Colour Television

Chassis

QFU1.2E

LA

Service
Service
Service

Service Manual

Contents

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2014-Jan-10

PHILIPS

1. Revision List

Manual xxxx xxx xxxx.0
- First release.

Manual xxxx xxx xxxx.1
- **Chapter 2:** Table 2-1 updated (added CTNs).
- **Chapter 4:** added additional Ambilight unit handling info; see section 4.3.2.

Manual xxxx xxx xxxx.2
- **Chapter 2:** Table 2-1 updated (added CTNs).

Manual xxxx xxx xxxx.3
- **Chapter 2:** Table 2-1 updated (added CTNs).
- **Chapter 6:** added white tone values; see section 6.3.1.

Manual xxxx xxx xxxx.4
- **Chapter 2:** Table 2-1 updated (added CTNs).
- **Chapter 4:** updated and added cable wiring (added CTNs).
- **Chapter 6:** added white tone values (added CTNs).
- **Chapter 9:** added wiring diagrams (added CTNs).
- **Chapter 10:** added schematics (AL).
- **Chapter 11:** added styling sheets (added CTNs).

2. Technical Specs, Diversity, and Connections

Index of this chapter:

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

2.1 Technical Specifications

For on-line product support please use the 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

	2	4		7		9						10							11
		Mechanics		Descr.		Block Diagrams						Schematics							Styling
CTN	Connection Overview	Wire Dressing	Assembly Removal	Power Supply	General Power Architecture	Wiring Diagram	Video	Audio	Control & Clock	I2C	Supply lines	Power Supply	SSB	Amplifier control module	(Keyboard Control Module)	(Wireless LAN USB, Light Sensor, IR/LED Module)	(Sensor Module)	(AmbiLight)	Sheet
40PFL8008K/12	2.3	4-1	4.3	7.2	7.3	-	9.9	9.9	-	-	9.10	-	10.1	-	10.5	10.7	10.9	10.11	11.3
40PFL8008S/12	2.3	4-1	4.3	7.2	7.3	-	9.9	9.9	-	-	9.10	-	10.1	-	10.5	10.7	10.9	10.11	11.3
40PFL8008S/60	2.3	4-1	4.3	7.2	7.3	-	9.9	9.9	-	-	9.10	-	10.1	-	10.5	10.7	10.9	10.11	11.3
42PFL6008H/12	2.3	4-3	4.3	7.2	7.3	9.2	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.7	10.9	10.15	11.1
42PFL6008K/12	2.3	4-3	4.3	7.2	7.3	9.2	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.7	10.9	10.15	11.1
42PFL6008S/12	2.3	4-3	4.3	7.2	7.3	9.2	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.7	10.9	10.15	11.1
42PFL6008S/60	2.3	4-3	4.3	7.2	7.3	9.2	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.7	10.9	10.15	11.1
42PFL6158K/12	2.3	4-3	4.3	7.2	7.3	9.2	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.7	10.9	10.15	11.1
42PFL6158S/12	2.3	4-3	4.3	7.2	7.3	9.2	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.7	10.9	10.15	11.1
42PFL6188K/12	2.3	4-3	4.3	7.2	7.3	9.2	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.7	10.9	10.15	11.1
42PFL6188S/12	2.3	4-3	4.3	7.2	7.3	9.2	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.7	10.9	10.15	11.1
42PFL6198K/12	2.3	4-3	4.3	7.2	7.3	9.2	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.7	10.9	10.15	11.1
42PFL6678K/12	2.3	4-3	4.3	7.2	7.3	9.2	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.7	10.9	10.15	11.1
42PFL6678S/12	2.3	4-3	4.3	7.2	7.3	9.2	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.7	10.9	10.15	11.1
42PFL7008H/12	2.3	4-4	4.3	7.2	7.3	-	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.7	10.9	10.11 10.12	11.2
42PFL7008K/12	2.3	4-4	4.3	7.2	7.3	-	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.7	10.9	10.11 10.12	11.2
42PFL7008S/12	2.3	4-4	4.3	7.2	7.3	-	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.7	10.9	10.11 10.12	11.2
42PFL7008S/60	2.3	4-4	4.3	7.2	7.3	-	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.7	10.9	10.11 10.12	11.2
42PFL7008T/12	2.3	4-4	4.3	7.2	7.3	-	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.7	10.9	10.11 10.12	11.2
42PFL7108H/12	2.3	4-4	4.3	7.2	7.3	-	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.7	10.9	10.11 10.12	11.2

	2	4		7		9						10							11
		Mechanics		Descr.		Block Diagrams						Schematics							Styling
CTN	Connection Overview	Wire Dressing	Assembly Removal	Power Supply	General Power Architecture	Wiring Diagram	Video	Audio	Control & Clock	I2C	Supply lines	Power Supply	SSB	Amplifier control module	(Keyboard Control Module)	(Wireless LAN USB, Light Sensor, IR/LED Module)	(Sensor Module)	(AmbiLight)	Sheet
42PFL7108K/12	2.3	4-4	4.3	7.2	7.3	-	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.7	10.9	10.11 10.12	11.2
42PFL7108S/12	2.3	4-4	4.3	7.2	7.3	-	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.7	10.9	10.11 10.12	11.2
42PFL7108S/60	2.3	4-4	4.3	7.2	7.3	-	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.7	10.9	10.11 10.12	11.2
42PFL7108T/12	2.3	4-4	4.3	7.2	7.3	-	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.7	10.9	10.11 10.12	11.2
46PDL8908S/12	2.3	4-7	4.3	7.2	7.3	-	9.9	9.9	-	-	9.10	-	10.1	-	10.5	10.8	10.9	10.12	11.4
46PDL8908S/60	2.3	4-7	4.3	7.2	7.3	-	9.9	9.9	-	-	9.10	-	10.1	-	10.5	10.8	10.9	10.12	11.4
46PFL8008K/12	2.3	4-5	4.3	7.2	7.3	-	9.9	9.9	-	-	9.10	-	10.1	-	10.5	10.7	10.9	10.15	11.3
46PFL8008S/12	2.3	4-5	4.3	7.2	7.3	-	9.9	9.9	-	-	9.10	-	10.1	-	10.5	10.7	10.9	10.15	11.3
46PFL8008S/60	2.3	4-5	4.3	7.2	7.3	-	9.9	9.9	-	-	9.10	-	10.1	-	10.5	10.7	10.9	10.15	11.3
46PFL8008S/98	2.3	4-5	4.3	7.2	7.3	-	9.9	9.9	-	-	9.10	-	10.1	-	10.5	10.7	10.9	10.15	11.3
47PFL6008H/12	2.3	4-3	4.3	7.2	7.3	9.2	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.7	10.9	10.15	11.1
47PFL6008K/12	2.3	4-3	4.3	7.2	7.3	9.2	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.7	10.9	10.15	11.1
47PFL6008S/12	2.3	4-3	4.3	7.2	7.3	9.2	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.7	10.9	10.15	11.1
47PFL6008S/60	2.3	4-3	4.3	7.2	7.3	9.2	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.7	10.9	10.15	11.1
47PFL6158K/12	2.3	4-3	4.3	7.2	7.3	9.2	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.7	10.9	10.15	11.1
47PFL6158S/12	2.3	4-3	4.3	7.2	7.3	9.2	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.7	10.9	10.15	11.1
47PFL6188K/12	2.3	4-3	4.3	7.2	7.3	9.2	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.7	10.9	10.15	11.1
47PFL6188S/12	2.3	4-3	4.3	7.2	7.3	9.2	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.7	10.9	10.15	11.1
47PFL6198K/12	2.3	4-3	4.3	7.2	7.3	9.2	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.7	10.9	10.15	11.1
47PFL6678K/12	2.3	4-3	4.3	7.2	7.3	9.2	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.7	10.9	10.15	11.1
47PFL6678S/12	2.3	4-3	4.3	7.2	7.3	-	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.7	10.9	10.15	11.1
47PFL7008H/12	2.3	4-4	4.3	7.2	7.3	-	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.7	10.9	10.12 10.13	11.2
47PFL7008K/12	2.3	4-4	4.3	7.2	7.3	-	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.7	10.9	10.12 10.13	11.2
47PFL7008S/12	2.3	4-4	4.3	7.2	7.3	-	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.7	10.9	10.12 10.13	11.2
47PFL7008S/60	2.3	4-4	4.3	7.2	7.3	-	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.7	10.9	10.12 10.13	11.2
47PFL7108H/12	2.3	4-4	4.3	7.2	7.3	-	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.7	10.9	10.12 10.13	11.2
47PFL7108K/12	2.3	4-4	4.3	7.2	7.3	-	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.7	10.9	10.12 10.13	11.2
47PFL7108S/12	2.3	4-4	4.3	7.2	7.3	-	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.7	10.9	10.12 10.13	11.2
47PFL7108S/60	2.3	4-4	4.3	7.2	7.3	-	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.7	10.9	10.12 10.13	11.2
55PDL8908D/78	2.3	4-7	4.3	7.2	7.3	-	9.9	9.9	-	-	9.10	-	10.3	-	10.5	-	10.9	10.11 10.12 10.14	11.8
55PDL8908S/12	2.3	4-7	4.3	7.2	7.3	-	9.9	9.9	-	-	9.10	-	10.1	-	10.5	10.7	10.9	10.13 10.10 10.11	11.8
55PDL8908S/60	2.3	4-7	4.3	7.2	7.3	-	9.9	9.9	-	-	9.10	-	10.1	-	10.5	10.7	10.9	10.13 10.10 10.11	11.8
55PDL8908S/98	2.3	4-7	4.3	7.2	7.3	-	9.9	9.9	-	-	9.10	-	10.1	-	10.5	10.7	10.9	10.13 10.10 10.11	11.8
55PFL6008H/12	2.3	4-3	4.3	7.2	7.3	9.3	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.8	10.9	10.16	11.5
55PFL6008K/12	2.3	4-3	4.3	7.2	7.3	9.3	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.8	10.9	10.16	11.5
55PFL6008S/12	2.3	4-3	4.3	7.2	7.3	9.3	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.8	10.9	10.16	11.5
55PFL6008S/60	2.3	4-3	4.3	7.2	7.3	9.3	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.8	10.9	10.16	11.5
55PFL6008T/12	2.3	4-3	4.3	7.2	7.3	9.3	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.8	10.9	10.16	11.5
55PFL6158K/12	2.3	4-3	4.3	7.2	7.3	9.3	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.8	10.9	10.16	11.5
55PFL6158S/12	2.3	4-3	4.3	7.2	7.3	9.3	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.8	10.9	10.16	11.5
55PFL6188K/12	2.3	4-3	4.3	7.2	7.3	9.3	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.8	10.9	10.16	11.5

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CTN	2	4		7		9						10							11
		Mechanics		Descr.		Block Diagrams						Schematics							Styling
	Connection Overview	Wire Dressing	Assembly Removal	Power Supply	General Power Architecture	Wiring Diagram	Video	Audio	Control & Clock	I2C	Supply lines	Power Supply	SSB	Amplifier control module	(Keyboard Control Module)	(Wireless LAN USB, Light Sensor, IR/LED Module)	(Sensor Module)	(AmbiLight)	Sheet
55PFL6188S/12	2.3	4-3	4.3	7.2	7.3	9.3	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.8	10.9	10.16	11.5
55PFL6198K/12	2.3	4-3	4.3	7.2	7.3	9.3	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.8	10.9	10.16	11.5
55PFL6678K/12	2.3	4-3	4.3	7.2	7.3	9.3	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.8	10.9	10.16	11.5
55PFL6678S/12	2.3	4-3	4.3	7.2	7.3	9.3	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.8	10.9	10.16	11.5
55PFL7008H/12	2.3	4-8	4.3	7.2	7.3	9.4	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.8	10.9	10.13 10.10 10.11	11.6
55PFL7008K/12	2.3	4-8	4.3	7.2	7.3	9.4	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.8	10.9	10.13 10.10 10.11	11.6
55PFL7008S/12	2.3	4-8	4.3	7.2	7.3	9.4	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.8	10.9	10.13 10.10 10.11	11.6
55PFL7008S/60	2.3	4-8	4.3	7.2	7.3	9.4	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.8	10.9	10.13 10.10 10.11	11.6
55PFL7108H/12	2.3	4-8	4.3	7.2	7.3	9.4	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.8	10.9	10.13 10.10 10.11	11.6
55PFL7108K/12	2.3	4-8	4.3	7.2	7.3	9.4	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.8	10.9	10.13 10.10 10.11	11.6
55PFL7108S/12	2.3	4-8	4.3	7.2	7.3	9.4	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.8	10.9	10.13 10.10 10.11	11.6
55PFL7108S/60	2.3	4-8	4.3	7.2	7.3	9.4	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.8	10.9	10.13 10.10 10.11	11.6
55PFL8008K/12	2.3	4-9	4.3	7.2	7.3	-	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.8	10.9	10.15	11.7
55PFL8008S/12	2.3	4-9	4.3	7.2	7.3	-	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.8	10.9	10.15	11.7
55PFL8008S/60	2.3	4-9	4.3	7.2	7.3	-	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.8	10.9	10.15	11.7
60PFL6008H/12	2.3	4-3	4.3	7.2	7.3	9.5	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.7	10.9	10.17	11.5
60PFL6008K/12	2.3	4-3	4.3	7.2	7.3	9.5	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.7	10.9	10.17	11.5
60PFL6008S/12	2.3	4-3	4.3	7.2	7.3	9.5	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.7	10.9	10.17	11.5
60PFL6008S/60	2.3	4-3	4.3	7.2	7.3	9.5	9.9	9.9	-	-	9.10	-	10.2	-	10.5	10.7	10.9	10.17	11.5
60PFL8708S/12	2.3	4-11	4.3	7.2	7.3	9.6	9.9	9.9	-	-	9.10	-	10.3	-	10.5	-	10.9	10.18	11.9
60PFL8708S/60	2.3	4-11	4.3	7.2	7.3	9.6	9.9	9.9	-	-	9.10	-	10.3	-	10.5	-	10.9	10.18	11.9
65PFL9708S/12	2.3	4-12	4.3	7.2	7.3	9.7	9.9	9.9	-	-	9.10	-	10.3	-	-	-	10.9	10.11 10.12 10.14	11.10
65PFL9708S/60	2.3	4-12	4.3	7.2	7.3	9.7	9.9	9.9	-	-	9.10	-	10.3	-	-	-	10.9	10.11 10.12 10.14	11.10
84PFL9708S/12	2.3	4-14	4.3	7.2	7.3	9.8	9.9	9.9	-	-	9.10	-	10.3	10.4	-	-	10.9	10.11 10.12 10.14	11.11
84PFL9708/78	2.3	4-14	4.3	7.2	7.3	9.8	9.9	9.9	-	-	9.10	-	10.3	10.4	-	-	10.9	10.11 10.12 10.14	11.11

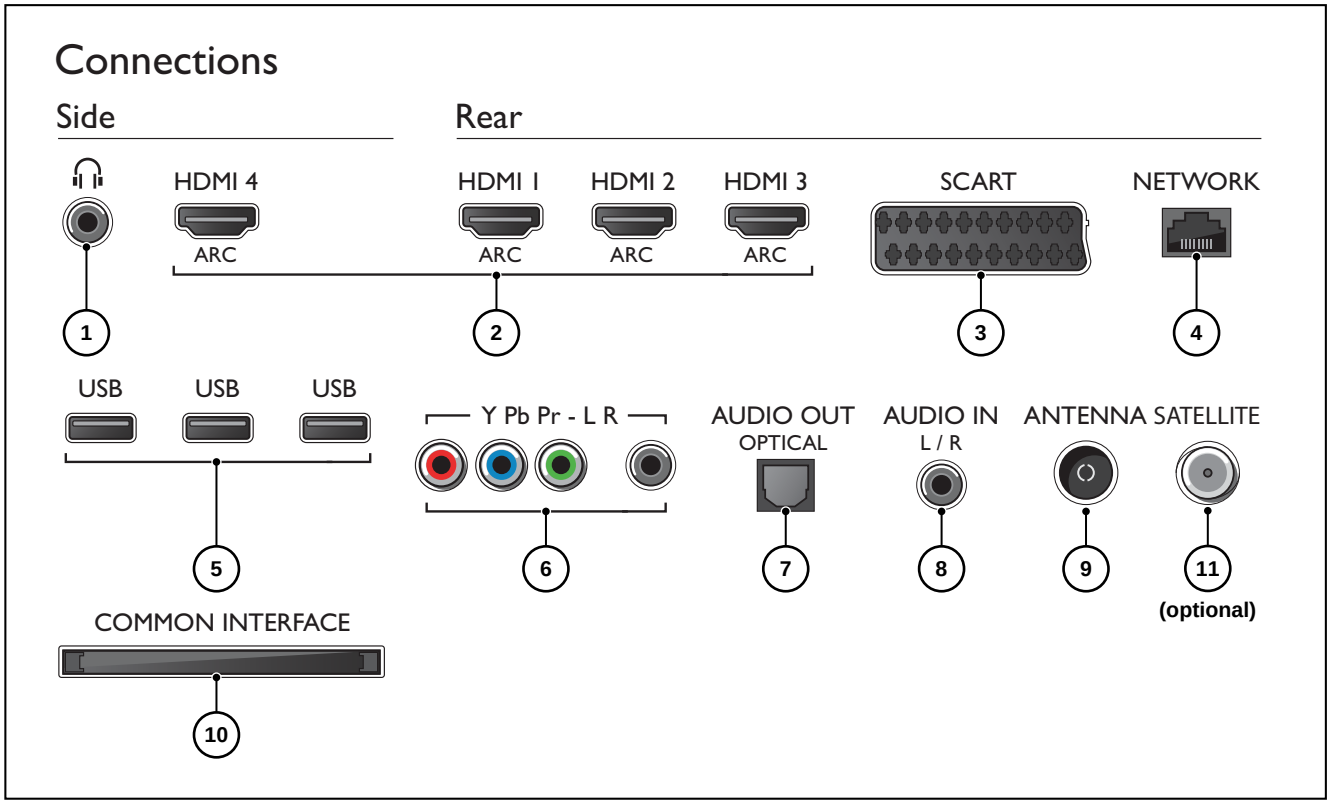
2.2 Directions for Use

You can download this information from the following websites:

http://www.philips.com/support

http://www.p4c.philips.com

2.3 Connections



19370_062_130201.eps
130404

Figure 2-1 Connection overview

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

2.3.1 Connections

1 - Head phone (Output)

Bk	- Head phone	32 - 600 ohm / 10 mW	

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

10000_017_090121.eps
090428

Figure 2-2 HDMI (type A) connector

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

3 - Video RGB - In, CVBS - In/Out, Audio - In/Out

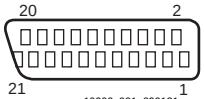


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Figure 2-3 SCART connector

1	- n.c.		
2	- Audio R	0.5 V_{RMS} / 10 kohm	
3	- n.c.		
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	- n.c.		
20	- Video CVBS	1 V_{PP} / 75 ohm	
21	- Shield	Gnd	

4 - RJ45: Ethernet

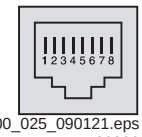

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Figure 2-4 Ethernet connector

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	

5 - USB2.0

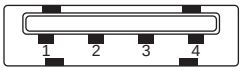

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Figure 2-5 USB (type A)

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

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

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

7 - Cinch: S/PDIF - Out

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

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

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

9 - Aerial - In

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

10 - Common Interface

68p - See Figure 10-1-35 B06I, CI conditional access

11 - SAT - In (optional)

-	- F-type	Coax, 75 ohm

2.4 Chassis Overview

Refer to chapter 9. Block Diagrams for PWB/CBA locations.

3. Precautions, Notes, and Abbreviation List

Index of this chapter:

3.1 Safety Instructions

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

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

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

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

3.2 Warnings

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

3.3 Notes

3.3.1 General

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

3.3.2 Schematic Notes

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

3.3.3 Spare Parts

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

3.3.4 BGA (Ball Grid Array) ICs

Introduction

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

BGA Temperature Profiles

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

3.3.5 Lead-free Soldering

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

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

3.3.6 Alternative BOM identification

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

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

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

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

Figure 3-1 Serial number (example)

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

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

3.3.8 Practical Service Precautions

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

3.4 Abbreviation List

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

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

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

4. Mechanical Instructions

Index of this chapter:

Notes:

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

4.1 Cable Dressing-

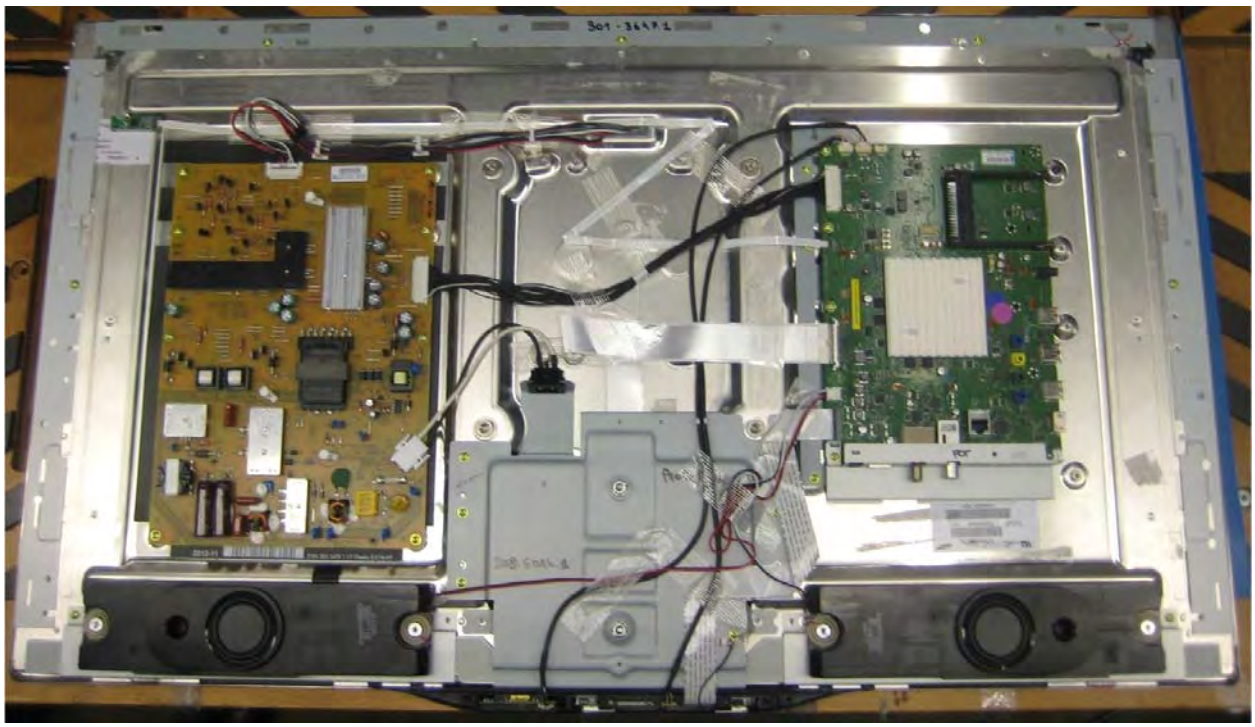

Figure 4-1 Cable dressing 40" 8000 series

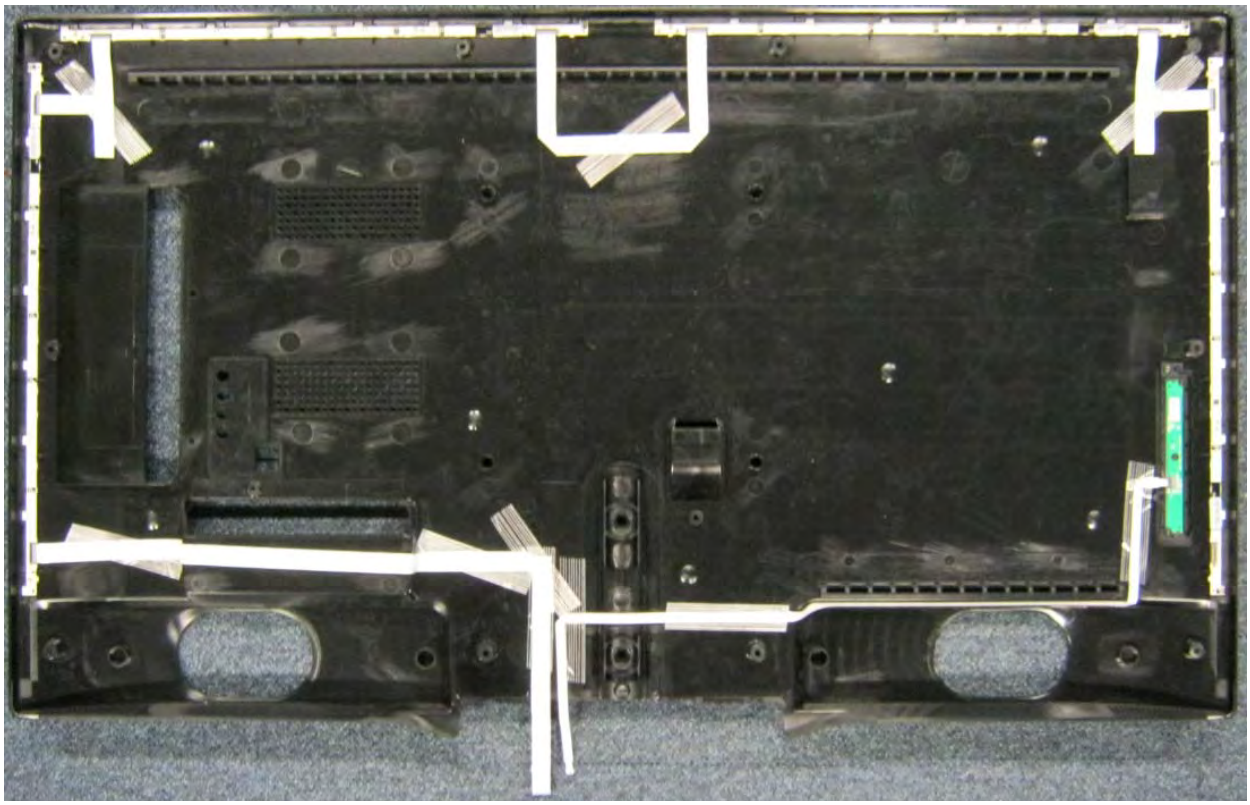

Figure 4-2 Back cover 40" 8000 series

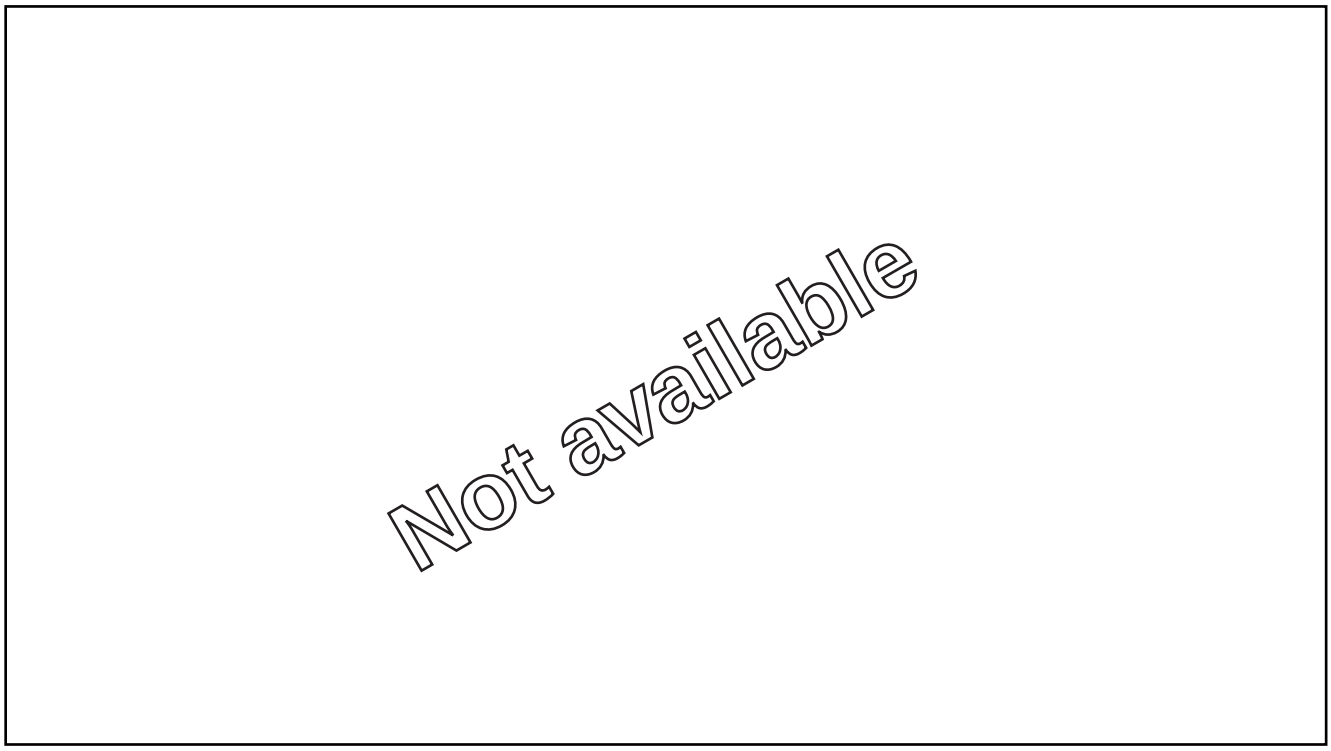

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Figure 4-3 Cable dressing 42" - 47" - 55" - 60" 6000 series

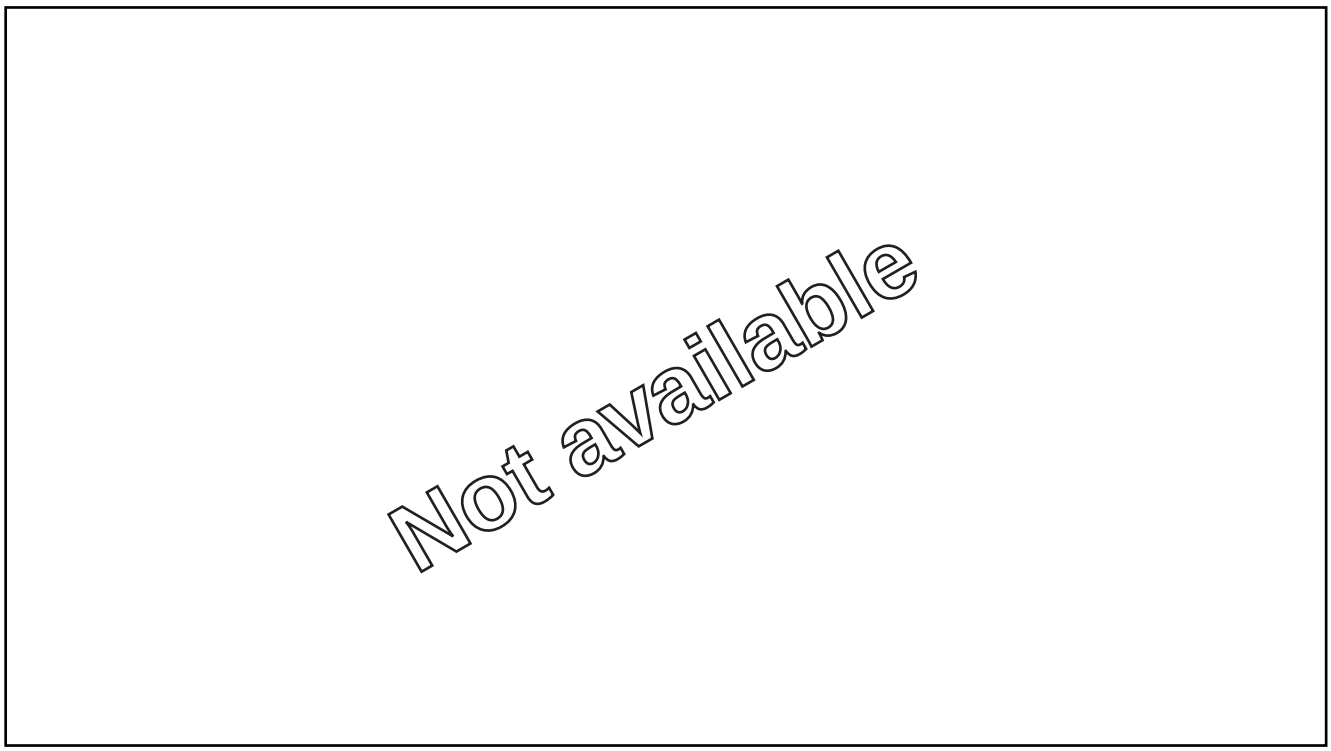

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Figure 4-4 Cable dressing 42" - 47” 7000 series

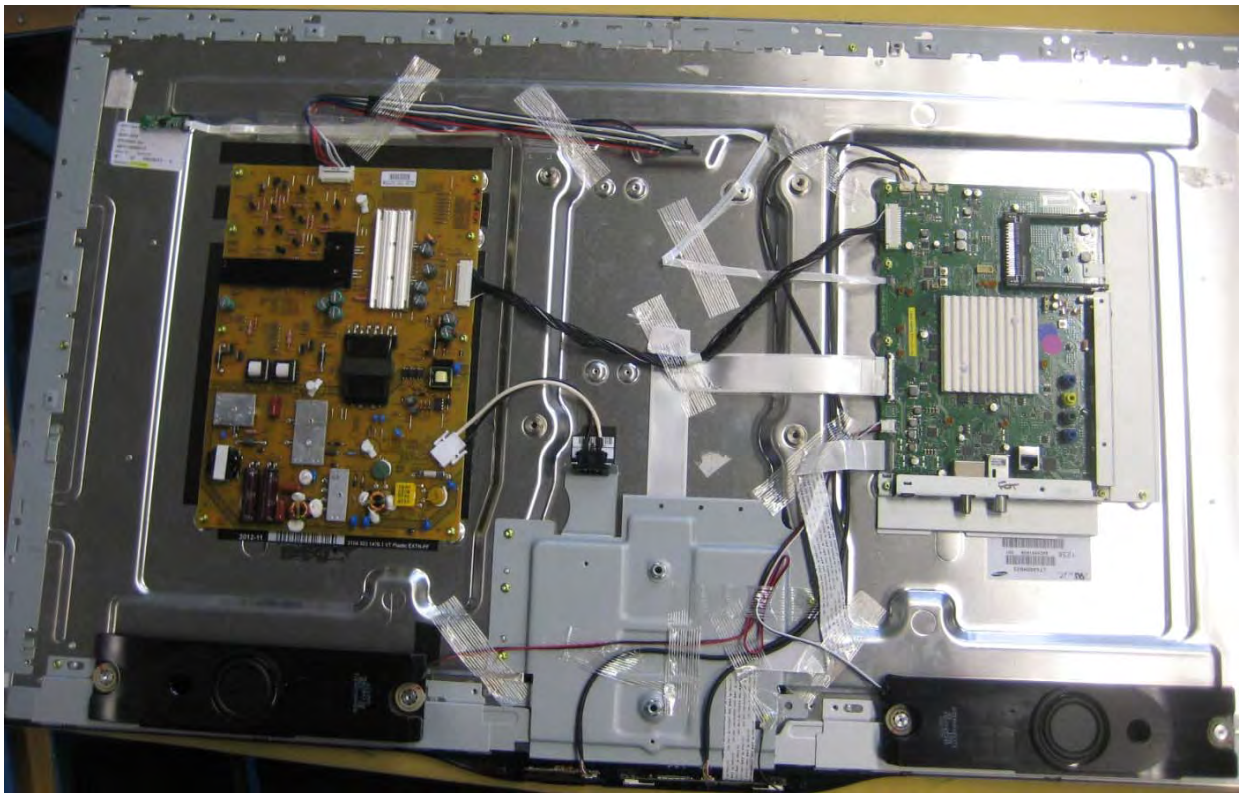

Figure 4-5 Cable dressing 46" 8000 series

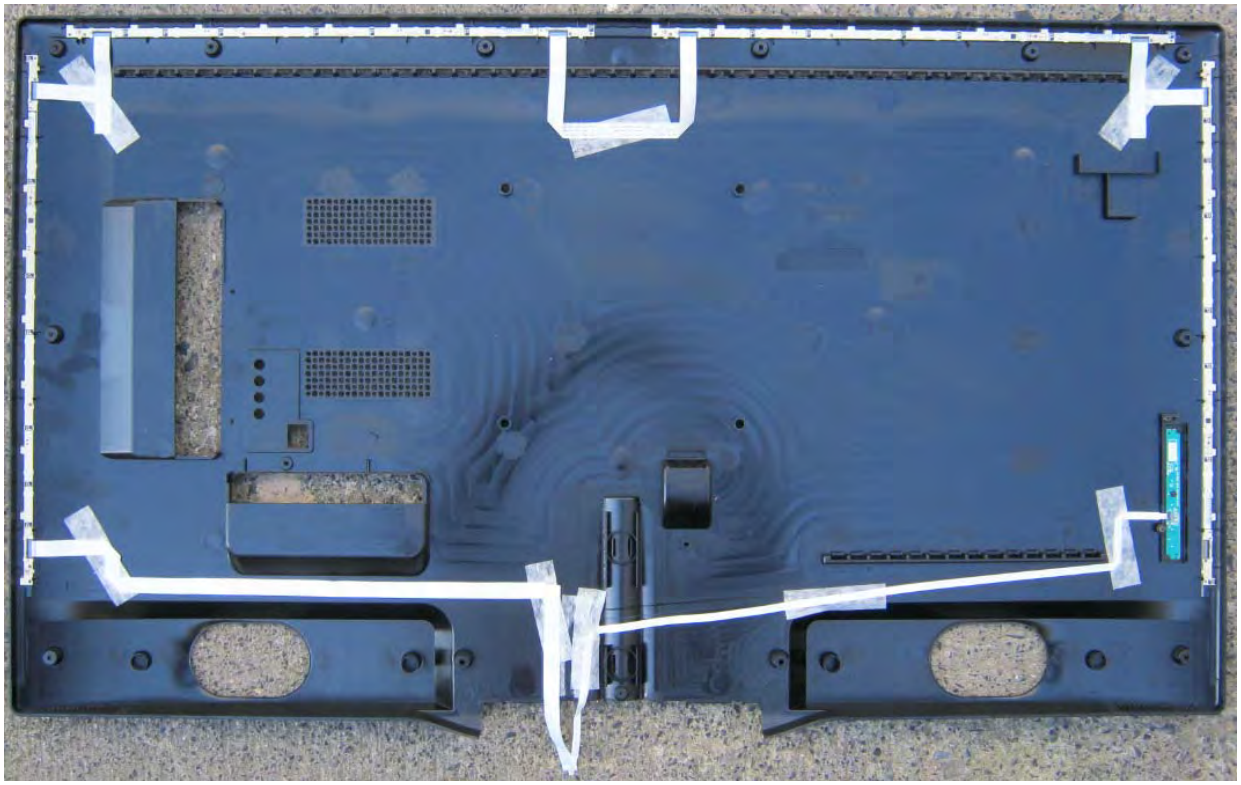

Figure 4-6 Back cover 46" 8000 series

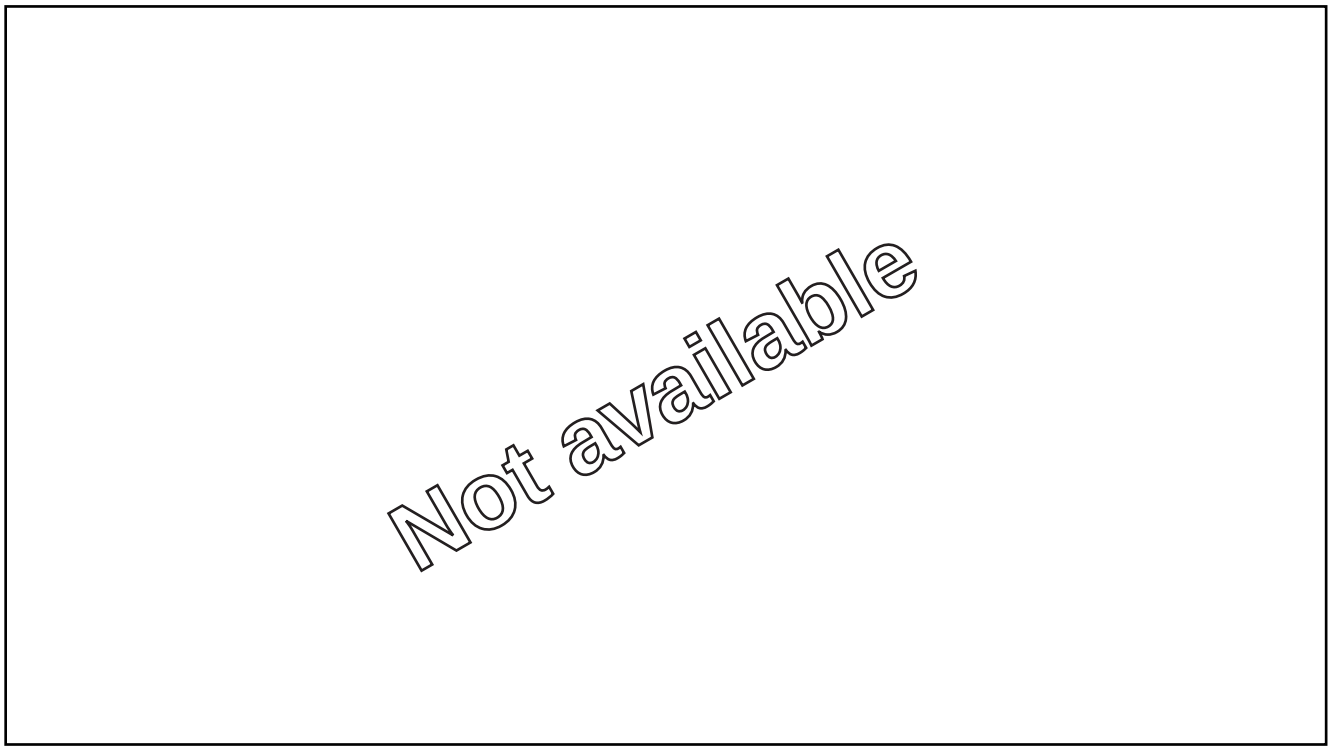

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Figure 4-7 Cable dressing 46" - 55" 8000 Design series

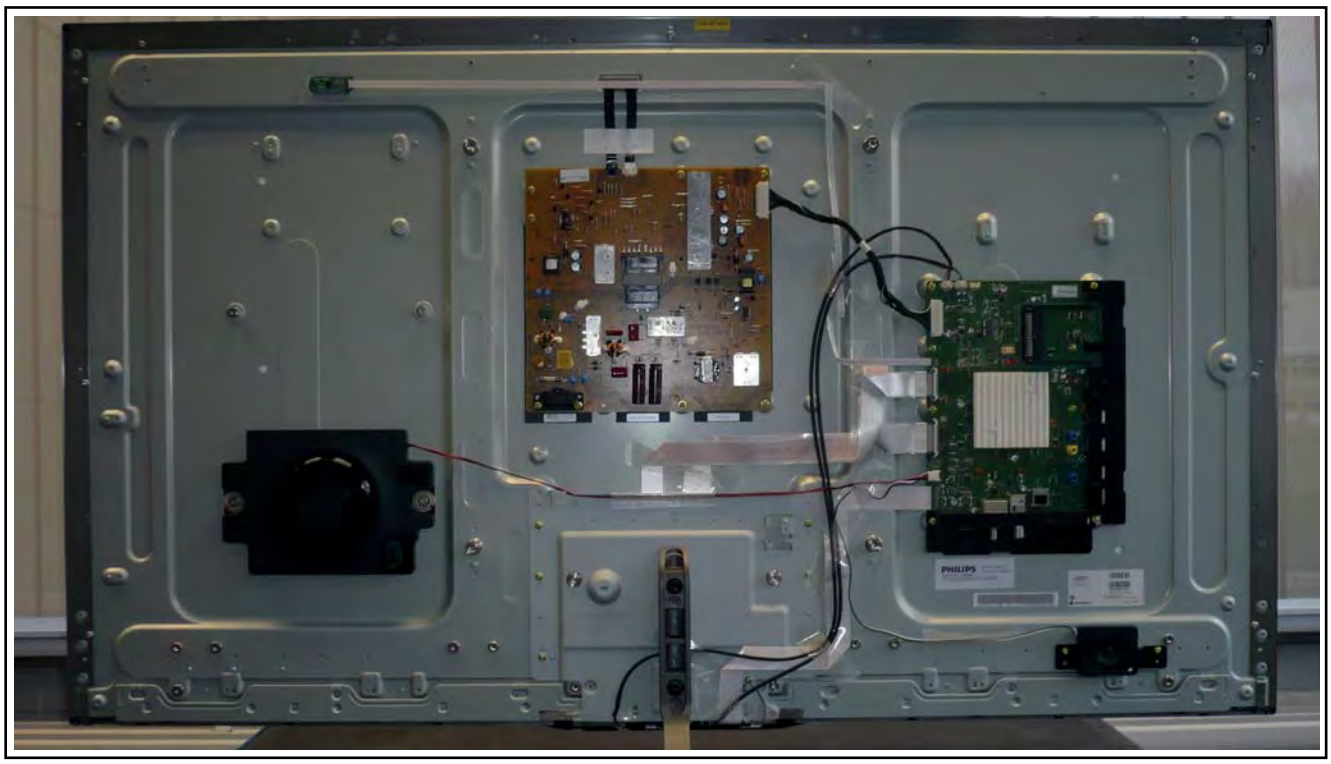

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Figure 4-8 Cable dressing 55" 7000 series

Figure 4-9 Cable dressing 55" 8000 series

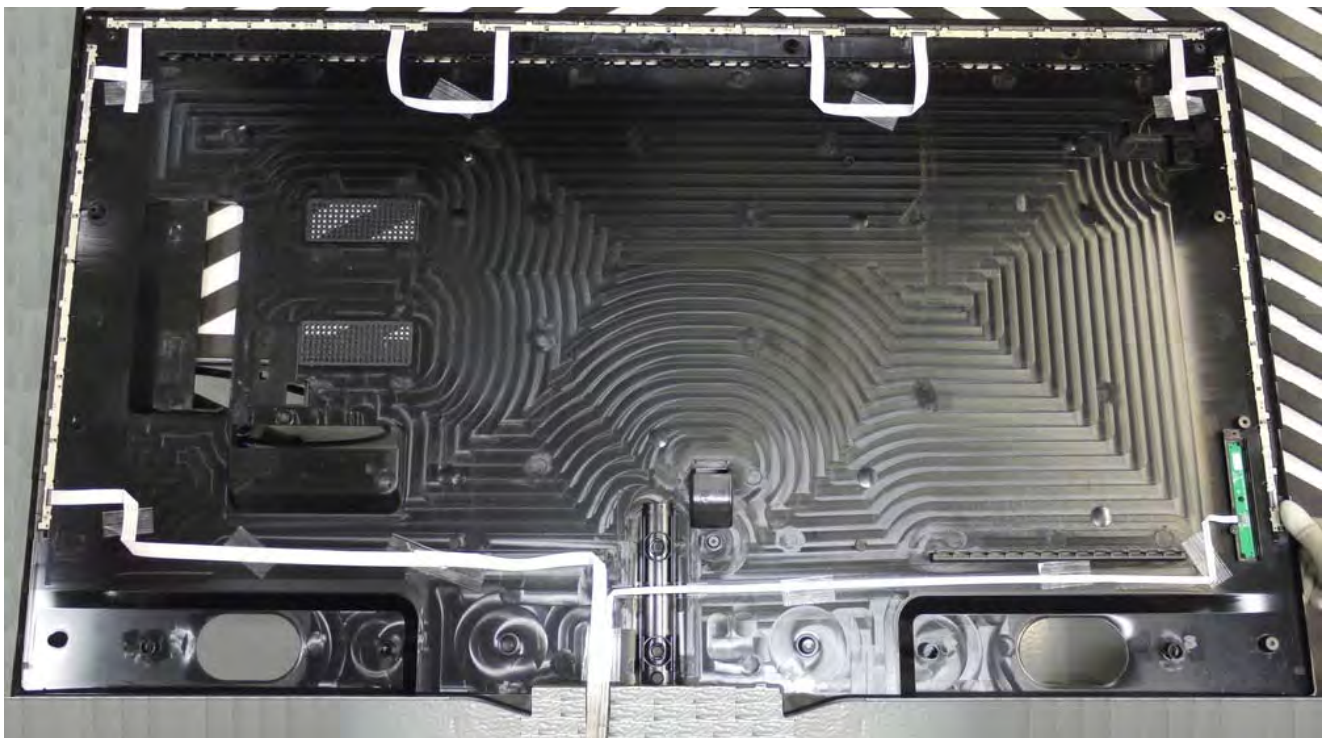

Figure 4-10 Back cover 55" 8000 series

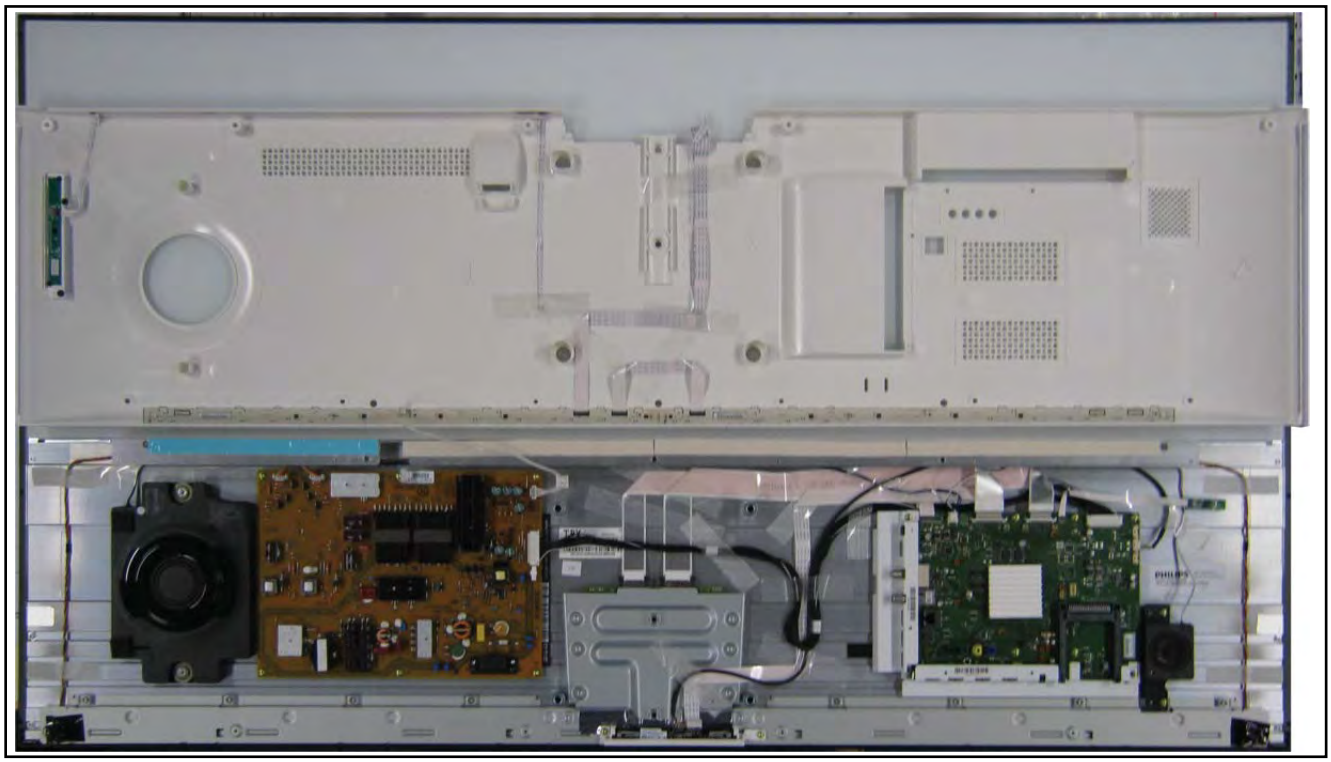

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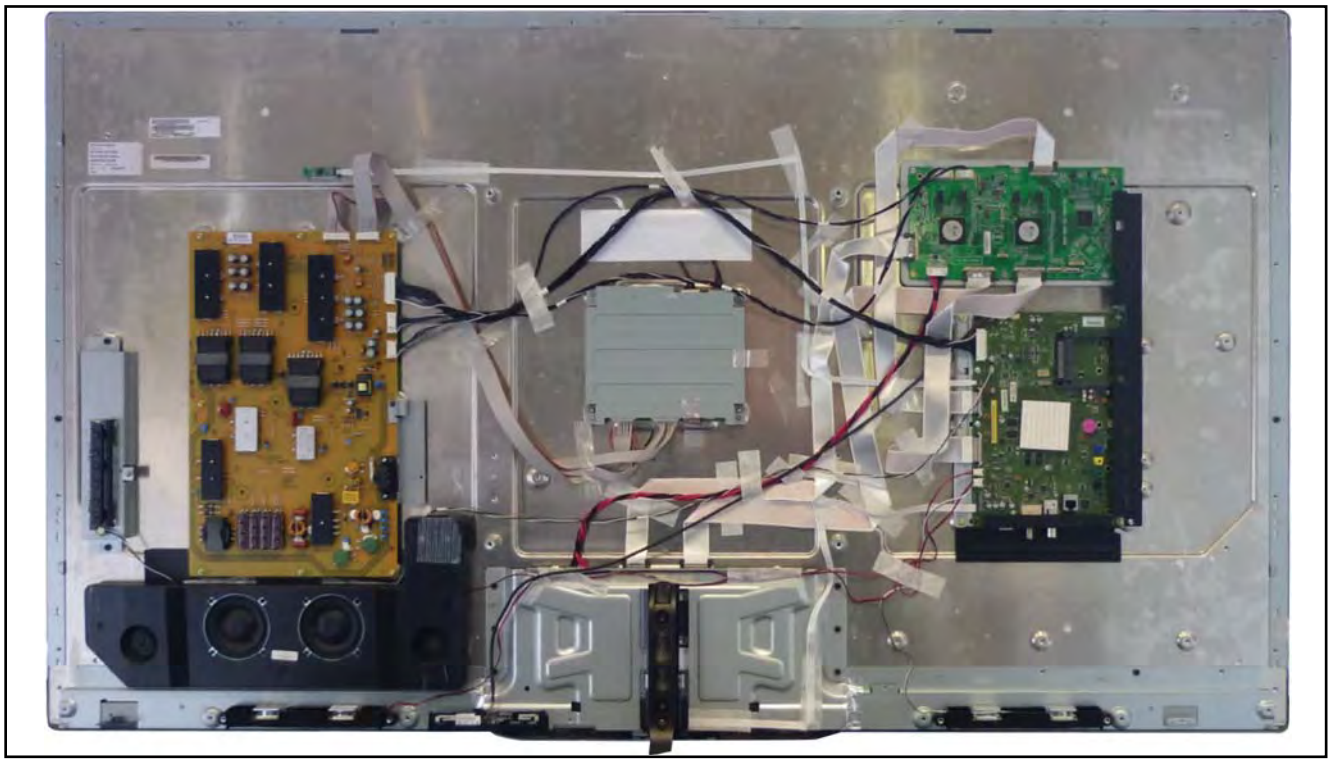
Figure 4-11 Cable dressing 60" 8000 series



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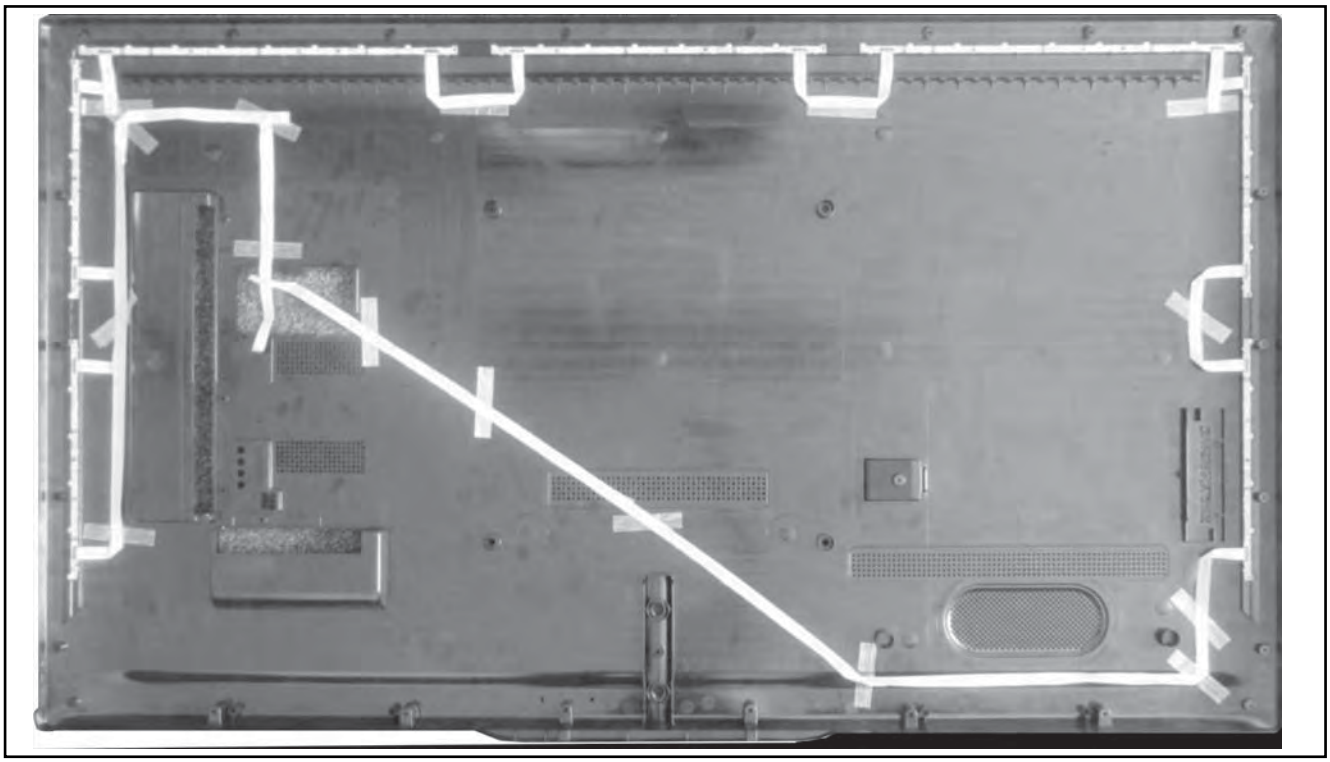
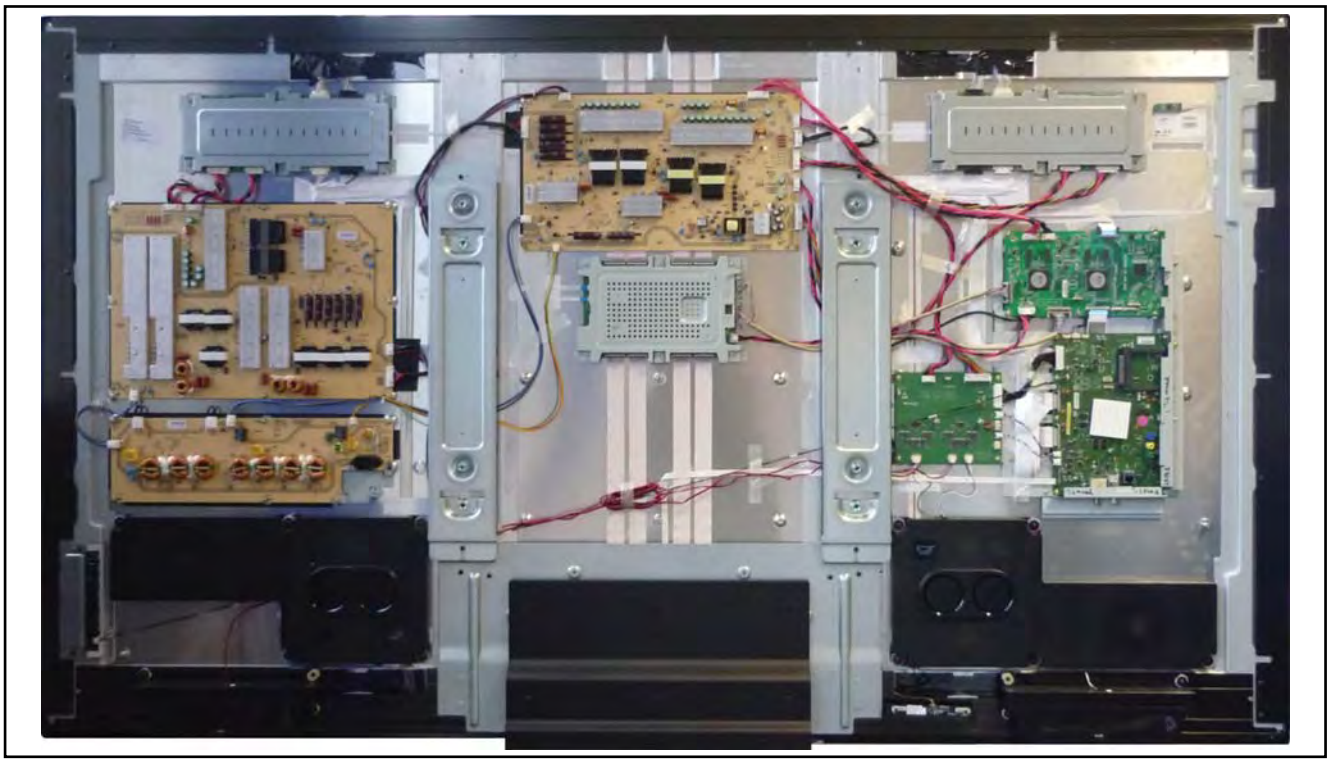
140110

Figure 4-12 Cable dressing 65" 9000 series



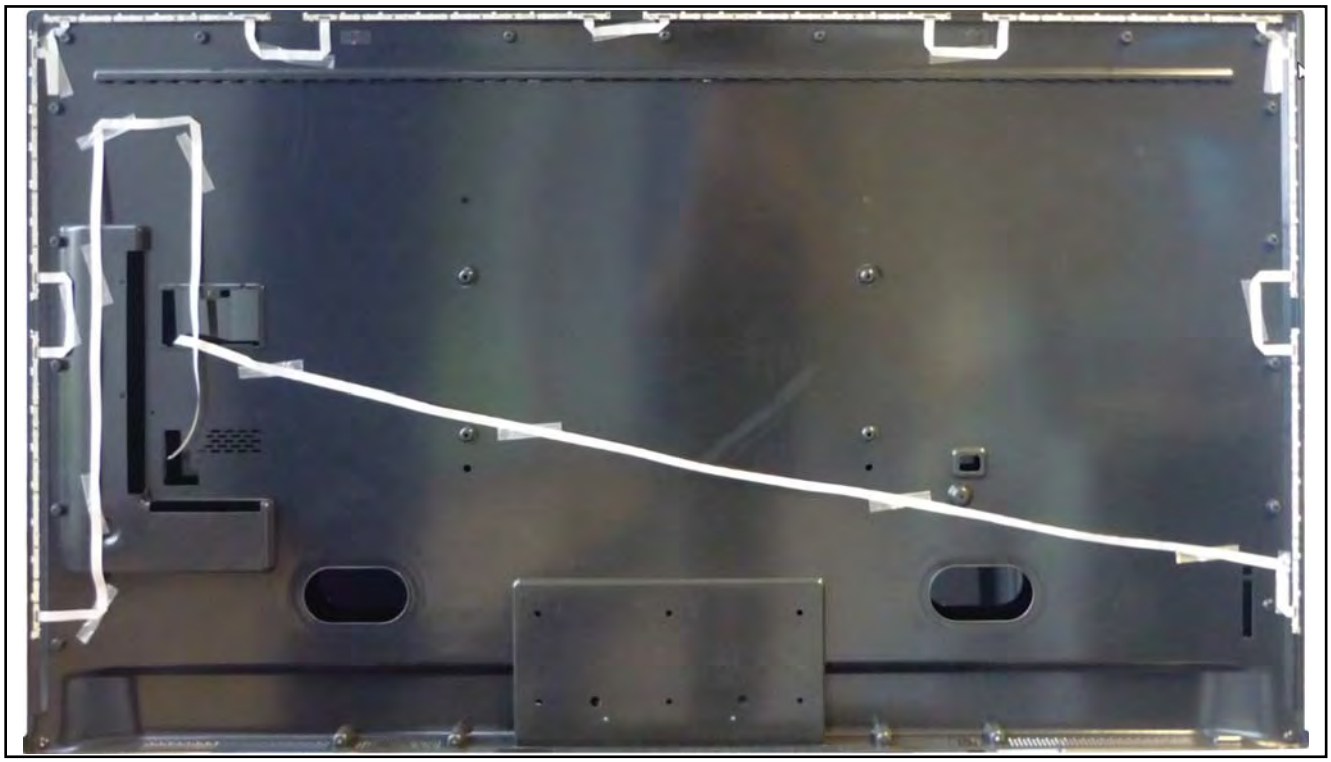
19374_029_140110.eps
140110

Figure 4-13 Cable dressing 65" 9000 series - Back cover



19374_030_140110.eps
140110

Figure 4-14 Cable dressing 84" 9000 series



19374_031_140110.eps
140110

Figure 4-15 Cable dressing 84" 9000 series - Back cover

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.

4.3.1 Rear Cover

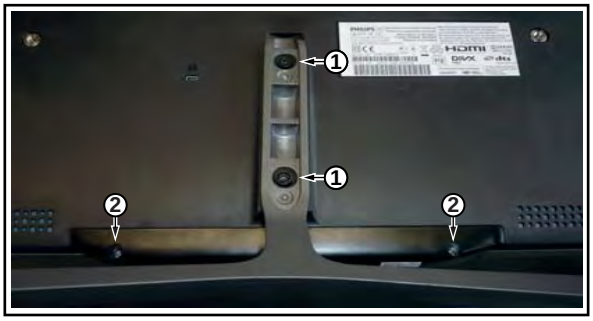
Warning: Disconnect the mains power cord before removing the rear cover.
Attention: *For Ambilight sets, the leading edge cover has to be removed.*

It is mandatory to remove the leading edge cover and disconnect the cables prior to removal of the rear cover!
See Figure 4-16 and Figure 4-17 for details.

1. For sets equipped with Ambilight: remove the stand and swivel block [1].
2. Remove the leading edge hatch that covers the Ambilight connector [2].
3. Unplug the Ambilight connectors located underneath the hatch [3].
4. 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.

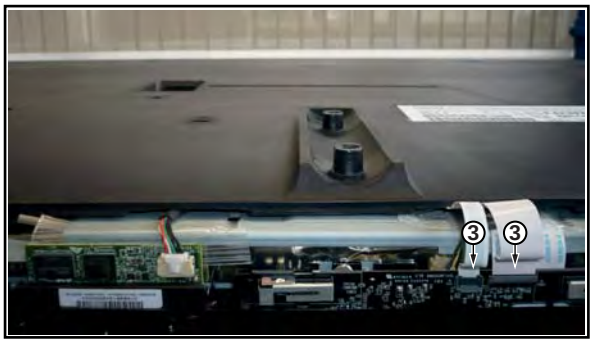
Caution: Failure to follow these guidelines can seriously damage the display!
Ensure that ESD safe measures are taken.

4.3 Assy/Panel Removal



19370_080_130208.eps
130208

Figure 4-16 Rear cover removal Ambilight models -1-



19370_081_130208.eps
130208

Figure 4-17 Rear cover removal Ambilight models -2-

4.3.2 Ambilight units in Rear Cover

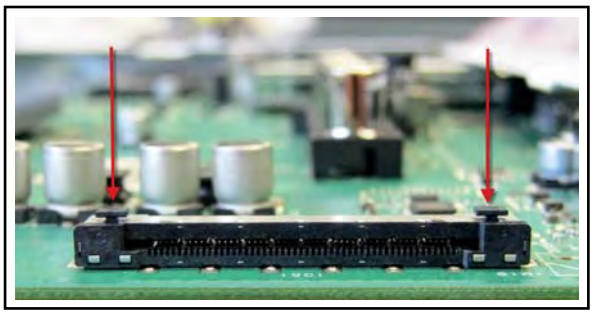
The Ambilight units are affixed in the rear cover and will self-destruct upon removal.

Attention: *it is of the utmost importance to remove all remains of any adhesive that might be left on the inside of the rear cover.*

The new units come with double-sided adhesive tape. Ensure a correct mounting to avoid uneven light emission of the units.

4.3.3 SSB

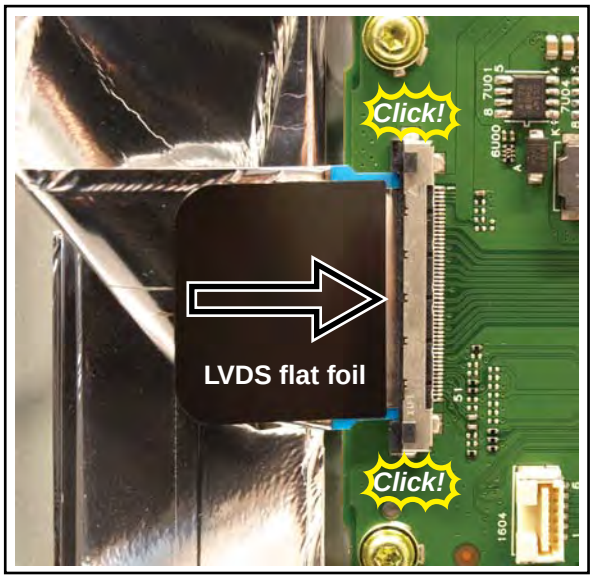
Refer to Figure 4-18 and Figure 4-19 for details.
Some SSBs have a dedicated LVDS connector, requiring pressing two catches as indicated in the figure, before removing the LVDS cable.



19054_001_111010.eps
111010

Figure 4-18 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 4-19 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

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.

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

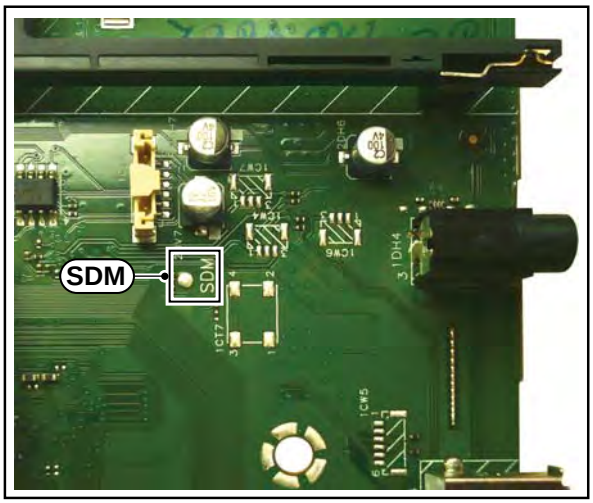
Table 5-1 SDM default settings

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 the main menu “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 figure Service mode pad).
- **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.



19370_061_130201.eps
130507

Figure 5-1 Service mode pad

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

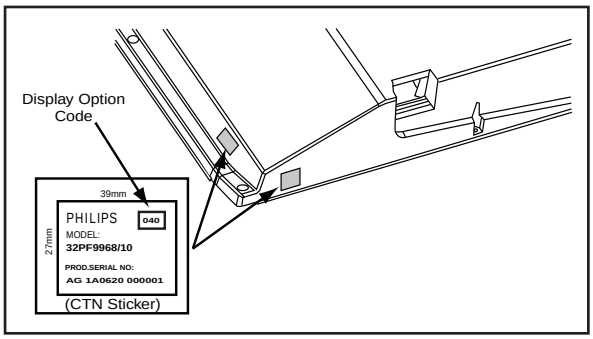
Via a standard RC transmitter: Key in the code “062596” directly followed by the “INFO” or “OK” button. After activating SAM with this method a service warning will appear on the screen, continue by pressing the “OK” button on the RC.

Contents of SAM
- **Hardware Info.**
  - **A. SW Version.** Displays the software version of the main software (**example:** QF2XX_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 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 5-2 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.
- **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 “repairl” 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 STANDBY 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.xml) 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.xml) 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.

Attention: for every dump which imply data tranfers to USB, preferably execute without connected devices like HDD, camera, etc.linked via USB port.This to avoid any possible data corruption.

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 sensor board.** Shows the 12NC of the sensor board.

Software versions

- **Current main software.** Displays the build-in main software version. In case of field problems related to software, upgrade can be done. As this software is consumer upgradeable, it will also be published on the Internet.
  Example: QF2xx-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_77.3.11.16
- **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.
- **PQ back-end version.**Displays the Scan/backlight microProcessor software version.Device processes the backlight + boost pwm control, scanning, 3D drive.
- **NT 72314 software.**Software version Novatek 72314 (Frame Rate Convertor) device, located on Quad full HD Bolt-on board.
- **NT 68361 software.**Software version Novatek 68361 (4K HDMI to LVDS) device, located on Quad full HD Bolt-on board.
- **RF4CE software.**Software version for the RF4CE board**.**

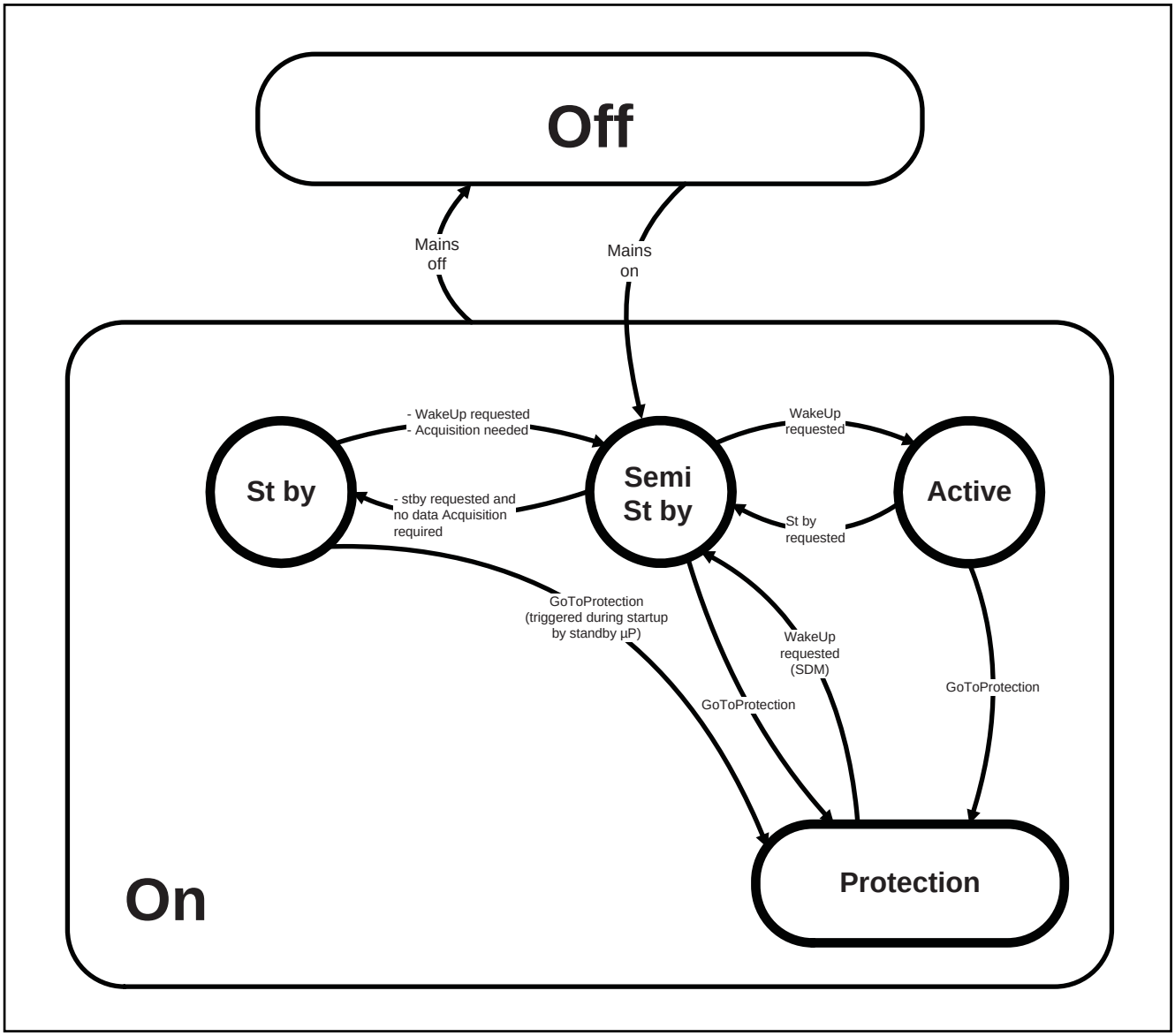
Quality items

- **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.
- **ESN-Netflix.** Netflix electronic serial number.
- **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).

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.



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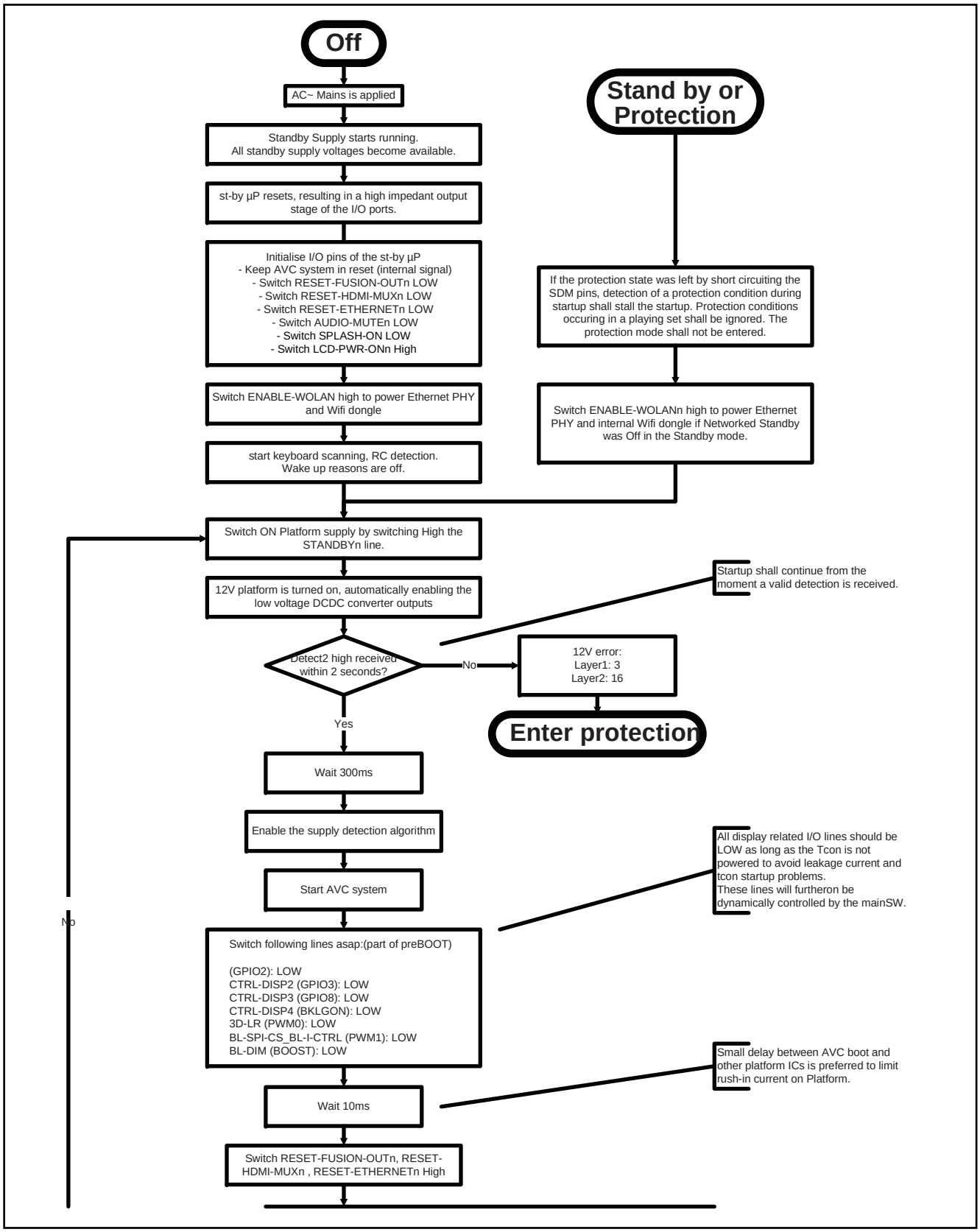
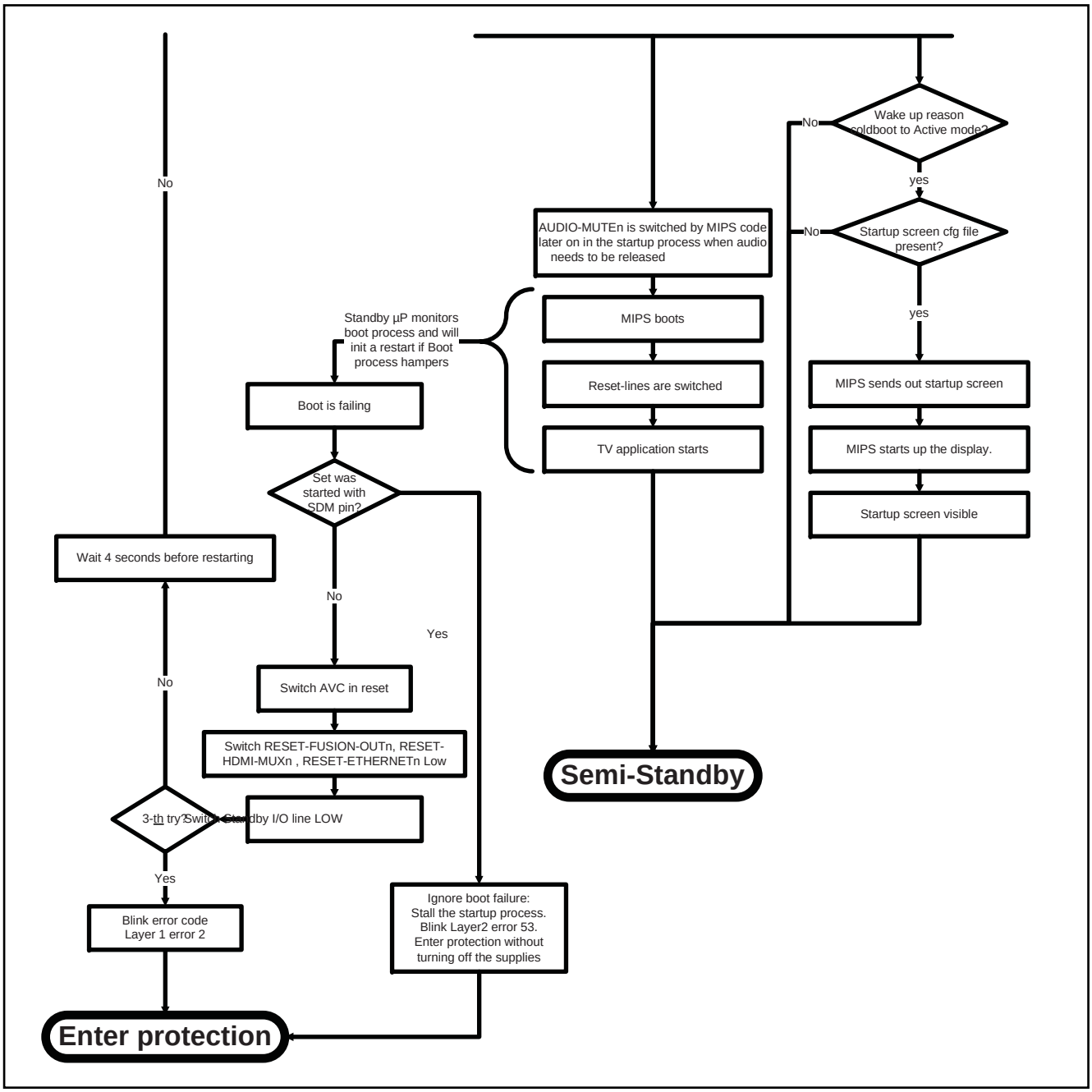
120504

Figure 5-3 Transition diagram



19210_080_120504.eps
120504

Figure 5-4 “Off” to “Semi Standby” flowchart (part 1)



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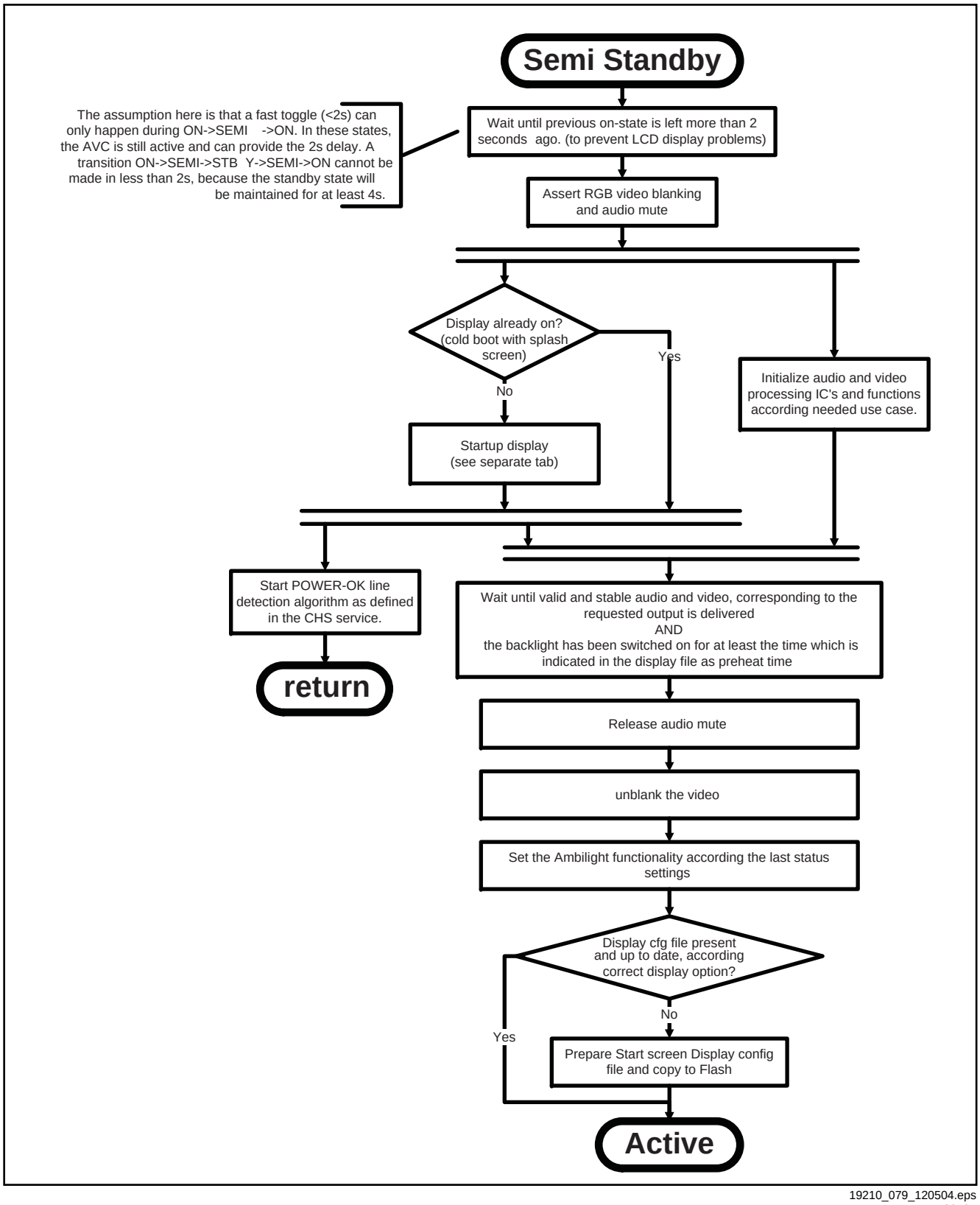
120504

Figure 5-5 “Off” to “Semi Standby” flowchart (part 2)



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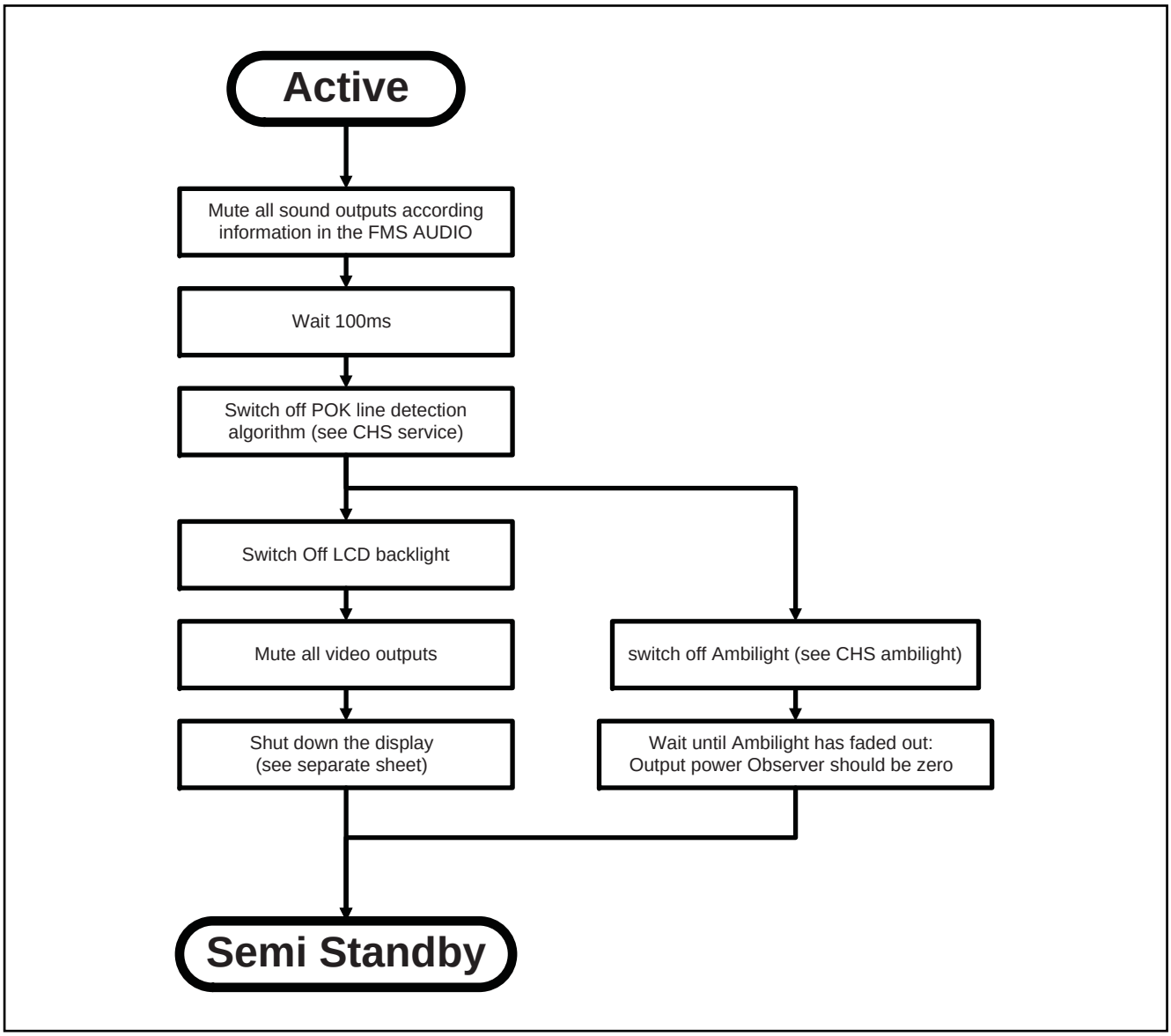
120504

Figure 5-6 “Semi Standby” to “Active” flowchart



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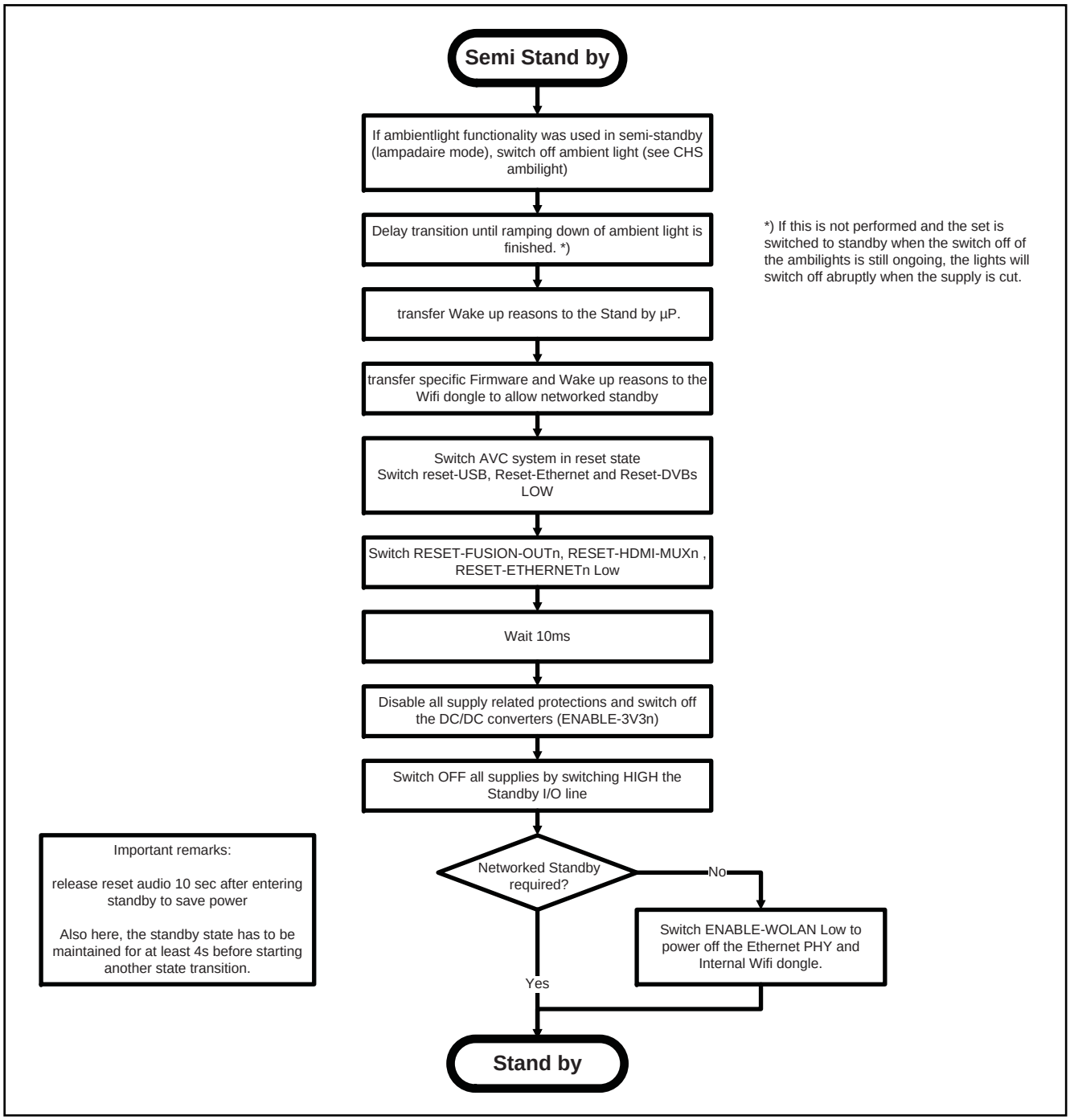
120504

Figure 5-7 “Active” to “Semi Standby” flowchart



19210_078_120504.eps
120504

Figure 5-8 “Semi Standby” to “Standby” flowchart

5.4 Service Tools

5.4.1 ComPair

The ComPair Tool is no longer supported.

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(s) **LAYER 1** will be displayed via blinking LED.(attention: any new remote control press will disable the error blinking LED sequence, recovery by exit and invoke CSM again for re-enabling the error blinking).
- 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 I^2C 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^2CM3 (SSB + SRF bus)	2	13	MIPS	E	BL / EB	SSB	SSB
I^2CM2 (BE bus)	2	14	MIPS	E	BL / EB	SSB	SSB
I^2CM1(FE bus)	2	18	MIPS	E	BL / EB	SSB	SSB
PNX (Fusion) doesn't boot	2	15	Stby µP	P	BL	Fusion	SSB
12V	3	16	Stby µP	P	BL	/	Supply
HDMI mux	2	23	MIPS	E	EB	SII9287	SSB
I2C 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	SI2169	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	M24C64	SSB
Tuner DVB-S2	2	36	MIPS	E	EB	STV611X	SSB
Class-D	2	37	MIPS	E	EB	TAS 5731 PHP	SSB
µProcessor PQ	2	38	MIPS	E	EB	LPC1114	SSB
IO Expander	2	41	MIPS	E	EB	PCA9554	SSB
T° sensor SSB/set	2	42	MIPS	E	EB	LM75	T° sensor/SSB
Light sensor	6	43	MIPS	E	EB	TSL2571	Set
µP touch control	6	44	MIPS	E	EB	/	Set
RF4CE	6	46	MIPS	E	EB	/	Set
MIPS doesn't boot (SW cause)	2	53	Stby µP	P	BL	FUSION	SSB
NT72314	9	61	MIPS	E	EB	NT72314/	QFHD
NT68361	9	62	MIPS	E	EB	NT68361/	QFHD
NT72314 not alive	9	63	MIPS	E	EB	NT72314/	QFHD
NT68361 not alive	9	64	MIPS	E	EB	NT68361/	QFHD

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 (I^2C 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 (I^2C 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 (I^2C 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 Standby 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)**. "Power OK" not applicable.
- **Error 23 (HDMI mux)**. When there is no I^2C 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 I^2C communication towards the I^2C 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 I^2C 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 I^2C 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 I^2C 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 I^2C 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 I^2C 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: "<< ERROR >>> PFPOW_.C: First Error (id19, Layer_1= 2 Layer_= 35)".
- **Error 36 (Tuner DVB-S)**. When there is no I^2C 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 I^2C 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 (microProcessor PQ)**. When there is no I^2C communication towards this processor 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.
- **Error 41 (I/O Expander)**. When there is no I^2C communication towards this processor device during start-up, LAYER 2 error = 41 will be logged and displayed via the blinking LED procedure when SDM is switched "on".
- **Error 42 (Temp sensor)**. Only applicable for TV sets equipped/stuffed with temperature devices.
- **Error 43 (Light sensor)**. When there is no I^2C 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 I^2C 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.
- **Error 61 (NT72314)**. When there is no I²C acknowledge from the Novatek device (Quad full HD Bolt-on board) towards the MIPS during start-up, LAYER 2 error = 61 will be logged.Here, the Novatek device operates as frame rate convertor.
- **Error 62 (NT68361)**. When there is no I²C acknowledge from the Novatek device (Quad full HD Bolt-on board) towards the MIPS during start-up, LAYER 2 error = 62 will be logged.Here, the Novatek device supports the 4K HDMI to LVDS conversion.
- **Error 63 (NT72314 not alive)**.Error generated via I²C by the device itself, although acknowledge passed and confirmed.
- **Error 64 (NT68361 not alive)**.Error generated via I²C by the device itself, although acknowledge passed and confirmed.

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 then 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, +2V5, +1V2 and +1V1 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.xml) 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 Power conversion and distribution.

Description

Input power for the TV platform comes from the main power supply that delivers +3V5-STANDBY (pin 9 of connector 1M90) and +12V (pins 11,12 and 25,26 of the same connector). +3V5-STANDBY (3.5V nominal) is the permanent voltage while +12V is started by the STANDBY signal (connector 1M90, pin 10) when going from high to low. +12V is split in few 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 and +V-LNB switching regulators.

The on board power supply consists of 4 switching voltage regulators (5 in case of DVB-S version), 8 linear voltage regulators (9 in case of DVB-S version) and an over-current protection circuit for 12V (AMBI-POWER) ambilight boards.

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

- +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 and +1V5 to +1V2-MIPS and +1V5 to +1V2-FE linear voltage regulators.
- +3V3 supply voltage (3.32V nominal): overall 3.3V for on board IC's and external ambientlight panels, also used as input voltage for linear voltage regulators delivering +1V1-FA, +1V2-FA and +2V5.
- +5V (5.15V nominal) for USB ports, 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 (if present) DVB-T2 and DVB-S2 demodulator IC devices.
- +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 Vx1 interface and various other internal blocks of Fusion.
- +3V3 supply voltages (3.3V nominal, from +5V) for RF tuners, separate linear regulator per tuner.
- +3V3-STANDBY supply voltage(3.3V nominal, from +3V5-STANDBY) for Fusion standby controller and IR/RF remote-control receivers.
- +3V3-LAN supply voltage (3.37V nominal, from +3V5-STANDBY) for WiFi module and LAN interface of Fusion, this supply voltage is present when ENABLE-WOLAN is high.

