

L12M3.1L

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Service Service Service



Service Manual

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1. Revision List

Manual xxxx xxx xxxx.0

- First release.

Manual xxxx xxx xxxx.1

- Chapter 2:** [Table 2-1](#) updated (added CTNs).
- Chapter 5:** added Ambilight parameters setting instructions; see section [5.7](#).
- Chapter 5:** Remote Control Unit (un-)pairing instructions; see section [5.8](#).
- Chapter 6:** added white tone values; see section [6.3.2](#).
- Chapter 6:** added display code overview; see section [6.4.3](#).

2. Technical Specifications and Connections

Index of this chapter:

[2.1 Technical Specifications](#)

[2.2 Directions for Use](#)

[2.3 Connections](#)

Notes:

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

2.1 Technical Specifications

For on-line product support please use the links in [Table 2-1](#). Here is product information available, as well as getting started, user manuals, frequently asked questions and software & drivers.

Table 2-1 Described Model Numbers and Diversity

CTN	2	4		7	9		10							11
	Connection Overview	Mechanics		Descr.	Block Diagrams		Schematics							Styling
		Wire Dressing Dressing	Assembly Removal	Introduction	Wiring Diagram	Block Diagram	Power Supply	SSB	ALC (Option Board)	J (Sensor Board)	E (Keyboard/Leading Edge)	AL (AmbiLight)	Sheet	
32PFL3508G/78	2.3	4-1	4.3	7.1	9-1	9-13	10.3	10.6	-	10.10	10.8	-	11.1	
32PFL3518G/77	2.3	4-1	4.3	7.1	9-1	9-13	10.3	10.6	-	10.10	10.8	-	11.1	
32PFL3518G/78	2.3	4-1	4.3	7.1	9-1	9-13	10.3	10.6	-	10.10	10.8	-	11.1	
32PFL4508G/77	2.3	4-2	4.3	7.1	9-2	9-13	10.3	10.6	-	10.9	10.8	-	11.2	
39PFL3508G/78	2.3	4-3	4.3	7.1	9-3	9-13	10.2	10.6	10.4	10.10	10.8	-	11.3	
39PFL4508G/78	2.3	4-4	4.3	7.1	9-4	9-13	10.2	10.6	10.4	10.9	10.8	-	11.4	
42PFL3508G/77	2.3	4-5	4.3	7.1	9-5	9-13	10.1	10.6	-	10.10	10.8	-	11.5	
42PFL3508G/78	2.3	4-5	4.3	7.1	9-5	9-13	10.1	10.6	-	10.10	10.8	-	11.5	
42PFL4508G/77	2.3	4-6	4.3	7.1	9-6	9-13	10.1	10.6	-	10.9	10.8	-	11.6	
42PFL4508G/78	2.3	4-6	4.3	7.1	9-6	9-13	10.1	10.6	-	10.9	10.8	-	11.6	
42PFL5008G/78	2.3	4-7	4.3	7.1	9-7	9-13	10.1	10.6	-	10.9	10.8	10.12	11.7	
42PFL5508G/78	2.3	4-7	4.3	7.1	9-7	9-13	10.1	10.6	-	10.9	10.8	10.12	11.7	
46PFL4508G/77	2.3	4-8	4.3	7.1	9-8	9-13	10.1	10.6	-	10.9	10.8	-	11.8	
46PFL4508G/78	2.3	4-8	4.3	7.1	9-8	9-13	10.1	10.6	-	10.9	10.8	-	11.8	
46PFL5508G/78	2.3	4-9	4.3	7.1	9-7	9-13	10.1	10.6	-	10.9	10.7	-	11.7	
47PFL7008G/77	2.3	4-10	4.3	7.1	9-9	9-14	-	10.5	-	-	10.7	10.15	11.9	
47PFL7008G/78	2.3	4-10	4.3	7.1	9-9	9-14	-	10.5	-	-	10.7	10.15	11.9	
47PFL8008G/78	2.3	4-11	4.3	7.1	9-10	9-14	-	10.5	-	-	10.7	10.13 10.14	11.10	
55PFL7008G/78	2.3	4-12	4.3	7.1	9-11	9-14	-	10.5	-	-	10.7	10.16	11.9	
55PFL8008G/77	2.3	4-13	4.3	7.1	9-12	9-14	-	10.5	-	-	10.7	10.14 10.12	11.11	
55PFL8008G/78	2.3	4-13	4.3	7.1	9-12	9-14	-	10.5	-	-	10.7	10.14 10.12	11.11	

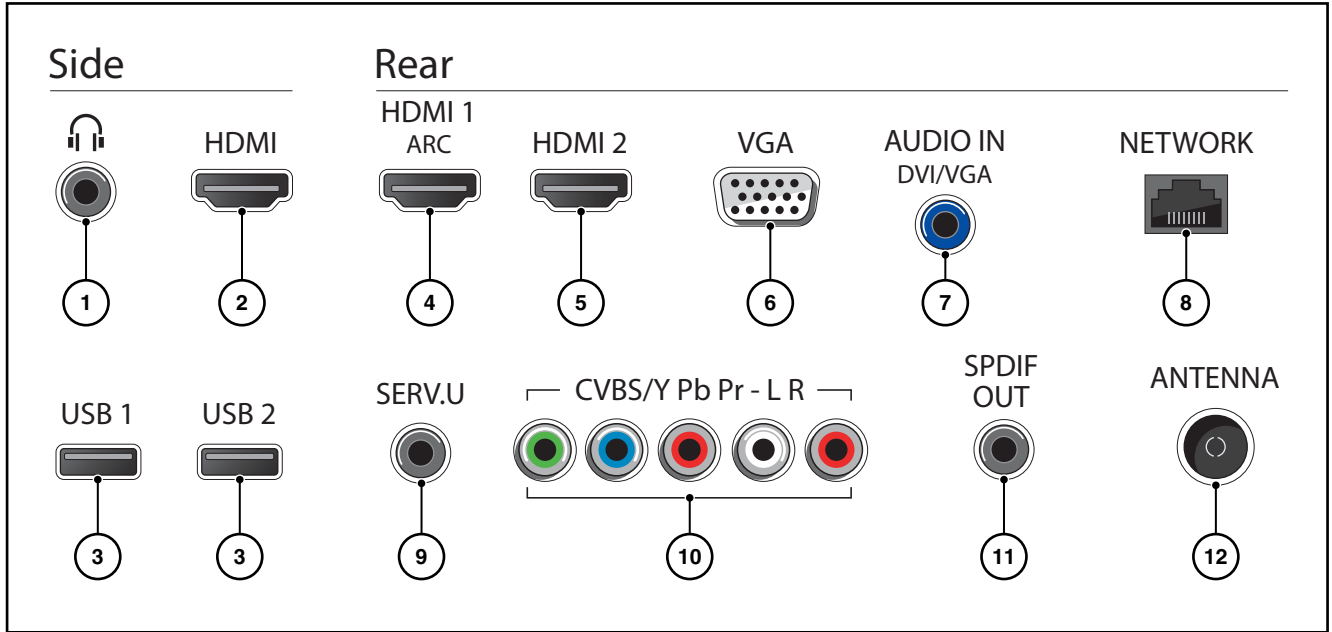
2.2 Directions for Use

You can download this information from the following websites:

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

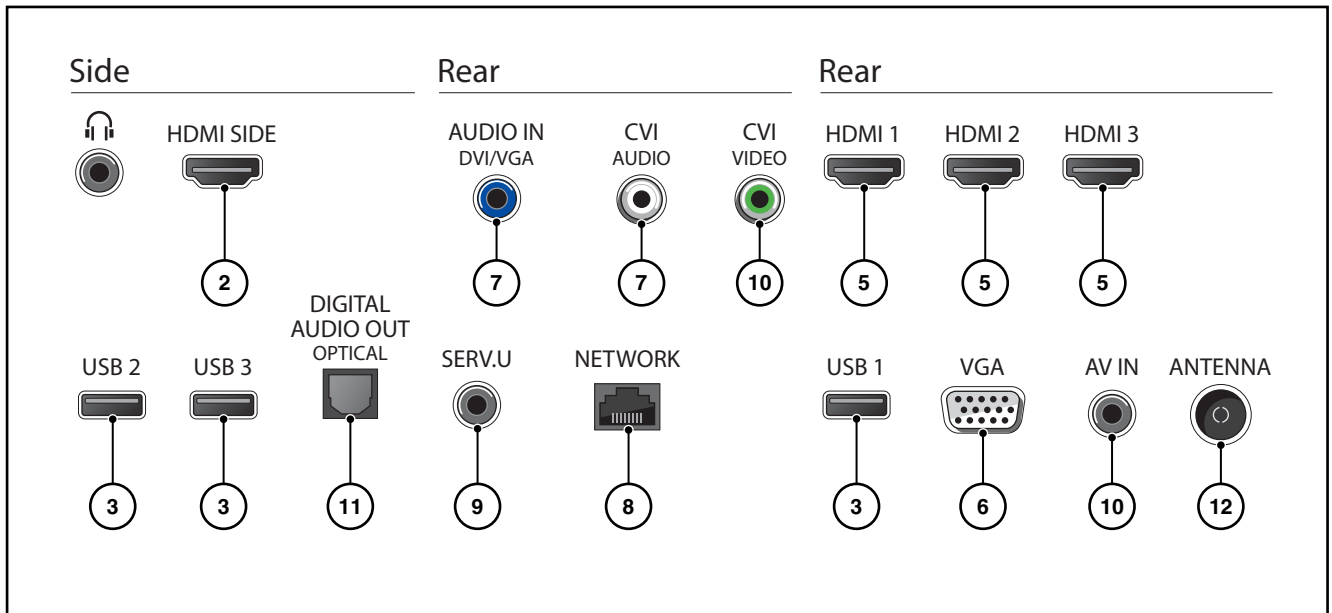
<http://www.p4c.philips.com>

2.3 Connections



19510_001_130424.eps
130424

Figure 2-1 Connection overview 3xxx, 4xxx, 5xxx series



19511_006_130617.eps
130617

Figure 2-2 Connection overview 7xxx, 8xxx series

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

2.3.1 Side Connections

1 - Head phone (Output)

Bk - Head phone 32 - 600 ohm / 10 mW



2 - HDMI: Digital Video, Digital Audio - In

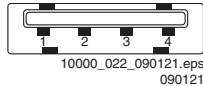


10000_017_090121.eps
090428

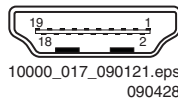
Figure 2-3 HDMI (type A) connector

- | | | |
|------------|--------------|---|
| 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 | ⊕ |

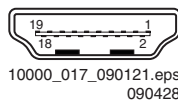
8	- Shield	Gnd	⏏
9	- D0-	Data channel	⊕
10	- CLK+	Data channel	⊕
11	- Shield	Gnd	⏏
12	- CLK-	Data channel	⊕
13	- Easylink	Control channel/CEC	⊕⊕
14	- n.c.		
15	- DDC_SCL	DDC clock	⊕
16	- DDC_SDA	DDC data	⊕⊕
17	- Ground	Gnd	⏏
18	- +5V		⊕
19	- HPD	Hot Plug Detect	⊕
20	- Ground	Gnd	⏏

3 - USB1, -2**Figure 2-4 USB (type A)**

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

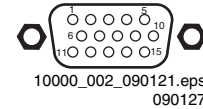
2.3.2 Rear Connections**4 - HDMI1: Digital Video, Digital Audio - In - Audio Return Channel****Figure 2-5 HDMI (type A) connector**

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

5 - HDMI2: Digital Video, Digital Audio - In (optional)**Figure 2-6 HDMI (type A) connector**

1	- D2+	Data channel	⊕
2	- Shield	Gnd	⏏
3	- D2-	Data channel	⊕
4	- D1+	Data channel	⊕
5	- Shield	Gnd	⏏
6	- D1-	Data channel	⊕
7	- D0+	Data channel	⊕

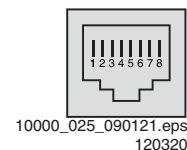
8	- Shield	Gnd	⏏
9	- D0-	Data channel	⊕
10	- CLK+	Data channel	⊕
11	- Shield	Gnd	⏏
12	- CLK-	Data channel	⊕
13	- Easylink	Control channel/CEC	⊕⊕
14	- n.c.		
15	- DDC_SCL	DDC clock	⊕
16	- DDC_SDA	DDC data	⊕⊕
17	- Ground	Gnd	⏏
18	- +5V		⊕
19	- HPD	Hot Plug Detect	⊕
20	- Ground	Gnd	⏏

6 - VGA: Video RGB - In**Figure 2-7 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	- n.c.		
12	- DDC_SDA	DDC data	⊕
13	- H-sync	0 - 5 V	⊕
14	- V-sync	0 - 5 V	⊕
15	- DDC_SCL	DDC clock	⊕

7 - Mini Jack: Audio - In DVI/VGA/CVI

Bk	- Audio	0.5 V _{RMS} / 10 kΩ	⊕
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8 - RJ45: Ethernet**Figure 2-8 Ethernet connector**

1	- TD+	Transmit signal	⊕
2	- TD-	Transmit signal	⊕
3	- RD+	Receive signal	⊕
4	- CT	Centre Tap: DC level fixation	
5	- CT	Centre Tap: DC level fixation	
6	- RD-	Receive signal	⊕
7	- GND	Gnd	⏏
8	- GND	Gnd	⏏

9 - Service Connector (UART)

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

10 - AV IN: Cinch/Break-out cable: Video CVBS/YPbPr - In, Audio - In

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

11 - Cinch: S/PDIF - Out

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

12 - Aerial - In

- - F-type Coax, 75 Ω 

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: AG2B0335000001) 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
DMR	Digital Media Reader: card reader
DMSD	Digital Multi Standard Decoding
DNM	Digital Natural Motion

DNR	Digital Noise Reduction: noise reduction feature of the set		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.
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.
		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
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		Latin America
DVB-C	Digital Video Broadcast - Cable	LATAM	Liquid Crystal Display
DVB-T	Digital Video Broadcast - Terrestrial	LCD	Light Emitting Diode
DVD	Digital Versatile Disc	LED	Monochrome TV system. Sound carrier distance is 6.5 MHz. L' is Band I, L is all bands except for Band I
DVI(-d)	Digital Visual Interface (d= digital only)	L/L'	LG.Philips LCD (supplier)
E-DDC	Enhanced Display Data Channel (VESA standard for communication channel and display). Using E-DDC, the video source can read the EDID information from the display.	LPL	Loudspeaker
		LS	Low Voltage Differential Signalling
EDID	Extended Display Identification Data (VESA standard)	LVDS	Mega bits per second
		Mbps	Monochrome TV system. Sound carrier distance is 4.5 MHz
EEPROM	Electrically Erasable and Programmable Read Only Memory	M/N	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
EMI	Electro Magnetic Interference	MHEG	Microprocessor without Interlocked Pipeline-Stages; A RISC-based microprocessor
EPG	Electronic Program Guide		Matrix Output Processor
EPLD	Erasable Programmable Logic Device		Metal Oxide Silicon Field Effect Transistor, switching device
EU	Europe		Motion Pictures Experts Group
EXT	EXternal (source), entering the set by SCART or by cinches (jacks)		Multi Platform InterFace
FDS	Full Dual Screen (same as FDW)	MIPS	MUTE Line
FDW	Full Dual Window (same as FDS)		Mainstream TV: TV-mode with Consumer TV features enabled (iTV)
FLASH	FLASH memory		Not Connected
FM	Field Memory or Frequency Modulation	MOP	Near Instantaneous Compounded Audio Multiplexing. This is a digital sound system, mainly used in Europe.
		MOSFET	Negative Temperature Coefficient, non-linear resistor
FPGA	Field-Programmable Gate Array		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)
FTV	Flat TeleVision	MPEG	Non-Volatile Memory: IC containing TV related data such as alignments
Gb/s	Giga bits per second	MPIF	Open Circuit
G-TXT	Green TeleteXT	MUTE	On Screen Display
H	H_sync to the module	MTV	Over the Air Download. Method of software upgrade via RF transmission. Upgrade software is broadcasted in TS with TV channels.
HD	High Definition		On screen display Teletext and Control; also called Artistic (SAA5800)
HDD	Hard Disk Drive	NC	Project 50: communication protocol between TV and peripherals
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	Phase Alternating Line. Color system mainly used in West Europe (colour carrier = 4.433619 MHz) and South America (colour carrier PAL M = 3.575612 MHz and PAL N = 3.582056 MHz)
		NTC	Printed Circuit Board (same as "PWB")
		NTSC	Pulse Code Modulation
		NVM	
HDMI	High Definition Multimedia Interface		
HP	HeadPhone	O/C	
I	Monochrome TV system. Sound carrier distance is 6.0 MHz	OSD	
		OAD	
I ² C	Inter IC bus		
I ² D	Inter IC Data bus		
I ² S	Inter IC Sound bus		
IF	Intermediate Frequency	OTC	
IR	Infra Red		
IRQ	Interrupt Request	P50	
ITU-656	The ITU Radio communication Sector (ITU-R) is a standards body subcommittee of the International Telecommunication Union relating to radio communication. ITU-656 (a.k.a. SDI), is a digitized video format used for broadcast grade video. Uncompressed digital component or digital composite signals can be used.	PAL	
		PCB	
		PCM	

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

4. Mechanical Instructions

Index of this chapter:

[4.1 Cable Dressing](#)

[4.2 Service Positions](#)

[4.3 Assy/Panel Removal](#)

[4.4 Set Re-assembly](#)

Notes:

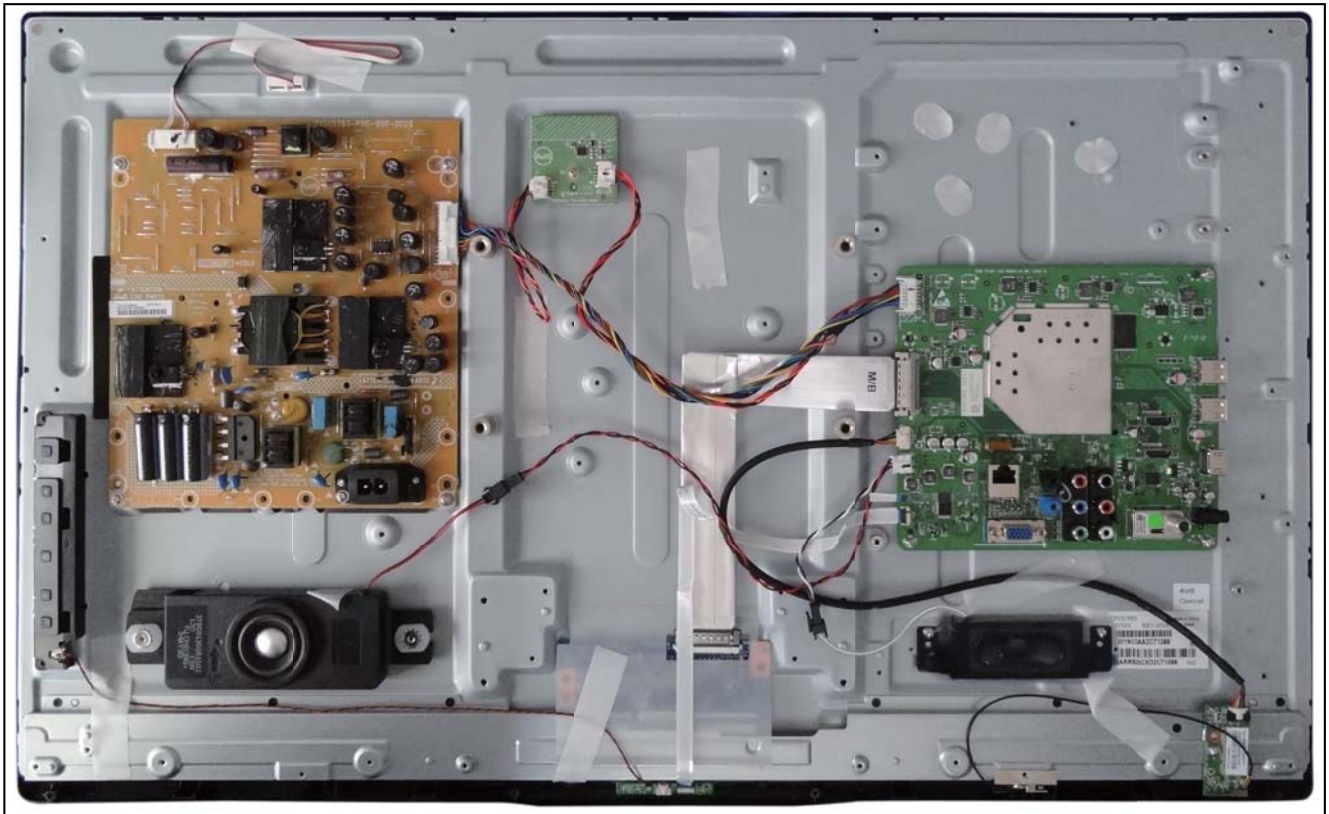
- Figures below can deviate slightly from the actual situation, due to the different set executions.

4.1 Cable Dressing



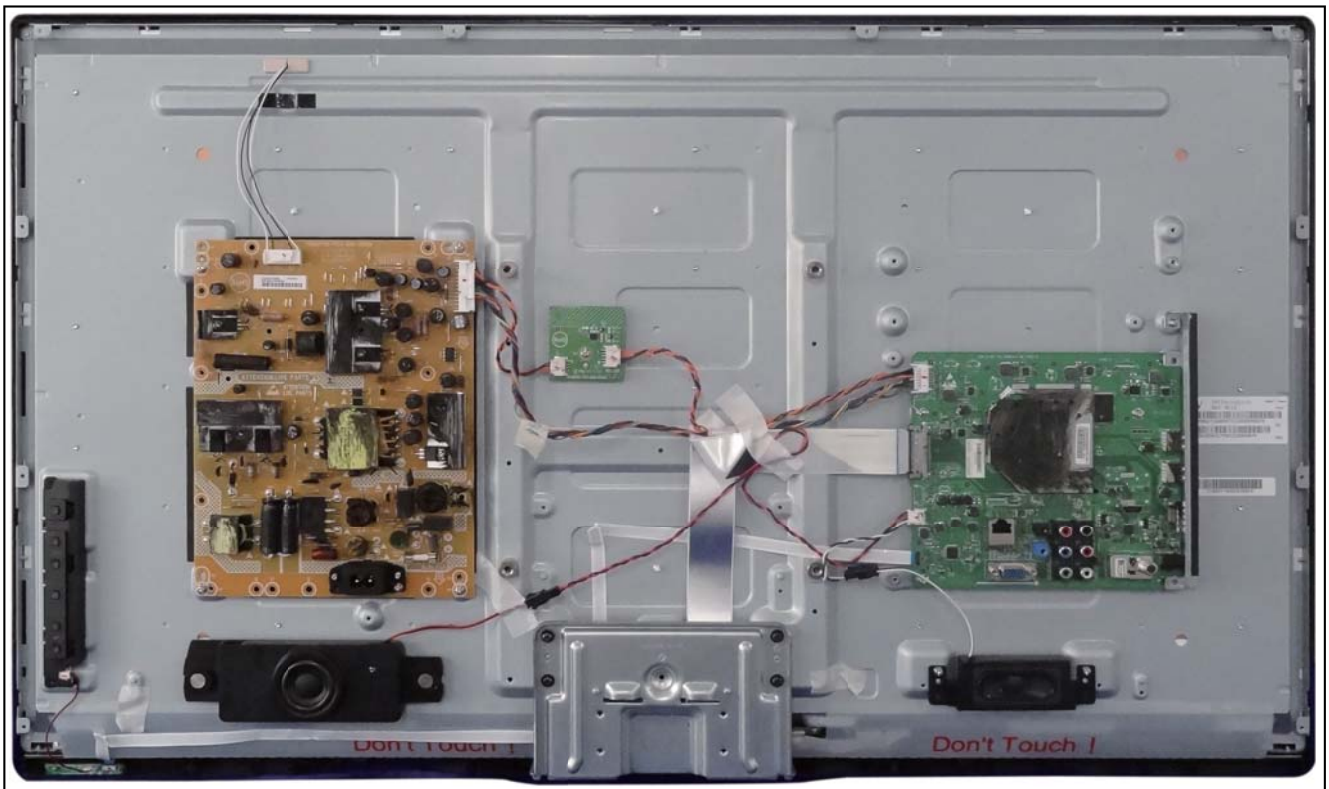
19511_004_130614.eps
130614

Figure 4-1 Cable dressing 32" 35xx series



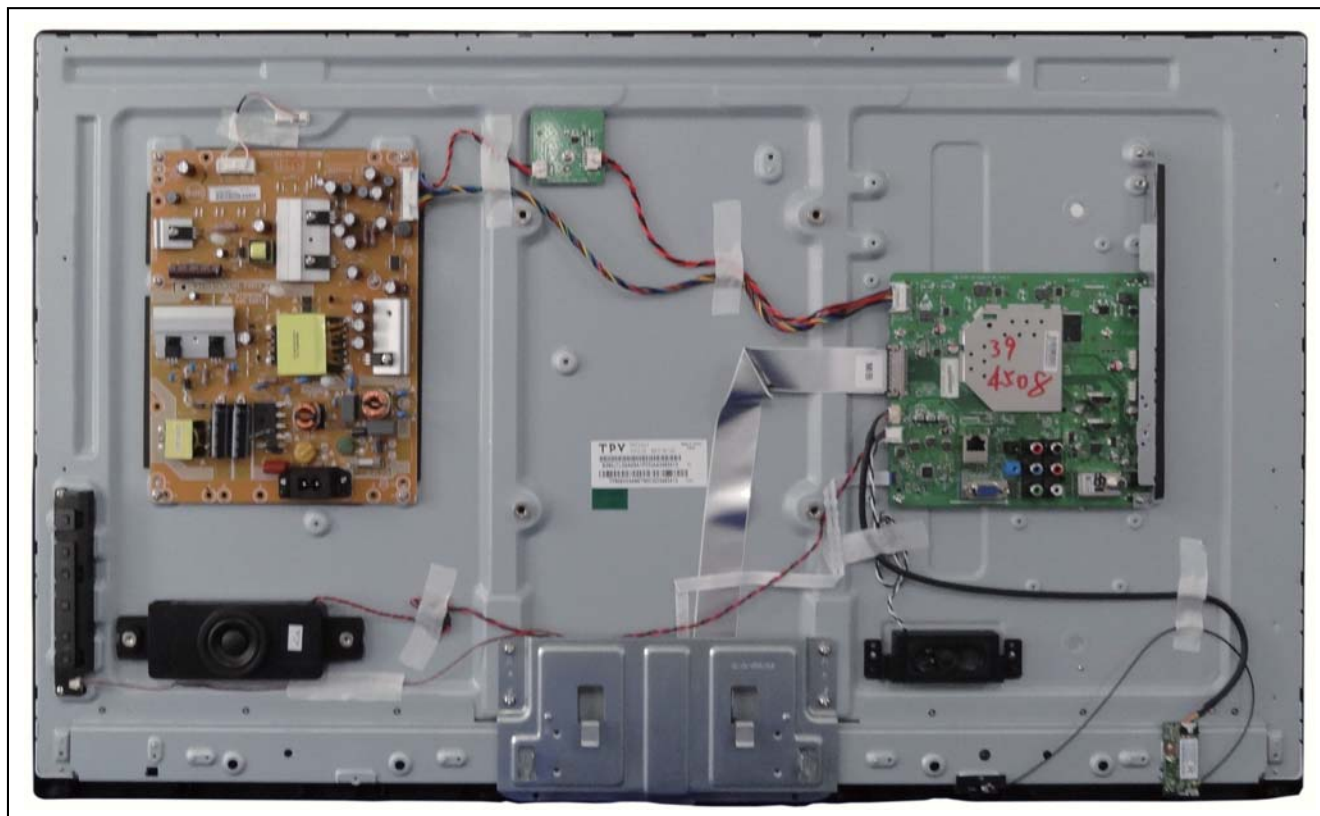
19511_005_130614.eps
130614

Figure 4-2 Cable dressing 32" 45xx series



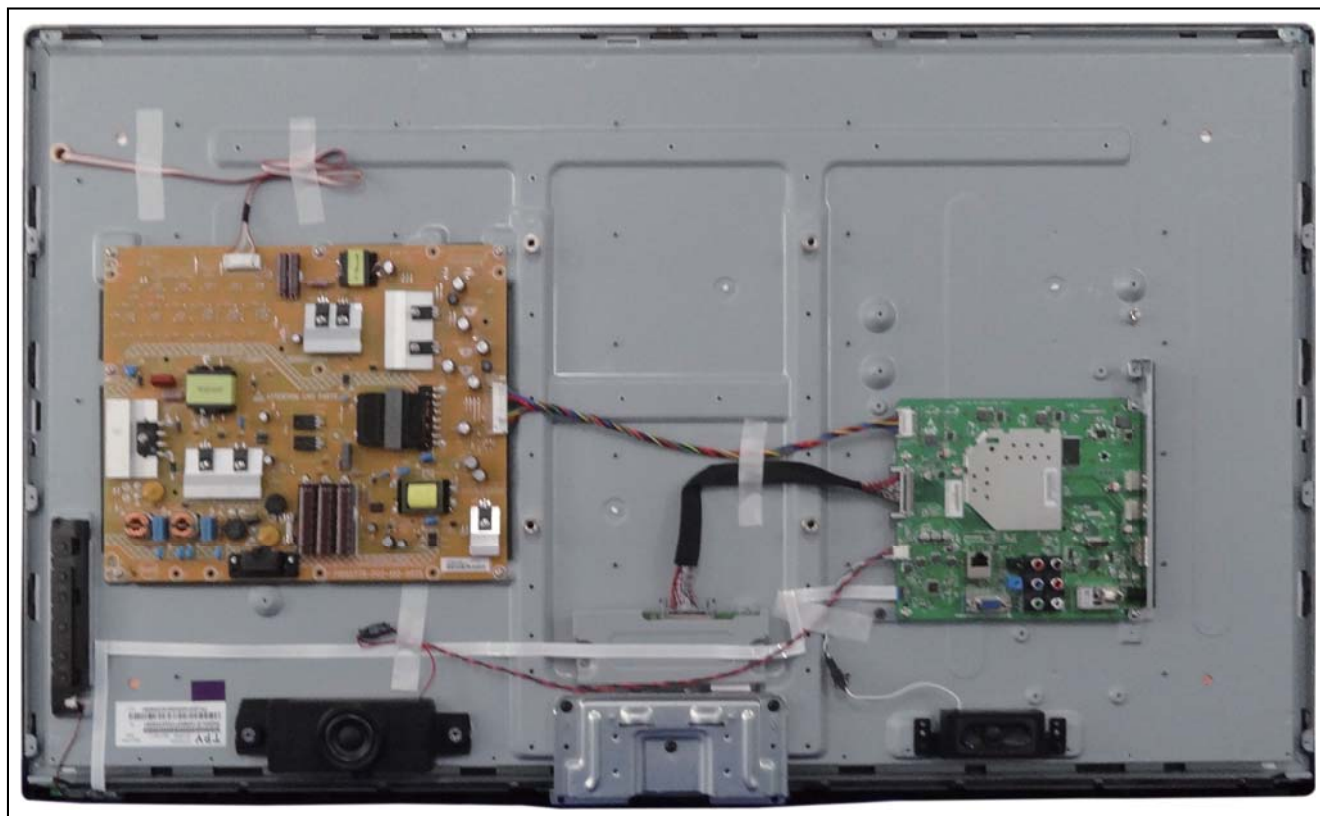
19511_007_130617.eps
130617

Figure 4-3 Cable dressing 39" 35xx series



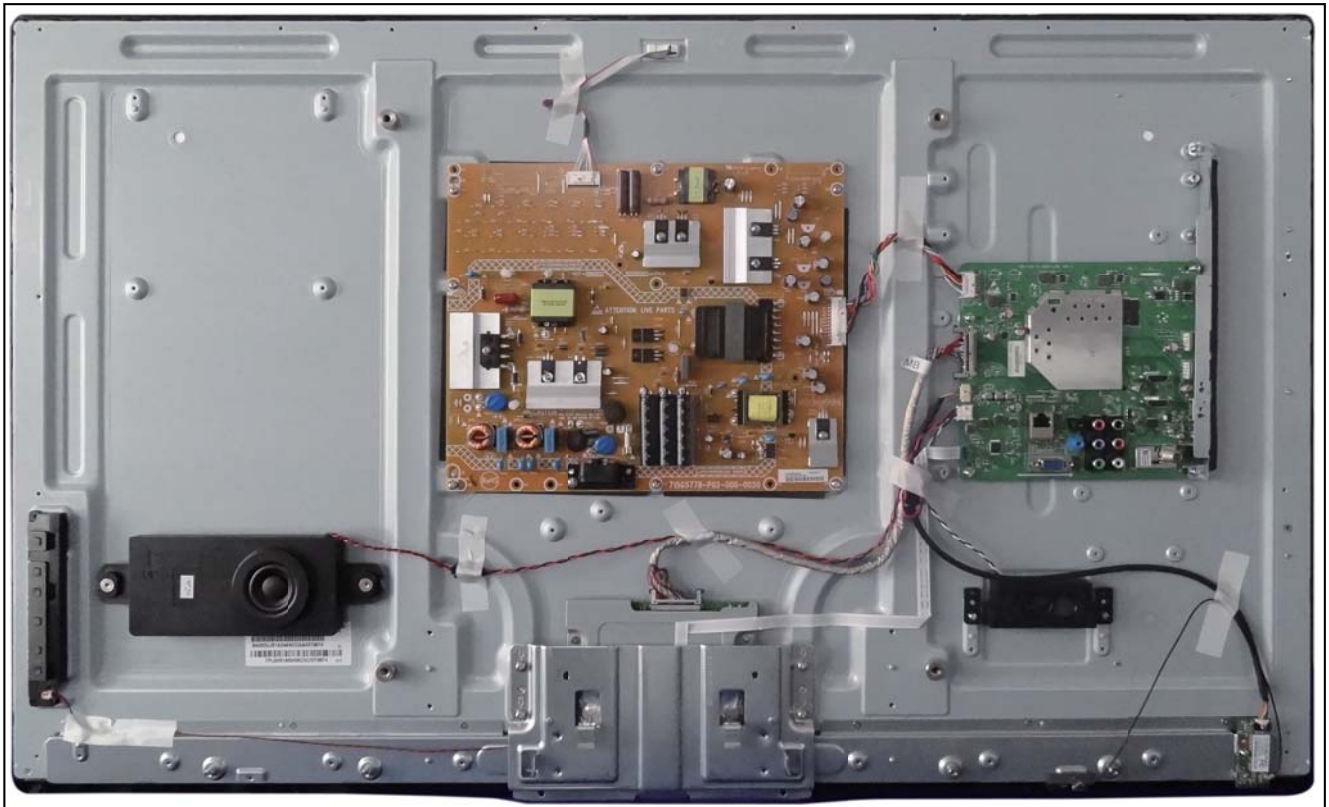
19510_100_130424.eps
130424

Figure 4-4 Cable dressing 39" 45xx series



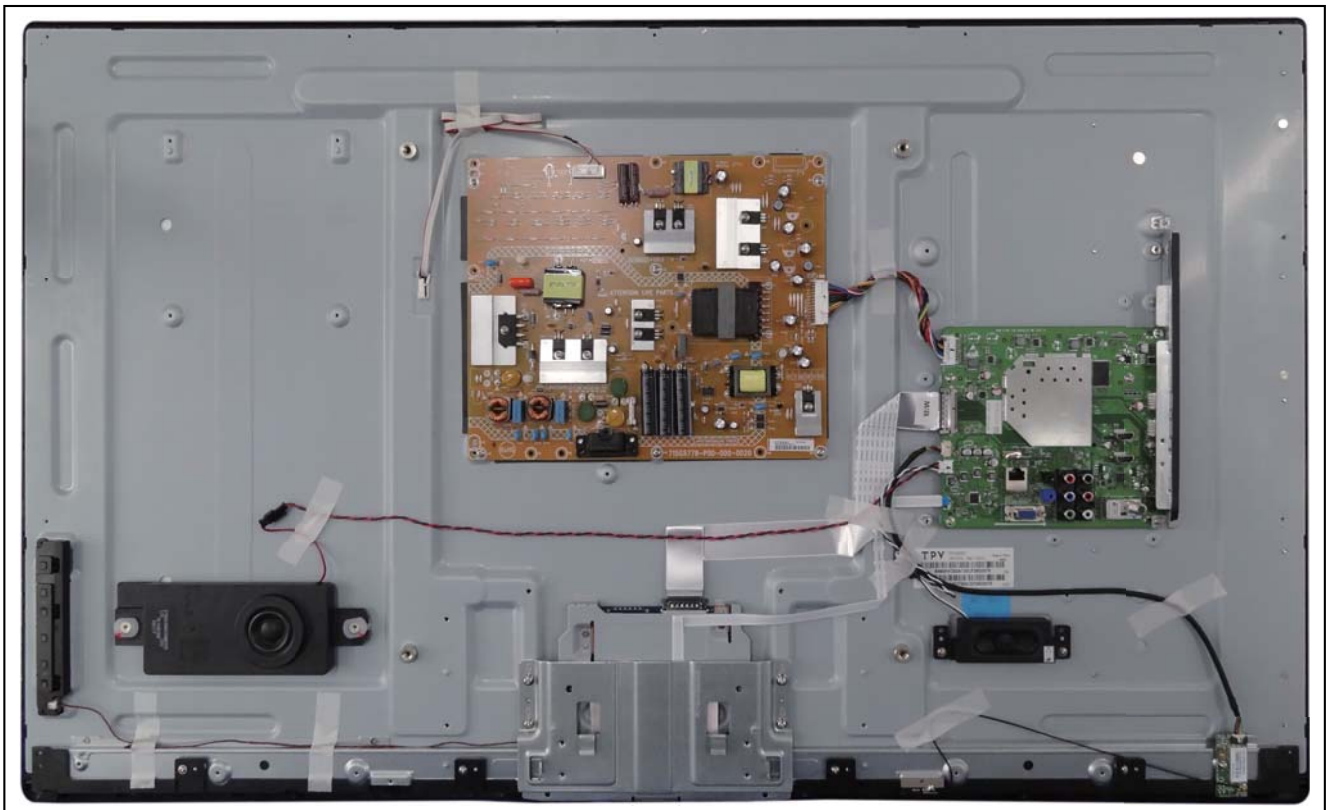
19510_101_130424.eps
130424

Figure 4-5 Cable dressing 42" 35xx series



19511_008_130617.eps
130617

Figure 4-6 Cable dressing 42" 45xx series



19510_102_130424.eps
130424

Figure 4-7 Cable dressing 42" 5xxx series



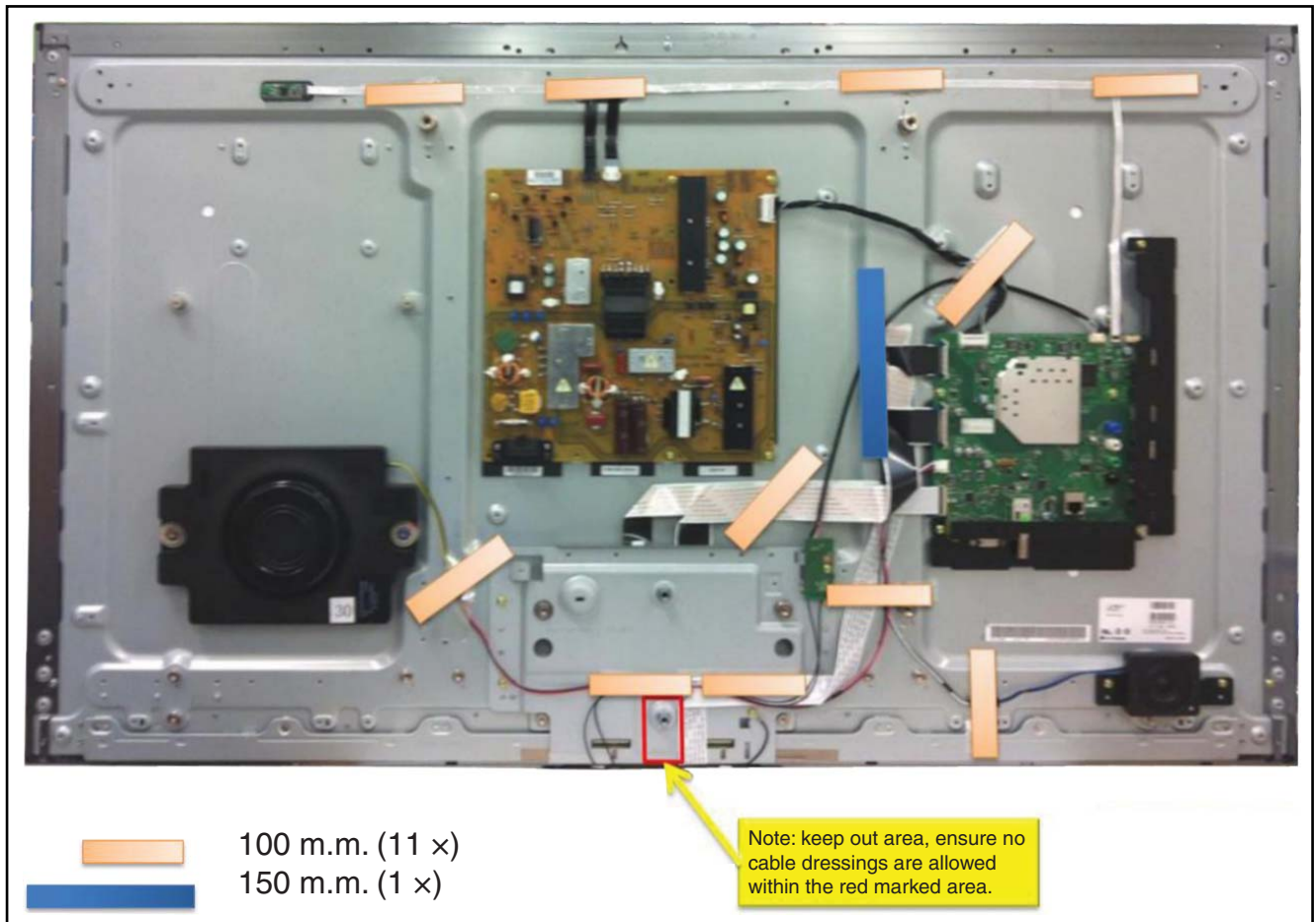
19510_103_130424.eps
130425

Figure 4-8 Cable dressing 46" 45xx series

Not yet available

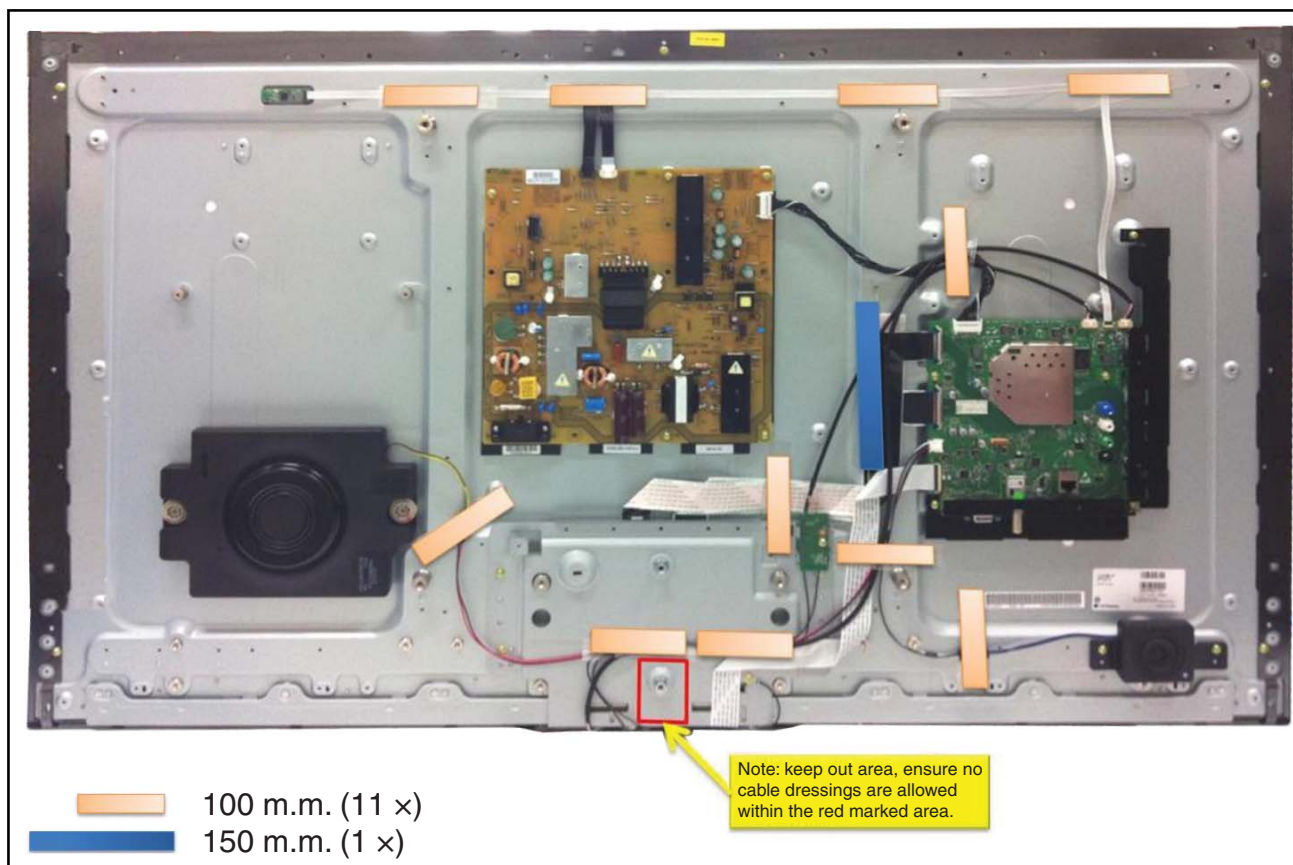
10000_035_090121.eps
100416

Figure 4-9 Cable dressing 46" 55xx series



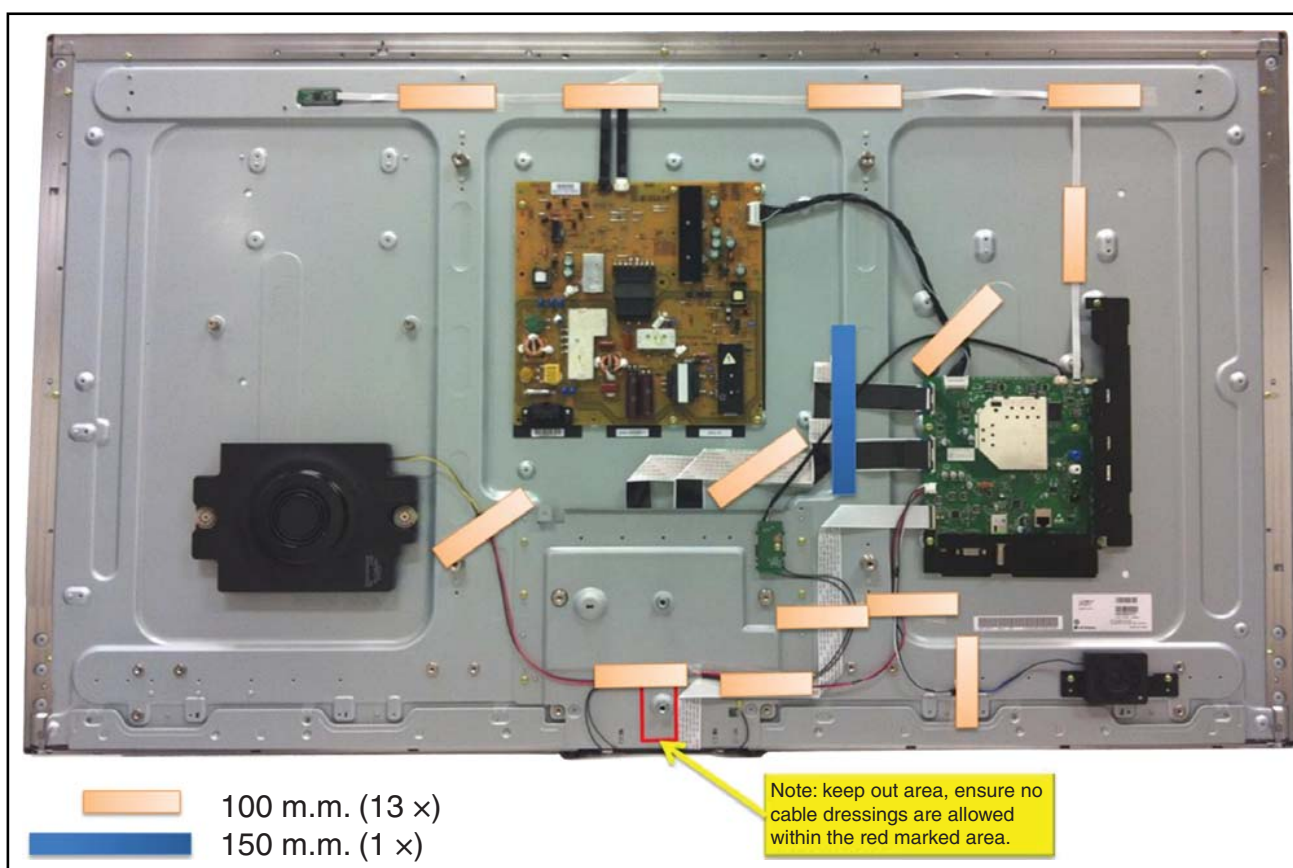
19511_009_130617.eps
130617

Figure 4-10 Cable dressing 47" 70xx series



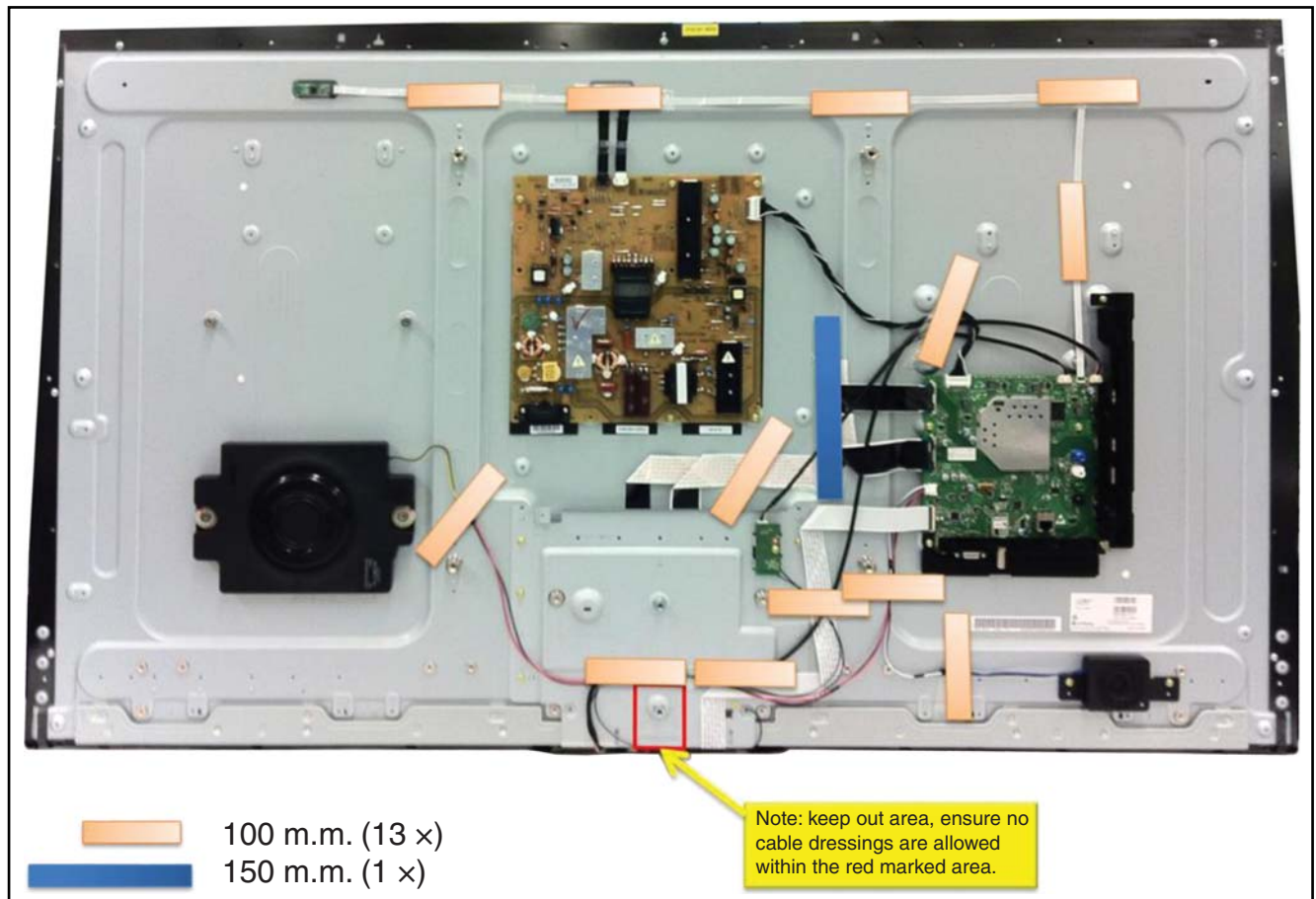
19511_010_130617.eps
130617

Figure 4-11 Cable dressing 47" 80xx series



19511_011_130617.eps
130617

Figure 4-12 Cable dressing 55" 70xx series



19511_012_130617.eps
130617

Figure 4-13 Cable dressing 55" 80xx series

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 Assy/Panel Removal

4.3.1 Rear Cover

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

Attention: Sets in the 7000 & 8000 range are equipped with a hatch to disconnect the keyboard control panel and/or Ambilight units. Ambilight sets in the 5x00 range are equipped with a hatch to disconnect the Ambilight units.

