

Service
Service
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Service Manual

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1. Revision List

Manual xxxx xxx xxxx.0

- First release.

Manual xxxx xxx xxxx.1

- Chapter 2:** Updated table [2.1 Technical Specifications](#).
- Chapter 4:** Added figures [4-6 Cable dressing \(40" 6510&6540 series\)](#), [4-7 Cable dressing \(40" 6550&6560&6580 series\)](#), [4-10 Cable dressing \(50" 6510&6540 series\)](#), [4-11 Cable dressing \(50" 6550&6560&6580 series\)](#), [4-13 Cable dressing \(55" 6510&6540 series\)](#) and [4-14 Cable dressing \(55" 6550&6560&6580 series\)](#), added section [4.4 Assembly/Panel Removal \(for 32"/40"/50"/55"Pxx65x0 series\)](#).
- Chapter 5:** Updated table [5-2 Factory mode overview](#).
- Chapter 6:** Updated tables [6-2 White tone default settings](#) and [6-3 Display code overview](#).
- Chapter 7:** Updated figure [7-2 Power Architecture](#) and table [7-1 Connector overview](#).
- Chapter 10:** Added circuit diagrams [10.4 A 715G6677 PSU](#), [10.10 E 715G7118 Keyboard control panel](#), [10.11 AL 715G7035 Ambilight Board](#), [10.12 AL 715G7036 Ambilight Board](#), [10.13 AL 715G6981 Ambilight Board](#), [10.14 AL 715G7004 Ambilight Board](#), [10.15 AL 715G7006 Ambilight Board](#) and [10.16 AL 715G7007 Ambilight Board](#).
- Chapter 11:** Added styling sheets [11.6 6510&6540 series 40"](#), [11.7 6550&6560&6580 series 40"](#), [11.10 6510&6540 series 50"](#), [11.11 6550&6560&6580 series 50"](#), [11.13 6510&6540 series 55"](#) and [11.14 6550&6560&6580 series 55"](#).

Manual xxxx xxx xxxx.2

- Chapter 2:** Updated table [2.1 Technical Specifications](#).
- Chapter 4:** Added figures [4-5 Cable dressing \(40" 6400 series\)](#), [4-8 Cable dressing \(48" 5500 series\)](#) and [4-9 Cable dressing \(50" 6400 series\)](#), updated section [4.3 Assembly/Panel Removal \(for 32"/39"/40"/55"Pxx5500 series & 40"/50"/55"Pxx6400 series\)](#).
- Chapter 5:** Updated table [5-2 Factory mode overview](#).

- Chapter 6:** Updated tables [6-2 White tone default settings](#) and [6-3 Display code overview](#).
- Chapter 7:** Updated figure [7-2 Power Architecture](#) and table [7-1 Connector overview](#).
- Chapter 11:** Added styling sheets [11.5 6400 series 40"](#), [11.8 5500 series 48"](#), and [11.9 6400 series 50"](#).

Manual xxxx xxx xxxx.3

- Chapter 2:** Updated table [2.1 Technical Specifications](#).
- Chapter 4:** Added figures [4-15 Cable dressing \(65" 6520 series\)](#), added section [4.5 Assembly/Panel Removal \(for 65"PFx6520 series\)](#).
- Chapter 5:** Updated table [5-2 Factory mode overview](#).
- Chapter 6:** Updated tables [6-2 White tone default settings](#) and [6-3 Display code overview](#).
- Chapter 7:** Updated figure [7-2 Power Architecture](#) and table [7-1 Connector overview](#).
- Chapter 10:** Added circuit diagrams [10.5 A 715G6960 PSU](#) and [10.8 J 715G7045 IR/LED Panel](#).
- Chapter 11:** Added styling sheets [11.15 6520 series 65"](#).

Manual xxxx xxx xxxx.4

- Chapter 2:** Updated table [2.1 Technical Specifications](#).
- Chapter 4:** Added figures [4-2 Cable dressing \(32" 6500 series\)](#).
- Chapter 5:** Updated table [5-2 Factory mode overview](#).
- Chapter 6:** Updated tables [6-2 White tone default settings](#) and [6-3 Display code overview](#).
- Chapter 10:** Added circuit diagrams [10.17 AL 715G7037 Ambilight Board](#) and [10.18 AL 715G7038 Ambilight Board](#).
- Chapter 11:** Added styling sheets [11.2 6500 series 32"](#).

Manual xxxx xxx xxxx.5

- Chapter 6:** Updated tables [6-2 White tone default settings](#).

Manual xxxx xxx xxxx.6

- Chapter 2:** Updated table [2.1 Technical Specifications](#).
- Chapter 6:** Updated tables [6-2 White tone default settings](#) and [6-3 Display code overview](#).

2. Technical Specs, Diversity, and Connections

Index of this chapter:

- [2.1 Technical Specifications](#)
- [2.2 Directions for Use](#)
- [2.3 Connections](#)
- [2.4 Chassis Overview](#)

Notes:

- Figures can deviate due to the different set executions.

- Specifications are indicative (subject to change).

2.1 Technical Specifications

For on-line product support please use the links in [back to div.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						9	10					11
	Connection Overview	Mechanics						Block Diagram	Schematics					Styling
		Wire Dressing	Rear Cover Removal	Keyboard Control Removal	SSB Removal	IR/LED Board Removal	Power Supply		SSB	J (IR/LED)	E (Keyboard/Leading Edge)			
32PFH5500/88	2-1	4-1	4-16 & 4-17	4-18	4-19	4-20 & 4-21	9.1	10.1	10.6	10.7	10.9	11.1		
32PFK5500/12	2-1	4-1	4-16 & 4-17	4-18	4-19	4-20 & 4-21	9.1	10.1	10.6	10.7	10.9	11.1		
32PFT5500/12	2-1	4-1	4-16 & 4-17	4-18	4-19	4-20 & 4-21	9.1	10.1	10.6	10.7	10.9	11.1		
32PFH6500/88	2-1	4-2	4-22 & 4-23	4-24	4-25	4-26 & 4-27	9.1	10.1	10.6	10.7	10.10	11.2		
32PFK6500/12	2-1	4-2	4-22 & 4-23	4-24	4-25	4-26 & 4-27	9.1	10.1	10.6	10.7	10.10	11.2		

CTN	2	4						9	10					11
			Mechanics						Schematics					
			Wire Dressing	Rear Cover Removal	Keyboard Control Removal	SSB Removal	IR/LED Board Removal		Block Diagram	Power Supply	SSB	J (IR/LED)	E (Keyboard/Leading Edge)	
32PFT6500/12	2-1	4-2	4-22 & 4-23	4-24	4-25	4-26 & 4-27	9.1	10.1	10.6	10.7	10.10	11.2		
32PFT6500/60	2-1	4-2	4-22 & 4-23	4-24	4-25	4-26 & 4-27	9.1	10.1	10.6	10.7	10.10	11.2		
39PFH5500/88	2-1	4-1	4-16 & 4-17	4-18	4-19	4-20 & 4-21	9.1	10.2	10.6	10.7	10.9	11.3		
39PFK5500/12	2-1	4-3	4-16 & 4-17	4-18	4-19	4-20 & 4-21	9.1	10.2	10.6	10.7	10.9	11.3		
39PFT5500/12	2-1	4-3	4-16 & 4-17	4-18	4-19	4-20 & 4-21	9.1	10.2	10.6	10.7	10.9	11.3		
40PFH5500/88	2-1	4-4	4-16 & 4-17	4-18	4-19	4-20 & 4-21	9.1	10.2	10.6	10.7	10.9	11.4		
40PFK5500/12	2-1	4-4	4-16 & 4-17	4-18	4-19	4-20 & 4-21	9.1	10.2	10.6	10.7	10.9	11.4		
40PFT5500/12	2-1	4-4	4-16 & 4-17	4-18	4-19	4-20 & 4-21	9.1	10.2	10.6	10.7	10.9	11.4		
40PUK6400/12	2-1	4-5	4-16 & 4-17	4-18	4-19	4-20 & 4-21	9.1	10.4	10.6	10.7	10.9	11.6		
40PUH6400/88	2-1	4-5	4-16 & 4-17	4-18	4-19	4-20 & 4-21	9.1	10.4	10.6	10.7	10.9	11.6		
40PUT6400/12	2-1	4-5	4-16 & 4-17	4-18	4-19	4-20 & 4-21	9.1	10.4	10.6	10.7	10.9	11.6		
40PUT6400/60	2-1	4-5	4-16 & 4-17	4-18	4-19	4-20 & 4-21	9.1	10.4	10.6	10.7	10.9	11.6		
40PFH6510/88	2-1	4-6	4-22 & 4-23	4-24	4-25	4-26 & 4-27	9.1	10.4	10.6	10.7	10.10	11.6		
40PFK6510/12	2-1	4-6	4-22 & 4-23	4-24	4-25	4-26 & 4-27	9.1	10.4	10.6	10.7	10.10	11.6		
40PFT6510/12	2-1	4-6	4-22 & 4-23	4-24	4-25	4-26 & 4-27	9.1	10.4	10.6	10.7	10.10	11.6		
40PFT6510/60	2-1	4-6	4-22 & 4-23	4-24	4-25	4-26 & 4-27	9.1	10.4	10.6	10.7	10.10	11.6		
40PFK6540/12	2-1	4-6	4-22 & 4-23	4-24	4-25	4-26 & 4-27	9.1	10.4	10.6	10.7	10.10	11.6		
40PFH6550/88	2-1	4-7	4-22 & 4-23	4-24	4-25	4-26 & 4-27	9.1	10.4	10.6	10.7	10.10	11.7		
40PFK6550/12	2-1	4-7	4-22 & 4-23	4-24	4-25	4-26 & 4-27	9.1	10.4	10.6	10.7	10.10	11.7		
40PFT6550/12	2-1	4-7	4-22 & 4-23	4-24	4-25	4-26 & 4-27	9.1	10.4	10.6	10.7	10.10	11.7		
40PFK6560/12	2-1	4-7	4-22 & 4-23	4-24	4-25	4-26 & 4-27	9.1	10.4	10.6	10.7	10.10	11.7		
40PFK6580/12	2-1	4-7	4-22 & 4-23	4-24	4-25	4-26 & 4-27	9.1	10.4	10.6	10.7	10.10	11.7		
48PFH5500/88	2-1	4-10	4-16 & 4-17	4-18	4-19	4-20 & 4-21	9.1	10.4	10.6	10.7	10.9	11.8		
48PFK5500/12	2-1	4-10	4-16 & 4-17	4-18	4-19	4-20 & 4-21	9.1	10.4	10.6	10.7	10.9	11.8		
48PFT5500/12	2-1	4-10	4-16 & 4-17	4-18	4-19	4-20 & 4-21	9.1	10.4	10.6	10.7	10.9	11.8		
50PUK6400/12	2-1	4-9	4-16 & 4-17	4-18	4-19	4-20 & 4-21	9.1	10.3	10.6	10.7	10.9	11.9		
50PUH6400/88	2-1	4-9	4-16 & 4-17	4-18	4-19	4-20 & 4-21	9.1	10.3	10.6	10.7	10.9	11.9		
50PUT6400/12	2-1	4-9	4-16 & 4-17	4-18	4-19	4-20 & 4-21	9.1	10.3	10.6	10.7	10.9	11.9		
50PUT6400/60	2-1	4-9	4-16 & 4-17	4-18	4-19	4-20 & 4-21	9.1	10.3	10.6	10.7	10.9	11.9		
50PFH6510/88	2-1	4-10	4-22 & 4-23	4-24	4-25	4-26 & 4-27	9.1	10.3	10.6	10.7	10.10	11.10		
50PFK6510/12	2-1	4-10	4-22 & 4-23	4-24	4-25	4-26 & 4-27	9.1	10.3	10.6	10.7	10.10	11.10		
50PFT6510/12	2-1	4-10	4-22 & 4-23	4-24	4-25	4-26 & 4-27	9.1	10.3	10.6	10.7	10.10	11.10		
50PFT6510/60	2-1	4-10	4-22 & 4-23	4-24	4-25	4-26 & 4-27	9.1	10.3	10.6	10.7	10.10	11.10		
50PFK6540/12	2-1	4-10	4-22 & 4-23	4-24	4-25	4-26 & 4-27	9.1	10.3	10.6	10.7	10.10	11.10		
50PFH6550/88	2-1	4-11	4-22 & 4-23	4-24	4-25	4-26 & 4-27	9.1	10.3	10.6	10.7	10.10	11.11		
50PFK6550/12	2-1	4-11	4-22 & 4-23	4-24	4-25	4-26 & 4-27	9.1	10.3	10.6	10.7	10.10	11.11		
50PFT6550/12	2-1	4-11	4-22 & 4-23	4-24	4-25	4-26 & 4-27	9.1	10.3	10.6	10.7	10.10	11.11		
50PFK6560/12	2-1	4-11	4-22 & 4-23	4-24	4-25	4-26 & 4-27	9.1	10.3	10.6	10.7	10.10	11.11		
50PFK6580/12	2-1	4-11	4-22 & 4-23	4-24	4-25	4-26 & 4-27	9.1	10.3	10.6	10.7	10.10	11.11		
55PFH5500/88	2-1	4-12	4-16 & 4-17	4-18	4-19	4-20 & 4-21	9.1	10.3	10.6	10.7	10.9	11.12		
55PFK5500/12	2-1	4-12	4-16 & 4-17	4-18	4-19	4-20 & 4-21	9.1	10.3	10.6	10.7	10.9	11.12		
55PFT5500/12	2-1	4-12	4-16 & 4-17	4-18	4-19	4-20 & 4-21	9.1	10.3	10.6	10.7	10.9	11.12		
55PUH6400/88	2-1	4-12	4-16 & 4-17	4-18	4-19	4-20 & 4-21	9.1	10.3	10.6	10.7	10.9	11.12		
55PUK6400/12	2-1	4-12	4-16 & 4-17	4-18	4-19	4-20 & 4-21	9.1	10.3	10.6	10.7	10.9	11.12		
55PUT6400/12	2-1	4-12	4-16 & 4-17	4-18	4-19	4-20 & 4-21	9.1	10.3	10.6	10.7	10.9	11.12		
55PFH6510/88	2-1	4-13	4-16 & 4-17	4-18	4-25	4-26 & 4-27	9.1	10.3	10.6	10.7	10.10	11.13		
55PFK6510/12	2-1	4-13	4-22 & 4-23	4-24	4-25	4-26 & 4-27	9.1	10.3	10.6	10.7	10.10	11.13		
55PFT6510/12	2-1	4-13	4-22 & 4-23	4-24	4-25	4-26 & 4-27	9.1	10.3	10.6	10.7	10.10	11.13		
55PFT6510/60	2-1	4-13	4-22 & 4-23	4-24	4-25	4-26 & 4-27	9.1	10.3	10.6	10.7	10.10	11.13		
55PFK6540/12	2-1	4-13	4-22 & 4-23	4-24	4-25	4-26 & 4-27	9.1	10.3	10.6	10.7	10.10	11.13		
55PFH6550/88	2-1	4-14	4-22 & 4-23	4-24	4-25	4-26 & 4-27	9.1	10.3	10.6	10.7	10.10	11.14		
55PFK6550/12	2-1	4-14	4-22 & 4-23	4-24	4-25	4-26 & 4-27	9.1	10.3	10.6	10.7	10.10	11.14		
55PFT6550/12	2-1	4-14	4-22 & 4-23	4-24	4-25	4-26 & 4-27	9.1	10.3	10.6	10.7	10.10	11.14		
55PFK6560/12	2-1	4-14	4-22 & 4-23	4-24	4-25	4-26 & 4-27	9.1	10.3	10.6	10.7	10.10	11.14		
55PFK6580/12	2-1	4-14	4-22 & 4-23	4-24	4-25	4-26 & 4-27	9.1	10.3	10.6	10.7	10.10	11.14		
65PFH6520/88	2-1	4-15	4-29 & 4-30	4-31	4-32	-	9.1	10.5	10.6	10.8	10.10	11.15		
65PFK6520/12	2-1	4-15	4-29 & 4-30	4-31	4-32	-	9.1	10.5	10.6	10.8	10.10	11.15		
65PFT6520/12	2-1	4-15	4-29 & 4-30	4-31	4-32	-	9.1	10.5	10.6	10.8	10.10	11.15		
65PFT6520/60	2-1	4-15	4-29 & 4-30	4-31	4-32	-	9.1	10.5	10.6	10.8	10.10	11.15		

2.2 Directions for Use

Directions for use can be downloaded from the following websites:

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

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

2.3 Connections

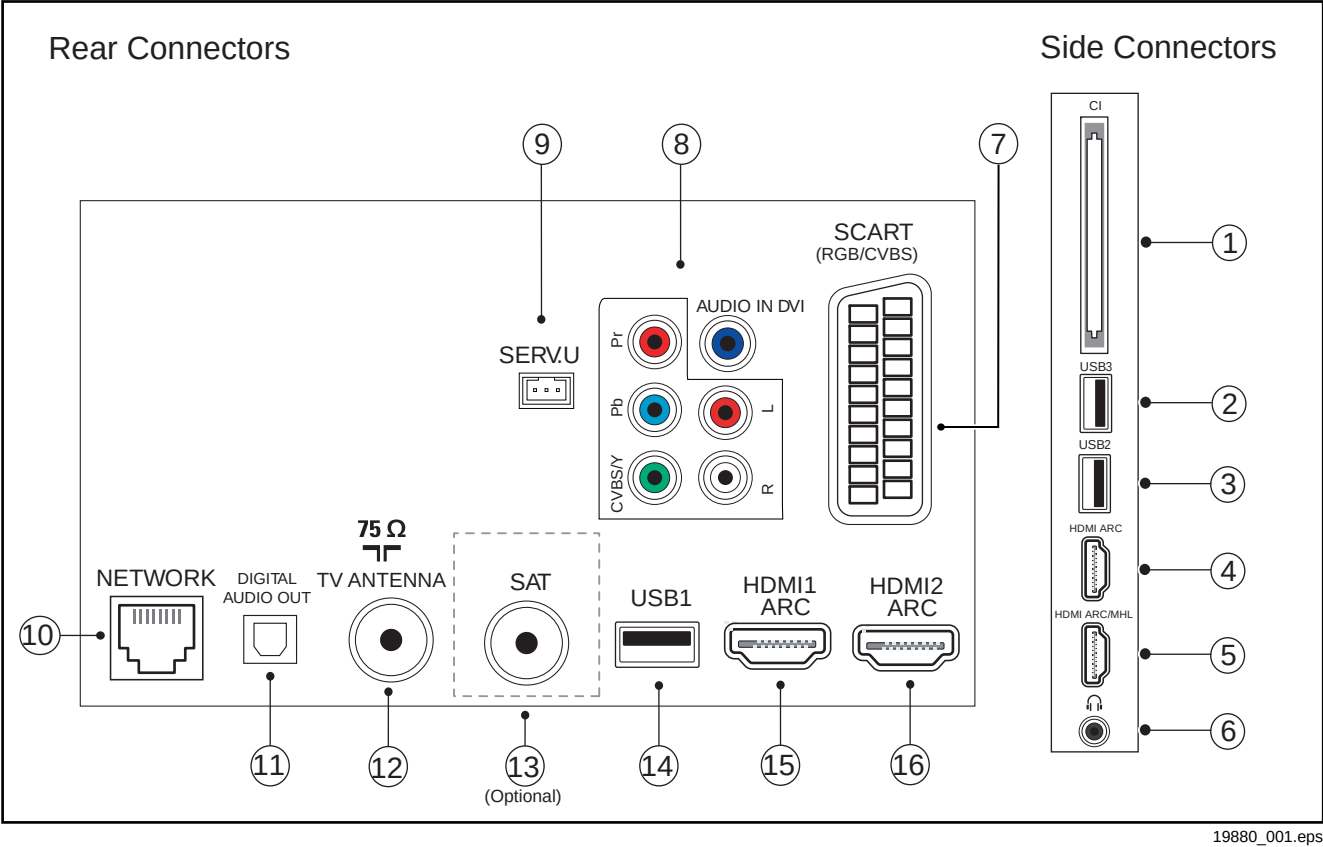


Figure 2-1 Connection overview

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

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

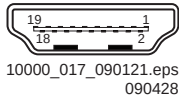


Figure 2-4 HDMI (type A) connector

2.3.1 Side Connections

1 - Common Interface
68p - See figure 10-6-13

2 - USB 3.2.0

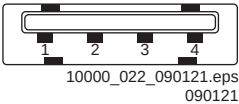


Figure 2-2 USB (type A)

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

Gnd

3 - USB 2.2.0

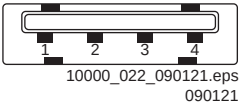
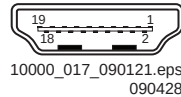


Figure 2-3 USB (type A)

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

Gnd

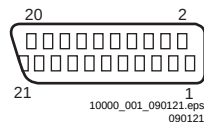
1	- D2+	Data channel	⊕
2	- Shield	Gnd	⊥
3	- D2-	Data channel	⊕
4	- D1+	Data channel	⊕
5	- Shield	Gnd	⊥
6	- D1-	Data channel	⊕
7	- D0+	Data channel	⊕
8	- Shield	Gnd	⊥
9	- D0-	Data channel	⊕
10	- CLK+	Data channel	⊕
11	- Shield	Gnd	⊥
12	- CLK-	Data channel	⊕
13	- Easylink/CEC	Control channel	⊕⊕
14	- ARC	Audio Return Channel	⊕
15	- DDC_SCL	DDC clock	⊕
16	- DDC_SDA	DDC data	⊕⊕
17	- Ground	Gnd	⊥
18	- +5V		⊕
19	- HPD	Hot Plug Detect	⊕
20	- Ground	Gnd	⊥

5- HDMI ARC/MHL: Digital Video - In, Digital Audio with ARC - In/Out**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/CEC	Control channel	⊕
14	- ARC	Audio Return Channel	⊕
15	- DDC_SCL	DDC clock	⊕
16	- DDC_SDA	DDC data	⊕
17	- Ground	Gnd	⊥
18	- +5V		⊕
19	- HPD	Hot Plug Detect	⊕
20	- Ground	Gnd	⊥

6- Head phone (Output)

Bk - Head phone 80 - 600 Ω / 10 mW

**2.3.2 Rear Connections****7 - SCART: Video RGB/YC - In, CVBS - In/Out, Audio - In/Out****Figure 2-6 SCART connector**

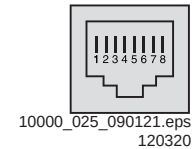
1	- Audio R	0.5 V _{RMS} / 1 kΩ	⊕
2	- Audio R	0.5 V _{RMS} / 10 kΩ	⊕
3	- Audio L	0.5 V _{RMS} / 1 kΩ	⊕
4	- Ground Audio	Gnd	⊥
5	- Ground Blue	Gnd	⊥
6	- Audio L	0.5 V _{RMS} / 10 kΩ	⊕
7	- Video Blue/C-out	0.7 V _{PP} / 75 Ω	⊕
8	- Function Select	0 - 2 V: INT 4.5 - 7 V: EXT 16:9 9.5 - 12 V: EXT 4:3	⊕
9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

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

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

9 - Service / UART

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

10 - RJ45: Ethernet**Figure 2-7 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	⊥

11 - Cinch: Digital Audio - OutBK - Coaxial 0.4 - 0.6V_{PP} / 75 W

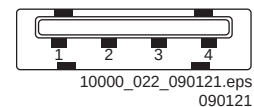
kq

12 - TV ANTENNA - In

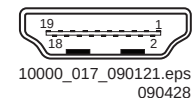
Signal input from an antenna, cable or satellite.

13 - SAT - In

Signal input from an SAT.

14- USB1 2.0**Figure 2-8 USB (type A)**

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

15 - HDMI1 : Digital Video - In, Digital Audio - In/Out**Figure 2-9 HDMI (type A) connector**

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

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

16 - HDMI2 : Digital Video - In, Digital Audio - In/Out

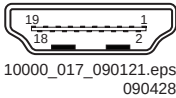


Figure 2-10 HDMI (type A) connector

1	- D2+	Data channel	↔
2	- Shield	Gnd	⏏
3	- D2-	Data channel	↔

4	- D1+	Data channel	↔
5	- Shield	Gnd	⏏
6	- D1-	Data channel	↔
7	- D0+	Data channel	↔
8	- Shield	Gnd	⏏
9	- D0-	Data channel	↔
10	- CLK+	Data channel	↔
11	- Shield	Gnd	⏏
12	- CLK-	Data channel	↔
13	- Easylink/CEC	Control channel	↔
14	- n.c.		
15	- DDC_SCL	DDC clock	↔
16	- DDC_SDA	DDC data	↔
17	- Ground	Gnd	⏏
18	- +5V		↔
19	- HPD	Hot Plug Detect	↔
20	- Ground	Gnd	⏏

2.4 Chassis Overview

Refer to [9. Block Diagrams](#) for PWB/CBA locations.

3. Precautions, Notes, and Abbreviation List

Index of this chapter:

- [3.1 Safety Instructions](#)
- [3.2 Warnings](#)
- [3.3 Notes](#)
- [3.4 Abbreviation List](#)

3.1 Safety Instructions

Safety regulations require the following **during** a repair:

- Connect the set to the Mains/AC Power via an isolation transformer (> 800 VA).
- Replace safety components, indicated by the symbol , only by components identical to the original ones. Any other component substitution (other than original type) may increase risk of fire or electrical shock hazard.

Safety regulations require that **after** a repair, the set must be returned in its original condition. Pay in particular attention to the following points:

- Route the wire trees correctly and fix them with the mounted cable clamps.
- Check the insulation of the Mains/AC Power lead for external damage.
- Check the strain relief of the Mains/AC Power cord for proper function.
- Check the electrical DC resistance between the Mains/AC Power plug and the secondary side (only for sets that have a Mains/AC Power isolated power supply):
 1. Unplug the Mains/AC Power cord and connect a wire between the two pins of the Mains/AC Power plug.
 2. Set the Mains/AC Power switch to the "on" position (keep the Mains/AC Power cord unplugged!).
 3. Measure the resistance value between the pins of the Mains/AC Power plug and the metal shielding of the tuner or the aerial connection on the set. The reading should be between 4.5 MΩ and 12 MΩ.
 4. Switch "off" the set, and remove the wire between the two pins of the Mains/AC Power plug.
- Check the cabinet for defects, to prevent touching of any inner parts by the customer.

3.2 Warnings

- All ICs and many other semiconductors are susceptible to electrostatic discharges (ESD ) . Careless handling during repair can reduce life drastically. Make sure that, during repair, you are connected with the same potential as the mass of the set by a wristband with resistance. Keep components and tools also at this same potential.
- Be careful during measurements in the high voltage section.
- Never replace modules or other components while the unit is switched "on".
- When you align the set, use plastic rather than metal tools. This will prevent any short circuits and the danger of a circuit becoming unstable.

3.3 Notes

3.3.1 General

- Measure the voltages and waveforms with regard to the chassis (= tuner) ground () , or hot ground () , depending on the tested area of circuitry. The voltages and waveforms shown in the diagrams are indicative. Measure them in the Service Default Mode with a colour bar signal and stereo sound (L: 3 kHz, R: 1 kHz unless stated otherwise) and picture carrier at 475.25 MHz for PAL, or 61.25 MHz for NTSC (channel 3).
- Where necessary, measure the waveforms and voltages with () and without () aerial signal. Measure the voltages in the power supply section both in normal operation () and in stand-by () . These values are indicated by means of the appropriate symbols.

3.3.2 Schematic Notes

- All resistor values are in ohms, and the value multiplier is often used to indicate the decimal point location (e.g. 2K2 indicates 2.2 kΩ).
- Resistor values with no multiplier may be indicated with either an "E" or an "R" (e.g. 220E or 220R indicates 220 Ω).
- All capacitor values are given in micro-farads ($\mu = \times 10^{-6}$), nano-farads ($n = \times 10^{-9}$), or pico-farads ($p = \times 10^{-12}$).
- Capacitor values may also use the value multiplier as the decimal point indication (e.g. 2p2 indicates 2.2 pF).
- An "asterisk" (*) indicates component usage varies. Refer to the diversity tables for the correct values.
- The correct component values are listed on the Philips Spare Parts Web Portal.

3.3.3 Spare Parts

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

3.3.4 BGA (Ball Grid Array) ICs

Introduction

For more information on how to handle BGA devices, visit this URL: <http://www.atyourservice-magazine.com>. Select "Magazine", then go to "Repair downloads". Here you will find information on how to deal with BGA-ICs.

BGA Temperature Profiles

For BGA-ICs, you **must** use the correct temperature-profile. Where applicable and available, this profile is added to the IC Data Sheet information section in this manual.

3.3.5 Lead-free Soldering

Due to lead-free technology some rules have to be respected by the workshop during a repair:

- Use only lead-free soldering tin. If lead-free solder paste is required, please contact the manufacturer of your soldering equipment. In general, use of solder paste within workshops should be avoided because paste is not easy to store and to handle.
- Use only adequate solder tools applicable for lead-free soldering tin. The solder tool must be able:
 - To reach a solder-tip temperature of at least 400°C.
 - To stabilize the adjusted temperature at the solder-tip.
 - To exchange solder-tips for different applications.
- Adjust your solder tool so that a temperature of around 360°C - 380°C is reached and stabilized at the solder joint. Heating time of the solder-joint should not exceed ~ 4 sec. Avoid temperatures above 400°C, otherwise wear-out of tips will increase drastically and flux-fluid will be destroyed. To avoid wear-out of tips, switch "off" unused equipment or reduce heat.
- Mix of lead-free soldering tin/parts with leaded soldering tin/parts is possible but PHILIPS recommends strongly to **avoid** mixed regimes. If this cannot be avoided, carefully clear the solder-joint from old tin and re-solder with new tin.

3.3.6 Alternative BOM identification

It should be noted that on the European Service website, "Alternative BOM" is referred to as "Design variant".

The **third digit** in the serial number (example:

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: $9 \text{ plus } 26 = 35$ 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),
DNR	Digital Noise Reduction: noise

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 reduction feature of the set

DRAM	Dynamic RAM		a maximum data rate of 270 Mbit/s, with a minimum bandwidth of 135 MHz.
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		
DVB-C	Digital Video Broadcast - Cable	LATAM	Latin America
DVB-T	Digital Video Broadcast - Terrestrial	LCD	Liquid Crystal Display
DVD	Digital Versatile Disc	LED	Light Emitting Diode
DVI(-d)	Digital Visual Interface (d= digital only)	L/L'	Monochrome TV system. Sound carrier distance is 6.5 MHz. L' is Band I, L is all bands except for Band I
E-DDC	Enhanced Display Data Channel (VESA standard for communication channel and display). Using E-DDC, the video source can read the EDID information from the display.	LPL	LG.Philips LCD (supplier)
		LS	Loudspeaker
		LVDS	Low Voltage Differential Signalling
EDID	Extended Display Identification Data (VESA standard)	Mbps	Mega bits per second
		M/N	Monochrome TV system. Sound carrier distance is 4.5 MHz
EEPROM	Electrically Erasable and Programmable Read Only Memory	MHEG	Part of a set of international standards related to the presentation of multimedia information, standardised by the Multimedia and Hypermedia Experts Group. It is commonly used as a language to describe interactive television services
EMI	Electro Magnetic Interference		
EPG	Electronic Program Guide		
EPLD	Erasable Programmable Logic Device		
EU	Europe		
EXT	EXternal (source), entering the set by SCART or by cinches (jacks)		
FDS	Full Dual Screen (same as FDW)	MIPS	Microprocessor without Interlocked Pipeline-Stages; A RISC-based microprocessor
FDW	Full Dual Window (same as FDS)		
FLASH	FLASH memory		
FM	Field Memory or Frequency Modulation	MOP	Matrix Output Processor
		MOSFET	Metal Oxide Silicon Field Effect Transistor, switching device
FPGA	Field-Programmable Gate Array		
FTV	Flat TeleVision	MPEG	Motion Pictures Experts Group
Gb/s	Giga bits per second	MPIF	Multi Platform InterFace
G-TXT	Green TeleteXT	MUTE	MUTE Line
H	H_sync to the module	MTV	Mainstream TV: TV-mode with Consumer TV features enabled (iTV)
HD	High Definition		
HDD	Hard Disk Drive	NC	Not Connected
HDCP	High-bandwidth Digital Content Protection: A "key" encoded into the HDMI/DVI signal that prevents video data piracy. If a source is HDCP coded and connected via HDMI/DVI without the proper HDCP decoding, the picture is put into a "snow vision" mode or changed to a low resolution. For normal content distribution the source and the display device must be enabled for HDCP "software key" decoding.	NICAM	Near Instantaneous Compounded Audio Multiplexing. This is a digital sound system, mainly used in Europe.
		NTC	Negative Temperature Coefficient, non-linear resistor
		NTSC	National Television Standard Committee. Color system mainly used in North America and Japan. Color carrier NTSC M/N= 3.579545 MHz, NTSC 4.43= 4.433619 MHz (this is a VCR norm, it is not transmitted off-air)
		NVM	Non-Volatile Memory: IC containing TV related data such as alignments
HDMI	High Definition Multimedia Interface		
HP	HeadPhone	O/C	Open Circuit
I	Monochrome TV system. Sound carrier distance is 6.0 MHz	OSD	On Screen Display
		OAD	Over the Air Download. Method of software upgrade via RF transmission. Upgrade software is broadcasted in TS with TV channels.
I ² C	Inter IC bus		
I ² D	Inter IC Data bus		
I ² S	Inter IC Sound bus		
IF	Intermediate Frequency	OTC	On screen display Teletext and Control; also called Artistic (SAA5800)
IR	Infra Red		
IRQ	Interrupt Request	P50	Project 50: communication protocol between TV and peripherals
ITU-656	The ITU Radio communication Sector (ITU-R) is a standards body subcommittee of the International Telecommunication Union relating to radio communication. ITU-656 (a.k.a. SDI), is a digitized video format used for broadcast grade video.	PAL	Phase Alternating Line. Color system mainly used in West Europe (colour carrier = 4.433619 MHz) and South America (colour carrier PAL M = 3.575612 MHz and PAL N = 3.582056 MHz)
	Uncompressed digital component or digital composite signals can be used. The SDI signal is self-synchronizing, uses 8 bit or 10 bit data words, and has	PCB	Printed Circuit Board (same as "PWB")
		PCM	Pulse Code Modulation
		PDP	Plasma Display Panel

PFC	Power Factor Corrector (or Pre-conditioner)	SXGA	1280 × 1024
PIP	Picture In Picture	TFT	Thin Film Transistor
PLL	Phase Locked Loop. Used for e.g. FST tuning systems. The customer can give directly the desired frequency	THD	Total Harmonic Distortion
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	VSb	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		
SWAN	Spatial temporal Weighted Averaging Noise reduction		

4. Mechanical Instructions

Index of this chapter:

[4.1 Cable Dressing](#)

[4.2 Service Positions](#)

[4.3 Assembly/Panel Removal \(for 32"/39"/40"/55"Pxx5500 series & 40"/50"/55"Pxx6400 series\)](#)

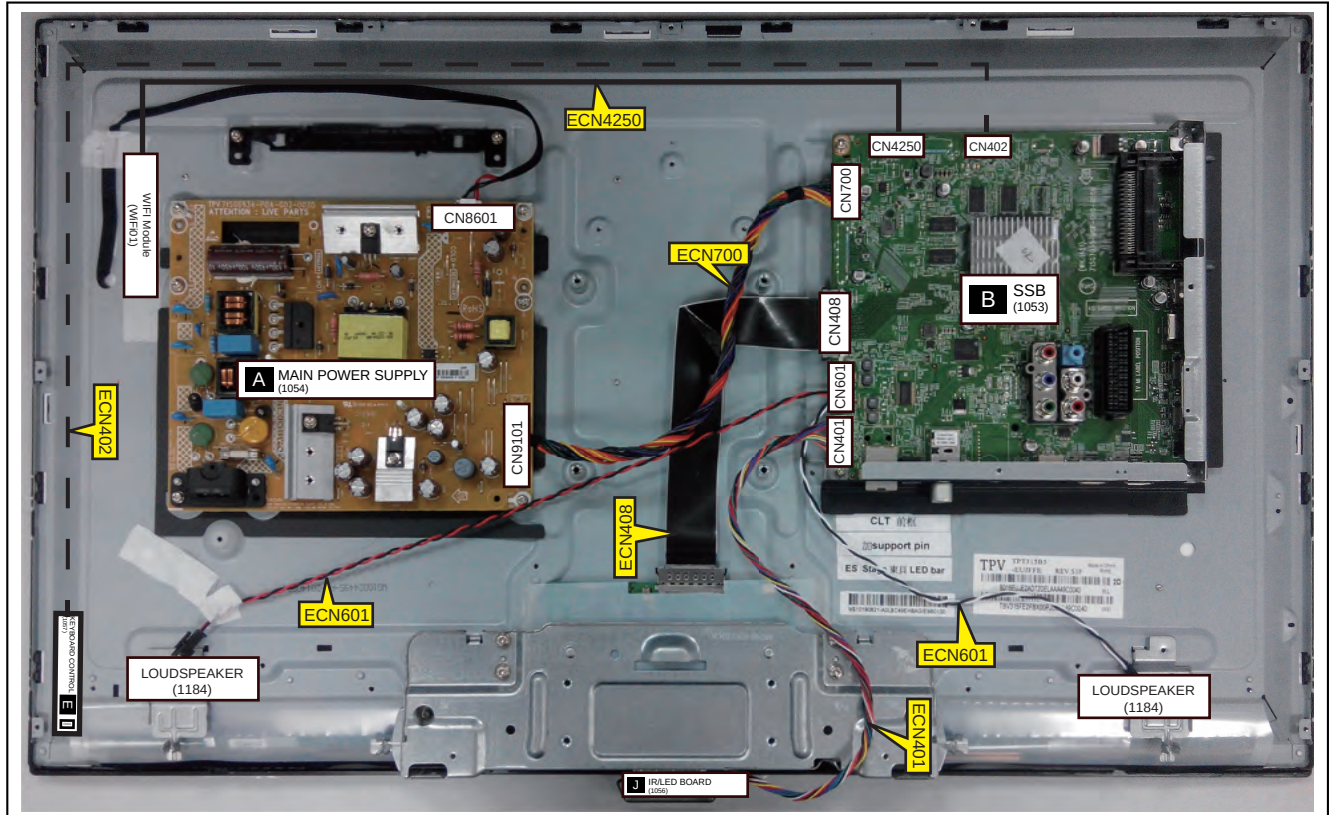
[4.4 Assembly/Panel Removal \(for 32"/40"/50"/55"Pxx65x0 series\)](#)

[4.6 Set Re-assembly](#)

Notes:

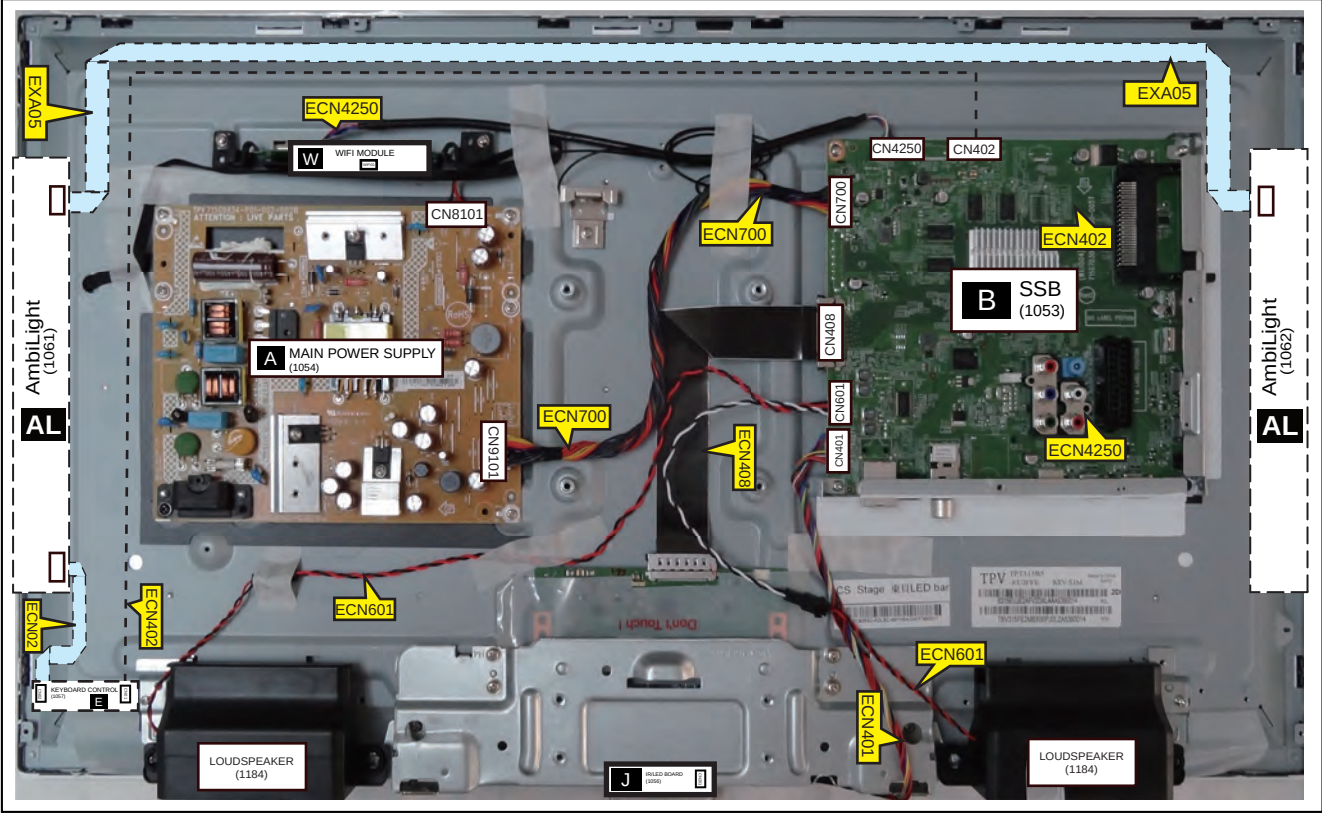
- Figures below can deviate slightly from the actual situation, due to the different set executions.

4.1 Cable Dressing



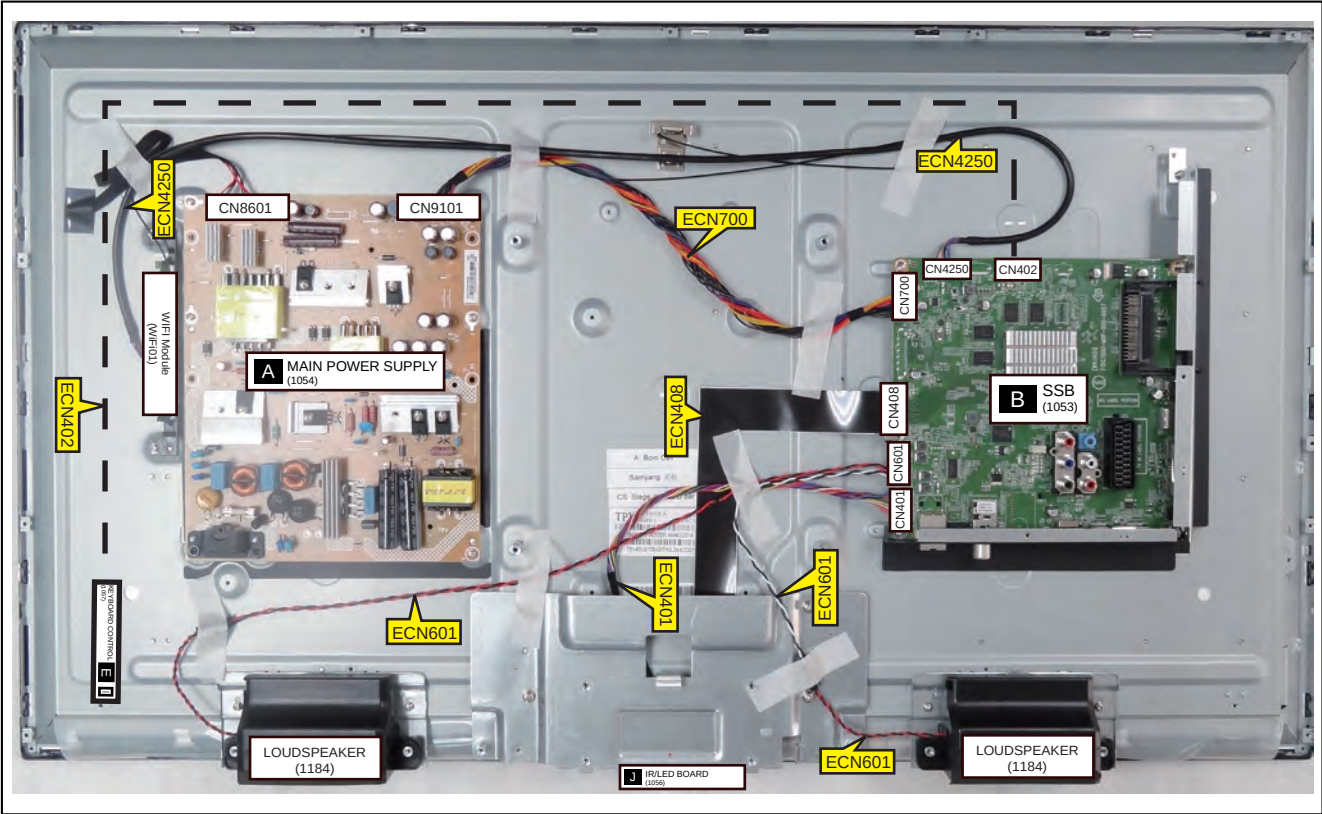
19880_100.eps

Figure 4-1 Cable dressing (32" 5500 series)



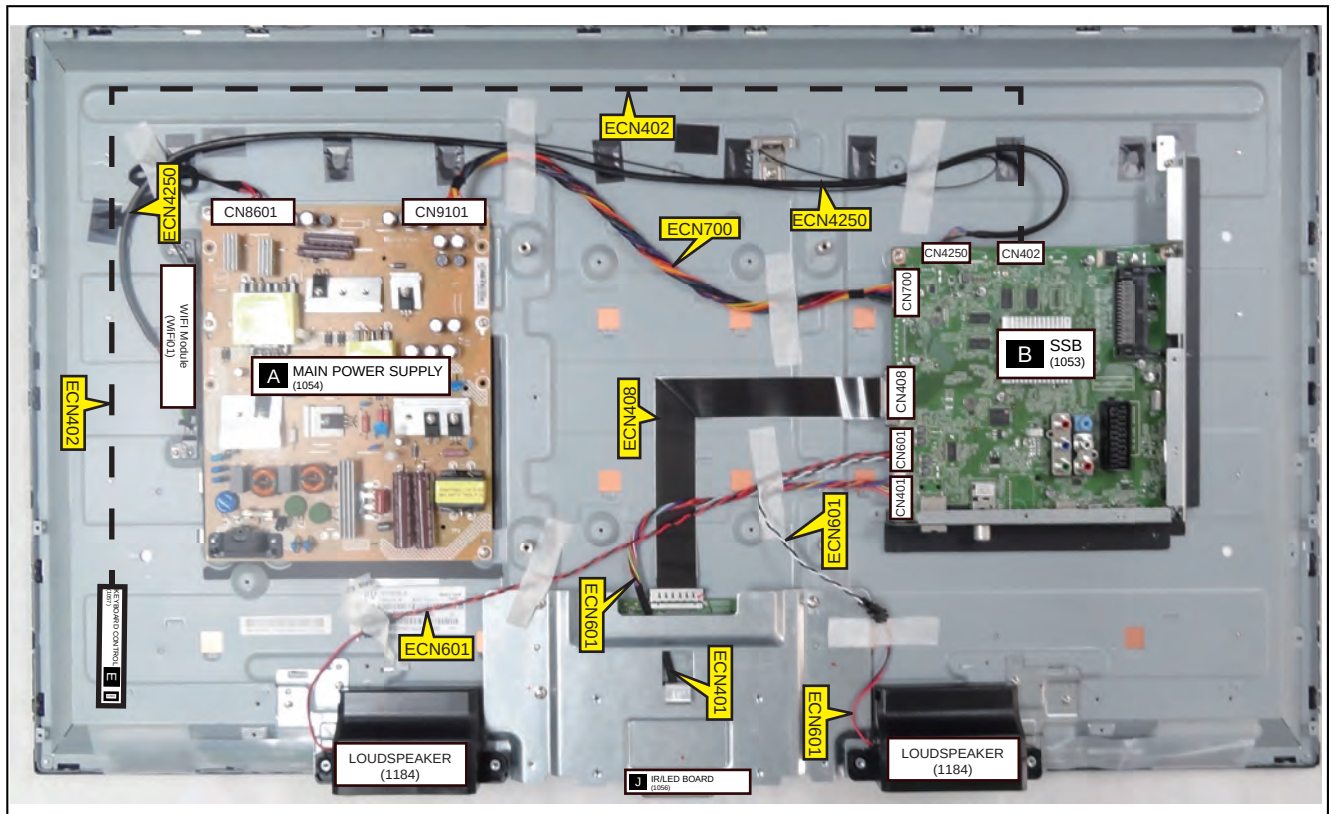
19884_100.eps

Figure 4-2 Cable dressing (32" 6500 series)



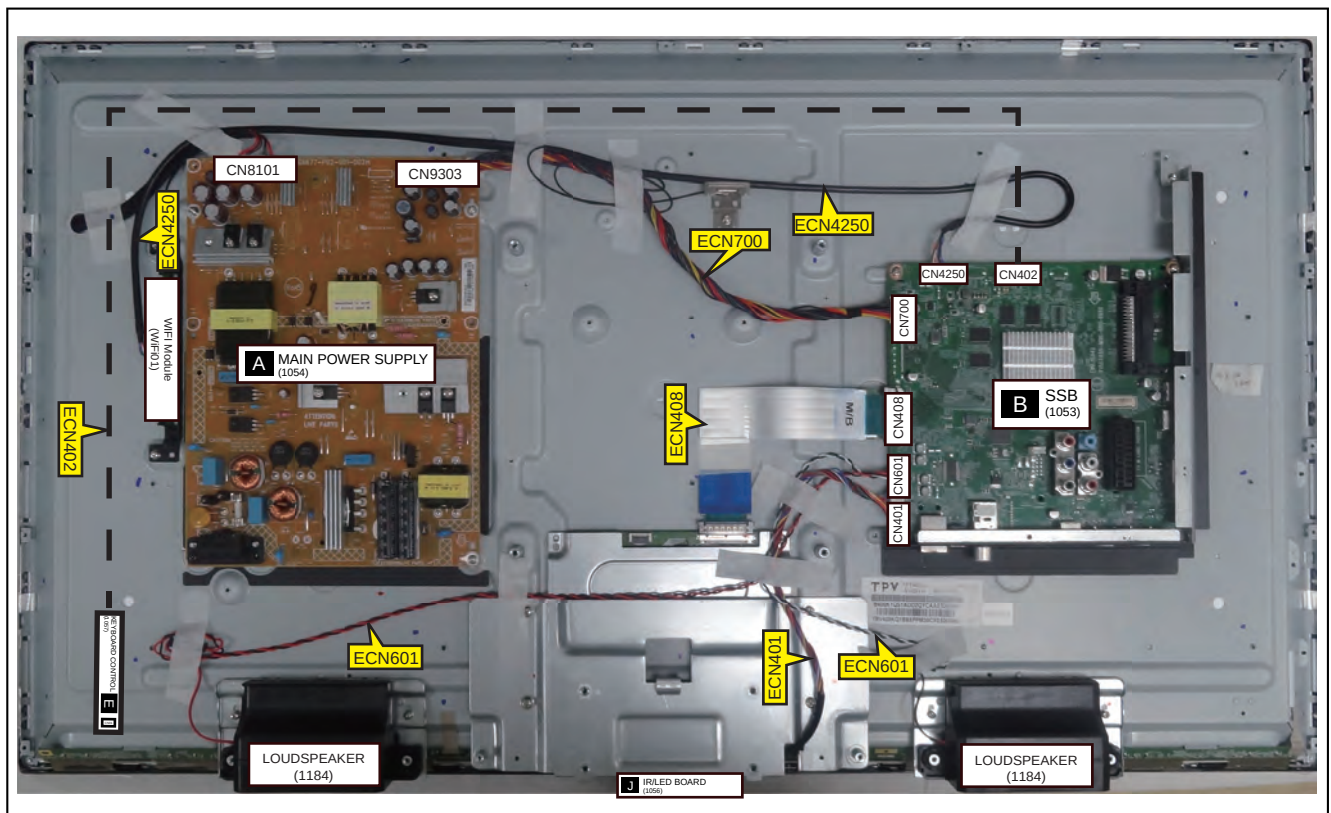
19880_101.eps

Figure 4-3 Cable dressing (39" 5500 series)



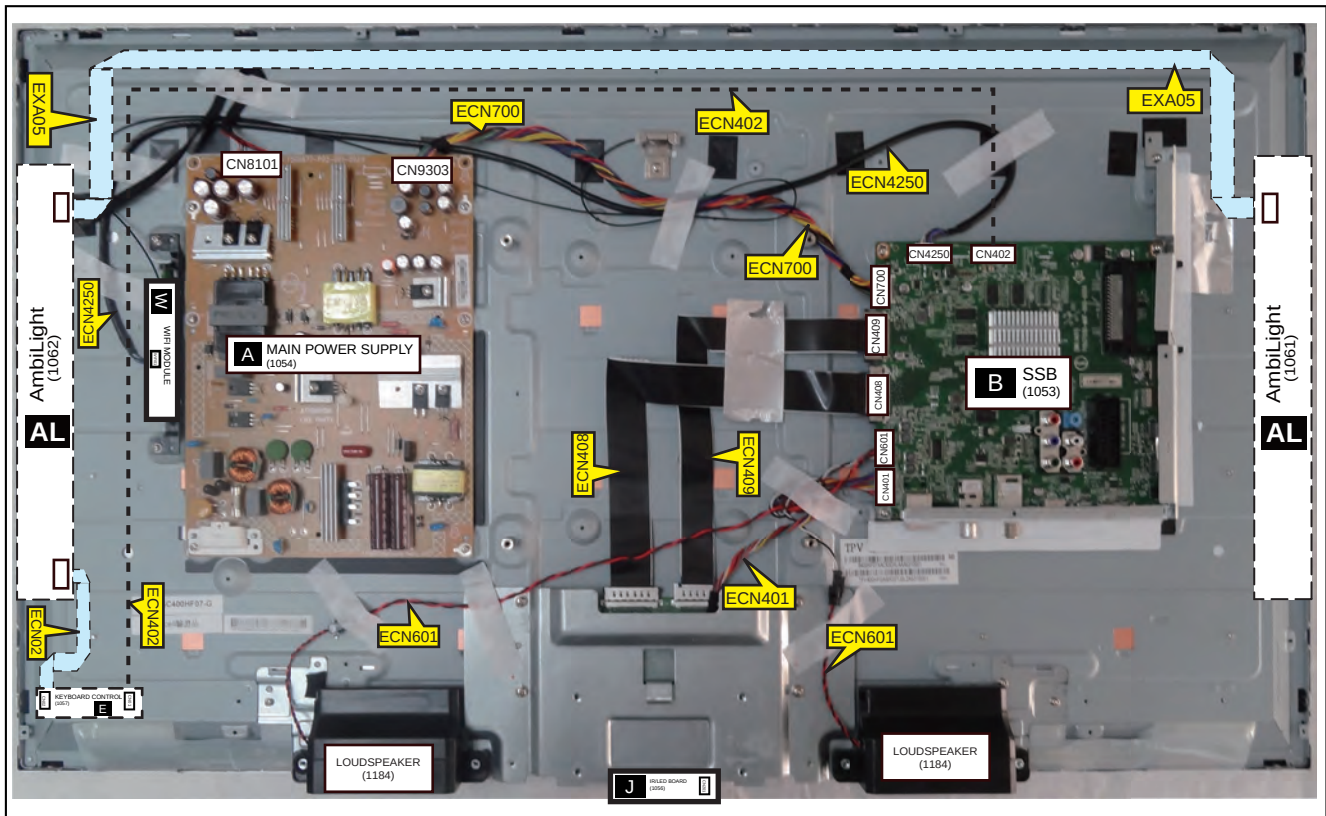
19880_102.eps

Figure 4-4 Cable dressing (40" 5500 series)



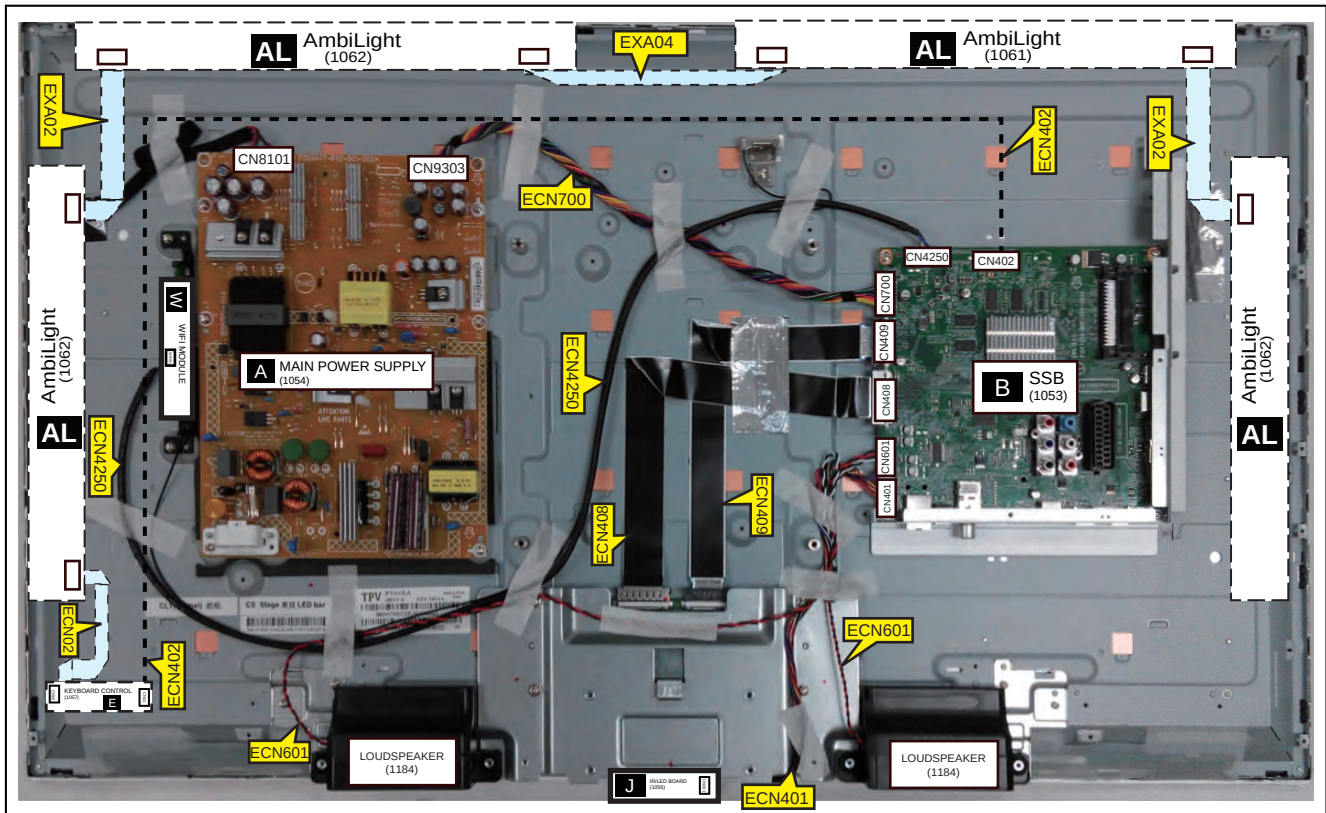
19882_100.eps

Figure 4-5 Cable dressing (40" 6400 series)



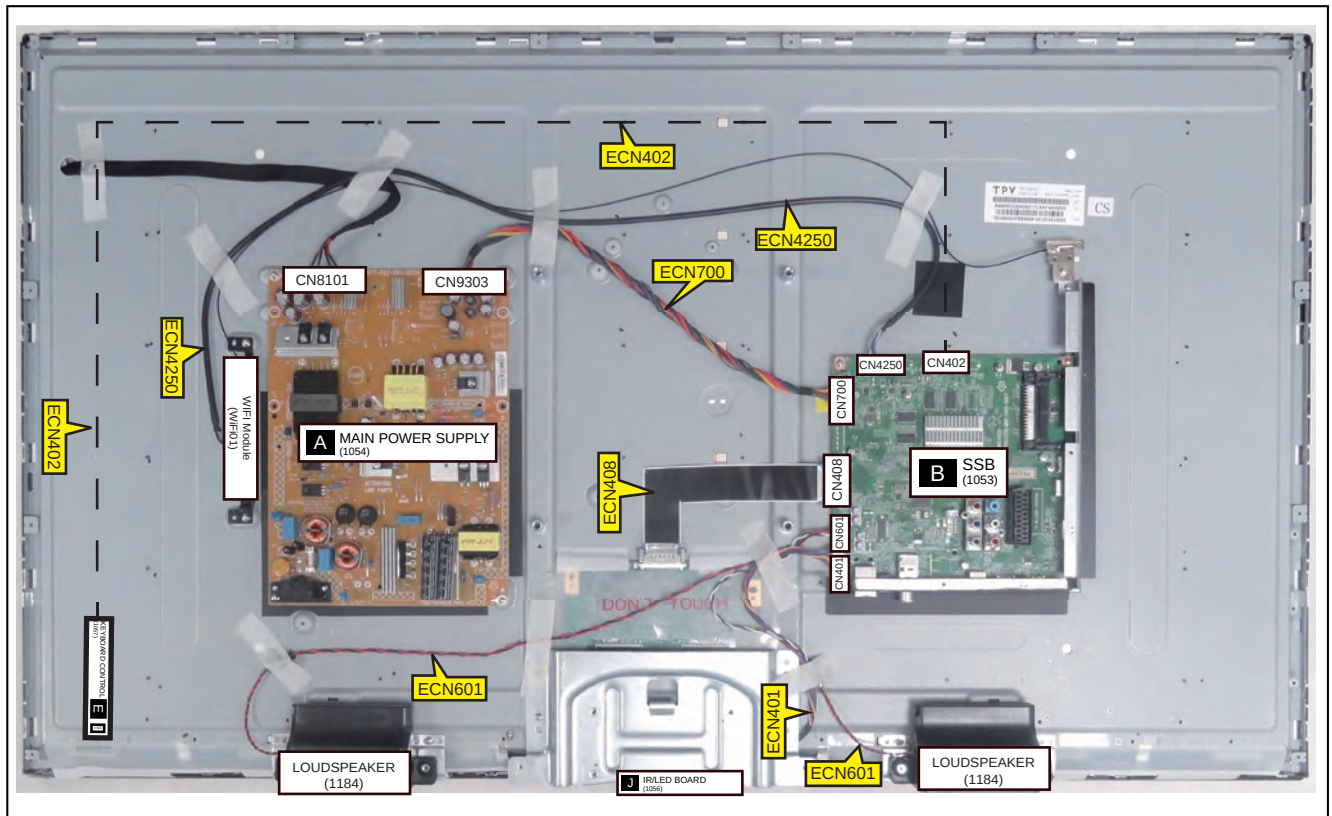
19881_100.eps

Figure 4-6 Cable dressing (40" 6510&6540 series)



