

Service
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Service

Service Manual

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1. Revision List

Manual xxxx xxx xxxx.0

- First release.

Manual xxxx xxx xxxx.1

- Chapter 4:** added additional LVDS cable handling info; see section [4.3.2](#).
- Chapter 5:** added white tone alignment values; see section [6.3.1](#).

Manual xxxx xxx xxxx.2

- Chapter 2:** [Table 2-1](#) updated (added CTNs).

Manual xxxx xxx xxxx.3

- Chapter 10:** added PSU schematics; see section [10-0-1](#).
- Chapter 11:** added styling sheets Infinity models 42" and 47" sets; see sheets [11.4](#) and [11.6](#).

2. Technical Specifications, Diversity, and Connections

Index of this chapter:

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

Notes:

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

2.1 Technical Specifications

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

Table 2-1 Described Model Numbers and Diversity

CTN	2	4		7	9						10					11
	Connection Overview	Mechanics		Descr.	Block Diagrams						Schematics					Styling
		Wire Dressing Dressing	Assembly Removal	Power Supply	Wiring Diagram	Video	Audio	Control & Clock	I2C	Supply lines	Power Supply	SSB	J (Sensor Board)	E (Keyboard/Leading Edge)	AL (Ambilight)	Sheet
32PFL6007H/12	2.3	4-1	4.3	7.2	9.1	9.10	9.11	9.12	9.13	9.14	10.2	10.4	10.5	10.8	10.16	11.1
32PFL6007K/12	2.3	4-1	4.3	7.2	9.1	9.10	9.11	9.12	9.13	9.14	10.2	10.4	10.5	10.8	10.16	11.1
32PFL6007T/12	2.3	4-1	4.3	7.2	9.1	9.10	9.11	9.12	9.13	9.14	10.2	10.4	10.5	10.8	10.16	11.1
32PFL6087H/12	2.3	4-1	4.3	7.2	9.1	9.10	9.11	9.12	9.13	9.14	10.2	10.4	10.5	10.8	10.16	11.1
32PFL6087K/12	2.3	4-1	4.3	7.2	9.1	9.10	9.11	9.12	9.13	9.14	10.2	10.4	10.5	10.8	10.16	11.1
32PFL6087T/12	2.3	4-1	4.3	7.2	9.1	9.10	9.11	9.12	9.13	9.14	10.2	10.4	10.5	10.8	10.16	11.1
37PFL6007H/60	2.3	4-3	4.3	7.2	9.2	9.10	9.11	9.12	9.13	9.14	10.3	10.4	10.5	10.8	10.15	11.2
37PFL6007H/12	2.3	4-3	4.3	7.2	9.2	9.10	9.11	9.12	9.13	9.14	10.3	10.4	10.5	10.8	10.15	11.2
37PFL6007K/12	2.3	4-3	4.3	7.2	9.2	9.10	9.11	9.12	9.13	9.14	10.3	10.4	10.5	10.8	10.15	11.2
37PFL6007T/12	2.3	4-3	4.3	7.2	9.2	9.10	9.11	9.12	9.13	9.14	10.3	10.4	10.5	10.8	10.15	11.2
37PFL6777H/12	2.3	4-3	4.3	7.2	9.2	9.10	9.11	9.12	9.13	9.14	10.3	10.4	10.6	10.8	10.15	11.2
37PFL6777K/12	2.3	4-3	4.3	7.2	9.2	9.10	9.11	9.12	9.13	9.14	10.3	10.4	10.6	10.8	10.15	11.2
42PDL6907H/12	2.3	4-5	4.3	7.2	9.3	9.10	9.11	9.12	9.13	9.14	-	10.4	10.7	10.9	10.12	11.3
42PDL6907K/12	2.3	4-5	4.3	7.2	9.3	9.10	9.11	9.12	9.13	9.14	-	10.4	10.7	10.9	10.12	11.3
42PDL6907T/12	2.3	4-5	4.3	7.2	9.3	9.10	9.11	9.12	9.13	9.14	-	10.4	10.7	10.9	10.12	11.3
42PFL6007H/12	2.3	4-7	4.3	7.2	9.3	9.10	9.11	9.12	9.13	9.14	-	10.4	10.5	10.8	10.14	11.3
42PFL6007H/60	2.3	4-7	4.3	7.2	9.3	9.10	9.11	9.12	9.13	9.14	-	10.4	10.5	10.8	10.14	11.3
42PFL6007K/12	2.3	4-7	4.3	7.2	9.3	9.10	9.11	9.12	9.13	9.14	-	10.4	10.5	10.8	10.14	11.3
42PFL6007T/12	2.3	4-7	4.3	7.2	9.3	9.10	9.11	9.12	9.13	9.14	-	10.4	10.5	10.8	10.14	11.3
42PFL6007T/60	2.3	4-7	4.3	7.2	9.3	9.10	9.11	9.12	9.13	9.14	-	10.4	10.5	10.8	10.14	11.3
42PFL6057H/12	2.3	4-7	4.3	7.2	9.3	9.10	9.11	9.12	9.13	9.14	-	10.4	10.5	10.8	10.14	11.3
42PFL6057H/60	2.3	4-7	4.3	7.2	9.3	9.10	9.11	9.12	9.13	9.14	-	10.4	10.5	10.8	10.14	11.3
42PFL6057K/12	2.3	4-7	4.3	7.2	9.3	9.10	9.11	9.12	9.13	9.14	-	10.4	10.5	10.8	10.14	11.3
42PFL6057T/12	2.3	4-7	4.3	7.2	9.3	9.10	9.11	9.12	9.13	9.14	-	10.4	10.5	10.8	10.14	11.3
42PFL6057T/60	2.3	4-7	4.3	7.2	9.3	9.10	9.11	9.12	9.13	9.14	-	10.4	10.5	10.8	10.14	11.3
42PFL6067H/12	2.3	4-7	4.3	7.2	9.3	9.10	9.11	9.12	9.13	9.14	-	10.4	10.5	10.8	10.14	11.3
42PFL6067H/60	2.3	4-7	4.3	7.2	9.3	9.10	9.11	9.12	9.13	9.14	-	10.4	10.5	10.8	10.14	11.3
42PFL6067K/12	2.3	4-7	4.3	7.2	9.3	9.10	9.11	9.12	9.13	9.14	-	10.4	10.5	10.8	10.14	11.3
42PFL6067T/12	2.3	4-7	4.3	7.2	9.3	9.10	9.11	9.12	9.13	9.14	-	10.4	10.5	10.8	10.14	11.3
42PFL6067T/60	2.3	4-7	4.3	7.2	9.3	9.10	9.11	9.12	9.13	9.14	-	10.4	10.5	10.8	10.14	11.3
42PFL6097H/12	2.3	4-7	4.3	7.2	9.3	9.10	9.11	9.12	9.13	9.14	-	10.4	10.5	10.8	10.14	11.3
42PFL6097H/60	2.3	4-7	4.3	7.2	9.3	9.10	9.11	9.12	9.13	9.14	-	10.4	10.5	10.8	10.14	11.3
42PFL6097K/12	2.3	4-7	4.3	7.2	9.3	9.10	9.11	9.12	9.13	9.14	-	10.4	10.5	10.8	10.14	11.3
42PFL6097T/12	2.3	4-7	4.3	7.2	9.3	9.10	9.11	9.12	9.13	9.14	-	10.4	10.5	10.8	10.14	11.3
42PFL6097T/60	2.3	4-7	4.3	7.2	9.3	9.10	9.11	9.12	9.13	9.14	-	10.4	10.5	10.8	10.14	11.3
42PFL6687H/12	2.3	4-7	4.3	7.2	9.4	9.10	9.11	9.12	9.13	9.14	-	10.4	10.6	10.8	10.14	11.3

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42PFL6687K/12	2.3	4-7	4.3	7.2	9.4	9.10	9.11	9.12	9.13	9.14	-	10.4	10.6	10.8	10.14	11.3	
42PFL6687T/60	2.3	4-7	4.3	7.2	9.4	9.10	9.11	9.12	9.13	9.14	-	10.4	10.6	10.8	10.14	11.3	
42PFL6877H/12	2.3	4-7	4.3	7.2	9.4	9.10	9.11	9.12	9.13	9.14	-	10.4	10.6	10.8	10.14	11.3	
42PFL6877H/60	2.3	4-7	4.3	7.2	9.4	9.10	9.11	9.12	9.13	9.14	-	10.4	10.6	10.8	10.14	11.3	
42PFL6877K/12	2.3	4-7	4.3	7.2	9.4	9.10	9.11	9.12	9.13	9.14	-	10.4	10.6	10.8	10.14	11.3	
42PFL6877T/12	2.3	4-7	4.3	7.2	9.4	9.10	9.11	9.12	9.13	9.14	-	10.4	10.6	10.8	10.14	11.3	
42PFL6877T/60	2.3	4-7	4.3	7.2	9.4	9.10	9.11	9.12	9.13	9.14	-	10.4	10.6	10.8	10.14	11.3	
47PDL6907H/12	2.3	4-10	4.3	7.2	9.8	9.10	9.11	9.12	9.13	9.14	-	10.4	10.7	10.9	10.12	11.5	
47PDL6907K/12	2.3	4-10	4.3	7.2	9.8	9.10	9.11	9.12	9.13	9.14	-	10.4	10.7	10.9	10.12	11.5	
47PDL6907T/12	2.3	4-10	4.3	7.2	9.8	9.10	9.11	9.12	9.13	9.14	-	10.4	10.7	10.9	10.12	11.5	
47PFL6007H/12	2.3	4-12	4.3	7.2	9.6	9.10	9.11	9.12	9.13	9.14	-	10.4	10.5	10.8	10.13	11.5	
47PFL6007H/60	2.3	4-12	4.3	7.2	9.6	9.10	9.11	9.12	9.13	9.14	-	10.4	10.5	10.8	10.13	11.5	
47PFL6007K/12	2.3	4-12	4.3	7.2	9.6	9.10	9.11	9.12	9.13	9.14	-	10.4	10.5	10.8	10.13	11.5	
47PFL6007T/12	2.3	4-12	4.3	7.2	9.6	9.10	9.11	9.12	9.13	9.14	-	10.4	10.5	10.8	10.13	11.5	
47PFL6007T/60	2.3	4-12	4.3	7.2	9.6	9.10	9.11	9.12	9.13	9.14	-	10.4	10.5	10.8	10.13	11.5	
47PFL6057H/12	2.3	4-12	4.3	7.2	9.6	9.10	9.11	9.12	9.13	9.14	-	10.4	10.5	10.8	10.13	11.5	
47PFL6057H/60	2.3	4-12	4.3	7.2	9.6	9.10	9.11	9.12	9.13	9.14	-	10.4	10.5	10.8	10.13	11.5	
47PFL6057K/12	2.3	4-12	4.3	7.2	9.6	9.10	9.11	9.12	9.13	9.14	-	10.4	10.5	10.8	10.13	11.5	
47PFL6057T/12	2.3	4-12	4.3	7.2	9.6	9.10	9.11	9.12	9.13	9.14	-	10.4	10.5	10.8	10.13	11.5	
47PFL6057T/60	2.3	4-12	4.3	7.2	9.6	9.10	9.11	9.12	9.13	9.14	-	10.4	10.5	10.8	10.13	11.5	
47PFL6067H/12	2.3	4-12	4.3	7.2	9.6	9.10	9.11	9.12	9.13	9.14	-	10.4	10.5	10.8	10.13	11.5	
47PFL6067H/60	2.3	4-12	4.3	7.2	9.6	9.10	9.11	9.12	9.13	9.14	-	10.4	10.5	10.8	10.13	11.5	
47PFL6067K/12	2.3	4-12	4.3	7.2	9.6	9.10	9.11	9.12	9.13	9.14	-	10.4	10.5	10.8	10.13	11.5	
47PFL6067T/12	2.3	4-12	4.3	7.2	9.6	9.10	9.11	9.12	9.13	9.14	-	10.4	10.5	10.8	10.13	11.5	
47PFL6067T/60	2.3	4-12	4.3	7.2	9.6	9.10	9.11	9.12	9.13	9.14	-	10.4	10.5	10.8	10.13	11.5	
47PFL6097H/12	2.3	4-12	4.3	7.2	9.6	9.10	9.11	9.12	9.13	9.14	-	10.4	10.5	10.8	10.13	11.5	
47PFL6097H/60	2.3	4-12	4.3	7.2	9.6	9.10	9.11	9.12	9.13	9.14	-	10.4	10.5	10.8	10.13	11.5	
47PFL6097K/12	2.3	4-12	4.3	7.2	9.6	9.10	9.11	9.12	9.13	9.14	-	10.4	10.5	10.8	10.13	11.5	
47PFL6097T/12	2.3	4-12	4.3	7.2	9.6	9.10	9.11	9.12	9.13	9.14	-	10.4	10.5	10.8	10.13	11.5	
47PFL6097T/60	2.3	4-12	4.3	7.2	9.6	9.10	9.11	9.12	9.13	9.14	-	10.4	10.5	10.8	10.13	11.5	
47PFL6687H/12	2.3	4-12	4.3	7.2	9.7	9.10	9.11	9.12	9.13	9.14	-	10.4	10.6	10.8	10.12 10.11	11.5	
47PFL6687H/60	2.3	4-12	4.3	7.2	9.7	9.10	9.11	9.12	9.13	9.14	-	10.4	10.6	10.8	10.12 10.11	11.5	
47PFL6687K/12	2.3	4-12	4.3	7.2	9.7	9.10	9.11	9.12	9.13	9.14	-	10.4	10.6	10.8	10.12 10.11	11.5	
47PFL6687T/60	2.3	4-12	4.3	7.2	9.7	9.10	9.11	9.12	9.13	9.14	-	10.4	10.6	10.8	10.12 10.11	11.5	
47PFL6877H/12	2.3	4-12	4.3	7.2	9.7	9.10	9.11	9.12	9.13	9.14	-	10.4	10.6	10.8	10.12 10.11	11.5	
47PFL6877H/60	2.3	4-12	4.3	7.2	9.7	9.10	9.11	9.12	9.13	9.14	-	10.4	10.6	10.8	10.12 10.11	11.5	
47PFL6877K/12	2.3	4-12	4.3	7.2	9.7	9.10	9.11	9.12	9.13	9.14	-	10.4	10.6	10.8	10.12 10.11	11.5	
47PFL6877T/12	2.3	4-12	4.3	7.2	9.7	9.10	9.11	9.12	9.13	9.14	-	10.4	10.6	10.8	10.12 10.11	11.5	
47PFL6877T/60	2.3	4-12	4.3	7.2	9.7	9.10	9.11	9.12	9.13	9.14	-	10.4	10.6	10.8	10.12 10.11	11.5	
55PFL6007H/12	2.3	4-15	4.3	7.2	9.9	9.10	9.11	9.12	9.13	9.14	10.1	10.4	10.5	10.10	10.12	11.7	
55PFL6007K/12	2.3	4-15	4.3	7.2	9.9	9.10	9.11	9.12	9.13	9.14	10.1	10.4	10.5	10.10	10.12	11.7	
55PFL6007T/12	2.3	4-15	4.3	7.2	9.9	9.10	9.11	9.12	9.13	9.14	10.1	10.4	10.5	10.10	10.12	11.7	
55PFL6097H/12	2.3	4-15	4.3	7.2	9.9	9.10	9.11	9.12	9.13	9.14	10.1	10.4	10.5	10.10	10.12	11.7	
55PFL6097K/12	2.3	4-15	4.3	7.2	9.9	9.10	9.11	9.12	9.13	9.14	10.1	10.4	10.5	10.10	10.12	11.7	
55PFL6097T/12	2.3	4-15	4.3	7.2	9.9	9.10	9.11	9.12	9.13	9.14	10.1	10.4	10.5	10.10	10.12	11.7	

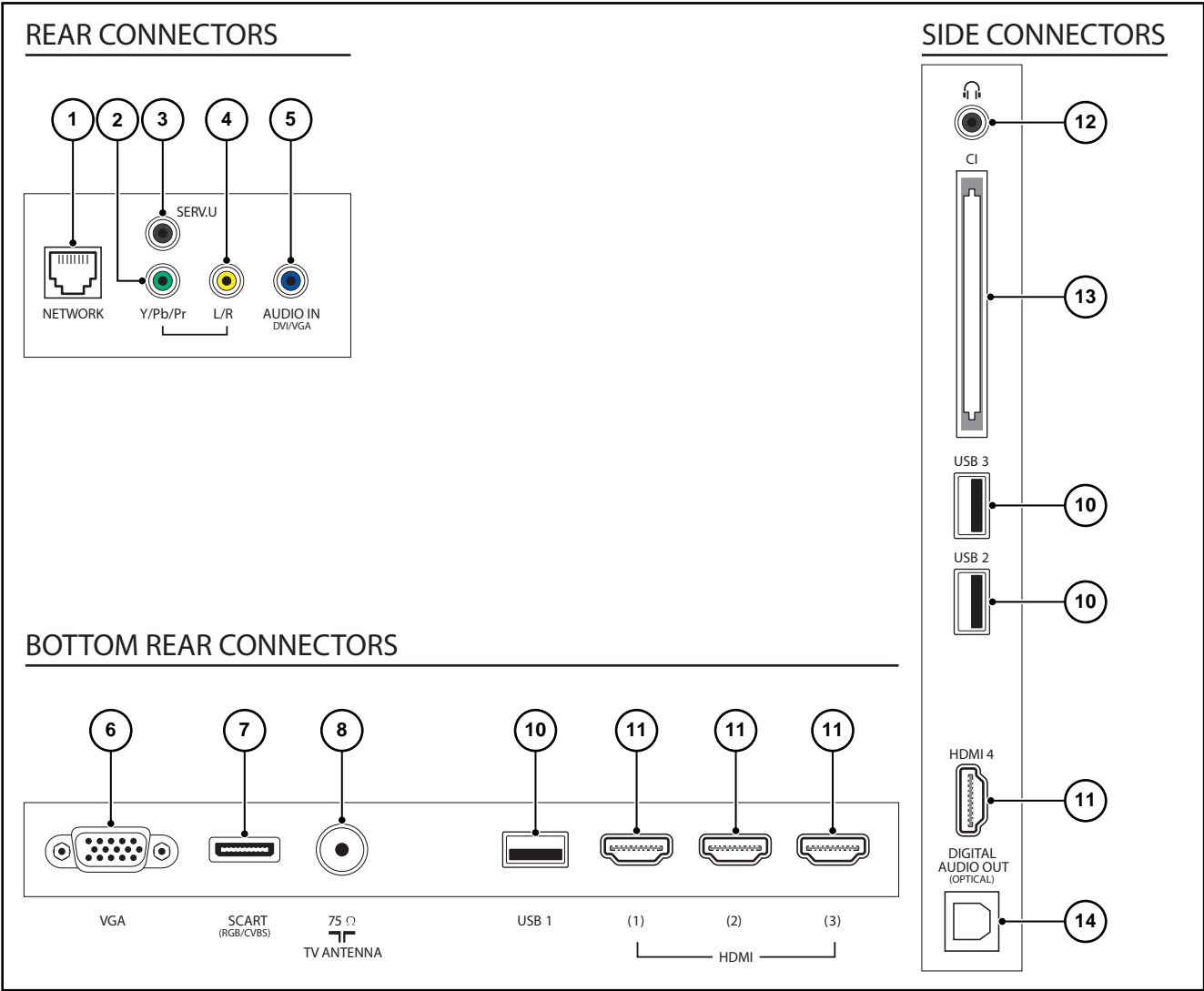
2.2 Directions for Use

You can download this information from the following websites:

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

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

2.3 Connections

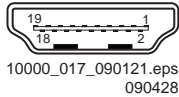


19280_097_120503.eps
120503

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- HDMI 1, 2, 3, 4: Digital Video - In, Digital Audio with ARC - In/Out



10000_017_090121.eps
090428

Figure 2-3 HDMI (type A) connector

2.3.1 Connections

1 - USB2.0

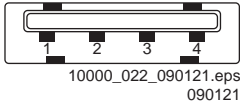


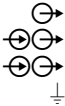
Figure 2-2 USB (type A)

- 1 - +5V

2 - Data (-)

3 - Data (+)

4 - Ground
- Gnd



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

19 - HPD	Hot Plug Detect	
20 - Ground	Gnd	
3 - Cinch: S/PDIF - Out		
Bk - Coaxial	0.4 - 0.6V _{PP} / 75 ohm	
4 - Head phone (Output)		
Bk - Head phone	32 - 600 ohm / 10 mW	
5 - Common Interface		
68p - See Figure 10-4-47 B07D. Common interface		
6 - Video RGB - In, CVBS - In/Out, Audio - In/Out (optional via break-out cable)		

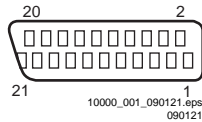


Figure 2-4 SCART connector

1 - Audio R	0.5 V _{RMS} / 1 kohm	
2 - Audio R	0.5 V _{RMS} / 10 kohm	
3 - Audio L	0.5 V _{RMS} / 1 kohm	
4 - Ground Audio	Gnd	
5 - Ground Blue	Gnd	
6 - Audio L	0.5 V _{RMS} / 10 kohm	
7 - Video Blue	0.7 V _{PP} / 75 ohm	
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 ohm	
12 - n.c.		
13 - Ground Red	Gnd	
14 - Ground P50	Gnd	
15 - Video Red	0.7 V _{PP} / 75 ohm	
16 - Status/FBL	0 - 0.4 V: INT 1 - 3 V: EXT / 75 ohm	
17 - Ground Video	Gnd	
18 - Ground FBL	Gnd	
19 - Video CVBS/Y	1 V _{PP} / 75 ohm	
20 - Video CVBS	1 V _{PP} / 75 ohm	
21 - Shield	Gnd	

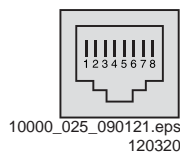
7 - RJ45: Ethernet

Figure 2-5 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	

8 - Cinch: Video YPbPr - In, Audio - In (optional via break-out cable)

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

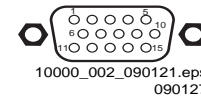
9 - VGA: Video RGB - In

Figure 2-6 VGA Connector

1 - Video Red	0.7 V _{PP} / 75 ohm	
2 - Video Green	0.7 V _{PP} / 75 ohm	
3 - Video Blue	0.7 V _{PP} / 75 ohm	
4 - n.c.		
5 - Ground	Gnd	
6 - Ground Red	Gnd	
7 - Ground Green	Gnd	
8 - Ground Blue	Gnd	
9 - +5V _{DC}	+5 V	
10 - Ground Sync	Gnd	
11 - n.c.		
12 - DDC_SDA	DDC data	
13 - H-sync	0 - 5 V	
14 - V-sync	0 - 5 V	
15 - DDC_SCL	DDC clock	

10 - Cinch: Audio - In (VGA/DVI)

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

11 - Aerial - In

- - IEC-type (EU)	Coax, 75 ohm	
-------------------	--------------	--

12 - Service Connector (UART)

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

2.4 Chassis Overview

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

3. Precautions, Notes, and Abbreviation List

Index of this chapter:

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

3.1 Safety Instructions

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

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

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

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

3.2 Warnings

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

3.3 Notes

3.3.1 General

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

3.3.2 Schematic Notes

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

3.3.3 Spare Parts

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

3.3.4 BGA (Ball Grid Array) ICs

Introduction

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

BGA Temperature Profiles

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

3.3.5 Lead-free Soldering

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

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

3.3.6 Alternative BOM identification

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

The **third digit** in the serial number (example: AG2B0335000001) indicates the number of the alternative B.O.M. (Bill Of Materials) that has been used for producing the specific TV set. In general, it is possible that the same TV model on the market is produced with e.g. two different types of displays, coming from two different suppliers. This will then

result in sets which have the same CTN (Commercial Type Number; e.g. 28PW9515/12) but which have a different B.O.M. number.

By looking at the third digit of the serial number, one can identify which B.O.M. is used for the TV set he is working with. If the third digit of the serial number contains the number "1" (example: AG1B033500001), then the TV set has been manufactured according to B.O.M. number 1. If the third digit is a "2" (example: AG2B033500001), then the set has been produced according to B.O.M. no. 2. This is important for ordering the correct spare parts!

For the third digit, the numbers 1...9 and the characters A...Z can be used, so in total: 9 plus 26 = 35 different B.O.M.s can be indicated by the third digit of the serial number.

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



Figure 3-1 Serial number (example)

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

If a board is defective, consult your repair procedure to decide if the board has to be exchanged or if it should be repaired on component level.

If your repair procedure says the board should be exchanged completely, do not solder on the defective board. Otherwise, it cannot be returned to the O.E.M. supplier for back charging!

3.3.8 Practical Service Precautions

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

3.4 Abbreviation List

0/6/12 SCART switch control signal on A/V board. 0 = loop through (AUX to TV),

6 = play 16 : 9 format, 12 = play 4 : 3 format

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

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

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

4. Mechanical Instructions

Index of this chapter:

[4.1 Cable Dressing](#)

[4.2 Service Positions](#)

[4.3 Assy/Panel Removal](#)

[4.4 Set Re-assembly](#)

Notes:

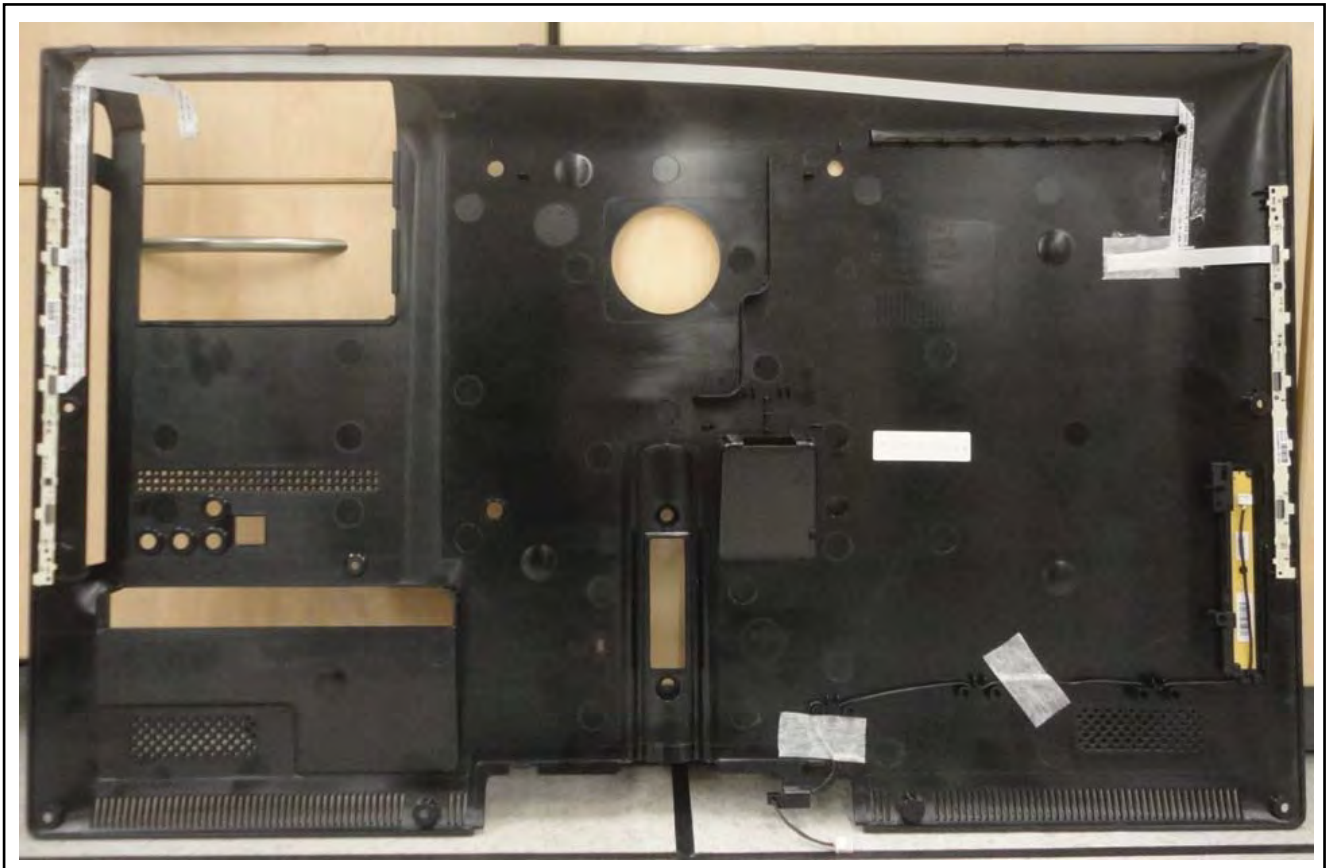
- Figures below can deviate slightly from the actual situation, due to the different set executions.

4.1 Cable Dressing



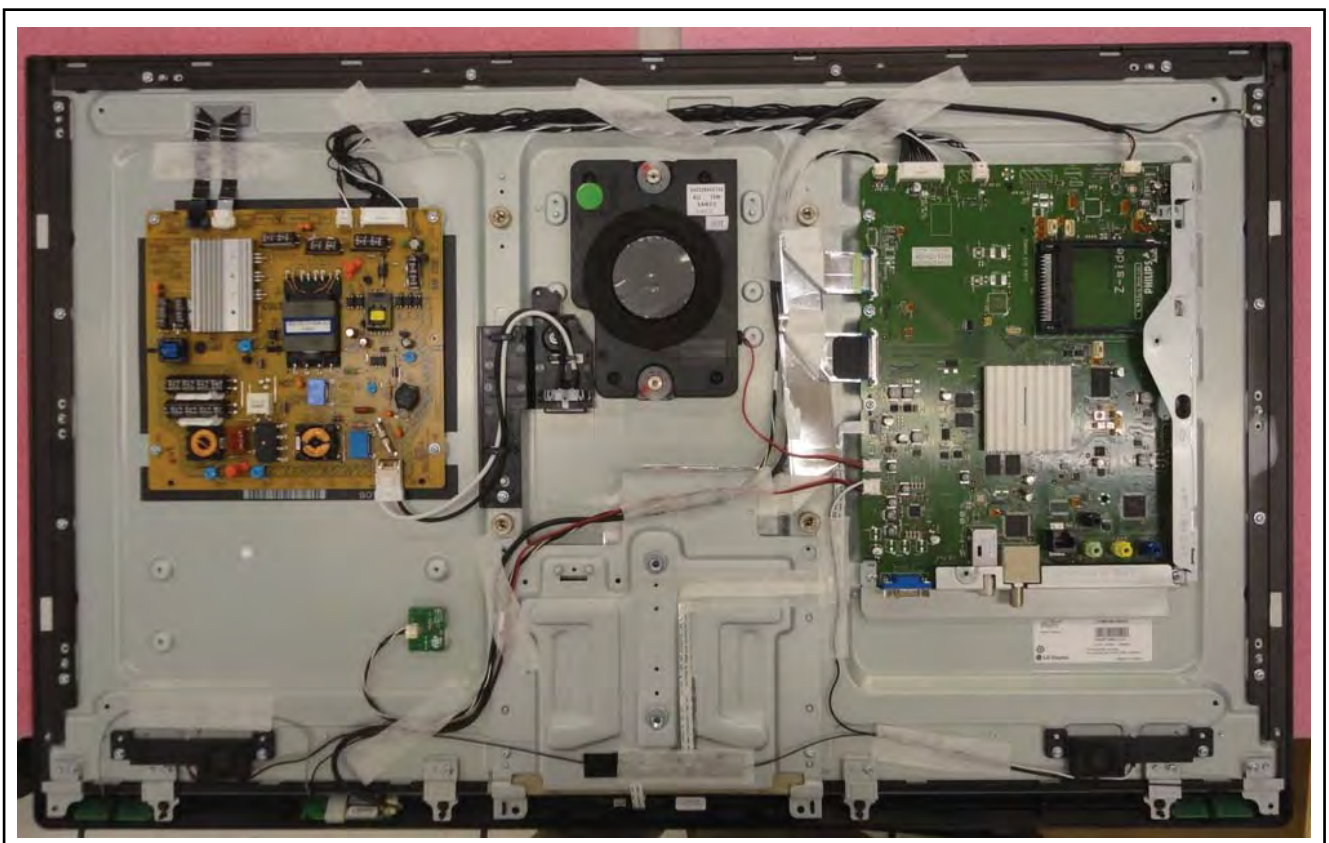
19280_105_120504.eps
120504

Figure 4-1 Cable dressing 32"



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120504

Figure 4-2 Cable dressing 32" back cover 2-sided Ambilight



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120504

Figure 4-3 Cable dressing 37"

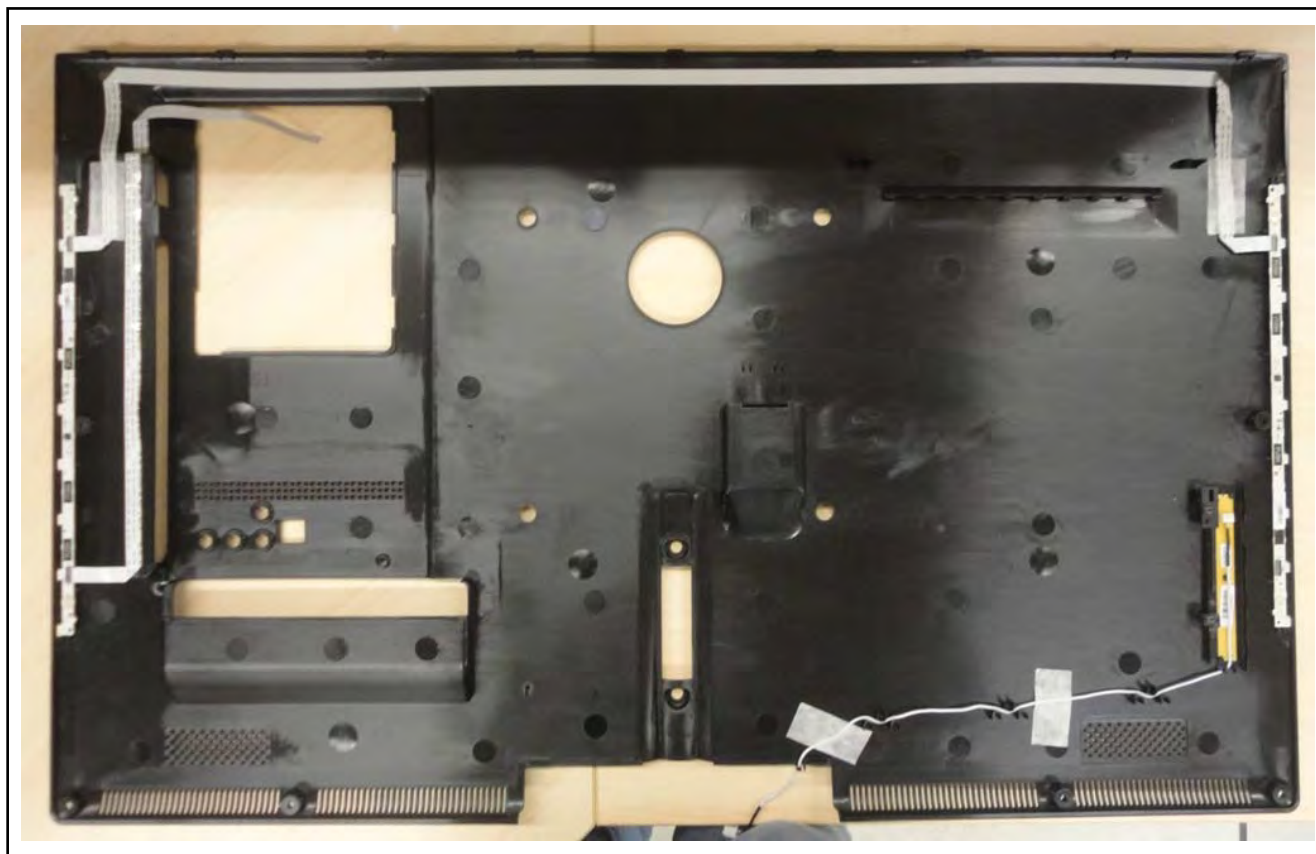
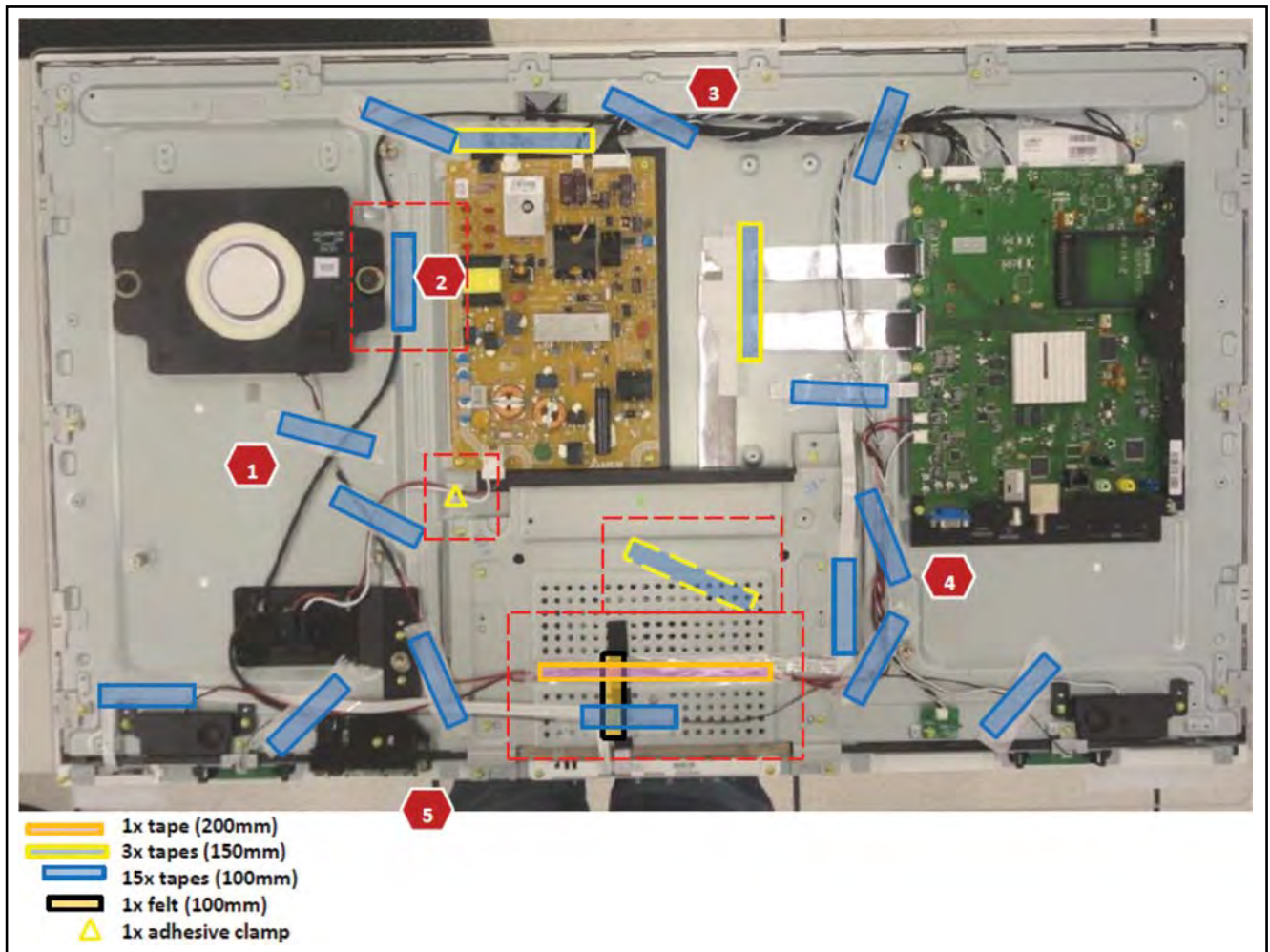
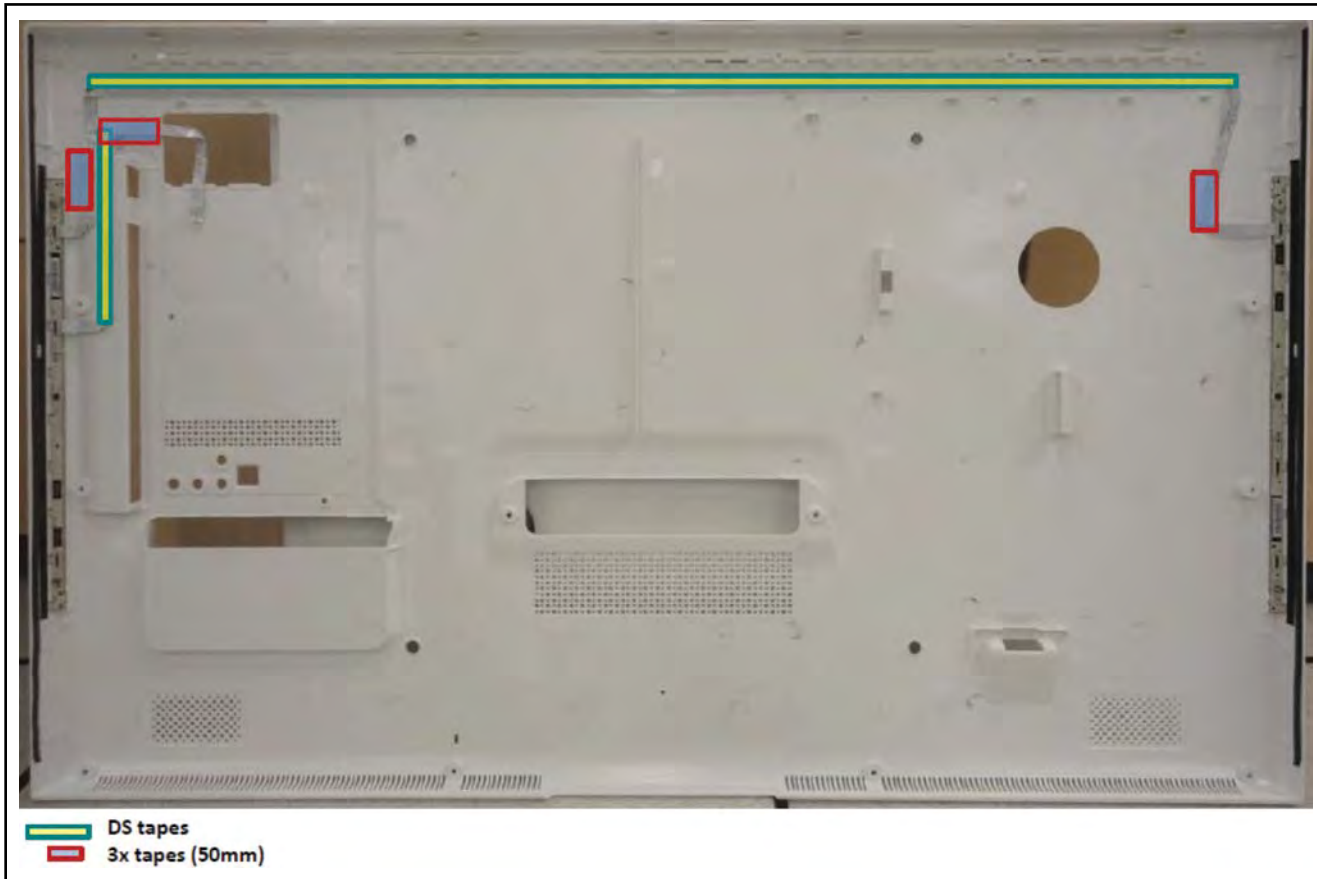


Figure 4-4 Cable dressing 37" back cover 2-sided Ambilight



19282_008_120920.eps
120920

Figure 4-5 Cable dressing 42" PDL series



10000_000full_090126.eps
091118

Figure 4-6 Cable dressing 42" PDL series back cover 2-sided Ambilight

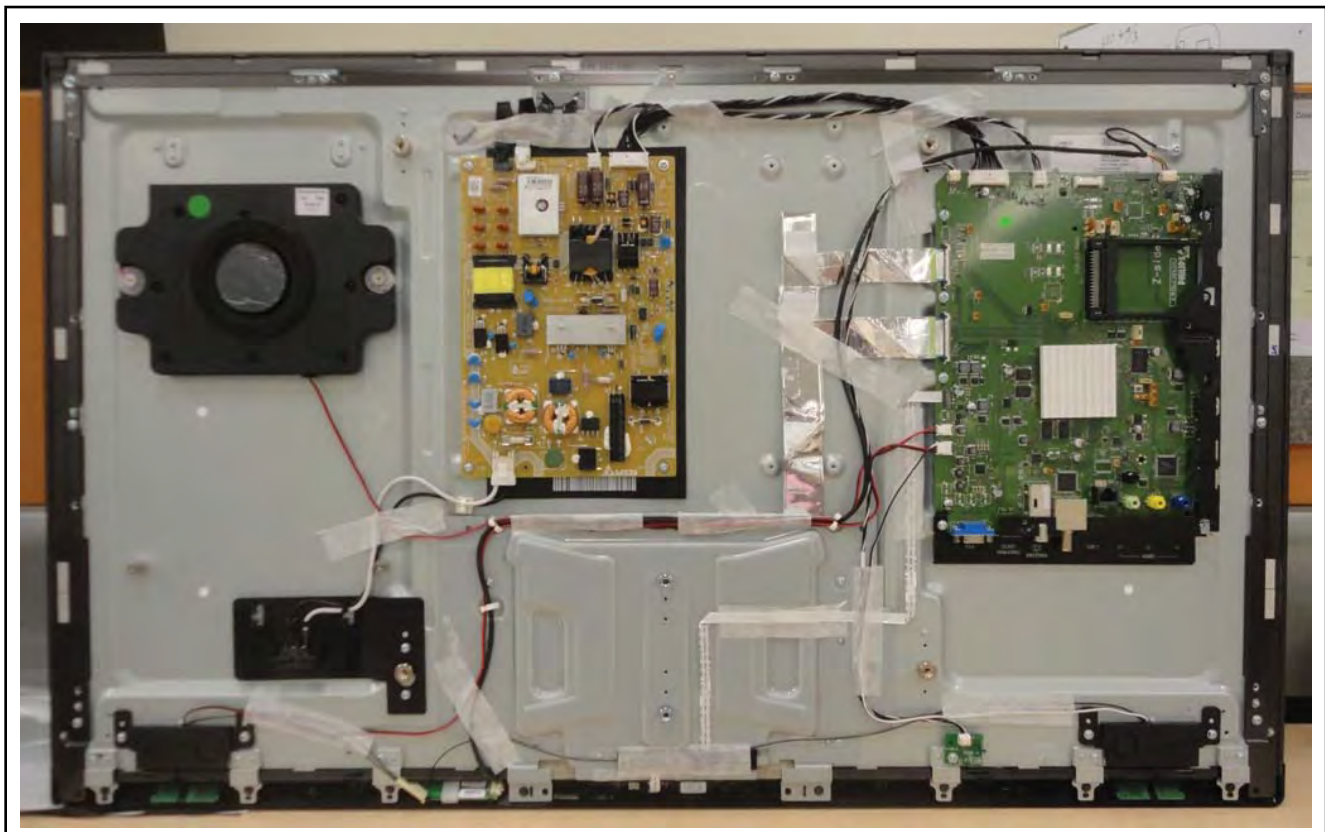
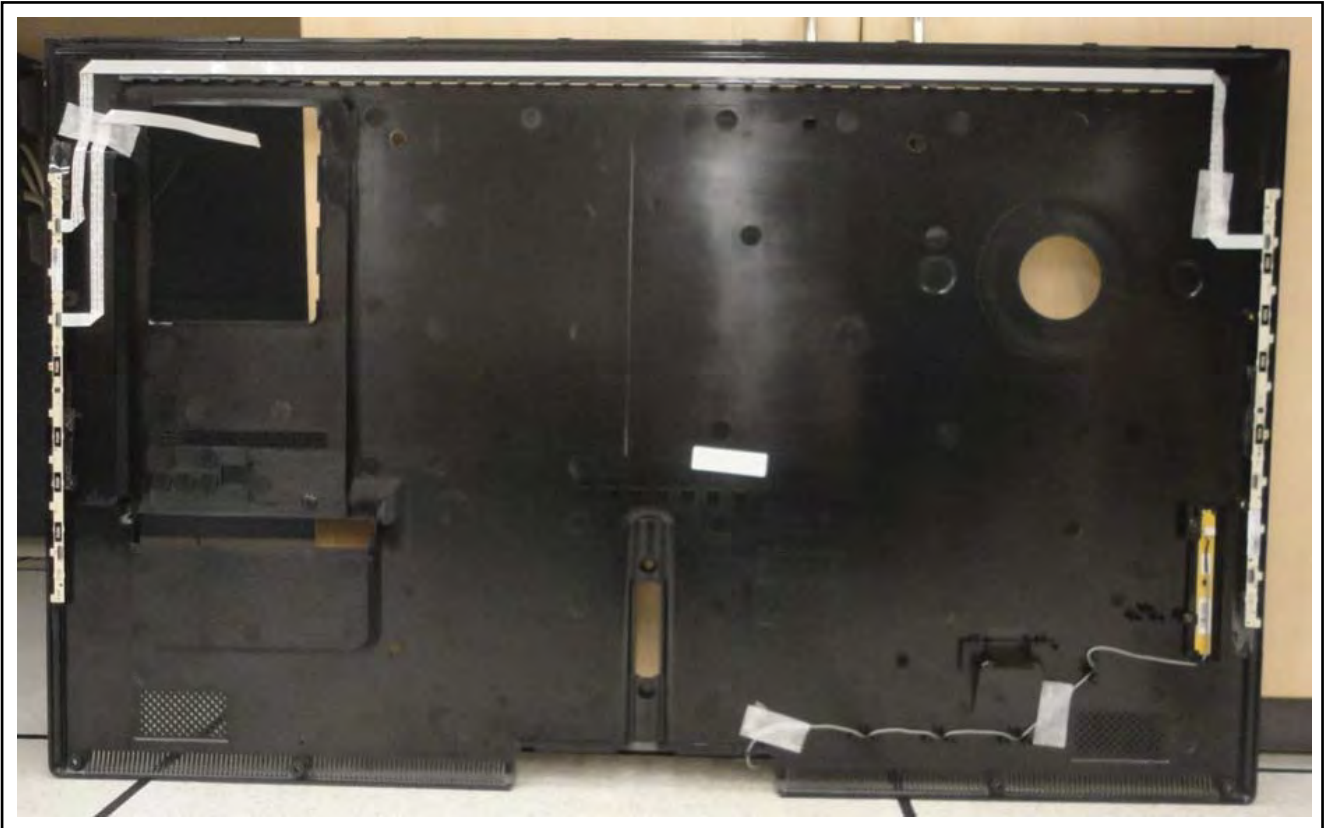
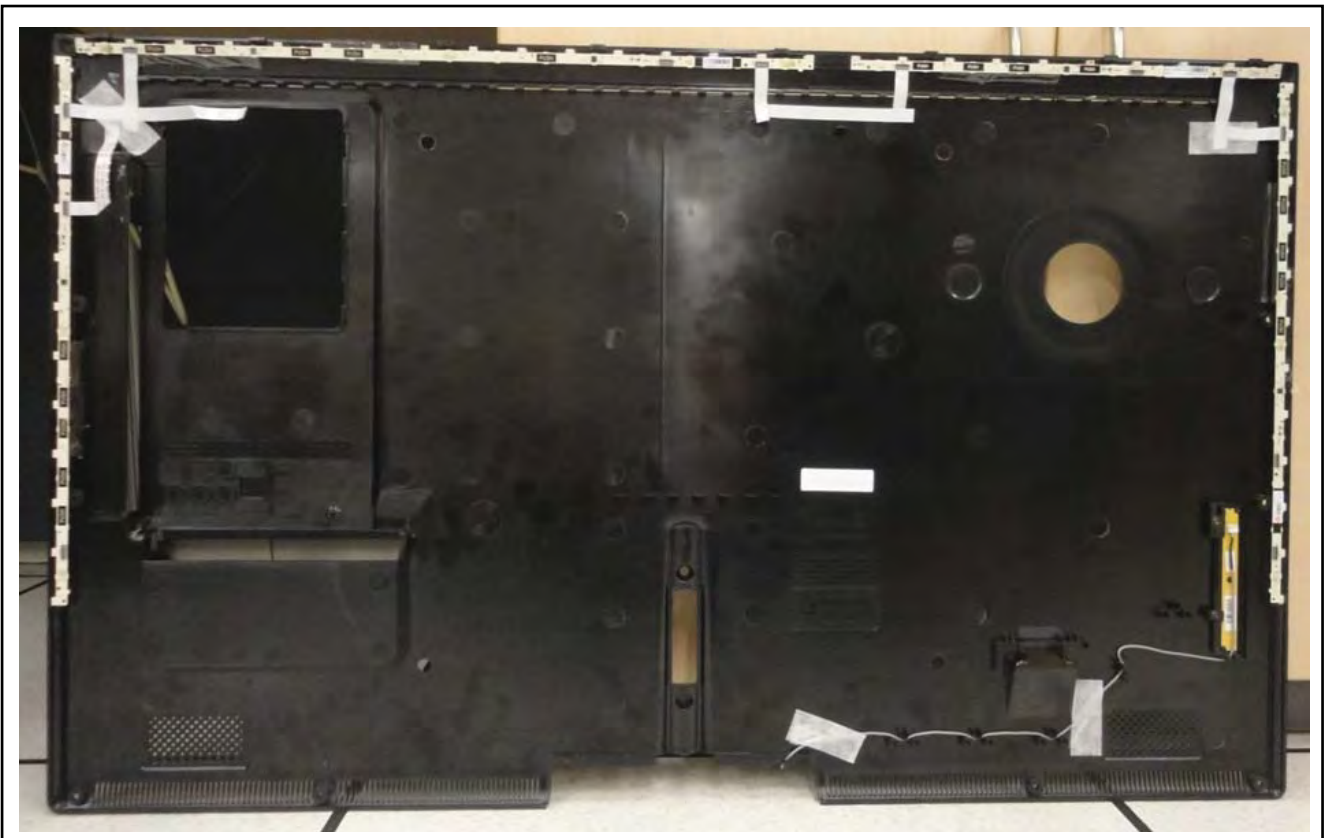


Figure 4-7 Cable dressing 42" PFL series



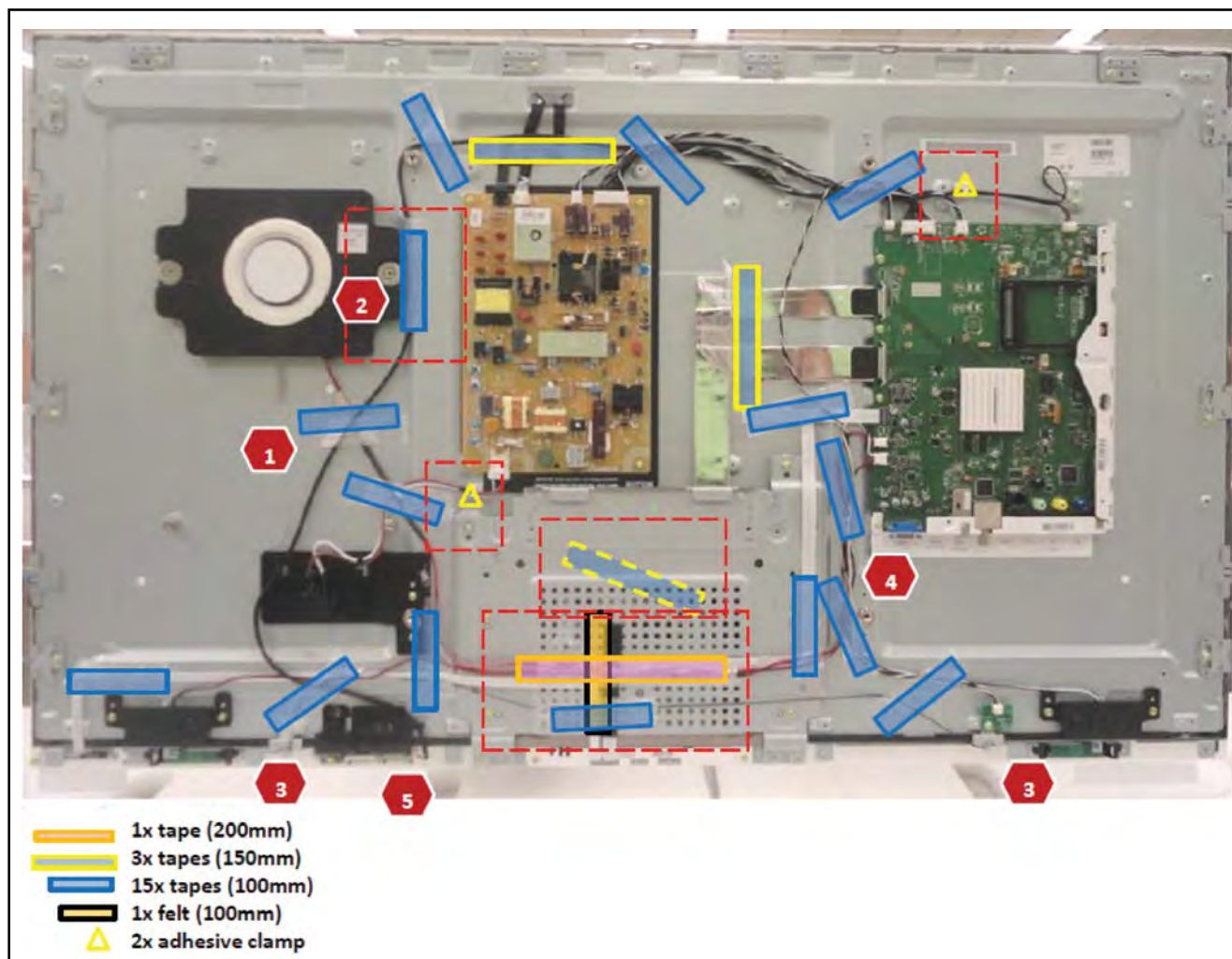
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120504

Figure 4-8 Cable dressing 42" PFL series back cover 2-sided Ambilight



19280_111_120504.eps
120504

Figure 4-9 Cable dressing 42" PFL series back cover 3-sided Ambilight



19282_010_120920.eps
120920

Figure 4-10 Cable dressing 47" PDL series

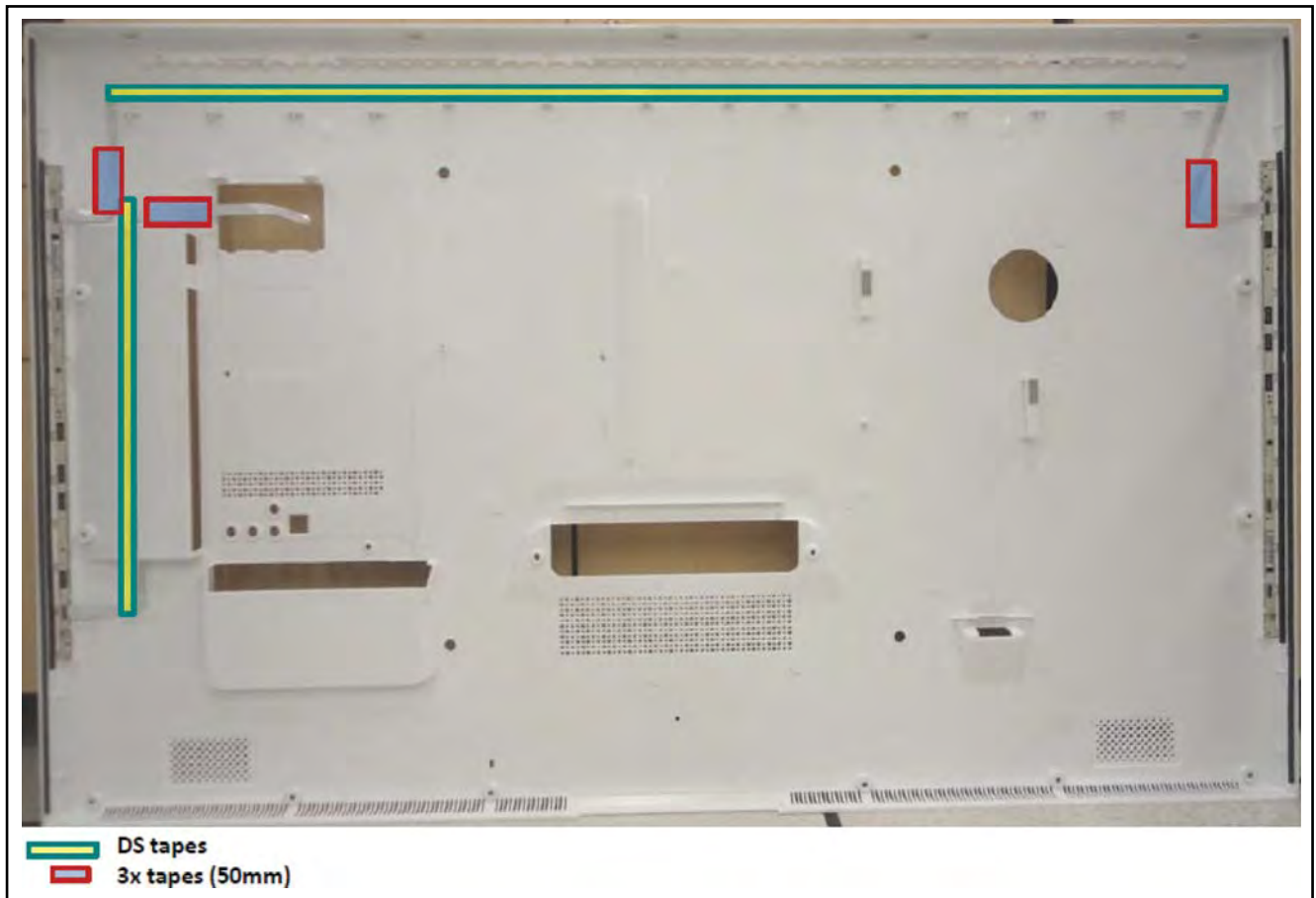
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Figure 4-11 Cable dressing 47" PDL series back cover 2-sided Ambilight

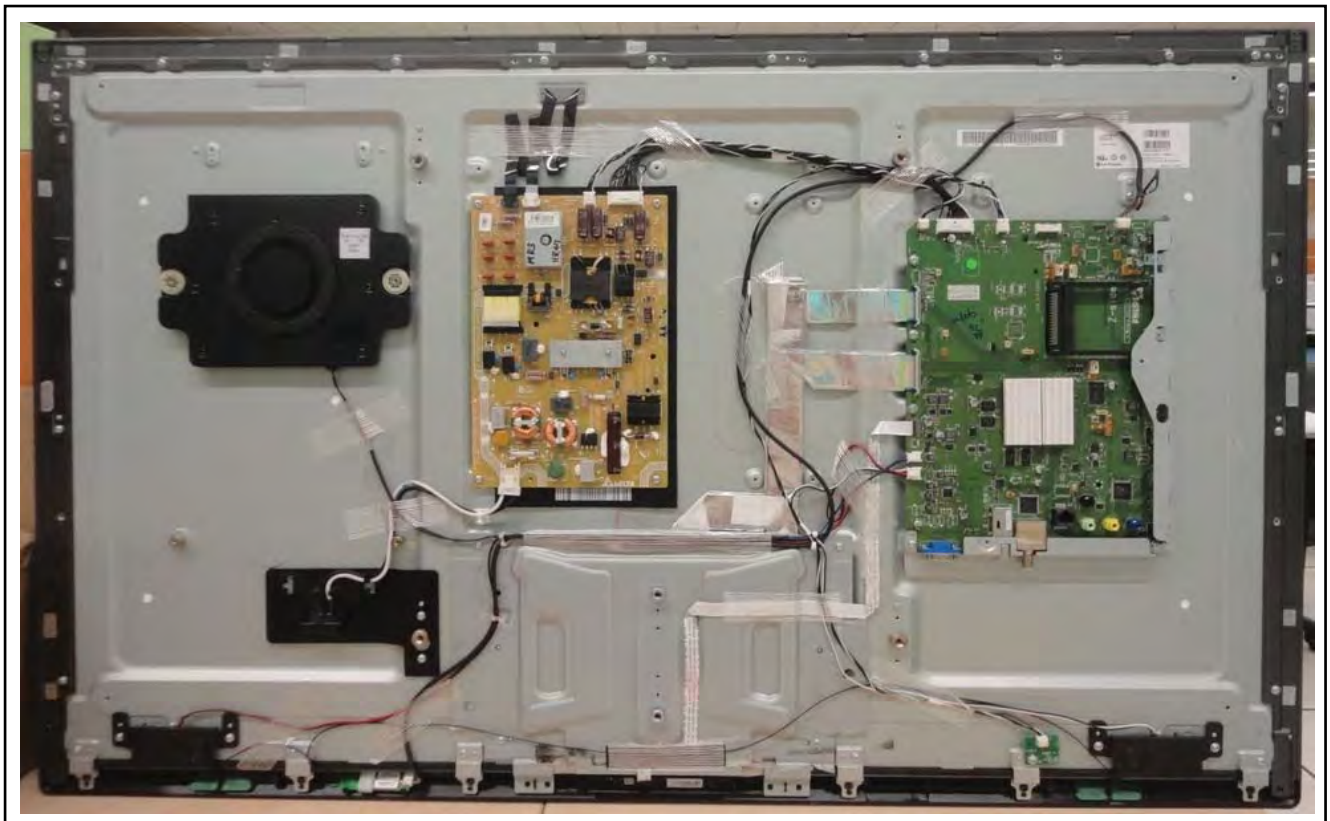
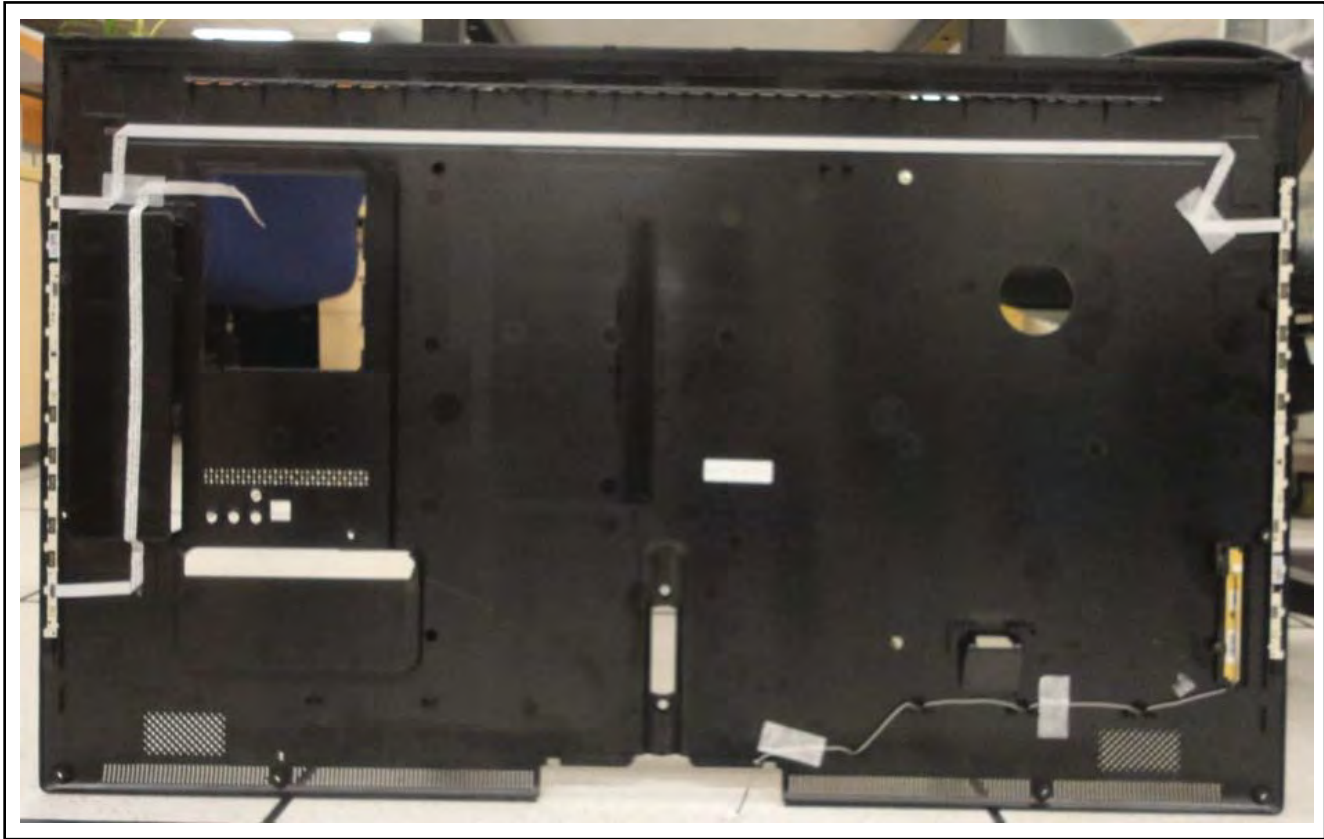
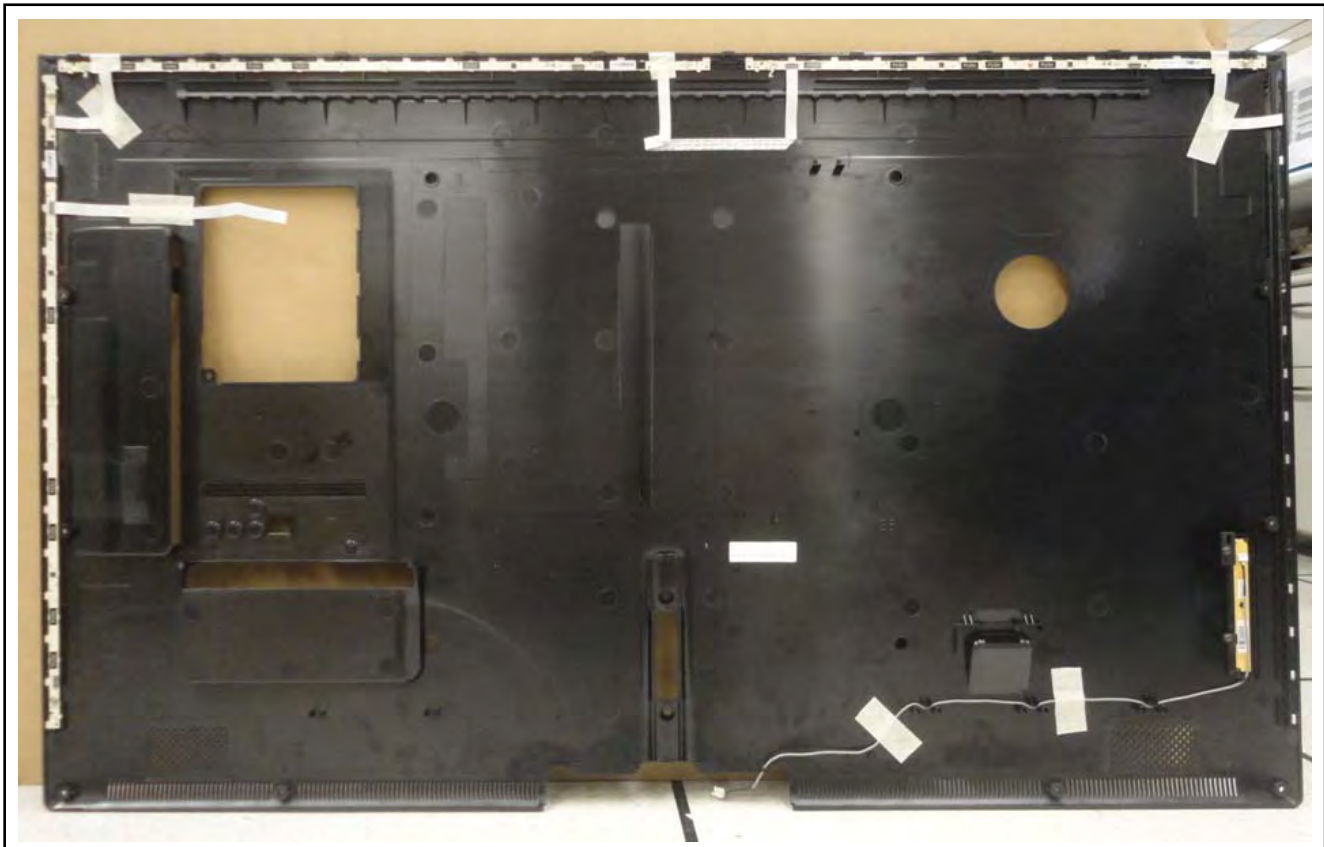


Figure 4-12 Cable dressing 47" PFL series



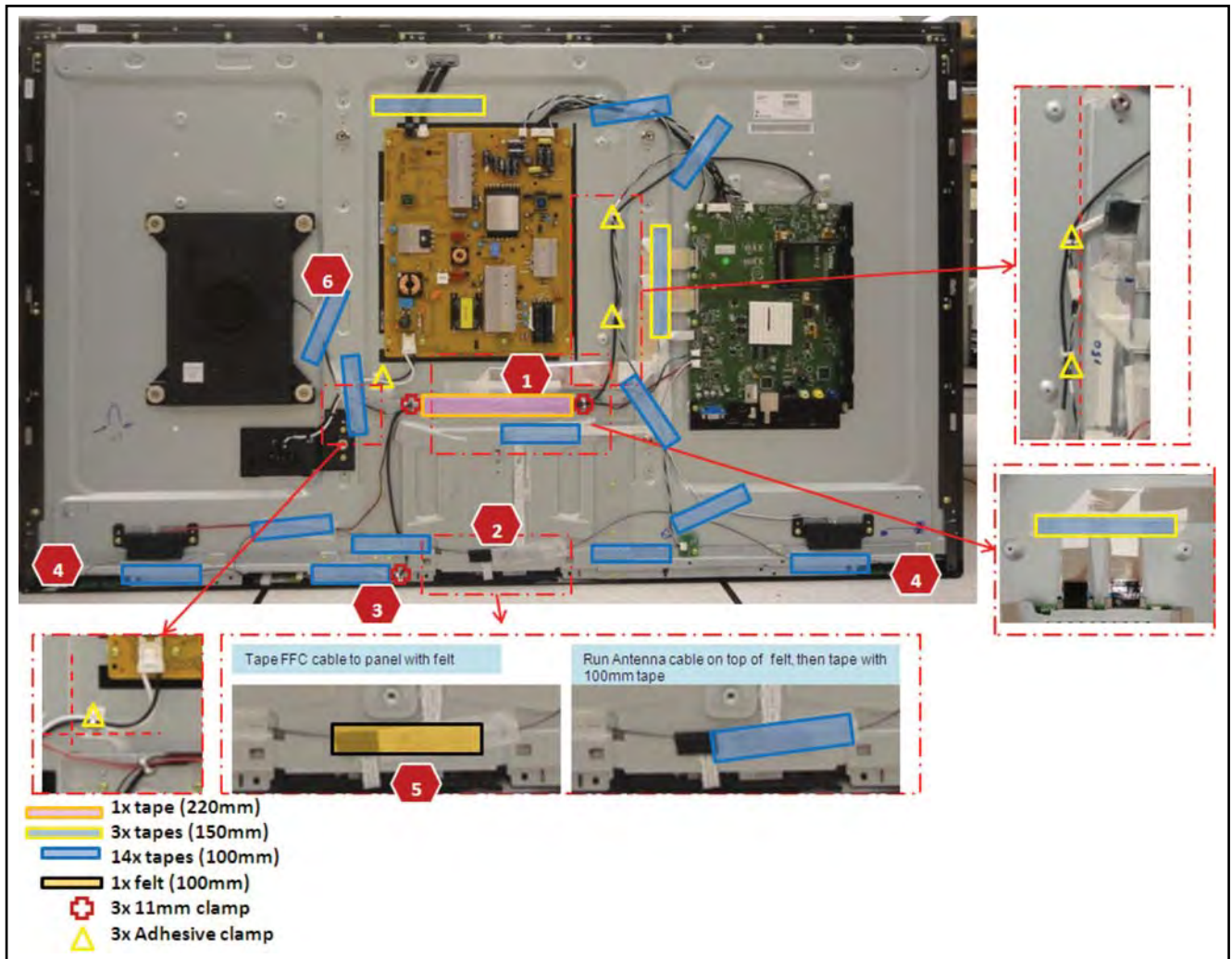
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120504

Figure 4-13 Cable dressing 47" PFL series back cover 2-sided Ambilight



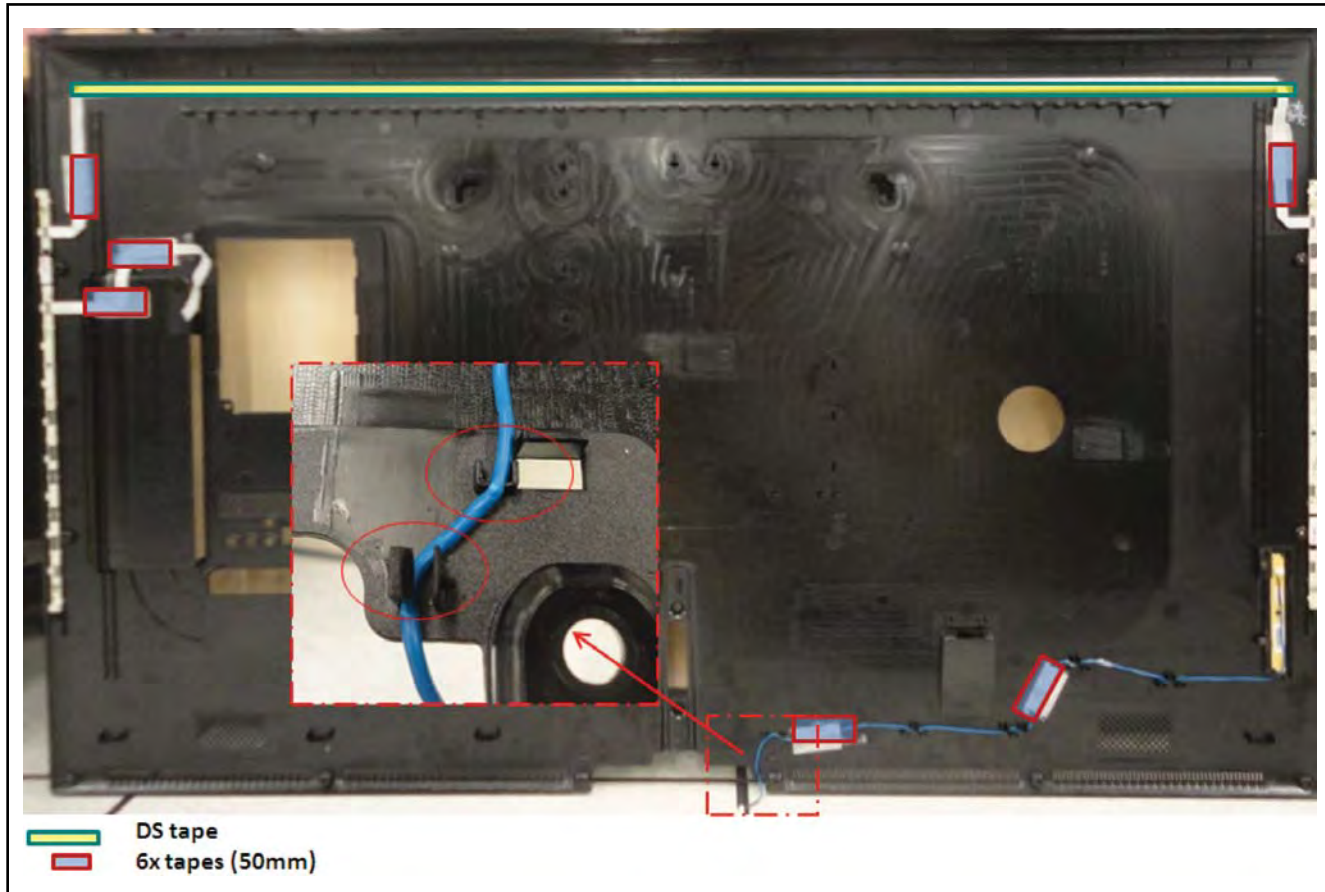
19280_114_120504.eps
120504

Figure 4-14 Cable dressing 47" PFL series back cover 3-sided Ambilight



19282_012_120920.eps
 120920

Figure 4-15 Cable dressing 55"



19282_013_120920.eps
120920

Figure 4-16 Cable dressing 55" back cover 2-sided Ambilight

4.2 Service Positions

For easy servicing of a TV set, the set should be put face down on a soft flat surface, foam buffers or other specific workshop tools. Ensure that a stable situation is created to perform measurements and alignments. When using foam bars take care that these always support the cabinet and **never** only the

display. **Caution:** Failure to follow these guidelines can seriously damage the display! Ensure that ESD safe measures are taken.

