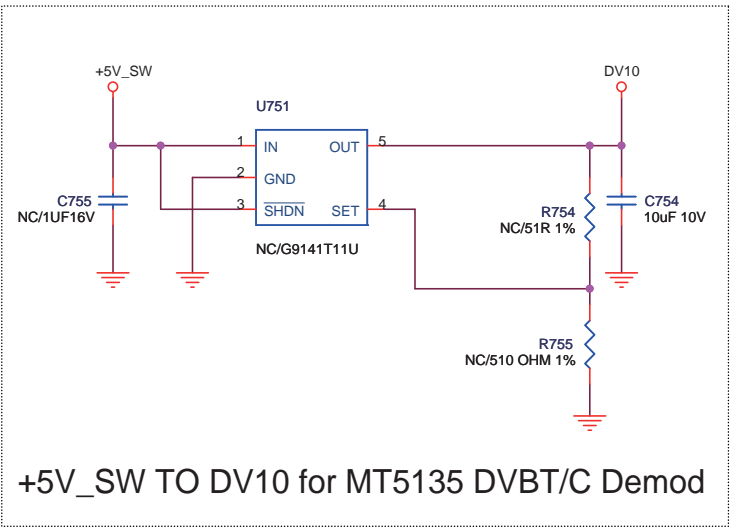
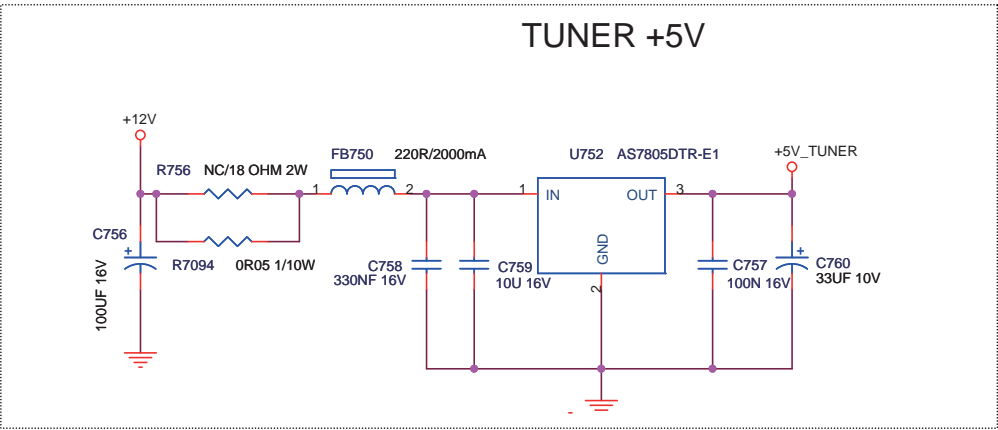
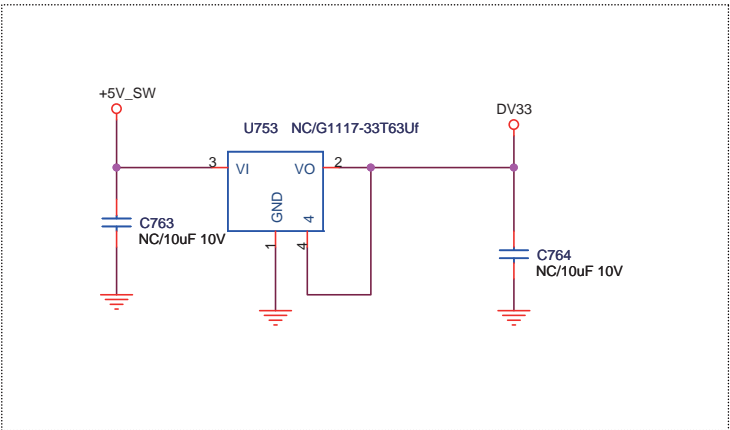
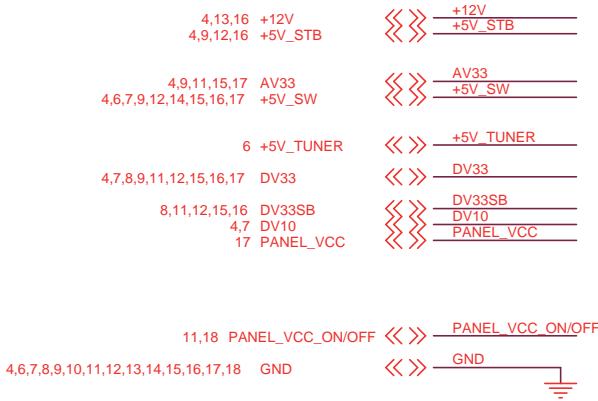
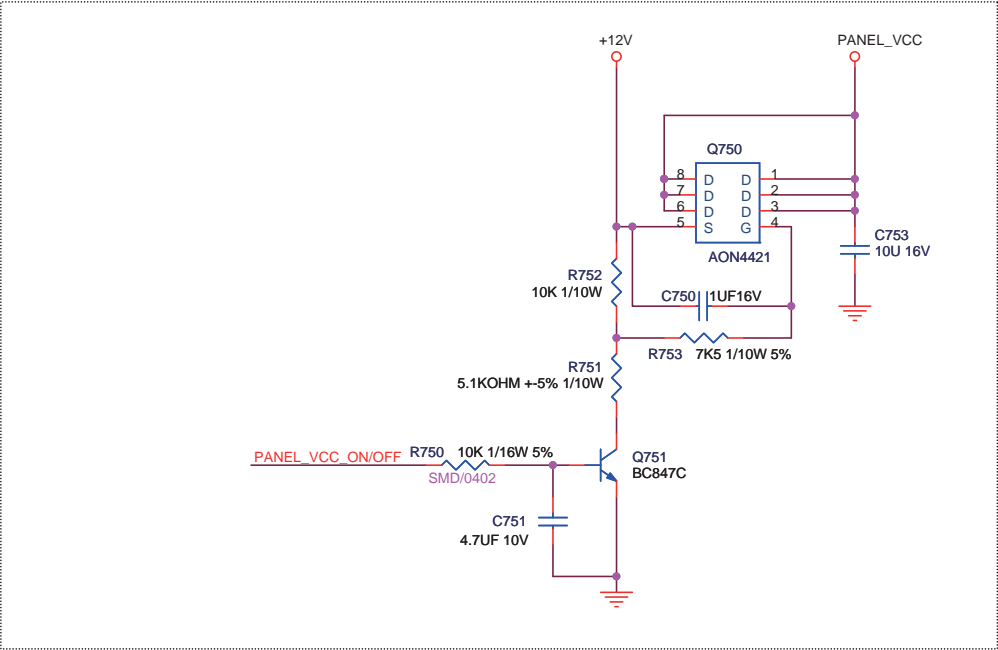
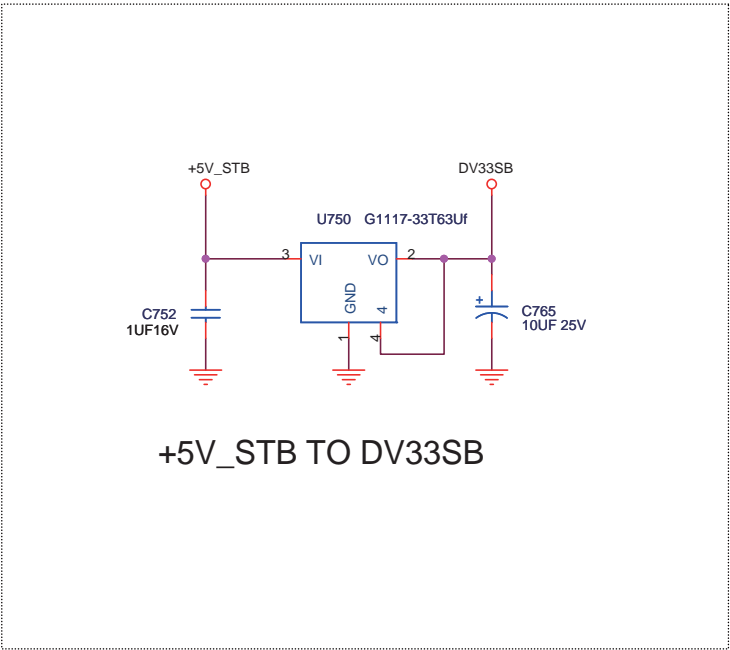
Power layout bottom	715G4546	A	2011-04-12
		B	
		C	
		D	