Start-up of switching converters is triggered by DETECT12V signal that becomes high when +12V rises above 10V and stays above 9V (1V hysteresis).DETECT12V is used as enable signal by the +12V to +5V switching converter;+12V to +1V1-FD and +12V to +1V5(and +1V2-MIPS) will start at the same time with +5V due to ENABLE+1V5+1V1 that is set high by DETECT12V signal.Tuners are supplied from their respective linear voltage regulators when +5V starts.The rest of the supply voltages (+3V3, +2V5, +1V2-FA, +1V2-FE and +1V1-FA) are switched on a few milliseconds later by signal ENABLE+3V3.

In case of TV sets having ambilight consumption from +12V higher than 1A, the electronic protection circuit (7UAC or 7UAD 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 for 7UAC and 3.5A for 7UAD. Once the over-current protection is triggered, it can be reset by removing the shortcircuit cause and keeping it under no load condition for about 100 ms.

Important remark: for tests, GND-AL must be connected to platform GND.

+V-LNB value is set via the I^2C bus: around 13V for vertical polarized satellite channels and around 18V for the horizontal ones. Maximum output current is limited 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 R3 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 7UP2, 500KHz for 7UC0 and 7URA, 650KHz for 7UB5 and 800KHz for 7UR6.
- 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"

This mode can be recognized as state of no respons on any random remote control request, this mode manifest by flashing LED, visualized in front of the TV.
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 “QFUX.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 over and over). 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).
- I^2C 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 Memory test

The memory test is running in the background of the main TV software.It allocates a memory pool used to write and read back predefined data, as reference to detect possible memory corruption.The memory test is enabled by dial-in of sequence “6636” while the remote control (dedicated) is in DVD mode and the TV in CSM.Once the red LED in the front of the TV set starts blinking, exit CSM in order to display video.As long as the memory test is running and no error is detected, the standby LED is blinking.Upon detection of errors, the standby LED stays continuous ON and details will be shown in the prints of the Uart logging.It is not possible to stop the memory test once launched unless the TV is restarted, also increase/decrease the frequency of the memory interface can not be set.

Startup procedure:
- Switch ON the TV set.
- Set TV use case (preferably DVBT H264 or HDMI1080p).
- Invoke CSM (dial-in “123654”on the remote control).
- Set the remote control in DVD mode, and enter sequence “6636”.
- Check the loggings coming from the service connector (Mips Uart prints) :
  “**MemoryTest No errors found so far (loop xx)”
  xx : number of tests done.
- As long as the memory test is running and no error is detected, the standby LED is blinking continuously, upon detection of errors, the standby LED stays ON.
- Get out of CSM in order to see video.

COM port settings:
- Baud rate: 115200
- Data: 8 bits
- Parity: none
- Stop: 1 bit
- Flow control: none

Error detection :
In case some errors are detected, the standby LED will stop blinking and following logs can be retrieved in the Uart prints:
- Error: offset [address] (READ/WRITE) xxxxxxxx/yyyyyyyy/ zzzzzzzz should be nnnnnnnn.
  with:
- Offset: offset address where error is detected from start of buffer.
- Address: physical address where error is detected from start of buffer.
- READ/WRITE: indicates if error occurred during read or write memory access.
- xxxxxxxx/yyyyyyyy/zzzzzzzz: the 3 data reads from the memory location where the error(s) occurred.
- nnnnnnnn: correct data (expected content).

In some cases the TV software can crash before an error is detected.Thus, symptoms of software crash (reboot, picture freeze, no picture) should also be considered as test failure.

5.8.9 Loudspeakers

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

5.8.10 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).
Attention point for cable handling: (dis)connection for power cable (power supply <=> SSB) should always be executed without any bending or mechanical stress on the outisdes of the connector 1M90.Risk of double pins inside the connector should be avoid in this way.

5.8.11 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:
The display option code can be changed by "062598 HOME XXX" special SAM command (XXX=display option in 3 digits).

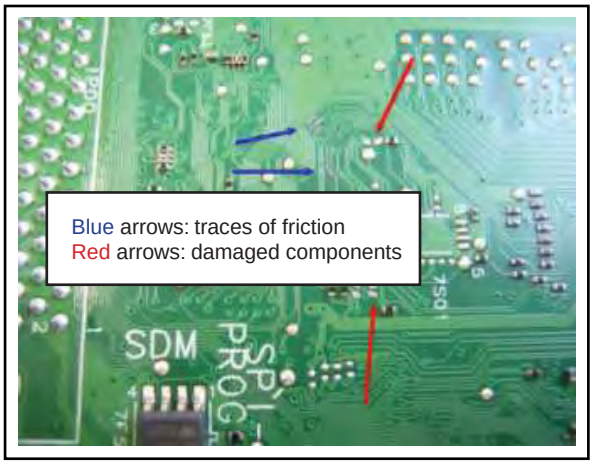
5.8.12 SSB Replacement

Follow the instructions in the flowchart in case a SSB has to be exchanged. See table 5-3 SSB replacement instructions.

For a more general overview of steps to follow, refer to figure 5-11 SSB replacement flowchart.

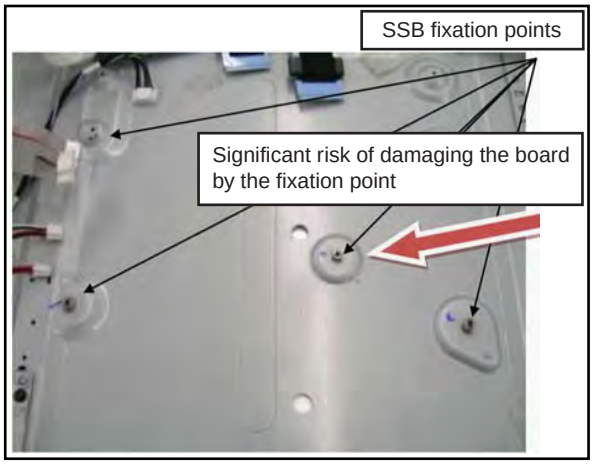
Table 5-3 SSB replacement instructions

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. In case of issues by copying the program map table, 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 5-9 and Figure 5-10.
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 5-9 and Figure 5-10.
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 adviced 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 on 1M90. 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 × Elpida = 73, 4 × Elpida = 64, 2 × Hynix = 72, 4 × 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!).



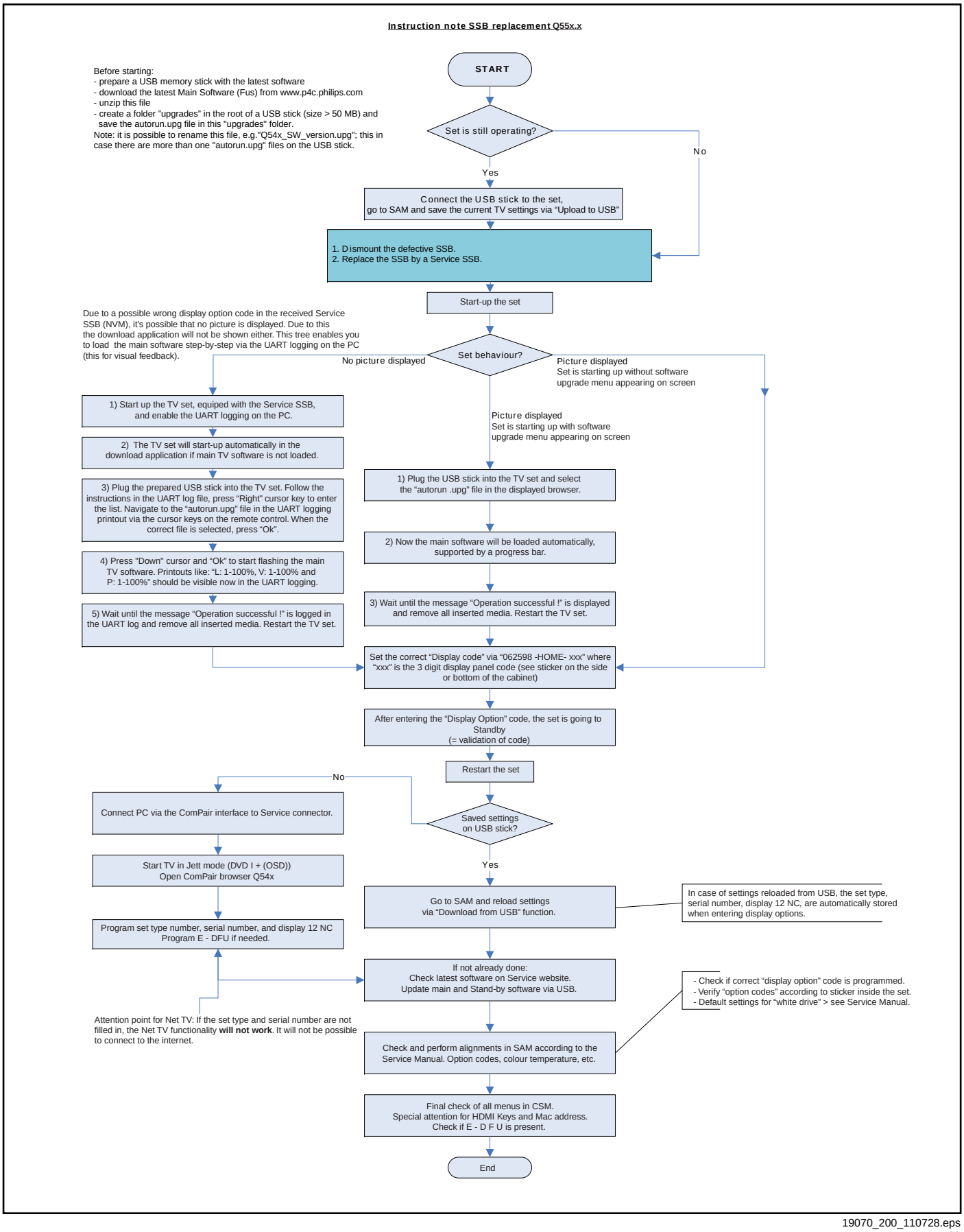
19070_201_110728.eps
110804

Figure 5-9 Mounting attention points [1/2]



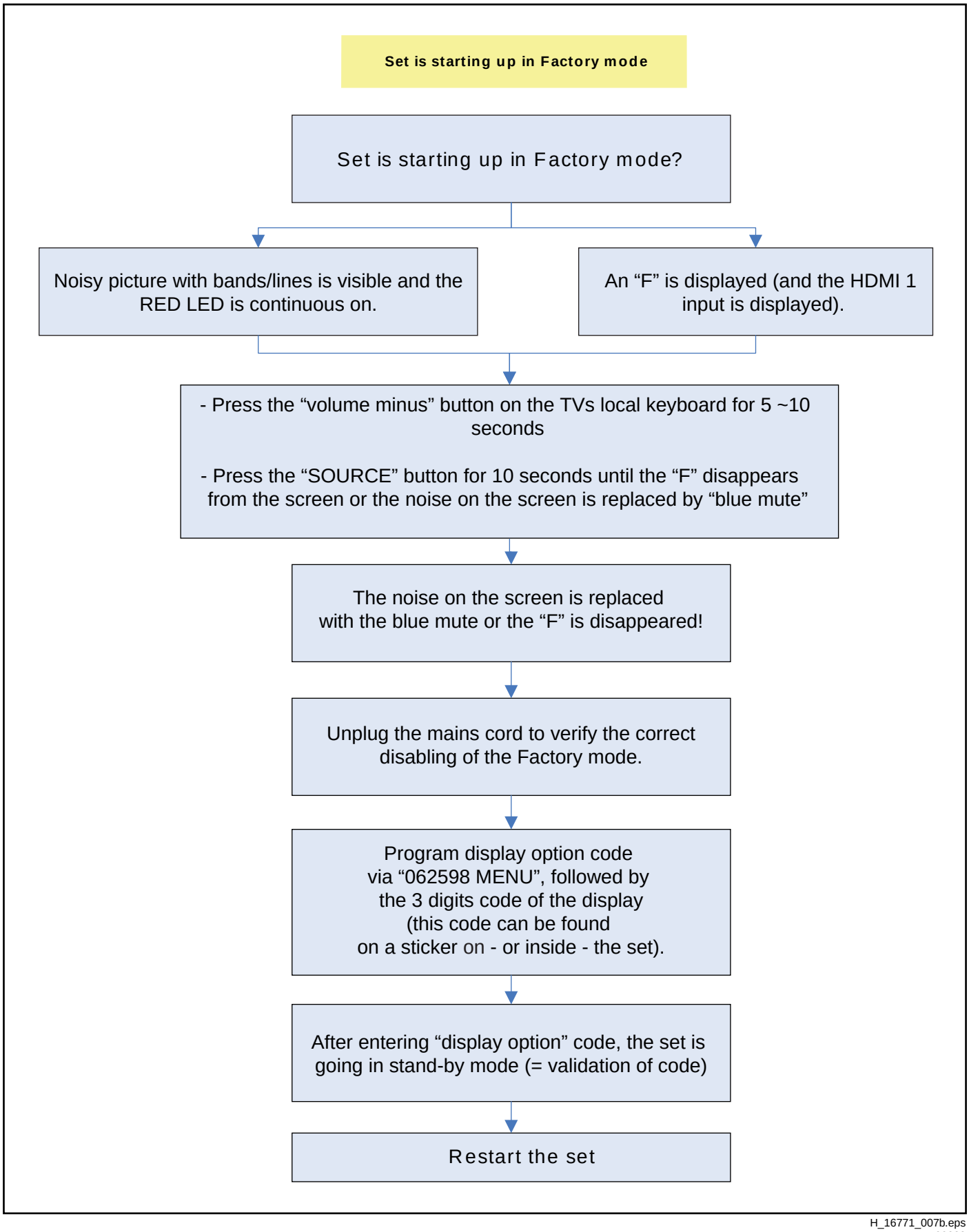
19070_202_110728.eps
110804

Figure 5-10 Mounting attention points [2/2]



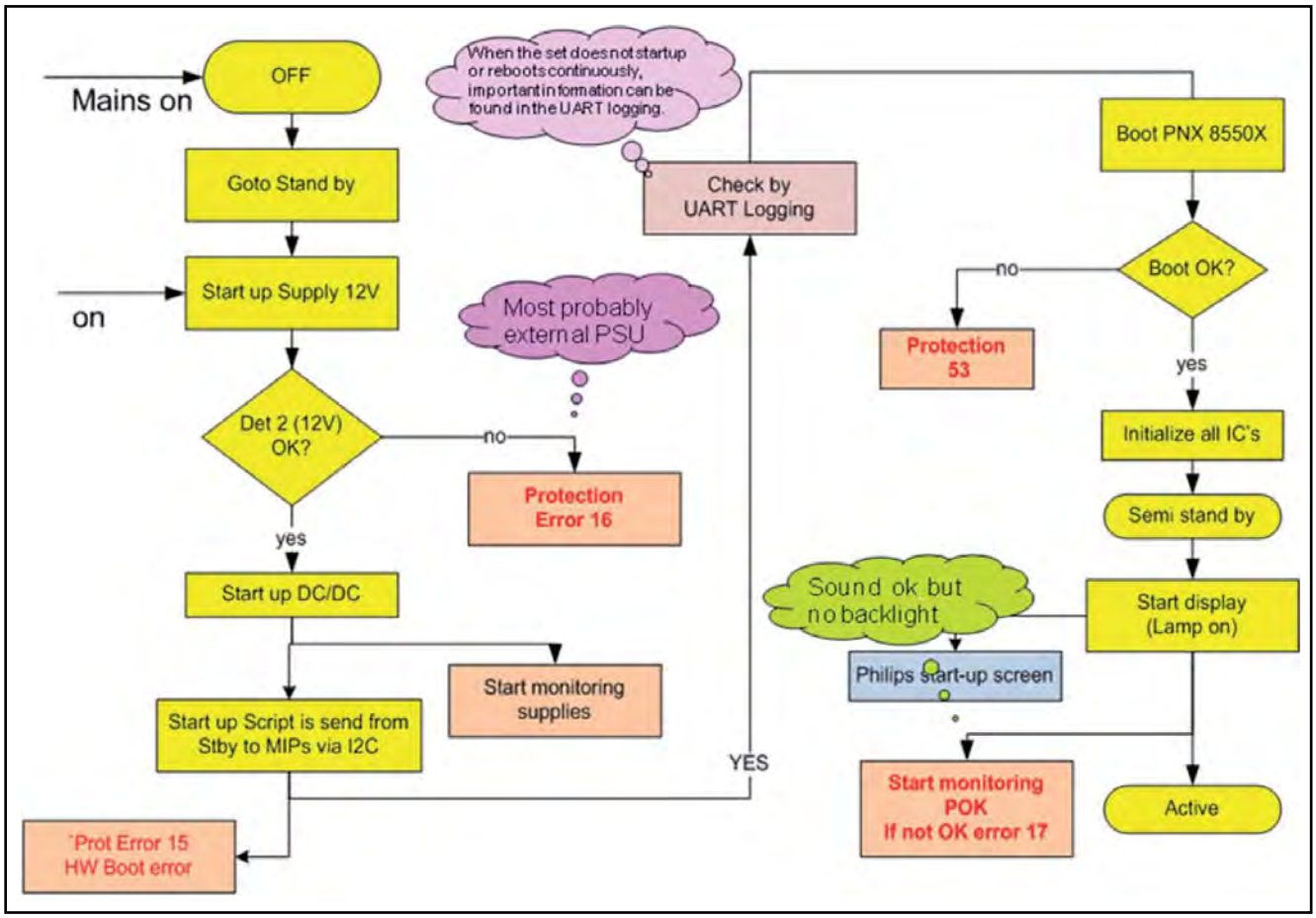
19070_200_110728.eps
111103

Figure 5-11 SSB replacement flowchart



H_16771_007b.eps
100322

Figure 5-12 SSB replacement flowchart - Factory mode



18753_211_100811.eps
110810

Figure 5-13 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” (part of the one-zip file: e.g. QF2EU_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_77.03.12.00_16.00.00.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.

- **BLCtrlµP_QF2EU_x.x.x.x.zip.** Contains the BLCtrlµP software in “upg” format.SW version available in CSM 2.5 PQ back-end software version.Attention : no power interruption allowed during the upgrade process (upgrade not full proof).
- **FullUpgrade_QF2EU_x.x.x.x.zip.** Contains the “upg” file which is needed to upgrade the TV main software and the standby software at once.
- **ProcessNVM_QF2EU_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.
- **NovatekAfterburner314_QF2EU_x.x.x.x.zip.** Contains the software in “upg” format to drive the Novatek 72314 (Frame Rate Convertor) device, located on Quad full HD Bolt-on board.
- **NovatekQfhdHDMI_QF2EU_x.x.x.x.zip.**Contains the software in “upg” format to drive the Novatek 68361 (4K HDMI to LVDS) device, located on Quad full HD Bolt-on board.

5.9.5 UART logging 2K13 (see section “5.8 Fault Finding and Repair Tips, 5.8.6 Logging).

6. Alignments

Index of this chapter:

6.1 General Alignment Conditions

Perform all electrical adjustments under the following conditions:

- Power supply voltage (depends on region):
  - **AP-NTSC:** 120 VAC or 230 V_{AC} / 50 Hz (± 10%).
  - **AP-PAL-multi:** 120 - 230 V_{AC} / 50 Hz (± 10%).
  - **EU:** 230 V_{AC} / 50 Hz (± 10%).
  - **US:** 120 V_{AC} / 60 Hz (± 10%).
  - **LATAM-NTSC:** 120 - 230 V_{AC} / 50 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: Ri > 10 MΩ, Ci < 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 standby.
- 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.

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 standby 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 color analyser (e.g.Minolta CA-210) in the centre of the screen and note the x, y value.
- Apply a 90% full white screen to the HDMI input and select this input.Format : 720p50.If a Quantum Data generator is used, it’s recommended to select the “FLAT” predefined setting from the device.
- 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 : 40/46/55(8000 series) displays.6-2 White D alignment values : 42/47/55(6000-7000 series) displays.). 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 : 40/46/55(8000 series) displays.

Value	Cool (11000K)	Normal (9000K)	Warm (6500K)
x	0.280	0.292	0.320
y	0.295	0.310	0.345

Table 6-2 White D alignment values : 42/47/55(6000-7000 series) displays.

Value	Cool (11000K)	Normal (9000K)	Warm (6500K)
x	0.277	0.289	0.317
y	0.299	0.313	0.348

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

- Select a COLOUR TEMPERATURE (e.g. COOL, NORMAL, or WARM).
- Set the RED, GREEN and BLUE default values according to the values in Table 6-5.
- 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 40" PFL series

White Tone	40PFL8008/x		
Colour Temp	**R**	**G**	**B**
Normal	127	110	110
Cool	123	115	127
Warm	127	99	72

Table 6-4 White tone default settings 42" PFL series

White Tone	42PFLxxx8/x		
Colour Temp	**R**	**G**	**B**
Normal	127	118	116
Cool	120	120	127
Warm	127	108	74

Table 6-5 White tone default settings 46" PFL series

White Tone	46PFL8008/x		
Colour Temp	**R**	**G**	**B**
Normal	127	99	108
Cool	124	102	125
Warm	127	87	71

Table 6-6 White tone default settings 46" PDL series

White Tone	46PDL8908/x		
Colour Temp	**R**	**G**	**B**
Normal	127	92	92
Cool	127	98	110
Warm	127	84	58

Table 6-7 White tone default settings 47" PFL series

White Tone	47PFL6xx8/x		
Colour Temp	**R**	**G**	**B**
Normal	127	105	98
Cool	126	112	124
Warm	127	95	58

White Tone	47PFL7xx8/x		
Colour Temp	**R**	**G**	**B**
Normal	127	109	110
Cool	123	112	127
Warm	127	96	63

Table 6-8 White tone default settings 55" PFL series

White Tone	55PFL6xx8/x		
Colour Temp	**R**	**G**	**B**
Normal	127	99	97
Cool	127	107	118
Warm	127	87	54

White Tone	55PFL7xx8/x		
Colour Temp	**R**	**G**	**B**
Normal	127	97	101
Cool	127	102	122
Warm	127	85	58

White Tone	55PFL8008/x		
Colour Temp	**R**	**G**	**B**
Normal	127	103	113
Cool	122	103	127
Warm	127	90	74

Table 6-9 White tone default settings 55" PDL series

White Tone	55PDL8908/x		
Colour Temp	**R**	**G**	**B**
Normal	127	96	98
Cool	127	100	116
Warm	127	88	59

Table 6-10 White tone default settings 60" PFL series

White Tone	60PFL6008/x		
Colour Temp	**R**	**G**	**B**
Normal	127	108	103
Cool	127	115	121
Warm	127	96	63

White Tone	60PFL8708/x		
Colour Temp	**R**	**G**	**B**
Normal	127	123	91
Cool	124	125	111
Warm	127	118	51

Table 6-11 White tone default settings 65" PFL series

White Tone	65PFL9708/x		
Colour Temp	**R**	**G**	**B**
Normal	125	123	125
Cool	113	115	127
Warm	127	113	89

Table 6-12 White tone default settings 84" PFL series

White Tone	84PFL9708/x		
Colour Temp	**R**	**G**	**B**
Normal	127	112	118
Cool	120	111	127
Warm	127	104	79

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 “6-13 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 6-13 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

6.4 Option Settings

6.4.1 Introduction

The microprocessor communicates with a large number of I^2C 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” / “standby” 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 6.4.4.

6.4.3 Option Code Overview

Refer to the rearcover 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**!

6.4.4 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 rearcover 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 Specs, Diversity, and Connections.

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 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.

18310_221_090318.eps
090319

Figure 6-1 SSB identification

6.6 Total Overview SAM modes

Table 6-14 SAM mode overview

Main Menu	Sub-menu 1	Sub-menu 2	Sub-menu 3	Description
Hardware Info	A. SW version	e.g. “QF2EU_0.49.1.0		Display TV & Standby SW version and CTN serial number
	B. Standby processor version	e.g. “STDBY_77.3.11.16”		
	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				Displays 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		LCD White Point Alignment. For values, see Table 6-5 White tone default settings 46" PFL series to 6-8 White tone default settings 55" PFL series
		White point green		
		White point blue		
	Ambilight	Select module		
		Brightness		
		Select matrix		
Option numbers	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.
Store				Select Store in the SAM root menu after making **any** changes
Software maintenance	Software events	Display		Display information is for development purposes
		Clear		
		Test reboot		
		Test kernel crash		
		Test application crash		
	Hardware events	Display		Display information is for development purposes
		Clear		
Test setting	Digital info	Current frequency: 538		
		QAM modulation: 64-qam		Display information is for development purposes
		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		

Main Menu	Sub-menu 1	Sub-menu 2	Sub-menu 3	Description
RF4CE pairing tables				Clear paired remote control
Development file versions	Development 1 file version	Display parameters DISPT5.0.9.29		Display information is for development purposes
		Acoustics parameters SNDPR 5.0.6.20		
		PQ parameters FUSIO 1.0.27.22		
		Ambilight parameters PRFAM 5.0.5.2		
		Temp comp parameters 1.3		
	Development 2 file version	12NC one zip software		Display information is for development purposes
		Initial main software		
		NVM version QF2EU_0.4.5.0		
		e-Sticker software		
Upload to USB	Channel list (not)			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 (not)			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:

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

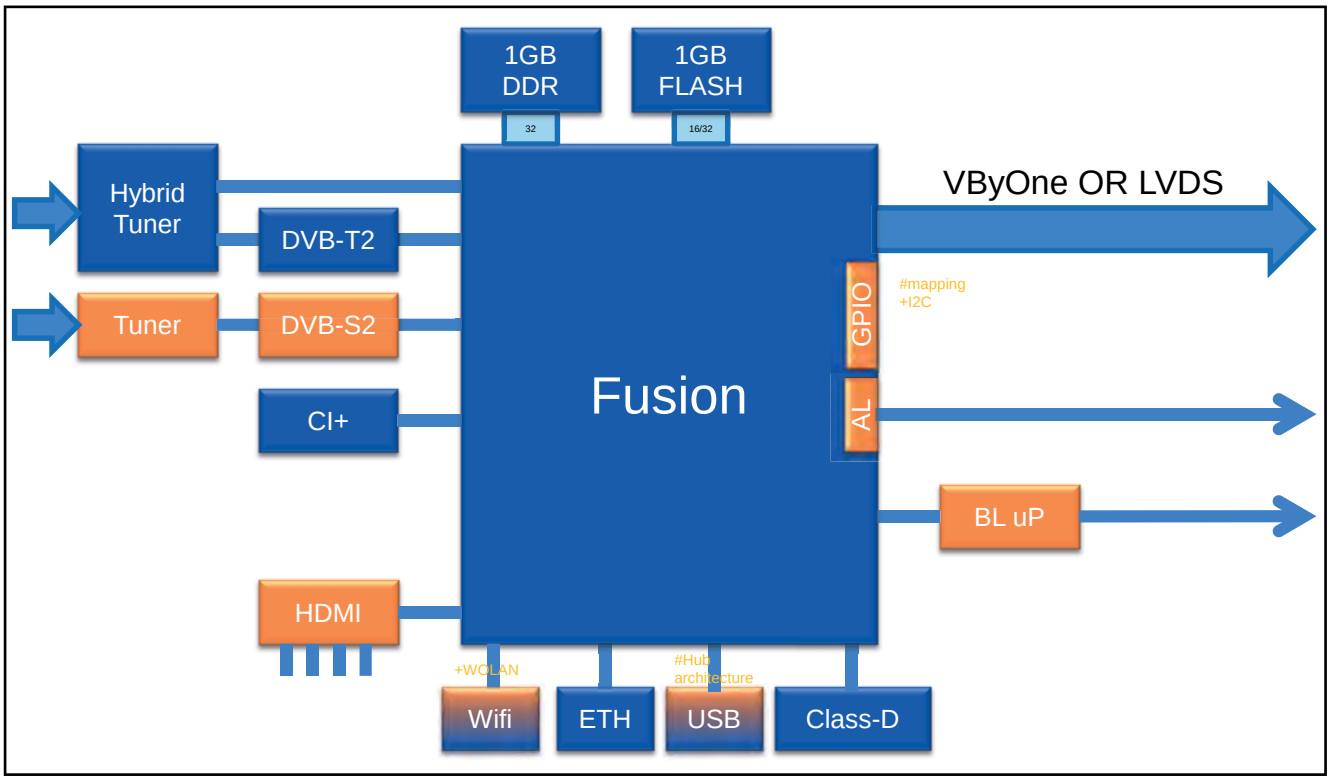
The QFU1.2E LA chassis is part of the FUSION platform and covers sets in the 6xxx, 7xxx, 8xxx and 9xxx range.

It uses the same chipset as the earlier QFU1.1E LA chassis.

Only circuits that differ from this chassis are described in this manual. For all other info, refer to the QFU1.1E LA manual.

7.1.1 FUSION 2013 Architecture Overview

For details about the chassis block diagrams refer to chapter 9. Block Diagrams. An overview of the FUSION 2013 architecture can be found in Figure 7-1.



19370_083_130208.eps
130208

Figure 7-1 Architecture of FUSION platform 2013

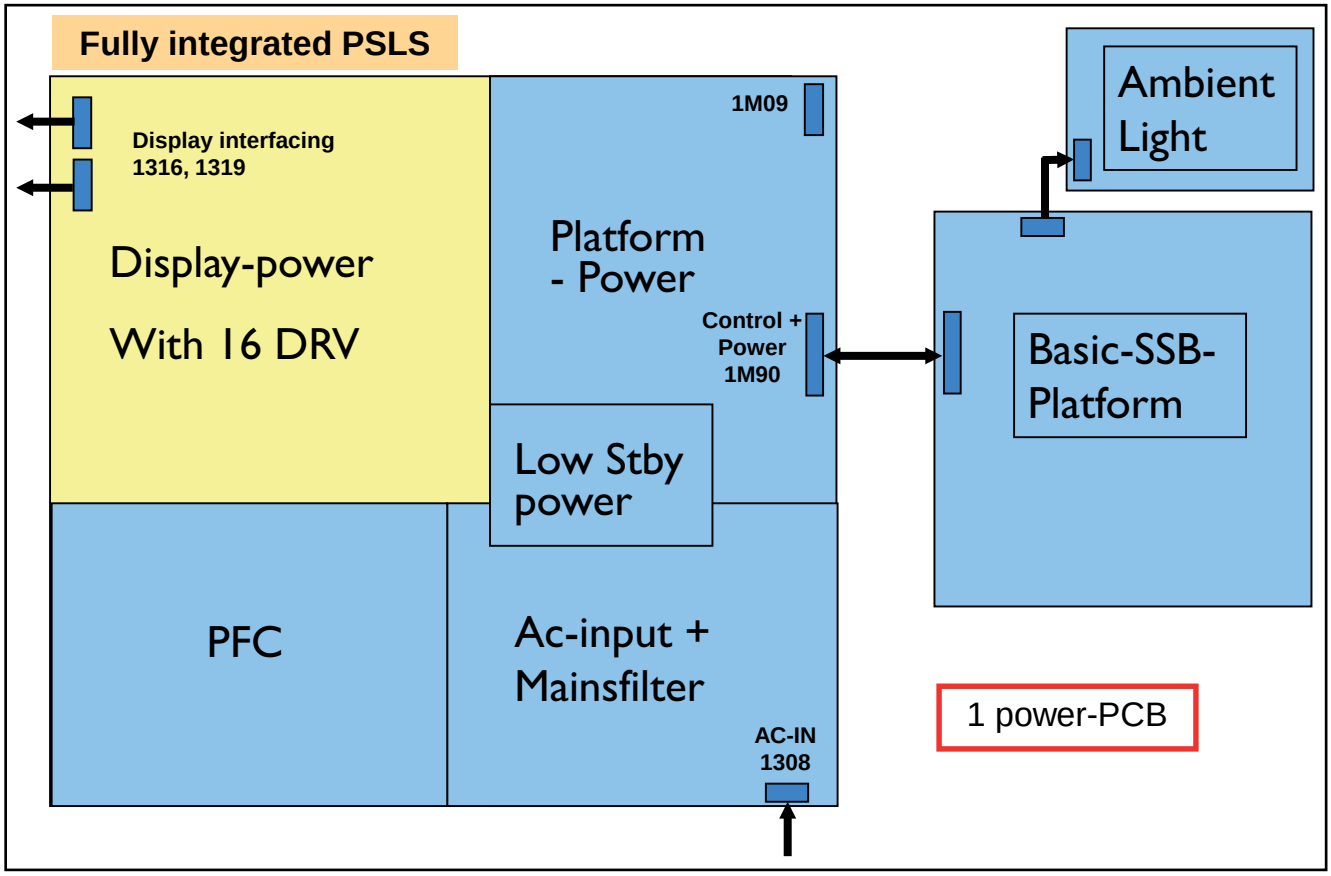
7.2 Power Supply

7.2.1 Power Supply Unit

All 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.

7.3 General Power Architecture

For the power architecture, refer to figure 7-2



19370_084_130208.eps
130208

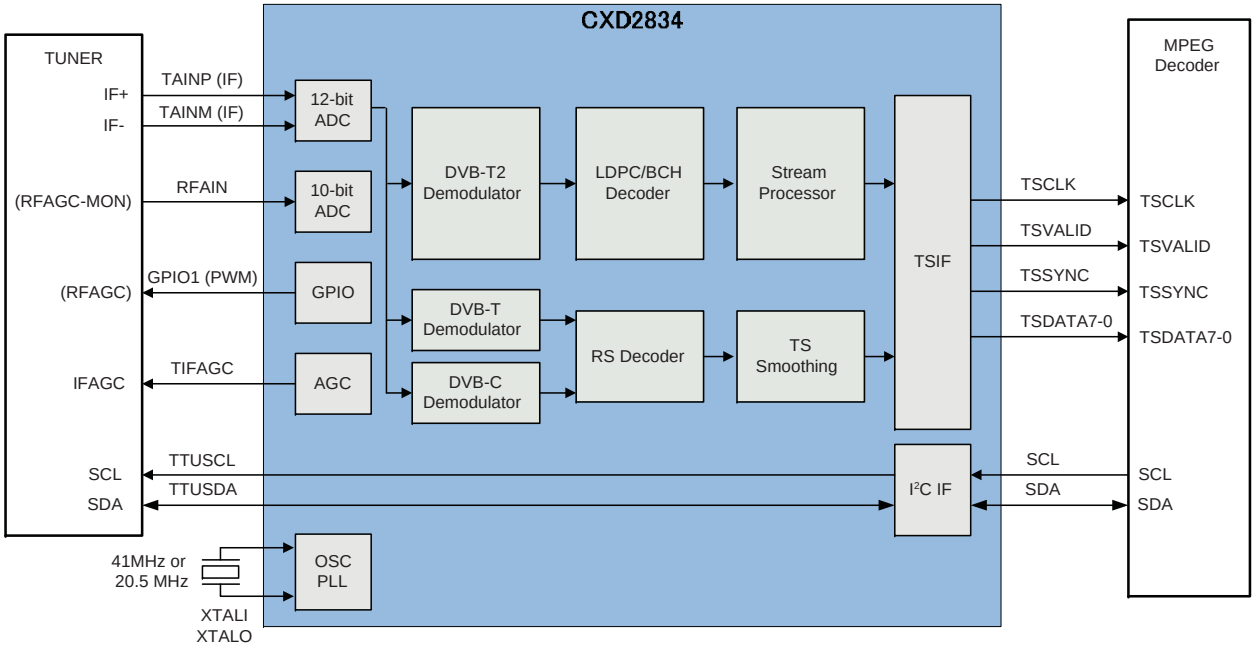
Figure 7-2 High level power architecture

8. IC Data Sheets

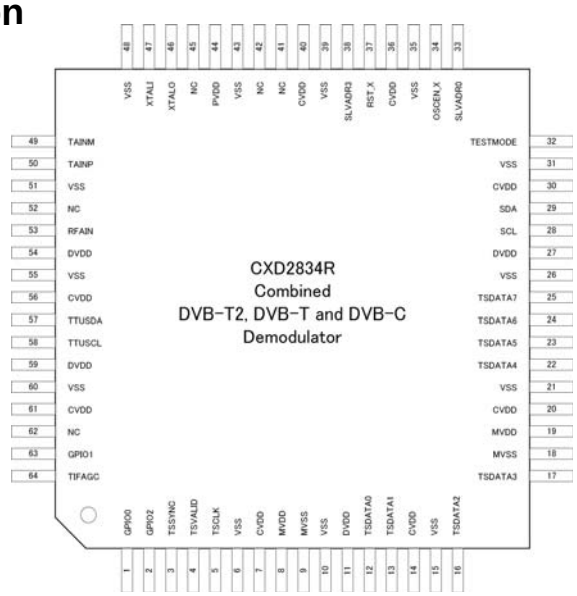
This chapter shows the internal block diagrams and pin configurations of ICs that are drawn as “black boxes” in the electrical diagrams (with the exception of “memory” and “logic” ICs).

8.1 Diagram 10-1-8 B02C, DVBT2 channel decoder B02C, CXD2834 (IC7KC0)

Block diagram



Pinning information



19220_025_120227.eps
120227

Figure 8-1 Internal block diagram and pin configuration

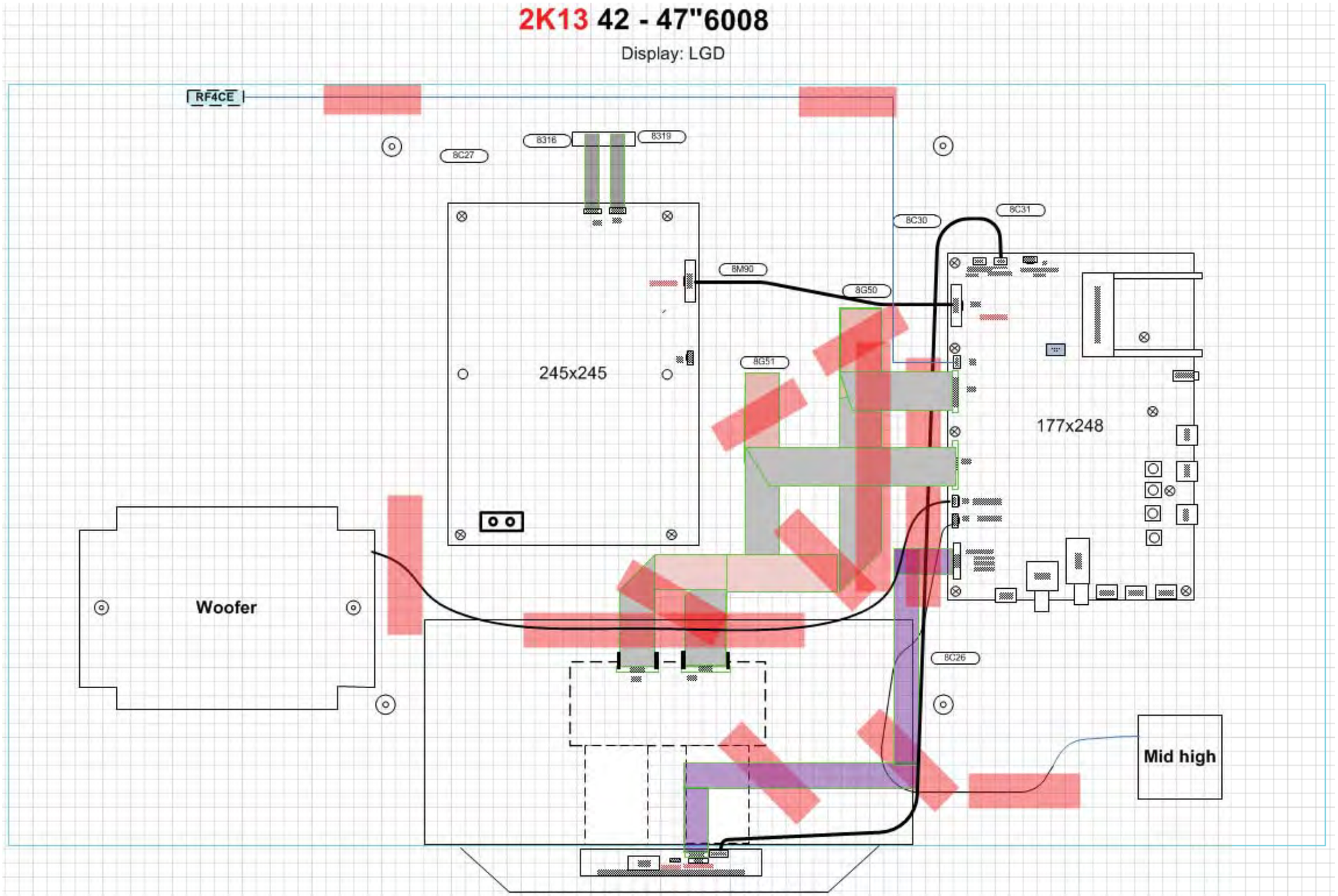
Personal Notes:

9. Block Diagrams

9.1 Wiring Diagram Series 40"

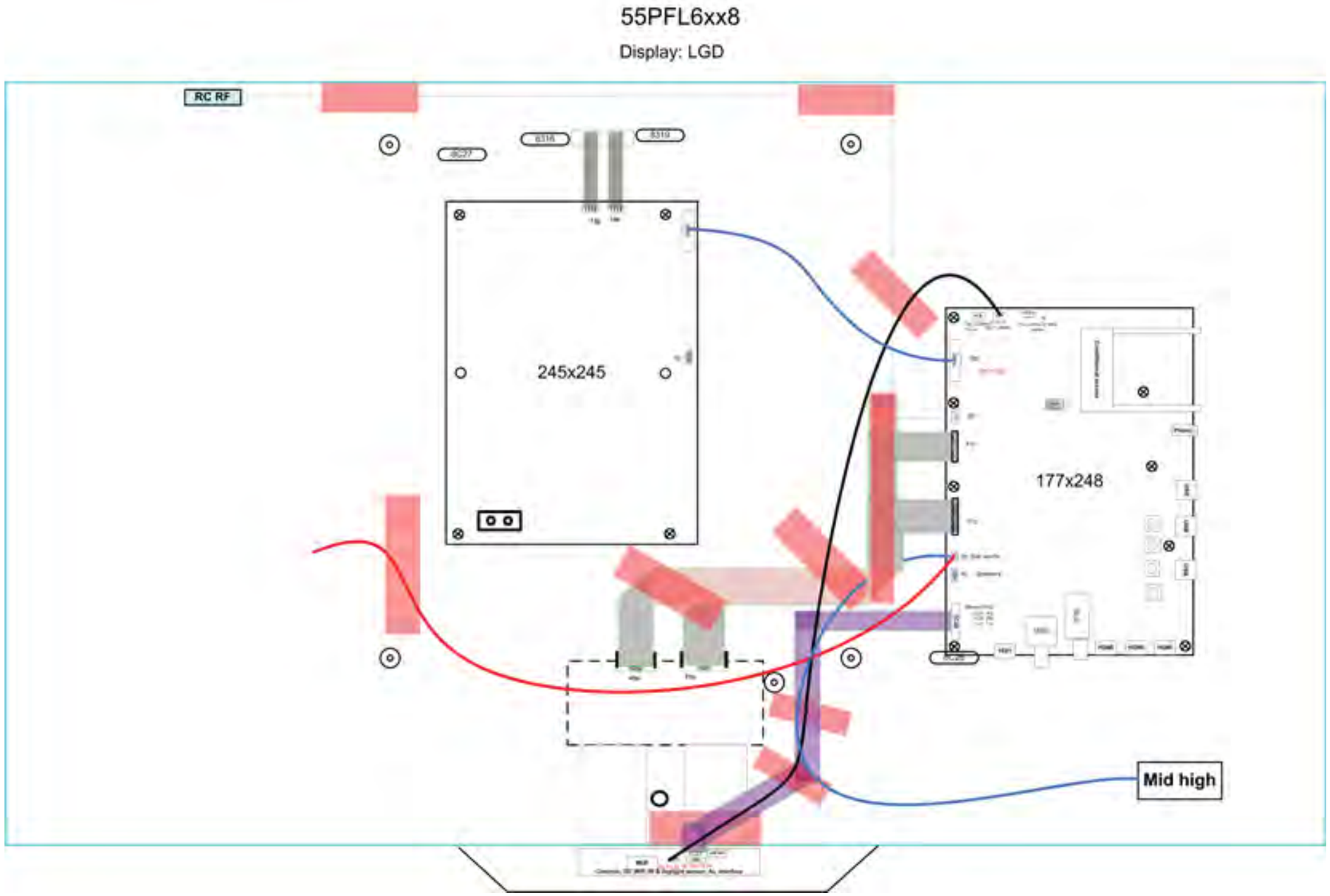
9.2 Wiring Diagram 42" - 47" 6xxx series

Wiring diagram 42"- 47" 6xxx series



9.3 Wiring Diagram 55" 6xxx series

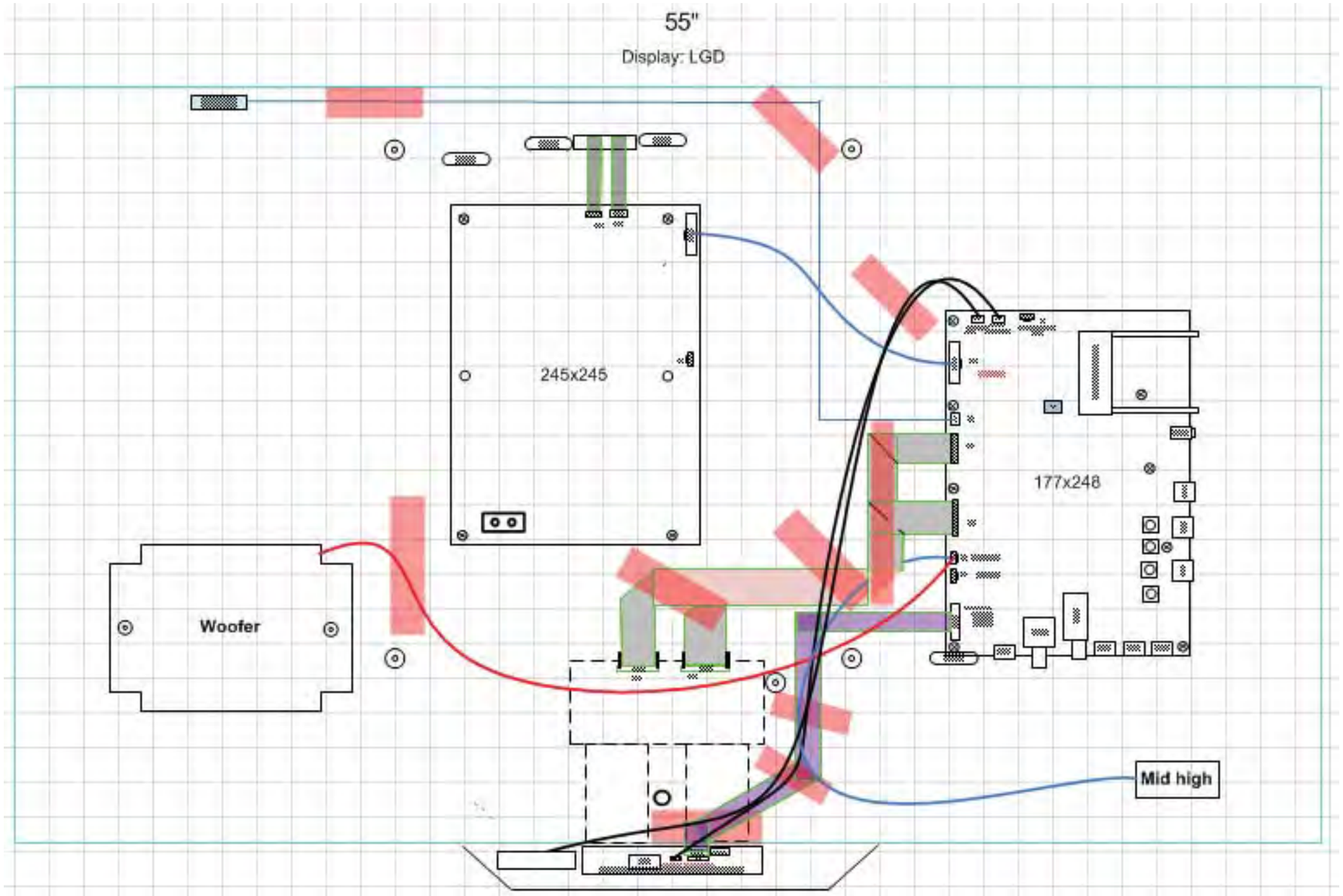
Wiring diagram 55" 6xxx series



19374_024_140110.eps
140110

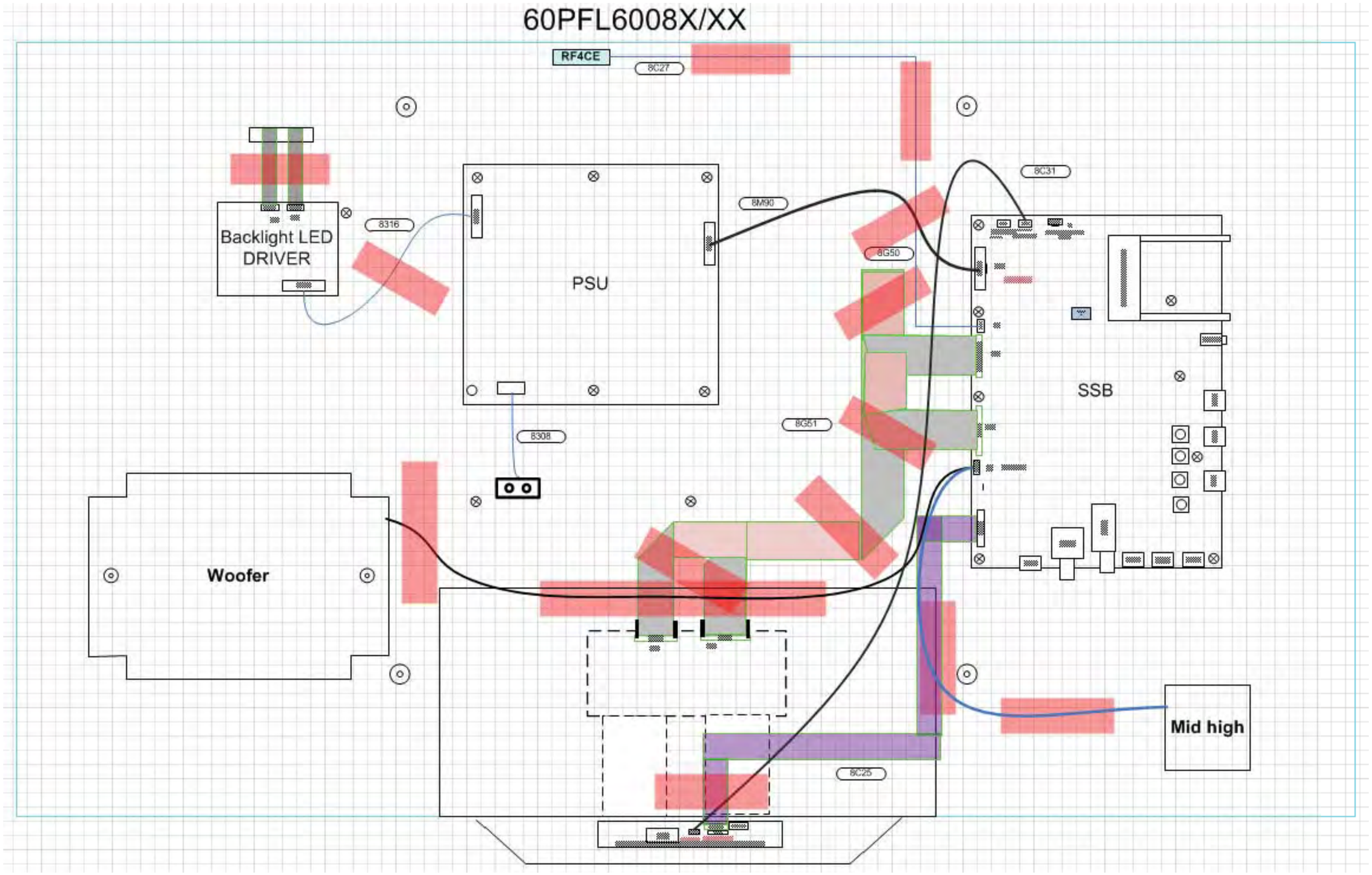
9.4 Wiring Diagram 55" 7xxx series

Wiring diagram 55" 7xx8 series



9.5 Wiring Diagram 60" 6xxx series

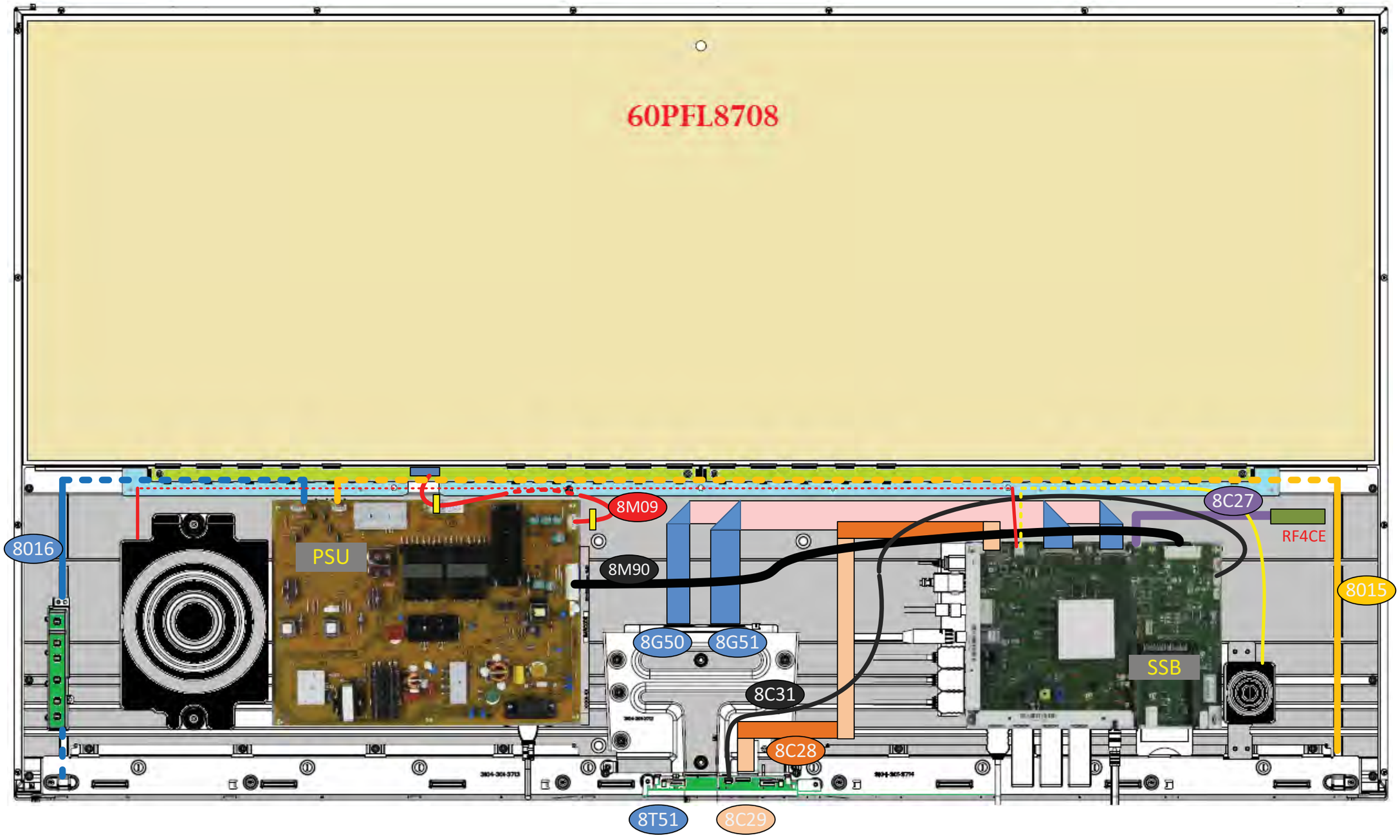
Wiring diagram 60" 6xxx series



19374_023_140110.eps
140110

9.6 Wiring Diagram 60" 8xxx series

Wiring diagram 60" 8xxx series



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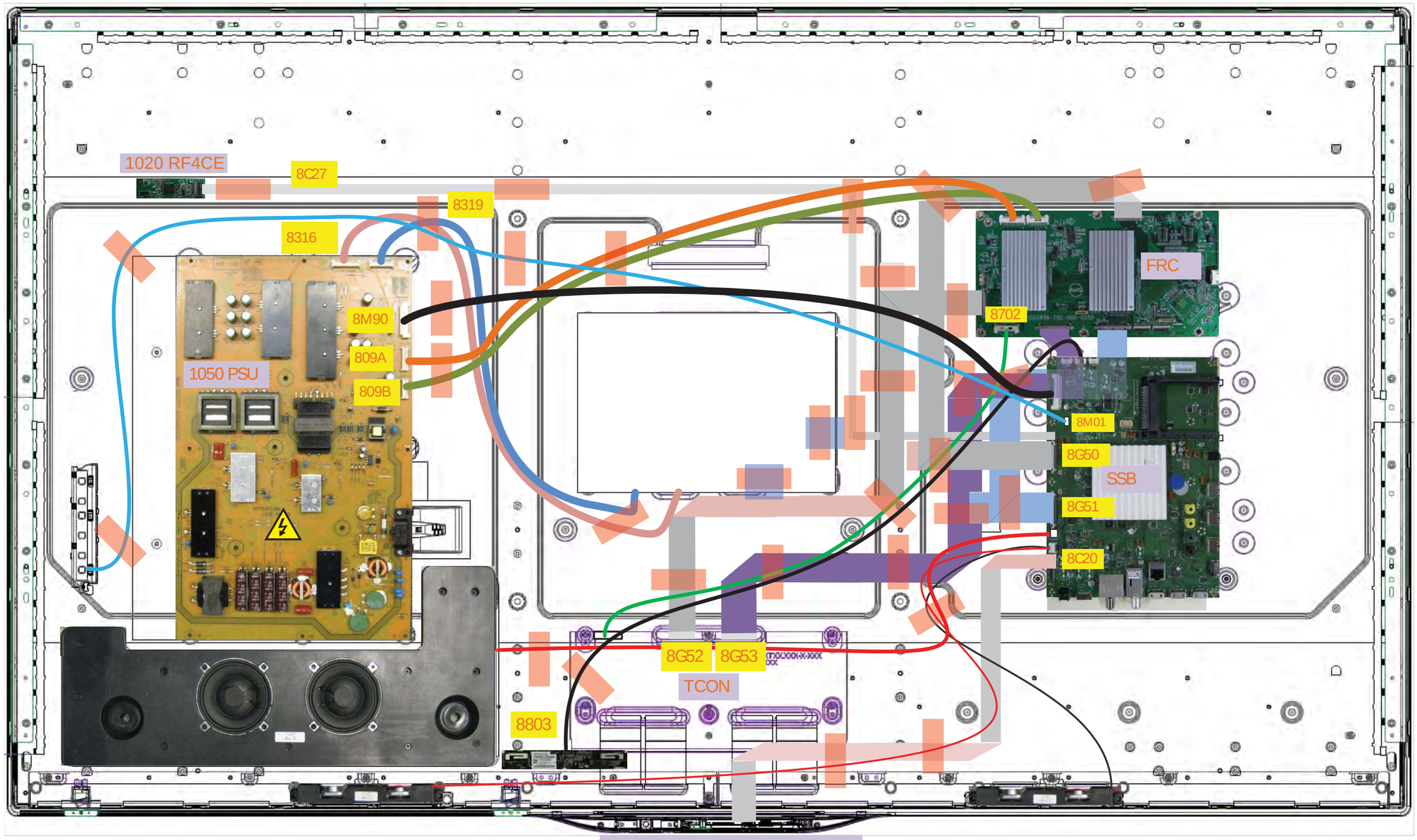
140110

9.7 Wiring Diagram 65" 9xxx series

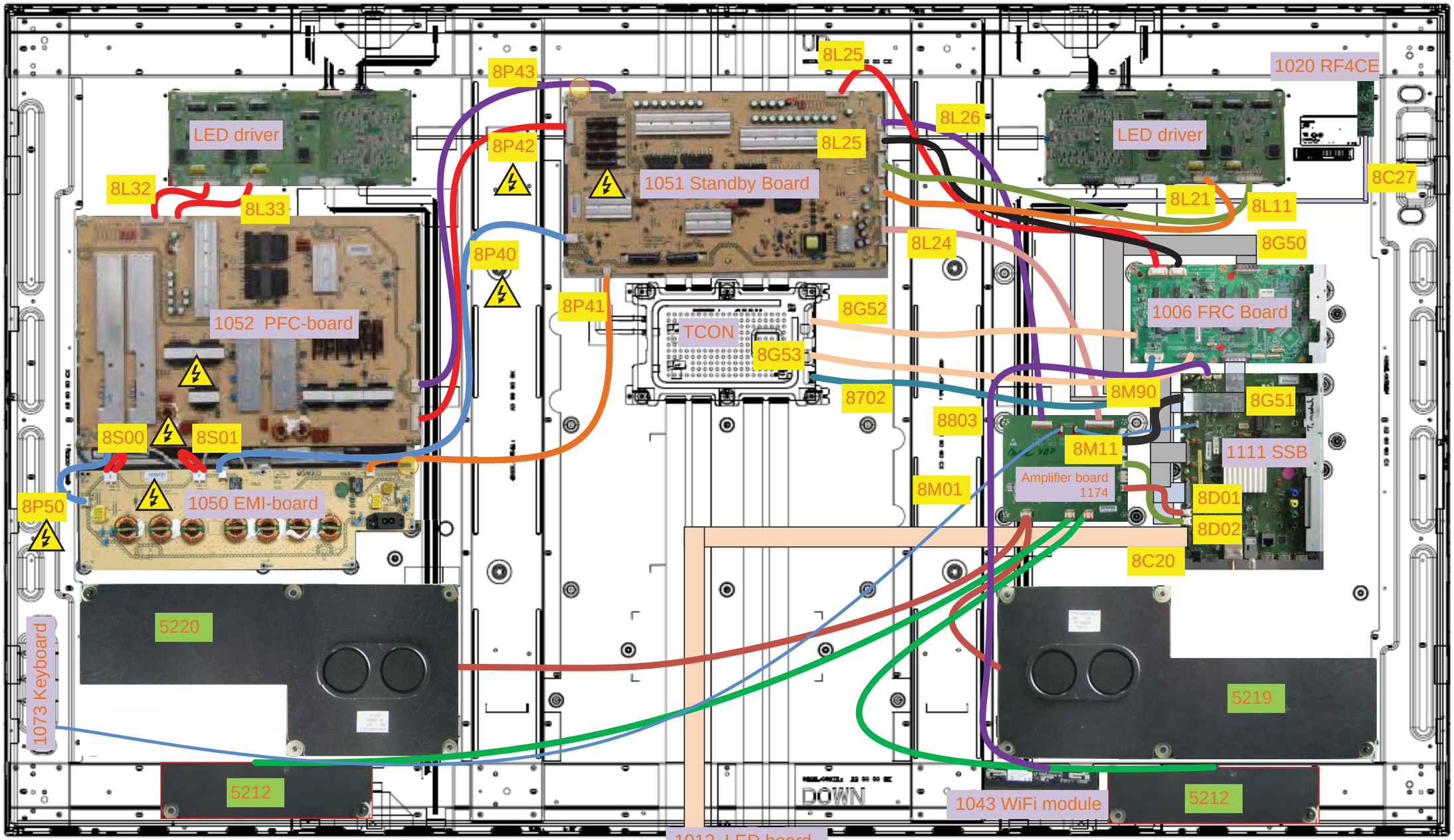
Wiring diagram 65" 9xxx series



19374_021_140110.eps
140110

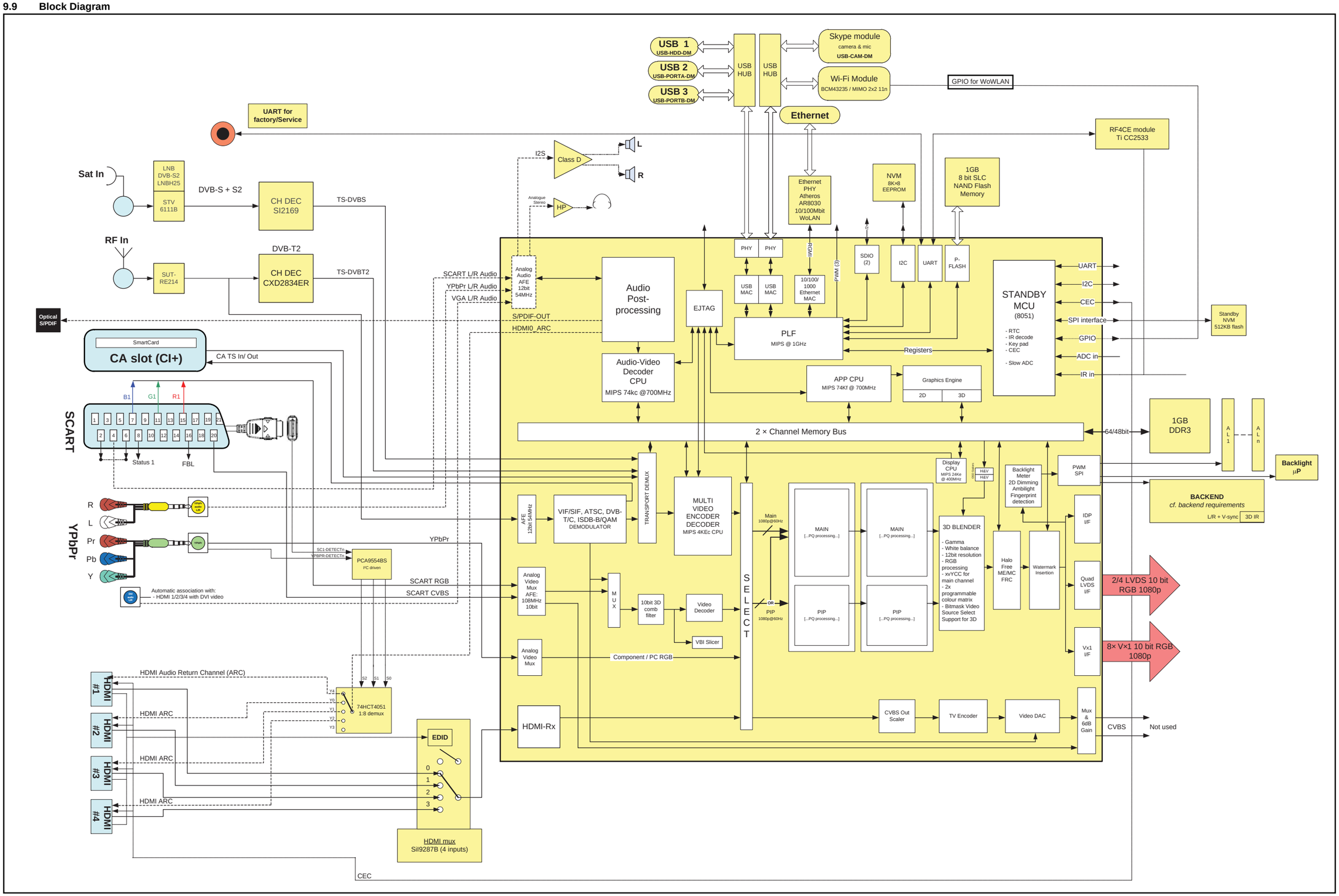
9.8 Wiring Diagram 84" 9xx8 Series

Wiring diagram 84" 9xx8 series



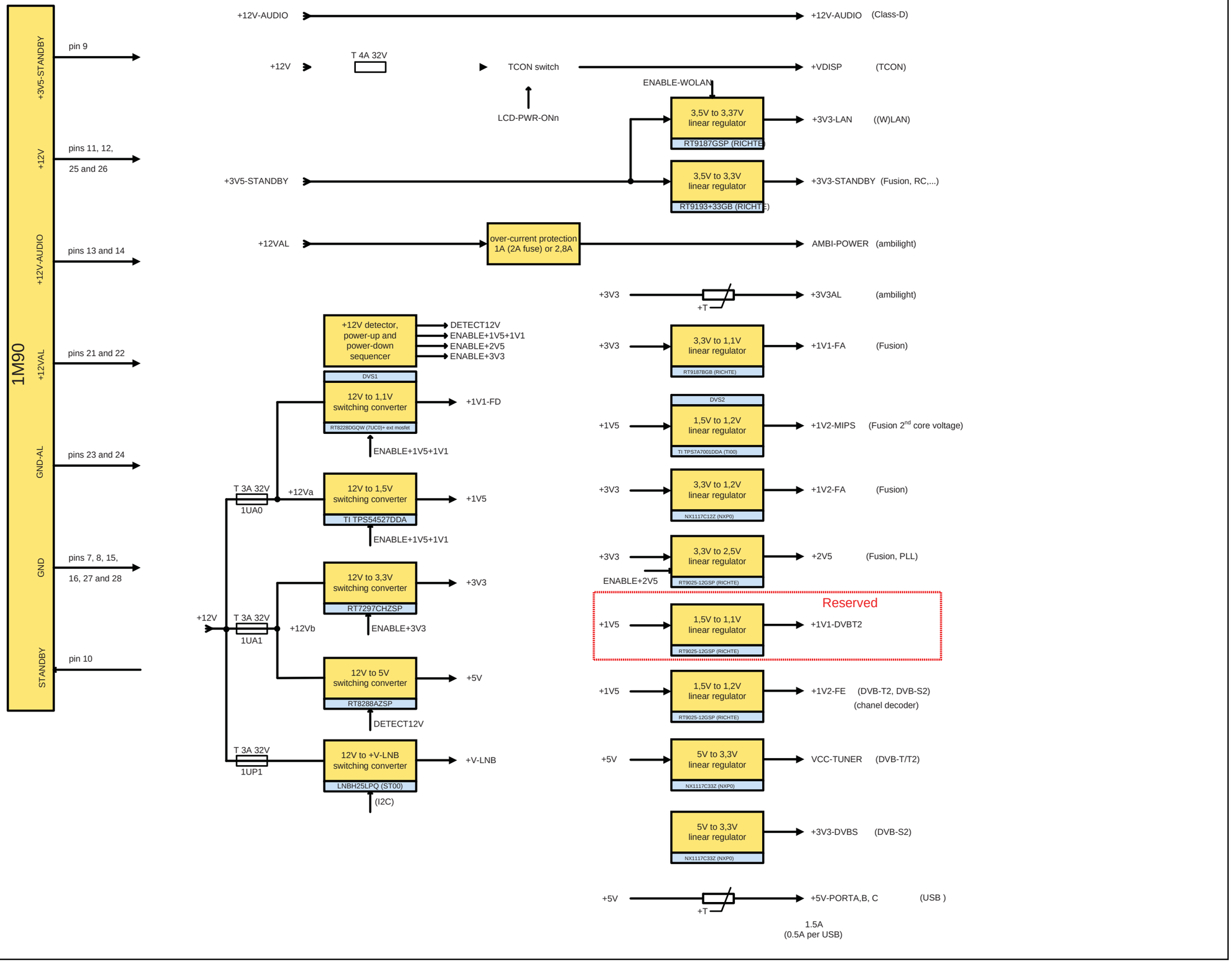
19374_015_131126.eps
131126

9.9 Block Diagram



19370_059_130201.eps
130201

9.10 Block Diagram Supplylines



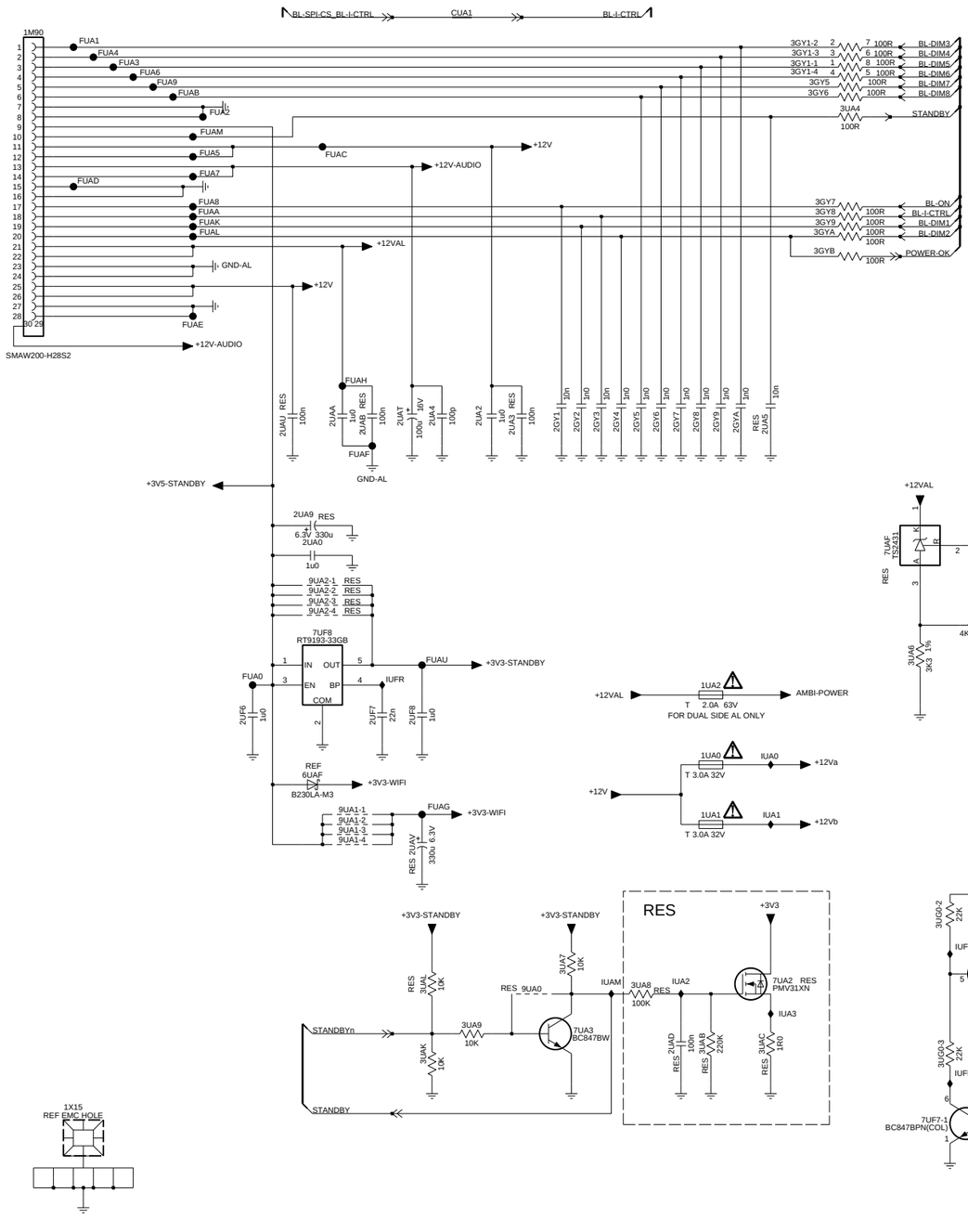
19370_060_130201.eps
130201

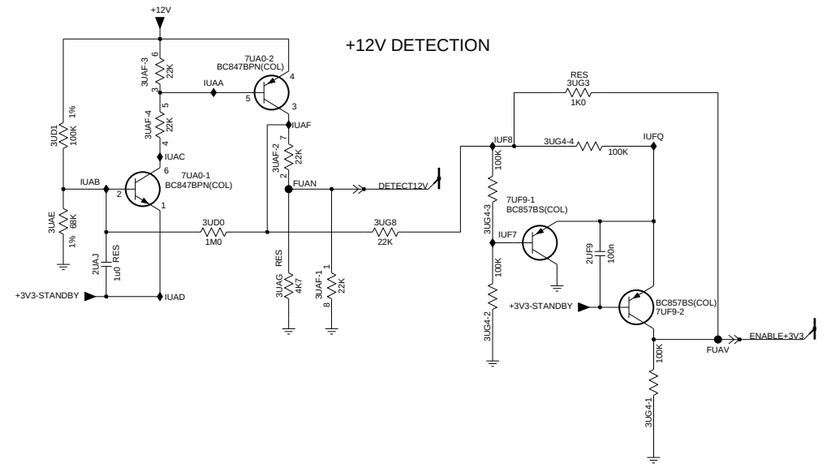
10. Circuit Diagrams and PWB Layouts

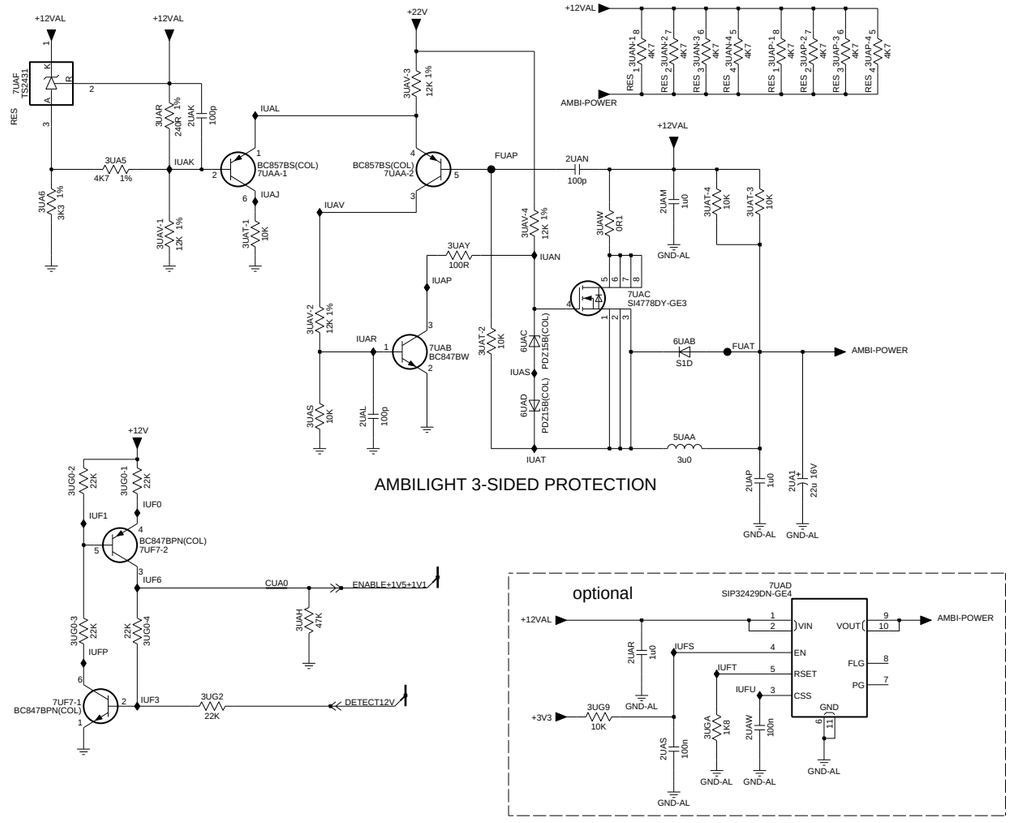
10.1 310431366124 SSB

10-1-1 B01A, Power connector

B01A Power connector







Power connector	3104 313 6612	4 2012-11-22

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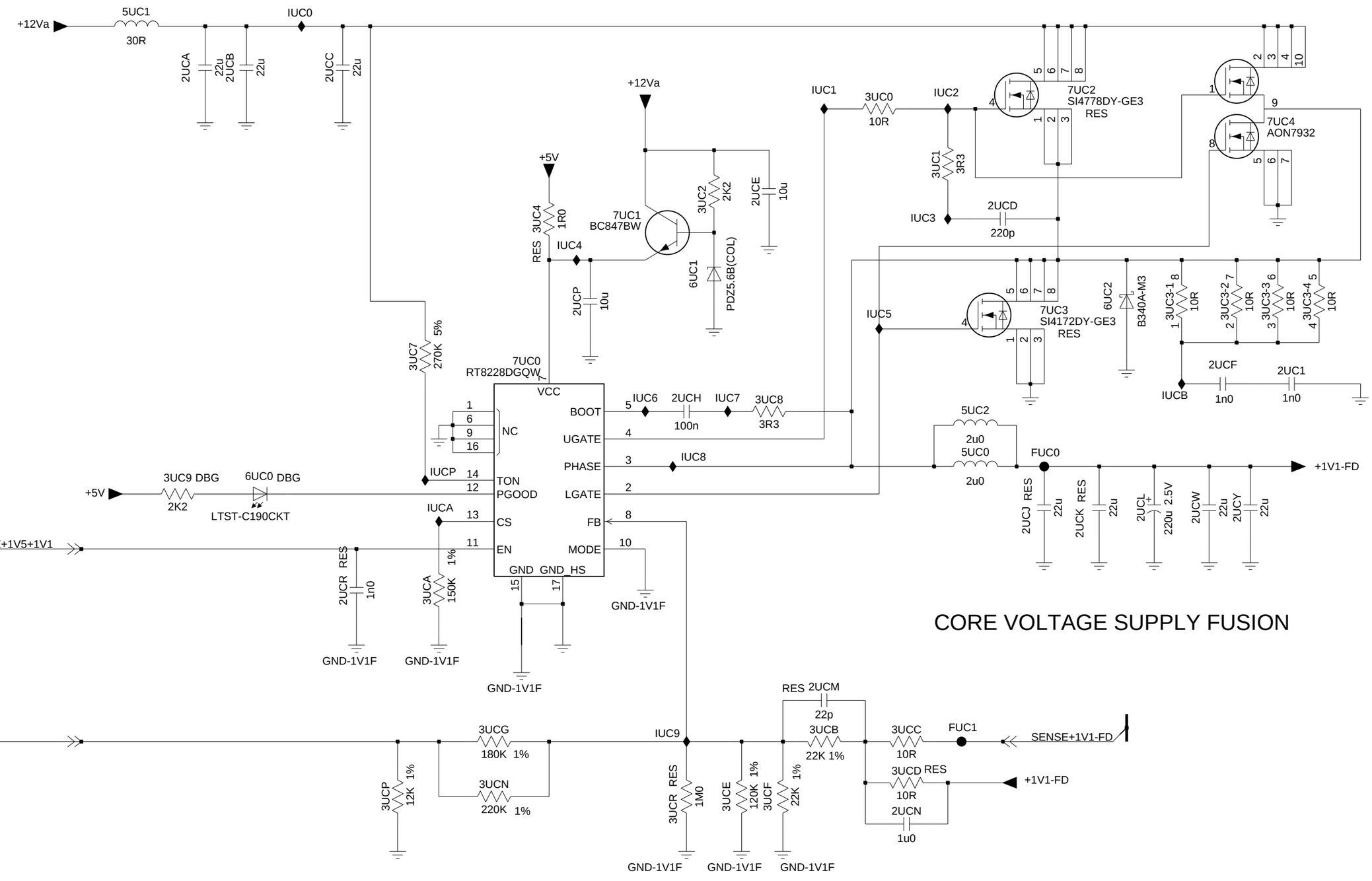
130227

10-1-2 B01B, Fusion supply

B01B Fusion supply

B01B



CORE VOLTAGE SUPPLY FUSION

Fusion supply	3104 313 6612	4 2012-11-22

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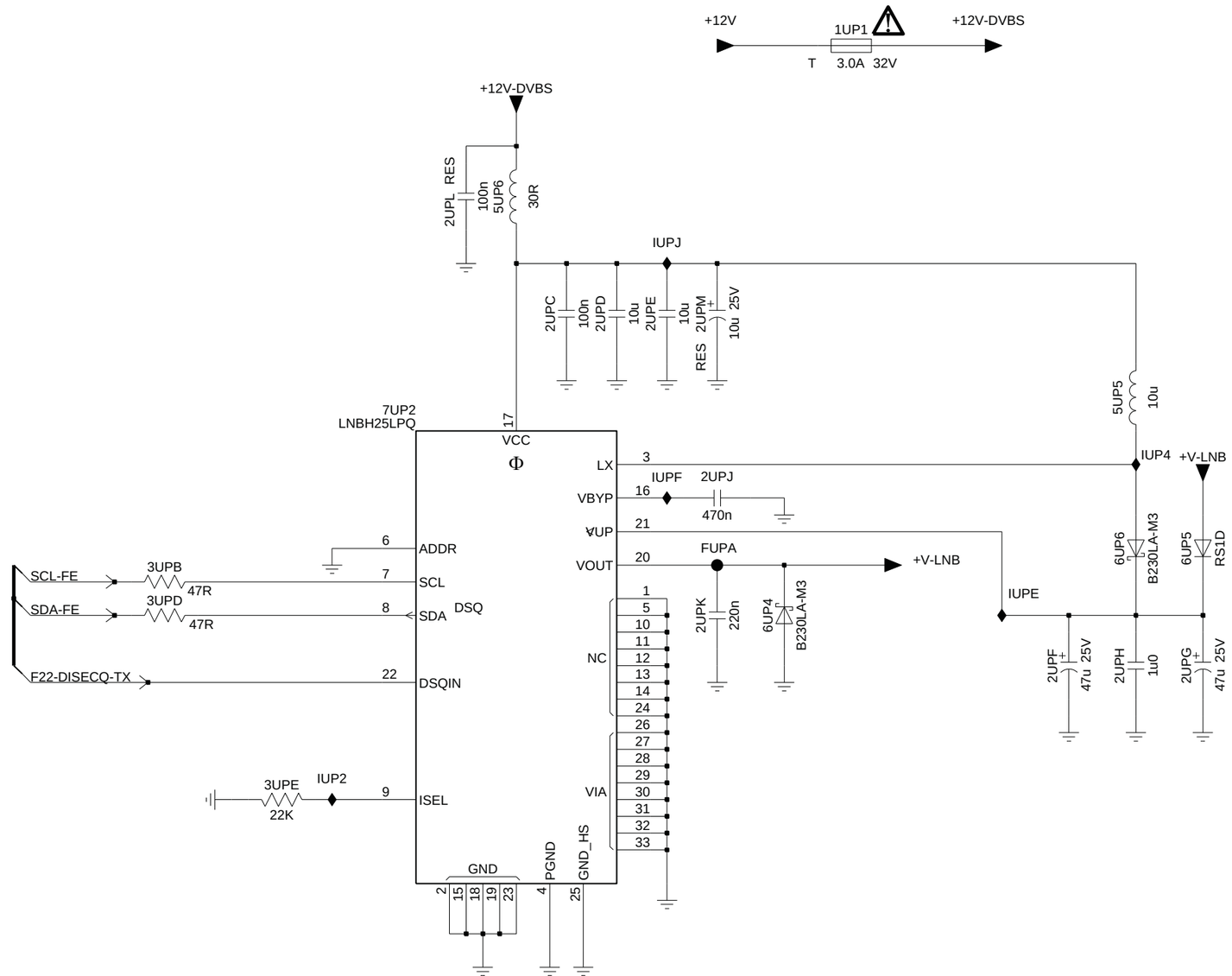
130227

10-1-3 B01C, LNB supply

B01C LNB supply

B01C



LNB supply	3104 313 6612	4 2012-11-22

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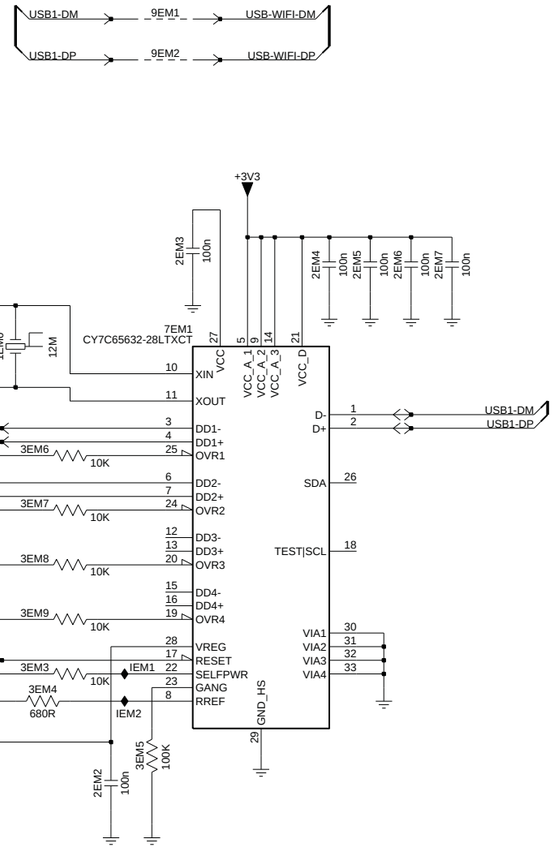
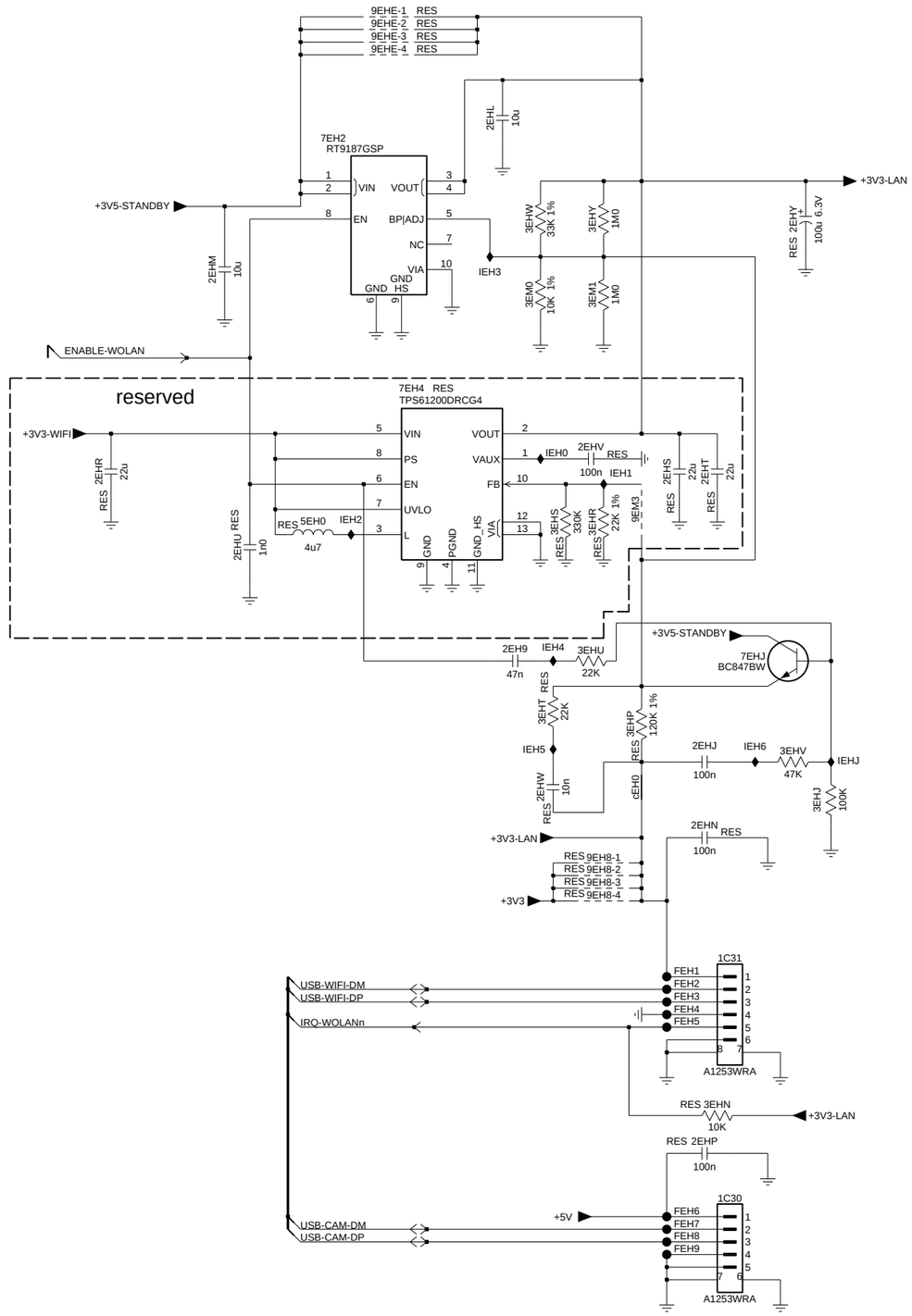
130227

10-1-4 B01D, USB internal

B01D USB internal

B01D





USB internal	3104 313 6612	4 2012-11-22

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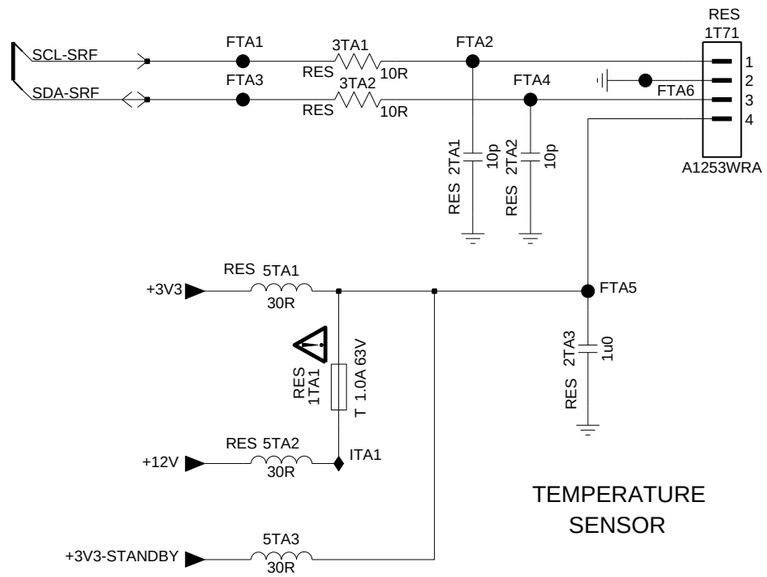
130227

10-1-5 B01E, Miscellaneous

B01E Miscellaneous

B01E



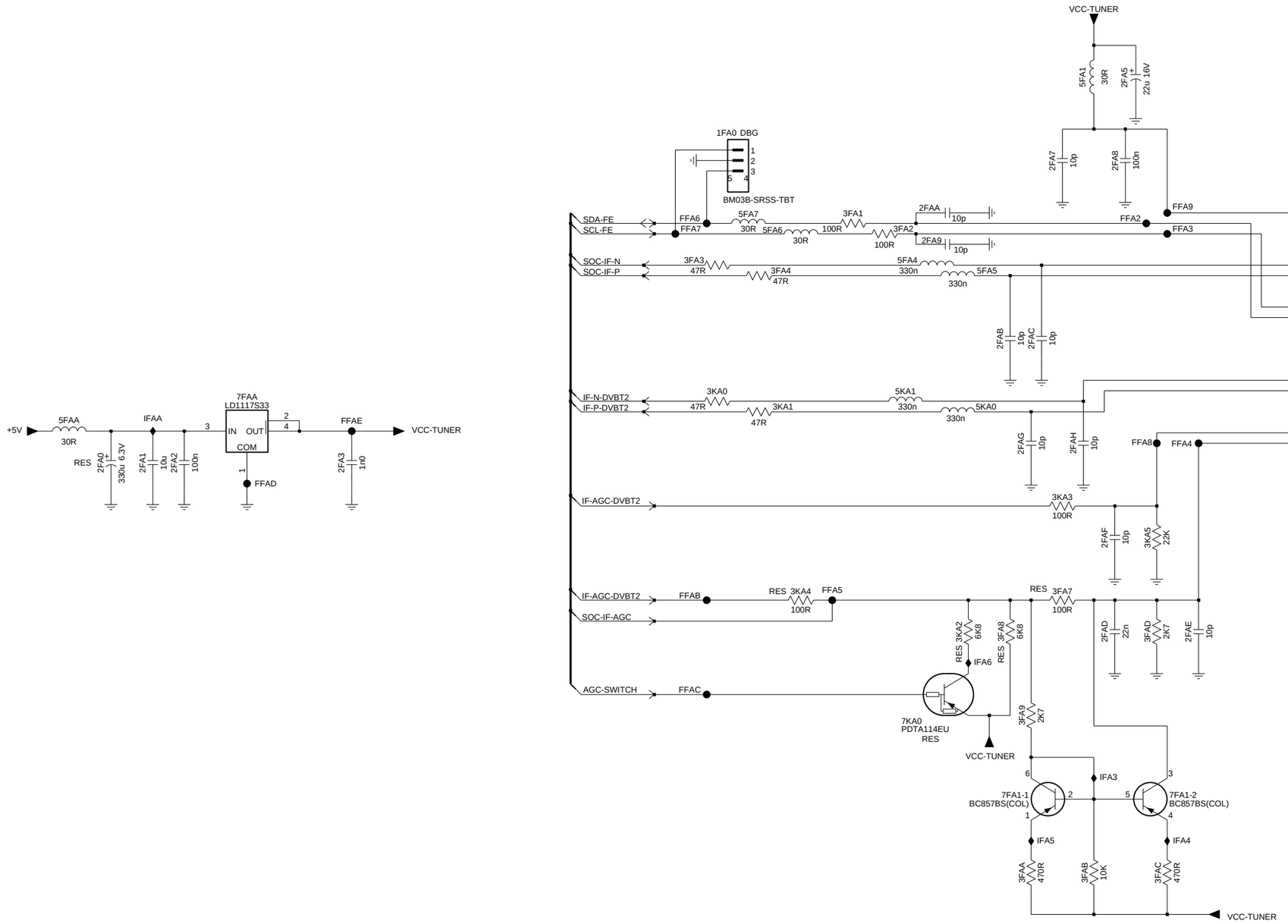
Miscellaneous	3104 313 6612	4 2012-11-22

19370_131_130227.eps
130227

10-1-6 B02A, Hybrid T/C tuner

B02A Hybrid T/C tuner

B02A



Hybrid T/C tuner	3104 313 6612	4 2012-11-22

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130227

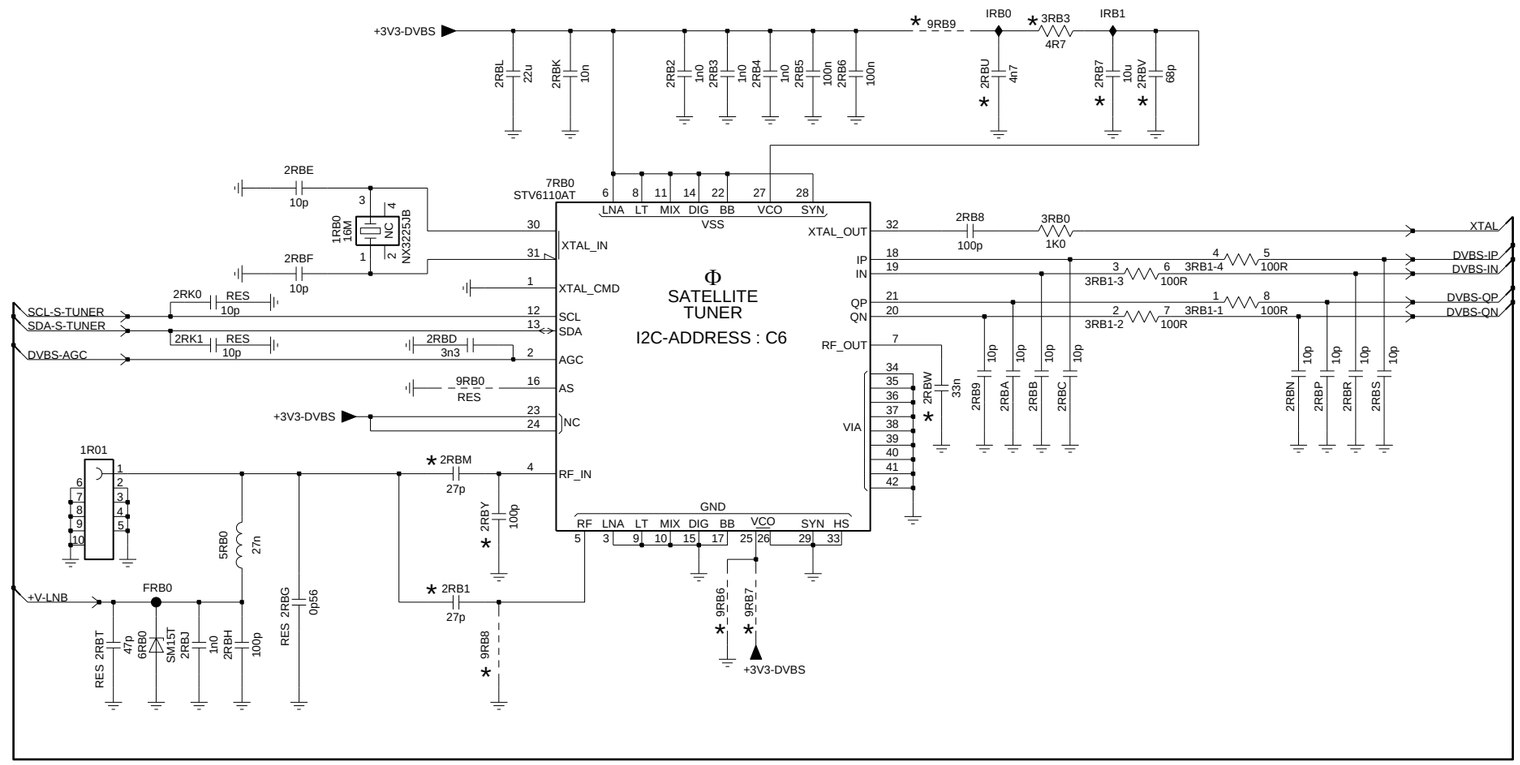
10-1-7 B02B, Satellite tuner

B02B Satellite tuner

B02B

Diversity Matrix (Satellite Tuner dependant)

