Colour Television

Chassis

QM15.2E

LA

Service
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Service

Service Manual

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2015-Sep-30

PHILIPS

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 Amiblight 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 Amiblight 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:

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

	2	4					9	10				11
		Mechanics						Schematics				
CTN	Connection Overview	Wire Dressing	Rear Cover Removal	Kyboard Control Removal	SSB Removal	IR/LED Board Removal	Block Diagram	Power Supply	SSB	J (IR/LED)	E (Keyboard/Leading Edge)	Styling
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

	2	4					9	10				11
		Mechanics						Schematics				
CTN	Connection Overview	Wire Dressing	Rear Cover Removal	Kyboard Control Removal	SSB Removal	IR/LED Board Removal	Block Diagram	Power Supply	SSB	J (IR/LED)	E (Keyboard/Leading Edge)	Styling
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

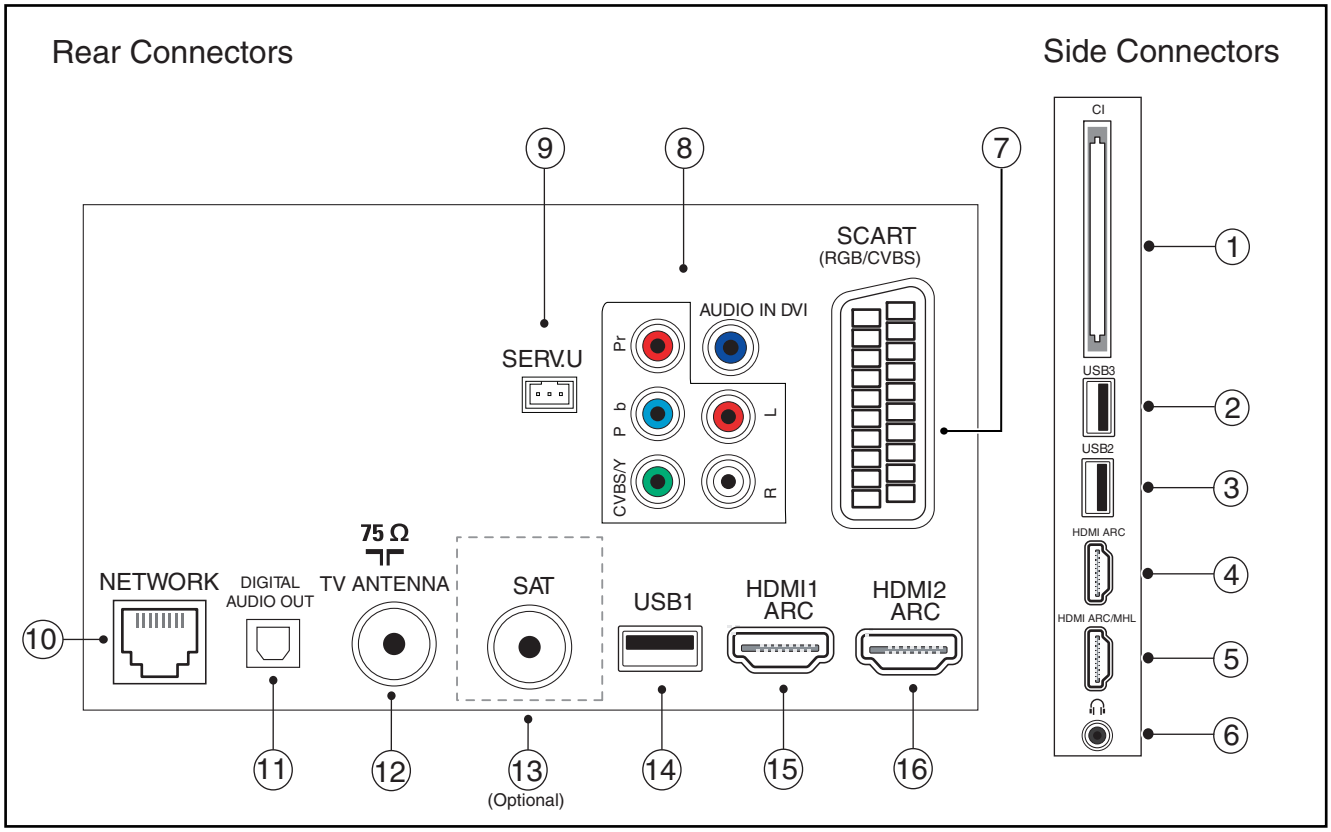

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Figure 2-1 Connection overview

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

2.3.1 Side Connections

1 - Common Interface

68p - See figure 10-6-13

2 - USB3 2.0

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Figure 2-2 USB (type A)

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

3 - USB2 2.0

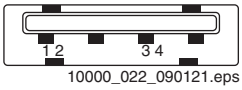

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Figure 2-3 USB (type A)

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

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

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Figure 2-4 HDMI (type A) connector

1	- D2+ D	ata channel
2	- Shield Gnd	
3	- D2- D	ata channel
4	- D1+ D	ata channel
5	- Shield Gnd	
6	- D1- D	ata channel
7	- D0+ D	ata channel
8	- Shield Gnd	
9	- D0- D	ata channel
10	- CLK+ D	ata channel
11	- Shield Gnd	
12	- CLK- D	ata channel
13	- Easylink/CEC C	ontrol channel
14	- ARC	Audio Return Channel
15	- DDC_SCL D	DC clock
16	- DDC_SDA D	DC 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

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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

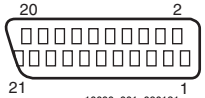

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Figure 2-6 SCART connector

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 Tr	ansmit	⊖→
3	- UART_RX Receive		⊕→

10 - RJ45: Ethernet

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120320

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 - Out

BK	- 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

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Figure 2-8 USB (type A)

1	- +5V	⊖→
2	- Data (-)	⊕⊖→
3	- Data (+)	⊕⊖→
4	- Ground Gnd	⏚

15 - HDMI1 : Digital Video - In, Digital Audio - In/Out

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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

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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

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

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

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

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

3.2 Warnings

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

3.3 Notes

3.3.1 General

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

3.3.2 Schematic Notes

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

3.3.3 Spare Parts

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

3.3.4 BGA (Ball Grid Array) ICs

Introduction

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

BGA Temperature Profiles

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

3.3.5 Lead-free Soldering

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

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

3.3.6 Alternative BOM identification

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

The **third digit** in the serial number (example: AG**2**B0335000001) indicates the number of the alternative B.O.M. (Bill Of Materials) that has been used for producing the specific TV set. In general, it is possible that the same TV model on the market is produced with e.g. two different types of displays, coming from two different suppliers. This will then

result in sets which have the same CTN (Commercial Type Number; e.g. 28PW9515/12) but which have a different B.O.M. number.
By looking at the third digit of the serial number, one can identify which B.O.M. is used for the TV set he is working with. If the third digit of the serial number contains the number “1” (example: AG**1**B033500001), then the TV set has been manufactured according to B.O.M. number 1. If the third digit is a “2” (example: AG**2**B0335000001), then the set has been produced according to B.O.M. no. 2. This is important for ordering the correct spare parts!
For the third digit, the numbers 1...9 and the characters A...Z can be used, so in total: 9 plus 26= 35 different B.O.M.s can be indicated by the third digit of the serial number.

Identification: The bottom line of a type plate gives a 14-digit serial number. Digits 1 and 2 refer to the production centre (e.g. SN is Lysomice, RJ is Kobierzyce), digit 3 refers to the B.O.M. code, digit 4 refers to the Service version change code, digits 5 and 6 refer to the production year, and digits 7 and 8 refer to production week (in example below it is 2010 week 10 / 2010 week 17). The 6 last digits contain the serial number.

Figure 3-1 Serial number (example)

3.3.7 Board Level Repair (BLR) or Component Level Repair (CLR)

If a board is defective, consult your repair procedure to decide if the board has to be exchanged or if it should be repaired on component level.
If your repair procedure says the board should be exchanged completely, do not solder on the defective board. Otherwise, it cannot be returned to the O.E.M. supplier for back charging!

3.3.8 Practical Service Precautions

- **It makes sense to avoid exposure to electrical shock.** While some sources are expected to have a possible dangerous impact, others of quite high potential are of limited current and are sometimes held in less regard.
- **Always respect voltages**. While some may not be dangerous in themselves, they can cause unexpected reactions that are best avoided. Before reaching into a powered TV set, it is best to test the high vdtage insulation. It is easy to do, and is a good service precaution.

3.4 Abbreviation List

0/6/12	SCART switch control signal on A/V board. 0 = loop through (AUX to TV), 6 = play 16 : 9 format, 12 = play 4 : 3 format
AARA	Automatic Aspect Ratio Adaptation: algorithm that adapts aspect ratio to remove horizontal black bars; keeps the original aspect ratio
ACI	Automatic Channel Installation: algorithm that installs TV channels directly from a cable network by means of a predefined TXT page
ADC	Analogue to Digital Converter
AFC	Automatic Frequency Control: control signal used to tune to the correct frequency
AGC	Automatic Gain Control: algorithm that controls the video input of the feature box
AM	Amplitude Modulation
AP	Asia Pacific
AR	Aspect Ratio: 4 by 3 or 16 by 9
ASF	Auto Screen Fit: algorithm that adapts aspect ratio to remove horizontal black bars without discarding video information
ATSC	Advanced Television Systems Committee, the digital TV standard in the USA
ATV	See Auto TV
Auto TV	A hardware and software control system that measures picture content, and adapts image parameters in a dynamic way
AV	External Audio Video
AVC	Audio Video Controller
AVIP	Audio Video Input Processor
B/G	Monochrome TV system. Sound carrier distance is 5.5 MHz
BDS	Business Display Solutions (iTV)
BLR	Board-Level Repair
BTSC	Broadcast Television Standard Committee. Multiplex FMstereo sound system, originating from the USA and used e.g. in LATAM and AP-NTSC countries
B-TXT	Blue TeleteXT
C	Centre channel (audio)
CEC	Consumer Electronics Control bus: remote control bus on HDMI connections
CL	Constant Level: audio output to connect with an external amplifier
CLR	Component Level Repair
ComPair	Computer aided rePair
CP	Connected Planet / Copy Protection
CSM	Customer Service Mode
CTI	Color Transient Improvement: manipulates steepness of chroma transients
CVBS	Composite Video Blanking and Synchronization
DAC	Digital to Analogue Converter
DBE	Dynamic Bass Enhancement: extra low frequency amplification
DCM	Data Communication Module. Also referred to as System Card or Smartcard (for iTV).
DDC	See “E-DDC”
D/K	Monochrome TV system. Sound carrier distance is 6.5 MHz
DFI	Dynamic Frame Insertion
DFU	Directions For Use: owner's manual
DMR	Digital Media Reader: card reader
DMSD	Digital Multi Standard Decoding
DNM	Digital Natural Motion
DNR	Digital Noise Reduction: noise reduction feature of the set

back to div.table

DRAM	Dynamic RAM
DRM	Digital Rights Management
DSP	Digital Signal Processing
DST	Dealer Service Tool: special remote control designed for service technicians
DTCP	Digital Transmission Content Protection; A protocol for protecting digital audio/video content that is traversing a high speed serial bus, such as IEEE-1394
DVB-C	Digital Video Broadcast - Cable
DVB-T	Digital Video Broadcast - Terrestrial
DVD	Digital Versatile Disc
DVI(-d)	Digital Visual Interface (d= digital only)
E-DDC	Enhanced Display Data Channel (VESA standard for communication channel and display). Using E-DDC, the video source can read the EDID information form the display.
EDID	Extended Display Identification Data (VESA standard)
EEPROM	Electrically Erasable and Programmable Read Only Memory
EMI	Electro Magnetic Interference
EPG	Electronic Program Guide
EPLD	Erasable Programmable Logic Device
EU	Europe
EXT	EXTernal (source), entering the setby SCART or by cinches (jacks)
FDS	Full Dual Screen (same as FDW)
FDW	Full Dual Window (same as FDS)
FLASH	FLASH memory
FM	Field Memory or Frequency Modulation
FPGA	Field-Programmable Gate Array
FTV	Flat TeleVision
Gb/s	Giga bits per second
G-TXT	Green TeleteXT
H	H_sync to the module
HD	High Definition
HDD	Hard Disk Drive
HDCP	High-bandwidth Digital Content Protection: A “key” encoded into the HDMI/DVI signal that prevents video data piracy. If a source is HDCP coded and connected via HDMI/DVI without the proper HDCP decoding, the picture is put into a “snow vision” mode or changed to a low resolution. For normal content distribution the source and the display device must be enabled for HDCP “software key” decoding.
HDMI	High Definition Multimedia Interface
HP	HeadPhone
I	Monochrome TV system. Sound carrier distance is 6.0 MHz
I^2C	Inter IC bus
I^2D	Inter IC Data bus
I^2S	Inter IC Sound bus
IF	Intermediate Frequency
IR	Infra Red
IRQ	Interrupt Request
ITU-656	The ITU Radio communication Sector (ITU-R) is a standards body subcommittee of the International Telecommunication Union relating to radio communication. ITU-656 (a.k.a. SDI), is a digitized video format used for broadcast grade video. Uncompressed digital component or digital composite signals can be used. The SDI signal is self-synchronizing, uses 8 bit or 10 bit datawords, and has a maximum data rate of 270 Mbit/s, with a minimum bandwidth of 135 MHz.
iTV	Institutional TeleVision; TV sets for hotels, hospitals etc.
LS	Last Status; The settings last chosen by the customer and read and stored in RAM or in the NVM. They are called at start-up of the set to configure it according to the customer's preferences
LATAM	Latin America
LCD	Liquid Crystal Display
LED	Light Emitting Diode
L/L'	Monochrome TV system. Sound carrier distance is 6.5 MHz. L' is Band I, L is all bands except for Band I
LPL	LG.Philips LCD (supplier)
LS	Loudspeaker
LVDS	Low Voltage Differential Signalling
Mbps	Mega bits per second
M/N	Monochrome TV system. Sound carrier distance is 4.5 MHz
MHEG	Part of a set of international standards related to the presentation of multimedia information, standardised by the Multimedia and Hypermedia Experts Group. It is commonlyused as a language to describe interactive television services
MIPS	Microprocessor without Interlocked Pipeline-Stages; A RISC-based microprocessor
MOP	Matrix Output Processor
MOSFET	Metal Oxide Silicon Field Effect Transistor, switching device
MPEG	Motion Pictures Experts Group
MPIF	Multi Platform InterFace
MUTE	MUTE Line
MTV	Mainstream TV: TV-mode with Consumer TV features enabled (iTV)
NC	Not Connected
NICAM	Near Instantaneous Compounded Audio Multiplexing. This is a digital sound system, mainly used in Europe.
NTC	Negative Temperature Coefficient, non-linear resistor
NTSC	National Television Standard Committee. Color system mainly used in North America and Japan. Color carrier NTSC M/N= 3.579545 MHz, NTSC 4.43= 4.433619 MHz (this is a VCR norm, it is not transmitted off-air)
NVM	Non-Volatile Memory: IC containing TV related data such as alignments
O/C	Open Circuit
OSD	On Screen Display
OAD	Over the Air Download. Method of software upgrade via RFtransmission. Upgrade software is broadcasted in TS with TV channels.
OTC	On screen display Teletext and Control; also called Artistic (SAA5800)
P50	Project 50: communication protocol between TV and peripherals
PAL	Phase Alternating Line. Color system mainly used in West Europe (colour carrier = 4.433619 MHz) and South America (colour carrier PAL M = 3.575612 MHz and PAL N = 3.582056 MHz)
PCB	Printed Circuit Board (same as “PWB”)
PCM	Pulse Code Modulation
PDP	Plasma Display Panel

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

4. Mechanical Instructions

Index of this chapter:

Notes:

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

4.1 Cable Dressing

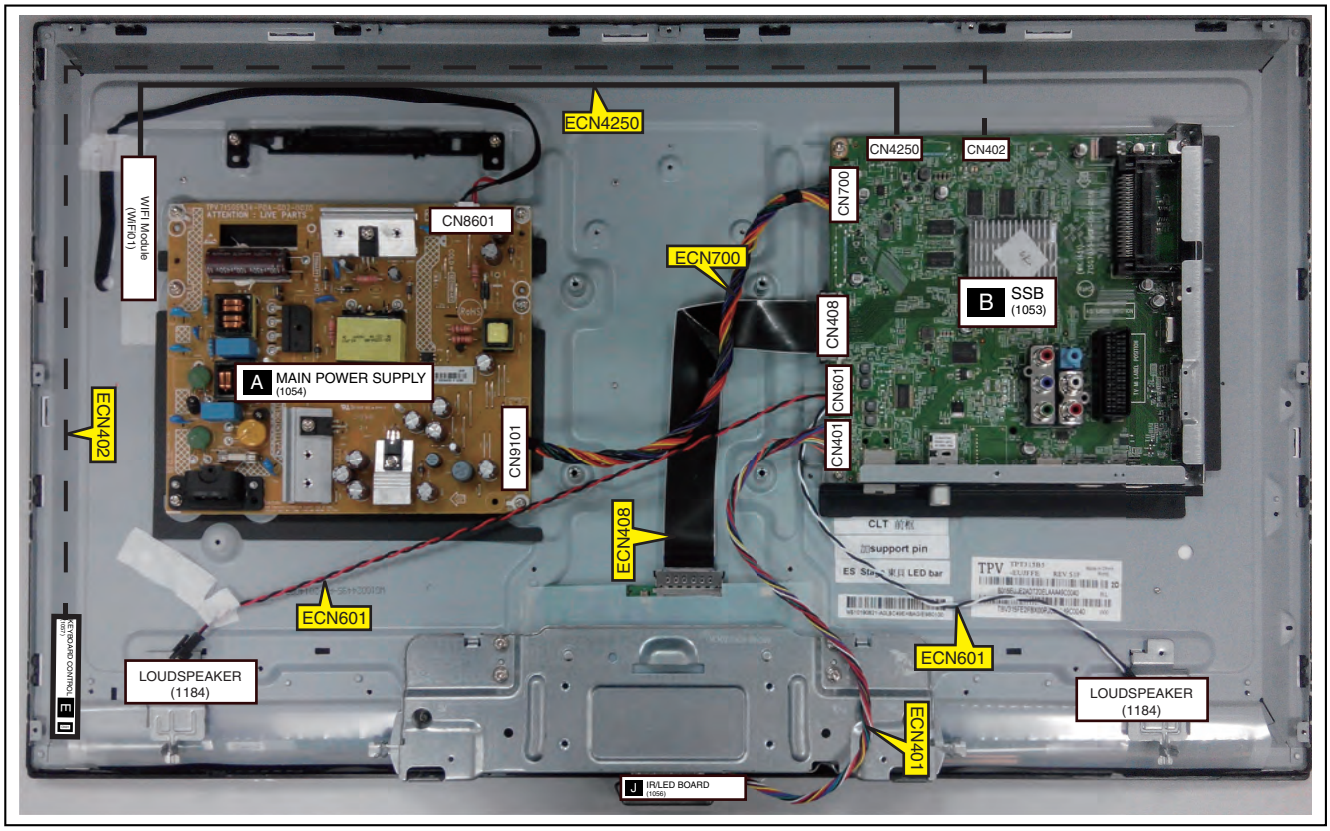

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Figure 4-1 Cable dressing (32" 5500 series)

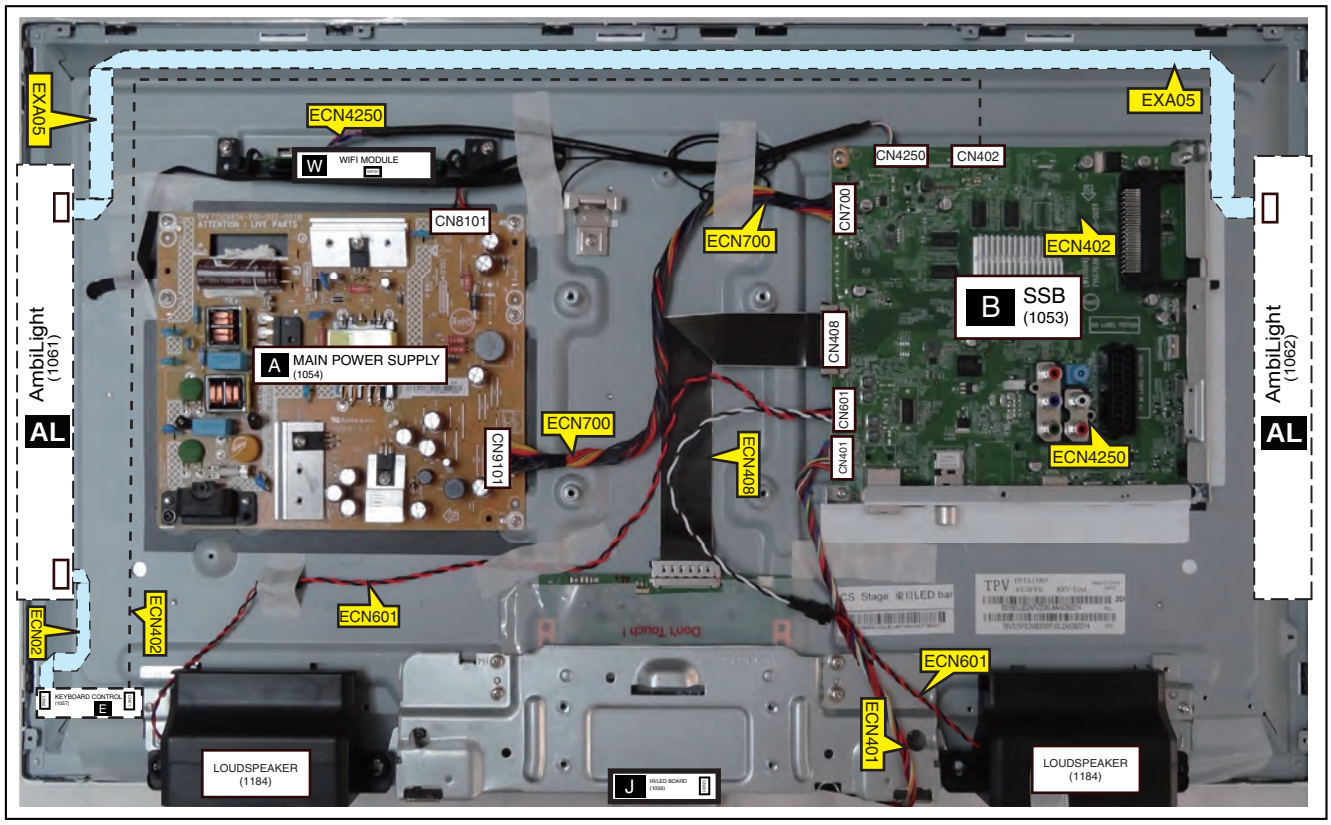

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Figure 4-2 Cable dressing (32" 6500 series)

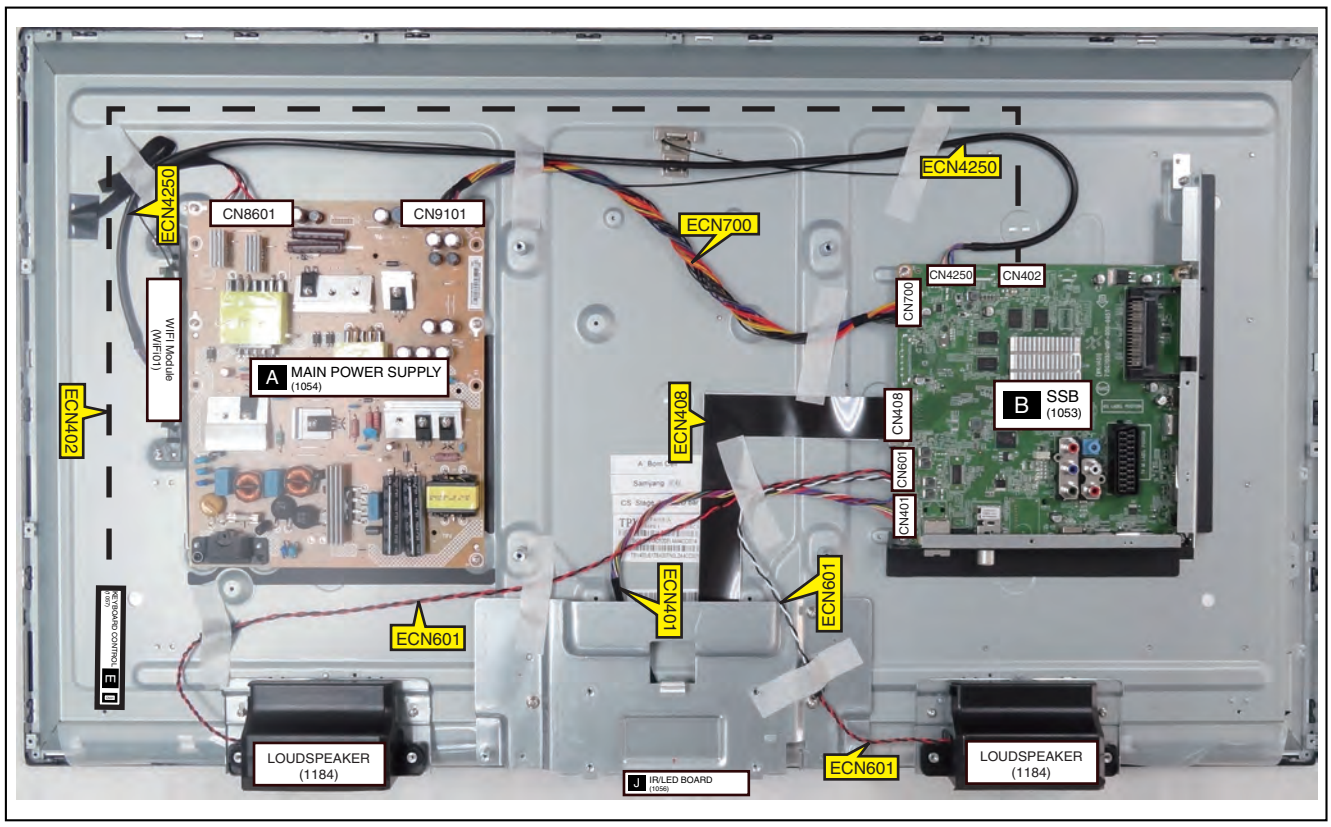

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Figure 4-3 Cable dressing (39" 5500 series)

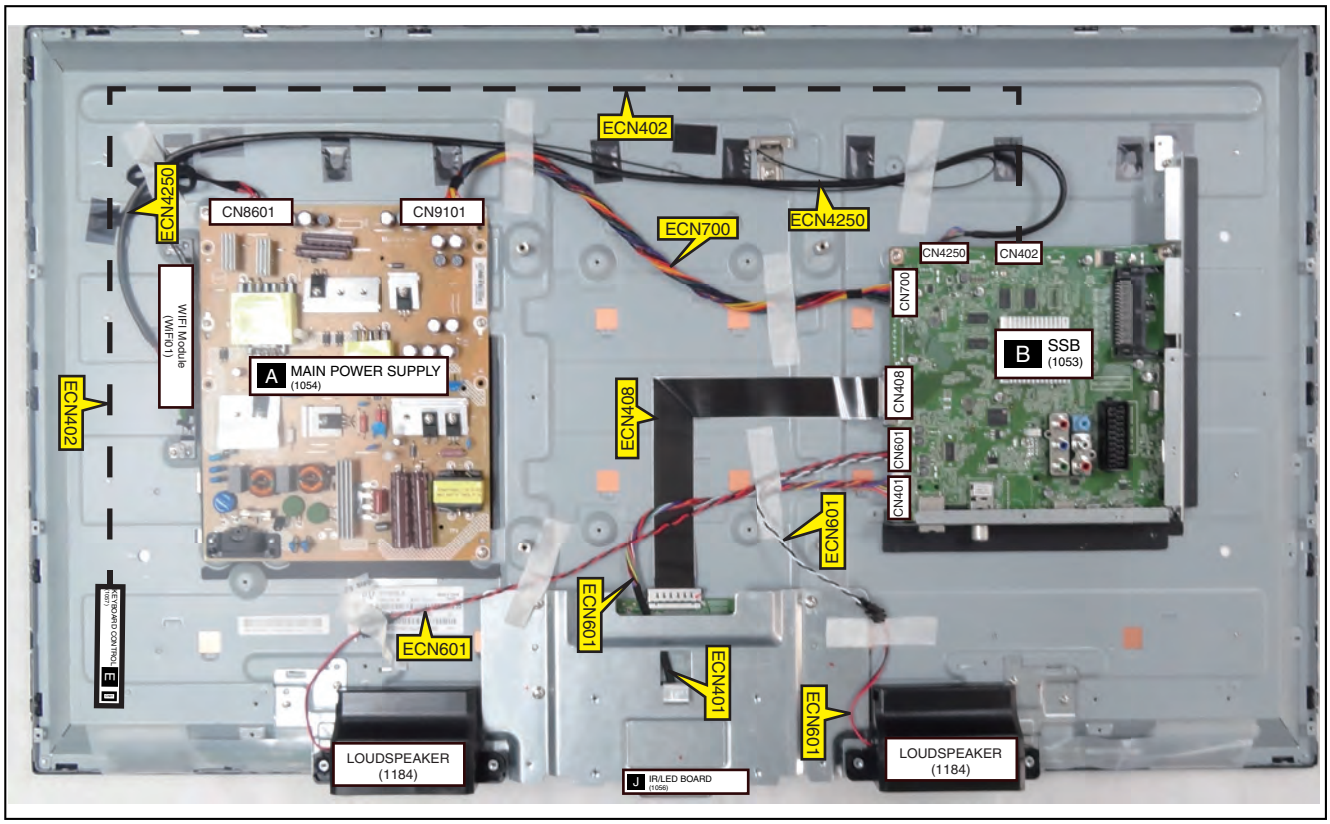

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Figure 4-4 Cable dressing (40" 5500 series)

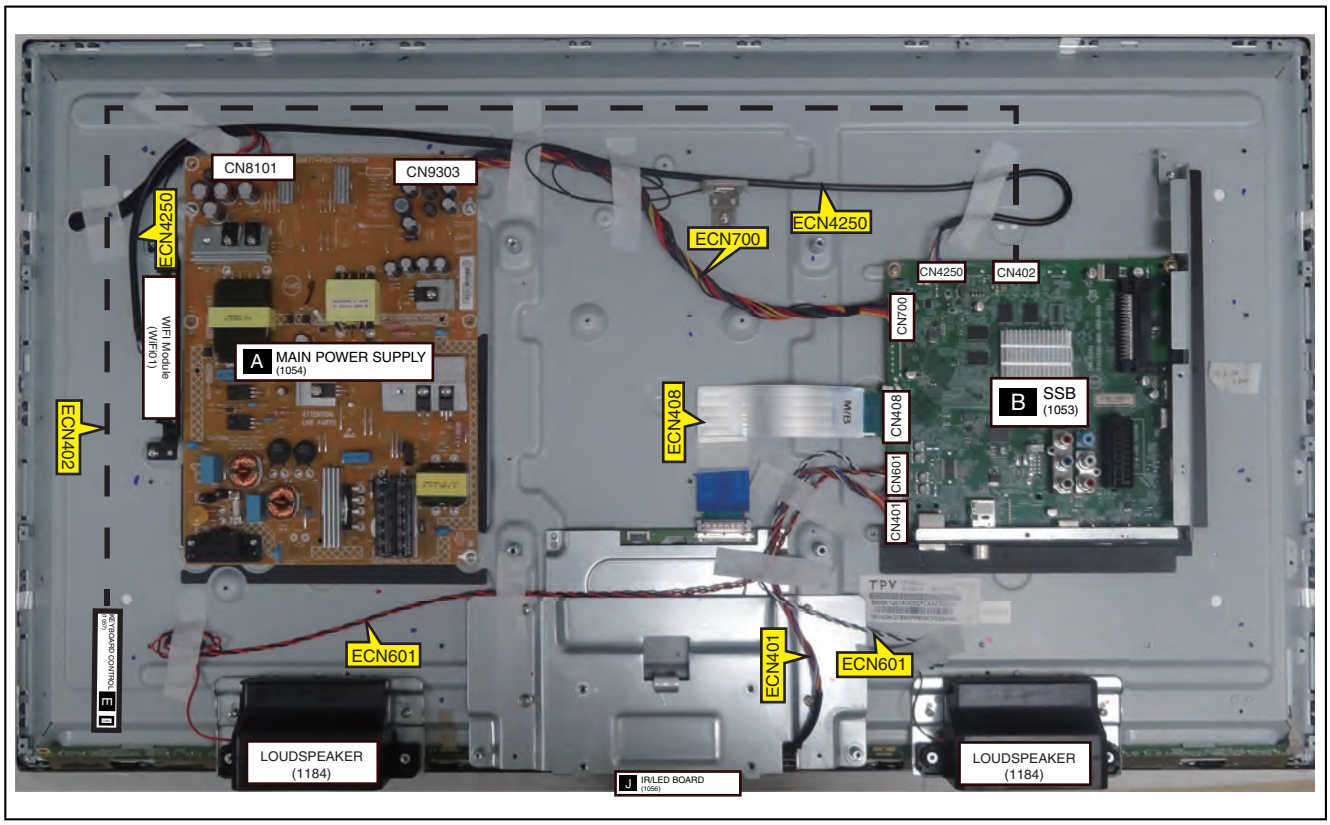

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Figure 4-5 Cable dressing (40" 6400 series)

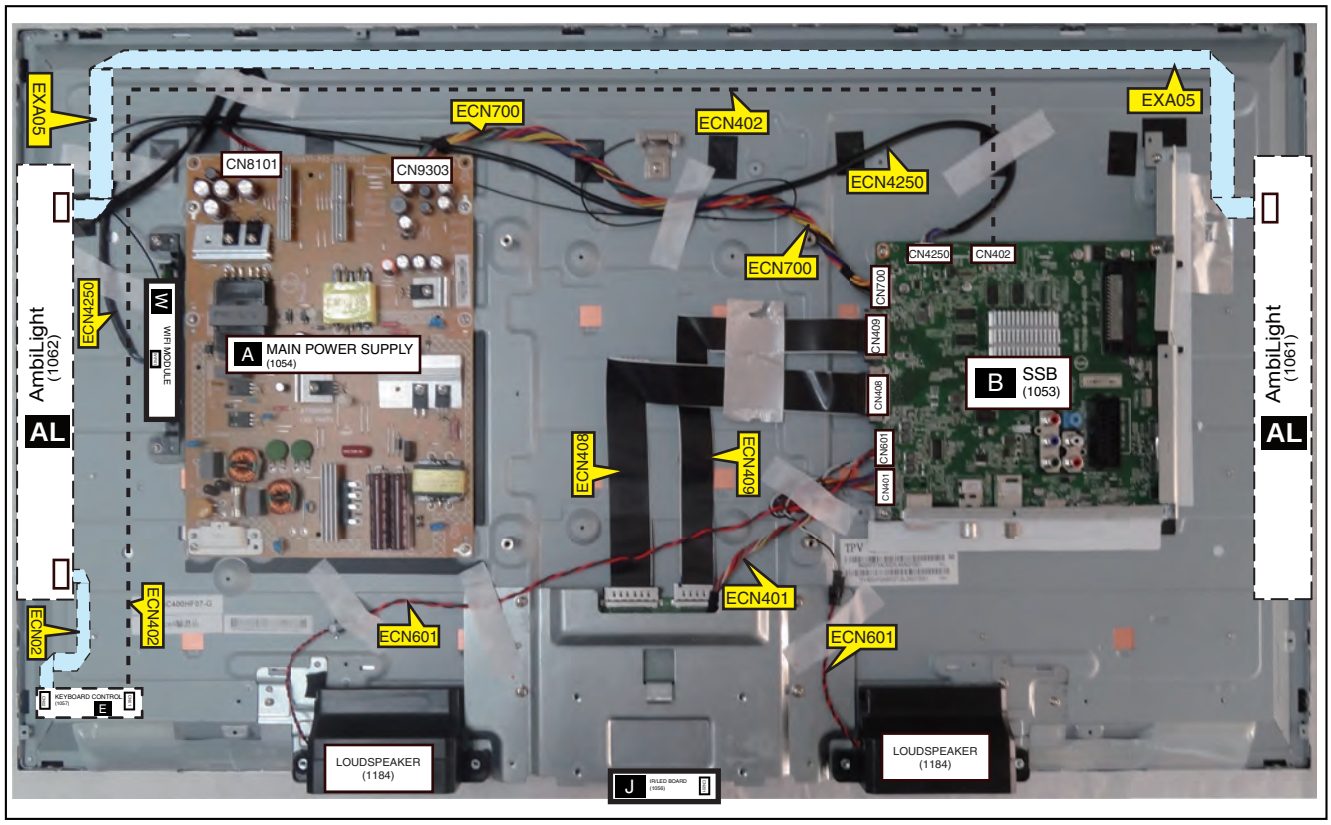

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Figure 4-6 Cable dressing (40" 6510&6540 series)

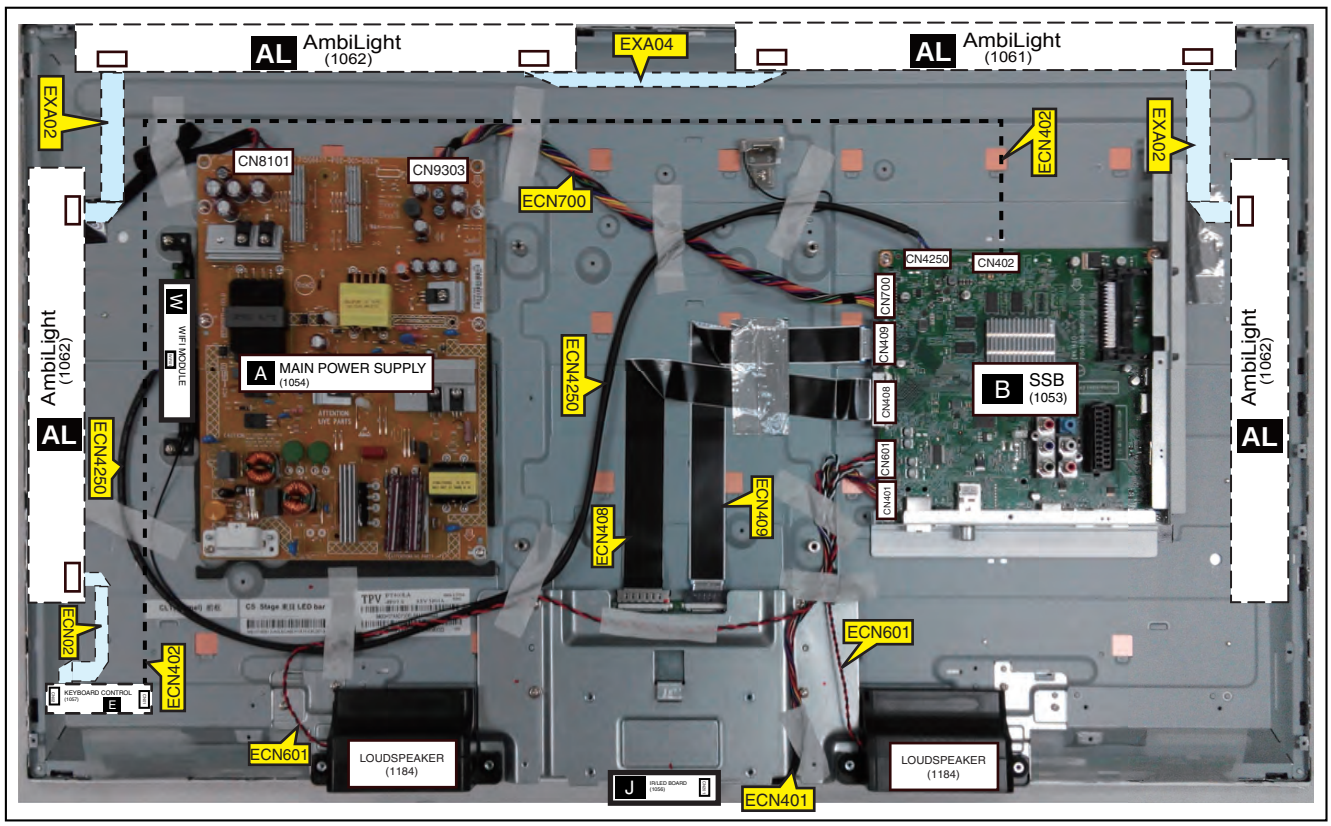

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Figure 4-7 Cable dressing (40" 6550&6560&6580 series)

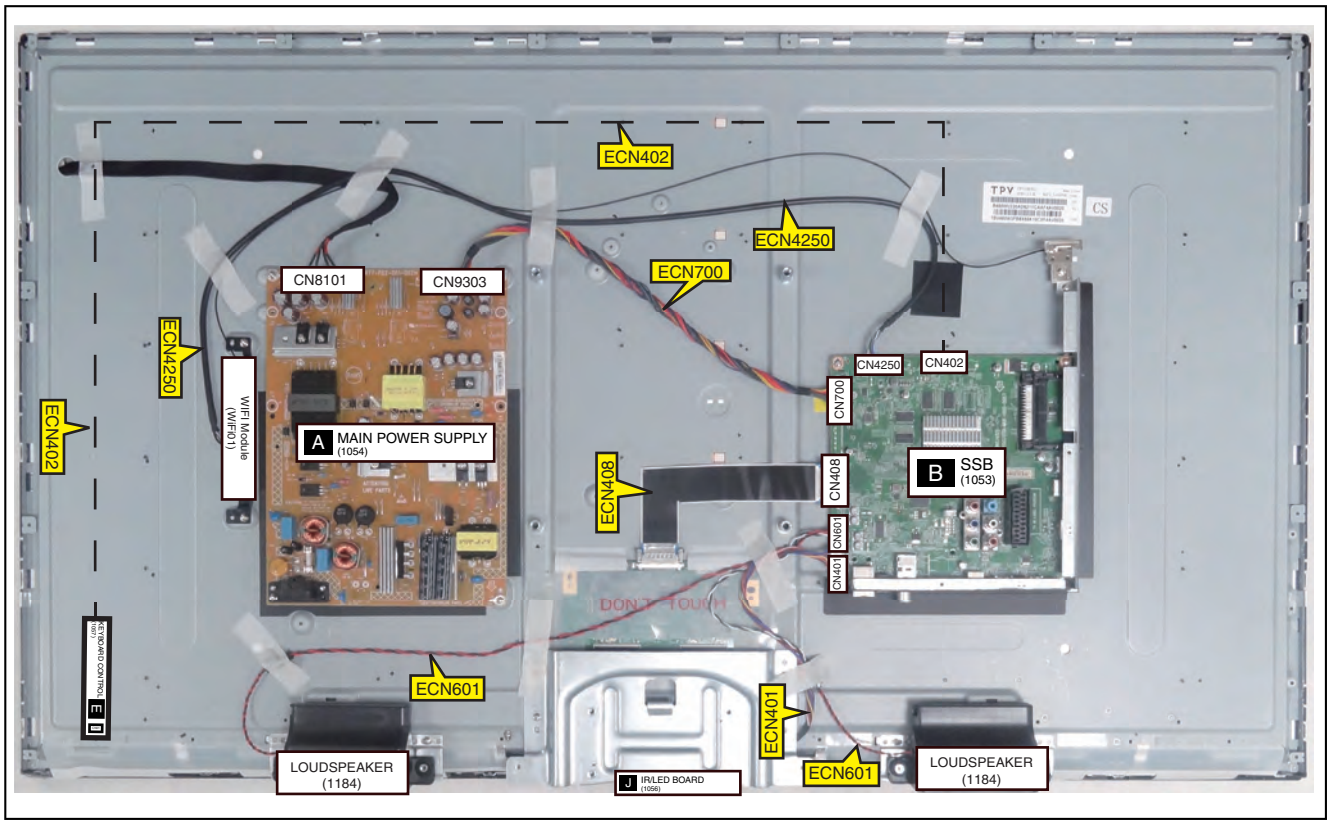

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Figure 4-8 Cable dressing (48" 5500 series)

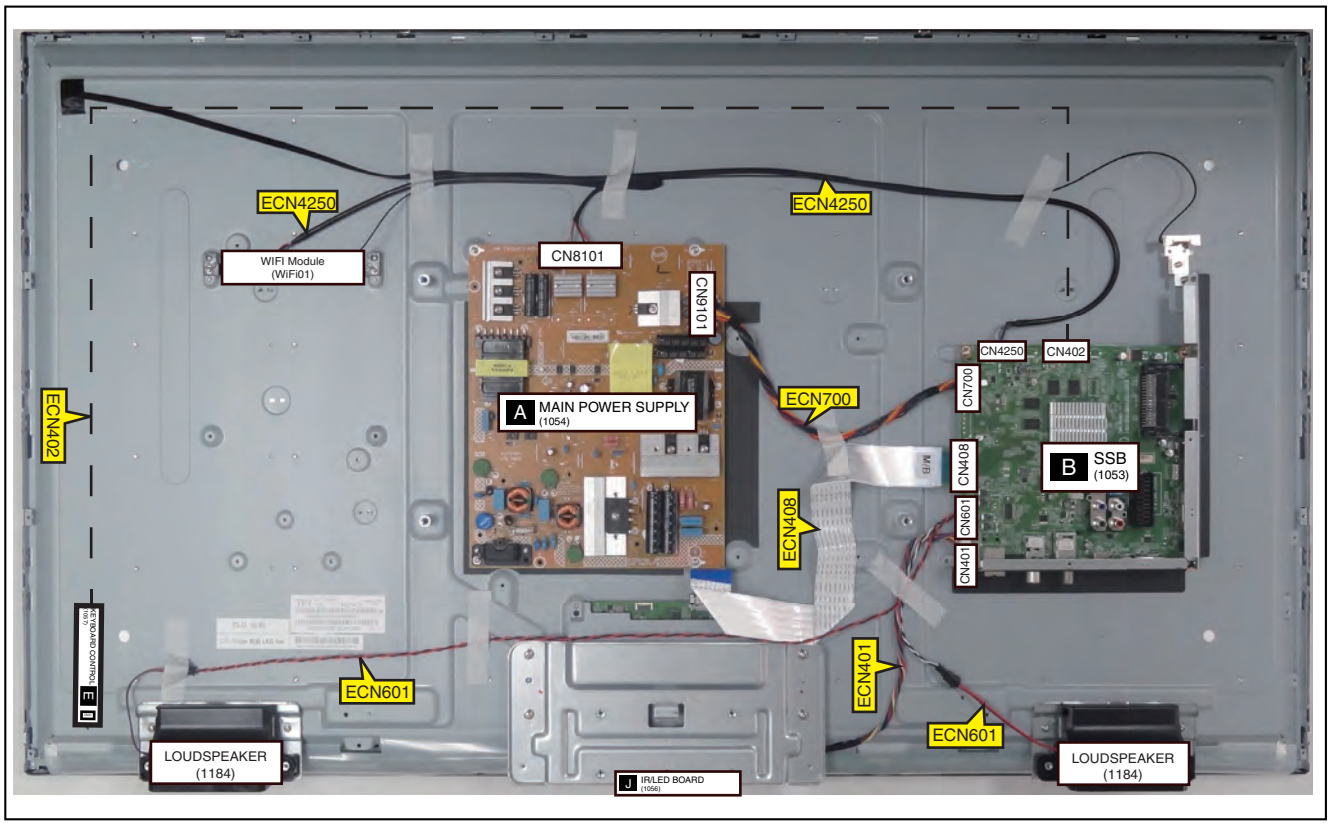

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Figure 4-9 Cable dressing (50" 6400 series)

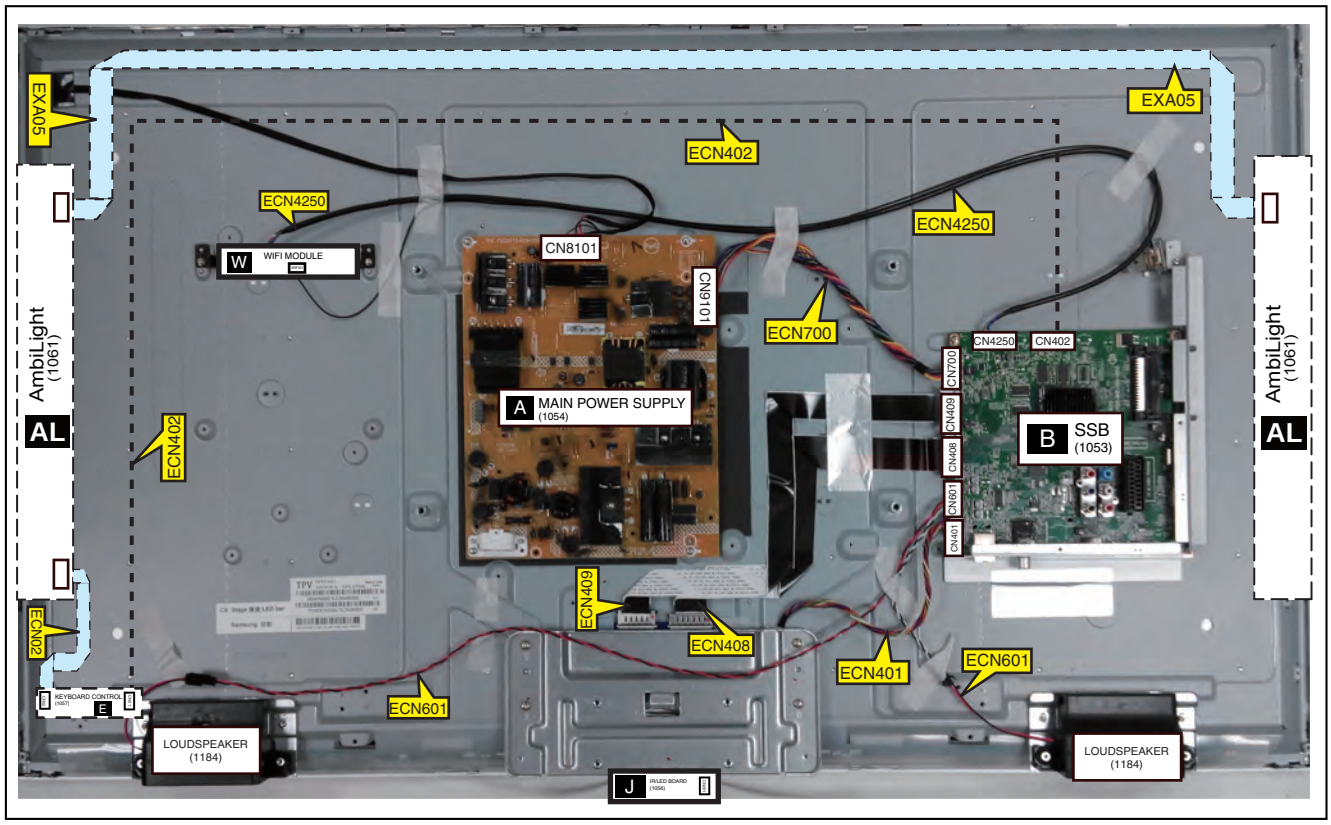

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Figure 4-10 Cable dressing (50" 6510&6540 series)

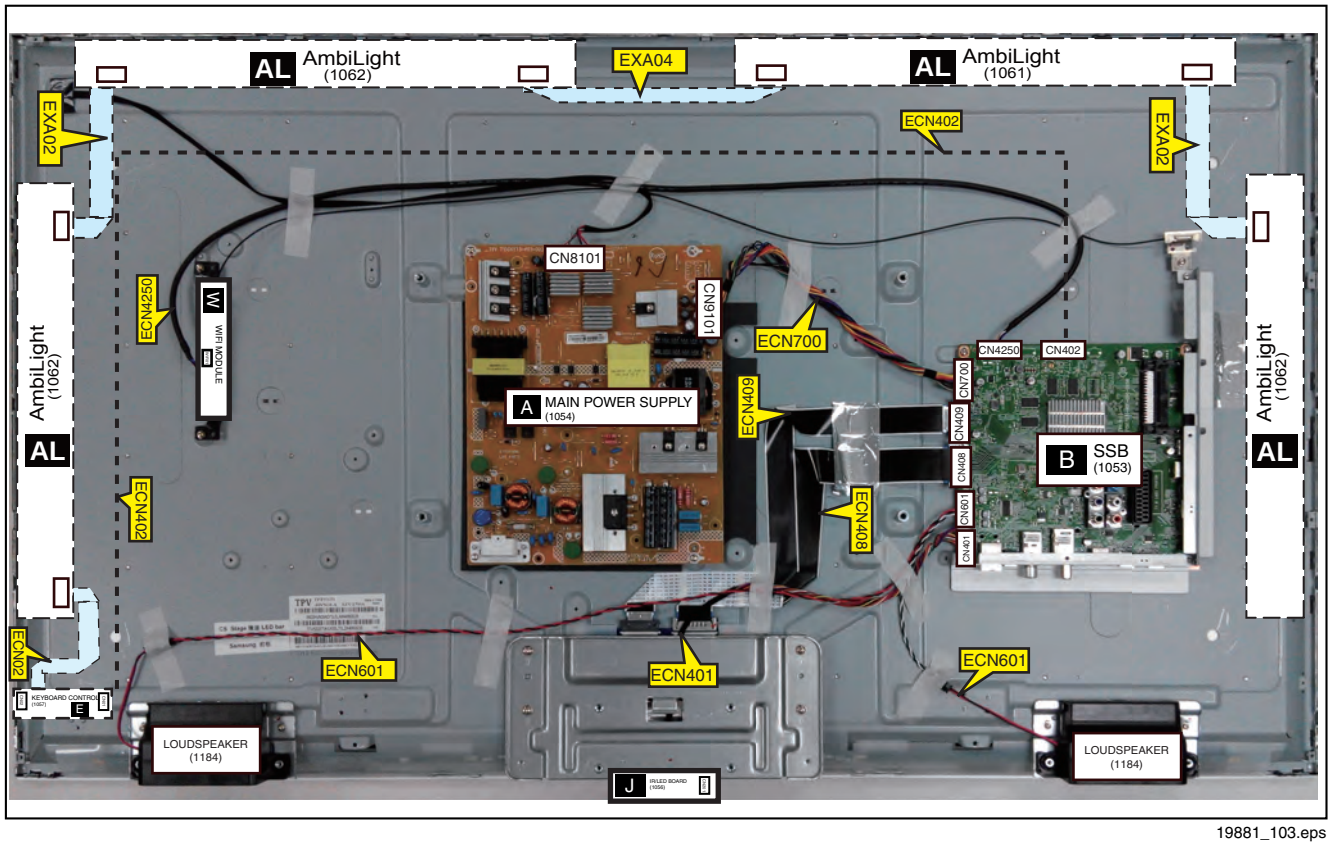

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Figure 4-11 Cable dressing (50" 6550&6560&6580 series)

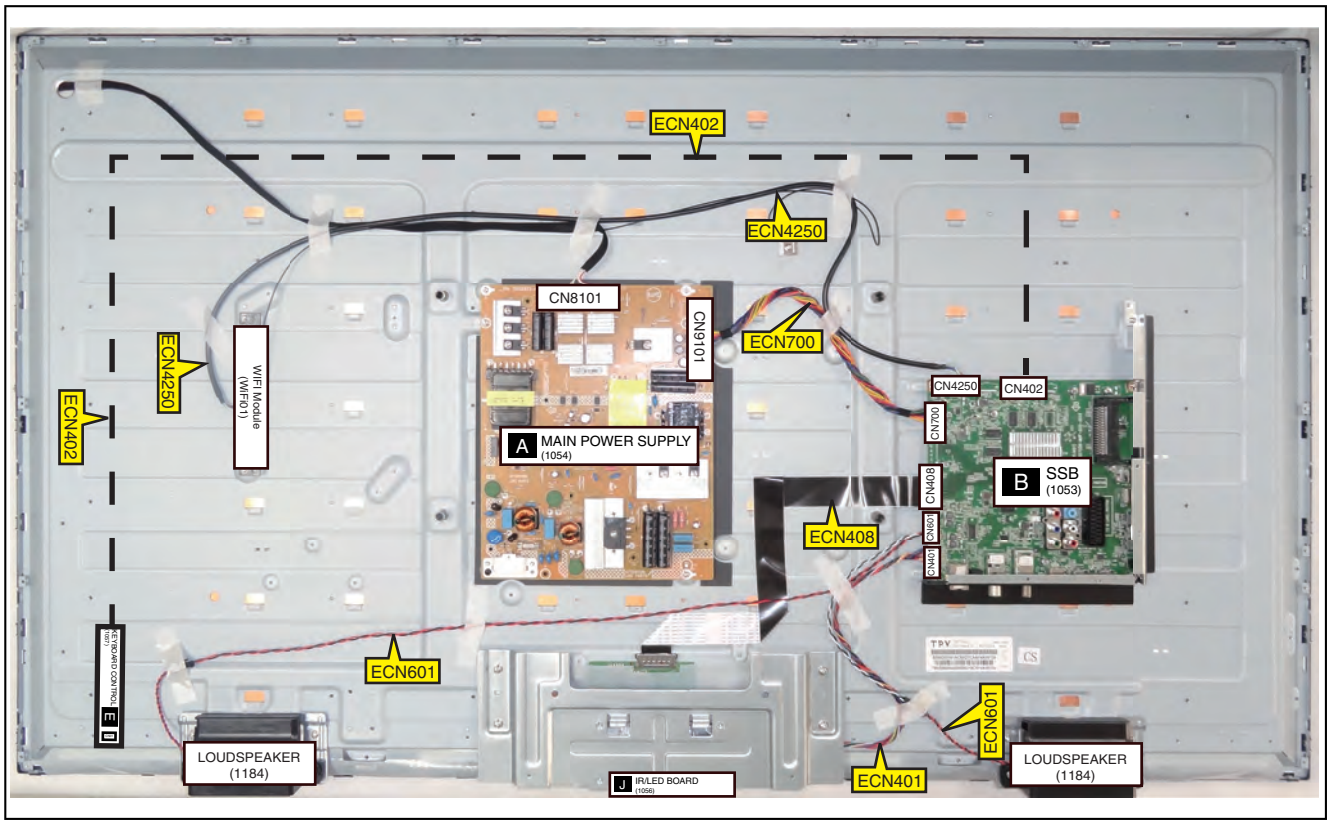

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Figure 4-12 Cable dressing (55" 5500&6400 series)

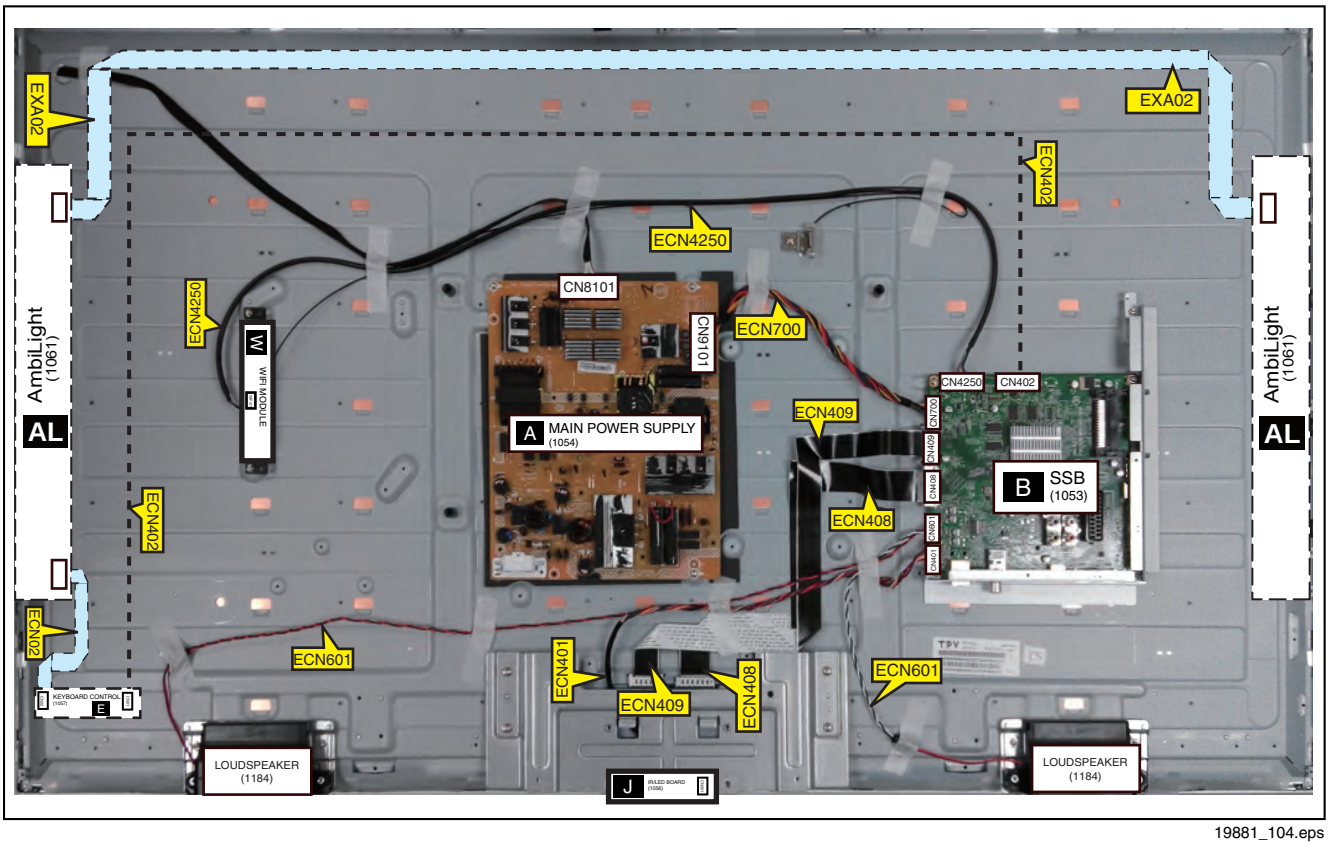

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Figure 4-13 Cable dressing (55" 6510&6540 series)

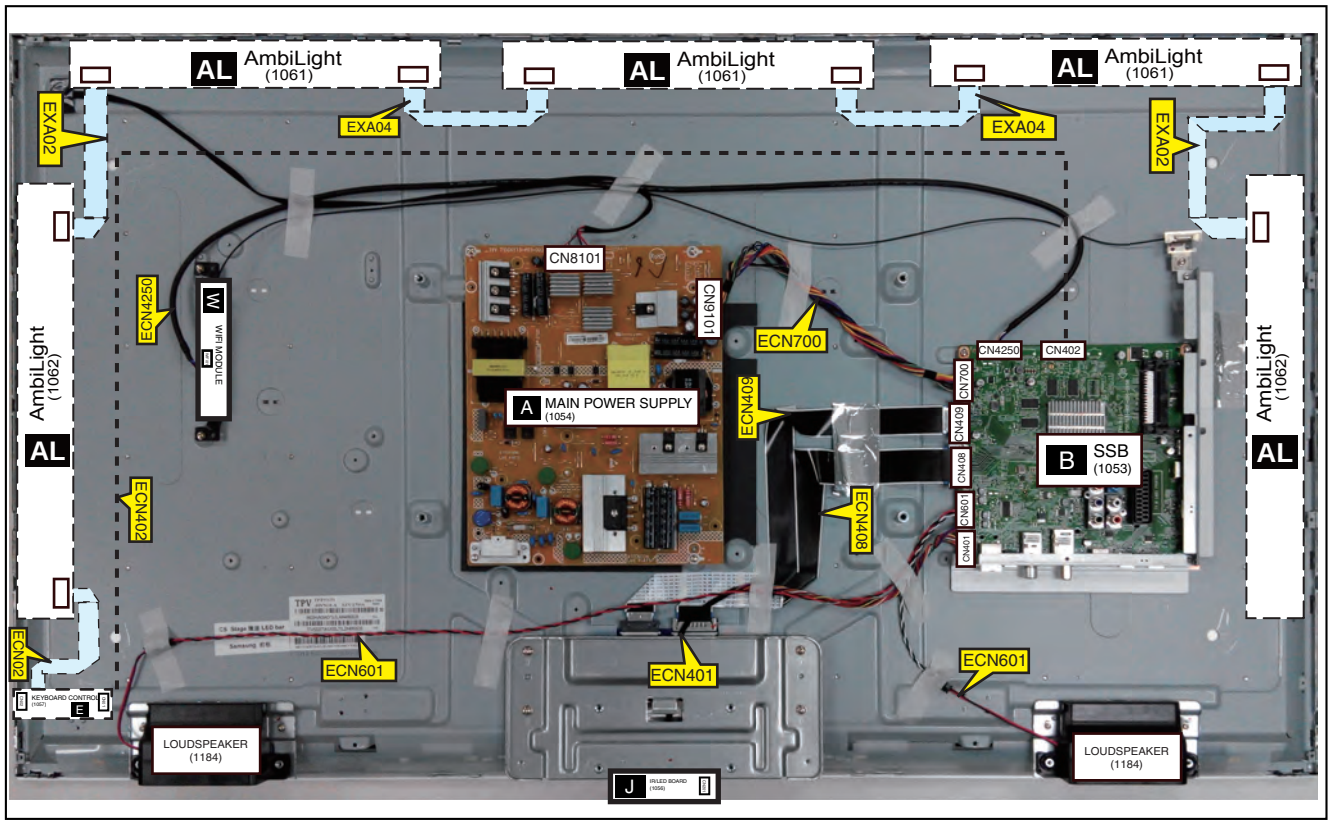

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Figure 4-14 Cable dressing (55" 6550&6560&6580 series)

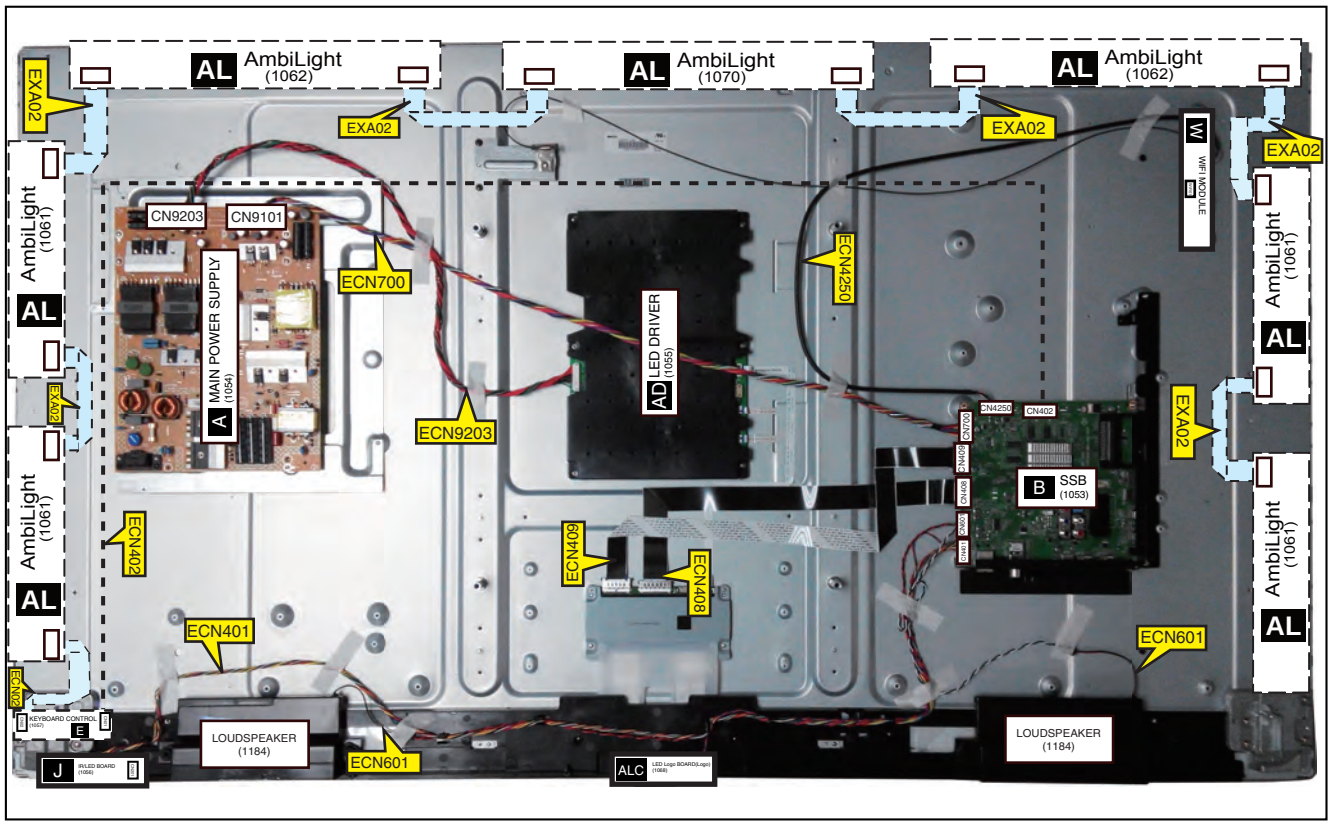

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Figure 4-15 Cable dressing (65" 6520 series)

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.