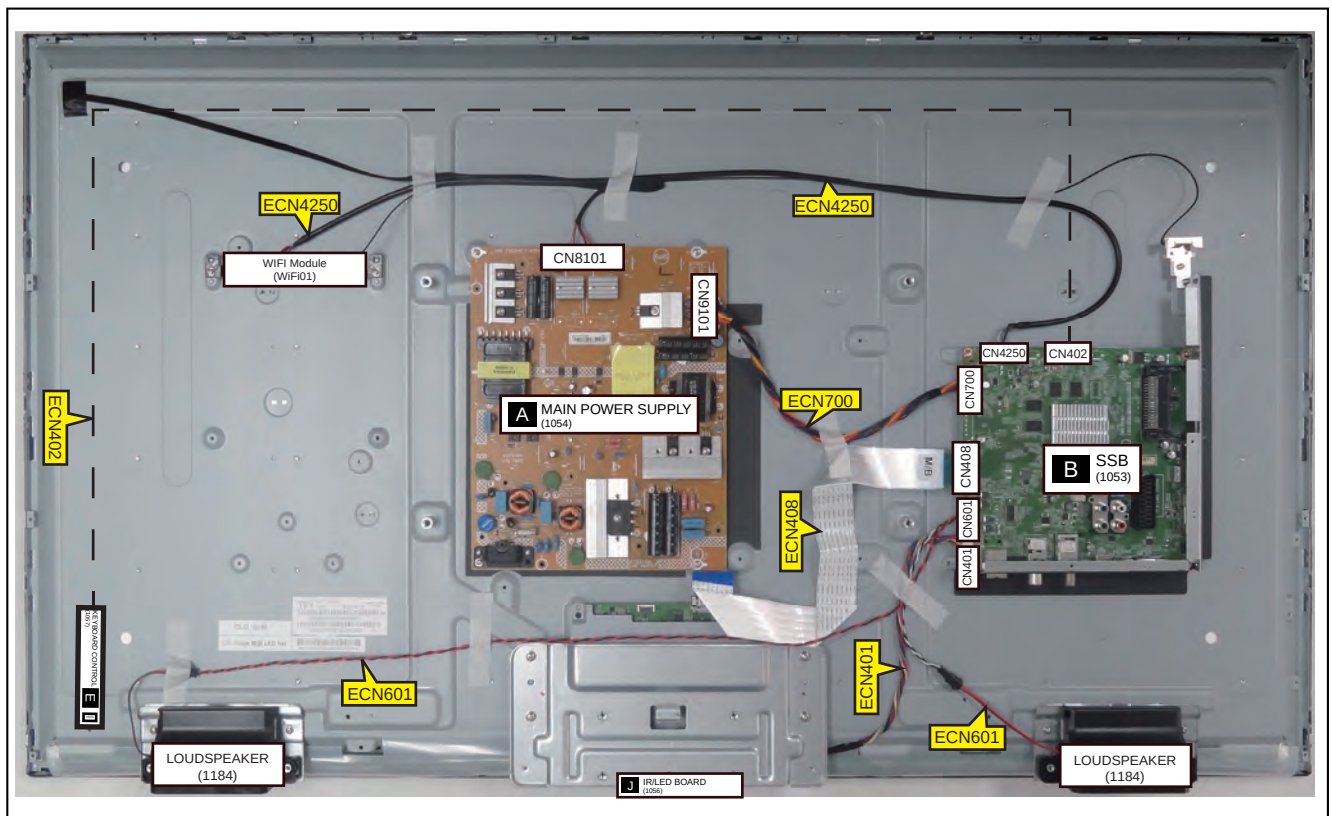
19881_101.eps

Figure 4-7 Cable dressing (40" 6550&6560&6580 series)



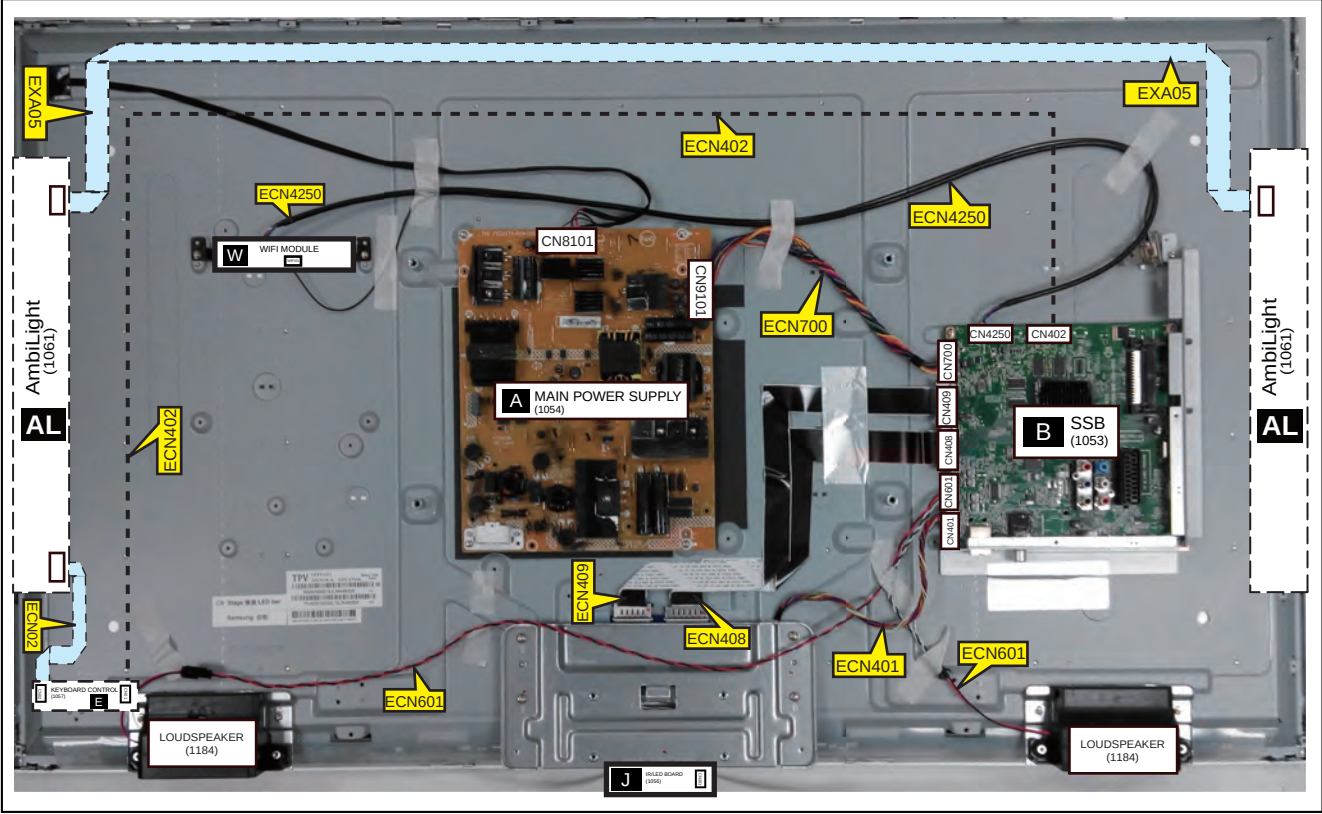
19882_101.eps

Figure 4-8 Cable dressing (48" 5500 series)



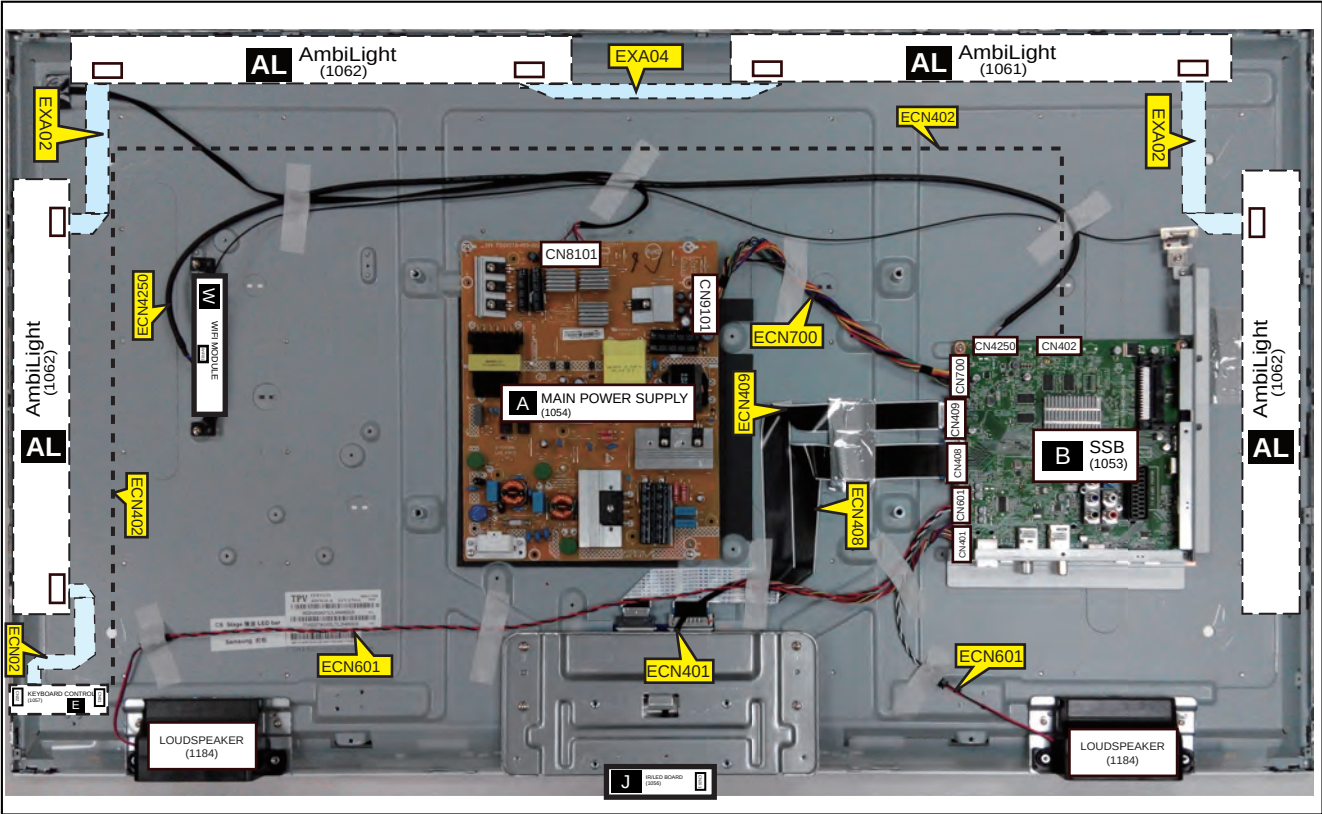
19882_102.eps

Figure 4-9 Cable dressing (50" 6400 series)



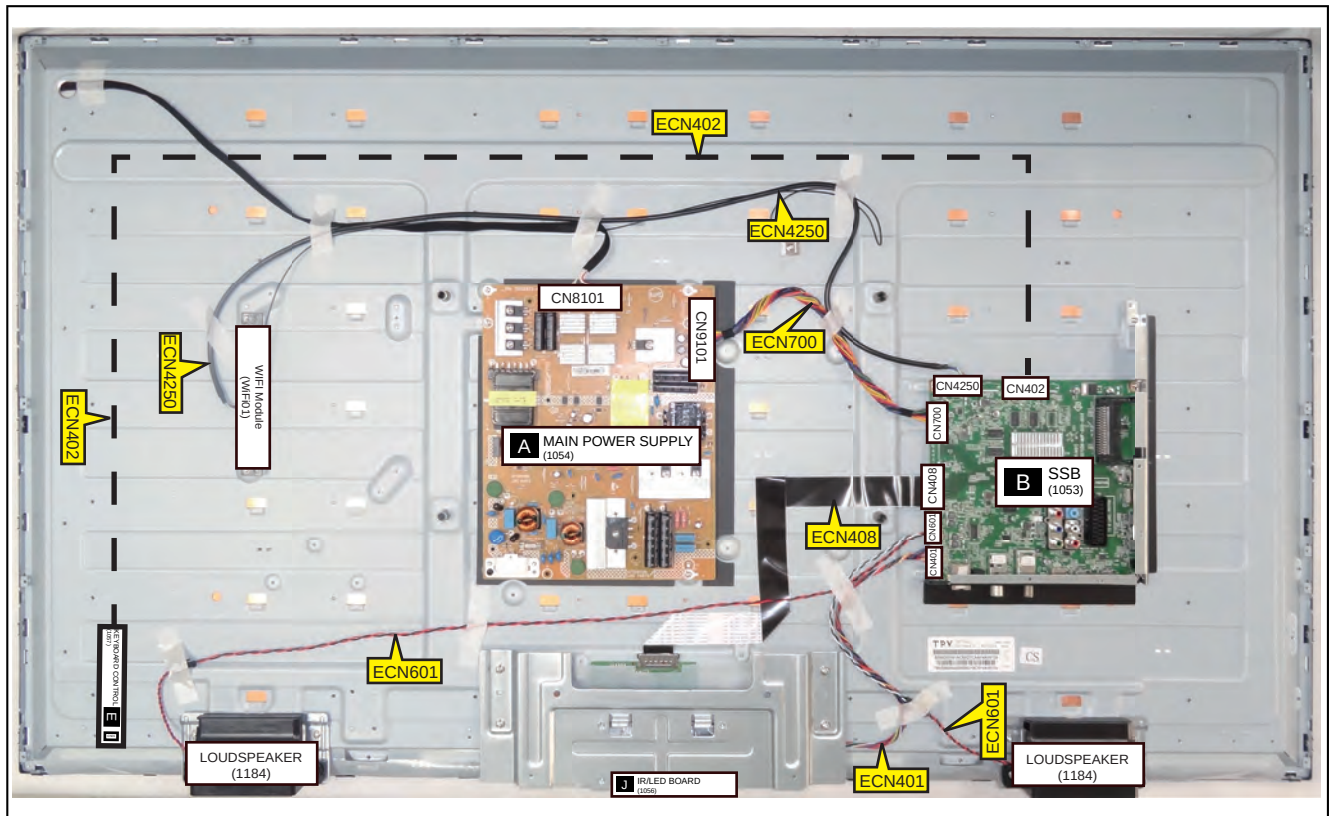
19881_102.eps

Figure 4-10 Cable dressing (50" 6510&6540 series)



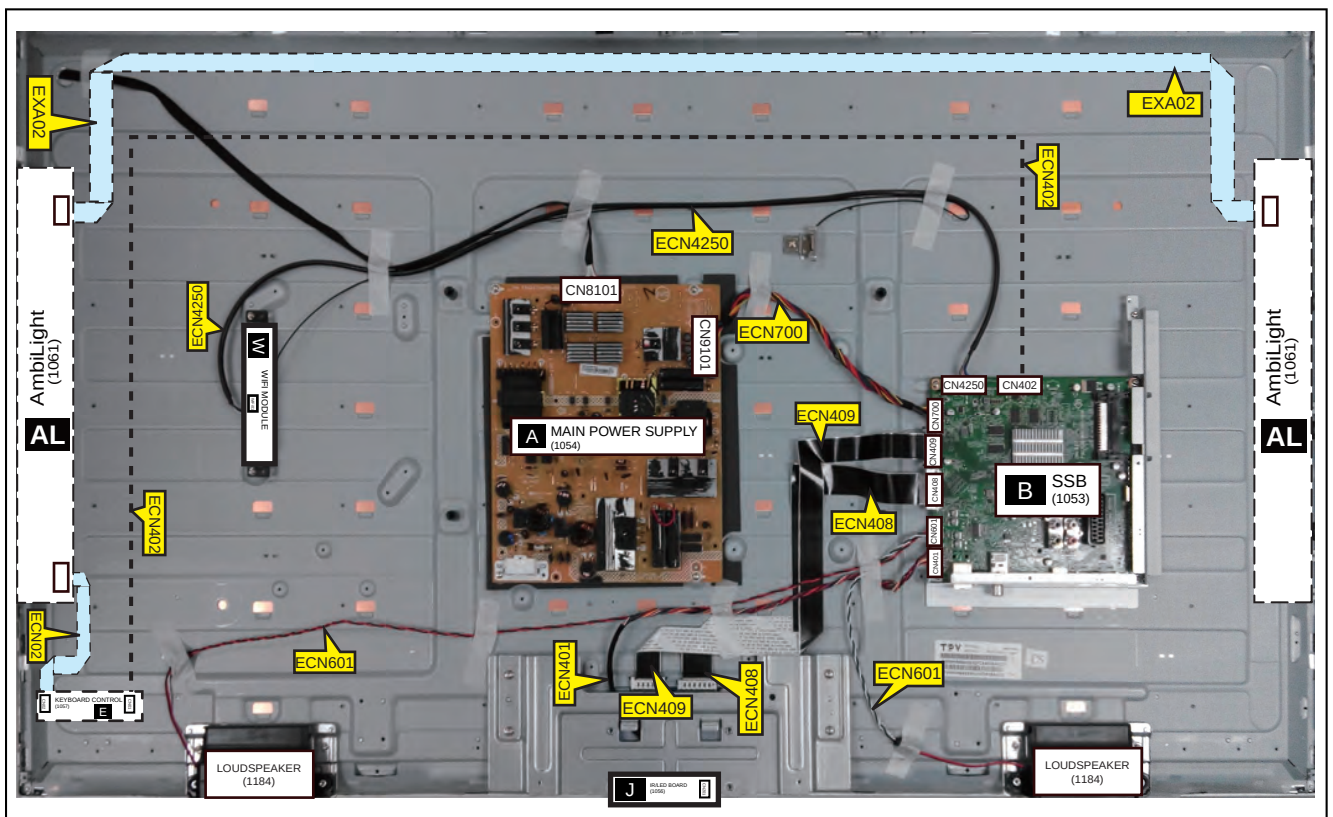
19881_103.eps

Figure 4-11 Cable dressing (50" 6550&6560&6580 series)



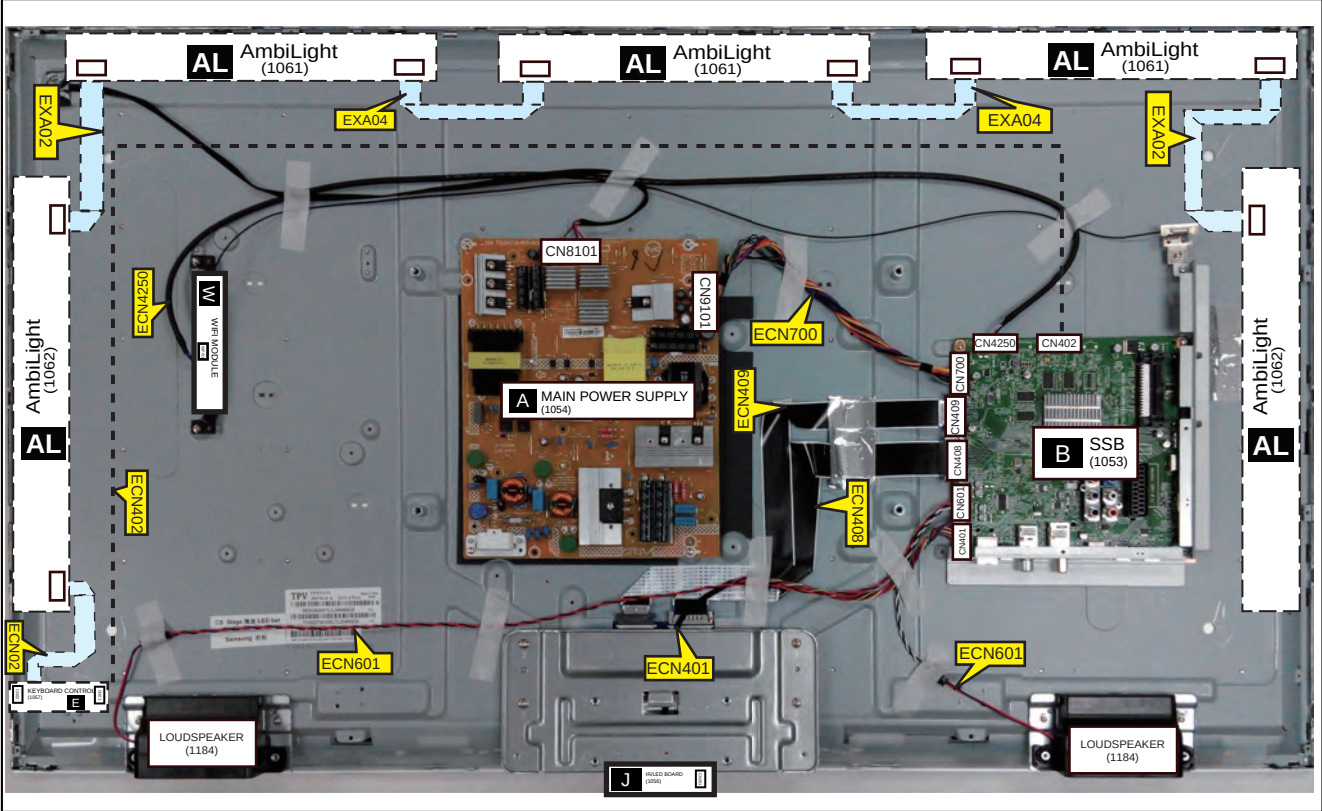
19880_103.eps

Figure 4-12 Cable dressing (55" 5500&6400 series)



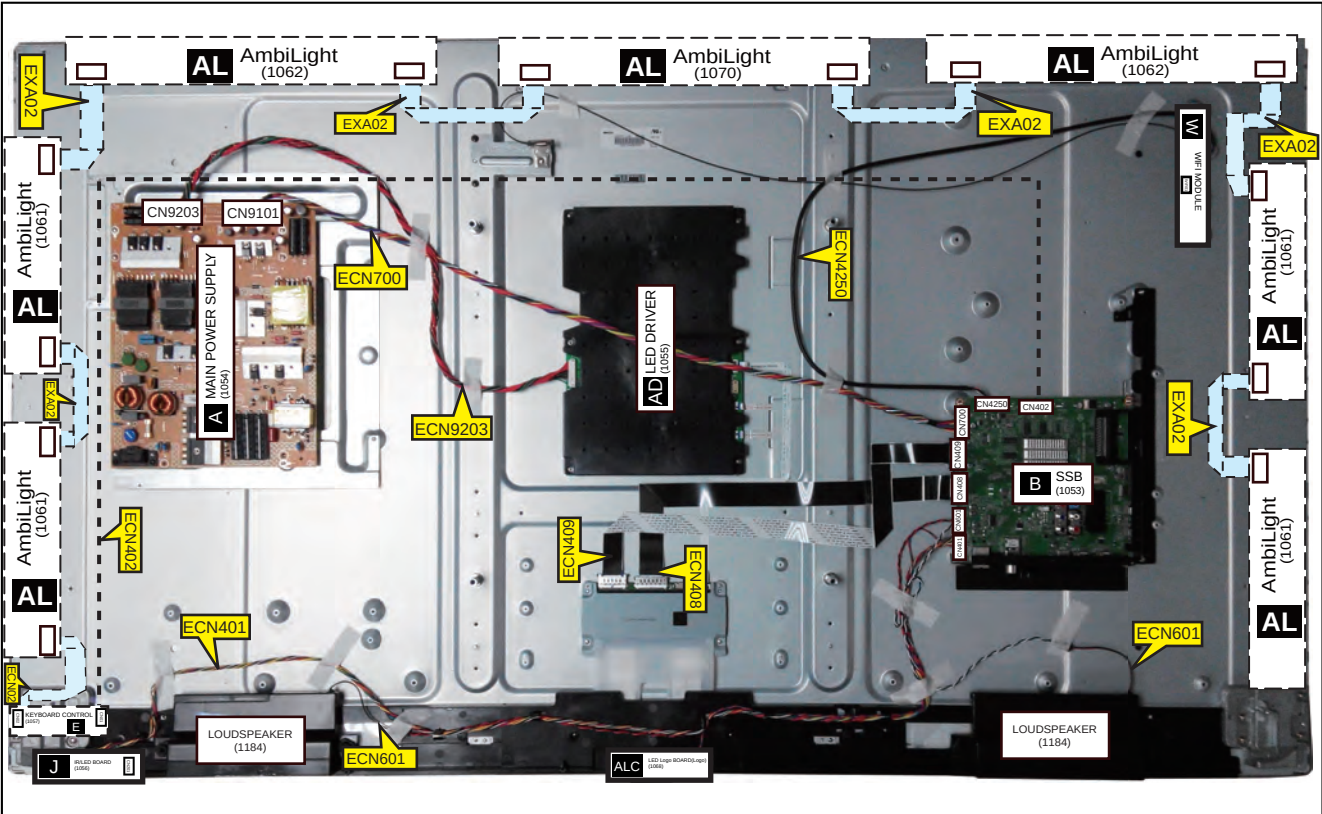
19881_104.eps

Figure 4-13 Cable dressing (55" 6510&6540 series)



19881_105.eps

Figure 4-14 Cable dressing (55" 6550&6560&6580 series)



19883_100.eps

Figure 4-15 Cable dressing (65" 6520 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 Assembly/Panel Removal (for 32"/39"/40"/55"Pxx5500 series & 40"/50"/55"Pxx6400 series)

Instructions below apply to the 40PFT5500/12, but will be similar for other 32"/39"/40"/55"Pxx5500 & 40"/50"/55"Pxx6400 series models.

4.3.1 Rear Cover

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

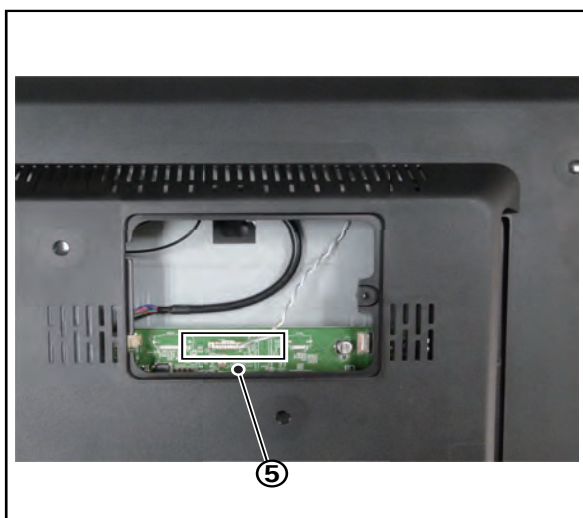
Warning: Disconnect the mains power cord before removing the rear cover.

1. Remove fixation screws [1] that secure the base assy, pull out the base assy from the set. Refer to [Figure 4-16](#) for details.
2. Remove the fixation screws [2], [3] and [4] that secure the rear cover. Refer to [Figure 4-16](#) for details.
3. Unplug the connector [5] from SSB. Refer to [Figure 4-17](#) for details.
4. Gently lift the rear cover from the TV. Make sure that wires and cables are not damaged while lifting the rear cover from the set.



19880_104.eps

Figure 4-16 Rear cover removal[1]



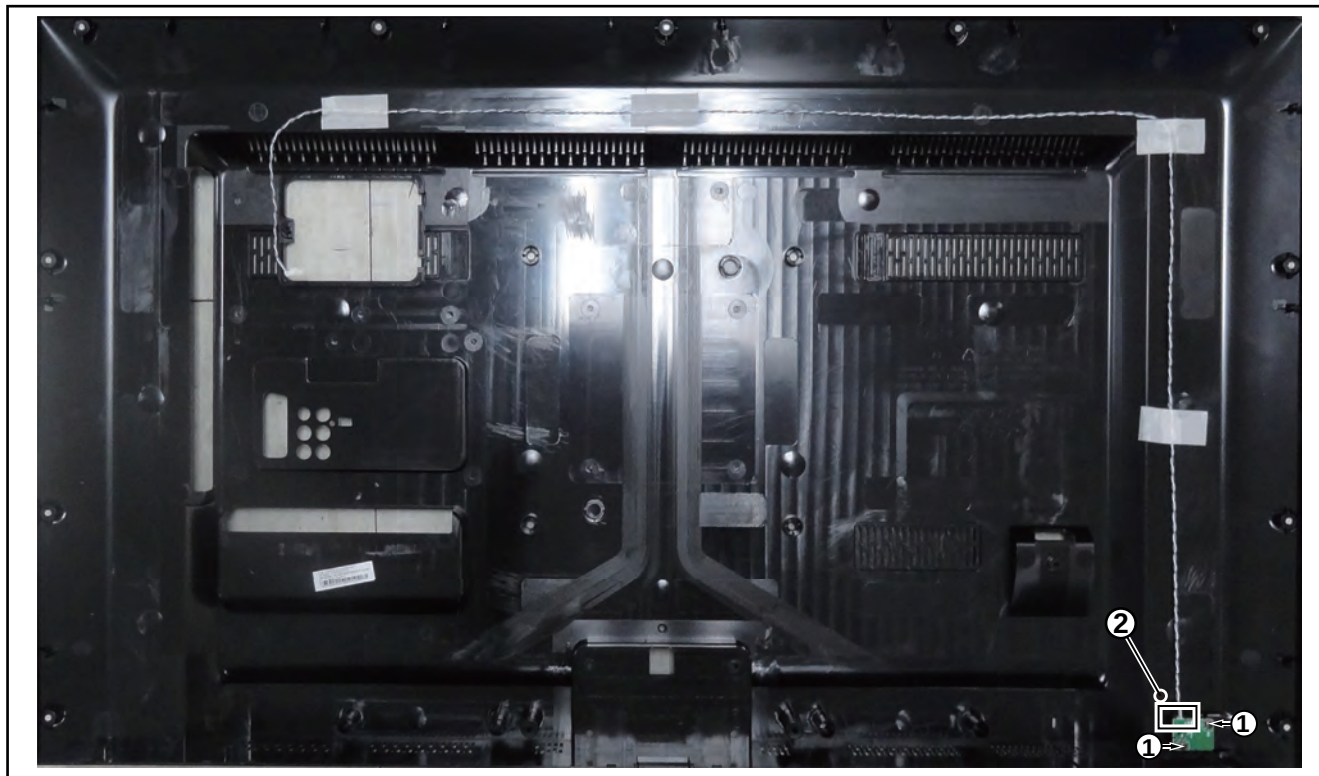
19880_106.eps

Figure 4-17 Rear cover removal[2]

4.3.2 Keyboard Control unit

1. Unplug the connector [2] from the keyboard control panel.
2. Remove the fixation screws [1] that secure the keyboard
3. Gently take the keyboard out. Refer to [Figure 4-18](#) for details.

When defective, replace the whole unit.



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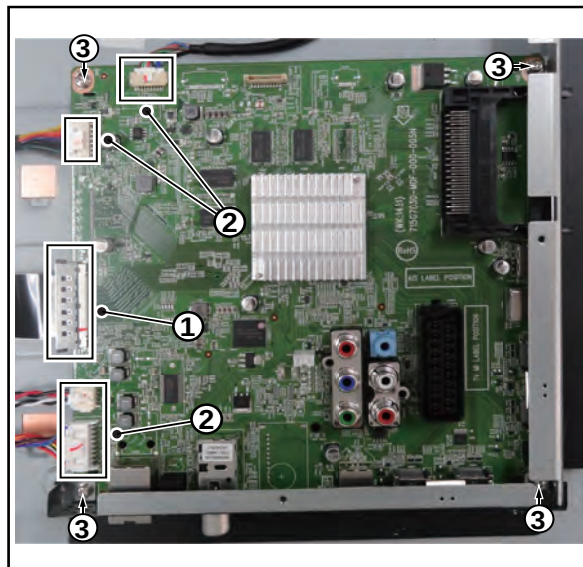
Figure 4-18 Keyboard removal

4.3.3 Small Signal Board (SSB)

Refer to [Figure 4-19](#) for details.

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

1. Release the clips from the LVDS connector that connect with the SSB[1].
- Caution:** be careful, as these are very fragile connectors!
2. Unplug all other connectors [2] .
3. Remove all the fixation screws from the SSB [3].
4. The SSB can now be shifted from side connector cover, then lifted and taken out of the I/O bracket. Refer to [Figure 4-19](#) for details.



19880_108.eps

Figure 4-19 SSB removal

4.3.4 Power Supply Unit (PSU)

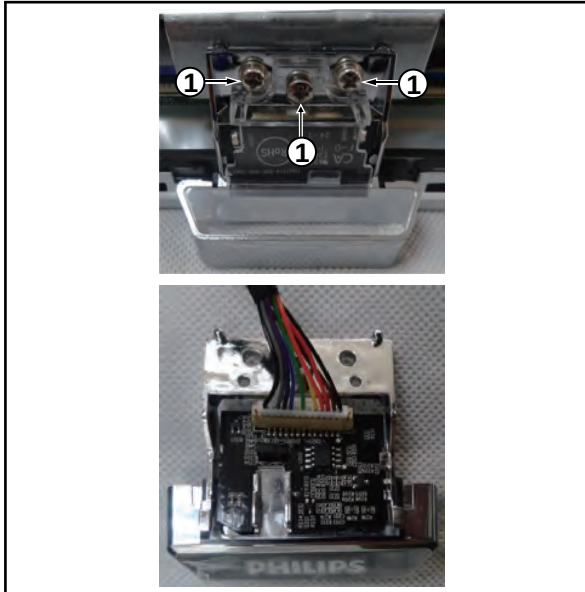
Caution: it is mandatory to remount all different screws at their original position during re-assembly. Failure to do so may result in damaging the PSU.

1. Gently unplug all connectors from the PSU.
2. Remove all fixation screws from the PSU.
3. The PSU can be taken out of the set now.

4.3.5 IR board Control Unit

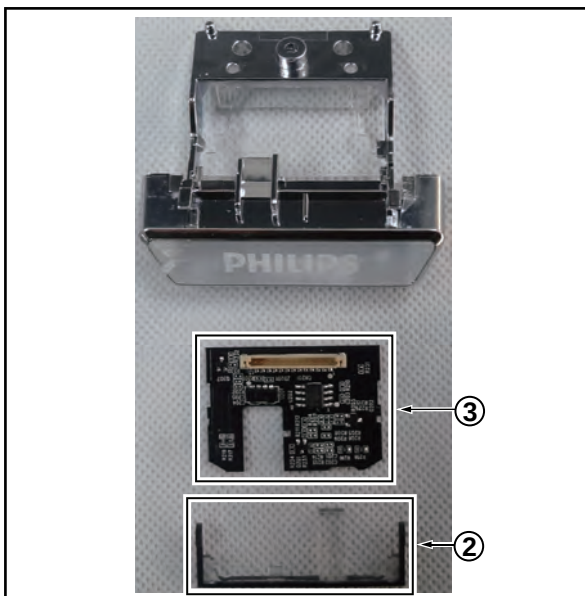
Refer to [Figure 4-20](#), [Figure 4-21](#) for details.

1. Unplug the connector from the SSB.
Caution: be careful, as these are very fragile connectors!
2. Remove all the fixation screws from the IR board control unit [1]. Refer to [Figure 4-20](#) for details.
3. Remove the IR lens [2], IR board [3] from the DECO_REAR_COVER. Refer to [Figure 4-21](#) for details.
When defective, replace the whole unit.



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Figure 4-20 IR board removal[1]



19850_104.eps

Figure 4-21 IR board removal[2]

4.3.6 Speakers

1. Gently release the tapes that secure the speaker cables.
2. Unplug the speaker connector from the SSB.
3. Take the speakers out.
When defective, replace the both units.

4.3.7 WIFI module

1. Unplug the connector from the SSB.
2. Remove fixation screw that secure the WIFI module, getntly remove the module from the set.
When defective, replace the whole unit.

4.3.8 LCD Panel

1. Remove the SSB as described earlier.
2. Remove the PSU as described earlier.
3. Remove the keyboard control panel as described earlier.
4. Remove the stand bracket as described earlier.
5. Remove the IR Board as described earlier.
6. Remove the WIFI module as earlier.
7. Remove the fixations screws that fix the metal clamps to the front bezel. Take out those clamps.
8. Remove all other metal parts not belonging to the panel.
9. Lift the LCD Panel from the bezel.
When defective, replace the whole unit.

4.4

Assembly/Panel Removal (for 32"/40"/50"/55"Pxx65x0 series)
 Instructions below apply to the 50PFK6550/12, but will be similar for other 32"/40"/50"/55"Pxx65x0 series models.

4.4.1

Rear Cover

Refer to [Figure 4-22](#) for details.

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

1. Remove fixation screws [1] that secure the base assy, pull out the base assy from the set. Refer to [Figure 4-22](#) for details.
2. Remove the fixation screws [2], [3] and [4] that secure the rear cover. Refer to [Figure 4-22](#) for details.
3. Unplug the connector [5] from SSB. Refer to [Figure 4-23](#) for details.
4. Gently lift the rear cover from the TV. Make sure that wires and cables are not damaged while lifting the rear cover from the set.

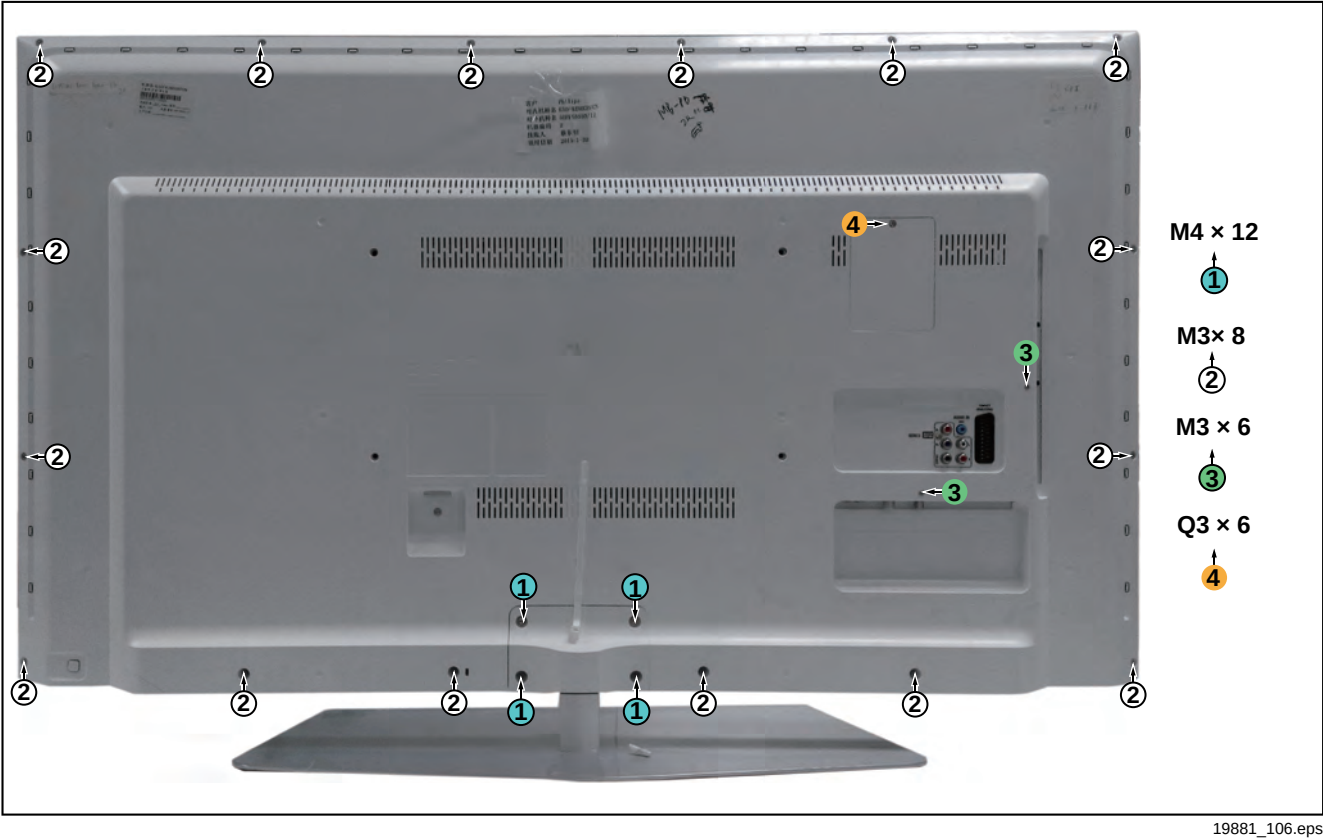


Figure 4-22 Rear cover removal[1]

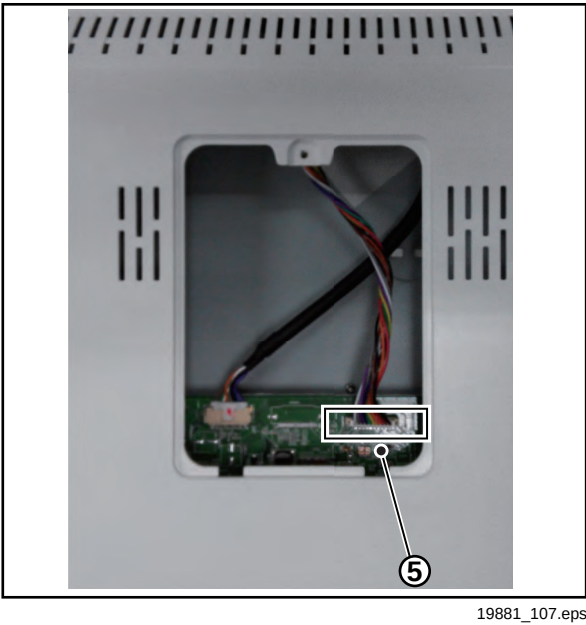


Figure 4-23 Rear cover removal[2]

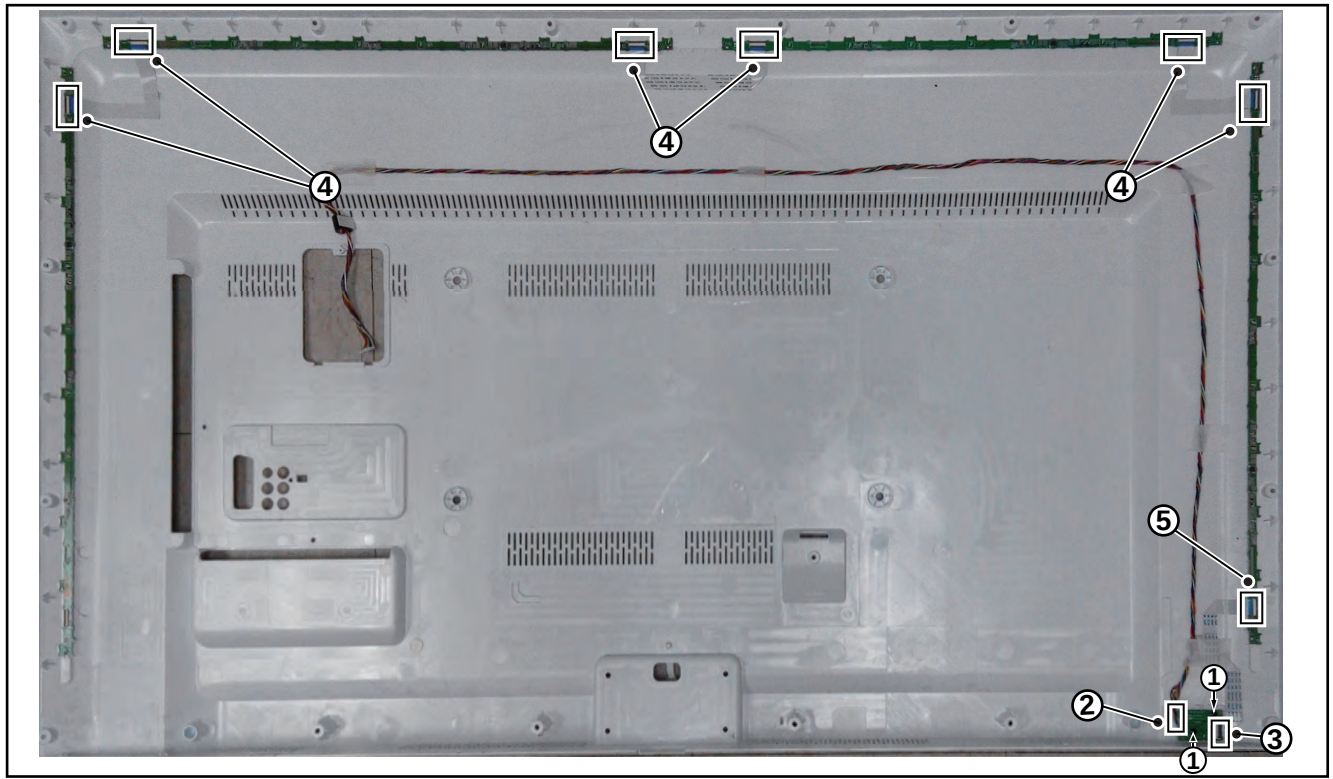
4.4.2 AmbiLight Panel

Refer to [Figure 4-24](#) for details.

1. Gently release the clamps and unplug the two connectors [4] that secure the ambilight panels. Release the clips from

the FFC connector that connect with the Keyboard control panel [5].

2. Lift the AmbiLight panel from the rear cover. Make sure that wires and flat foils are not damaged while lifting the Ambilight panel from the rear cover.



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Figure 4-24 Ambilight and Keyboard removal

4.4.3 Keyboard Control Unit

Refer to [Figure 4-24](#) for details.

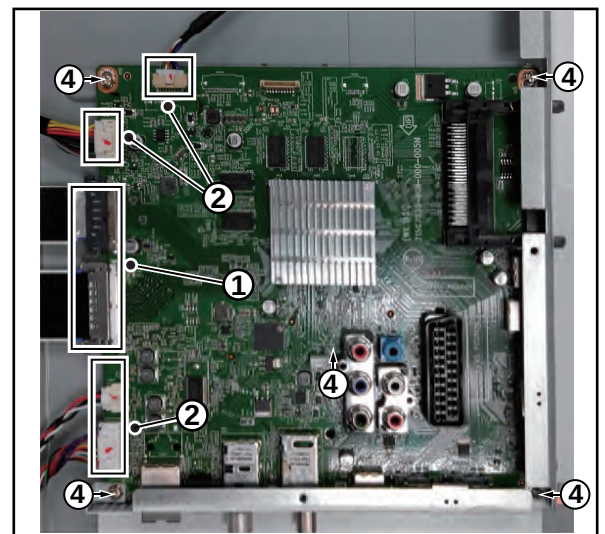
1. Release the connector [2] from the SSB Board, then release the connectors [3] from the Ambilight panel.
Caution: be careful, as these are very fragile connectors!
2. Remove all the fixation screws from the keyboard control panel [1] and take it out from the Back cover.
When defective, replace the whole unit.

4.4.4 Small Signal Board (SSB)

Refer to [Figure 4-25](#) for details.

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

1. Release the clips from the LVDS connector that connect with the SSB[1].
Caution: be careful, as these are very fragile connectors!
2. Unplug all other connectors [2].
3. Remove all the fixation screws from the SSB [3].
4. The SSB can now be shifted from side connector cover, then lifted and taken out of the I/O bracket. Refer to [Figure 4-25](#) for details.



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Figure 4-25 SSB removal

4.4.5 Power Supply Unit (PSU)

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

1. Gently unplug all connectors from the PSU.
2. Remove all fixation screws from the PSU.
3. The PSU can be taken out of the set now.

4.4.6 IR board Control Unit

Refer to [Figure 4-26](#), [Figure 4-27](#) for details.

1. Unplug the connector from the SSB.
- Caution:** be careful, as these are very fragile connectors!
2. Remove all the fixation screws from the IR board control unit [1]. Refer to [Figure 4-26](#) for details.
 3. Remove the IR lens [2], IR board [3] from the DECO_REAR_COVER. Refer to [Figure 4-27](#) for details.
- When defective, replace the whole unit.

4.4.7 Speakers

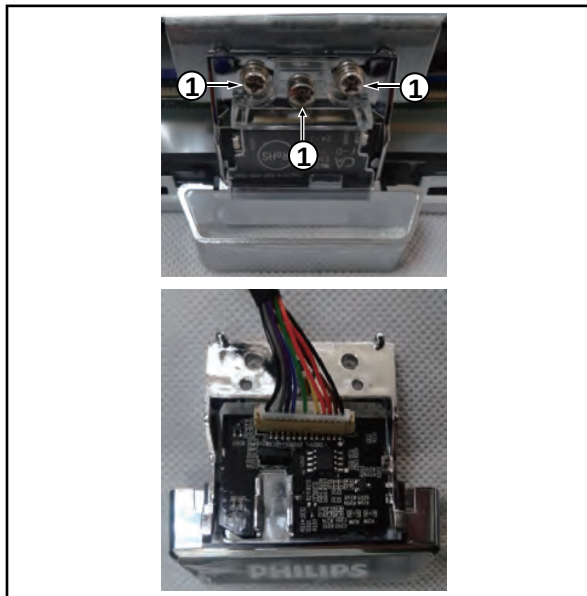
1. Gently release the tapes that secure the speaker cables.
 2. Unplug the speaker connector from the SSB.
 3. Take the speakers out.
- When defective, replace the both units.

4.4.8 WIFI module

1. Unplug the connector from the SSB.
 2. Remove fixation screw that secure the WIFI module, getntly remove the module from the set.
- When defective, replace the whole unit.

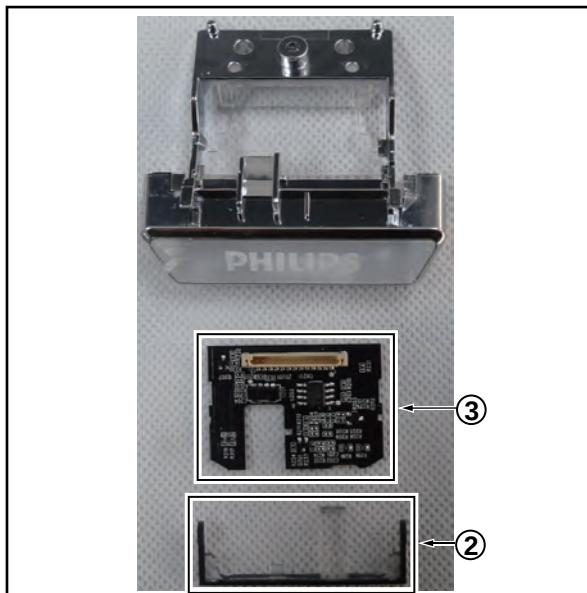
4.4.9 LCD Panel

1. Remove the SSB as described earlier.
 2. Remove the PSU as described earlier.
 3. Remove the keyboard control panel as described earlier.
 4. Remove the stand bracket as described earlier.
 5. Remove the IR Board as described earlier.
 6. Remove the WIFI module as earlier.
 7. Remove the fixations screws that fix the metal clamps to the front bezel. Take out those clamps.
 8. Remove all other metal parts not belonging to the panel.
 9. Lift the LCD Panel from the bezel.
- When defective, replace the whole unit.



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Figure 4-26 IR board removal[1]



19850_104.eps

Figure 4-27 IR board removal[2]

4.5 Assembly/Panel Removal (for 65"PFx6520 series)

Instructions below apply to the 65PFH6520/88, but will be similar for other 65"PFx6520 series models.

4.5.1 Stand

Refer to [Figure 4-28](#) for details.

1. Remove the fixation screws [1] that secure the stand bracket. Refer to [Figure 4-28](#) for details.
2. Take the stand bracket out from the set.



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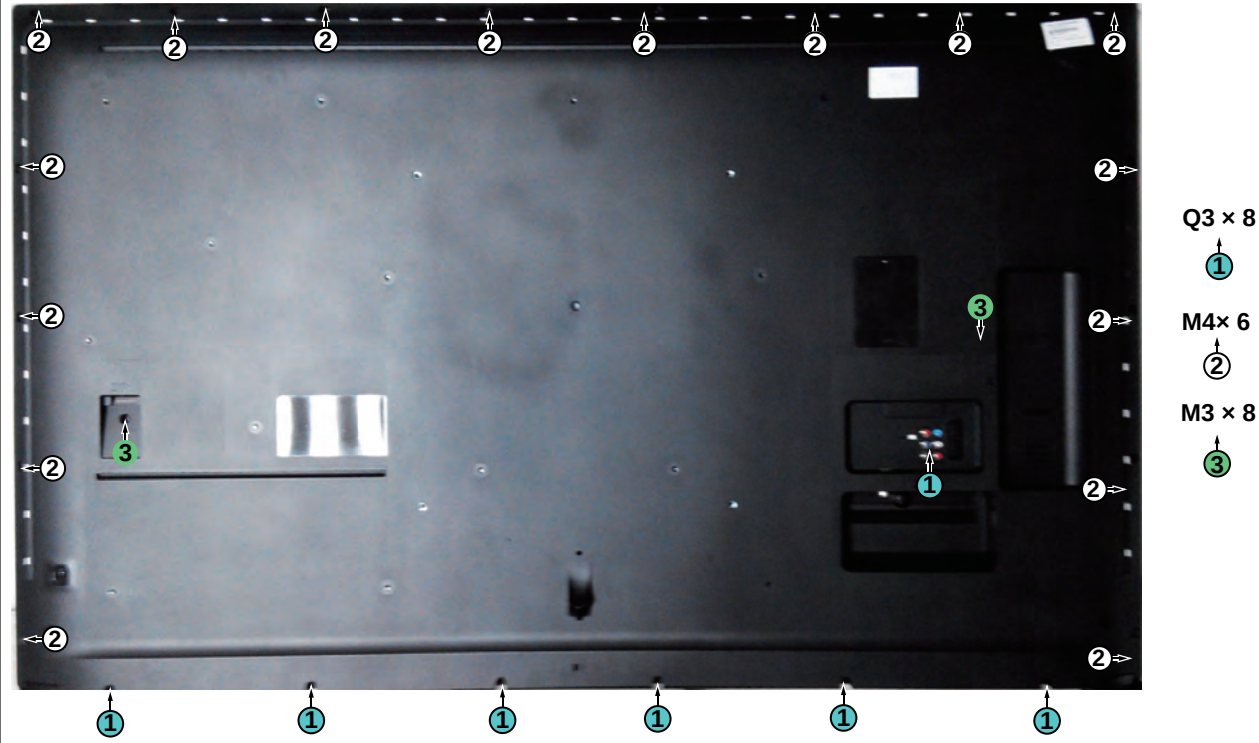
Figure 4-28 Stand removal

4.5.2 Rear Cover

Refer to [Figure 4-29](#) & [Figure 4-30](#) for details.

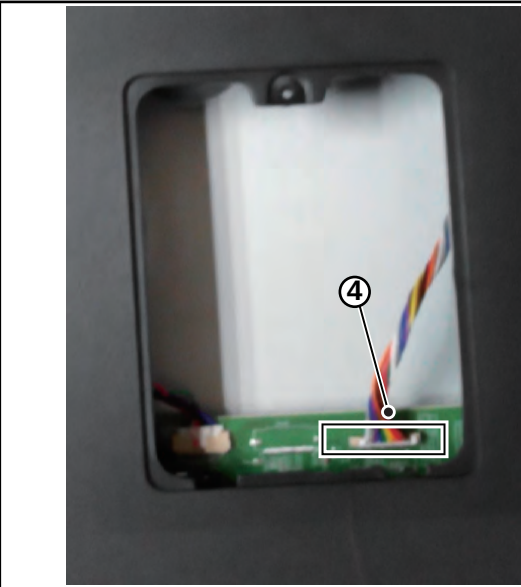
Warning: Disconnect the mains power cord before removing the rear cover.

1. Remove the fixation screws [1], [2] and [3] that secure the rear cover. Refer to [Figure 4-29](#) for details.
2. Unplug the connector [4] from SSB. Refer to [Figure 4-30](#) for details.
3. Gently lift the rear cover from the TV. Make sure that wires and cables are not damaged while lifting the rear cover from the set.



19883_102.eps

Figure 4-29 Rear cover removal[1]



19883_103.eps

Figure 4-30 Rear cover removal[2]

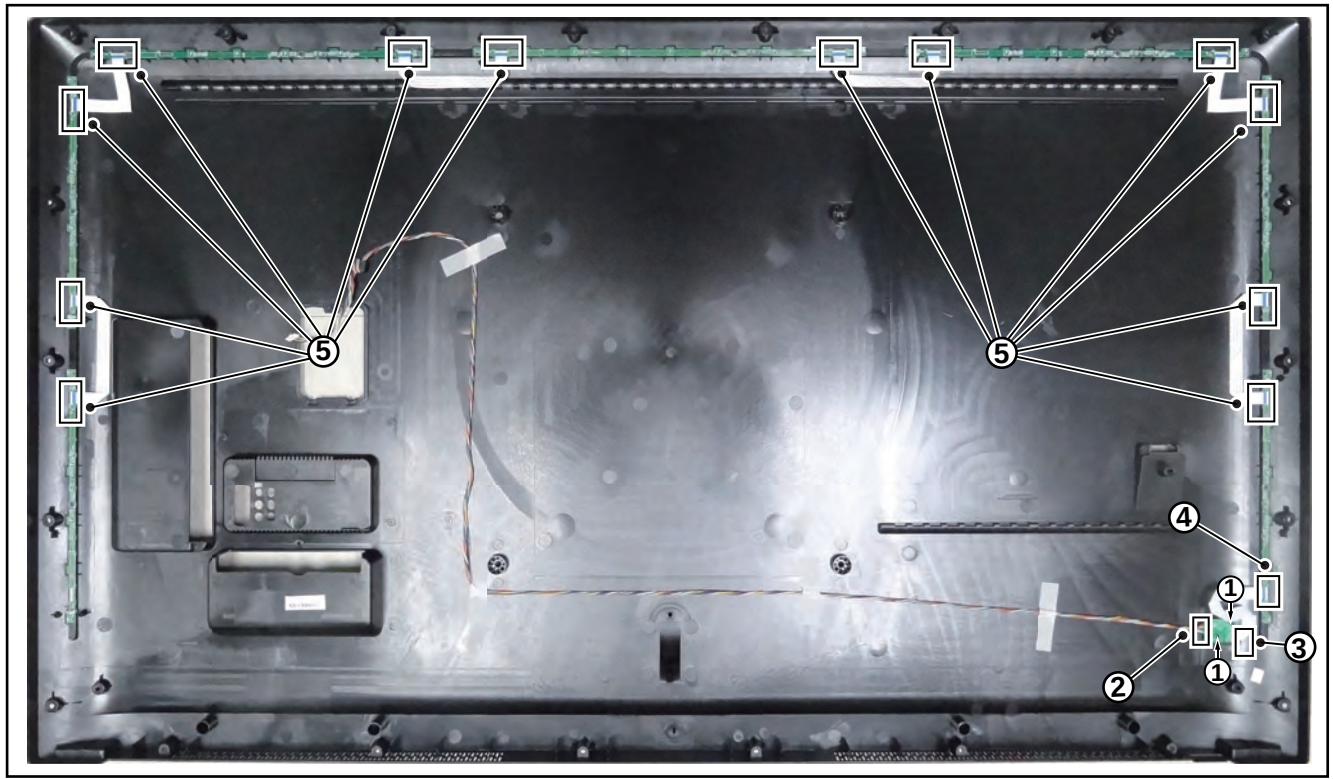
4.5.3 AmbiLight Panel

Refer to [Figure 4-31](#) for details.

1. Gently release the clamps and unplug the connectors [5] that secure the ambilight panels. Release the clips from the

FFC connector that connect with the Keyboard control panel [4].

2. Lift the AmbiLight panel from the rear cover. Make sure that wires and flat foils are not damaged while lifting the Ambilight panel from the rear cover.



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Figure 4-31 Ambilight and Keyboard removal

4.5.4 Keyboard Control Unit

Refer to [Figure 4-31](#) for details.

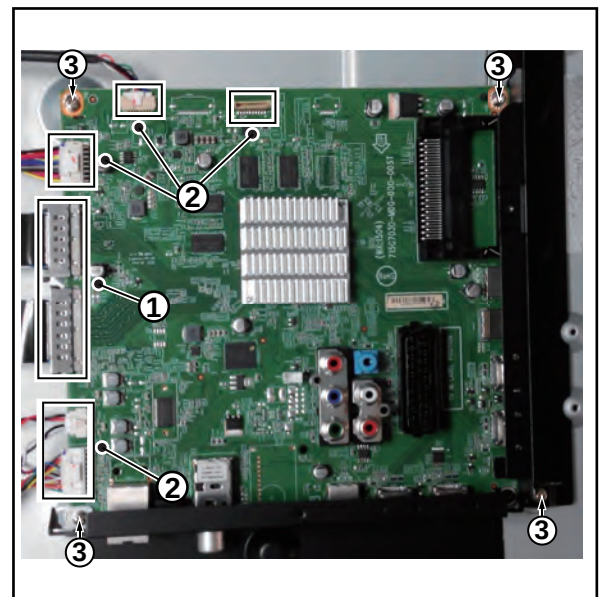
1. Release the connector [2] from the SSB Board, then release the connector [3] from the Ambilight panel.
Caution: be careful, as these are very fragile connectors!
2. Remove all the fixation screws from the keyboard control panel [1] and take it out from the Back cover.
When defective, replace the whole unit.

4.5.5 Small Signal Board (SSB)

Refer to [Figure 4-32](#) for details.

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

1. Release the clips from the LVDS connector that connect with the SSB [1].
Caution: be careful, as these are very fragile connectors! Unplug the cable/flat foils connector.
2. Unplug all other connectors [2].
3. Remove all the fixation screws from the SSB [3].
4. Take out the SSB with I/O bracket.
5. The SSB can now be shifted away from side connector cover, then lifted and taken out of the I/O bracket. Refer to [Figure 4-32](#) for details.



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Figure 4-32 SSB removal

4.5.6 Power Supply Unit (PSU)

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

1. Unplug all connectors from the PSU.
2. Remove all fixation screws from the PSU.
3. The PSU can be taken out of the set now.

4.5.7 Speakers

1. Gently release the tapes that secure the speaker cables.
2. Unplug the speaker connector from the SSB.
3. Take the speakers out.

When defective, replace the both units.

4.5.8 IR/LED Board

1. Remove the stand bracket as described earlier.
2. Gently release the clips that hold the board and take it out from the bezel.
3. Unplug both the connectors from the IR/LED board.

When defective, replace the whole unit.

4.5.9 WIFI module

1. Unplug the connector from the SSB.
2. Remove fixation screw that secure the WIFI module, gently remove the module from the set.

When defective, replace the whole unit.

4.5.10 LCD Panel

1. Remove the SSB as described earlier.
2. Remove the PSU as described earlier.
3. Remove the keyboard control panel as described earlier.
4. Remove the stand bracket as described earlier.
5. Remove the IR/LED as described earlier.
6. Remove the WIFI module as earlier.
7. Remove the fixations screws that fix the metal clamps to the front bezel. Take out those clamps.
8. Remove all other metal parts not belonging to the panel.
9. Lift the LCD Panel from the bezel.

When defective, replace the whole unit.

4.6 Set Re-assembly

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

Notes:

- While re-assembling, make sure that all cables are placed and connected in their original position. See [Figure 4-1](#) to [Figure 4-15](#).
- Pay special attention not to damage the EMC foams on the SSB shields. Ensure that EMC foams are mounted correctly.

5. Service Modes, Error Codes, and Fault Finding

Index of this chapter:

- [5.1 Test Points](#)
- [5.2 Service Modes](#)
- [5.3 Stepwise Start-up](#)
- [5.4 Service Tools](#)
- [5.5 Software Upgrading](#)
- [5.6 Error Codes](#)
- [5.7 The Blinking LED Procedure](#)
- [5.8 Fault Finding and Repair Tips](#)

5.1 Test Points

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

Perform measurements under the following conditions:

- Service Default Mode.
- Video: Colour bar signal.
- Audio: 3 kHz left, 1 kHz right.

5.2 Service Modes

The Service Mode feature is split into five parts:

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

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

- A pre-defined situation to ensure measurements can be made under uniform conditions (SDM).
- Activates the blinking LED procedure for error identification when no picture is available (SDM).
- Make alignments (e.g. White Tone), reset the error buffer (SAM and Factory Mode).
- 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 micro processor (PWM, registers, etc.), and by making use of a fault finding database. It will also be possible to up and download the software of the TV set via I²C with help of ComPair. To do this, ComPair has to be connected to the TV set via the ComPair connector, which will be accessible through the rear of the set (without removing the rear cover).

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

5.2.1 General

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

Life Timer

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

Software Identification, Version, and Cluster

The software ID, version, and cluster will be shown in the main menu display of SDM, SAM, and CSM.

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

- AAAAA is the chassis name: QM152.
- B is the region indication: E = Europe, A = AP/China, U = NAFTA, L = LATAM.
- X is the main version number: this is updated with a major change of specification (incompatible with the previous software version). Numbering will go from 1 - 99 and AA - ZZ.
 - If the main version number changes, the new version number is written in the NVM.
 - If the main version number changes, the default settings are loaded.
- YYY is the sub version number: this is updated with a minor change (backwards compatible with the previous versions). Numbering will go from 000 - 999.
 - If the sub version number changes, the new version number is written in the NVM.
 - If the NVM is refreshed, the software identification, version, and cluster will also be written to NVM.

Display Option Code Selection

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

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

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

5.2.2 Service Default Mode (SDM)

Purpose

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

Specifications

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

- Automatic user menu time-out (menu switches back/OFF automatically).
- Auto Volume levelling (AVL).

How to Activate SDM

To activate SDM, use the following methods:

- Press the following key sequence on the RC transmitter: "062596", directly followed by the "Home/Menu" button.

After activating this mode, "SDM" will appear in the upper left corner of the screen.

On Screen Menu

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

- xxxxx Operating hours (in decimal).
- AAAAB-X.YYY See [Software Identification, Version, and Cluster](#) for the software 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. In this chassis two times eight option codes are used.

How to Navigate

As this mode is read only, there is nothing to navigate. To switch to other modes, use one of the following methods:

- Command MENU from the user remote will exit SDM.
- To prevent the OSD from interfering with measurements in SDM, use the command "Adjust" or "Options" ("STATUS" or "INFO" for NAFTA and LATAM) from the user remote. This will switch the OSD "off" while remaining in the SDM mode. The "SDM" OSD is remains visible in the upper right corner of the screen. To exit SDM switch to "Stand-by" mode.
- Press the following key sequence on the remote control transmitter: "062596" directly followed by the OK button to switch to SAM (do not allow the display to time out between entries while keying the sequence). Remarks: new remote

controls will not have I+ button, but an "INFO" button instead.