Position Nr	Affected Pin	Default Value	STV6110	STV6111
2RBY	4,5	100P	-	X
9RB8	4,5	JUMP	X	-
2RBM	4,5	27P	X	-
2RB1	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



Satellite tuner	3104 313 6612	4	2012-11-22

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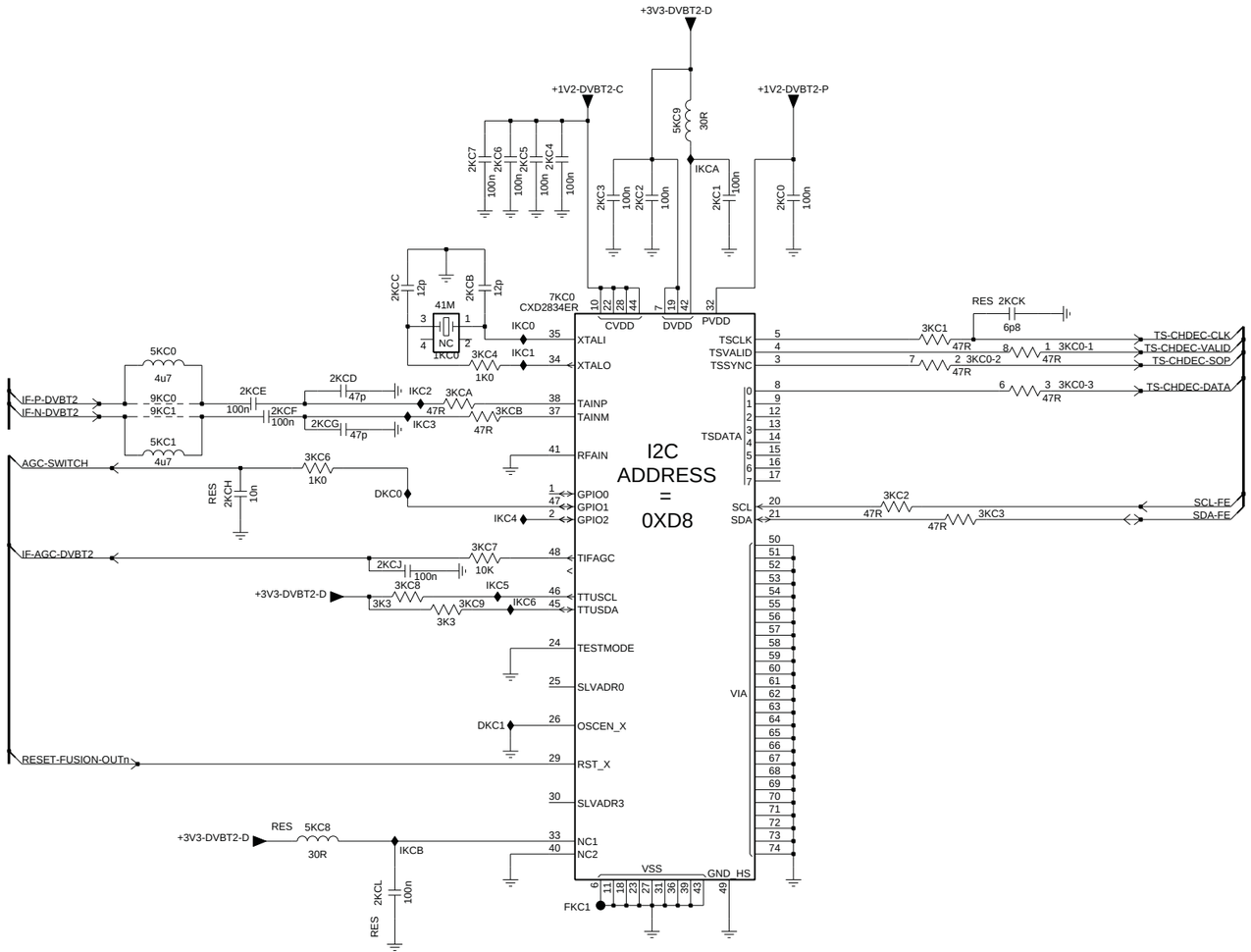
130227

10-1-8 B02C, DVBT2 channel decoder

B02C DVBT2 channel decoder

B02C



7KC0	+1V1-DVBT2
CXD2834	+1V2
GAIA3	+1V1

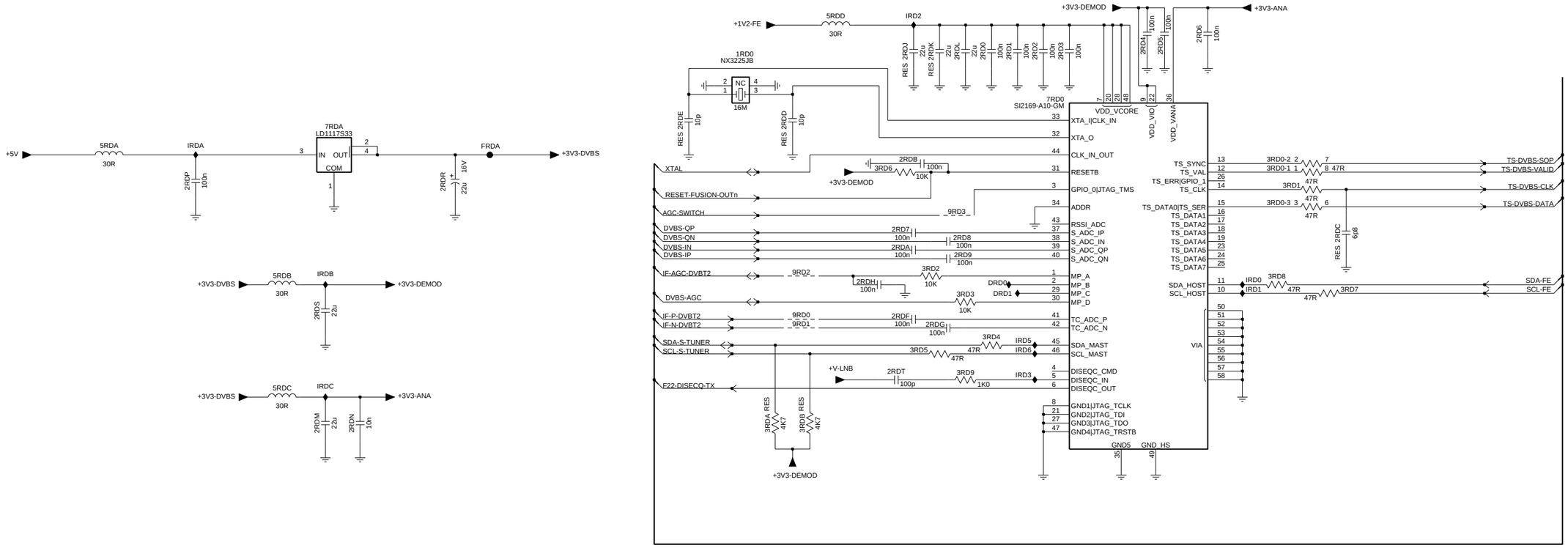
DVBT2 channel decoder	3104 313 6612	4 2012-11-22

19370_134_130227.eps
130227

10-1-9 B02D, DVBS/S2 channel decoder

B02D DVBS/S2 channel decoder

B02D



DVBS/S2 channel decoder	3104 313 6612	4 2012-11-22

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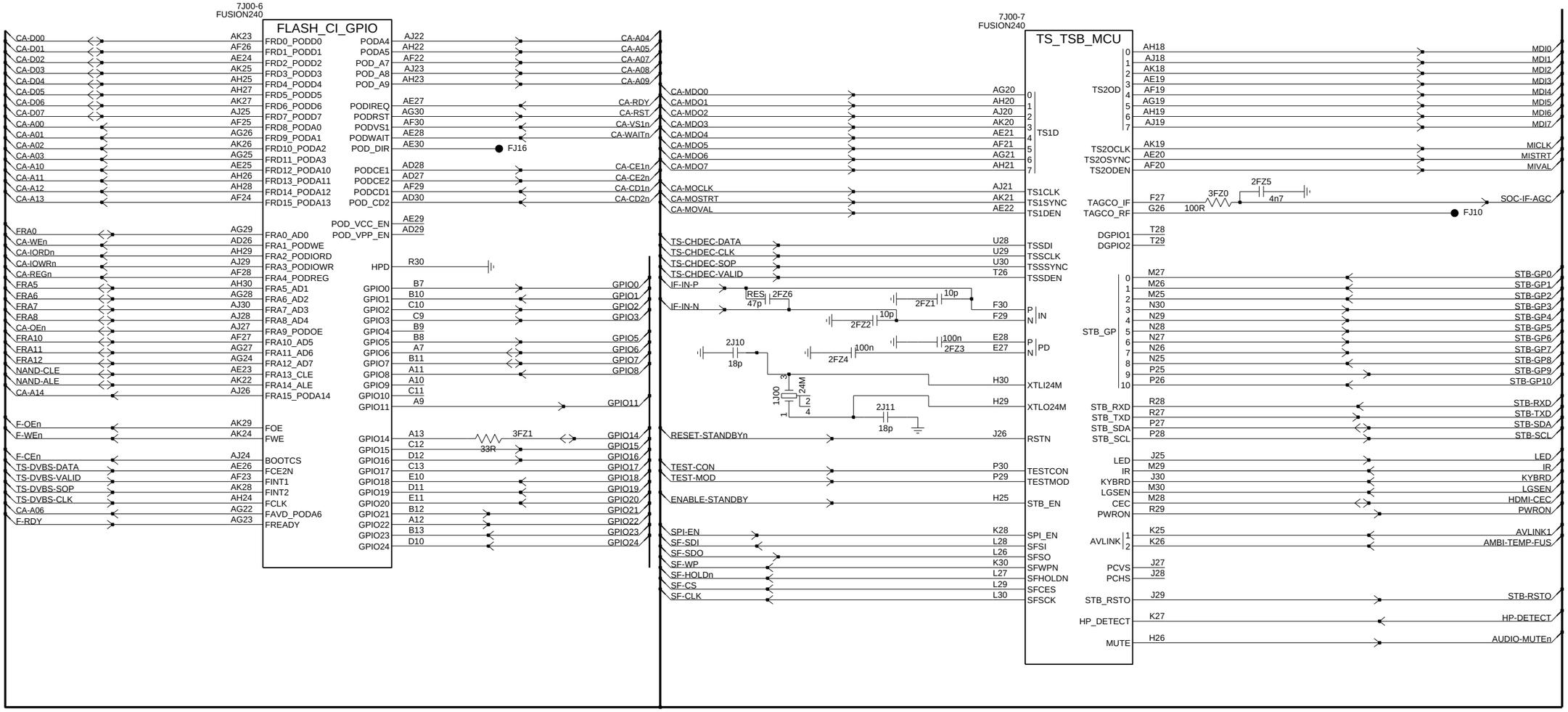
130227

10-1-10 B03A, Fusion

B03A Fusion

B03A



B03A

Fusion	3104 313 6612	4 2012-11-22

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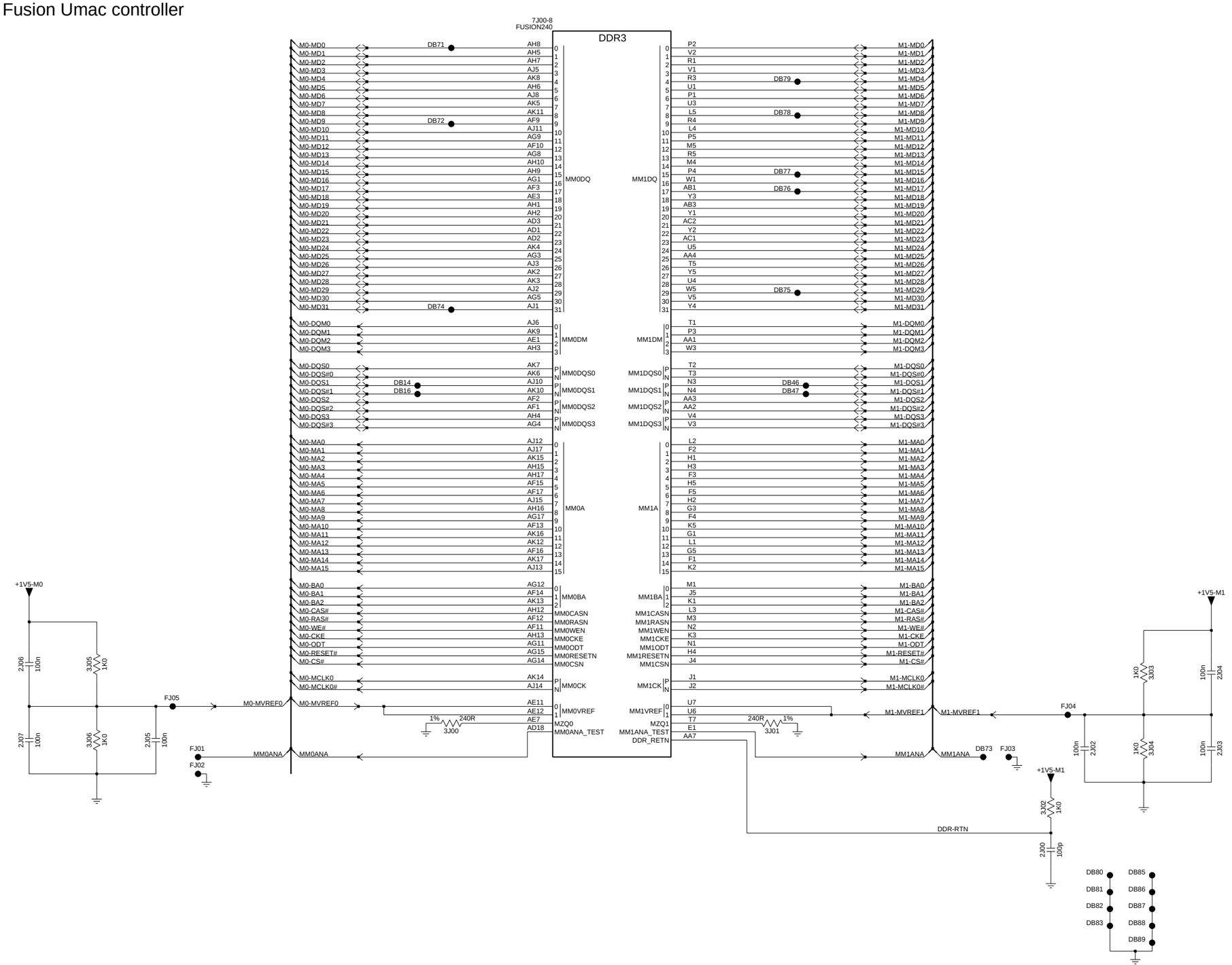
130227

10-1-11 B03B, Fusion Umac controller

B03B Fusion Umac controller

B03B



Fusion Umac controller	3104 313 6612	4 2012-11-22

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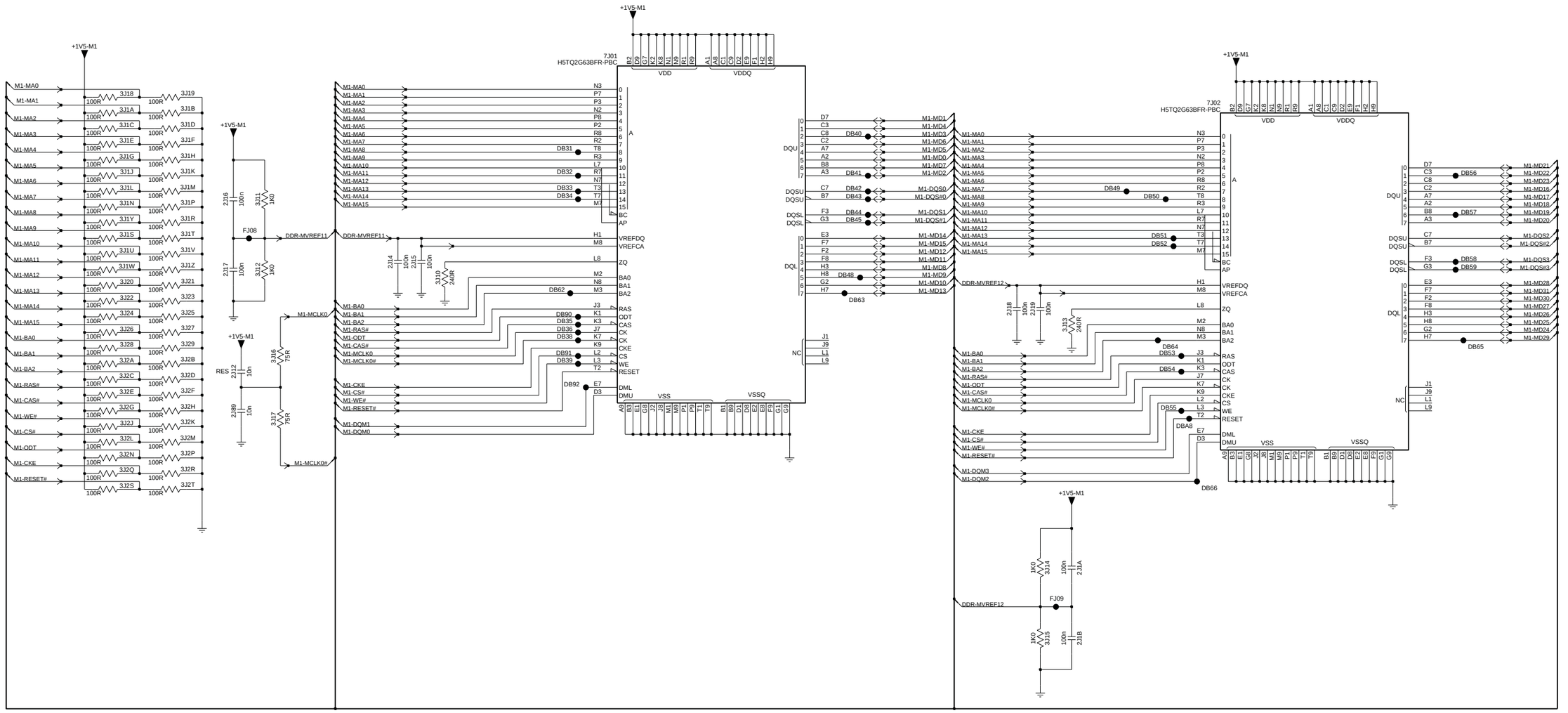
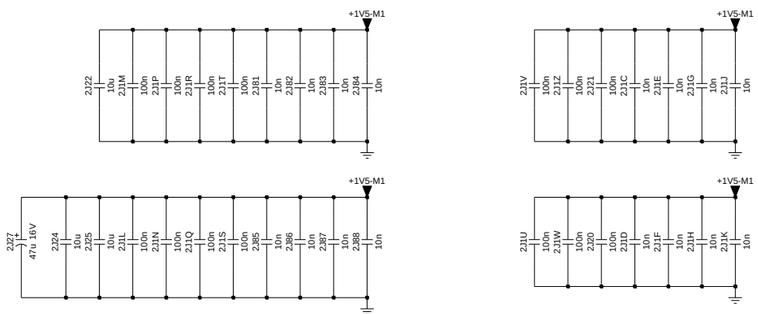
130227

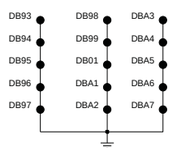
10-1-12 B03C, Umac 1 DDR3

B03C Umac 1 DDR3

B03C







Umac 1 DDR3	3104 313 6612	4 2012-11-22

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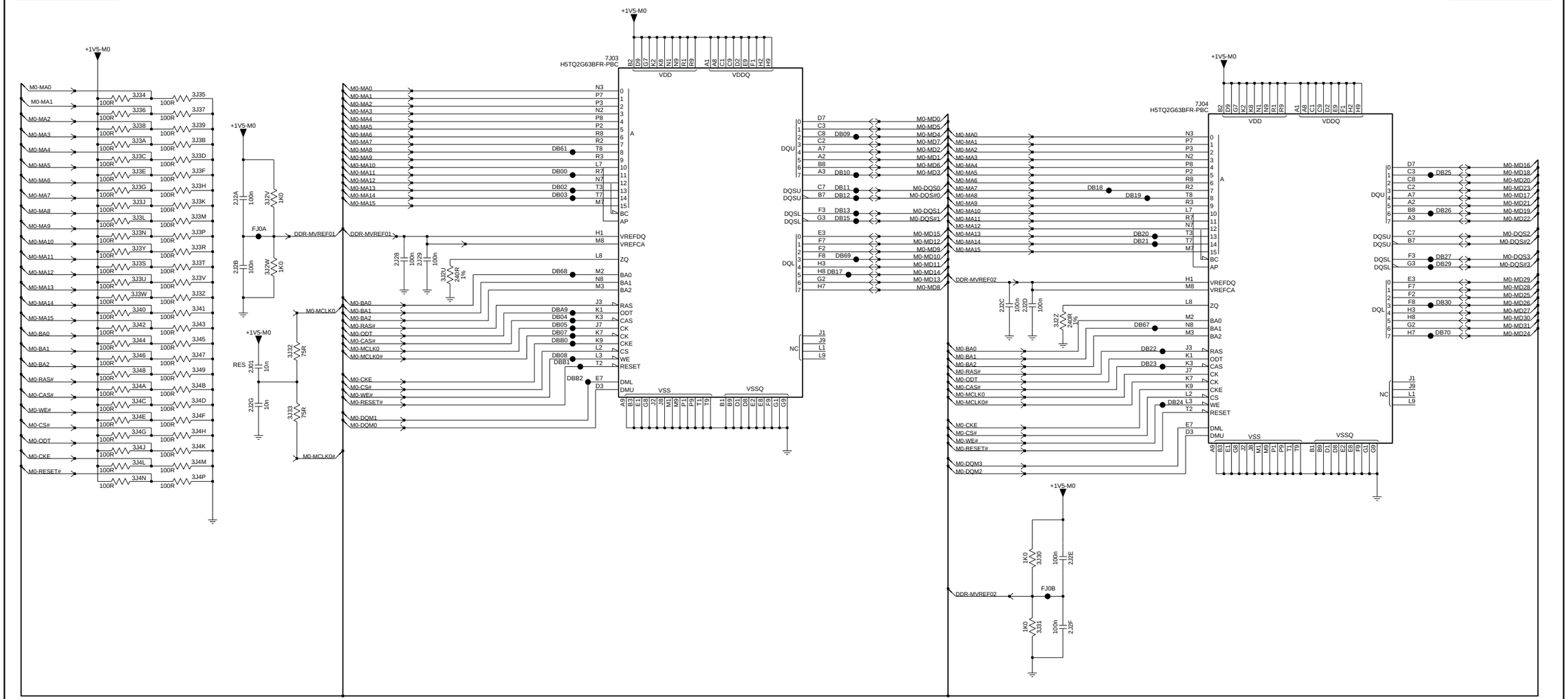
10-1-13 B03D, Umac 0 DDR3

B03D Umac 0 DDR3



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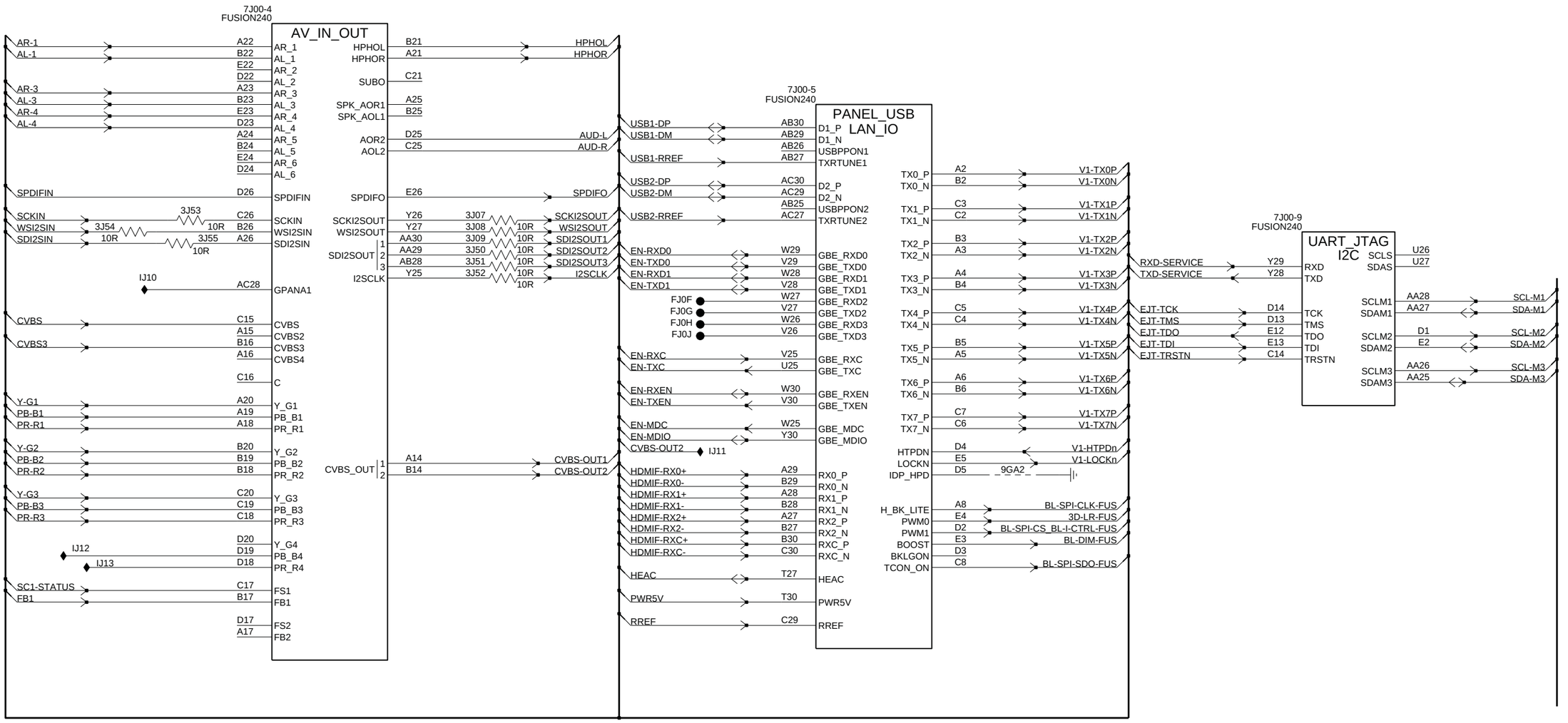
B03E Fusion

B03E



B03E

Fusion	3104 313 6612	4 2012-11-22

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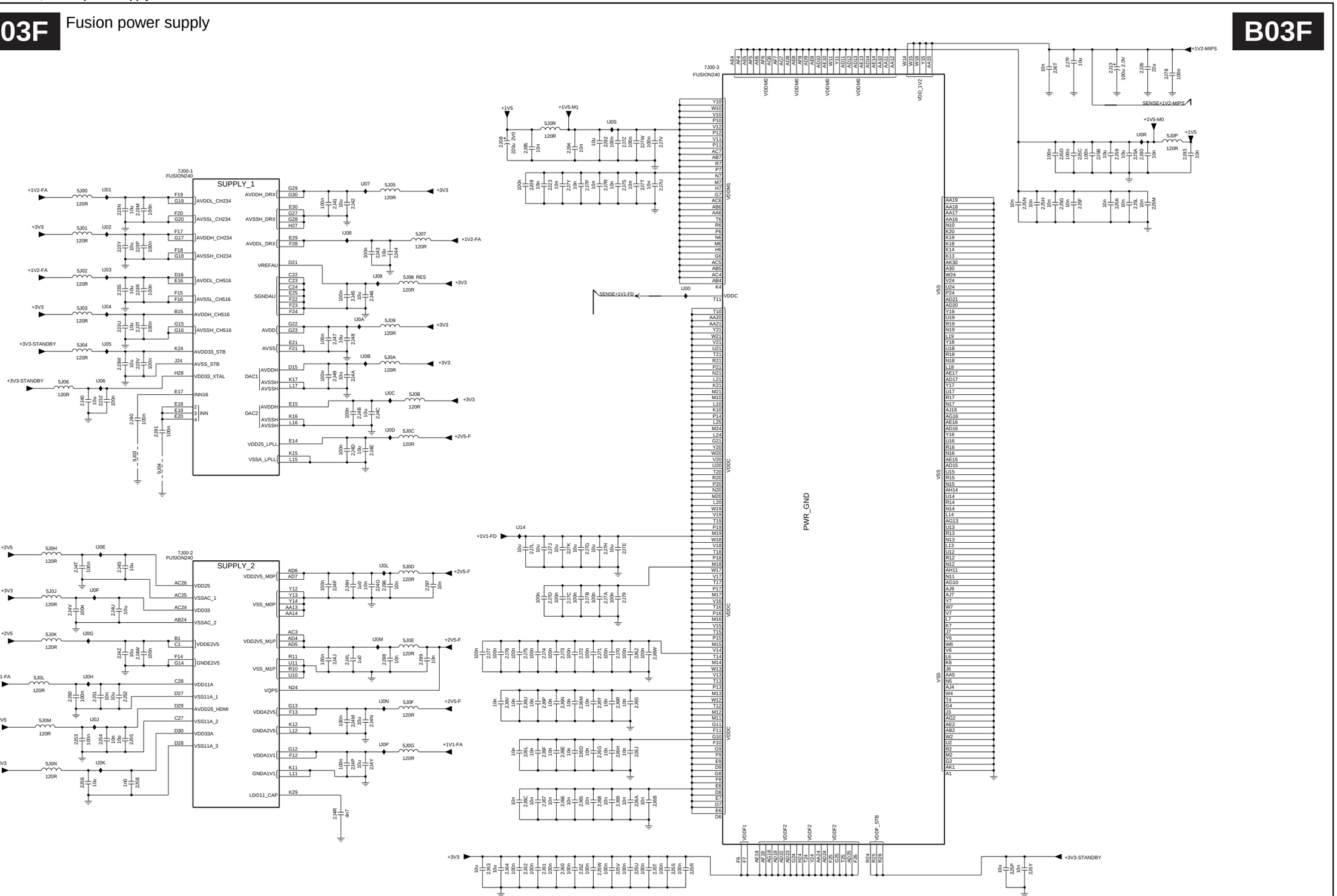
130227

10-1-15 B03F, Fusion power supply

B03F Fusion power supply



Fusion power supply	3104 313 6612	4 2012-11-22

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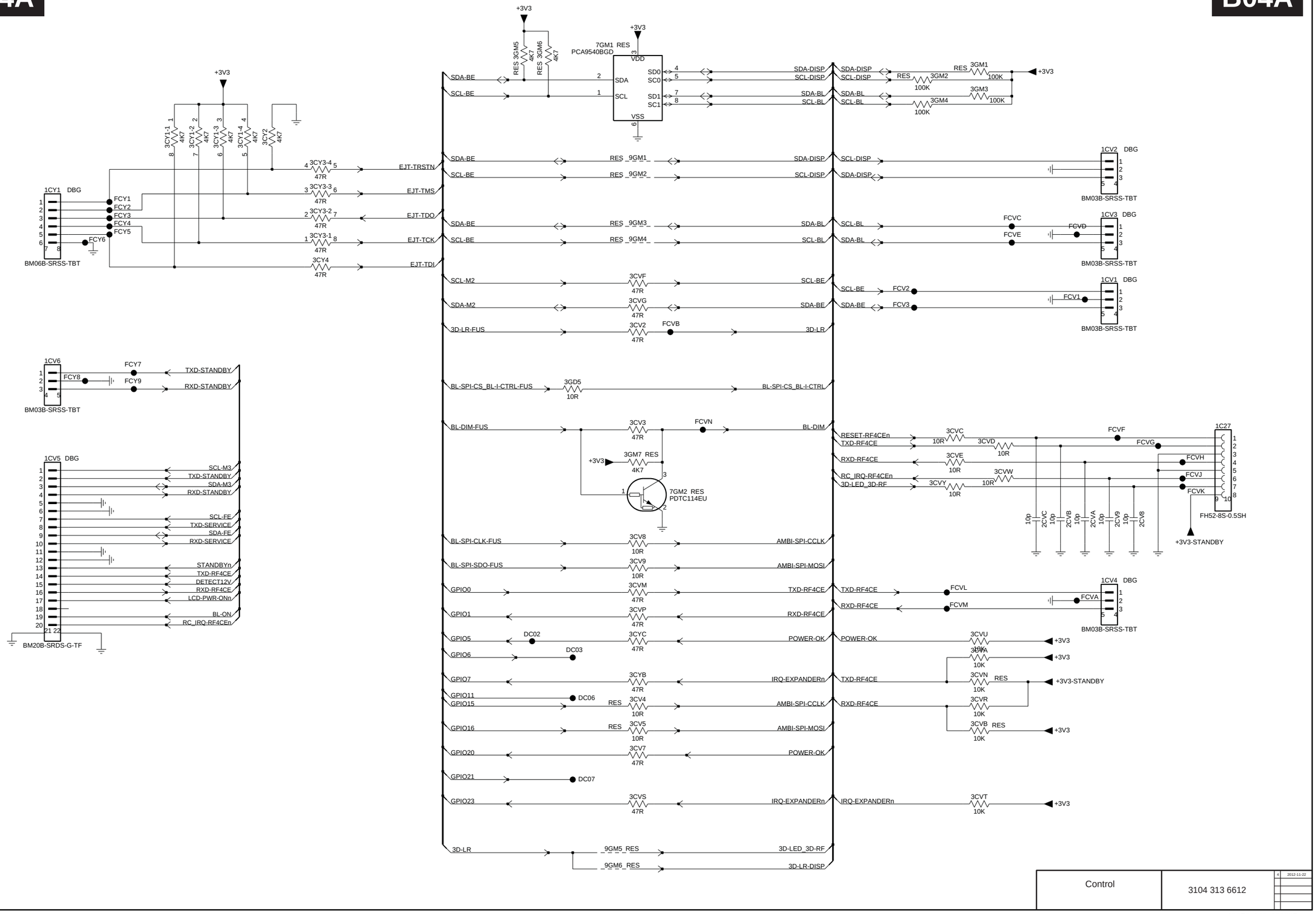
130227

10-1-16 B04A, Control

B04A Control

B04A



Control | 3104 313 6612 | 4 2012-11-22

19370_142_130227.eps
130227

10-1-17 B04B, V-by-One out

B04B V-by-One out

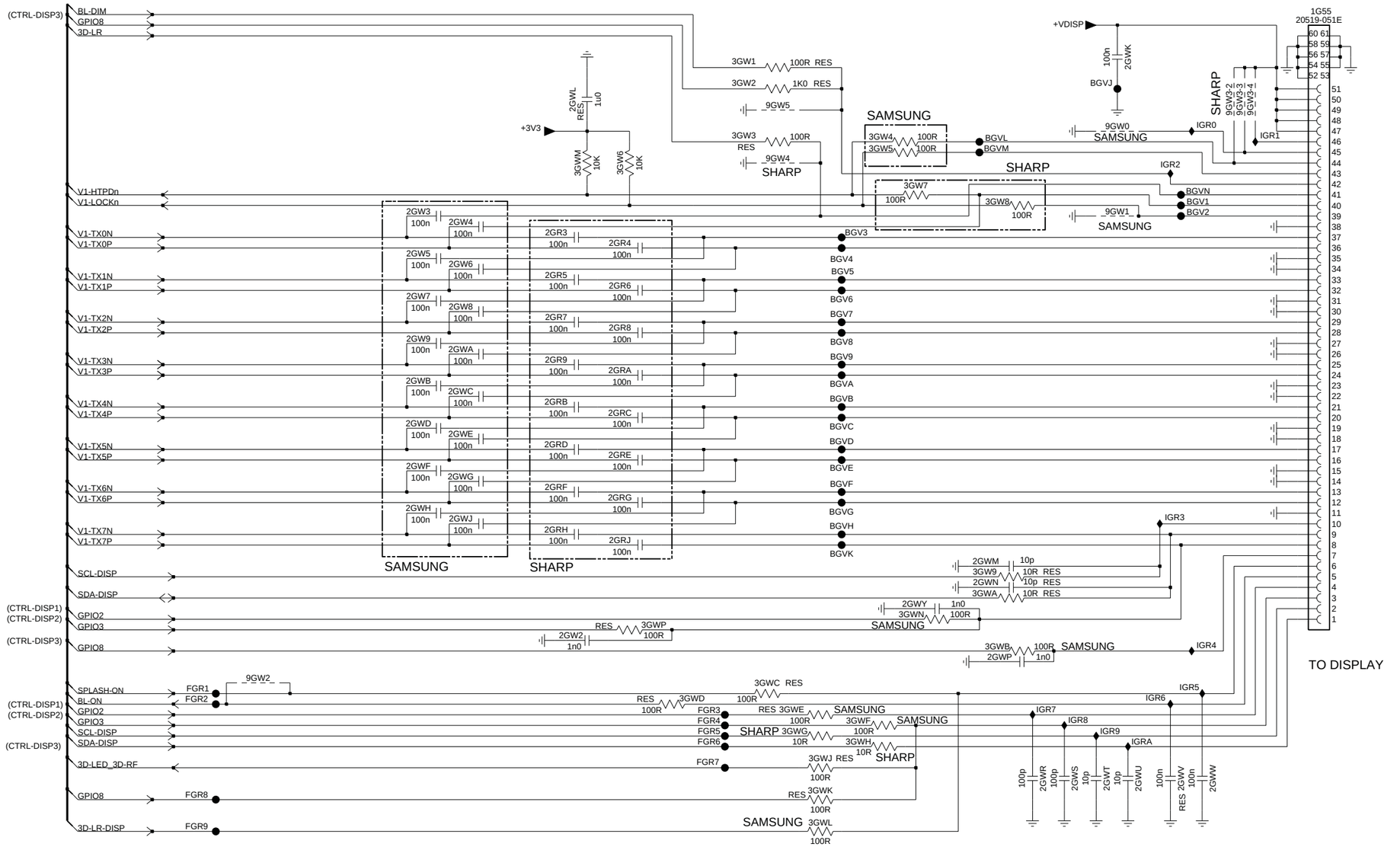
B04B

FGV5 FGV0 FGV6 FGV7 FGV8 FGV9 FGVA FGVB FGVC FGVD FGVF FGVG FGVH FGVJ FGVK FGVL FGVM FGVN FGVP FGVQ FGVR FGVS FGVT FGVU FGVV FGVW FGVY FGU0 FGU1 FGU2 FGU3 FGU4 FGU5

IGV7 IGV5 IGW1 IGW2 IGW3 IGW4 IGW5 IGW6 IGU8 IGW7 IGW8 IGW9

FGU7 FGVZ FGW0 FGVE FGU9 FGUF FGWA FGU6 FGWE FGWB FGWC FGWD FGWF FGWG FGWH FGWJ FGWK FGWL FGWM FGWN FGWP FGWQ FGWR FGWS

FGWT FGWU FGWV FGWW FGWY FGWZ



V-by-One out	3104 313 6612	4 2012-11-22

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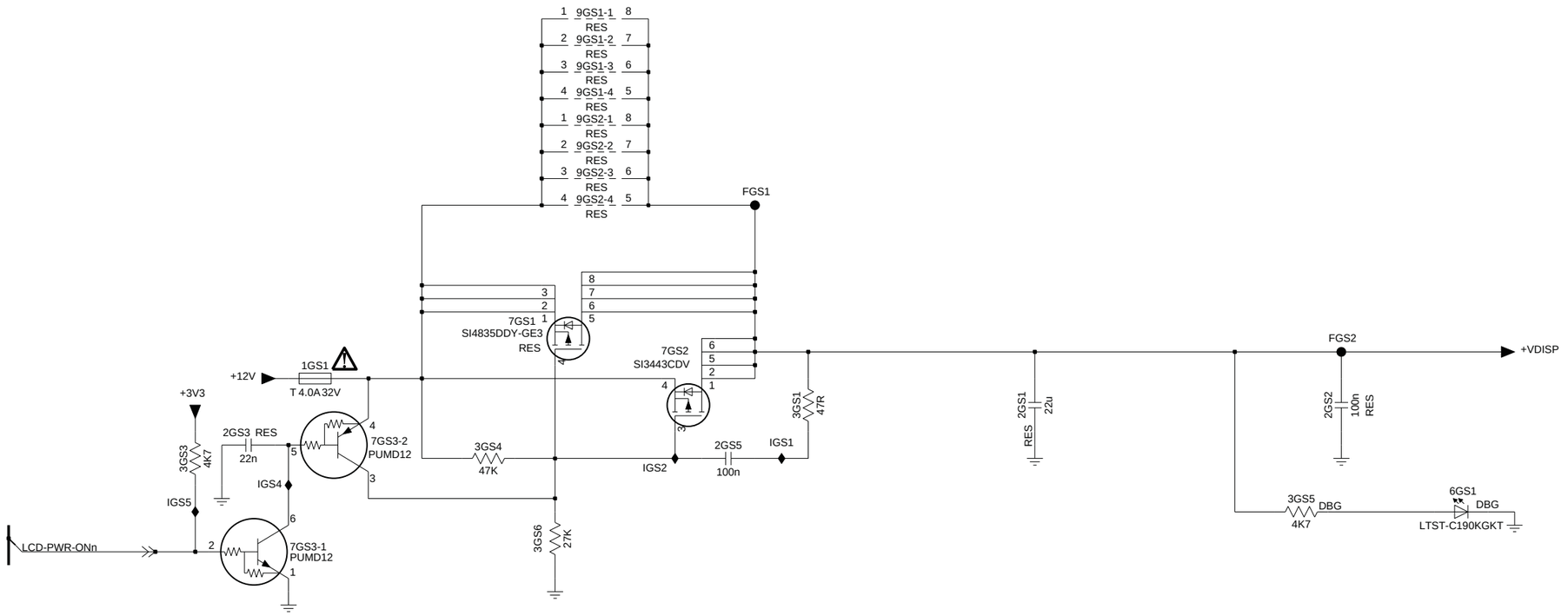
130227

10-1-18 B04C, Output Vdisp

B04C Output Vdisp

B04C



Output Vdisp	3104 313 6612	4 2012-11-22

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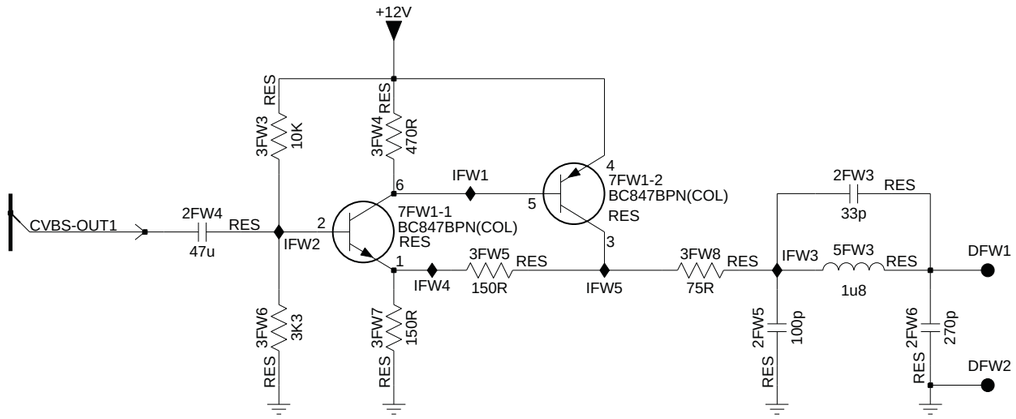
130227

10-1-19 B04D, Tuner CVBS debug

B04D Tuner CVBS debug

B04D



Tuner CVBS debug	3104 313 6612	4 2012-11-22

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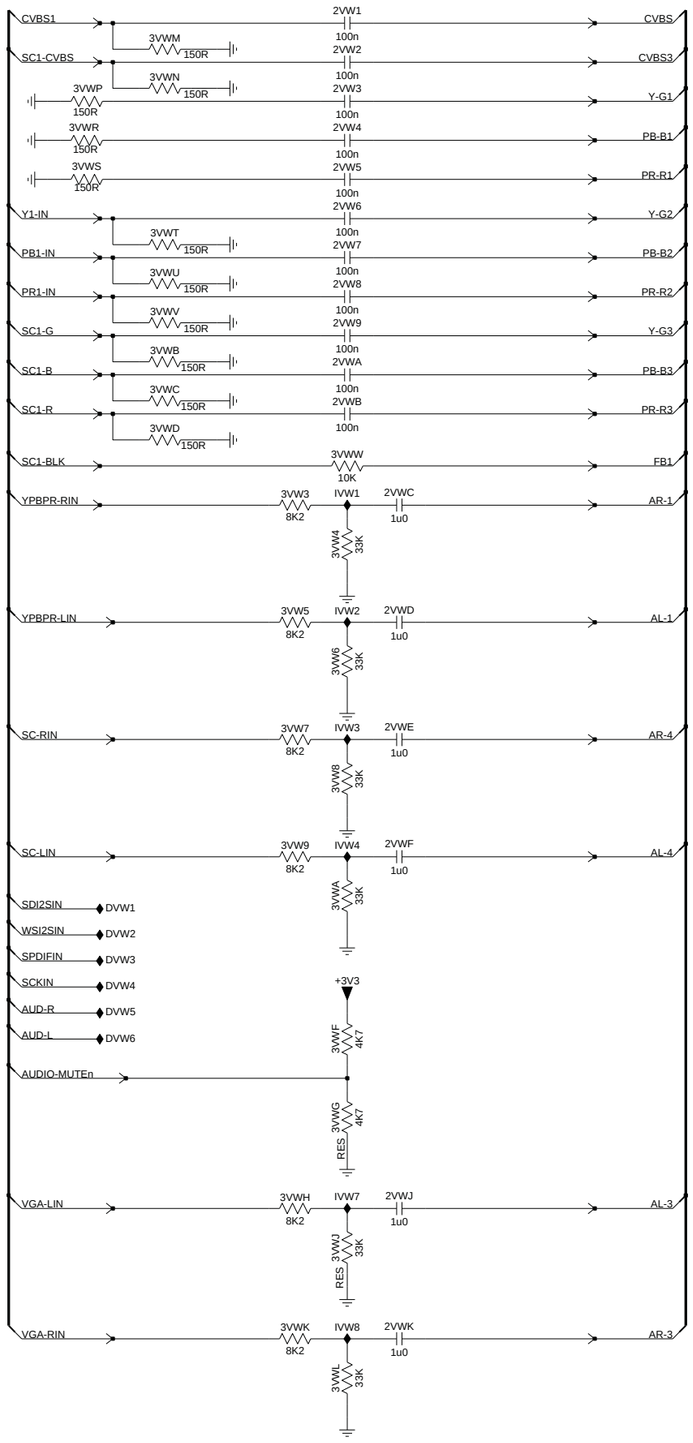
130227

B04E Audio - video

B04E



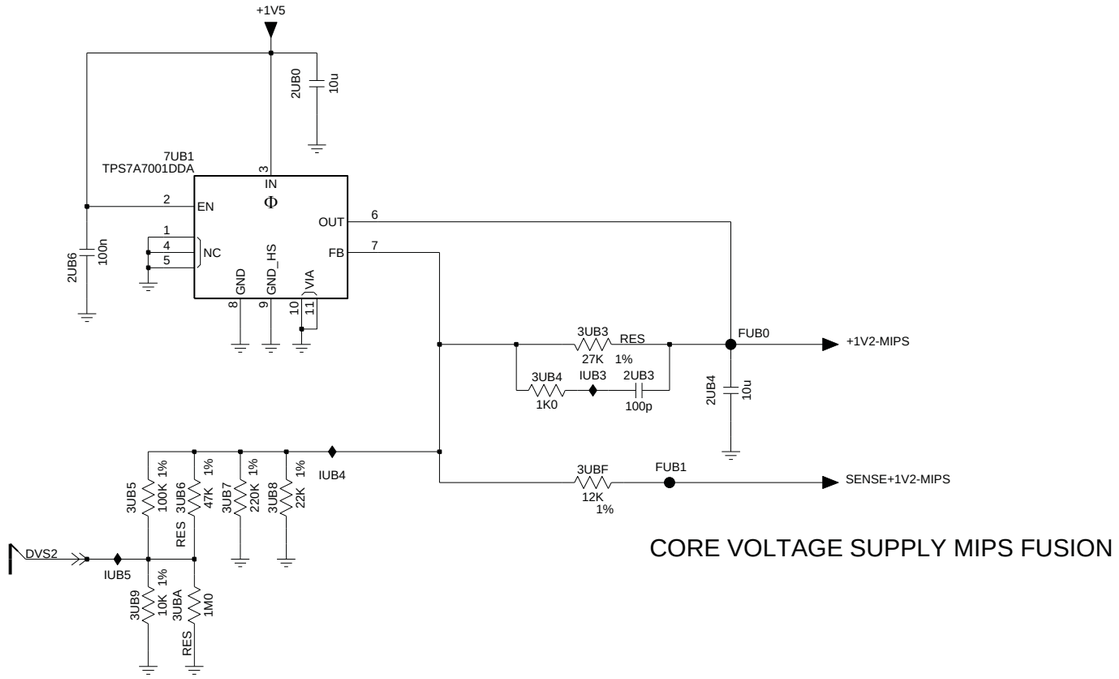
Audio - video	3104 313 6612	4 2012-11-22

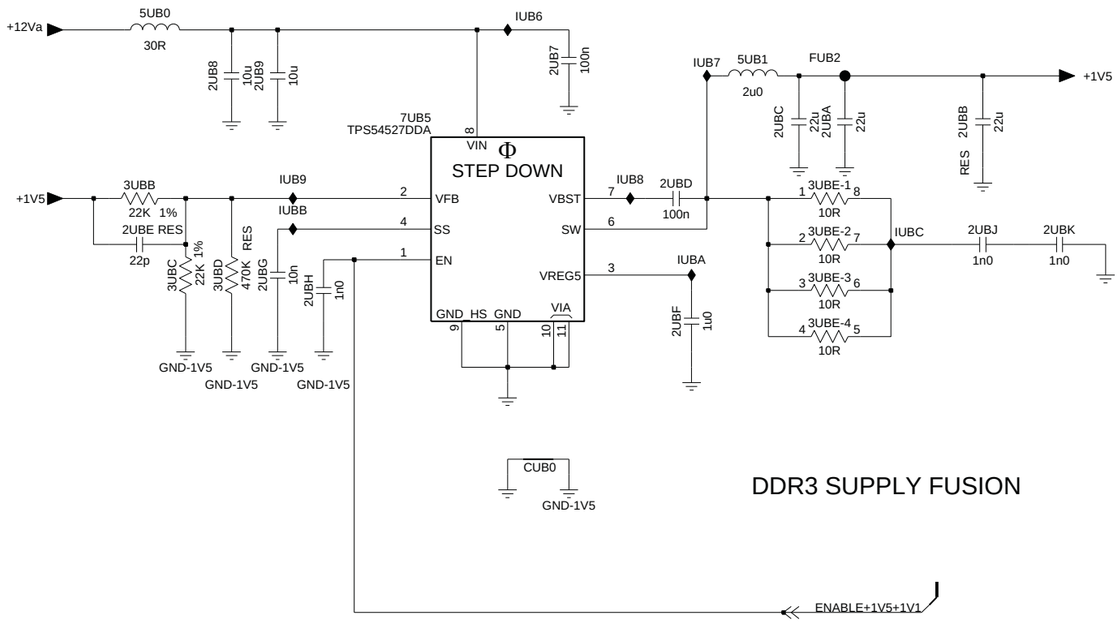
19370_146_130227.eps
130227

10-1-21 B04F, Fusion supply

B04F Fusion supply

B04F





Fusion supply	3104 313 6612	4 2012-11-22

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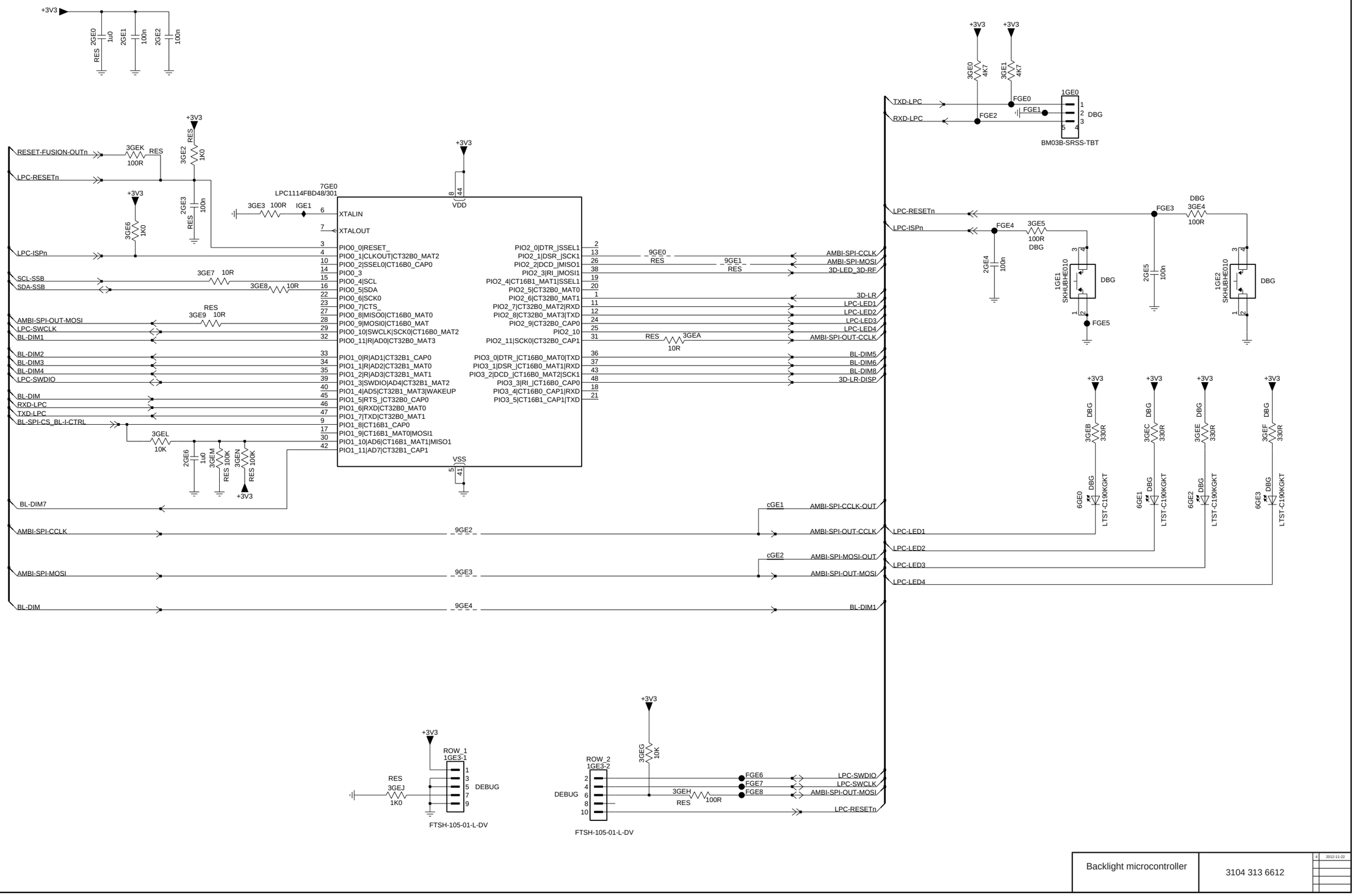
10-1-22 B04G, Backlight microcontroller

B04G Backlight microcontroller

B04G



Backlight microcontroller	3104 313 6612	4 2012-11-22

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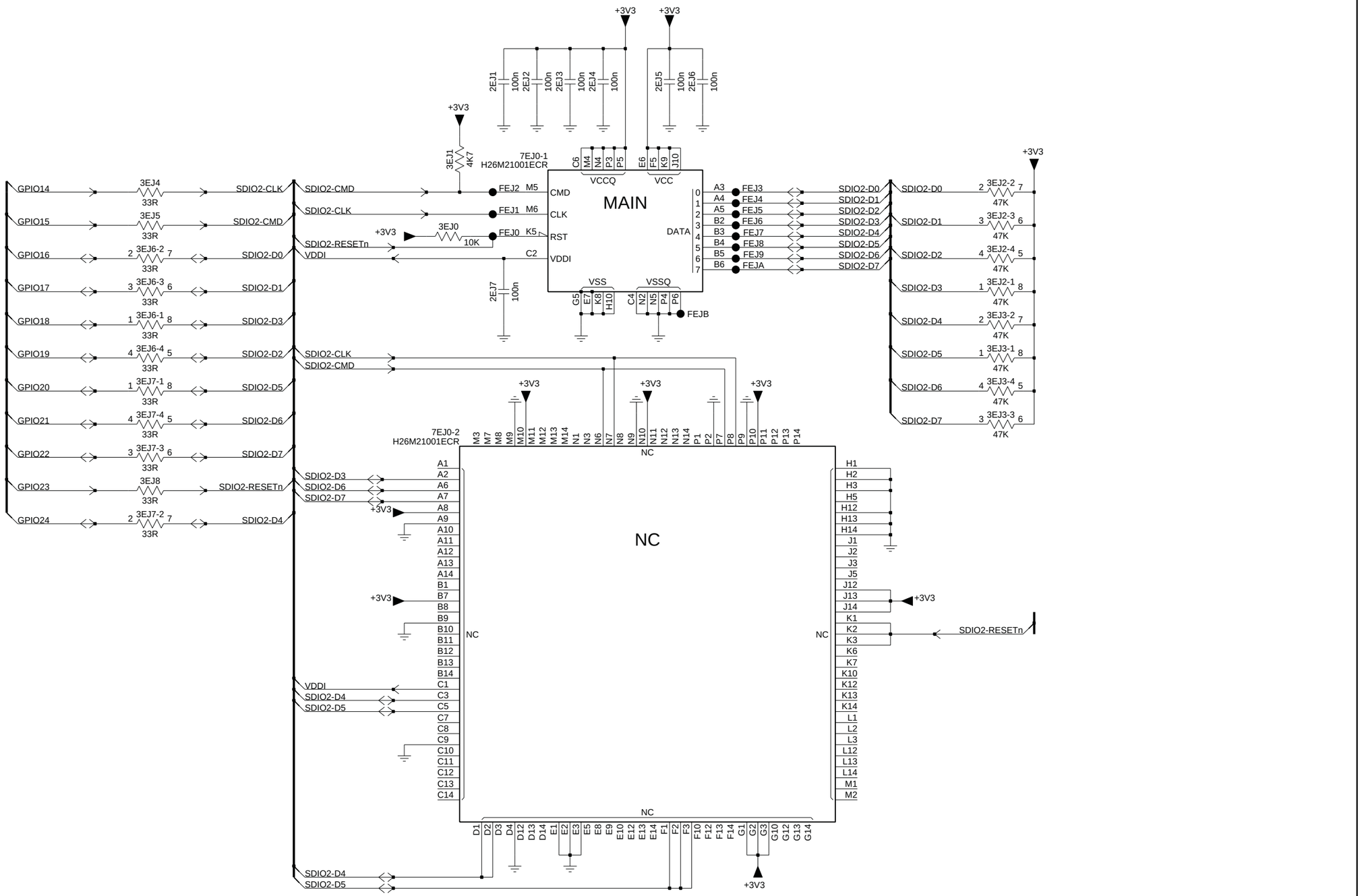
130227

B04H eMMC

B04H



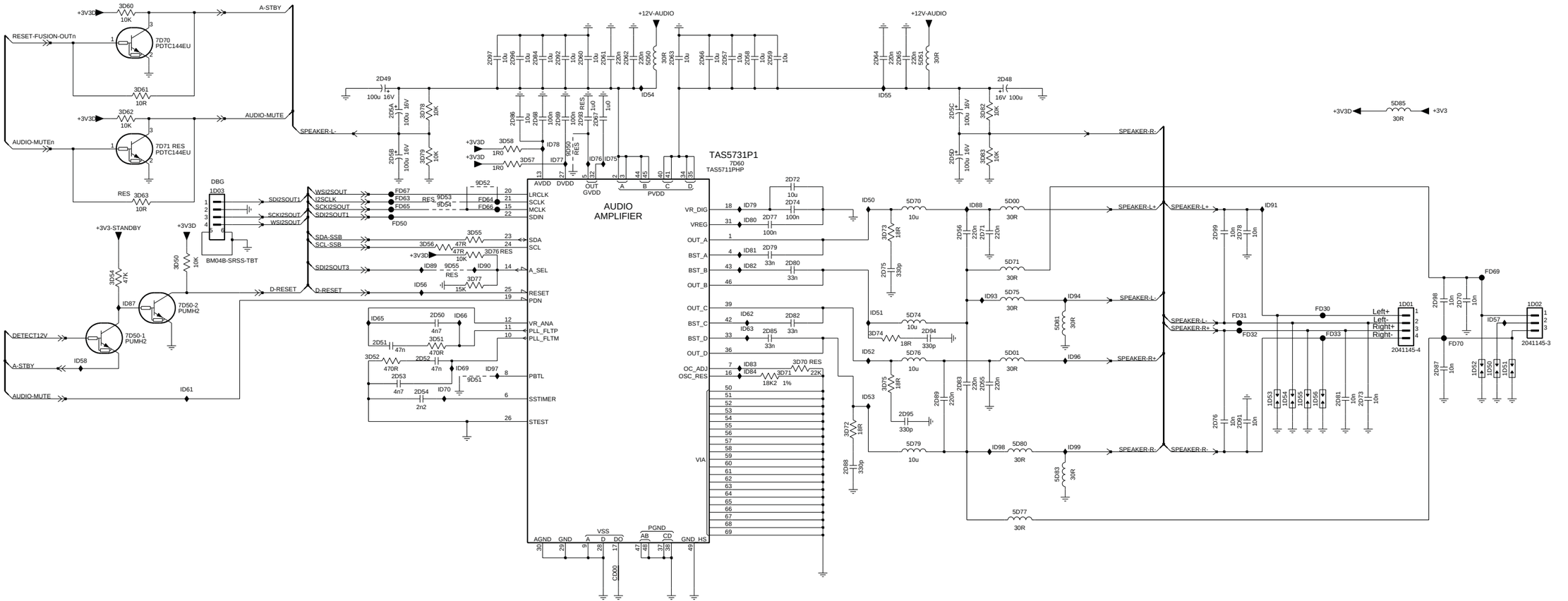
eMMC	3104 313 6612	4 2012-11-22

19370_149_130227.eps
130227

10-1-24 B05A, Class-D amplifier

B05A Class-D amplifier

B05A

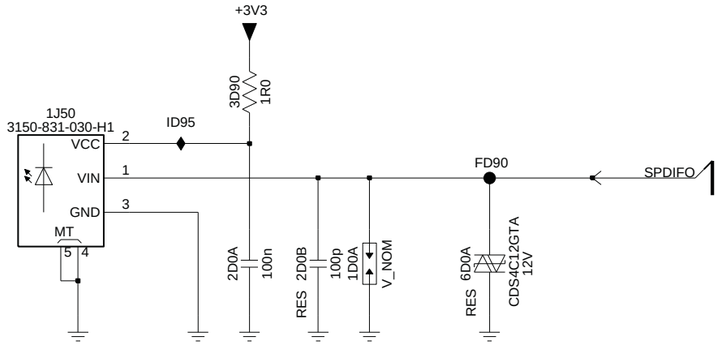


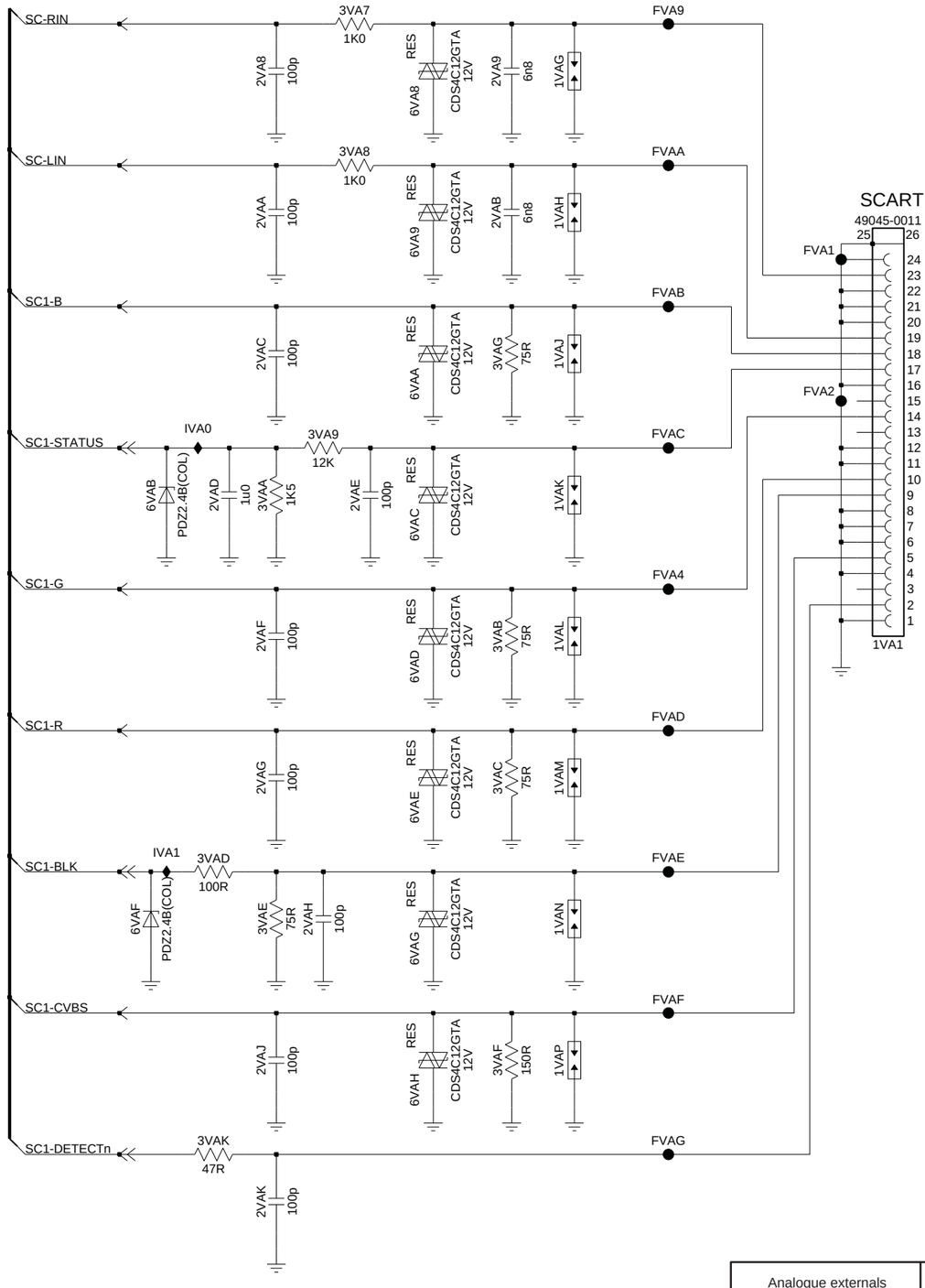
Class-D amplifier	3104 313 6612	4 2012-11-22

19370_150_130227.eps
130227

B05B Analogue externals

B05B





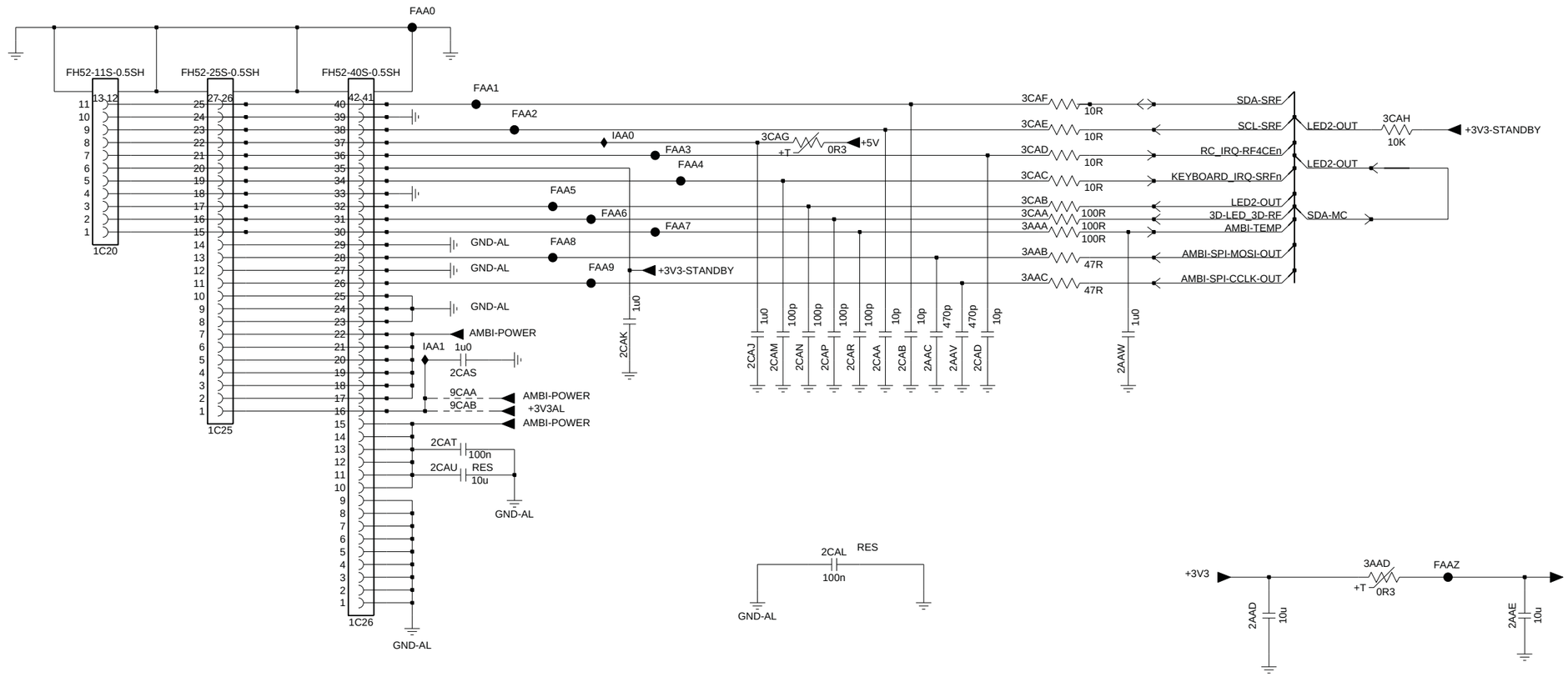
Analogue externals	3104 313 6612	4 2012-11-22

19370_151_130227.eps
130227

10-1-26 B05C, Sensor board and AmbiLight

B05C Sensor board and AmbiLight

B05C



Sensor board and AmbiLight	3104 313 6612	4 2012-11-22

19370_152_130227.eps
130227

B06A HDMI

B06A

HDMI CONNECTOR 4

HDMI CONNECTOR 3

HDMI CONNECTOR 2

HDMI CONNECTOR 1

I2C ADDRESS
SII9287B=0XB2

7HA0 SII9287B

1V2 DVB-T2 and DVB-S2

7HA5 RT9715EGB

7HA1-1 RT9025-12GSP

7HA1-2 RT9025-12GSP

pins (9,27,64)

pin (38)

pin (49)

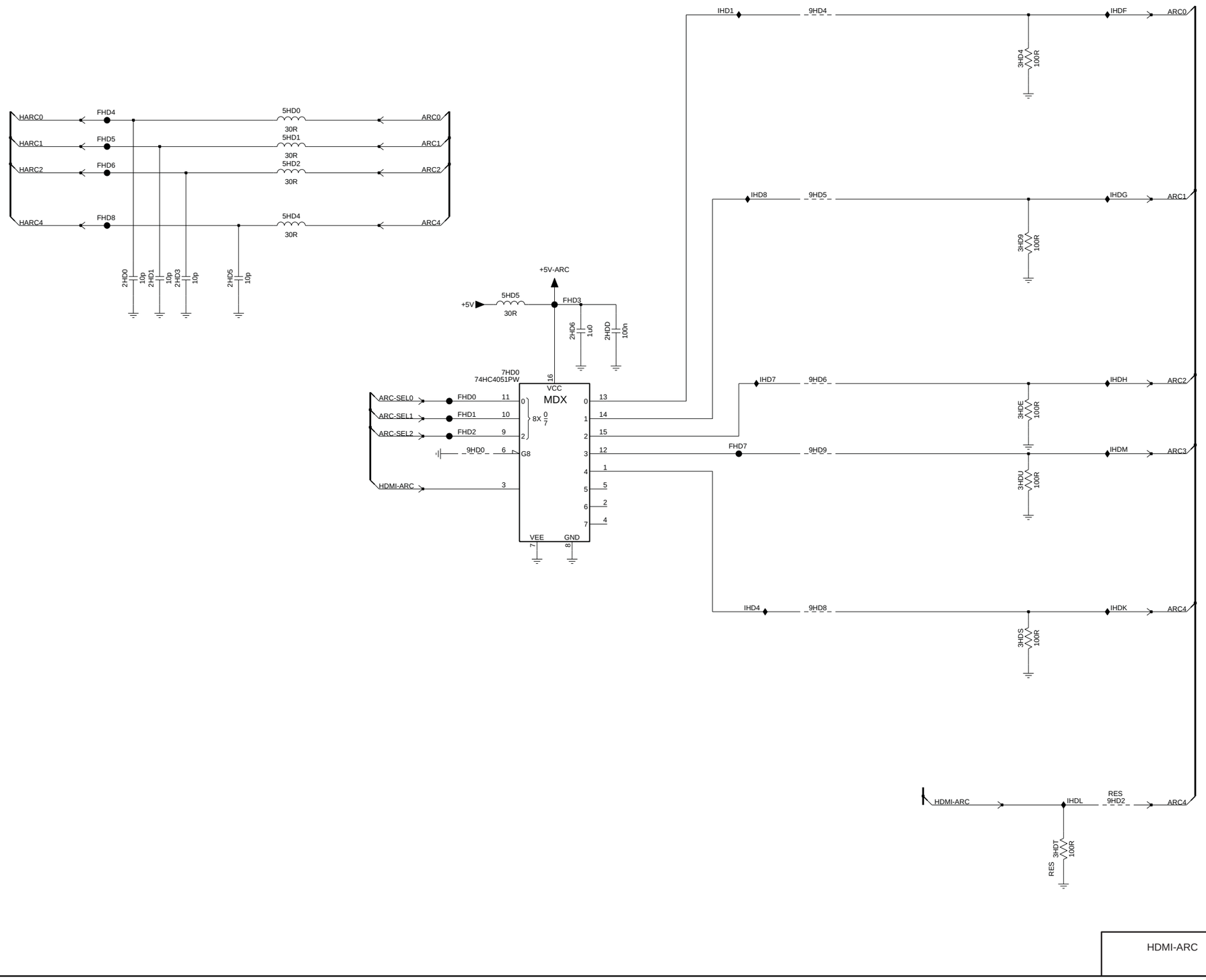
HDMI	3104 313 6612	4	2012-11-22

19370_153_130227.eps
130227

10-1-28 B06B, HDMI-ARC

B06B HDMI-ARC

B06B



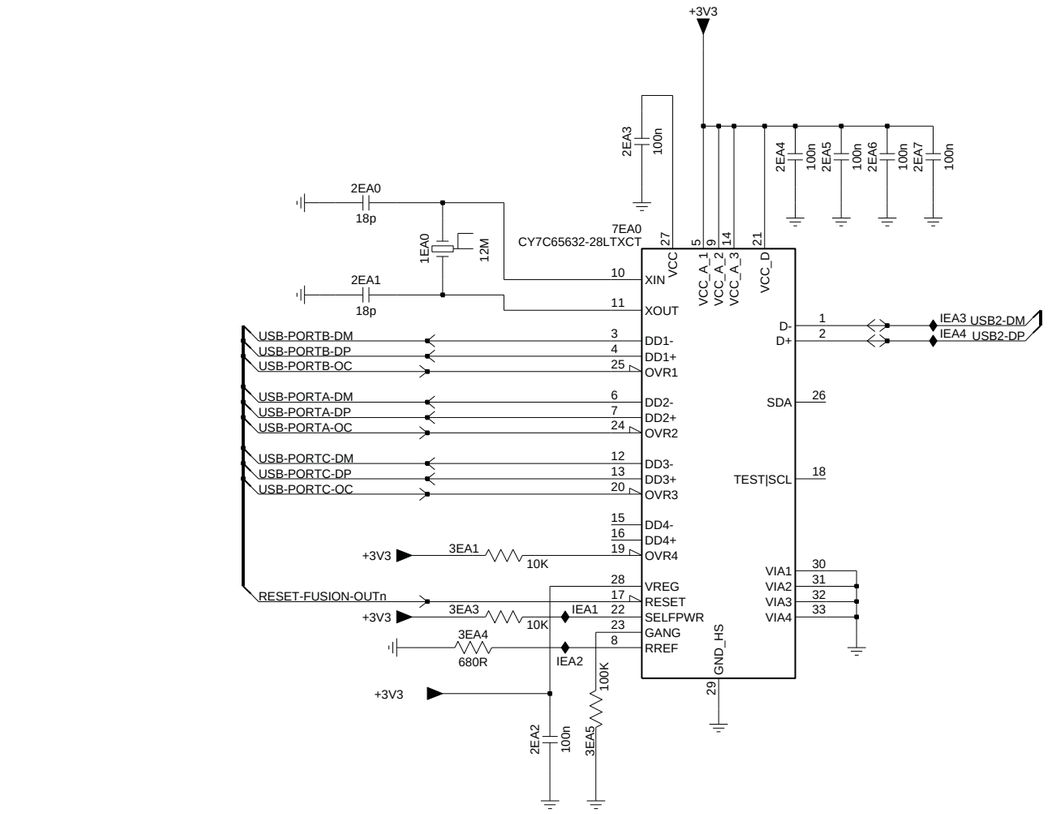
HDMI-ARC	3104 313 6612	4 2012-11-22

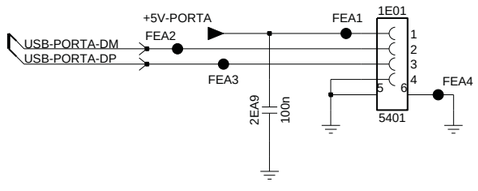
19370_154_130227.eps
130227

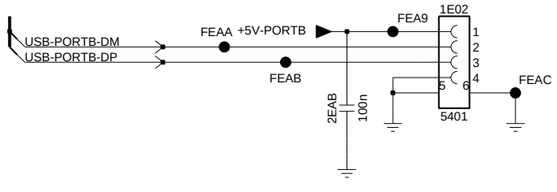
10-1-29 B06C, USB external

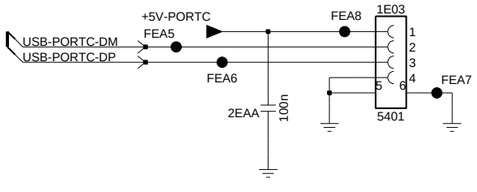
B06C USB external

B06C









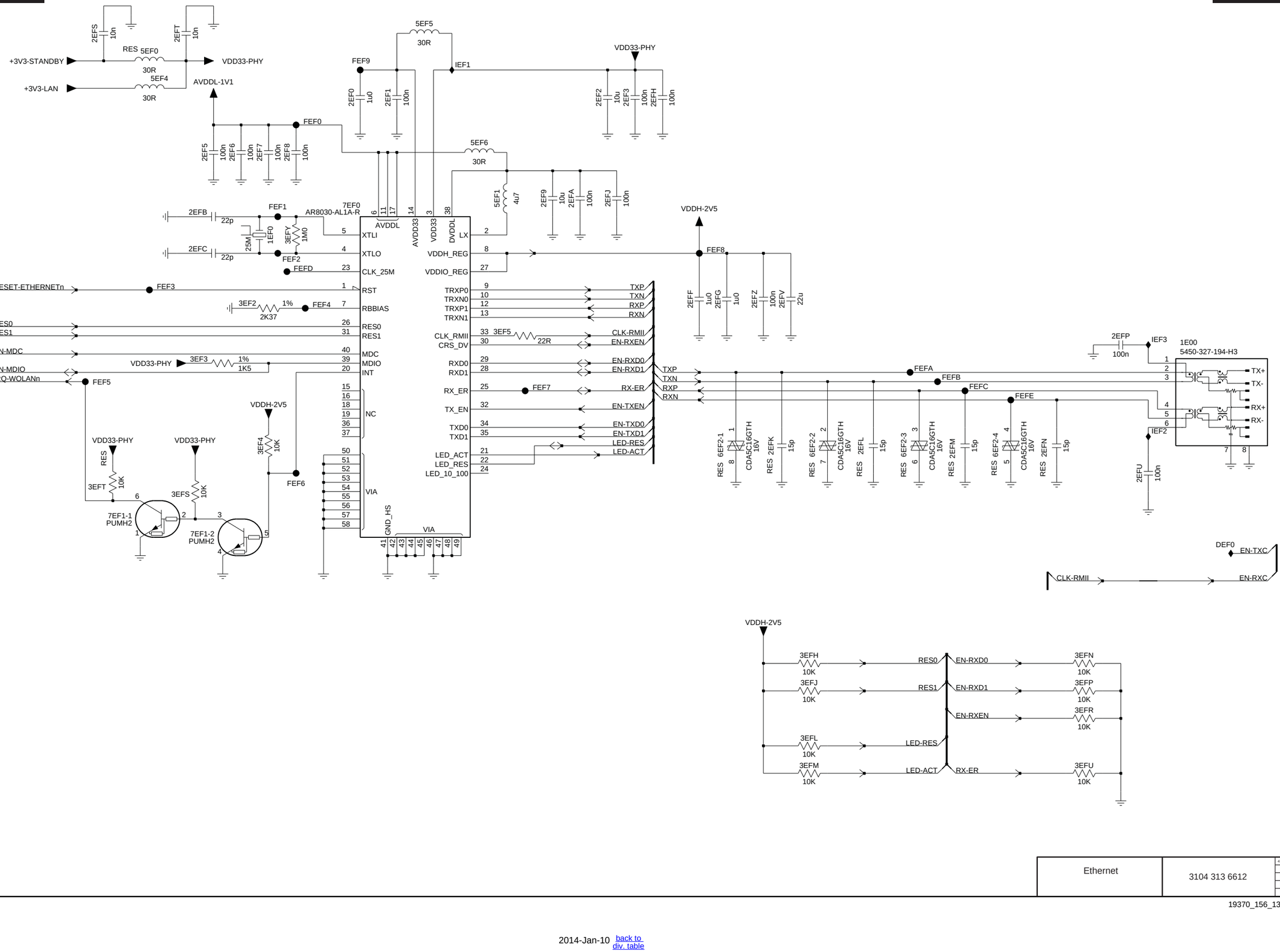
USB external	3104 313 6612	4 2012-11-22

19370_155_130227.eps
130227

10-1-30 B06D, Ethernet

B06D Ethernet

B06D



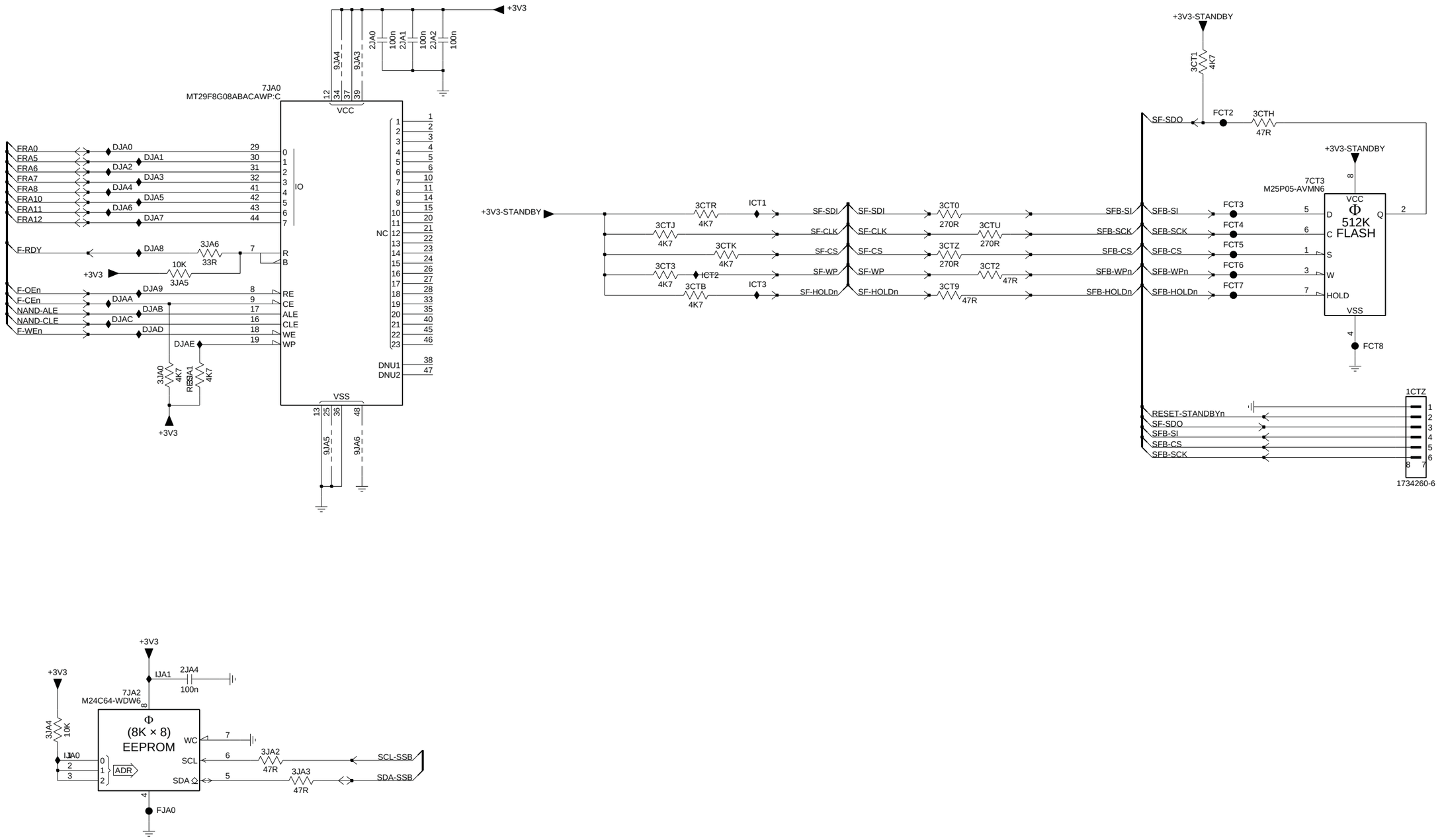
Ethernet	3104 313 6612	4 2012-11-22

19370_156_130227.eps
130227

10-1-31 B06E, NAND flash, serial flash and EEPROM

B06E NAND flash, serial flash and EEPROM

B06E



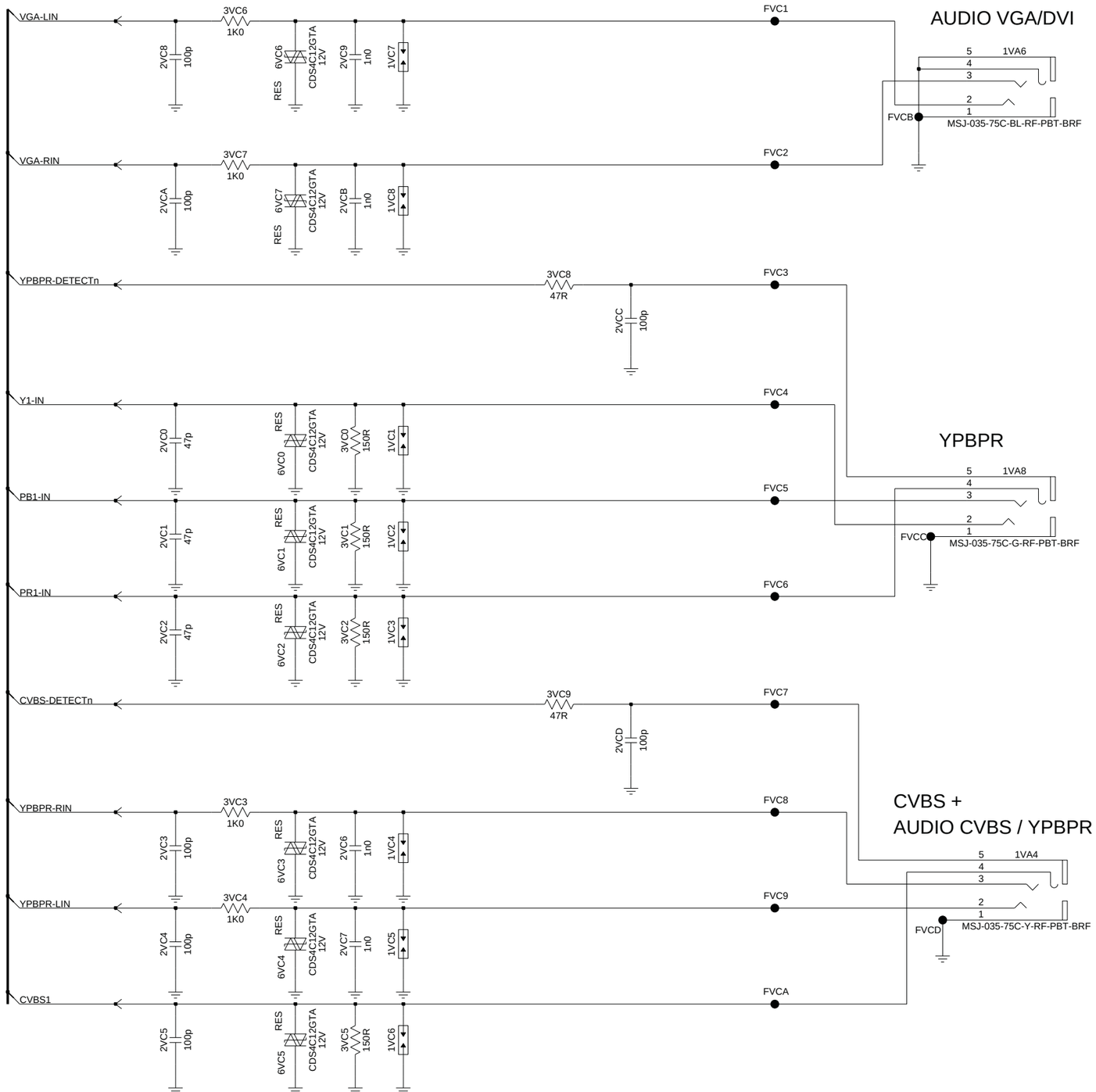
NAND flash, serial flash and EEPROM	3104 313 6612	4 2012-11-22

