Colour Television

Chassis

Q552.4E

LA

Service
Service
Service

Service Manual

Contents

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1. Revision List

Manual xxxx xxx xxxx.0
- First release.

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

Manual xxxx xxx xxxx.2
- **Chapter 4:** added additional LVDS cable handling info; see section 4.4.2.

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		9						10				11	
		Mechanics		Block Diagrams						Schematics				Styling	
CTN	Connection Overview	Wire Dressing Dressing	Assembly Removal	Wiring Diagram	Video	Audio	Control & Clock	I2C	Supply lines	Power Supply	SSB	J (Sensor Board)	E (Keyboard/Leading Edge)	Name	Sheet
32PFL4007H/12	2.3	4-1	4.4	9.1	9.9	9.10	9.11	9.12	9.13	10.1	10.4	10.7	10.9	4000	11.1
32PFL4007H/60	2.3	4-1	4.4	9.1	9.9	9.10	9.11	9.12	9.13	10.1	10.4	10.7	10.9	4000	11.1
32PFL4007K/12	2.3	4-1	4.4	9.1	9.9	9.10	9.11	9.12	9.13	10.1	10.4	10.7	10.9	4000	11.1
32PFL4007M/08	2.3	4-1	4.4	9.1	9.9	9.10	9.11	9.12	9.13	10.1	10.4	10.7	10.9	4000	11.1
32PFL4007T/12	2.3	4-1	4.4	9.1	9.9	9.10	9.11	9.12	9.13	10.1	10.4	10.7	10.9	4000	11.1
32PFL4007T/60	2.3	4-1	4.4	9.1	9.9	9.10	9.11	9.12	9.13	10.1	10.4	10.7	10.9	4000	11.1
32PFL4027H/12	2.3	4-1	4.4	9.1	9.9	9.10	9.11	9.12	9.13	10.1	10.4	10.7	10.9	4000	11.1
32PFL4027H/60	2.3	4-1	4.4	9.1	9.9	9.10	9.11	9.12	9.13	10.1	10.4	10.7	10.9	4000	11.1
32PFL4027K/12	2.3	4-1	4.4	9.1	9.9	9.10	9.11	9.12	9.13	10.1	10.4	10.7	10.9	4000	11.1
32PFL4027T/12	2.3	4-1	4.4	9.1	9.9	9.10	9.11	9.12	9.13	10.1	10.4	10.7	10.9	4000	11.1
32PFL4027T/60	2.3	4-1	4.4	9.1	9.9	9.10	9.11	9.12	9.13	10.1	10.4	10.7	10.9	4000	11.1
32PFL4037H/12	2.3	4-1	4.4	9.1	9.9	9.10	9.11	9.12	9.13	10.1	10.4	10.7	10.9	4000	11.1
32PFL4037H/60	2.3	4-1	4.4	9.1	9.9	9.10	9.11	9.12	9.13	10.1	10.4	10.7	10.9	4000	11.1
32PFL4037K/12	2.3	4-1	4.4	9.1	9.9	9.10	9.11	9.12	9.13	10.1	10.4	10.7	10.9	4000	11.1
32PFL4037T/12	2.3	4-1	4.4	9.1	9.9	9.10	9.11	9.12	9.13	10.1	10.4	10.7	10.9	4000	11.1
32PFL4037T/60	2.3	4-1	4.4	9.1	9.9	9.10	9.11	9.12	9.13	10.1	10.4	10.7	10.9	4000	11.1
32PFL4047T/12	2.3	4-1	4.4	9.1	9.9	9.10	9.11	9.12	9.13	10.1	10.4	10.7	10.9	4000	11.1
32PFL5007H/12	2.3	4-5	4.4	9.5	9.9	9.10	9.11	9.12	9.13	-	10.4	10.5	10.8	5000	11.5
32PFL5007H/60	2.3	4-5	4.4	9.5	9.9	9.10	9.11	9.12	9.13	-	10.4	10.5	10.8	5000	11.5
32PFL5007K/12	2.3	4-5	4.4	9.5	9.9	9.10	9.11	9.12	9.13	-	10.4	10.5	10.8	5000	11.5
32PFL5007M/08	2.3	4-5	4.4	9.5	9.9	9.10	9.11	9.12	9.13	-	10.4	10.5	10.8	5000	11.5
32PFL5007T/12	2.3	4-5	4.4	9.5	9.9	9.10	9.11	9.12	9.13	-	10.4	10.5	10.8	5000	11.5
32PFL5007T/60	2.3	4-5	4.4	9.5	9.9	9.10	9.11	9.12	9.13	-	10.4	10.5	10.8	5000	11.5
32PFL5507H/12	2.3	4-5	4.4	9.5	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.5
32PFL5507H/60	2.3	4-5	4.4	9.5	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.5
32PFL5507K/12	2.3	4-5	4.4	9.5	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.5
32PFL5507M/08	2.3	4-5	4.4	9.5	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.5
32PFL5507T/12	2.3	4-5	4.4	9.5	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.5
32PFL5507T/60	2.3	4-5	4.4	9.5	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.5
37PFL4007H/12	2.3	4-2	4.4	9.2	9.9	9.10	9.11	9.12	9.13	10.1	10.4	10.7	10.9	4000	11.2
37PFL4007K/12	2.3	4-2	4.4	9.2	9.9	9.10	9.11	9.12	9.13	10.1	10.4	10.7	10.9	4000	11.2
37PFL4007M/08	2.3	4-2	4.4	9.2	9.9	9.10	9.11	9.12	9.13	10.1	10.4	10.7	10.9	4000	11.2
37PFL4007T/12	2.3	4-2	4.4	9.2	9.9	9.10	9.11	9.12	9.13	10.1	10.4	10.7	10.9	4000	11.2
37PFL4007T/60	2.3	4-2	4.4	9.2	9.9	9.10	9.11	9.12	9.13	10.1	10.4	10.7	10.9	4000	11.2

	2	4		9						10				11	
		Mechanics		Block Diagrams						Schematics				Styling	
CTN	Connection Overview	Wire Dressing Dressing	Assembly Removal	Wiring Diagram	Video	Audio	Control & Clock	I2C	Supply lines	Power Supply	SSB	J (Sensor Board)	E (Keyboard/Leading Edge)	Name	Sheet
40PFL5007H/12	2.3	4-6	4.4	9.6	9.9	9.10	9.11	9.12	9.13	-	10.4	10.5	10.8	5000	11.6
40PFL5007H/60	2.3	4-6	4.4	9.6	9.9	9.10	9.11	9.12	9.13	-	10.4	10.5	10.8	5000	11.6
40PFL5007K/12	2.3	4-6	4.4	9.6	9.9	9.10	9.11	9.12	9.13	-	10.4	10.5	10.8	5000	11.6
40PFL5007M/08	2.3	4-6	4.4	9.6	9.9	9.10	9.11	9.12	9.13	-	10.4	10.5	10.8	5000	11.6
40PFL5007T/12	2.3	4-6	4.4	9.6	9.9	9.10	9.11	9.12	9.13	-	10.4	10.5	10.8	5000	11.6
40PFL5007T/60	2.3	4-6	4.4	9.6	9.9	9.10	9.11	9.12	9.13	-	10.4	10.5	10.8	5000	11.6
40PFL5507H/12	2.3	4-6	4.4	9.6	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.6
40PFL5507H/60	2.3	4-6	4.4	9.6	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.6
40PFL5507K/12	2.3	4-6	4.4	9.6	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.6
40PFL5507M/08	2.3	4-6	4.4	9.6	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.6
40PFL5507T/12	2.3	4-6	4.4	9.6	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.6
40PFL5507T/60	2.3	4-6	4.4	9.6	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.6
40PFL5527H/12	2.3	4-6	4.4	9.6	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.6
40PFL5527H/60	2.3	4-6	4.4	9.6	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.6
40PFL5527K/12	2.3	4-6	4.4	9.6	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.6
40PFL5527M/08	2.3	4-6	4.4	9.6	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.6
40PFL5527T/12	2.3	4-6	4.4	9.6	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.6
40PFL5527T/60	2.3	4-6	4.4	9.6	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.6
40PFL5537H/12	2.3	4-6	4.4	9.6	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.6
40PFL5537H/60	2.3	4-6	4.4	9.6	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.6
40PFL5537K/12	2.3	4-6	4.4	9.6	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.6
40PFL5537M/08	2.3	4-6	4.4	9.6	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.6
40PFL5537T/12	2.3	4-6	4.4	9.6	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.6
40PFL5537T/60	2.3	4-6	4.4	9.6	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.6
42PFL4007H/12	2.3	4-3	4.4	9.3	9.9	9.10	9.11	9.12	9.13	10.2	10.4	10.7	10.9	4000	11.3
42PFL4007K/12	2.3	4-3	4.4	9.3	9.9	9.10	9.11	9.12	9.13	10.2	10.4	10.7	10.9	4000	11.3
42PFL4007M/08	2.3	4-3	4.4	9.3	9.9	9.10	9.11	9.12	9.13	10.2	10.4	10.7	10.9	4000	11.3
42PFL4007T/12	2.3	4-3	4.4	9.3	9.9	9.10	9.11	9.12	9.13	10.2	10.4	10.7	10.9	4000	11.3
42PFL4007T/60	2.3	4-3	4.4	9.3	9.9	9.10	9.11	9.12	9.13	10.2	10.4	10.7	10.9	4000	11.3
42PFL4047T/12	2.3	4-3	4.4	9.3	9.9	9.10	9.11	9.12	9.13	10.2	10.4	10.7	10.9	4000	11.3
42PFL4307H/12	2.3	4-3	4.4	9.3	9.9	9.10	9.11	9.12	9.13	10.2	10.4	10.7	10.9	4000	11.3
42PFL4307K/12	2.3	4-3	4.4	9.3	9.9	9.10	9.11	9.12	9.13	10.2	10.4	10.7	10.9	4000	11.3
42PFL4307T/12	2.3	4-3	4.4	9.3	9.9	9.10	9.11	9.12	9.13	10.2	10.4	10.7	10.9	4000	11.3
42PFL4317K/12	2.3	4-3	4.4	9.3	9.9	9.10	9.11	9.12	9.13	10.2	10.4	10.7	10.9	4000	11.3
46PFL5007H/12	2.3	4-7	4.4	9.7	9.9	9.10	9.11	9.12	9.13	-	10.4	10.5	10.8	5000	11.7
46PFL5007K/12	2.3	4-7	4.4	9.7	9.9	9.10	9.11	9.12	9.13	-	10.4	10.5	10.8	5000	11.7
46PFL5007M/08	2.3	4-7	4.4	9.7	9.9	9.10	9.11	9.12	9.13	-	10.4	10.5	10.8	5000	11.7
46PFL5007T/12	2.3	4-7	4.4	9.7	9.9	9.10	9.11	9.12	9.13	-	10.4	10.5	10.8	5000	11.7
46PFL5507H/12	2.3	4-7	4.4	9.7	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.7
46PFL5507H/60	2.3	4-7	4.4	9.7	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.7
46PFL5507K/12	2.3	4-7	4.4	9.7	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.7
46PFL5507M/08	2.3	4-7	4.4	9.7	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.7
46PFL5507T/12	2.3	4-7	4.4	9.7	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.7
46PFL5507T/60	2.3	4-7	4.4	9.7	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.7
46PFL5527H/12	2.3	4-7	4.4	9.7	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.7
46PFL5527H/60	2.3	4-7	4.4	9.7	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.7
46PFL5527K/12	2.3	4-7	4.4	9.7	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.7
46PFL5527M/08	2.3	4-7	4.4	9.7	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.7
46PFL5527T/12	2.3	4-7	4.4	9.7	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.7
46PFL5527T/60	2.3	4-7	4.4	9.7	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.7
46PFL5537T/60	2.3	4-7	4.4	9.7	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.7
46PFL5537H/12	2.3	4-7	4.4	9.7	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.7
46PFL5537H/60	2.3	4-7	4.4	9.7	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.7
46PFL5537K/12	2.3	4-7	4.4	9.7	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.7
46PFL5537M/08	2.3	4-7	4.4	9.7	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.7
46PFL5537T/12	2.3	4-7	4.4	9.7	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.7
47PFL4007H/12	2.3	4-4	4.4	9.4	9.9	9.10	9.11	9.12	9.13	10.2	10.4	10.7	10.9	4000	11.4
47PFL4007H/60	2.3	4-4	4.4	9.4	9.9	9.10	9.11	9.12	9.13	10.2	10.4	10.7	10.9	4000	11.4
47PFL4007K/12	2.3	4-4	4.4	9.4	9.9	9.10	9.11	9.12	9.13	10.2	10.4	10.7	10.9	4000	11.4
47PFL4007M/08	2.3	4-4	4.4	9.4	9.9	9.10	9.11	9.12	9.13	10.2	10.4	10.7	10.9	4000	11.4
47PFL4007T/12	2.3	4-4	4.4	9.4	9.9	9.10	9.11	9.12	9.13	10.2	10.4	10.7	10.9	4000	11.4
47PFL4007T/60	2.3	4-4	4.4	9.4	9.9	9.10	9.11	9.12	9.13	10.2	10.4	10.7	10.9	4000	11.4
47PFL4037T/12	2.3	4-4	4.4	9.4	9.9	9.10	9.11	9.12	9.13	10.2	10.4	10.7	10.9	4000	11.4
47PFL4047T/12	2.3	4-4	4.4	9.4	9.9	9.10	9.11	9.12	9.13	10.2	10.4	10.7	10.9	4000	11.4

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	2	4		9						10				11	
		Mechanics		Block Diagrams						Schematics				Styling	
CTN	Connection Overview	Wire Dressing Dressing	Assembly Removal	Wiring Diagram	Video	Audio	Control & Clock	I2C	Supply lines	Power Supply	SSB	J (Sensor Board)	E (Keyboard/Leading Edge)	Name	Sheet
47PFL4307H/12	2.3	4-4	4.4	9.4	9.9	9.10	9.11	9.12	9.13	10.2	10.4	10.7	10.9	4000	11.4
47PFL4307K/12	2.3	4-4	4.4	9.4	9.9	9.10	9.11	9.12	9.13	10.2	10.4	10.7	10.9	4000	11.4
47PFL4307T/12	2.3	4-4	4.4	9.4	9.9	9.10	9.11	9.12	9.13	10.2	10.4	10.7	10.9	4000	11.4
55PFL5507H/12	2.3	4-8	4.4	9.8	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.8
55PFL5507H/60	2.3	4-8	4.4	9.8	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.8
55PFL5507K/12	2.3	4-8	4.4	9.8	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.8
55PFL5507M/08	2.3	4-8	4.4	9.8	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.8
55PFL5507T/12	2.3	4-8	4.4	9.8	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.8
55PFL5507T/60	2.3	4-8	4.4	9.8	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.8
55PFL5527H/12	2.3	4-8	4.4	9.8	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.8
55PFL5527K/12	2.3	4-8	4.4	9.8	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.8
55PFL5527M/08	2.3	4-8	4.4	9.8	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.8
55PFL5527T/12	2.3	4-8	4.4	9.8	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.8
55PFL5537H/12	2.3	4-8	4.4	9.8	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.8
55PFL5537K/12	2.3	4-8	4.4	9.8	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.8
55PFL5537M/08	2.3	4-8	4.4	9.8	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.8
55PFL5537T/12	2.3	4-8	4.4	9.8	9.9	9.10	9.11	9.12	9.13	-	10.3	10.6	10.8	5000	11.8

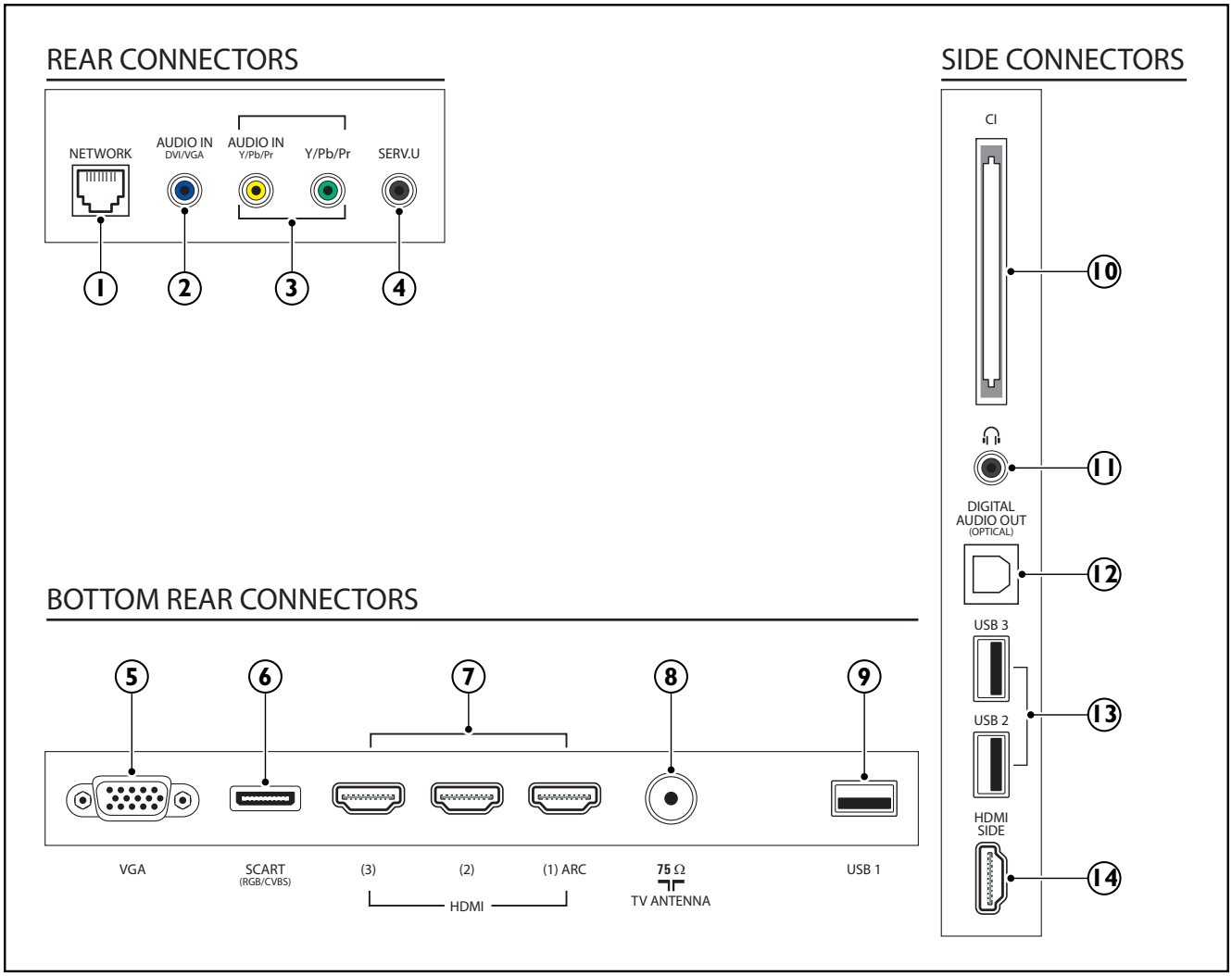
2.2 Directions for Use

You can download this information from the following websites:

http://www.philips.com/support

http://www.p4c.philips.com

2.3 Connections



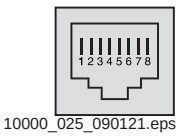
19220_007_120222.eps
120222

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 Rear Connections

1 - RJ45: Ethernet



10000_025_090121.eps
120320

Figure 2-2 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	⏚

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

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

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

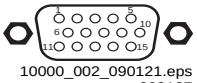
Gn	- Video Y	1 V_{PP} / 75 ohm	⊕◎
Bu	- Video Pb	0.7 V_{PP} / 75 ohm	⊕◎
Rd	- Video Pr	0.7 V_{PP} / 75 ohm	⊕◎
Rd	- Audio - R	0.5 V_{RMS} / 10 kohm	⊕◎
Wh	- Audio - L	0.5 V_{RMS} / 10 kohm	⊕◎

4 - Service Connector (UART)

1	- Ground	Gnd	⏚
2	- UART_TX	Transmit	⊖→
3	- UART_RX	Receive	⊕←

2.3.2 Rear Connections - Bottom

5 - VGA: Video RGB - In



10000_002_090121.eps
090127

Figure 2-3 VGA Connector

1	- Video Red	0.7 V_{PP} / 75 ohm	⊕←
2	- Video Green	0.7 V_{PP} / 75 ohm	⊕←
3	- Video Blue	0.7 V_{PP} / 75 ohm	⊕←
4	- n.c.		
5	- Ground	Gnd	⏚
6	- Ground Red	Gnd	⏚

7	- Ground Green	Gnd	⏚
8	- Ground Blue	Gnd	⏚
9	- +5V$_{DC}$	+5 V	⊕
10	- Ground Sync	Gnd	⏚
11	- n.c.		
12	- DDC_SDA	DDC data	⊕
13	- H-sync	0 - 5 V	⊕
14	- V-sync	0 - 5 V	⊕
15	- DDC_SCL	DDC clock	⊕

6 - SCART: Video RGB - In, CVBS - In, Audio - In

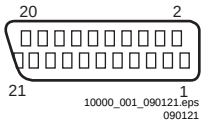


Figure 2-4 SCART connector

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	⏚

7 - HDMI: Digital Video - In, Digital Audio with ARC - In/Out (optional)

Figure 2-5 HDMI (type A) connector

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

8 - Aerial - In

-	- IEC-type (EU)	Coax, 75 ohm	⊤

9 - USB 1: USB2.0

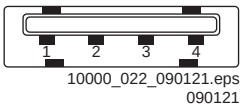


Figure 2-6 USB (type A)

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

2.3.3 Side Connections

10 - Common Interface

68p	- See diagram B05G 10-3-15		⊕⊖

11 - Head phone (Output)

Bk	- Head phone	32 - 600 ohm / 10 mW	3.5mm

12 - Optical: S/PDIF - Out

Bk	- Coaxial	Optical signal	⊖

13 - USB 2, 3: USB2.0

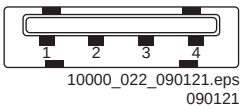


Figure 2-7 USB (type A)

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

14 - HDMI SIDE: Digital Video, Digital Audio - In

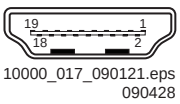


Figure 2-8 HDMI (type A) connector

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

2.4 Chassis Overview

Refer to chapter 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

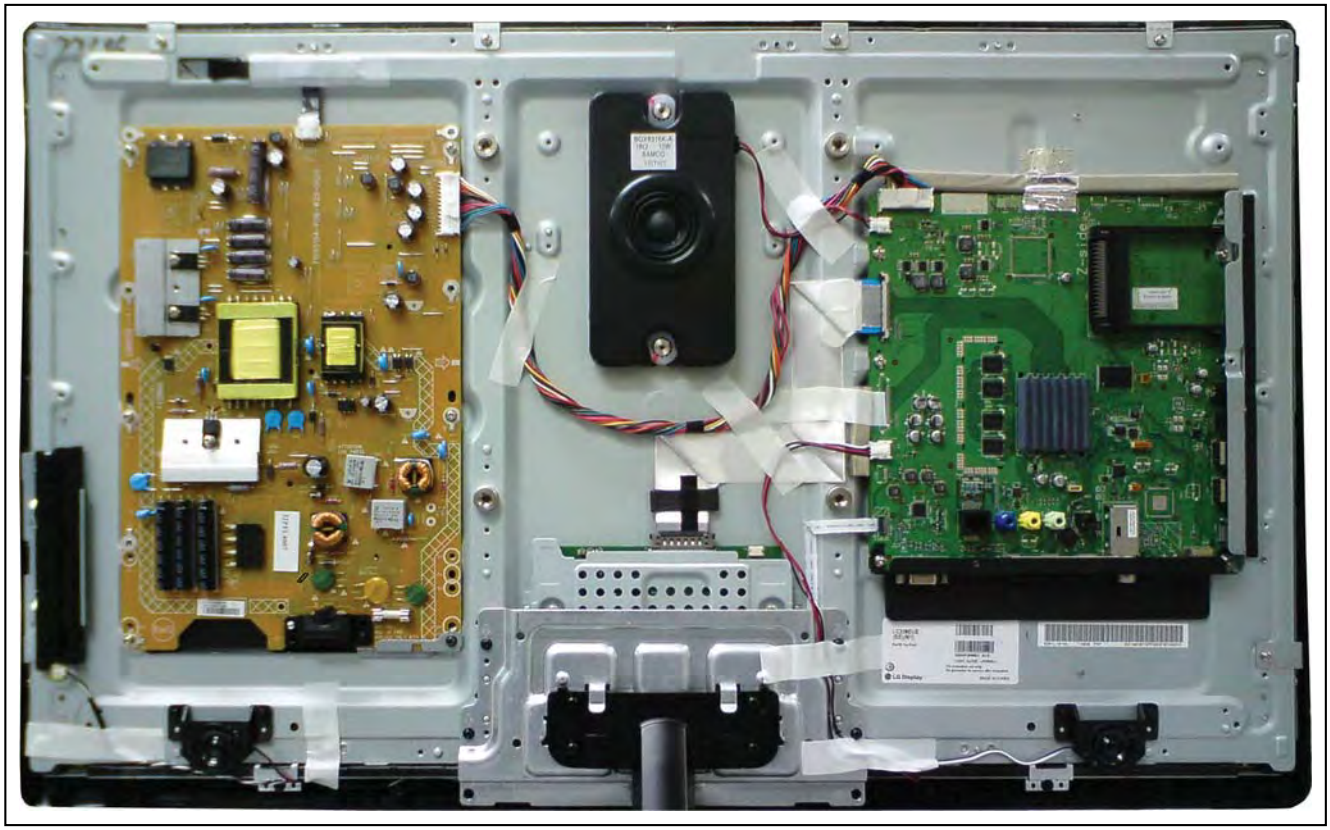
4. Mechanical Instructions

Index of this chapter:

Notes:

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

4.1 Cable Dressing 4000 Styling (xxPFL4xx7x/xx series)



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120223

Figure 4-1 Cable dressing 32PFL4xx7x/xx

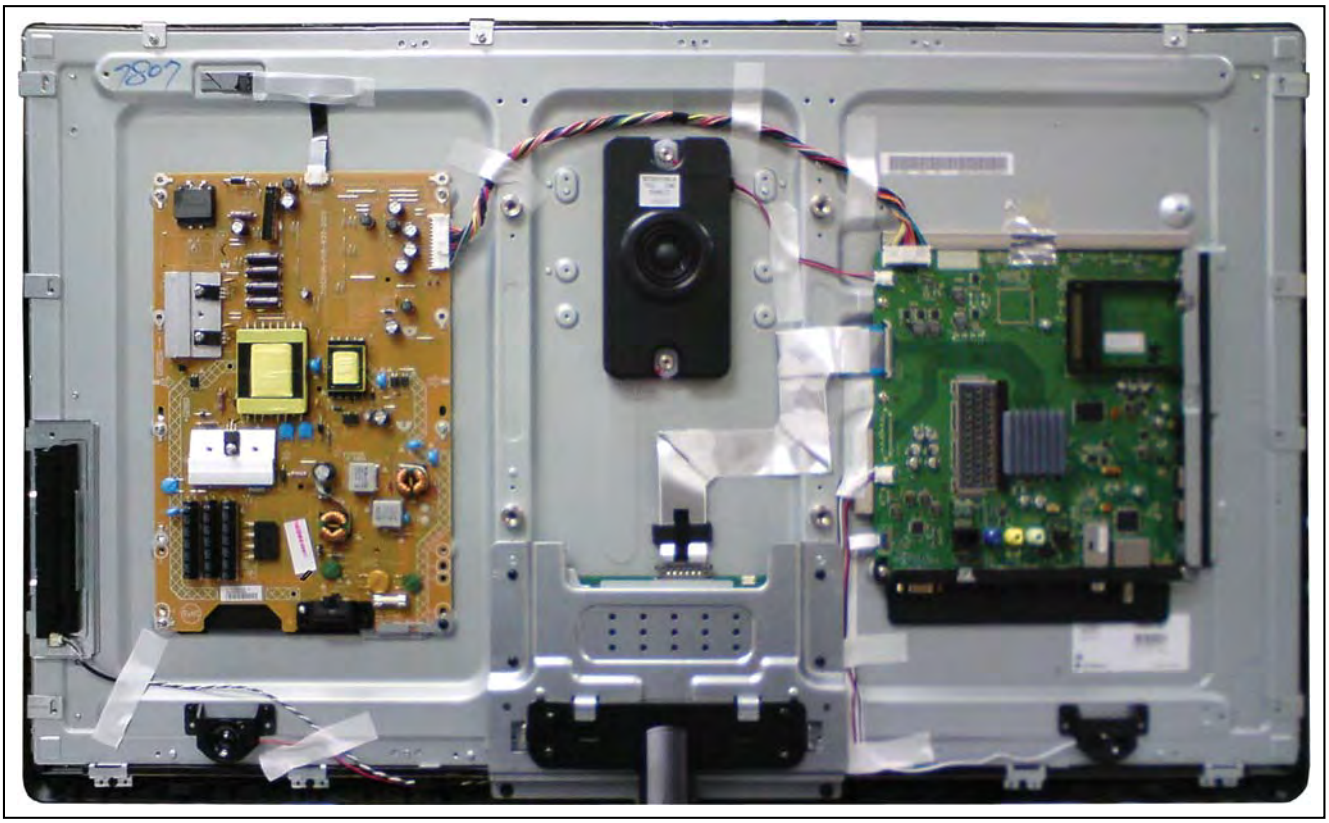

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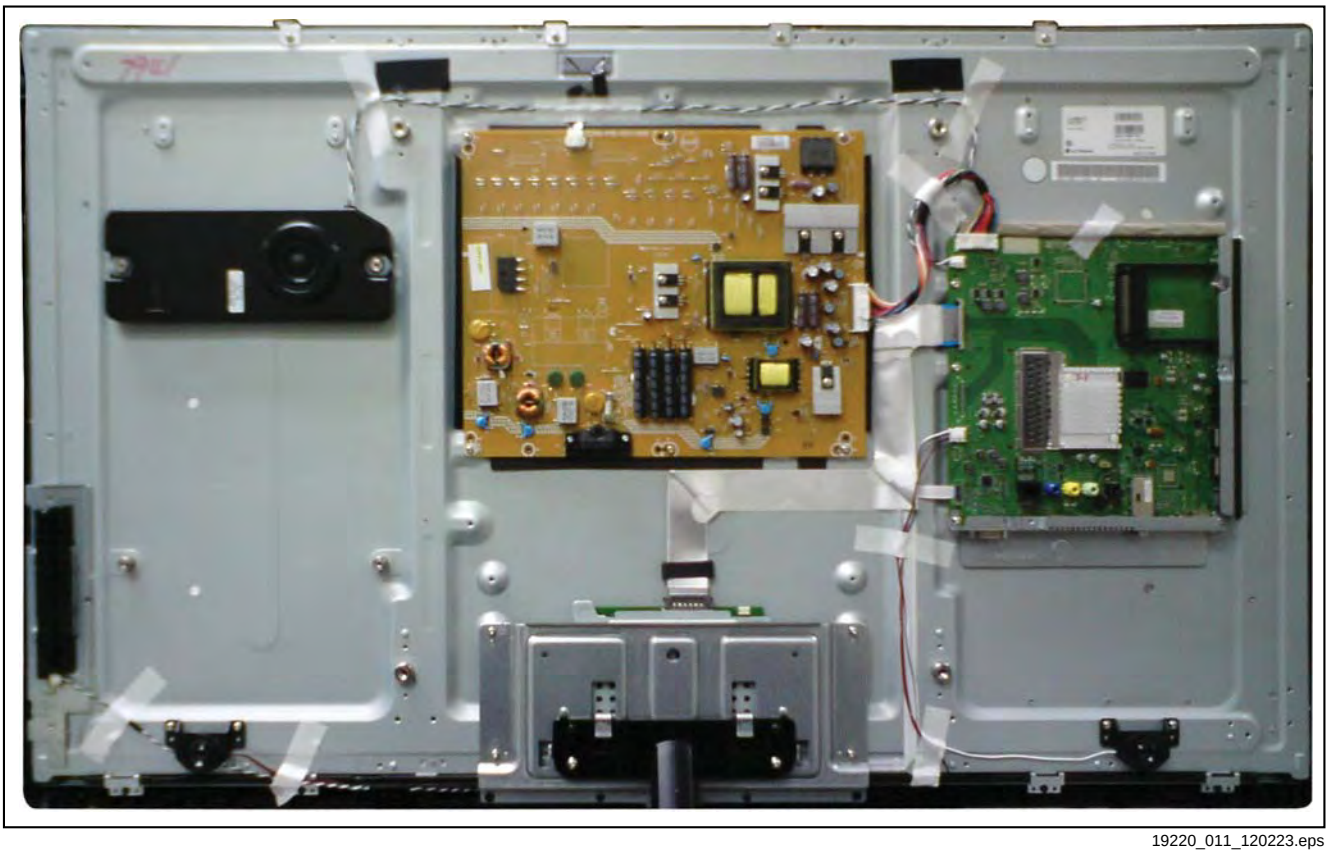
Figure 4-2 Cable dressing 37PFL4xx7x/xx



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120223

Figure 4-3 Cable dressing 42PFL4xx7x/xx

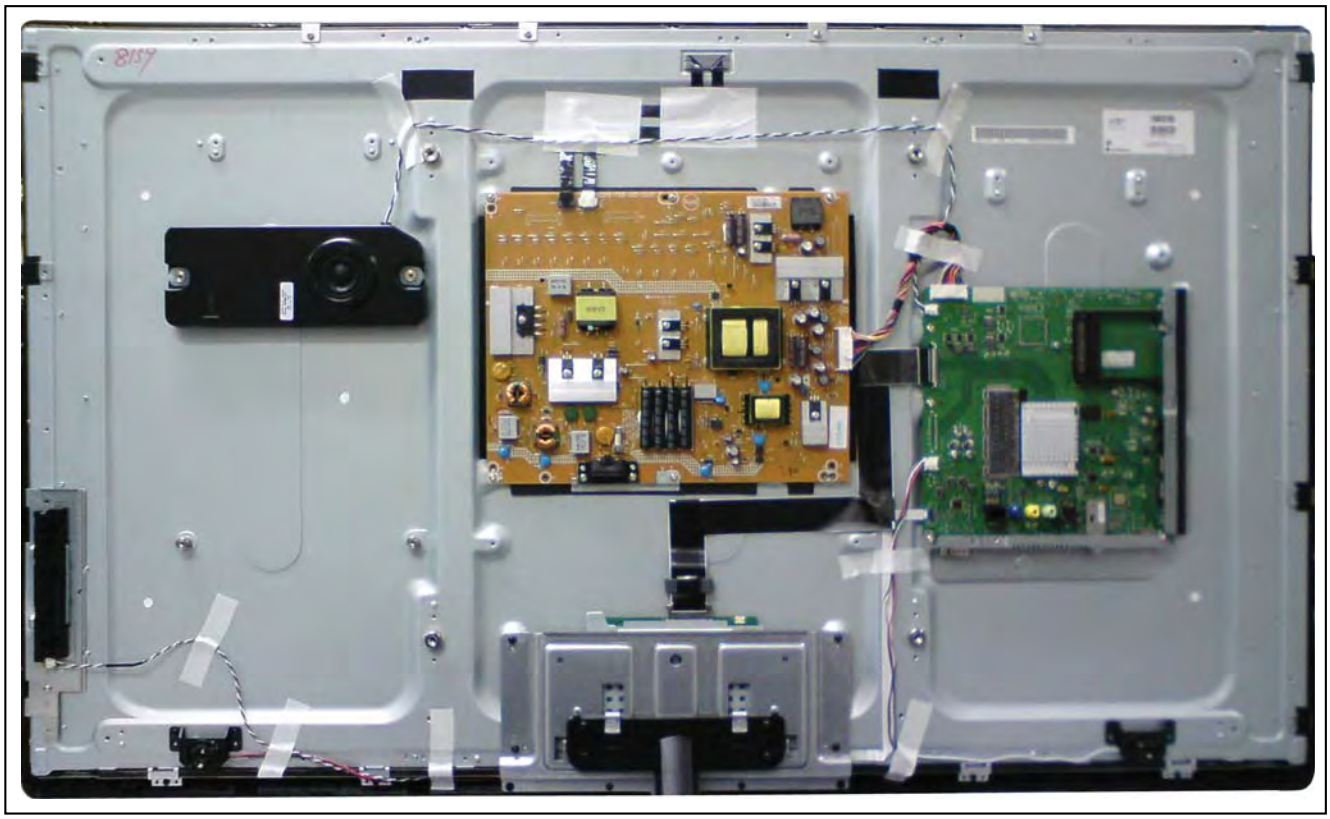

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Figure 4-4 Cable dressing 47PFL4xx7x/xx

4.2 Cable Dressing 5000 styling (xxPFL5xx7x/xx series)

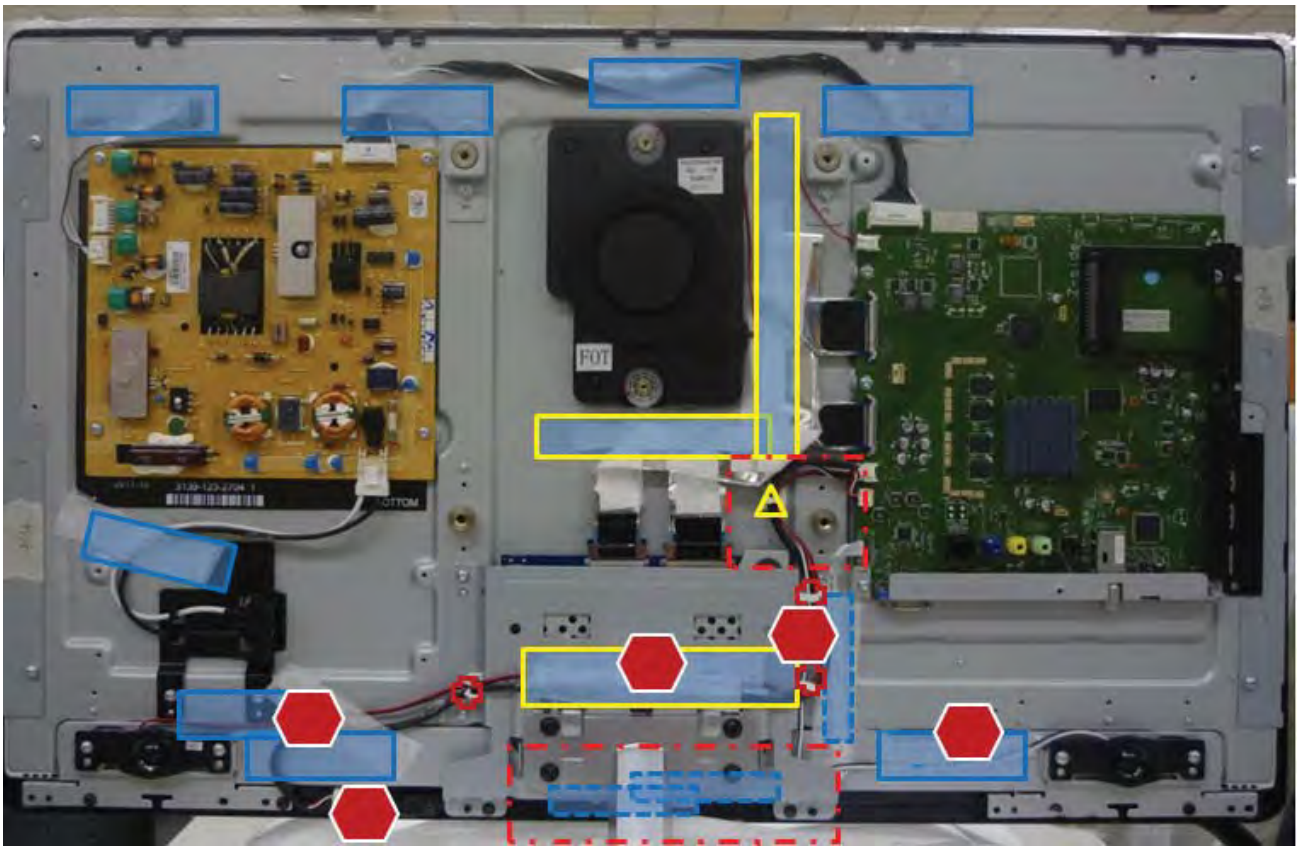

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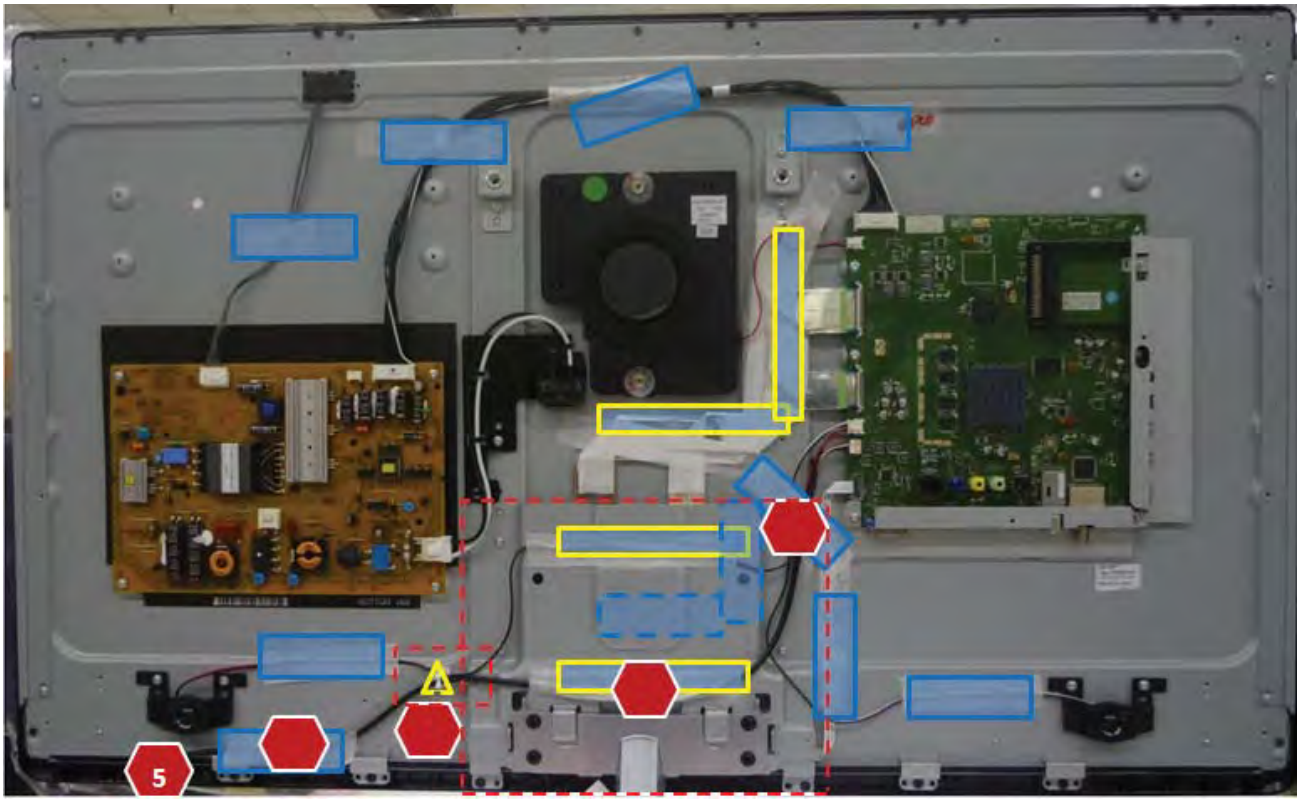
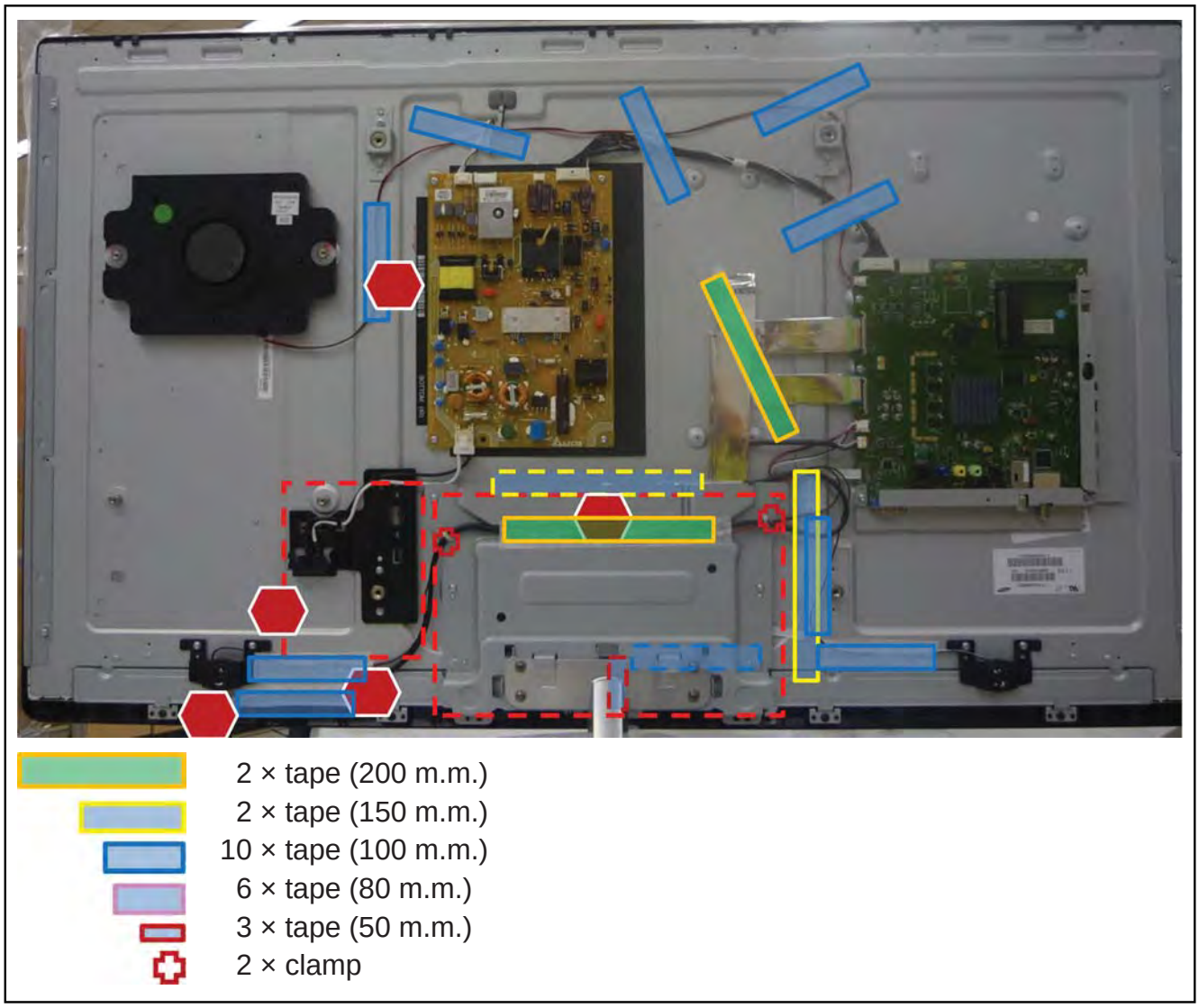
Figure 4-5 Cable dressing 32PFL5xx7x/xx



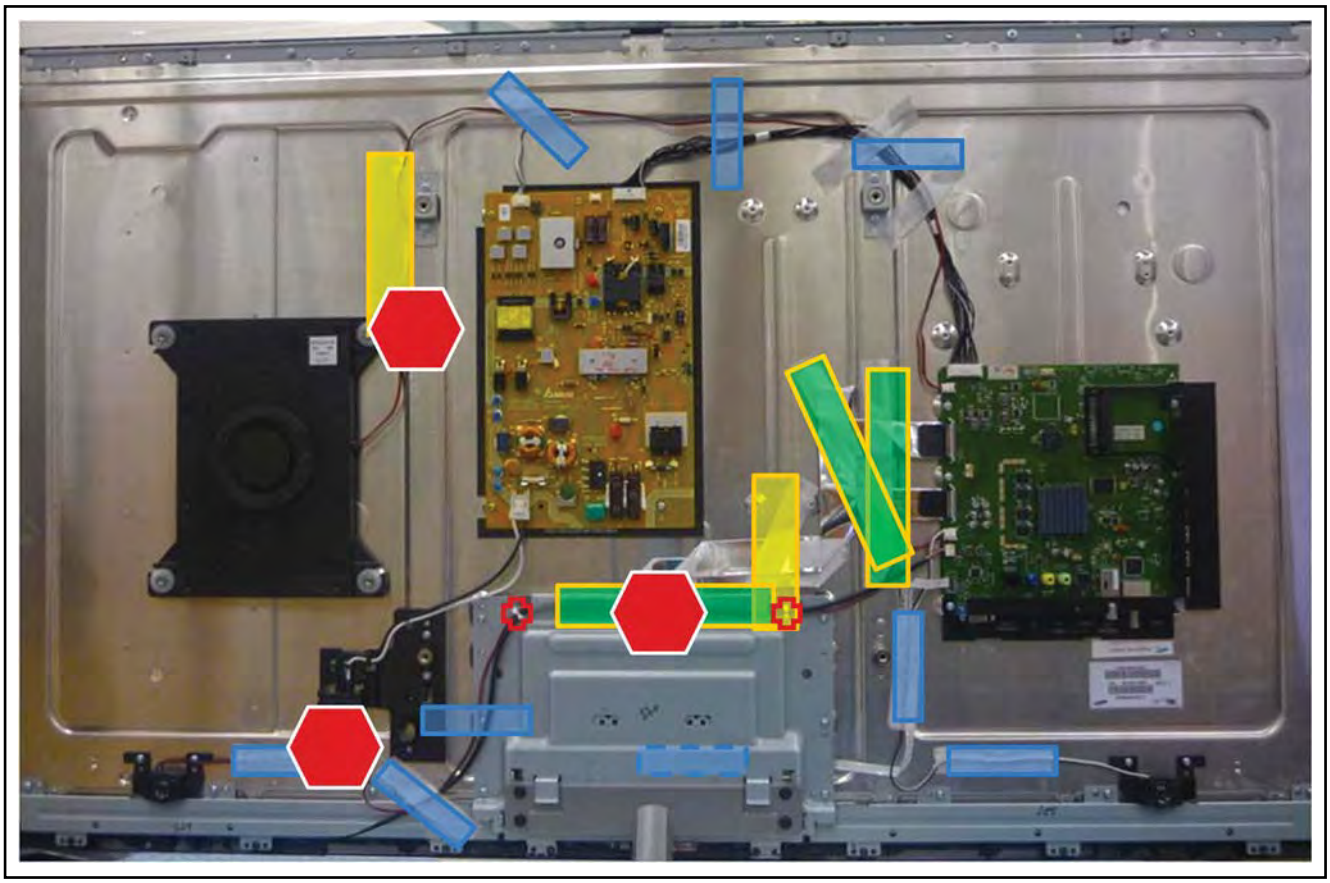
19220_015_120223.eps
120223

Figure 4-6 Cable dressing 40PFL5xx7x/xx



19220_016_120223.eps
120223

Figure 4-7 Cable dressing 46PFL5xx7x/xx



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120229

Figure 4-8 Cable dressing 55PFL5xx7x/xx

4.3 Service Positions

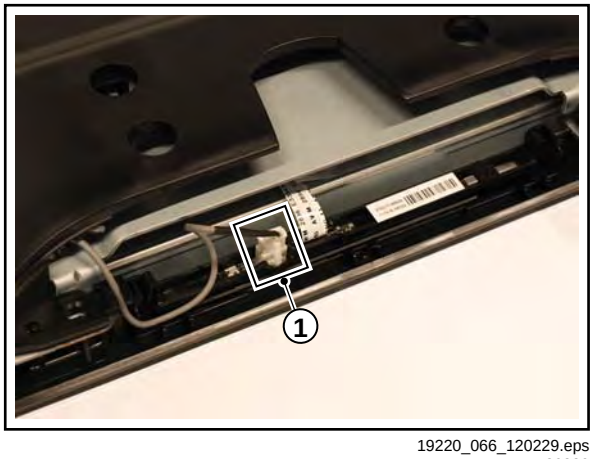
For easy servicing of a TV set, the set should be put face down on a soft flat surface, foam buffers or other specific workshop tools. Ensure that a stable situation is created to perform measurements and alignments. When using foam bars take care that these always support the cabinet and **never** only the display. **Caution:** Failure to follow these guidelines can seriously damage the display!
Ensure that ESD safe measures are taken.

4.4 Assy/Panel Removal

Instructions below apply to the 32PFL5507K/12, but will be similar for other models.

4.4.1 Rear Cover

Warning: Disconnect the mains power cord before removing the rear cover.
Attention: Before lifting the rear cover, unplug the Keyboard Control connector [1], as indicated in Figure 4-9.



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120229

Figure 4-9 Rear cover removal

4.4.2 Small Signal Board (SSB)

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

ATTENTION!
The LVDS connector(s) require(s) a special procedure for disconnecting.
Refer to Figure 4-10 to Figure 4-13 for clarification.
1. Press the catches [1] simultaneously.
2. Slide the LVDS cable sidewards carefully [2].

Failure to pressing the catches leads to a damaged LVDS cable [3]!
Any LVDS cable that is damaged at the notch area must be replaced with a new one to avoid future unnecessary repair actions.

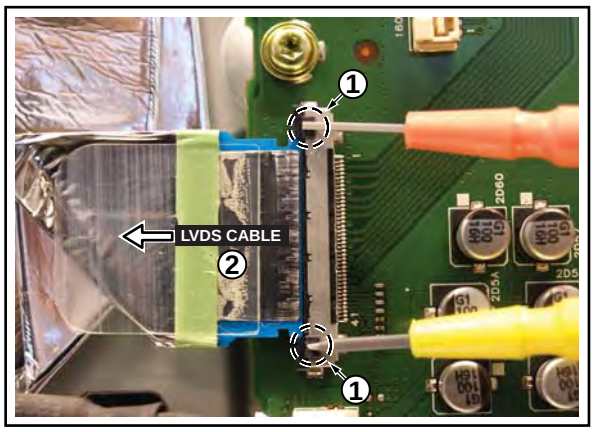

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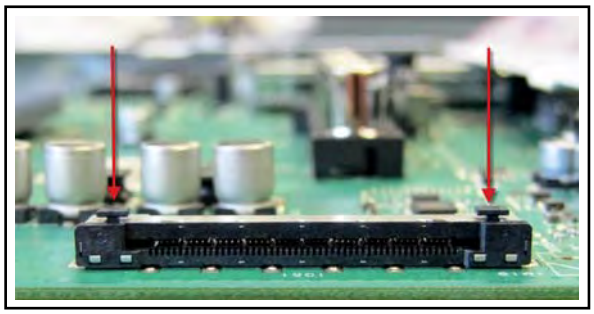
Figure 4-10 LVDS connector - correct handling



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111010

Figure 4-11 Unlocking LVDS connector

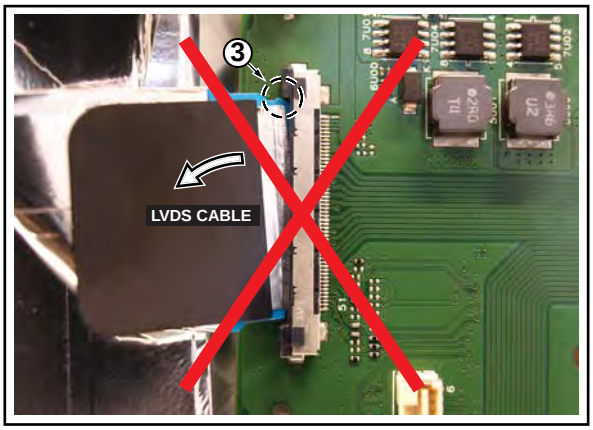

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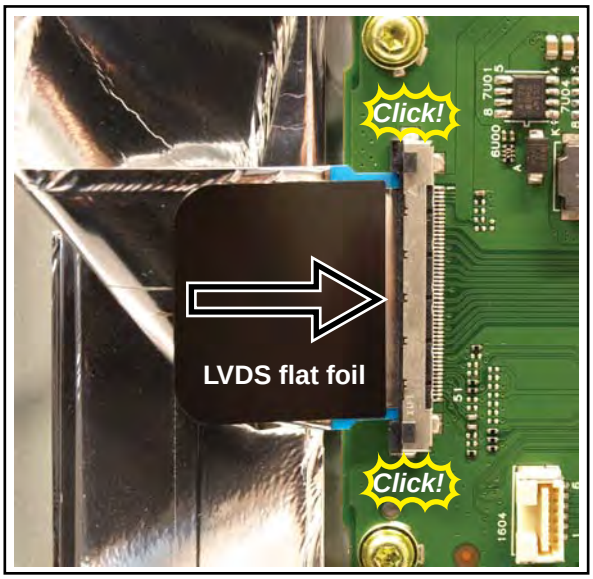
Figure 4-12 LVDS cable - damaged notch area [3]

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



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120626

Figure 4-13 SSB LVDS - catch locking

4.4.3 IR/LED panel

1. Unlock the catches at both sides.
2. Flip the board upside-down.
3. Unlock the cable from the connector.

When defective, replace the whole unit.

4.4.4 Keyboard Control Panel

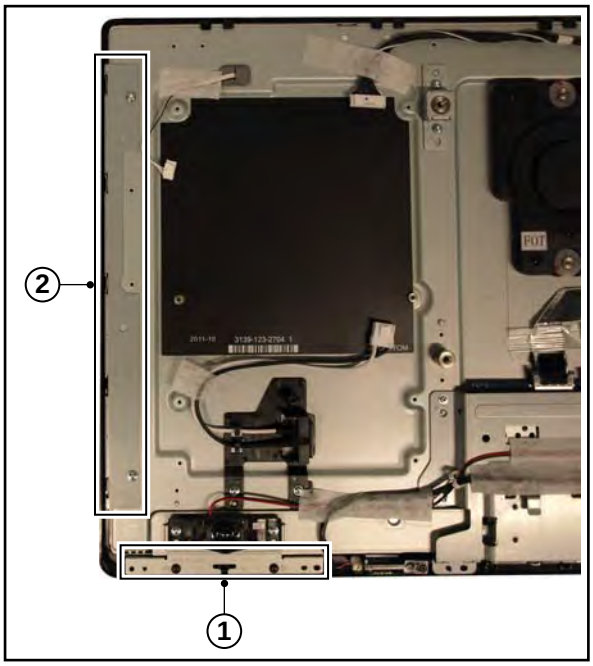
The keyboard control panel is located in the rear cover.
When defective, replace the whole unit.

4.4.5 LCD Panel

Refer to Figure 4-14 for details.
1. Remove the SSB as described earlier.
2. Remove the PSU.
3. Remove the stand.
4. Remove the stand bracket.
5. Remove the mains plug together with its subframe.
6. Remove the woofer.
7. Remove the IR/LED panel as earlier described.
8. Remove the WiFi module.

9. Remove the speakers together with their subframes.
10. Remove all remaining boards and cables that do not belong to the LCD panel.
11. Remove the rims [1] and [2] at both sides of the set.
12. Lift the LCD panel from the bezel.

When defective, replace the whole unit.



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120229

Figure 4-14 LCD panel removal

4.5 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.

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

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

5.2.1 Service Default Mode (SDM)

Purpose
- To create a pre-defined setting, to get the same measurement results as given in this manual.
- To override software protections detected by stand-by processor and make the TV start up to the step just before protection (a sort of automatic stepwise start-up). See section "5.3 Stepwise 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%.
- All service-unfriendly modes (if present) are disabled, like:
  - (Sleep) timer.
  - Child/parental lock.
  - Picture mute (blue mute or black mute).
  - Automatic volume levelling (AVL).
  - Skip/blank of non-favourite pre-sets.

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 standard RC-transmitter and key in the code "062596", directly followed by the "MENU" (or "HOME") button.
  Note: It is possible that, together with the SDM, the main menu will appear. To switch it "off", push the "MENU" (or "HOME") button again.
  Analogue SDM can also be activated by grounding for a moment the solder path on the SSB, with the indication "SDM" (see Service mode pad).
- **Digital SDM**: use the standard 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.

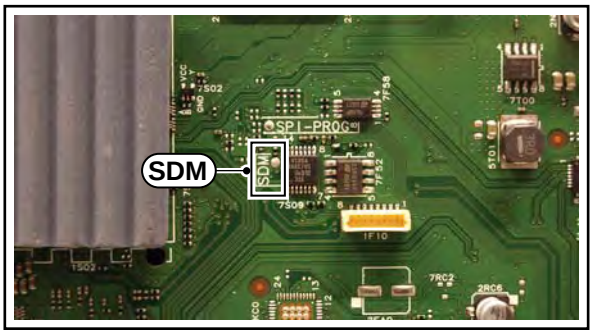

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Figure 5-1 Service mode pad

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

How to Navigate

When the "MENU" (or "HOME") button is pressed on the RC transmitter, the TV set will toggle between the SDM and the normal user menu.

How to Exit SDM

Use one of the following methods:
- Switch the set to STAND-BY 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:** Q555X-1.2.3.4 = AAAAB_X.Y.W.Z).
    - **AAAA**= the chassis name.
    - **B**= the software branch version. This is a sequential number (this is no longer the region indication, as the software is now multi-region).
    - **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. STBY PROC Version.** Displays the software version of the stand-by 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. ComPair will foresee in a possibility to do this.
- **Operation Hours.** Displays the accumulated total of operation hours (not the stand-by 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.
- **Dealer Options.** Extra features for the dealers.
- **Options.** 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.
- **Initialize NVM.** The moment the processor recognizes a corrupted NVM, the “initialize 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).
  - Initialize 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 Stand-by 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.

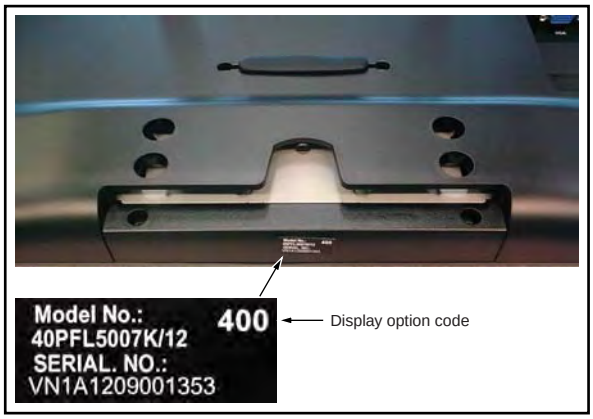

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Figure 5-2 Location of Display Option Code sticker

- **Store - go right.** All options and alignments are stored when pressing “cursor right” (or the “OK” button) and then the “OK”-button.
- **Operation hours display.** Displays the accumulated total of operation hours of the screen itself. In case of a display replacement, reset to “0” or to the consumed operation hours of the spare display.
- **SW Maintenance.**
  - **SW Events.** In case of specific software problems, the development department can ask for this info.
  - **HW Events.** In case of specific software problems, the development department can ask for this info :
    - Event 26: refers to a power dip, this is logged after the TV set reboots due to a power dip.
    - Event 17: refers to the power OK status, sensed even before the 3 x retry to generate the error code.
- **Test settings.** For development purposes only.
- **Development file versions.** Not useful for Service purposes, this information is only 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 “Channel list”, “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 to upload all several items at once.
  First a directory “repair\” has to 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.
- **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”. To make sure that the download of the channel list from USB to the TV is executed properly, it is necessary to restart the TV and tune to a valid preset if necessary. The “All” item supports to download all several items at once.
- **NVM editor.** For NET TV the set “type number” must be entered correctly.
  Also the production code (AG code) can be entered here via the RC-transmitter.
  Correct data can be found on the side/rear sticker.

How to Navigate

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

How to Exit SAM

Use one of the following methods:

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

5.2.3 Customer Service Mode (CSM)

Purpose

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

When in this chassis CSM is activated, a test pattern will be displayed during 5 seconds (1 second Blue, 1 second Green and 1 second Red, then again 1 second Blue and 1 second Green). This test pattern is generated by the PNX51X0 (located on the 200Hz board as part of the display). So if this test pattern is shown, it could be determined that the back end video chain (PNX51X0 and display) is working.For TV sets without the PNX51X0 inside, every menu from CSM will be used as check for the back end chain video.

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

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

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

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

Also when CSM is activated, the LAYER 1 error is displayed via blinking LED. Only the latest error is displayed (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, this set type has to be re-written to NVM. ComPair will foresee in a possibility to do this. The update can also 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, this production code has to be re-written to NVM. ComPair will foresee in a possibility to do this. The update can also 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 via time extraction.
- **Options 1.** Gives the option codes of option group 1 as set in SAM (Service Alignment Mode).
- **Options 2.** Gives the option codes 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. ComPair will foresee in a possibility to do this. This identification number is the 12nc number of the SSB.
- **12NC display.** Shows the 12NC of the display.
- **12NC supply.** Shows the 12NC of the power supply.
- **12NC 200Hz board.** Shows the 12NC of the 200Hz Panel (when present).
- **12NC AV PIP.** Shows the 12NC of the AV PIP board (when present).

Software versions

- **Current main SW.** Displays the build-in main software version. In case of field problems related to software, software can be upgraded. As this software is consumer upgradeable, it will also be published on the Internet.
  Example: Q55xx1.2.3.4
- **Stand-by SW.** Displays the build-in stand-by processor software version. Upgrading this software will be possible via ComPair or via USB (see section 5.9 Software Upgrading).
  Example: STDBY_83.84.0.0.
- **e-UM version.** Displays the electronic user manual software-version (12NC version number). Most significant number here is the last digit.
- **FPGA software.**

Quality items

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

H : 0000 000X (number of hardware events : SW EVENT-LOG #(events).

How to Exit CSM

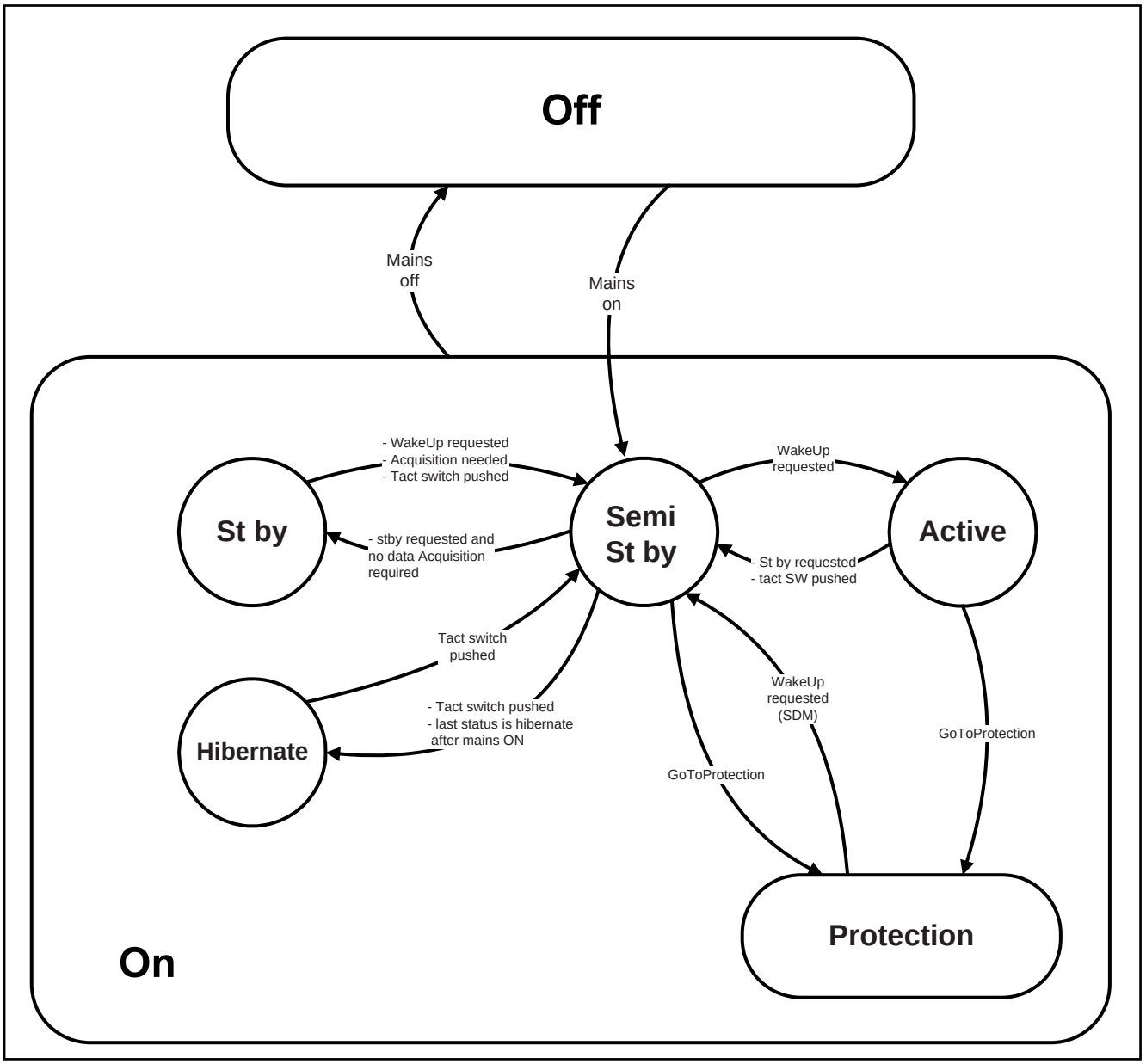
Press “MENU” (or "HOME") / “Back” key on the RC-transmitter.