How to Exit SDM

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

5.2.3 Service Alignment Mode (SAM)

Purpose

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

Specifications

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

How to Activate SAM

To activate SAM, use one of the following methods:

- Press the following key sequence on the remote control transmitter: "062596", directly followed by the "INFO/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.

Table 5-1 SAM mode overview

Main Menu	Sub-menu 1	Sub-menu 2	Description
Hardware info			The information of Hardware
Operation hours			This represents the life timer. The timer counts normal operation hours, but does not count Stand-by hours.
Shop operation hours			This represents the life timer. The timer counts normal shop operation hours, but does not count Stand-by hours.
Errors			Shows all errors detected since the last time the buffer was erased. Five errors possible.
Reset error buffer			Reset error buffer
Alignments	Warm	R Gain	To align the White Tone. See paragraph 6.3 Software Alignments in the Alignments section for a detailed description
		G Gain	
		B Gain	
	Normal	R Gain	
		G Gain	
		B Gain	
	Cool	R Gain	
		G Gain	
		B Gain	
Ambilight	Select module		Ambilight select module
	Brightness		Brightness of Ambilight
Option numbers	Group 1		Group 1 Option number
	Group 2		Group 2 Option number
	Store		Store the Option number
Store			Store
Software maintenance	Software events		Software events
	Hardware events		Hardware events
Test setting	Digital info		Test setting
BT Pairing tables	Clear paired remote control		Clear paired remote control
Wi-Fi Direct settings	Reset Wi-Fi Direct group		Reset Wi-Fi Direct group
Development 1 file versions			Development 1 file versions
Development 2 file versions			Development 2 file versions

Main Menu	Sub-menu 1	Sub-menu 2	Description
Upload to USB			To upload several settings from the TV to an USB stick
Download from USB			To download several settings from the USB stick to the TV
NVM editor	Type number		NVM-editor will function as in the past: type number, production code, 18AC SSB, 18AC display, 18AC supply is a decimal value via digit entry
	Production code		
	18AC SSB		
	18AC display		
	18AC supply		
Upload to USB	Channel List		To upload several settings from the TV to an USB stick
	NVM Copy		
	Readable info		
	EDID Copy		
Download from USB	Channel List		To download several settings from the USB stick to the TV
	NVM Copy		
	EDID Copy		
Initialize NVM	Press [OK] to Initialize NVM immediately		To initialize a (corrupted) NVM. Be careful, this will erase all settings.

How to Navigate

- In the SAM menu, select menu items with the UP/DOWN keys on the remote control transmitter. The selected item will be indicated. When not all menu items fit on the screen, use the UP/DOWN keys to display the next/previous menu items.
- With the "LEFT/RIGHT" keys, it is possible to:
 - (De) activate the selected menu item.
 - (De) activate the selected sub menu.
 - Change the value of the selected menu item.
- When you press the MENU button once while in top level SAM, the set will switch to the normal user menu (with the SAM mode still active in the background).
- Press the following key sequence on the remote control transmitter: "062596" directly followed by the "Home/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 RGB Align settings), leave the top level SAM menu by using the POWER button on the remote control transmitter or the television set. The mentioned exceptions must be stored separately via the STORE button.

How to Exit SAM

Use one of the following methods:

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

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

5.2.4 Contents of the Factory mode:

Purpose

- To perform extended alignments.

Specifications

- Displaying and or changing Panel ID information.
- Displaying and or changing Tuner ID information.
- Error buffer clearing.
- Various software alignment settings.
- Testpattern displaying.
- Public Broadcasting Service password Reset.
- etc.

How to Activate the Factory mode

To activate the Factory mode, use the following method:

- Press the following key sequence on the remote control transmitter: from the "menu/home" press "1999", directly followed by the "Back/Return" button. Do not allow the display to time out between entries while keying the sequence.

After entering the Factory mode, the following items are displayed,

Table 5-2 Factory mode overview

Item	Item value	Default value						Description
		32"	39"	40"	48"	50"	55"	
0	F/W VERSION	Press OK						Displays the software versions of the supplier, Flash PQ, Smart Picture, BL Dimming, Source Meter, the Picture Quality checksum, the Dimming library, the Source meter library, the Flash AQ, MCU and OAD software versions.
1	PANEL_ID	See table back to div.table 6-3						Displays and changes the Panel ID with the left and right cursor; be careful changing this, it can result in not correct displaying the screen!
2	DEMODO_TYPE	0	0	2	0	1	1	Choose demod type.
3	NVM ADDRESS	0						NVM address 0 to 8191, Use Item 6 to change and 7 to store the data to the correct NVM address
4	NVM VALUE	0						Displays the value at the NVM address of item 5
5	NVM STORE	Press OK						Use this option to save the data of item 6 to NVM address of item 5
6	COPY NVM to USB	Press OK						Use this to store the NVM data to the REPAIR folder of a FAT formatted USB memory stick. The TV will write two files in the REPAIR folder of the memory stick. It will create this folder if it does not exist. The items are "Channel list", "Personal settings", "Option codes", "Display-related alignments" and "History list". In case the download to the USB stick was not successful "Failure" will appear. In this case, check if the USB stick is connected properly. Now the settings are stored onto the USB stick and can be used to download onto another TV or other SSB. Uploading is of course only possible if the software is running and if a picture is available. This method is created to be able to save the customer's TV settings and to store them into another SSB.
7	COPY NVM to TV	Press OK						Use this to store the NVM data from the USB memory stick to the TV. The TV will save the two files which were created in item 8 to the NVM of the set. Use these options when replacing a SSB. When "USB to TV Success" is displayed remove the power and restart the TV

Item	Item value	Default value						Description
		32"	39"	40"	48"	50"	55"	
8	TV Settings Key	1	1	1	1	1	1	TV Settings Key
9	TV Settings VALUE	0	0	0	0	0	0	TV Settings VALUE
10	TV Settings STORE	Press OK						TV Settings STORE
11	COPY TV Settings to USB	Press OK						COPY TV Settings to USB
12	COPY TV Settings to TV	Press OK						COPY TV Settings to TV
13	VIRGIN_MODE	Off	Off	Off	Off	On	Off	Use this to return the set to virgin mode. Depends whether the set has been used already.
14	ORT_MODE	On	On	On	On	On	Off	ORT mode
15	DRMWARNING	On	Off	Off	Off	On	On	Warning the data rights management
16	AGEING MODE	Off	Off	Off	Off	Off	Off	Use this for aging a new LCD panel
17	COLOR TEMP MODE	Normal						
18	CLR_TEMP_R	119	123	127	127	127	0	Red colour temperature setting
19	CLR_TEMP_G	105	127	105	105	105	0	Green colour temperature setting
20	CLR_TEMP_B	255	114	95	95	95	0	Blue colour temperature setting
21	ADC_GAIN_R	255	255	255	255	255	255	Red ADC gain
22	ADC_GAIN_G	255	255	255	255	255	255	Green ADC gain
23	ADC_GAIN_B	255	255	255	255	255	255	Blue ADC gain
24	ADC_OFFSET_R	127	127	127	127	127	127	Red ADC offset
25	ADC_OFFSET_G	127	127	127	127	127	127	Green ADC offset
26	ADC_OFFSET_B	127	127	127	127	127	127	Blue ADC offset
27	AUD_GAIN_HDMI	0						HDMI audio gain
28	AUD_GAIN_ATV	0	0	0	0	12	0	Analogue TV audio gain
29	AUD_GAIN_DTV	0						Digital TV audio gain
30	AUD_GAIN_USB	0	2	2	0	0	0	USB audio gain
31	AQ_INDEX	0	0	15	10	10	15	Audio Quality index
32	Copy PQ to USB	Press OK						Saves the picture quality data to a file "pq.bin" to the root of a FAT formatted USB memory stick
33	Copy PQ to TV	Press OK						Loads the picture quality data from a file "pq.bin" in to the TV
34	Copy AQ to USB	Press OK						Loads the audio quality data from a file "AQ.bin" in to the TV
35	Copy AQ to TV	Press OK						Loads the audio quality data from a file "AQ.bin" in to the TV
36	COPY DB CHL to USB	Press OK						Copy the USB channel list to USB
37	COPY DB CHL to TV	Press OK						Copy the TV channel list to TV
38	LIGHT SENSOR TYPE	0	0	0	0	0	1	Light sensor type
39	TEMP SENSOR TYPE	0	0	0	0	0	3	Temperature sensor
40	AMBILIGHT TYPE	0	0	0	0	0	0	The type of Ambient light
41	AMBILIGHT TYPE VALUE	0	0	0	0	0	3	The type value of Ambient light
42	LED TYPE	0	0	0	0	0	0	The type of LED
43	3D	0	2	2	0	0	2	3D on/off
44	BLUETOOTH	0	0	0	1	1	1	BLUETOOTH
45	ARC TEST	On	On	On	On	On	On	ARC test
46	EXIT_FACTORY	Press OK						Exits the Factory mode

How to Exit the Factory mode

Use one of the following methods:

- Select EXIT_FACTORY from the menu and press the "OK" button.

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

- Possibility to use "CH+" or "CH-" for channel surfing, or enter the specific channel number on the RC.

How to Activate CSM

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

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

Contents of CSM

- 1.1 Set Type** This information is very helpful for a helpdesk/workshop as reference for further diagnosis. In this way, it is not necessary for the customer to look at the rear of the TV-set. Note that if an NVM is replaced or is initialized after corruption, this set type has to be re-written to NVM.
- 1.2 Production code** Displays the production code (the serial number) of the TV. Note that if an NVM is replaced or is initialized after corruption, this production code has to be re-written to NVM.
- 1.4 a Option Code 1** Gives the option codes of option group 1 as set in SAM.
- 1.4b Option Code 2** Gives the option codes of option group 2 as set in SAM.
- 1.5 18AC SSB** Gives an identification of the SSB as stored in NVM. Note that if an NVM is replaced or is initialized after

5.2.5 Customer Service Mode (CSM)

Purpose

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

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

Specifications

- Ignore "Service unfriendly modes".
- Line number for every line (to make CSM language independent).
- Set the screen mode to full screen (all contents on screen is visible).
- After leaving the Customer Service Mode, the original settings are restored.

corruption, this identification number has to be re-written to NVM. This identification number is the 12NC number of the SSB.

- **1.6 18AC Display** 18NC NVM read/write.
- **1.7 18AC Supply** 18AC NVM read/write.
- **1.8 18AC sensor board** 18AC NVM read/write.
- **2.1 Current Main SW** Displays the built-in main software version. In case of field problems related to software, software can be upgraded. As this software is consumer upgradeable, it will also be published on the internet.
- **2.2 Standby Software** Displays the built-in stand-by processor software version. Upgrading this software will be possible via USB.
- **2.3 e-UM version** eDFU (help) version.
- **2.4 Strings database version** Displays the version of strings database.
- **2.10 Channel package version** version of channel package.
- **3.1 Signal Quality** Analog/digital signal strength.
- **3.4 Ethernet MAC address** A Media Access Control address (MAC address) is a unique identifier assigned to network interfaces for communications on the physical network segment.

- **3.5 Wireless MAC address** Wireless Media Access Control address.
- **3.6 Netflix key** Indicates the validity of the netflix key. In case this key are not valid and the customer wants to make use of the functionality, the SSB has to be replaced.
- **3.7 CI module** Indicates the module of CI.
- **3.8 CI+ protected service** The IC+ protectd service.
- **3.9 Event counter** The counter of event.

How to Navigate

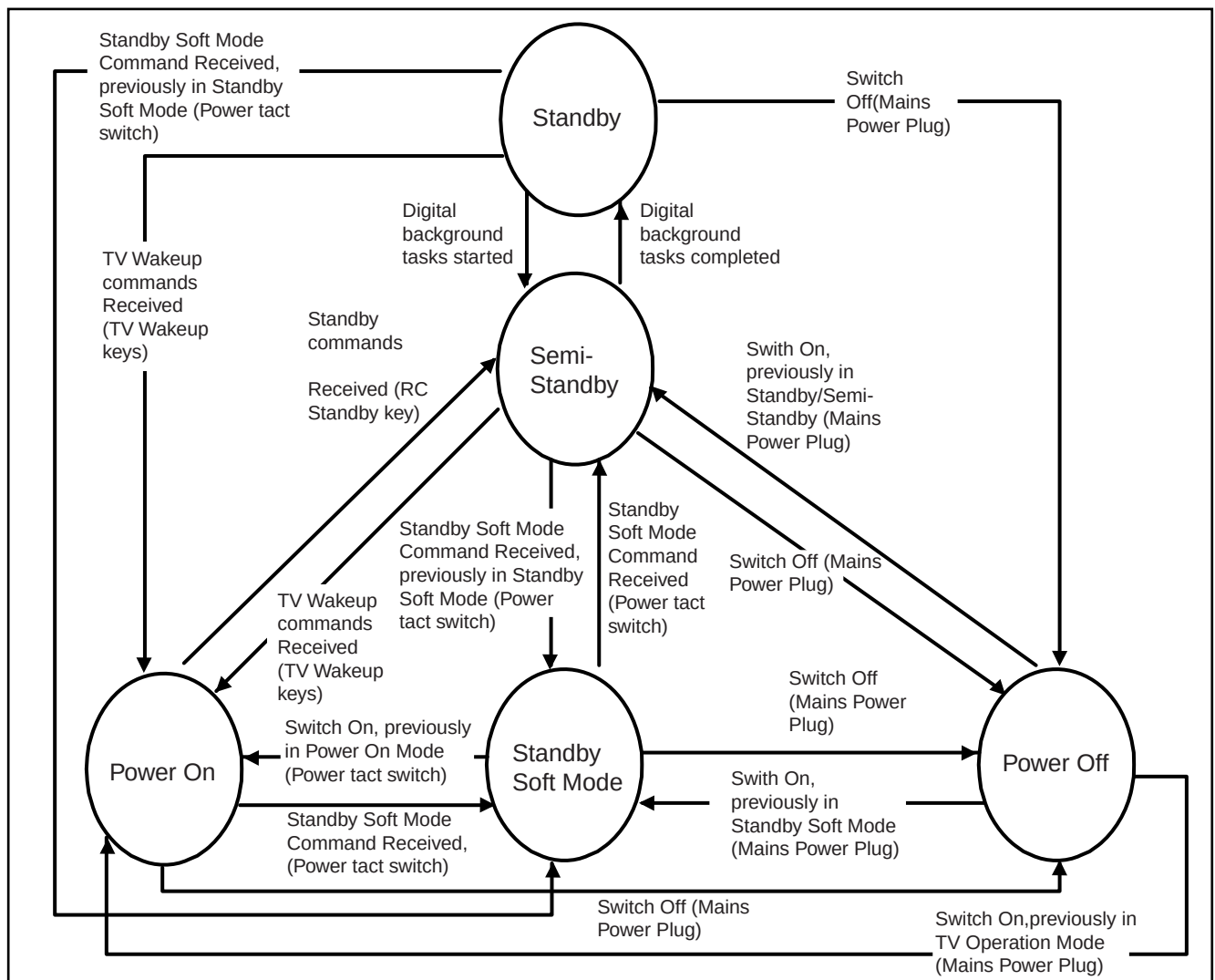
By means of the "CURSOR-DOWN/UP" knob (or the scroll wheel) on the RC-transmitter, can be navigated through the menus.

How to Exit CSM

To exit CSM, use one of the following methods.

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

5.3 Stepwise Start-up



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120224

Figure 5-1 Stepwise Start-up

5.4 Service Tools

5.4.1 ComPair

Introduction

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

- 1. ComPair helps to quickly get an understanding on how to repair the chassis in a short and effective way.
- 2. ComPair allows very detailed diagnostics and is therefore capable of accurately indicating problem areas. No knowledge on I²C or UART commands is necessary, because ComPair takes care of this.
- 3. ComPair speeds up the repair time since it can automatically communicate with the chassis (when the micro processor is working) and all repair information is directly available.
- 4. ComPair features TV software up possibilities.

Specifications

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

The ComPair fault finding program is able to determine the problem of the defective television, by a combination of automatic diagnostics and an interactive question/answer procedure.

How to Connect

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

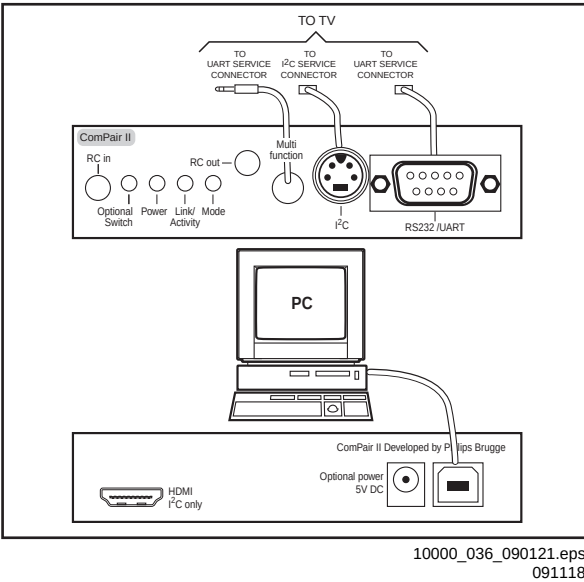


Figure 5-2 ComPair II interface connection

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

How to Order

ComPair II order codes:

- ComPair II interface: 3122 785 91020.
- Software is available via the Philips Service web portal.
- ComPair UART interface cable for TPM10.1x xx.
(using DB9 to 2mm pitch JST connector): 3122 785 90630.

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

5.5 Software Upgrading

5.5.1 Description

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

5.5.2 Introduction

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

Preparing a portable memory for software upgrade

The following requirements have to be met:

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

Note:

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

5.5.3 Check the current TV software version

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

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

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

5.5.4 Download the latest software

- 1. Open the internet page <http://www.philips.com/support>.
- 2. Find information and software related to the TV.
- 3. Select the latest software update file and download it to the PC.
- 4. Insert the USB memory stick into one of the USB ports of the PC.
- 5. Decompress the downloaded ZIP file and copy it to the root directory of the USB flash drive.

5.5.5 Update the TV software

- 1. Turn the TV on and wait for it to boot completely.
- 2. Insert the USB memory stick that contains the software update files in one of the TV's USB ports.
- 3. The TV will detect the USB memory stick automatically. Then a window jumps out as [Figure 5-3](#).
Note: If the USB flash drive is not detected after power up, disconnect it and re-insert it.
- 4. Select [Update] and press OK. See [Figure 5-3](#).
- 5. To proceed, In next menu select [Start] and press OK to start software updates. See [Figure 5-4](#).
- 6. Upgrading will now begins and the status of the updating progress will be displayed.
- 7. When the TV software is updated. Remove your USB flash drive, then select [Restart] and press OK to restart the TV. See [Figure 5-5](#).

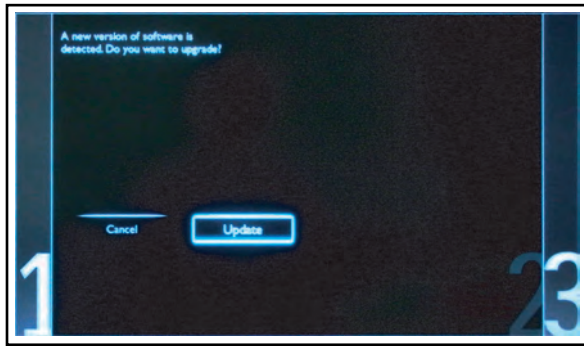
19080_207_110324.eps
110324

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

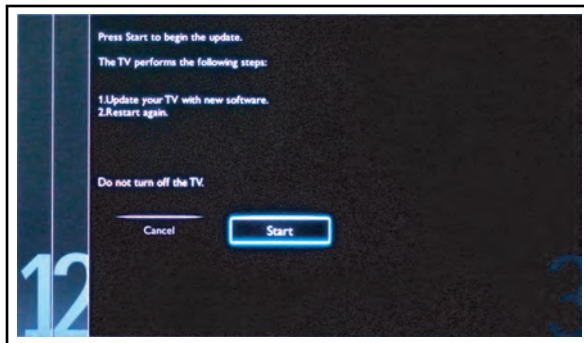
19080_208_110324.eps
110324

Figure 5-4 Update the TV software [2/3]

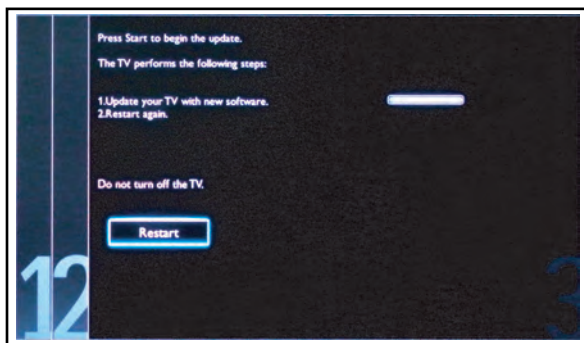
19080_209_110324.eps
110324

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

Note:

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

5.5.6 Content and Usage of the One-Zip Software File

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

- EDID_clustername.zip:** Contains the EDID content of the different EDID NVMs. See ComPair for further instructions.

- FUS_clustername_version.zip:** Contains the file downloaded which is needed to upgrade the TV main software and the software download application.
- NVM_clustername_version.zip:** Default NVM content. Must be programmed via ComPair.

5.5.7 How to Copy NVM Data to/from USB

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

Table 5-3 Service mode overview

Service Modes	Description
SAM	Service alignment mode
Factory Mode	Used for extended alignments
SDM	Service default Mode
CSM	3-page compact CSM pages. There will be CSM dump to USB-stick upon entering CSM-mode
USB SW upgradeable	SW-upgrading of flash memories MT5593 can be done via USB. The main SW can be upgraded via the ZIP file downloaded.
NVM-Editor in SAM	NVM-editor will function as in the past: Address and Value field is a decimal value via digit entry
Service Data	New Service data in SAM for CTN, Prod. no., 12NC programming with virtual keyboard
USB copy/paste in SAM	Channel list, NVM data, Readable info, EDID
UART logging	There will be printout available in UART. No specifications of the printout, per MTK provision/definition.
Blind SAM	RC sequence "062598" + "Menu" + "Panel code"
Clear Buffer	RC sequence "062599" + "OK" or via SAM

5.6 Error Codes**5.6.1 Introduction**

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

- Activated (SW) protection.
- Failing 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.

5.6.2 How to Read the Error Buffer

You can read the error buffer in three ways:

- On screen via the SAM/SDM/CSM (if you have a picture).
Example:
 - ERROR: 000 000 000 000 000:** No errors detected
 - ERROR: 013 000 000 000 000:** Error code 13 is the last and only detected error

- **ERROR: 034 013 000 000 000:** Error code 13 was detected first and error code 34 is the last detected (newest) error
- Via the blinking LED procedure (when you have no picture). See paragraph [5.7 The Blinking LED Procedure](#).
- Via ComPair.

5.6.3 Error codes

In this chassis only “layer 2” error codes are available and point to problems on the SSB. They are triggered by LED blinking when CSM is activated. Only the following layer 2 errors are defined:

Table 5-4 Error code table

Layer-2 error code	Defective device
13	General I ² C bus error on the SSB
16	+12 V missing or low, PSU defective
27	Channel decoder error on the SSB
34	Tuner I ² C bus error on the SSB
35	EEPROM I ² C error on SSB, M24C64

5.6.4 How to Clear the Error Buffer

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

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

5.7 The Blinking LED Procedure

5.7.1 Introduction

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

5.7.2 Displaying the Entire Error Buffer

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

5.8 Fault Finding and Repair Tips

Note:

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

5.8.1 NVM Editor

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

Caution:

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

5.8.2 Load Default NVM Values

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

5.8.3 No Picture

When you have no picture, first make sure you have entered the correct display code. See paragraph [6.4 Option Settings](#) for the instructions. See also [back to div.table 6-3](#).

5.8.4 Unstable Picture via HDMI input

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

5.8.5 No Picture via HDMI input

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

5.8.6 TV Will Not Start-up from Stand-by

Possible Stand-by Controller failure. Re-flash the software.

5.8.7 Audio Amplifier

The Class D-IC U606 has a powerpad for cooling. When the IC is replaced it must be ensured that the powerpad is very well pushed to the PWB while the solder is still liquid. This is needed to insure that the cooling is guaranteed, otherwise the Class D-IC could break down in short time.

5.8.8 CSM

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

5.8.9 Loudspeakers

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

5.8.10 Display option code

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

6. Alignments

Index of this chapter:

- [6.1 General Alignment Conditions](#)
- [6.2 Hardware Alignments](#)
- [6.3 Software Alignments](#)
- [6.4 Option Settings](#)
- [6.5 Reset of Repaired SSB](#)

6.1 General Alignment Conditions

Perform all electrical adjustments under the following conditions:

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

6.2 Hardware Alignments

Not applicable.

6.3 Software Alignments

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

- White point.

To store the data:

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

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

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

6.3.1 RGB Alignment

Before alignment, set the picture as follows:

Picture Setting	
Dynamic backlight	Off
Dynamic Contrast	Off
Color Enhancement	Off
Picture Format	Unscaled
Light Sensor	Off
Brightness	50
Color	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 “128”.

In case you have a colour analyser:

- Measure with a calibrated (phosphor- independent) color analyser (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](#)). Tolerance: dx: ± 0.003, dy: ± 0.003.
- Repeat this step for the other colour 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

Value	Cool (11000 K)	Normal (9000 K)	Warm (6500 K)
x	0.276	0.287	0.313
y	0.282	0.296	0.329

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

6.3.2 Display Adjustment

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

- Enter SAM mode.
- Select a colour temperature (e.g. COOL, NORMAL, or WARM).
- Set the RED, GREEN and BLUE default values according to the values in [back to div.table 6-2](#).
- When finished press OK on the RC, then press STORE to store the aligned values to the NVM.
- Restore the initial picture settings after the alignments.

Table 6-2 White tone default settings

Picture mode	Screen size	Colour temperature		
		Red	Green	Blue
Normal (9000K)	32PFH5500/88	119	105	127
	32PFK5500/12	117	104	126
	32PFT5500/12	119	105	126
	32PFH6500/88	126	122	125
	32PFK6500/12	126	122	123
	32PFT6500/12	125	121	123
	32PFT6500/60	125	120	122
	39PFH5500/88	123	127	114
	39PFK5500/12	122	126	113
	39PFT5500/12	123	127	113
	40PFH5500/88	127	105	95
	40PFK5500/12	126	104	94
	40PFT5500/12	127	104	95
	40PUK6400/12	127	105	95
	40PUH6400/88	126	104	95
	40PUT6400/12	127	105	94
	40PUT6400/60	126	103	94
	40PFH6510/88	124	101	90
	40PFK6510/12	127	105	95
	40PFT6510/12	126	101	92
	40PFT6510/60	122	103	91
	40PFK6540/12	123	104	95
	40PFH6550/88	126	104	94
	40PFK6550/12	124	106	95
	40PFT6550/12	123	103	91
	40PFK6560/12	125	100	93
	40PFK6580/12	125	101	93
	48PFH5500/88	127	127	95
	48PFK5500/12	126	127	94
	48PFT5500/12	127	126	95
	50PUK6400/12	127	105	95
	50PFH6510/88	127	105	94
	50PFK6510/12	126	103	93
	50PFT6510/12	125	102	91
	50PFT6510/60	124	102	92
	50PFK6540/12	127	101	92
	50PFH6550/88	126	102	94
	50PFK6550/12	127	102	90
	50PFT6550/12	125	103	90
	50PFK6560/12	127	102	92
	50PFK6580/12	126	101	93
	55PFH5500/88	127	104	95
	55PFK5500/12	126	104	95
	55PFT5500/12	127	105	93
	55PUH6400/88	126	105	94
	55PUK6400/12	125	104	95
	55PUT6400/12	127	105	95
	55PFH6510/88	126	110	115
	55PFK6510/12	125	109	114
	55PFT6510/12	122	111	112
	55PFT6510/60	124	110	113
	55PFK6540/12	126	108	114
	55PFH6550/88	127	113	116
	55PFK6550/12	127	114	116
	55PFT6550/12	126	114	115
	55PFK6560/12	125	113	115
	55PFK6580/12	126	112	114
	65PFH6520/88	127	105	95
	65PFK6520/12	127	104	96
	65PFT6520/12	126	105	92
	65PFT6520/60	125	104	93

Picture mode	Screen size	Colour temperature		
		Red	Green	Blue
Cool (11000K)	32PFH5500/88	101	93	127
	32PFK5500/12	100	92	127
	32PFT5500/12	101	93	127
	32PFH6500/88	96	109	127
	32PFK6500/12	97	108	127
	32PFT6500/12	95	106	125
	32PFT6500/60	94	107	126
	39PFH5500/88	123	117	126
	39PFK5500/12	122	116	126
	39PFT5500/12	123	117	127
	40PFH5500/88	102	100	127
	40PFK5500/12	100	99	126
	40PFT5500/12	127	101	127
	40PUK6400/12	104	98	125
	40PUH6400/88	103	97	125
	40PUT6400/12	104	98	124
	40PUT6400/60	102	98	125
	40PFH6510/88	114	116	127
	40PFK6510/12	115	114	126
	40PFT6510/12	114	115	126
	40PFT6510/60	114	116	127
	40PFK6540/12	120	114	113
	40PFH6550/88	122	111	110
	40PFK6550/12	121	114	114
	40PFT6550/12	123	113	116
	40PFK6560/12	122	113	115
	40PFK6580/12	123	111	116
	48PFH5500/88	127	127	101
	48PFK5500/12	126	124	100
	48PFT5500/12	125	127	101
	50PUK6400/12	127	114	116
	50PFH6510/88	121	114	116
	50PFK6510/12	120	113	115
	50PFT6510/12	122	112	116
	50PFT6510/60	121	111	116
	50PFK6540/12	127	101	106
	50PFH6550/88	105	105	127
	50PFK6550/12	104	105	126
	50PFT6550/12	105	104	123
	50PFK6560/12	104	103	122
	50PFK6580/12	105	100	123
	55PFH5500/88	107	114	126
	55PFK5500/12	106	114	125
	55PFT5500/12	107	113	126
	55PUH6400/88	126	113	115
	55PUK6400/12	127	114	112
	55PUT6400/12	125	111	116
	55PFH6510/88	91	90	121
	55PFK6510/12	121	92	124
	55PFT6510/12	123	96	125
	55PFT6510/60	124	97	126
	55PFK6540/12	121	95	123
	55PFH6550/88	105	90	125
	55PFK6550/12	107	91	123
	55PFT6550/12	106	91	122
	55PFK6560/12	104	93	124
	55PFK6580/12	103	91	123
	65PFH6520/88	127	114	114
	65PFK6520/12	126	112	113
	65PFT6520/12	125	112	112
	65PFT6520/60	126	111	113

Picture mode	Screen size	Colour temperature		
		Red	Green	Blue
Warm (6500K)	32PFH5500/88	127	112	101
	32PFK5500/12	126	111	100
	32PFT5500/12	125	110	101
	32PFH6500/88	127	108	71
	32PFK6500/12	127	108	70
	32PFT6500/12	127	107	71
	32PFT6500/60	127	108	71
	39PFH5500/88	127	112	106
	39PFK5500/12	127	112	105
	39PFT5500/12	127	113	107
	40PFH5500/88	127	110	95
	40PFK5500/12	127	112	97
	40PFT5500/12	127	111	96
	40PUK6400/12	127	99	97
	40PUH6400/88	127	98	97
	40PUT6400/12	126	97	96
	40PUT6400/60	127	97	97
	40PFH6510/88	127	91	54
	40PFK6510/12	127	90	53
	40PFT6510/12	127	91	53
	40PFT6510/60	127	90	54
	40PFK6540/12	125	92	51
	40PFH6550/88	126	90	54
	40PFK6550/12	127	91	55
	40PFT6550/12	127	91	54
	40PFK6560/12	127	91	52
	40PFK6580/12	126	90	51
	48PFH5500/88	125	95	95
	48PFK5500/12	123	96	94
	48PFT5500/12	122	95	92
	50PUK6400/12	127	91	54
	50PFH6510/88	118	98	79
	50PFK6510/12	117	98	79
	50PFT6510/12	116	97	79
	50PFT6510/60	118	96	78
	50PFK6540/12	117	95	77
	50PFH6550/88	118	97	76
	50PFK6550/12	114	98	77
	50PFT6550/12	119	96	78
	50PFK6560/12	114	98	77
	50PFK6580/12	119	96	78
	55PFH5500/88	127	91	54
	55PFK5500/12	125	91	53
	55PFT5500/12	127	90	52
	55PUH6400/88	126	90	54
	55PUK6400/12	124	91	53
	55PUT6400/12	125	92	54
	55PFH6510/88	120	101	91
	55PFK6510/12	122	102	93
	55PFT6510/12	121	104	93
	55PFT6510/60	122	101	92
	55PFK6540/12	123	101	91
	55PFH6550/88	121	104	91
	55PFK6550/12	127	101	95
	55PFT6550/12	125	105	92
	55PFK6560/12	121	104	91
	55PFK6580/12	125	103	92
	65PFH6520/88	127	91	54
	65PFK6520/12	126	90	54
	65PFT6520/12	125	91	53
	65PFT6520/60	127	92	52

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

Note: The information of the RGB value is only for reference, the specific value is based on model adjustment.

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 MT5561 ICs is made known by the option codes.

Notes:

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

6.4.2 Option Code Overview

Enter SAM mode to check the option codes. they could be edited in the NVM.

6.4.3 Display Code Overview

Press the following key sequence on a standard RC transmitter: “062598” directly followed by MENU and “xxx”, where “xxx” is a 3 digit decimal value of the panel type: see column “Display Code” in [back to div.table 6-3](#). After resetting the Display Code, restart the set immediately.

Table 6-3 Display code overview

CTN ALT BOM#	Panel Type	Display Code
32PFH5500/88	TPT315B5-EUJFFE	211
32PFK5500/12	TPT315B5-EUJFFE	211
32PFT5500/12	TPT315B5-EUJFFE	211
32PFH6500/88	TPT315B5-EUJFFE S1M	221
32PFK6500/12	TPT315B5-EUJFFE S1M	221
32PFT6500/12	TPT315B5-EUJFFE S1M	221
32PFT6500/60	TPT315B5-EUJFFE S1M	221
39PFH5500/88	TPT400LA-J6PE1	212
39PFK5500/12	TPT400LA-J6PE1	212
39PFT5500/12	TPT400LA-J6PE1	212
40PFH5500/88	TPT400LA-HM10.S S01C	213
40PFH5500/88	TPT400LA-HN02.S SS01C	034
40PFK5500/12	TPT400LA-HM10.S S01C	213
40PFK5500/12	TPT400LA-HN02.S SS01C	034
40PFT5500/12	TPT400LA-HM10.S S01C	213
40PFT5500/12	TPT400LA-HN02.S SS01C	034
40PUK6400/12	TPT400LA-K1QS1.N	231
40PUK6400/12	TPT400UA-DJ1QS5.N SM1	035
40PUH6400/88	TPT400LA-K1QS1.N	231
40PUH6400/88	TPT400UA-DJ1QS5.N SM1	035
40PUT6400/12	TPT400LA-K1QS1.N	231
40PUT6400/12	TPT400UA-DJ1QS5.N SM1	035
40PUT6400/60	TPT400LA-K1QS1.N	231
40PUT6400/60	TPT400UA-DJ1QS5.N SM1	035
40PFH6510/88	TPT400LA-HF07.S	217
40PFK6510/12	TPT400LA-HF07.S	217
40PFT6510/12	TPT400LA-HF07.S	217
40PFT6510/60	TPT400LA-HF07.S	217
40PFK6540/12	TPT400LA-HF07.S	217
40PFH6550/88	TPT400LA-HF07.S	217
40PFK6550/12	TPT400LA-HF07.S	217
40PFT6550/12	TPT400LA-HF07.S	217
40PFK6560/12	TPT400LA-HF07.S	217
40PFK6580/12	TPT400LA-HF07.S	217

CTN_ALT BOM#	Panel Type	Display Code
48PFH5500/88	TPT480H2-HWU23.K	214
48PFH5500/88	TPT480LS-HN08.S	032
48PFK5500/12	TPT480H2-HWU23.K	214
48PFH5500/88	TPT480LS-HN08.S	032
48PFT5500/12	TPT480H2-HWU23.K	214
48PFH5500/88	TPT480LS-HN08.S	032
50PUK6400/12	TPT500DK-QS1 SC1H	232
50PUK6400/12	TPT500UK-DJ2QS5.N SM1A	036
50PUH6400/88	TPT500DK-QS1 SC1H	232
50PUH6400/88	TPT500UK-DJ2QS5.N SM1A	036
50PUT6400/12	TPT500DK-QS1 SC1H	232
50PUT6400/12	TPT500UK-DJ2QS5.N SM1A	036
50PUT6400/60	TPT500DK-QS1 SC1H	232
50PUT6400/60	TPT500UK-DJ2QS5.N SM1A	036
50PFH6510/88	TPT500J1-HVN08.A	218
50PFK6510/12	TPT500J1-HVN08.A	218
50PFT6510/12	TPT500J1-HVN08.A	218
50PFT6510/60	TPT500J1-HVN08.A	218
50PFK6540/12	TPT500J1-HVN08.A	218
50PFH6550/88	TPT500J1-HVN08.A	218
50PFK6550/12	TPT500J1-HVN08.A	218
50PFT6550/12	TPT500J1-HVN08.A	218
50PFK6560/12	TPT500J1-HVN08.A	218
50PFK6580/12	TPT500J1-HVN08.A	218
55PFH5500/88	TPT550J1-DUYSHA.G S1A	216
55PFH5500/88	TPT550J1-DUYSHA.G S1D	033
55PFK5500/12	TPT550J1-DUYSHA.G S1A	216
55PFK5500/12	TPT550J1-DUYSHA.G S1D	033
55PFT5500/12	TPT550J1-DUYSHA.G S1A	216
55PFT5500/12	TPT550J1-DUYSHA.G S1D	033
55PUH6400/88	TPT550J1-QVN03.U	233
55PUK6400/12	TPT550J1-QVN03.U	233
55PUT6400/12	TPT550J1-QVN03.U	233
55PFH6510/88	TPT550J1-HVN06.U	219
55PFK6510/12	TPT550J1-HVN06.U	219
55PFT6510/12	TPT550J1-HVN06.U	219
55PFT6510/60	TPT550J1-HVN06.U	219
55PFK6540/12	TPT550J1-HVN06.U	219
55PFH6550/88	TPT550J1-HVN06.U	219
55PFK6550/12	TPT550J1-HVN06.U	219
55PFT6550/12	TPT550J1-HVN06.U	219
55PFK6560/12	TPT550J1-HVN06.U	219
55PFK6580/12	TPT550J1-HVN06.U	219
65PFH6520/88	V650HP1-LS6 E8	220
65PFK6520/12	V650HP1-LS6 E8	220
65PFT6520/12	V650HP1-LS6 E8	220
65PFT6520/60	V650HP1-LS6 E8	220

6.5 Reset of Repaired SSB

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

A repaired SSB in Service should get the service Set type "00PF0000000000" and Production code "00000000000000". Also the virgin bit is to be set. To set all this, you can use the ComPair tool or use the "NVM editor" and "Dealer options" items in SAM (do not forget to "store").

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

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

Remark:

- After the NVM has been replaced, go to SAM and scroll to the <Reload MAC address> (see figure 1*).
- Select the item and press <OK> on the RC.

6.5.1 Reset of Repaired SSB

Instruction

After NVM replacement, reload MAC address via SAM menu. This ensures the correct MAC address to be available in CSM for future repair actions.

Way of working:

- After the NVM has been replaced, go to SAM and scroll to the <Reload MAC address> .
- Select the item and press <OK> on the RC.

Notes:

- Only applicable to all related models that are "**Smart TV level 0**" enabled (only YouTube access). For models without internet connection feature, **no action** is needed.
- HDCP keys are located in the NVM. If you are loading NVM with the ComPair tool, there is warning message displayed.

New NVM EEPROMs are shipped with pre-loaded HDCP keys.

6.5.2 SSB Identification

SSB's of this chassis are identified by a "715" code on the SSB. 715Axxxx-Nnn-MMM-O000

- **715** main category, Printed Wiring Board
- **Axxxx** sub category, sequential coding number
- **Nnn** Version code
 - **N** Development number
 - **nn** Production number
- **MMM** Mounting variation code
- **O000** Optional variation code

Make sure when replacing an SSB the SSB identification codes match the replacement panel.

6.6 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](#)
- [7.2 Power Supply](#)
- [7.3 DC/DC Converters](#)
- [7.4 Front-End Analogue and DVB-T/T2, DVB-C, DVB S/S2, ISDB-T reception](#)
- [7.5 HDMI](#)
- [7.6 Video and Audio Processing - MT5593F/H/UPIJ](#)

Notes:

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

7.1 Introduction

The QM15.2E LA is a new chassis launched in Europe in 2015. The whole range is covered by MT5593.

The major deltas versus its predecessor support NTSC; PAL-M; PAL-N; DVB-T/T2/S2/C AND ISDB-T with also multi-media, CEC, ARC, MHL, USB 3.0, WIFI, smart TV functionality.

The QM15.2E LA chassis comes with the following stylings:

- series xxPFH5500xx
- series xxPFK5500xx
- series xxPFT5500xx
- series xxPFx65xx
- series xxPUx6400xx

7.1.1 Implementation

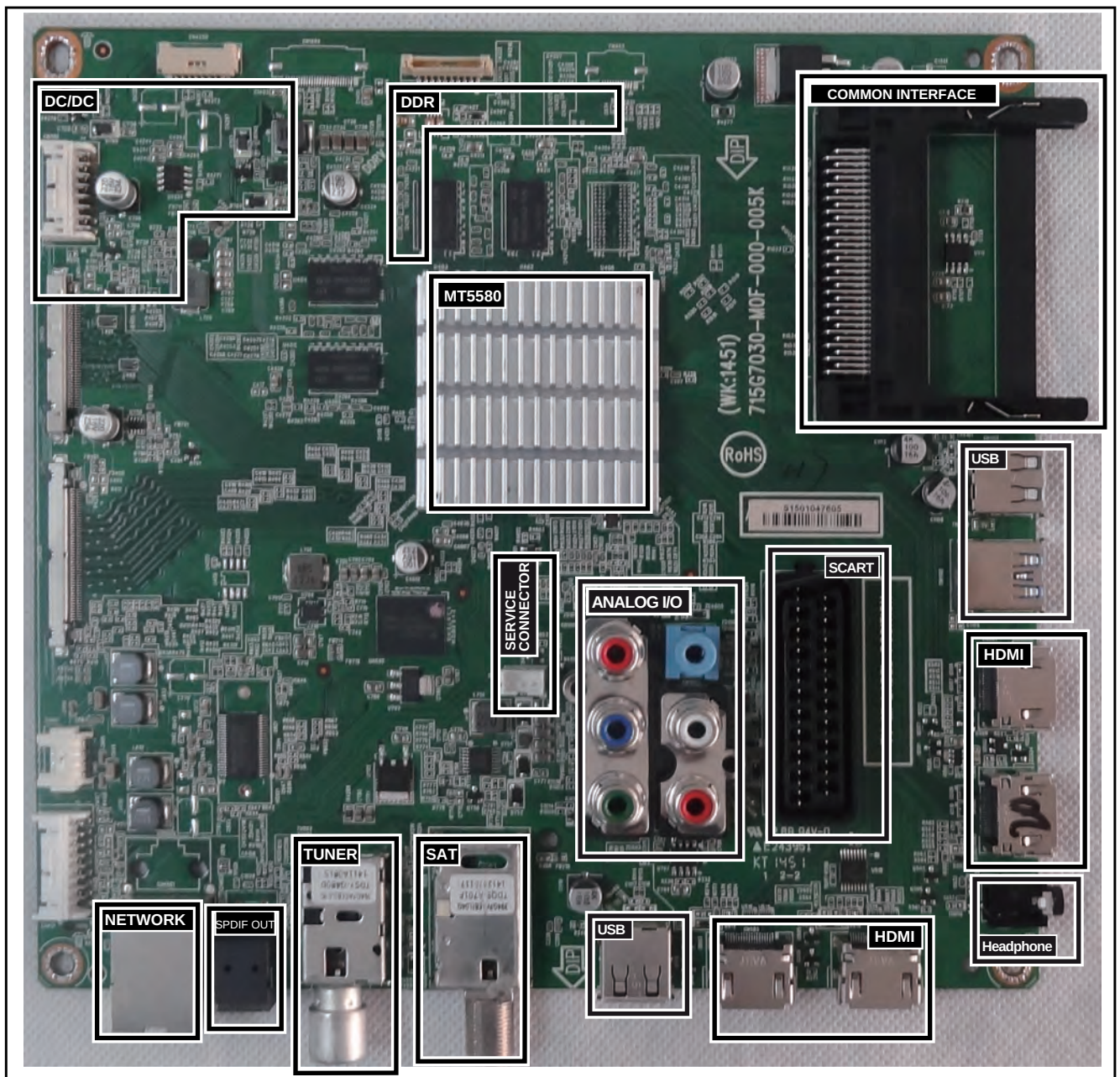
Key components of this chassis are:

- SCALER MT5593F/H/UPIJ HSBGA-900
- FLASH THGBMBG6D1KBAIL 8GB FBGA153
- DRAM K4B2G1646Q-BCMA 2Gb FBGA-96
- DRAM K4B4G1646D-BCMA 4Gb FBGA-96
- DRAM NT5CB256M16CP-EK 4Gb FBGA-96
- TUNER EUROPE TDSY-G480D
- TUNER EUROPE TDQS-A701F only for K series
- DEMODULATOR Si2168-C50-GMR QFN-48 for T series
- DEMODULATOR Si2166-B22-GM QFN48 for K series
- AUDIO Amplifier. TAS5760LDDCAR 20W TSSOP-48

7.1.2 QM15.2E LA Architecture Overview

For details about the chassis block diagrams refer to [9. Block Diagrams](#). An overview architecture can be found in [Figure 9.1](#).

7.1.3 SSB Cell Layout



19880_200.eps

Figure 7-1 SSB layout cells (top view)

7.2 Power Supply

Refer to figure [Figure 7-2](#) for the power architecture of this platform.

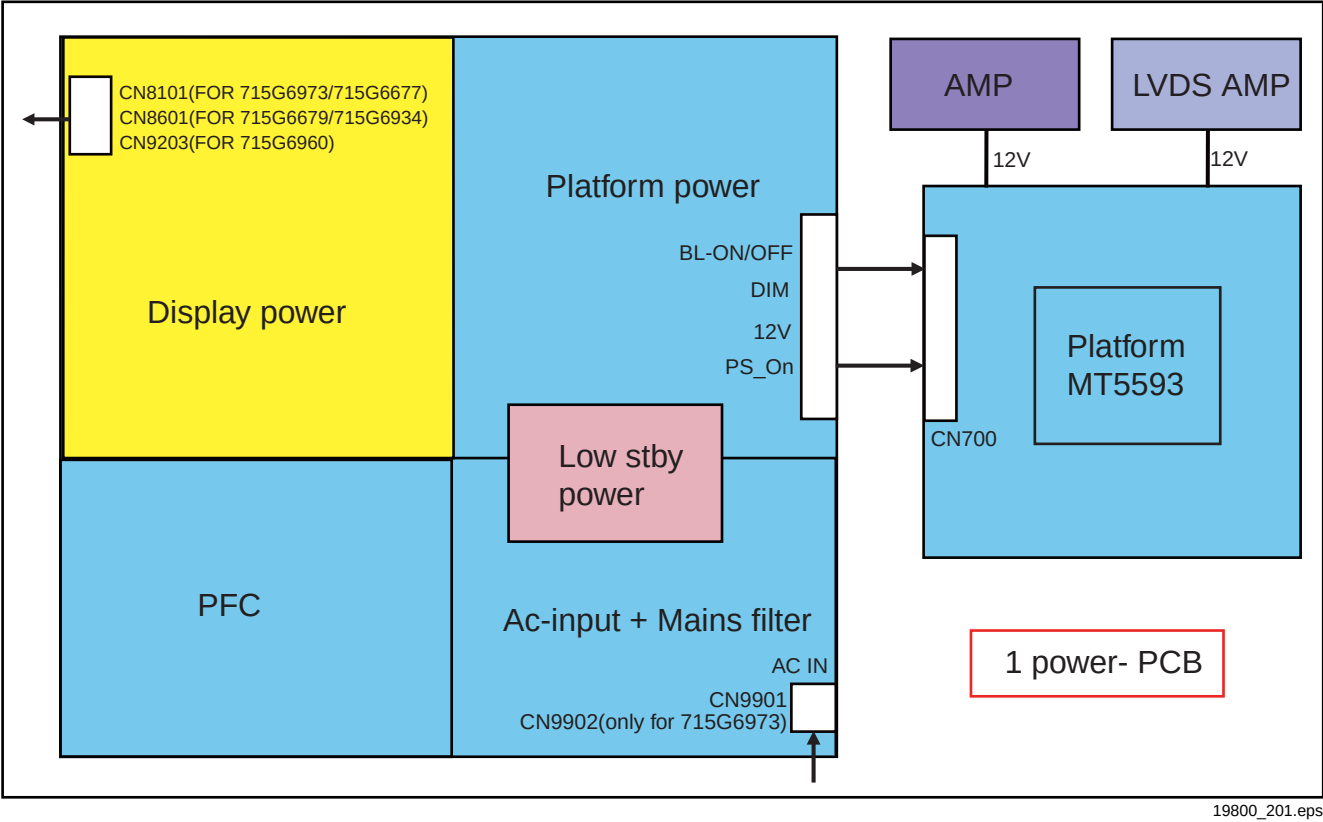


Figure 7-2 Power Architecture

7.2.1 Power Supply Unit

All power supplies are a black box for Service. When defective, a new board must be ordered and the defective one must be returned, unless the main fuse of the board is broken. Always replace a defective fuse with one with the correct specifications! This part is available in the regular market. Consult the Philips Service web portal for the order codes of the boards.

Important delta's with the QM15.2E LA classis platform are:

- New power architecture for LED backlight
- "Boost"-signal is now a PWM-signal + continuous variable.

The control signals are:

- Stand-by
- Lamp "on/off"
- DIM (PWM) (not for PSDL)

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

The output voltages to the chassis are:

- +3.5/8.5V output (standby mode) for 32"
- +3.5V output (standby mode) for 32/39/40"/65"
- +3.6V/8.5V/12V output (standby mode) for 48"
- +3.65V output (standby mode) for 50"/55"
- +12 output (on-mode) for all model
- +3.5~3.6V output(on-mode) for 39/40/48/55"
- +12V_audio (audio AMP power)
- +24V (the power supply for driver board)for 65
- 31.5V(bolt-on voltage) for 39/40"
- 37.4V(bolt-on voltage) for 48"
- Output to the display; in case of
 - IPB: High voltage to the LCD panel

- PSL and PSLS (LED-driver outputs)
- PSDL (high frequent) AC-current.

7.2.2 Diversity

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

- The following displays can be distinguished:
- CCFL/EEFL backlight: power panel is conventional IPB
 - LED backlight:
 - side-view LED without scanning: PSL power panel
 - side-view LED with scanning: PSLS power panel
 - direct-view LED without 2D-dimming: PSL power panel
 - direct-view LED with 2D-dimming: PSDL power panel.

PSL stands for **P**ower **S**upply with integrated **L**ED-drivers.
PSLS stands for a **P**ower **S**upply with integrated **L**ED-drivers with added **S**canning functionality (added microcontroller).
PSDL stands for a **P**ower **S**upply for **D**irect-view **L**ED backlight with 2D-dimming.

7.2.3 Connector overview

Table 7-1 Connector overview

Number	Connector									
	CN9101	CN8601	CN9101	CN8601	CN9101	CN8101	CN9303	CN8101	CN9102	CN9203
Description	to SSB	to panel	to SSB	to panel	to SSB	to panel	to SSB	to panel	to SSB	to panel
Pin	16	6	16	12	14	12	16	12	16	14
1	DIM	VLED+	DIM	VLED+	DIM	+VLED	DIM	VLED+	+3.5V	On/off
2	On/off	VLED+	On/off	n.c.	On/off	n.c.	BL_ON/OFF	n.c.	+3.5V	DIM
3	PS_ON	n.c.	PS_ON	VLED-	PS_ON	-VLED1	PS_ON	-VLED-1	+12V	3D
4	n.c.	n.c.	2D/3D	VLED-	3D_ON	-LED1	3D_ON	-VLED-1	+12V	+12V
5	GND	VLED-	GND	VLED-	GND	-LED1	GND	-VLED-1	+12V	GND
6	GND	VLED-	GND	n.c.	GND	n.c.	GND	n.c.	+12V	GND
7	GND	-	GND	n.c.	GND	n.c.	GND	n.c.	+12V-A	GND
8	GND	-	GND	VLED-	GND	-LED2	GND	-VLED-2	+12V-A	GND
9	+12V-AUDIO	-	+12V-AUDIO	VLED-	+12V-A	-LED2	+12V-A	-VLED-2	GND	GND
10	+12V-AUDIO	-	+12V-AUDIO	VLED-	+12V-A	-LED2	+12V-A	-VLED-2	GND	+24V
11	+12V	-	+12V	n.c.	+12V	n.c.	+12V	n.c.	GND	+24V
12	+12V	-	+12V	VLED+	+12V	+VLED	+12V	+VLED	GND	+24V
13	+12V_AL	-	+12V	-	+12V	-	+12V	-	3D_ON	+24V
14	+12V_AL	-	+12V	-	+12V	-	+12V	-	PS_ON	+24V
15	+3.5/+5v	-	+3.5/+5v	-	-	-	+3.5/+5v	-	On/off	-
16	+3.5/+5v	-	+3.5/+5v	-	-	-	+3.5/+5v	-	DIM	-

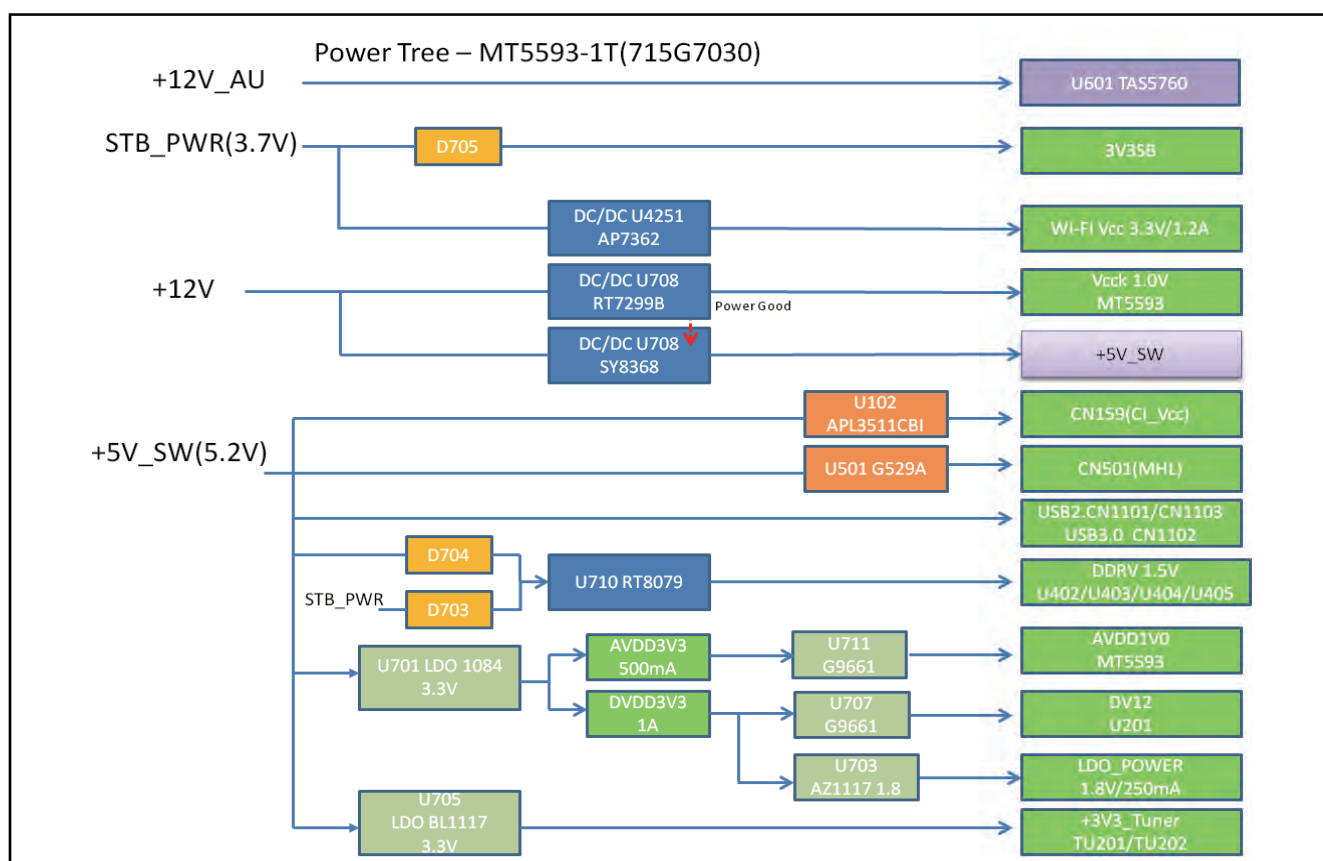
7.3 DC/DC Converters

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

- +STB_PWR, permanent voltage for the Stand-by Power system and WIFI.
- +3V3SB, voltage for scaler, EMMC, IR/LED receiver, Key board
- +12V, input from the power supply for the panel common(active mode)
- +12V, input from the power supply for LNB supply
- LDO_PWR, DVDD3V3, voltage for EMMC when TV on
- DDRV, VCC, voltage for DDR
- AVD3V3, AVDD1V0, supply voltage for scaler MT5593

- +5V_SW, USB port supply voltage
- +3V3_TUNER, supply voltage for tuner
- +5V-USB, input intermediate supply voltage for USB Power
- PVDD from the power +12V_AU for the AUDIO AMP
- DV12, +3.3V_T2, +3.3VA_T2 voltage for Demodulator IC channel
- Wi-Fi_VCC, voltage for WIFI

Figures gives a graphical representation of the DC/DC converters with its current consumptions :



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Figure 7-3 DC/DC converters

7.4 Front-End Analogue and DVB-T/T2, DVB-C; DVB S/S2, ISDB-T reception

7.4.1 Front-End Analogue and DVB T/C reception

The Front-End for analogue tuner consist of the following key components:

- TUNER EUROPE TDSY-G480D
- TUNER EUROPE TDQS-A701F only for K series
- SCALER MT5593F/H/UIPJ HSBGA-900 Processor

Below find a block diagram of the front-end application for analogue part.

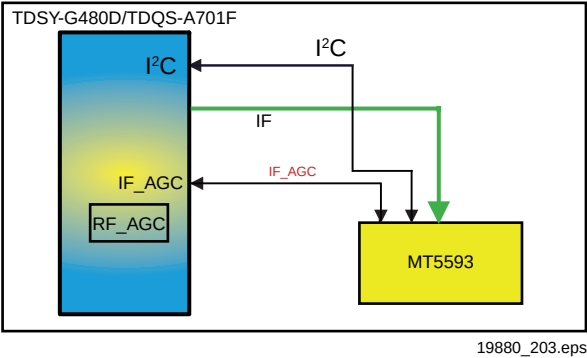


Figure 7-4 Front-End Analogue block diagram

7.4.2 DTV T2 reception

The Front-End for DVT part consist of the following key components:

- TUNER EUROPE TDSY-G480D
- SCALER MT5593F/H/UIPJ HSBGA-900 Processor
- DEMODULATOR Si2168-C50-GMR QFN-48 for T series

Below find a block diagram of the front-end application for DTV part.

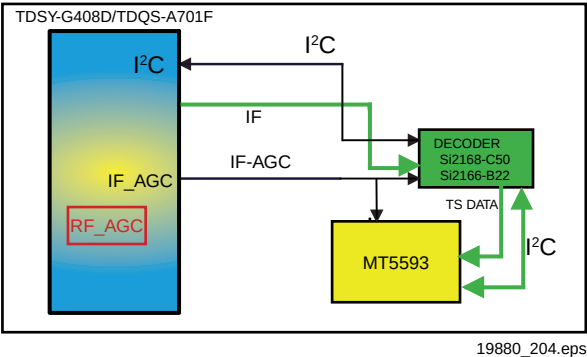


Figure 7-5 Front-End DVB-T2 DTV block diagram

7.4.3 Front-End DTV-S2 reception

The Front-End for ISTB part consist of the following key components:

- TUNER EUROPE TDQS-A701F for K series
- SCALER MT5593F/H/UIPJ HSBGA-900 Processor
- DEMODULATOR Si2166-B22-GM QFN48 for K series

Below find a block diagram of the front-end application for DTV part.

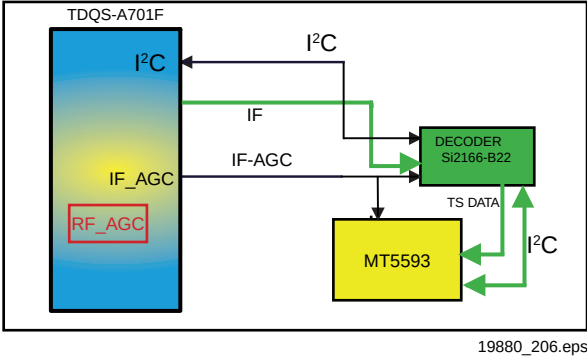


Figure 7-6 Front-End S2 DTV block diagram

7.5 HDMI

Refer to figure [7-7 HDMI input configuration](#) for the application.

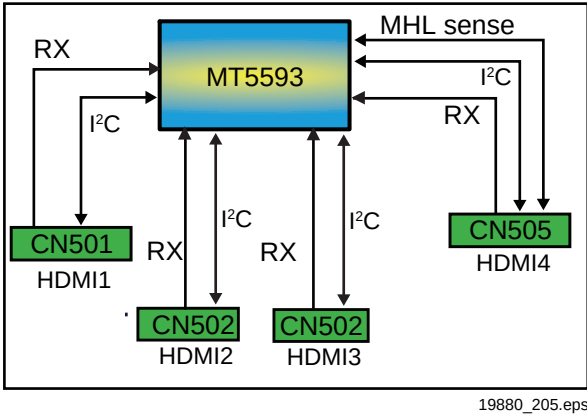


Figure 7-7 HDMI input configuration

- The following HDMI connector can be used:
- HDMI 1: HDMI input (TV digital interface support HDMI1.4/HDCP1.3) with digital audio/PC DVI input/ARC
 - HDMI 2: HDMI input (TV digital interface support HDCP) with digital audio/PC DVI input/ARC
 - HDMI 3: HDMI input (TV digital interface support HDMI1.4/HDCP1.3) with digital audio/PC DVI input/ARC
 - HDMI 4: HDMI input (TV digital interface support HDMI1.4/HDCP1.3) with digital audio/PC DVI input/ARC
 - +5V detection mechanism
 - Stable clock detection mechanism
 - MHL 2.0 function only for HDMI4
 - Audio return channel(ARC)
 - HPD control
 - CEC control

7.6 Video and Audio Processing - MT5593F/H/UIPJ

The MT5593F/H/UIPJ is the main audio and video processor (or System-on-Chip) for this platform. It has the following features:

- ATSC /DVB-T /DVB-C/DTMB demodulators
- Ture 120HZ Full HD MJC
- Power CPU core
- 3D graphic support OpenGL ES 1.1/2.0
- A multi-standard video decoder
- A transport de-multiplexer
- One HDMI 2.0 receiver with 3D support
- MHL2.0& Standby charging
- 2D/3D converter
- Rich format audio codec
- Local dimming (LED backlight)

- Ethernet MAC+PHY
- TCON
- Panel overdrive control
- Four-link LVDS, mini-LVDS, V-by-one, EPI

The MT5593F/H/UPIJ family consists of a DTV front-end demodulator, a backend decoder and a TV controller and offers high integration for advanced applications. It integrates a transport de-multiplexer, a high definition video decoder, an audio decoder, a four-link LVDS transmitter, a mini-LVDS transmitter, a V-by-one transmitter, an EPI transmitter, and an NTSC/PAL/SECAM TV decoder with 3D comb filter(NTSC/PAL).

The MT5593FPIJ enables consumer electronics manufacturers to build high quality, low cost and feature-rich DTV.