4.3 Assy/Panel Removal

4.3.1 Rear Cover

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

Attention: All sets are equipped with a hatch to disconnect the keyboard control panel. Ambilight sets are in addition equipped with a hatch to disconnect the Ambilight units.

These hatches are indicated on the rear cover with

SERVICE ▲.

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

See [Figure 4-17](#) to [Figure 4-20](#) for details.

1. For sets equipped with Ambilight: open the hatch that covers the Ambilight connector and unplug the connector [1].
2. Remove the hatch that covers the keyboard control panel connector by removing the screws [3] and releasing the catches on top of the hatch with a screwdriver (not indicated on figure).
3. For sets equipped with Ambilight: remove the stand and swivel block [4].
4. Unplug the keyboard control panel connector located underneath the keyboard control hatch.
5. Remove remaining fixation screws as indicated in the overview of [Figure 4-19](#) or [Figure 4-20](#) (depending on screen size).

6. Execute all actions as depicted in [Figure 4-21](#) to [Figure 4-28](#).

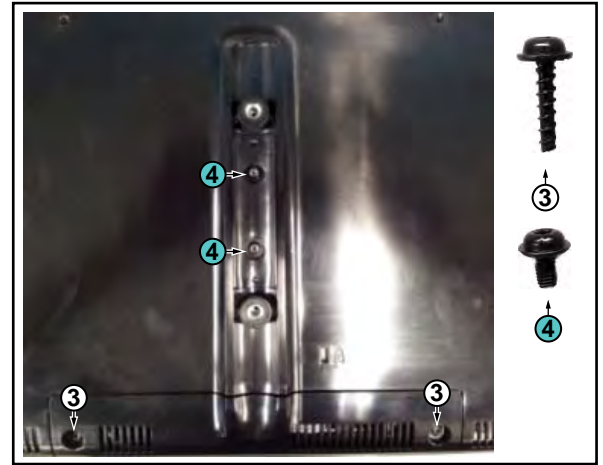
7. Lift the rear cover from the TV. Make sure that wires and flat foils are not damaged while lifting the rear cover from the set.

When re-mounting the backcover: start with the bottom, followed by pressing the catches in reverse order.



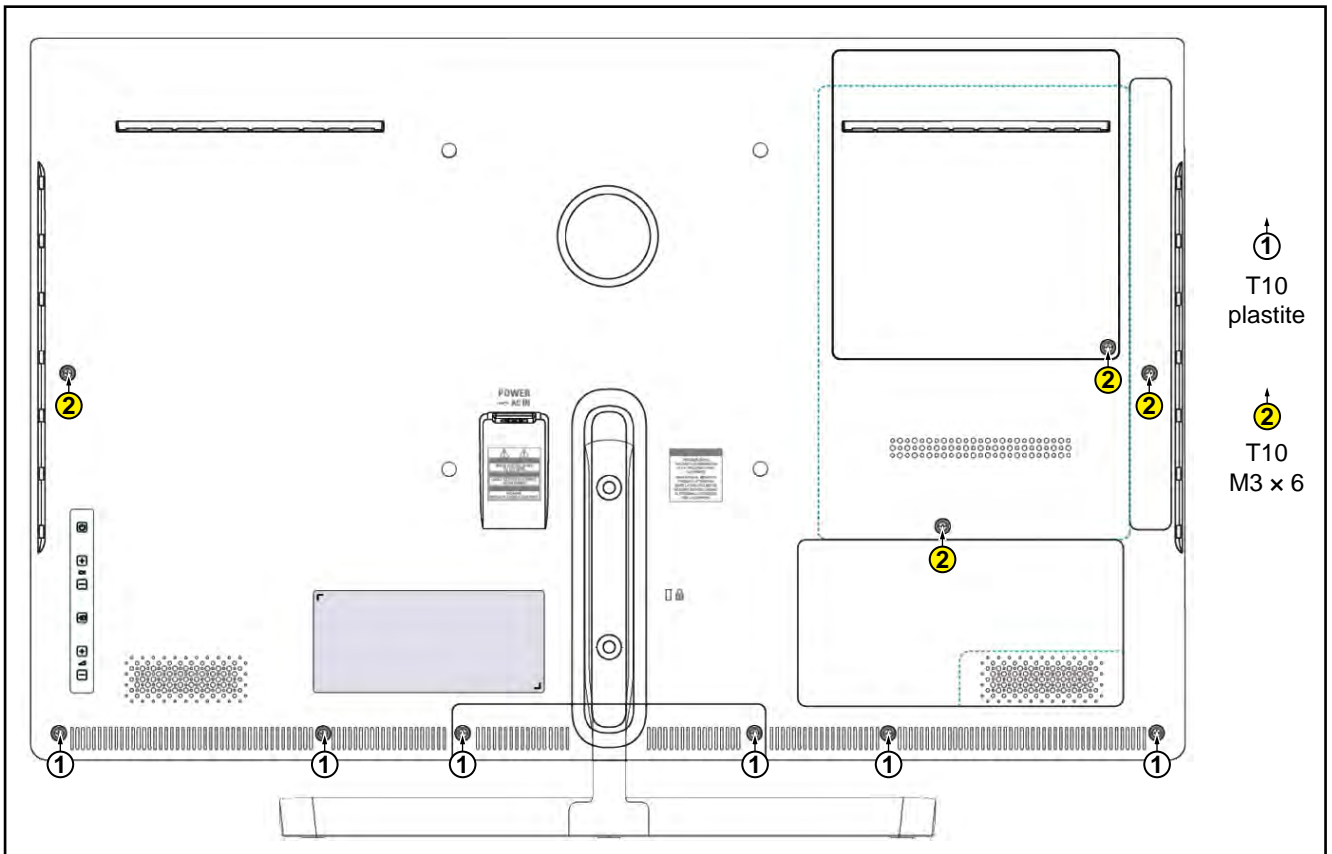
19300_053_120418.eps
120418

Figure 4-17 Rear cover removal -all models -1-



19300_054_120418.eps
120418

Figure 4-18 Rear cover removal -all models -2-



19210_090_120509.eps
120509

Figure 4-19 Rear cover removal - 32/37" sets

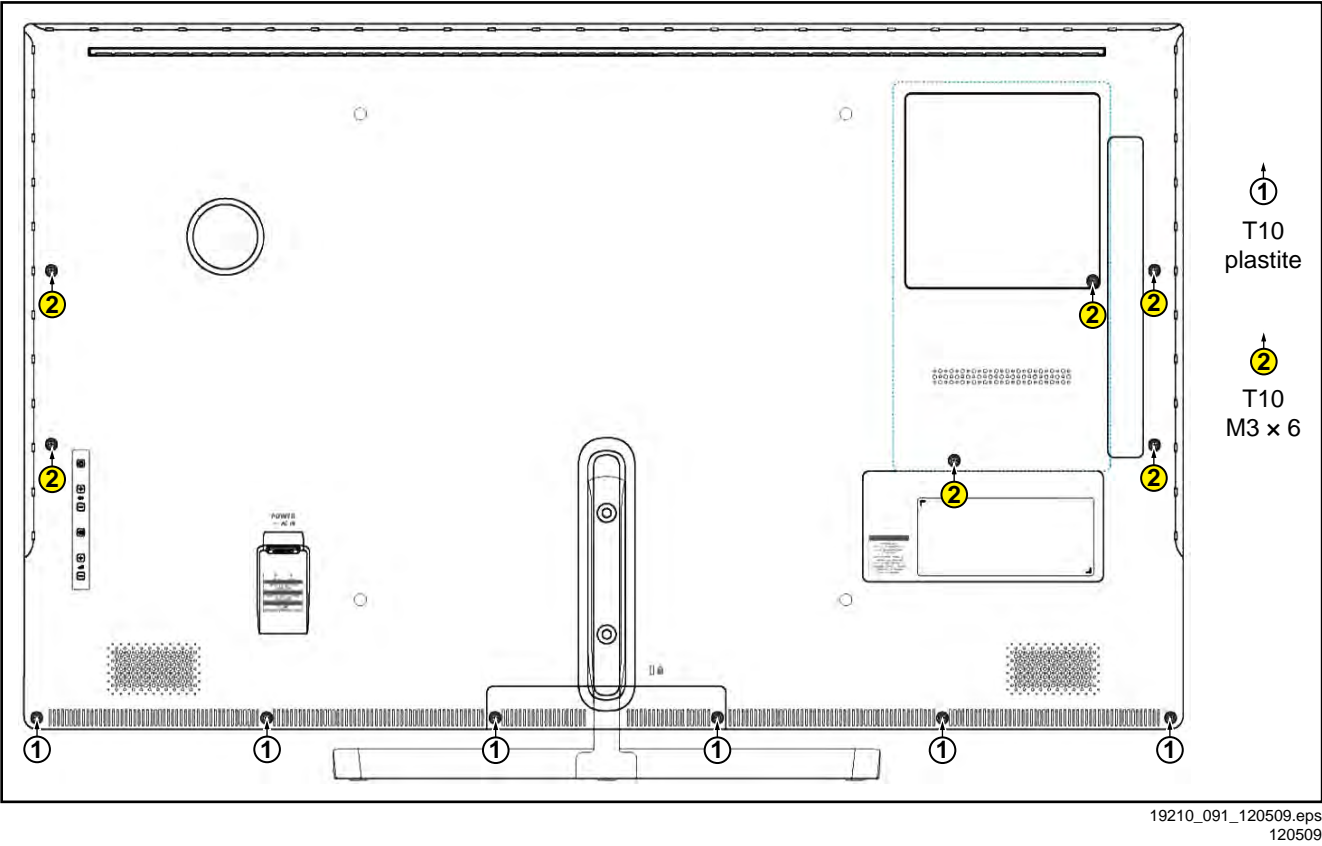


Figure 4-20 Rear cover removal - 42/47" sets

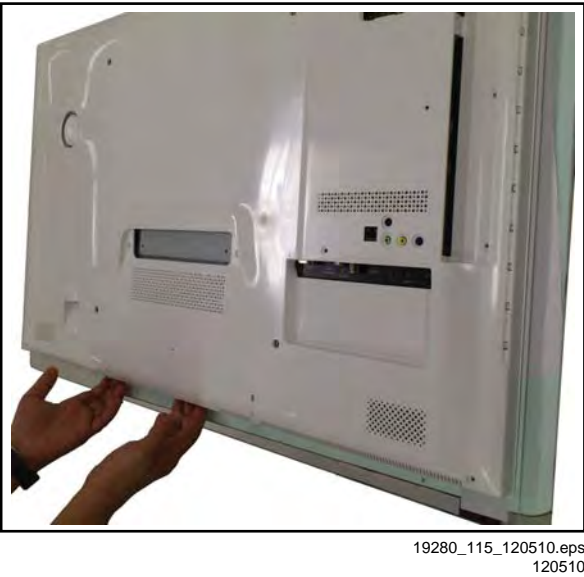


Figure 4-21 Pulling bottom of backcover upwards



Figure 4-22 Releasing side catch -1-

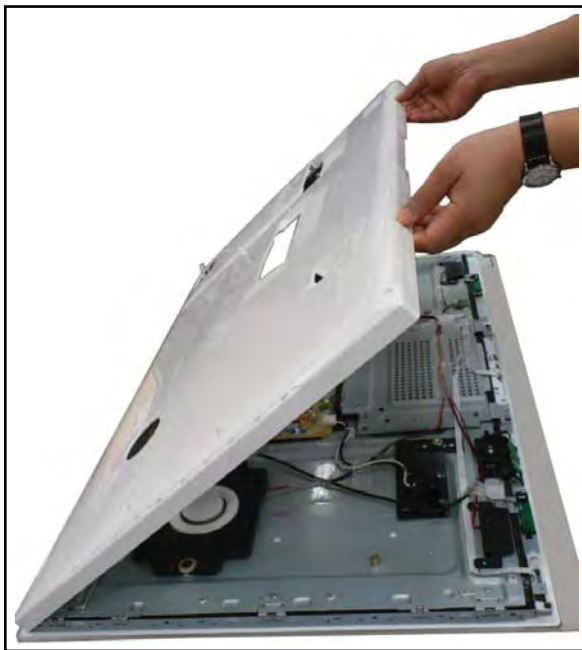


Figure 4-23 Releasing side catch -2-



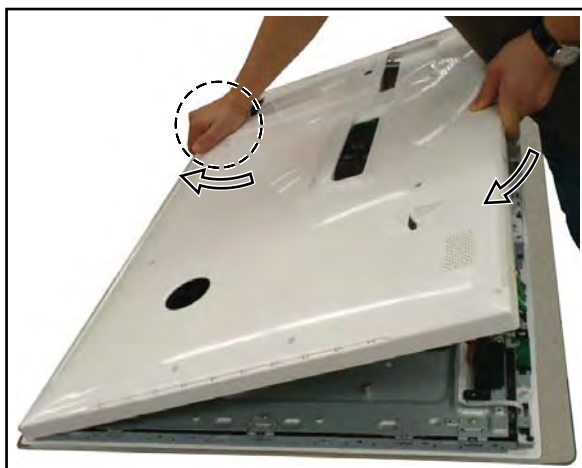
19280_118_120510.eps
120510

Figure 4-24 Releasing side catch -3-



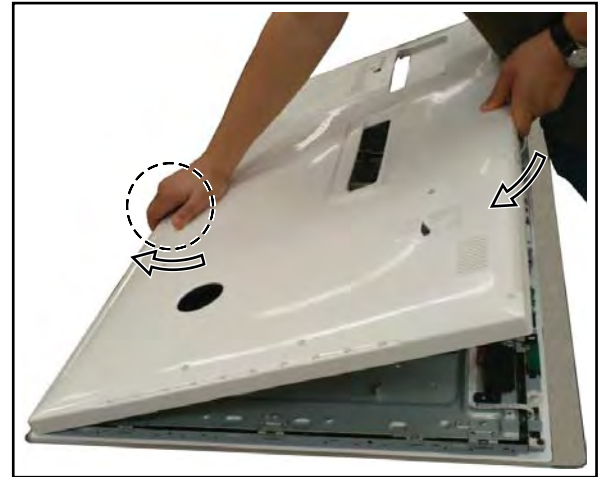
19280_119_120510.eps
120510

Figure 4-25 Pulling bottom edge upwards



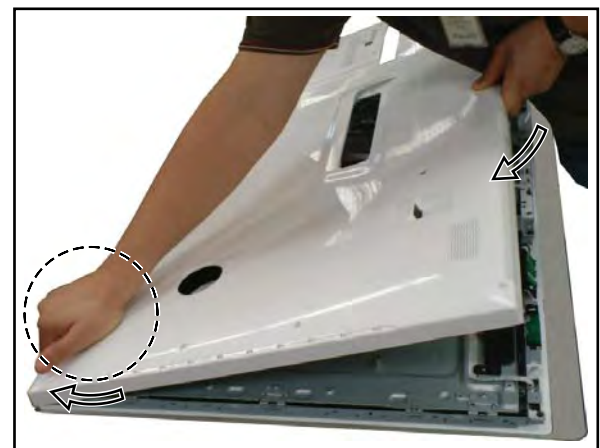
19280_120_120510.eps
120510

Figure 4-26 Releasing top catch right



19280_121_120510.eps
120510

Figure 4-27 Releasing top catch middle

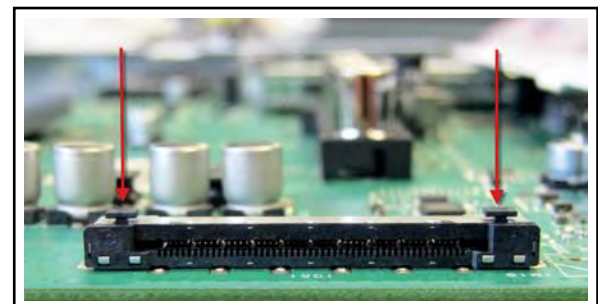


19280_122_120510.eps
120510

Figure 4-28 Releasing top catch left

4.3.2 SSB

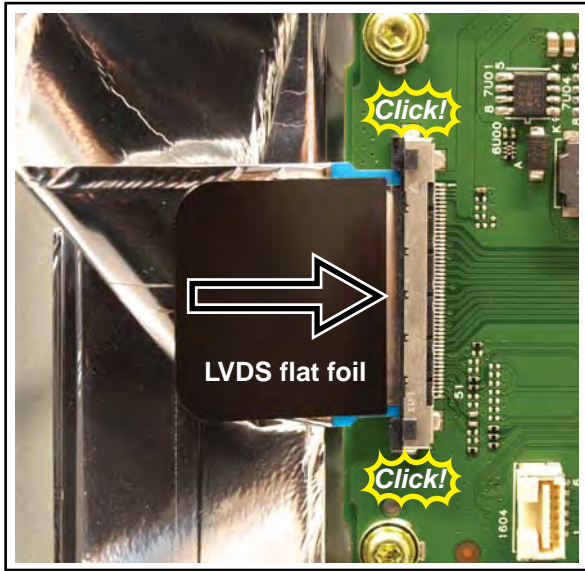
Refer to [Figure 4-29](#) and [Figure 4-30](#) for details. Some SSBs have a dedicated LVDS connector, requiring pressing two catches as indicated in the figure, before removing the LVDS cable.



19054_001_111010.eps
111010

Figure 4-29 SSB LVDS connector catches (optional) -1-

Upon re-connecting the LVDS cable, ensure the catches are locked after having inserted the LVDS cable.



19222_001_120626.eps
120626

Figure 4-30 SSB LVDS connector catches (optional) -2-

4.4 Set Re-assembly

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

Notes:

- While re-assembling, make sure that all cables are placed and connected in their original position.
- Pay special attention not to damage the EMC foams in the set. Ensure that EMC foams are mounted correctly.

5. Service Modes, Error Codes, and Fault Finding

Index of this chapter:

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

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

Service Default mode (SDM) and Service Alignment Mode (SAM) offers several features for the service technician, while the Customer Service Mode (CSM) is used for communication between the call centre and the customer.

This chassis also offers the option of using ComPair, a hardware interface between a computer and the TV chassis. It offers the abilities of structured troubleshooting, error code reading, and software version read-out for all chassis. (see also section "[5.4.1 ComPair](#)").

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 Service Default Mode (SDM)

Purpose

- To create a pre-defined setting, to get the same measurement results as given in this manual.
- To override SW protections detected by the standby processor and make the TV start up to the step just before protection. See section "[5.3 Start-up](#)".
- To start the blinking LED procedure where only LAYER 2 errors are displayed. (see also section "[5.5 Error Codes](#)").

Specifications

Table 5-1 SDM default settings

Region	Freq. (MHz)	Default system
Europe, AP(PAL/Multi)	475.25	PAL B/G
Europe, AP DVB-T	546.00 PID Video: 0B 06 PID PCR: 0B 06 PID Audio: 0B 07	DVB-T

- All picture settings at 50% (brightness, colour, contrast).
- Sound volume at 25%.

How to Activate SDM

For this chassis there are two kinds of SDM: an **analogue SDM** and a **digital SDM**. Tuning will happen according [Table 5-1](#).

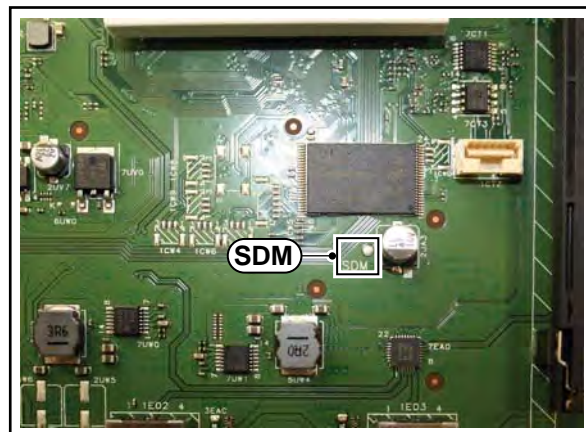
- **Analogue SDM:** use the RC-transmitter and key in the code "062596", directly followed by the "MENU" (or "HOME") button.

Note: It is possible that, together with the SDM, the main menu will appear. To switch it "off", push the "MENU" (or "HOME") button again.

Analogue SDM can also be activated by grounding the solder path on the SSB, with the indication "SDM" (see figures [Service mode pad - front](#)) and [Service mode pad - back](#).

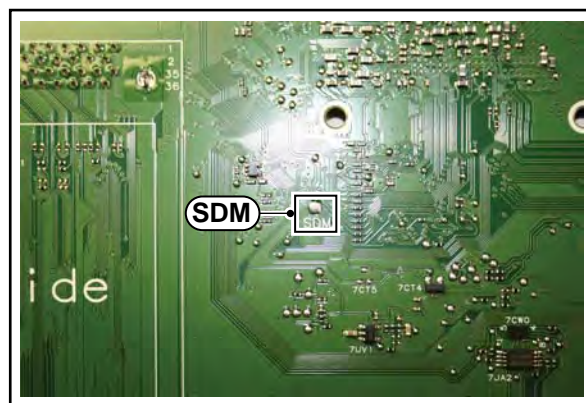
- **Digital SDM:** use the RC-transmitter and key in the code "062593", directly followed by the "MENU" (or "HOME") button.

Note: It is possible that, together with the SDM, the main menu will appear. To switch it "off", push the "MENU" (or "HOME") button again.



19210_082_120507.eps
120507

Figure 5-1 Service mode pad - front



19210_083_120507.eps
120507

Figure 5-2 Service mode pad - back

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

How to Exit SDM

Use one of the following methods:

- Switch the set to STANDBY via the RC-transmitter.
- Via a standard customer RC-transmitter: key in "00"-sequence.

5.2.2 Service Alignment Mode (SAM)

Purpose

- To perform (software) alignments.
- To change option settings.
- To easily identify the used software version.
- To view operation hours.
- To display (or clear) the error code buffer.

How to Activate SAM

Via a standard RC transmitter: Key in the code "062596" directly followed by the "INFO" or "OK" button. After activating SAM with this method a service warning will appear on the screen, continue by pressing the "OK" button on the RC.

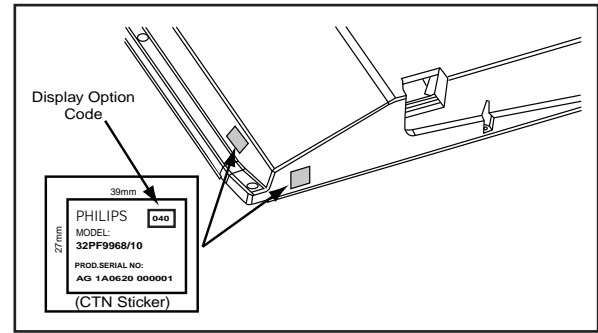
Contents of SAM

• Hardware Info.

- **A. SW Version.** Displays the software version of the main software (**example:** QF1XX-1.2.3.4 = AAABB_X.Y.W.Z).
 - **AAA**= the chassis name.
 - **BB**= Product ID.
 - **X.Y.W.Z**= the software version, where X is the main version number (different numbers are not compatible with one another) and Y.W.Z is the sub version number (a higher number is always compatible with a lower number).
- **B. Standby processor version.** Displays the software version of the standby processor.
- **C. Production Code.** Displays the production code of the TV, this is the serial number as printed on the back of the TV set. Note that if an NVM is replaced or is initialized after corruption, this production code has to be re-written to NVM. The update can be done via the NVM editor available in SAM.
- **Operation hours.** Displays the accumulated total of operation hours (not the standby hours). Every time the TV is switched "on/off", 0.5 hours is added to this number.
- **Errors** (followed by maximum 10 errors). The most recent error is displayed at the upper left (for an error explanation see section "[5.5 Error Codes](#)").
- **Reset Error Buffer.** When "cursor right" (or "OK" button) pressed here, followed by the "OK" button, the error buffer is reset.
- **Alignments.** This will activate the "ALIGNMENTS" sub-menu. See Chapter [6. Alignments](#).
- **Options numbers.** Extra features for Service. For more info regarding option codes, see chapter [6. Alignments](#). Note that if the option code numbers are changed, these have to be confirmed with pressing the "OK" button before the options are stored, otherwise changes will be lost.
- **Initialise NVM.** The moment the processor recognizes a corrupted NVM, the "initialise NVM" line will be highlighted. Now, two things can be done (dependent of the service instructions at that moment):
 - Save the content of the NVM via ComPair for development analysis, **before** initializing. This will give the Service department an extra possibility for diagnosis (e.g. when Development asks for this).
 - Initialise the NVM.

Note: When the NVM is corrupted, or replaced, there is a high possibility that no picture appears because the display code is not correct. So, before initializing the NVM via the SAM, a picture is necessary and therefore the correct display option has to be entered. Refer to Chapter [6. Alignments](#) for details. To adapt this option, it's advised to use ComPair (the correct values for the options can be found in Chapter [6. Alignments](#)) or a method via a standard RC (described below).

Changing the display option via a standard RC: Key in the code "062598" directly followed by the "MENU" (or "HOME") button and "XXX" (where XXX is the 3 digit decimal display code as mentioned on the sticker in the set). Make sure to key in all three digits, also the leading zero's. If the above action is successful, the front LED will go out (Standby) as an indication that the RC sequence was correct. After the display option is changed in the NVM, the TV will go to the Standby mode. If the NVM was corrupted or empty before this action, it will be initialized first (loaded with default values). This initializing can take up to 20 seconds.



10000_038_090121.eps
090819

Figure 5-3 Location of Display Option Code sticker

- **Store - go right.** All options and alignments are stored when pressing "cursor right" or the "OK" button.
- **Software maintenance.**
 - **SW Events.** In case of specific software problems, the development department can ask for this info.
 - **HW Events.** In case of specific software problems, the development department can ask for this info :
 - **Event 26:** refers to a power dip, this is logged after the TV set reboots due to a power dip.
 - **Event 17:** refers to the power OK status, sensed even before the 3 x retry to generate the error code.
- **Test settings.** For development purposes only.
- **RF4CE pairing tables.** Clear paired remote control. Re-pairing (coldboot of platform possibly needed) can be done by pressing the red/blue hot keys simultaneously for a few seconds. (be sure the distance between the remote control and TV set RF4CE receiver is less then 30cm). Message like "Pairing successful", confirms the match-make.
- **Development 1 file versions.** Not useful for Service purposes, this information is mainly used by the development department.
- **Development 2 file versions.** Not useful for Service purposes, this information is mainly used by the development department.
- **Upload to USB.** To upload several settings from the TV to an USB stick, which is connected to the SSB. The items are "Personal settings", "Option codes", "Alignments", "Identification data" (includes the set type and prod code + all 12NC like SSB, display, boards), "History list". The "All" item supports the upload of all several items at once.
A directory "repair" will be created in the root of the USB stick.
 To upload the settings, select each item separately, press "cursor right" (or the "OK" button), confirm with "OK" and wait until the message "Done" appears. In case the download to the USB stick was not successful, "Failure" will be displayed. In this case, check if the USB stick is connected properly and if the directory "repair" is present in the root of the USB stick. Now the settings are stored onto the USB stick and can be used to download into another TV or other SSB. Uploading is of course only possible if the software is running and preferably 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. Important remark : to upload the "channel list", select "Home" => "Setup" => "TV settings" => "General settings" => "Channel list copy" => "Copy to USB". The procedure is also described in the (electronic) user manual.
- **Download from USB.** To download several settings from the USB stick to the TV, same way of working needs to be followed as described in "Upload to USB". The "All" item supports to download all several items at once. Important remark : to download the "channel list", select "Home" => "Setup" => "TV settings" => "General settings" => "Channel list copy" => "Copy to TV". The procedure is also described in the (electronic) user manual.
- **NVM editor.** For Smart TV the set "Type number" must be

entered correctly.

Also the "Production code" (factory location code), "12NC SSB", "12NC display" and "12NC supply" can be entered here via the RC-transmitter. Be sure the cursor is put fully to the left (use back key) of the dialog box before enter the new data.

Correct data can be found on the side/rear sticker.

How to Navigate

- In SAM, the menu items can be selected with the "CURSOR UP/DOWN" key on the RC-transmitter. The selected item will be highlighted. When not all menu items fit on the screen, move the "CURSOR UP/DOWN" key to display the next/previous menu items.
- With the "CURSOR LEFT/RIGHT" keys, it is possible to:
 - (De) activate the selected menu item.
 - (De) activate the selected sub menu.
- With the "OK" key, it is possible to activate the selected action.

How to Exit SAM

Use one of the following methods:

- Switch the TV set to STAND-BY via the RC-transmitter.
- Via a standard RC-transmitter, key in "00" sequence, or select the "BACK" key.

5.2.3 Customer Service Mode (CSM)

Purpose

When a customer is having problems with his TV-set, he can call his dealer or the Customer Helpdesk. The service technician can then ask the customer to activate the CSM, in order to identify the status of the set. Now, the service technician can judge the severity of the complaint. In many cases, he can advise the customer how to solve the problem, or he can decide if it is necessary to visit the customer. The CSM is a read only mode; therefore, modifications in this mode are not possible.

Provided CSM is activated, every menu from CSM can be used as check for the back end chain video. So for all CSM content displayed, it could be determined that the back end video chain is working.

When CSM is activated **and** there is a USB stick connected to the TV set, the software will dump the CSM content to the USB stick. The file (CSM_model number_serial number.txt) will be saved in the root of the USB stick. This info can be handy if no information is displayed.

Additional in CSM mode (with USB stick connected), pressing "OK" will create an **extended CSM dump** file on the USB stick. This file (Extended_CSM_model number_serial number.txt) contains:

- The normal CSM dump information,
- All items (from SAM "load to USB", but in readable format),
- Operating hours,
- Error codes,
- SW/HW event logs.

To have fast feedback from the field, a flashdump can be requested by development. When in CSM, push the "red" button and key in serial digits '2679' (same keys to form the word 'COPY' with a cellphone). A file "Dump_model number_serial number.bin" will be written on the connected USB device. This can take 1/2 minute, depending on the quantity of data that needs to be dumped.

Also when CSM is activated, the LAYER 1 error is displayed via blinking LED. (see also section [5.5 Error Codes](#)).

How to Activate CSM

Key in the code "123654" via the standard RC transmitter.

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

How to Navigate

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

Contents of CSM

The contents are reduced to 3 pages: General, Software versions and Quality items. The group names itself are not shown anywhere in the CSM menu.

General

- **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, the set type content has to be re-written to NVM. The update can be done via the NVM editor available in SAM.
- **Production code.** Displays the production code (the serial number) of the TV. Note that if an NVM is replaced or is initialized after corruption, the production code content has to be re-written to NVM. The update can be done via the NVM editor available in SAM.
- **Installed date.** Indicates the date of the first installation of the TV. This date is acquired by time extraction.
- **Options 1.** Displays the option codes numbers of option group 1 as set in SAM (Service Alignment Mode).
- **Options 2.** Displays the option codes numbers of option group 2 as set in SAM (Service Alignment Mode).
- **12NC 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. The update can be done via the NVM editor available in SAM. This identification number is the 12nc number of the SSB.
- **12NC display.** Shows the 12NC of the display. Note that if an NVM is replaced or is initialized after corruption, this identification number has to be re-written to NVM. The update can be done via the NVM editor available in SAM.
- **12NC supply.** Shows the 12NC of the power supply. Note that if an NVM is replaced or is initialized after corruption, this identification number has to be re-written to NVM. The update can be done via the NVM editor available in SAM.
- **12NC RF4CE board.** Shows the 12NC of the RF4CE board.

Software versions

- **Current main software.** Displays the build-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.
Example: QF1xx-1.2.3.4
- **Standby software.** Displays the build-in standby processor software version. Upgrading this software will be possible via USB (see section [5.9 Software Upgrading](#)).
Example: STDBY_61.0.0.7
- **e-UM version.** Displays the electronic user manual SW-version (12NC version number). Most significant number here is the last digit.
- **Strings database version.** Reflects the latest embedded string database version.
- **FPGA video version.** Displays the Scan/backlight FPGA software version. Device processes the backlight + boost pwm control, scanning, 3D drive and ambilight buffering.
- **3D dongle software version.** Not applicable.
- **FRC-V software.** Not applicable.
- **RF4CE software.** Embedded software version located on the RF4CE board.
- **FPGA lattice backlight software.**
- **FPGA HDR software.**

Quality items

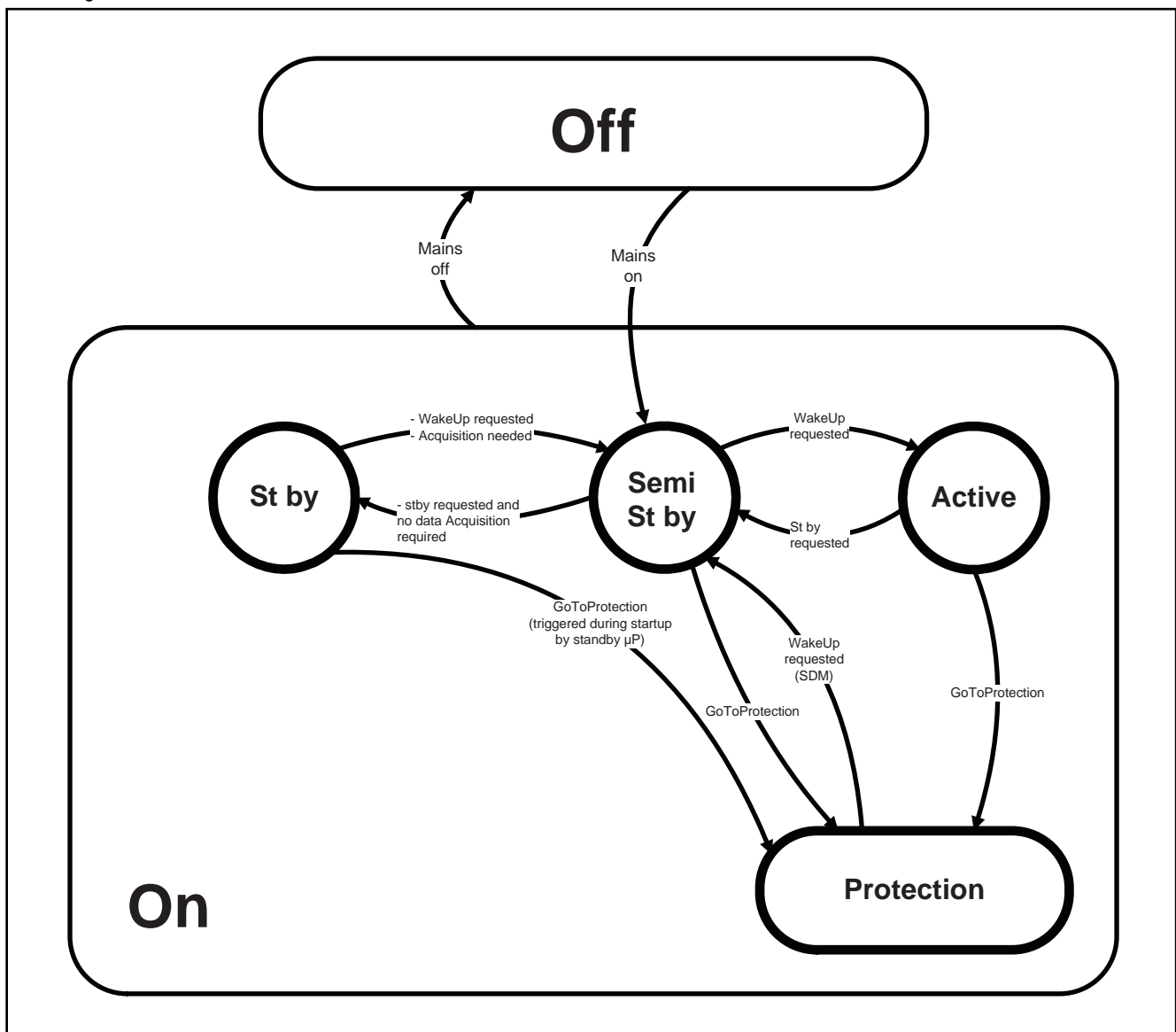
- **Signal quality.** Bad / average /good (not for DVB-S).
- **Ethernet MAC address.** Displays the MAC address present in the SSB.
- **Wireless MAC address.** Displays the wireless MAC address to support the Wi-Fi functionality.
- **BDS key.** Indicates if the set is in the BDS status.
- **CI module.** Displays status if the common interface module is detected.
- **CI + protected service.** Yes/No.
- **Event counter :**
S : 000X 0000(number of software recoveries : SW EVENT-LOG #(reboots)
S : 0000 000X (number of software events : SW EVENT-LOG #(events)
H : 000X 0000(number of hardware errors)
H : 0000 000X (number of hardware events : SW EVENT-LOG #(events).
- **Coldboot counter.** Neglect "BDS mode settings"
- **Fastcoldboot counter.** Neglect "BDS mode settings"
- **Hotboot counter.** Neglect "BDS mode settings"
- **Application hotboot counter.** Neglect "BDS mode settings"

How to Exit CSM

Press "MENU" (or "HOME") / "Back" key on the RC-transmitter.

5.3**Start-up**

As described, the start-up diagrams below, documents which supplies are present at any certain moment.



19210_076_120504.eps
120504

Figure 5-4 Transition diagram

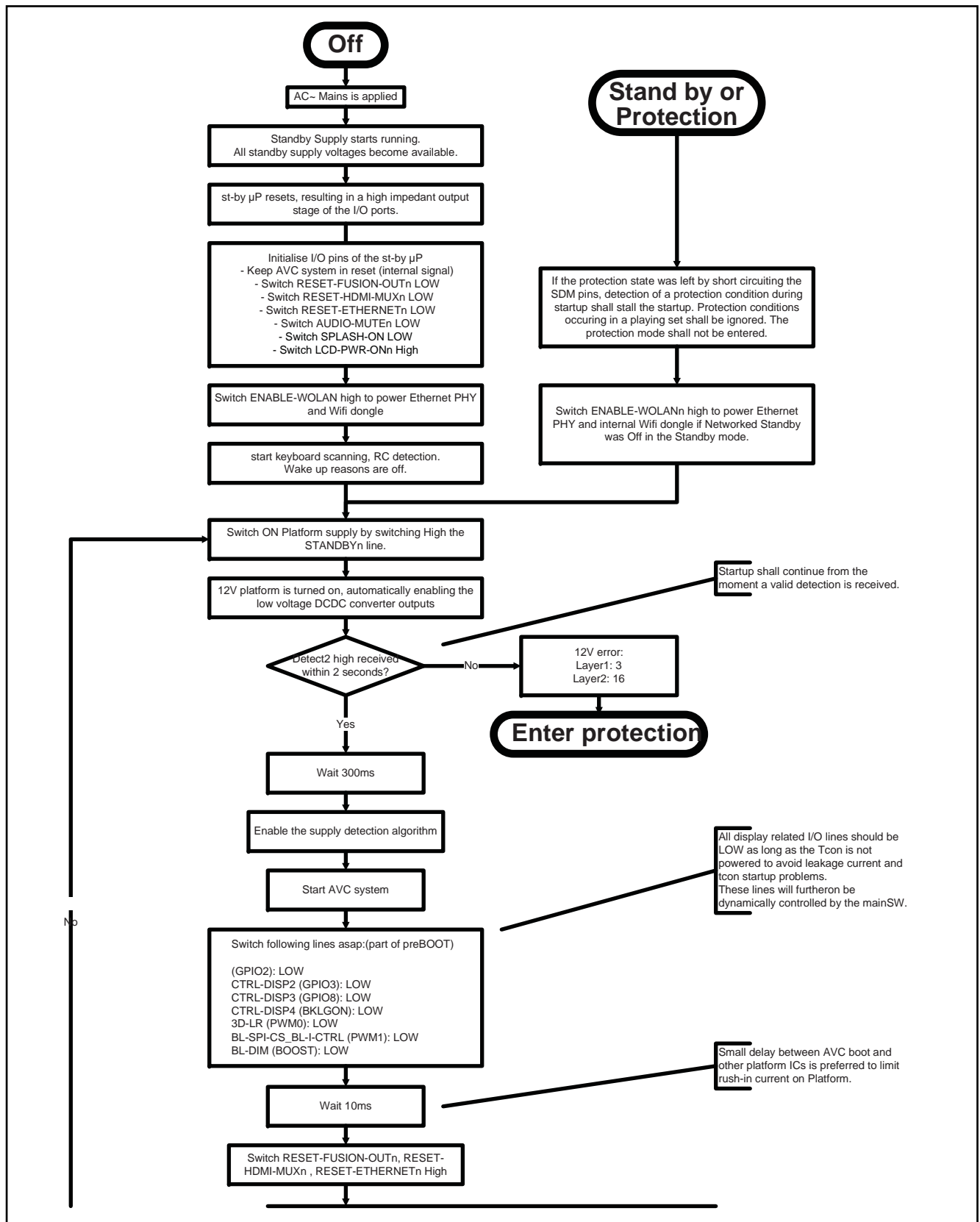
19210_080_120504.eps
120504

Figure 5-5 "Off" to "Semi Stand-by" flowchart (part 1)

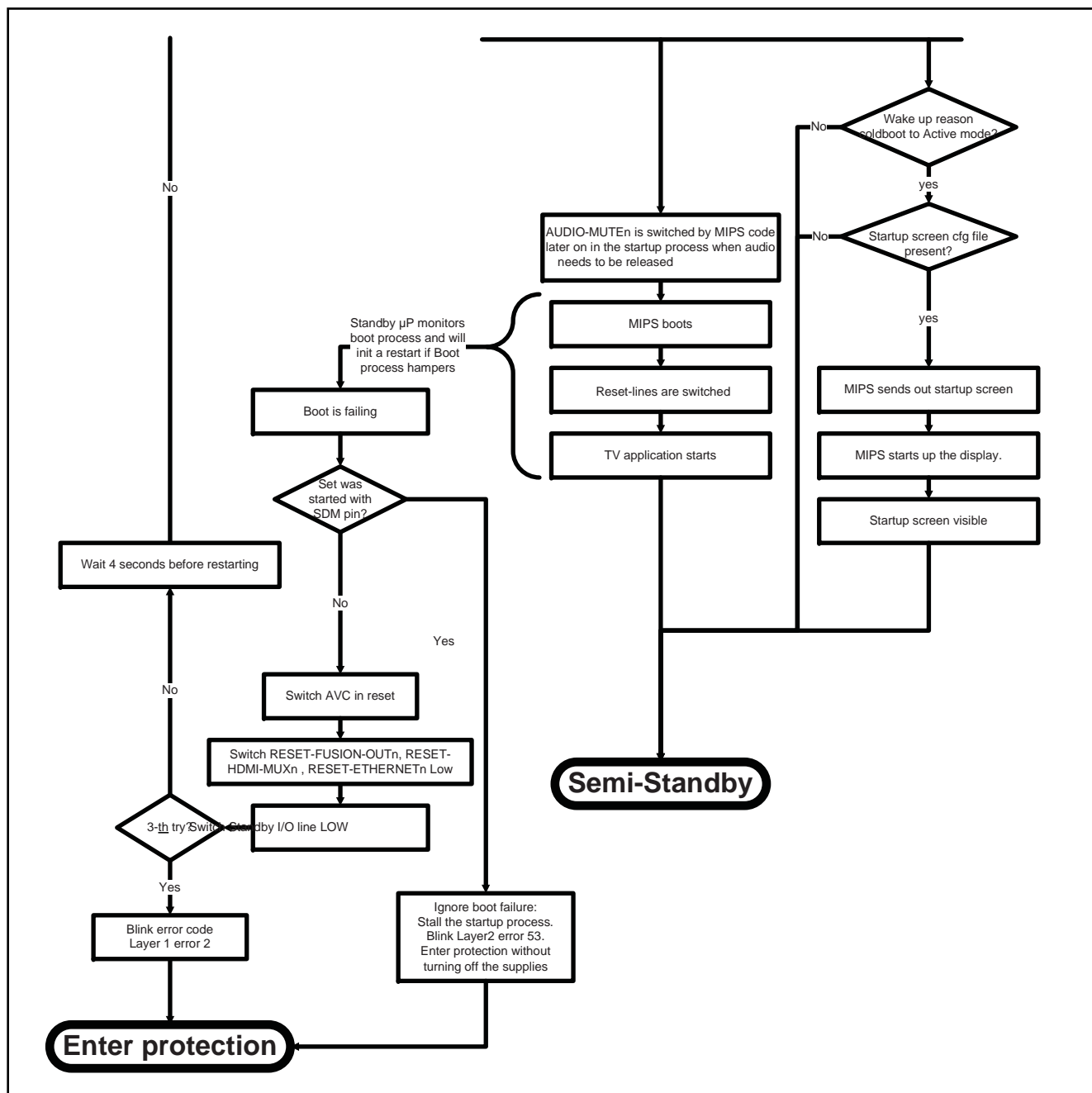
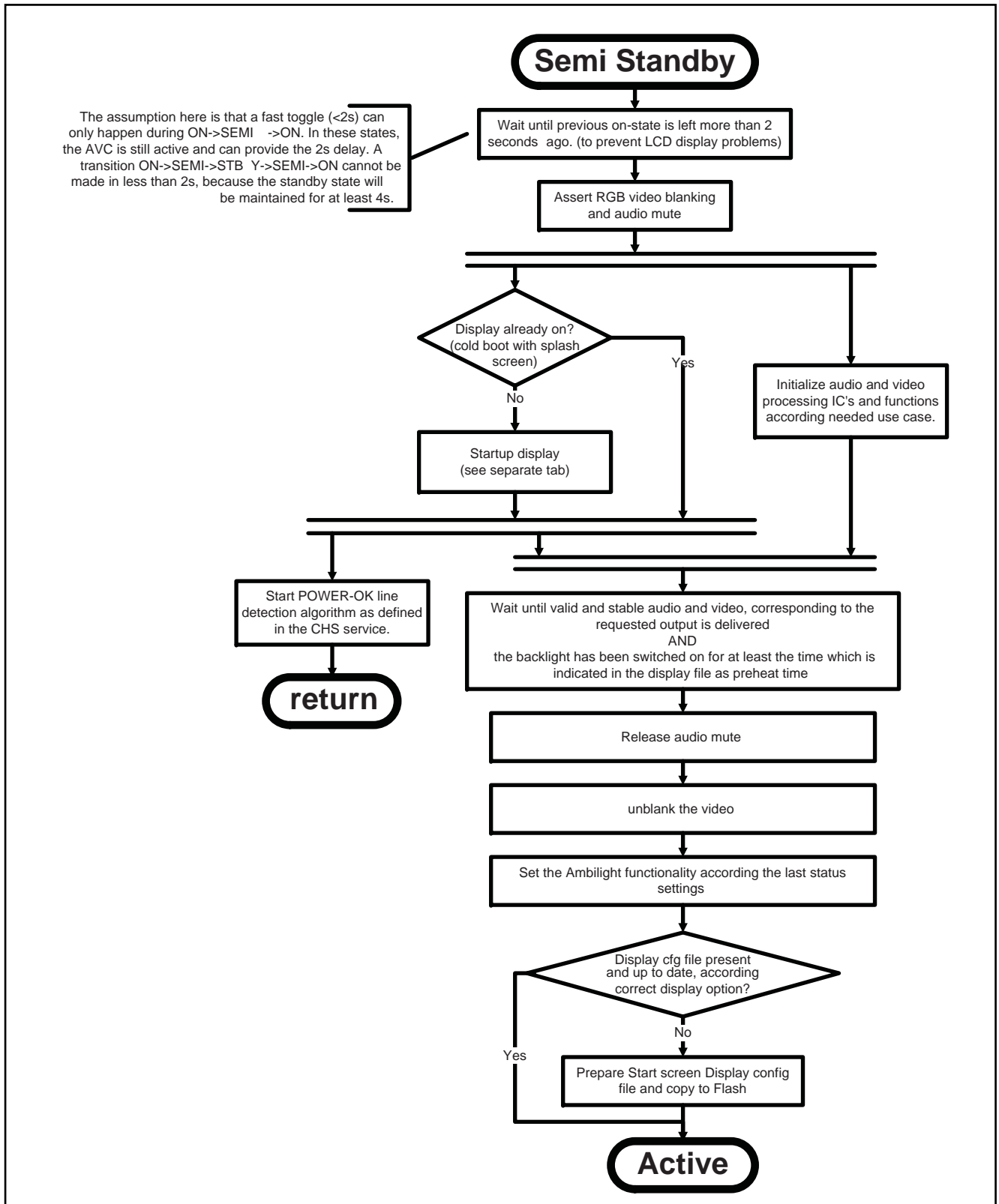
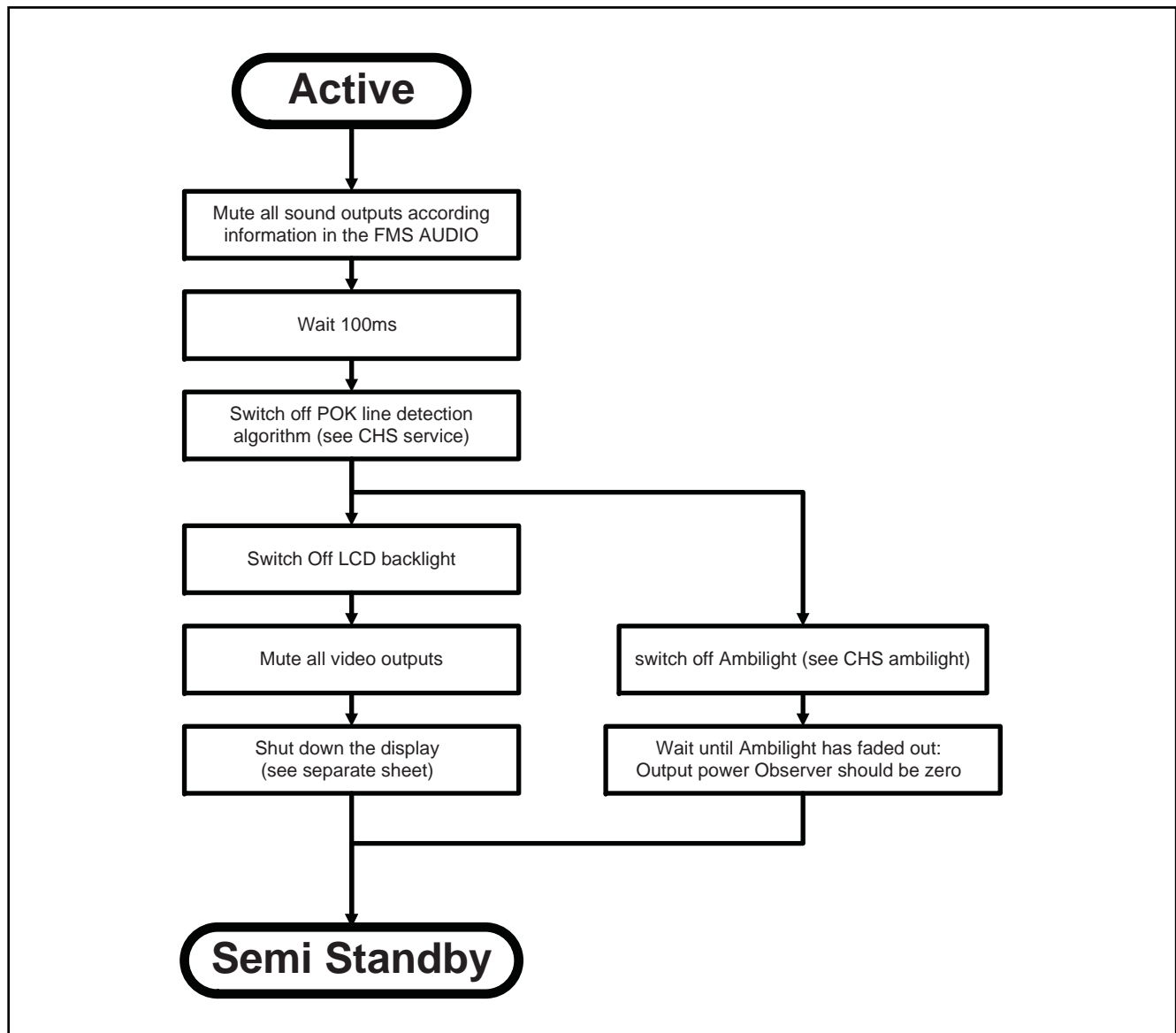
19210_081_120504.eps
120504

Figure 5-6 "Off" to "Semi Stand-by" flowchart (part 2)



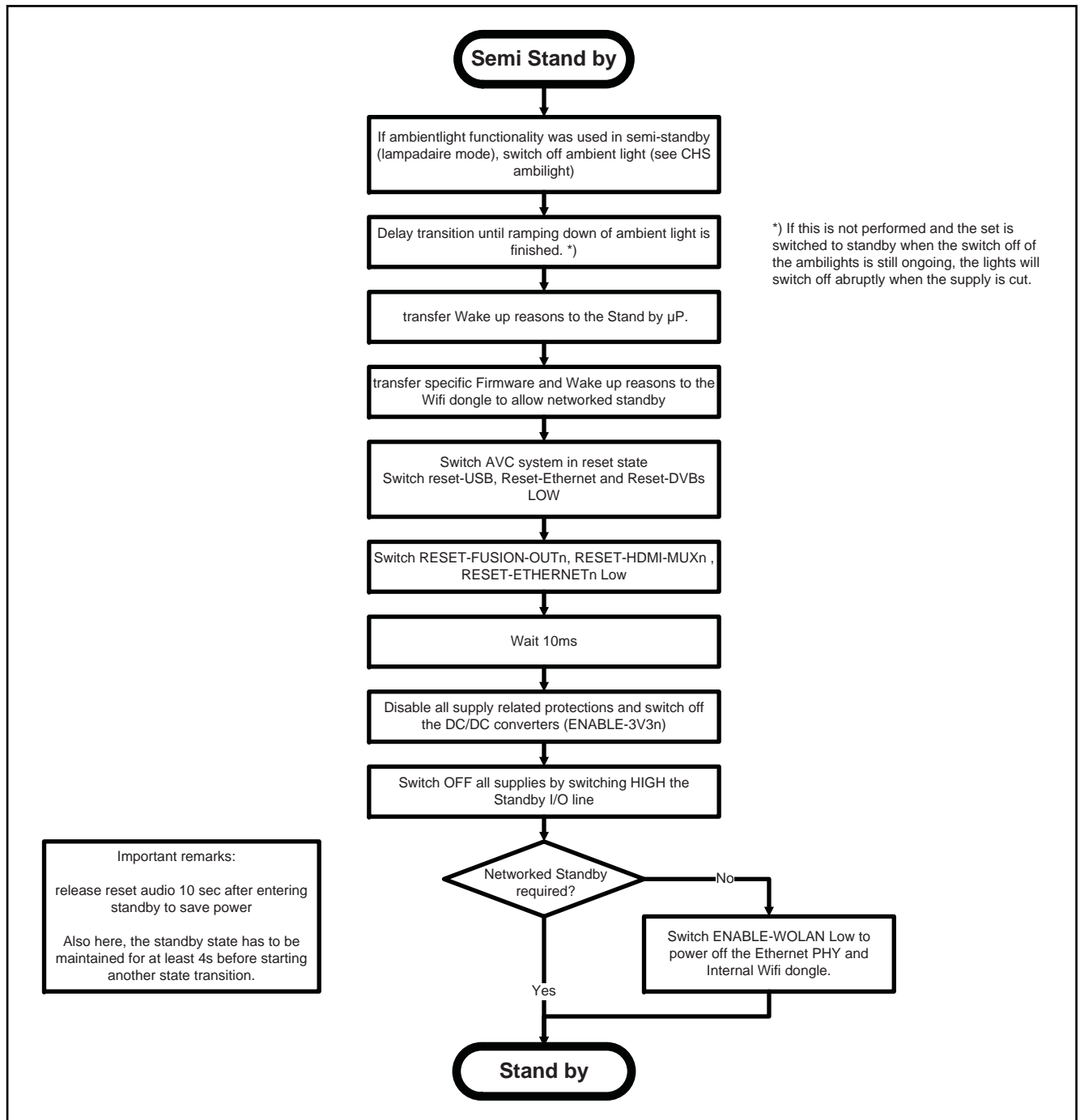
19210_079_120504.eps
120504

Figure 5-7 “Semi Stand-by” to “Active” flowchart



19210_077_120504.eps
120504

Figure 5-8 "Active" to "Semi Stand-by" flowchart



19210_078_120504.eps
120504

Figure 5-9 “Semi Stand-by” to “Stand-by” flowchart

5.4 Service Tools

5.4.1 ComPair

Introduction

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

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

Specifications

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

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

How to Connect

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

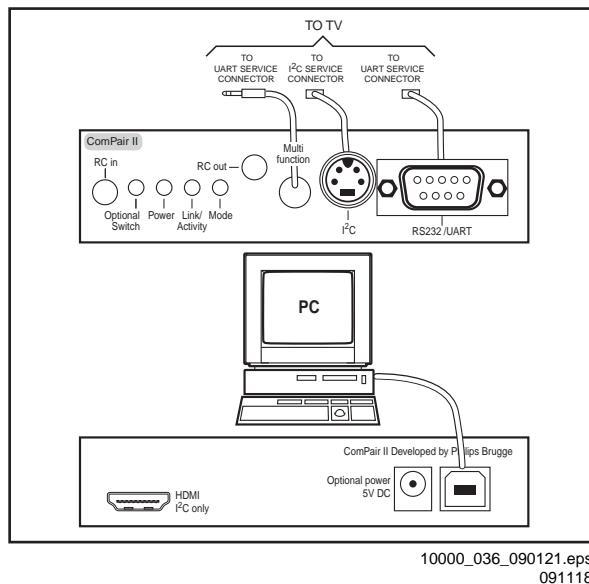


Figure 5-10 ComPair II interface connection

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 QF1x.x.
(using 3.5 mm Mini Jack connector): 3138 188 75051.

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

5.5 Error Codes

5.5.1 Introduction

The error code buffer contains all detected errors since the last time the buffer was erased. The buffer is written from left to right, new errors are logged at the left side, and all other errors shift one position to the right.

When an error occurs, it is added to the list of errors, provided the list is not full. When an error occurs and the error buffer is full, then the new error is not added, and the error buffer stays intact (history is maintained).

To prevent that an occasional error stays in the list forever, the error is removed from the list after more than 50 hrs. of operation.

When multiple errors occur (errors occurred within a short time span), there is a high probability that there is some relation between them.

- **If no errors are there, the LED should not blink at all in CSM or SDM. No spacer must be displayed as well.**
- **There is a simple blinking LED procedure for board level repair (home repair) so called LAYER 1 errors** next to the existing errors which are LAYER 2 errors (see [Table 5-2](#)).
 - LAYER 1 errors are one digit errors.
 - LAYER 2 errors are 2 digit errors.
- **In protection mode.**
 - From consumer mode: **LAYER 1**.
 - From SDM mode: **LAYER 2**.
- **Fatal errors, if I2C bus is blocked and the set reboots, CSM and SAM are not selectable.**
 - From consumer mode: **LAYER 1**.
 - From SDM mode: **LAYER 2**.
- In CSM mode.
 - When entering CSM: error **LAYER 1** will be displayed by blinking LED.
- In SDM mode.
 - When SDM is entered via Remote Control code or the hardware pins, **LAYER 2** is displayed via blinking LED.
- Error display on screen.
 - In CSM no error codes are displayed on screen.
 - In SAM the complete error list is shown.

Basically there are three kinds of errors:

- **Errors detected by the Standby software which lead to protection.** These errors will always lead to protection and an automatic start of the blinking LED LAYER 1 error. (see section "[5.6 The Blinking LED Procedure](#)").
- **Errors detected by the Standby software which not lead to protection.** In this case the front LED should blink the involved error. See also section "[5.5 Error Codes, 5.5.4 Error Buffer](#)". Note that it can take up several minutes before the TV starts blinking the error (e.g. LAYER 1 error = 2, LAYER 2 error = 15 or 53).
- **Errors detected by main software (MIPS).** In this case the error will be logged into the error buffer and can be read out via ComPair, via blinking LED method LAYER 1-2 error, or in case picture is visible, via SAM.

5.5.2 How to Read the Error Buffer

Use one of the following methods:

- On screen via the SAM (only when a picture is visible).
E.g.:
 - **00 00 00 00 00:** No errors detected
 - **23 00 00 00 00:** Error code 23 is the last and only detected error.
 - **37 23 00 00 00:** Error code 23 was first detected and error code 37 is the last detected error.
 - **Note that no protection errors can be logged in the error buffer.**
- Via the blinking LED procedure. See section [5.5.3 How to Clear the Error Buffer](#).

- Via ComPair.

5.5.3 How to Clear the Error Buffer

Use one of the following methods:

- By activation of the “RESET ERROR BUFFER” command in the SAM menu.
- If the content of the error buffer has not changed for 50+ hours, it resets automatically.

5.5.4 Error Buffer

In case of non-intermittent faults, clear the error buffer before starting to repair (**before** clearing the buffer, write down the content, as this history can give significant information). This to ensure that old error codes are no longer present.

If possible, check the entire contents of the error buffer. In some situations, an error code is only the result of another error code and not the actual cause. (e.g. a fault in the protection detection circuitry can also lead to a protection)

There are several mechanisms of error detection:

- Via error bits in the status registers of ICs.
- Via polling on I/O pins going to the standby processor.
- Via sensing of analog values on the standby processor or the Mips.
- Via a “not acknowledge” of an I²C communication.

Take notice that some errors need several minutes before they start blinking or before they will be logged. So in case of problems wait 2 minutes from start-up onwards, and then check if the front LED is blinking or if an error is logged.

Table 5-2 Error code overview

Description	Layer 1	Layer 2	Monitored by	Error/Prot	Error Buffer/ Blinking LED	Device	Defective Board
I ² CM3 (SSB + SRF bus)	2	13	MIPS	E	BL / EB	SSB	SSB
I ² CM2 (BE bus)	2	14	MIPS	E	BL / EB	SSB	SSB
I ² CM1 (FE bus)	2	18	MIPS	E	BL / EB	SSB	SSB
Fusion doesn't boot (HW cause)	2	15	Stby μ P	P	BL	Fusion	SSB
12V	3	16	Stby μ P	P	BL	/	Supply
Display supply (POK)	3	17	MIPS	E	EB	/	Supply
HDMI mux	2	23	MIPS	E	EB	SI19387	SSB
I ² C switch	2	24	MIPS	E	EB	PCA9540	SSB
Channel dec DVB-T2	2	27	MIPS	E	EB	CXD2834	SSB
Channel dec DVB-S2	2	28	MIPS	E	EB	STV0903	SSB
Lnb controller	2	31	MIPS	E	EB	LNBH25	SSB
Hybrid Tuner	2	34	MIPS	E	EB	SUT-RE214Z	SSB
Main NVM	2	35	MIPS	E	EB	STM24C64	SSB
Tuner DVB-S2	2	36	MIPS	E	EB	STV6110	SSB
Class-D	2	37	MIPS	E	EB	TAS 5731 PHP	SSB
FPGA Scan Backlight	2	38	MIPS	E	EB	XC6SLX4	SSB
T° sensor SSB/Display	2	42	MIPS	E	EB	LM 75	T° sensor on SSB/Display
Light sensor	6	43	MIPS	E	EB	TSL2571	Set
μ P touch control	6	44	MIPS	E	EB	/	Set
RF4CE	6	46	MIPS	E	EB	/	Set
MIPS doesn't boot (SW cause)	2	53	Stby μ P	P	BL	FUSION	SSB
FPGA HDR	5	61	MIPS	E	BL	Xilinx Spartan	Display
FPGA Lattice Backlight	5	62	MIPS	E	BL	Lattice	Display
TCON μ P (SHARP)	7	54	MIPS	E	BL	/	Display
TCON ASIC (SHARP)	7	55	MIPS	E	BL	/	Display
VCON cal (SHARP)	7	56	MIPS	E	BL	/	Display

Extra Info

- **Rebooting.** When a TV is constantly rebooting due to internal problems, most of the time no errors will be logged or blinked. This rebooting can be recognized via a ComPair interface and Hyperterminal (for Hyperterminal settings, see section “[5.8 Fault Finding and Repair Tips, 5.8.6 Logging](#)”). It's shown that the loggings which are generated by the main software keep continuing.
- **Error 13 (I²C bus M3, SSB + SRF bus blocked).** Current situation: when this error occurs, the TV can reboot due to the blocked bus. The best way for further diagnosis here, is to check the logging output.
- **Error 14 (I²C bus M2, BE bus blocked).** Current situation: when this error occurs. The best way for further diagnosis here, is to check the logging output.
- **Error 18 (I²C bus M1, FE bus blocked).** Current situation: when this error occurs. The best way for further diagnosis here, is to check the logging output.
- **Error 15 (Fusion doesn't boot).** Indicates that the main processor was not able to read his bootscript. This error will point to a hardware problem around the Fusion (supplies not OK, Fusion device completely dead, link between Mips and Stand-by Processor broken, etc...) Other root causes for this error can be due to hardware problems regarding the DDR's and the bootscript reading from the Fusion device.
- **Error 16 (12V).** This voltage is made in the power supply and results in protection (LAYER 1 error = 3) in case of absence. When SDM (maintain grounding continuously) is activated we see blinking LED LAYER 2 error = 16.
- **Error 17 (Display Supply).** Here the status of the “Power OK” is checked by software, no protection will occur during failure of the display supply, only error logging. LED blinking of LAYER 1 error = 3 in CSM, in SDM this gives LAYER 2 error = 17.
- **Error 23 (HDMI mux).** When there is no I²C communication towards the HDMI mux after start-up, LAYER 2 error = 23 will be logged and displayed via the blinking LED procedure if SDM is switched on.
- **Error 24 (I²C switch).** When there is no I²C communication towards the I²C switch, LAYER 2 error = 24 will be logged and displayed via the blinking LED procedure when SDM is switched on.
- **Error 27 (Channel dec DVB-T2).** When there is no I²C communication towards the DVB-T channel decoder, LAYER 2 error = 27 will be logged and displayed via the blinking LED procedure if SDM is switched on.
- **Error 28 (Channel dec DVB-S2).** When there is no I²C communication towards the DVB-S channel decoder, LAYER 2 error = 28 will be logged and displayed via the blinking LED procedure if SDM is switched on.

- **Error 31 (Lnb controller).** When there is no I²C communication towards this device, LAYER 2 error = 31 will be logged and displayed via the blinking LED procedure if SDM is activated.
- **Error 34 (Tuner).** When there is no I²C communication towards the tuner during start-up, LAYER 2 error = 34 will be logged and displayed via the blinking LED procedure when SDM is switched on.
- **Error 35 (main NVM).** When there is no I²C communication towards the main NVM during start-up, LAYER 2 error = 35 will be displayed via the blinking LED procedure when SDM is switched "on". All service modes (CSM, SAM and SDM) are accessible during this failure, observed in the Uart logging as follows: "<< ERRO >>> PFPOW_C: First Error (id19, Layer_1= 2 Layer_= 35)".
- **Error 36 (Tuner DVB-S).** When there is no I²C communication towards the DVB-S tuner during start-up, LAYER 2 error = 36 will be logged and displayed via the blinking LED procedure when SDM is switched "on".
- **Error 37 (Class-D).** When there is no I²C communication towards the Class-D amplifier during start-up, LAYER 2 error = 37 will be logged and displayed via the blinking LED procedure when SDM is switched "on".
- **Error 38 (FPGA ScanBacklight).** When there is no I²C communication towards this FPGA device during start-up, LAYER 2 error = 38 will be logged and displayed via the blinking LED procedure when SDM is switched "on". This device supports the backlight + boost pwm control, scanning, 3D drive and ambilight buffering.
- **Error 42 (Temp sensor).** Only applicable for TV sets equipped/stuffed with temperature devices.
- **Error 43 (Light sensor).** When there is no I²C communication towards the light sensor device during start-up, LAYER 2 error = 43 will be logged and displayed via the blinking LED procedure when SDM is switched "on".
- **Error 44 (Touch control).** When there is no I²C communication towards the touch control micro processor during start-up, LAYER 2 error = 44 will be logged and displayed via the blinking LED procedure when SDM is switched "on".
- **Error 46 (RF4CE).** When there is no I²C communication towards the RF4CE driver during start-up, LAYER 2 error = 46 will be logged and displayed via the blinking LED procedure when SDM is switched "on".
- **Error 53.** This error will indicate that the Fusion device has read his bootscript (when this would have failed, error 15 would blink) but initialization was never completed because of hardware problems (NAND flash, DDR...) or software initialization problems. Possible cause could be that there is no valid software loaded (try to upgrade to the latest main software version). Note that it can take a few minutes before the TV starts blinking LAYER 1 error = 2 or in SDM (maintain grounding continuously), LAYER 2 error = 53.

5.6 The Blinking LED Procedure

5.6.1 Introduction

The blinking LED procedure can be split up into two situations:

- **Blinking LED procedure LAYER 1 error.** In this case the error is automatically blinked when the TV is put in CSM. This will be only one digit error, namely the one that is referring to the defective board (see table "[5-2 Error code overview](#)") which causes the failure of the TV. This approach will especially be used for home repair and call centres. The aim here is to have service diagnosis from a distance.
- **Blinking LED procedure LAYER 2 error.** Via this procedure, the contents of the error buffer can be made visible via the front LED. In this case the error contains 2 digits (see table "[5-2 Error code overview](#)") and will be displayed when SDM (hardware pins) is activated. This is especially useful for fault finding and gives more details regarding the root cause of the defective board.

Important remark:

For an empty error buffer, the LED should not blink at all in CSM or SDM. No spacer will be displayed.

When one of the blinking LED procedures is activated, the front LED will show (blink) the contents of the error buffer. Error codes greater than 10 are shown as follows:

1. "n" long blinks (where "n" = 1 to 9) indicating decimal digit
2. A pause of 1.5 s
3. "n" short blinks (where "n" = 1 to 9)
4. A pause of approximately 3 s,
5. When all the error codes are displayed, the sequence finishes with a LED blink of 3 s (spacer).
6. The sequence starts again.

Example: Error 12 8 6 0 0.

After activation of the SDM, the front LED will show:

1. One long blink of 750 ms (which is an indication of the decimal digit) followed by a pause of 1.5 s
2. Two short blinks of 250 ms followed by a pause of 3 s
3. Eight short blinks followed by a pause of 3 s
4. Six short blinks followed by a pause of 3 s
5. One long blink of 3 s to finish the sequence (spacer).
6. The sequence starts again.

5.6.2 How to Activate

Use one of the following methods:

- **Activate the CSM.** The blinking front LED will show the layer 1 error(s), this works in "normal operation" mode or automatically when the error/protection is monitored by the Standby processor.
In case no picture is shown and there is no LED blinking, read the logging to detect whether "error devices" are mentioned. (see section "[5.8 Fault Finding and Repair Tips](#), [5.8.6 Logging](#)").
- **Activate the SDM.** The blinking front LED will show the entire content of the LAYER 2 error buffer, this works in "normal operation" mode or when SDM (via hardware pins) is activated when the tv set is in protection.

5.7 Protections

5.7.1 Software Protections

Most of the protections and errors use either the standby microprocessor or the MIPS controller as detection device. Since in these cases, checking of observers, polling of ADCs, and filtering of input values are all heavily software based, these protections are referred to as software protections. There are several types of software related protections, solving a variety of fault conditions:

- **Related to supplies:** presence of the +5V, +3V3 and 1V2 needs to be measured, no protection triggered here.
- **Protections related to breakdown of the safety check mechanism.** E.g. since the protection detections are done by means of software, failing of the software will have to initiate a protection mode since safety cannot be guaranteed any more.

Remark on the Supply Errors

The detection of a supply dip or supply loss during the normal playing of the set does not lead to a protection, but to a cold reboot of the set. If the supply is still missing after the reboot, the TV will go to protection.

Protections during Start-up

During TV start-up, some voltages and IC observers are actively monitored to be able to optimize the start-up speed, and to assure good operation of all components. If these monitors do not respond in a defined way, this indicates a malfunction of the system and leads to a protection. As the

observers are only used during start-up, they are described in the start-up flow in detail (see section ["5.3 Start-up"](#)).

5.8 Fault Finding and Repair Tips

Read also section ["5.5 Error Codes"](#), [5.5.4 Error Buffer](#), [Extra Info](#).

5.8.1 Ambilight

Due to the aging process on the LED's fitted on the Ambilight module, there can be a difference in the colour and/or light output of the spare ambilight modules in comparison with the originals ones contained in the TV set. Via SAM => alignments => ambilight, the spare module can be fine-tuned.

Other possibility: the original values can also be recovered via SAM, Upload to USB => alignments. Now the original settings are on the USB stick and can be reloaded into another SSB (NVM).

5.8.2 CSM

When CSM is activated and there is a USB stick connected to the TV, the software will dump the complete CSM content to the USB stick. The file (Csm.txt) will be saved in the root of the USB stick. If this mechanism works it can be concluded that a large part of the operating system is already working (MIPS, USB...)