These hatches are indicated on the rear cover with

SERVICE ▲.

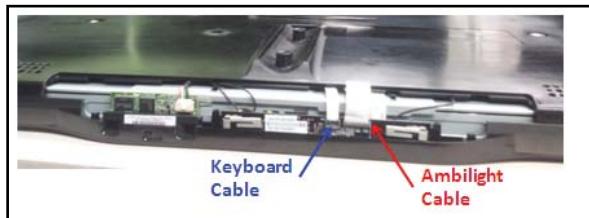
It is mandatory to open the hatches and disconnect the cables prior to removal of the rear cover!

1. For sets in the 5x000 range equipped with Ambilight: open the hatch that covers the Ambilight connector and unplug the connector; see [Figure 4-14](#). Remove the screw [1], lift the connector [2] and slide the cable upwards [3].
2. For sets in the 7000 & 8000 range: open the hatch that covers the leading edge and unplug the connectors; see [Figure 4-15](#).
3. Lift the rear cover from the TV. Make sure that wires and flat foils are not damaged while lifting the rear cover from the set.



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130424

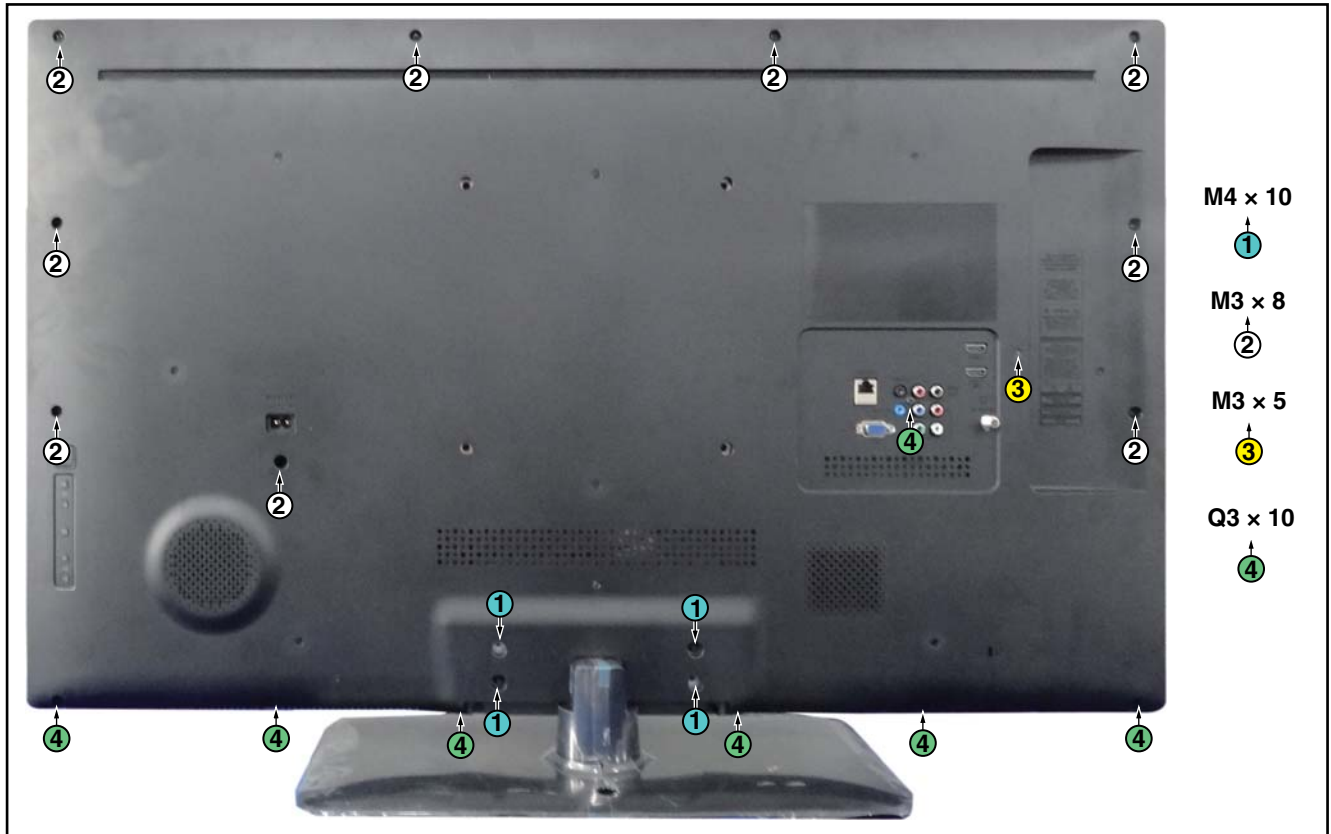
Figure 4-14 Rear cover removal - back cover hatch



19510_105_130424.eps
130424

Figure 4-15 Rear cover removal - leading edge hatch

Refer to [Figure 4-16](#) for screw positions.



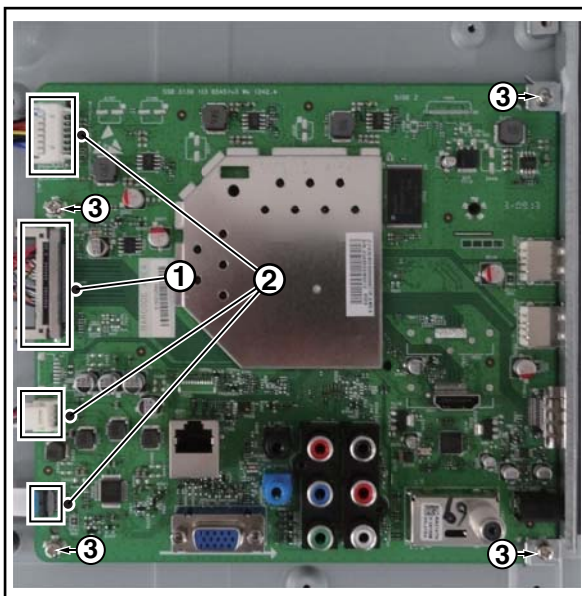
19510_106_130424.eps
130424

Figure 4-16 Back cover screw positions

4.3.2 Small Signal Board

Refer to [Figure 4-14](#) for details.

1. Unplug the LVDS connector [1].
2. Unplug the remaining connectors [2].
3. Remove the screws [3].



19510_108_130424.eps
130424

Figure 4-17 SSB

4.3.3 Ambilight units in Rear Cover

The Ambilight units are affixed in the rear cover and will self-destruct upon removal.

Attention: it is of the utmost importance to remove all remains of any adhesive that might be left on the inside of the rear cover, prior to affixing the new Ambilight units.

The new units come with double-sided adhesive tape. Ensure a correct mounting to avoid uneven light emission of the units. Refer to [Figure 4-18](#) for the wiring position.



19510_107_130424.eps
130424

Figure 4-18 Back cover Ambilight wiring

4.4 Set Re-assembly

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

▲ For sets in the 7000- and 8000 range, it is of the utmost importance to keep cables out of the swivel range when re-assembling the set, to avoid future cable cut. Refer to [Figure 4-10](#) to [Figure 4-13](#).

Notes:

- While re-assembling, make sure that all cables are placed and connected in their original position.
- Pay special attention not to damage the EMC foams in the set. 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 Service Tools](#)
- [5.4 Error Codes](#)
- [5.5 The Blinking LED Procedure](#)
- [5.6 Fault Finding and Repair Tips](#)
- [5.7 Ambilight Parameters in NVM](#)
- [5.8 Pairing/Unpairing the Remote Control unit](#)
- [5.9 Software Upgrading](#)

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.

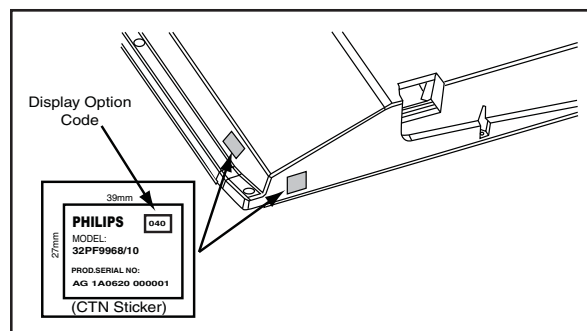
The screen will show: "AAAAAAB-XXX.YYY.MMM.TTT", where:

- **AAAAAA** is the chassis name: L12M31L.
- **B** is the region indication: E= Europe, A= AP/China, U= NAFTA, L= LATAM.
- **XXX** is the main version number: this is updated with a major change of specification (incompatible with the previous software version). Numbering will go from 0 - 255. **YYY** is the sub version number: this is updated with a minor change of specification (incompatible with the previous software version). Numbering will go from 0 - 255. **MMM** is the number of the mandatory (upgrade) release in association with the area of the mandatory (upgrade) release. Numbering will go from 0 - 255. **TTT bit 7 to 1** is the area of the mandatory (upgrade) release where 0 - none, 1 - Netflix, rest reserved. **TTT bit 0** : 0 = development release, 1 = production release.
 - If any version number changes, the new version number is written in the NVM.
 - If any version number changes, the default settings are loaded.

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/HOME** and "**xxx**", where "xxx" is a 3 digit decimal value of the panel type, 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.



10000_038_090121.eps
090819

Figure 5-1 Location of Display Option Code sticker

During this algorithm, the NVM-content must be filtered, because several items in the NVM are TV-related and not SSB-related (e.g. Model and Prod. S/N). Therefore, "Model" and "Prod. S/N" data is changed into "See Type Plate". identify the set, for further actions.

5.1 Test Points

In the chassis schematics and layout overviews, the test points are mentioned. In the schematics and layouts, test points are indicated with "Fxxx" or "lxxx".

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

Perform measurements under the following conditions:

- Service Default Mode.
- Video: Color 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).
- The possibility to overrule software protections when SDM is entered via the Service pins.
- Make alignments (e.g. White Tone), (de)select options, enter options codes, 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 uP (PWM, registers, etc.), and by making use of a fault finding database. It will also be possible to up and download the software of the TV set via 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).

In this chassis, the set has to be put in Service Mode (SDM, SDA) before you can use ComPair.

In case a call centre or consumer reads "See Type Plate" in CSM mode, he needs to look to the side/bottom sticker to

5.2.2 Service Default Mode (SDM)

Purpose

Set the TV in SDM mode in order to be able to create a pre-defined 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.
- Set Smart Picture to "Game".
- Set Smart Sound to "Standard".
- Tune channel to:
 - for analogue SDM: channel 3 (61.25 MHz)
 - for digital SDM: channel 26 (545.143 MHz).
- For digital SDM: set PID default from the stream.
- All service-unfriendly modes (if present) are disabled, since they interfere with diagnosing/repairing a set. These service unfriendly modes are:
 - (Sleep) timer.
 - Blue mute/Wall paper.
 - Auto switch "off" (when there is no "ident" signal).
 - Hotel or hospital mode.
 - Child lock or parental lock (manual or via V-chip).
 - Skipping, blanking of "Not favorite", "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

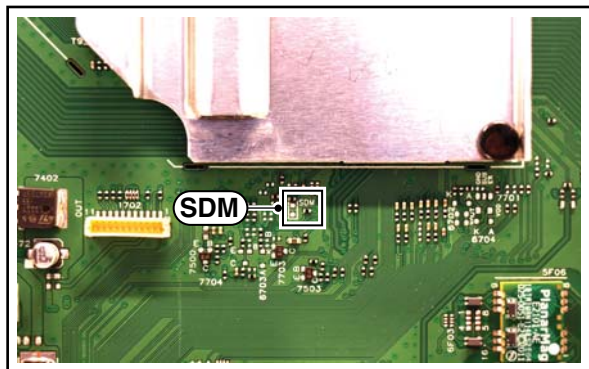
To activate **analogue** SDM, use **one** of the following methods:

- Press the following key sequence on the RC transmitter: "062596" directly followed by the **MENU** button.
- Short one of the "Service" pads on the TV board during cold start (see [Figure 5-2](#)). Then press the mains button (remove the short after start-up).

Caution: When doing this, the service-technician must know exactly what he is doing, as it could damage the television set.

To activate **digital** SDM:

- Press the following sequence on the RC transmitter: "062593" directly followed by the **MENU** button.



19300_068_120419.eps
120419

Figure 5-2 Service pad

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:

- xxxx: Operating hours (in decimal).

- **AAAAAAB-XXX.YYY.MMM.TTT**: 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.

How to Navigate

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

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

How to Exit

Switch the set to Stand-by.

- pressing the standby button on the remote control transmitter or on the television set, or
 - via a standard RC-transmitter by keying the "00" sequence.
- If you switch the television set "off" by removing the mains (i.e., unplugging the television), the television set will remain in SDM when mains is re-applied, and the error buffer is not cleared. The error buffer will only be cleared when the "clear" command is used in the SAM menu.

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.
- In case the set is accidentally in Factory mode (with an "F" displayed on the screen), pressing and holding "VOL-" button for 5 seconds and then followed by pressing and holding the "CH-" button for another 5 seconds should exit the Factory mode.

5.2.3 Service Alignment Mode (SAM)

Purpose

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

Specifications

- 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).
- Set Smart Picture to "Game".

How to Activate

To activate SAM, use one of the following methods:

- Press the following key sequence on the remote control transmitter: "062596" directly followed by the **INFO[i+]/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.

Menu items and explanation:

1. **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:** 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. Five errors possible.
 - **OP1/OP2:** 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.
2. **Clear.** 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.
3. **Options.** To set the option bits. See paragraph [6.4 Option Settings](#) in the "Alignments" chapter for a detailed description.
4. **Alignments.**
 - **RGB Align.** To align the White Tone. See [White Tone Alignment:](#) for a detailed description.
 - **Ambilight.** To align the Ambilight Units.
5. **NVM editor.**
 - **NVM Editor.** To change the NVM data in the television set. See also paragraph [5.6 Fault Finding and Repair Tips](#).
 - **Service Data.** 12 nc data.
6. **Upload to USB.**
7. **Download from USB.**
8. **Initialise NVM.** To initialize a (corrupted) NVM. Be careful, this will erase all settings!
9. **Dealer Options.**
10. **Event Count.**
 - **Hardware Events.** To Display and Clear the hardware events.
 - **Software Events.** To Display and Clear the software events.
11. **RF4CE Pairing Tables.** To Clear the paired remote immediately.

How to Navigate

- In the SAM menu, select menu items with the UP/DOWN keys on the remote control transmitter. The selected item will be indicated. When not all menu items fit on the screen, use the UP/DOWN keys to display the next / previous menu items.
- With the LEFT/RIGHT keys, it is possible to:
 - Activate the selected menu item.
 - Change the value of the selected menu item.
 - Activate the selected sub menu.
- When you press the MENU button twice while in top level SAM, the set will switch to the normal user menu (with the SAM mode still active in the background). To return to the SAM menu press the MENU button.
- The "INFO[i+]/OK" key from the user remote will toggle the OSD "on/off" with "SAM" OSD remaining always "on".
- Press the following key sequence on the remote control transmitter: "062596" directly followed by the MENU button to switch to SDM (do not allow the display to time out between entries while keying the sequence).

How to Store SAM Settings

To store the settings changed in SAM mode (except the OPTIONS and 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

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

Note:

- When the TV is switched "off" by a power interrupt while in SAM, the TV will show up in "normal operation mode" as soon as the power is supplied again. The error buffer will not be cleared.
- In case the set is in Factory mode by accident (with "F" displayed on screen), pressing and holding "VOL-" button for 5 seconds and then followed by pressing and holding the "CH-" button for another 5 seconds should exit the Factory mode.

5.2.4 Customer Service Mode (CSM)

Purpose

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

Specifications

- Ignore "Service unfriendly modes".
- Set volume to 25%.
- Set Smart Picture to "Game".
- Set Smart Sound to "Standard".
- 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

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:

Menu Explanation CSM1

1. **Set Type.** Type number, e.g. 39PFL4508G/78. (*)
2. **Production code.** Product serial no., e.g. BZ1A1008123456 (*). BZ= Production centre, 1= BOM code, A= Service version change code, 10= Production year, 08= Production week, 123456= Serial number.
3. **Installation date.** Indicates the date of the first initialization of the TV. This date is acquired via time extraction.
4. **a - Option Code 1.** Option code information (group 1).
b - Option Code 2. Option code information (group 2).
5. **SSB.** Indication of the SSB factory ID (= 12nc). (*)
6. **Display.** Indication of the display ID (=12 nc). (*)
7. **PSU.** Indication of the PSU factory ID (= 12nc).
8. **RF4CE.** Indication of the RF4CE software version (= 12nc).

(*) If an NVM IC is replaced or initialized, these items must be re-written to it. ComPair will foresee in a possibility to do this. Also the NVM editor in the SAM menu can be used.

Menu Explanation CSM2

1. **Current Main SW.** Shows the main software version.
2. **Standby SW.** Shows the Stand-by software version.
3. **Panel Code.** Shows the current display code.

4. **Bootloader ID.** Shows the Bootloader software ID.
5. **NVM Version.** The NVM software version no.
6. **Flash ID.** Shows the flash ID.
7. **e_UM version.** To display eUM version.
8. **Channel_table_struct_version.** Channel structure version.
9. **RF4CE software.** Shows the RF4CE software version.

Menu Explanation CSM3

1. **Signal Quality.** Shows the signal quality for RF signals and other sources (No Tuned/Poor/Average/Good).
2. **Child lock.** This is a combined item for locks. If any lock (Preset lock, child lock, lock after, or Parental lock) is active, this item indicates "active".
3. **HDCP Keys.** not used (HDCP key is embedded in the SiL9187 mux IC).
4. To display ethernet MAC address.
5. To display wireless MAC address.
6. not used.
7. not used.
8. not used.
9. not used.
10. **Event Counter.** Display event and Clear event.

Create a CSM dump on an USB stick

There will be CSM dump to a plugged in USB-stick upon entering CSM-mode. An extended CSM dump will be created when the "OK" button on RC is pressed in CSM while a USB stick is plugged in. A direct CSM flash dump will be created when the buttons "red + 2679" on the remote control are pressed in CSM while a USB stick is plugged in.

How to Exit

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 Service Tools

5.3.1 ComPair

Prerequisite

In this chassis, ComPair can only be used in one of the Service Modes (SAM, SDM).

Introduction

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

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

Specifications

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

How to Connect

This is described in the ComPair chassis fault finding database.

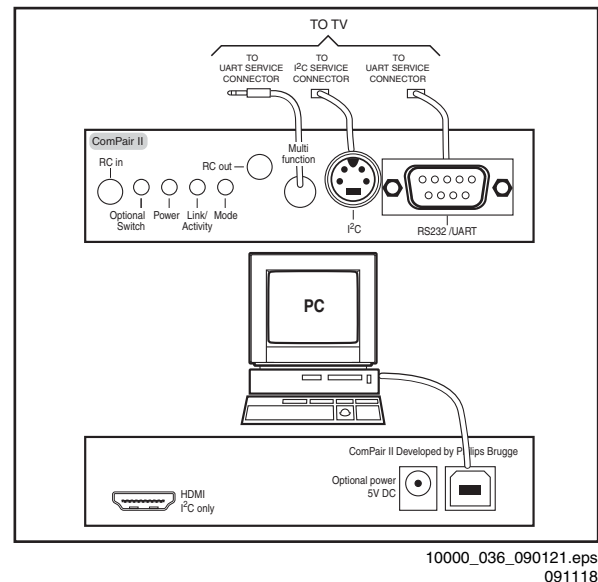


Figure 5-3 ComPair II interface connection

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

How to Order

ComPair II order codes:

- ComPair II interface: 3122 785 91020.
- ComPair UART interface cable: 3138 188 75051.
- Program software can be downloaded from the Philips Service web portal.

Note: For this chassis, no new database is made as ComPair will be phased out.

In addition, you can use the ComPair box as level shifter for UART logging.

Additional cables for VCOM Alignment

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

5.4 Error Codes

5.4.1 Introduction

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

- Activated (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.

5.4.2 How to Read the Error Buffer

You can read the error buffer in three ways:

- On screen via the SAM/SDM/CSM (if you have a picture).
Example:
 - ERROR: 0 0 0 0 0** : No errors detected
 - ERROR: 6 0 0 0 0** : Error code 6 is the last and only detected error
 - ERROR: 9 6 0 0 0** : Error code 6 was detected first and error code 9 is the last detected (newest) error
- Via the blinking LED procedure (when you have no picture). See paragraph [5.5 The Blinking LED Procedure](#).
- Via ComPair.

5.4.3 Error codes

The “layer 1” error codes are pointing to the defective board. They are triggered by LED blinking when CSM is activated. In the LC10 platform, only two boards are present: the SSB and the PSU/IPB, meaning only the following layer 1 errors are defined:

- 2: SSB
- 3: IPB/PSU
- 4: Display

Table 5-1 Error code table

Layer-1 error code	Defective board	Layer-2 error code	Defective device
3	IPB/PSU	16	+12 V missing/low, PSU defective
3	IPB/PSU	17	POK line defective (only 7000/8000 range)
2	SSB	13	general I2C bus error on SSB
2	SSB	35	EEPROM I2C error on SSB, 24MC64-W
2	SSB	34	tuner I2C error on SSB
2	SSB	27	channel decoder on SSB
6	Light sensor	43	light sensor board error/defective
6	RF4CE	46	RF4CE board error/defective

5.4.4 How to Clear the Error Buffer

The error code buffer is cleared in the following cases:

- By using the CLEAR command in the SAM menu:
- 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.

5.5 The Blinking LED Procedure

5.5.1 Introduction

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

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

Example (1): error code 4 will result in four times the sequence LED “on” for 0.25 seconds / LED “off” for 0.25 seconds. After this sequence, the LED will be “off” for 1.5 seconds. Any 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.

5.5.2 Displaying the Entire Error Buffer

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

5.6 Fault Finding and Repair Tips

Notes:

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

5.6.1 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.

5.6.2 Load Default NVM Values

It is possible to download default values automatically into the NVM in case a blank NVM is placed or when the NVM first 20 address contents are “FF”. After the default values are downloaded, it is possible to start-up and to start aligning the TV set. To initiate a forced default download the following action has to be performed:

- Switch “off” the TV set with the mains cord disconnected from the wall outlet (it does not matter if this is from “Stand-by” or “Off” situation).
- Short-circuit the SDM pads on the SSB (keep short circuited, see [Figure 5-2](#)).
- Press “P+” or “CH+” on the local keyboard (and keep it pressed).
- Reconnect the mains supply to the wall outlet.
- Release the “P+” or “CH+” when the set is started up and has entered SDM.

When the downloading has completed successfully, the set will perform a restart. After this, put the set to Stand-by and remove the short-circuit on the SDM pads.

Alternative method:

It is also possible to upload the default values to the NVM with ComPair in case the SW is changed, the NVM is replaced with a new (empty) one, or when the NVM content is corrupted. After replacing an EEPROM (or with a defective/no EEPROM), default settings should be used to enable the set to start-up and allow the Service Default Mode and Service Alignment Mode to be accessed. Refer also to section [5.7 Ambilight Parameters in NVM](#) for checking/setting the correct parameters for the Ambilight units.

5.6.3 No Picture

When you have no picture, first make sure you have entered the correct display code.

See [Display Option Code Selection](#) for the instructions.

5.6.4 Unstable Picture via HDMI input

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

5.6.5 No Picture via HDMI input

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

5.6.6 HDMI CEC Not Functioning

Go to Home/Menu -> Setup -> Installation -> Preference and set the Easylink option to "on". Also check if the connected device is CEC enabled.

5.6.7 TV Will Not Start-up from Stand-by.

Possible Stand-by Controller failure. Reflash the SW.

5.6.8 Cannot measure 1 kHz signal at tweeter 1D01 connector

This is normal behavior. Sound system is active 2.1 system with separate tweeter and subwoofer paths. Use 8 kHz test signal for tweeter measurement.

5.6.9 Low output measured at tweeter 1D01 connector

This is normal behavior. Tweeter only covers higher frequency for rated power (4 W each), whereas the subwoofer output (1D02 connector) is full range coverage for output power of 12 W.

5.6.10 No sound output at class D amplifier

Check following points:

- Presence of both supply +V_{SND} (12 V) & 3V3D (3.3 V)
- I²S input signal: pins 15, 20, 21, 22
 - pin 15: MCLK = 12.288 MHz
 - pin 20: LRCLK = 48 kHz
 - pin 21: SCLK = 3.072 MHz
 - pin 22: SDIN = audio data.
- Check I²C communication: pins 23 and 24
- Check startup GPIO: pins 19 and 25; for normal operation, both should be HIGH
- Check outputs: pins 1, 36, 39 and 46; all should have a 12 V PWM signal with a switching frequency of 384 kHz.

5.6.11 Front-end: no picture in analog RF mode

Check following points:

- Tuner supply voltage (3V3) presence available at pin 2/4 7216 and F203
- I²C lines are working correctly (3V3)
- Manually store a known channel and check if there is IF output at tuner pins 7 & 8; if not, tuner may be faulty
- Check whether picture is present in CVBS; in not, check Video section.

5.6.12 Front-end: no picture in digital RF mode

Check following points:

- Tuner supply voltage (3V3) presence available at pin 2/4 7216 and F203
- I²C lines are working correctly (3V3)

- Manually store a known channel and check if there is IF output at tuner pins 2 & 3; if not, tuner may be faulty
- Supply voltage (1V2, 2V5, 3V3) presence available to digital demodulator 7210
- Correct functioning of crystal 1205 (41 MHz)
- Pin DEMOD_RST is HIGH in normal operation
- Transport stream output from 7210 is available; if yes, check Video section.

5.6.13 USB troubleshooting

- USB hub does not work when it is plugged in to USB2 and -3.
 - > Connect USB hub to USB1 (only this port supports hub)
- TV cannot detect the presence of USB devices.
 - > USB device maybe faulty, replace with another USB device.
- TV cannot detect the presence of USB devices.
 - > Ensure USB device connected to the TV USB input ports comply with USB standard (USB certified).
- TV sometimes can/cannot detect USB devices.
 - > If connected to a passive USB hub, remove the passive USB hub.
 - > Devices connected to a passive USB hub may have drawn current exceeding 500 mA (= limit from TV USB port).

5.6.14 Ethernet troubleshooting

- Ethernet cannot establish link.
 - > Check the ethernet magnetic that it is stuffed with the correct orientation.
- When connected to computer, the speed indicated on the computer screen is 10 Mbps instead of 100 Mbps.
 - > Check the computer network properties setting and ensure that it is set to "Auto".
- Unable to login to NetTV website.
 - > Make sure all of the keys are loaded in e.g. MAC address, ECD key, etc.

5.6.15 HDMI troubleshooting

- TV cannot detect the presence of HDMI source.
 - > Check if there is +5 V at pin 18 of HDMI connector.
- No picture on TV screen.
 - > Make sure HDCP is valid.
- In PC mode, TV is unable to display picture for certain output resolutions.
 - > Check TV specification if the TV can support the selected resolution.
- CEC not functioning.
 - > Turn on "Easyliok" feature from the TV menu.

5.7 Ambilight Parameters in NVM

In following events, the Ambilight parameters should be checked and adapted (if needed) via SAM using the NVM editor:

- *NVM upgrade*
- *SSB exchange*.

The information only applies to sets equipped with Ambilight (5000/5500/7000- and 8000 series).

Refer also to section [5.2.3 Service Alignment Mode \(SAM\)](#).

Table 5-2 Ambilight configuration settings

NVM address		Value (in dec)	
Hex	Dec	5000/5500/7000 series	8000 series
D2E	3374	196	64
D3F	3391	196	64
D50	3408	196	64
D61	3425	196	64
D72	3442	196	64

Refer to Table [5-2 Ambilight configuration settings](#).

1. go via SAM to the NVM editor
2. in the NVM editor, go to all decimal addresses as specified for the applicable set type
3. check the decimal values and edit if needed.

5.8 Pairing/Unpairing the Remote Control unit

Upon changing the remote control unit, one should (re-)pair the unit by following the following instructions.

5.8.1 Pairing procedure

1. Check if unit is already paired by pressing the <Home> button.
 - a. if TV responds by showing the HOME menu, unit is already paired. Press again the <Home> button to leave the HOME menu and do not execute the pairing action.
 - b. if TV does not respond, goto step 2.
2. Press the <red> and <blue> button simultaneously for more than 2 seconds while pointing the remote control unit to the TV.
3. An OSD message should appear indicating the correct pairing of the unit.
4. Press <Home> on the remote control unit to check if the unit is paired correctly to the TV.

5.8.2 Unpairing procedure

1. Check if unit is already paired to any TV by pressing the <Home> button.
 - a. if no TV responds, the unit is already unpaired. You may pair it now to any TV by following the steps mentioned in section [5.8.1 Pairing procedure](#).
 - b. if any TV responds, goto step 2.
2. Press the <TV> and <Mute> and <0> button simultaneously for more than 2 seconds while pointing the remote control unit to the TV.
3. Press the <Home> button to check if the TV is unpaired correctly. The TV should not respond.
 - Don't press the OK button as in some conditions the unit might re-pair with the TV.
 - Don't press the <red> and <blue> button as the unit will re-pair with the TV.
4. Remove the batteries from the unit.

5.9 Software Upgrading

5.9.1 Introduction

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.

5.9.2 Main Software Upgrade

Automatic Software Upgrade

In "normal" conditions, so when there is no major problem with the TV, the main software and the default software upgrade application can be upgraded with the "autorun.upg" (FUS part in the one-zip file). This can also be done by the consumers themselves, but they will have to get their software from the commercial Philips website or via the Software Update Assistant in the user menu (see DFU). The "Autorun.upg" file must be placed in the root of your USB stick.

How to upgrade:

1. Copy the "autorun.upg" file to the root of an USB stick.
2. Insert the USB stick in the side I/O while the set is "on". The TV will prompt an upgrade message. Press "Update" to continue, after which the upgrading process will start. As soon as the programming is finished, the set must be restarted.

In the "Setup" menu you can check if the latest software is running.

5.9.3 How to Copy NVM Data to/from USB

Write NVM Data to USB

1. Insert the USB stick into the USB slot while in SAM mode.
2. 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 "L12M31L_NVM_T2U.BIN" (this takes a couple of seconds).

Write NVM Data to TV

1. First, ensure (via a PC) that the filename on the USB stick has the correct format: "L12M31L_NVM_U2T.BIN".
2. Insert the USB stick into the USB slot while in SAM mode.
3. 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: "L12M31L_NVM_U2T.MAK" (0x00 to write protect, 0xFF to overwrite).

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

5.9.4 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 "L12M31L_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: "L12M31L_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.

5.9.5 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 "L12M31L_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: "L12M31L_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.

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 Cable Position Numbers](#)

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

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

6.1 General Alignment Conditions

Perform all electrical adjustments under the following conditions:

- Power supply voltage (depends on region):
 - AP-NTSC: 120 V_{AC} or 230 V_{AC} / 50 Hz (± 10%).
 - AP-PAL-multi: 120 - 230 V_{AC} / 50 Hz (± 10%).
 - EU: 230 V_{AC} / 50 Hz (± 10%).
 - LATAM-NTSC: 120 - 230 V_{AC} / 50 Hz (± 10%).
 - US: 120 V_{AC} / 60 Hz (± 10%).
- Connect the set to the mains via an isolation transformer with low internal resistance.
- Allow the set to warm up for approximately 15 minutes.
- Measure voltages and waveforms in relation to correct ground (e.g. measure audio signals in relation to AUDIO_GND).

Caution: It is not allowed to use heatsinks as ground.
- Test probe: R_i > 10 Mohm, C_i < 20 pF.
- Use an isolated trimmer/screwdriver to perform alignments.

6.2 Hardware Alignments

There are no hardware alignments foreseen for this chassis.

6.3 Software Alignments

With the software alignments of the Service Alignment Mode (SAM) the RGB settings can be aligned.

6.3.1 Tuner Adjustment (RF AGC Take Over Point)

Purpose: To keep the tuner output signal constant as the input signal amplitude varies.

No alignment is necessary, as the AGC alignment is done automatically.

6.3.2 RGB Alignment

Before alignment, set the picture as follows:

Picture Setting	
Dynamic backlight	Off
Dynamic Contrast	Off
Colour Enhancement	Off
Picture Format	Unscaled
Light Sensor	Off
Brightness	50
Colour	0
Contrast	100

White Tone Alignment:

- Activate SAM.
- Select "RGB Align." and choose a color temperature.
- Use a 100% white screen as input signal and set the following values:
 - "Red BL Offset" and "Green BL Offset" to "7" (if present).

- All "White point" values initial to "127".

In case you have a color analyzer:

- Measure with a calibrated (phosphor- independent) color analyzer (e.g. Minolta CA-210) in the centre of the screen. Consequently, the measurement needs to be done in a dark environment.
- Adjust the correct x,y coordinates (while holding one of the White point registers R, G or B on max. value) by means of decreasing the value of one or two other white points to the correct x,y coordinates (see Table 6-1 White D alignment values LC320EUE-SEM1 (panel ID 402) to 6-7 White D alignment values LC420EUE-SEF2 (panel ID 411)). Tolerance: dx: ± 0.002, dy: ± 0.002.
- Repeat this step for the other color Temperatures that need to be aligned.
- When finished return to the SAM root menu and press STANDBY on the RC to store the aligned values to the NVM.

Table 6-1 White D alignment values LC320EUE-SEM1 (panel ID 402)

Value	Cool (9480 K)	Normal (8050 K)	Warm (6100 K)
x	0.280	0.292	0.319
y	0.299	0.314	0.347

Table 6-2 White D alignment values LC420EUE-SEM2 (panel ID 403)

Value	Cool (9710 K)	Normal (8170 K)	Warm (6150 K)
x	0.280	0.291	0.318
y	0.296	0.311	0.345

Table 6-3 White D alignment values LC470EUE-SEM2 (panel ID 404)

Value	Cool (9490 K)	Normal (8060 K)	Warm (6080 K)
x	0.281	0.292	0.319
y	0.297	0.311	0.345

Table 6-4 White D alignment values LC420EUE-FEP1 (panel ID 406)

Value	Cool (9540 K)	Normal (8060 K)	Warm (6130 K)
x	0.280	0.291	0.318
y	0.300	0.314	0.347

Table 6-5 White D alignment values LC470EUF-FEP1 (panel ID 407)

Value	Cool (10100 K)	Normal (8450 K)	Warm (6310 K)
x	0.277	0.288	0.315
y	0.295	0.310	0.343

Table 6-6 White D alignment values LC550EUF-FEP1 (panel ID 410)

Value	Cool (t.b.d. K)	Normal (t.b.d. K)	Warm (t.b.d. K)
x	t.b.d.	t.b.d.	t.b.d.
y	t.b.d.	t.b.d.	t.b.d.

Table 6-7 White D alignment values LC420EUE-SEF2 (panel ID 411)

Value	Cool (t.b.d. K)	Normal (t.b.d. K)	Warm (t.b.d. K)
x	t.b.d.	t.b.d.	t.b.d.
y	t.b.d.	t.b.d.	t.b.d.

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

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

Table 6-8 Tint settings 32" 3508 series

Colour Temp.	R	G	B
Cool	219	238	255
Normal	253	253	247
Warm	255	226	171

Table 6-9 Tint settings 32" 3518 series

Colour Temp.	R	G	B
Cool	249	228	250
Normal	255	224	220
Warm	255	188	135

Table 6-10 Tint settings 32" 4508 series

Colour Temp.	R	G	B
Cool	t.b.d.	t.b.d.	t.b.d.
Normal	t.b.d.	t.b.d.	t.b.d.
Warm	t.b.d.	t.b.d.	t.b.d.

Table 6-11 Tint settings 39" 3508 series

Colour Temp.	R	G	B
Cool	t.b.d.	t.b.d.	t.b.d.
Normal	t.b.d.	t.b.d.	t.b.d.
Warm	t.b.d.	t.b.d.	t.b.d.

Table 6-12 Tint settings 39" 4508 series

Colour Temp.	R	G	B
Cool	t.b.d.	t.b.d.	t.b.d.
Normal	t.b.d.	t.b.d.	t.b.d.
Warm	t.b.d.	t.b.d.	t.b.d.

Table 6-13 Tint settings 42" 3508 series

Colour Temp.	R	G	B
Cool	238	237	253
Normal	255	232	232
Warm	255	206	145

Table 6-14 Tint settings 42" 4508 series

Colour Temp.	R	G	B
Cool	t.b.d.	t.b.d.	t.b.d.
Normal	t.b.d.	t.b.d.	t.b.d.
Warm	t.b.d.	t.b.d.	t.b.d.

Table 6-15 Tint settings 42" 5008 series

Colour Temp.	R	G	B
Cool	215	223	255
Normal	250	244	251
Warm	255	219	176

Table 6-16 Tint settings 42" 5508 series

Colour Temp.	R	G	B
Cool	219	226	255
Normal	252	246	250
Warm	255	218	172

Table 6-17 Tint settings 46" 4508 series

Colour Temp.	R	G	B
Cool	233	222	253
Normal	255	233	237
Warm	255	202	163

Table 6-18 Tint settings 46" 5508 series

Colour Temp.	R	G	B
Cool	255	210	222
Normal	255	198	187
Warm	255	170	114

Table 6-19 Tint settings 47" 7008 series

Colour Temp.	R	G	B
Cool	219	227	255
Normal	250	242	241
Warm	255	215	151

Table 6-20 Tint settings 47" 8008 series

Colour Temp.	R	G	B
Cool	193	216	255
Normal	241	246	254
Warm	255	228	165

Table 6-21 Tint settings 55" 7008 series

Colour Temp.	R	G	B
Cool	233	218	255
Normal	255	235	236
Warm	255	205	144

Table 6-22 Tint settings 55" 8008 series

Colour Temp.	R	G	B
Cool	240	217	255
Normal	255	227	230
Warm	255	195	137

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 specific ICs (or functions) is made known by the option codes.

- Notes:**
- After changing the option(s), save them with the STORE command.

- The new option setting becomes active after the TV is switched “off” and “on” again with the mains switch (the EARM is then read again).

6.4.2 How To Set Option Codes

When the NVM is replaced, all options will require resetting. To be certain that the factory settings are reproduced exactly, you must set all option numbers. You can find the correct option numbers see sticker on the inside the cabinet.

How to Change Options Codes

An option code (or “option byte”) represents eight different options (bits). All options are controlled via ten option bytes (OP#1... OP#10).

Activate SAM and select “Options”. Now you can select the option byte (OP#1... OP#10) with the CURSOR UP/ DOWN keys, and enter the new 3 digit (decimal) value. For the correct factory default settings, see the sticker inside the set.

6.4.3 Display Code Overview

Table 6-23 Display code overview

CTN	Panel Type	Disp. code
32PFL3508G/xx	LCO3151A051AD5010X	440
32PFL3518G/xx	LCA315HVN01ADA010X	441
32PFL4508G/xx	LCA315HVN01A12010X	444
39PFL3508G/xx	LCA390HVN01AD6080T	453
39PFL4508G/xx	LCA390HVN01A03010X	445
42PFL3508G/xx	LCA420HVN04AD8030X	442
42PFL4508G/xx	LCA420HVN04A11010X	454
42PFL5x08G/xx	LCA420HVD02A22030X	447
46PFL4508G/xx	LCA460HVD02A12010X	446
46PFL5508G/xx	LCA460HVD02A12010X	448
47PFL7008G/xx	LC470EUF-PFF1	430
47PFL8008G/xx	LC470EUF-PFF1	430
55PFL7008G/xx	LC550EUF-PFF1	431
55PFL8008G/xx	LC550EUF-PFF1	431

6.5 Cable Position Numbers

In this chassis, the cable position numbers can be defined via the rule that the number is always starting with an “E” followed by the connector number of the current sourcing board. The order is always seen from where the power initiates from. So from PSU to SSB, from SSB to IR/LED panel, from IR/LED panel to keyboard control panel. For example, a cable from the PSU connector CN902 to the SSB connector CN701, will have the position number ECN902.

7. Circuit Descriptions

Index of this chapter:

[7.1 Introduction](#)

Notes:

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

7.1 Introduction

The L12M3.1L LA chassis is a digital chassis using a Mediatek chipset. It covers screen sizes of 32" to 55".

Main key components are the Mediatek MT5396 integrated "System On Chip" (SoC) that supports multimedia video/audio input.

System SoC is based on MT5396:

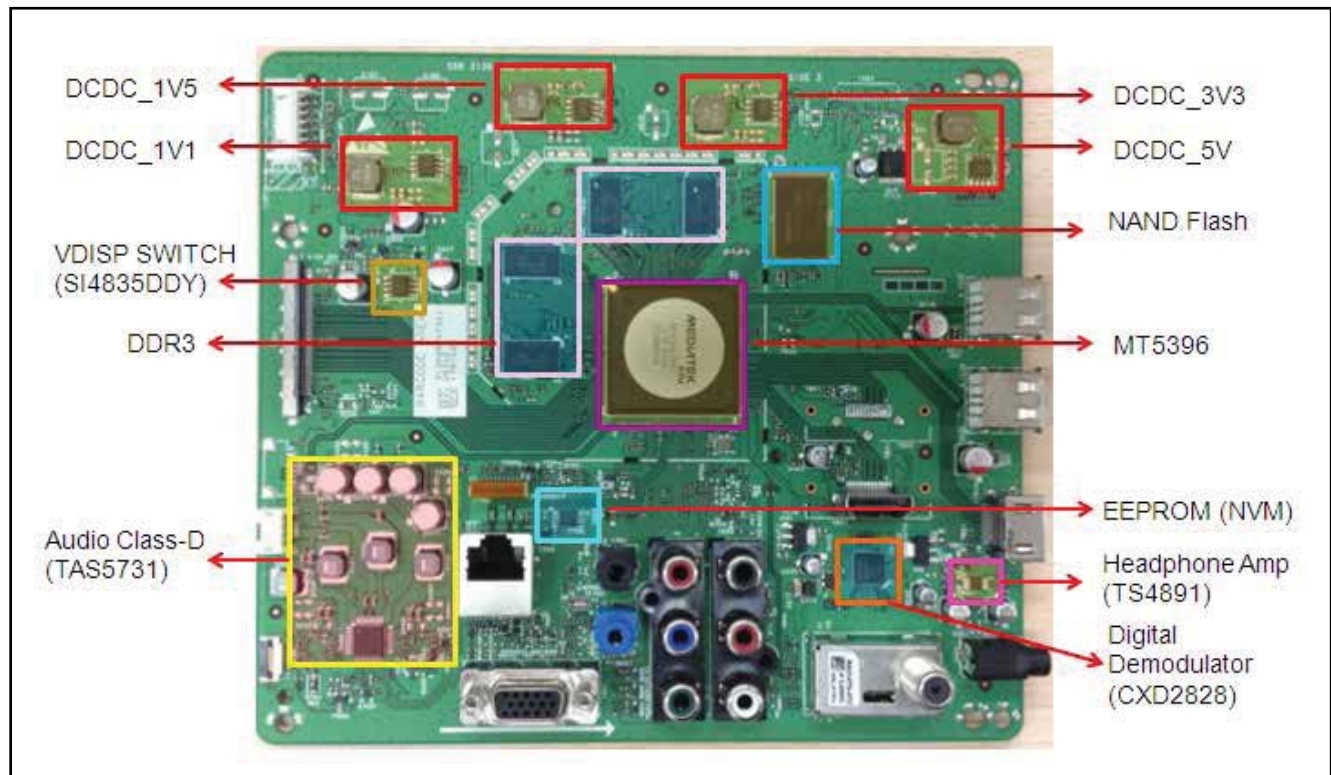
- NAND Flash – 512 Mbyte, Hynix.
- DDR 1.33 GHz– 512 + 256 Mbyte, Hynix.