5.3 Stepwise Start-up

When the TV is in a protection state due to an error detected by stand-by software (error blinking is displayed) **and** SDM is activated via shortcutting the SDM solder path on the SSB, the TV starts up until it reaches the situation just before protection. So, this is a kind of automatic stepwise start-up. In combination with the start-up diagrams below, you can see which supplies are present at a certain moment. Caution: in case the start-up in this mode with a faulty FET 7U0X (diagram B02A) is done, you can destroy all IC’s supplied by the +1V8 and +1V1, due to overvoltage (12V on XVX-line). It is recommended to measure first the FET 7U0X or others FET’s on shortcircuit before activating SDM via the service pads.

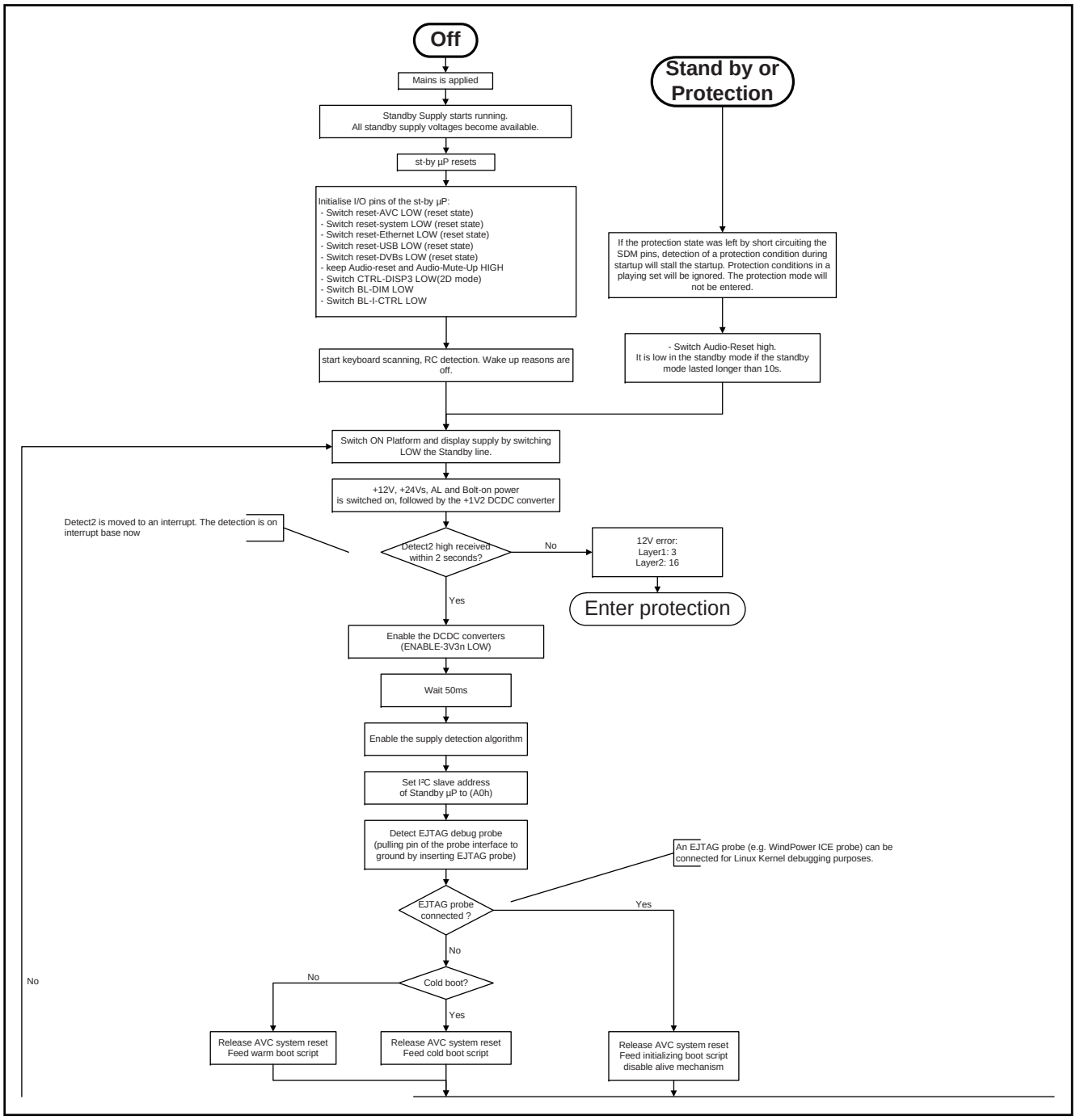
The abbreviations “SP” and “MP” in the figures stand for:

- SP: protection or error detected by the **S**tand-by **P**rocessor.
- MP: protection or error detected by the MIPS **M**ain **P**rocessor.



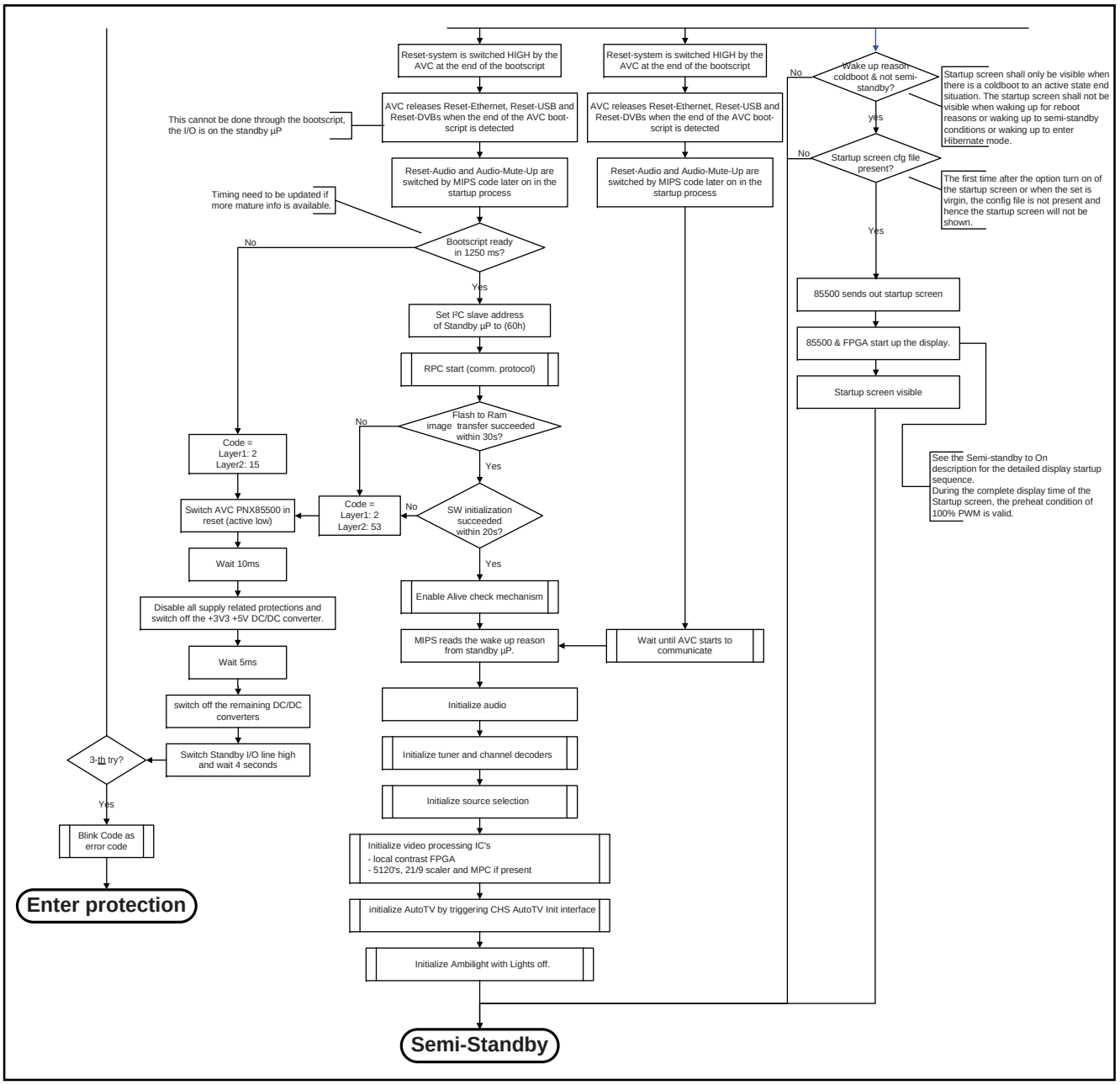
18770_250_100216.eps
100402

Figure 5-3 Transition diagram



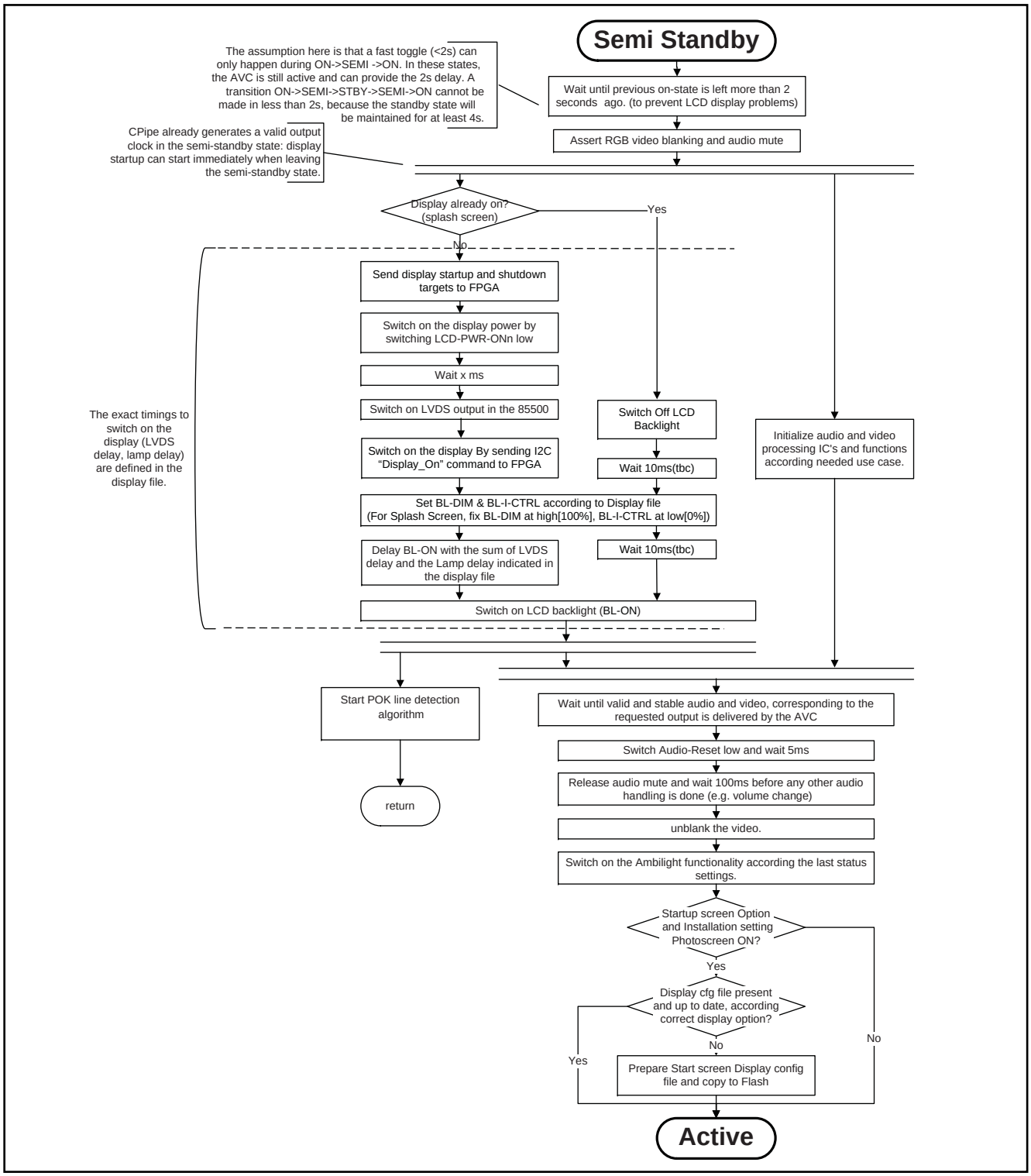
19220_071_120229.eps
120229

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



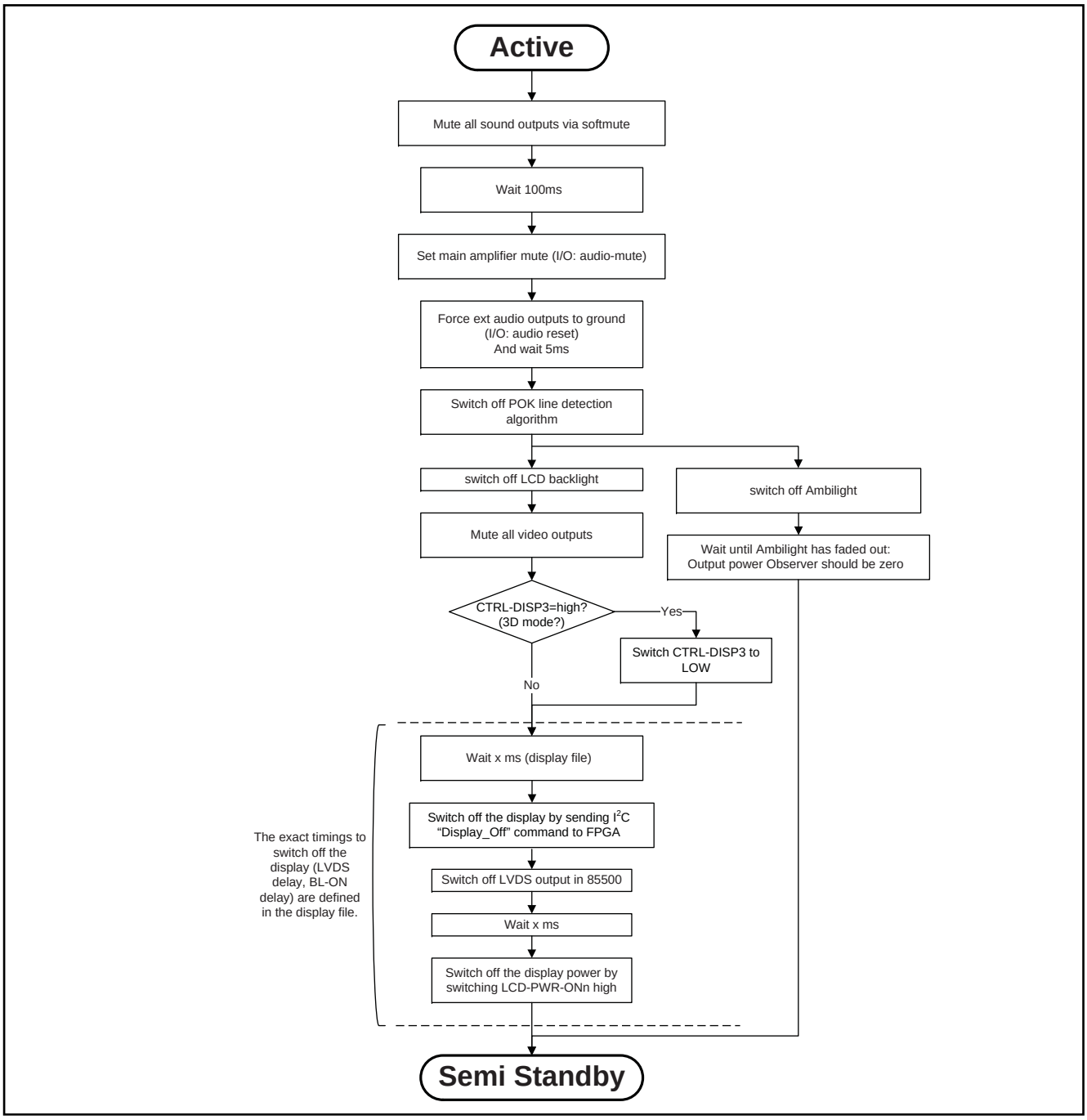
19220_072_120229.eps
120229

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



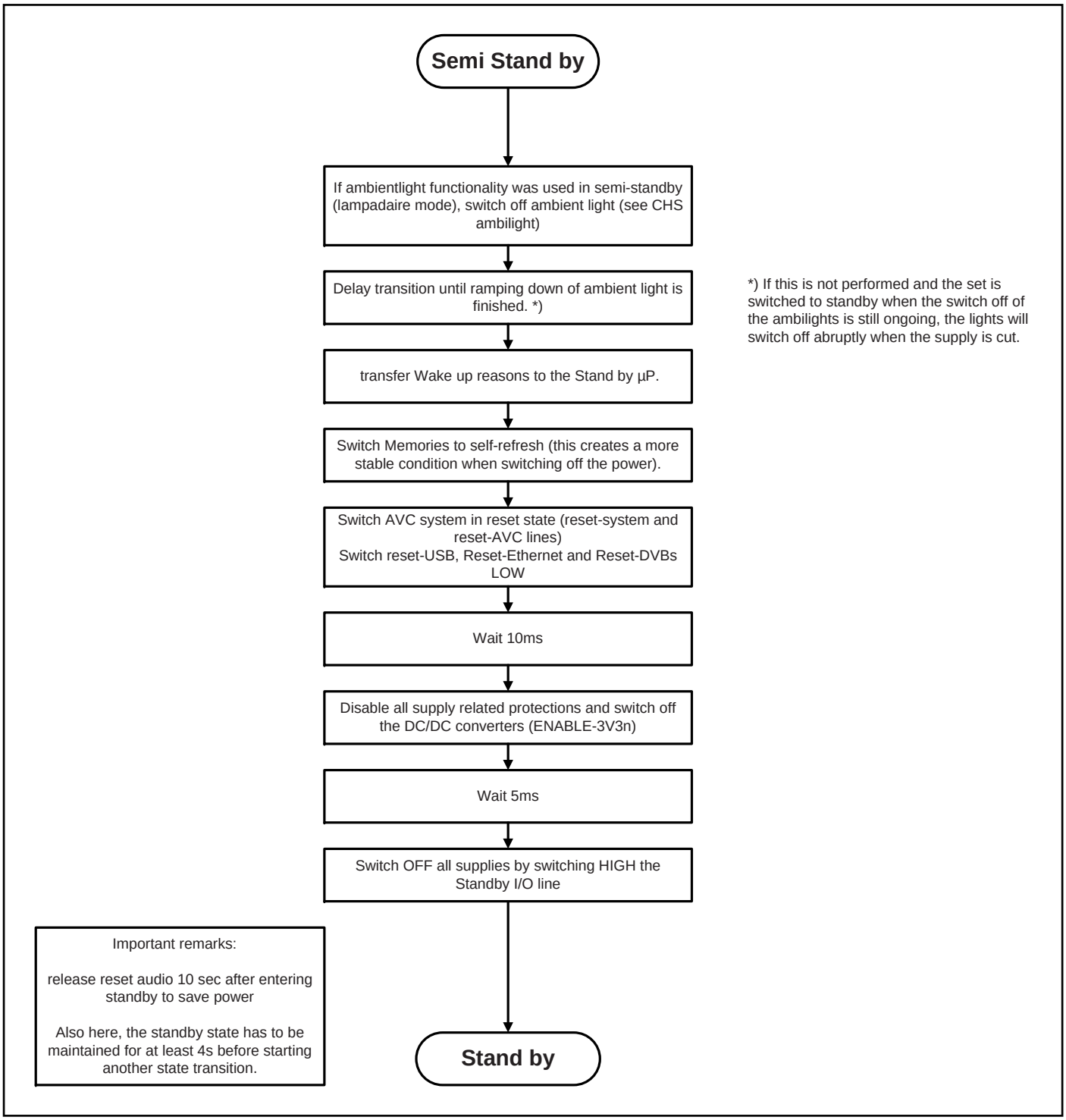
19220_074_120229.eps
120229

Figure 5-6 “Semi Stand-by” to “Active” flowchart



19220_073_120229.eps
120229

Figure 5-7 "Active" to "Semi Stand-by" flowchart



18770_256_100216.eps
100216

Figure 5-8 “Semi Stand-by” to “Stand-by” flowchart

5.4 Service Tools

5.4.1 ComPair

Introduction

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

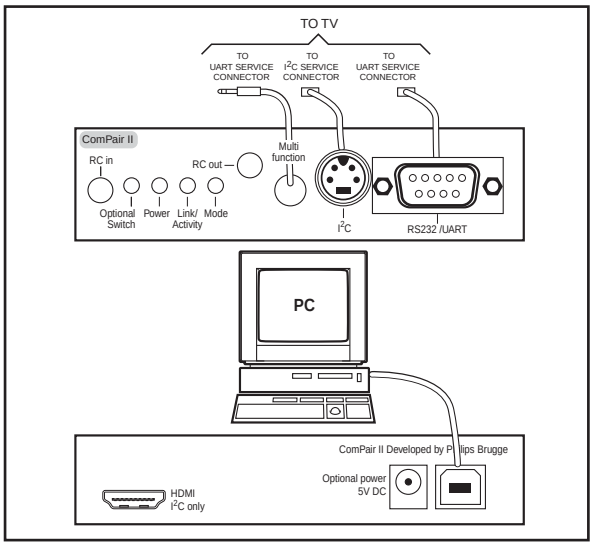
1. ComPair helps to quickly get an understanding on how to repair the chassis in a short and effective way.
2. ComPair allows very detailed diagnostics and is therefore capable of accurately indicating problem areas. No knowledge on I²C or UART commands is necessary, because ComPair takes care of this.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

Specifications

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

How to Connect

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



10000_036_090121.eps
091118

Figure 5-9 ComPair II interface connection

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

How to Order

ComPair II order codes:

- ComPair II interface: 3122 785 91020.
- Software is available via the Philips Service web portal.
- ComPair UART interface cable for Q55x.x. (using 3.5 mm Mini Jack connector): 3138 188 75051.

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

5.5 Error Codes

5.5.1 Introduction

The error code buffer contains all detected errors since the last time the buffer was erased. The buffer is written from left to right, new errors are logged at the left side, and all other errors shift one position to the right.
When an error occurs, it is added to the list of errors, provided the list is not full. When an error occurs and the error buffer is full, then the new error is not added, and the error buffer stays intact (history is maintained).
To prevent that an occasional error stays in the list forever, the error is removed from the list after more than 50 hrs. of operation.
When multiple errors occur (errors occurred within a short time span), there is a high probability that there is some relation between them.

New in this chassis is the way errors can be displayed:

- **If no errors are there, the LED should not blink at all in CSM or SDM. No spacer must be displayed as well.**
- **There is a simple blinking LED procedure for board level repair (home repair) so called LAYER 1 errors** next to the existing errors which are LAYER 2 errors (see Table 5-2).
  - LAYER 1 errors are one digit errors.
  - LAYER 2 errors are 2 digit errors.
- **In protection mode**.
  - From consumer mode: **LAYER 1.**
  - From SDM mode: **LAYER 2**.
- **Fatal errors, if I2C bus is blocked and the set reboots, CSM and SAM are not selectable**.
  - From consumer mode: **LAYER 1.**
  - From SDM mode: **LAYER 2**.
- In CSM mode.
  - When entering CSM: error **LAYER 1** will be displayed by blinking LED. Only the latest error is shown.
- 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 Stand-by 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 Stand-by 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 stand-by processor.
- Via sensing of analog values on the stand-by processor or the PNX8550.
- 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^2C3	2	13	MIPS	E	BL / EB	SSB	SSB
I^2C2	2	14	MIPS	E	BL / EB	SSB	SSB
I^2C4	2	18	MIPS	E	BL / EB	SSB	SSB
PNX doesn't boot (HW cause)	2	15	Stby µP	P	BL	SSB	SSB
12V	3	16	Stby µP	P	BL	/	Supply
Inverter or display supply	3	17	MIPS	E	EB	/	Supply
HDMI mux	2	23	MIPS	E	EB	Sil9x87A	SSB
I2C switch	2	24	MIPS	E	EB	PCA9540	SSB
AV-PIP board	8	25	MIPS	E	EB		AV PIP board
Channel dec DVB-C	2	27	MIPS	E	EB	TDA10024	SSB
Channel dec	2	27	MIPS	E	EB	TC90157	SSB
Channel dec DVBT2	2	27	MIPS	E	EB	CXD2820	SSB
Channel DVB-S	2	28	MIPS	E	EB	STV0903	SSB
14v/18v OLP LNB controller	2	32	MIPS	E	EB		SSB
LNB controller R3	2	31	MIPS	E	EB	LNBH 23	SSB
LNB controller R4	2	31	MIPS	E	EB	LNBH 25	SSB
Tuner1	2	34	Stby µP	P	EB	DTT71300	SSB
main NVM	2	35	MIPS	E	x	STM24C64	SSB
Tuner DVB-S	2	36	MIPS	E	EB	STV6110	SSB
Class-D	2	37	MIPS	E	EB	TAS5711PHP	SSB
FPGA backlight	2	38	MIPS	E	EB	LX 4	SSB
Temperature sensor LED driver/TCON	7	42	MIPS	E	EB	LM 75	Temperature sensor
Temperature sensor SSB/set	2	42	MIPS	E	EB	LM 75	Temperature sensor
FAN	7	43	MIPS	E	EB		FAN
FPGA PQ	2	45	MIPS	E	EB	LX 25	SSB
MIPS doesn't boot (SW cause)	2	53	Stby µP	P	BL	PNX8550	SSB

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. In this case diagnose has to be done via ComPair.
- **Error 13 (I^2C bus 3, SSB bus blocked)**. Current situation: when this error occurs, the TV will constantly reboot due to the blocked bus. The best way for further diagnosis here, is to use ComPair.
- **Error 14 (I^2C bus 2, TV set bus blocked)**. Current situation: when this error occurs, the TV will constantly reboot due to the blocked bus. The best way for further diagnosis here, is to use ComPair.
- **Error 18 (I^2C bus 4, Tuner bus blocked)**. In case this bus is blocked, short the "SDM" solder paths on the SSB during startup, LAYER error 2 = 18 will be blinked.
- **Error 15 (PNX8550 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 PNX8550 (supplies not OK, PNX 8550 completely dead, I^2C link between PNX and Stand-by Processor broken, etc...). When error 15 occurs it is also possible that I^2C1 bus is blocked (NVM). I^2C1 can be indicated in the schematics as follows: SCL-UP-MIPS, SDA-UP-MIPS.
Other root causes for this error can be due to hardware problems regarding the DDR's and the bootscript reading from the PNX8550.
- **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 is activated we see blinking LED LAYER 2 error = 16.
- **Error 17 (Invertor or Display Supply)**. Here the status of the "Power OK" is checked by software, no protection will occur during failure of the invertor or display supply (no picture), only error logging. LED blinking of LAYER 1 error = 3 in CSM, in SDM this gives LAYER 2 error = 17.
- **Error 23 (HDMI)**. 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. Remark: this only works for TV sets with an I^2C controlled screen included.

- **Error 28 (Channel dec DVB-S)**. When there is no I²C communication towards the DVB-S channel decoder, LAYER 2 error = 28 will be logged and displayed via the blinking LED procedure if SDM is switched on.
- **Error 31 (Lnb controller)**. When there is no I²C communication towards this device, LAYER 2 error = 31 will be logged and displayed via the blinking LED procedure if SDM is activated.
- **Error 34 (Tuner)**. When there is no I²C communication towards the tuner during start-up, LAYER 2 error = 34 will be logged and displayed via the blinking LED procedure when SDM is switched on.
- **Error 35 (main NVM)**. When there is no I²C communication towards the main NVM during start-up, LAYER 2 error = 35 will be displayed via the blinking LED procedure when SDM is switched “on”. All service modes (CSM, SAM and SDM) are accessible during this failure, observed in the Uart logging as follows: "<< ERRO >>> PFPOW_.C: First Error (id19, Layer_1= 2 Layer_= 35)".
- **Error 36 (Tuner DVB-S)**. When there is no I²C communication towards the DVB-S tuner during start-up, LAYER 2 error = 36 will be logged and displayed via the blinking LED procedure when SDM is switched “on”.
- **Error 37 (Class-D amplifier)**. When there is no I²C communication towards the TAS5731PHP 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”.
  Note: TV in normal working condition, but without Audio out from speaker.
- **Error 42 (Temp sensor)**. Only applicable for TV sets equipped with temperature devices.
- **Error 53**. This error will indicate that the PNX8550 has read his bootscript (when this would have failed, error 15 would blink) but initialization was never completed because of hardware problems (NAND flash, ...) 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, LAYER 2 error = 53.

5.6 The Blinking LED Procedure

5.6.1 Introduction

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

- **Blinking LED procedure LAYER 1 error.** In this case the error is automatically blinked when the TV is put in CSM. This will be only one digit error, namely the one that is referring to the defective board (see table “5-2 Error code overview”) which causes the failure of the TV. This approach will especially be used for home repair and call centres. The aim here is to have service diagnosis from a distance.
- **Blinking LED procedure LAYER 2 error.** Via this procedure, the contents of the error buffer can be made visible via the front LED. In this case the error contains 2 digits (see table “5-2 Error code overview”) and will be displayed when SDM (hardware pins) is activated. This is especially useful for fault finding and gives more details regarding the failure 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 only the latest layer 1 error, this works in “normal operation” mode or automatically when the error/protection is monitored by the Stand-by 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 stand-by microprocessor or the MIPS controller as detection device. Since in these cases, checking of observers, polling of ADCs, and filtering of input values are all heavily software based, these protections are referred to as software protections. There are several types of software related protections, solving a variety of fault conditions:

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

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

Protections during Start-up
During TV start-up, some voltages and IC observers are actively monitored to be able to optimise 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 Stepwise Start-up”).

5.7.2 Hardware Protections

The only real hardware protection in this chassis appears in case of an audio problem e.g. DC voltage on the speakers. This protection will only affect the Class D audio amplifier (item 7D60; see diagram B06A) and puts the amplifier in a continuous burst mode (cyclus approximately 2 seconds).

Repair Tip

- There still will be a picture available but no sound. While the Class D amplifier tries to start-up again, the cone of the loudspeakers will move slowly in one or the other direction until the initial failure shuts the amplifier down, this cyclus starts over and over again. The headphone amplifier will also behaves similar.

5.8 Fault Finding and Repair Tips

Read also section "5.5 Error Codes, 5.5.4 Error Buffer, Extra Info".

5.8.1 Audio Amplifier

The Class D-IC 7D60 has a powerpad for cooling. When the IC is replaced it must be ensured that the powerpad is very well pushed to the PWB while the solder is still liquid. This is needed to insure that the cooling is guaranteed, otherwise the Class D-IC could break down in short time.

5.8.2 AV PIP

To check the AV PIP board (if present) functionality, a dedicated tespattern can be invoke as follows: select the "multiview" icon in the User Interface and press the "OK" button. Apply for the main picture an extended source, e.g. HDMI input. Proceed by entering CSM (push '123654' on the remote control) and press the yellow button. A coloured testpattern should appear now, generated by the AV PIP board (this can take a few seconds).

5.8.3 CSM

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

5.8.4 DC/DC Converter

Description basic board

The basic board power supply consists of 4 DC/DC converters and 5 linear stabilizers. All DC/DC converters have +12V input voltage and deliver:

- +1V1 supply voltage (1.15V nominal), for the core voltage of PNX855xx, stabilized close to the point of load; SENSE+1V1 signal provides the DC-DC converter the needed feedback to achieve this.
- +1V8 supply voltage, for the DDR2 memories and DDR2 interface of PNX855xx.
- +3V3 supply voltage (3.30V nominal), overall 3.3 V for onboard IC's, for non-5000 series SSB diversities only.
- +5V (5.15V nominal) for USB, WIFI and Conditional Access Module and +5V5-TUN for +5V-TUN tuner stabilizer.

The linear stabilizers are providing:

- +1V2 supply voltage (1.2V nominal), stabilized close to PNX855xx device, for various other internal blocks of PNX855xx; SENSE+1V2 signal provides the needed feedback to achieve this.
- +2V5 supply voltage (2.5V nominal), for LVDS interface and various other internal blocks of PNX855xx. Stabilizer 7UC0 is used (diagram B02B).
- +3V3 supply voltage (3V3 nominal), is provided by 7UD1 (diagram B02C); the 12 V to 3V3 DC-DC converter delivers the supply voltage to the PNX855xx.
- +5V-TUN supply voltage (5V nominal) for tuner and IF amplifier.

+3V3-STANDY (3V3 nominal) is the permanent voltage, supplying the Stand-by microprocessor inside PNX855xx.

Supply voltage +1V1 is started immediately when +12V voltage becomes available (+12V is enabled by STANDBY signal when "low"). Supply voltages +3V3, +2V5, +1V8, +1V2 and +5V-TUN are switched "on" by signal ENABLE-3V3 when "low", provided that +12V (detected via 7U40 and 7U41) is present.

+12V is considered OK (=> DETECT2 signal becomes "high", +12V to +1V8, +12V to +3V3, +12V to +5V DC-DC converter can be started up) if it rises above 10V and doesn't drop below 9V5. A small delay of a few milliseconds is introduced between the start-up of 12V to +1V8 DC-DC converter and the two other DC-DC converters via 7U48 and associated components.

Description DVB-S2:

- LNB-RF1 (0V = disabled, 14V or 18V in normal operation) LNB supply generated via the second conversion channel of 7TP2 (diagram B03B) LNB supply control IC. It provides supply voltage that feeds the outdoor satellite reception equipment.
- +3V3-DVBS (3V3 nominal), +2V5-DVBS (2V5 nominal) and +1V-DVBS (1.03V nominal) power supply for the silicon tuner and channel decoder. +1V-DVBS is generated via a 5V to 1V DC-DC converter and is stabilized at the point of load (channel decoder) by means of feedback signal SENSE+1V0-DVBS. +3V3-DVBS and +2V5-DVBS are generated via linear stabilizers from +5V-DVBS that by itself is generated via the first conversion channel of 7TP2.

At start-up, +24V becomes available when STANDBY signal is "low" (together with +12V for the basic board), when +3V3 from the basic board is present the two DC-DC converters channels inside 7TP2 are activated. Initially only the 24V to 5V converter (channel 1 of 7TP2 generating +5V-DVBS) will effectively work, while +V-LNB is held at a level around 11V7 via diode 6TP5.

If +24V drops below +15V level then the DVB-S2 supply will stop, even if +3V3 is still present.

Note: +24V audio is used in 4000 series, 4300 & 5000 series use +12V audio.

Debugging

The best way to find a failure in the DC/DC converters is to check their start-up sequence at power "on" via the mains cord, presuming that the stand-by microprocessor and the external supply are operational. Take STANDBY signal "high"-to-"low" transition as time reference.
When +12V becomes available (maximum 1 second after STANDBY signal goes "low") then +1V1 is started immediately. After ENABLE-3V3 goes "low", all the other supply voltages should rise within a few milliseconds.

Tips

- Behaviour comparison with a reference TV550 platform can be a fast way to locate failures.
- If +12V stays "low", check the integrity of fuse 1U40.
- Check the integrity (at least no short circuit between drain and source) of the power MOS-FETs before starting up the platform in SDM, otherwise many components might be damaged. Using a ohmmeter can detect short circuits between any power rail and ground or between +12V and any other power rail.
- Short circuit at the output of an integrated linear stabilizer (7UC0) will heat up this device strongly.
- Switching frequencies should be 500 kHz ...600 kHz for 12 V to 1.1 V and 12 V to 1.8 V DC-DC converters, 900 kHz for 12 V to 3.3 V and 12 V to 5 V DC-DC converters. The DVB-S2 supply 24 V to 5 V and 24 V to +V LNB DC-DC converters operates at 300 kHz while for 5 V to 1.1 V DC-DC converter 900 kHz is used.

5.8.5 Exit "Factory Mode"

When an "F" is displayed in the screen's right corner, this means the set is in "Factory" mode, and it normally happens after a new SSB is mounted. 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 the "F" disappears from the screen.

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 "Q55X.X", this will set the ComPair interface in the appropriate mode).
- Close ComPair

After start-up of the Hyperterminal, fill in a name (f.i. "logging") in the "Connection Description" box, then apply the following settings:
1. COMx
2. Bits per second = 115200
3. Data bits = 8
4. Parity = none
5. Stop bits = 1
6. Flow control = none

During the start-up of the TV set, the logging will be displayed. This is also the case during rebooting of the TV set (the same logging appears time after time). Also available in the logging is the "Display Option Code" (useful when there is no picture), look for item "DisplayRawNumber" 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 PNX855xx 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 erros, read/write speed and timing control.

No Uart logging at all:
- In case there is no Uart logging coming out, check if the startup script can be send over the I^2C bus (3 trials to startup) + power supplies are switched on and stable.
- No startup will end up in a blinking LED status : error LAYER 1 = "2", error LAYER 2 = "53" (startup with SDM solder paths 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:
- Failure messages should be checked and investigated.For instance fatal error on the PNX51x0: check startup of the back-end processor, supplies..reset, I^2C bus. => error mentioned in the logging as: *51x0 failed to start by itself*.
- 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 error mentioned as e.g.: " I^2C bus 4 blocked".
- 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. "DVBS2Suppoprted : 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 software 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 is shown in the logging as follows: "cosupgstdcmds_mcmdwritepart: Programming 102400 bytes, 40505344 of 40607744 bytes programmed".

Startup in Jett Mode:
Check Uart logging in Jet mode mentioned as : "JETT UART READY".

Uart logging changing preset:
=> COMMAND: calling DFB source = RC6, system=0, key = 4".

5.8.8 Loudspeakers

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

5.8.9 PSL

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

5.8.10 Tuner

Attention: In case the tuner is replaced, always check the tuner options!

5.8.11 Display option code

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

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

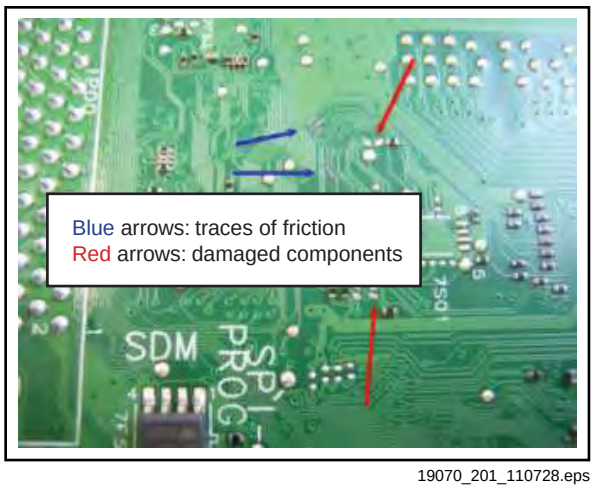
5.8.12 SSB Replacement

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 5-12 SSB replacement flowchart.

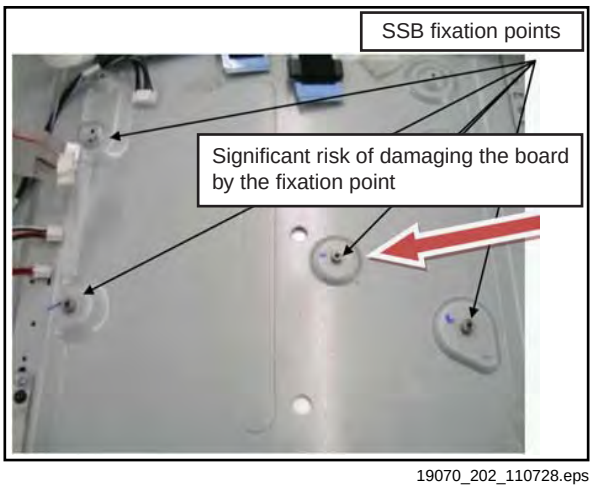
Table 5-3 SSB replacement instructions

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. On sets with software before Q552-xx-140-x-x, there was an issue by copying the program map table, so it is advised to reinstall the programs from Virgin mode instead of using copy via USB.
3	Disconnect set from mains and from antenna.	Safety and ESD!
4	Open the set and disconnect LVDS flat cable. Disconnect other cables / connections.	Always take care for ESD! Be extra careful when removing connectors!
5	Dismount the (defective) SSB from the set.	Do not damage SSB copper tracks with your tools! Do not scratch bottom of SSB (be very careful by moving SSB over SSB supports). See Figure 5-10 and Figure 5-11.
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 5-10 and Figure 5-11.
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 switch “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. Adjust White point colour temperature alignment for normal, warm and cool according to values in section 6.3.1.	Attention, check if Tuner on defect board and new board is the same. If not, the same Tuner option code nbr 1 needs to be adapted (add or substract 512). refer to General Service Info GSC_89308. 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. Display drive, and White point colour temperature needs to be aligned! See section 6.3.1.	Even when the SSB already has the latest software, it is mandatory to upgrade again the software to update the 200 Hz T-CON part. At the end of the main software update process, a dedicated software is loaded, from the main processor via the LVDS connection, to upgrade the 200 Hz T-CON part. For certain LCD displays, a dedicated Display software patch (autoscript) is available. See General Service info GSC_85590.
16	Once the set is playing, check cable connection between PSU and SSB, by moving the cable if there are no bad connections.	Check the two power connectors 1M95 and 1M99. Bad contact or bad connection here can give reboots.
17	Fill in the Electronic DDF (Defect Description Form): Fault symptom, TV type and TV serial number.	It is mandatory to fill in the E-DDF form (see the “At Your Service” web portal).
18	Install presets or check if all presets are OK. Check in CSM if Type number, Serial number, Main and Standby software are correct.	Special attention for Standby software: check if Standby software ID is matching with the D-RAM’s mounted on the SSB (2 × 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!).



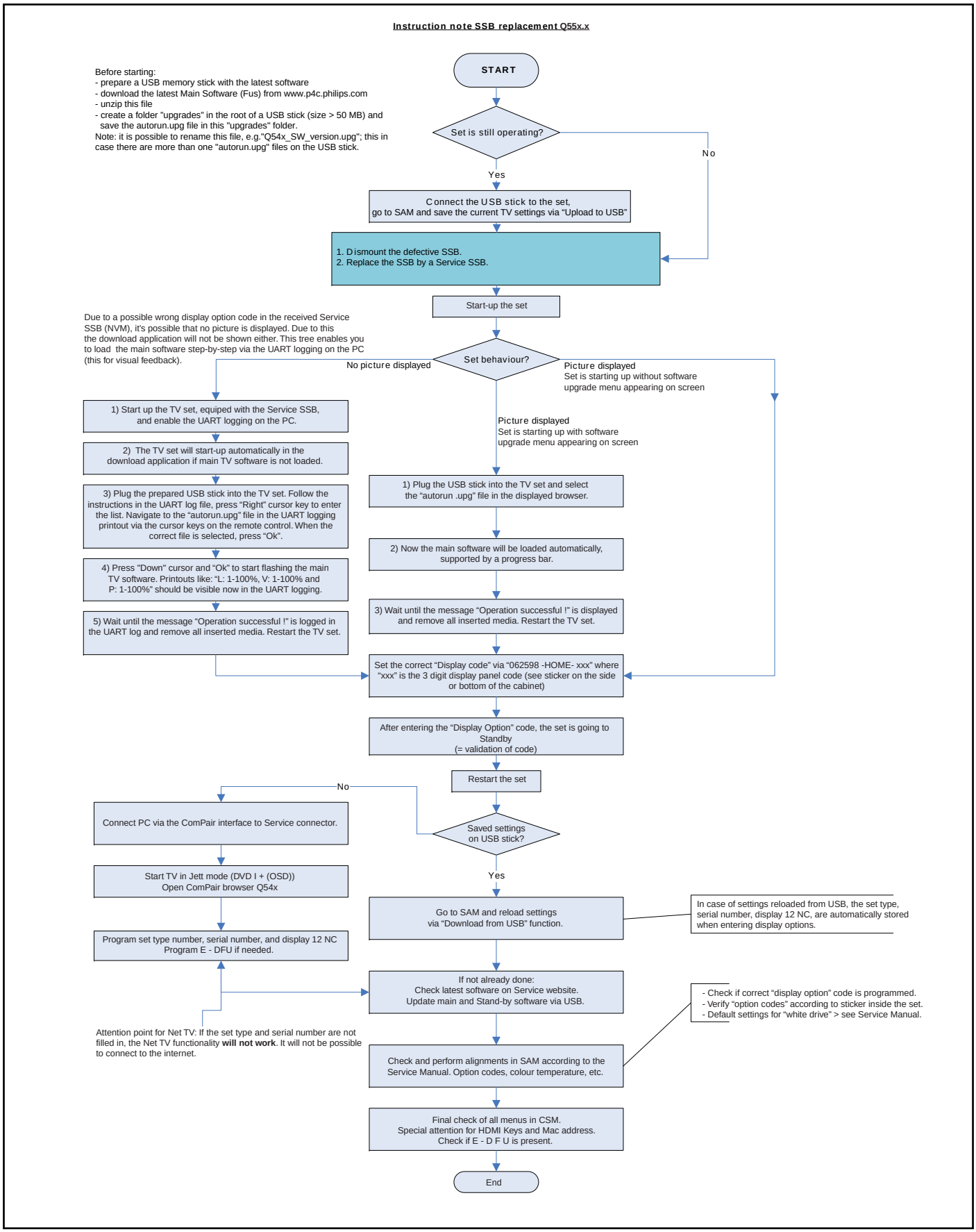
19070_201_110728.eps
110804

Figure 5-10 Mounting attention points [1/2]



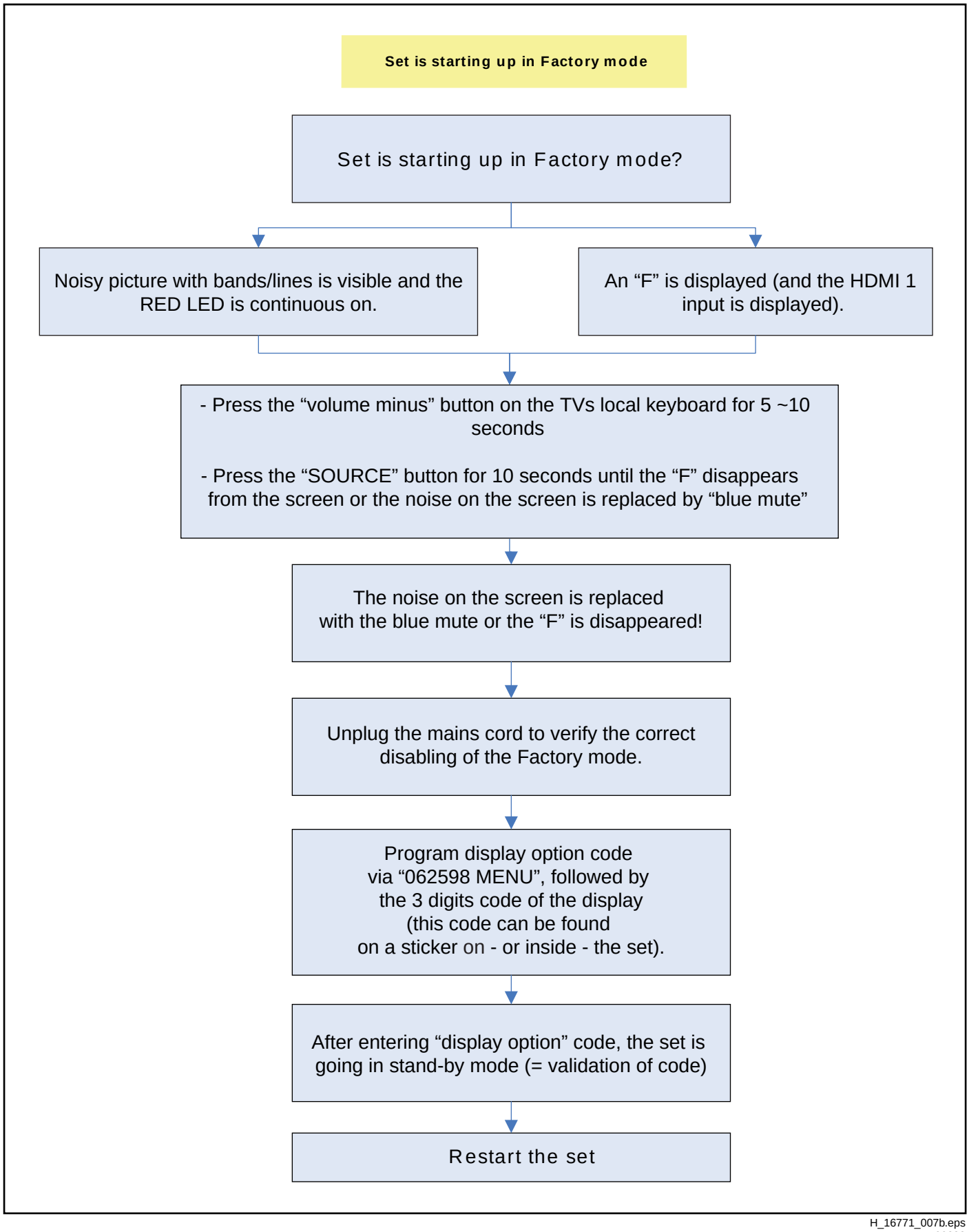
19070_202_110728.eps
110804

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



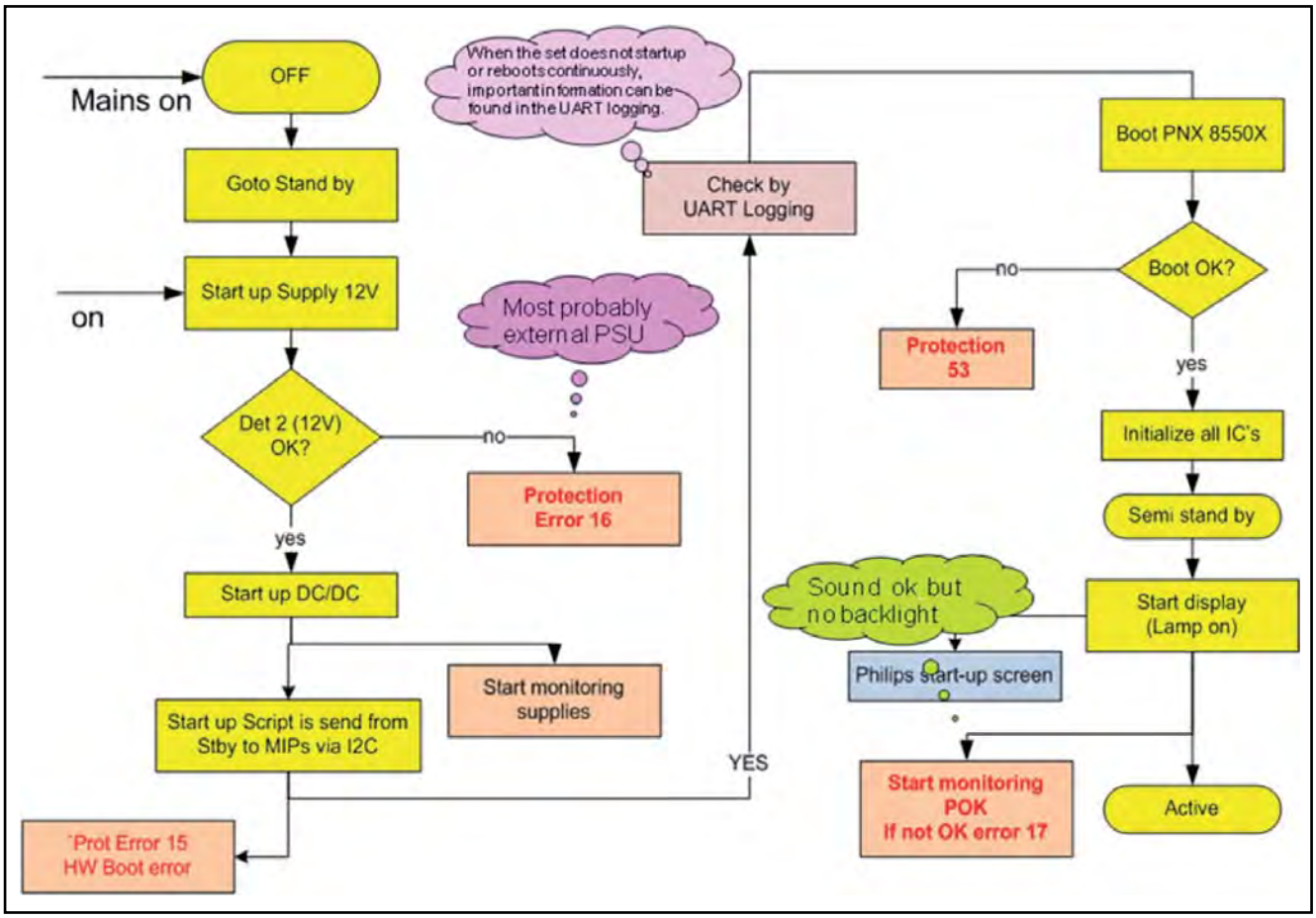
19070_200_110728.eps
111103

Figure 5-12 SSB replacement flowchart



H_16771_007b.eps
100322

Figure 5-13 SSB replacement flowchart - Factory mode



18753_211_100811.eps
110810

Figure 5-14 SSB start-up

5.9 Software Upgrading

5.9.1 Introduction

The set software and security keys are stored in a NAND-Flash, which is connected to the PNX855xx.

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 codes (see sticker inside the TV).
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 the CI + key, MAC address.. are valid.

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

5.9.2 Main Software Upgrade

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

Automatic Software Upgrade
In “normal” conditions, so when there is no major problem with the TV, the main software and the default software upgrade application can be upgraded with the “AUTORUN.UPG” (FUS part of the one-zip file: e.g. 3104 337 05661 _FUS _Q555X_ x.x.x.x_prod.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 (it is also possible to use a TV remote in “DVD” mode). 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.
3. The back-up software upgrade application will start.

5.9.3 Stand-by Software Upgrade via USB

In this chassis it is possible to upgrade the Stand-by software via a USB stick. The method is similar to upgrading the main software via USB.
Use the following steps:

1. Create a directory “UPGRADES” on the USB stick.
2. Copy the Stand-by software (part of the one-zip file, e.g. StandbyFactory_88.0.0.0.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.

- **AmbiCpld_Q55XX_x.x.x.x_prod.zip.** Contains the program instruction and software content, needed to upgrade the ambilight CPLD on the TV550 platform.
- **BalanceFPGA_Q555X_x.x.x.x_prod.zip.** Contains the BalanceFPGA software in “upg” format.
- **FUS_Q555X_x.x.x.x_prod.zip.** Contains the “autorun.upg” which is needed to upgrade the TV main software and the software download application.
- **PNX5130UPG_Q555X_x.x.x.x_prod.zip.** Contains the PNX5130 software in “upg” format.
- **StandbySW_Q555X_x.x.x.x_prod.zip.** Contains the StandbyFactory software in “upg” format.
- **ProcessNVM_Q55XX_x.x.x.x_prod.zip.** Default NVM content. Must be programmed via ComPair or can be loaded via USB, be aware that all alignments stored in NVM are overwritten here.

5.9.5 UART logging 2K10 (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%).
  - **LATAM-NTSC:** 120 - 230 V_{AC} / 50 Hz (± 10%).
  - **US:** 120 V_{AC} / 60 Hz (± 10%).
- Connect the set to the mains via an isolation transformer with low internal resistance.
- Allow the set to warm up for approximately 15 minutes.
- Measure voltages and waveforms in relation to correct ground (e.g. measure audio signals in relation to AUDIO_GND).
  Caution: It is not allowed to use heat sinks as ground.
- Test probe: 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 Stand-by.
- Warming up (>15 minutes).

6.2 Hardware Alignments

Not applicable.

6.3 Software Alignments

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

- White point
- Ambilight.

To store the data:

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

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

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

6.3.1 White Point

- Choose “TV menu”, “Setup”, “More 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 Plus HD” and set picture settings as follows:

Picture Setting	
Dynamic Contrast	Off
Dynamic Backlight	Off
Colour Enhancement	Off
Gamma	0

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

White point alignment LCD screens:

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

In case you have a colour analyser:

- Measure, in a dark environment, with a calibrated contactless colour analyser (Minolta CA-210 or Minolta CS-200) in the centre of the screen and note the x, y value.
- Change the pattern to 90% white screen. If a Quantum Data generator is used, select the “GreyAll” test pattern at level = 230.
- Adjust the correct x, y coordinates (while holding one of the White point registers R, G or B on 127) by means of decreasing the value of one or two other white points to the correct x, y coordinates (see Table 6-1 White D alignment values - LED - Minolta CA-210, or 6-2 White D alignment values - LED - Minolta CS-200). Tolerance: dx: ± 0.002, dy: ± 0.002.
- Repeat this step for the other colour temperatures that need to be aligned.
- When finished press OK on the RC and then press STORE (in the SAM root menu) to store the aligned values to the NVM.
- Restore the initial picture settings after the alignments.

Table 6-1 White D alignment values - LED - Minolta CA-210

Value	Cool (9420K)	Normal (8120K)	Warm (6080K)
x	0.282	0.292	0.320
y	0.298	0.311	0.345

Table 6-2 White D alignment values - LED - Minolta CS-200

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

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

- Select a COLOUR TEMPERATURE (e.g. COOL, NORMAL, or WARM).
- Set the RED, GREEN and BLUE default values according to the values in Table 6-3 to Table 6-10.

- 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 setting 32" (4000 series)

White Tone	e.g. 32PFL4xx7x/xx		
Colour Temperature	R	G	B
Normal	126	115	122
Cool	112	110	127
Warm	127	104	81

Table 6-4 White tone default setting 37" (4000 series)

White Tone	e.g. 37PFL4xx7x/xx		
Colour Temperature	R	G	B
Normal	126	105	127
Cool	105	94	127
Warm	127	94	85

Table 6-5 White tone default setting 42" (4000 series)

White Tone	e.g. 42PFL4xx7/xx		
Colour Temperature	R	G	B
Normal	127	111	114
Cool	124	115	127
Warm	127	99	76

Table 6-6 White tone default setting 47" (4000 series)

White Tone	e.g. 47PFL4xx7/xx		
Colour Temperature	R	G	B
Normal	127	112	118
Cool	115	119	127
Warm	127	100	76

Table 6-7 White tone default setting 32" (5000 series)

White Tone	e.g. 32PFL5xx7/xx		
Colour Temperature	R	G	B
Normal	127	96	84
Cool	127	99	102
Warm	127	83	44

Table 6-8 White tone default setting 40" (5000 series)

White Tone	e.g. 40PFL5xx7/xx		
Colour Temperature	R	G	B
Normal	115	121	127
Cool	97	108	127
Warm	127	117	92

Table 6-9 White tone default setting 46" (5000 series)

White Tone	e.g. 46PFL5xx7.xx		
Colour Temperature	R	G	B
Normal	127	97	92
Cool	127	101	109
Warm	127	84	53

Table 6-10 White tone default setting 55" (5000 series)

White Tone	e.g. 55PFL5xx7/xx		
Colour Temperature	R	G	B
Normal	127	98	85
Cool	127	104	105
Warm	127	83	45

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. The presence / absence of these PNX51XX ICs (back-end advanced video picture improvement IC which offers motion estimation and compensation features (commercially called HDNM) plus integrated Ambilight control) is made known by the option codes.

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

6.4.2 Dealer Options

For dealer options, in SAM select “Dealer options”.
See Table 6-12 SAM mode overview.

6.4.3 (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.

6.4.4 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 a sticker inside the TV set.
Example: The options sticker gives the following option numbers:
- 32776 00001 15421 02235
- 43847 36615 33024 00012

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.

6.4.5 Option Code Overview

Refer to the 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**!

6.4.6 Option Bit Overview

For test purposes, please find below an overview of the Option Codes on **bit** level. With a bin/dec converter, you can calculate the Option Code.

Caution
When manipulating option codes, know what you're doing.
Wrong option codes could damage the set.
Prescribed option codes below are an *example*, *not valid for all sets* and are *subject to modification*.
The correct option codes are always present on a sticker inside the set!

Table 6-11 Option codes at bit level (Option 1 - Option 8)

Option & Bit	Dec. Value	Option Name	Prescribed Value[1)]	Description
Option 1 (prescribed value 32776[1)])				
Bit 15 (MSB)	32768	Video Store Streaming	1[1)]	0 = OFF 1 = ON
Bit 14	16384	Multi App	00[1)]	00 = none 01 = multi app 10 = AVPIP + multi app 11 = future use
Bit 13	8192			
Bit 12	4096	Perfect Pixel	00[1)]	00 = Pixel Plus HD 01 = Pixel Precise HD 10 = Perfect Pixel HD 11 = future use
Bit 11	2048			
Bit 10	1024	Tuner Type	000[1)]	000 = TH2603 (Europe/CH) 001 = FA2307 (Brazil) 010 = VA1E1ED2411 011 = SUT-RE2144 100 = future use 101 = future use 110 = future use 111 = future use
Bit 9	512			
Bit 8	256			
Bit 7	128	PQ Profiles	000[1)]	000 = OFF 001 = ON 010 = future use 011 = future use 100 = future use 101 = future use 110 = future use 111 = future use
Bit 6	64			
Bit 5	32			
Bit 4	16	DNM	01[1)]	00 = Perfect Natural Motion 01 = HD Natural Motion 10 = future use 11 = future use
Bit 3	8			
Bit 2	4	MOP AL	0[1)]	0 = OFF 1 = ON
Bit 1	2	AL Optical Syst	00[1)]	00 = 140 nit 01 = 200 nit 10 = 110 nit 11 = future use
Bit 0 (LSB)	1			
Option 2 (prescribed value 00001[1)])				
Bit 15 (MSB)	32768	AL Shop Mode	0[1)]	0 = boost mode in shop is OFF 1 = boost mode in shop is ON
Bit 14	16384	AL settings storage location	0[1)]	0 = stored in AL modules 1 = stored in SSB
Bit 13	8192	Wall Adaptive AL	0[1)]	0 = OFF 1 = ON
Bit 12	4096	Sunset	0[1)]	0 = OFF 1 = ON
Bit 11	2048	Ambient Light	0000[1)]	0000 = none 0001 = 2-sided (3/3) 0010 = 2-sided (4/4) 0011 = 2-sided (5/5) 0100 = 2-sided (6/6) 0101 = 2-sided (7/7) 0110 = 3-sided (4/7/4) 0111 = 3-sided (5/5)(9/9)(5/5) 1000 = 3-sided (3/6/3) 1001 = 3-sided (5/5)(10/10)(5/5) 1010 = 2-sided (8/8) 1011 = 3-sided (5/12/15) 1100 = 2-sided (1/1) 1101 = 2-sided (2/2) 1110 = 3-side (4/10/4) 1111 = 3-side (6/6)(11/11)(6/6)
Bit 10	1024			
Bit 9	512			
Bit 8	256			
Bit 7	128	FPGA3Dact/1Ddimm	0[1)]	0 = OFF 1 = ON
Bit 6	64	AL Select	0[1)]	0 = AL2k10 1 = AL2k11
Bit 5	32	3D Passive	0[1)]	0 = 2D 1 = 3D passive
Bit 4	16	Smart Bit Enhancement (SBE)	0[1)]	0 = off 1 = on (200 Hz board present)
Bit 3	8	Super Resolution	0[1)]	0 = Super Resolution SD 1 = Super Resolution HD

Option & Bit	Dec. Value	Option Name	Prescribed Value[1)]	Description
Bit 2	4	Light Sensor Type	00[1)]	00 = future use 01 = future use 10 = future use 11 = future use
Bit 1	2			
Bit 0 (LSB)	1	Light Sensor	1[1)]	0 = OFF 1 = ON
Option 3 (prescribed value 15421[1)])				
Bit 15 (MSB)	32768	Side IO	0[1)]	0 = not present 1 = present
Bit 14	16384	AV3	011[1)]	000 = none 001 = CVBS 010 = YPbPr 011 = YPbPr/LR:Europe 100 = YPbPr/HV/LR 101 = CVBS/LR:Brazil 110 = CVBS/Yc/LR 111 = YPbPr/CVBS/LR
Bit 13	8192			
Bit 12	4096			
Bit 11	2048	AV2	11[1)]	00 = Scart/CVBS/RGB/LR 01 = CVBS 10 = YPbPr/LR 11 = none:Europe and Brazil
Bit 10	1024			
Bit 9	512	AV1	00[1)]	00 = Scart/CVBS/RGB/LR:Europe 01 = CVBS/YC/YPbPr/HV/LR 10 = CVBS/YC/YPbPr/LR 11 = YPbPr/LR:Brazil
Bit 8	256			
Bit 7	128	3D Prepared	0[1)]	0 = not prepared 1 = prepared
Bit 6	64	Sound in Stand	0[1)]	0 = OFF 1 = ON
Bit 5	32	Headphone	1[1)]	0 = OFF 1 = ON
Bit 4	16	Seamless System	1[1)]	0 = OFF 1 = ON
Bit 3	8	ViewPort 21_9/PQL	1[1)]	0 = OFF 1 = ON
Bit 2	4	HDMI Side	1[1)]	0 = OFF 1 = ON (HDMI 4)
Bit 1	2	HDMI 3	0[1)]	0 = OFF 1 = ON
Bit 0 (LSB)	1	HDMI 2	1[1)]	0 = OFF 1 = ON
Option 4 (prescribed value 02235[1)])				
Bit 15 (MSB)	32768	Cabinet	00001[1)]	Cabinet type (no detailed info available)
Bit 14	16384			
Bit 13	8192			
Bit 12	4096			
Bit 11	2048			
Bit 10	1024	Region	000[1)]	000 = Europe (/02, /05 & /12) 001 = AP PAL multi 010 = AP NTSC 011 = future use 100 = Latam (/78 & /77) 101 = Australia 110 = China (/93) 111 = future use
Bit 9	512			
Bit 8	256			
Bit 7	128	Display MSB	1[1)]	0 = display option =< 255 1 = display option > 255
Bit 6	64	S Video	0[1)]	0 = OFF 1 = ON
Bit 5	32	Video Store USB	1[1)]	0 = OFF 1 = ON
Bit 4	16	Internet software Upgrade	1[1)]	0 = OFF 1 = ON (automatic software upgradable via internet)
Bit 3	8	Online Service	1[1)]	0 = OFF 1 = ON (connection to internet provider Philips)
Bit 2	4	WiFi	0[1)]	0 = OFF 1 = ON (wireless connection to ethernet; no link with “Ethernet option” bit “0”)
Bit 1	2	DLNA	1[1)]	0 = OFF 1 = PC link
Bit 0 (LSB)	1	Ethernet	1[1)]	0 = OFF 1 = Ethernet vonnector and HW present
Option 5 (prescribed value 43847[1)])				
Bit 15 (MSB)	32768	8 Days EPG	1[1)]	0 = OFF 1 = ON (country dependent)
Bit 14	16384	DVBC Installation	01[1)]	00 = OFF 01 = Country dependent 10 = ON 11 = future use
Bit 13	8192			
Bit 12	4096	DVBT Installation	01[1)]	00 = OFF 01 = Country dependent 10 = ON 11 = future use
Bit 11	2048			

Option & Bit	Dec. Value	Option Name	Prescribed Value[1)]	Description
Bit 10	1024	DVB-S	0[1)]	0 = OFF 1 = ON (ATSC/DVB should be ON)
Bit 9	512	DVB-C	1[1)]	0 = OFF 1 = ON (ATSC/DVB should be ON)
Bit 8	256	DVB	1[1)]	0 = analogue only 1 = DVBT (and C/S depending DVBC/S option)
Bit 7	128	Display Type	01000111[1)]	Display Type (ex.: 327)
Bit 6	64			
Bit 5	32			
Bit 4	16			
Bit 3	8			
Bit 2	4			
Bit 1	2			
Bit 0 (LSB)	1			
Option 6 (prescribed value 36615[1)])				
Bit 15 (MSB)	32768	E-sticker	1[1)]	0 = OFF 1 = ON
Bit 14	16384	Hotel Mode	00[1)]	00 = OFF 01 = 1V1 10 = 1V2 11 = future use
Bit 13	8192			
Bit 12	4096	Virgin	0[1)]	0 = ON 1 = OFF
Bit 11	2048	empty	-	-
Bit 10	1024	Auto Store Mode	11[1)]	00 = none 01 = PDC_VPS 10 = TXT page 11 = PDC_VPS_TXT
Bit 9	512			
Bit 8	256	Temp sensor on SSB	1[1)]	0 = OFF 1 = ON
Bit 7	128	Ginga	00[1)]	00 = OFF 01 = Country dependent 10 = ON 11 = future use
Bit 6	64			
Bit 5	32	MHP	00[1)]	00 = OFF 01 = Country dependent 10 = ON 11 = future use
Bit 4	16			
Bit 3	8	Over the Air Download	01[1)]	00 = OFF 01 = Country dependent 10 = ON 11 = future use
Bit 2	4			
Bit 1	2	DVBC light	1[1)]	0 = OFF 1 = ON (when DVBC Installation is OFF or when ON but selected country is OFF, this option is used)
Bit 0 (LSB)	1	DVBT light	1[1)]	0 = OFF 1 = ON (when DVBT Installation is OFF or when ON but selected country is OFF, this option is used)
Option 7 (prescribed value 33024[1)])				
Bit 15 (MSB)	32768	Visual Identity	1[1)]	0 = User Interface 2k10 1 = User Interface 2k11 (always ON)
Bit 14	16384	Red LED Config LUT	000[1)]	000 = LUT 0 001 = LUT 1 010 = future use 011 = future use 100 = future use 101 = future use 110 = future use 111 = future use
Bit 13	8192			
Bit 12	4096			
Bit 11	2048	Board Identifier	00[1)]	not used, should always be “00”
Bit 10	1024			
Bit 9	512	Manet	0[1)]	0 = all sets except Manet 1= Manet
Bit 8	256	Auto Power Down	1[1)]	0 = OFF 1 = ON
Bit 7	128	Light Guide	0[1)]	0 = OFF 1 = ON
Bit 6	64	E-box	0[1)]	0 = integrated set 1 = e-box/monitor
Bit 5	32	Temp LUT	000[1)]	000 = future use 001 = future use 010 = future use 011 = future use 100 = future use 101 = future use 110 = future use 111 = future use
Bit 4	16			
Bit 3	8			
Bit 2	4	Temp Sensor	00[1)]	00 = no temp sensor 01 = temp sensor in display 10 = temp sensor on additional board 11 = temp sensor in AL module
Bit 1	2			
Bit 0 (LSB)	1	FAN	0[1)]	0 = no fan 1 = fan(s) present)
Option 8 (prescribed value 00012[1)])				
Bit 15 (MSB)	32768	MSB Cabinet	0[1)]	Cabinet

Option & Bit	Dec. Value	Option Name	Prescribed Value[1)]	Description
Bit 14	16384	3D goggles	0[1)]	0 = 2K10 Xpand 1 = 2k11 Real D
Bit 13	8192	empty	-	-
Bit 12	4096	3D Overdrive LUT	000[1)]	000 = no overdrive LUT 001 = LUT1 010 = LUT2 011 = LUT3 100 = LUT4 101 = LUT5 110 = LUT6 111 = LUT7
Bit 11	2048			
Bit 10	1024			
Bit 9	512	ISF	0[1)]	0 = OFF 1 = ON
Bit 8	256	DVB-S channel decoder + new LNB	0[1)]	0 = OFF 1 = channel decoder STV 0903BAC + LNBH25
Bit 7	128	MSB Light Sensor type	0[1)]	-
Bit 6	64	DVB-T2 Sony channel decoder	1[1)]	0 = OFF 1 = channel decoder T2: CXD2834ER
Bit 5	32	FPGA PQ	0[1)]	0 = not present 1 = present
Bit 4	16	2player gaming	1[1)]	0 = OFF 1 = ON
Bit 3	8	WM DRM10	1[1)]	0 = OFF 1 = ON
Bit 2	4	HBBTV	1[1)]	0 = OFF 1 = ON
Bit 1	2	DVB-T2 Installation	0[1)]	0 = no installation 1 = country depending
Bit 0 (LSB)	1	DVB-T2	1[1)]	0 = OFF 1 = channel decoder 2

Note
1). Example

6.5 Reset of Repaired SSB

A very important issue towards a repaired SSB from a Service repair shop (SSB repair on component level) implies the reset of the NVM on the SSB.
A repaired SSB in Service should get the service Set type “00PF0000000000” and Production code “00000000000000”. Also the virgin bit is to be set. To set all this, you can use the ComPair tool or use the “NVM editor” and “Dealer options” items in SAM (do not forget to “store”).