5.8.3 DC/DC Converter

Description

Input power for the TV platform comes from the main power supply that delivers +3V3STANDBY (pin 1 of connector 1M95) and +12V (pins 5,6 of the same connector). +3V3STANDBY (3.3V nominal) is the permanent voltage, supplying the standby microprocessor inside the Fusion chip while +12V is started by the STANDBY signal (connector 1M95, pin 2) when going from high to low. +12V is split in three branches via fuses 1UA0 (+12Va), 1UA1 (+12Vb) and 1UP1(+12-DVBS):

- +12Va serves as input voltage for the switching voltage regulators that deliver +1V1-FD and +1V5.
- +12Vb is used as input voltage for the switching voltage regulators that deliver +3V3 and +5V.
- +12V-DVBS (if DVB-S functionality is present) goes to 12V to +1V0-DVBS and 12V to +V-LNB switching regulators.

The on board power supply consists of 4 switching voltage regulators (6 in case of DVB-S version), 6 linear voltage regulators (7 in case of DVB-S version) one power switch delivering +3V3AL for Ambilight driver boards and an over-current protection for 12V (AMBI-POWER) Ambilight boards.

All switching voltage regulators have 12V input voltage and deliver:

- +1V0-DVBS core supply voltage for DVB-S2 demodulator (1.02V nominal), stabilized close to the point of load by means of SENSE+1V0-DVBS signal.
- +1V1-FD Fusion main core supply voltage (0.95V...1.2V - depending on DVS1 signal), stabilized close to the point of load by means of SENSE+1V1-FD signal.
- +1V5 supply voltage (1.53V nominal), for the DDR3 memories and DDR3 interface of the Fusion chip.
- +3V3 supply voltage (3.37V nominal): overall 3.3V for on board IC's and for WiFi module, also used as input voltage for linear voltage regulators delivering +1V1-FA, +1V2-FA and +2V5.
- +5V (5.15V nominal) for USB, WiFi, Conditional Access Module and via linear voltage regulators, the DVB-T and DVB-S tuner supplies.
- +V-LNB (13V or 18V) supply for outdoor satellite reception equipment.

The linear voltage regulators are providing:

- +1V1-FA supply voltage (1.10V nominal, from +3V3) for low power analog (PLL) blocks inside Fusion chip.
- +1V2-MIPS supply voltage (1.05...1.3V depending on DVS2 signal, input voltage: +1V5) for Fusion auxiliary core.
- +1V2-FE supply voltage (1.20V nominal, from +1V5) for HDMI multiplexer and (if present) DVB-T2 demodulator IC device.
- +1V2-FA supply voltage (1.20V nominal, from +3V3) for higher power analog Fusion internal blocks (mainly video ADC's).
- +2V5 supply voltage (2.5V nominal, from +3V3) for LVDS (or Vby1) interface and various other internal blocks of Fusion.
- +3V3 supply voltages (3.3V nominal, from +5V) for RF tuners, separate linear regulator per tuner.

Supply voltages +1V1-FD, +1V5 and +1V2-MIPS are started immediately when +12V rises above the 5V level. The rest of the supply voltages (+5V, +3V3, +2V5, +1V2-FA and +1V1-FA) are turned on by signal DETECT12V when becomes high. The tuners are supplied from their respective linear voltage regulators when +5V starts. +1V0-DVBS is started almost at the same time, when +2V5-DVBS (derived from +3V3-DVBS via the equivalent diode 7RC2) rises.

DETECT12V becomes high when +12V rises above 10V and stays above 9.5V (0.5V hysteresis).

+3V3AL will become available when enabled via software (signal ENABLE-3V3-AMBI high). In case of TV sets having Ambilight consumption from 12V + higher than 1A, the electronic protection circuit (7UAC and surrounding components) is used instead of fuse 1UA2. AMBI-POWER should be available shortly (100 ms) after +12V starts if there is no load on it. The over-current trigger level is around 4.1A. Once triggered, it can be reset by removing the shortcircuit cause and keeping it under no load condition for about 100 ms.

+V-LNB value is determined via software: around 13V for vertical polarized satellite channels and around 18V for the horizontal ones. Maximum current is limited in both cases to 400mA

Debugging

The best way to find a failure in the DC/DC converters is to check their start-up sequence at power "on", presuming that the external supply is operational. Take the STANDBY signal "high"-to-"low" transition as trigger reference and check the power start-up sequence as described above.

Tips

- Behaviour comparison with a working Fusion platform can be a fast way to locate failures.
- Check first the integrity of fuses 1UA0, 1UA1 and (if present) 1UA2 and 1UP1.
- If a fuse is found interrupted: check the respective +12Va (or +12Vb or +12V-DVBS) short circuit with all of the derived supply voltages, for example: a +12Va ->+1V5 short circuit will probably be caused by a defective 7UB5 integrated circuit.
- Switching frequency should be around 400KHz for 12V to +V-LNB switching voltage regulator, 500KHz for +12V to +1V1-FD and 600KHz...700KHz for the others.
- When a short circuit to GND is found on one of the supply voltage delivered by a switching voltage regulator, then try first removing the power coil(s) from the output filter of the converter, this to point the location of the short circuit (at converter side or at load side).

5.8.4 Power Supply Unit

For fault finding tips, refer to section [7.2.1](#).

5.8.5 Exit “Factory Mode”

To exit this mode, push the “VOLUME minus” button on the TV’s local keyboard for 10 seconds (this disables the continuous mode).
Then push the “SOURCE” button for 10 seconds until to exit the “Factory mode”.

5.8.6 Logging

When something is wrong with the TV set (f.i. the set is rebooting) you can check for more information via the logging in Hyperterminal. The Hyperterminal is available in every Windows application via Programs, Accessories, Communications, Hyperterminal. Connect a “ComPair UART”-cable (3138 188 75051) from the service connector in the TV to the “multi function” jack at the front of ComPair II box.

Required settings in ComPair before starting to log:

- Start up the ComPair application.
- Select the correct database (open file “QFU1X.X”, this will set the ComPair interface in the appropriate mode).
- Close ComPair

After start-up of the Hyperterminal, fill in a name (f.i. “logging”) in the “Connection Description” box, then apply the following settings:

1. COMx
2. Bits per second = 115200
3. Data bits = 8
4. Parity = none
5. Stop bits = 1
6. Flow control = none

During the start-up of the TV set, the logging will be displayed. This is also the case during rebooting of the TV set (the same logging appears time after time). Also available in the logging is the “Display Option Code” (useful when there is no picture), look for item “display number xxx” in the beginning of the logging. Tip: when there is no picture available during rebooting you are able to check for “error devices” in the logging (LAYER 2 error) which can be very helpful to determine the failure cause of the reboot. For protection state, there is no logging.

5.8.7 Guidelines Uart logging

Description possible cases:

Uart loggings are displayed:

- When Uart loggings are coming out, the first conclusion we can make is that the TV set is starting up and communication with the flash RAM seems to be supported. The Fusion processor is able to read and write in the DRAMs.
- We can not yet conclude: Flash RAM and DRAMs are fully operational/reliable. There still can be errors in the data transfers, DRAM errors, read/write speed and timing control.

No Uart logging at all:

- No startup will end up in a blinking LED status: error LAYER 1 = “2”, error LAYER 2 = “53” (startup with SDM solder paths continuous short).
- Error LAYER 2 = “15” (hardware cause) is more related to a supply issue while error LAYER 2 = “53” (software cause) refers more to boot issues.

Uart loggings reporting fault conditions, error messages, error codes, fatal errors:

- Some failures are indicated by error codes in the logging, check with error codes table (see Table “[5-2 Error code overview](#)”). e.g. => <<<ERROR>>>PLFPOW_MERR.C : First Error (id=10,Layer_1=2,Layer_2=23).
- I²C bus errors.
- Not all failures or error messages should be interpreted as fault. For instance root cause can be due to wrong option codes settings => e.g. “FpgaDimmingPresent: False/True”.

In the Uart log startup script we can observe and check the enabled loaded option codes.

Defective sectors (bad blocks) in the Nand Flash can also be reported in the logging.

Startup in the SW upgrade application and observe the Uart logging:

Starting up the TV set in the Manual Software Upgrade mode will show access to USB, meant to copy software content from USB to the DRAM. Progress feedback can be found in the logging.

Startup in Jett Mode:

Check Uart logging in Jet mode mentioned as : “JETT UART READY”.

5.8.8 Loudspeakers

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

5.8.9 Power Supply

In case of no picture when CSM (test pattern) is activated and backlight doesn’t light up, it’s recommended first to check the LED drivers on the PSL(S) + wiring (LAYER 2 error = 17 is displayed in SDM).

5.8.10 Display option code

Attention: In case the SSB is replaced, always check the display option code number (group 2, first option number e.g. “44855”) in SAM, even when picture is available. Performance with the incorrect display option code can lead to unwanted side-effects for certain conditions.

Also supported in this chassis:

While in the download application (start up in TV mode + “OK” button pressed), the display option code can be changed via 062598 HOME XXX special SAM command (XXX=display option in 3 digits).

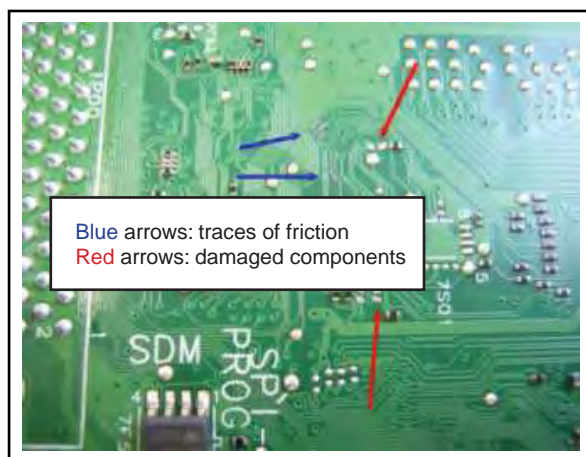
5.8.11 SSB Replacement

For a more general overview of steps to follow, refer to figure [5-13 SSB replacement flowchart](#).

Follow the instructions in the flowchart in case a SSB has to be exchanged. See table [5-3 SSB replacement instructions](#).

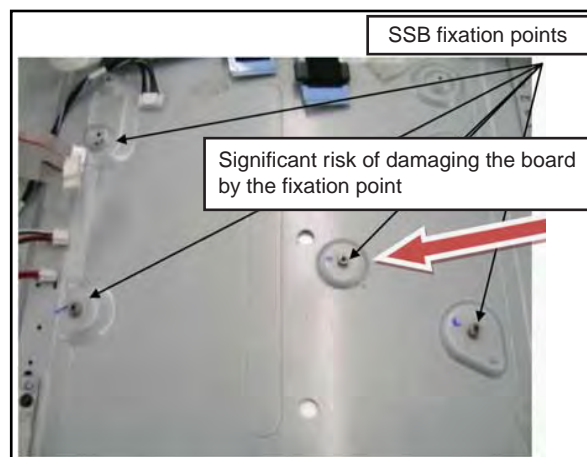
Table 5-3 SSB replacement instructions

Step #	Action to do	Advise / Attention points / Remarks
1	Ensure ESD protection by using a wristband	-
2	If SSB is still functional: Go via SAM to "upload to USB" and copy Personal settings - Option codes - Alignments (Presets) - Set Identification. Advice: because of differences in memory allocation, it is advised to upgrade main SW before copying data from existing SSB. Copy of Preset list is possible from normal user interface.	Upload to USB: A directory "repair" will be created on the USB, and all data will be copied in this directory. On sets with software before Q552-xx-140-x-x, there was an issue by copying the program map table, so it is advised to reinstall the programs from Virgin mode instead of using copy via USB.
3	Disconnect set from mains and from antenna.	Safety and ESD!
4	Open the set and disconnect LVDS flat cable. Disconnect other cables / connections.	Always take care for ESD! Be extra careful when removing connectors!
5	Dismount the (defective) SSB from the set.	Do not damage SSB copper tracks with your tools! Do not scratch bottom of SSB (be very careful by moving SSB over SSB supports). See Figure 5-11 and Figure 5-12 .
6	Place new SSB in the set, and fixate/mount carefully.	Do not damage SSB copper tracks with your tools! Do not scratch bottom of SSB (be very careful by moving SSB over SSB supports). See Figure 5-11 and Figure 5-12 .
7	Connect PSU and other connectors. Insert the optional WiFi module.	Make sure that the connectors are correctly plugged-in and locked (click). Special attention for the optional WiFi module: a defective WiFi module can give reboots or no start-up of the SSB. In this case do a trial without WiFi module.
8	Connect LVDS connector(s).	Be very careful: wrong or bad connection can damage the TCON part on the SSB and damage the LCD display. Check if flat cables are fitted correctly before closing the connector lock.
9	Connect set to mains and switch TV "On".	Check start-up of the set, backlight switching "On".
10	If the set does not start (or reboots) check: - The connectors from the power supply, - The power supply cable and connection pins, - LVDS cable connection.	Power supply connector must "snap" into the socket.
11	Before programming the new SSB, upgrade to latest software. If set is starting up in software upgrade mode, then first install new software via software Upgrade Menu or via the autorun.upg file.	Some SSB's will start-up in software upgrade mode, and software needs to be installed before you can program the Display Option codes. It's advised to use an autorun.upg file for software upgrade, this in case you have no OSD on the screen.
12	If set is starting up without picture or menu (OSD), first program the correct Display Option codes.	Use blind service mode "062598" + "Home" button, directly followed by the Display Option code (3 digits). Set will switch to Standby after Display Option code is entered.
13	Go to SAM and program "Set type" and "Serial number". This is possible via the NVM editor and virtual keyboard. In case personal settings were recovered from the defective SSB, you can use an "Upload from USB".	Programming "Set type" and "Serial number" is mandatory to have all functionality of the set, like DLNA, Net TV... For certain sets you may need to use ComPair for this.
14	Check if option codes are correct, and keys are present. SSBs with integrated TCON needs TCON alignment in SAM.	Validity of HDCP, CI+, Marlin, and WDRM keys can be checked via ComPair.
15	Update to latest software (Standby and main software). This step is necessary to make sure that the (optional) 200 Hz T-CON board has the latest software.	Even when the SSB already has the latest software, it is mandatory to upgrade again the software to update the 200 Hz T-CON part. At the end of the main software update process, a dedicated software is loaded, from the main processor via the LVDS connection, to upgrade the 200 Hz T-CON part. For certain LCD displays, a dedicated Display software patch (autoscript) is available. See General Service info GSC_85590.
16	Once the set is playing, check cable connection between PSU and SSB, by moving the cable if there are no bad connections.	Check the two power connectors 1M95 and 1M99. Bad contact or bad connection here can give reboots.
17	Fill in the Electronic DDF (Defect Description Form): Fault symptom, TV type and TV serial number.	It is mandatory to fill in the E-DDF form (see the "At Your Service" web portal).
18	Install presets or check if all presets are OK. Check in CSM if Type number, Serial number, Main and Standby software are correct.	Special attention for Standby software: check if Standby software ID is matching with the D-RAM's mounted on the SSB (2 x Elpida = 73, 4 x Elpida = 64, 2 x Hynix = 72, 4 x Hynix = 63).
19	Check connectivity to Net TV and DLNA. Check AmbiLight functionality.	Only for sets having these functionalities.
20	Inform customer about Memory Card, USB, or Hard drive PVR (Personal Video Recording) recordings.	Inform customer that previous recordings made on Memory Card (movie download), USB, or Hard drive will be lost. USB or Hard drive needs to be re-formatted and matched with new SSB (WDRM Keys!).



19070_201_110728.eps
110804

Figure 5-11 Mounting attention points [1/2]



19070_202_110728.eps
110804

Figure 5-12 Mounting attention points [2/2]

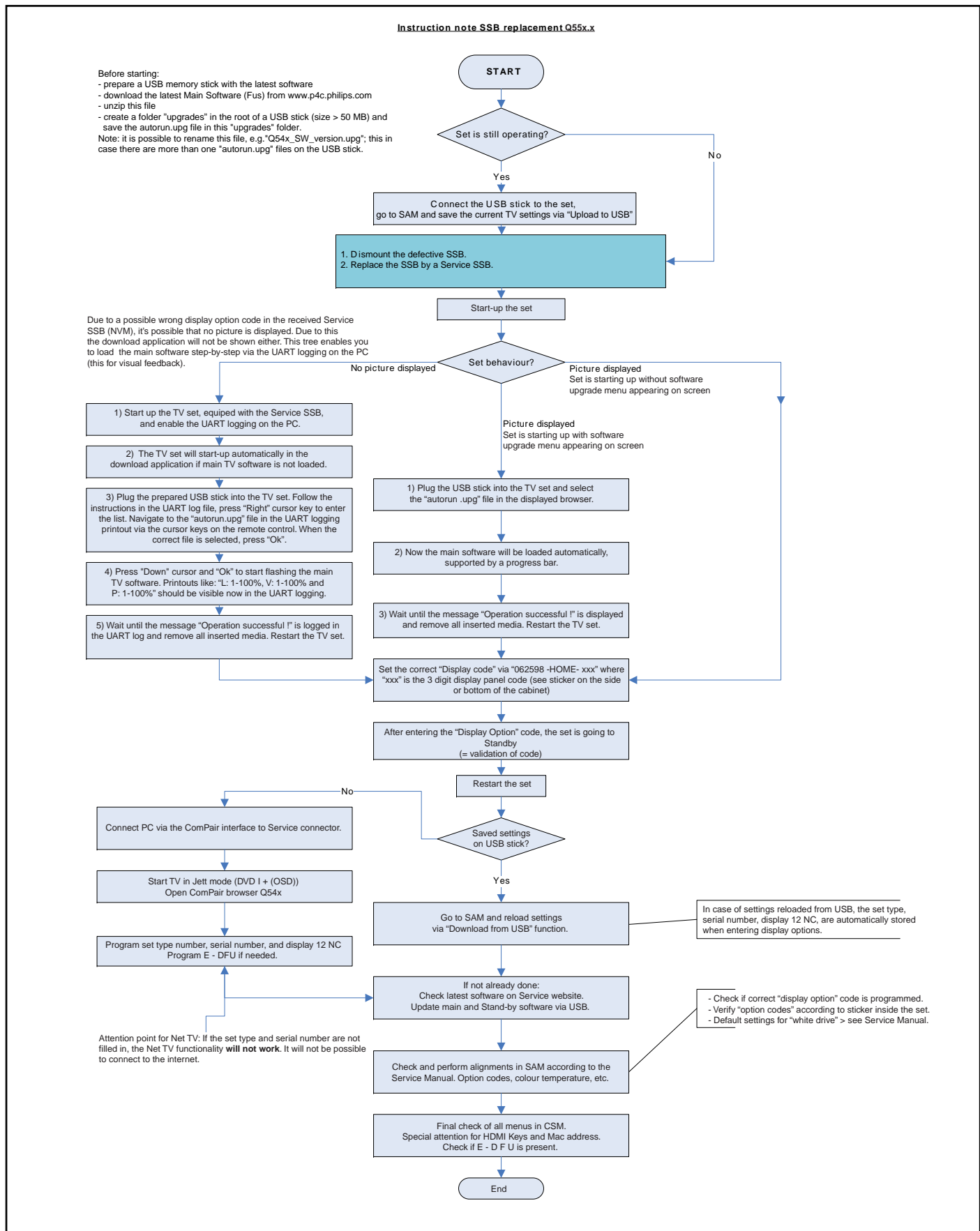
19070_200_110728.eps
111103

Figure 5-13 SSB replacement flowchart

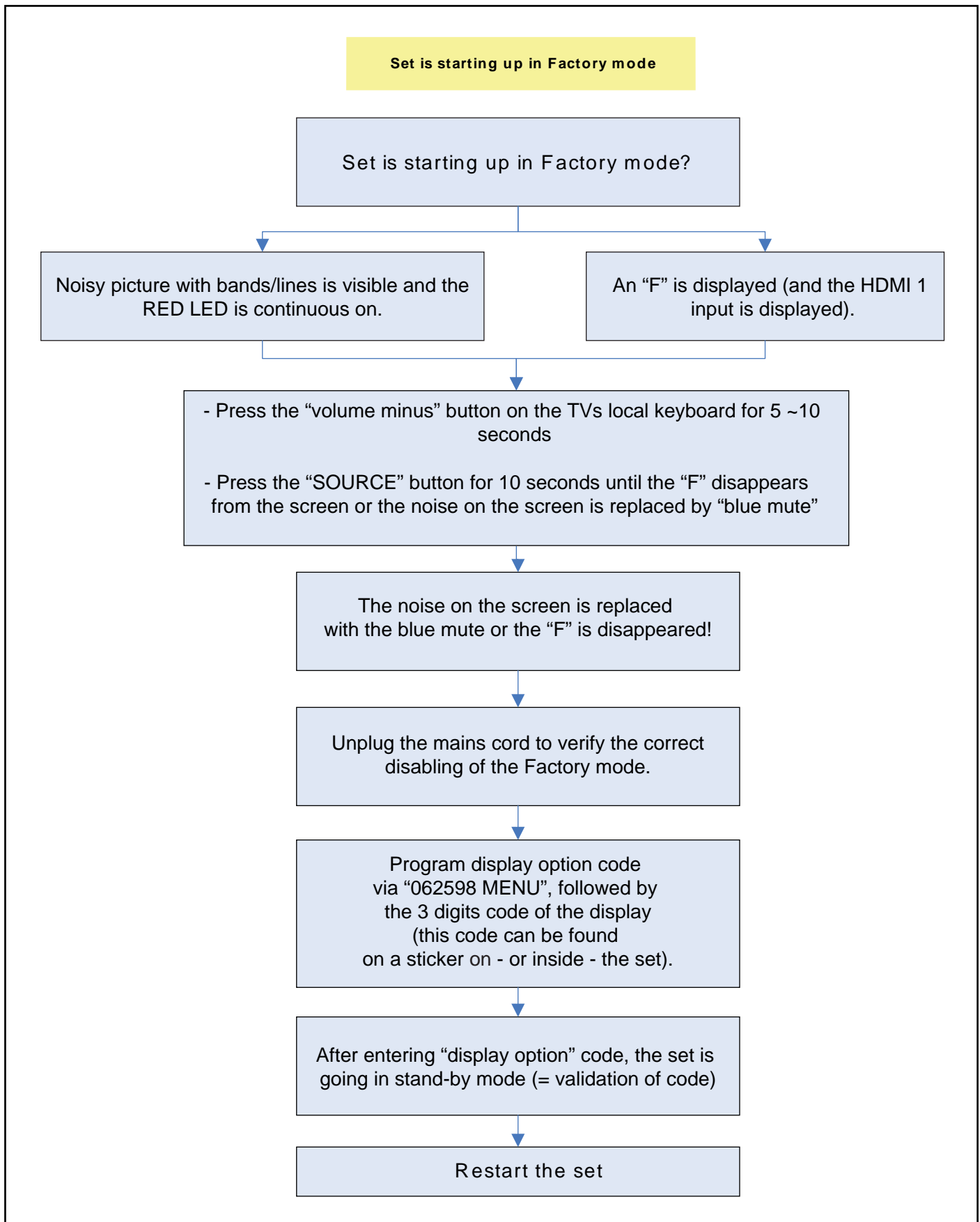
H_16771_007b.eps
100322

Figure 5-14 SSB replacement flowchart - Factory mode

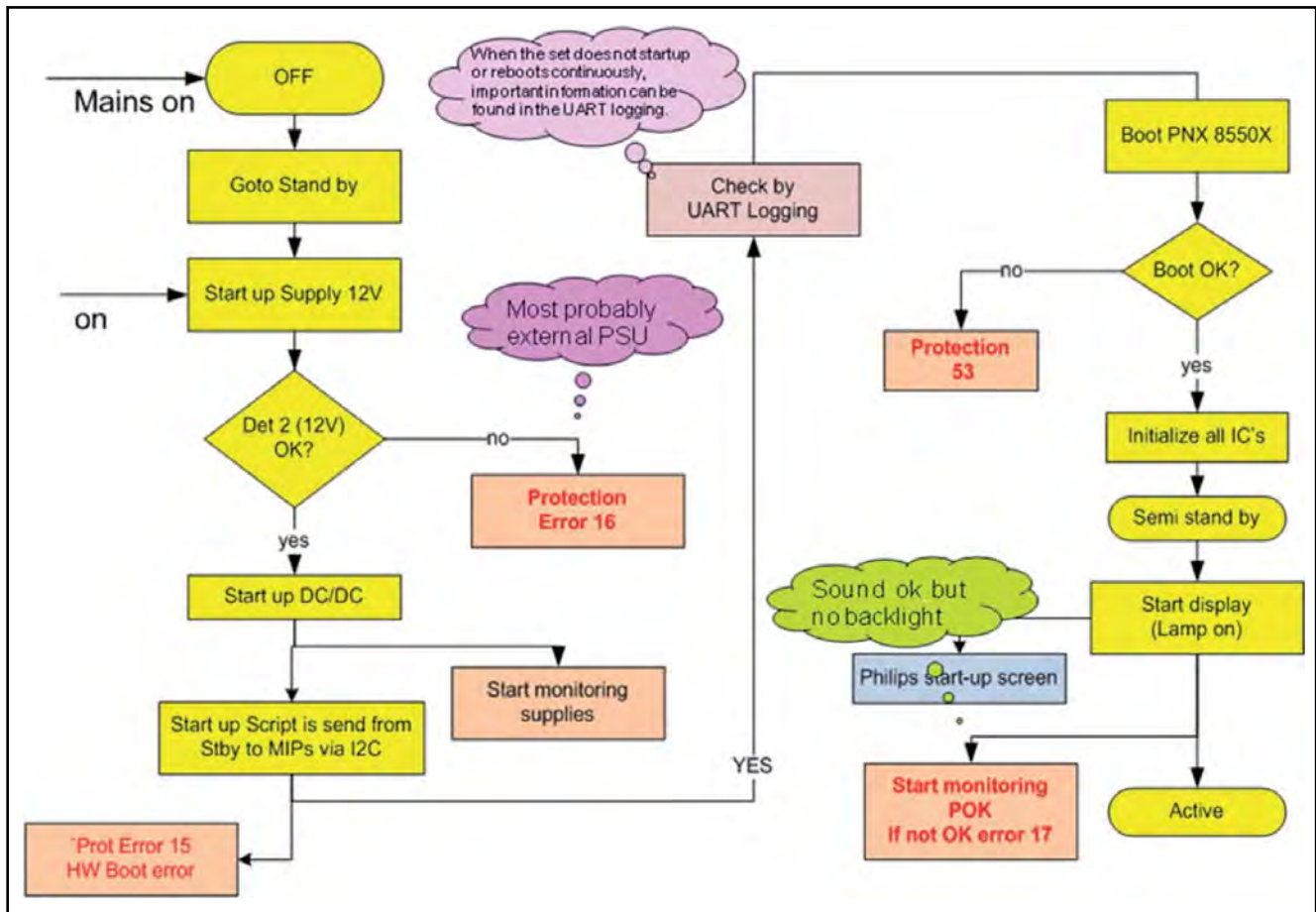
18753_211_100811.eps
110810

Figure 5-15 SSB start-up

5.9 Software Upgrading

Always check for the latest software version on the service website in relation to the correct CTN!!!

5.9.1 Introduction

The set software and security keys are stored in a NAND-Flash, which is connected to the Fusion processor.

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, without the need of an E-JTAG debugger. A description on how to upgrade the main software can be found in the electronic User Manual.

Important: When the NAND-Flash must be replaced, a new SSB must be ordered, due to the presence of the security keys! (CI +, MAC address, ...).

Perform the following actions after SSB replacement:

1. Set the correct option numbers (see rearcover sticker).
2. Update the TV software => see the eUM (electronic User Manual) for instructions.
3. Perform the alignments as described in chapter 6 (section [6.5 Reset of Repaired SSB](#)).
4. Check in CSM if Set type, MAC address are valid.

For the correct order number of a new SSB, always refer to the Spare Parts list!

5.9.2 Main Software Upgrade

- The "UpgradeAll.upg" file is only used in the factory.

Automatic Software Upgrade

In "normal" conditions, so when there is no major problem with the TV, the main software and the default software upgrade application can be upgraded with the "AUTORUN.UPG" (FUS part of the one-zip file: e.g. QF1EU_0.88.0.0.zip). This can also be done by the consumers themselves, but they will have to get their software from the commercial Philips website or via the Software Update Assistant in the user menu (see eUM). The "autorun.upg" file must be placed in the root of the USB stick.

How to upgrade:

1. Copy "AUTORUN.UPG" to the root of the USB stick.
2. Insert USB stick in the set while the set is operational. The set will restart and the upgrading will start automatically. As soon as the programming is finished, a message is shown to remove the USB stick and restart the set.

Manual Software Upgrade

In case that the software upgrade application does not start automatically, it can also be started manually.

How to start the software upgrade application manually:

1. Disconnect the TV from the Mains/AC Power.
2. Press the "OK" button on a Philips TV remote control or a Philips DVD RC-6 remote control (attention : not supported by use of RF4CE remote due to the fact this application is not running yet at the time of the "OK" request). Keep the "OK" button pressed while reconnecting the TV to the Mains/AC Power.
3. The software upgrade application will start.

Attention!

In case the download application has been started **manually**, the "autorun.upg" will maybe not be recognized.

What to do in this case:

1. Create a directory "UPGRADES" on the USB stick.
2. Rename the "autorun.upg" to something else, e.g. to "software.upg". Do not use long or complicated names, keep it simple. Make sure that "AUTORUN.UPG" is no longer present in the root of the USB stick.
3. Copy the renamed "upg" file into this directory.
4. Insert USB stick into the TV.
5. The renamed "upg" file will be visible and selectable in the upgrade application.

Back-up Software Upgrade Application

If the default software upgrade application does not start (could be due to a corrupted boot sector) via the above described method, try activating the "back-up software upgrade application".

How to start the "back-up software upgrade application" manually:

1. Disconnect the TV from the Mains/AC Power.
2. Press the "CURSOR DOWN"-button on a Philips TV remote control while reconnecting the TV to the Mains/AC Power.(attention : not supported by use of RF4CE remote due to the fact this application is not running yet at the time of the "CURSOR-DOWN" request).
3. The back-up software upgrade application will start.

5.9.3 Standby Software Upgrade via USB

In this chassis it is possible to upgrade the Standby software via a USB stick. The method is similar as upgrading the main software via USB.

Use the following steps:

1. Create a directory "UPGRADES" on the USB stick.
2. Copy the Standby software (one-zip file StandbyUpgrade, e.g. StandbyFactory_61.0.0.00_13.00.00.upg) into this directory.
3. Insert the USB stick into the TV.
4. Start the download application manually (see section "[Manual Software Upgrade](#)").
5. Select the appropriate file and press the "OK" button to upgrade.

5.9.4 Content and Usage of the One-Zip Software File

Below the content of the One-Zip file is explained, and instructions on how and when to use it.

- **BLCtrlFPGA_QF1EU_x.x.x.x.zip**. Contains the BLCtrlFPGA software in "upg" format. SW version available in CSM 2.5 FPGA video version. Attention : no power interruption allowed during the upgrade process (upgrade not full proof).
- **FUS_QF1EU_x.x.x.x.zip**. Contains the "autorun.upg" which is needed to upgrade the TV main software and the software download application.
- **StandbyUpgrade_QF1EU_x.x.x.x.zip**. Contains the StandbyFactory software in "upg" format.
- **ProcessNVM_QF1EU_x.x.x.x.zip**. Default NVM content. Must be programmed via ComPair or can be loaded via USB, be aware that all alignments stored in NVM are overwritten here.

5.9.5 UART logging 2K12 (see section "[5.8 Fault Finding and Repair Tips](#), [5.8.6 Logging](#))

6. Alignments

Index of this chapter:

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

6.1 General Alignment Conditions

- Perform all electrical adjustments under the following conditions:
- Power supply voltage (depends on region):
 - AP-NTSC:** 120 V_{AC} or 230 V_{AC} / 50 Hz (± 10%).
 - AP-PAL-multi:** 120 - 230 V_{AC} / 50 Hz (± 10%).
 - EU:** 230 V_{AC} / 50 Hz (± 10%).
 - LATAM-NTSC:** 120 - 230 V_{AC} / 50 Hz (± 10%).
 - US:** 120 V_{AC} / 60 Hz (± 10%).
 - Connect the set to the mains via an isolation transformer with low internal resistance.
 - Allow the set to warm up for approximately 15 minutes.
 - Measure voltages and waveforms in relation to correct ground (e.g. measure audio signals in relation to AUDIO_GND). **Caution:** It is not allowed to use heat sinks as ground.
 - Test probe: R_i > 10 MΩ, C_i < 20 pF.
 - Use an isolated trimmer/screwdriver to perform alignments.

6.1.1 Alignment Sequence

- First, set the correct options:
 - In SAM, select "Option numbers".
 - Fill in the option settings for "Group 1" and "Group 2" according to the set sticker (see also paragraph [6.4 Option Settings](#)).
 - Press OK on the remote control before the cursor is moved to the left.
 - In submenu "Option numbers" select "Store" and press OK on the RC.
- OR:
 - In main menu, select "Store" again and press OK on the RC.
 - Switch the set to Stand-by.
- Warming up (>15 minutes).

6.2 Hardware Alignments

Not applicable.

6.3 Software Alignments

- Put the set in SAM mode (see Chapter [5. Service Modes, Error Codes, and Fault Finding](#)). The SAM menu will now appear on the screen. Select ALIGNMENTS and go to one of the sub menus. The alignments are explained below.
- The following items can be aligned:
- White point
 - Ambilight.
 - TCON alignment : not applicable
 - Reset TCON alignment : not applicable

To store the data:

- Press OK on the RC **before the cursor is moved to the left**
- In main menu 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 White Point

- Choose "Home", "Setup", "TV Settings" and then "Picture" and set picture settings as follows:

Picture Setting	
Contrast	100
Brightness	50
Colour	0
Light Sensor	Off
Picture format	Unscaled

- In menu "Picture", choose "Pixel Precise HD" and set picture settings as follows:

Picture Setting	
Dynamic Contrast	Off
Dynamic Backlight	Off
Colour Enhancement	Off
Gamma (advanced)	0

- Go to the SAM and select "Alignments"-> "White point".

White point alignment LCD screens:

- Use a 100% white screen (format: 720p50) to the HDMI input and set the following values:
 - "Colour temperature": "Cool".
 - All "White point" values to: "127".

In case you have a colour analyser:

- Measure, in a dark environment, with a calibrated contactless colour analyser (Minolta CA-210 or Minolta CS-200) in the centre of the screen and note the x, y value.
- Change the pattern to 90% white screen. If a Quantum Data generator is used, select the "GreyAll" test pattern at level = 230.
- Adjust the correct x, y coordinates (while holding one of the White point registers R, G or B on 127) 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 - LED - Minolta CA-200](#), or [6-2 White D alignment values - LED - Minolta CA-210](#)). Tolerance: dx: ± 0.002, dy: ± 0.002.
- Repeat this step for the other colour temperatures that need to be aligned.
- When finished press OK on the RC and then press STORE (in the SAM root menu) to store the aligned values to the NVM.
- Restore the initial picture settings after the alignments.

Table 6-1 White D alignment values - LED - Minolta CA-200

Tint	Temperature in K	d uv	x	y
Cool	11000	0.000	0.276	0.282
Normal	9000	0.000	0.287	0.296
Warm	6500	+0.003	0.313	0.329

Table 6-2 White D alignment values - LED - Minolta CA-210

Tint	Temperature in K	d uv	x	y
Cool	9940	0.0037	0.279	0.293
Normal	8250	0.0043	0.291	0.308
Warm	6200	0.0058	0.318	0.339

- 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.
- Select a COLOUR TEMPERATURE (e.g. COOL, NORMAL, or WARM).

- Set the RED, GREEN and BLUE default values according to the values in [Table 6-3](#).
- When finished press OK on the RC, then press STORE (in the SAM root menu) to store the aligned values to the NVM.
- Restore the initial picture settings after the alignments.

Table 6-3 White tone default settings 32"

White Tone	e.g. 32PFL6xx7/x		
Colour Temp	R	G	B
Normal	125	116	117
Cool	103	103	127
Warm	127	103	64

Table 6-4 White tone default settings 37"

White Tone	e.g. 37PFL6xx7/x		
Colour Temp	R	G	B
Normal	123	117	124
Cool	97	102	127
Warm	127	104	72

Table 6-5 White tone default settings 42"

White Tone	e.g. 42PFL6xx7/x		
Colour Temp	R	G	B
Normal	126	119	113
Cool	113	112	127
Warm	127	100	64

Table 6-6 White tone default settings 47"

White Tone	e.g. 47PFL6xx7/x		
Colour Temp	R	G	B
Normal	127	107	107
Cool	119	105	126
Warm	127	92	58

Table 6-7 White tone default settings 55"

White Tone	e.g. 55PFL6xx7/x		
Colour Temp	R	G	B
Normal	127	116	114
Cool	117	112	125
Warm	127	103	71

6.3.2 Ambilight

Each ambient light module is aligned by a matrix and by the brightness. After replacement of a spare module, the brightness/color can be adjust/fine-tuned according the neighbouring modules.

1. Go to SAM.
2. Select "Alignments".
3. Select "Ambilight". A white test pattern shall be displayed by the ambilight modules.
4. Select the number of the module that have to be aligned. Module 1 is the first one which will come across according the wiring path, starting at the small signal panel, proceeding towards the ambient light modules one by one after the other. The first module will be attached to the next module 2. Module number 2 to number 3 etc. Herewith the way to define the ambilight module numbering.
5. Align the brightness, use as reference the neighbouring modules output. Adjust now by eye side, the brightness is automatically stored.
6. Select one of 10 matrixes which color matches most with the neighbouring modules. (see table "[6-8 Overview matrix correction table](#)").

7. The alignment is stored automatically (tip: don't switch off the set immediately after the alignment is done, automatic storage can require a time frame of 10 seconds).

Table 6-8 Overview matrix correction table

Matrix #	fR	fG	fB
Matrix 0	1	1	1
Matrix 1	1	0.9	0.9
Matrix 2	0.9	1	0.9
Matrix 3	0.9	0.9	1
Matrix 4	0.9	1	1
Matrix 5	1	0.9	1
Matrix 6	1	1	0.9
Matrix 7	0.95	1	1
Matrix 8	1	0.95	1
Matrix 9	1	1	0.95

6.3.3 TCON alignment (not applicable)

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.

Notes:

- After changing the option number(s), save them by pressing the "OK" button on the RC before the cursor is moved to the left, select "STORE" in the SAM root menu 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 (Service) Options

From 2011 onwards, it is not longer possible to change individual option settings in SAM. Options can only be changed all at once by using the option codes as described in section [6.4.3](#).

6.4.3 Opt. No. (Option numbers)

Select this sub menu to set all options at once (expressed in two long strings of numbers).

An option number (or "option byte") represents a number of different options. When you change these numbers directly, you can set all options very quickly. All options are controlled via eight option numbers.

When the NVM is replaced, all options will require resetting. To be certain that the factory settings are reproduced exactly, you must set both option number lines. You can find the correct option numbers on the backcover sticker from the TV set.

Example: The options sticker gives the following option numbers:

- Group 1 : 08192 00133 01387 45160
- Group 2 : 12232 04256 00164 00000

The first line (group 1) indicates hardware options 1 to 4, the second line (group 2) indicate software options 5 to 8.

Every 5-digit number represents 16 bits (so the maximum value will be 65536 if all options are set).

When all the correct options are set, the sum of the decimal values of each Option Byte (OB) will give the option number.

Diversity

Not all sets with the same Commercial Type Number (CTN) necessarily have the same option code!

Use of Alternative BOM => an alternative BOM number usually indicates the use of an alternative display or power supply. This results in another display code thus in another Option code. Refer to Chapter [2. Technical Specifications, Diversity, and Connections](#).

6.4.4 Option Code Overview

Refer to the backcover sticker in the set for the correct option codes.
Important: after having edited the option numbers as described above, you **must press OK** on the remote control **before the cursor is moved to the left!**

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 needs to be set. To set all this, you can use the ComPair tool or use the "NVM editor" and "Setup => TV settings => General settings => Reinstall TV" (virgin mode).

After a repaired SSB has been mounted in the set (set repair on board level), the type number (CTN) and production code + 12NC's (SSB, display and supply) of the TV has to be set according the type plate of the set (no info on 12NC's here). For this, you can use the NVM editor in SAM. This action also ensures the correct functioning of the "Smart TV" feature and access to the Smart TV portals. The loading of the CTN and production code can also be done via ComPair (Model number programming).

After a SSB repair, the original channel map can be restored, provided that the original channel map was stored on a USB

6.6 Total Overview SAM modes

Table 6-9 SAM mode overview

Main Menu	Sub-menu 1	Sub-menu 2	Sub-menu 3	Description
Hardware Info	A. SW version	e.g. "Q5551_0.9.1.0"		Display TV & Stand-by SW version and CTN serial number
	B. Stand-by processor version	e.g. "STDBY_83.84.0.0"		
	C. Production code	e.g. "see type plate"		
Operation hours				Displays the accumulated total of operation hours.TV switched "on/off" & every 0.5 hours is increase one
Errors				Displayed the most recent errors
Reset error buffer				Clears all content in the error buffer
Alignment	White point	Colour temperature	Normal	3 different modes of colour temperature can be selected
			Warn	
			Cool	
		White point red		
	Ambilight	White point green		LCD White Point Alignment. For values, see Table 6-3 White tone default settings 32"
		White point blue		
		Select module		
Dealer options	Virgin mode	Off/On		Select Virgin mode On/Off. TV starts up / does not start up (once) with a language selection menu after the mains switch is turned "on" for the first time (virgin mode)
	E-sticker	Off/On		Select E-sticker On/Off (USP's on-screen)
	Auto store mode	None		
		PDC/VPS		
		TXT page		
Option numbers		PDC/VPS/TXT		
	Group 1	e.g. "00008.00001.15421.02239"		The first line (group 1) indicates hardware options 1 to 4
	Group 2	e.g. "44816.34311.33024.00000"		The second line (group 2) indicates software options 5 to 8
	Store			Store after changing
Initialise NVM				N.A.

stick before repair was commenced and that basic functionality of the TV, needed for this procedure, was not hampered as a result of the defect. The procedure of "channel map cloning" is clearly described in the (electronic) user manual.

6.5.1 SSB identification

Whenever ordering a new SSB, it should be noted that the correct ordering number (12nc) of a SSB is located on a sticker on the SSB. The format is <12nc SSB><serial number>. The ordering number of the correct "Service" SSB is the one preceded by the letter "S" in case 2 or more ordering numbers are present on the bar code sticker.

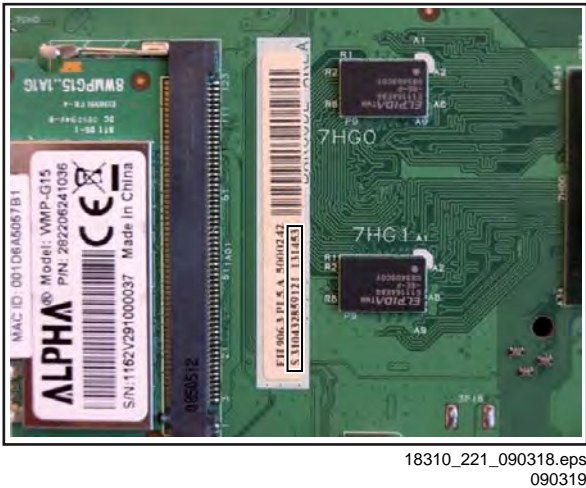


Figure 6-1 SSB identification

Main Menu	Sub-menu 1	Sub-menu 2	Sub-menu 3	Description
Store				Select Store in the SAM root menu after making any changes
Operation hours display		0003		In case the display must be swapped for repair, you can reset the ""Display operation hours" to "0". So, this one does keeps up the lifetime of the display itself (mainly to compensate the degeneration behaviour)
Software maintenance	Software events	Display		Display information is for development purposes
		Clear		
		Test reboot		
		Test cold reboot		
		Test application crash		
	Hardware events	Display		Display information is for development purposes
Test setting	Digital info	Clear		
		Current frequency: 538		Display information is for development purposes
		QAM modulation: 64-qam		
		Symbol rate:		
		Original network ID: 12871		
		Network ID: 12871		
		Transport stream ID: 2		
		Service ID: 3		
		Hierarchical modulation: 0		
		Selected video PID: 35		
		Selected main audio PID: 99		
		Selected 2nd audio PID: 8191		
	Install start frequency	000		Install start frequency from "0" MHz
	Install end frequency	999		Install end frequency as "999" MHz
	Default install frequency			
	Installation	Digital only		Select Digital only or Digital + Analogue before installation
		Digital + Analogue		
Development file versions	Development 1 file version	Display parameters DISPT5.0.9.29		Display information is for development purposes
		Acoustics parameters ACSTS 5.0.6.20		
		PQ - TV550 1.0.27.22		
		PQS- Profile set		
		PQF - Fixed settings		
		PQU - User styles		
		Ambilight parameters PRFAM 5.0.5.2		
	Development 2 file version	12NC one zip software		Display information is for development purposes
		Initial main software		
		NVM version Q55x1_0.4.5.0		
		Flash units software		
		Temp com file version none		
Upload to USB	Channel list			Item "Channel list" removed from the user interface
	Personal settings			
	Option codes			
	Alignments			
	Identification data			
	History list			
	All (options included)			
Download from USB	Channel list			Item "Channel list" removed from the user interface
	Personal settings			
	Option codes			
	Alignments			
	Identification data			
	All (options included)			
NVM editor	Type number	see type plate		NVM editor; re key-in type number and production code after SSB replacement
	Production code	see type plate		

7. Circuit Descriptions

Index of this chapter:

- [7.1 Introduction](#)
- [7.2 Power Supply](#)
- [7.3 General Power Architecture](#)
- [7.4 Back-End Processing](#)

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 QFU2.1E LA chassis is part of the FUSION platform and covers sets in the 6xxx range.

7.1.1 FUSION 2011 Architecture Overview

For details about the chassis block diagrams refer to [chapter 9. Block Diagrams](#). An overview of the FUSION 2012 architecture can be found in [Figure 7-1](#).

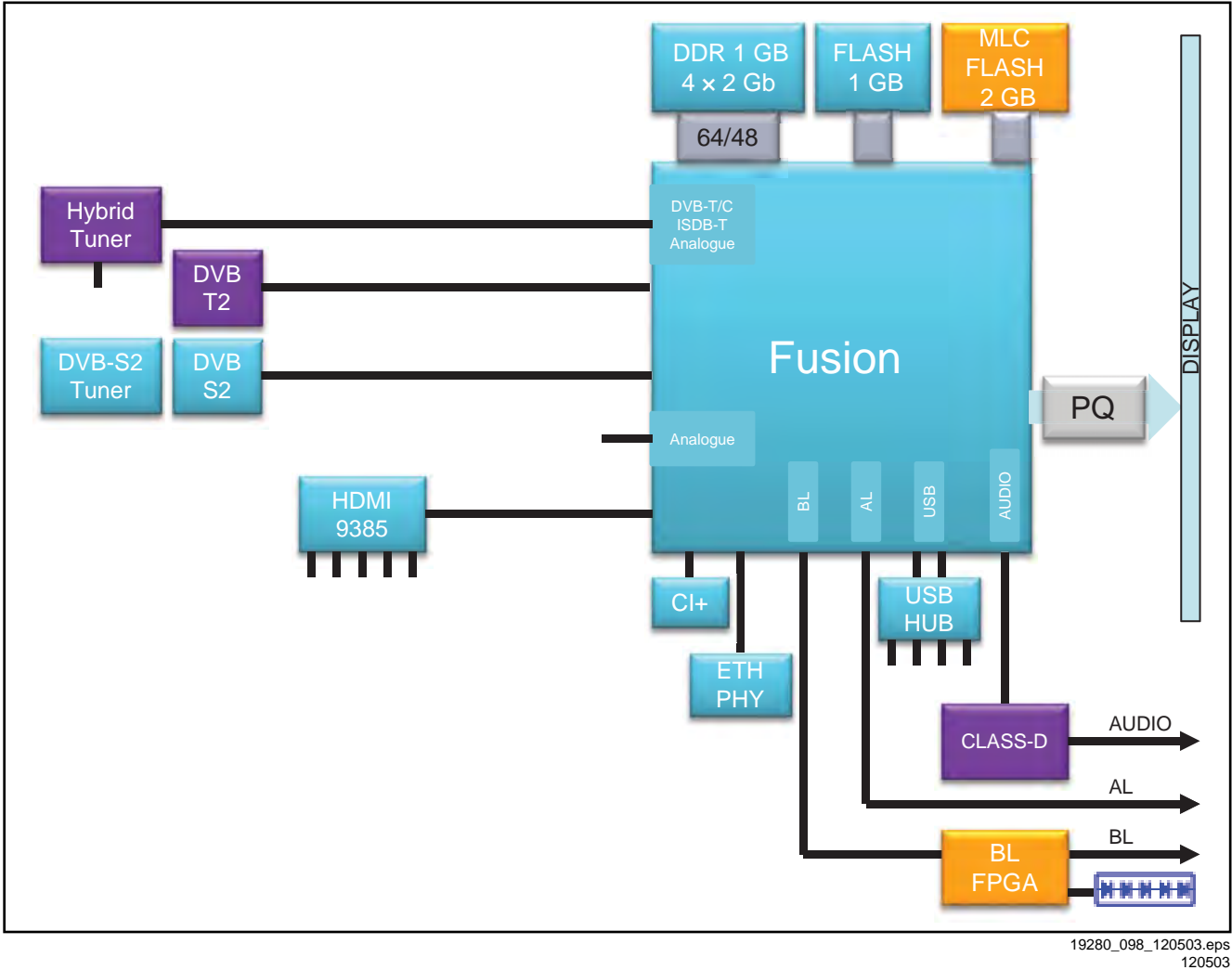
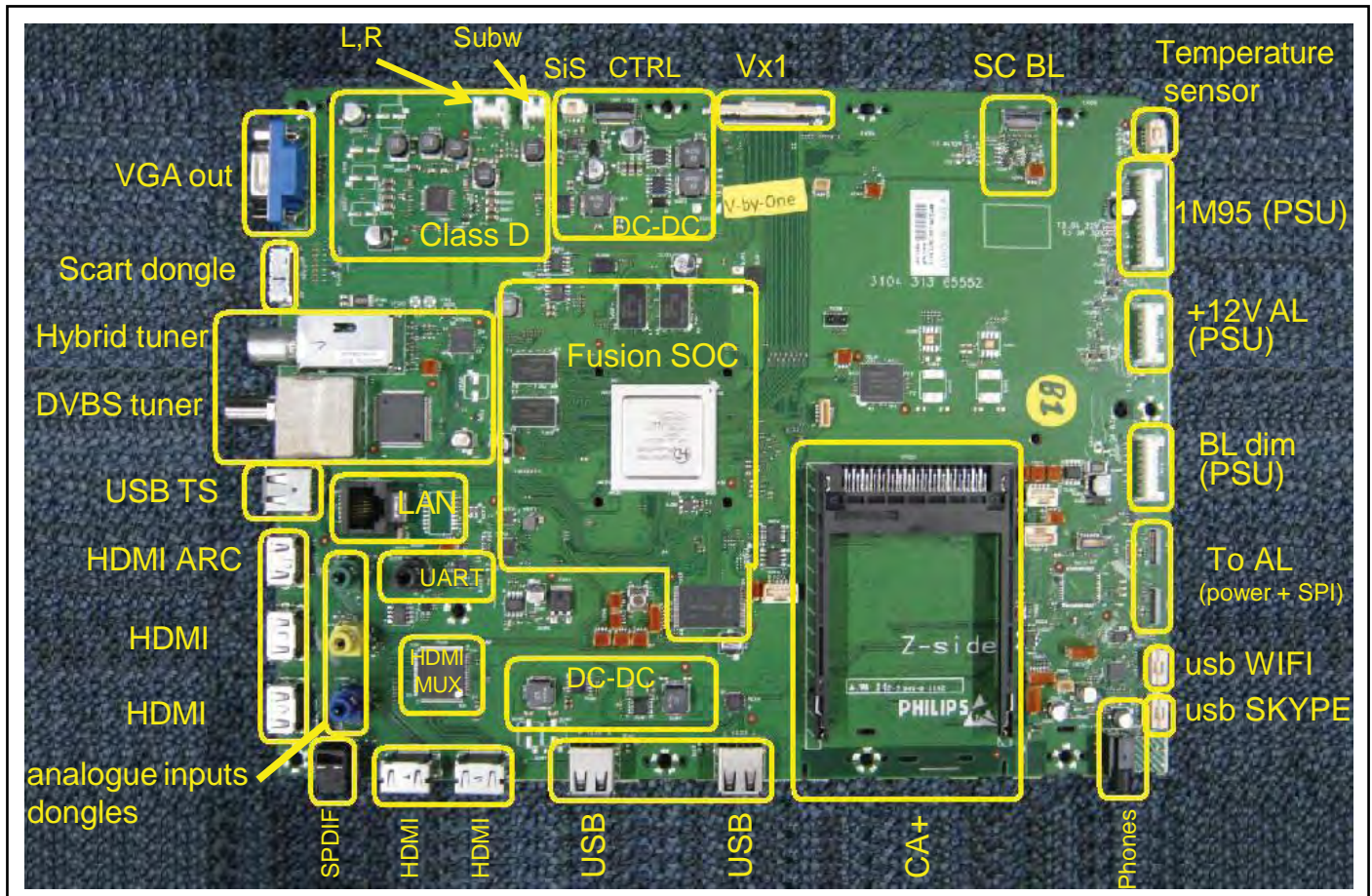


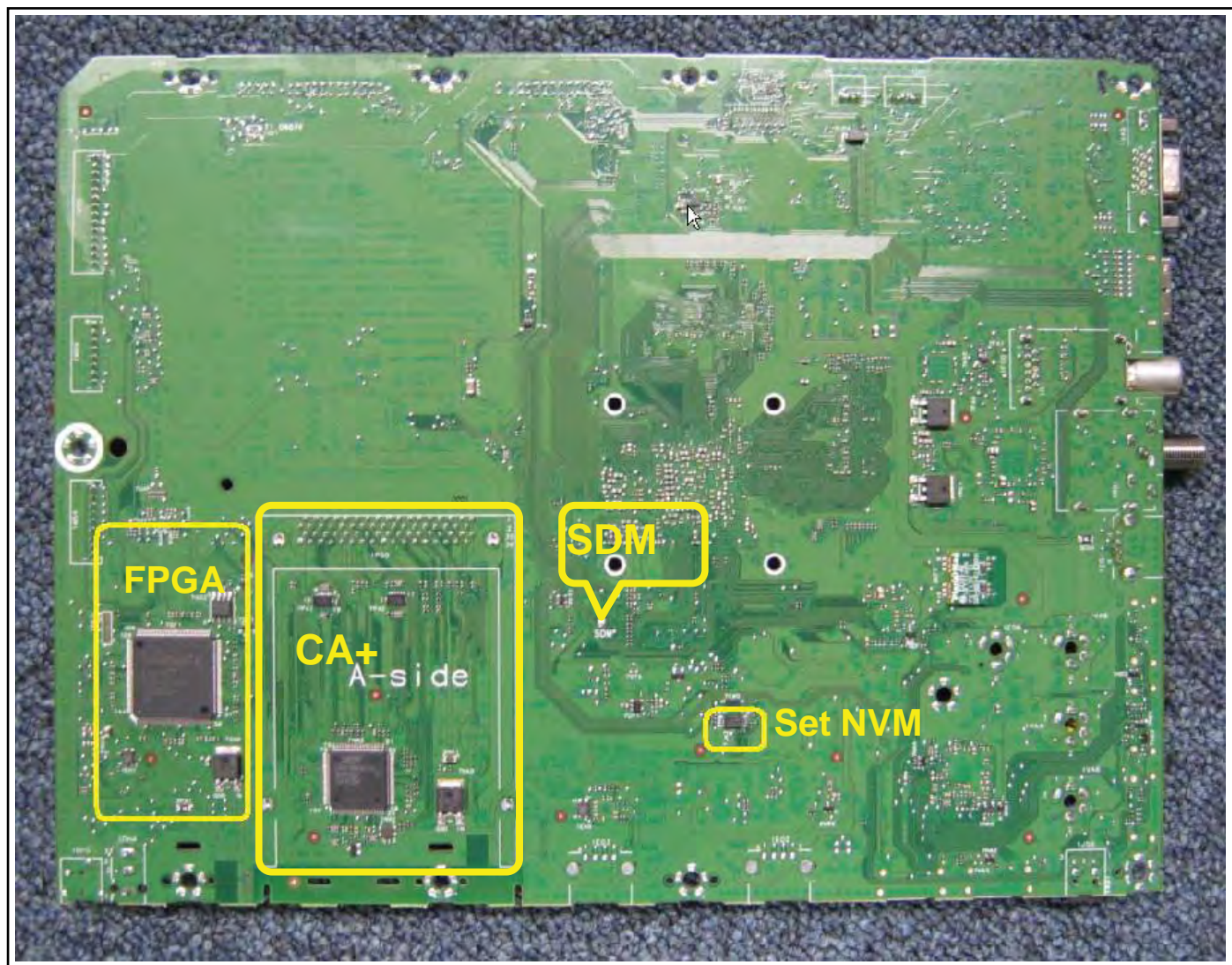
Figure 7-1 Architecture of FUSION platform 2012

7.1.2 SSB Cell Layout



19280_099_120503.eps
120503

Figure 7-2 SSB layout cells (top view)



19280_100_120503.eps
120503


Figure 7-3 SSB layout cells (bottom view)

7.2 Power Supply

7.2.1 Power Supply Unit

For 32", 37", and 55" sets, power supply units should be repaired on component level. Detailed information is given in sections 7.2.2 and 7.2.3. All **other** power supplies are a black box for Service. When any of these power supplies is defective, a new board must be ordered and the defective one must be returned, unless the main fuse of the board is broken. Always replace a defective fuse with one with the correct specifications! This part is available in the regular market. Consult the Philips Service web portal for the order codes of the boards.

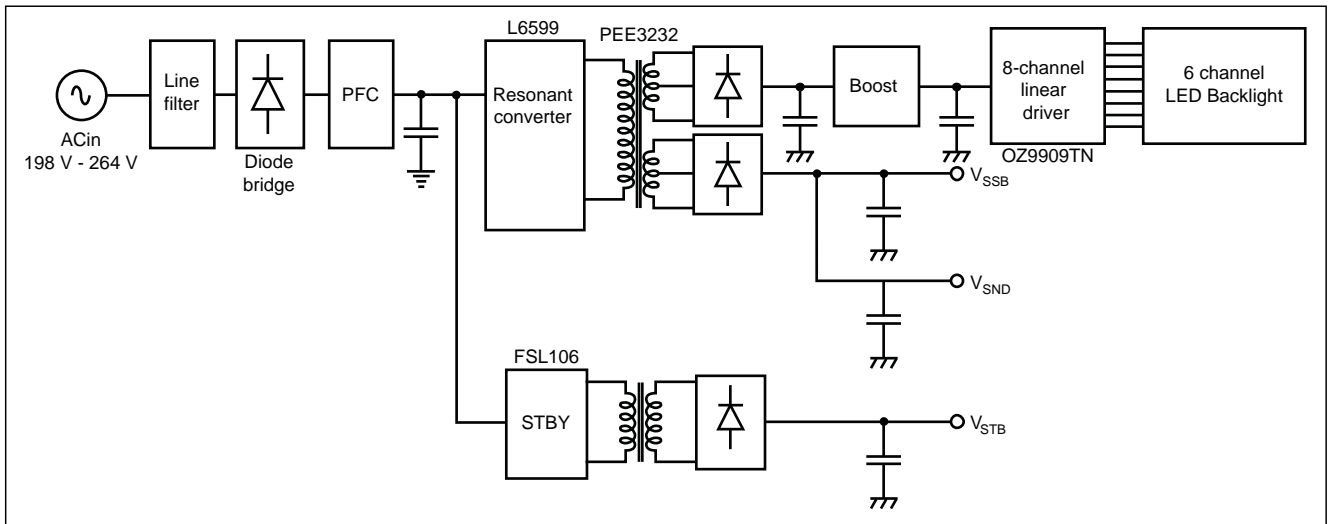
SAFETY INSTRUCTION

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.

7.2.2 PLDC-P109B (32" sets) and PLDD-P109A (37" sets)

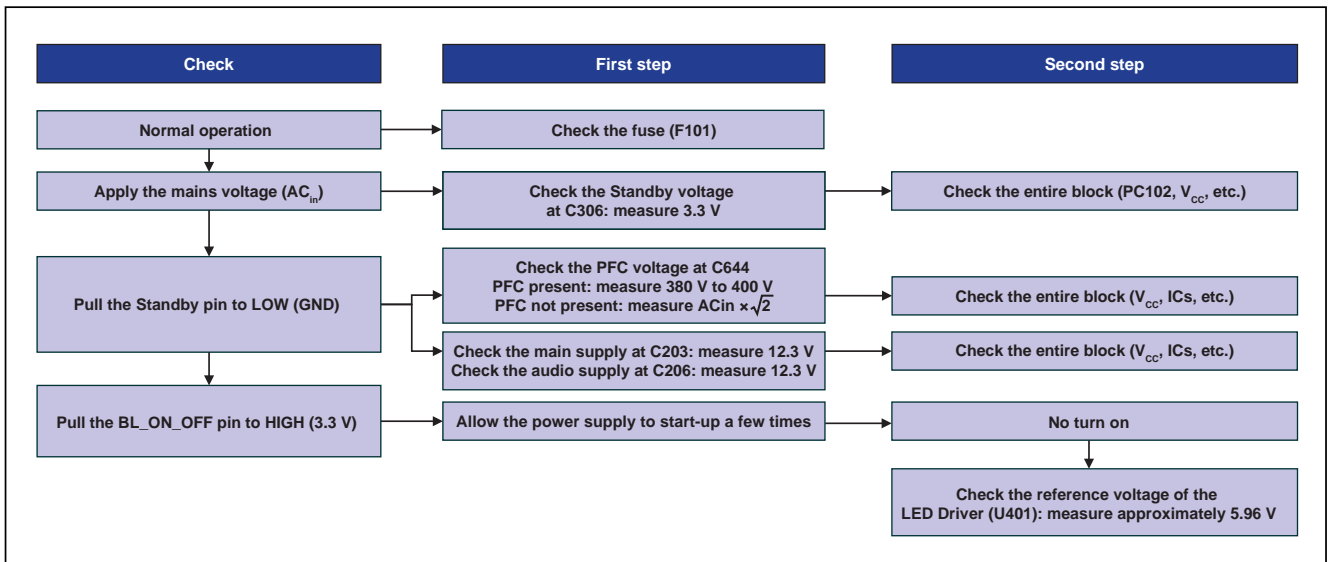
The output voltages to the chassis are:

- V_{STB} (+3.3 V; stand-by mode)
- V_{SSB} (+12.3 V; on-mode)
- V_{SND} (+12.3 V; audio circuit).



19280_101_120503.eps
1205031

Figure 7-4 Block diagram 32" & 37"



19280_102_120504.eps
120504

Figure 7-5 Test instructions 32" & 37"

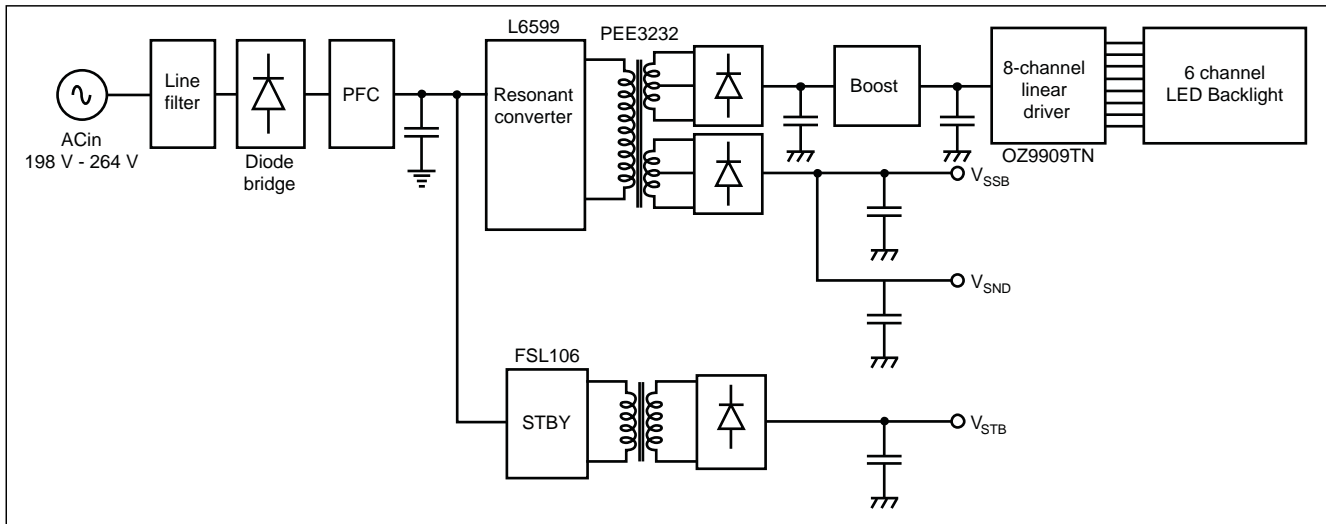
Following checks have to be performed:

- check fuse (F101)
- standby check V_{STB} (C306), measure 3.3 V
- PFC voltage check (C644), measure 380 - 400 V; if no PFC applied, measure 311 @ 220 V
- multi-level check V_{SSB} (C203), measure 12.3 V
- multi-level check V_{SND} (C206), measure 12.3V
- reference voltage check (U401), measure 5.96 V (appr.).

7.2.3 PLDK-P107B (55" sets)

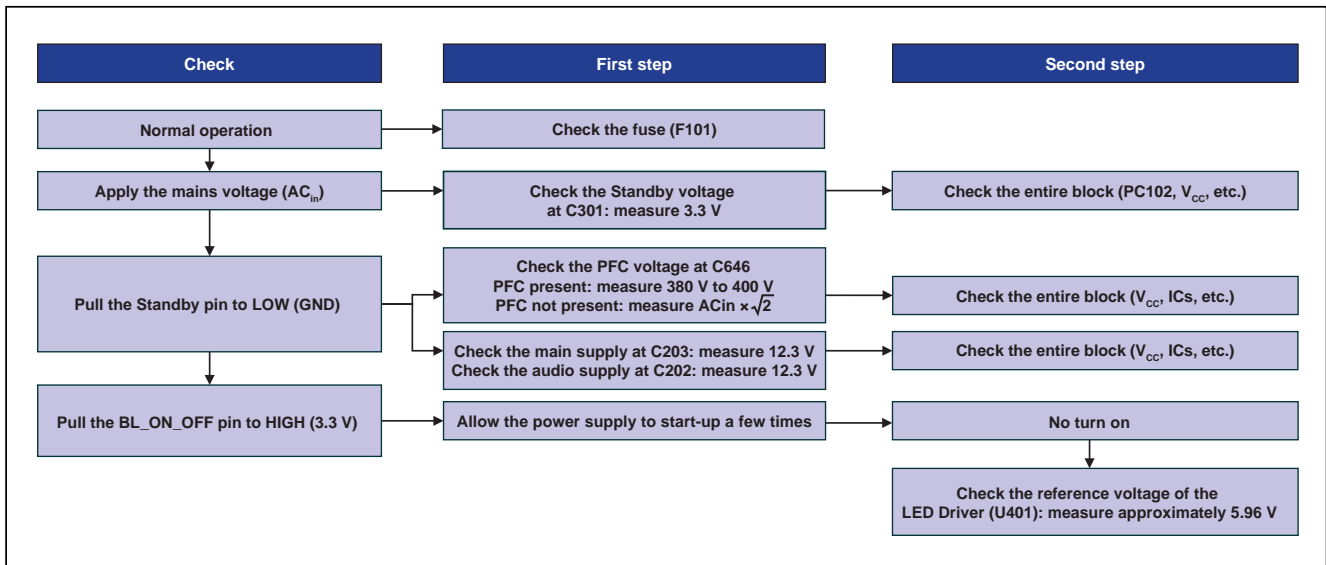
The output voltages to the chassis are:

- V_{STB} (+3.3 V; stand-by mode)
- V_{SSB} (+12.3 V; on-mode)
- V_{SND} (+12.3 V; audio circuit).



19280_101_120503.eps
1205031

Figure 7-6 Block diagram 55"



19283_001_121009.eps
121009

Figure 7-7 Test instructions 55"

Following checks have to be performed:

- check fuse (F101)
- standby check V_{STB} (C301), measure 3.3 V
- PFC voltage check (C646), measure 380 - 400 V; if no PFC applied, measure 311 @ 220 V
- multi-level check V_{SSB} (C203), measure 12.3 V
- multi-level check V_{SND} (C202), measure 12.3V
- reference voltage check (U401), measure 5.96 V (appr.).

7.3 General Power Architecture

For the power architecture refer to figure 7-8 and 7-9.

For start-up steps (for trouble-shooting), refer to figure 7-10.

The start-up sequence is marked with numbers in red.

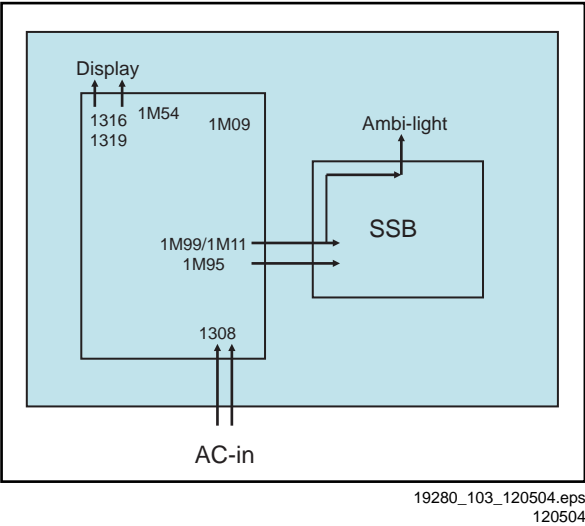


Figure 7-8 General power architecture

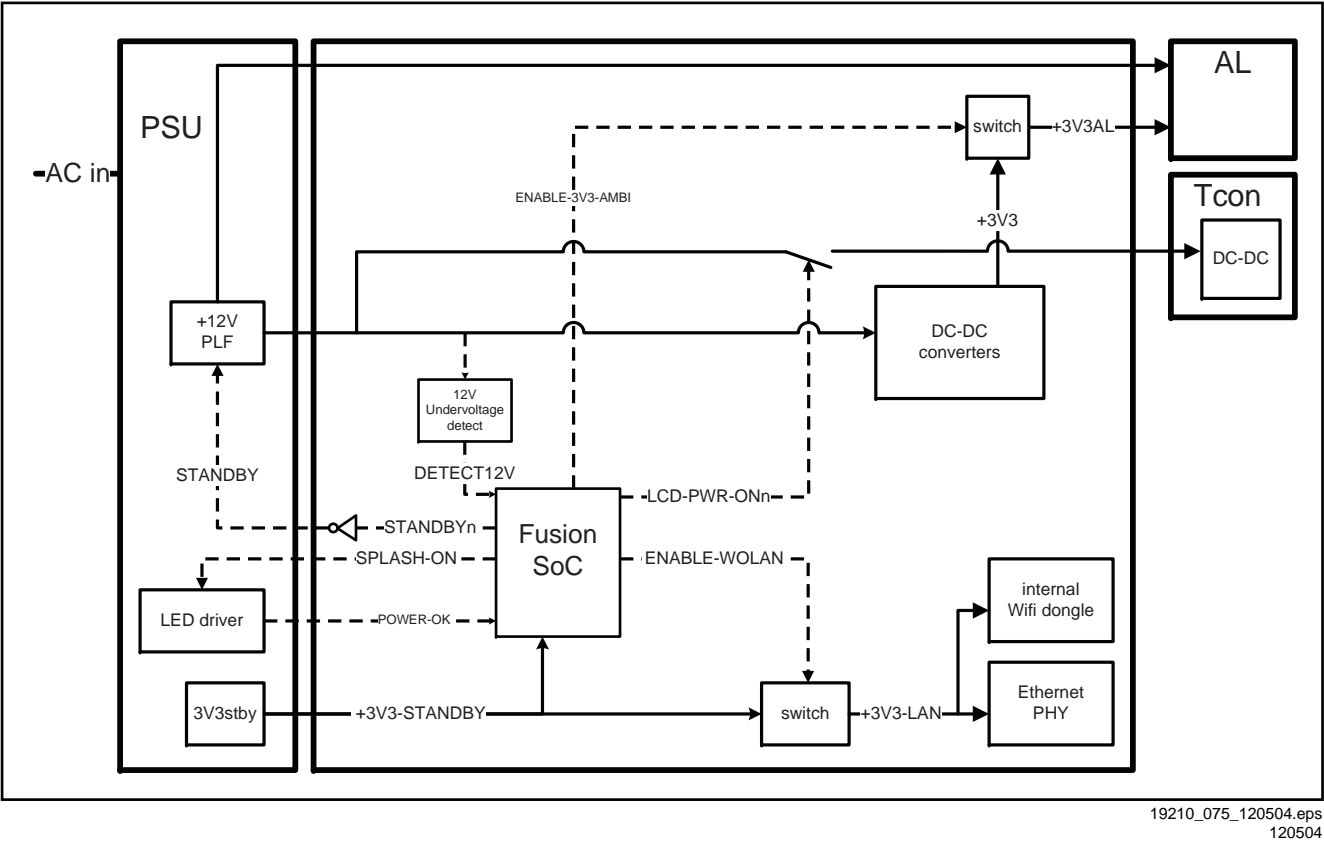


Figure 7-9 Functional supply overview

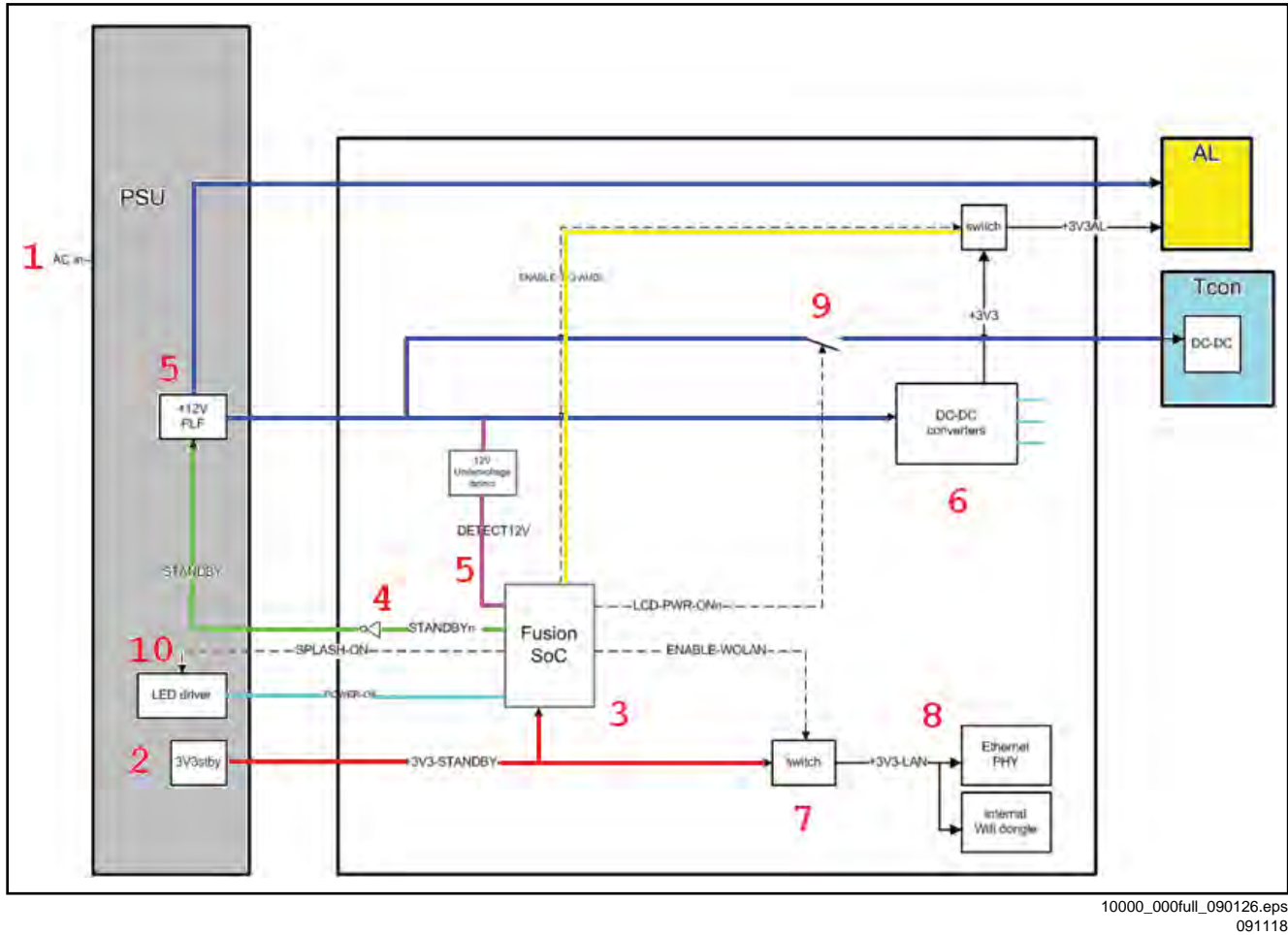
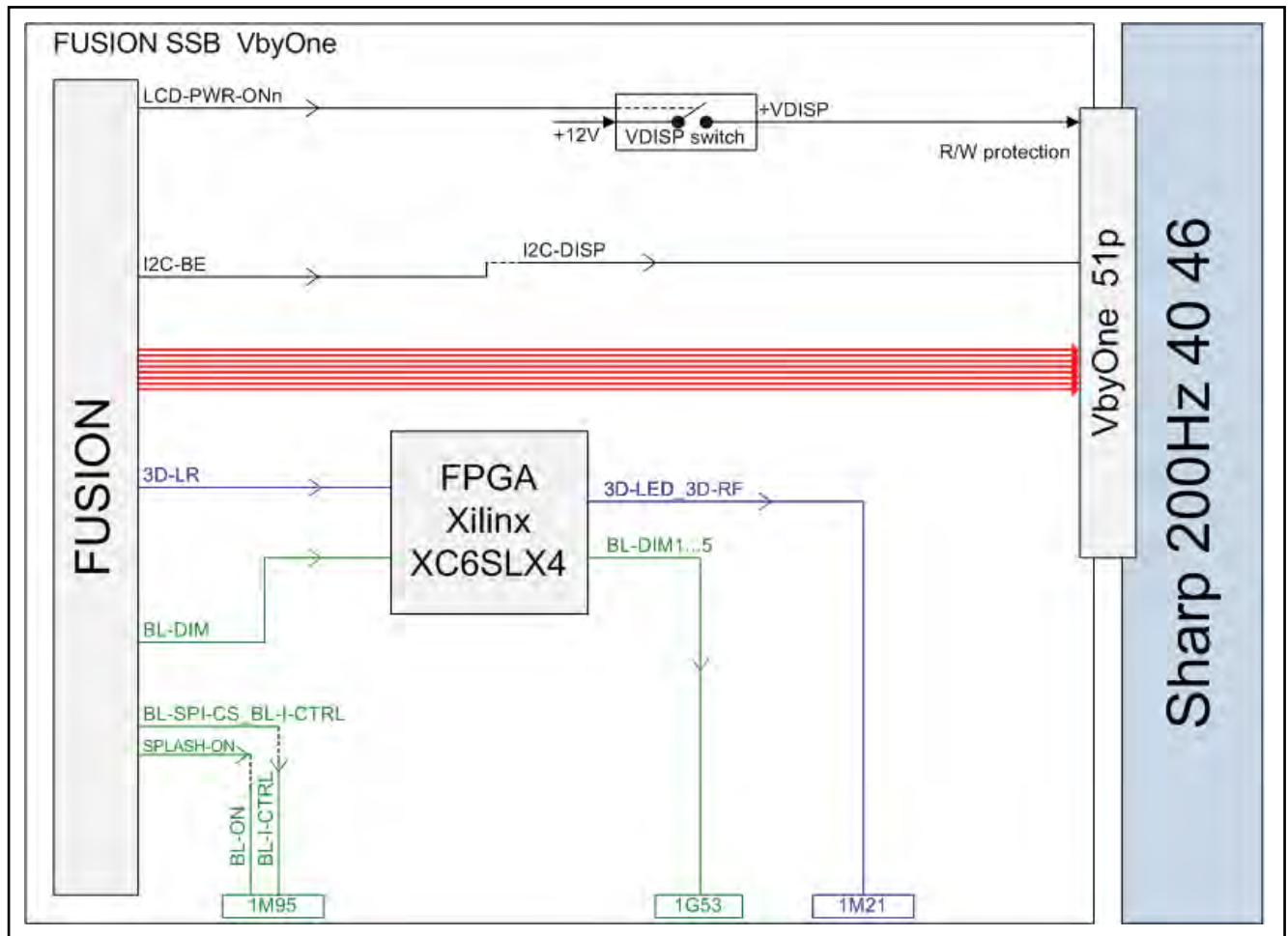


Figure 7-10 Functional power overview - power sequence

7.4 Back-End Processing

For the configuration, refer to [Figure 7-11](#).