Tuner/Frontend configuration:

- Sony Silicon In Can Tuner (SUT-RA214Z).
- Sony Digital Demodulator (CXD2828).
- Analog demodulator embedded in MT5396.

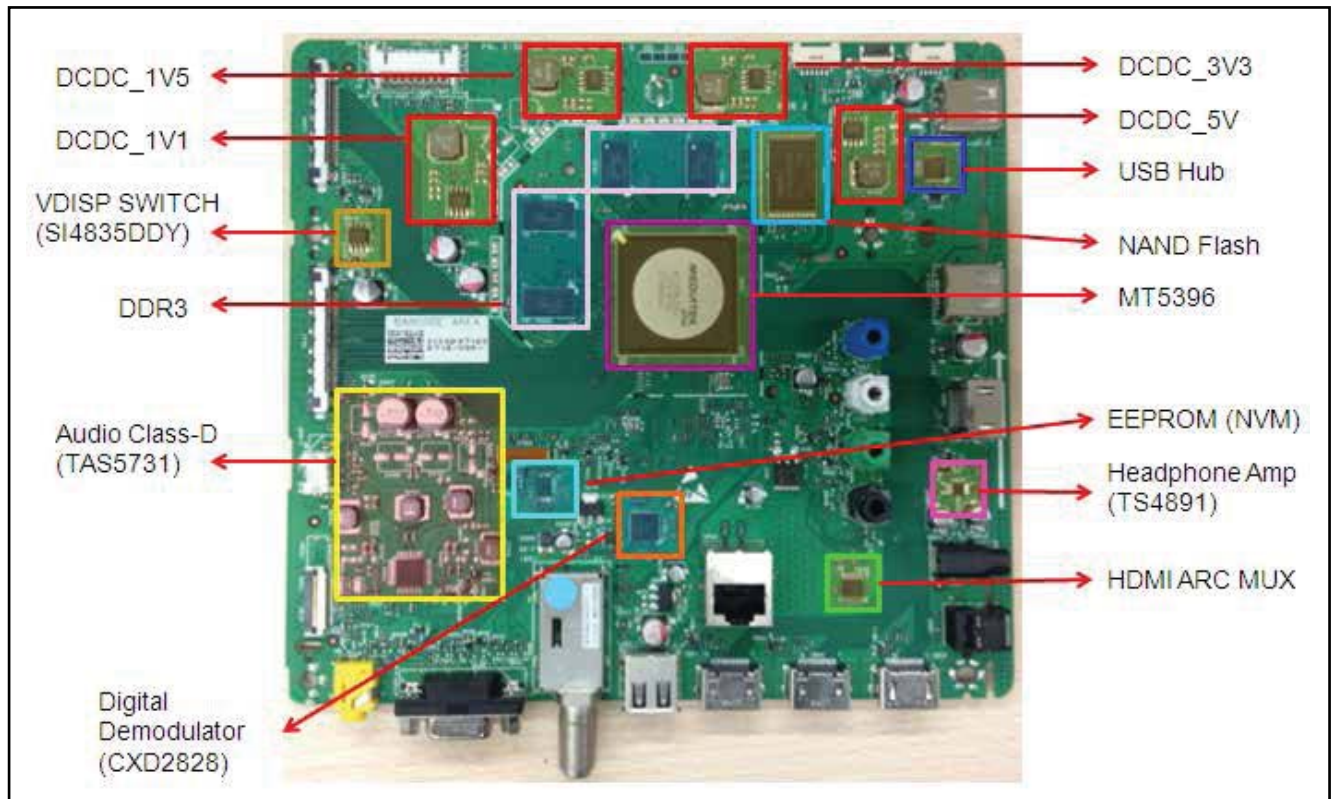
Audio configuration:

- Texas Instruments Audio Class-D Amplifier (TAS5731PHP).
- Texas Instruments Headphone Amplifier (TPA6111A2DGN).



19510_200_130424.eps
130424

Figure 7-1 SSB key component overview 3500-, 4500-, 5000, 5500 series



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130424

Figure 7-2 SSB key component overview 7000-, 8000 series

8. IC Data Sheets

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

8.1 Diagram [10-6-2 B02A, Tuner & demodulator](#), Type SUT-RA214 (IC1201)

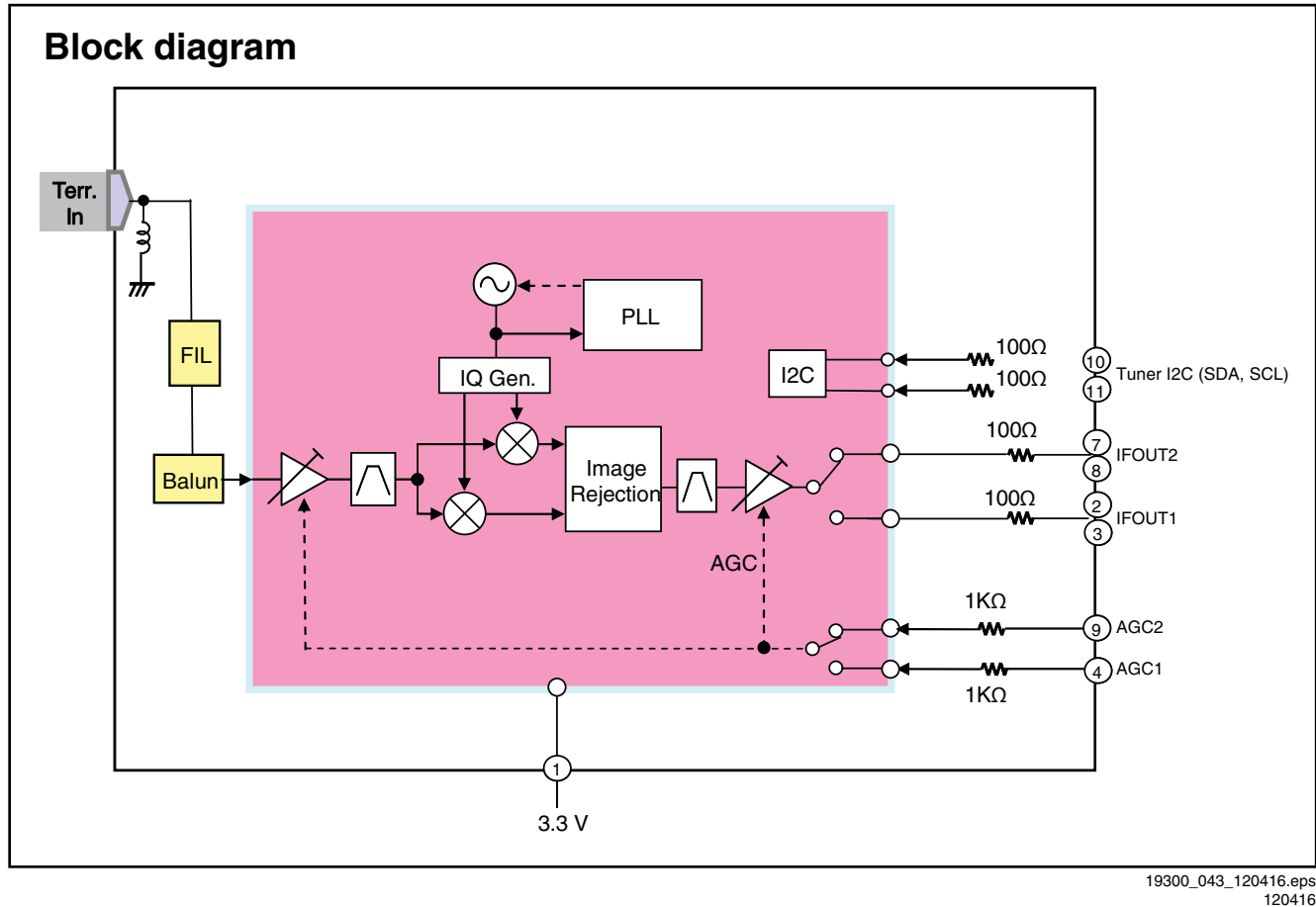
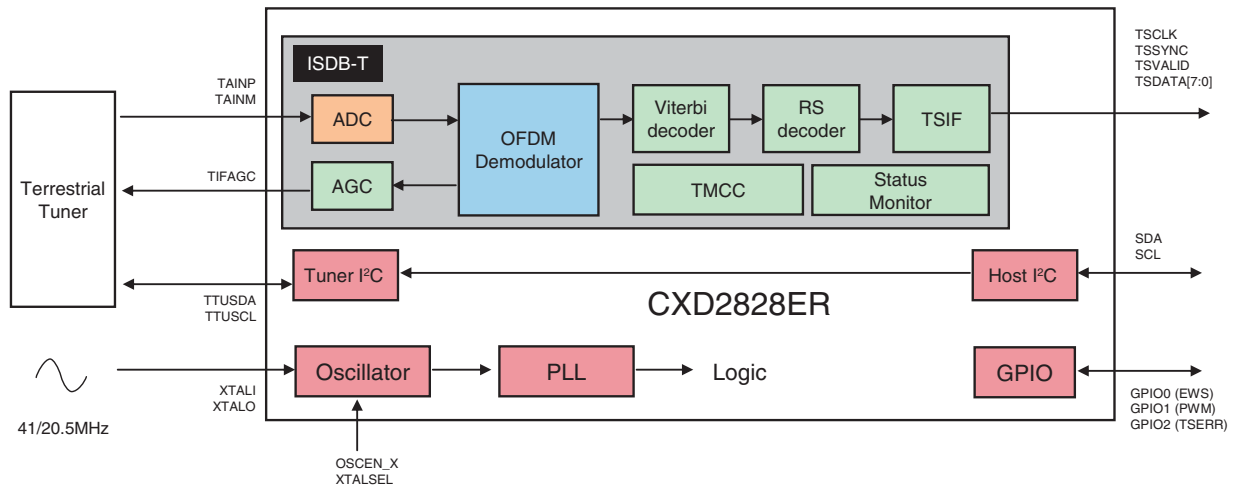


Figure 8-1 Internal block diagram and pin configuration

8.2 Diagram 10-6-2 B02A, Tuner & demodulator, Type CXD2828 (IC7210)

Block diagram



Pinning information

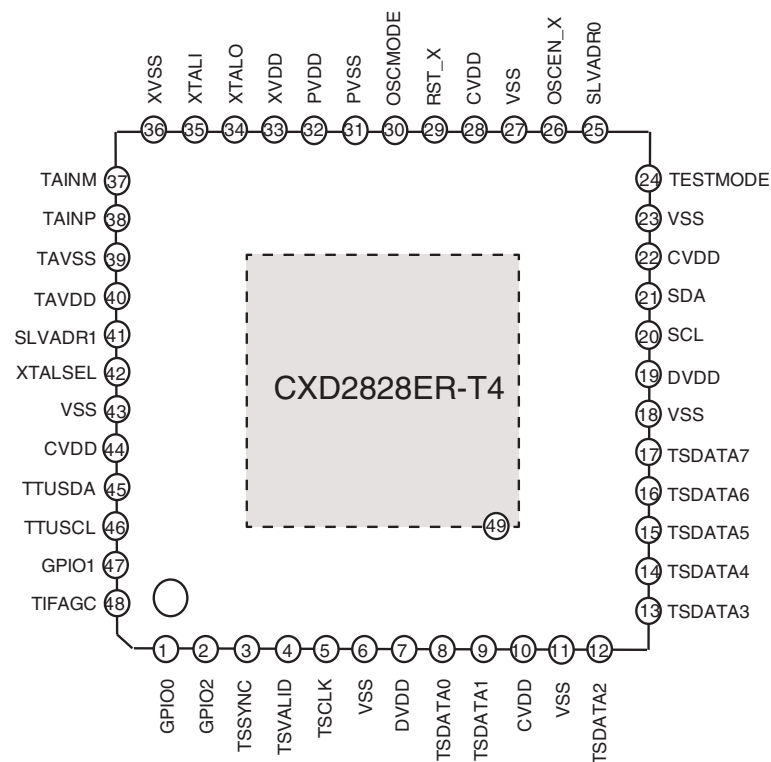
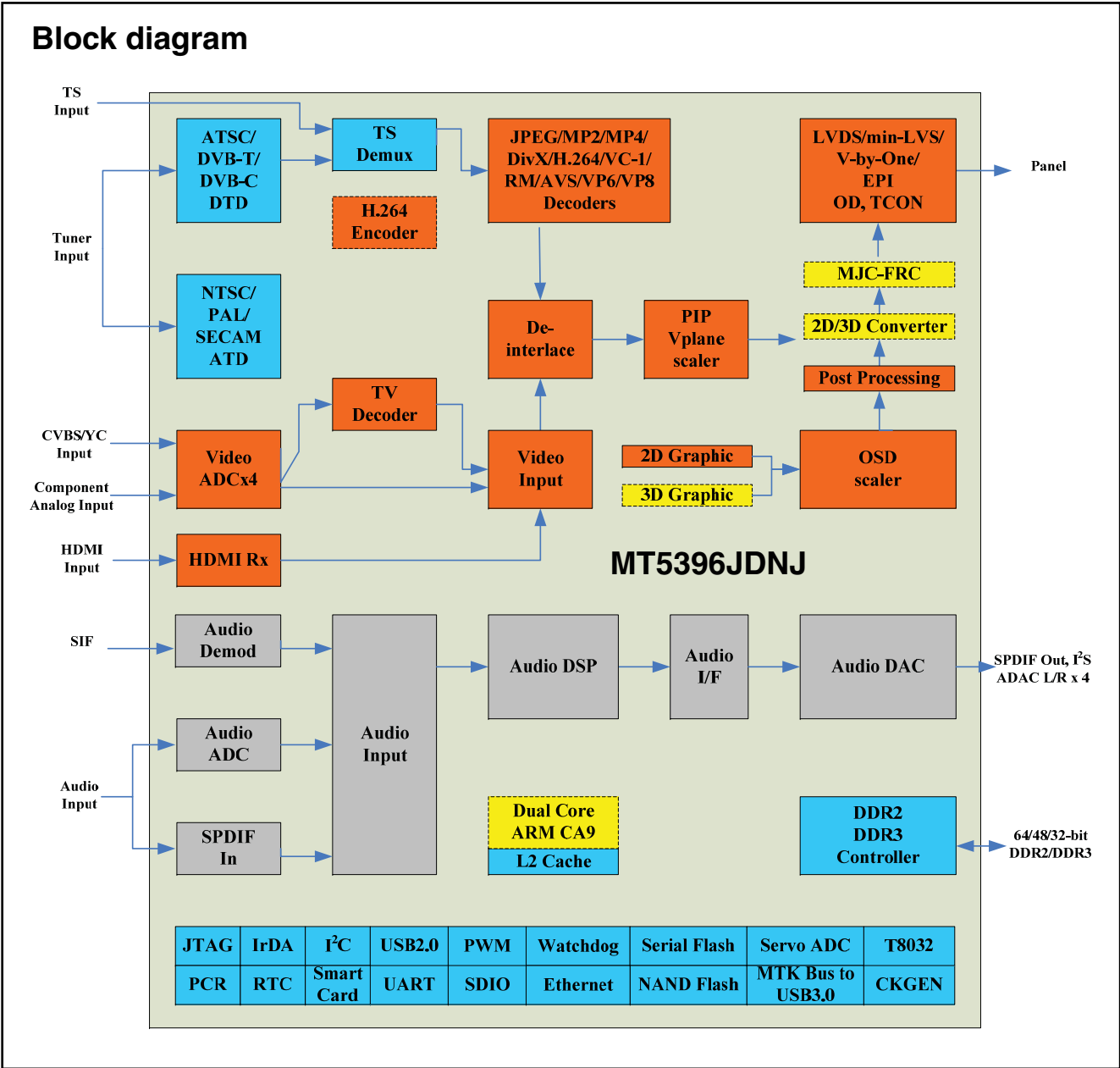
19260_300_120320.eps
120323

Figure 8-2 Internal block diagram and pin configuration

8.3 Diagram [10-6-4 B04A, MTK5396 power](#), Type MT5396 (IC7300)



19300_040_120416.eps
120416

Figure 8-3 Internal block diagram

Pinning information 1, MT5396JDNJ

825	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
A	BRDQ0	BRDQ6	DDRV	DDRV	ARDQ21		ARDQM2		ARDQS2#			ARDQ22	ARBA0	ARA2	ARA13		ARDQ8	DVSS	
B	BRDQ9	BRDQ2	DDRV	DDRV	ARDQ23		ARDQ30		ARDQS2	ARDQ31		ARDQ18	ARA3	ARRESE T	ARA7		ARDQ1	DVSS	
C	BRDQ13	BRDQ4	DDRV	DDRV	ARDQ19	ARDQ24	ARDQ28	ARDQ33	ARCLK1#	ARDQ29	ARDQ27	ARDQ16	ARDQ20	ARA11	ARA14	ARDQ5	ARDQ3	DVSS	ARDQM0
D	BRDQM1	BRDQ15	BRDQ11	DDRV	DDRV	ARDQ17	ARDQ26	ARDQS3#	ARCLK1	ARDQ25	DVSS	DVSS	ARA8	ARWE#	ARDQ7	ARBA2	ARDQ10	DVSS	ARDQ14
E			BRDQS0#	BRDQS0	DDRV	DDRV	DVSS	DVSS	DVSS	ARDQM3	DVSS	DVSS	ARA4	ARA6	ARA9	ARCS#	ARCAS#	ARODT	DVSS
F	BRDQS1	BRDQS1#	BRCLK0#	BRCLK0	DVSS	DDRV	DDRV	DVSS	DVSS	ARCKE	ARA10	DVSS	ARA12	ARA1	ARA0	ARA5	ARRAS#	ARCSX#	DVSS
G		BRDQM0	BRDQ12	BRDQ14	BRCXS#	DDRV	DDRV		MEMTN	MEMTP	ARBA1		RVREF_ B	DVSS	DDRV	DVSS	DVSS	DDRV	DVSS
H			BRDQ10	BRRAS#	BRCAS#	BRODT	DDRV	DDRV		DDRV	DVSS		DDRV						DVSS
J	BRDQ1	BRDQ3	BRDQ8	DVSS	DVSS	DVSS		DDRV		DDRV	DVSS	DVSS							
K	BRDQ5	BRDQ7	BRCXS#	BRBA2	BRA5	BRA0	DVSS												
L			BRA7	BRWE#	BRA14	BRA8	DVSS	DVSS											
M	BRA2	BRRESE T	BRA9	BRA13	BRA11		DVSS												
N	BRBA0	BRA3	BRA1	BRA6	BRA12	BRA4	DDRV							AVDD33_ MEMPLL	AVSS33_ MEMPLL				
P	BRDQ22	BRDQ18	BRDQ20	BRA10	BRBA1	BRCKE	DDRV						RVREF_ C	VCKK	VCKK	VCKK	VCKK	VCKK	VCKK
R	DVSS	DVSS	DVSS	DVSS	DVSS	DVSS	DVSS							VCKK	DVSS	DVSS	DVSS	DVSS	DVSS
T			BRDQ27	BRDQ16	DDRV	DDRV	DVSS	DVSS						VCKK	DVSS	DVSS	DVSS	DVSS	DVSS
U	BRDQM3	BRDQ31	BRDQ29	BRDQ25	DDRV	DDRV	DVSS							VCKK	DVSS	DVSS	DVSS	DVSS	DVSS
V	BRDQS2#	BRDQS2	BRCLK1#	BRCLK1	DDRV	DDRV	RVREF_ D							VCKK	DVSS	DVSS	DVSS	DVSS	DVSS
W			BRDQS3#	BRDQS3#	DVSS	DVSS	DVSS	DVSS						VCKK	DVSS	DVSS	DVSS	DVSS	DVSS
Y	BRDQM2	BRDQ30	BRDQ28	DVSS	DVSS	DVSS	DVSS	DVSS						VCKK	DVSS	DVSS	DVSS	DVSS	DVSS
AA			BRDQ24	BRDQ26	DVSS		DVSS							VCKK	DVSS	DVSS	DVSS	DVSS	DVSS
AB	BRDQ21	BRDQ23	BRDQ19	BRDQ17	DVSS	DVSS								VCKK	DVSS	DVSS	DVSS	DVSS	DVSS
AC	DDRV	DDRV	DDRV	DDRV	DDRV	DDRV								VCKK	VCKK	VCKK	VCKK	VCKK	VCKK
AD	BE4P	BE4N												AVDD12_ REC	REXT	AVDD33_ COM	AVDD33_ LD	VCKK	AVDD12_ RGB
AE	BE3P	BE3N	BECKP	BECKN	AVSS33_ LVDSB	AVDD33_ LVDSB													
AF			BE2P	BE2N	AVSS12_ VPLL	AVDD12_ VPLL													
AG	BE1P	BE1N	BE0P	BE0N	AVSS12_ LVDS_1	AVDD12_ LVDS_1	REXT_V PLL												
AH			BO4P	BO4N	AVSS33_ LVDSA		AVDD33_ LVDSA												
AJ	BO3P	BO3N	BOCKP	BOCKN	AVSS12_ LVDS_2	AVDD12_ LVDS_2													
AK			BO2P	BO2N					VCC3IO_ B	VCC3IO_ B	VCC3IO_ B						AVSS33_ VGA_ST B	AVDD33_ VGA_ST B	
AL	BO1P	BO1N	BO0P	BO0N					VCC3IO_ B					AVSS12_ REC	AVSS33_ COM	AVSS33_ LD			
AM			AE4P	AE4N			VCKK	VCKK	LDM_DO	AOSDAT A4	AOSDAT A3	AOMCLK		JTDI		PHYLED 0		OPCTRL 7	OPCTRL 2
AN	AE3P	AE3N					VCKK	VCKK	AOSDAT A0	AOSDAT A1	AOSDAT A2	OSCL0		JTRST#	OSCL1	PHYLED 1		OPCTRL 9	OPCTRL 6
AP	AECKP	AECKN	AO4P	AO3P	AO2P	AO1P	VCKK	VCKK	GPIO52	LDM_DI	AOLRCK	OSDA0	AVDD33_ USB_P2 P3	JTCK	OSDA1			U0RX	OPCTRL 5
AR	AE2P	AE2N	AO4N	AO3N	AO2N	AO1N	VCKK	VCKK	GPIO54	LDM_VS YNC	AOBCK	OPWM0	AVSS33_ USB_P2 P3	JTDO	JTMS	ASPDIF0		U0TX	OPCTRL 4
AT	AE1P	AE0P		AOCKP		AO0P	VCKK	VCKK	GPIO53		LDM_CS	OPWM1	USB_DP _P2	USB_DP _P3		U1TX	RXVP_1	TXVP_0	
AU	AE1N	AE0N		AOCKN		AO0N	VCKK	VCKK	GPIO55		LDM_CL K	OPWM2	USB_DM _P2	USB_DM _P3		U1RX	RXVN_1	TXVN_0	
LB	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	RT
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Figure 8-4 Pin configuration -1-

Pinning information 2, MT5396JDNJ

ARCLK0	ARCLK0		ARDQ9		DDRV	DVSS	TCON5	TCON7	GPI045		PDD3	PDD1		PACLE	POWE#	SD_D2	SD_D0	A
ARDQS1	ARDQS0		ARDQ11		DDRV	DVSS	TCON4	TCON6	TCON12		PDD4	PDD2		POCE1#	SD_D3	SD_CMD	SD_CLK	B
ARDQS1	ARDQS0	ARDQ15	ARDQ0	ARDQ6	DDRV	DVSS		TCON8	EMMC_C LK	PDD6	GPI047	PDD0	POOE#	PAALE	SD_D1	USB_DP _P0	USB_DM _P0	C
ARDQ12	ARDQM1	ARDQ13	ARDQ2	ARDQ4	DDRV	DVSS	FSRC_W R	TCON9	PDD7	PDD5	GPI046	PARB#	POCE0#	AVSS33_ USB_P1	AVDD33_ USB_P0 P1	USB_DP _P1	USB_DM _P1	D
DDRV	DVSS	DVSS	DDRV	DDRV	DVSS		TCON1	TCON10	GPI051	GPI048	GPI049	GPI043	GPI042	VCC3IO_ A	GPI035	GPI028	GPI036	E
DDRV	DVSS	DVSS	DDRV	DDRV	DVSS		TCON0	TCON11	TCON3	TCON2	GPI050	GPI044	VCC3IO_ A	GPI027	GPI034	GPI02	GPI01	F
DDRV	RVREF_ A	DVSS	DDRV	DDRV	DVSS						VCC3IO_ A	VCC3IO_ A	GPI024	GPI06	GPI05	GPI04	GPI03	G
		DVSS							VCC3IO_ A	VCC3IO_ A	GPI026	GPI00	GPI012	GPI07	GPI025			H
		DVSS							VCC3IO_ A	VCC3IO_ A		GPI015	GPI023	GPI016	GPI022	GPI020	GPI021	J
											GPI011	GPI010	GPI017	GPI018	GPI014	GPI019		K
											GPI09	GPI041	GPI08	GPI013				L
											GPI040	GPI033	GPI038	GPI031	GPI039	GPI032		M
		DVSS									GPI037	GPI029	SPI_DAT A	SPI_CLE	CI_INT	SPI_CLK 1		N
VCCK	DVSS	DVSS	VCCK								GPI030	PVR_TS DATA0	PVR_TS DATA1	SPI_CLK				P
DVSS	DVSS	DVSS	DVSS	VCCK								PVR_TS VAL	PVR_TS SYNC	PVR_TS CLK	CI_TSDA TA0	CI_TSVL L	CI_TSSV NC	R
DVSS	DVSS	DVSS	DVSS	VCCK					DEM0D_ TSDATA3	DEM0D_ TSVAL	DEM0D_ TSCCLK	DEM0D_ TSDATA2	DEM0D_ TSTSYNC	DEM0D_ RST	DEM0D_ TSDATA0	DEM0D_ CI_TSC K		T
DVSS	DVSS	DVSS	DVSS	AVDD12_ PCIE11										RF_AGC	IF_AGC	DEM0D_ TSDATA1		U
DVSS	DVSS	DVSS	VCCK	AVDD33_ PCIE11					DEM0D_ TSDATA7	DEM0D_ TSDATA6	DEM0D_ TSDATA5	DEM0D_ TSDATA4	OSDA2	OSCL2				V
DVSS	DVSS	DVSS	VCCK	AVDD12_ HDMI_2_ RX					AVSS12_ PCIE11					PCIE11_ TXN	PCIE11_ TXP	PCIE11_ REFCKN	PCIE11_ REFCKP	W
DVSS	DVSS	DVSS	VCCK	AVDD12_ HDMI_1_ RX					AVDD33_ HDMI_2_ RX			ASPDIF1	ALIN	PCIE11_ RXN	PCIE11_ RXP			Y
DVSS	DVSS	DVSS	VCCK	AVDD12_ HDMI_0_ RX					AVDD33_ HDMI_1_ RX			HDMI_C EC		HDMI_2_ RX_1B	HDMI_2_ RX_1	HDMI_2_ RX_2B	HDMI_2_ RX_2	AA
DVSS	DVSS	DVSS	DVSS	AVDD12_ HDMI_3_ RX					AVDD33_ HDMI_0_ RX	AVSS33_ HDMI_R X		HDMI_2_ SDA	HDMI_2_ RX_0B	HDMI_2_ RX_0				AB
VCCK	VCCK	VCCK	VCCK	VCCK					AVDD33_ HDMI_3_ RX		HDMI_2_ PWR5V	HDMI_2_ HPD	HDMI_2_ SCL	HDMI_1_ RX_2B	HDMI_1_ RX_2	HDMI_2_ RX_CB	HDMI_2_ RX_C	AC
AVDD33_ VDAC_B G	AVDD33_ VDAC	AVDD33_ DEM0D	VCCK	VCCK					AVSS33_ HDMI_R X				HDMI_1_ SDA	HDMI_1_ RX_1B	HDMI_1_ RX_1			AD
									AVSS33_ DAC1	HDMI_1_ PWR5V	HDMI_1_ HPD	HDMI_1_ SCL	HDMI_1_ RX_CB	HDMI_1_ RX_C	HDMI_1_ RX_0B	HDMI_1_ RX_0		AE
									AVDD33_ DAC1	AVSS33_ HDMI_R X	AVSS33_ HDMI_R X	HDMI_0_ SDA	HDMI_0_ RX_2B	HDMI_0_ RX_2				AF
									AVDD33_ DAC	HDMI_0_ PWR5V	HDMI_0_ HPD	HDMI_0_ SCL	HDMI_0_ RX_0B	HDMI_0_ RX_0	HDMI_0_ RX_1B	HDMI_0_ RX_1		AG
						AVSS33_ XTAL_ST B					HDMI_3_ PWR5V	HDMI_3_ SCL	HDMI_3_ SDA	HDMI_0_ RX_CB	HDMI_0_ RX_C			AH
AVDD10_ LDO	AVSS12_ RGB	AVSS33_ VDAC_B G				AVSS12_ DEM0D	VMID_AA DC	AVSS33_ AADC				HDMI_3_ HPD	HDMI_3_ RX_C	HDMI_3_ RX_1B	HDMI_3_ RX_1	HDMI_3_ RX_2B	HDMI_3_ RX_2	AJ
			AVDD33_ PLLGP	AVDD33_ CVBS_1	AVDD33_ CVBS_2		AVDD33_ XTAL_ST B		AVSS33_ DAC				HDMI_3_ RX_CB	HDMI_3_ RX_0B	HDMI_3_ RX_0			AK
				AVSS33_ VDAC	AVSS33_ CVBS_1		AVDD12_ DEM0D		AVDD33_ AADC									AL
OPWRS B		ORESET #	ADIN7_S RV	ADIN6_S RV	VSYNC	AVSS33_ CVBS_2	AVSS33_ PLLGP	AVSS33_ DEM0D				AR1_AD AC	AL2_ADA C	AL1_ADA C	AL3_ADA C	AR3_AD AC	AR2_AD AC	AM
OPCTRL 1	OPCTRL 3	LED_PW M1	ADIN0_S RV	ADIN1_S RV	HSYNC			MPXP	CVBS0P	LOUTP				AL0_ADA C	AR0_AD AC			AN
OPCTRL 8	LED_PW M0	VGA_SC L	ADIN2_S RV	COM	SOY1	PR1P	Y0P	SC0	VDACY_ OUT	CVBS_C OM	LOUTN	AIN4_L_ AADC		AIN2_L_ AADC		AIN6_L_ AADC	AIN5_L_ AADC	AP
OPCTRL 0	STB_SD A	VGA_SD A	ADIN3_S RV	GP	RP	PB1P	SOY0	PR0P	SY0	CVBS2P	CVBS1P		AIN4_R_ AADC		AIN6_R_ AADC	AIN5_R_ AADC	AIN3_L_ AADC	AR
OPCTRL 10	STB_SC L		ADIN5_S RV	SOG		COM1		PB0P		CVBS3P		ADCINN_ DEM0D		XTALI	AIN1_R_ AADC	AIN3_R_ AADC	AIN1_L_ AADC	AT
OPCTRL 11	OIRI		ADIN4_S RV	BP		Y1P		COM0		VDACX_ OUT		ADCINP_ DEM0D		XTALO	AIN0_L_ AADC	AIN2_R_ AADC	AIN0_R_ AADC	AU
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	RB

19300_042_120416.eps
120416

Figure 8-5 Pin configuration -2-

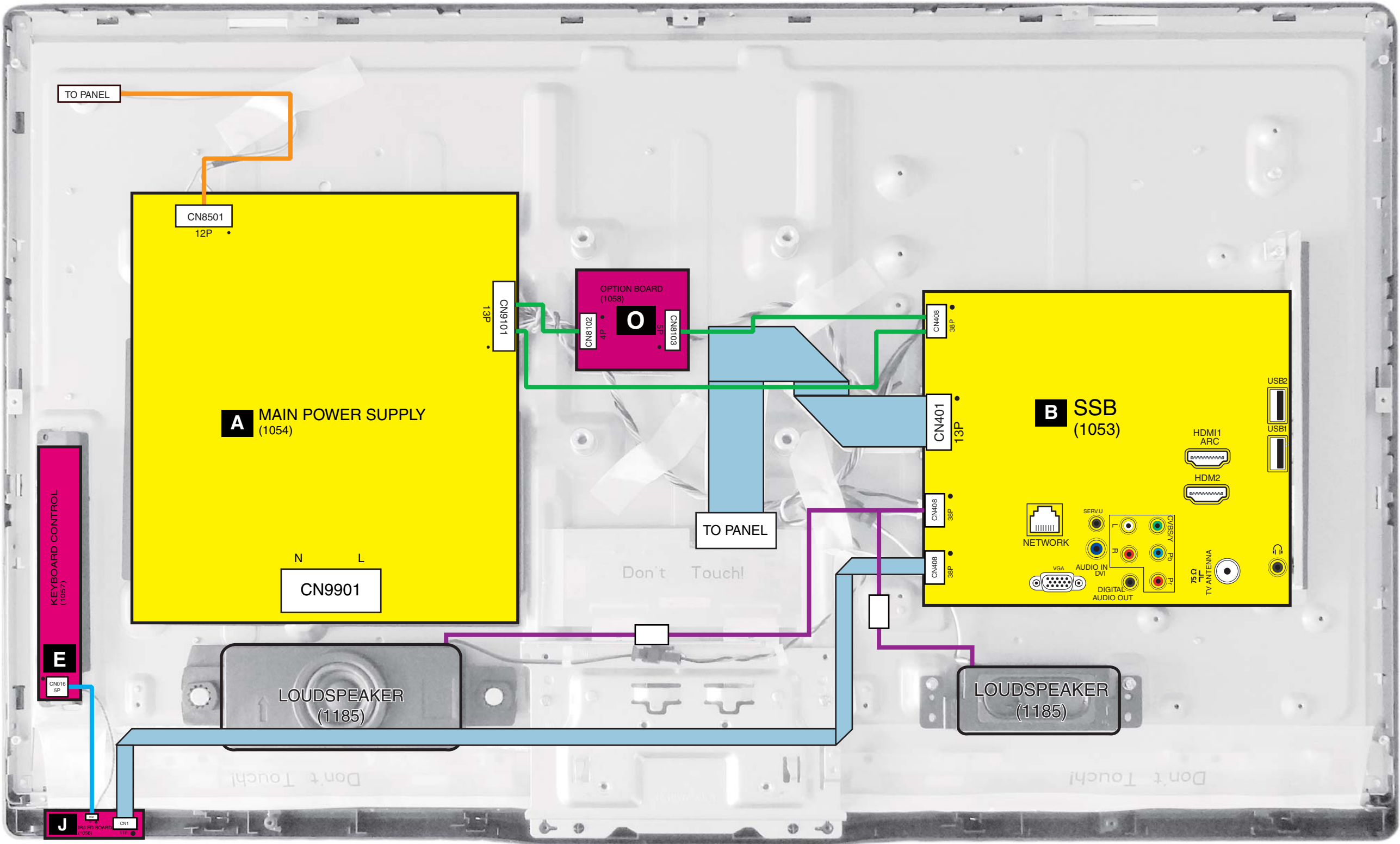
9. Block Diagrams

9-1 Wiring Diagram 32" (3500 series)

See note in Chapter 6 about cable position numbers

- Board Level Repair
- Component Level Repair
Only for authorized workshops

WIRING DIAGRAM 32" (3500 series)

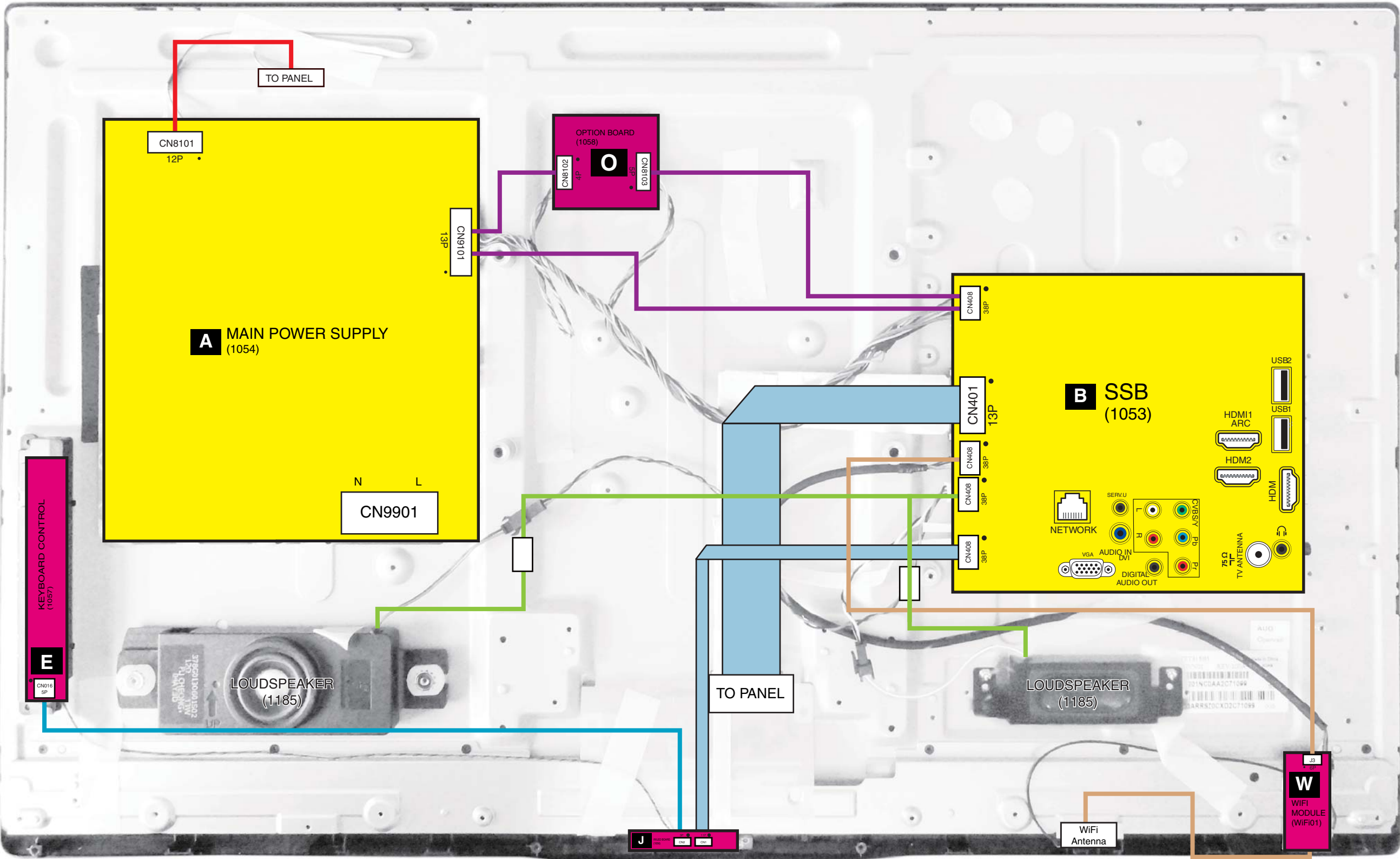


9-2 Wiring Diagram 32" (4500 series)

See note in Chapter 6 about cable position numbers

WIRING DIAGRAM 32" (4500 series)

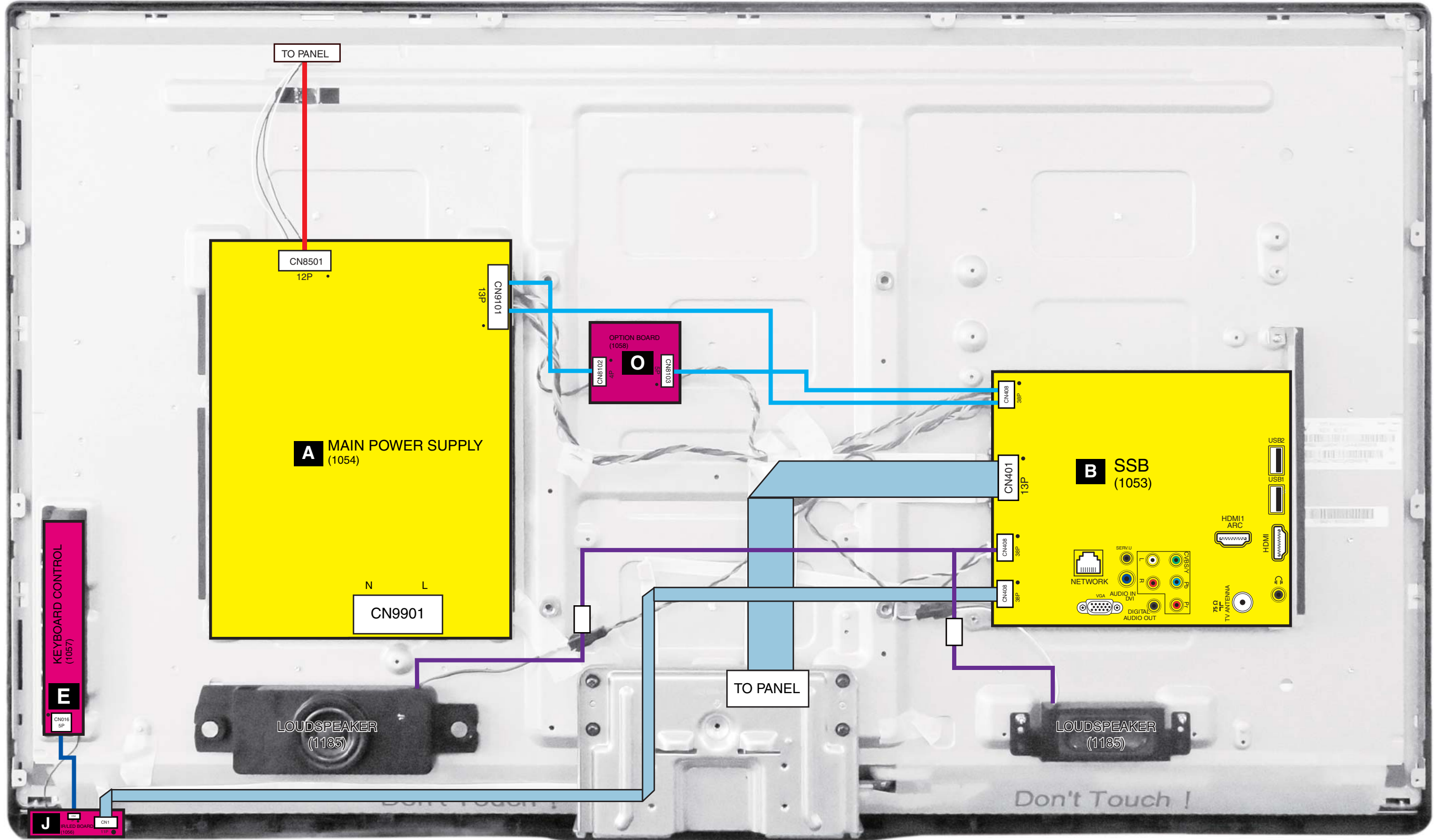
- Board Level Repair
- Component Level Repair
Only for authorized workshops



See note in Chapter 6 about cable position numbers

WIRING DIAGRAM 39" (3500 series)

-  Board Level Repair
-  Component Level Repair
Only for authorized workshops

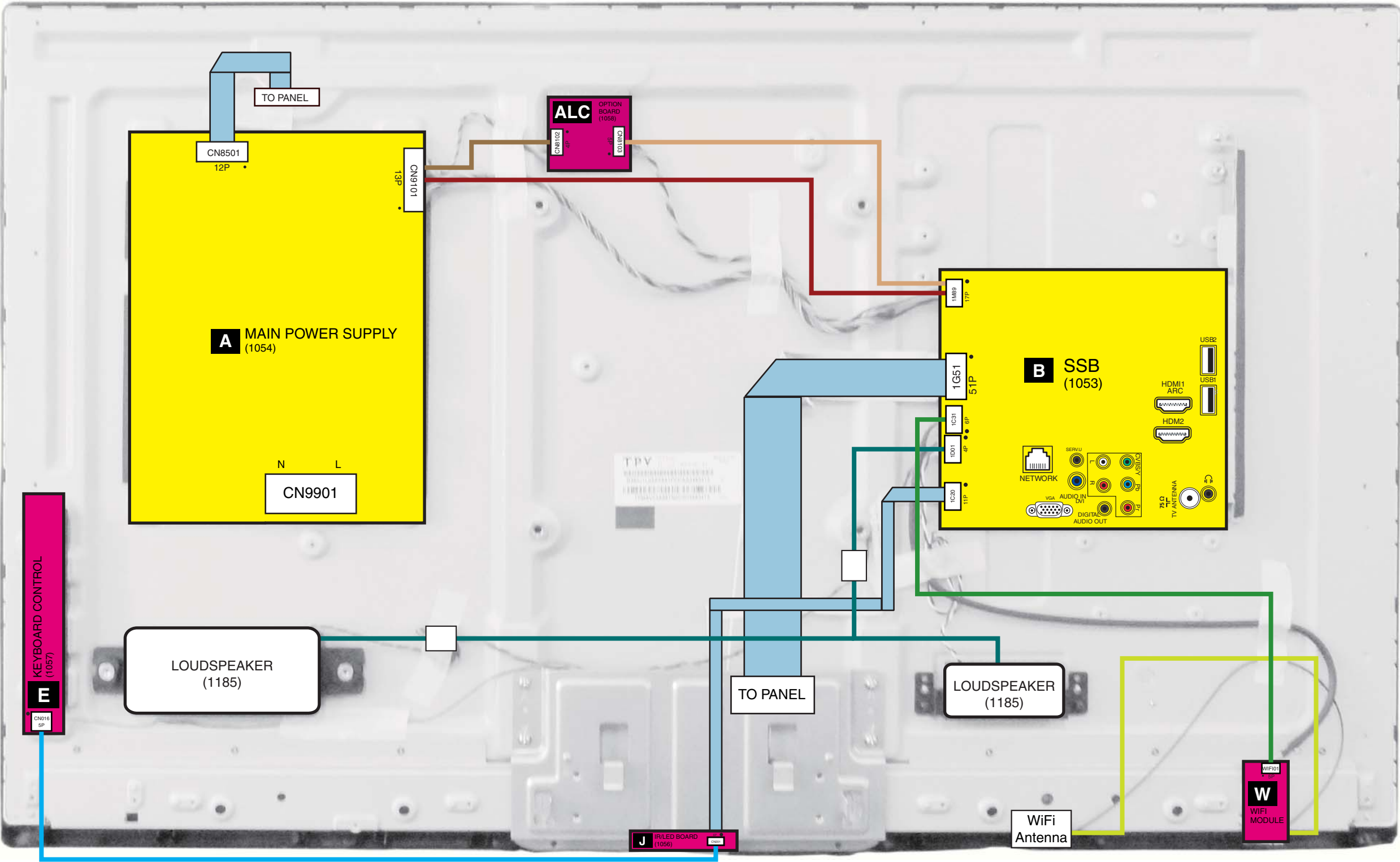


9-4 Wiring Diagram 39" (4500 series)

See note in Chapter 7 about cable position numbers

WIRING DIAGRAM 39" (4500 series)