The MT5593P/H/UFIJ family supports Full-HD MPEG1/2/4/H.264/VC1/RM/AVS/ and H.264/HEVC video decoder standards, and JPEG. The MT5593FPIJ also supports Media Tek MDDi de-interlace solution which can reach very smooth picture quality for motions. A 3D comb filter added to the TV decoder recovers great details for still pictures. The special color processing technology provides a natural, deep colors and true studio quality video. Moreover, the MT5593 family has built-in high resolution and high-quality audio codec. The MT5593F/H/UPIJ family provides consumers with and Full-HD 120Hz experience. It integrates high-quality Full-HD ME/MC technology.

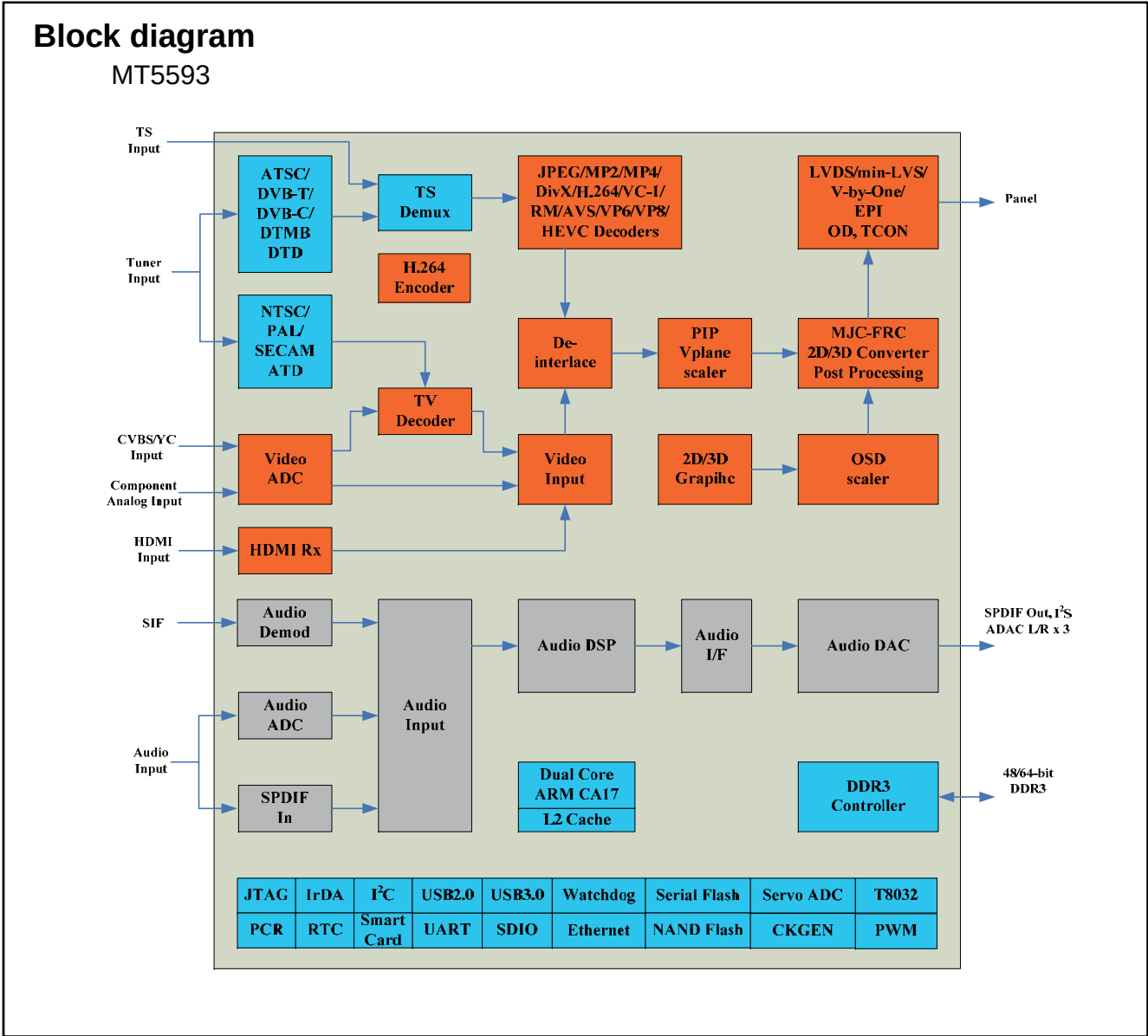
The MT5593F/H/UPIJ family supports ASTC,DVB-T and DVB-C,DTMB demodulation functions. It reserves transport stream inputs for external demodulators for other countries or areas.TV maker can easily port the same UI to worldwide TV models. First-class adjacent and co-channel rejection capability grants excellent reception. Professional error-concealment provides stable, smooth and mosaic-free video quality

For a functional diagram of the MT5593F/H/UPIJ, refer to [Figure 8-1](#).

8. IC Data Sheets

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

8.1 Diagram [10-6-3 Peripheral](#), B03, MT5593 (IC U401)



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Figure 8-1 Internal block diagram

Pinning Information

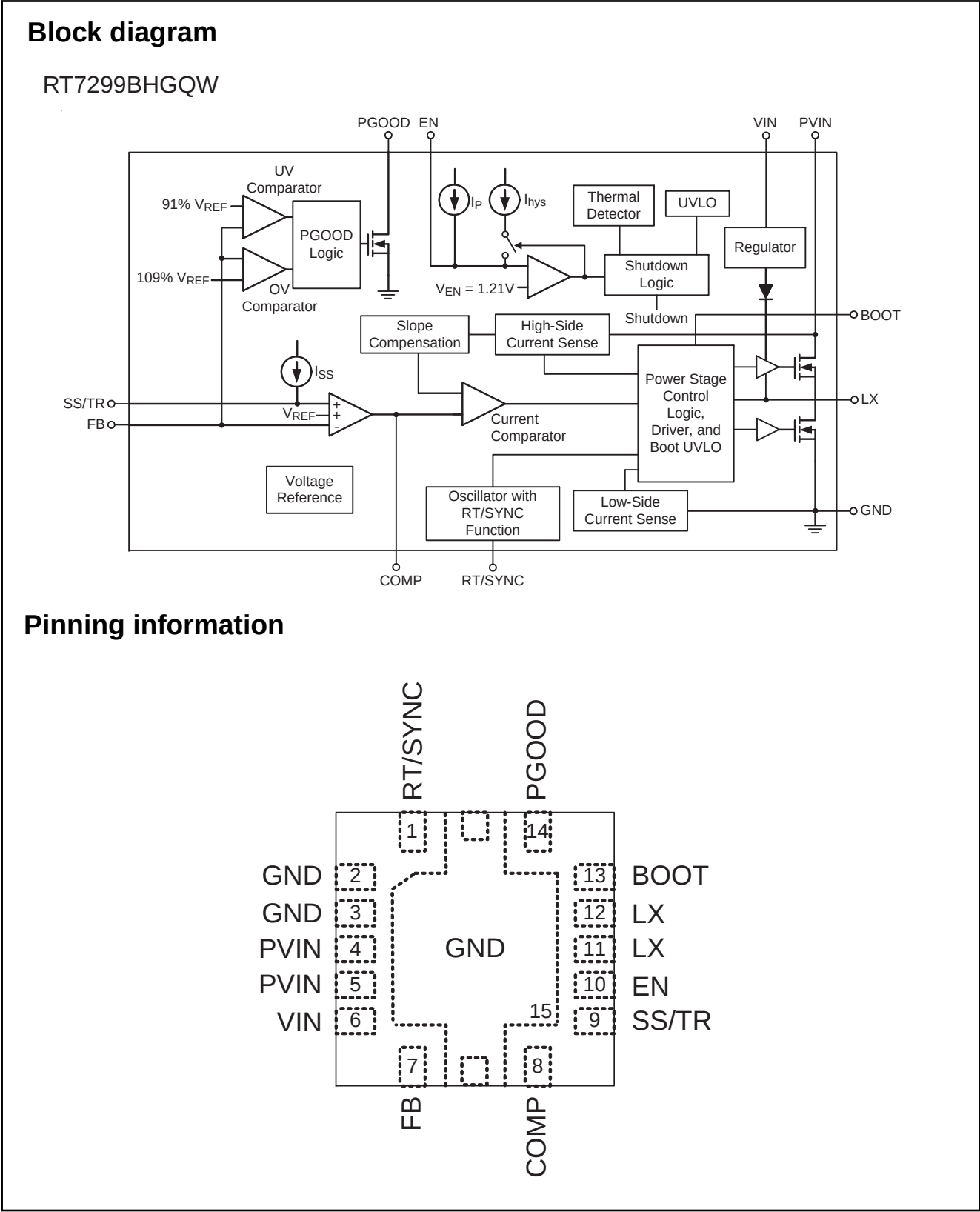
MT5593

Pin	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	38	
A	NC	CL_A1	CL_A2	CL_A3	CL_A4	CL_A5	CL_A6	CL_A7	CL_A8	CL_A9	CL_A10	CL_A11	CL_A12	CL_A13	CL_A14	CL_A15	CL_A16	CL_A17	CL_A18	CL_A19	CL_A20	CL_A21	CL_A22	CL_A23	CL_A24	CL_A25	CL_A26	CL_A27	CL_A28	CL_A29	CL_A30	CL_A31	CL_A32	CL_A33	CL_A34	CL_A35	CL_A36	CL_A37	CL_A38
B	CL_B1	CL_B2	CL_B3	CL_B4	CL_B5	CL_B6	CL_B7	CL_B8	CL_B9	CL_B10	CL_B11	CL_B12	CL_B13	CL_B14	CL_B15	CL_B16	CL_B17	CL_B18	CL_B19	CL_B20	CL_B21	CL_B22	CL_B23	CL_B24	CL_B25	CL_B26	CL_B27	CL_B28	CL_B29	CL_B30	CL_B31	CL_B32	CL_B33	CL_B34	CL_B35	CL_B36	CL_B37	CL_B38	
C	CL_C1	CL_C2	CL_C3	CL_C4	CL_C5	CL_C6	CL_C7	CL_C8	CL_C9	CL_C10	CL_C11	CL_C12	CL_C13	CL_C14	CL_C15	CL_C16	CL_C17	CL_C18	CL_C19	CL_C20	CL_C21	CL_C22	CL_C23	CL_C24	CL_C25	CL_C26	CL_C27	CL_C28	CL_C29	CL_C30	CL_C31	CL_C32	CL_C33	CL_C34	CL_C35	CL_C36	CL_C37	CL_C38	
D	CL_D1	CL_D2	CL_D3	CL_D4	CL_D5	CL_D6	CL_D7	CL_D8	CL_D9	CL_D10	CL_D11	CL_D12	CL_D13	CL_D14	CL_D15	CL_D16	CL_D17	CL_D18	CL_D19	CL_D20	CL_D21	CL_D22	CL_D23	CL_D24	CL_D25	CL_D26	CL_D27	CL_D28	CL_D29	CL_D30	CL_D31	CL_D32	CL_D33	CL_D34	CL_D35	CL_D36	CL_D37	CL_D38	
E	CL_E1	CL_E2	CL_E3	CL_E4	CL_E5	CL_E6	CL_E7	CL_E8	CL_E9	CL_E10	CL_E11	CL_E12	CL_E13	CL_E14	CL_E15	CL_E16	CL_E17	CL_E18	CL_E19	CL_E20	CL_E21	CL_E22	CL_E23	CL_E24	CL_E25	CL_E26	CL_E27	CL_E28	CL_E29	CL_E30	CL_E31	CL_E32	CL_E33	CL_E34	CL_E35	CL_E36	CL_E37	CL_E38	
F	CL_F1	CL_F2	CL_F3	CL_F4	CL_F5	CL_F6	CL_F7	CL_F8	CL_F9	CL_F10	CL_F11	CL_F12	CL_F13	CL_F14	CL_F15	CL_F16	CL_F17	CL_F18	CL_F19	CL_F20	CL_F21	CL_F22	CL_F23	CL_F24	CL_F25	CL_F26	CL_F27	CL_F28	CL_F29	CL_F30	CL_F31	CL_F32	CL_F33	CL_F34	CL_F35	CL_F36	CL_F37	CL_F38	
G	CL_G1	CL_G2	CL_G3	CL_G4	CL_G5	CL_G6	CL_G7	CL_G8	CL_G9	CL_G10	CL_G11	CL_G12	CL_G13	CL_G14	CL_G15	CL_G16	CL_G17	CL_G18	CL_G19	CL_G20	CL_G21	CL_G22	CL_G23	CL_G24	CL_G25	CL_G26	CL_G27	CL_G28	CL_G29	CL_G30	CL_G31	CL_G32	CL_G33	CL_G34	CL_G35	CL_G36	CL_G37	CL_G38	
H	CL_H1	CL_H2	CL_H3	CL_H4	CL_H5	CL_H6	CL_H7	CL_H8	CL_H9	CL_H10	CL_H11	CL_H12	CL_H13	CL_H14	CL_H15	CL_H16	CL_H17	CL_H18	CL_H19	CL_H20	CL_H21	CL_H22	CL_H23	CL_H24	CL_H25	CL_H26	CL_H27	CL_H28	CL_H29	CL_H30	CL_H31	CL_H32	CL_H33	CL_H34	CL_H35	CL_H36	CL_H37	CL_H38	
I	CL_I1	CL_I2	CL_I3	CL_I4	CL_I5	CL_I6	CL_I7	CL_I8	CL_I9	CL_I10	CL_I11	CL_I12	CL_I13	CL_I14	CL_I15	CL_I16	CL_I17	CL_I18	CL_I19	CL_I20	CL_I21	CL_I22	CL_I23	CL_I24	CL_I25	CL_I26	CL_I27	CL_I28	CL_I29	CL_I30	CL_I31	CL_I32	CL_I33	CL_I34	CL_I35	CL_I36	CL_I37	CL_I38	
J	CL_J1	CL_J2	CL_J3	CL_J4	CL_J5	CL_J6	CL_J7	CL_J8	CL_J9	CL_J10	CL_J11	CL_J12	CL_J13	CL_J14	CL_J15	CL_J16	CL_J17	CL_J18	CL_J19	CL_J20	CL_J21	CL_J22	CL_J23	CL_J24	CL_J25	CL_J26	CL_J27	CL_J28	CL_J29	CL_J30	CL_J31	CL_J32	CL_J33	CL_J34	CL_J35	CL_J36	CL_J37	CL_J38	
K	CL_K1	CL_K2	CL_K3	CL_K4	CL_K5	CL_K6	CL_K7	CL_K8	CL_K9	CL_K10	CL_K11	CL_K12	CL_K13	CL_K14	CL_K15	CL_K16	CL_K17	CL_K18	CL_K19	CL_K20	CL_K21	CL_K22	CL_K23	CL_K24	CL_K25	CL_K26	CL_K27	CL_K28	CL_K29	CL_K30	CL_K31	CL_K32	CL_K33	CL_K34	CL_K35	CL_K36	CL_K37	CL_K38	
L	CL_L1	CL_L2	CL_L3	CL_L4	CL_L5	CL_L6	CL_L7	CL_L8	CL_L9	CL_L10	CL_L11	CL_L12	CL_L13	CL_L14	CL_L15	CL_L16	CL_L17	CL_L18	CL_L19	CL_L20	CL_L21	CL_L22	CL_L23	CL_L24	CL_L25	CL_L26	CL_L27	CL_L28	CL_L29	CL_L30	CL_L31	CL_L32	CL_L33	CL_L34	CL_L35	CL_L36	CL_L37	CL_L38	
M	CL_M1	CL_M2	CL_M3	CL_M4	CL_M5	CL_M6	CL_M7	CL_M8	CL_M9	CL_M10	CL_M11	CL_M12	CL_M13	CL_M14	CL_M15	CL_M16	CL_M17	CL_M18	CL_M19	CL_M20	CL_M21	CL_M22	CL_M23	CL_M24	CL_M25	CL_M26	CL_M27	CL_M28	CL_M29	CL_M30	CL_M31	CL_M32	CL_M33	CL_M34	CL_M35	CL_M36	CL_M37	CL_M38	
N	CL_N1	CL_N2	CL_N3	CL_N4	CL_N5	CL_N6	CL_N7	CL_N8	CL_N9	CL_N10	CL_N11	CL_N12	CL_N13	CL_N14	CL_N15	CL_N16	CL_N17	CL_N18	CL_N19	CL_N20	CL_N21	CL_N22	CL_N23	CL_N24	CL_N25	CL_N26	CL_N27	CL_N28	CL_N29	CL_N30	CL_N31	CL_N32	CL_N33	CL_N34	CL_N35	CL_N36	CL_N37	CL_N38	
O	CL_O1	CL_O2	CL_O3	CL_O4	CL_O5	CL_O6	CL_O7	CL_O8	CL_O9	CL_O10	CL_O11	CL_O12	CL_O13	CL_O14	CL_O15	CL_O16	CL_O17	CL_O18	CL_O19	CL_O20	CL_O21	CL_O22	CL_O23	CL_O24	CL_O25	CL_O26	CL_O27	CL_O28	CL_O29	CL_O30	CL_O31	CL_O32	CL_O33	CL_O34	CL_O35	CL_O36	CL_O37	CL_O38	
P	CL_P1	CL_P2	CL_P3	CL_P4	CL_P5	CL_P6	CL_P7	CL_P8	CL_P9	CL_P10	CL_P11	CL_P12	CL_P13	CL_P14	CL_P15	CL_P16	CL_P17	CL_P18	CL_P19	CL_P20	CL_P21	CL_P22	CL_P23	CL_P24	CL_P25	CL_P26	CL_P27	CL_P28	CL_P29	CL_P30	CL_P31	CL_P32	CL_P33	CL_P34	CL_P35	CL_P36	CL_P37	CL_P38	
Q	CL_Q1	CL_Q2	CL_Q3	CL_Q4	CL_Q5	CL_Q6	CL_Q7	CL_Q8	CL_Q9	CL_Q10	CL_Q11	CL_Q12	CL_Q13	CL_Q14	CL_Q15	CL_Q16	CL_Q17	CL_Q18	CL_Q19	CL_Q20	CL_Q21	CL_Q22	CL_Q23	CL_Q24	CL_Q25	CL_Q26	CL_Q27	CL_Q28	CL_Q29	CL_Q30	CL_Q31	CL_Q32	CL_Q33	CL_Q34	CL_Q35	CL_Q36	CL_Q37	CL_Q38	
R	CL_R1	CL_R2	CL_R3	CL_R4	CL_R5	CL_R6	CL_R7	CL_R8	CL_R9	CL_R10	CL_R11	CL_R12	CL_R13	CL_R14	CL_R15	CL_R16	CL_R17	CL_R18	CL_R19	CL_R20	CL_R21	CL_R22	CL_R23	CL_R24	CL_R25	CL_R26	CL_R27	CL_R28	CL_R29	CL_R30	CL_R31	CL_R32	CL_R33	CL_R34	CL_R35	CL_R36	CL_R37	CL_R38	
S	CL_S1	CL_S2	CL_S3	CL_S4	CL_S5	CL_S6	CL_S7	CL_S8	CL_S9	CL_S10	CL_S11	CL_S12	CL_S13	CL_S14	CL_S15	CL_S16	CL_S17	CL_S18	CL_S19	CL_S20	CL_S21	CL_S22	CL_S23	CL_S24	CL_S25	CL_S26	CL_S27	CL_S28	CL_S29	CL_S30	CL_S31	CL_S32	CL_S33	CL_S34	CL_S35	CL_S36	CL_S37	CL_S38	
T	CL_T1	CL_T2	CL_T3	CL_T4	CL_T5	CL_T6	CL_T7	CL_T8	CL_T9	CL_T10	CL_T11	CL_T12	CL_T13	CL_T14	CL_T15	CL_T16	CL_T17	CL_T18	CL_T19	CL_T20	CL_T21	CL_T22	CL_T23	CL_T24	CL_T25	CL_T26	CL_T27	CL_T28	CL_T29	CL_T30	CL_T31	CL_T32	CL_T33	CL_T34	CL_T35	CL_T36	CL_T37	CL_T38	
U	CL_U1	CL_U2	CL_U3	CL_U4	CL_U5	CL_U6	CL_U7	CL_U8	CL_U9	CL_U10	CL_U11	CL_U12	CL_U13	CL_U14	CL_U15	CL_U16	CL_U17	CL_U18	CL_U19	CL_U20	CL_U21	CL_U22	CL_U23	CL_U24	CL_U25	CL_U26	CL_U27	CL_U28	CL_U29	CL_U30	CL_U31	CL_U32	CL_U33	CL_U34	CL_U35	CL_U36	CL_U37	CL_U38	
V	CL_V1	CL_V2	CL_V3	CL_V4	CL_V5	CL_V6	CL_V7	CL_V8	CL_V9	CL_V10	CL_V11	CL_V12	CL_V13	CL_V14	CL_V15	CL_V16	CL_V17	CL_V18	CL_V19	CL_V20	CL_V21	CL_V22	CL_V23	CL_V24	CL_V25	CL_V26	CL_V27	CL_V28	CL_V29	CL_V30	CL_V31	CL_V32	CL_V33	CL_V34	CL_V35	CL_V36	CL_V37	CL_V38	
W	CL_W1	CL_W2	CL_W3	CL_W4	CL_W5	CL_W6	CL_W7	CL_W8	CL_W9	CL_W10	CL_W11	CL_W12	CL_W13	CL_W14	CL_W15	CL_W16	CL_W17	CL_W18	CL_W19	CL_W20	CL_W21	CL_W22	CL_W23	CL_W24	CL_W25	CL_W26	CL_W27	CL_W28	CL_W29	CL_W30	CL_W31	CL_W32	CL_W33	CL_W34	CL_W35	CL_W36	CL_W37	CL_W38	
X	CL_X1	CL_X2	CL_X3	CL_X4	CL_X5	CL_X6	CL_X7	CL_X8	CL_X9	CL_X10	CL_X11	CL_X12	CL_X13	CL_X14	CL_X15	CL_X16	CL_X17	CL_X18	CL_X19	CL_X20	CL_X21	CL_X22	CL_X23	CL_X24	CL_X25	CL_X26	CL_X27	CL_X28	CL_X29	CL_X30	CL_X31	CL_X32	CL_X33	CL_X34	CL_X35	CL_X36	CL_X37	CL_X38	
Y	CL_Y1	CL_Y2	CL_Y3	CL_Y4	CL_Y5	CL_Y6	CL_Y7	CL_Y8	CL_Y9	CL_Y10	CL_Y11	CL_Y12	CL_Y13	CL_Y14	CL_Y15	CL_Y16	CL_Y17	CL_Y18	CL_Y19	CL_Y20	CL_Y21	CL_Y22	CL_Y23	CL_Y24	CL_Y25	CL_Y26	CL_Y27	CL_Y28	CL_Y29	CL_Y30	CL_Y31	CL_Y32	CL_Y33	CL_Y34	CL_Y35	CL_Y36	CL_Y37	CL_Y38	
Z	CL_Z1	CL_Z2	CL_Z3	CL_Z4	CL_Z5	CL_Z6	CL_Z7	CL_Z8	CL_Z9	CL_Z10	CL_Z11	CL_Z12	CL_Z13	CL_Z14	CL_Z15	CL_Z16	CL_Z17	CL_Z18	CL_Z19	CL_Z20	CL_Z21	CL_Z22	CL_Z23	CL_Z24	CL_Z25	CL_Z26	CL_Z27	CL_Z28	CL_Z29	CL_Z30	CL_Z31	CL_Z32	CL_Z33	CL_Z34	CL_Z35	CL_Z36	CL_Z37	CL_Z38	

19880_301.eps

Figure 8-2 Internal pin configuration

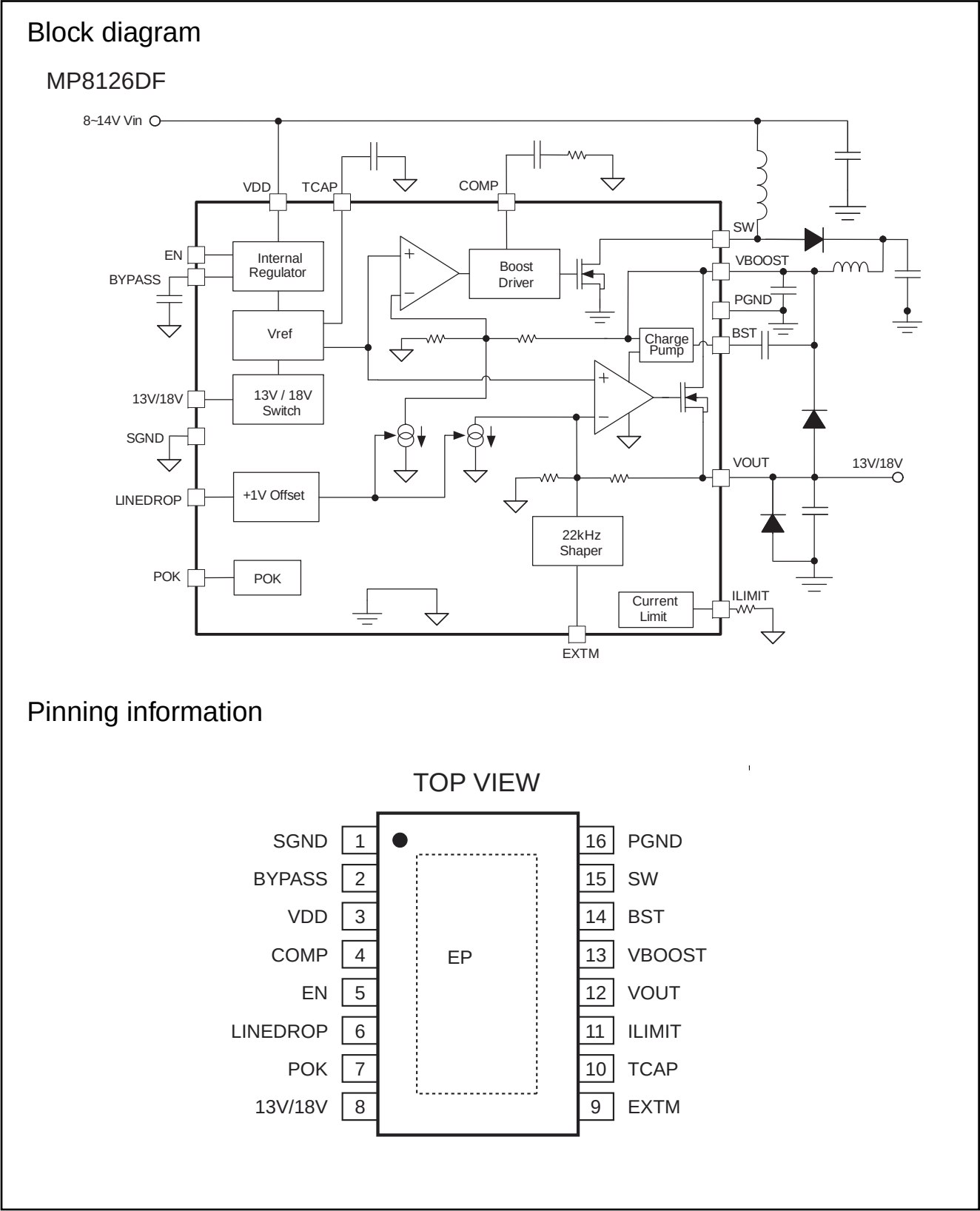
8.2 Diagram [10-6-1 System Power 1](#), B01, RT7299BHGQW (IC U704)



19880_302.eps

Figure 8-3 Internal block diagram and pin configuration

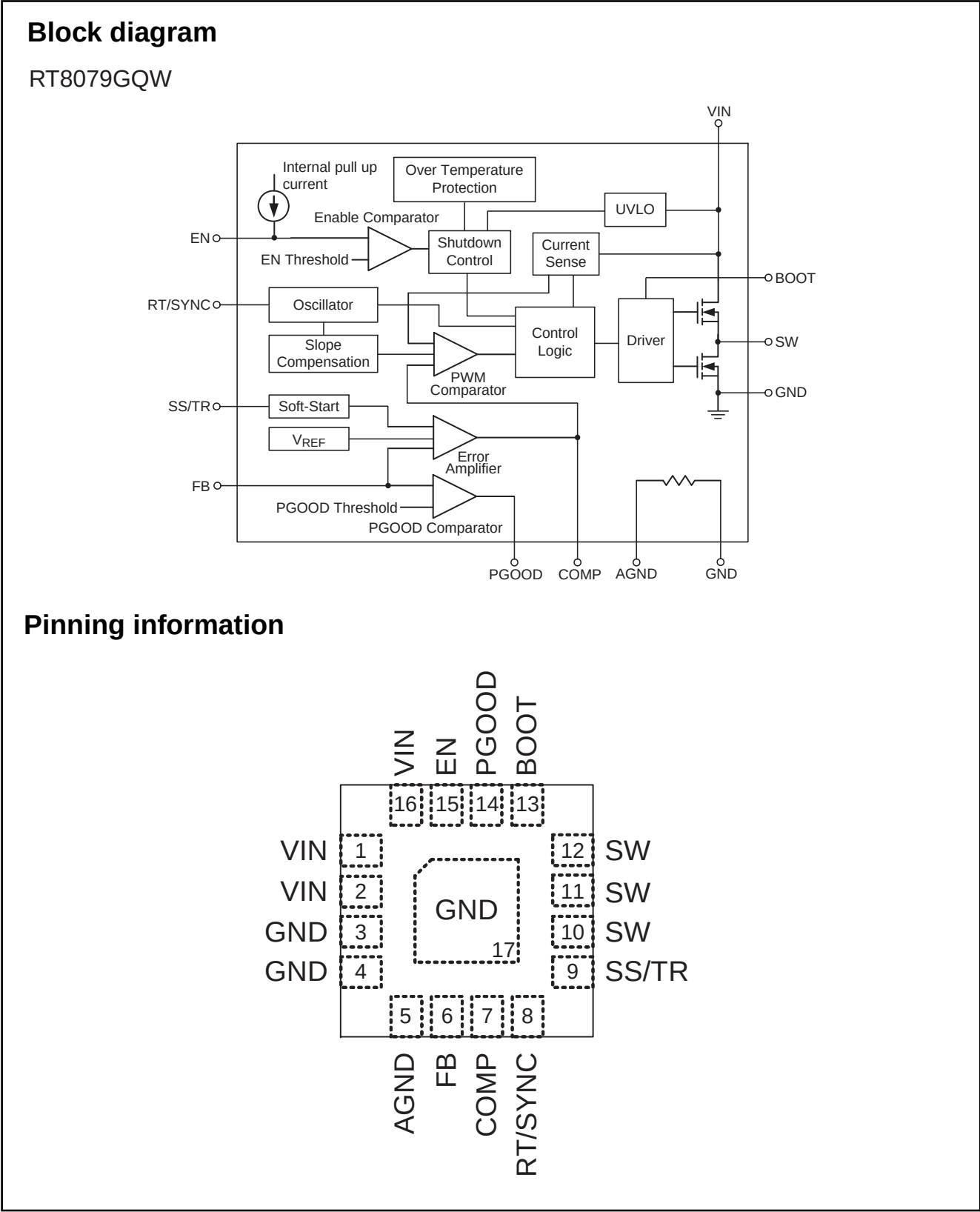
8.3 Diagram 10-6-2 System Power 2, B02, MP8126DF (IC U202)



19790_304.eps

Figure 8-4 Internal block diagram and pin configuration

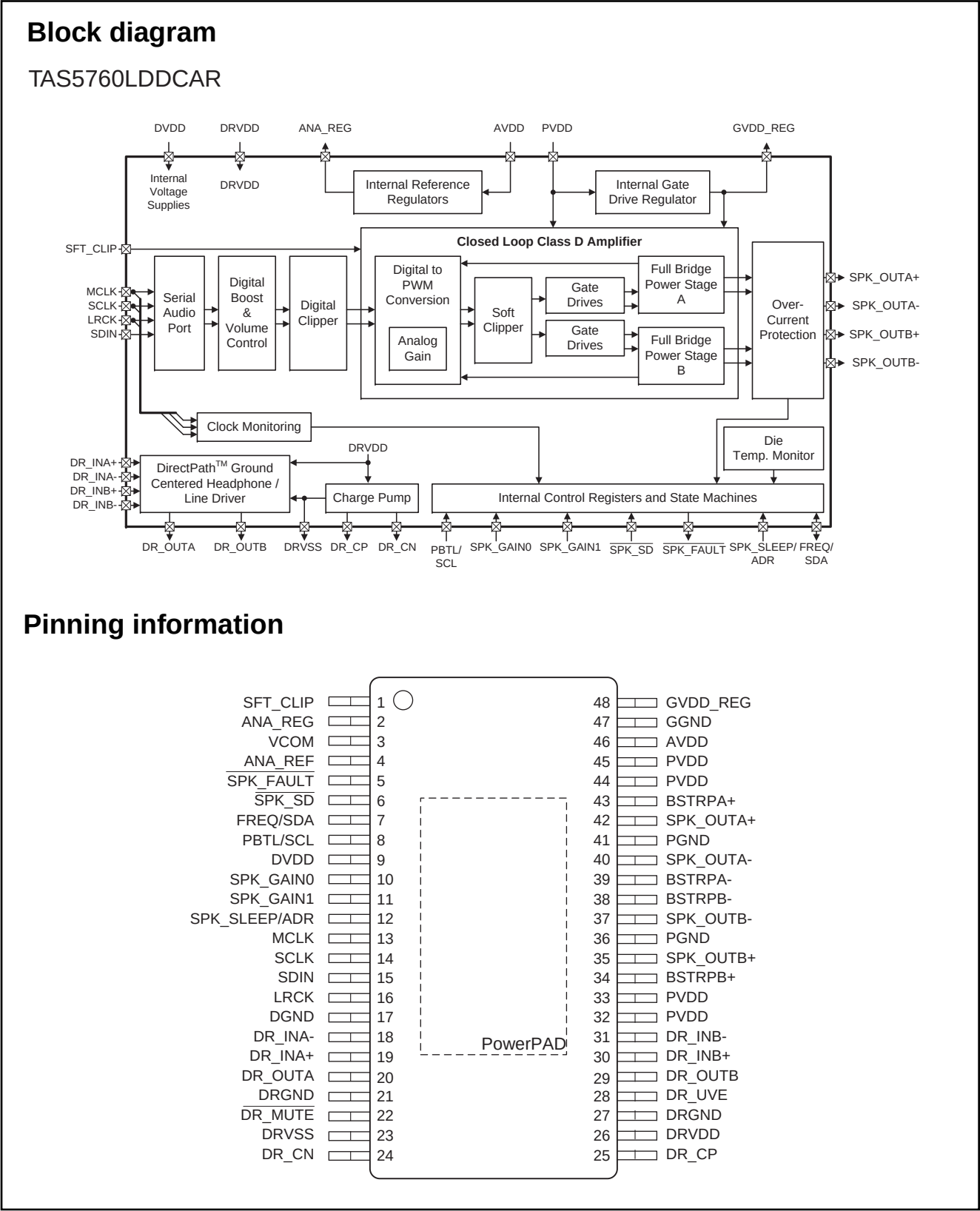
8.4 Diagram [10-6-1 System Power 1](#), B01, RT8079GQW (IC U710)



19880_303.eps

Figure 8-5 Internal block diagram and pin configuration

8.5 Diagram 10-6-6 DDR3x1, B06, TAS5760LDDCAR (IC U601)



19880_304.eps

Figure 8-6 Internal block diagram and pin configuration

8.6 Diagram [10-6-10 MHL/HDMI Input, B10, Si2166-B22 \(IC U201\)](#)

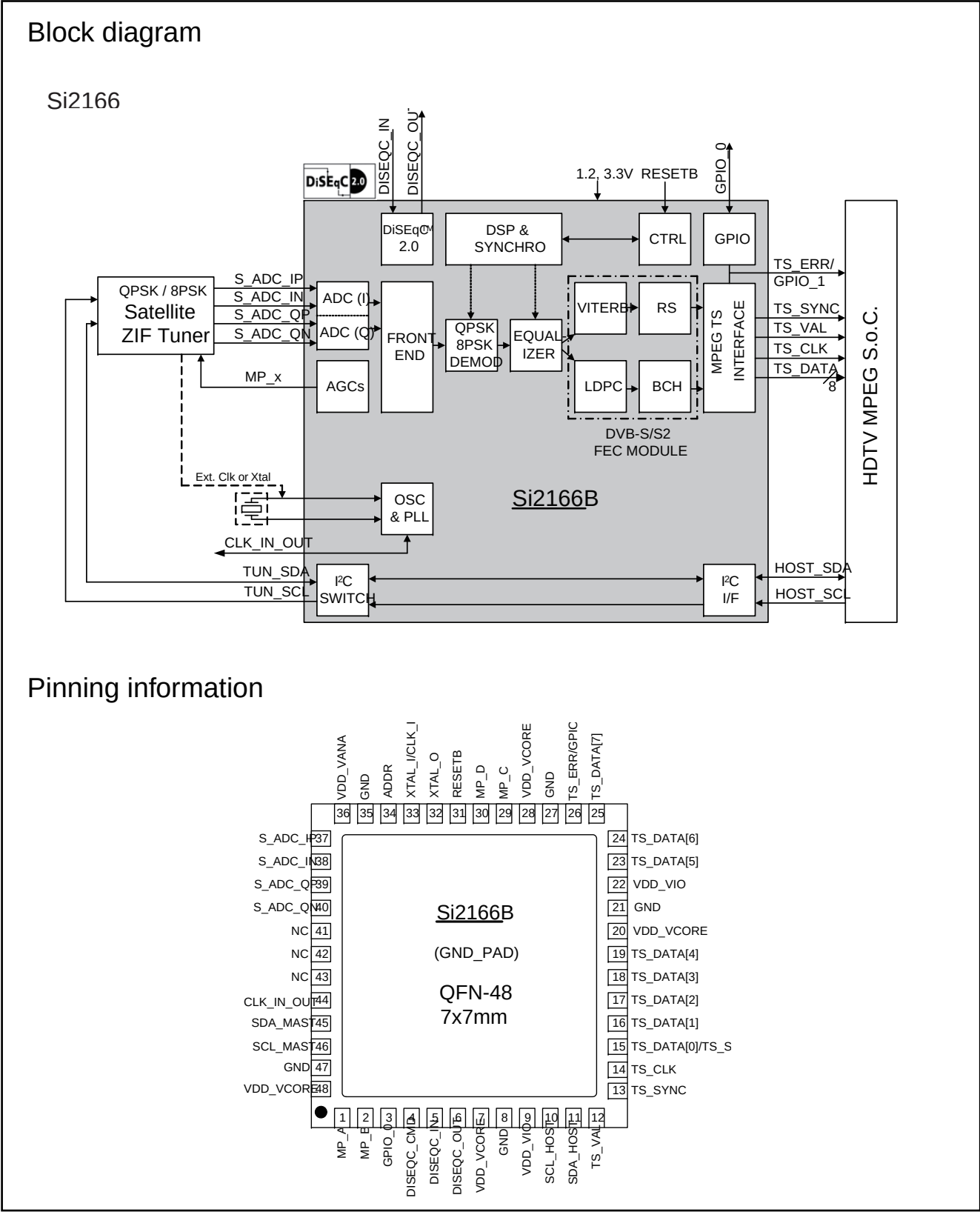
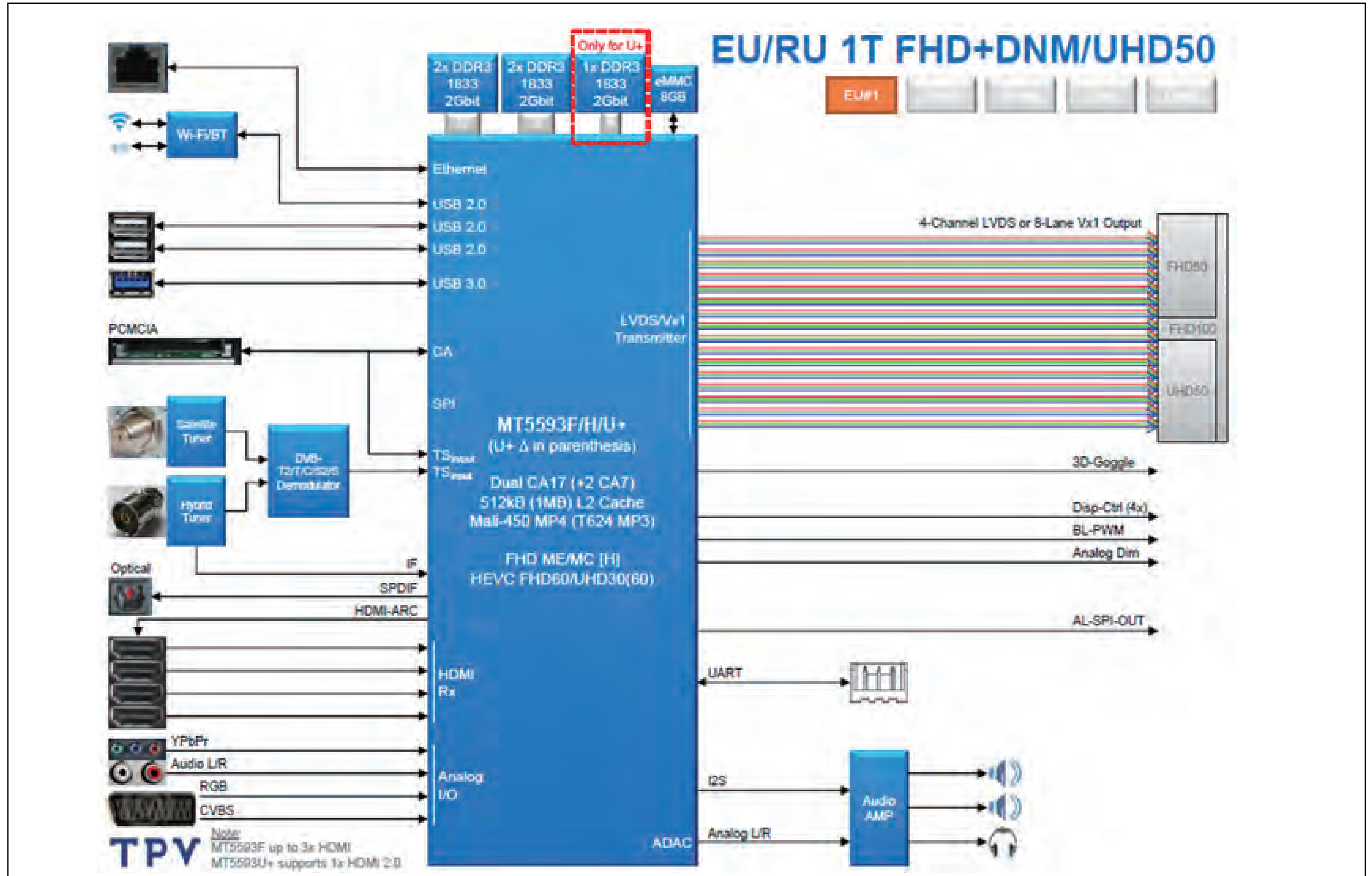


Figure 8-7 Internal block diagram and pin configuration

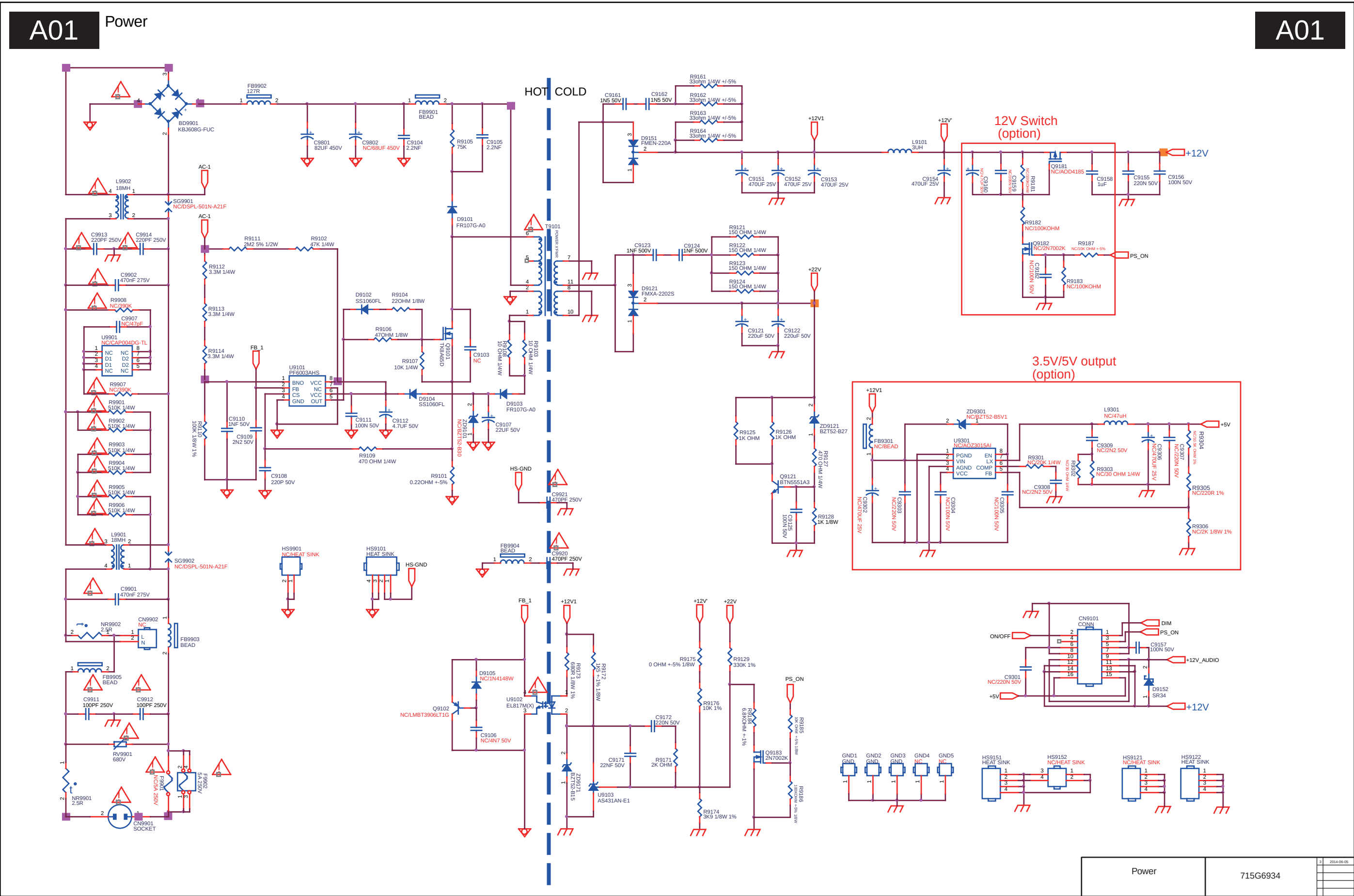
9. Block Diagrams

9.1 Block diagram 5500/65x0/6400 series



10. Circuit Diagrams and PWB Layouts

10.1 A 715G6934 PSU
10-1-1 Power

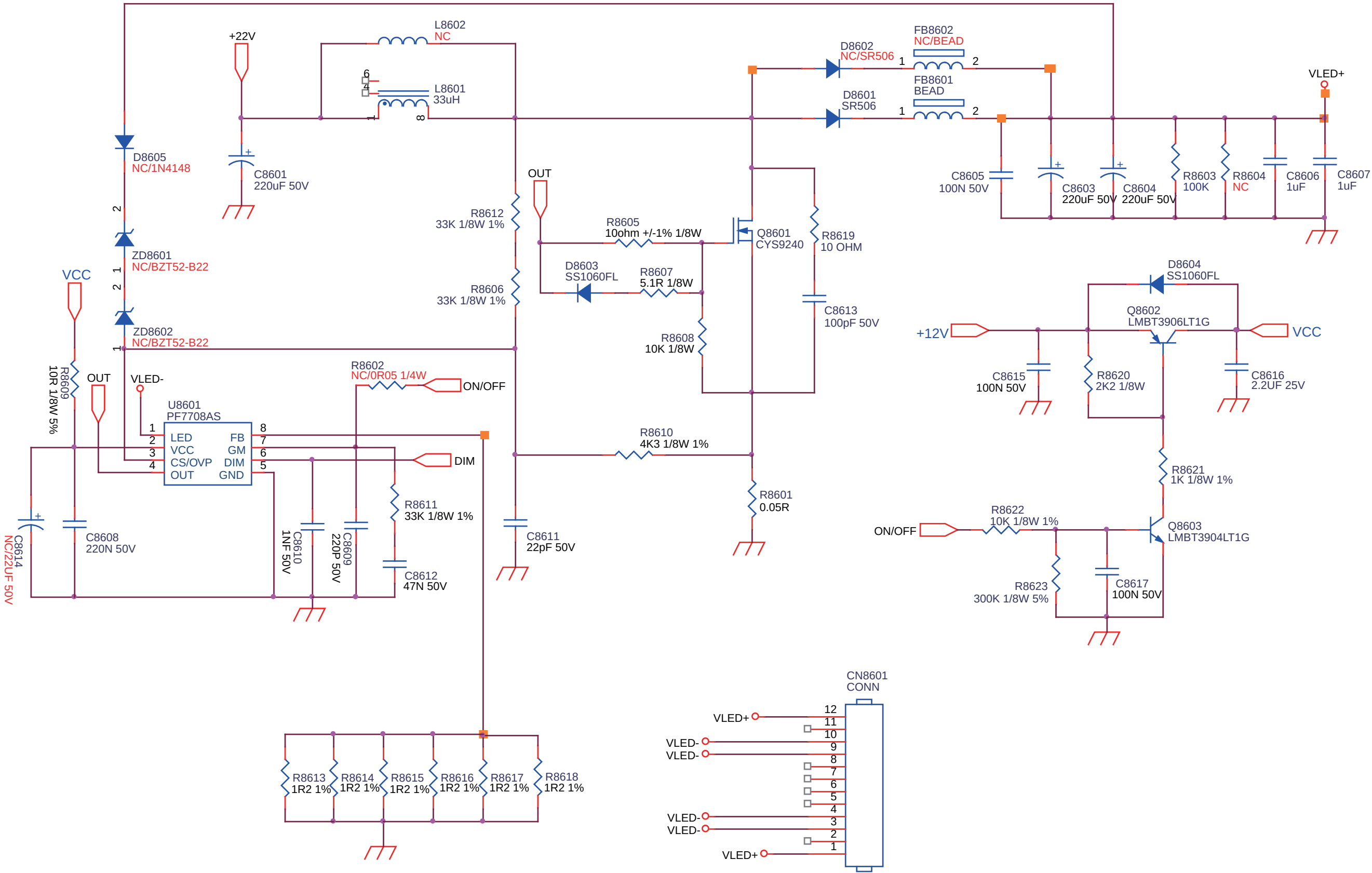


10-1-2 LED DRIVER

A02

LED DRIVER

A02

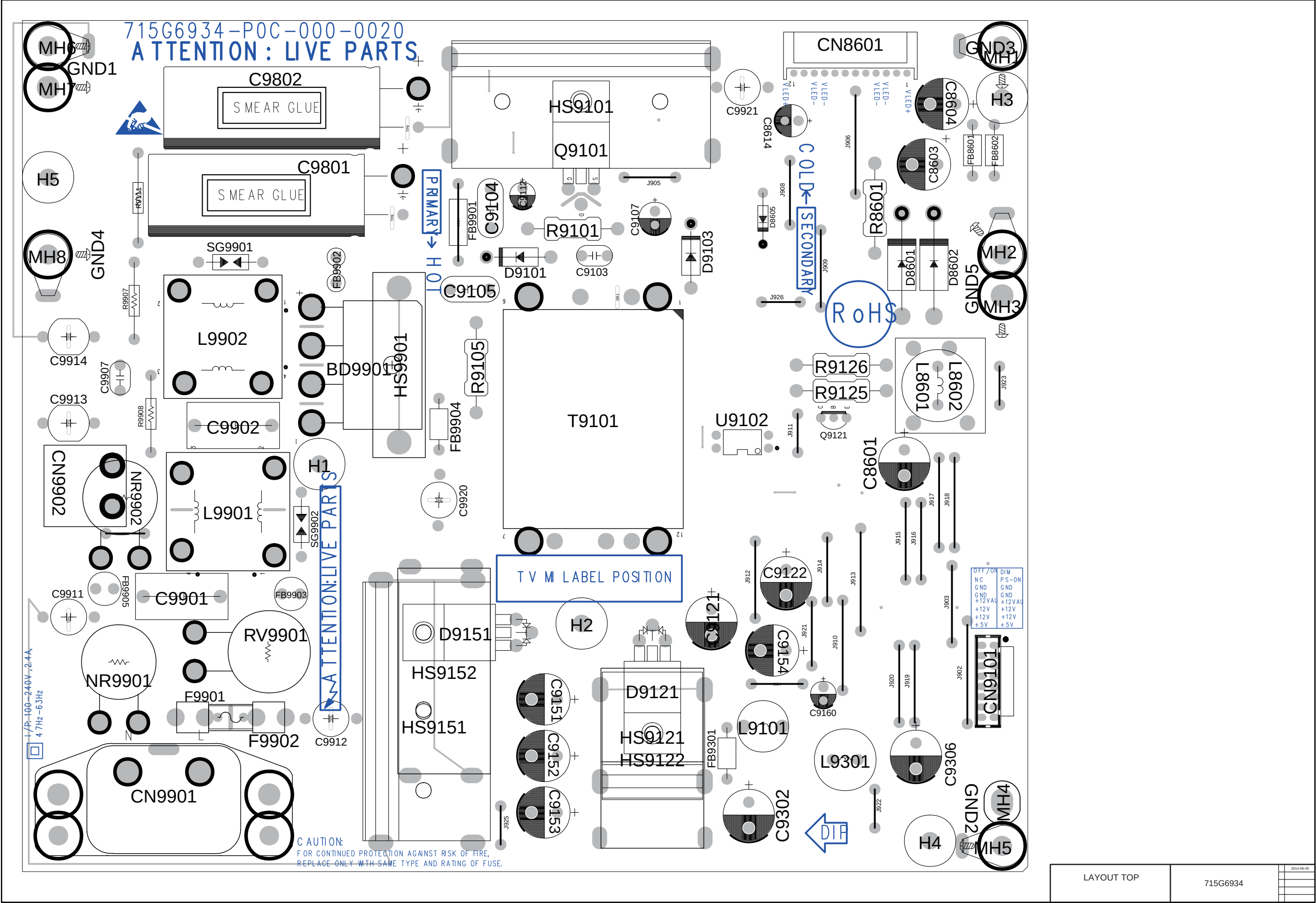


LED DRIVER

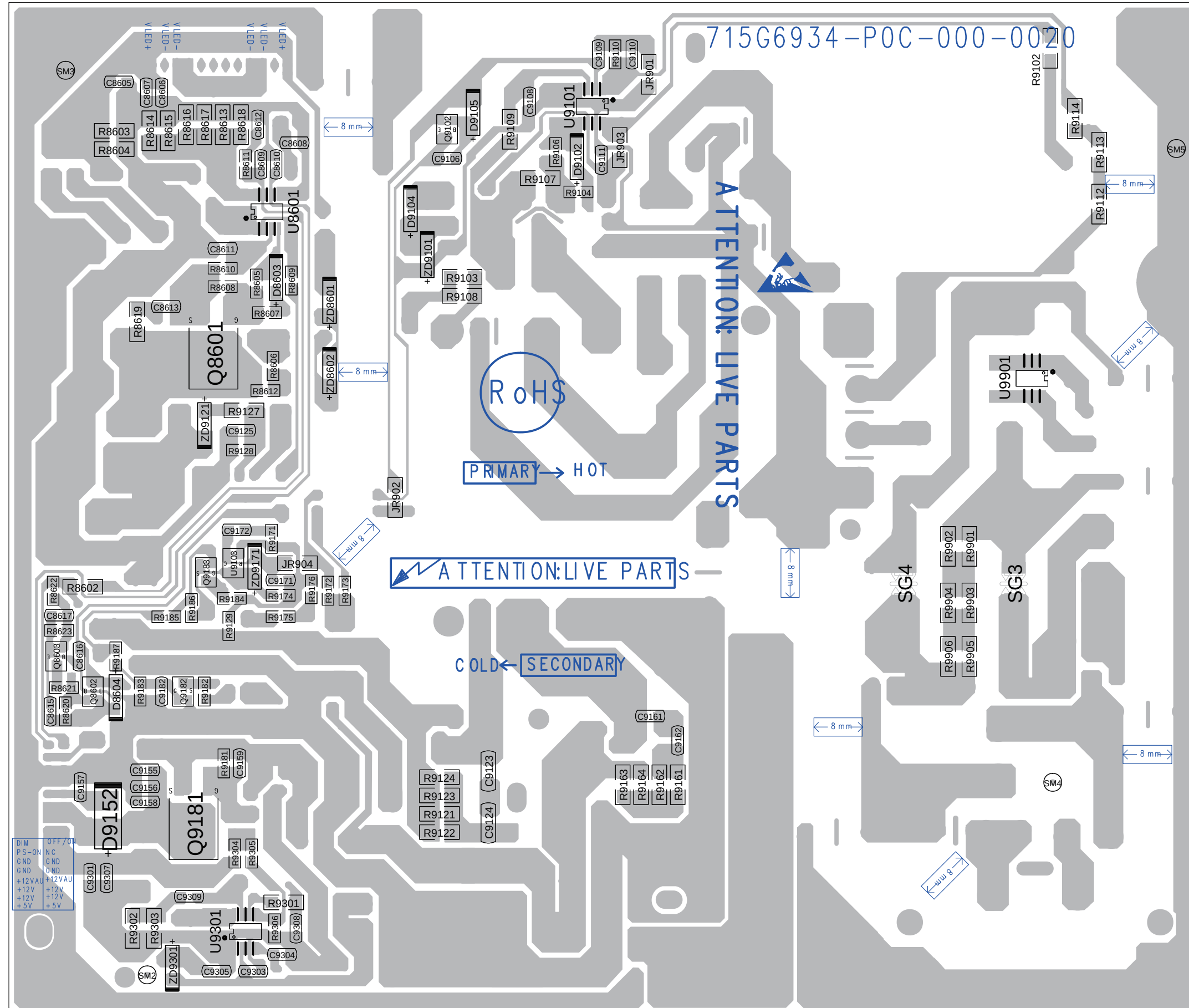
715G6934

2014-08-05

10-1-3 Power layout top



10-1-4 Power layout bottom



LAYOUT BOTTOM

715G6934

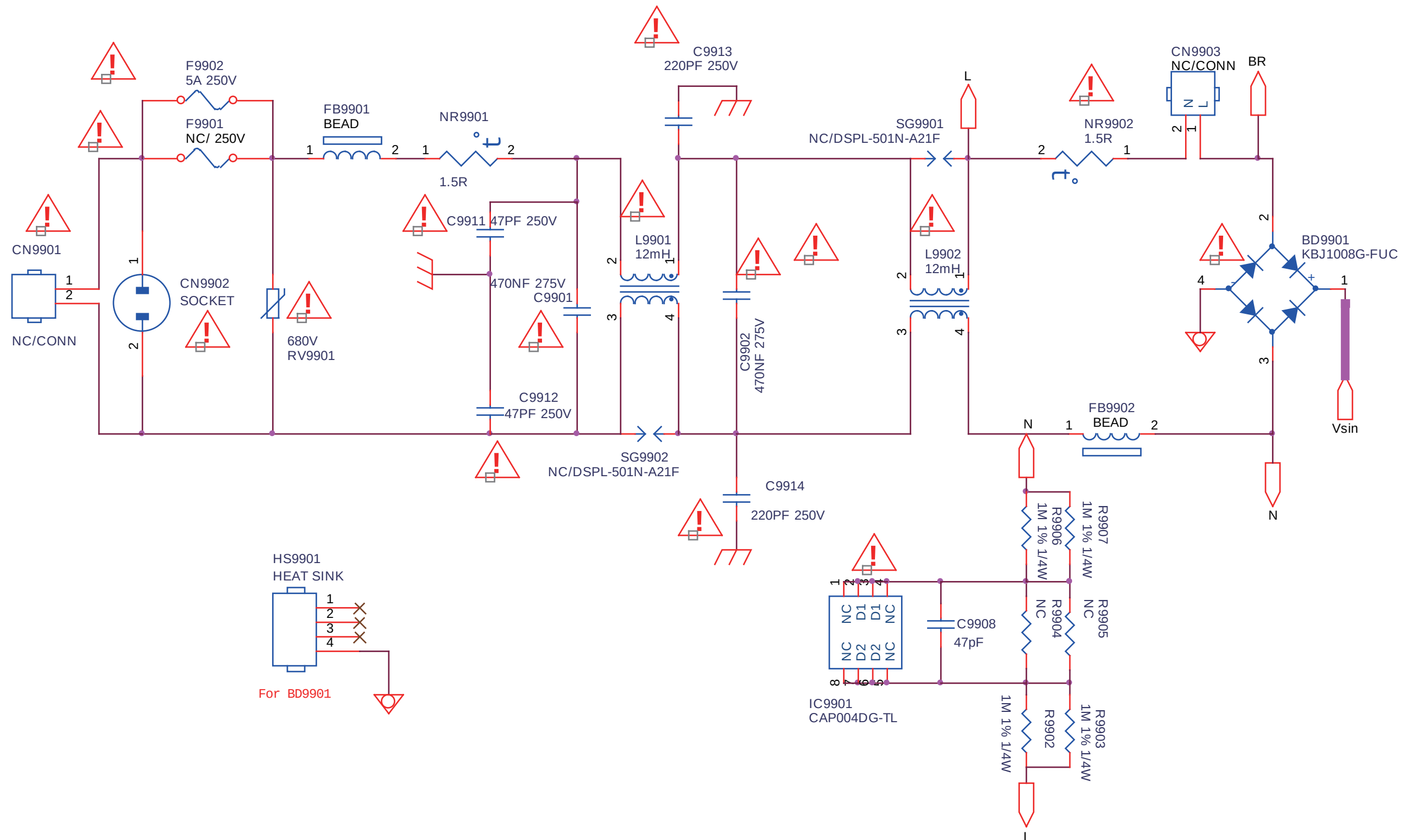
2014-06-05

10.2 A 715G6679 PSU

10-2-1 AC input

A01 AC input

A01



AC input

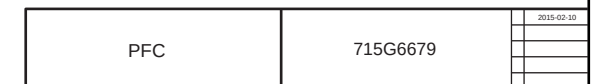
715G6679

2015-02-25

19880_500.eps

PFC

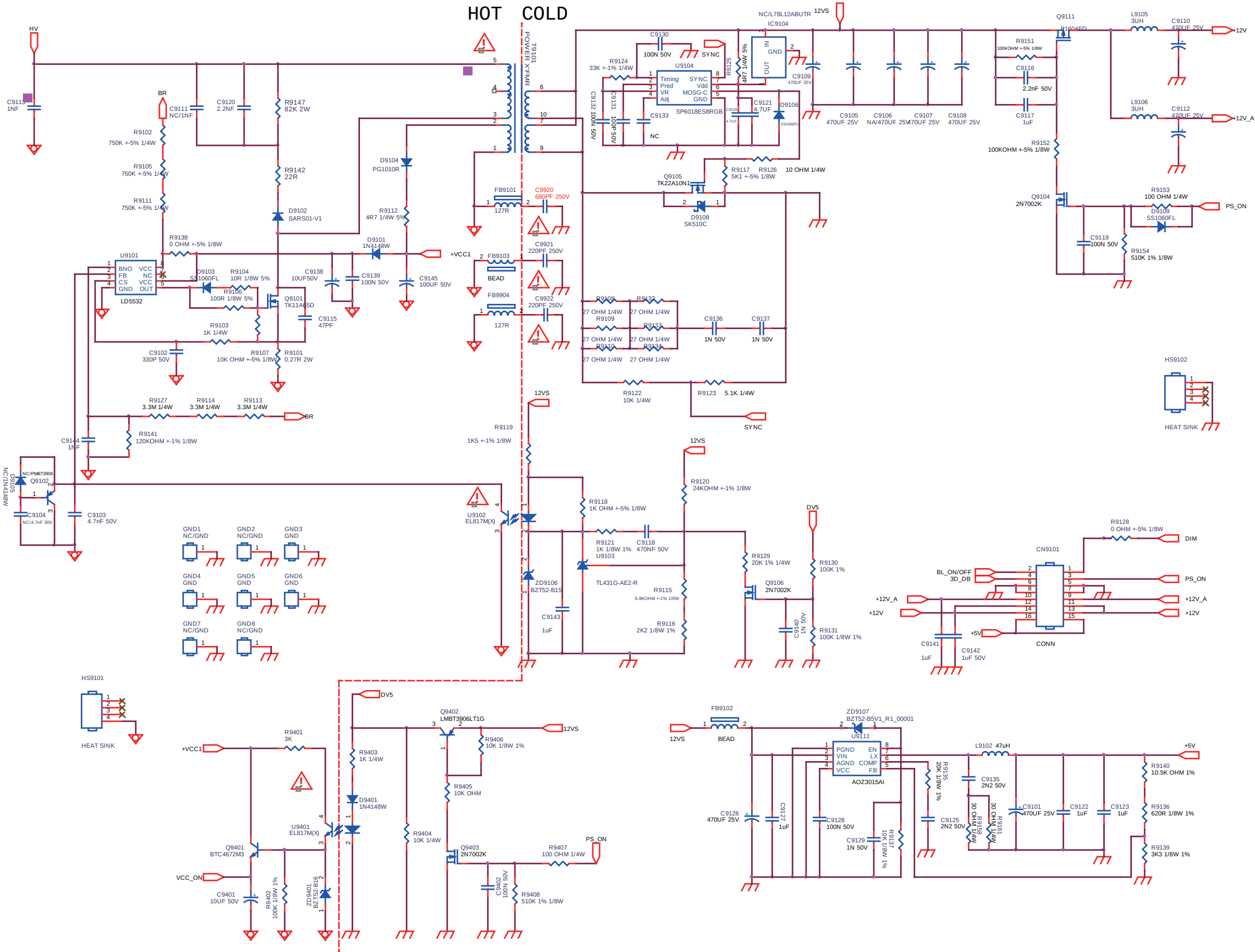
A02



A03

Main Power

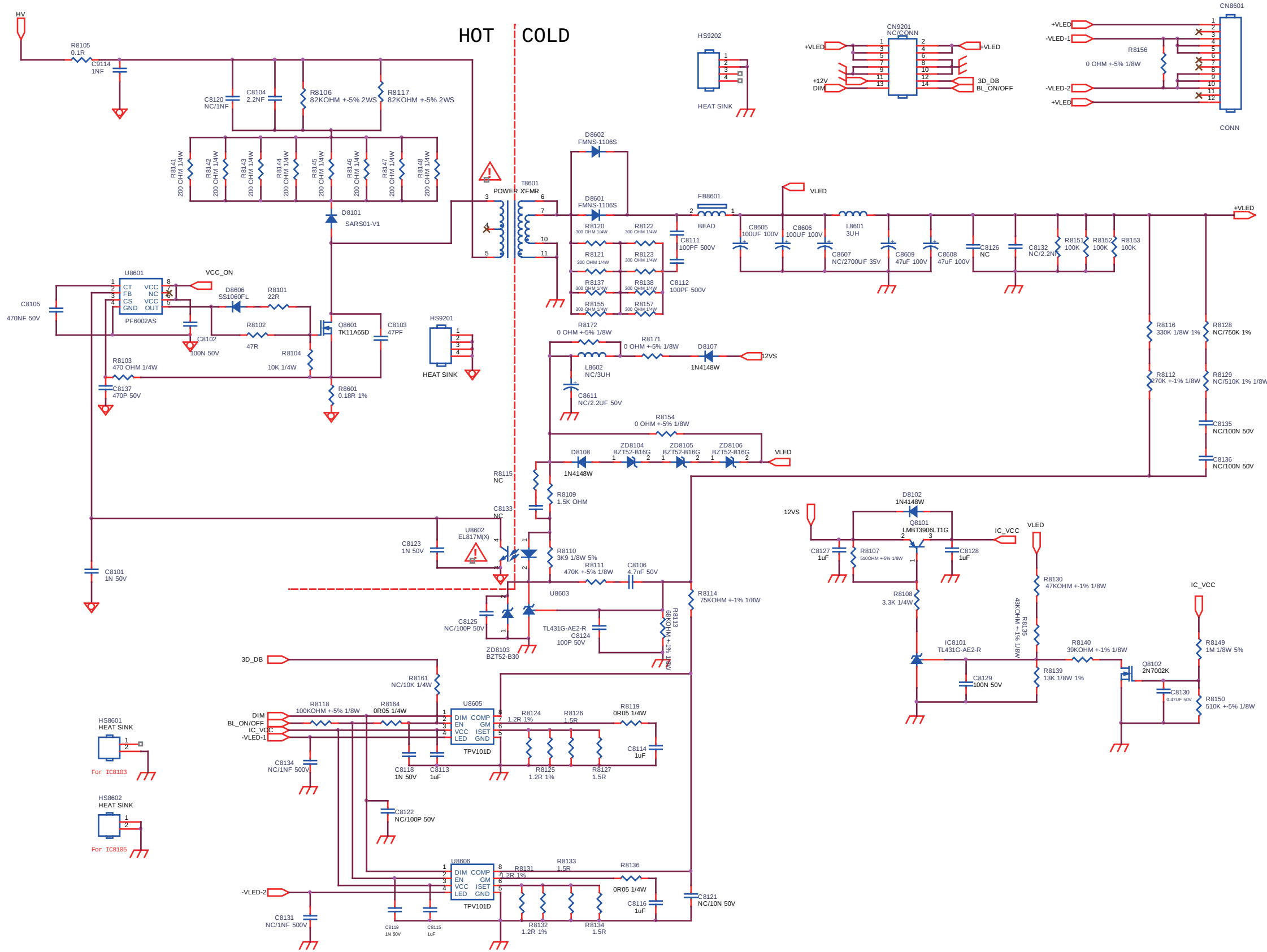
A03



A04

LED

A04



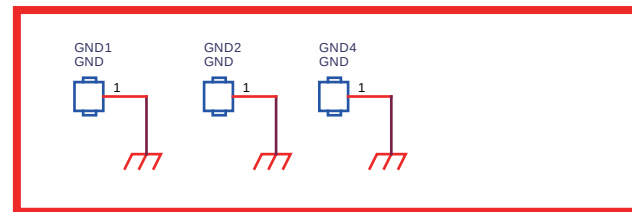
LED

715G6679

10-3-1 AC input

AC input

A01



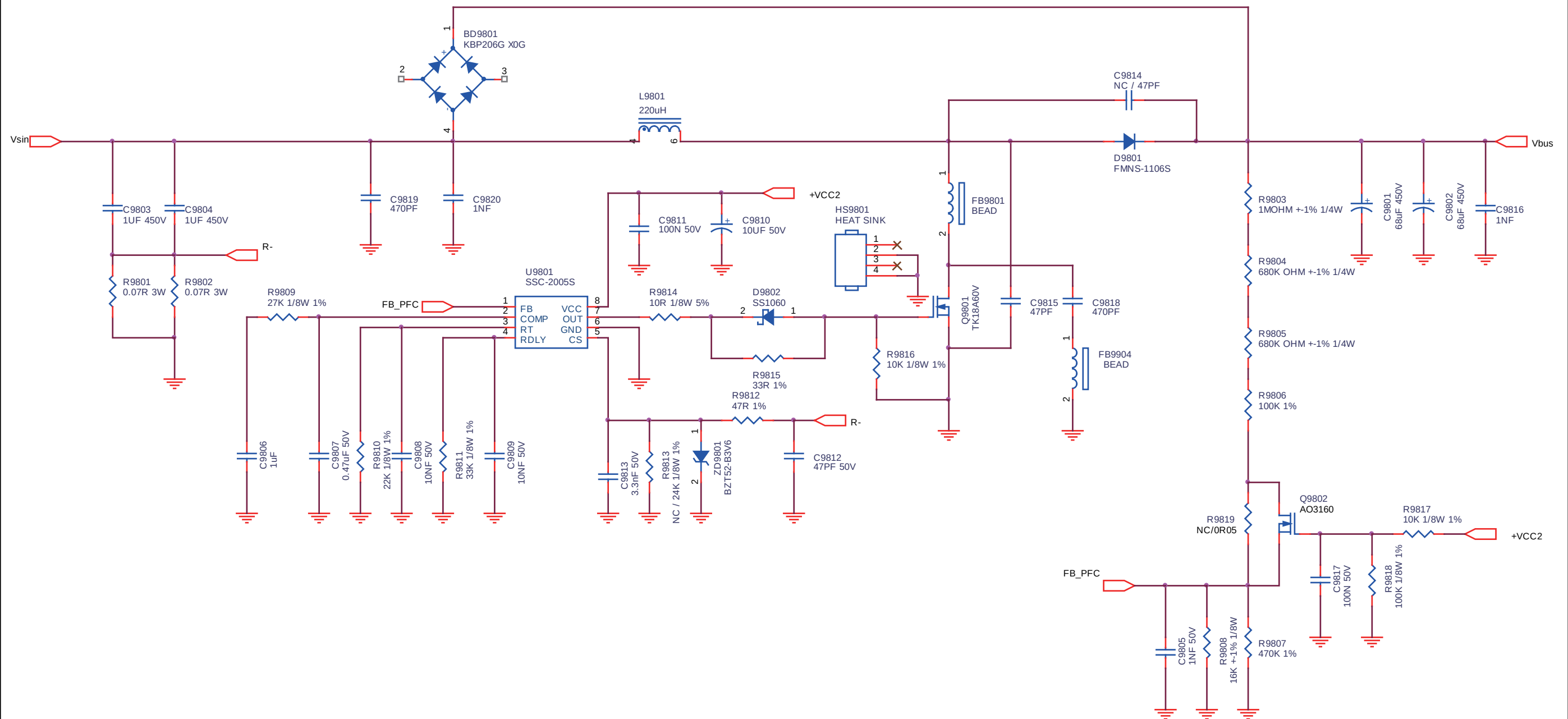
715G6973

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2015-Sep-30 [back to div.table](#)