19210_065_120504.eps
120507

Figure 7-11 Back-end configuration xxPFL6xxx/x series

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 [10-2-7 B02A, Tuner-channel decoder](#) B02A, CXD2834 (IC7KC0)

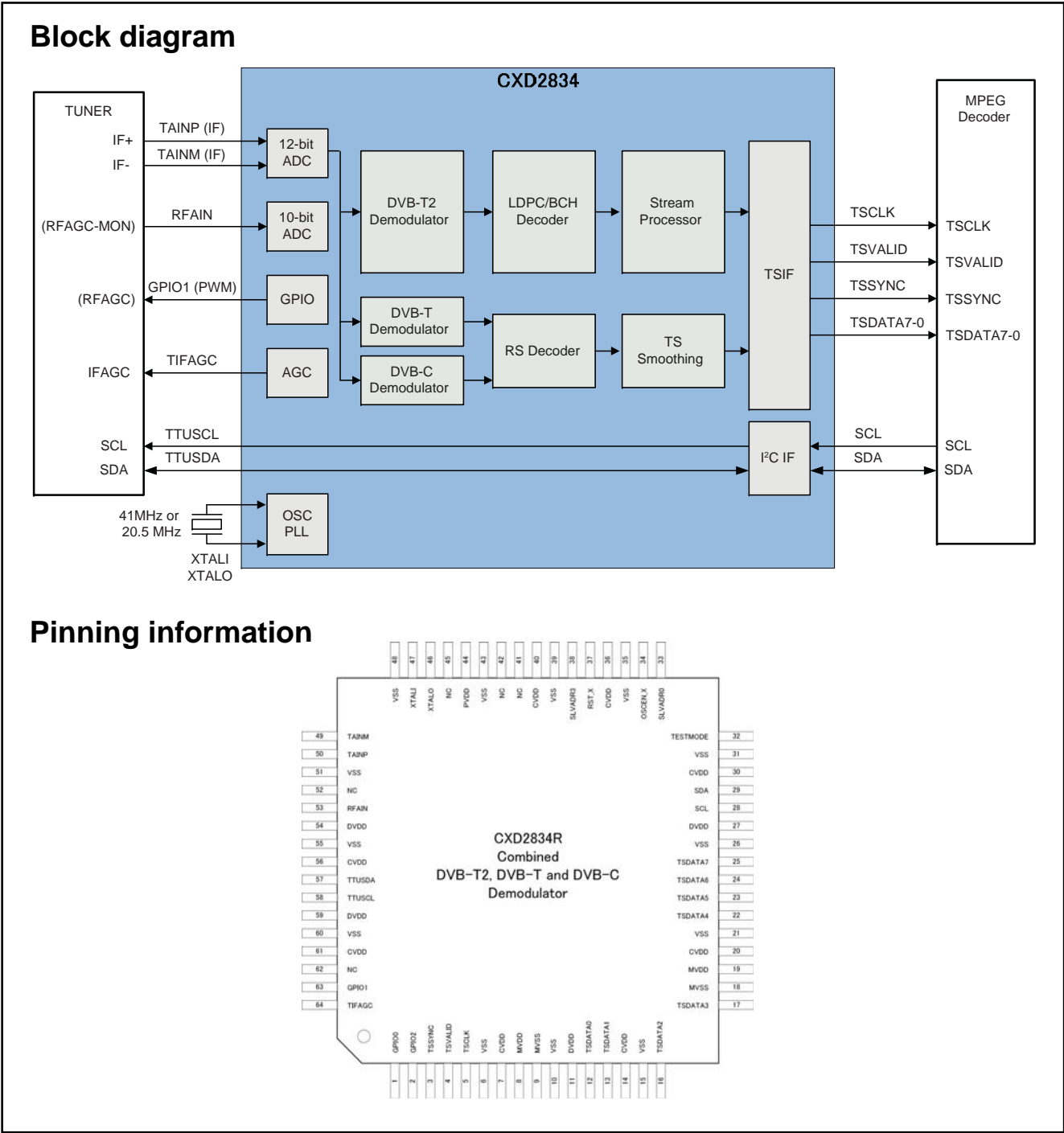
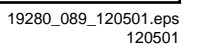
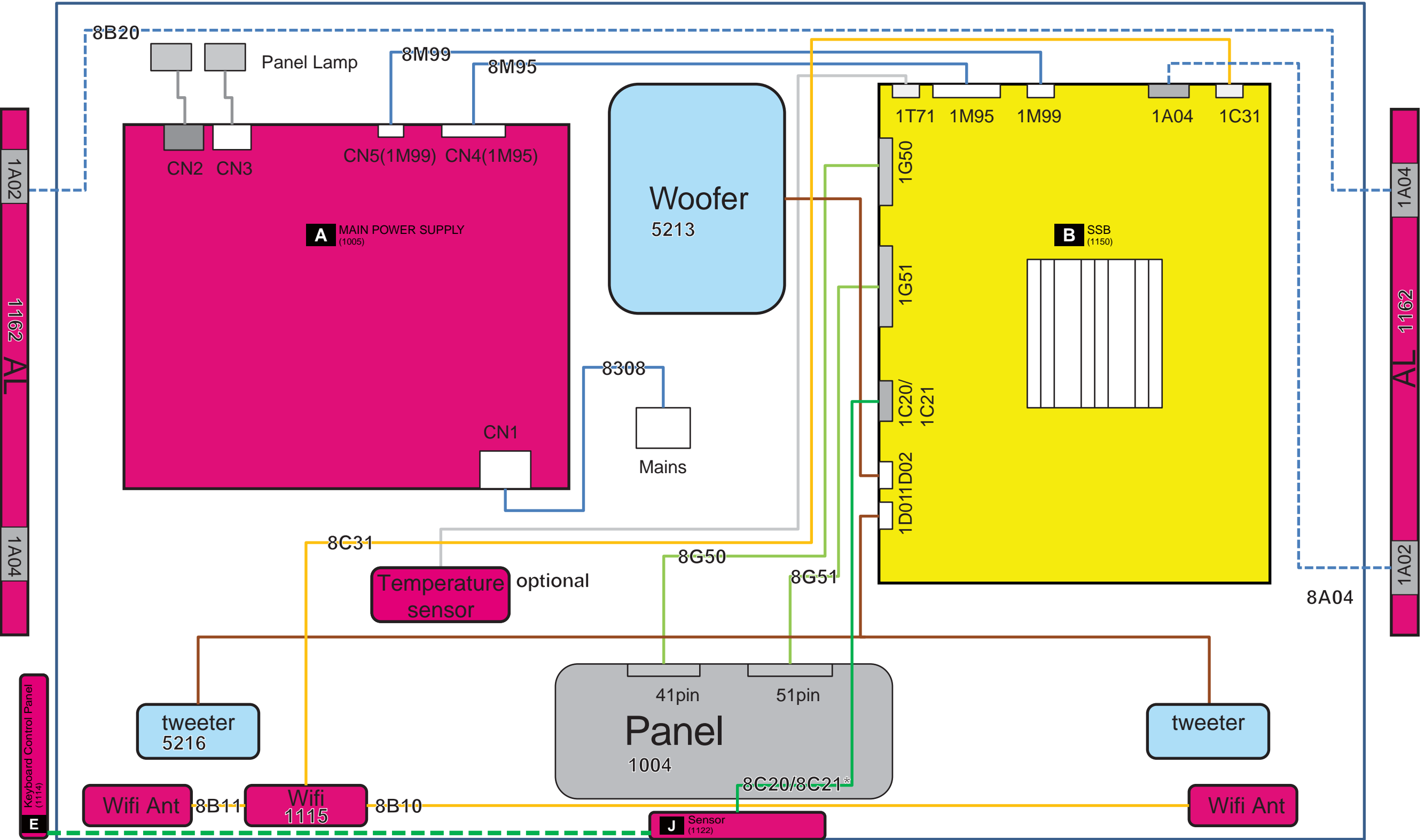


Figure 8-1 Internal block diagram and pin configuration

9.1 6000 series, 2 sided AmbiLight 32"



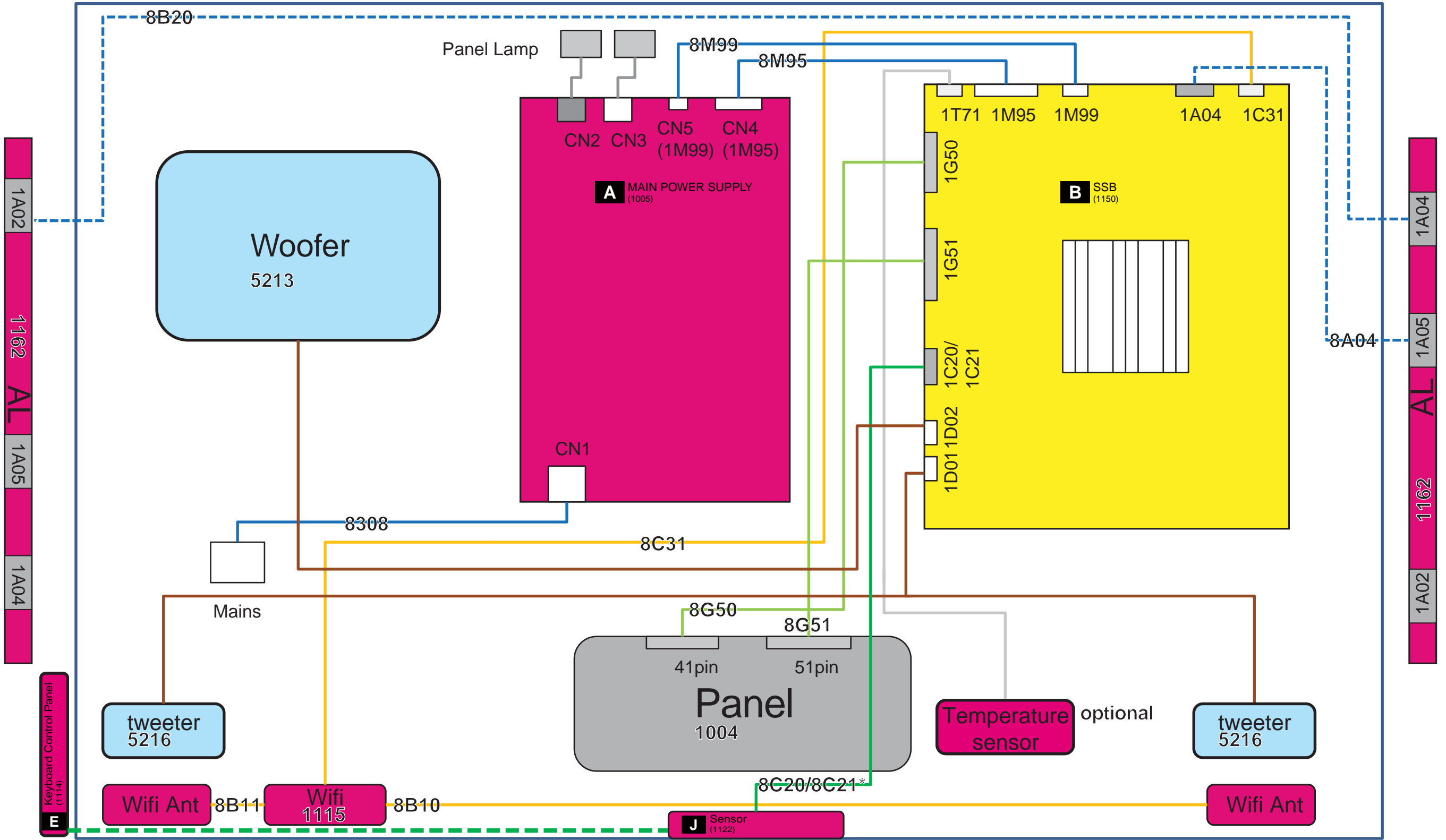
6000 series, 2 sided AmbiLight 37"



* For non RF4CE cable 8C20 is used
For RF4CE cable 8C21 is used

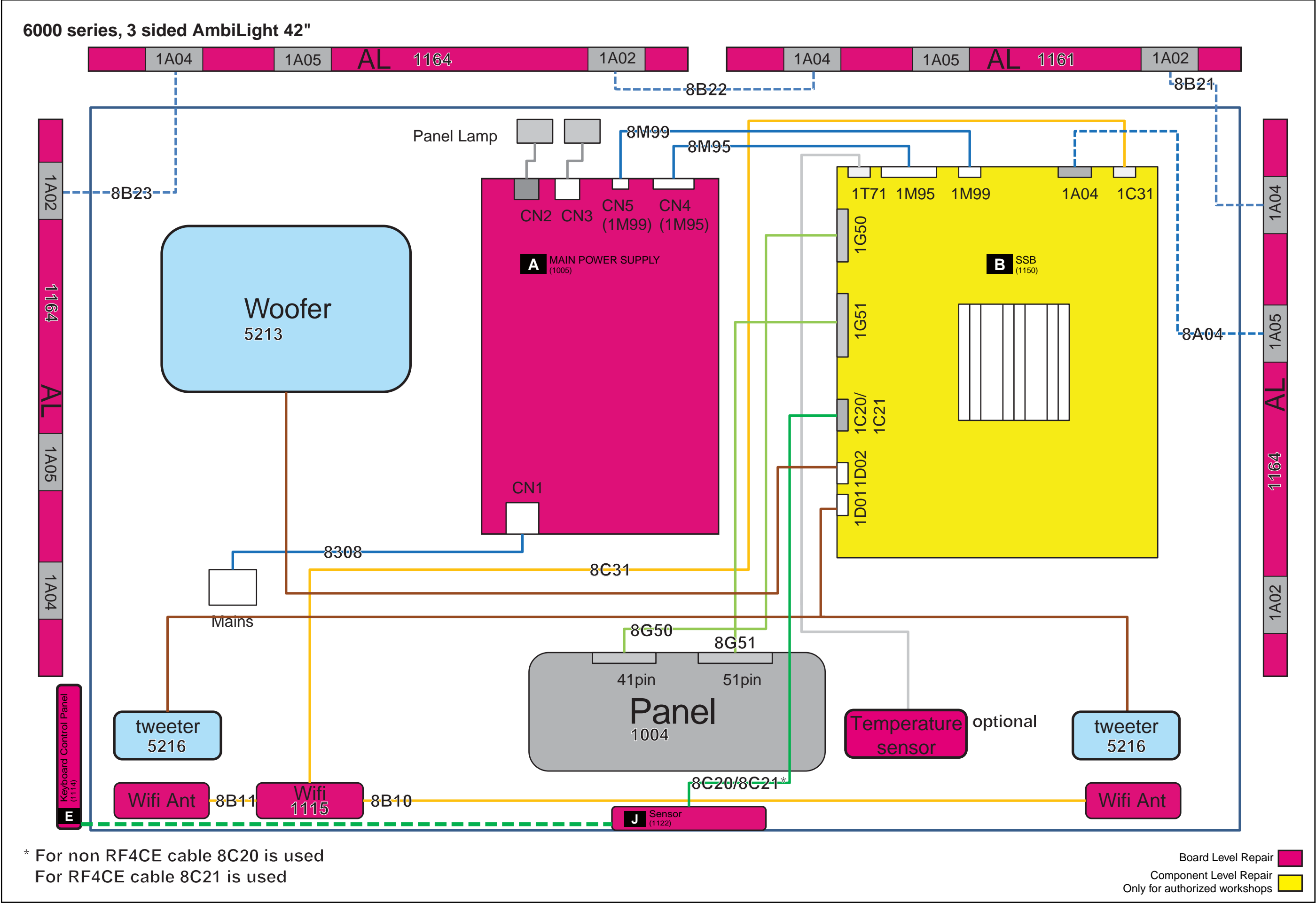
Board Level Repair
Component Level Repair
Only for authorized workshops

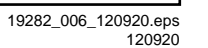
6000 series, 2 sided AmbiLight 42"



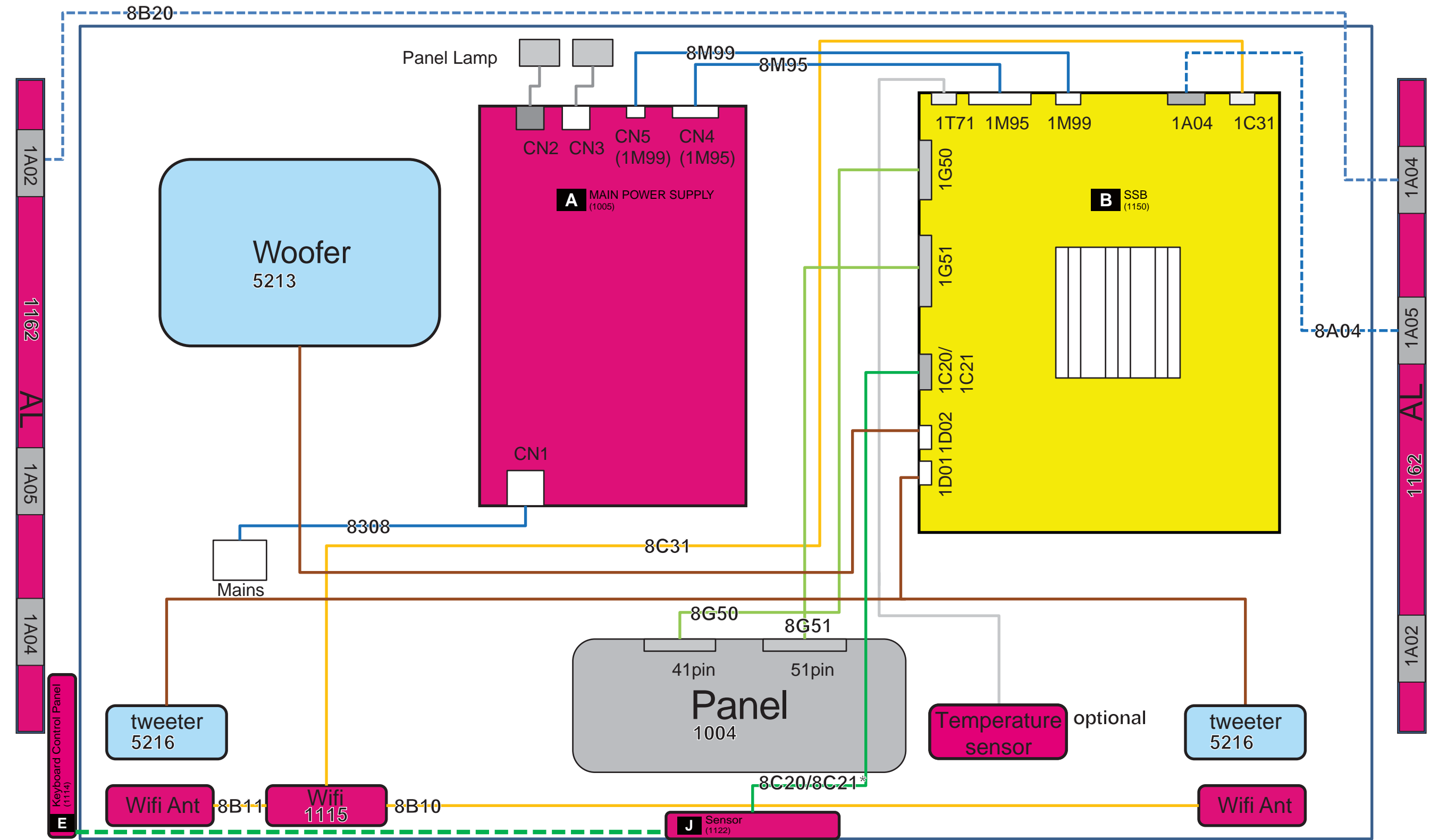
* For non RF4CE cable 8C20 is used
For RF4CE cable 8C21 is used

Board Level Repair
Component Level Repair
Only for authorized workshops





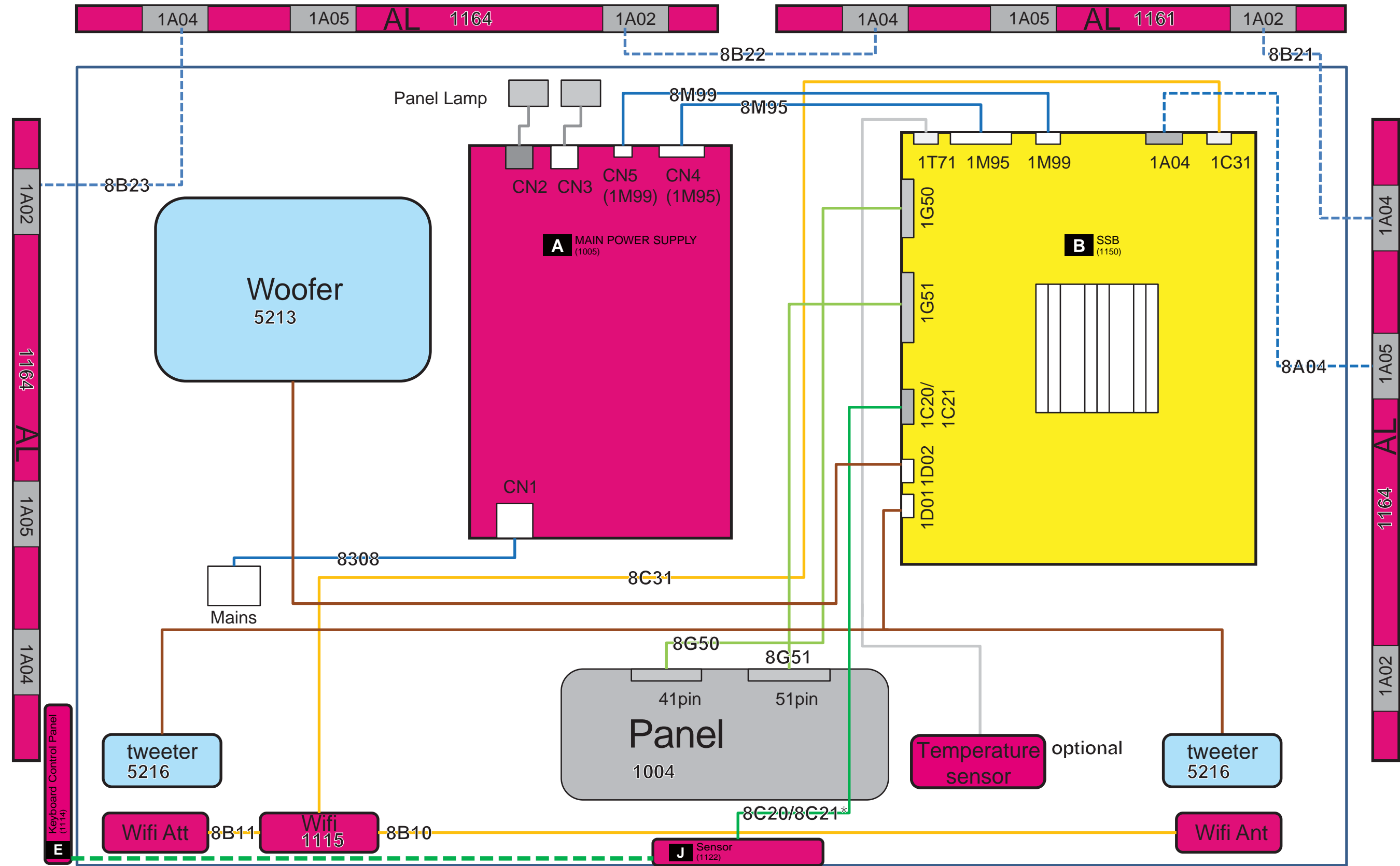
6000 series, 2 sided AmbiLight 47"



* For non RF4CE cable 8C20 is used
For RF4CE cable 8C21 is used

Board Level Repair
Component Level Repair
Only for authorized workshops

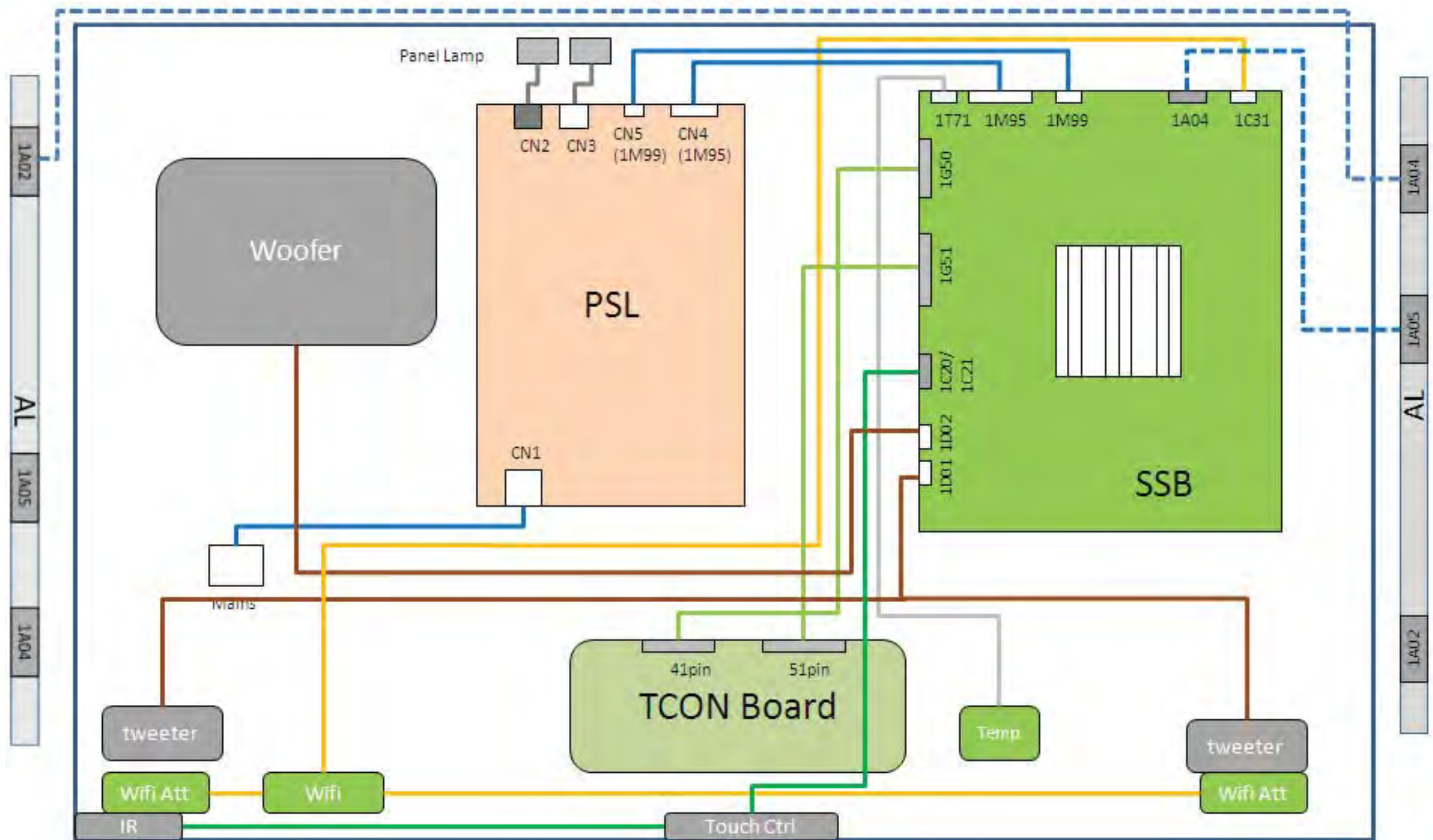
6000 series, 3 sided AmbiLight 47"



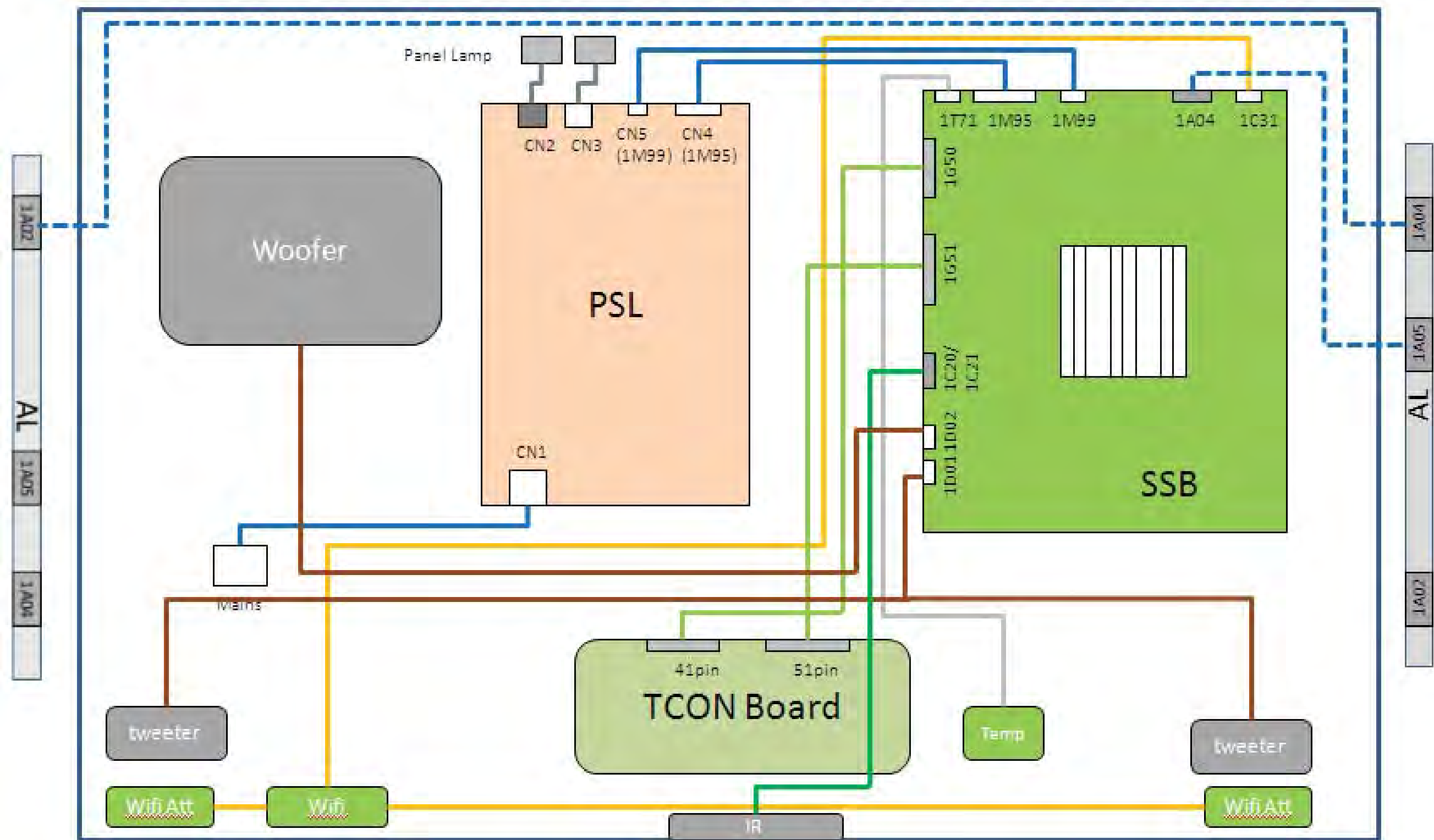
* For non RF4CE cable 8C20 is used
For RF4CE cable 8C21 is used

9.8 Infinity series, 2 sided AmbiLight 47"

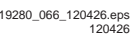
Infinity series, 2 sided AmbiLight 47"



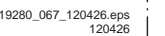
6000 series, 2 sided AmbiLight 55"



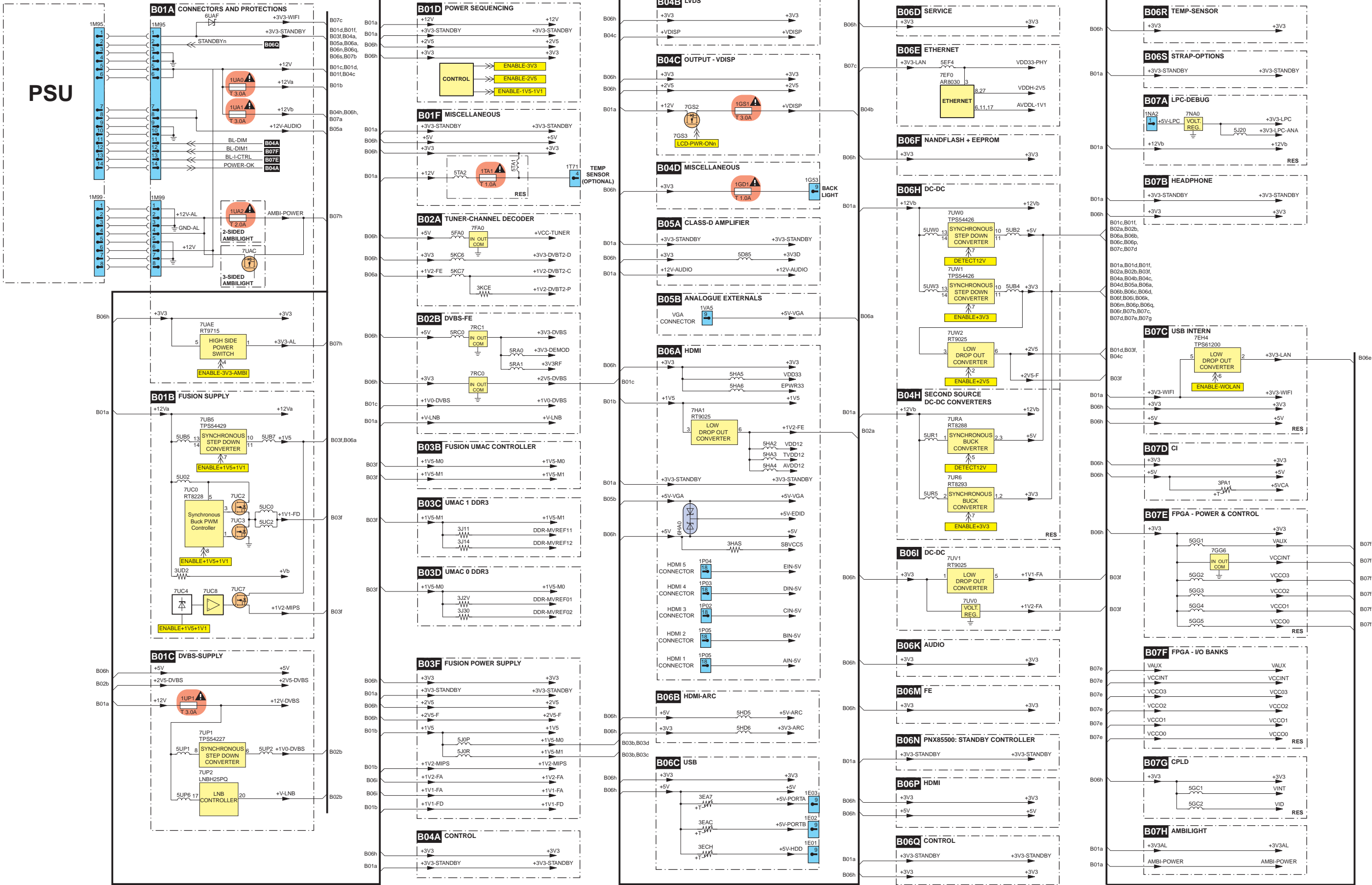
B02B DVBS-FE



B02B DVBS-FE

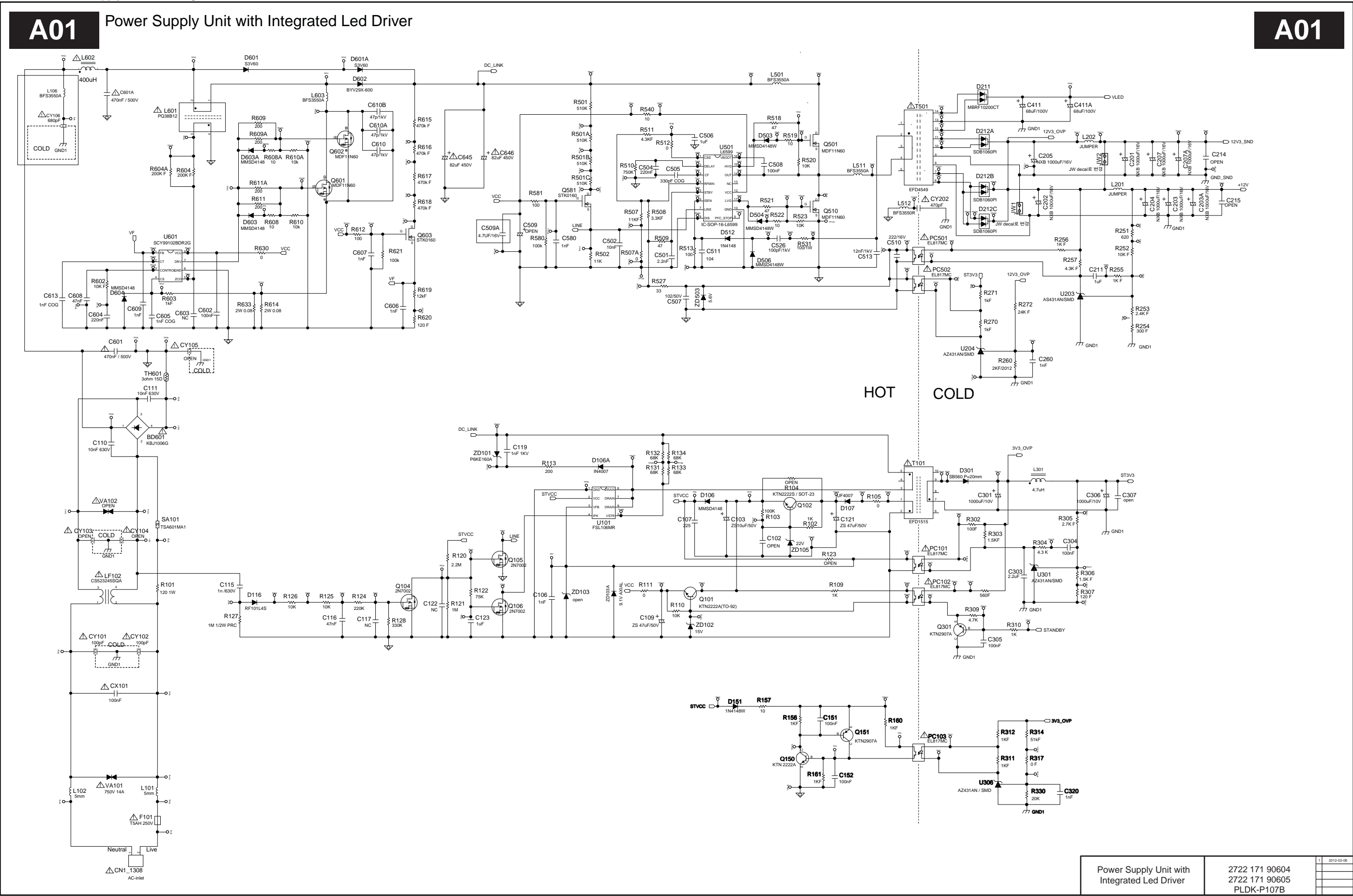


9.14 Supply Lines Overview
SUPPLY LINES OVERVIEW

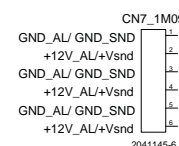
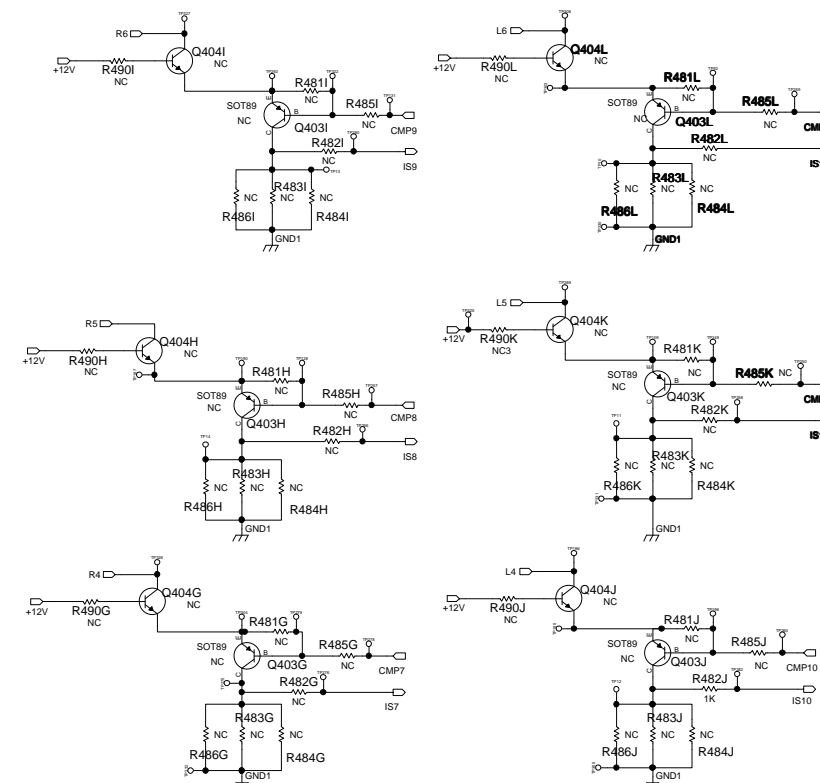
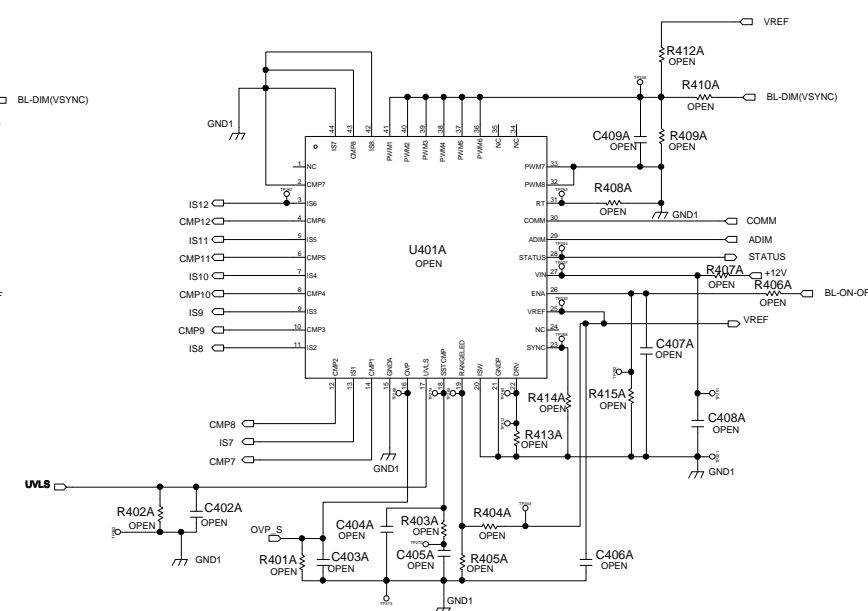


10. Circuit Diagrams and PWB Layouts

10.1 A 722217190604 - 722217190605 PSL
10-0-1 Power Supply Unit with Integrated LED Driver

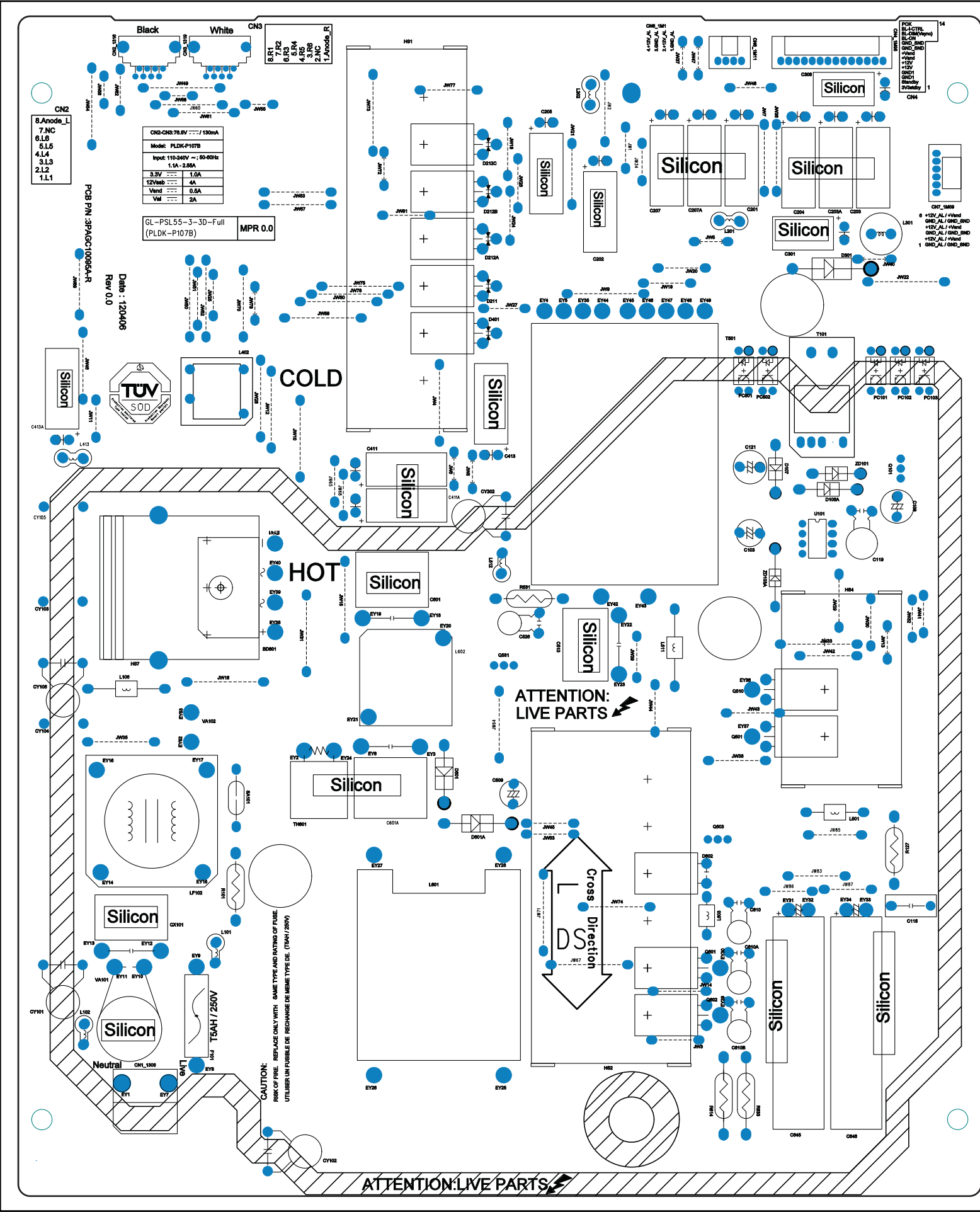


SLAVE



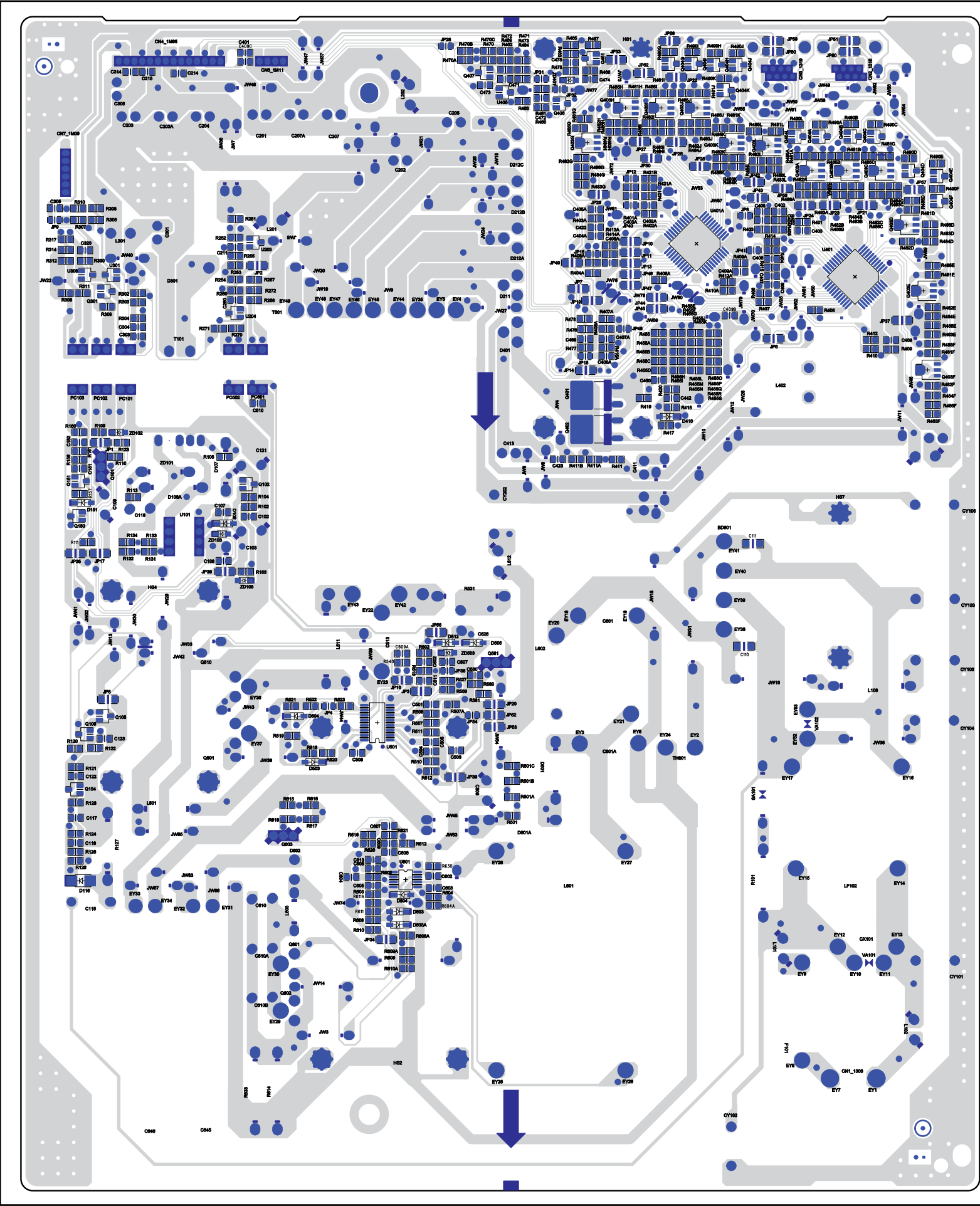
1	2012-02-06

10-1-2 Layout top



Layout top	2722 171 90604 2722 171 90605 PLDK-P107D	1 2012-02-08
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10-1-3 Layout bottom



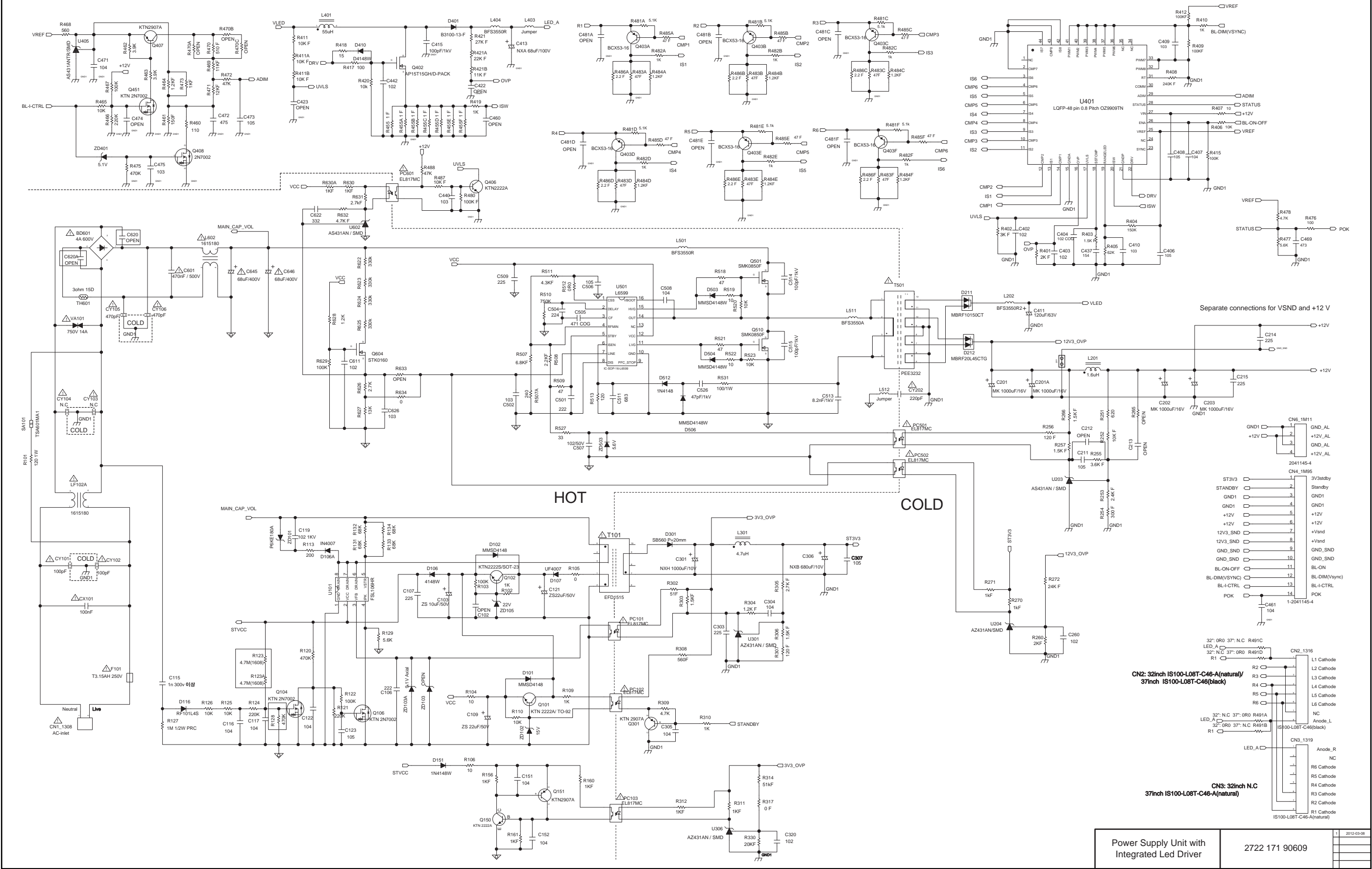
Layout bottom	2722 171 90604	1	2012-02-08
	2722 171 90605		
	PLDK-P107D		

10.2 A 272217190609
10-2-1 A01, PSL

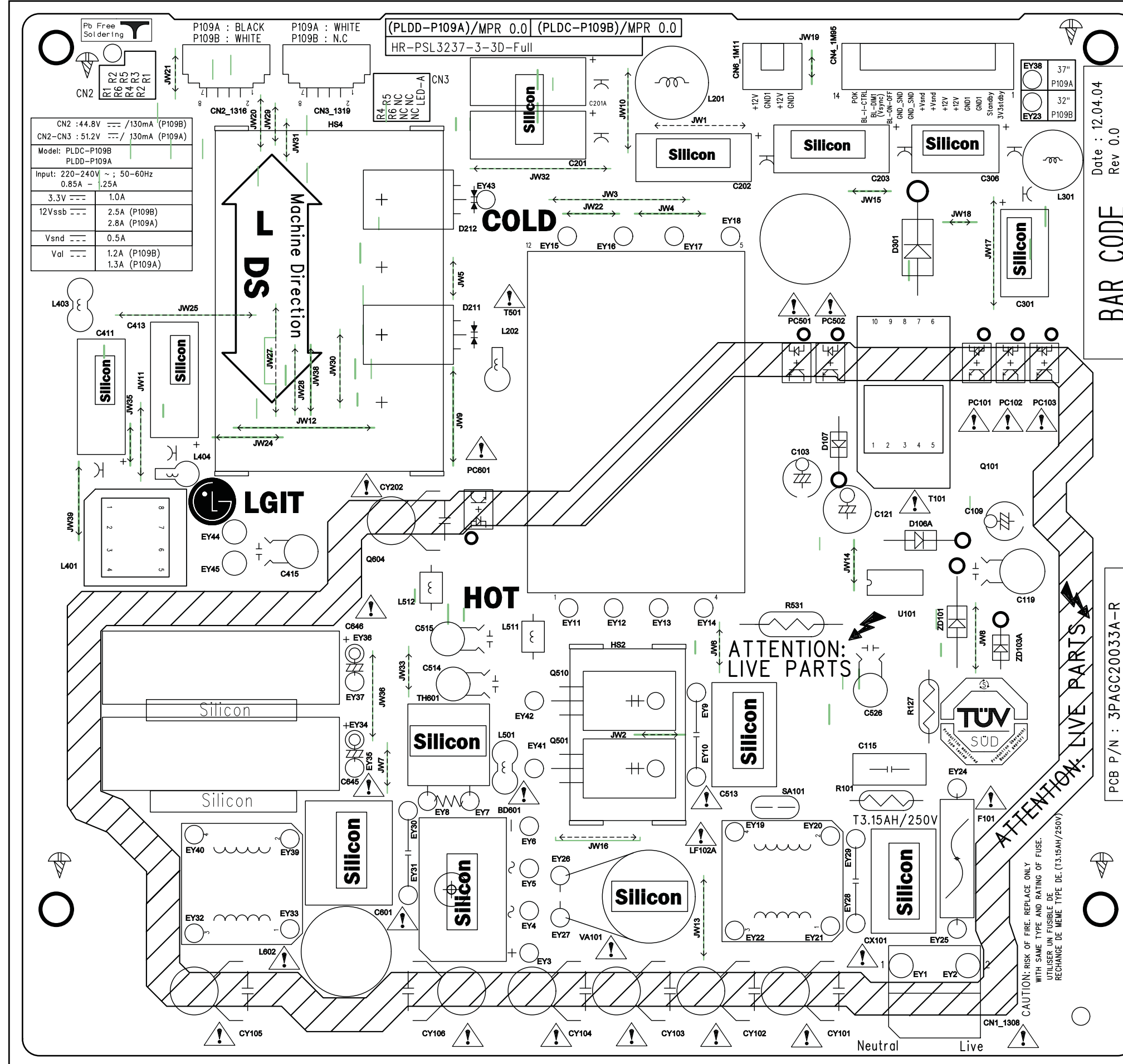
A01

Power Supply Unit with Integrated Led Driver

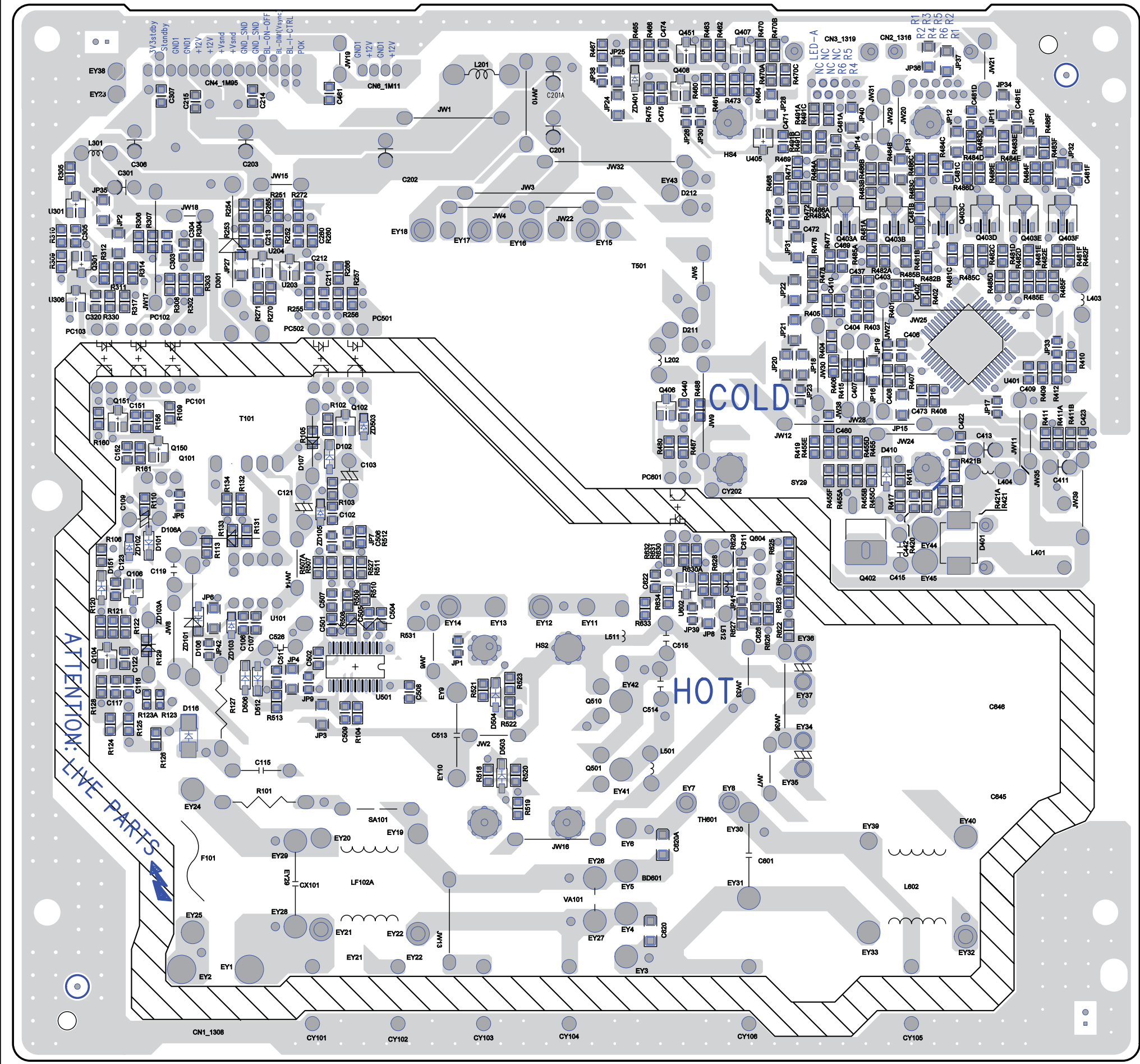
A01



10-2-2 Layout top



10-2-3 Layout bottom



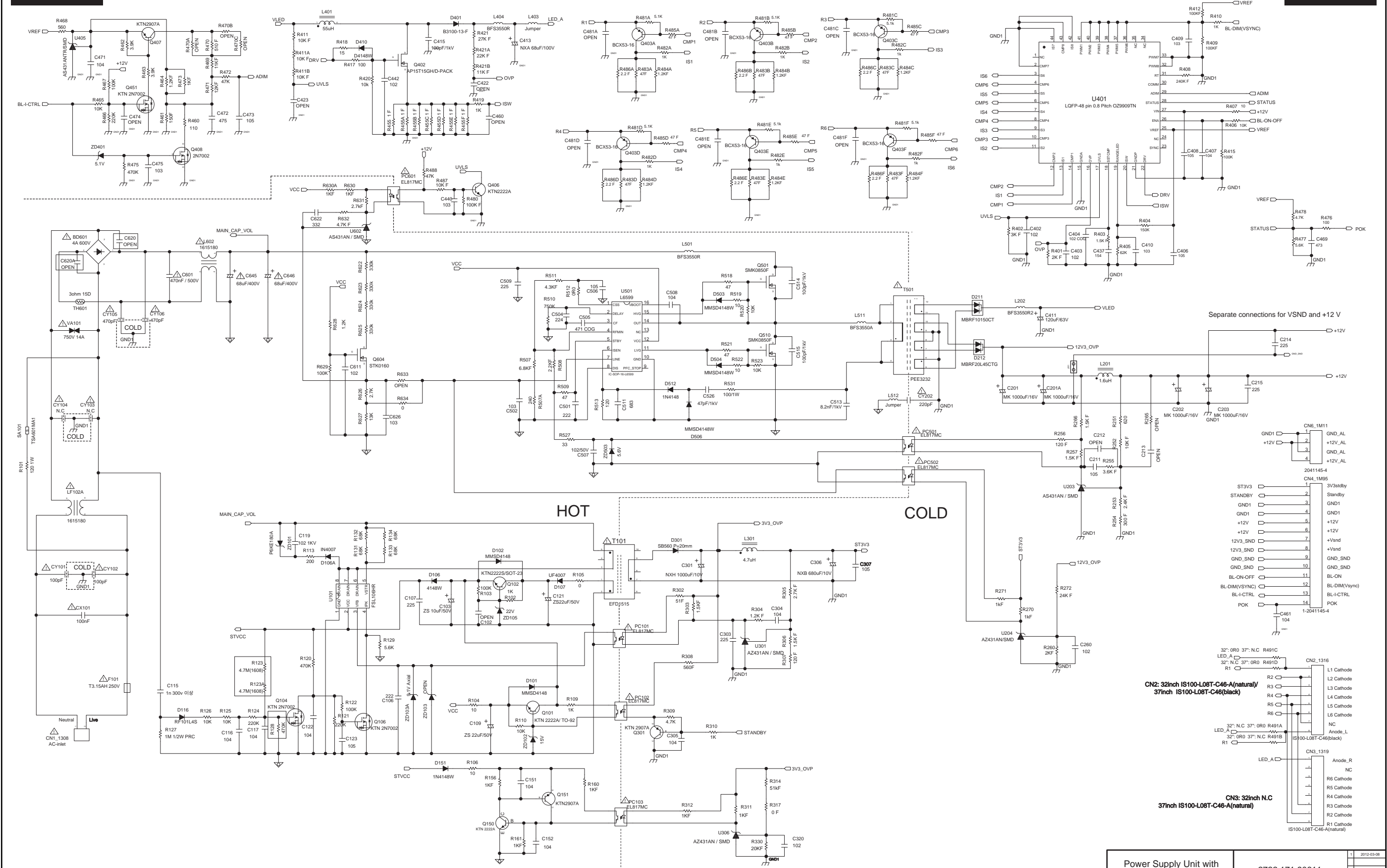
PSL Layout bottom	2722 171 90609	1	2012-03-08
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10.3 A 272217190611
10-3-1 A01, PSL

A01

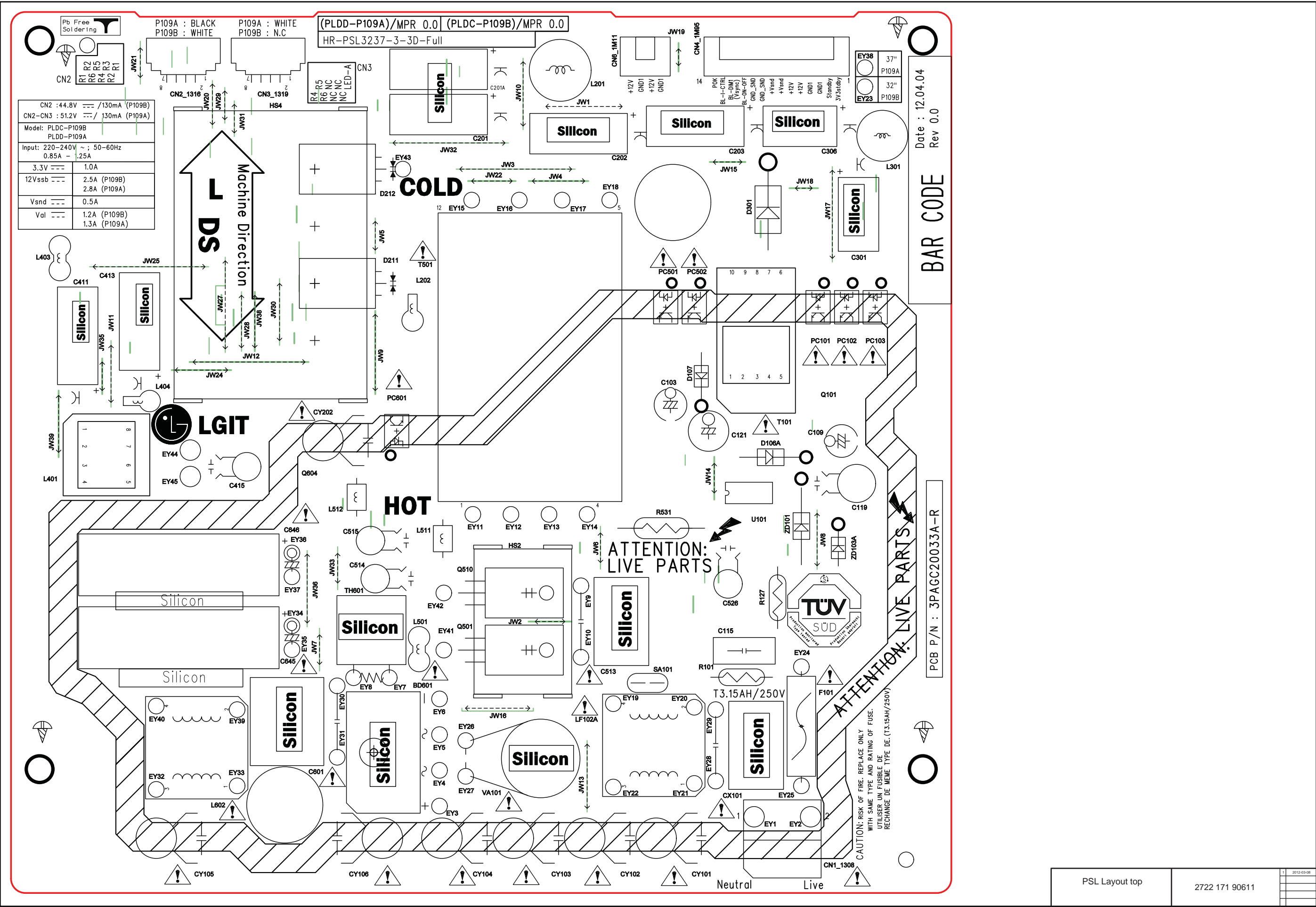
Power Supply Unit with Integrated Led Driver