After a repaired SSB has been mounted in the set (set repair on board level), the type number (CTN) and production code of the TV has to be set according to the type plate of the set. For this, you can use the NVM editor in SAM. This action also ensures the correct functioning of the “Net TV” feature and access to the Net 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.

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

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 a “Service” SSB is the same as the ordering number of an initial “factory” SSB.

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090319

Figure 6-1 SSB identification

6.6 Total Overview SAM modes

Table 6-12 SAM mode overview

Main Menu	Sub-menu 1	Sub-menu 2	Sub-menu 3	Description
Hardware Info	A. software version	e.g. “Q5551_0.9.1.0		Display TV & Stand-by software version and CTN serial number
	B. Stand-by processor version	e.g. “STDBY_83.84.0.0”		
	C. Production code	e.g. “see type plate”		
Operation hours				Displays the accumulated total of operation hours.TV switched “on/off” & every 0.5 hours is increase one
Errors				Displayed the most recent errors
Reset error buffer				Clears all content in the error buffer
Alignment	White point	Colour temperature	Normal	3 different modes of colour temperature can be selected
			Warn	
			Cool	
		White point red		LCD White Point Alignment. For values, see Table 6-3 White tone default setting 32" (4000 series) to 6-10 White tone default setting 55" (5000 series)
		White point green		
		White point blue		
	Ambilight	Select module		
		Brightness		
		Select matrix		
Dealer options	Virgin mode	Off/On		Select Virgin mode On/Off. TV starts up / does not start up (once) with a language selection menu after the mains switch is turned “on” for the first time (virgin mode)
	E-sticker	Off/On		Select E-sticker On/Off (USP’s on-screen)
	Auto store mode	None		
		PDC/VPS		
		TXT page		
		PDC/VPS/TXT		
	Miscellaneous	Hotel mode	Off	Hotel mode is Off
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
Operation hours display		0003		In case the display must be swapped for repair, you can reset the “”Display operation hours” to “0”. So, this one does keeps up the lifetime of the display itself (mainly to compensate the degeneration behaviour)
Software maintenance	Software events	Display		Display information is for development purposes
		Clear		
		Test reboot		
		Test cold reboot		
		Test application crash		
	Hardware events	Display		Display information is for development purposes
		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
Development file versions	Development 1 file version	Display parameters DISPT5.0.9.29		Display information is for development purposes
		Acoustics parameters ACSTS 5.0.6.20		
		PQ - TV550 1.0.27.22		
		PQS- Profile set		
		PQF - Fixed settings		
		PQU - User styles		
		Ambilight parameters PRFAM 5.0.5.2		
	Development 2 file version	12NC one zip software		Display information is for development purposes
		Initial main software		
		NVM version Q55x1_0.4.5.0		
		Flash units software		
		Temp com file version none		
Upload to USB	Channel list			To upload several settings from the TV to an USB stick
	Personal settings			
	Option codes			
	Alignments			
	Identification data			
	History list			
	All (options included)			
Download from USB	Channel list			To download several settings from the USB stick to the TV
	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
	AG 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 Q552.4E LA is part of the TV550 “R4” 2012 platform. It uses the (same) PNX855xx chipset as its predecessor Q552.2E LA, part of the TV550 2011 platform.
The major deltas versus the Q552.2 are:

- integrated Wifi in 5000 & 5500 series
- implementation of “active” 3D for 5500 series
- 2 to 3D conversion
- TV video call feature.

For Service, the platform is supporting Remote Diagnostics (“IP Remote Diagnostics and Repair”). Detailed information will follow via the regular communication channels.

The Q552.4E LA chassis comes with the following stylings:

- 4000 (series xxPFL4xxx),
- 5000 (series xxPFL5xxx).

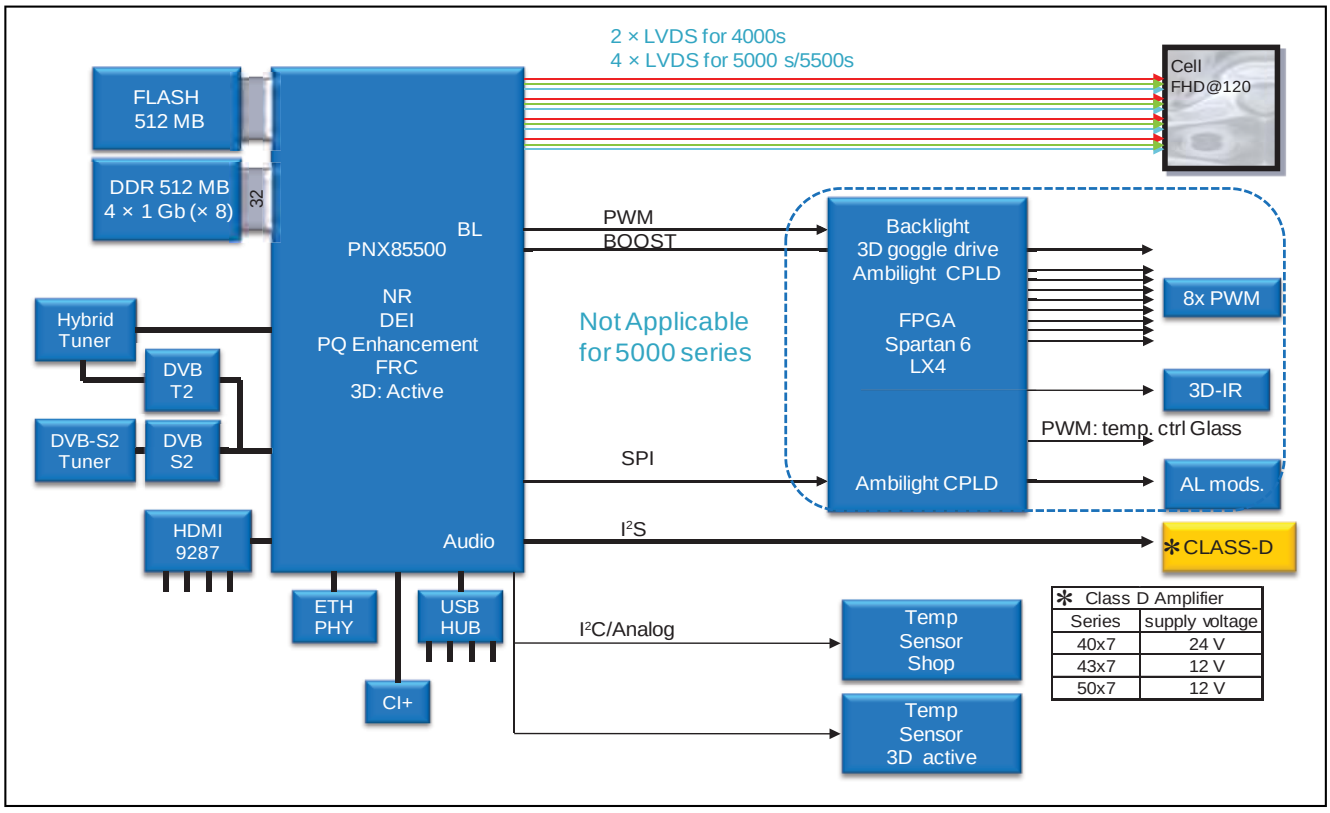
7.1.1 Implementation

Key components of this chassis are:

- PNX855xx System-On-Chip (SOC) TV Processor
- SUT-RE214Z Hybrid Tuner (DVB-T/C, analogue)
- STV6110A DVB-S Satellite Tuner
- SII9x87 HDMI Switch
- TAS5731 Class D Power Amplifier
- LAN8710 Dual Port Gigabit Ethernet media access controller.

7.1.2 TV550 Architecture Overview

For details about the chassis block diagrams refer to chapter 9. Block Diagrams. An overview of the TV550 “R4” 2012 architecture can be found in Figure 7-1 and Figure 7-2.



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120224

Figure 7-1 Architecture of TV550 R4 platform (4000-5000 range)

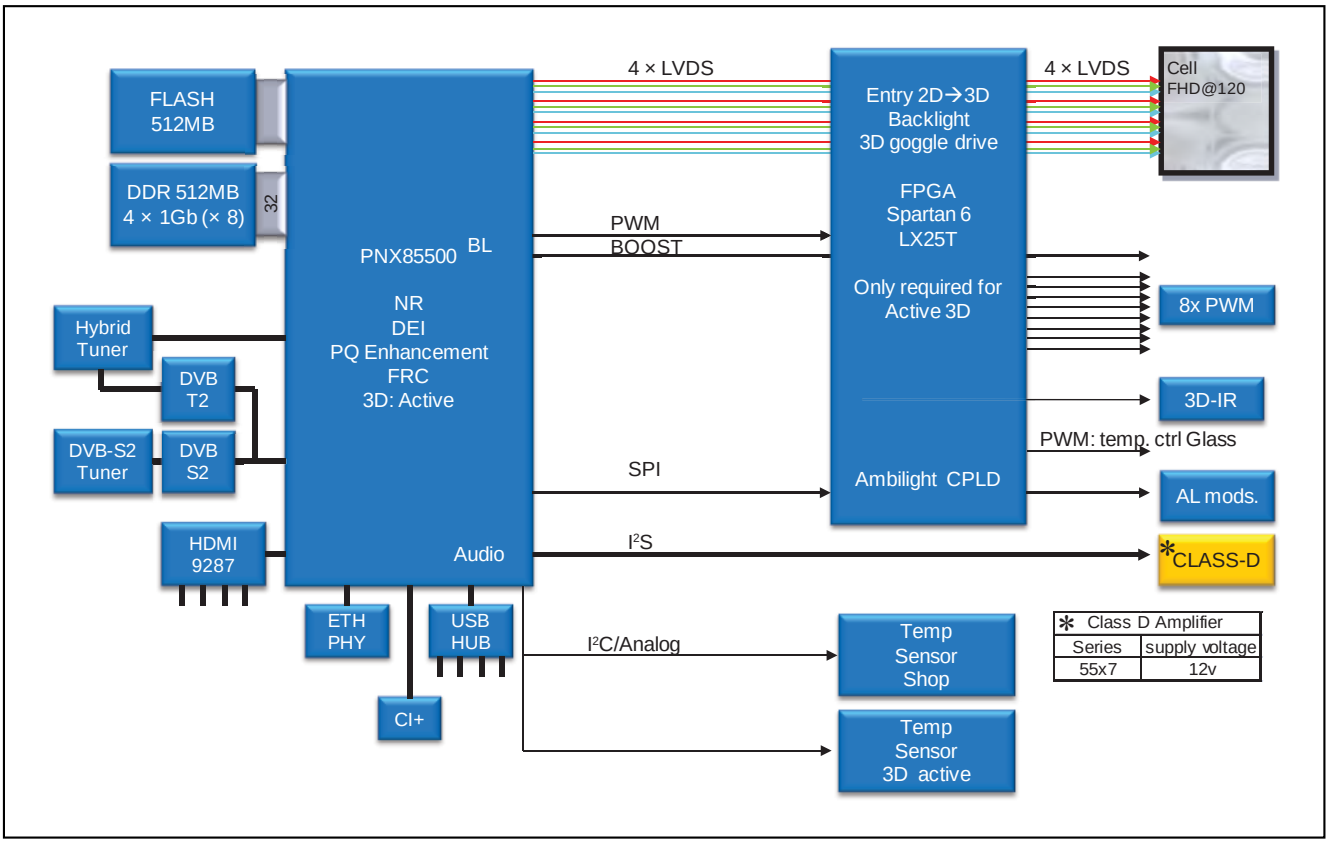

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Figure 7-2 Architecture of TV550 R4 platform (5500 range; supporting “active” 3D)

7.1.3 SSB Cell Layout

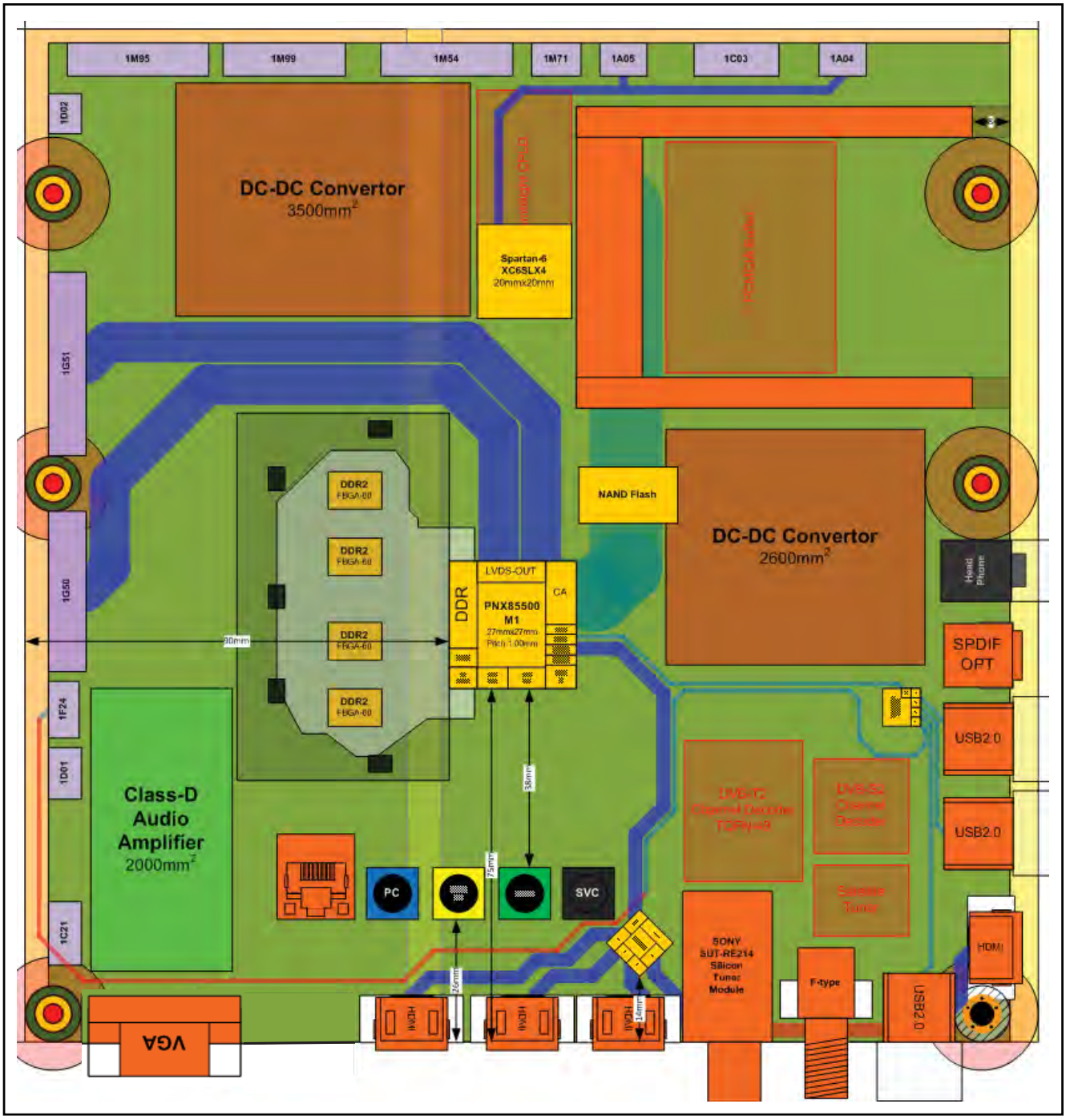

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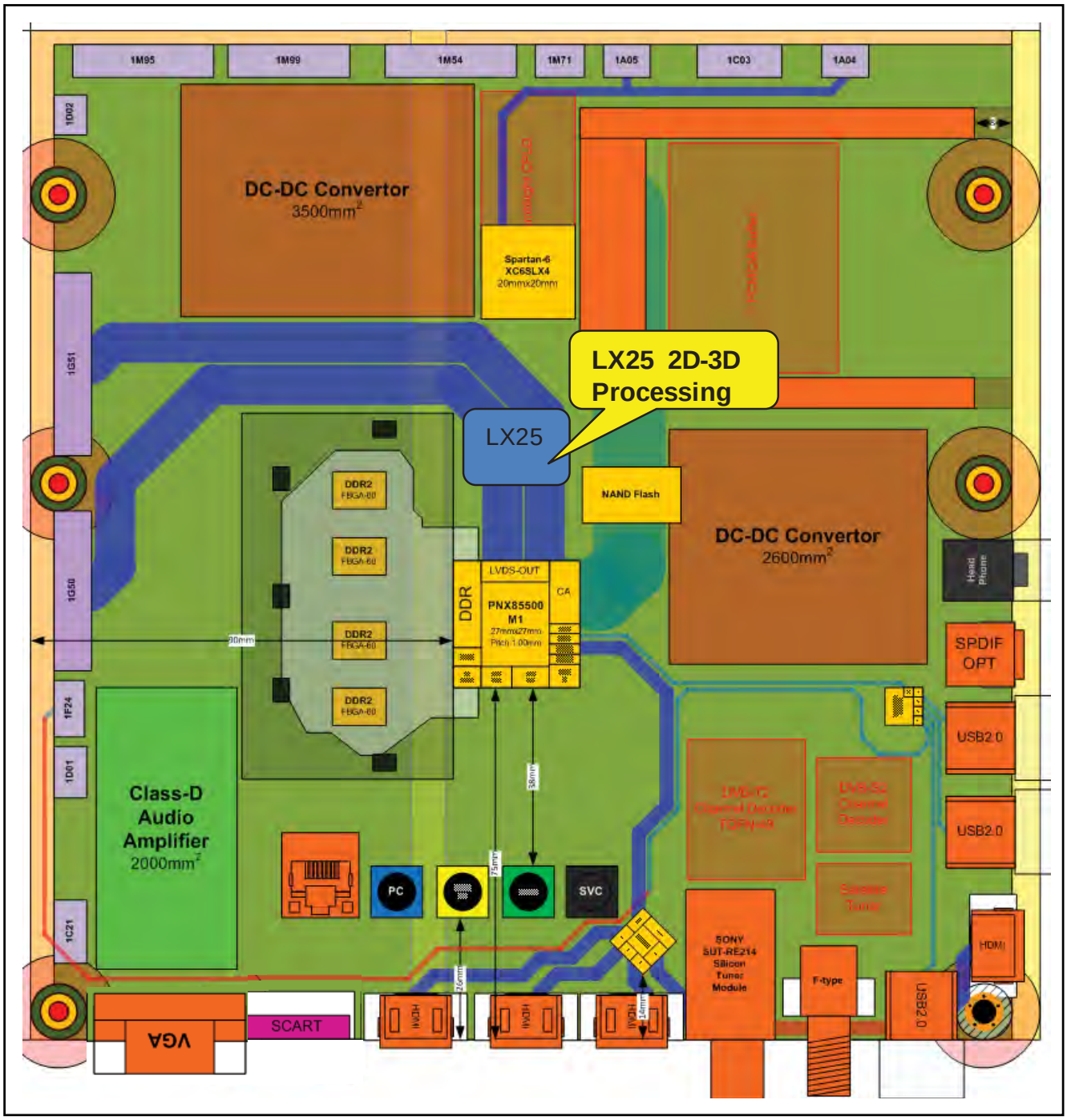
Figure 7-3 SSB layout cells (top view; 4000-5000 range)



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120227

Figure 7-4 SSB layout cells (5500 range; supporting “active” 3D)

7.2 Power Supply

7.2.1 Power Supply Unit 4xx7 series

No pinning table is available.
Refer to section 10.1 and 10.2 for schematics.

7.2.2 Power Supply Unit 5xx7 series

Table 7-1 Connector overview 5xx7 series, all screen sizes

	Connector			
no.	**1308**	**1316**	**1M95**	**1M99**
Description	**Mains**	**to display**	**to SSB**	**to SSB**
Pin	**CN1**	**CN2**	**CN4**	**CN5**
1	N	A1	+3V3SB	GND_AL
2	L	n.c.	Standby	12V3
3	n.a.	n.c.	GND1	GND_AL
4	n.a.	C1	GND1	12V3
5	n.a.	C2	+12V3	GND1
6	n.a.	C3	+12V3	+12V3
7	n.a.	C4	+Vsnd	GND1
8	n.a.	n.a.	+Vsnd	+12V3
9	n.a.	n.a.	GND_SND	n.a.
10	n.a.	n.a.	GND_SND	n.a.
11	n.a.	n.a.	BL_ON	n.a.
12	n.a.	n.a.	BL_DIM	n.a.
13	n.a.	n.a.	BL_I_CTRL	n.a.
14	n.a.	n.a.	POK	n.a.

No schematics are available.

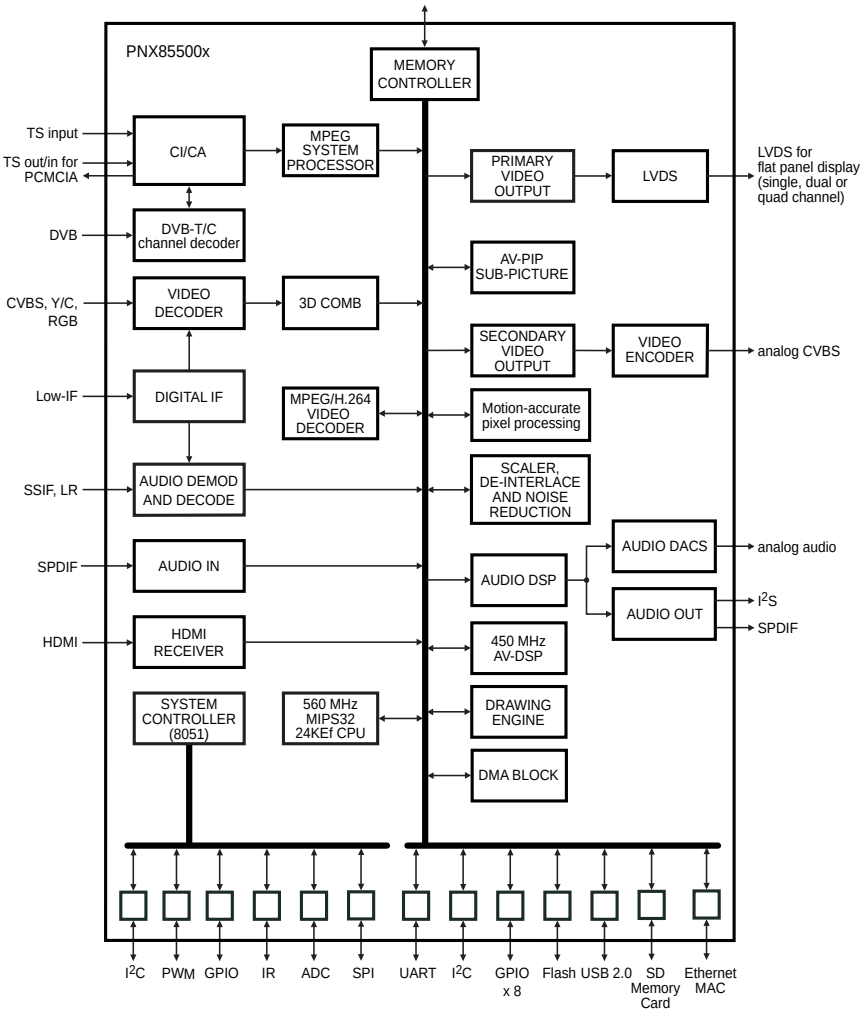
7.3 Video and Audio Processing - PNX855xx

The PNX855xx is the main audio and video processor (or System-on-Chip) for this platform. It has the following features:

- Multi-standard digital video decoder (MPEG-2, H.264, MPEG-4)
- Integrated DVB-T/DVB-C channel decoder
- Integrated CI+
- Integrated motion accurate picture processing (MAPP2)
- High definition ME/MC
- 2D LED backlight dimming option
- Embedded HDMI HDCP keys
- Extended colour gamut and colour booster
- Integrated USB2.0 host controller
- Improved MPEG artefact reduction compared with PNX8543
- Security for customers own code/settings (secure flash).

The TV550 combines front-end video processing functions, such as DVB-T channel decoding, MPEG-2/H.264 decode, analog video decode and HDMI reception, with advanced back-end video picture improvements. It also includes next generation Motion Accurate Picture Processing (MAPP2). The MAPP2 technology provides state-of-the-art motion artifact reduction with movie judder cancellation, motion sharpness and vivid colour management. High flat panel screen resolutions and refresh rates are supported with formats including 1366 × 768 @ 100Hz/120Hz and 1920 × 1080 @ 100Hz/120Hz. The combination of Ethernet, CI+ and H.264 supports new TV experiences with IPTV and VOD. On top of that, optional support is available for 2D dimming in combination with LED backlights for optimum contrast and power savings up to 50%.

For a functional diagram of the PNX855xx, refer to Figure 7-5.



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111103

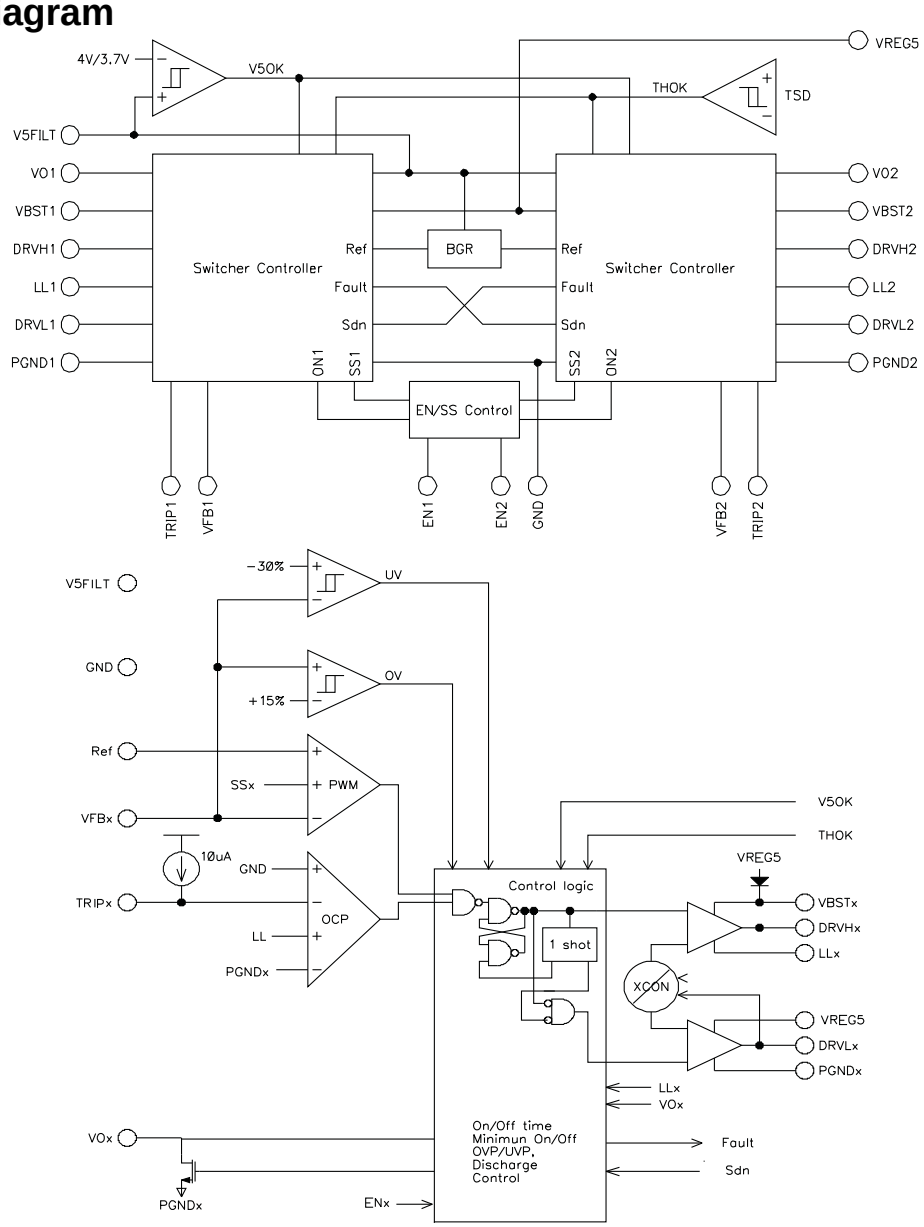
Figure 7-5 PNX855xx functional diagram

8. IC Data Sheets

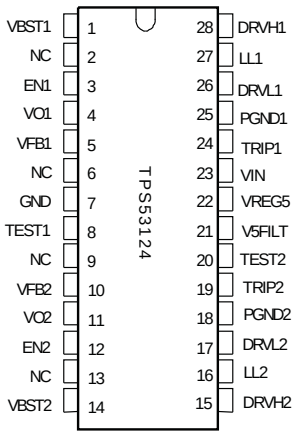
This chapter shows the internal block diagrams and pin configurations of ICs that are drawn as “black boxes” in the electrical diagrams (with the exception of “memory” and “logic” ICs).

8.1 Diagram 10-3-3 DC/DC B02A, TPS53126PW (IC7U03)

Block diagram



Pinning information



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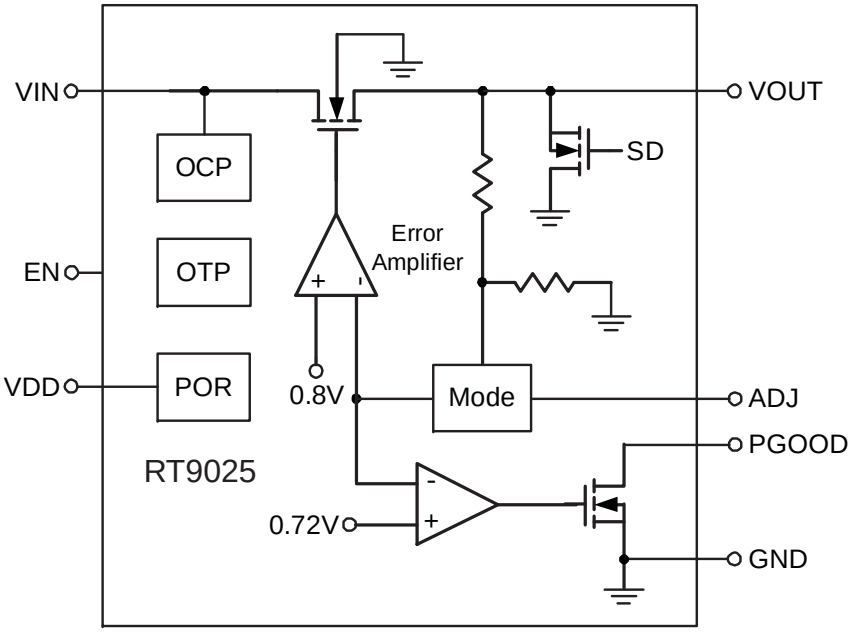
100416

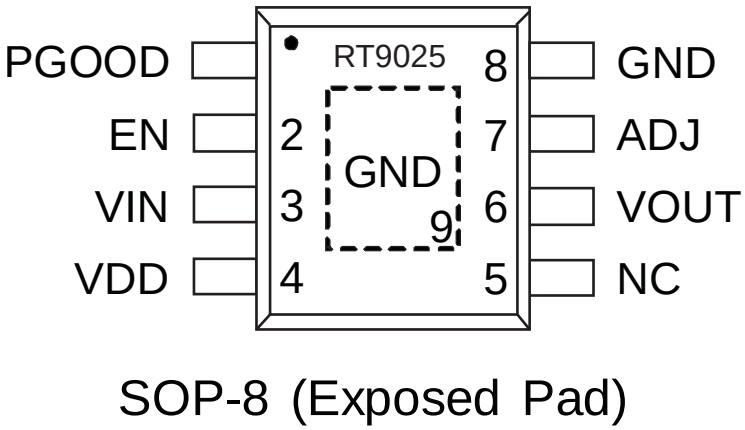
Figure 8-1 Internal block diagram and pin configuration

8.2 Diagram 10-3-4 DC/DC, 1.8 V to 1.2 V conversion B02B, RT9025 (IC 7UA4-1)

Block diagram



Pinning information



SOP-8 (Exposed Pad)

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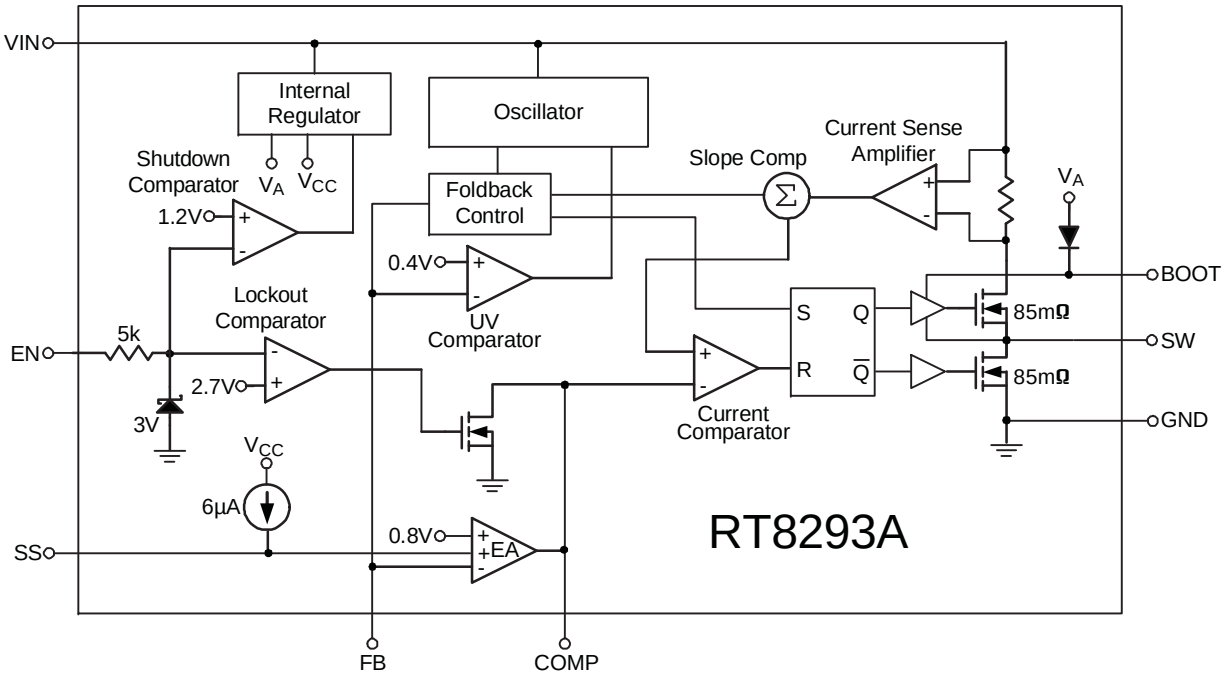
120227

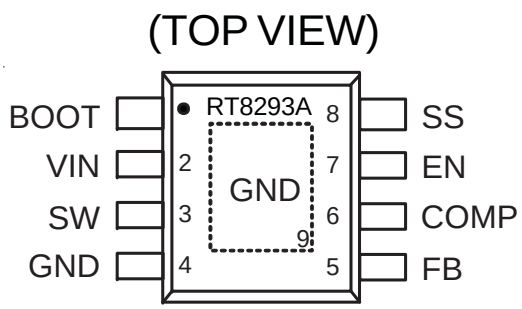
Figure 8-2 Internal block diagram and pin configuration

8.3 Diagram 10-3-5 DC/DC, 12 V to 5 V/3.3 V conversion B02C, RT8293AHGSP (IC 7UD0)

Block diagram



Pinning information



SOP-8 (Exposed Pad)

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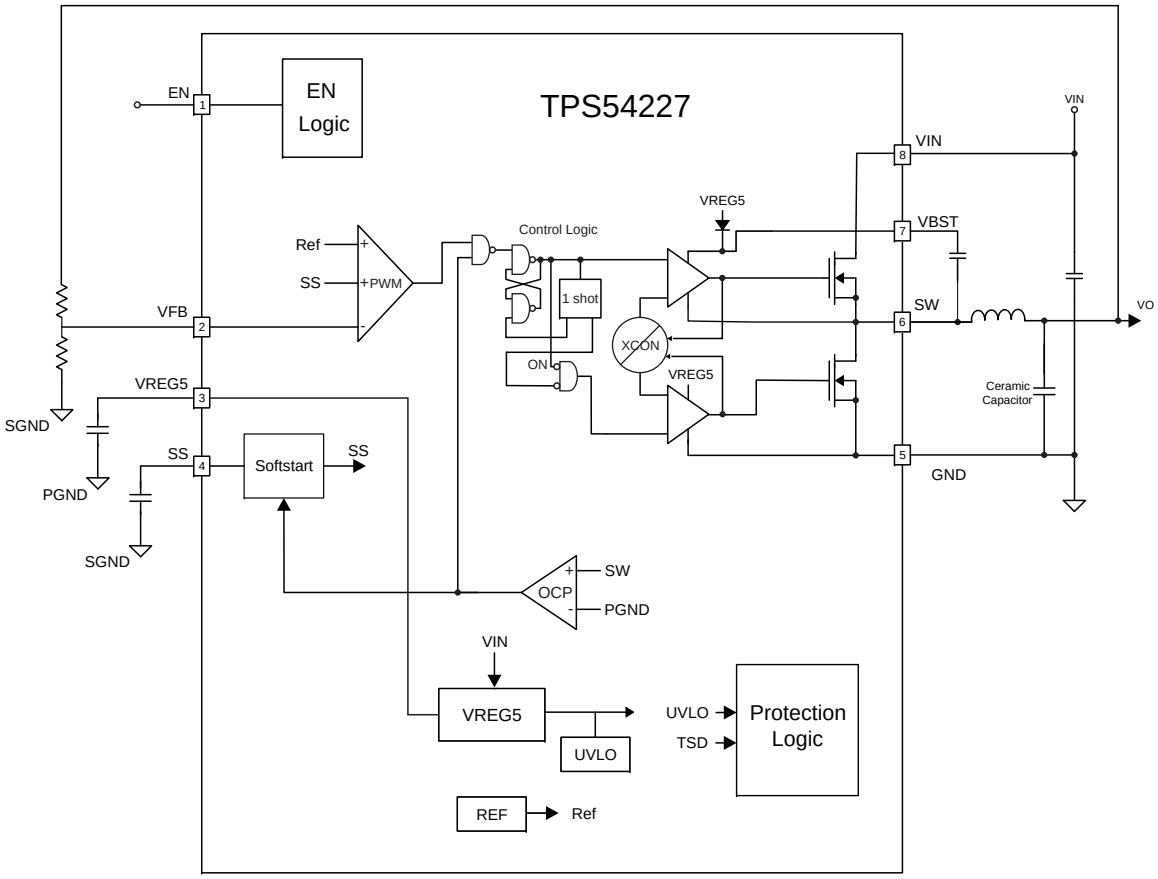
120227

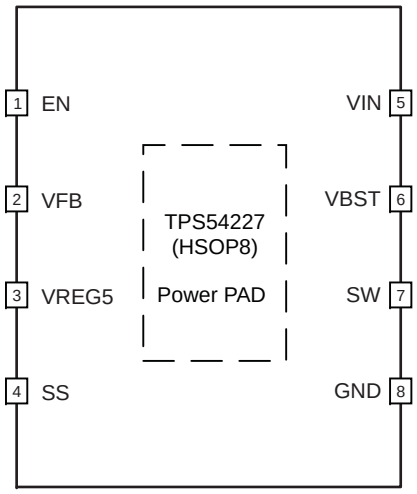
Figure 8-3 Internal block diagram and pin configuration

8.4 Diagram 10-3-6 DVBS supply B03A, TPS54227DDA (IC 7T00)

Block diagram



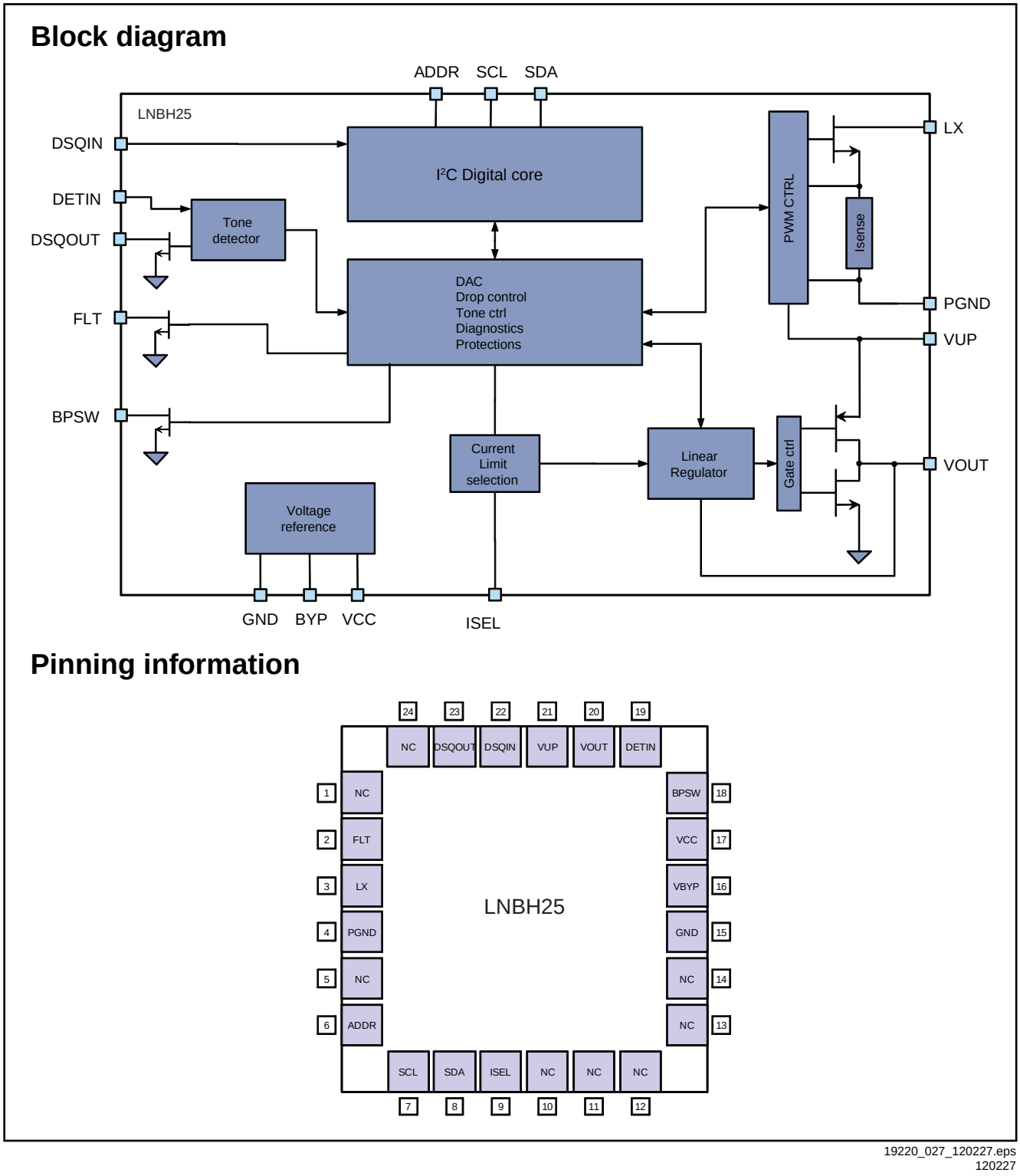
Pinning information



19220_029_120227.eps
120227

Figure 8-4 Internal block diagram and pin configuration

8.5 Diagram 10-3-7 Core voltage supply for DVBS demodulator B03B, LNBH25PQ (IC 7TP2)

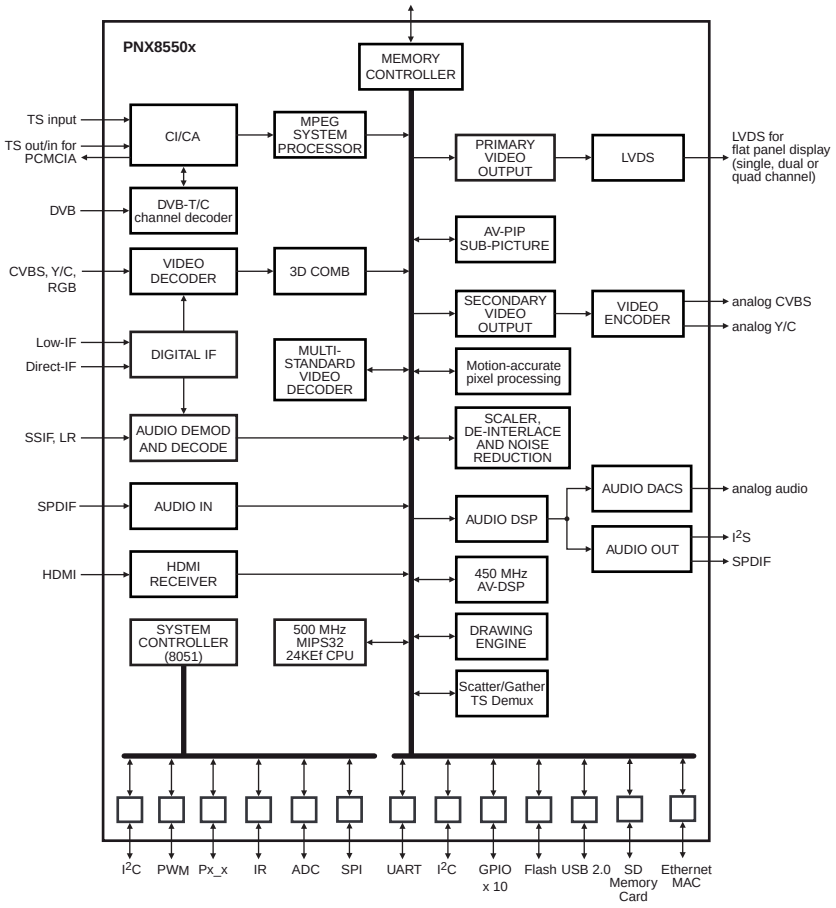


19220_027_120227.eps
120227

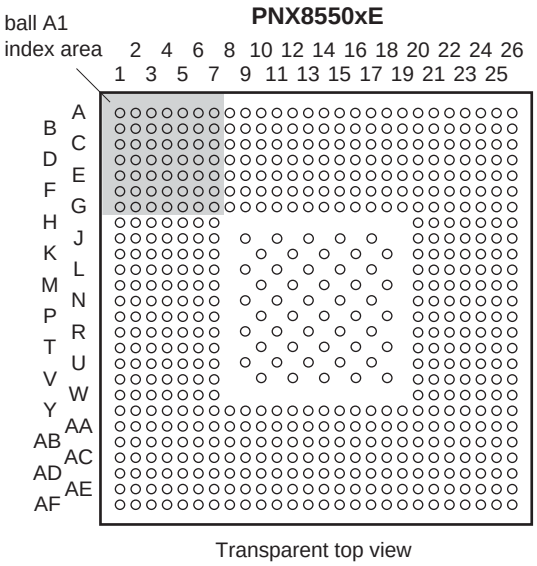
Figure 8-5 Internal block diagram and pin configuration

8.6 Diagram 10-3-9 PNX 85500: Power B05A, PNX855xx (IC7S00)

Block diagram



Pinning information

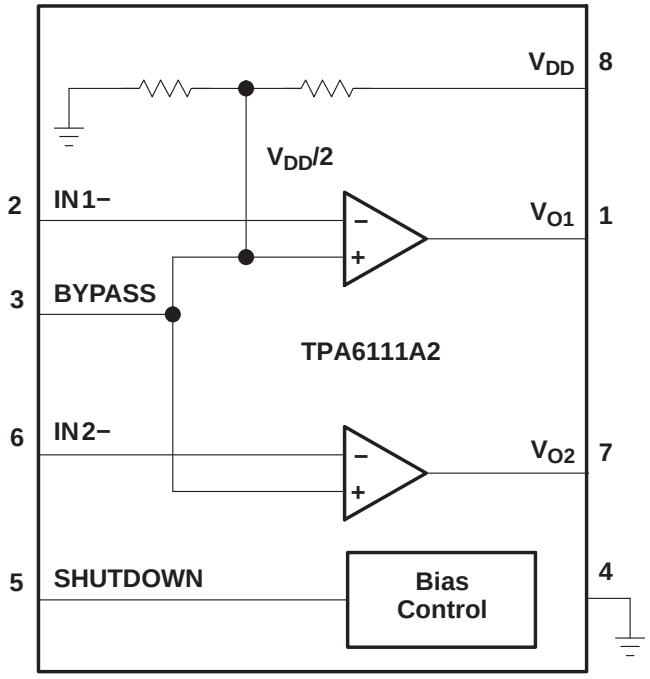


18770_308_100217.eps
100217

Figure 8-6 Internal block diagram and pin configuration

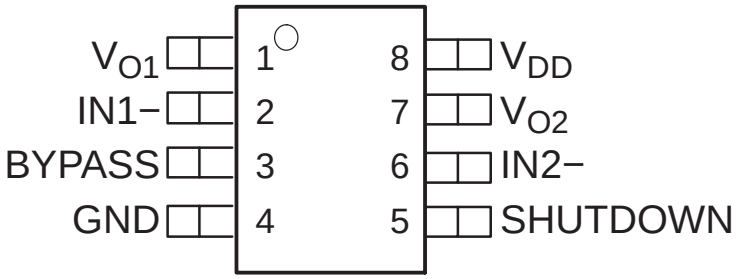
8.7 Diagram 10-3-17 PNX 85500: Headphone B05I, TS489IST (IC 7NN1)

Block diagram



Pinning information

D OR DGN PACKAGE
(TOP VIEW)

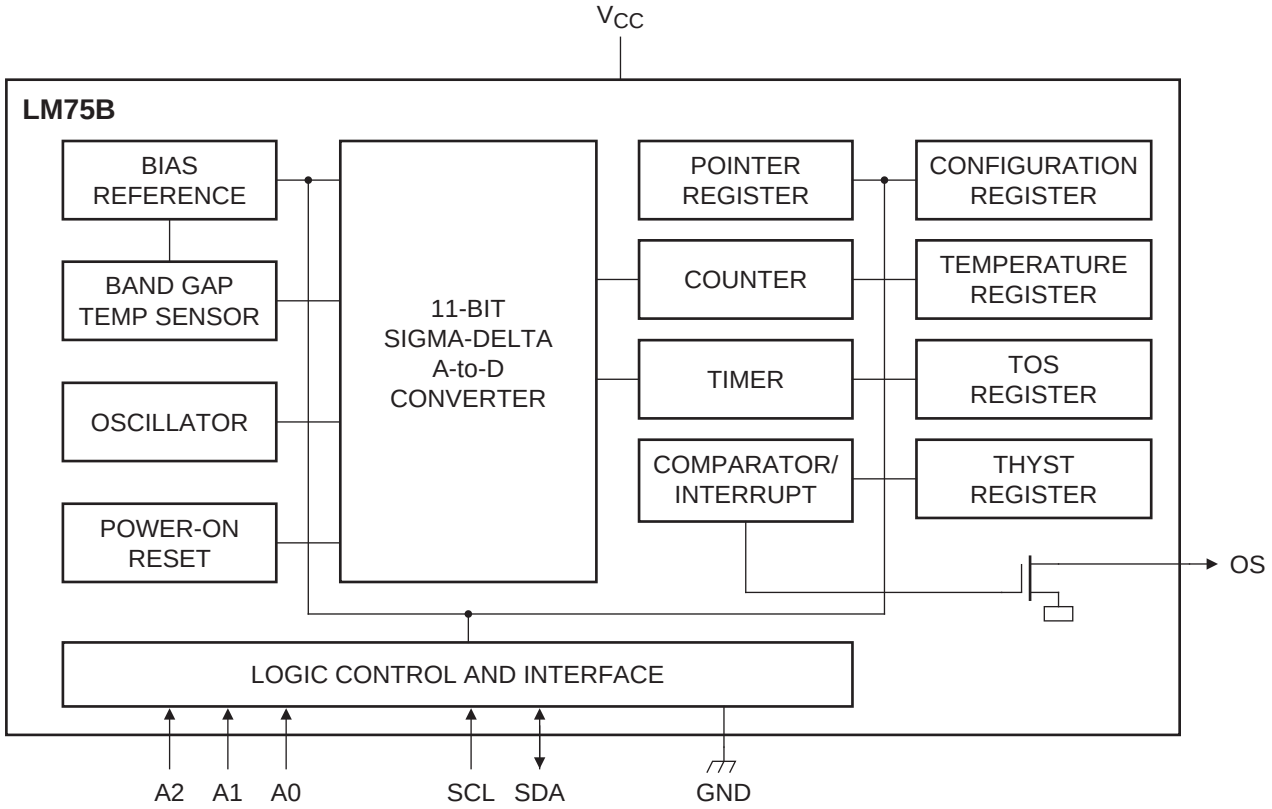


18770_309_100217.eps
110602

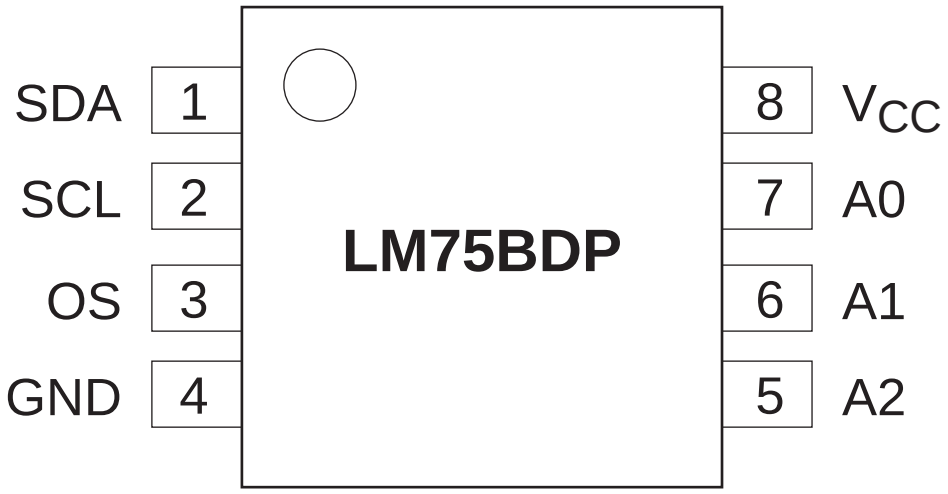
Figure 8-7 Internal block diagram and pin configuration

8.8 Diagram 10-3-23 PNX 85500: Temperature sensor B05O, LM75BDP (IC 7USA)

Block diagram



Pinning information

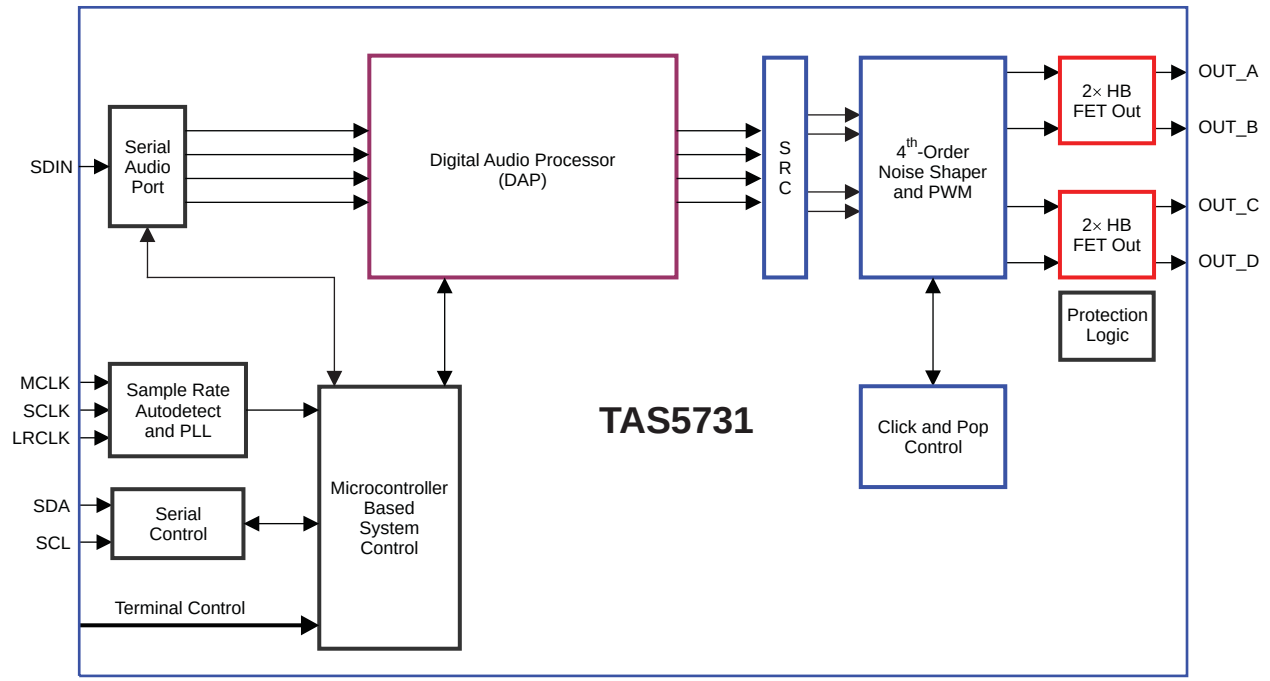


18770_300_100217.eps
100217

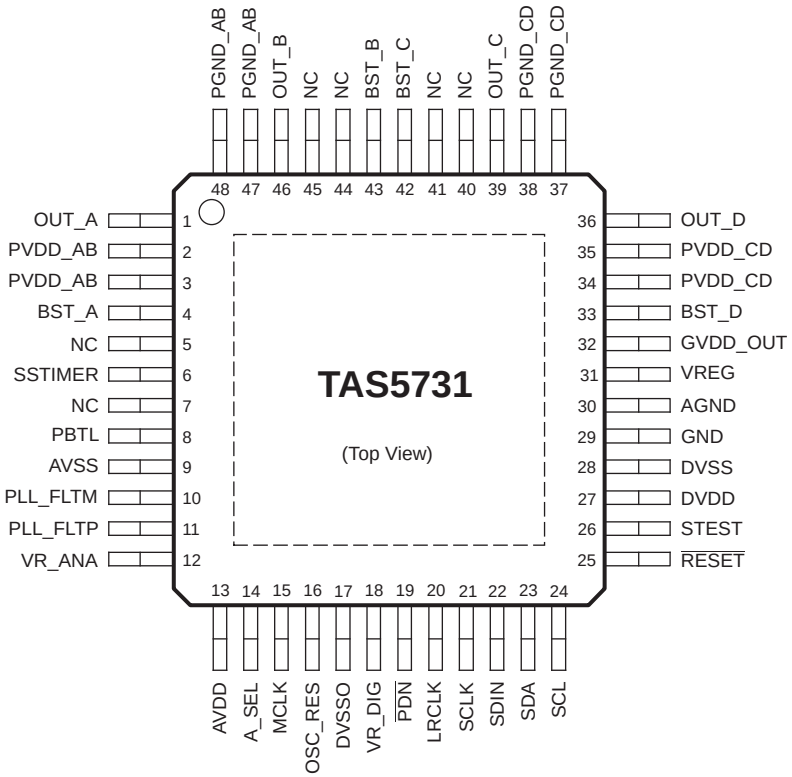
Figure 8-8 Pin configuration

8.9 Diagram 10-3-25 Class-D amplifier B06A, TAS5731PHP (IC 7D60)

Block diagram



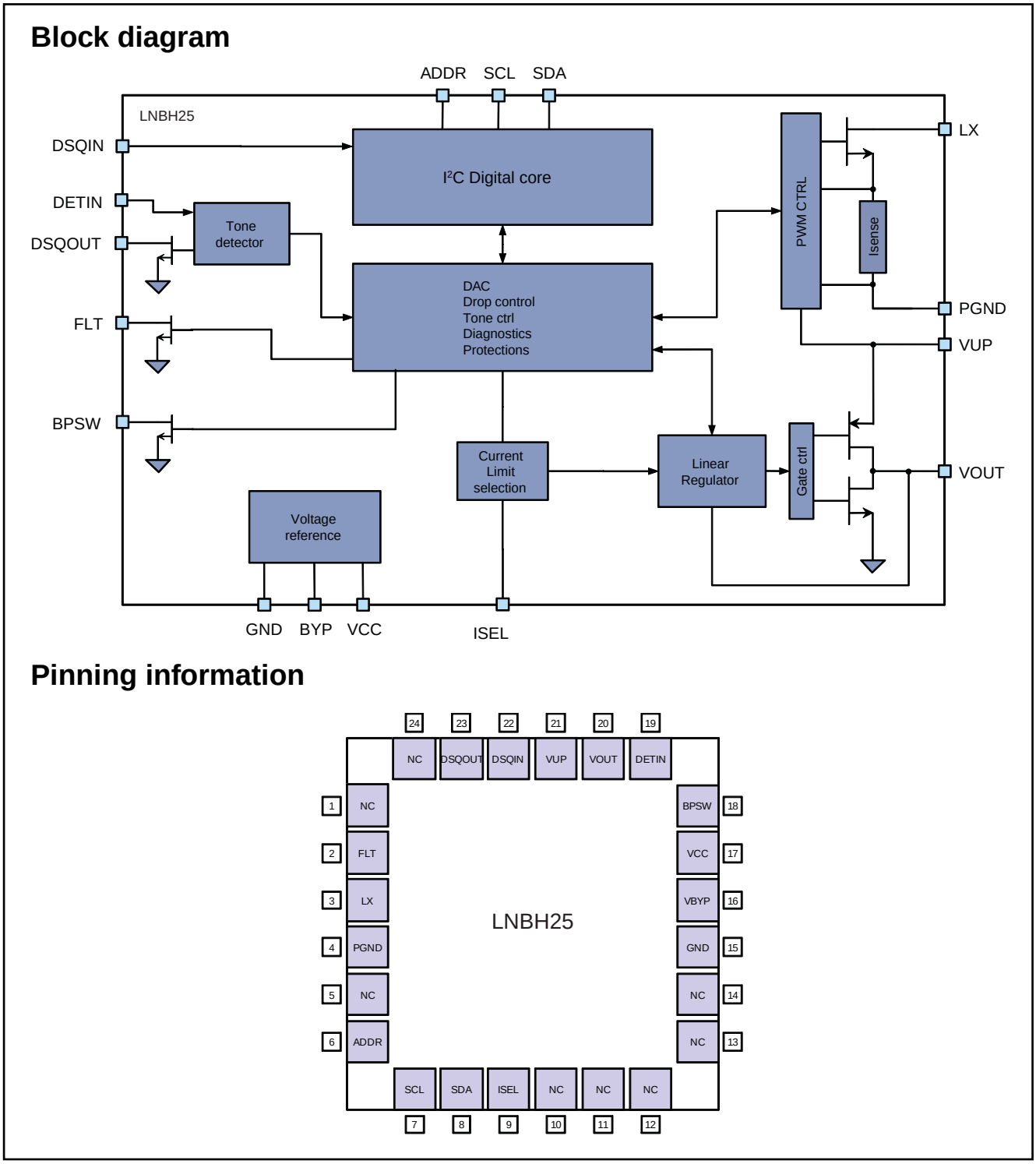
Pinning information



19220_086_120229.eps
120229

Figure 8-9 Internal block diagram and pin configuration

8.10 Diagram 10-3-26 USB hub B06B, CY7C65632-28LTXCT (IC 7FL5)

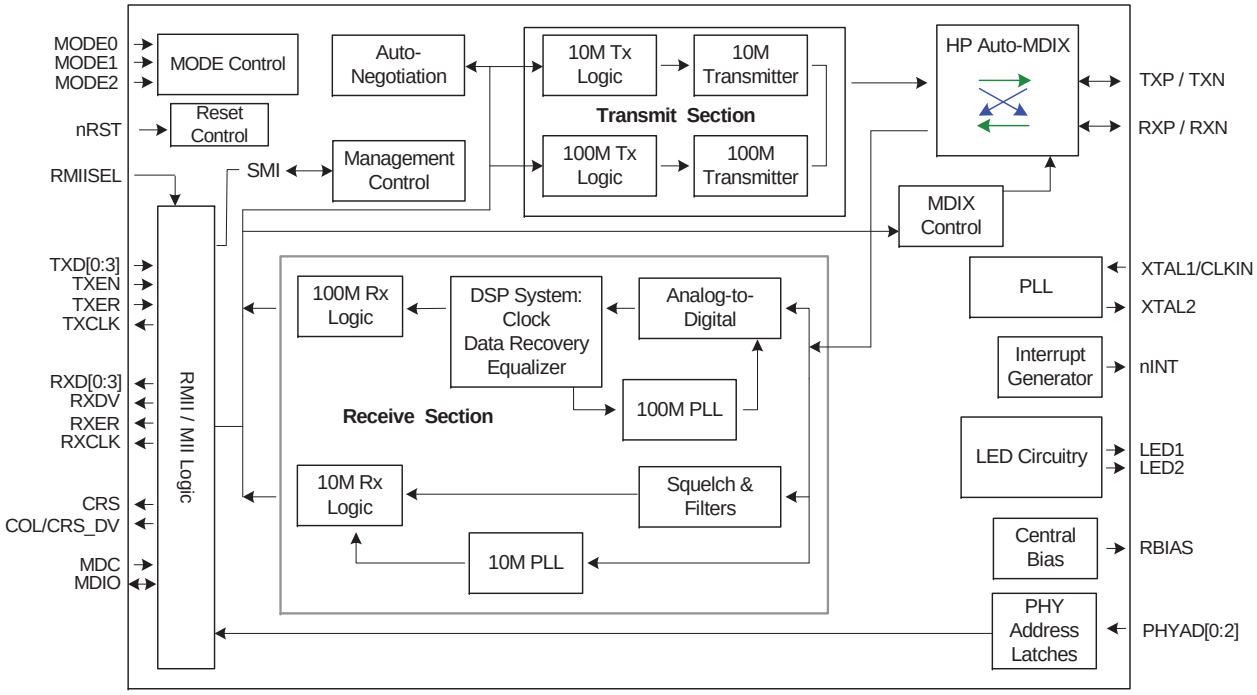


19220_027_120227.eps
120227

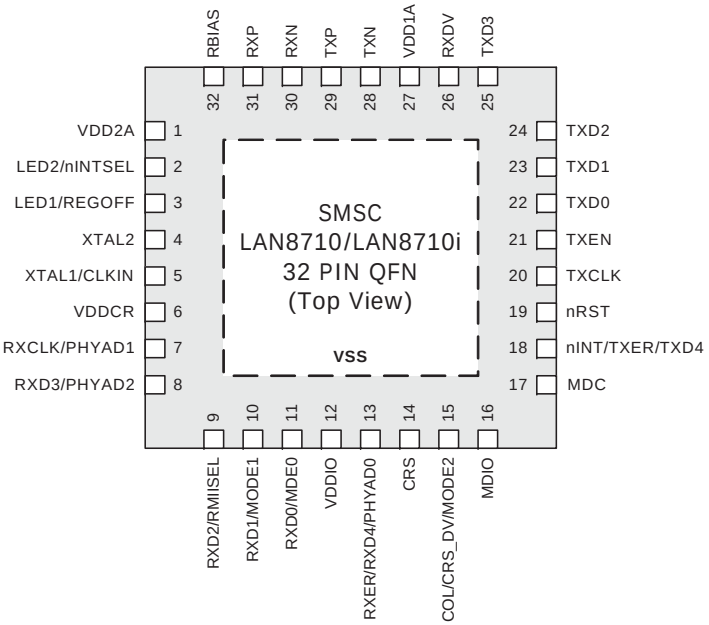
Figure 8-10 Internal block diagram and pin configuration