POWER-2

B02

POWER-2

B02



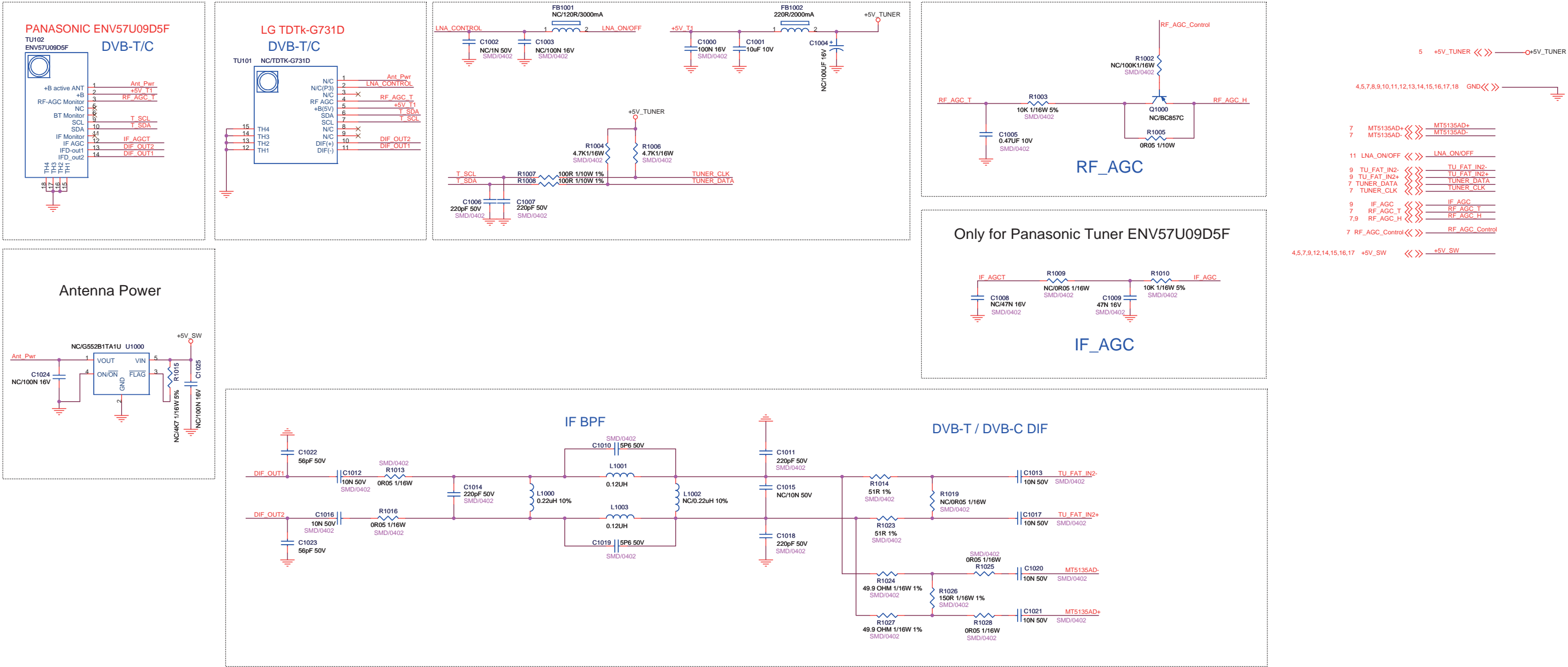
POWER-2	715G4481	1	2011-04-12

TUNER

B03

TUNER

B03

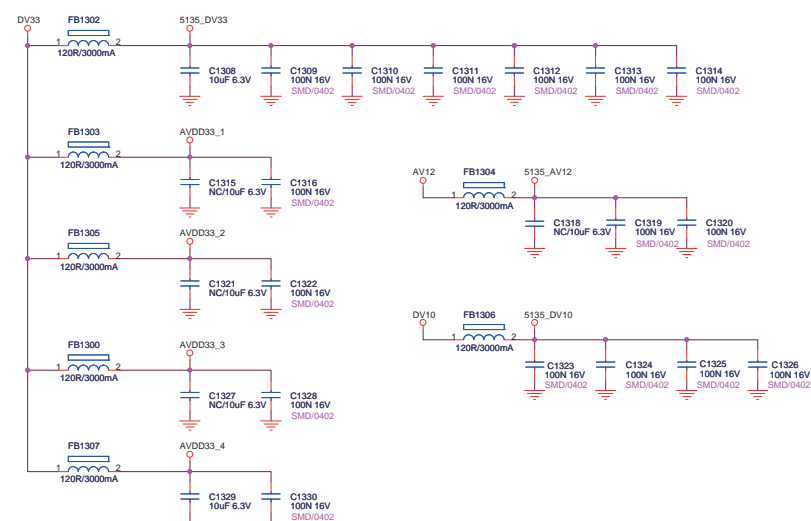
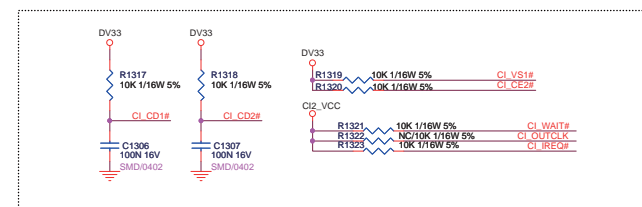
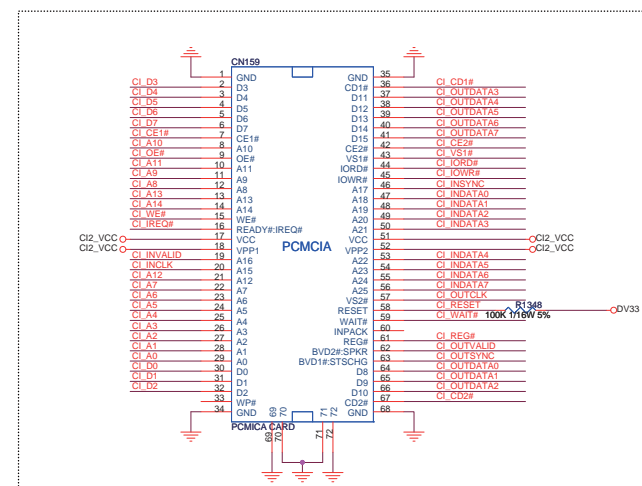
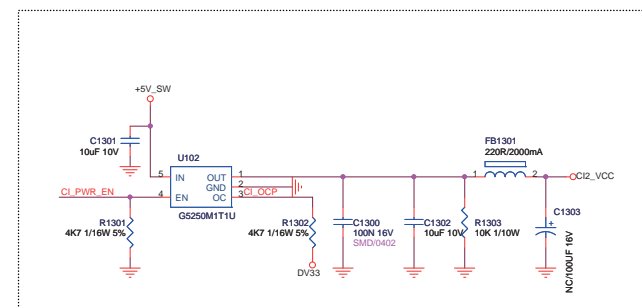
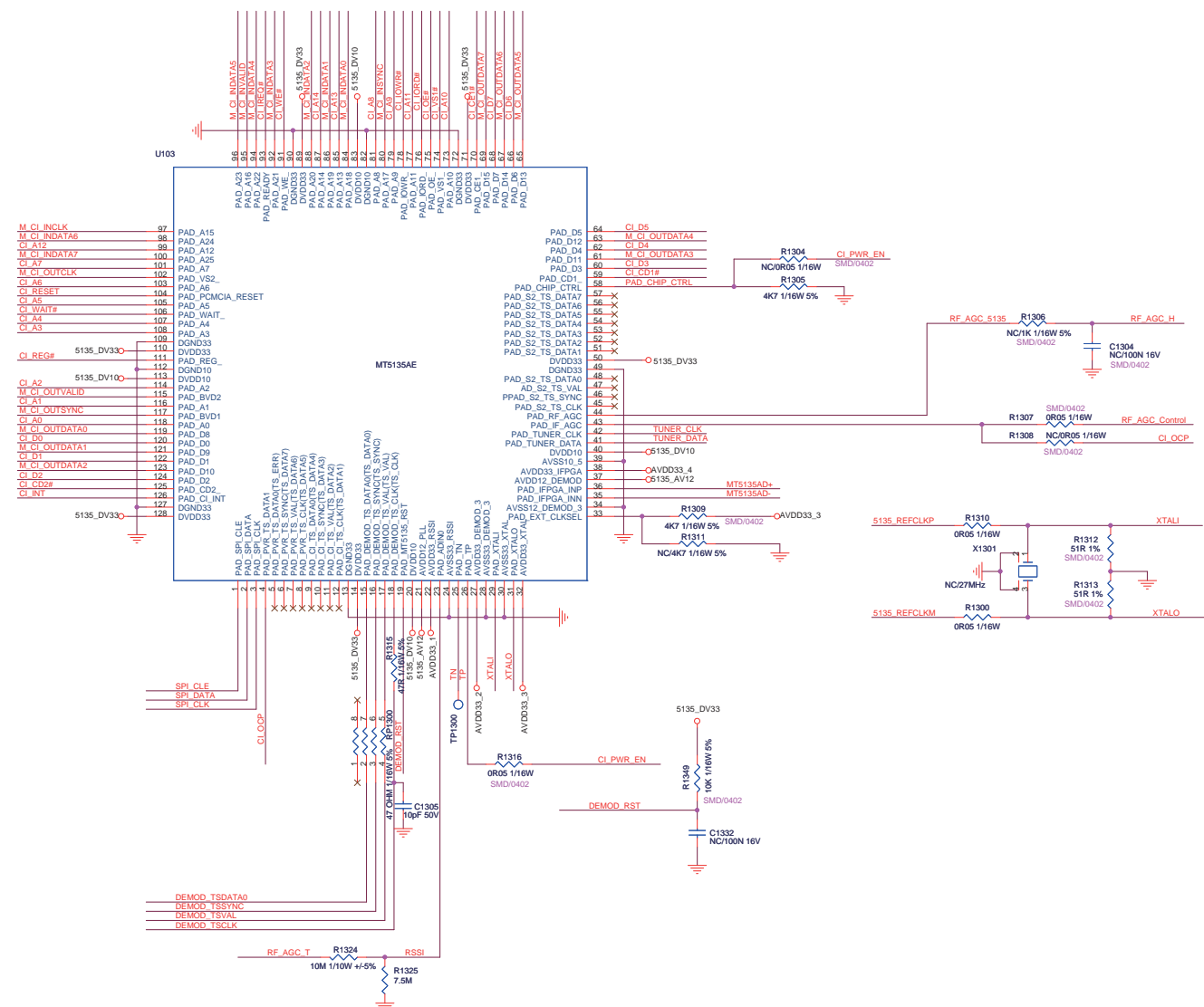