A01

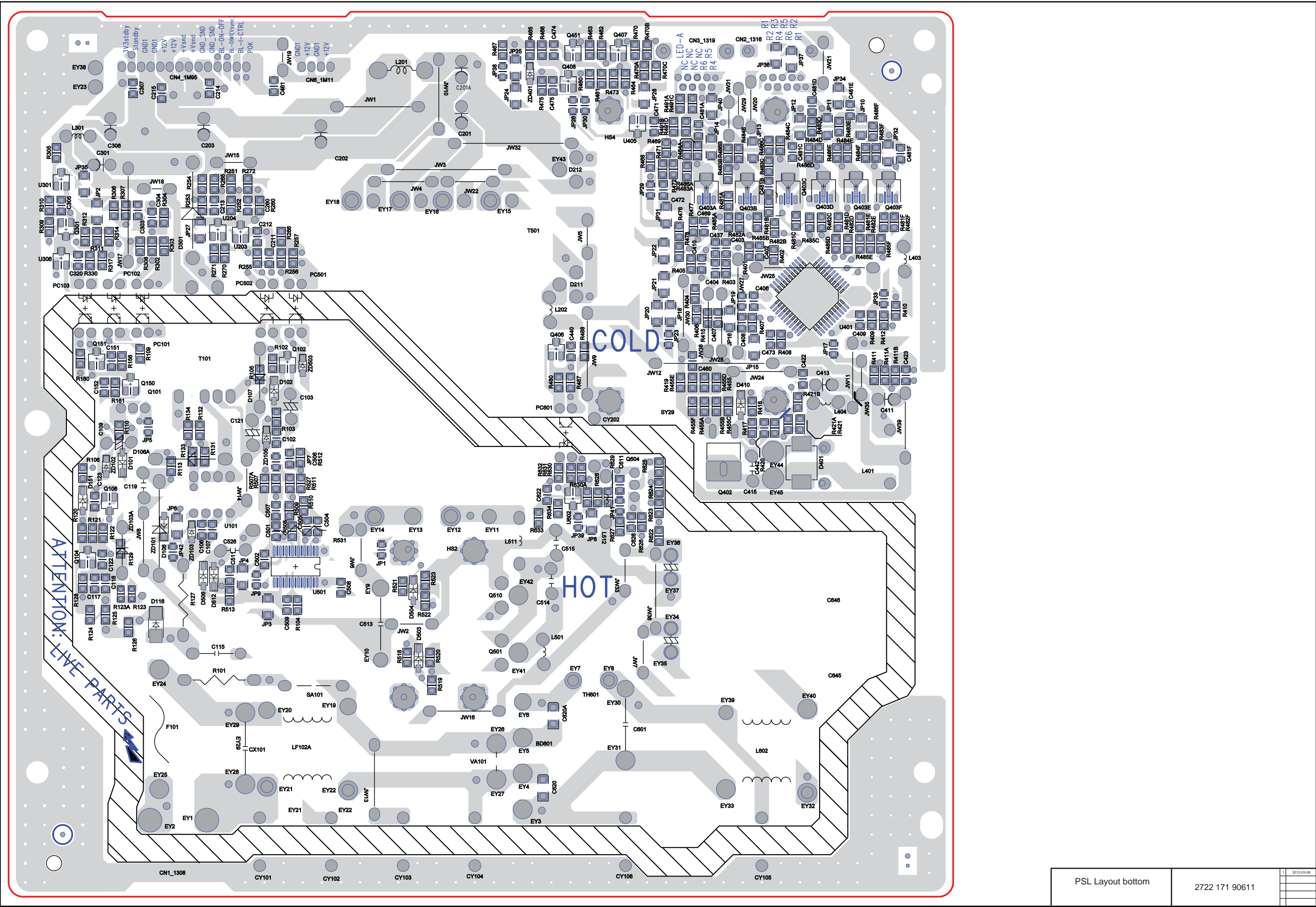


Power Supply Unit with Integrated Led Driver	2722 171 90611	1	2012-03-08

10-3-2 Layout top

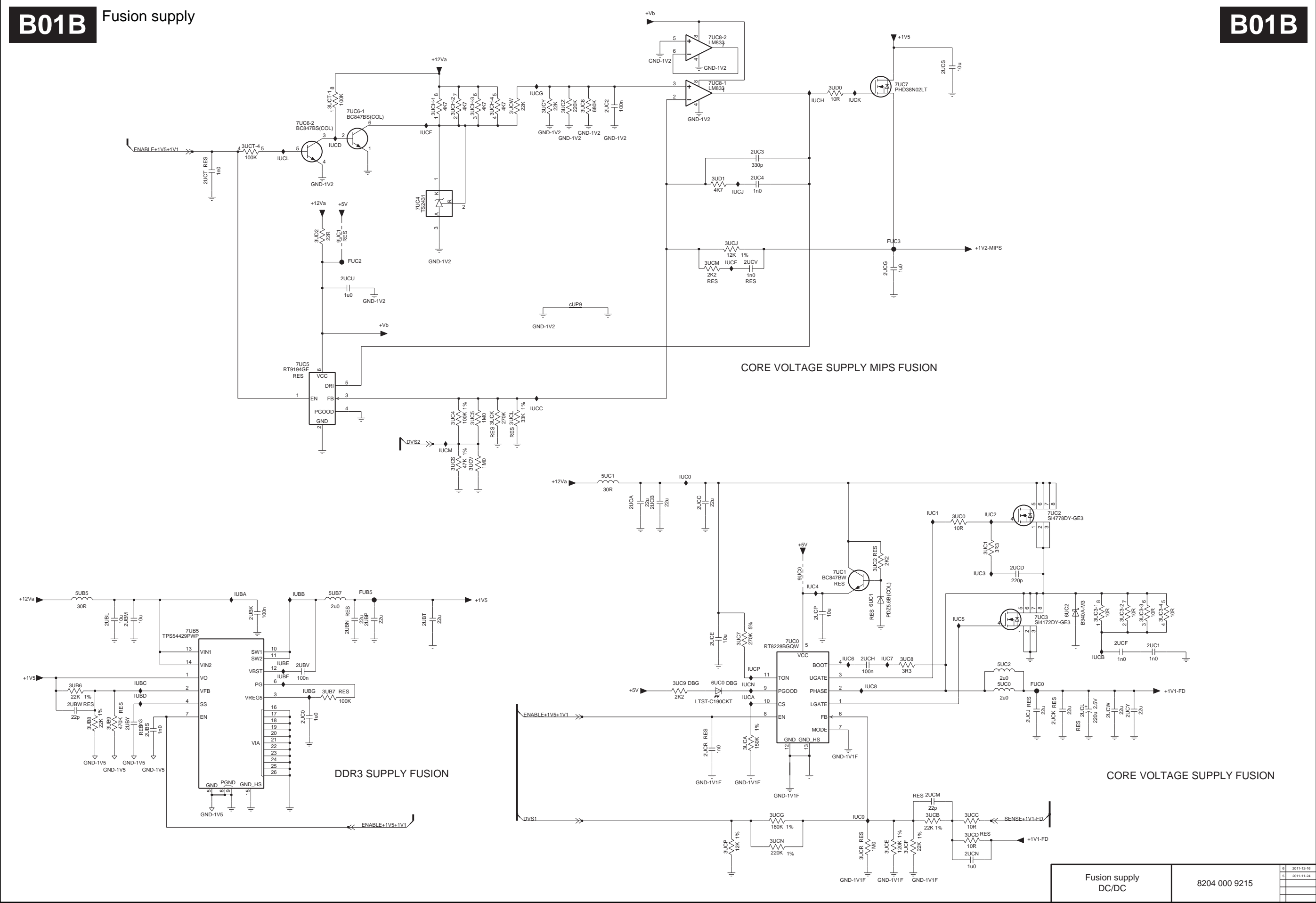


10-3-3 Layout bottom



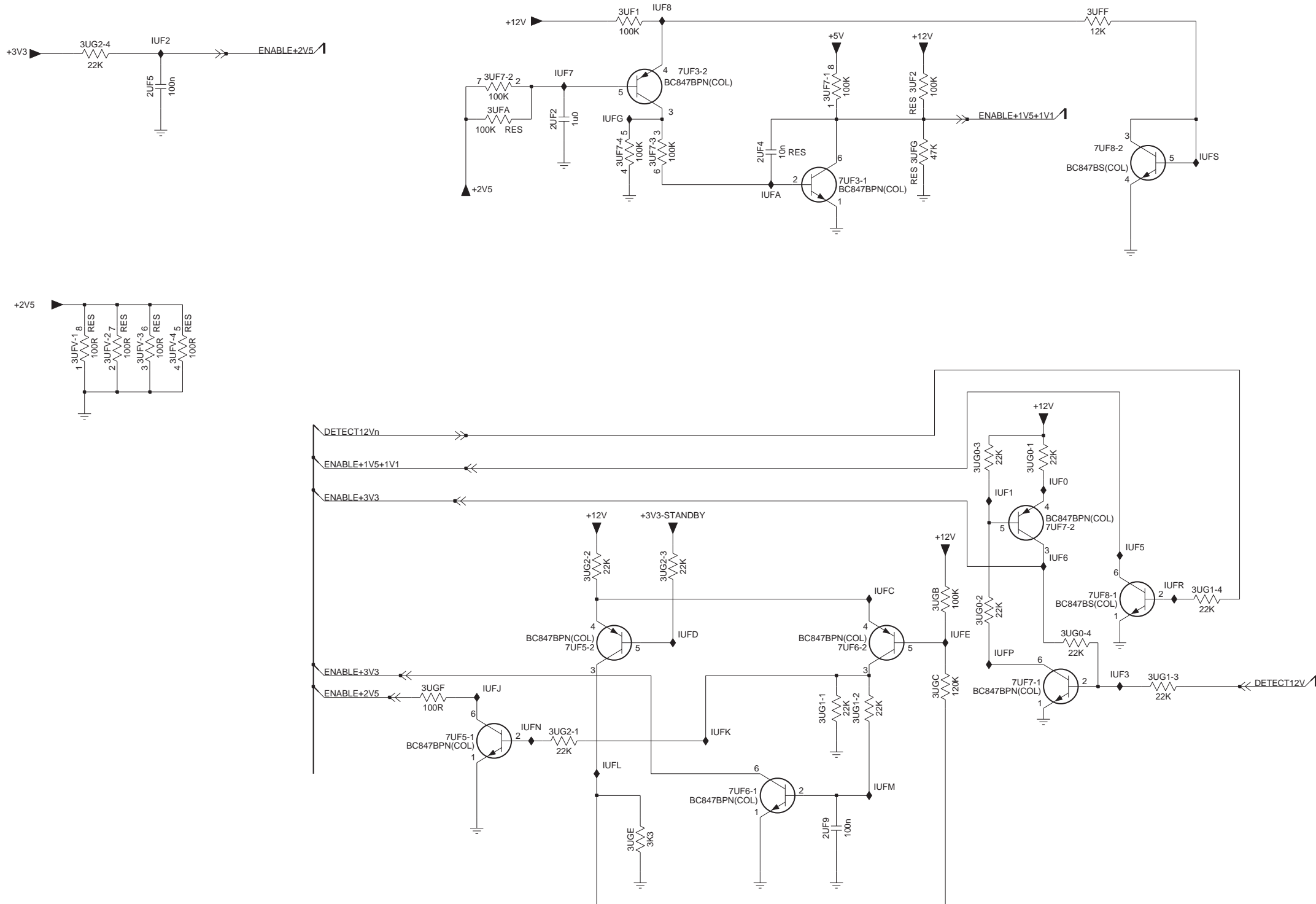
PSL Layout bottom	2722 171 90611	1	2012-03-08

10-4-2 B01B, Fusion supply DC/DC



B01D Power sequencing

B01D



Power sequencing DC/DC	8204 000 9215	4	2011-12-16
		5	2011-11-24

10-4-5 B01E, -

B01E

B01E

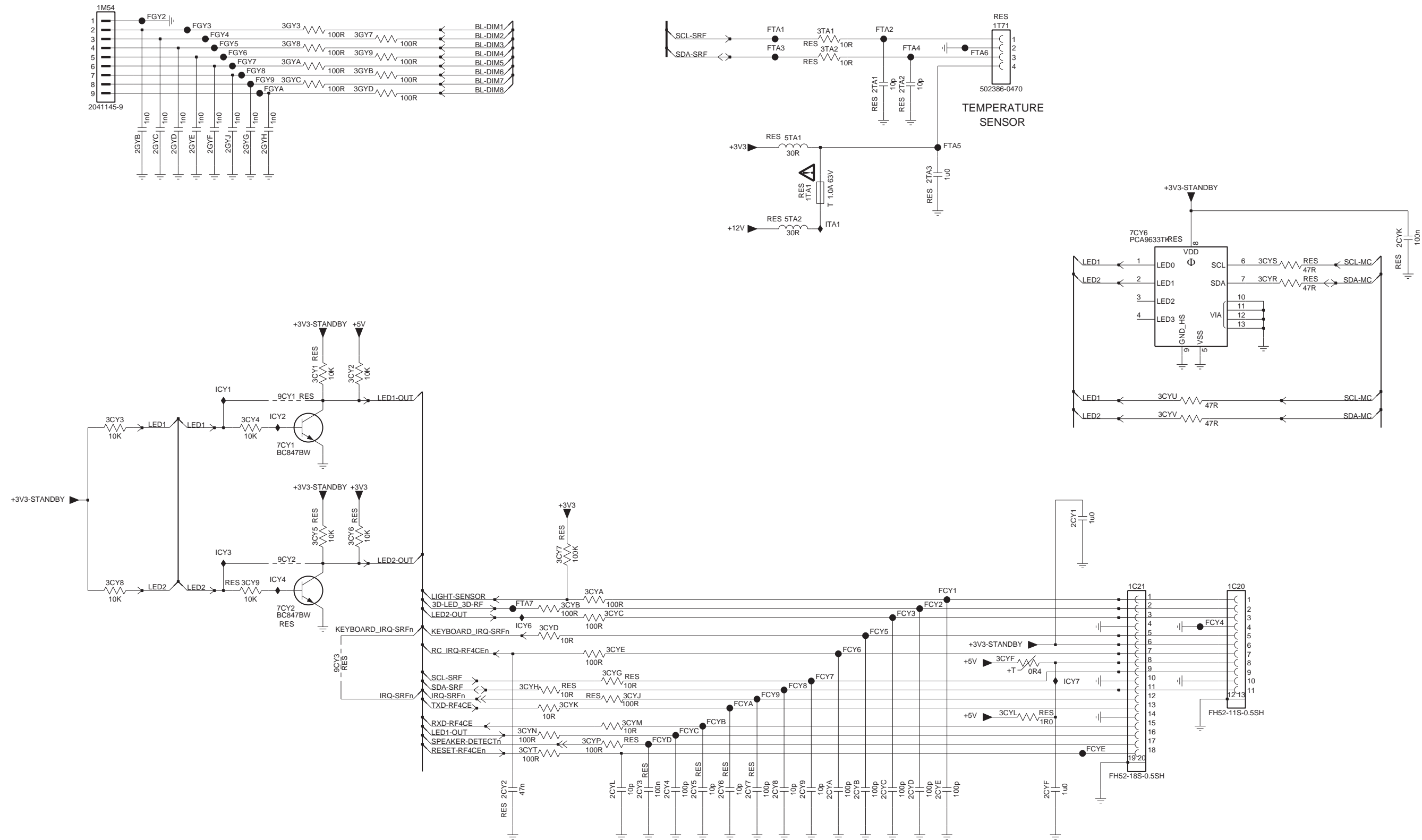
Intentionally blank

DC/DC	8204 000 9215	4	2011-12-16
		5	2011-11-24

B01F

Miscellaneous

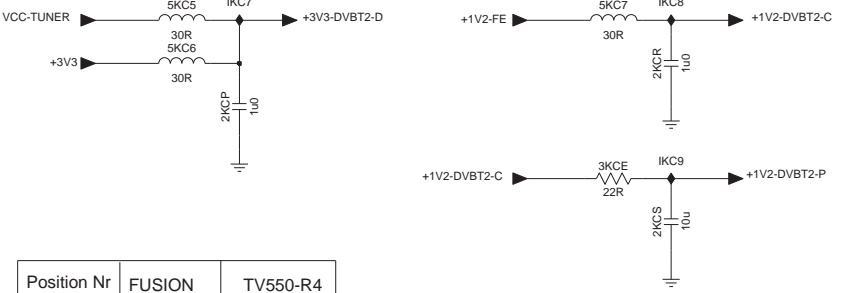
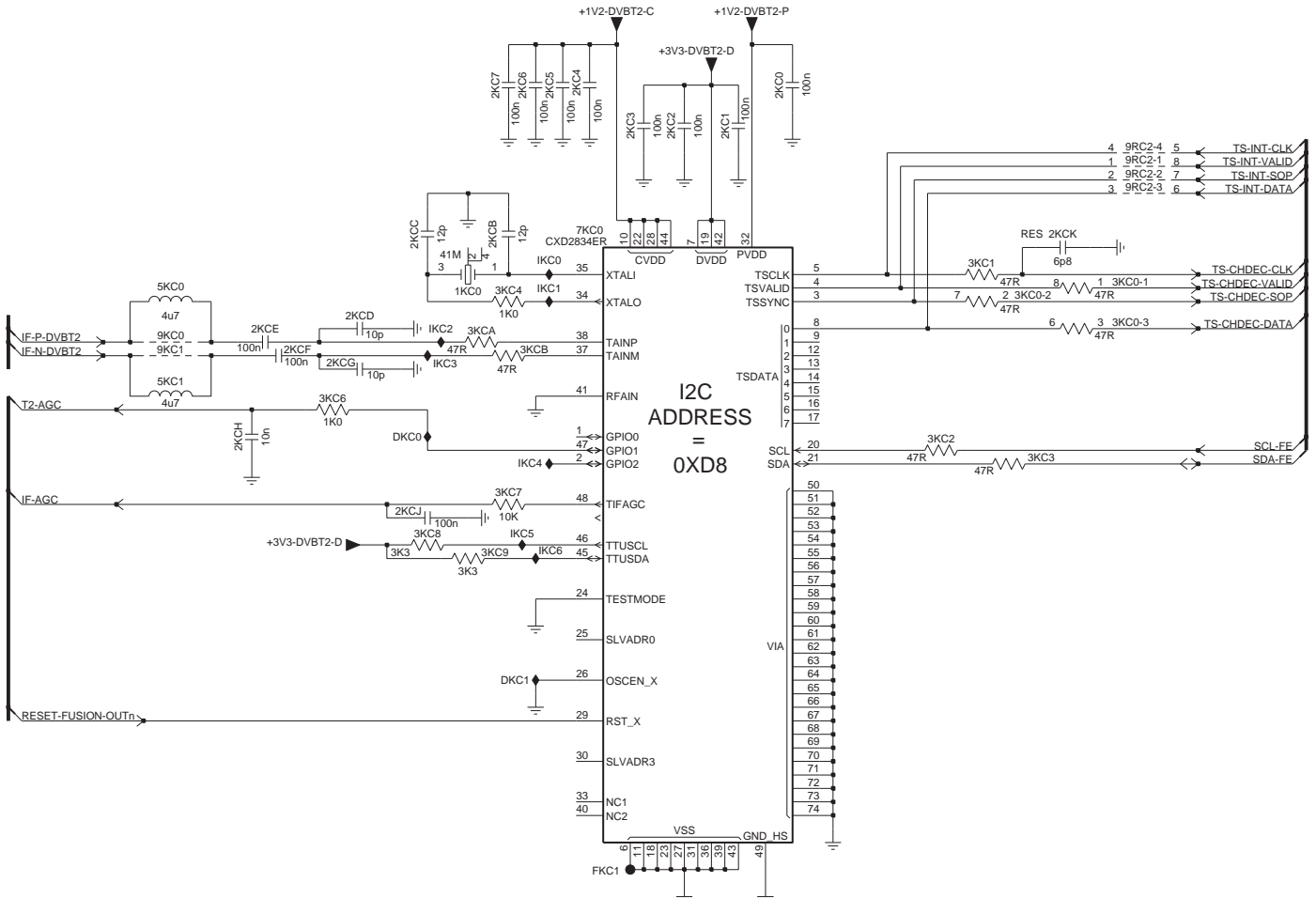
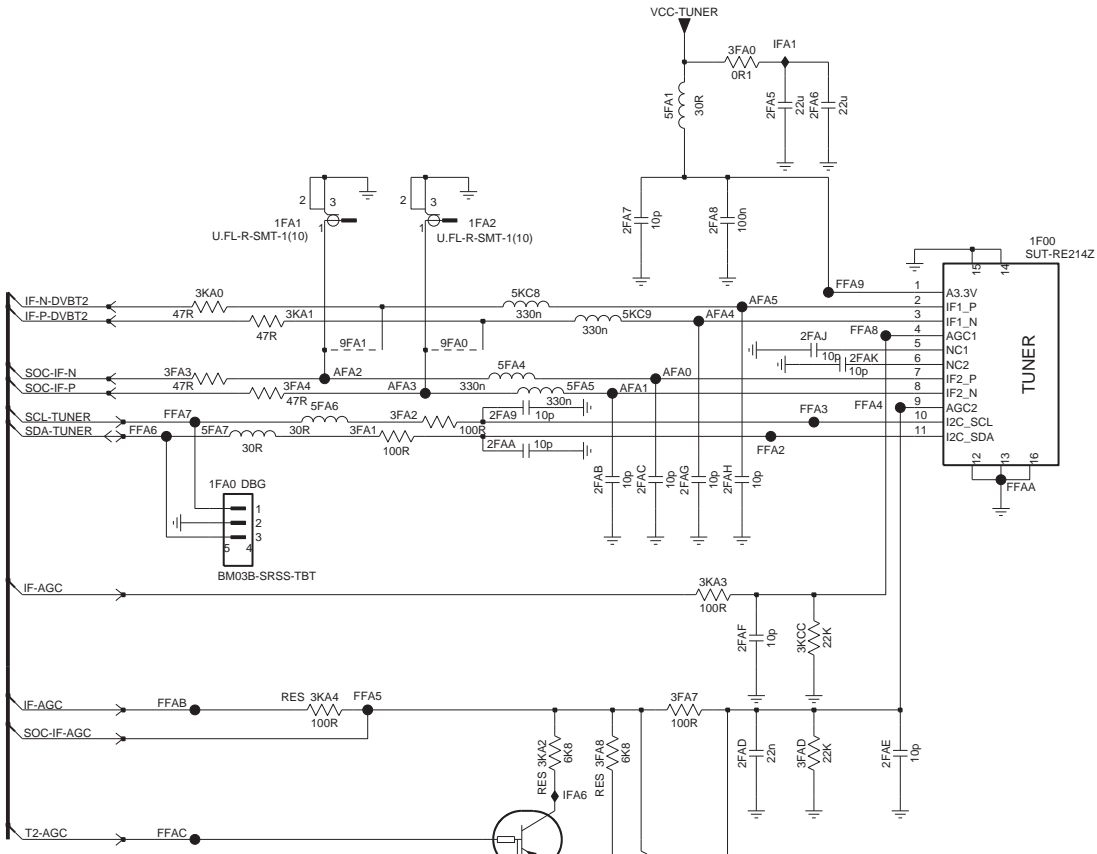
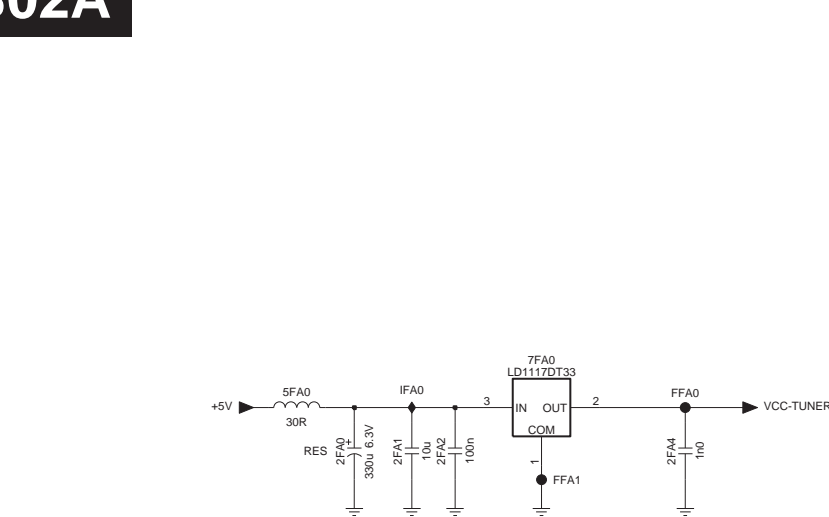
B01F



Miscellaneous DC/DC	8204 000 9215	4	2011-12-16
		5	2011-11-24

B02A Tuner-channel decoder

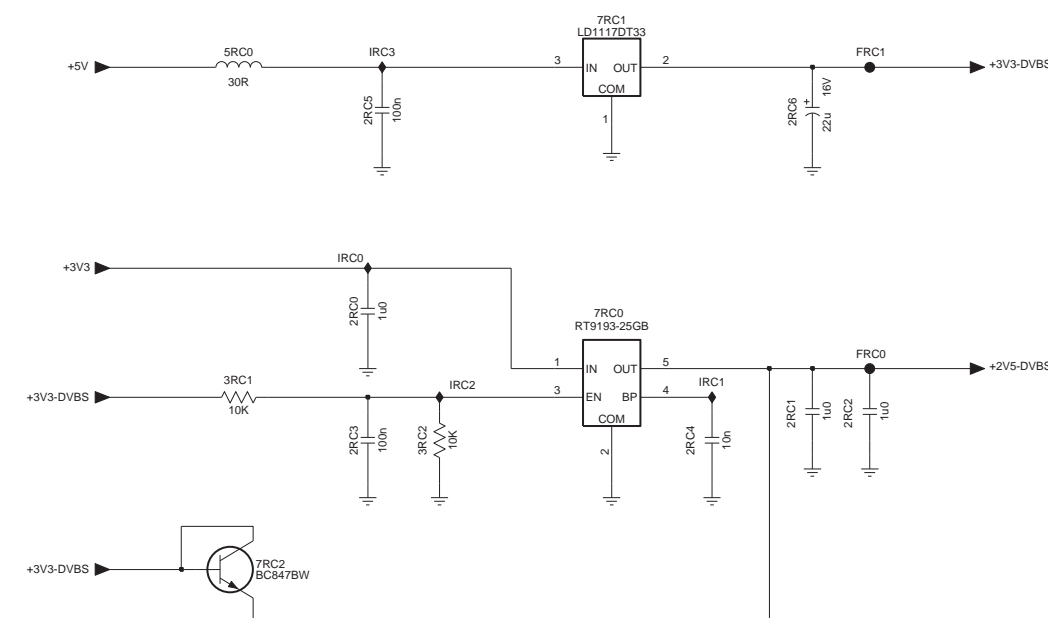
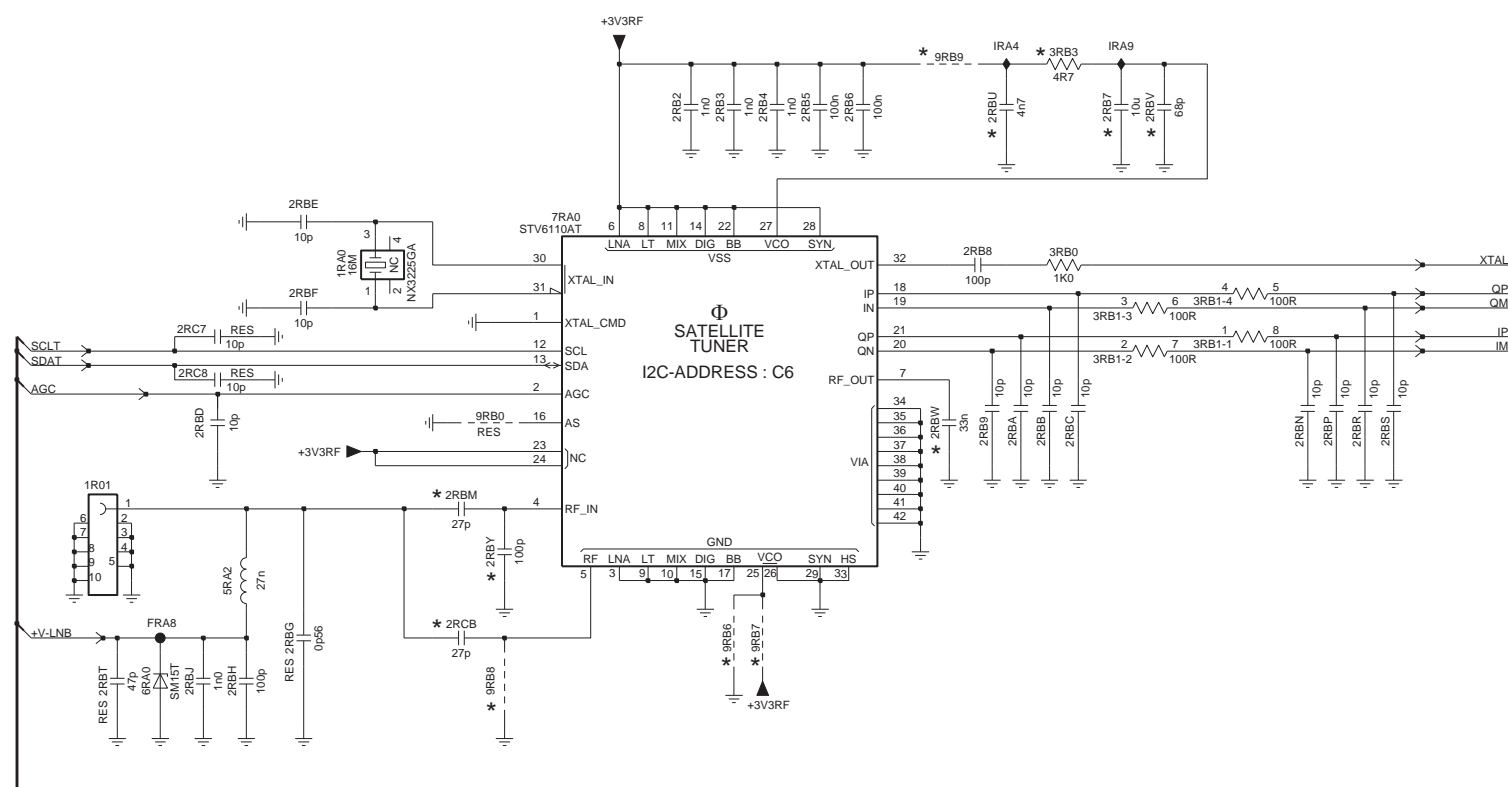
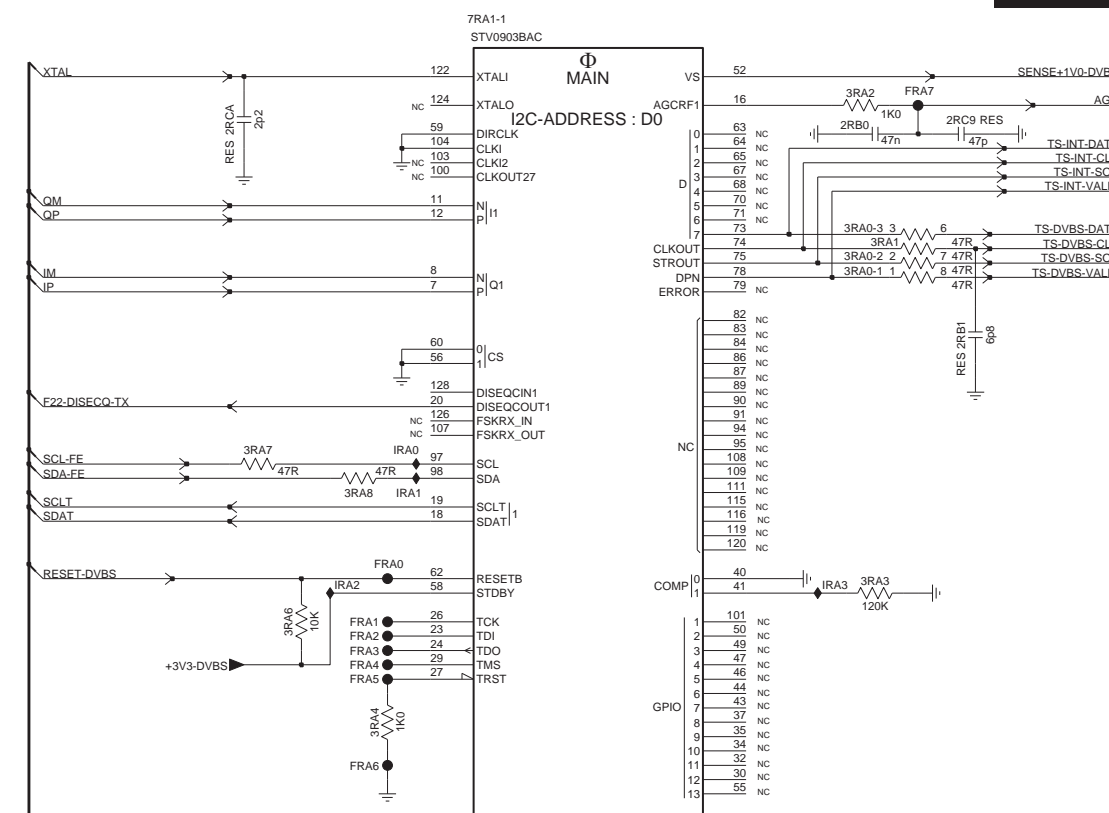
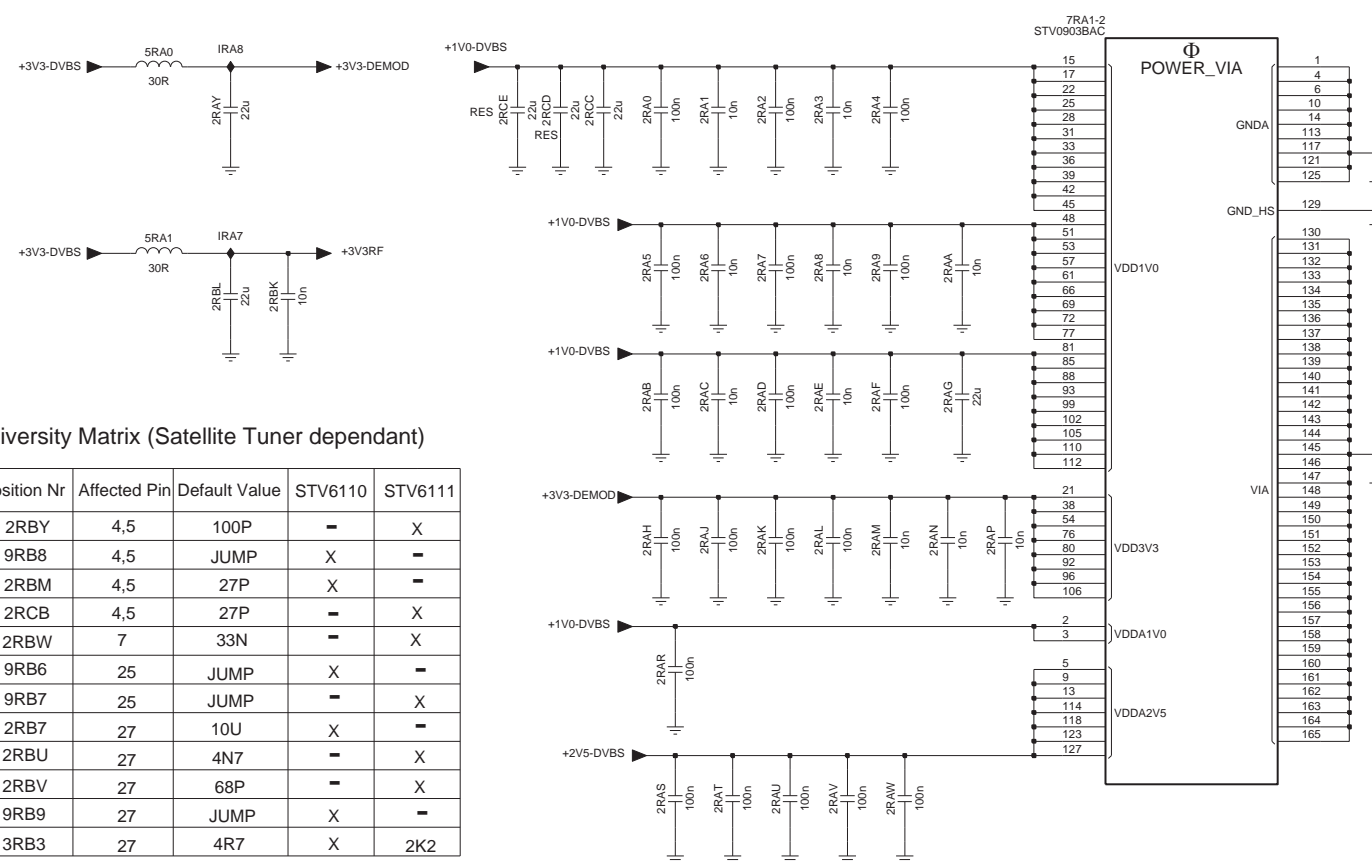
B02A



Position Nr	FUSION	TV550-R4
3FA7	-	100R
3FA9	2K7	-
3FAA	470R	-
3FAB	10K	-
3FAC	470R	-
3FAD	2K7	22K
2FAD	100nF	22nF
7FA1	BC857BS	-

Tuner-channel decoder Front-end	8204 000 9218	5	2011-12-08
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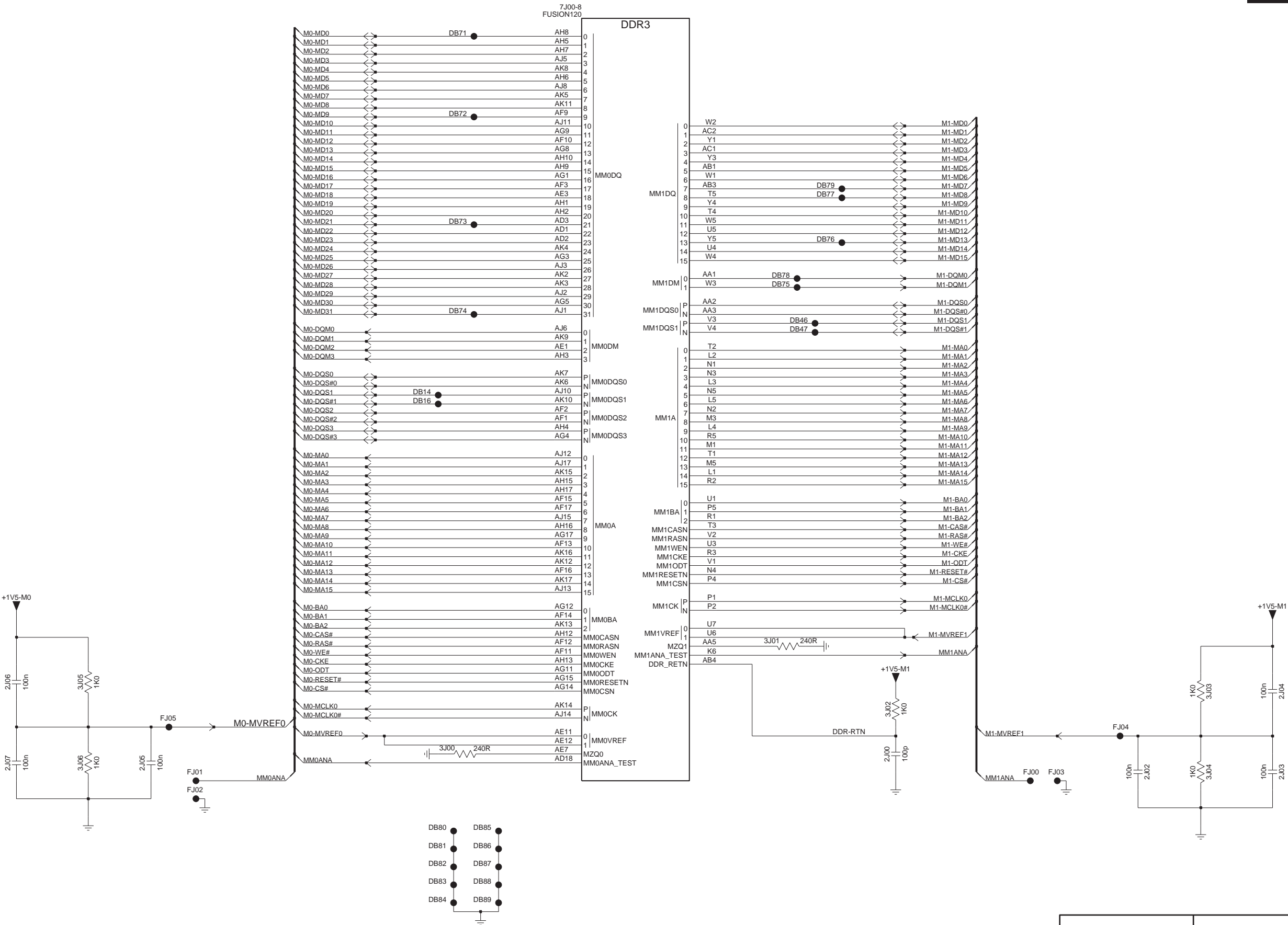
Position Nr	Affected Pin	Default Value	STV6110	STV6111
2RB5	4,5	100P	—	X
9RB8	4,5	JUMP	X	—
2RBM	4,5	27P	X	—
2RCB	4,5	27P	—	X
2RBW	7	33N	—	X
9RB6	25	JUMP	X	—
9RB7	25	JUMP	—	X
2RB7	27	10U	X	—
2RBU	27	4N7	—	X
2RBV	27	68P	—	X
9RB9	27	JUMP	X	—
3RB3	27	4R7	X	2K2



10-4-10 B03B, UMAC controller

B03B UMAC controller

B03B



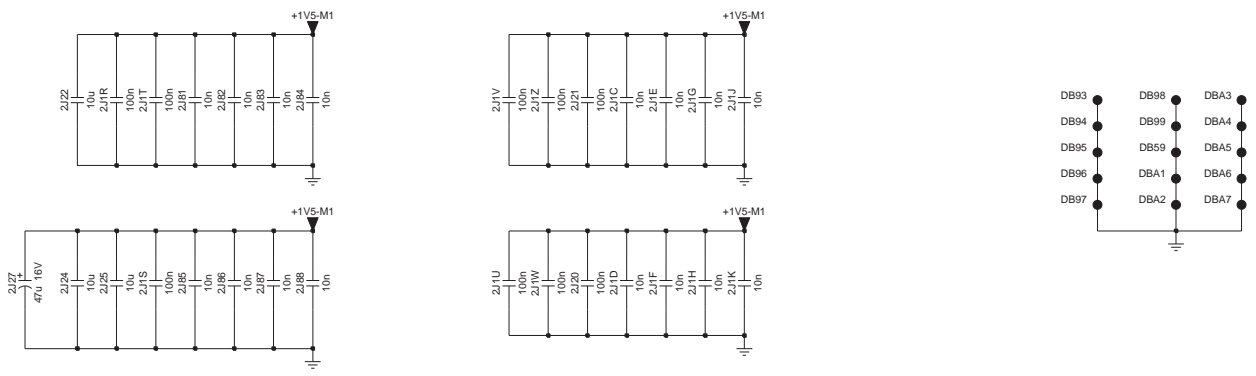
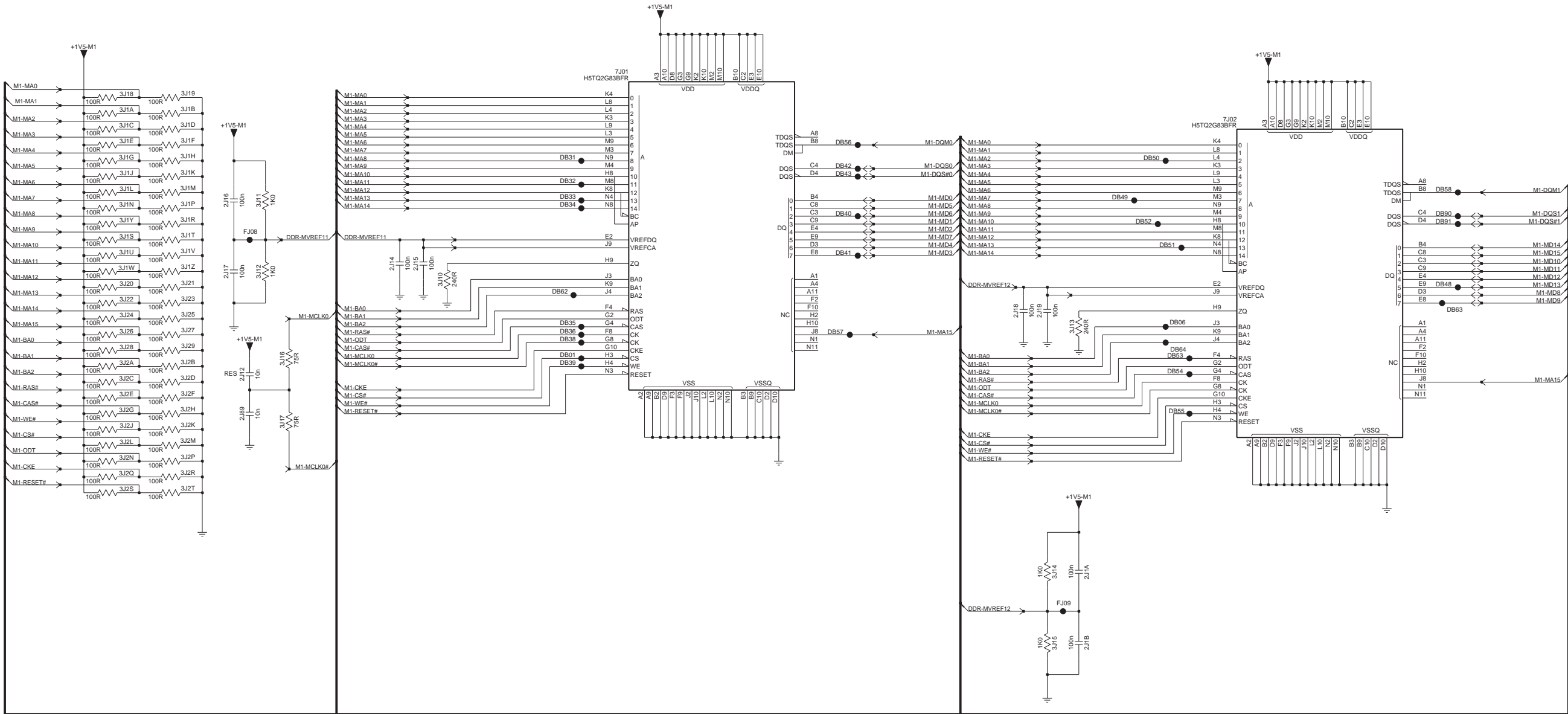
UMAC controller	8204 000 9238	3	2011-12-18
		2	2011-11-24

10-4-11 B03C, UMAC 1 DDR3

B03C

UMAC 1 DDR3

B03C



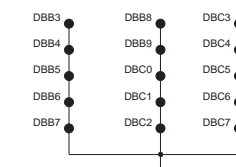
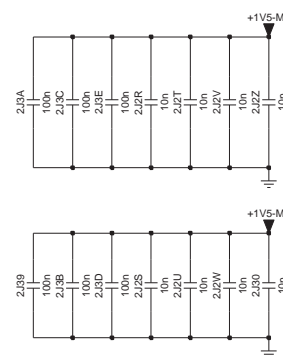
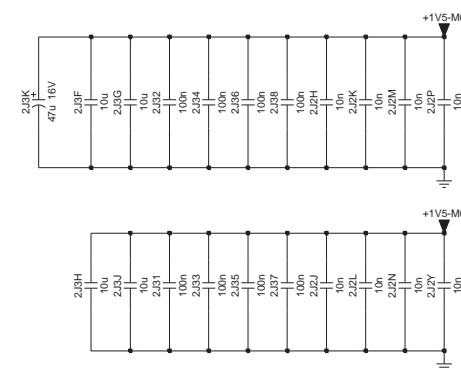
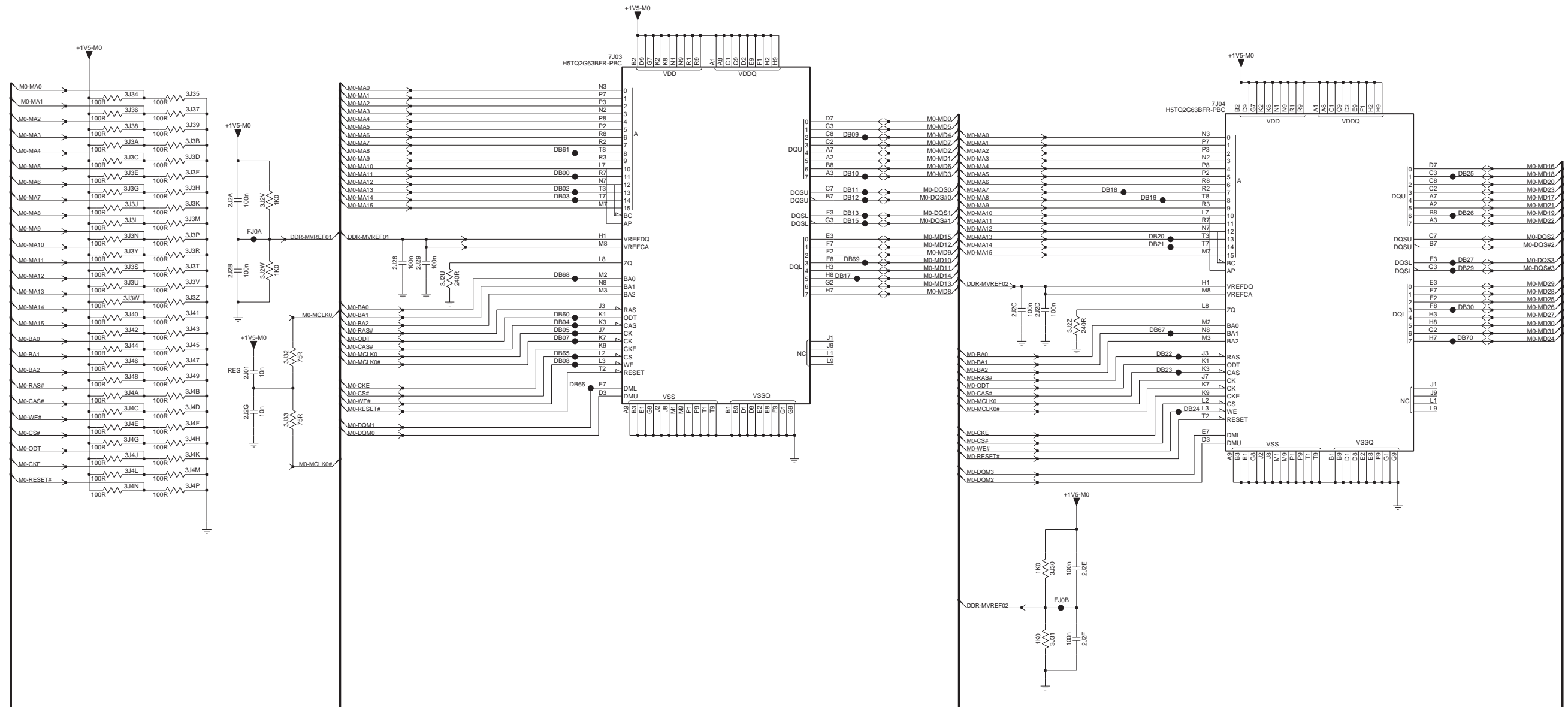
UMAC 1 DDR3	8204 000 9238	3	2011-12-18
		2	2011-11-24

10-4-12 B03D, UMAC 0 DDR3

B03D

UMAC 0 DDR3

B03D

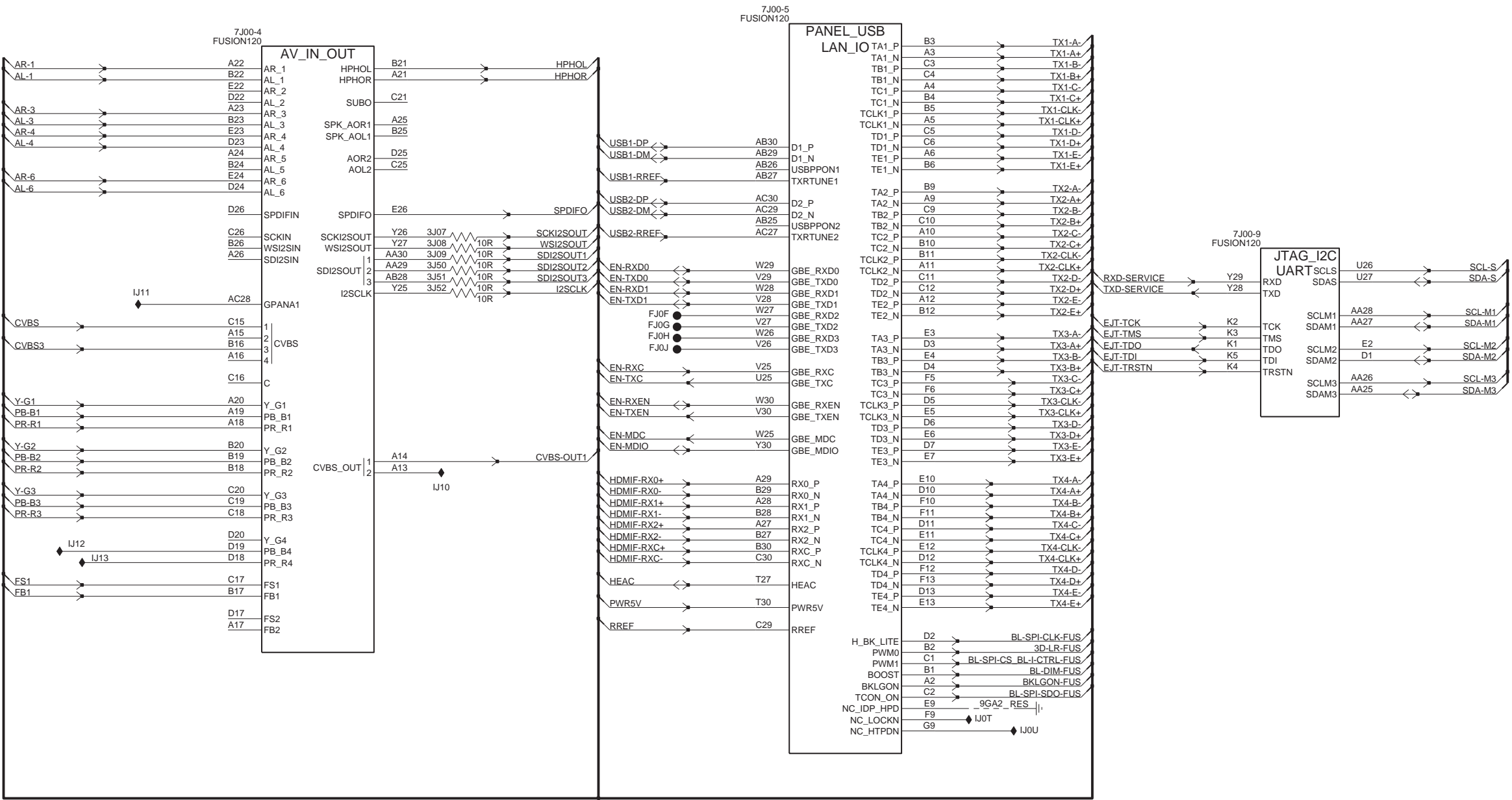


UMAC 0 DDR3	8204 000 9238	3	2011-12-16
		2	2011-11-24

10-4-13 B03E, LVDS fanout

B03E LVDS fanout

B03E



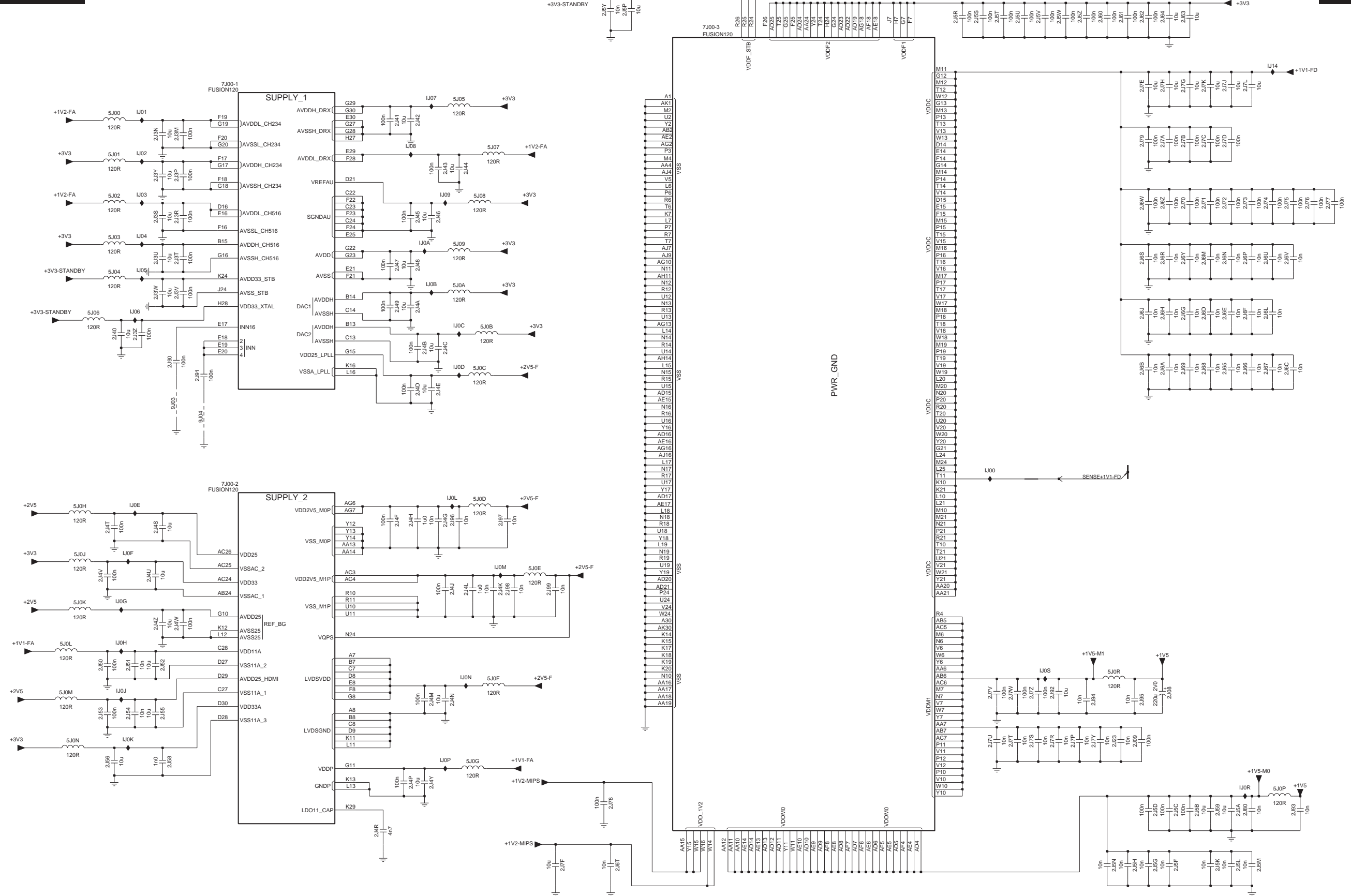
LVDS fanout	8204 000 9238	3	2011-12-18
		2	2011-11-24

10-4-14 B03F, Fanout power supply

B03F

Fanout power supply

B03F

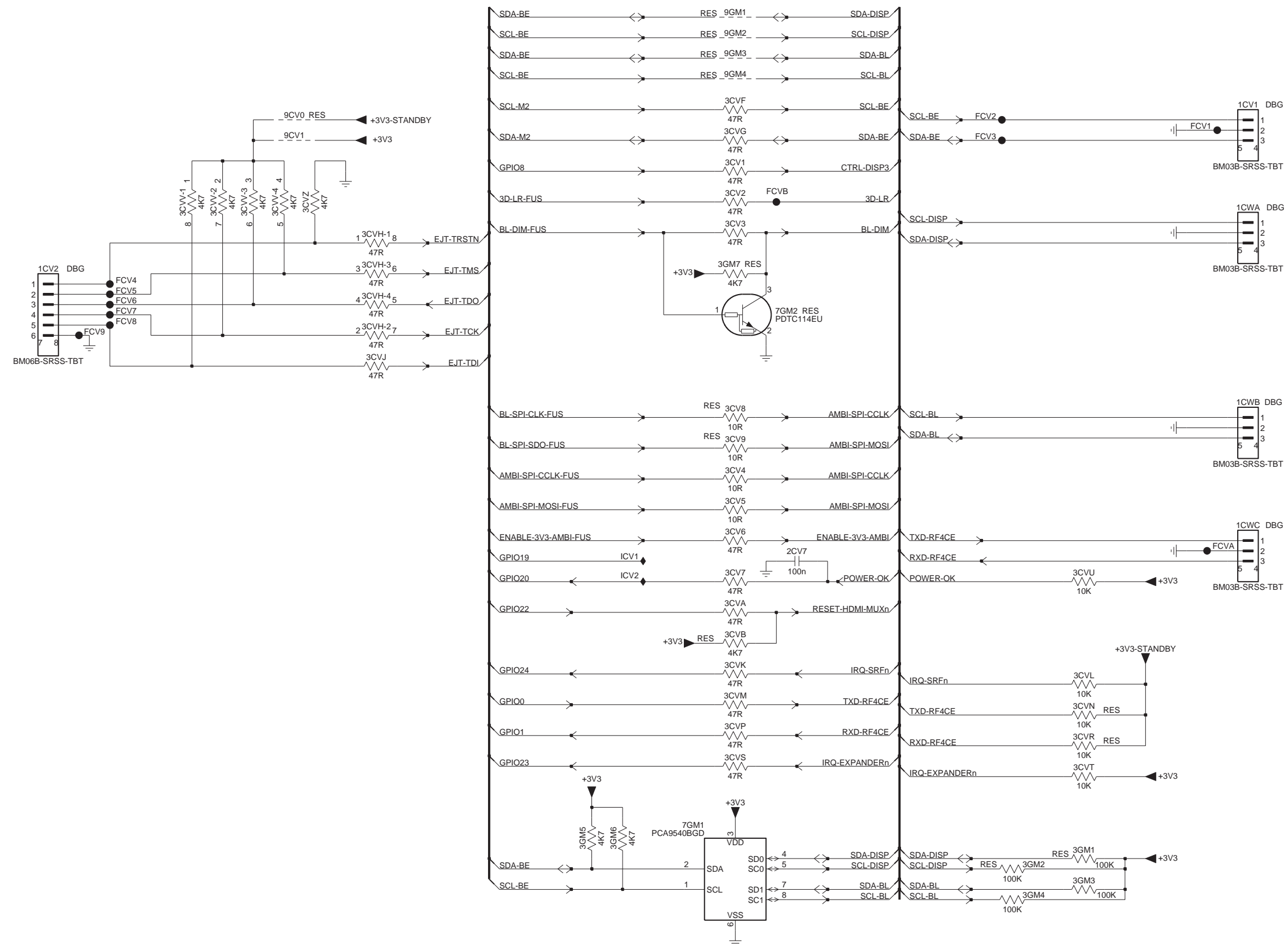


Fanout power supply

8204 000 9238

3	2011-12-18
2	2011-11-24
1	2011-11-24

19280_014_120322.eps
120322

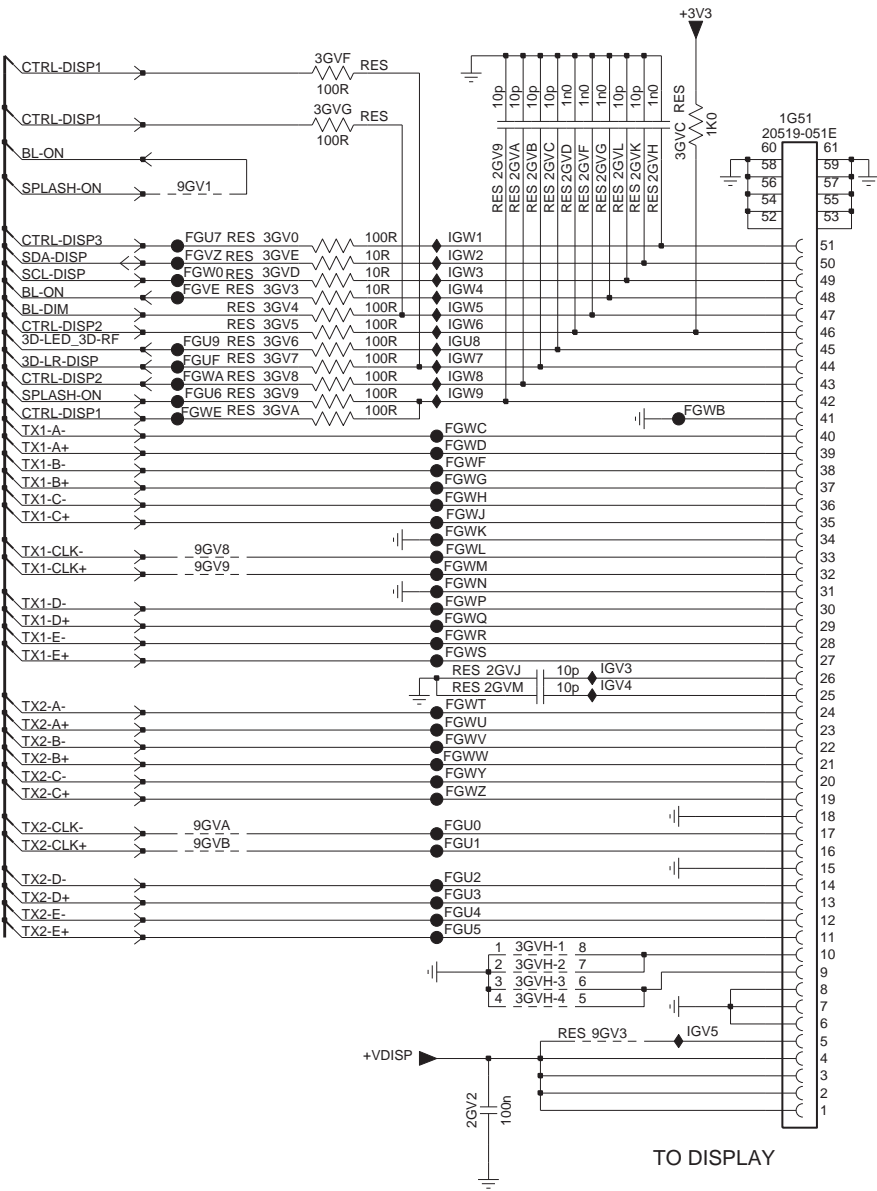
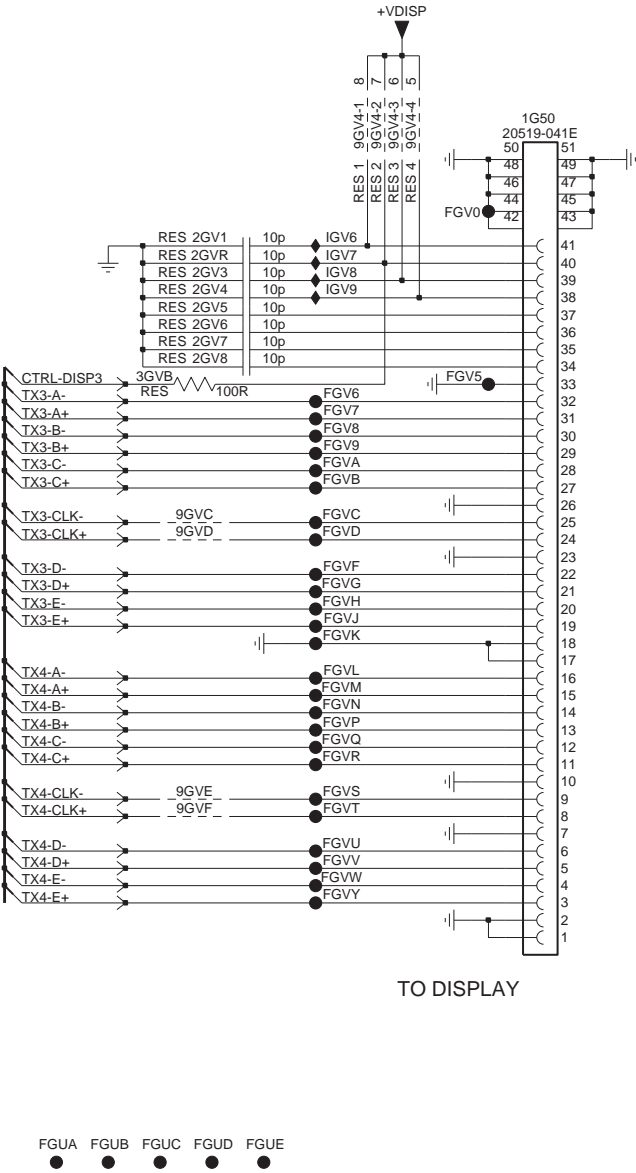


Control	8204 000 9231	4 2011-12-06

10-4-16 B04B, LVDS

B04B LVDS

B04B

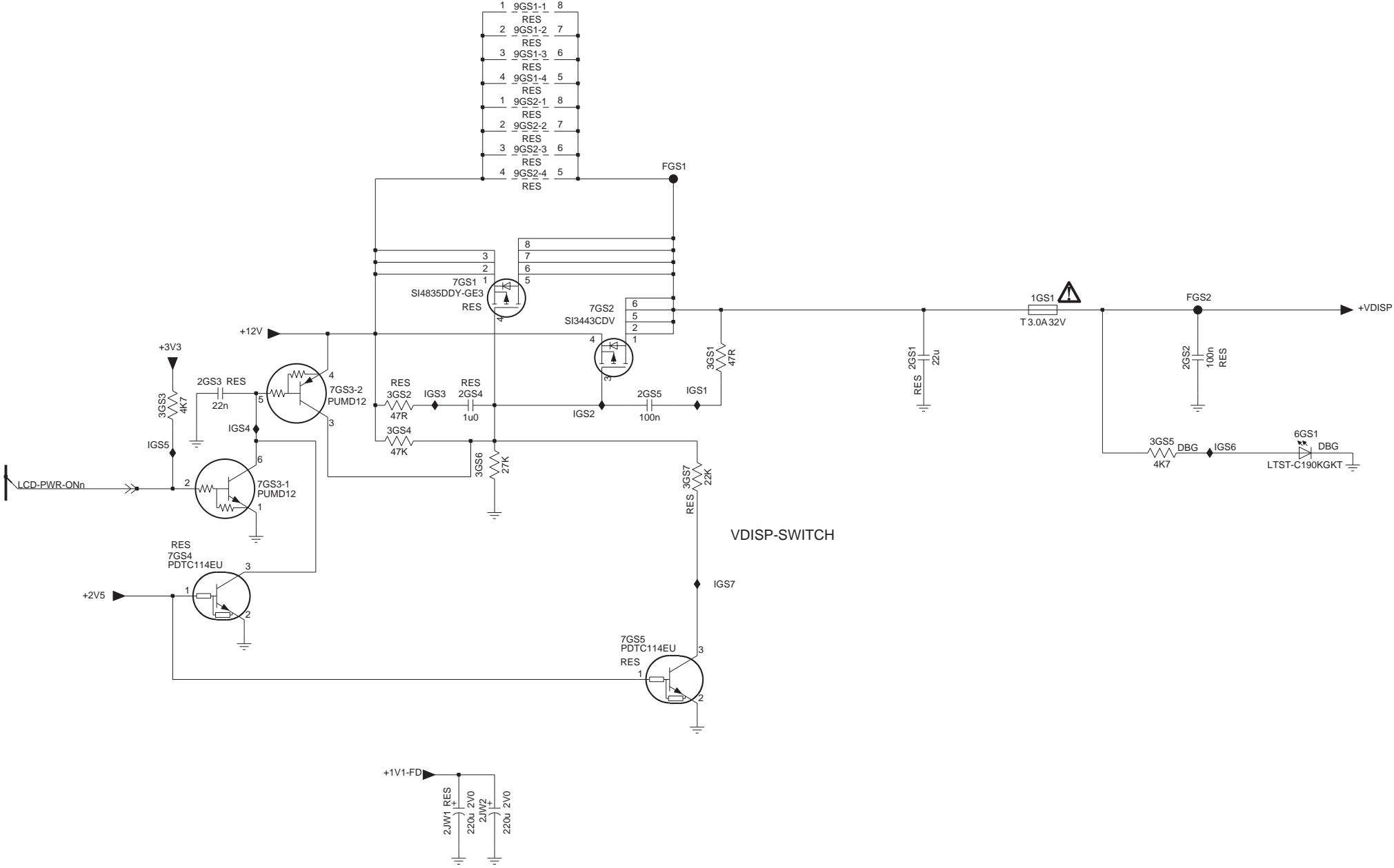


LVDS	8204 000 9231	4	2011-12-08

10-4-17 B04C, VDisp

B04C VDisp

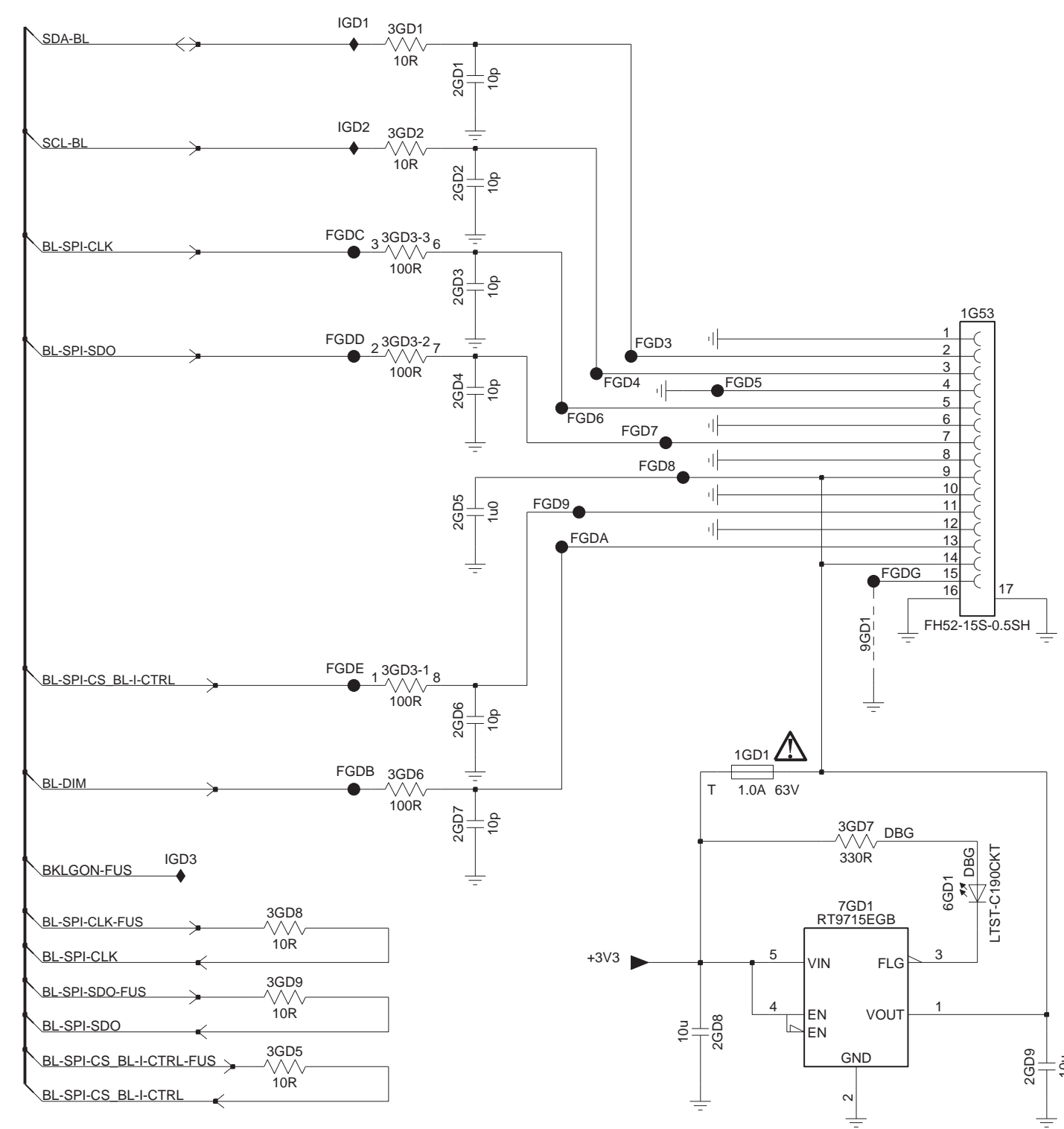
B04C



VDisp	8204 000 9231	4	2011-12-08

B04D Connector - Backlight

B04D

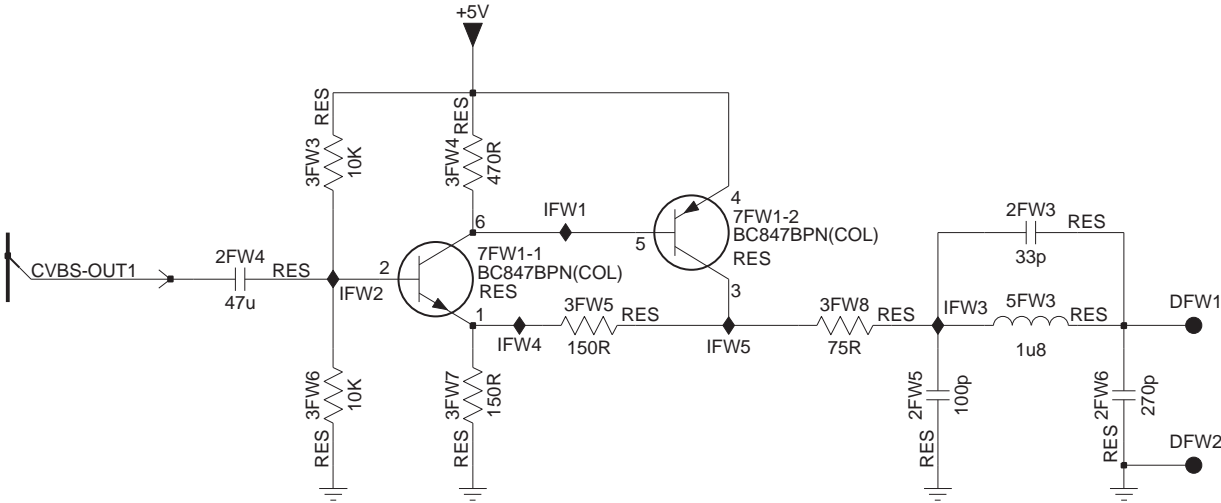


Connector - Backlight	8204 000 9231	4	2011-12-08

B04E

Tuner CVBS Debug

B04E



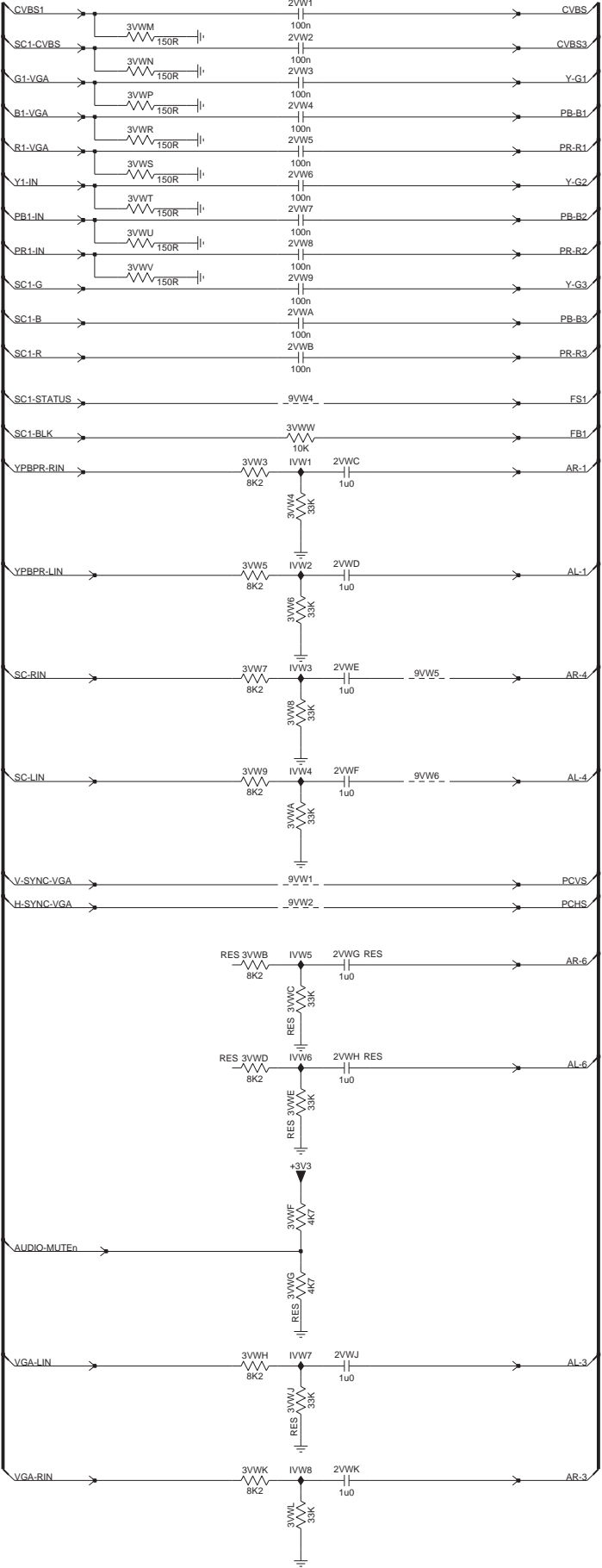
Tuner CVBS Debug	8204 000 9231	4	2011-12-08