19370_157_130227.eps
130227

10-1-32 B06F, Analogue externals

B06F Analogue externals

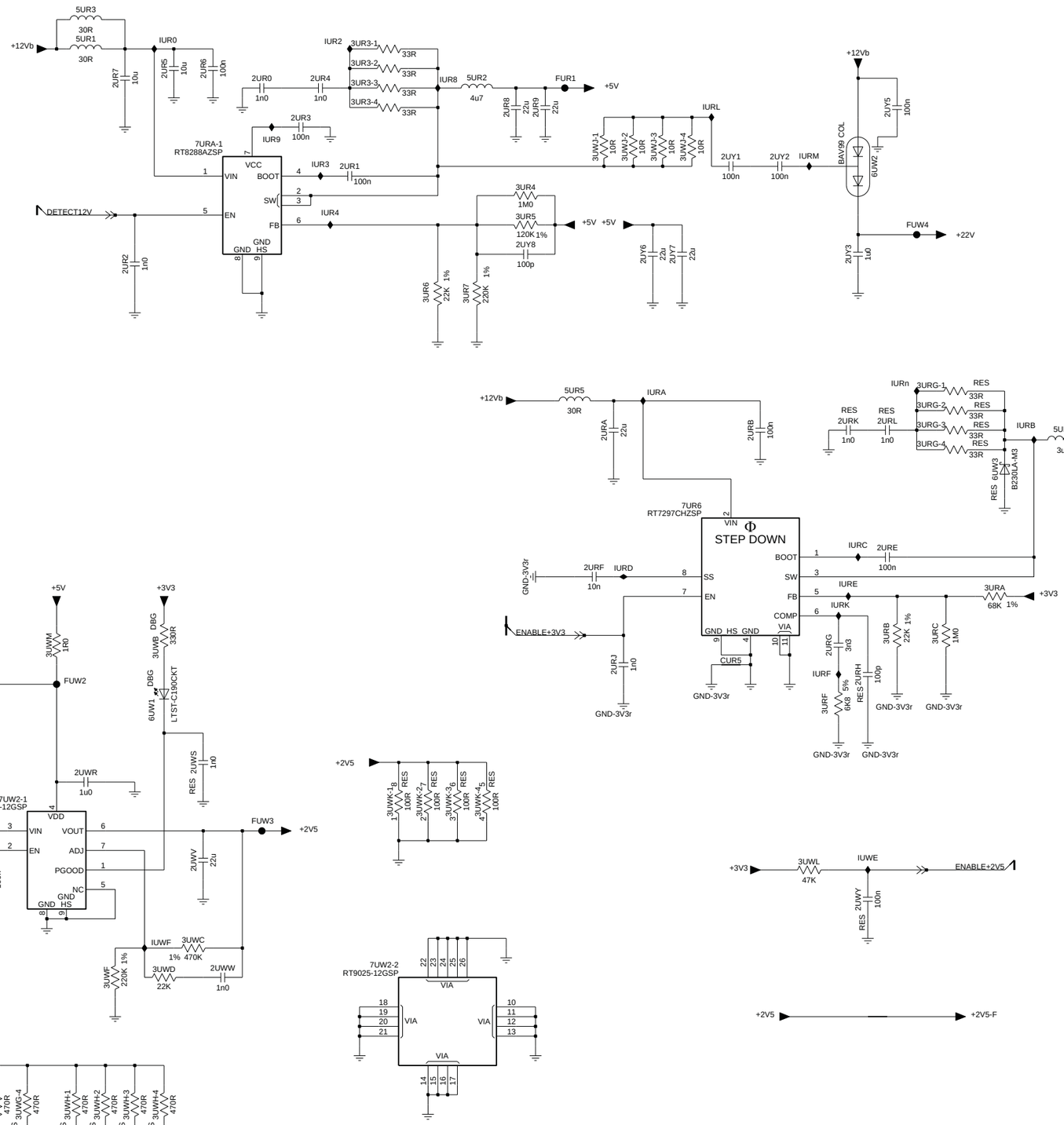
B06F



Analogue externals	3104 313 6612	4 2012-11-22

19370_158_130227.eps
130227

B06G DC-DC

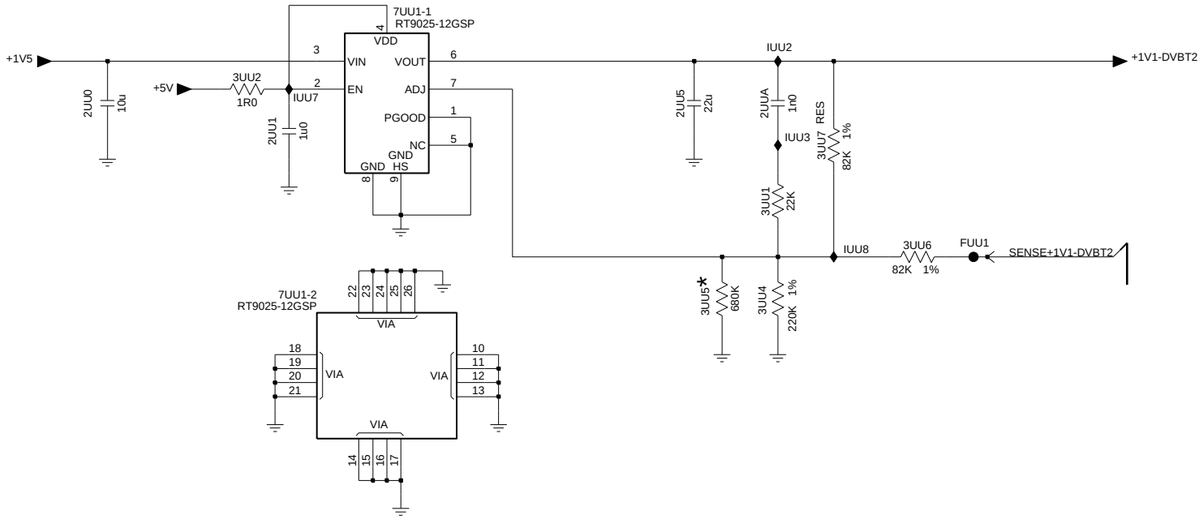


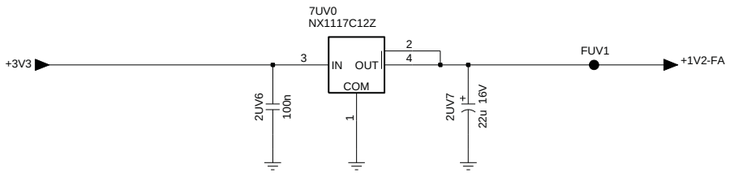
DC-DC	3104 313 6612	4 2012-11-22

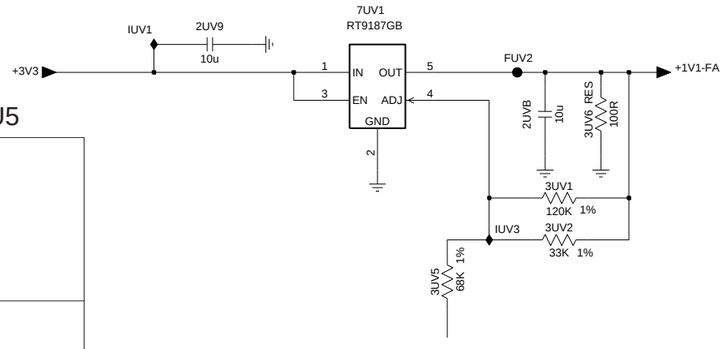
19370_159_130227.eps
130227

10-1-34 B06H, DC-DC

B06H DC-DC



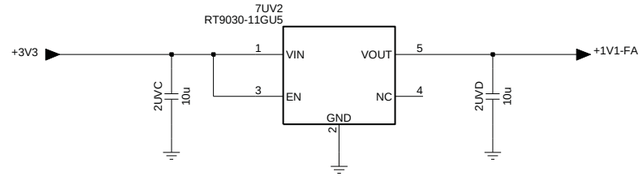




+1V1-DVBT2 (*) 3UU5

1.10 V	RES
1.20 V	680 kΩ

Optional



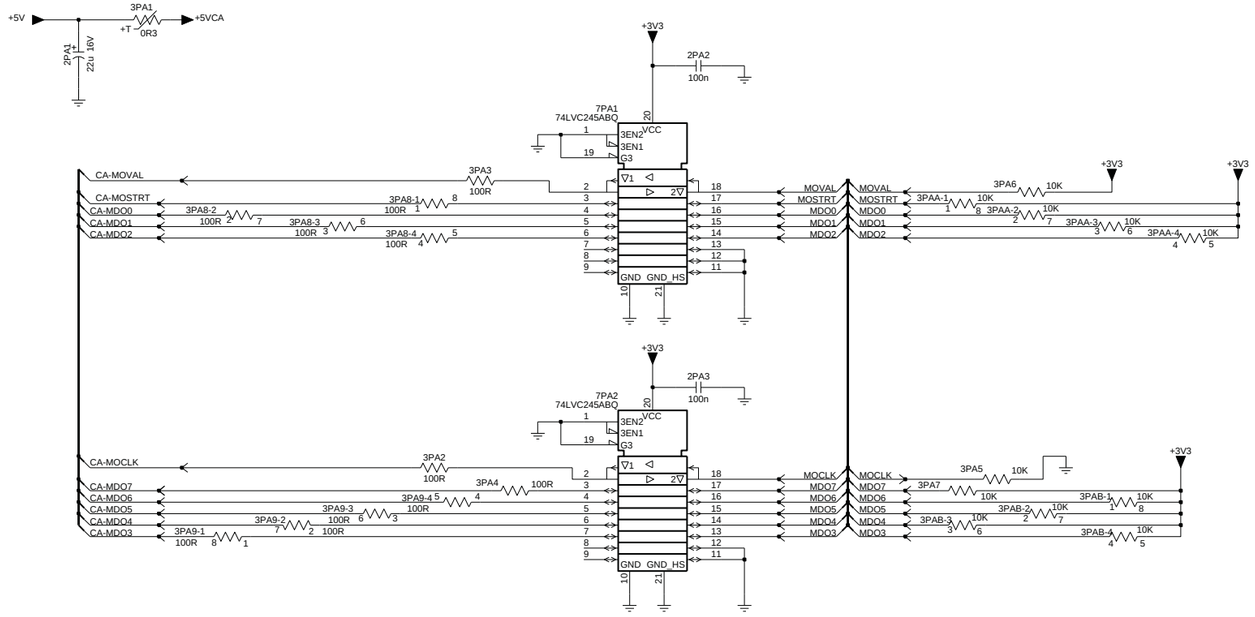
DC-DC	3104 313 6612	4 2012-11-22

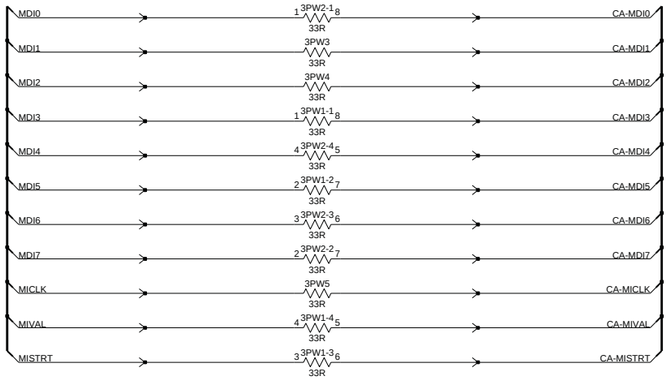
19370_160_130227.eps
130227

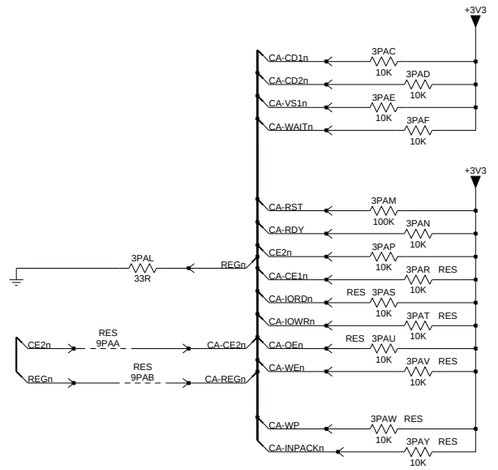
10-1-35 B06I, CI conditional access

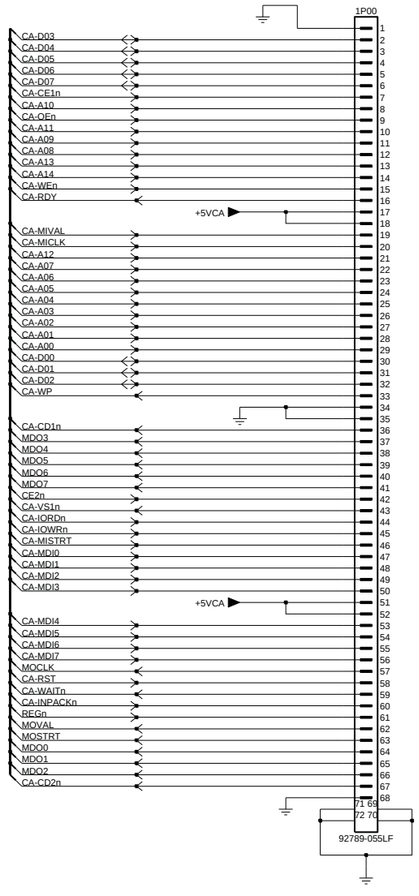
B06I CI conditional access

B06I







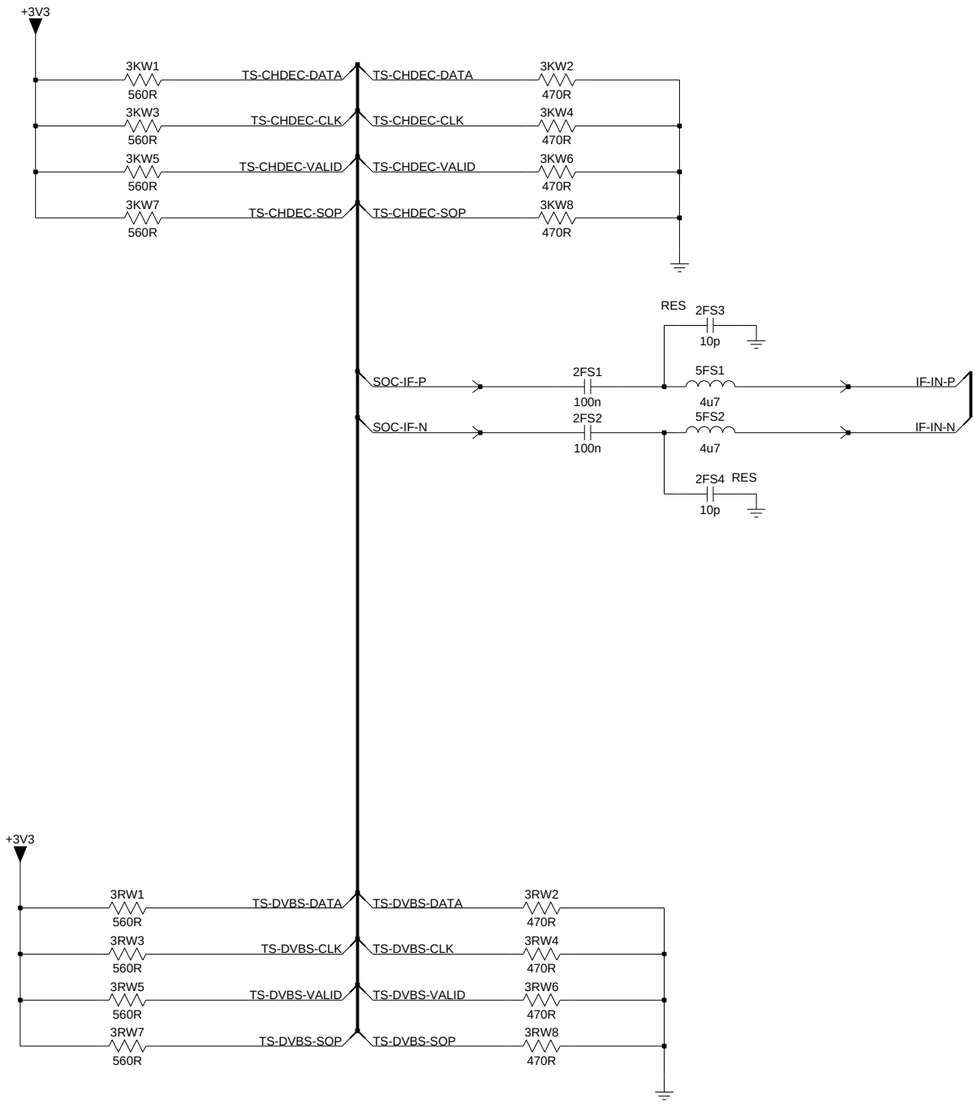


CI conditional access	3104 313 6612	4 2012-11-22

19370_161_130227.eps
130227

B06J FE

B06J



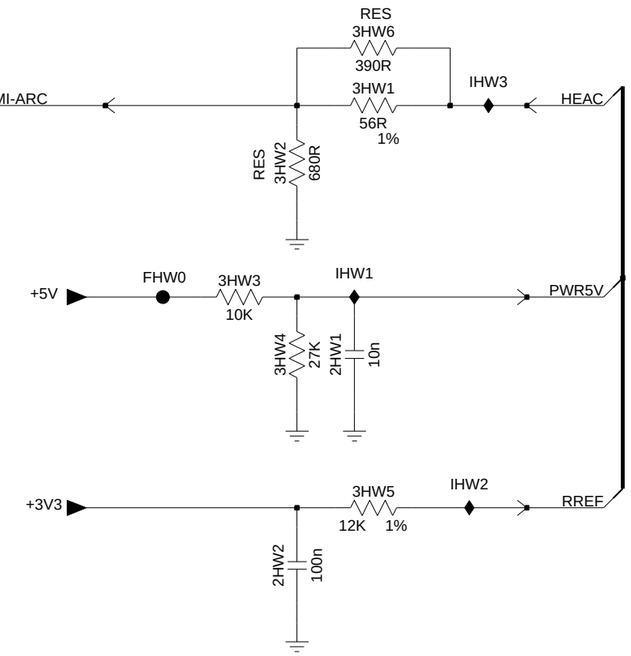
FE	3104 313 6612	4 2012-11-22

19370_162_130227.eps
130227

10-1-37 B06K, HDMI

B06K HDMI

B06K



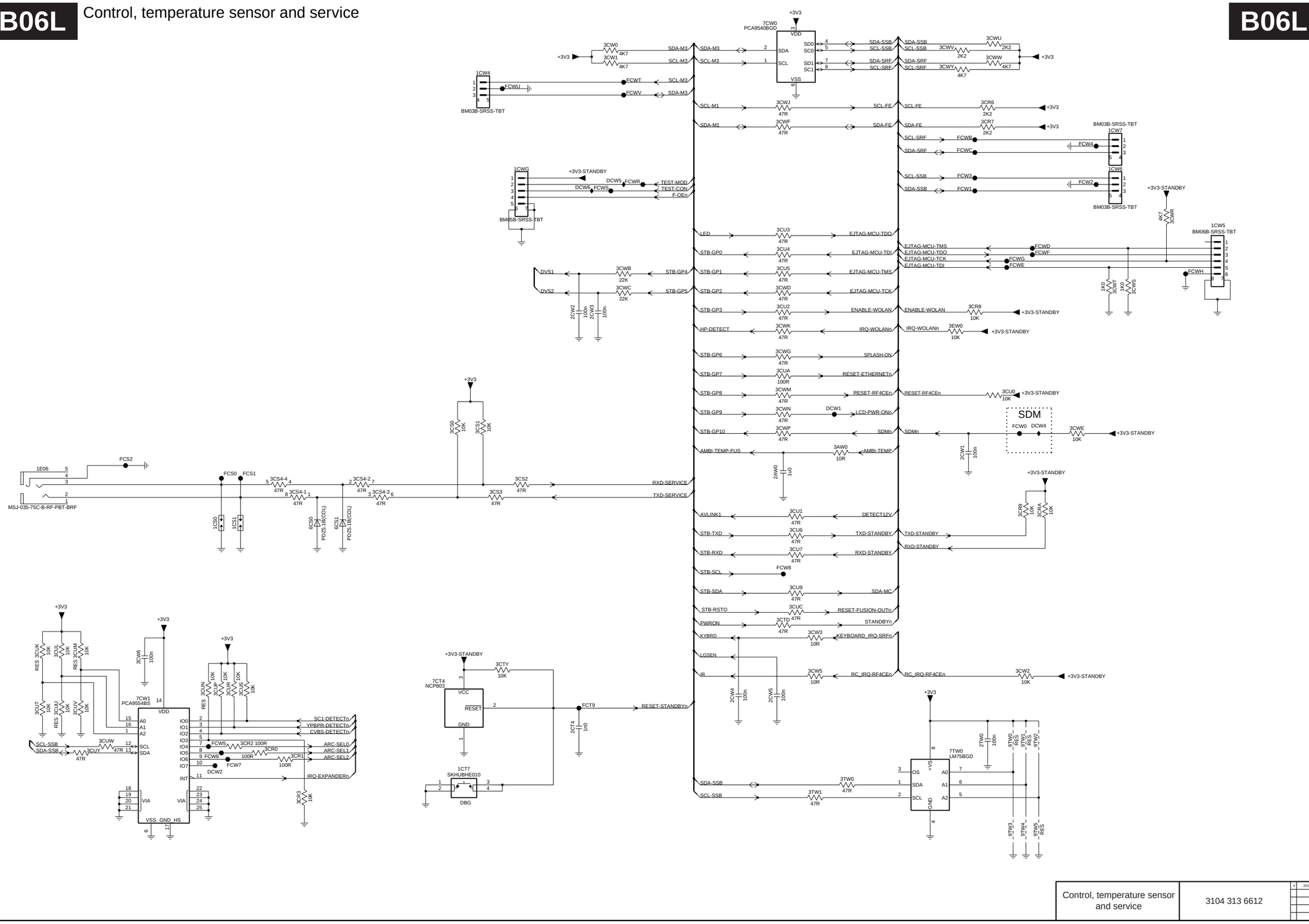
HDMI	3104 313 6612	4 2012-11-22

19370_163_130227.eps
130227

10-1-38 B06L, Control, temperature sensor and service

B06L Control, temperature sensor and service

B06L



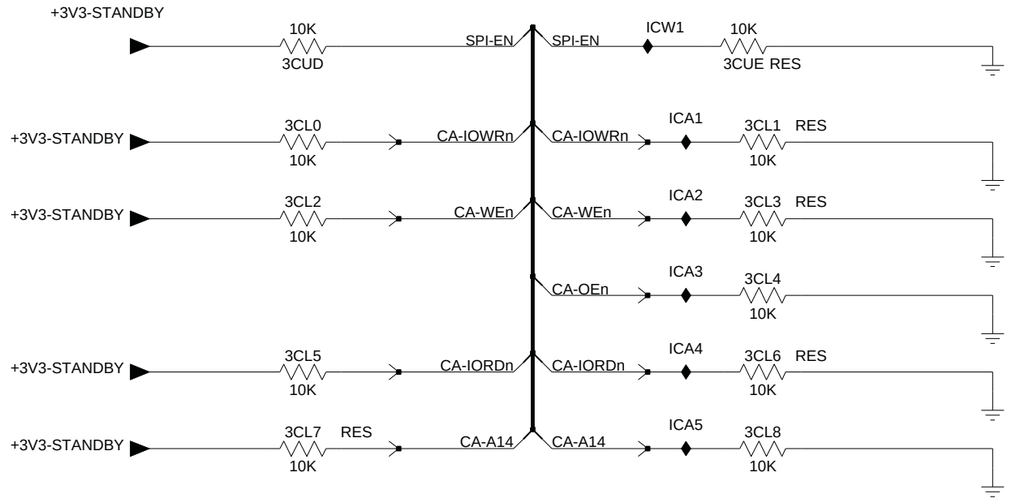
Control, temperature sensor and service	3104 313 6612	4 2012-11-22

19370_164_130227.eps
130227

10-1-39 B06M, Strap options

B06M Strap options

B06M



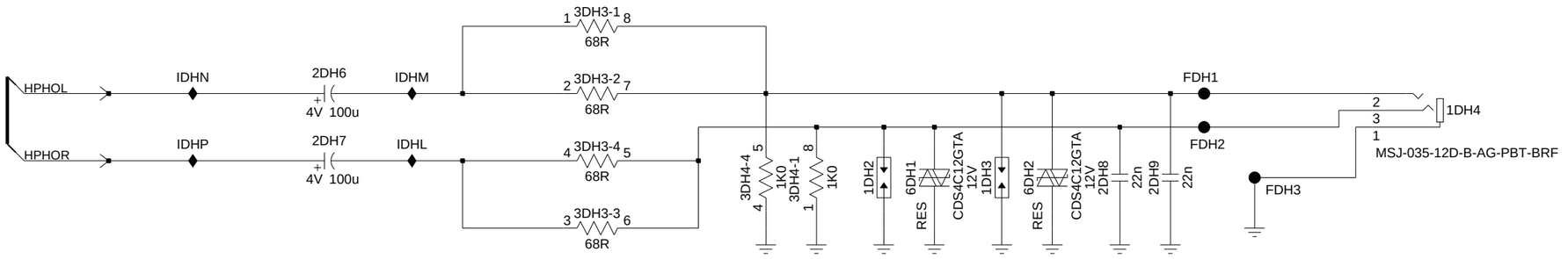
B06M

Strap options	3104 313 6612	4 2012-11-22

19370_165_130227.eps
130227

B06N Headphone

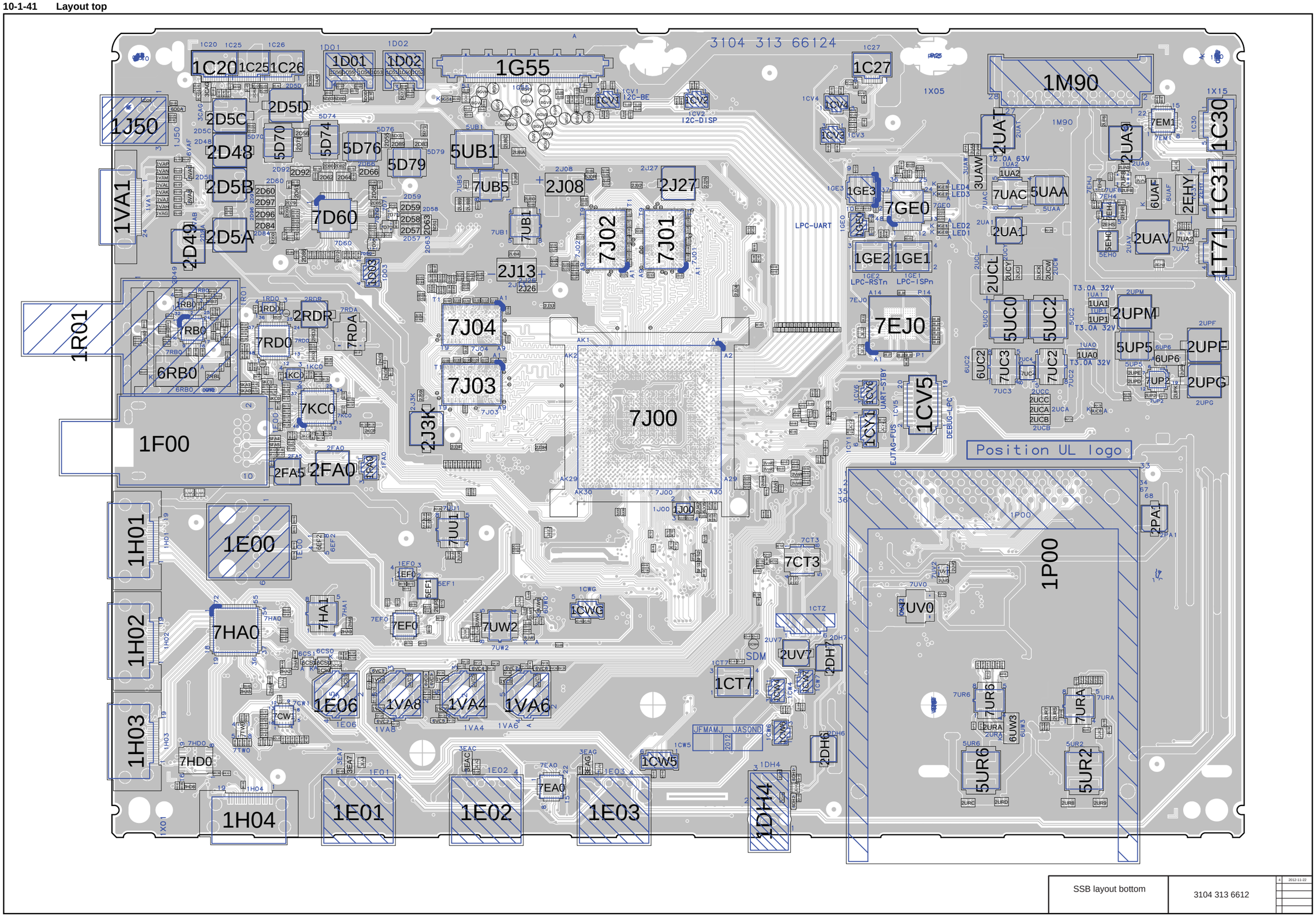
B06N



Headphone	3104 313 6612	4 2012-11-22

19370_166_130227.eps
130227

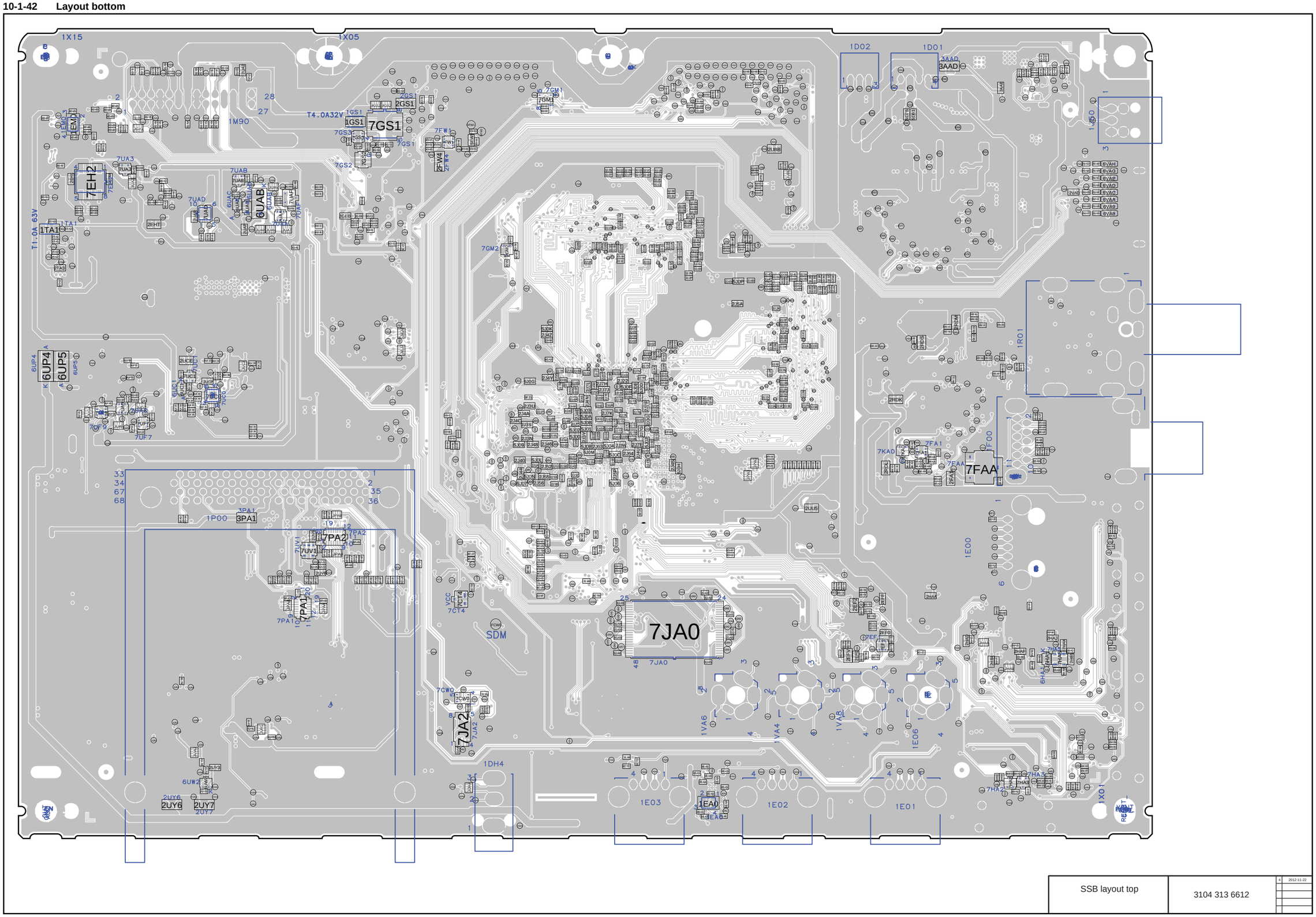
10-1-41 Layout top



SSB layout bottom	3104 313 6612	4 2012-11-22

19370_167_130228.eps
130228

10-1-42 Layout bottom



SSB layout top	3104 313 6612	4 2012-11-22

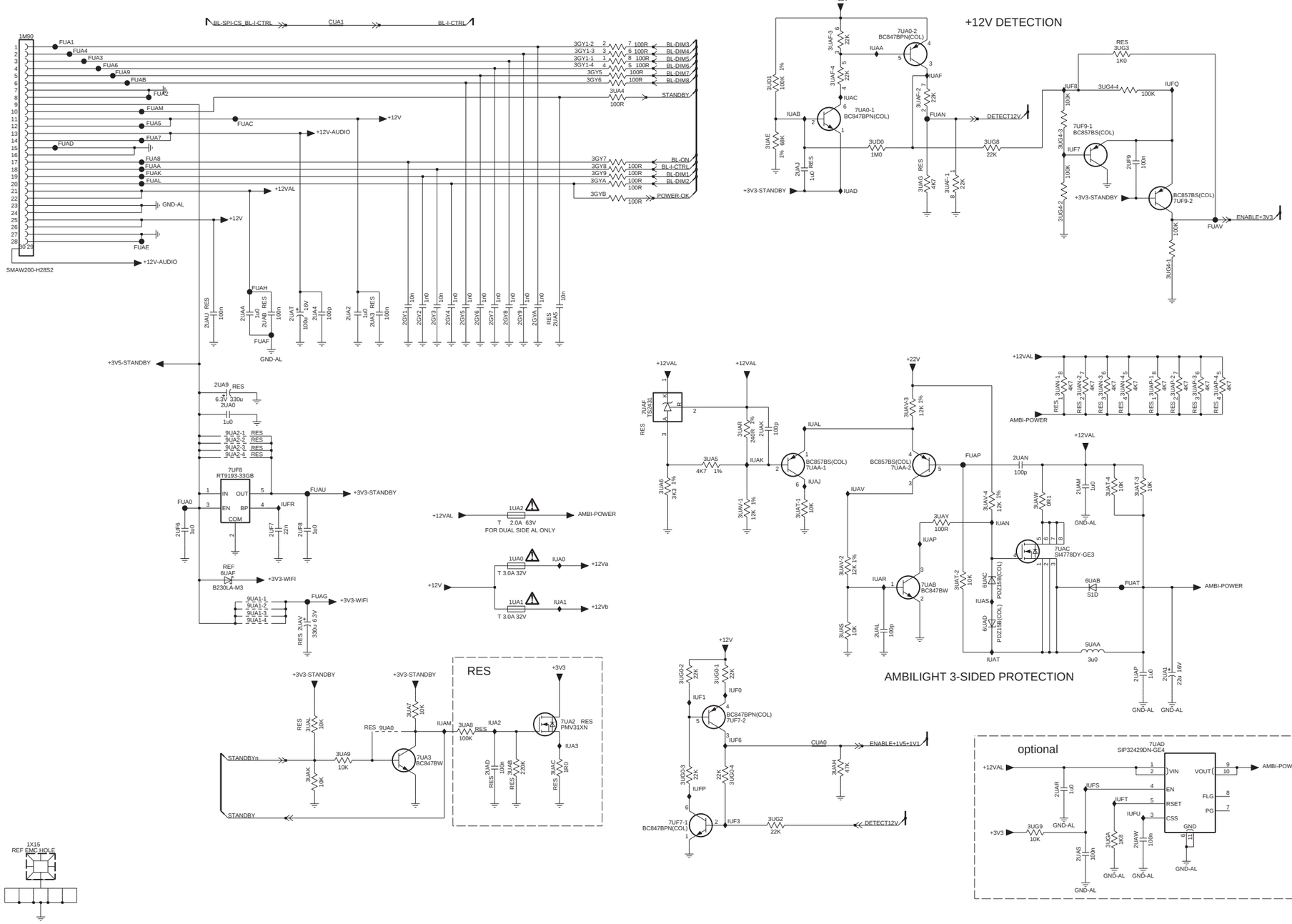
19370_168_130228.eps
130228

10.2 310431366185 SSB

10-2-1 B01A, Power connector

B01A Power connector

B01A



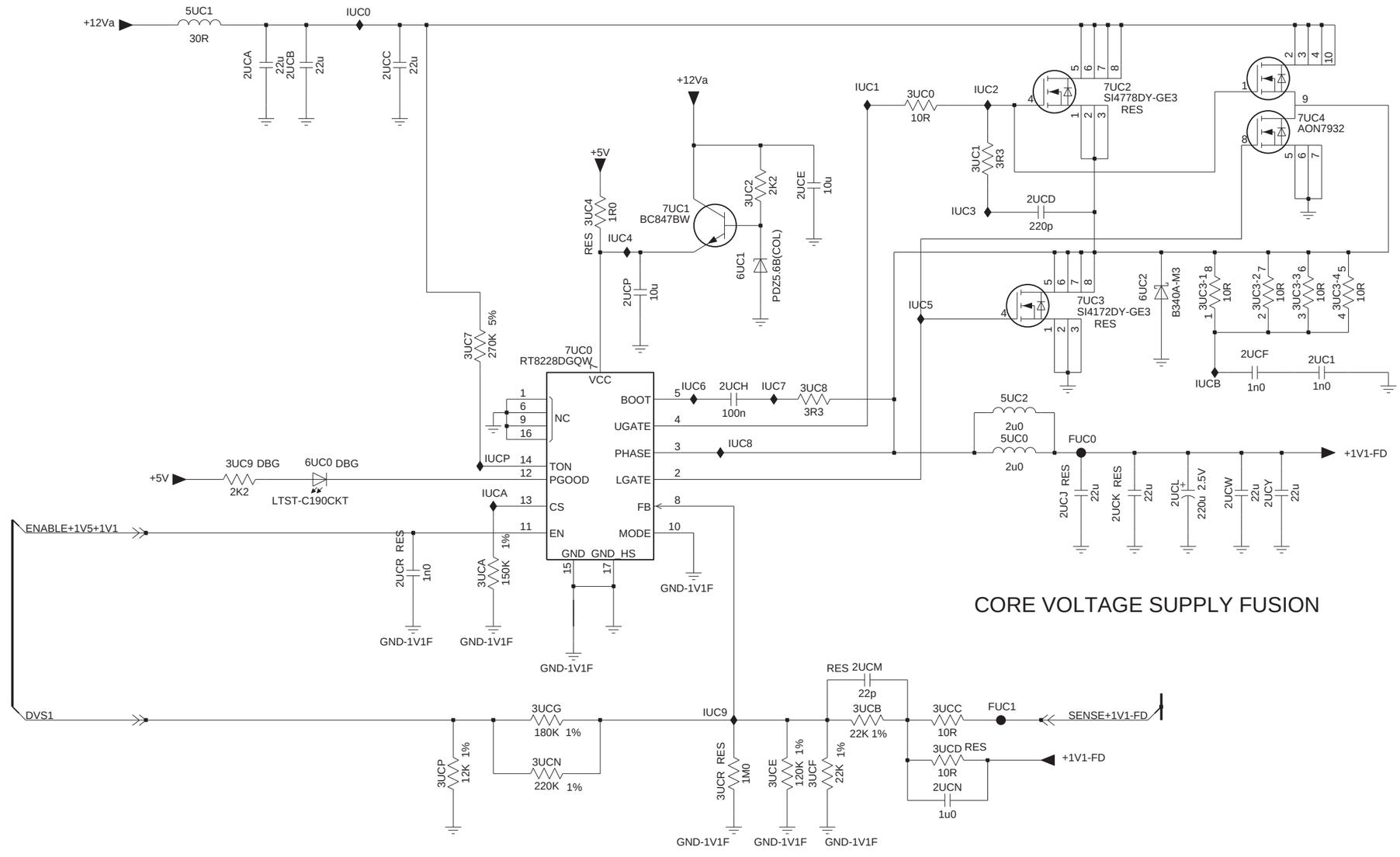
Power connector	3104 313 6618	6 2012-11-08

19370_001_130129.eps
130129

10-2-2 B01B, Fusion supply

B01B Fusion supply

B01B



CORE VOLTAGE SUPPLY FUSION

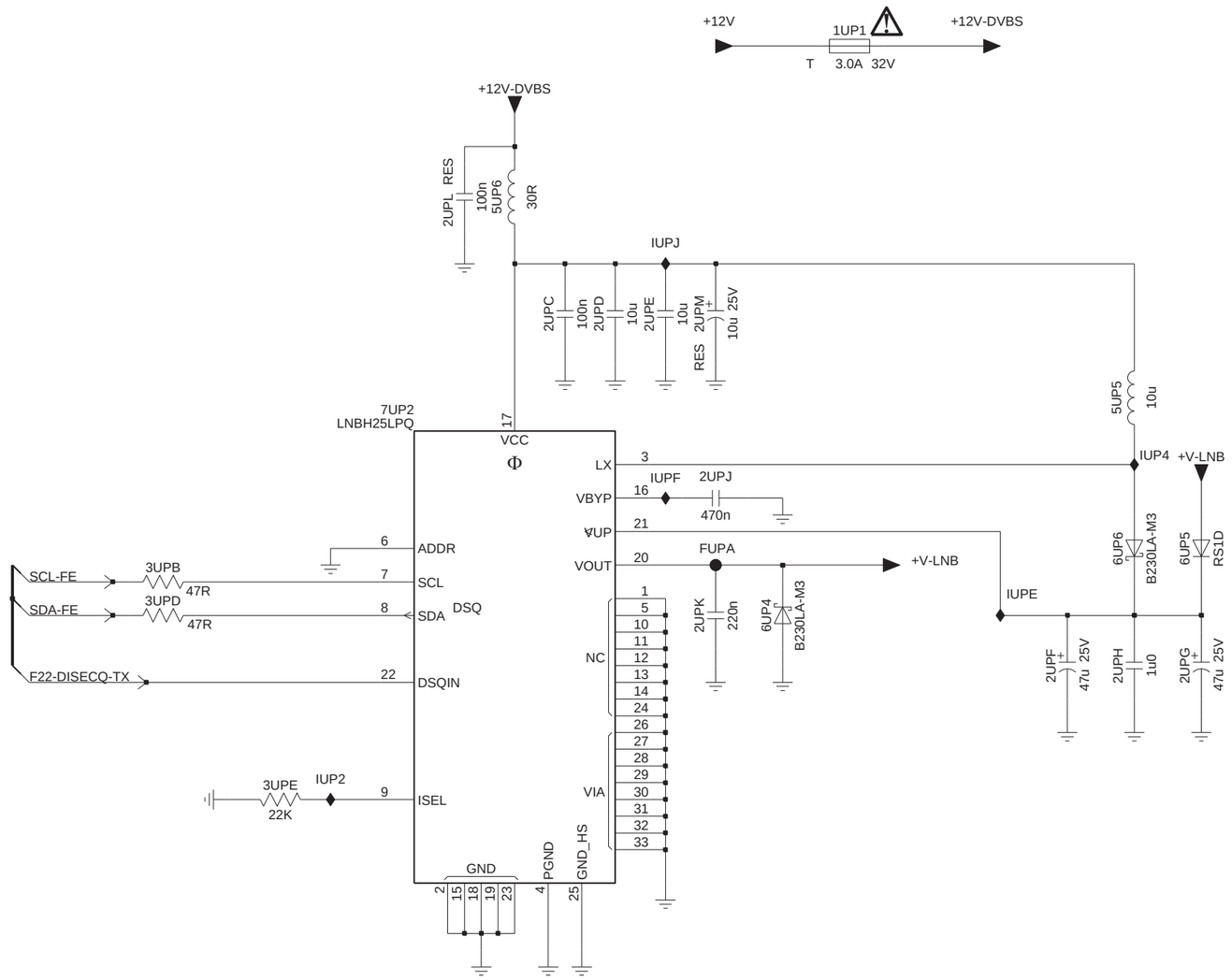
Fusion supply	3104 313 6618	5 2012-11-08

19370_002_130129.eps
130129

10-2-3 B01C, LNB supply

B01C LNB supply

B01C



B01C

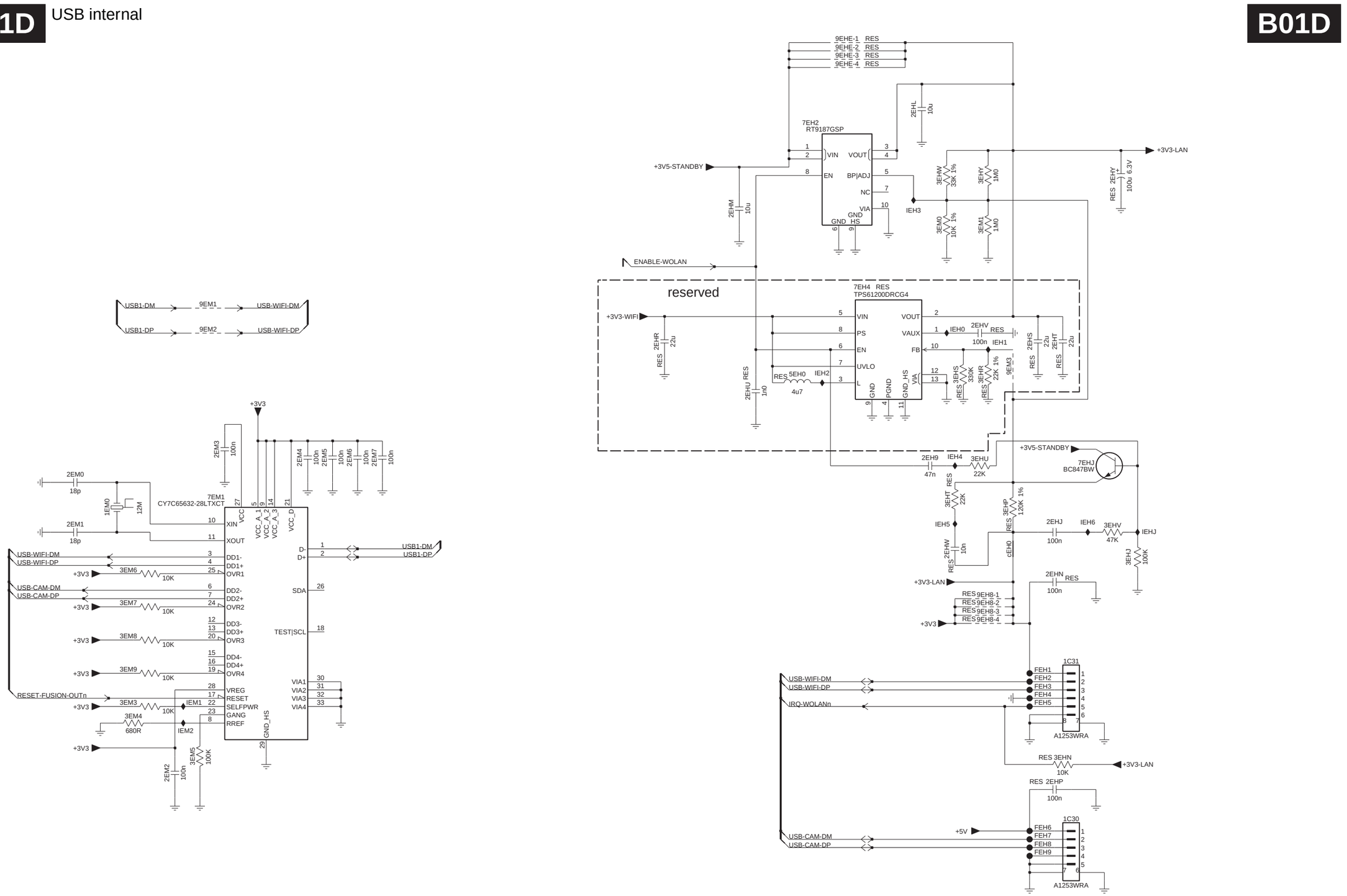
LNB supply	3104 313 6618	5 2012-11-08

19370_003_130129.eps
130129

10-2-4 B01D, USB internal

B01D USB internal

B01D



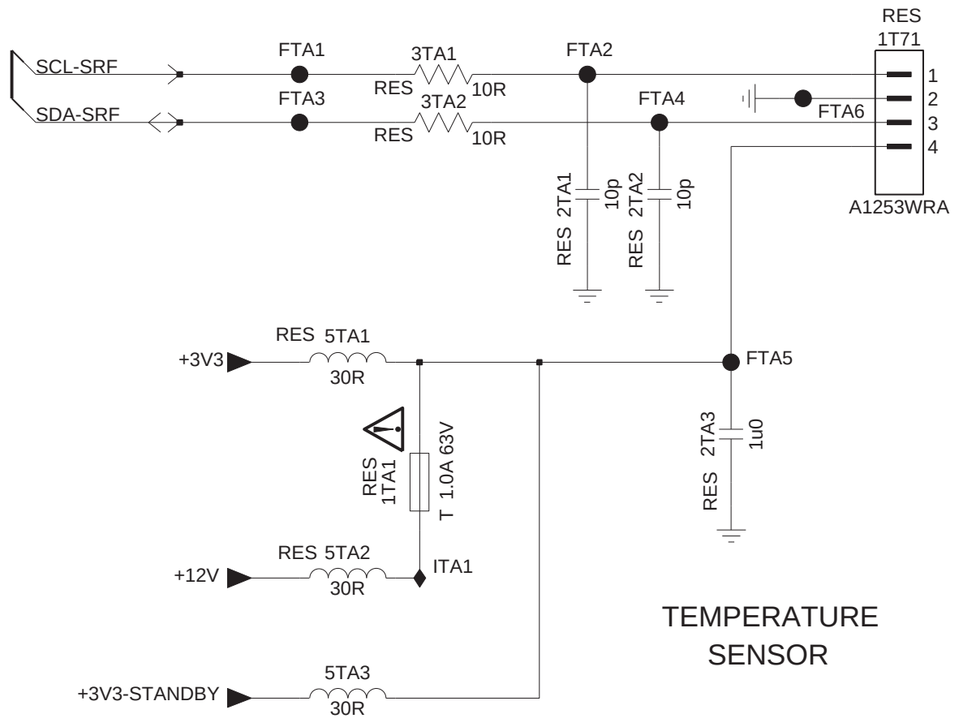
USB internal	3104 313 6618	5 2012-11-08

19370_004_130129.eps
130129

10-2-5 B01E, Miscellaneous

B01E Miscellaneous

B01E



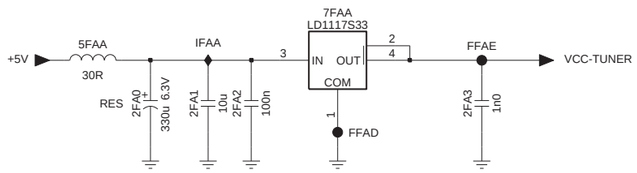
Miscellaneous	3104 313 6618	0 2012-11-08

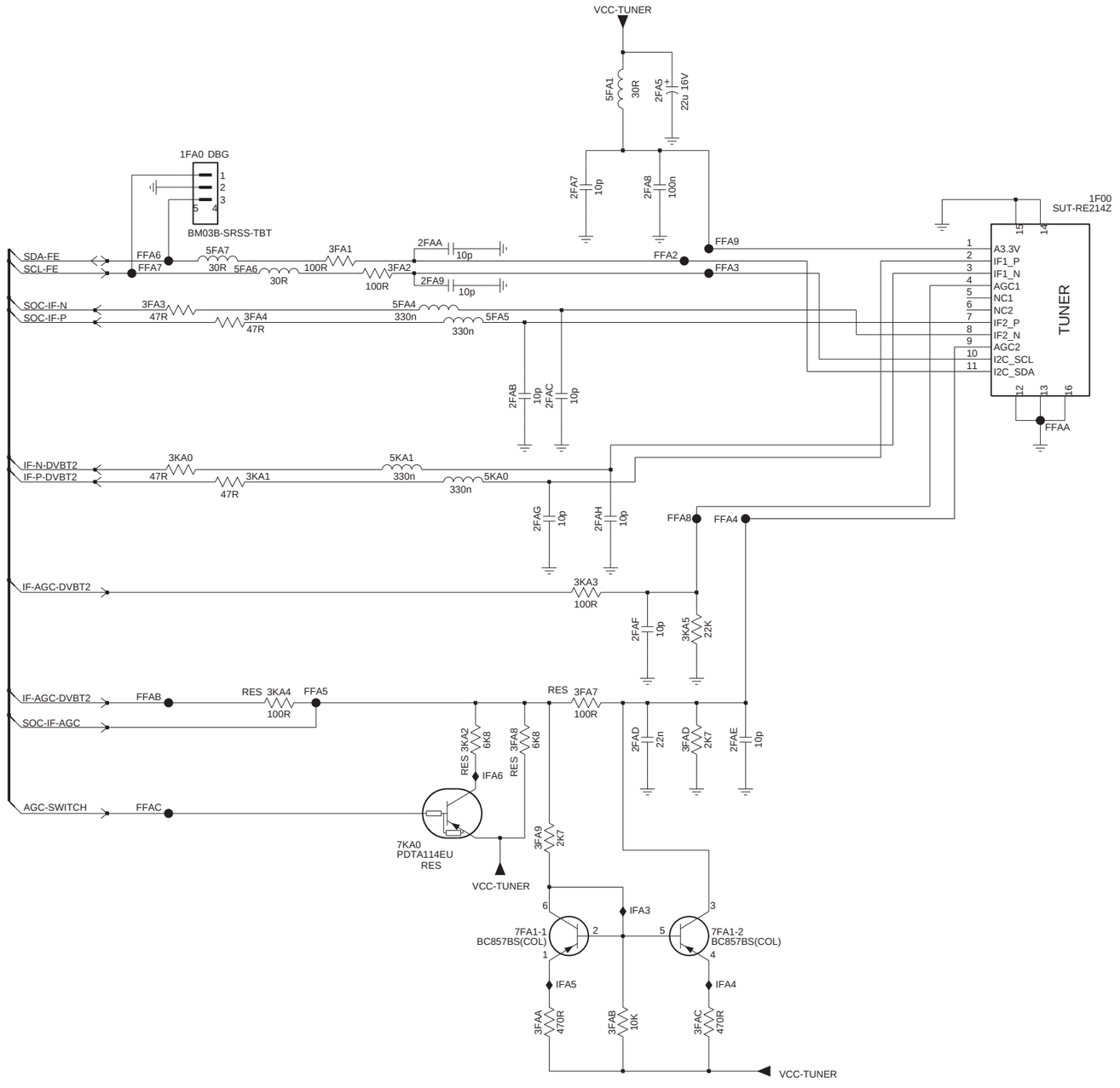
19370_005_130129.eps
130129

10-2-6 B02A, Hybrid T/C tuner

B02A Hybrid T/C tuner

B02A





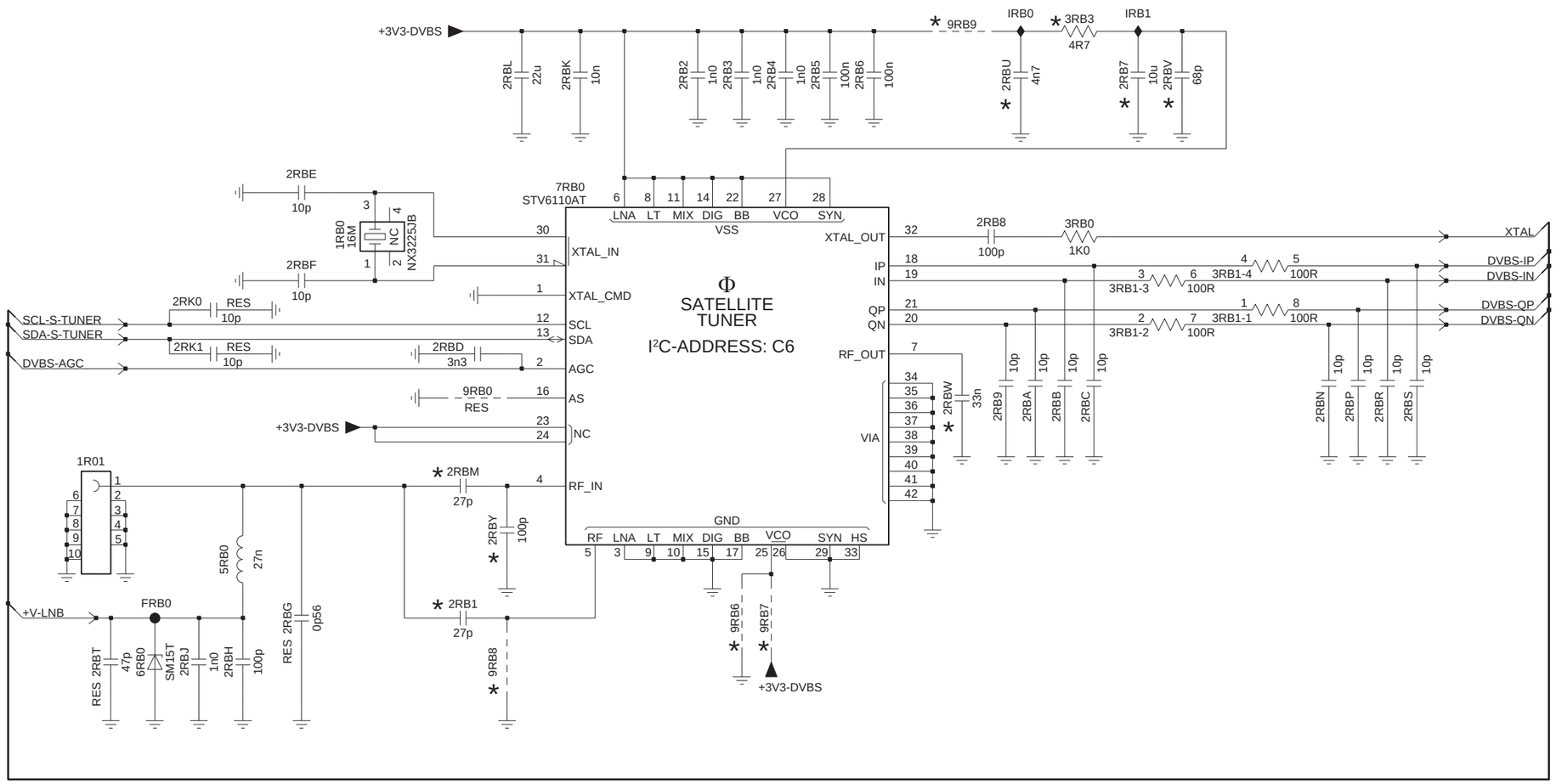
Hybrid T/C tuner	3104 313 6618	0 2012-11-08

19370_006_130129.eps
130129

10-2-7 B02B, Satellite tuner

B02B Satellite tuner

B02B



Diversity Matrix (Satellite Tuner dependant)

Position Nr	Affected Pin	Default Value	STV6110	STV6111
2RBY	4,5	100P	-	X
9RB8	4,5	JUMP	X	-
2RBM	4,5	27P	X	-
2RB1	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

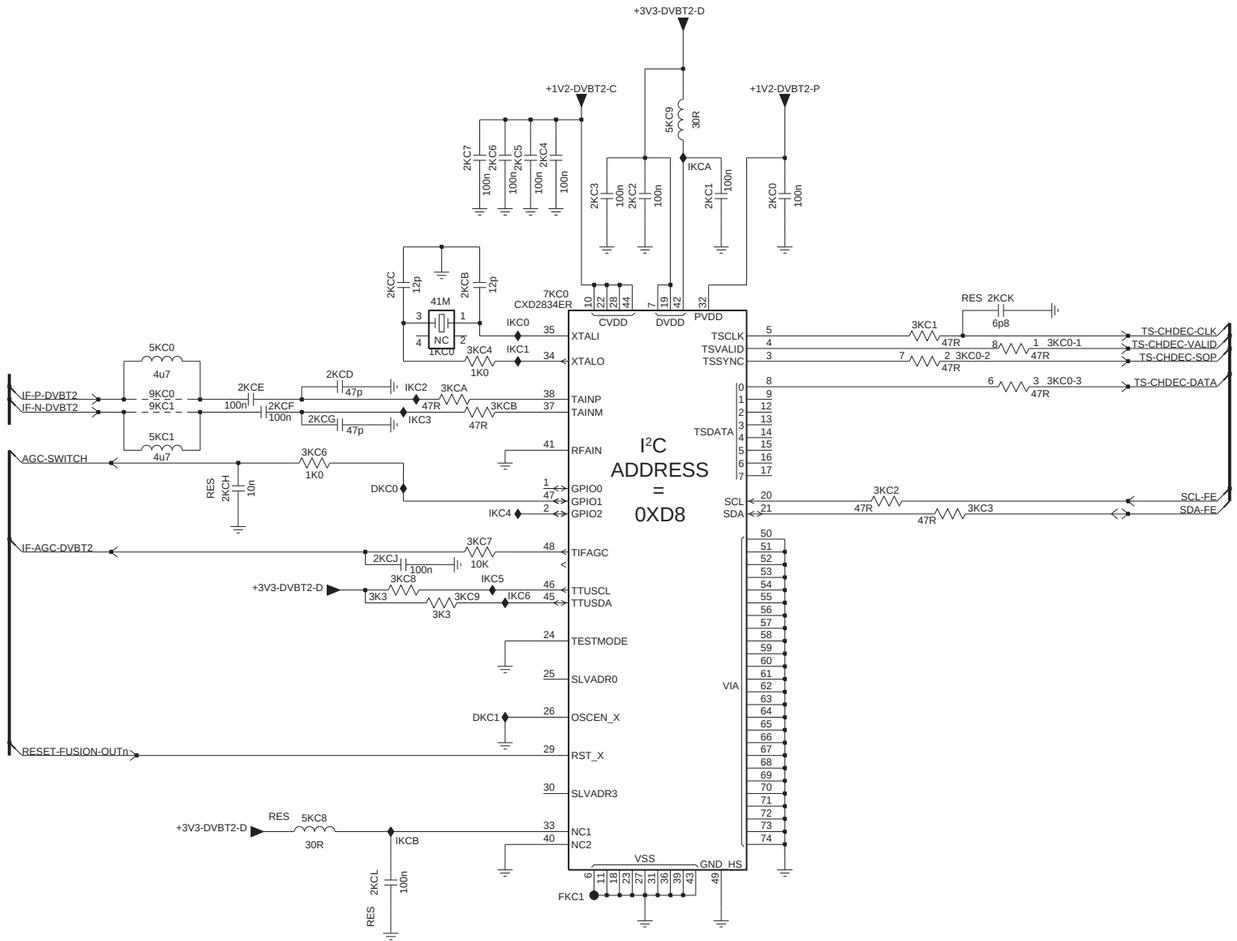
Satellite tuner	3104 313 6618	5 2012-11-08

19370_007_130129.eps
130129

10-2-8 B02C, DVBT2 channel decoder

B02C DVBT2 channel decoder

B02C



7KC0	+1V1-DVBT2
CXD2834	+1V2
GAIA3	+1V1

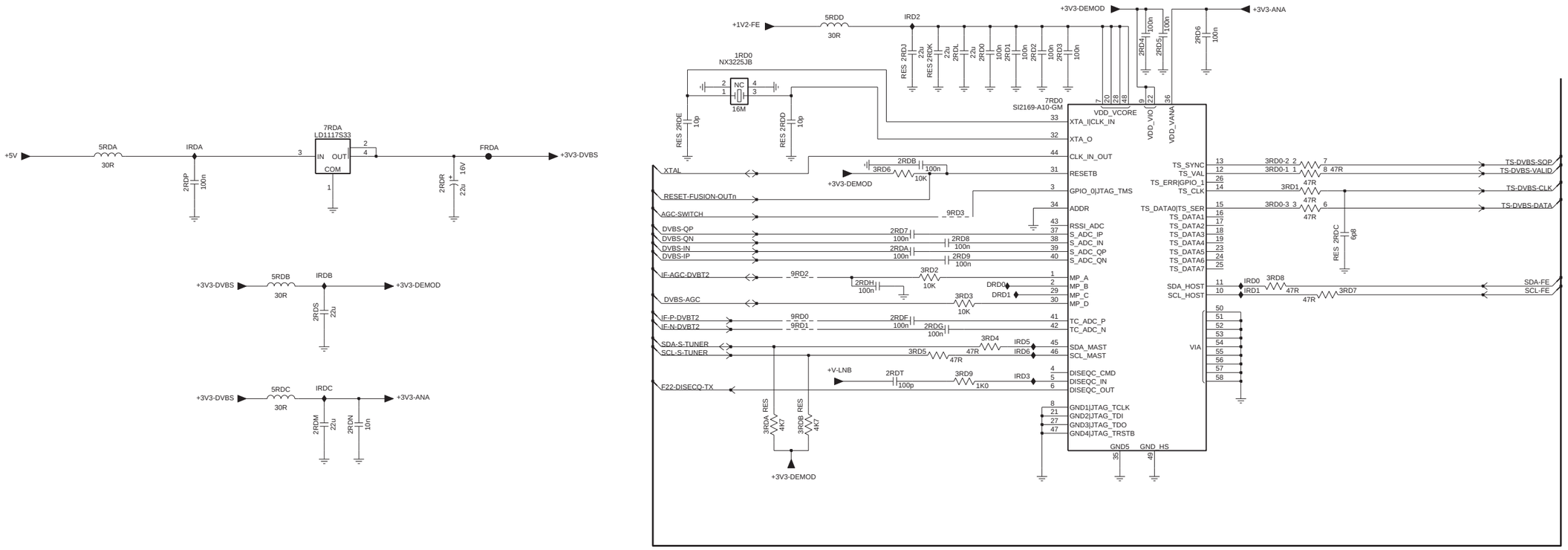
DVBT2 channel decoder	3104 313 6618	5 2012-11-08

19370_008_130129.eps
130129

10-2-9 B02D, DVBS/S2 channel decoder

B02D DVBS/S2 channel decoder

B02D



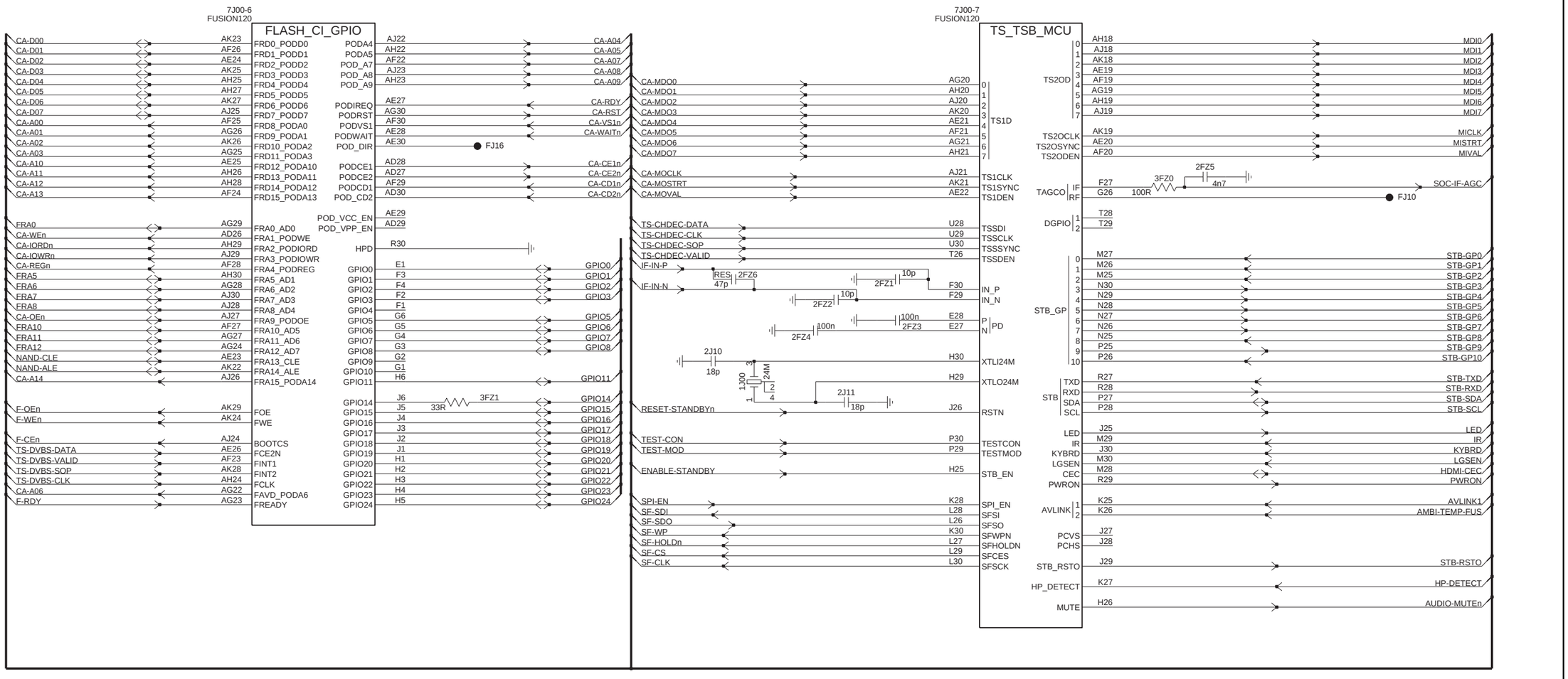
B02D

DVBS/S2 channel decoder	3104 313 6618	5 2012-11-08

19370_009_130129.eps
130129

B03A Fusion

B03A



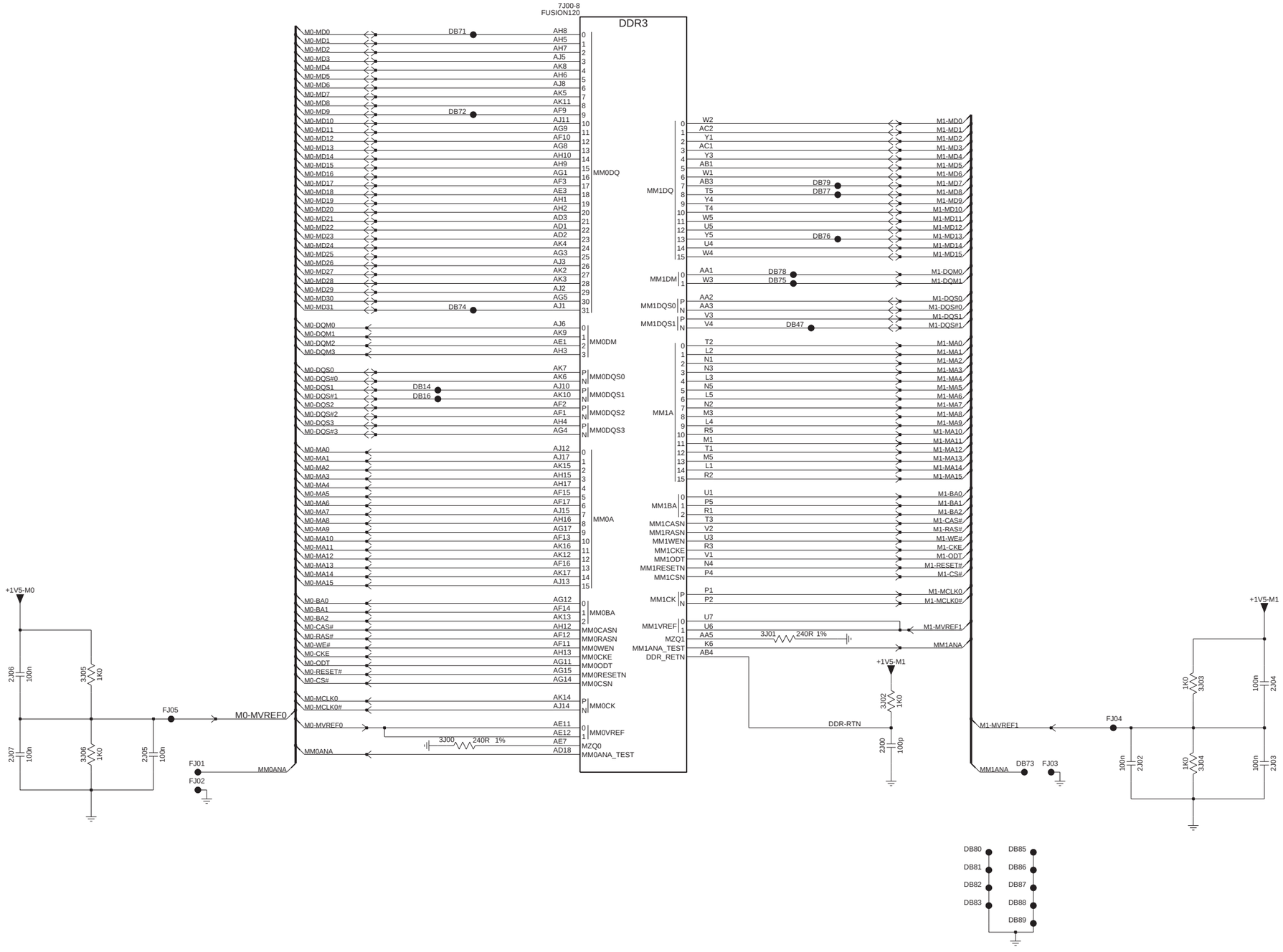
Fusion	3104 313 6618	9 2012-11-08

19370_010_130129.eps
130129

10-2-11 B03B, Fusion Umac controller

B03B Fusion Umac controller

B03B

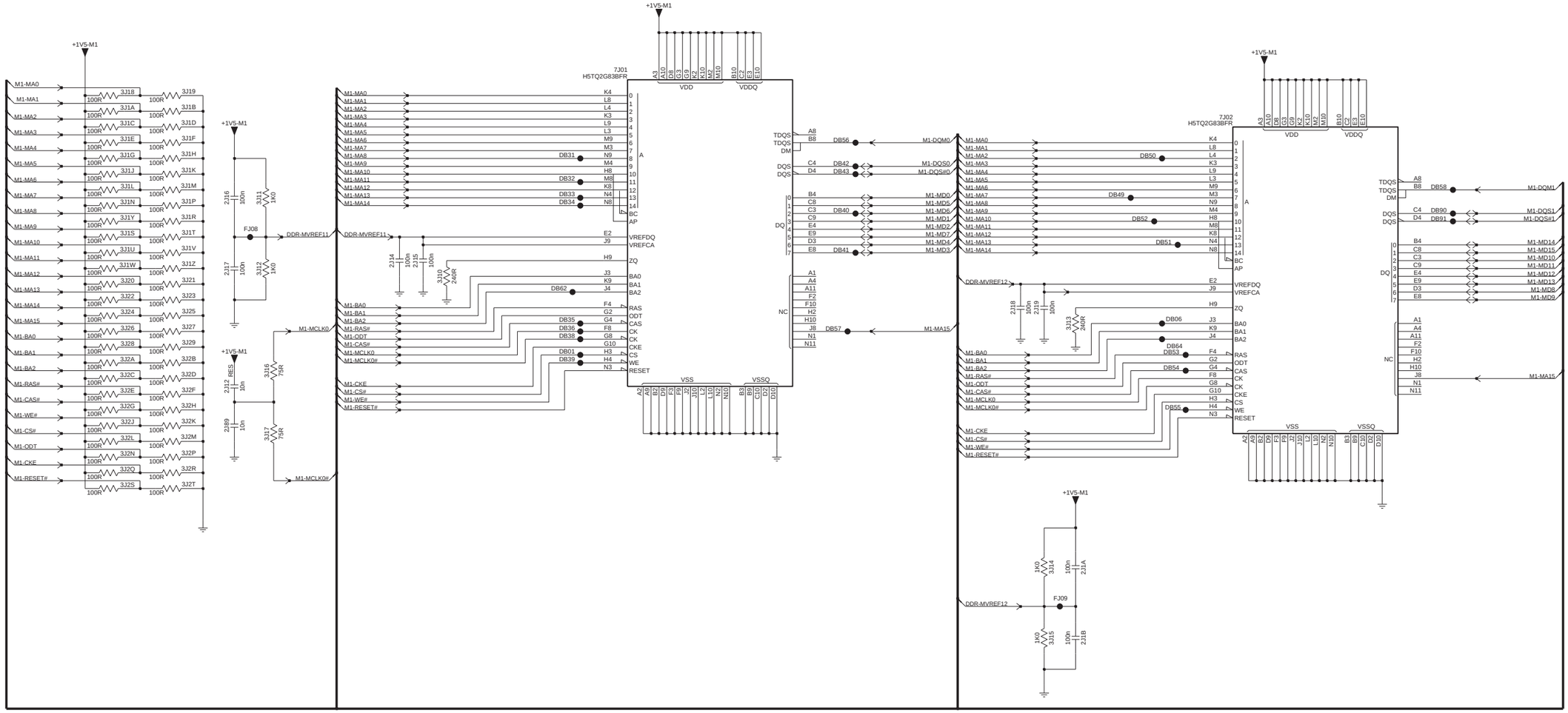


Fusion Umac controller	3104 313 6618	5 2012-11-08

19370_011_130129.eps
130129

10-2-12 B03C, Umac 1 DDR3

B03C Umac 1 DDR3



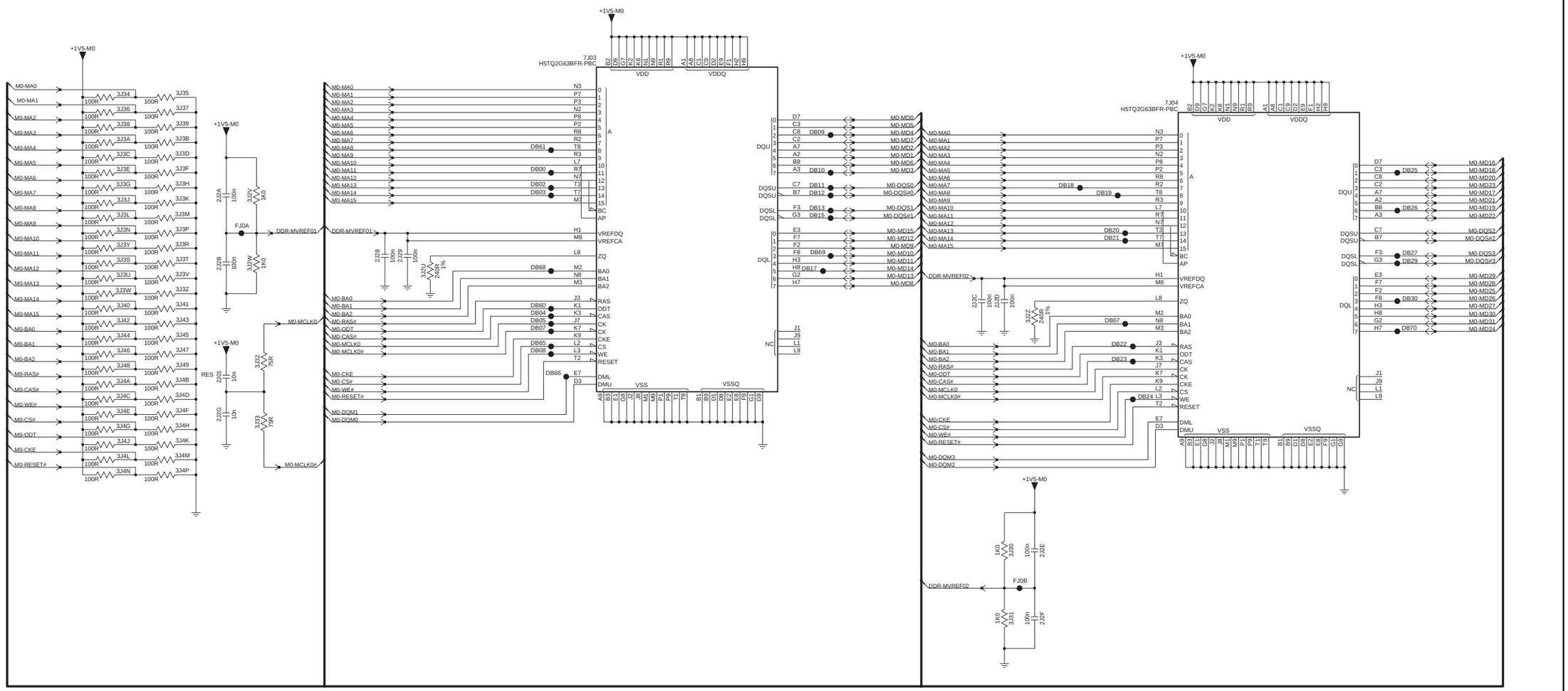
Umac 1 DDR3	3104 313 6618	5 2012-11-08

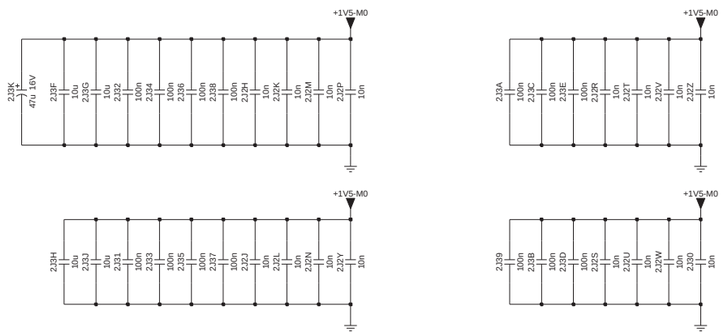
19370_012_130129.eps
130129

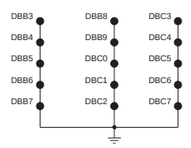
10-2-13 B03D, Umac 0 DDR3

B03D Umac 0 DDR3

B03D







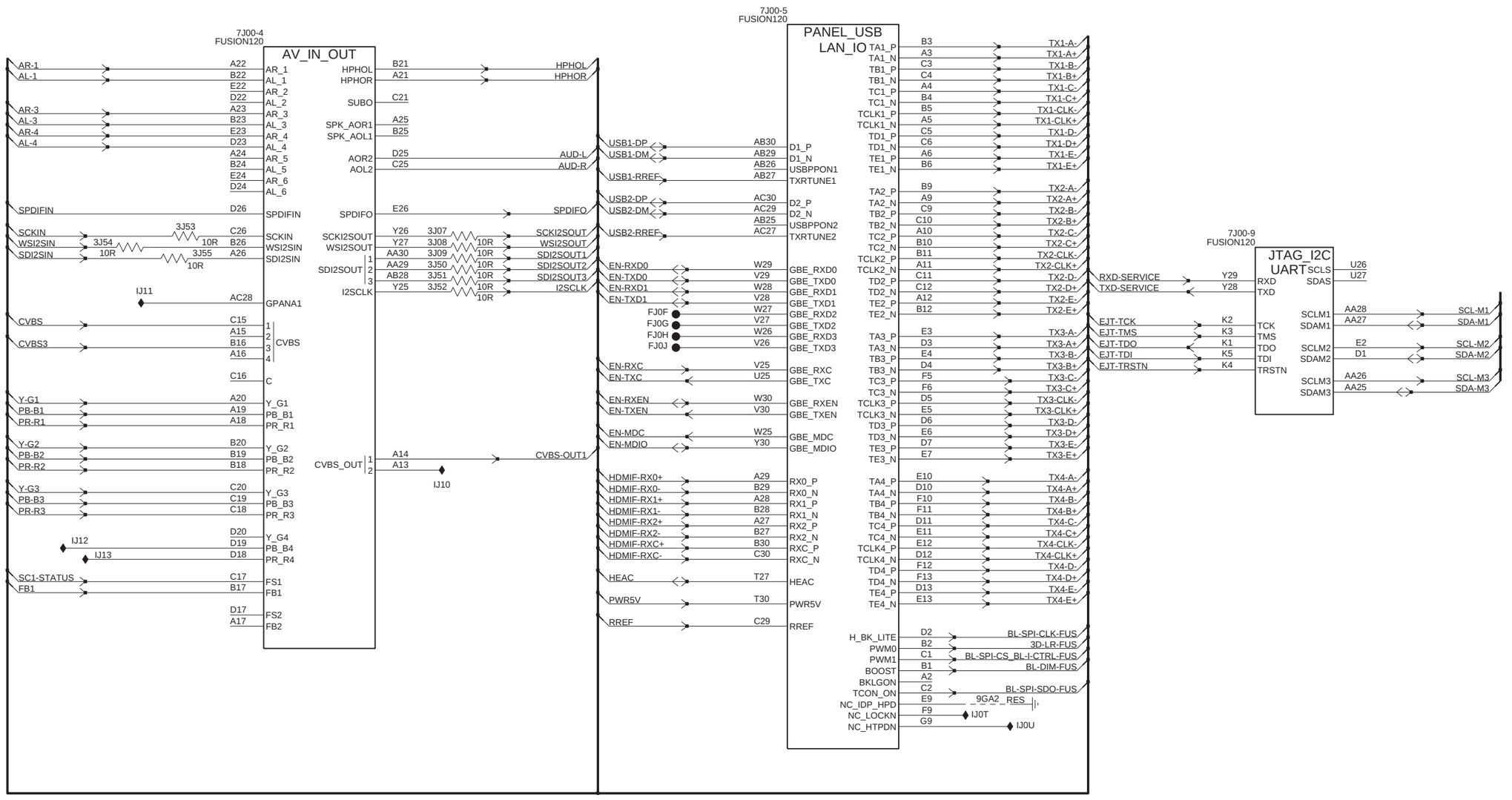
Umac 0 DDR3	3104 313 6618	5 2012-11-08

19370_013_130129.eps
130129

10-2-14 B03E, Fusion

B03E Fusion

B03E

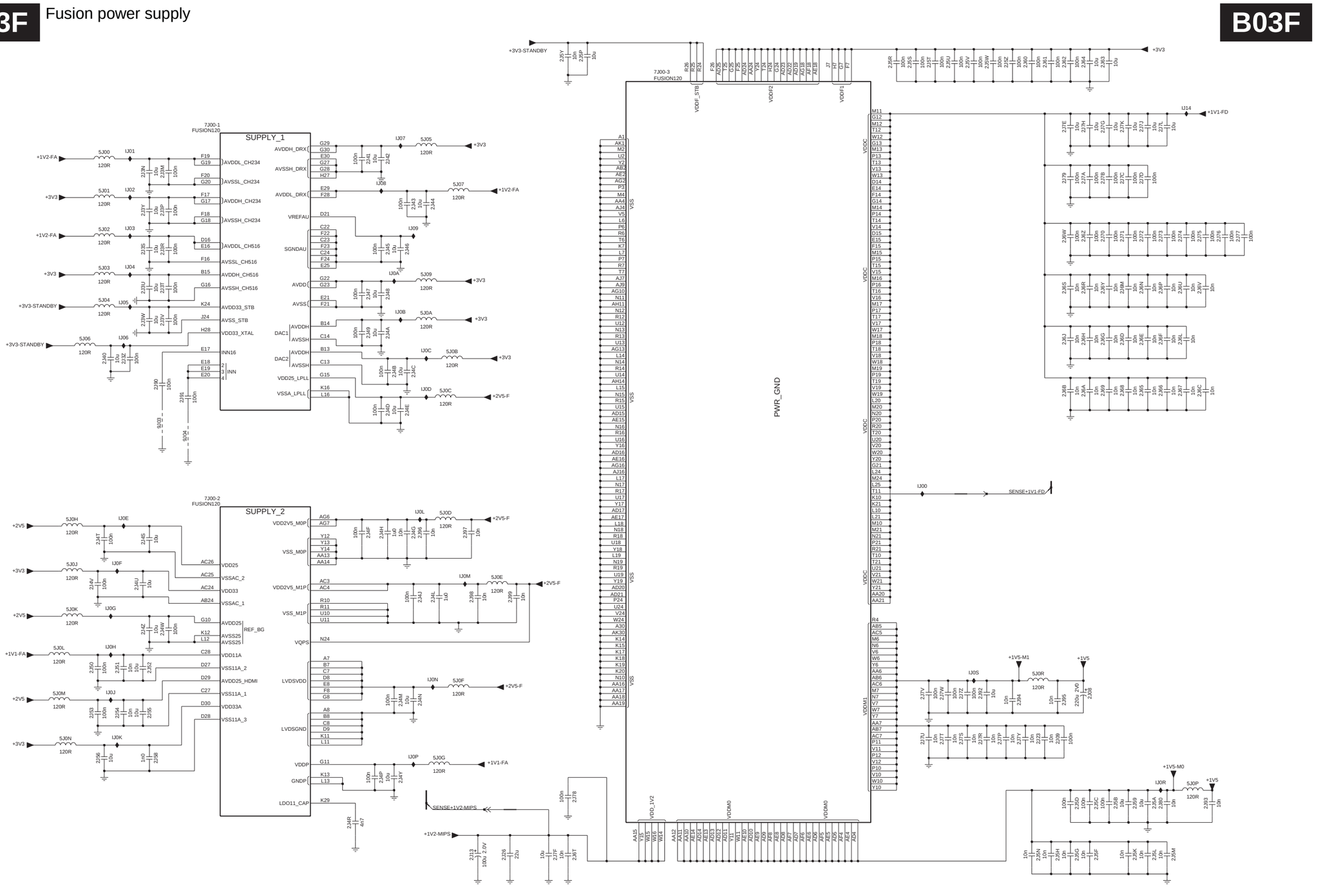


Fusion	3104 313 6618	5 2012-11-08

19370_014_130129.eps
130129

10-2-15 B03F, Fusion power supply

B03F Fusion power supply



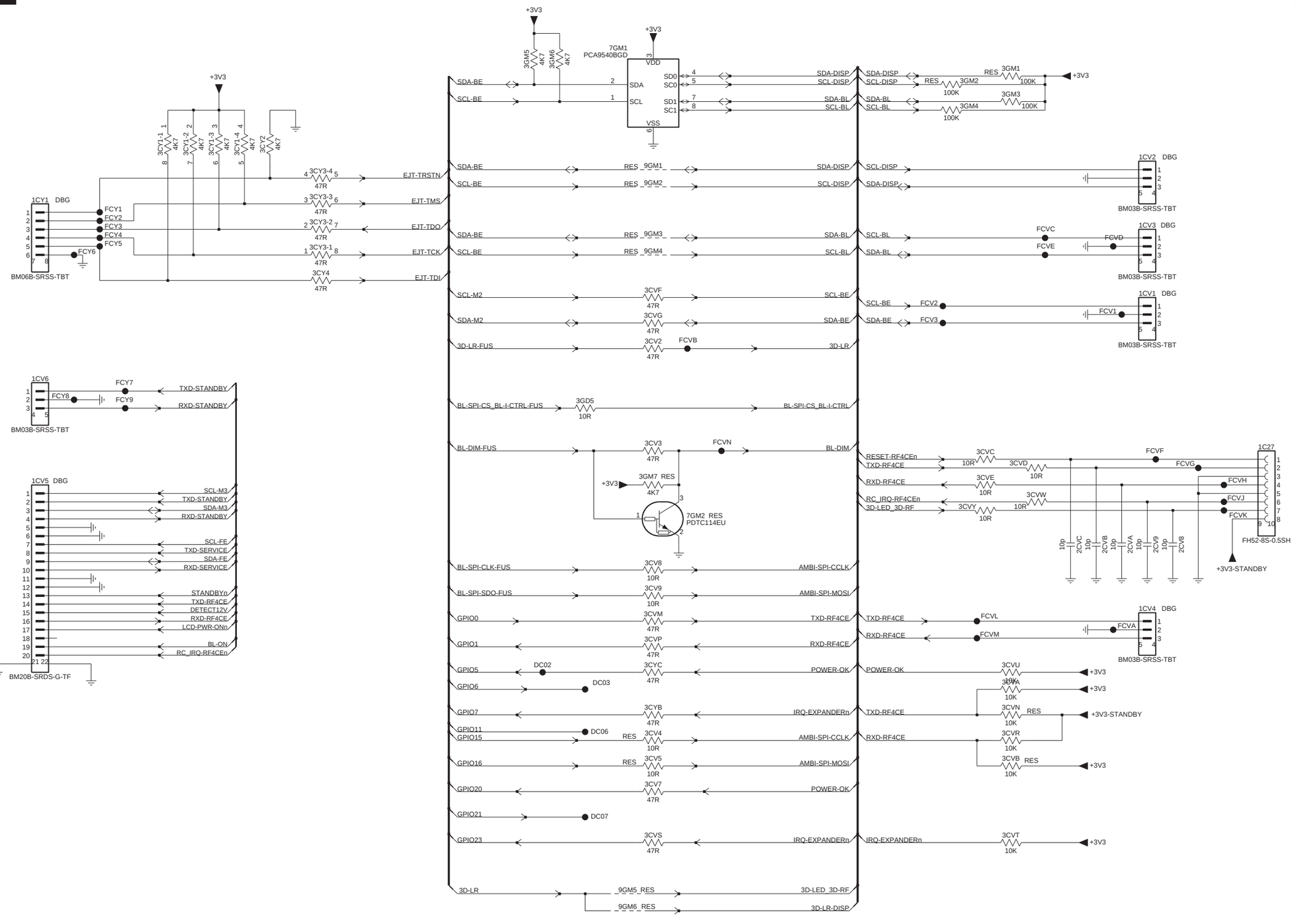
Fusion power supply	3104 313 6618	5 2012-11-08

19370_015_130129.eps
130129

10-2-16 B04A, Control

B04A Control

B04A

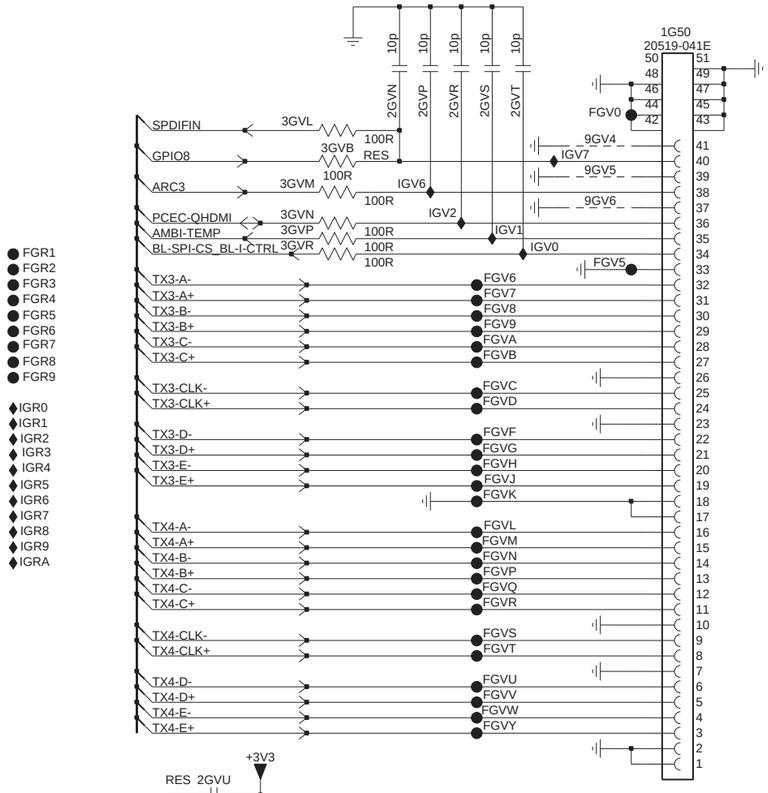


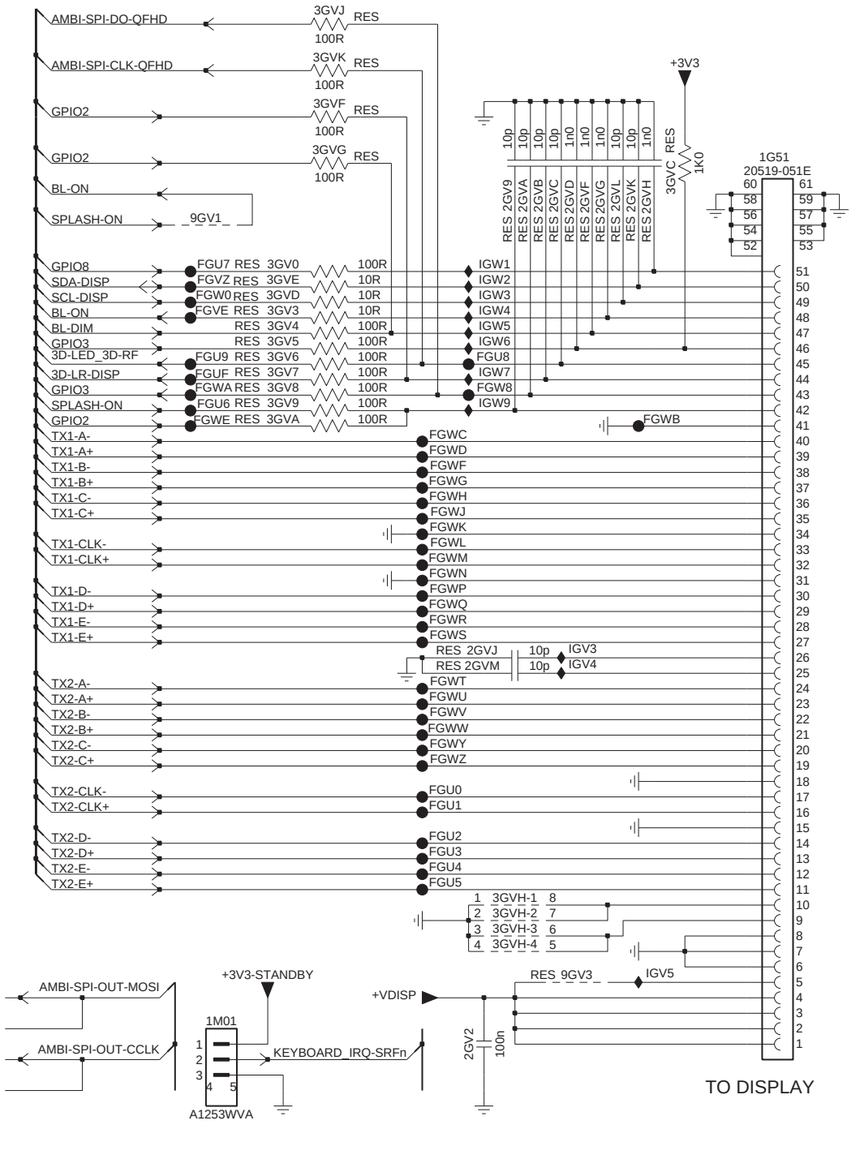
Control	3104 313 6618	5 2012-11-08

19370_016_130129.eps
130129

B04B LVDS

B04B





1X03 EMC HOLE

1X05 REF EMC HOLE

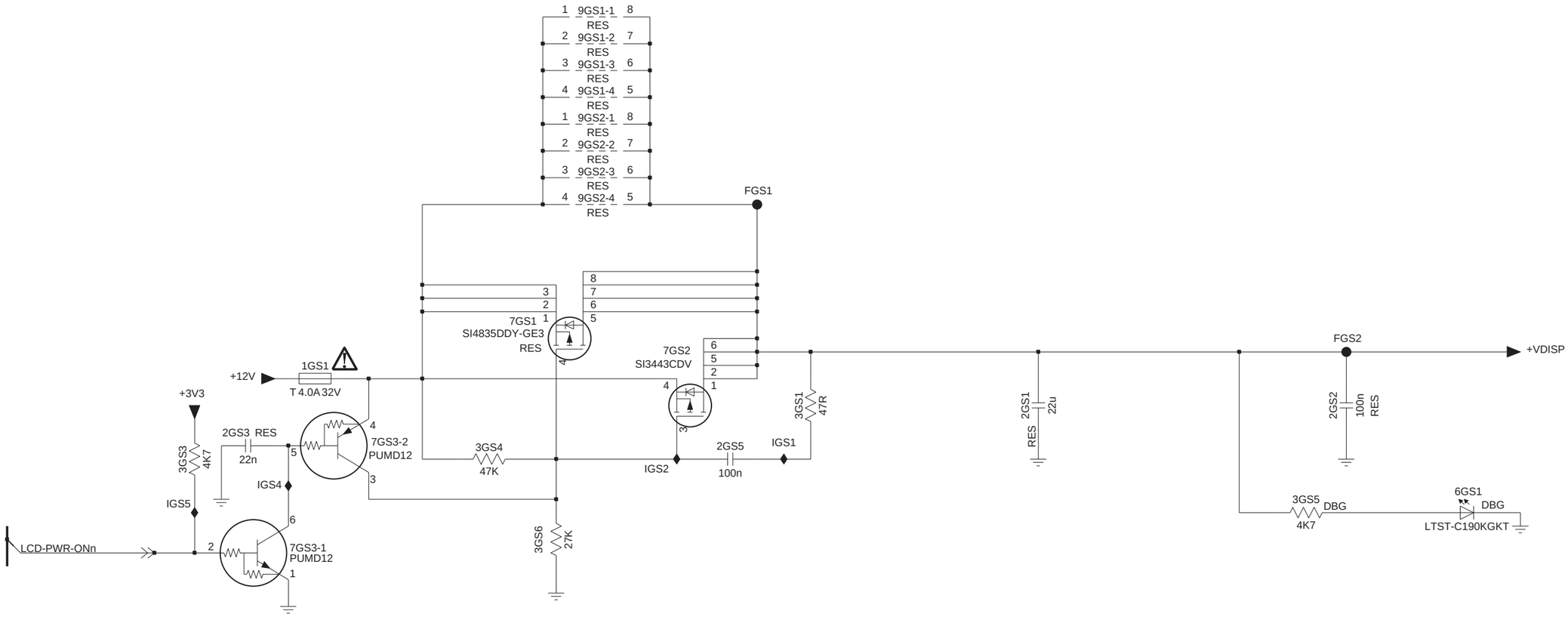
LVDS	3104 313 6618	9 2012-11-08

19370_017_130129.eps
130129

10-2-18 B04C, Output Vdisp

B04C Output Vdisp

B04C



B04C

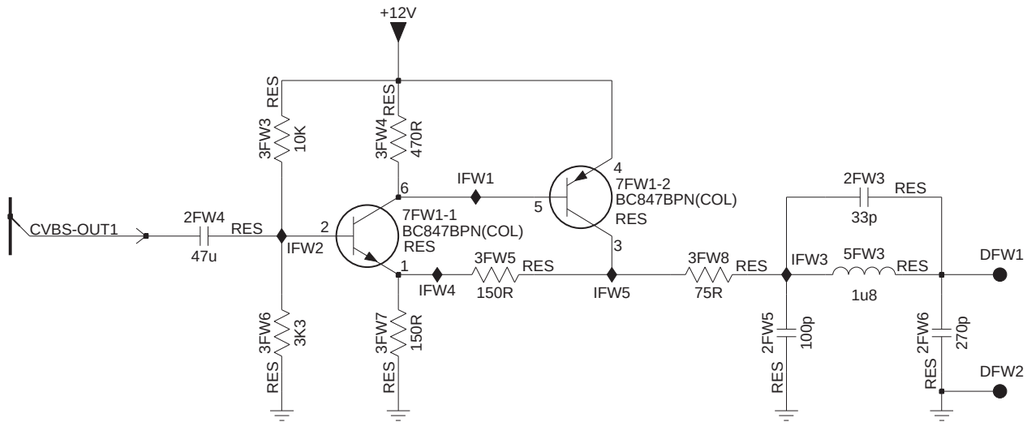
Output Vdisp	3104 313 6618	5 2012-11-08

19370_018_130129.eps
130129

10-2-19 B04D, Tuner CVBS debug

B04D Tuner CVBS debug

B04D

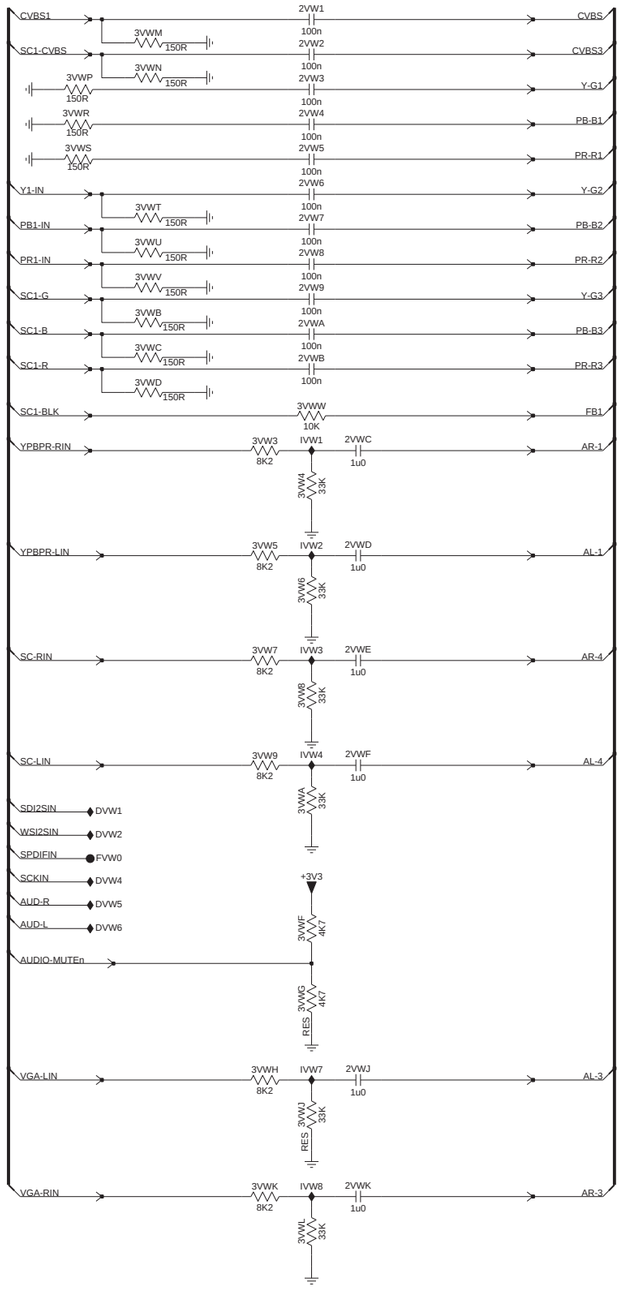


Tuner CVBS debug	3104 313 6618	1 2012-11-08

19370_019_130129.eps
130129

B04E Audio - video

B04E



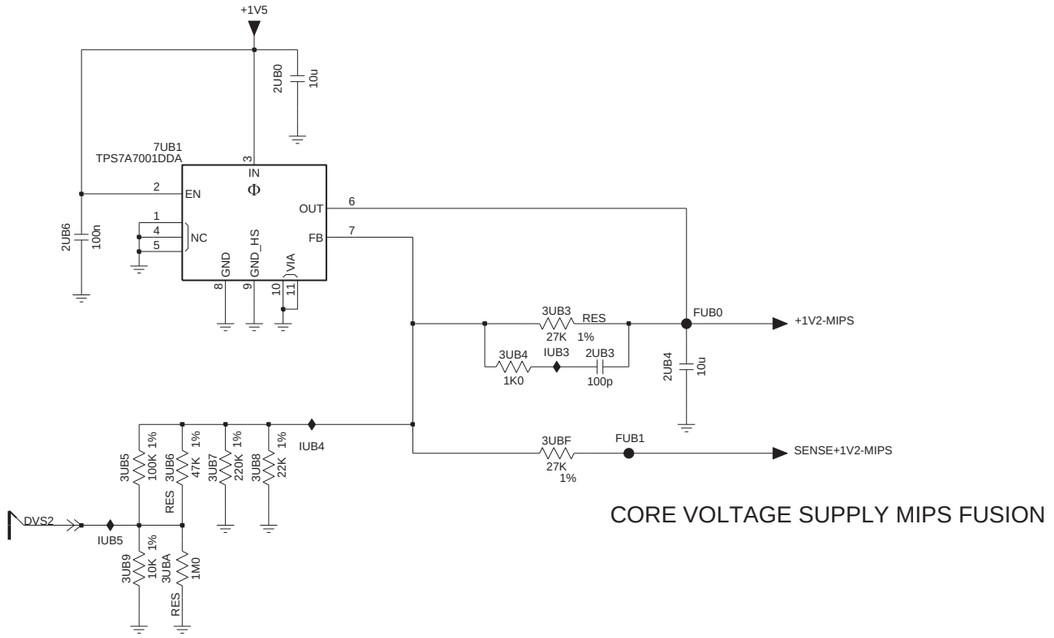
Audio - video	3104 313 6618	9 2012-11-08