PFC

A02

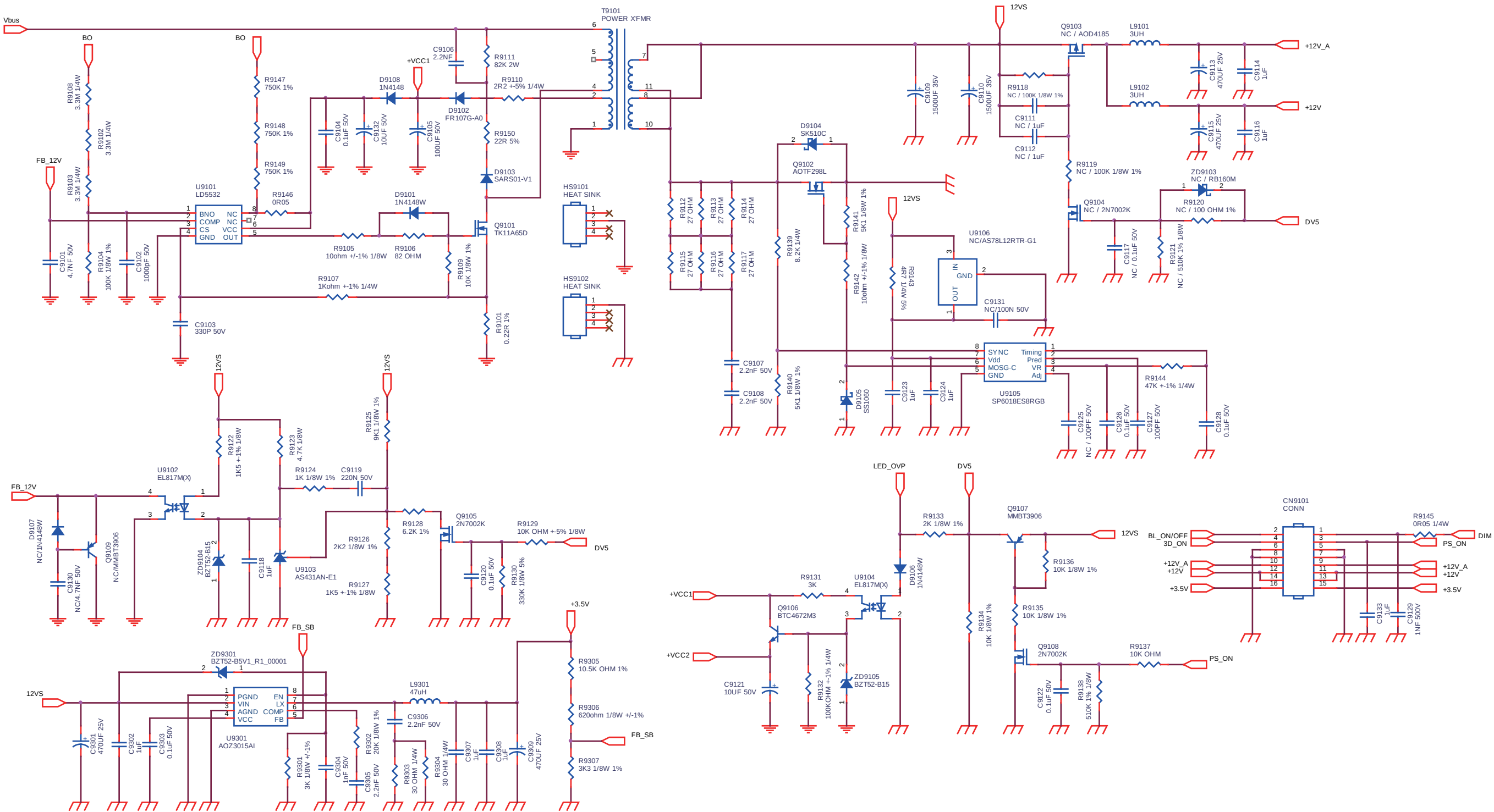


PFC	715G6973	2014-12-08

A03

Main power

A03

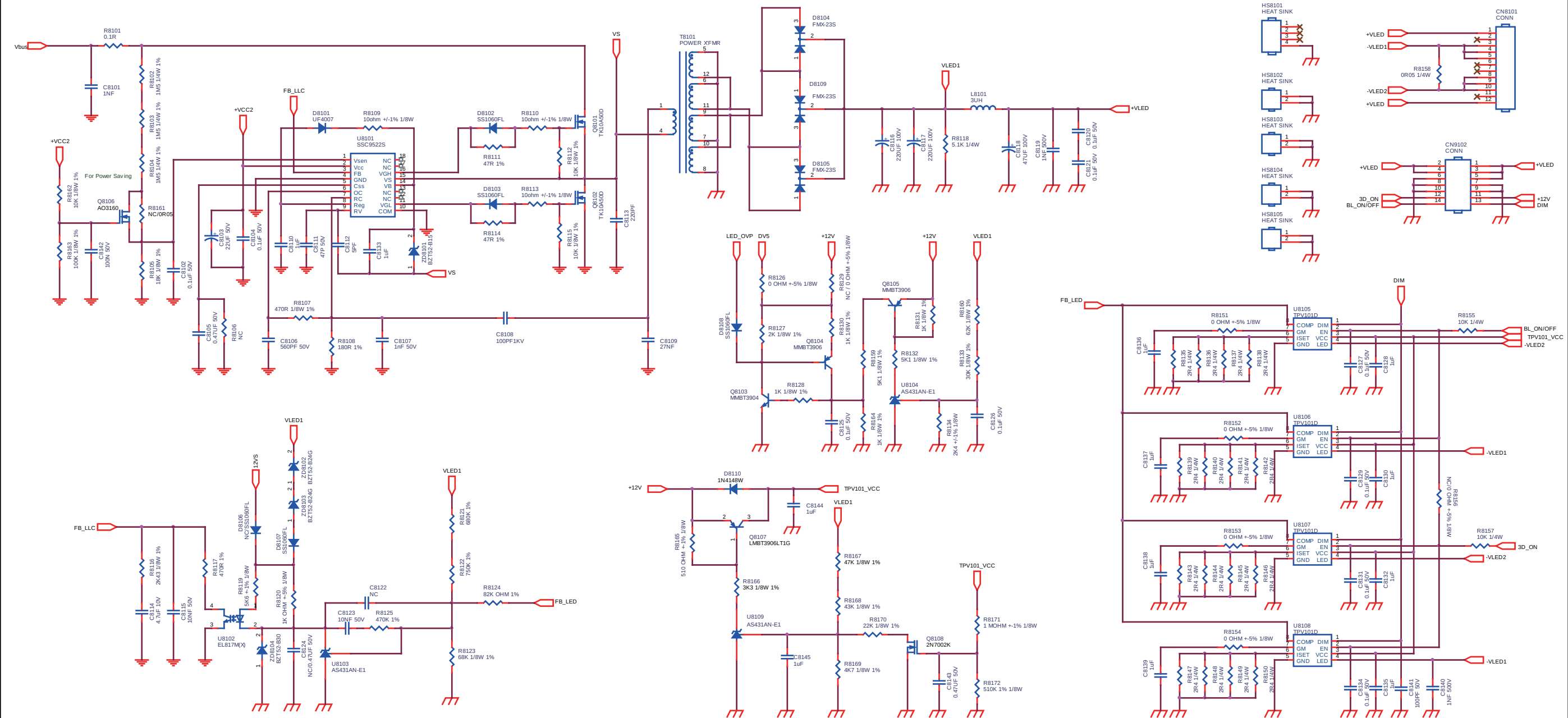


Main power	715G6973	2014-12-08

LED Driver

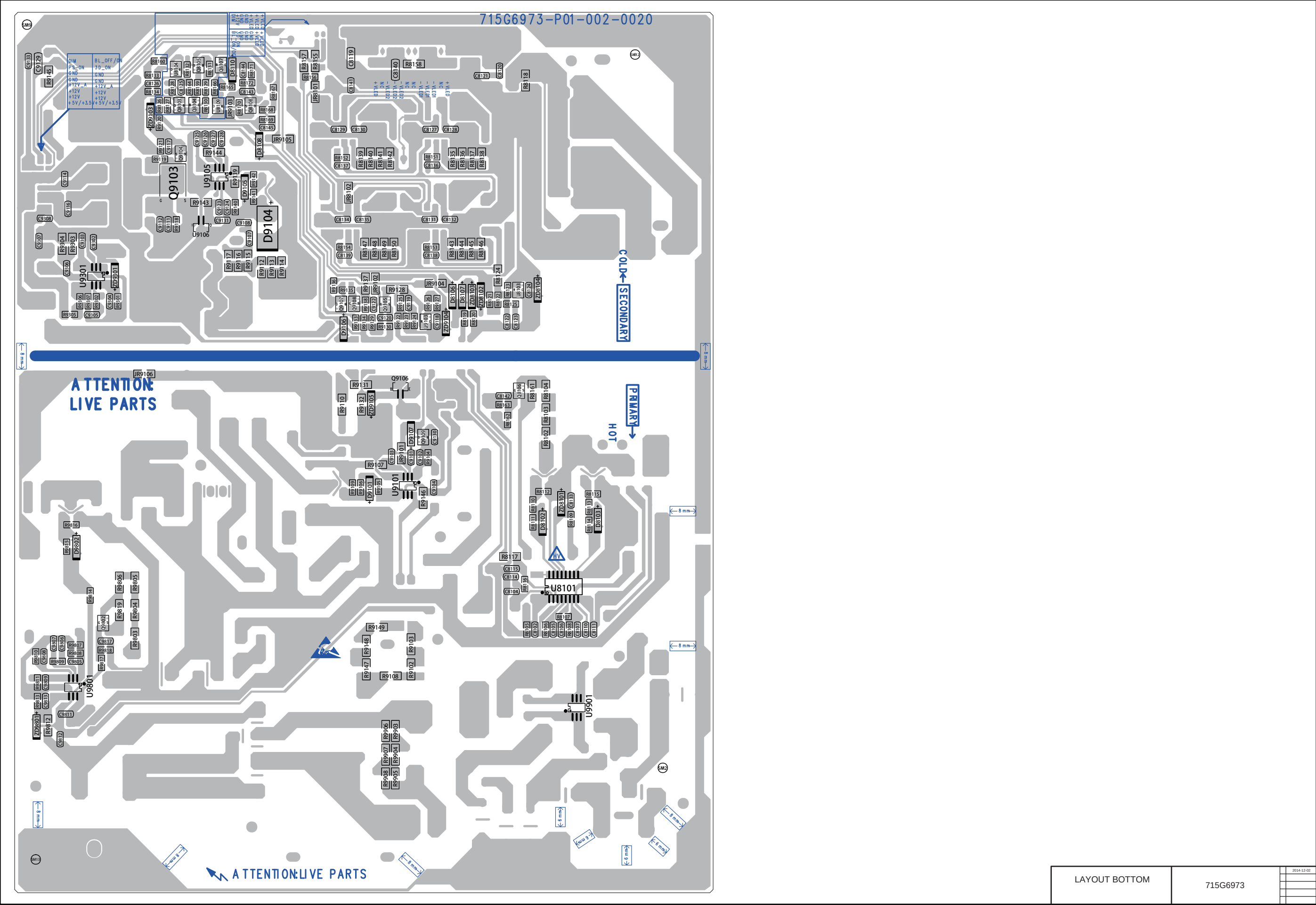
LED Driver

A04



LED Driver	715G6973	2014-12-08

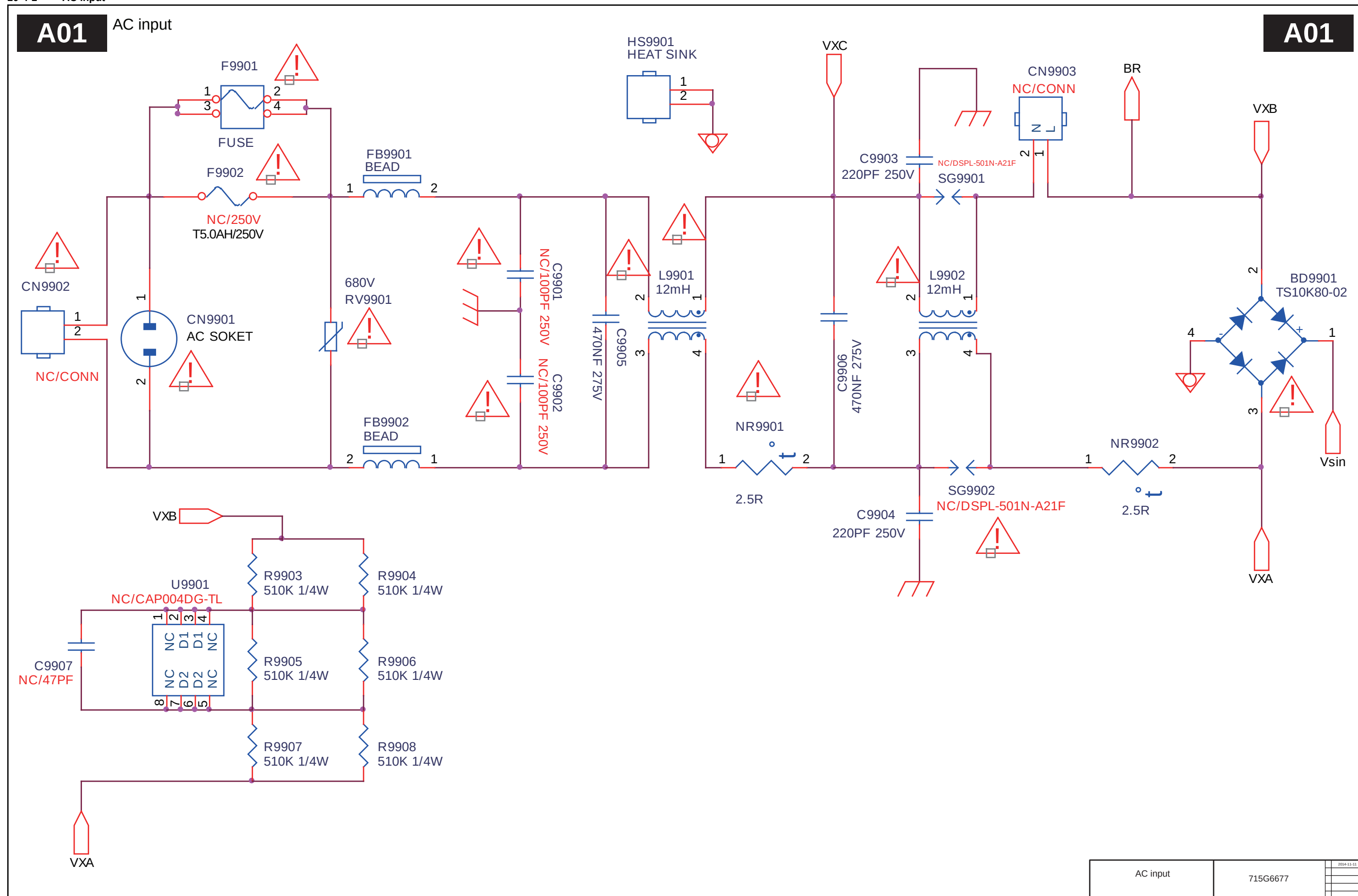
10-3-6 Power layout bottom



LAYOUT BOTTOM	715G6973	2014-12-02

10.4 A 715G6677 PSU

10-4-1 AC input



AC input

715G6677

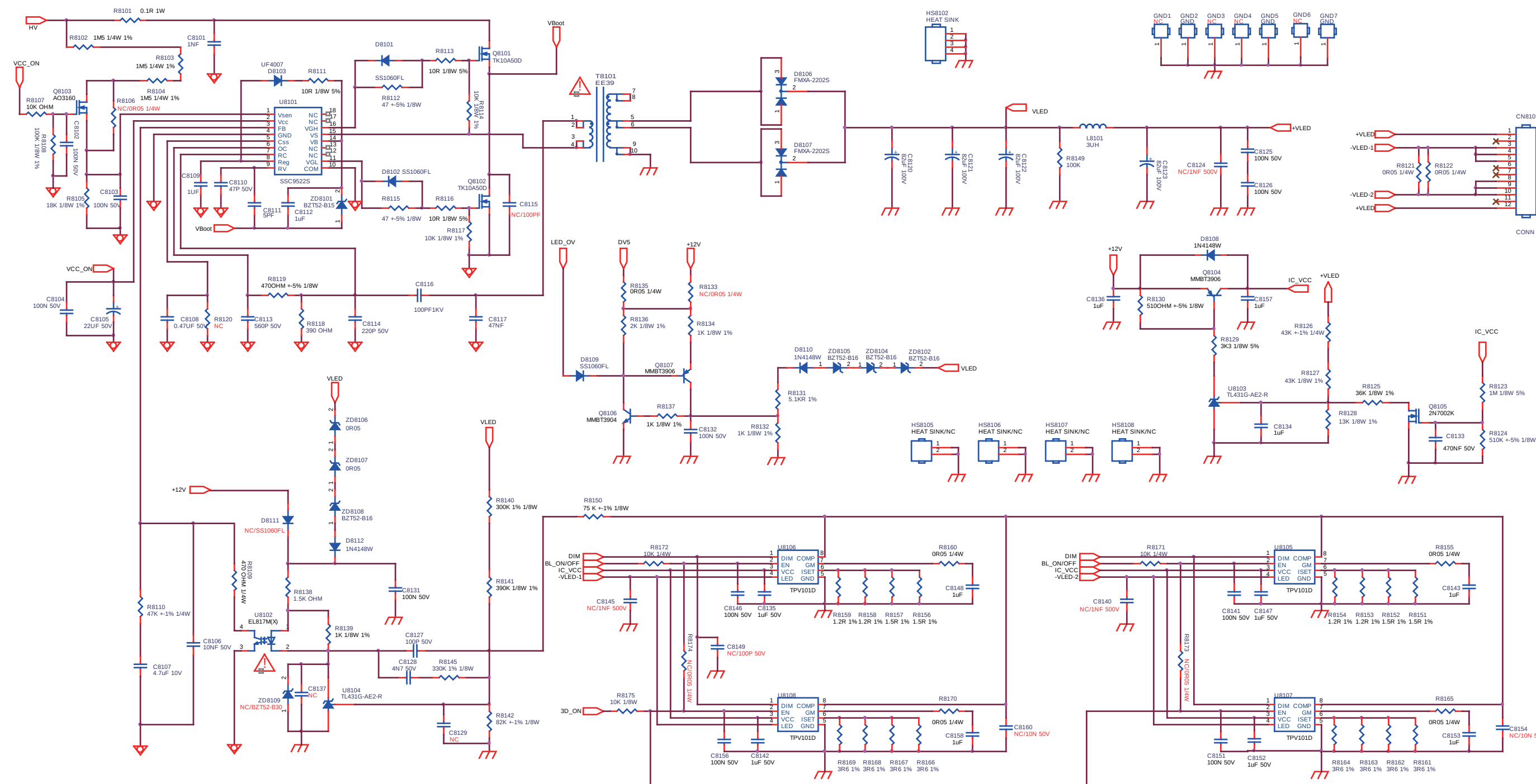
2014-11-11

19820_540.eps



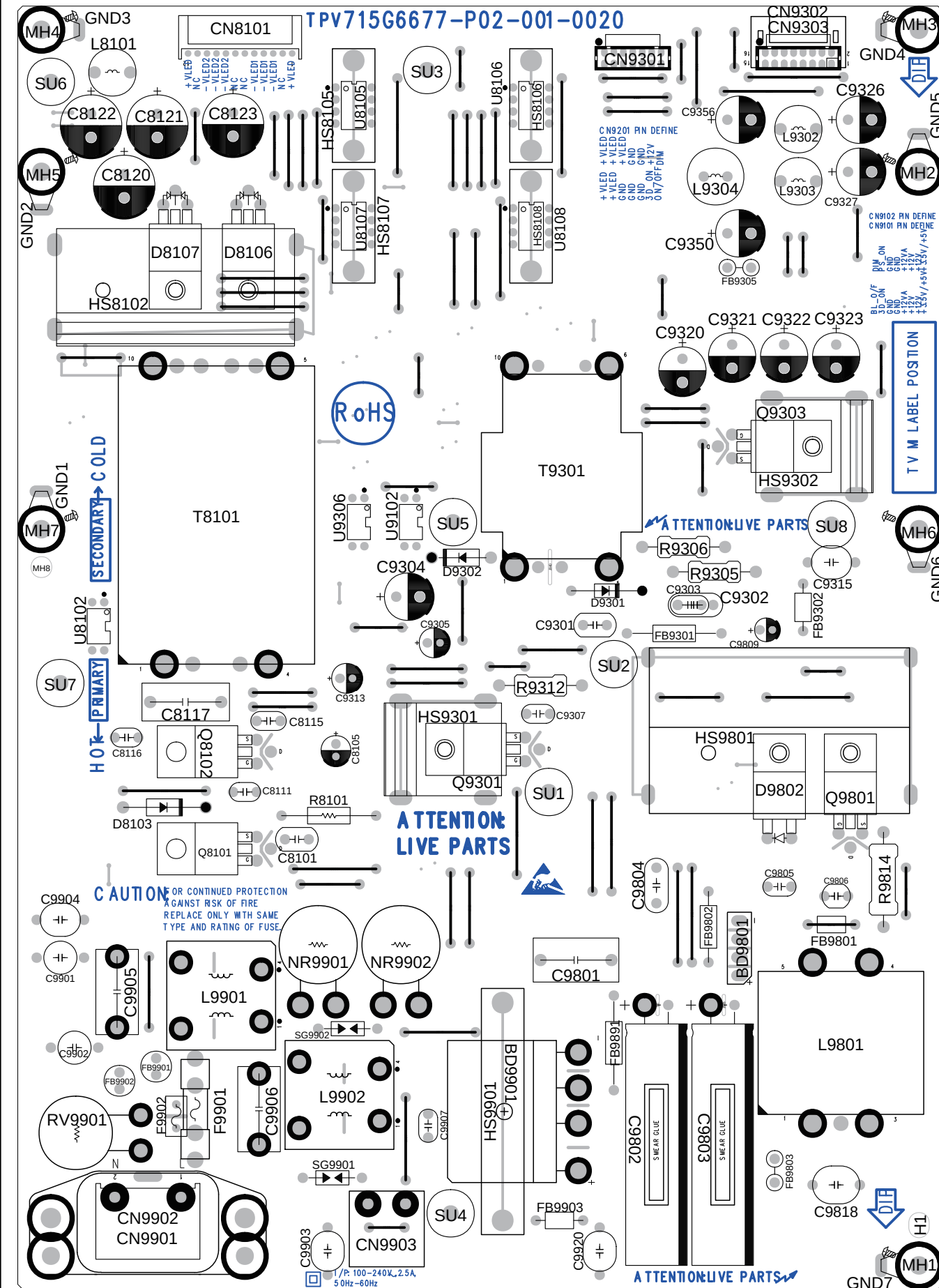
LED

A04

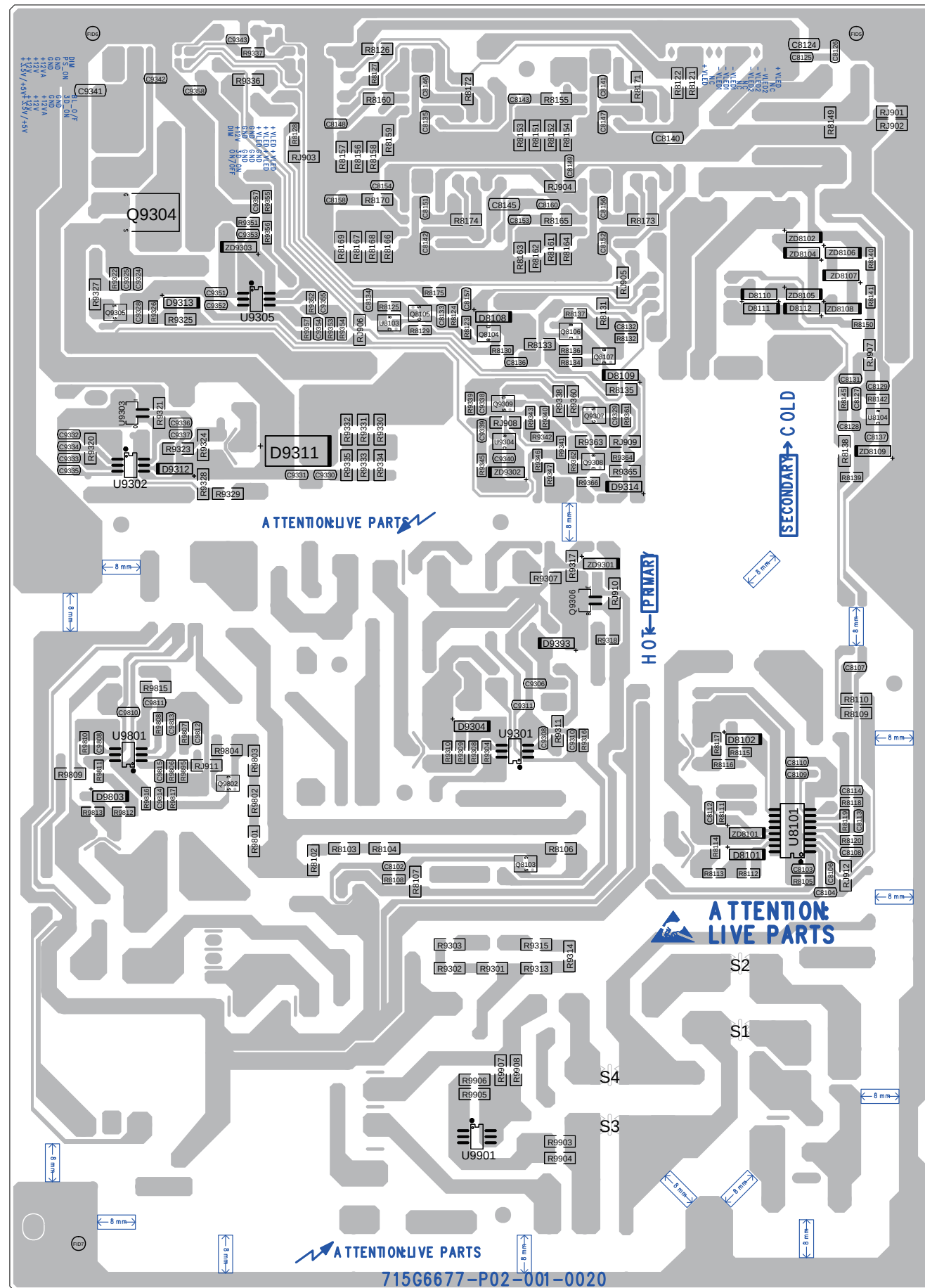


LED	715G6677	2014-11-11

10-4-5 Power layout top

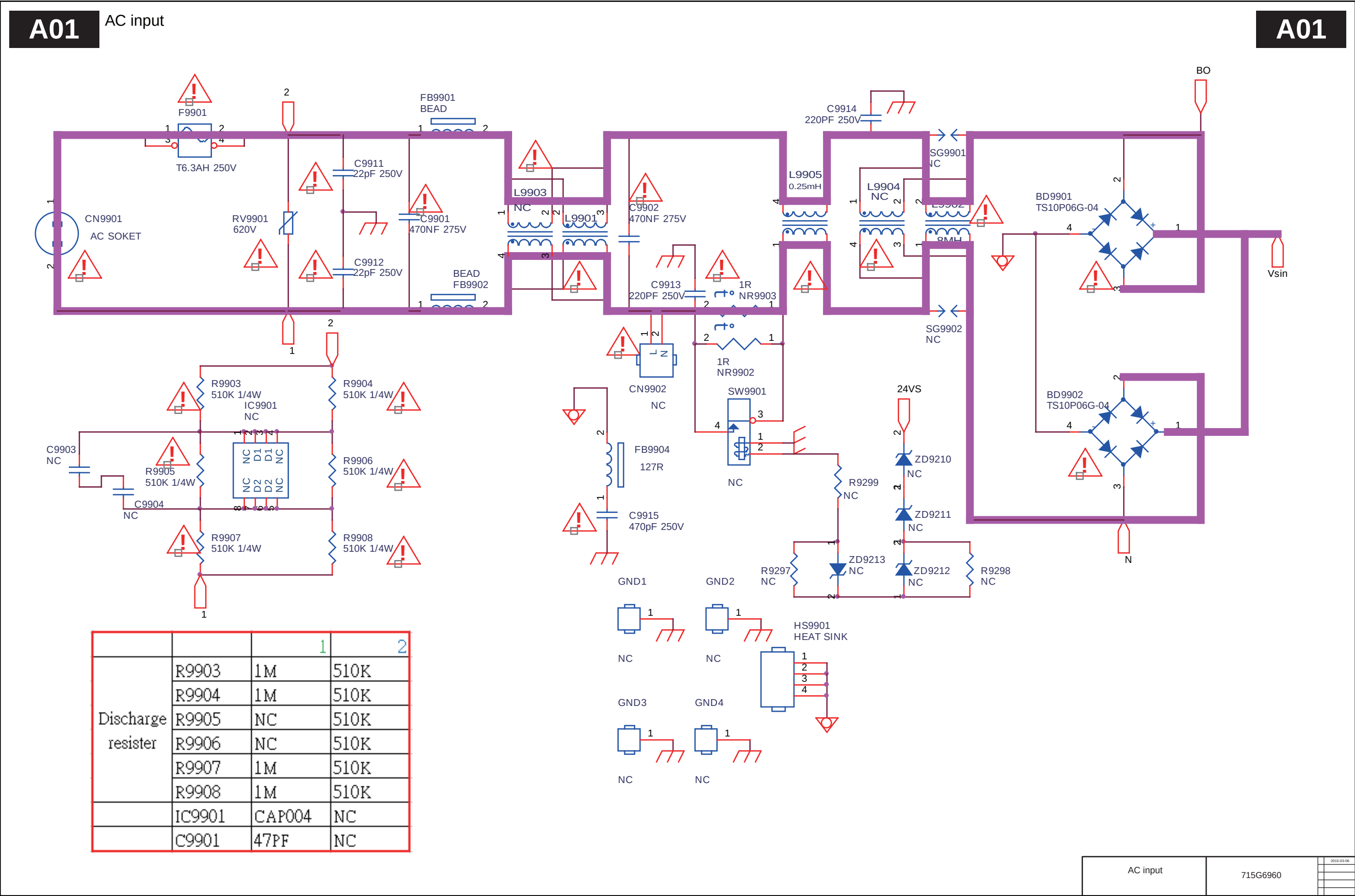


10-4-6 Power layout bottom



LAYOUT BOTTOM	715G6677	2016-11-06

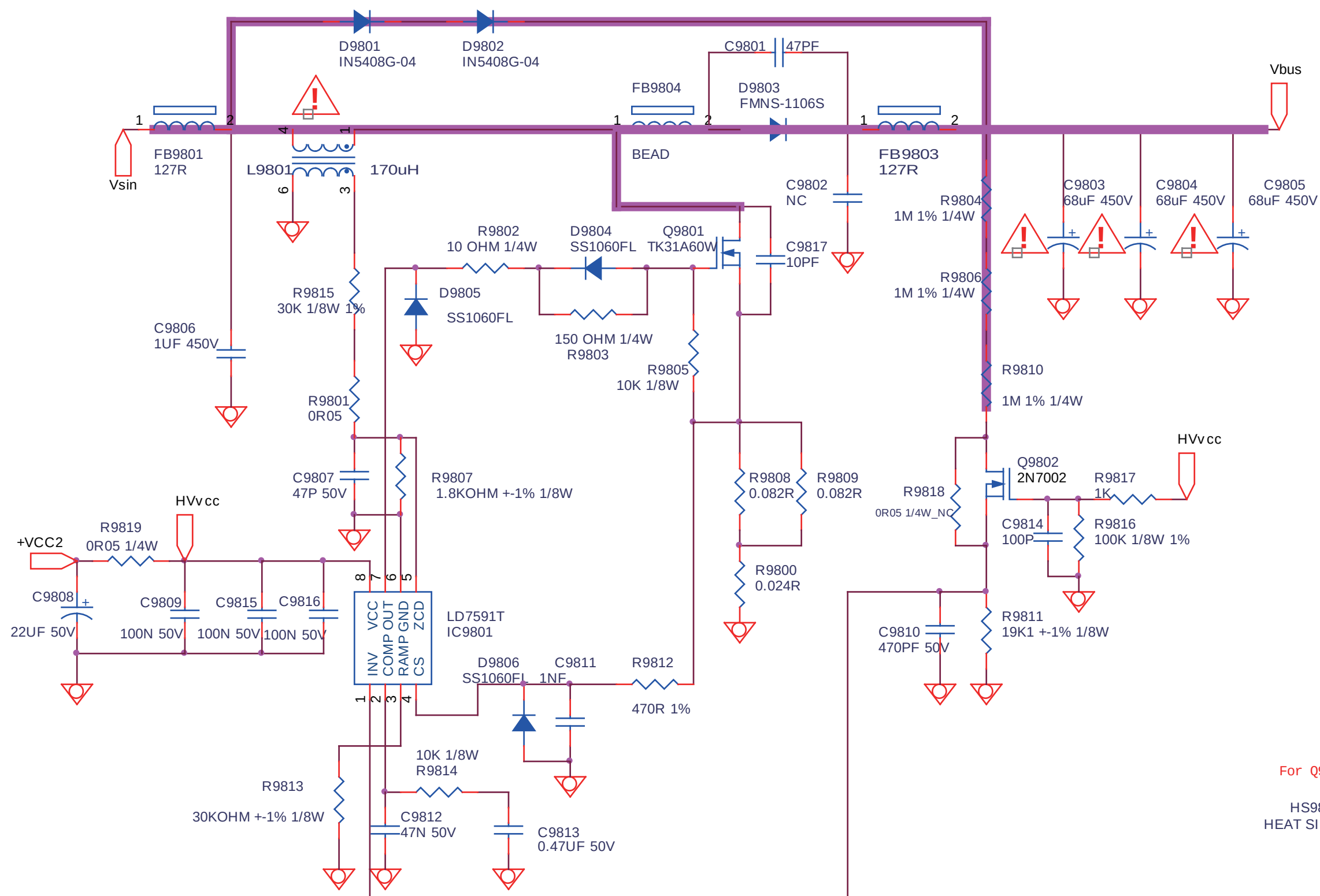
10.5 A 715G6960 PSU
10-5-1 AC input



A02

PFC with LD7591T

A02

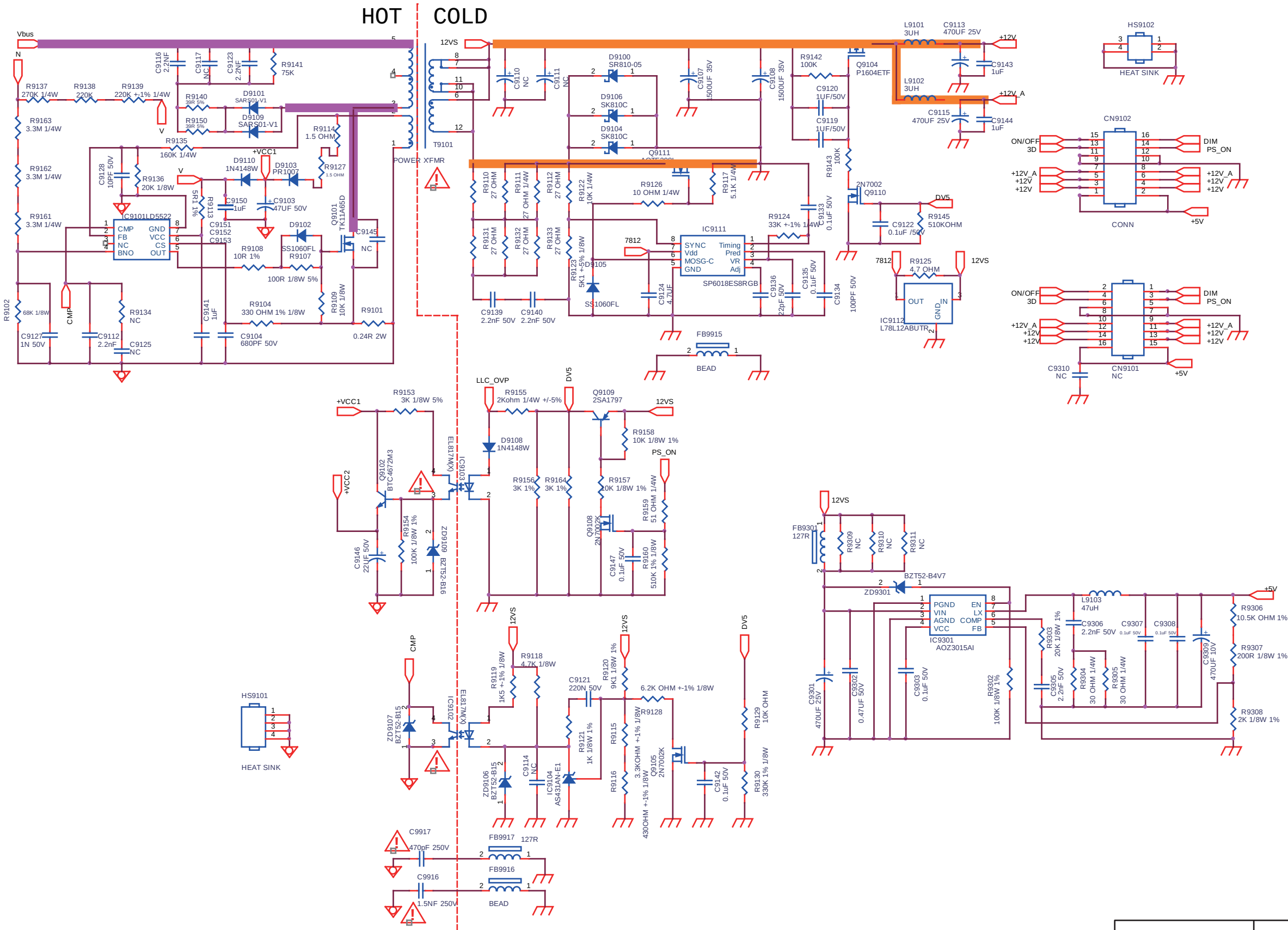


10-5-3 Flyback with LD5522

A03

Flyback with LD5522

A03



Flyback with LD5522

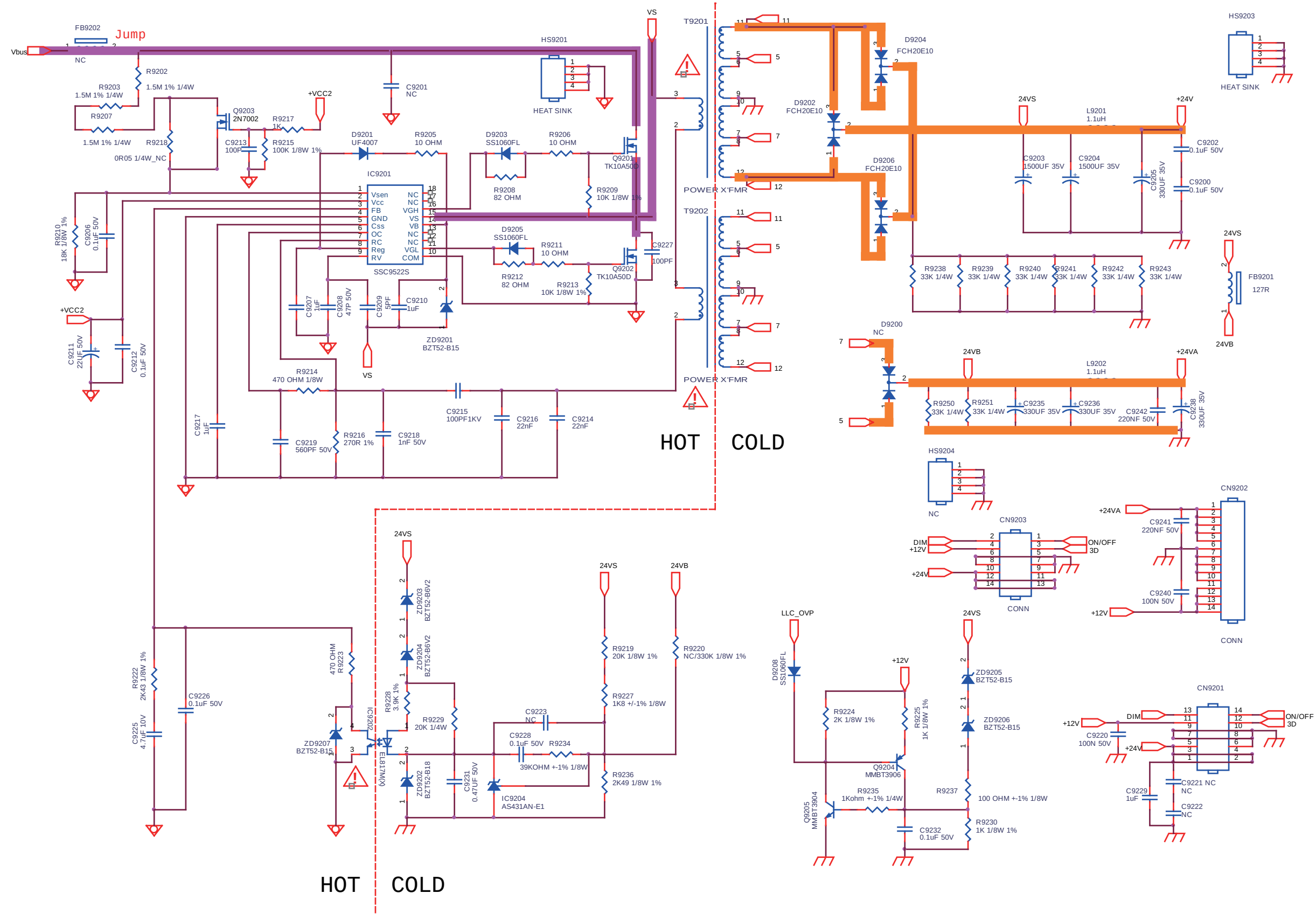
715G6960

2015-03-06

A04

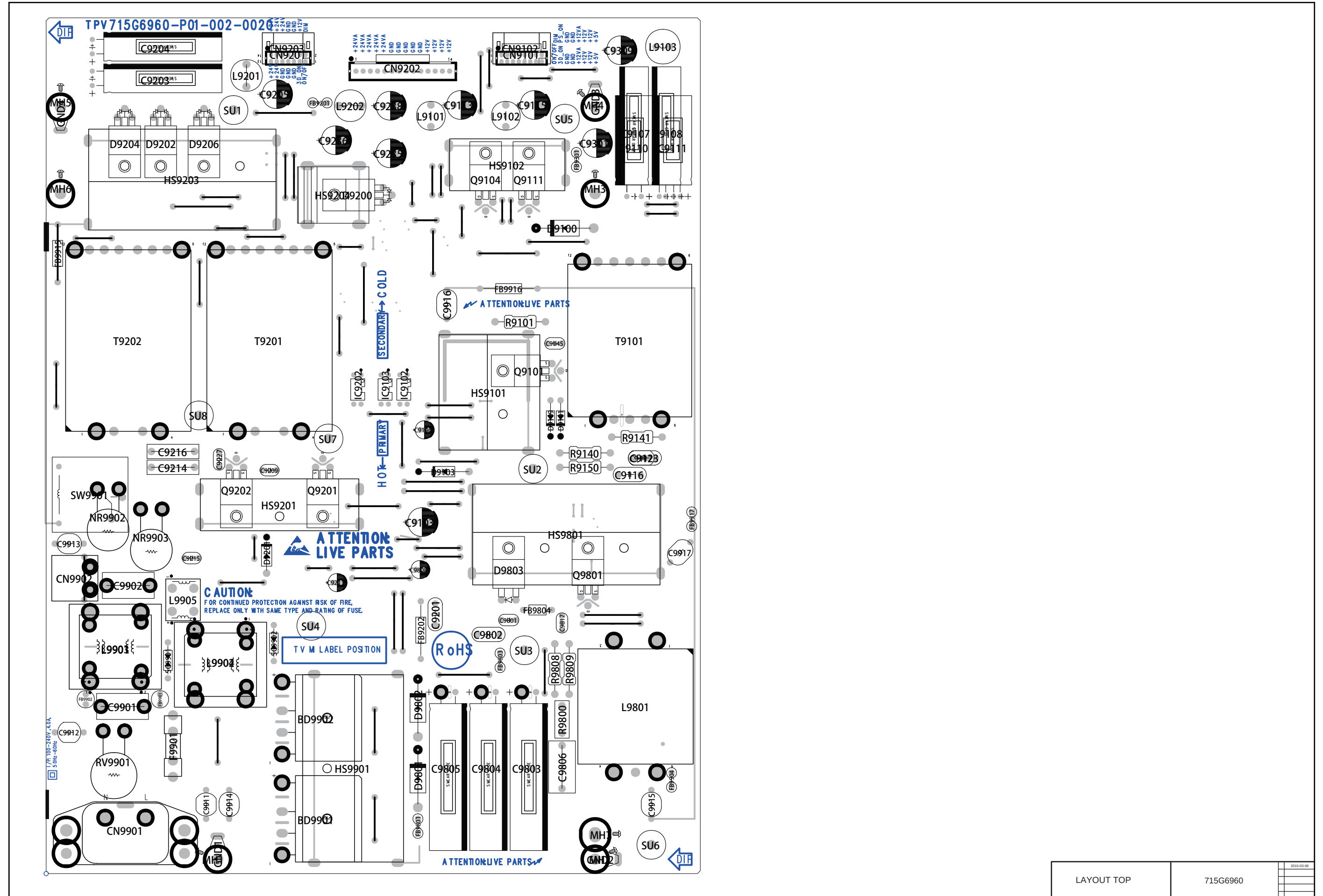
LLC with Sanken

A04



LLC with Sanken	715G6960	2015-03-06

10-5-5 Power layout top

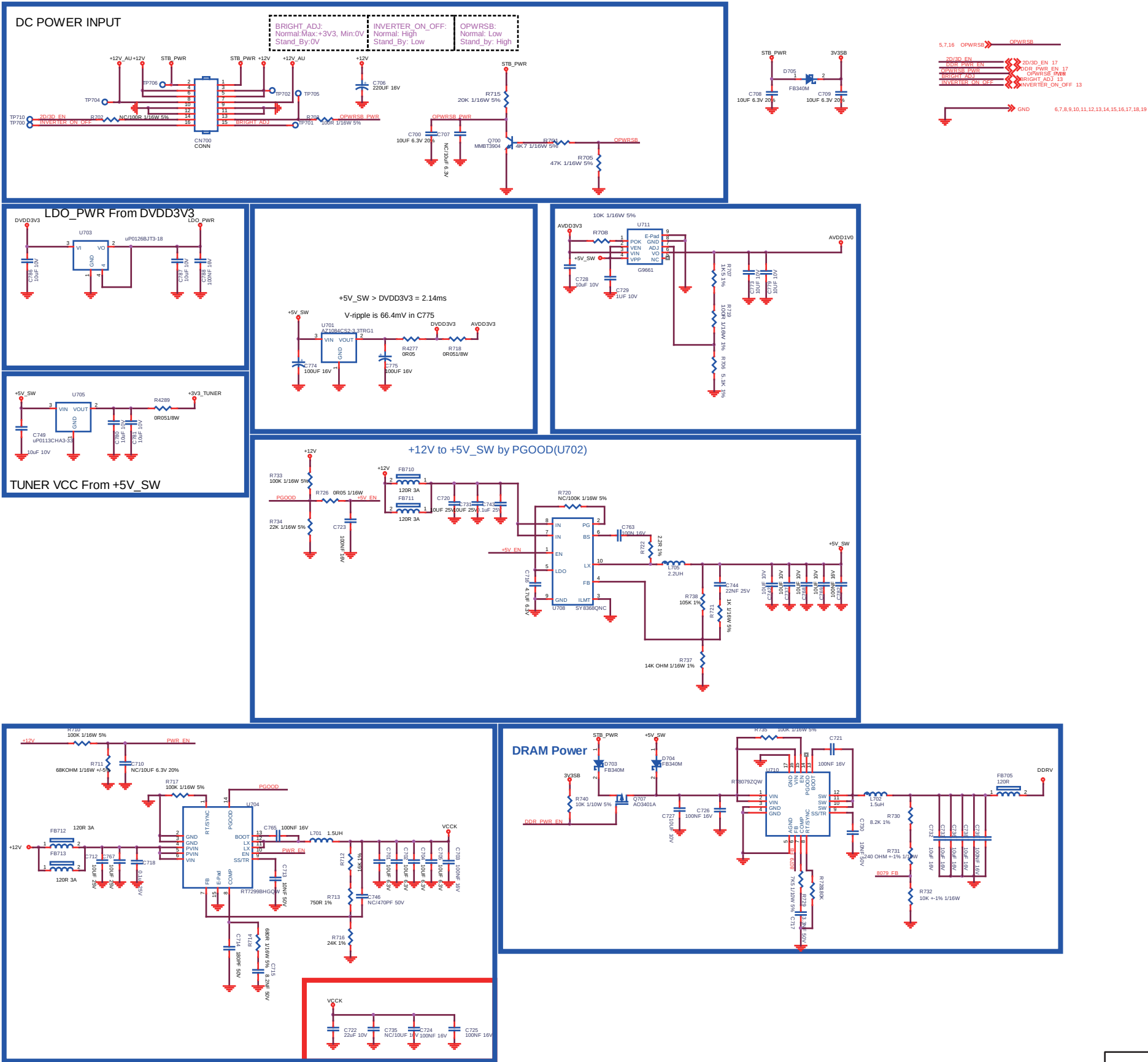


10.6 B 715G7030 SSB
10-6-1 System Power 1

B01

System Power 1

B01



System Power 1	715G7030	C	2015-01-26

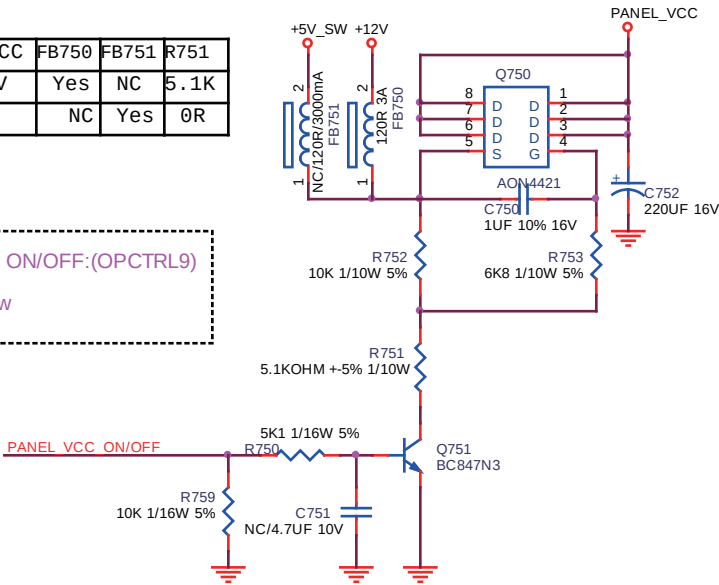
B02 System Power 2

B02

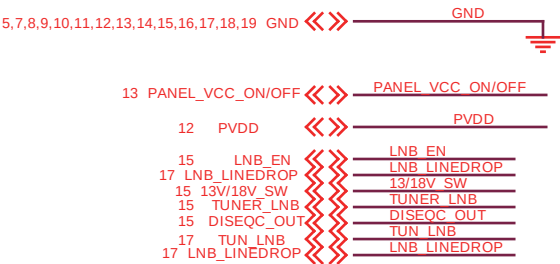
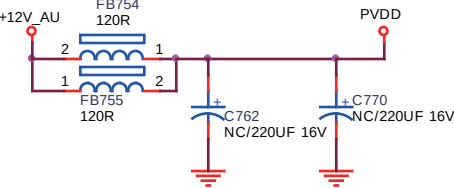
Panel VCC=12V or 5V

PANEL VCC	FB750	FB751	R751
+12V	Yes	NC	5.1K
+5V	NC	Yes	0R

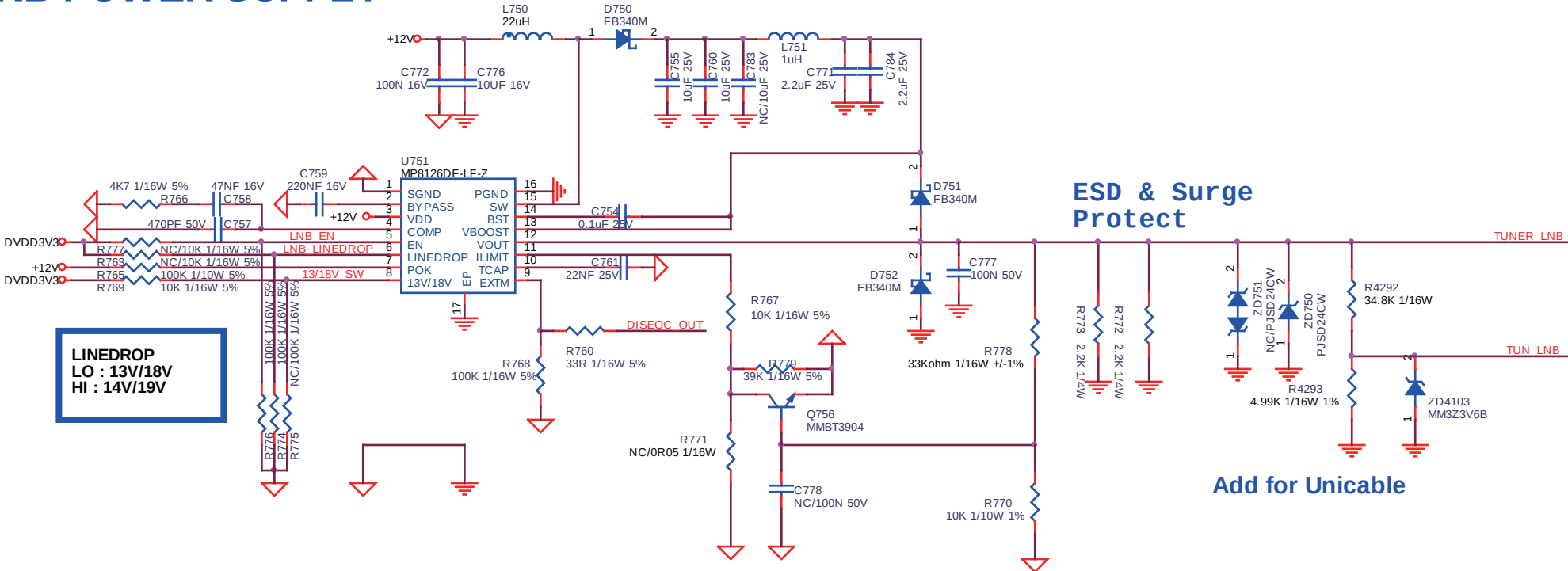
PANEL_VCC ON/OFF:(OPCTRL9)
Normal:High
Stand_By:Low