10-4-20 B04F, Audio - Video

B04F

Audio - Video

B04F

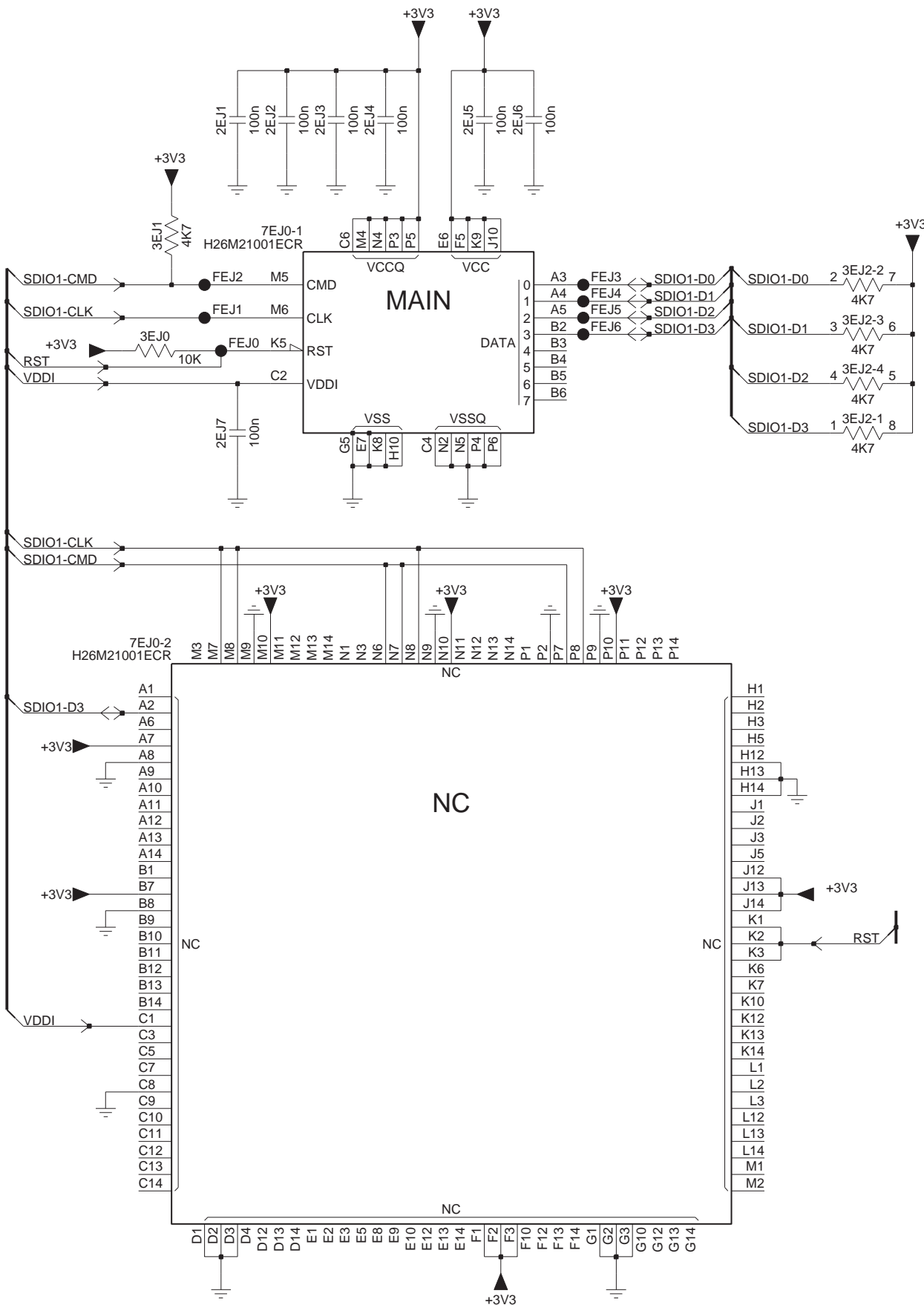


Audio - Video	8204 000 9231	4	2011-12-08

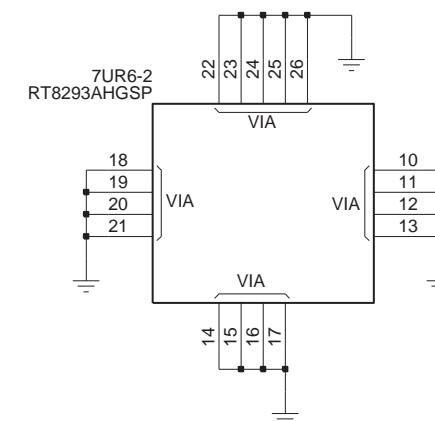
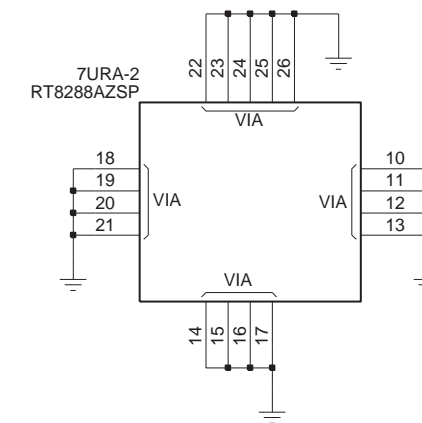
B04G

EMMC

B04G

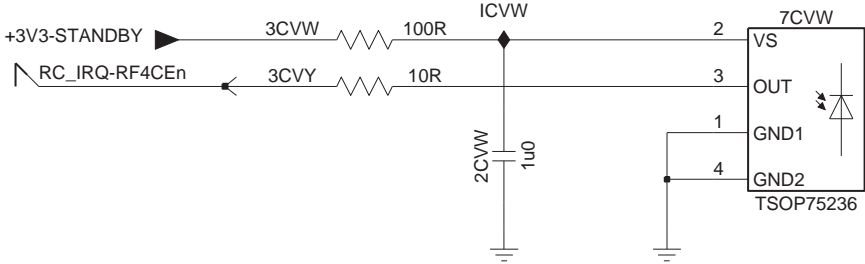


EMMC	8204 000 9231	4	2011-12-08



B04I IR Debug

B04I

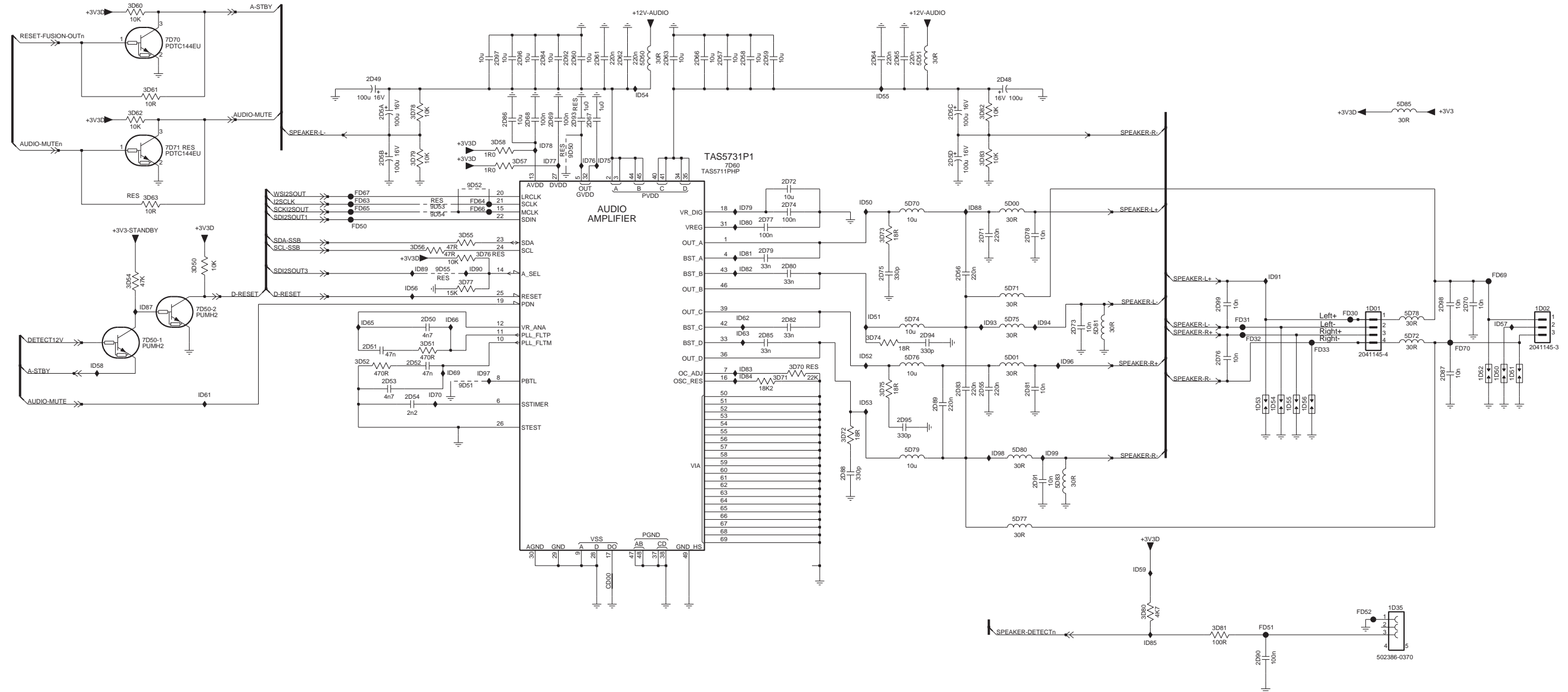


IR Debug	8204 000 9231	4	2011-12-08

10-4-24 B05A, Class-D amplifier

B05A Class-D amplifier

B05A



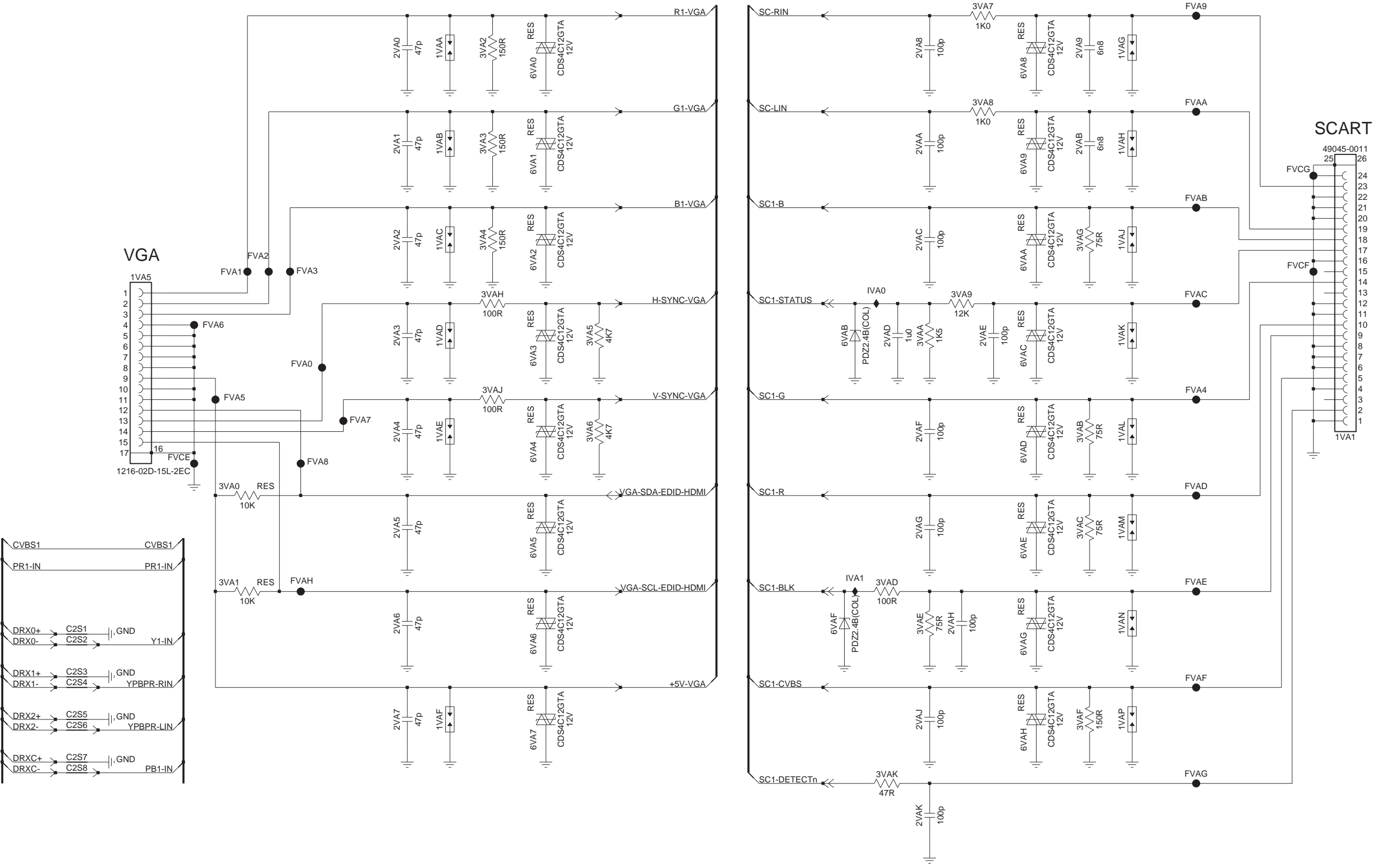
Class-D amplifier	8204 000 9220	4	2011-12-16

10-4-25 B05B, Analogue externals

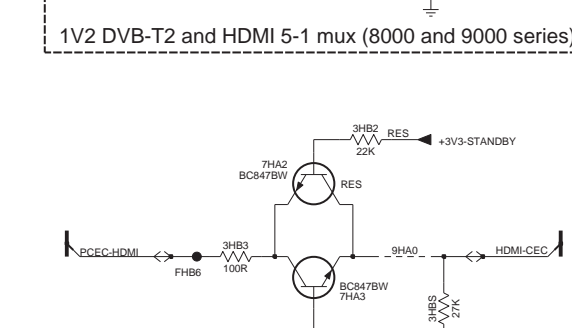
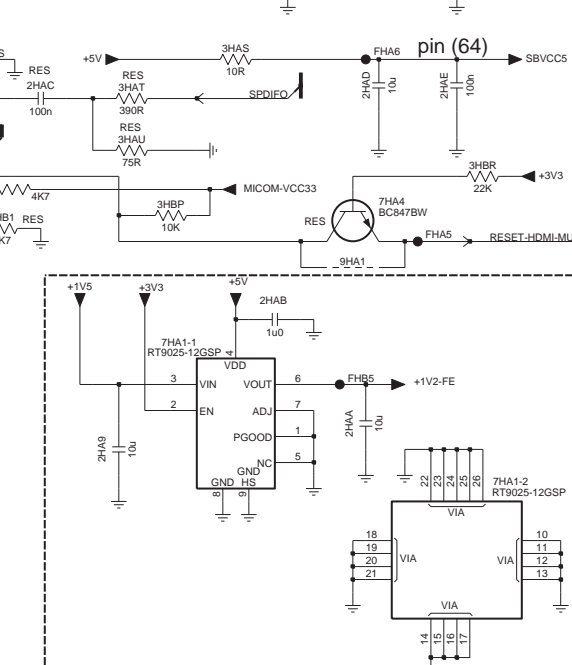
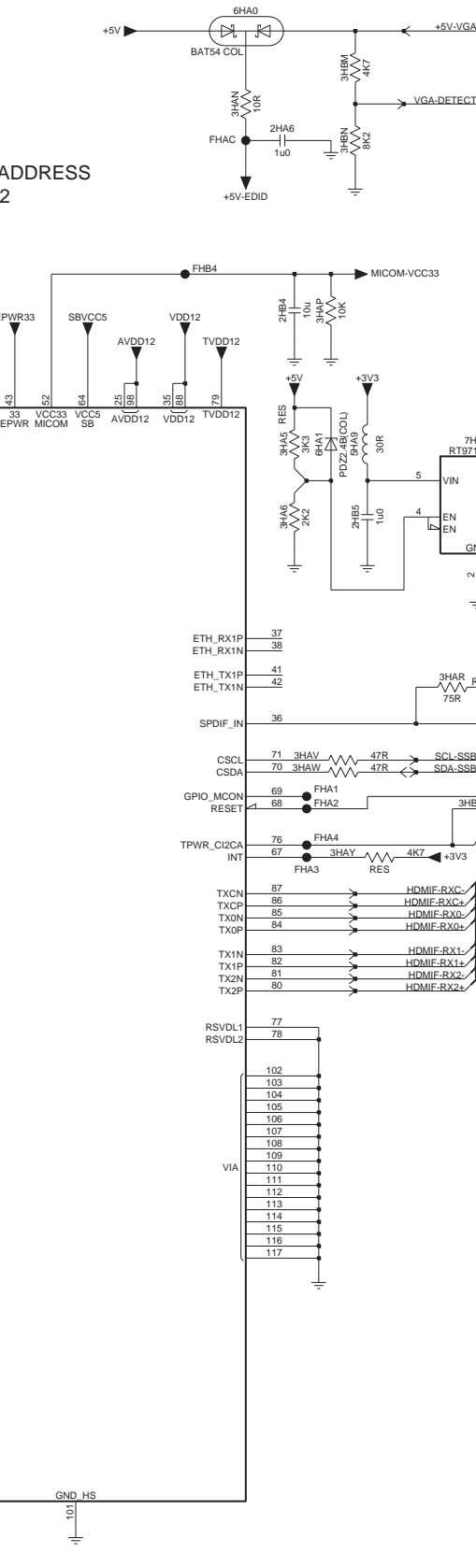
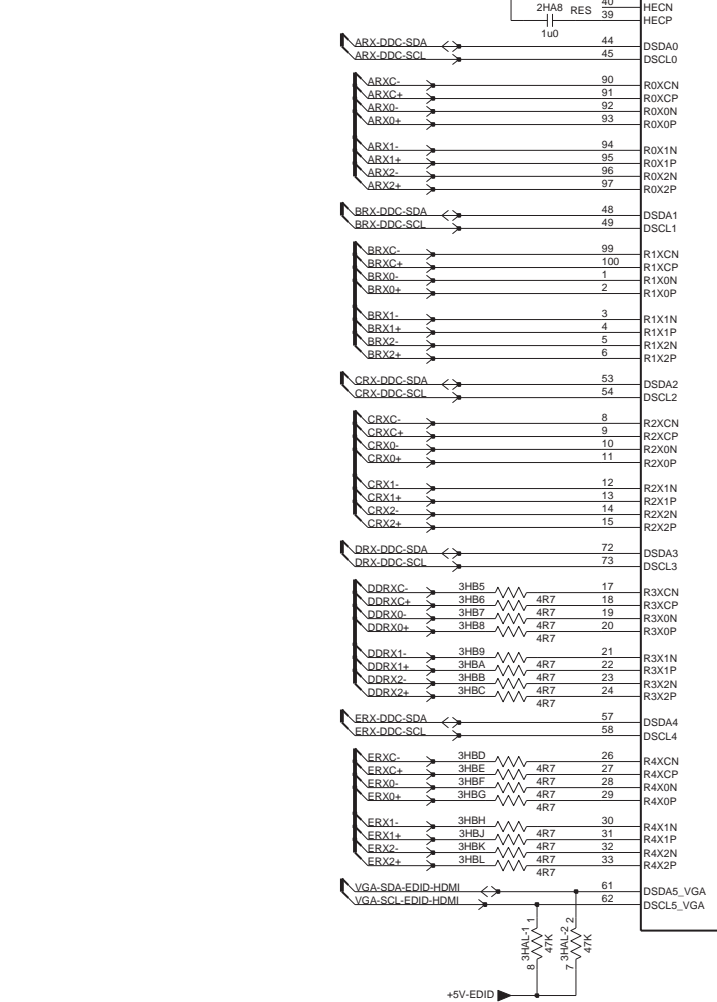
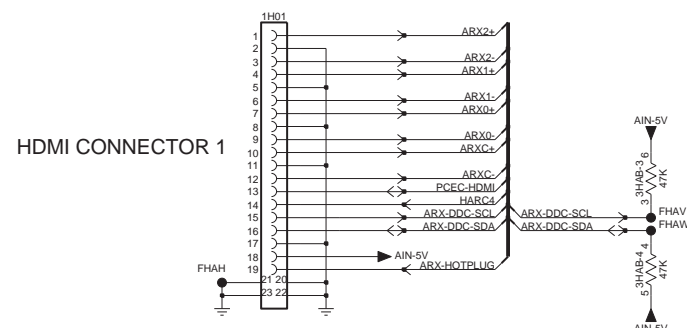
B05B

Analogue externals

B05B



Analogue externals	8204 000 9220	4	2011-12-18



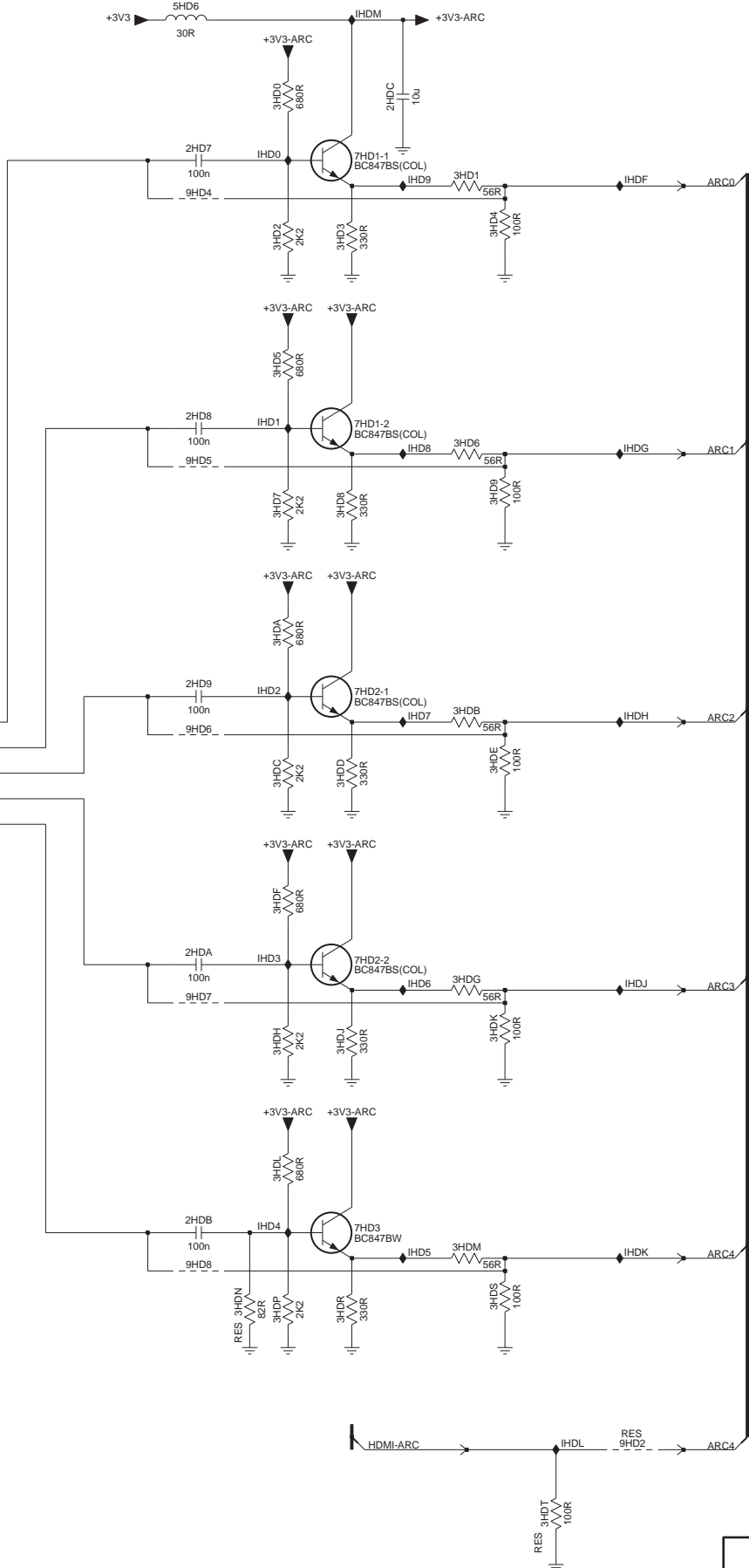
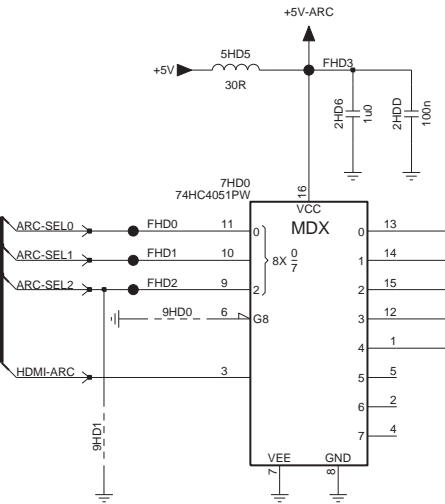
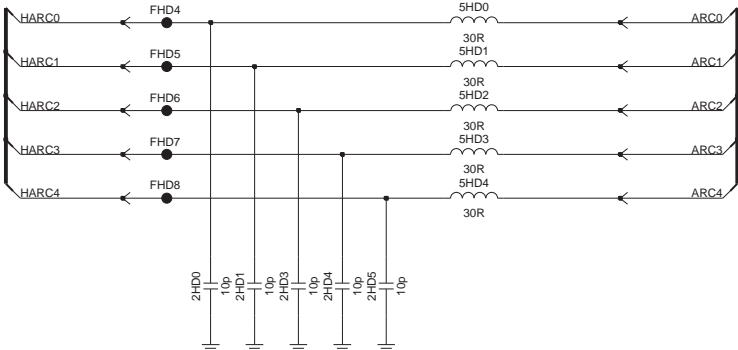
HDMI	8204 000 9223	5	2011-12-06

10-4-27 B06B, HDMI-ARC

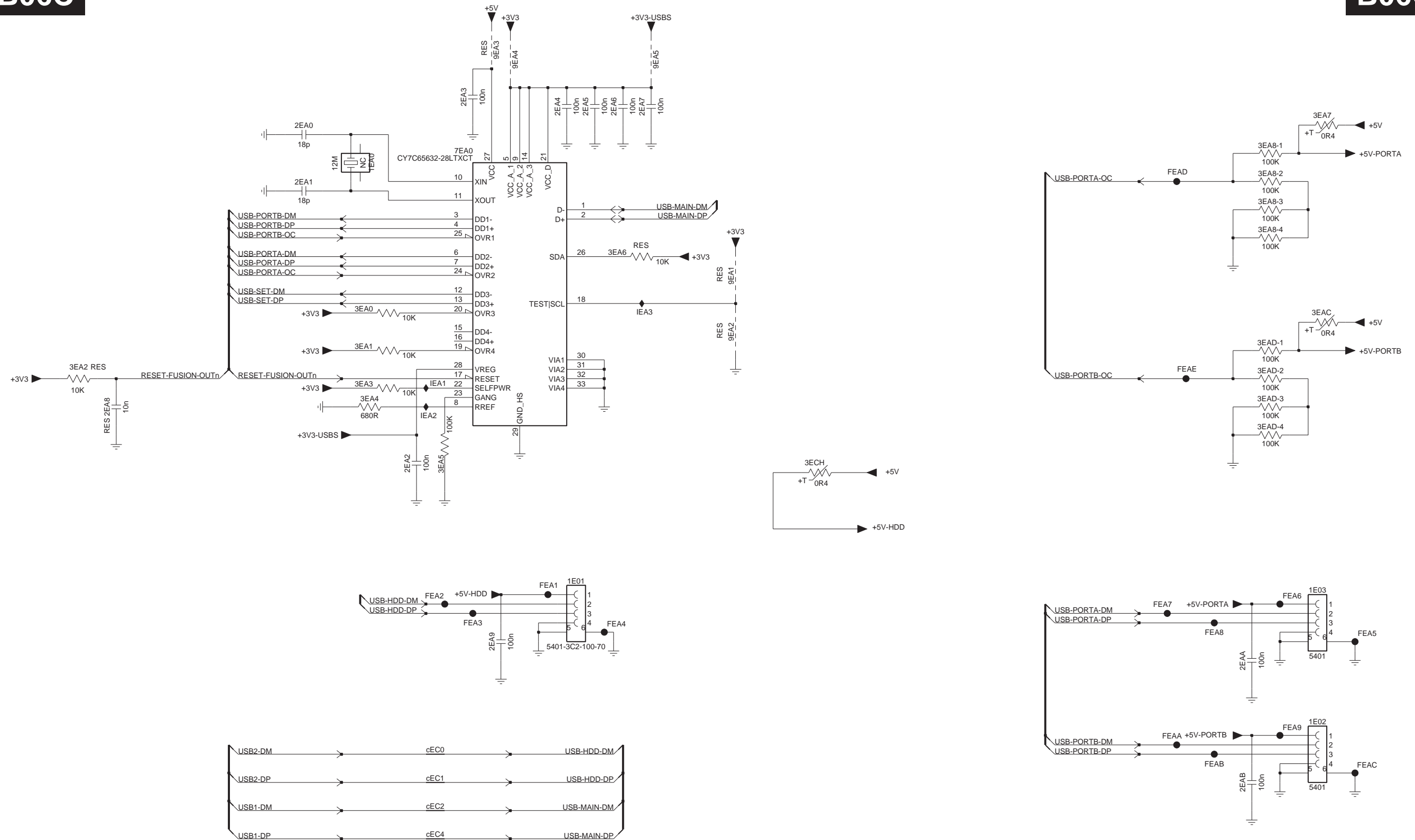
B06B

HDMI-ARC

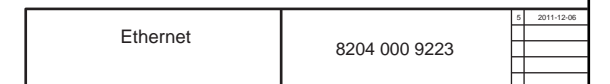
B06B



HDMI-ARC	8204 000 9223	5	2011-12-08

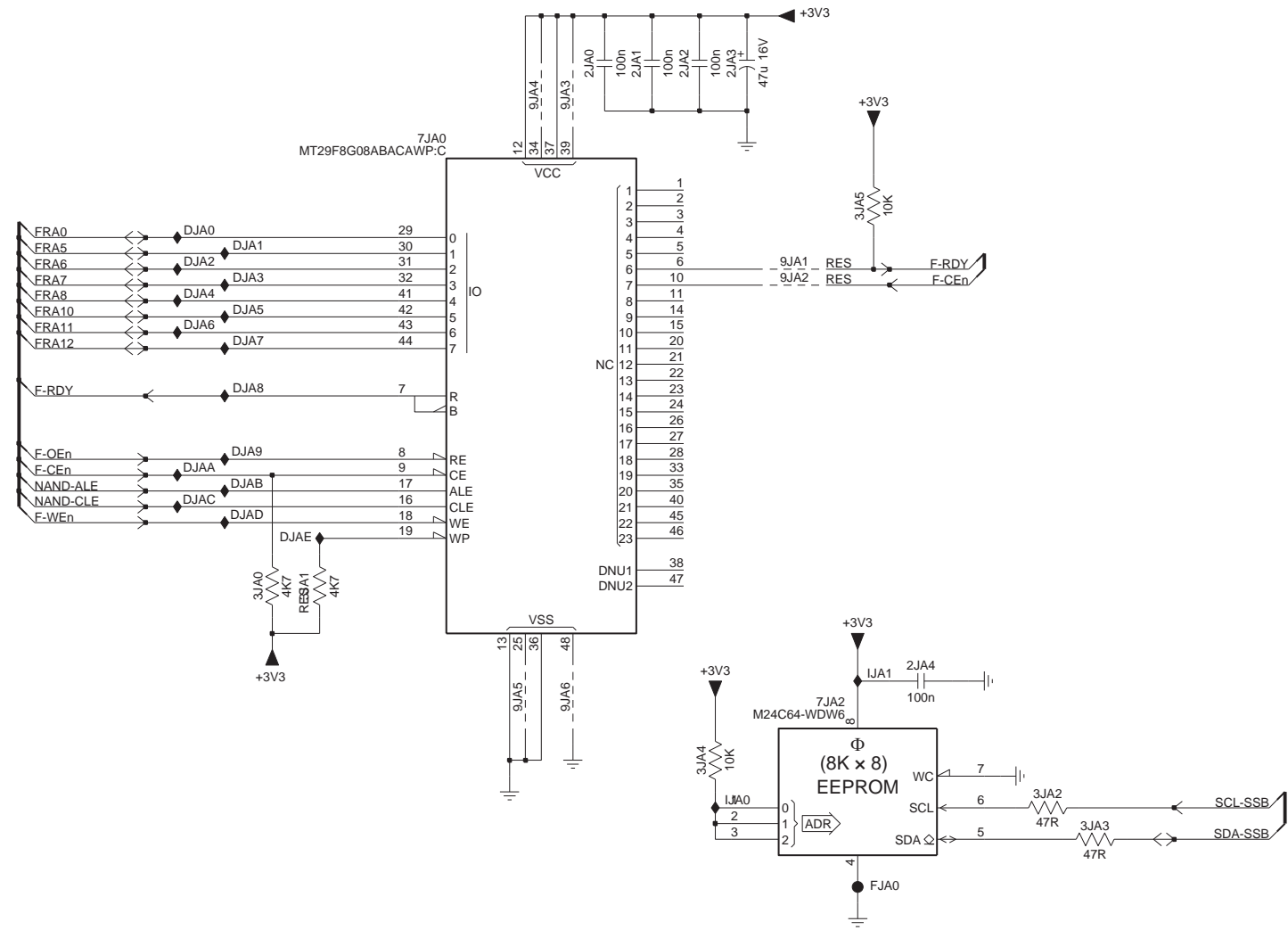


USB	8204 000 9223	5	2011-12-06

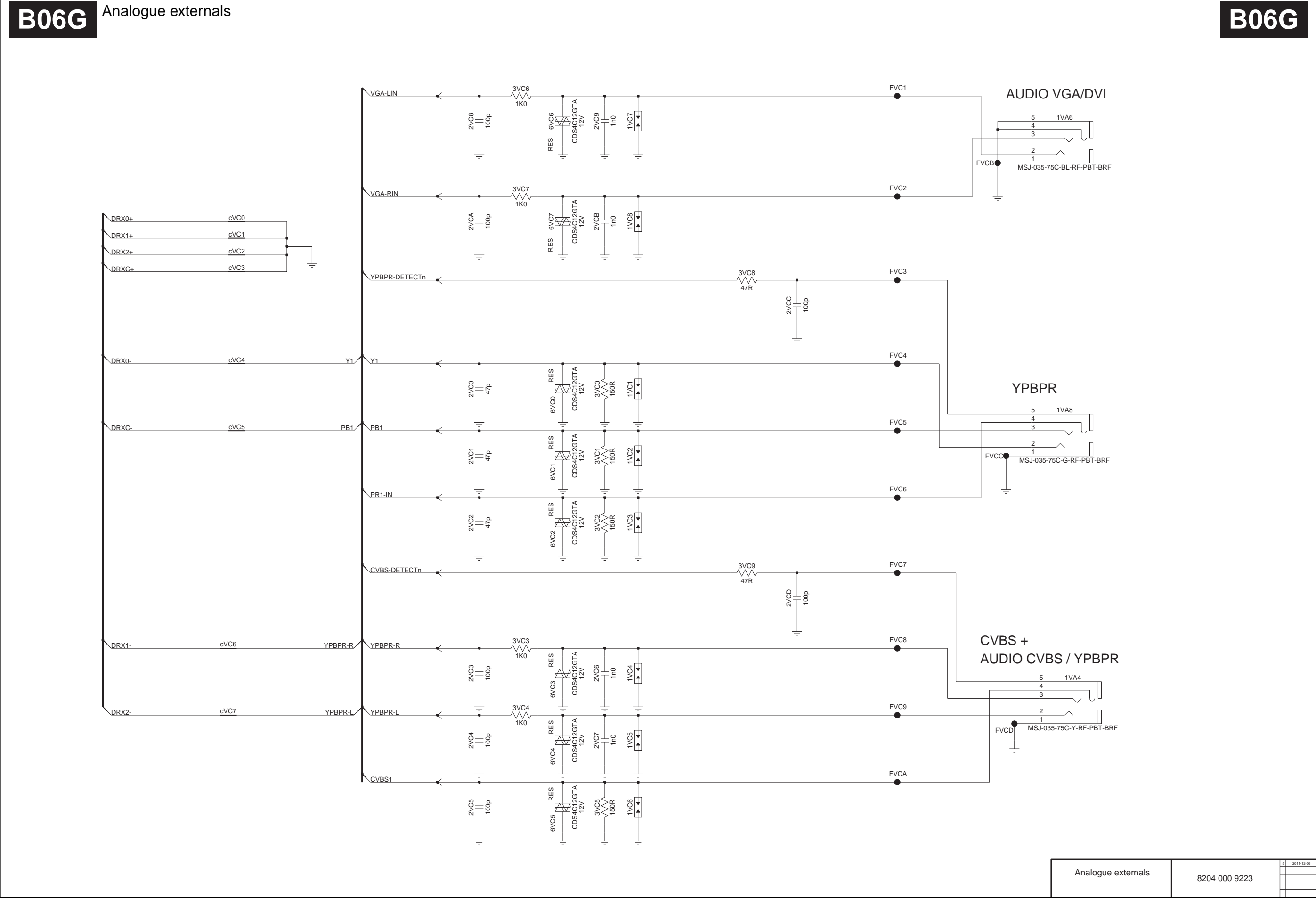


B06F NAND-Flash & EEPROM

B06F



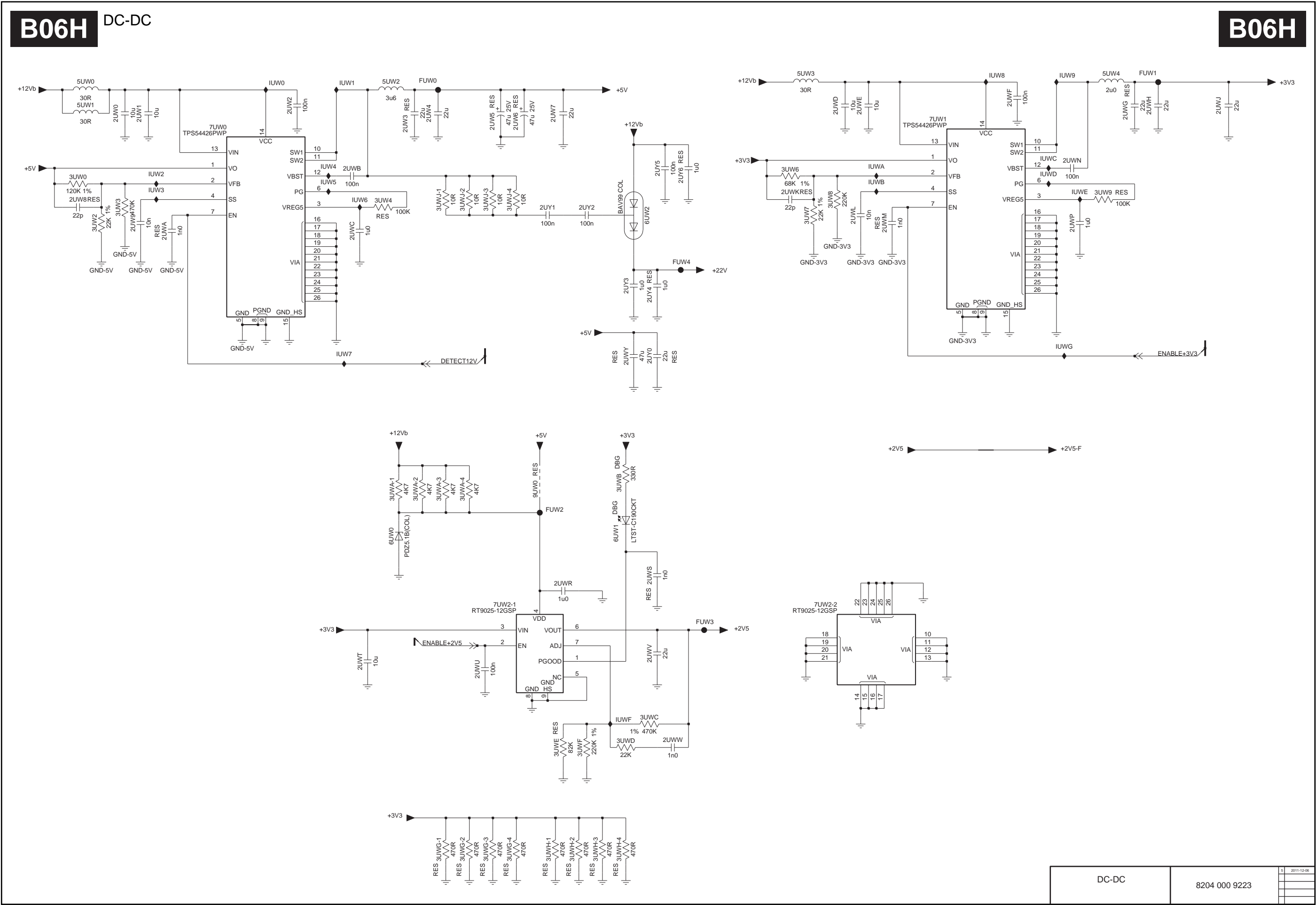
NAND-Flash & EEPROM	8204 000 9223	5	2011-12-08



Analogue externals	8204 000 9223	5	2011-12-08

19280_032_120322.eps
120322

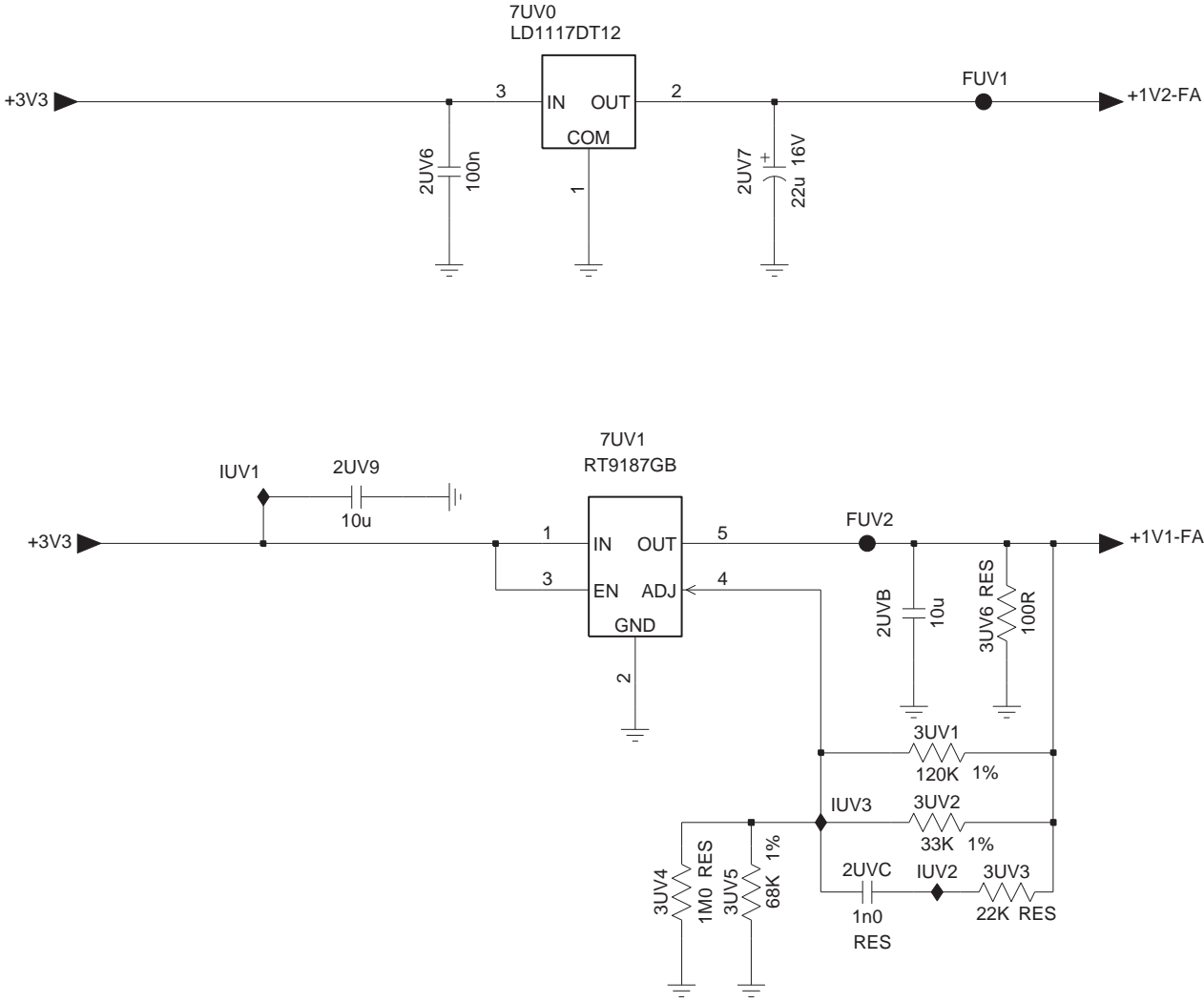
10-4-33 B06H, DC-DC



10-4-34 B06I, DC-DC

B06I DC-DC

B06I



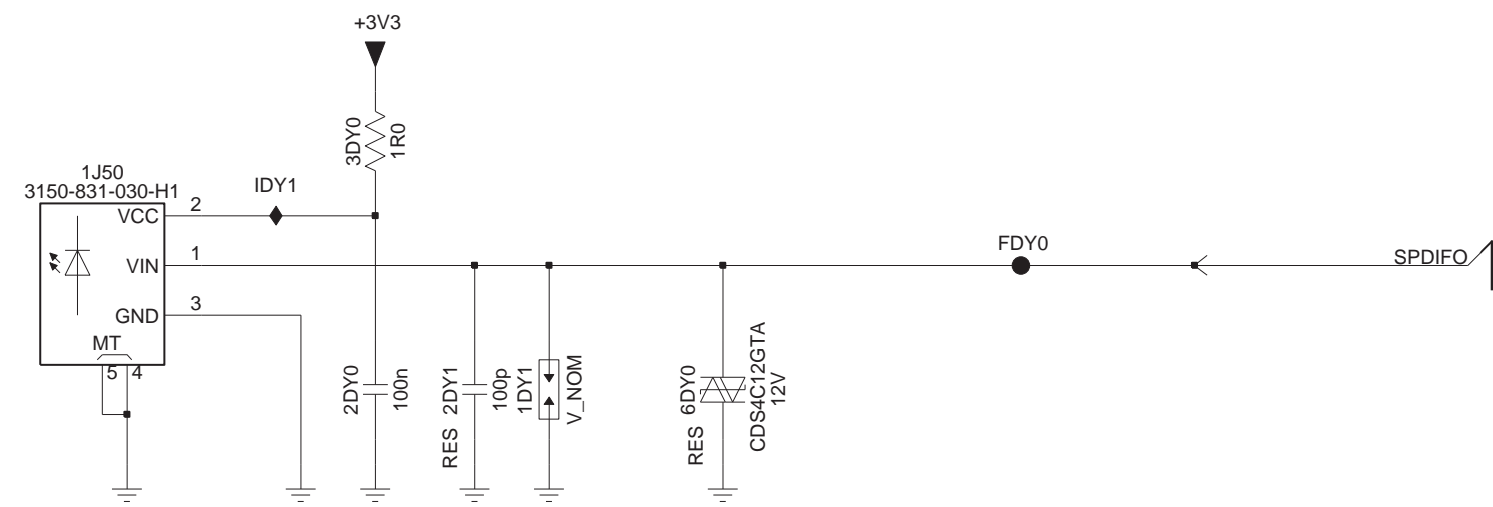
DC-DC	8204 000 9223	5	2011-12-08

19280_034_120322.eps
120322

10-4-35 B06K, Audio

B06K Audio

B06K



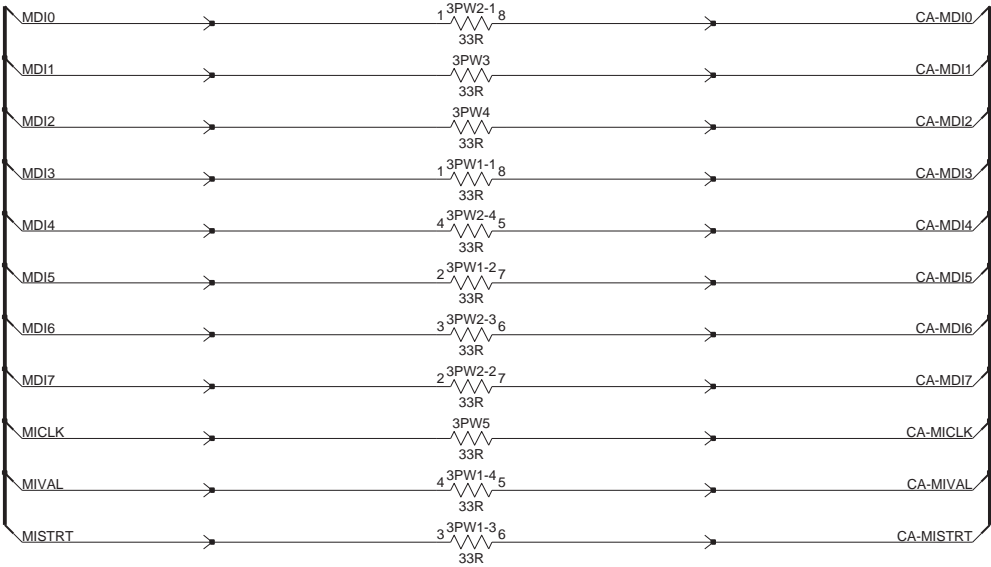
Audio	8204 000 9223	5	2011-12-08

19280_035_120322.eps
120322

10-4-36 B06L, Conditional access

B06L

Conditional access



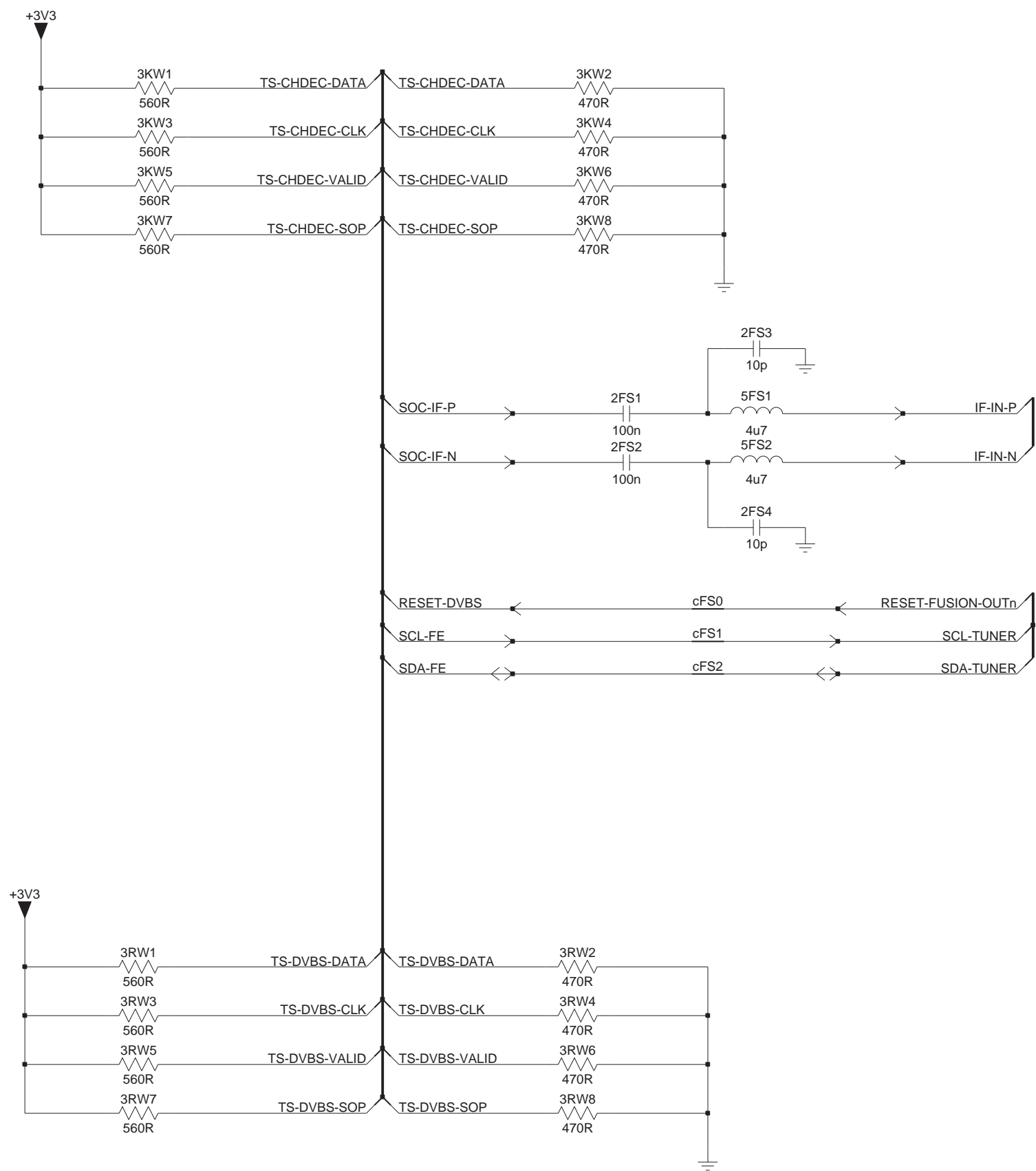
Conditional access	8204 000 9223	5	2011-12-08

19280_036_120322.eps
120322

10-4-37 B06M, FE

B06M FE

B06M



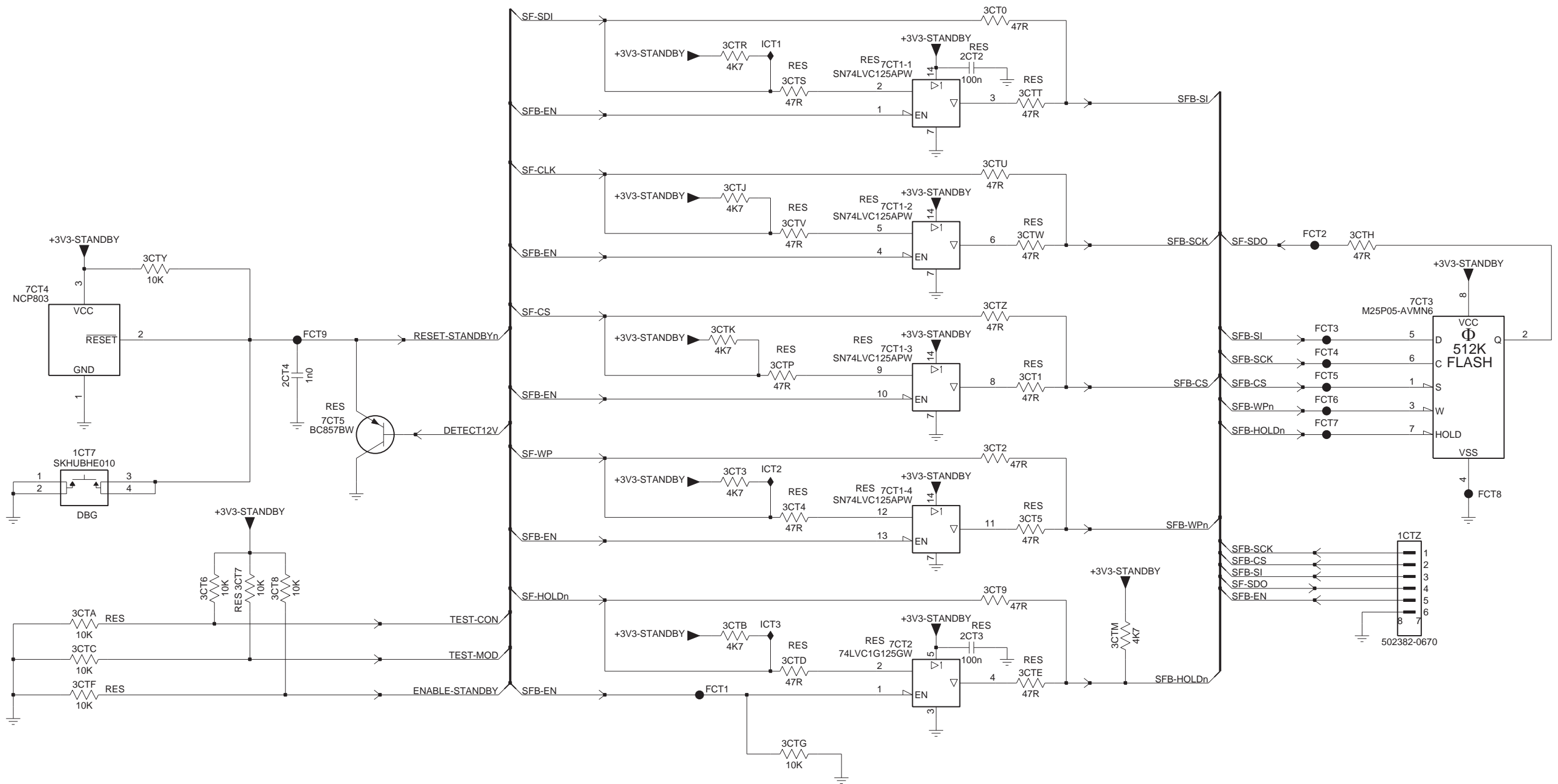
FE	8204 000 9223	5	2011-12-08

10-4-38 B06N, Serial flash

B06N

Serial flash

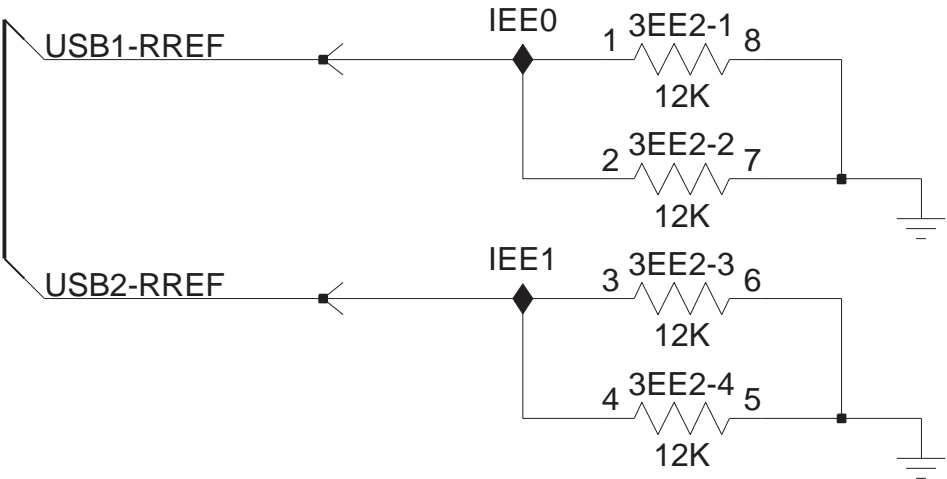
B06N



Serial flash	8204 000 9223	5	2011-12-08

B06O Fusion peripherals

B06O

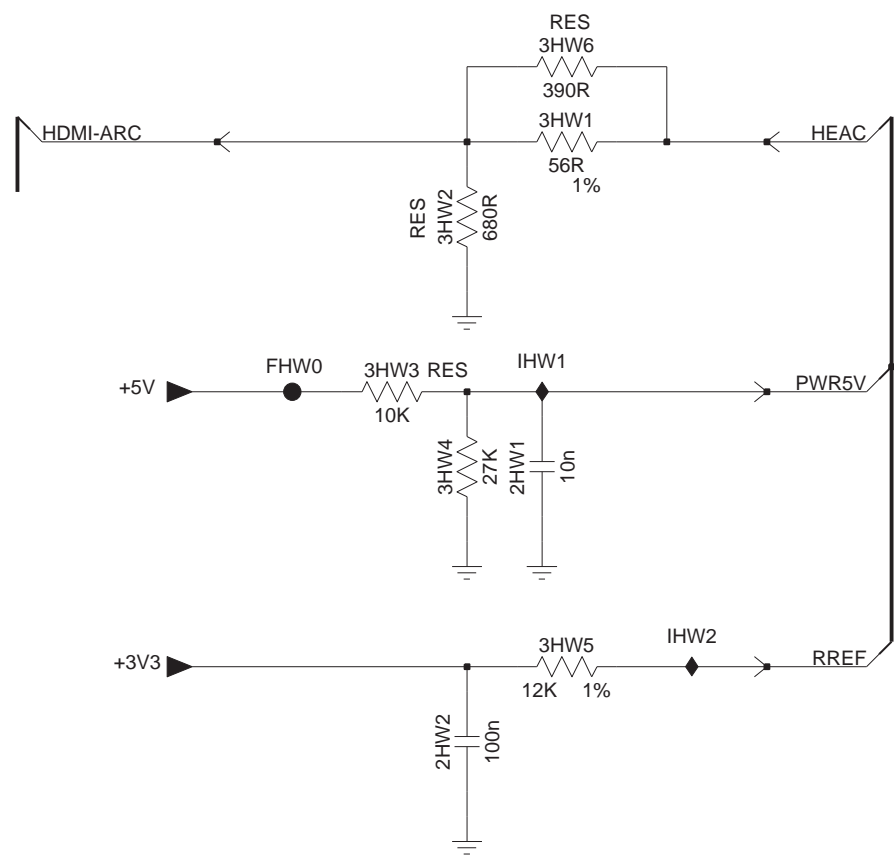


Fusion peripherals	8204 000 9223	5	2011-12-08

10-4-40 B06P, HDMI

B06P HDMI

B06P



HDMI	8204 000 9223	5	2011-12-08

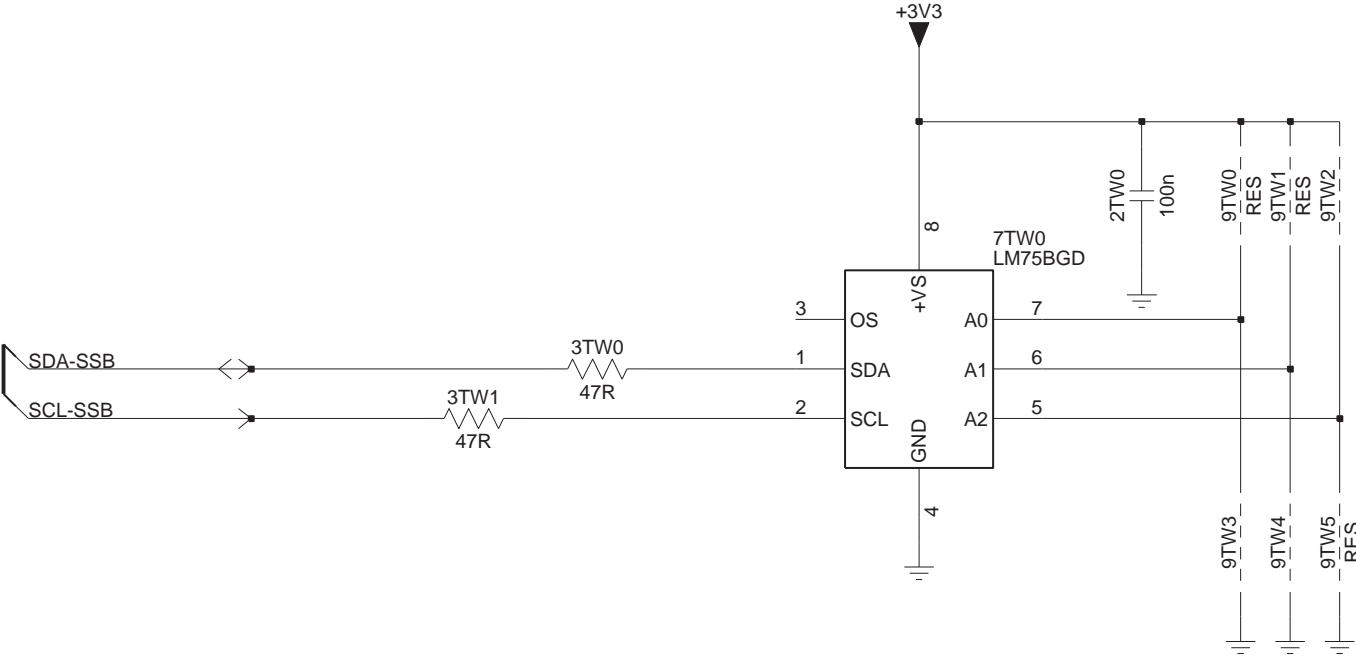
19280_040_120322.eps
120322

10-4-42 B06R, Temperature sensor

B06R

Temperature sensor

B06R



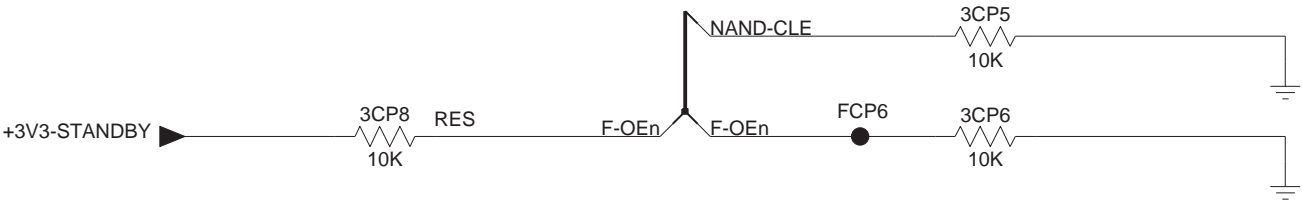
Temperature sensor	8204 000 9223	5	2011-12-08