19370_020_130129.eps
130129

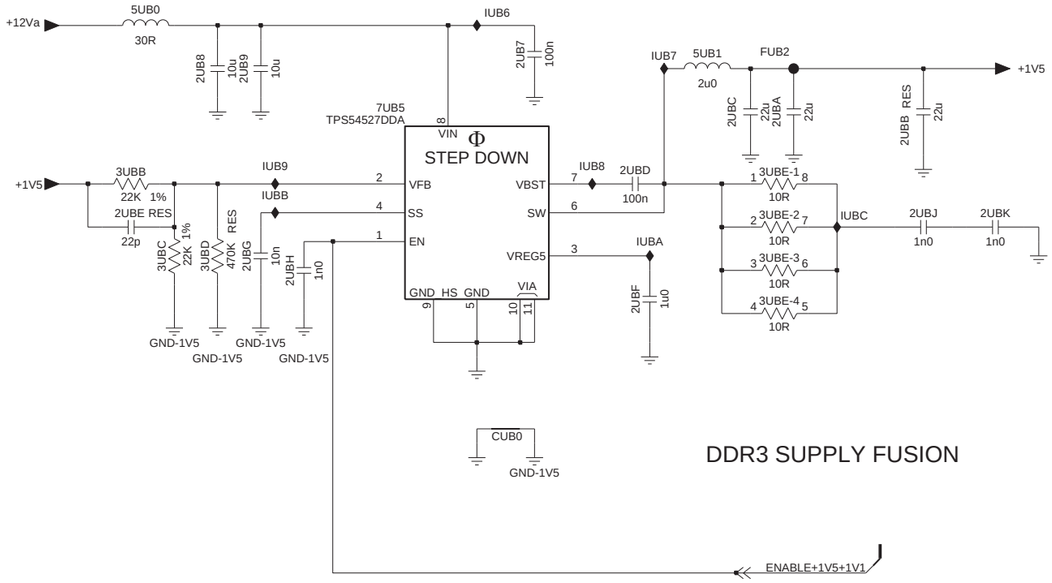
10-2-21 B04F, Fusion supply

B04F Fusion supply

B04F



CORE VOLTAGE SUPPLY MIPS FUSION



DDR3 SUPPLY FUSION

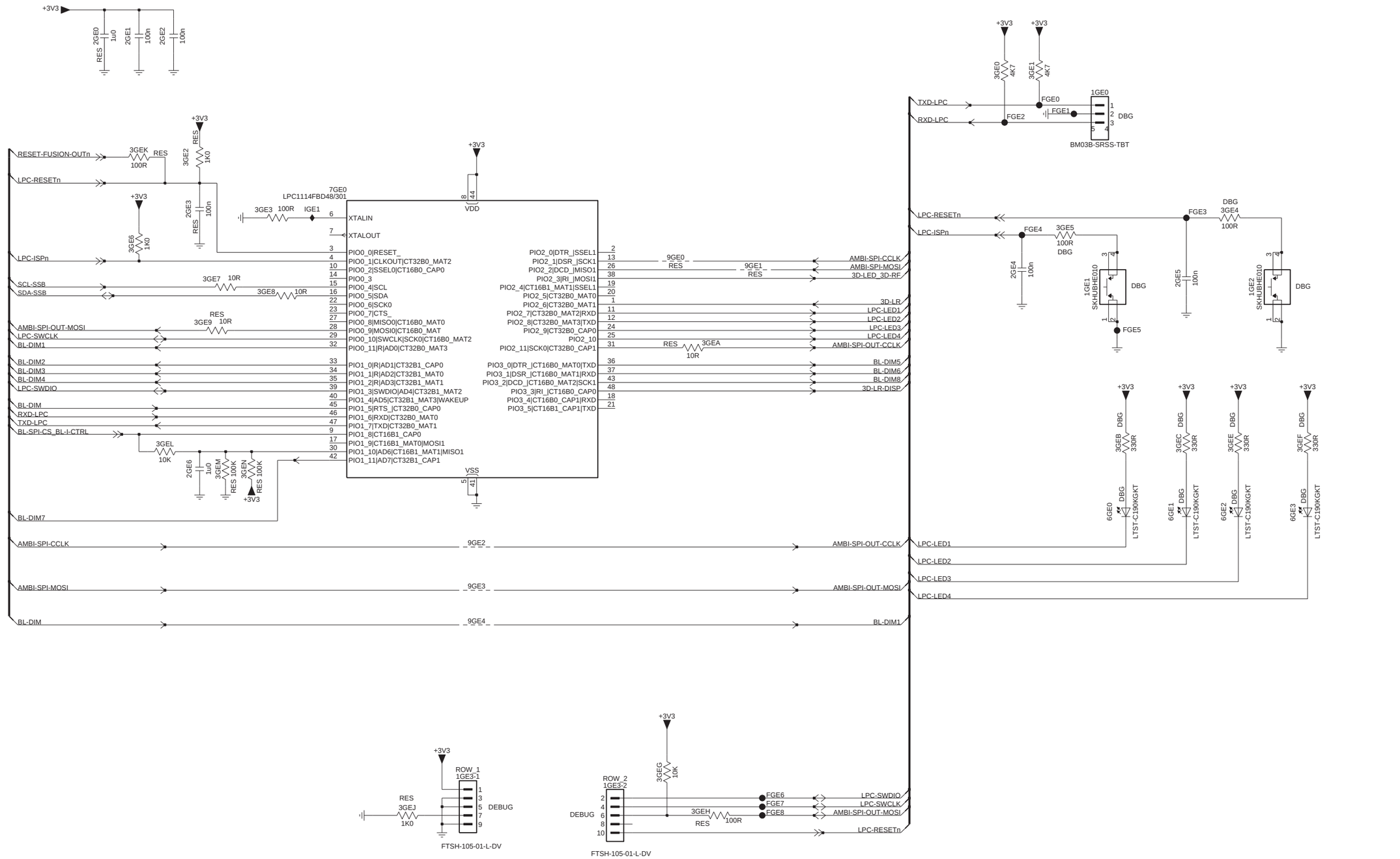
Fusion supply	3104 313 6618	5 2012-11-08

19370_021_130129.eps
130129

10-2-22 B04G, Backlight microcontroller

B04G Backlight microcontroller

B04G

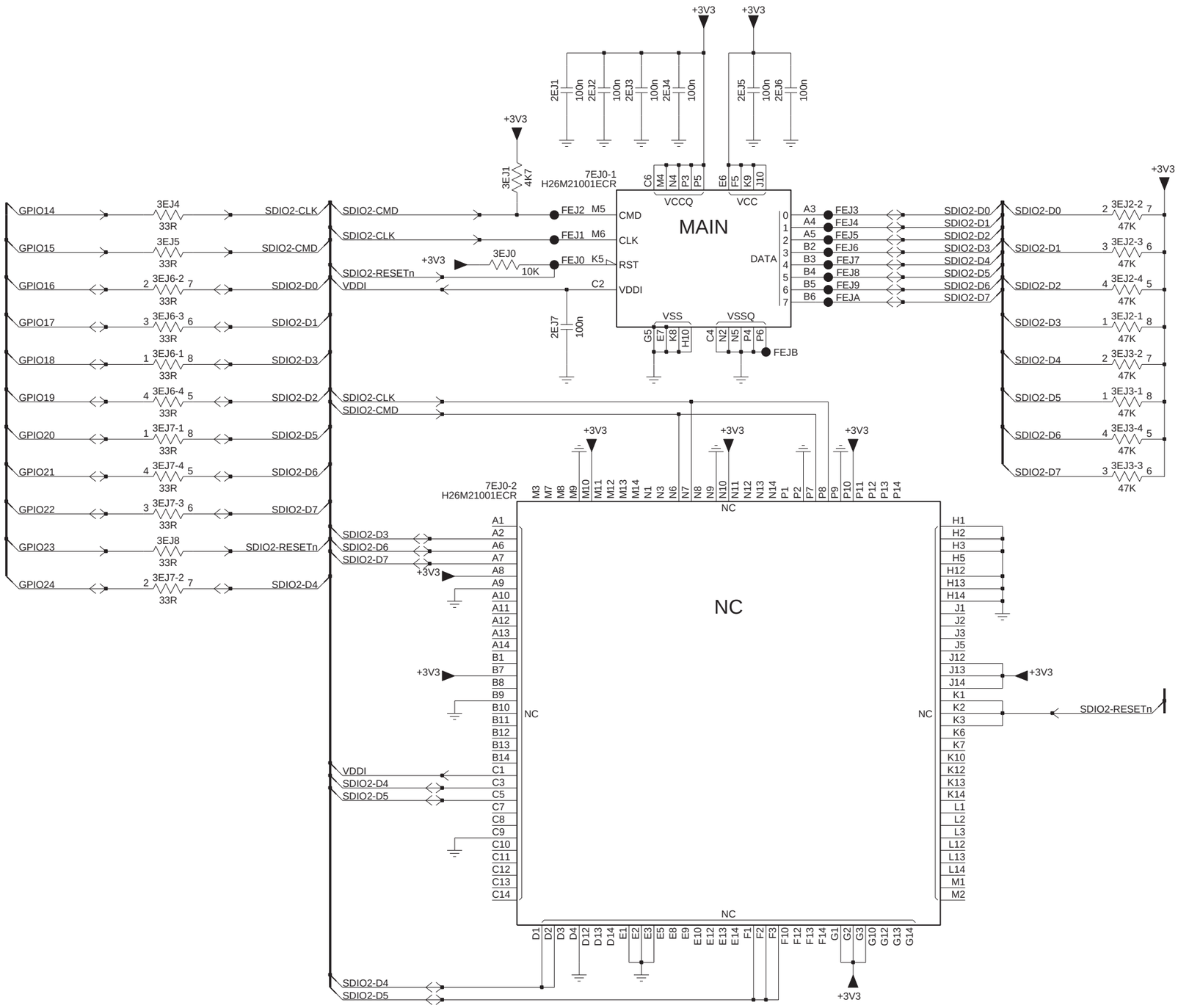


Backlight microcontroller	3104 313 6618	5 2012-11-08

19370_022_130129.eps
130129

B04H eMMC

B04H



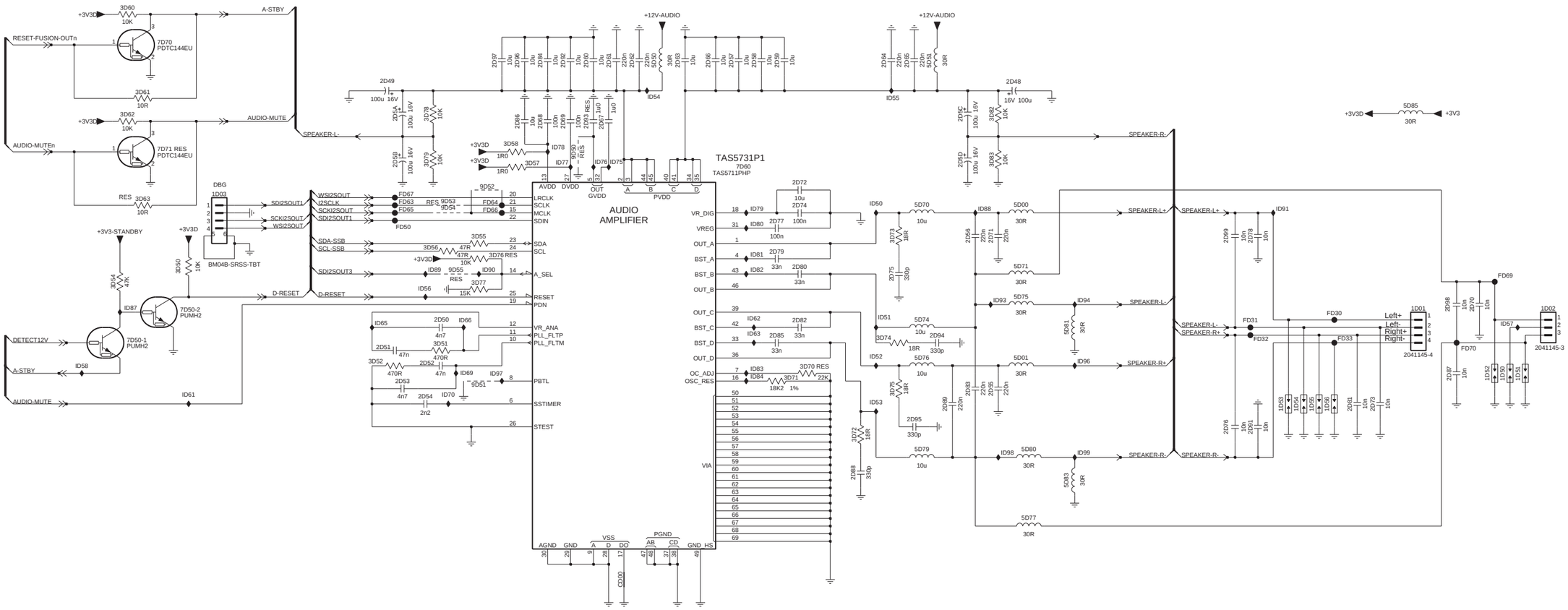
eMMC	3104 313 6618	5 2012-11-08

19370_023_130129.eps
130129

10-2-24 B05A, Class-D amplifier

B05A Class-D amplifier

B05A

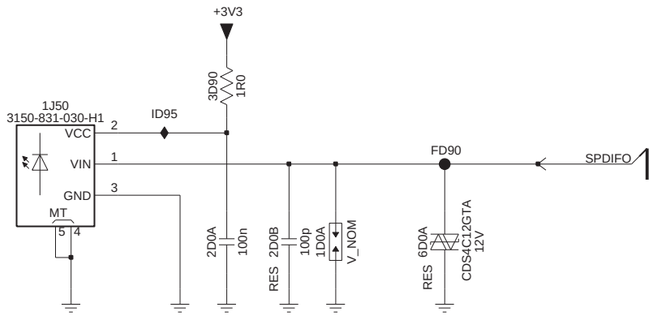


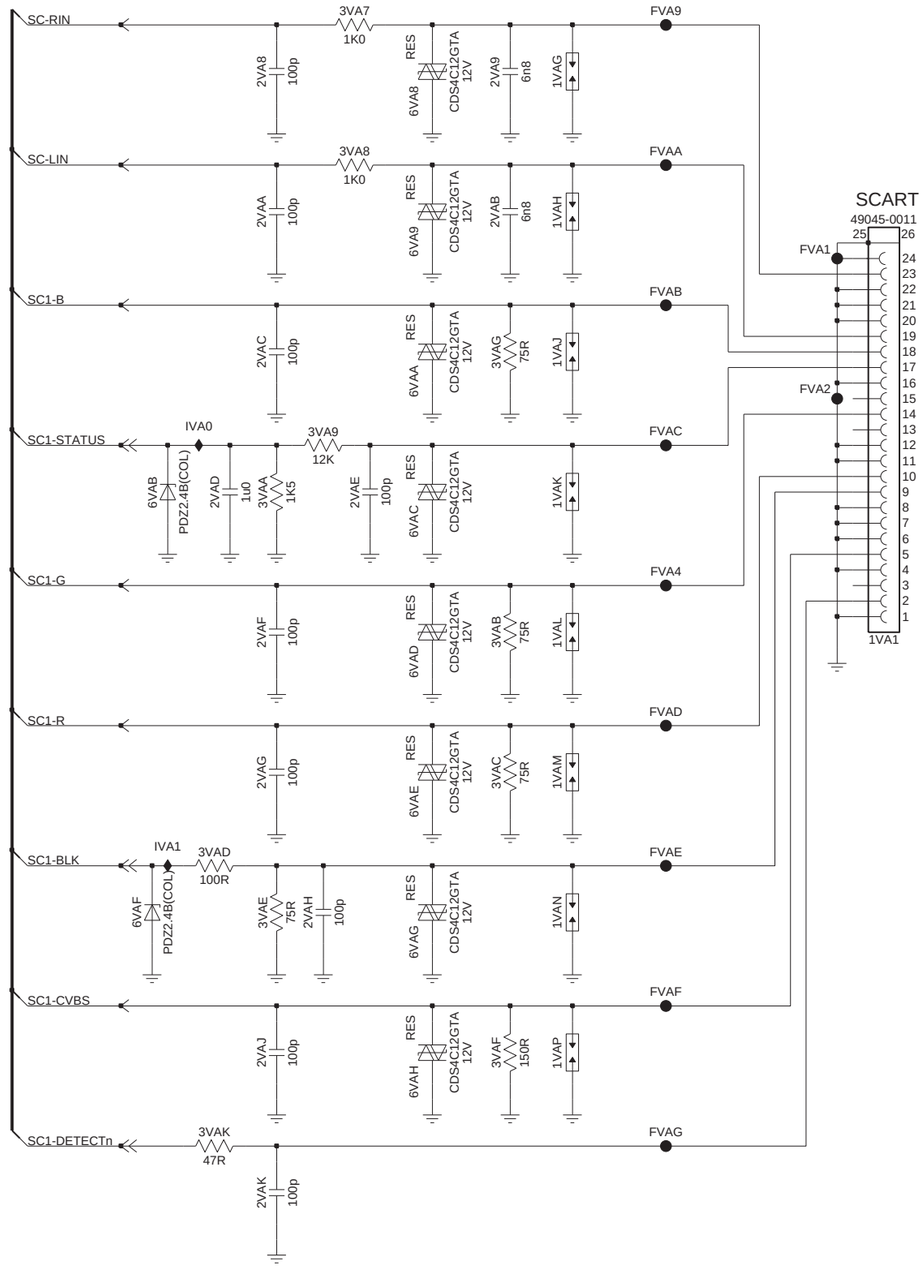
Class-D amplifier	3104 313 6618	5 2012-11-08

19370_024_130129.eps
130129

B05B Analogue externals

B05B



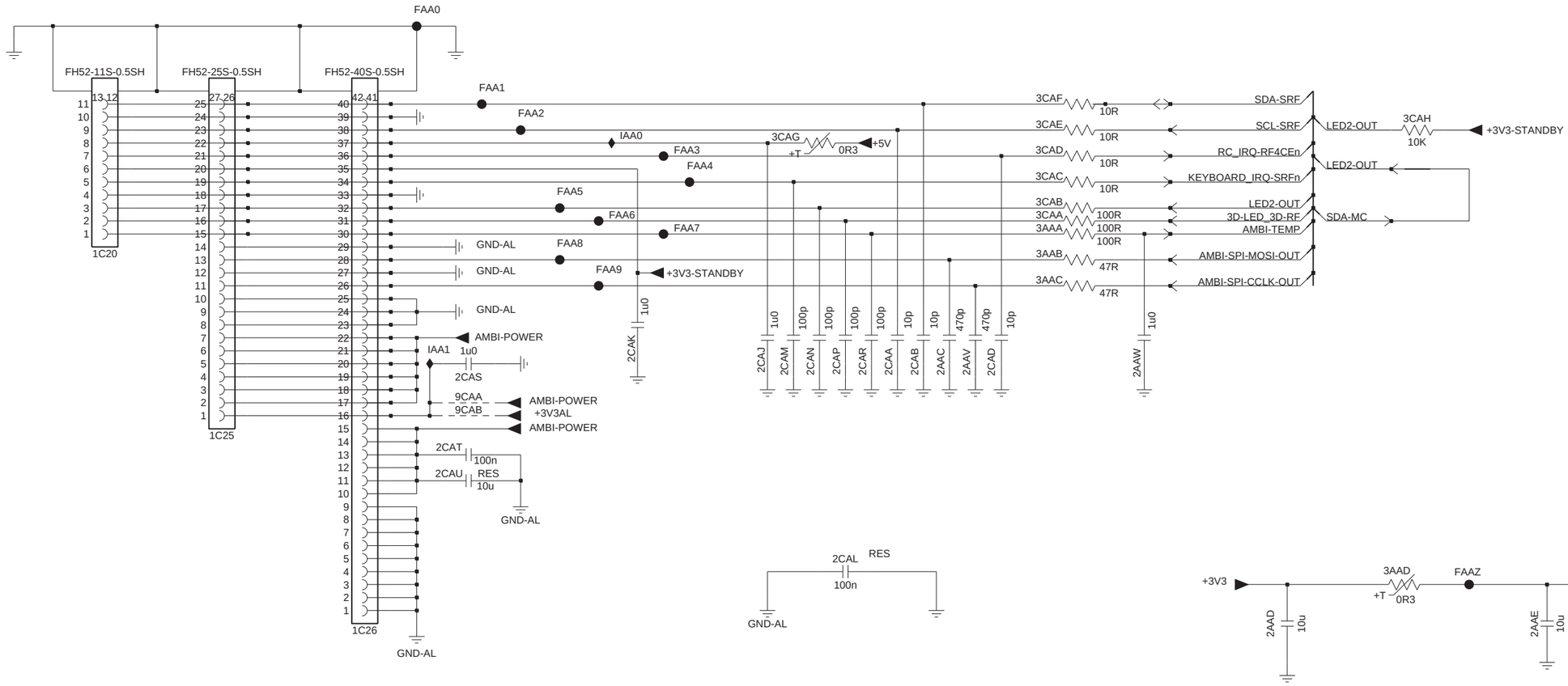


Analogue externals	3104 313 6618	5 2012-11-08

19370_025_130129.eps
130129

10-2-26 B05C, Sensor board and AmbiLight

B05C Sensor board and AmbiLight



Sensor board and AmbiLight	3104 313 6618	9 2012-11-08

19370_026_130129.eps
130129

B06A HDMI

B06A

HDMI CONNECTOR 4

HDMI CONNECTOR 3

HDMI CONNECTOR 2

HDMI CONNECTOR 1

I2C ADDRESS
SII9287B=OXB2

pins (9,27,64)

pin (38)

pin (49)

1V2 DVB-T2 and DVB-S2

1X01 REF EMC HOLE

1X07 EMC HOLE

1X08 EMC HOLE

1X09 EMC HOLE

1X14 REF EMC HOLE

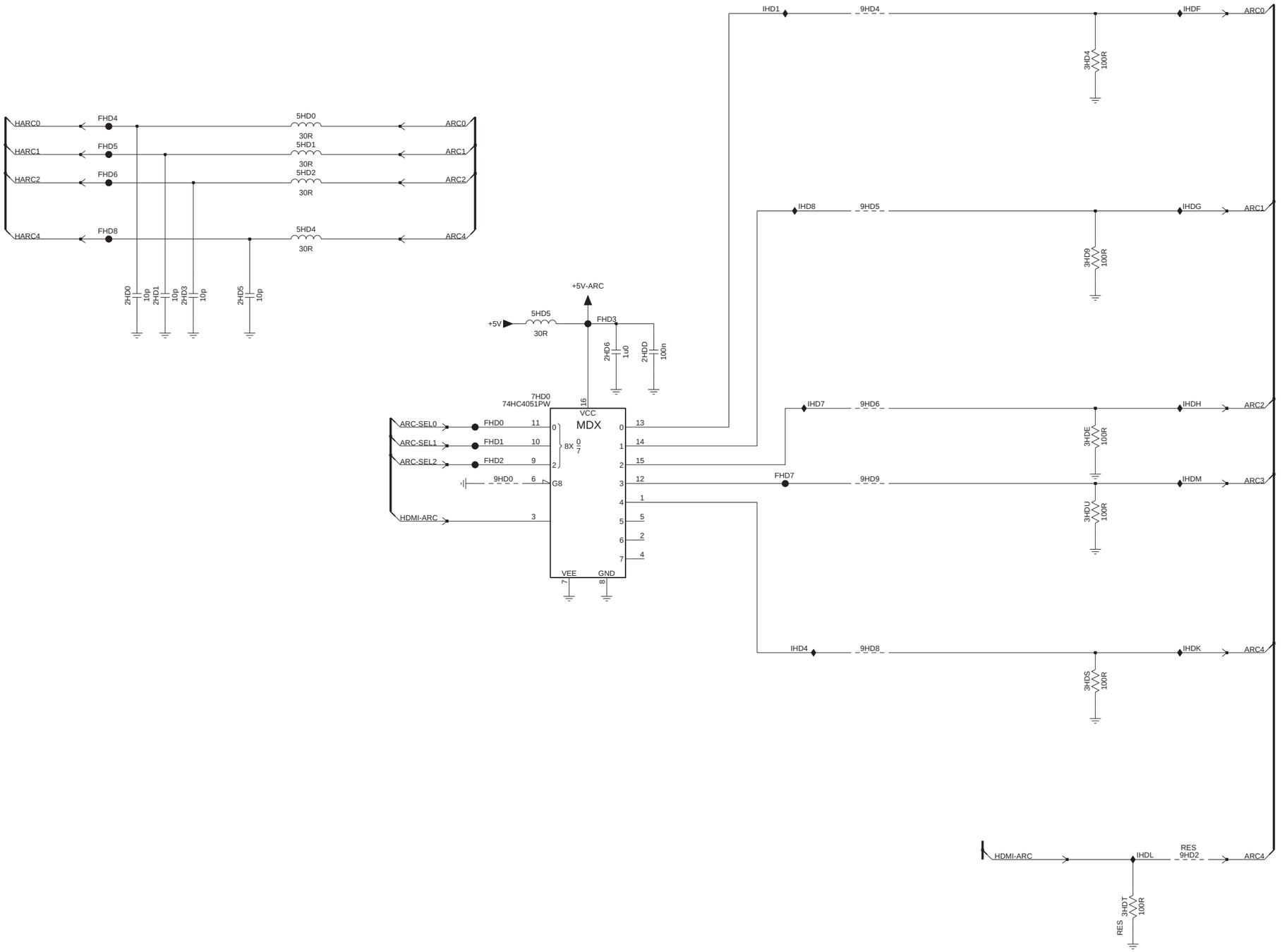
HDMI	3104 313 6618	5 2012-11-08

19370_027_130129.eps
130129

10-2-28 B06B, HDMI-ARC

B06B HDMI-ARC

B06B



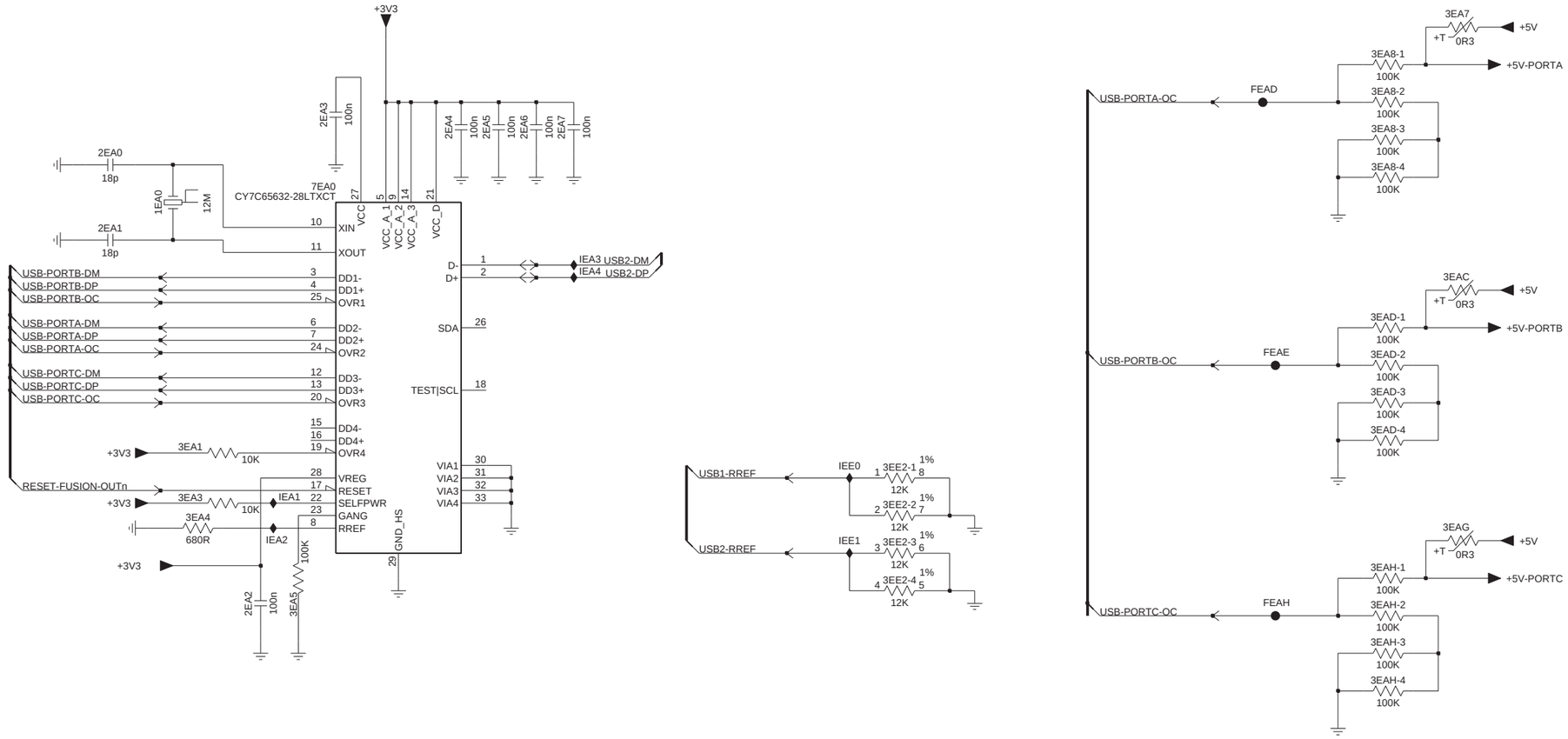
HDMI-ARC	3104 313 6618	5 2012-11-08

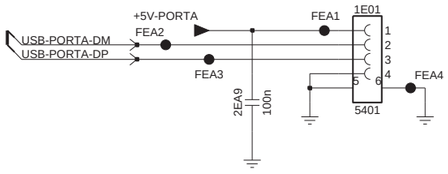
19370_028_130129.eps
130129

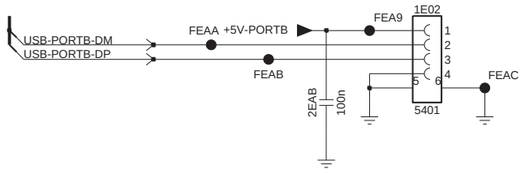
10-2-29 B06C, USB external

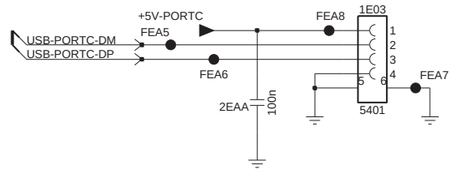
B06C USB external

B06C









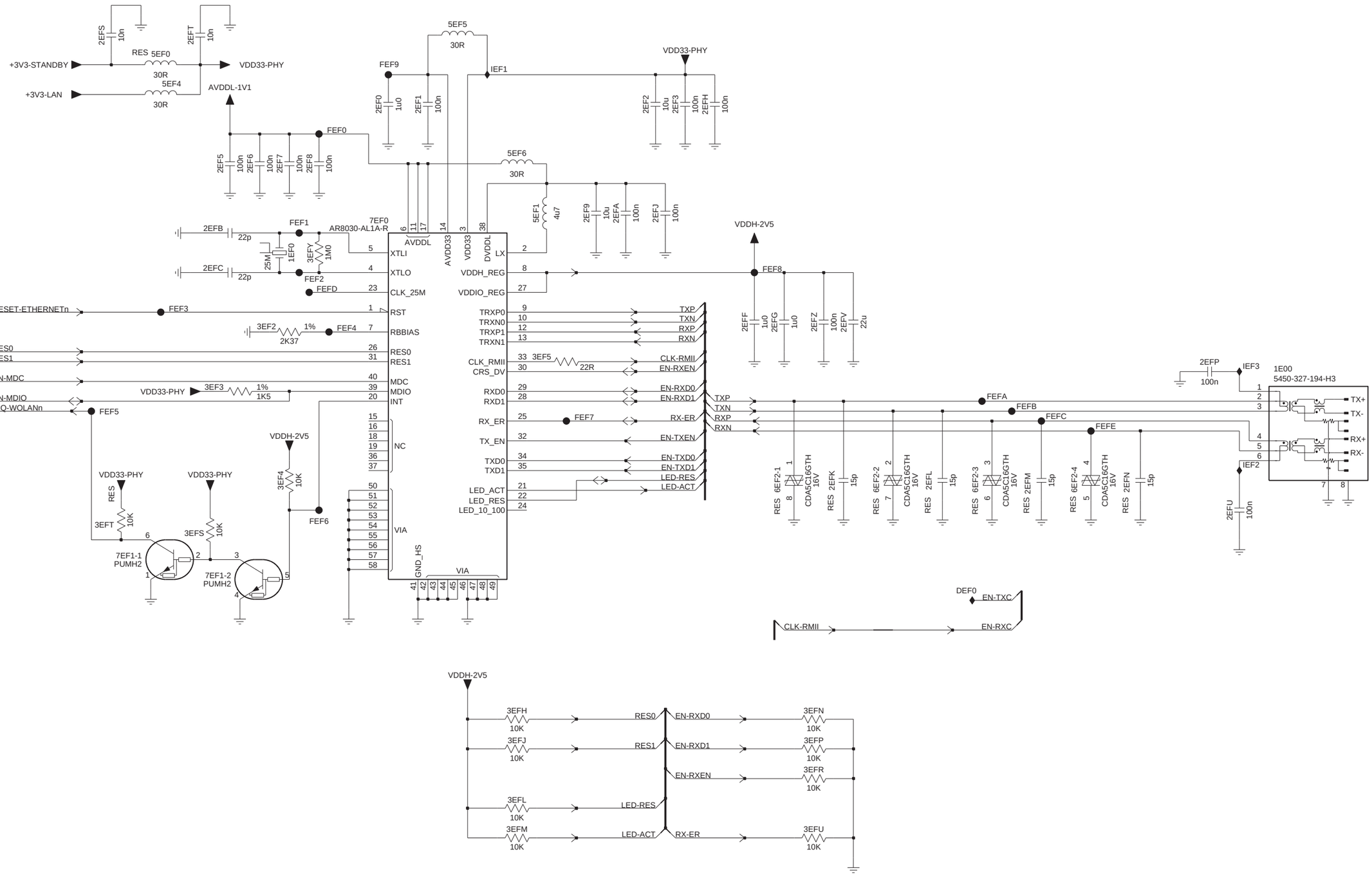
USB external	3104 313 6618	5 2012-11-08

19370_029_130129.eps
130129

10-2-30 B06D, Ethernet

B06D Ethernet

B06D



B06D

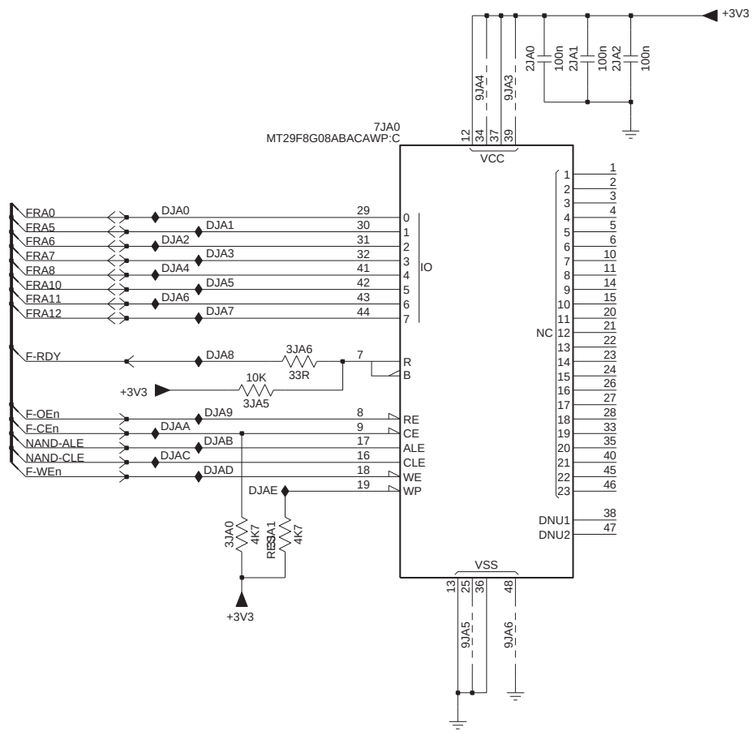
Ethernet	3104 313 6618	9 2012-11-08

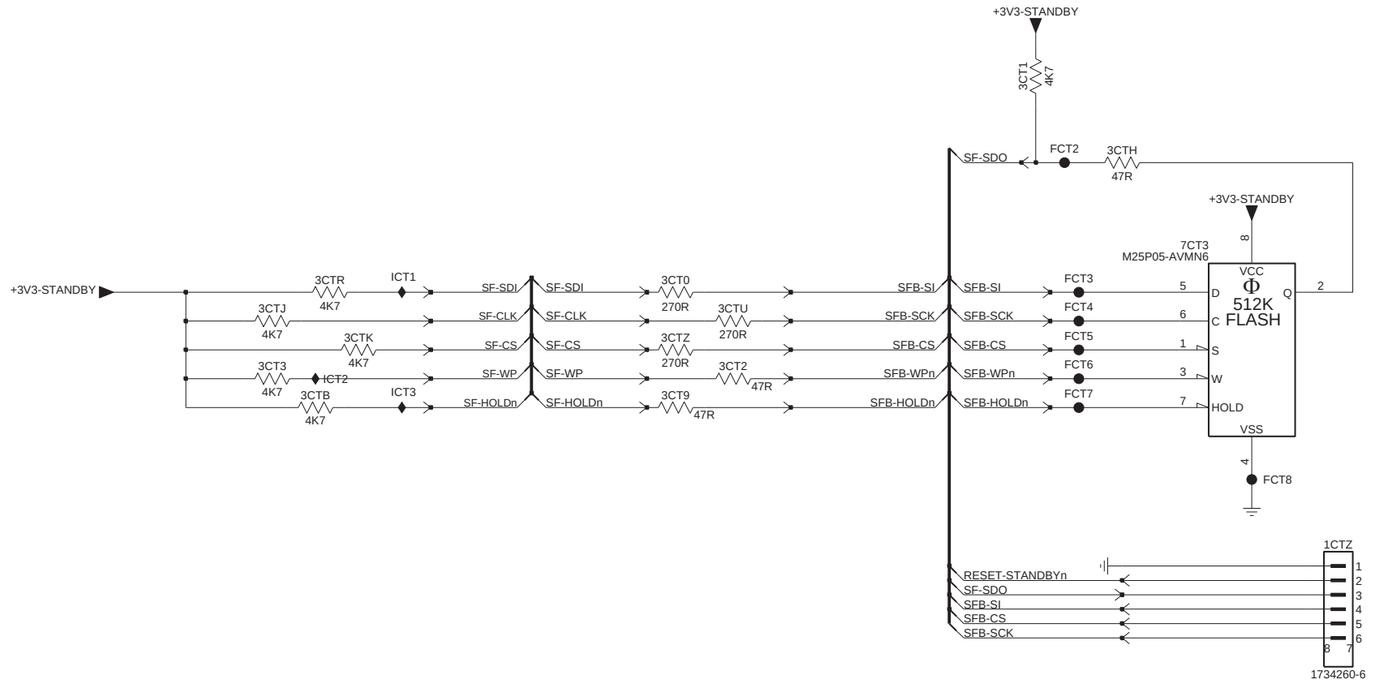
19370_030_130129.eps
130129

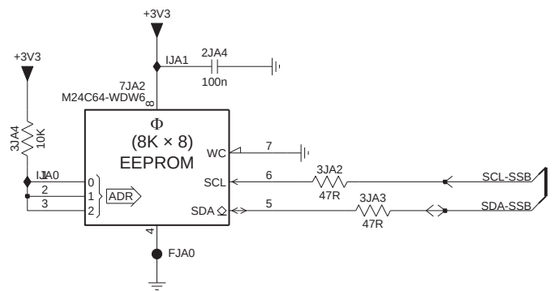
10-2-31 B06E, NAND flash, serial flash and EEPROM

B06E NAND flash, serial flash and EEPROM

B06E







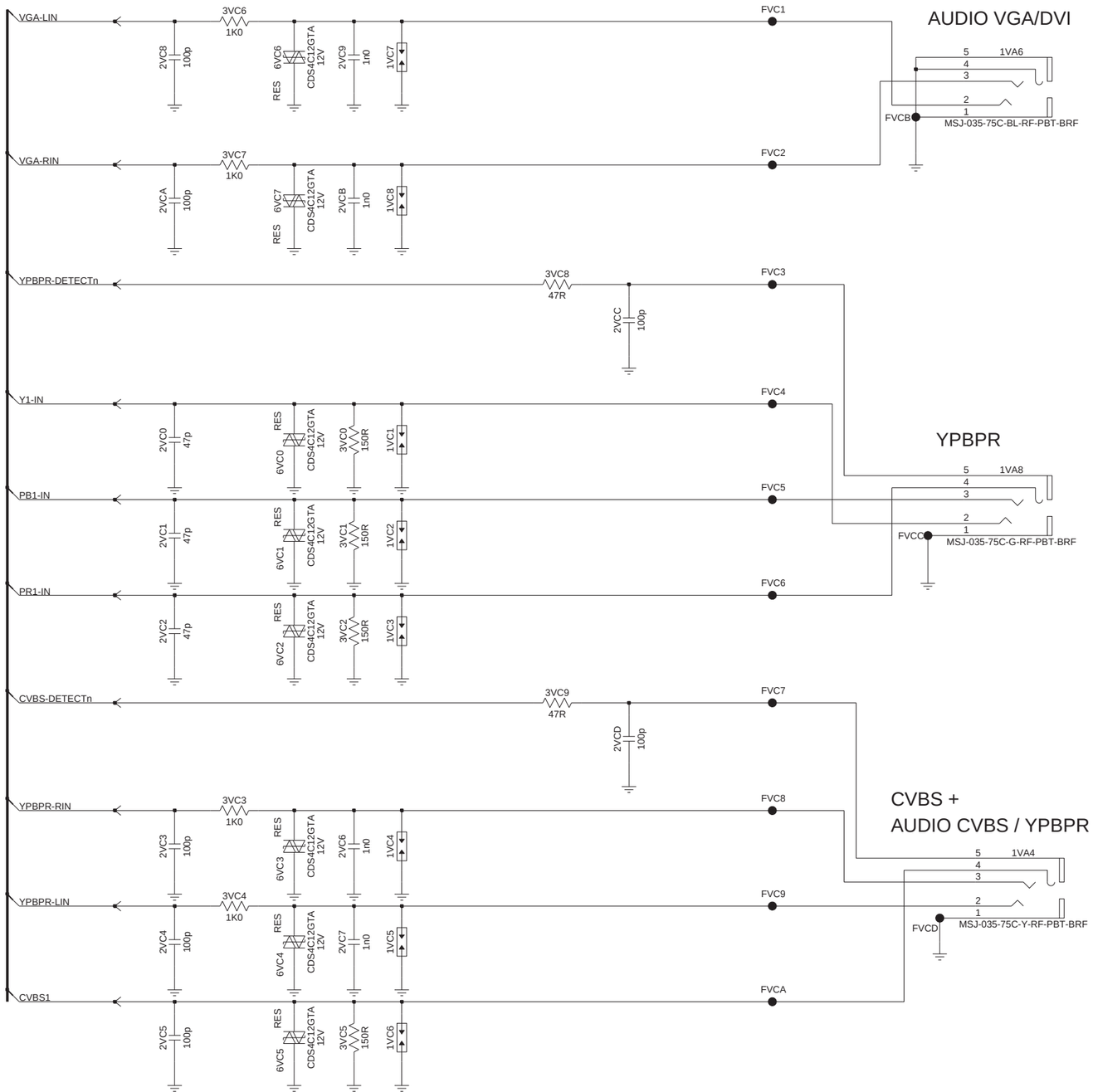
NAND flash, serial flash and EEPROM	3104 313 6618	5 2012-11-08

19370_031_130129.eps
130129

10-2-32 B06F, Analogue externals

B06F Analogue externals

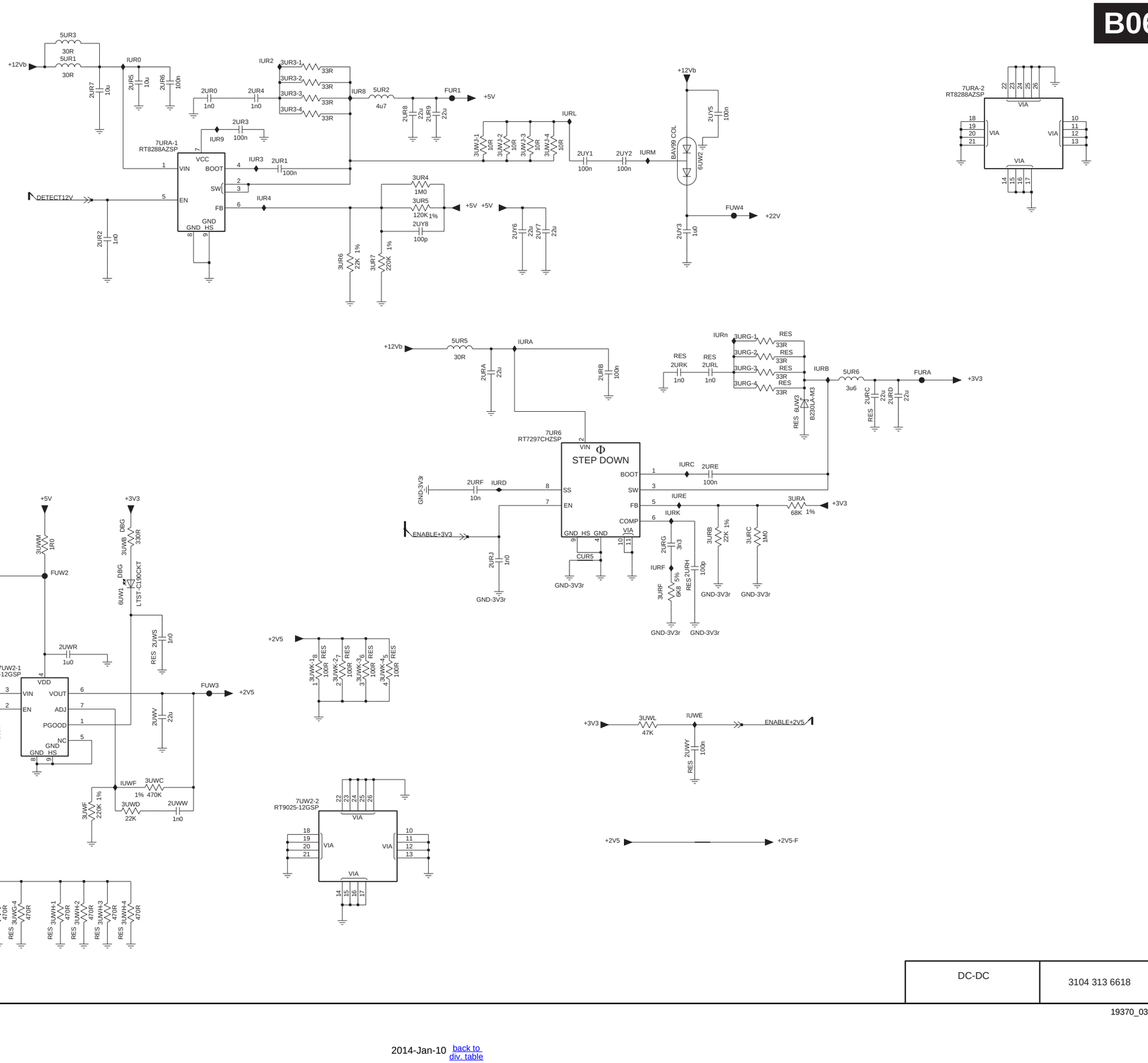
B06F



Analogue externals	3104 313 6618	9 2012-11-08

19370_032_130129.eps
130129

B06G DC-DC



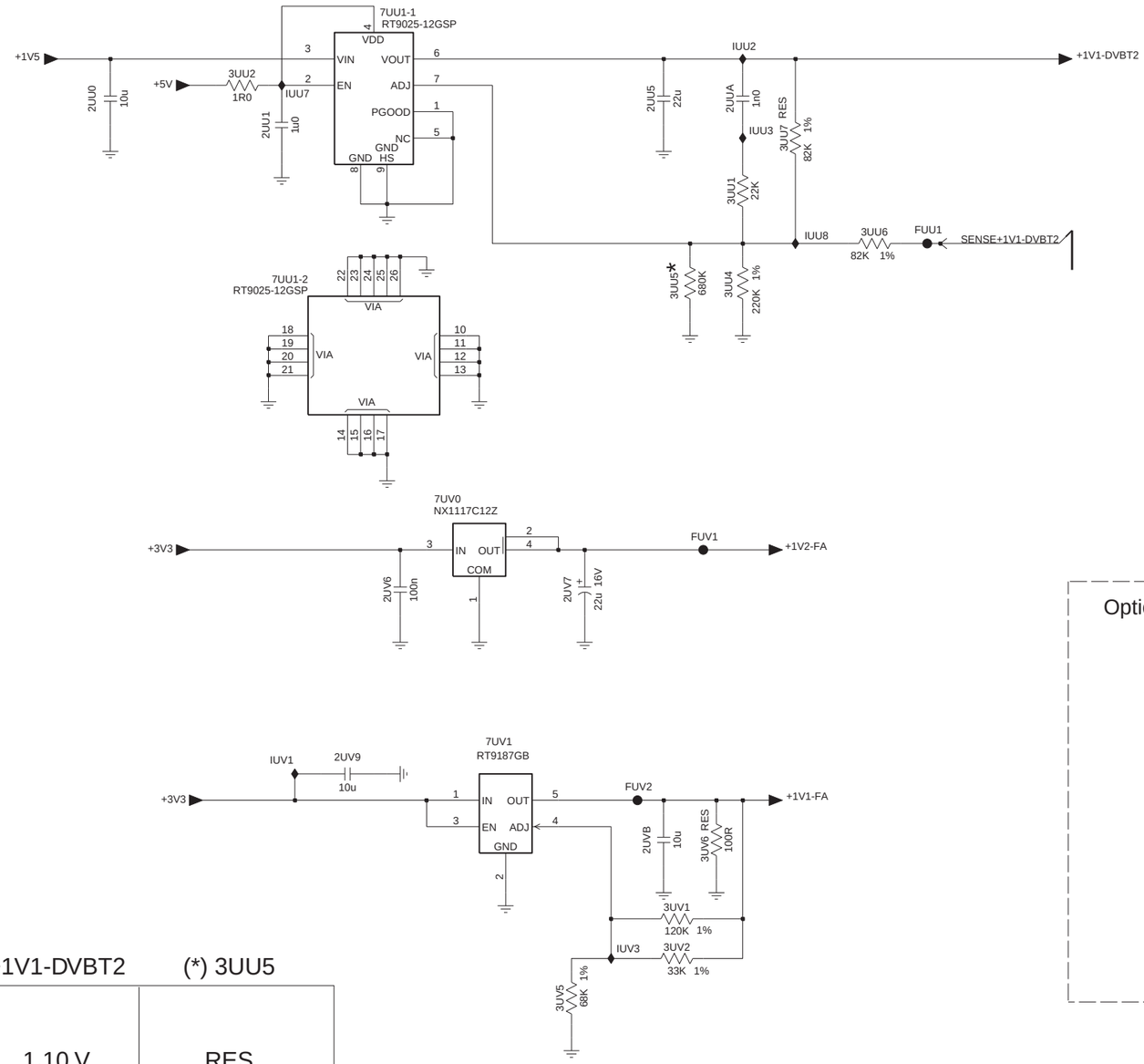
DC-DC	3104 313 6618	5 2012-11-08

19370_033_130129.eps
130129

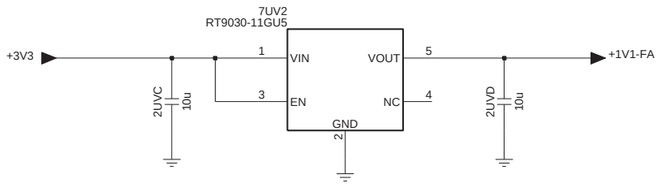
10-2-34 B06H, DC-DC

B06H DC-DC

B06H



Optional



+1V1-DVBT2 (*) 3UU5

1.10 V	RES
1.20 V	680 kΩ

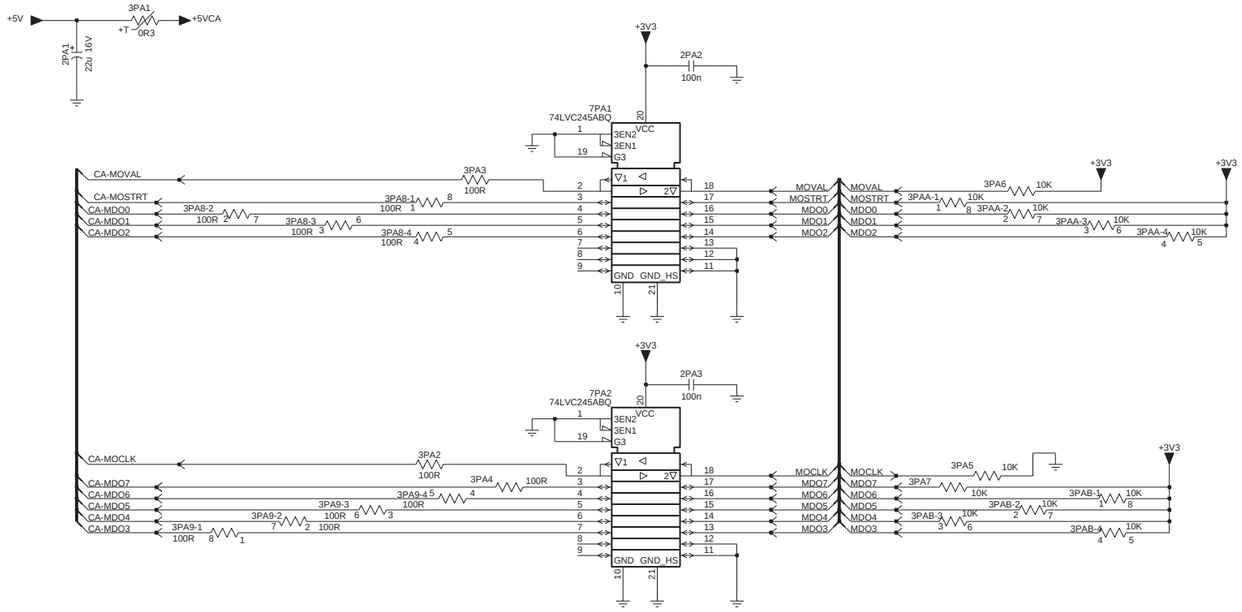
DC-DC	3104 313 6618	0 2012-11-08

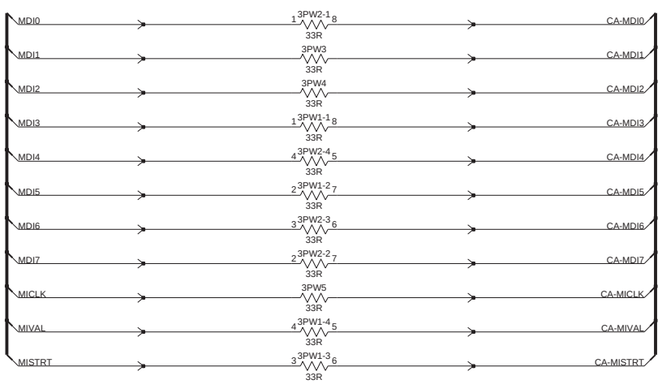
19370_034_130129.eps
130129

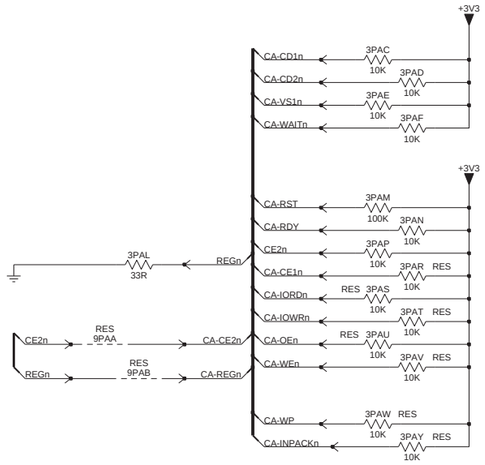
10-2-35 B06I, CI conditional access

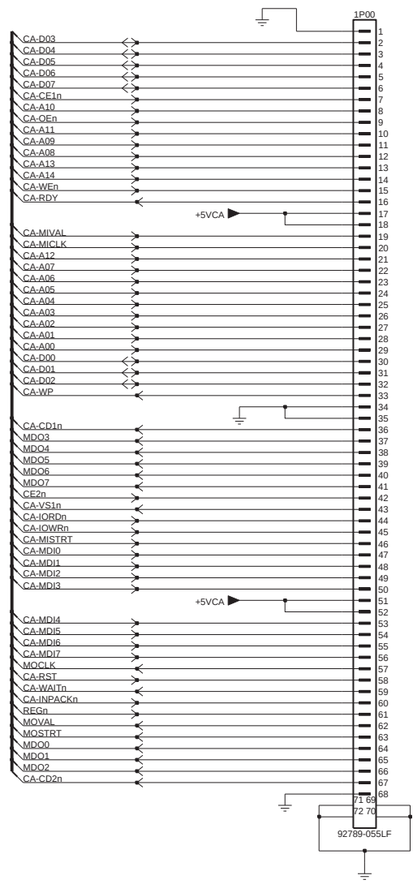
B06I CI conditional access

B06I







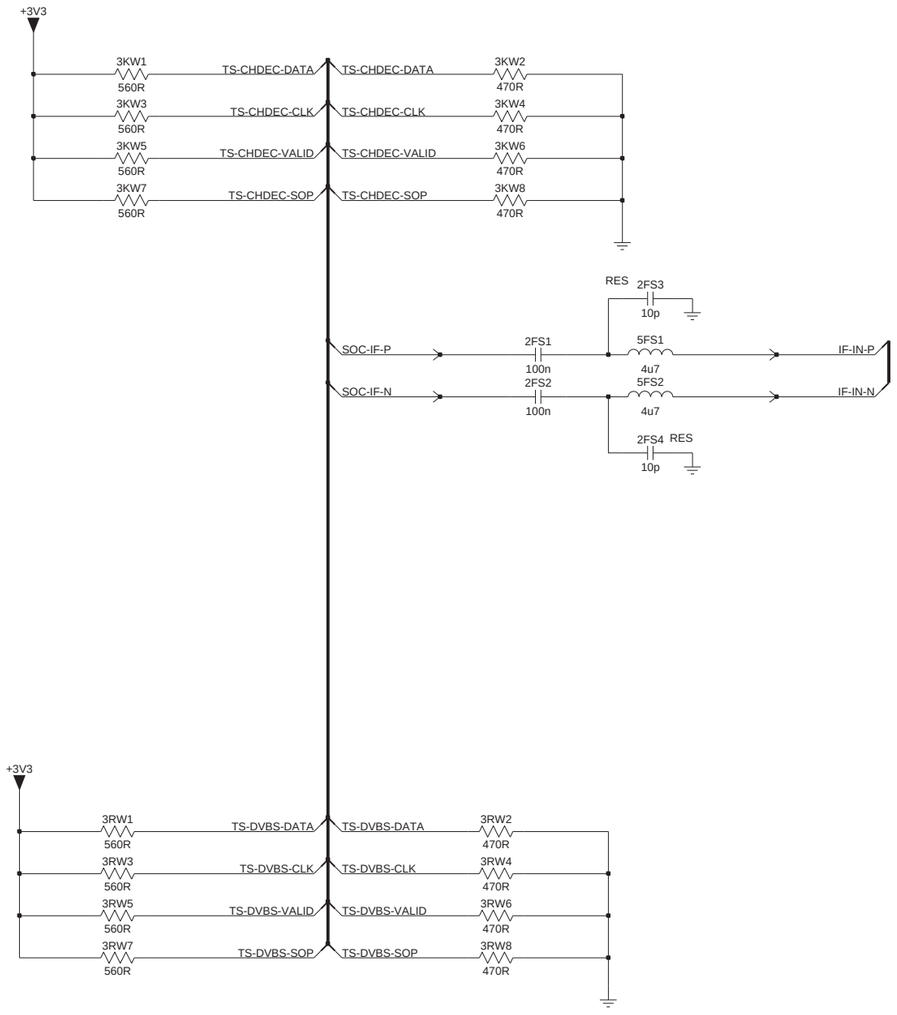


CI conditional access	3104 313 6618	5 2012-11-08

19370_035_130129.eps
130129

B06J FE

B06J

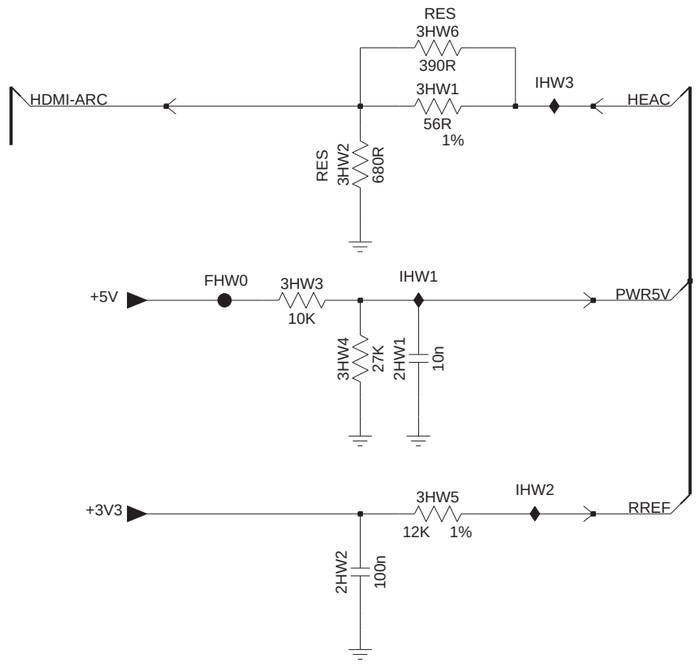


FE	3104 313 6618	5 2012-11-08

19370_036_130129.eps
130129

B06K HDMI

B06K



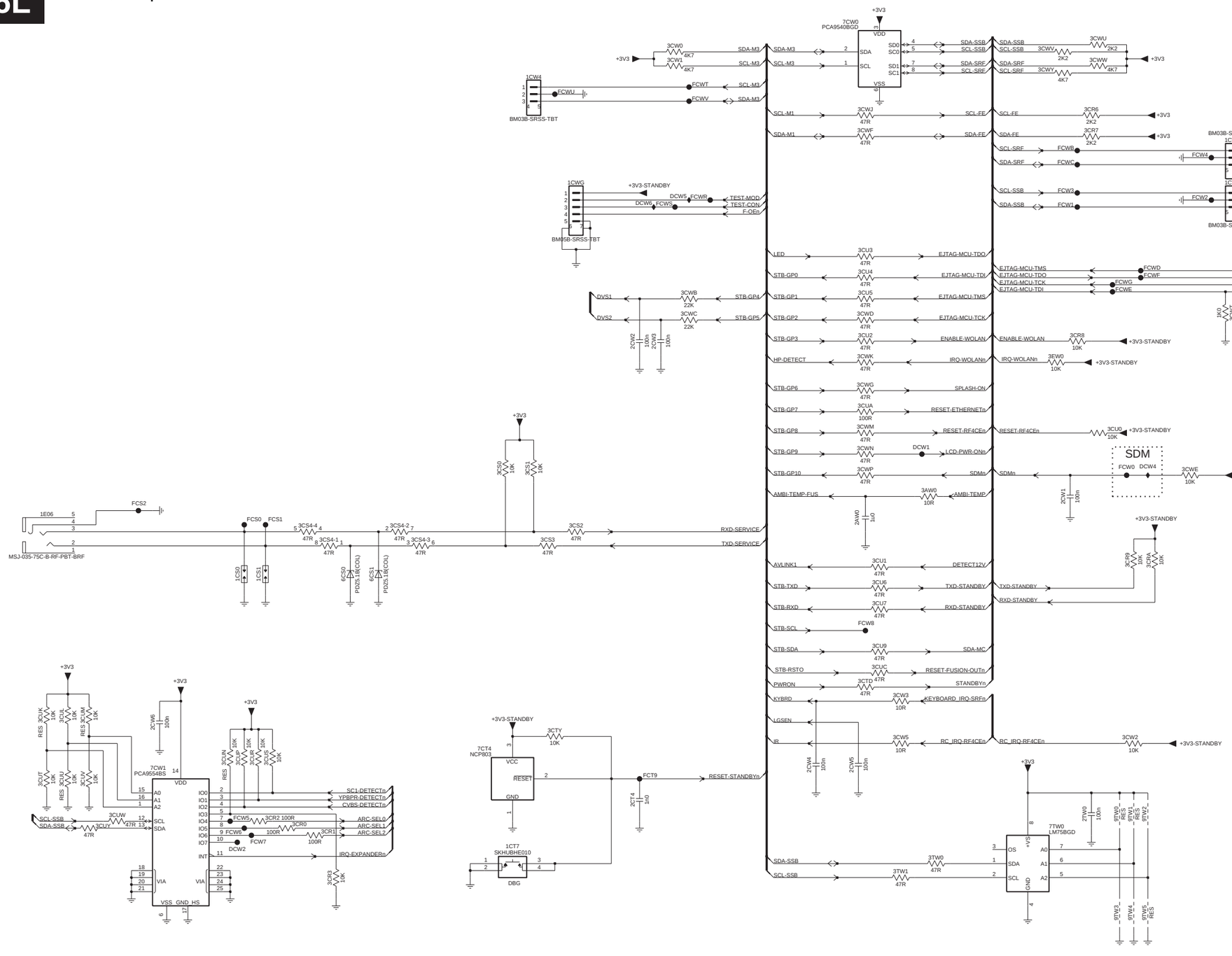
HDMI	3104 313 6618	5 2012-11-08

19370_037_130129.eps
130129

10-2-38 B06L, Control, temperature sensor and service

B06L Control, temperature sensor and service

B06L



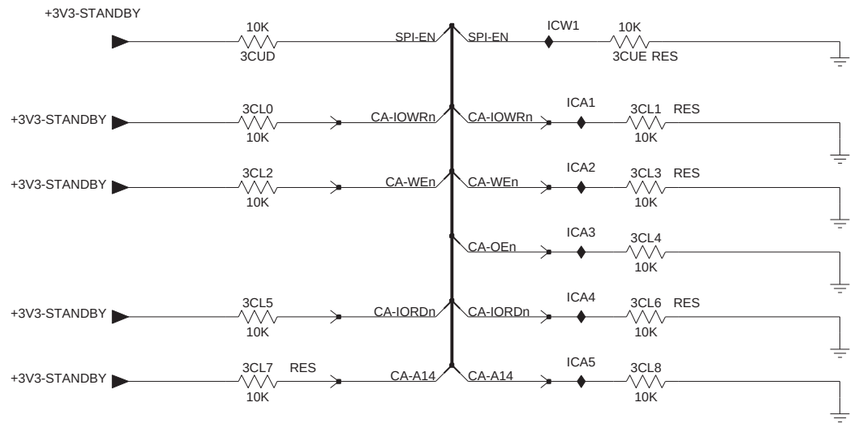
Control, temperature sensor and service	3104 313 6618	0 2012-11-08

19370_038_130129.eps
130129

10-2-39 B06M, Strap options

B06M Strap options

B06M



B06M

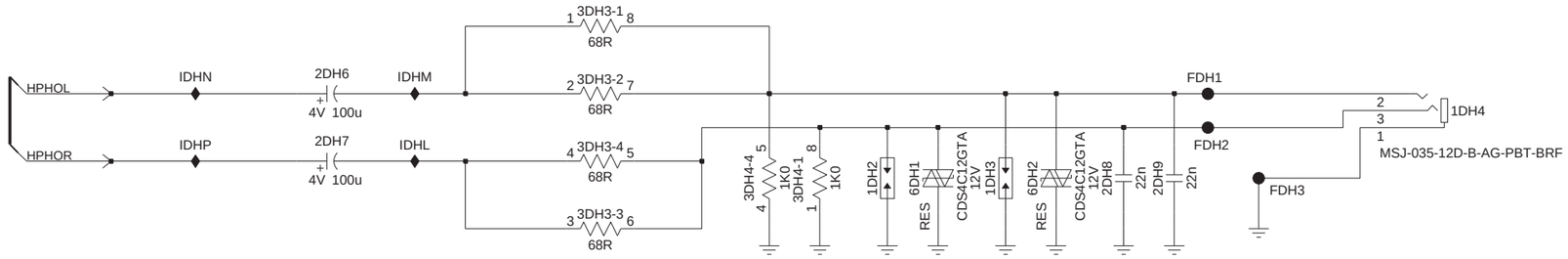
Strap options	3104 313 6618	5 2012-11-08

19370_039_130129.eps
130129

10-2-40 B06N, Headphone

B06N Headphone

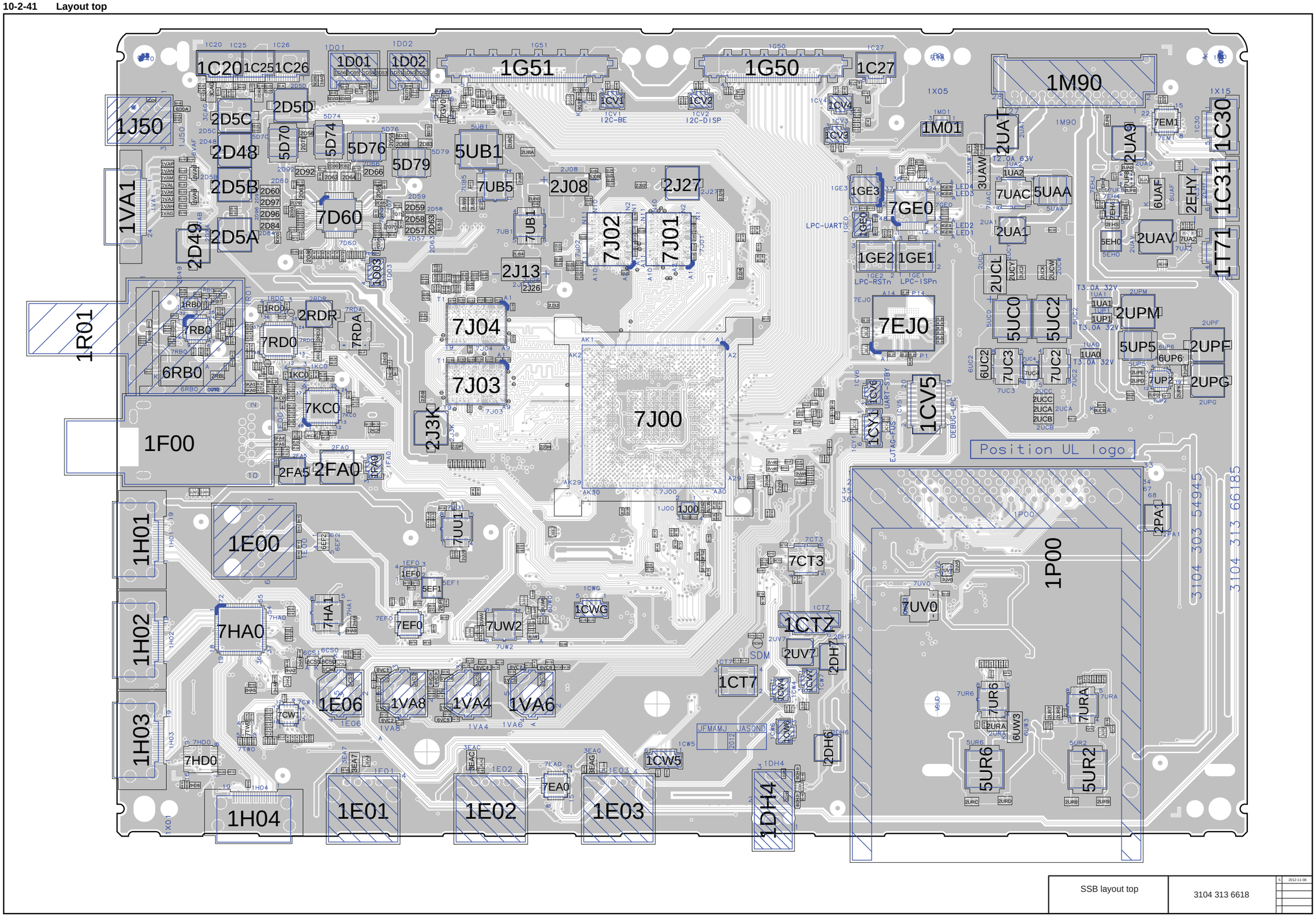
B06N



Headphone	3104 313 6618	9 2012-11-08

19370_040_130129.eps
130129

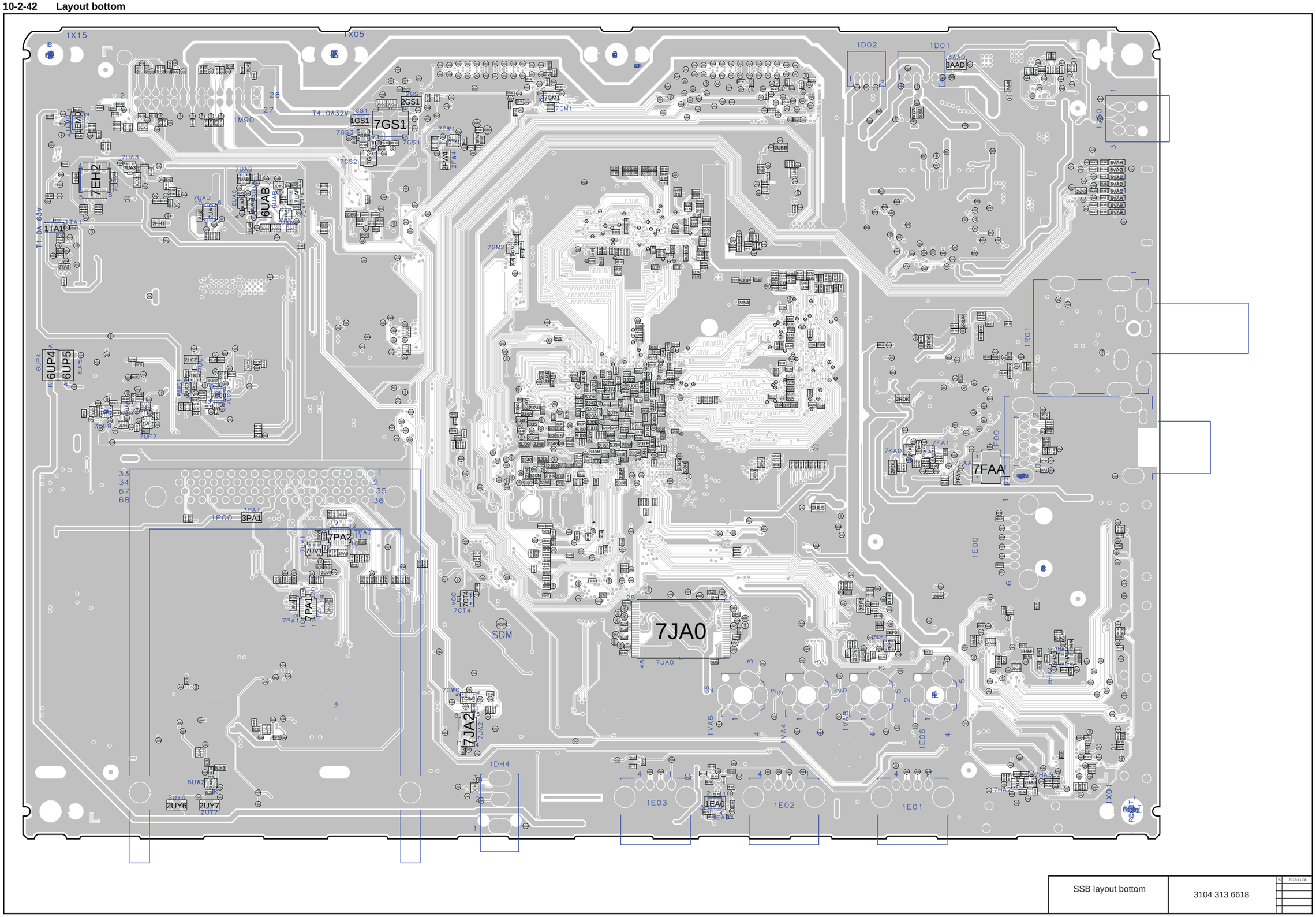
10-2-41 Layout top



SSB layout top	3104 313 6618	5 2012-11-08

19370_041_130130.eps
130130

10-2-42 Layout bottom



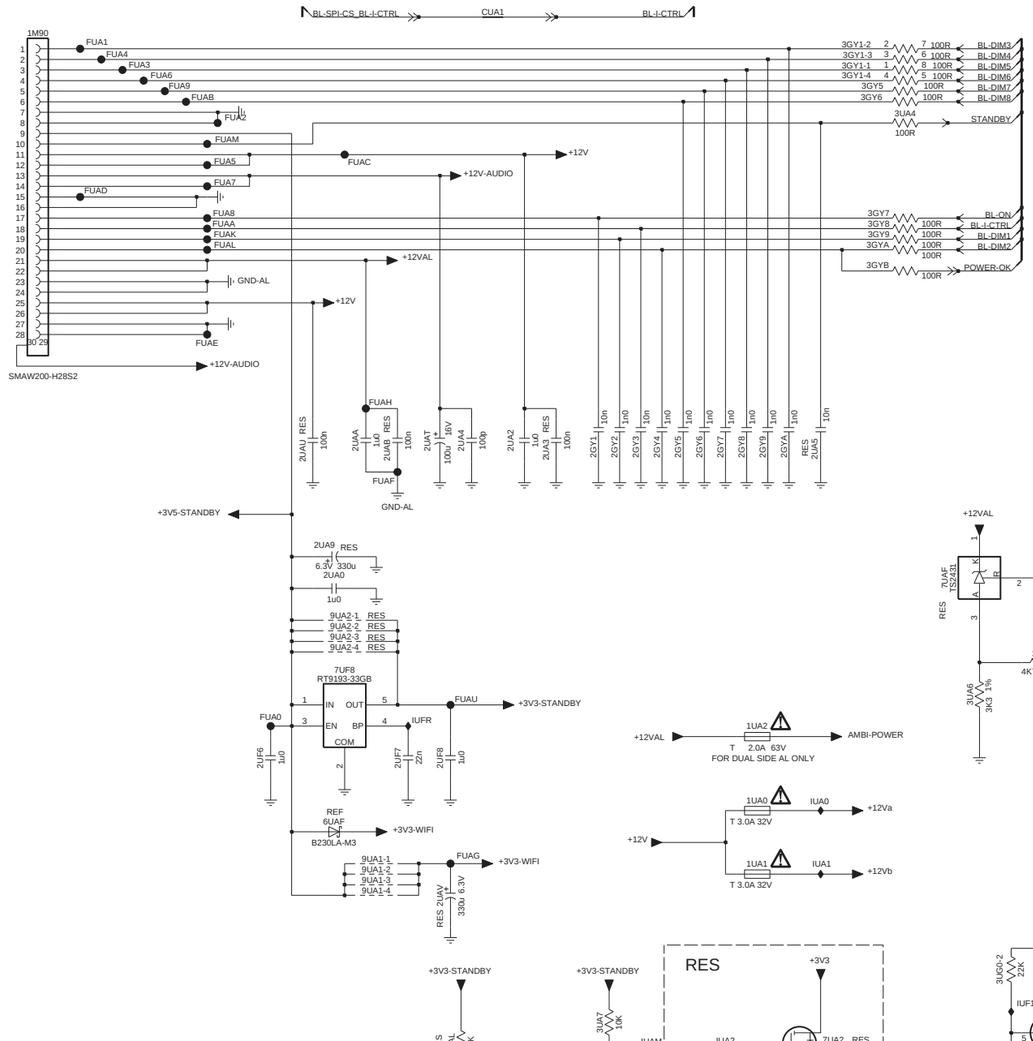
19370_042_130130.eps
130130

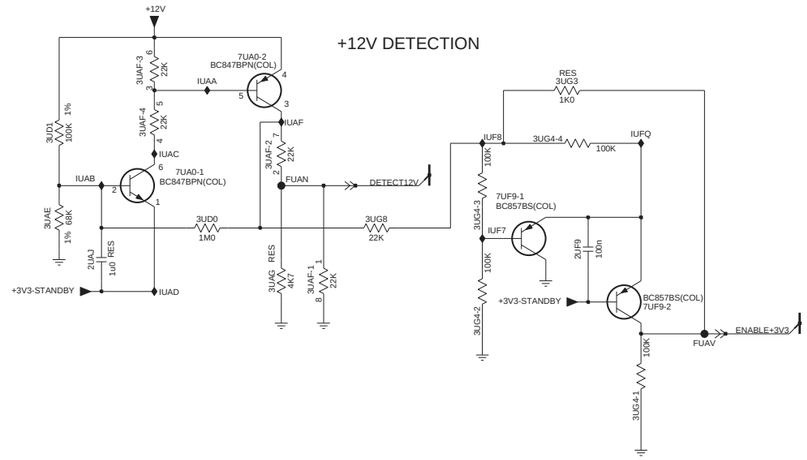
10.3 310431366186 SSB

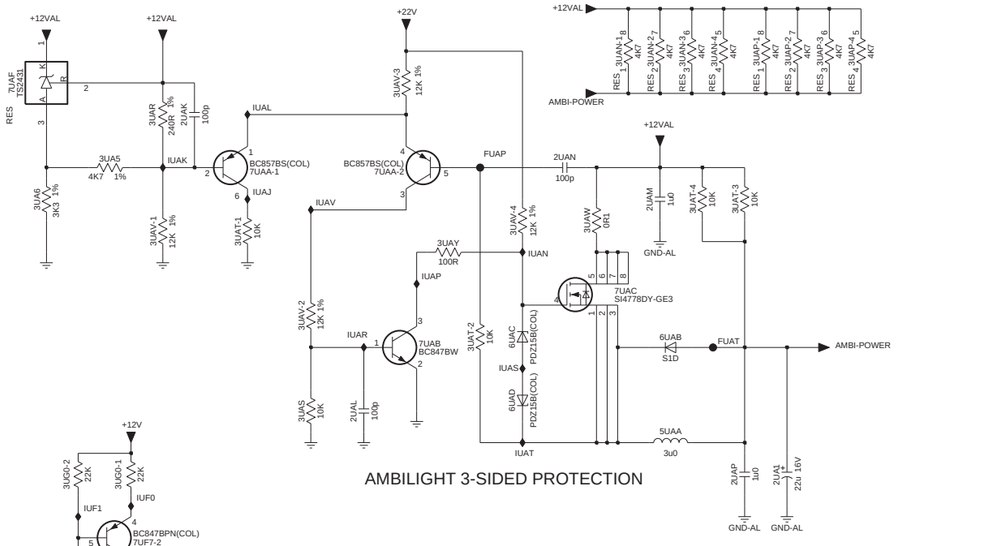
10-3-1 B01A, Power connector

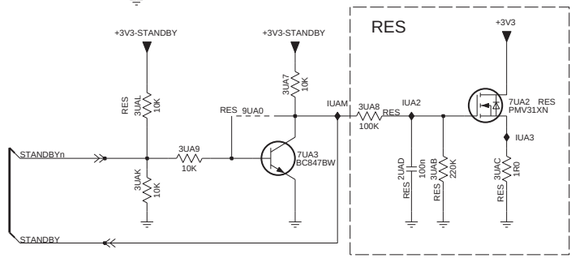
B01A Power connector

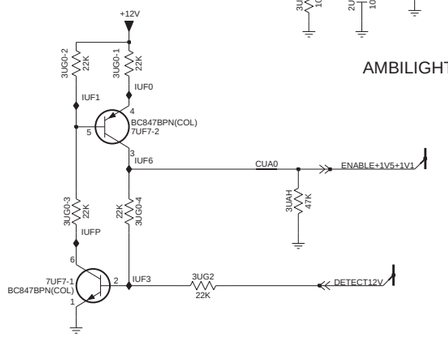
B01A



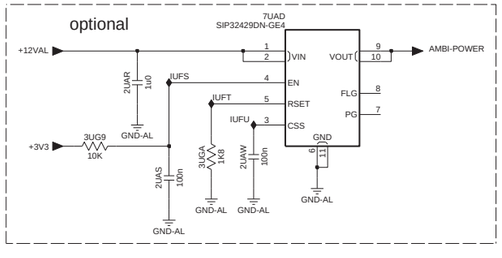


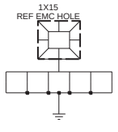






AMBILIGHT 3-SIDED PROTECTION





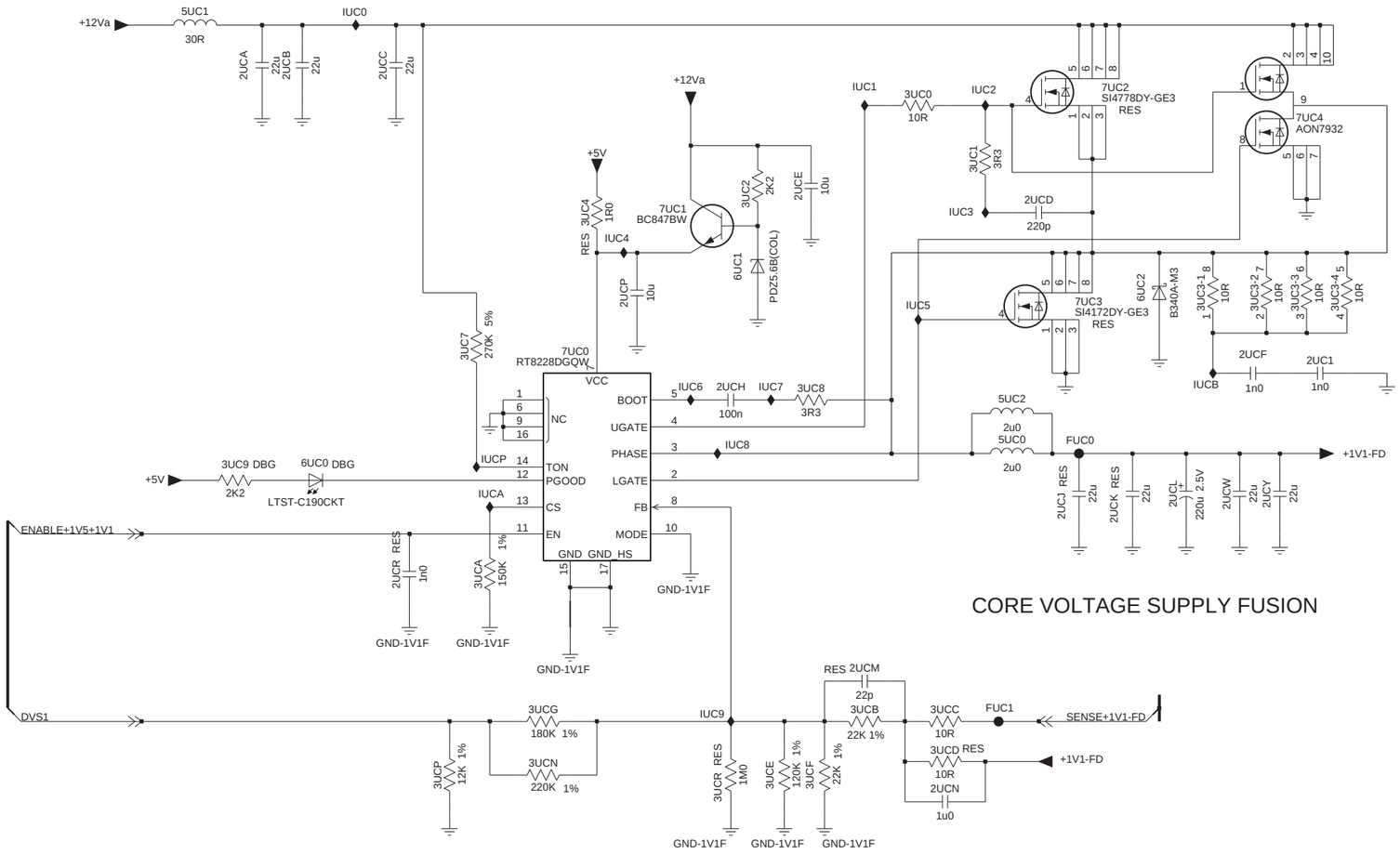
Power connector	3104 313 6618	6 2013-01-11 5 2012-11-08

19370_085_130222.eps
130222

10-3-2 B01B, Fusion supply

B01B Fusion supply

B01B



CORE VOLTAGE SUPPLY FUSION

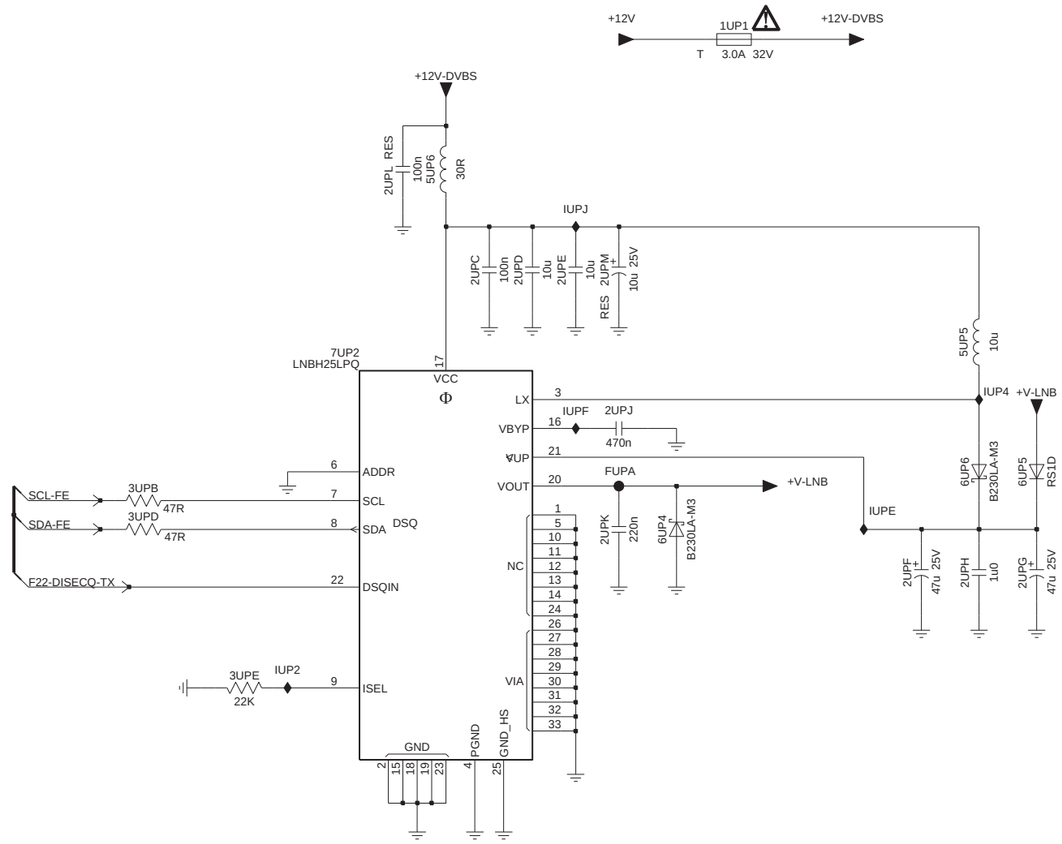
Fusion supply	3104 313 6618	6 2013-01-11 5 2012-11-08

19370_086_130222.eps
130222

10-3-3 B01C, LNB supply

B01C LNB supply

B01C



LNB supply	3104 313 6618	6 2013-01-11 5 2012-11-08

19370_087_130222.eps
130222

10-3-4 B01D, USB internal

B01D USB internal

B01D

USB1-DM 9EM1 USB-WIFI-DM
USB1-DP 9EM2 USB-WIFI-DP

+3V3
2EM3 100n
2EM4 100n 2EM5 100n 2EM6 100n 2EM7 100n
2EM0 18p
2EM1 18p
1EM0 12M
7EM1 CY7C65632-28LTXCT
VCC 27
VCC_A_1 5
VCC_A_2 9
VCC_A_3 14
VCC_D 21
10 XIN
11 XOUT
3 DD1-
4 DD1+
25 OVR1
6 DD2-
7 DD2+
24 OVR2
12 DD3-
13 DD3+
20 OVR3
15 DD4-
16 DD4+
19 OVR4
28 VREG
17 RESET
22 SELFPWR
23 GANG
8 RRREF
29 GND_HS
D- 1
D+ 2
SDA 26
TEST|SCL 18
VIA1 30
VIA2 31
VIA3 32
VIA4 33
USB1-DM
USB1-DP
USB-WIFI-DM
USB-WIFI-DP
3EM6 10K
USB-CAM-DM
USB-CAM-DP
3EM7 10K
3EM8 10K
3EM9 10K
RESET-FUSION-OUTn
3EM3 10K IEM1
3EM4 680R IEM2
2EM2 100n
3EM5 100K

9EHE-1 RES
9EHE-2 RES
9EHE-3 RES
9EHE-4 RES
2EHL 10u
7EH2 RT9187GSP
1 VIN
2 VIN
3 VOUT
4 VOUT
8 EN
5 BP|ADJ
7 NC
10 VIA
GND
6 GND_HS
9
+3V5-STANDBY
2EHM 10u
3EHW 33K 1%
3EHY 1M0
+3V3-LAN
RES 2EHY 100u 6.3V
IEH3
3EM0 10K 1%
3EM1 1M0
ENABLE-WOLAN

reserved

7EH4 RES TPS61200DRCG4
+3V3-WIFI
2EHR 22u
5 VIN
8 PS
6 EN
7 UVLO
3 L
9 GND
4 PGND
11 GND_HS
2 VOUT
1 VAUX
10 FB
12
13 VIA
2EHU RES 1n0
RES 5EH0 4u7 IEH2
IEH0
2EHV RES 100n
IEH1
2EHS 22u
2EHT 22u
RES 22u
RES 3EHS 330K
RES 3EHR 22K 1%
9EM3
+3V5-STANDBY
2EH9 47n
IEH4
3EHU 22K
7EHJ BC847BW
RES 3EHT 22K
RES 3EHP 120K 1%
IEH5
2EHJ 100n
IEH6
3EHV 47K
IEHJ
3EHJ 100K
RES 2EHW 10n
0EH0
+3V3-LAN
2EHN 100n RES
RES 9EH8-1
RES 9EH8-2
RES 9EH8-3
RES 9EH8-4
+3V3
1C31
FEH1
FEH2
FEH3
FEH4
FEH5
1 2 3 4 5 6 8 7
A1253WRA
USB-WIFI-DM
USB-WIFI-DP
IRQ-WOLANn
RES 3EHN 10K +3V3-LAN
RES 2EHP 100n
1C30
FEH6
FEH7
FEH8
FEH9
1 2 3 4 5 7 6
A1253WRA
+5V
USB-CAM-DM
USB-CAM-DP

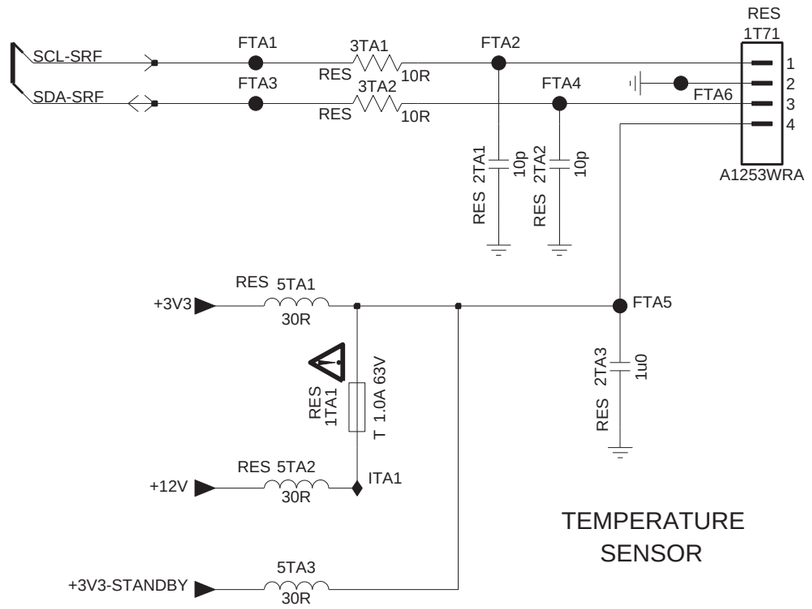
USB internal	3104 313 6618	6 2013-01-11 5 2012-11-08

19370_088_130222.eps
130222

10-3-5 B01E, Miscellaneous

B01E Miscellaneous

B01E

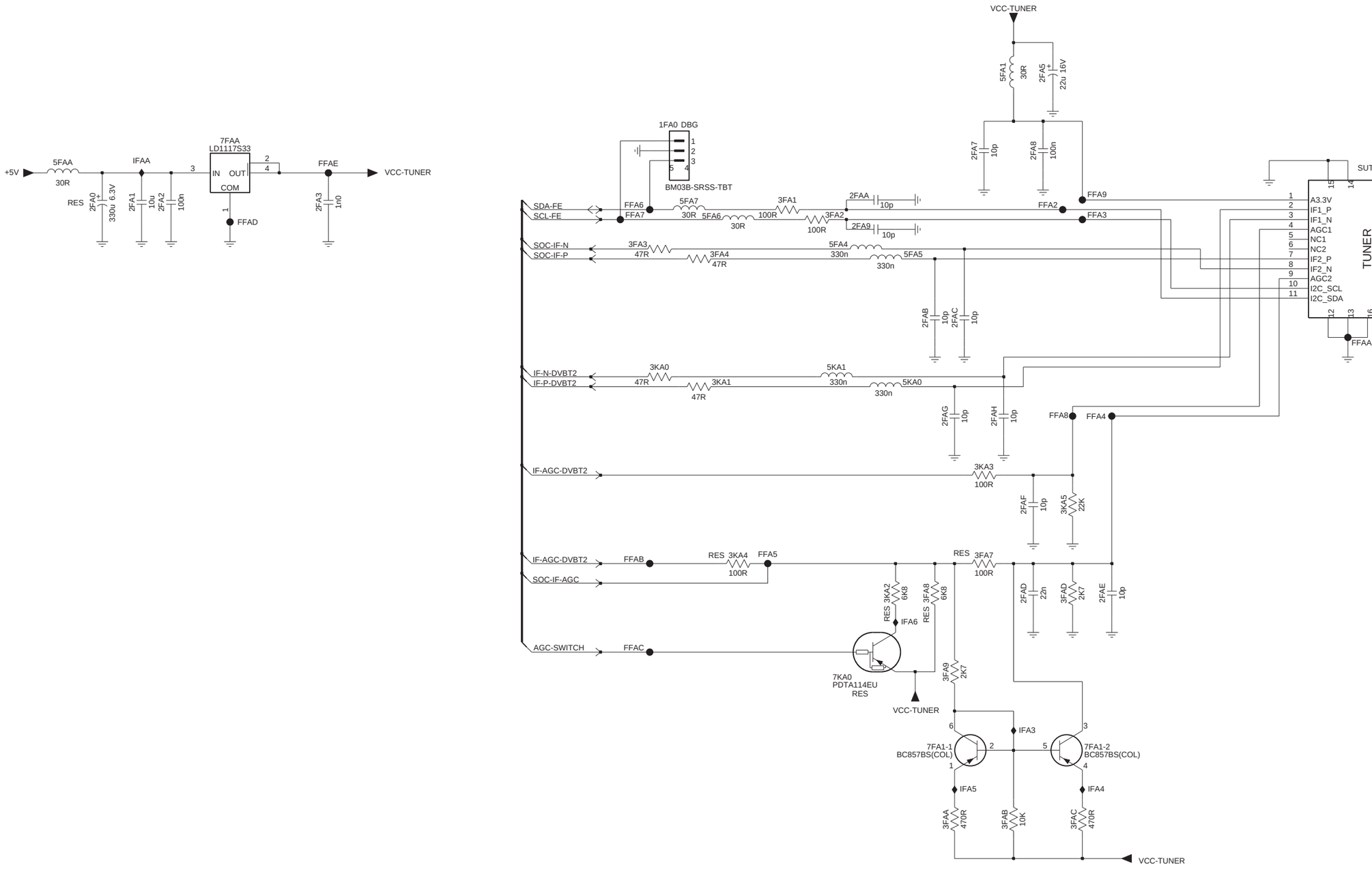


Miscellaneous	3104 313 6618	6 2013-01-11 5 2012-11-08

19370_089_130222.eps
130222

10-3-6 B02A, Hybrid T/C tuner

B02A Hybrid T/C tuner



Hybrid T/C tuner	3104 313 6618	6 2013-01-11 5 2012-11-08

19370_090_130222.eps
130222

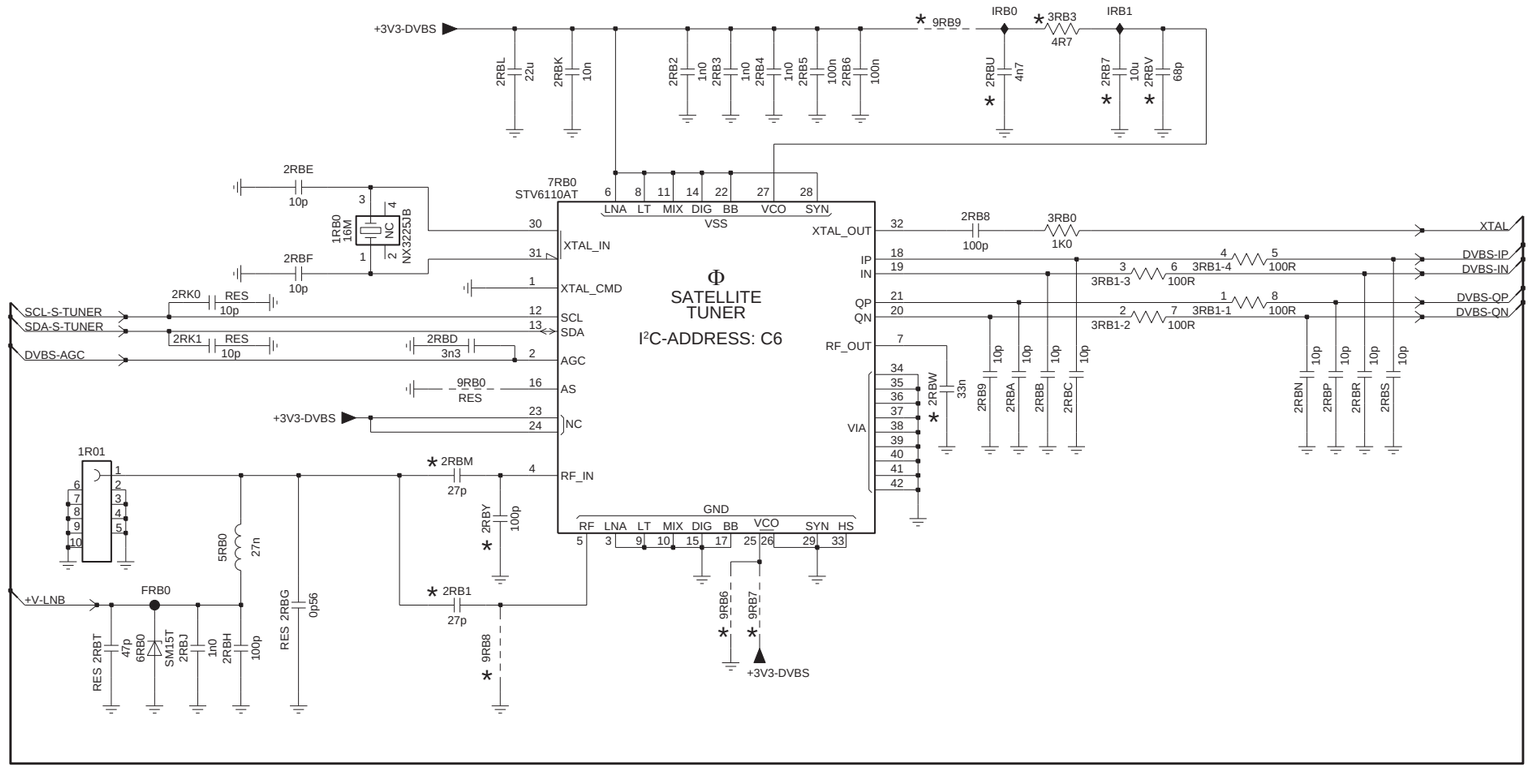
10-3-7 B02B, Satellite tuner

B02B Satellite tuner

B02B

Diversity Matrix (Satellite Tuner dependant)