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Figure 4-16 Rear cover removal[1]

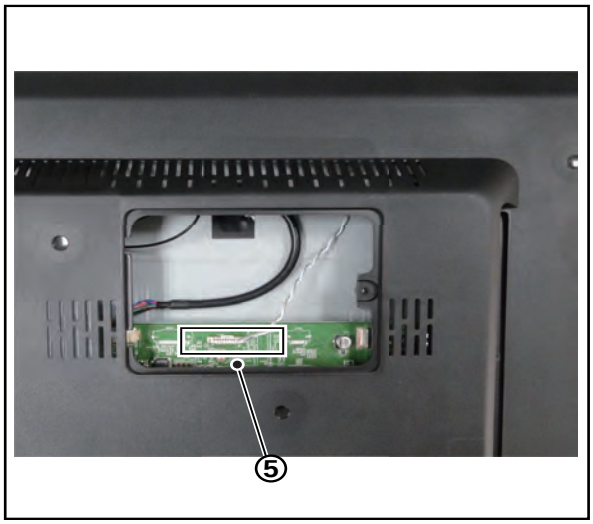

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Figure 4-17 Rear cover removal[2]

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.

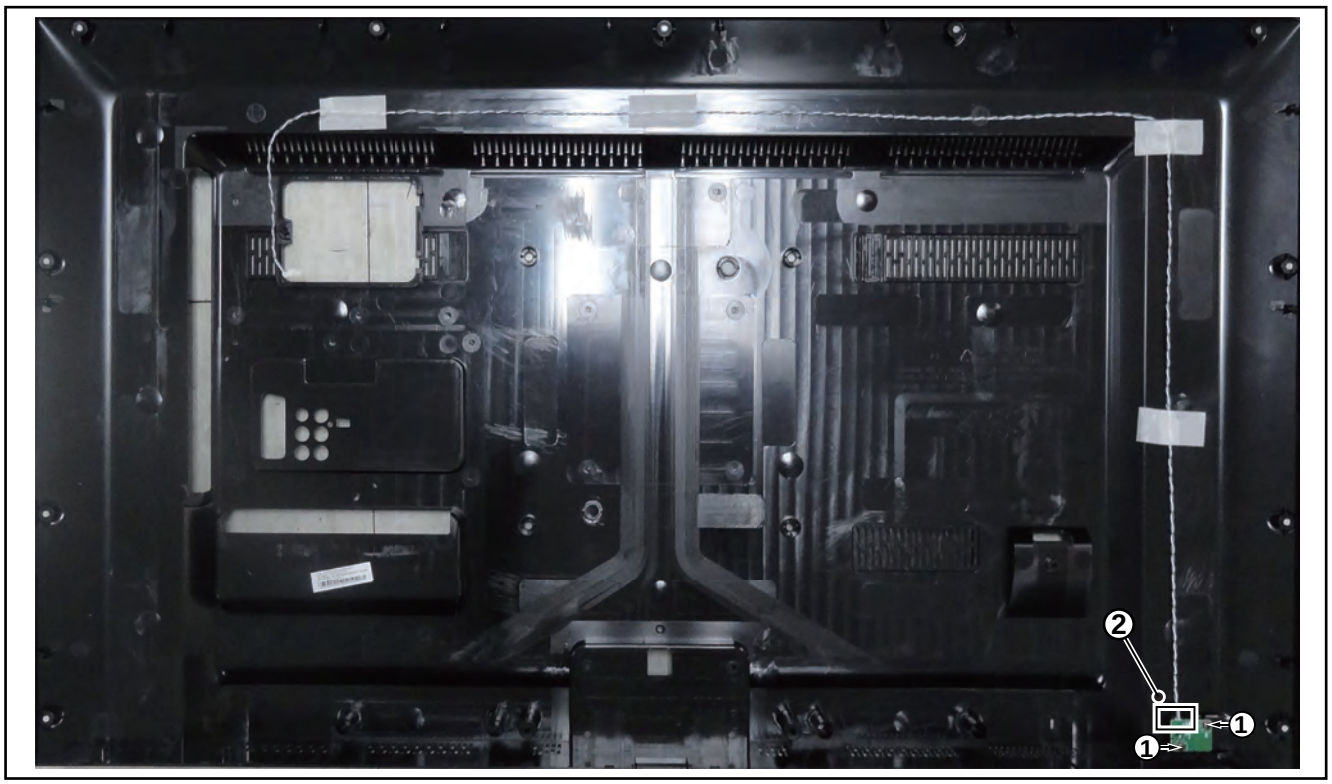

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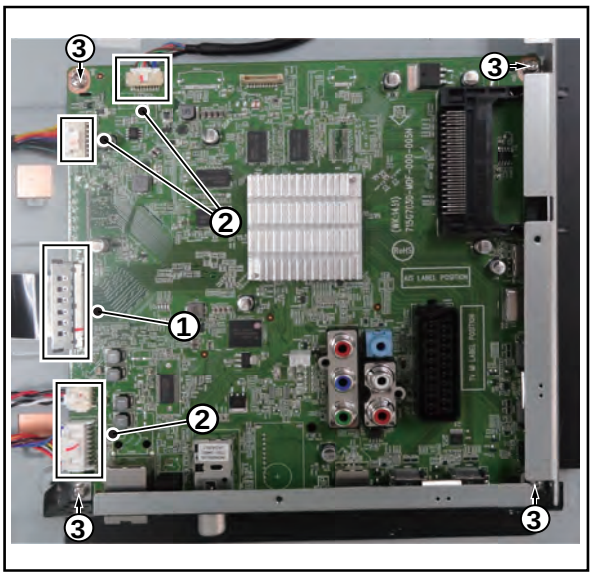
Figure 4-18 Keyboard removal

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 toremount all different screws at their original position duringre-assembly. Failureto do so mayresult 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.

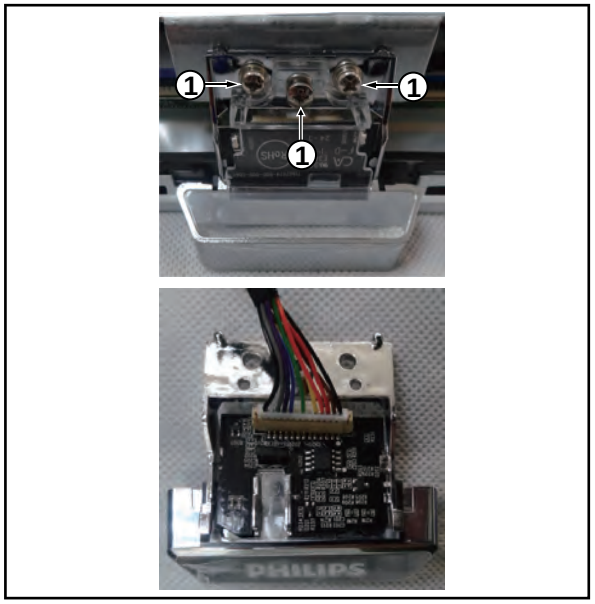


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Figure 4-20 IR board removal[1]

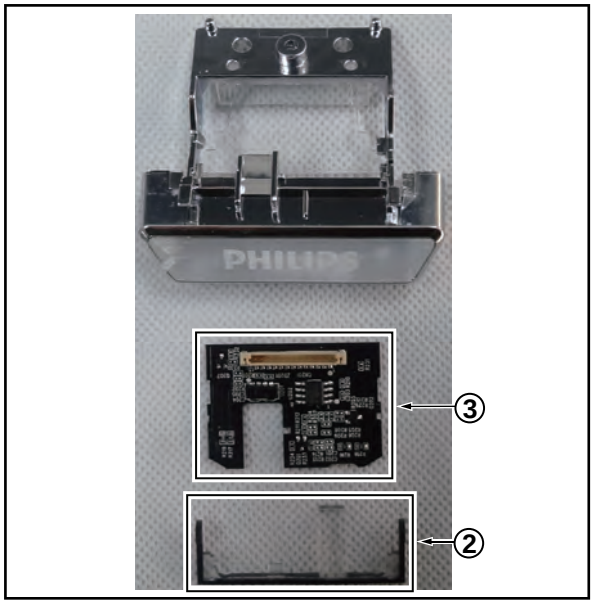

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Figure 4-21 IR board removal[2]

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.

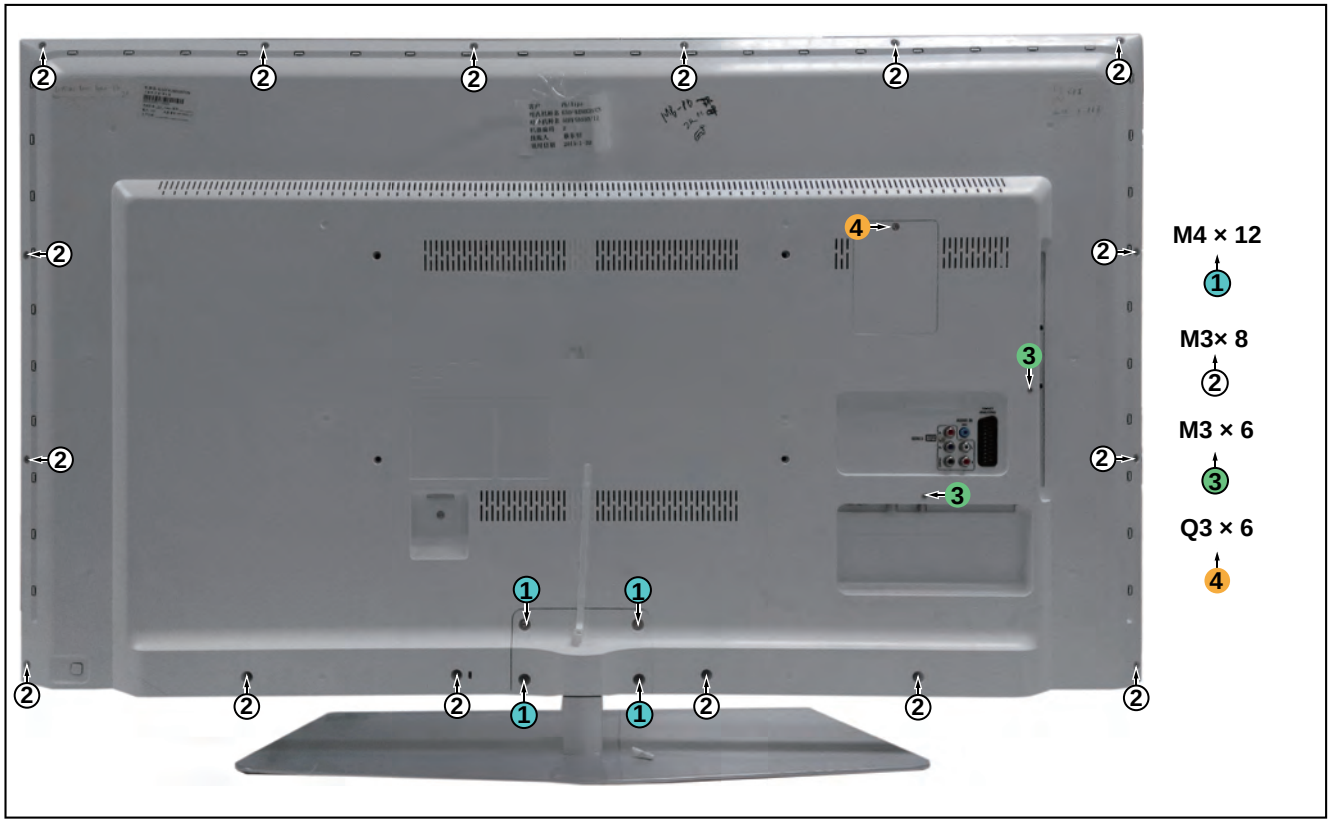

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Figure 4-22 Rear cover removal[1]

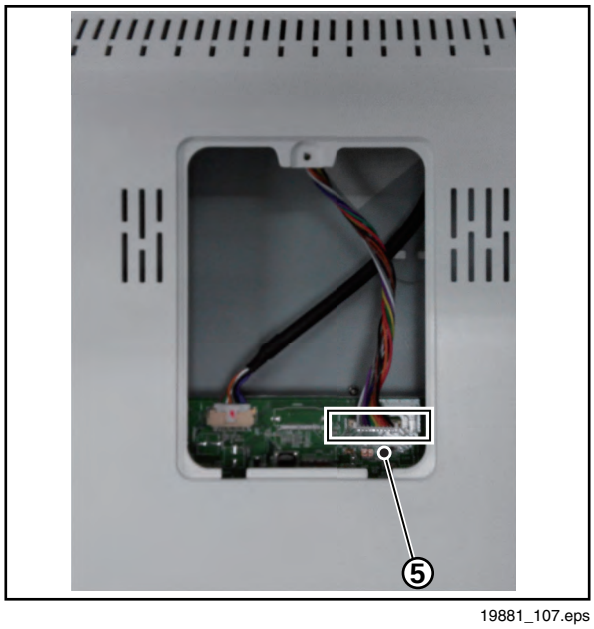

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Figure 4-23 Rear cover removal[2]

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.

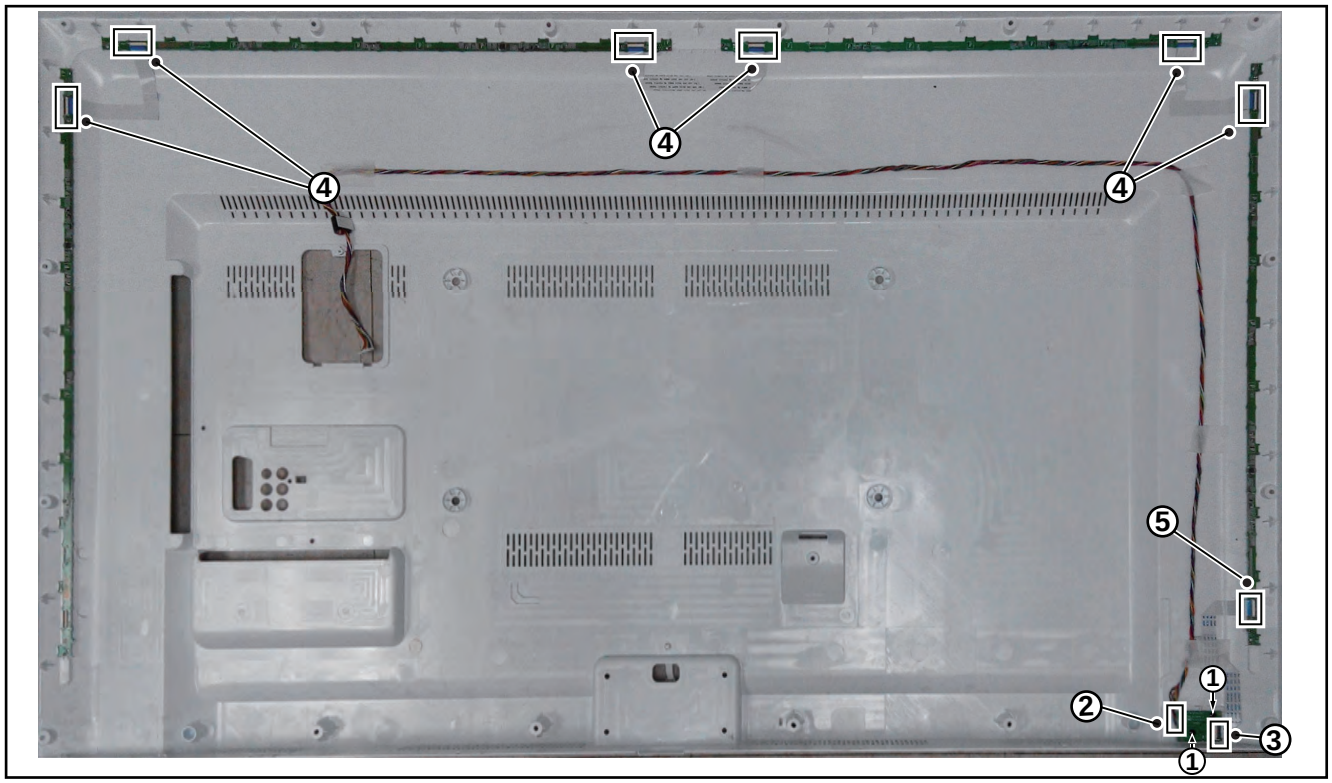

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Figure 4-24 Ambilight and Keyboard removal

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.

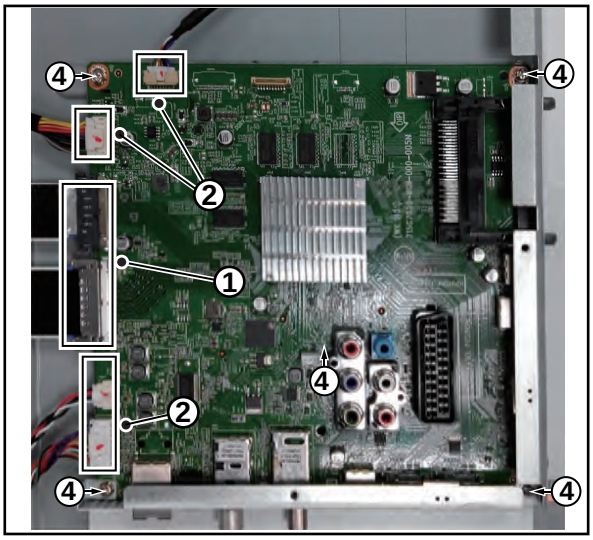

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Figure 4-25 SSB removal

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.

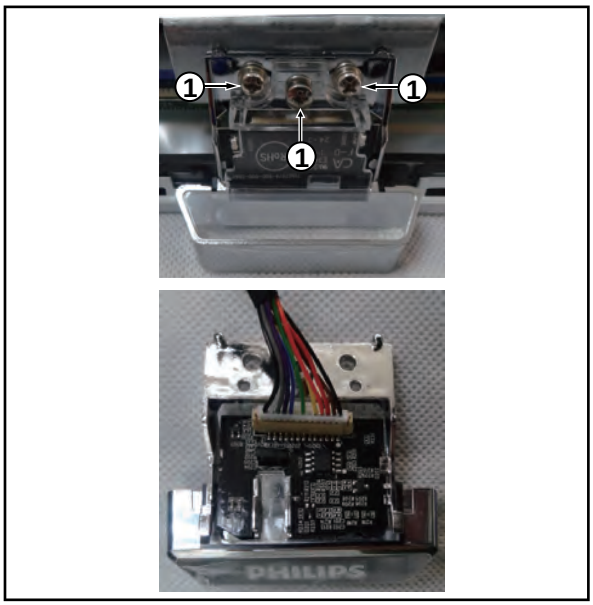

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Figure 4-26 IR board removal[1]

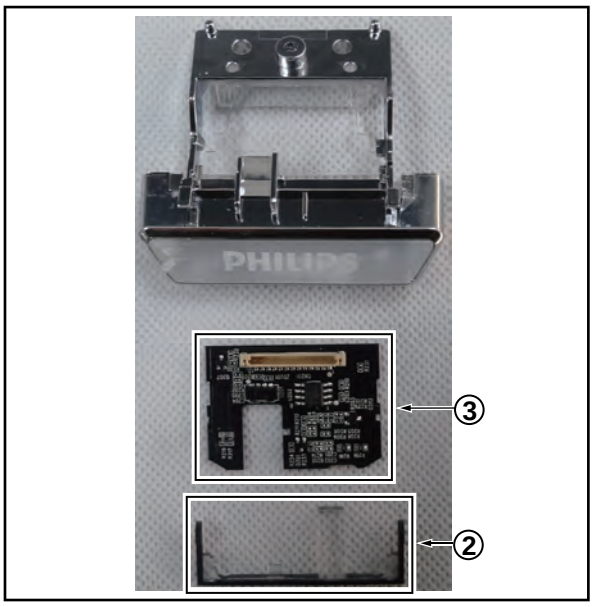

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Figure 4-27 IR board removal[2]

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.

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.

19883_101.eps

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.

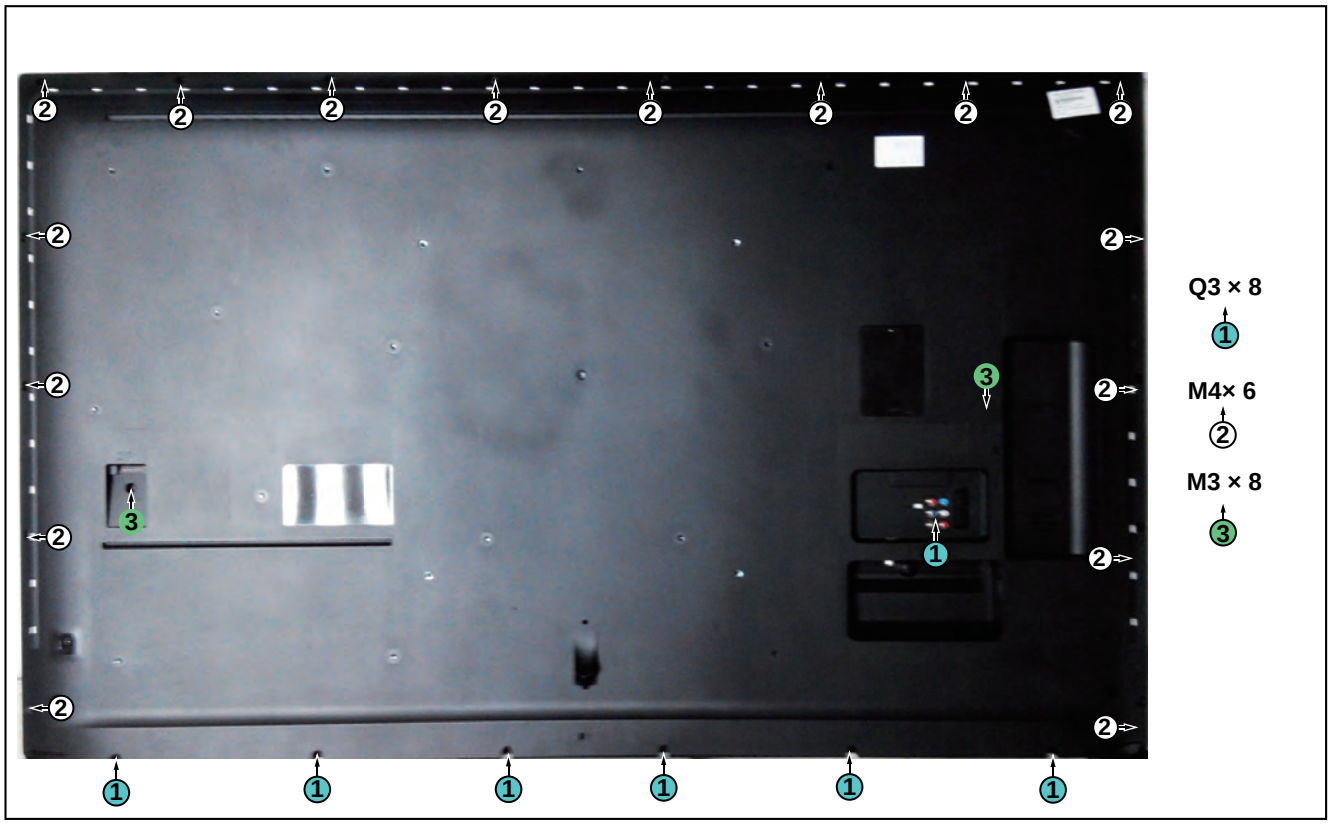

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Figure 4-29 Rear cover removal[1]

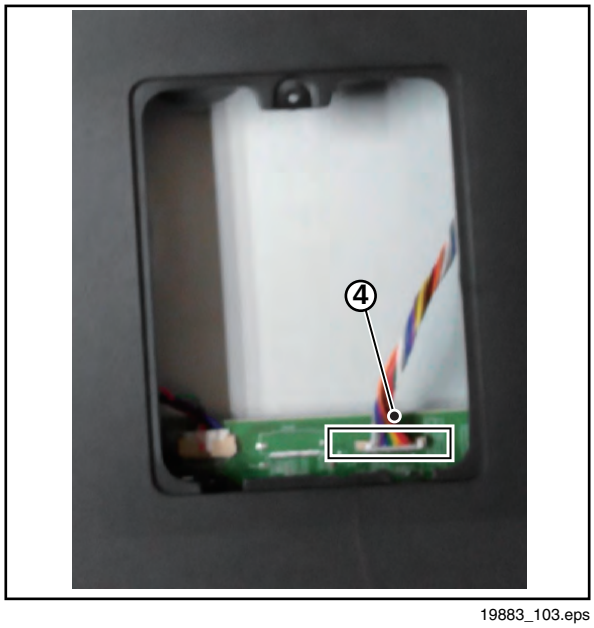

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Figure 4-30 Rear cover removal[2]

4.5.3 AmbiLight Panel

Refer to Figure 4-31 for details.

1. Gently release the clamps and unplug the connectors [5] that secure theambilight panels. Release theclips 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.

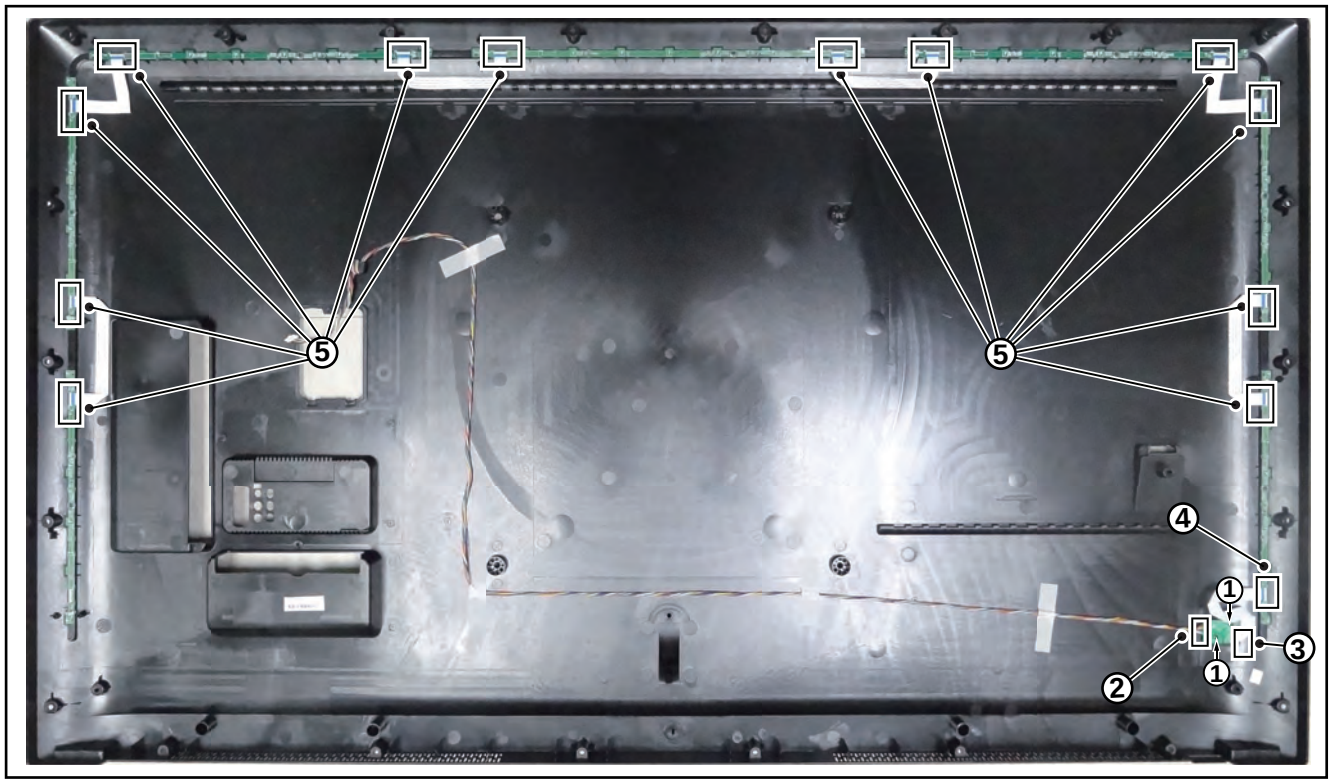

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Figure 4-31 Ambilight and Keyboard removal

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.

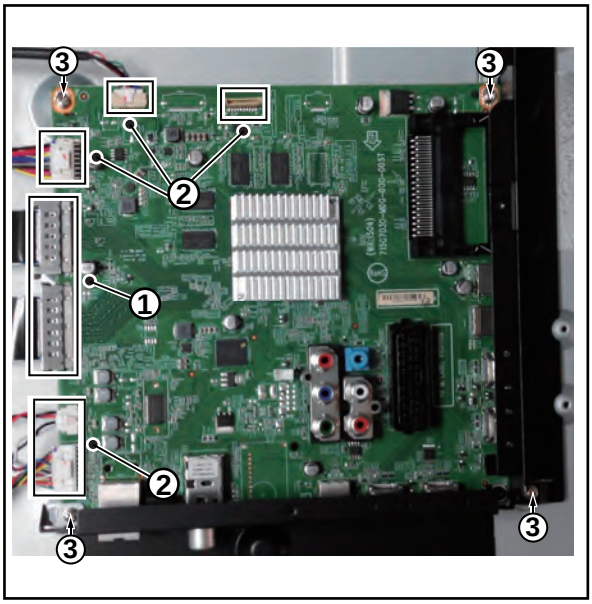

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Figure 4-32 SSB removal

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, getntly 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 whde 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

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 I^2C /UART level and can be used by a Service engineer to quickly diagnose the TV set by reading out error codes, read and write in NVMs, communicate with ICs and the 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 I^2C with help of ComPair. To do this, ComPair has to be connected to the TV set via the ComPair connector, which will be accessible through the rear of the set (without removing the rear cover).

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

5.2.1 General

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

Life Timer

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

Software Identification, Version, and Cluster

The software ID, version, and cluster will be shown in the main menu display of SDM, SAM, and CSM.
The screen will show: "AAAAAB-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". Incase 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 32"	39"	40"	48"	50"	55"	Description
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	DEMOD_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

back to div.table

Item	Item value	Default value						Description
		32"	39"	40"	48"	50"	55"	
8	TV Settings ey K	1	1	1	1	1	1	TV ettings Sy K
9	TV Settings ALUE V	0	0	0	0	0	0	TV ettings SALUE V
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	Red 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 V udio Taina g
29	AUD_GAIN_DTV	0						Digital TV audio gain
30	AUD_GAIN_USB	0	2	2	0	0	0	USB udio aina g
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 ENSOR SYPE	0	0	0	0	0	1	Light ensor ype e t
39	TEMP ENSOR SYPE	0	0	0	0	0	3	Tempreture ensor s
40	AMBILIGHT TYPE	0	0	0	0	0	0	The type f mbient ight l
41	AMBILIGHT TYPE VALUE	0	0	0	0	0	3	The type alue f mbient ight
42	LED YPE T	0	0	0	0	0	0	The type f ED o L
43	3D	0	2	2	0	0	2	3D n/off o
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.

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.
- 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

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 andthe 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

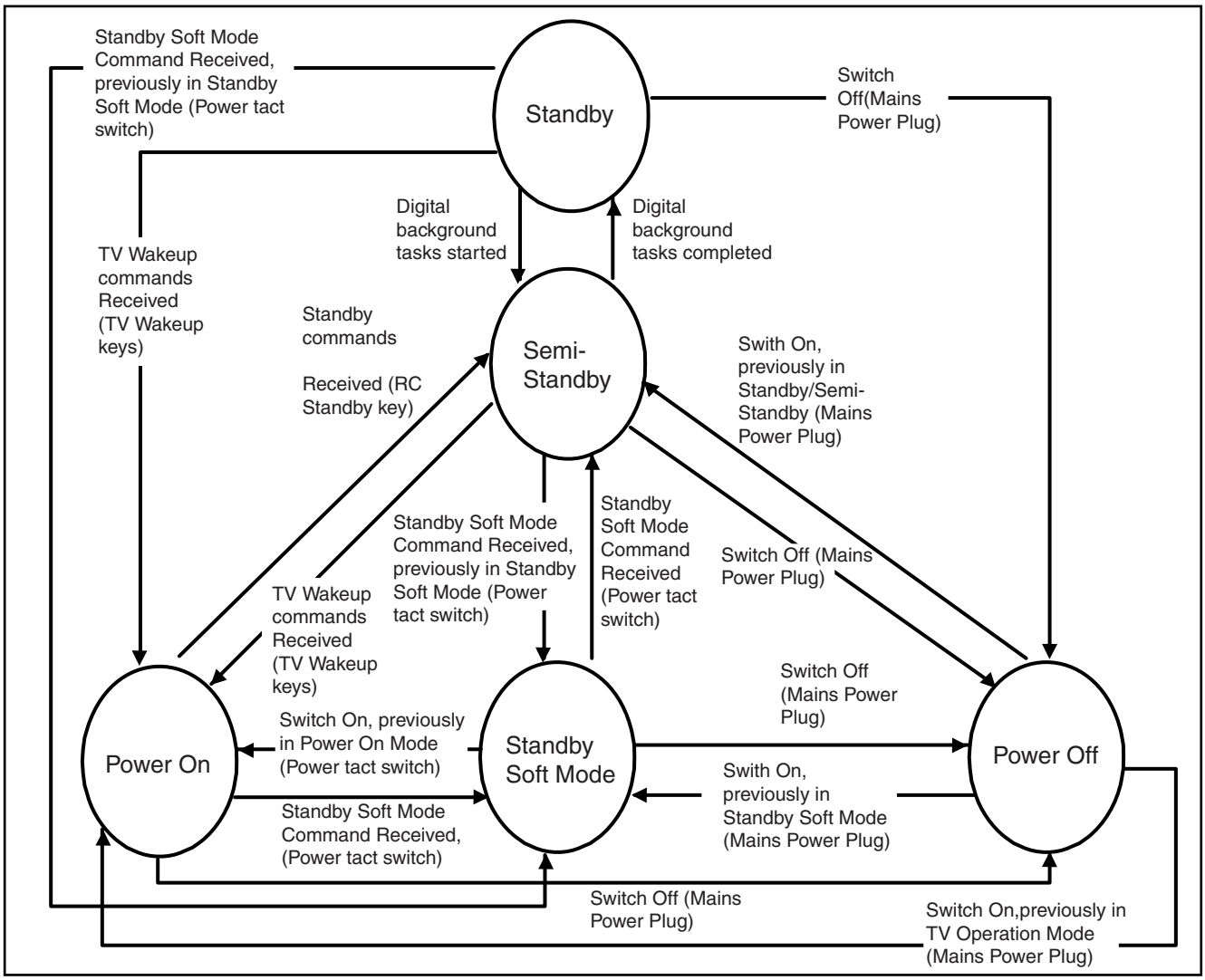
By means of the “CURSOR-DOWN/UP” knob (or the scroll wheel) on the RC-transmitter, can be navigated through the menus.

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



19080_206_110323.eps
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:

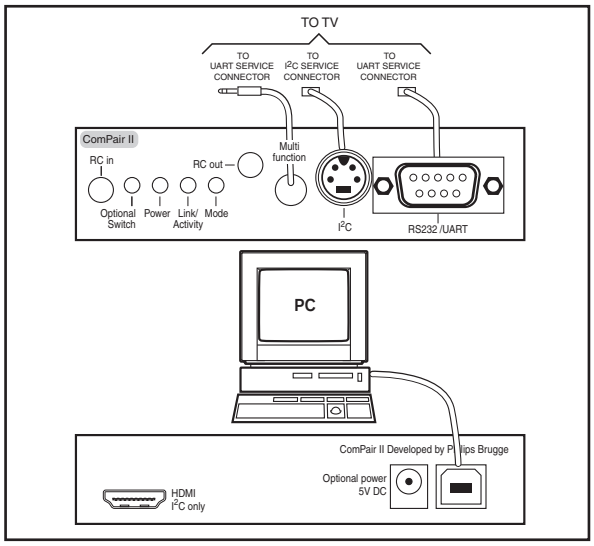
1. ComPair helps to quickly get an understanding on how to repair the chassis in a short and effective way.
2. ComPair allows very detailed diagnostics and is therefore capable of accurately indicating problem areas. No knowledge on I^2C or UART commands is necessary, because ComPair takes care of this.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

Specifications

ComPair consists of a Windows based fault finding program and an interface box between PC and the (defective) product. The ComPair II interface box is connected **to the PC** via an USB cable. For the TV chassis, the ComPair interface box and the TV communicate via a bi-directional cable via the service connector(s).
The ComPair fault finding program is able to determine the problem of the defective television, by a combination of automatic diagnostics and an interactive question/answer procedure.

How to Connect

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



10000_036_090121.eps
091118

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".

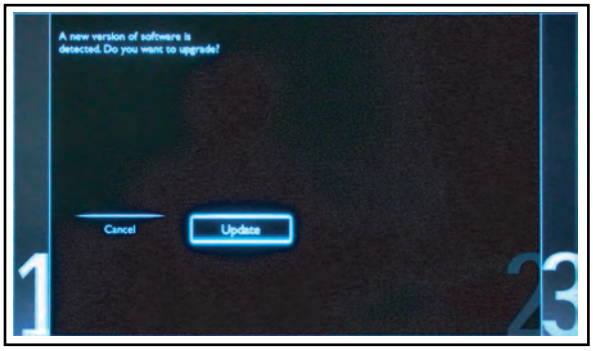
If the current software version of the TV is the same as the latest update file found on http://www.philips.com/support, it is not necessary to update the TV software.

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.

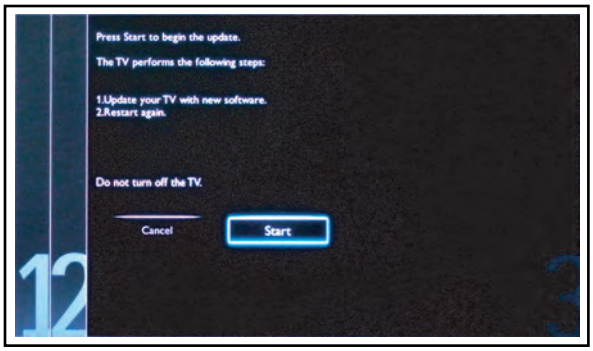
5.5.5 Update the TV software

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.



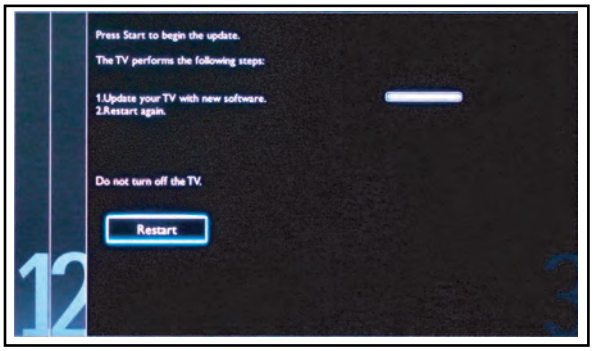
19080_207_110324.eps
110324

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, usethe 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 I^2C device.
- General I^2C error.

The last five errors, stored in the NVM, are shown in the Service menu’s. This is called the error buffer.
The error code buffer contains all errors detected since the last time the buffer was erased. The buffer is written from left to right. When an error occurs that is not yet in the error code buffer, it is displayed at the left sideand 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^2C bus error on the SSB
16	+12 V missing or low, PSU defective
27	Channel decoder error on the SSB
34	Tuner I^2C bus error on the SSB
35	EEPROM I^2C 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 96 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

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.

back to div.table

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
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

back to div.table

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-OOOO
- **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
- **OOOO** 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:

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 foundin Figure 9.1.

7.1.3 SSB Cell Layout

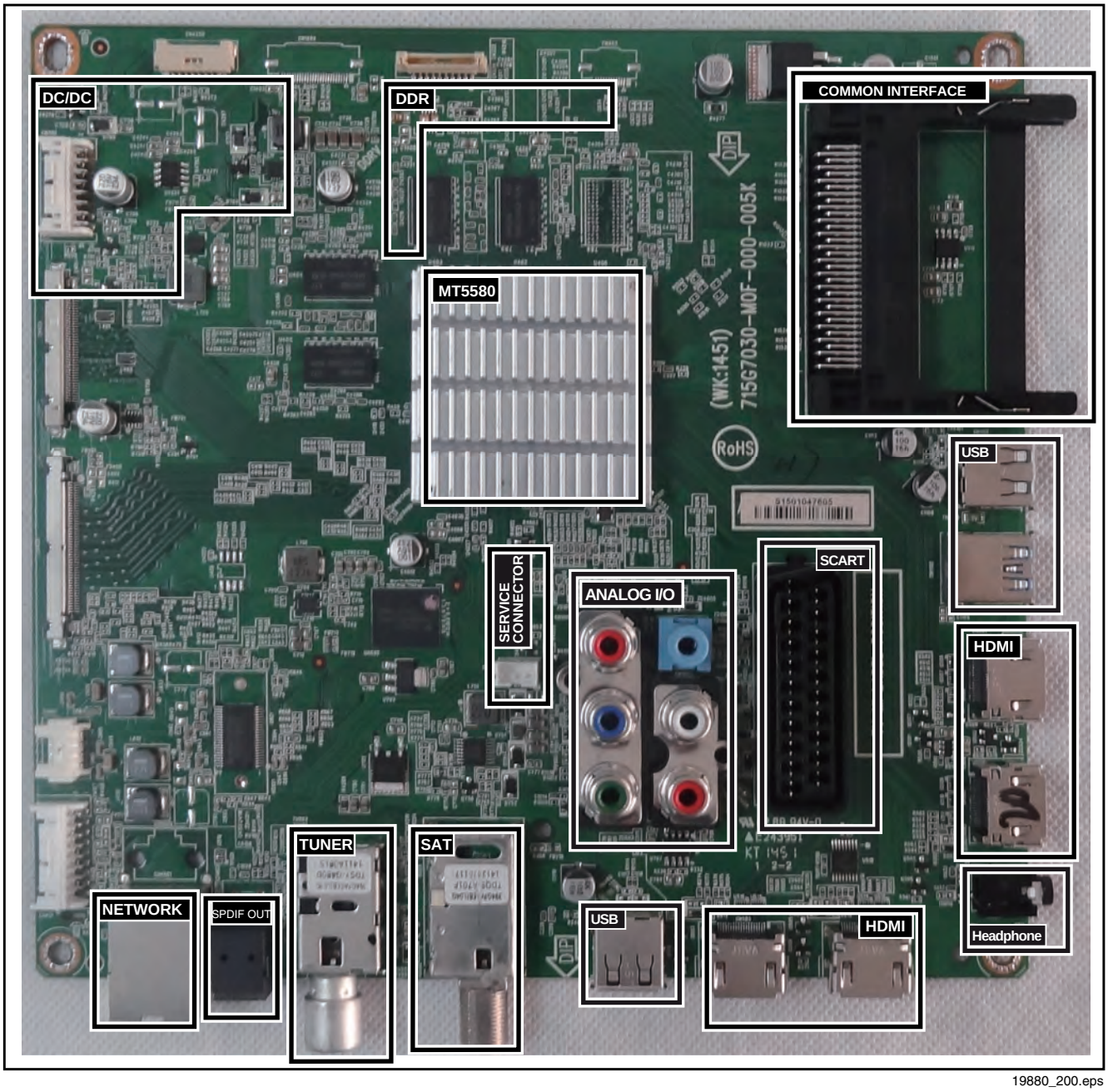


Figure 7-1 SSB layout cells (top view)

7.2 Power Supply

Refer to figure Figure 7-2 for the power architecture of this platform.

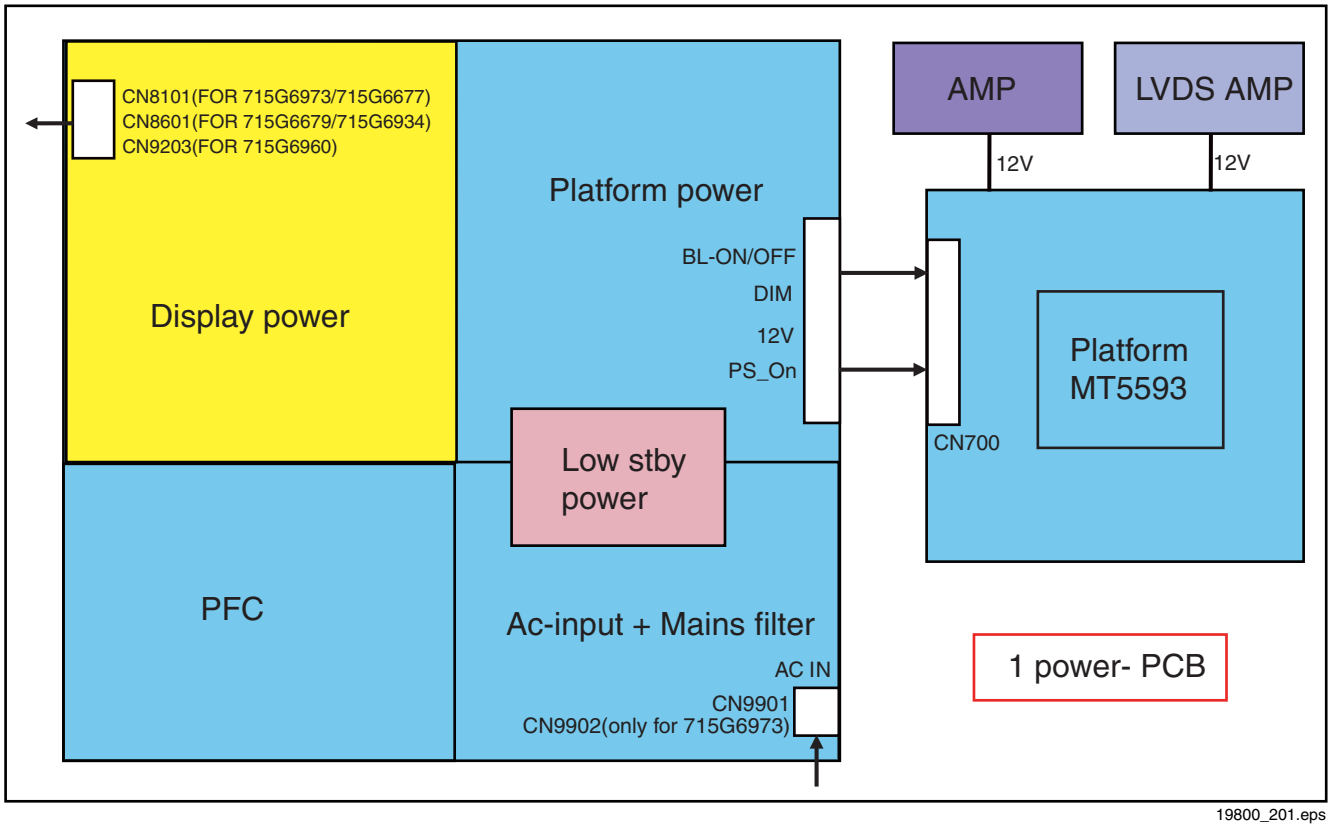


Figure 7-2 Power Architecture

7.2.1 Power Supply Unit

All power supplies are a blackbox 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 theorder codesof 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:
- +3.7V output (standby mode) for 32''
- +3.5V output (standby mode) for 32/39/40''/65''
- +3.7V output (standby mode) for 48''
- +3.7V output (standby mode) for 50''/55''
- +12 output (on-mode) for all model
- +12V 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	+3.7v	-	+3.7v	-	-	-	+3.7v	-	On/off	-
16	+3.7v	-	+3.7v	-	-	-	+3.7v	-	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 reciver,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, VCCK, 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 :

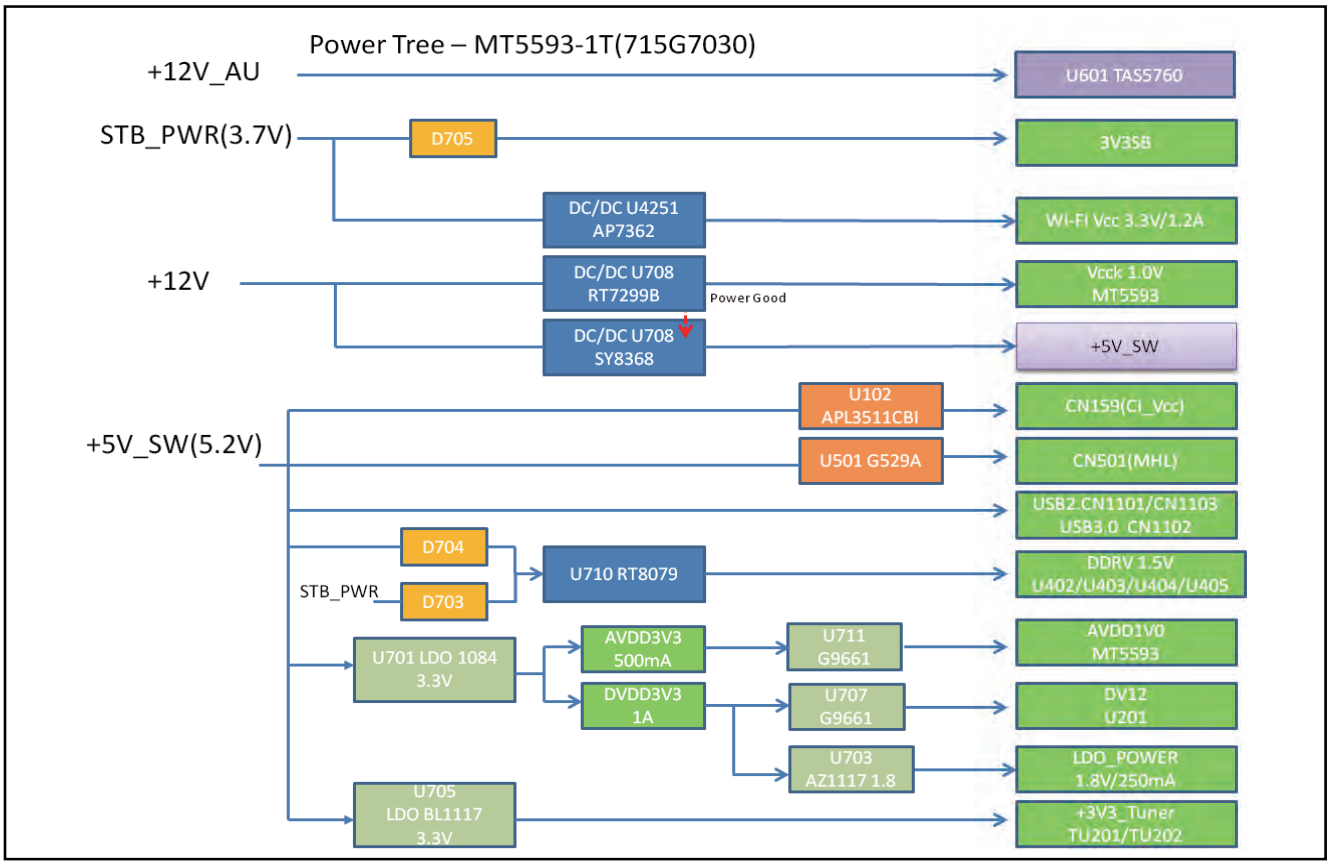


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Figure 7-3 DC/DC converters

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/UPIJ HSBGA-900 Processor

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

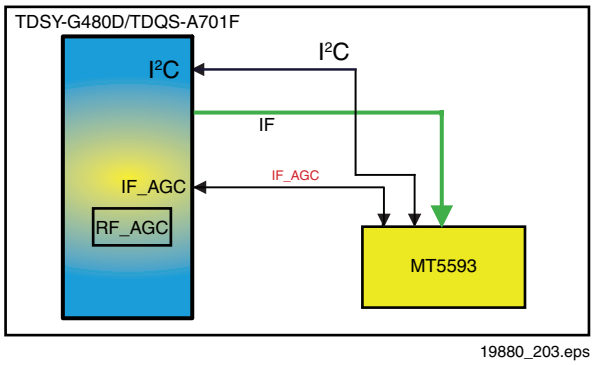

Figure 7-4 Front-End Analogue block diagram

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/UPIJ 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.

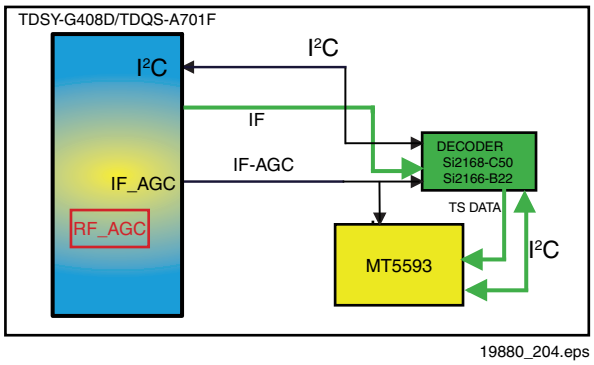

Figure 7-5 Front-End DVB-T2 DTV block diagram

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/UPIJ HSBGA-900 Processor
- DEMODULATOR Si2166-B22-GM QFN48 for K series

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

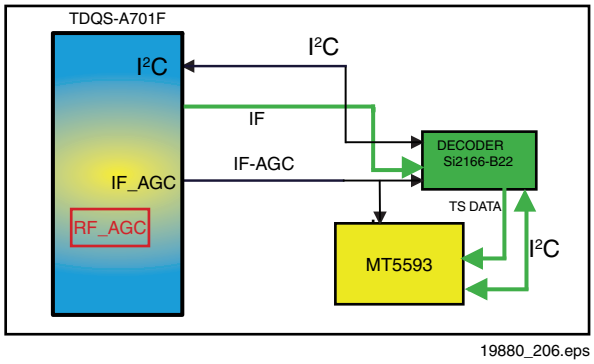

Figure 7-6 Front-End S2 DTV block diagram

7.5 HDMI

Refer to figure 7-7 HDMI input configuration for the application.