- Board Level Repair
- Component Level Repair
Only for authorized workshops

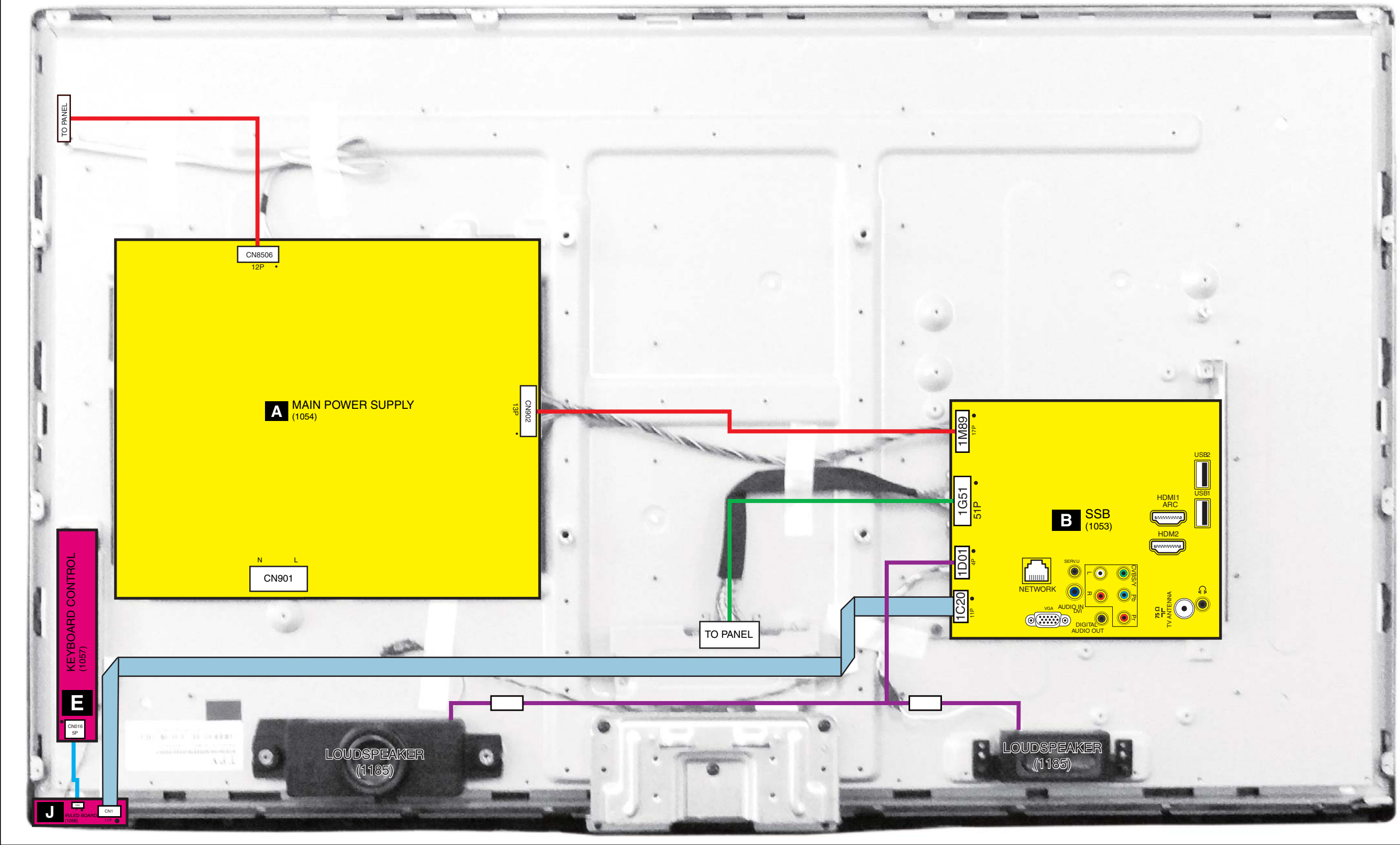


9-5 Wiring Diagram 42" (3500 series)

WIRING DIAGRAM 42" (3500 series)

See note in Chapter 6 about cable position numbers

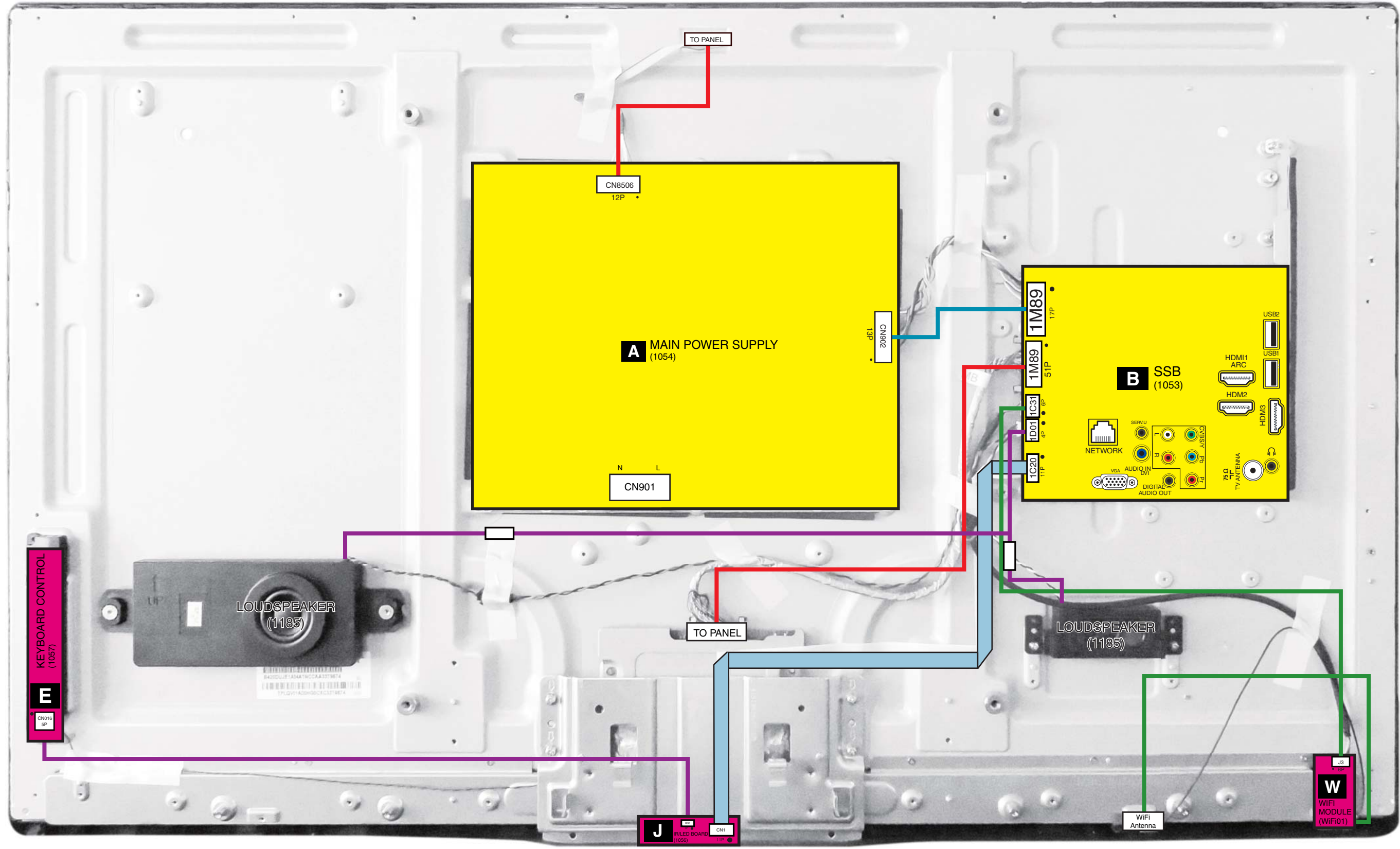
- Board Level Repair
- Component Level Repair
Only for authorized workshops



See note in Chapter 6 about cable position numbers

WIRING DIAGRAM 42" (4500 series)

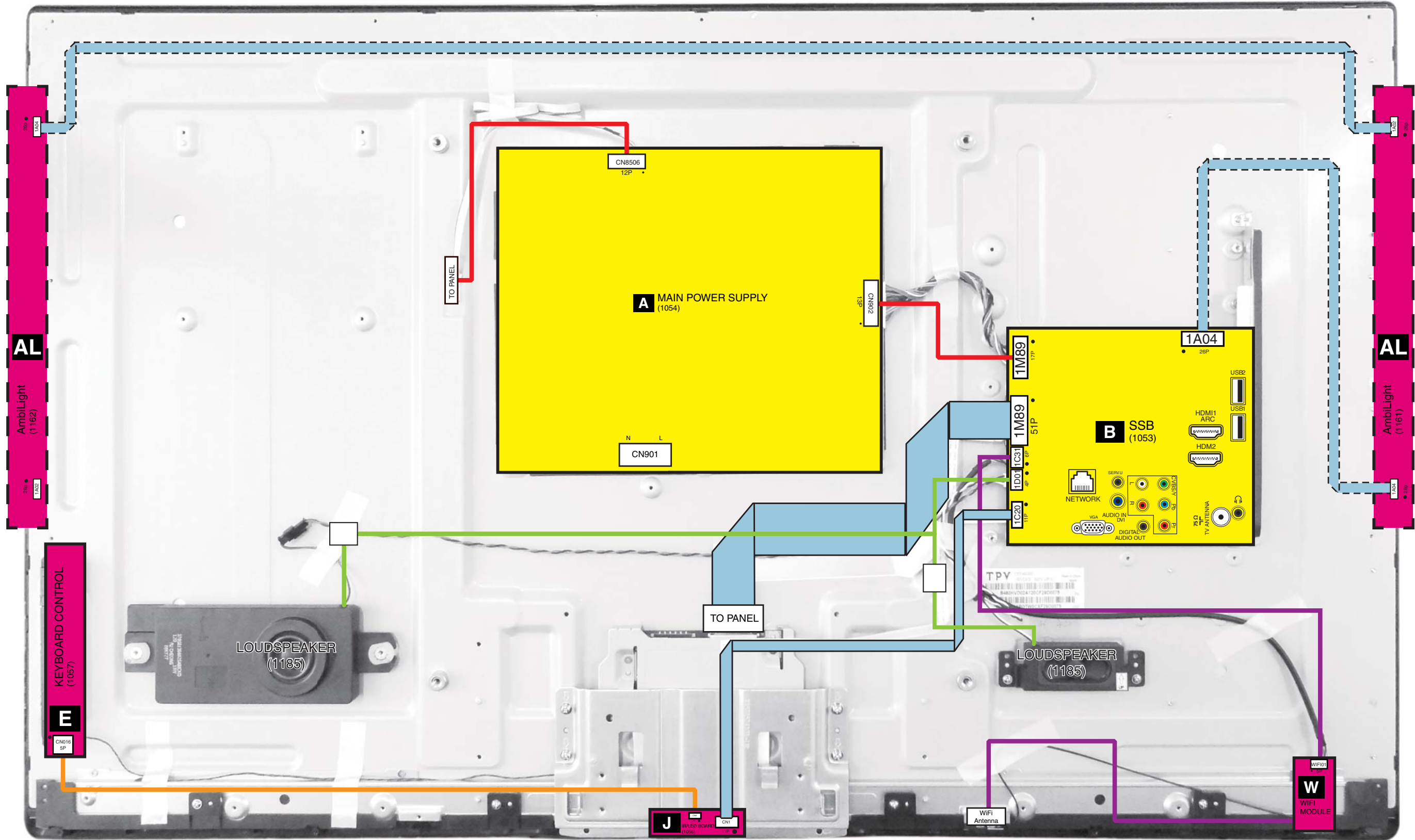
-  Board Level Repair
-  Component Level Repair
Only for authorized workshops



WIRING DIAGRAM 42"/46" (5000/5500 series)

See note in Chapter 7 about cable position numbers

- Board Level Repair
- Component Level Repair
Only for authorized workshops

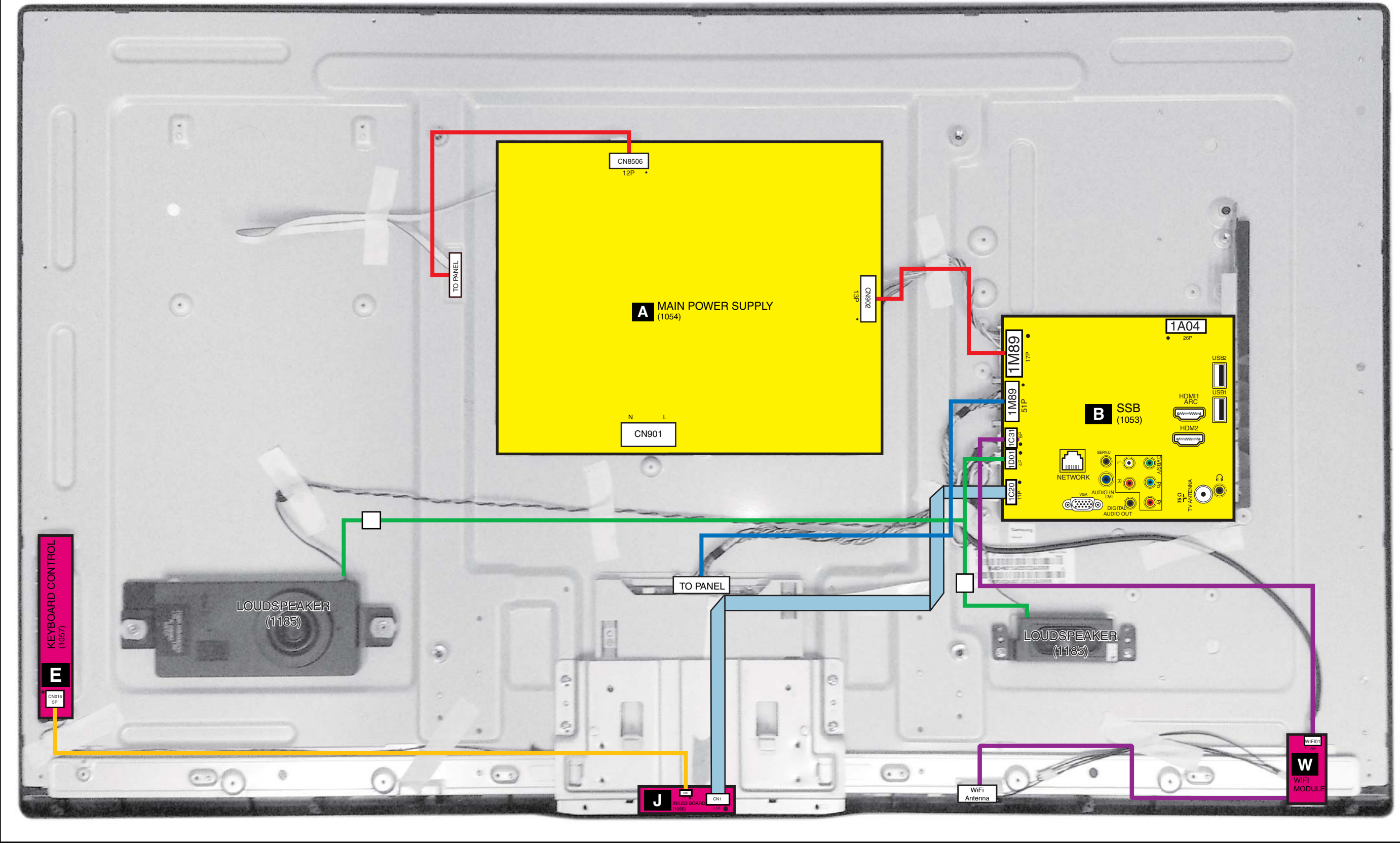


9-8 Wiring Diagram 46" (4500 series)

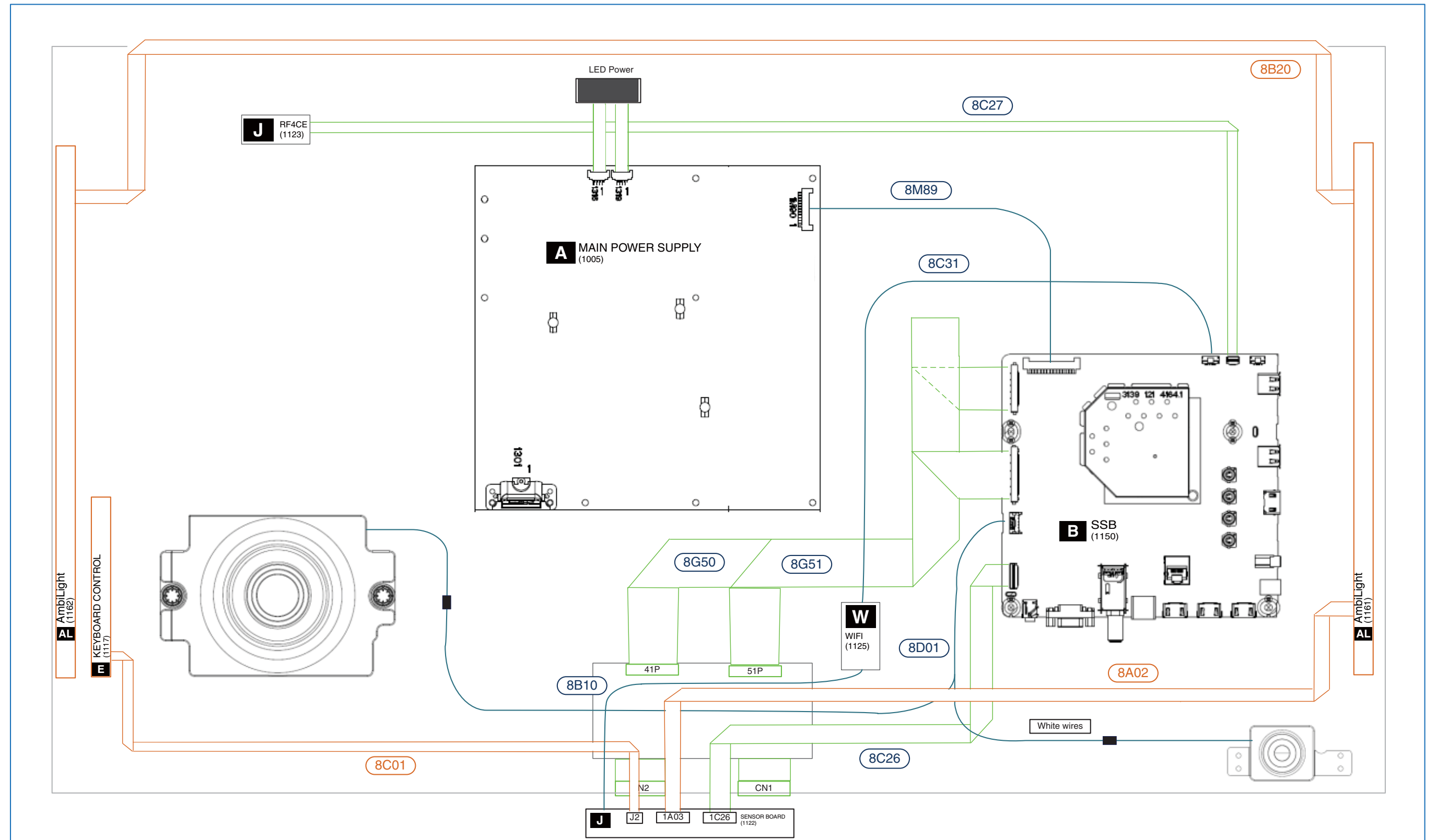
WIRING DIAGRAM 46" (4500 series)

See note in Chapter 7 about cable position numbers

- Board Level Repair
- Component Level Repair
Only for authorized workshops

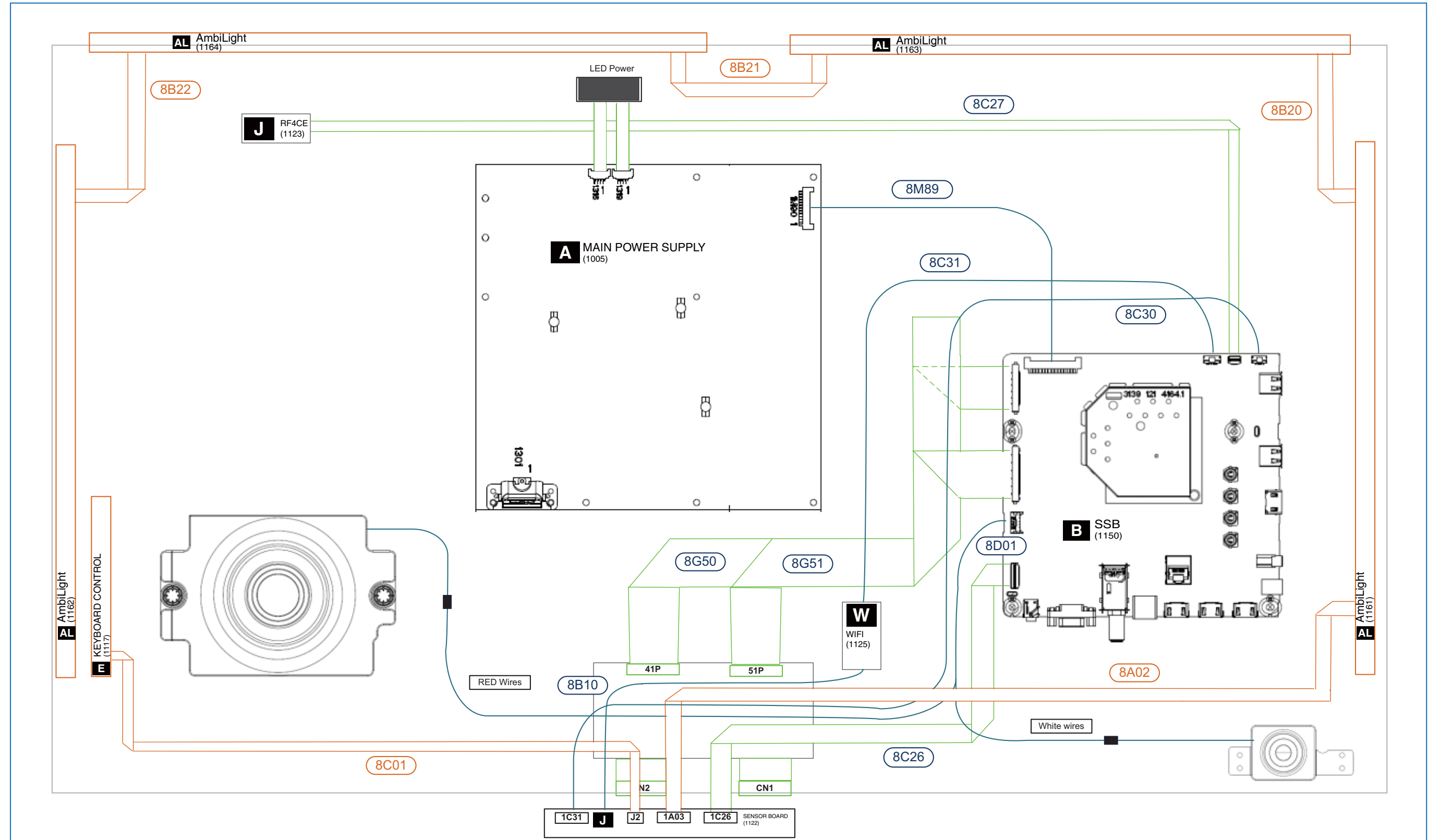


Wiring diagram 47" (7000 series)



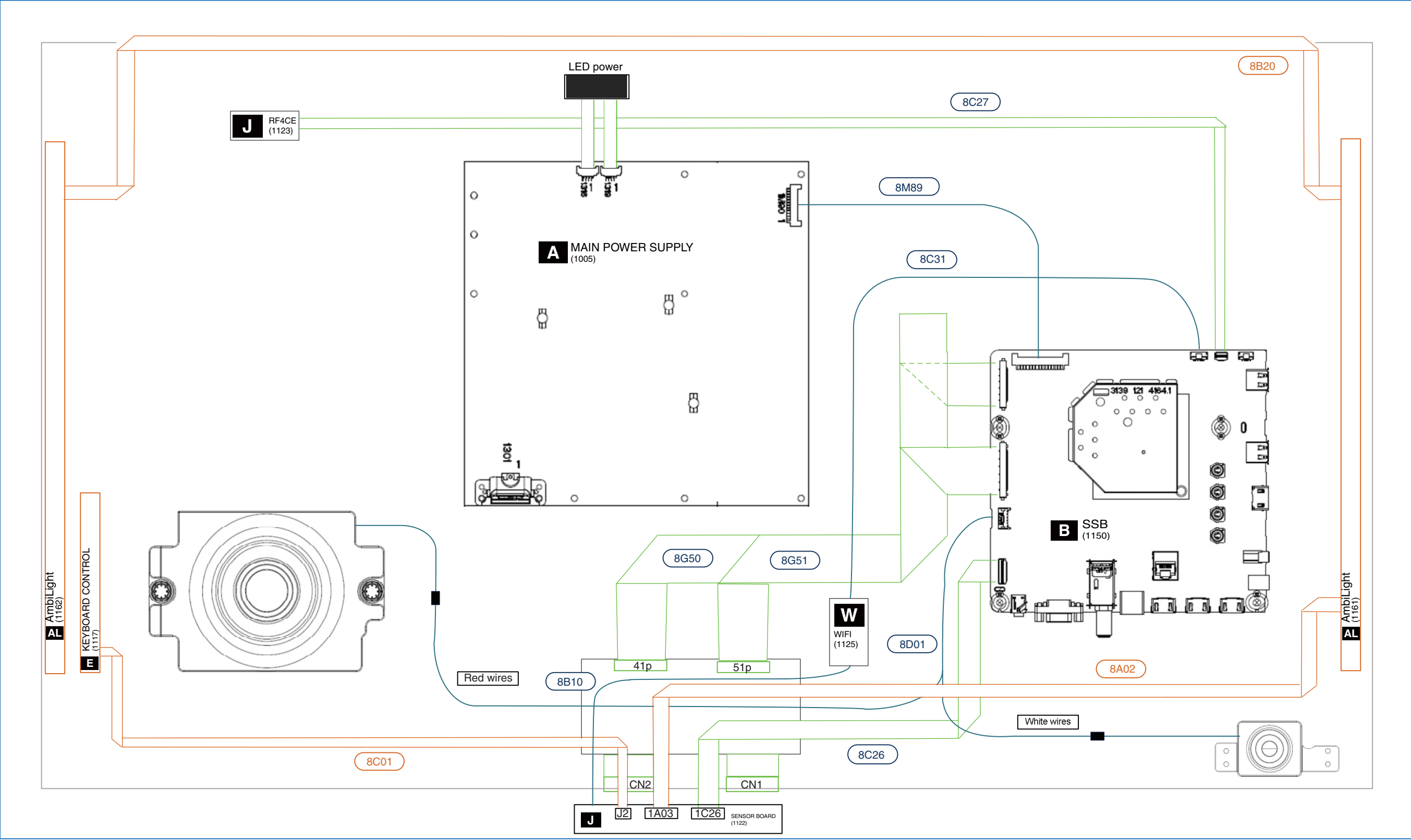
Note: Modules and cables shown in brown colour are mounted in the rear cover.

Wiring diagram 47" (8000 series)



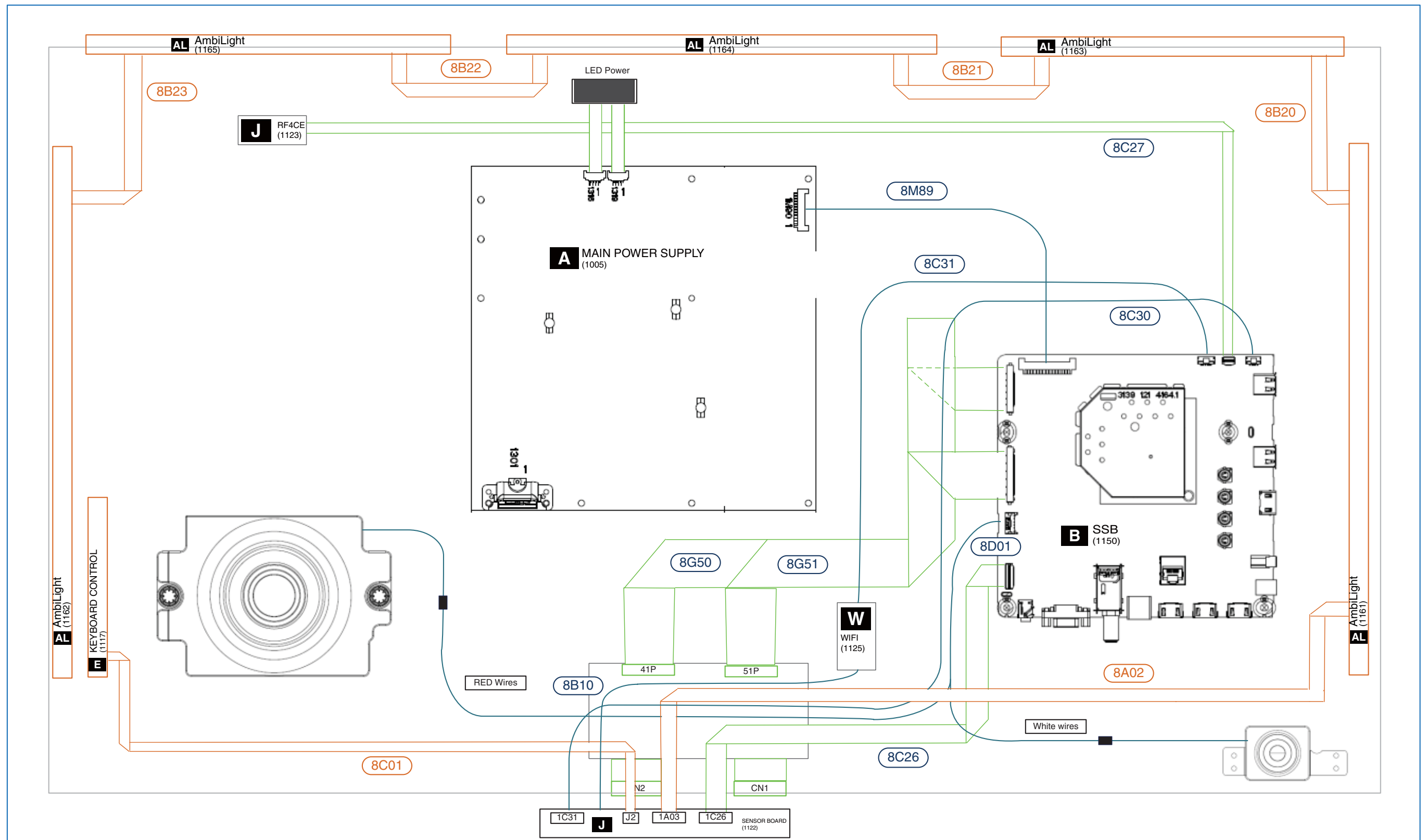
Note: Modules and cables shown in brown colour are mounted in the rear cover.

Wiring diagram 55" (7000 series)



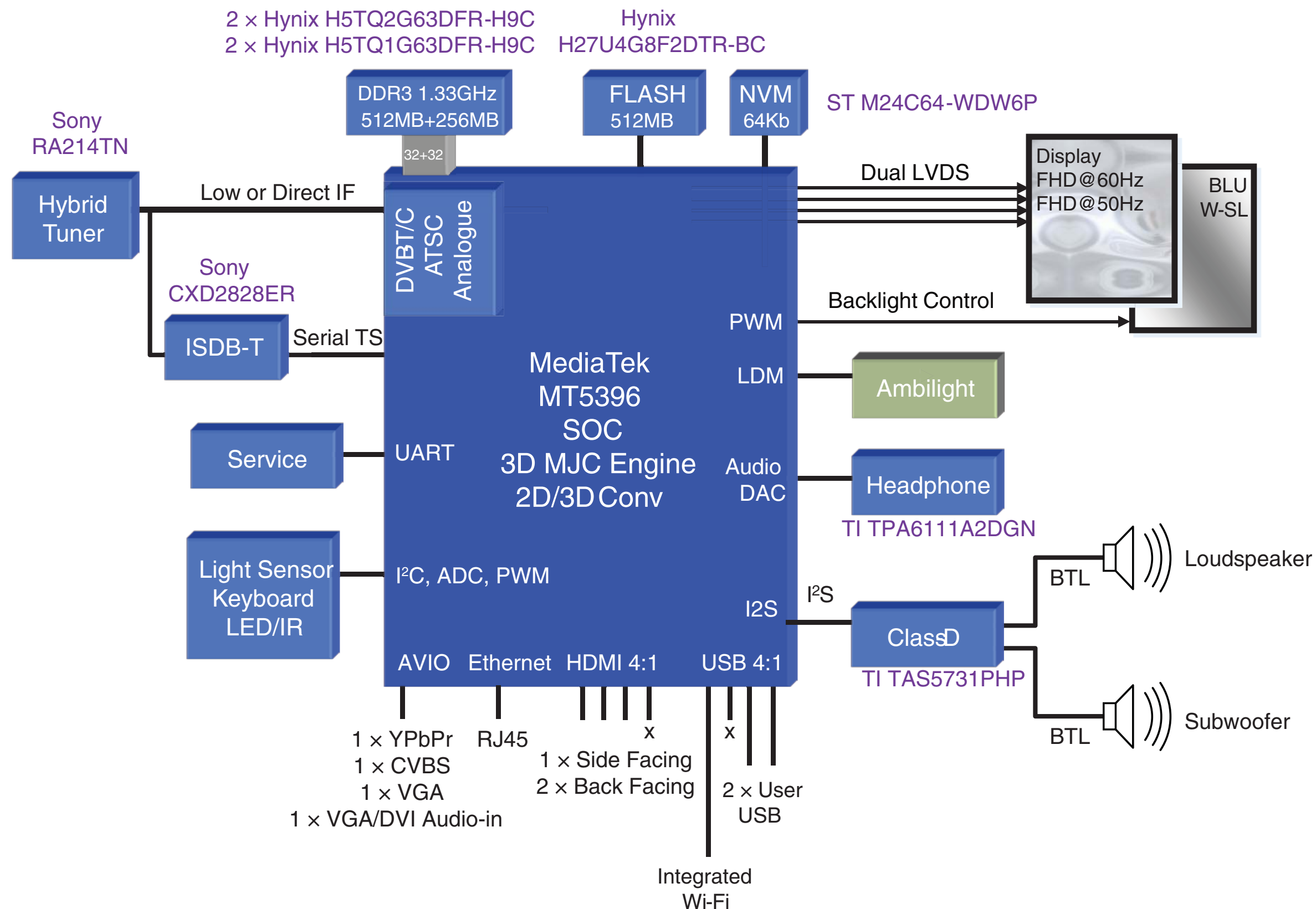
Note: Modules and cables shown in brown colour are mounted in the rear cover.

Wiring diagram 55" (8000 series)

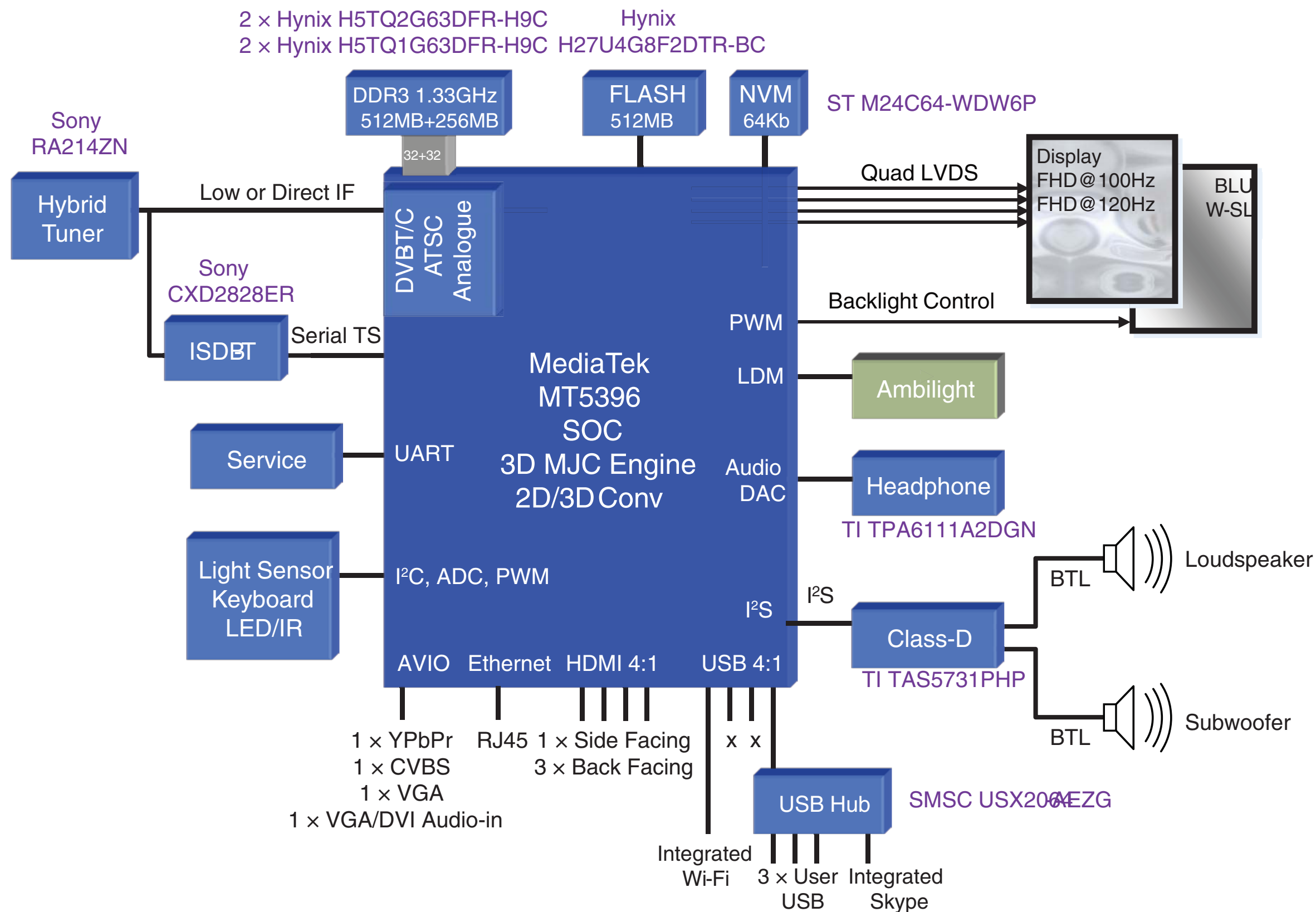


Note: Modules and cables shown in brown colour are mounted in the rear cover.

MT5396 Block Diagram (3139 123 65451)

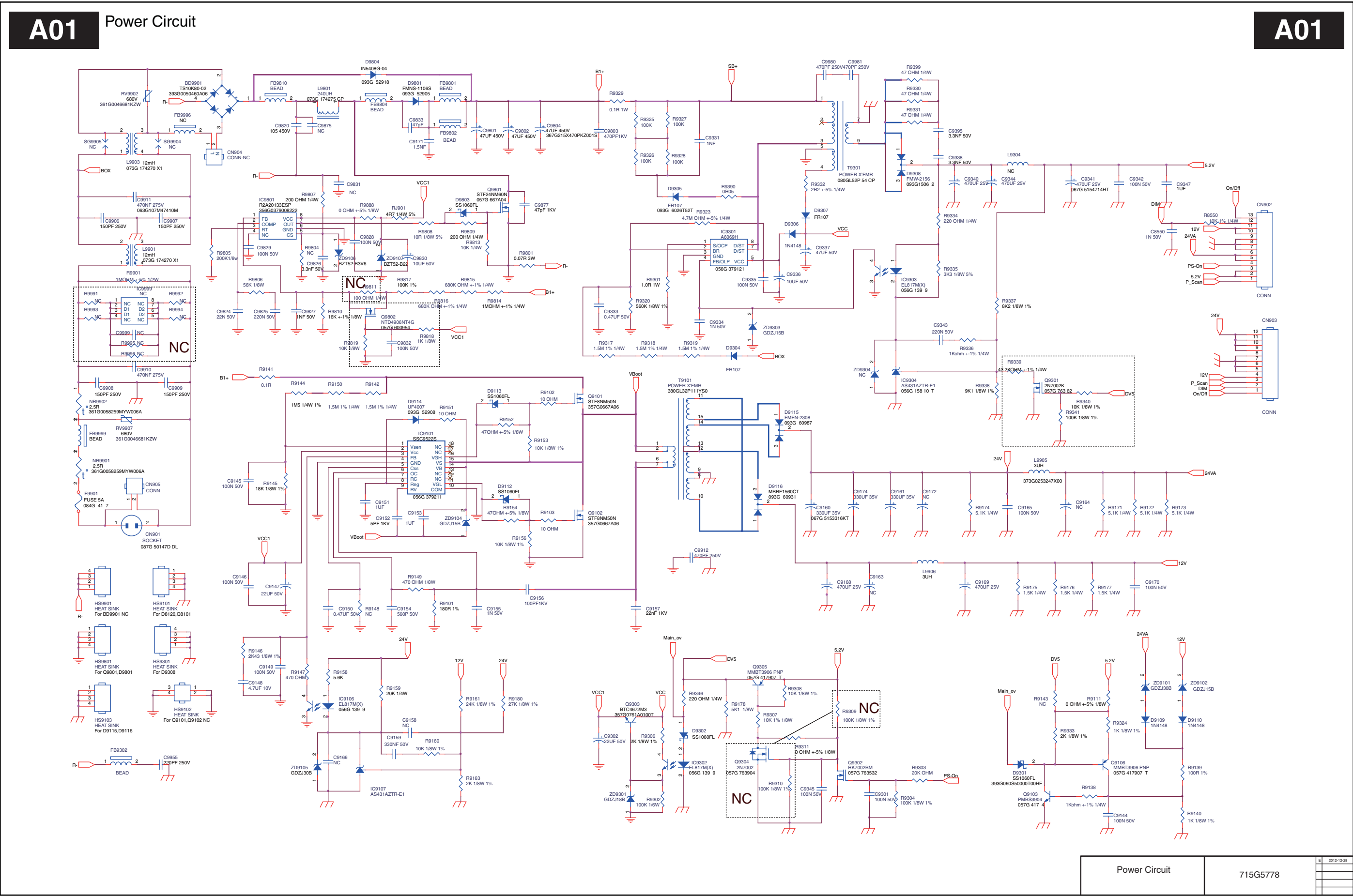


MT5396 Block Diagram (3139 123 65441)



10. Circuit Diagrams and PWB Layouts

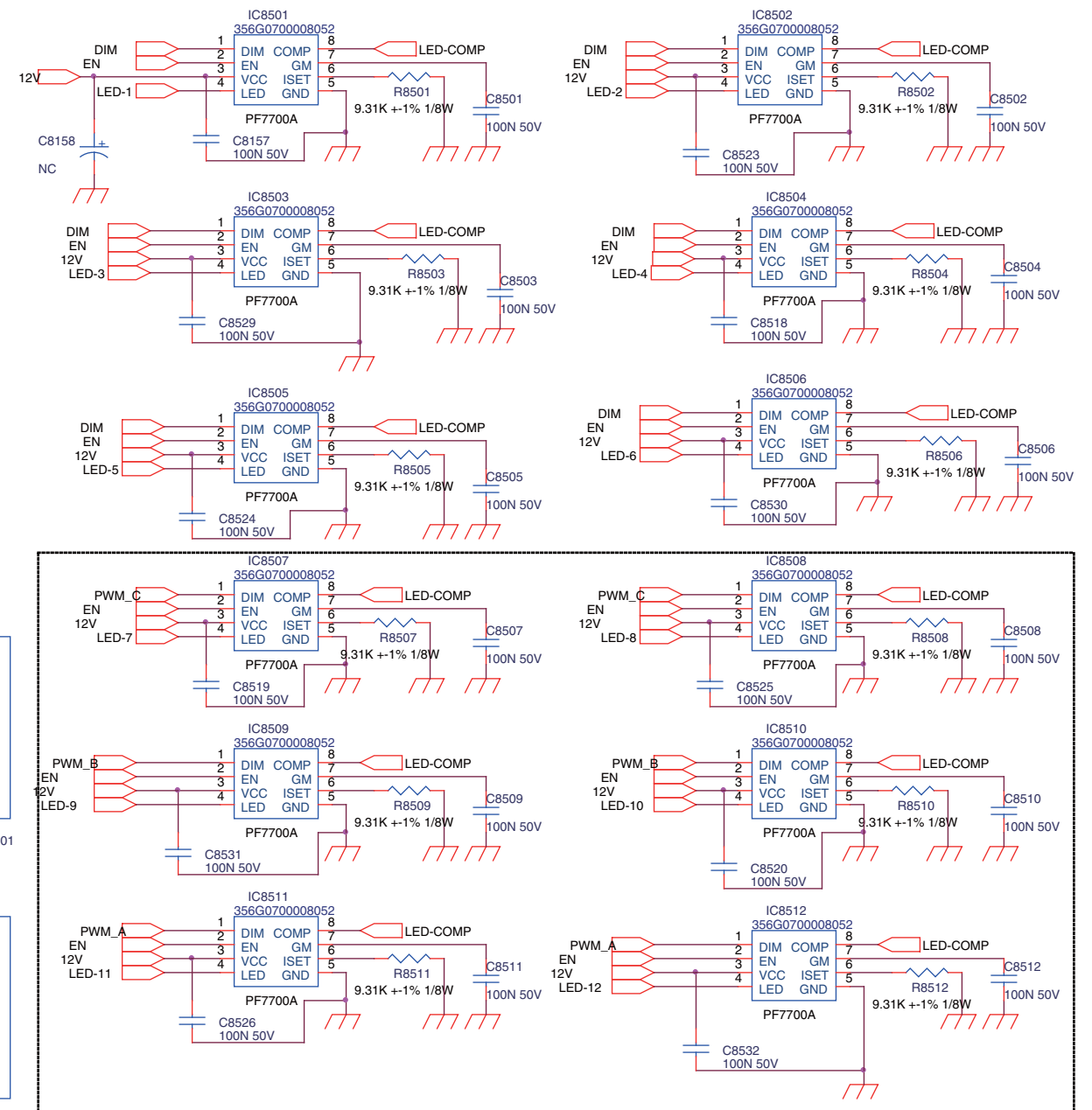
10.1 A 715G5778 PSU 10-1-1 A01, Power Circuit