TUNER	715G4481	1	2011-04-12

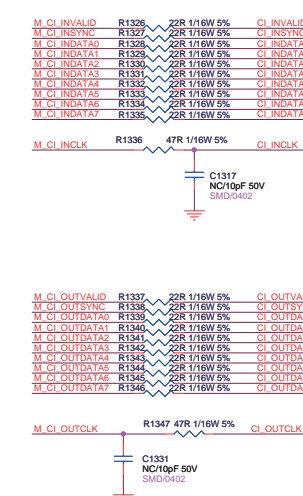
CI CARD/MT5135

B04

B04



Function 1 (Internal CI) CI Interface

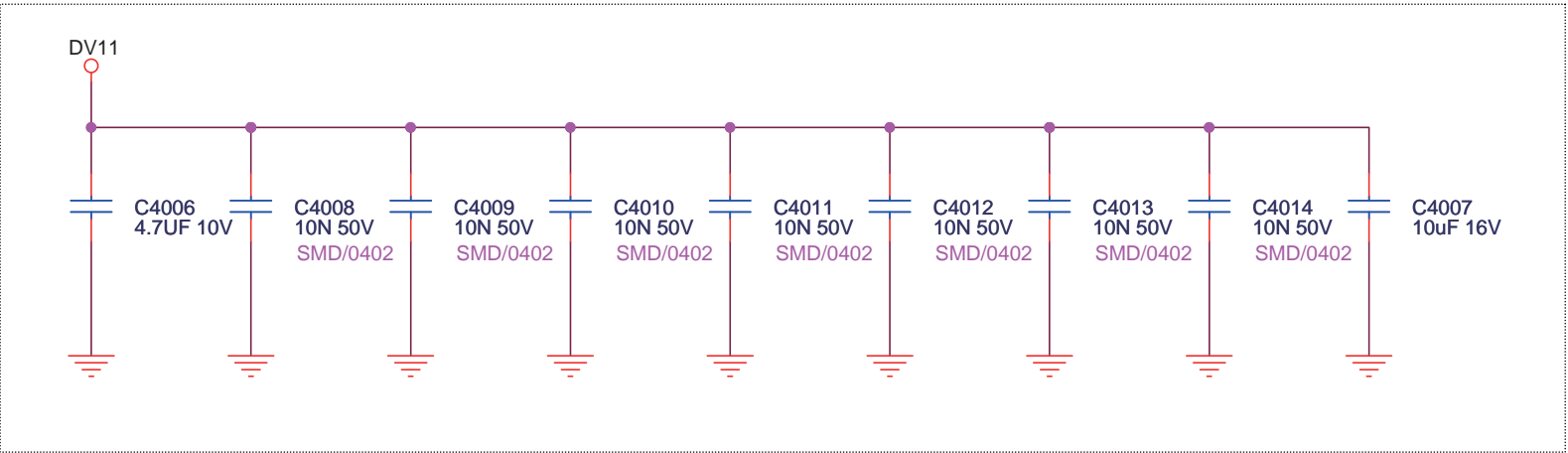
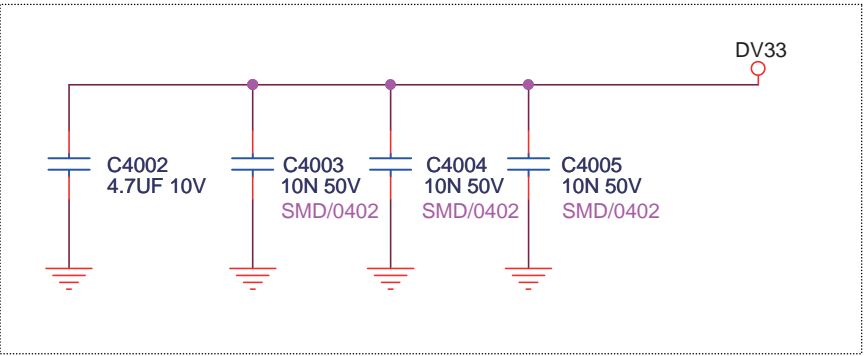
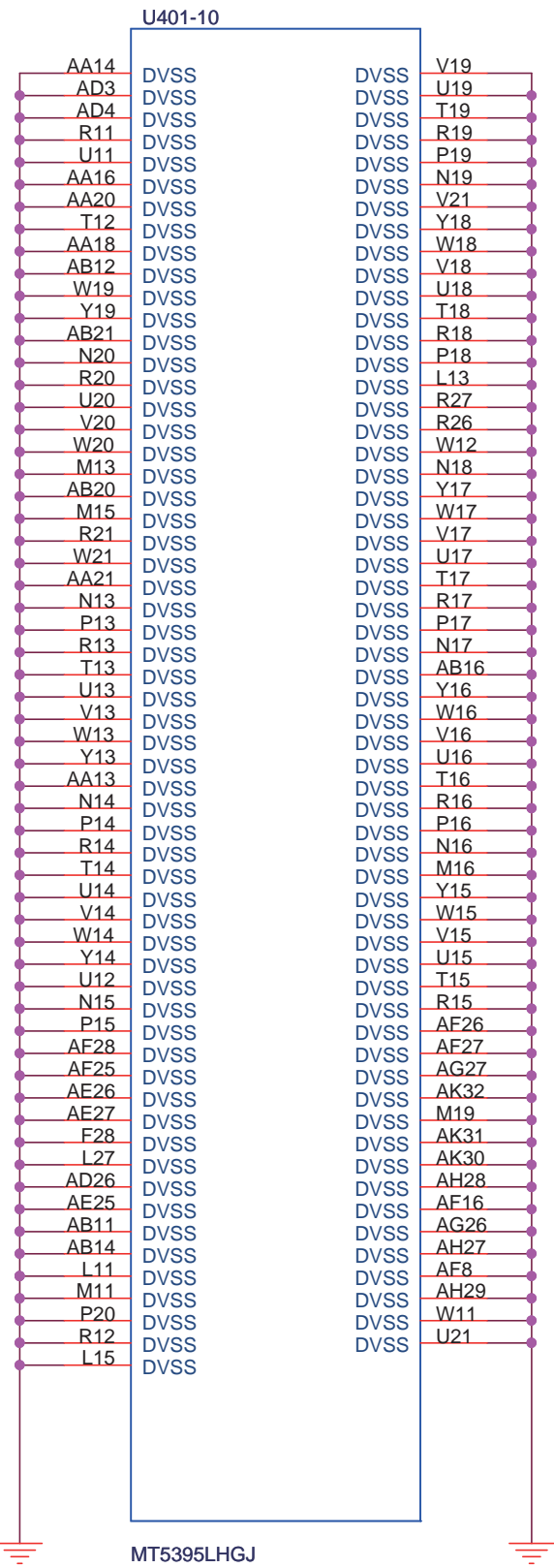


MT5395 BYPASS/TRAP.

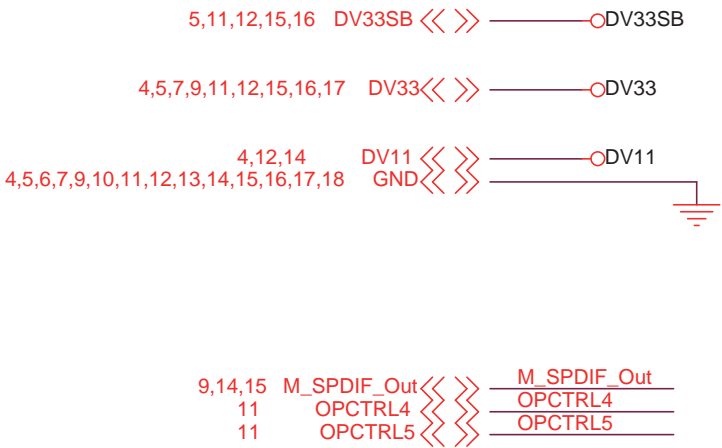
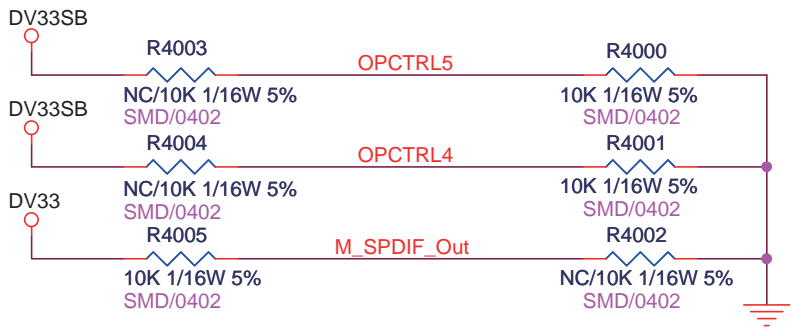
B05