8.11 Diagram 10-3-27 Ethernet & service B06C, LAN8710A-EZKH (IC 7N10)

Block diagram



Pinning information

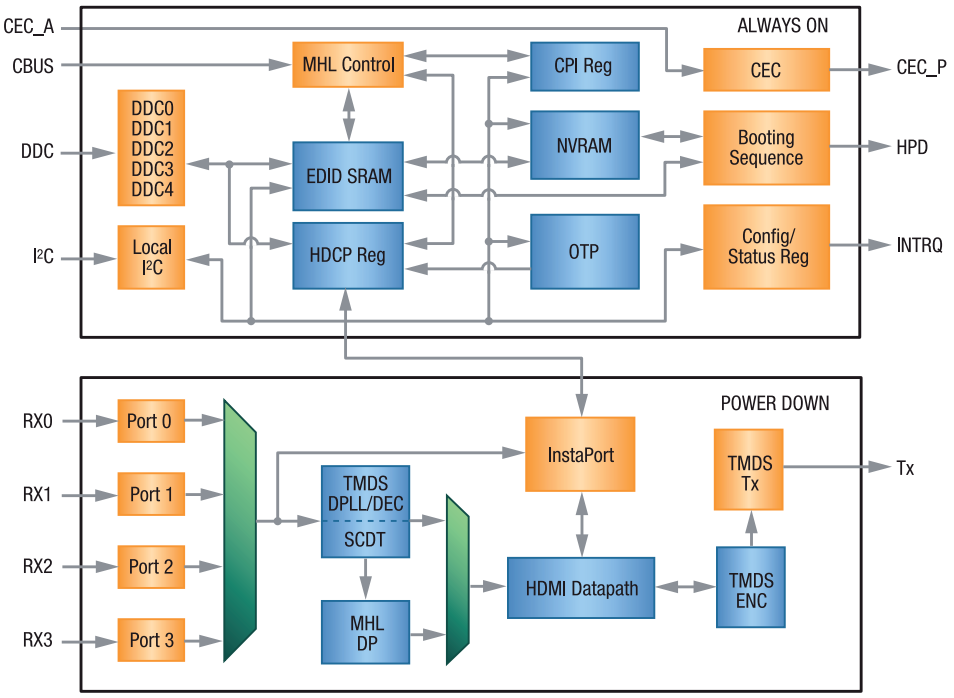


18770_302_100217.eps
100217

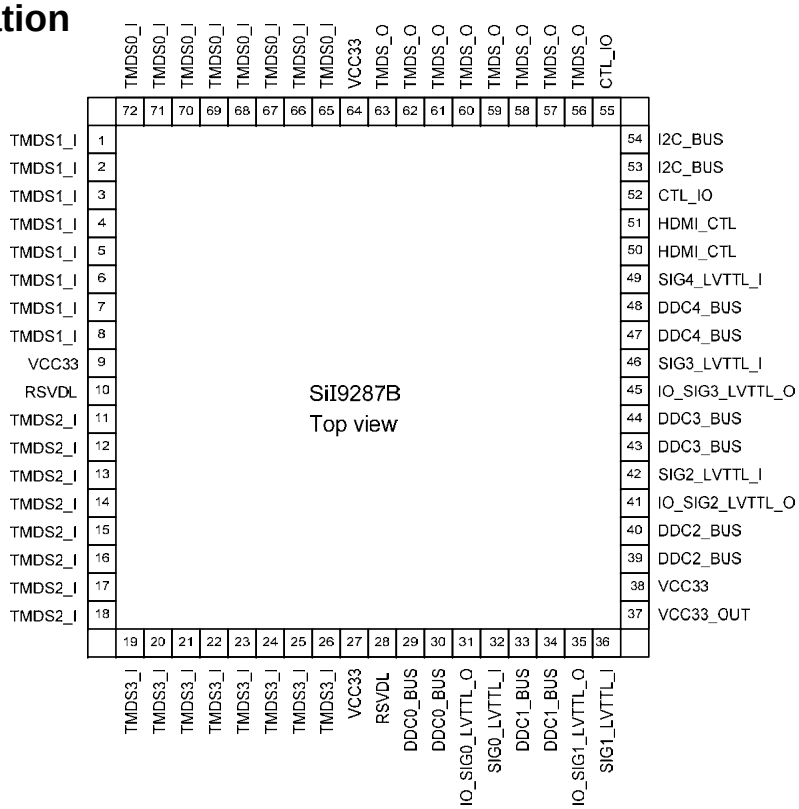
Figure 8-11 Internal block diagram and pin configuration

8.12 Diagram 10-3-28 HDMI B06D, SiI9x87B (IC 7NC1)

Block diagram



Pinning information

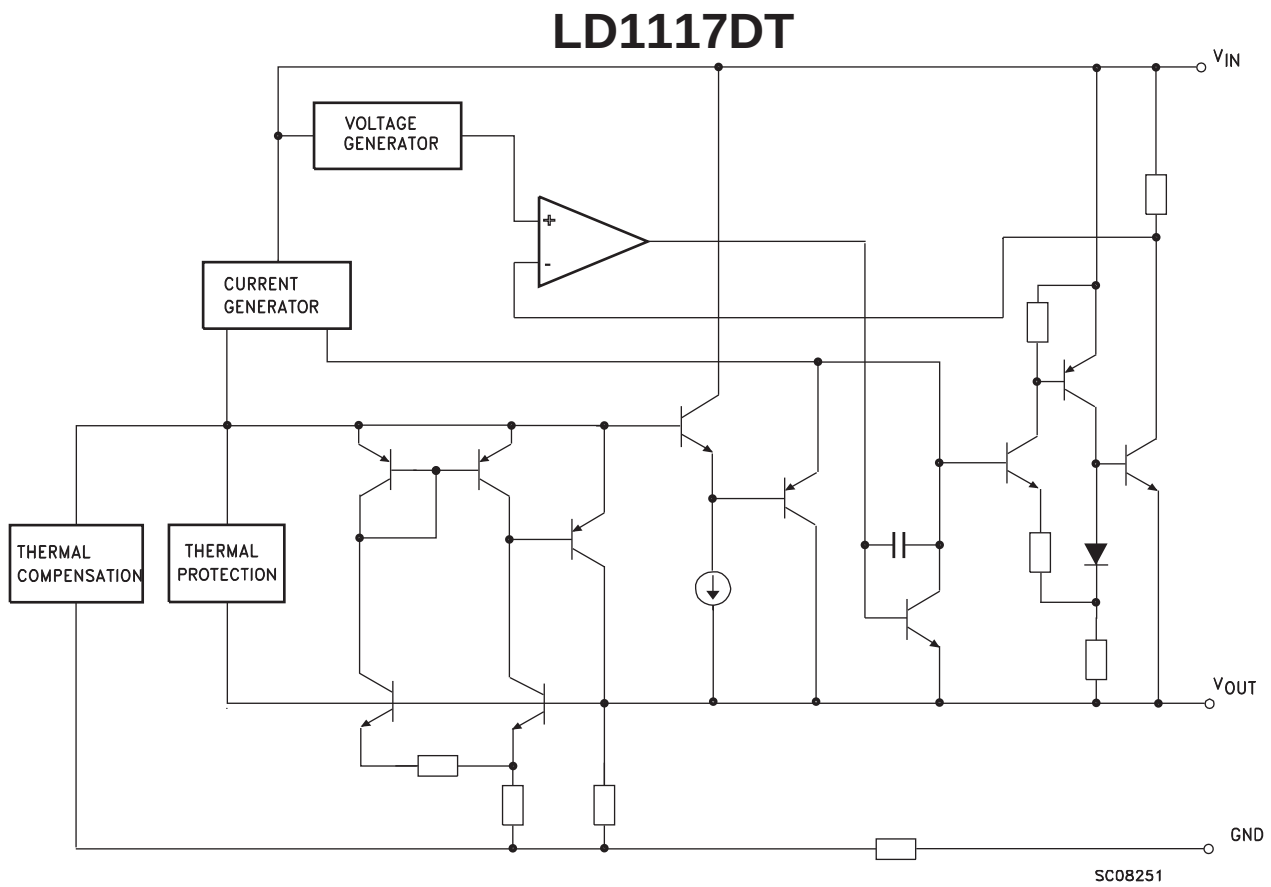


18770_303_100217.eps
100217

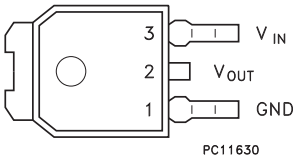
Figure 8-12 Internal block diagram and pin configuration

8.13 Diagram 10-3-29 FPGA, power & control B07A, LD1117DT12 (IC 7J20)

Block diagram



Pinning information



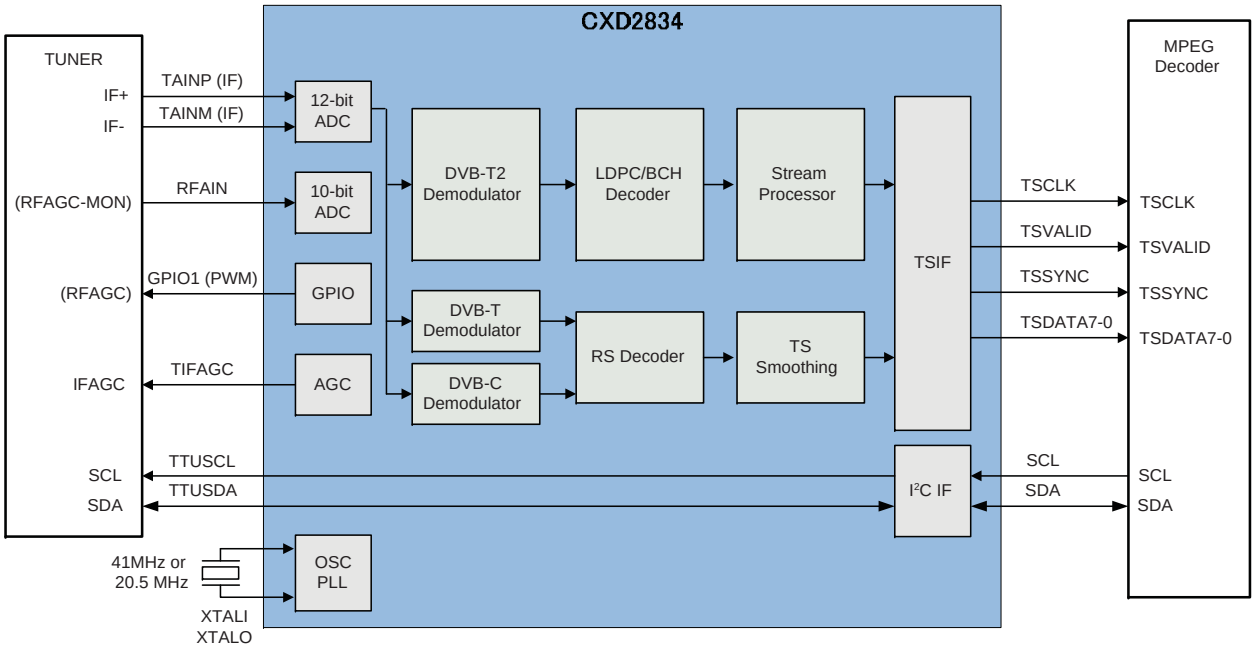
DPAK

F_15710_166.eps
100402

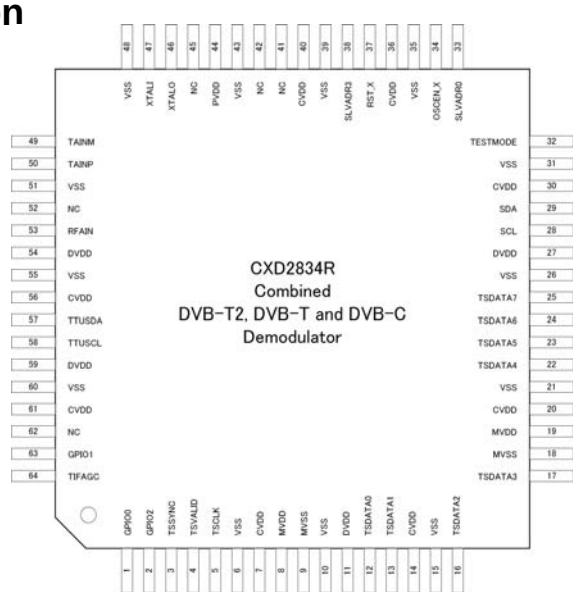
Figure 8-13 Internal block diagram and pin configuration

8.14 Diagram 10-3-31 Tuner, channel decoder B08A, CXD2834ER (IC 7KC0)

Block diagram



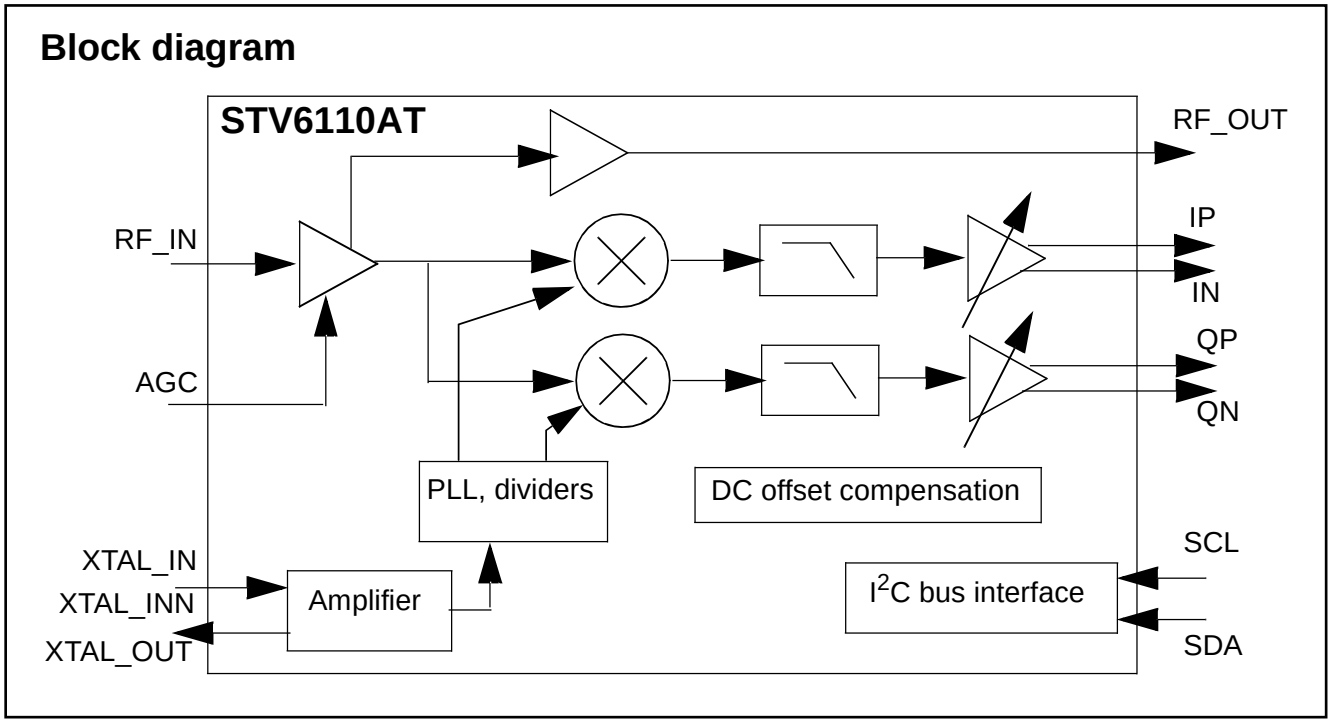
Pinning information



19220_025_120227.eps
120227

Figure 8-14 Internal block diagram and pin configuration

8.15 Diagram 10-3-32 DVBS, FE B08B, STV6110AT (IC 7RA0)



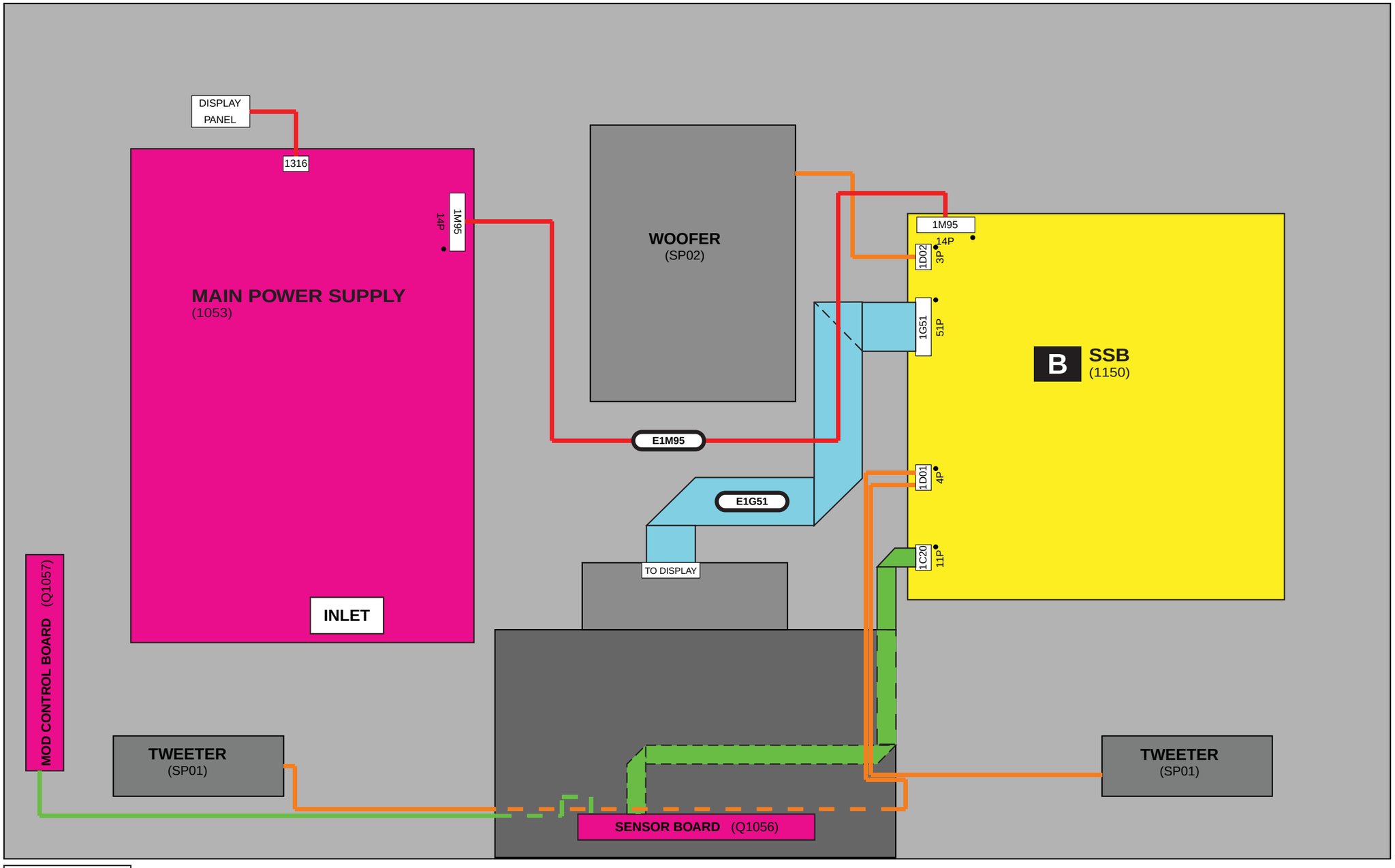
18770_304_100217.eps
110601

Figure 8-15 Internal block diagram and pin configuration

9. Block Diagrams

9.1 Wiring diagram 4000 series 32"

WIRING DIAGRAM 32" 4000 Series



1M95 (B01A)
1. +3V3STBY
2. STANDBY
3. GND
4. GND
5. +12Vin
6. +12Vin
7. +12VAUDIO
8. +12VAUDIO
9. GND
10. GND
11. BL-ON-1
12. BL-DIM-1
13. BL-I-CTRL-1
14. POWER-OK-1

1G51 (B09A)
1. +VDISP
2. +VDISP
3. +VDISP
4. +VDISP
|
|
51.

1C20 (B01B)
1. LIGHT-SENSOR
2. 3D-LED
3. LED-2
4. GND
5. KEYBOARD
6. +3V3-STANDBY
7. RC
8. +5V
9. SCL-SET
10. GND
11. SDA-SET

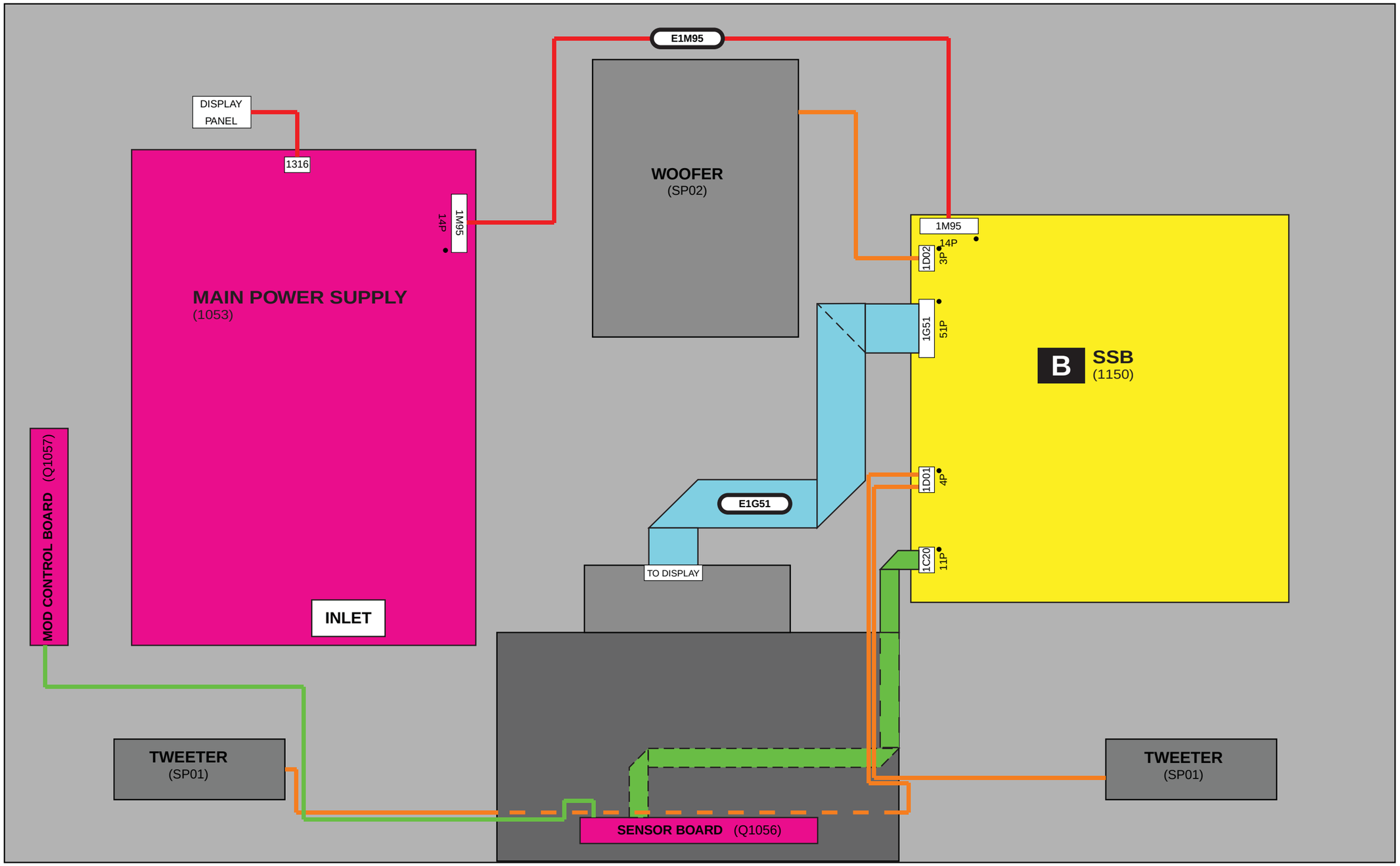
1D01 (B06A)
1. LEFT-+
2. LEFT--
3. RIGHT-+
4. RIGHT--

1D02 (B06A)
1. LEFT-+
2. GND
3. RIGHT--

19220_018_120224.eps
120224

9.2 Wiring diagram 4000 series 37"

WIRING DIAGRAM 37" 4000 Series



1M95 (B01A)
1. +3V3STBY
2. STANDBY
3. GND
4. GND
5. +12Vin
6. +12Vin
7. +12VAUDIO
8. +12VAUDIO
9. GND
10. GND
11. BL-ON-1
12. BL-DIM-1
13. BL-I-CTRL-1
14. POWER-OK-1

1G51 (B09A)
1. +VDISP
2. +VDISP
3. +VDISP
4. +VDISP
|
|
51.

1C20 (B01B)
1. LIGHT-SENSOR
2. 3D-LED
3. LED-2
4. GND
5. KEYBOARD
6. +3V3-STANDBY
7. RC
8. +5V
9. SCL-SET
10. GND
11. SDA-SET

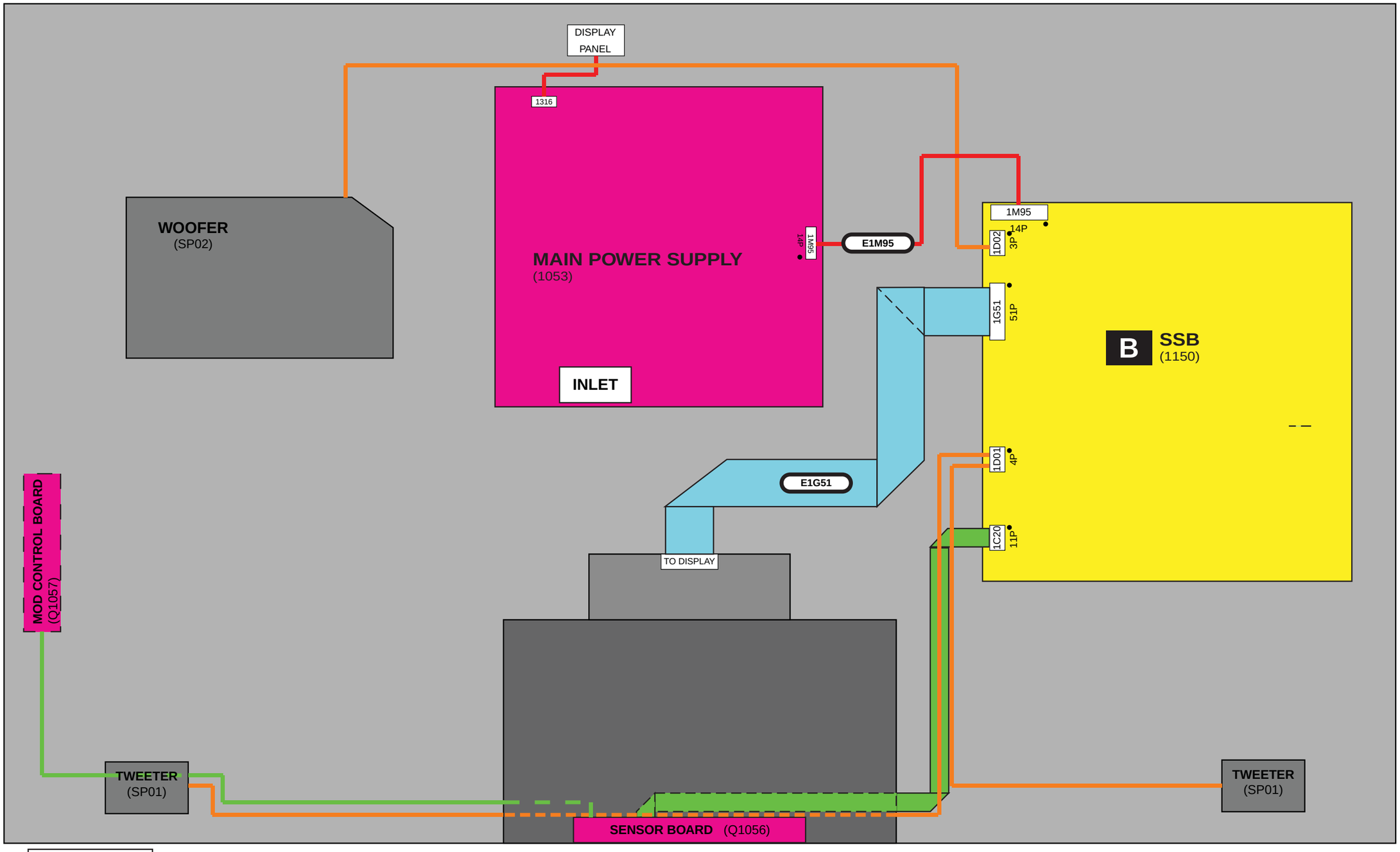
1D01 (B06A)
1. LEFT-+
2. LEFT--
3. RIGHT-+
4. RIGHT--

1D02 (B06A)
1. LEFT-+
2. GND
3. RIGHT--

19220_019_120224.eps
120224

9.3 Wiring diagram 4000 series 42"

WIRING DIAGRAM 42" 4000 series



1M95 (B01A)
1. +3V3STBY
2. STANDBY
3. GND
4. GND
5. +12Vin
6. +12Vin
7. +12VAUDIO
8. +12VAUDIO
9. GND
10. GND
11. BL-ON-1
12. BL-DIM-1
13. BL-I-CTRL-1
14. POWER-OK-1

1G51 (B09A)
1. +VDISP
2. +VDISP
3. +VDISP
4. +VDISP
|
|
51.

1C20 (B01B)
1. LIGHT-SENSOR
2. 3D-LED
3. LED-2
4. GND
5. KEYBOARD
6. +3V3-STANDBY
7. RC
8. +5V
9. SCL-SET
10. GND
11. SDA-SET

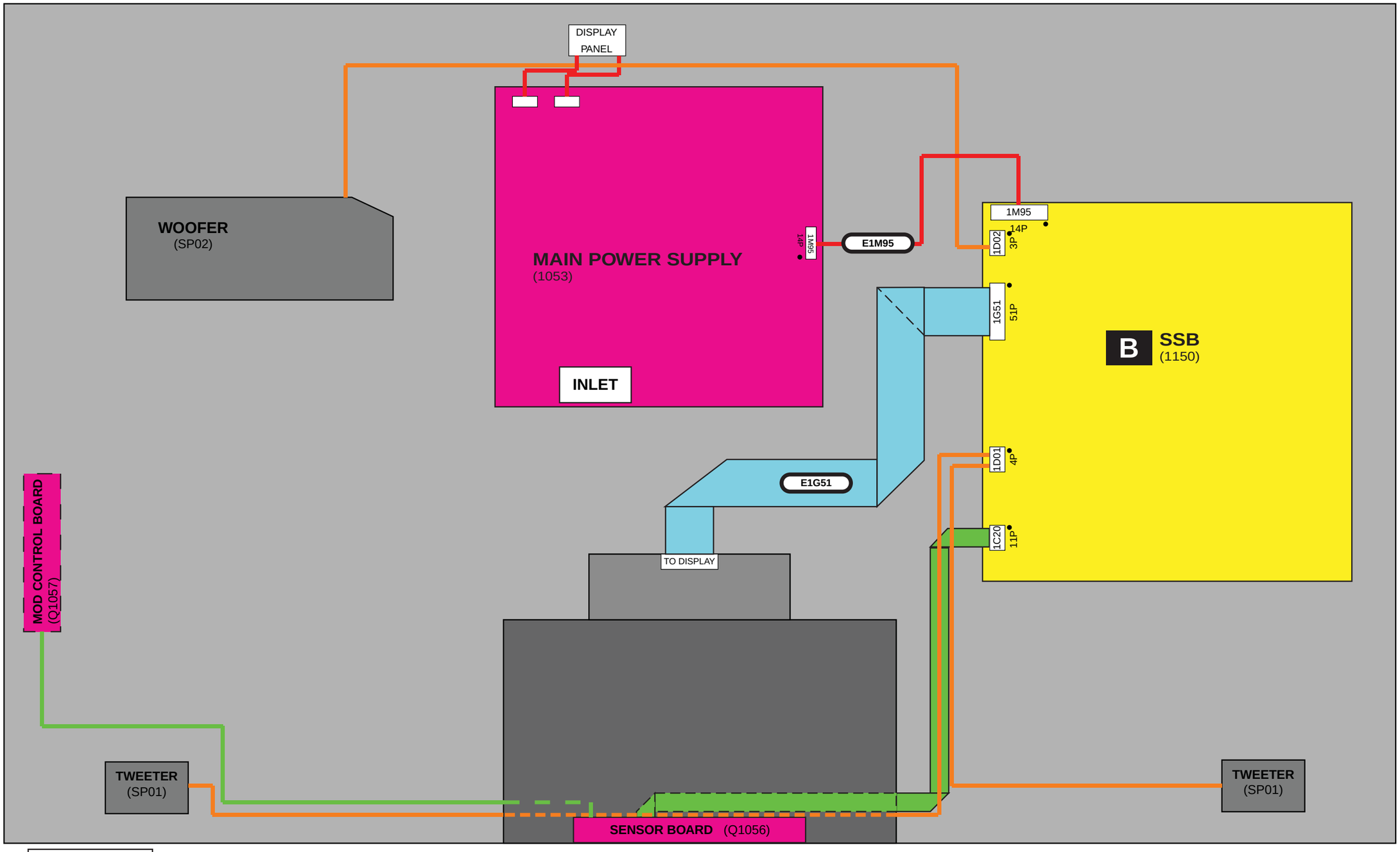
1D01 (B06A)
1. LEFT-+
2. LEFT--
3. RIGHT-+
4. RIGHT--

1D02 (B06A)
1. LEFT-+
2. GND
3. RIGHT--

19220_020_120224.eps
120224

9.4 Wiring diagram 4000 series 47"

WIRING DIAGRAM 47" 4000 series



1M95 (B01A)
1. +3V3STBY
2. STANDBY
3. GND
4. GND
5. +12Vin
6. +12Vin
7. +12VAUDIO
8. +12VAUDIO
9. GND
10. GND
11. BL-ON-1
12. BL-DIM-1
13. BL-I-CTRL-1
14. POWER-OK-1

1G51 (B09A)
1. +VDISP
2. +VDISP
3. +VDISP
4. +VDISP
|
|
51.

1C20 (B01B)
1. LIGHT-SENSOR
2. 3D-LED
3. LED-2
4. GND
5. KEYBOARD
6. +3V3-STANDBY
7. RC
8. +5V
9. SCL-SET
10. GND
11. SDA-SET

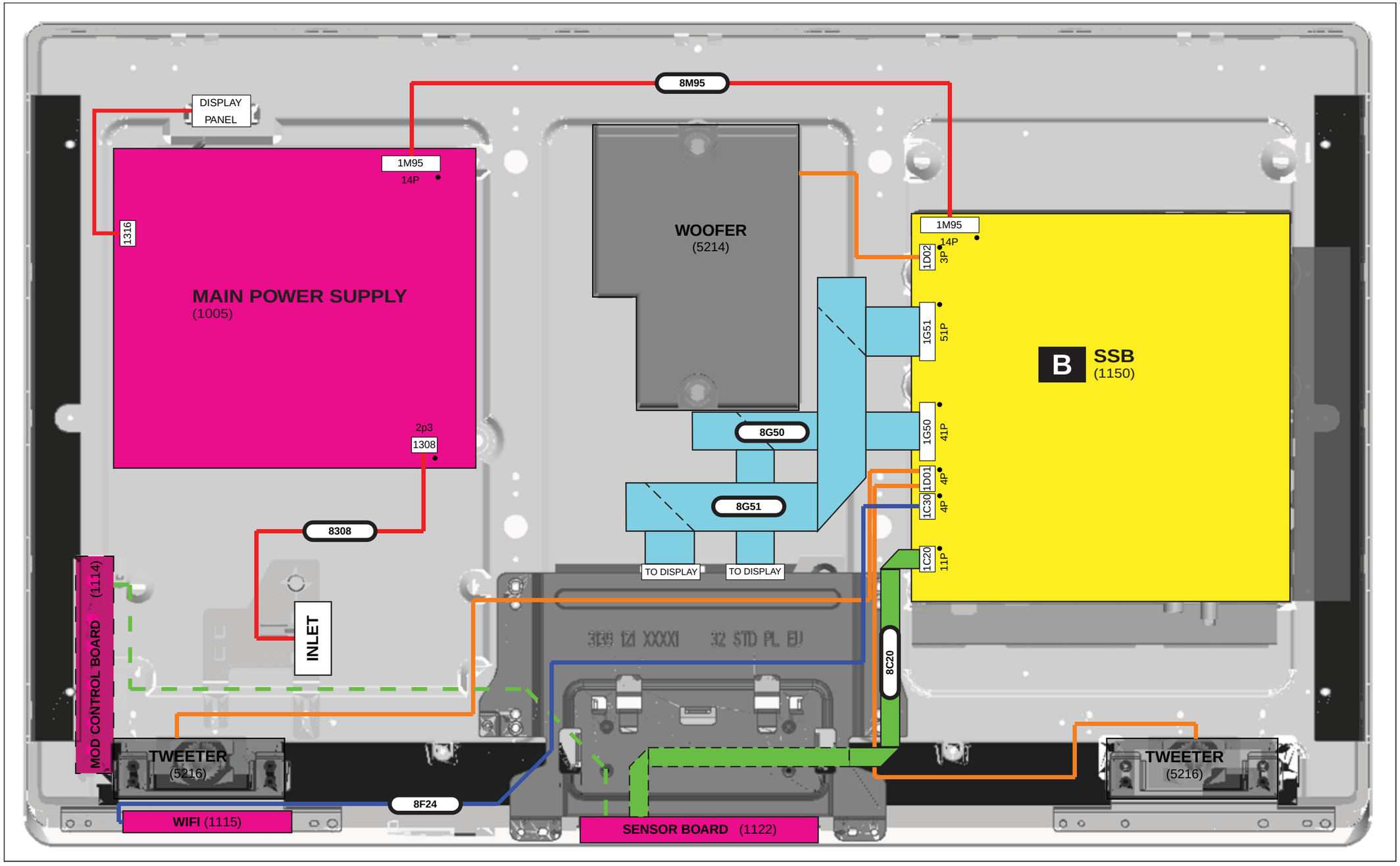
1D01 (B06A)
1. LEFT-+
2. LEFT--
3. RIGHT-+
4. RIGHT--

1D02 (B06A)
1. LEFT-+
2. GND
3. RIGHT--

19220_021_120224.eps
120224

9.5 Wiring diagram 5000 & 5500 series 32"

WIRING DIAGRAM 32" 5000 and 5500 Series



1M95 (B01A)
1. +3V3STBY
2. STANDBY
3. GND
4. GND
5. +12Vin
6. +12Vin
7. +12VAUDIO
8. +12VAUDIO
9. GND
10. GND
11. BL-ON-1
12. BL-DIM-1
13. BL-I-CTRL-1
14. POWER-OK-1

1G50 (B09A)
1. GND
2. GND
|
|
|
|
41.

1G51 (B09A)
1. +VDISP
2. +VDISP
3. +VDISP
4. +VDISP
|
|
51.

1C20 (B01B)
1. LIGHT-SENSOR
2. 3D-LED
3. LED-2
4. GND
5. KEYBOARD
6. +3V3-STANDBY
7. RC
8. +5V
9. SCL-SET
10. GND
11. SDA-SET

1D01 (B06A)
1. LEFT-+
2. LEFT--
3. RIGHT-+
4. RIGHT--

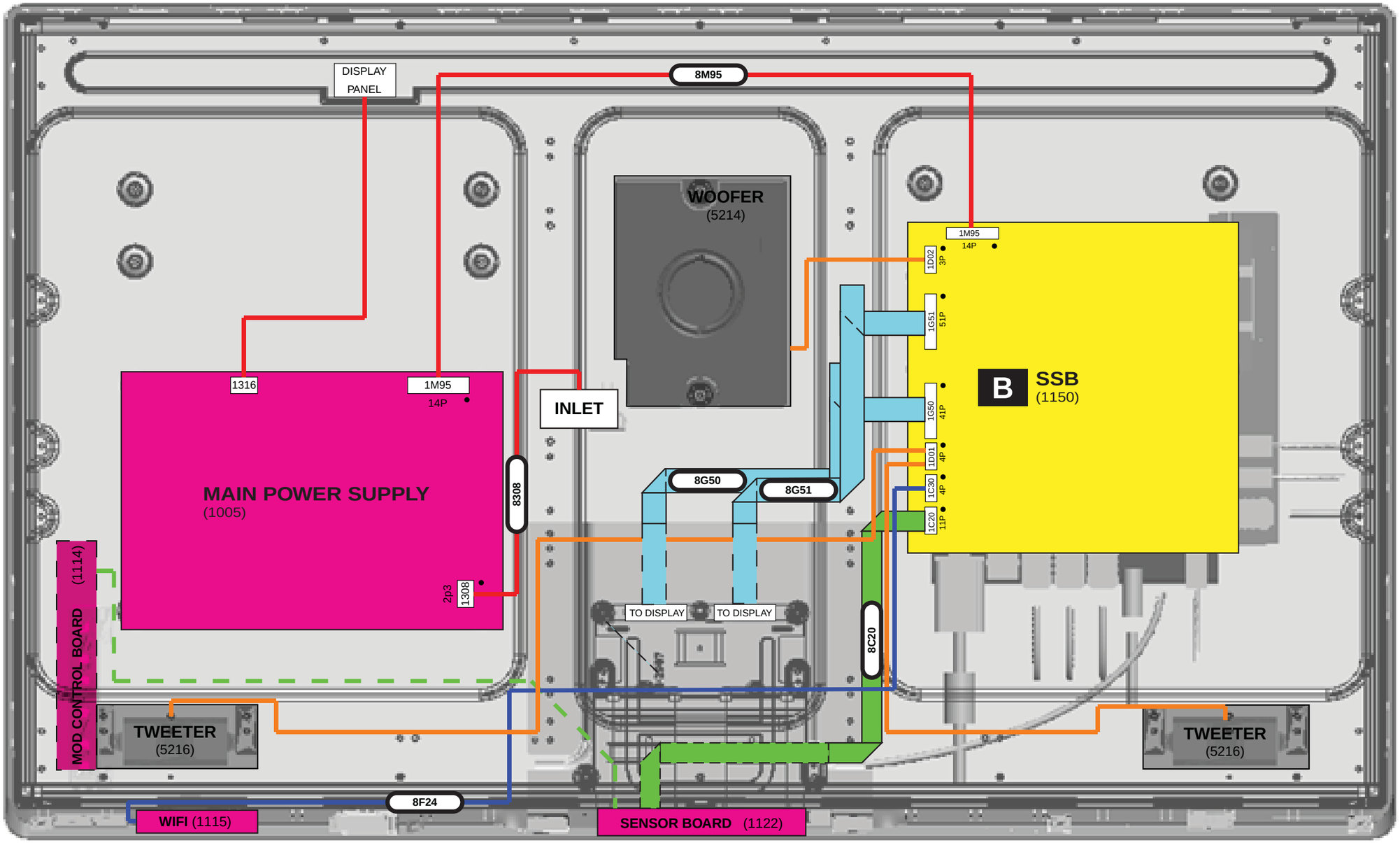
1D02 (B06A)
1. LEFT-+
2. GND
3. RIGHT--

1C30 (B06B)
1. +5V
2. USB-WIFI-DDn
3. USB-WIFI-DDp
4. GND

19220_006_120215.eps
120223

9.6 Wiring diagram 5000 & 5500 series 40"

WIRING DIAGRAM 40" 5000 and 5500 Series



1M95 (B01A)
1. +3V3STBY
2. STANDBY
3. GND
4. GND
5. +12Vin
6. +12Vin
7. +12VAUDIO
8. +12VAUDIO
9. GND
10. GND
11. BL-ON-1
12. BL-DIM-1
13. BL-I-CTRL-1
14. POWER-OK-1

1G50 (B09A)
1. GND
2. GND
|
|
|
|
41.

1G51 (B09A)
1. +VDISP
2. +VDISP
3. +VDISP
4. +VDISP
|
|
51.

1C20 (B01B)
1. LIGHT-SENSOR
2. 3D-LED
3. LED-2
4. GND
5. KEYBOARD
6. +3V3-STANDBY
7. RC
8. +5V
9. SCL-SET
10. GND
11. SDA-SET

1D01 (B06A)
1. LEFT-+
2. LEFT--
3. RIGHT-+
4. RIGHT--

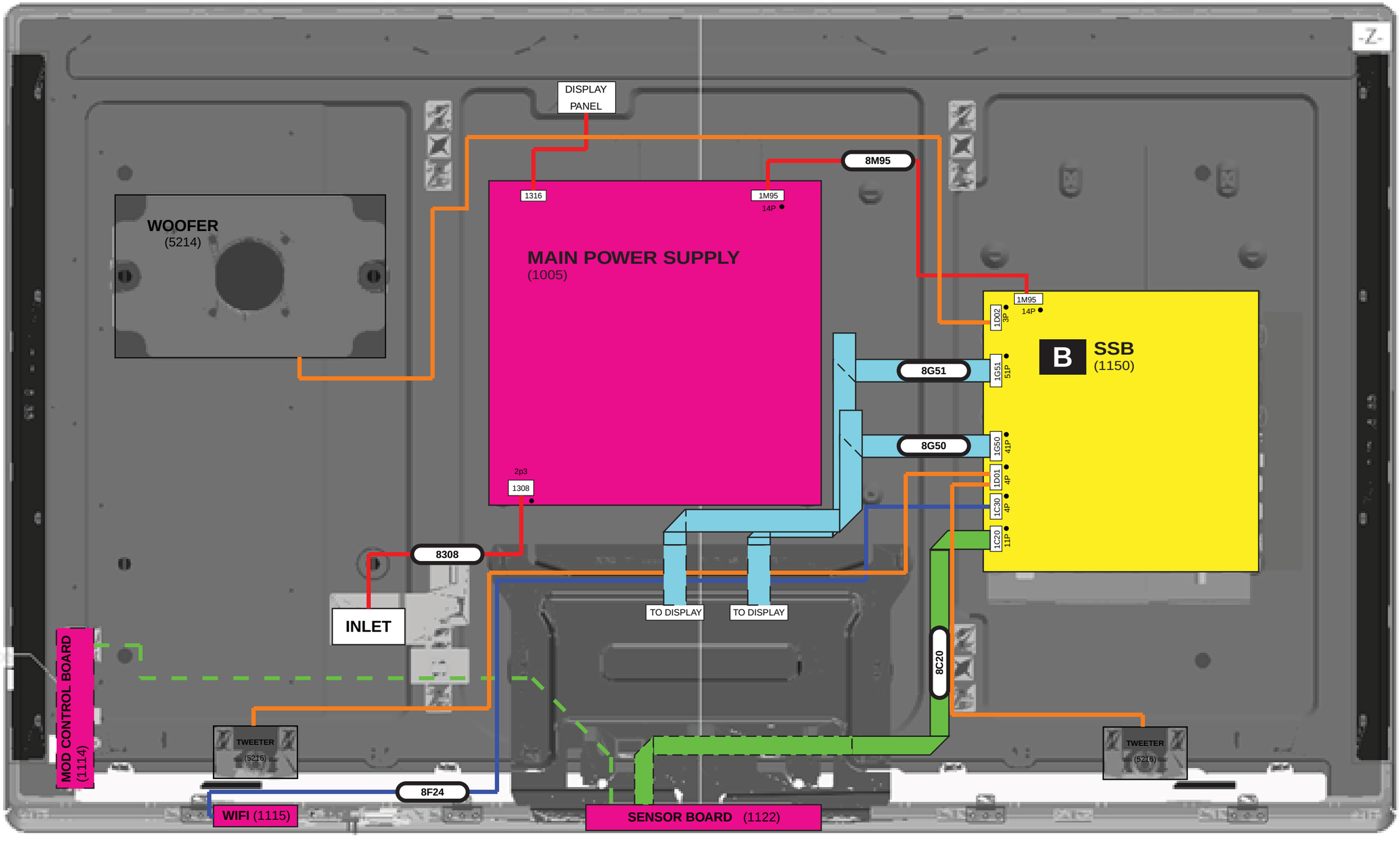
1D02 (B06A)
1. LEFT-+
2. GND
3. RIGHT--

1C30 (B06B)
1. +5V
2. USB-WIFI-DDn
3. USB-WIFI-DDp
4. GND

19220_013_120223.eps
120223

9.7 Wiring diagram 5000 & 5500 series 46"

WIRING DIAGRAM 46" 5000 and 5500 Series



1M95 (B01A)
1. +3V3STBY
2. STANDBY
3. GND
4. GND
5. +12Vin
6. +12Vin
7. +12VAUDIO
8. +12VAUDIO
9. GND
10. GND
11. BL-ON-1
12. BL-DIM-1
13. BL-I-CTRL-1
14. POWER-OK-1

1G50 (B09A)
1. GND
2. GND
|
|
|
|
41.

1G51 (B09A)
1. +VDISP
2. +VDISP
3. +VDISP
4. +VDISP
|
|
51.

1C20 (B01B)
1. LIGHT-SENSOR
2. 3D-LED
3. LED-2
4. GND
5. KEYBOARD
6. +3V3-STANDBY
7. RC
8. +5V
9. SCL-SET
10. GND
11. SDA-SET

1D01 (B06A)
1. LEFT-+
2. LEFT--
3. RIGHT-+
4. RIGHT--

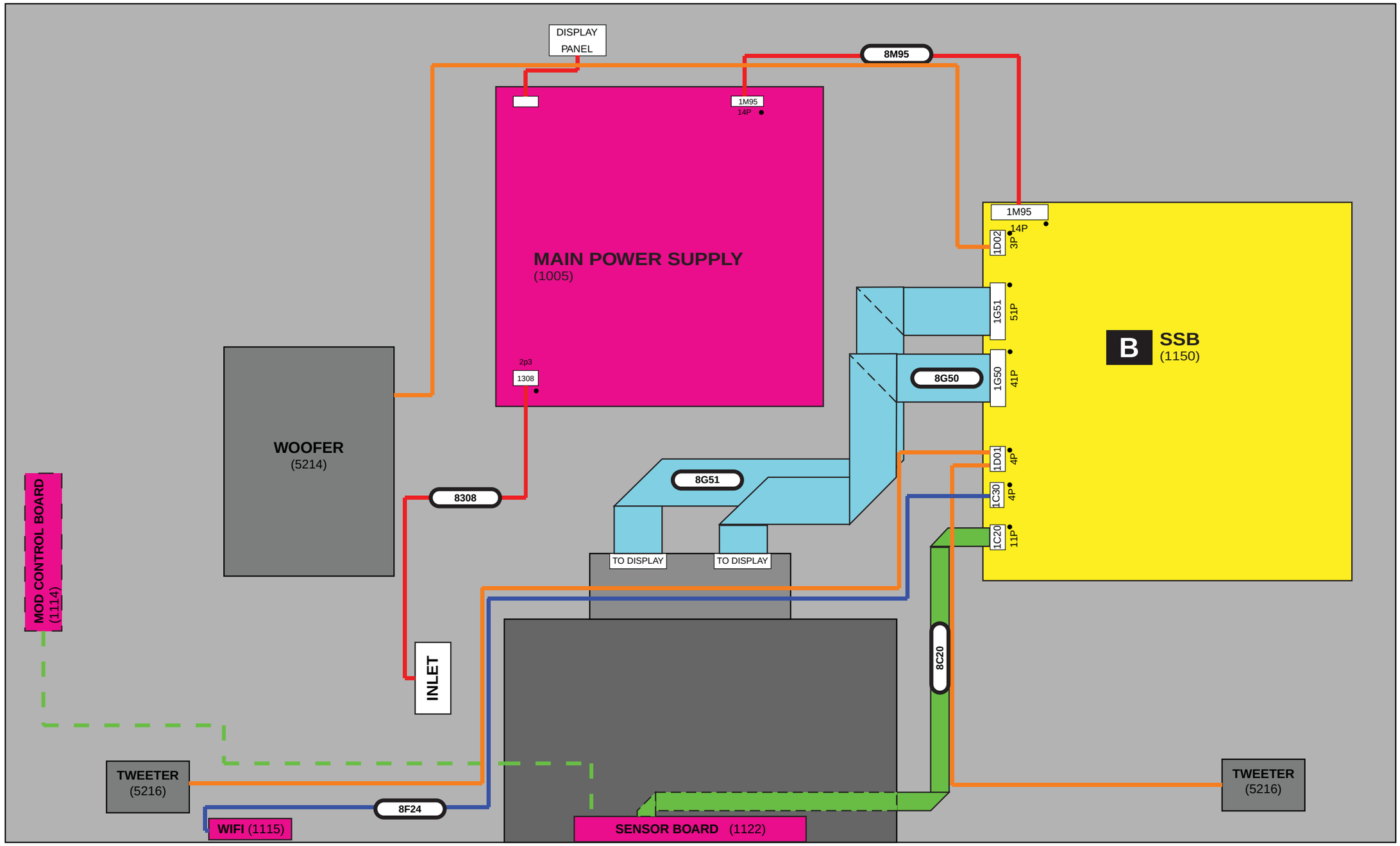
1D02 (B06A)
1. LEFT-+
2. GND
3. RIGHT--

1C30 (B06B)
1. +5V
2. USB-WIFI-DDn
3. USB-WIFI-DDp
4. GND

19220_008_120223.eps
120223

9.8 Wiring diagram 5000 series 55"

WIRING DIAGRAM 55" 5000 and 5500 series



1M95 (B01A)
1. +3V3STBY
2. STANDBY
3. GND
4. GND
5. +12Vin
6. +12Vin
7. +12VAUDIO
8. +12VAUDIO
9. GND
10. GND
11. BL-ON-1
12. BL-DIM-1
13. BL-I-CTRL-1
14. POWER-OK-1

1G50 (B09A)
1. GND
2. GND
|
|
|
|
41.

1G51 (B09A)
1. +VDISP
2. +VDISP
3. +VDISP
4. +VDISP
|
|
51.

1C20 (B01B)
1. LIGHT-SENSOR
2. 3D-LED
3. LED-2
4. GND
5. KEYBOARD
6. +3V3-STANDBY
7. RC
8. +5V
9. SCL-SET
10. GND
11. SDA-SET

1D01 (B06A)
1. LEFT-+
2. LEFT--
3. RIGHT-+
4. RIGHT--

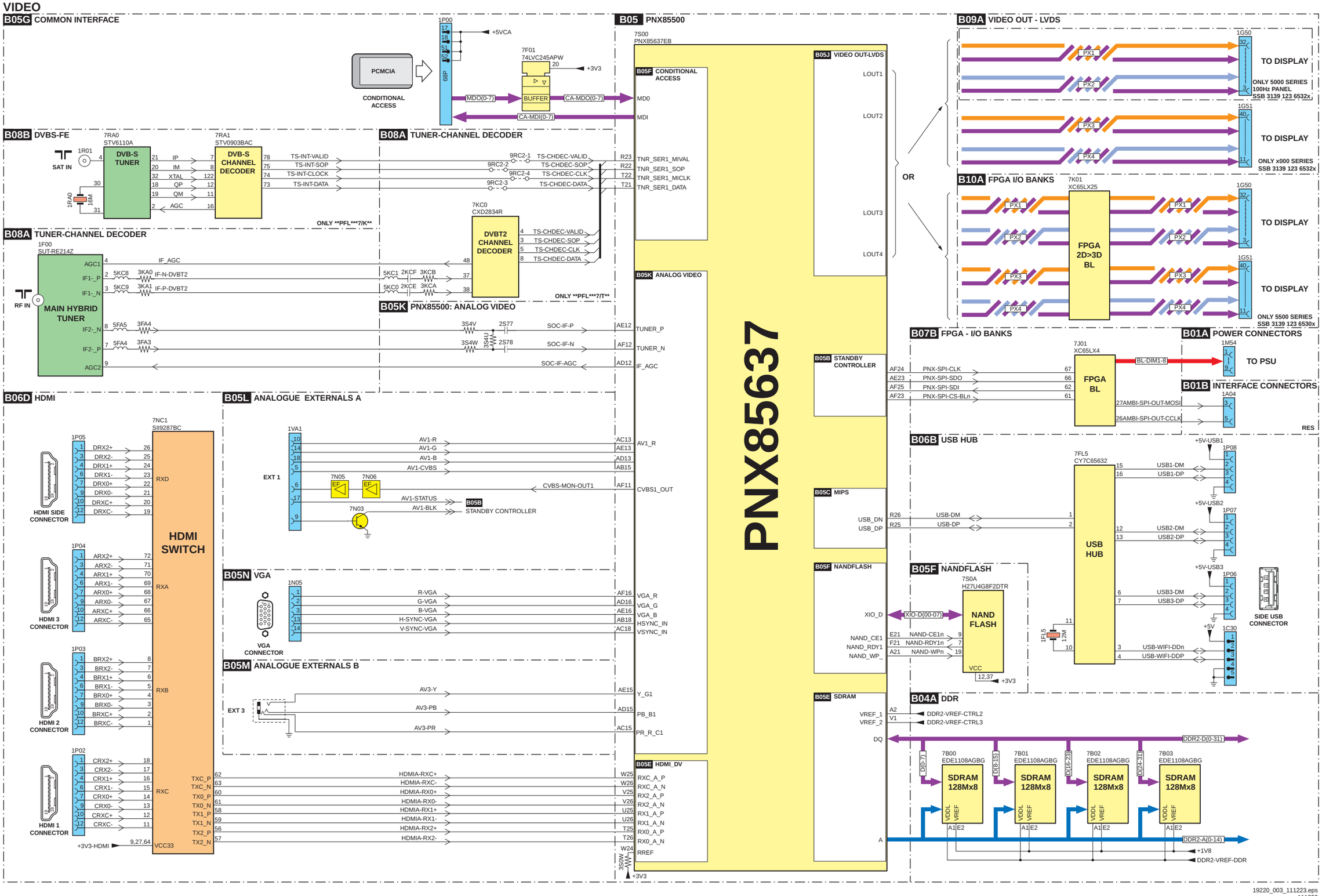
1D02 (B06A)
1. LEFT-+
2. GND
3. RIGHT--

1C30 (B06B)
1. +5V
2. USB-WIFI-DDn
3. USB-WIFI-DDp
4. GND

19220_096_120301.eps
120301

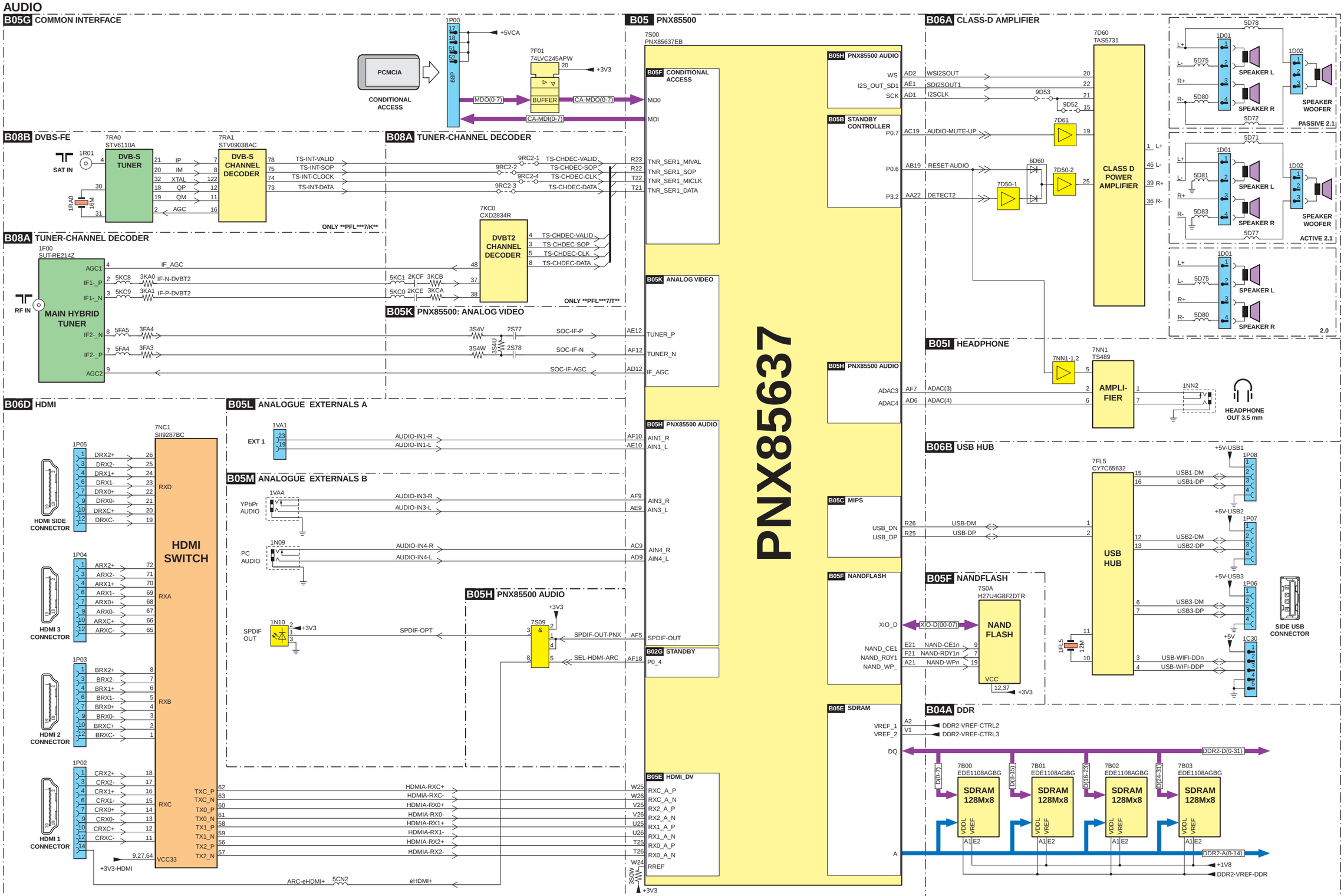
9.9 Block Diagram Video

VIDEO



19220_003_111223.eps
111223

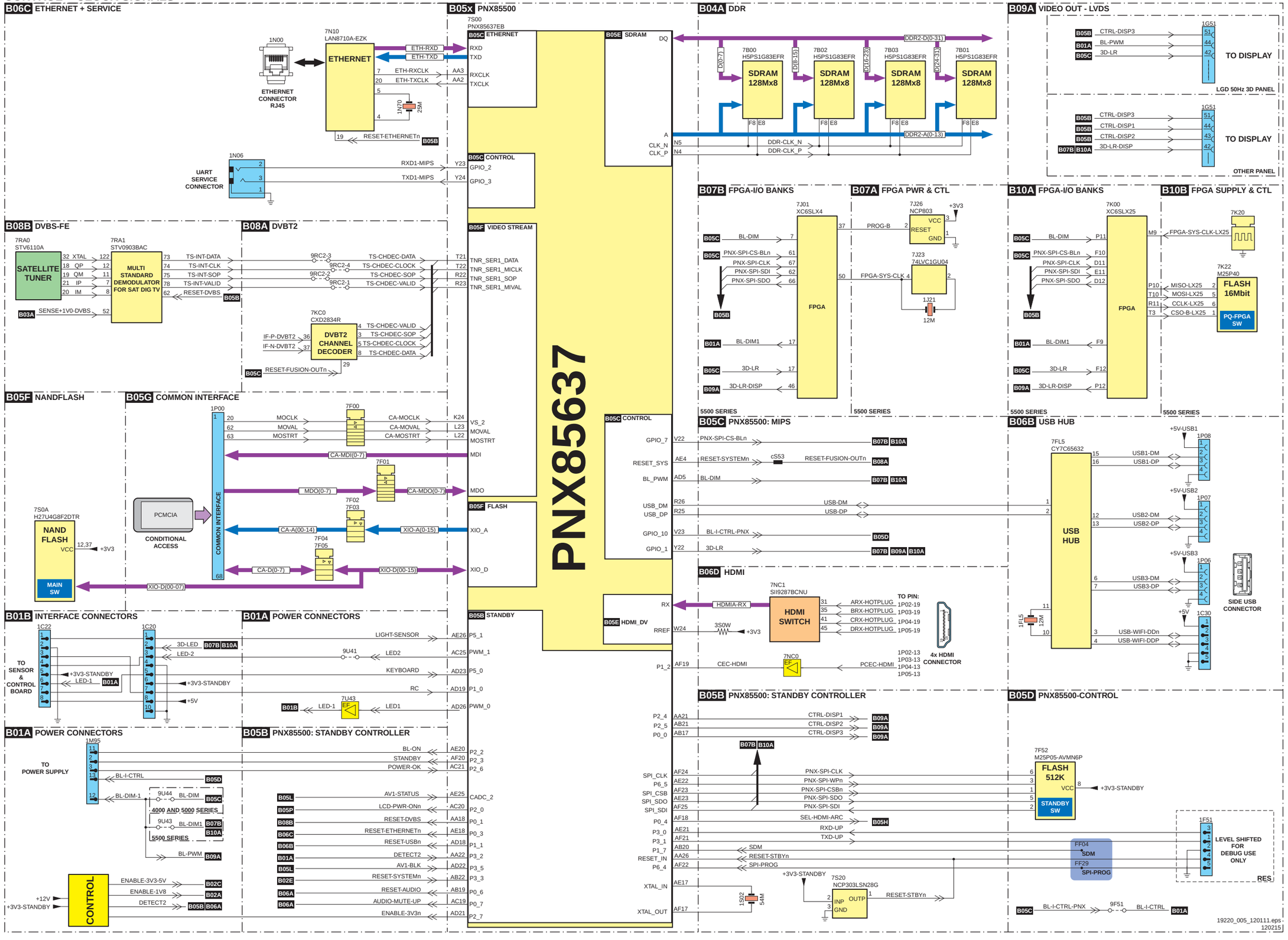
9.10 Block Diagram Audio



19220_002_111223.eps
111223

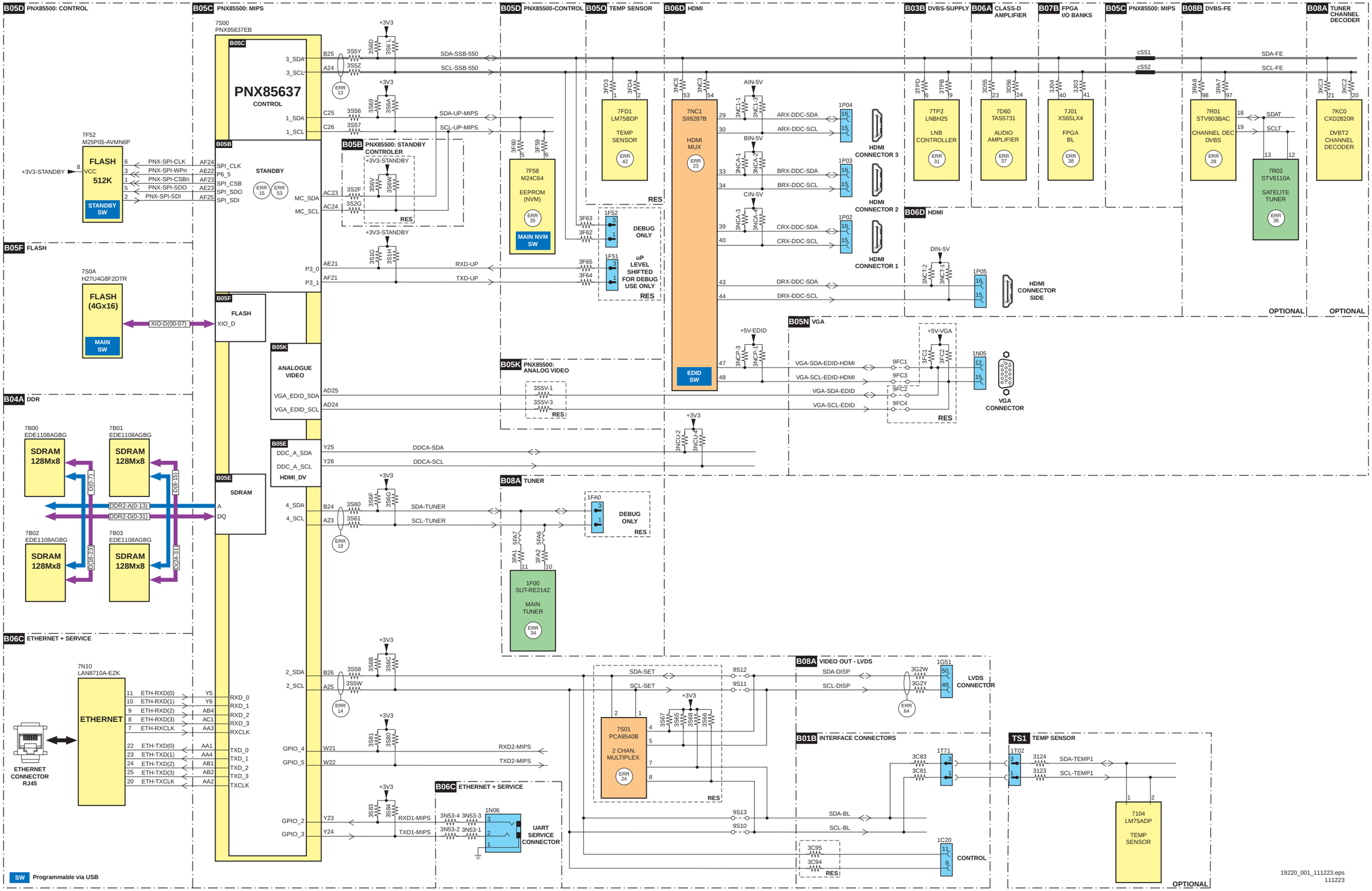
9.11 Block Diagram Control & Clock Signals