Power Circuit

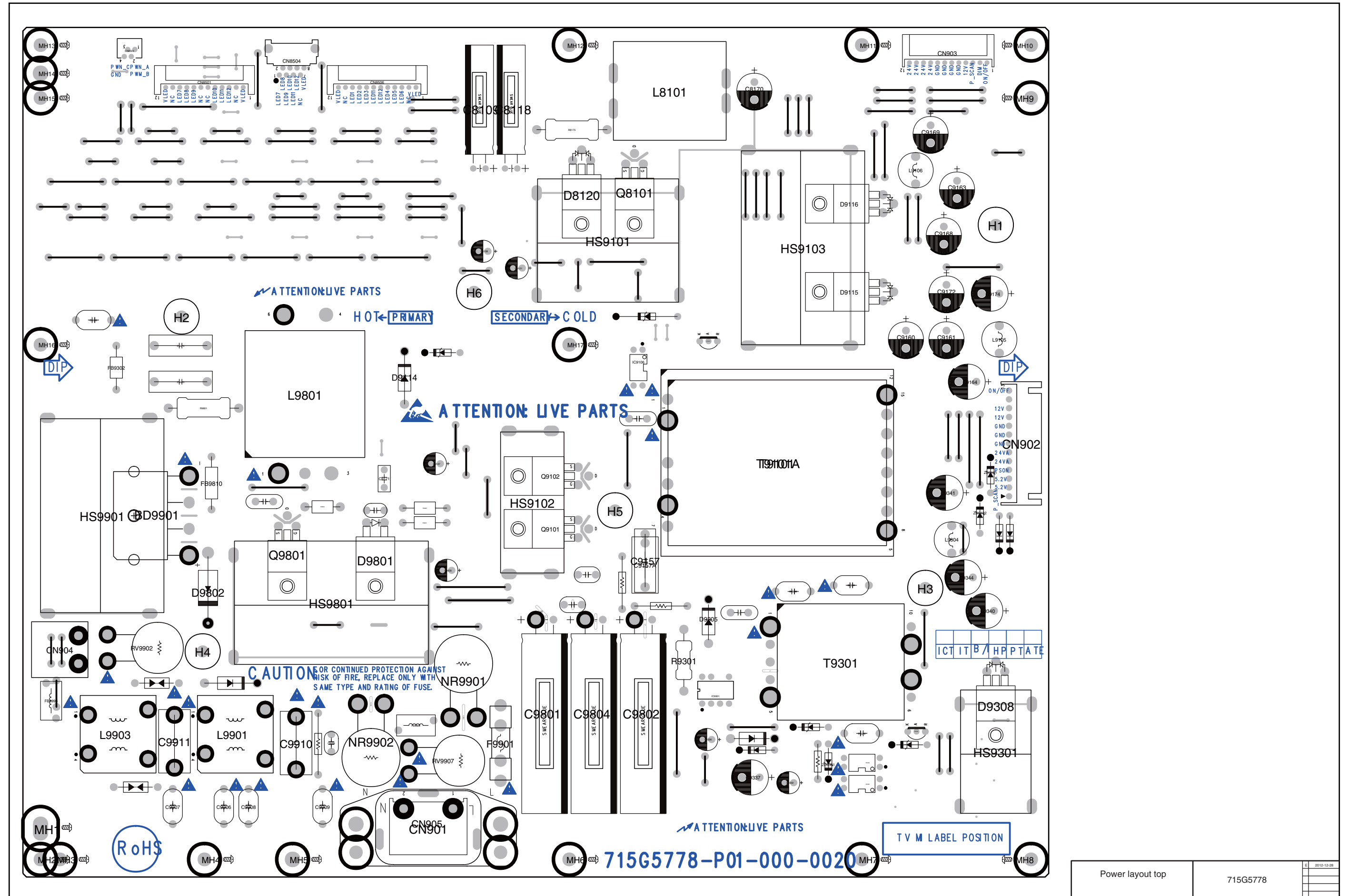
715G5778

E	2012-12-28

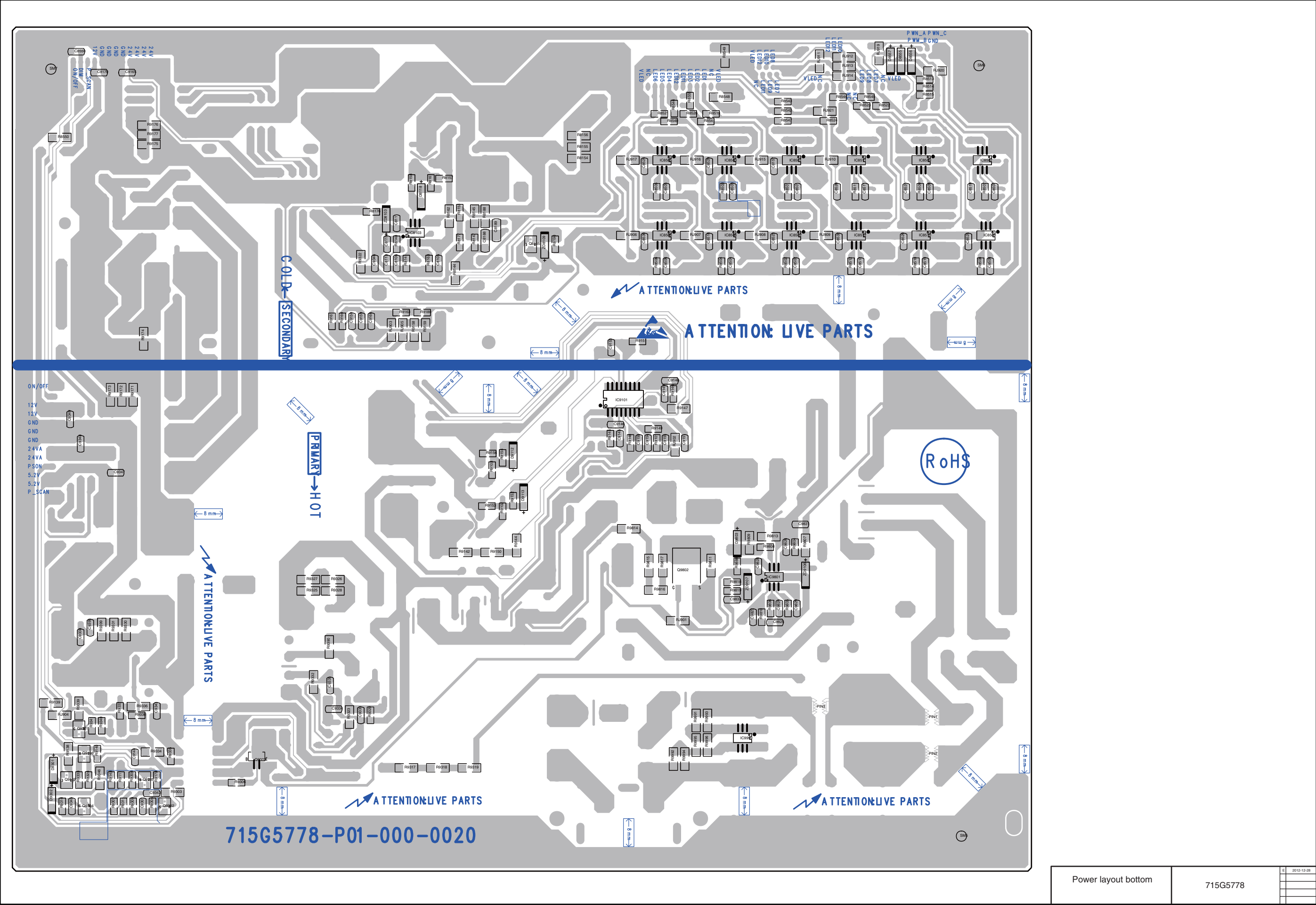


19430_501_130114.eps
130114

10-1-3 Power layout top

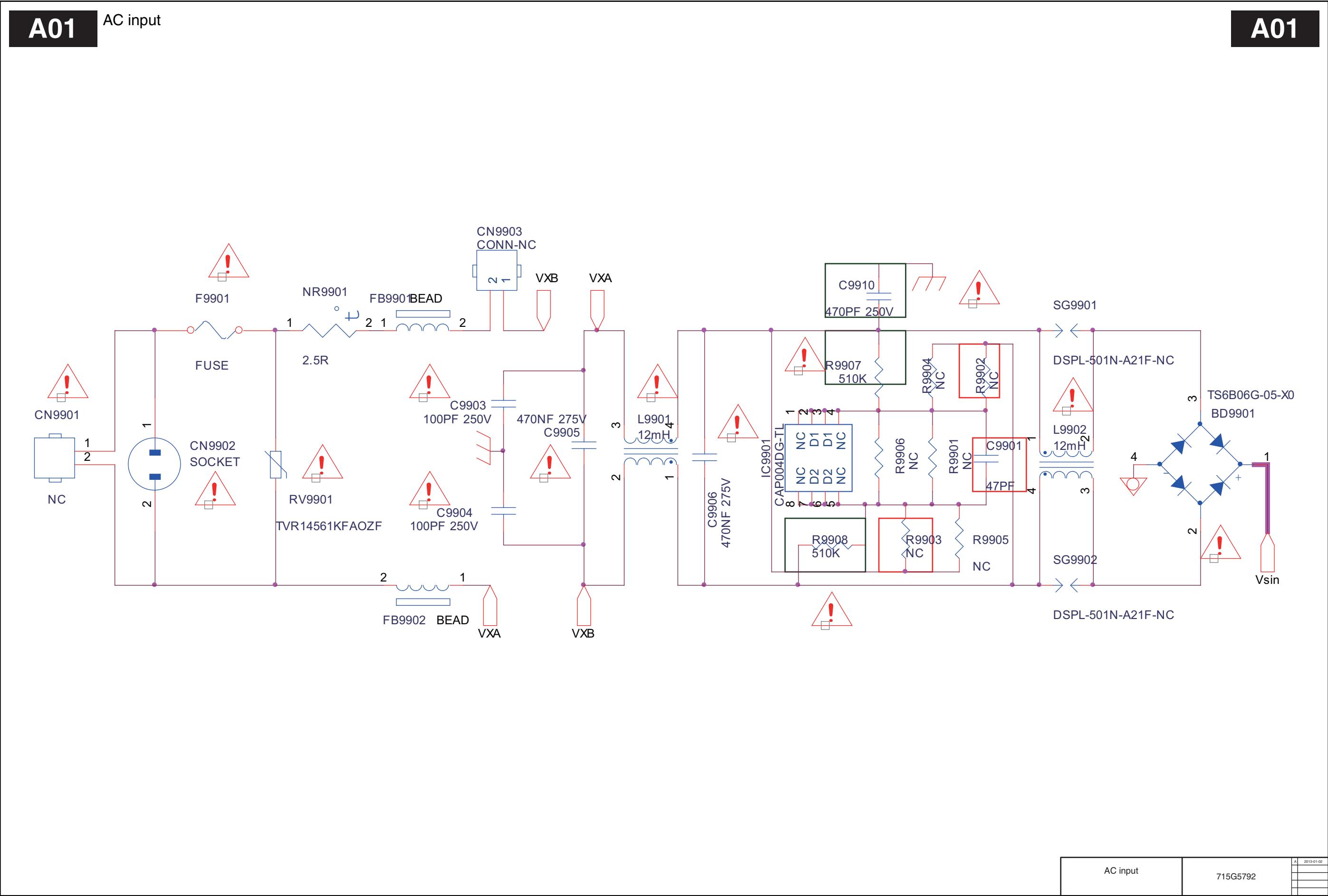


10-1-4 Power layout bottom



Power layout bottom	715G5778	6	2013-12-28

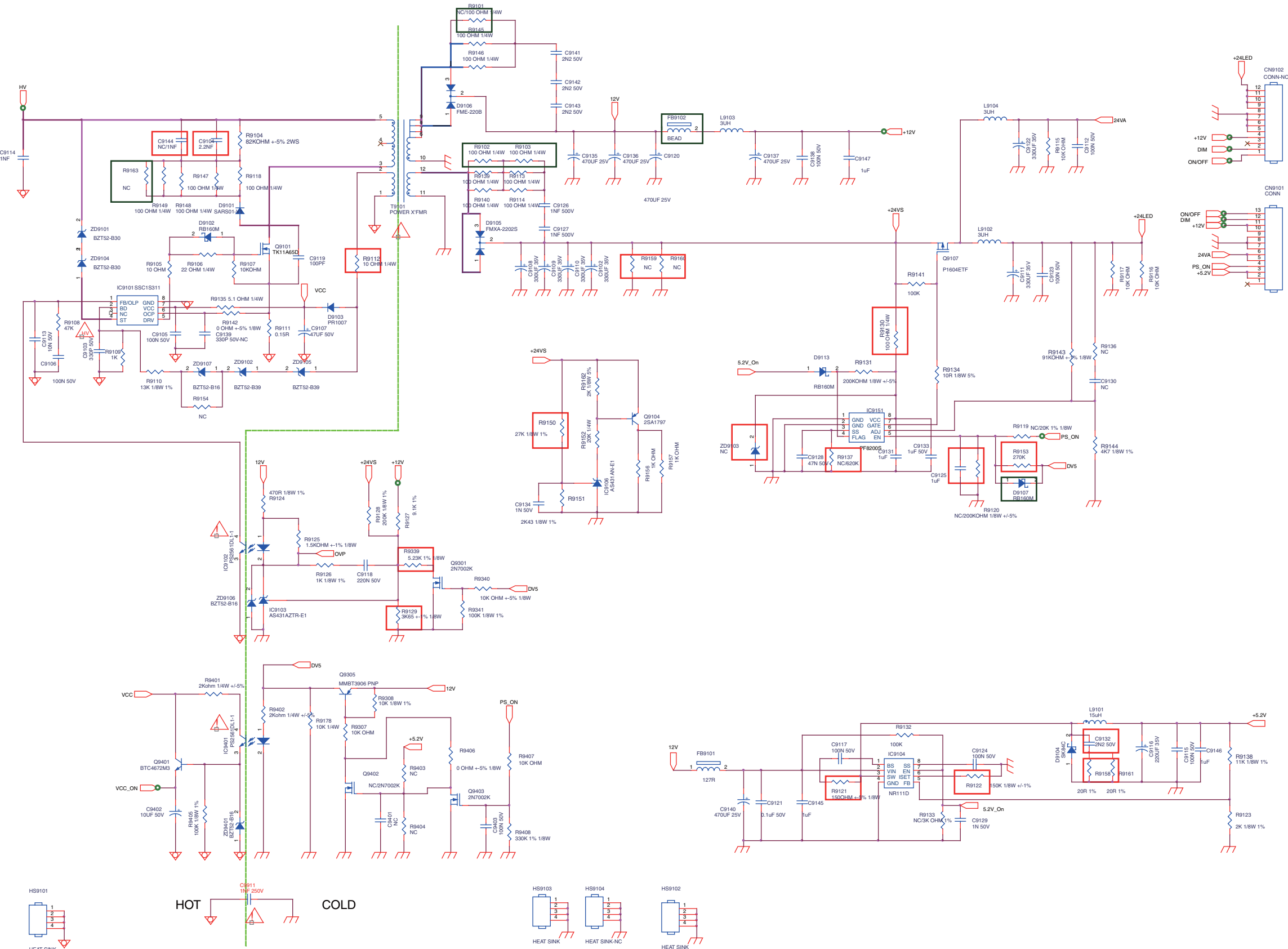
10.2 A 715G5792 PSU
10-2-1 A01, AC input



A03

Main Power

A03



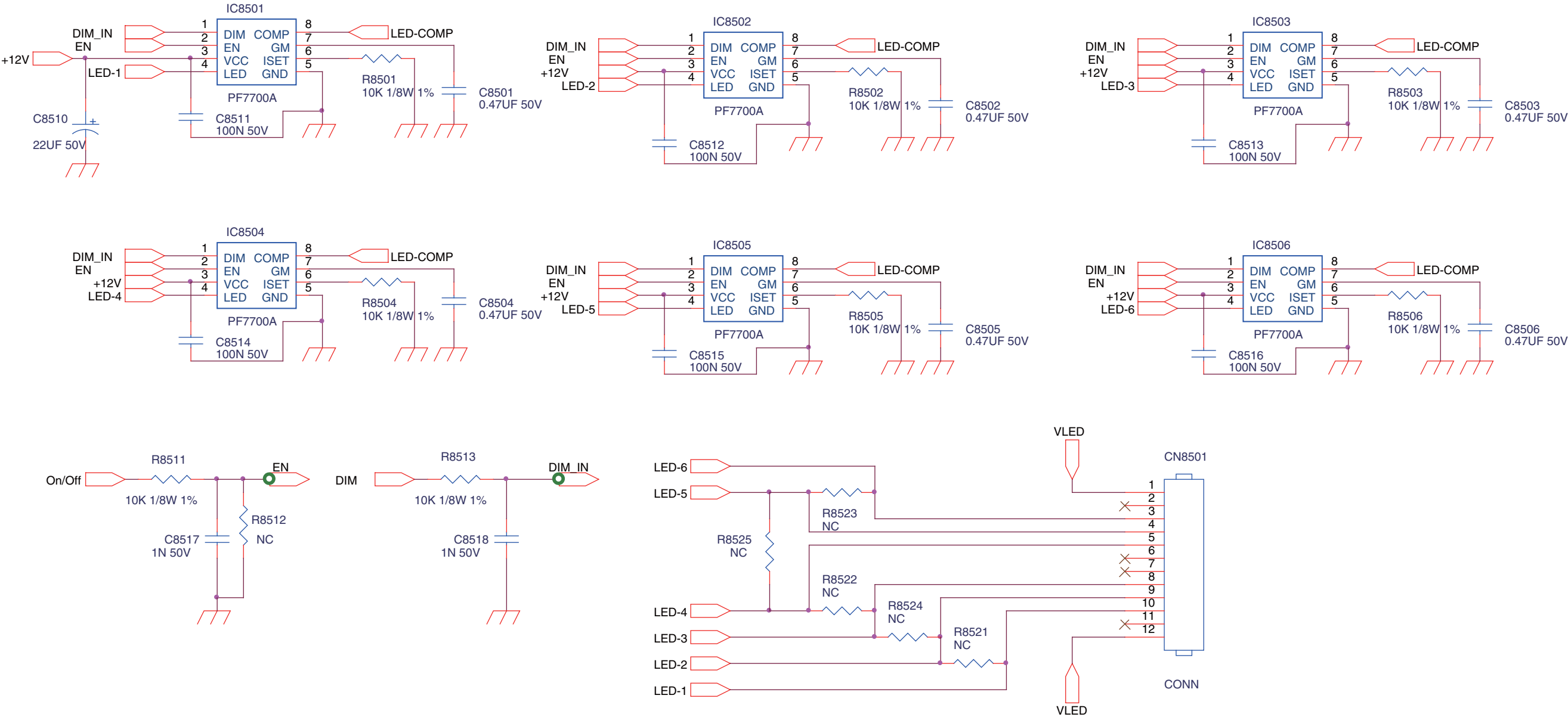
Main Power

715G5792

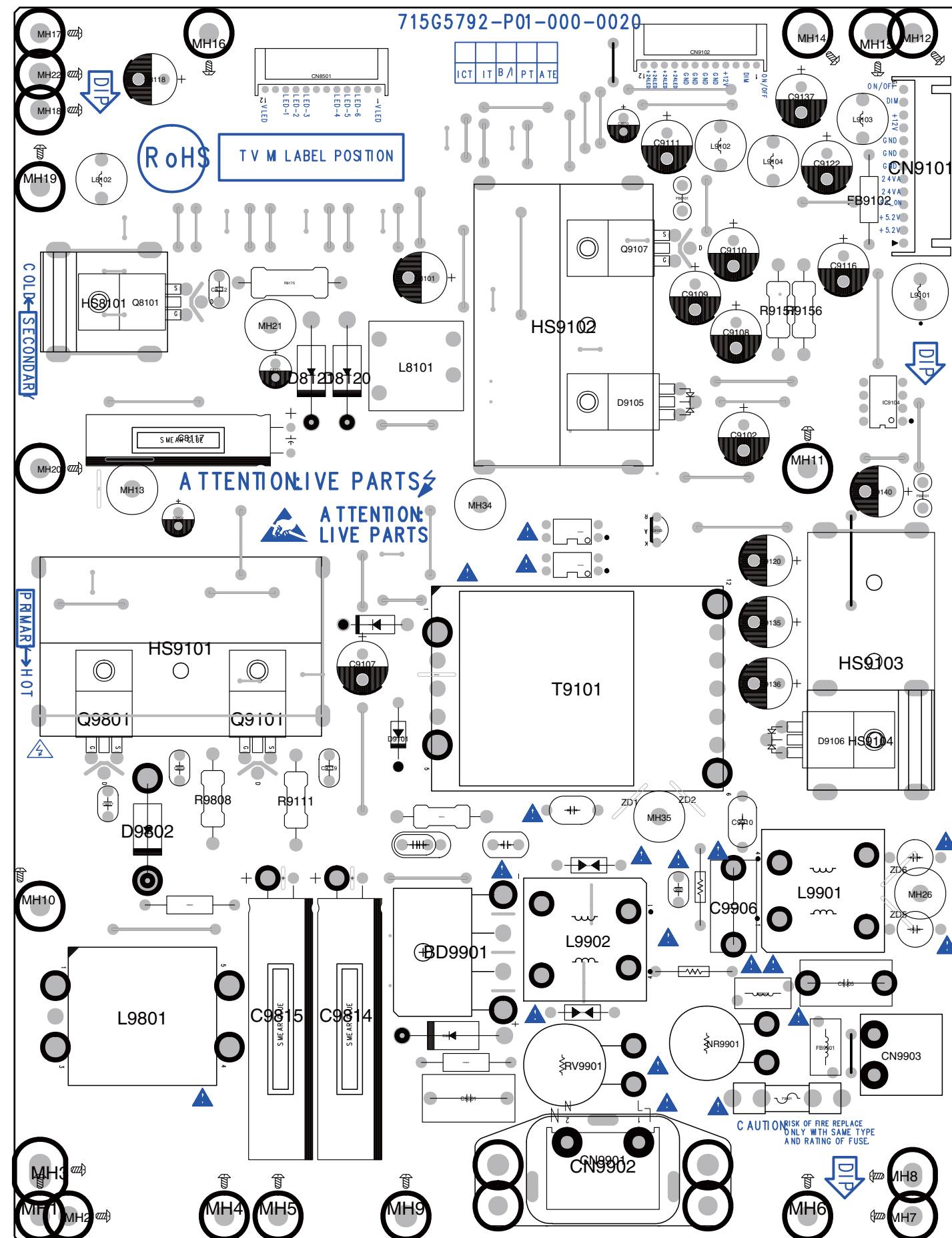
A05

LED Current Balance

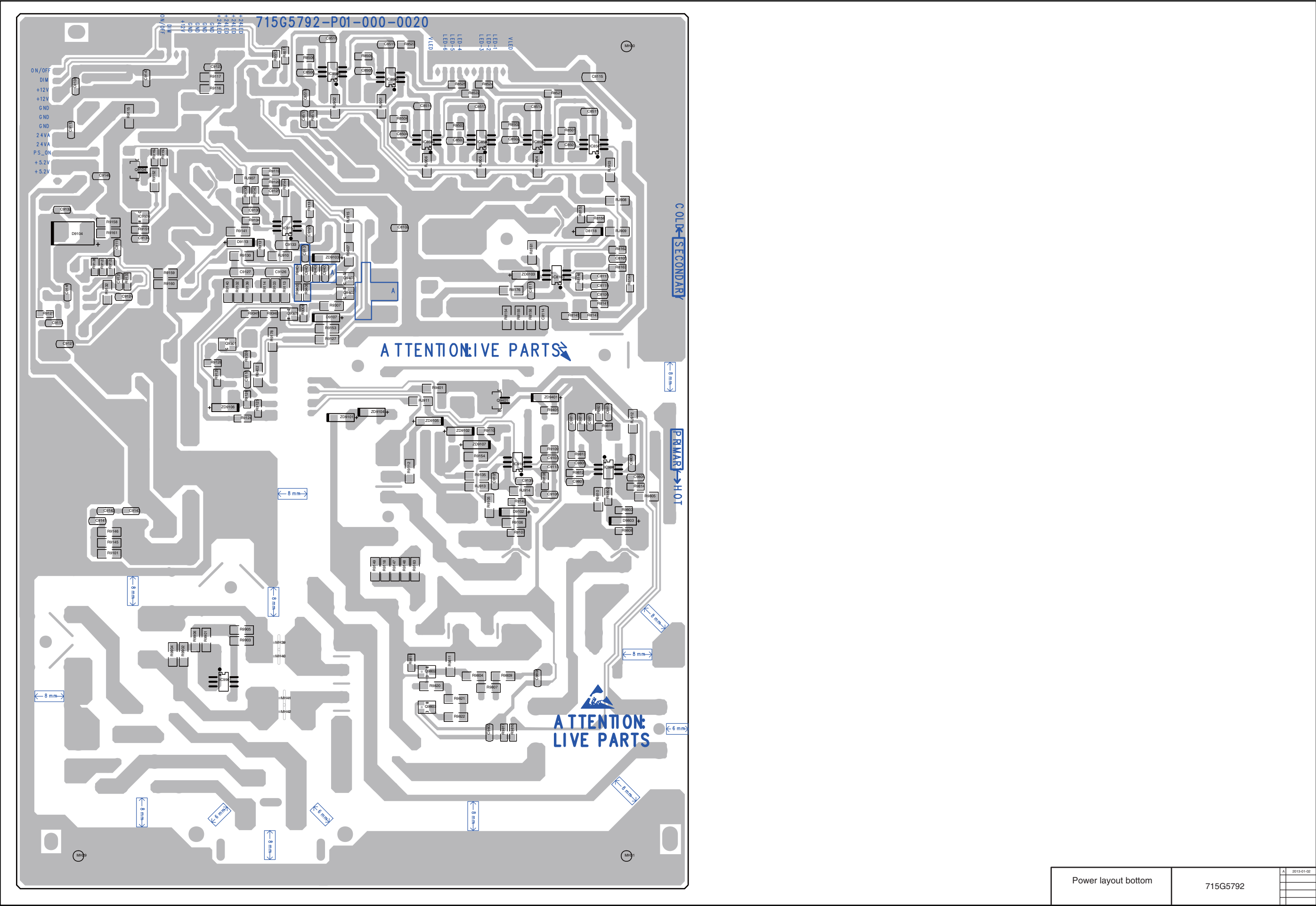
A05



10-2-6 Power layout top

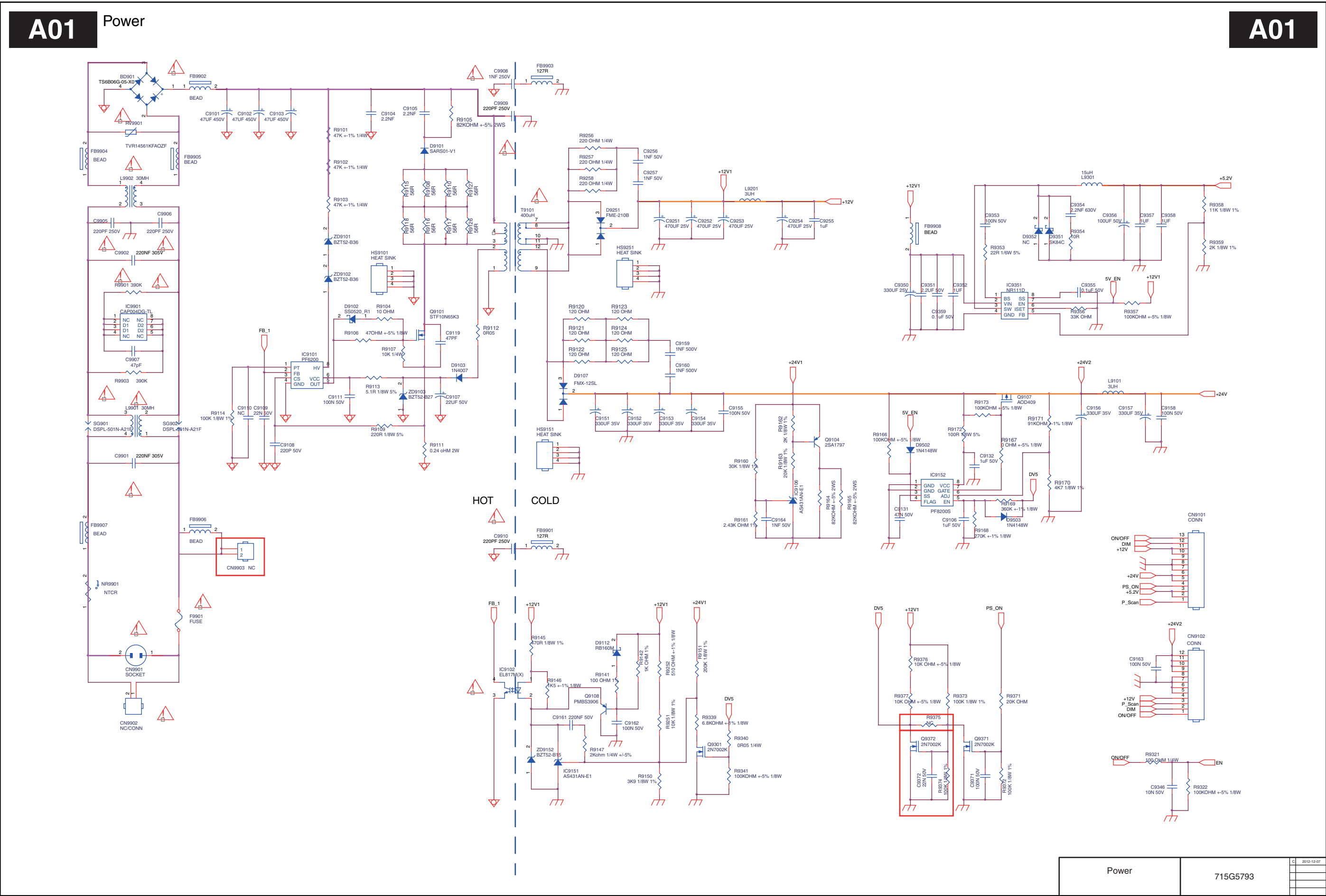


10-2-7 Power layout bottom

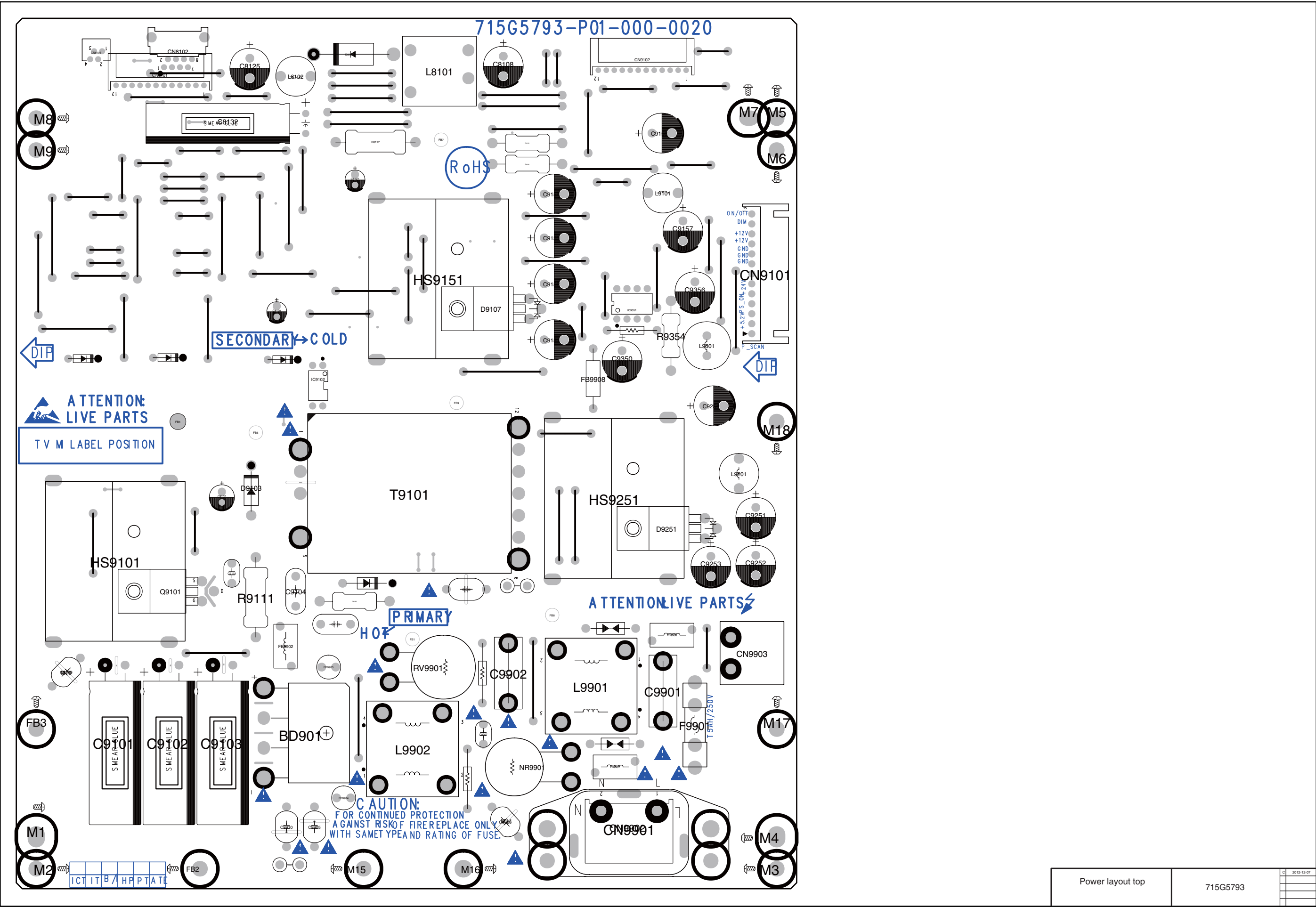


Power layout bottom	715G5792	A	2013-01-02

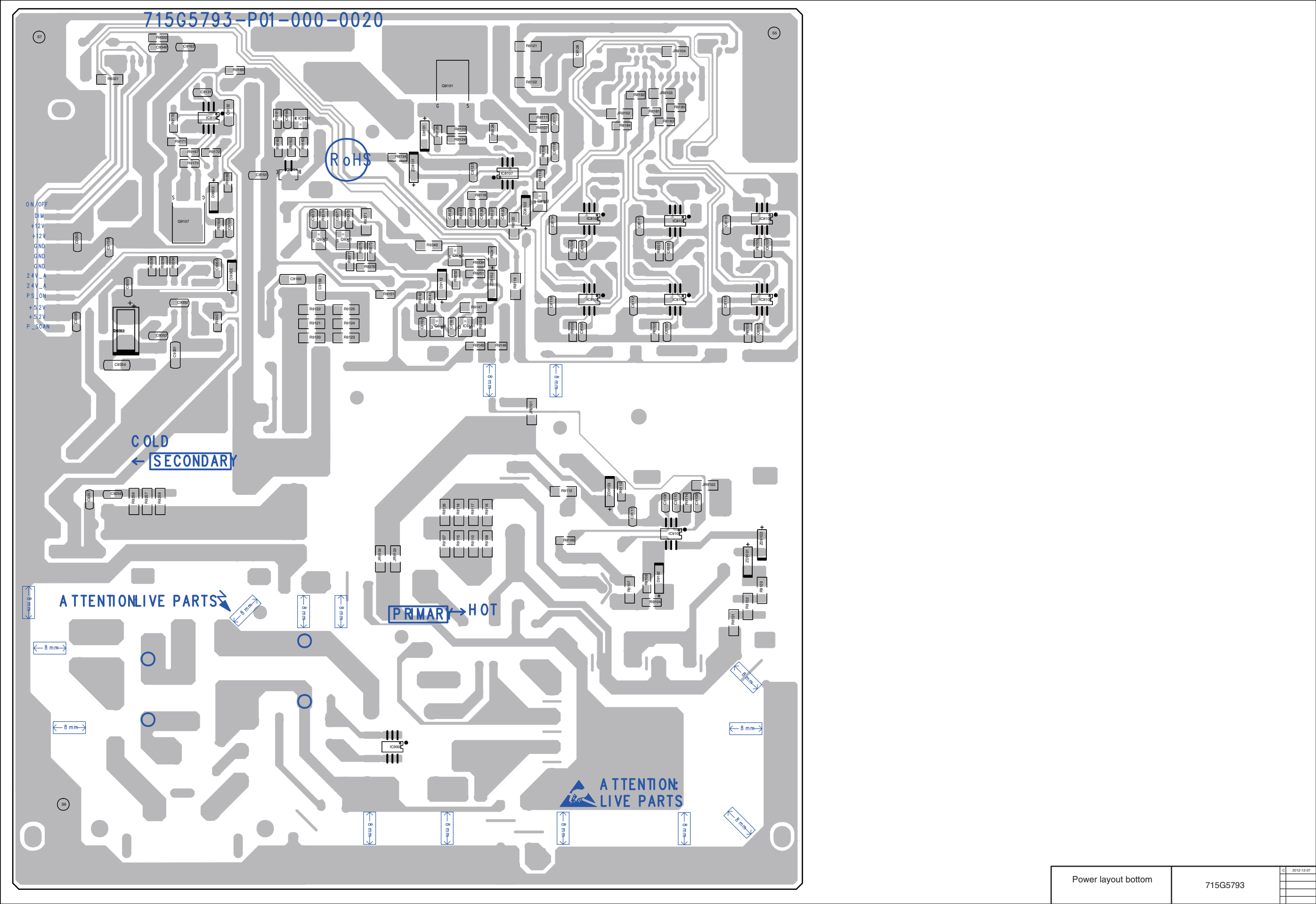
10.3 A 715G5793 PSU
10-3-1 A01, Power



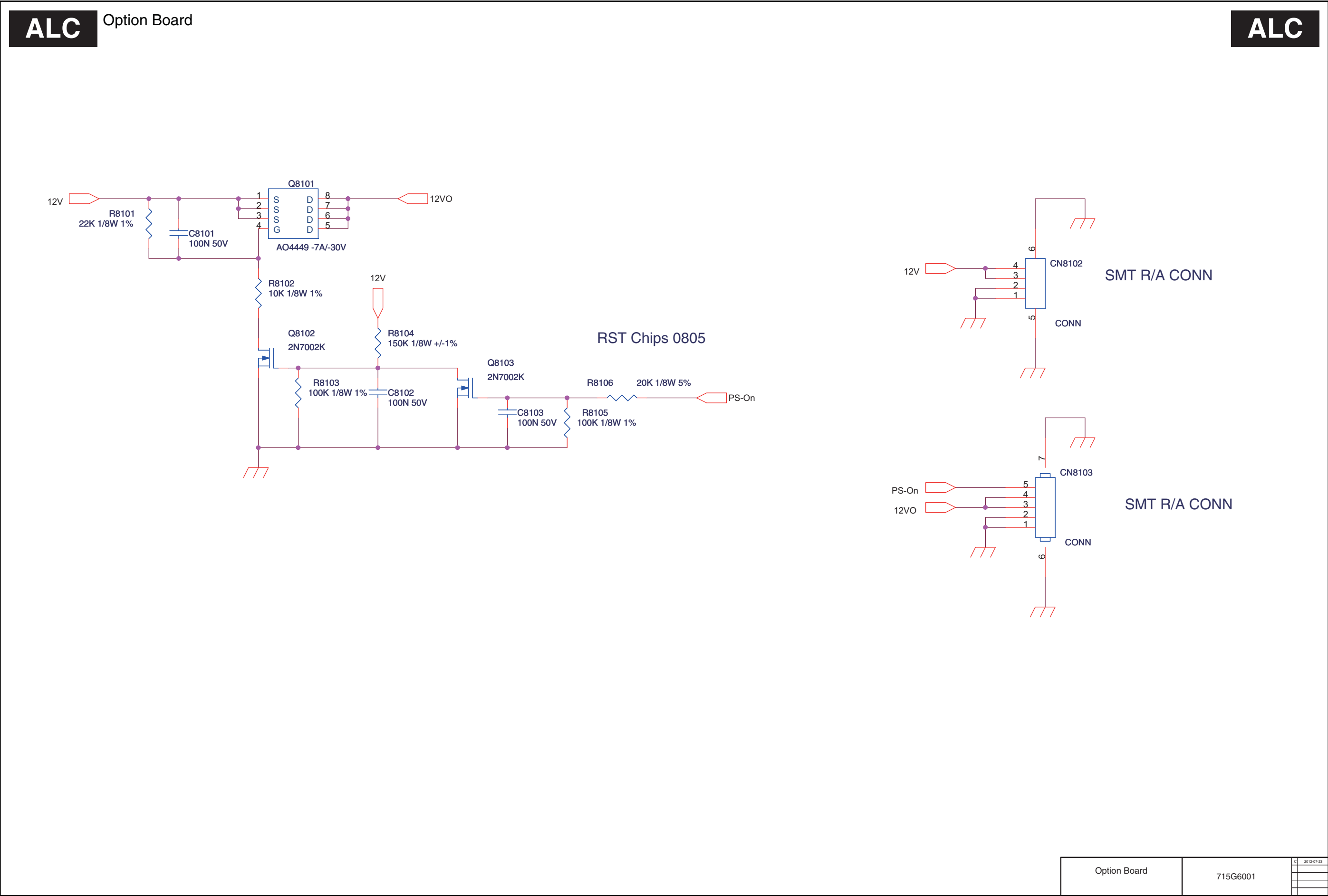
10-3-3 Power layout top



10-3-4 Power layout bottom

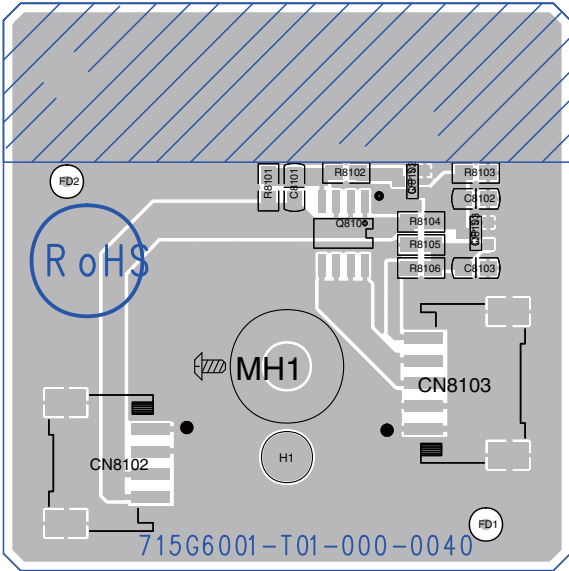


10.4 ALC 715G6001
10-4-1 Option Board

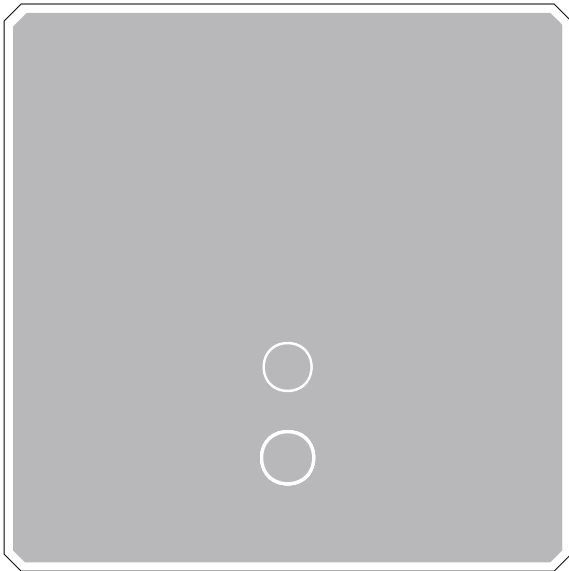


10-4-2 Option board layout

Layout Option Board (top side)



Layout Option Board (bottom side)

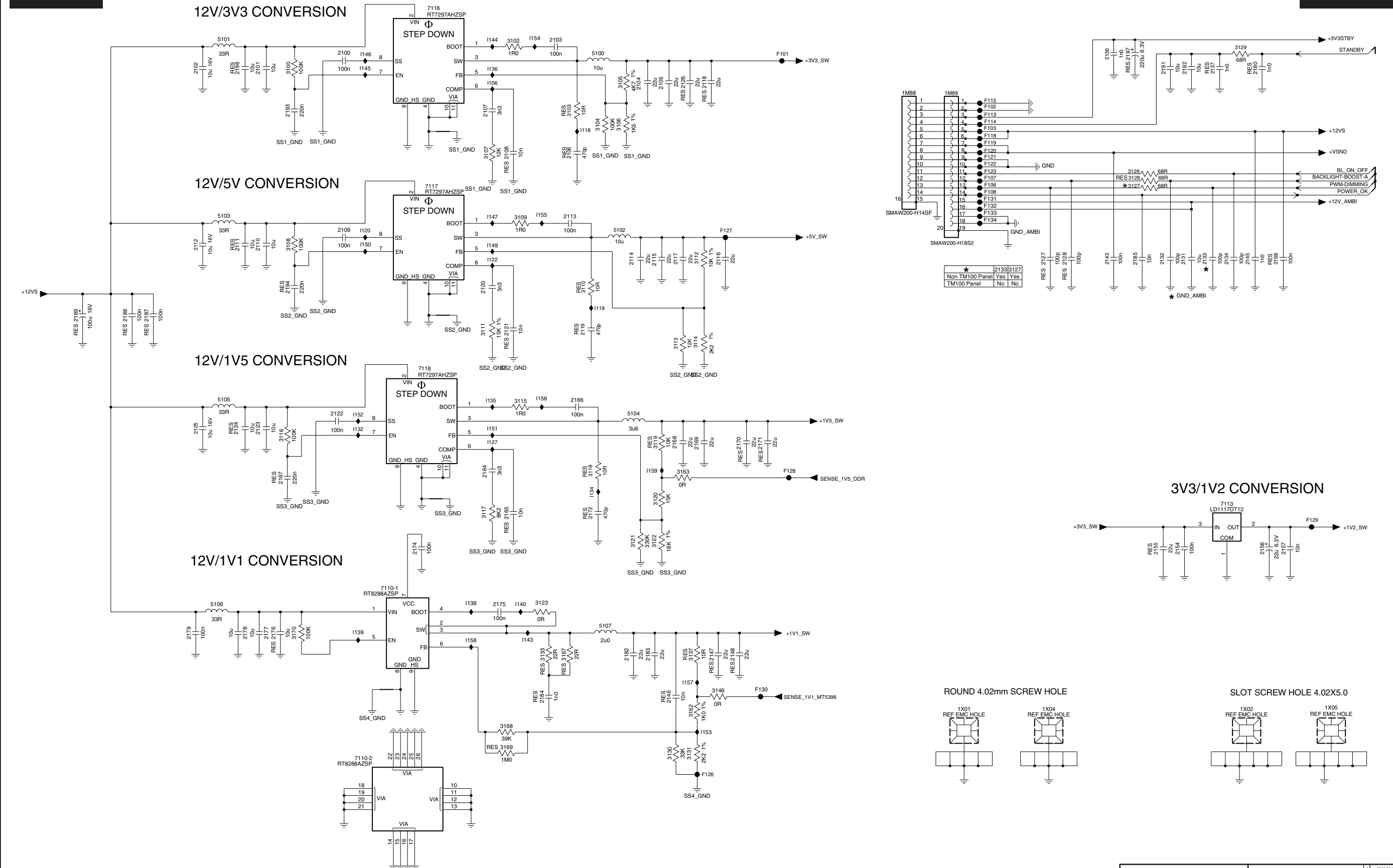


Option board layout top/bottom	715G6001	C	2013-07-23

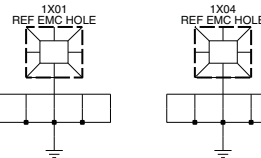
10.5 313912365441 SSB
10-5-1 B01A, DC-DC

B01A DC-DC

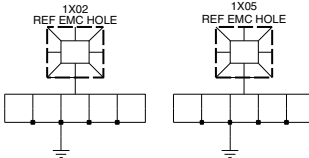
B01A



ROUND 4.02mm SCREW HOLE



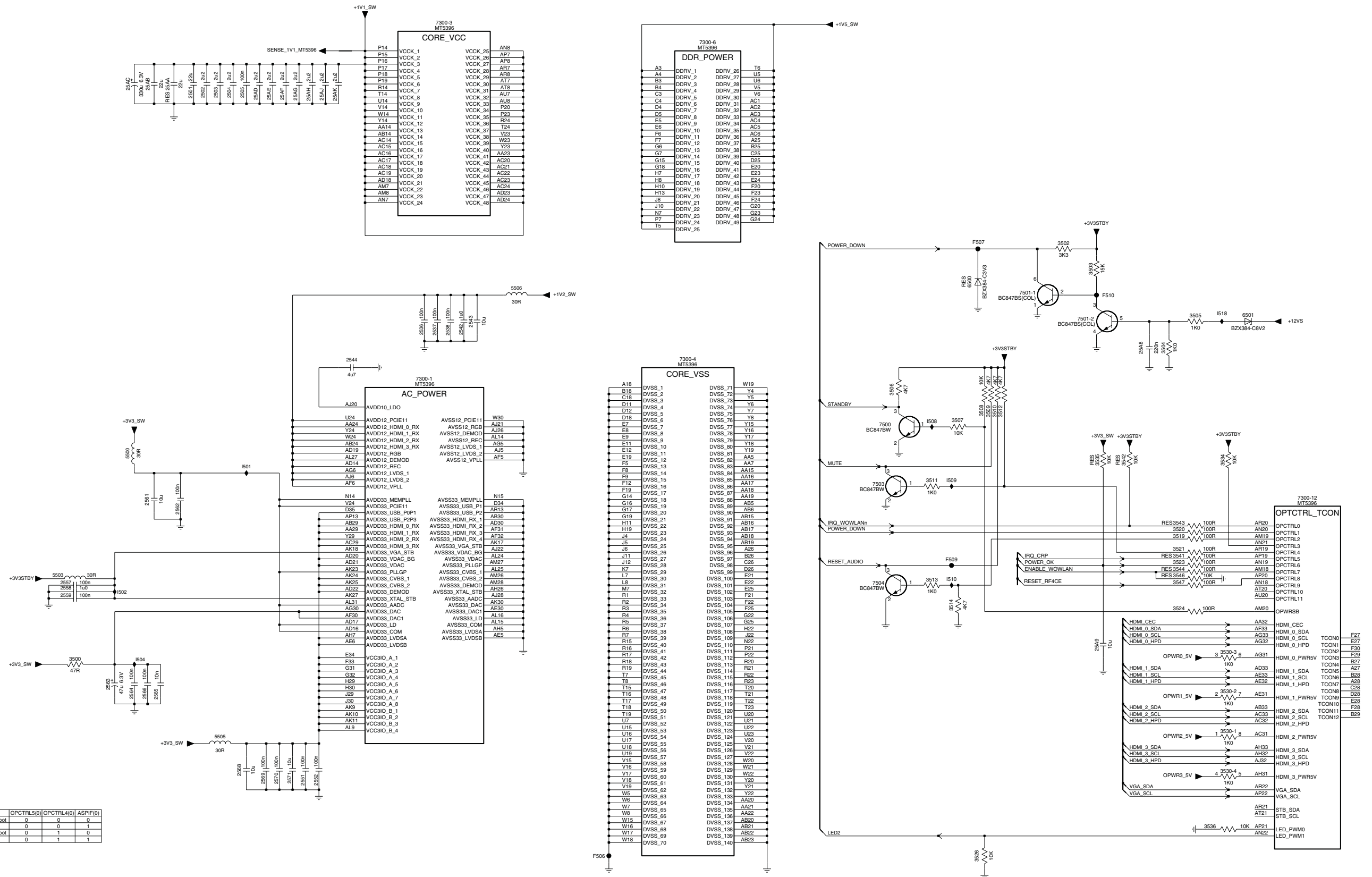
SLOT SCREW HOLE 4.02X5.0



PCB SB SSB
MT5396 R2 LATAM 2K13

3139 123 6544

1	2013-01-11



STRAPPING	OPCTRL5(0)	OPCTRL4(0)	ASPIF(0)
ICE MODE+27M+Serial Boot	0	0	0
ROM Boot+27M	0	0	1
ICE MODE+54M+Serial Boot	0	1	0
ROM Boot+54M	0	1	1