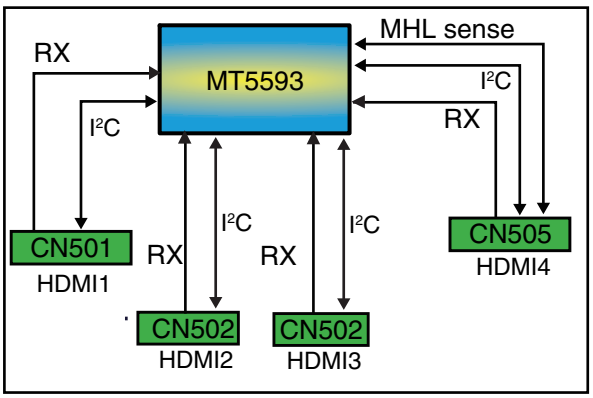

Figure 7-7 HDMI input configuration

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/UPIJ

The MT5593F/H/UPIJ 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 muti-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)

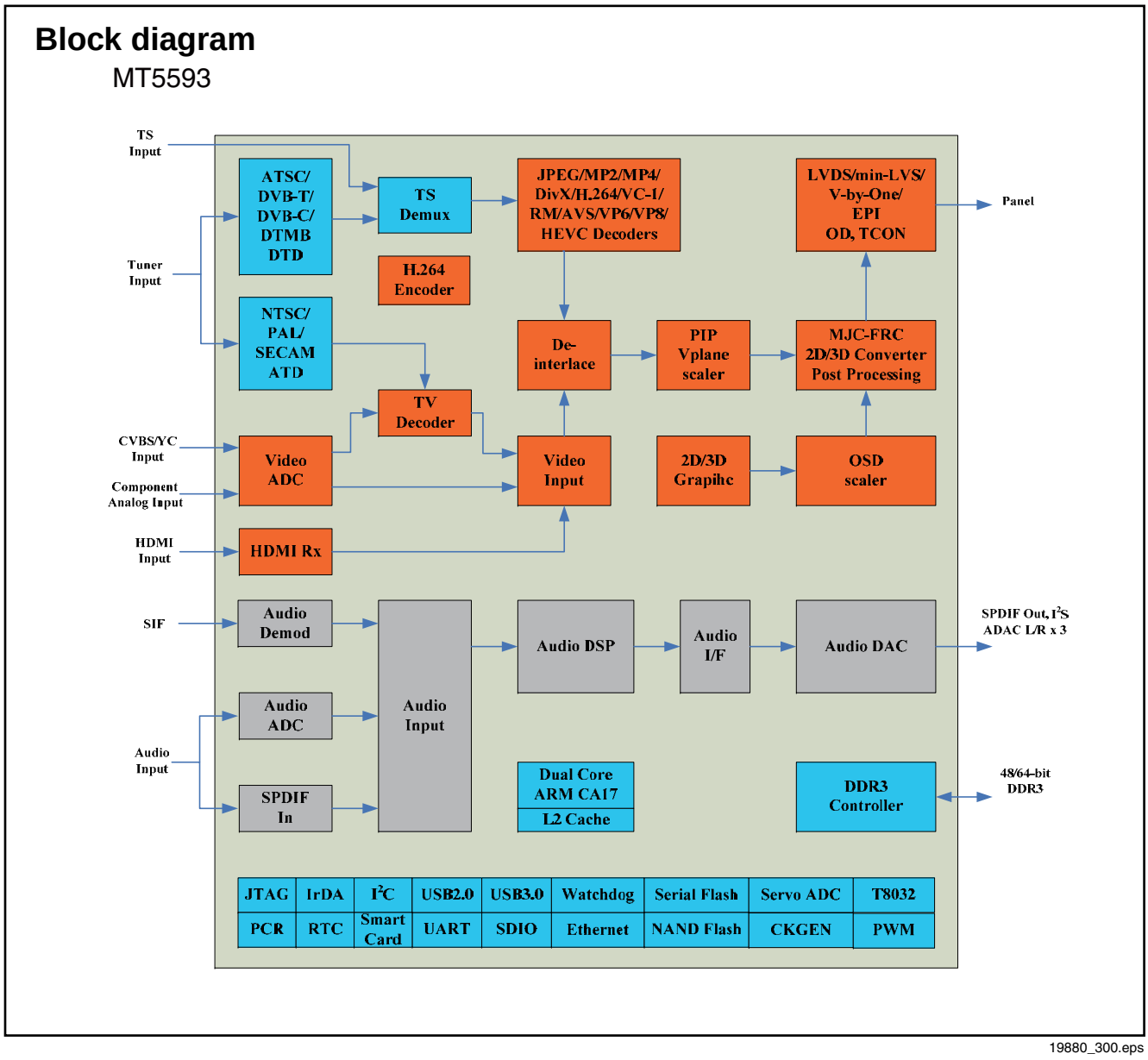

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Figure 8-1 Internal block diagram

Pinning Information

MT5593

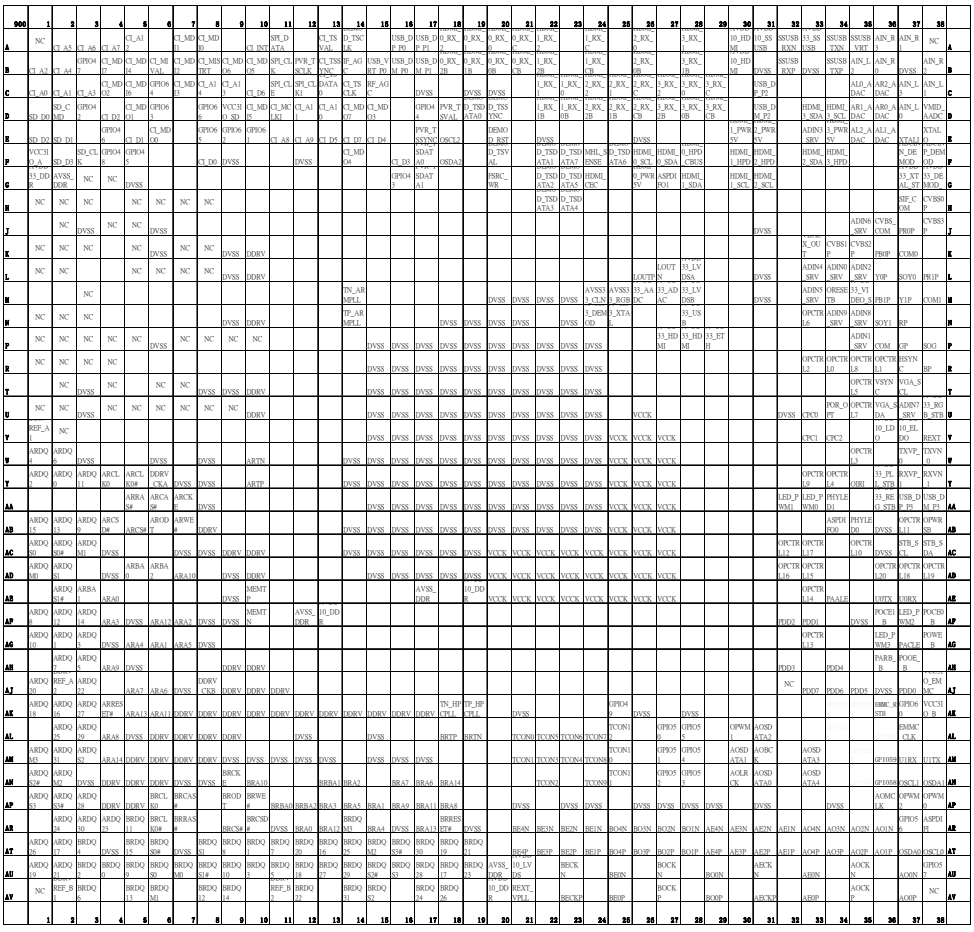

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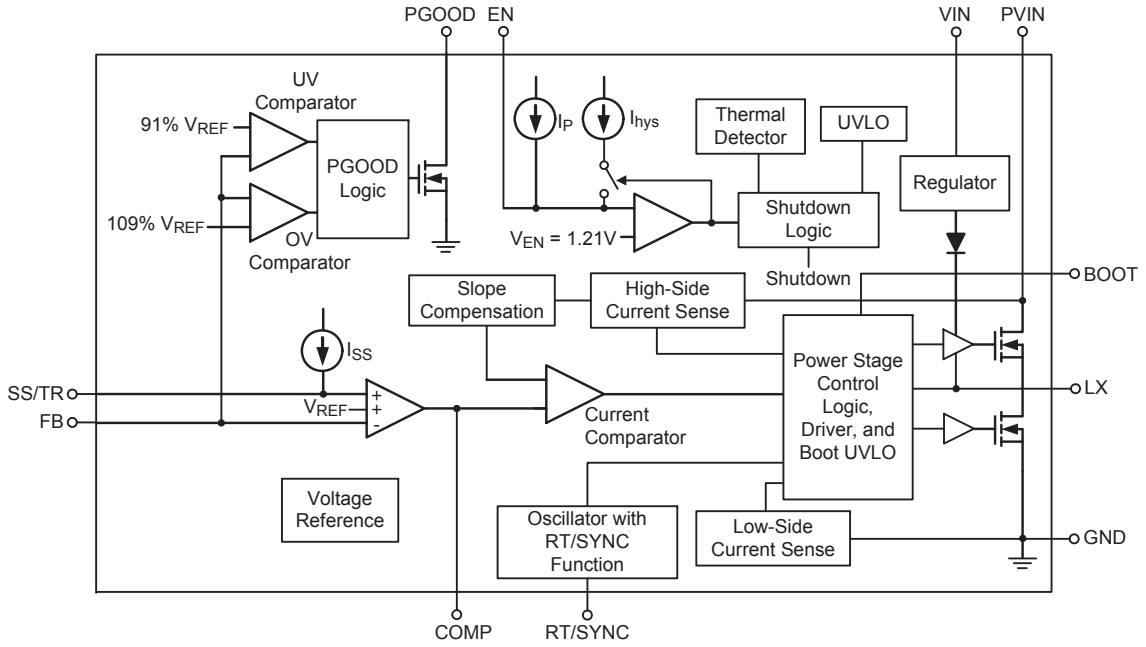
Figure 8-2 Internal pin configuration

back to div.table

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

Block diagram

RT7299BHGQW



Pinning information

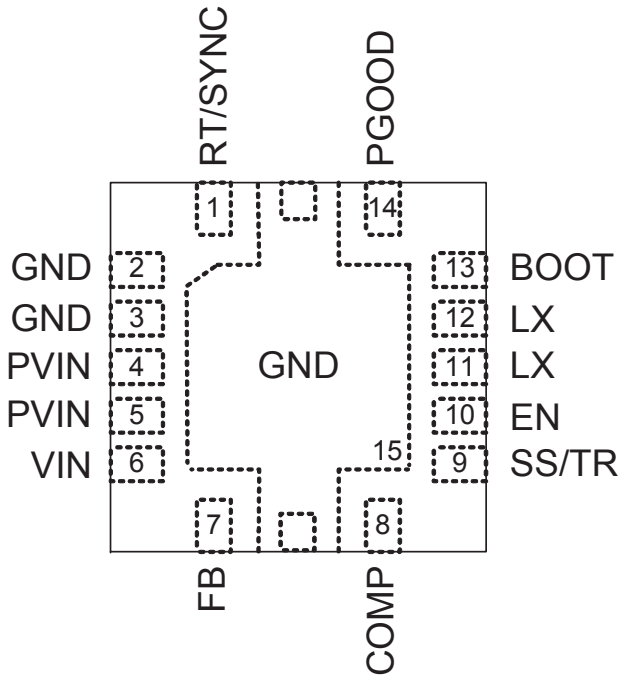


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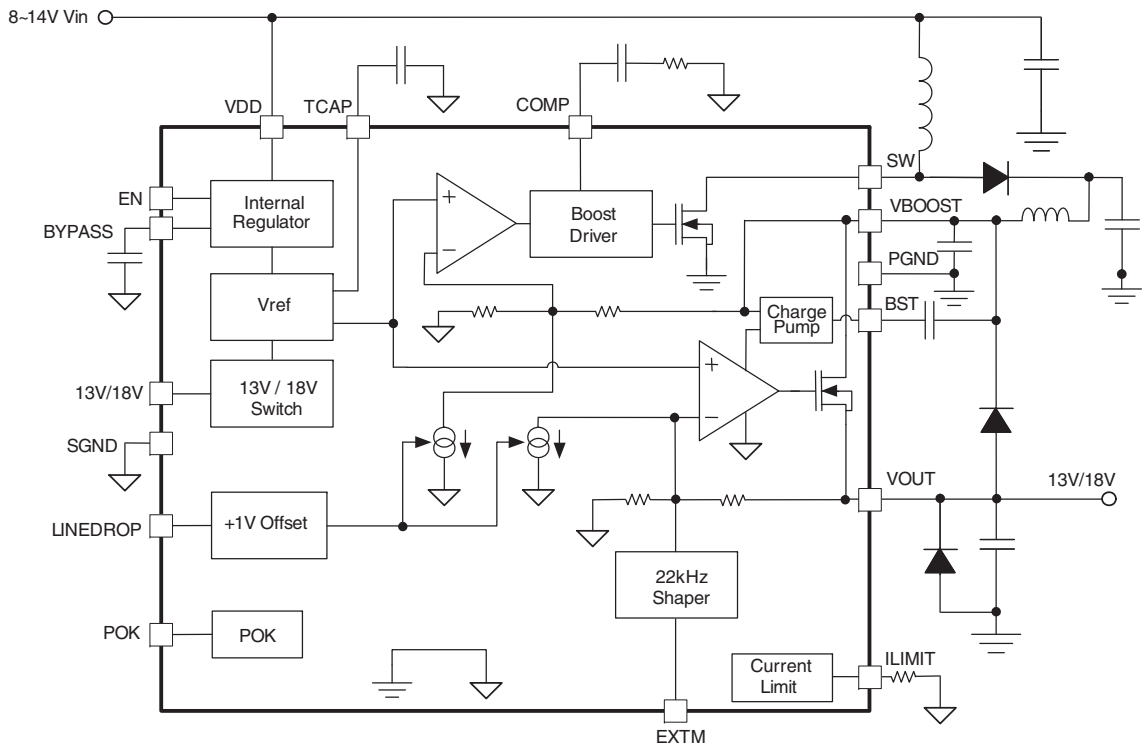
Figure 8-3 Internal block diagram and pin configuration

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

Block diagram

MP8126DF



Pinning information

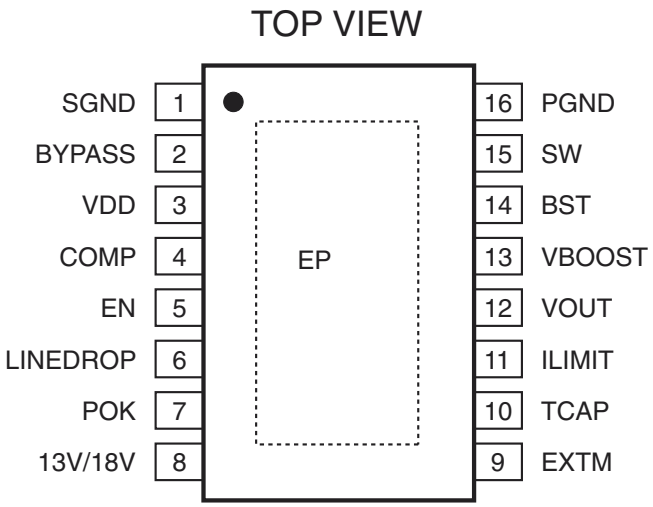


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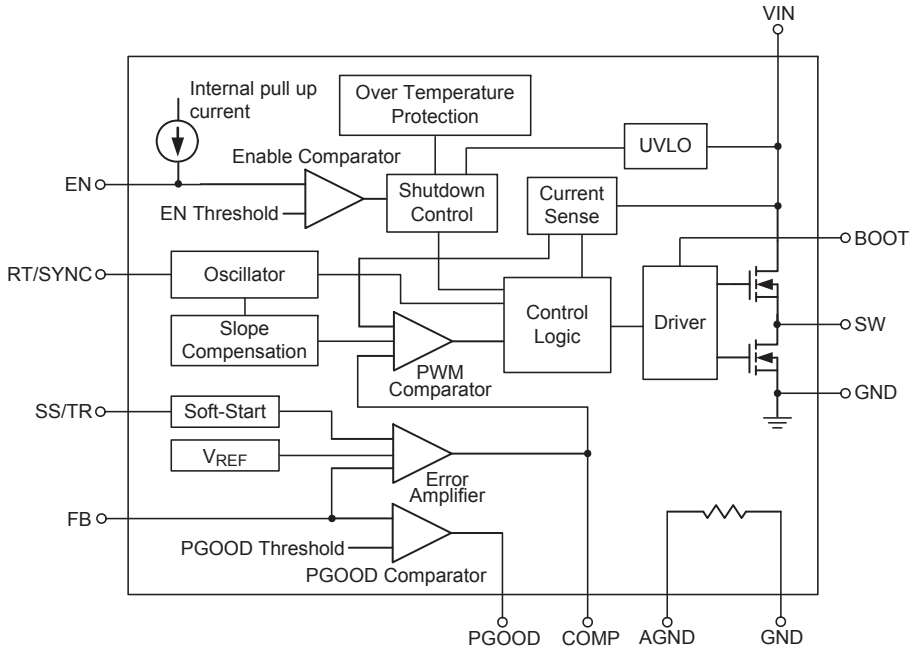
Figure 8-4 Internal block diagram and pin configuration

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

Block diagram

RT8079GQW



Pinning information

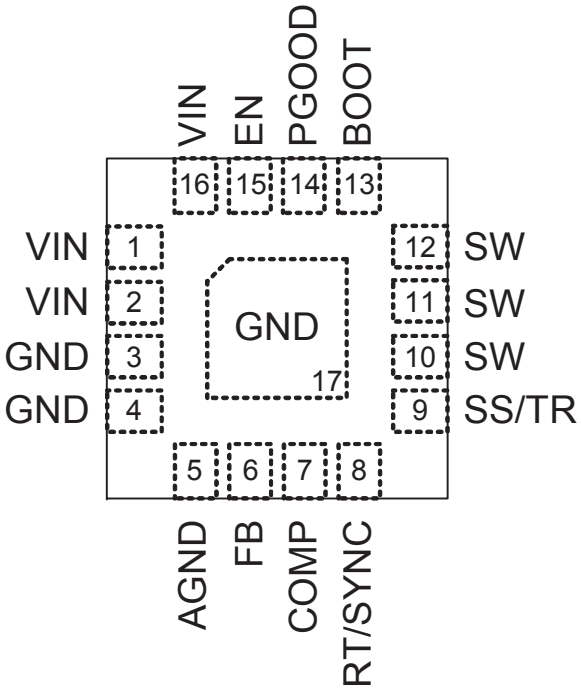


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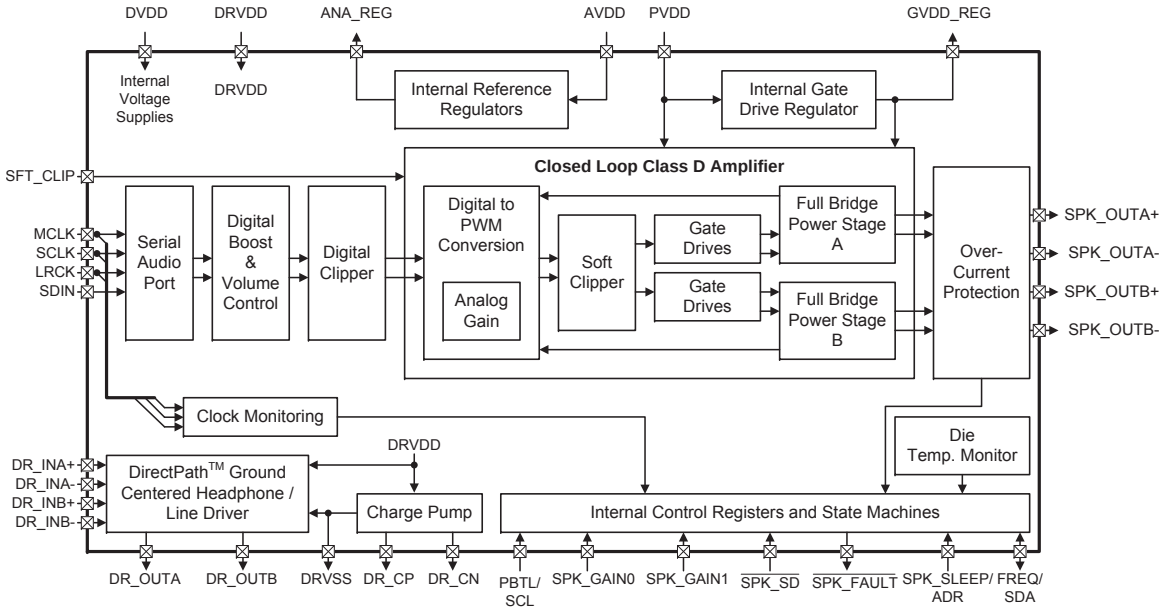
Figure 8-5 Internal block diagram and pin configuration

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

Block diagram

TAS5760LDDCAR



Pinning information

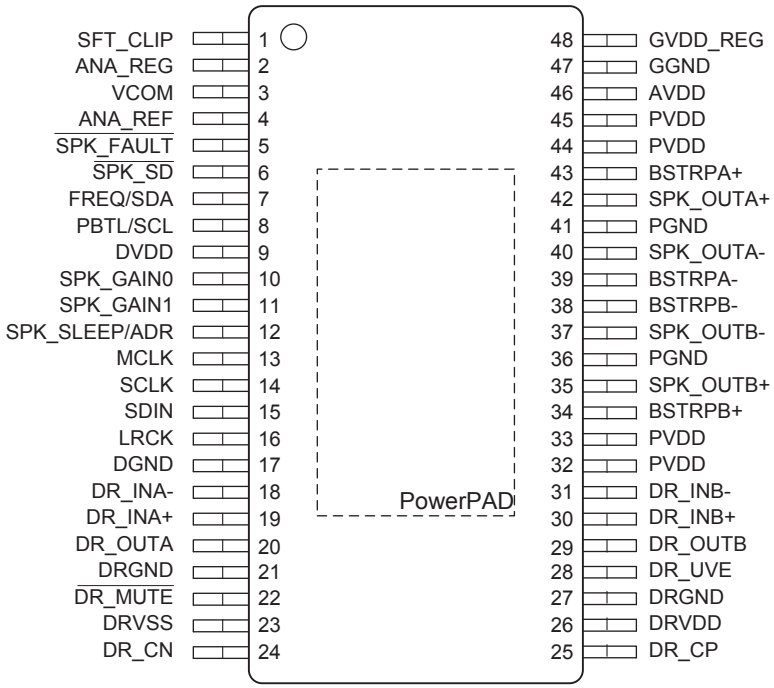


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Figure 8-6 Internal block diagram and pin configuration

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

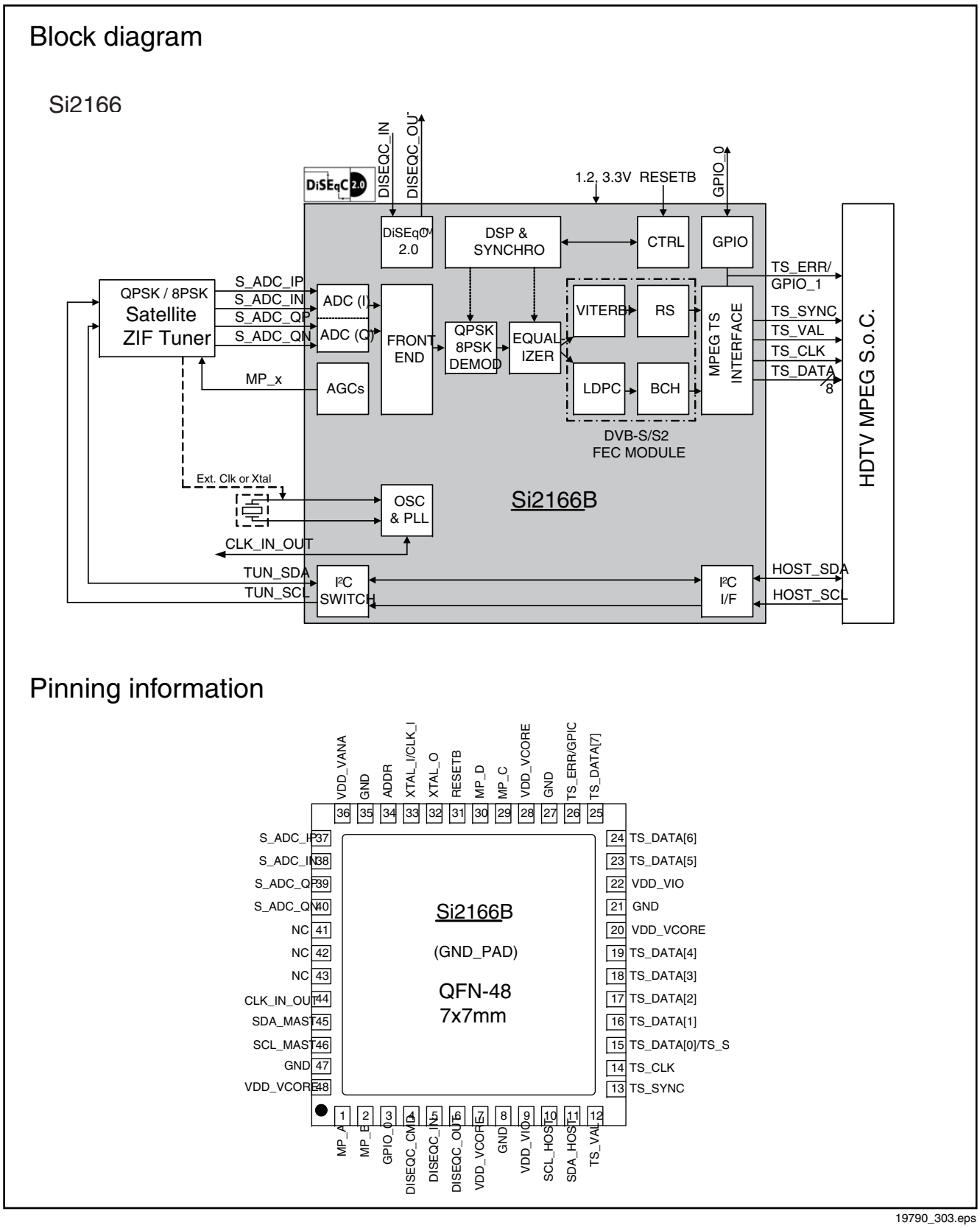
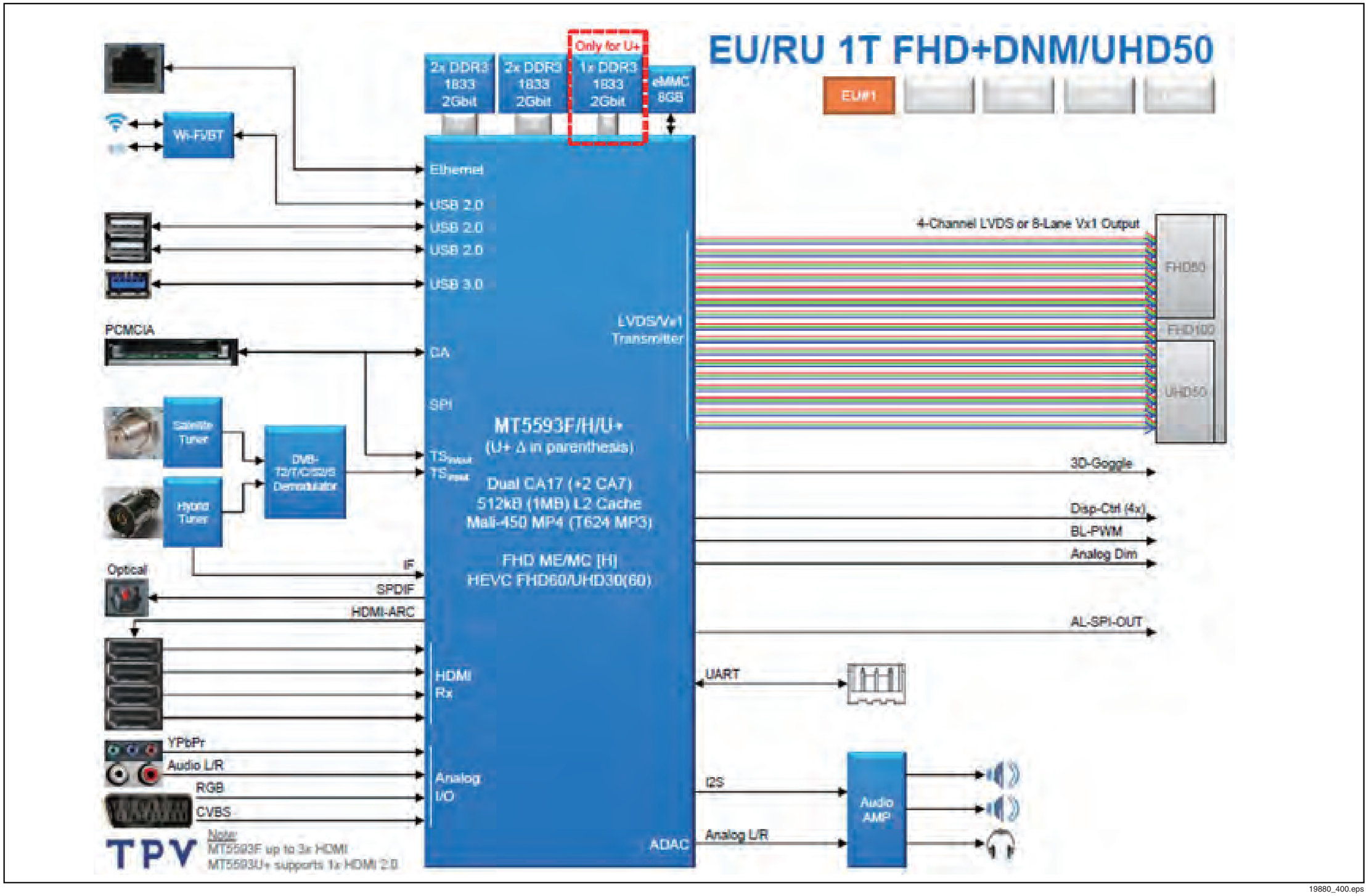


Figure 8-7 Internal block diagram and pin configuration

9. Block Diagrams

9.1 Block diagram 5500/65x0/6400 series



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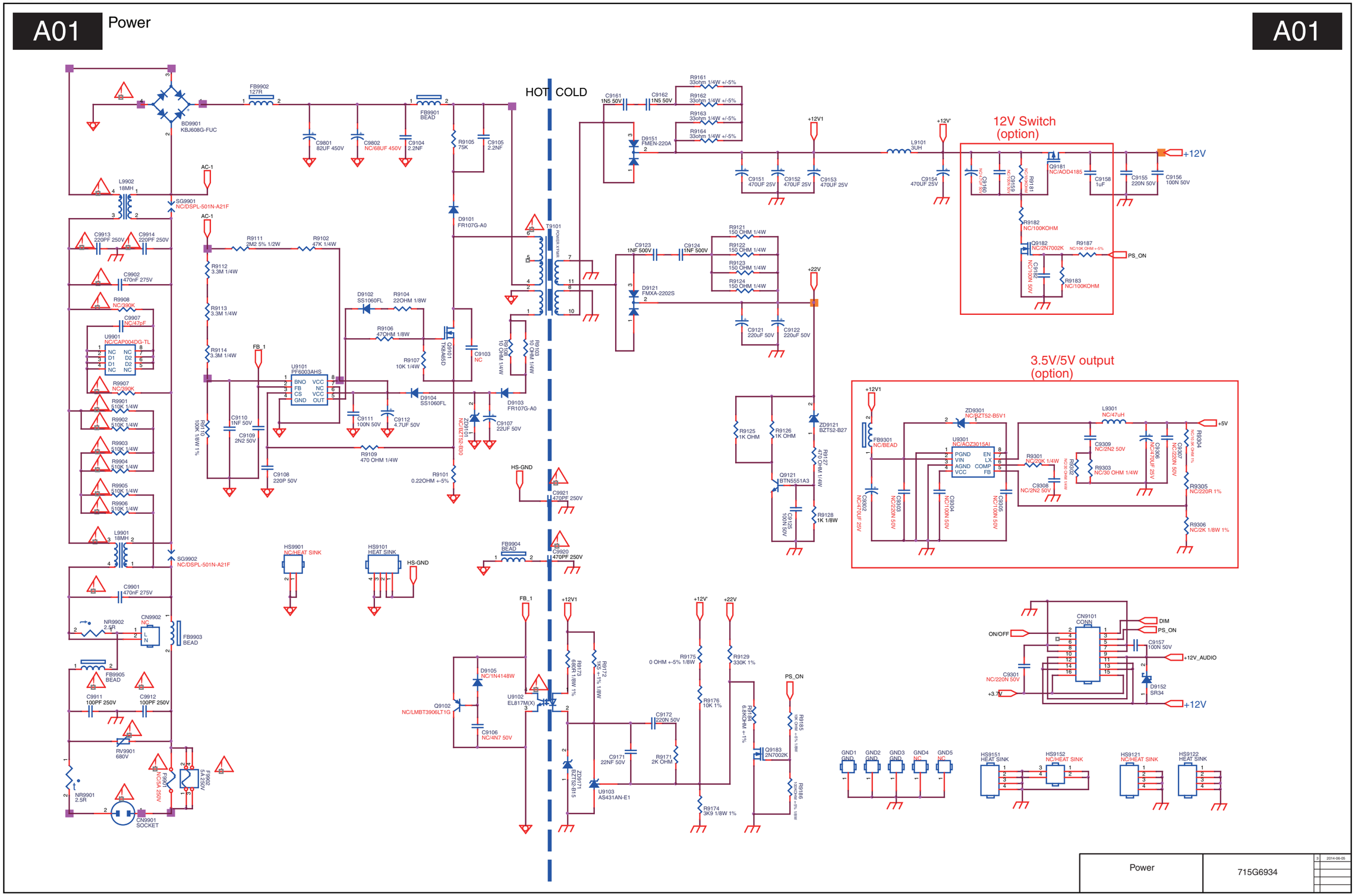
10. Circuit Diagrams and PWB Layouts

10.1 A 715G6934 PSU

10-1-1 Power

A01 Power



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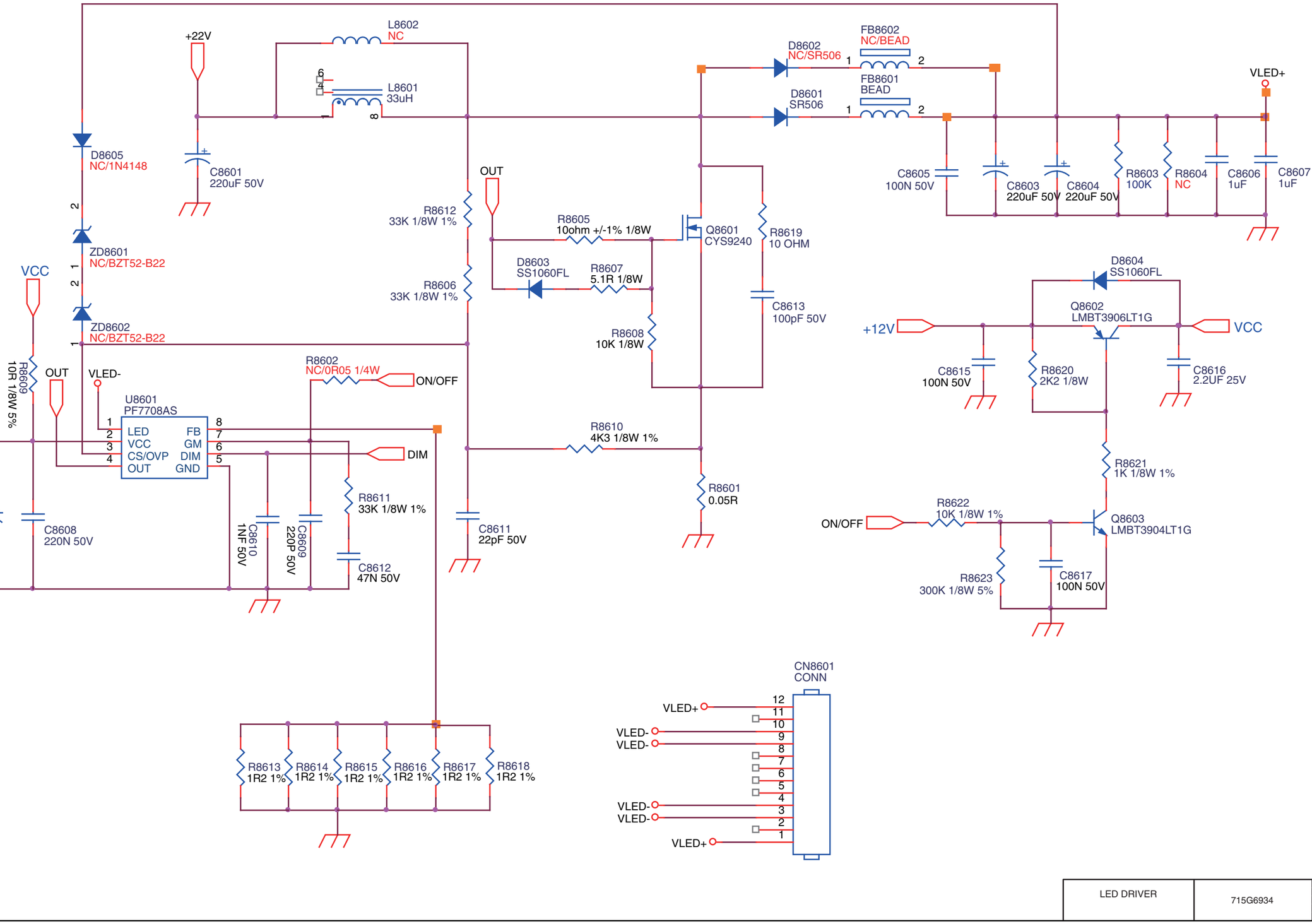
10-1-2 LED DRIVER

A02 LED DRIVER



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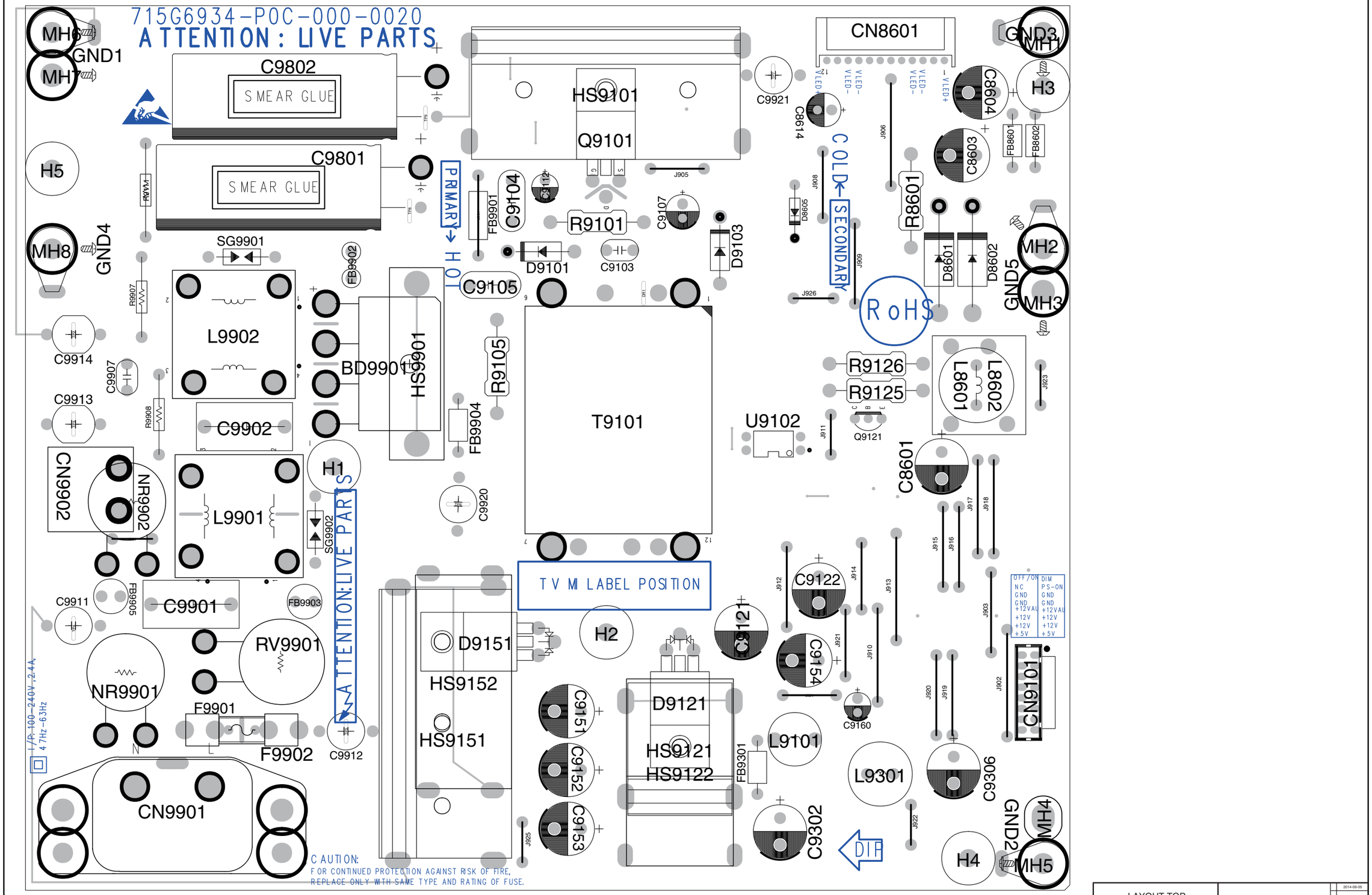
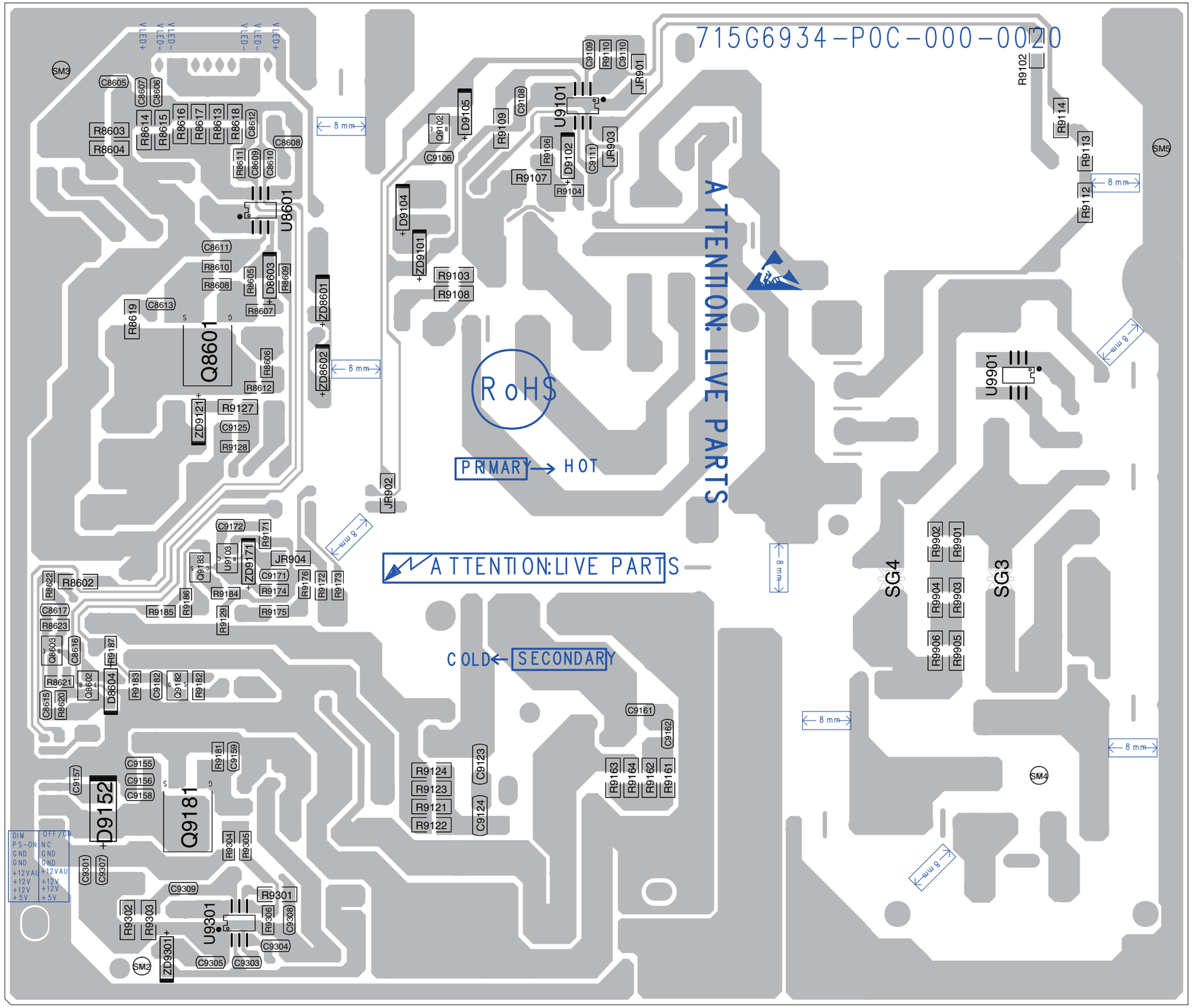
10-1-3 Power layout top



LAYOUT TOP | 715G6934 | 2014-06-05

19597_509.eps

10-1-4 Power layout bottom



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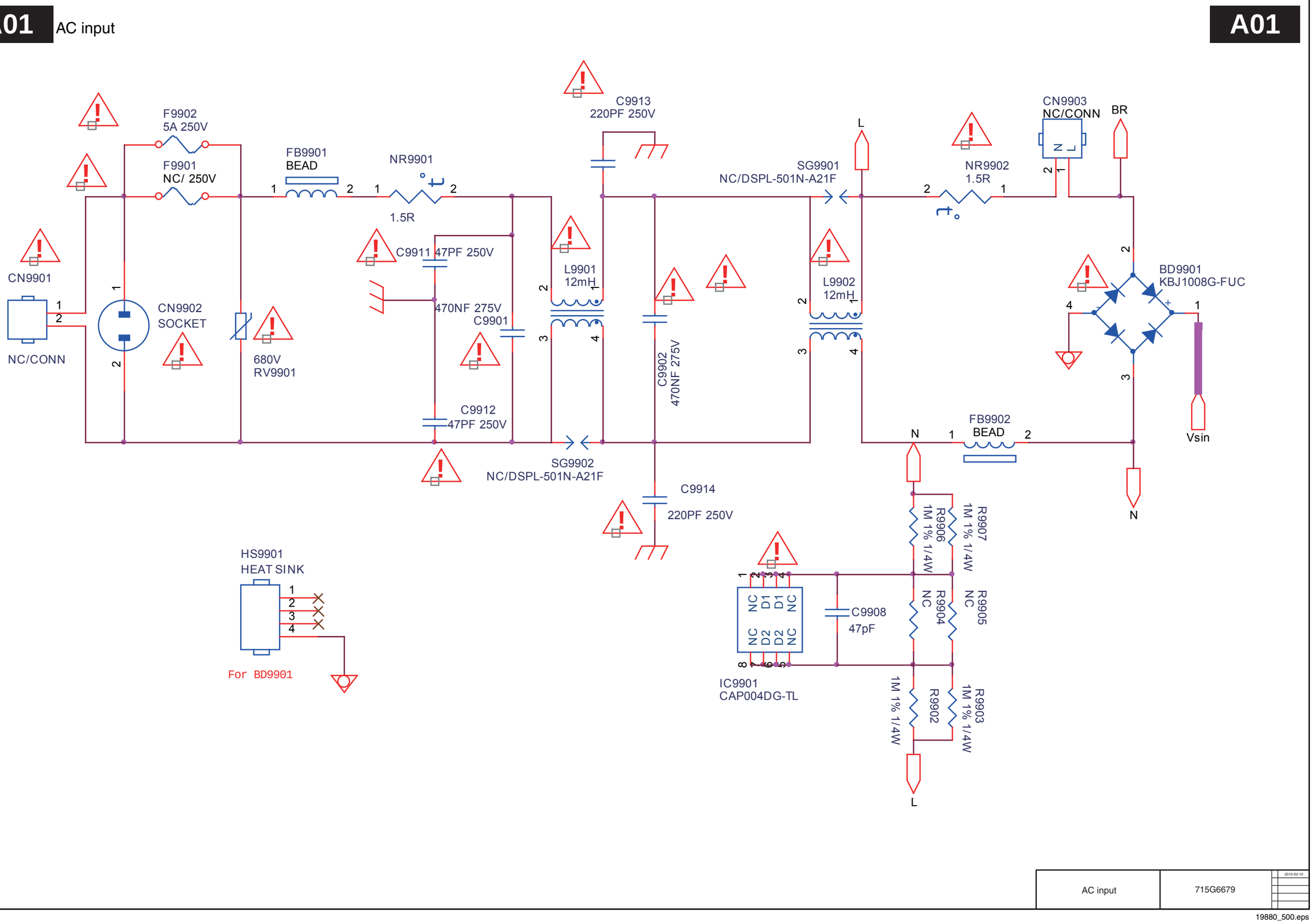
10.2 A 715G6679 PSU

10-2-1 AC input

A01 AC input



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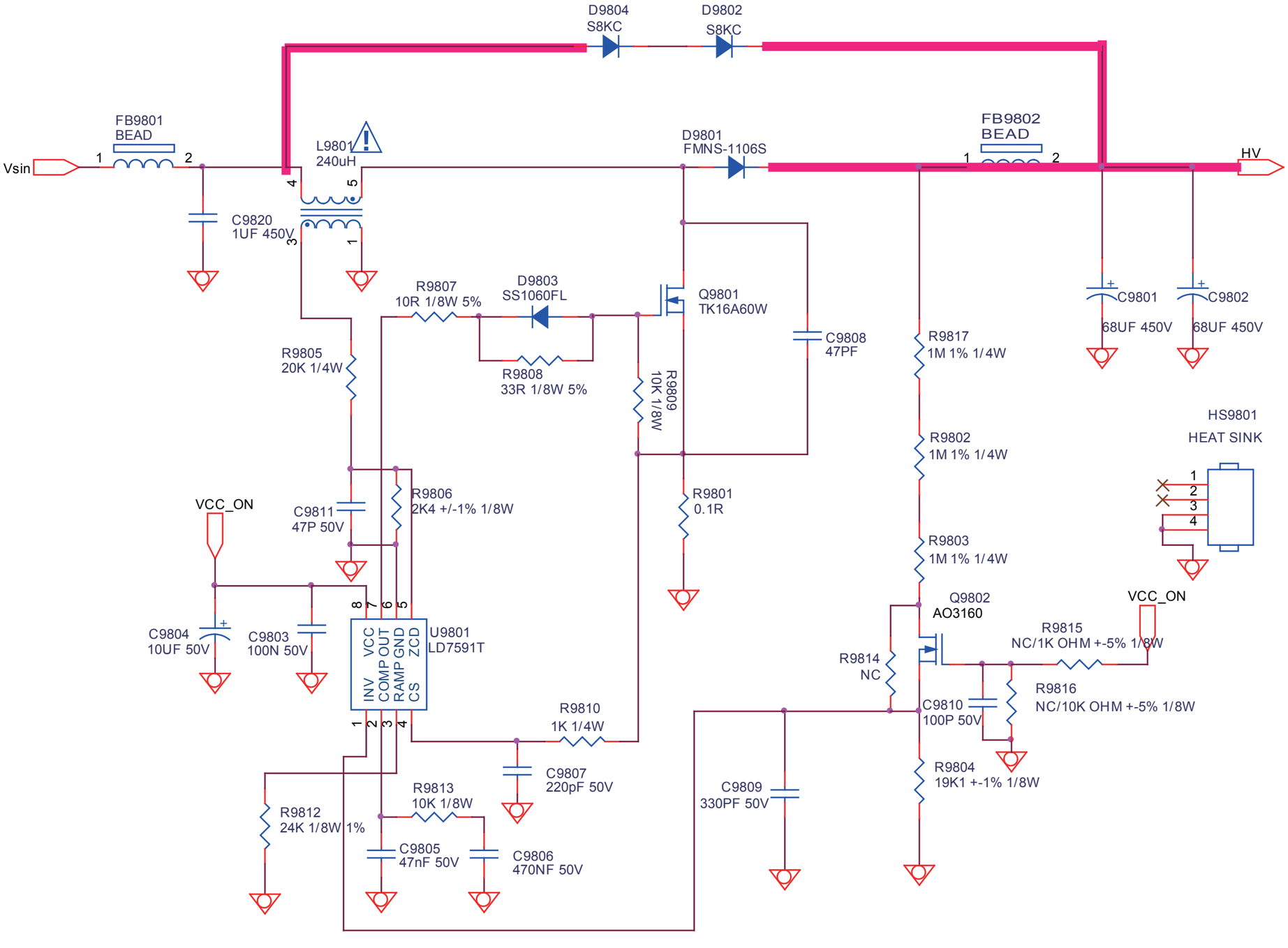
10-2-2 PFC

A02 PFC

A02



PFC	715G6679	2015-02-10

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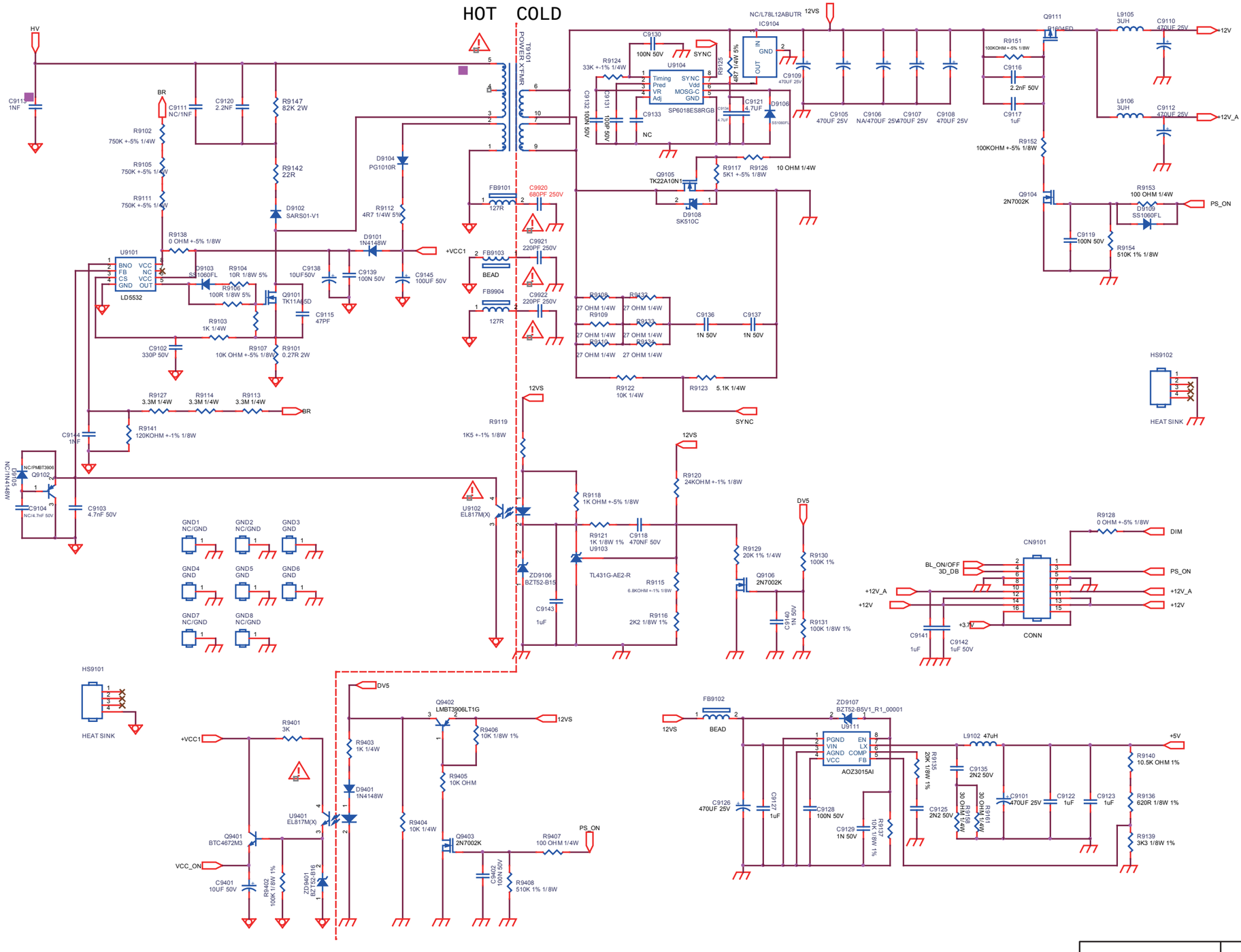
10-2-3 Main Power

A03 Main Power

A03



Main Power	715G6679	2015-02-10

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10-2-4 LED

A04 LED

A04

HOT COLD

HV
R8105 0.1R
C9114 1NF
C8120 NC/1NF
C8104 2.2NF
R8106 82KOHM +-5% 2WS
R8117 82KOHM +-5% 2WS
R8141 200 OHM 1/4W
R8142 200 OHM 1/4W
R8143 200 OHM 1/4W
R8144 200 OHM 1/4W
R8145 200 OHM 1/4W
R8146 200 OHM 1/4W
R8147 200 OHM 1/4W
R8148 200 OHM 1/4W
D8101 SARS01-V1
T8601 POWER XFMR
U8601 PF6002AS
VCC_ON
D8606 SS1060FL
R8101 22R
C8105 470NF 50V
C8102 100N 50V
R8102 47R
R8104 10K 1/4W
R8103 470 OHM 1/4W
C8137 470P 50V
Q8601 TK11A65D
C8103 47PF
R8601 0.18R 1%
HS9201 HEAT SINK
C8101 1N 50V
HS9202 HEAT SINK
D8602 FMNS-1106S
D8601 FMNS-1106S
R8120 300 OHM 1/4W
R8122 300 OHM 1/4W
R8121 300 OHM 1/4W
R8123 300 OHM 1/4W
R8137 300 OHM 1/4W
R8138 300 OHM 1/4W
R8155 300 OHM 1/4W
R8157 300 OHM 1/4W
C8111 100PF 500V
C8112 100PF 500V
FB8601 BEAD
VLED
C8605 100UF 100V
C8606 100UF 100V
L8601 3UH
C8607 NC/2700UF 35V
C8609 47uF 100V
C8608 47uF 100V
C8126 NC
C8132 NC/2.2N
R8151 100K
R8152 100K
R8153 100K
+VLED
R8172 0 OHM +-5% 1/8W
R8171 0 OHM +-5% 1/8W
D8107 1N4148W
12VS
L8602 NC/3UH
C8611 NC/2.2UF 50V
R8154 0 OHM +-5% 1/8W
D8108 1N4148W
ZD8104 BZT52-B16G
ZD8105 BZT52-B16G
ZD8106 BZT52-B16G
R8115 NC
R8109 1.5K OHM
C8133 NC
U8602 EL817M(X)
C8123 1N 50V
R8110 3K9 1/8W 5%
R8111 470K +-5% 1/8W
C8106 4.7nF 50V
U8603
TL431G-AE2-R
C8124 100P 50V
C8125 NC/100P 50V
ZD8103 BZT52-B30
R8113 68KOHM +-1% 1/8W
R8114 75KOHM +-1% 1/8W
3D_DB
R8161 NC/10K 1/4W
DIM
BL_ON/OFF
IC_VCC
-VLED-1
R8118 100KOHM +-5% 1/8W
R8164 0R05 1/4W
U8605 TPV101D
R8124 1.2R 1%
R8126 1.5R
R8119 0R05 1/4W
C8114 1uF
C8134 NC/1NF 500V
C8118 1N 50V
C8113 1uF
R8125 1.2R 1%
R8127 1.5R
C8122 NC/100P 50V
HS8601 HEAT SINK
For IC8103
HS8602 HEAT SINK
For IC8105
-VLED-2
U8606 TPV101D
R8131 1.2R 1%
R8133 1.5R
R8136 0R05 1/4W
C8116 1uF
C8121 NC/10N 50V
C8131 NC/1NF 500V
C8119 1N 50V
C8115 1uF
R8132 1.2R 1%
R8134 1.5R
CN9201 NC/CONN
+VLED
+12V DIM
3D_DB BL_ON/OFF
CN8601 CONN
-VLED-1
R8156 0 OHM +-5% 1/8W
-VLED-2
R8116 330K 1/8W 1%
R8128 NC/750K 1%
R8112 270K +-1% 1/8W
R8129 NC/510K 1% 1/8W
C8135 NC/100N 50V
C8136 NC/100N 50V
D8102 1N4148W
Q8101 LMBT3906LT1G
C8127 1uF
R8107 510OHM +-5% 1/8W
C8128 1uF
IC_VCC
R8108 3.3K 1/4W
IC8101 TL431G-AE2-R
C8129 100N 50V
R8135 43KOHM +-1% 1/8W
R8130 47KOHM +-1% 1/8W
R8139 13K 1/8W 1%
R8140 39KOHM +-1% 1/8W
Q8102 2N7002K
C8130 0.47UF 50V
R8149 1M 1/8W 5%
R8150 510K +-5% 1/8W

LED	715G6679	2015-02-10

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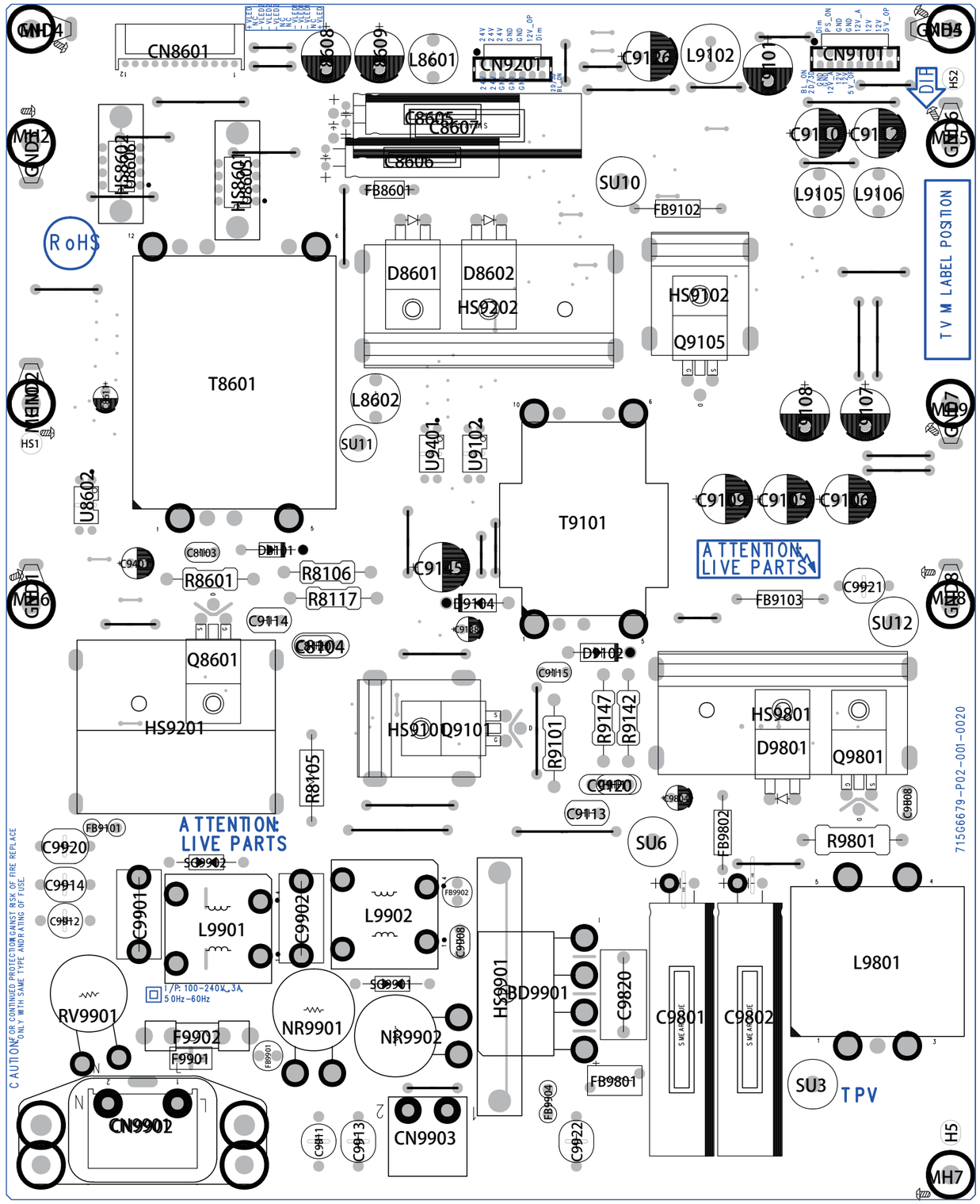
10-2-5 Power layout top