Position Nr	Affected Pin	Default Value	STV6110	STV6111
2RBY	4,5	100P	-	X
9RB8	4,5	JUMP	X	-
2RBM	4,5	27P	X	-
2RB1	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

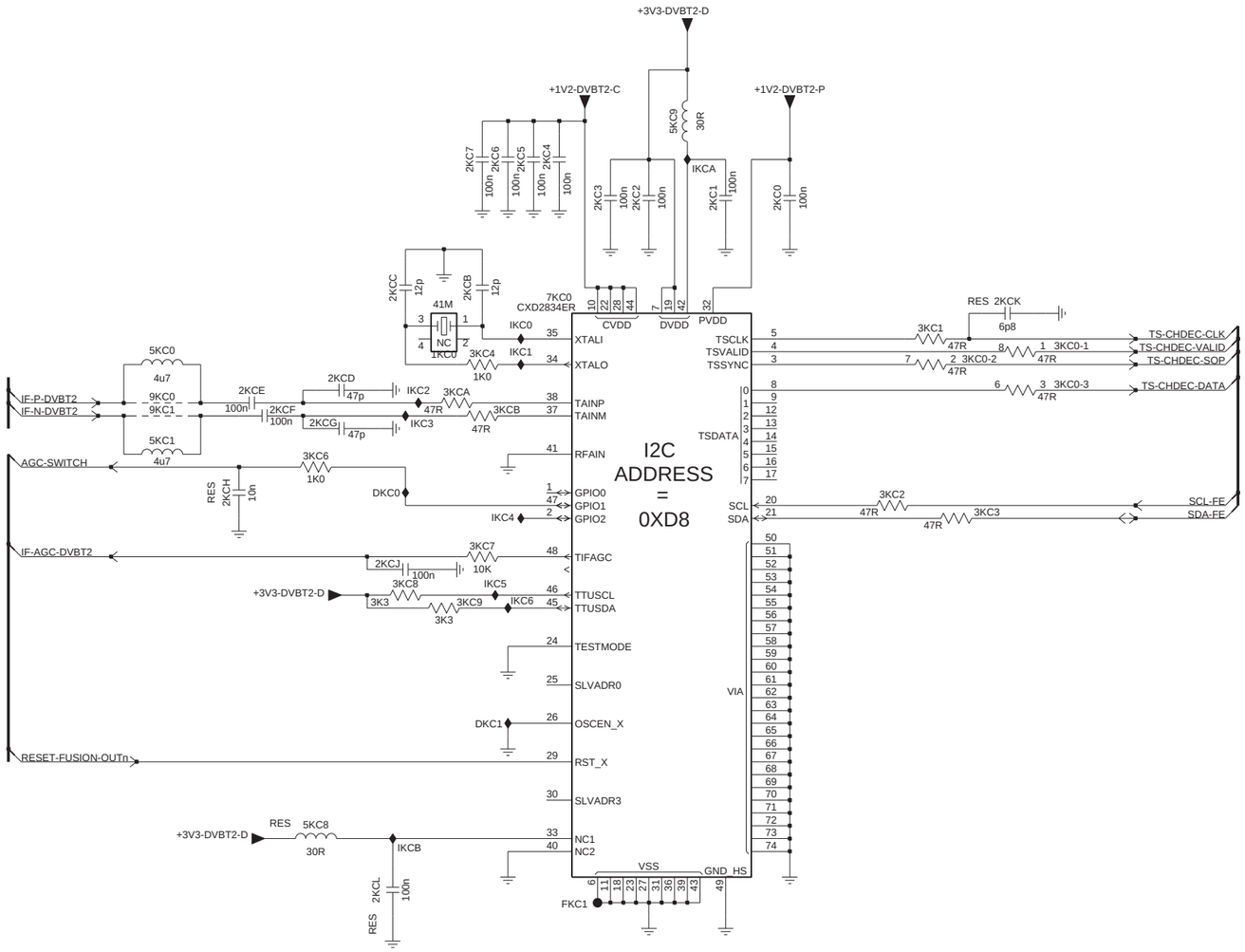


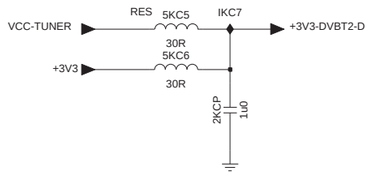
Satellite tuner	3104 313 6618	6 2013-01-11 5 2012-11-08

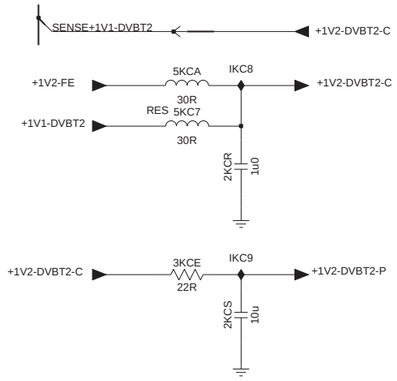
19370_091_130222.eps
130222

10-3-8 B02C, DVBT2 channel decoder

B02C DVBT2 channel decoder







7KC0	+1V1-DVBT2
CXD2834	+1V2
GAIA3	+1V1

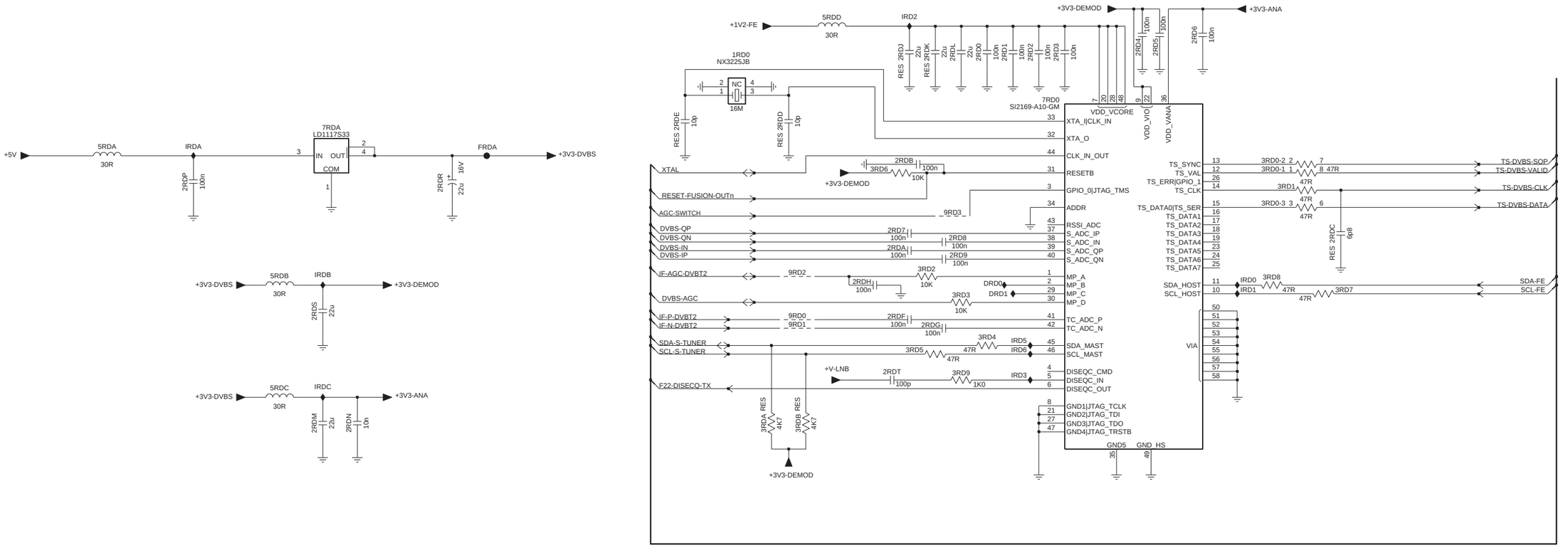
DVBT2 channel decoder	3104 313 6618	6 2013-01-11 5 2012-11-08

19370_092_130222.eps
130222

10-3-9 B02D, DVBS/S2 channel decoder

B02D DVBS/S2 channel decoder

B02D

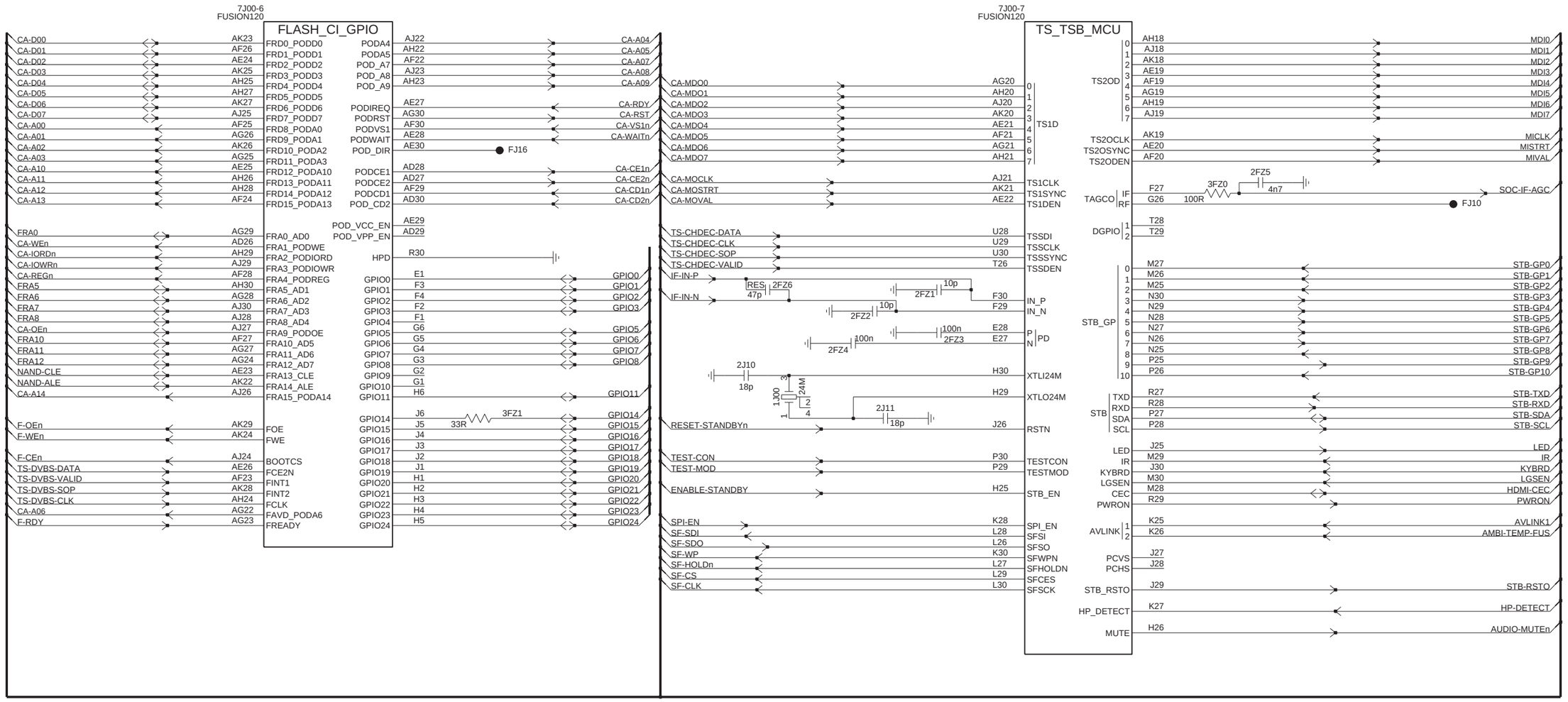


DVBS/S2 channel decoder	3104 313 6618	6 2013-01-11 5 2012-11-08

19370_093_130222.eps
130222

B03A Fusion

B03A



B03A

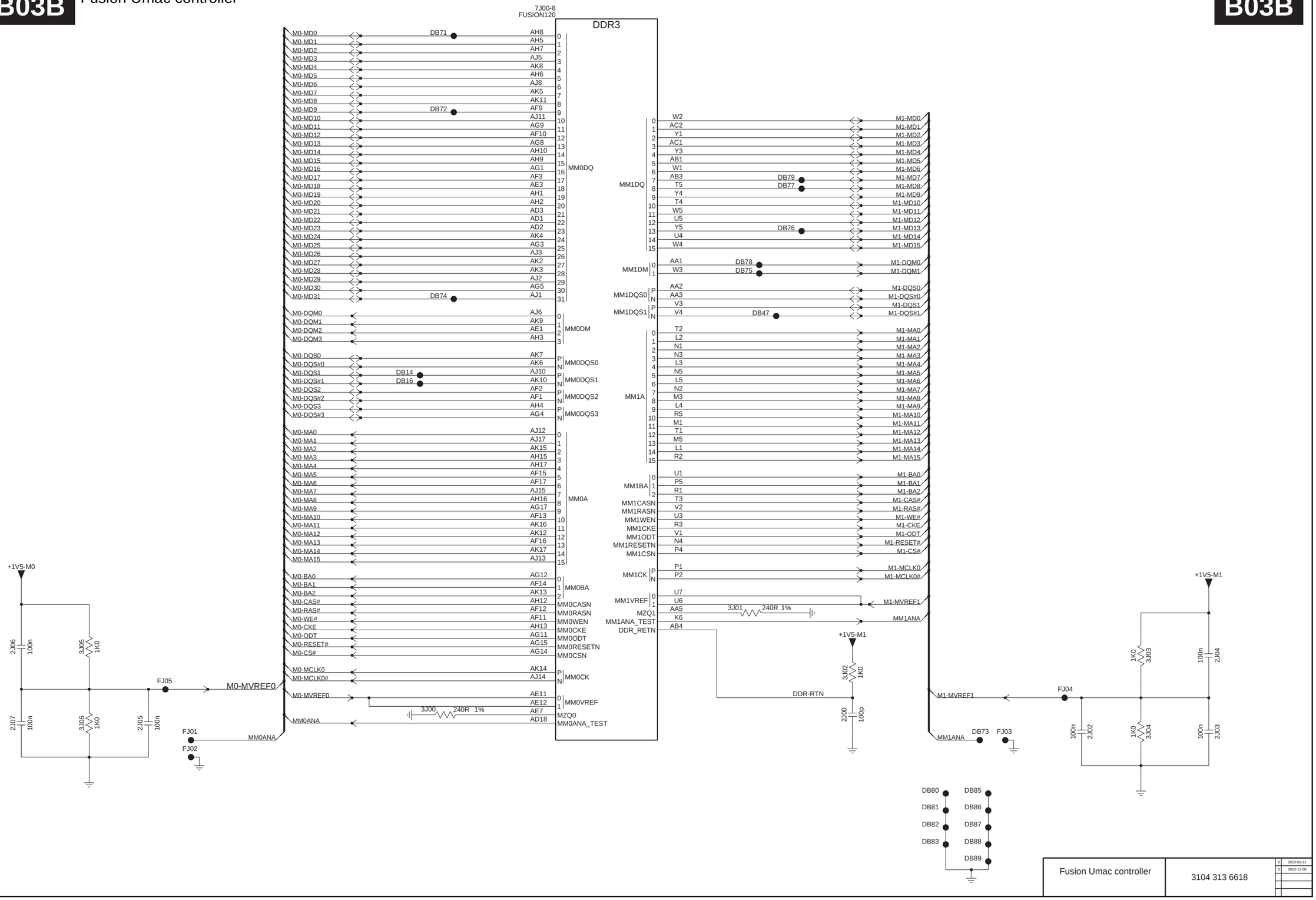
Fusion	3104 313 6618	6	2013-01-11
		5	2012-11-08

19370_094_130222.eps
130222

10-3-11 B03B, Fusion Umac controller

B03B Fusion Umac controller

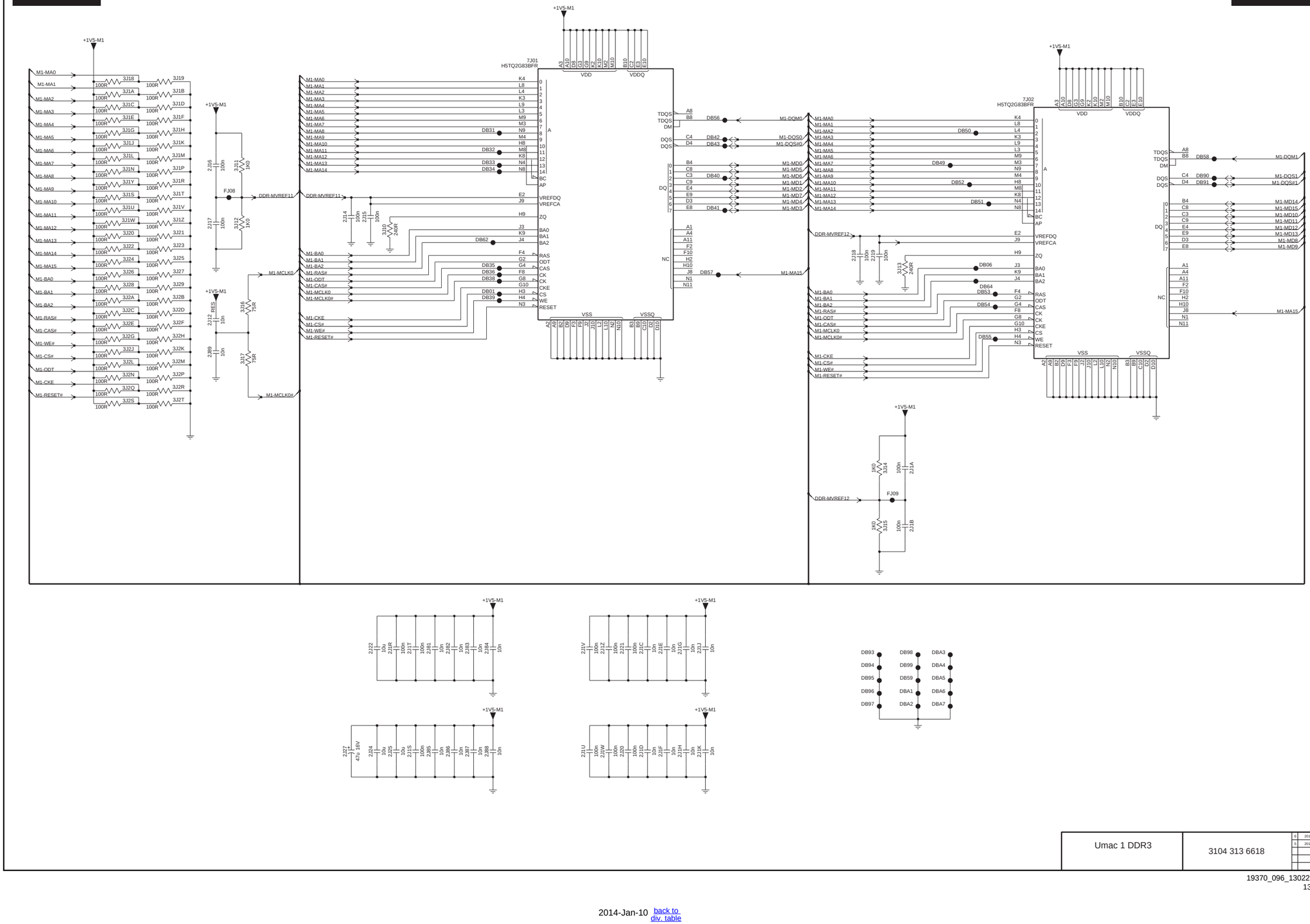
B03B



19370_095_130222.eps
130222

10-3-12 B03C, Umac 1 DDR3

B03C Umac 1 DDR3



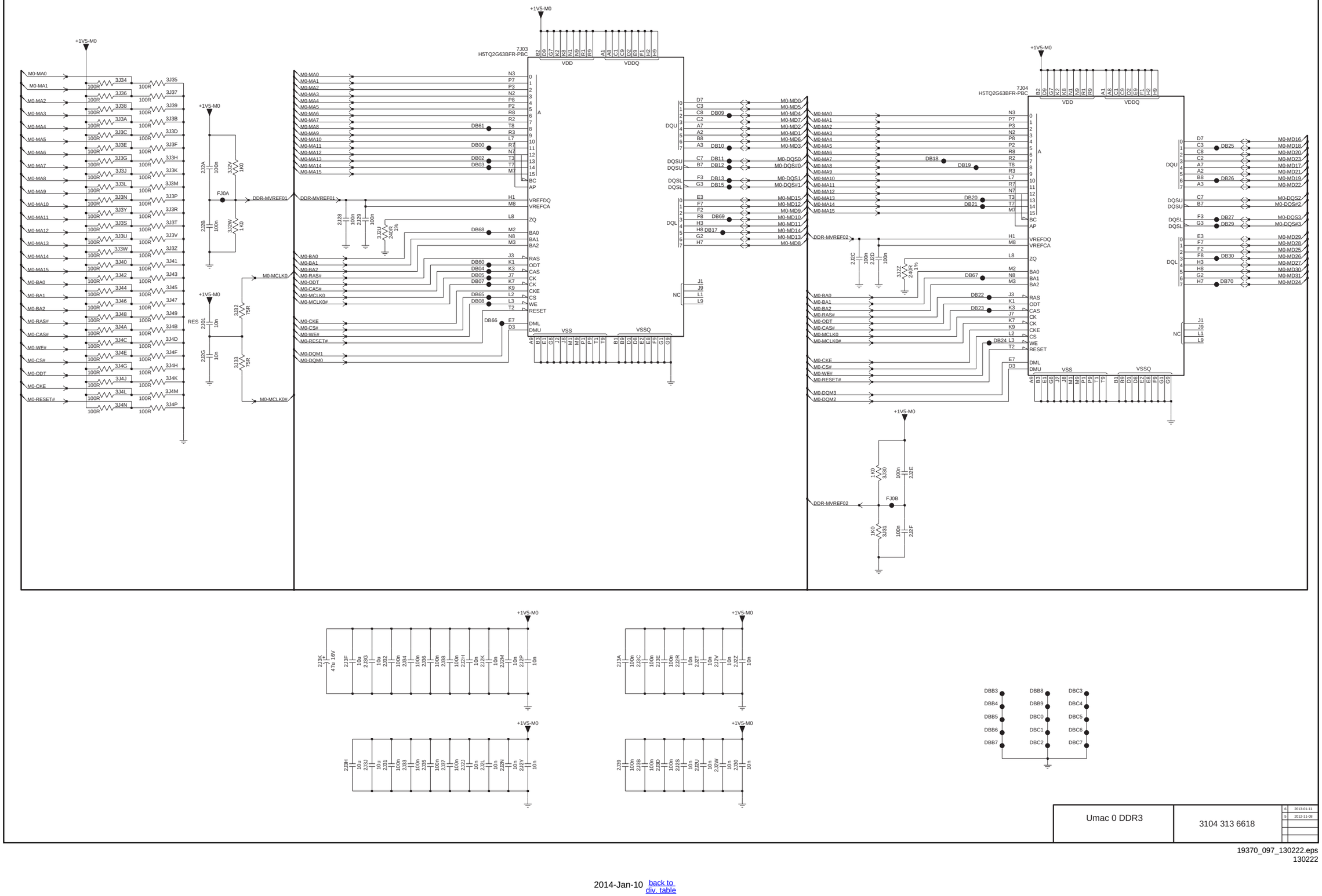
Umac 1 DDR3	3104 313 6618	6 2013-01-11 5 2012-11-08

19370_096_130222.eps
130222

10-3-13 B03D, Umac 0 DDR3

B03D Umac 0 DDR3

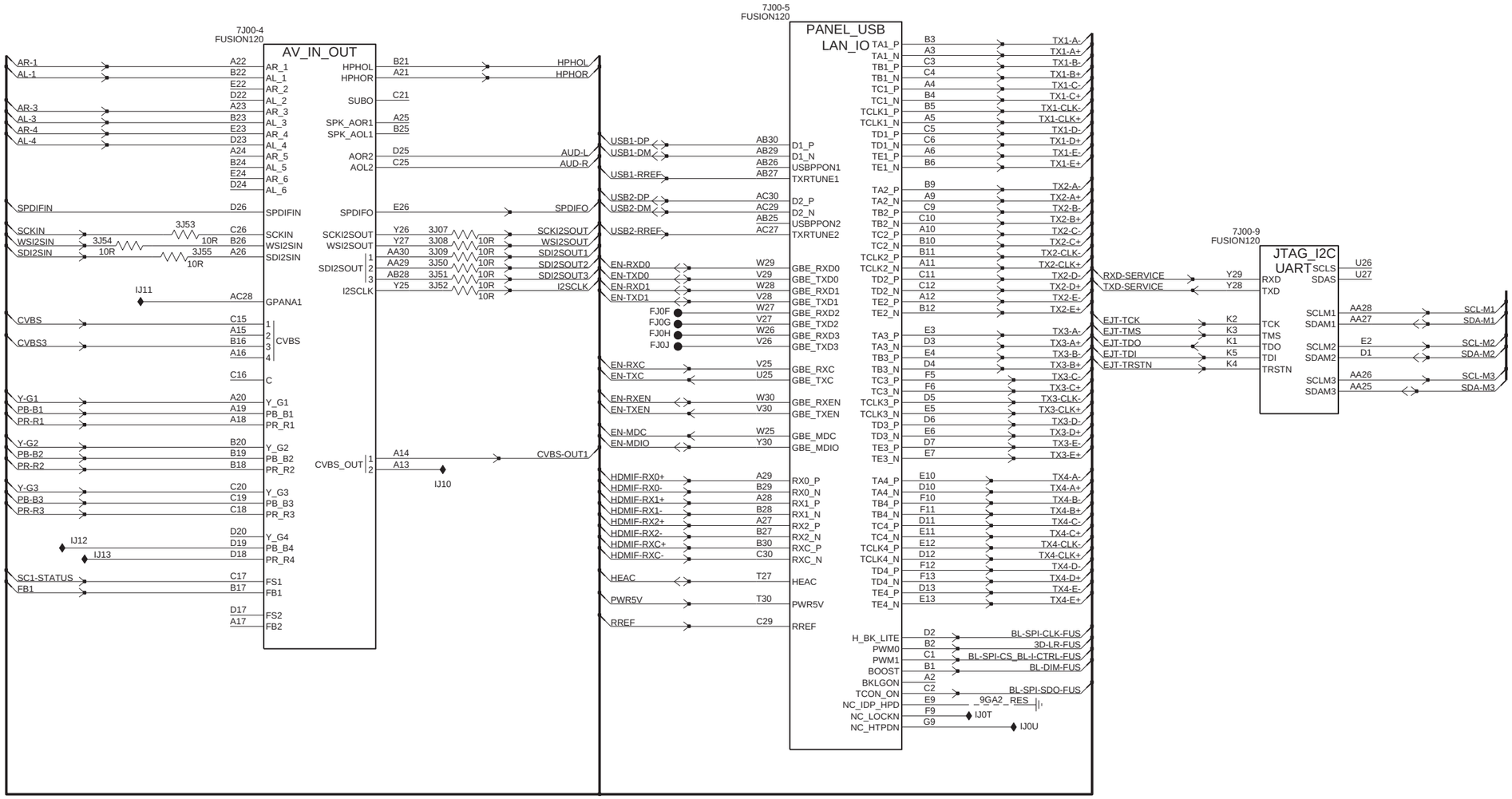
B03D



19370_097_130222.eps
130222

B03E Fusion

B03E



Fusion	3104 313 6618	6 2013-01-11 5 2012-11-08

19370_098_130222.eps
130222

10-3-15 B03F, Fusion power supply

B03F Fusion power supply

B03F

SUPPLY_1

SUPPLY_2

PWR_GND

Fusion power supply

3104 313 6618

6	2013-01-11
5	2012-11-08

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130222

10-3-16 B04A, Control

B04A Control

B04A

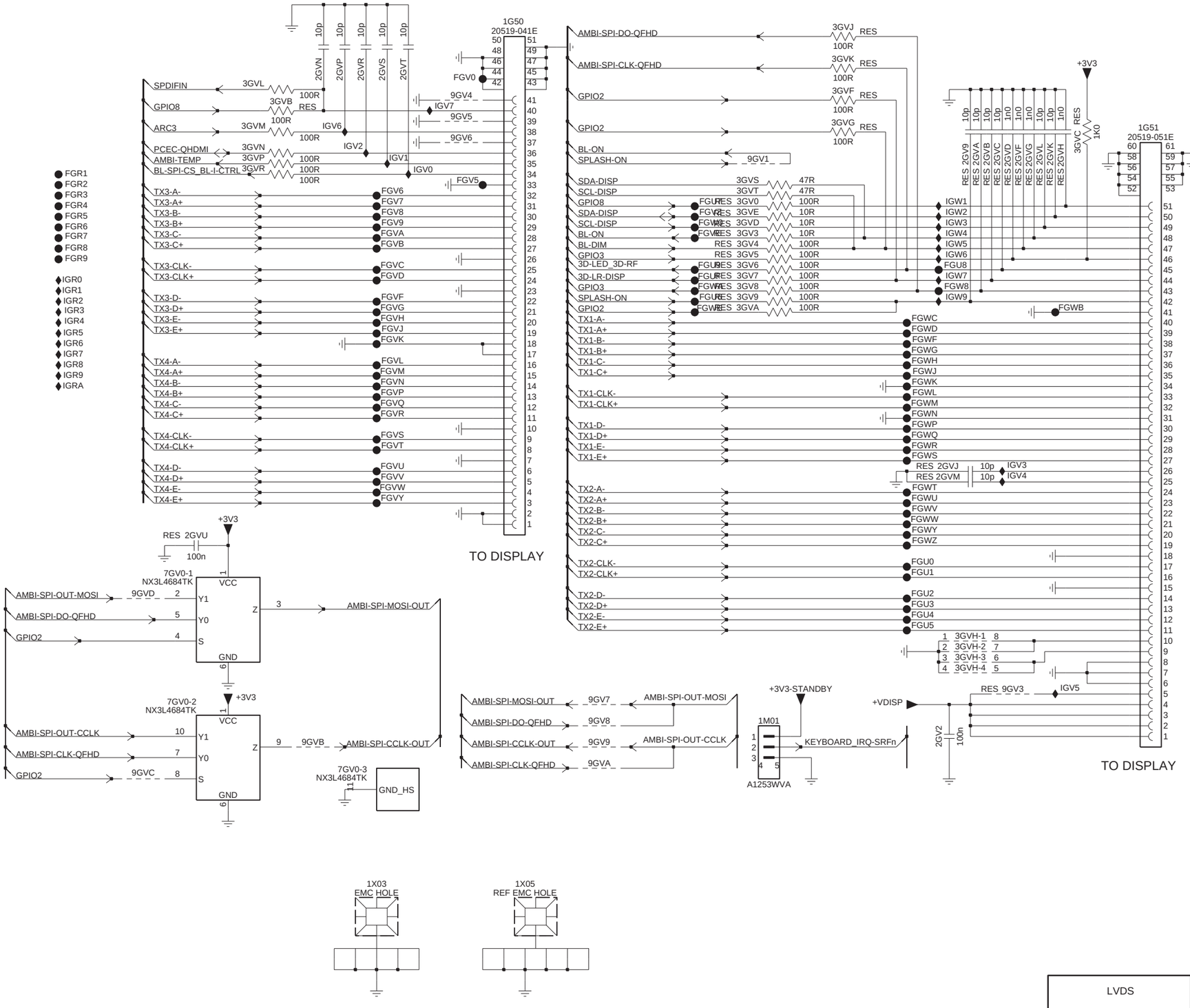
+3V3
3GM5 4K7
3GM6 4K7
7GM1 PCA9540BGD
VDD
SDA
SCL
SD0
SC0
SD1
SC1
VSS
SDA-BE
SCL-BE
SDA-DISP
SCL-DISP
SDA-BL
SCL-BL
RES 3GM1 100K
RES 3GM2 100K
3GM3 100K
3GM4 100K
3CY1-1 4K7
3CY1-2 4K7
3CY1-3 4K7
3CY1-4 4K7
3CY2 4K7
1CY1 DBG
FCY1
FCY2
FCY3
FCY4
FCY5
FCY6
BM06B-SRSS-TBT
3CY3-4 47R
3CY3-3 47R
3CY3-2 47R
3CY3-1 47R
3CY4 47R
EJT-TRSTN
EJT-TMS
EJT-TDO
EJT-TCK
EJT-TDI
RES 9GM1
RES 9GM2
RES 9GM3
RES 9GM4
1CV2 DBG
1CV3 DBG
1CV1 DBG
FCVC
FCVD
FCVE
FCV2
FCV1
FCV3
BM03B-SRSS-TBT
SCL-M2
SDA-M2
3CVF 47R
3CVG 47R
3D-LR-FUS
3CV2 47R
FCVB
3D-LR
SCL-BE
SDA-BE
1CV6
FCY7
FCY8
FCY9
TXD-STANDBY
RXD-STANDBY
BM03B-SRSS-TBT
BL-SPI-CS_BL-I-CTRL-FUS
3GD5 10R
BL-SPI-CS_BL-I-CTRL
BL-DIM-FUS
3CV3 47R
FCVN
BL-DIM
+3V3
3GM7 RES 4K7
7GM2 RES PDTC114EU
1CV5 DBG
SCL-M3
TXD-STANDBY
SDA-M3
RXD-STANDBY
SCL-FE
TXD-SERVICE
SDA-FE
RXD-SERVICE
STANDBYn
TXD-RF4CE
DETECT12V
RXD-RF4CE
LCD-PWR-ONn
BL-ON
RC_IRQ-RF4CEn
BM20B-SRDS-G-TF
BL-SPI-CLK-FUS
3CV8 10R
AMBI-SPI-CCLK
BL-SPI-SDO-FUS
3CV9 10R
AMBI-SPI-MOSI
GPIO0
3CVM 47R
TXD-RF4CE
GPIO1
3CVP 47R
RXD-RF4CE
GPIO5
DC02
3CYC 47R
POWER-OK
GPIO6
DC03
GPIO7
3CYB 47R
IRQ-EXPANDERn
GPIO11
GPIO15
DC06
RES
3CV4 10R
AMBI-SPI-CCLK
GPIO16
RES
3CV5 10R
AMBI-SPI-MOSI
GPIO20
3CV7 47R
POWER-OK
GPIO21
DC07
GPIO23
3CVS 47R
IRQ-EXPANDERn
3D-LR
9GM5_RES
9GM6_RES
3D-LED_3D-RF
3D-LR-DISP
RESET-RF4CEn
TXD-RF4CE
RXD-RF4CE
RC_IRQ-RF4CEn
3D-LED_3D-RF
3CVC 10R
3CVD 10R
3CVE 10R
3CVW 10R
3CVY 10R
FCVF
FCVG
FCVH
FCVJ
FCVK
1C27
FH52-8S-0.5SH
+3V3-STANDBY
10p 2CVC
10p 2CVB
10p 2CVA
10p 2CV9
10p 2CV8
1CV4 DBG
FCVL
FCVM
FCVA
BM03B-SRSS-TBT
POWER-OK
3CVU 10K
3CVA 10K
3CVN 10K
3CVR 10K
3CVB 10K
RES
IRQ-EXPANDERn
3CVT 10K

Control	3104 313 6618	6 2013-01-11 5 2012-11-08

19370_100_130222.eps
130222

B04B LVDS

B04B



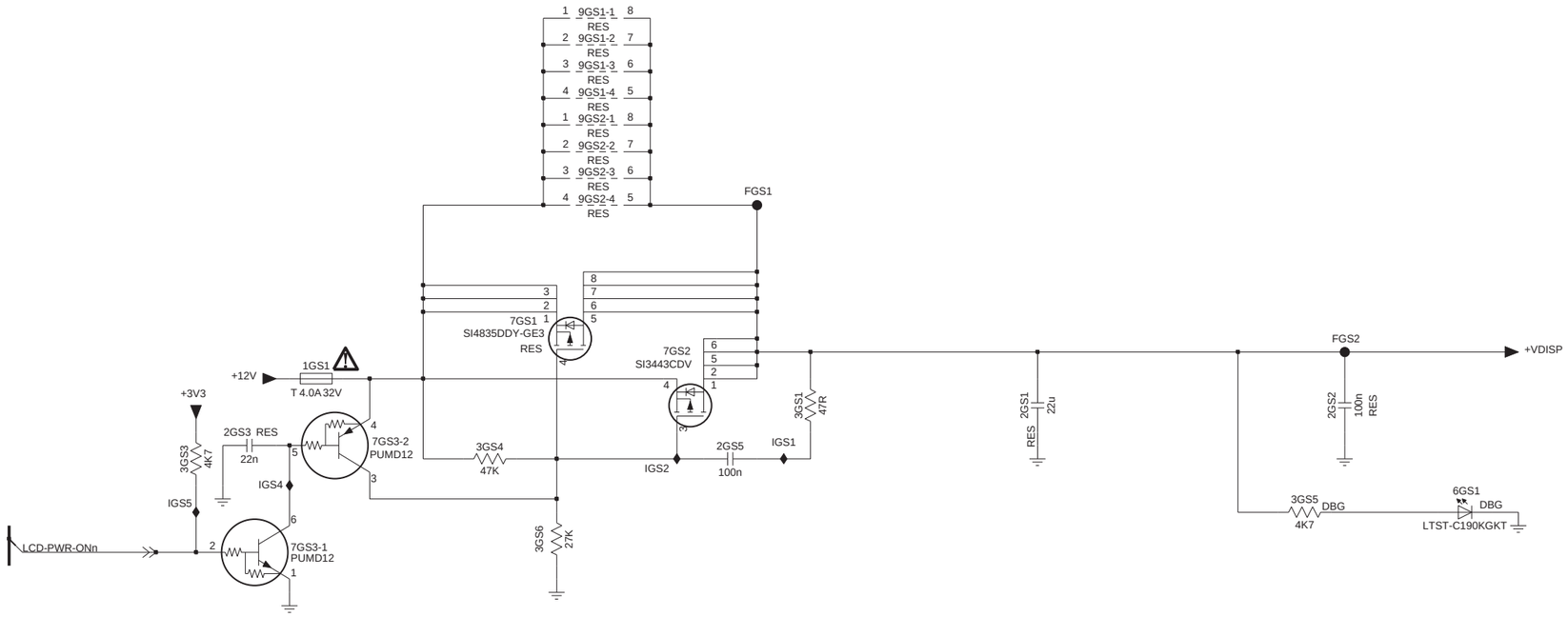
LVDS	3104 313 6618	6 2013-01-11 5 2012-11-08

19370_101_130222.eps
130222

10-3-18 B04C, Output Vdisp

B04C Output Vdisp

B04C

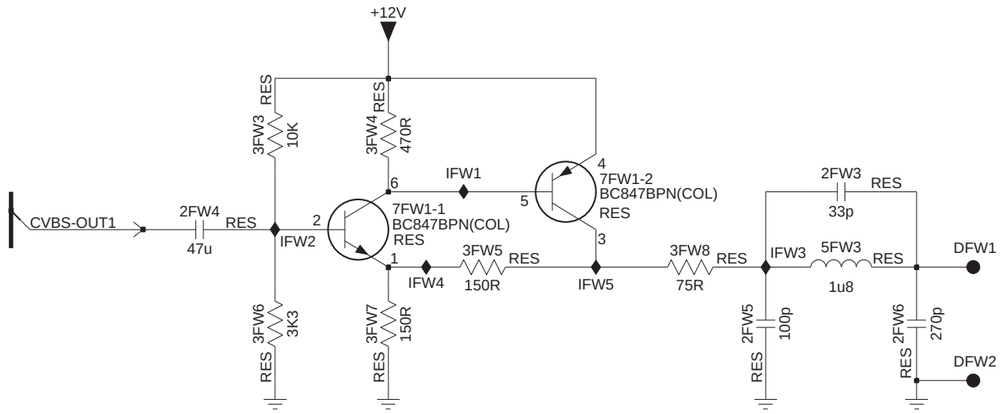


Output Vdisp	3104 313 6618	6 2013-01-11 5 2012-11-08

19370_102_130222.eps
130222

B04D Tuner CVBS debug

B04D



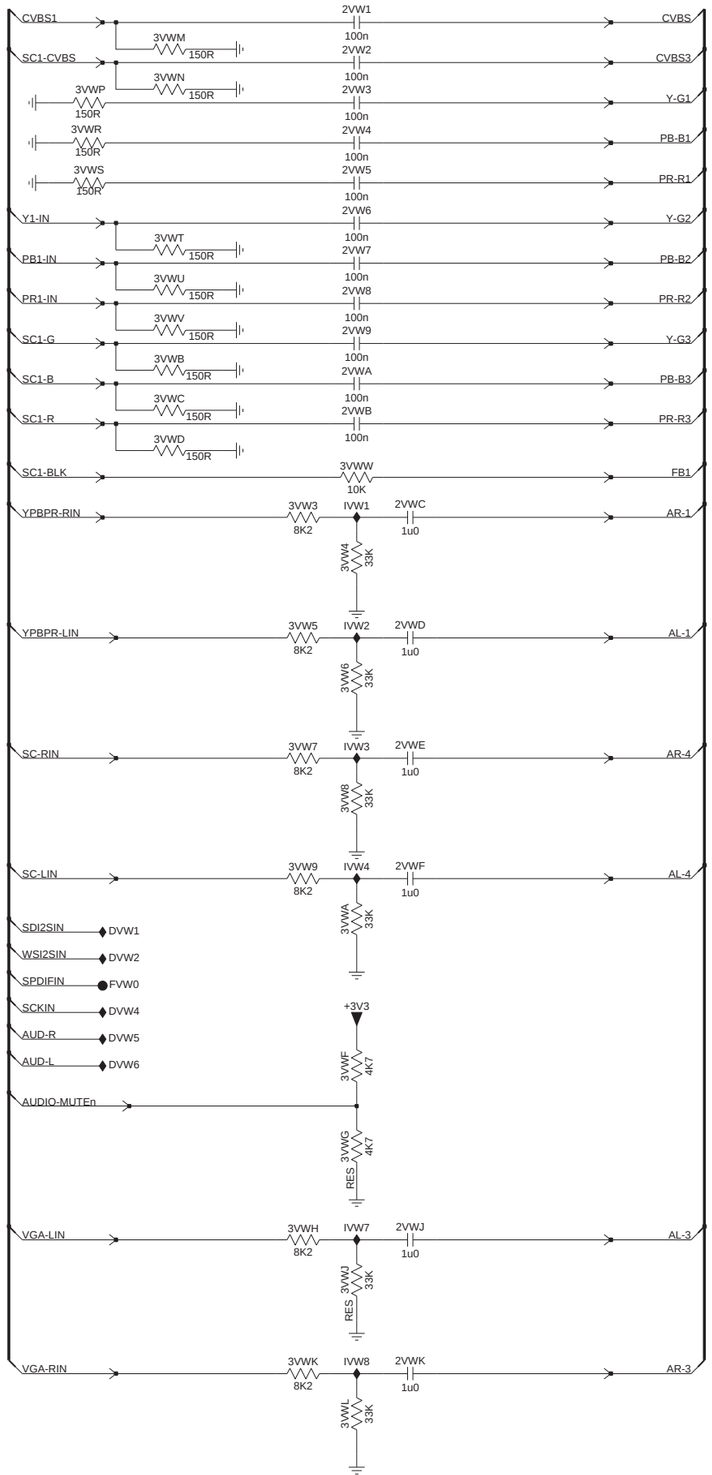
Tuner CVBS debug	3104 313 6618	6 2013-01-11 5 2012-11-08

19370_103_130222.eps
130222

10-3-20 B04E, Audio - video

B04E Audio - video

B04E



B04E

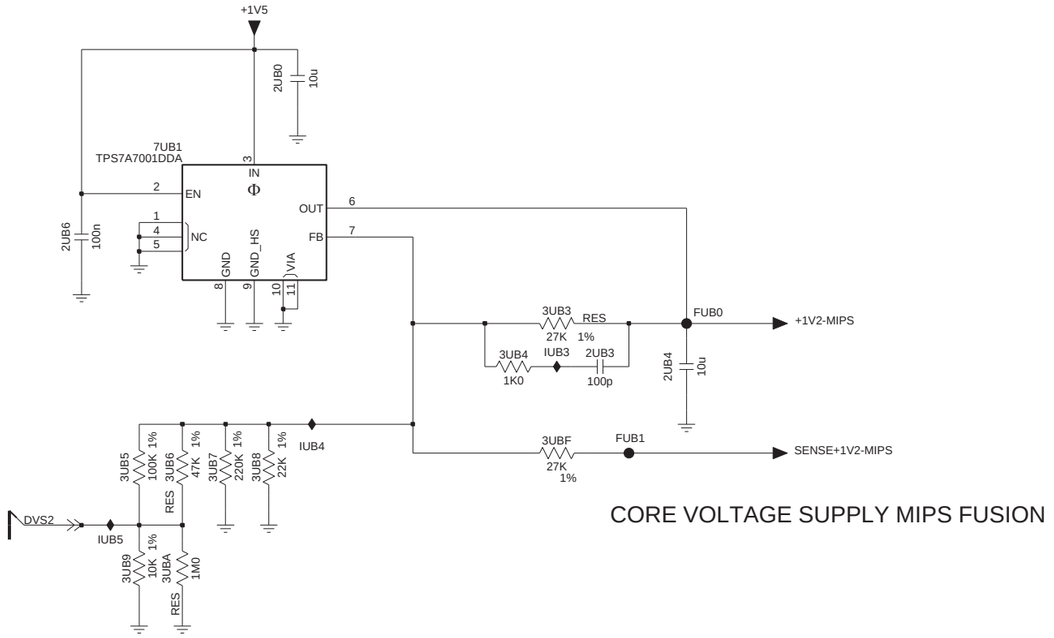
Audio - video	3104 313 6618	6 2013-01-11 5 2012-11-08

19370_104_130222.eps
130222

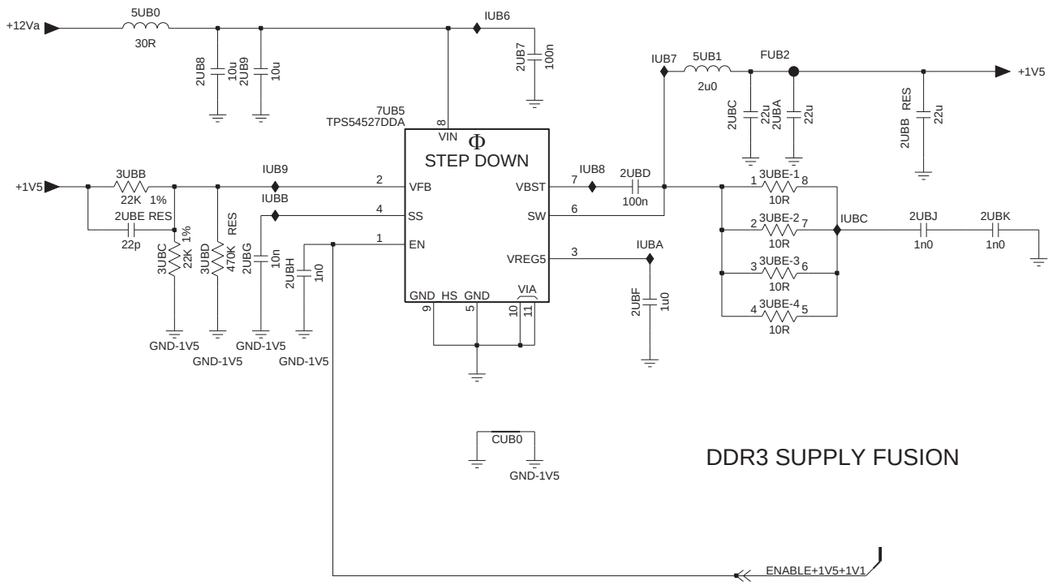
10-3-21 B04F, Fusion supply

B04F Fusion supply

B04F



CORE VOLTAGE SUPPLY MIPS FUSION



DDR3 SUPPLY FUSION

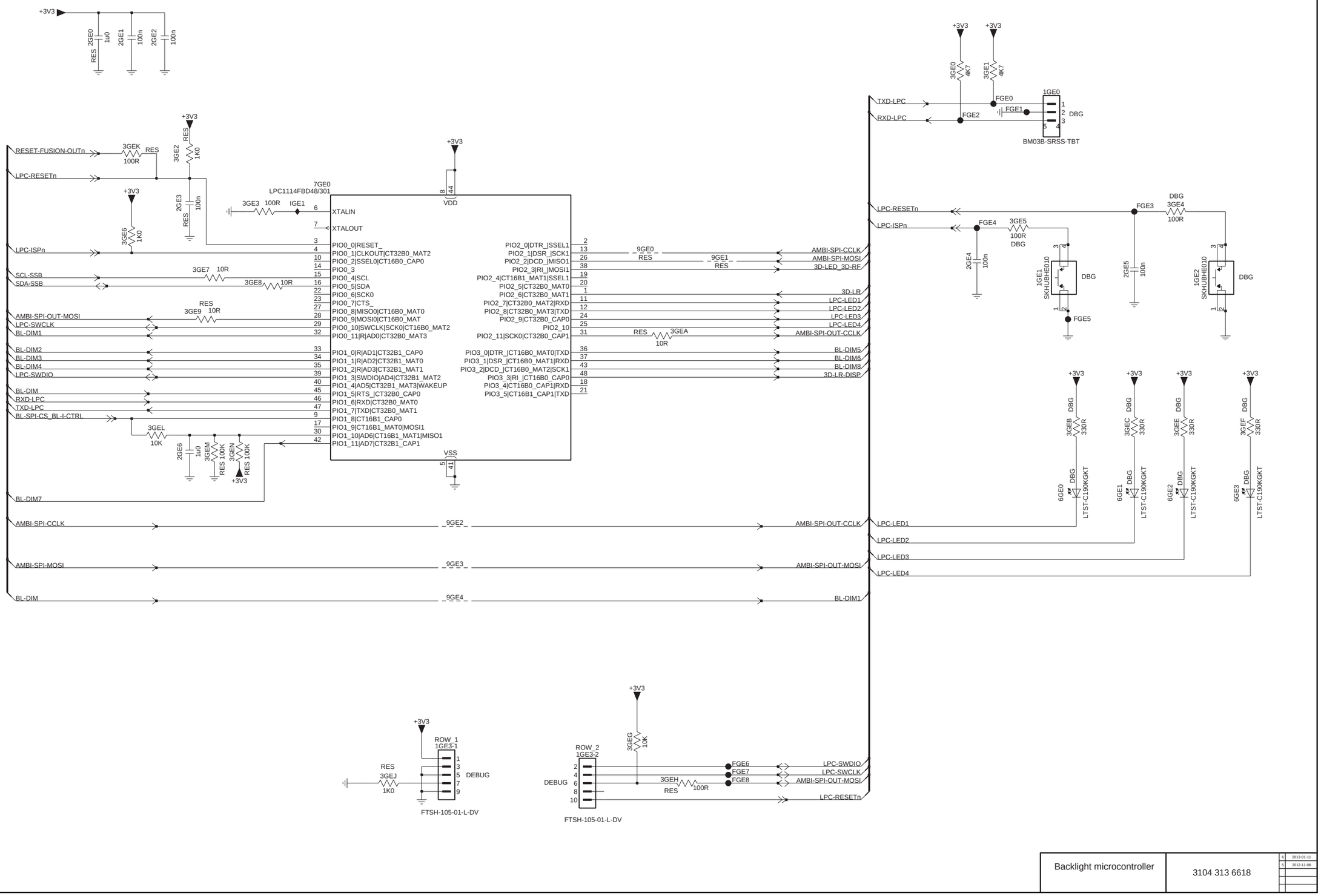
Fusion supply	3104 313 6618	6 2012-11-08 5 2013-01-11

19370_105_130222.eps
130222

10-3-22 B04G, Backlight microcontroller

B04G Backlight microcontroller

B04G

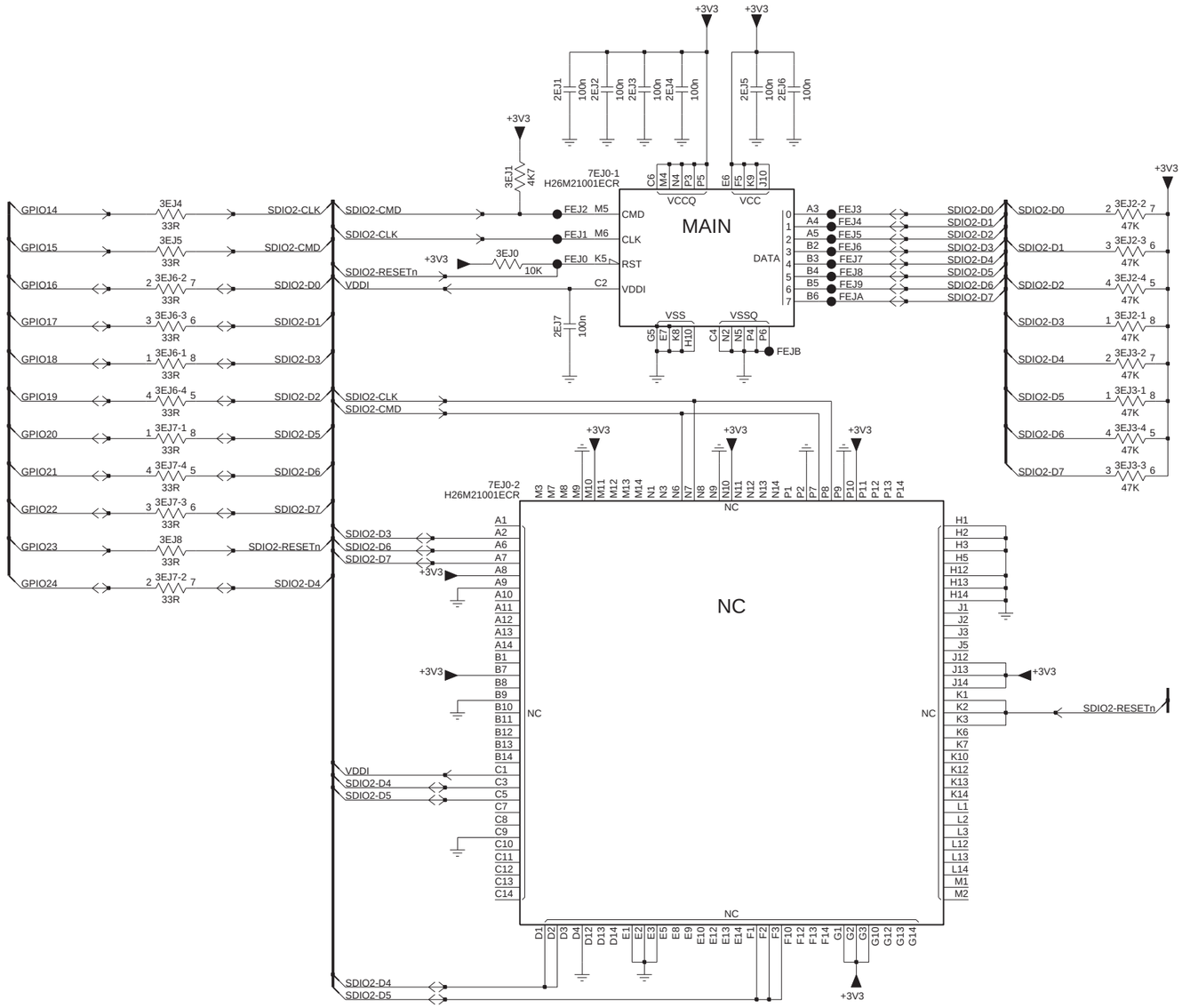


Backlight microcontroller	3104 313 6618	6 2013-01-11 5 2012-11-08

19370_106_130222.eps
130222

B04H eMMC

B04H



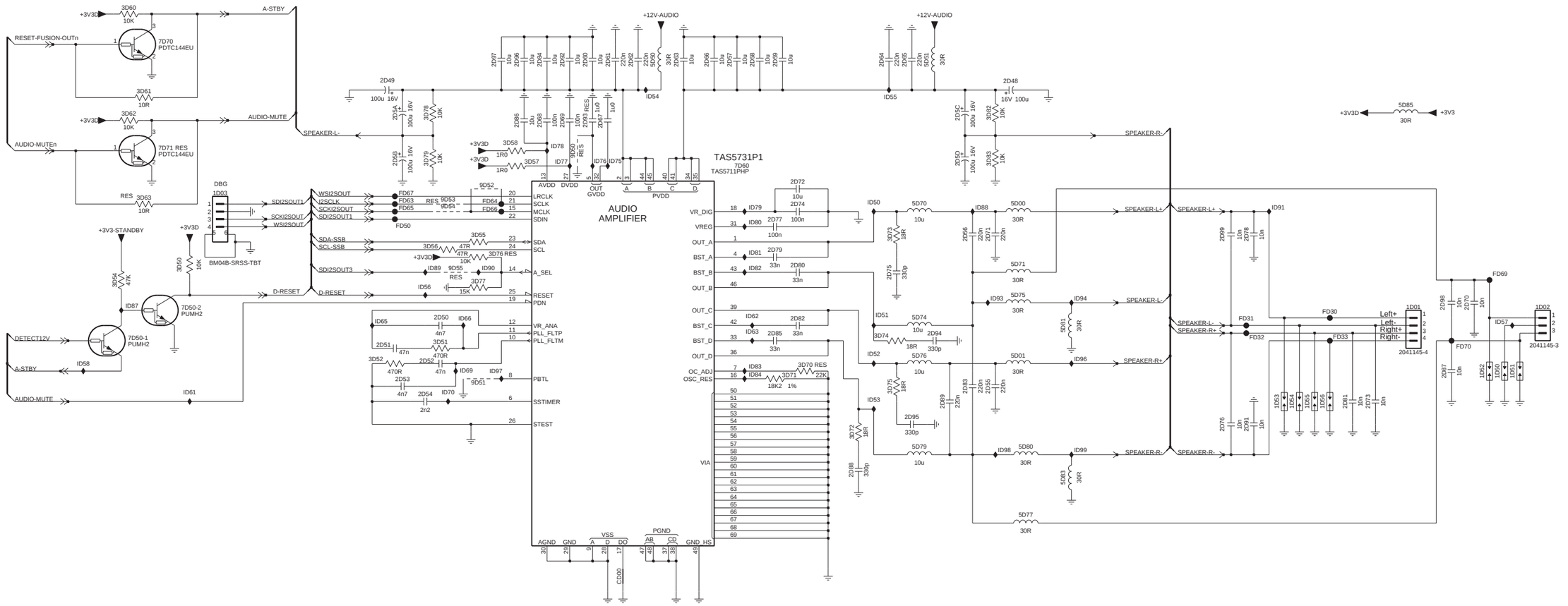
eMMC	3104 313 6618	6	2013-01-11
		5	2012-11-08

19370_107_130222.eps
130222

10-3-24 B05A, Class-D amplifier

B05A Class-D amplifier

B05A



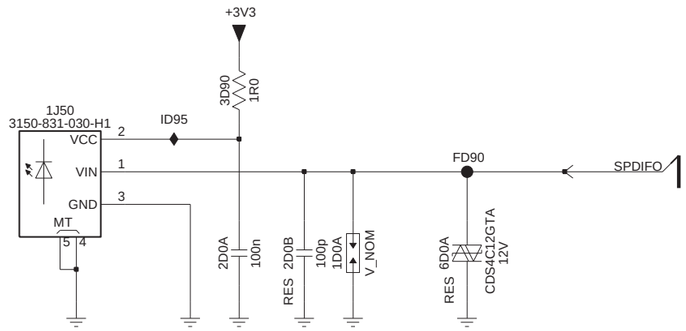
Class-D amplifier	3104 313 6618	6	2013-01-11
		5	2012-11-08

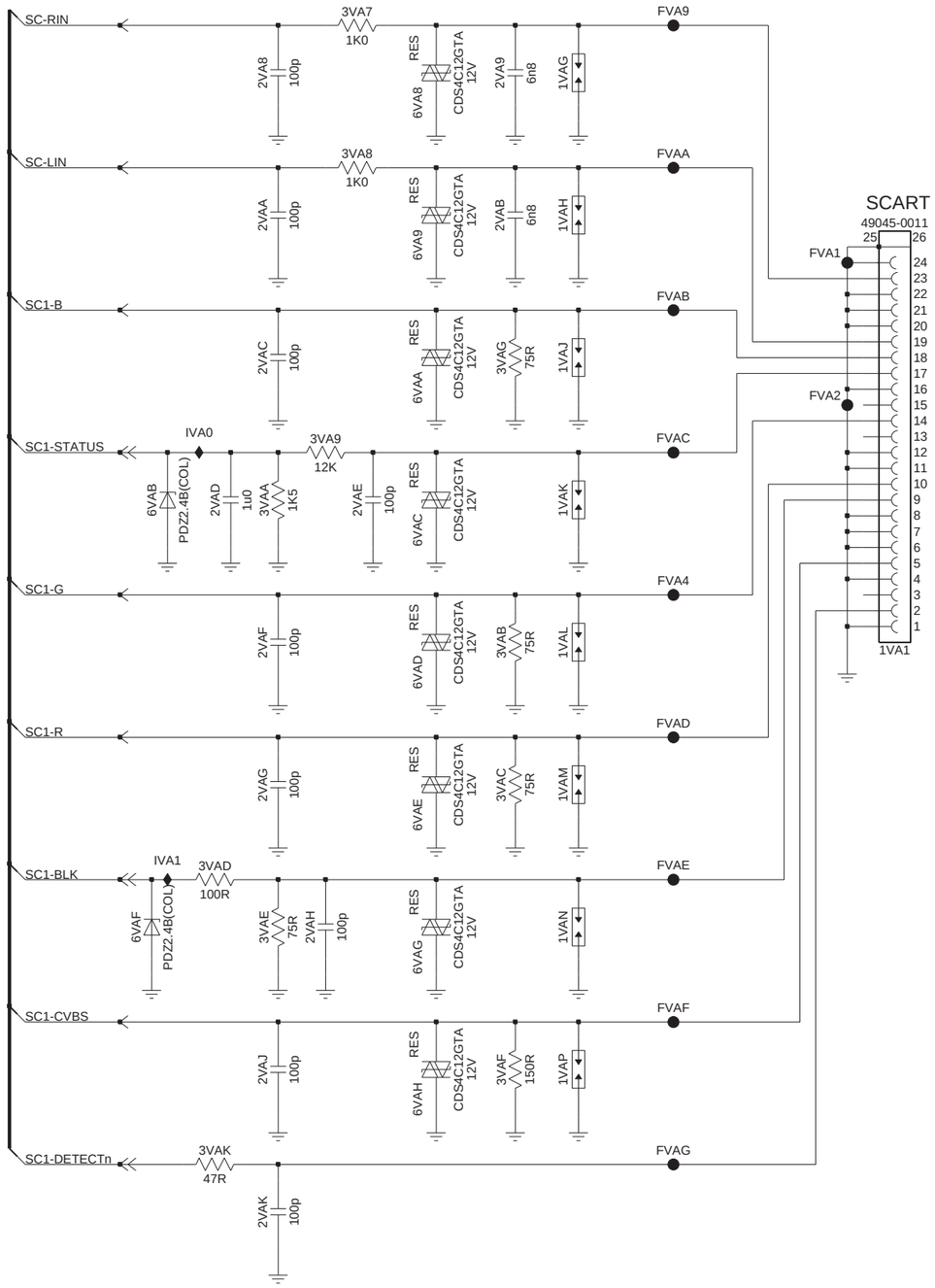
19370_108_130222.eps
130222

10-3-25 B05B, Analogue externals

B05B Analogue externals

B05B





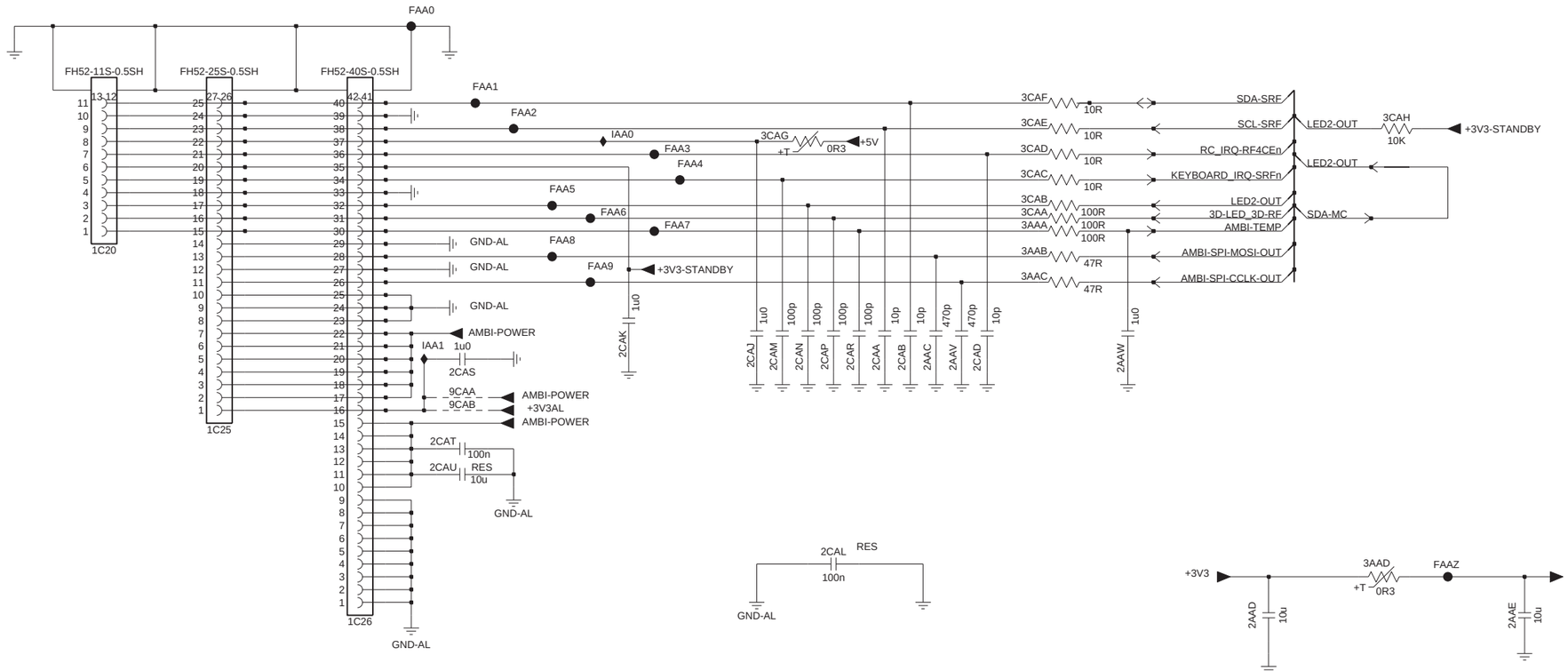
Analogue externals	3104 313 6618	6 2013-01-11 5 2012-11-08

19370_109_130222.eps
130222

10-3-26 B05C, Sensor board and AmbiLight

B05C Sensor board and AmbiLight

B05C



B05C

Sensor board and AmbiLight	3104 313 6618	6 2013-01-11 5 2012-11-08

19370_110_130222.eps
130222

B06A HDMI

B06A

HDMI CONNECTOR 4

HDMI CONNECTOR 3

HDMI CONNECTOR 2

HDMI CONNECTOR 1

I2C ADDRESS
SII9287B=OXB2

pins (9,27,64)

pin (38)

pin (49)

1V2 DVB-T2 and DVB-S2

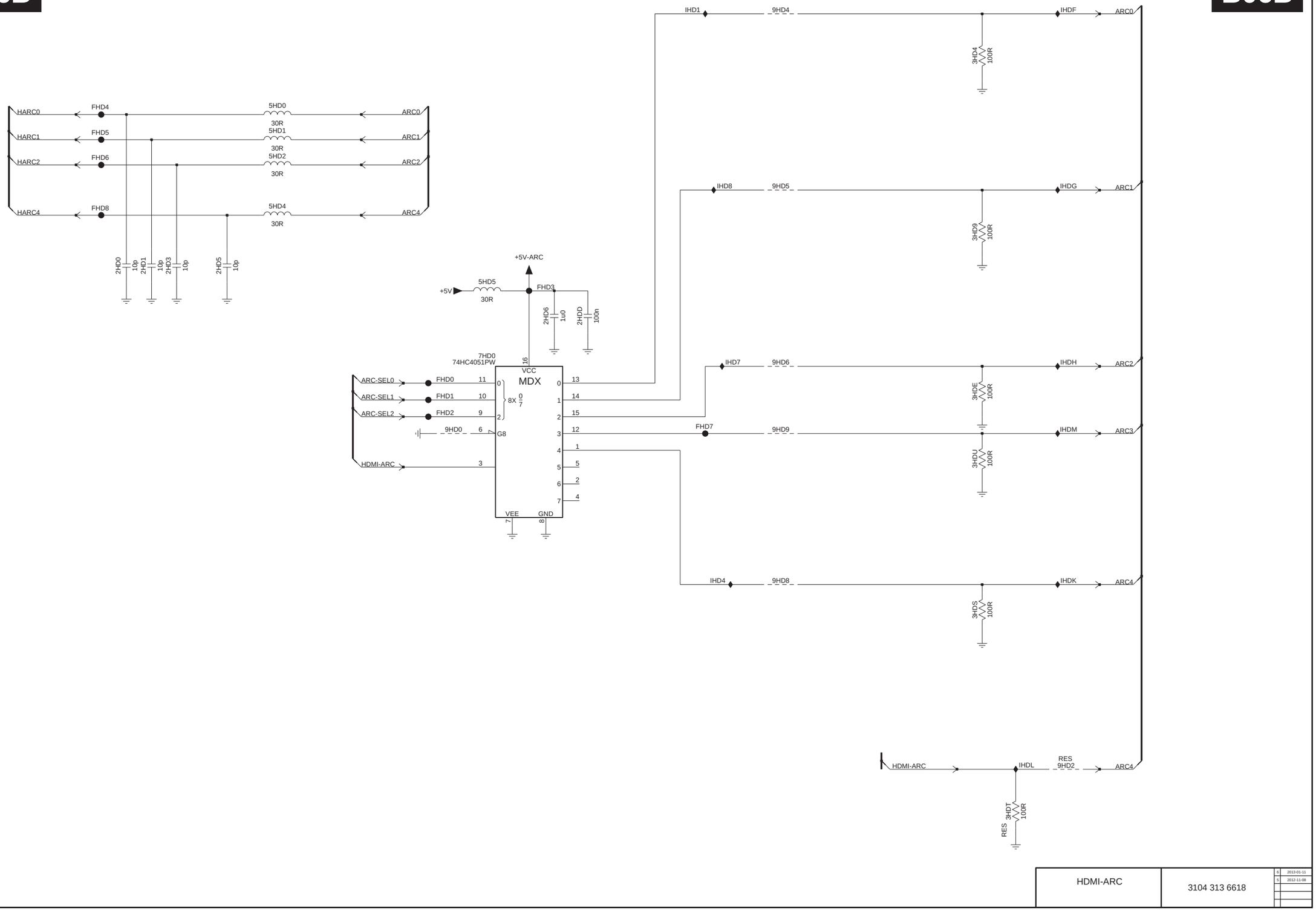
HDMI	3104 313 6618	6 2013-01-11 5 2012-11-08

19370_111_130222.eps
130222

10-3-28 B06B, HDMI-ARC

B06B HDMI-ARC

B06B



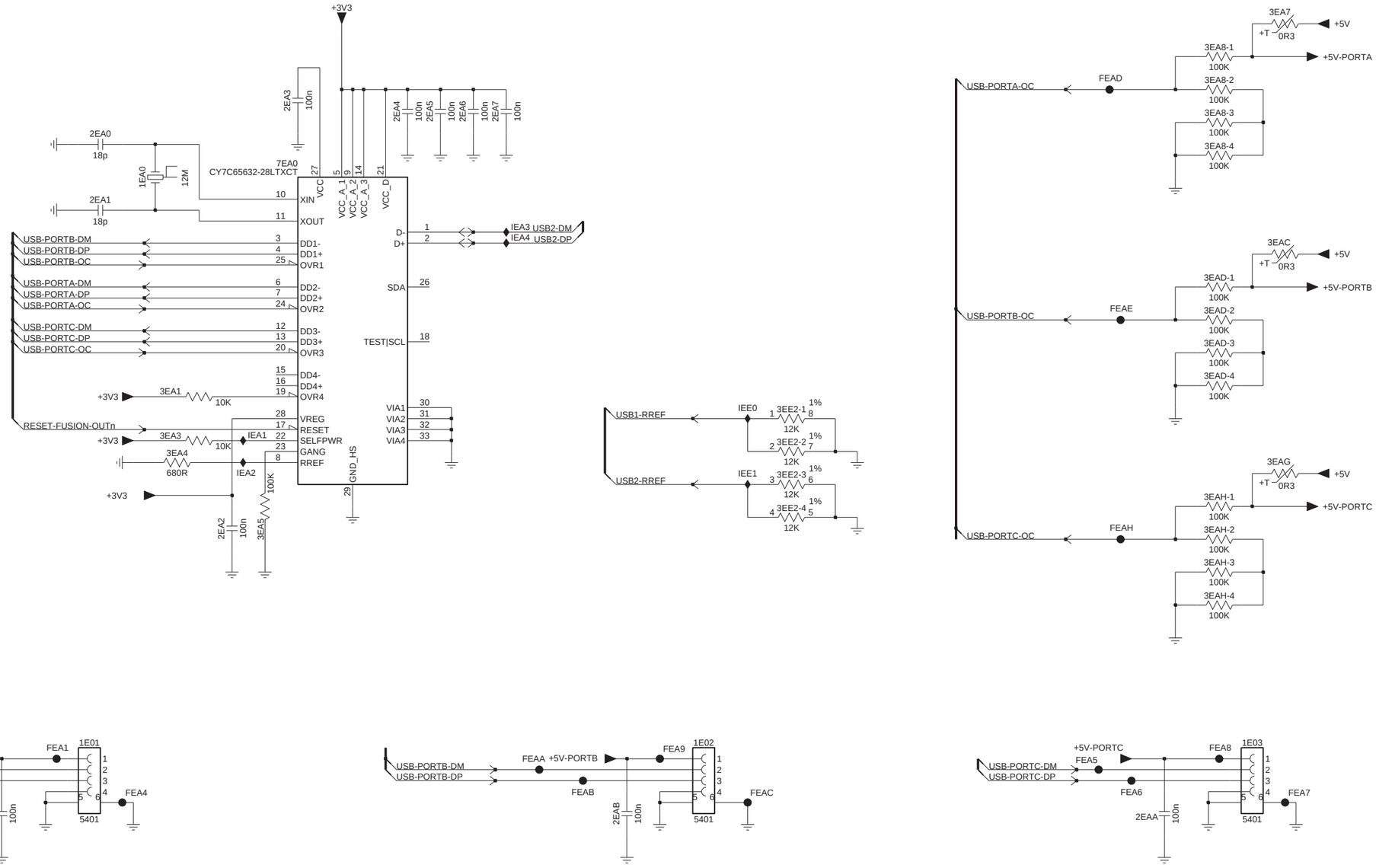
HDMI-ARC	3104 313 6618	6 2013-01-11 5 2012-11-08

19370_112_130222.eps
130222

10-3-29 B06C, USB external

B06C USB external

B06C



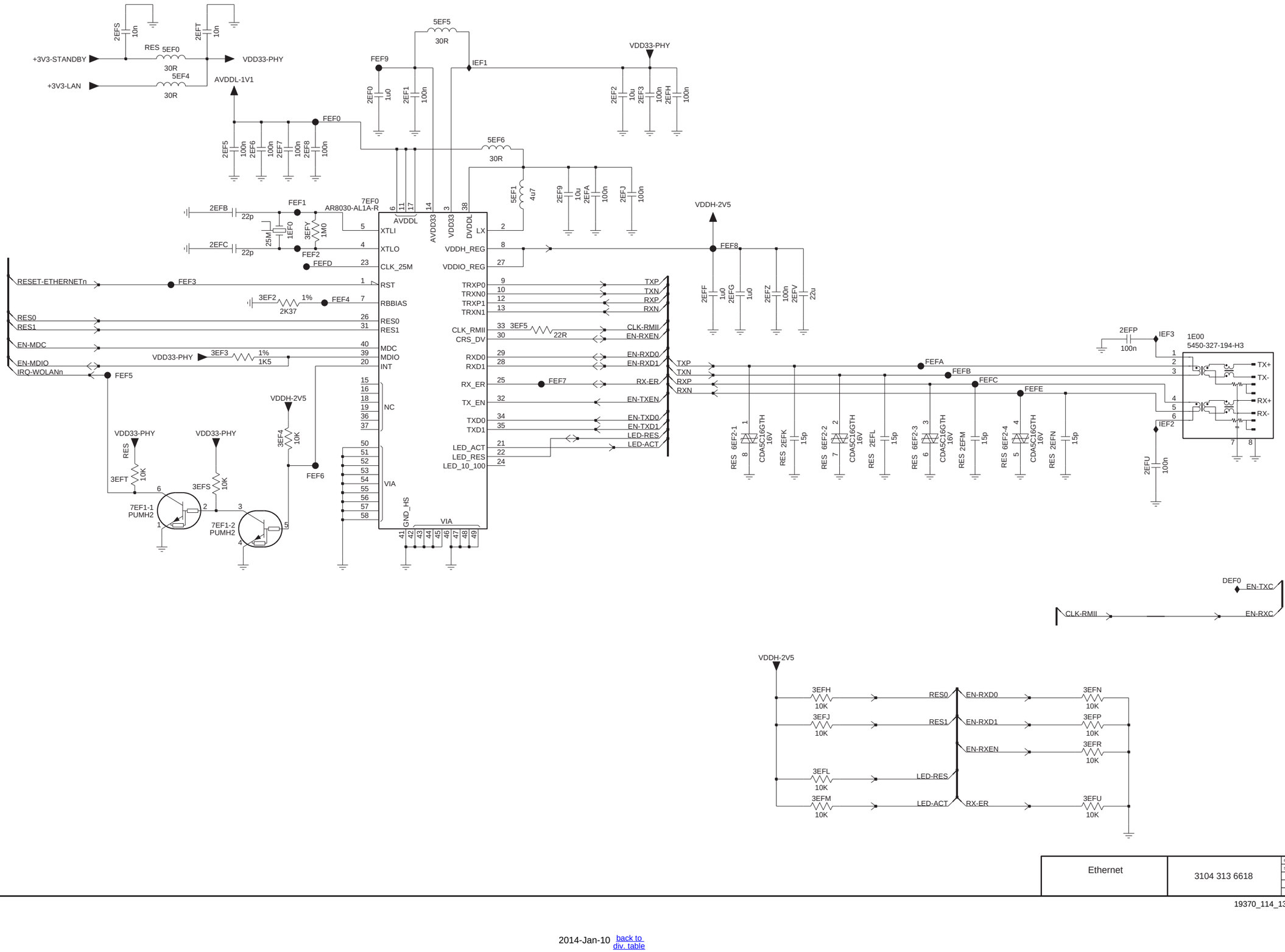
USB external	3104 313 6618	6 2013-01-11 5 2012-11-08

19370_113_130222.eps
130222

10-3-30 B06D, Ethernet

B06D Ethernet

B06D



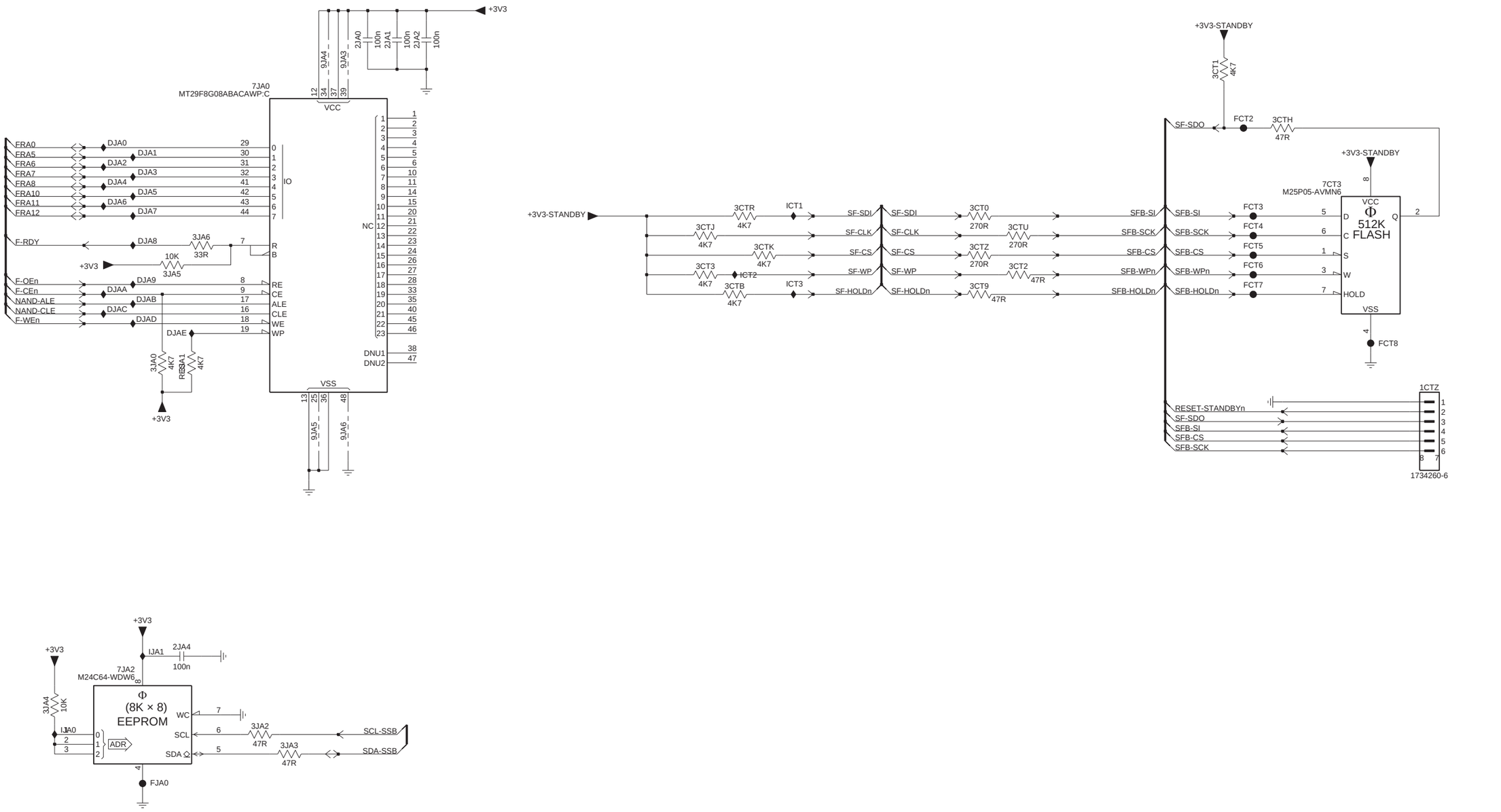
Ethernet	3104 313 6618	6	2013-01-11
		5	2012-11-08

19370_114_130222.eps
130222

10-3-31 B06E, NAND flash, serial flash and EEPROM

B06E NAND flash, serial flash and EEPROM

B06E



B06E

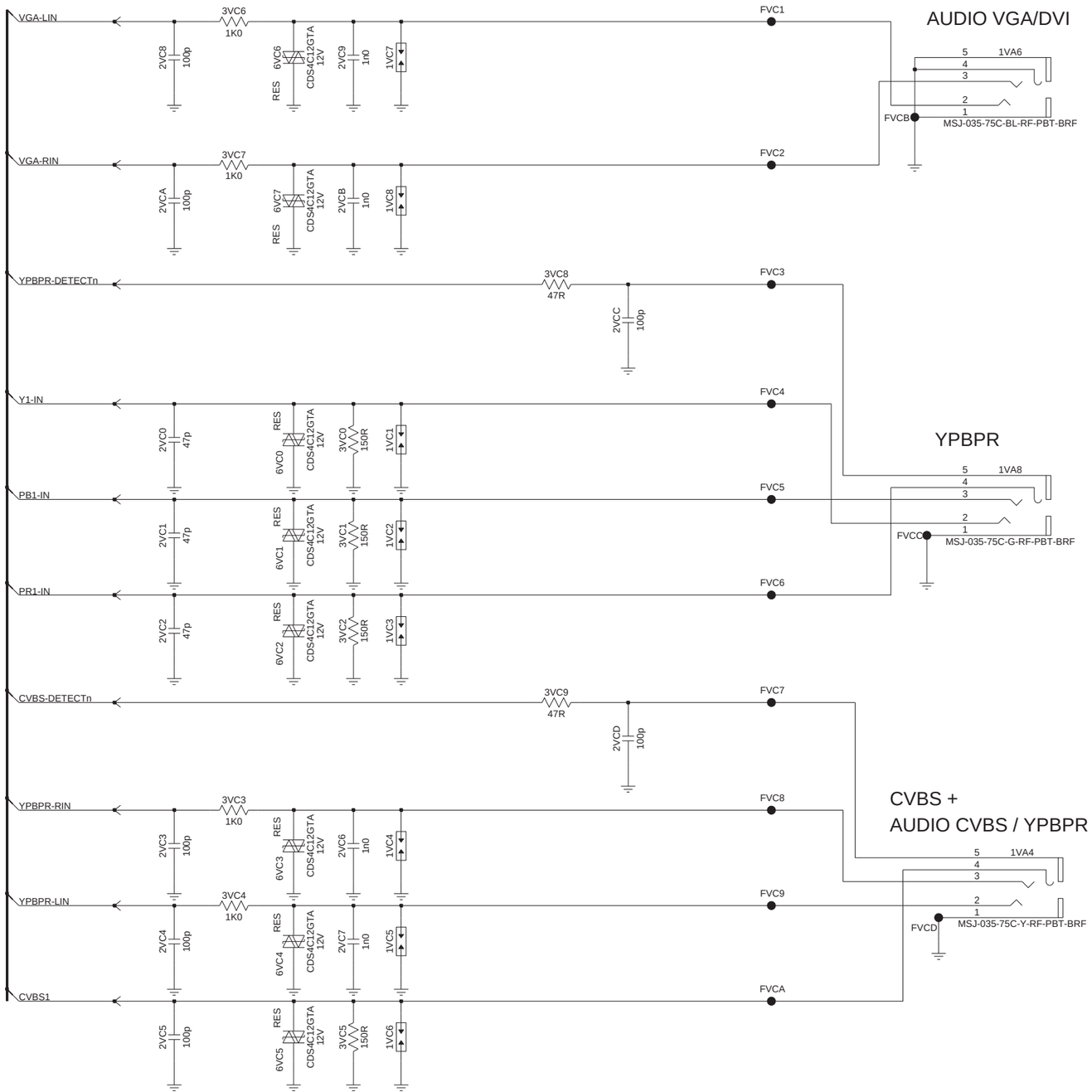
NAND flash, serial flash and EEPROM	3104 313 6618	6 2013-01-11 5 2012-11-08

19370_115_130222.eps
130222

10-3-32 B06F, Analogue externals

B06F Analogue externals

B06F

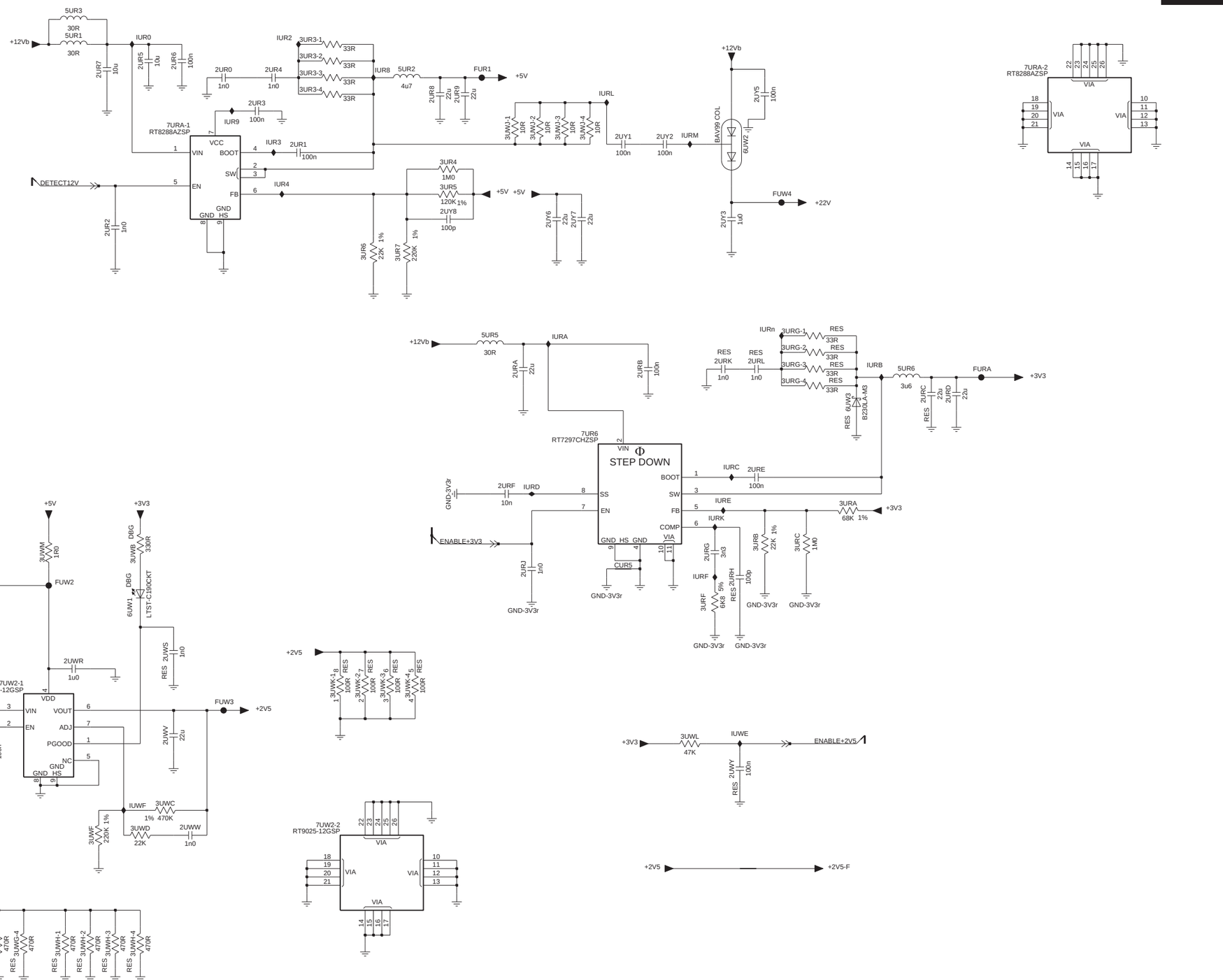


Analogue externals	3104 313 6618	6 2013-01-11 5 2012-11-08

19370_116_130222.eps
130222

B06G DC-DC

B06G



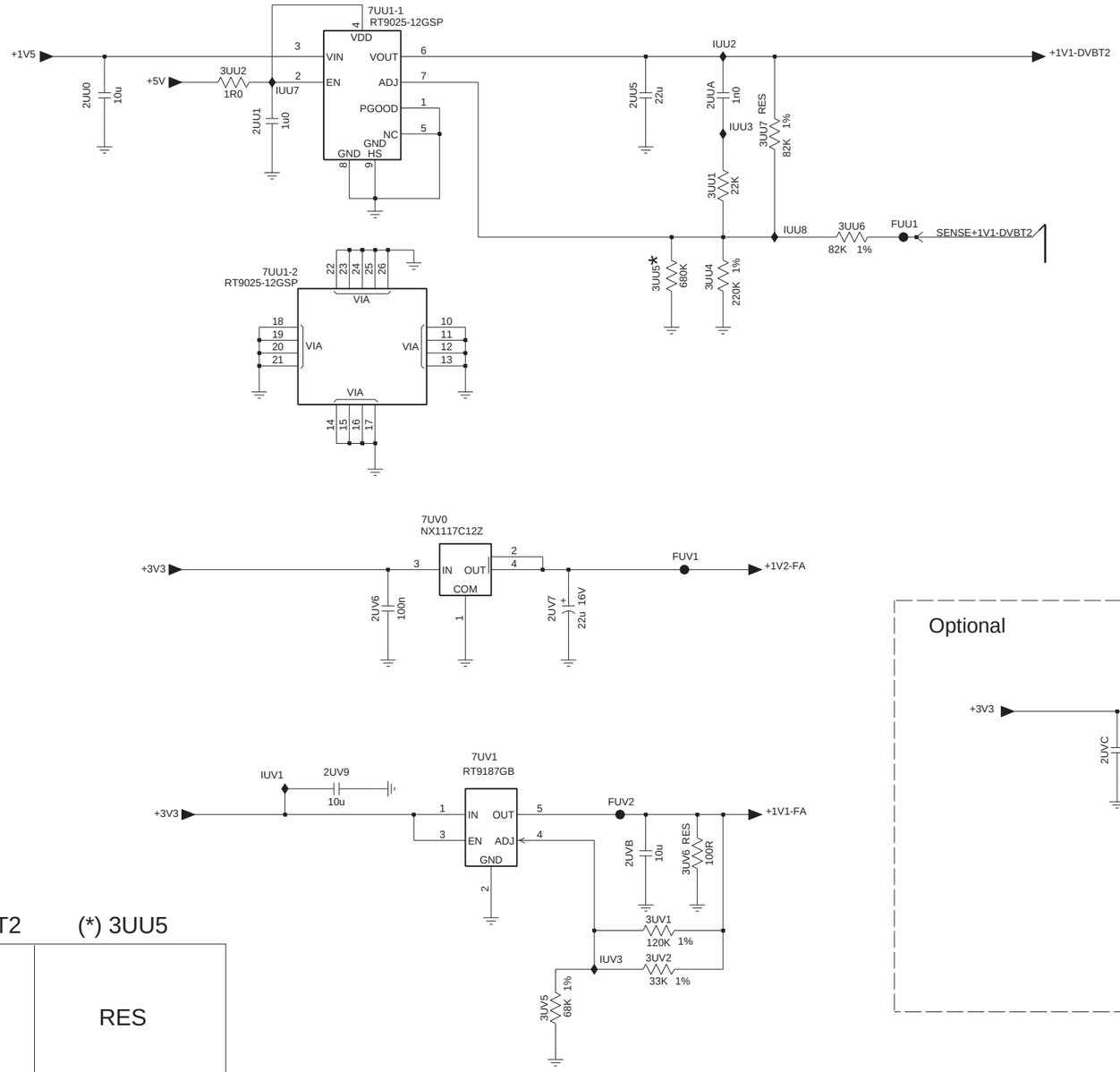
DC-DC	3104 313 6618	6 2013-01-11 5 2012-11-08

19370_117_130222.eps
130222

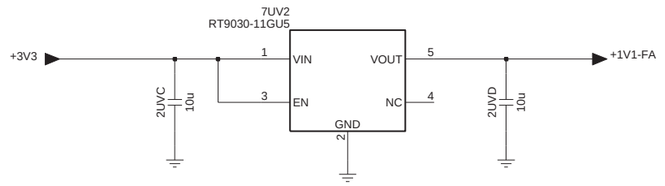
10-3-34 B06H, DC-DC

B06H DC-DC

B06H



Optional



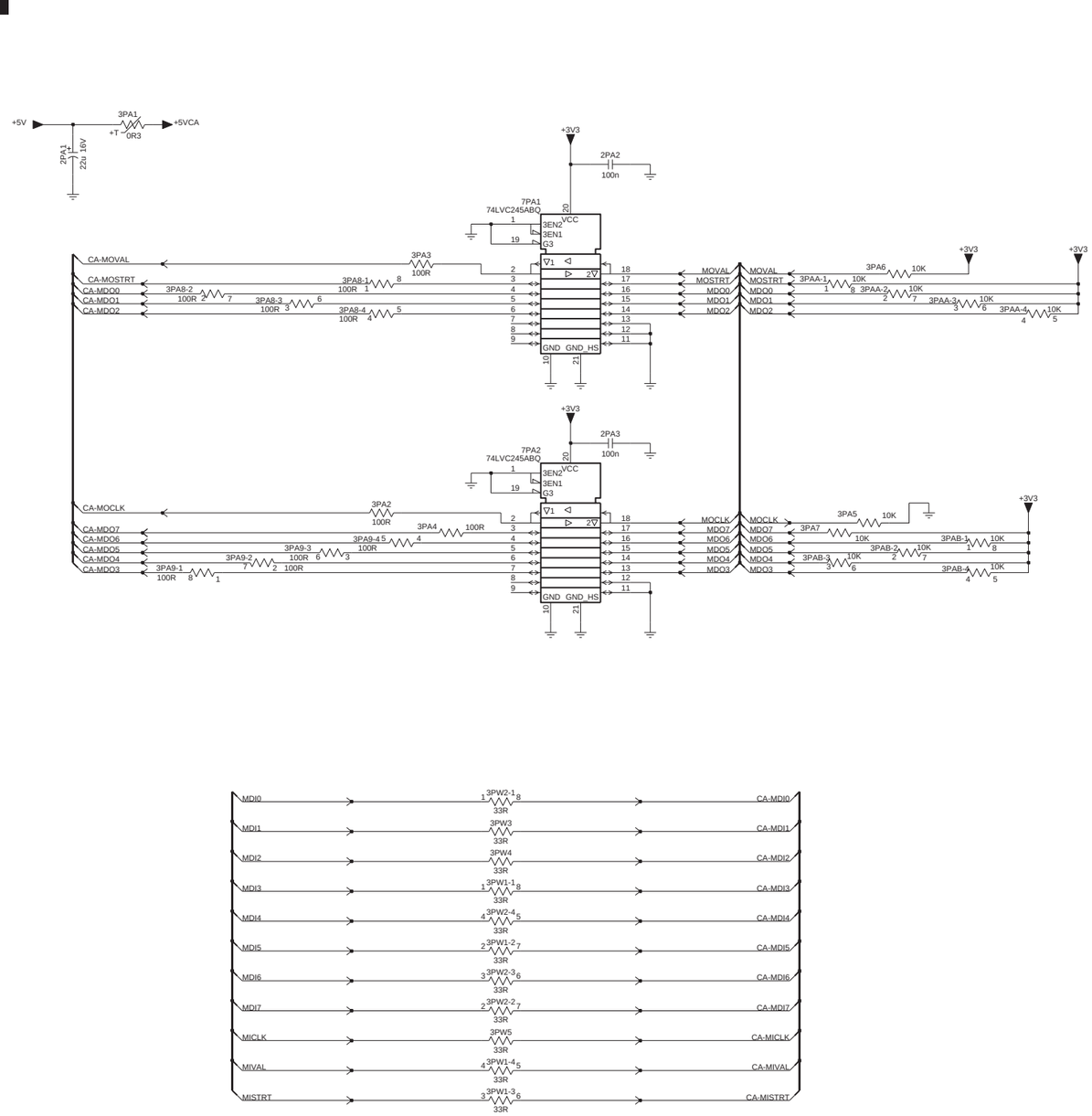
+1V1-DVBT2	(*) 3UU5
1.10 V	RES
1.20 V	680 kΩ