10-5-5 B04B, DDR3

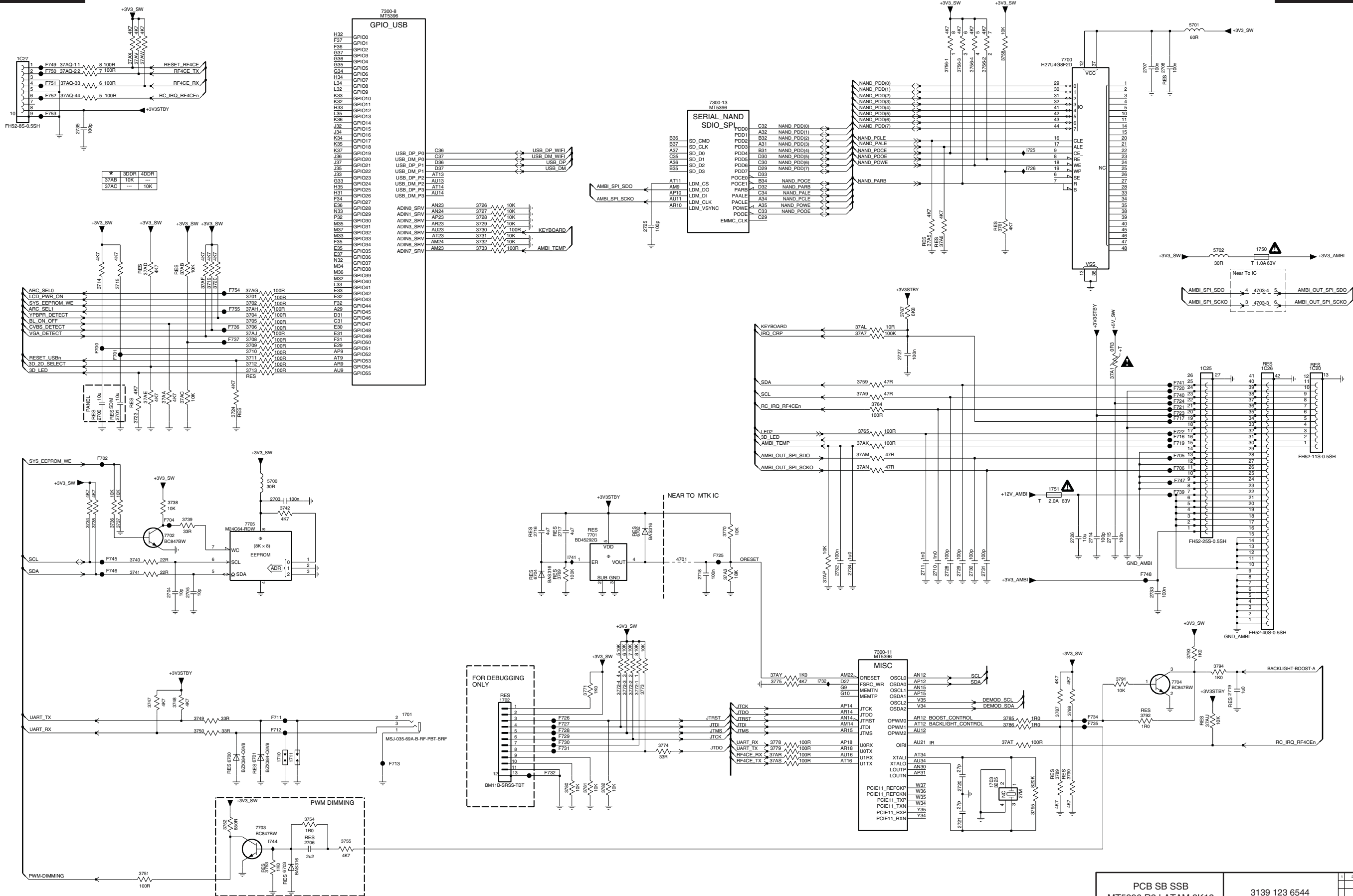
B04B DDR3**B04B**

10-5-6 B04C, Flash, control, EJTAG & AmbiLight

B04C

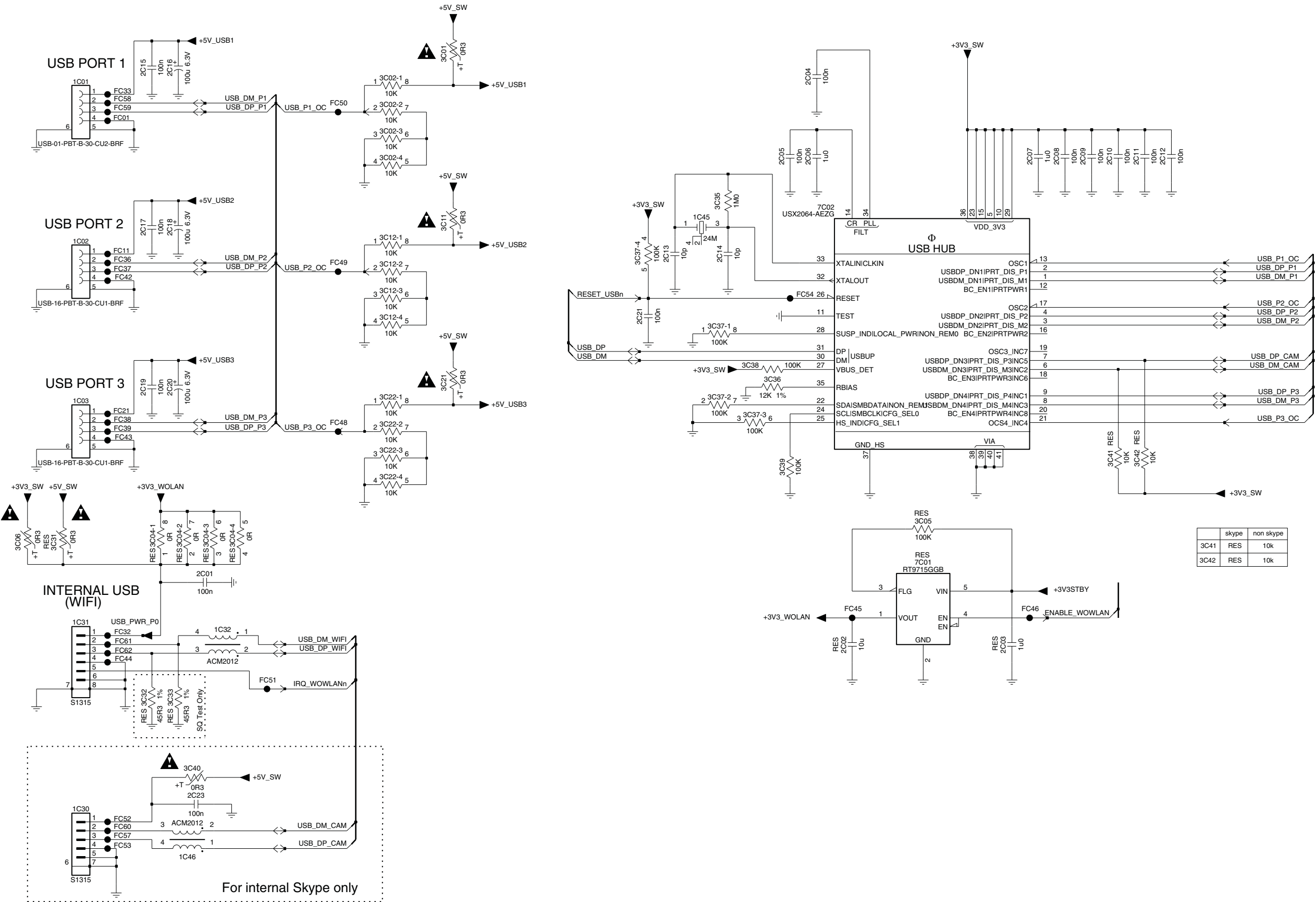
Flash, control, EJTAG & AmbiLight

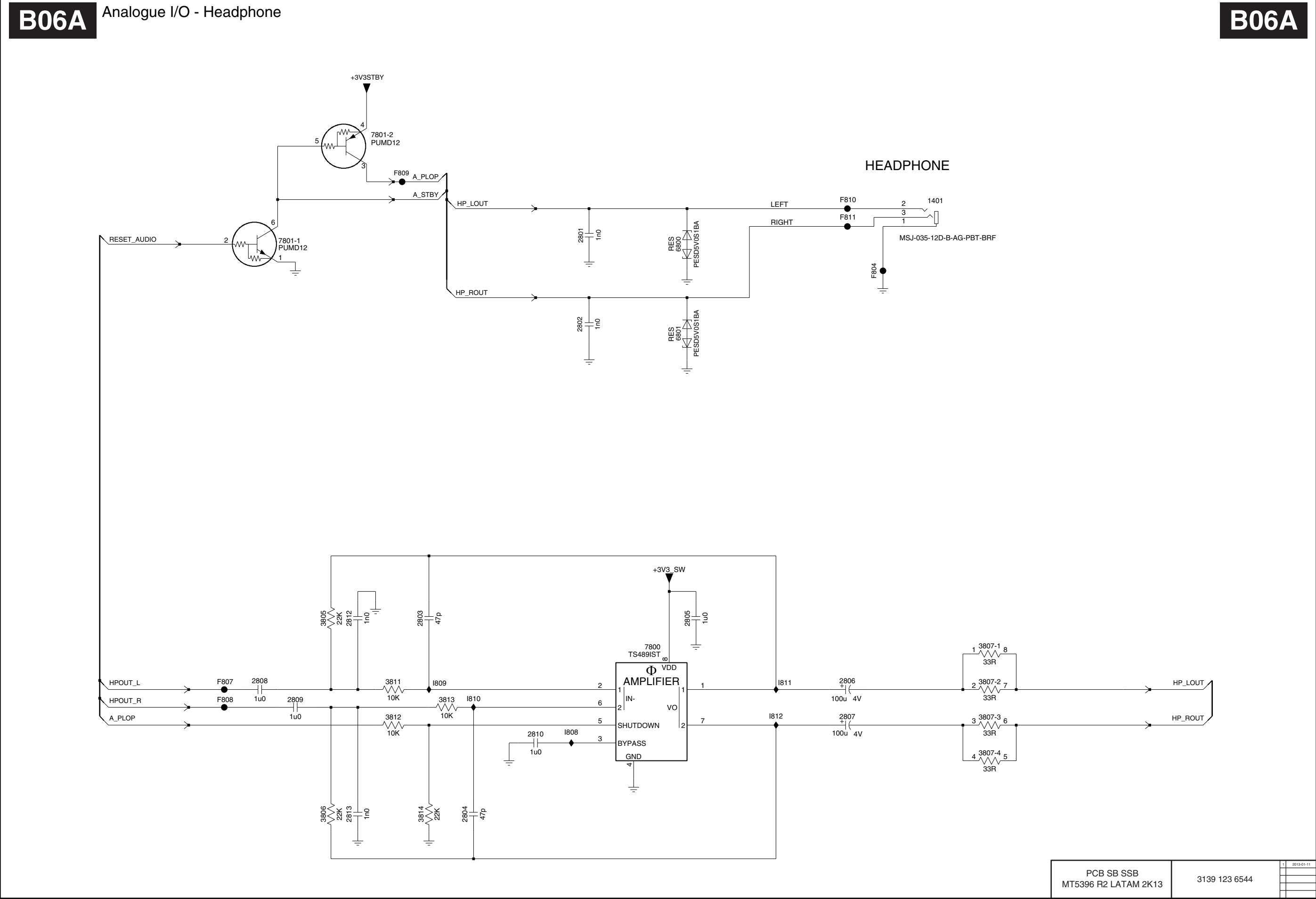
B04C

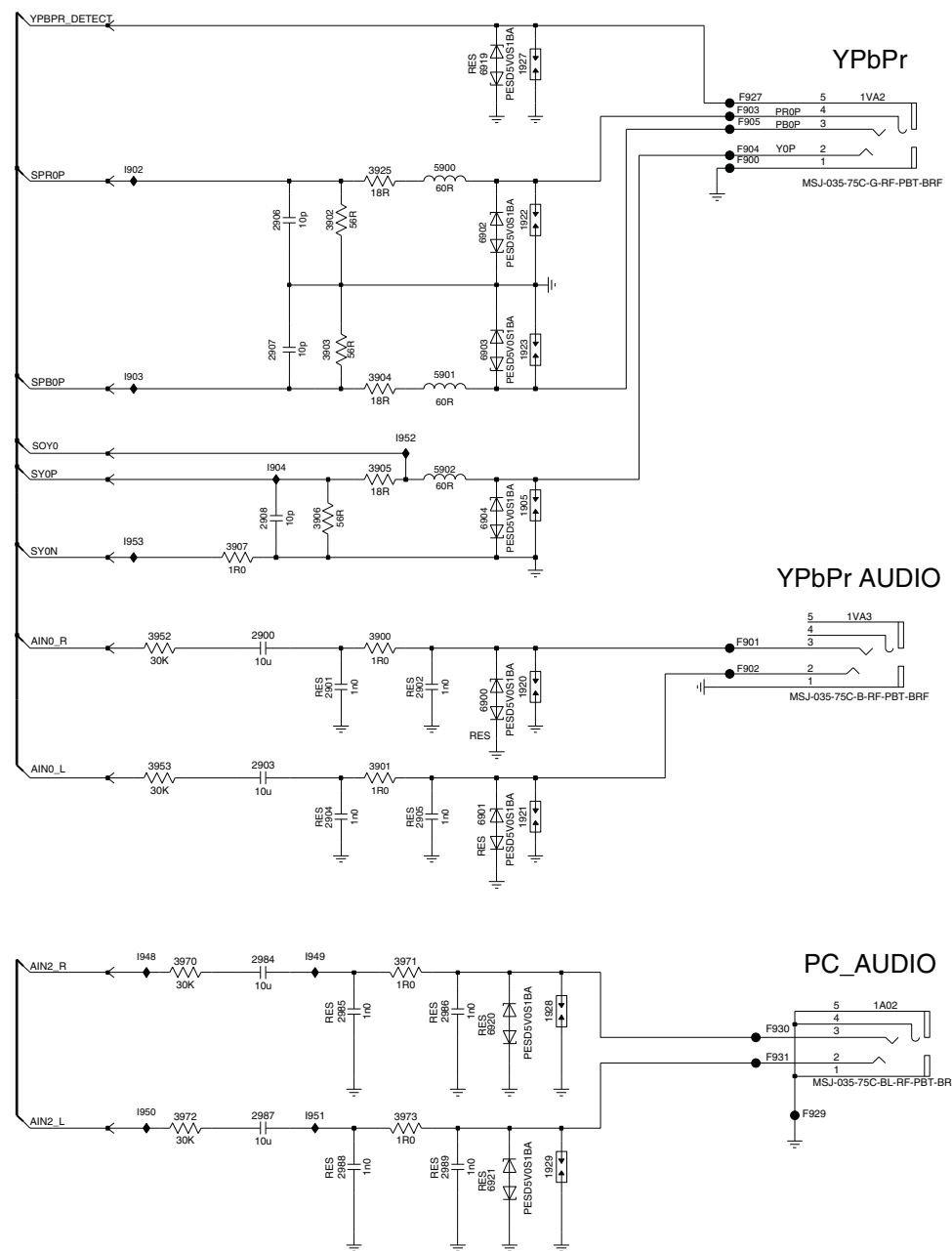
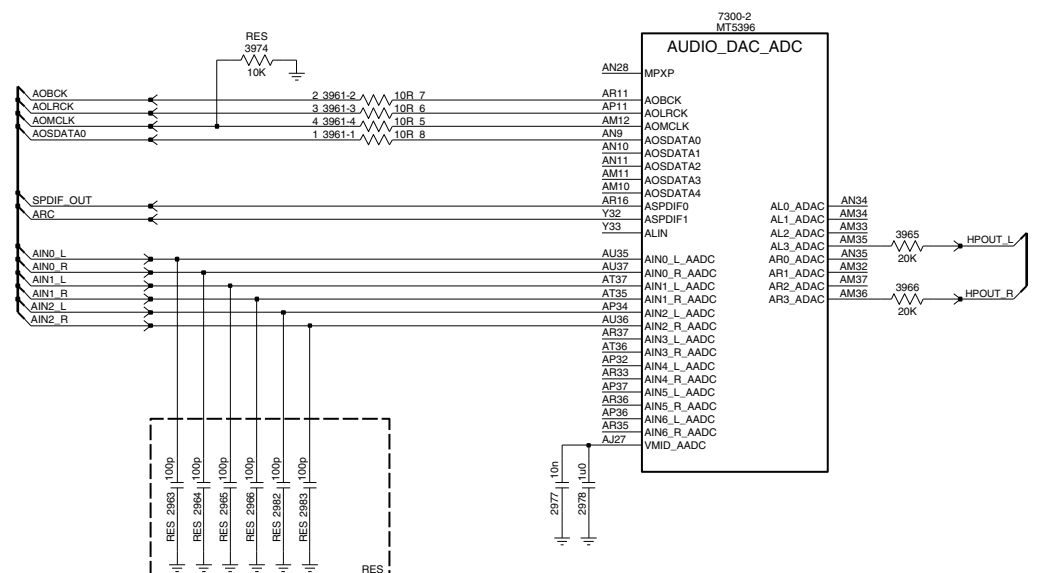


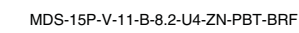
B05B Digital I/O - USB

B05B





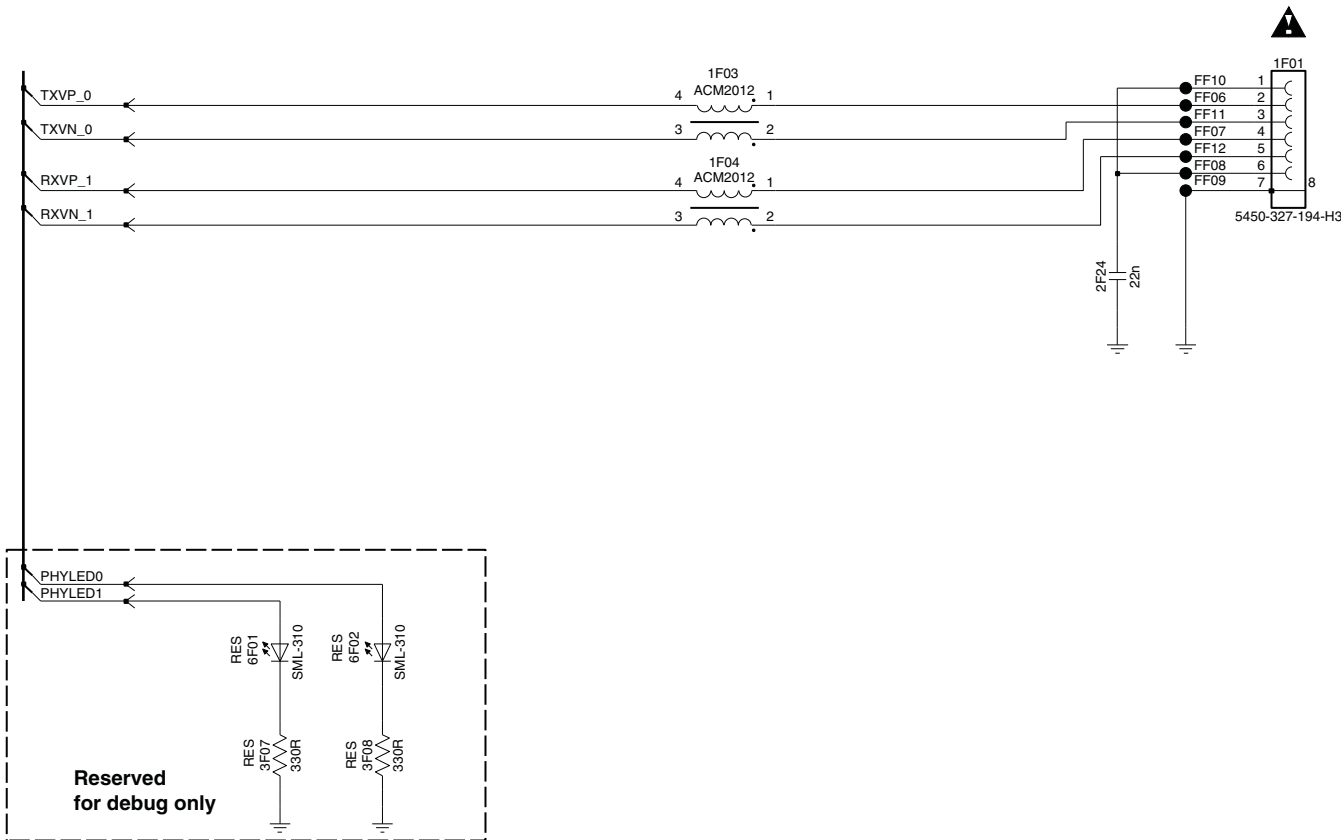




10-5-13 B07A, Ethernet

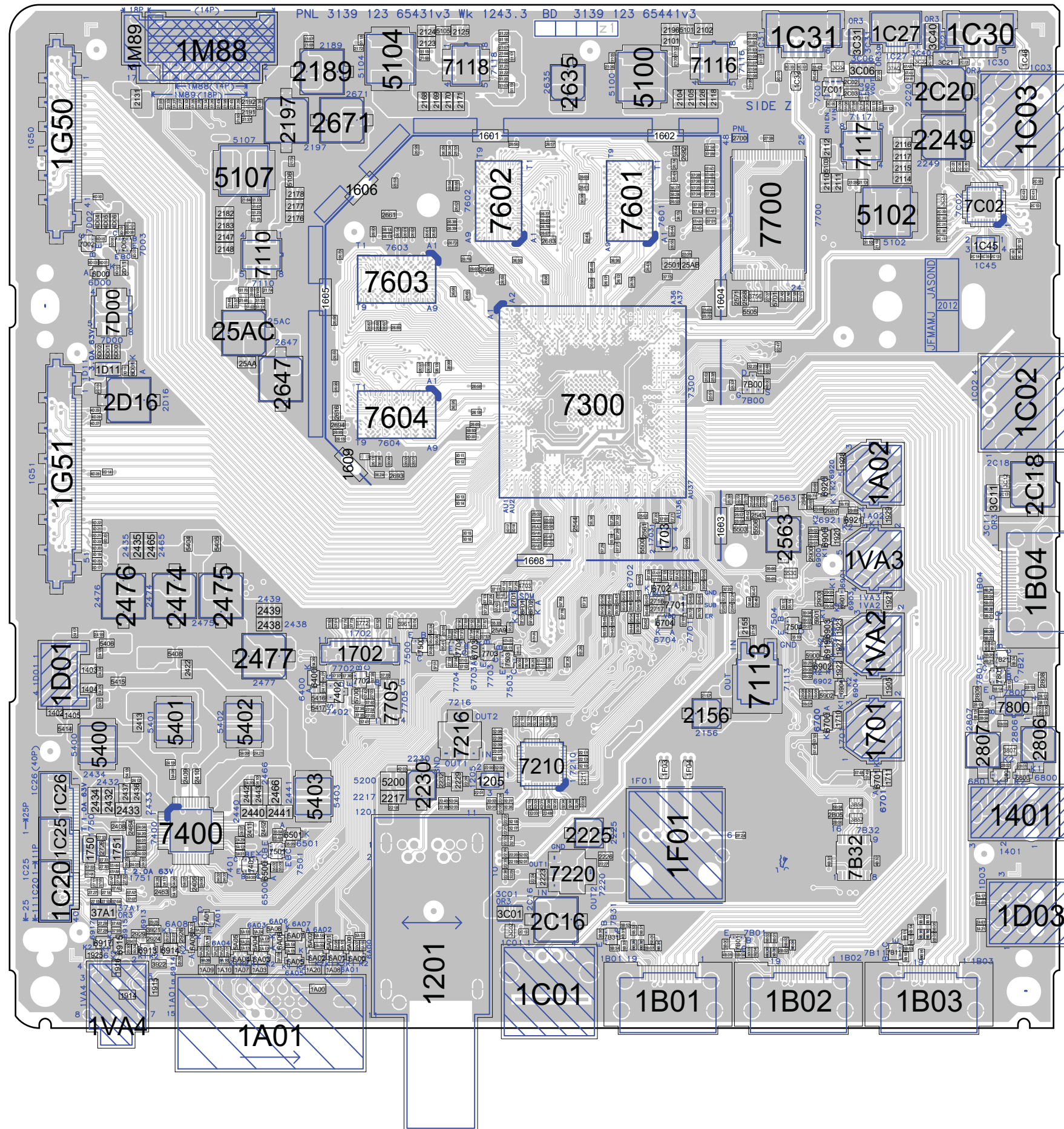
B07A Ethernet

B07A

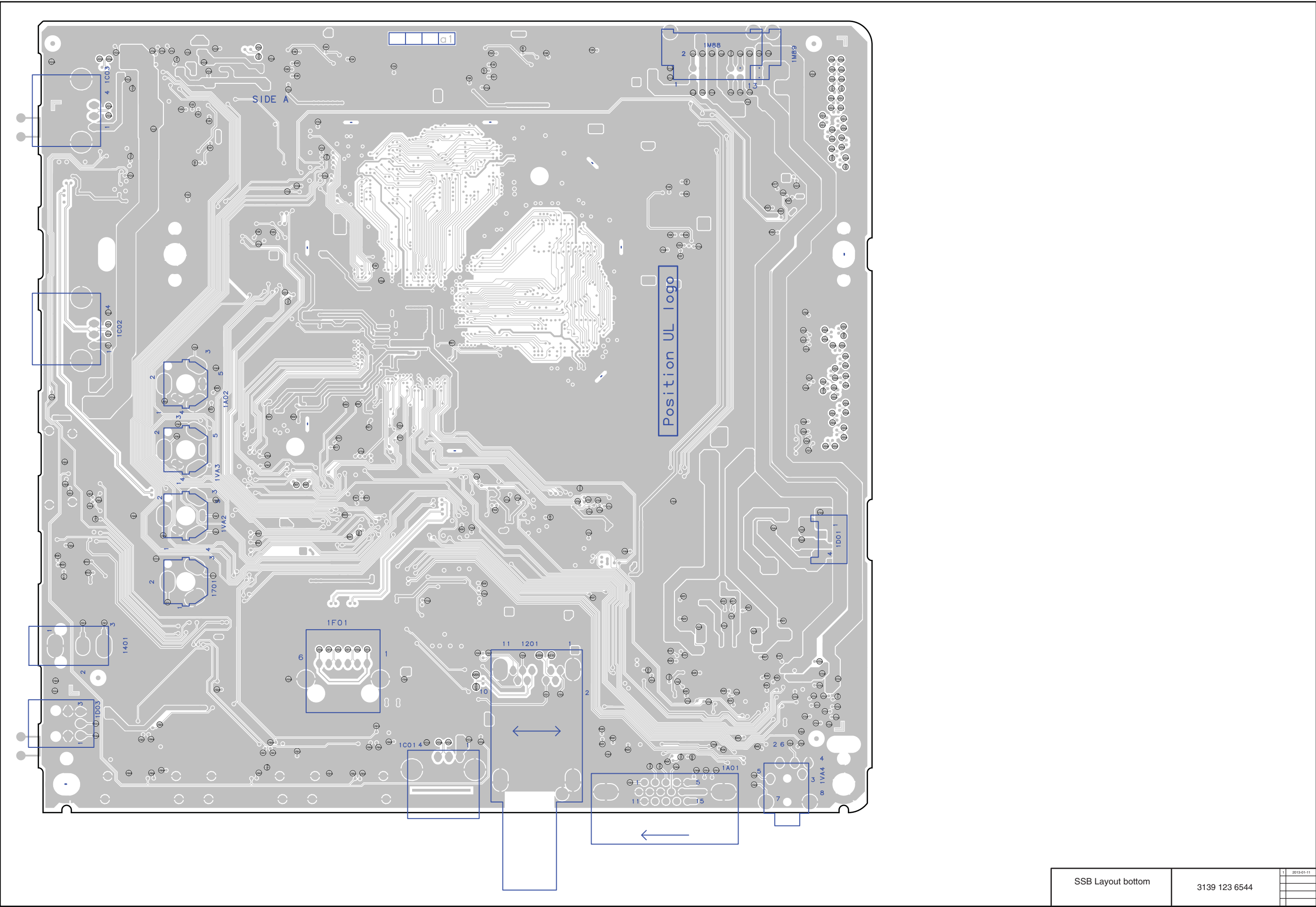


PCB SB SSB MT5396 R2 LATAM 2K13	3139 123 6544	1	2013-01-11

19510_512_130411.eps
130411



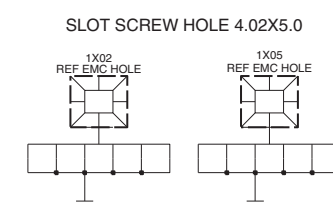
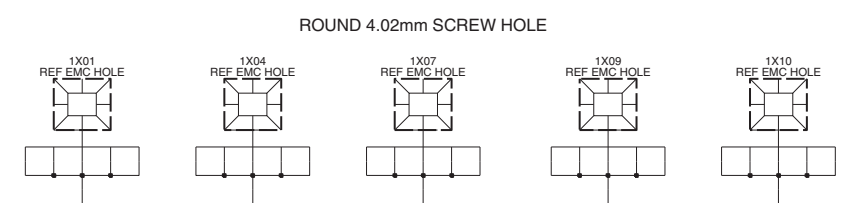
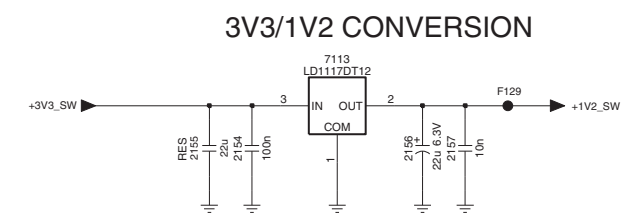
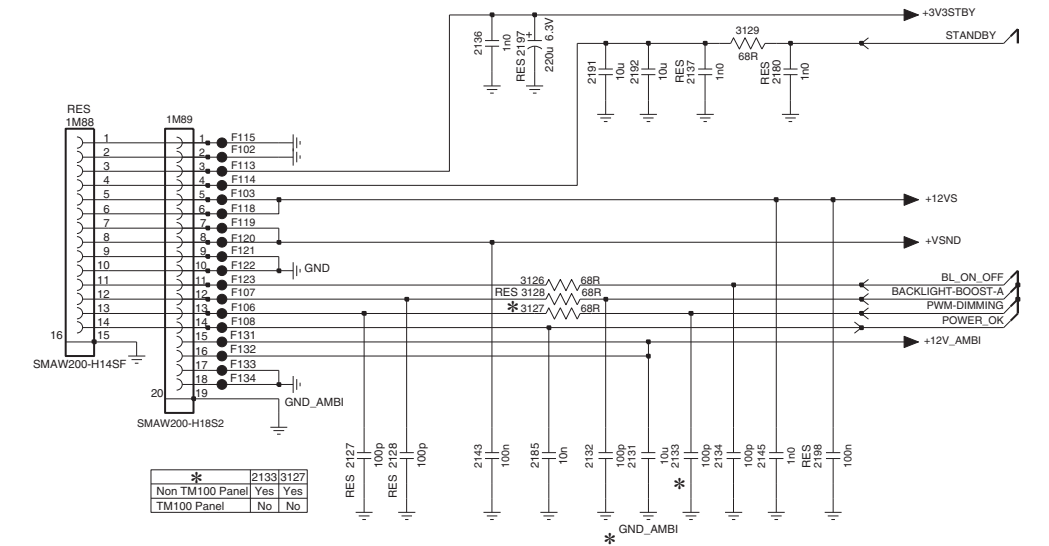
10-5-15 Layout bottom



SSB Layout bottom	3139 123 6544	1	2013-01-11
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B01A DC-DC

B01A

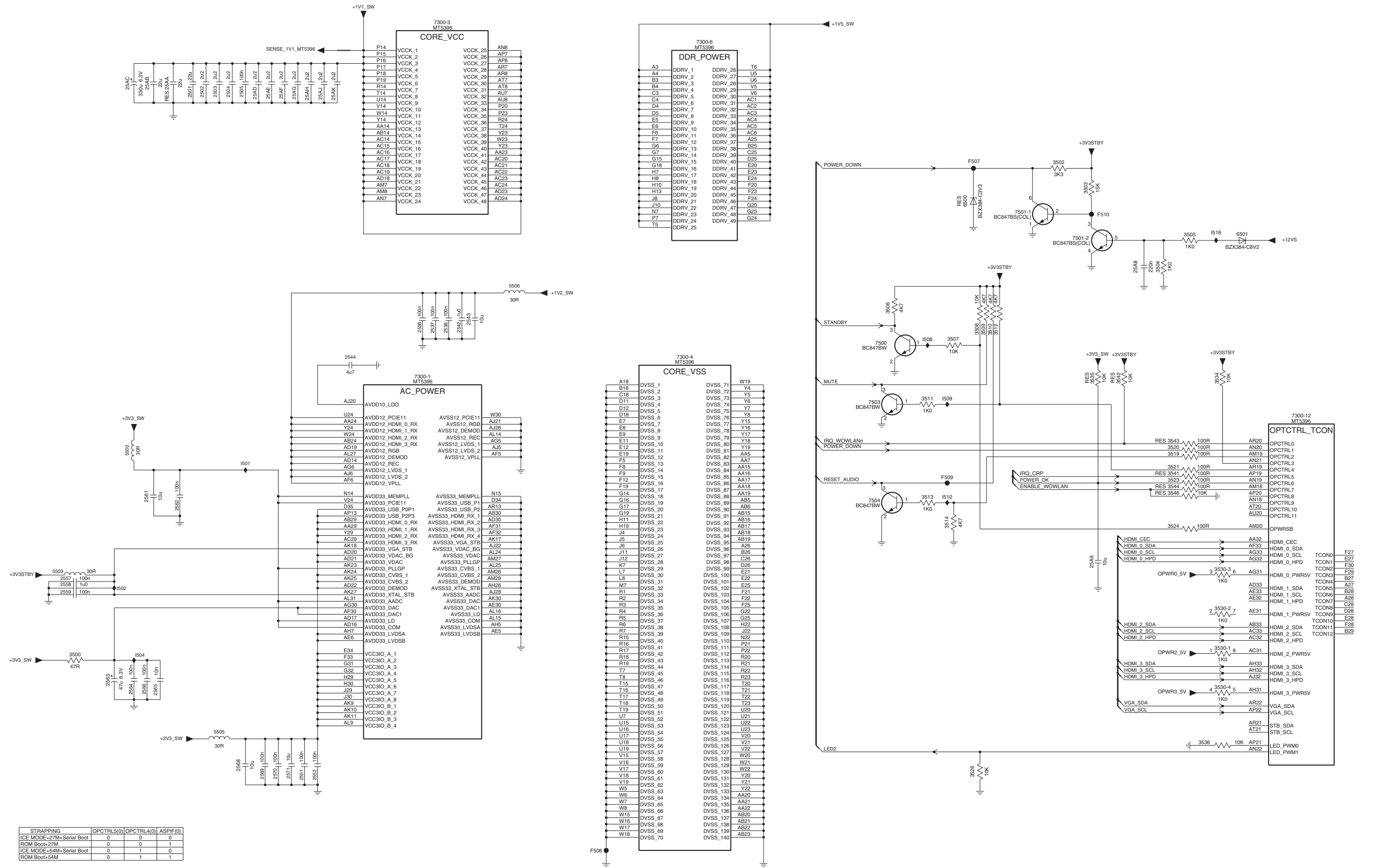


PCB SB SSB MT5396 R3 LATAM 2K13	3139 123 6545	<table border="1"> <tr> <td>1</td> <td>2013-01-11</td> </tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </table>	1	2013-01-11										
1	2013-01-11													

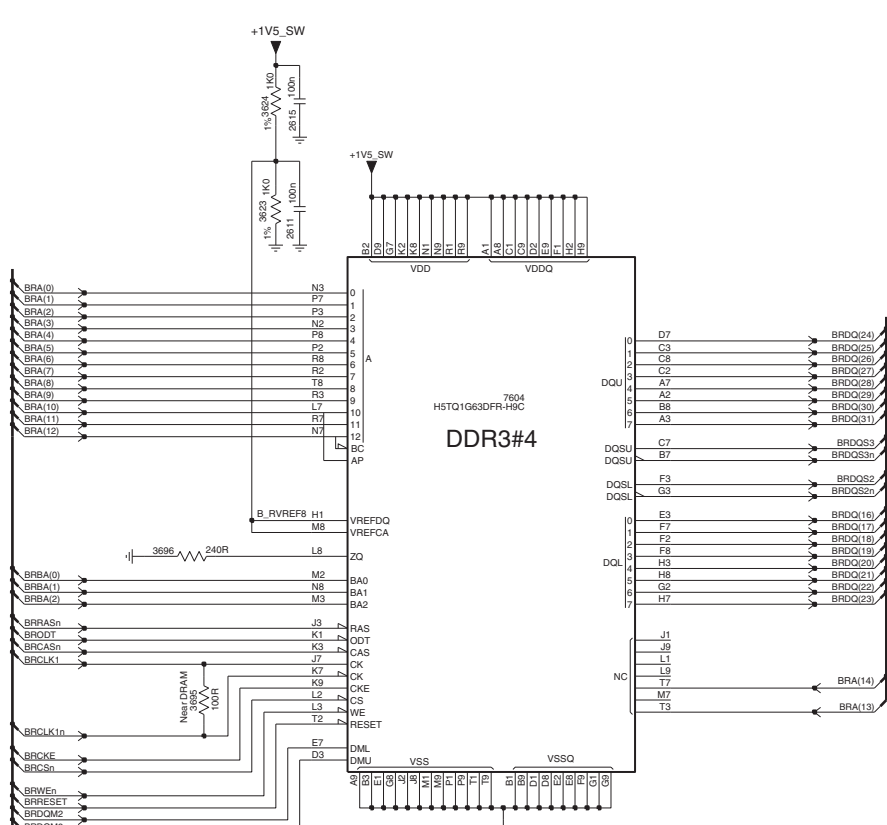
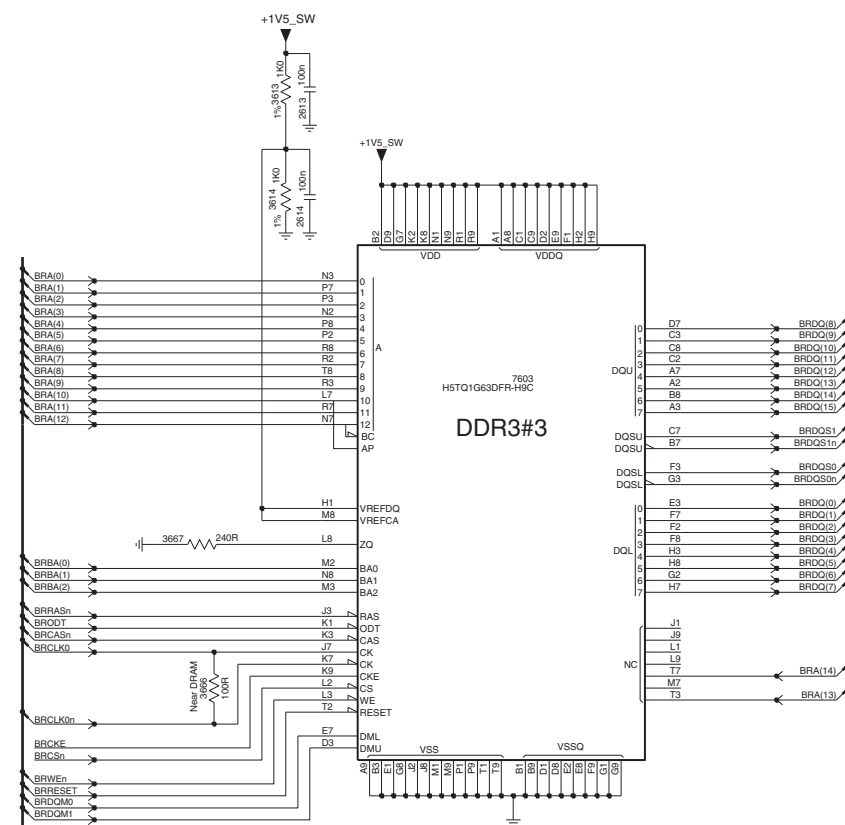
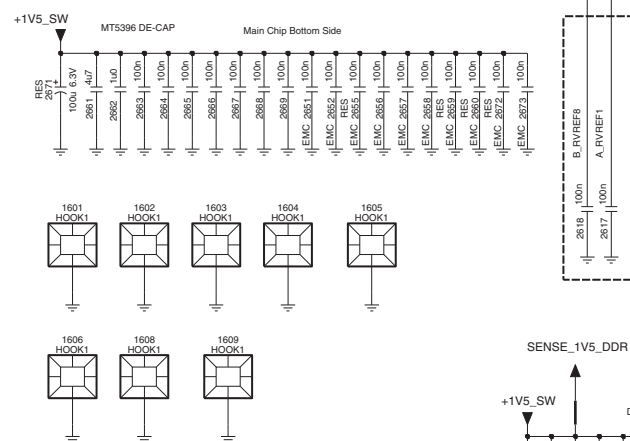
B04A

MTK5396 power

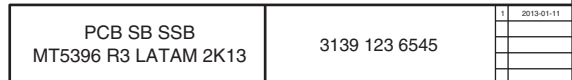
B04A

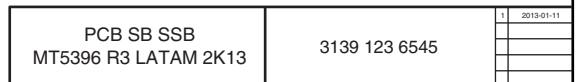


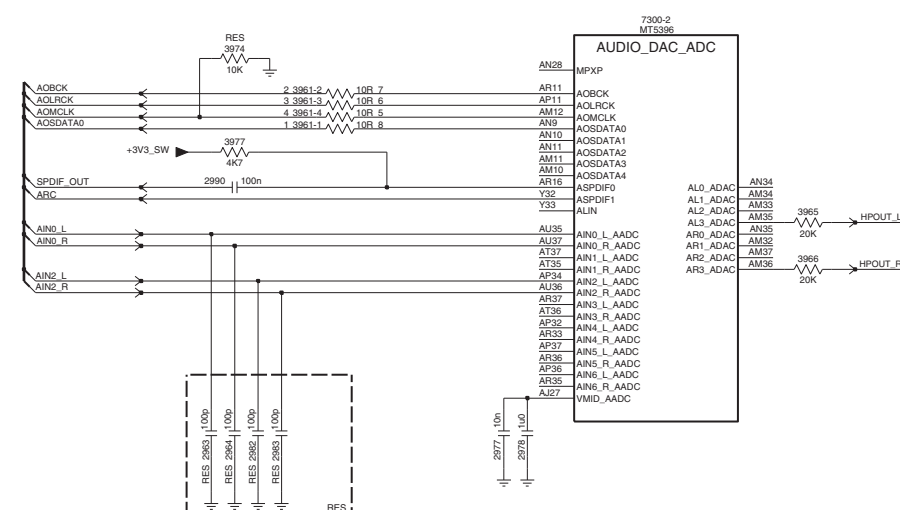
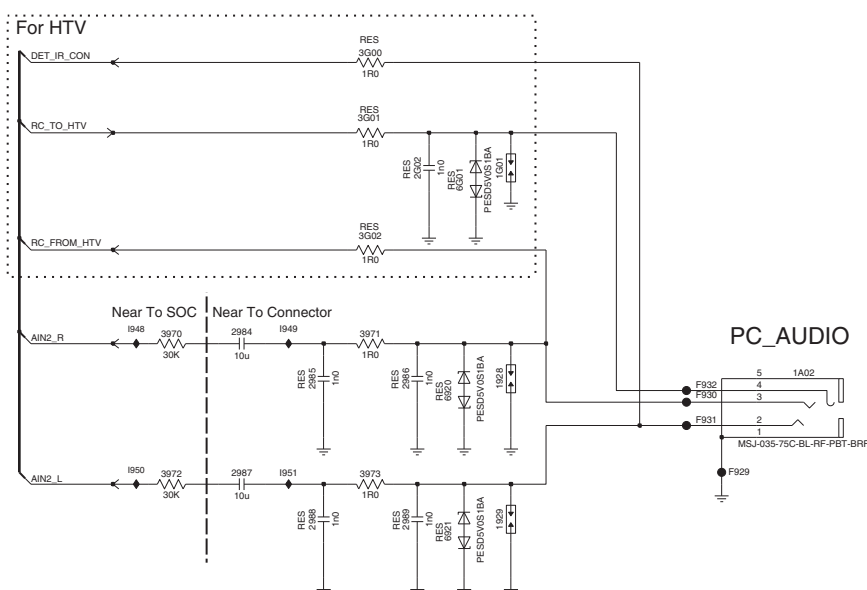
B04B DDR3