CONTROL + CLOCK SIGNALS



9.12 Block Diagram I²C

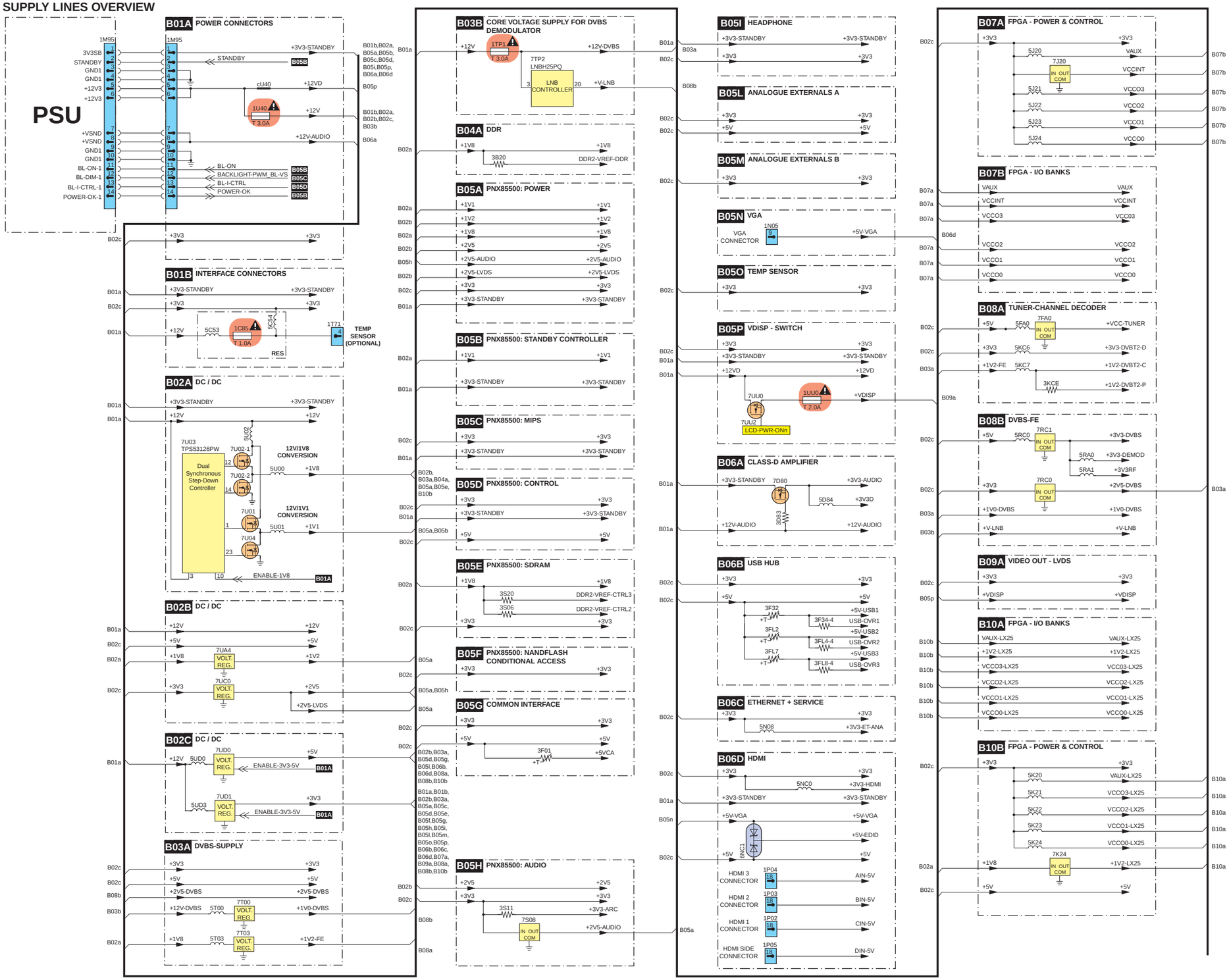
I²C



19220_001_111223.eps
111223

9.13 Supply Lines Overview

SUPPLY LINES OVERVIEW



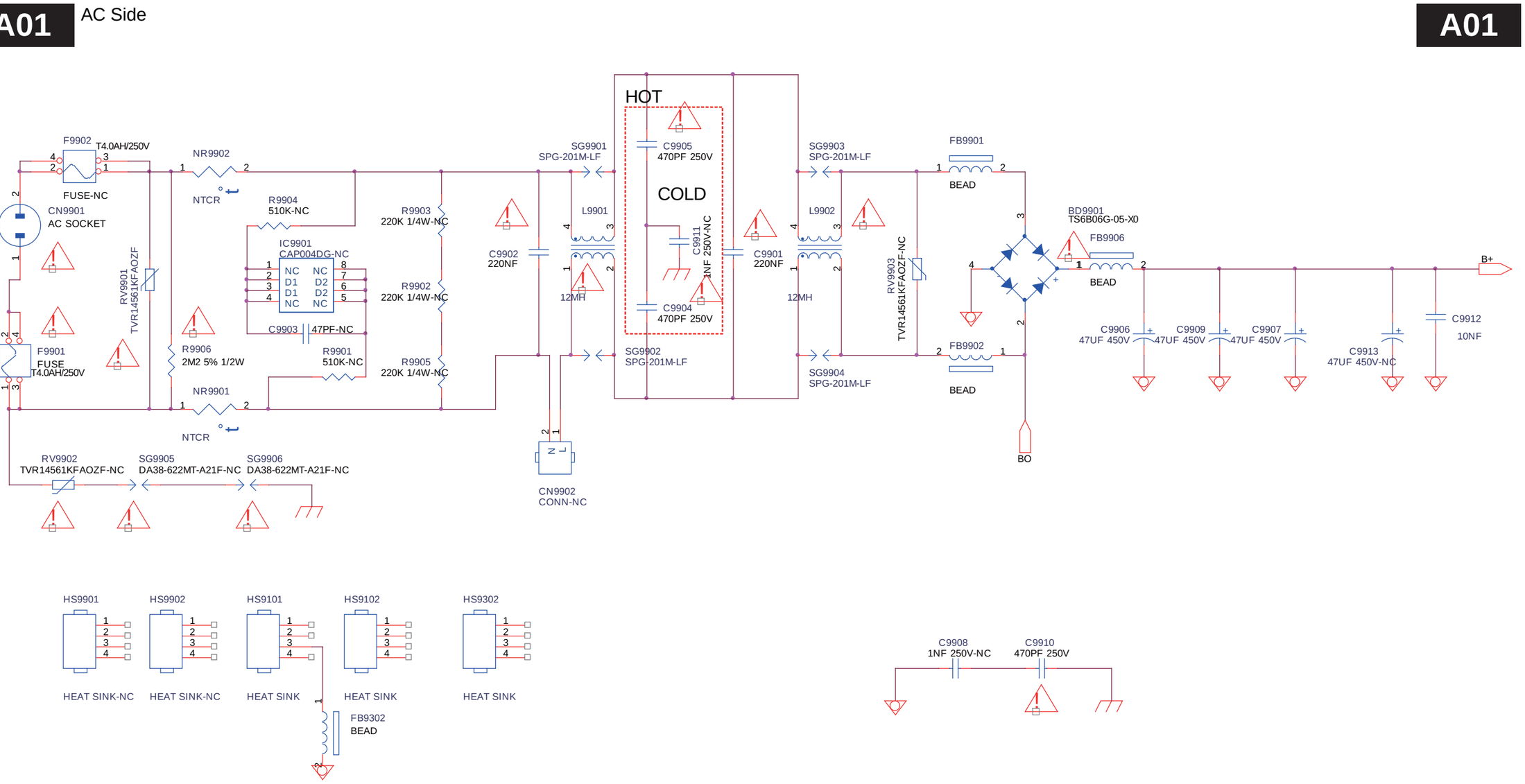
19220_004_111229.eps
111229

10. Circuit Diagrams and PWB Layouts

10.1 A 715G5194 PSU 32" & 37" 3500/4000 series

10-1-1 AC Side

A01 AC Side

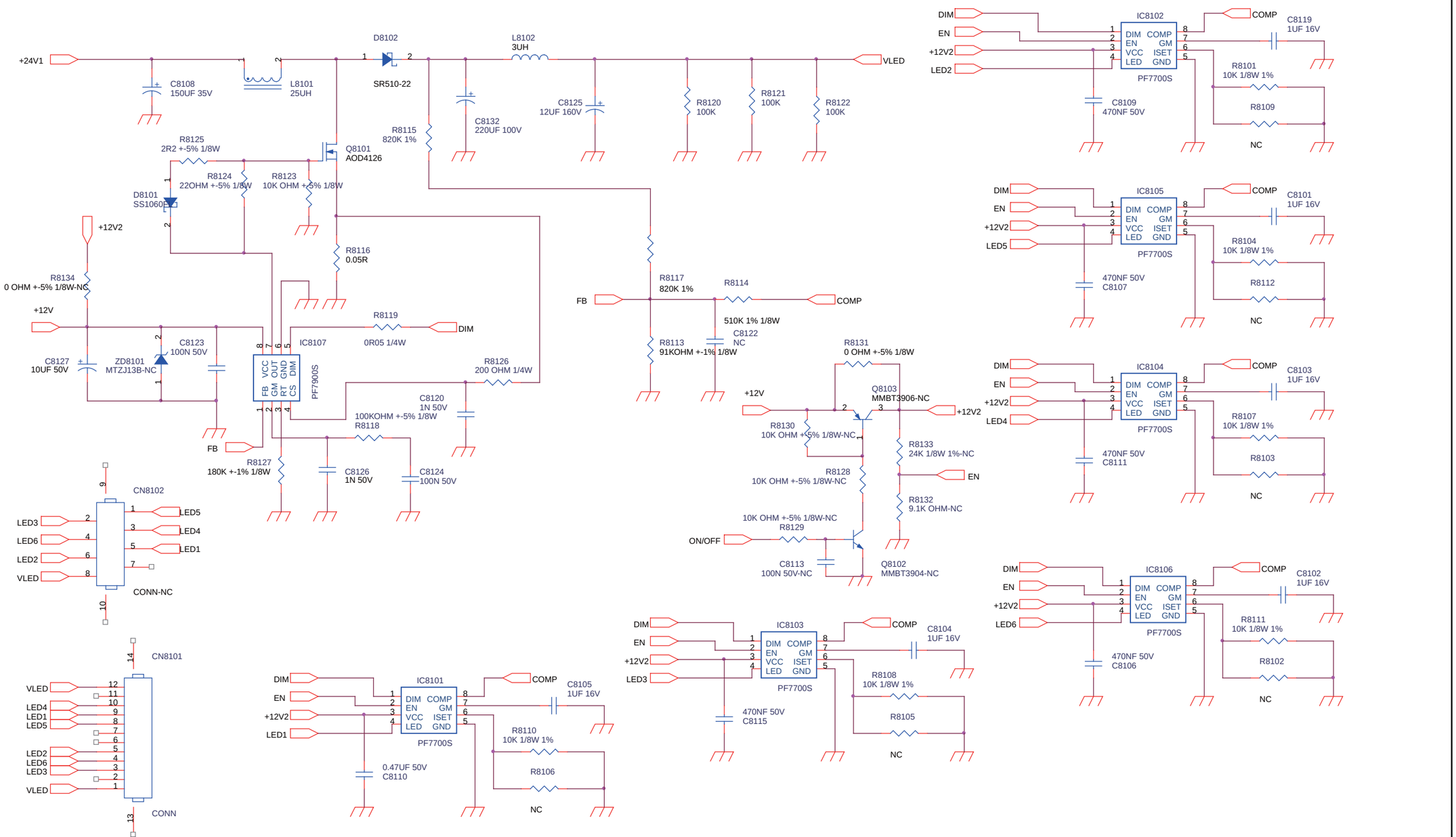


19240_500_120213.eps
120213

10-1-2 LED

A02 LED

A02



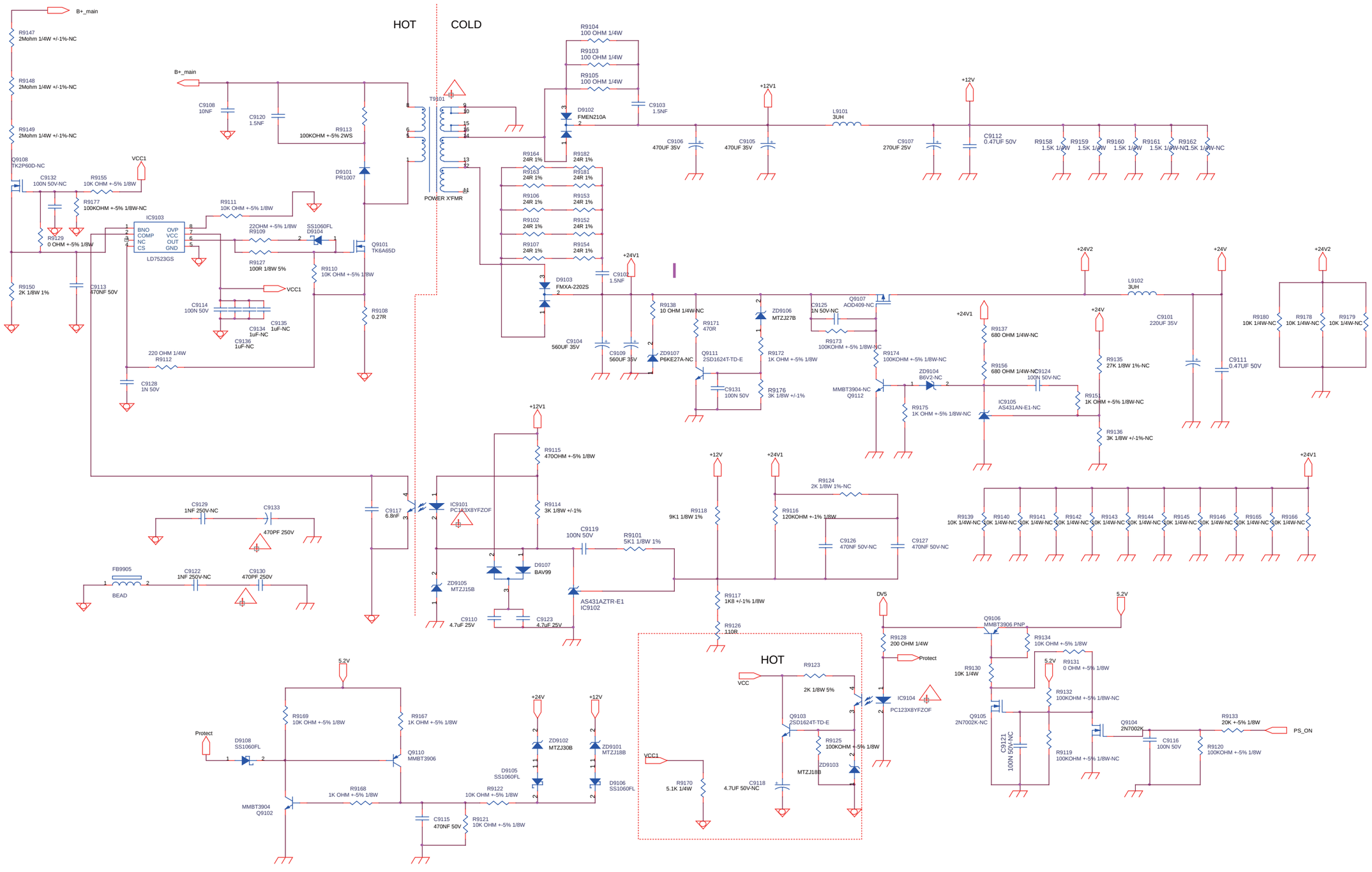
LED	715G5194	1 2012-01-09

19240_501_120213.eps
120213

10-1-3 Main Power

A03 Main Power

A03



Main Power	715G5194	1 2012-01-09

19240_502_120213.eps
120213

10-1-4 Standby

A04 Standby

A04

C9137 C9139 FB9304
470PF 250V-NC 220PF 250V BEAD
HOT COLD

B+ 0.1R R9302 FB9301 BEAD B+_main

R9319 47 OHM 1/4W
R9303 47 OHM 1/4W
R9304 47 OHM 1/4W
C9301 1.5NF
D9302 FMW-2156

R9301 100KOHM +-5% 2WS-NC
T9301
BO C9312 10NF 1.5NF C9302
D9301 1N4007
ZD9315 P6KE160A
R9305 2R2 +-5% 1/4W
D9303 PR1007
D9304 PR1007
POWER X'FMR
D9308
SR240S-NC
L9301 3UH
C9303 470UF 10V
C9304 470UF 10V
C9313 270UF 25V
C9305 0.47UF 50V
5.2V

R9306 1.5M 1%
R9308 0.75R
R9310 1.5M 1%
R9313 1.5M 1%
IC9301
S/OCP D/ST
BR D/ST
GND
FB/OLP VCC
A6069H
D9305 SS1060FL
VCC
C9306 100UF 50V
C9308 1N 50V
R9315 4.7M 5% 1/8W
C9310 220NF
R9317 560K 1/8W 1%
C9311 100N 50V
C9309 10UF 50V

R9307 220R 1%
IC9302 PC123X8YFZOF
1K OHM +-5% 1/8W R9312
C9307 220N 50V
R9314 1K OHM +-5% 1/8W
R9311 8K2 1/8W 1%
IC9303 AS431AN-E1
ZD9316 GDZJ5.6B
R9316 9K1 1/8W 1%
R9318 43K 1/8W 1%
Q9301 2N7002K
10K OHM +-5% 1/8W R9320
DV5
R9332 100KOHM +-5% 1/8W

+24V
D9306 SJPW-T4VL-NC
L9302 3UH-NC
CN9301 CN9303
CONN-NC CONN-NC
R9309 10K 1/4W
C9316 100UF 50V
CN9302 CN9304
ON/OFF DIM
+12V
PS_ON
5.2V P_OK
GND_Audio
CONN CONN-NC

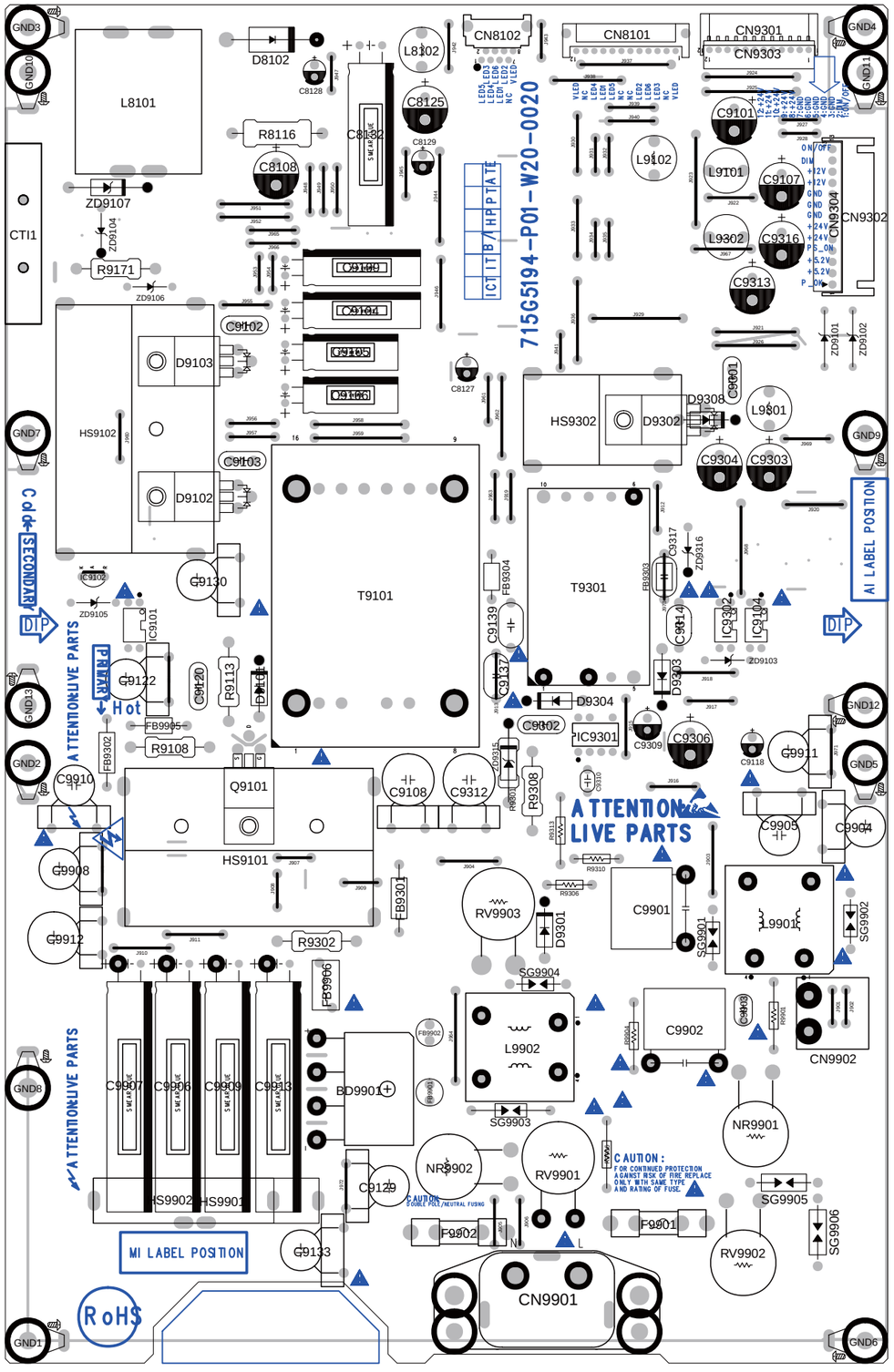
5.2V
R9323 10K 1/4W-NC
R9321 0R05 1/4W-NC
P_OK EN
R9324 0 OHM +-5% 1/8W
ON/OFF

C9314 470PF 250V
C9317 1NF 250V-NC

Standby	715G5194	1 2012-01-09

19240_503_120213.eps
120213

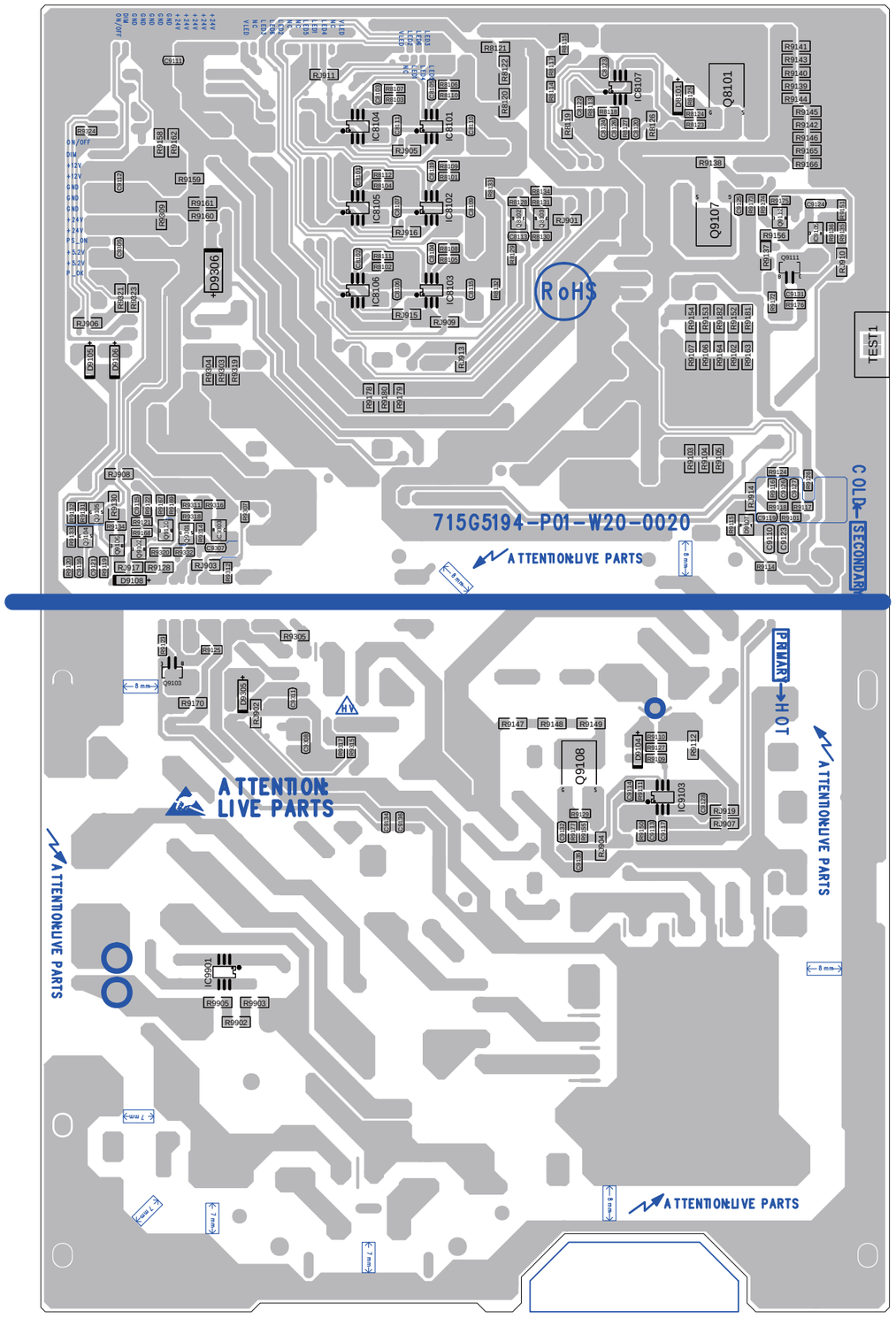
10-1-5 Power layout top



Power layout top	715G5194	1 2011-12-21

19240_504_120215.eps
120215

10-1-6 Power layout bottom



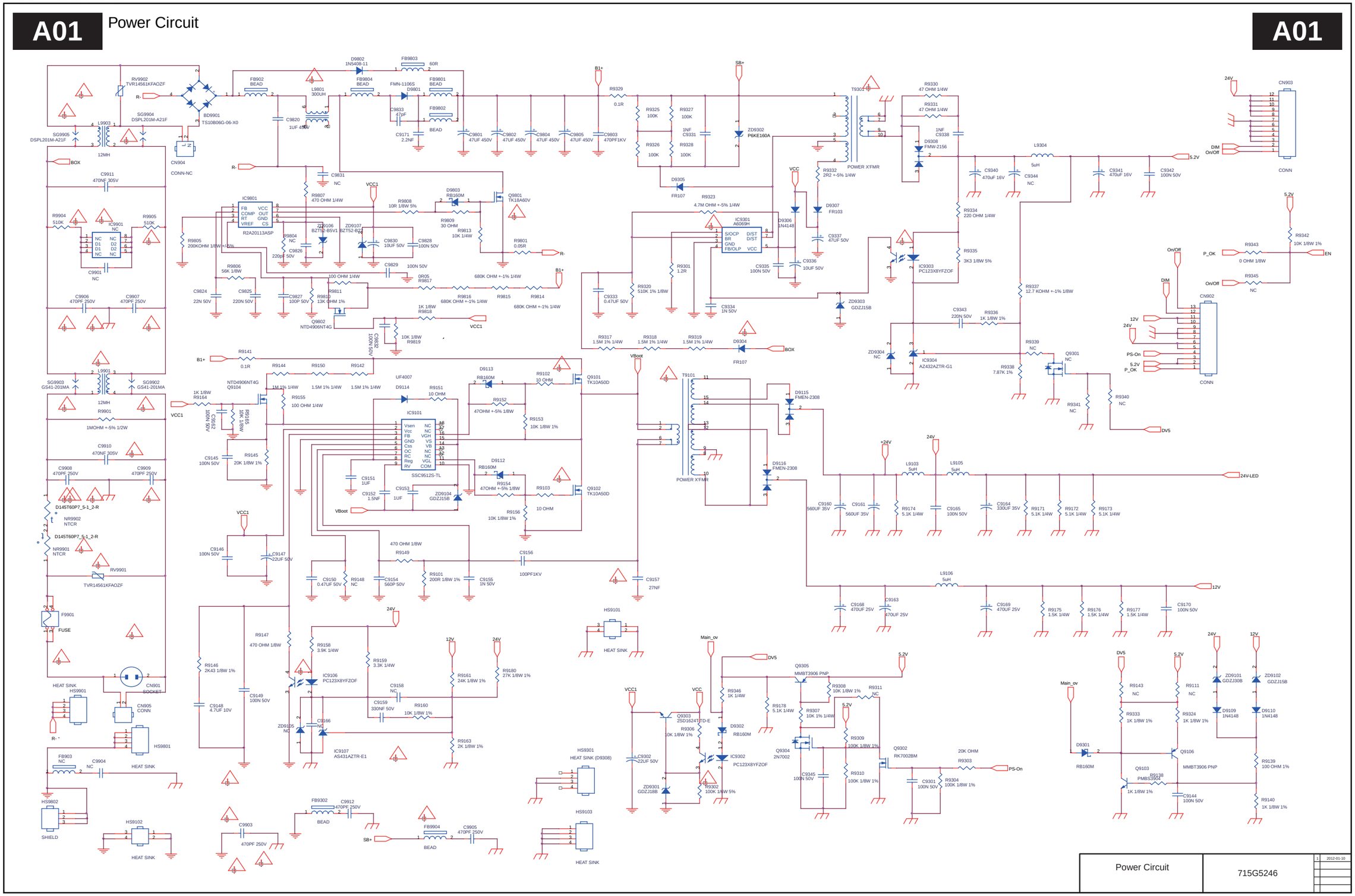
Power layout bottom | 715G5194 | 1 | 2011-12-21

19240_505_120215.eps
120215

10.2 A01 715G5246 PSU 42" 3500/4000 series

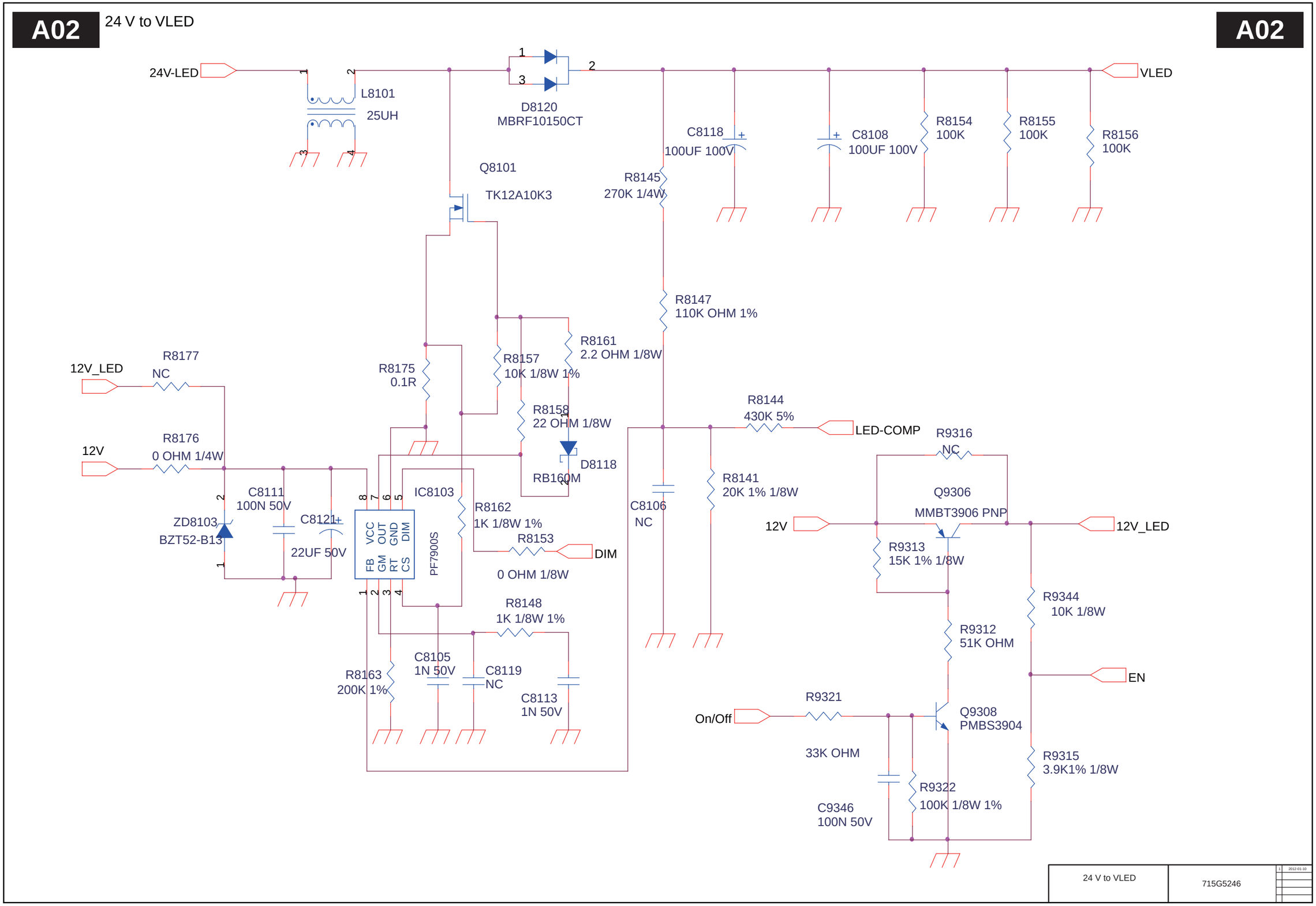
10-2-1 Power Circuit

A01 Power Circuit



19240_506_120213.eps
120320

10-2-2 24 V to VLED

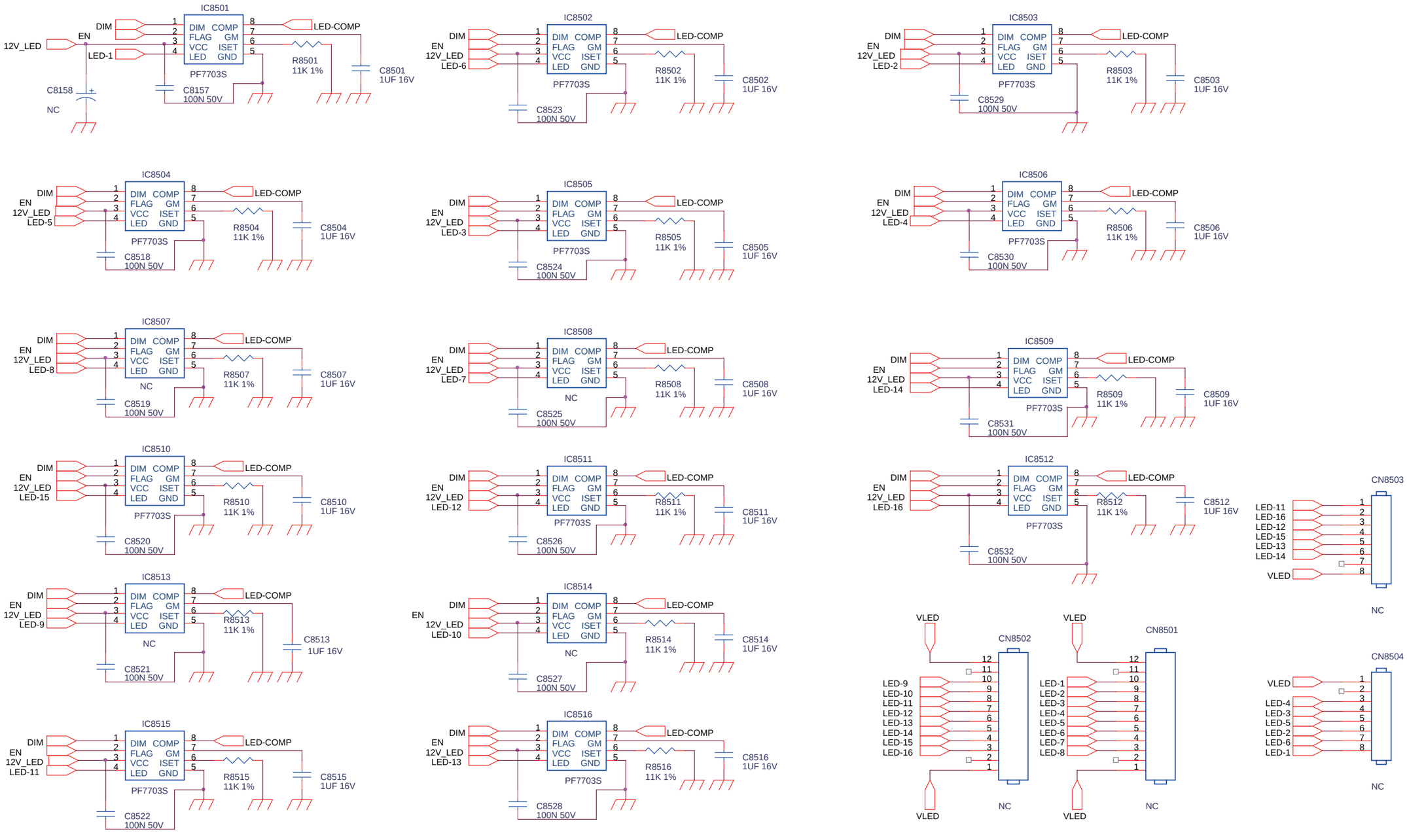


19240_507_120213.eps
120213

10-2-3 LED Driver

A03 LED Driver

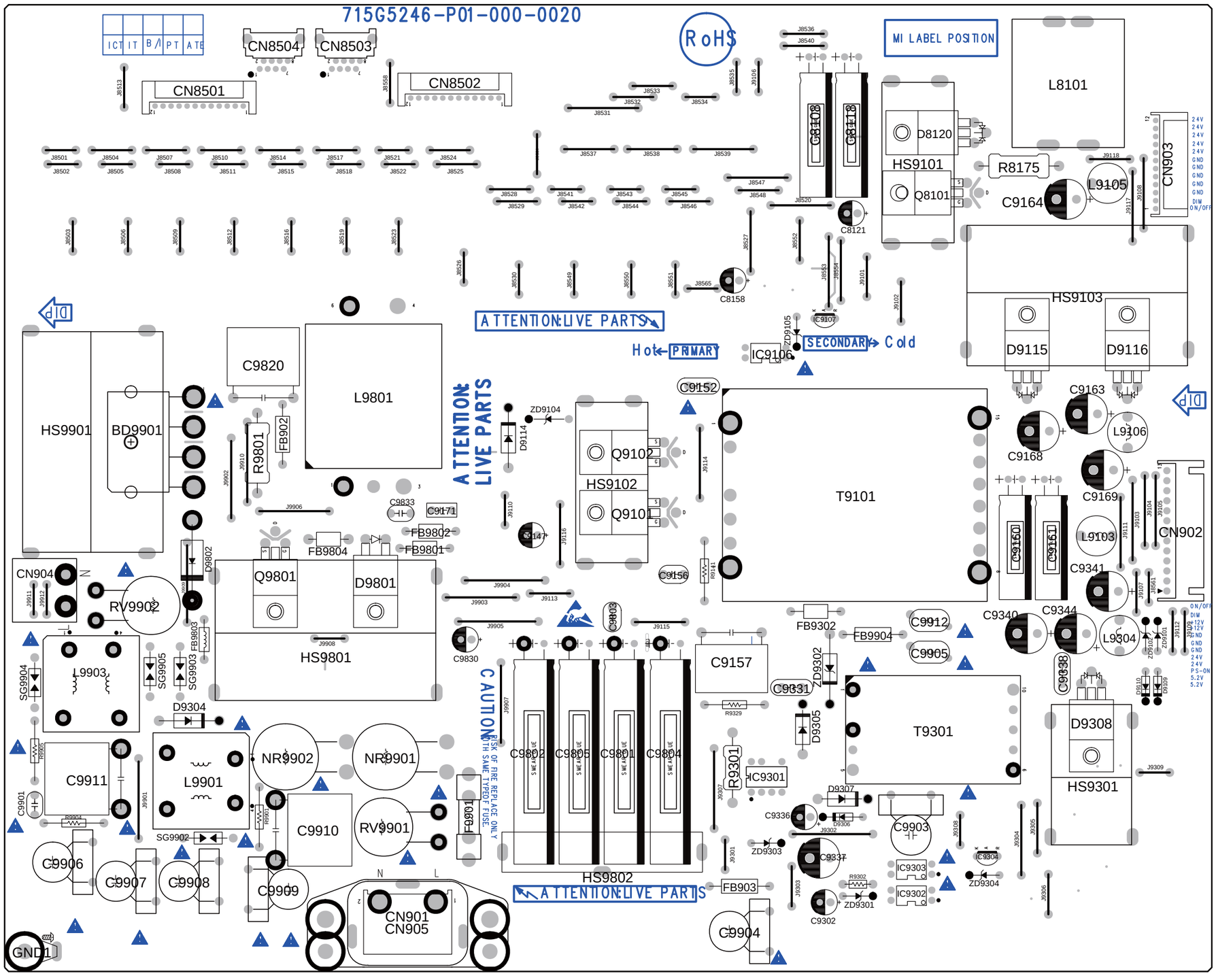
A03



LED Driver	715G5246	1 2012-01-10

19240_508_120213.eps
120213

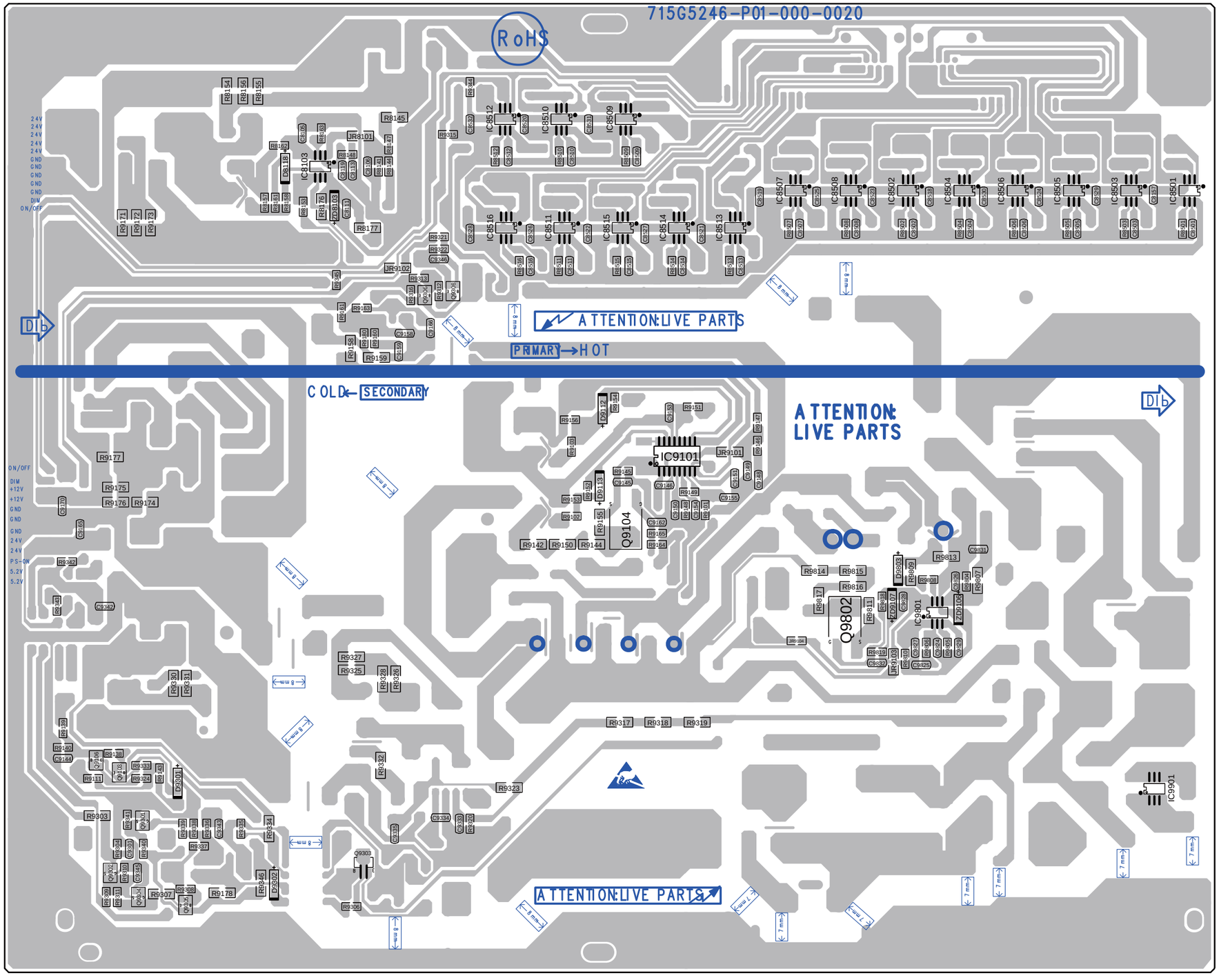
10-2-4 Power layout top



Power layout top	715G5246	1 2011-12-22

19240_509_120215.eps
120215

10-2-5 Power layout bottom



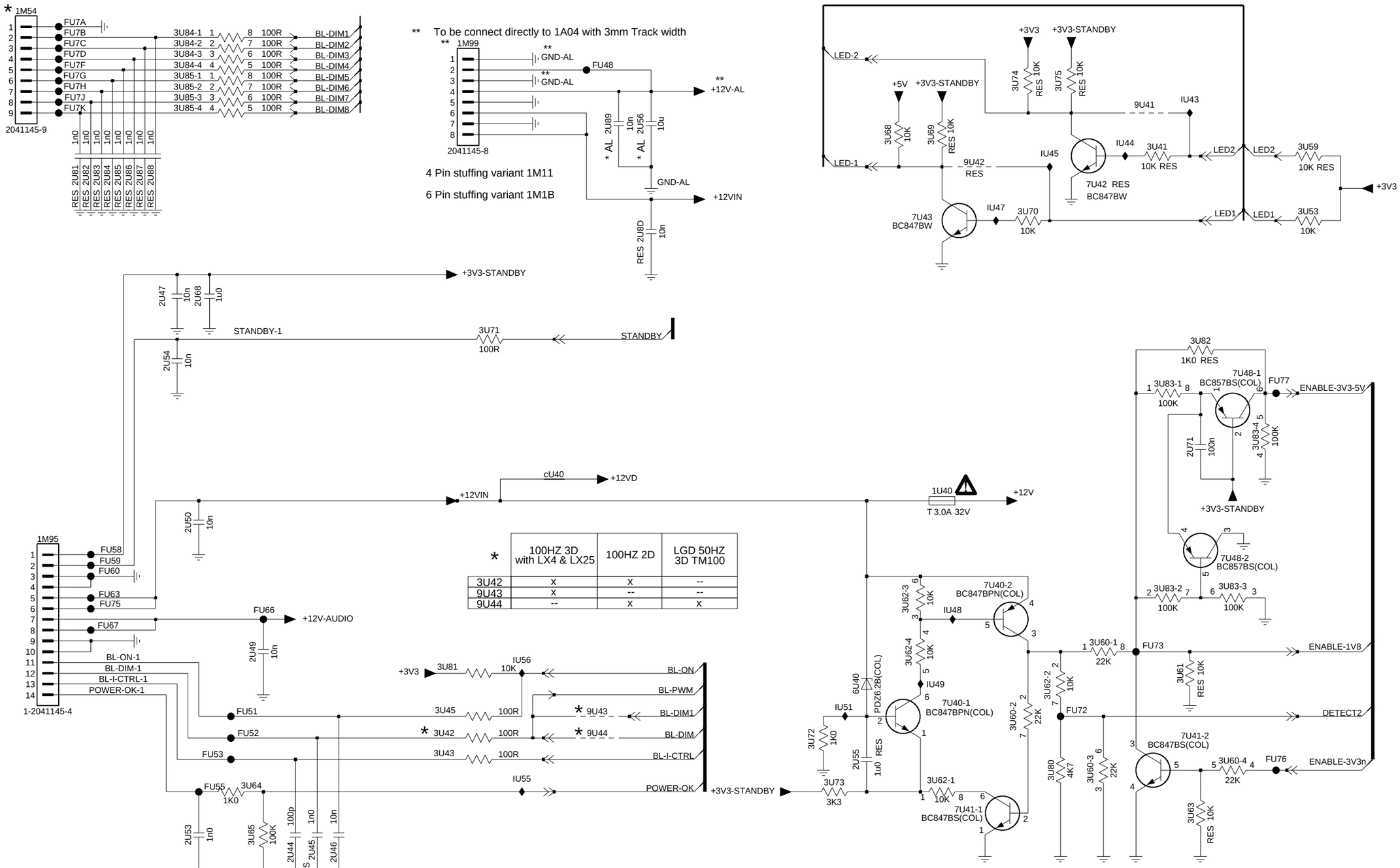
Power layout bottom	715G5246	1	2011-12-22

19240_510_120215.eps
120215

10.3 B 313912365313 SSB
10-3-1 Power connectors

B01A Power connectors

B01A



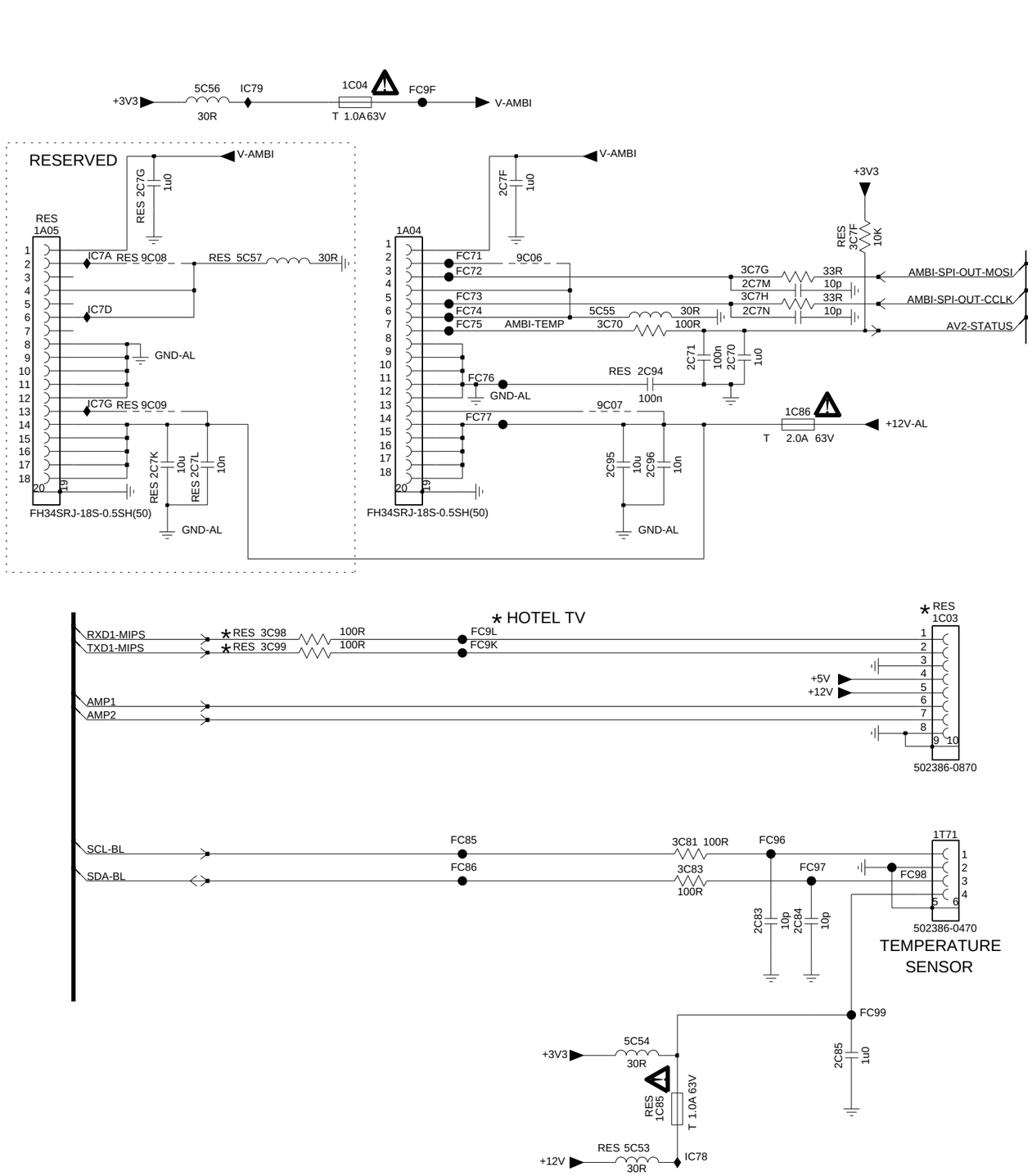
	Power connectors	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

19220_031_120228.eps
120509

10-3-2 Interface connectors

B01B Interface connectors

B01B



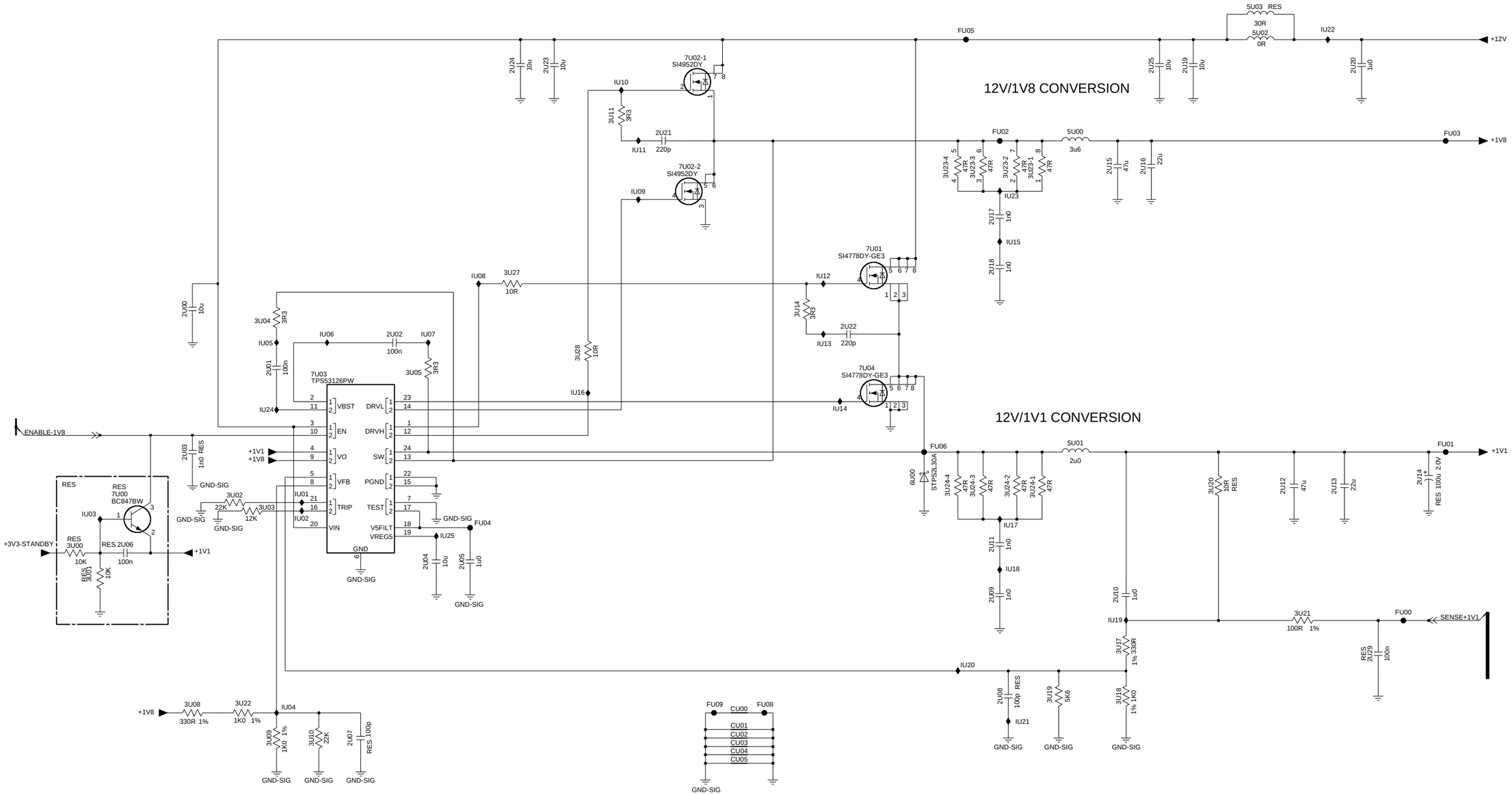
Interface connectors	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

19220_032_120228.eps
120509

10-3-3 DC/DC

B02A DC/DC

B02A



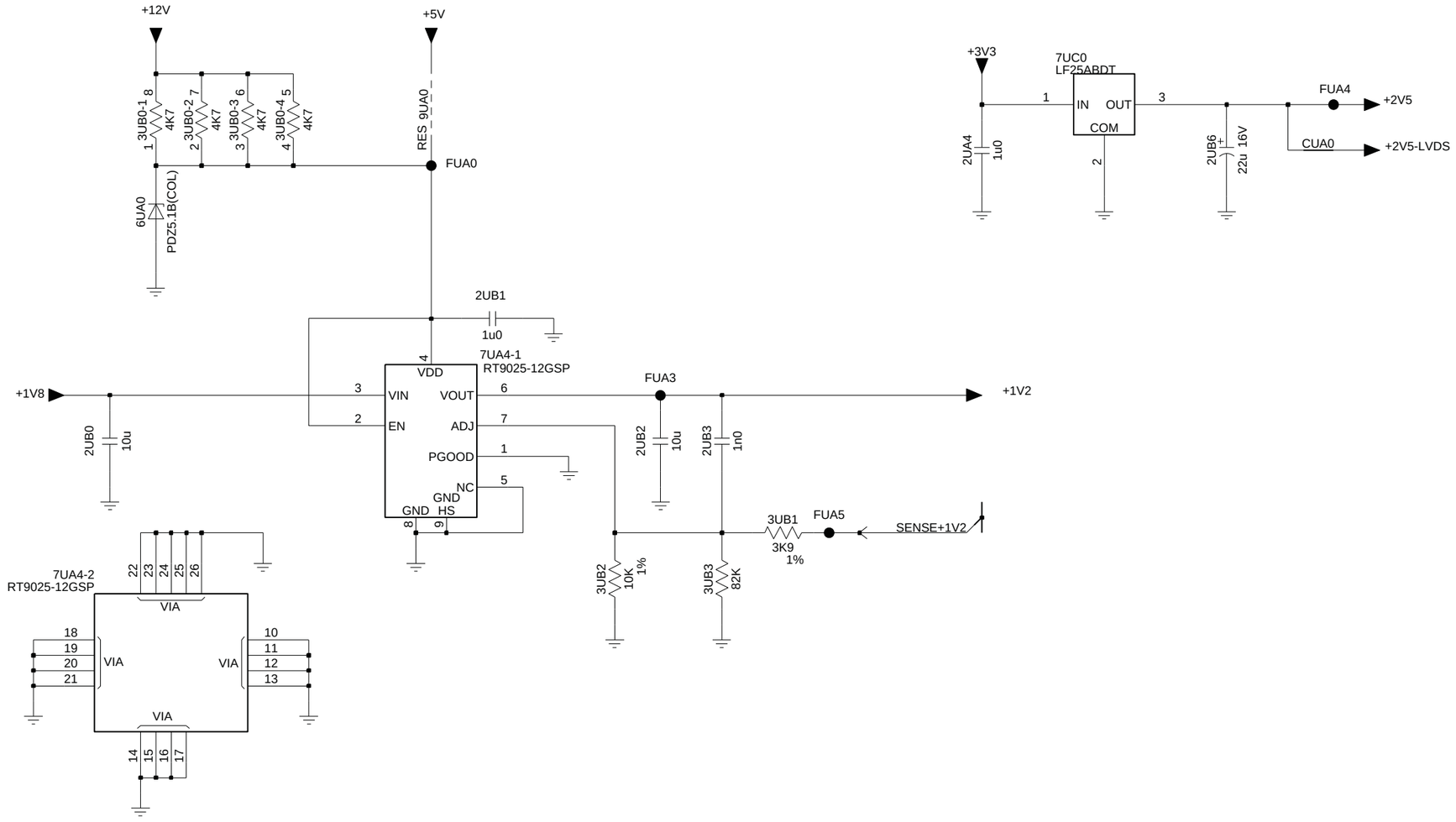
DC/DC	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

19220_033_120228.eps
120509

10-3-4 DC/DC, 1.8 V to 1.2 V conversion

B02B DC/DC 1.8 V to 1.2 V conversion

B02B



DC/DC 1.8 V to 1.2 V conversion	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

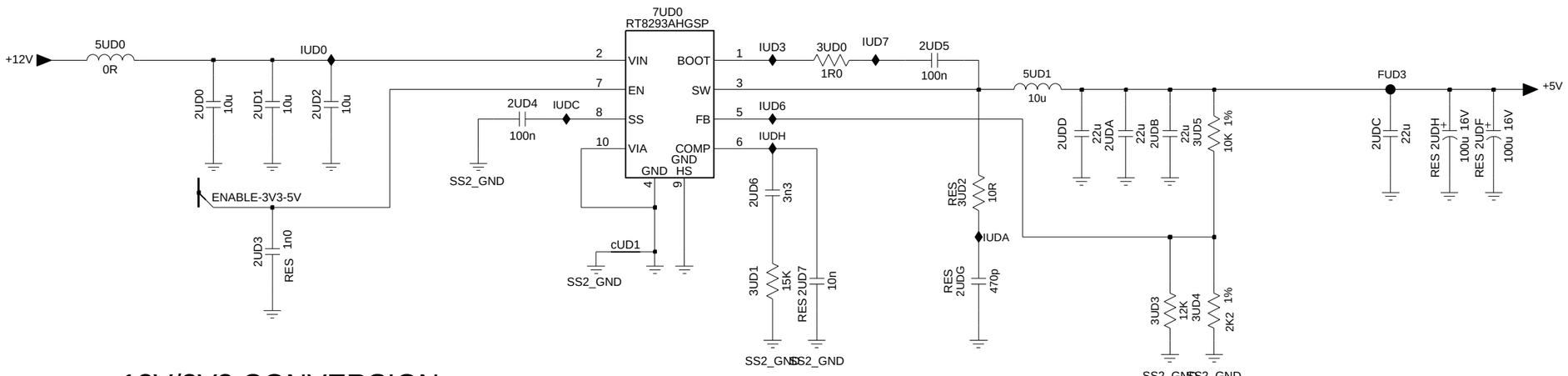
19220_034_120228.eps
120509

10-3-5 DC/DC, 12 V to 5 V/3.3 V conversion

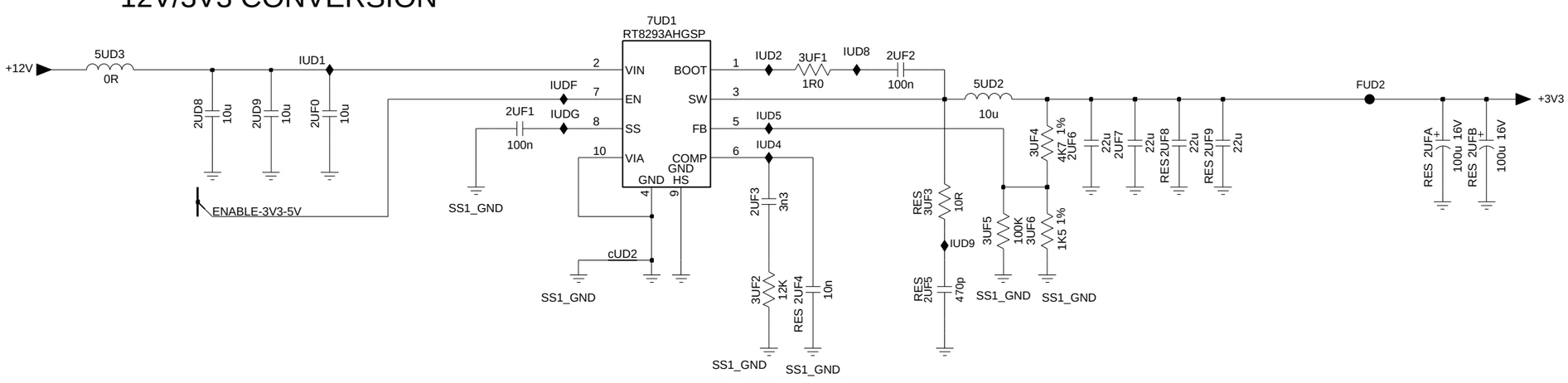
B02C DC/DC 12 V to 5 V/3.3 V conversion

B02C

12V/5V CONVERSION



12V/3V3 CONVERSION



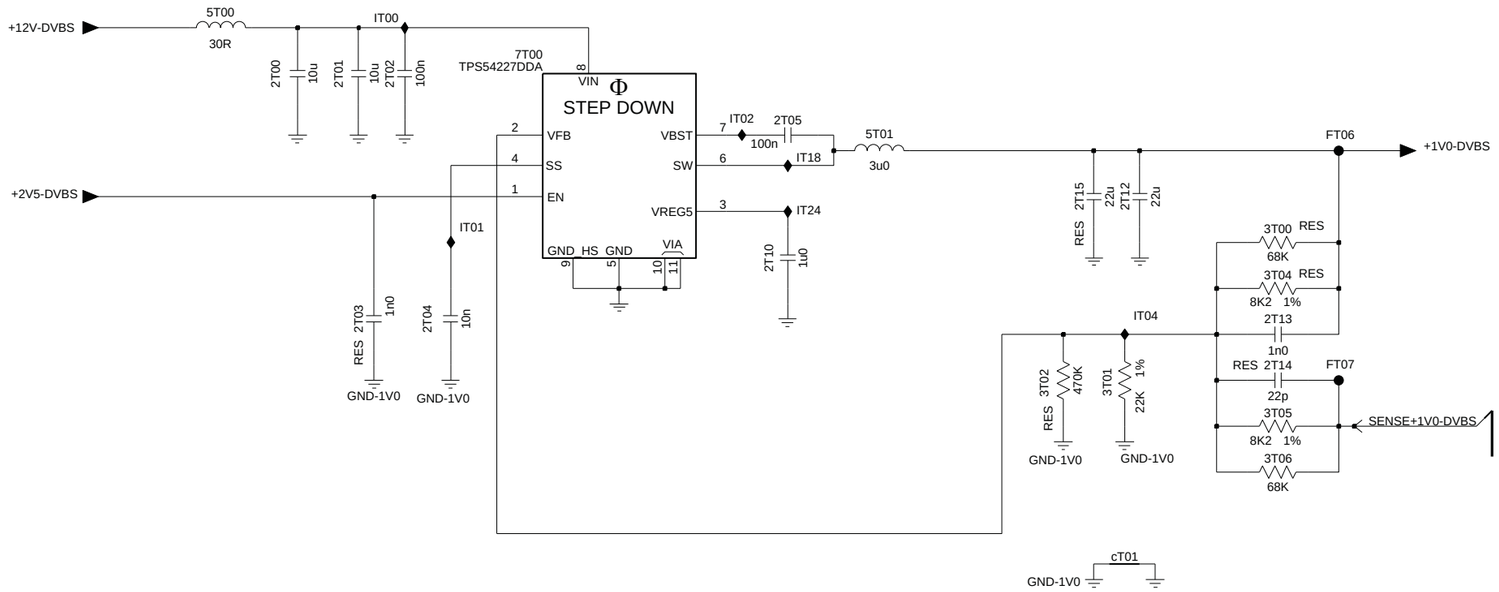
DC/DC 12 V to 5 V/3.3 V conversion	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