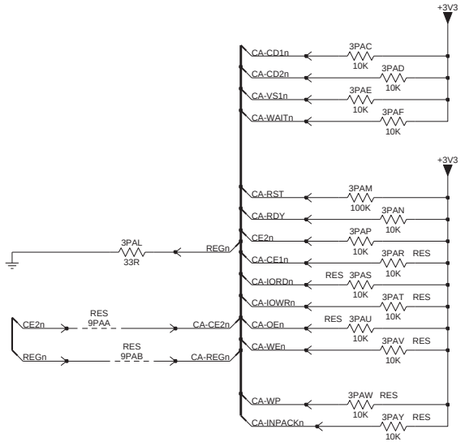
DC-DC	3104 313 6618	5 2012-11-08 6 2013-01-11

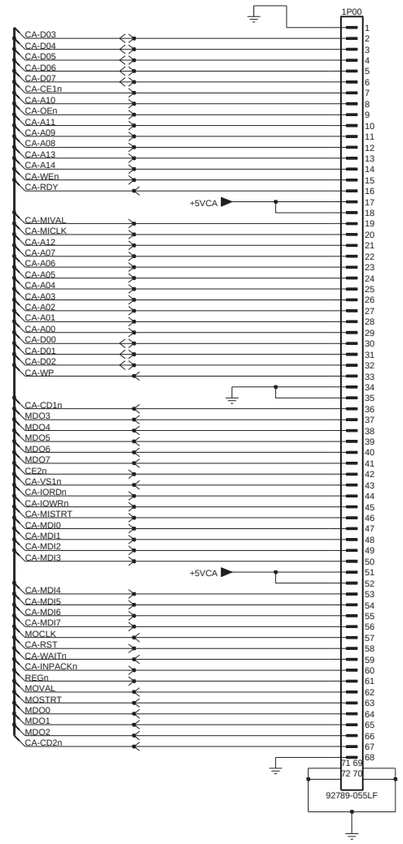
19370_118_130222.eps
130222

10-3-35 B06I, CI conditional access

B06I CI conditional access





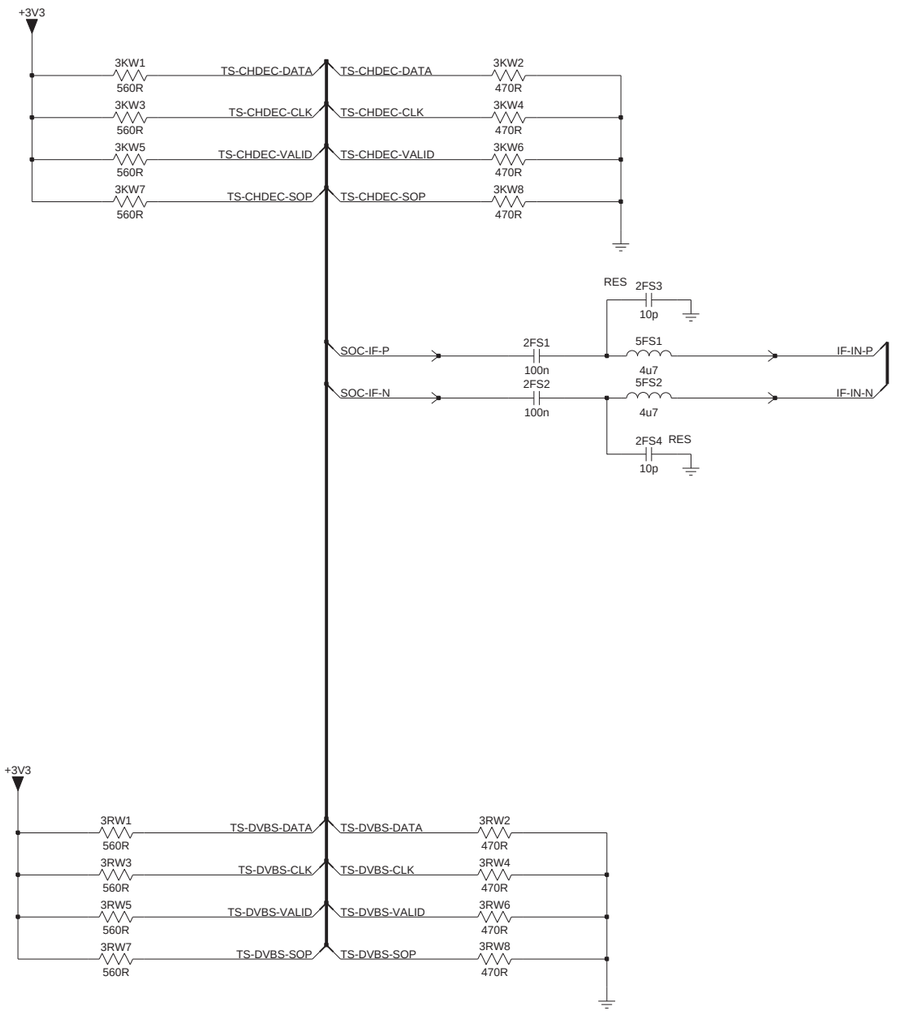


CI conditional access	3104 313 6618	6 2013-01-11 5 2012-11-08

19370_119_130222.eps
130222

B06J FE

B06J



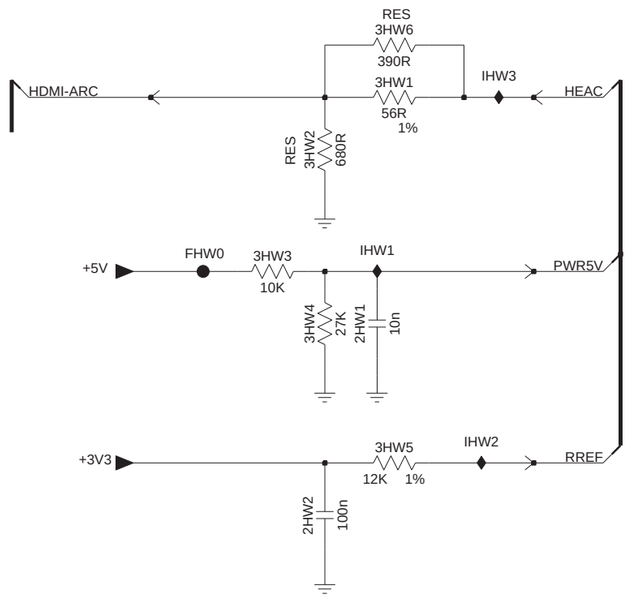
FE	3104 313 6618	6 2013-01-11 5 2012-11-08

19370_120_130222.eps
130222

10-3-37 B06K, HDMI

B06K HDMI

B06K



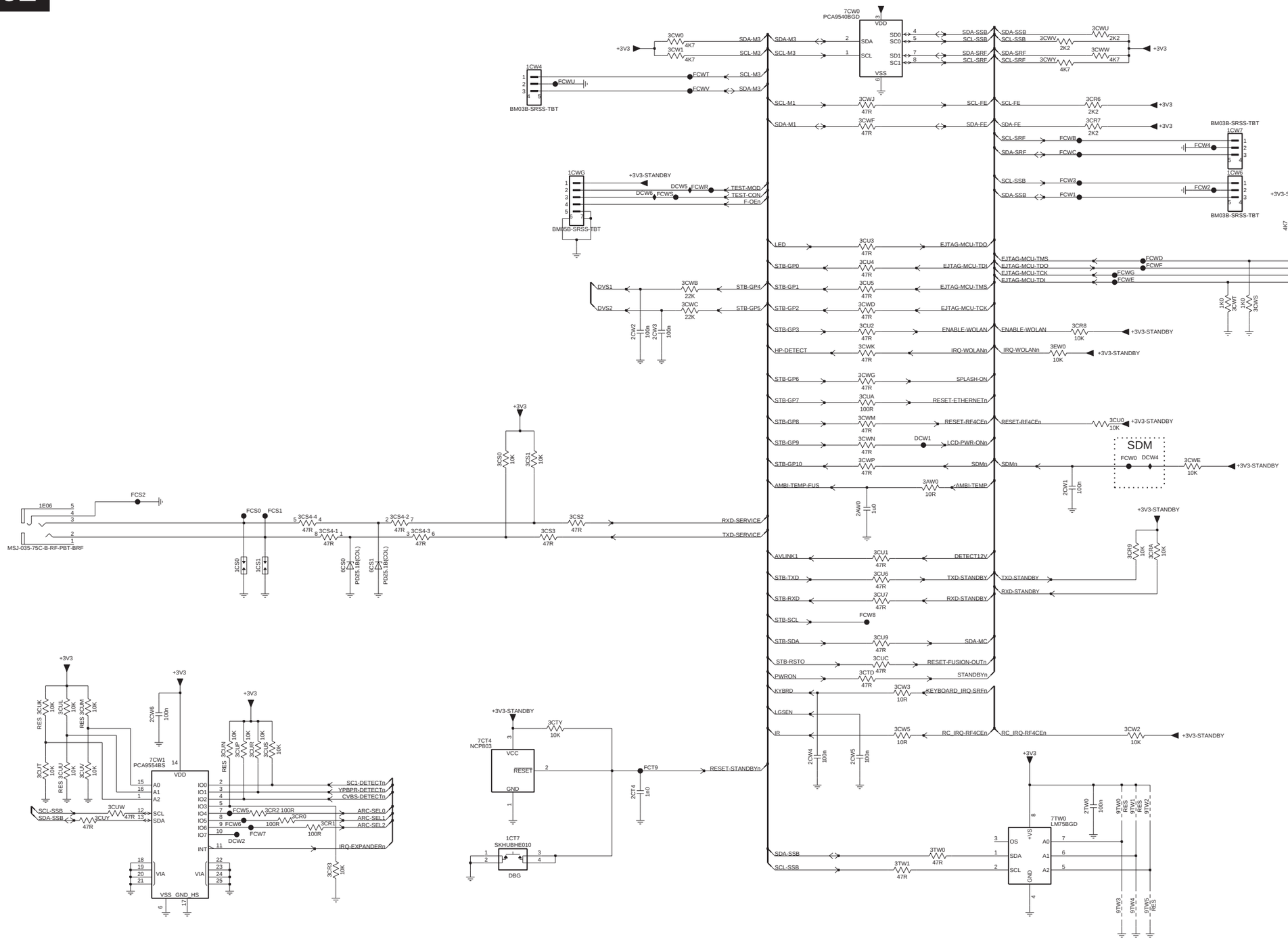
HDMI	3104 313 6618	6 2013-01-11 5 2012-11-08

19370_121_130222.eps
130222

10-3-38 B06L, Control, temperature sensor and service

B06L Control, temperature sensor and service

B06L



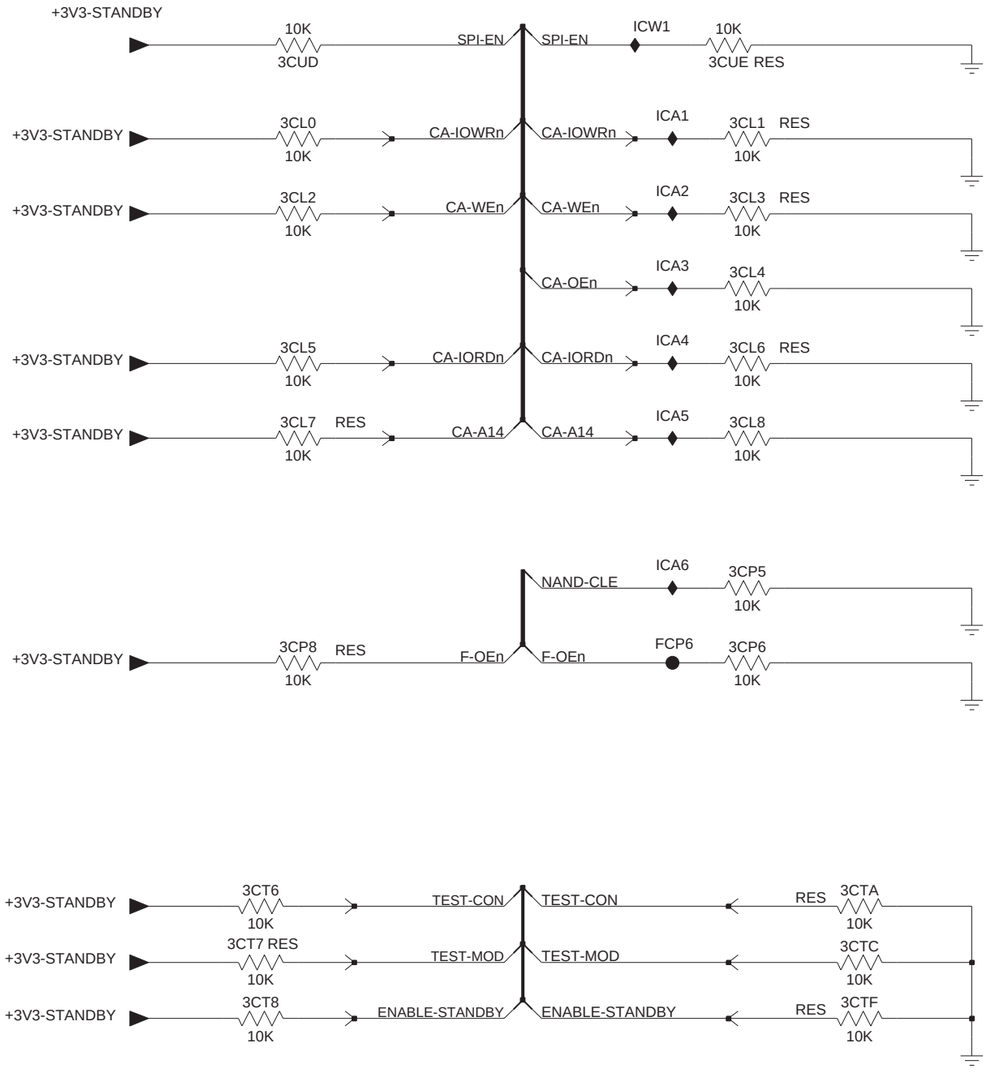
Control, temperature sensor and service	3104 313 6618	6 2013-01-11 5 2012-11-08

19370_122_130222.eps
130222

10-3-39 B06M, Strap options

B06M Strap options

B06M



B06M

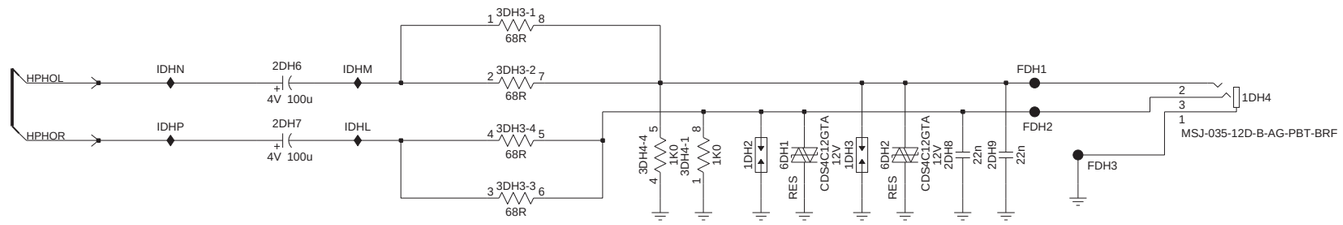
Strap options	3104 313 6618	6 2013-01-11 5 2012-11-06

19370_123_130222.eps
130222

10-3-40 B06N, Headphone

B06N Headphone

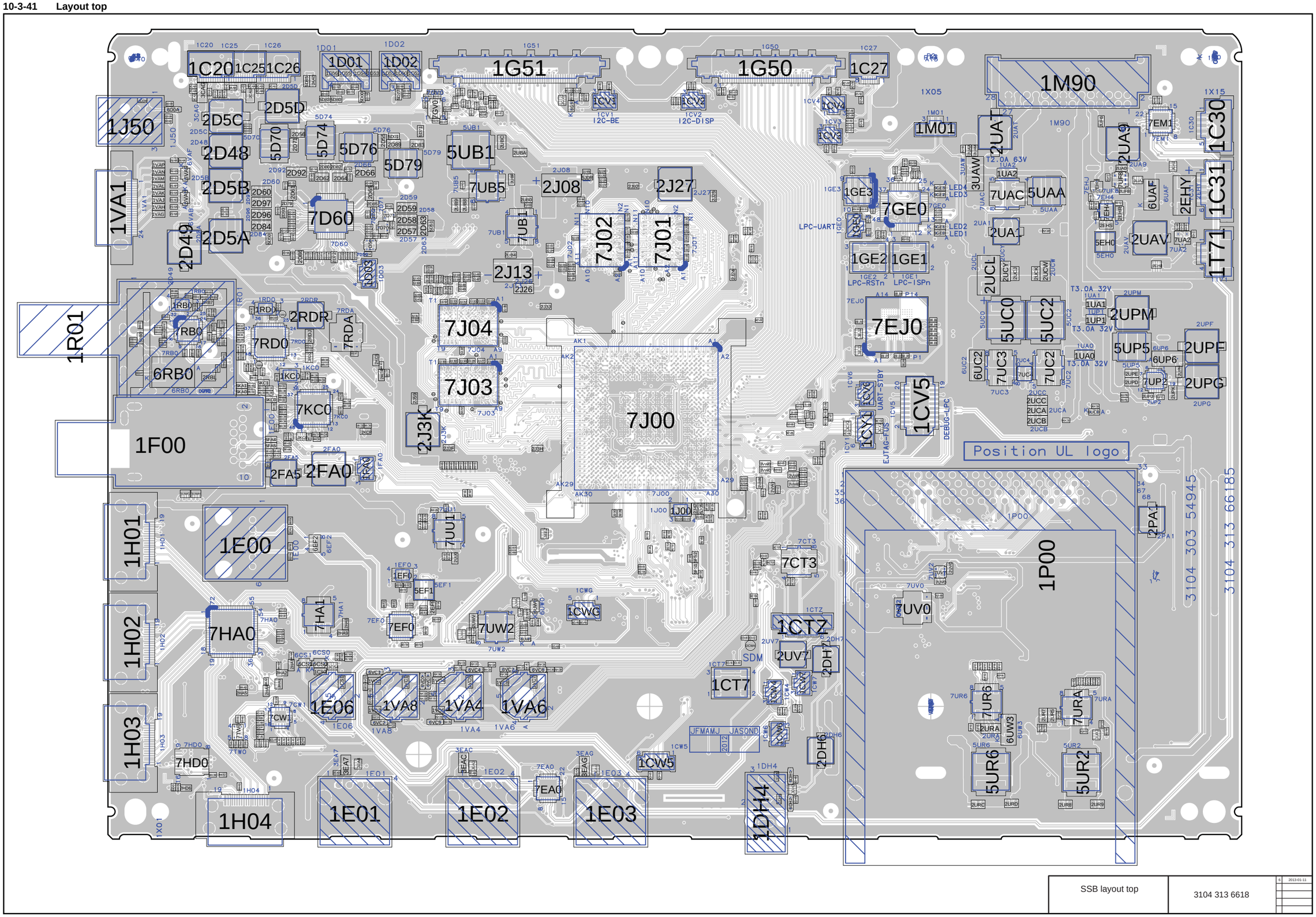
B06N



Headphone	3104 313 6618	6 2013-01-11 5 2012-11-08

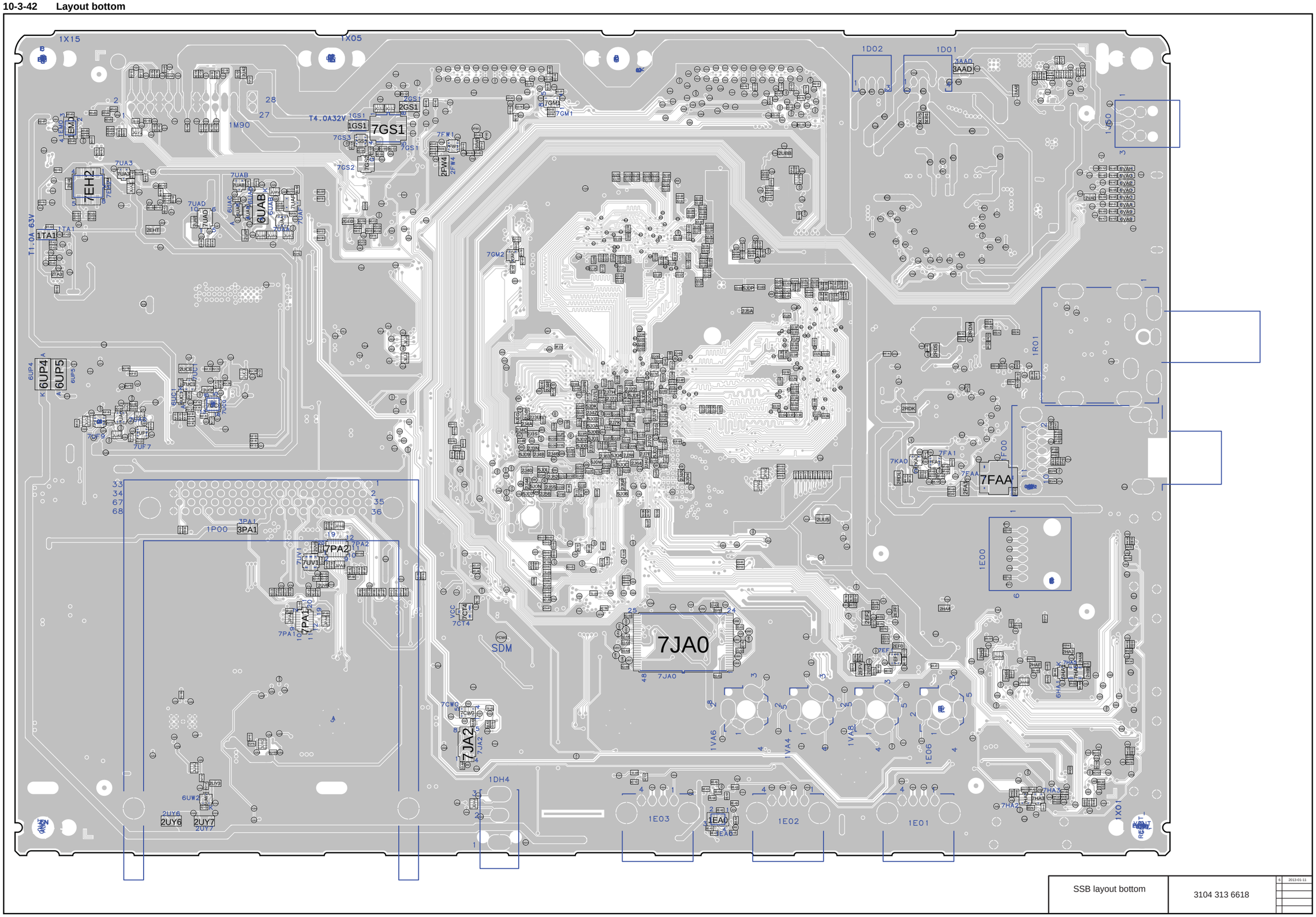
19370_124_130222.eps
130222

10-3-41 Layout top



19370_125_130226.eps
130226

10-3-42 Layout bottom



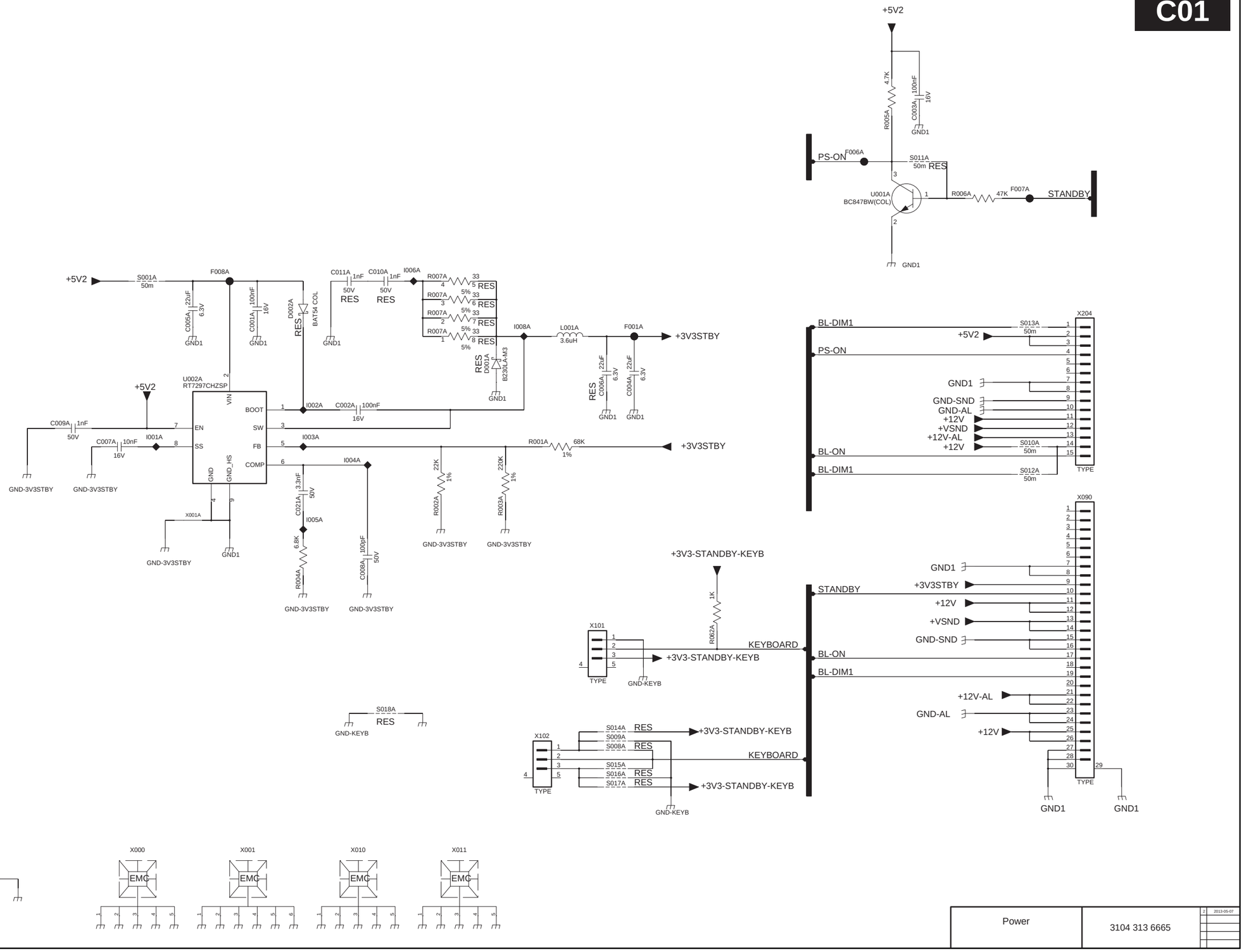
SSB layout bottom	3104 313 6618	6 2013-01-11

19370_126_130226.eps
130226

10.4 C 310431366652 Amplifier panel

10-4-1 Power

C01 Power



Power	3104 313 6665	2 2013-05-07

19374_006_131121.eps
131121

10-4-2 Amplifier

C02 Amplifier

C02

Master 500KC

Slave 500KC

Amplifier	3104 313 6665

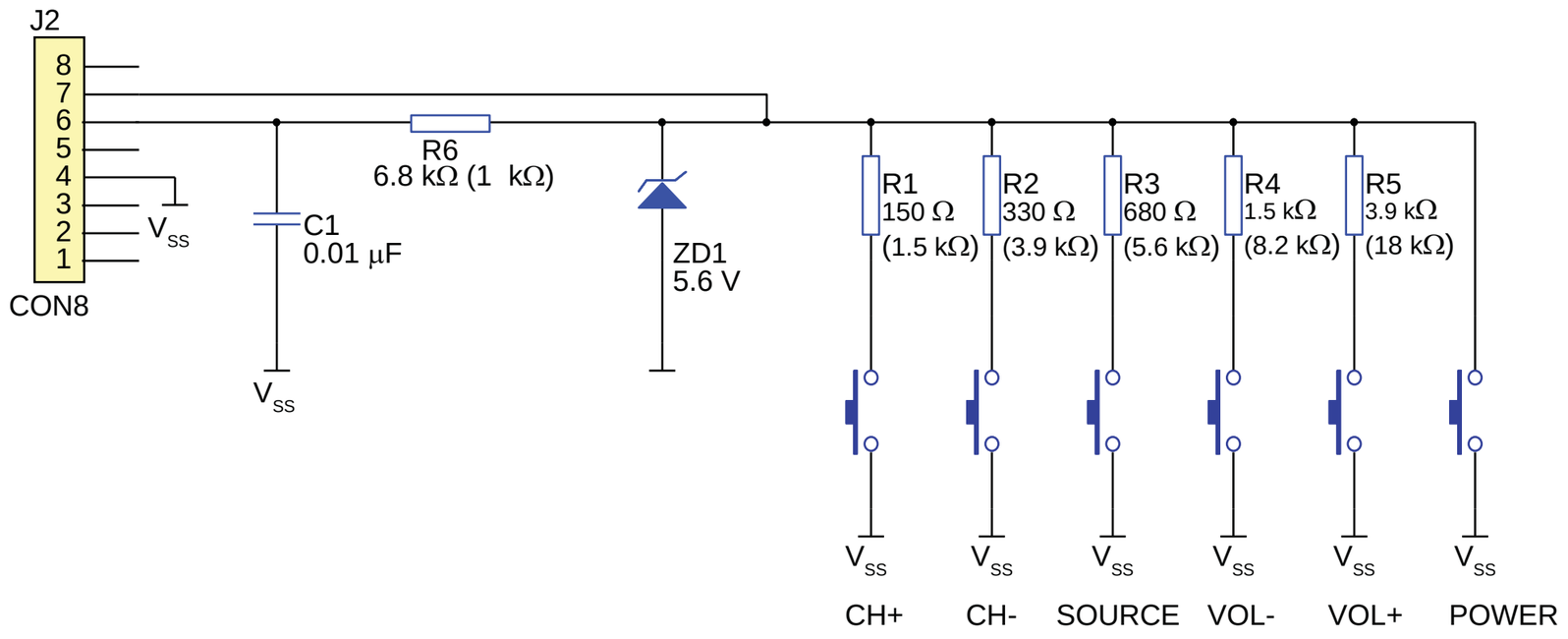
2 2013-05-07

19374_007_131121.eps
131121

10.5 272217190763, 272217190764, 272217190766 Keyboard Control Module

10-5-1 E, Keyboard Control Module

E Keyboard Control Module E



Keyboard Control Module	2722 171 90763 2722 171 90764 2722 171 90766	0.5 2012-09-27

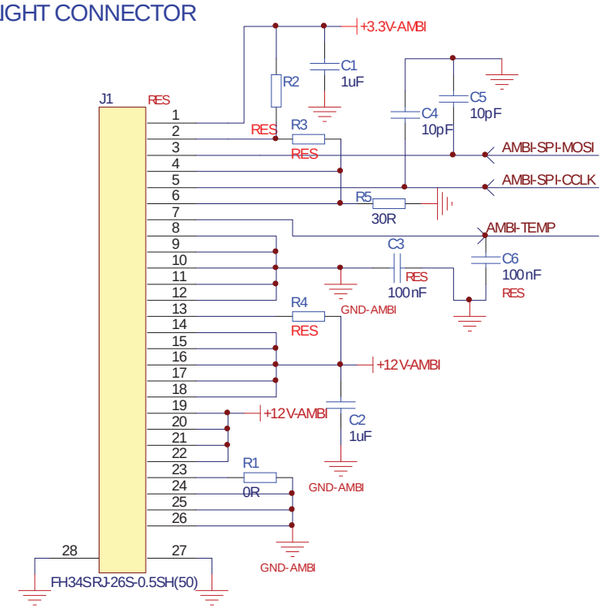
19370_044_130131.eps
130417

10.6 J 272217190804 QFHD sensor board

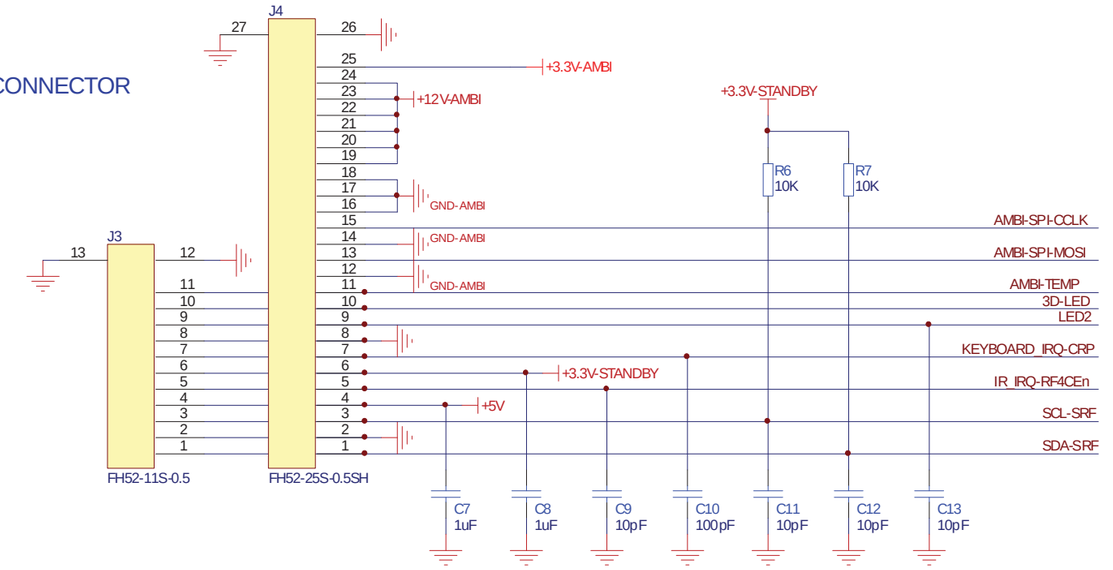
10-6-1 QFHD sensor board

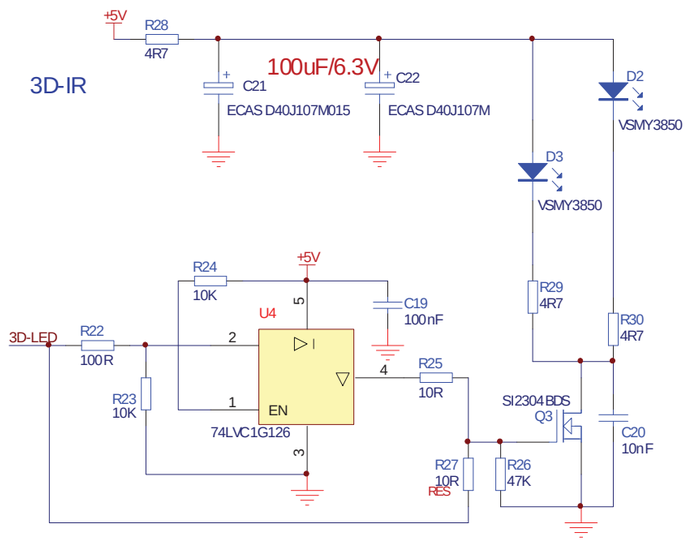
J QFHD sensor board J

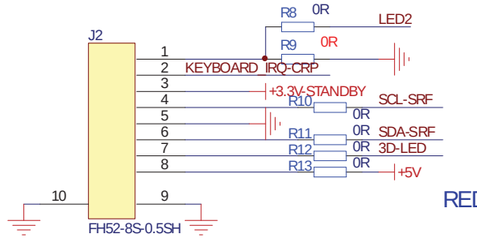
AMBILIGHT CONNECTOR



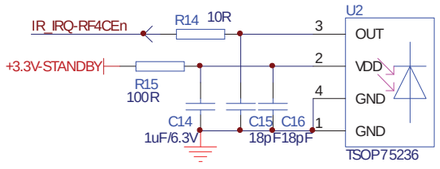
TV-CONNECTOR



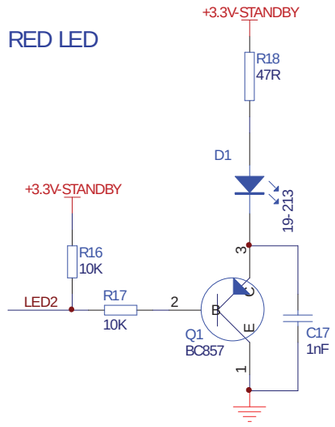




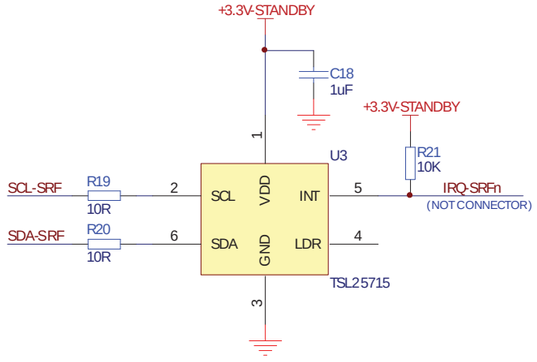
IR



RED LED



LIGHT SENSOR



QFHD sensor board	2722 171 90804	LB 2013-04-25

19374_008_131121.eps
131121

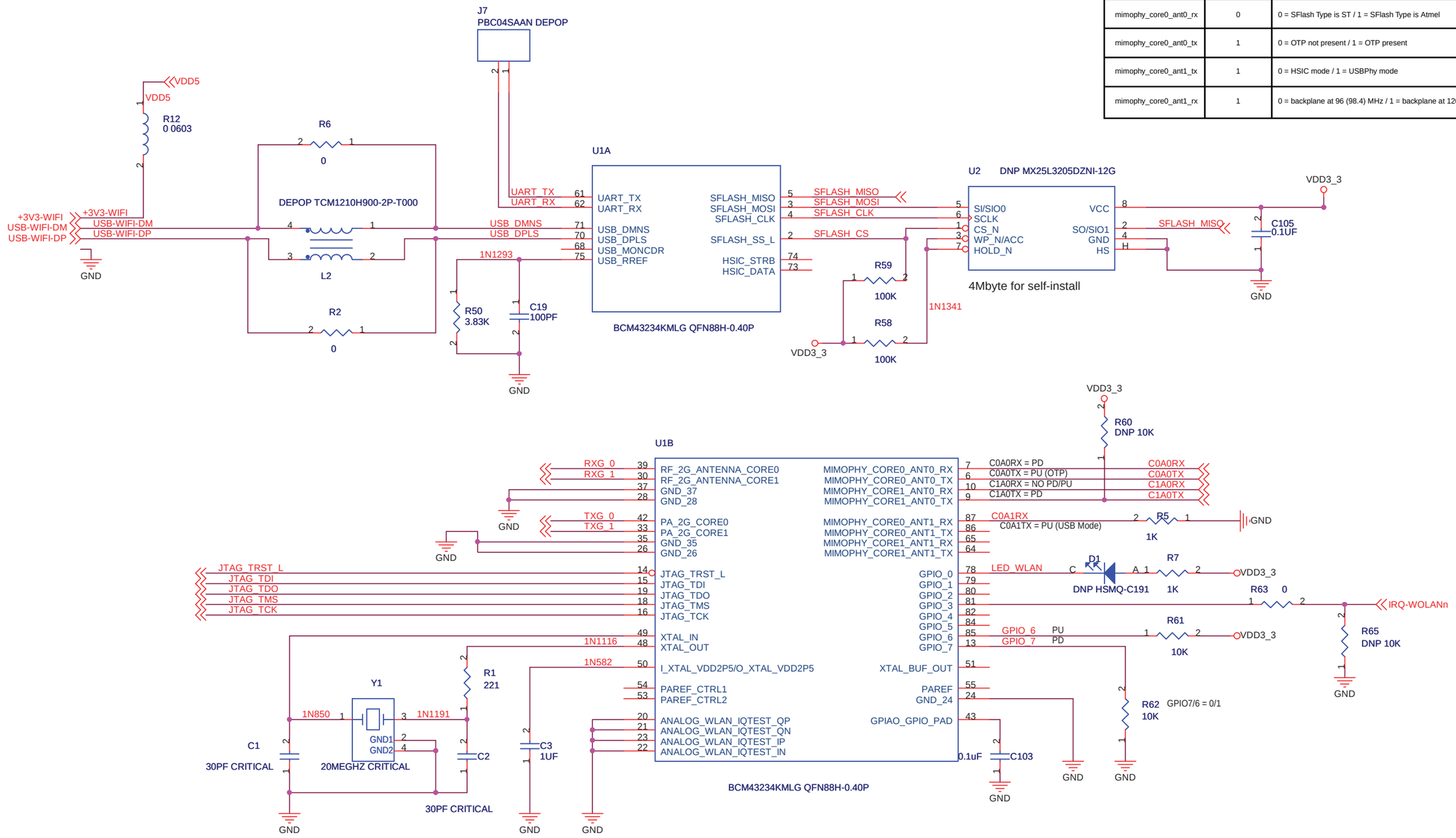
10.7 282206502664, 282206502665, 820400159661 Wireless LAN USB module, light sensor, IR/LED

10-7-1 J01, USB & control lines

J01 USB & control lines

J01

Pad	Chip default	Description
mimophy_core1_ant0_tx	0	0 = SFlash not present / 1 = SFlash present
mimophy_core0_ant0_rx	0	0 = SFlash Type is ST / 1 = SFlash Type is Atmel
mimophy_core0_ant0_tx	1	0 = OTP not present / 1 = OTP present
mimophy_core0_ant1_tx	1	0 = HSIC mode / 1 = USBPhy mode
mimophy_core0_ant1_rx	1	0 = backplane at 96 (98.4) MHz / 1 = backplane at 120 (123) MHz



Wireless LAN USB module, light sensor, IR/LED	2822 065 02664 2822 065 02665	P210 2012-07-24

19370_063_130204.eps
130204

10-7-2 J02, Connectors, LED

J02 Connectors, LED

J02

AMBILIGHT CONNECTOR

1A02 FH34SRJ-26S-0.5SH(50)

1A03 DNP FH34SRJ-18S-0.5SH

+3V3-AMBI, +12V-AMBI, GND-AMBI

9A01 0, 2A00 1u0, 4A00 DNP, 2A01 10p, 2A02 10p, 5A00 Bead 30ohm, 2A05 DNP 100n, 2A03 DNP 100n, 9000 0, 2A04 1u0, 9A02 0

AMBI-SPI-MOSI, AMBI-SPI-CCLK, AMBI-TEMP

WIFI CONNECTOR
Xinya S1315-06RVB-SB3-KH

S1315-06RVB-SB3-KH 1C31

TP9, TP10, TP11, TP12, +3V3-WIFI

USB-WIFI-DM, USB-WIFI-DP, IRQ-WOLANn, 3A17 10K

LED2, 9A12 DNP 0, 9A13 0

1C01 FH52-8S-0.5SH

KEYBOARD_IRQ-CRP, +3V3-STANDBY, 9A09 DNP 0 SCL-SRF, 9A10 DNP 0 SDA-SRF, 9A08 DNP 0 3D-LED, 9A11 DNP 0, +5V

Everlight 12-21/R6C-AR1S2B/2C
Liteon LTST-S321KRKT-PH

RED LED

+3V3-STANDBY, TP3, 3A04 47R, 3A16 47R, 3A05 10K, 6000, 6001, LTST-S321KRKT-PH

LED2, 3A06 10K, TP2, 7A01 BC857BW, 2A06 1n0, TP4, 7A02 DNP BC847BW, 3A07 DNP 10K

ANT1, 2A14 10p, 2A13 DNP 10p, 1A01 U.FL-R-SMT-1(10), 2A07 1.5p, 9A04 0, 2A17 DNP, AL1 2173487-1

ANT0, 2A12 10p, 2A11 DNP 10p, 1A00 U.FL-R-SMT-1(10), 2A08 1.5p, 9A06 0, 2A18 DNP, AR1 2173487-2

IR

+3V3-STANDBY, 3A12 100R, 2A09 1u0, 2A19 DNP 100p, 2A15 18p, 7003 TSOP75236 (VS, OUT, GND1, GND2)

IR_IRQ-RF4CEn, TP5, 3A13 10R, 2A16 18p, 2A20 DNP 100p

Wireless LAN USB module, light sensor, IR/LED	2822 065 02664 2822 065 02665	P210 2012-07-24

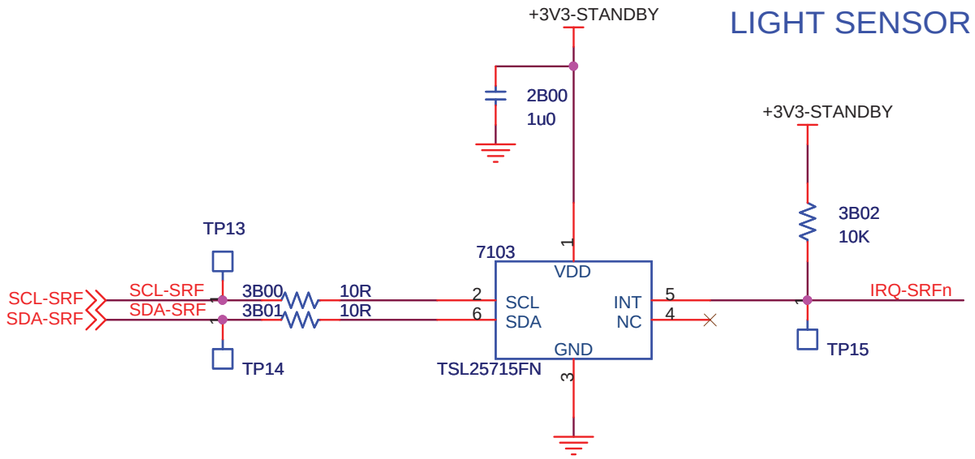
19370_064_130204.eps
130204

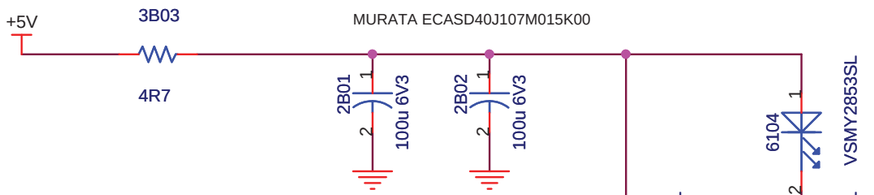
10-7-3 J03, Light sensor

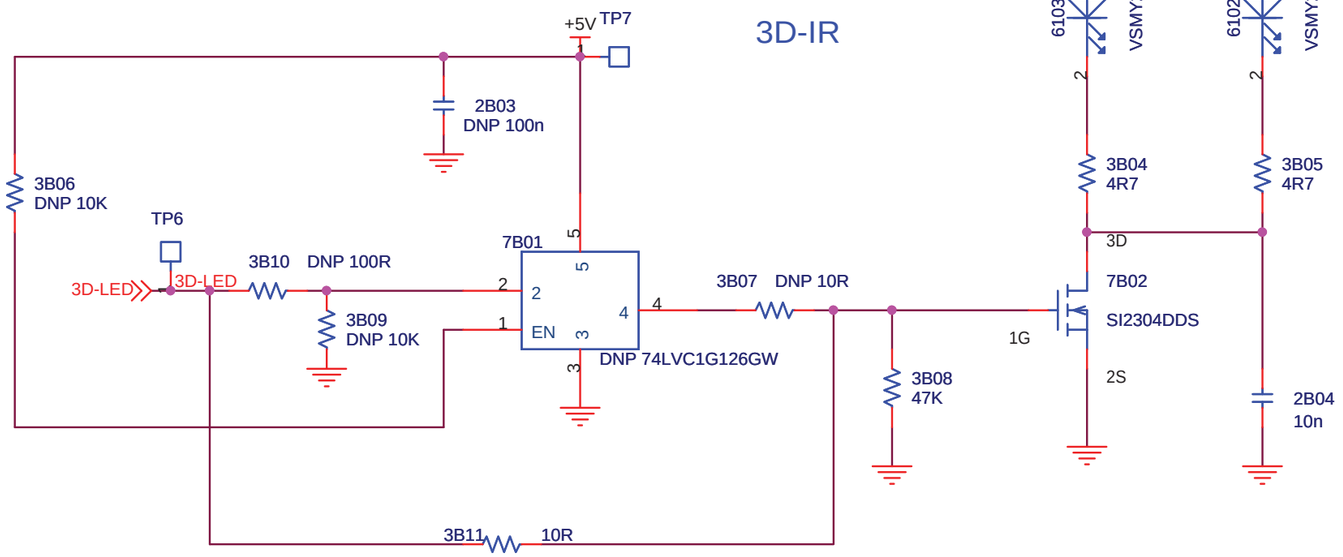
J03 Light sensor

J03

LIGHT SENSOR





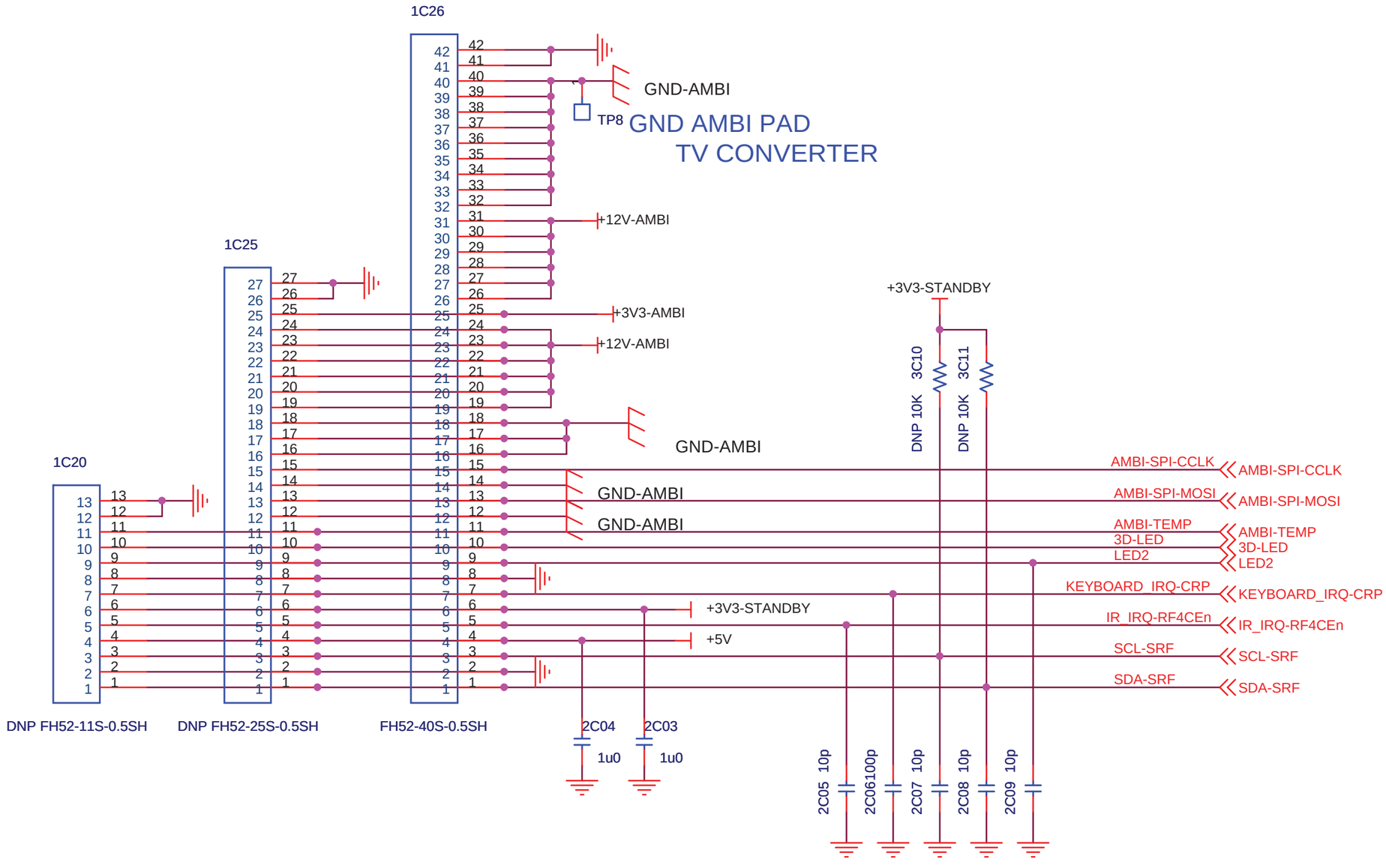


Wireless LAN USB module, light sensor, IR/LED	2822 065 02664 2822 065 02665	P210 2012-07-24

19370_065_130204.eps
130204

J04 Connectors

J04



J04

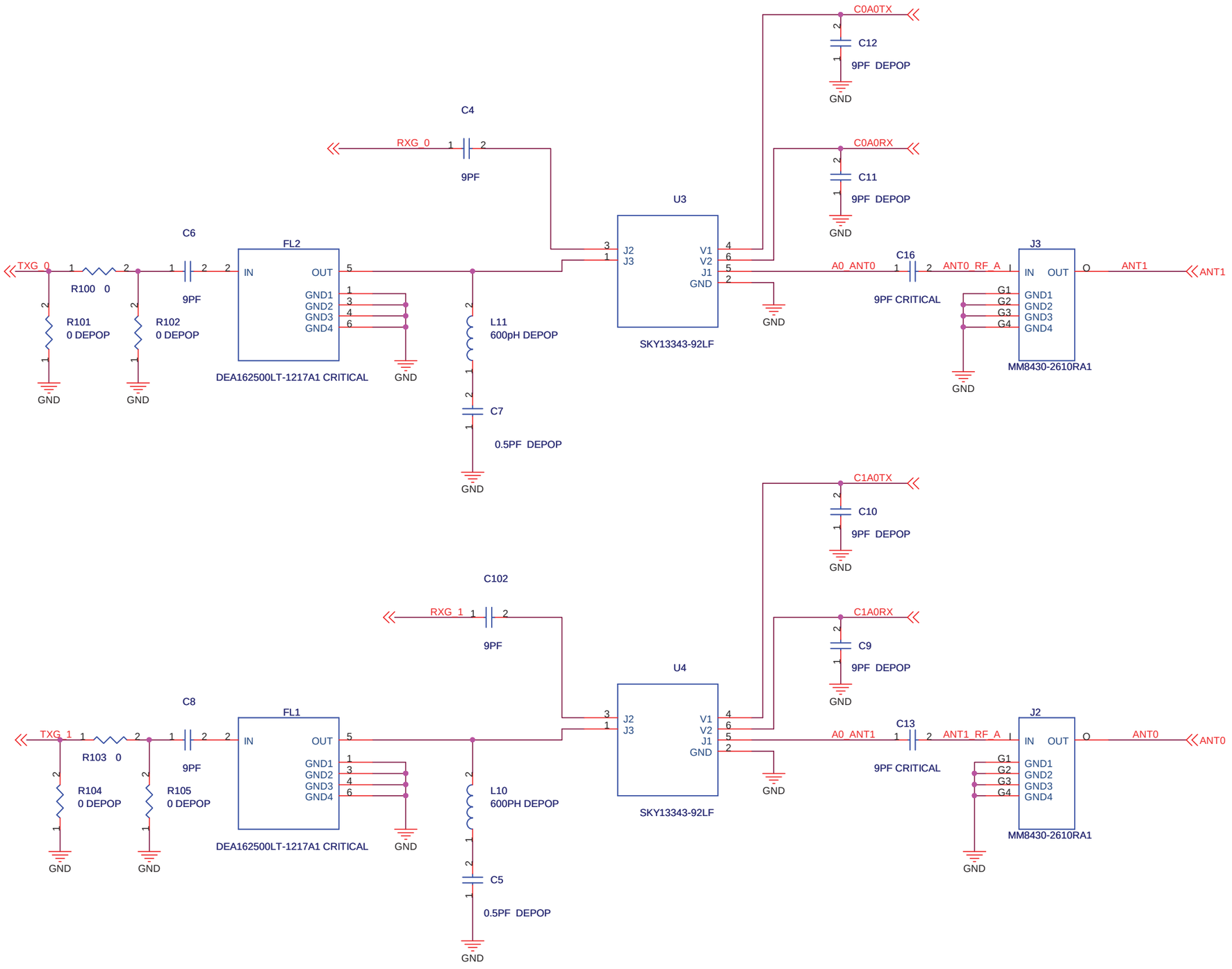
Wireless LAN USB module, light sensor, IR/LED	2822 065 02664 2822 065 02665	P210 2012-07-24

19370_066_130204.eps
130204

10-7-5 J05, RF Front-end

J05 RF Front-end

J05



Wireless LAN USB module, light sensor, IR/LED	2822 065 02664 2822 065 02665

19370_067_130204.eps
130204

10-7-6 J06, Power supply

J06 Power supply

J06

U1C

BCM43234KMLG QFN88H-0.40P

U5

PAM2306AYPAA DFN12 CRITICAL

DNP 2.2UH CURRENT=1.4A CRITICAL

2.2UH CURRENT=1.31A CRITICAL

Ferrite Bead 120ohm

Wireless LAN USB module, light sensor, IR/LED

2822 065 02664
2822 065 02665

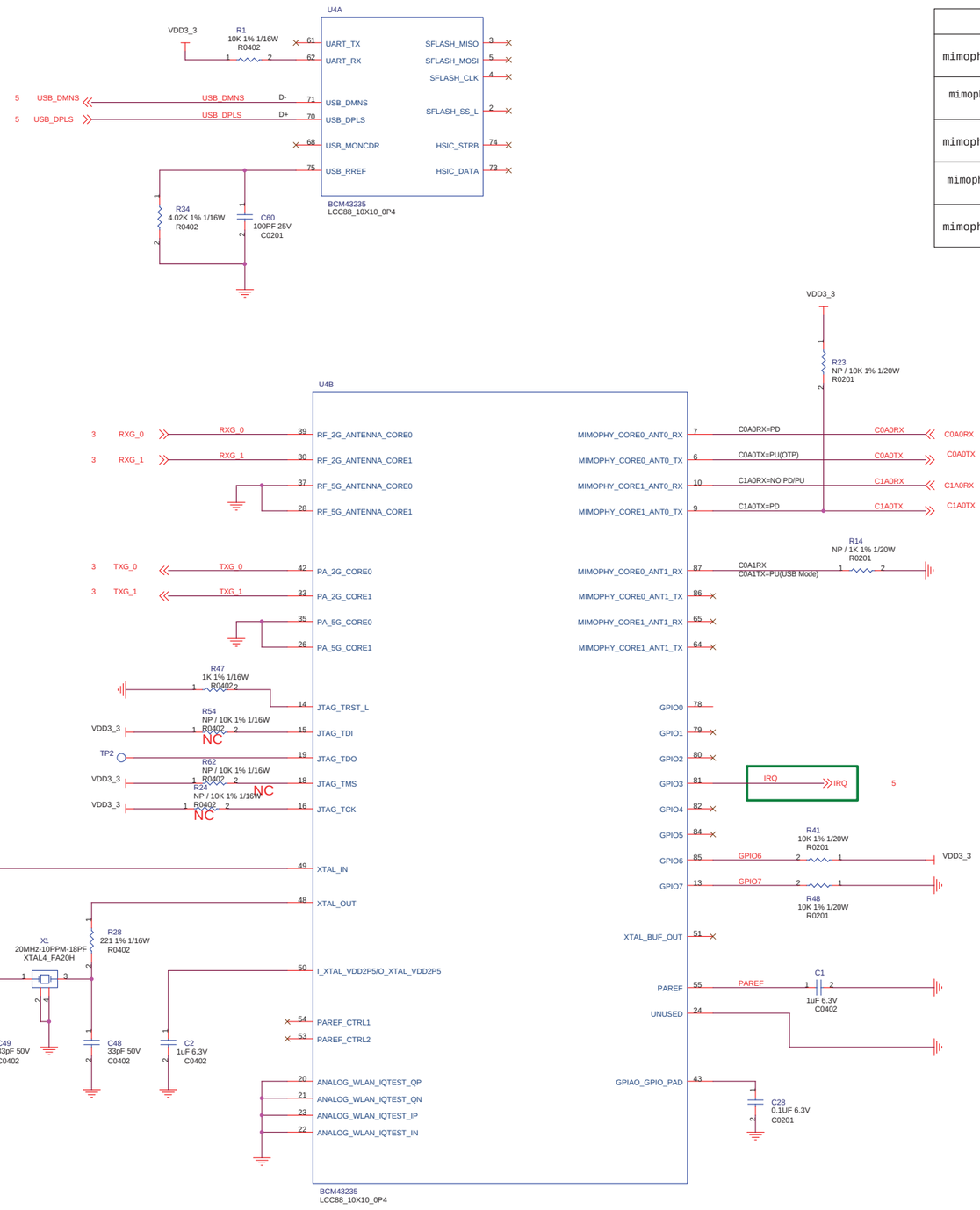
19370_066_130204.eps
130204

10.8 282206502668, 282206502669 Wireless LAN USB module, light sensor, IR/LED

10-8-1 J01, Control lines

J01 Control lines

J01



Pad	chip default	description
mimophy_core1_ant0_tx	0	0=SFLASH NOT PRESENT/ 1=SFLASH PRESENT
mimophy_core0_ant0_rx	0	1=SFLASH Type is Atmel/ 0=SFLASH Type is ST
mimophy_core0_ant0_tx	1	0=OTP NOT PRESENT/ 1=OTP PRESENT
mimophy_core0_ant1_tx	1	0=HSIC mode/ 1=USBPhymode
mimophy_core0_ant1_rx	1	0=backplane at 96(98.4)MHz/ 1=backplane at 120(123)MHz

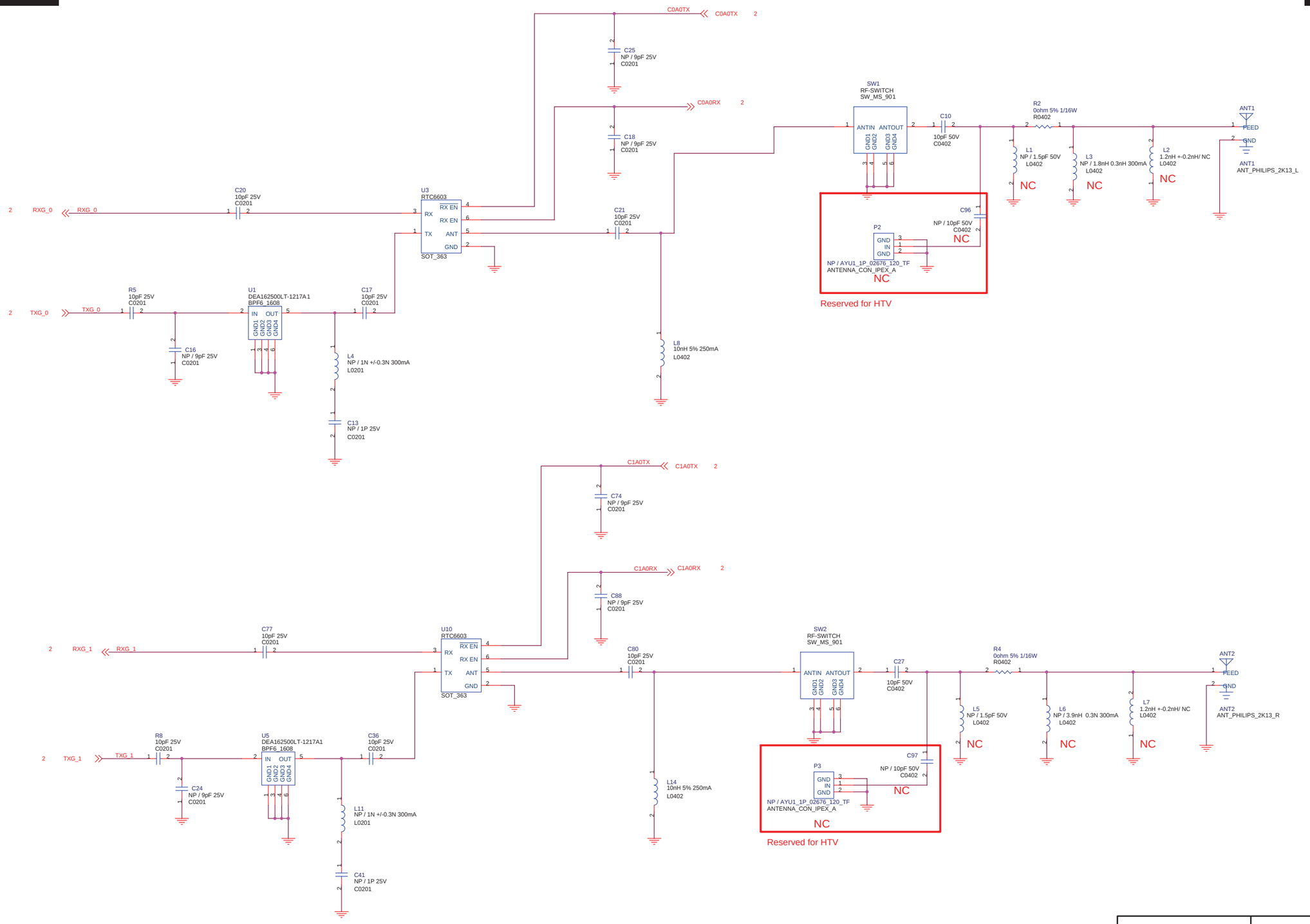
Wireless LAN USB module, light sensor, IR/LED	2822 065 02668 2822 065 02669	2A	2012-09-21

19370_073_130207.eps
130207

10-8-2 J02, Antenna switches

J02 Antenna switches

J02



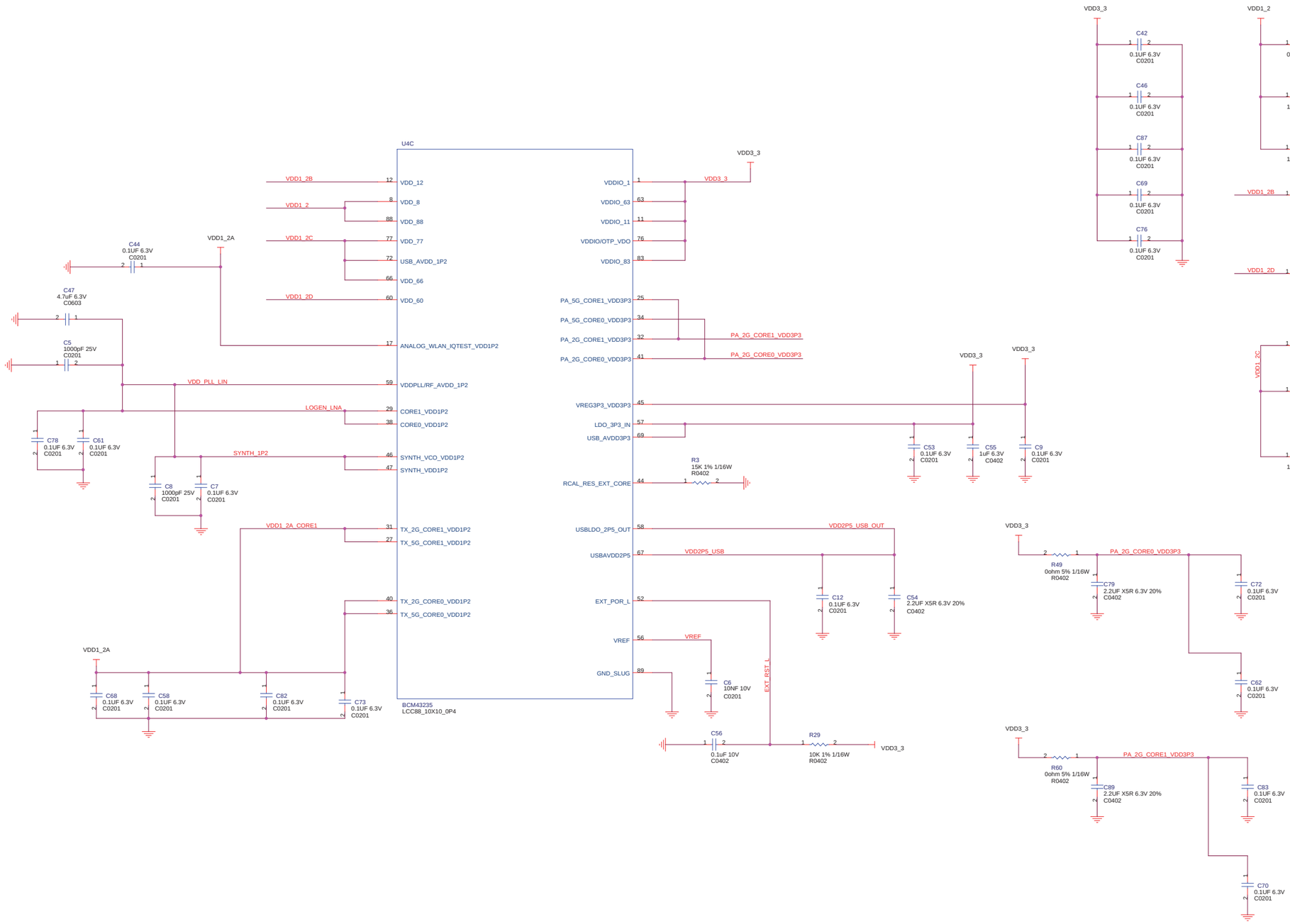
Wireless LAN USB module, light sensor, IR/LED	2822 065 02668 2822 065 02669	2A	2012-09-21

19370_074_130204.eps
130204

10-8-3 J03, Micro processor

J03 Micro processor

J03



J03

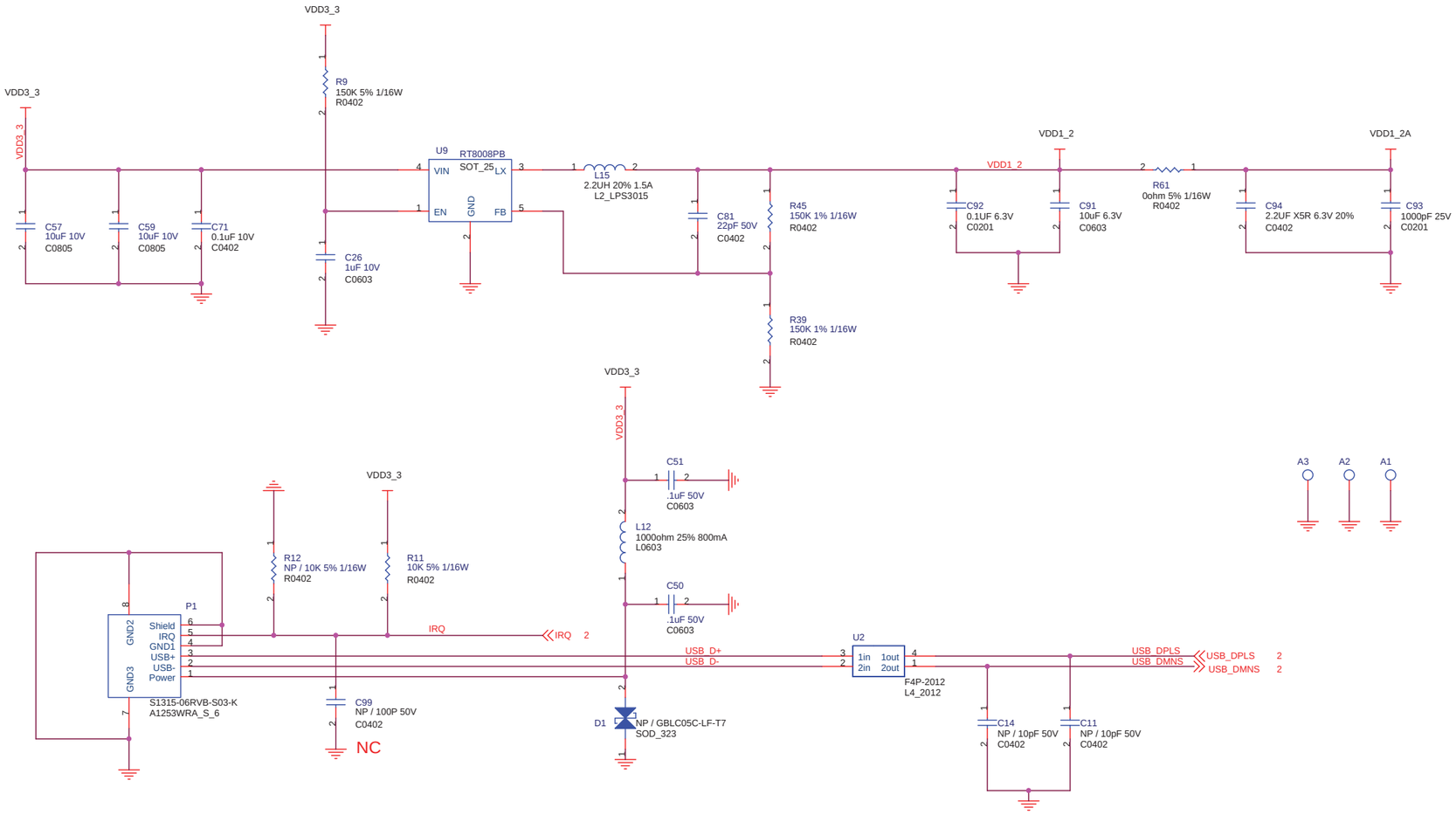
Wireless LAN USB module, light sensor, IR/LED	2822 065 02668 2822 065 02669	2A	2012-09-21

19370_075_130207.eps
130207

10-8-4 J04, USB

J04 USB

J04



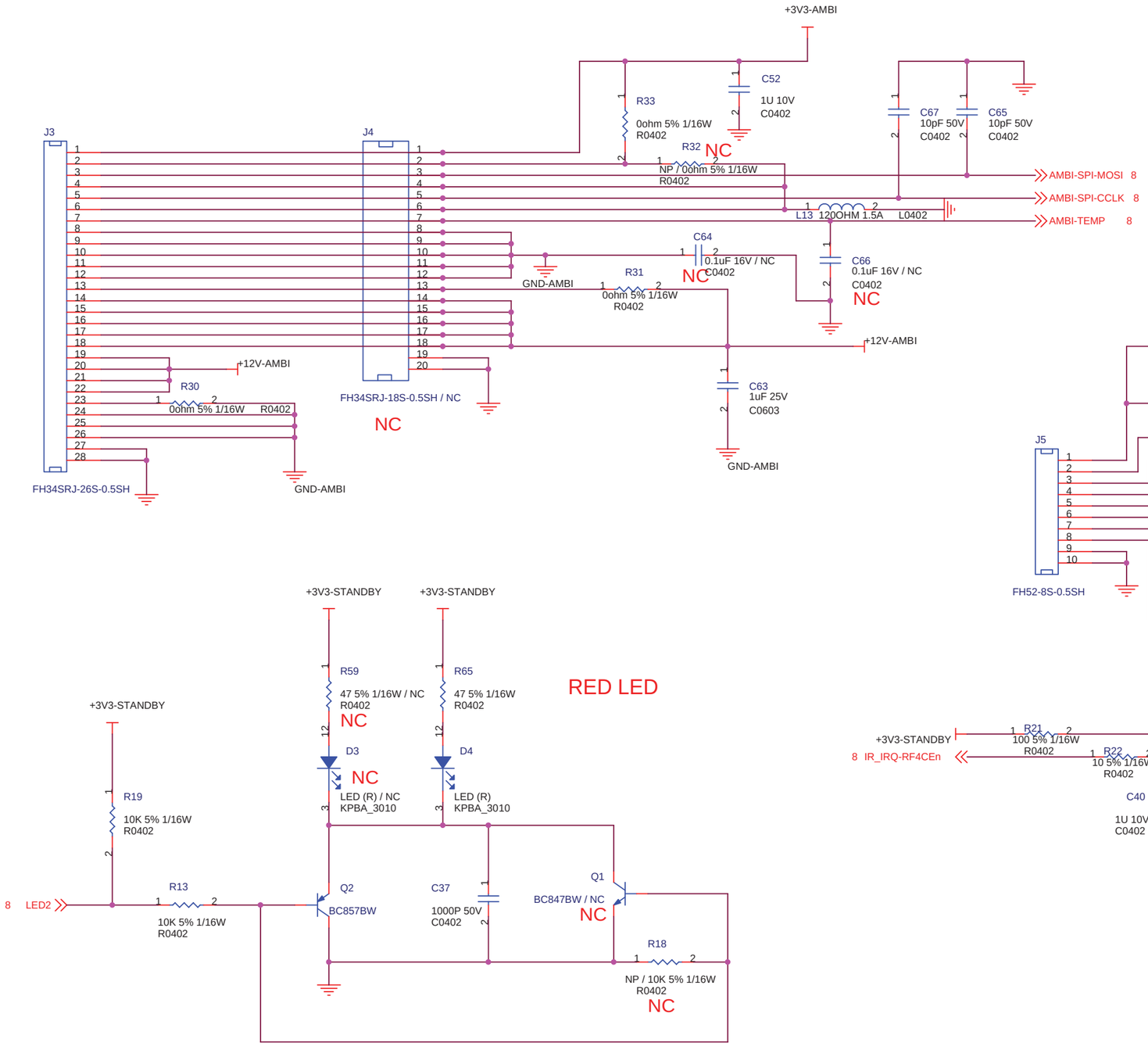
Wireless LAN USB module, light sensor, IR/LED	2822 065 02668 2822 065 02669	2A 2012-09-21

19370_076_130207.eps
130207

10-8-5 J05, Connectors, IR, and LED

J05 Connectors, IR, and LED

J05



Wireless LAN USB module, light sensor, IR/LED	2822 065 02668 2822 065 02669

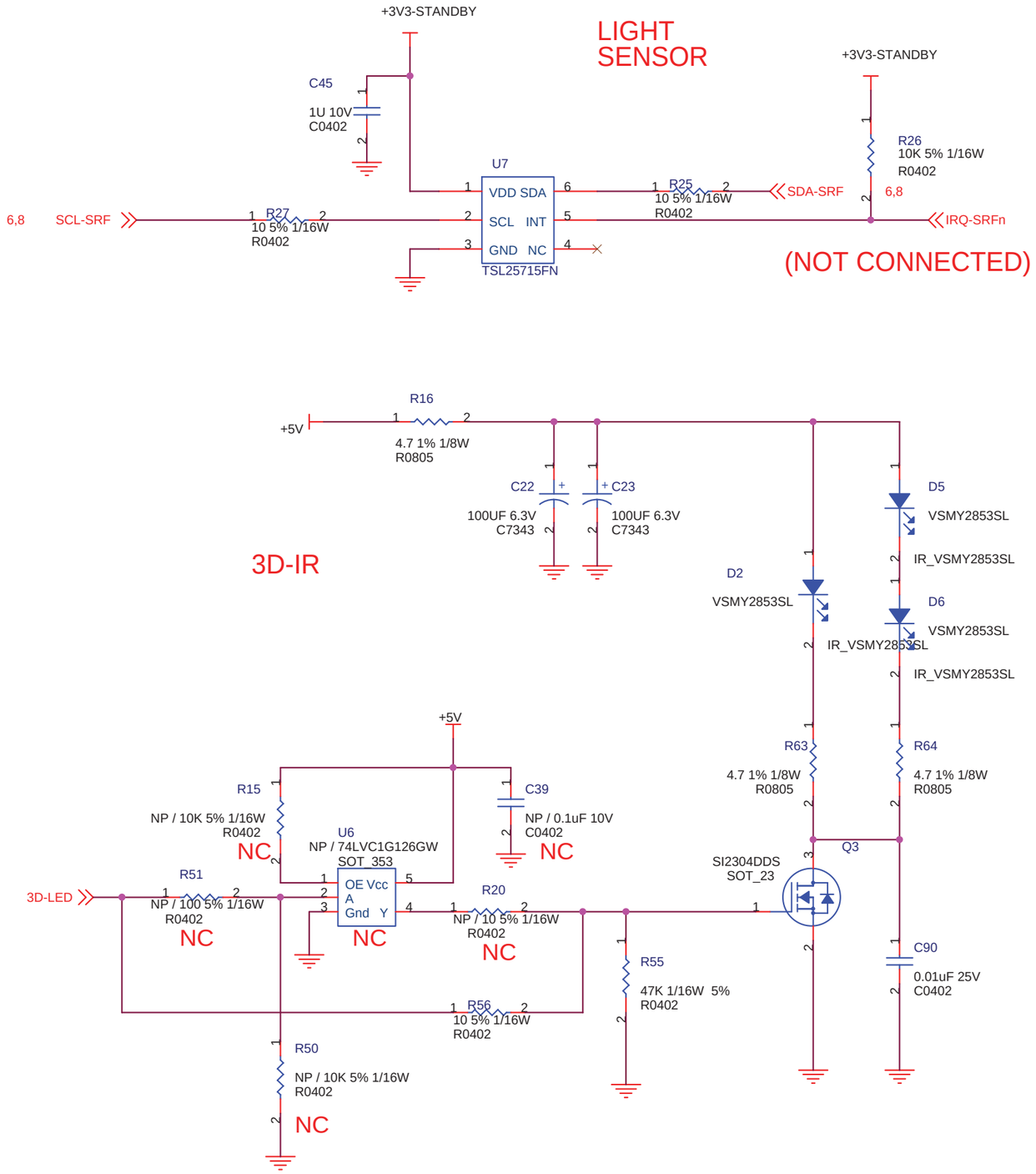
2A 2012-09-21

19370_077_130207.eps
130207

10-8-6 J06, Light sensor and 3D IR

J06 Light sensor and 3D IR

J06



Wireless LAN USB module, light sensor, IR/LED	2822 065 02668 2822 065 02669

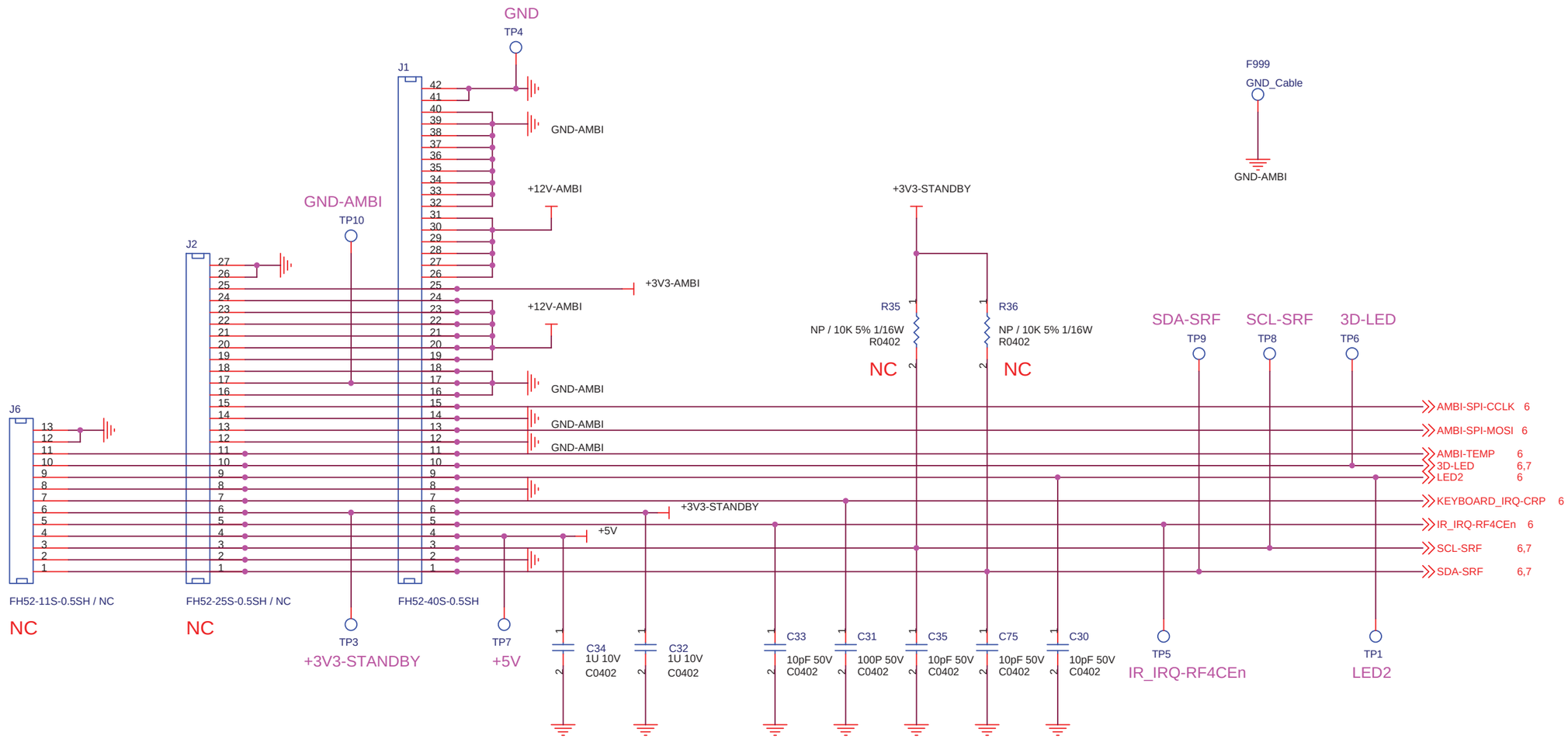
2A 2012-09-21

19370_078_130207.eps
130207

10-8-7 J07, Connectors

J07 Connectors

J07



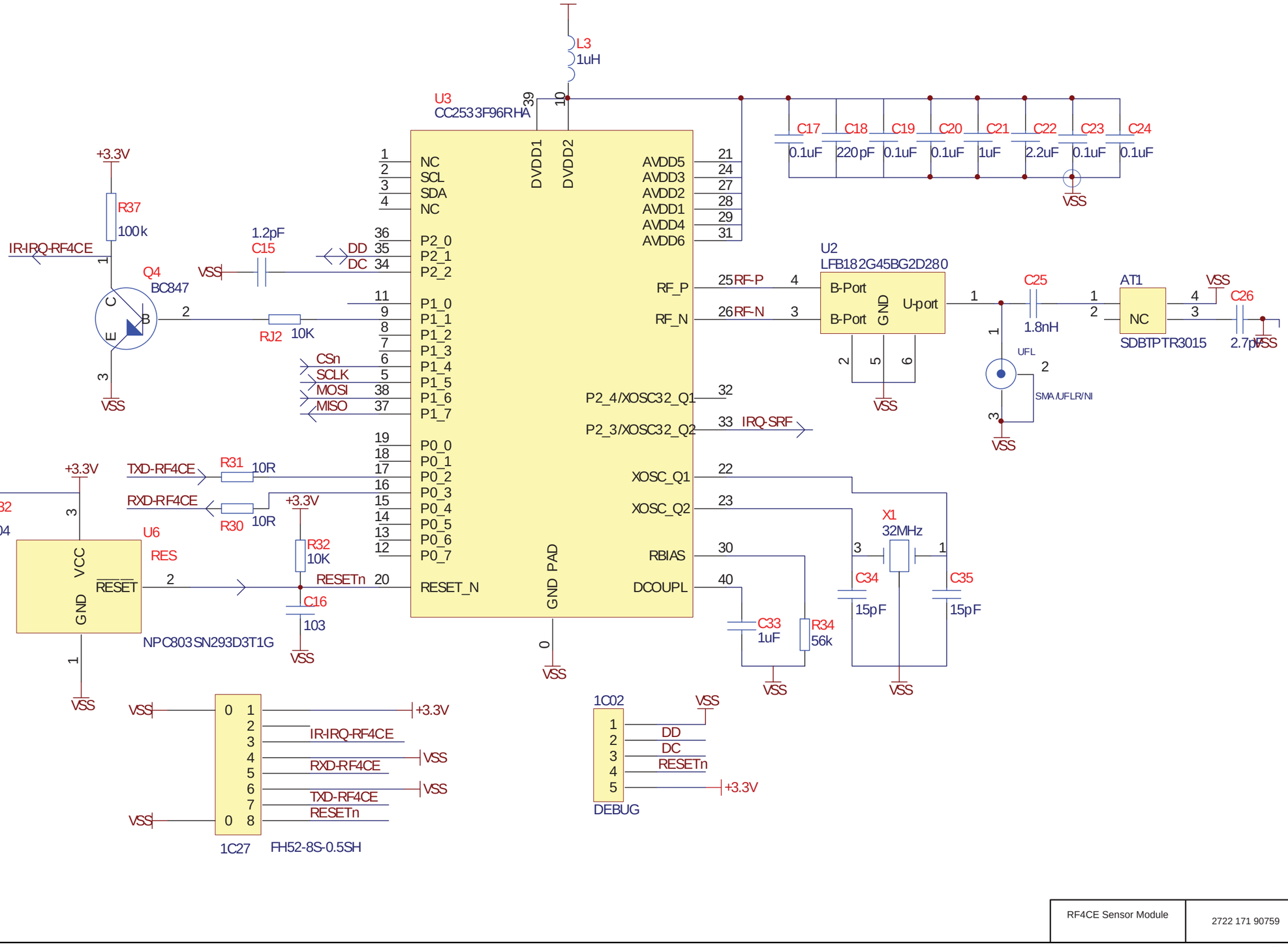
Wireless LAN USB module, light sensor, IR/LED	2822 065 02668 2822 065 02669	2A 2012-09-21

19370_079_130207.eps
130207

10.9 272217190759, 272217190761 Sensor Module

10-9-1 J, RF4CE Sensor Module

RF RF4CE Sensor Module RF



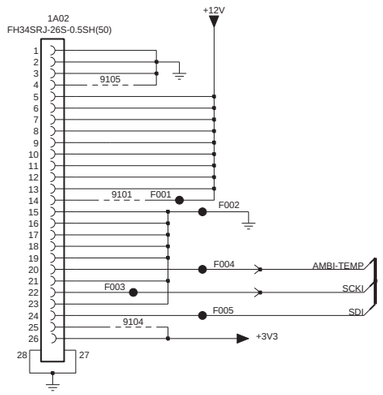
RF4CE Sensor Module	2722 171 90759	0.9 2012-11-21

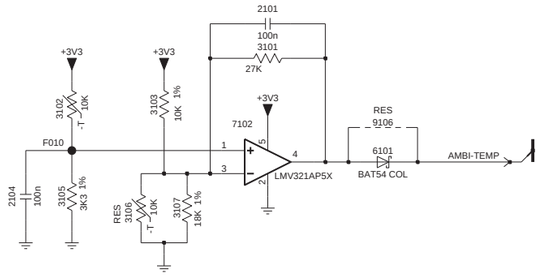
19370_043_130131.eps
130131

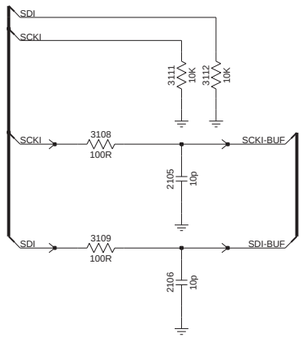
10.10 310431366033 AmbiLight
10-10-1 AL1, 7 LED Master LiteOn

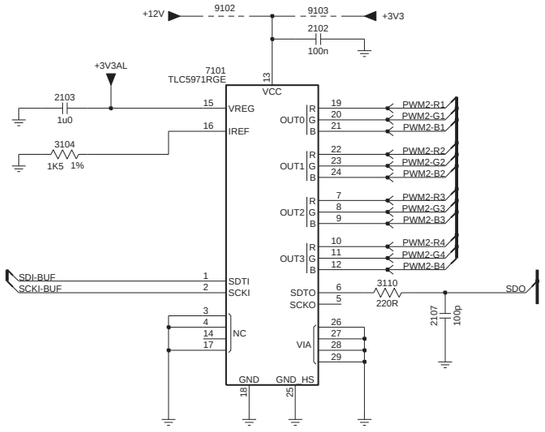
AL1 7 LED Master LiteOn

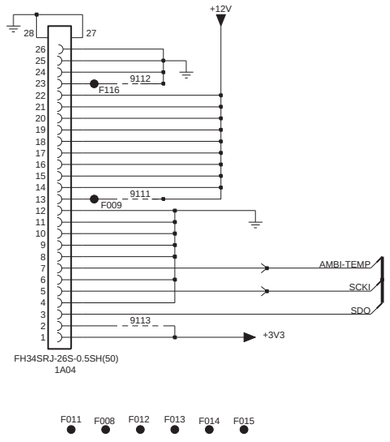
AL1

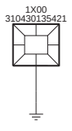












7 LED Master LiteOn	3104 313 6603	1 2012-08-30

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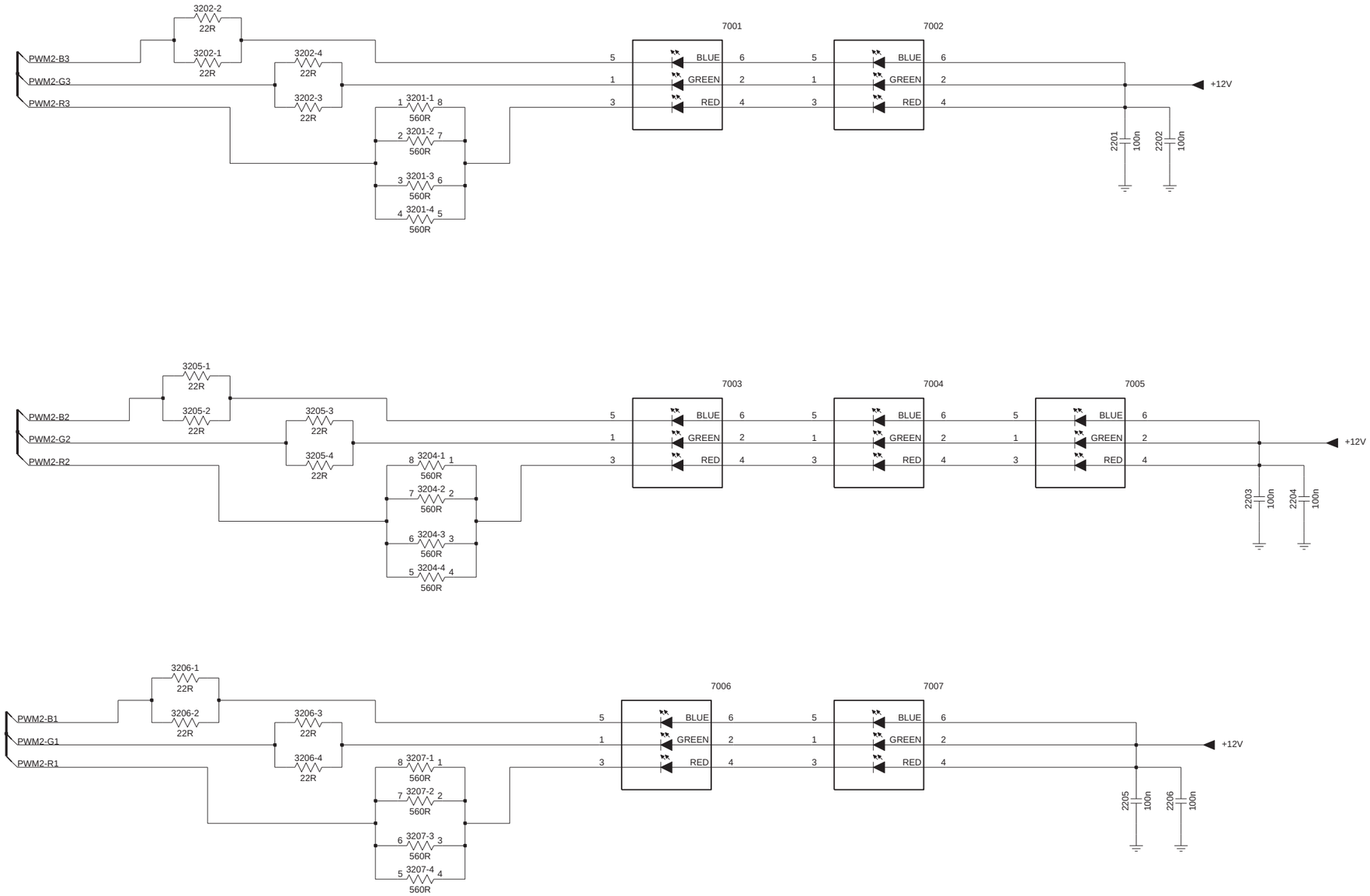
130131