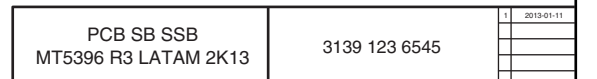


3139 123 6545

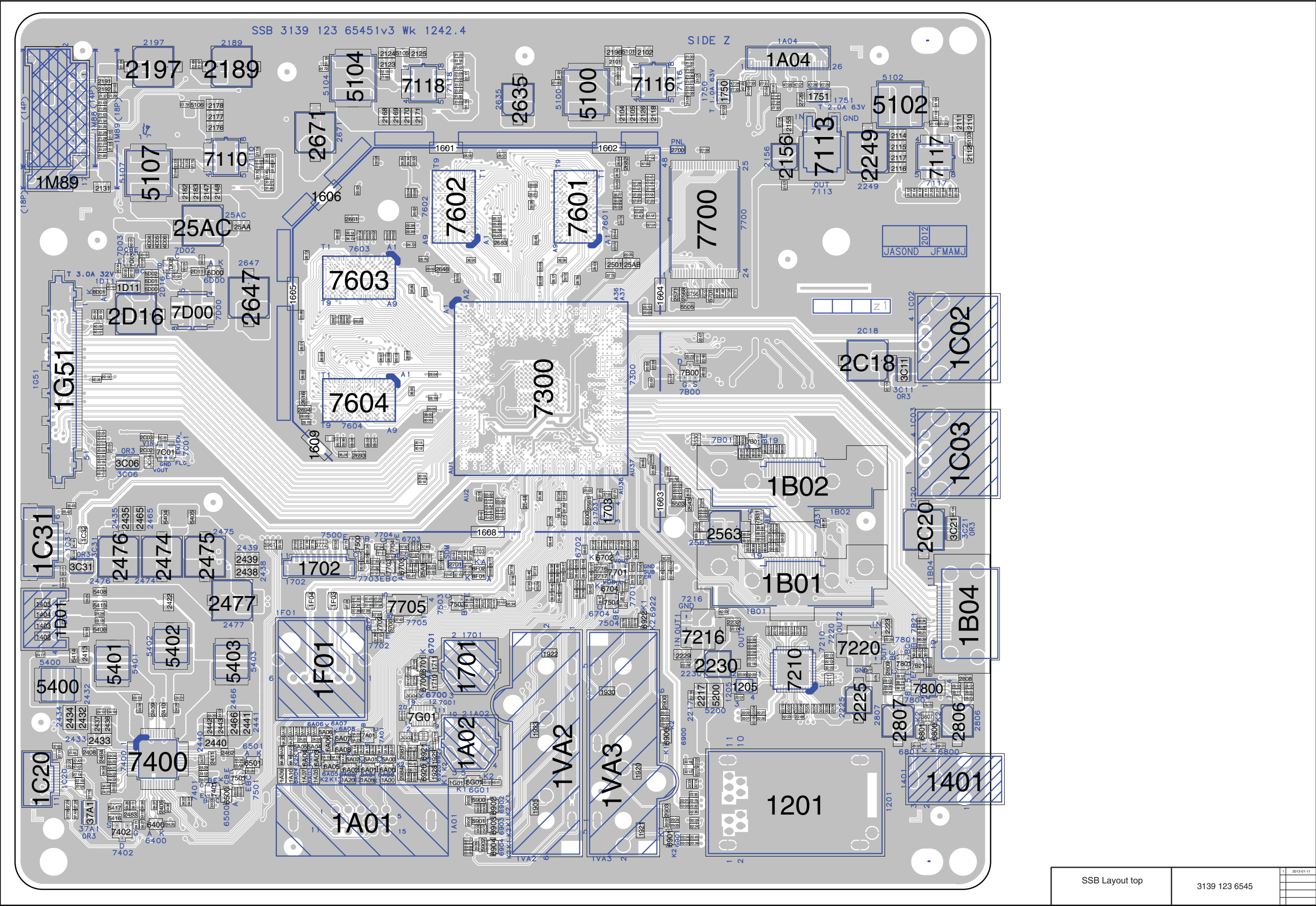








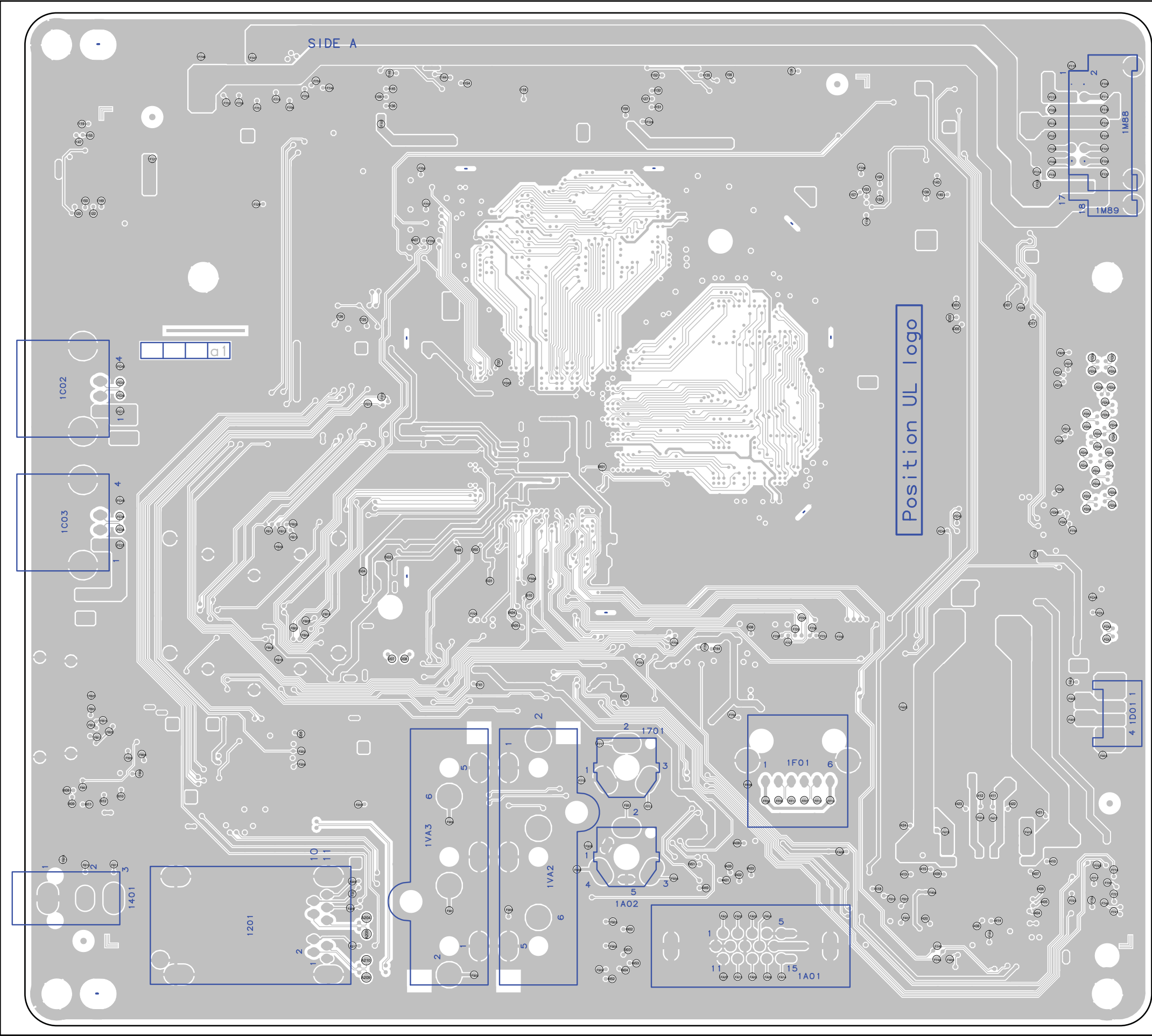
10-6-14 Layout top



SSB Layout top

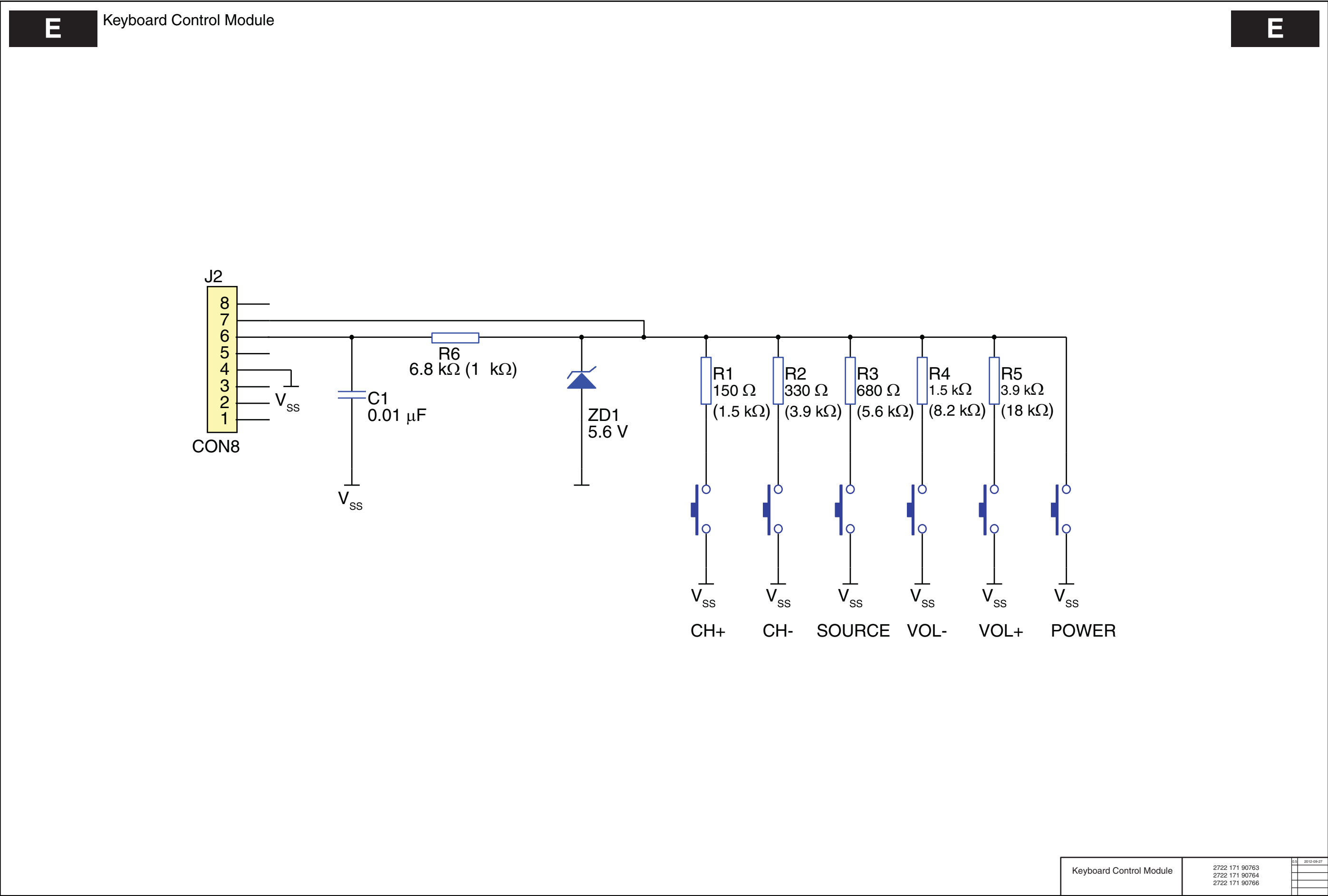
3139 123 6545

10-6-15 Layout bottom



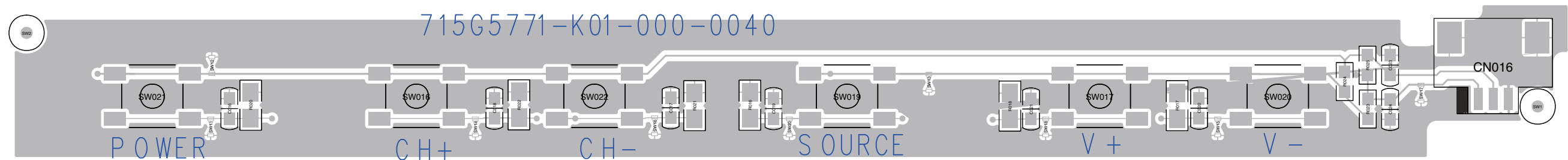
SSB Layout bottom	3139 123 6545	1	2013-01-11
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10.7 272217190763, 272217190764, 272217190766 Keyboard Control Module
10-7-1 E, Keyboard Control Module

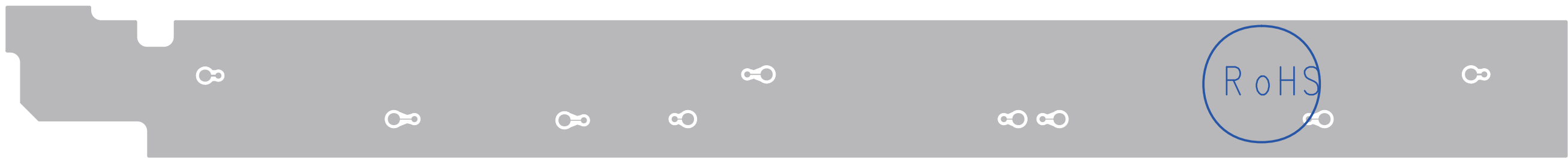


10-8-2 Keyboard control panel layout

Layout Keyboard control panel (top side)

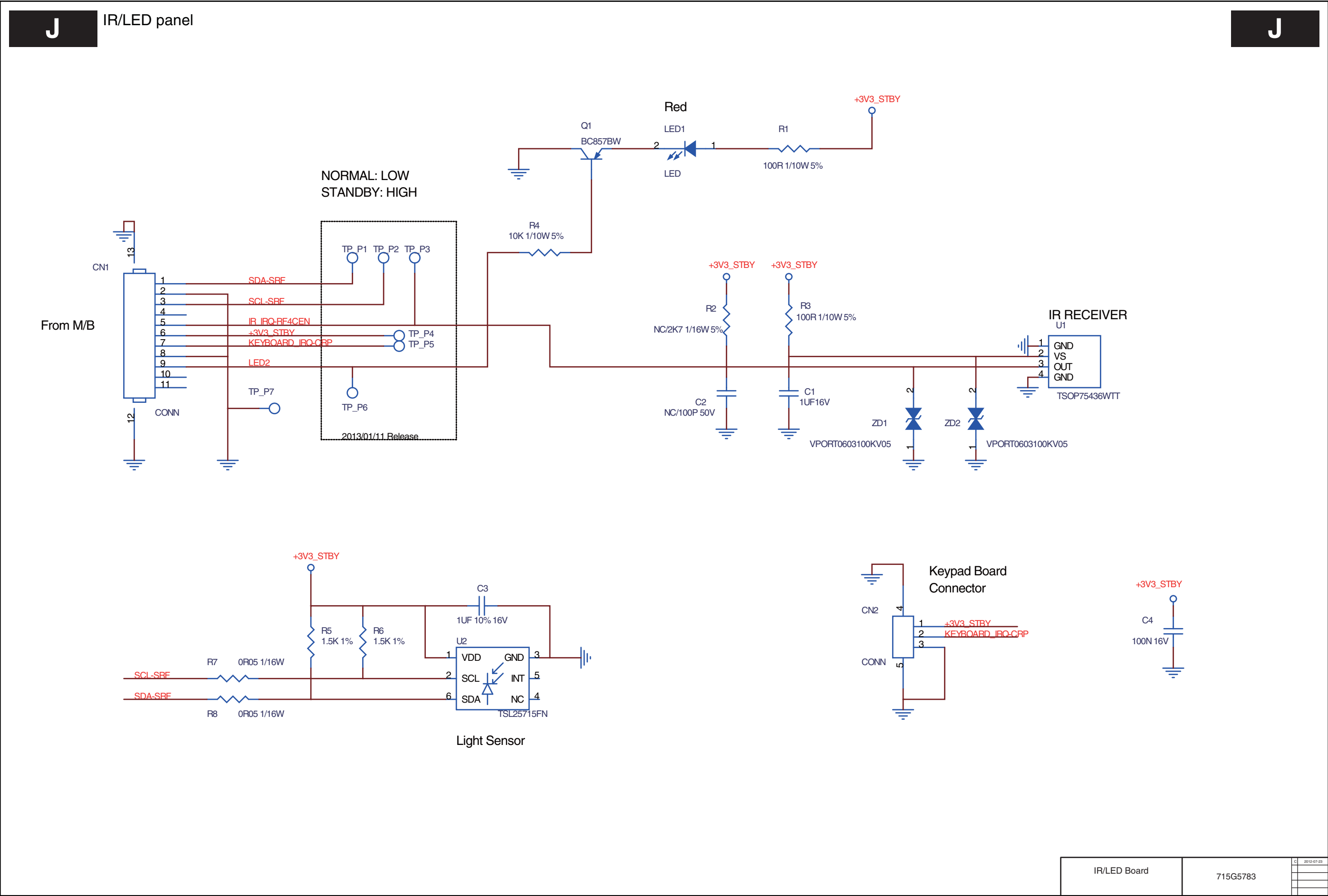


Layout Keyboard control panel (bottom side)



Keyboard control panel layout top/bottom	715G5771	C	2013-07-23

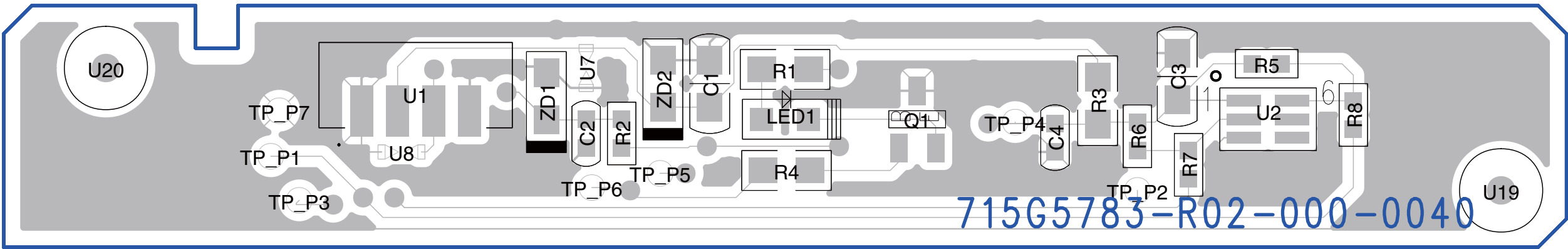
10.9 J 715G5783
10-9-1 IR/LED panel



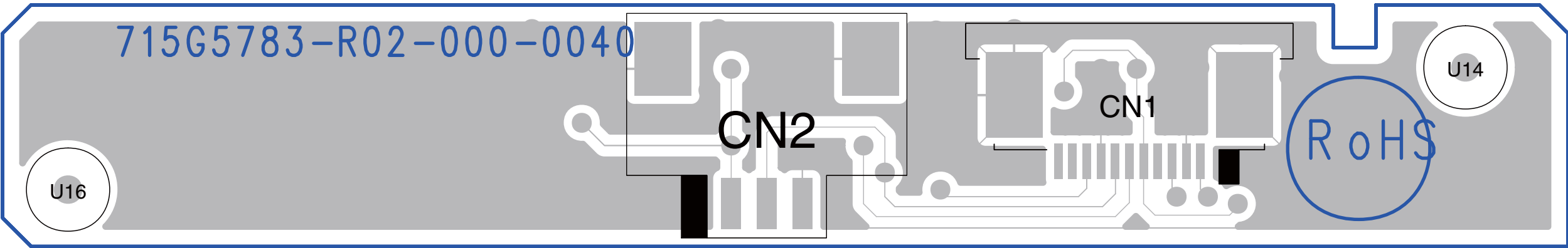
IR/LED Board	715G5783	C	2012-07-25

10-9-2 IR/LED panel layout

Layout IR/LED Board (top side)

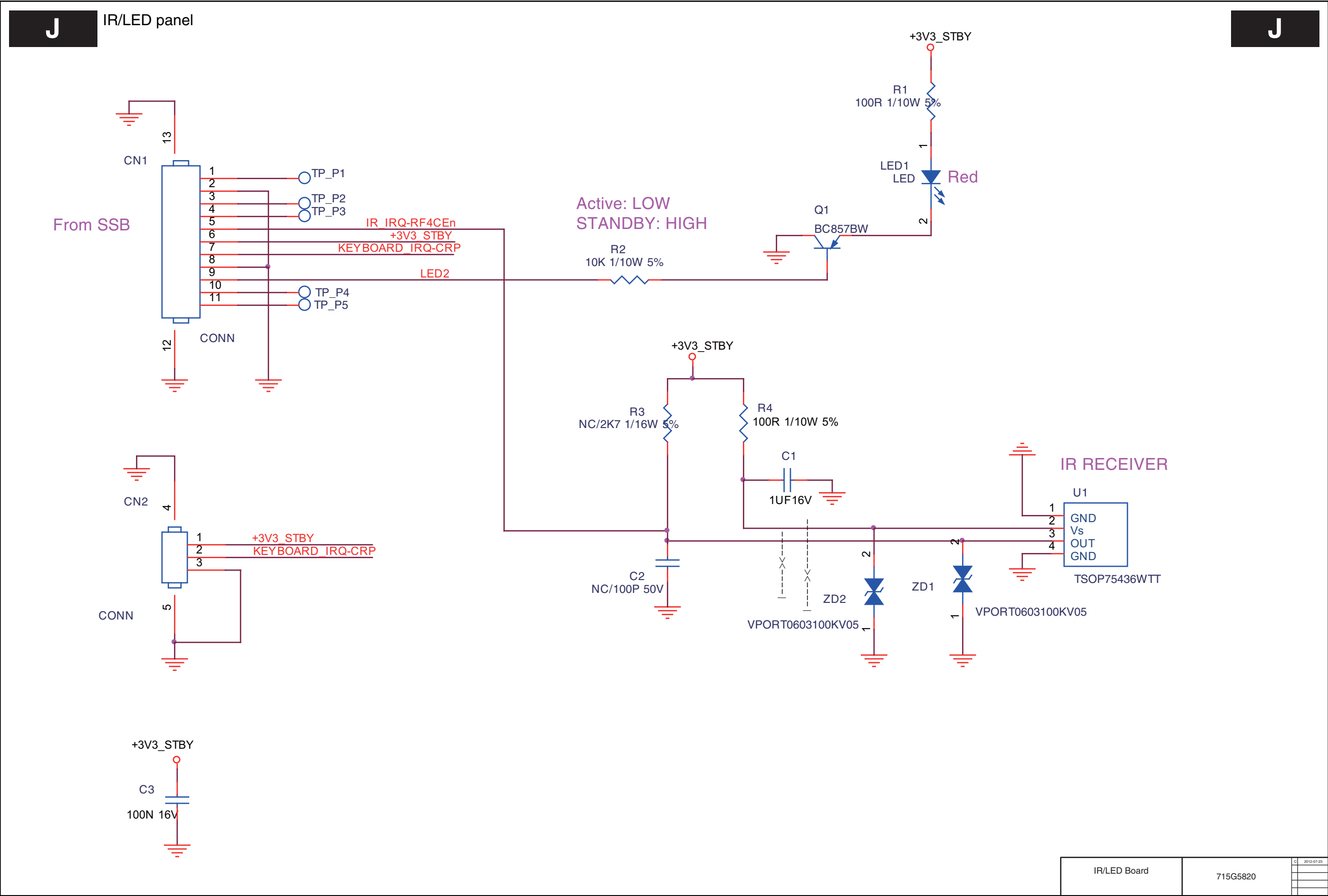


Layout IR/LED Board (bottom side)



IR/LED board layout top/bottom	715G5783	C	2013-07-23

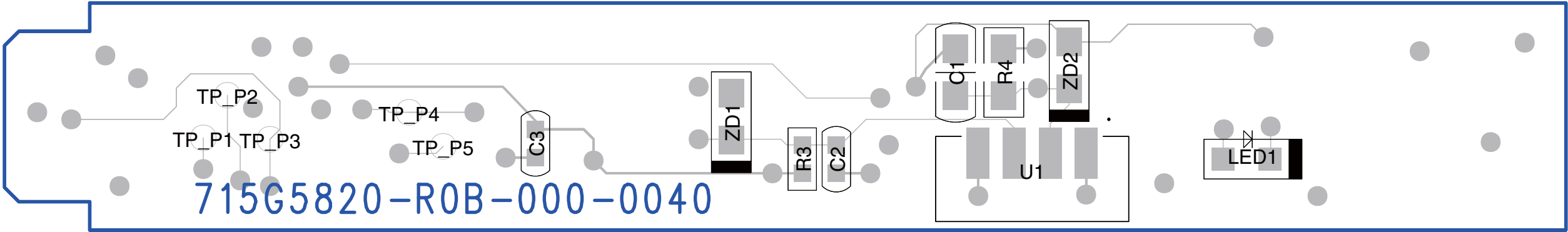
10.10 J 715G5820
10-10-1 IR/LED panel



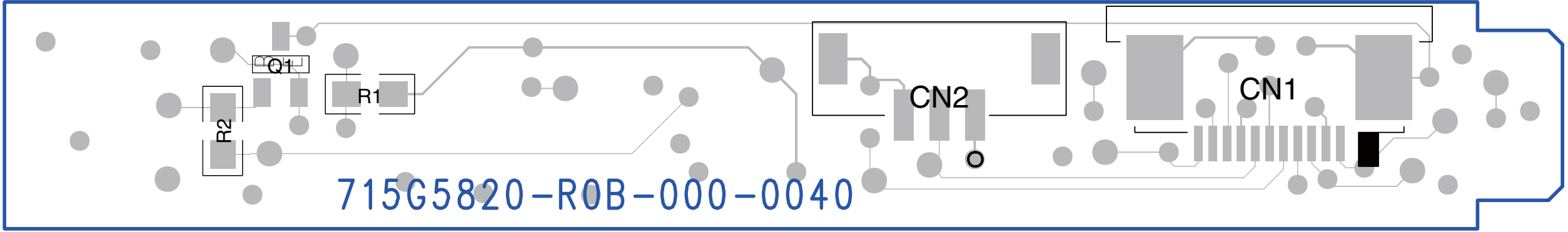
IR/LED Board	715G5820	C1	2012-07-25

10-10-2 IR/LED panel layout

Layout IR/LED Board (top side)



Layout IR/LED Board (bottom side)



IR/LED board layout top/bottom	715G5820	C	2013-07-23

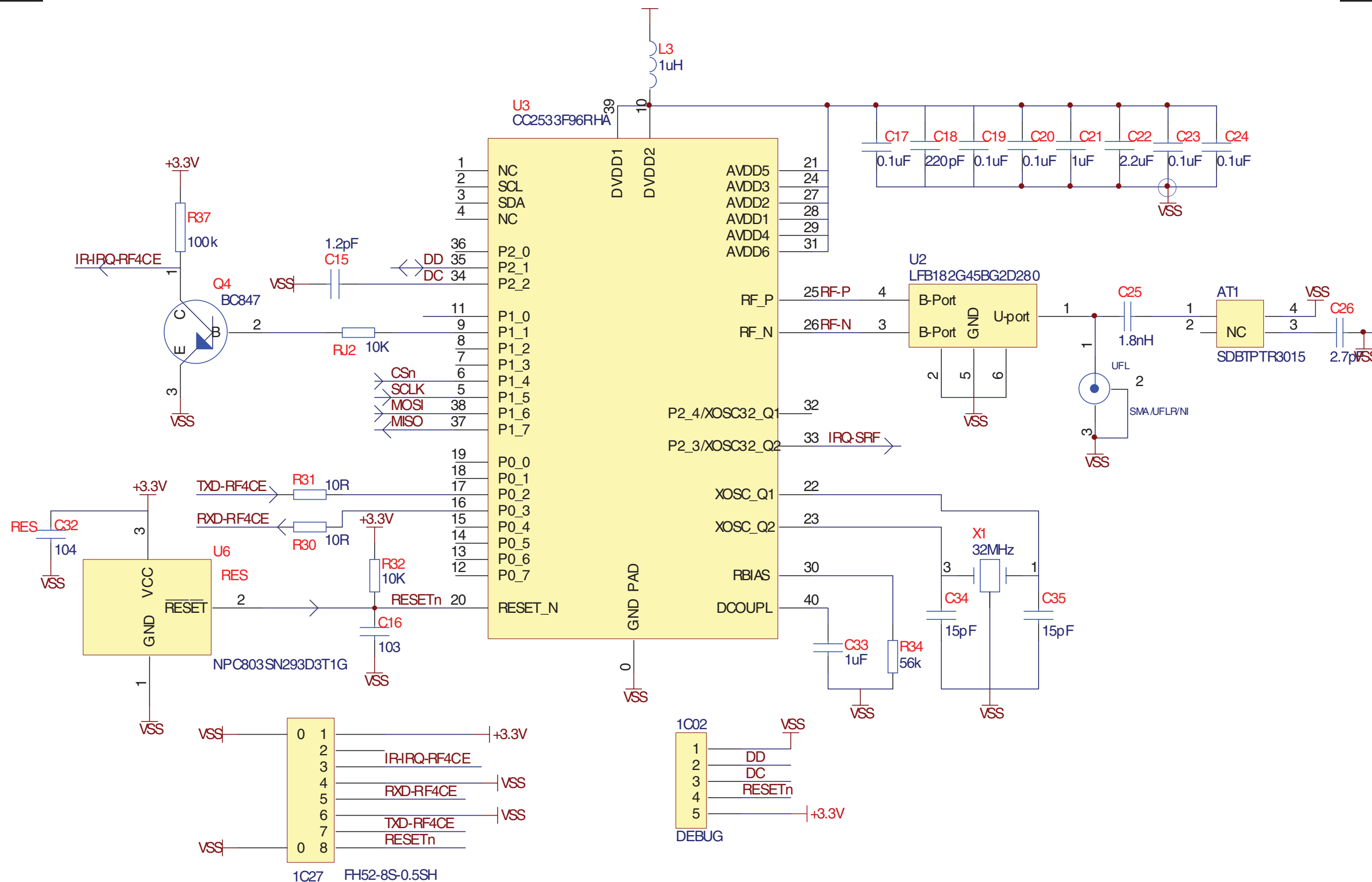
10.11 272217190759, 272217190761 Sensor Module

10-11-1 J, RF4CE Sensor Module

RF

RF4CE Sensor Module

RF



RF4CE Sensor Module

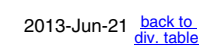
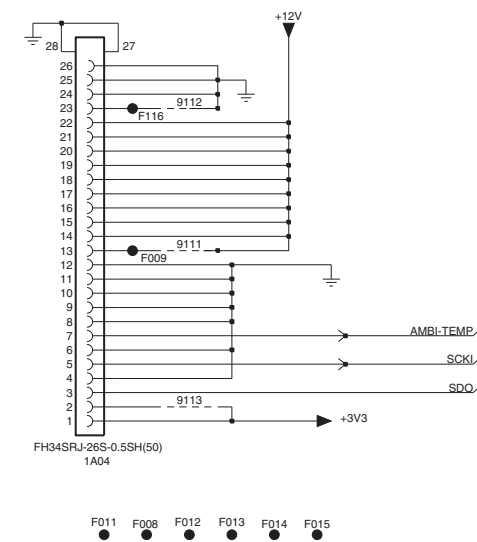
2722 171 90759

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130131

10-12-1 AL1, 7 LED Master LiteOn

7 LED Master LiteOn

AI 1

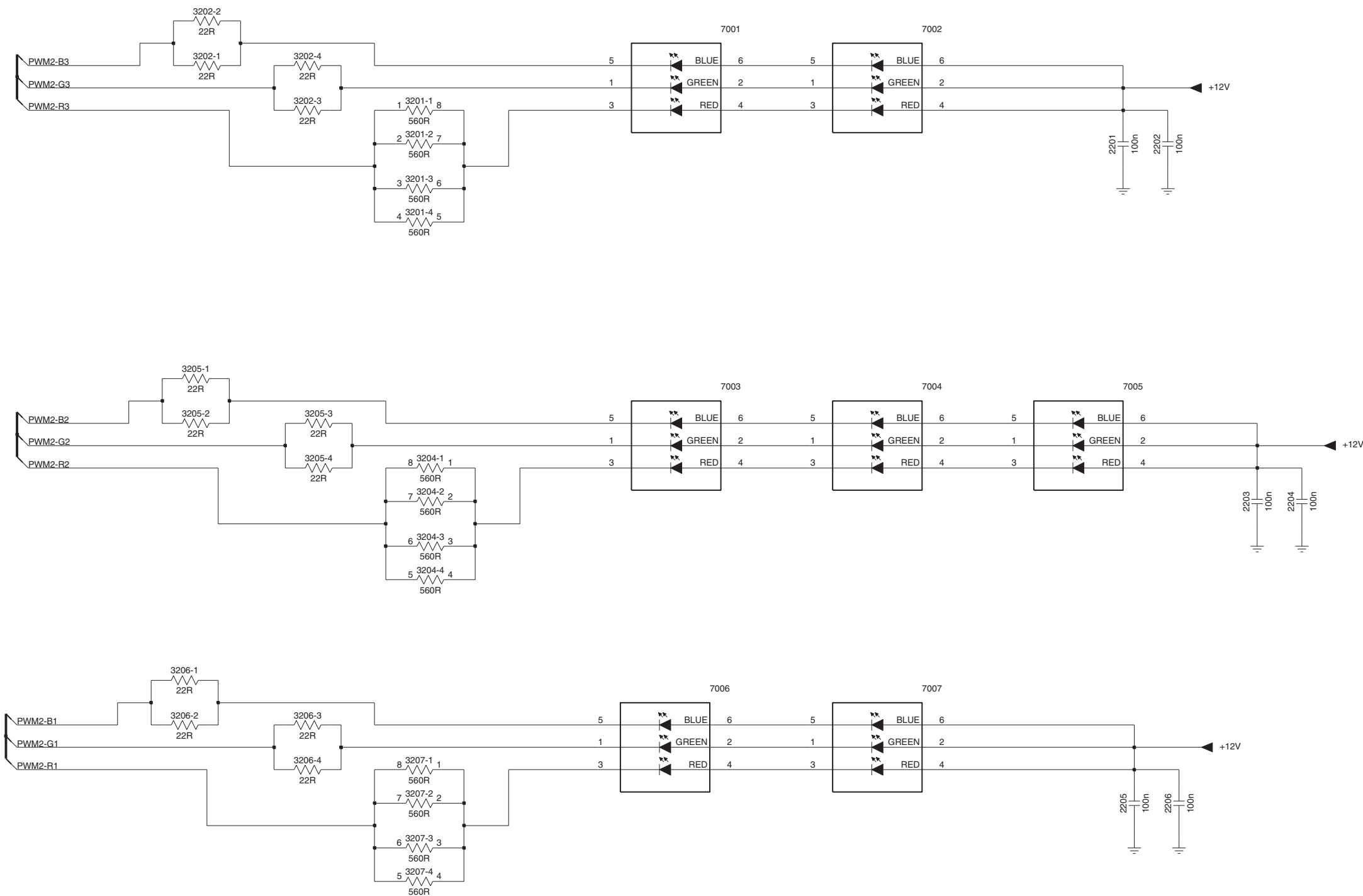


10-12-2 AL2, 7 LED Master LiteOn

AL2

7 LED Master LiteOn

AL2



7 LED Master LiteOn

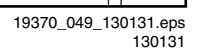
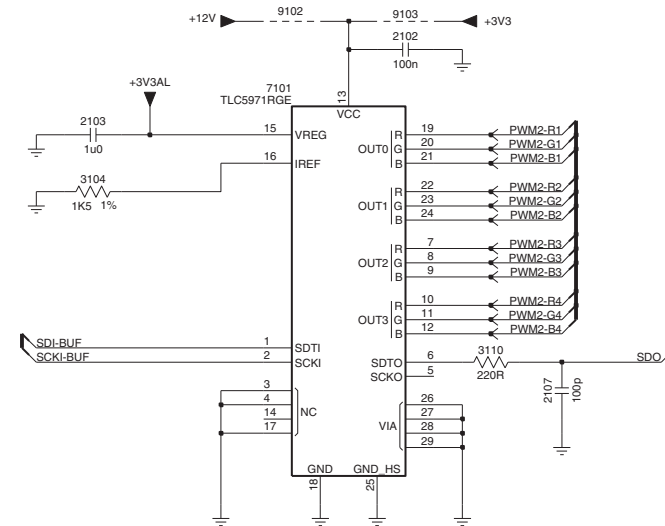
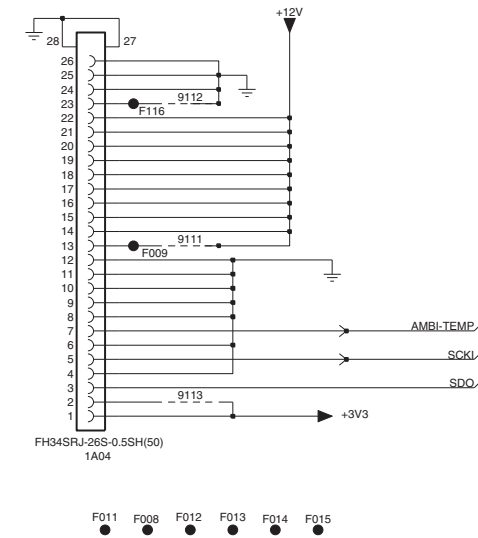
3104 313 6603

3	2012-08-30

10-13-1 AL1, 9 LED LiteOn

9 LED LiteOn

AI 1

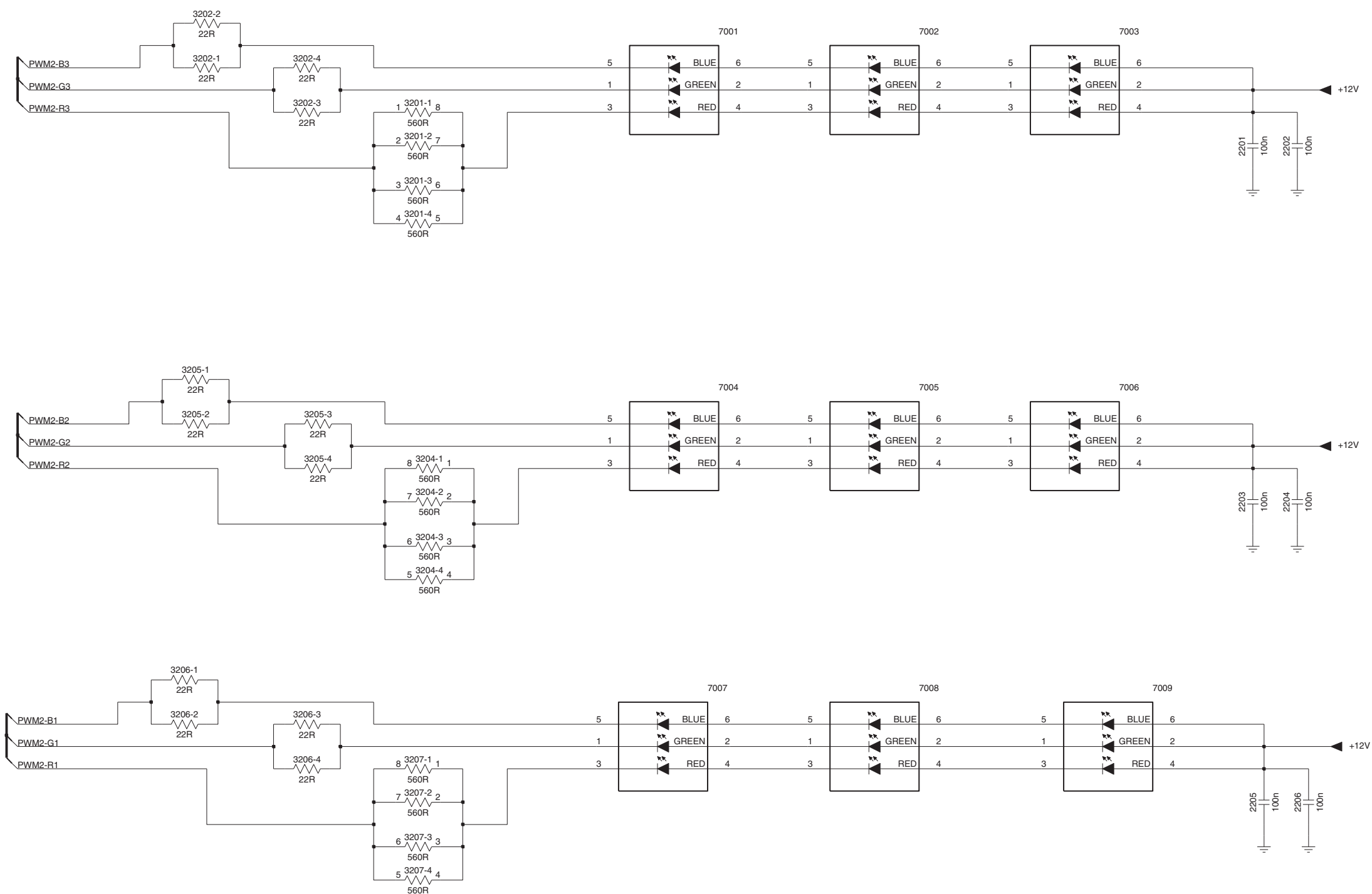


10-13-2 AL2, 9 LED LiteOn

AL2

9 LED LiteOn

AL2

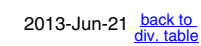
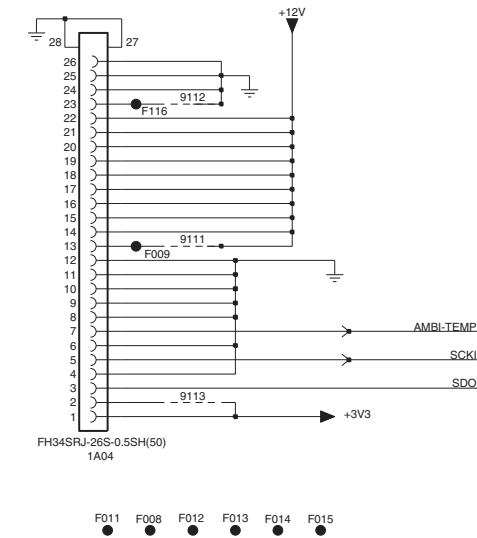


9 LED LiteOn	3104 313 6605	3	2012-08-30

10-14-1 AL1, 10 LED Master LiteOn

10 LED Master LiteOn

AL1

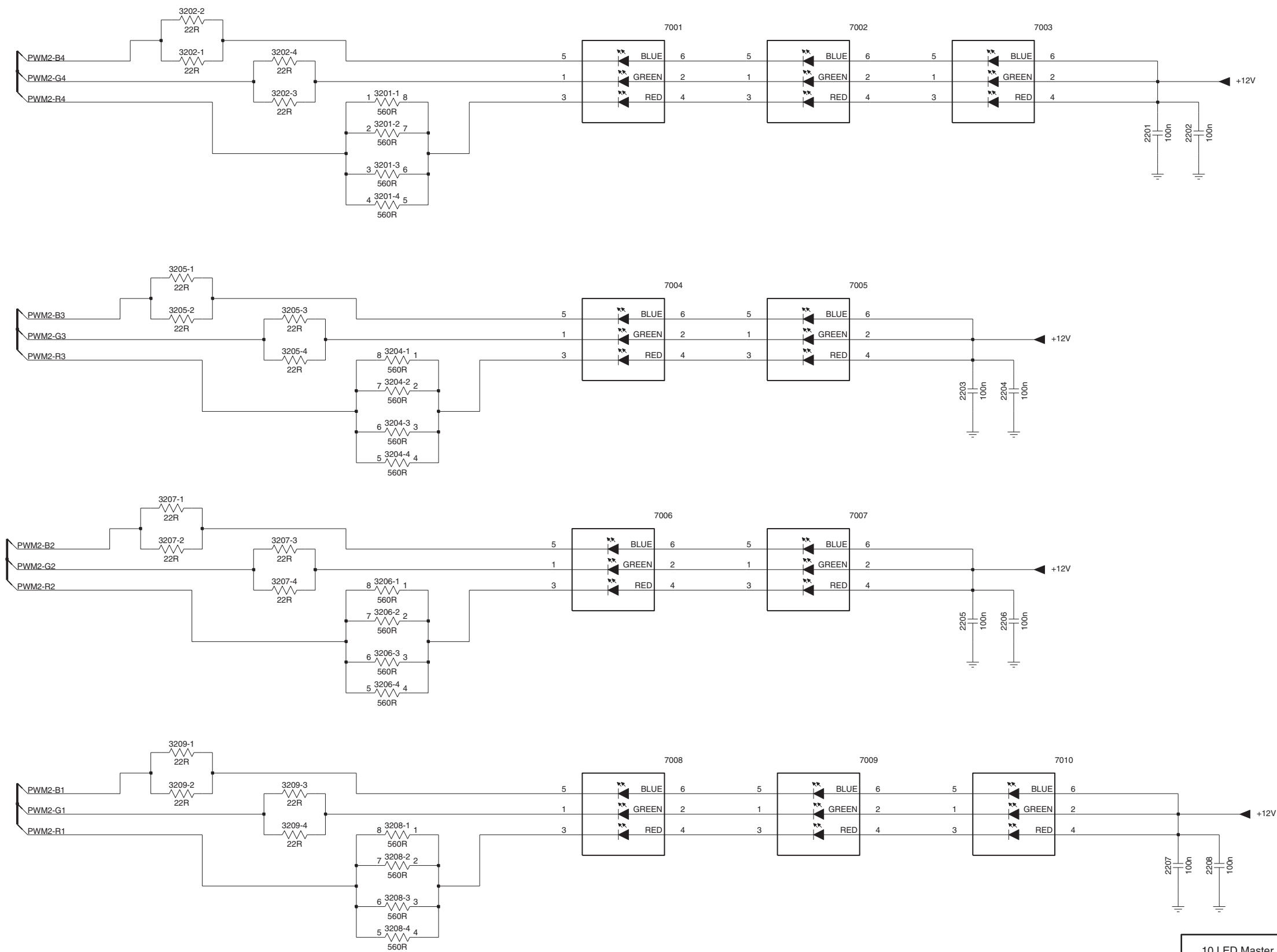


10-14-2 AL2, 10 LED Master LiteOn

AL2

10 LED Master LiteOn

AL2



10 LED Master LiteOn

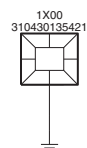
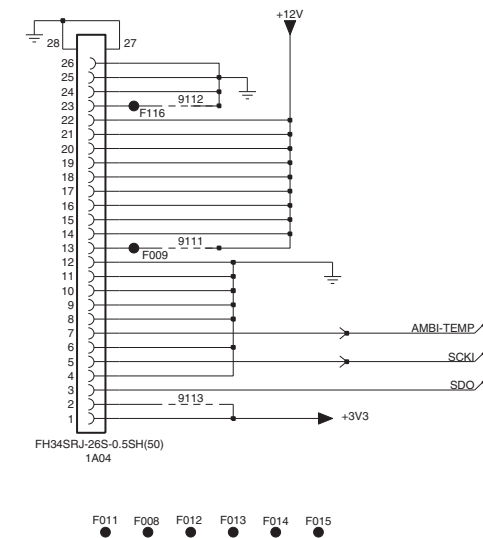
3104 313 6606

3	2012-08-30

10-15-1 AL1, 7 LED Everlight

7 LED Everlight

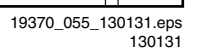
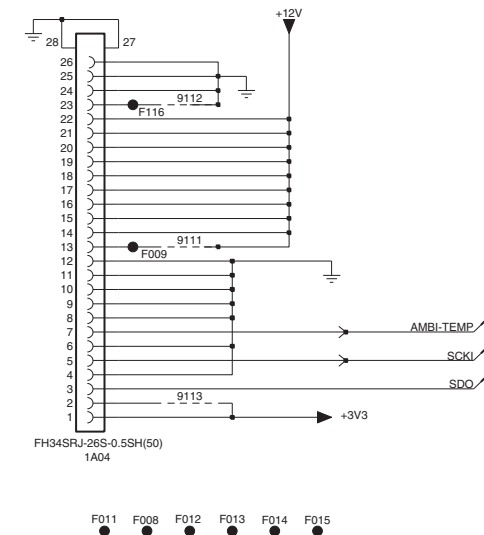
AL1