LAYOUT TOP	715G6673	2015-01-08

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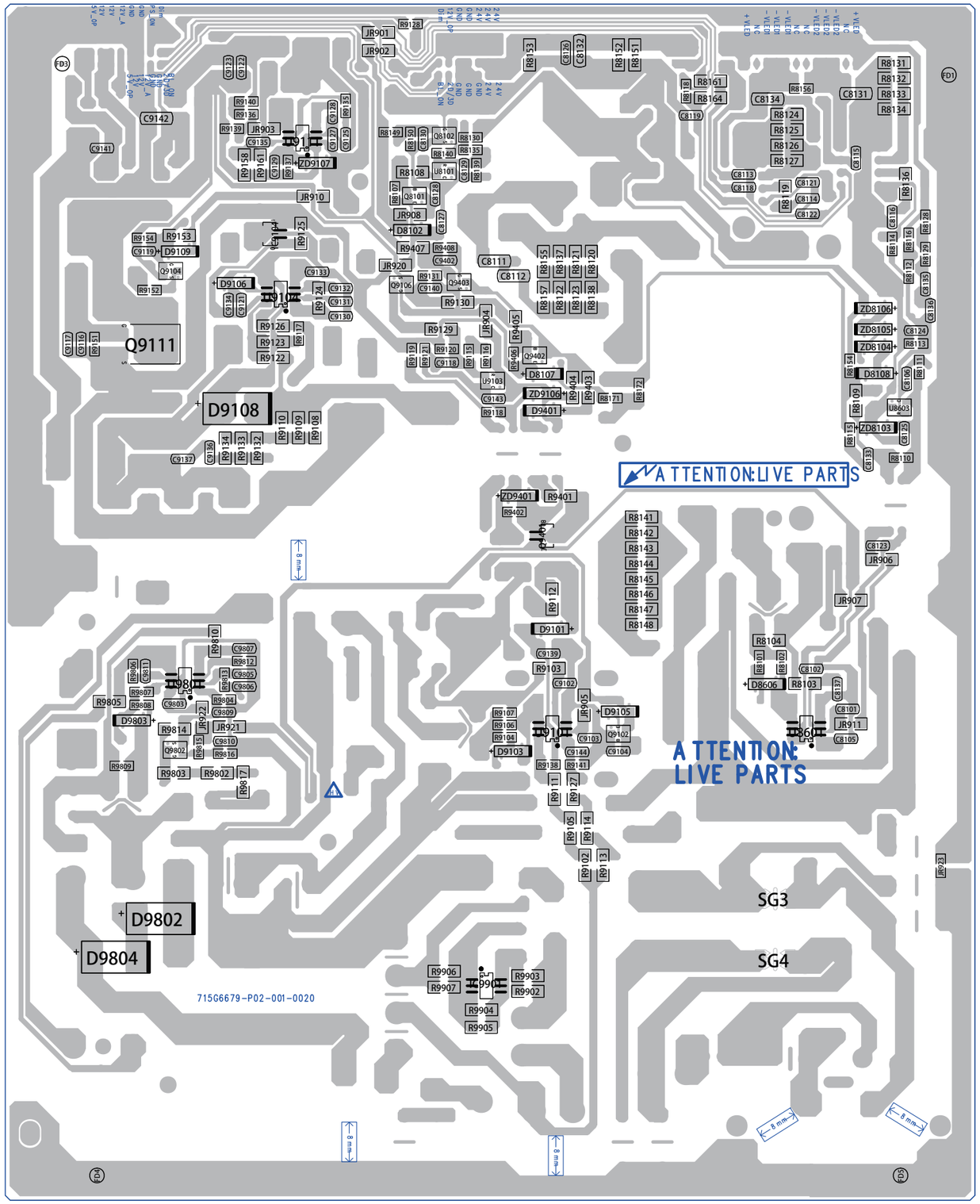
10-2-6 Power layout bottom



LAYOUT BOTTOM	715G6679	2014-06-05

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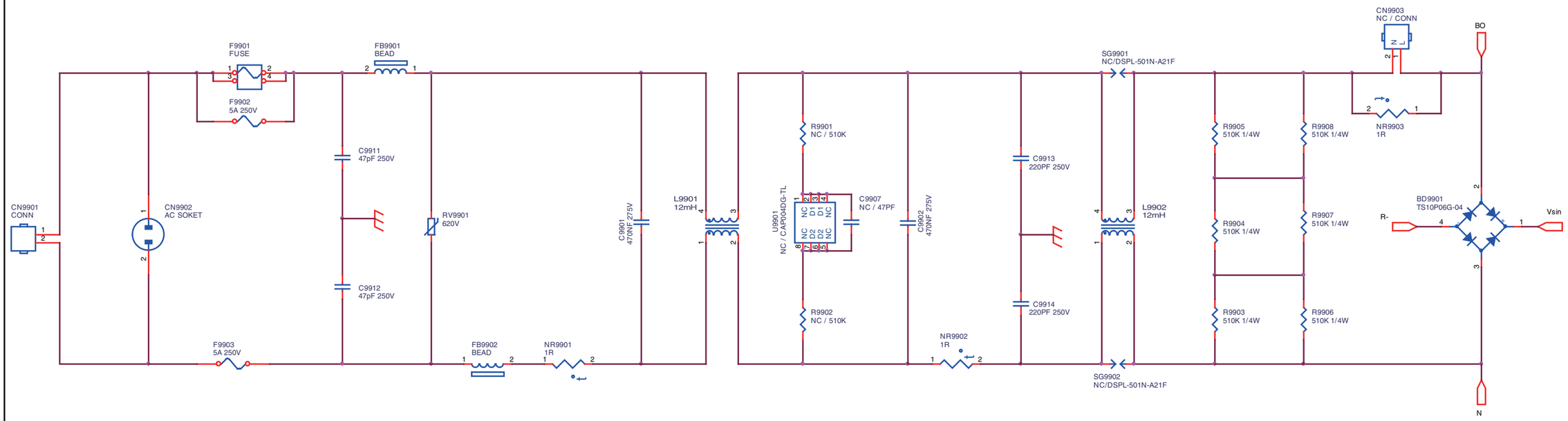
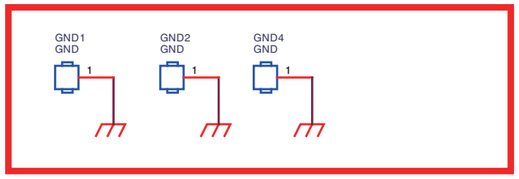
10.3 A 715G6973 PSU

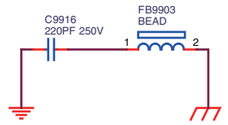
10-3-1 AC input

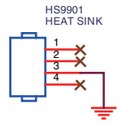
A01 AC input

A01







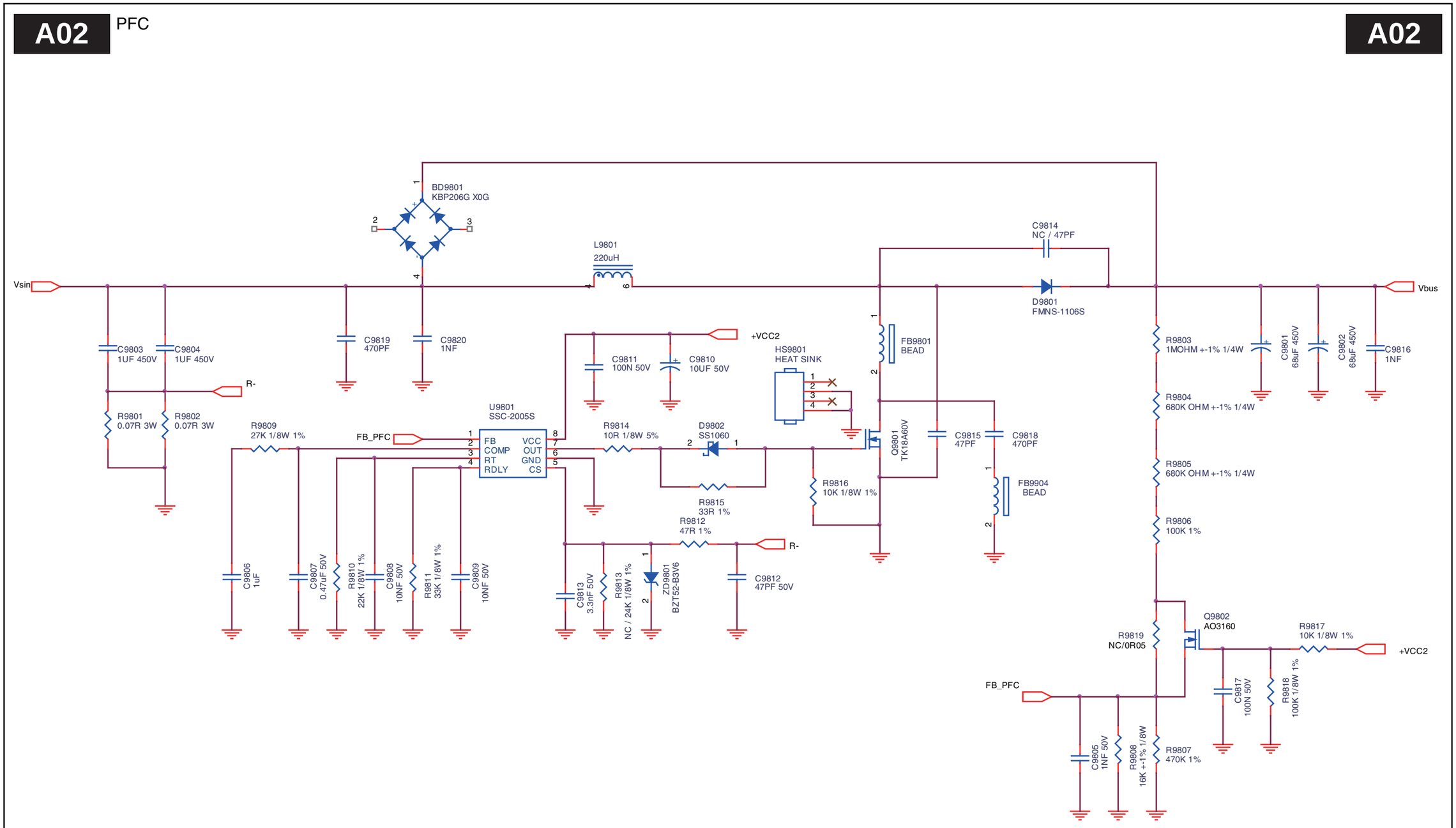


AC input	715G6973	2014-12-08

19820_544.eps

10-3-2 PFC

A02 PFC

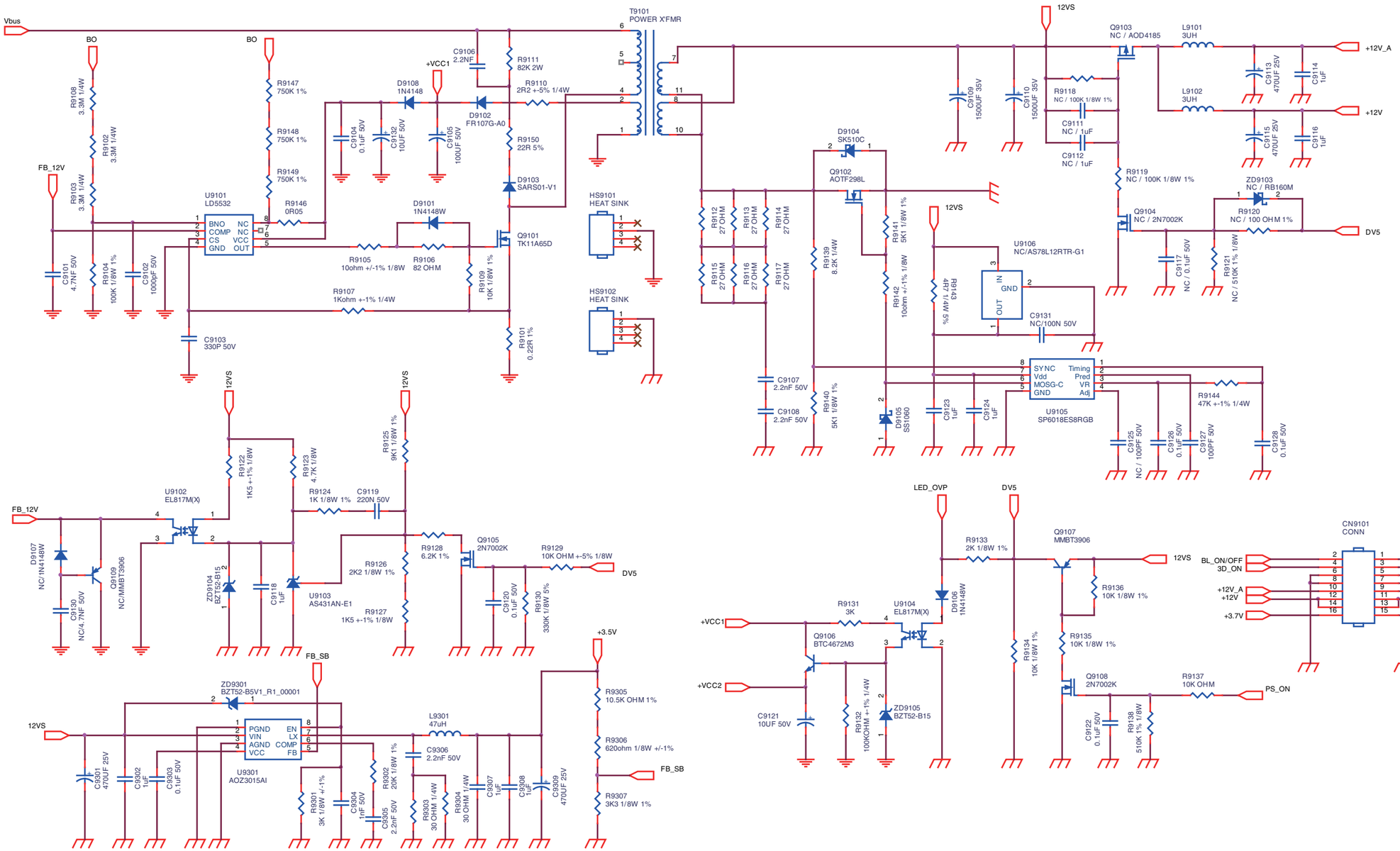


19820_545.eps

10-3-3 Main power

A03 Main power

A03



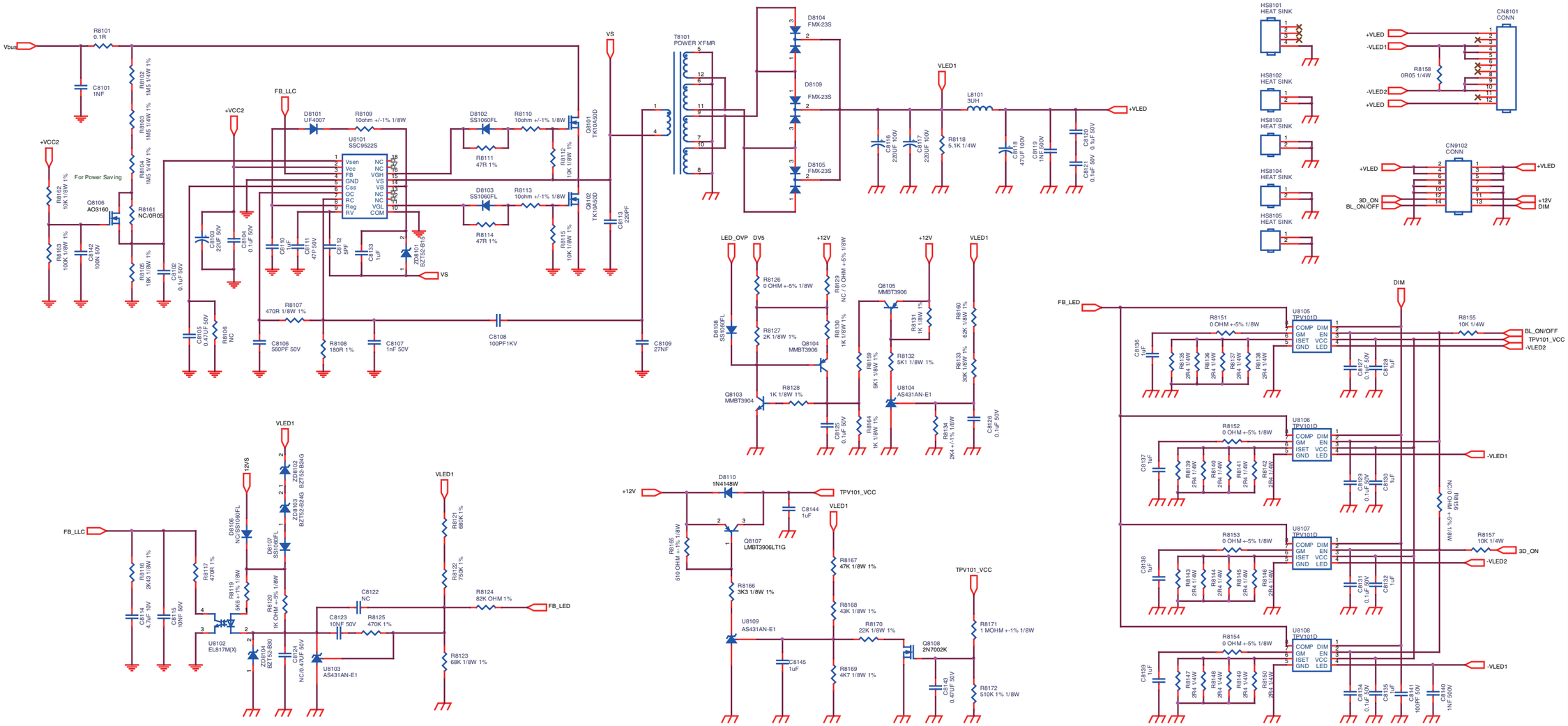
Main power	715G6973	2014-12-08

19820_546.eps

10-3-4 LED Driver

A04 LED Driver

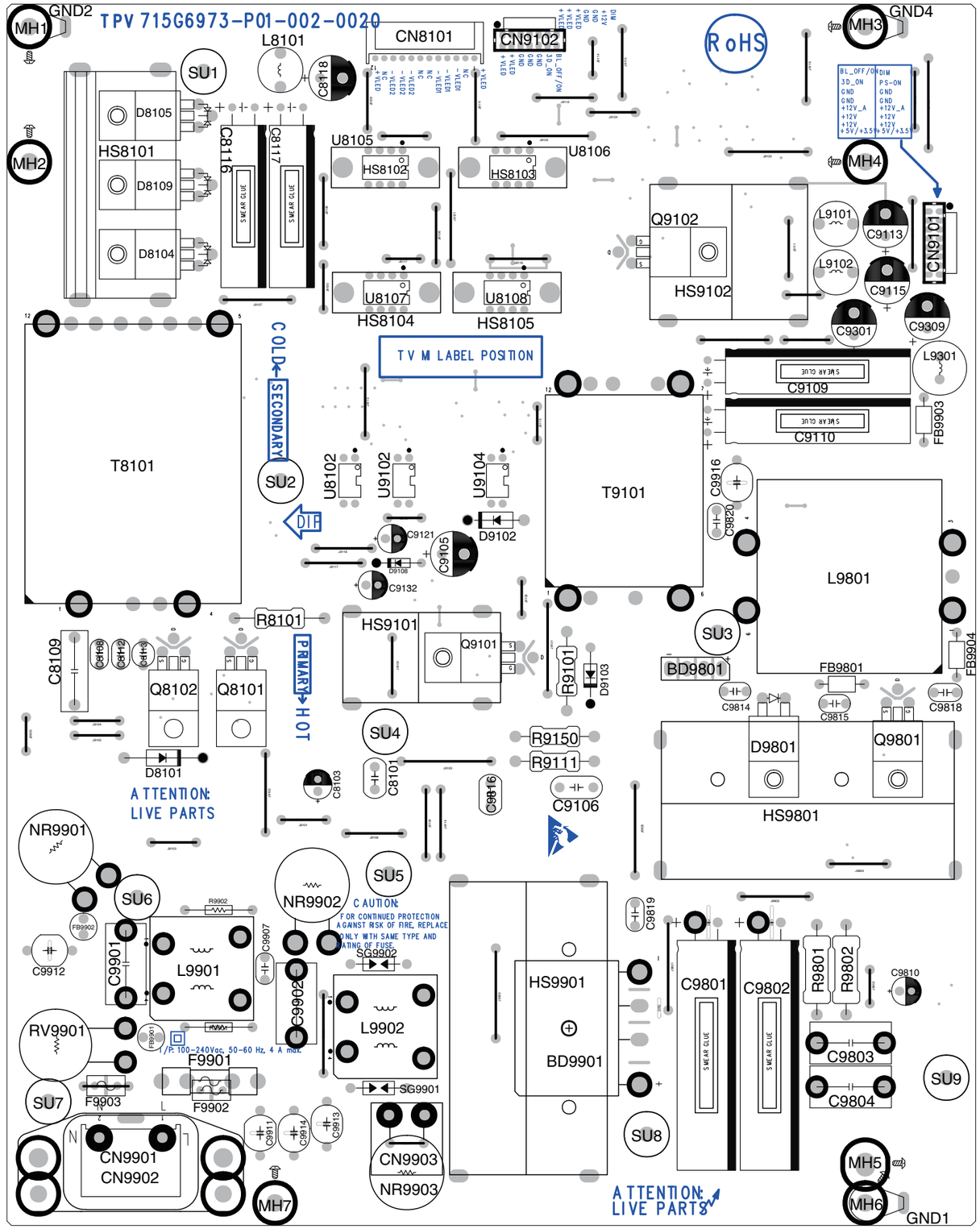
A04



LED Driver	715G6973	2014-12-08

19820_547.eps

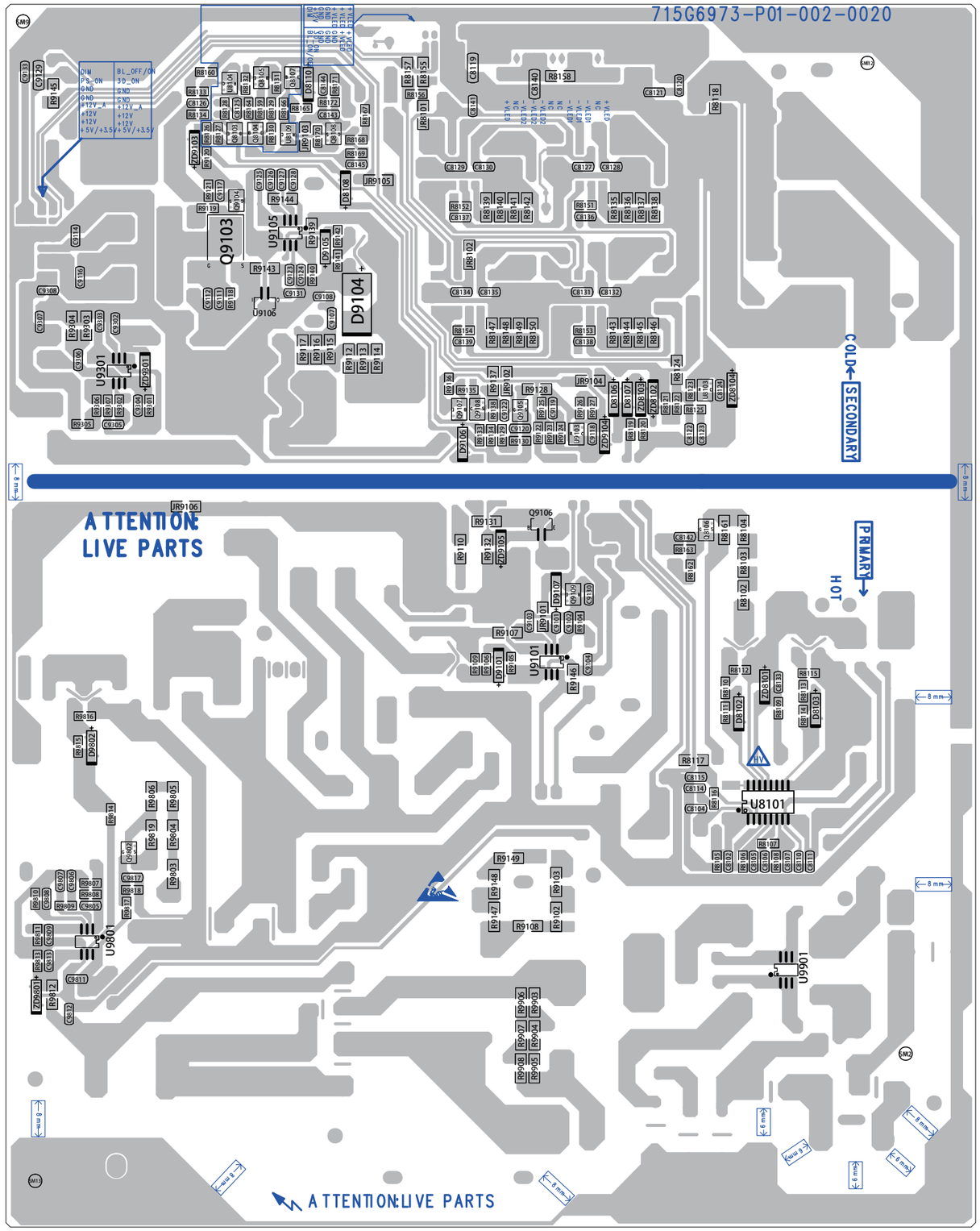
10-3-5 Power layout top



LAYOUT TOP	715G6973	2014-12-02

19820_548.eps

10-3-6 Power layout bottom



LAYOUT BOTTOM	715G6973	2014-12-02

19820_549.eps

10.4 A 715G6677 PSU

10-4-1 AC input

A01 AC input

A01

F9901
FUSE
F9902
NC/250V
T5.0AH/250V
CN9902
NC/CONN
CN9901
AC SOKET
680V
RV9901
FB9901
BEAD
FB9902
BEAD
C9901
NC/100PF 250V
C9902
NC/100PF 250V
C9905
470NF 275V
L9901
12mH
HS9901
HEAT SINK
NR9901
2.5R
VXC
C9906
470NF 275V
CN9903
NC/CONN
C9903
220PF 250V
NC/DSPL-501N-A21F
SG9901
L9902
12mH
BR
VXB
BD9901
TS10K80-02
Vsin
NR9902
2.5R
SG9902
NC/DSPL-501N-A21F
C9904
220PF 250V
VXA
VXB
U9901
NC/CAP004DG-TL
NC D1 D1 NC
NC D2 D2 NC
C9907
NC/47PF
R9903
510K 1/4W
R9904
510K 1/4W
R9905
510K 1/4W
R9906
510K 1/4W
R9907
510K 1/4W
R9908
510K 1/4W
VXA

AC input	715G6677	2014-11-11

19820_540.eps

10-4-2 PFC

A02 PFC

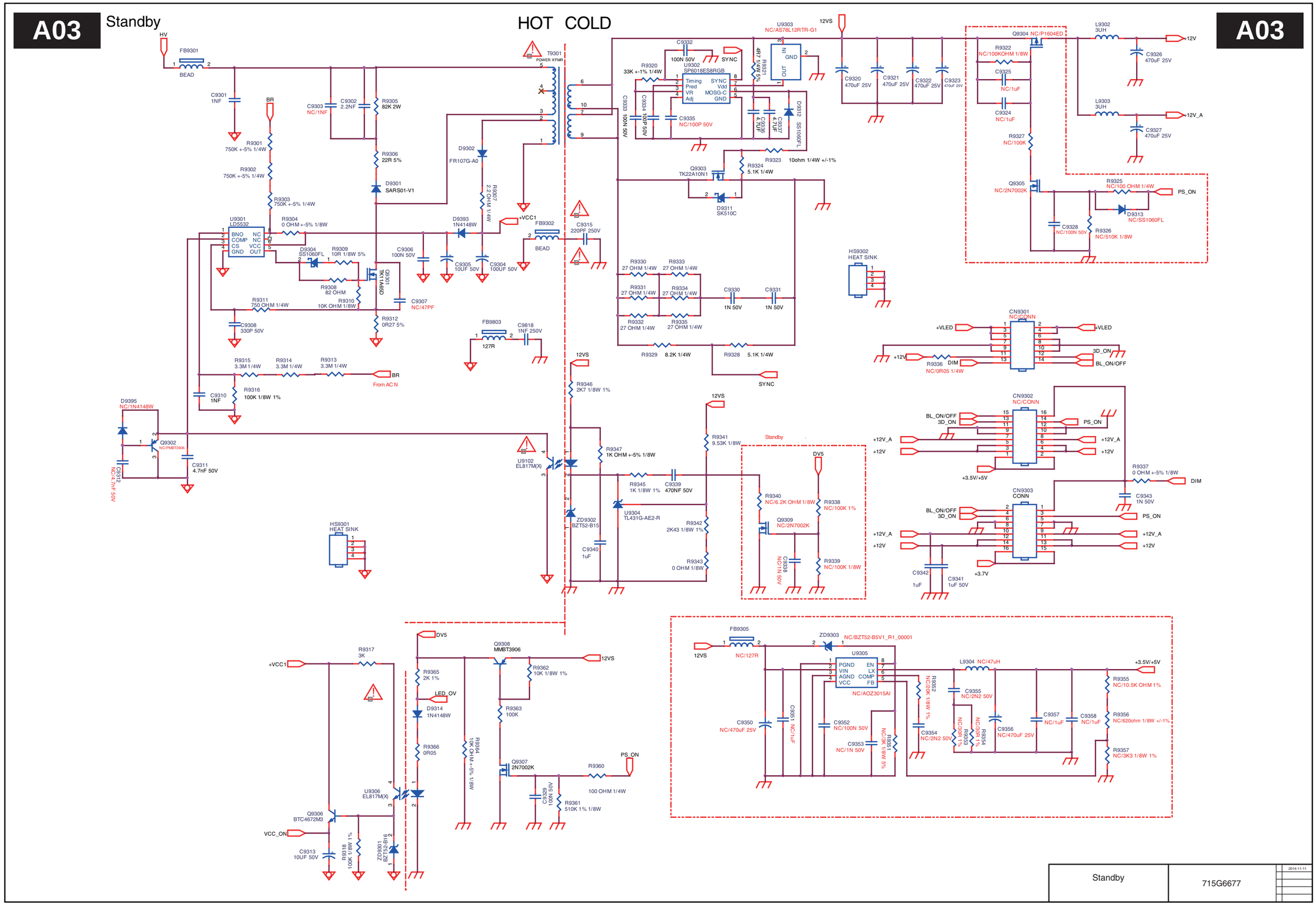
A02

Vsin
HV
FB9891 BEAD
C9801 1UF 450V
L9801 240uH
BD9801 KBP206G X0G
C9805 NC/47PF
D9802 FMNS-1106S
FB9802 BEAD
C9802 68UF 450V
C9803 68UF 450V
C9804 NC
Q9801 TK18A60V
D9803 SS1060FL
R9811 10 OHM
R9812 47OHM
C9806 NC/100PF
R9809 20K 1/4W
R9813 10K 1/8W
R9814 0.1R
R9801 1M 1% 1/4W
R9802 1M 1% 1/4W
R9803 1M 1% 1/4W
HS9801 HEAT SINK
VCC_ON
C9808 10PF 50V
R9810 2K 1/8W 1%
U9801 LD7591T
INV COMP RAMP CS VCC OUT GND ZCD
C9810 100N 50V
C9809 10UF 50V
R9815 470 OHM 1/4W
R9808 27K 1/8W 1%
C9811 1nF 50V
R9807 10K 1/8W
C9813 100N 50V
C9812 470NF 50V
R9804 NC/0R05
Q9802 AO3160
R9816 10K 1/8W 1%
C9814 100N 50V
R9817 100K 1/8W 1%
C9815 470P 50V
R9806 680K 1%
R9895 20K 1/8W 1%

PFC | 715G6677 | 2014-11-11

19820_541.eps

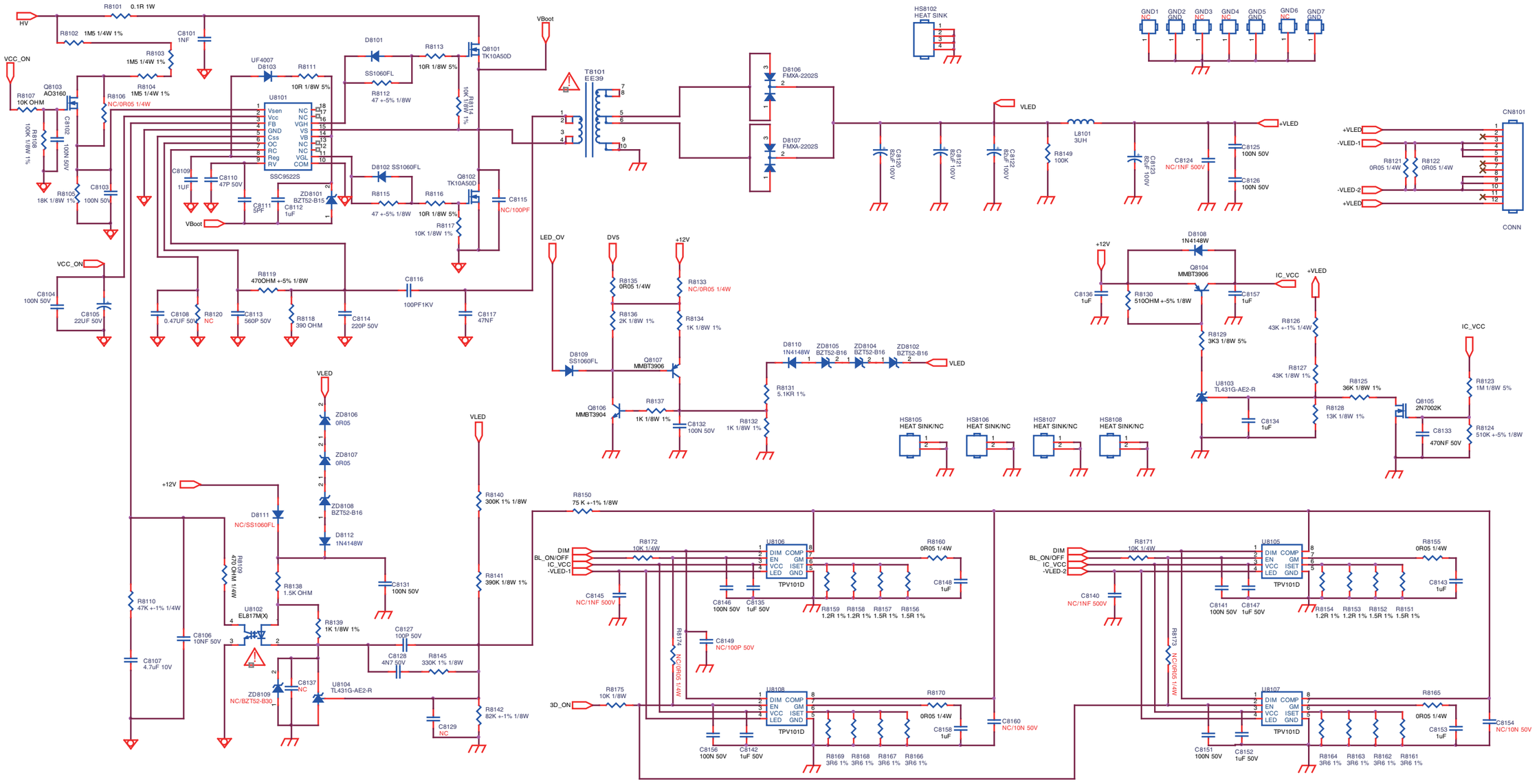
10-4-3 Standby



10-4-4 LED

A04 LED

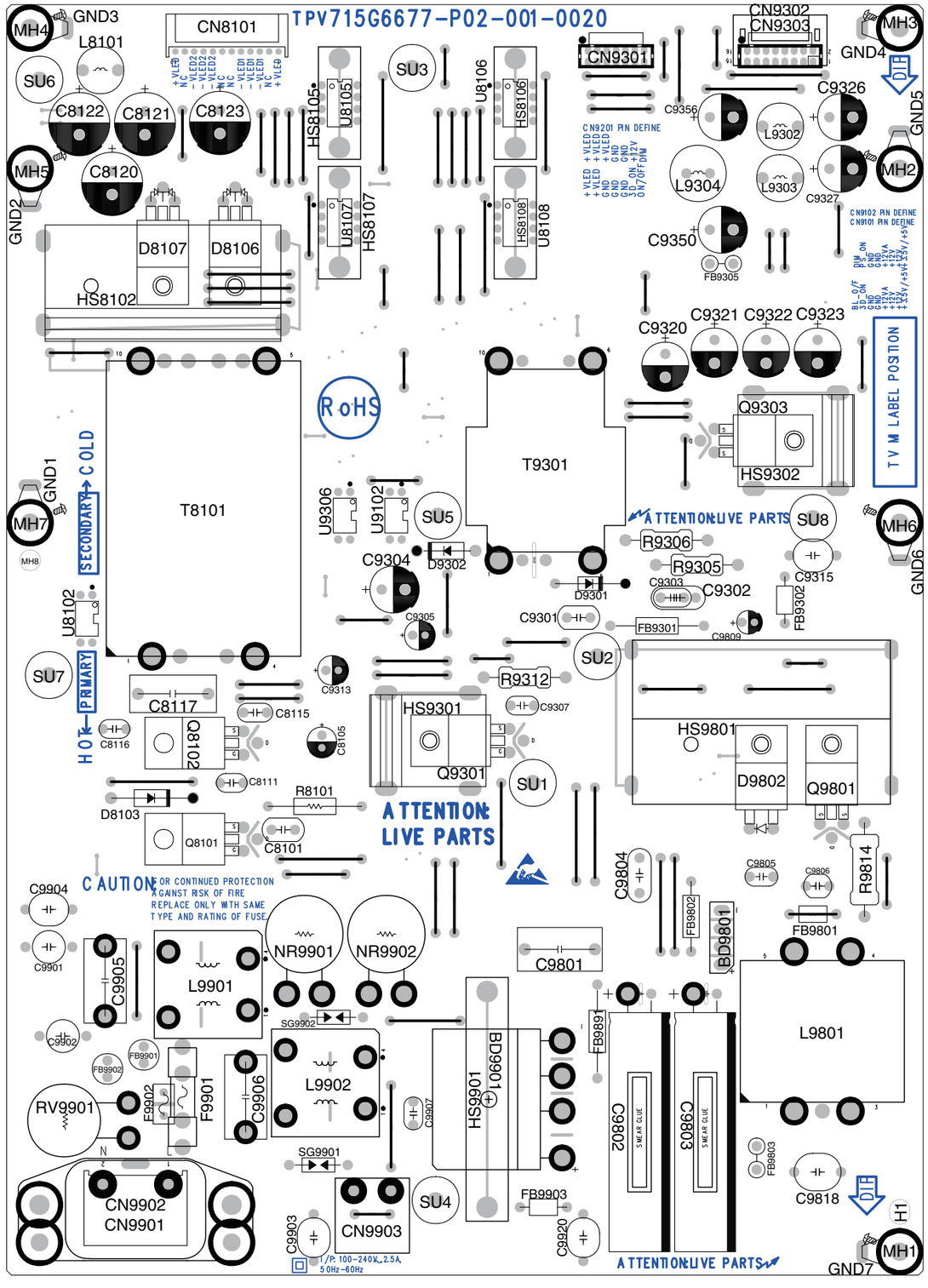
A04



LED	715G6677	2014-11-11

19820_543.eps

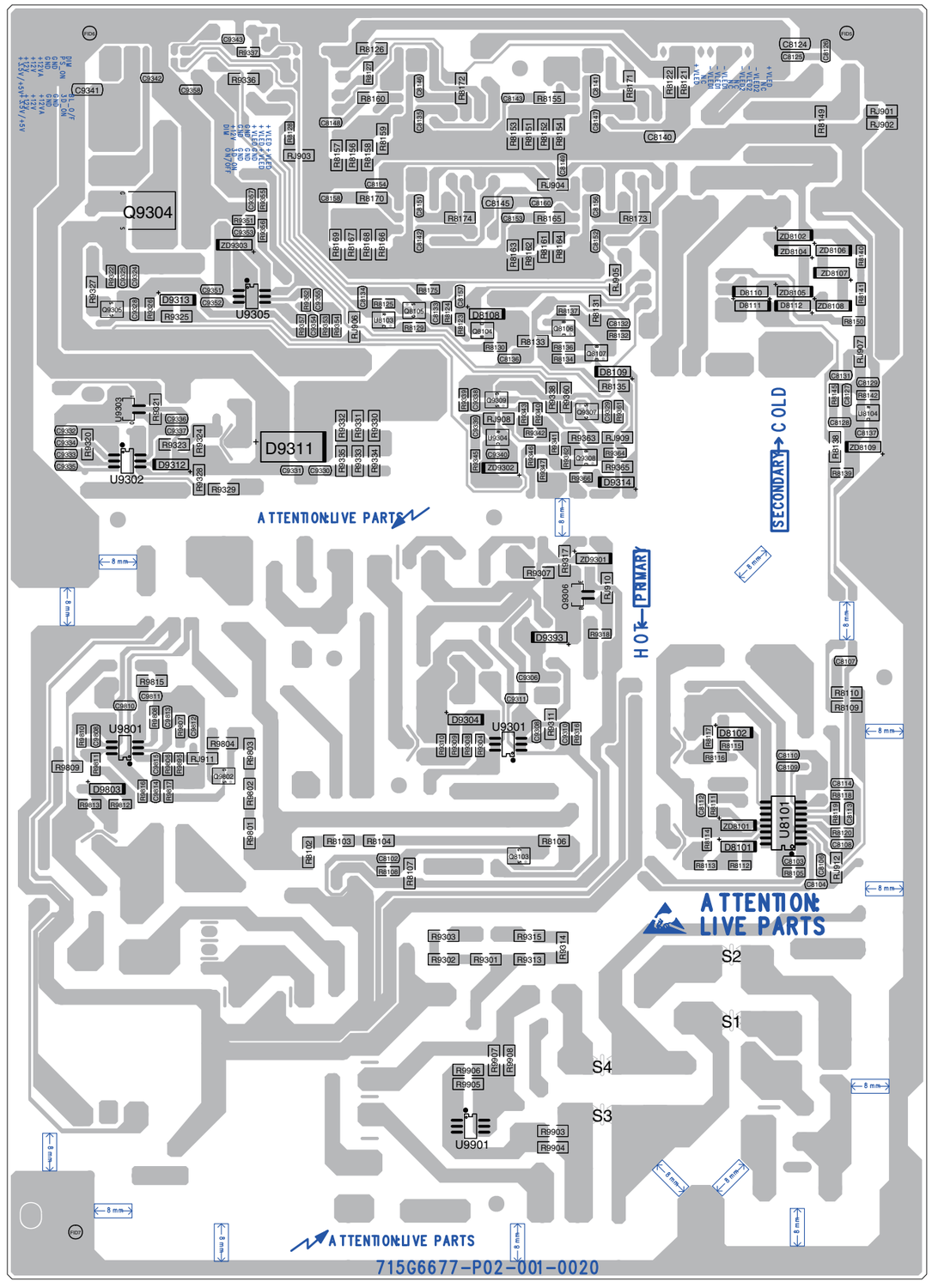
10-4-5 Power layout top



LAYOUT TOP	715G6677	2014-11-06

19850_504.eps

10-4-6 Power layout bottom



LAYOUT BOTTOM	715G6677	2014-11-06

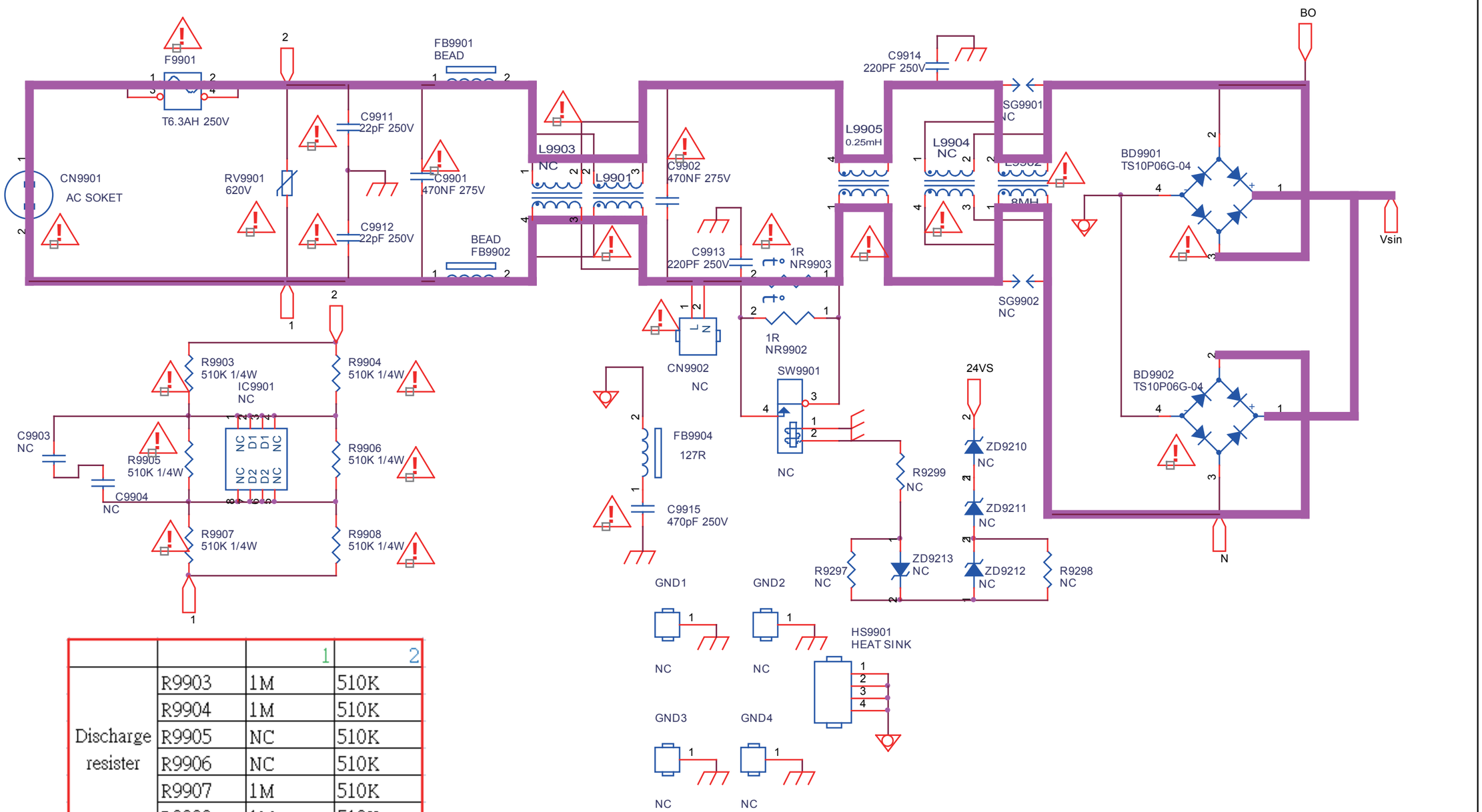
19850_505.eps

10.5 A 715G6960 PSU

10-5-1 AC input

A01 AC input

A01



		1	2
Discharge resister	R9903	1M	510K
	R9904	1M	510K
	R9905	NC	510K
	R9906	NC	510K
	R9907	1M	510K
	R9908	1M	510K
	IC9901	CAP004	NC
	C9901	47PF	NC