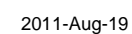
MT5395 BYPASS/TRAP

B05



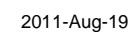
MT5395 STRAPPING MODE





B07 DDR3 MEMORY

B07

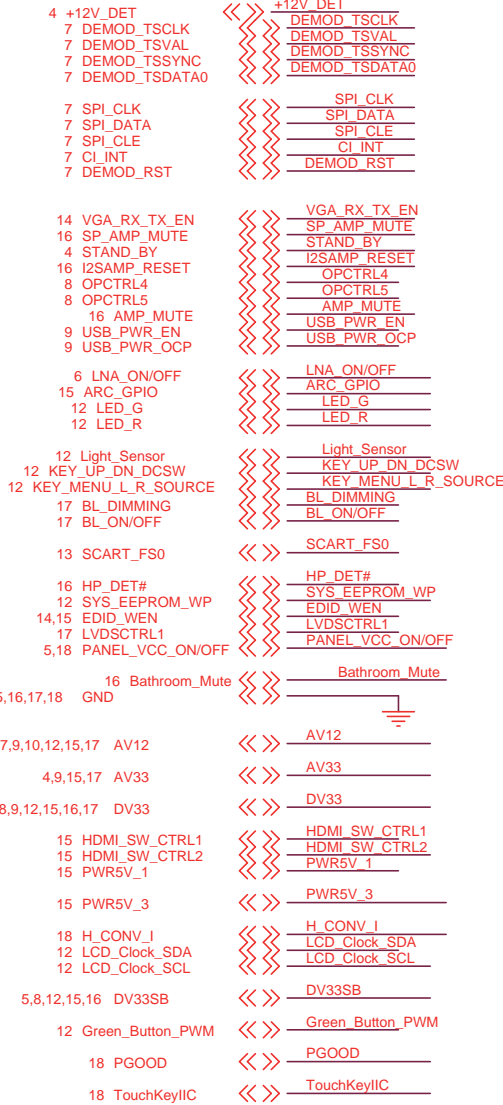
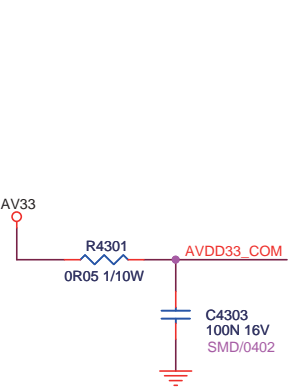
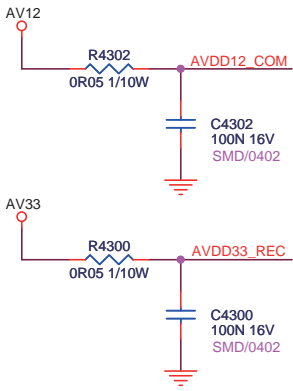
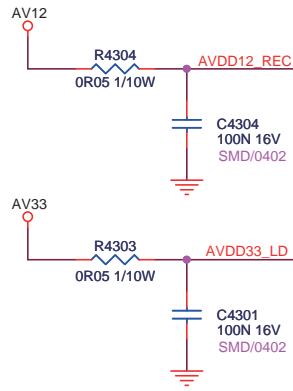
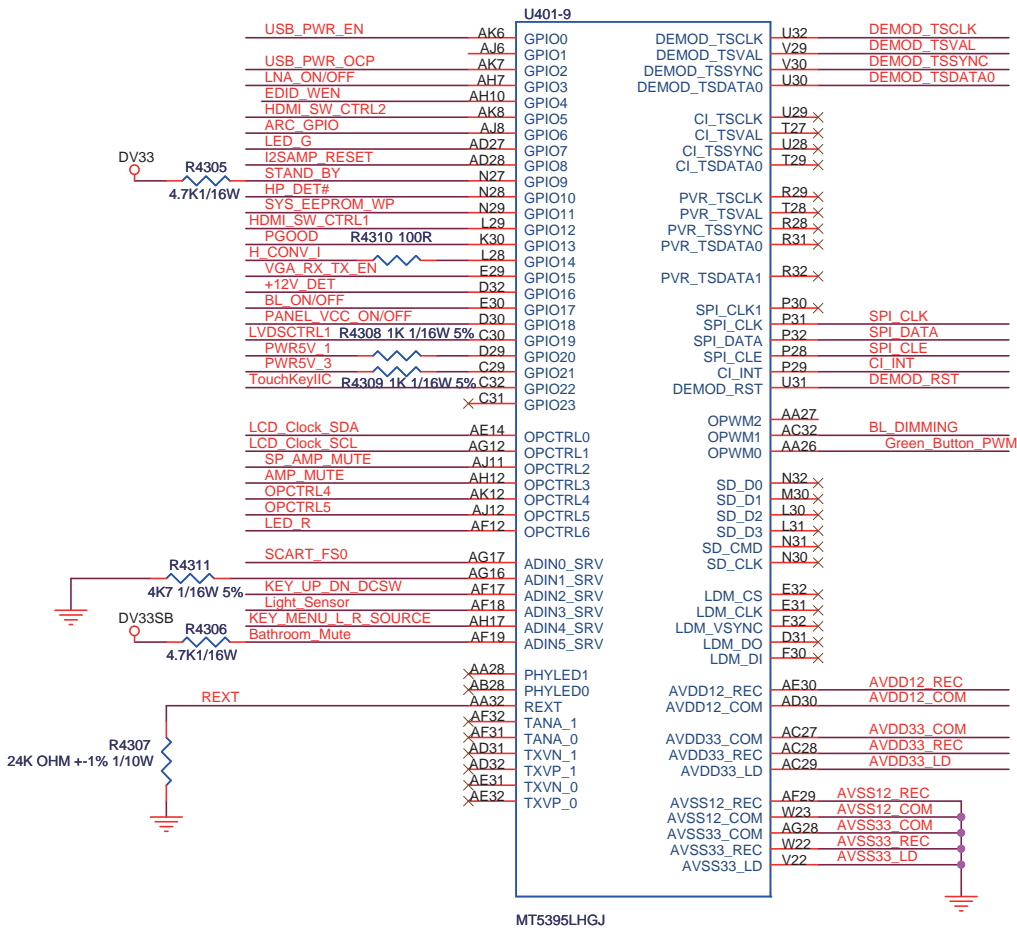