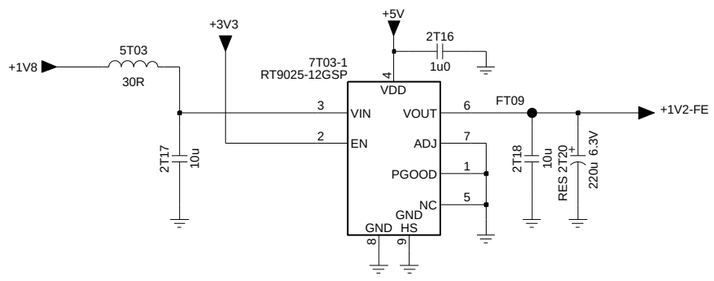
19220_035_120228.eps
120509

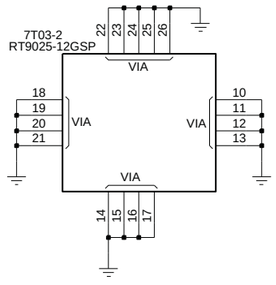
10-3-6 DVBS supply

B03A DVBS supply

B03A







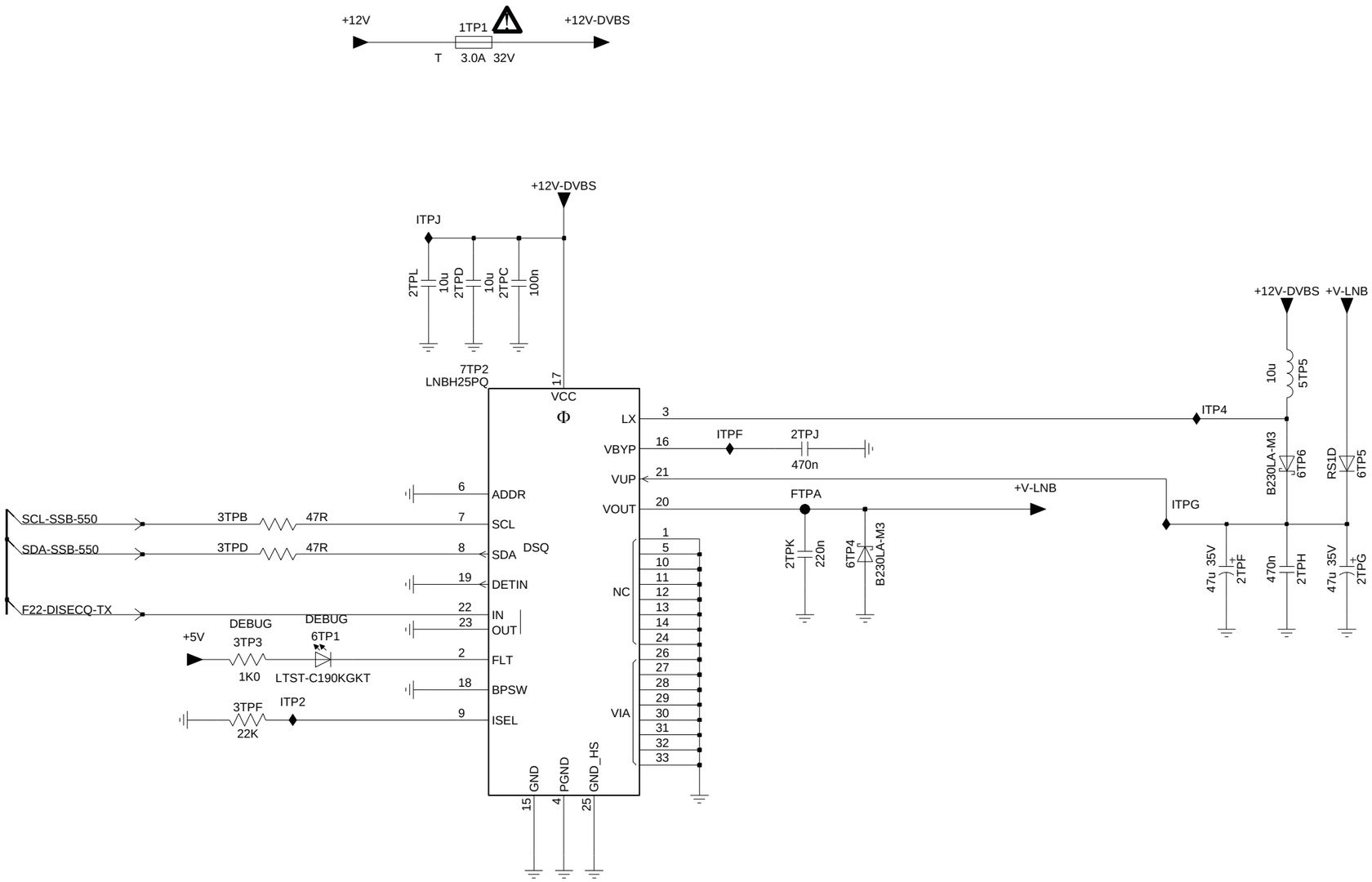
DVBS supply	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

19220_036_120228.eps
120509

10-3-7 Core voltage supply for DVBS demodulator

B03B Core voltage supply for DVBS demodulator

B03B

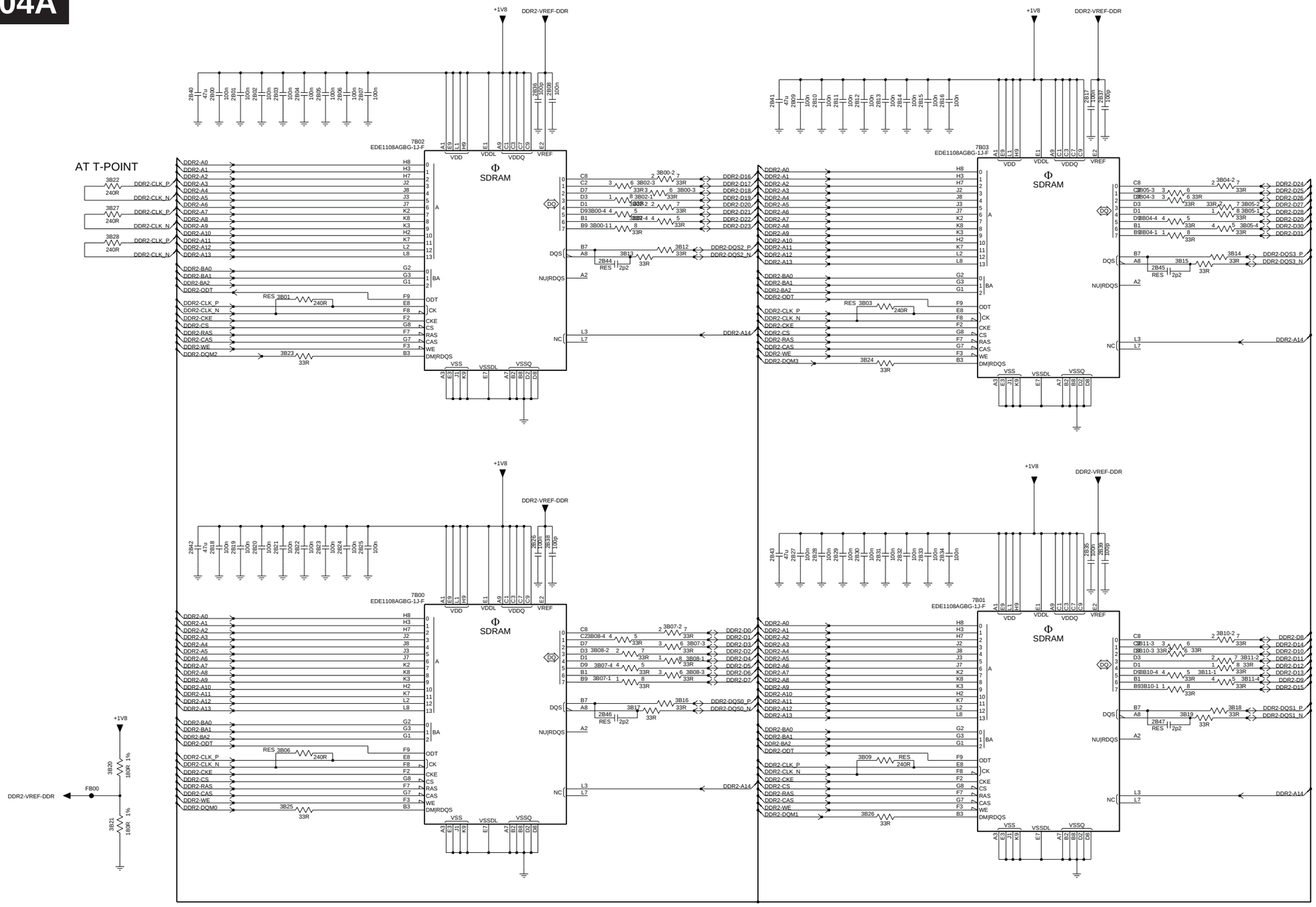


Core voltage supply for DVBS demodulator	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

19220_037_120228.eps
120509

B04A DDR

B04A



DDR	3139 123 6533	4	2012-04-23
		3	2011-12-12
		2	2011-05-25

19220_038_120228.eps
120509

10-3-9 PNX 85500: Power

B05A PNX 85500: Power

B05A

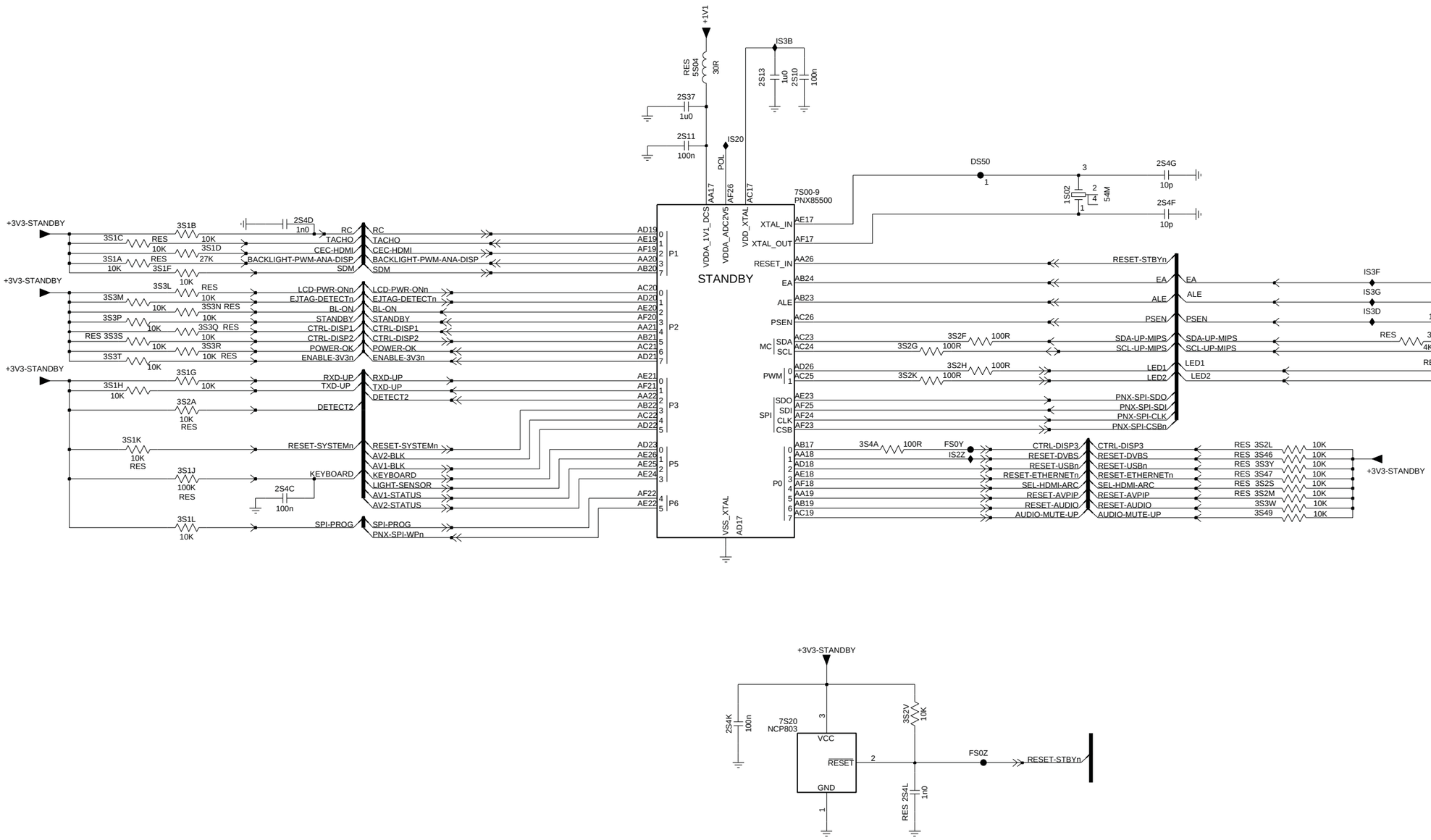
PNX 85500 Power	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

19220_039_120228.eps
120509

10-3-10 PNX 85500: Standby controller

B05B PNX 85500: Standby controller

B05B



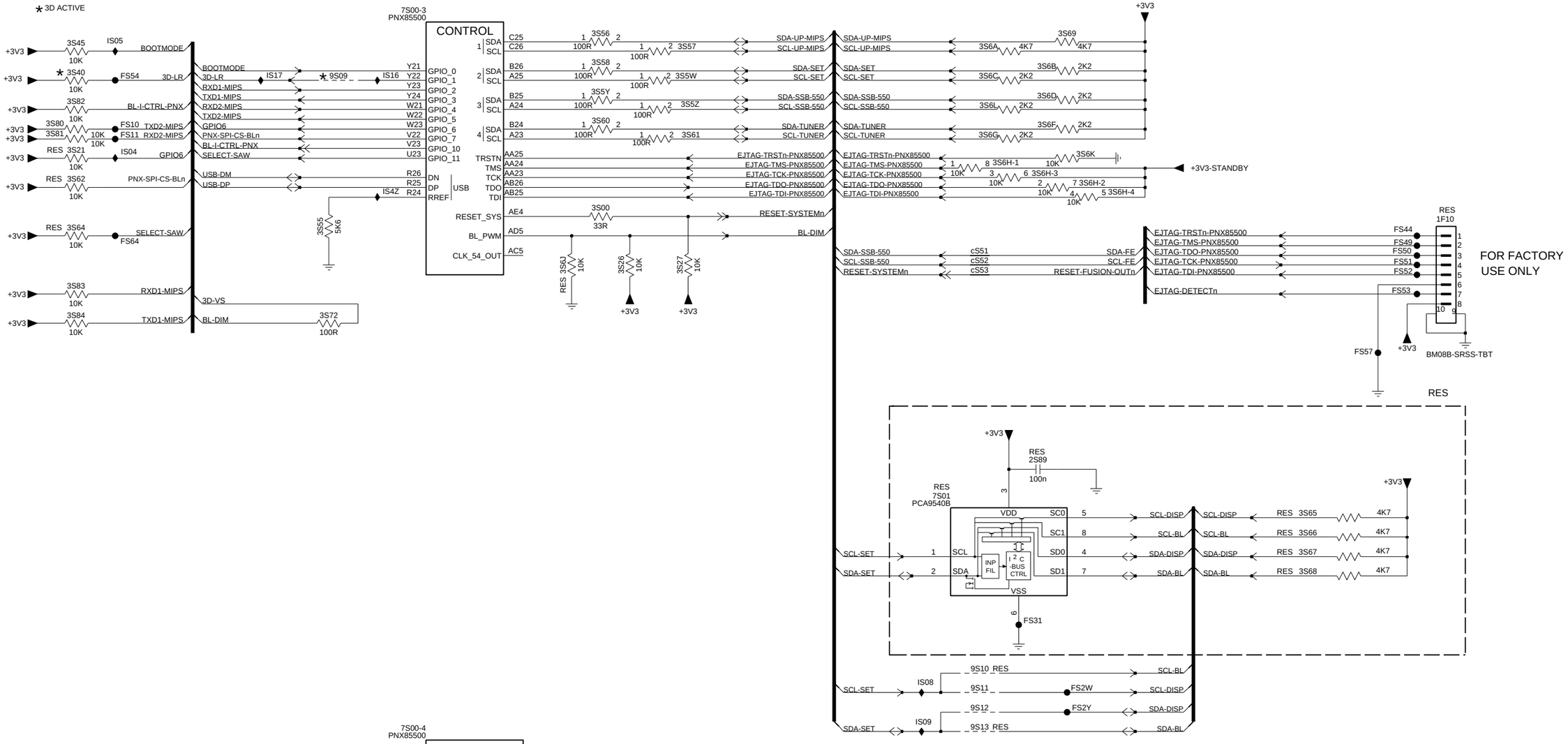
PNX 85500 Standby controller	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

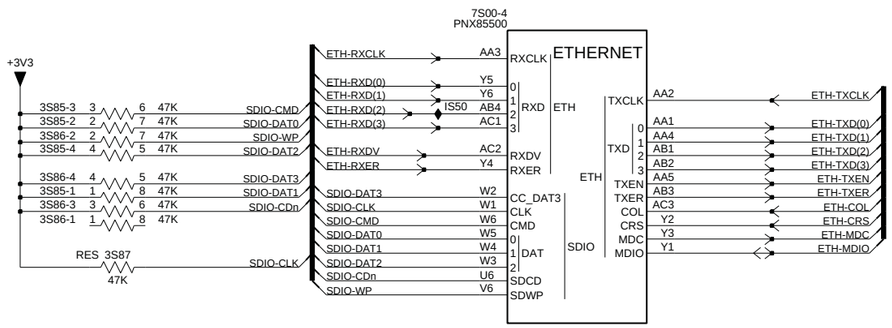
19220_040_120228.eps
120509

10-3-11 PNX 85500: MIPS

B05C PNX 85500: MIPS

B05C





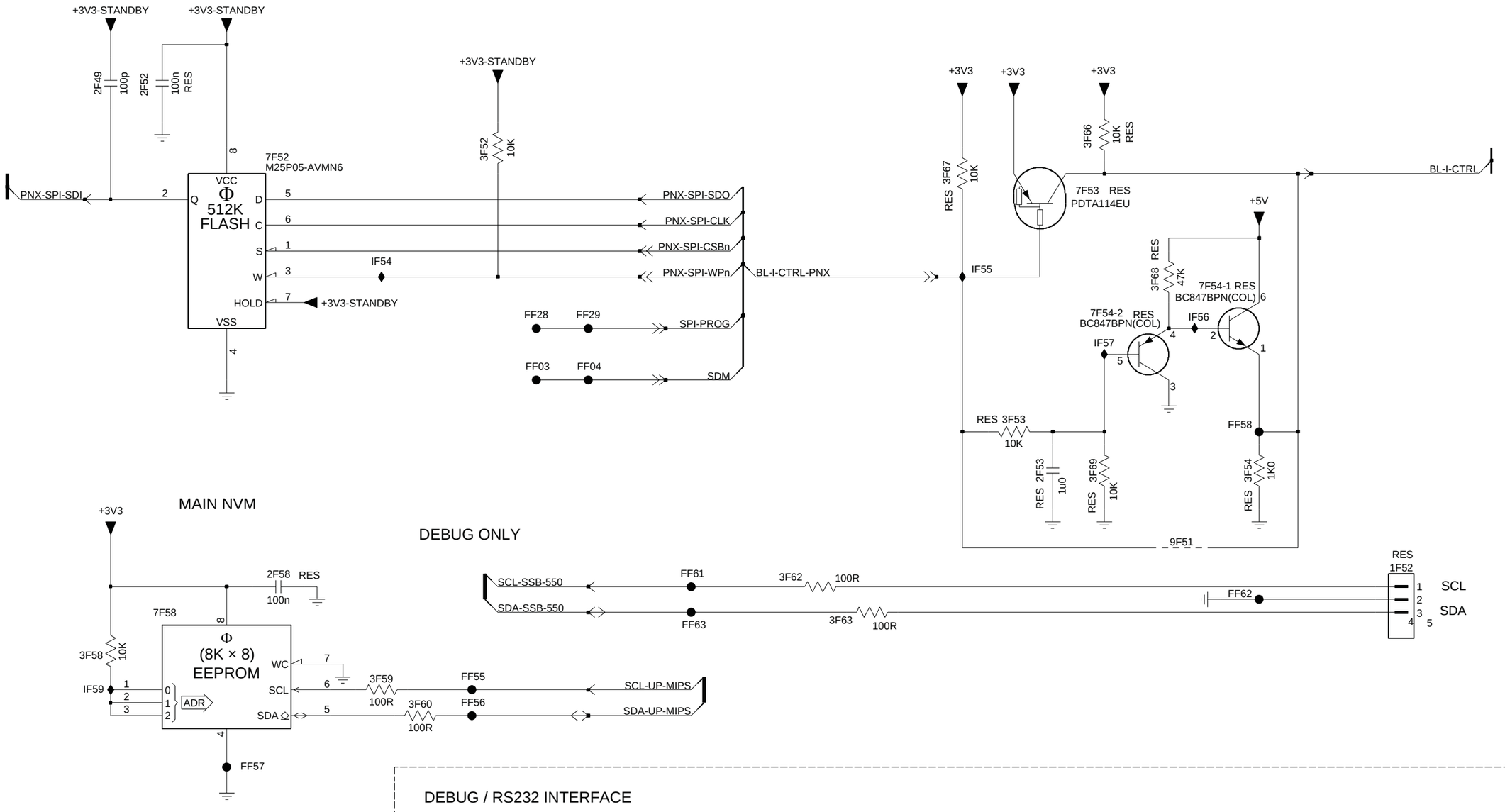
PNX 85500 MIPS	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

19220_041_120228.eps
120509

10-3-12 PNX 85500: Control

B05D PNX 85500: Control

B05D

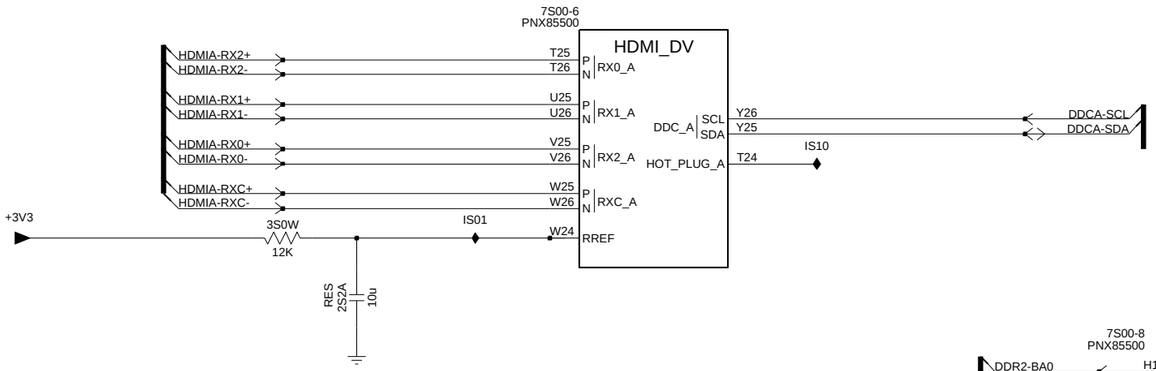


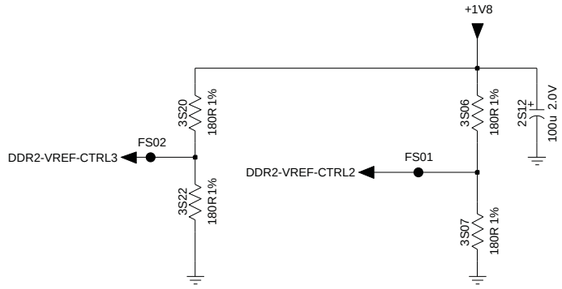
PNX 85500 Control	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

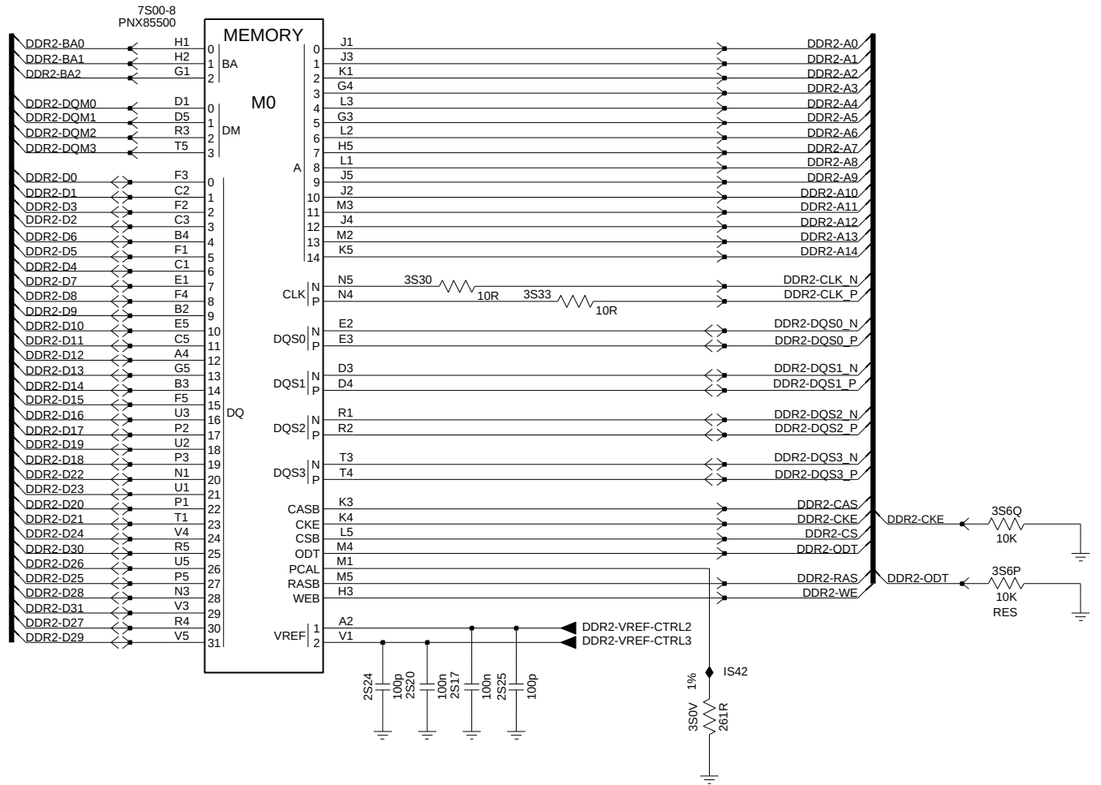
19220_042_120228.eps
120509

B05E PNX 85500: SDRAM

B05E







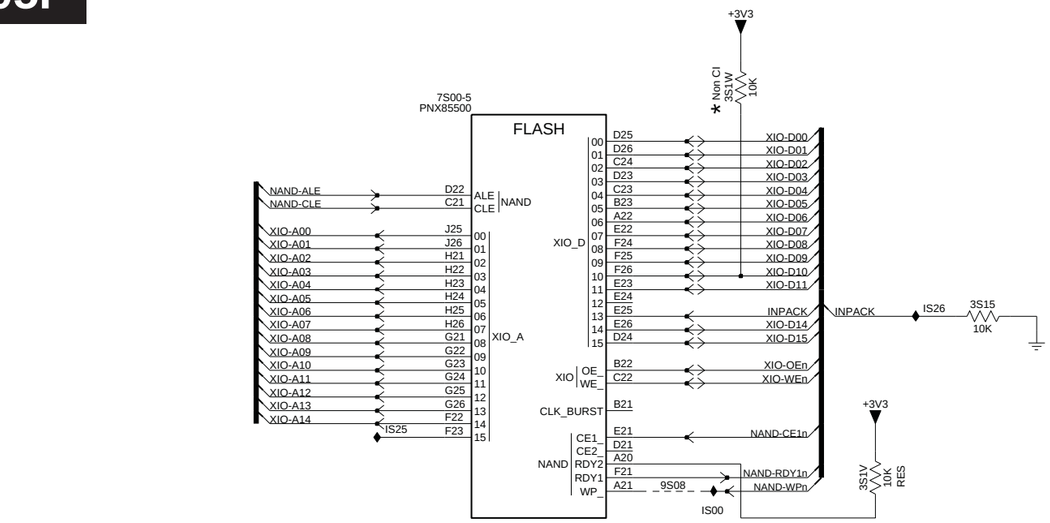
PNX 85500 SDRAM	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

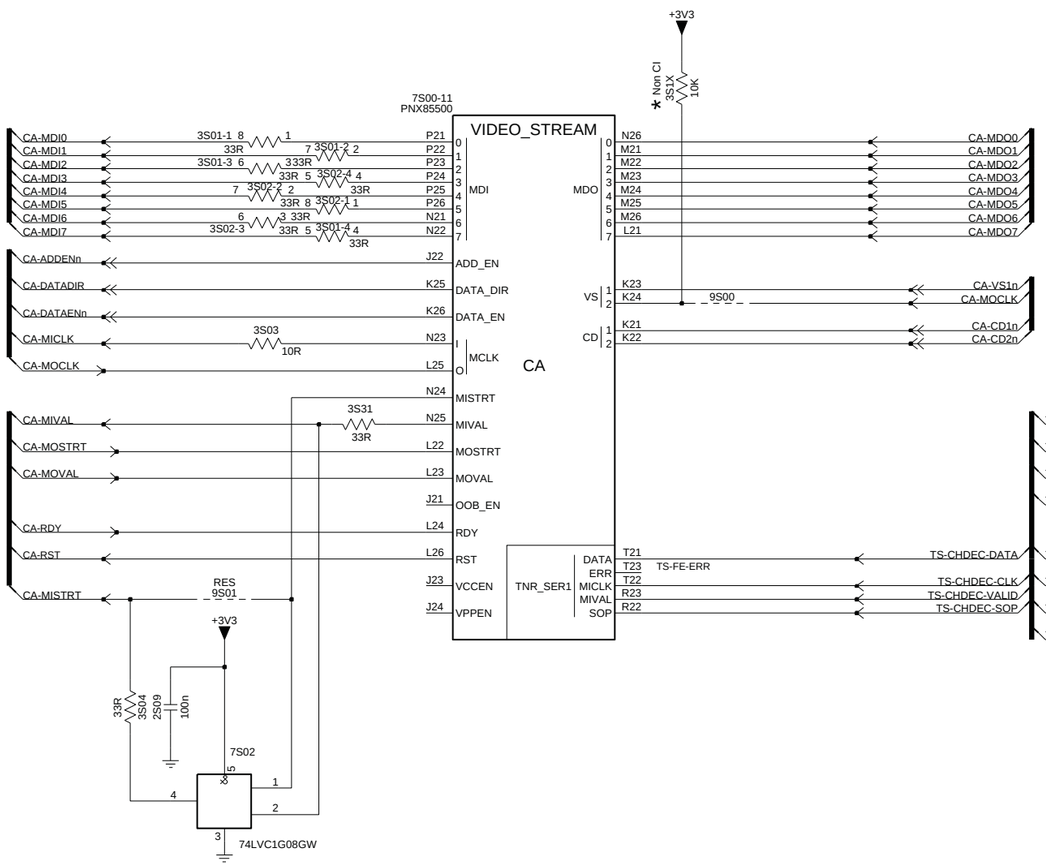
19220_043_120228.eps
120509

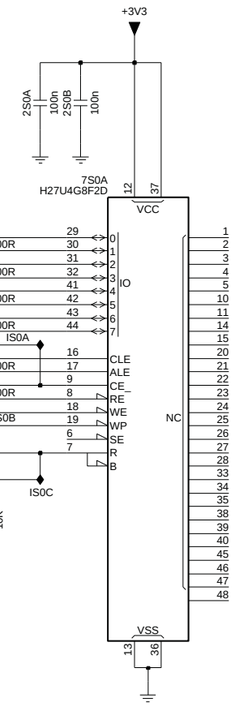
10-3-14 PNX 85500: Nandflash - conditional access

B05F PNX 85500: Nandflash - conditional access

B05F







PNX 85500 Nandflash conditional access	3139 123 6533

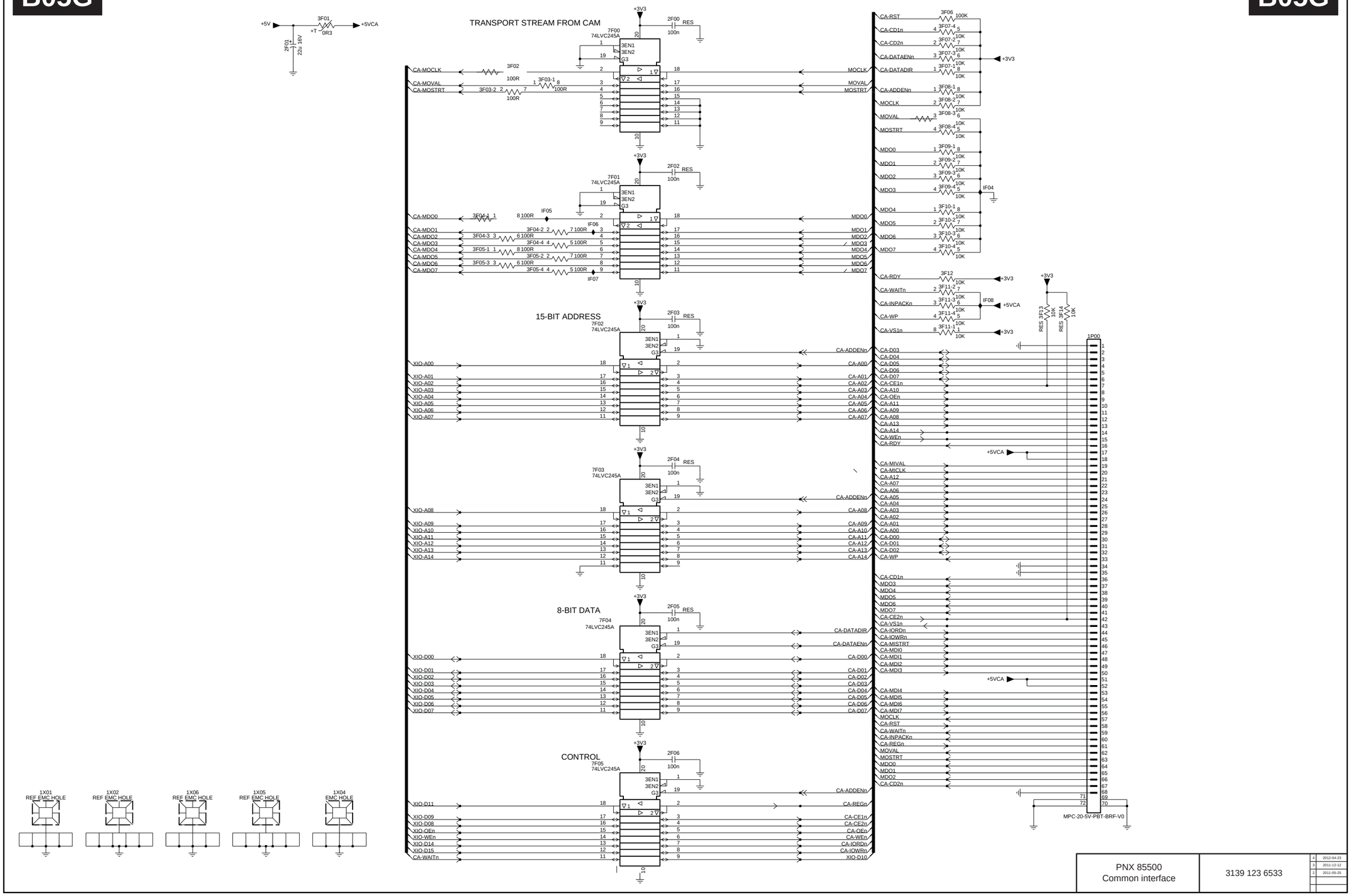
4	2012-04-23
3	2011-12-12
2	2011-05-25

19220_044_120228.eps
120509

10-3-15 PNX 85500: Common interface

B05G PNX 85500: Common interface

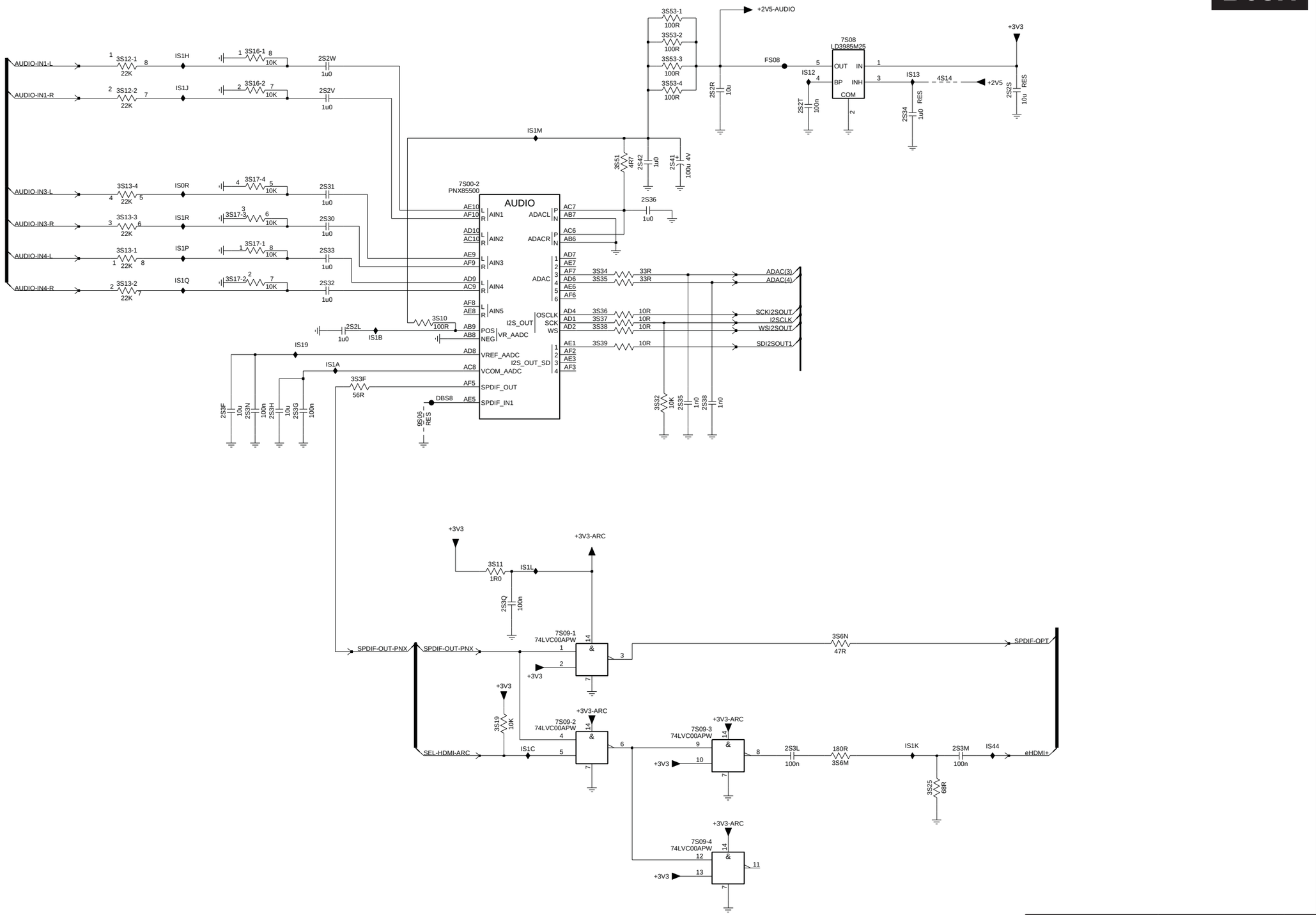
B05G



PNX 85500 Common interface	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

19220_045_120228.eps
120509

B05H PNX 85500: Audio **B05H**



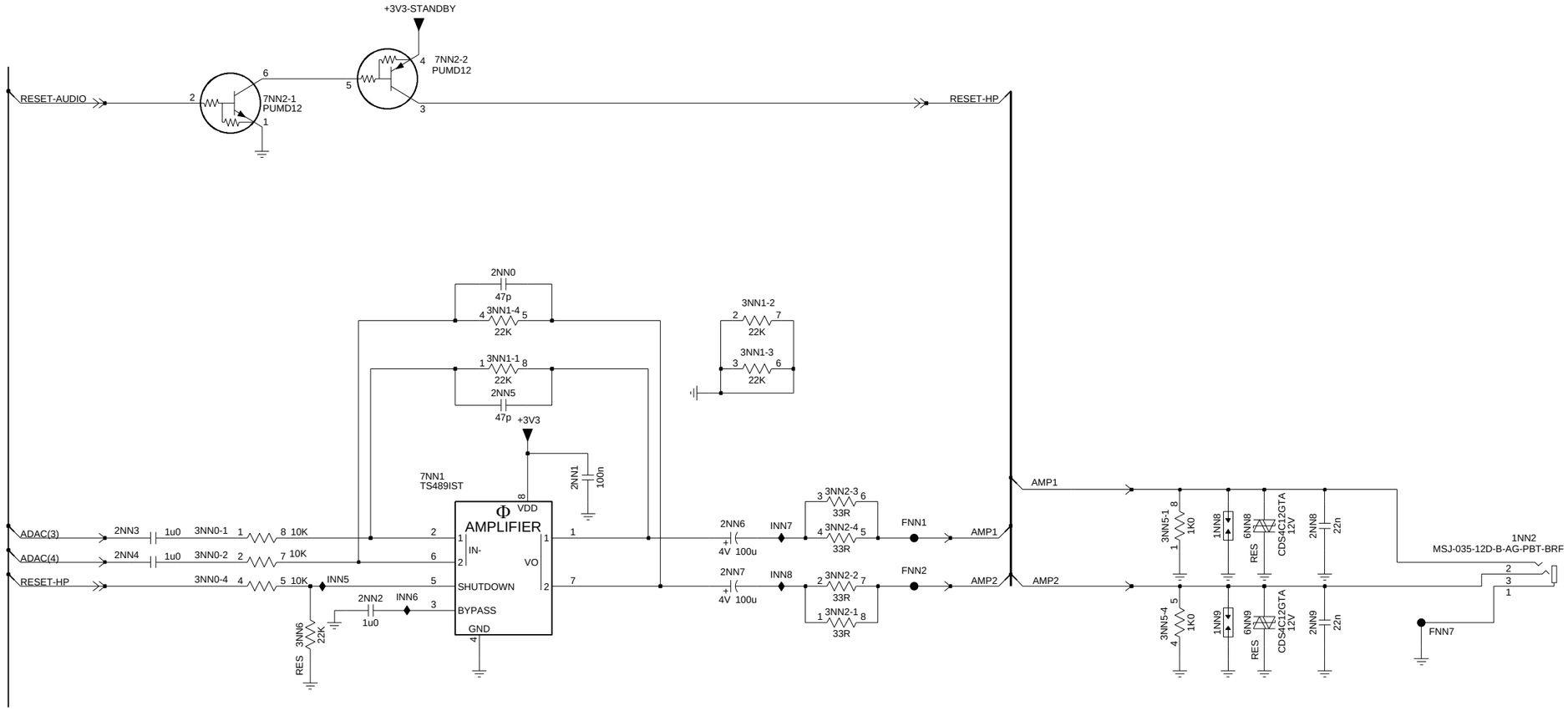
PNX 85500 Audio	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

19220_046_120228.eps
120509

10-3-17 PNX 85500: Headphone

B05I PNX 85500: Headphone

B05I

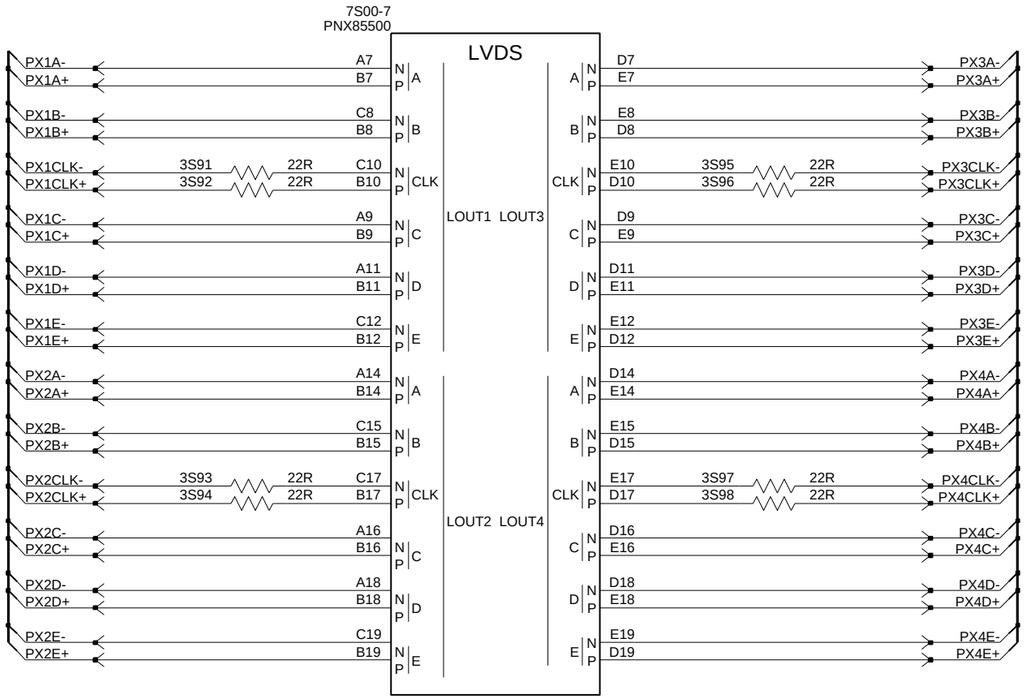


PNX 85500 Headphone	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

19220_047_120228.eps
120509

B05J PNX 85500: Video out - LVDS

B05J



PNX 85500 Video out - LVDS	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

19220_048_120228.eps
120509

10-3-19 PNX 85500: Analog video

B05K PNX 85500: Analog video

B05K

Connectivity

EU: SCART1
AP: -

EU: YPBPR1
AP: YPBPR1

EU: VGA
AP: VGA

AV1-CVBS, AV1-R, AV1-B, AV1-G
YPBPR1-SYNCIN1, AV3-Y, AV3-PR, AV3-PB
R-VGA, G-VGA, B-VGA, H-SYNC-VGA, V-SYNC-VGA, VGA-SCL-EDID, VGA-SDA-EDID

7S00-1 PNX85500 ANALOG_VIDEO
CVBS_Y1, SYNCIN1, Y_G1, PR_R_C1, PB_B1, AV1
CVBS_Y2, SYNCIN2, Y_G2, PR_R_C2, PB_B2, VGA
HSYNC_IN, VSYNC_IN, VSYNC, VGA_EDID
ATV_CVBS_Y3, CVBS_Y7, CVBS1_OUT, CVBS2_OUT, RESREF, CURREF, REF, IF_AGC, RF_AGC, TUNER
AGND

Y-SVHS, C-SVHS, CVBS-MON-OUT1, IS4V, IS4W
SOC-IF-AGC, SOC-IF-P, SOC-IF-N

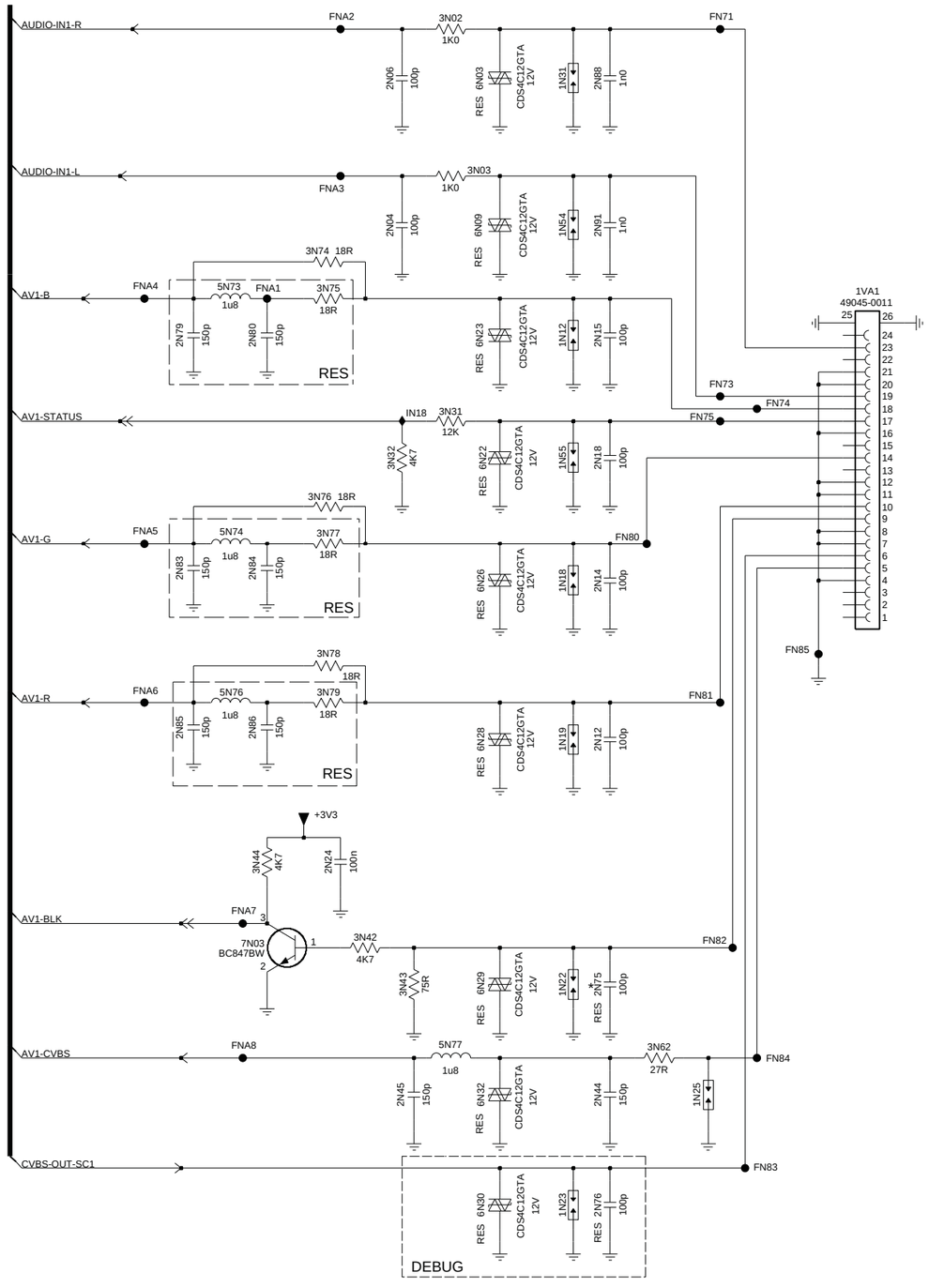
PNX 85500 Analog video	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

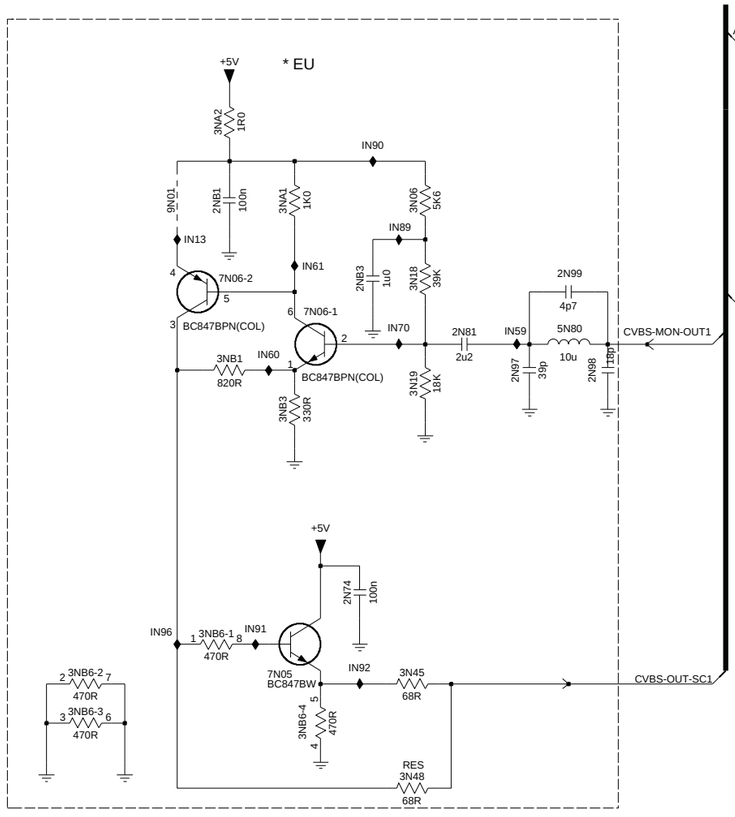
19220_049_120228.eps
120509

10-3-20 PNX 85500: Analogue externals A

B05L PNX 85500: Analogue externals A

B05L





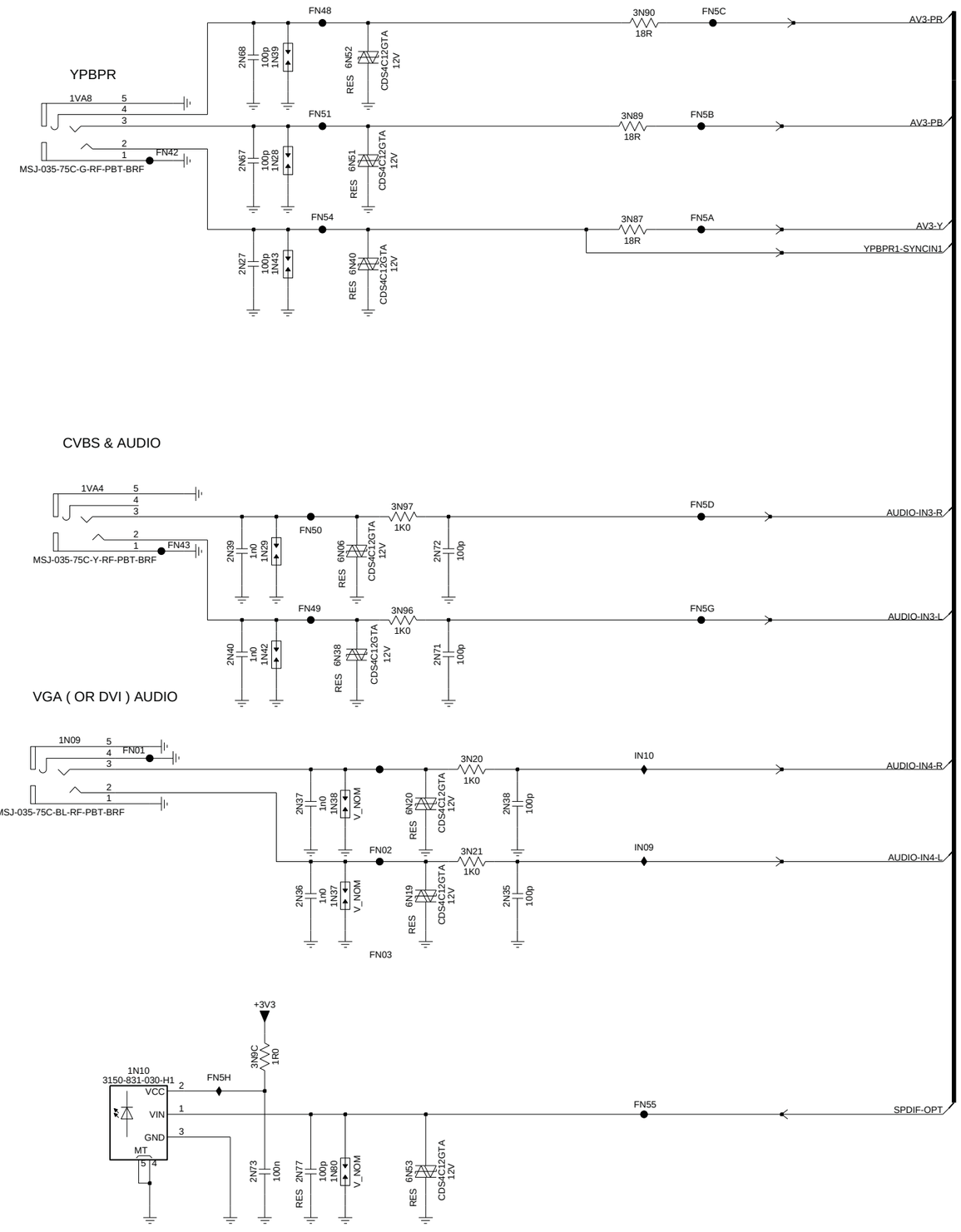
PNX 85500 Analogue externals A	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

19220_050_120228.eps
120509

10-3-21 PNX 85500: Analogue externals B

B05M PNX 85500: Analogue externals B

B05M



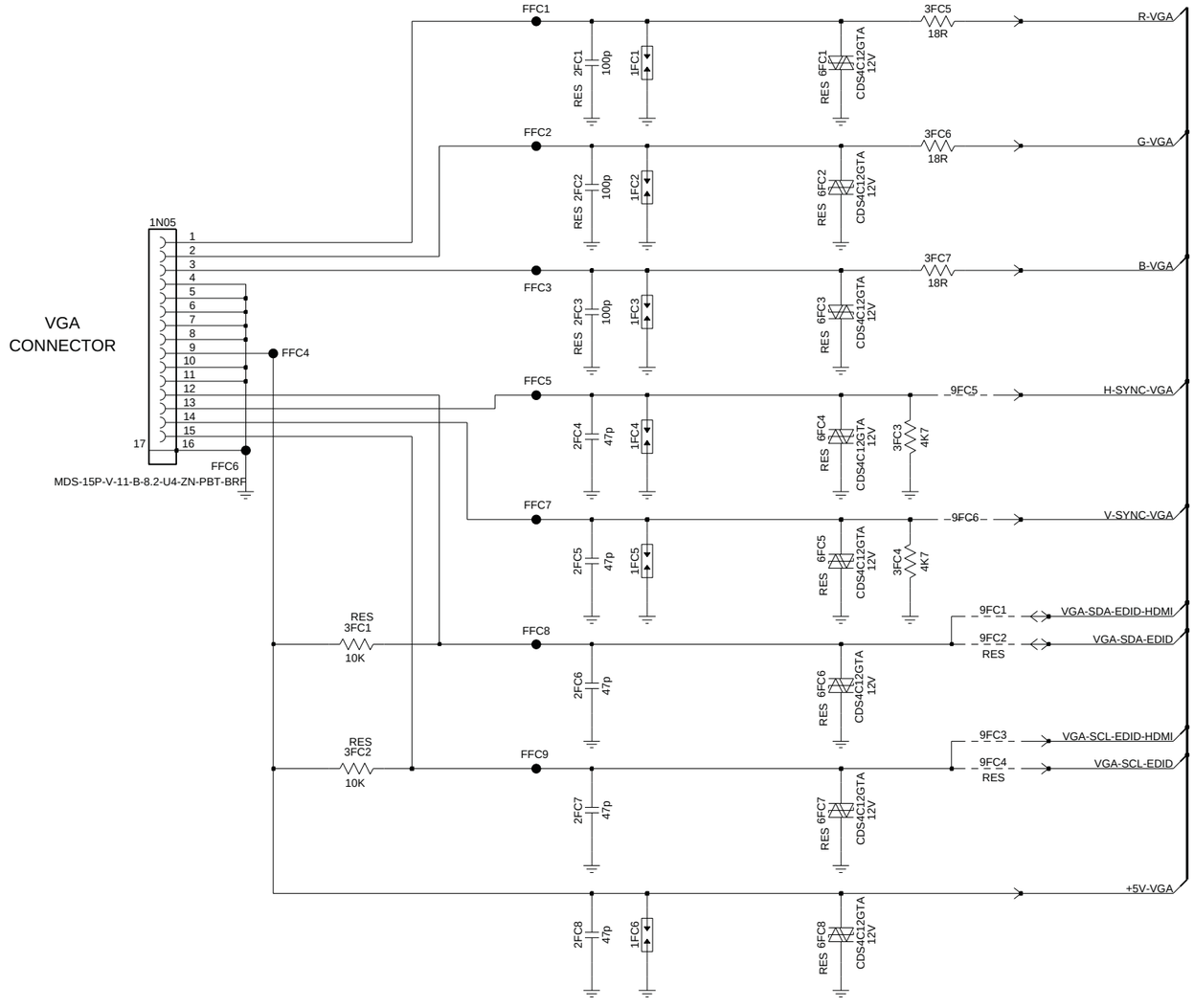
PNX 85500 Analogue externals B	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

19220_051_120228.eps
120509

10-3-22 PNX 85500: VGA

B05N PNX 85500: VGA

B05N

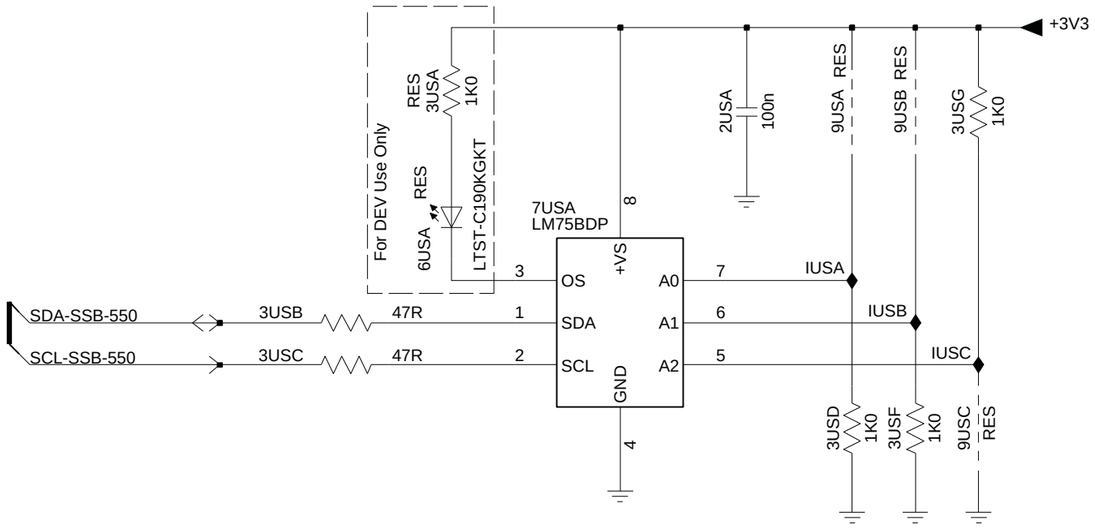


PNX 85500 VGA	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

19220_052_120228.eps
120509

B05O PNX 85500: Temperature sensor

B05O

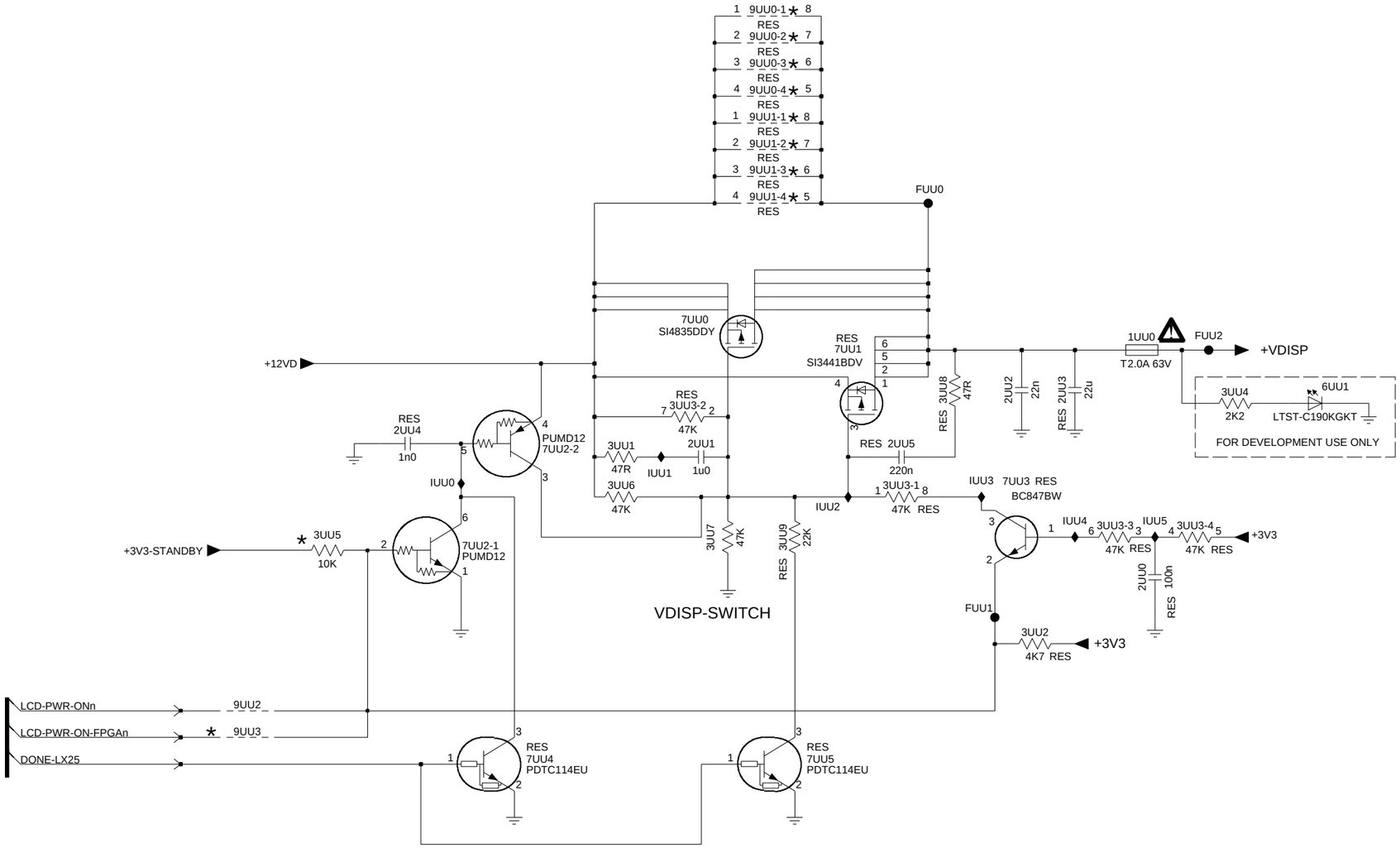


PNX 85500 Temperature sensor	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

19220_053_120228.eps
120509

B05P PNX 85500: Vdisp-switch

B05P



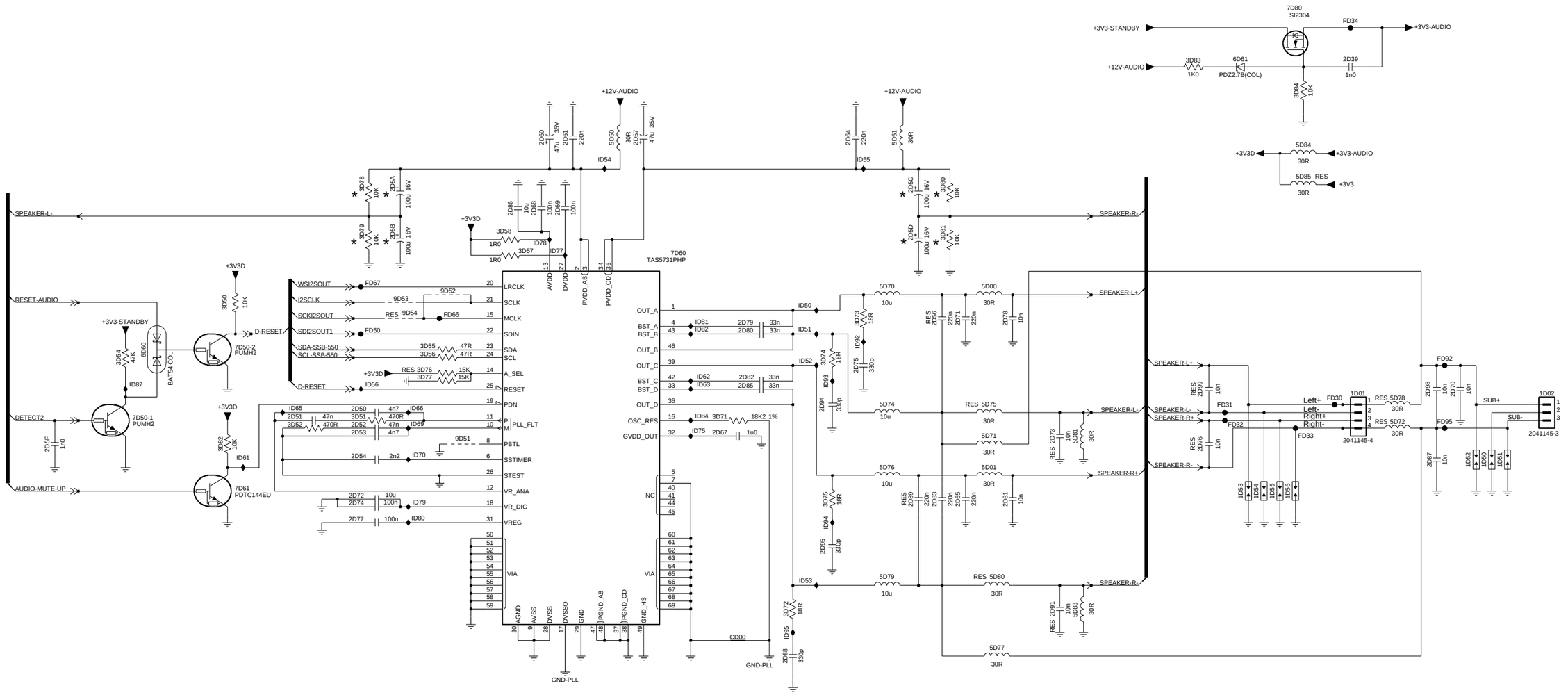
PNX 85500 Vdisp-switch	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

19220_054_120228.eps
120509

10-3-25 Class-D amplifier

B06A Class-D amplifier

B06A



	+12V-AUDIO (5000 & 5500 series)	+24V-AUDIO (4500 series)
2D57	100uF 16V (2022 031 00538)	47uF 35V (2020 031 00753)
2D60	100uF 16V (2022 031 00538)	47uF 35V (2020 031 00753)
3D83	1K0 (3198 031 01020)	6K8 (3198 031 06820)
6D61	BZX2V7 (3198 020 52780)	BZX5V6 (3198 020 55680)

Speaker Configuration	1D02	2D70	2D87	2D98	2D55	2D71	2D83	5D71	5D77	2D56	2D73	2D76	2D89	2D91	2D99	5D75	5D80	5D72	5D78	5D81	5D83	2D5A	2D5B	2D5C	2D5D	3D78	3D79	3D81	3D81
Active 2.1 (with Virtual Ground)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
★ Active 2.1 (E-cap in speaker)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No	No	No	No	No	Yes	Yes	No	No	No	No	No	No	No	No
Passive 2.1	Yes	Yes	Yes	Yes	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No	No	No	No	No
2.0	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No	No