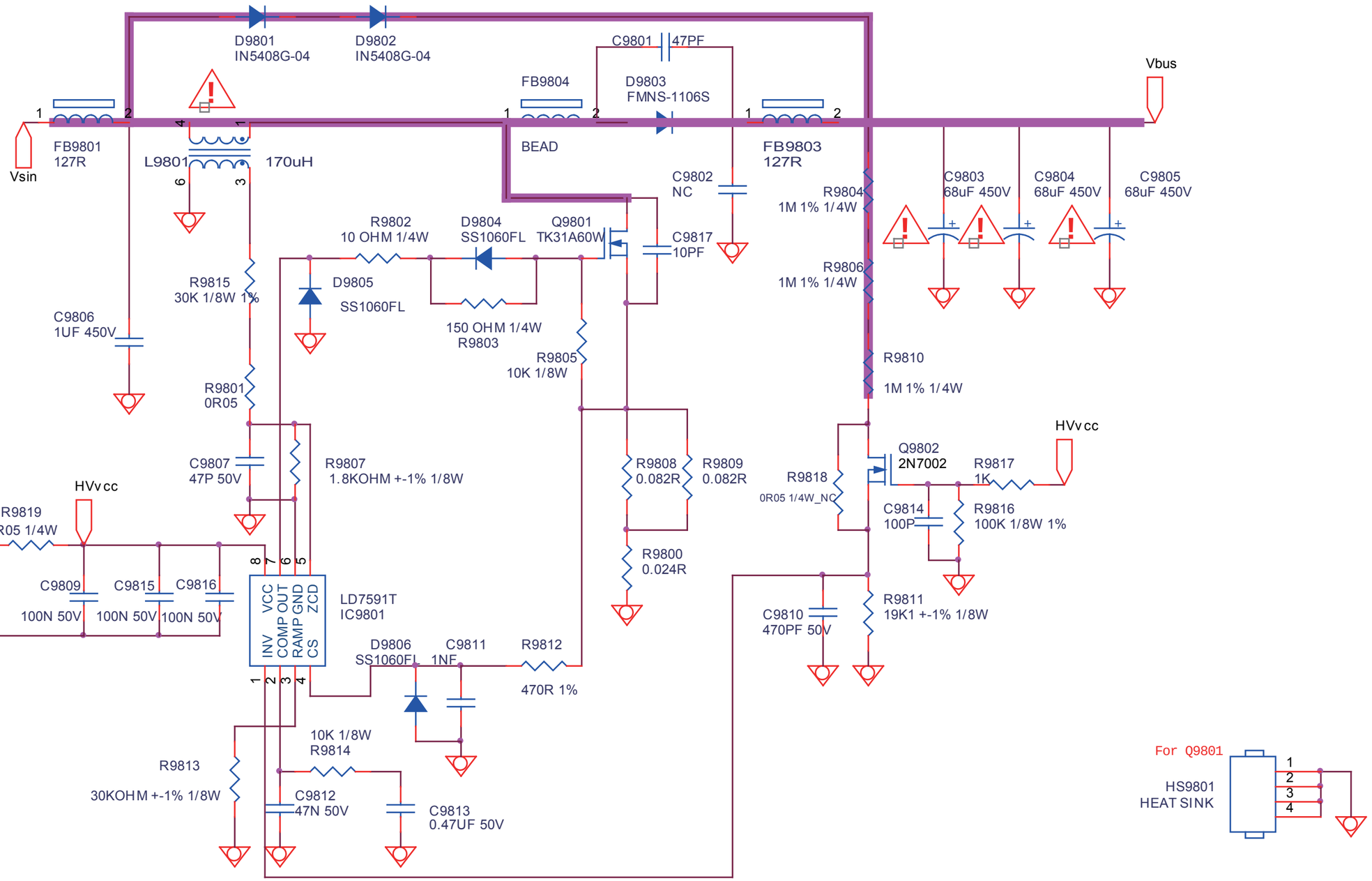
AC input	715G6960	2015-03-06

19881_500.eps

10-5-2 PFC with LD7591T

A02 PFC with LD7591T

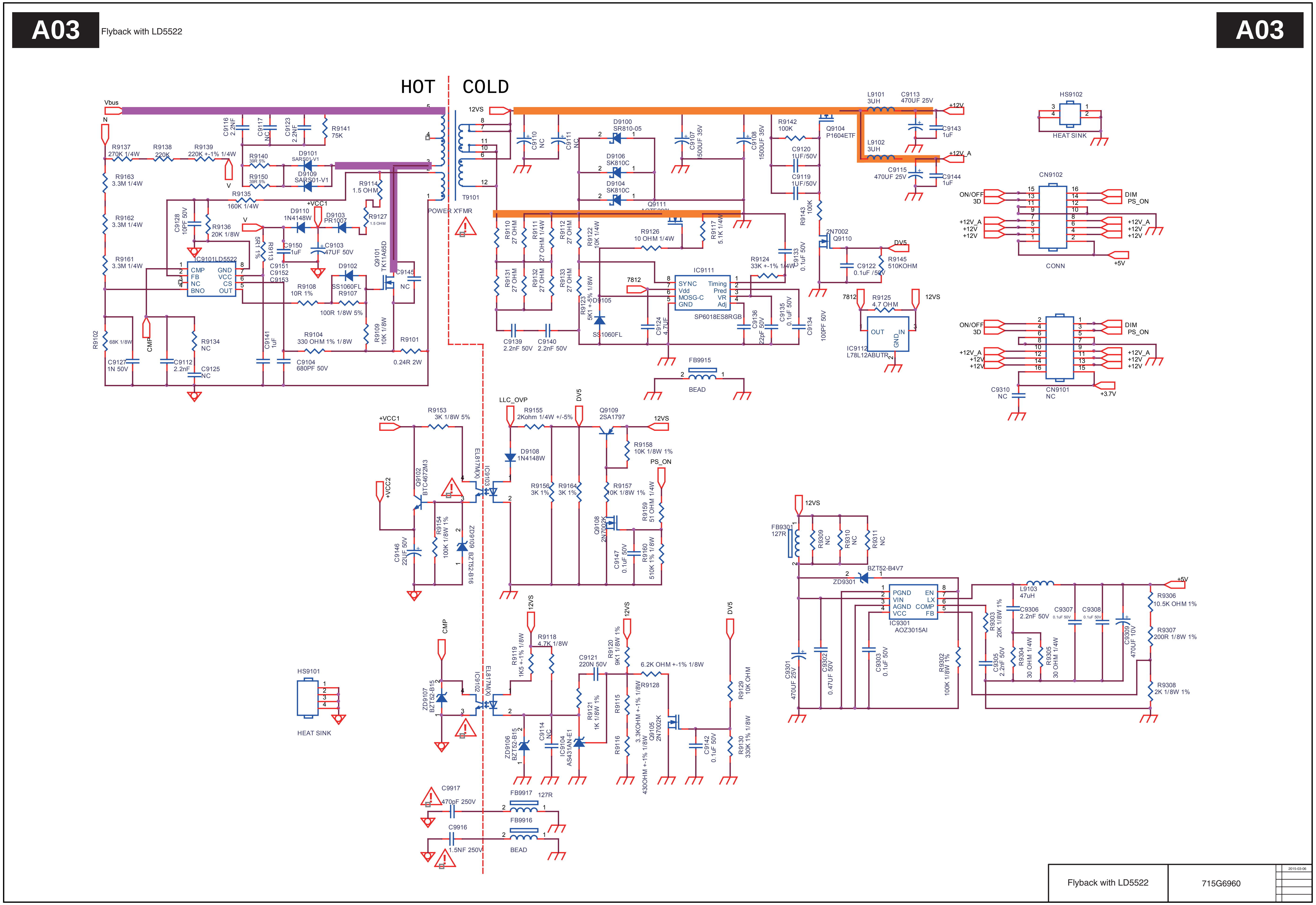
A02



PFC with LD7591T	715G6960	2015-03-06

19881_501.eps

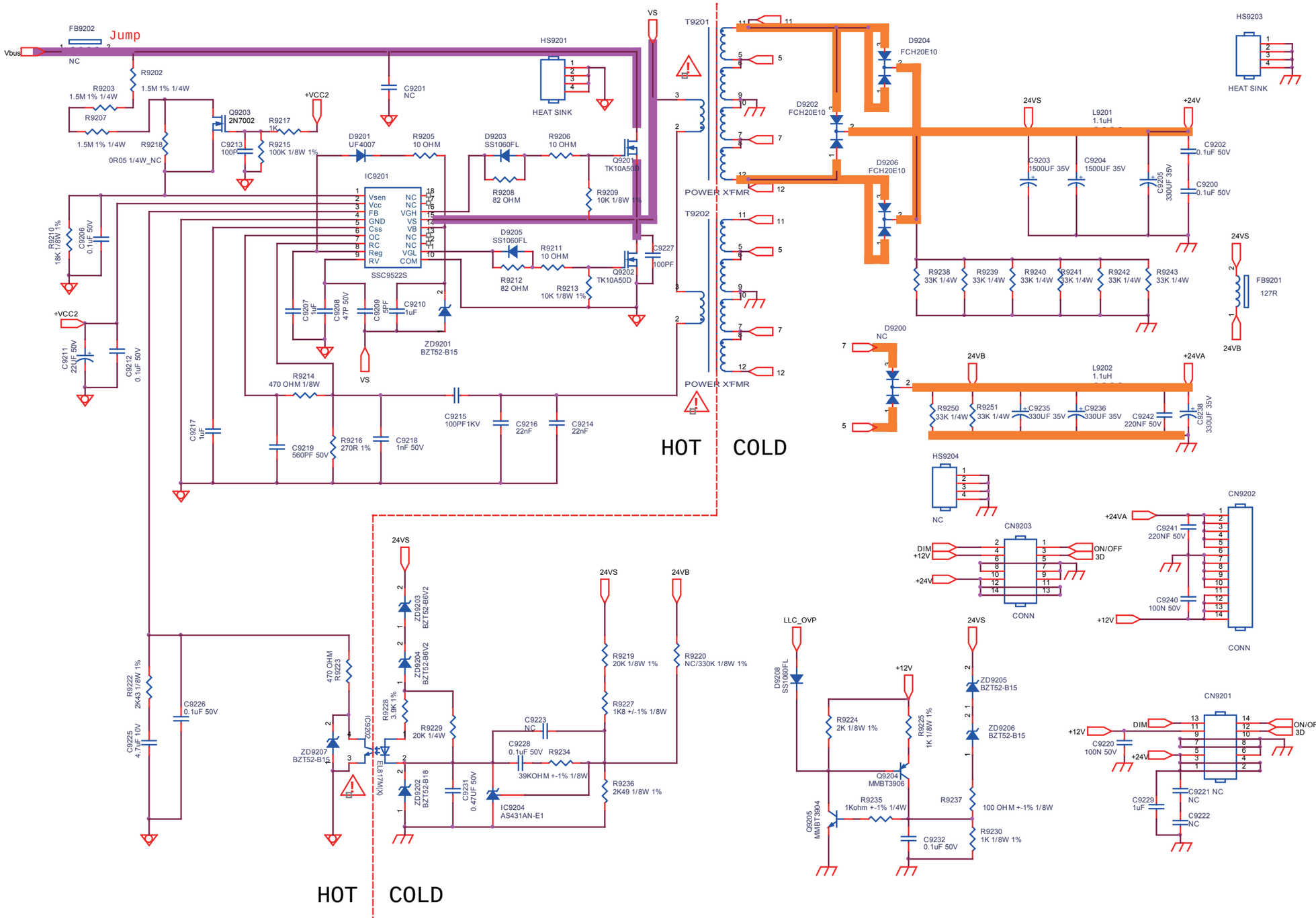
10-5-3 Flyback with LD5522



10-5-4 LLC with Sanken

A04 LLC with Sanken

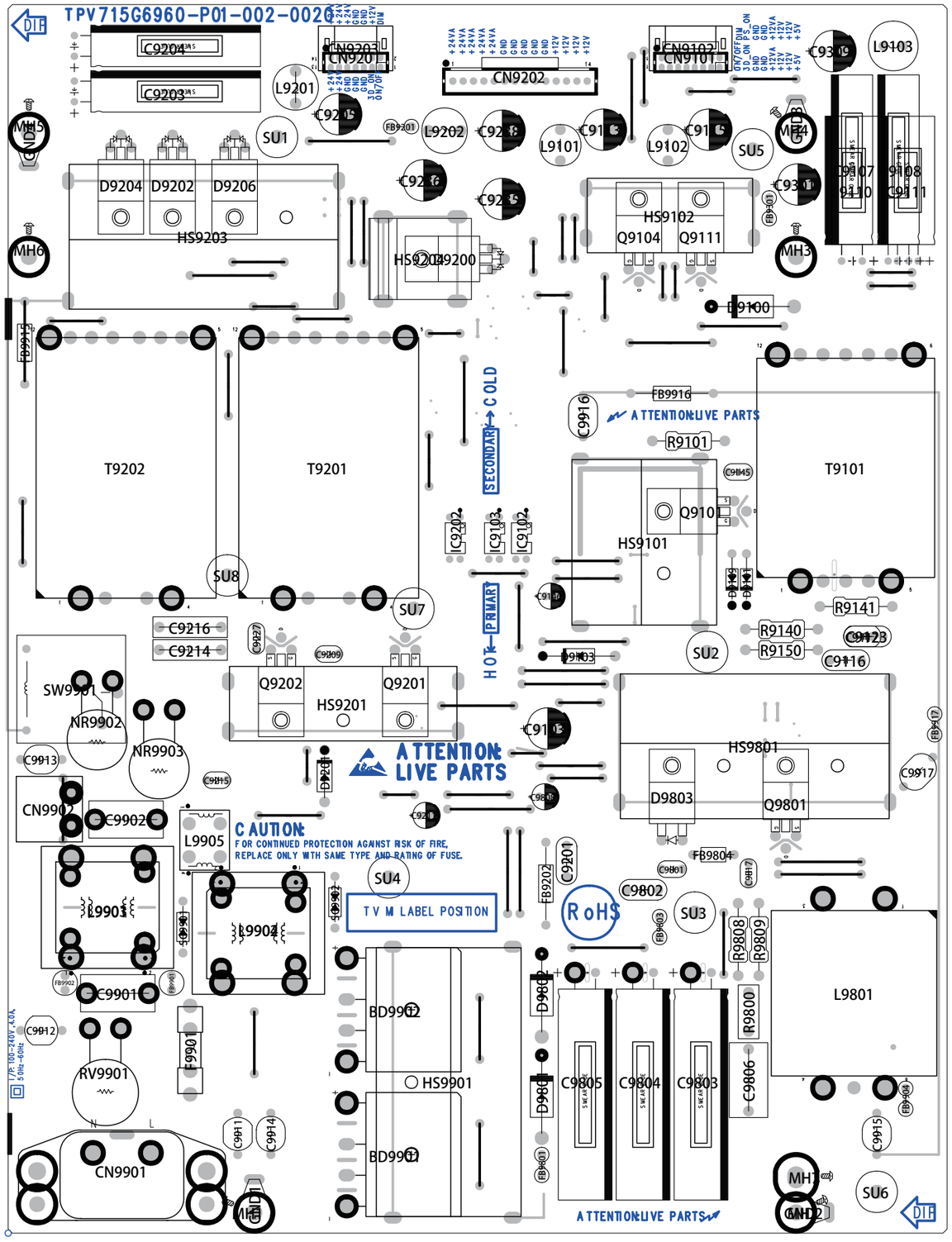
A04



LLC with Sanken	715G6960	2015-03-06

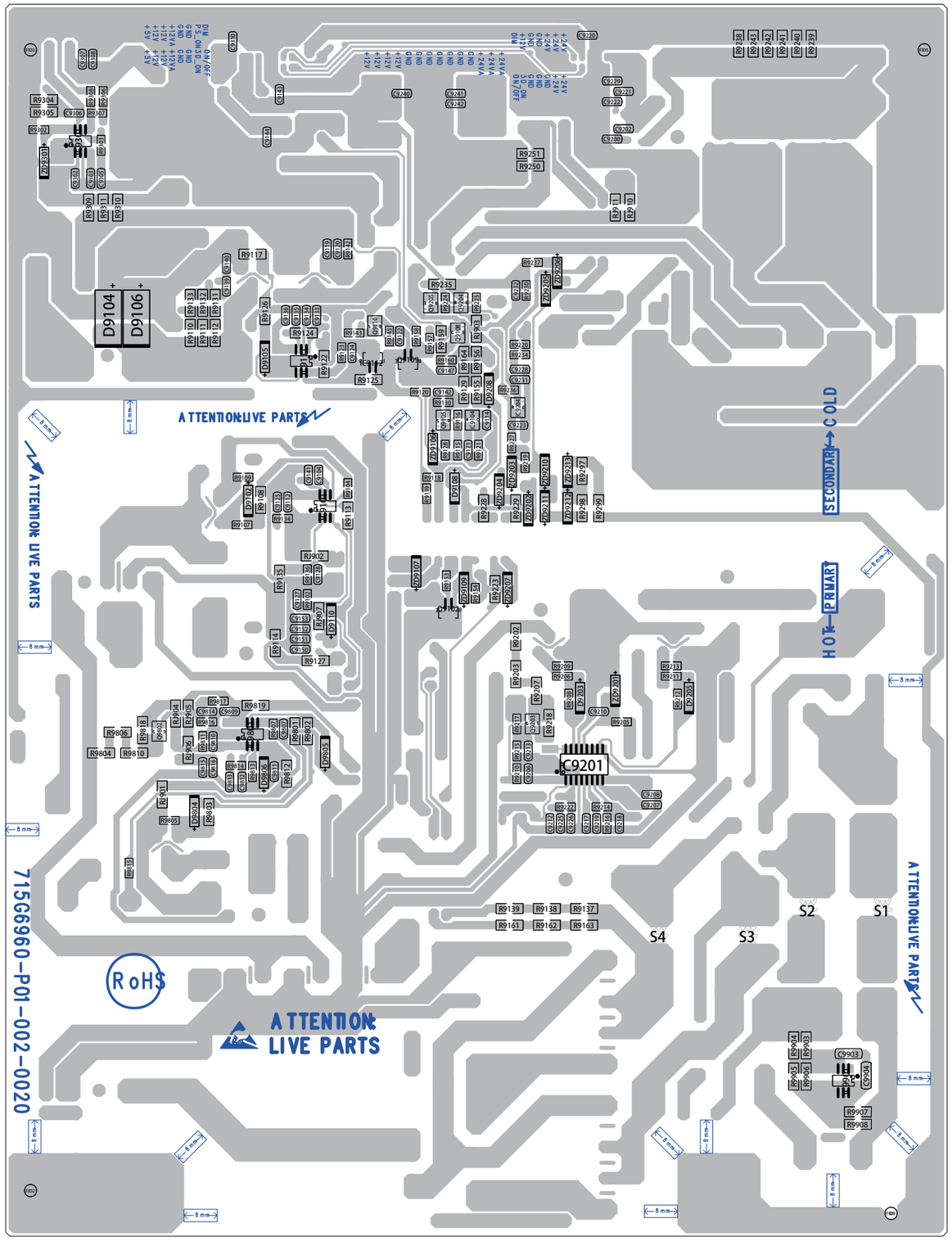
19881_503.eps

10-5-5 Power layout top



19881_504.eps

10-5-6 Power layout bottom



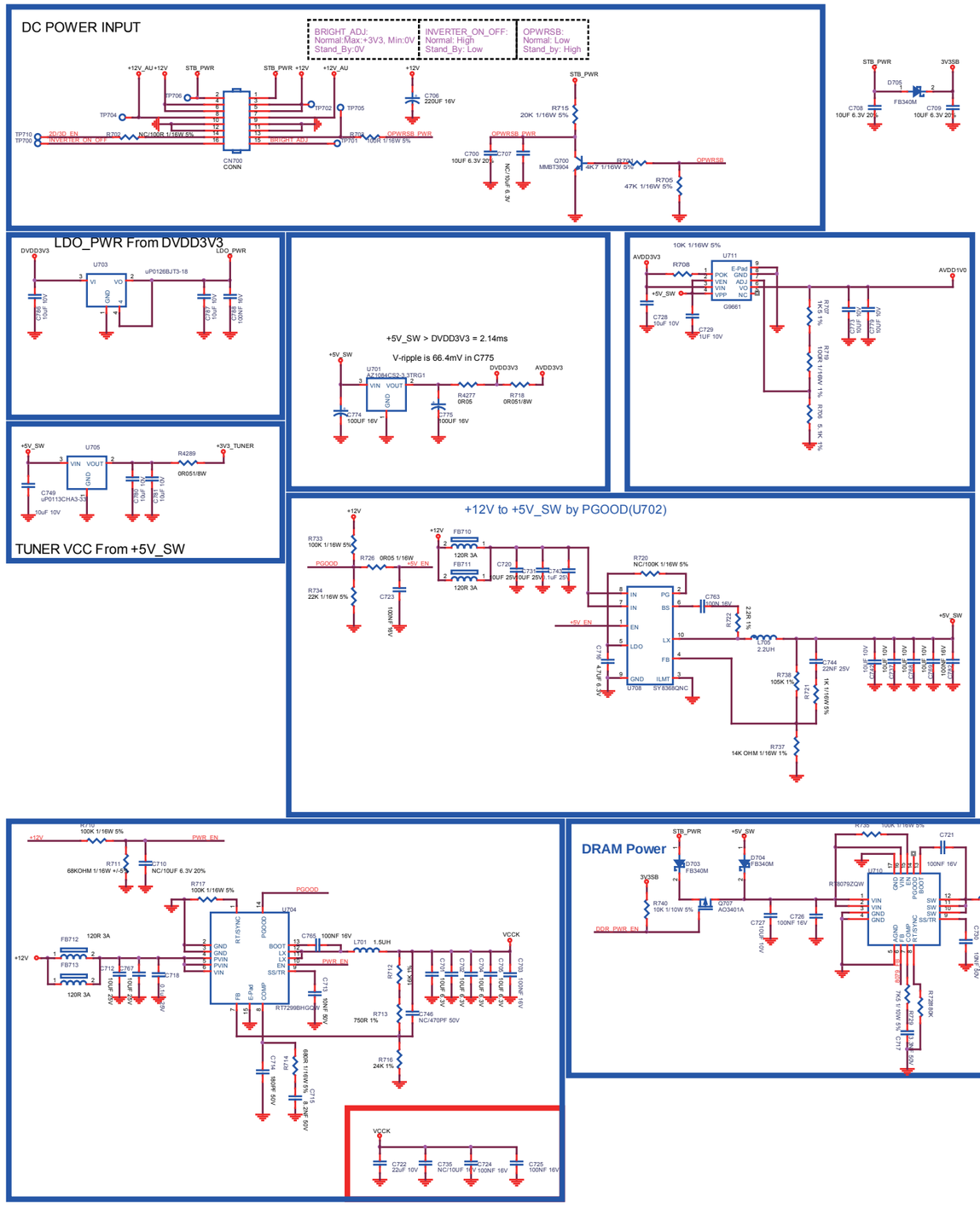
LAYOUT BOTTOM	715G6960	2015-03-06

19881_505.eps

10.6 B 715G7030 SSB

10-6-1 System Power 1

B01 System Power 1 **B01**



10-6-2 System Power 2

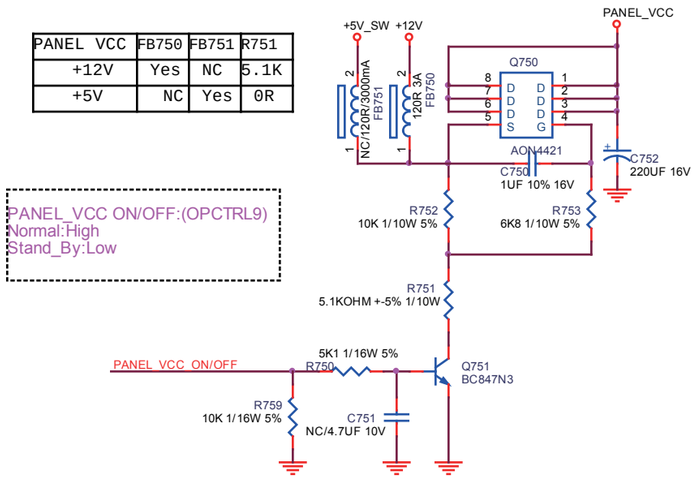
B02 System Power 2

B02

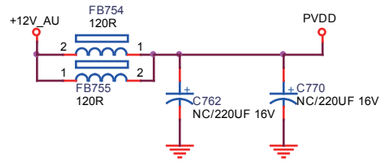
Panel VCC=12V or 5V

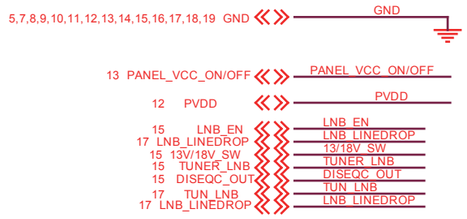
PANEL_VCC	FB750	FB751	R751
+12V	Yes	NC	5.1K
+5V	NC	Yes	0R

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

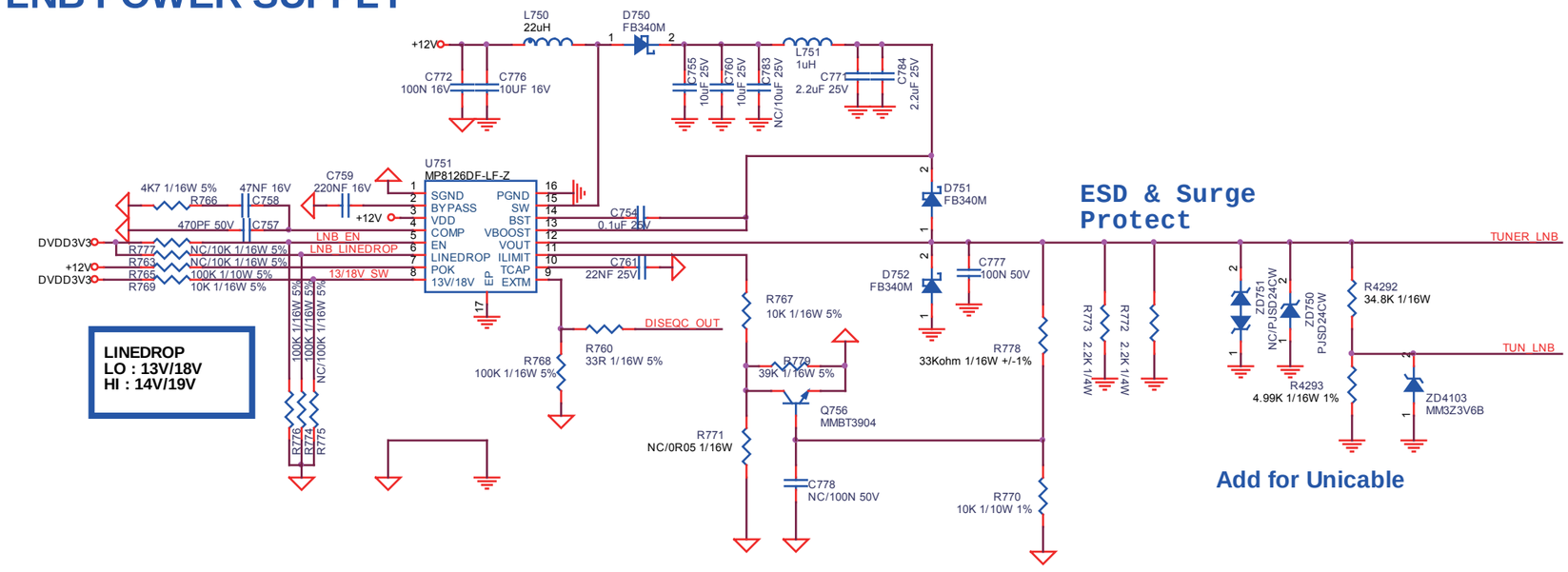


Audio VCC= +12V





LNB POWER SUPPLY



System Power 2	715G7030	C 2015-1-26

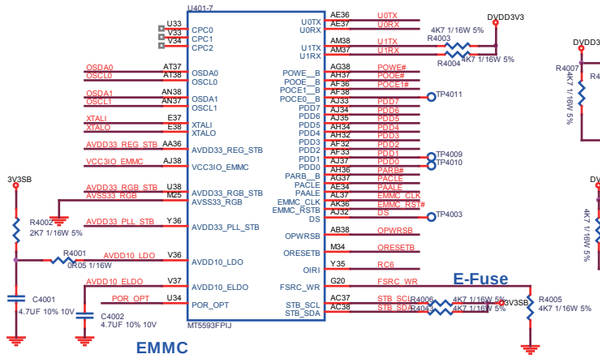
19880_507.eps

10-6-3 Peripheral

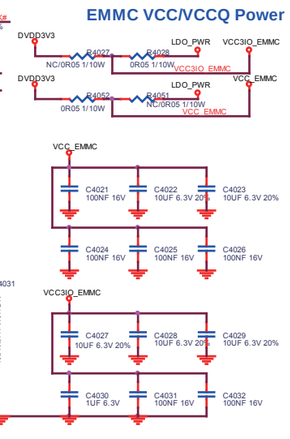
B03 Peripheral

B03

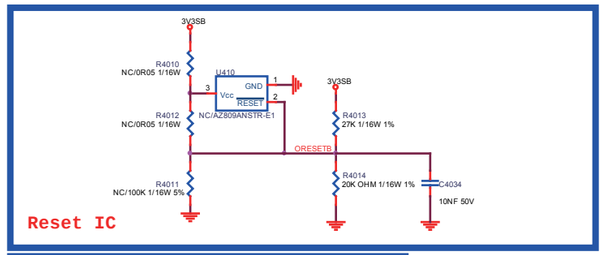
EMMC



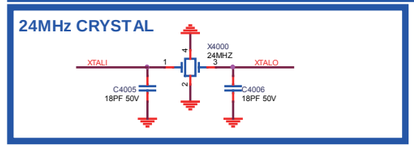
EMMC VCC/VCCQ Power



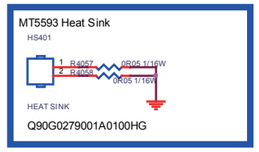
Reset IC



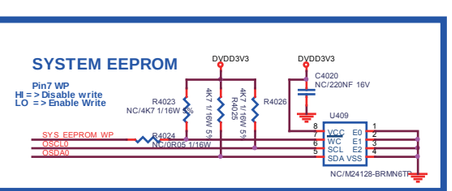
24MHz CRYSTAL



MT5593 Heat Sink



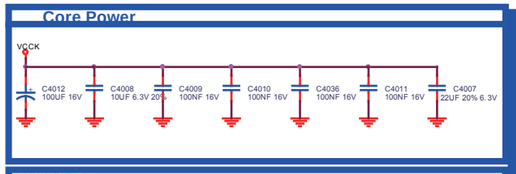
SYSTEM EEPROM



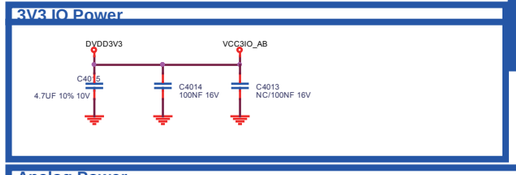
STRAPPING

STRAPPING	LED_PWM0	LED_PWM1	LED_PWM2
ICE moce + 24M + ROM to eMMC boot from eMMC pins (share pins w/s NAND)	0	0	0
ICE mode + 24M + serial boot	0	0	1
ICE moce + 24M + ROM to 60bit ECC Nand boot	0	1	0
ICE mode + 24M + serial boot(with GPIO)	0	1	1

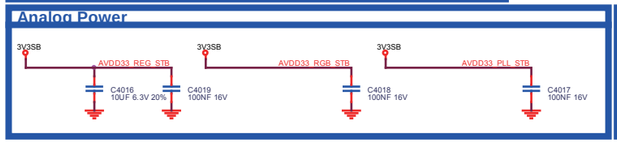
Core Power



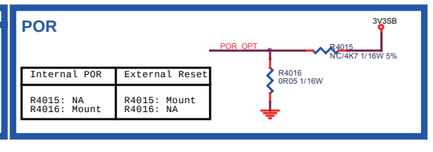
3V3 IO Power



Analog Power

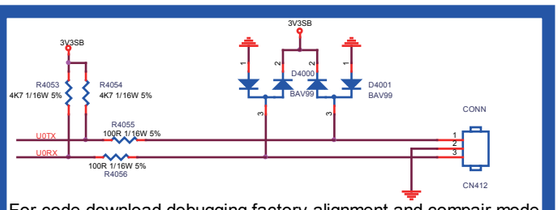


POR



Internal POR	External Reset
R4015: NA R4016: Mount	R4015: Mount R4016: NA

For code download,debugging,factory alignment and compair mode.



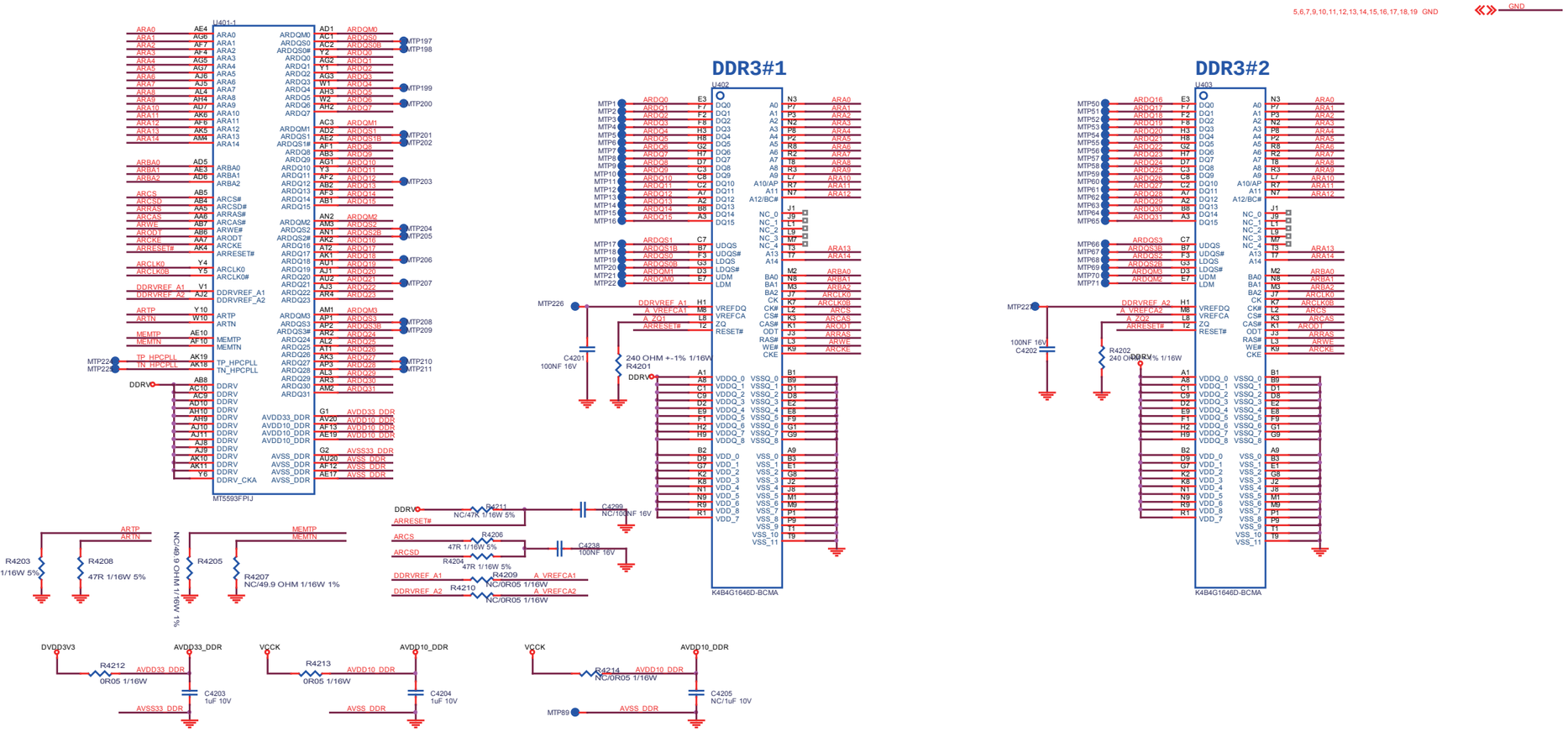
Peripheral	715G7030	C 2015-1-26

19880_508.eps

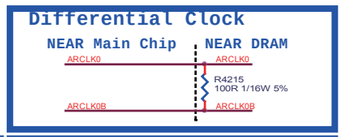
10-6-4 DDR3x2

B04 DDR3x2

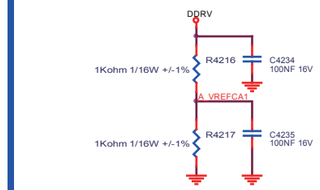
B04



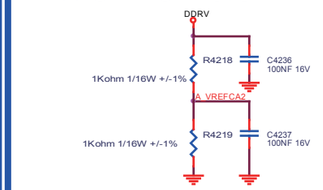
Differential Clock



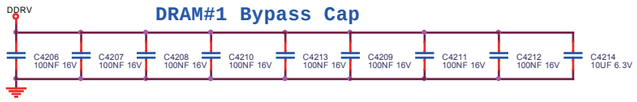
DDR3#1 Ref Volt.



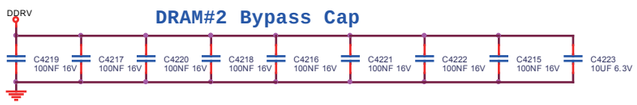
DDR3#2 Ref Volt.

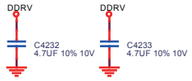


DRAM#1 Bypass Cap

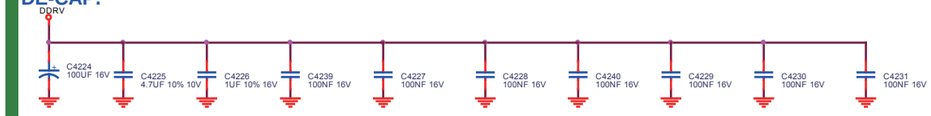


DRAM#2 Bypass Cap





DE-CAP.

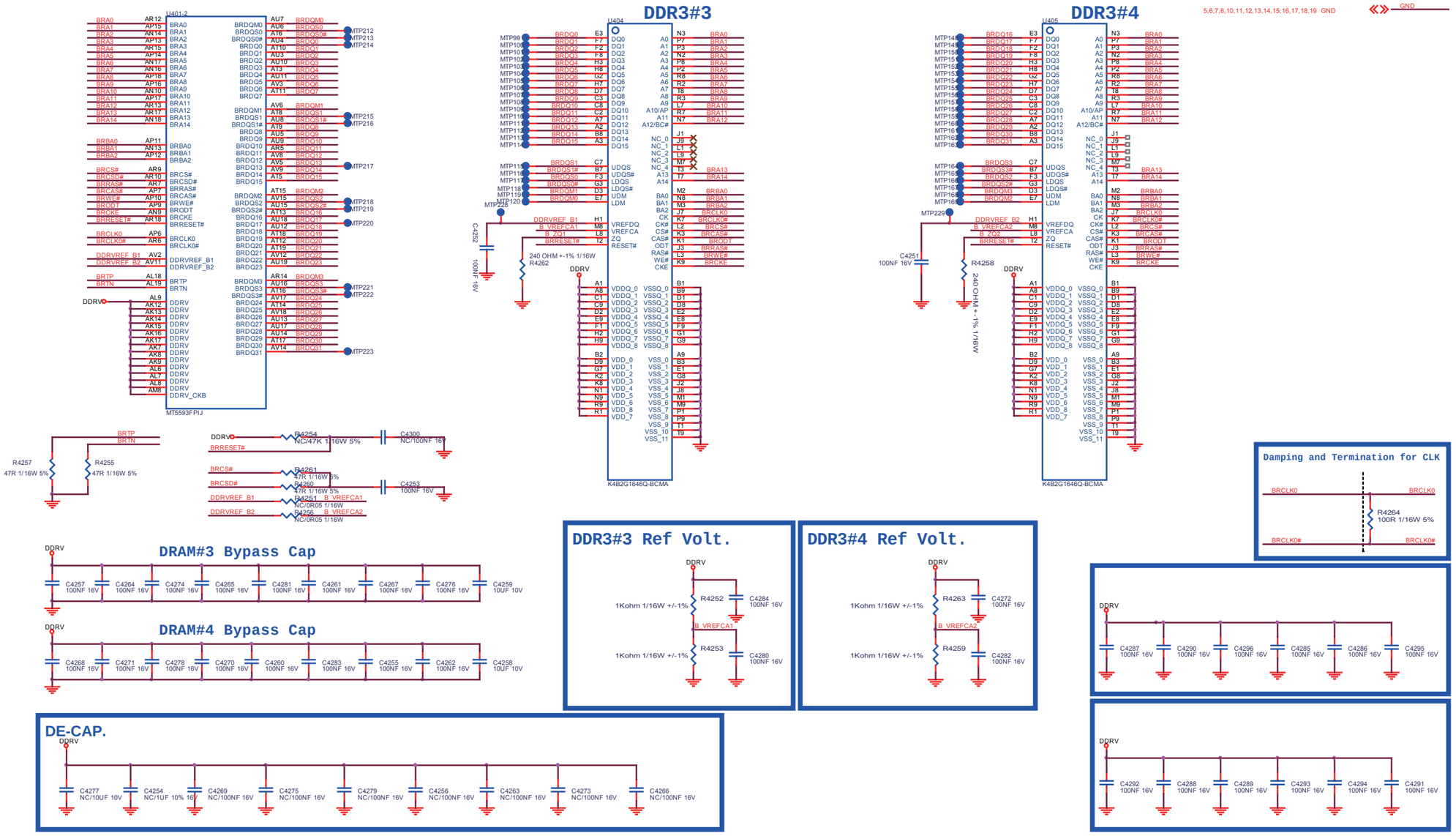


DDR3x2	715G7030	C 2015-1-26

19880_509.eps

B05 DDR3x2

B05

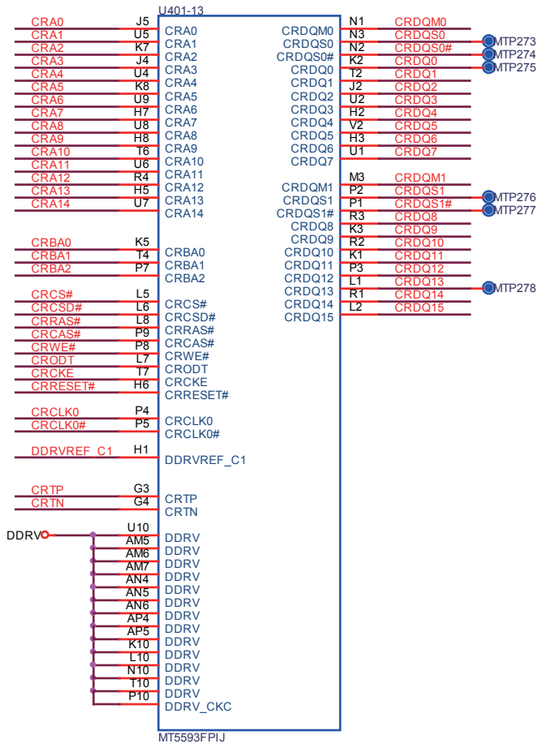


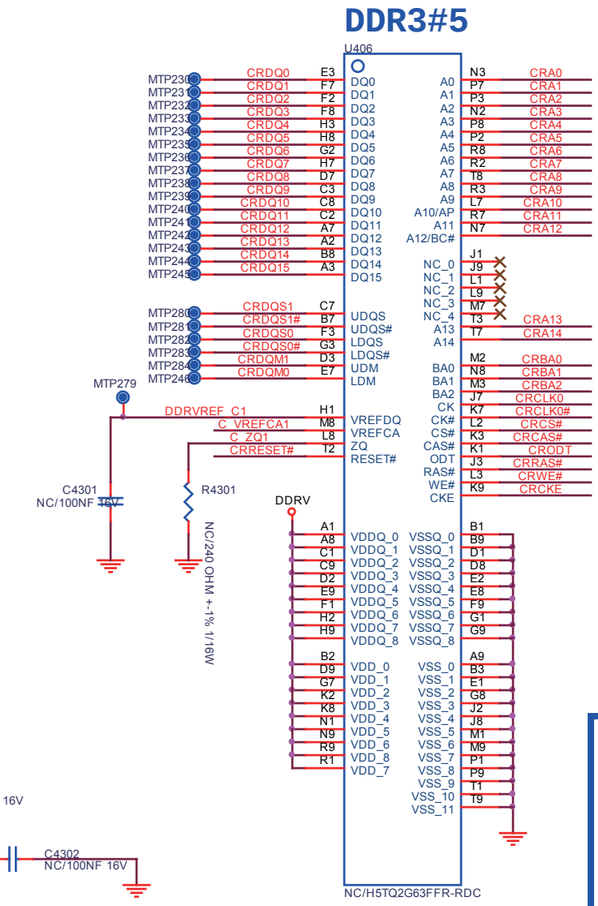
DDR3x2	715G7030	c 2015-1-26

19880_510.eps

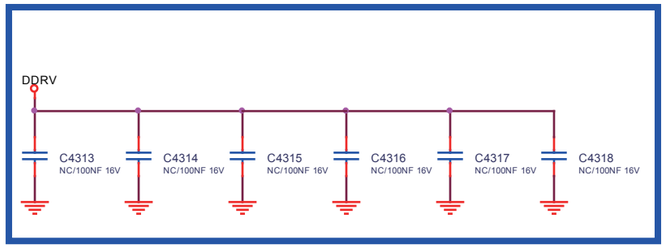
B06 DDR3x1

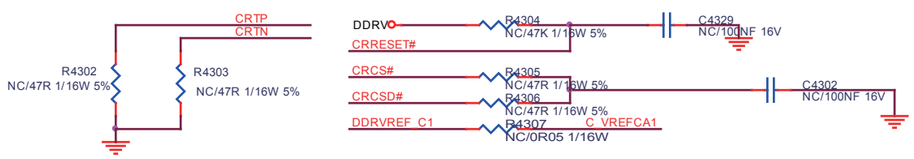
B06

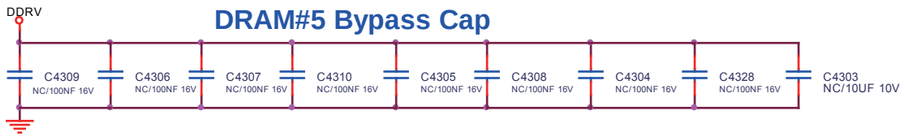


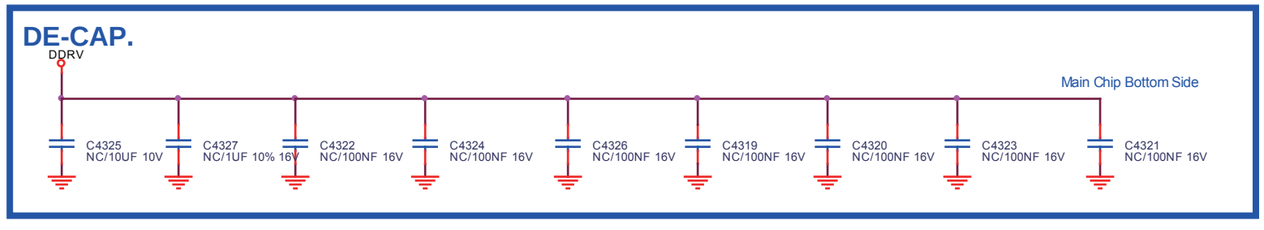


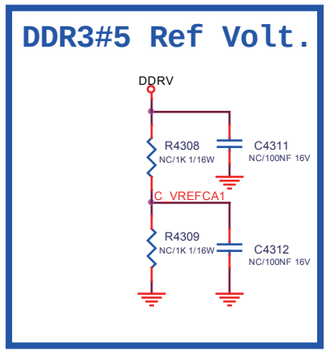
5,6,7,8,9,11,12,13,14,15,16,17,18,19 GND











DDR3x1	715G7030	c 2015-1-26

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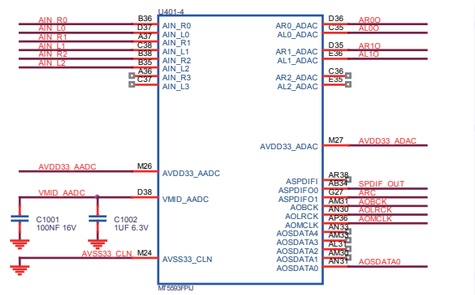
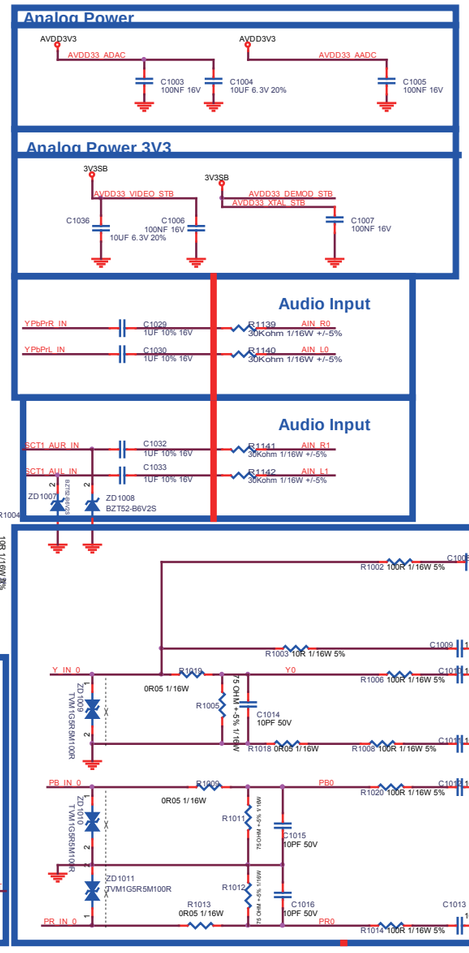
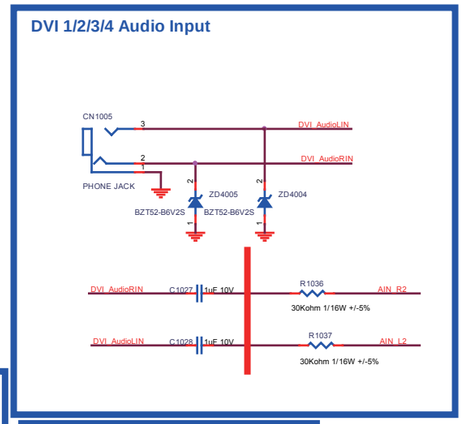
10-6-7 SCART/YPbPr

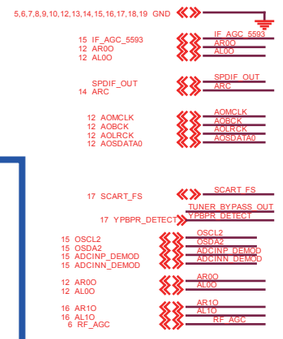
B07 SCART/YPbPr

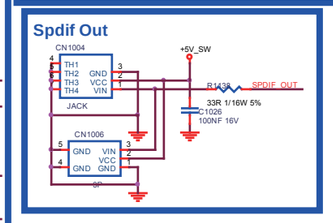
B07

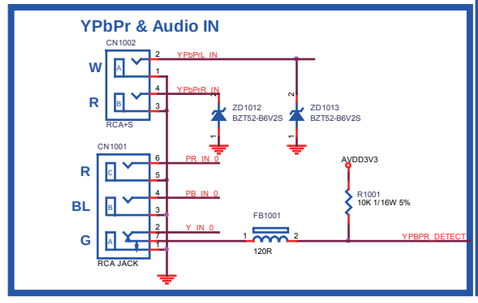


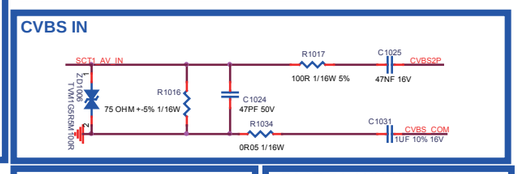


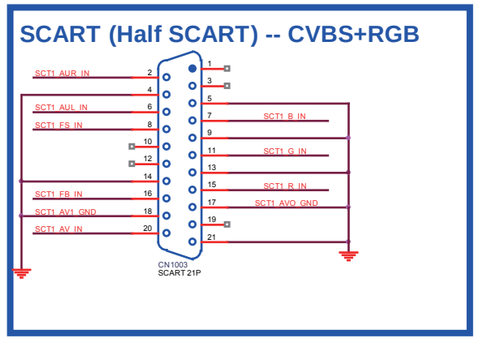


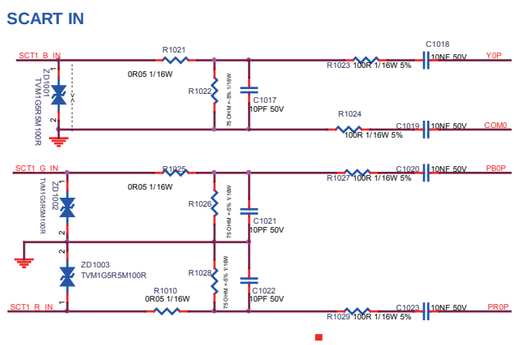


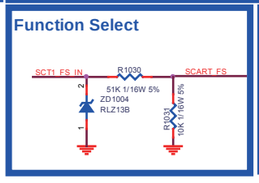


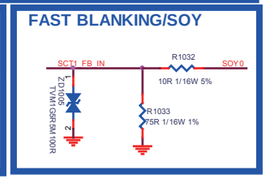












SCART/YPbPr	715G7030	C 2015-1-26

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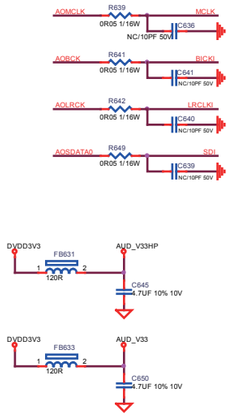
10-6-8 Speaker/Headphone

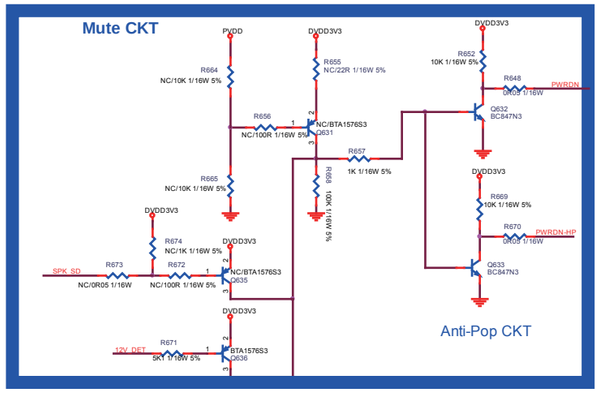
B08 Speaker/Headphone

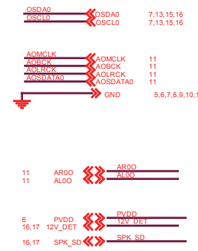
B08

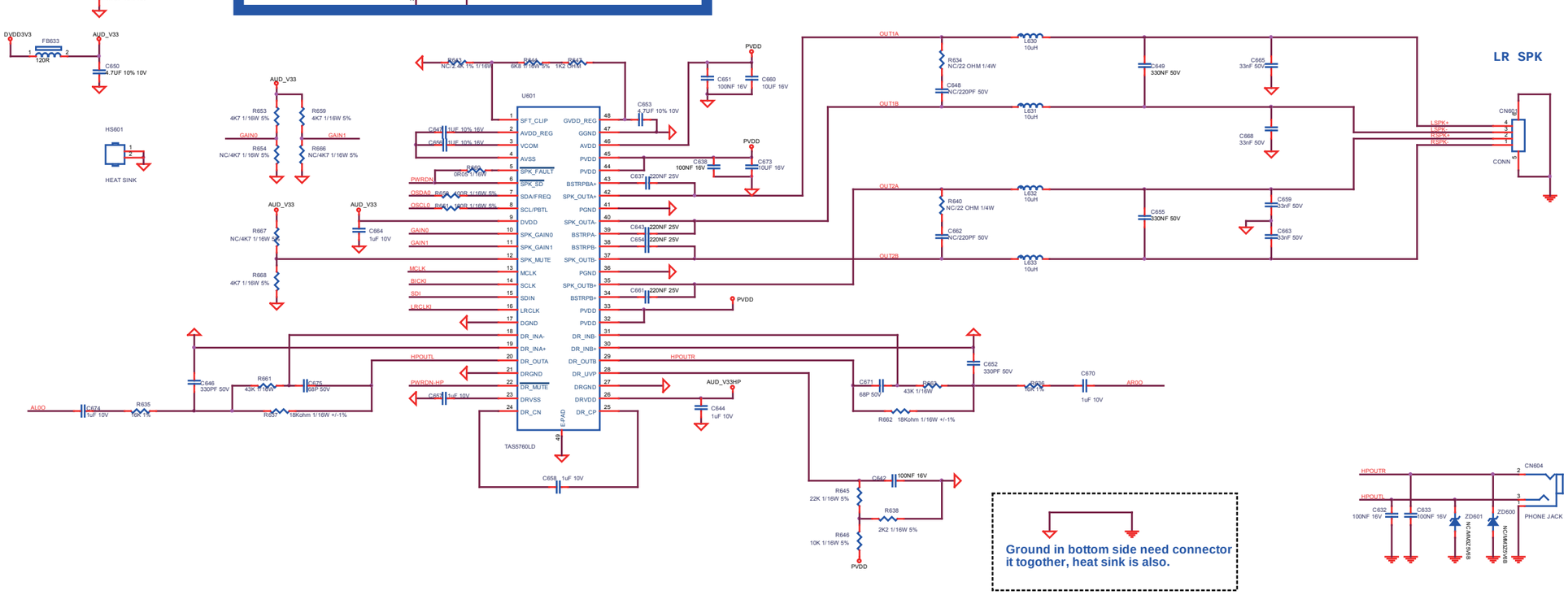
Main Speak CKT



Mute CKT







Speaker/Headphone	715G7030	C 2015-1-26

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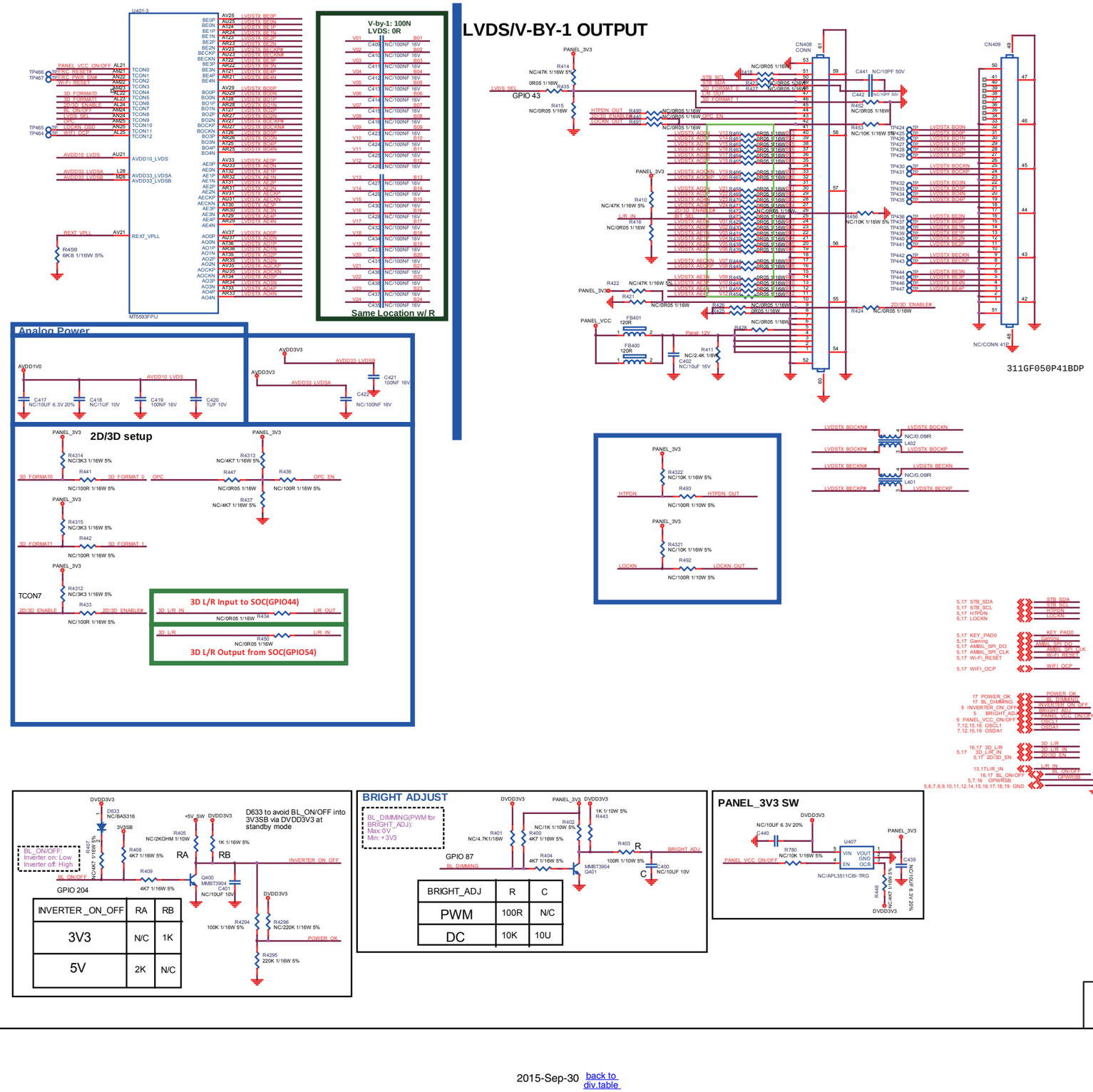
10-6-9 LVDS

B09 LVDS

B09



INVERTER_ON_OFF	RA	RB
3V3	N/C	1K
5V	2K	N/C

BRIGHT_ADJ	R	C
PWM	100R	N/C
DC	10K	10U

LVDS	715G7030	C 2015-1-26

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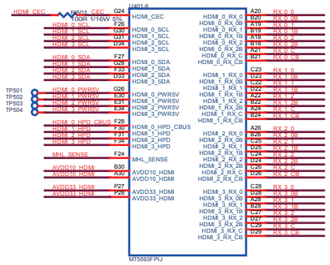
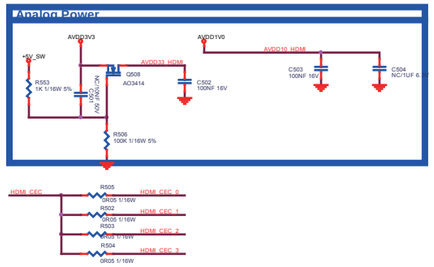
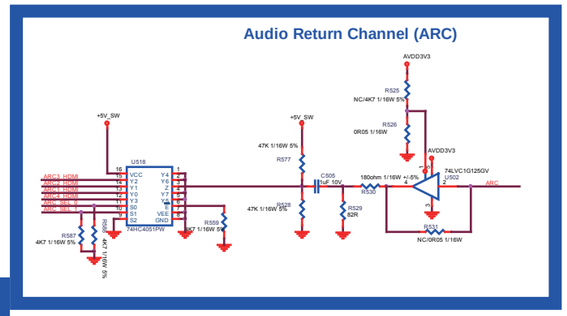
10-6-10 MHL/HDMI Input

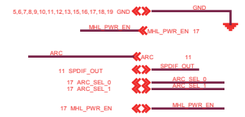
B10 MHL/HDMI Input

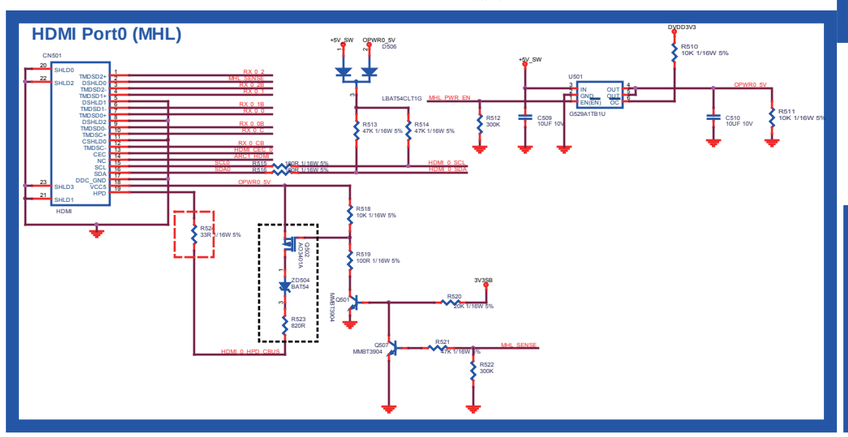
B10

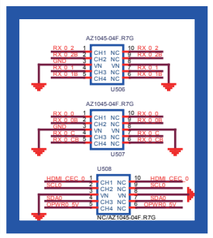


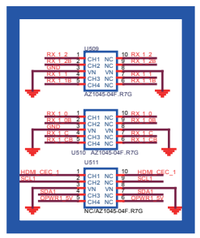


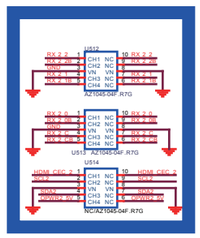


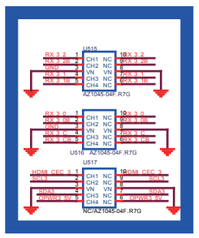


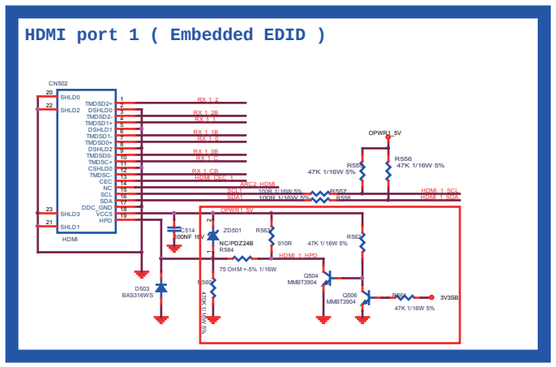


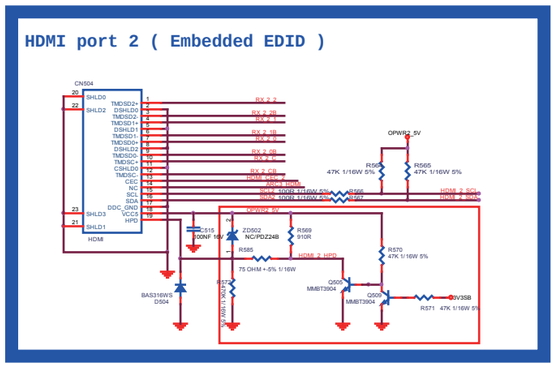


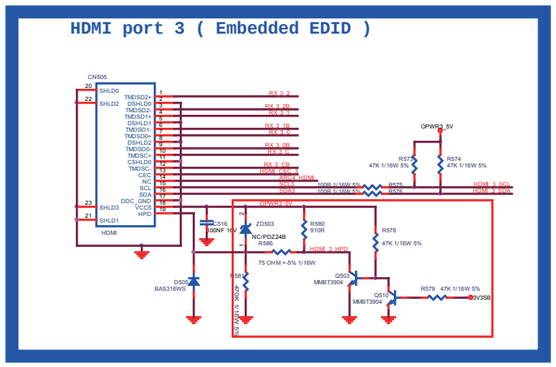












MHL/HDMI Input	715G7030	C 2015-1-26

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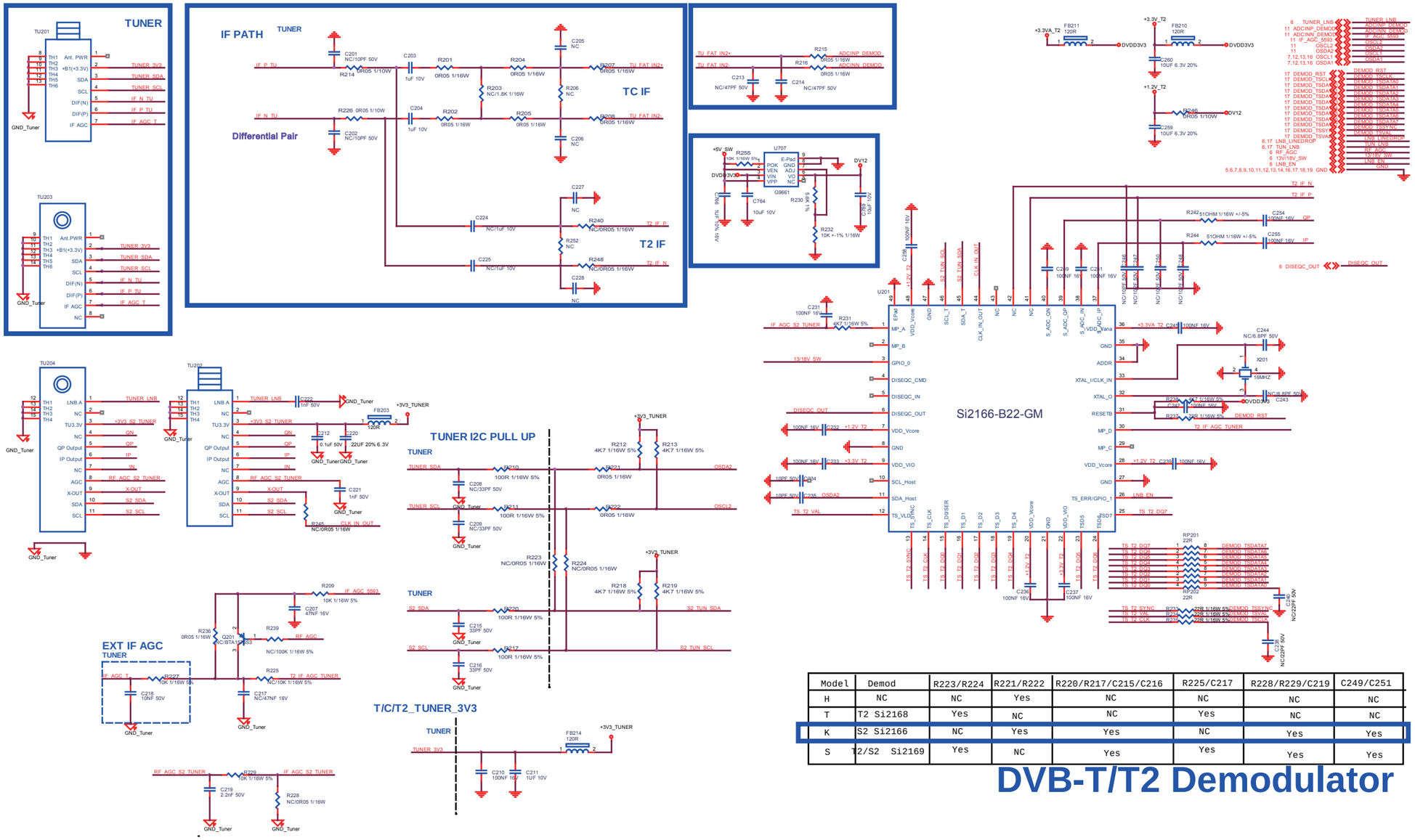
10-6-11 Tuner/Demodulator

B11 Tuner/Demodulator

B11



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 Si2168	Yes	NC	NC	Yes	NC	NC
K	S2 Si2166	NC	Yes	Yes	NC	Yes	Yes
S	T2/S2 Si2169	Yes	NC	Yes	Yes	Yes	Yes

Tuner/Demodulator	715G7030	C 2015-1-26

19880_516.eps

10-6-12 Connector

B12 Connector

B12

TO KEY PAD BOARD

3V3SB
R4100 6K8 1%
100R 1/10W 1%
R4102
KEY_PAD0
Key 1
LED_PWM1
LOGO
R4106 100R 1/10W 1%
C4106 0.1uF 50V
C4107 NC/0.1uF 50V

AL+KEY

CN402
Key 1
AMBIL_SPI_CLK#
AMBIL_SPI_DO#
+12V_AMBI
+12V_AMBI
AMBI_TEMP#
AMBI_3V3
FB715 NC/120R
DVDD3V3
CONN

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

3V3SB
R4154 NC/33K 1/16W 5%
R4148 NC/10K 1/16W 5%
IR_SW
IR_SW_IN
R4149 NC/22K 1/16W 5%
Q4102 NC/PMBT3904

IR_SW_IN	IR-Bypass
L	Yes
H	No

CN4100
NC/0R05 1/16W
R4130
R4131 NC/0R05 1/16W
R4132 NC/0R05 1/16W
IR_IN
IR_SW_IN
IR_OUT
NC/PHONE JACK
R4151 NC/10K 1/16W 5%
R4153 NC/10K 1/16W 5%
Q4101 NC/PMBT3904
R4157 NC/1K 1/16W 5%
Q4100 NC/2N7002
R4169 NC/100R 1/16W 5%
IR_RC
U4101 NC/TS4A3157DCKR
IR_IN
NO
GND
IR_SW
RC6
C4124 NC/10UF 6.3V
C4125 NC/100NF 16V

Ambient Light

+12V
F1402 NC/2A 63V
+12V_AMBI
FB714 NC/120R
C1408
U1401
NC/10UF 16V
DVDD3V3 DVDD3V3
R1407 NC/10K 1/16W 5%
C1402 NC/47NF
R1410 NC/10K 1/16W 5%
NC/AOZ1360DI/L
C1407 NC/100NF 16V
R1406 NC/47K 1/16W 5%
C1400 NC/10UF 16V
C1401 NC/10UF 16V
C1406 NC/100P 50V
CN1404 NC/CONN
AMBI_TEMP
R1401 NC/100R 1/16W 5%
AMBI_SPI_CLK
R1402 NC/47R 1/16W 5%
AMBI_SPI_DO
R1403 NC/47R 1/16W 5%
AMBI_SPI_DO#
C1404 NC/100P 50V
C1405 NC/100P 50V
AMBI_3V3
C1403 NC/1UF 10% 16V
R1405 AMBIL_SPI_CLK NC/4K7 1/16W 5%
R1404 AMBIL_SPI_DO NC/4K7 1/16W 5%
AMBI_TEMP#
AMBIL_SPI_CLK#

12V drop detect

+12V_AU
R4276 22K 1%
R4329 15K 1%
BTA1576S3 Q634
3V3SB
R4272 22K 1%
R4275 0R05 1/16W
12V_DET
R4274 100K 1%

Wi-Fi Power Control

C4246 NC/2.7pF
C4247 NC/2.7pF
CN4250
Wi-Fi_VCC
R4296 10K 1/16W 5%
R4295 10K 1/16W 5%
R4294 0R05 1/16W
USB_DM_P0
R4293 0R05 1/16W
USB_DP_P0
R4292 0R05 1/16W
WoWLAN_IRQ
R4291 0R05 1/16W
WoBLE-IRQ
R4290 0R05 1/16W
Wi-Fi_RESET
R4297 NC/10K 1/16W 5%
R4285 NC/10K 1/16W 5%
R4291 NC/10K 1/16W 5%
CONN

LED_R
Enable(Stand_By): High
Disable: Low

LED_PWM0 R4117 100R 1/16W 5%
R4114 100R 1/16W 5%
LED_R
RC6#
IR_SSB
IR_RC
C4118 NC/100N 50V
ZD4101 NC/MM3Z3V6B
R4115 NC/10K 1/16W 5%
C4117 NC/100N 50V
3V3SB
CN4401
LOGO
Key 1
LS_SCL
LS_SDA
Gamin
+5V_SW
R4118 100R 1/16W 5%
CONN
C4113 NC/100N 50V
80-IR-OUT
DVDD3V3
OSCL1
OSDA1
R4122 NC/100OHM
R4121 NC/100OHM
C4115 NC/10uF 6.3V
I/R_IN
R4119 NC/100OHM
ZD4102 NC/MM3Z3V6B
Gaming
R4299 NC/10K
R4300 NC/10K

TO IR/KEY BOARD

2W Mono Speaker output for BUH

NC/CONN
AL1O
R631 NC/200R 1/16W 5%
R630 NC/510R 1/16W 5%
3V3SB
+5V_SW
C630 NC/1nF 50V
C635 NC/10NF 50V
OPWRSB_PWR
IR_SSB
IR_RC
SPK_SD
U0TX
U0RX
C631 NC/1nF 50V
C634 NC/10NF 50V
AR1O
R632 NC/200R 1/16W 5%
R633 NC/510R 1/16W 5%
CN403
For shutdown 12V