10-16-1 AL1, 8 LED Everlight

8 LED Everlight

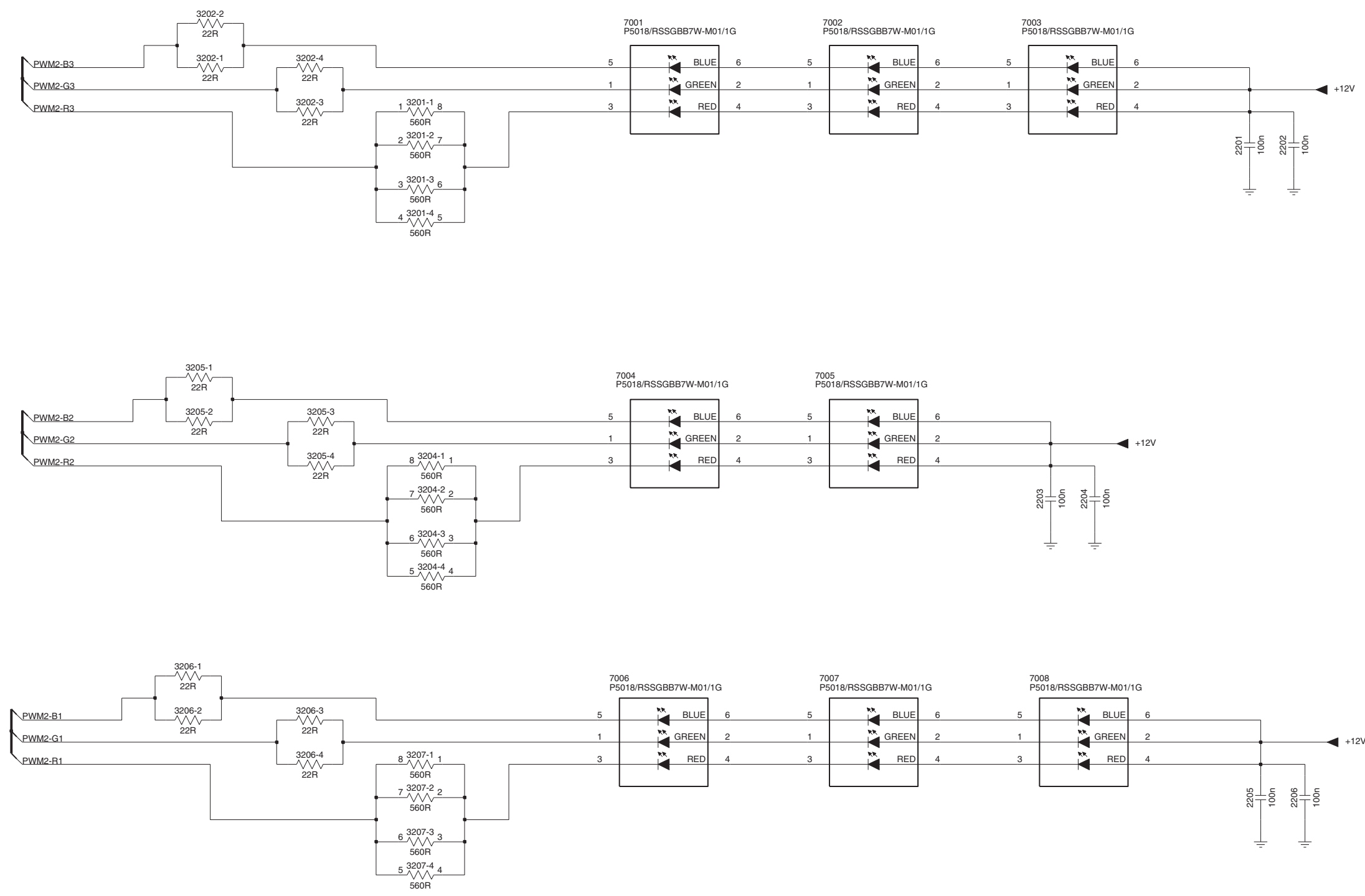
AI 1



10-16-2 AL2, 8 LED Everlight

AL2 8 LED Everlight

AL2

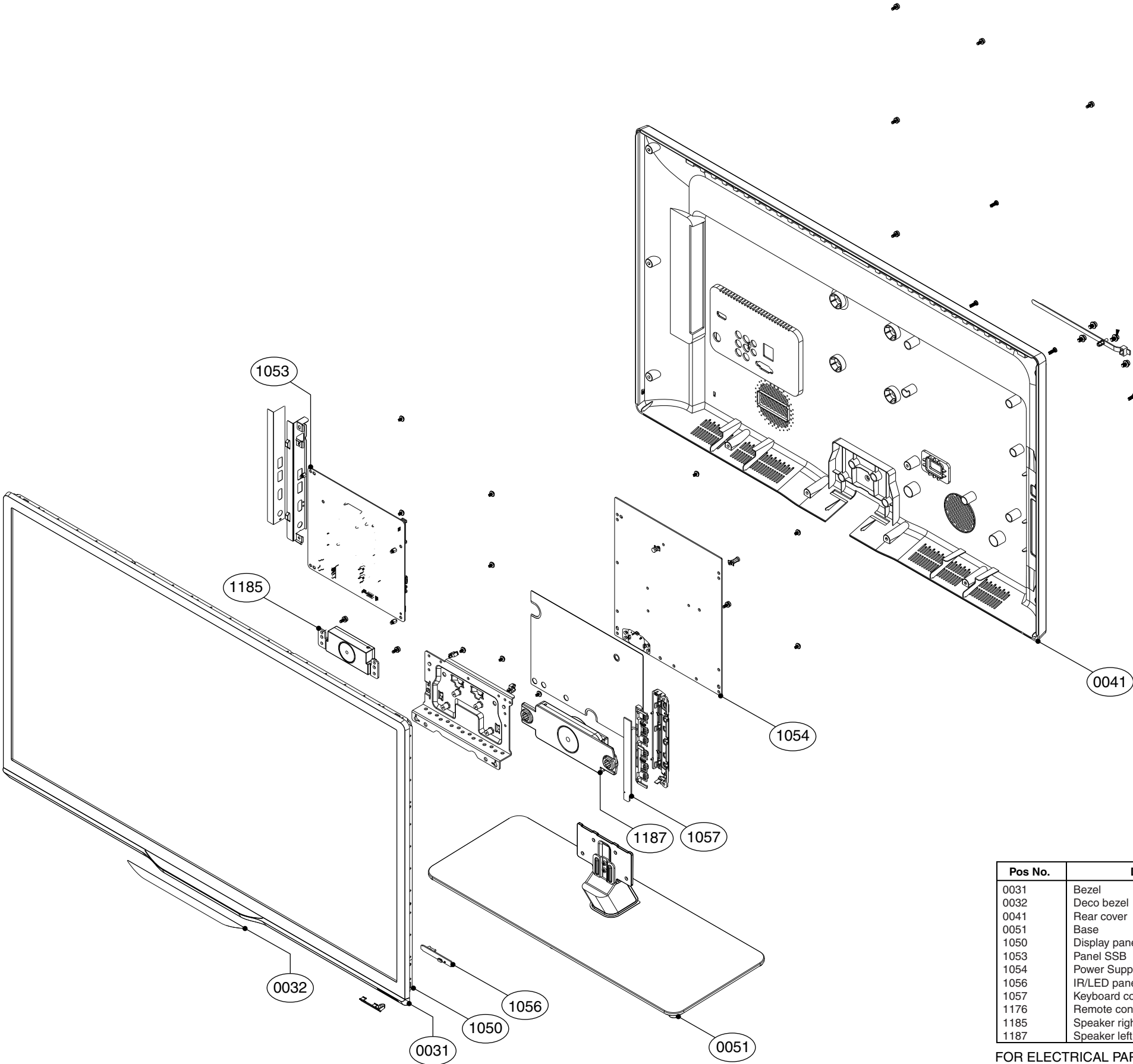


8 LED Everlight	3104 313 6630	2	2012-09-11

11. Styling Sheets

11.1 3500 series 32"

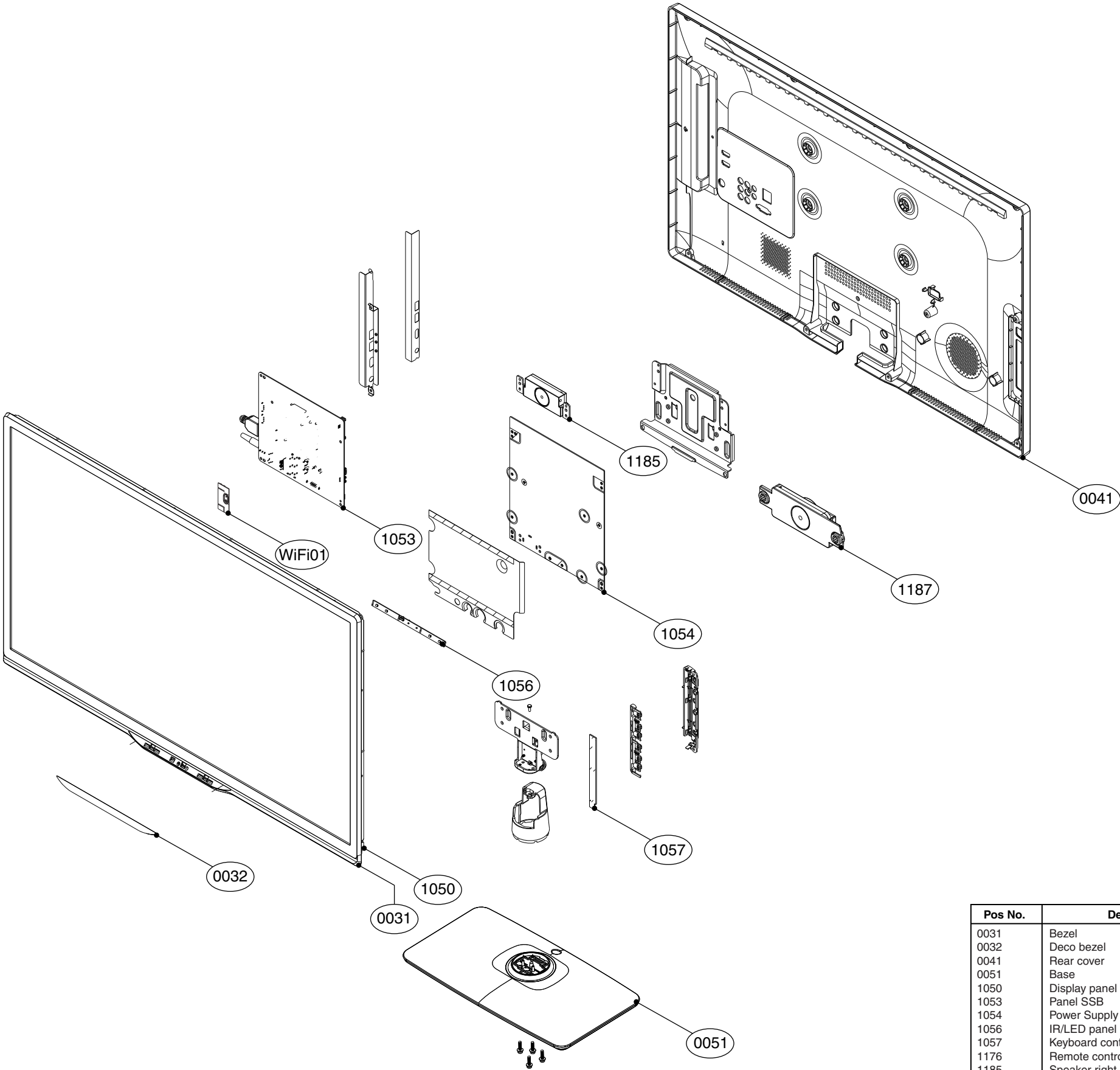
3500 series 32"



Pos No.	Description	Remarks
0031	Bezel	Not displayed
0032	Deco bezel	
0041	Rear cover	
0051	Base	
1050	Display panel	
1053	Panel SSB	
1054	Power Supply Unit	
1056	IR/LED panel	
1057	Keyboard control panel	
1176	Remote control	
1185	Speaker right	
1187	Speaker left	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

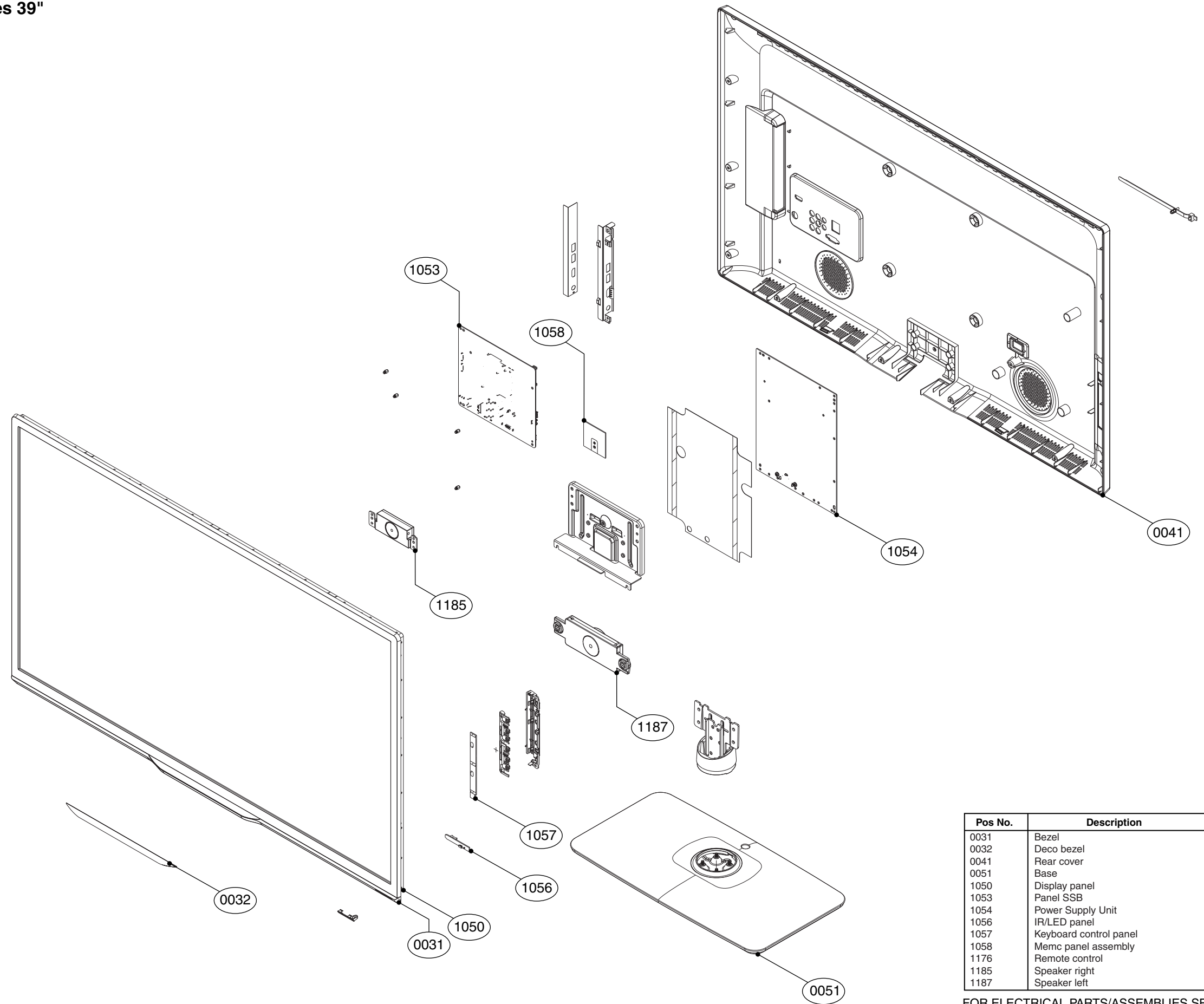
4500 series 32"



Pos No.	Description	Remarks
0031	Bezel	Not displayed
0032	Deco bezel	
0041	Rear cover	
0051	Base	
1050	Display panel	
1053	Panel SSB	
1054	Power Supply Unit	
1056	IR/LED panel	
1057	Keyboard control panel	
1176	Remote control	
1185	Speaker right	
1187	Speaker left	
WiFi01	WiFi Dongle	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

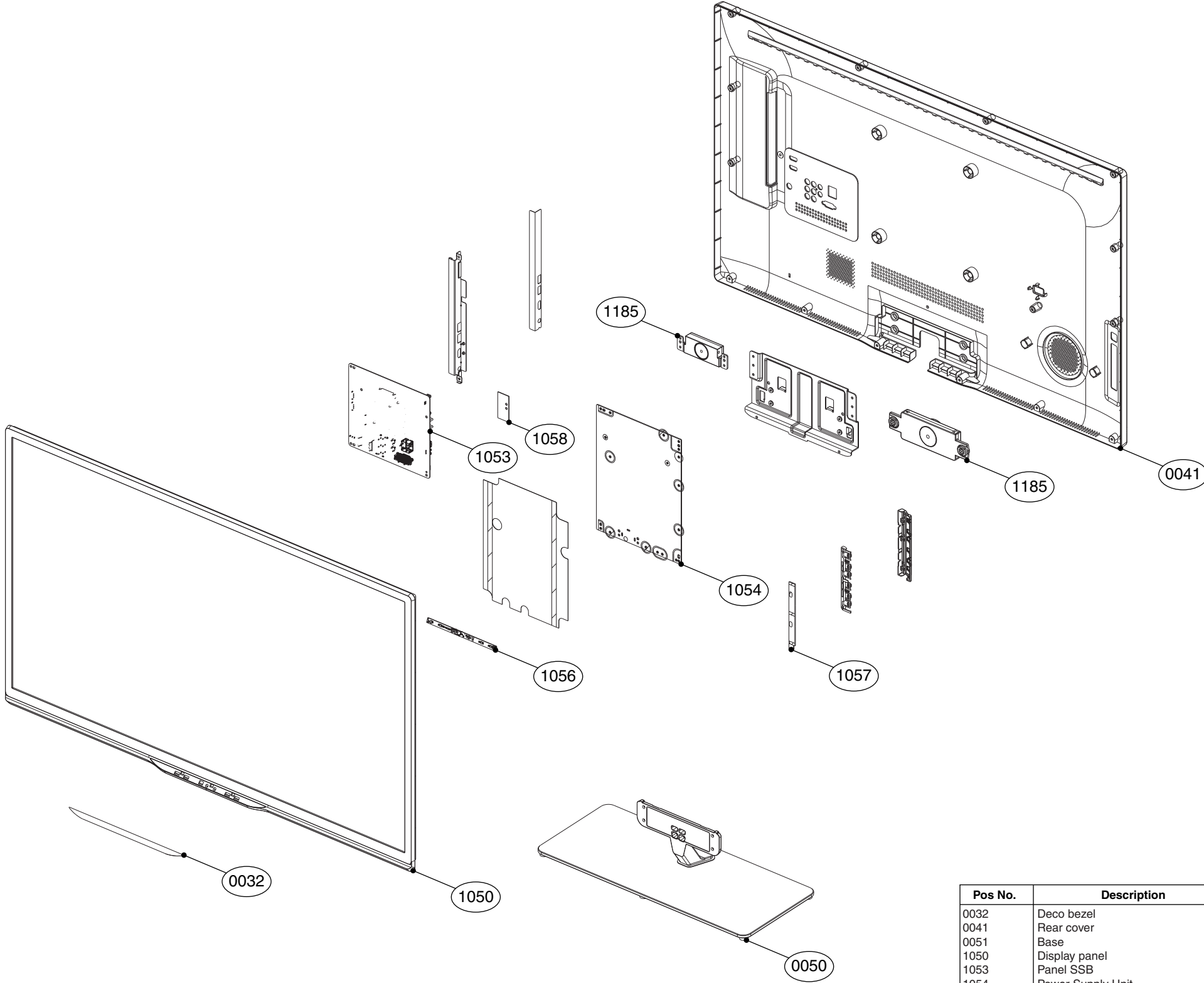
3500 series 39"



Pos No.	Description	Remarks
0031	Bezel	Not displayed
0032	Deco bezel	
0041	Rear cover	
0051	Base	
1050	Display panel	
1053	Panel SSB	
1054	Power Supply Unit	
1056	IR/LED panel	
1057	Keyboard control panel	
1058	Memc panel assembly	
1176	Remote control	
1185	Speaker right	
1187	Speaker left	

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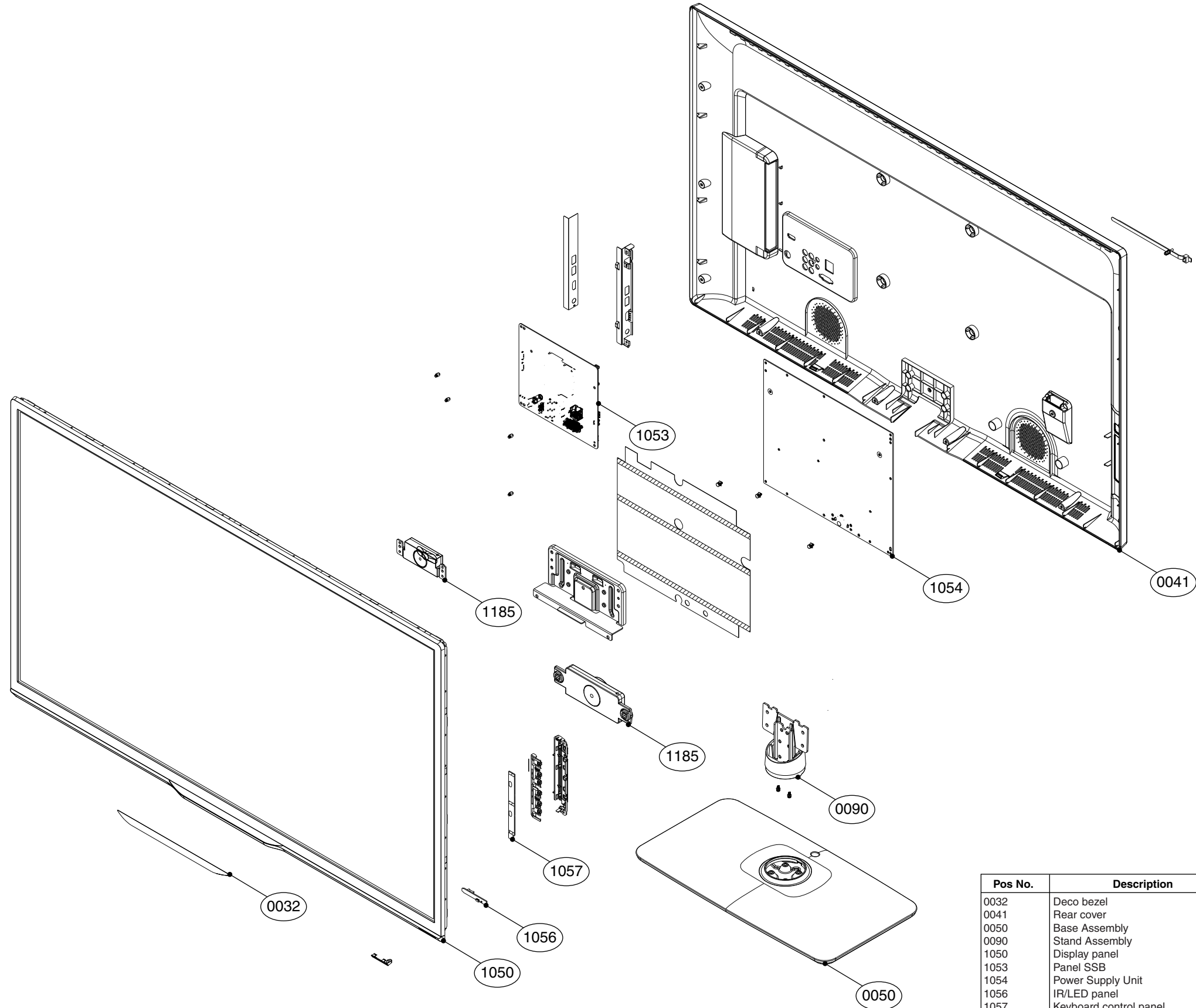
4500 series 39"



Pos No.	Description	Remarks
0032	Deco bezel	
0041	Rear cover	
0051	Base	
1050	Display panel	
1053	Panel SSB	
1054	Power Supply Unit	
1056	IR/LED panel	
1057	Keyboard control panel	
1058	Option board	
1176	Remote control	Not displayed
1185	Speakers	

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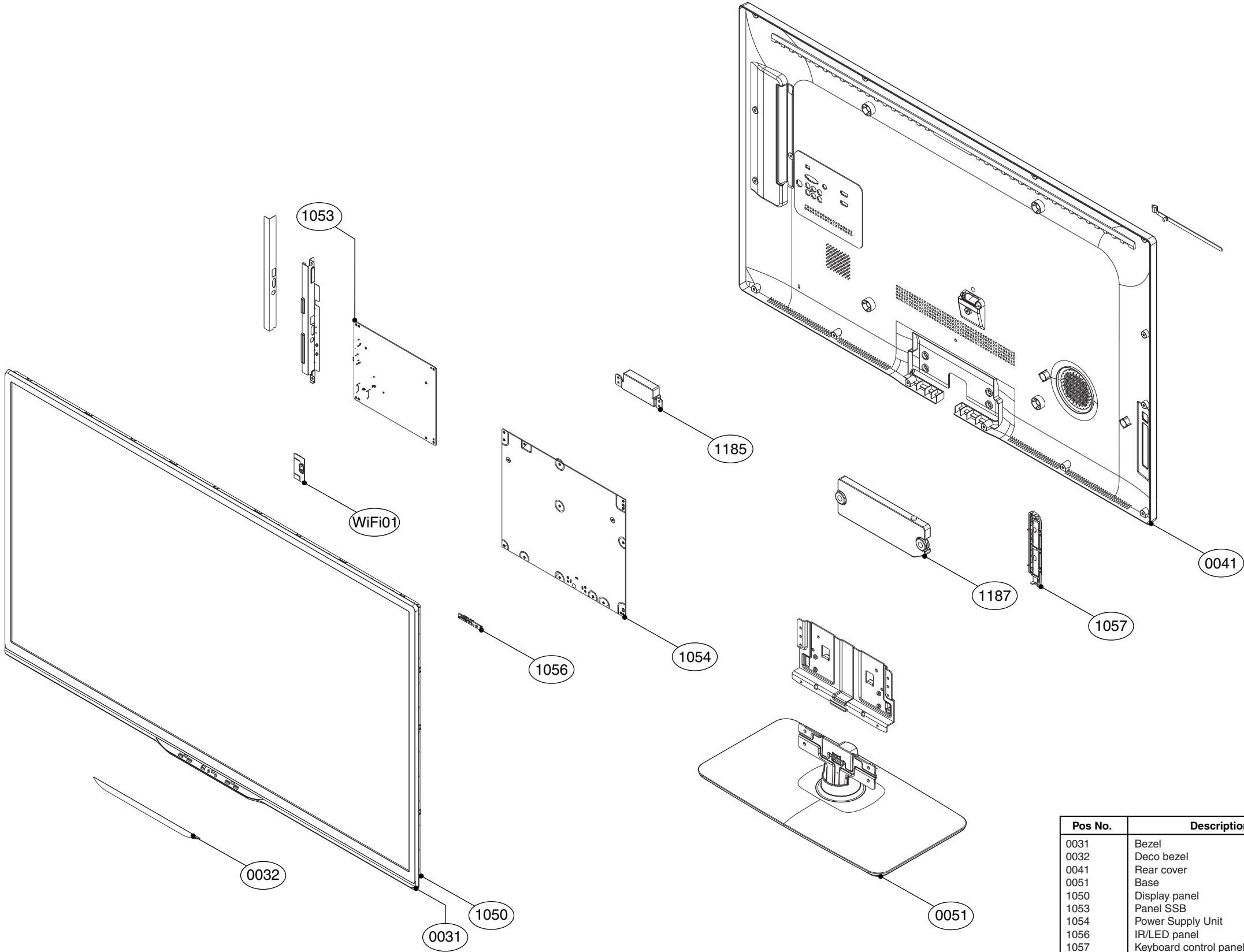
3500 series 42"



Pos No.	Description	Remarks
0032	Deco bezel	
0041	Rear cover	
0050	Base Assembly	
0090	Stand Assembly	
1050	Display panel	
1053	Panel SSB	
1054	Power Supply Unit	
1056	IR/LED panel	
1057	Keyboard control panel	
1176	Remote control	Not displayed
1185	Speakers	

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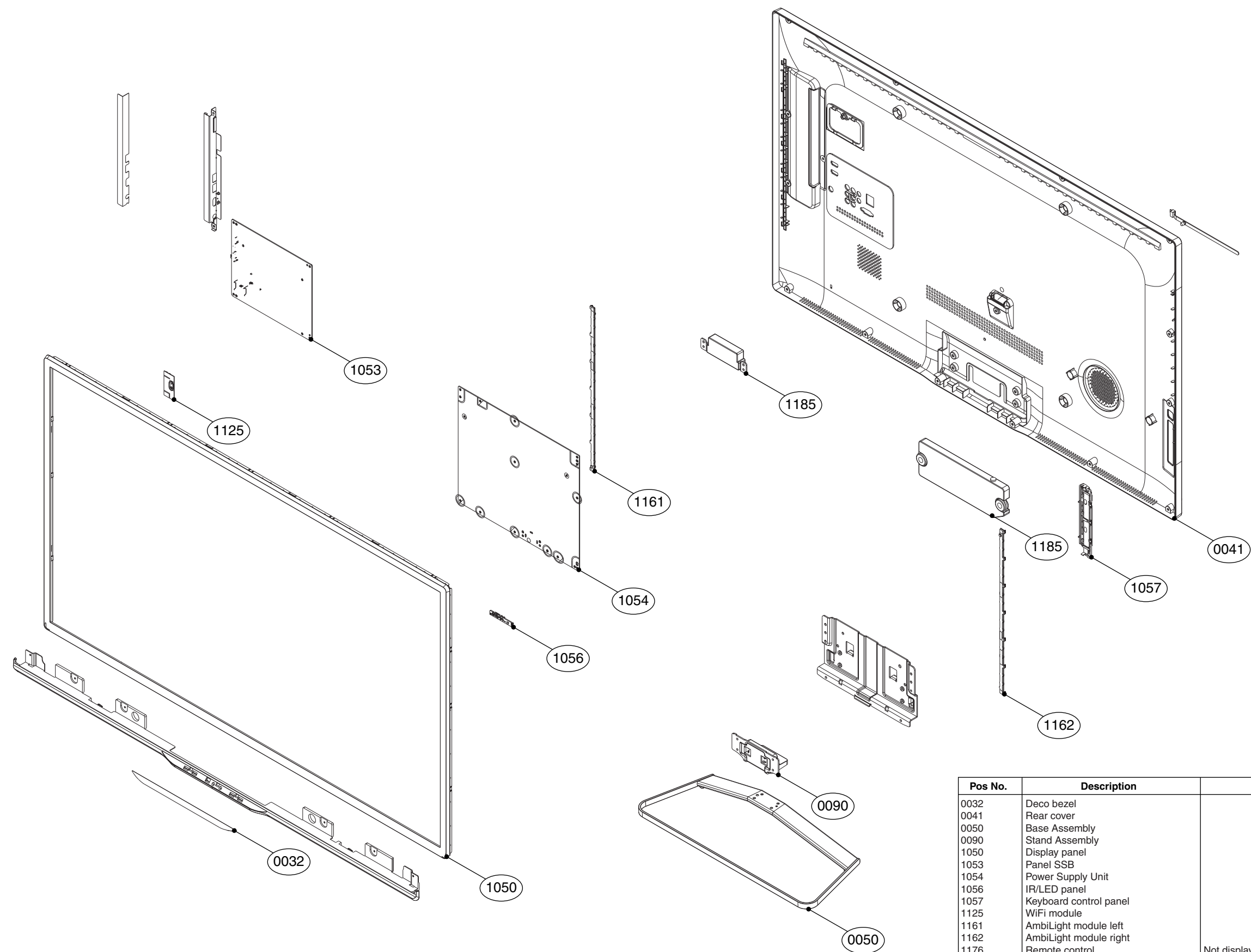
4500 series 42"



Pos No.	Description	Remarks
0031	Bezel	Not displayed
0032	Deco bezel	
0041	Rear cover	
0051	Base	
1050	Display panel	
1053	Panel SSB	
1054	Power Supply Unit	
1056	IR/LED panel	
1057	Keyboard control panel	
1176	Remote control	
1185	Speaker right	
1187	Speaker left	
WiFi01	WiFi Dongle	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

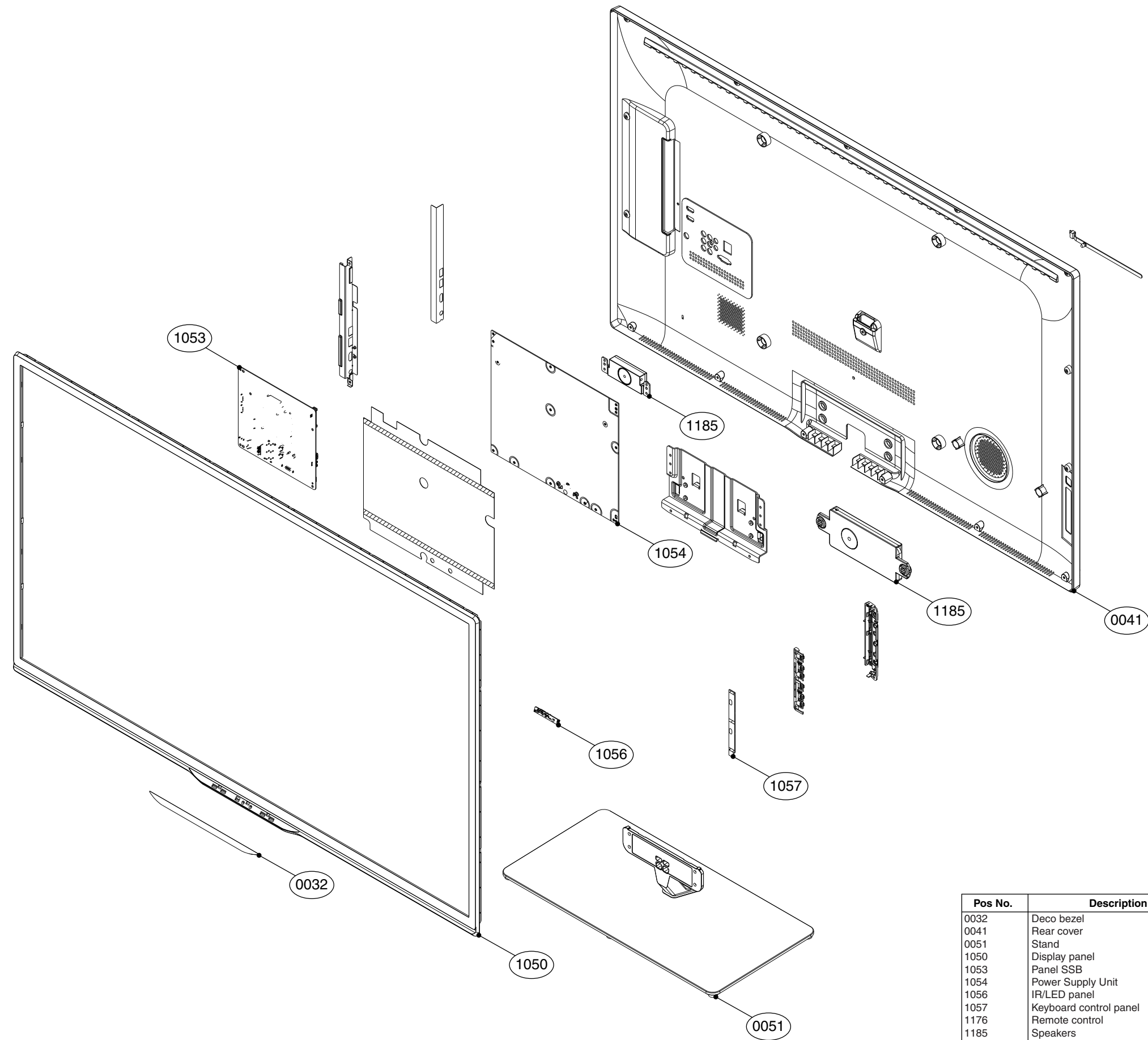
5000 and 5500 Series 42"/46"



Pos No.	Description	Remarks
0032	Deco bezel	
0041	Rear cover	
0050	Base Assembly	
0090	Stand Assembly	
1050	Display panel	
1053	Panel SSB	
1054	Power Supply Unit	
1056	IR/LED panel	
1057	Keyboard control panel	
1125	WiFi module	
1161	AmbiLight module left	
1162	AmbiLight module right	
1176	Remote control	Not displayed
1185	Speakers	

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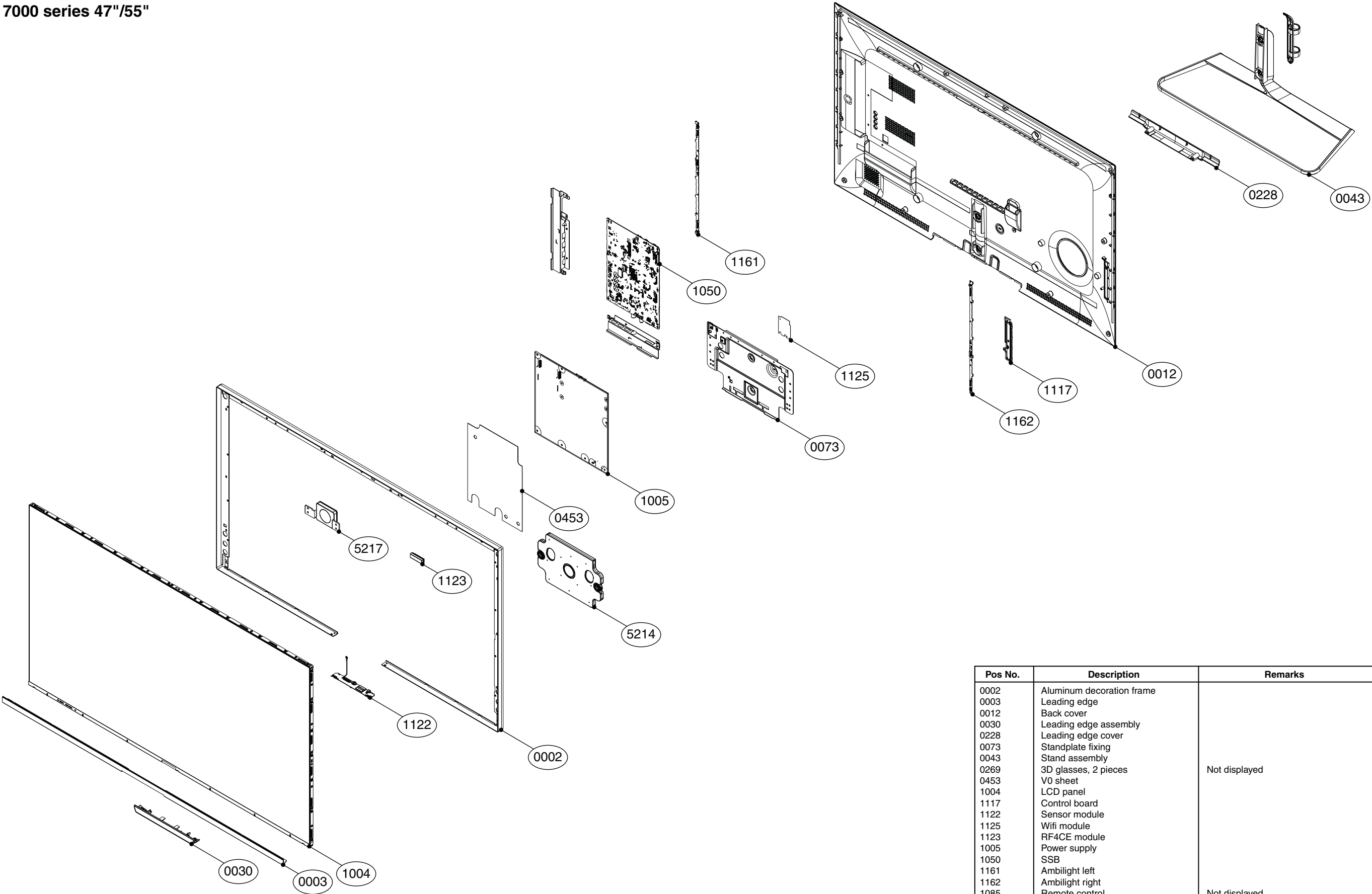
4500 series 46"



Pos No.	Description	Remarks
0032	Deco bezel	
0041	Rear cover	
0051	Stand	
1050	Display panel	
1053	Panel SSB	
1054	Power Supply Unit	
1056	IR/LED panel	
1057	Keyboard control panel	
1176	Remote control	Not displayed
1185	Speakers	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

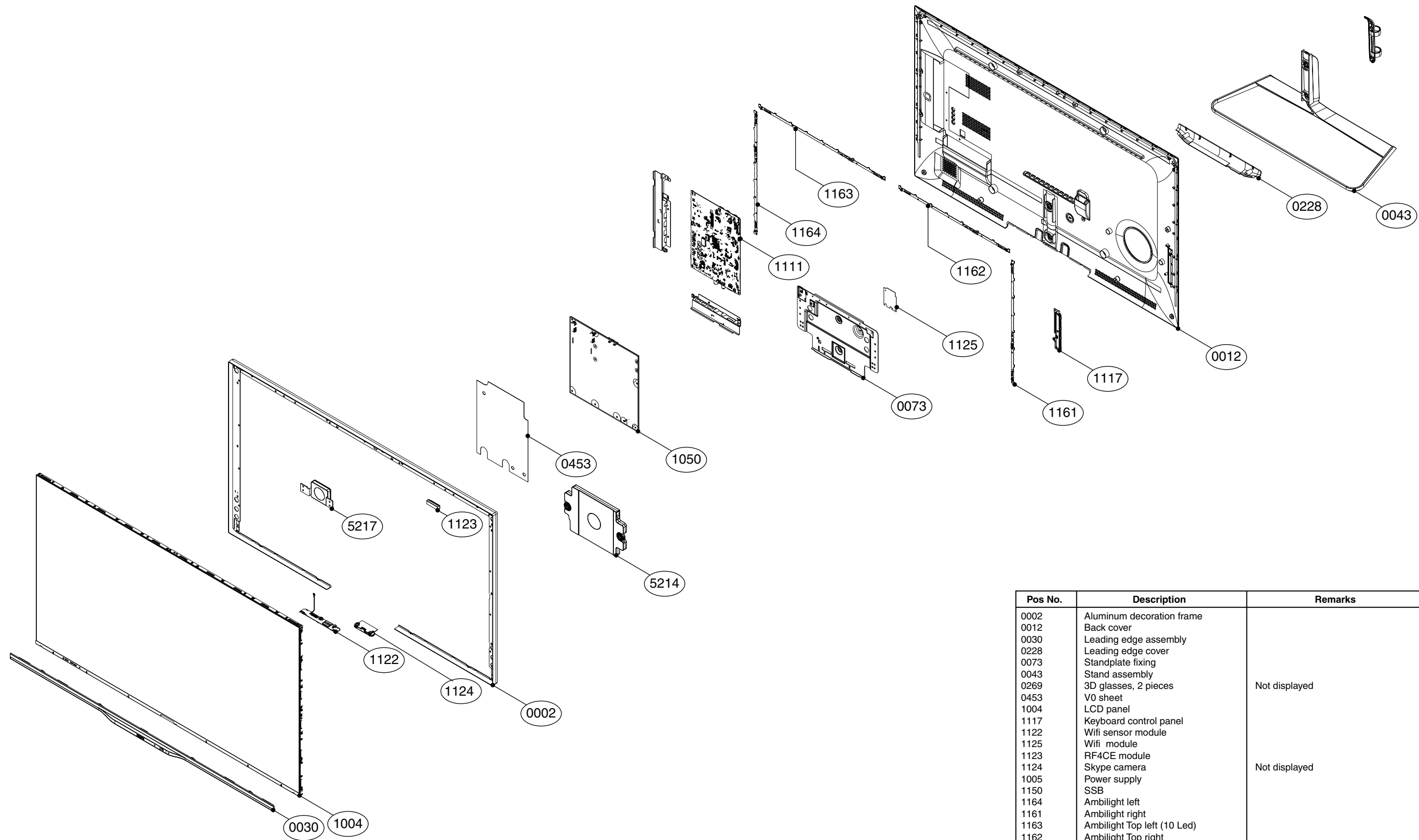
7000 series 47"/55"



Pos No.	Description	Remarks
0002	Aluminum decoration frame	Not displayed
0003	Leading edge	
0012	Back cover	
0030	Leading edge assembly	
0228	Leading edge cover	
0073	Standplate fixing	
0043	Stand assembly	
0269	3D glasses, 2 pieces	
0453	V0 sheet	
1004	LCD panel	
1117	Control board	
1122	Sensor module	
1125	Wifi module	
1123	RF4CE module	
1005	Power supply	Not displayed
1050	SSB	
1161	Ambilight left	
1162	Ambilight right	
1085	Remote control	
5214	Loudspeaker 4 Ω (Woofer)	Not displayed
5217	Loudspeaker 6 Ω	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

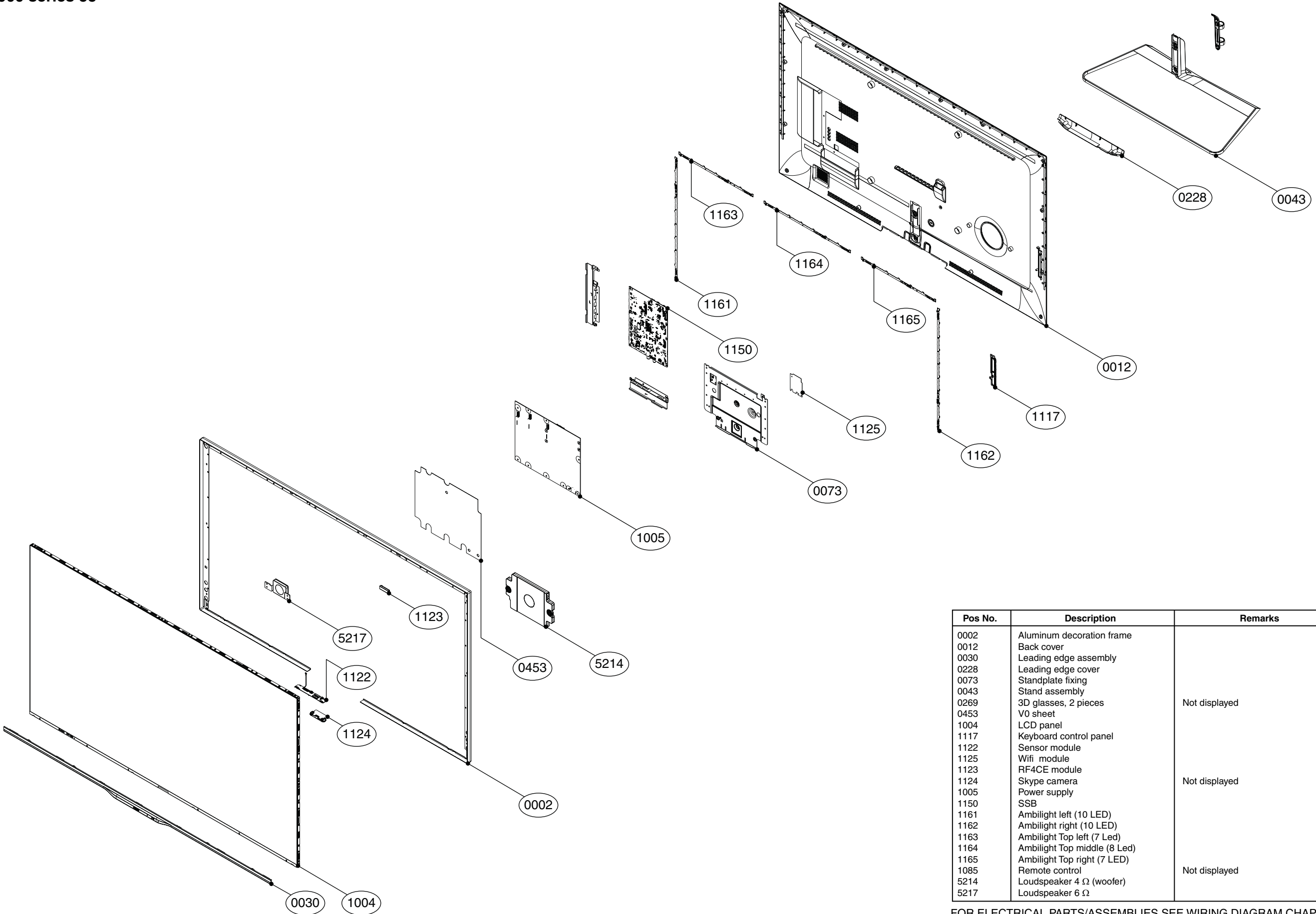
8000 series 47"



Pos No.	Description	Remarks
0002	Aluminum decoration frame	
0012	Back cover	
0030	Leading edge assembly	
0228	Leading edge cover	
0073	Standplate fixing	
0043	Stand assembly	
0269	3D glasses, 2 pieces	Not displayed
0453	V0 sheet	
1004	LCD panel	
1117	Keyboard control panel	
1122	Wifi sensor module	
1125	Wifi module	
1123	RF4CE module	
1124	Skype camera	Not displayed
1005	Power supply	
1150	SSB	
1164	Ambilight left	
1161	Ambilight right	
1163	Ambilight Top left (10 Led)	
1162	Ambilight Top right	
1085	Remote control	Not displayed
5214	Loudspeaker 4 Ω (woofer)	
5217	Loudspeaker 6 Ω	

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8000 series 55"



Pos No.	Description	Remarks
0002	Aluminum decoration frame	
0012	Back cover	
0030	Leading edge assembly	
0228	Leading edge cover	
0073	Standplate fixing	
0043	Stand assembly	
0269	3D glasses, 2 pieces	Not displayed
0453	V0 sheet	
1004	LCD panel	
1117	Keyboard control panel	
1122	Sensor module	
1125	Wifi module	
1123	RF4CE module	
1124	Skype camera	Not displayed
1005	Power supply	
1150	SSB	
1161	Ambilight left (10 LED)	
1162	Ambilight right (10 LED)	
1163	Ambilight Top left (7 Led)	
1164	Ambilight Top middle (8 Led)	
1165	Ambilight Top right (7 LED)	
1085	Remote control	Not displayed
5214	Loudspeaker 4 Ω (woofer)	
5217	Loudspeaker 6 Ω	

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