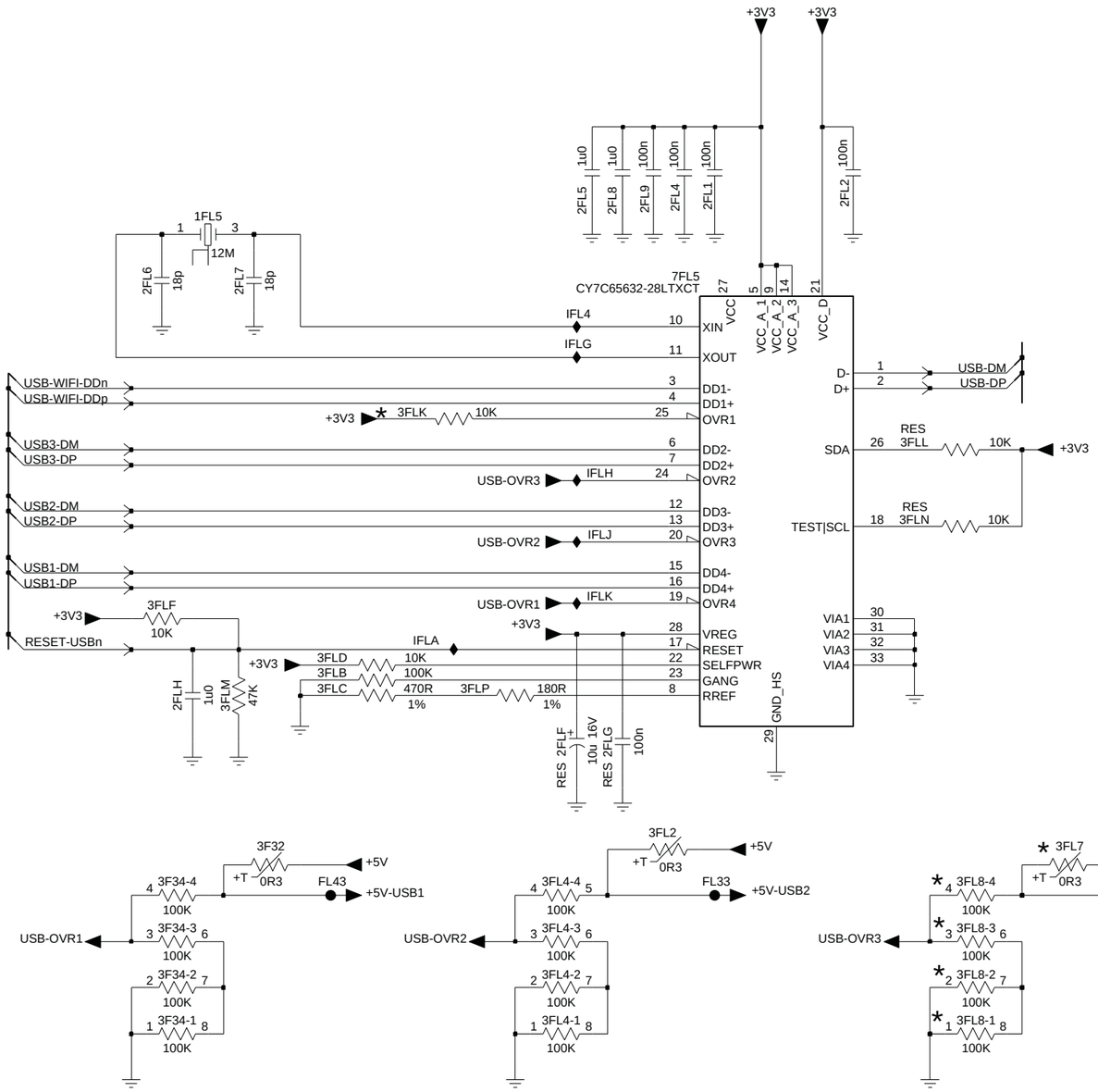
★ Current Configuration

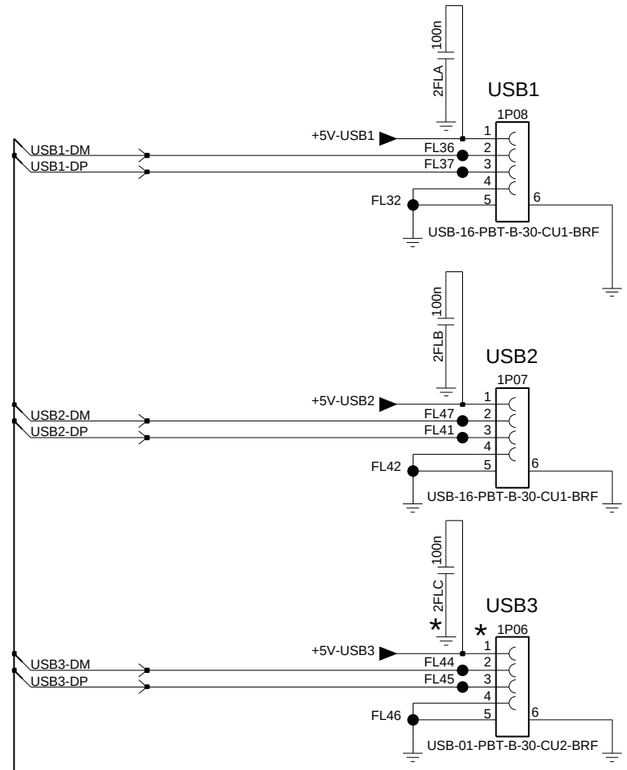
Class-D amplifier	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

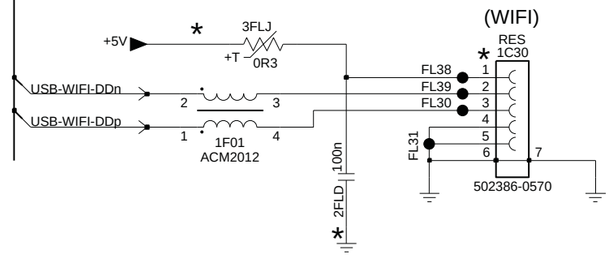
19220_055_120228.eps
120509

10-3-26 USB hub

B06B USB hub







* ONLY FOR 6000

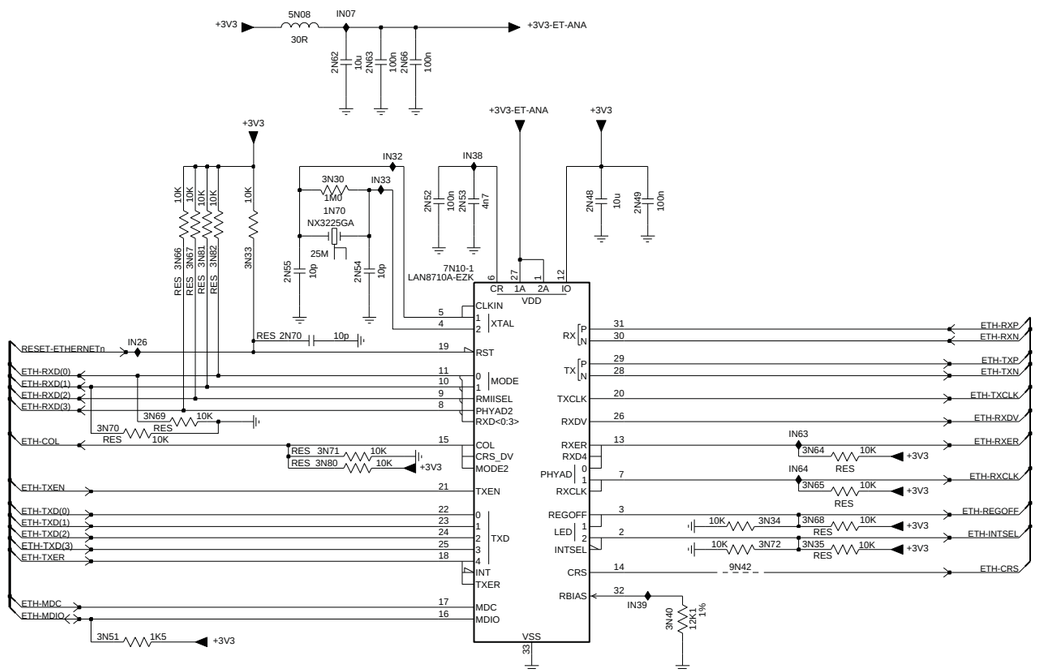
	7FL5
5000 2 × USB	CY7C65634
6000 3 × USB + WIFI	CY7C65632

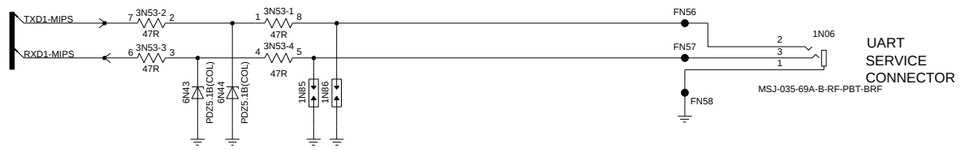
USB hub	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

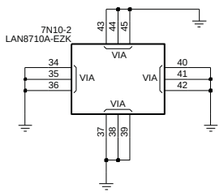
19220_056_120228.eps
120509

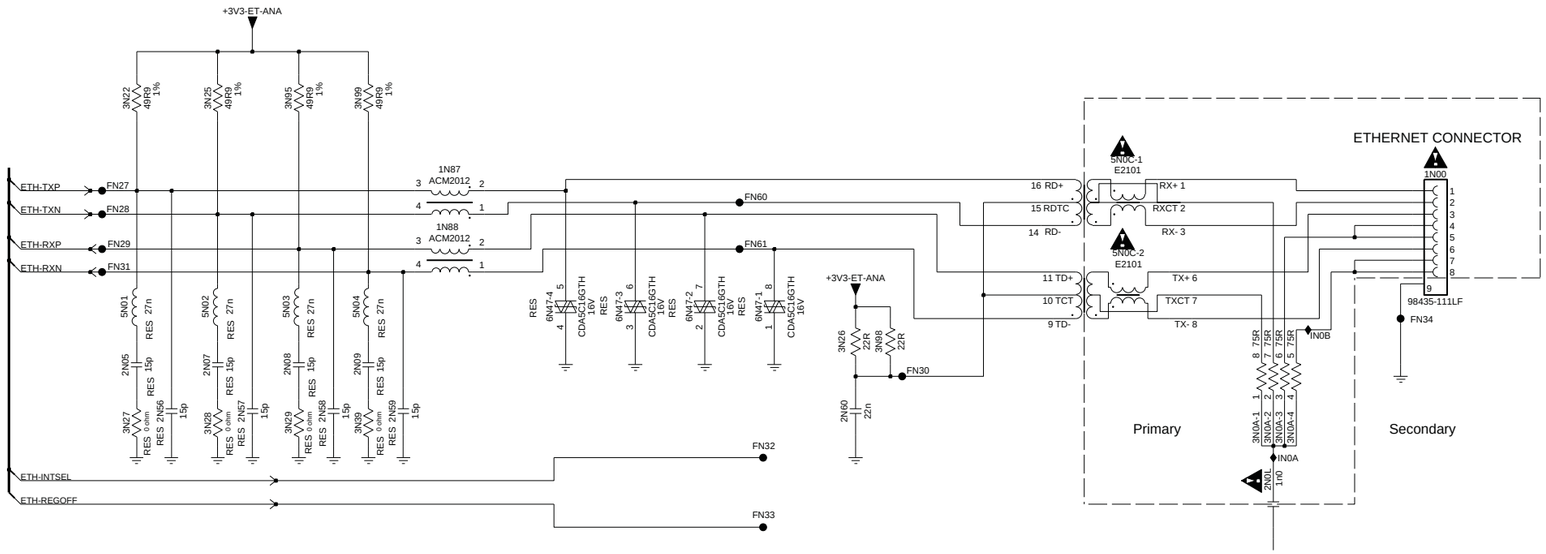
B06C Ethernet & service

B06C









CONFIGURATION RESISTOR SETTINGS

Resistor	POP	EMPTY
3N64 (RES)	PHYADD(0) = 1	PHYADD(0) = 0
3N65 (RES)	PHYADD(1) = 1	PHYADD(1) = 0
3N66 (RES)	PHYADD(2) = 1	PHYADD(2) = 0
3N67 (RES)	RMII mode selected	MII mode selected
3N68 (RES)	Internal 1.2V reg. disabled	Internal 1.2V reg. enabled
3N69 (RES)	MODE(0) = 0	MODE(0) = 1
3N70 (RES)	MODE(1) = 0	MODE(1) = 1
3N71 (RES)	MODE(2) = 0	MODE(2) = 1
3N72	INTERRUPT FUNCTION DISABLED ON nINT/TXER/TXD4 SIGNAL	INTERRUPT FUNCTION ENABLED ON nINT/TXER/TXD4 SIGNAL

Ethernet & service	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

19220_057_120228.eps
120509

B06D HDMI

B06D

I2C Address
SII9187B = 0xB2

Reserved

HDMI CONNECTOR 3

HDMI CONNECTOR 2

HDMI CONNECTOR 1

HDMI CONNECTOR SIDE

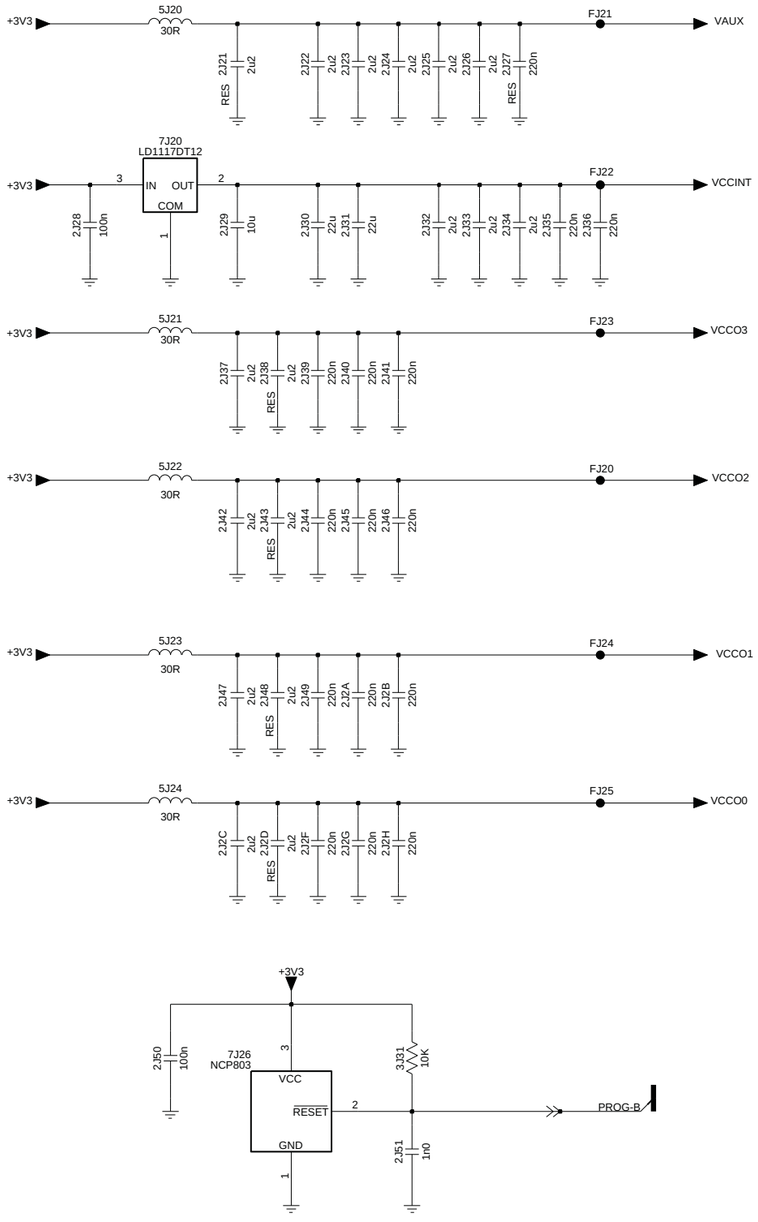
HDMI	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

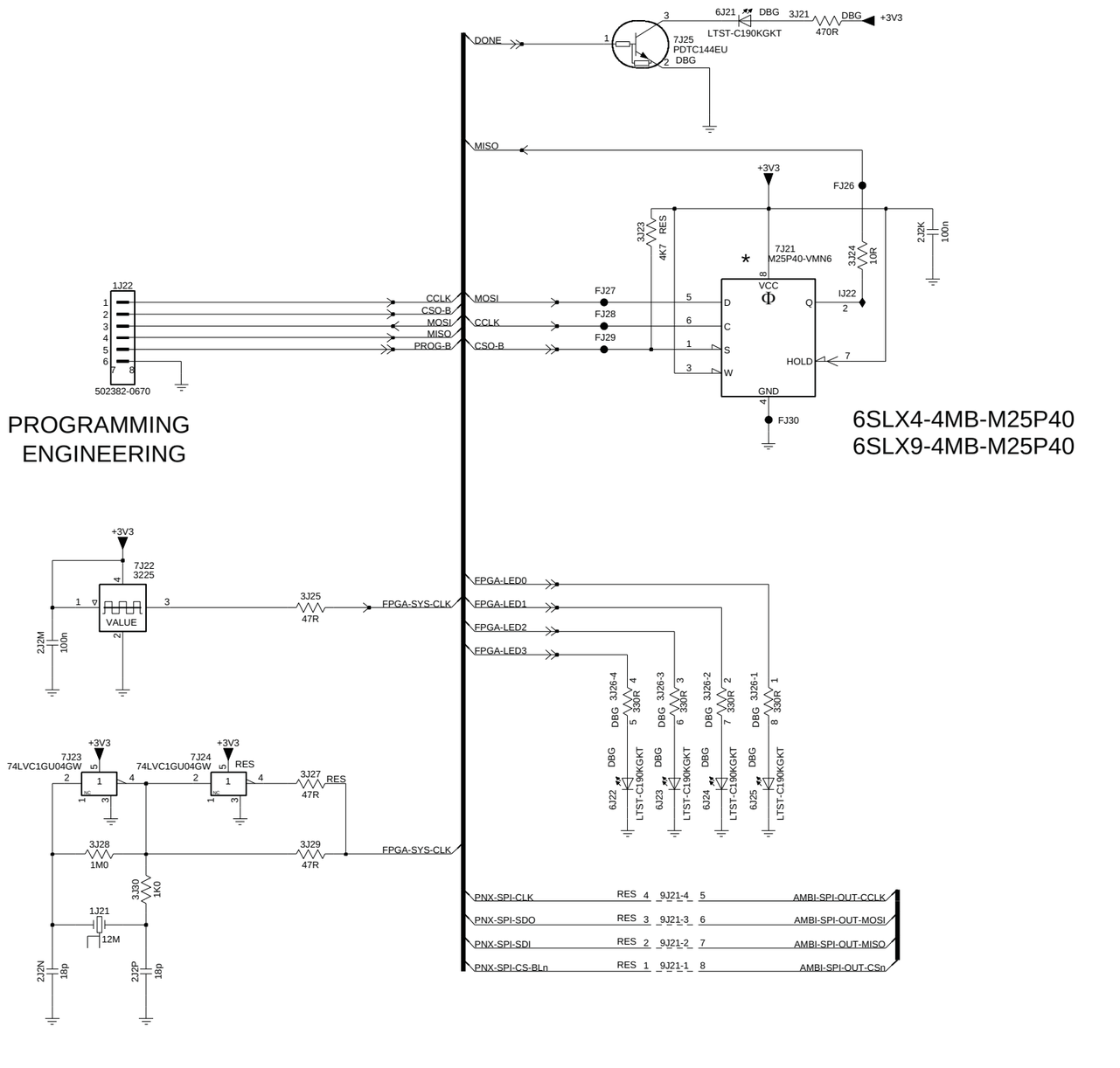
19220_058_120228.eps
120509

10-3-29 FPGA, power & control

B07A FPGA, power & control

B07A





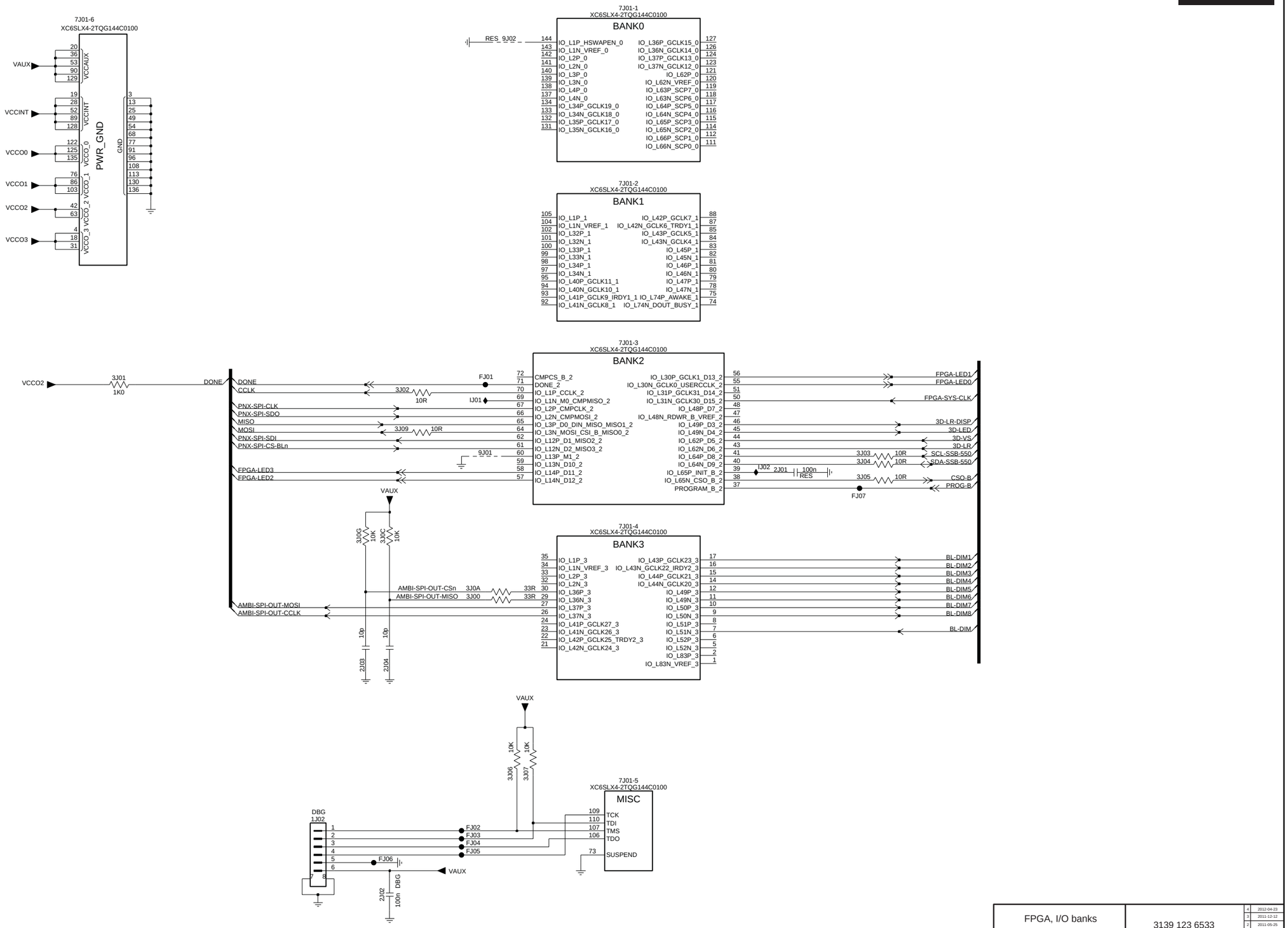
FPGA, power & control	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

19220_059_120228.eps
120509

10-3-30 FPGA, I/O banks

B07B FPGA, I/O banks

B07B

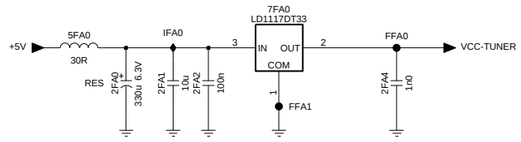


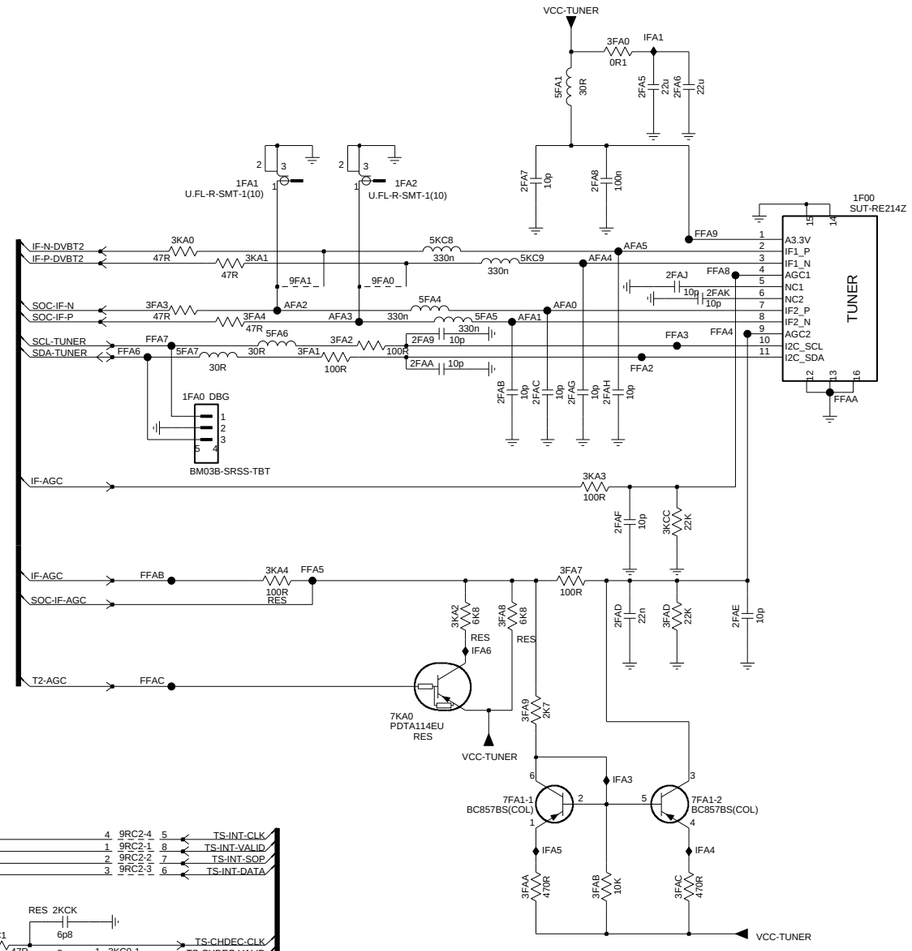
FPGA, I/O banks	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

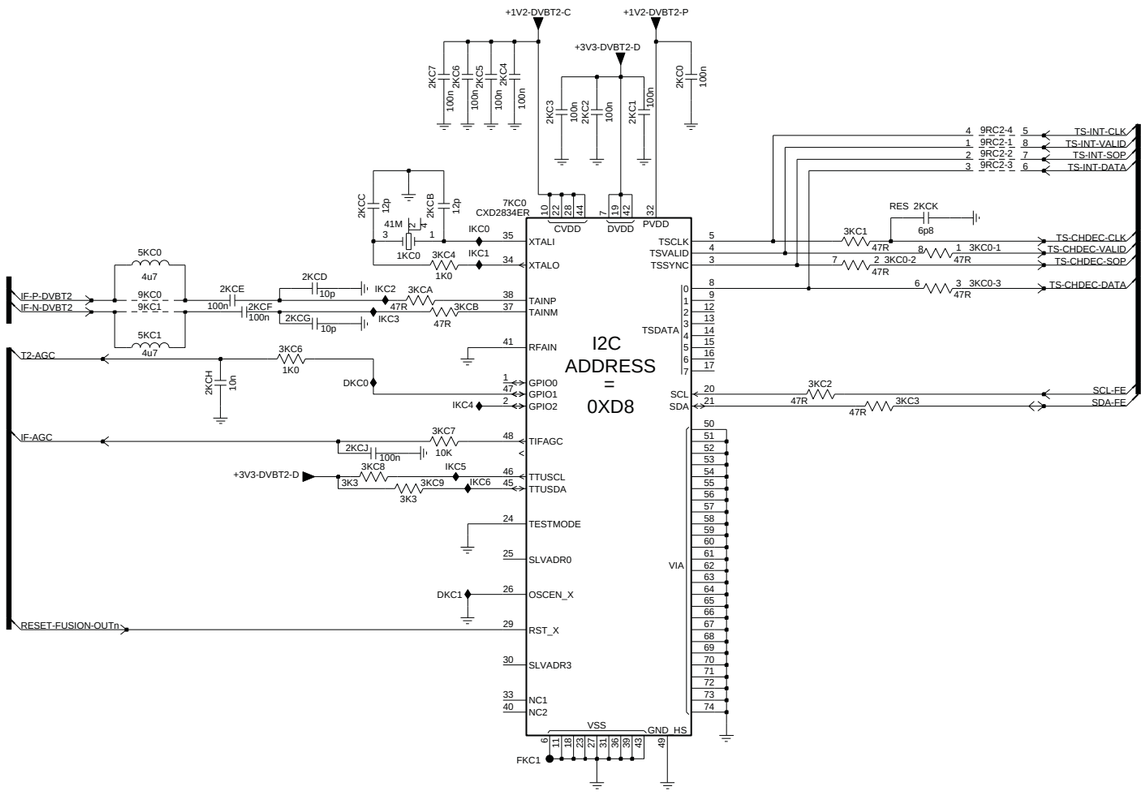
19220_060_120228.eps
120509

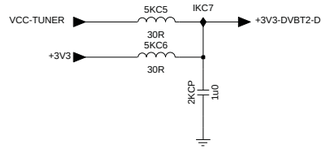
B08A Tuner, channel decoder

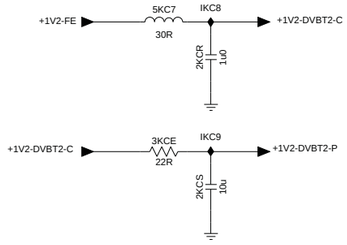
B08A











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

Tuner, channel decoder	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

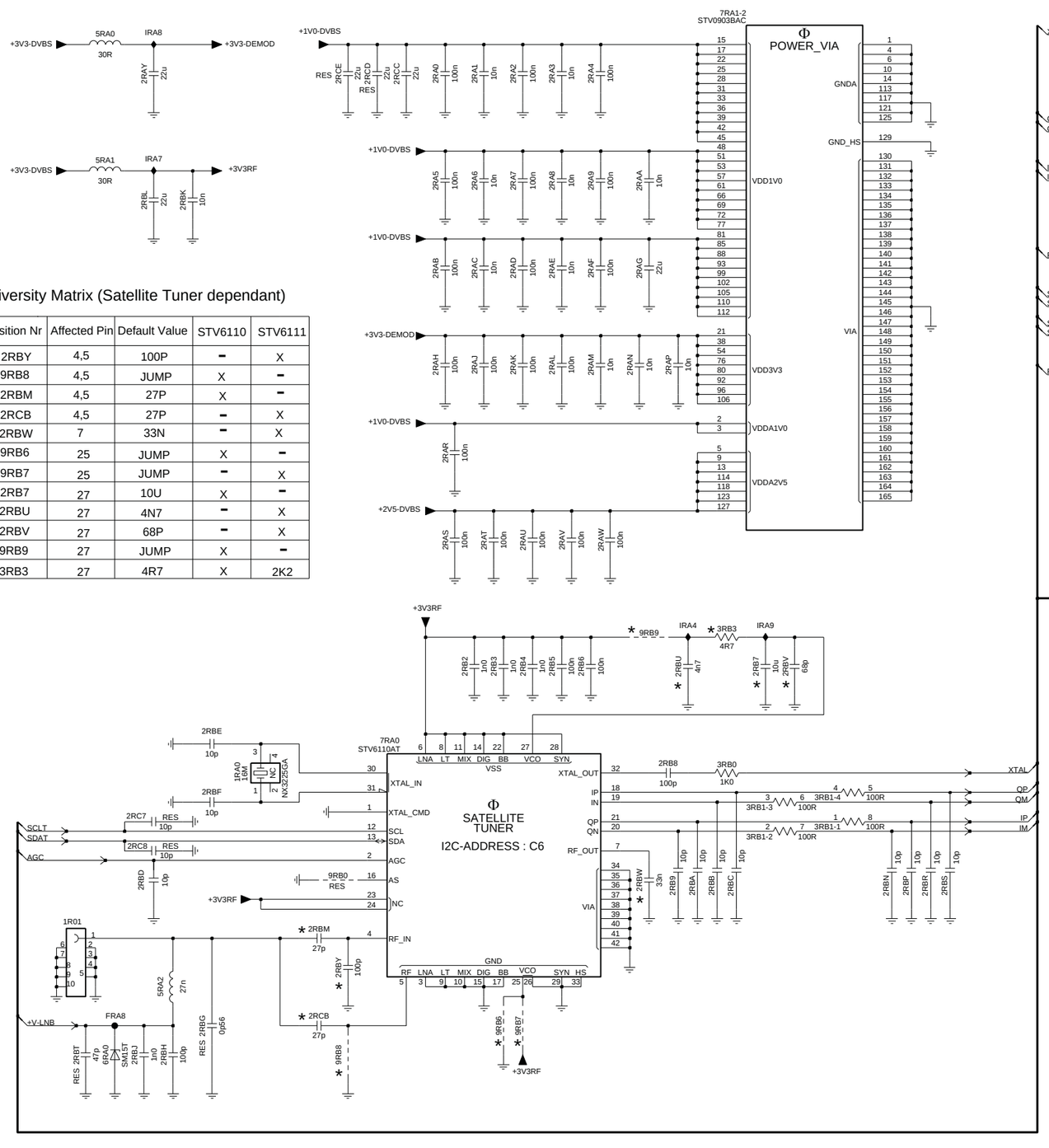
19220_061_120228.eps
120509

B08B DVBS, FE

B08B

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	-
2RCB	4,5	27P	-	X
2RBW	7	33N	-	X
9RB6	25	JUMP	X	-
9RB7	25	JUMP	-	X
2RB7	27	10U	X	-
2RBU	27	4N7	-	X
2RBV	27	68P	-	X
9RB9	27	JUMP	X	-
3RB3	27	4R7	X	2K2



DVBS, FE	3139 123 6533	4	2012-04-23
		3	2011-12-12
		2	2011-05-25

19220_062_120228.eps
120509

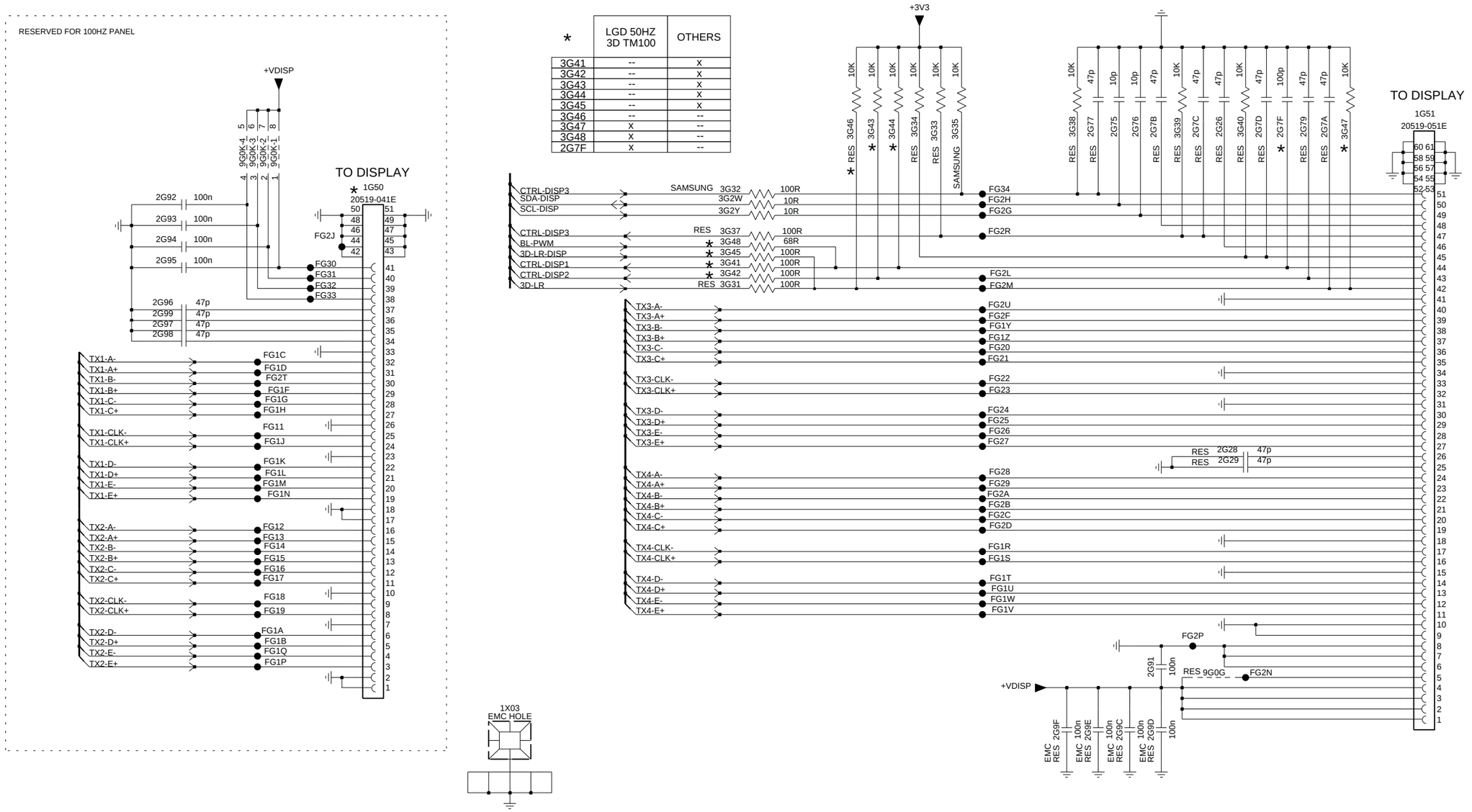
10-3-33 Video out - LVDS

B09A Video out - LVDS

B09A

RESERVED FOR 100HZ PANEL

*	LGD 50HZ 3D TM100	OTHERS
3G41	--	X
3G42	--	X
3G43	--	X
3G44	--	X
3G45	--	X
3G46	--	--
3G47	X	--
3G48	X	--
2G7F	X	--



Video out - LVDS	3139 123 6531

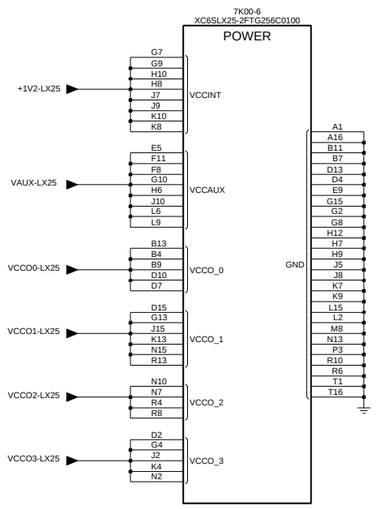
3	2011-12-29
2	2011-09-29

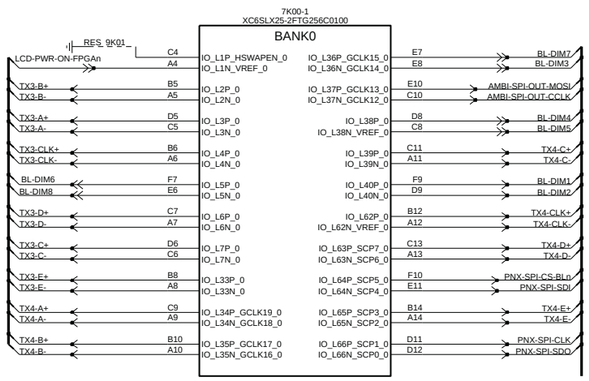
19220_076_120229.eps
120229

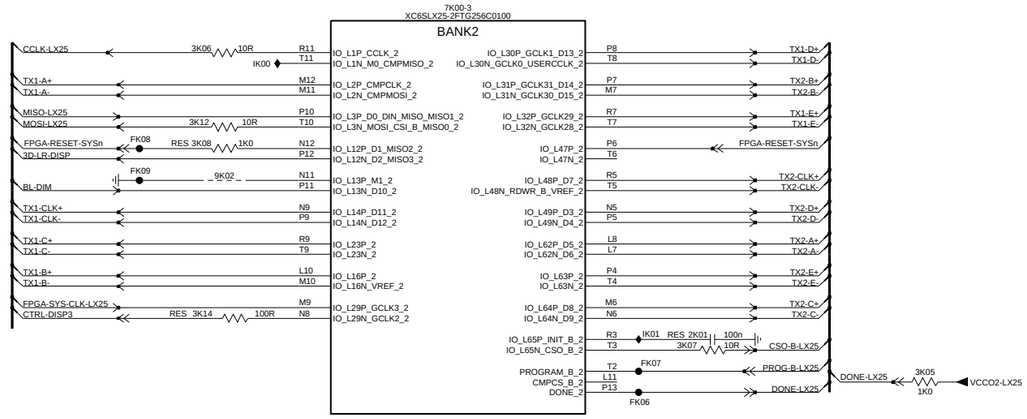
10-3-34 FPGA, I/O banks

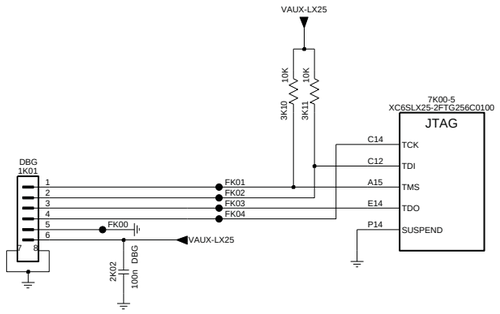
B10A FPGA, I/O banks

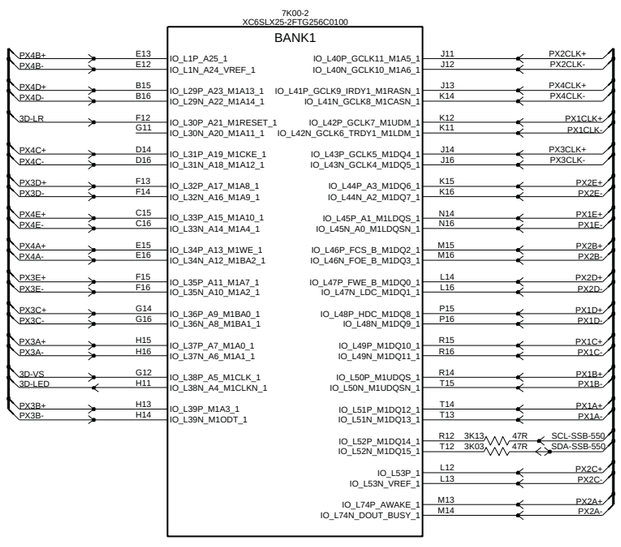
B10A

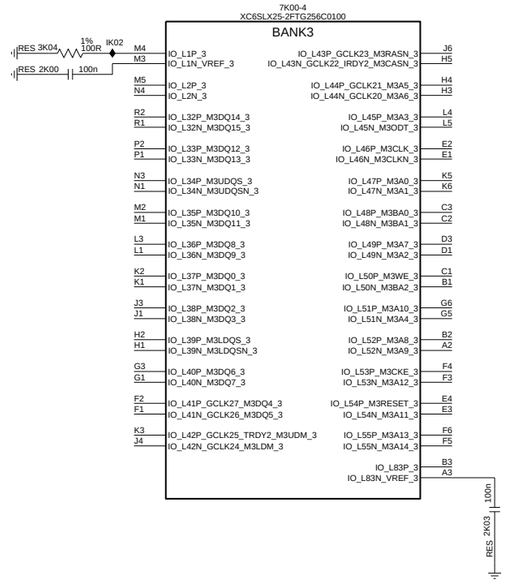












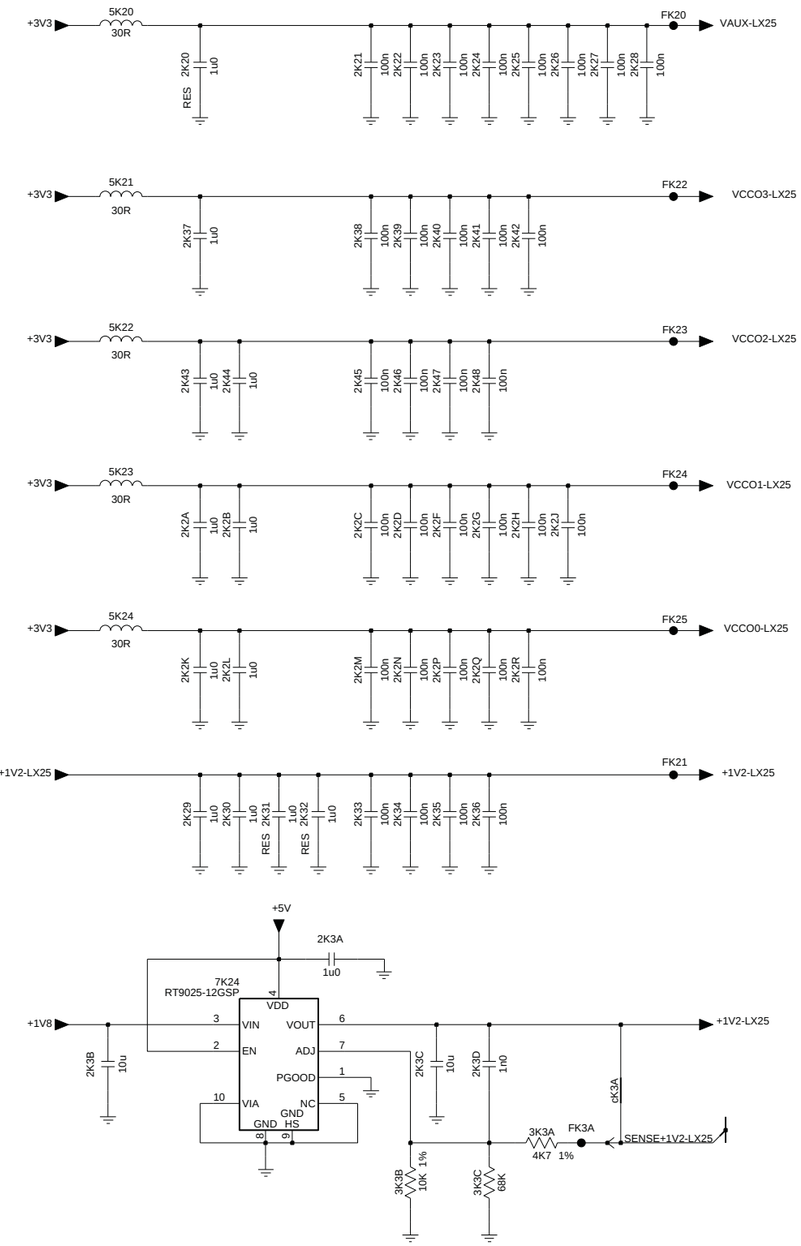
FPGA, I/O banks	3139 123 6531	3 2011-12-29 2 2011-09-29

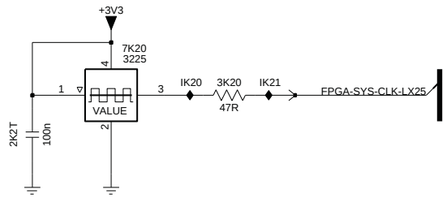
19220_077_120229.eps
120229

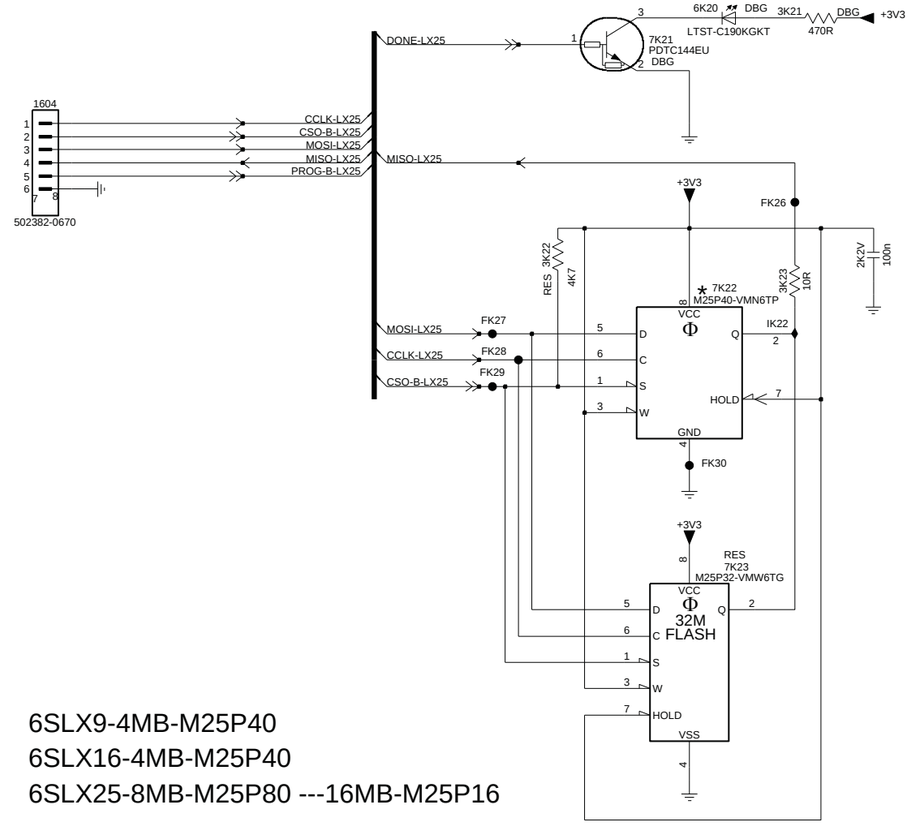
10-3-35 FPGA, supply & control

B10B FPGA, supply & control

B10B





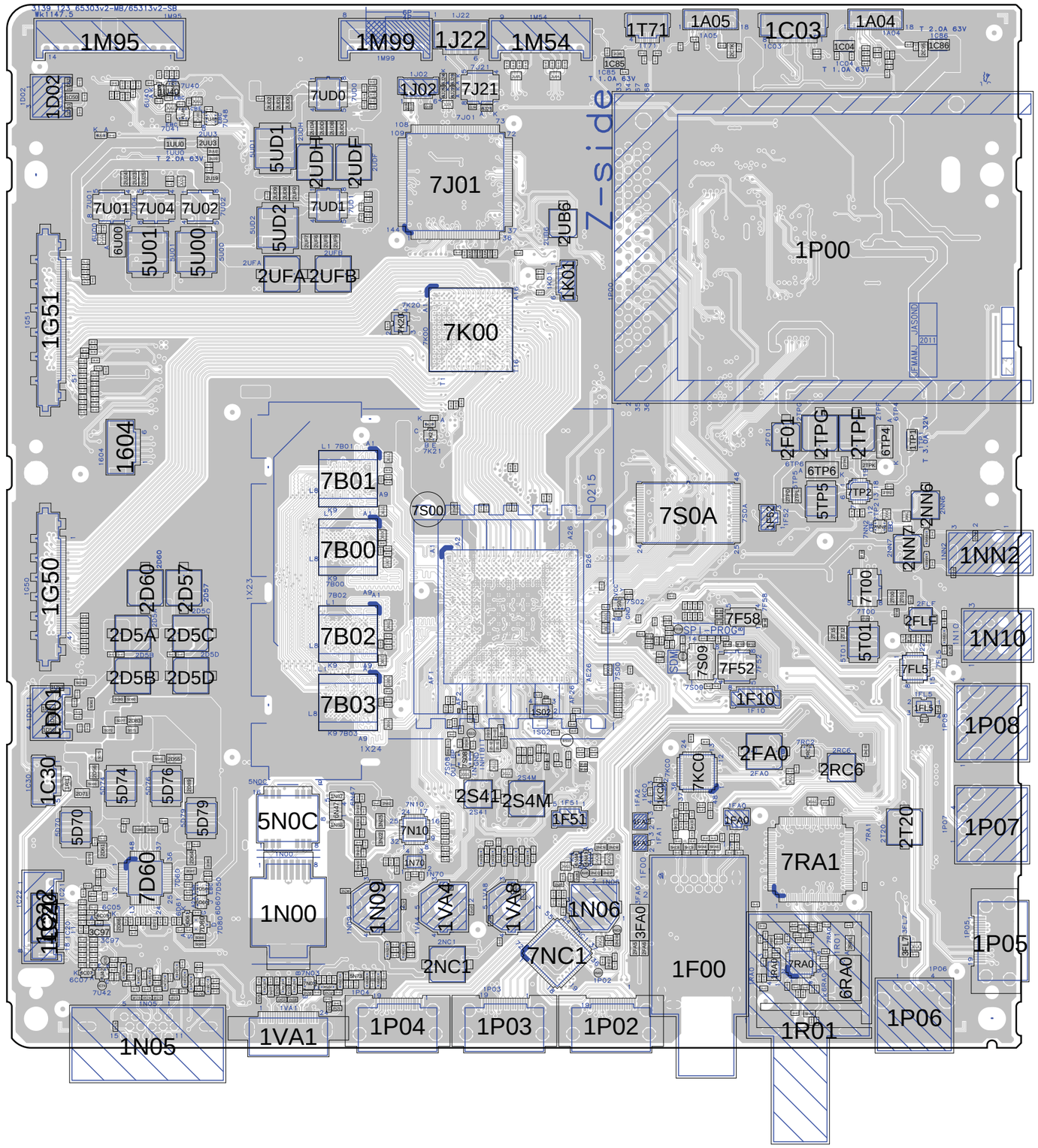


6SLX9-4MB-M25P40
6SLX16-4MB-M25P40
6SLX25-8MB-M25P80 ---16MB-M25P16

FPGA, supply & control	3139 123 6531	3 2011-12-29 2 2011-09-29

19220_078_120229.eps
120229

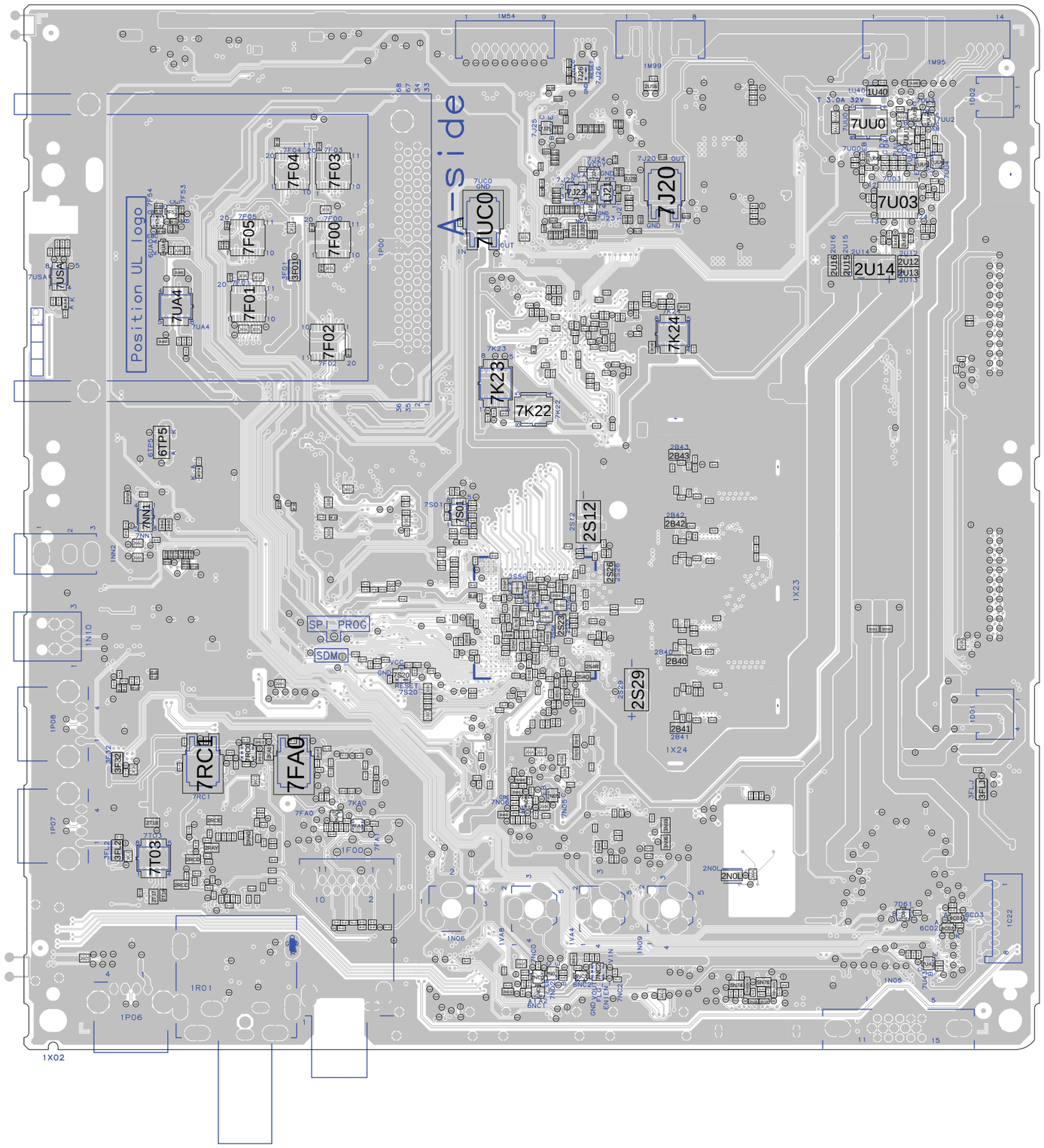
10-3-36 Layout top



Layout top	3139 123 6531	3 2011-12-29 2 2011-09-29

19220_079_120229.eps
120229

10-3-37 Layout bottom



Layout bottom	3139 123 6531	3 2011-12-29 2 2011-09-29

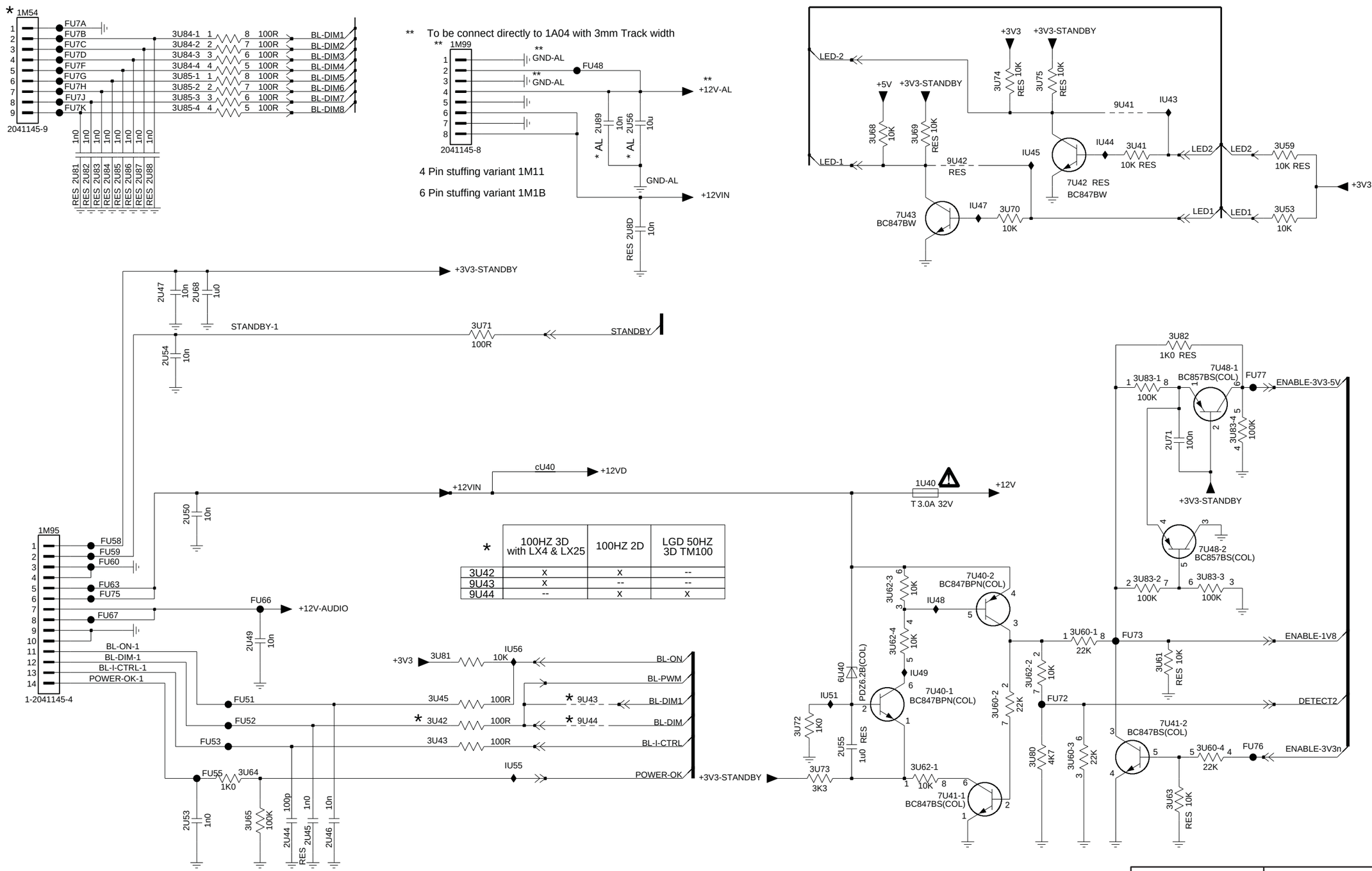
19220_080_120229.eps
120229

10.4 B 313912365333 - 313912365334 SSB

10-4-1 Power connectors

B01A Power connectors

B01A



19220_031_120228.eps
120509

10-4-2 Interface connectors

B01B Interface connectors

B01B

+3V3 5C56 30R IC79 1C04 T 1.0A 63V FC9F V-AMBI

RESERVED

V-AMBI RES 2C7G 1u0

RES 1A05 IC7A RES 9C08 RES 5C57 30R IC7D GND-AL IC7G RES 9C09 RES 2C7K 10u RES 2C7L 10n GND-AL

FH34SRJ-18S-0.5SH(50)

V-AMBI 2C7F 1u0

1A04 FC71 FC72 FC73 FC74 FC75 AMBI-TEMP 9C06 5C55 30R 3C70 100R

+3V3 RES 3C7F 10K

3C7G 33R 2C7M 10p AMBI-SPI-OUT-MOSI

3C7H 33R 2C7N 10p AMBI-SPI-OUT-CCLK

AV2-STATUS

2C71 100n 2C70 1u0

FC76 GND-AL RES 2C94 100n

9C07 FC77 1C86 T 2.0A 63V +12V-AL

2C95 10u 2C96 10n GND-AL

FH34SRJ-18S-0.5SH(50)

+3V3 3C74 100K RES

LIGHT-SENSOR FC87 3C75 100R 2C76 100p

2C93 47n RES

RC IC73 3C76 100R 2C77 100p

LED-2 IC74 3C77 100R 2C78 100p

RES PDZ5.6B(COL) 6C02

+3V3-STANDBY 2C79 100p

LED-1 IC75 3C78 100R 2C80 100p

RES PDZ5.6B(COL) 6C07

KEYBOARD FC95 3C79 10R 2C82 100p

RES PDZ5.6B(COL) 6C03

RES PDZ5.6B(COL) 6C05

To sensor & control

** 1C22 FC88 FC89 FC90 FC91 FC92 FC93 FC94 +5V 2041145-8

2C81 100n

** 1C20 FH52-11S-0.5SH

RES 1C21 FH52-18S-0.5SH

+3V3-STANDBY 2C90 ** 1u0

IC7H

+3V3 3C96 4K7

+5V ** 3C97 +T 0R3

2C91 ** 1u0 2C99 ** 100p

SCL-SET RES 3C94 47R FC9A

SDA-SET RES 3C95 47R FC9B

3D-LED 3C72 100R FC9D

RES 2C86 10p RES 2C87 10p 2C97 100p

TACHO cC01 IRQ-CRP RES 3C71 FC9G

TXD2-MIPS RES 100R 3C73 47R FC9H

RXD2-MIPS RES 3C7A 47R FC9J

RES 2C7B 10p RES 2C7C 10p RES 2C72 100p

* HOTEL TV

RXD1-MIPS * RES 3C98 100R FC9L

TXD1-MIPS * RES 3C99 100R FC9K

* RES 1C03 +5V +12V 502386-0870

AMP1 AMP2

SCL-BL FC85 3C81 100R FC96

SDA-BL FC86 3C83 100R FC97 FC98

1T71 502386-0470

2C83 10p 2C84 10p

TEMPERATURE SENSOR

FC99 2C85 1u0

+3V3 5C54 30R RES 1C85 T 1.0A 63V

+12V RES 5C53 30R IC78

Interface connectors	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

19220_032_120228.eps
120509

B02A DC/DC

B02A

12V/1V8 CONVERSION

12V/1V1 CONVERSION

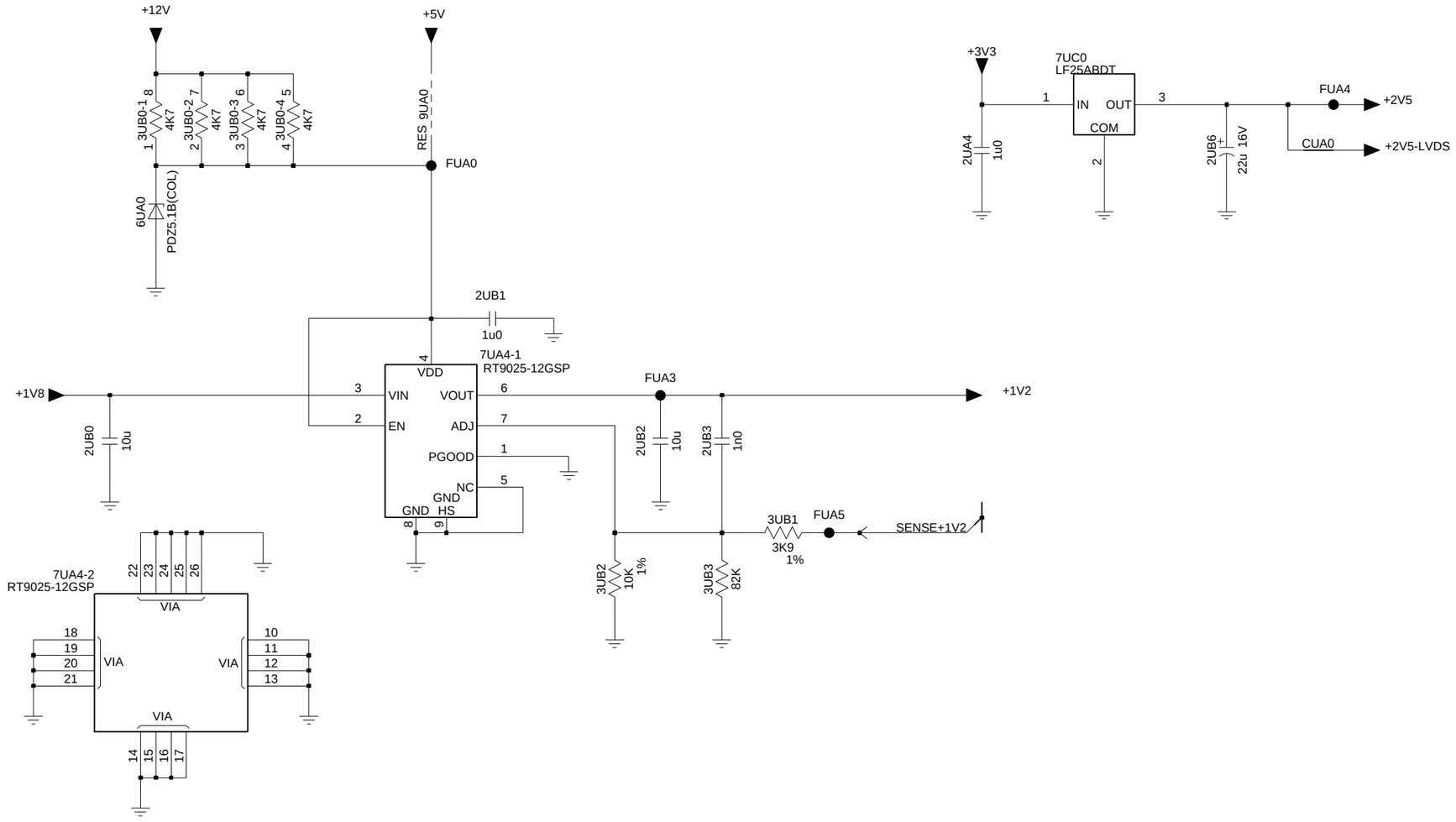
DC/DC	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

19220_033_120228.eps
120509

10-4-4 DC/DC, 1.8 V to 1.2 V conversion

B02B DC/DC 1.8 V to 1.2 V conversion

B02B



DC/DC 1.8 V to 1.2 V conversion	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