STB_PWR
U4251
IN OUT
IN OUT
EN OUT
GND ADJ/NC
E-PAD
AP7362-SP-13
C4243 10UF 6.3V 20%
C4245 10UF 6.3V 20%
C4241 10UF 6.3V 20%
C4242 100F 6.3V 20%
Wi-Fi_VCC
C4294 100NF 16V
R4271 100R 1/16W 5%
WIFI_PWR_EN
R4269 10K +-1% 1/16W
R4282 4K7 1/16W 5%

Wi-Fi_PWR_EN :
Enable : High
Disable : Low

Wi-Fi_OCP :
Disable : Low

STB_PWR
C4297 NC/100UF 16V
WIFI_PWR_EN
U4250
VIN VOUT
GND
EN OCB
NC/APL3511ABI-TRG
WIFI_OCP
R4265 NC/4K7 1/16W 5%
R4266 4K7 1/16W 5%
3V3SB
C4250 100UF 6.3V 20%
C4330 10UF 6.3V 20%
C4331 10UF 6.3V 20%
C4298 100NF 16V
FB4250
NC/120R
R4250 NC/10K 1/16W 5%
Wi-Fi_VCC
C4332 NC/100UF 16V

7,12,13,15 OSCL1
7,12,13,15 OSDA1
7,17 LED_PWM0
7,17 LED_PWM1
13,17 I_R_IN
17 Gaming
17 KEY_PAD0
12,17 HP_DET
12,17 12V_DET
17 WoBLE-IRQ
17 WoWLAN_IRQ
17 WIFI_PWR_EN
17 WIFI_OCP
17,18 WoL_PWR_EN
18 USB_DP_P0
18 USB_DM_P0
7 RC6
AMBIL_SPI_CLK 17
AMBIL_SPI_DO 17
AMBI_TEMP 17
5,17 Wi-Fi_RESET
OPWRSB_PWR 5,7
U0TX 7
U0RX 7
11 AR1O
11 AL1O
12,17 SPK_SD
5,6,7,8,9,10,11,12,13,14,15,17,18,19 GND

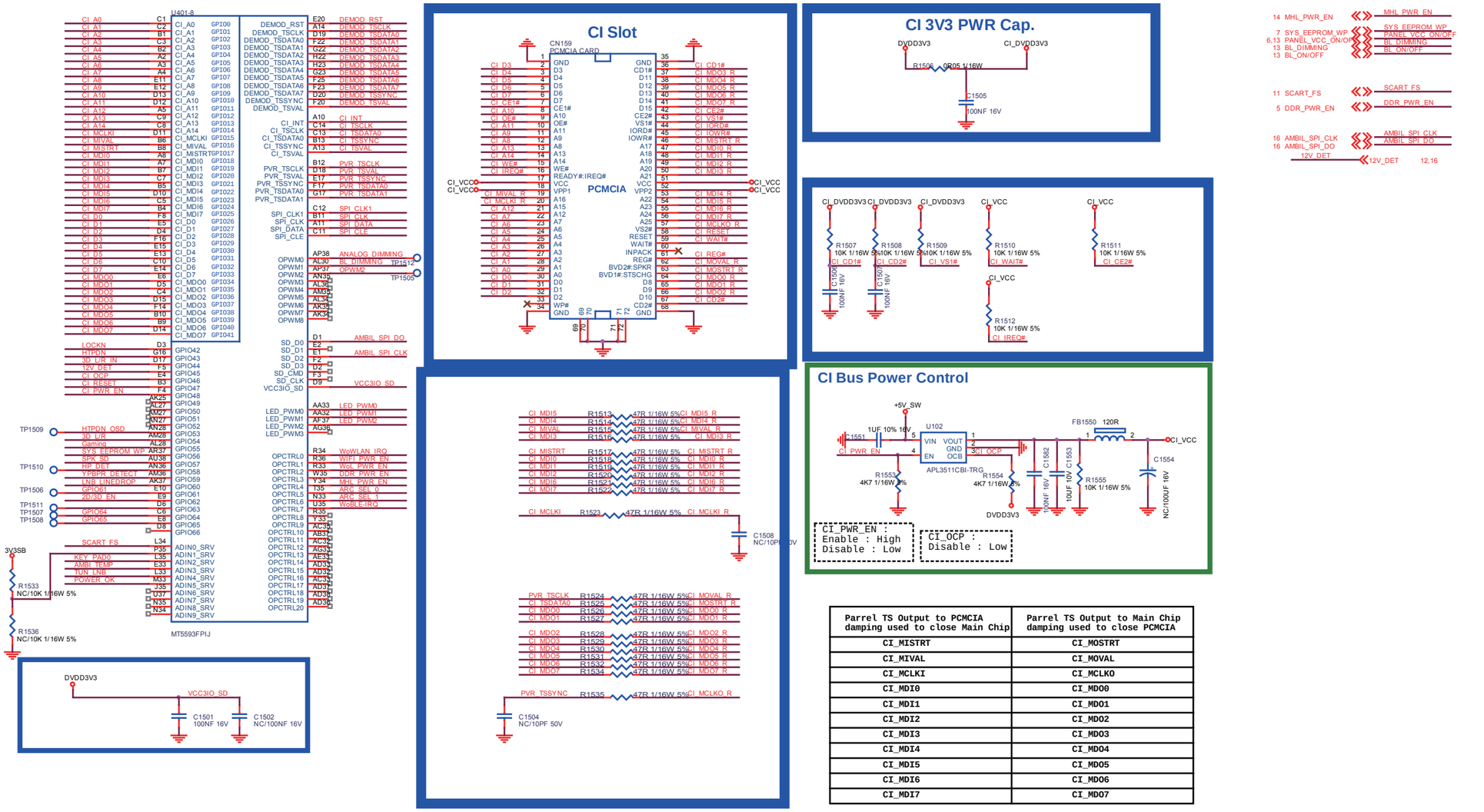
Connector	715G7030	C 2015-1-26

19880_517.eps

10-6-13 Internal CI

B13 Internal CI

B13



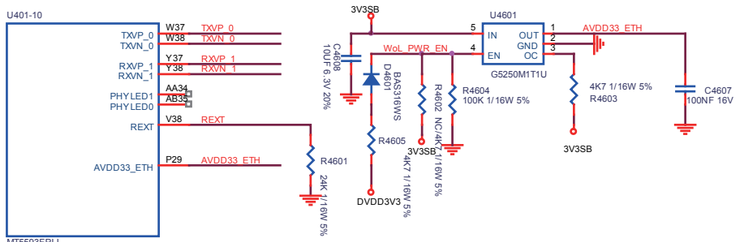
Parrel TS Output to PCMCIA damping used to close Main Chip	Parrel TS Output to Main Chip damping used to close PCMCIA
CI_MISTRT	CI_MOSTRT
CI_MIVAL	CI_MOVAL
CI_MCLKI	CI_MCLKO
CI_MDI0	CI_MDO0
CI_MDI1	CI_MDO1
CI_MDI2	CI_MDO2
CI_MDI3	CI_MDO3
CI_MDI4	CI_MDO4
CI_MDI5	CI_MDO5
CI_MDI6	CI_MDO6
CI_MDI7	CI_MDO7

10-6-14 USB/ETHERNET PHY

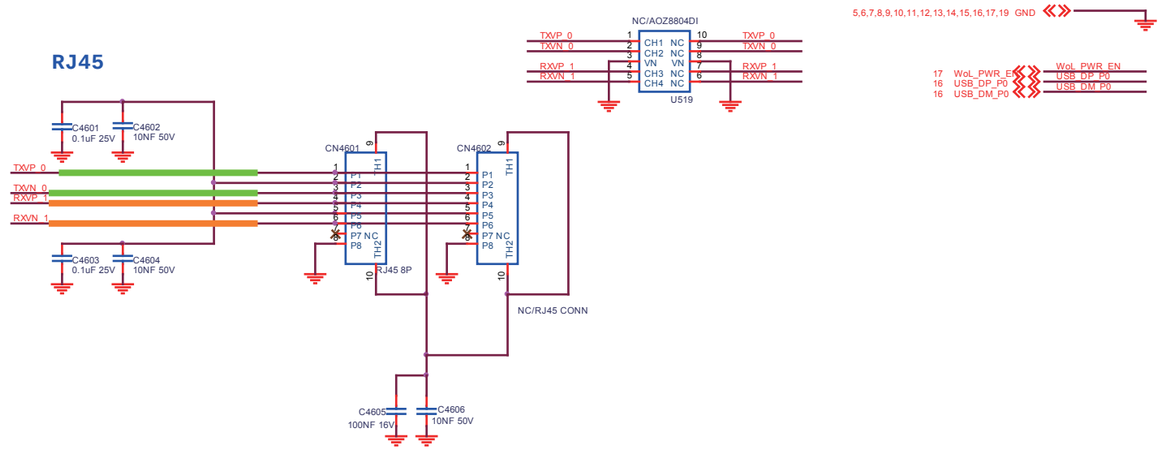
B14 USB/ETHERNET PHY

B14

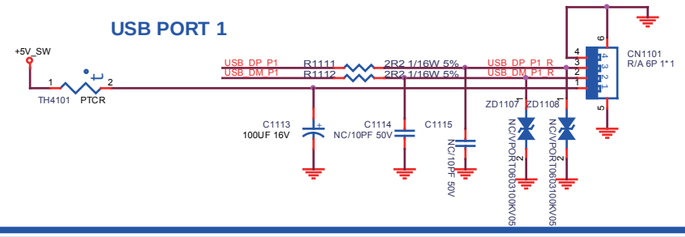
ETHERNET PHY



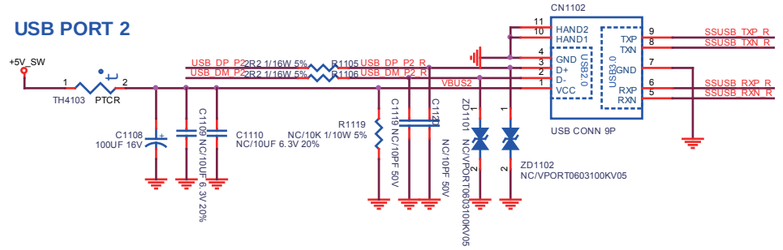
RJ45



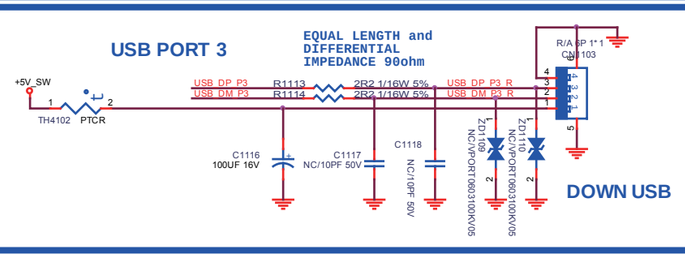
USB PORT 1

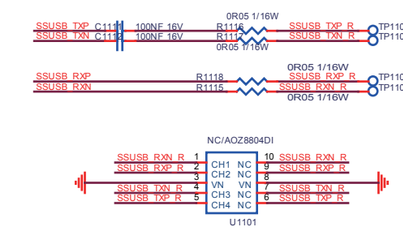


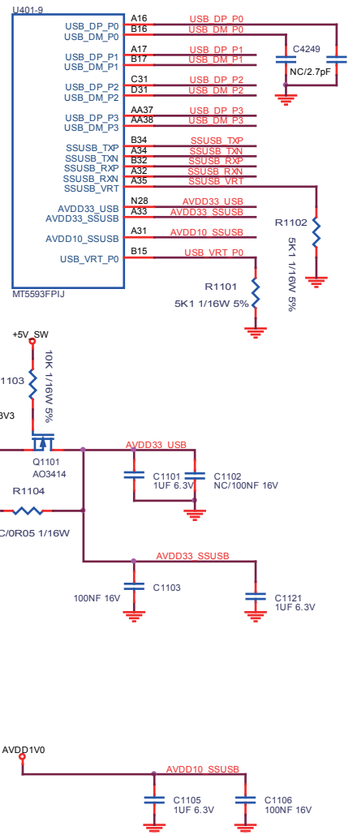
USB PORT 2



USB PORT 3







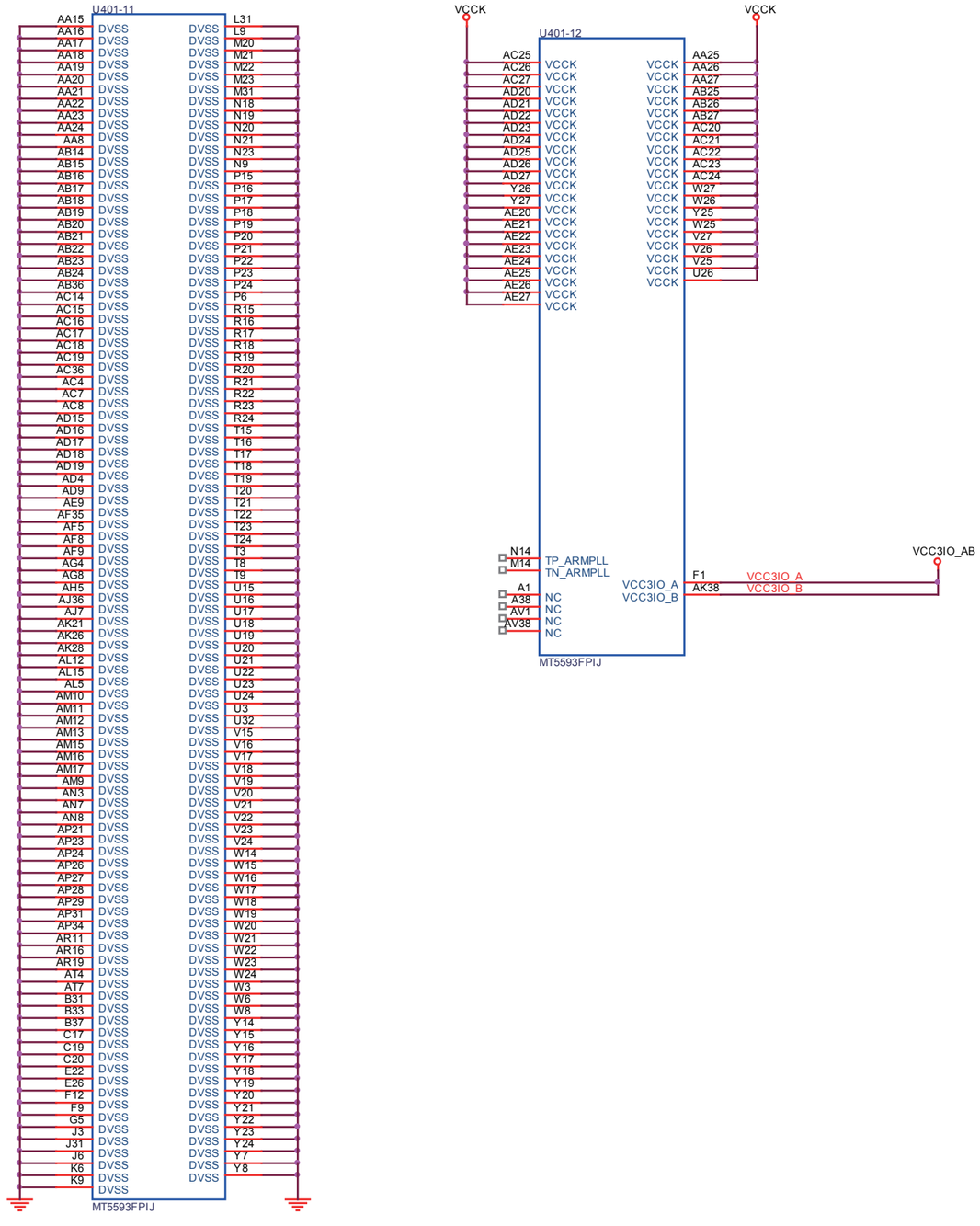
USB/ETHERNET PHY	715G7030	C 2015-1-26

19880_519.eps

10-6-15 VCCK & DVSS

B15 VCCK & DVSS

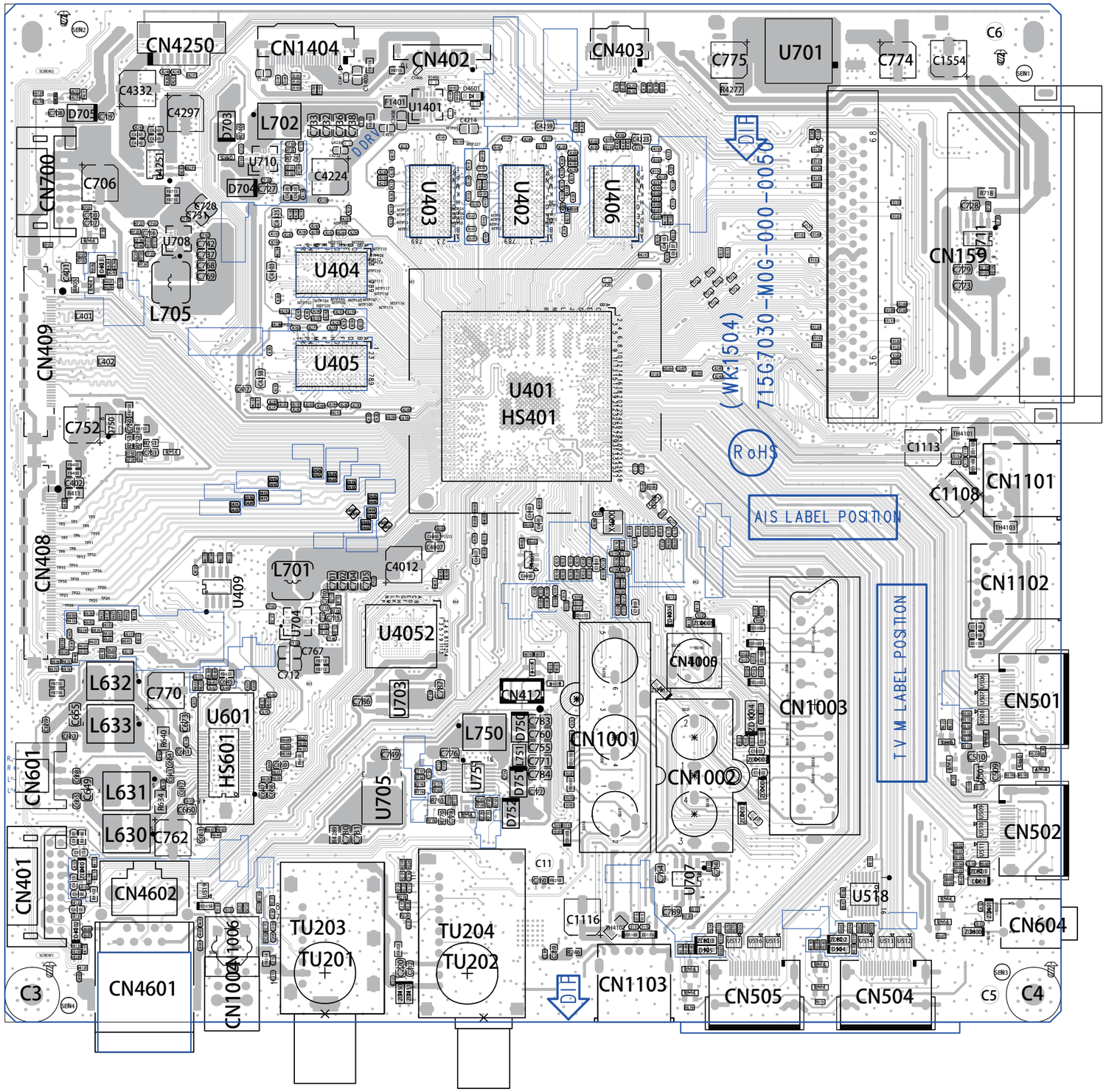
B15



VCCK & DVSS	715G7030	C 2015-1-26

19880_520.eps

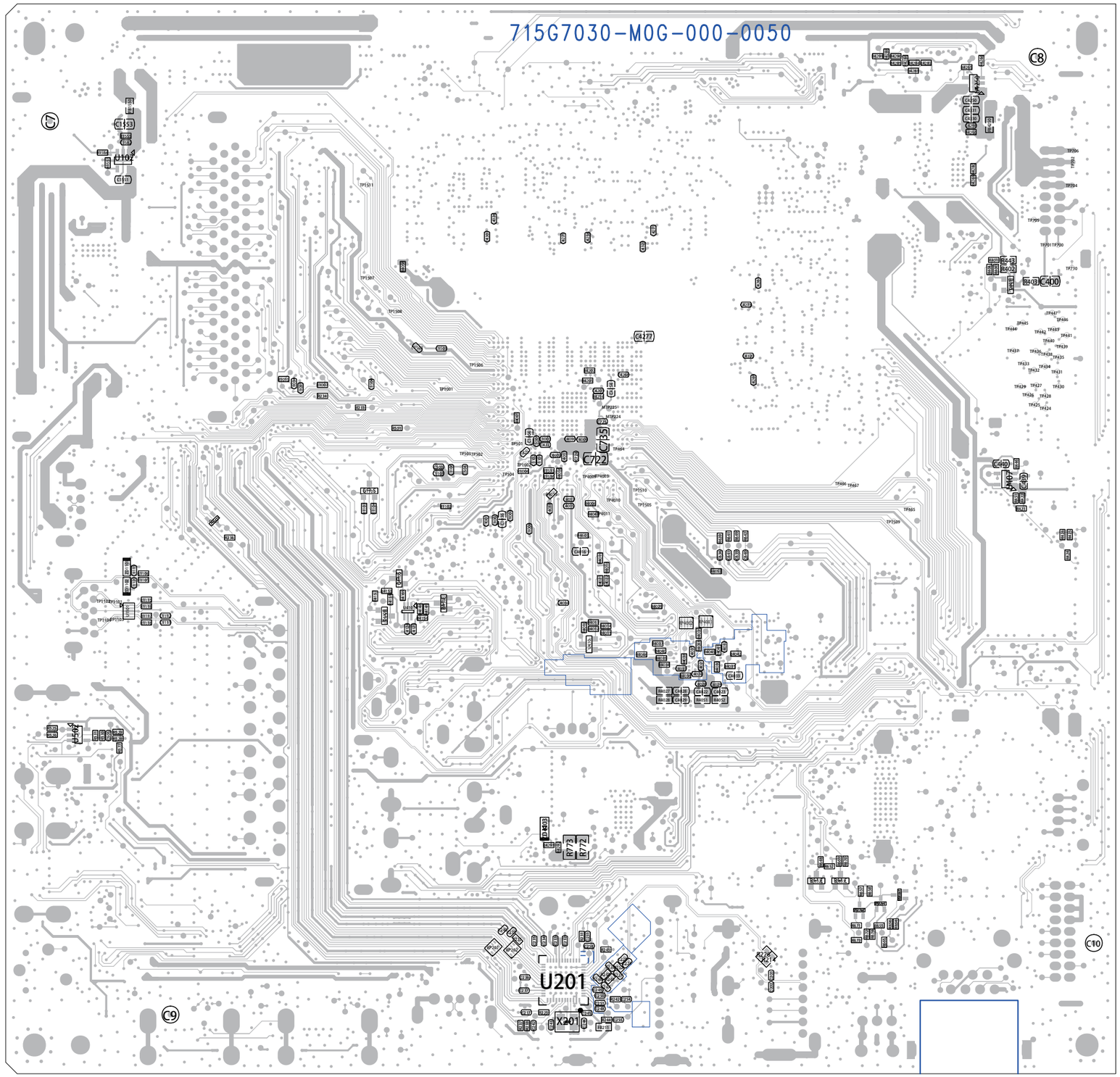
10-6-16 SSB layout top



LAYOUT TOP | 715G7030 | C 2015-01-23

19880_521.eps

10-6-17 SSB layout bottom



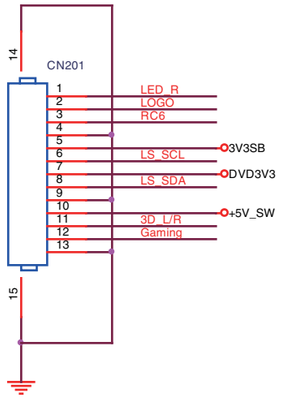
19880_522.eps

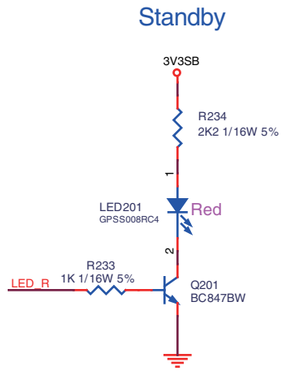
10.7 J 715G7074 IR/LED Panel
10-7-1 IR & 3D & Light sensor & LOGO

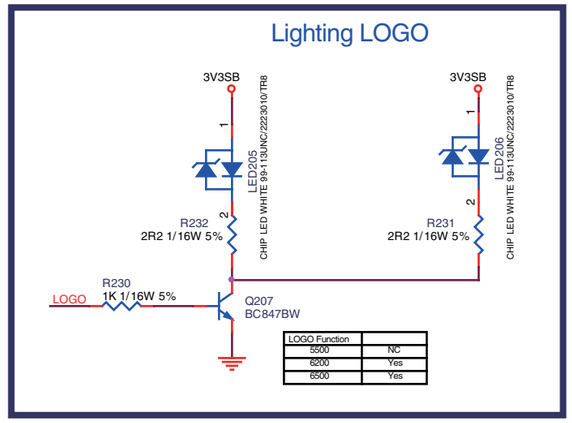
J

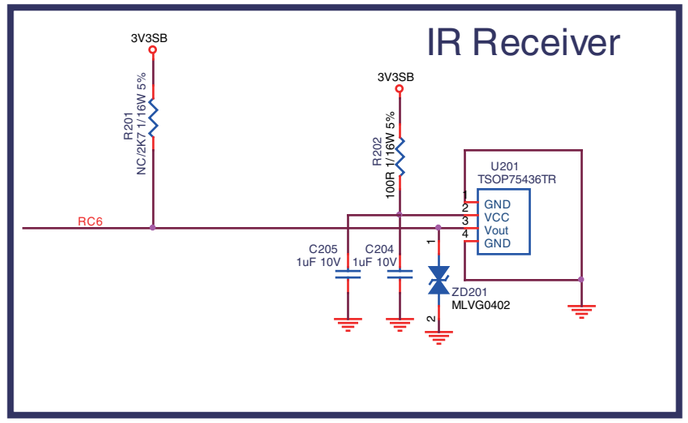
IR & 3D & Light sensor & LOGO

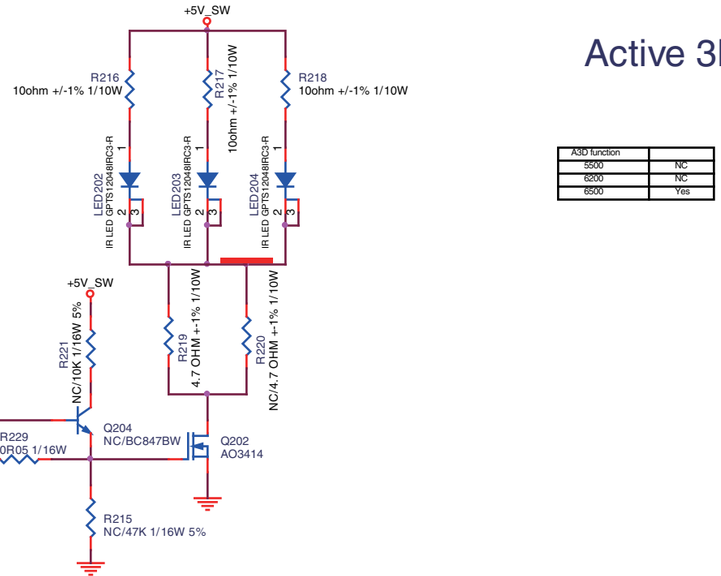
J









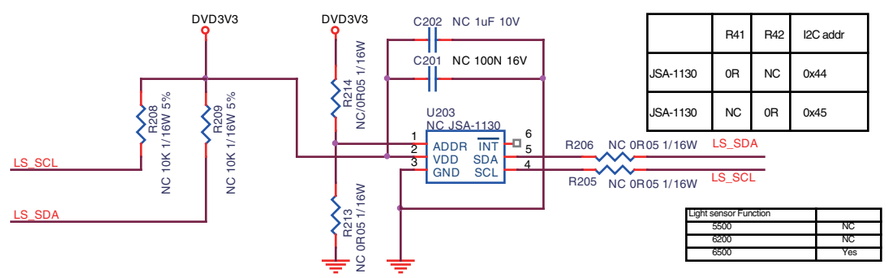


A3D function	
5500	NC
6200	NC
6500	Yes

Active 3D

A3D Control	I203	I204	I202
MTK 5593 Panel 100/120Hz]	NC	Yes	NC
PIC12F510-I/SN [Panel 50/60Hz]	Yes	NC	Yes

Light Sensor



	R41	R42	I2C addr
JSA-1130	0R	NC	0x44
JSA-1130	NC	0R	0x45

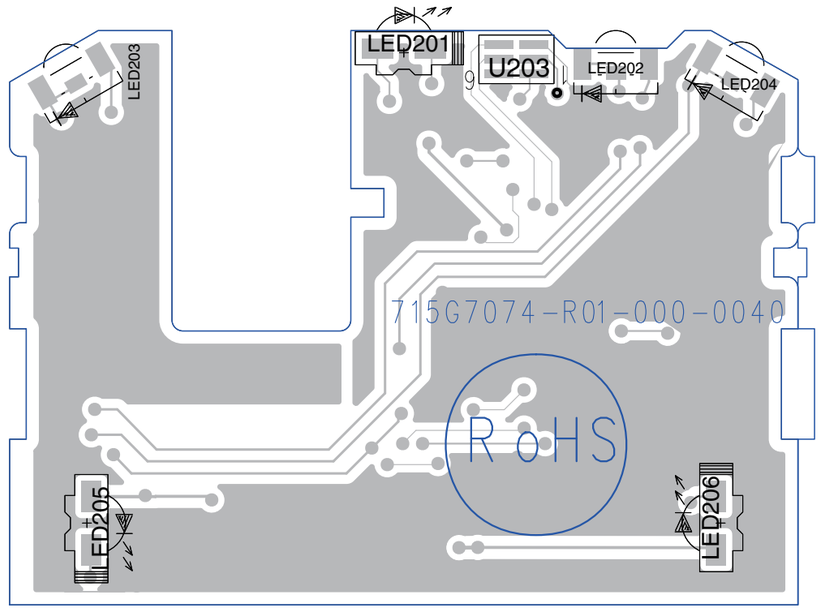
Light sensor Function	
5500	NC
6200	NC
6500	Yes

IR &3D&Light sensor&LOGO	715G7074	© 2014-09-30

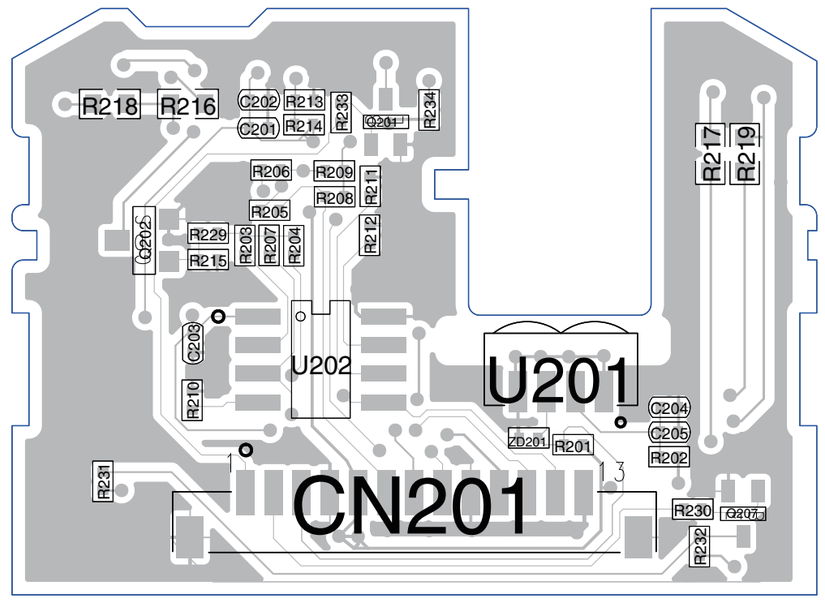
19850_526.eps

10-7-2 IR/LED board layout

Layout IR/LED panel (top side)



Layout IR/LED panel (bottom side)



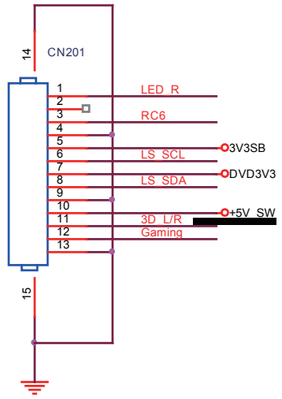
IR/LED panel layout top/bottom	715G7074

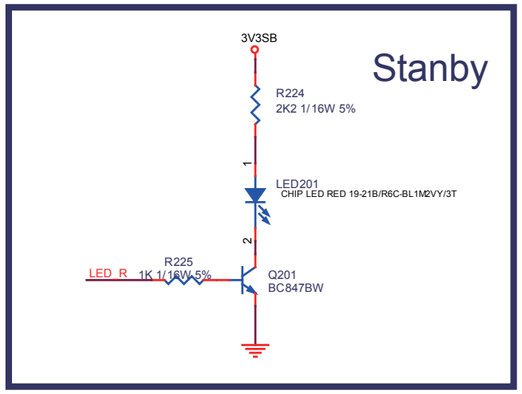
19850_527.eps

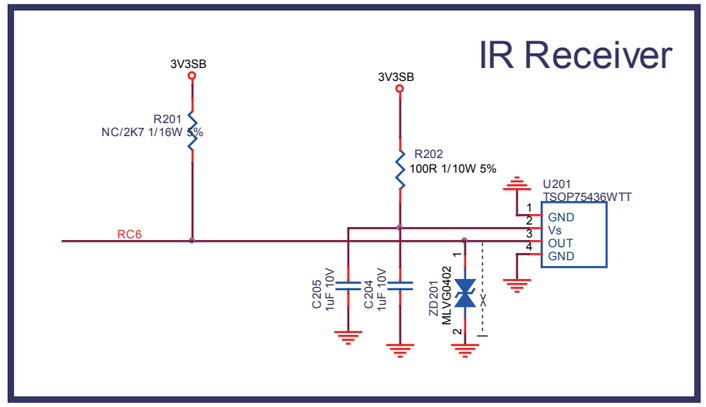
10.8 J 715G7045 IR/LED Panel

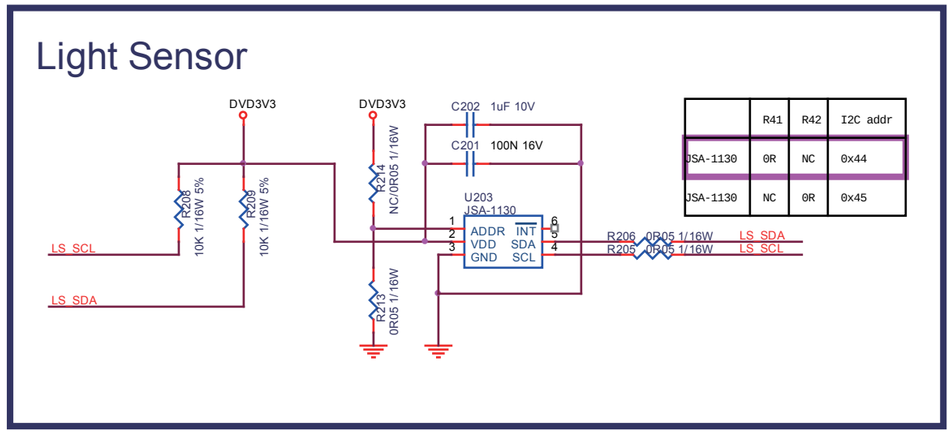
10-8-1 LED&IR&3D&Light sensor

J LED&IR&3D&Light sensor J





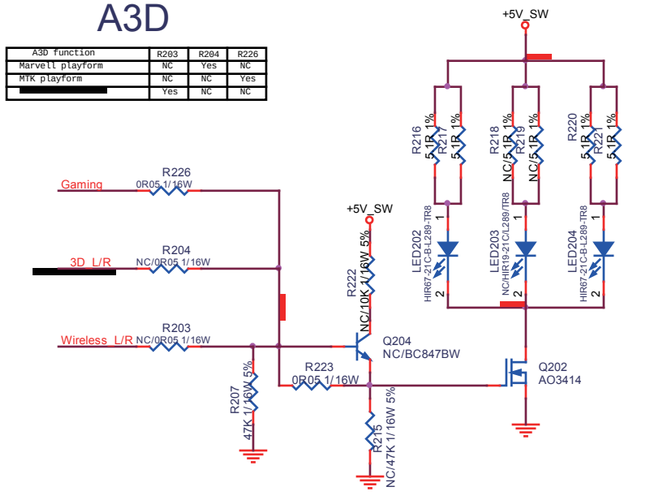




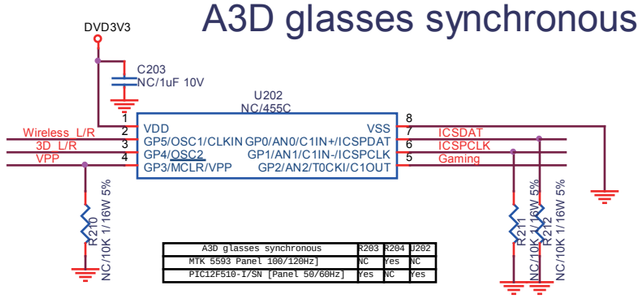
	R41	R42	I2C addr
JSA-1130	0R	NC	0x44
JSA-1130	NC	0R	0x45

A3D

A3D function	R203	R204	R226
Marvell playform	NC	Yes	NC
MTK playform	NC	NC	Yes
[redacted]	Yes	NC	NC



A3D glasses synchronous



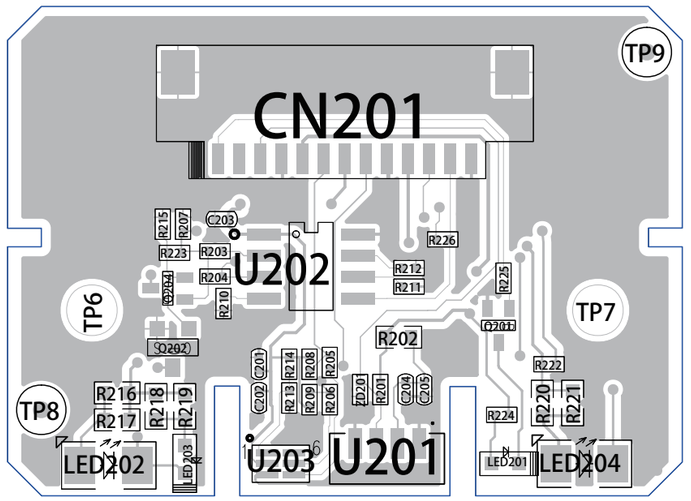
A3D glasses synchronous	R203	R204	U202
MTK 5593 Panel 100/120Hz]	NC	Yes	NC
PIC12F510-I/SN [Panel 50/60Hz]	Yes	NC	Yes

LED&IR&3D&Light sensor	715G7045	1 2014-11-01

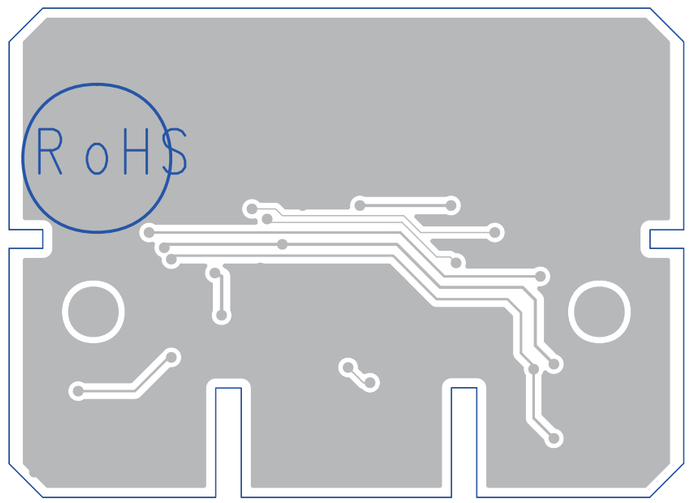
19792_508.eps

10-8-2 IR/LED board layout

Layout LED Board (top side)



Layout LED Board (bottom side)



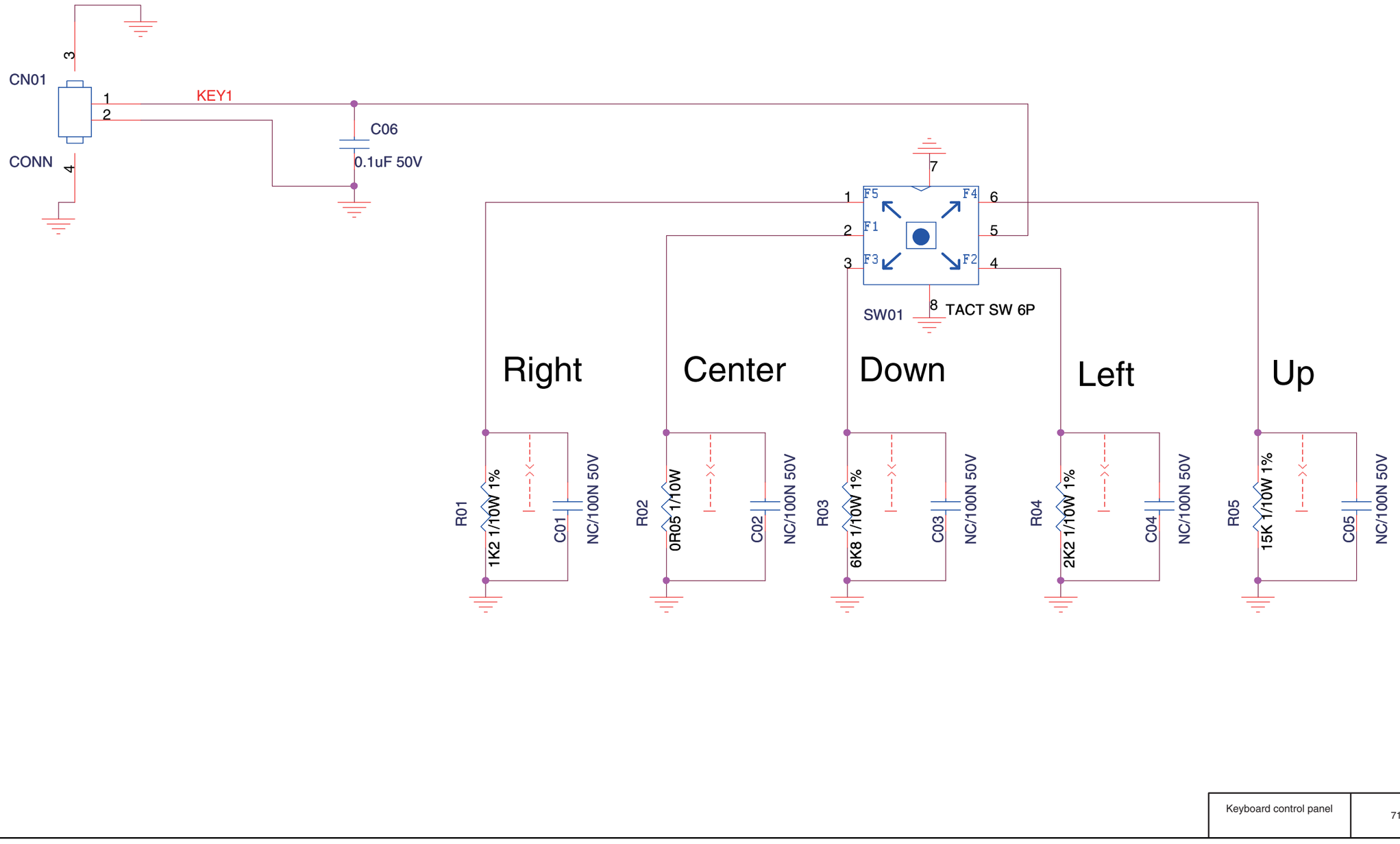
LED Board layout top/bottom	715G7045	1 2014-11-04

19792_509.eps

10.9 E 715G7088 Keyboard control panel

10-9-1 Key

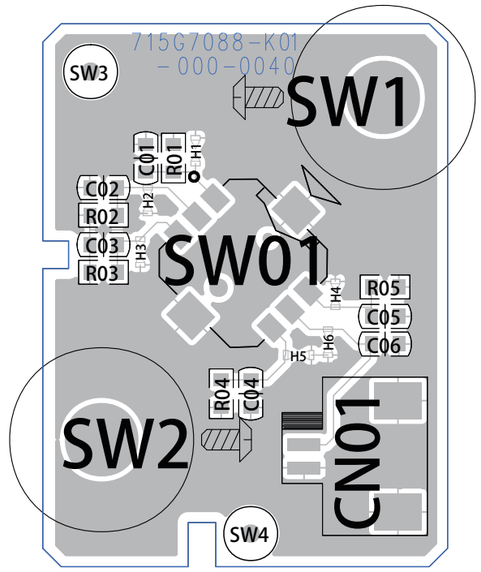
E Key



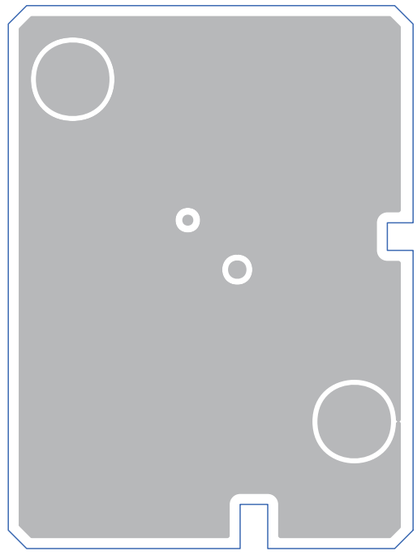
19791_502.eps

10-9-2 Key board layout

Layout Keyboard control panel (top side)



Layout Keyboard control panel (bottom side)



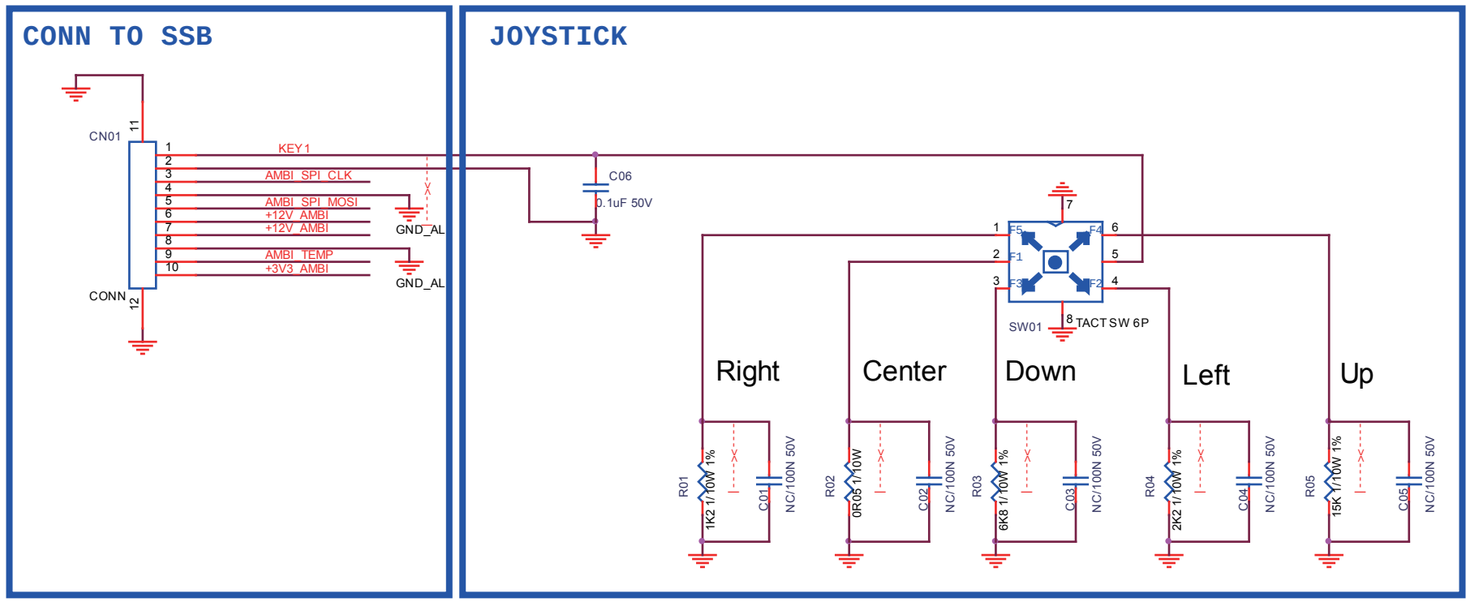
Keyboard control panel layout top/bottom	715G7088	1 2014-06-06

19791_503.eps

10.10 E 715G7118 Keyboard control panel

10-10-1 Key

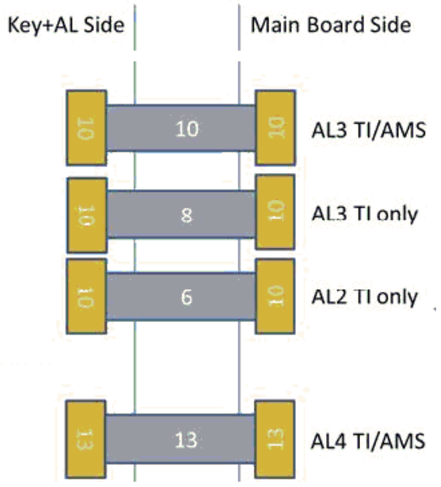
E Key

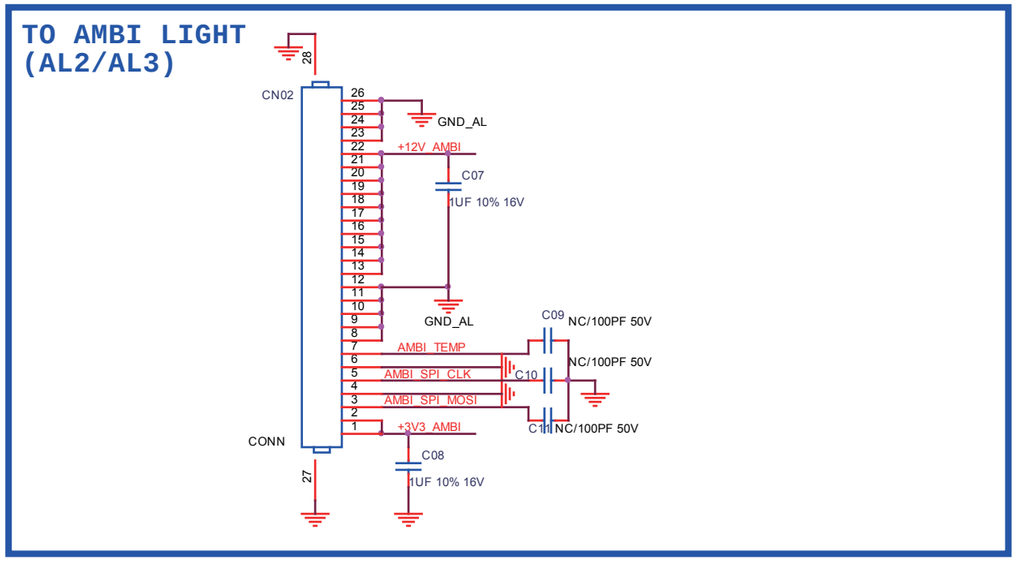


Direction	switch	Key function	Resistance	Voltage
Center	2-5 short	Menu	0R	0V
Right	1-5 short	CH+	1K2	0.5V
Left	4-5 short	CH-	2K2	0.81V
Down	3-5 short	VOL-	6K8	1.65V
Up	6-5 short	VOL+	15K	2.27V
		No function		3.3V

Joystick circuit diagram

	pin1	pin2	pin3	pin4	pin5	pin6
F1		o			o	
F2				o	o	
F3			o		o	
F4					o	o
F5	o				o	



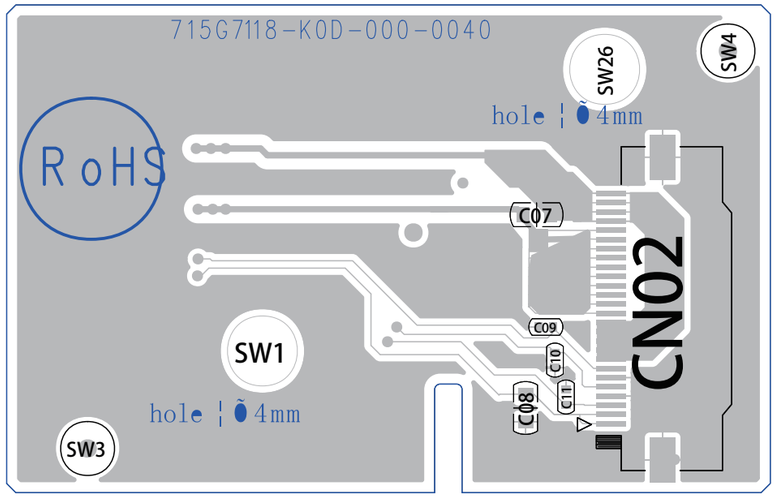


KEY	715G7118	1 2014-08-26

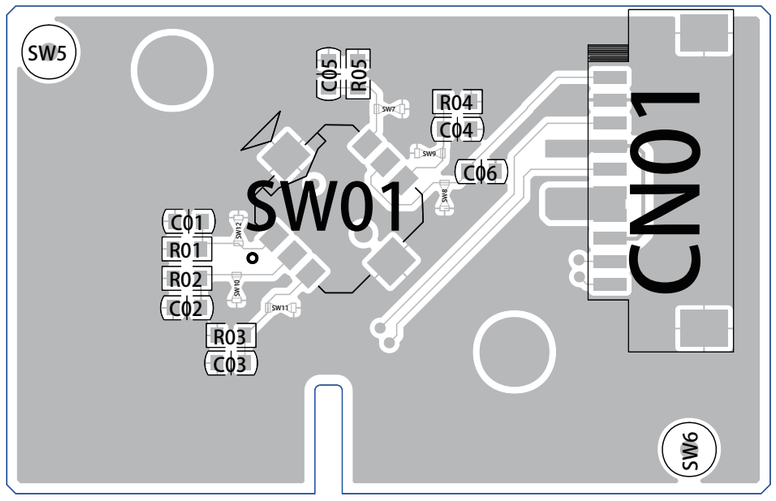
19792_510.eps

10-10-2 Key board layout

Layout Keyboard control panel (top side)



Layout Keyboard control panel (bottom side)



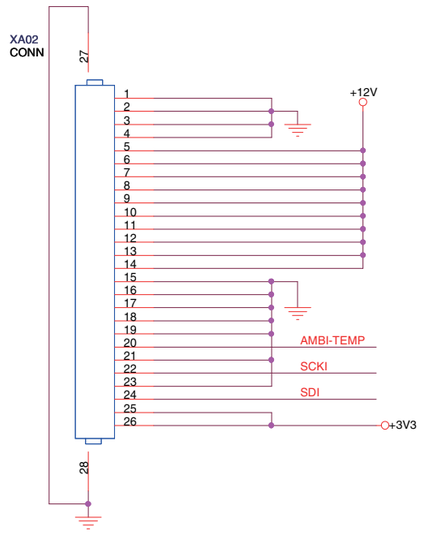
Keyboard control panel layout top/bottom	715G7118	1 2014-11-06

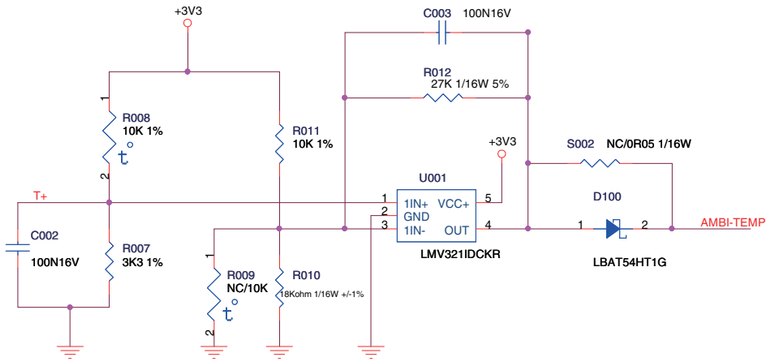
19792_511.eps

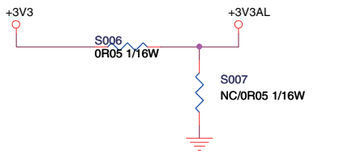
10.11 AL 715G7035 Ambilight Board

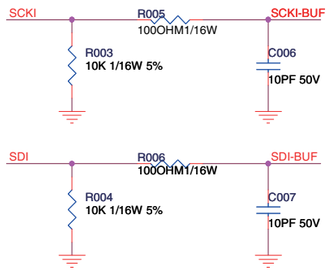
10-11-1 TCL5971

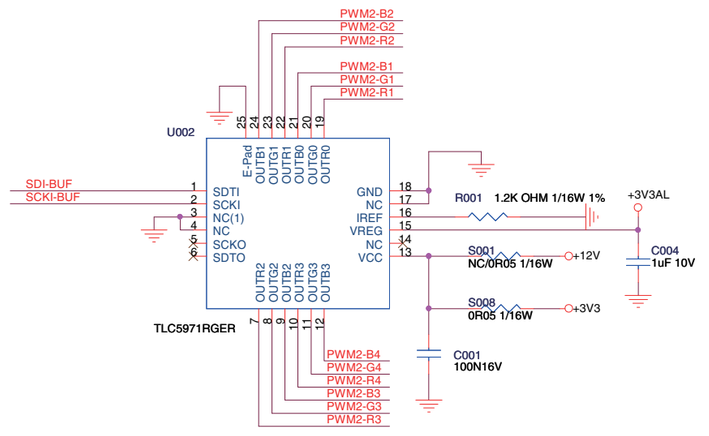
AL01 TCL5971 **AL01**

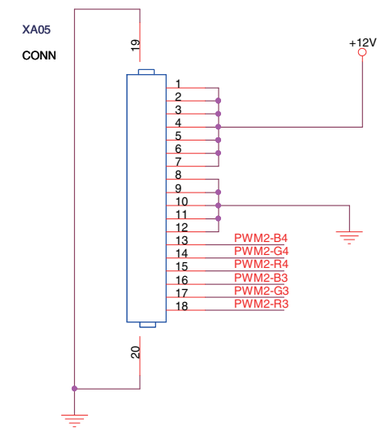


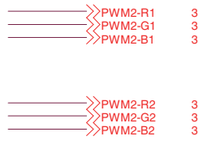


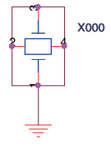


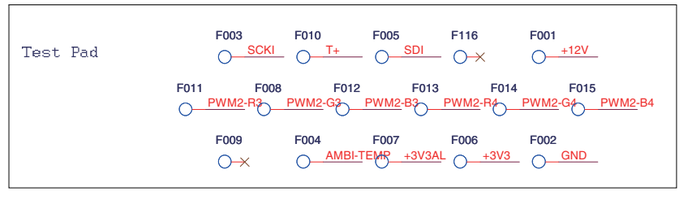












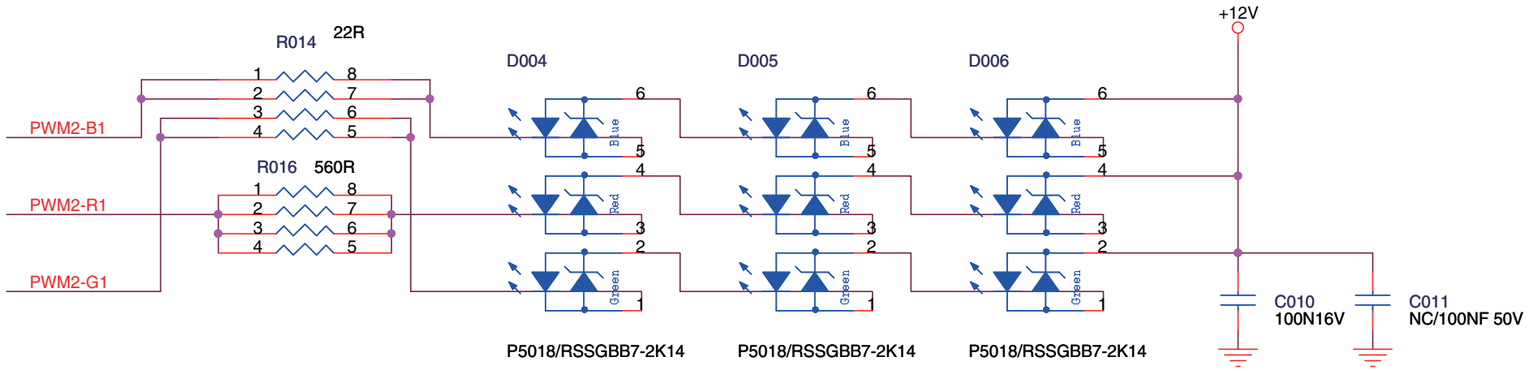
TCL5971	715G7035	2014-05-07

19792_514.eps

10-11-2 Ambilight 6-LED Master Clockwise

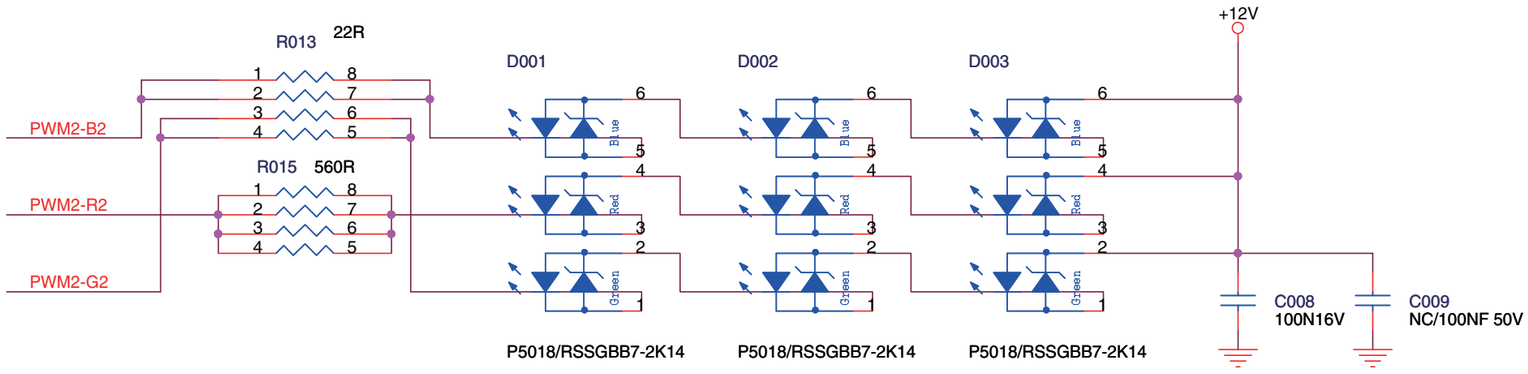
AL02 Ambilight 6-LED Master Clockwise

AL02



PWM2-R1 2
PWM2-G1 2
PWM2-B1 2

PWM2-R2 2
PWM2-G2 2
PWM2-B2 2

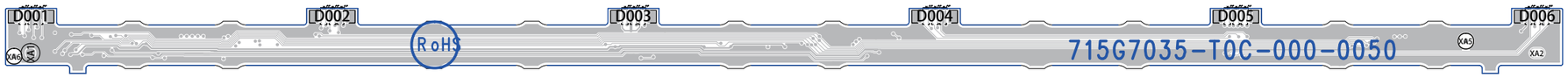


Ambilight 6-LED Master Clockwise	715G7035	2014-05-07

19792_515.eps

10-11-3 Ambilight Board layout

Layout Amblilight Board (top side)