Audio VCC= +12V



LNB POWER SUPPLY

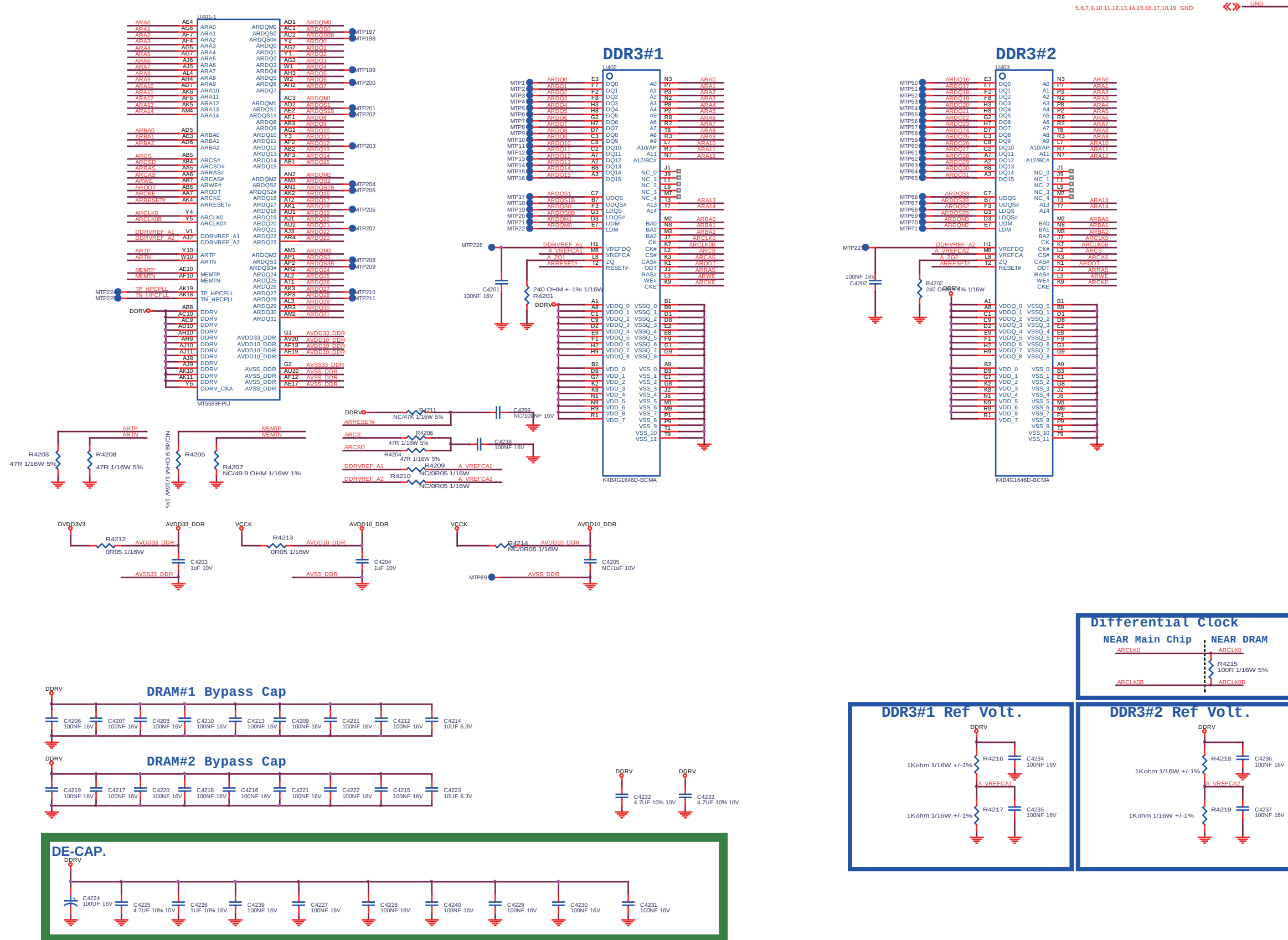


LINEDROP
LO : 13V/18V
HI : 14V/19V

ESD & Surge Protect

Add for Unicable

B04

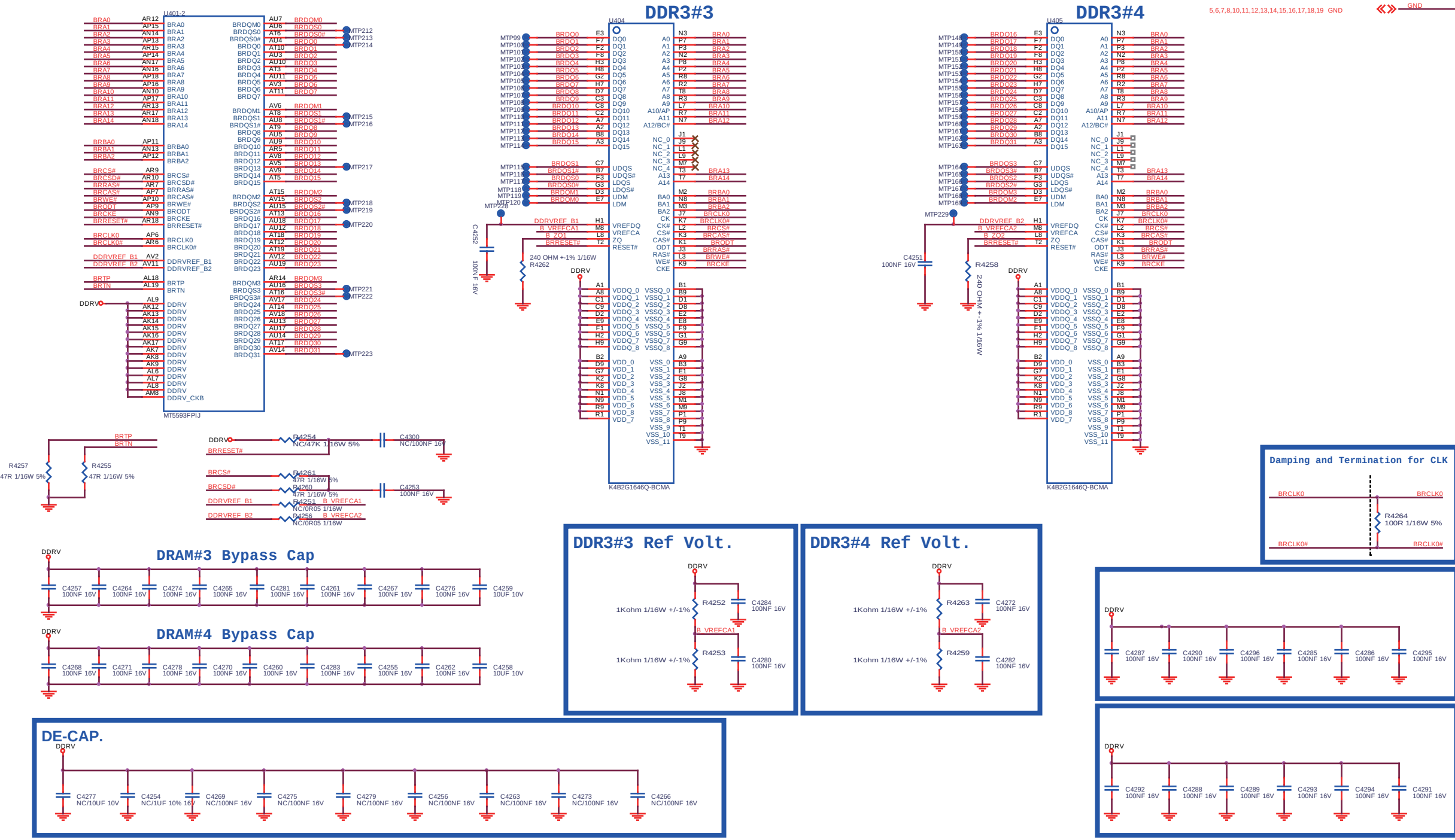


10-6-5 DDR3x2

B05

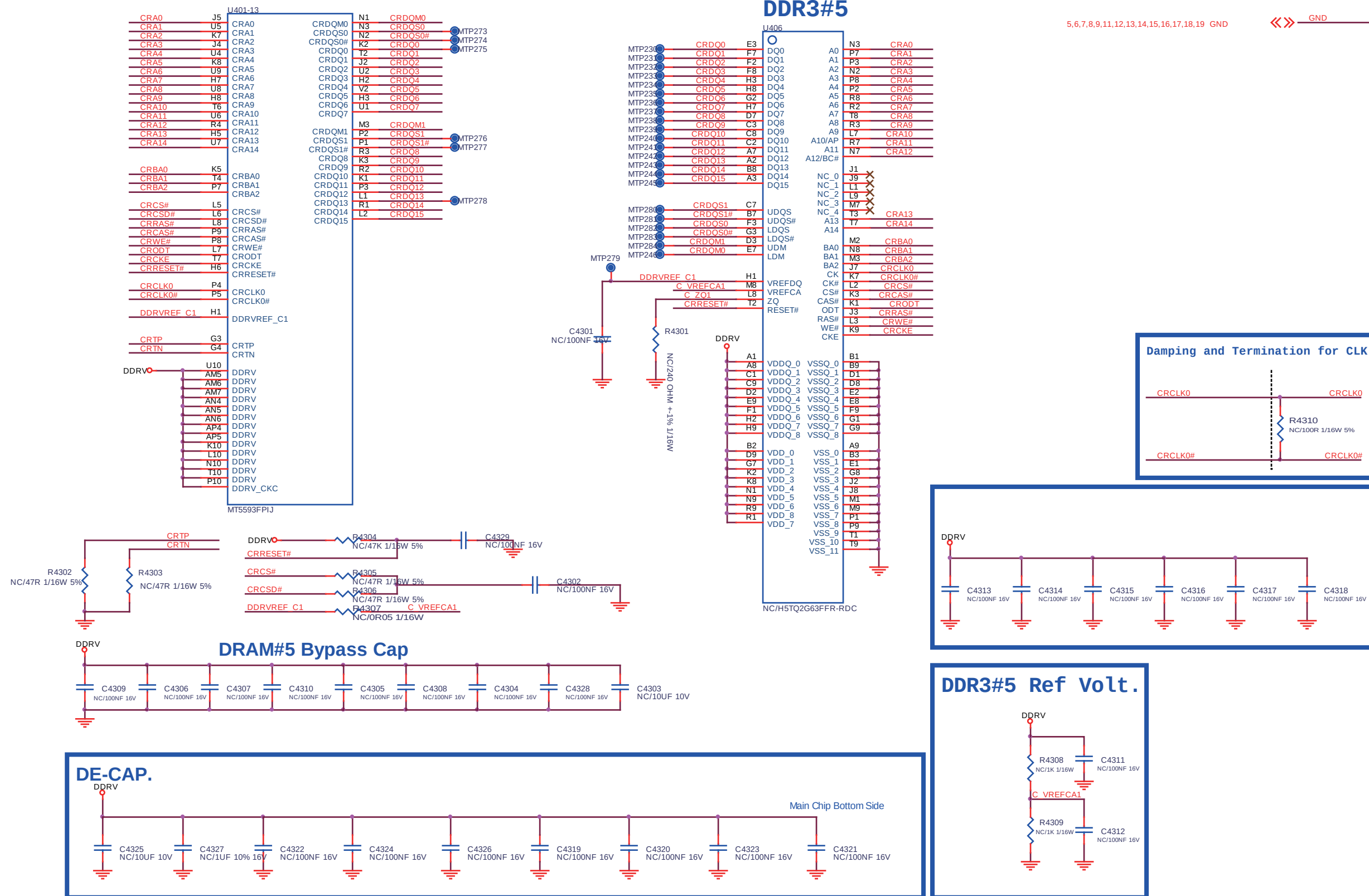
DDR3x2

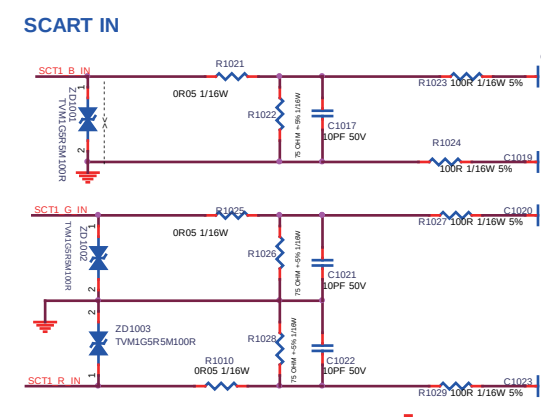
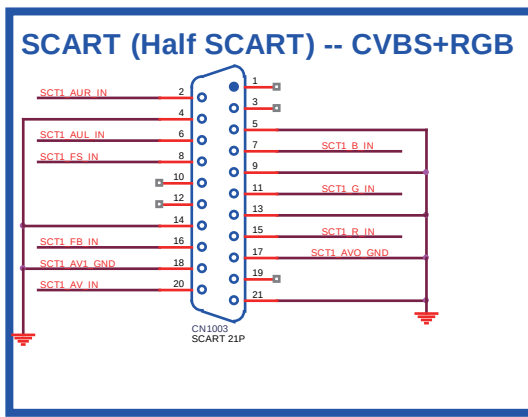
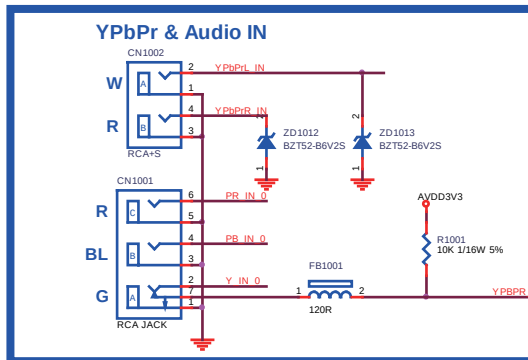
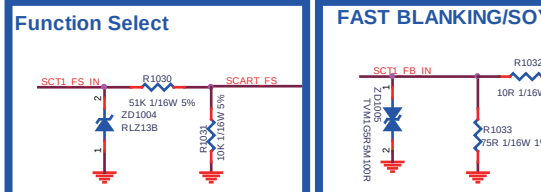
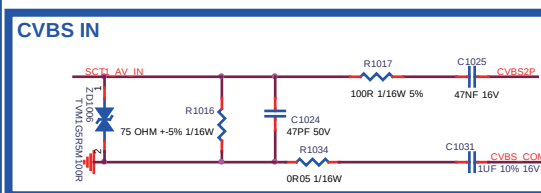
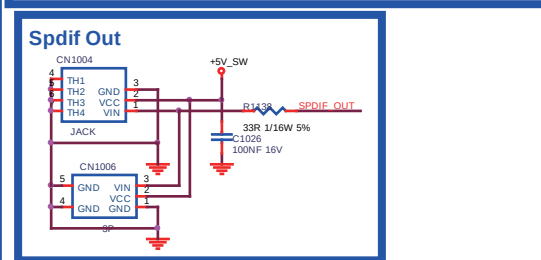
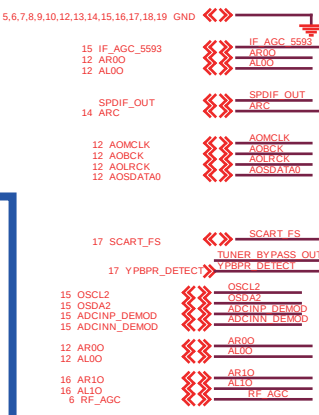
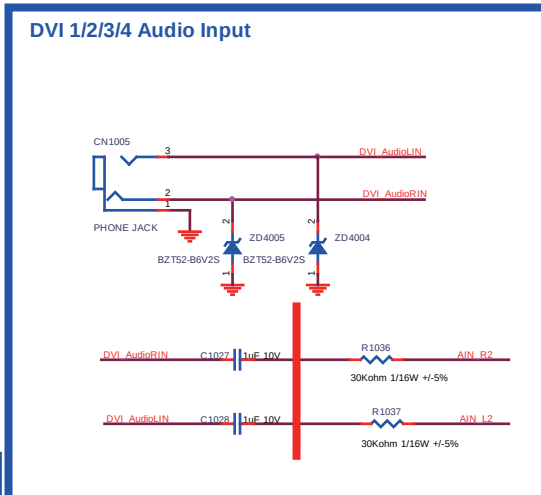
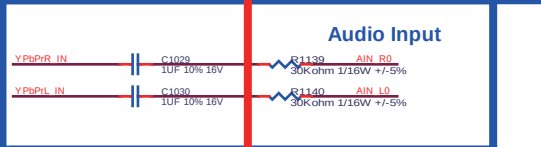
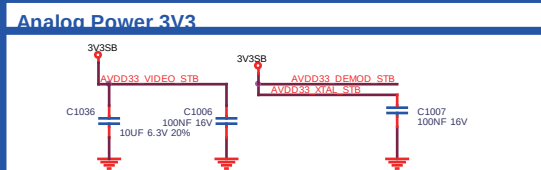
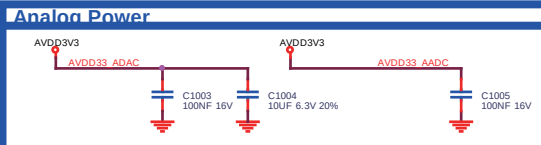
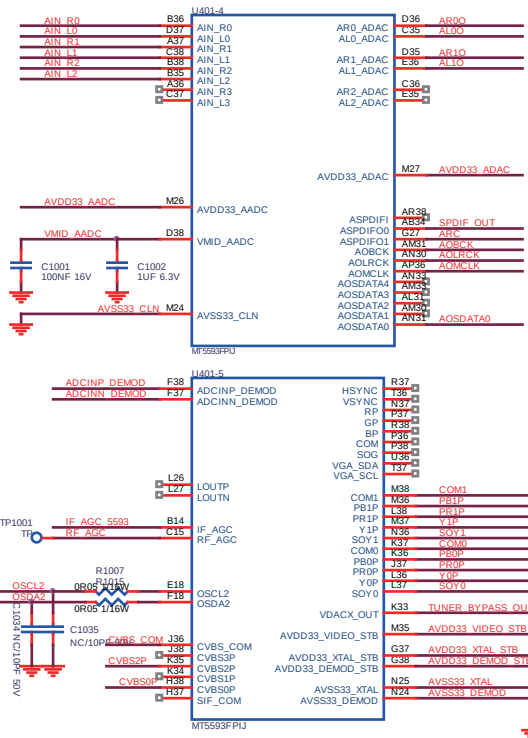
B05



DDR3x2	715G7030	C	2015-1-28

B06 DDR3x1



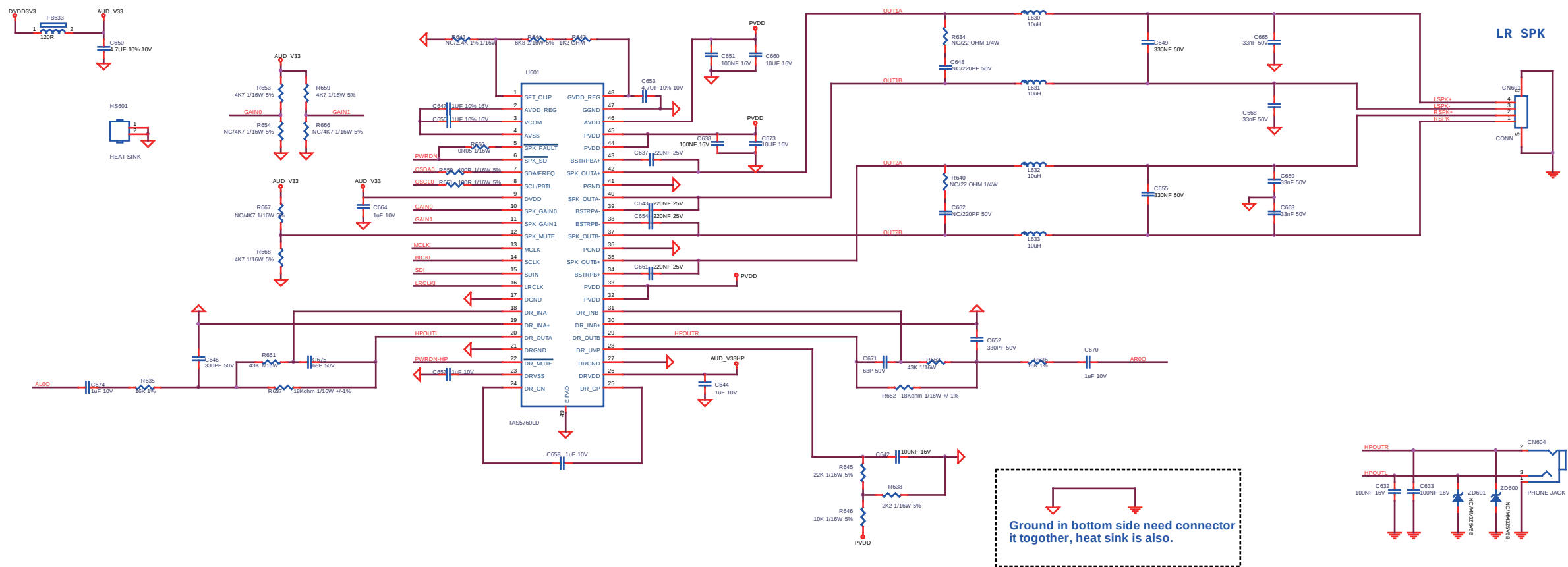
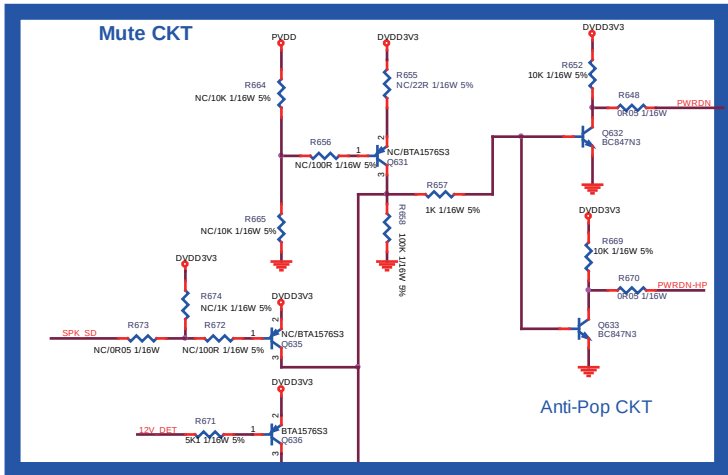
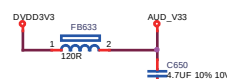
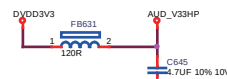
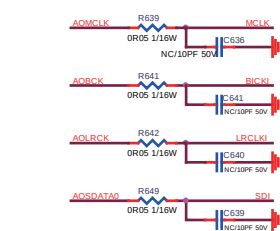


B08

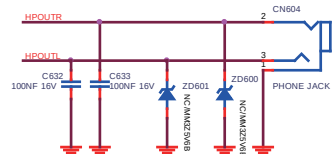
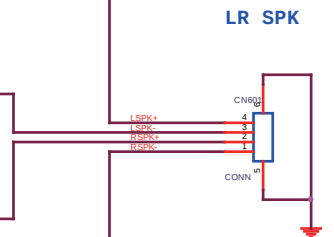
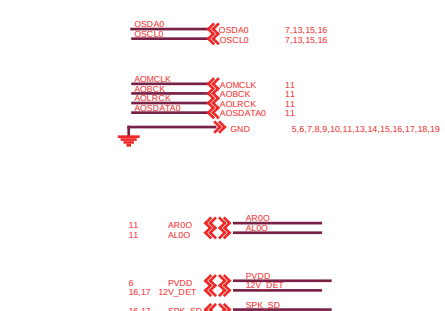
Speaker/Headphone

B08

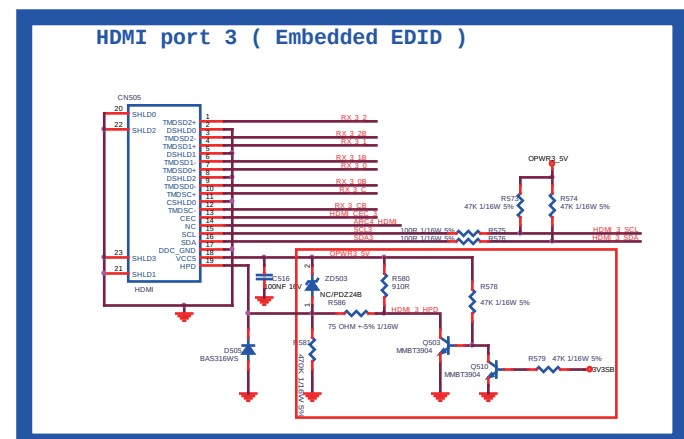
Main Speak CKT



Ground in bottom side need connector it together, heat sink is also.



Speaker/Headphone	715G7030	C	2015-1-08

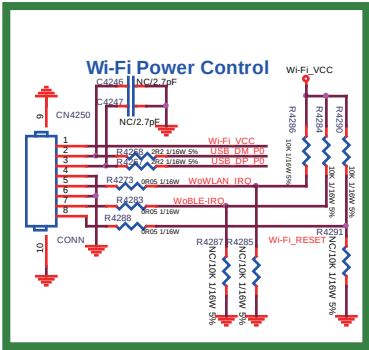
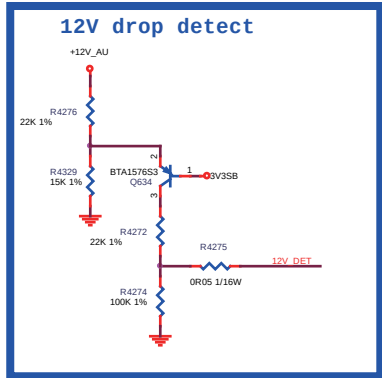
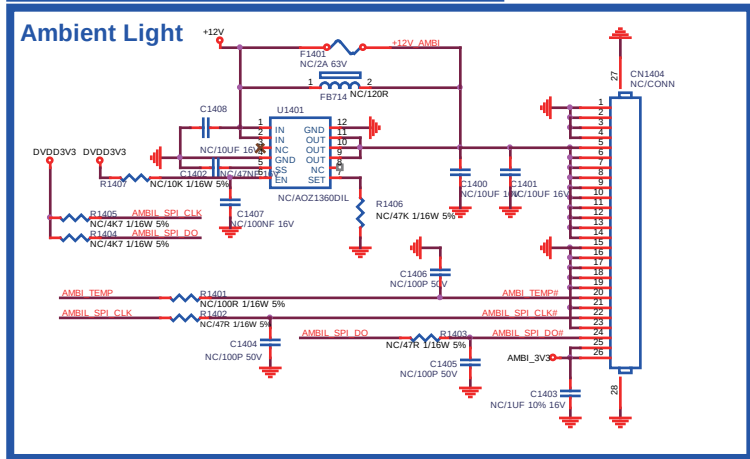
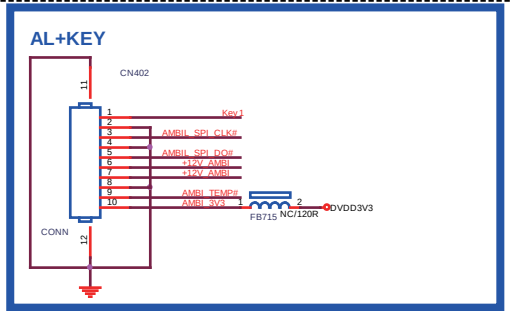
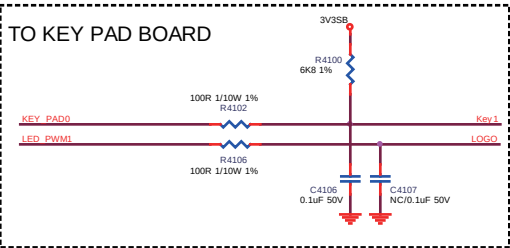


Model	Demod	R223/R224	R221/R222	R220/R217/C215/C216	R225/C217	R228/R229/C219	C249/C251
H	NC	NC	Yes	NC	NC	NC	NC
T	T2 S12168	Yes	NC	NC	Yes	NC	NC
K	S2 S12166	NC	Yes	Yes	NC	Yes	Yes
S	T2/S2 S12169	Yes	NC	Yes	Yes	Yes	Yes

B12

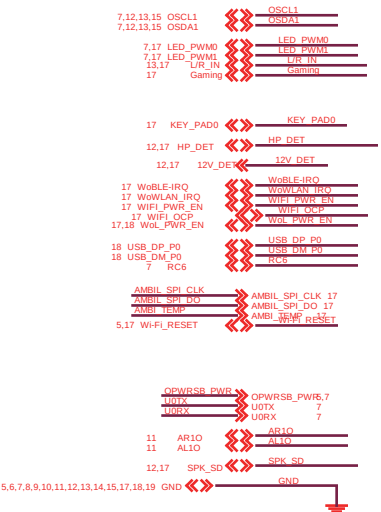
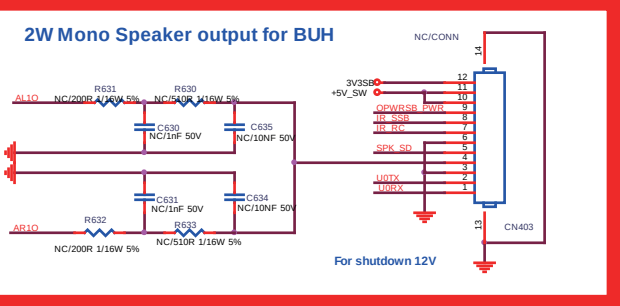
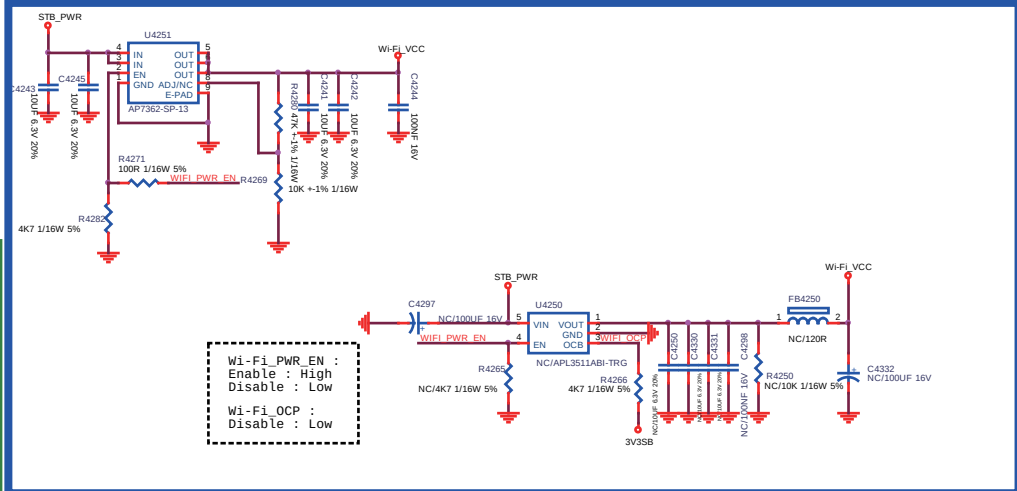
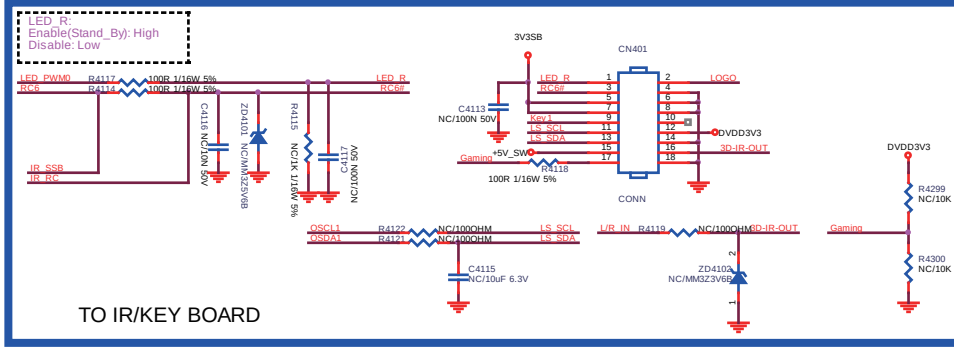
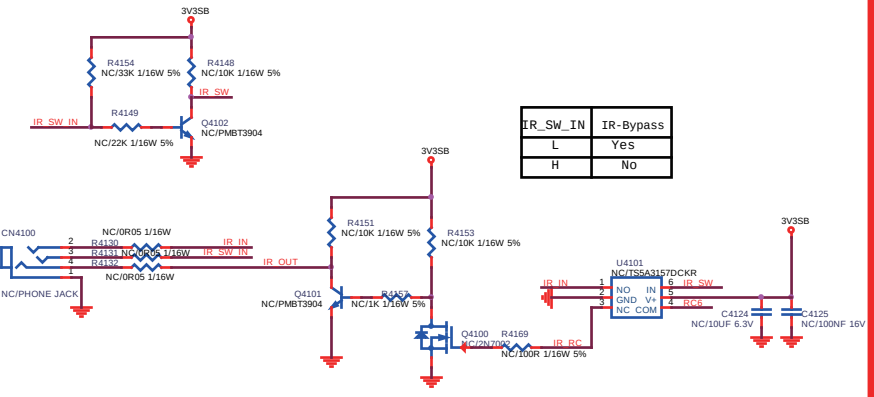
Connector

B12



Item	Function	BUH	Non-BUH
C4124 / C4125 CN4100 / Q4100 Q4101 / Q4102 R4130 / R4131 R4132 / R4148 R4149 / R4151 R4153 / R4154 R4157 / R4169 U4101	IR IN/ OUT	Yes	NO
C630 / C631 C634 / C635 CN602 / R630 R631 / R632 R633	2W Mono Speaker output for Bolt-on Board	Yes	NO
R4114		NO	Yes

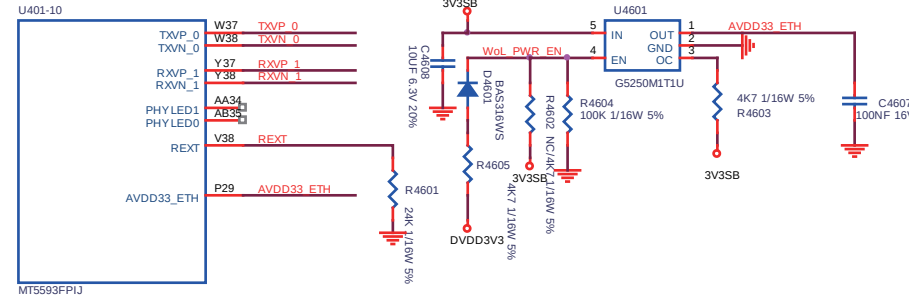
HTV IR IN/OUT



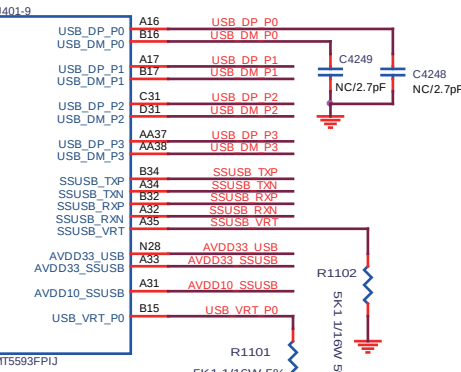
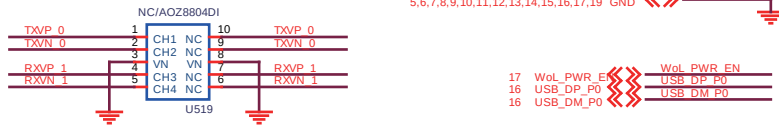
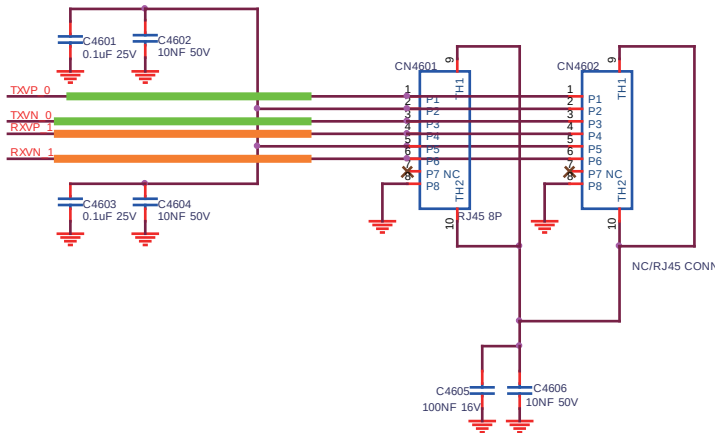
B14 USB/ETHERNET PHY

B14

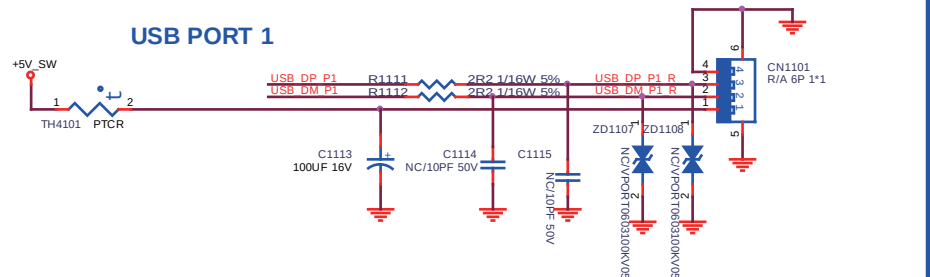
ETHERNET PHY



RJ45

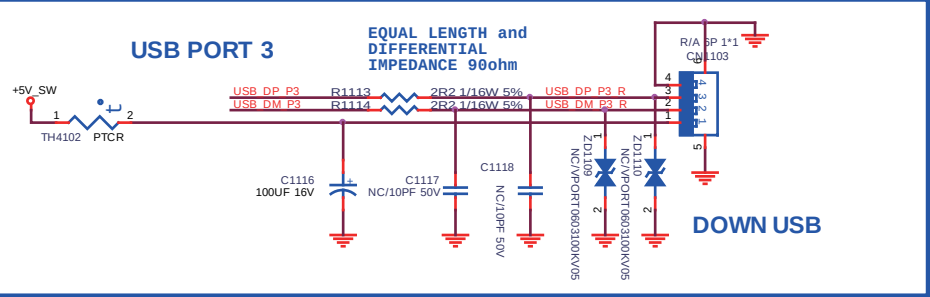


USB PORT 1



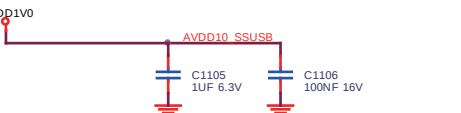
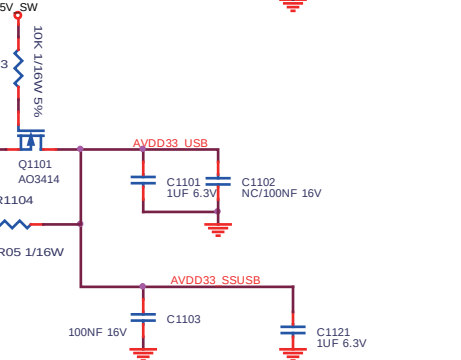
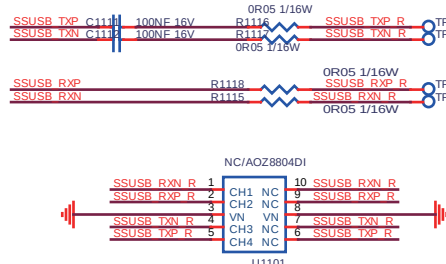
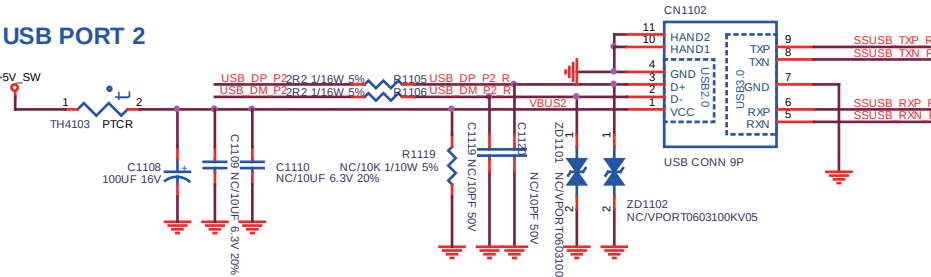
USB PORT 3

EQUAL LENGTH and DIFFERENTIAL IMPEDANCE 90ohm



DOWN USB

USB PORT 2

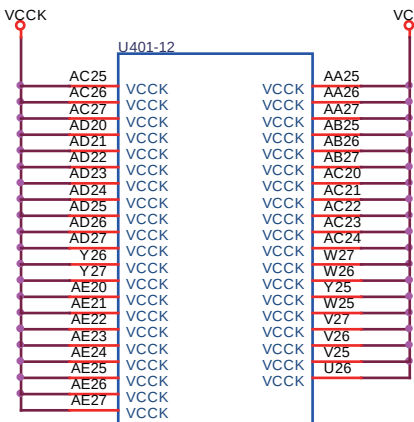
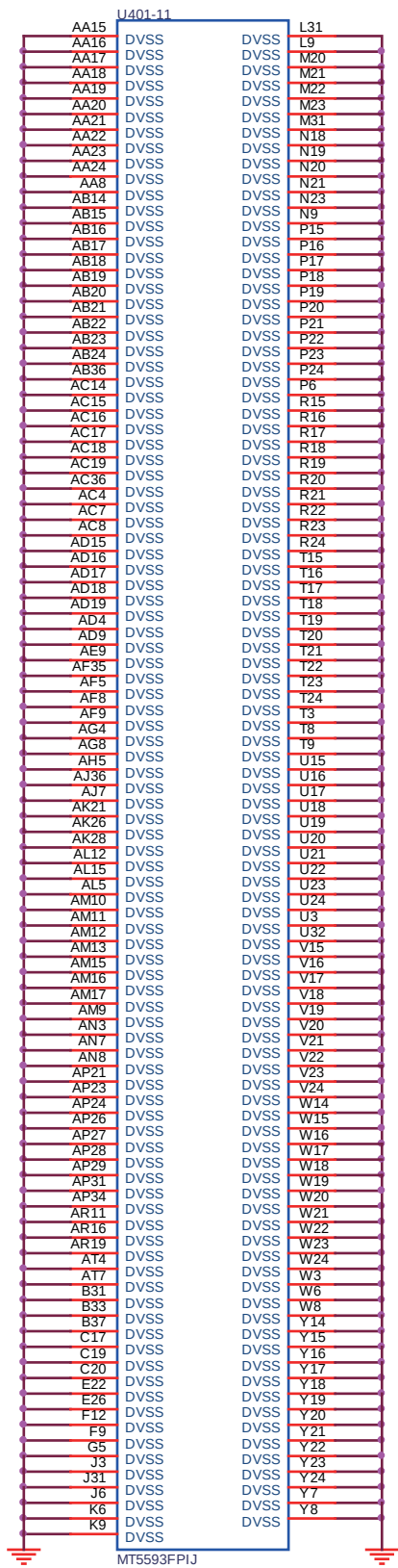


10-6-15 VCCK & DVSS

B15

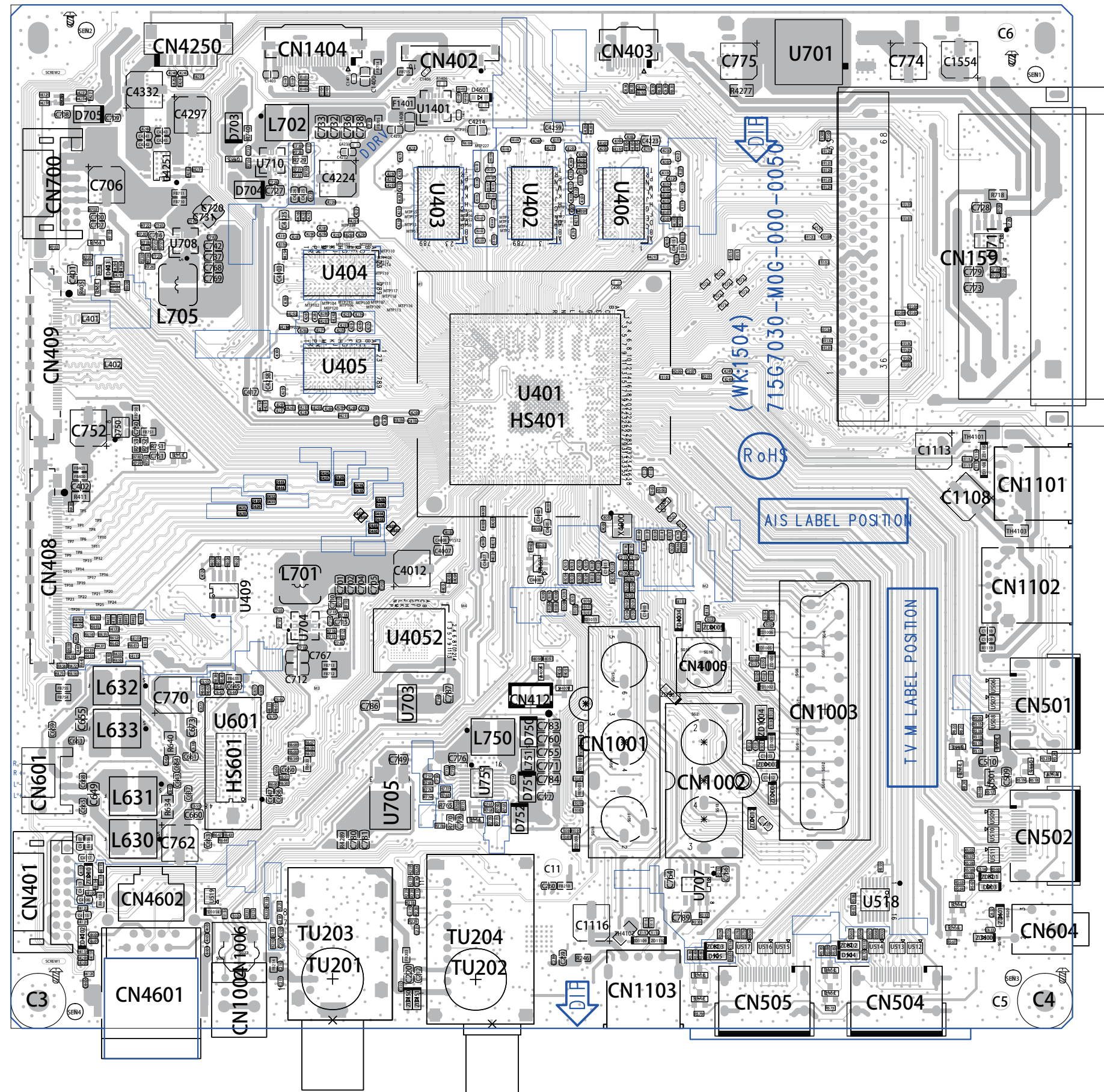
VCCK & DVSS

B15

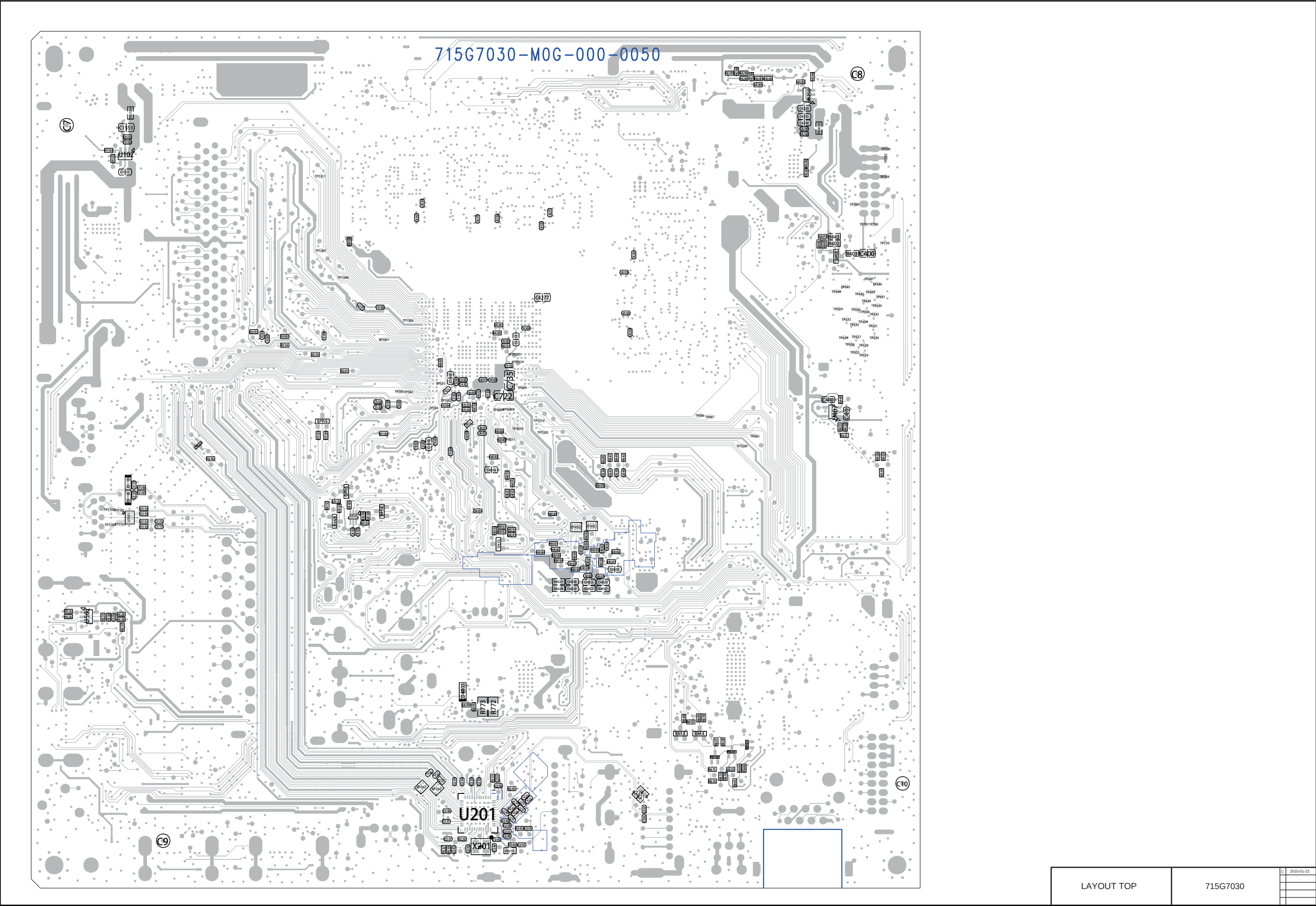


VCCK & DVSS	715G7030	C	2015-1-08

10-6-16 SSB layout top

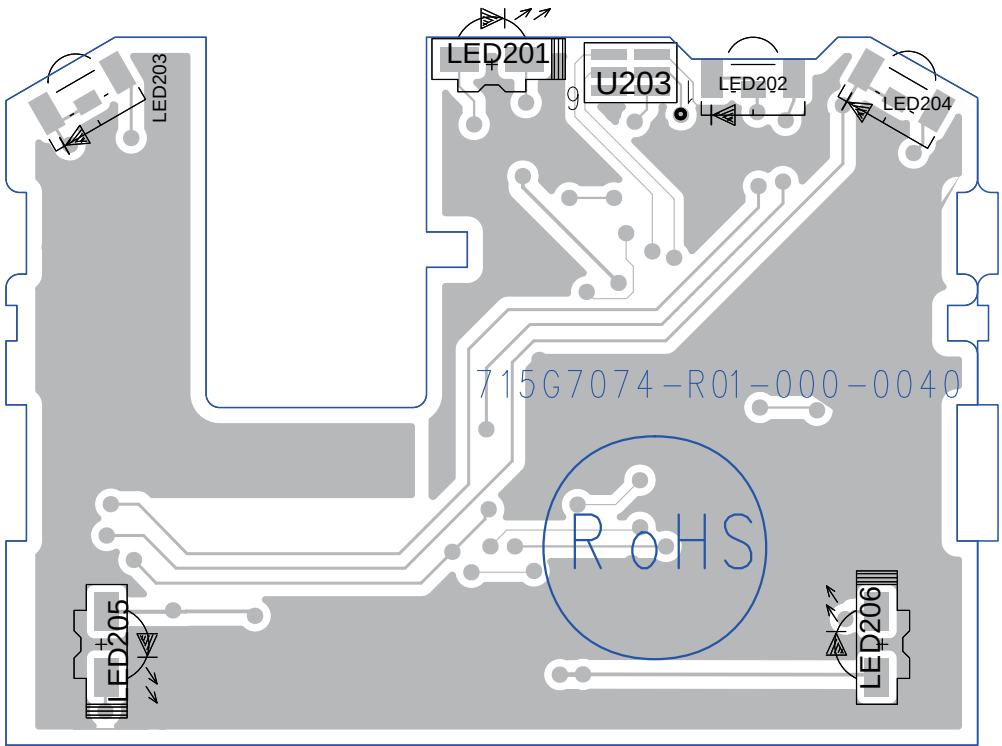


10-6-17 SSB layout bottom

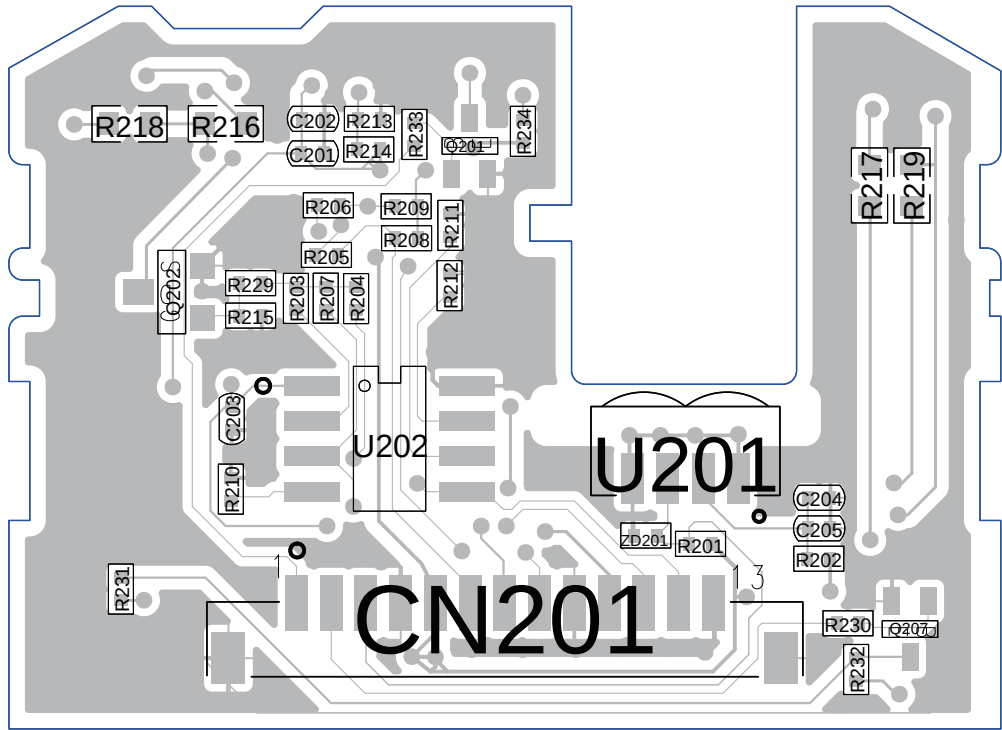


10-7-2 IR/LED board layout

Layout IR/LED panel (top side)

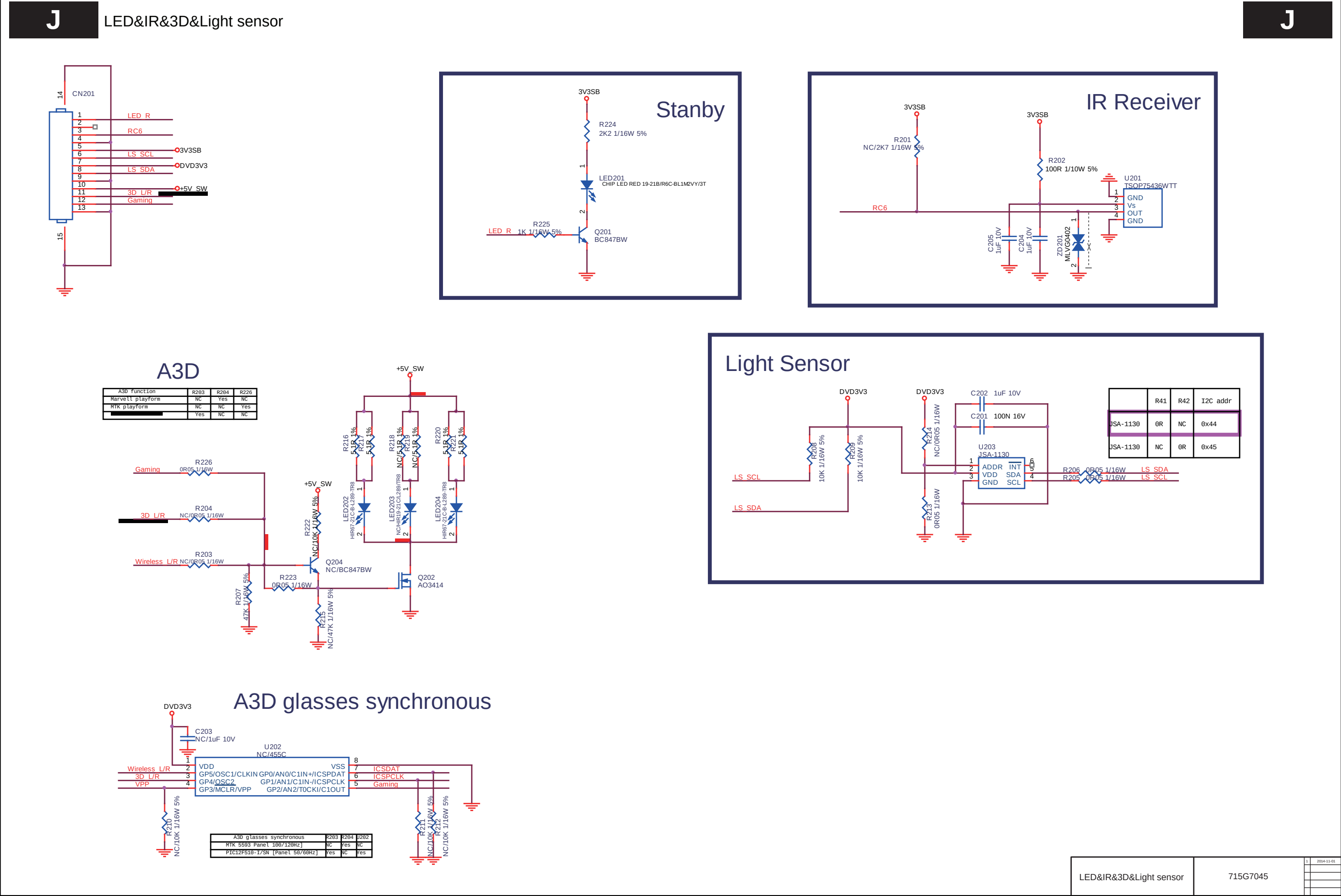


Layout IR/LED panel (bottom side)

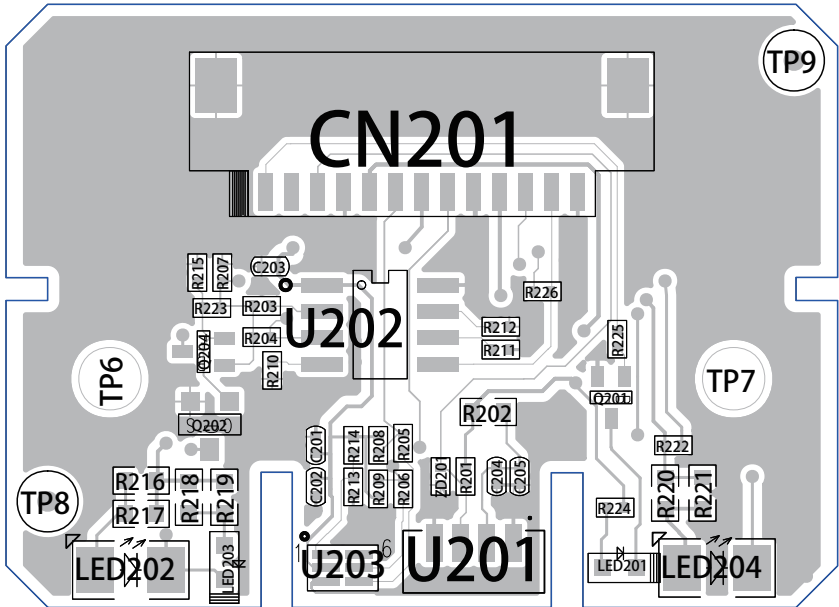


IR/LED panel layout top/bottom	715G7074	

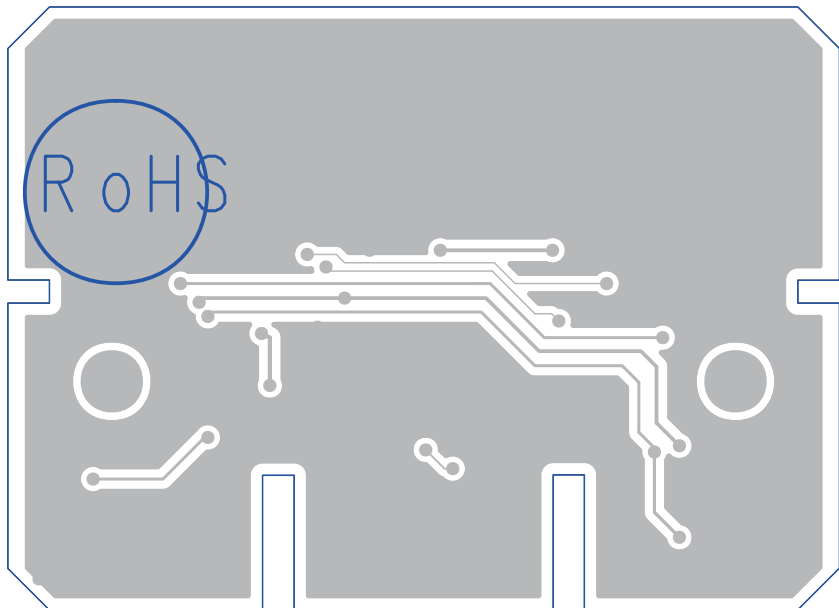
10.8 J 715G7045 IR/LED Panel
10-8-1 LED&IR&3D&Light sensor



Layout LED Board (top side)



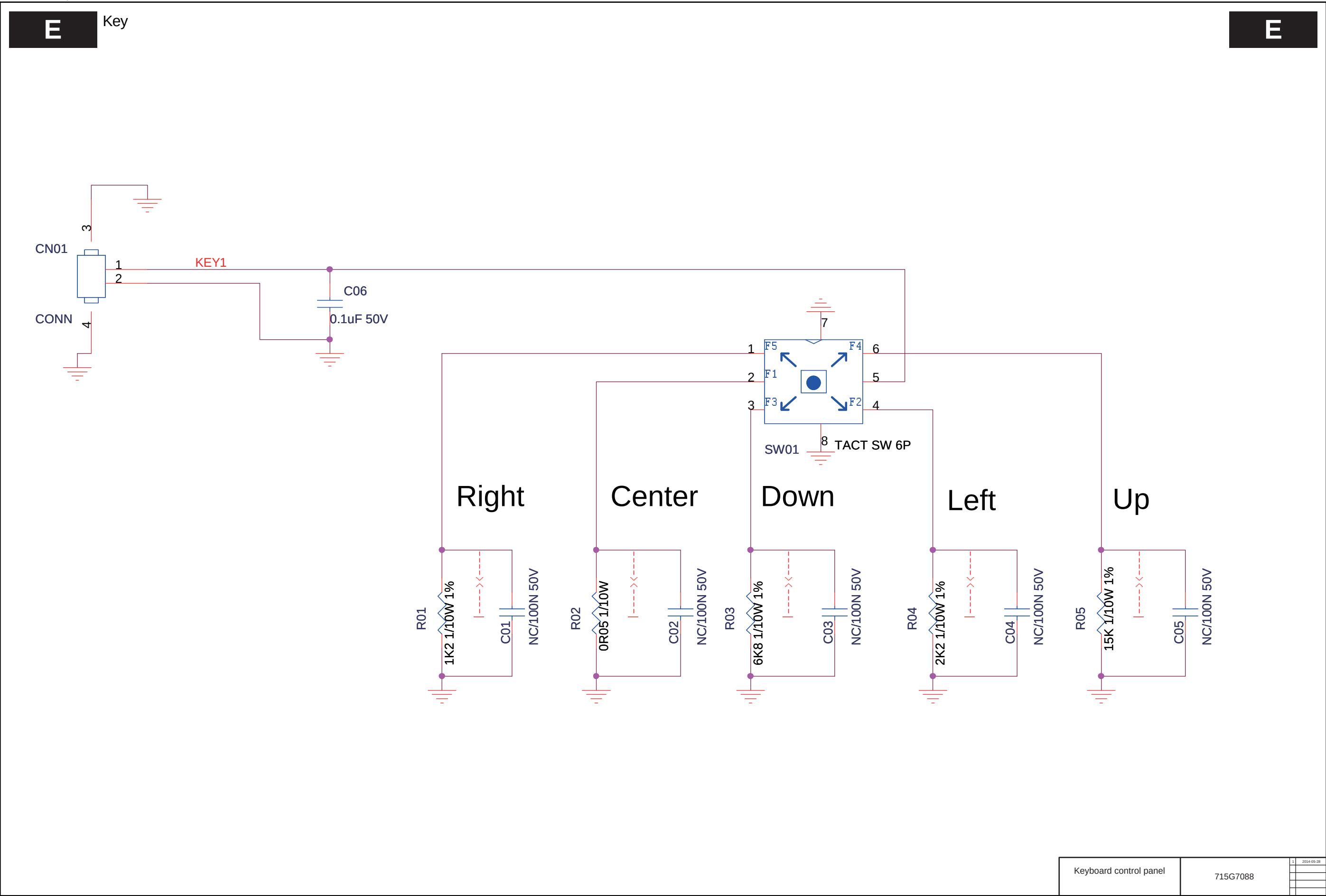
Layout LED Board (bottom side)