GPIO

B08

GPIO

B08



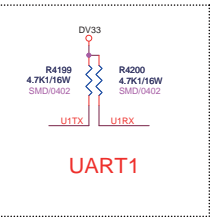
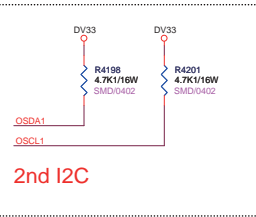
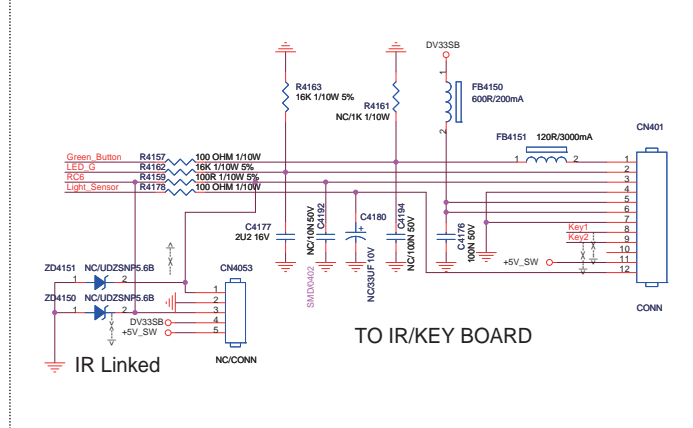
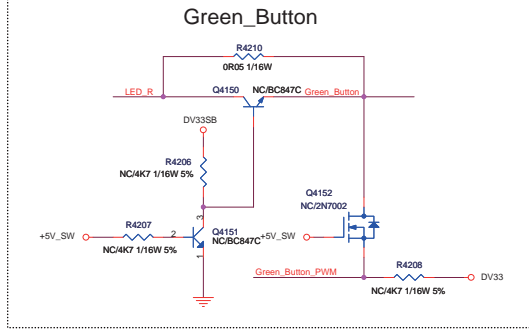
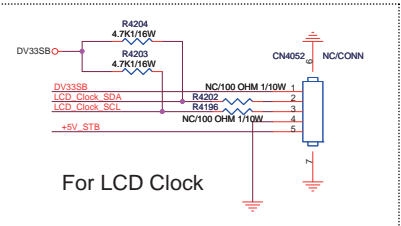
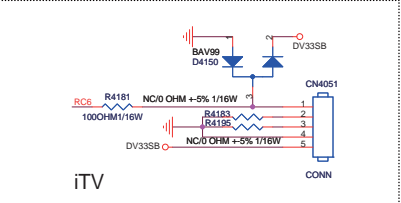
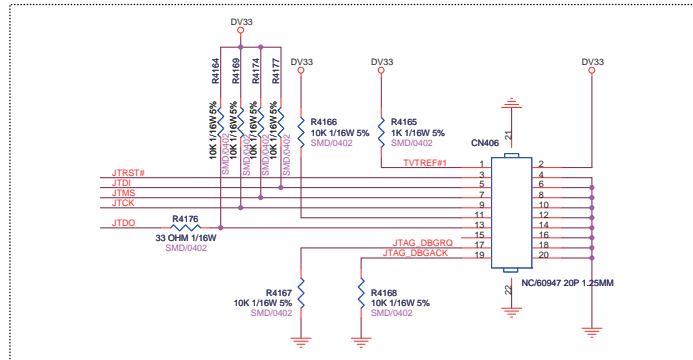
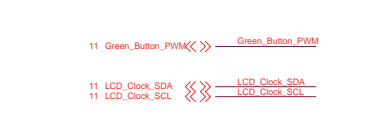
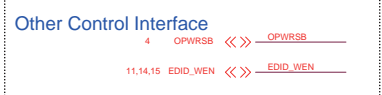
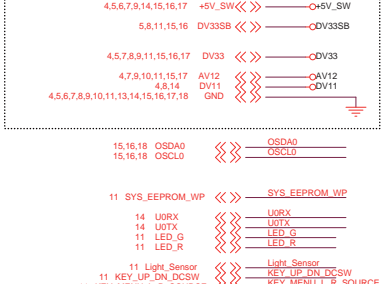
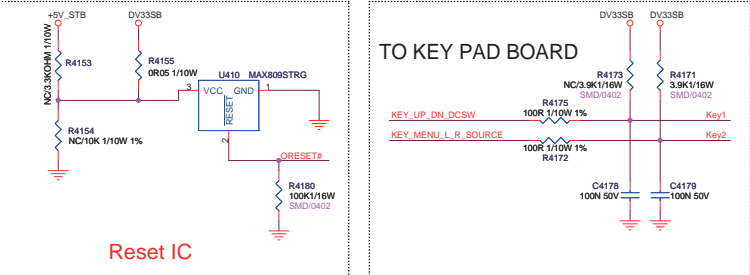
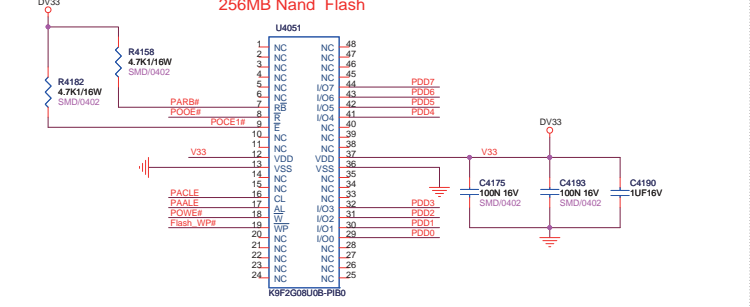
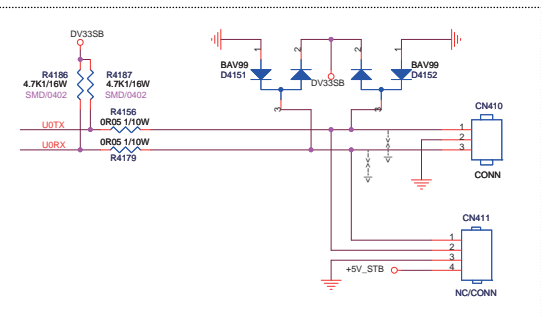
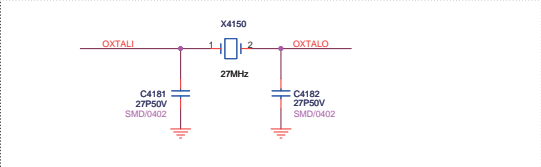
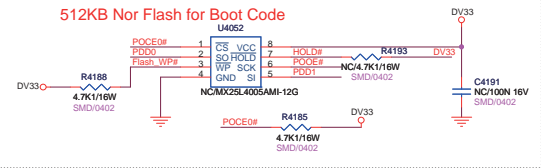
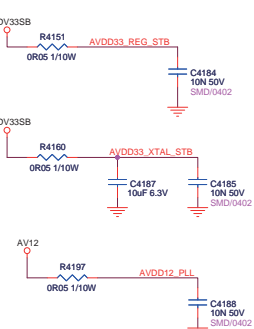
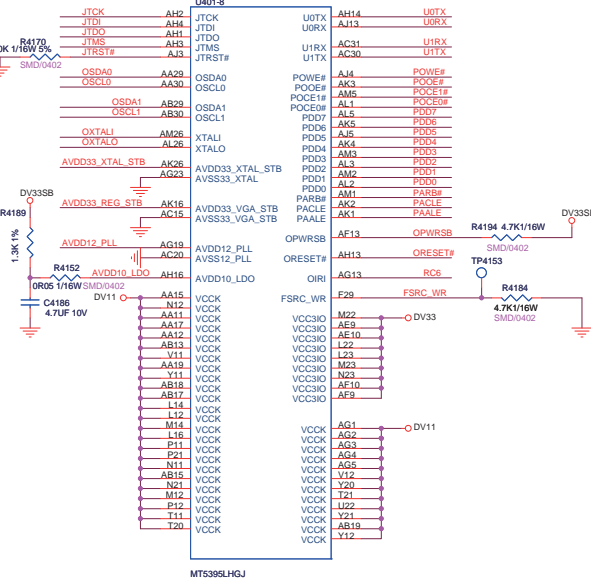
GPIO	715G4481	1	2011-04-12

FLASH/JTAG/UART/IR/RS232

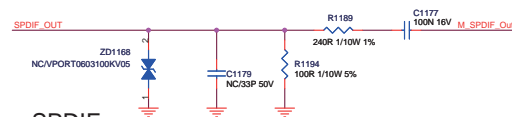
B09

FLASH/JTAG/UART/IR/RS232

B09



B11

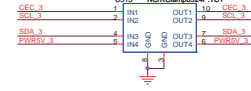
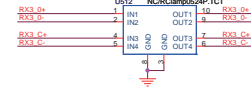
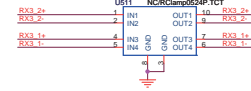
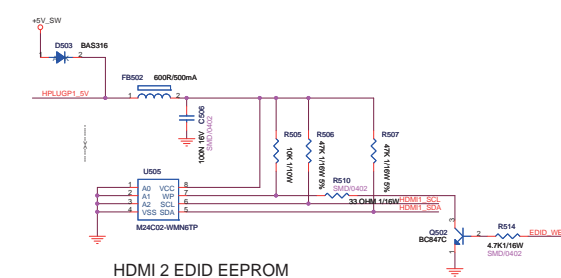
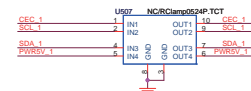
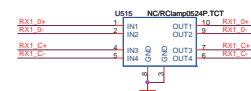
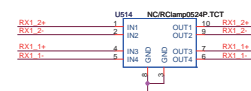
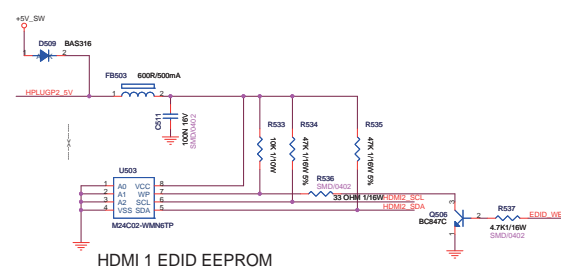
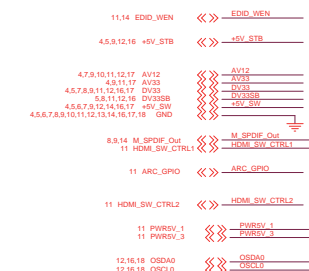
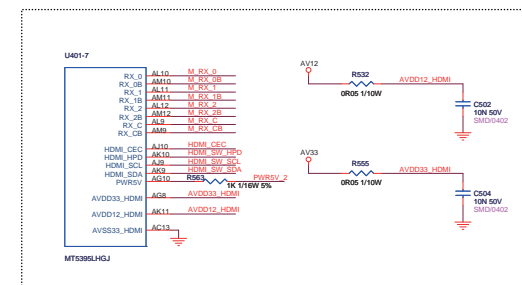