19280_042_120322.eps
120322

B06S

Strap options

B06S

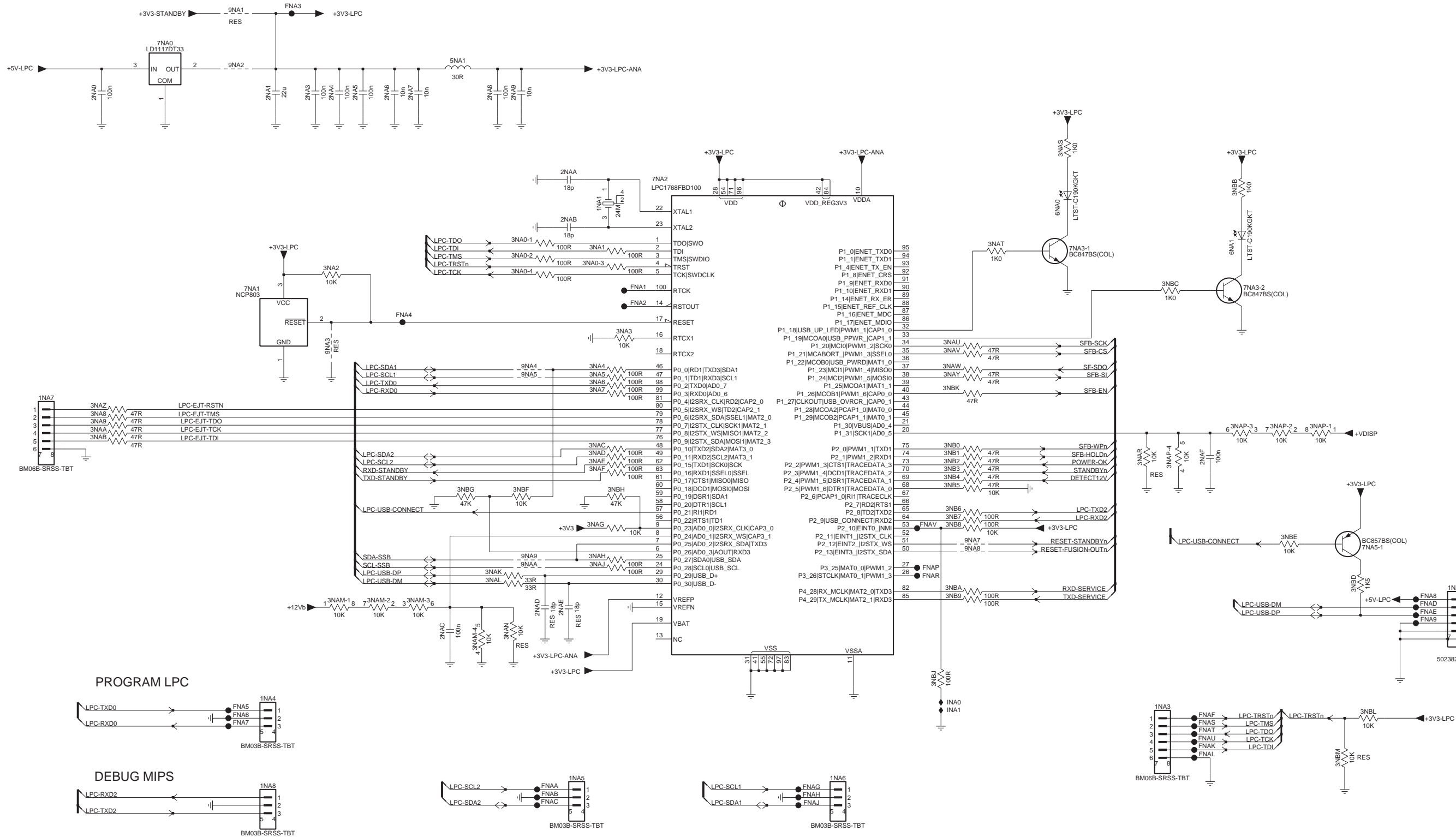


Strap options	8204 000 9223	5	2011-12-08

B07A

LPC debug

B07A



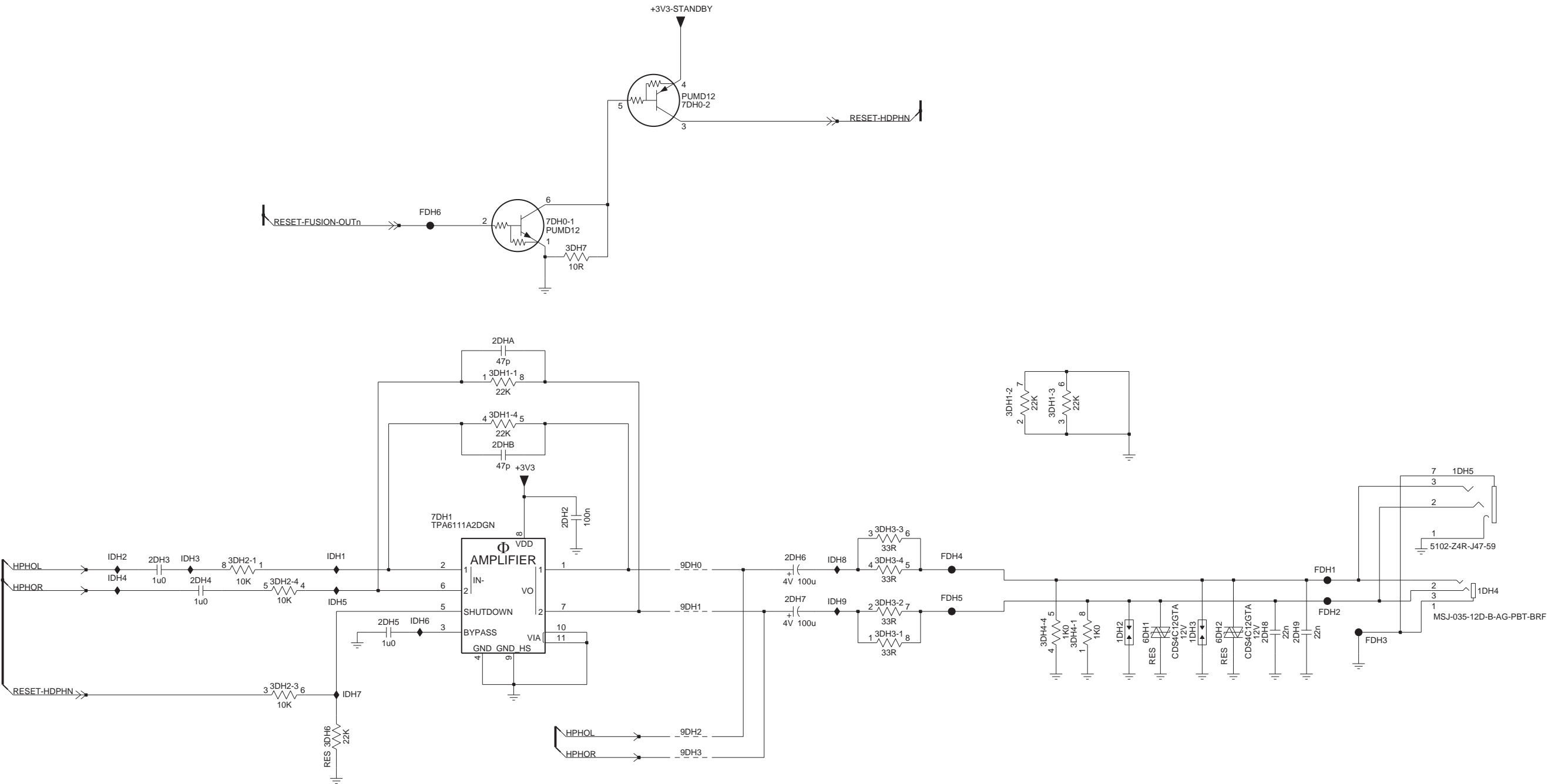
LPC debug	8204 000 9222	5	2011-12-18

10-4-45 B07B, Headphone

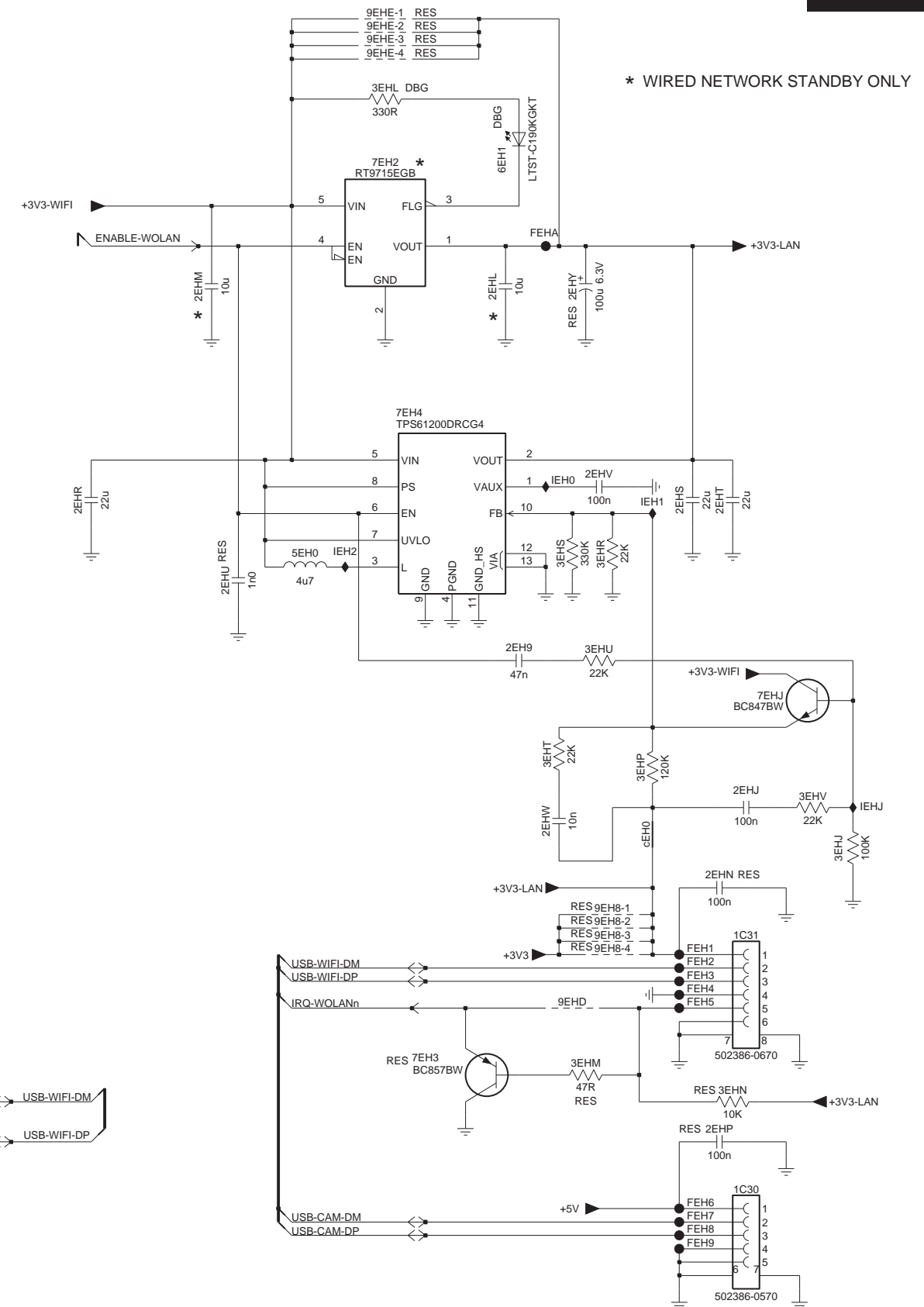
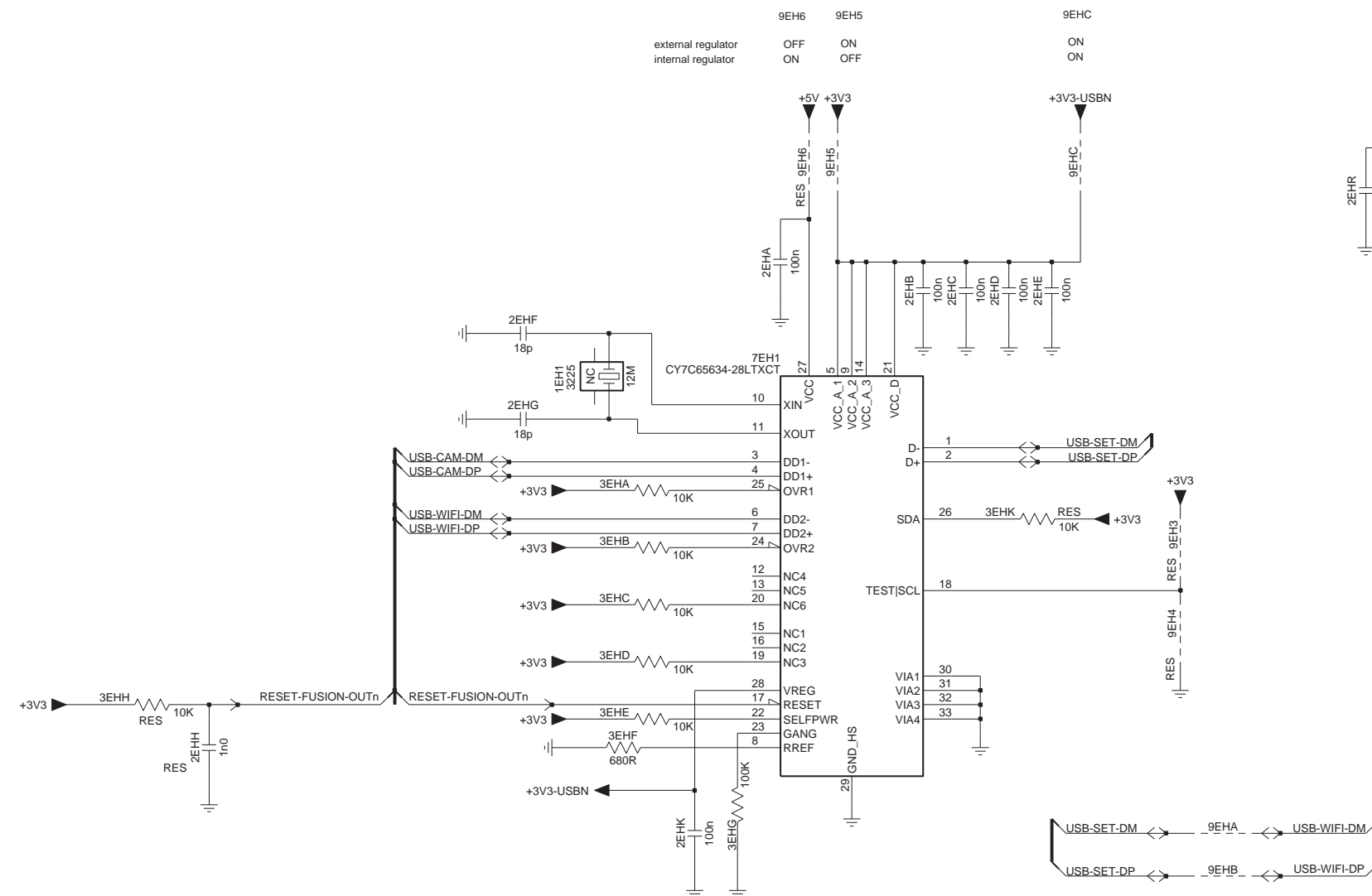
B07B

Headphone

B07B

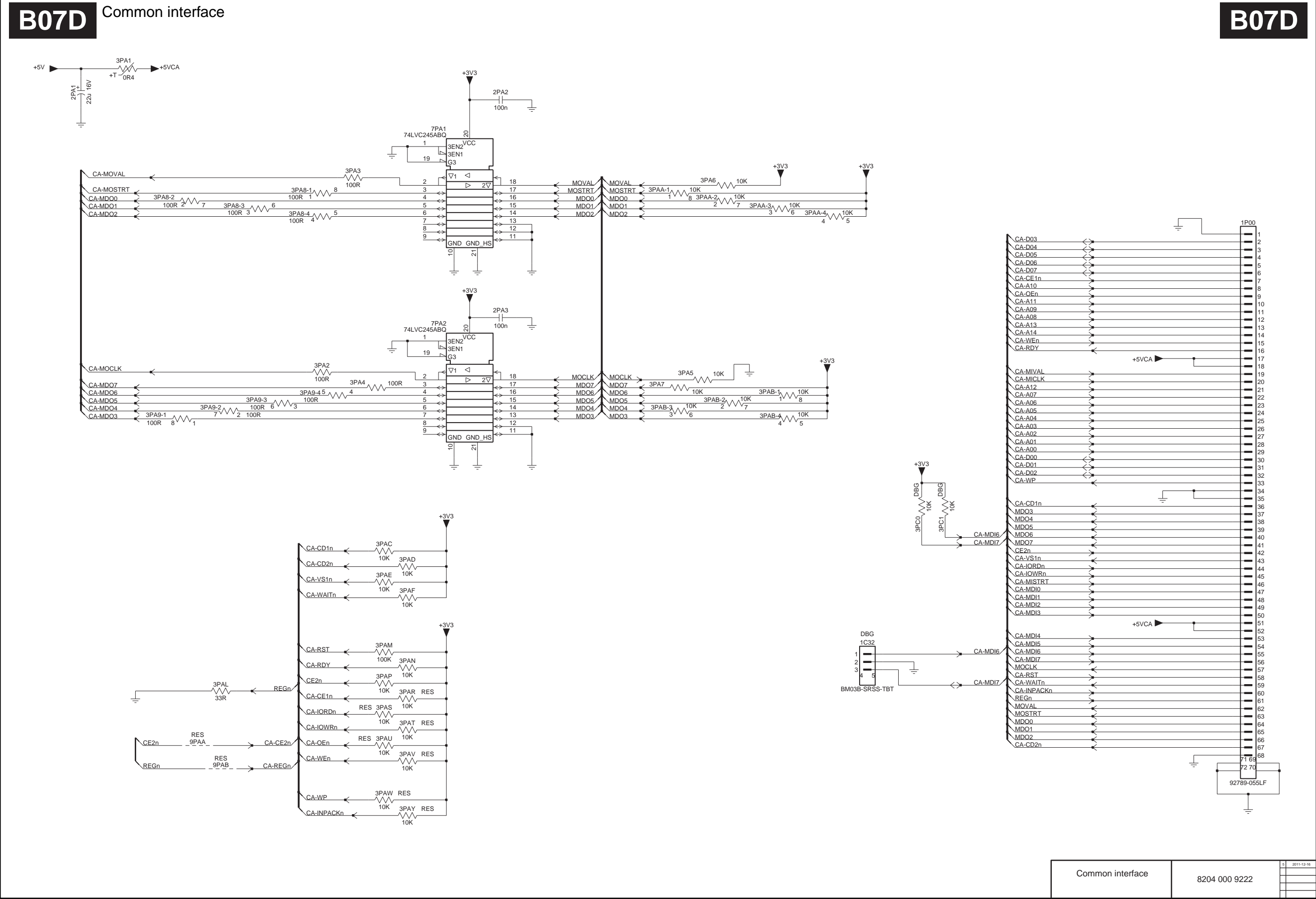


Headphone	8204 000 9222	5	2011-12-18



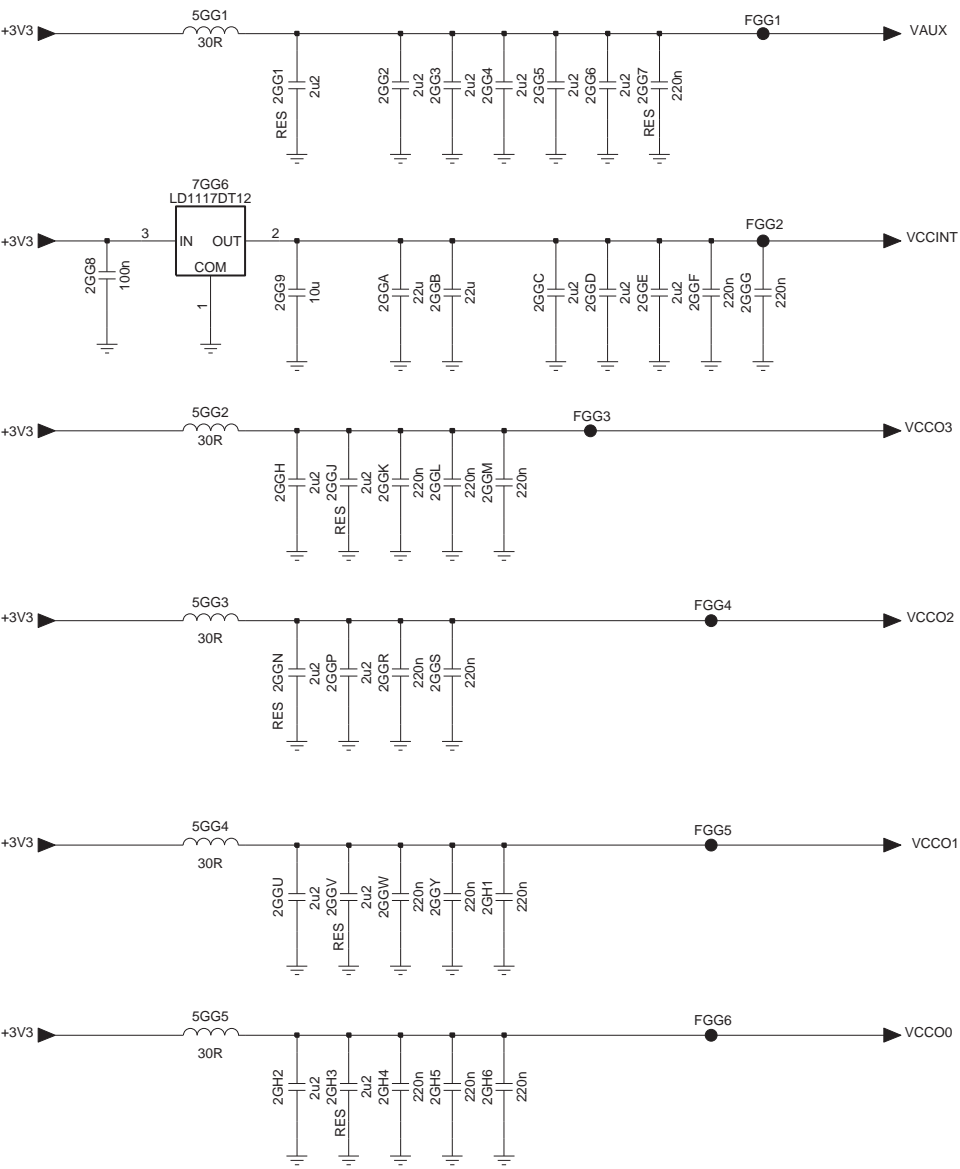
Internal USB	8204 000 9222	5	2011-12-16

10-4-47 B07D, Common interface

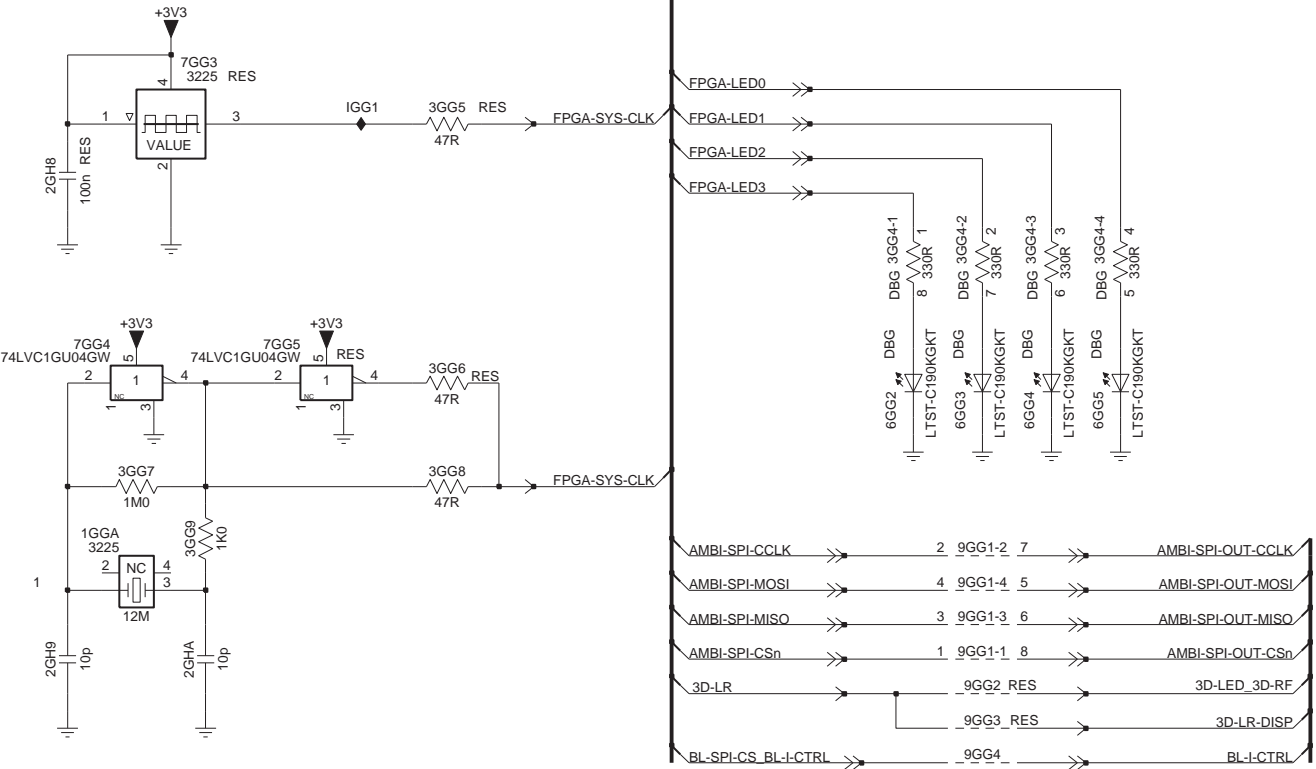


B07E FPGA - power & control

B07E



PROGRAMMING
ENGINEERING

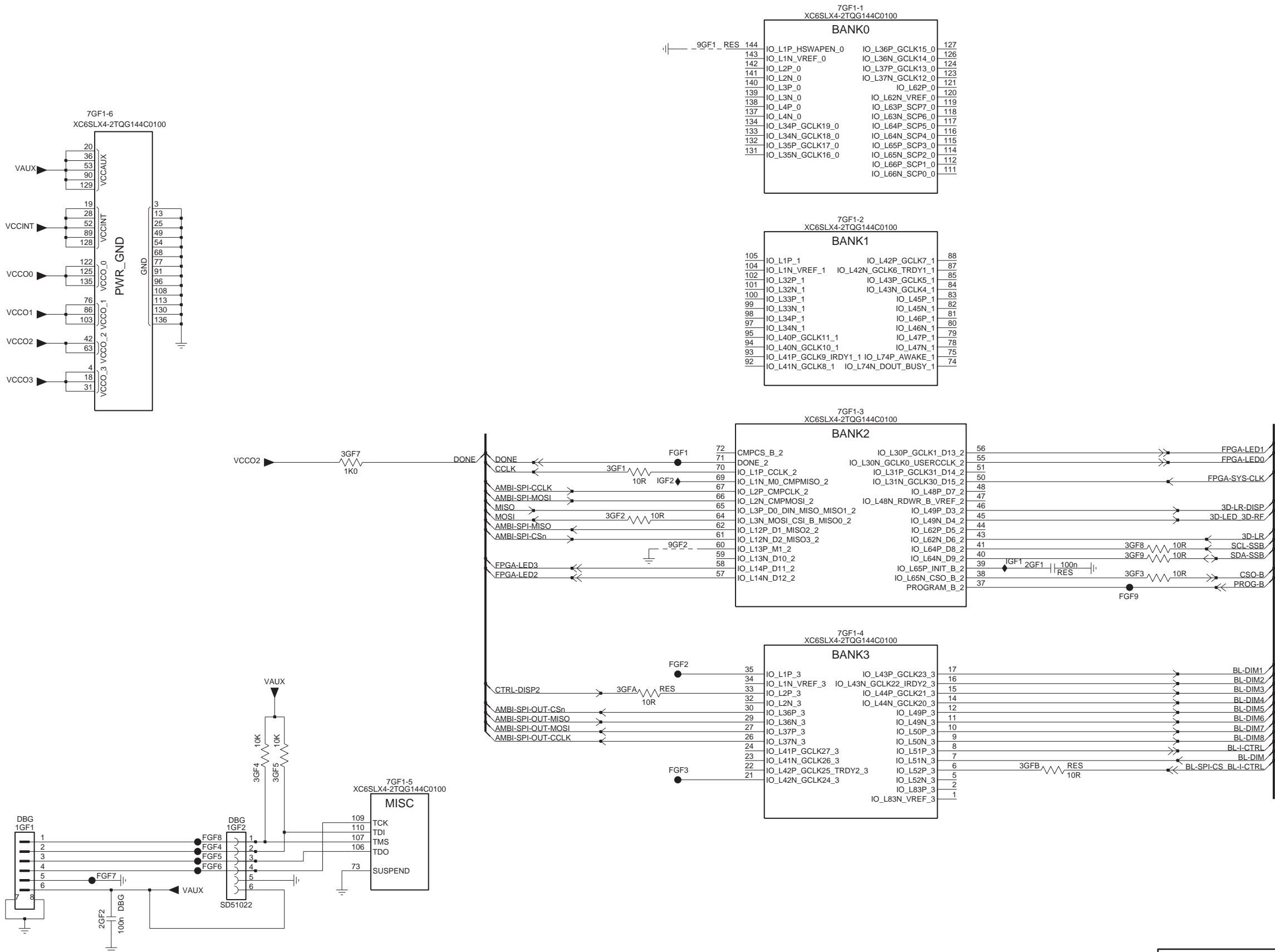


6SLX4-4MB-M25P40
6SLX9-4MB-M25P40

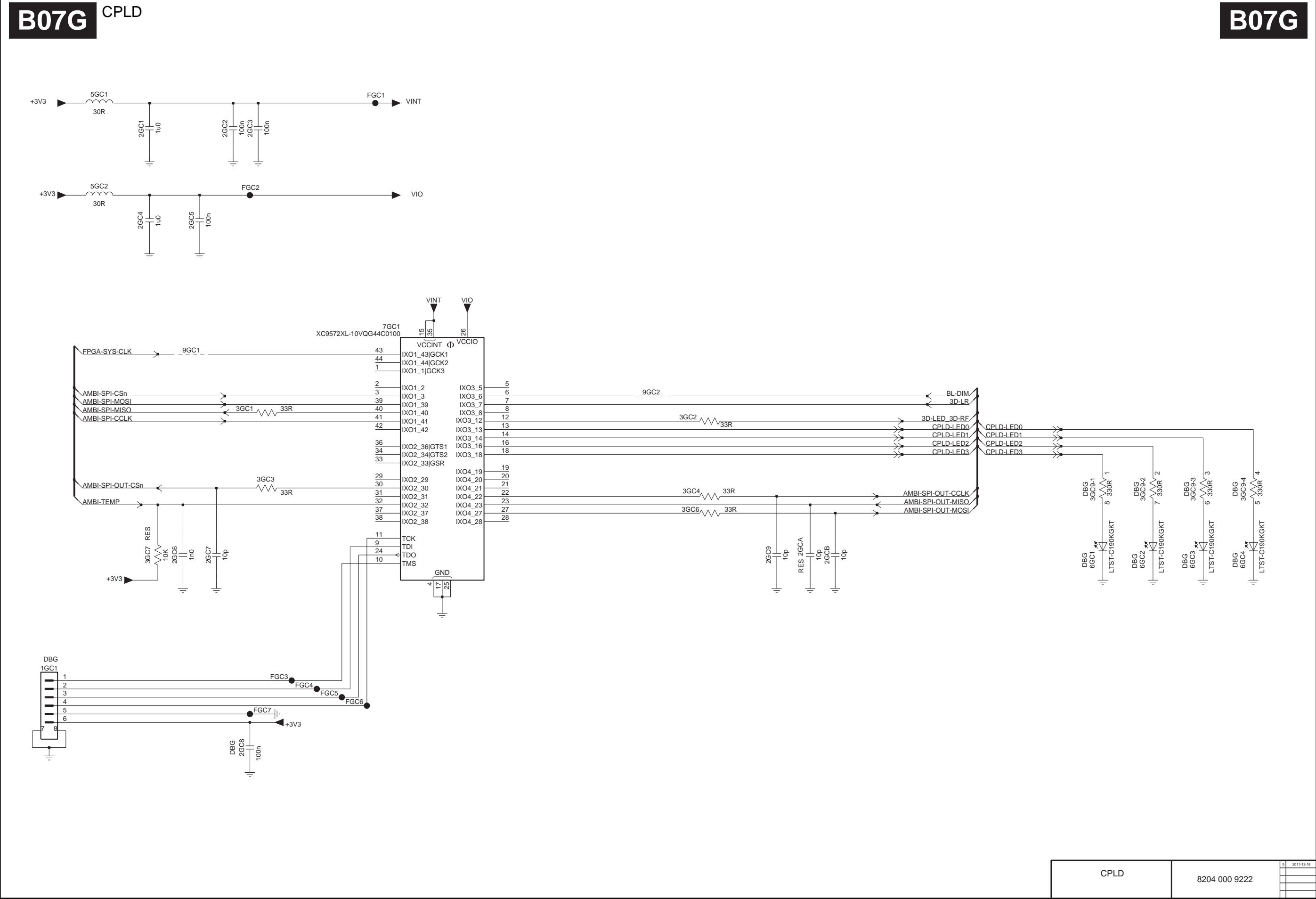
B07F

FPGA - I/O banks

B07F

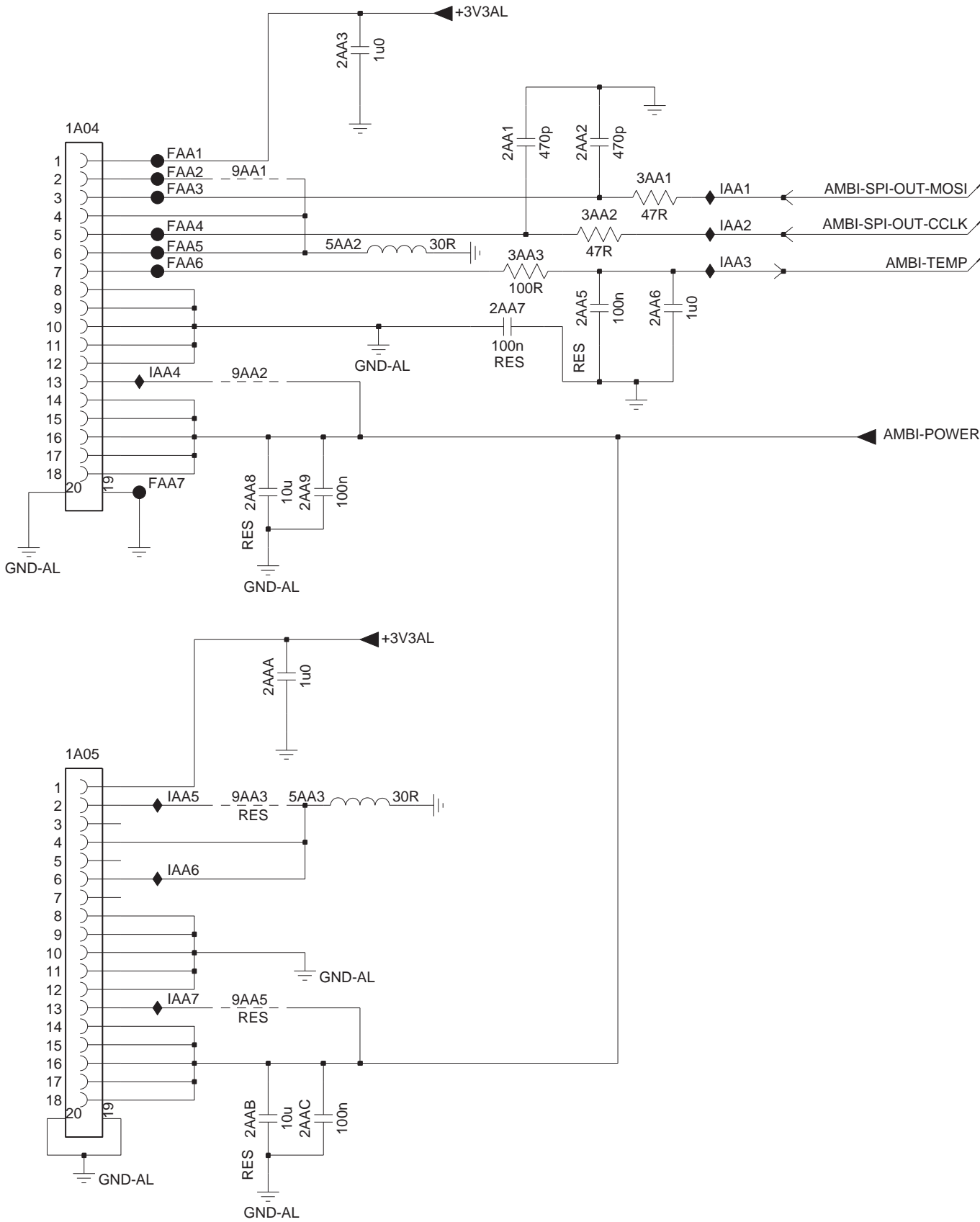


10-4-50 B07G, CPLD



B07H AmbiLight

B07H

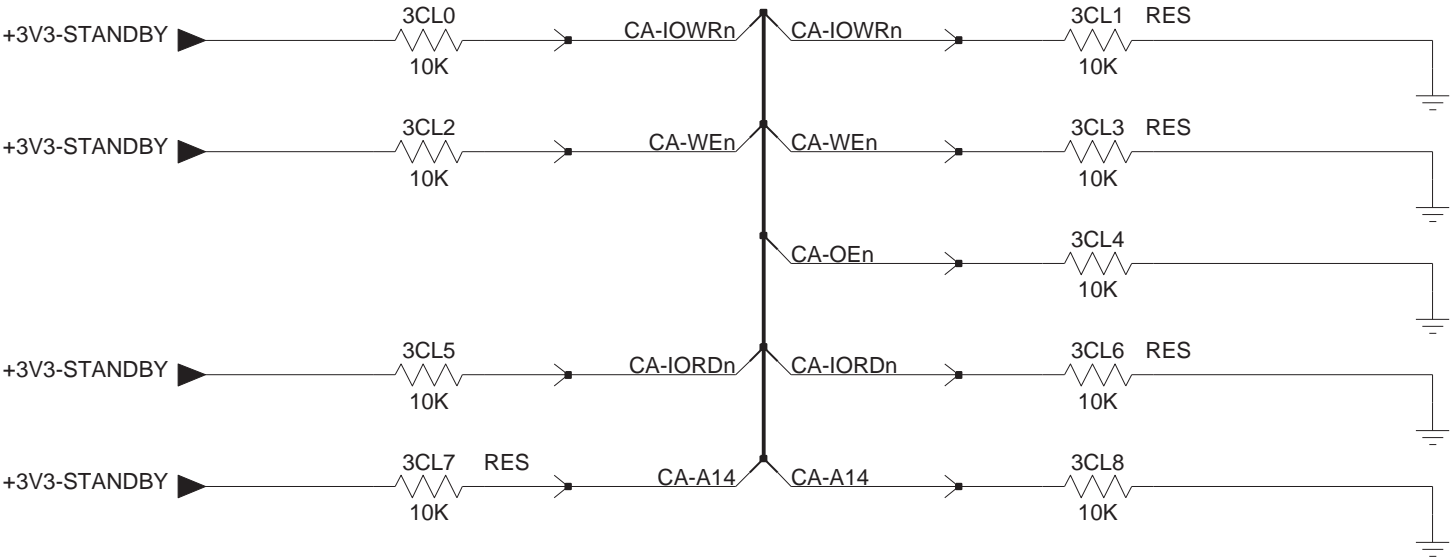


AmbiLight	8204 000 9222	5	2011-12-18

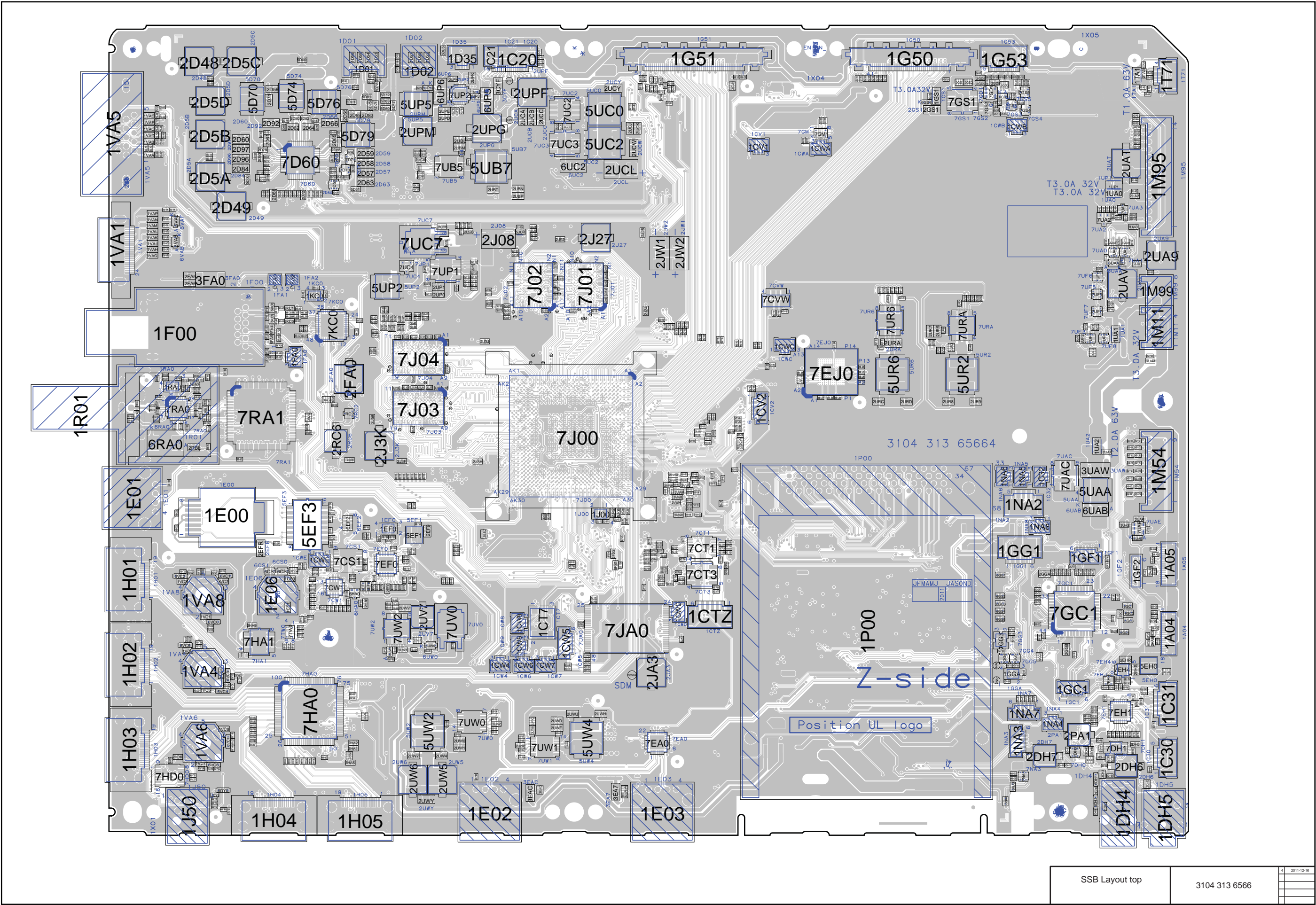
B07I

Interconnect

B07I



Interconnect	8204 000 9222	5	2011-12-18

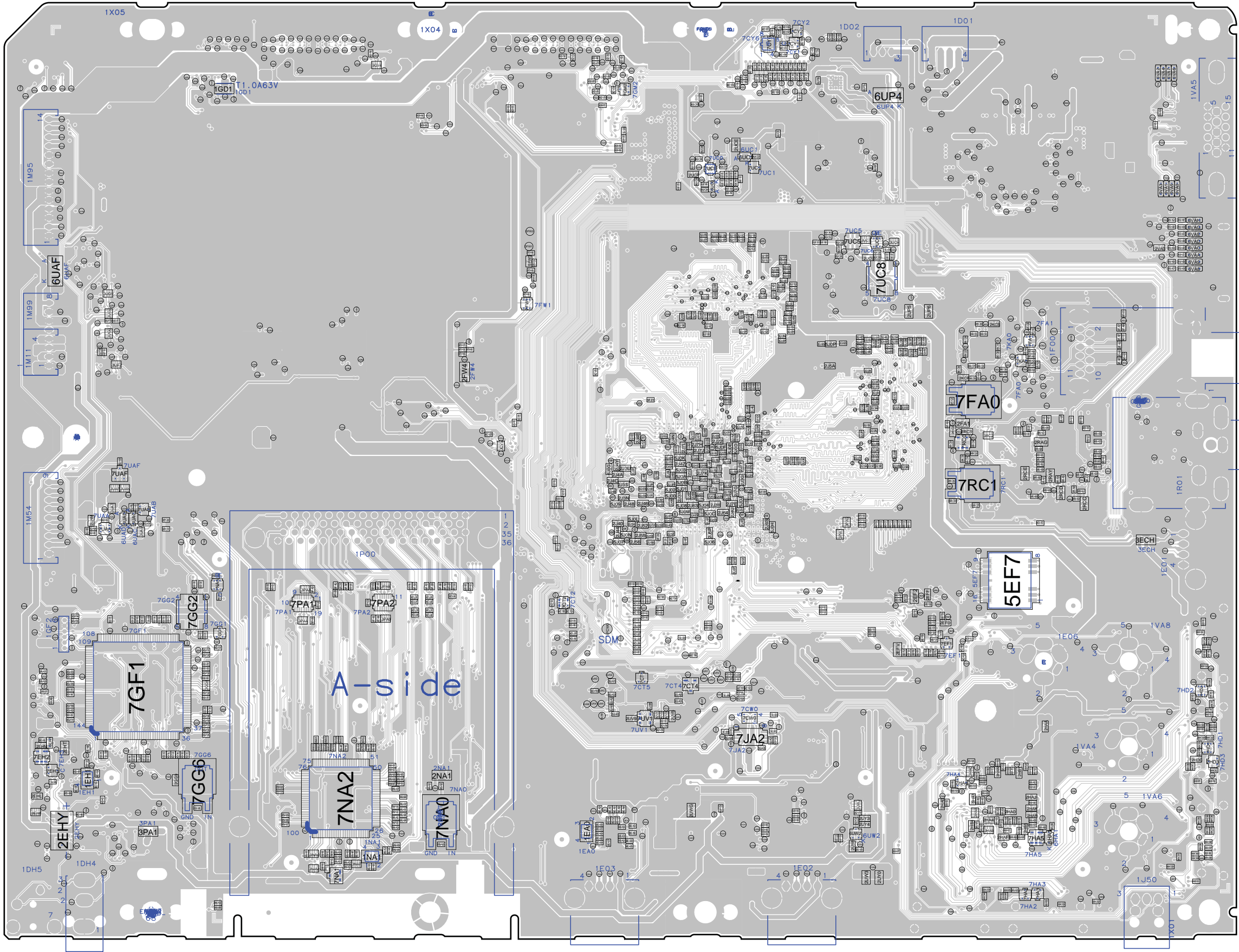


SSB Layout top

3104 313 6566

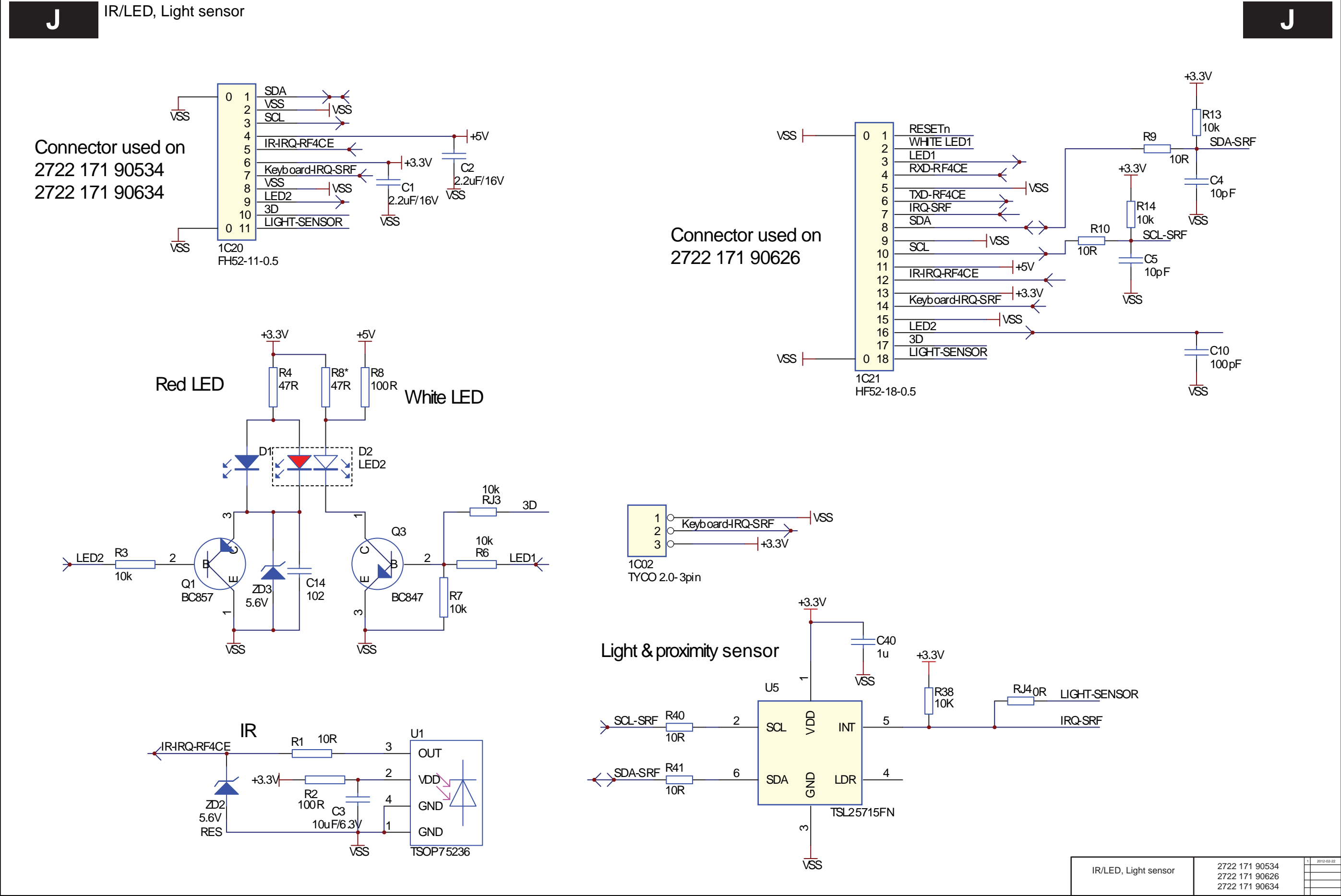
4	2011-12-18

10-4-54 Layout bottom



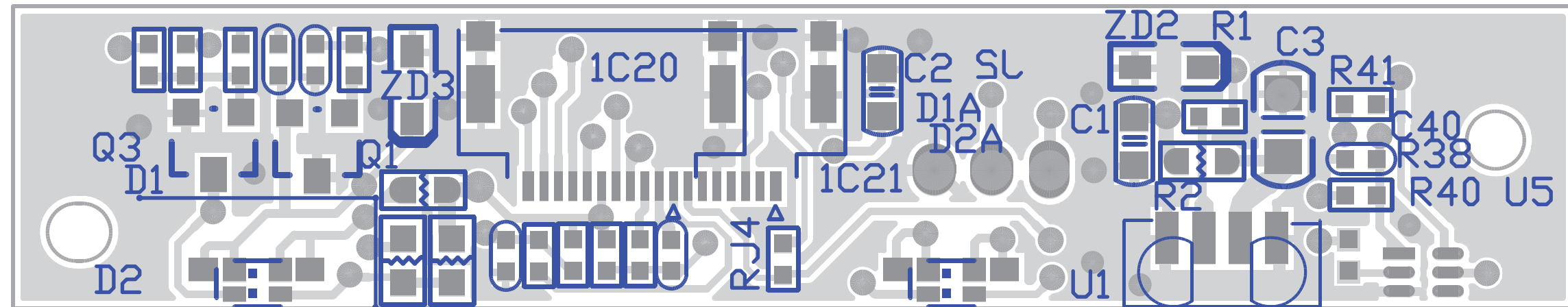
SSB Layout bottom	3104 313 6566	4	2011-12-18

10.5 J 2722171 90534, 90626 & 90634 Sensor board
10-5-1 Sensor board

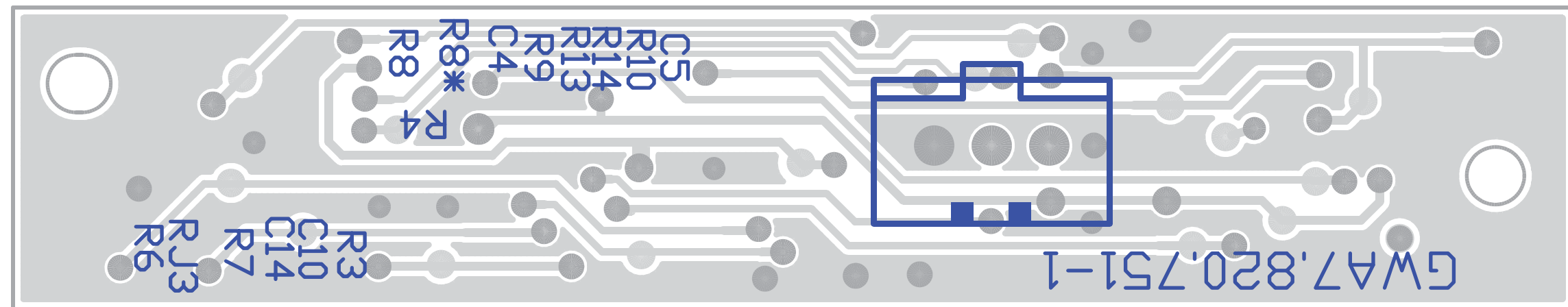


10-5-2 Sensor board layout

Layout top

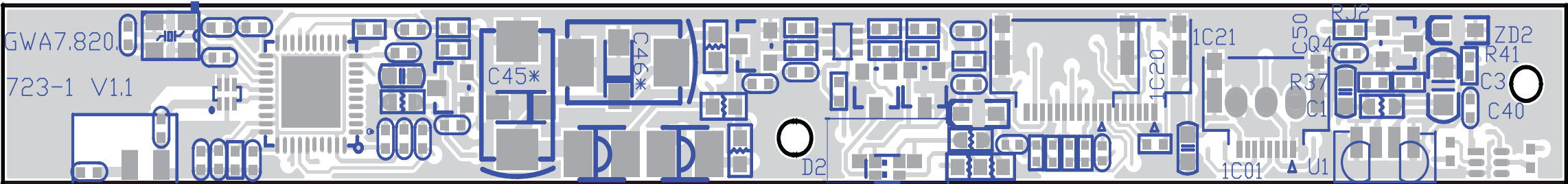


Layout bottom

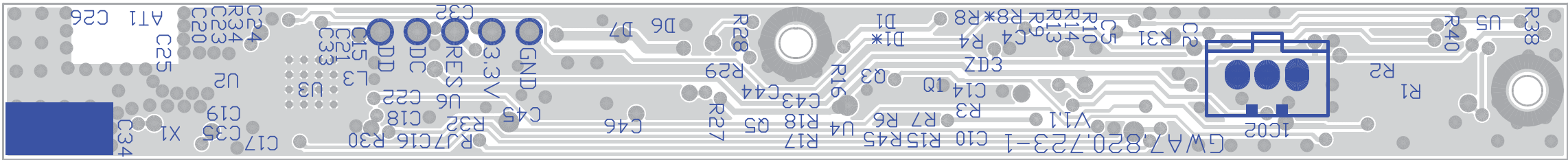


Layout	2722 171 90534	1	2010-11-22
	2722 171 90626		
	2722 171 90634		

Layout top



Layout bottom



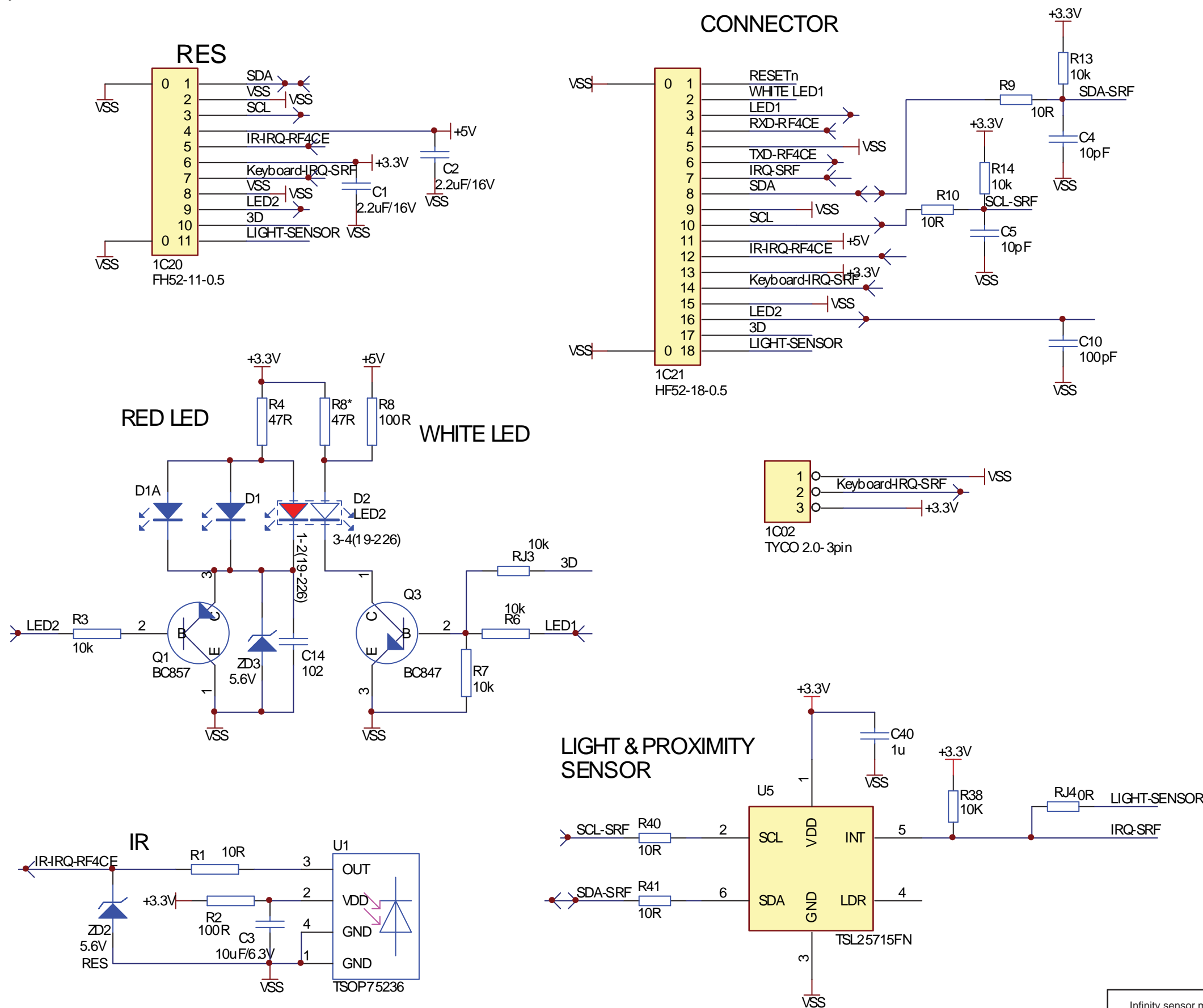
Layout	2722 171 90536	1	2012-02-22

10.7 J 272217190632 Infinity sensor module
10-7-1 Infinity sensor module

J

Infinity sensor module

J



Infinity sensor module

2722 171 90632

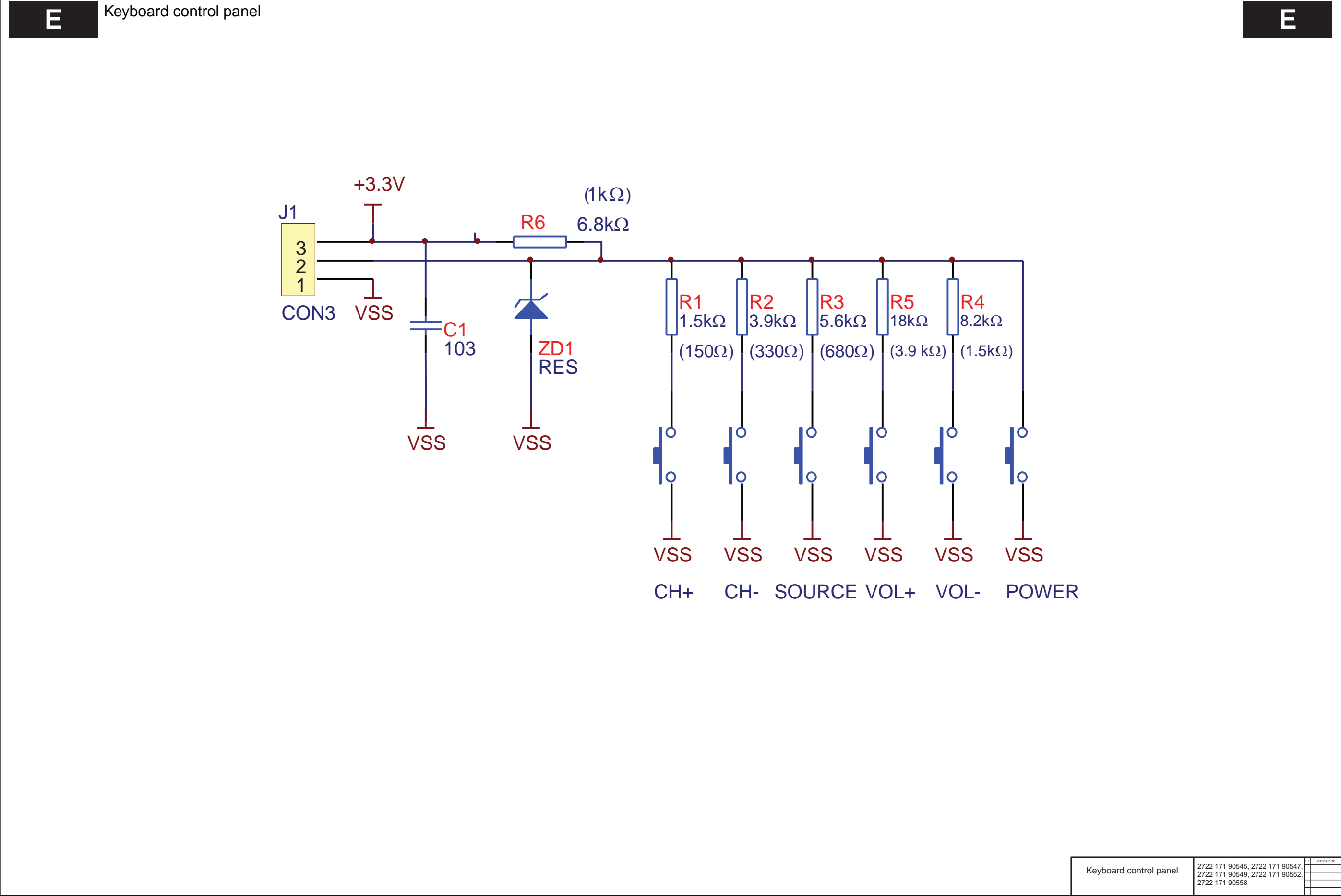
1	2012-03-22

10.8

E 2722171 90545, 90547, 90549, 90552, 90558 Keyboard control panel

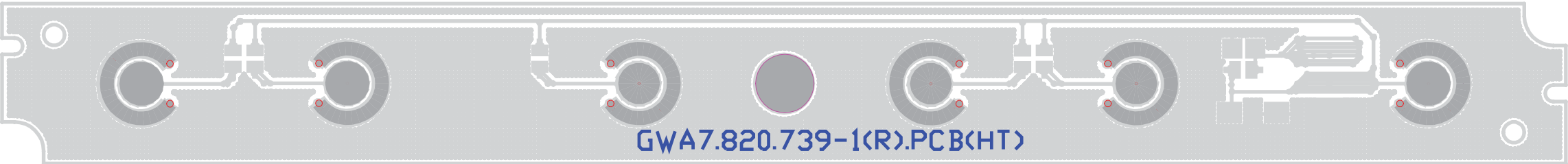
10-8-1

Keyboard control panel

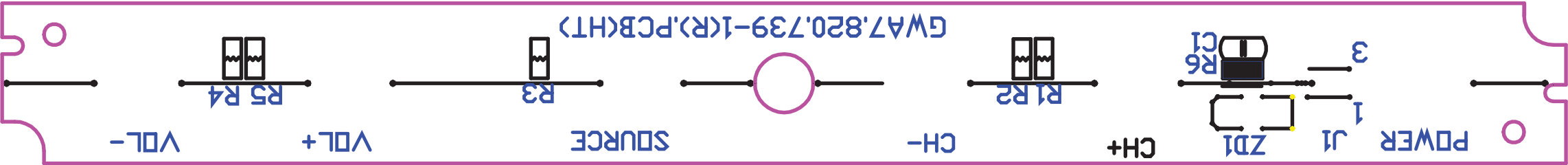


Keyboard control panel	2722 171 90545, 2722 171 90547,	1.1	2012-02-16
	2722 171 90549, 2722 171 90552,		
	2722 171 90558		

Layout top



Layout bottom



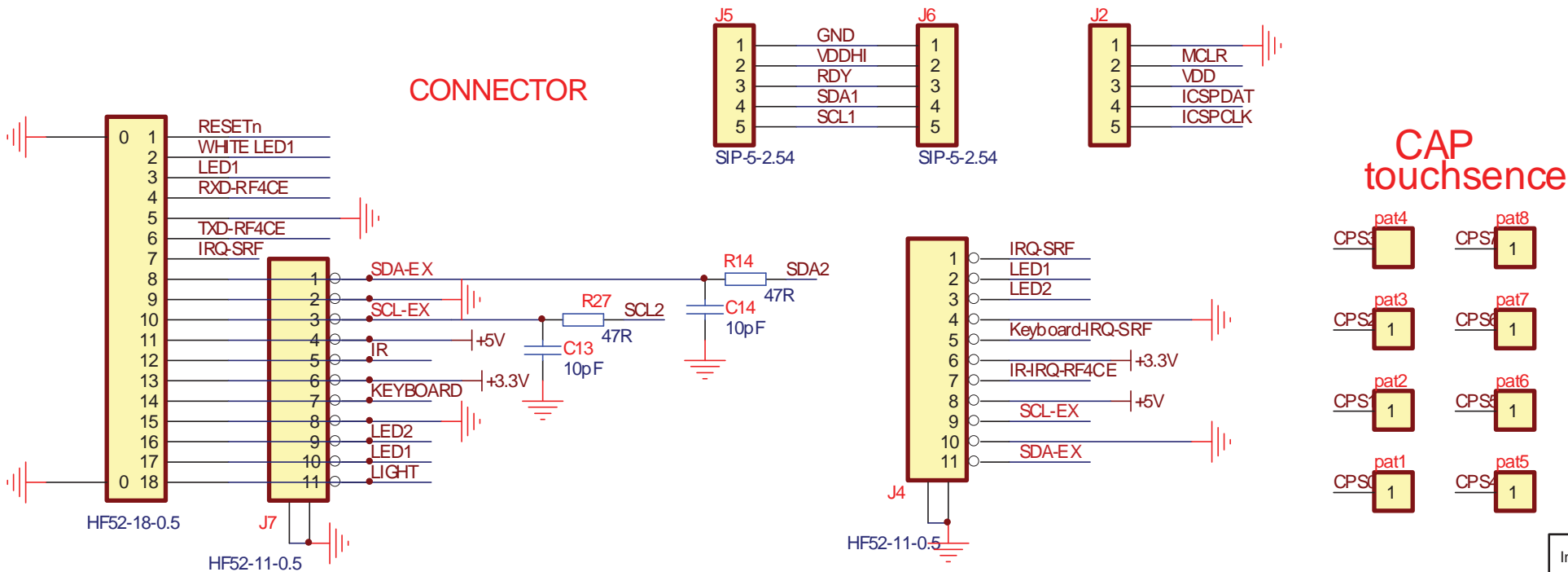
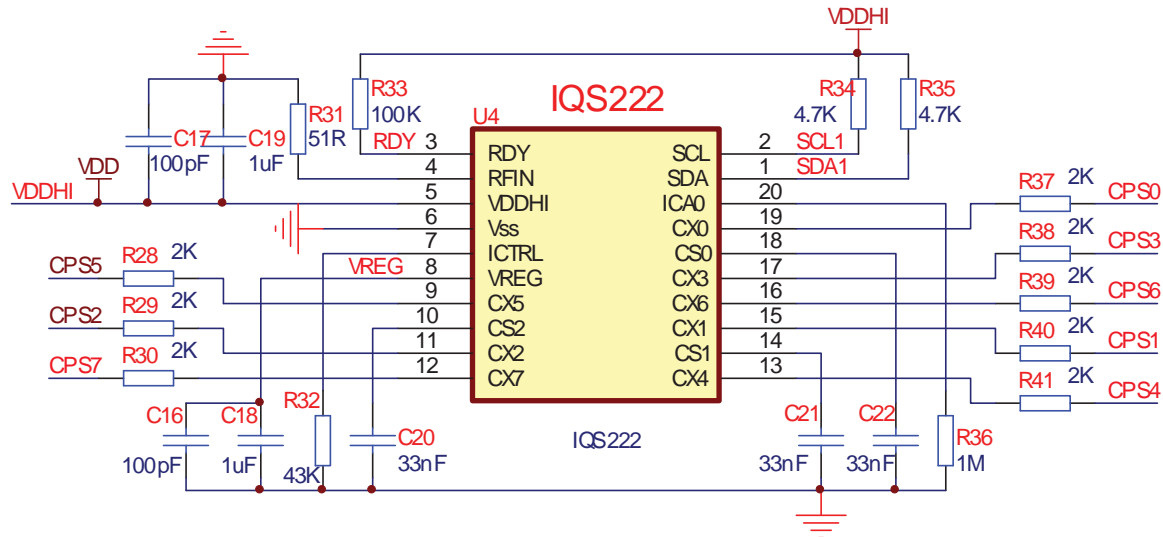
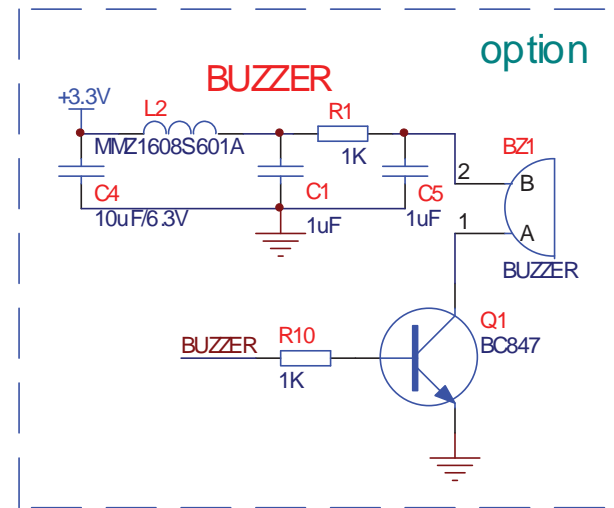
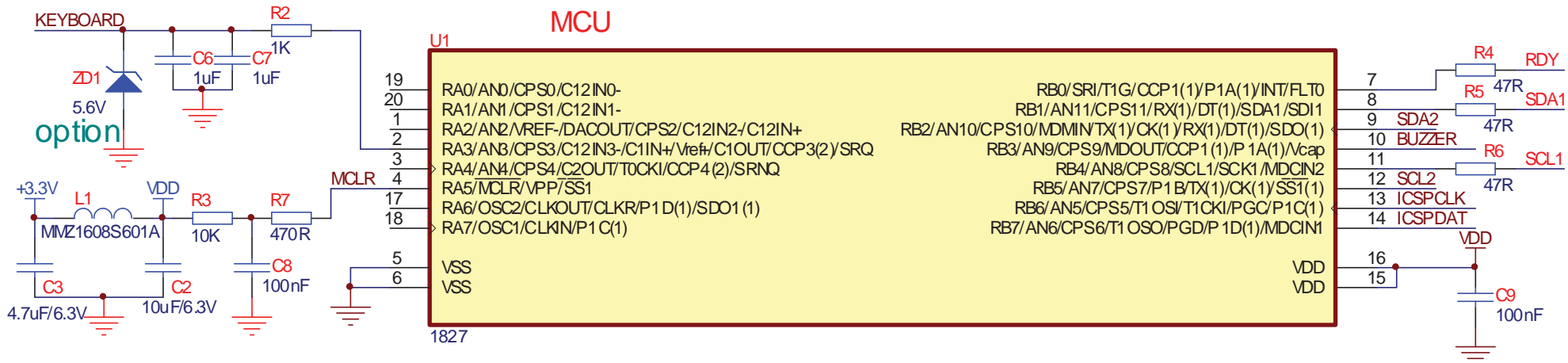
Layout	2722 171 90545, 2722 171 90547,	1.1	2012-02-18
	2722 171 90549, 2722 171 90552,		
	2722 171 90558		

10.9 E 272217190633 Infinity touch control module
10-9-1 Touch control module

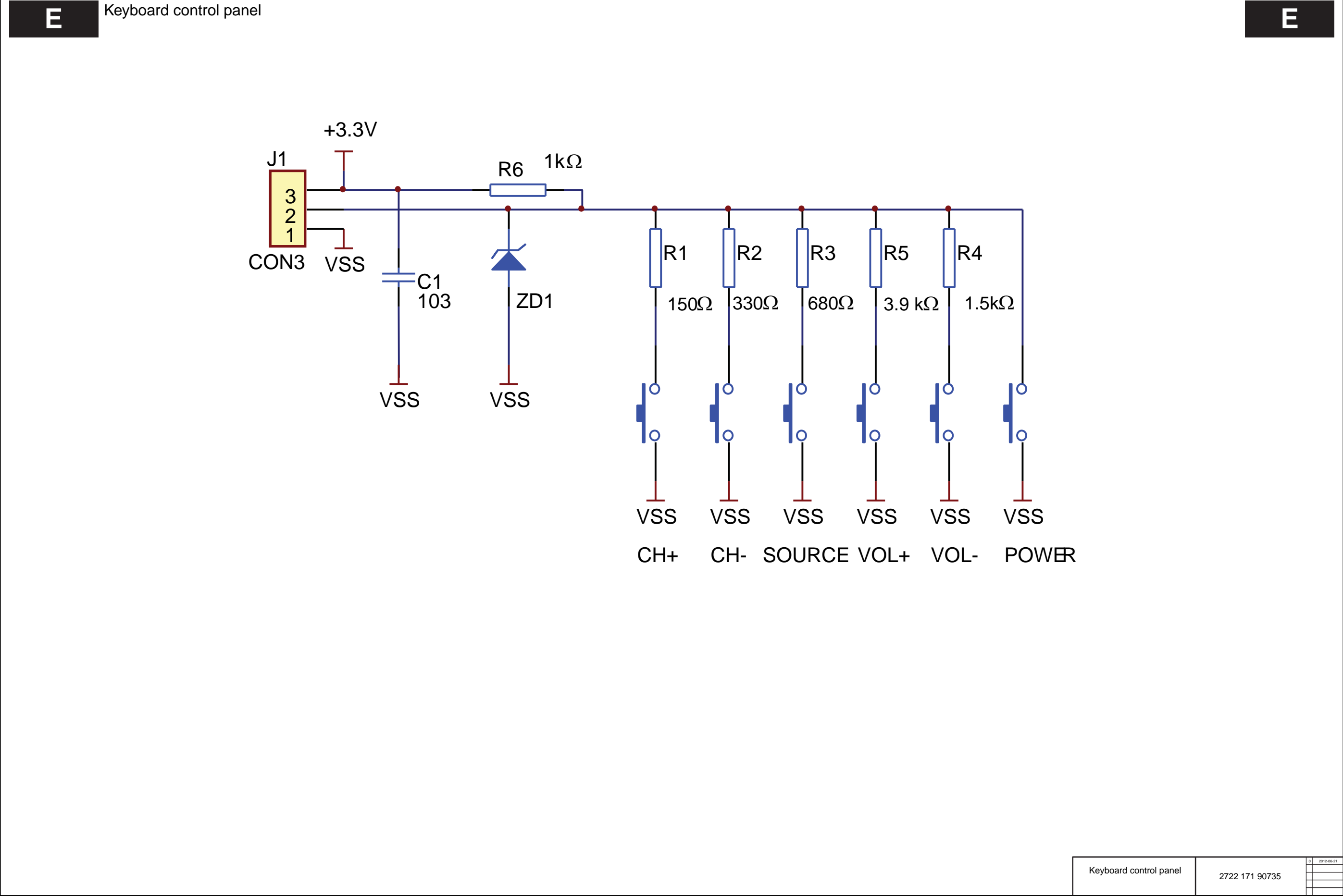
E

Infinity touch control module

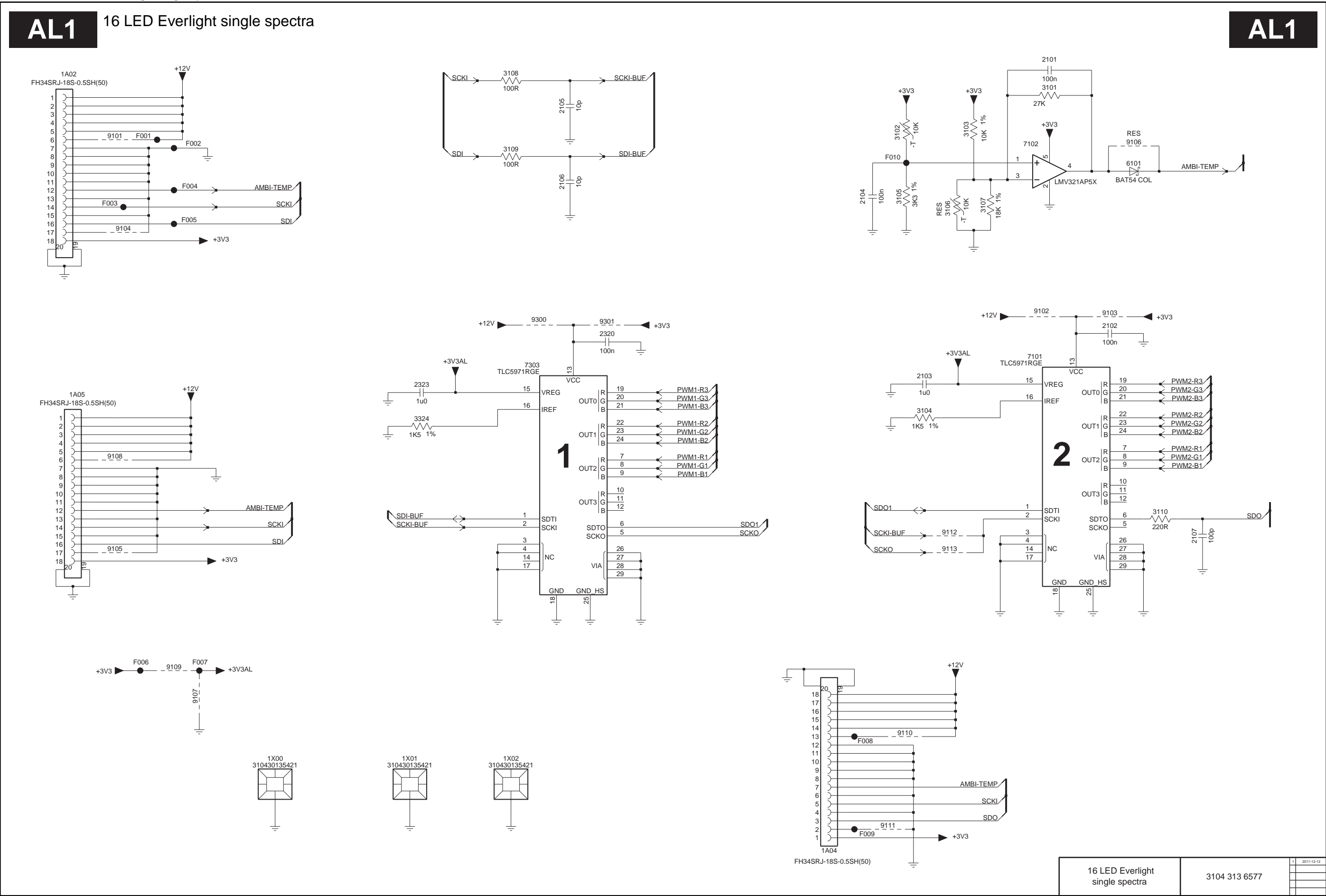
E



10.10 E 272217190735 Keyboard control panel
10-10-1 Keyboard control panel



10.11 AL 310431365771 16 LED AmbiLight
10-11-1 AL1,16 LED Everlight single spectra



16 LED Everlight single spectra

3104 313 6577

19280_084_120427.eps

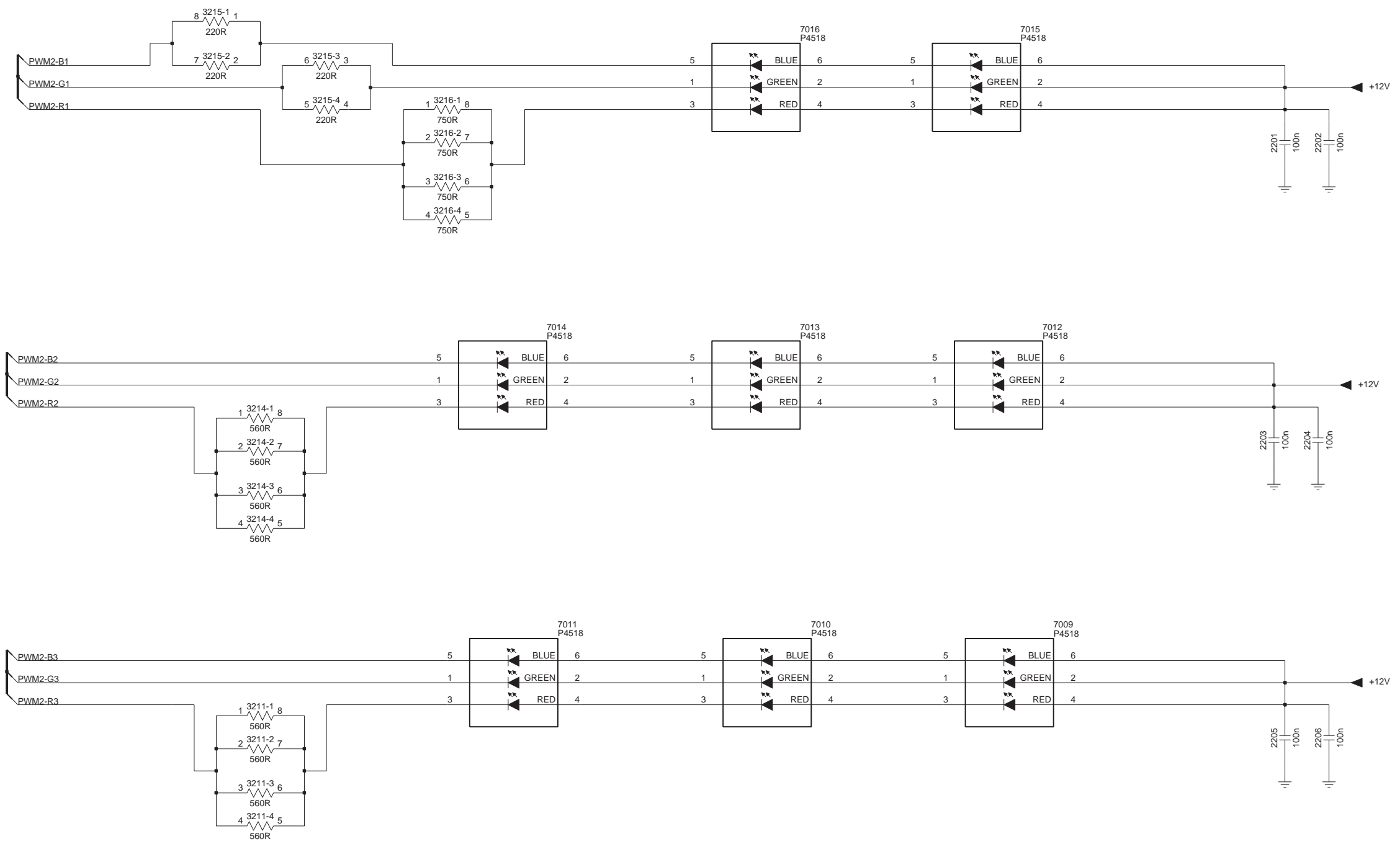
120427

10-11-2 AL2, 16 LED Everlight single spectra

AL2

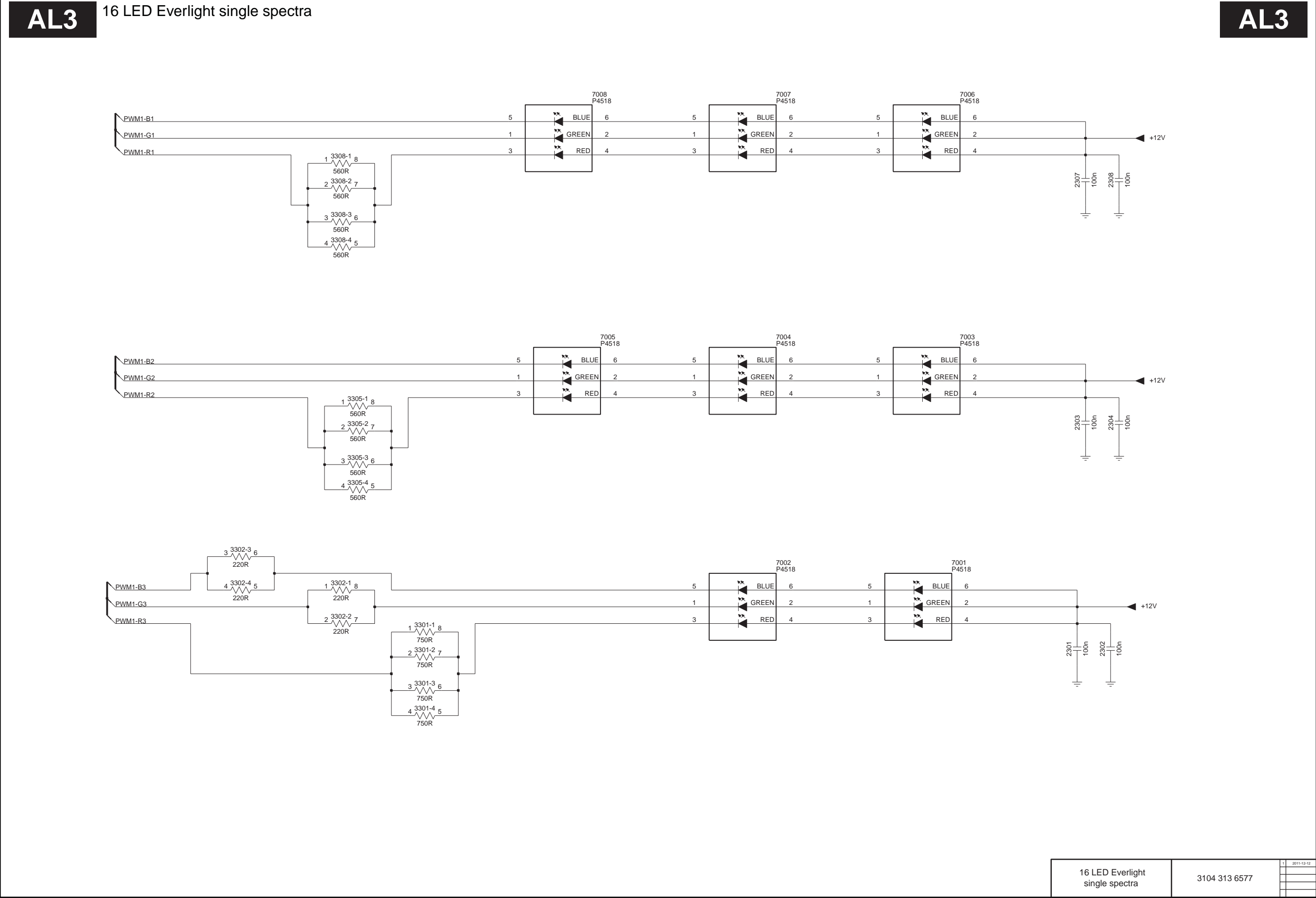
16 LED Everlight single spectra

AL2



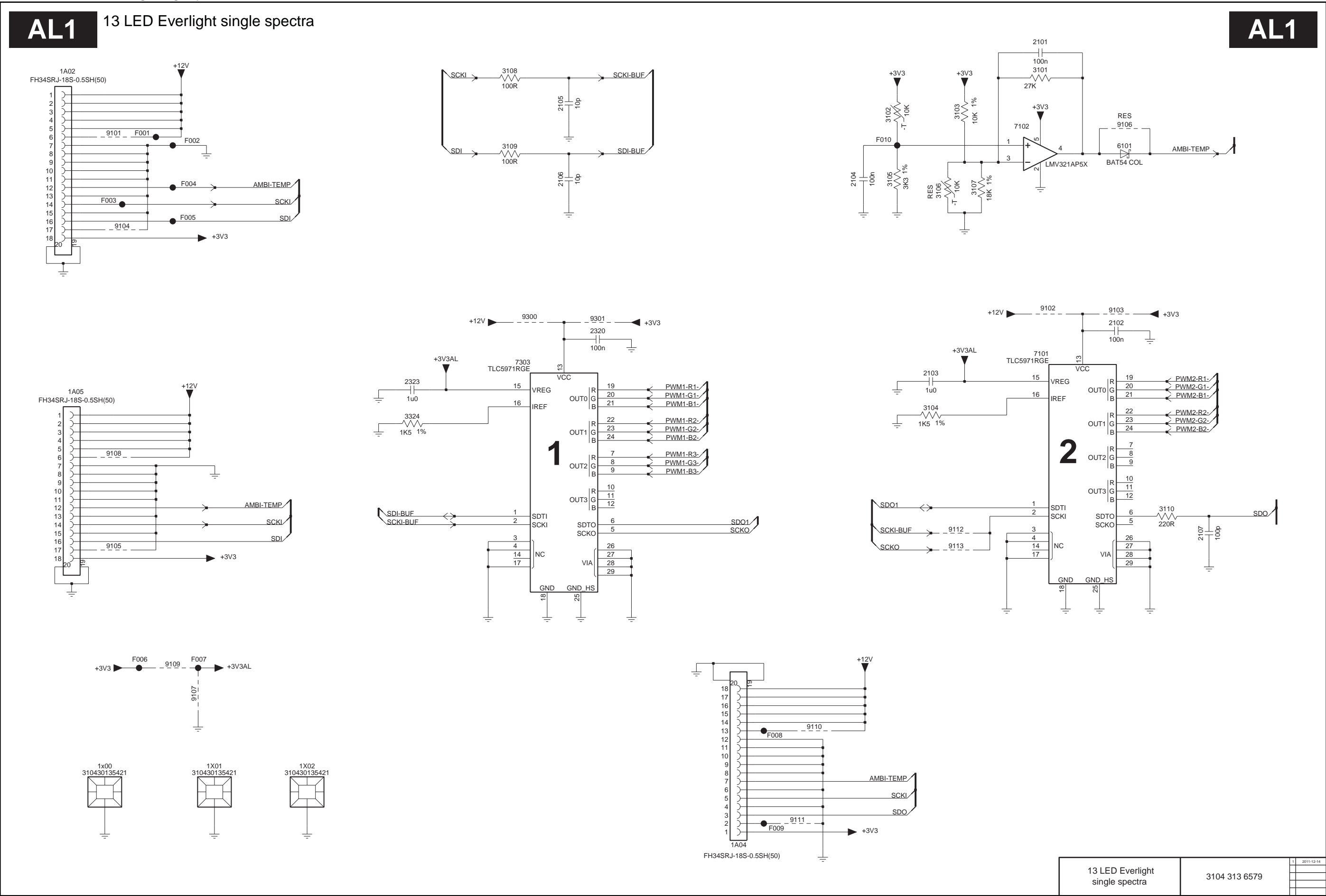
16 LED Everlight single spectra	3104 313 6577	1	2011-12-12