Layout Amblilight Board (bottom side)

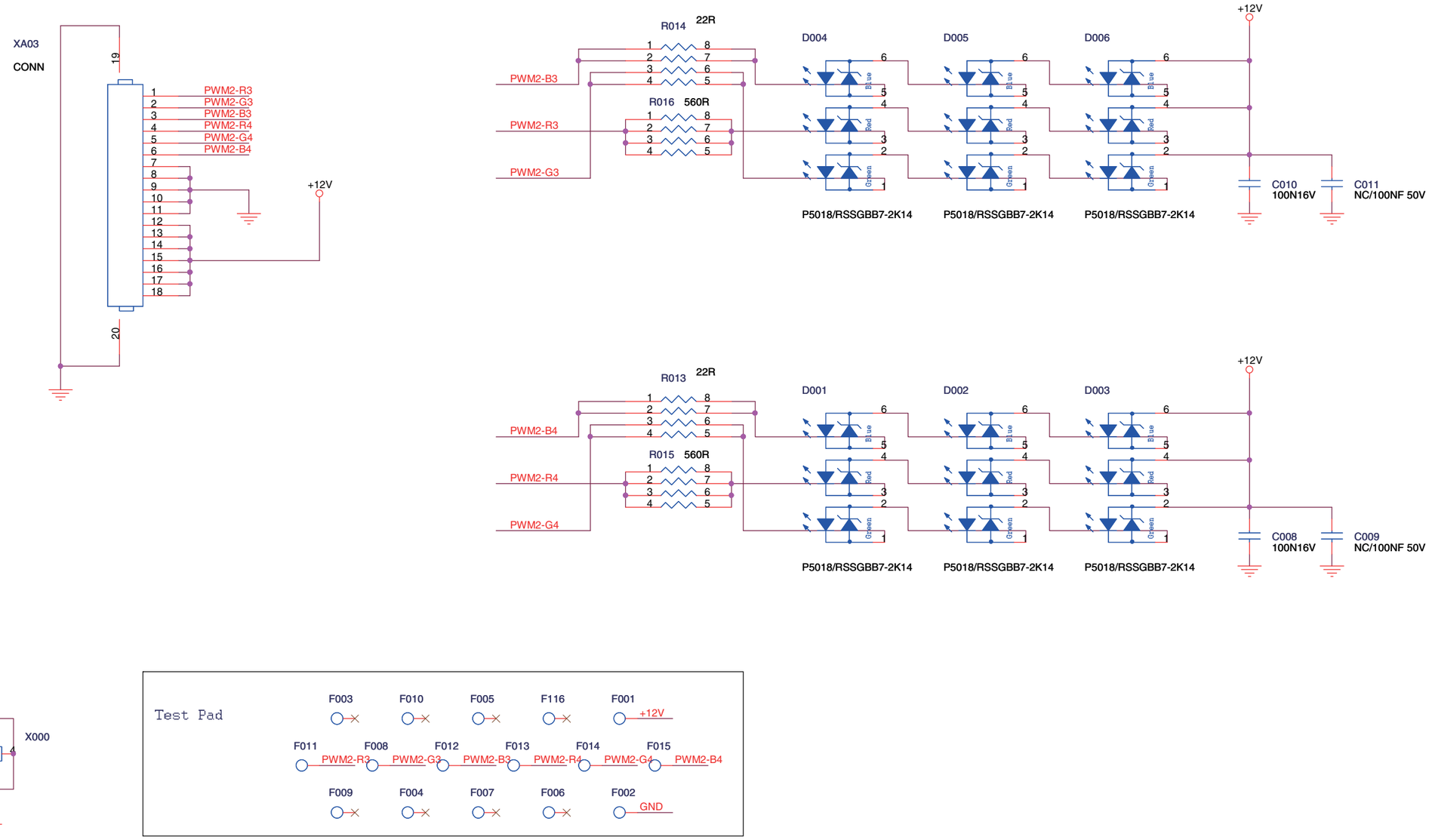
Ambilight Board layout top/bottom	715G7035	1 2014-04-28

19792_516.eps

10.12 AL 715G7036 Amiblight Board

10-12-1 Ambilight 6-LED Slave Clockwise

AL Ambilight 6-LED Slave Clockwise **AL**

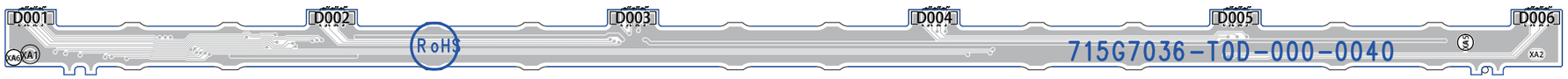


Ambilight 6-LED Slave Clockwise	715G7036	2014-05-07

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

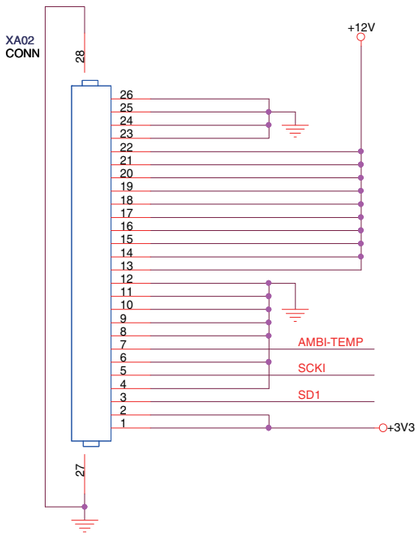
19792_518.eps

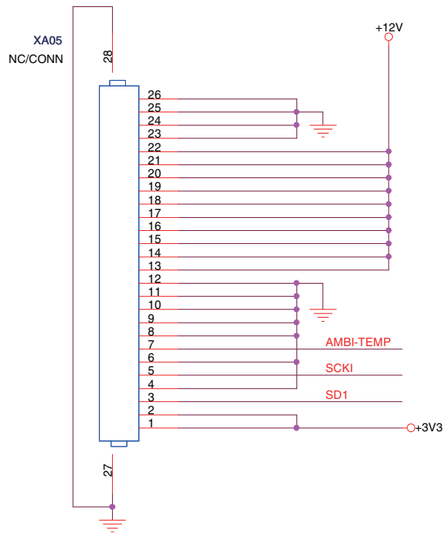
10.13 AL 715G6981 Ambilight Board

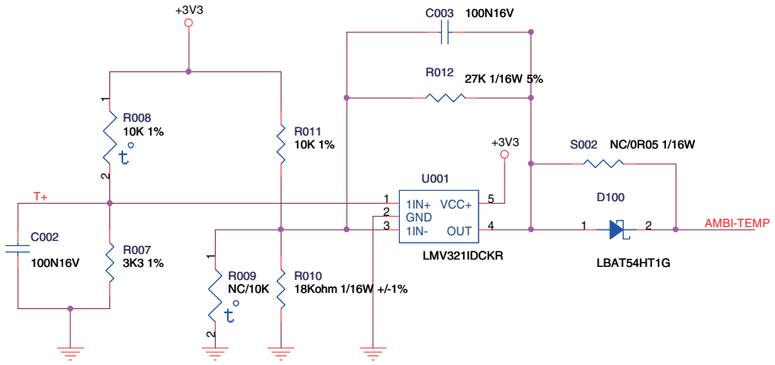
10-13-1 TCL5971

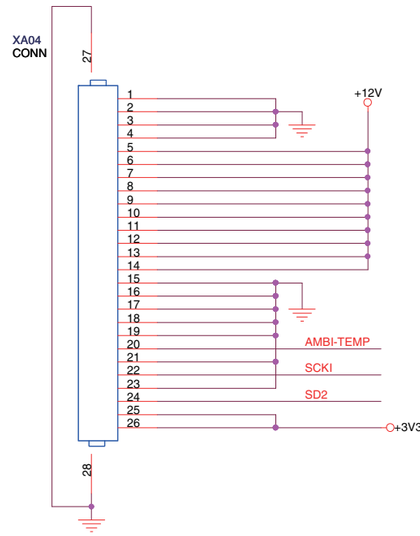
AL01 TCL5971

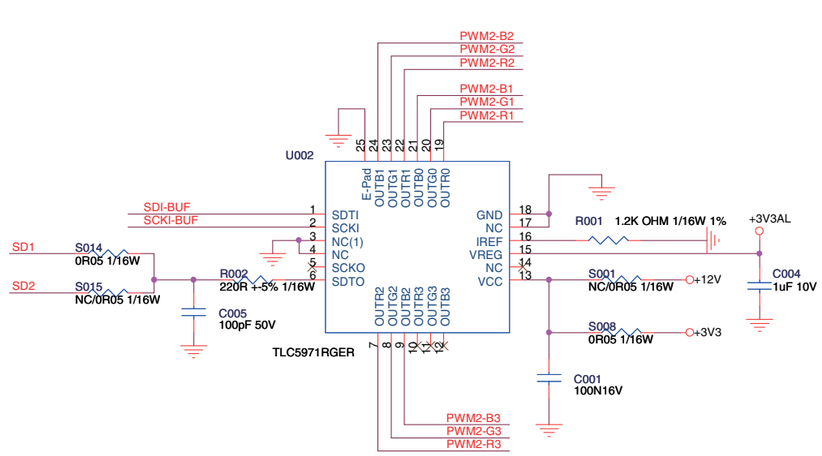
AL01



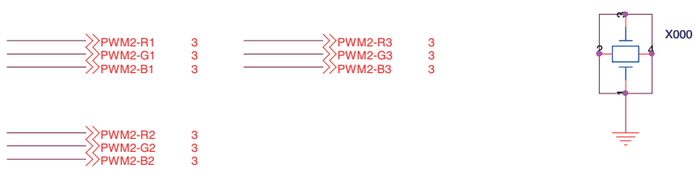


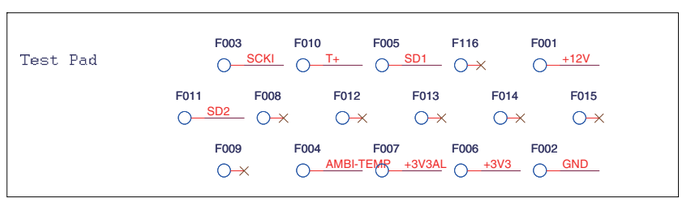






Item / Function	S012	S013	S014	S015
CounterClockwise (XA02:IN, XA04:OUT)	YES	NO	NO	YES
Clockwise (XA02:OUT, XA04:IN)	NO	YES	YES	NO





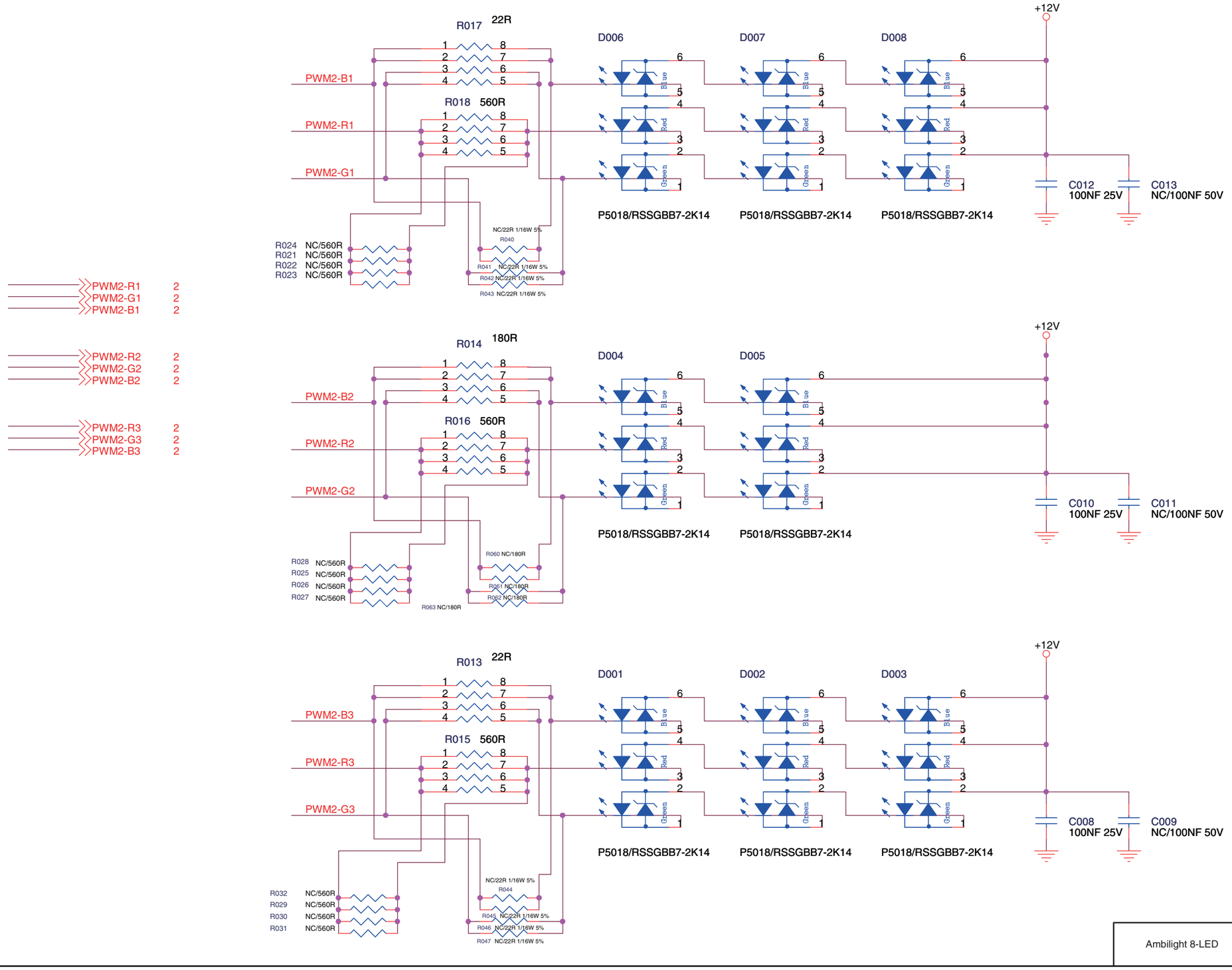
TCL5971	715G6981	2014-06-04

19792_522.eps

10-13-2 Ambilight 8-LED

AL02 Ambilight 8-LED

AL02



Ambilight 8-LED	715G6981	2014-05-07

19792_523.eps

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

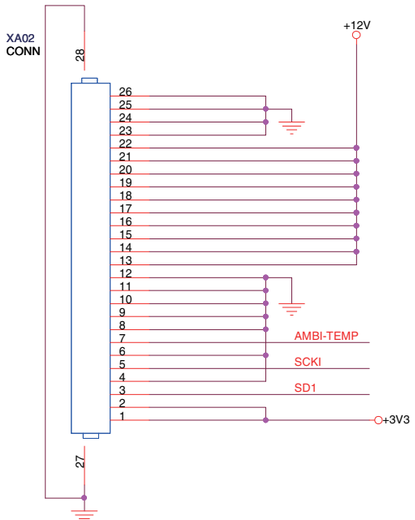
19792_524.eps

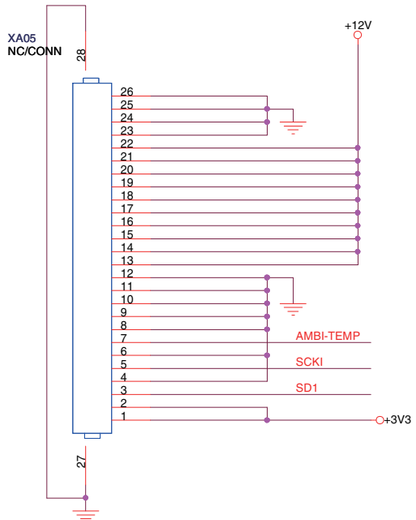
10.14 AL 715G7004 Ambilight Board

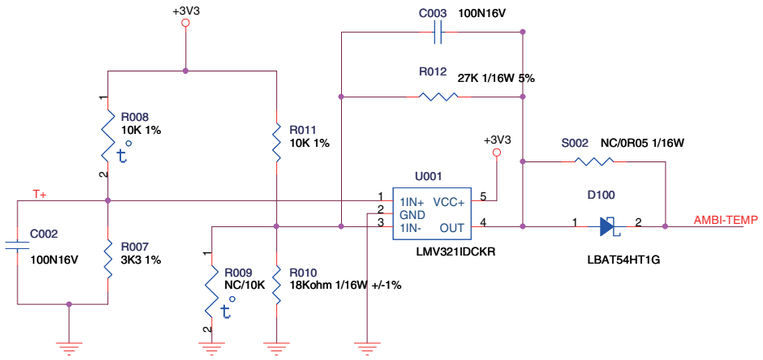
10-14-1 TCL5971

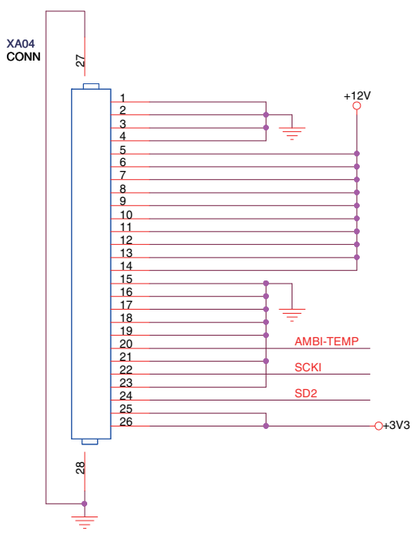
AL01 TCL5971

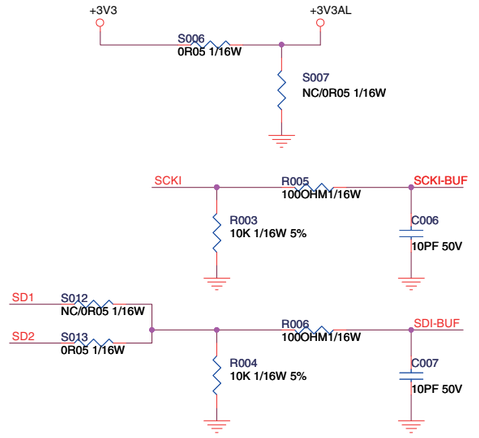
AL01

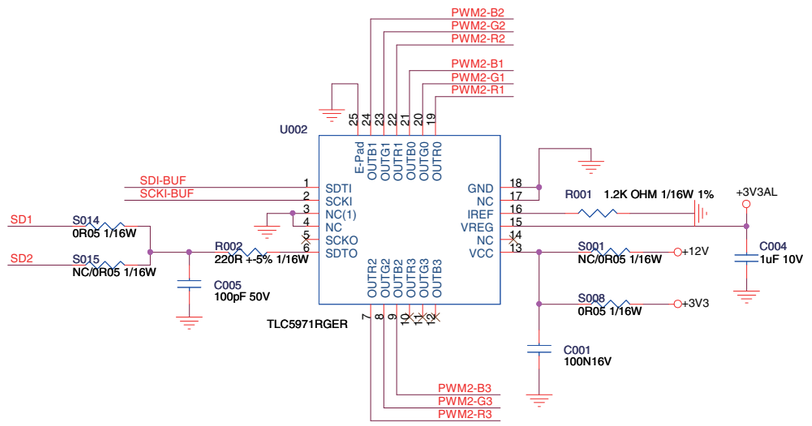


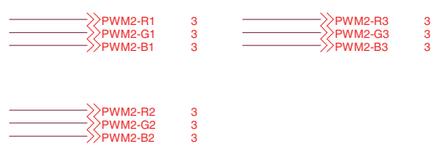


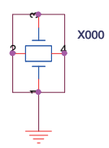


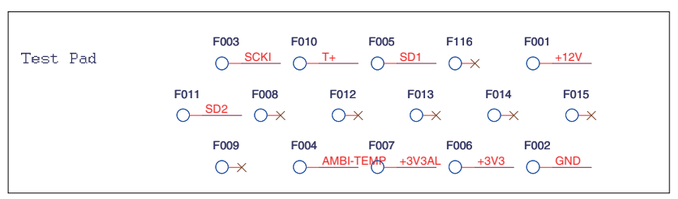












Item / Function	S012	S013	S014	S015
CounterClockwise (XA02:IN, XA04:OUT)	YES	NO	NO	YES
Clockwise (XA02:OUT, XA04:IN)	NO	YES	YES	NO

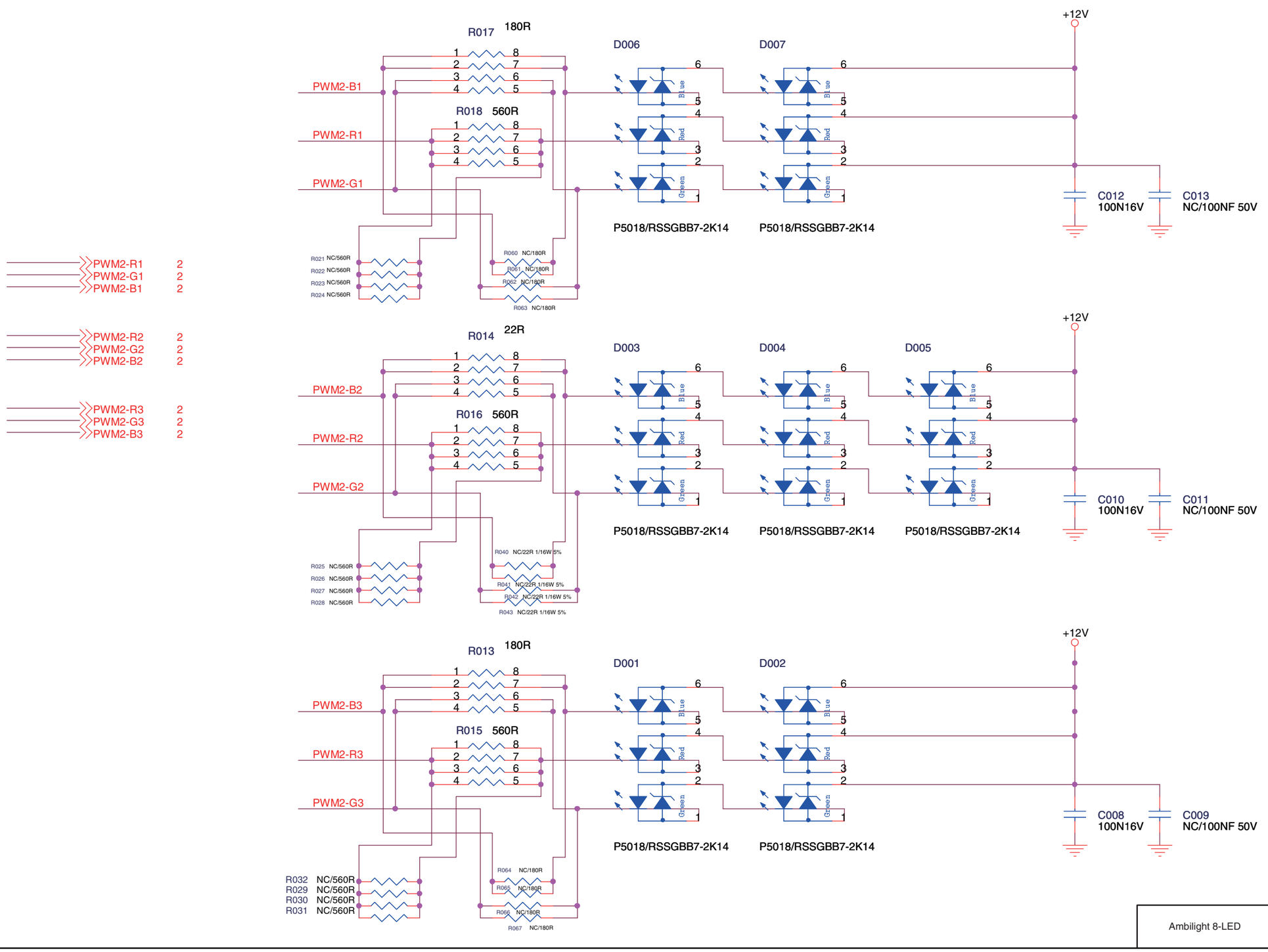
TCL5971	715G7004	2014-06-04

19792_519.eps

10-14-2 Ambilight 8-LED

AL02 Ambilight 8-LED

AL02

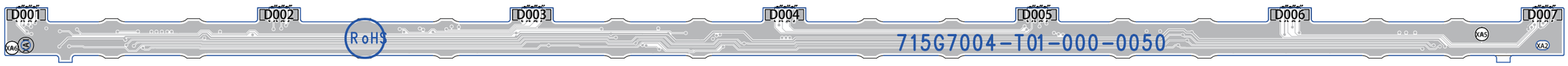


Ambilight 8-LED	715G7004	2014-07-07

19792_520.eps

10-14-3 Ambilight Board layout

Layout Ambilight Board (top side)



Layout Ambilight Board (bottom side)

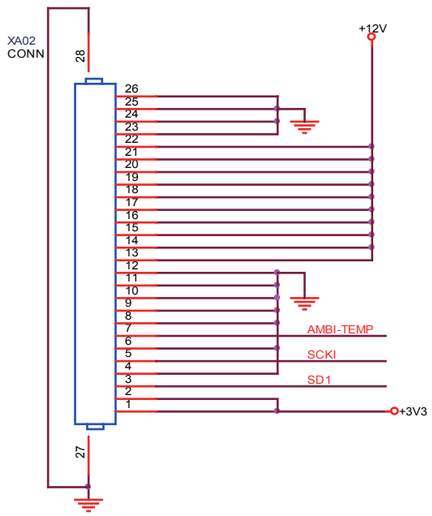
Ambilight Board layout top/bottom	715G7004	1 2014-10-01

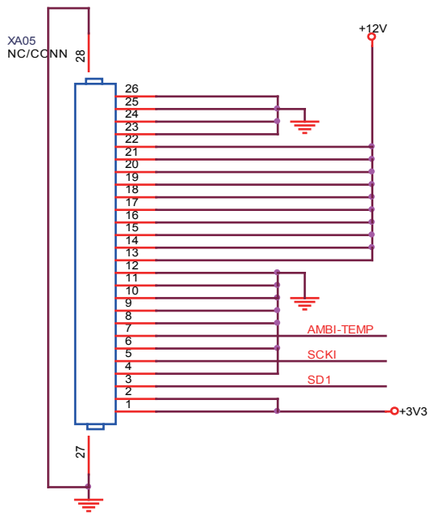
19792_521.eps

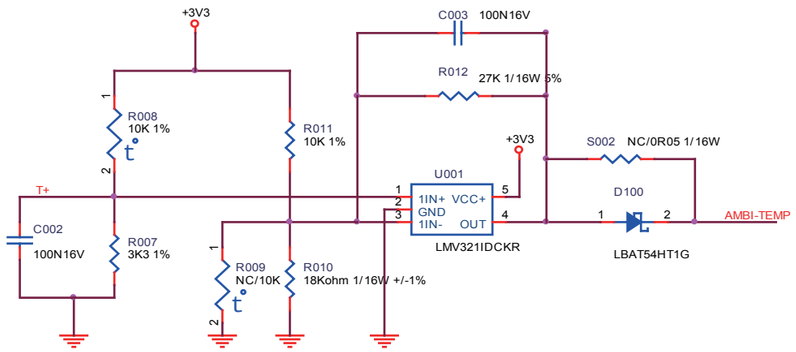
10.15 AL 715G7006 Ambilight Board

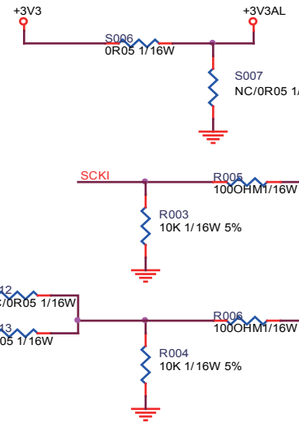
10-15-1 TLC5971

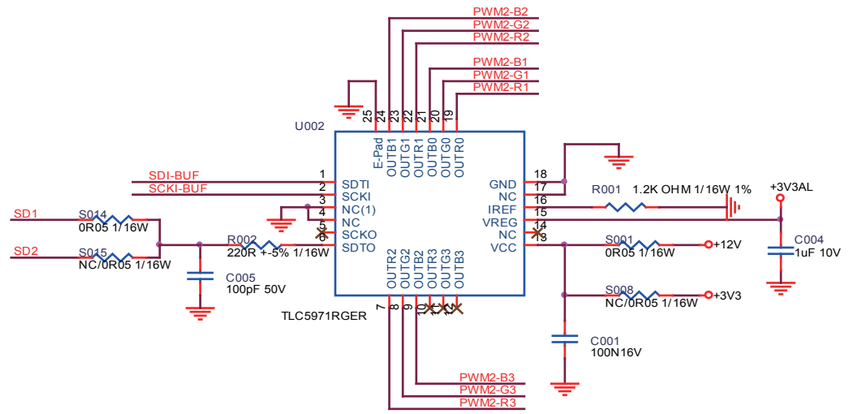
AL01 TLC5971 **AL01**

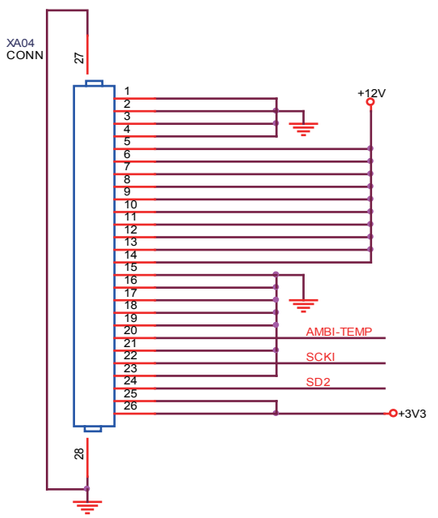




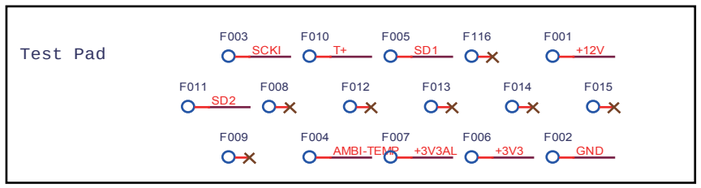








Item / Function	S012	S013	S014	S015
CounterClockwise (XA02:IN, XA04:OUT)	YES	NO	NO	YES
Clockwise (XA02:OUT, XA04:IN)	NO	YES	YES	NO



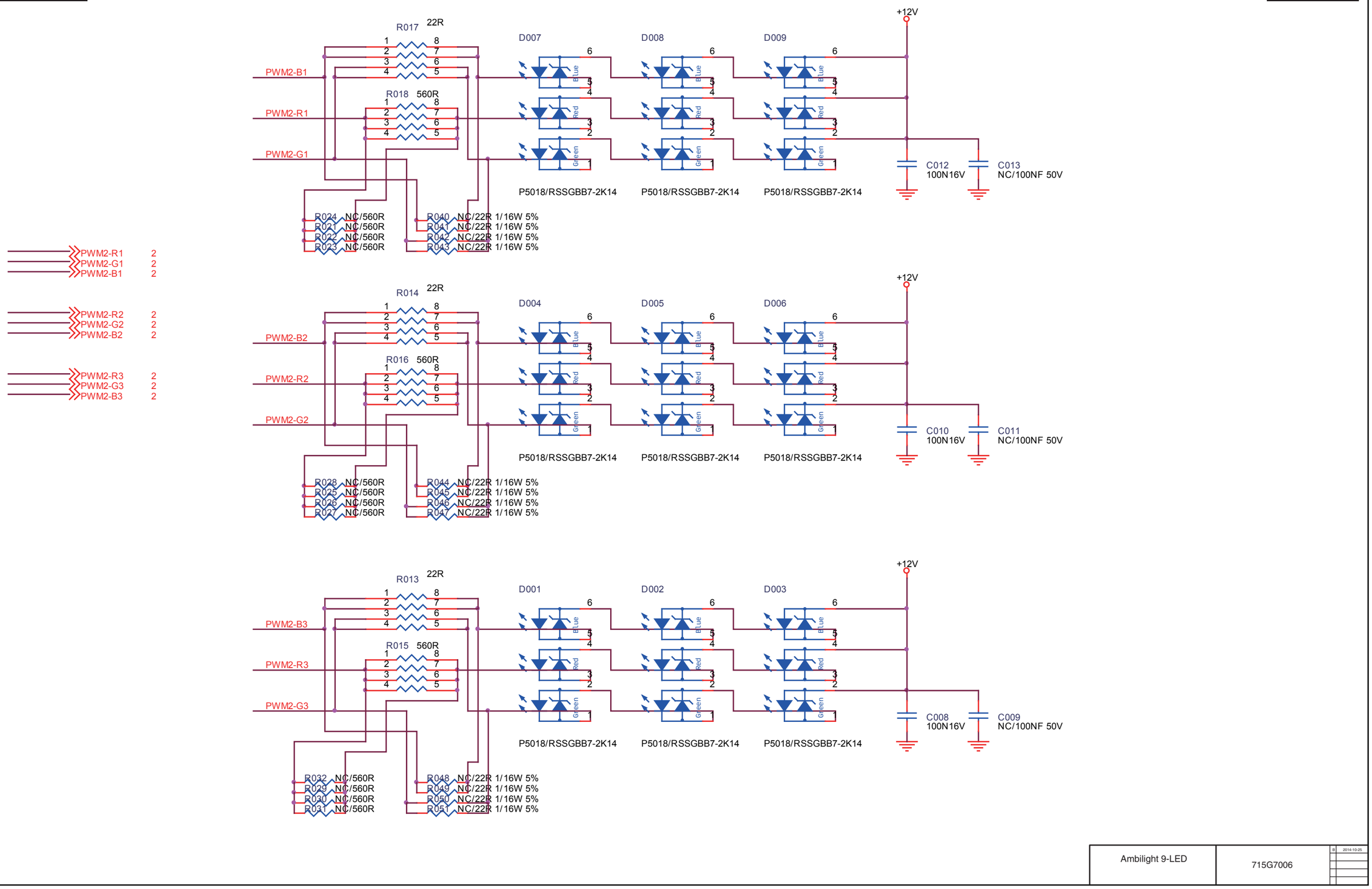
TLC5971	715G7006	2014-10-25

19810_561.eps

10-15-2 Ambilight 9-LED

AL02 Ambilight 9-LED

AL02



Ambilight 9-LED	715G7006	B 2014-10-28

19810_562.eps

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

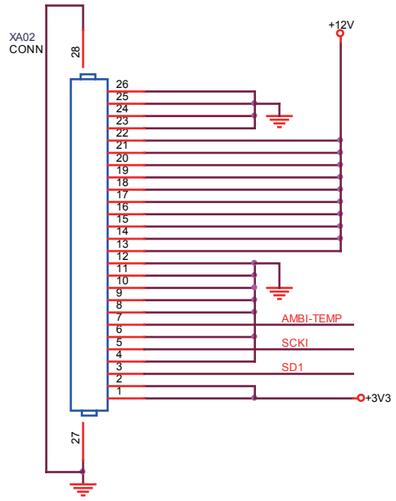
19810_563.eps

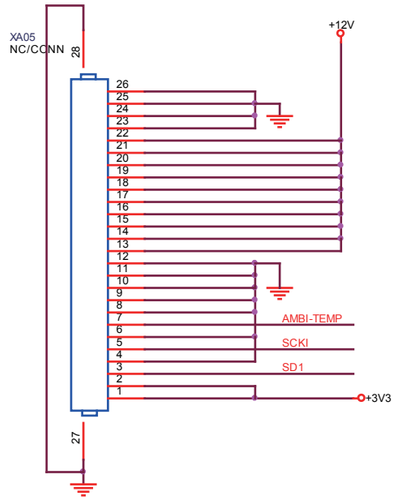
10.16 AL 715G7007 Ambilight Board

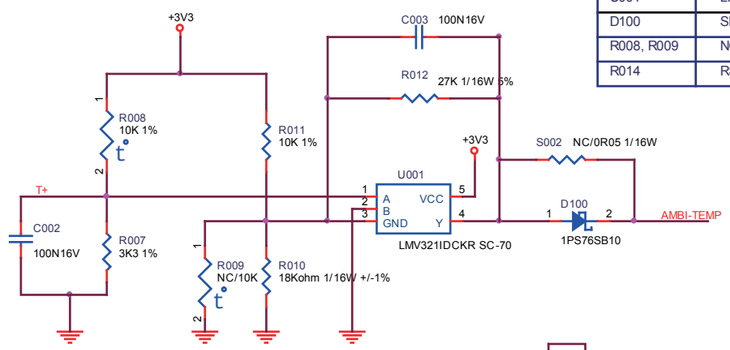
10-16-1 TCL5971

AL01 TLC5971

AL01

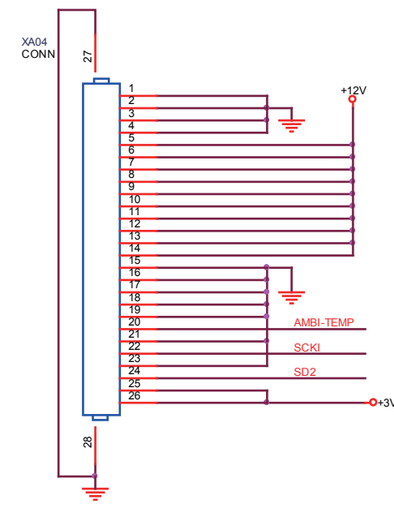


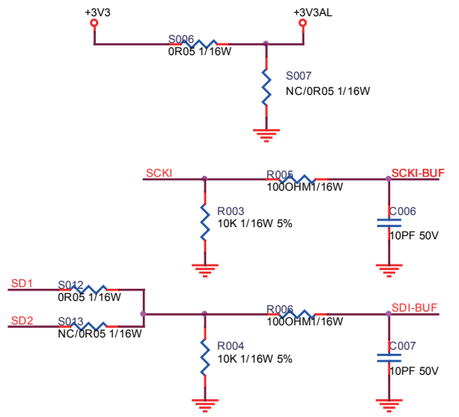


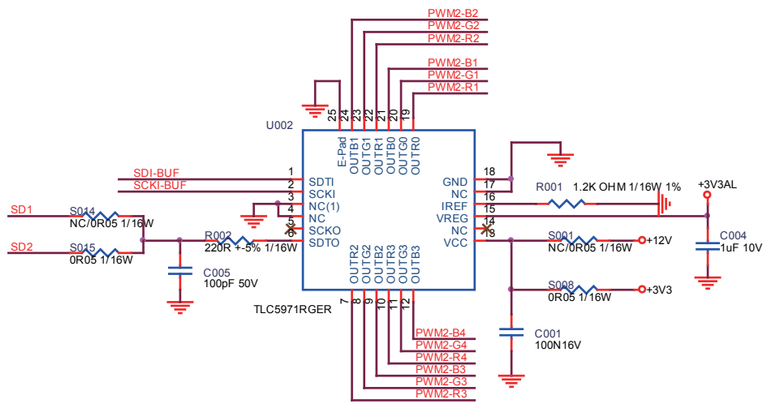


TPVision used part only, not TPV AVL

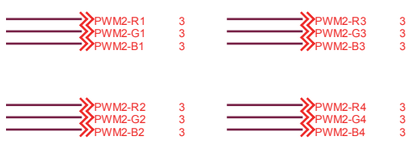
Reference	Description	Part ID
U001	LMV321IDCKR	356G0192005600
D100	Shottky BAT54WS	393R060S03000002TP
R008, R009	NCP15XH103F03RC	361G0054103AFM
R014	RSTNET 180R 5%	361R01261818J000TP

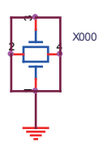


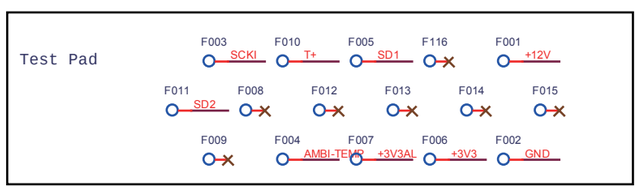




Item / Function	S012	S013	S014	S015
CounterClockwise (XA02:IN, XA04:OUT)	YES	NO	NO	YES
Clockwise (XA02:OUT, XA04:IN)	NO	YES	YES	NO







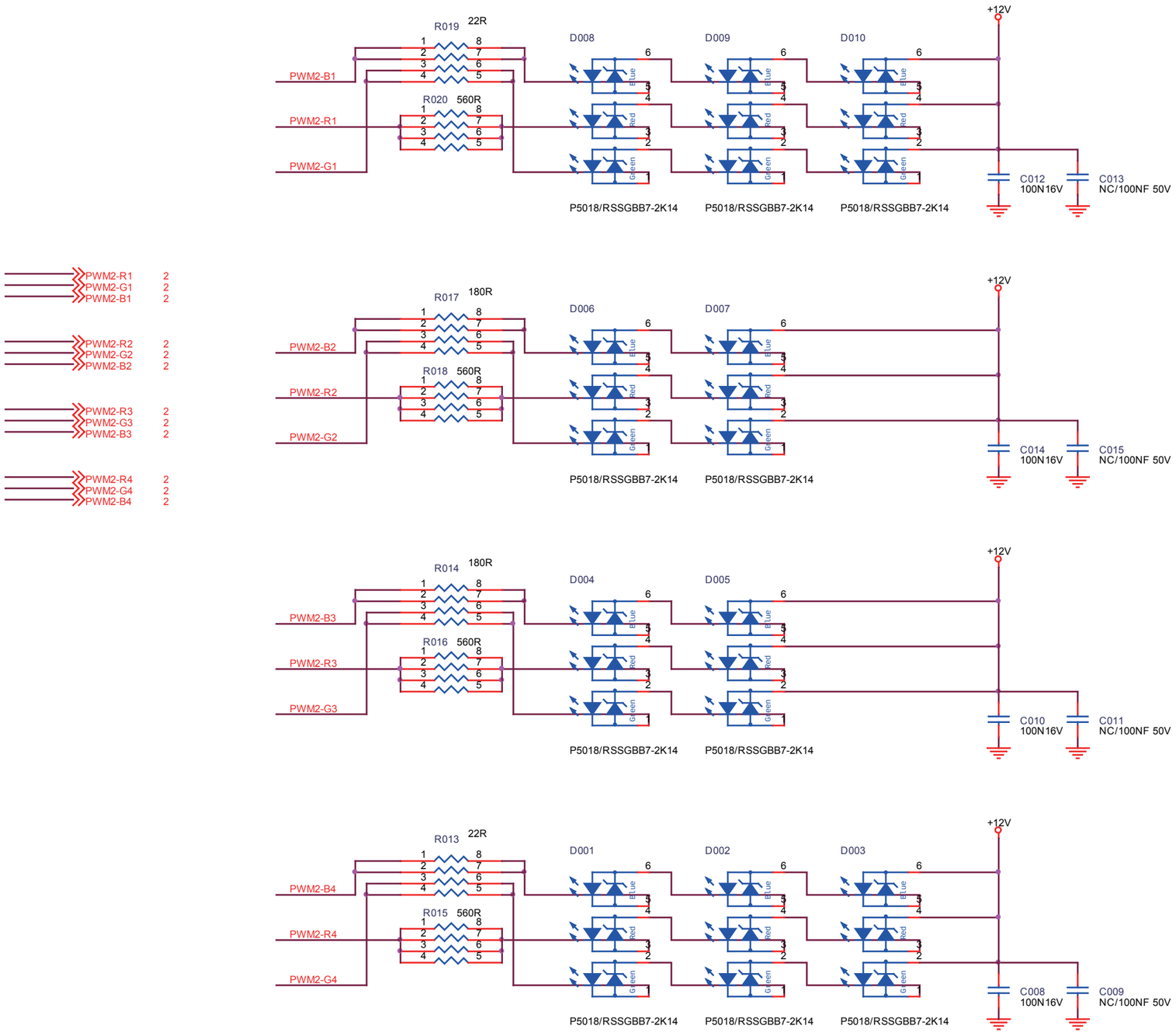
TLC5971	715G7007	2014-04-02

19810_564.eps

10-16-2 Ambilight 10-LED

AL02 Ambilight 10-LED

AL02



Ambilight 10-LED	715G7007	2014-04-01

19810_565.eps

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

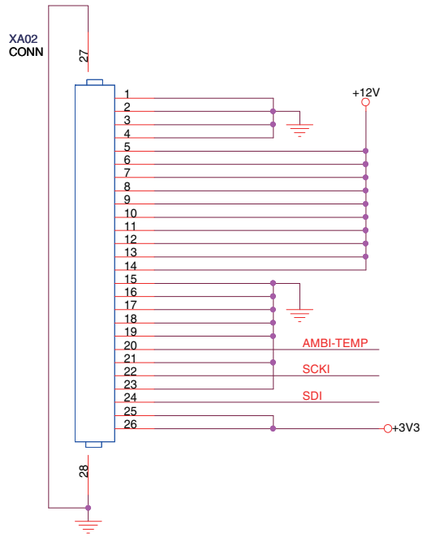
19810_566.eps

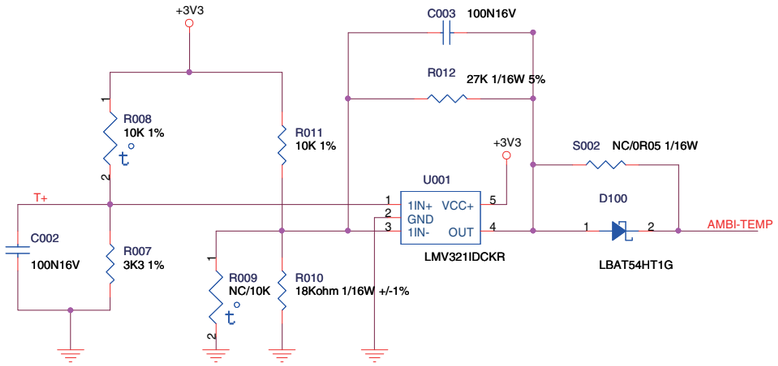
10.17 AL 715G7037 Ambilight Board

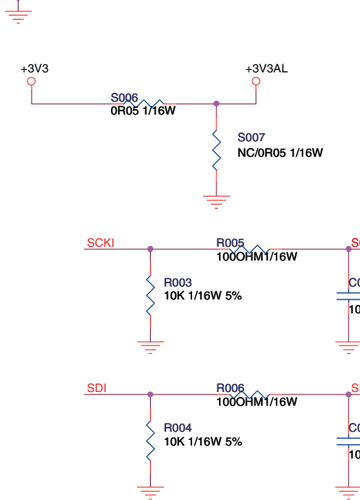
10-17-1 TCL5971

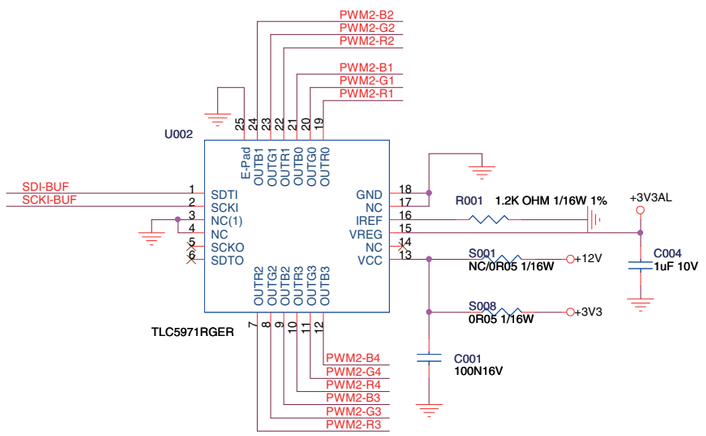
AL01 TCL5971

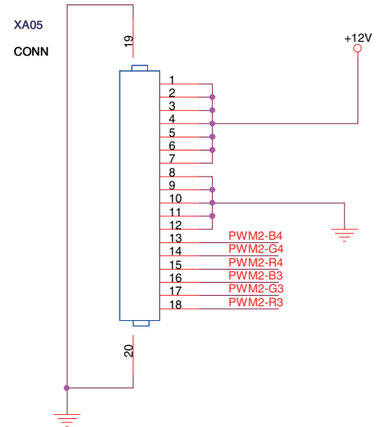
AL01

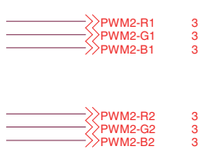


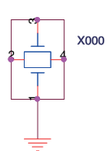


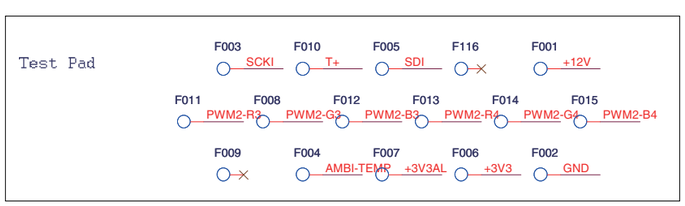












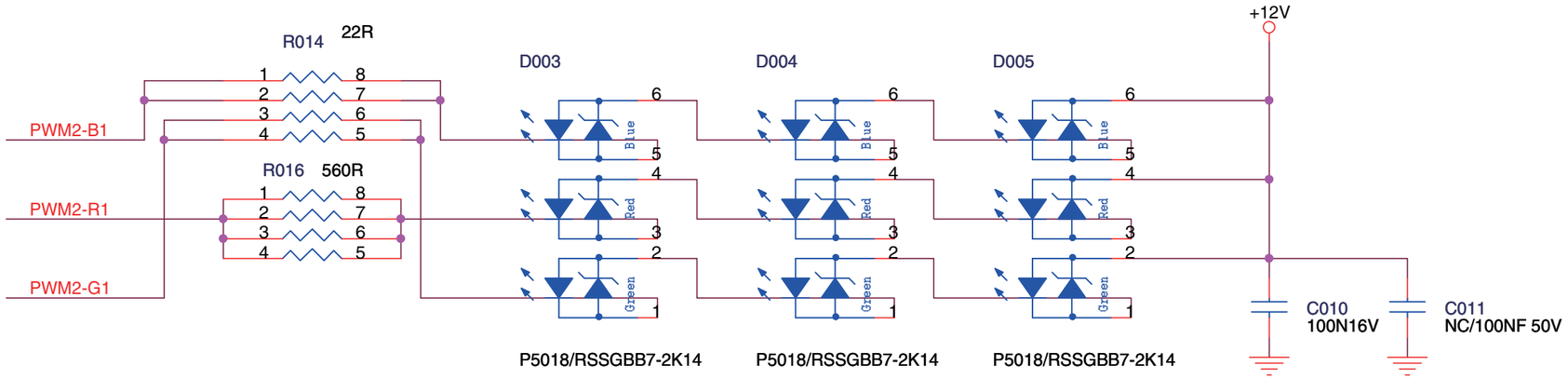
TCL5971	715G7037	2014-05-08

19884_500.eps

10-17-2 Ambilight 5-LED Master Clockwise

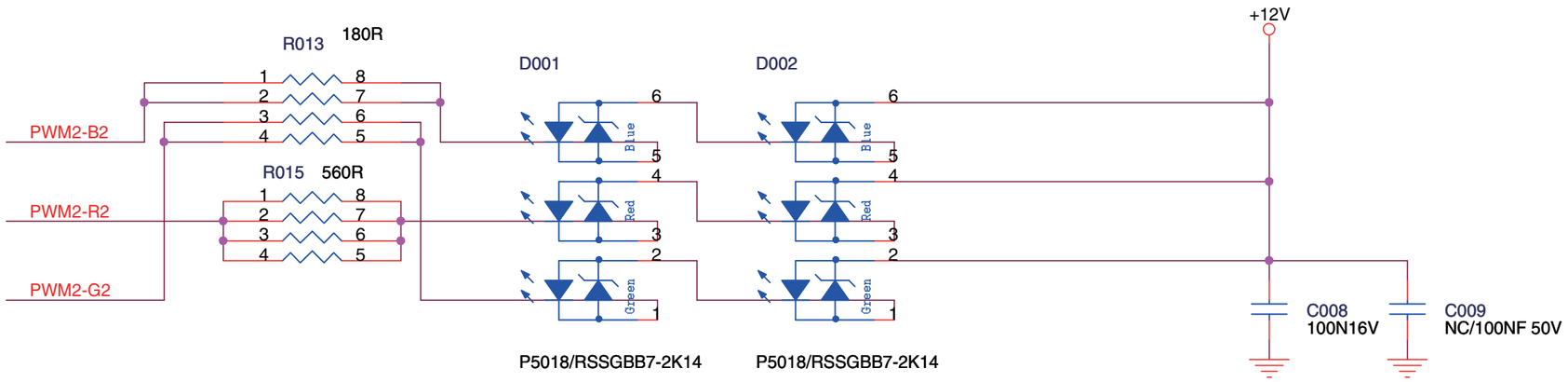
AL02 Ambilight 5-LED Master Clockwise

AL02



PWM2-R1 2
PWM2-G1 2
PWM2-B1 2

PWM2-R2 2
PWM2-G2 2
PWM2-B2 2



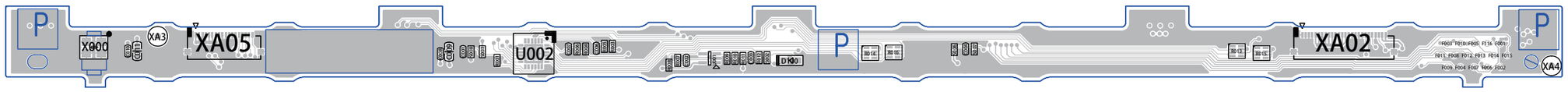
Ambilight 5-LED Master Clockwise	715G7037	2014-05-08

19884_501.eps

10-17-3 Ambilight Board layout

Layout Amblilight Board (top side)

Layout Amblilight Board (bottom side)



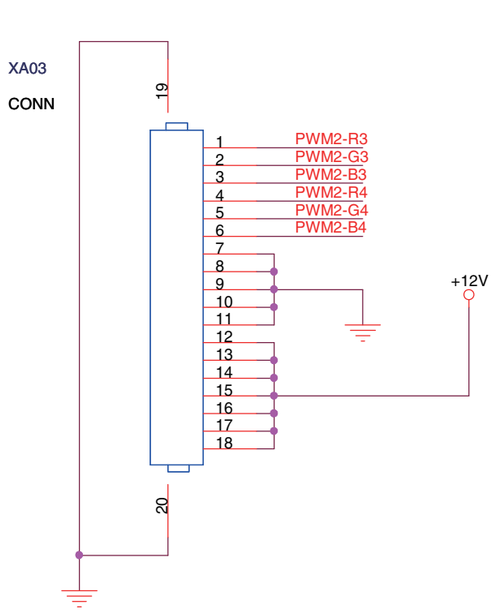
Ambilight Board layout top/bottom	715G7037	1 2014-10-21

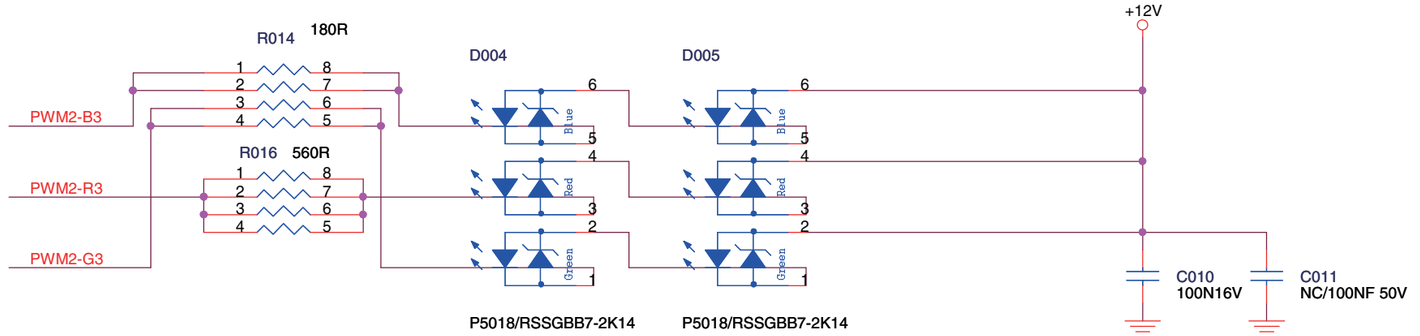
19884_502.eps

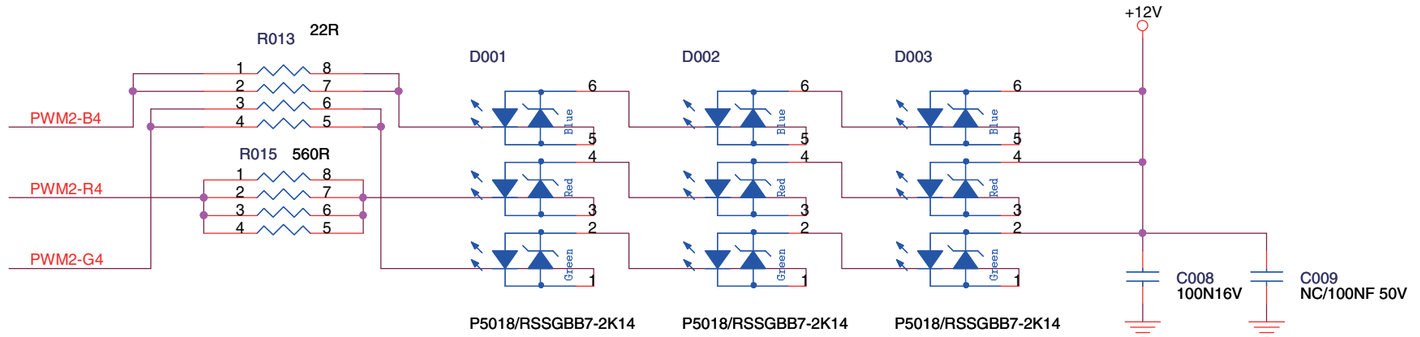
10.18 AL 715G7038 Amiblight Board

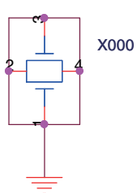
10-18-1 Ambilight 5-LED Slave Clockwise

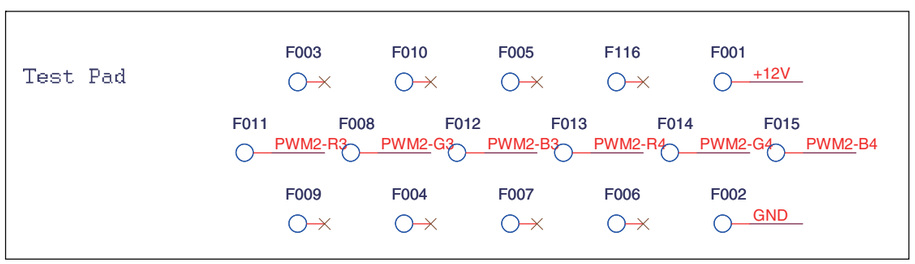
AL Ambilight 5-LED Slave Clockwise **AL**











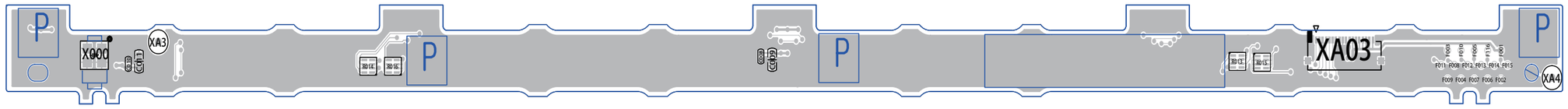
Ambilight 5-LED Slave Clockwise	715G7038	2014-05-08

19884_503.eps

10-18-2 Ambilight Board layout

Layout Amblilight Board (top side)

Layout Amblilight Board (bottom side)