LED Board layout top/bottom	715G7045	1	2014-11-04

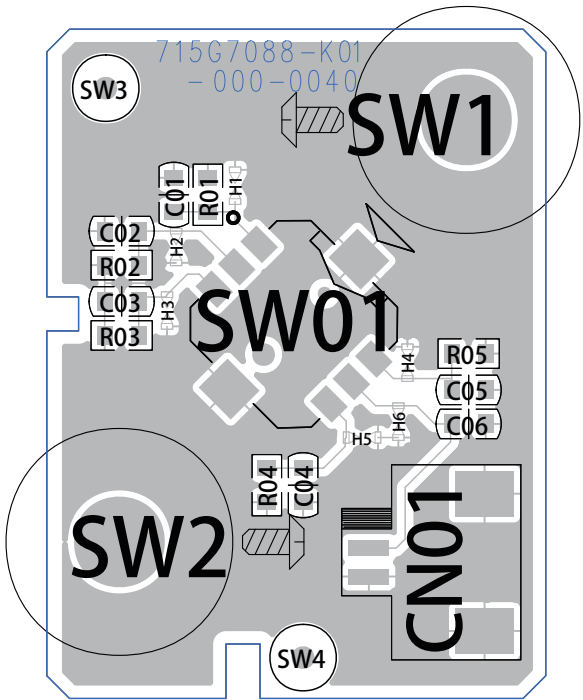
10.9 E 715G7088 Keyboard control panel

10-9-1 Key

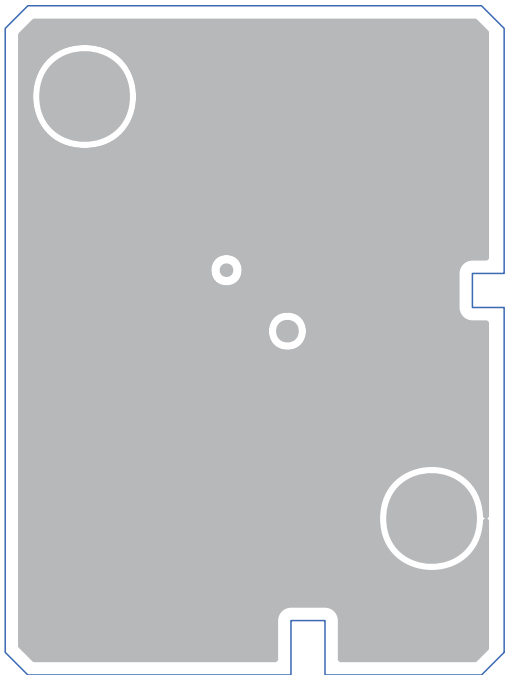


10-9-2 Key board layout

Layout Keyboard control panel (top side)



Layout Keyboard control panel (bottom side)



Keyboard control panel layout top/bottom	715G7088	1	2014-06-08

10.10 E 715G7118 Keyboard control panel

10-10-1 Key

E

Key

E

CONN TO SSB

JOYSTICK

TO AMBI LIGHT (AL2/AL3)

Key+AL Side

Main Board Side

10	10	10	AL3 TI/AMS
10	8	10	AL3 TI only
10	6	10	AL2 TI only
13	13	13	AL4 TI/AMS

Direction

switch

Key function

Resistance

Voltage

Center	2-5 short	Menu	0R	0V
Right	1-5 short	CH+	1K2	0.5V
Left	4-5 short	CH-	2K2	0.81V
Down	3-5 short	VOL-	6K8	1.65V
Up	6-5 short	VOL+	15K	2.27V
		No function		3.3V

Joystick circuit diagram

	pin1	pin2	pin3	pin4	pin5	pin6
F1						
F2						
F3						
F4						
F5						

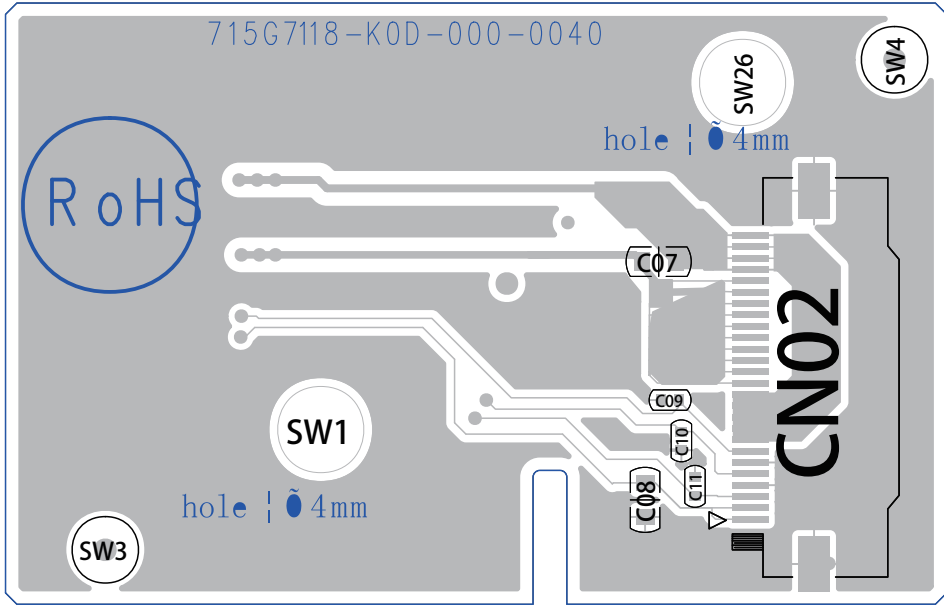
KEY	715G7118	1	2014-08-26

19792_510.eps

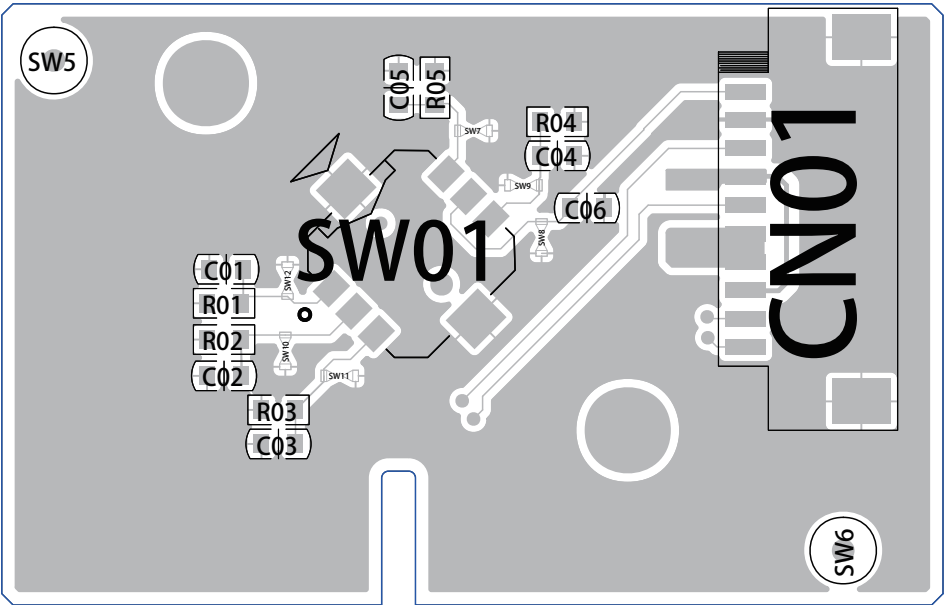
2015-Sep-30 [back to div table](#)

10-10-2 Key board layout

Layout Keyboard control panel (top side)



Layout Keyboard control panel (bottom side)



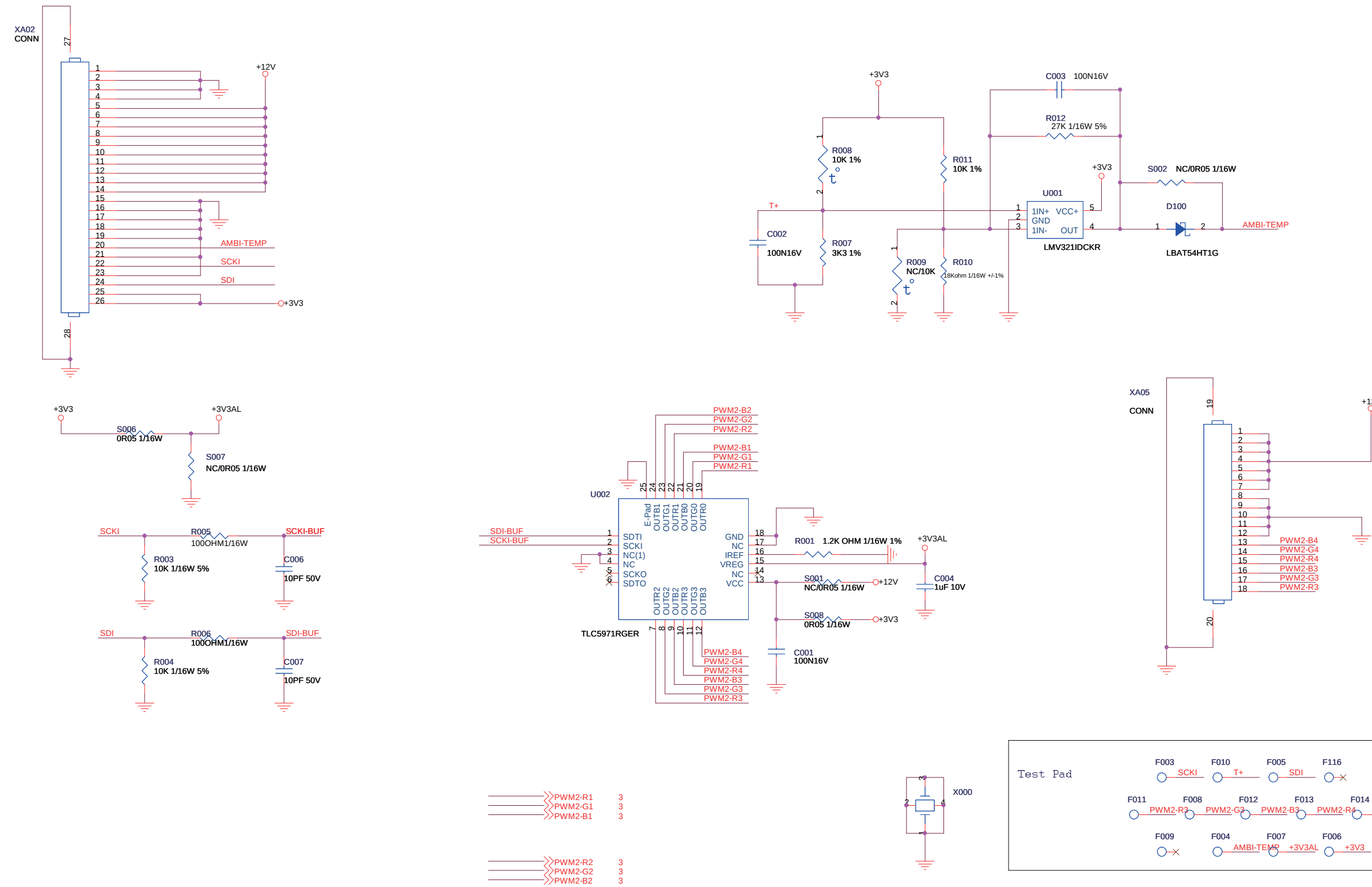
Keyboard control panel layout top/bottom	715G7118	1	2014-11-08

10.11 AL 715G7035 Ambilight Board
10-11-1 TCL5971

AL01

TCL5971

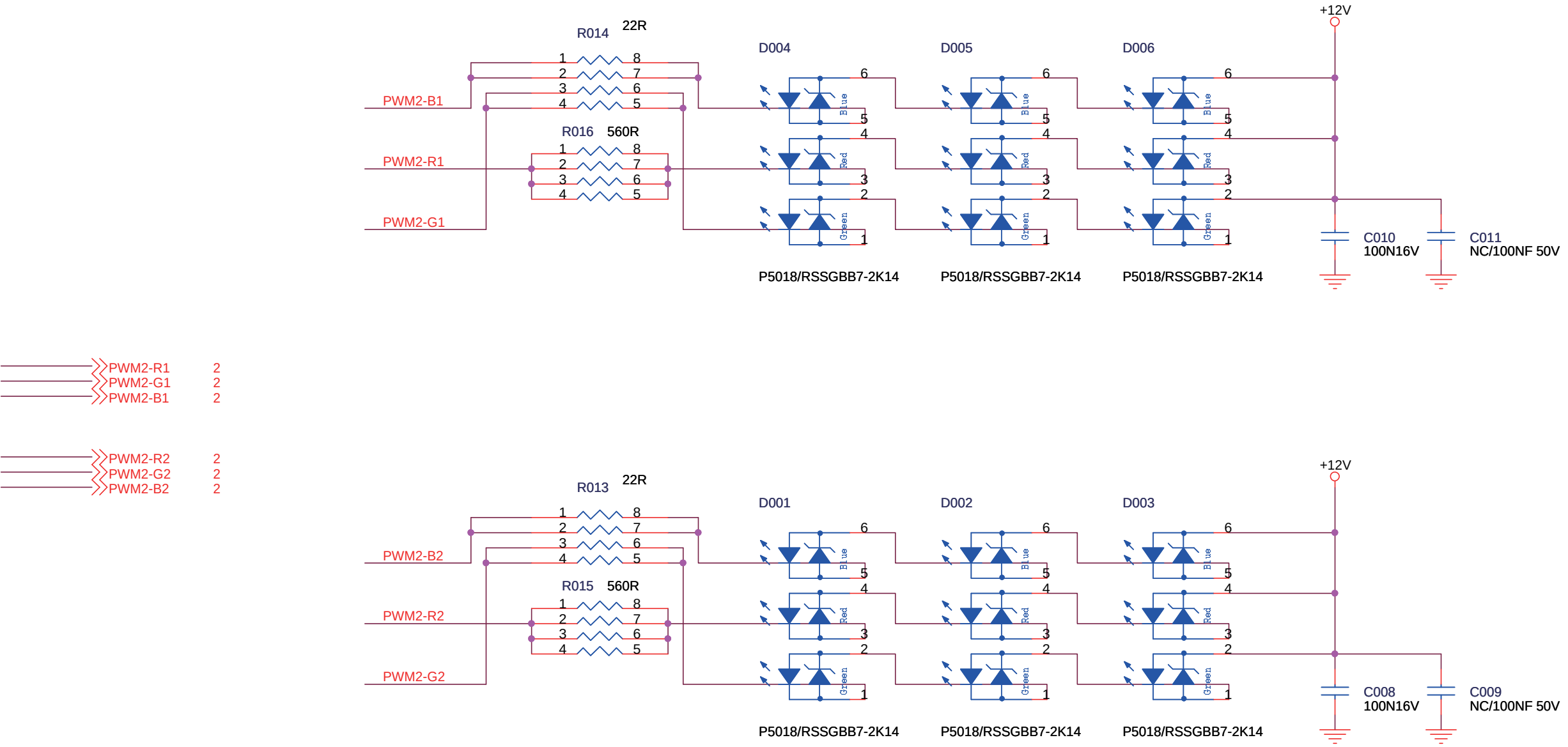
AL01



TCL5971	715G7035	2014-09-01

AL02 Ambilight 6-LED Master Clockwise

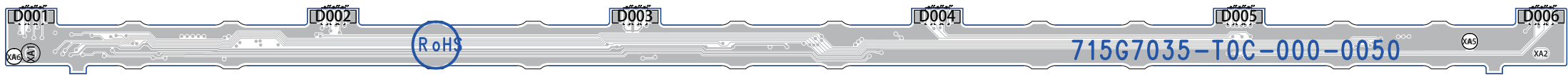
AL02



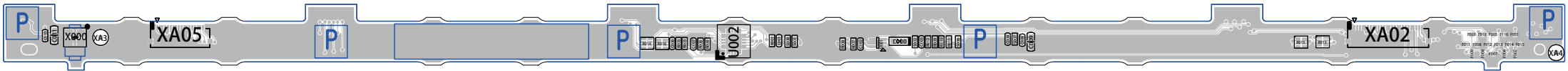
Ambilight 6-LED Master Clockwise	715G7035	2014-05-07

10-11-3 Ambilight Board layout

Layout Amblilght Board (top side)

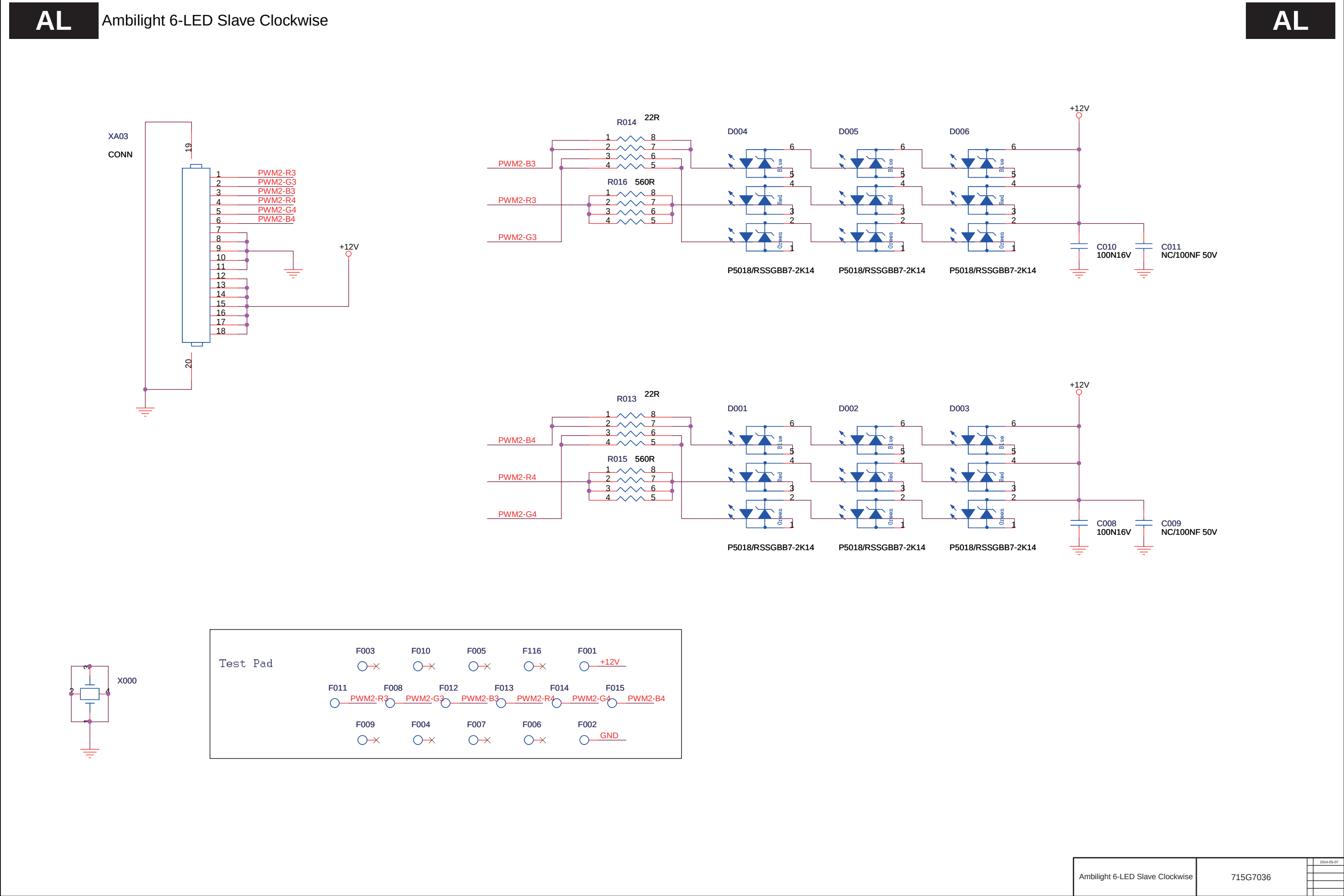


Layout Amblilght Board (bottom side)



Ambilight Board layout top/bottom	715G7035	1	2014-04-28

10.12 AL 715G7036 Ambilight Board
10-12-1 Ambilight 6-LED Slave Clockwise



Ambilight 6-LED Slave Clockwise

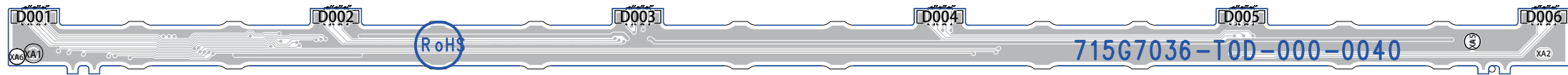
715G7036

2014-09-07

19792_517.eps

10-12-2 Ambilight Board layout

Layout Ambilight Board (top side)



Layout Ambilight Board (bottom side)



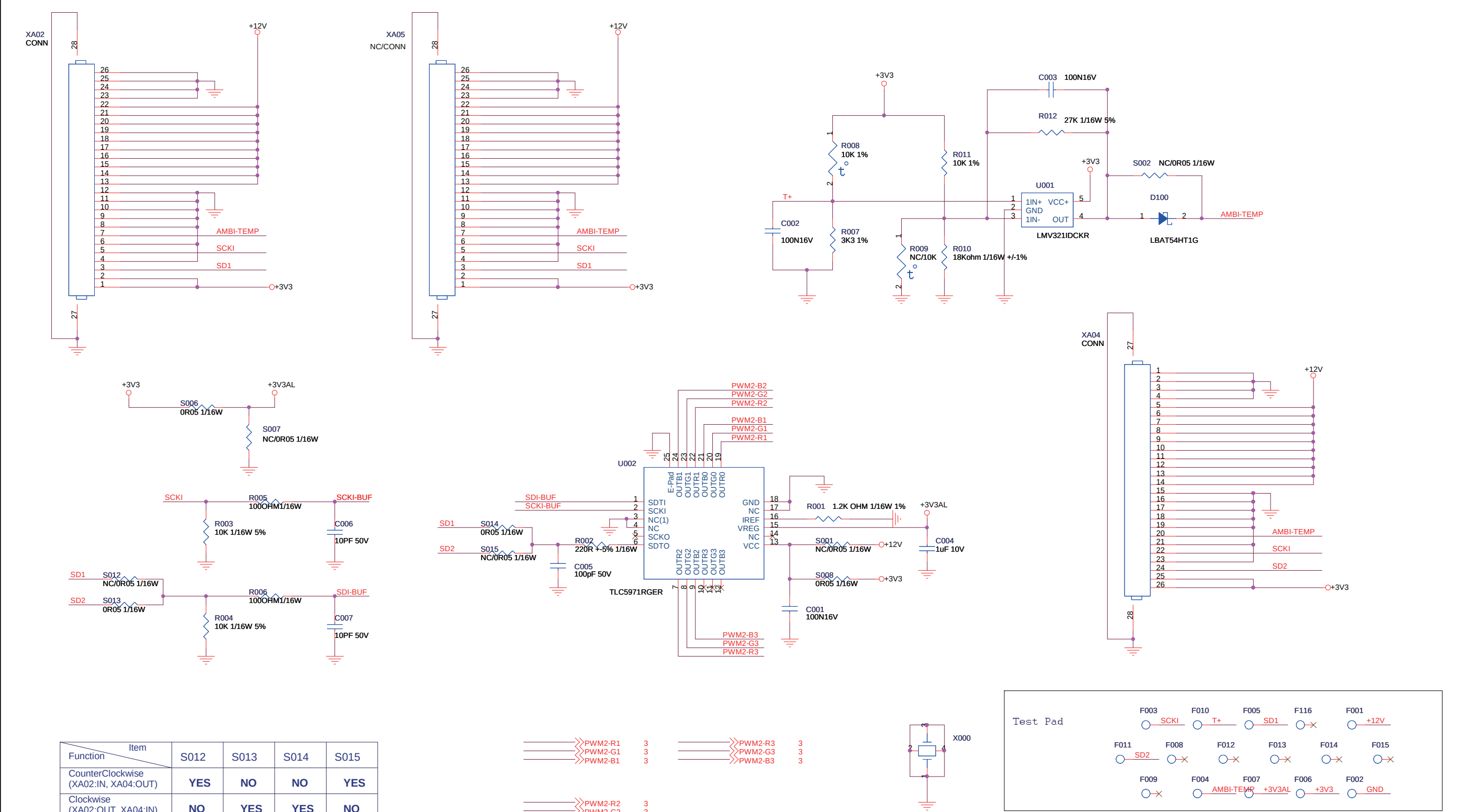
Ambilight Board layout top/bottom	715G7036	1	2014-11-01

10.13 AL 715G6981 Ambilight Board
10-13-1 TCL5971

AL01

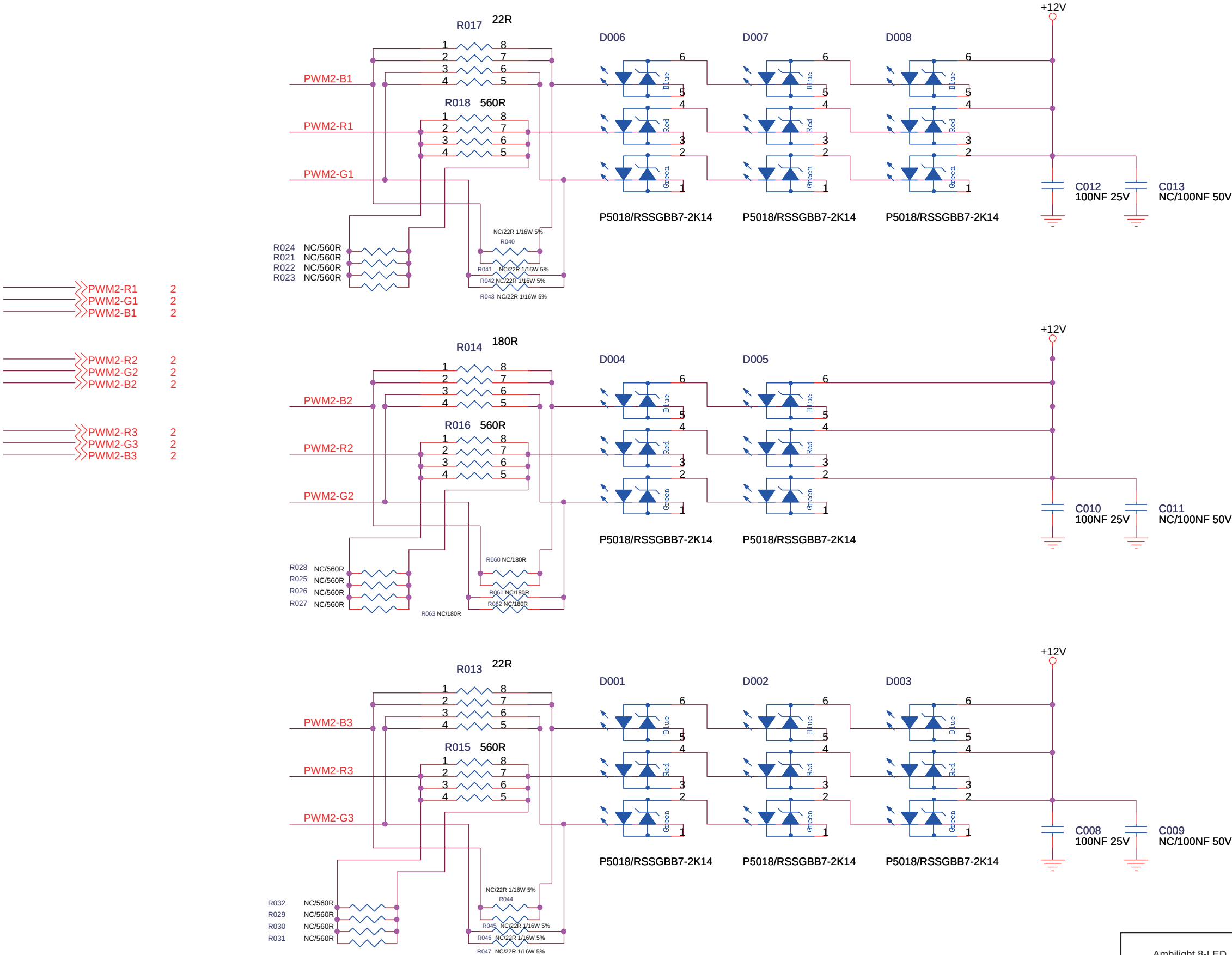
TCL5971

AL01



AL02 Ambilight 8-LED

AL02



Ambilight 8-LED	715G6981	2014-05-07

10-13-3 Ambilight Board layout

Layout Ambilight Board (top side)



Layout Ambilight Board (bottom side)

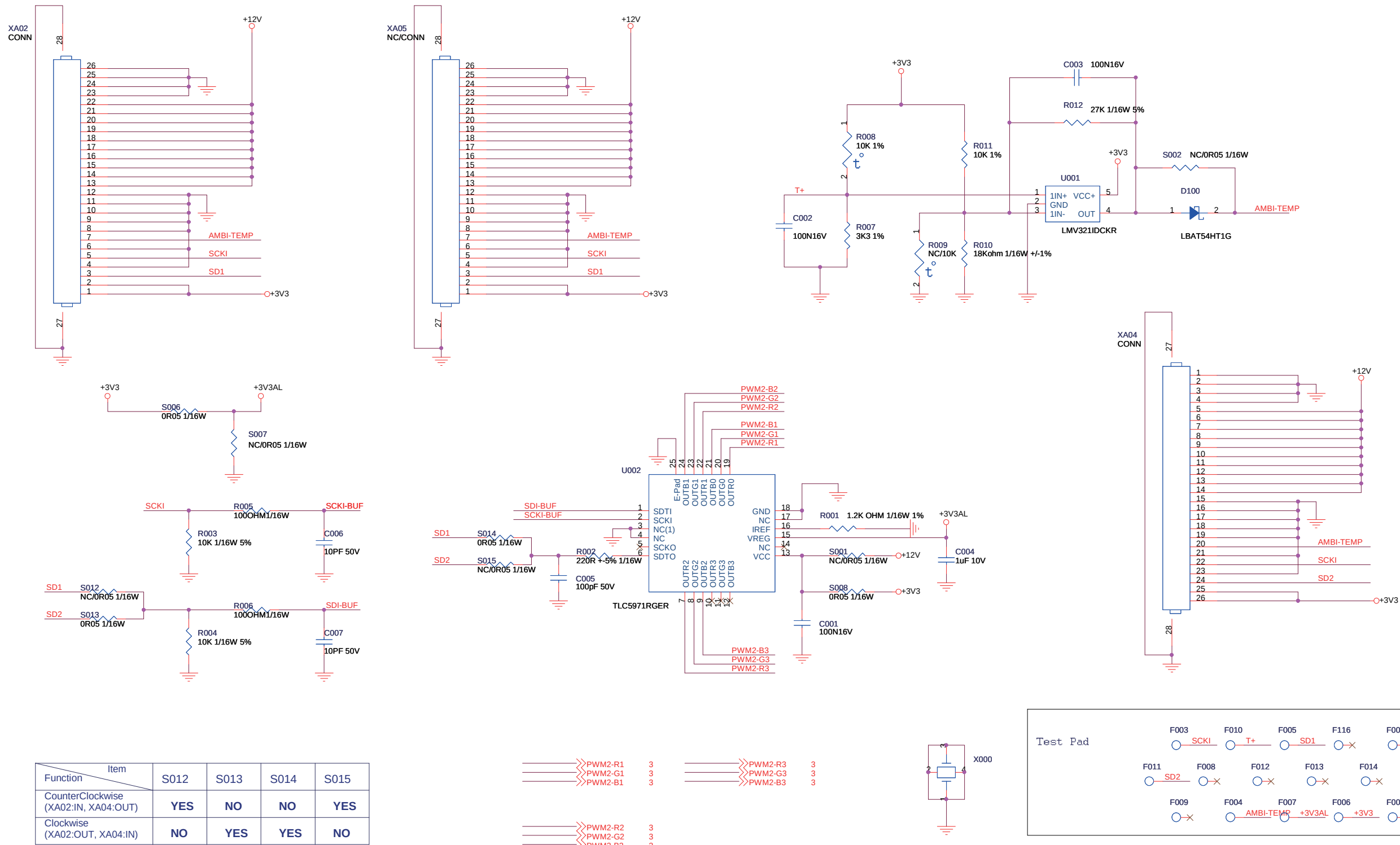


Ambilight Board layout top/bottom	715G6981	1	2014-10-22

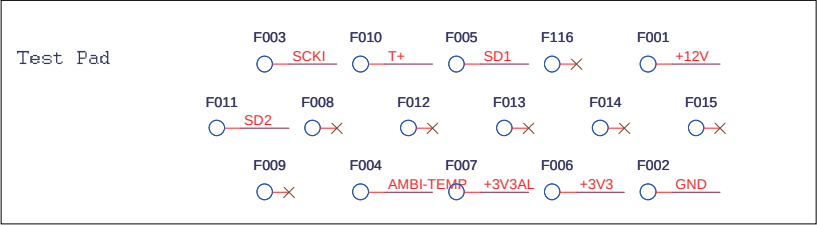
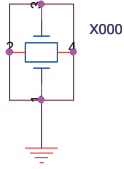
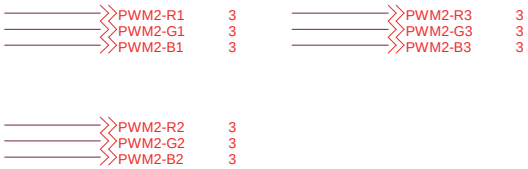
10.14 AL 715G7004 Ambilight Board
10-14-1 TCL5971

AL01 TCL5971

AL01



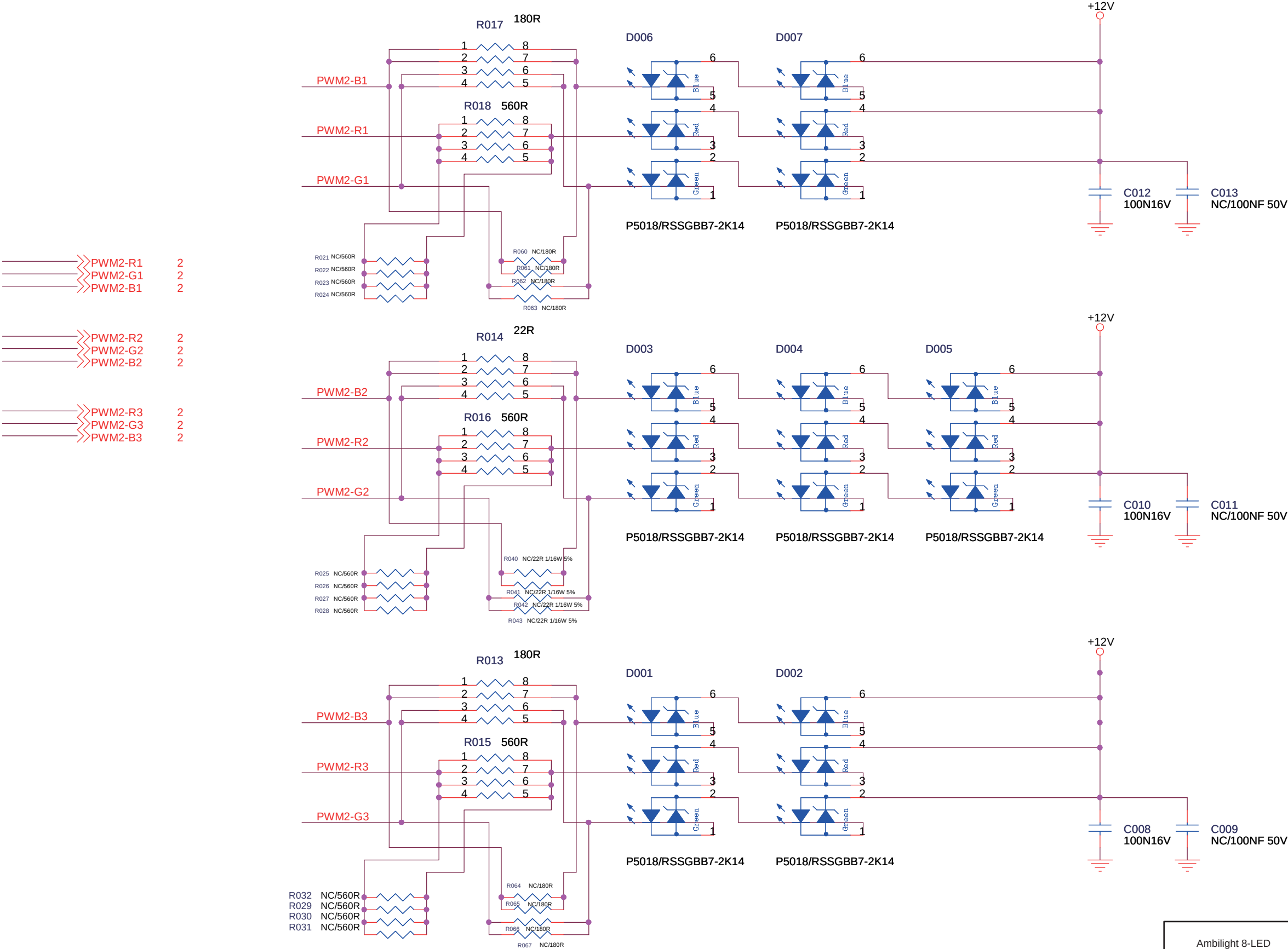
Function \ Item	S012	S013	S014	S015
CounterClockwise (XA02:IN, XA04:OUT)	YES	NO	NO	YES
Clockwise (XA02:OUT, XA04:IN)	NO	YES	YES	NO



10-14-2 Ambilight 8-LED

AL02 Ambilight 8-LED

AL02

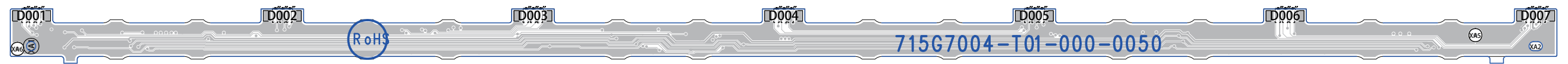


Ambilight 8-LED	715G7004	2014-07-01

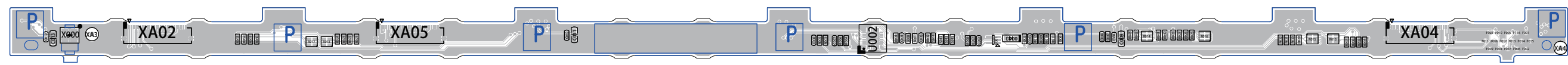
19792_520.eps

10-14-3 Ambilight Board layout

Layout Ambilight Board (top side)

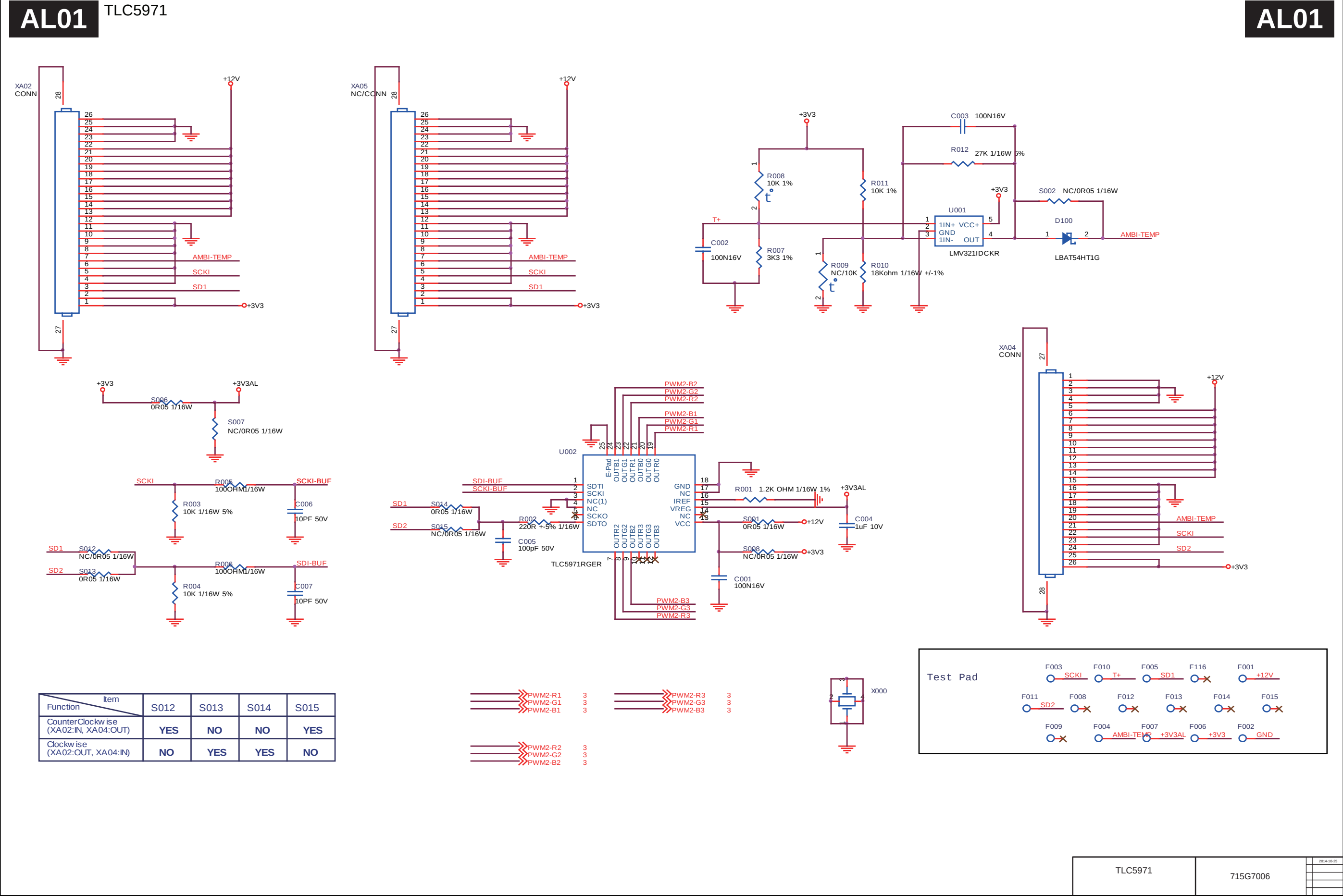


Layout Ambilight Board (bottom side)



Ambilight Board layout top/bottom	715G7004	1	2014-10-01

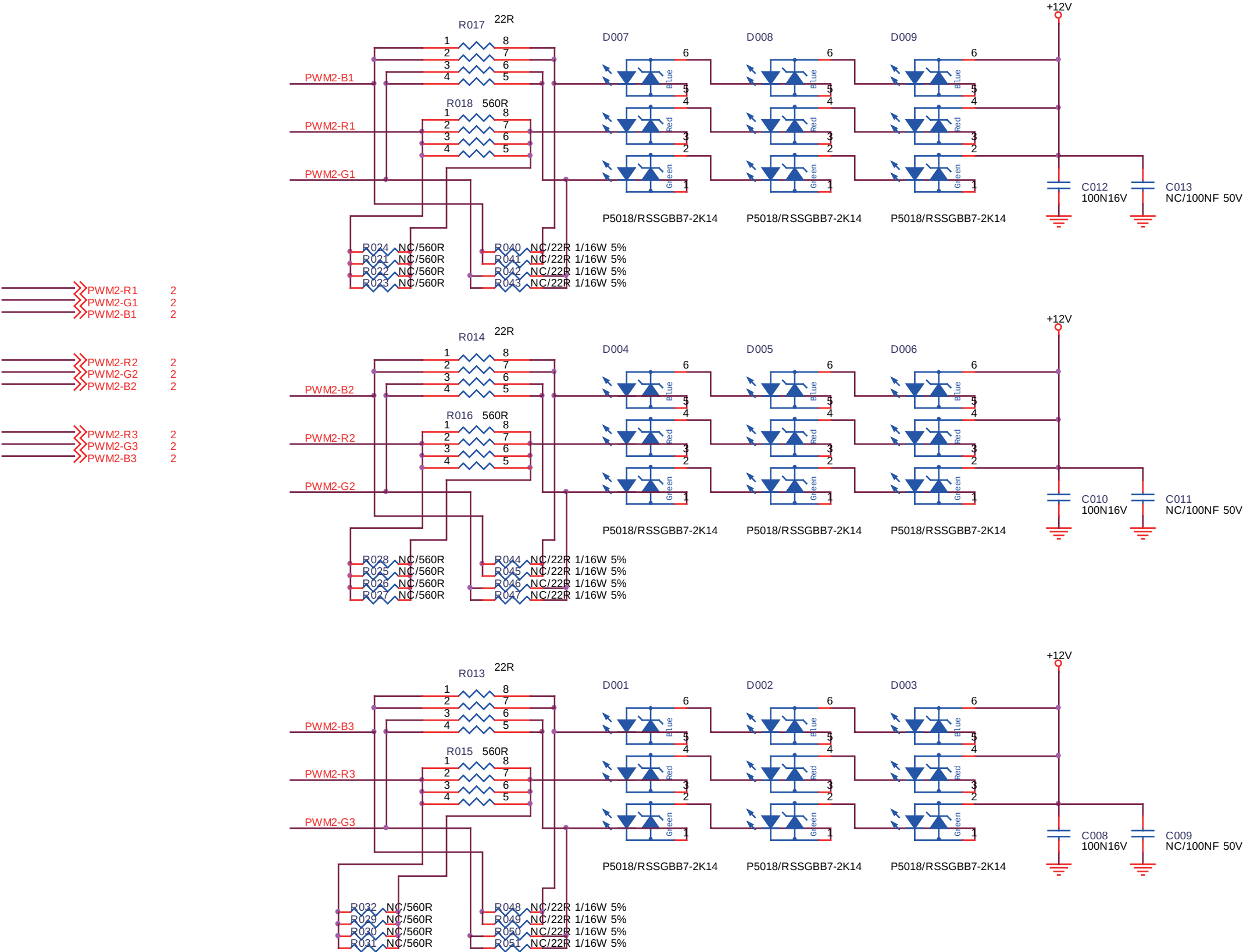
10.15 AL 715G7006 Ambilight Board
10-15-1 TLC5971



AL02

Ambilight 9-LED

AL02



Ambilight 9-LED	715G7006	8	2014-10-25

10-15-3 Layout Ambilight Board

Layout AmbiLight Board (top side)



Layout AmbiLight Board (bottom side)



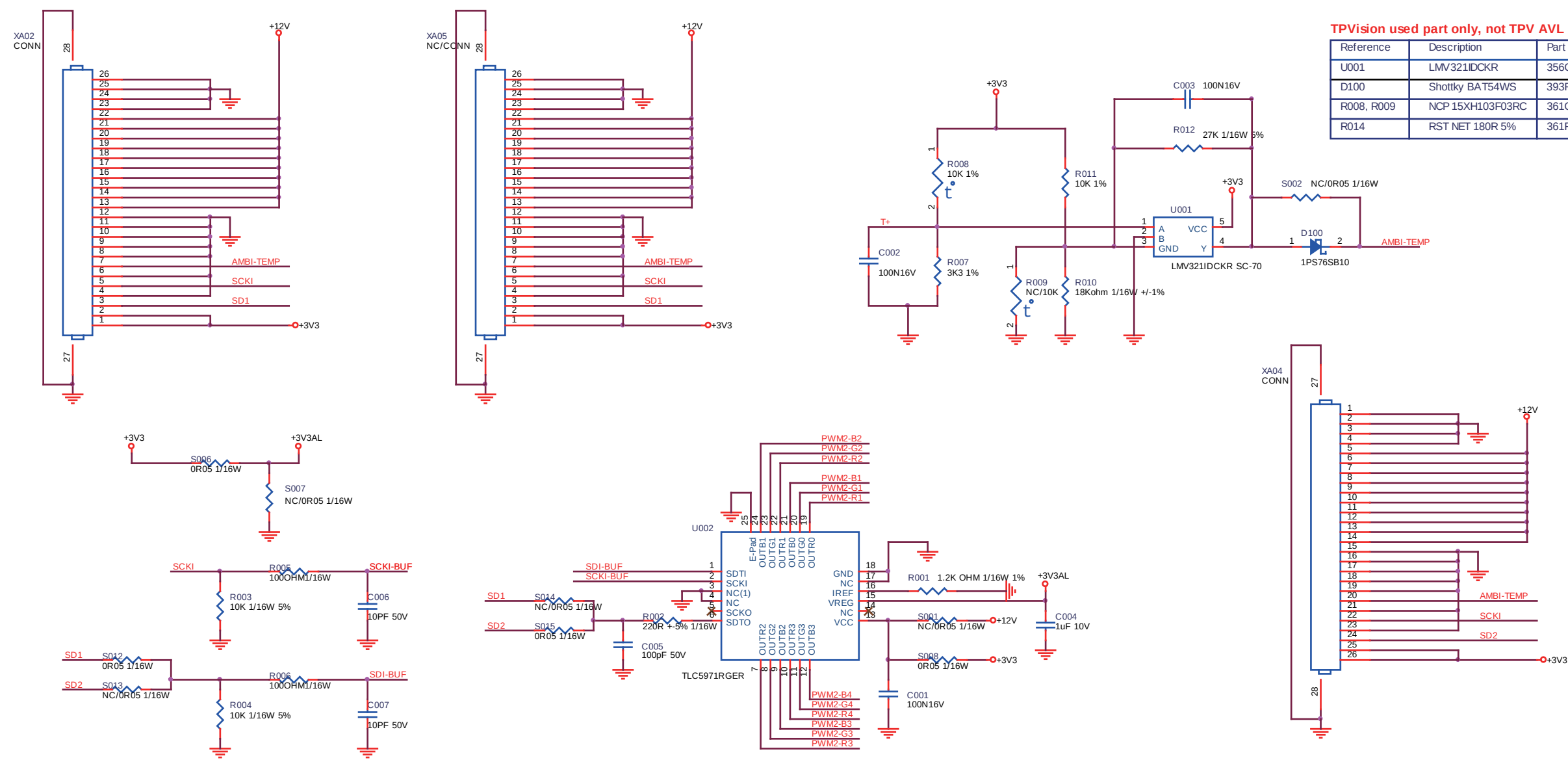
AmbiLight Board layout top/bottom	715G7007	2014-10-27

10.16 AL 715G7007 Ambilight Board
10-16-1 TCL5971

AL01

TLC5971

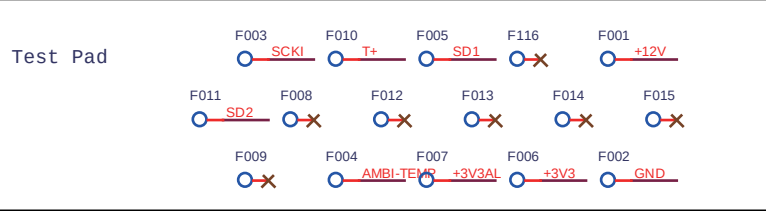
AL01



TPVision used part only, not TPV AVL

Reference	Description	Part ID
U001	LMV321IDCKR	356G0192005600
D100	Shottky BAT54WS	393R060S030000002TP
R008, R009	NCP 15XH103F03RC	361G0054103AFM
R014	RST NET 180R 5%	361R01261818J000TP

Function	Item	S012	S013	S014	S015
CounterClockwise (XA02:IN, XA04:OUT)		YES	NO	NO	YES
Clockwise (XA02:OUT, XA04:IN)		NO	YES	YES	NO



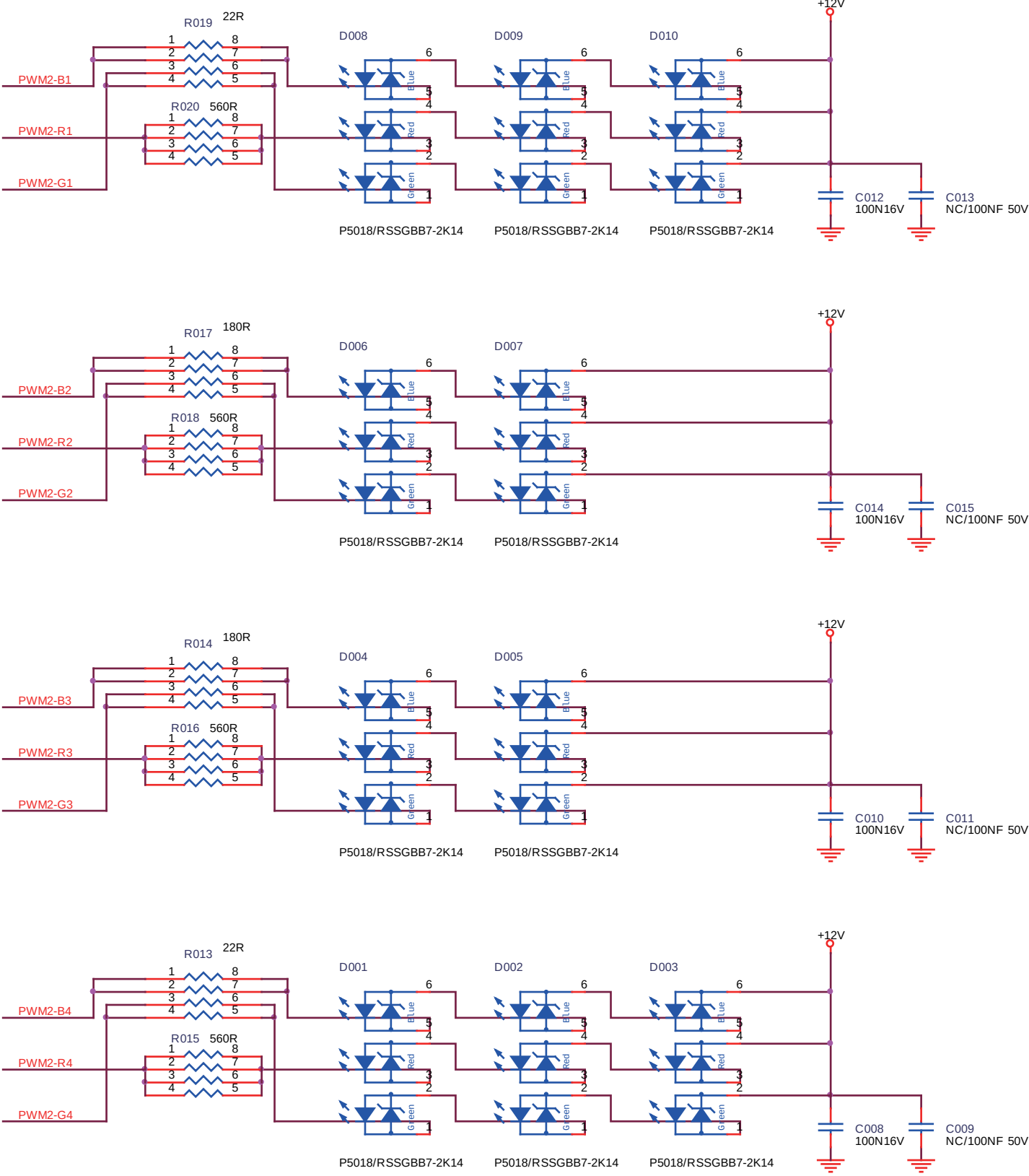
TLC5971	715G7007	2014-04-02
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10-16-2 Ambilight 10-LED

AL02 Ambilight 10-LED

AL02

- PWM2-R1 2
- PWM2-G1 2
- PWM2-B1 2
- PWM2-R2 2
- PWM2-G2 2
- PWM2-B2 2
- PWM2-R3 2
- PWM2-G3 2
- PWM2-B3 2
- PWM2-R4 2
- PWM2-G4 2
- PWM2-B4 2



Ambilight 10-LED	715G7007	2014-04-01

10-16-3 Layout AmbiLight Board

Layout AmbiLight Board (top side)



Layout AmbiLight Board (bottom side)

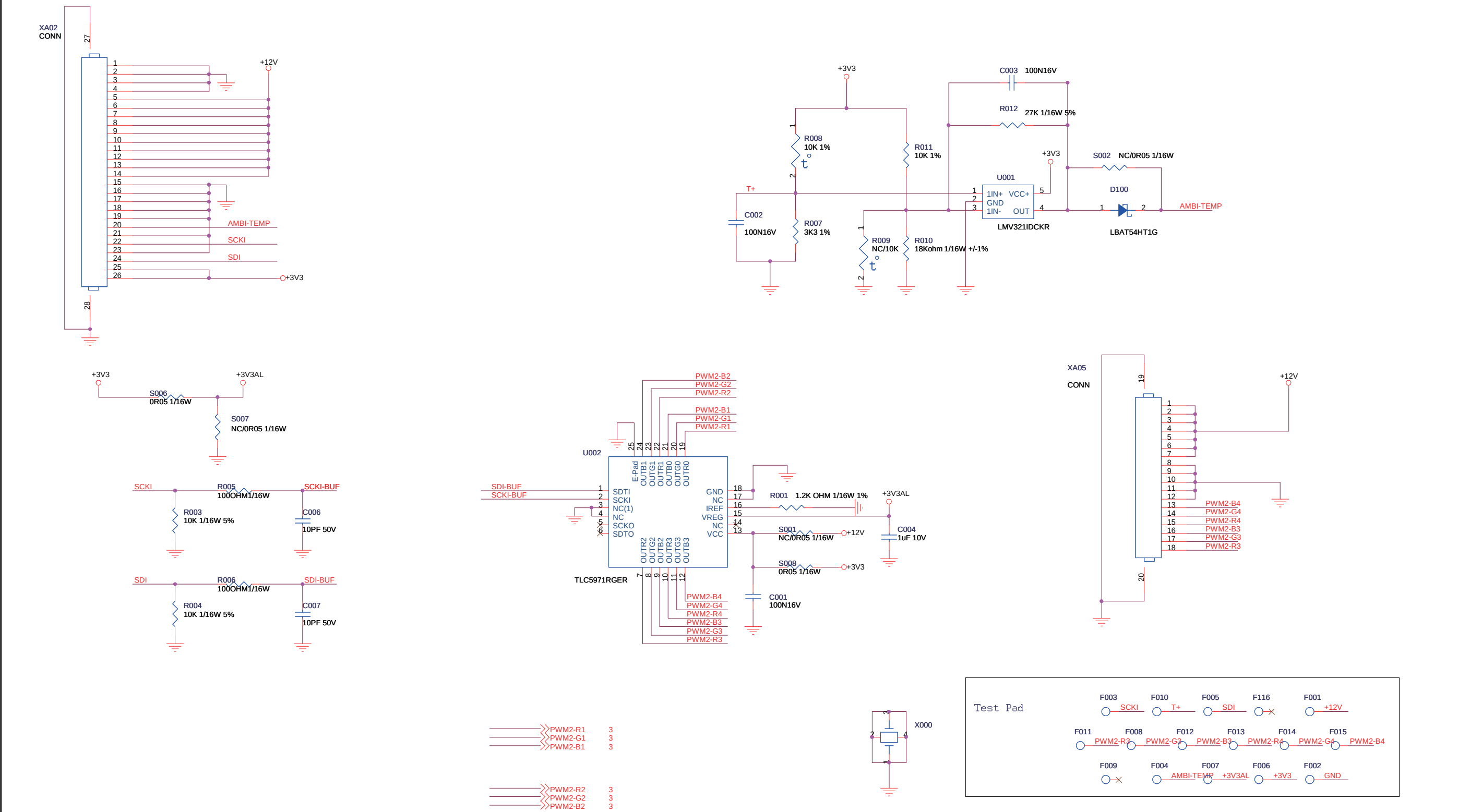


AmbiLight Board layout top/bottom	715G7007	2014-10-27

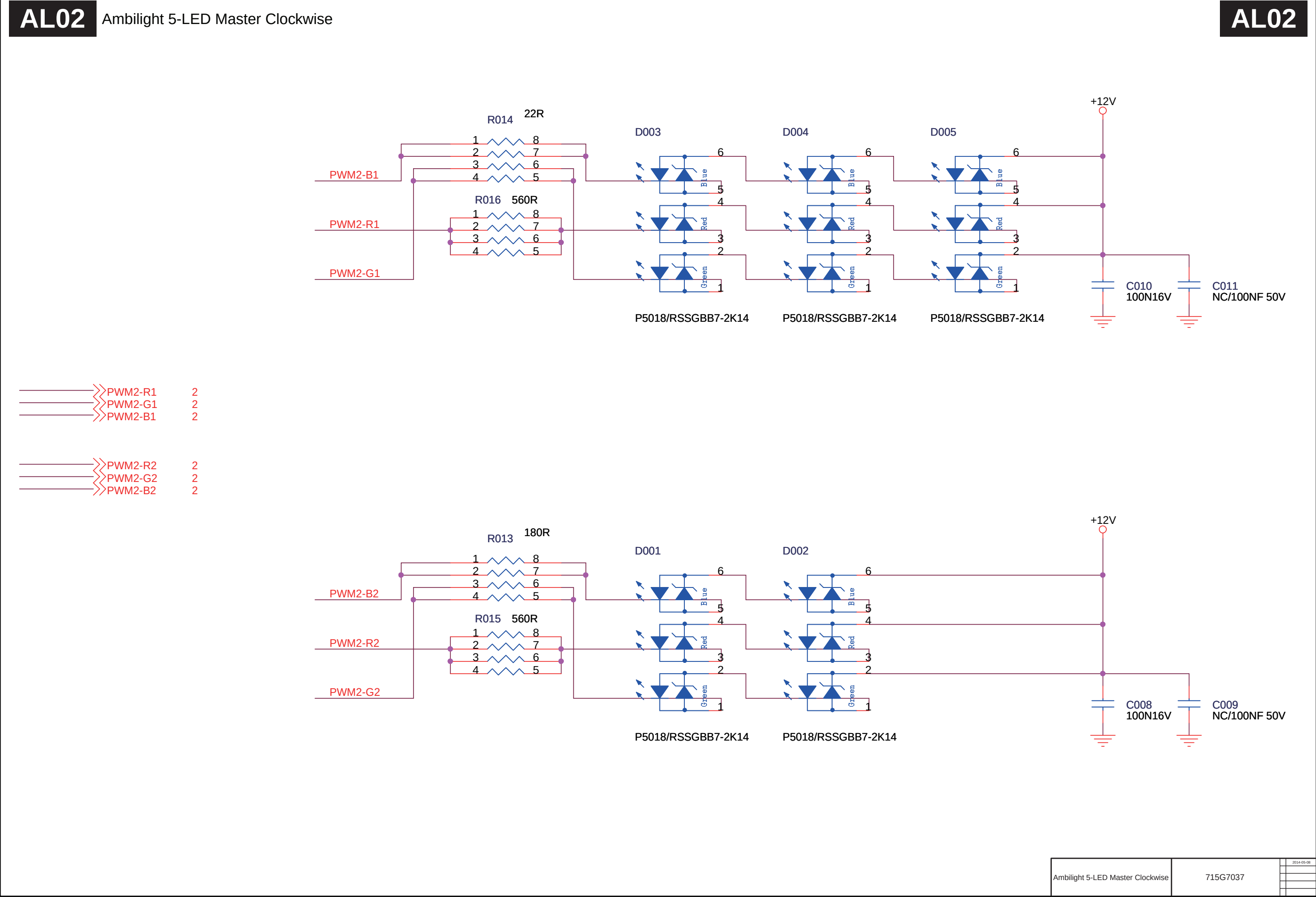
10.17 AL 715G7037 Ambilight Board
10-17-1 TCL5971