10-10-2 AL2, 7 LED Master LiteOn

AL2 7 LED Master LiteOn

AL2



7 LED Master LiteOn	3104 313 6603	3 2012-08-30

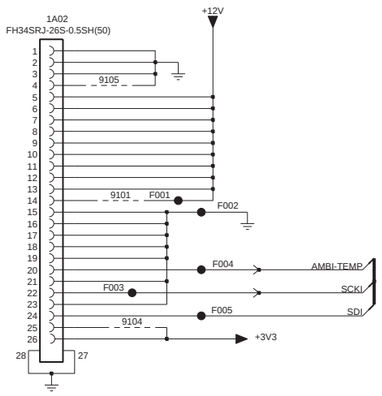
19370_046_130131.eps
130131

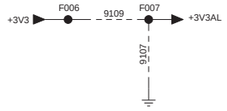
10.11 310431366043 AmbiLight

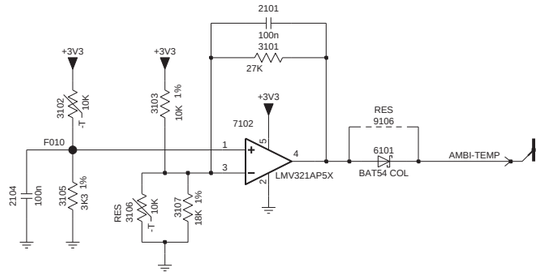
10-11-1 AL1, 8 LED LiteOn

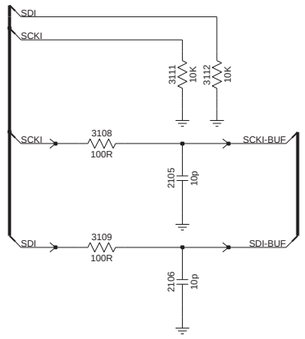
AL1 8 LED LiteOn

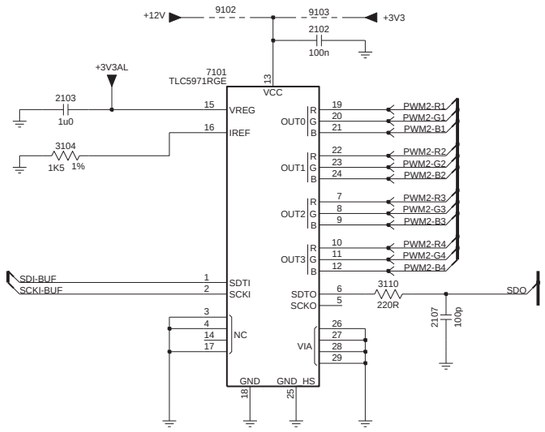
AL1

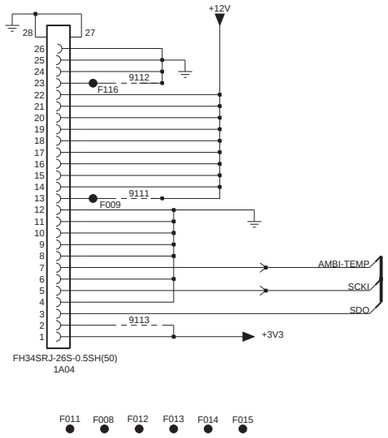


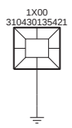












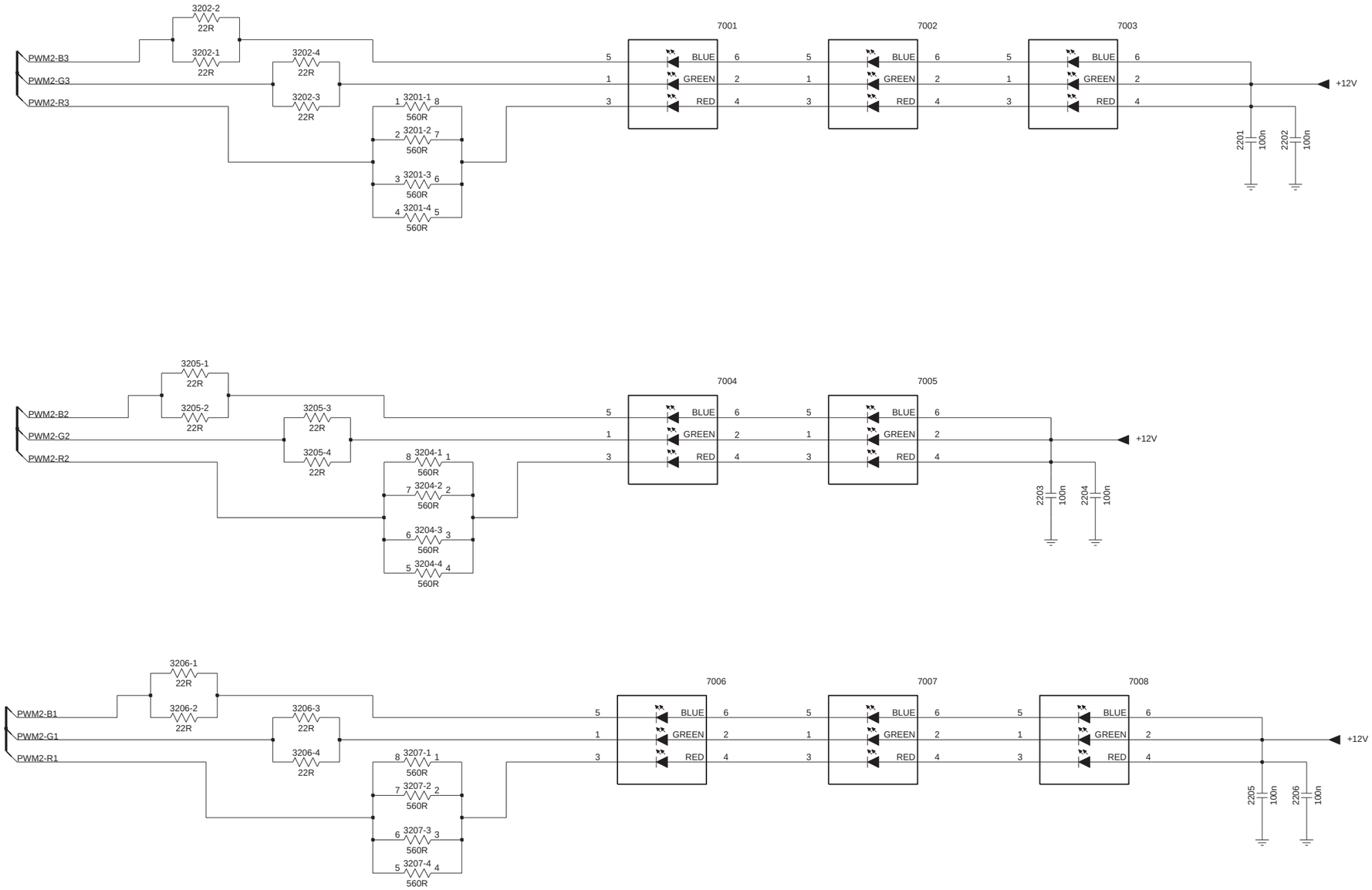
8 LED LiteOn	3104 313 6604	3 2012-08-30

19370_047_130131.eps
130131

10-11-2 AL2, 8 LED LiteOn

AL2 8 LED LiteOn

AL2



8 LED LiteOn	3104 313 6604	1 2012-08-30

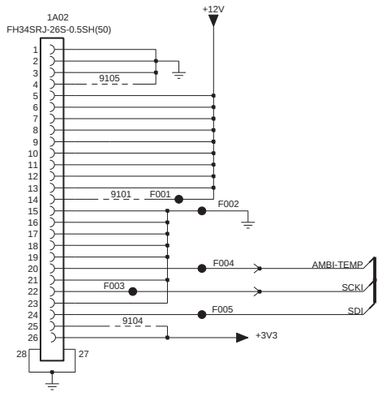
19370_048_130131.eps
130131

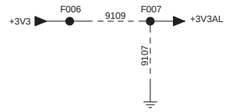
10.12 310431366053 AmbiLight

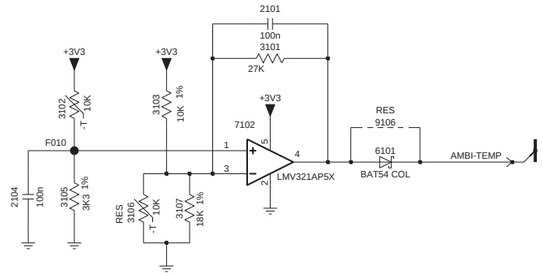
10-12-1 AL1, 9 LED LiteOn

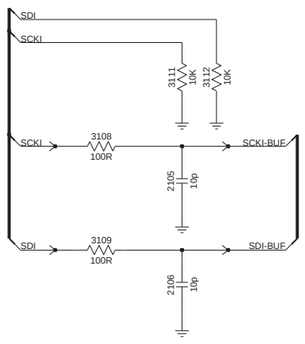
AL1 9 LED LiteOn

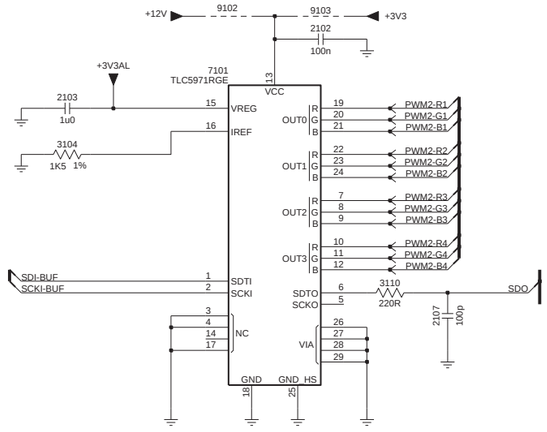
AL1

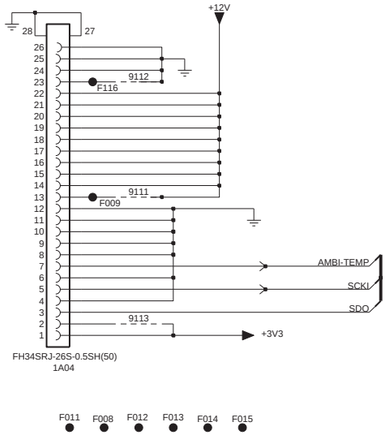


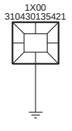












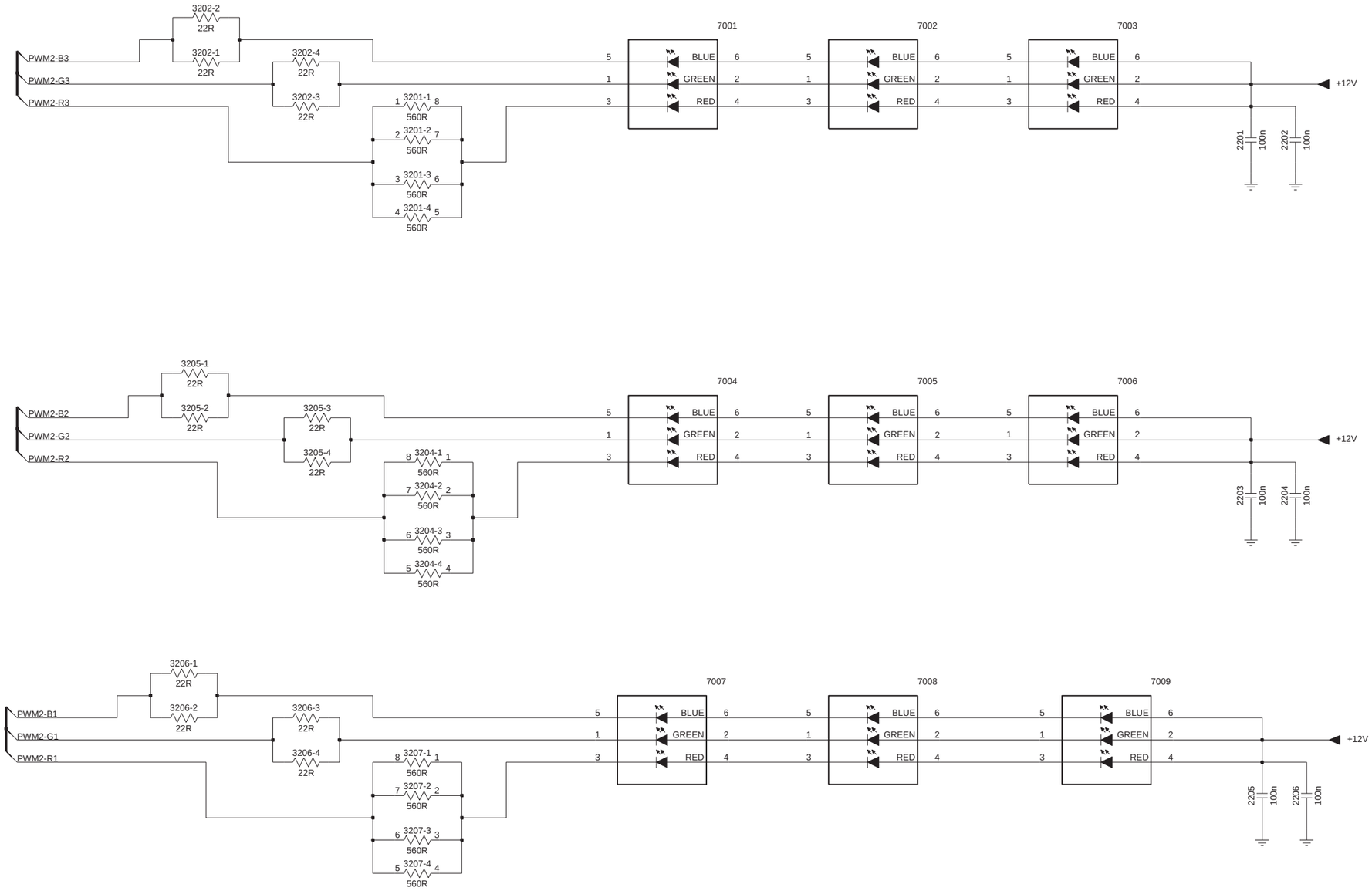
9 LED LiteOn	3104 313 6605	3 2012-08-30

19370_049_130131.eps
130131

10-12-2 AL2, 9 LED LiteOn

AL2 9 LED LiteOn

AL2



9 LED LiteOn	3104 313 6605	1 2012-08-30

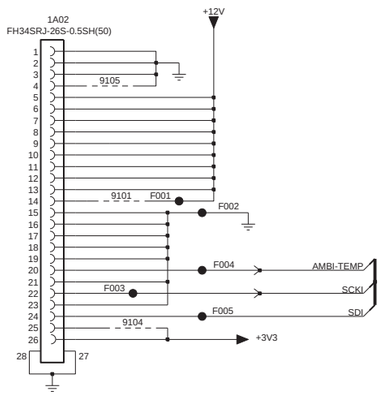
19370_050_130131.eps
130131

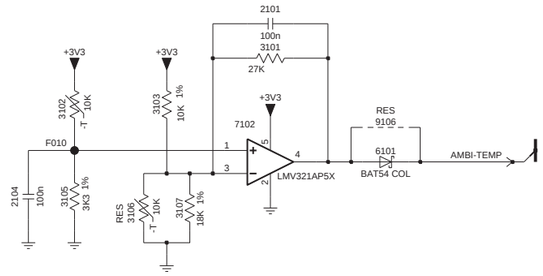
10.13 310431366063 AmbiLight

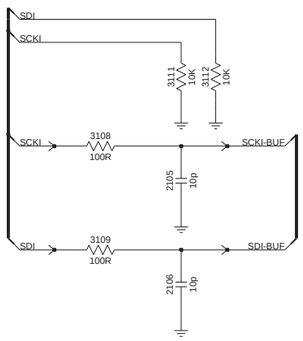
10-13-1 AL1, 10 LED Master LiteOn

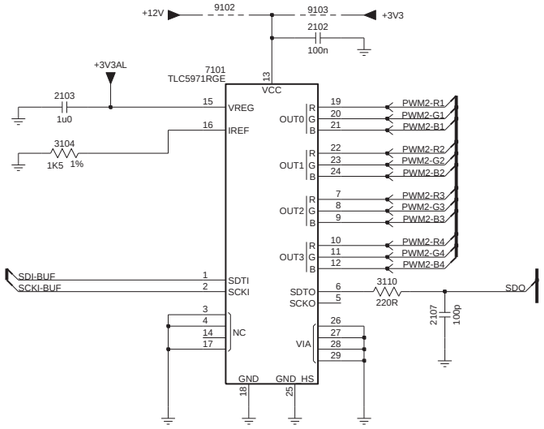
AL1 10 LED Master LiteOn

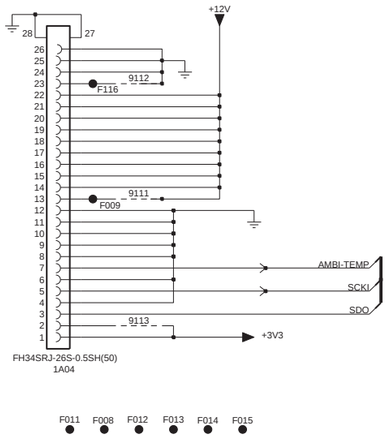
AL1

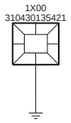












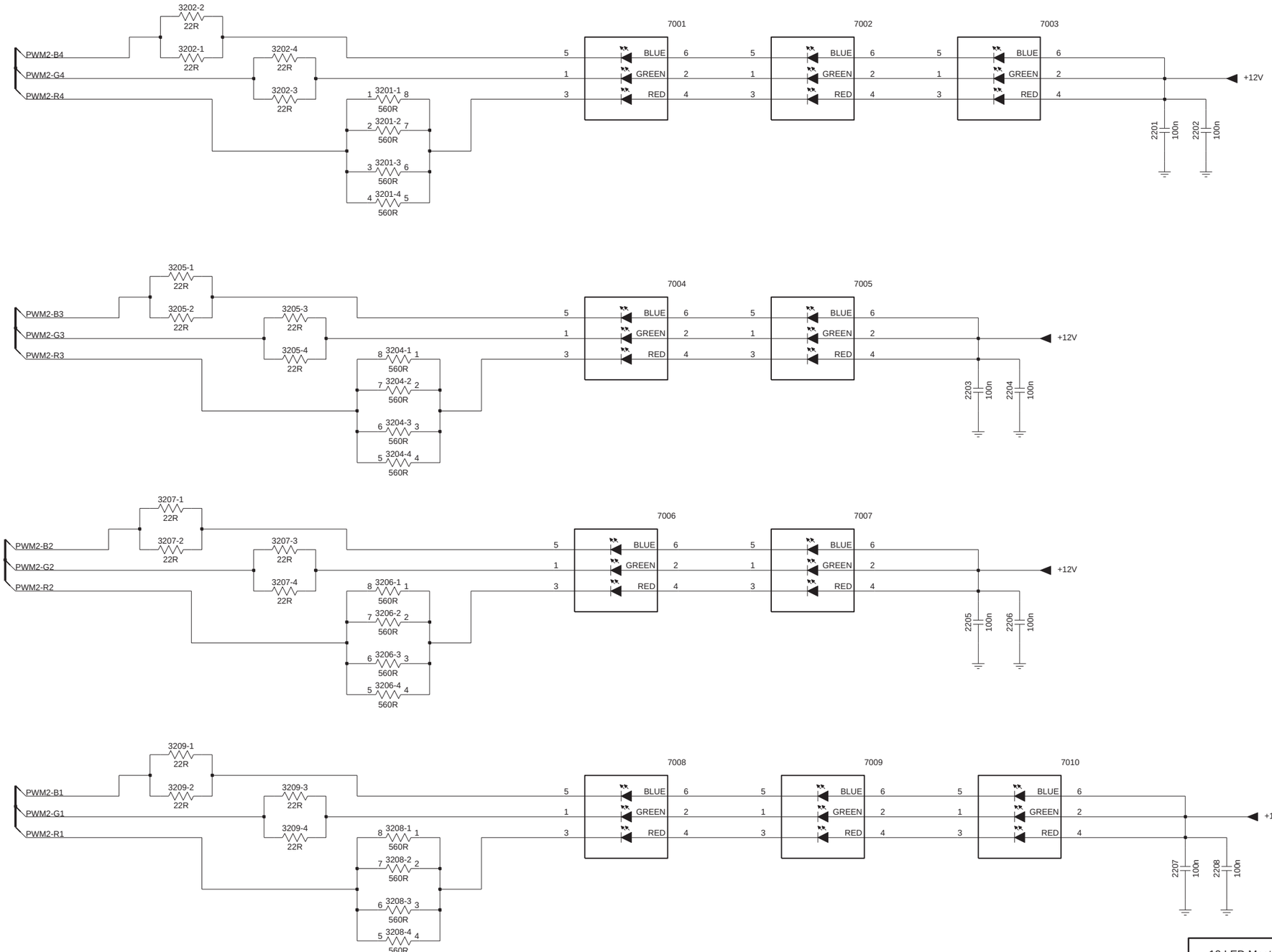
10 LED Master LiteOn	3104 313 6606	3 2012-08-30

19370_051_130131.eps
130131

10-13-2 AL2, 10 LED Master LiteOn

AL2 10 LED Master LiteOn

AL2



10 LED Master LiteOn	3104 313 6606	3 2012-08-30

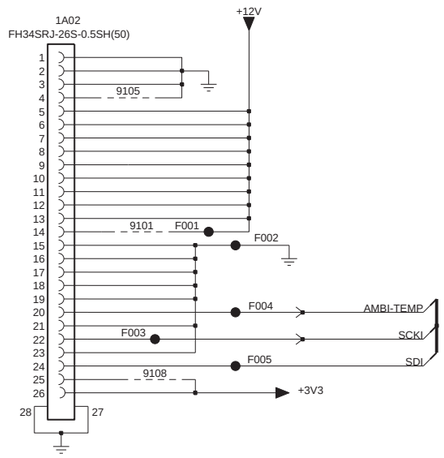
19370_052_130131.eps
130131

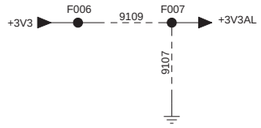
10.14 310431366171 AmbiLight

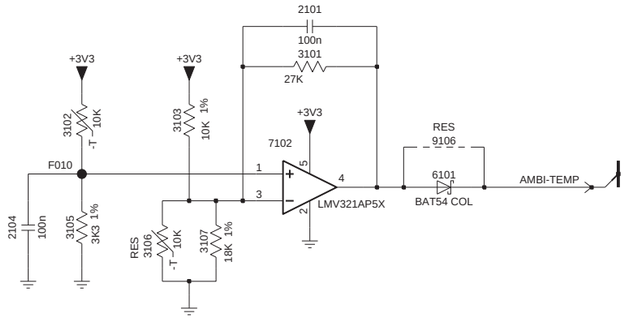
10-14-1 AL1, 6 LED LiteOn

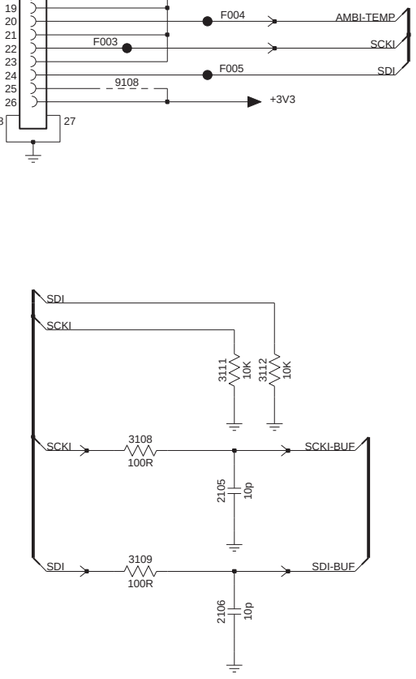
AL1 6 LED LiteOn

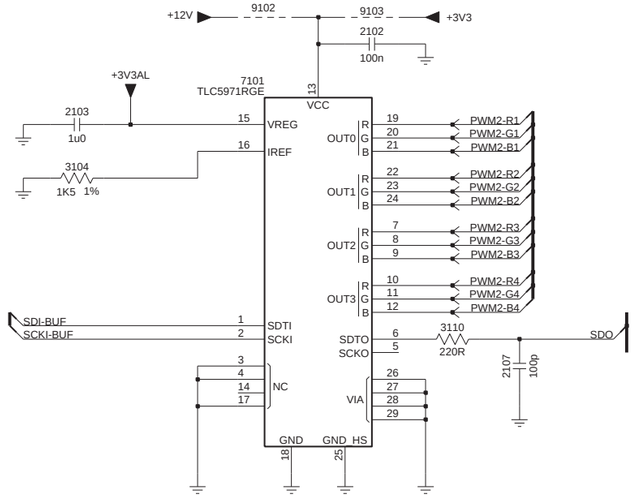
AL1

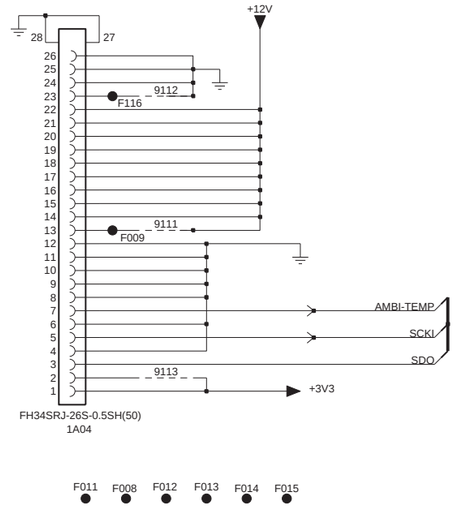


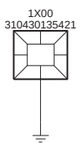












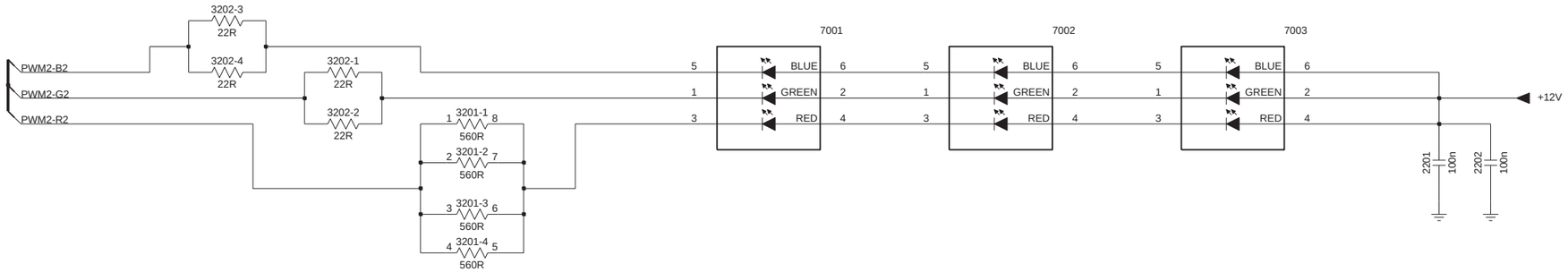
6 LED LiteOn	3104 313 6617	1 2012-11-26

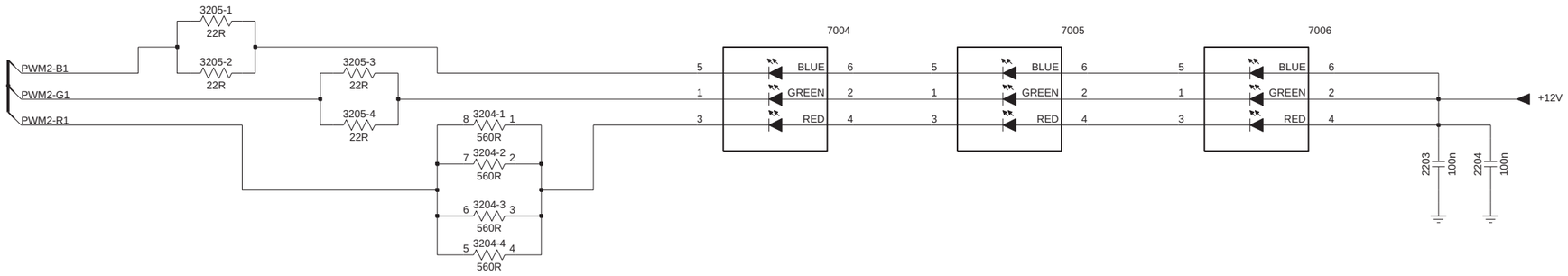
19374_001_130827.eps
130827

10-14-2 AL2, 6 LED LiteOn

AL2 6 LED LiteOn

AL2





6 LED LiteOn	3104 313 6617	1 2012-11-26

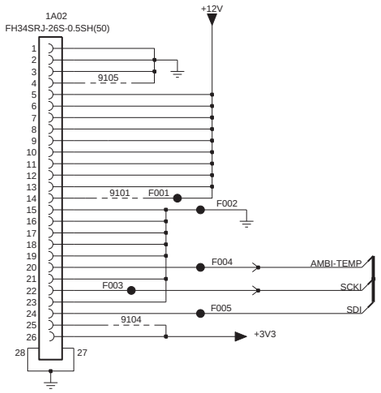
19374_002_130827.eps
130827

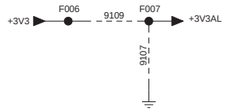
10.15 310431366292 AmbiLight

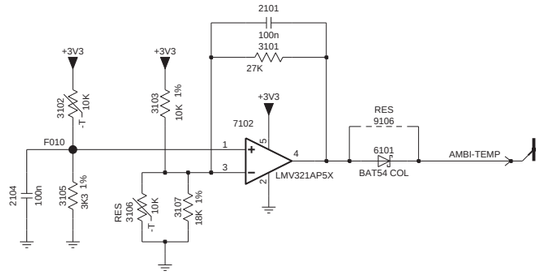
10-15-1 AL1, 7 LED Everlight

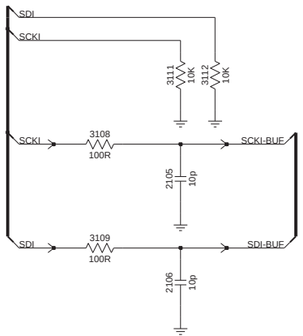
AL1 7 LED Everlight

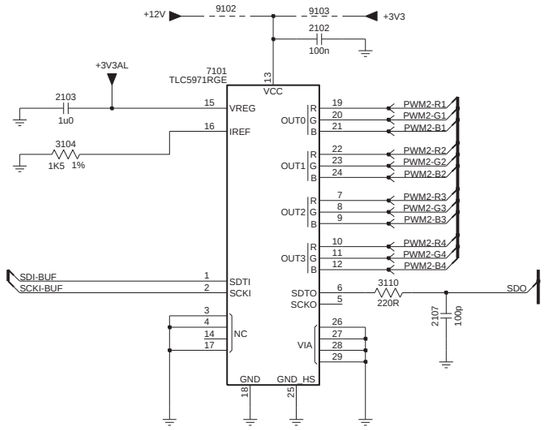
AL1

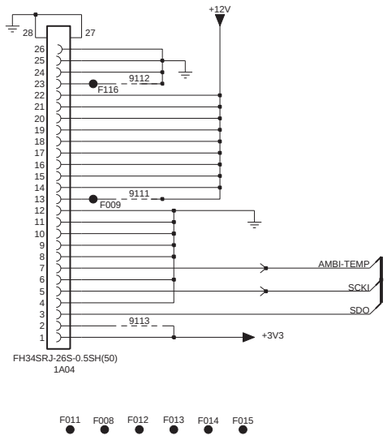












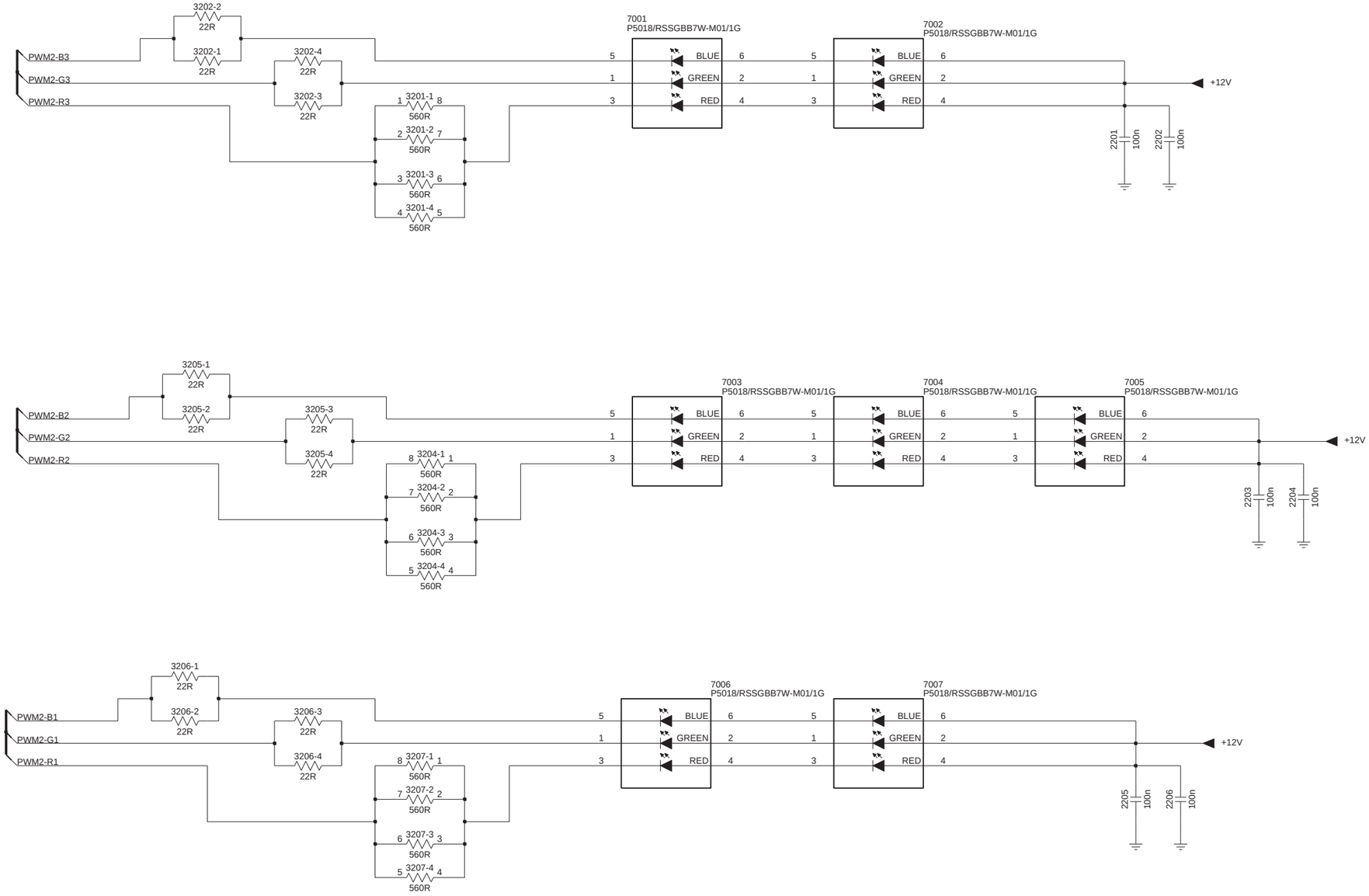
7 LED Everlight	3104 313 6629	2 2012-09-11

19370_053_130131.eps
130131

10-15-2 AL2, 7 LED Everlight

AL2 7 LED Everlight

AL2



7 LED Everlight	3104 313 6629	2 2012-09-11

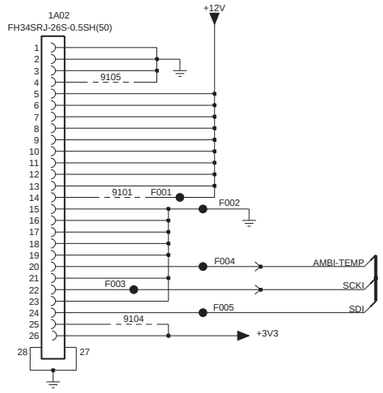
19370_054_130131.eps
130131

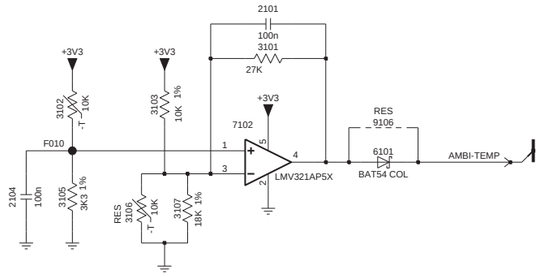
10.16 310431366302 AmbiLight

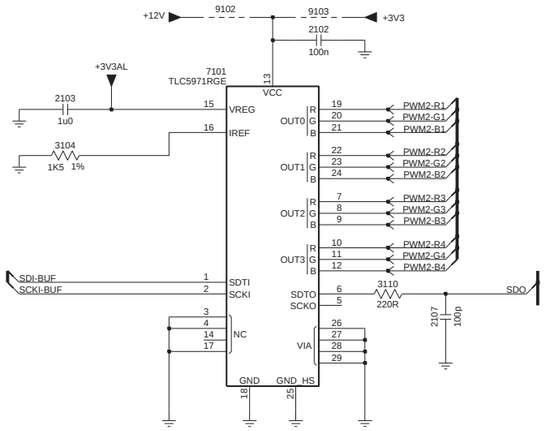
10-16-1 AL1, 8 LED Everlight

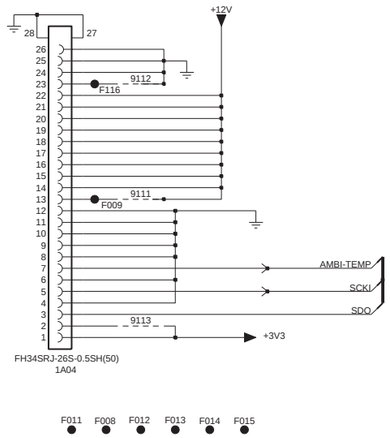
AL1 8 LED Everlight

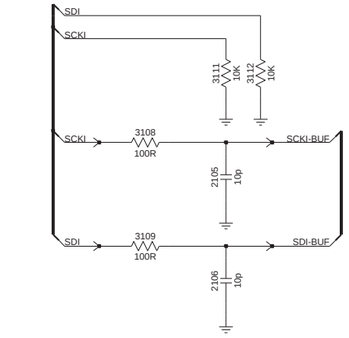
AL1

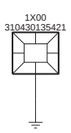












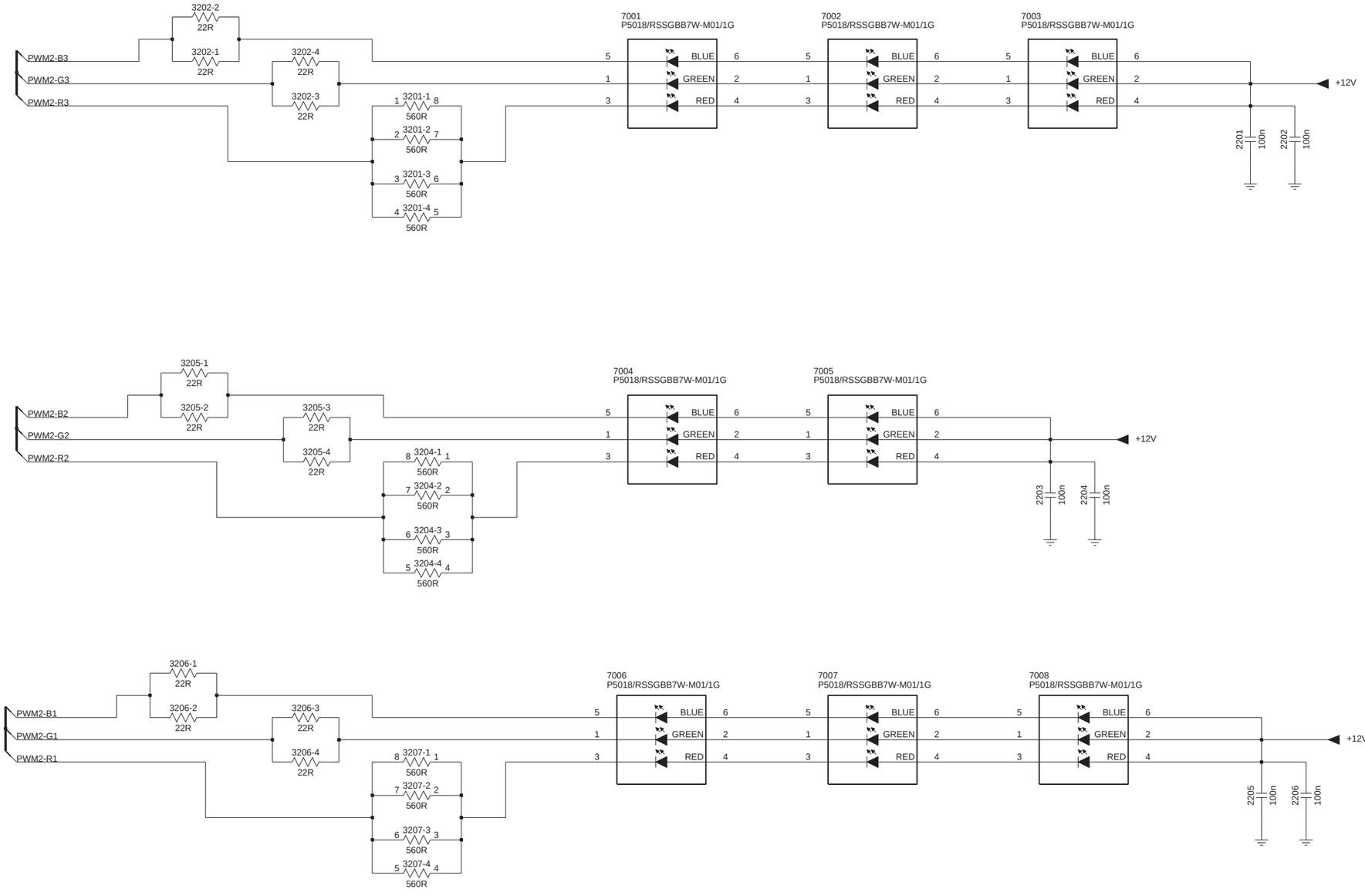
8 LED Everlight	3104 313 6630	2 2012-09-11

19370_055_130131.eps
130131

10-16-2 AL2, 8 LED Everlight

AL2 8 LED Everlight

AL2



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

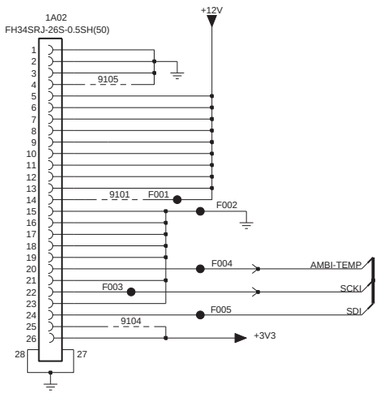
19370_056_130131.eps
130131

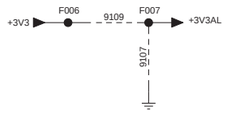
10.17 310431366312 AmbiLight

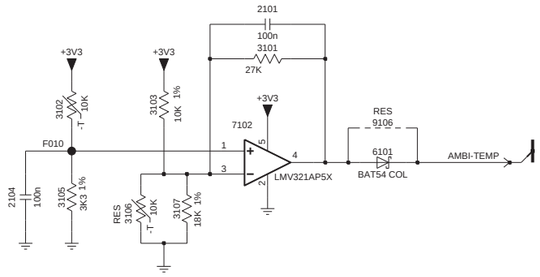
10-17-1 AL1, 9 LED Everlight

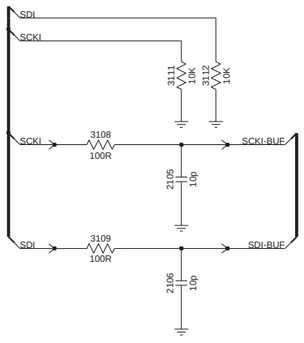
AL1 9 LED Everlight

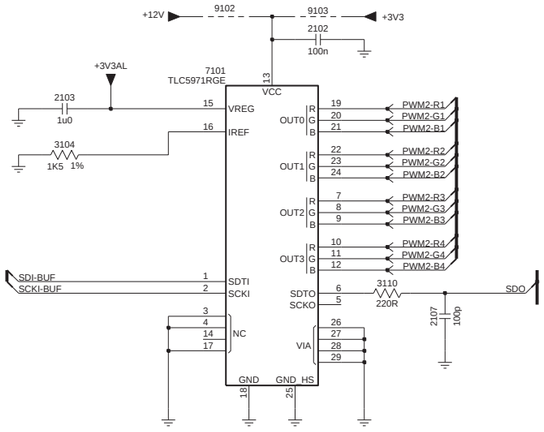
AL1

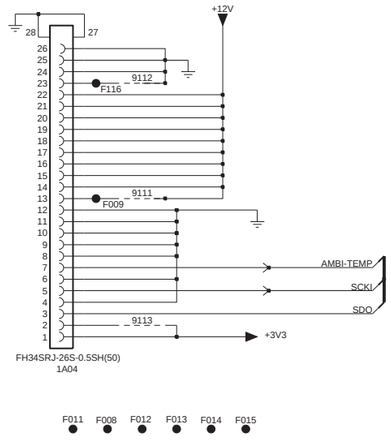


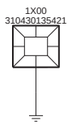












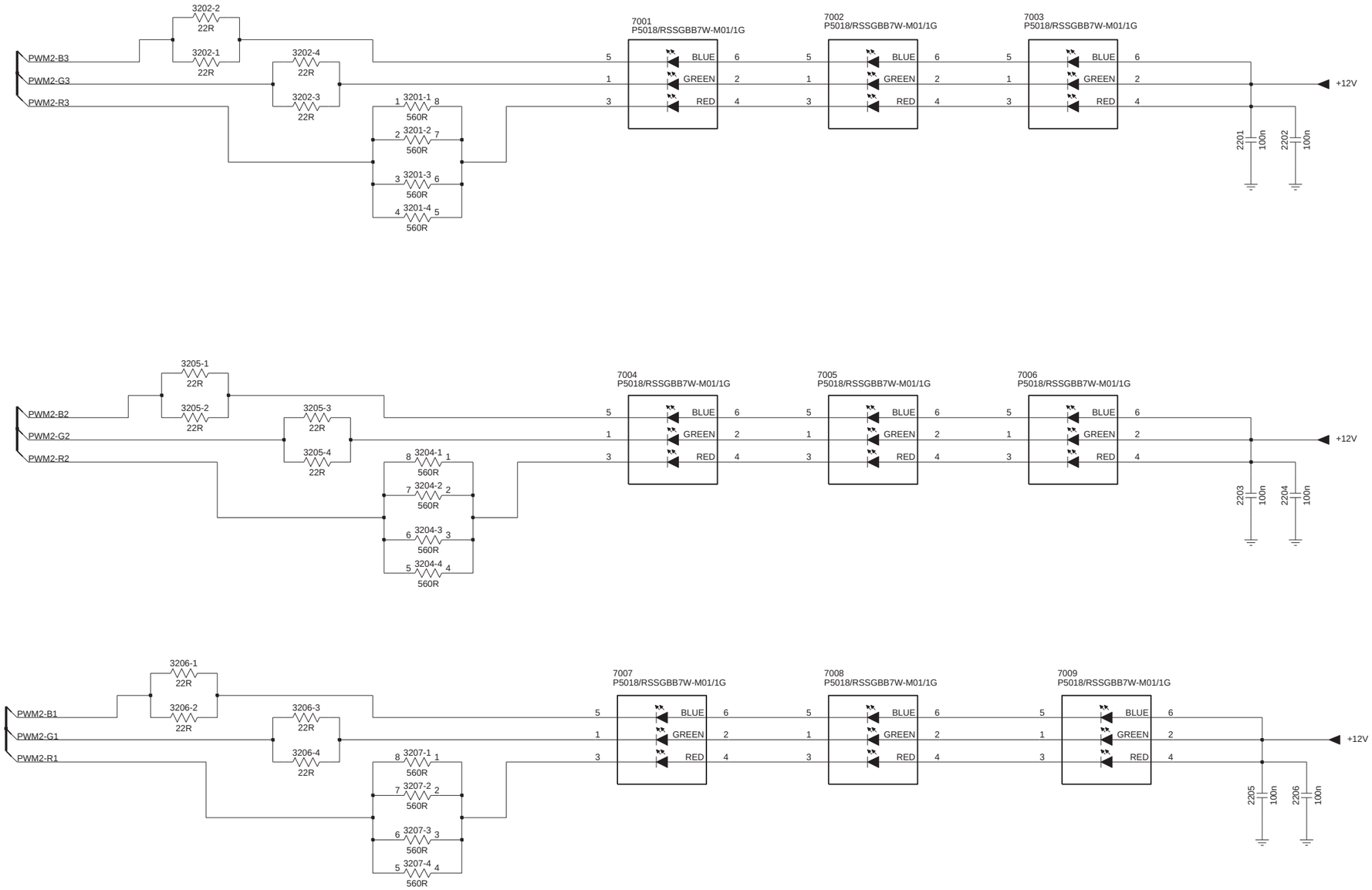
9 LED Everlight	3104 313 6631	2 2012-09-11

19370_057_130131.eps
130131

10-17-2 AL2, 9 LED Everlight

AL2 9 LED Everlight

AL2



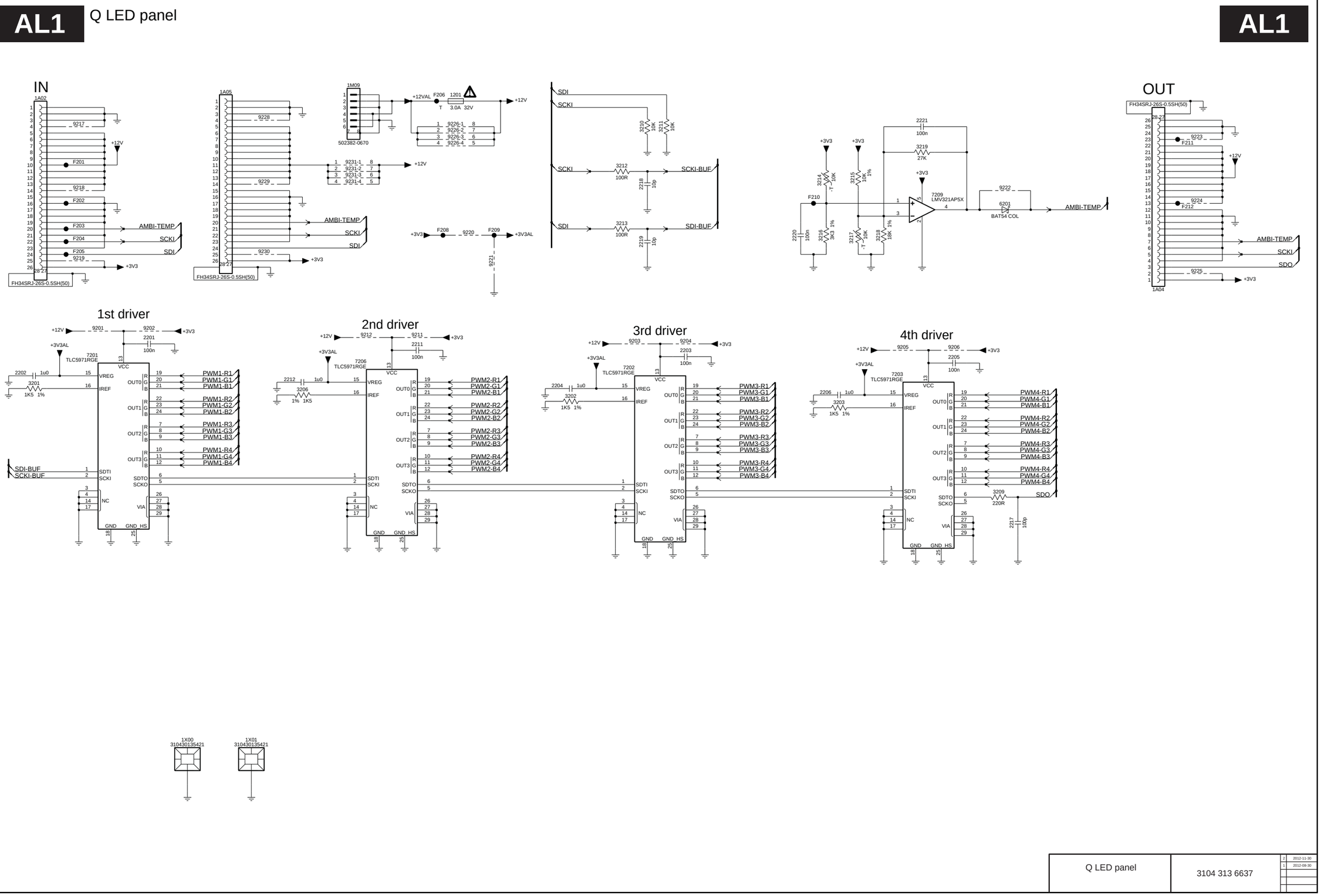
9 LED Everlight	3104 313 6631	2 2012-09-11

19370_058_130131.eps
130131

10.18 310431366372 AmbiLight

10-18-1 AL1, Q LED panel

AL1 Q LED panel



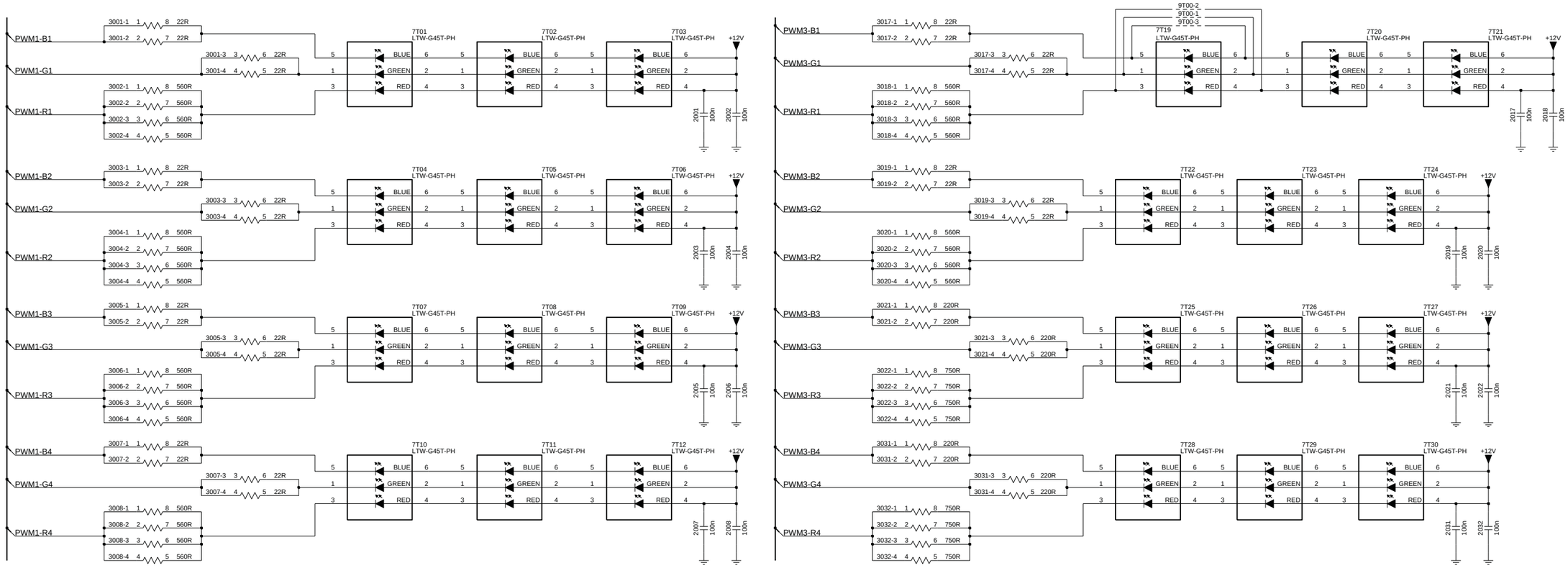
Q LED panel	3104 313 6637	2 2012-11-30 1 2012-08-30

19374_003_130828.eps
130828

10-18-2 AL2, Q LED panel

AL2 Q LED panel

AL2



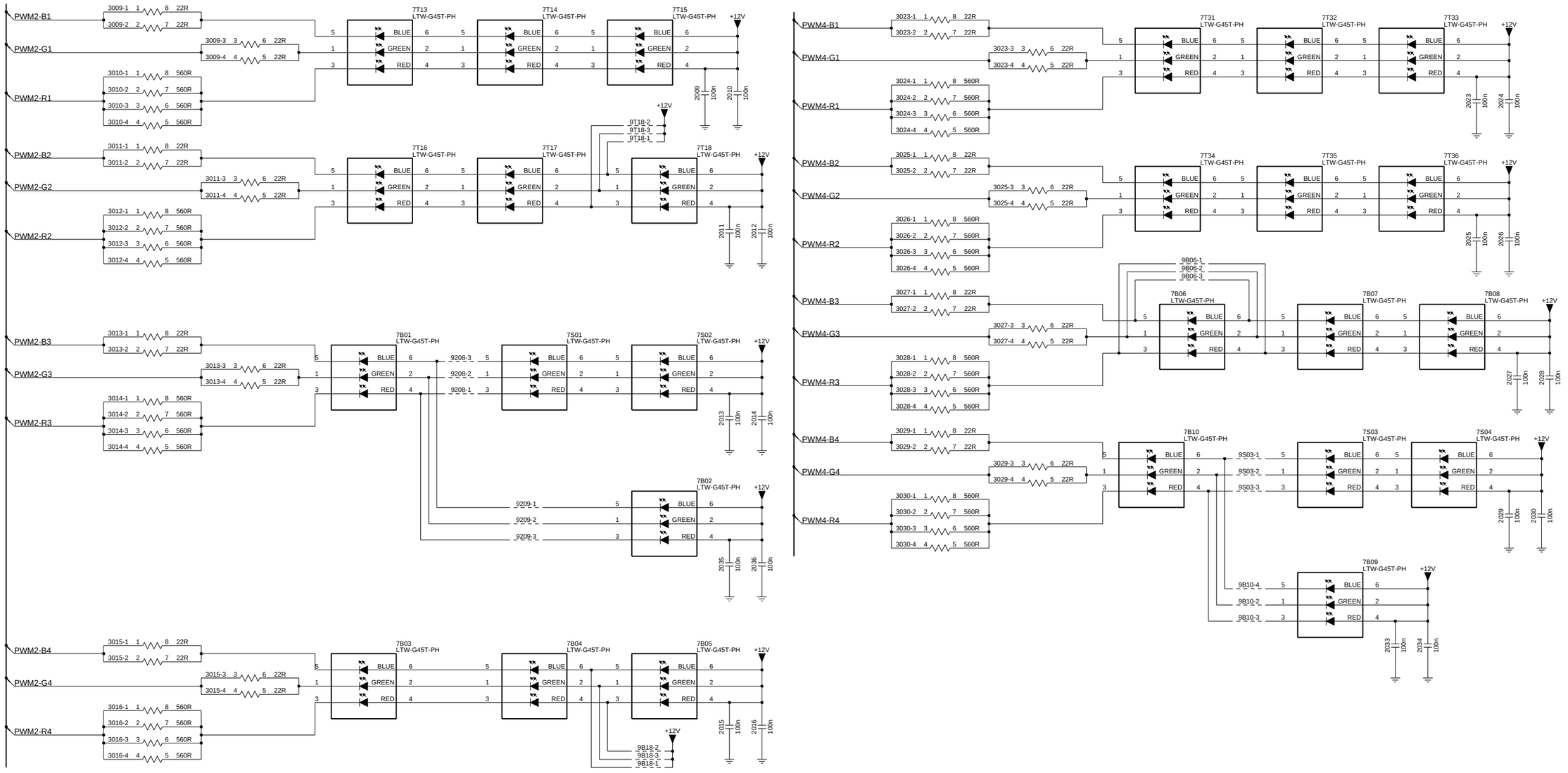
Q LED panel	3104 313 6637	2 2012-11-30 1 2012-08-30

19374_004_130828.eps
130828

10-18-3 AL3, Q LED panel

AL3 Q LED panel

AL3



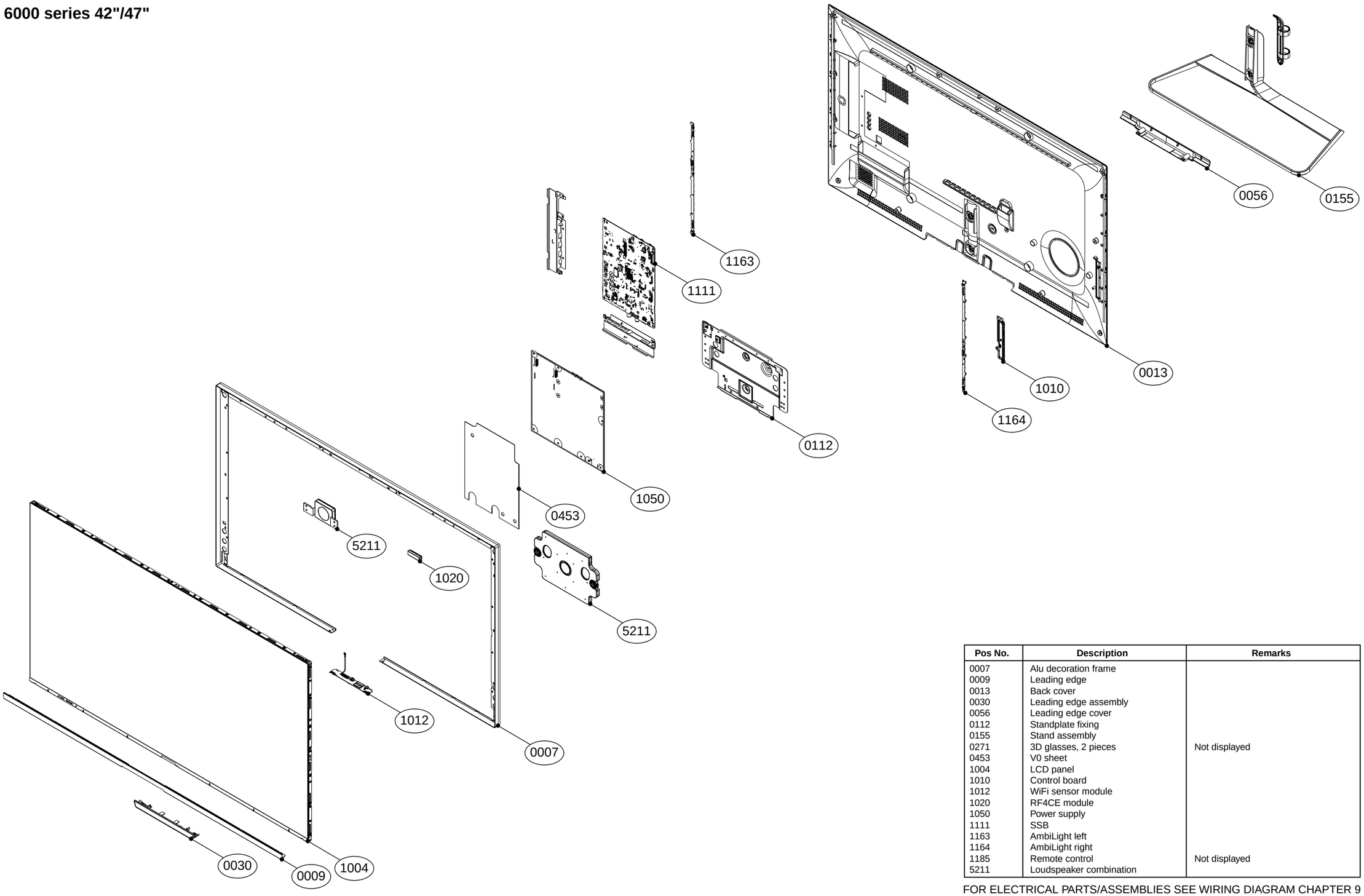
Q LED panel	3104 313 6637	2 2012-11-30 1 2012-08-30

19374_005_130828.eps
130828

11. Styling Sheets

11.1 6000 series 42"/47"

6000 series 42"/47"



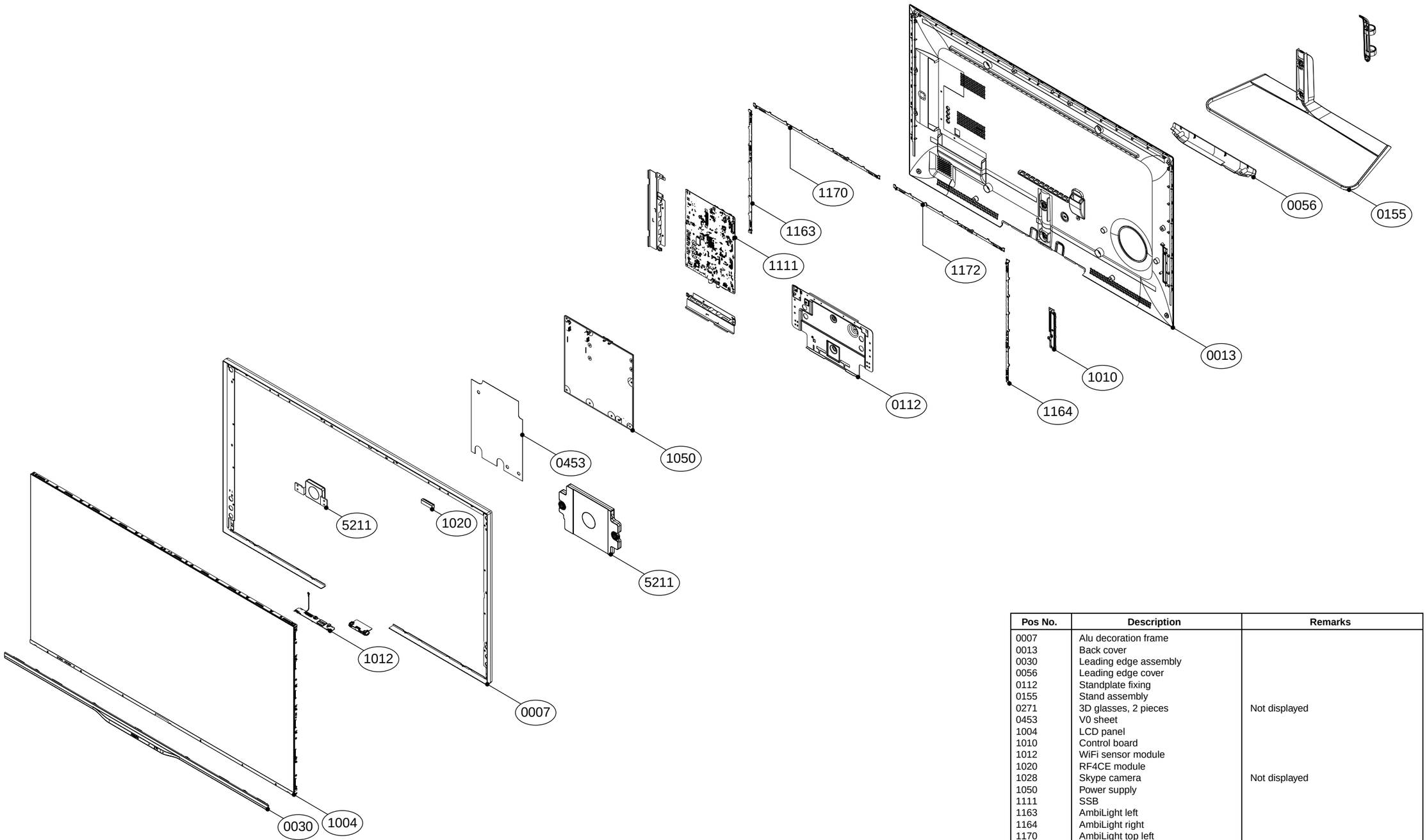
Pos No.	Description	Remarks
0007	Alu decoration frame	
0009	Leading edge	
0013	Back cover	
0030	Leading edge assembly	
0056	Leading edge cover	
0112	Standplate fixing	
0155	Stand assembly	
0271	3D glasses, 2 pieces	Not displayed
0453	V0 sheet	
1004	LCD panel	
1010	Control board	
1012	WiFi sensor module	
1020	RF4CE module	
1050	Power supply	
1111	SSB	
1163	AmbiLight left	
1164	AmbiLight right	
1185	Remote control	Not displayed
5211	Loudspeaker combination	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

19370_069_130205.eps
130205

11.2 7000 series 42"/47"

7000 series 42"/47"



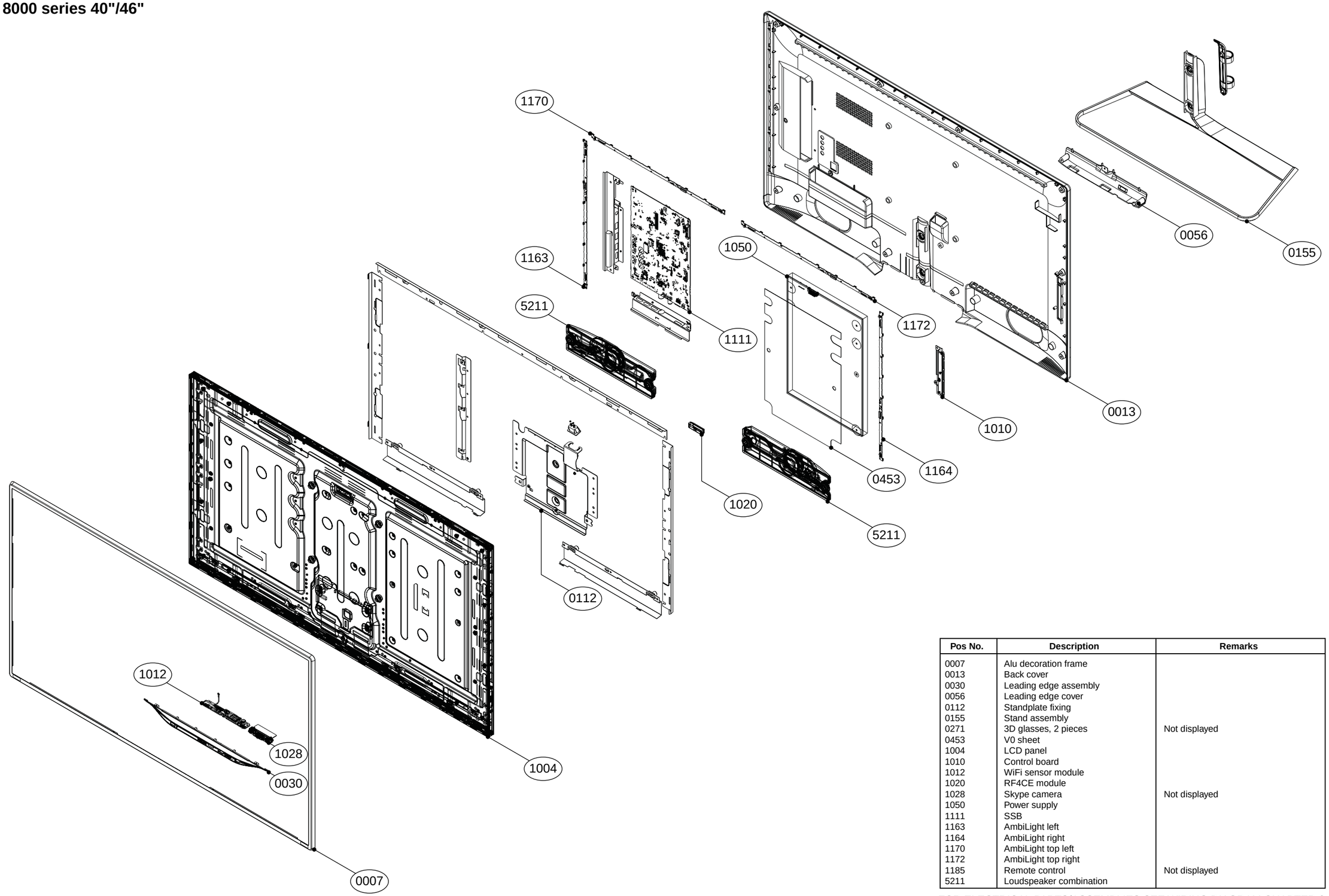
Pos No.	Description	Remarks
0007	Alu decoration frame	
0013	Back cover	
0030	Leading edge assembly	
0056	Leading edge cover	
0112	Standplate fixing	
0155	Stand assembly	
0271	3D glasses, 2 pieces	Not displayed
0453	V0 sheet	
1004	LCD panel	
1010	Control board	
1012	WiFi sensor module	
1020	RF4CE module	
1028	Skype camera	Not displayed
1050	Power supply	
1111	SSB	
1163	AmbiLight left	
1164	AmbiLight right	
1170	AmbiLight top left	
1172	AmbiLight top right	
1185	Remote control	Not displayed
5211	Loudspeaker combination	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

19370_070_130205.eps
130205

11.3 8000 series 40"/46"

8000 series 40"/46"



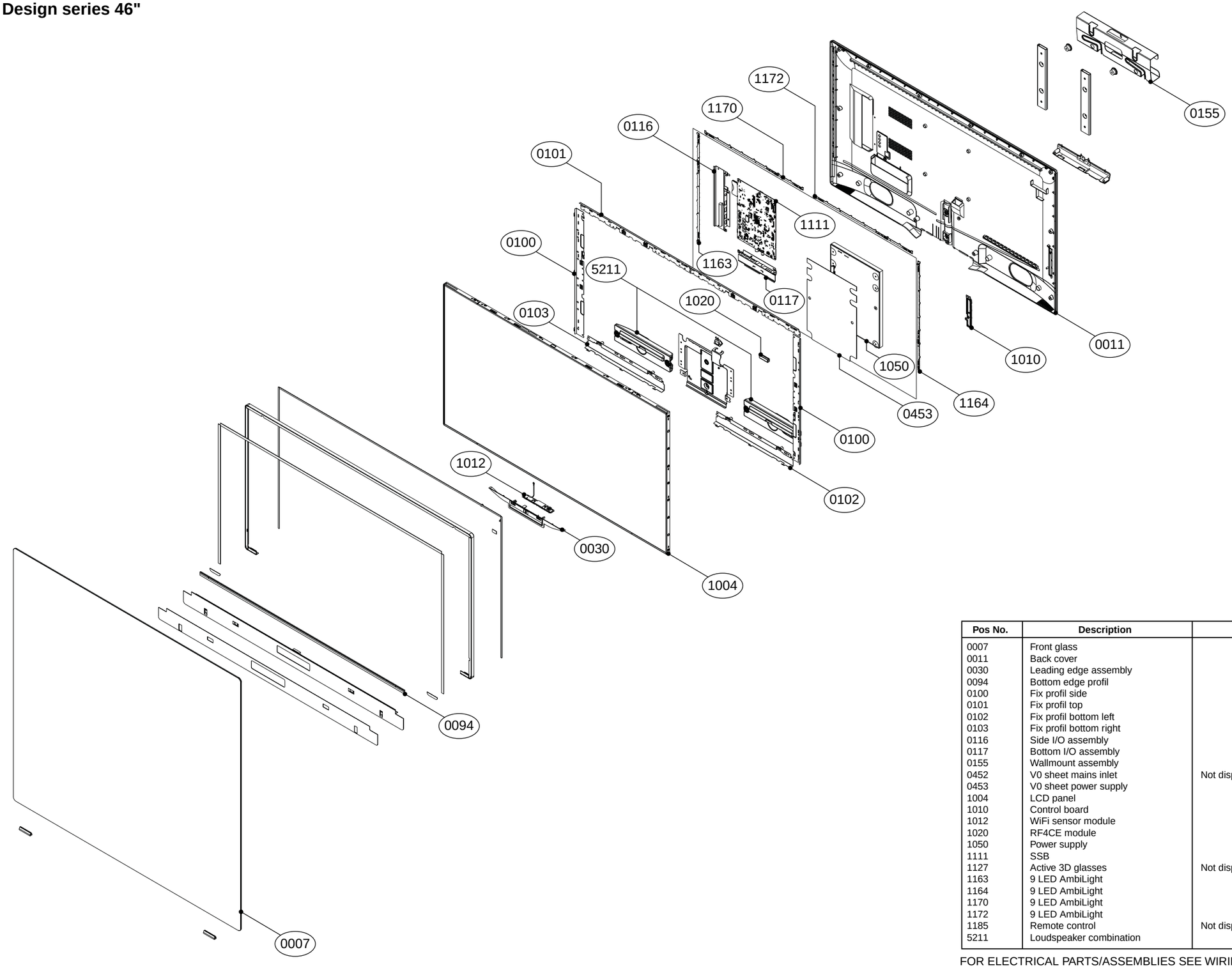
Pos No.	Description	Remarks
0007	Alu decoration frame	
0013	Back cover	
0030	Leading edge assembly	
0056	Leading edge cover	
0112	Standplate fixing	
0155	Stand assembly	
0271	3D glasses, 2 pieces	Not displayed
0453	V0 sheet	
1004	LCD panel	
1010	Control board	
1012	WiFi sensor module	
1020	RF4CE module	
1028	Skype camera	Not displayed
1050	Power supply	
1111	SSB	
1163	AmbiLight left	
1164	AmbiLight right	
1170	AmbiLight top left	
1172	AmbiLight top right	
1185	Remote control	Not displayed
5211	Loudspeaker combination	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

19371_002_130404.eps
130404

11.4 8000 Design series 46"

8000 Design series 46"



Pos No.	Description	Remarks
0007	Front glass	
0011	Back cover	
0030	Leading edge assembly	
0094	Bottom edge profil	
0100	Fix profil side	
0101	Fix profil top	
0102	Fix profil bottom left	
0103	Fix profil bottom right	
0116	Side I/O assembly	
0117	Bottom I/O assembly	
0155	Wallmount assembly	
0452	V0 sheet mains inlet	Not displayed
0453	V0 sheet power supply	
1004	LCD panel	
1010	Control board	
1012	WiFi sensor module	
1020	RF4CE module	
1050	Power supply	
1111	SSB	
1127	Active 3D glasses	Not displayed
1163	9 LED AmbiLight	
1164	9 LED AmbiLight	
1170	9 LED AmbiLight	
1172	9 LED AmbiLight	
1185	Remote control	Not displayed
5211	Loudspeaker combination	

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19374_017_131210.eps
131210

6000 series 55"/60"

Not available at time of issue

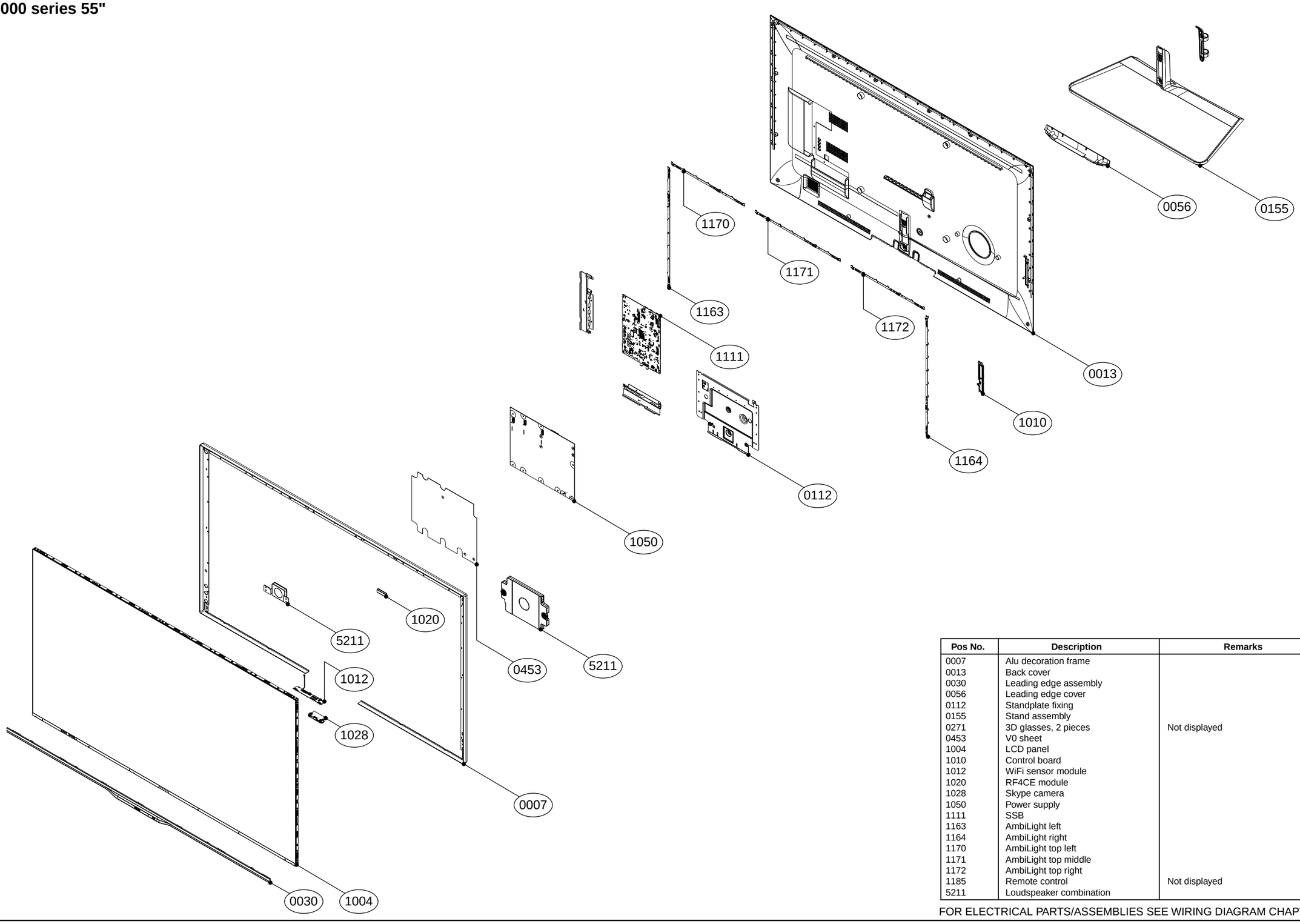
Pos No.	Description	Remarks
0007	Alu decoration frame	
0009	Leading edge	
0013	Back cover	
0030	Leading edge assembly	
0056	Leading edge cover	
0112	Standplate fixing	
0155	Stand assembly	
0271	3D glasses, 2 pieces	Not displayed
0453	V0 sheet	
1004	LCD panel	
1010	Control board	
1012	WiFi sensor module	
1020	RF4CE module	
1050	Power supply	
1111	SSB	
1163	AmbiLight left	
1164	AmbiLight right	
1185	Remote control	Not displayed
5211	Loudspeaker combination	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

19370_071_130205.eps
130205

11.6 7000 series 55"

7000 series 55"



Pos No.	Description	Remarks
0007	Alu decoration frame	
0013	Back cover	
0030	Leading edge assembly	
0056	Leading edge cover	
0112	Standplate fixing	
0155	Stand assembly	
0271	3D glasses, 2 pieces	Not displayed
0453	V0 sheet	
1004	LCD panel	
1010	Control board	
1012	WiFi sensor module	
1020	RF4CE module	
1028	Skype camera	
1050	Power supply	
1111	SSB	
1163	AmbiLight left	
1164	AmbiLight right	
1170	AmbiLight top left	
1171	AmbiLight top middle	
1172	AmbiLight top right	
1185	Remote control	Not displayed
5211	Loudspeaker combination	

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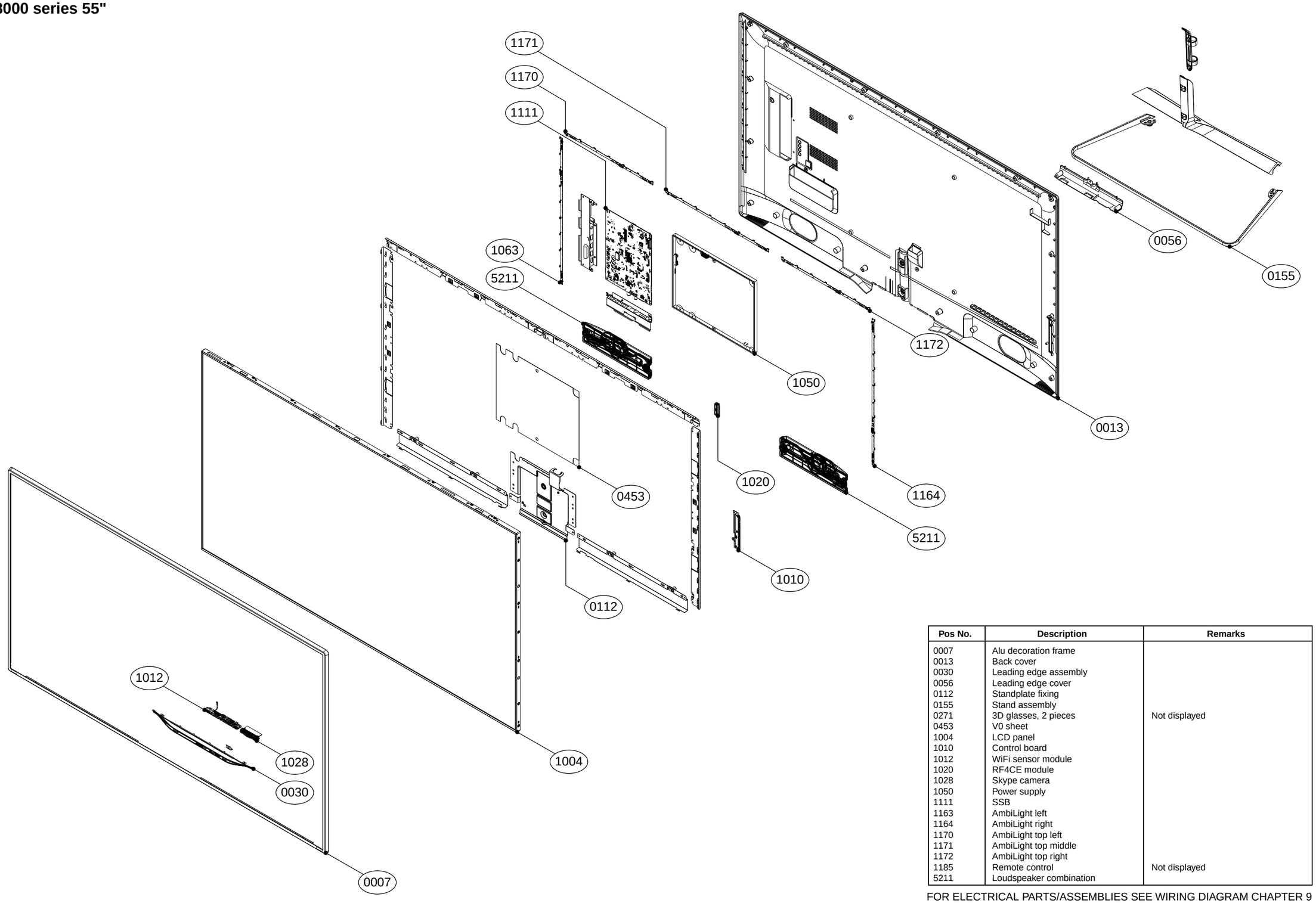
19370_072_130205.eps
130205

11.7 8000 series 55"

8000 series 55"



Pos No.	Description	Remarks
0007	Alu decoration frame	
0013	Back cover	
0030	Leading edge assembly	
0056	Leading edge cover	
0112	Standplate fixing	
0155	Stand assembly	
0271	3D glasses, 2 pieces	Not displayed
0453	V0 sheet	
1004	LCD panel	
1010	Control board	
1012	WiFi sensor module	
1020	RF4CE module	
1028	Skype camera	
1050	Power supply	
1111	SSB	
1163	AmbiLight left	
1164	AmbiLight right	
1170	AmbiLight top left	
1171	AmbiLight top middle	
1172	AmbiLight top right	
1185	Remote control	Not displayed
5211	Loudspeaker combination	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

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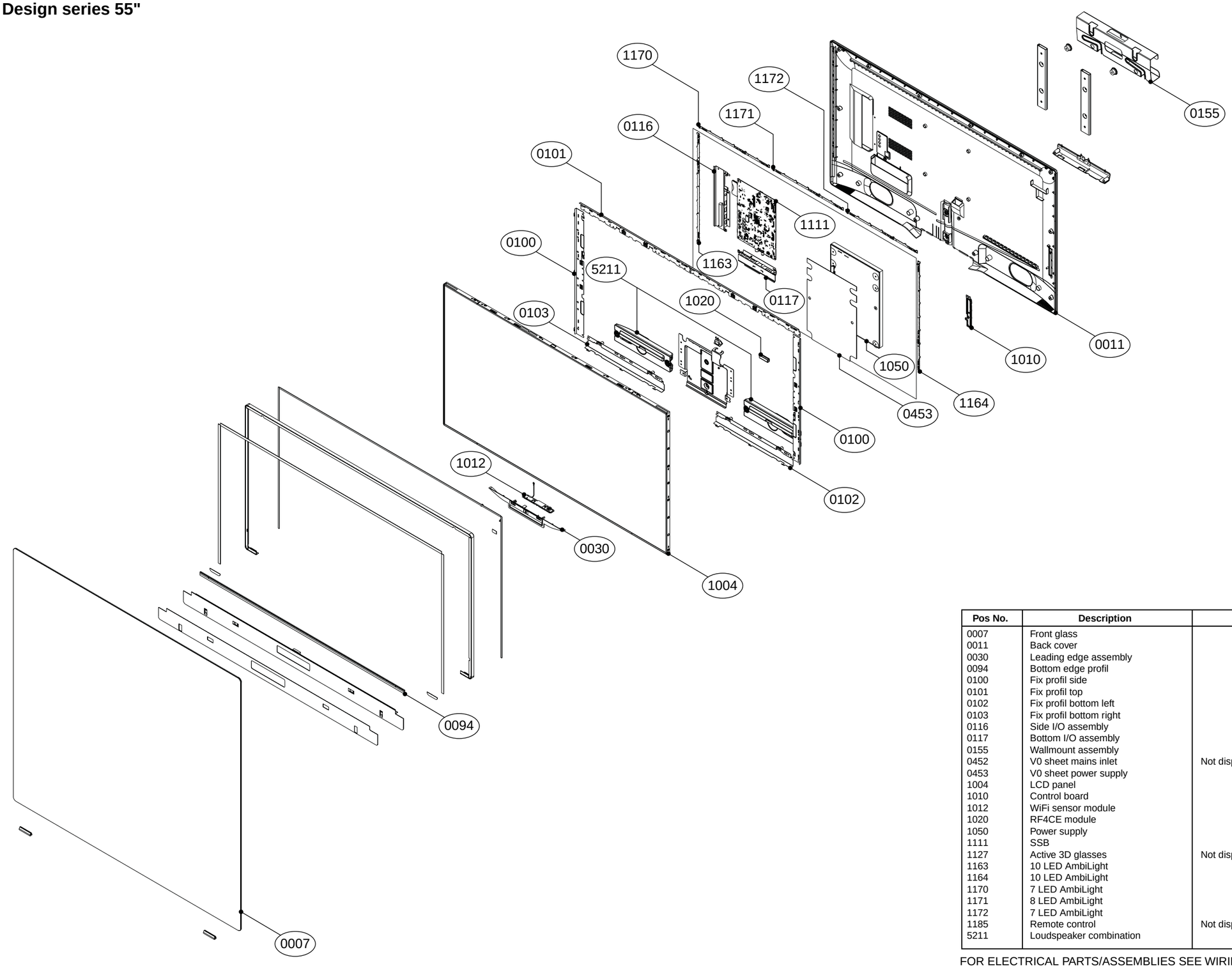
130404

11.8 8000 Design series 55"

8000 Design series 55"



Pos No.	Description	Remarks
0007	Front glass	
0011	Back cover	
0030	Leading edge assembly	
0094	Bottom edge profil	
0100	Fix profil side	
0101	Fix profil top	
0102	Fix profil bottom left	
0103	Fix profil bottom right	
0116	Side I/O assembly	
0117	Bottom I/O assembly	
0155	Wallmount assembly	
0452	V0 sheet mains inlet	Not displayed
0453	V0 sheet power supply	
1004	LCD panel	
1010	Control board	
1012	WiFi sensor module	
1020	RF4CE module	
1050	Power supply	
1111	SSB	
1127	Active 3D glasses	Not displayed
1163	10 LED AmbiLight	
1164	10 LED AmbiLight	
1170	7 LED AmbiLight	
1171	8 LED AmbiLight	
1172	7 LED AmbiLight	
1185	Remote control	Not displayed
5211	Loudspeaker combination	

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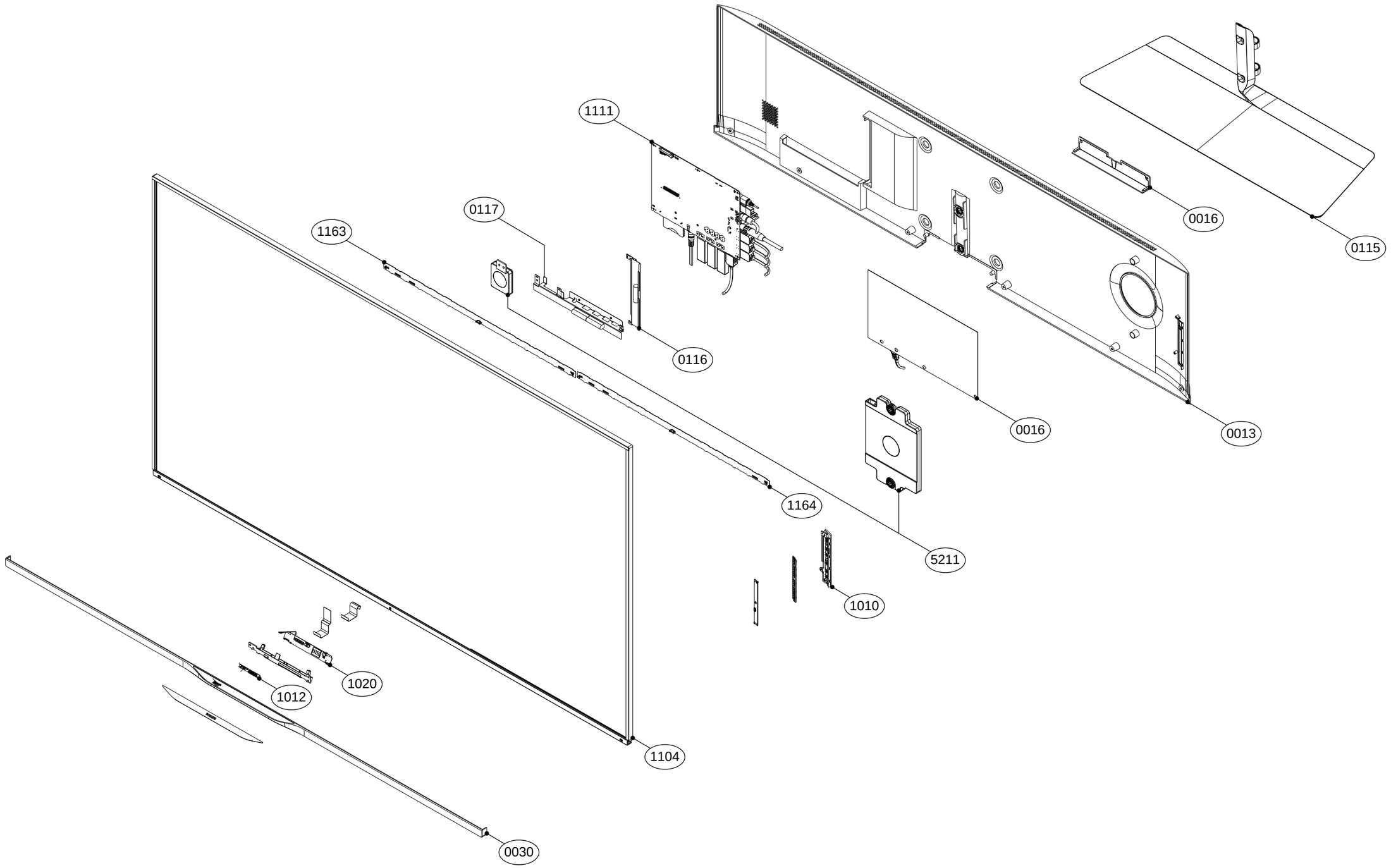
131210

11.9 8000 series 60"

8000 series 60"



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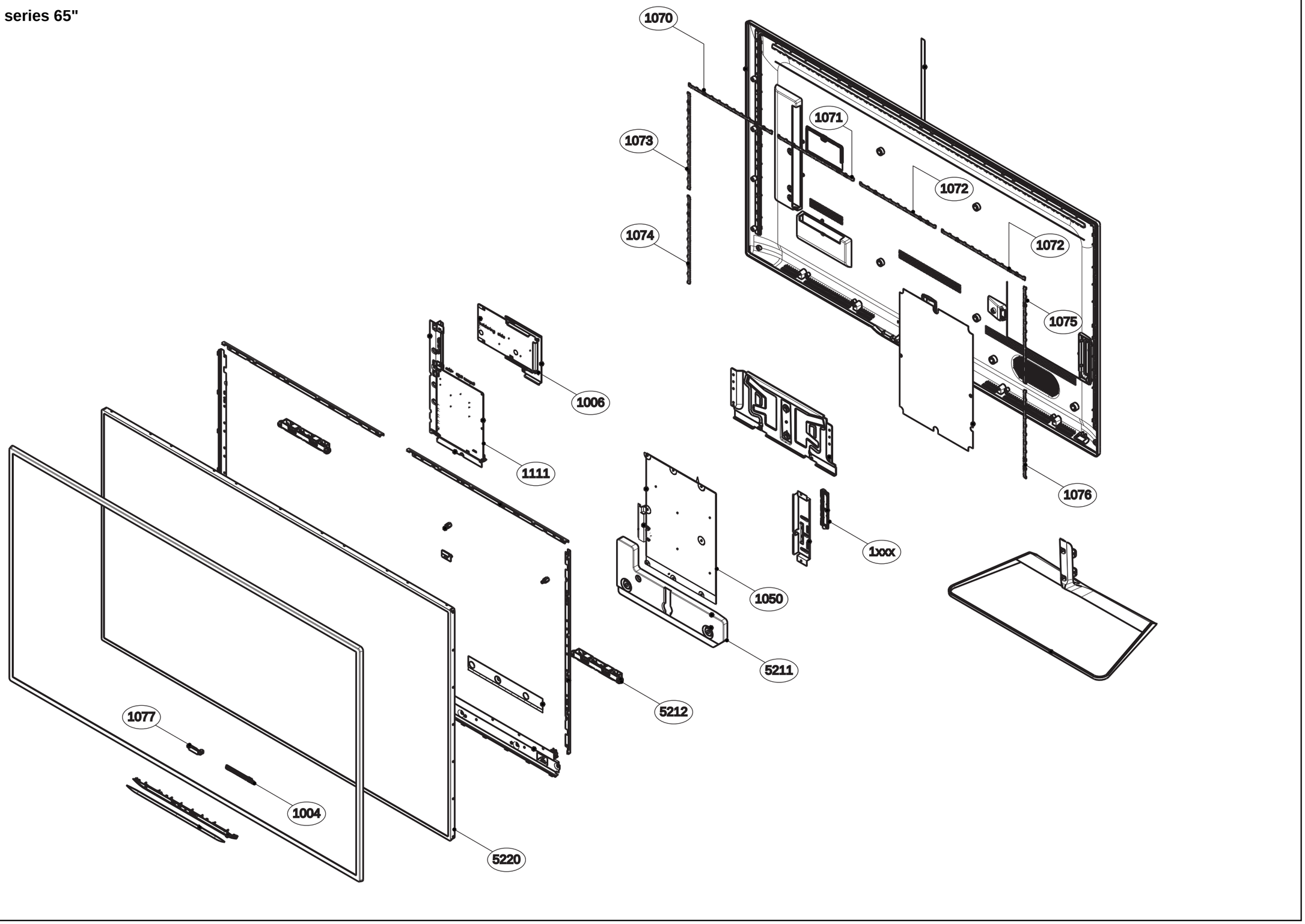
131220

11.10 9000 series 65"

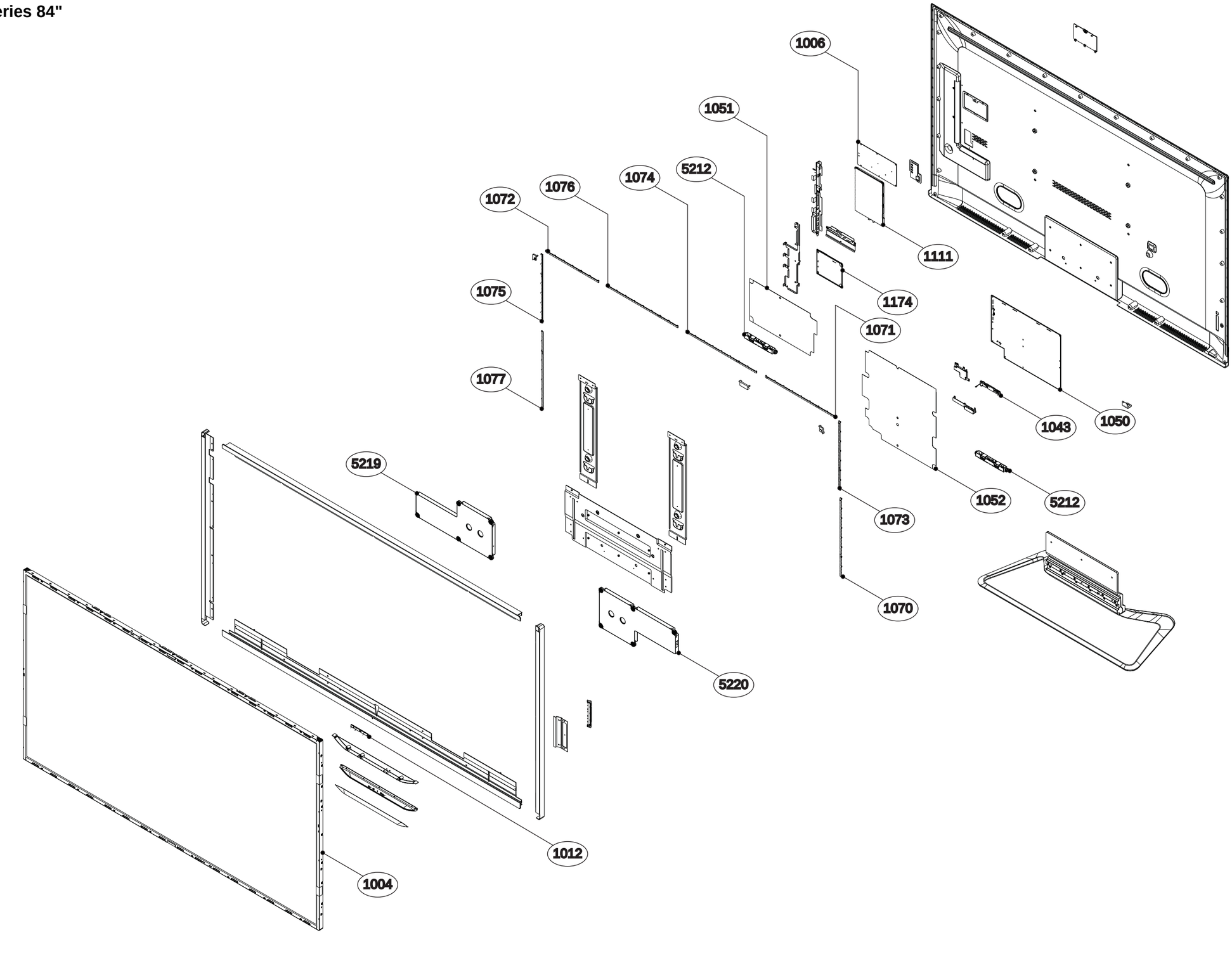
9000 series 65"



19374_021_131223.eps
140109

11.11 9000 series 84"

9000 series 84"



19374_019_131212.eps
131223