19090_518_110413.eps
110413

HDMI1/HDMI2/HDMI3 INPUT

B12

B12



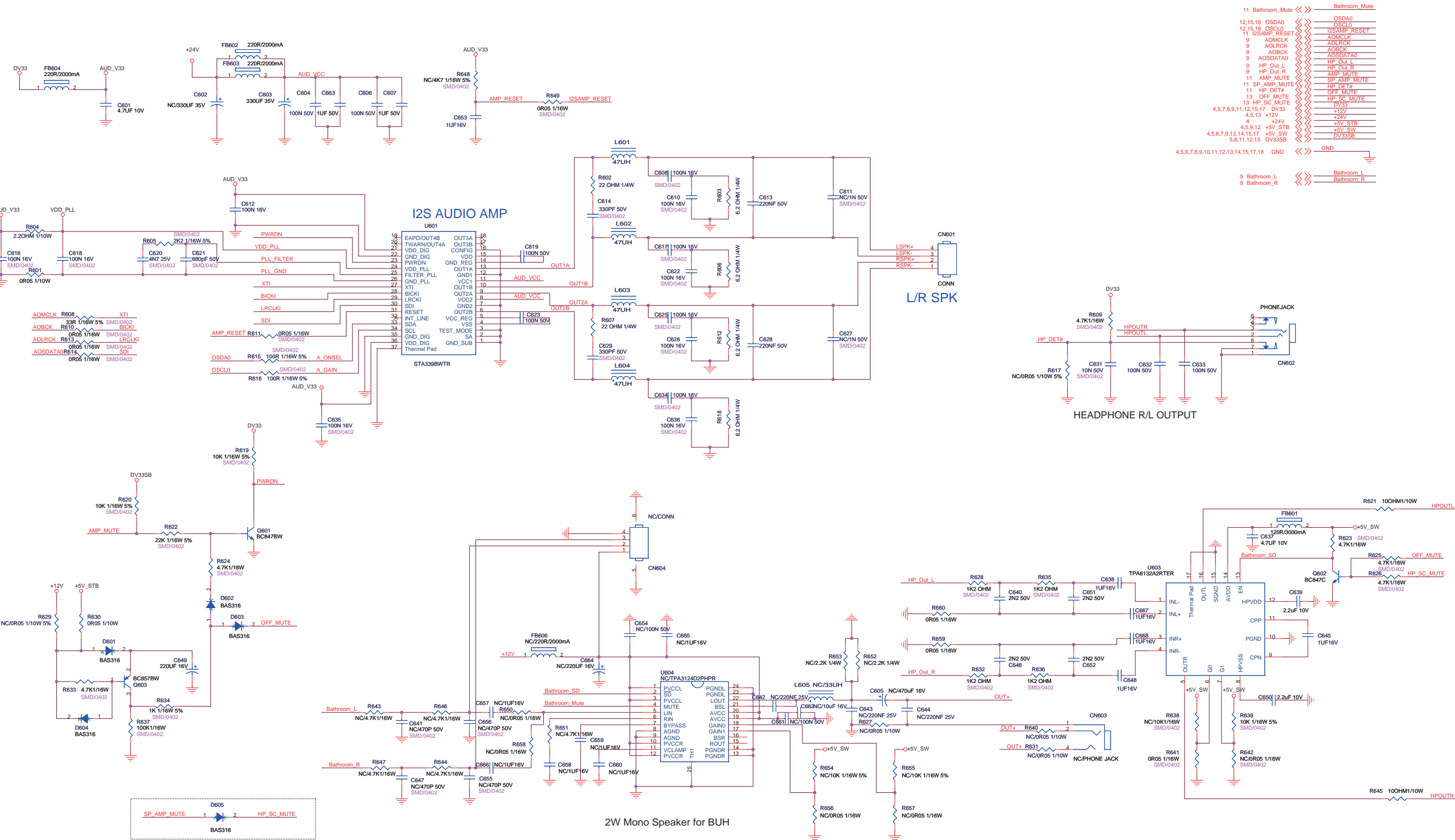
HDMI1/HDMI2/HDMI3 INPUT	715G4481	1	2011-04-12

AUDIO AMP/HEADPHONE OUT

B13

AUDIO AMP/HEADPHONE OUT

B13



AUDIO AMP/ HEADPHONE OUT	715G4481	1	2011-04-12

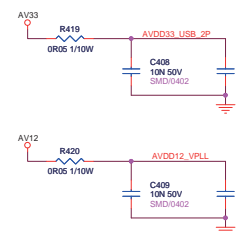
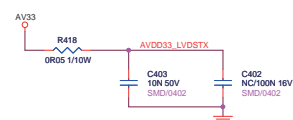
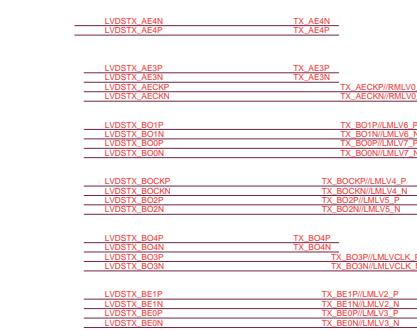
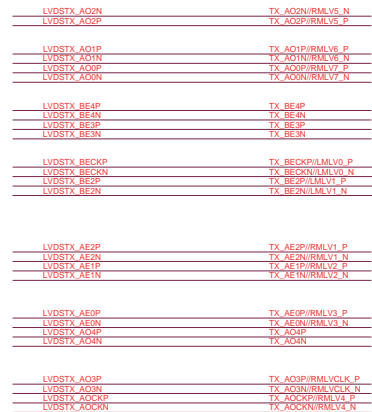
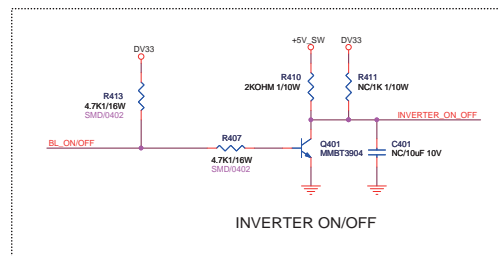
LVDS OUTPUT