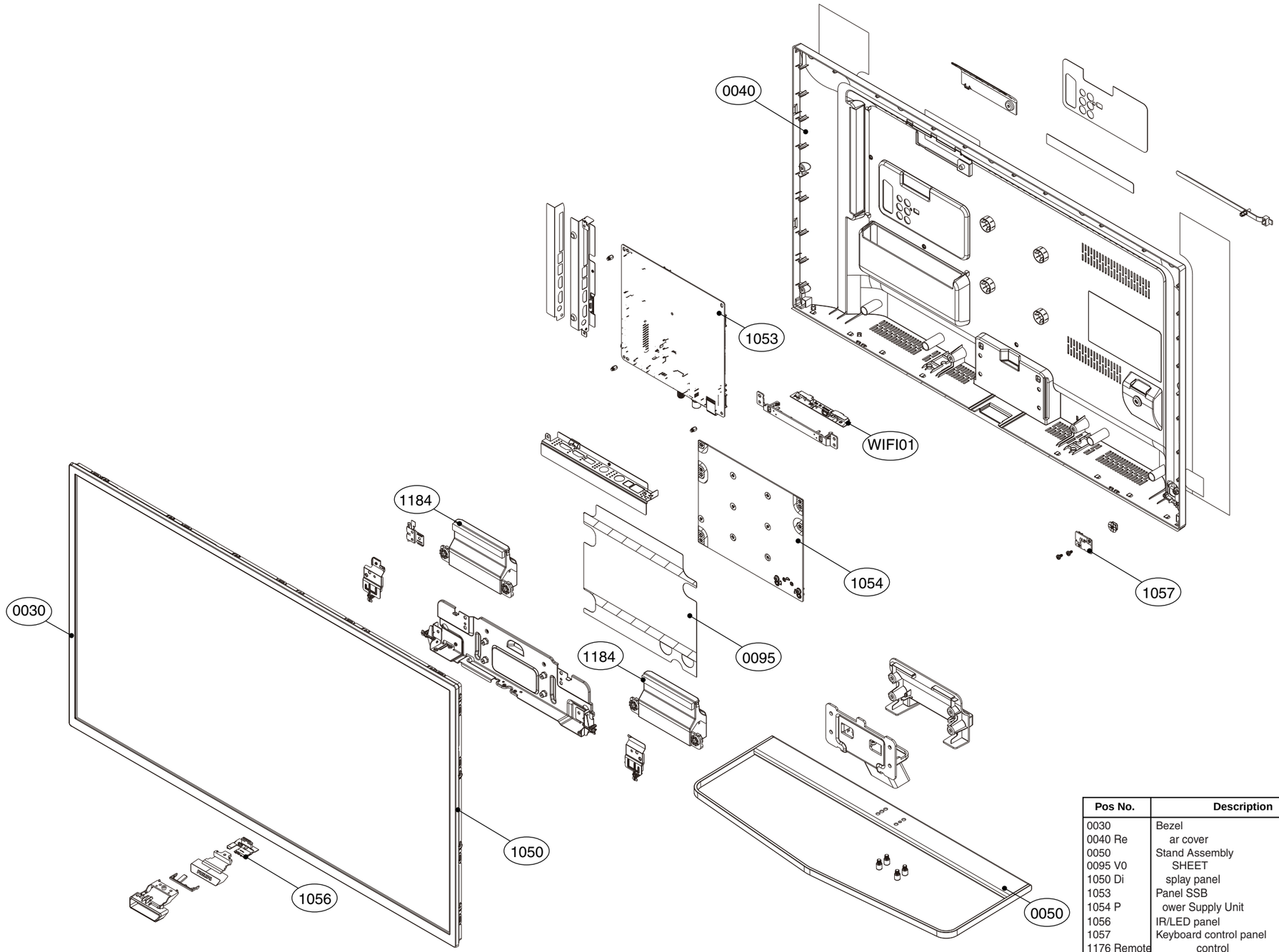
Ambilight Board layout top/bottom	715G7038	1 2014-10-21

19884_504.eps

11. Styling Sheets

11.1 5500 series 32"

5500 series 32"



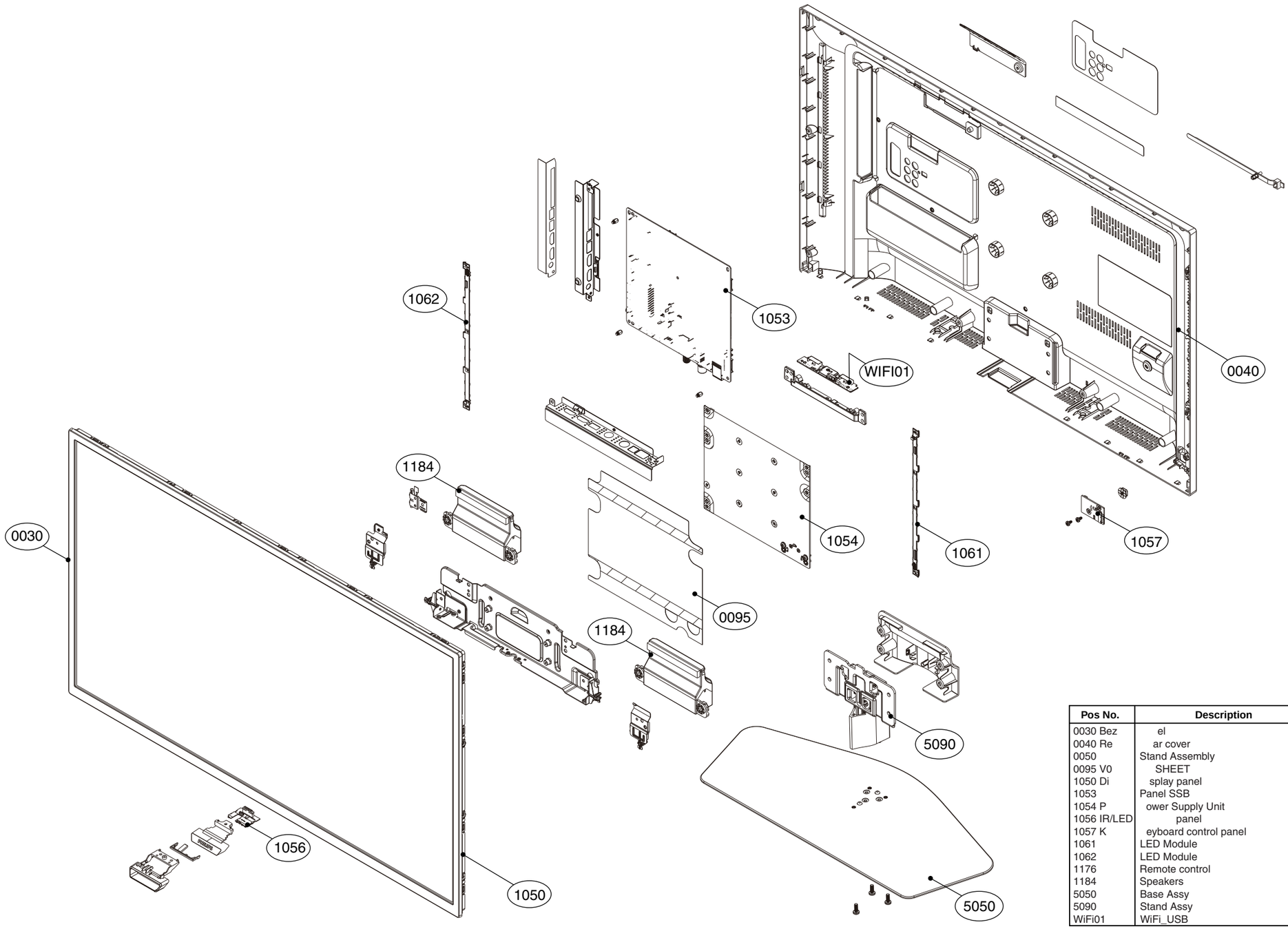
Pos No.	Description	Remarks
0030	Bezel	
0040 Re	ar cover	
0050	Stand Assembly	
0095 V0	SHEET	
1050 Di	splay panel	
1053	Panel SSB	
1054 P	ower Supply Unit	
1056	IR/LED panel	
1057	Keyboard control panel	
1176 Remote	control	Not displayed
1184	Speakers	
WIFI01	WiFi_USB	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

19880_800.eps

11.2 6500 series 32"

6500 series 32"



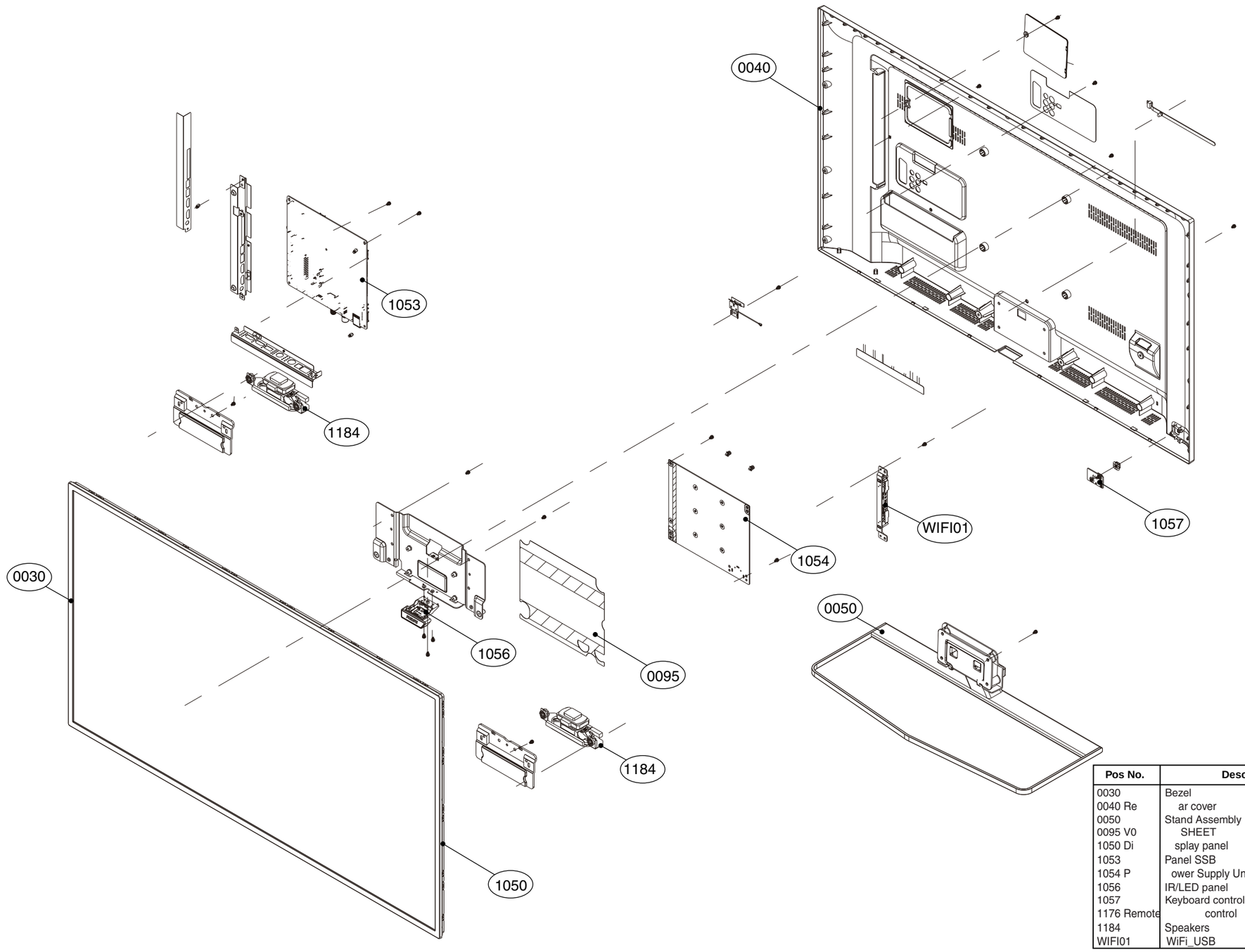
Pos No.	Description	Remarks
0030 Bez	el	
0040 Re	ar cover	
0050	Stand Assembly	
0095 V0	SHEET	
1050 Di	splay panel	
1053	Panel SSB	
1054 P	ower Supply Unit	
1056 IR/LED	panel	
1057 K	eyboard control panel	
1061	LED Module	
1062	LED Module	
1176	Remote control	Not displayed
1184	Speakers	
5050	Base Assy	
5090	Stand Assy	
WiFi01	WiFi_USB	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

19884_800.eps

11.3 5500 series 39"

5500 series 39"



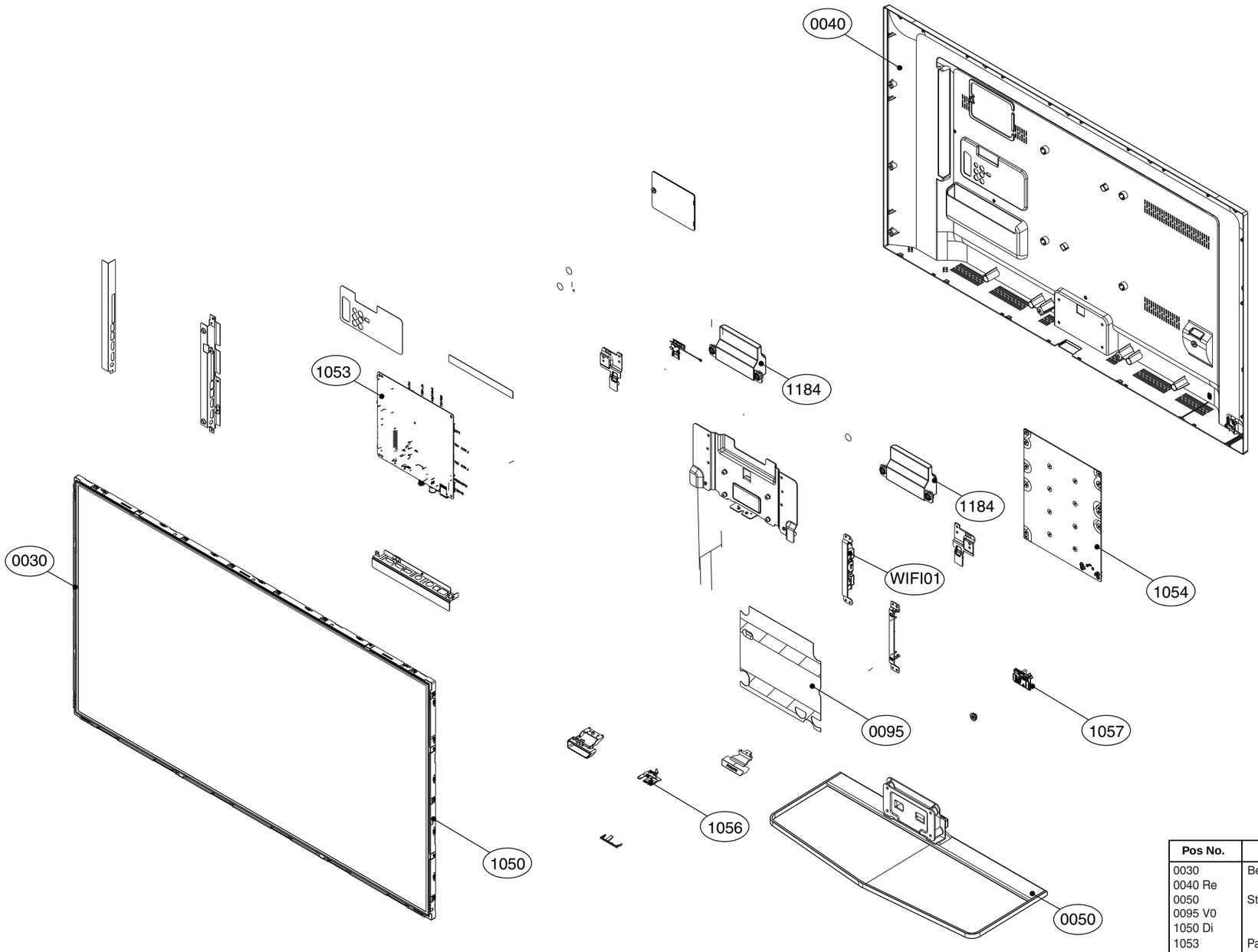
Pos No.	Description	Remarks
0030	Bezel	
0040 Re	ar cover	
0050	Stand Assembly	
0095 V0	SHEET	
1050 Di	splay panel	
1053	Panel SSB	
1054 P	ower Supply Unit	
1056	IR/LED panel	
1057	Keyboard control panel	
1176 Remote	control	Not displayed
1184	Speakers	
WIFI01	WiFi_USB	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

19880_801.eps

11.4 5500 series 40"

5500 series 40"



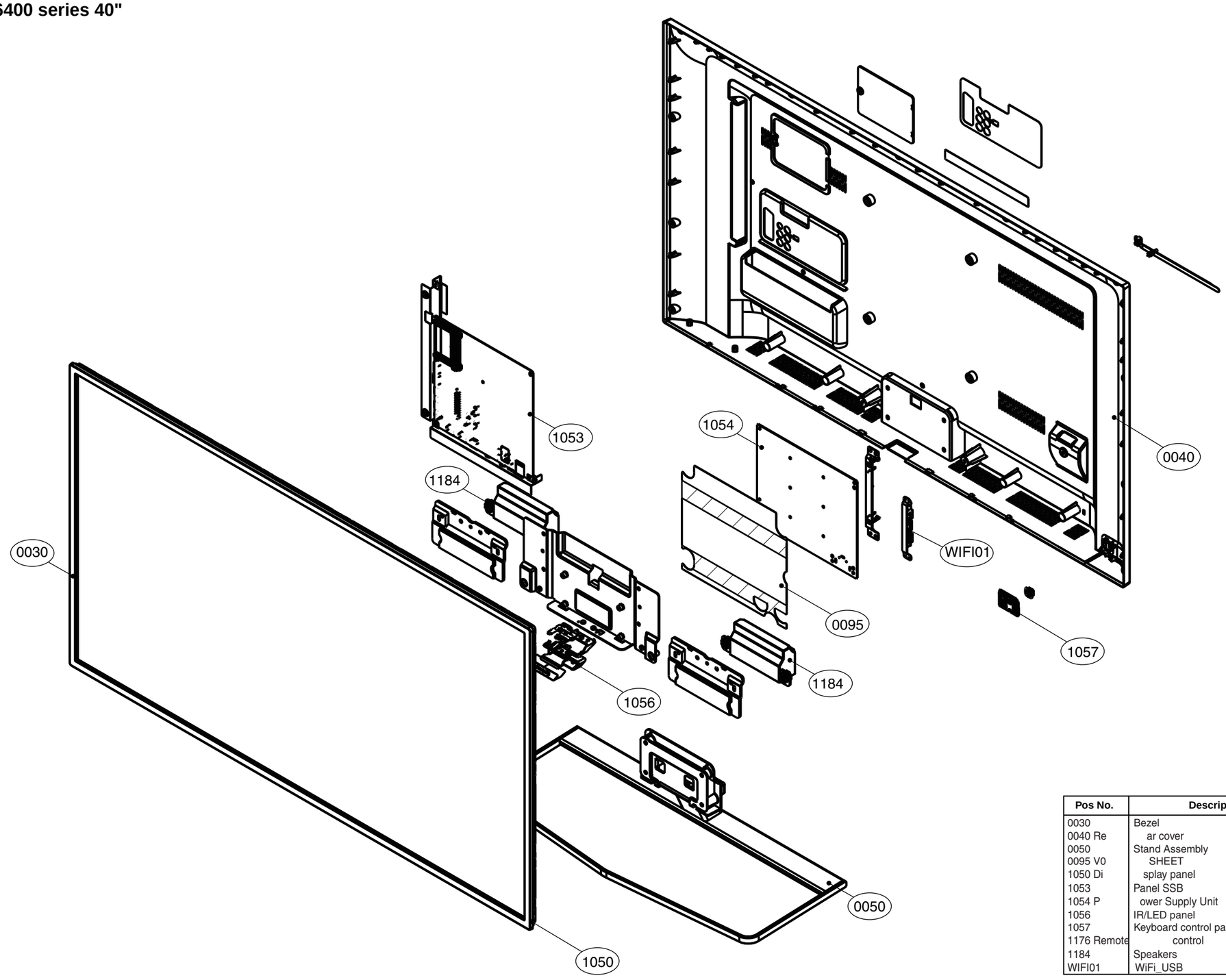
Pos No.	Description	Remarks
0030	Bezel	
0040 Re	ar cover	
0050	Stand Assembly	
0095 V0	SHEET	
1050 Di	splay panel	
1053	Panel SSB	
1054 P	ower Supply Unit	
1056	IR/LED panel	
1057	Keyboard control panel	
1176 Remote	control	Not displayed
1184	Speakers	
WIFI01	WiFi_USB	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

19880_802.eps

11.5 6400 series 40"

6400 series 40"



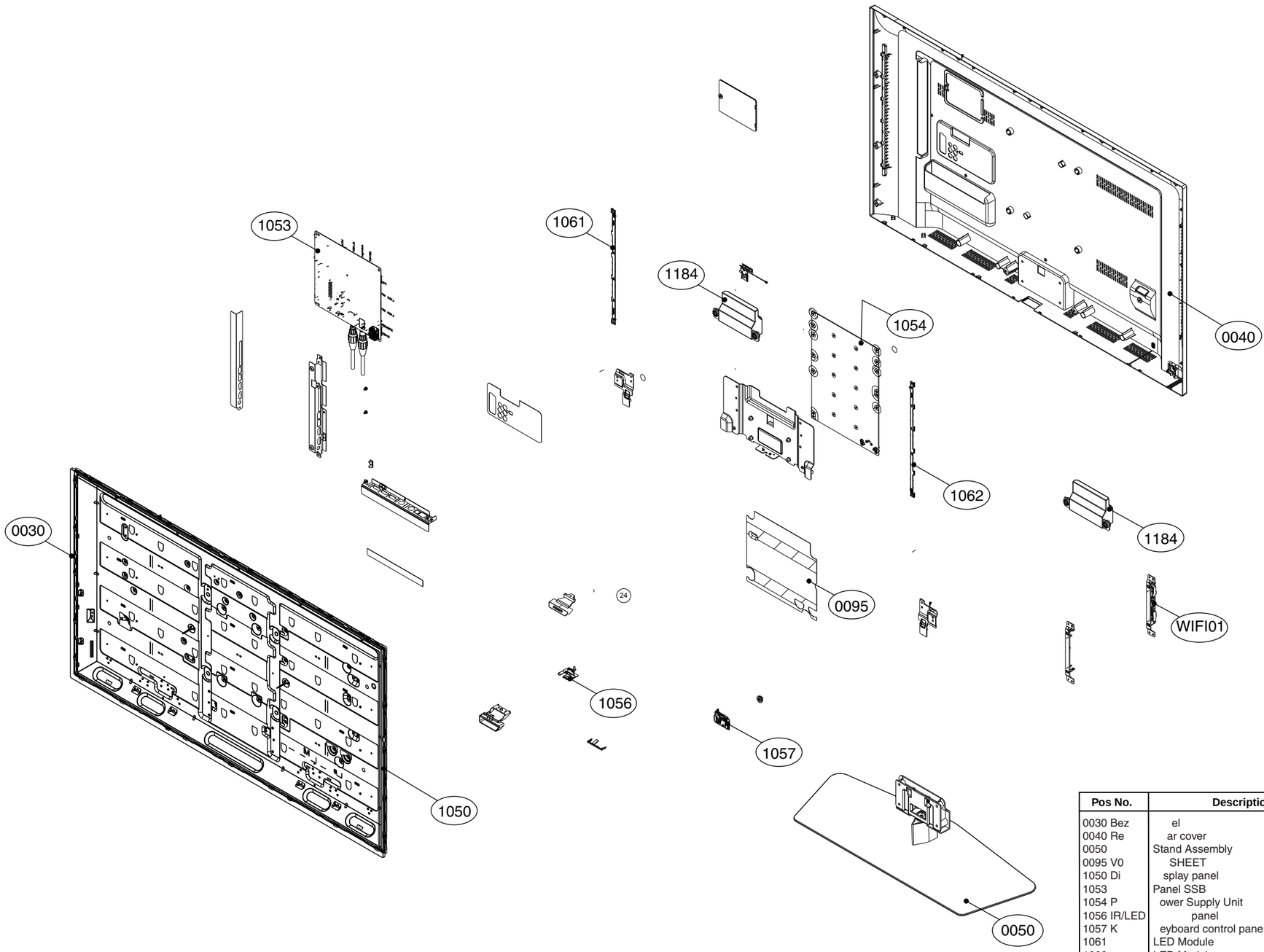
Pos No.	Description	Remarks
0030	Bezel	
0040 Re	ar cover	
0050	Stand Assembly	
0095 V0	SHEET	
1050 Di	splay panel	
1053	Panel SSB	
1054 P	ower Supply Unit	
1056	IR/LED panel	
1057	Keyboard control panel	
1176 Remote	control	Not displayed
1184	Speakers	
WIFI01	WiFi_USB	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

19882_800.eps

11.6 6510&6540 series 40"

6510&6540 series 40"



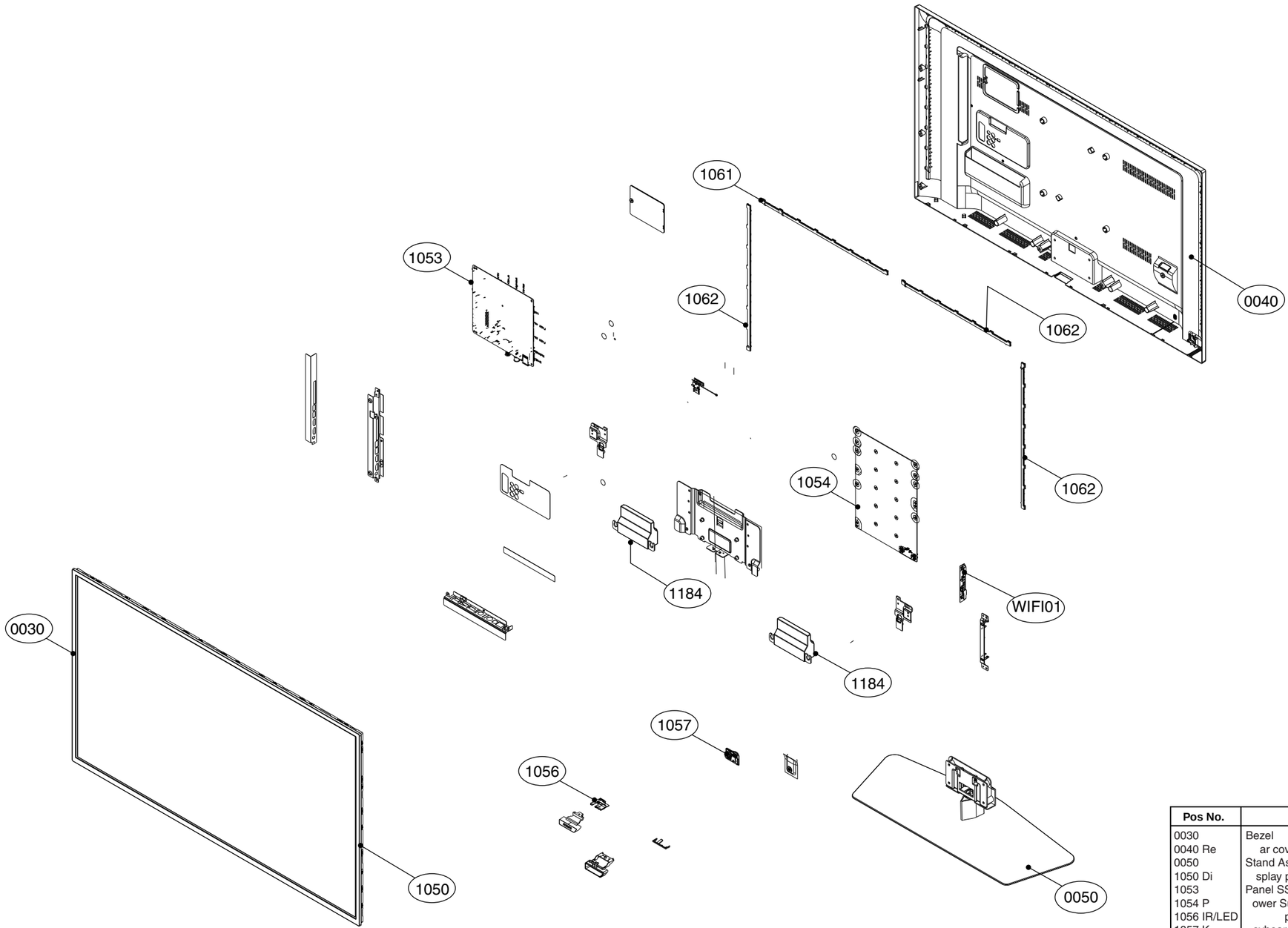
Pos No.	Description	Remarks
0030 Bez	el	
0040 Re	ar cover	
0050	Stand Assembly	
0095 V0	SHEET	
1050 Di	splay panel	
1053	Panel SSB	
1054 P	ower Supply Unit	
1056 IR/LED	panel	
1057 K	eyboard control panel	
1061	LED Module	
1062	LED Module	
1176	Remote control	Not displayed
1184	Speakers	
WiFi01	WiFi_USB	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

19881_800.eps

11.7 6550&6560&6580 series 40"

6550&6560&6580 series 40"



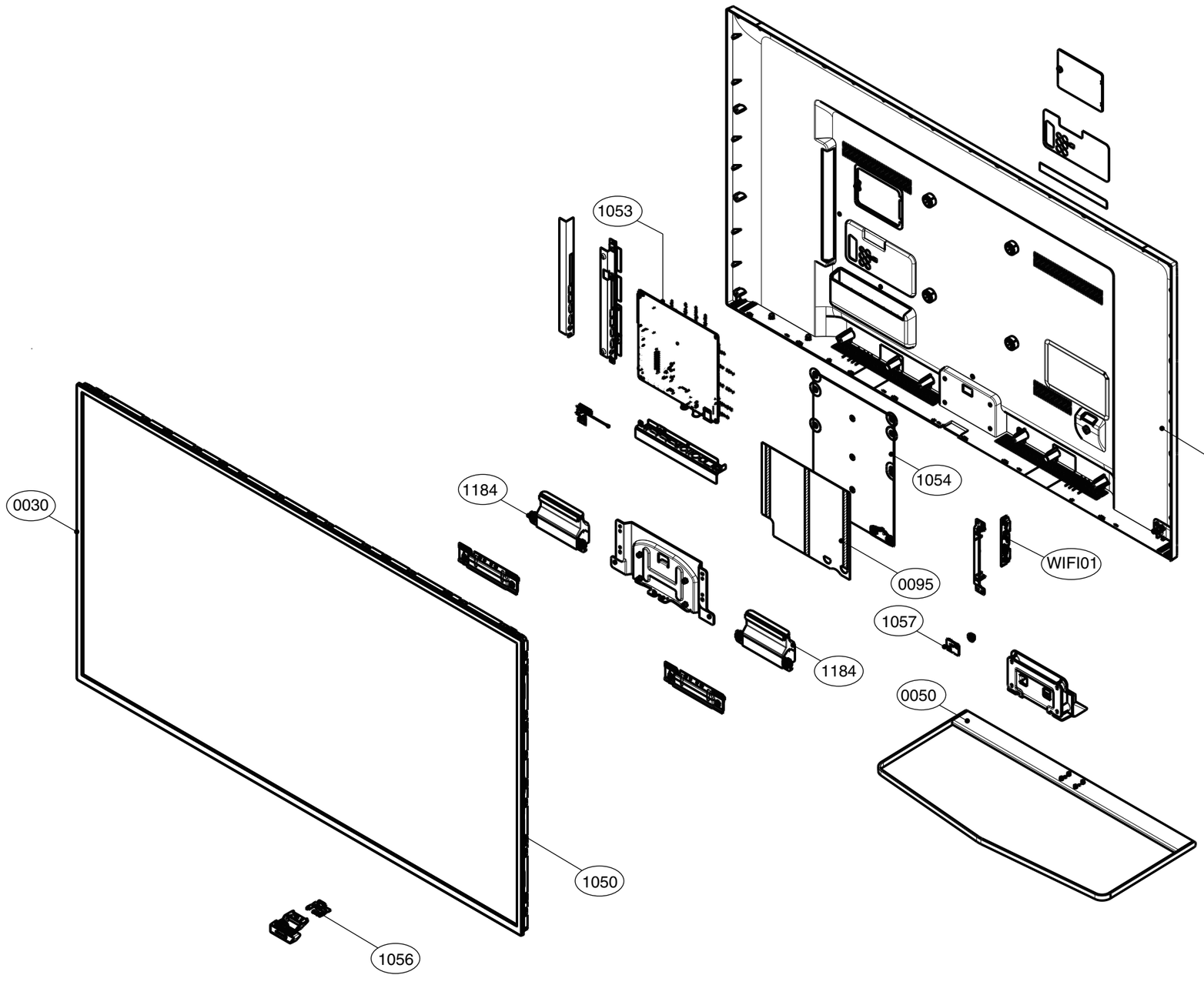
Pos No.	Description	Remarks
0030	Bezel	
0040 Re	ar cover	
0050	Stand Assembly	
1050 Di	splay panel	
1053	Panel SSB	
1054 P	ower Supply Unit	
1056 IR/LED	panel	
1057 K	eyboard control panel	
1061	LED Module	
1062	LED Modules	
1176	Remote control	Not displayed
1184	Speakers	
WiFi01	WiFi_USB	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

19881_801.eps

11.8 5500 series 48"

5500 series 48"



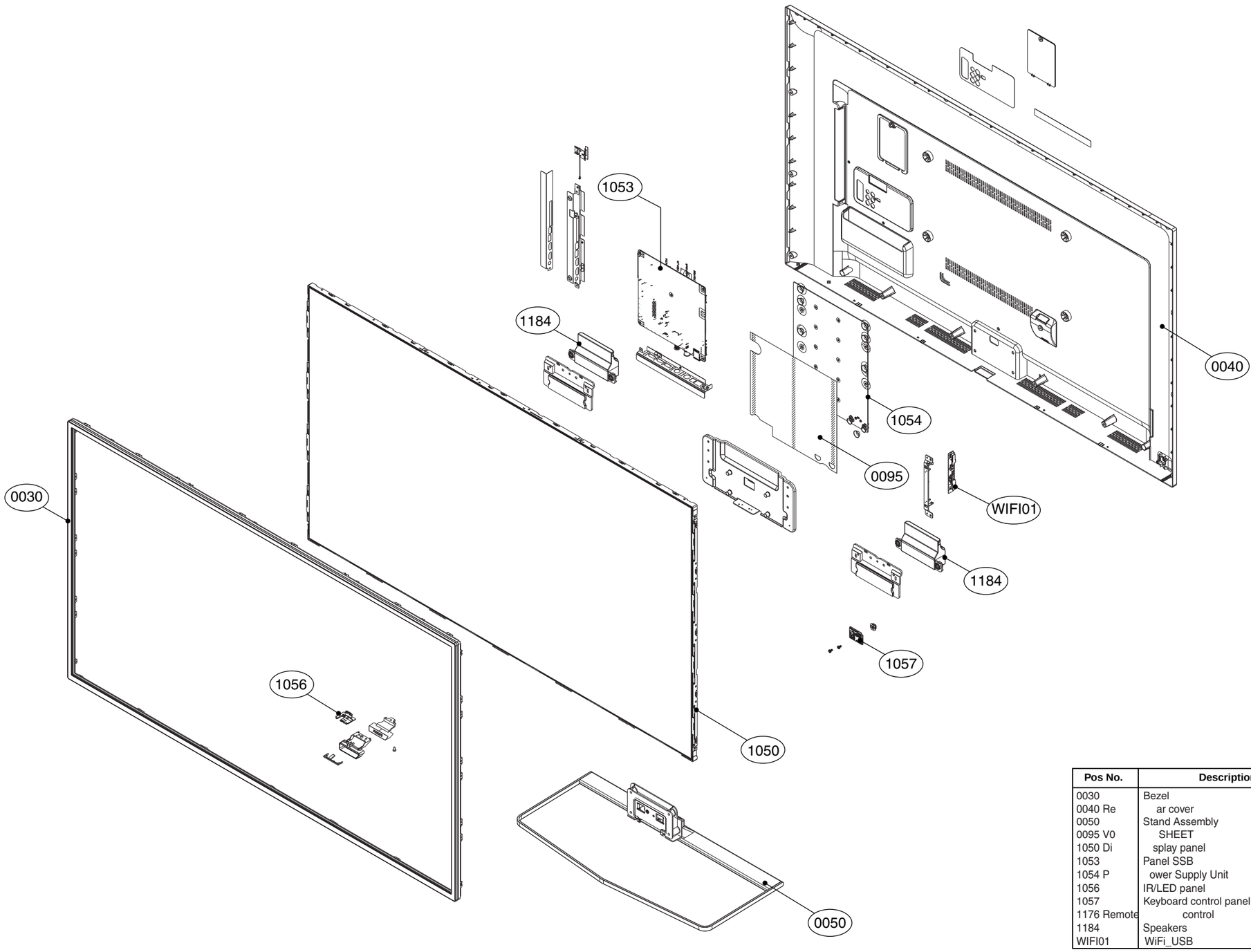
Pos No.	Description	Remarks
0030	Bezel	
0040 Re	ar cover	
0050	Stand Assembly	
0095 V0	SHEET	
1050 Di	splay panel	
1053	Panel SSB	
1054 P	ower Supply Unit	
1056	IR/LED panel	
1057	Keyboard control panel	
1176 Remote	control	Not displayed
1184	Speakers	
WIFI01	WiFi_USB	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

19882_801.eps

11.9 6400 series 50"

6400 series 50"



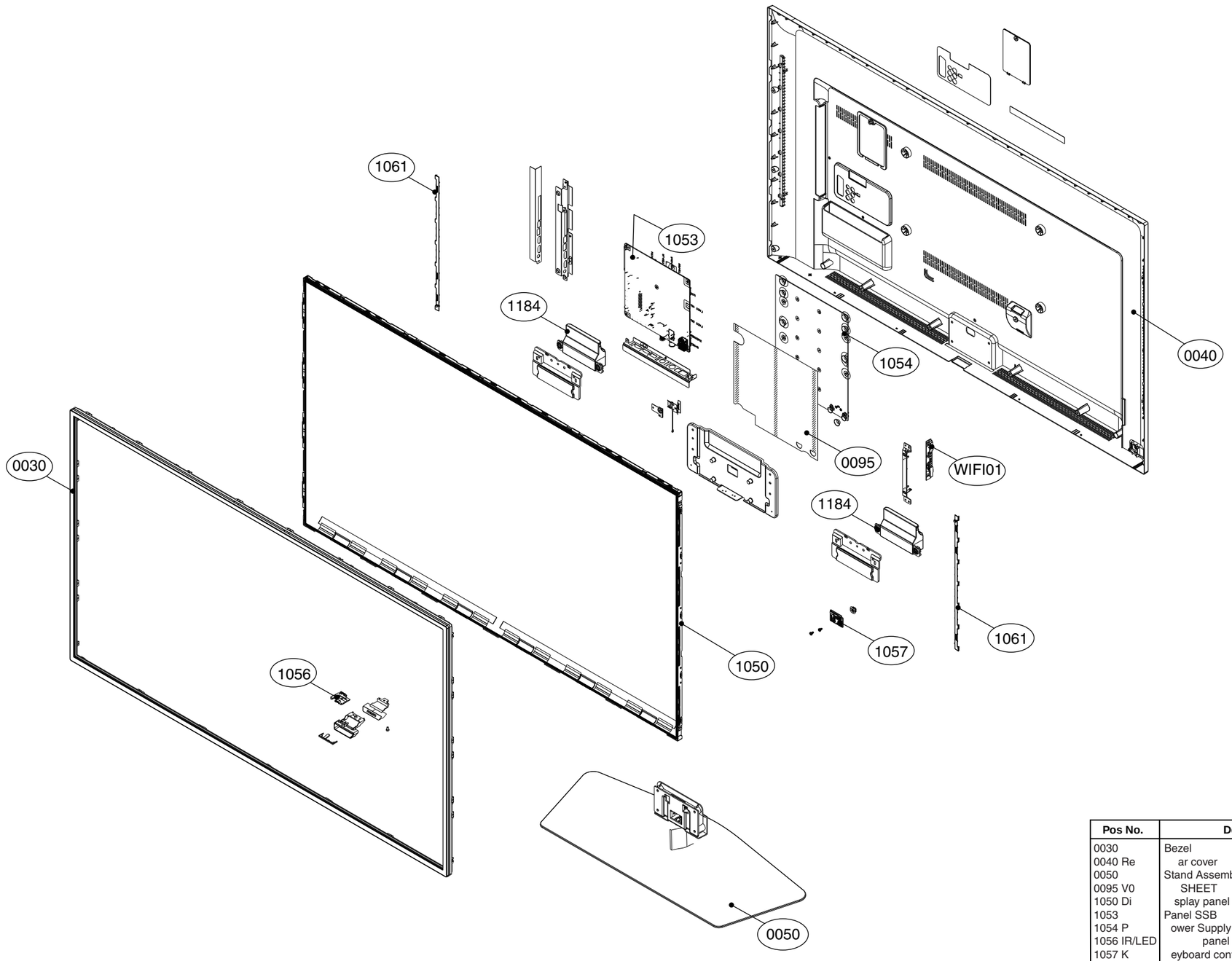
Pos No.	Description	Remarks
0030	Bezel	
0040 Re	ar cover	
0050	Stand Assembly	
0095 V0	SHEET	
1050 Di	splay panel	
1053	Panel SSB	
1054 P	ower Supply Unit	
1056	IR/LED panel	
1057	Keyboard control panel	
1176 Remote	control	Not displayed
1184	Speakers	
WIFI01	WiFi_USB	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

19882_802.eps

11.10 6510&6540 series 50"

6510&6540 series 50"



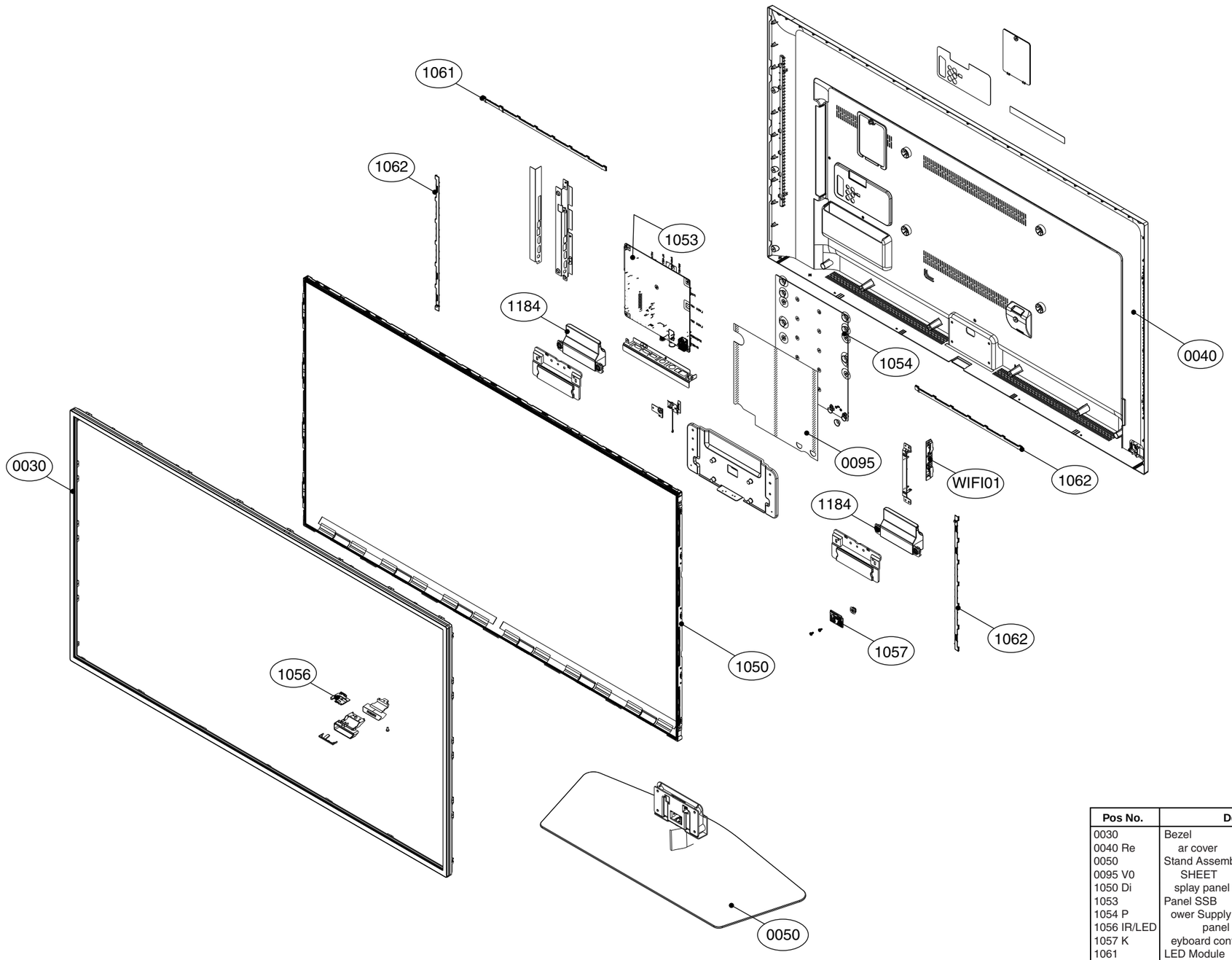
Pos No.	Description	Remarks
0030	Bezel	
0040 Re	ar cover	
0050	Stand Assembly	
0095 V0	SHEET	
1050 Di	splay panel	
1053	Panel SSB	
1054 P	ower Supply Unit	
1056 IR/LED	panel	
1057 K	eyboard control panel	
1061	LED Modules	
1176	Remote control	Not displayed
1184	Speakers	
WiFi01	WiFi_USB	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

19881_802.eps

11.11 6550&6560&6580 series 50"

6550&6560&6580 series 50"



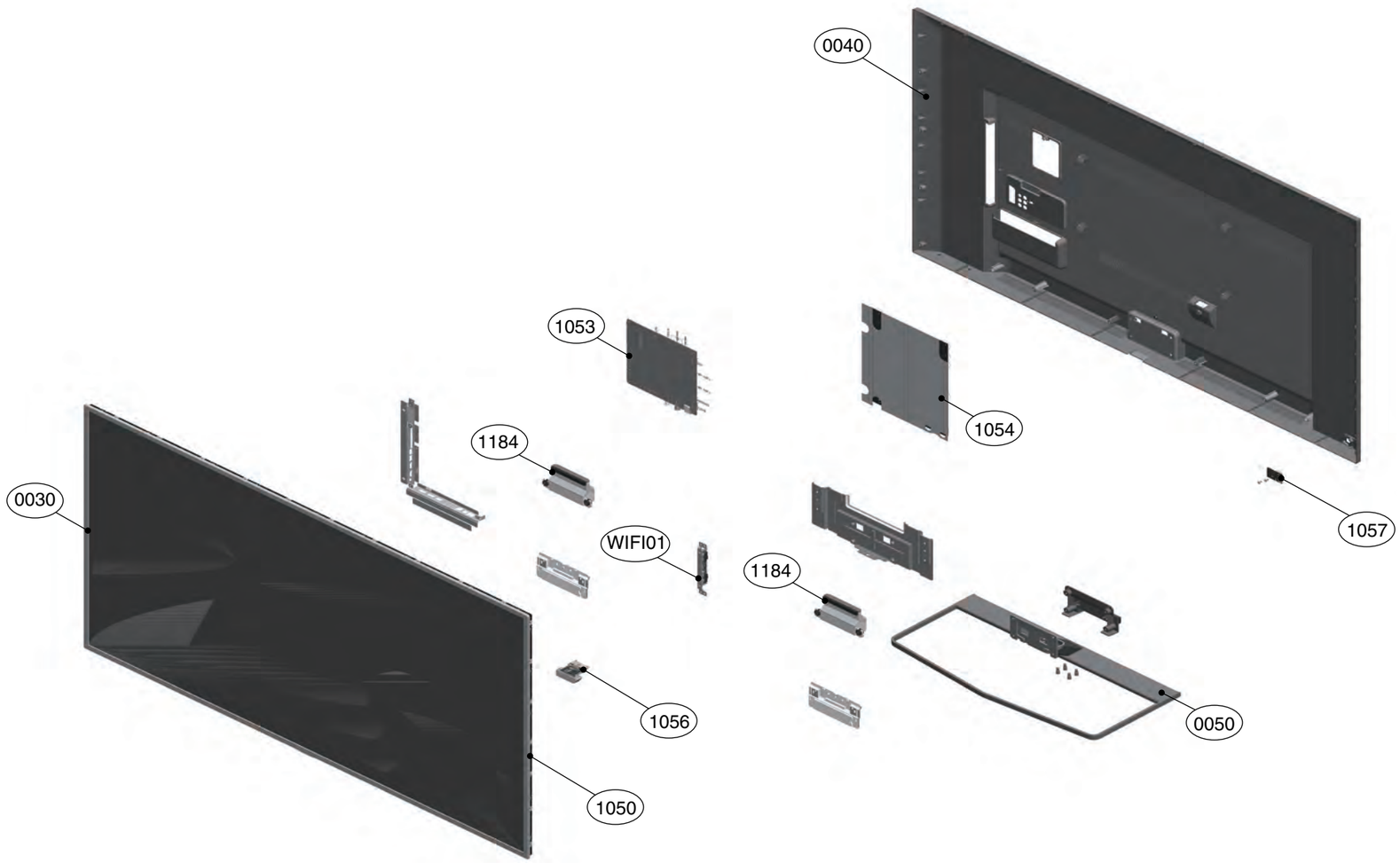
Pos No.	Description	Remarks
0030	Bezel	
0040 Re	ar cover	
0050	Stand Assembly	
0095 V0	SHEET	
1050 Di	splay panel	
1053	Panel SSB	
1054 P	ower Supply Unit	
1056 IR/LED	panel	
1057 K	eyboard control panel	
1061	LED Module	
1062	LED Modules	
1176	Remote control	Not displayed
1184	Speakers	
WiFi01	WiFi_USB	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

19881_803.eps

11.12 5500&6400 series 55"

5500&6400 series 55"



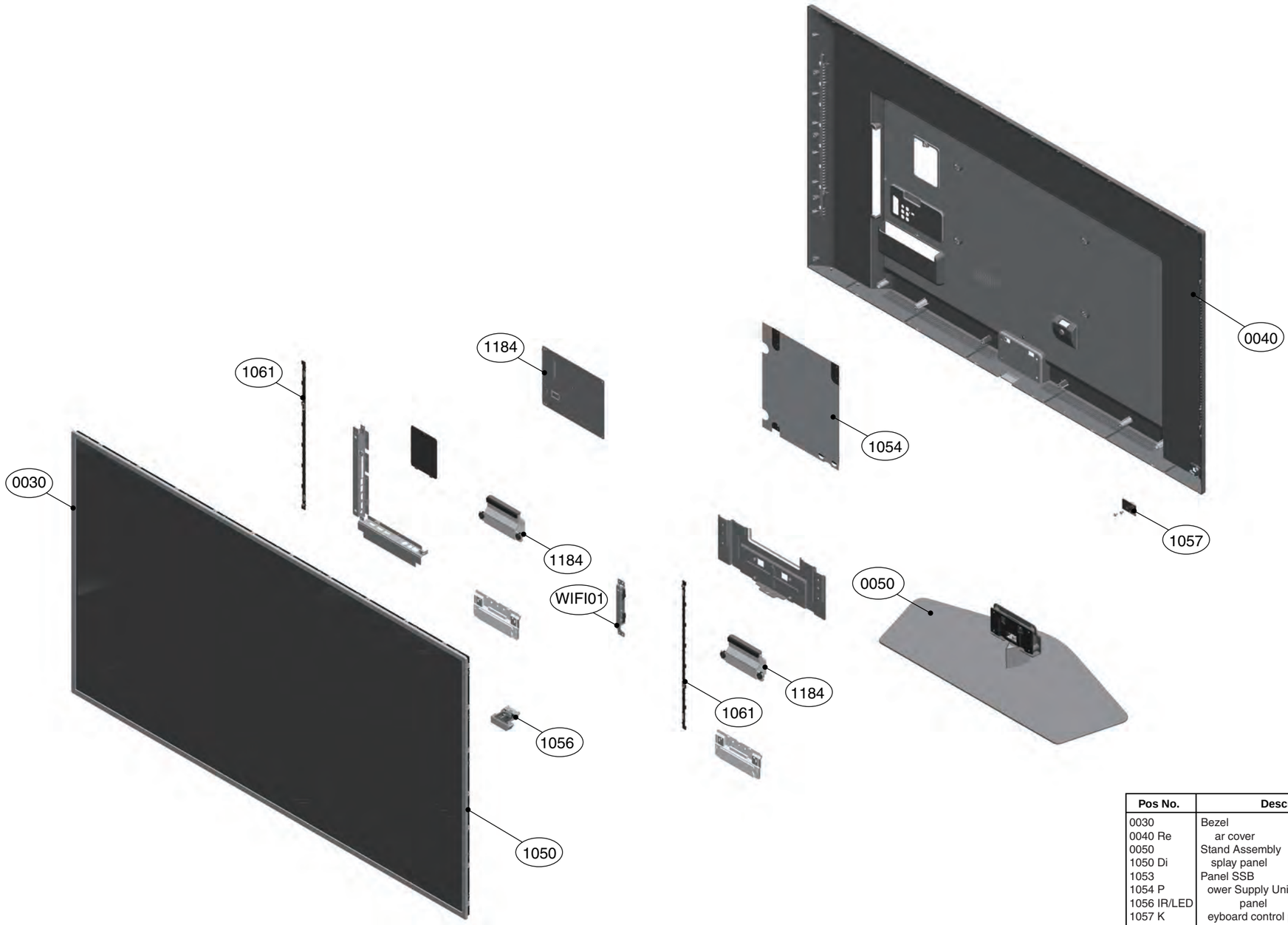
Pos No.	Description	Remarks
0030	Bezel	
0040 Re	ar cover	
0050	Stand Assembly	
1050 Di	splay panel	
1053	Panel SSB	
1054 P	ower Supply Unit	
1056	IR/LED panel	
1057	Keyboard control panel	
1176	Remote control	Not displayed
1184	Speakers	
WIFI01	WiFi_USB	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

19880_803.eps

11.13 6510&6540 series 55"

6510&6540 series 55"



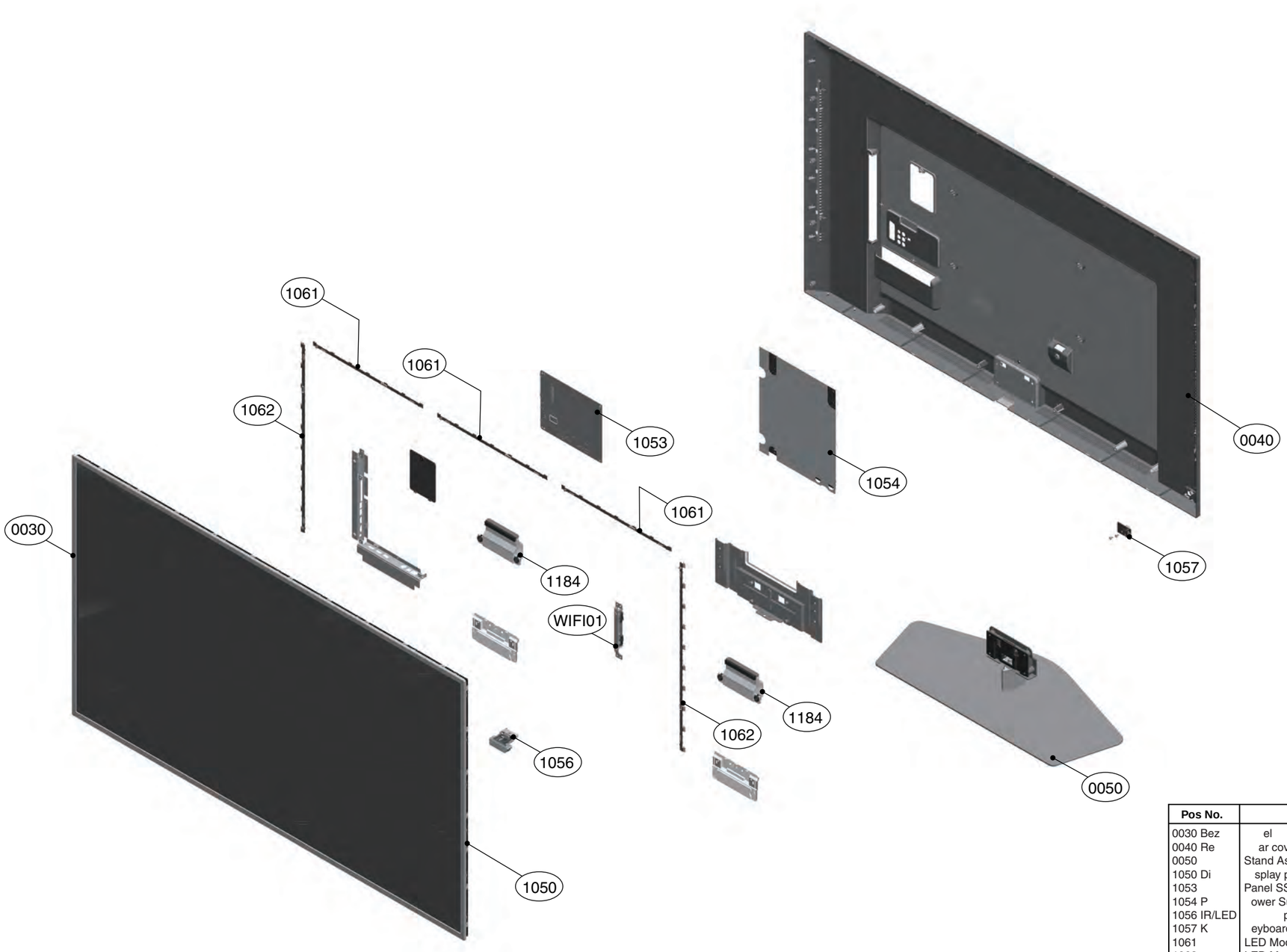
Pos No.	Description	Remarks
0030	Bezel	
0040 Re	ar cover	
0050	Stand Assembly	
1050 Di	splay panel	
1053	Panel SSB	
1054 P	ower Supply Unit	
1056 IR/LED	panel	
1057 K	eyboard control panel	
1061	LED Modules	
1176	Remote control	Not displayed
1184	Speakers	
WiFi01	WiFi_USB	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

19881_804.eps

11.14 6550&6560&6580 series 55"

6550&6560&6580 series 55"



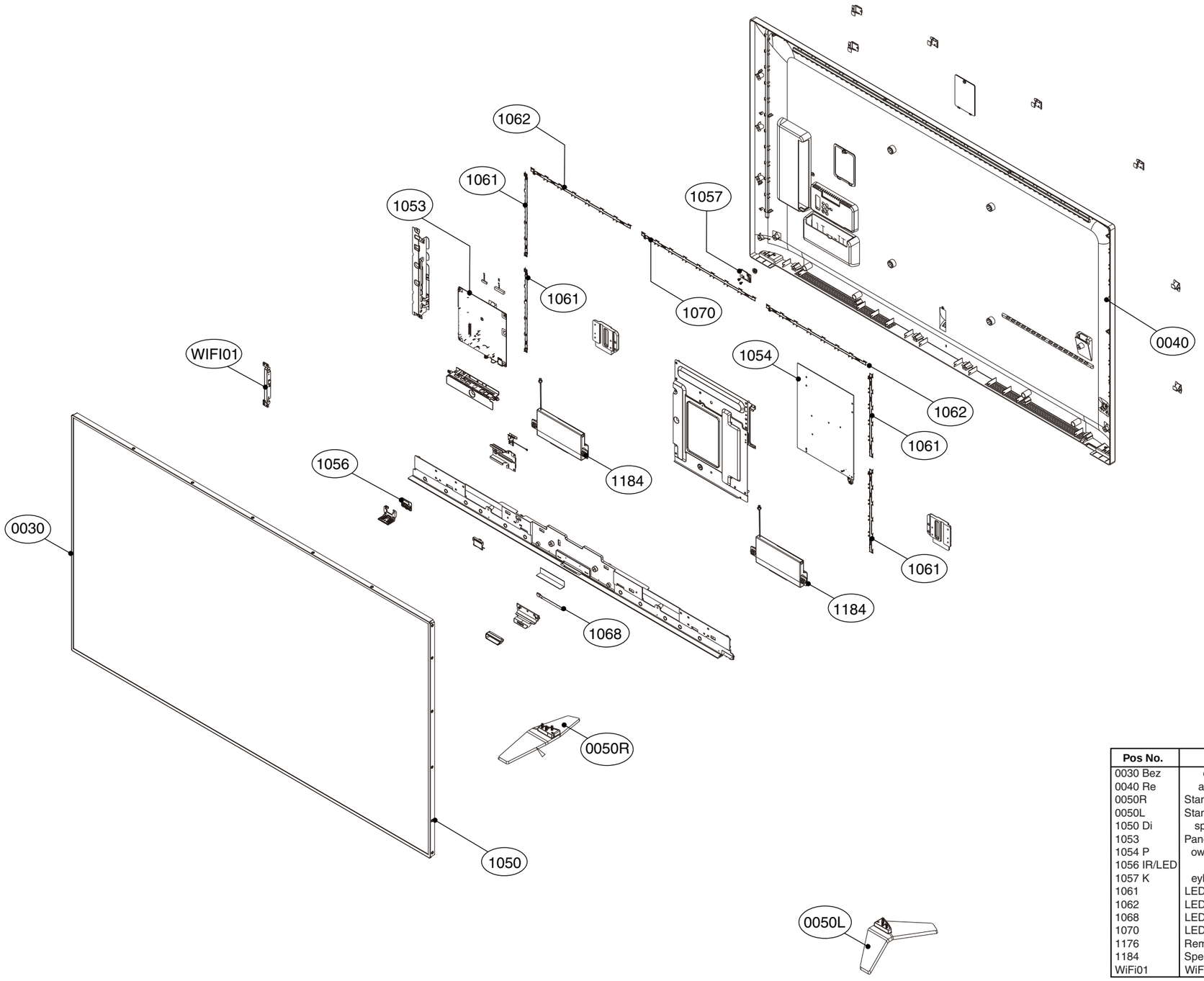
Pos No.	Description	Remarks
0030 Bez	el	
0040 Re	ar cover	
0050	Stand Assembly	
1050 Di	splay panel	
1053	Panel SSB	
1054 P	ower Supply Unit	
1056 IR/LED	panel	
1057 K	eyboard control panel	
1061	LED Modules	
1062	LED Modules	
1176	Remote control	Not displayed
1184	Speakers	
WiFi01	WiFi_USB	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

19881_805.eps

11.15 6520 series 65"

6520 series 65"



Pos No.	Description	Remarks
0030 Bez	el	
0040 Re	ar cover	
0050R	Stand_R	
0050L	Stand_L	
1050 Di	splay panel	
1053	Panel SSB	
1054 P	ower Supply Unit	
1056 IR/LED	panel	
1057 K	eyboard control panel	
1061	LED Modules	
1062	LED Modules	
1068	LED Logo	
1070	LED Module	
1176	Remote control	Not displayed
1184	Speakers	
WiFi01	WiFi_USB	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

19883_800.eps