10-11-3 AL3, 16 LED Everlight single spectra



16 LED Everlight single spectra	3104 313 6577	1	2011-12-12

10.12 AL 310431365791 13 LED AmbiLight
10-12-1 AL1,13 LED Everlight single spectra

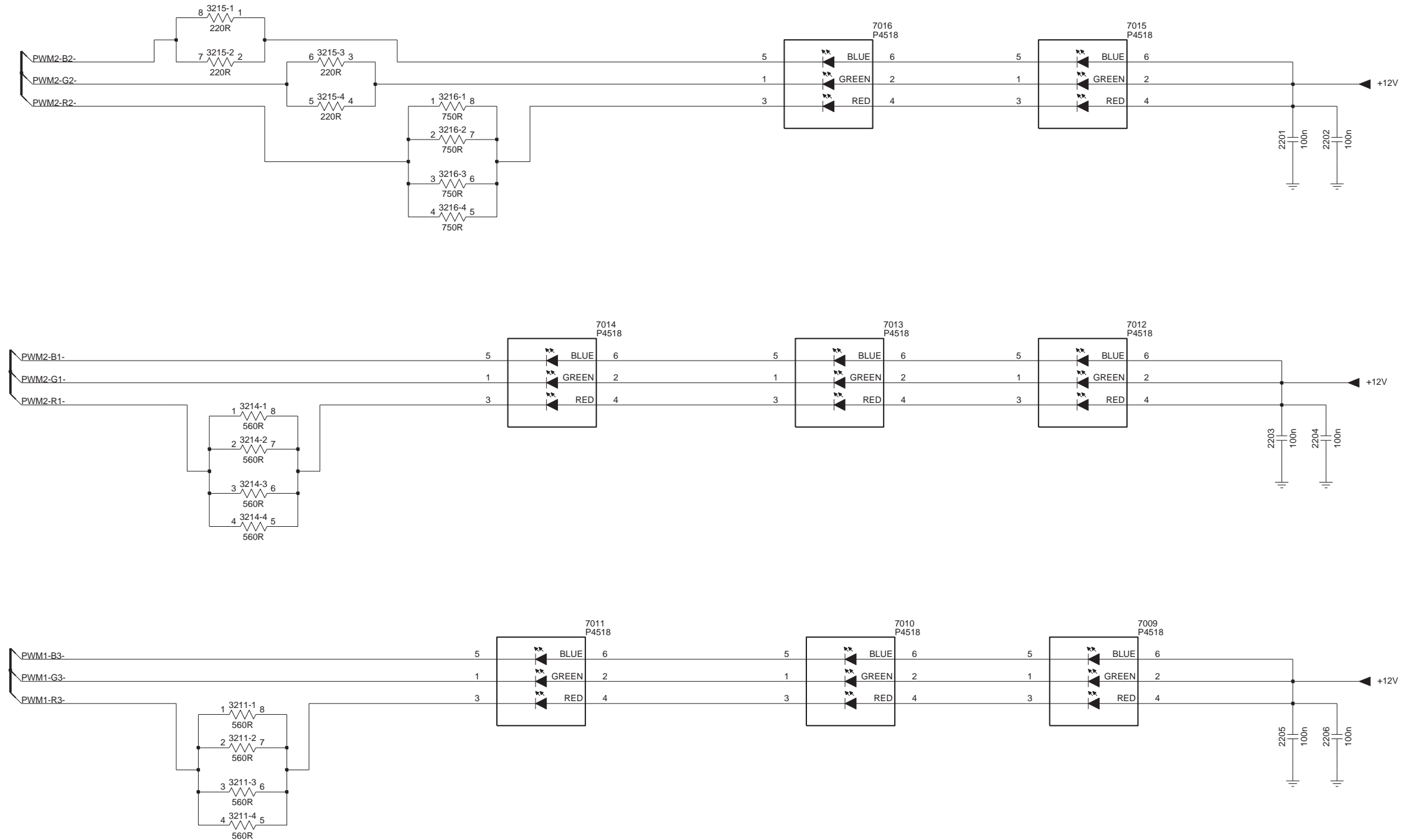


10-12-2 AL2, 13 LED Everlight single spectra

AL2

13 LED Everlight single spectra

AL2



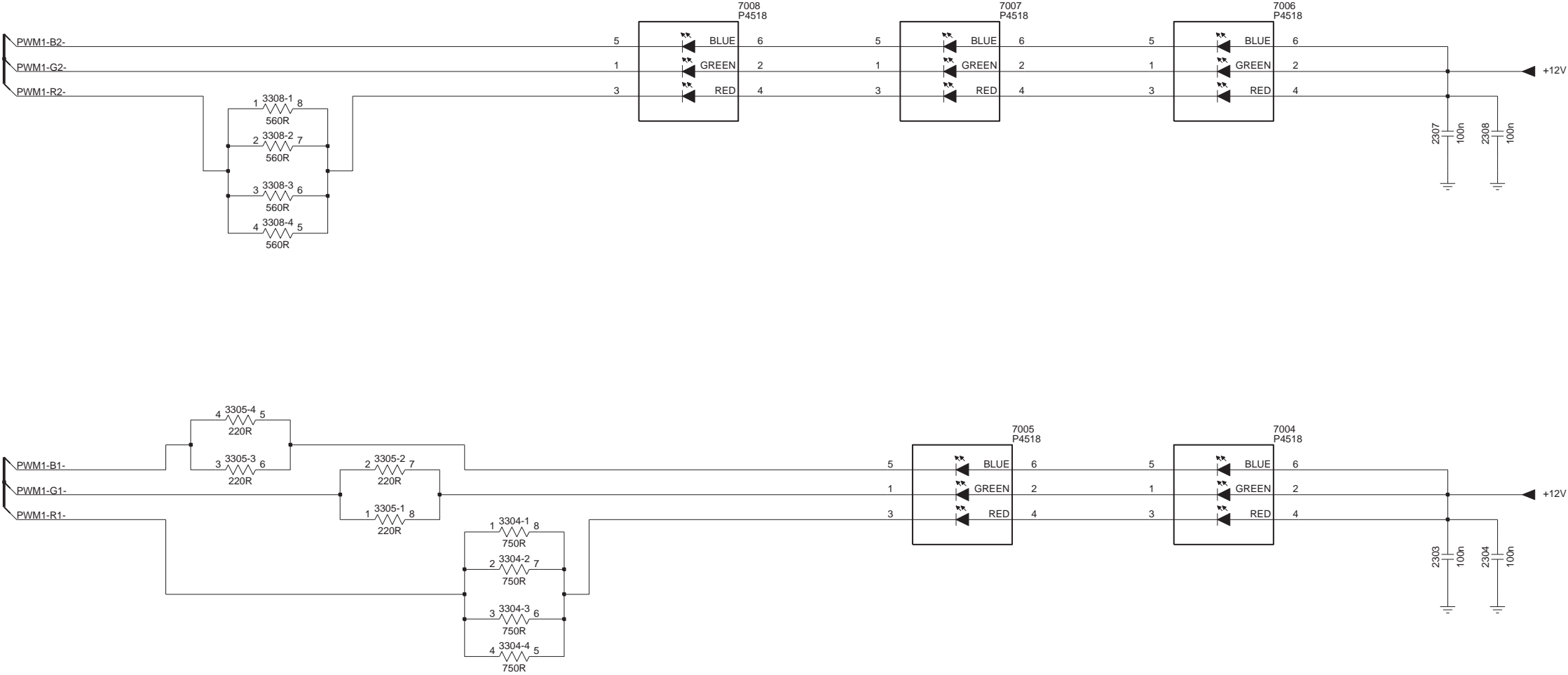
13 LED Everlight single spectra	3104 313 6579	1	2011-12-14

10-12-3 AL3, 13 LED Everlight single spectra

AL3

13 LED Everlight single spectra

AL3

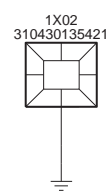


13 LED Everlight single spectra	3104 313 6579	1	2011-12-14

10-13-1 AL1,12 LED Everlight single spectra

12 LED Everlight single spectra

AL1

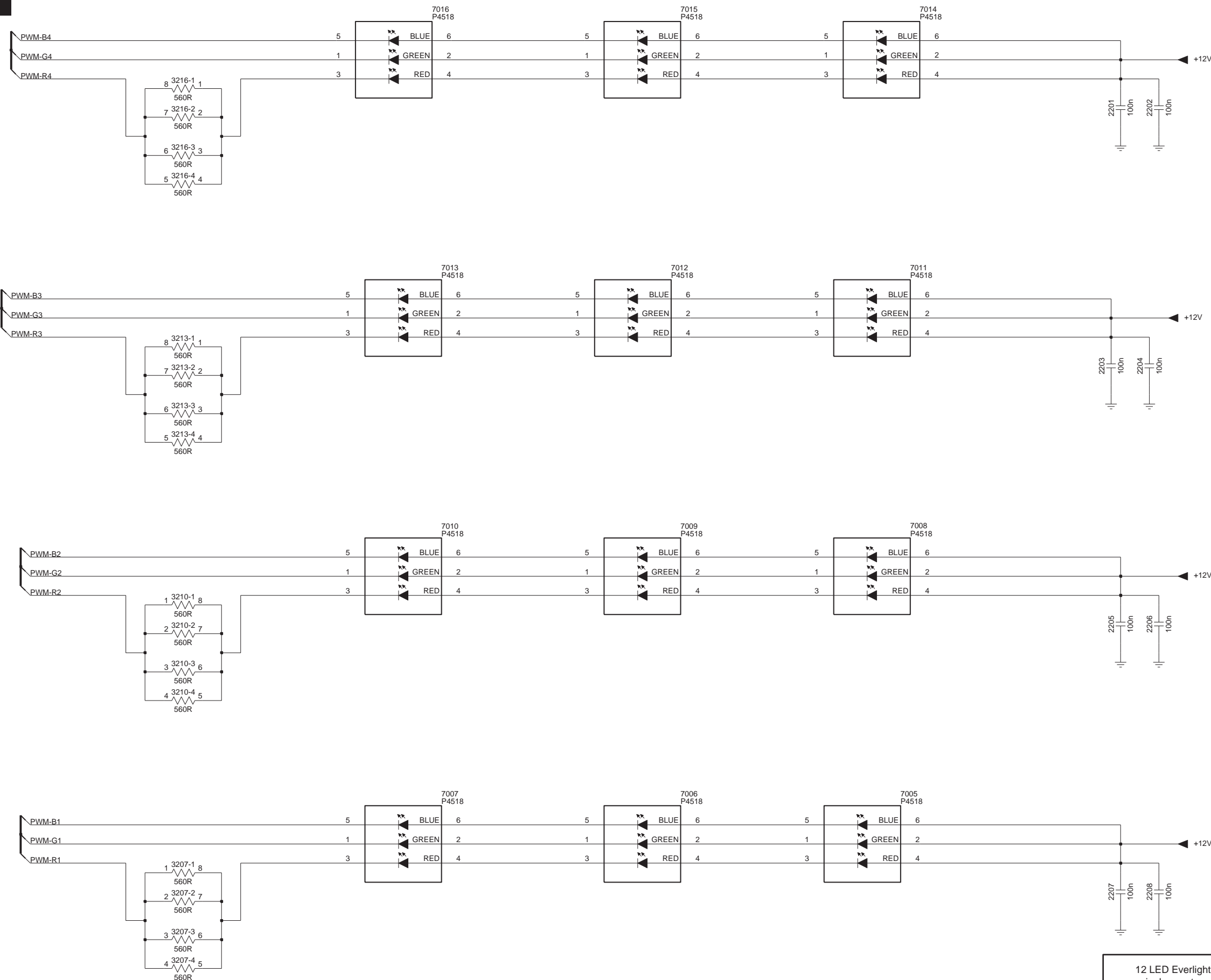


10-13-2 AL2, 12 LED Everlight single spectra

AL2

12 LED Everlight single spectra

AL2



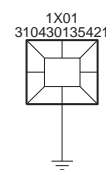
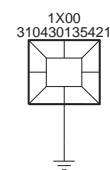
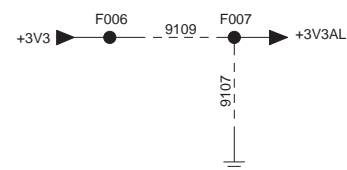
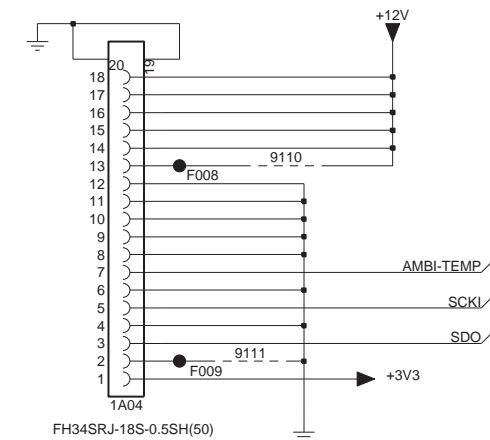
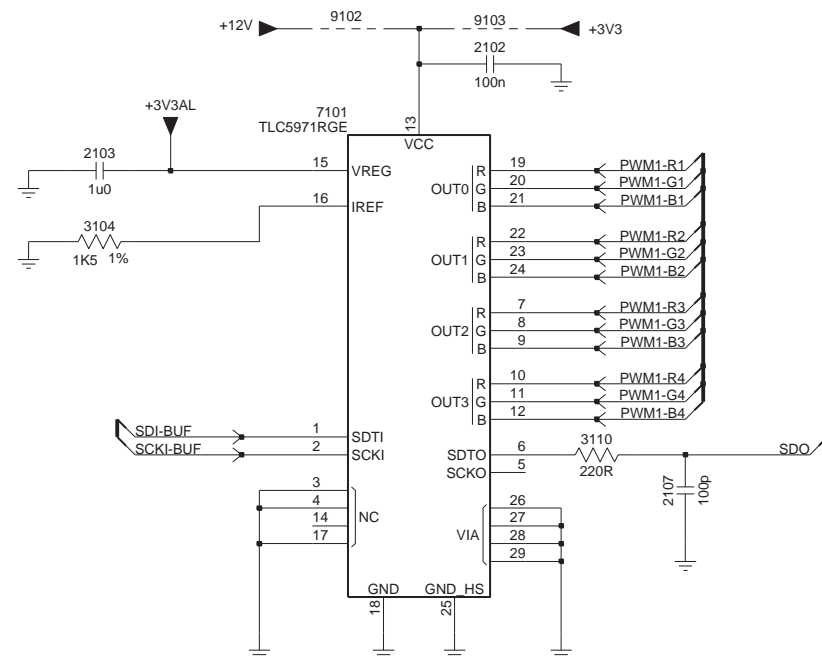
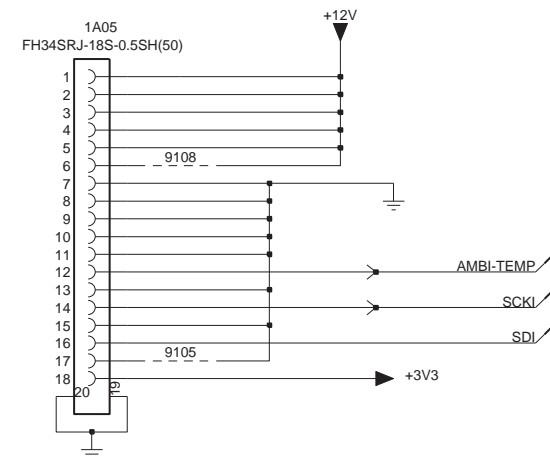
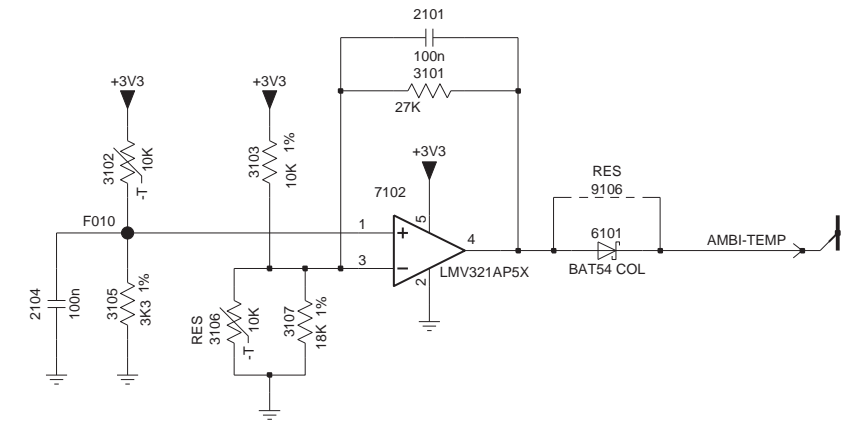
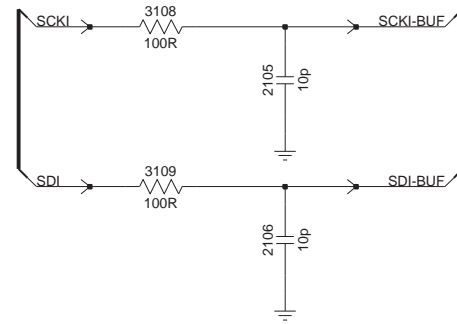
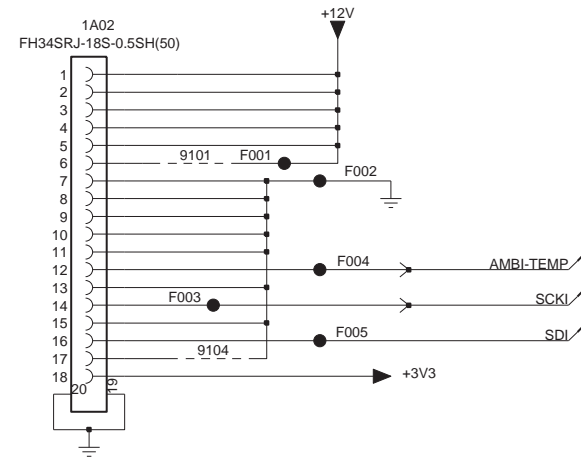
12 LED Everlight single spectra	3104 313 6580	4	2011-11-30

10-14-1 AL1, 10 LED Everlight single spectra

AL1

10 LED Everlight single spectra

AL1



10 LED Everlight
single spectra

3104 313 6581

3	2011-11-30

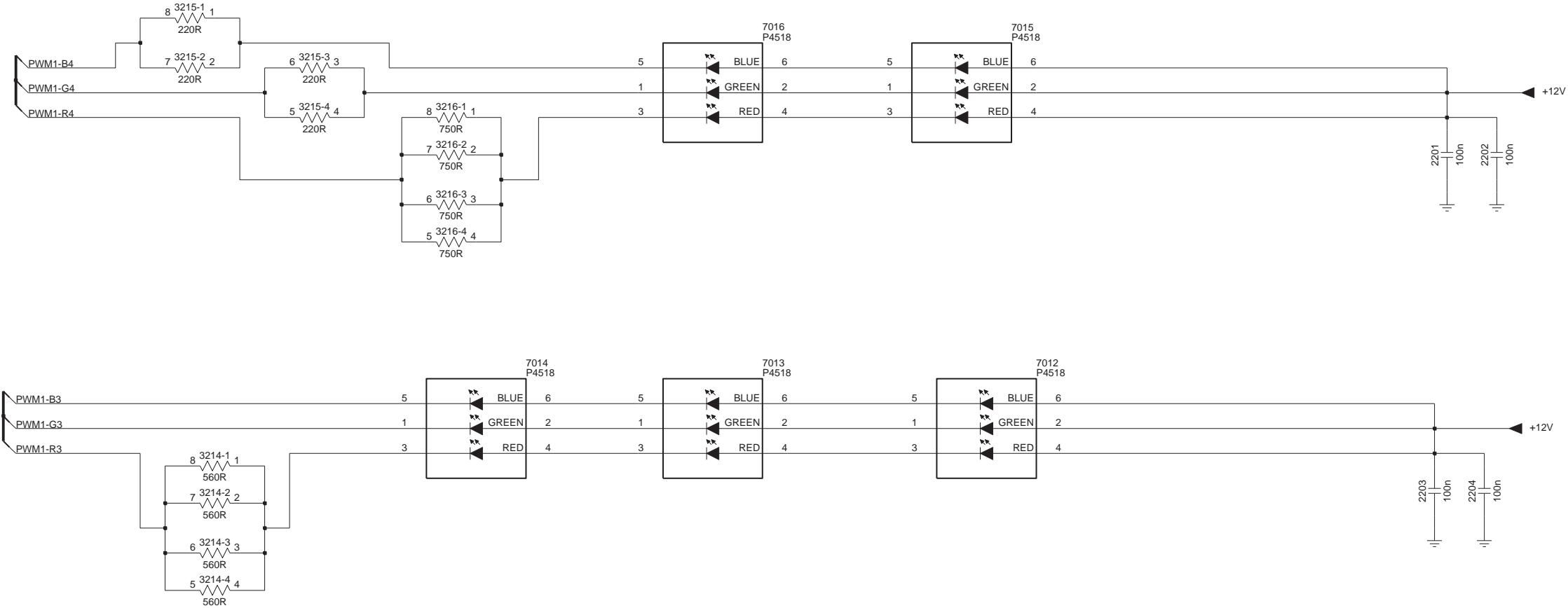
19280_072_120427.eps
120427

10-14-2 AL2, 10 LED Everlight single spectra

AL2

10 LED Everlight single spectra

AL2



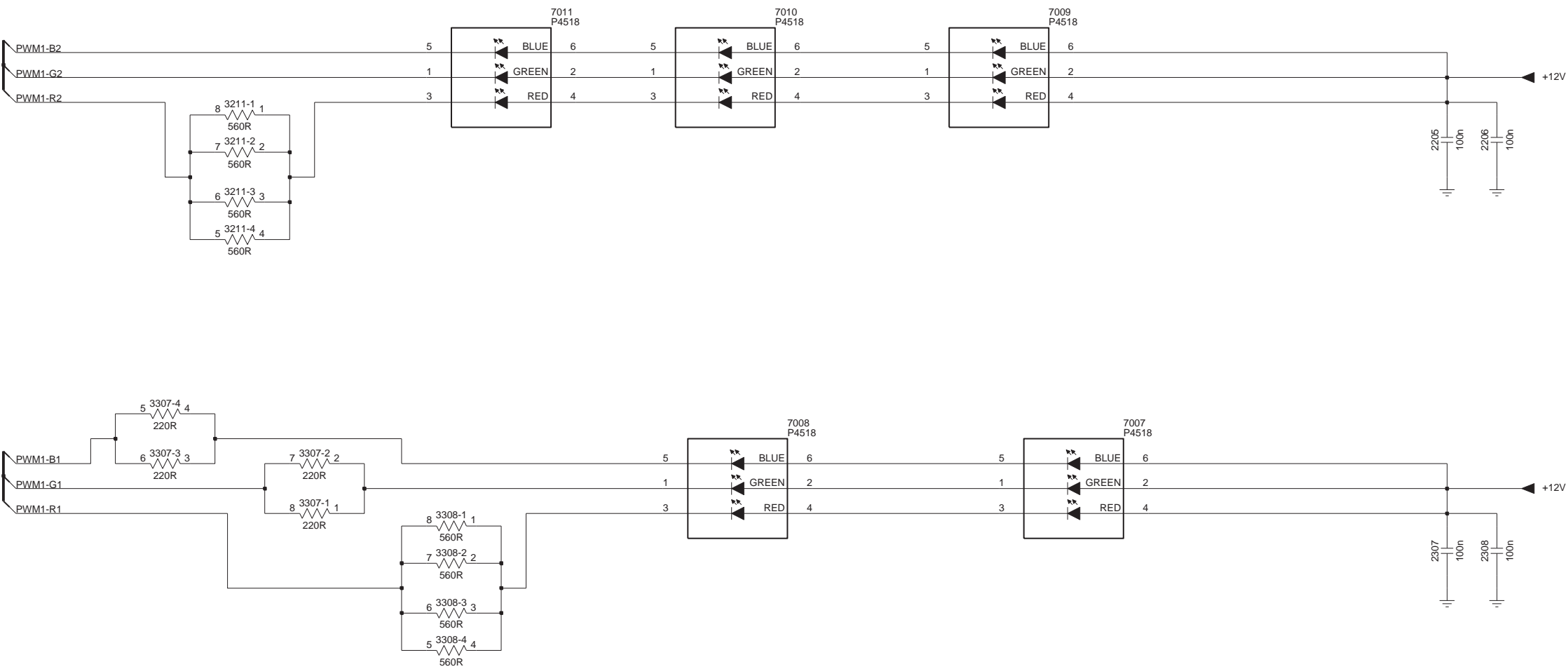
10 LED Everlight single spectra	3104 313 6581	3	2011-11-30

10-14-3 AL3, 10 LED Everlight single spectra

AL3

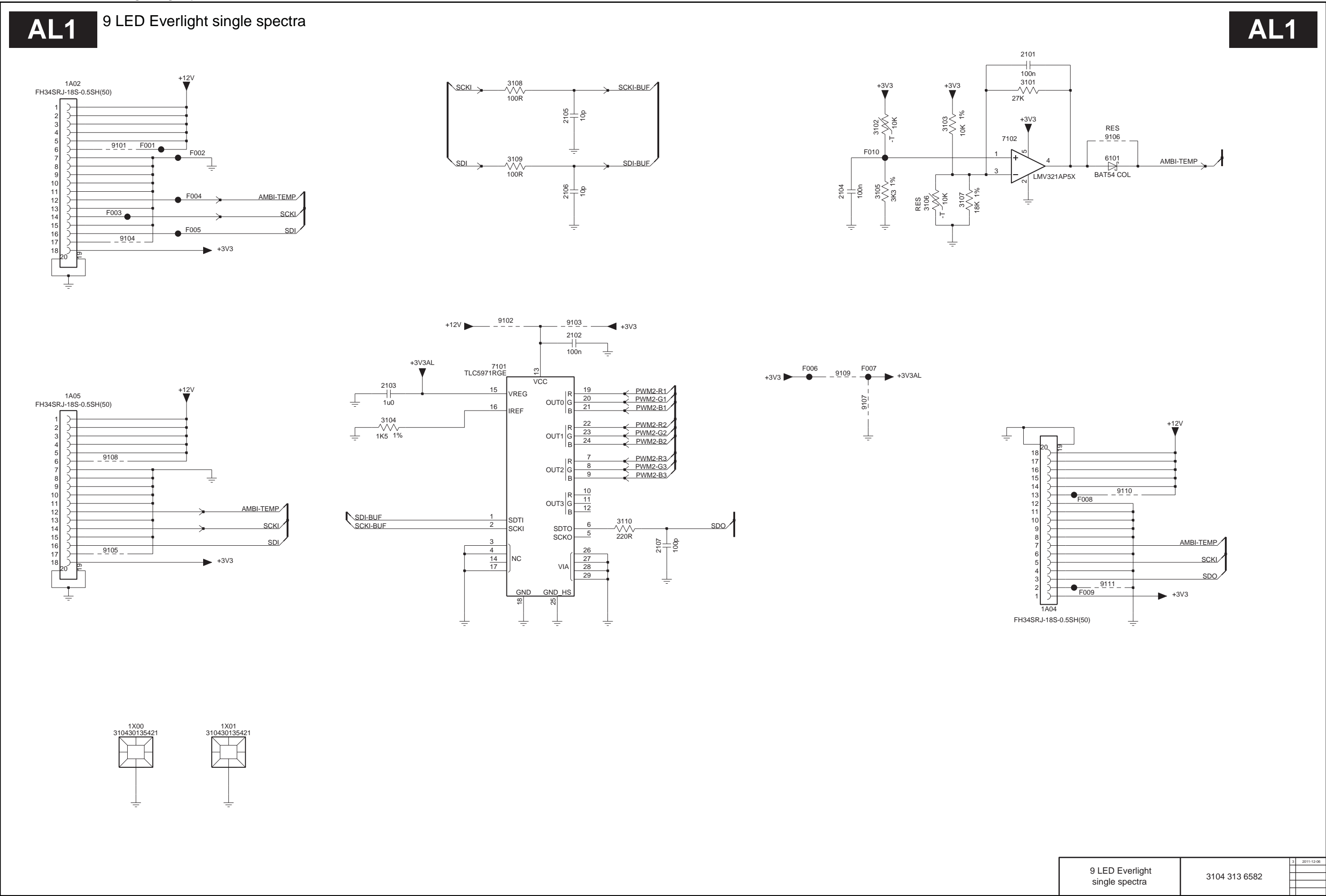
10 LED Everlight single spectra

AL3



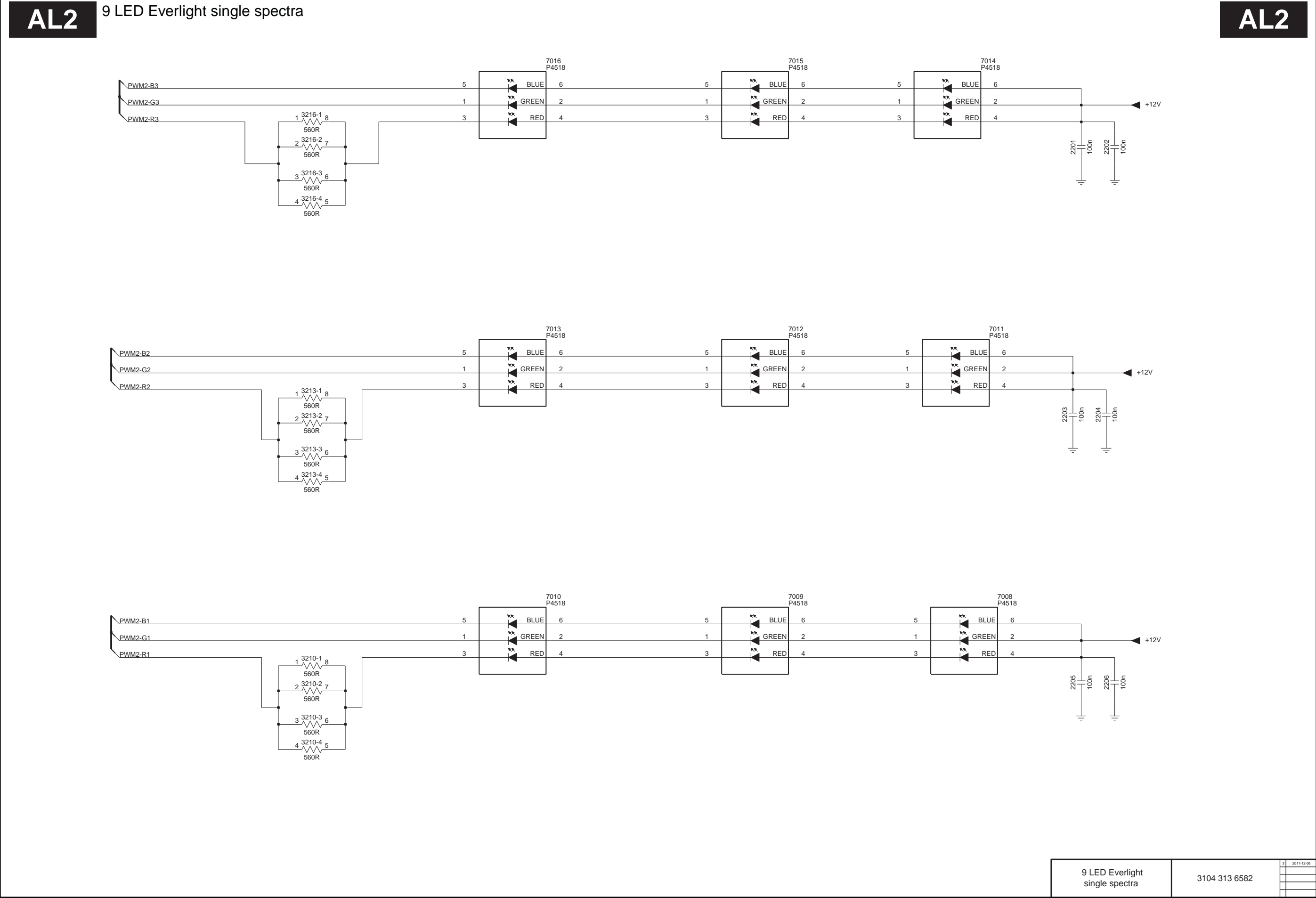
10 LED Everlight single spectra	3104 313 6581	3	2011-11-20

10.15 AL 310431365823 9 LED AmbiLight
10-15-1 AL1,9 LED Everlight single spectra



9 LED Everlight single spectra	3104 313 6582	3	2011-12-06

10-15-2 AL2, 9 LED Everlight single spectra

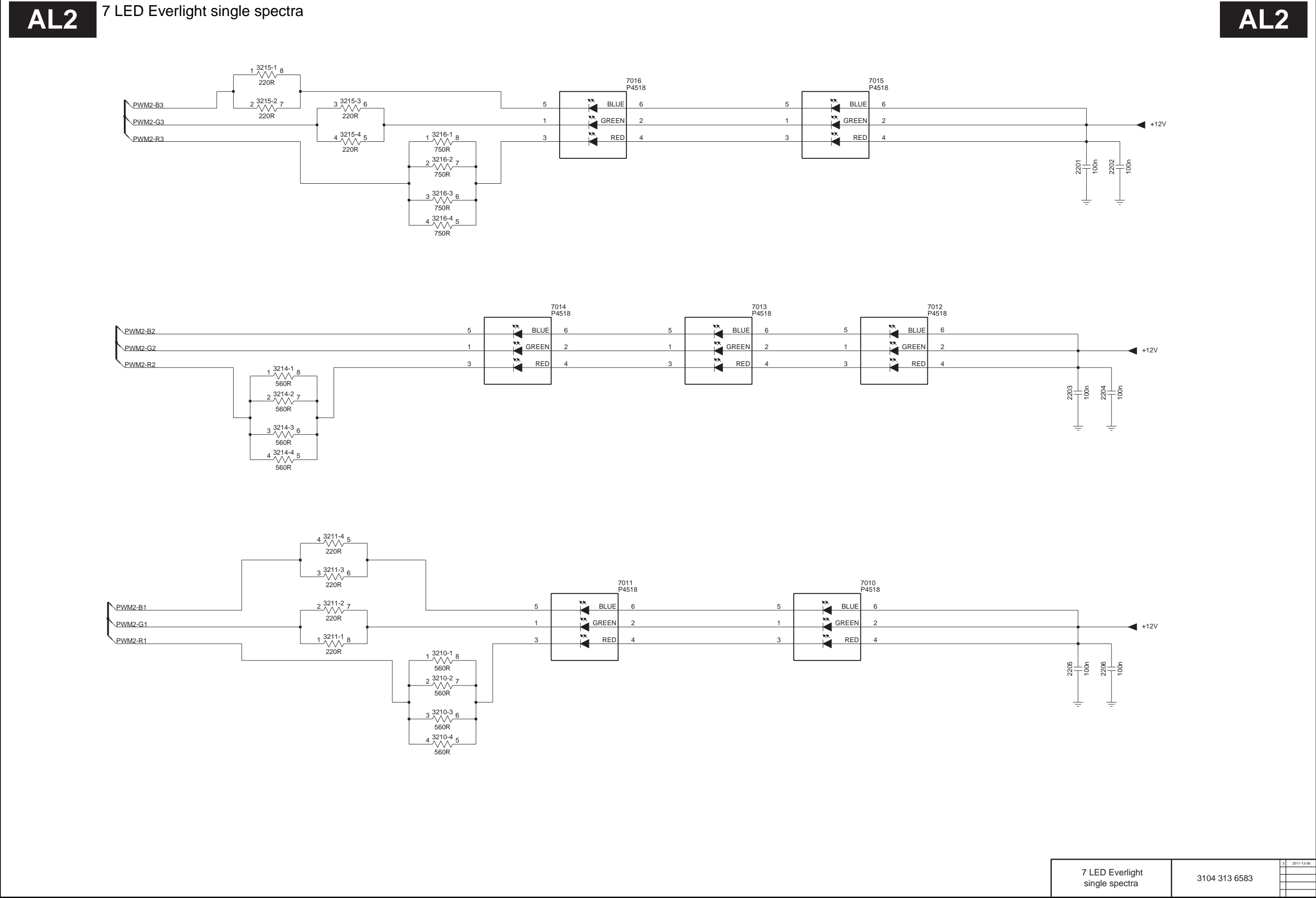


9 LED Everlight
single spectra

3104 313 6582

3	2011-12-08

10-16-2 AL2, 7 LED Everlight single spectra



7 LED Everlight
single spectra

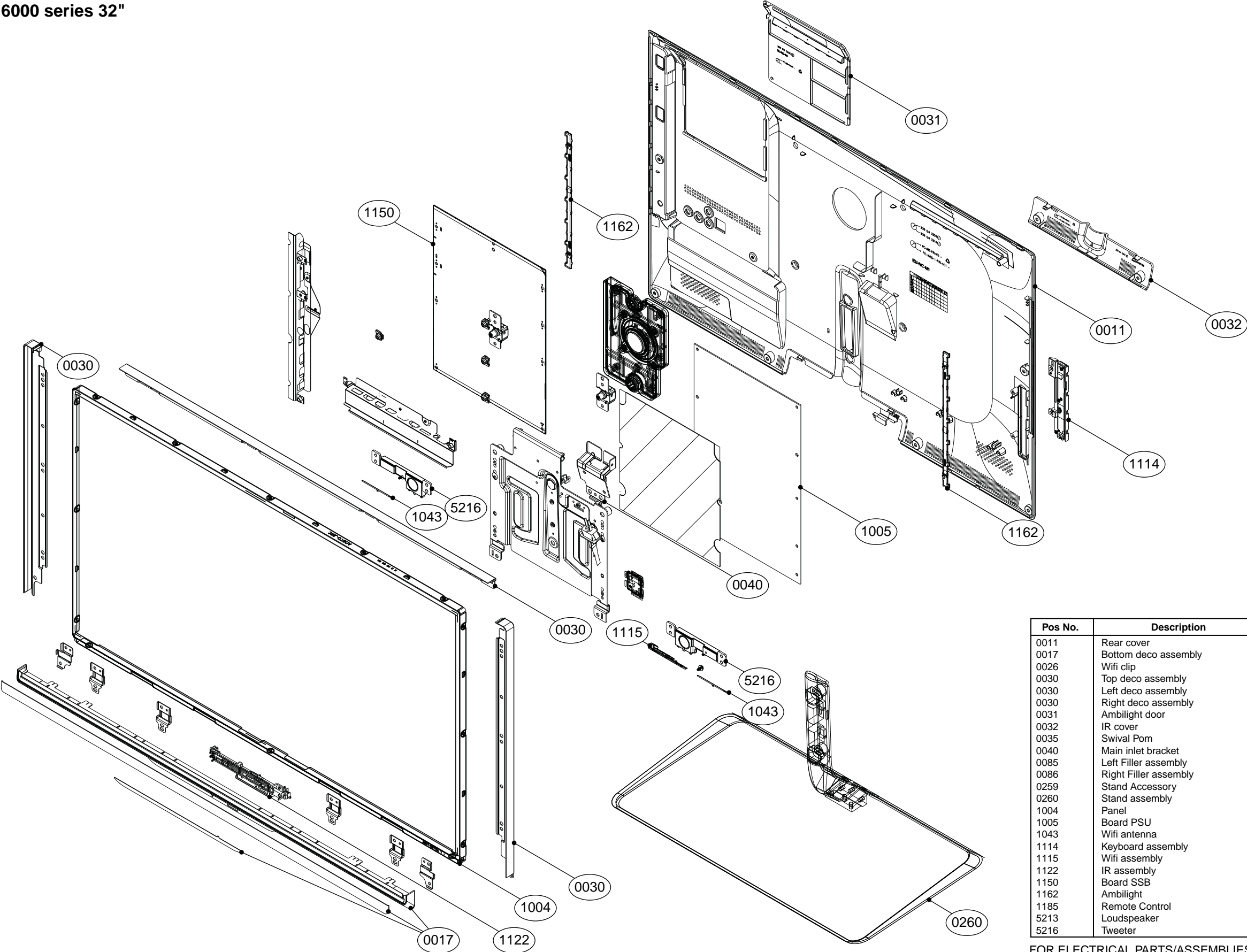
3104 313 6583

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11. Styling Sheets

11.1 6000 series 32"

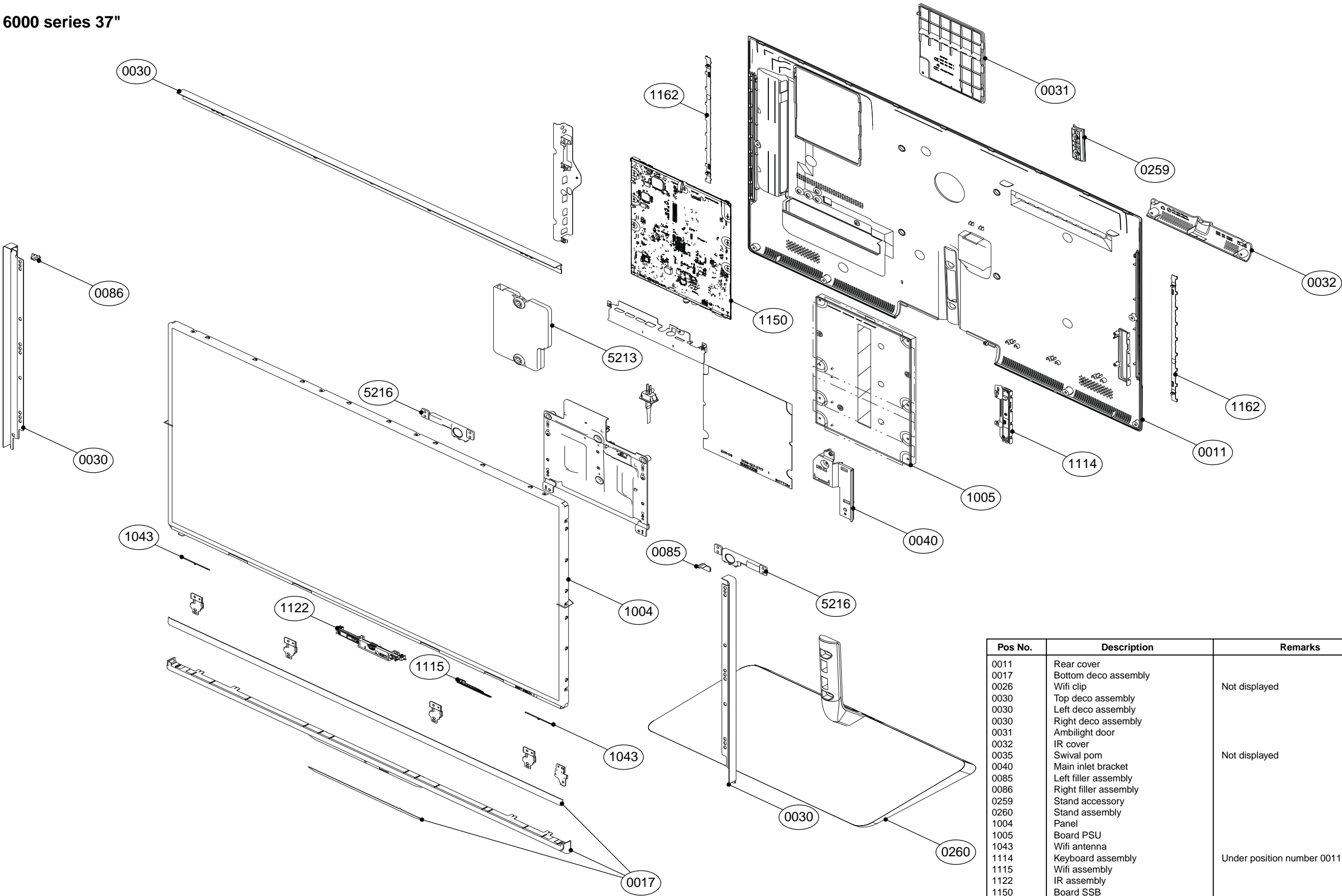
6000 series 32"



Pos No.	Description	Remarks
0011	Rear cover	Not displayed
0017	Bottom deco assembly	
0026	Wifi clip	
0030	Top deco assembly	
0030	Left deco assembly	Not displayed
0030	Right deco assembly	
0031	Ambilight door	
0032	IR cover	
0035	Swival Pom	Not displayed
0040	Main inlet bracket	
0085	Left Filler assembly	
0086	Right Filler assembly	
0259	Stand Accessory	Not displayed
0260	Stand assembly	
1004	Panel	Under position number 0011
1005	Board PSU	
1043	Wifi antenna	
1114	Keyboard assembly	
1115	Wifi assembly	Under position number 0011
1122	IR assembly	
1150	Board SSB	
1162	Ambilight	
1185	Remote Control	Not displayed
5213	Loudspeaker	
5216	Tweeter	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

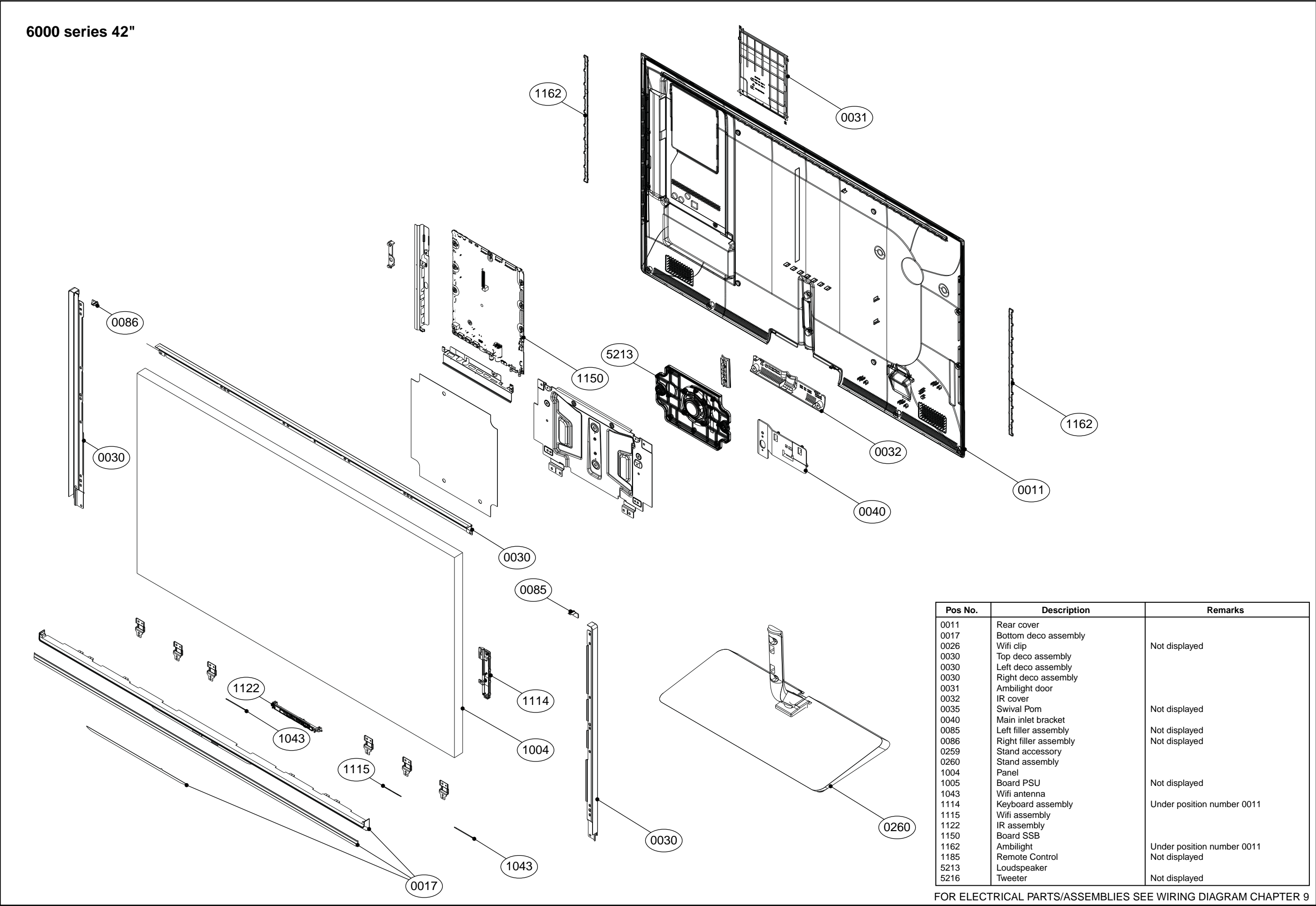
6000 series 37"



Pos No.	Description	Remarks
0011	Rear cover	
0017	Bottom deco assembly	
0026	Wifi clip	Not displayed
0030	Top deco assembly	
0030	Left deco assembly	
0030	Right deco assembly	
0031	Ambilight door	
0032	IR cover	
0035	Swival pom	Not displayed
0040	Main inlet bracket	
0085	Left filler assembly	
0086	Right filler assembly	
0259	Stand accessory	
0260	Stand assembly	
1004	Panel	
1005	Board PSU	
1043	Wifi antenna	
1114	Keyboard assembly	Under position number 0011
1115	Wifi assembly	
1122	IR assembly	
1150	Board SSB	
1162	Ambilight	Under position number 0011
1185	Remote Control	Not displayed
5213	Loudspeaker	
5216	Tweeter	

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6000 series 42"

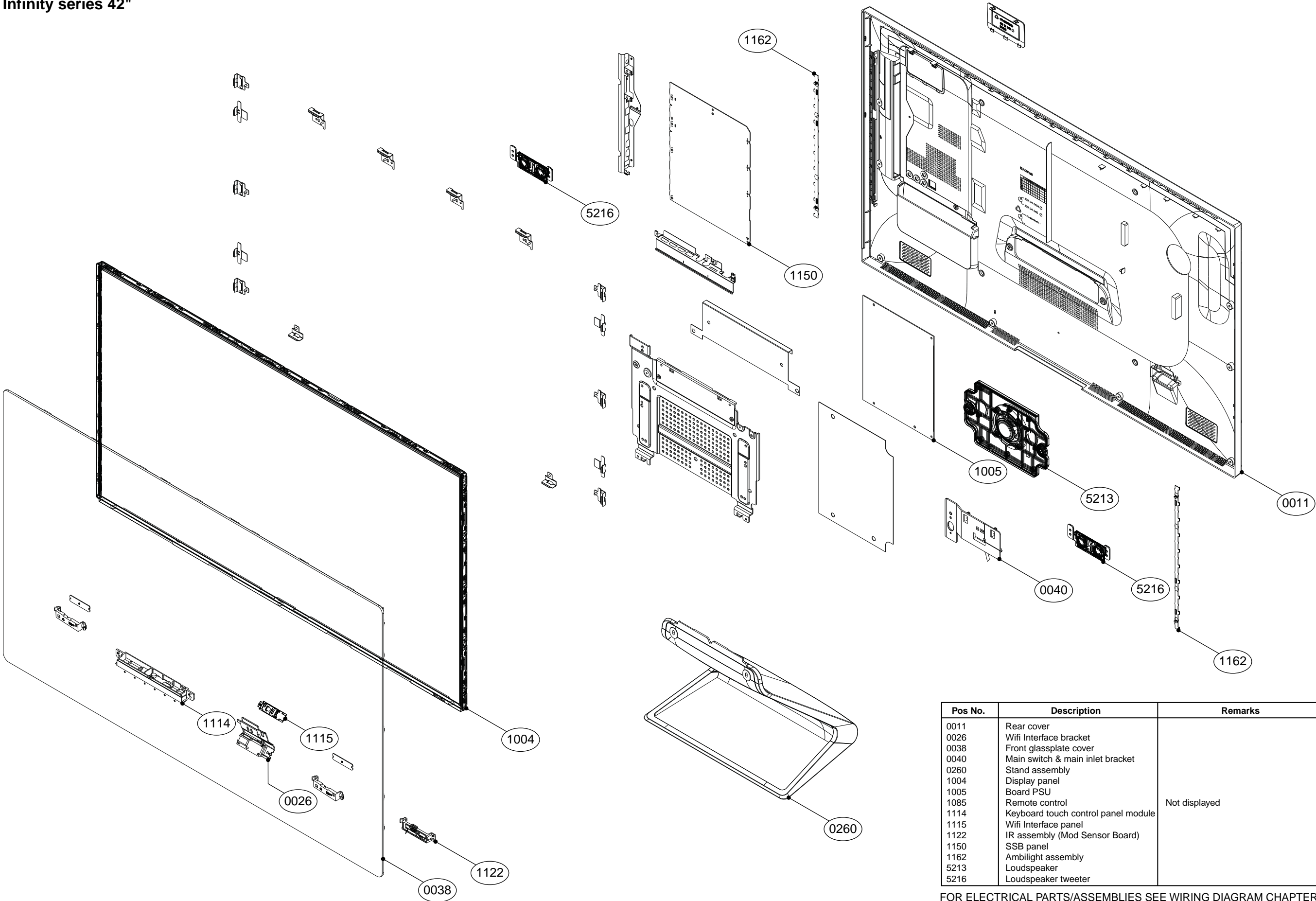


Pos No.	Description	Remarks
0011	Rear cover	
0017	Bottom deco assembly	
0026	Wifi clip	Not displayed
0030	Top deco assembly	
0030	Left deco assembly	
0030	Right deco assembly	
0031	Ambilight door	
0032	IR cover	
0035	Swival Pom	Not displayed
0040	Main inlet bracket	
0085	Left filler assembly	Not displayed
0086	Right filler assembly	Not displayed
0259	Stand accessory	
0260	Stand assembly	
1004	Panel	
1005	Board PSU	Not displayed
1043	Wifi antenna	
1114	Keyboard assembly	Under position number 0011
1115	Wifi assembly	
1122	IR assembly	
1150	Board SSB	
1162	Ambilight	Under position number 0011
1185	Remote Control	Not displayed
5213	Loudspeaker	
5216	Tweeter	Not displayed

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

11.4 Infinity series 42"

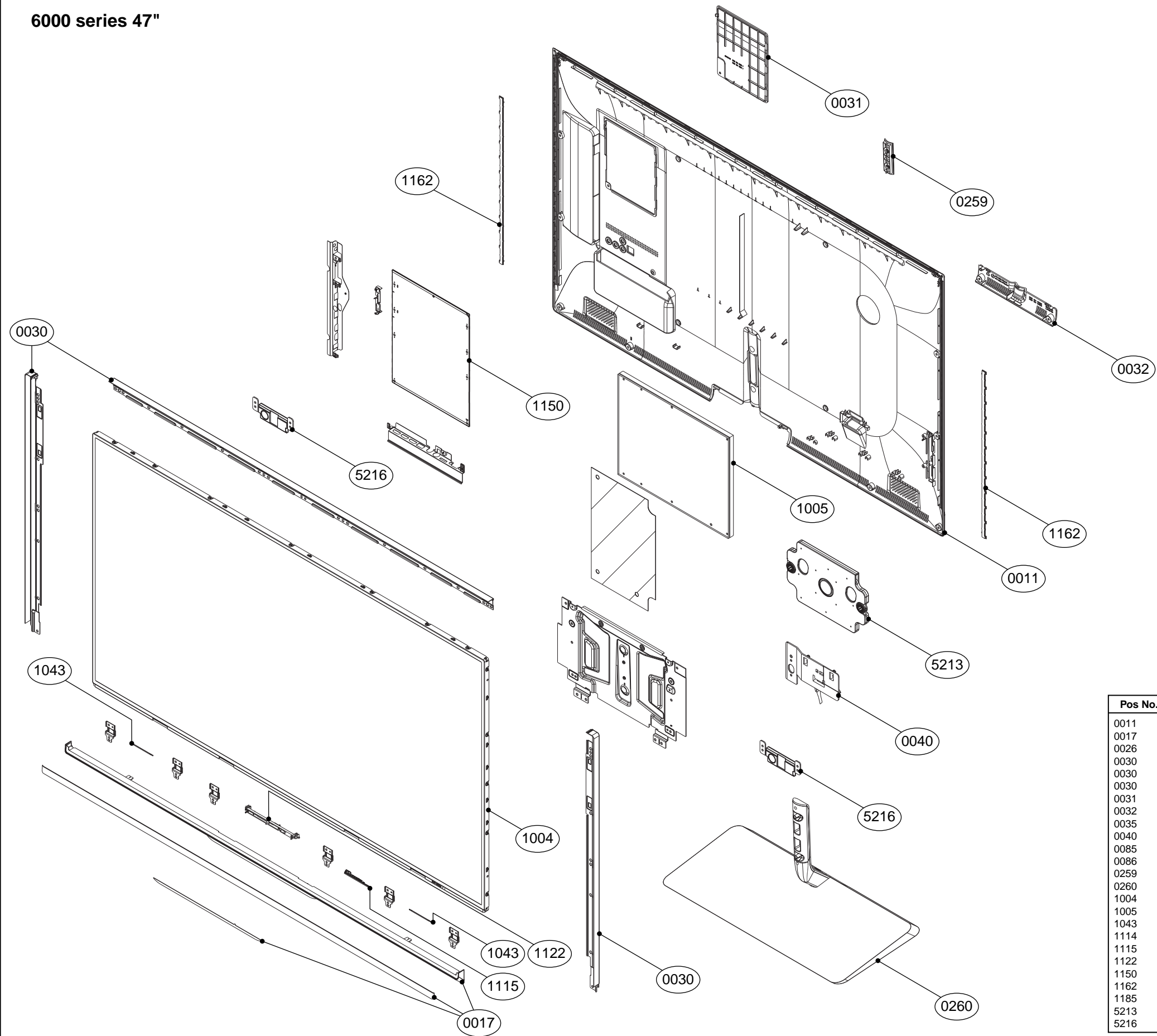
Infinity series 42"



Pos No.	Description	Remarks
0011	Rear cover	Not displayed
0026	Wifi Interface bracket	
0038	Front glassplate cover	
0040	Main switch & main inlet bracket	
0260	Stand assembly	
1004	Display panel	
1005	Board PSU	
1085	Remote control	
1114	Keyboard touch control panel module	
1115	Wifi Interface panel	
1122	IR assembly (Mod Sensor Board)	
1150	SSB panel	
1162	Ambilight assembly	
5213	Loudspeaker	
5216	Loudspeaker tweeter	

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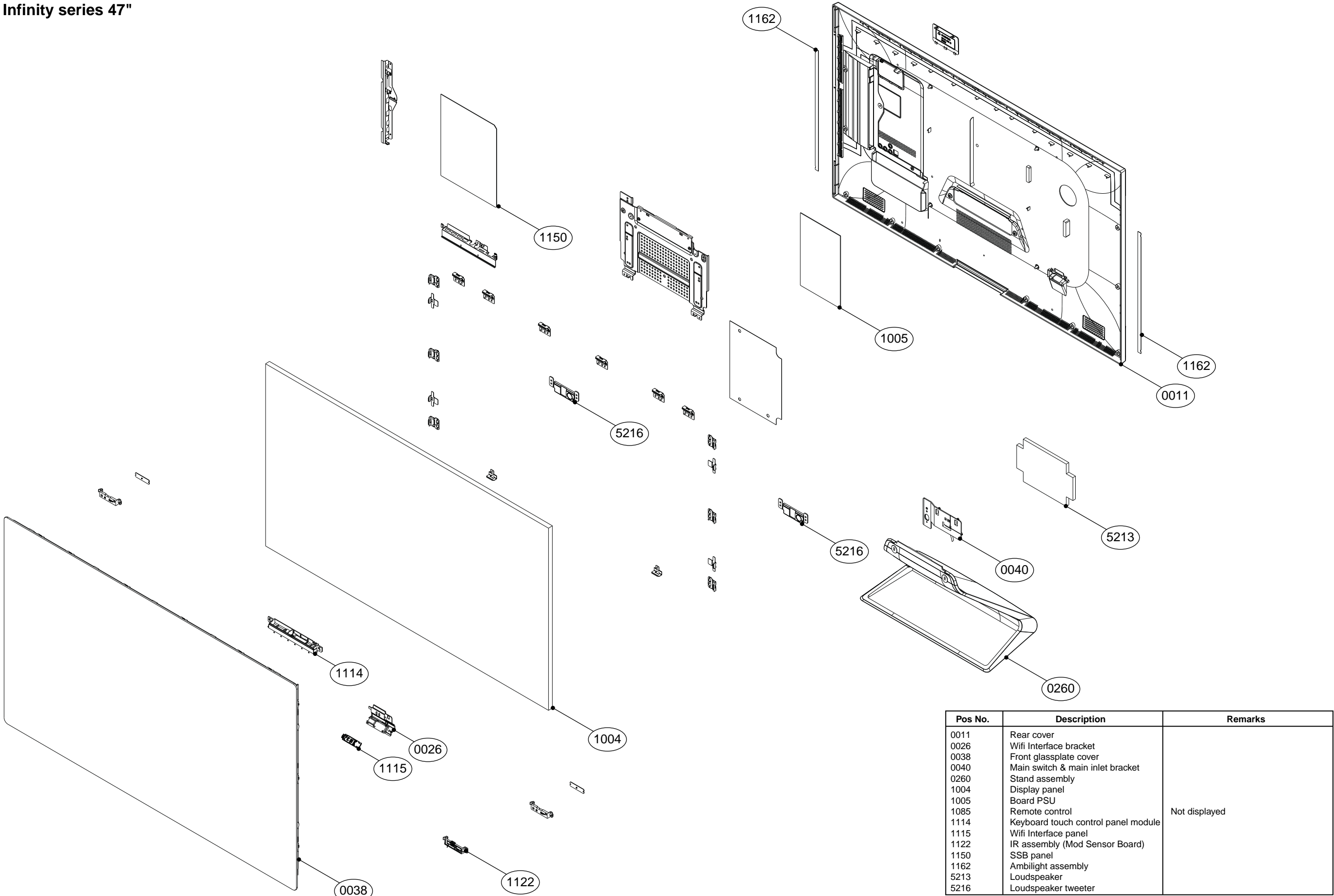
6000 series 47"



Pos No.	Description	Remarks
0011	Rear cover	
0017	Bottom deco assembly	
0026	Wifi clip	Not displayed
0030	Top deco assembly	
0030	Left deco assembly	
0030	Right deco assembly	
0031	Ambilight door	
0032	IR cover	
0035	Swival Pom	Not displayed
0040	Main inlet bracket	
0085	Left Filler assembly	Not displayed
0086	Right Filler assembly	Not displayed
0259	Stand Accessory	
0260	Stand assembly	
1004	Panel	
1005	Board PSU	
1043	Wifi antenna	
1114	Keyboard assembly	Not displayed, under position number 0011
1115	Wifi assembly	
1122	IR assembly	
1150	Board SSB	
1162	Ambilight	Under position number 0011
1185	Remote Control	Not displayed
5213	Loudspeaker	
5216	Tweeter	

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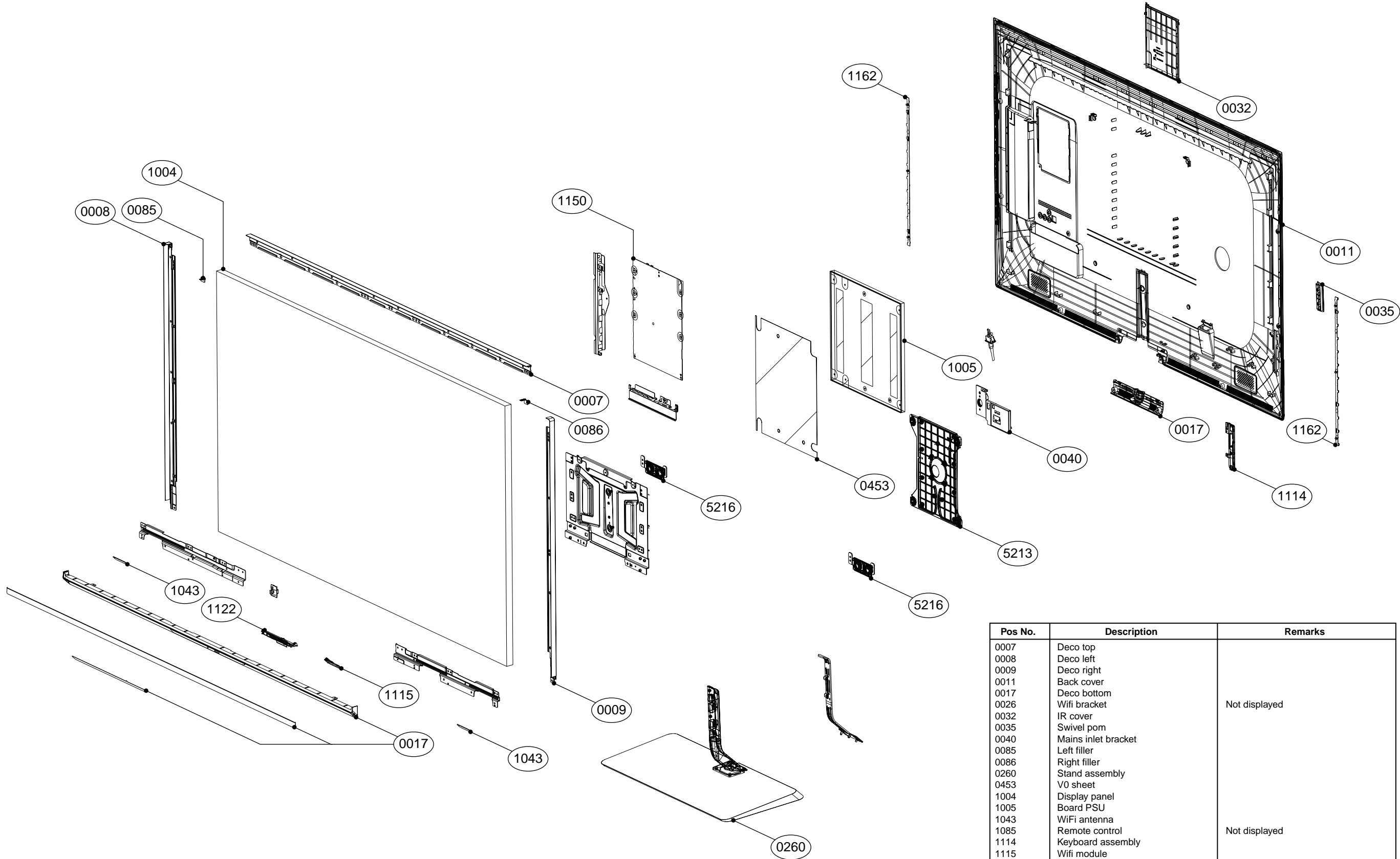
Infinity series 47"



Pos No.	Description	Remarks
0011	Rear cover	Not displayed
0026	Wifi Interface bracket	
0038	Front glassplate cover	
0040	Main switch & main inlet bracket	
0260	Stand assembly	
1004	Display panel	
1005	Board PSU	
1085	Remote control	
1114	Keyboard touch control panel module	
1115	Wifi Interface panel	
1122	IR assembly (Mod Sensor Board)	
1150	SSB panel	
1162	Ambilight assembly	
5213	Loudspeaker	
5216	Loudspeaker tweeter	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

6000 series 55"



Pos No.	Description	Remarks
0007	Deco top	Not displayed
0008	Deco left	
0009	Deco right	
0011	Back cover	
0017	Deco bottom	
0026	Wifi bracket	Not displayed
0032	IR cover	
0035	Swivel pom	
0040	Mains inlet bracket	
0085	Left filler	
0086	Right filler	
0260	Stand assembly	
0453	V0 sheet	
1004	Display panel	
1005	Board PSU	
1043	WiFi antenna	
1085	Remote control	
1114	Keyboard assembly	
1115	Wifi module	
1122	IR assembly	
1150	Board SSB	
1162	AmbiLight 12 LED	
5214	Loudspeaker	
5216	Loudspeaker tweeter	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9