AL01 TCL5971

AL01

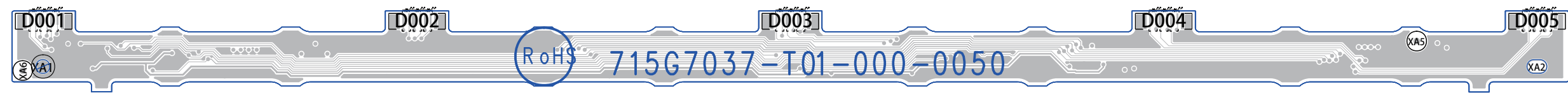


TCL5971	715G7037	2014-05-08

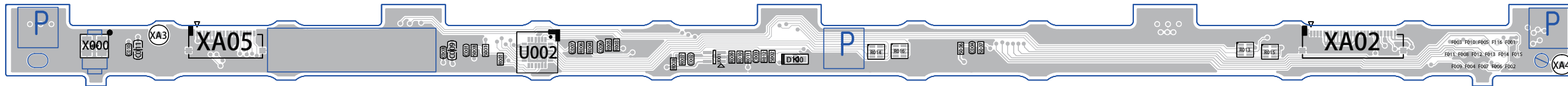


10-17-3 Ambilight Board layout

Layout Ambilight Board (top side)

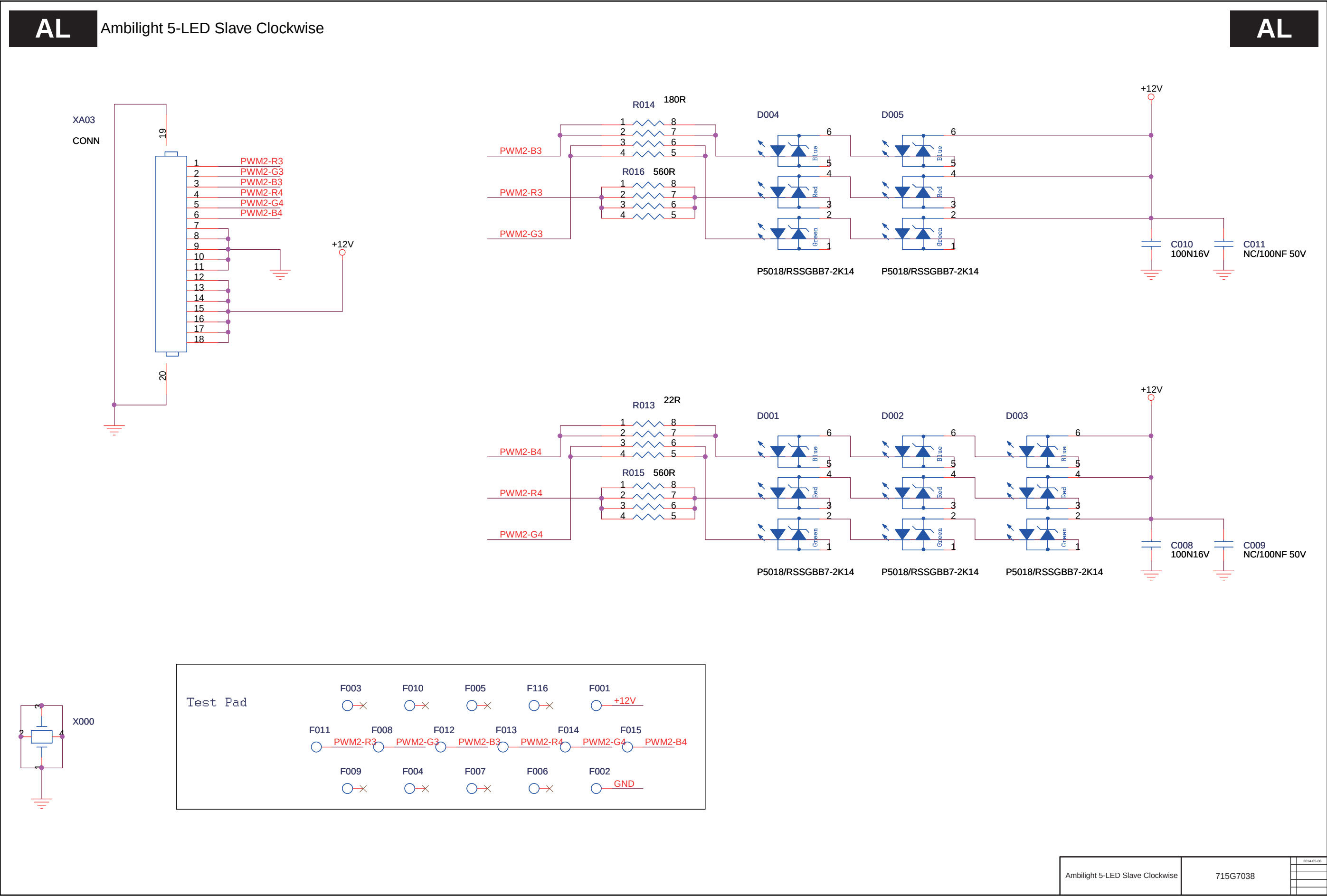


Layout Ambilight Board (bottom side)



Ambilight Board layout top/bottom	715G7037	1	2014-10-21

10.18 AL 715G7038 Amiblight Board
10-18-1 Amiblight 5-LED Slave Clockwise



Amiblight 5-LED Slave Clockwise

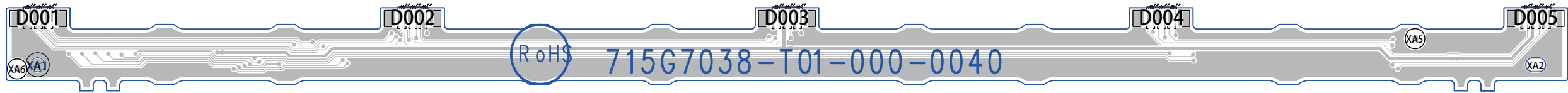
715G7038

2014-05-08

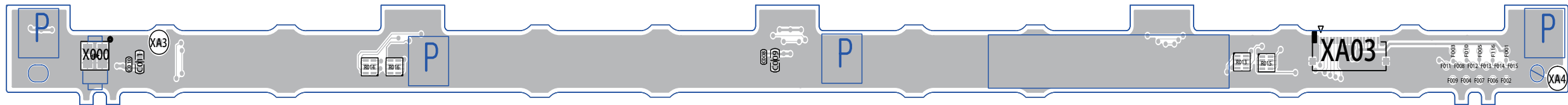
19884_503.eps

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Layout Ambilight Board (top side)



Layout Ambilight Board (bottom side)



11. Styling Sheets

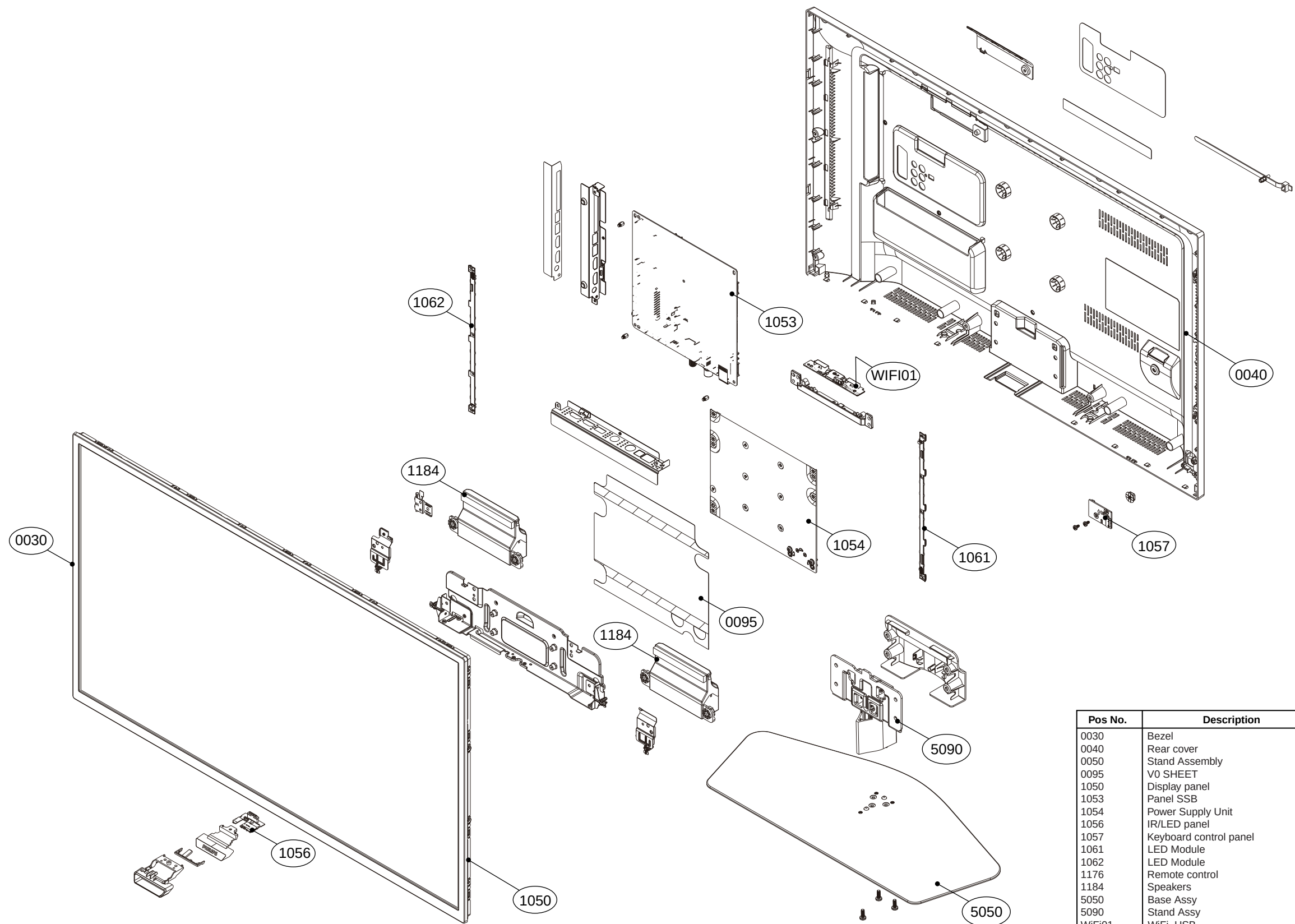
11.1 5500 series 32"

5500 series 32"

Pos No.	Description	Remarks
0030	Bezel	
0040	Rear cover	
0050	Stand Assembly	
0095	V0 SHEET	
1050	Display panel	
1053	Panel SSB	
1054	Power Supply Unit	
1056	IR/LED panel	
1057	Keyboard control panel	
1176	Remote control	Not displayed
1184	Speakers	
WIFI01	WIFI_USB	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

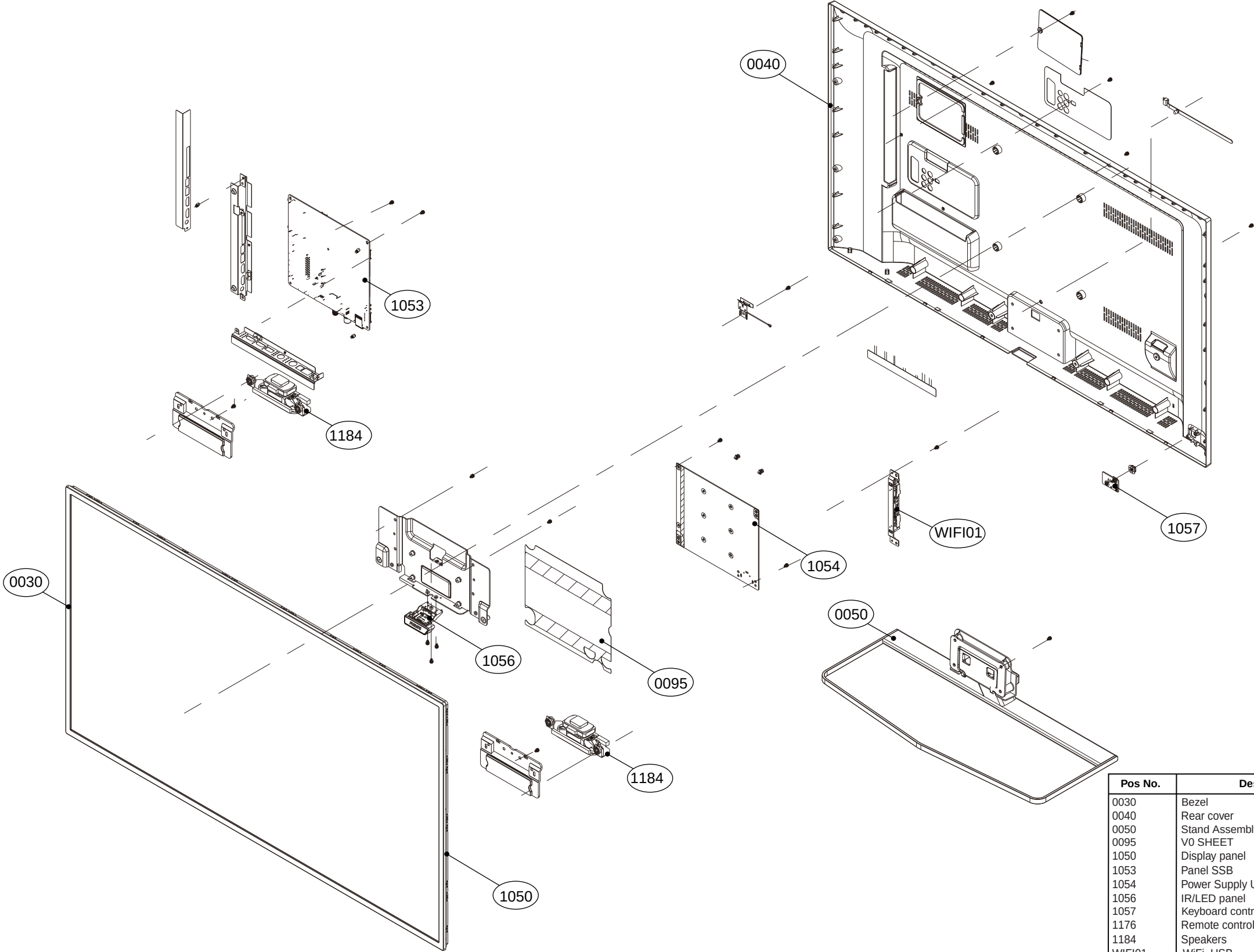
6500 series 32"



Pos No.	Description	Remarks
0030	Bezel	Not displayed
0040	Rear cover	
0050	Stand Assembly	
0095	V0 SHEET	
1050	Display panel	
1053	Panel SSB	
1054	Power Supply Unit	
1056	IR/LED panel	
1057	Keyboard control panel	
1061	LED Module	
1062	LED Module	
1176	Remote control	
1184	Speakers	
5050	Base Assy	
5090	Stand Assy	
WiFi01	WiFi USB	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

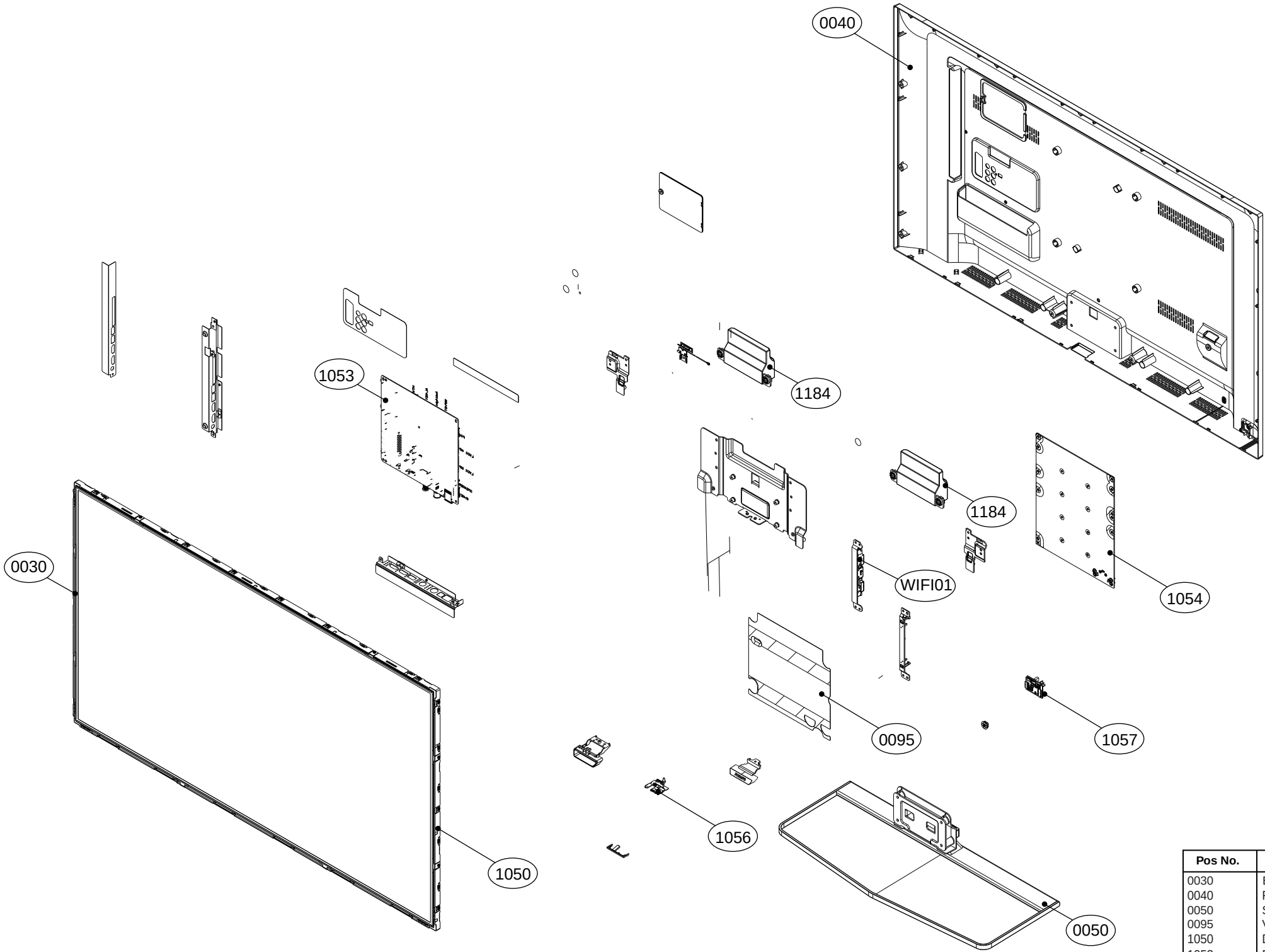
5500 series 39"



Pos No.	Description	Remarks
0030	Bezel	
0040	Rear cover	
0050	Stand Assembly	
0095	V0 SHEET	
1050	Display panel	
1053	Panel SSB	
1054	Power Supply Unit	
1056	IR/LED panel	
1057	Keyboard control panel	
1176	Remote control	Not displayed
1184	Speakers	
WIFI01	WiFi USB	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

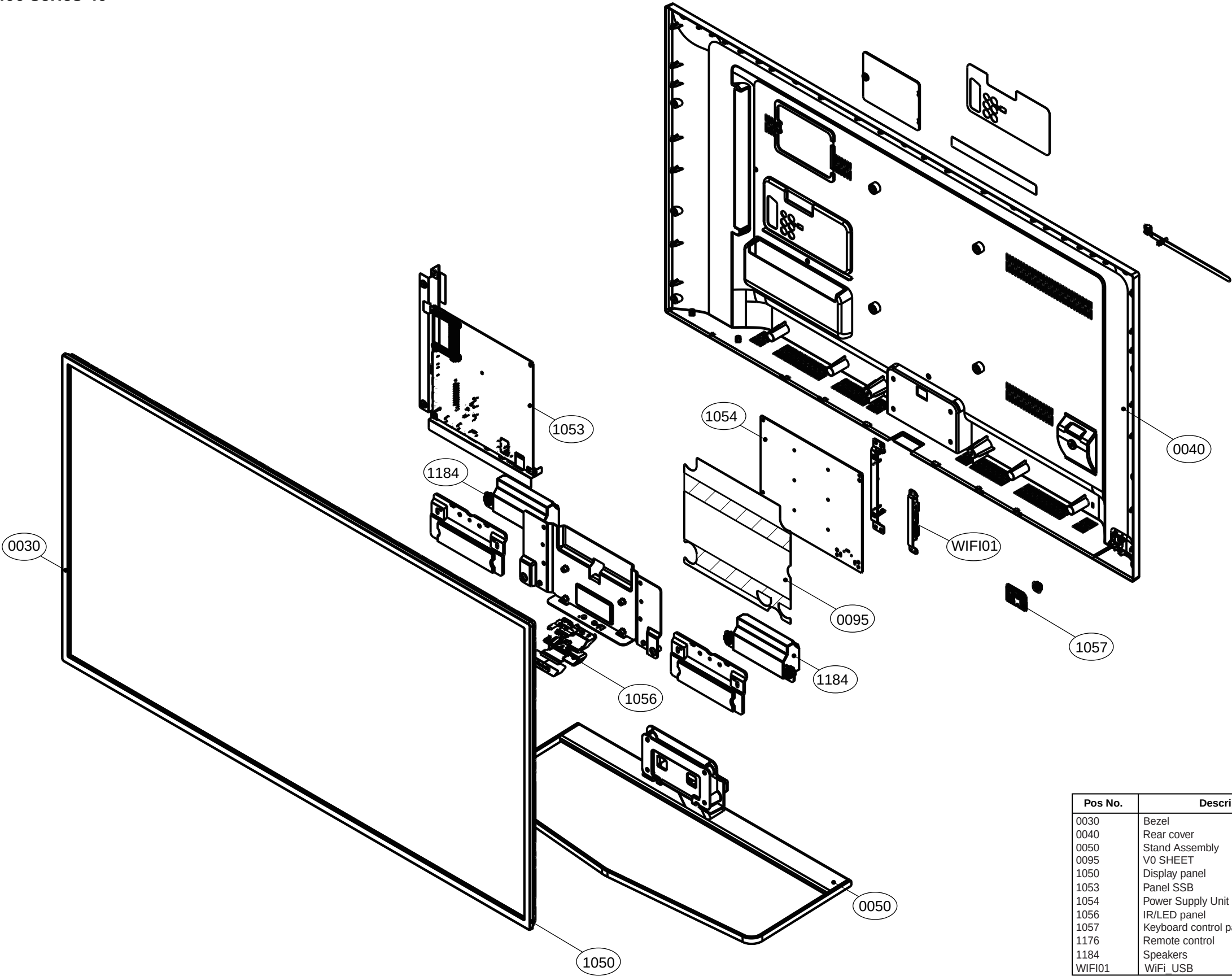
5500 series 40"



Pos No.	Description	Remarks
0030	Bezel	
0040	Rear cover	
0050	Stand Assembly	
0095	V0 SHEET	
1050	Display panel	
1053	Panel SSB	
1054	Power Supply Unit	
1056	IR/LED panel	
1057	Keyboard control panel	
1176	Remote control	Not displayed
1184	Speakers	
WIFI01	WiFi USB	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

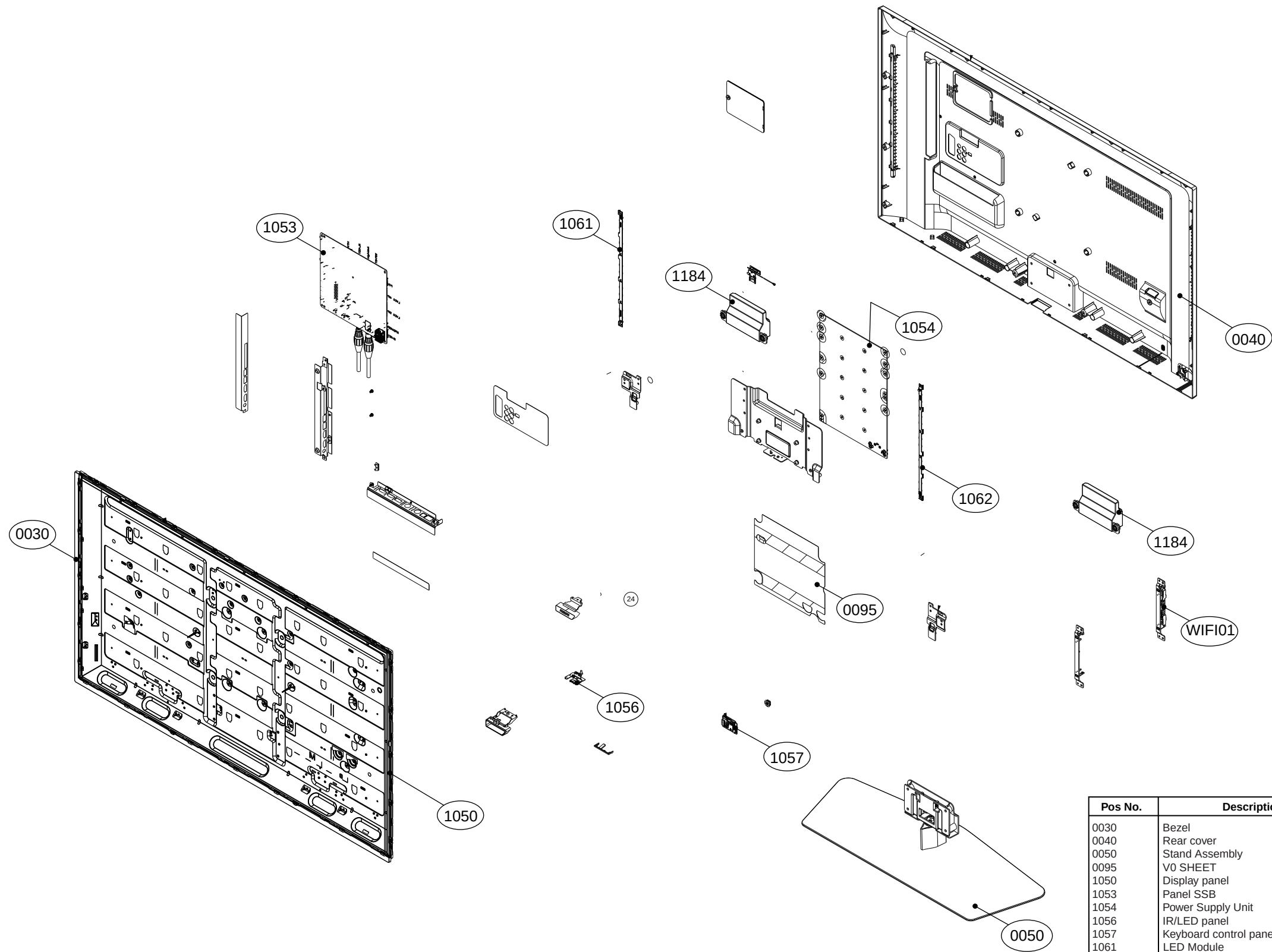
6400 series 40"



Pos No.	Description	Remarks
0030	Bezel	
0040	Rear cover	
0050	Stand Assembly	
0095	V0 SHEET	
1050	Display panel	
1053	Panel SSB	
1054	Power Supply Unit	
1056	IR/LED panel	
1057	Keyboard control panel	
1176	Remote control	Not displayed
1184	Speakers	
WIFI01	WiFi USB	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

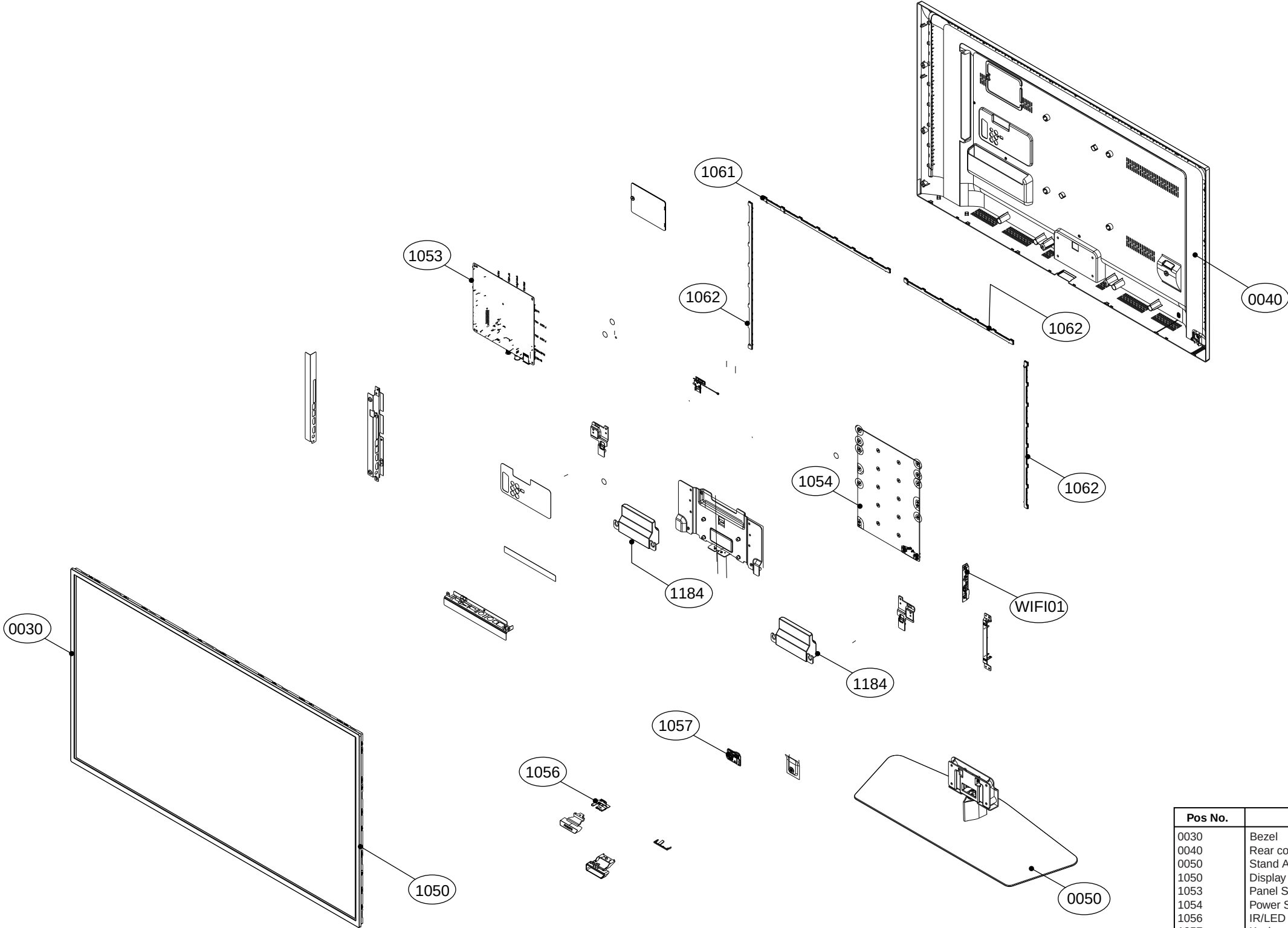
6510&6540 series 40"



Pos No.	Description	Remarks
0030	Bezel	
0040	Rear cover	
0050	Stand Assembly	
0095	V0 SHEET	
1050	Display panel	
1053	Panel SSB	
1054	Power Supply Unit	
1056	IR/LED panel	
1057	Keyboard control panel	
1061	LED Module	
1062	LED Module	
1176	Remote control	Not displayed
1184	Speakers	
WIFI01	WiFi_USB	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

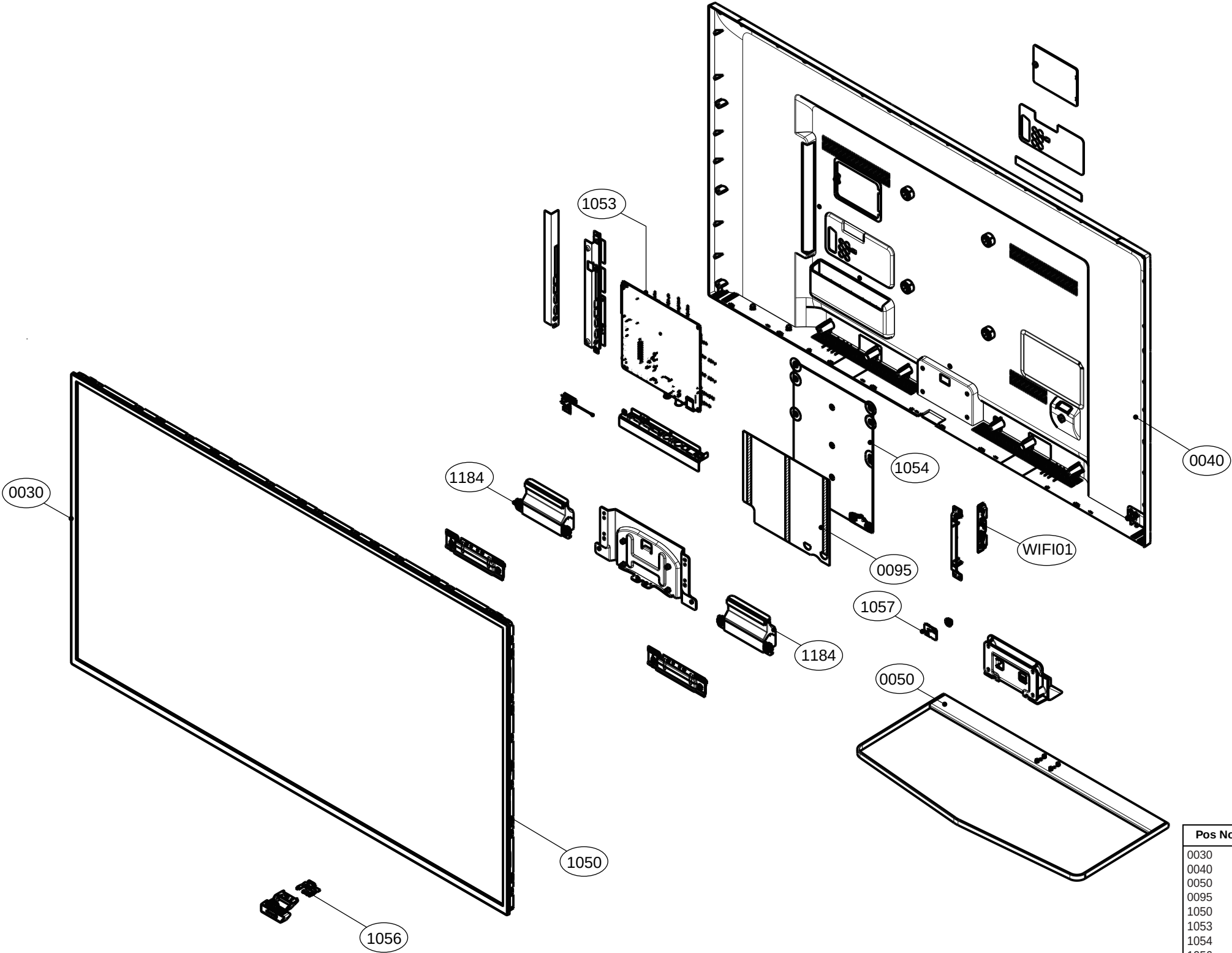
6550&6560&6580 series 40"



Pos No.	Description	Remarks
0030	Bezel	Not displayed
0040	Rear cover	
0050	Stand Assembly	
1050	Display panel	
1053	Panel SSB	
1054	Power Supply Unit	
1056	IR/LED panel	
1057	Keyboard control panel	
1061	LED Module	
1062	LED Modules	
1176	Remote control	
1184	Speakers	
WiFi01	WiFi_USB	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

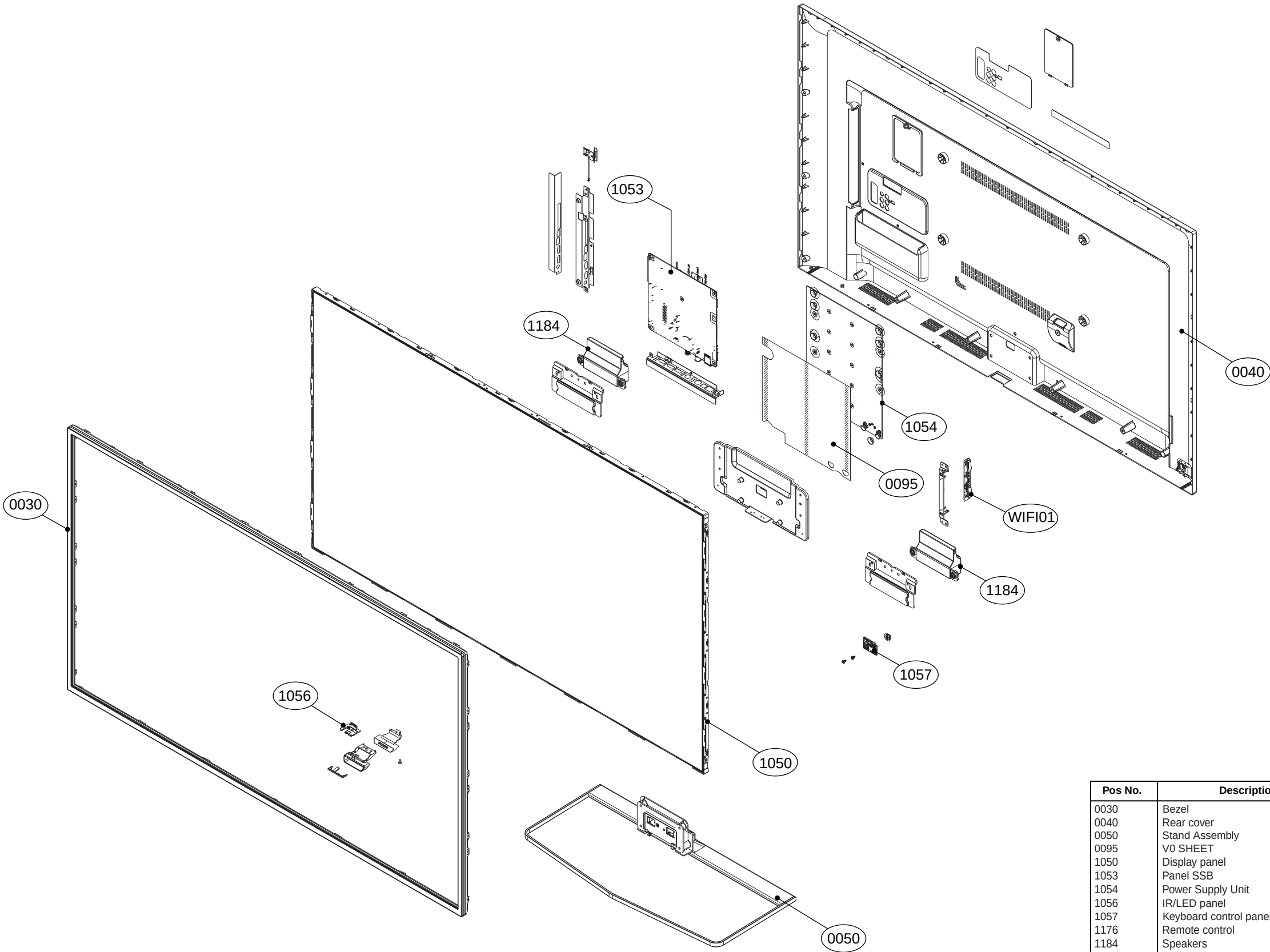
5500 series 48"



Pos No.	Description	Remarks
0030	Bezel	
0040	Rear cover	
0050	Stand Assembly	
0095	V0 SHEET	
1050	Display panel	
1053	Panel SSB	
1054	Power Supply Unit	
1056	IR/LED panel	
1057	Keyboard control panel	
1176	Remote control	Not displayed
1184	Speakers	
WIFI01	WiFi USB	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

6400 series 50"

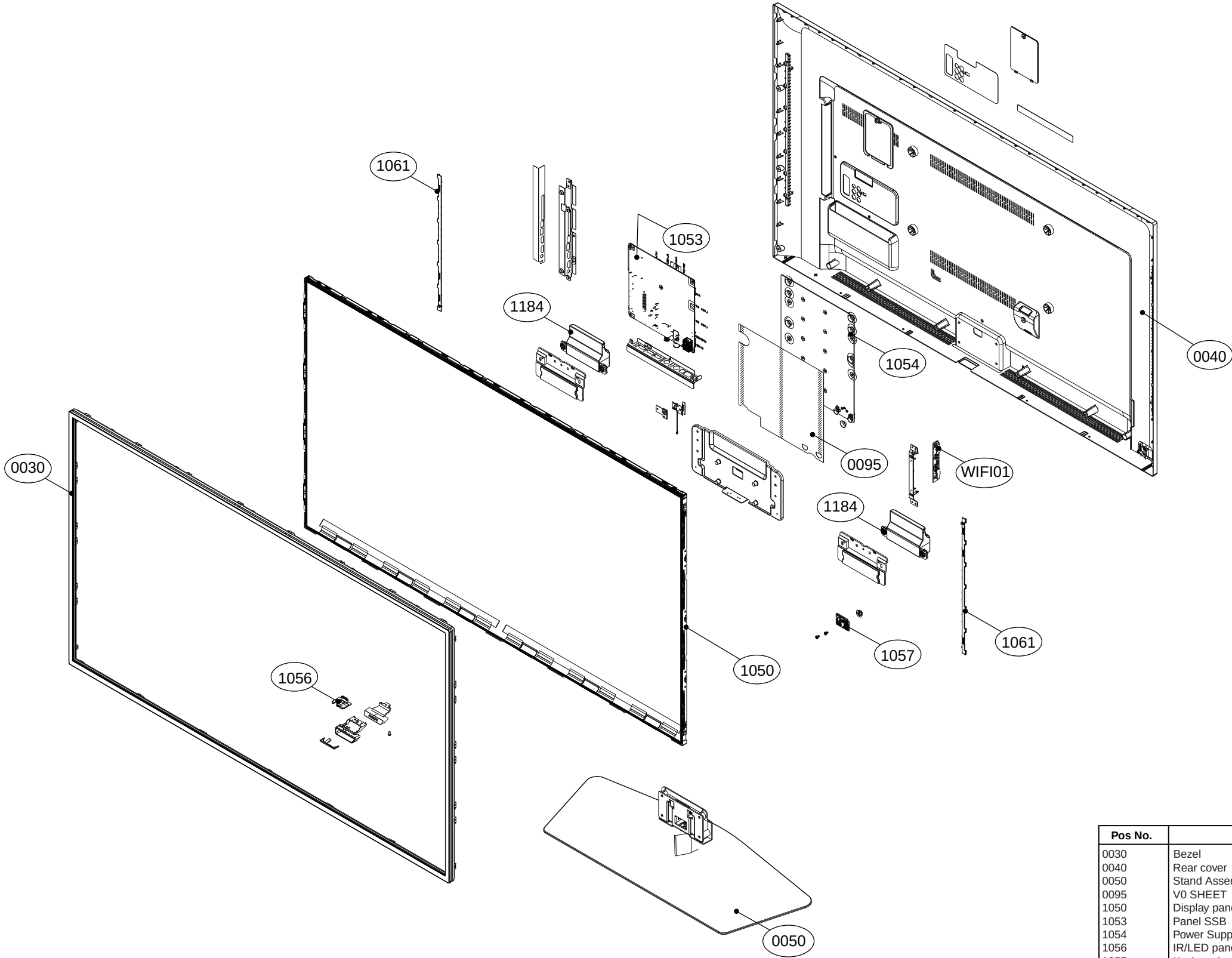


Pos No.	Description	Remarks
0030	Bezel	
0040	Rear cover	
0050	Stand Assembly	
0095	V0 SHEET	
1050	Display panel	
1053	Panel SSB	
1054	Power Supply Unit	
1056	IR/LED panel	
1057	Keyboard control panel	
1176	Remote control	Not displayed
1184	Speakers	
WIFI01	WiFi USB	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

11.10 6510&6540 series 50"

6510&6540 series 50"



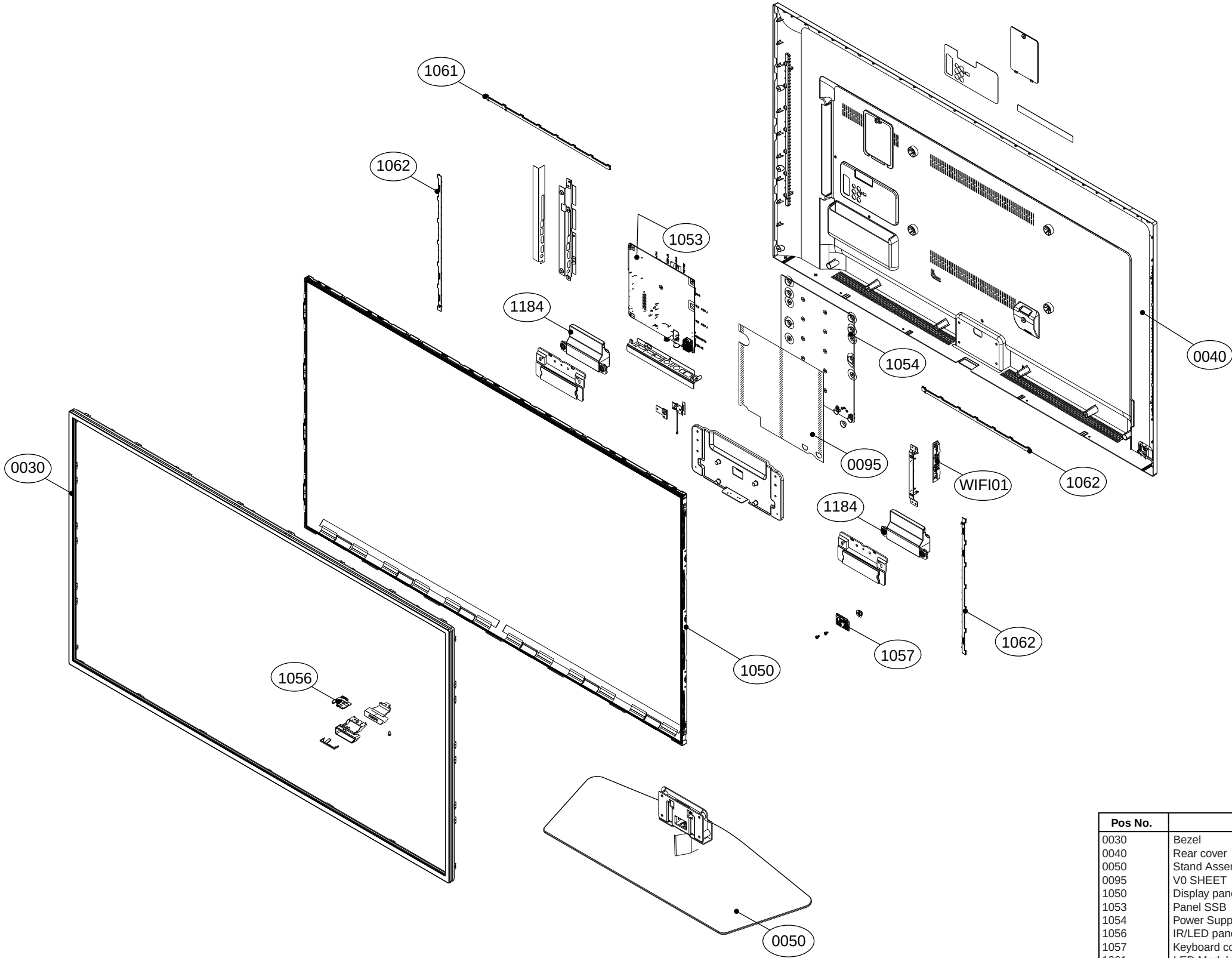
Pos No.	Description	Remarks
0030	Bezel	Not displayed
0040	Rear cover	
0050	Stand Assembly	
0095	V0 SHEET	
1050	Display panel	
1053	Panel SSB	
1054	Power Supply Unit	
1056	IR/LED panel	
1057	Keyboard control panel	
1061	LED Modules	
1176	Remote control	
1184	Speakers	
WiFi01	WiFi_USB	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

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11.11 6550&6560&6580 series 50"

6550&6560&6580 series 50"

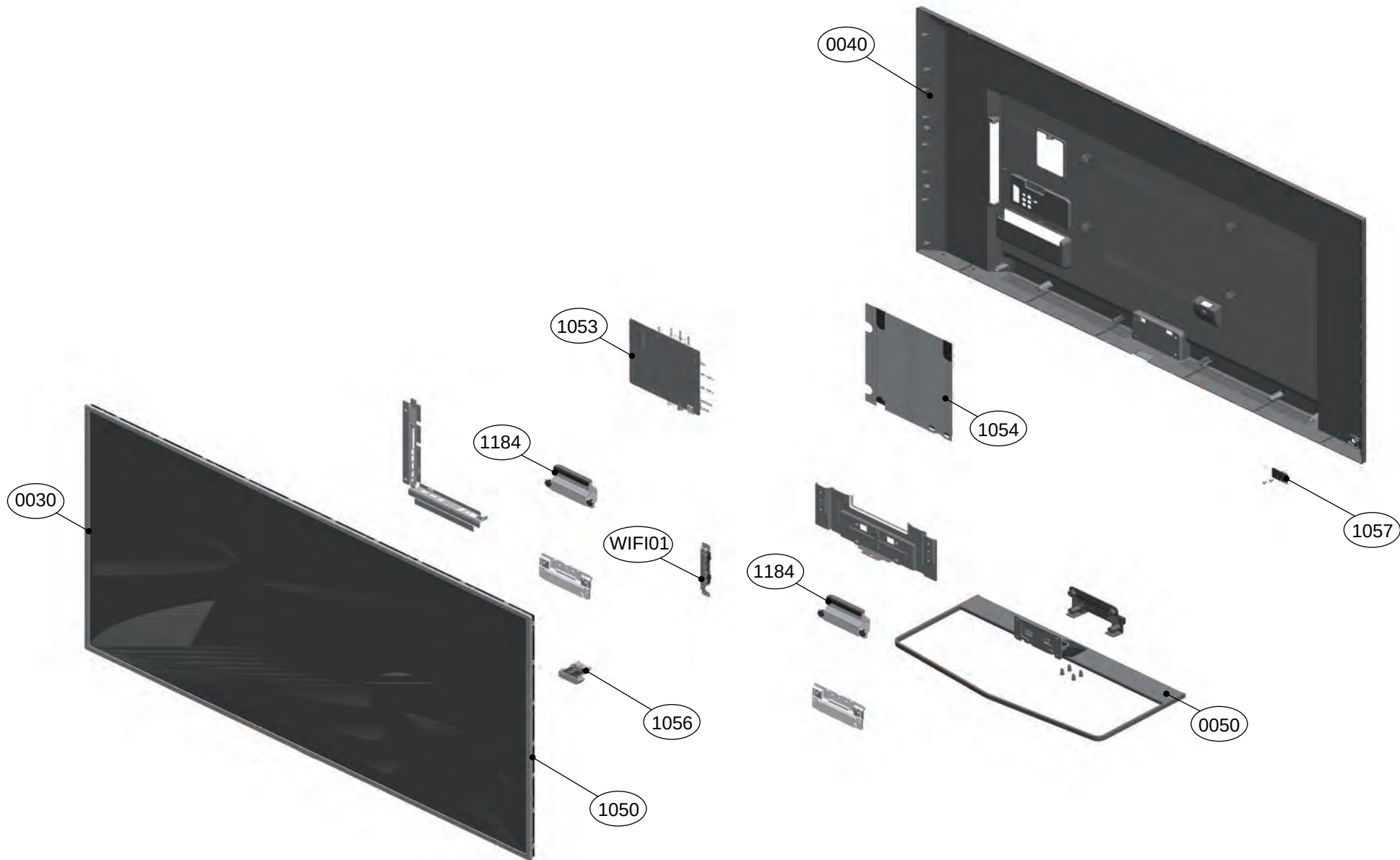


Pos No.	Description	Remarks
0030	Bezel	Not displayed
0040	Rear cover	
0050	Stand Assembly	
0095	V0 SHEET	
1050	Display panel	
1053	Panel SSB	
1054	Power Supply Unit	
1056	IR/LED panel	
1057	Keyboard control panel	
1061	LED Module	
1062	LED Modules	
1176	Remote control	
1184	Speakers	
WiFi01	WiFi_USB	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

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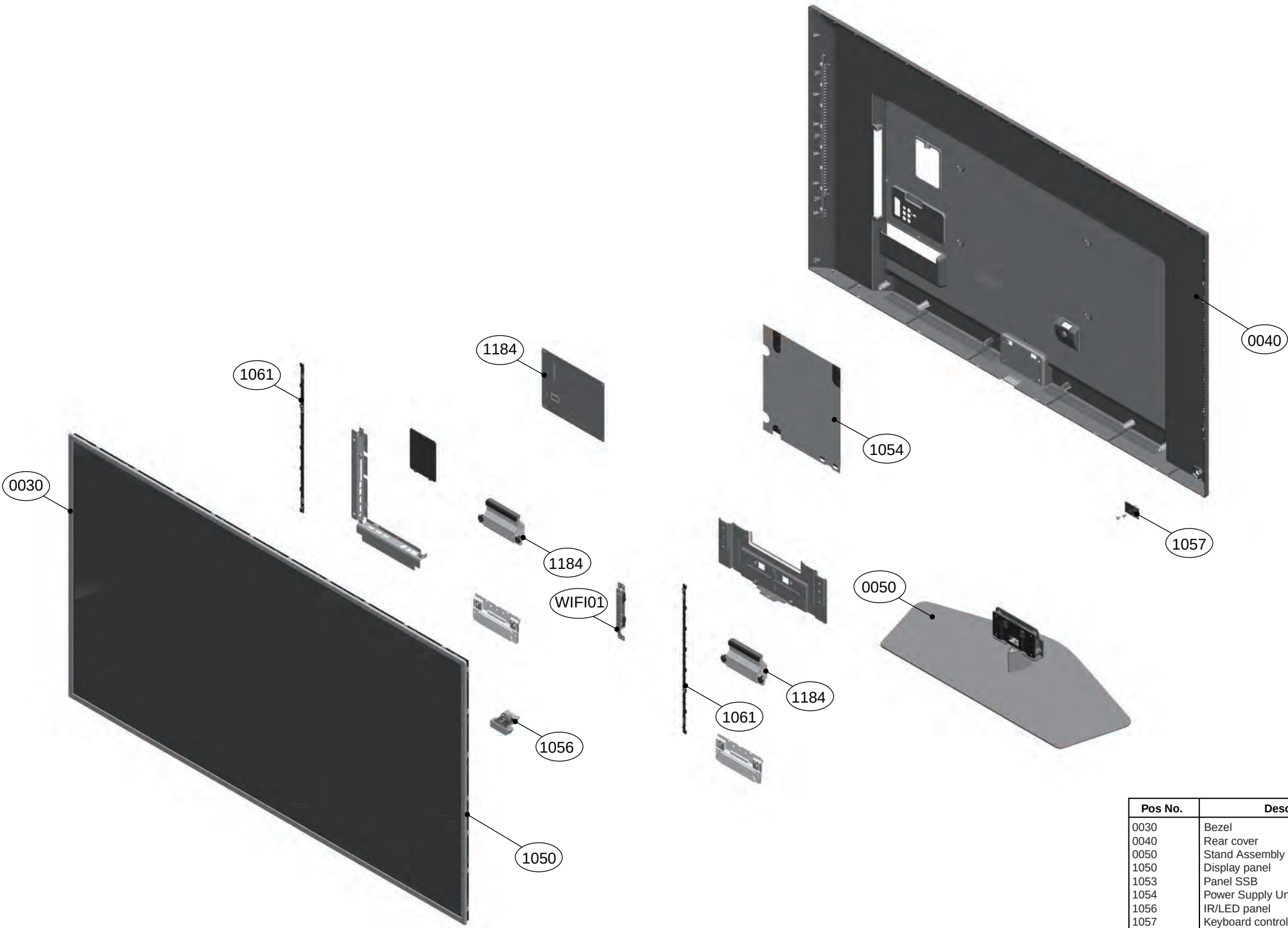
5500&6400 series 55"



Pos No.	Description	Remarks
0030	Bezel	Not displayed
0040	Rear cover	
0050	Stand Assembly	
1050	Display panel	
1053	Panel SSB	
1054	Power Supply Unit	
1056	IR/LED panel	
1057	Keyboard control panel	
1176	Remote control	
1184	Speakers	
WIFI01	WiFi USB	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

6510&6540 series 55"

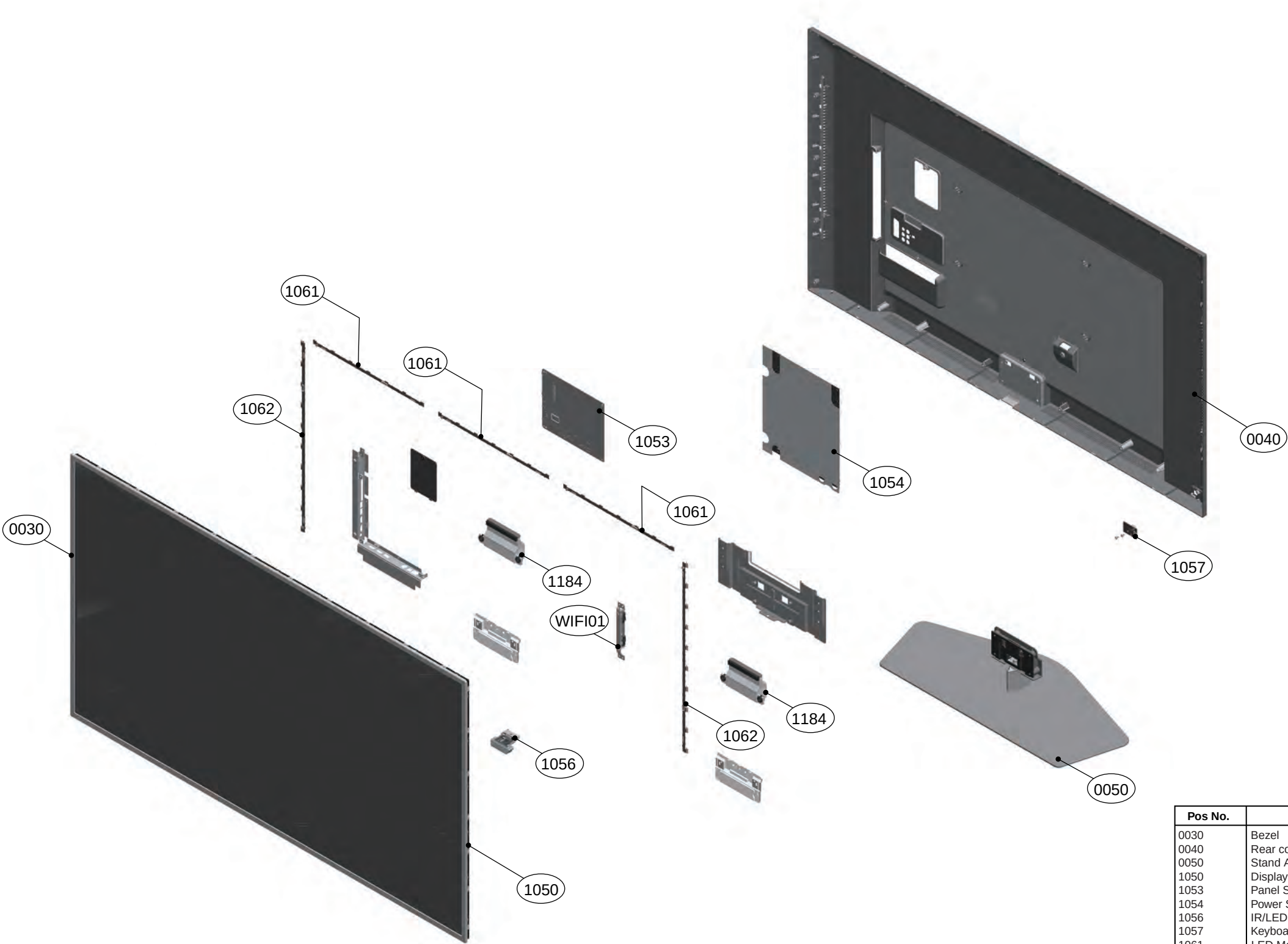


Pos No.	Description	Remarks
0030	Bezel	
0040	Rear cover	
0050	Stand Assembly	
1050	Display panel	
1053	Panel SSB	
1054	Power Supply Unit	
1056	IR/LED panel	
1057	Keyboard control panel	
1061	LED Modules	
1176	Remote control	Not displayed
1184	Speakers	
WiFi01	WiFi USB	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

11.14 6550&6560&6580 series 55"

6550&6560&6580 series 55"



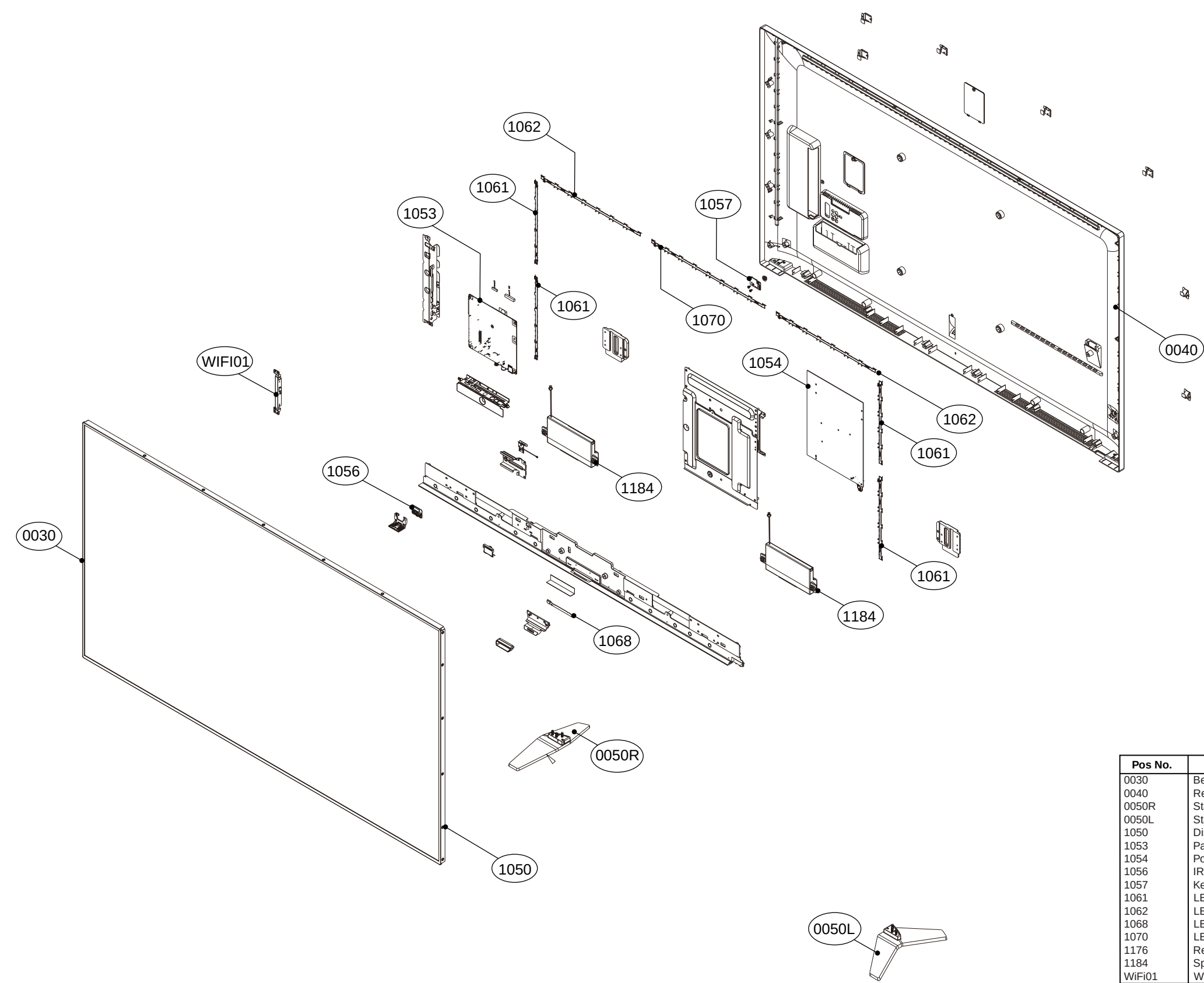
Pos No.	Description	Remarks
0030	Bezel	
0040	Rear cover	
0050	Stand Assembly	
1050	Display panel	
1053	Panel SSB	
1054	Power Supply Unit	
1056	IR/LED panel	
1057	Keyboard control panel	
1061	LED Modules	
1062	LED Modules	
1176	Remote control	Not displayed
1184	Speakers	
WiFi01	WiFi_USB	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

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11.15 6520 series 65"

6520 series 65"



Pos No.	Description	Remarks
0030	Bezel	Not displayed
0040	Rear cover	
0050R	Stand_R	
0050L	Stand_L	
1050	Display panel	
1053	Panel SSB	
1054	Power Supply Unit	
1056	IR/LED panel	
1057	Keyboard control panel	
1061	LED Modules	
1062	LED Modules	
1068	LED Logo	
1070	LED Module	
1176	Remote control	
1184	Speakers	
WiFi01	WiFi_USB	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9