B14

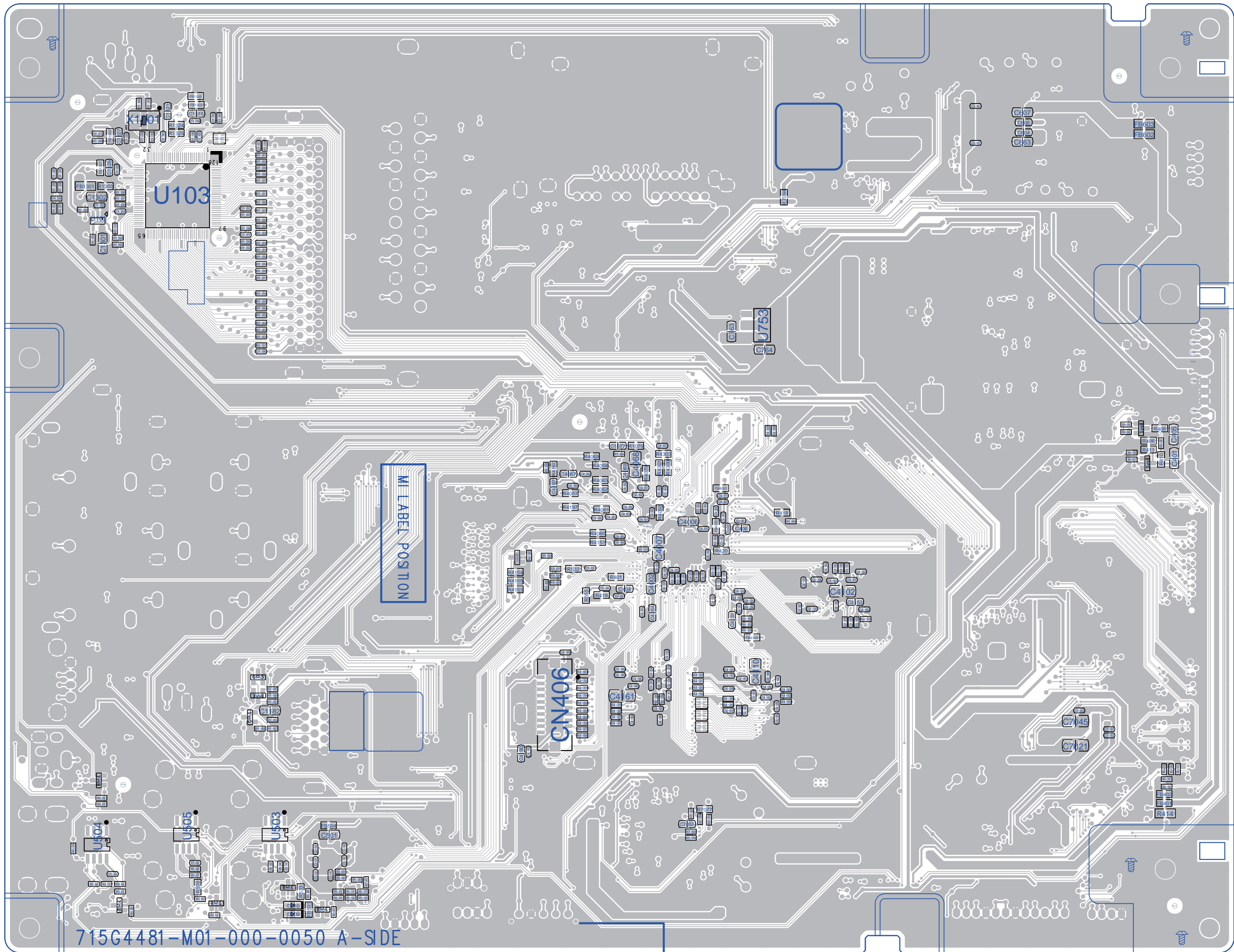
B14



FOR FULL HD PANEL

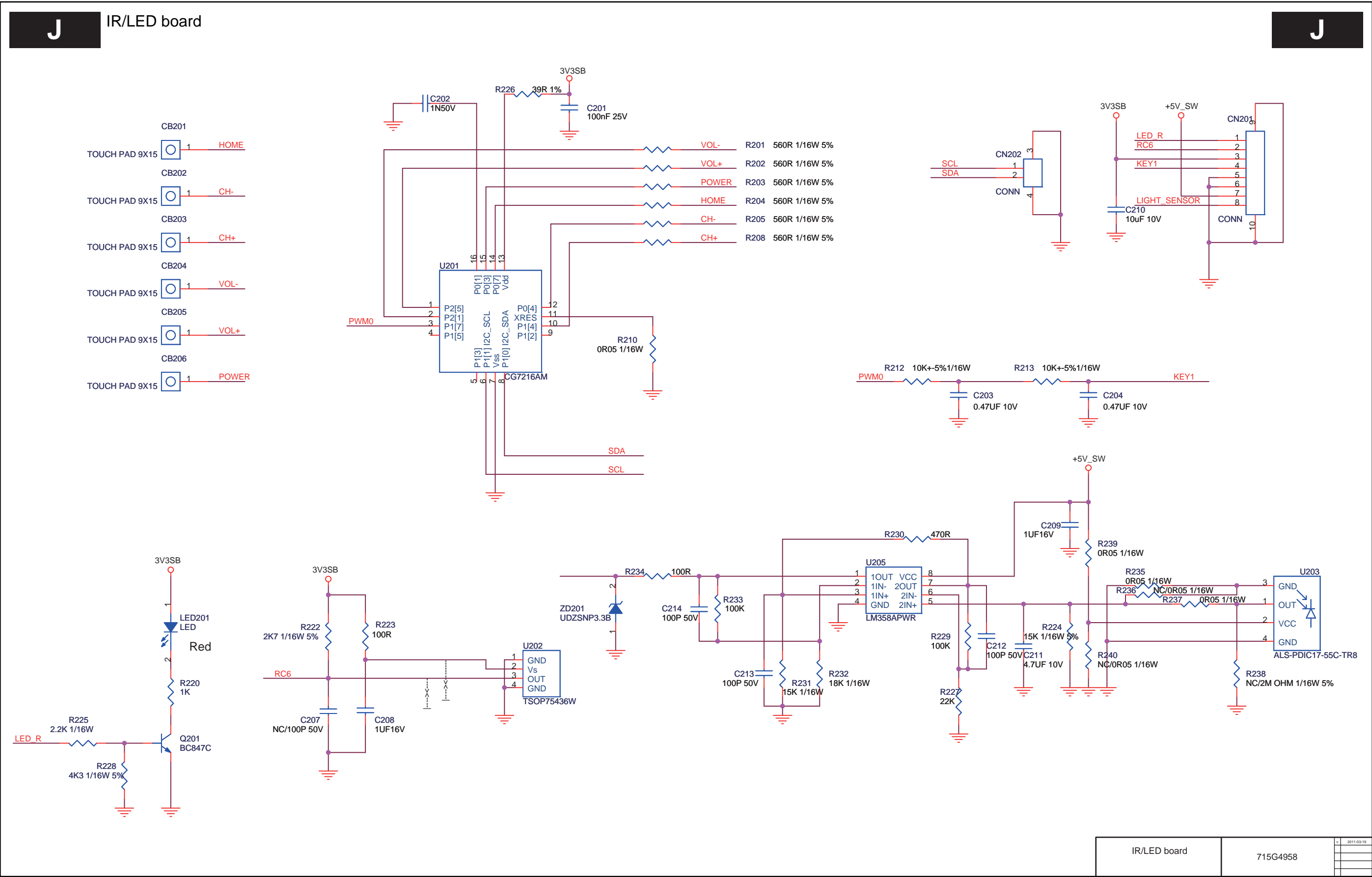
[illegible]

SSB layout bottom



SSB layout bottom	715G4481	1	2011-04-12

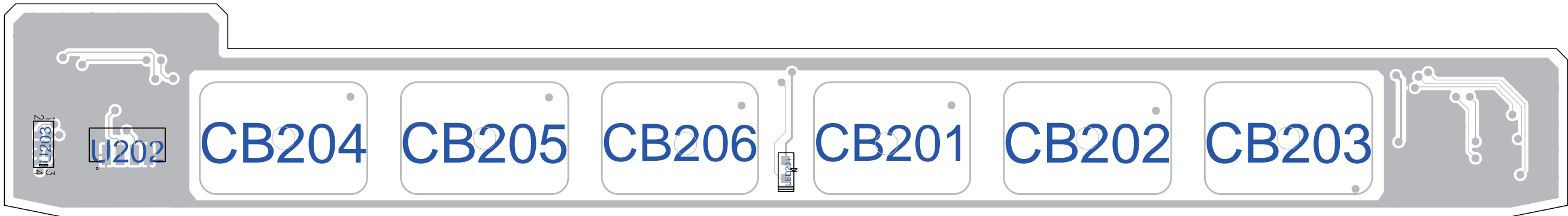
10-4 J 715G4958 IR Berlinale
IR/LED board



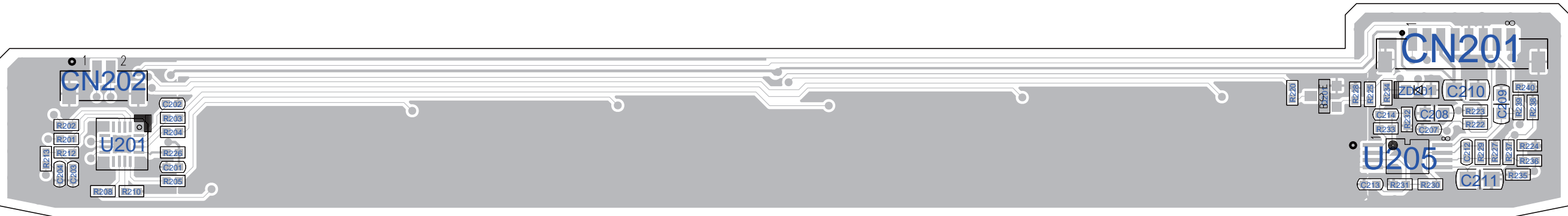
IR/LED board	715G4958	c	2011-03-19

IR/LED board layout

Layout IR/LED Board (Top Side)



Layout IR/LED Board (Bottom Side)

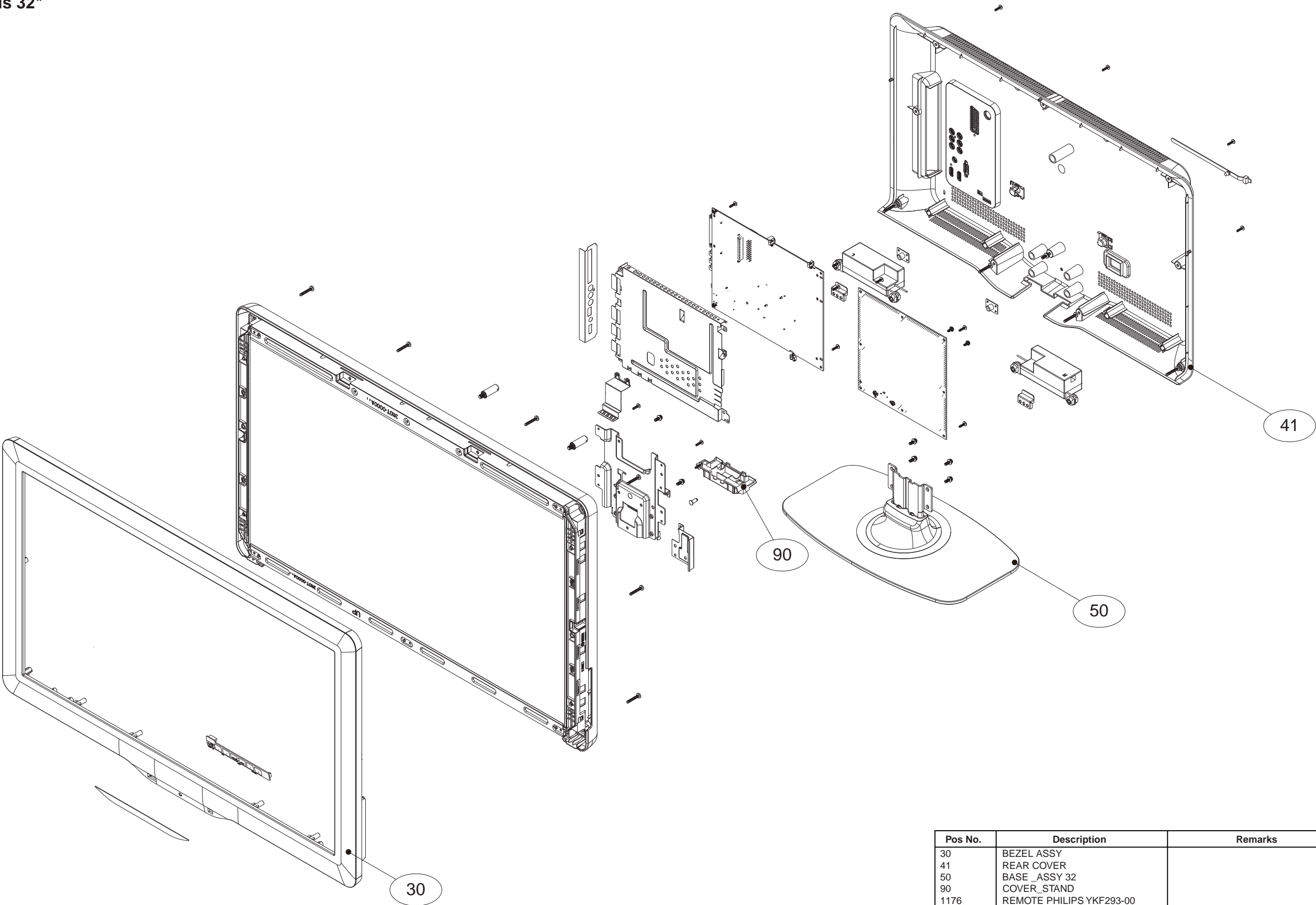


IR/LED board layout top/bottom	715G4958	C	2011-03-18

11. Styling Sheets

11-1 Dangerous 32"

Dangerous 32"

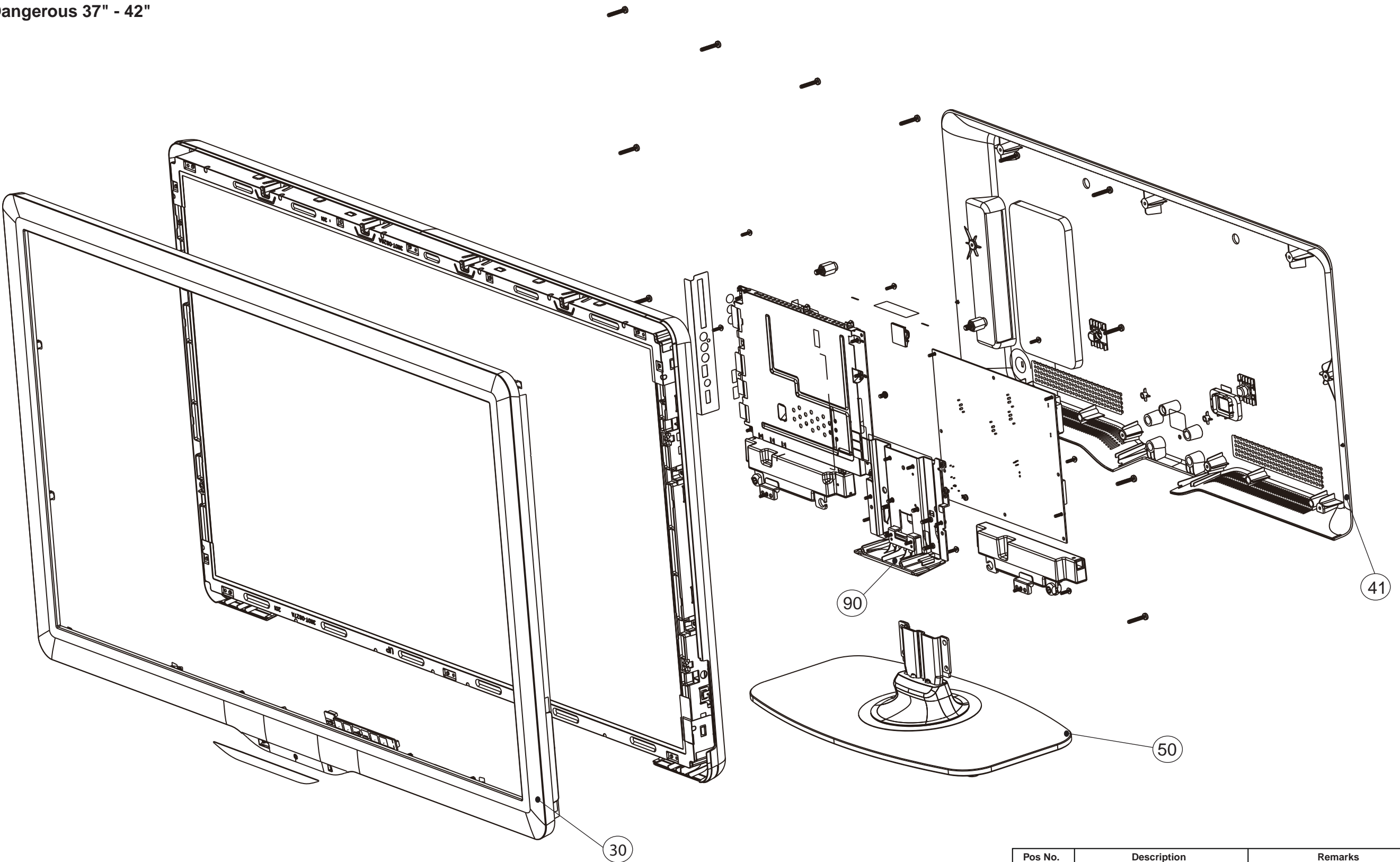


Pos No.	Description	Remarks
30	BEZEL ASSY	
41	REAR COVER	
50	BASE_ASSY 32	
90	COVER_STAND	
1176	REMOTE PHILIPS YKF293-00	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

11-2 Dangerous 37" - 42"

Dangerous 37" - 42"

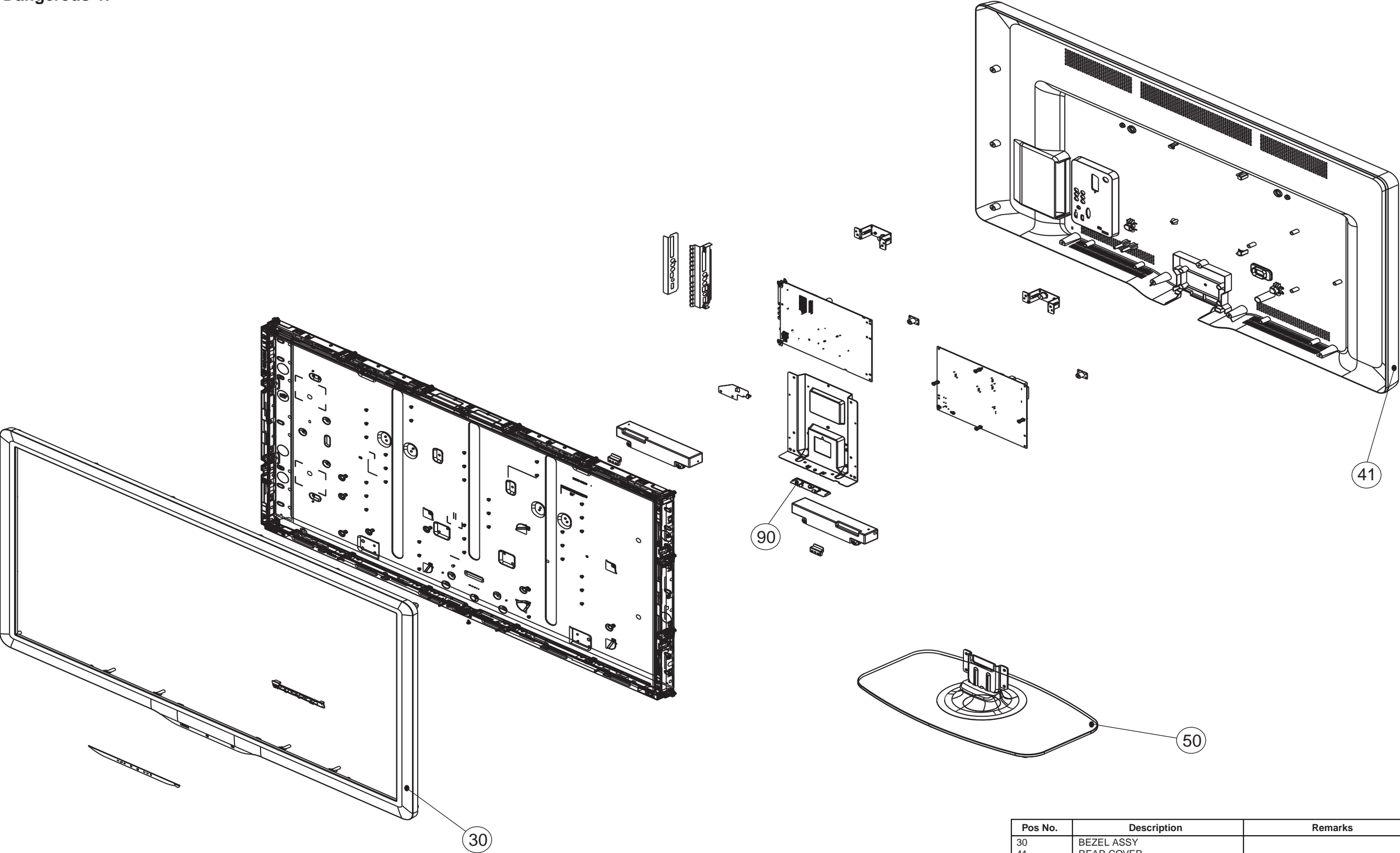


Pos No.	Description	Remarks
30	BEZEL ASSY	
41	REAR COVER	
50	BASE_ASSY 42	
90	COVER_STAND	
1176	REMOTE PHILIPS YKF293-001	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

11-3 Dangerous 47"

Dangerous 47"



Pos No.	Description	Remarks
30	BEZEL ASSY	
41	REAR COVER	
50	BASE_ASSY 47_GLASS	
90	COVER_STAND	
1176	REMOTE PHILIPS YKF293-001	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9