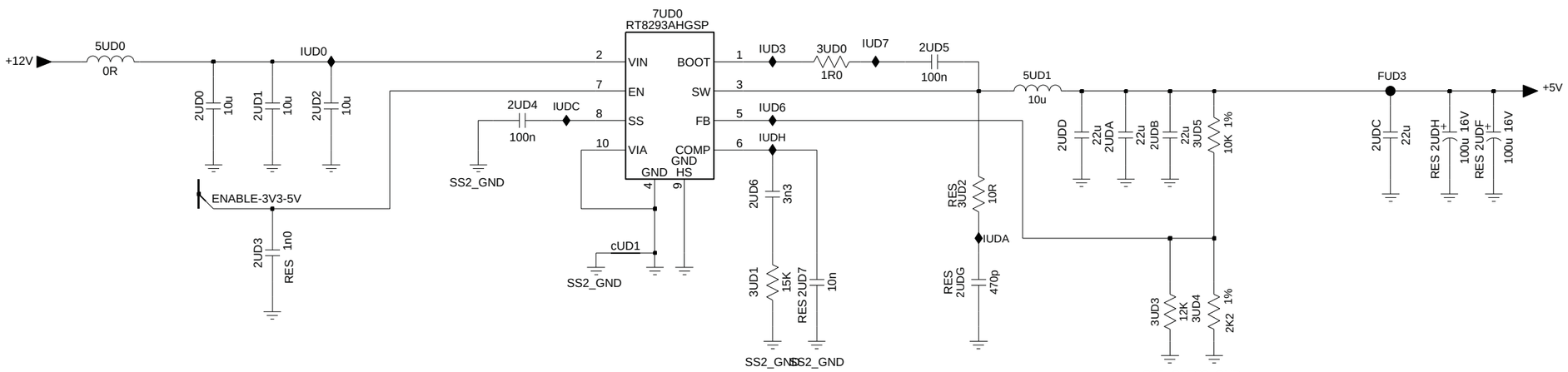
19220_034_120228.eps
120509

10-4-5 DC/DC, 12 V to 5 V/3.3 V conversion

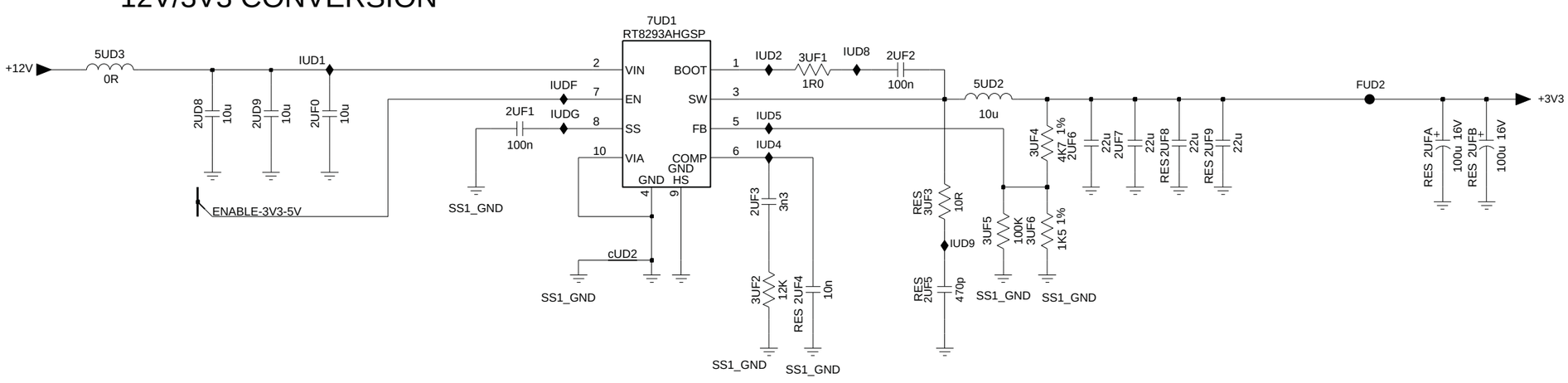
B02C DC/DC 12 V to 5 V/3.3 V conversion

B02C

12V/5V CONVERSION



12V/3V3 CONVERSION



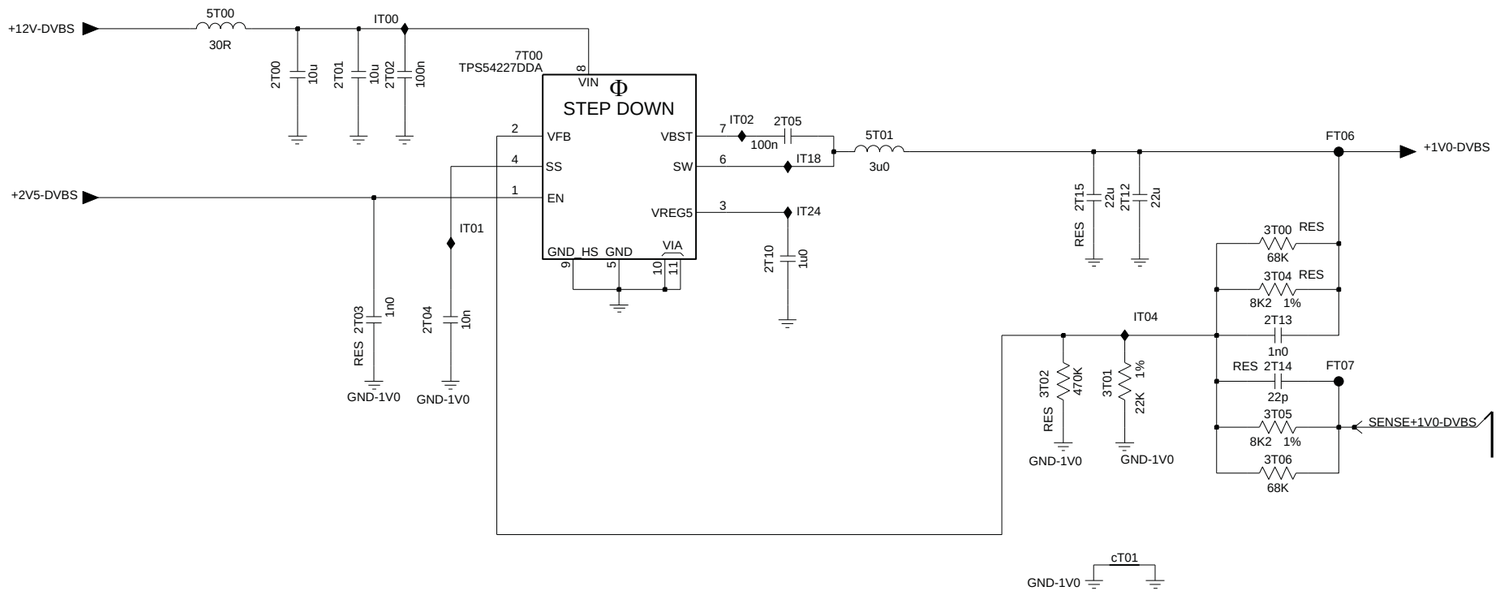
DC/DC 12 V to 5 V/3.3 V conversion	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

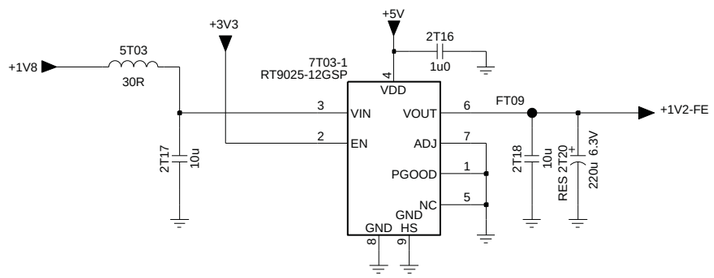
19220_035_120228.eps
120509

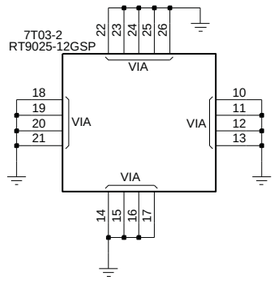
10-4-6 DVBS supply

B03A DVBS supply

B03A







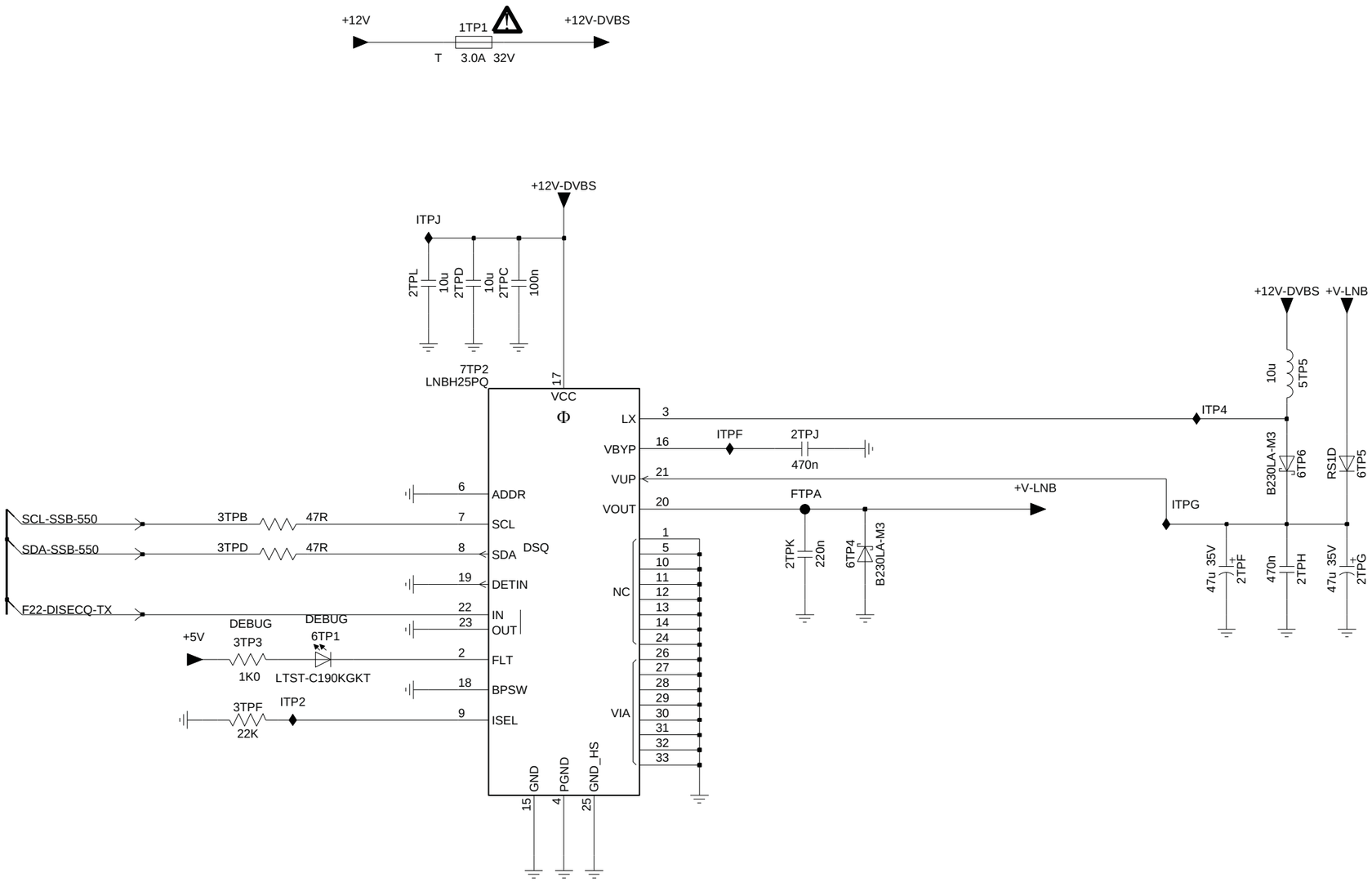
DVBS supply	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

19220_036_120228.eps
120509

10-4-7 Core voltage supply for DVBS demodulator

B03B Core voltage supply for DVBS demodulator

B03B

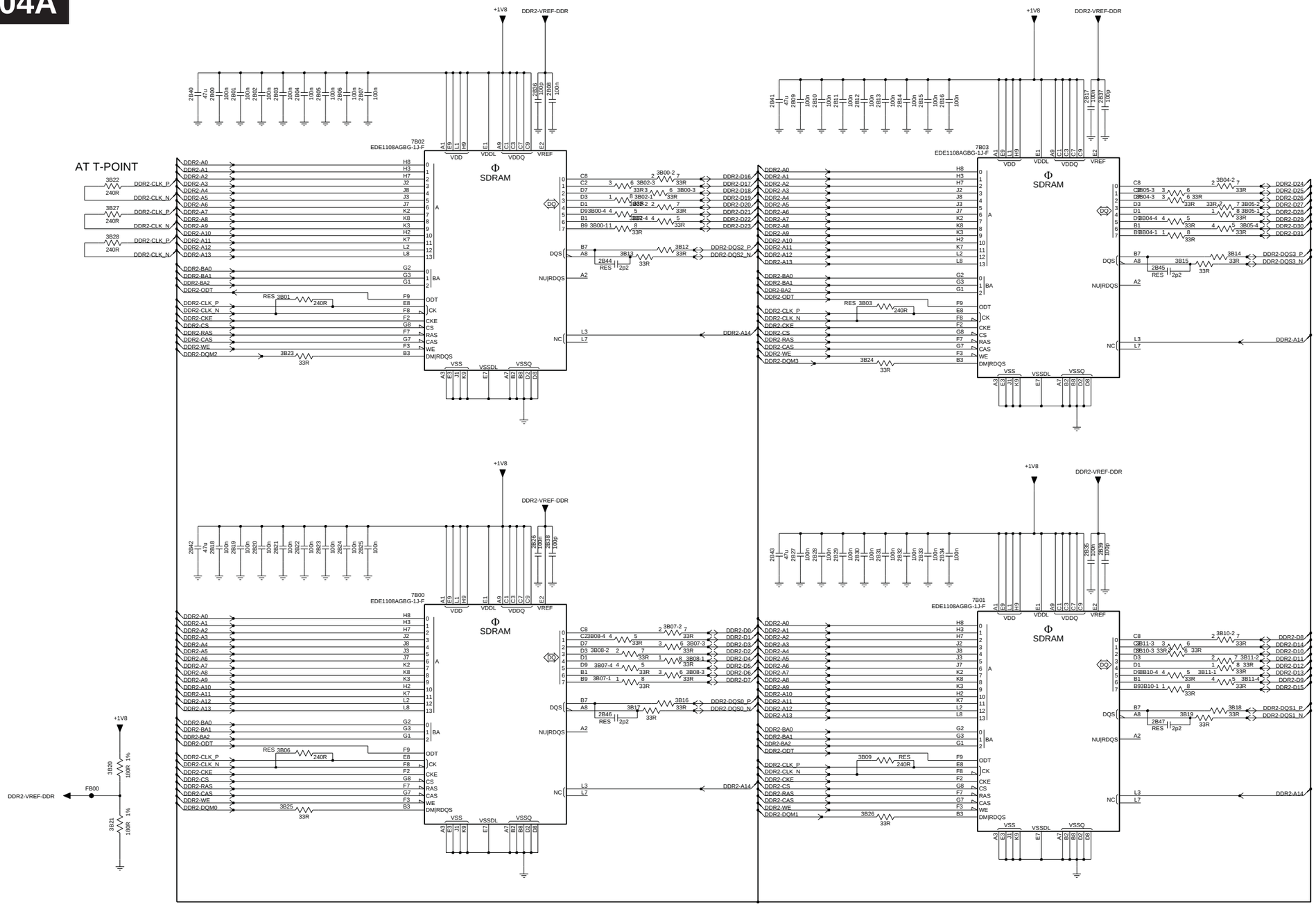


Core voltage supply for DVBS demodulator	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

19220_037_120228.eps
120509

B04A DDR

B04A



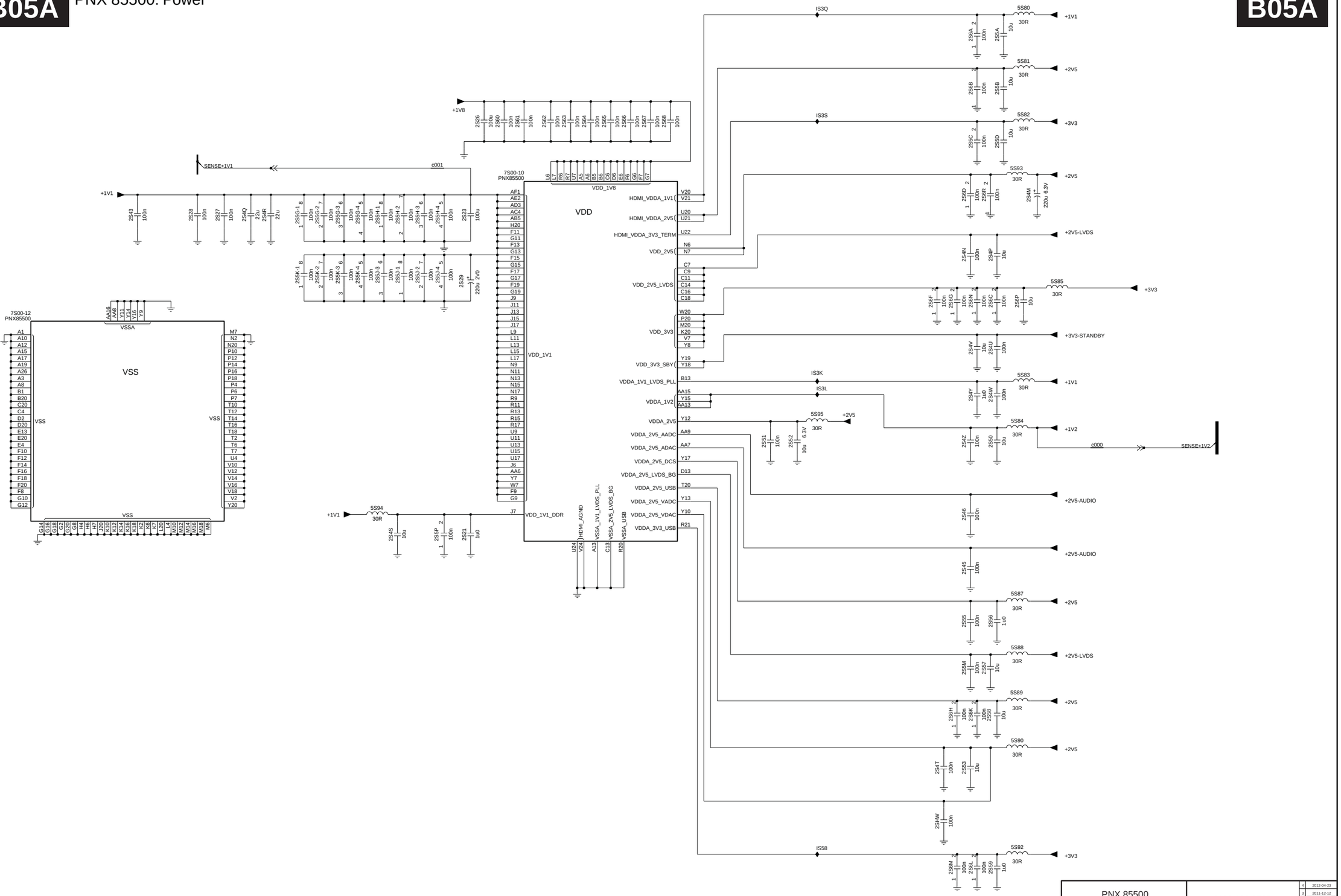
DDR	3139 123 6533	4	2012-04-23
		3	2011-12-12
		2	2011-05-25

19220_038_120228.eps
120509

10-4-9 PNX 85500: Power

B05A PNX 85500: Power

B05A

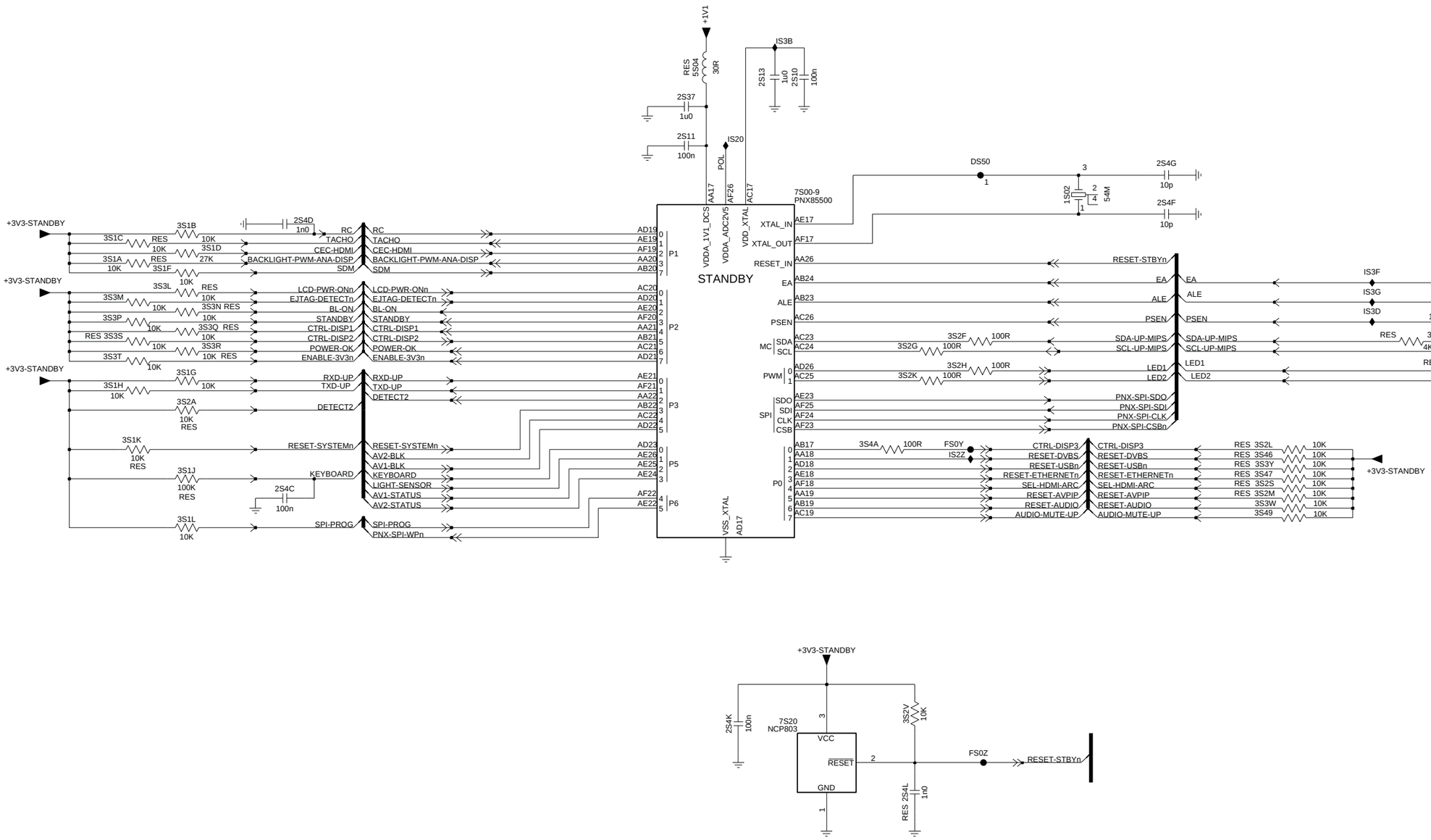


19220_039_120228.eps
120509

10-4-10 PNX 85500: Standby controller

B05B PNX 85500: Standby controller

B05B



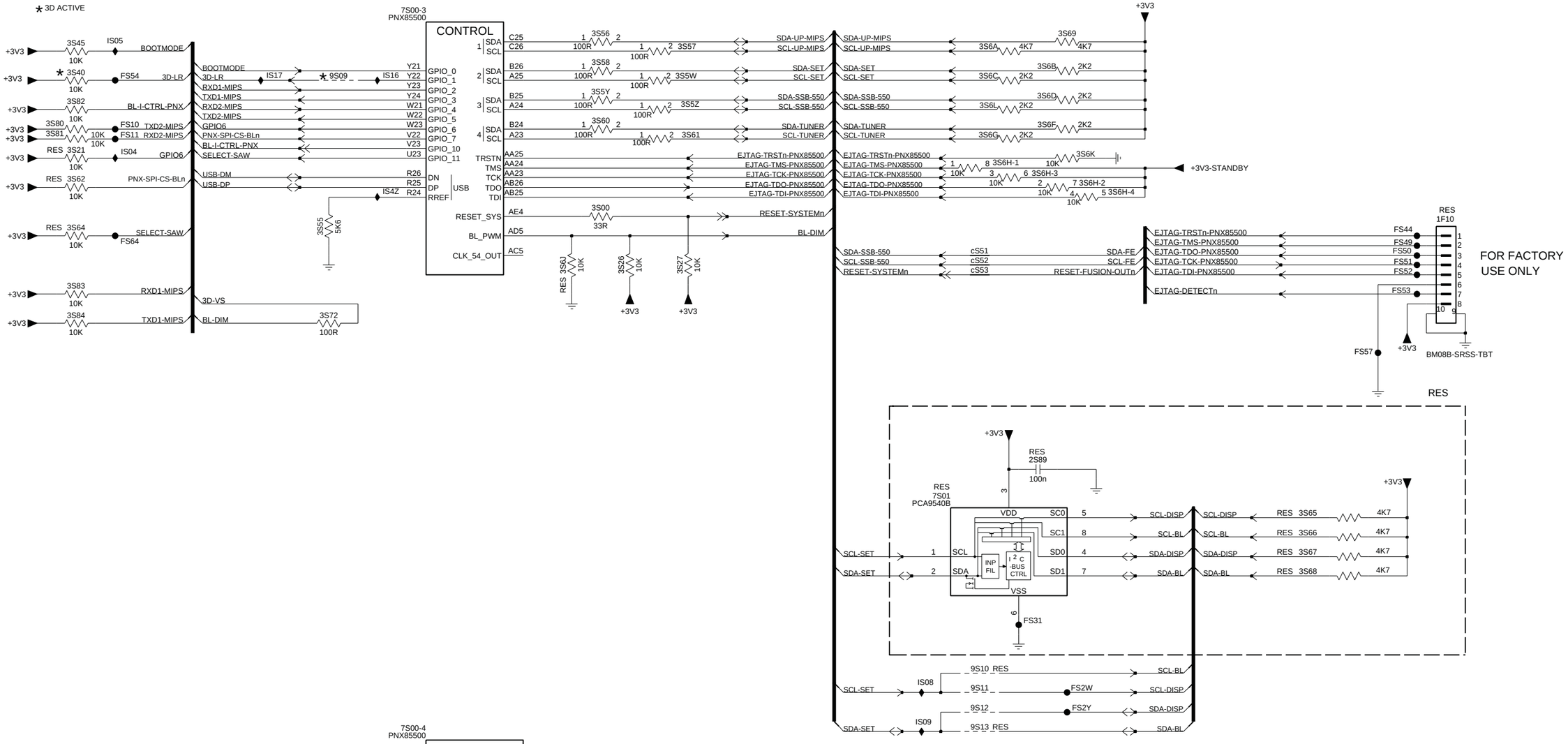
PNX 85500 Standby controller	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

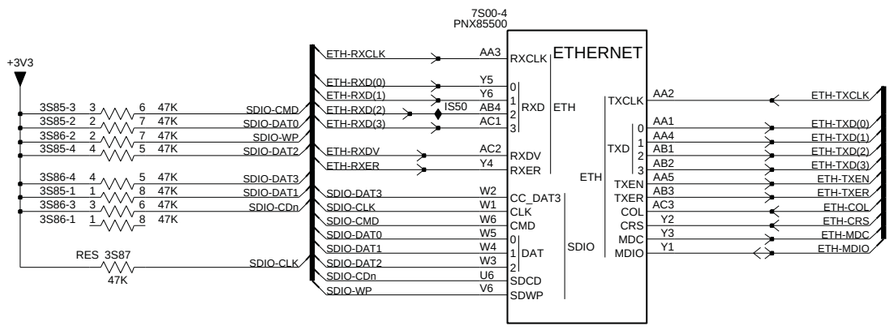
19220_040_120228.eps
120509

10-4-11 PNX 85500: MIPS

B05C PNX 85500: MIPS

B05C





PNX 85500
MIPS

3139 123 6533

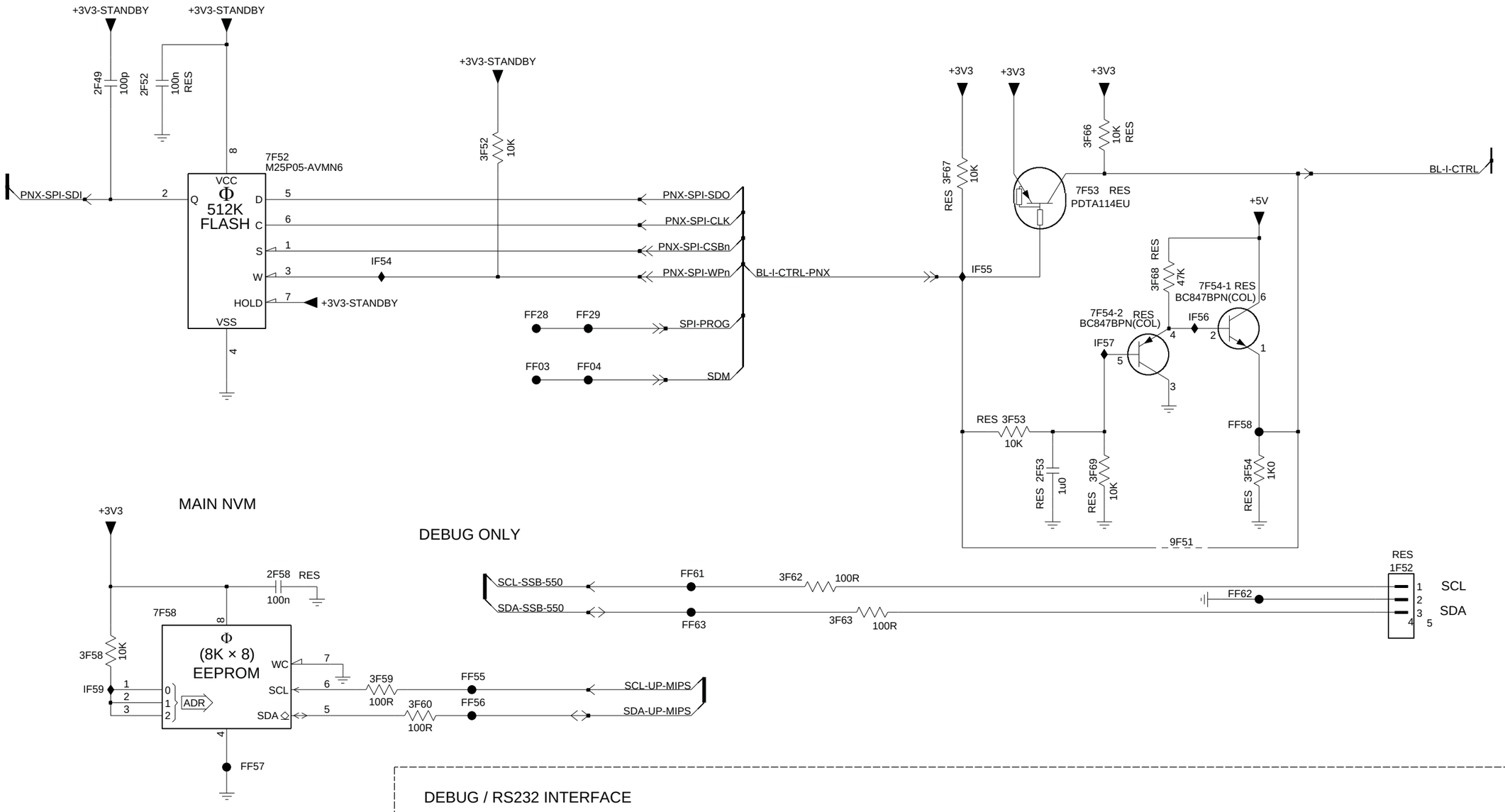
4	2012-04-23
3	2011-12-12
2	2011-05-25

19220_041_120228.eps
120509

10-4-12 PNX 85500: Control

B05D PNX 85500: Control

B05D

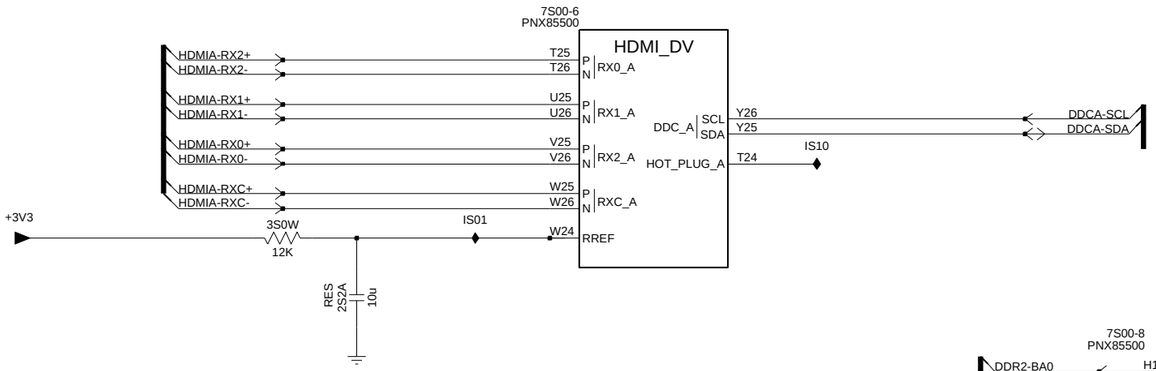


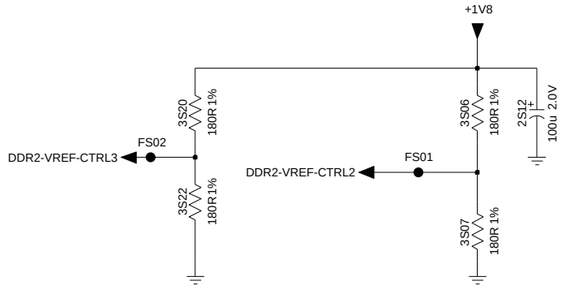
PNX 85500 Control	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

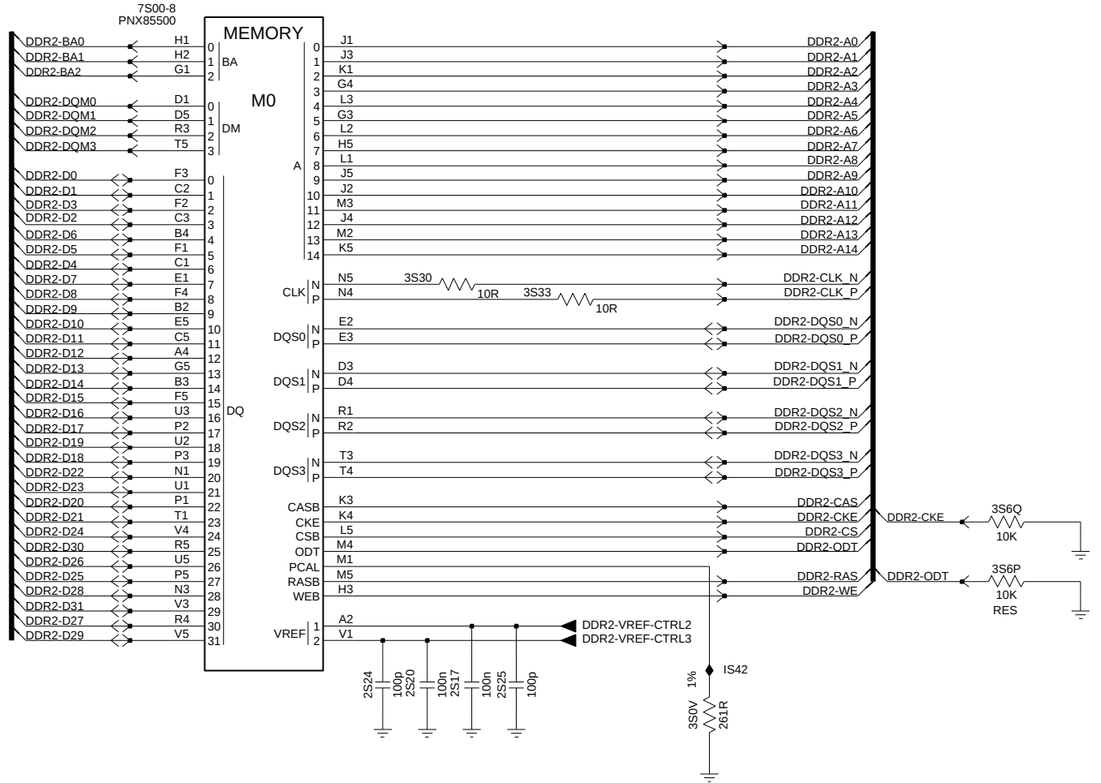
19220_042_120228.eps
120509

B05E PNX 85500: SDRAM

B05E







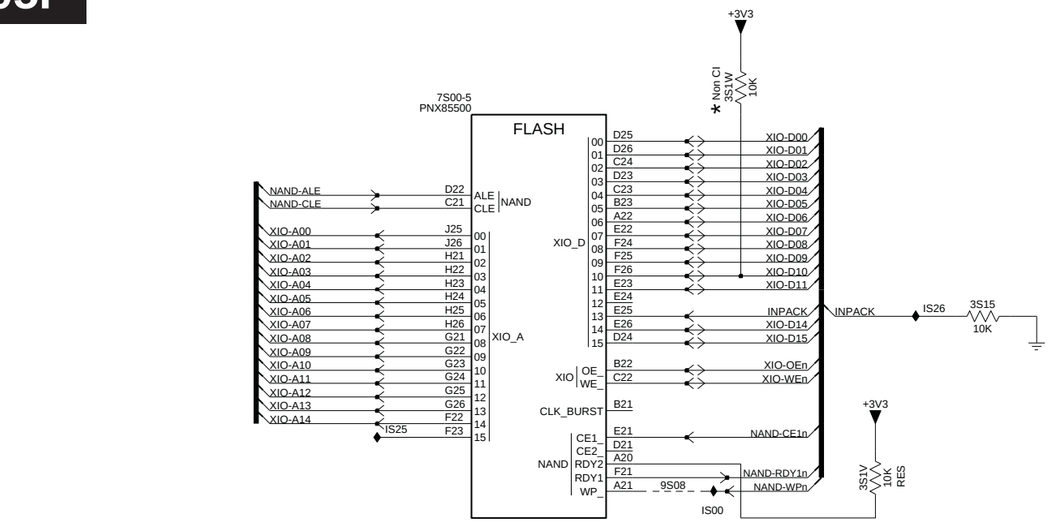
PNX 85500 SDRAM	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

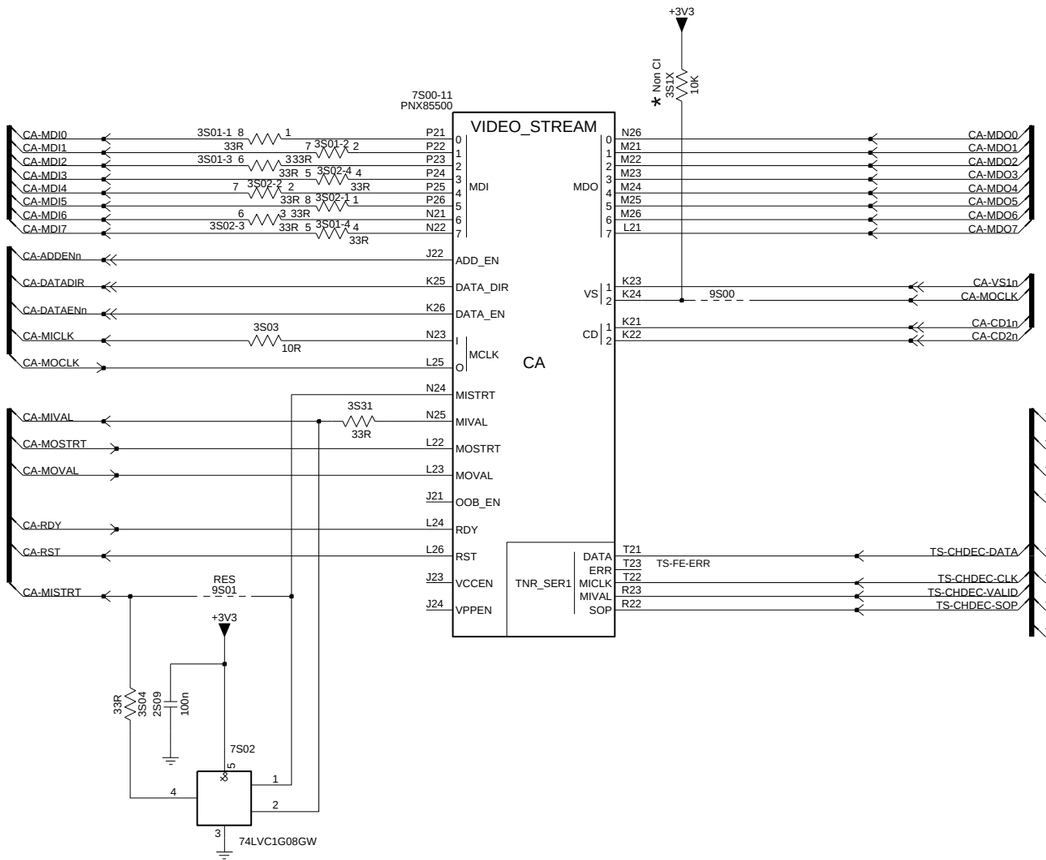
19220_043_120228.eps
120509

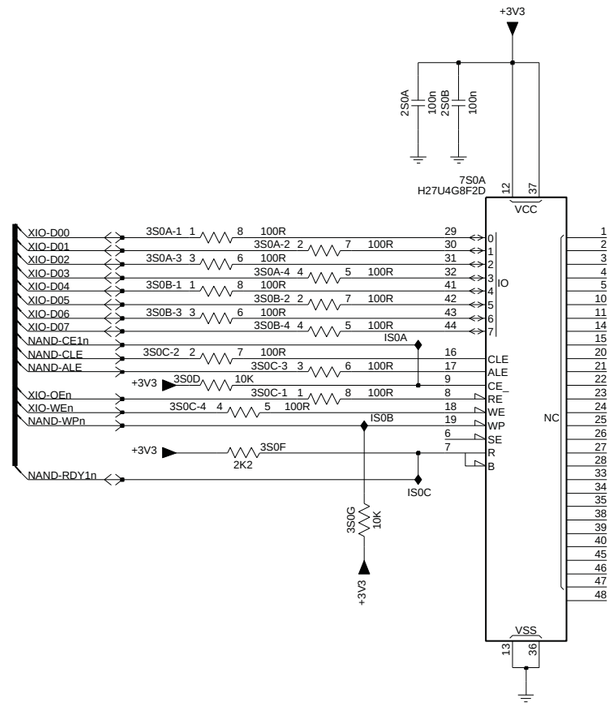
10-4-14 PNX 85500: Nandflash - conditional access

B05F PNX 85500: Nandflash - conditional access

B05F





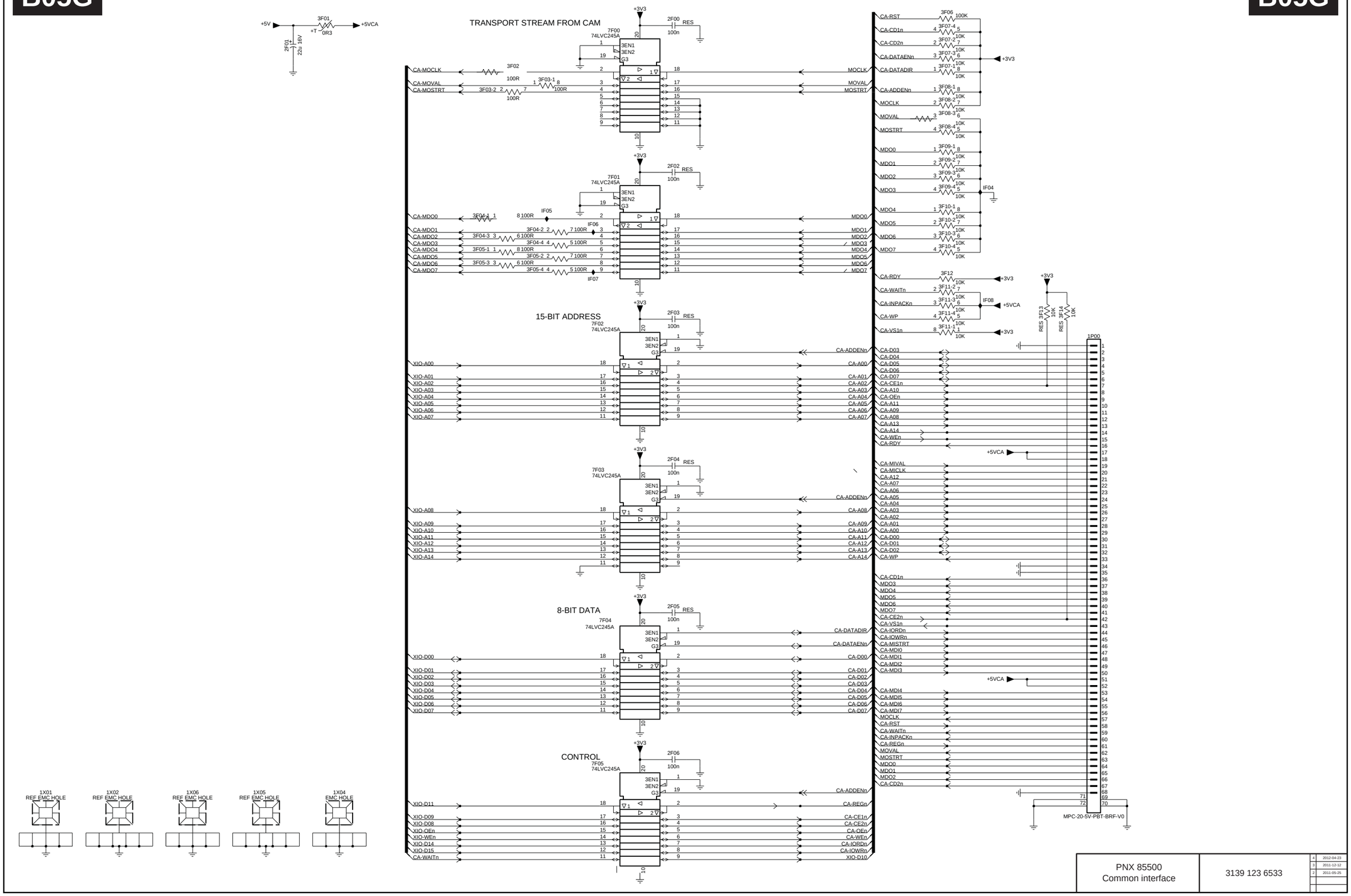


PNX 85500 Nandflash conditional access	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

19220_044_120228.eps
120509

B05G PNX 85500: Common interface

B05G

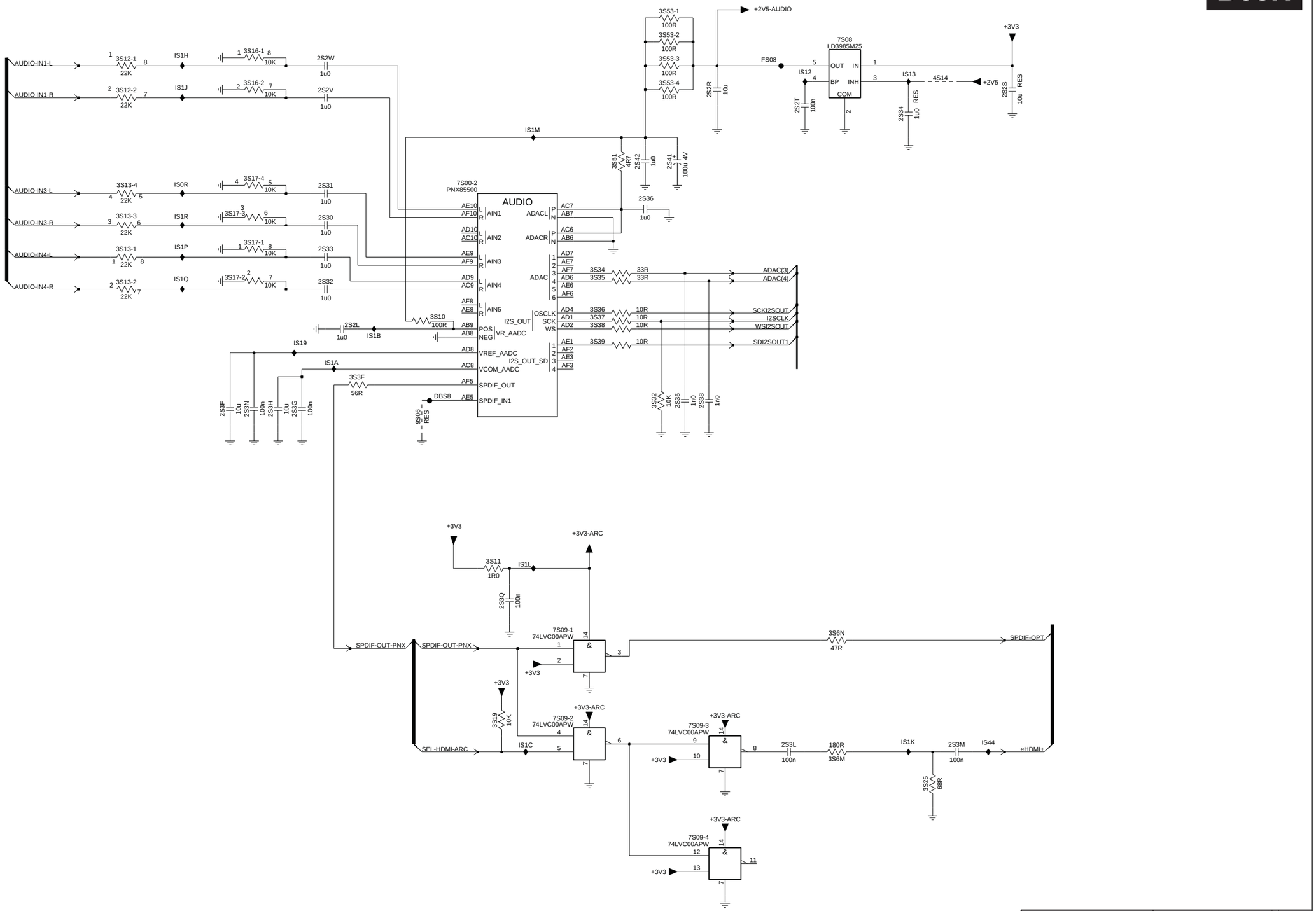


PNX 85500 Common interface	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

19220_045_120228.eps
120509

B05H PNX 85500: Audio

B05H



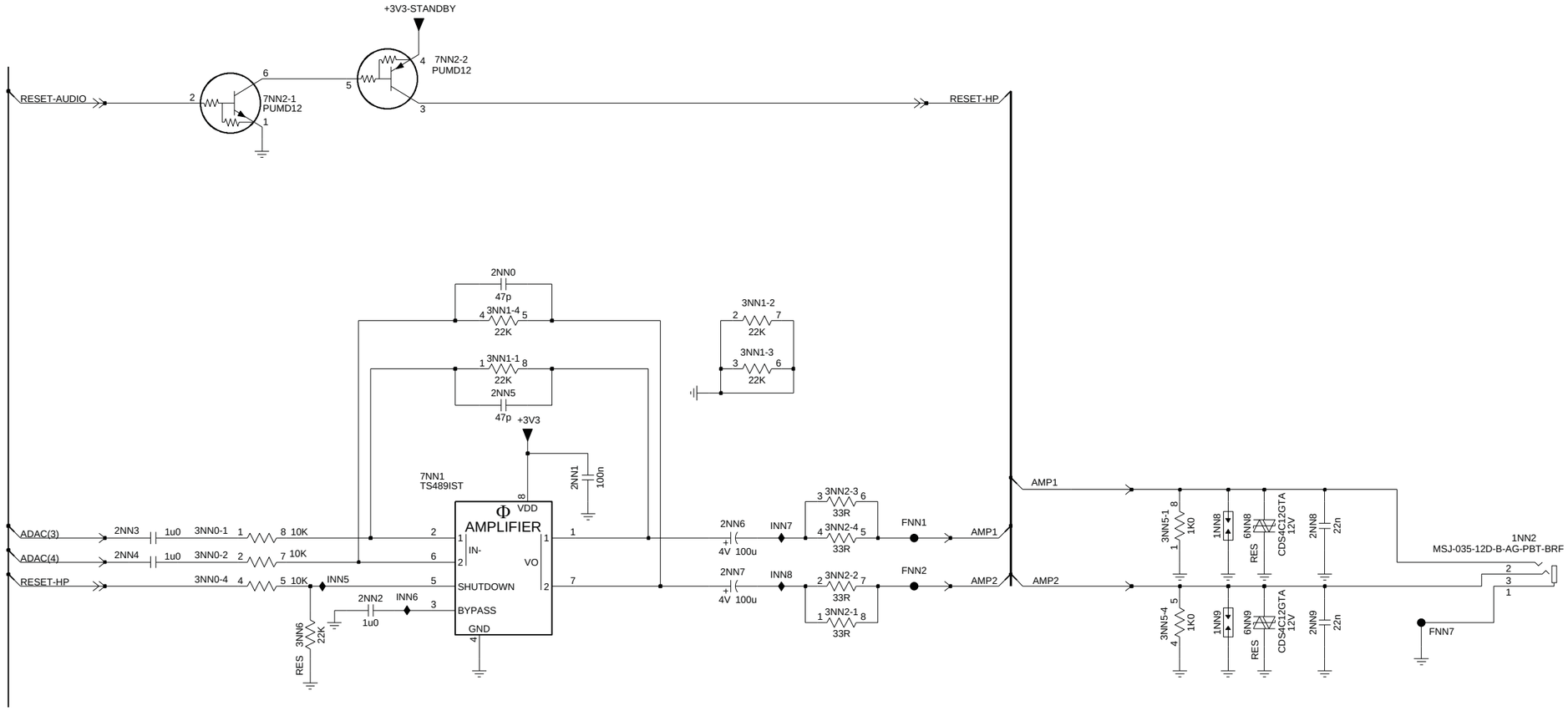
PNX 85500 Audio	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

19220_046_120228.eps
120509

10-4-17 PNX 85500: Headphone

B05I PNX 85500: Headphone

B05I

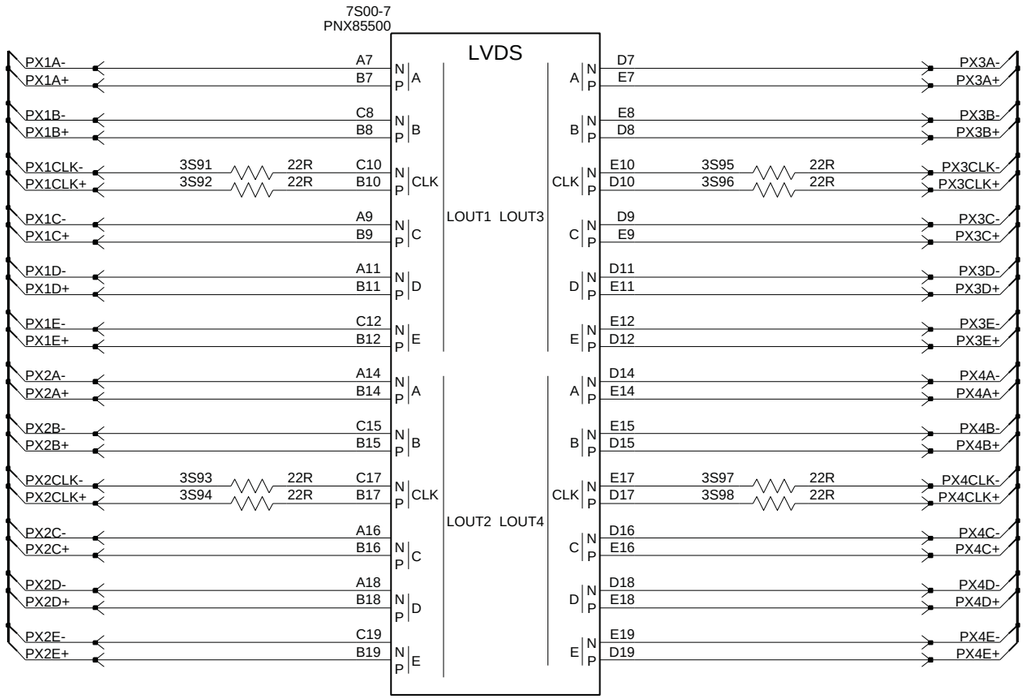


PNX 85500 Headphone	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

19220_047_120228.eps
120509

B05J PNX 85500: Video out - LVDS

B05J



PNX 85500 Video out - LVDS	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

19220_048_120228.eps
120509

10-4-19 PNX 85500: Analog video

B05K PNX 85500: Analog video

B05K

Connectivity

EU: SCART1
AP: -

EU: YPBPR1
AP: YPBPR1

EU: VGA
AP: VGA

AV1-CVBS, AV1-R, AV1-B, AV1-G
YPBPR1-SYNCIN1, AV3-Y, AV3-PR, AV3-PB
R-VGA, G-VGA, B-VGA, H-SYNC-VGA, V-SYNC-VGA, VGA-SCL-EDID, VGA-SDA-EDID

7S00-1 PNX85500 ANALOG_VIDEO

CVBS_Y1 ATV_CVBS_Y3 AV1
SYNCIN1 Y_G1 PR_R_C1 PB_B1
CVBS_Y2 SYNCIN2 Y_G2 PR_R_C2 PB_B2
R G B VGA
HSYNC_IN VSYNC
VGA_EDID
CVBS_Y7
CVBS1_OUT CVBS2_OUT
RESREF CURREF
REF
IF_AGC RF_AGC
TUNER
AGND

Y-SVHS, C-SVHS, CVBS-MON-OUT1, IS4V, IS4W, SOC-IF-AGC, SOC-IF-P, SOC-IF-N

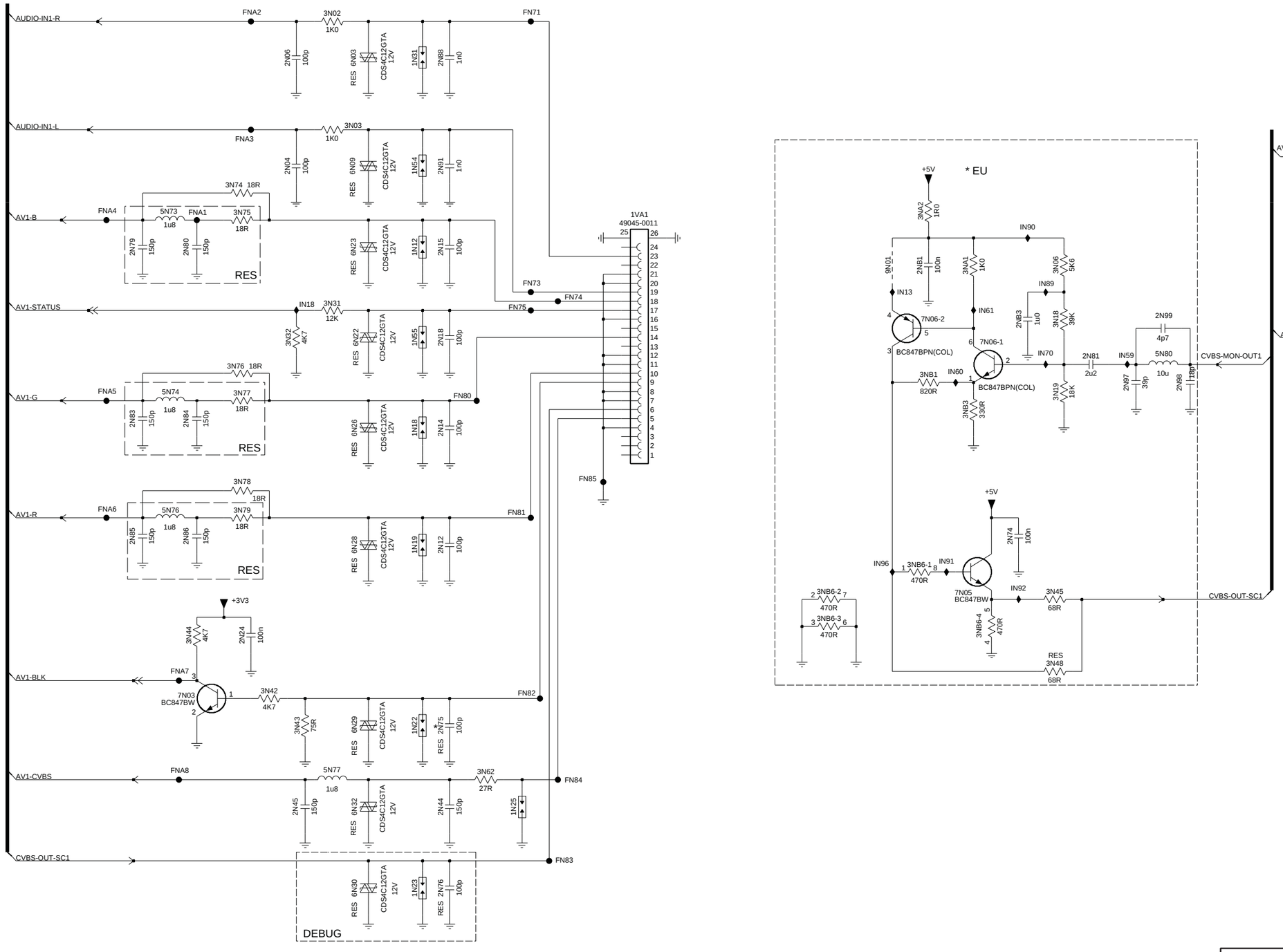
PNX 85500 Analog video	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

19220_049_120228.eps
120509

10-4-20 PNX 85500: Analogue externals A

B05L PNX 85500: Analogue externals A

B05L



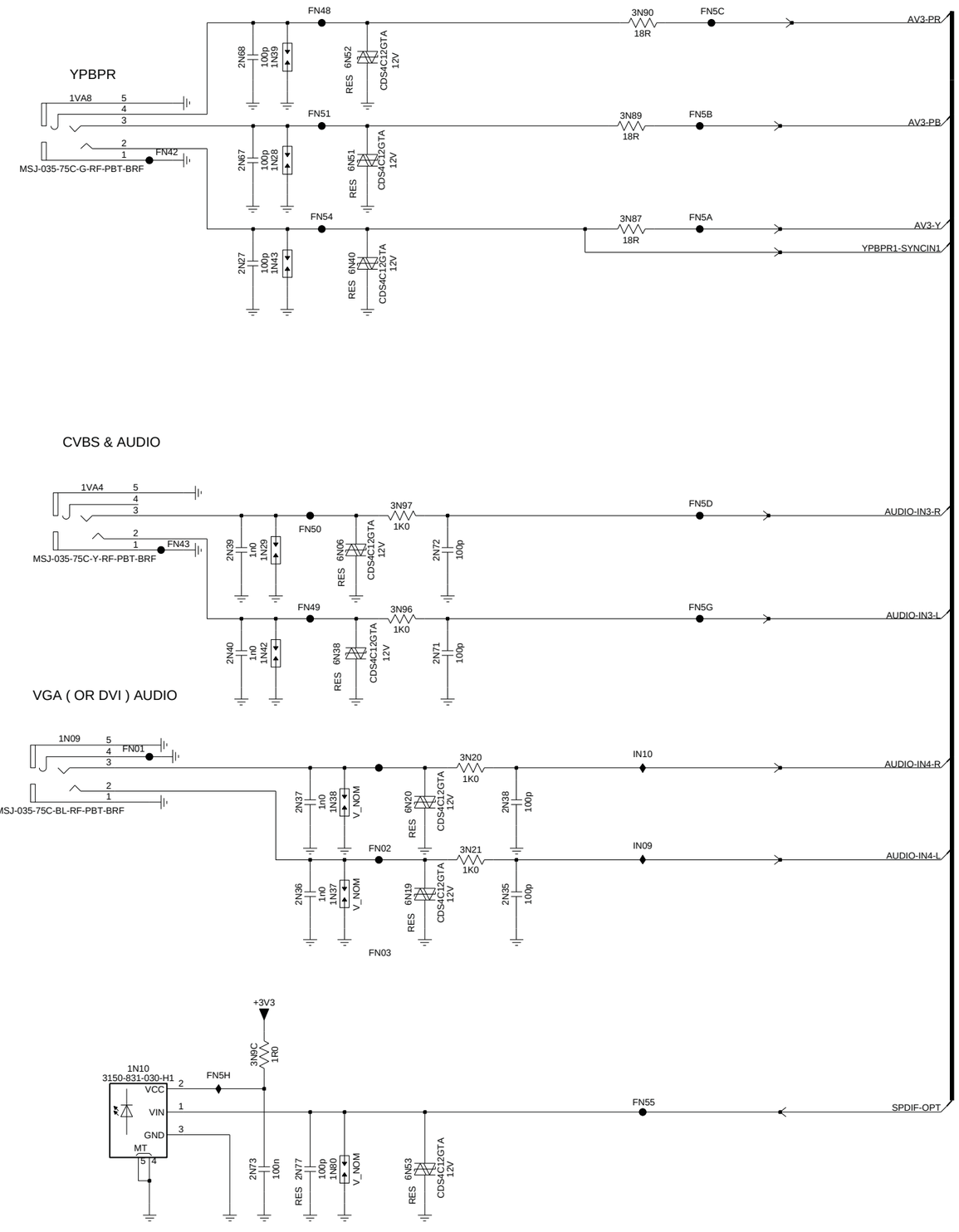
PNX 85500 Analogue externals A	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

19220_050_120228.eps
120509

10-4-21 PNX 85500: Analogue externals B

B05M PNX 85500: Analogue externals B

B05M

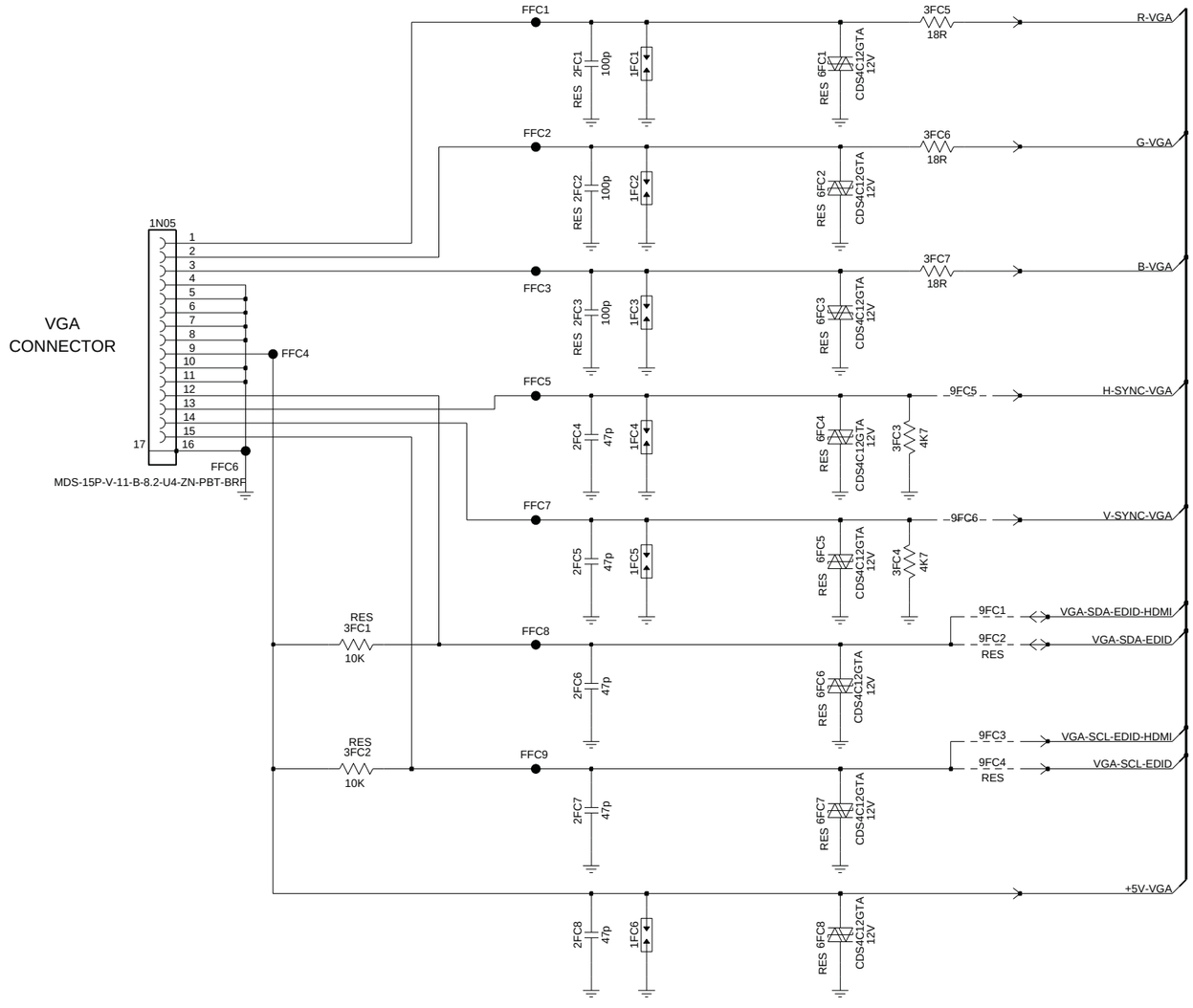


PNX 85500 Analogue externals B	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

19220_051_120228.eps
120509

B05N PNX 85500: VGA

B05N

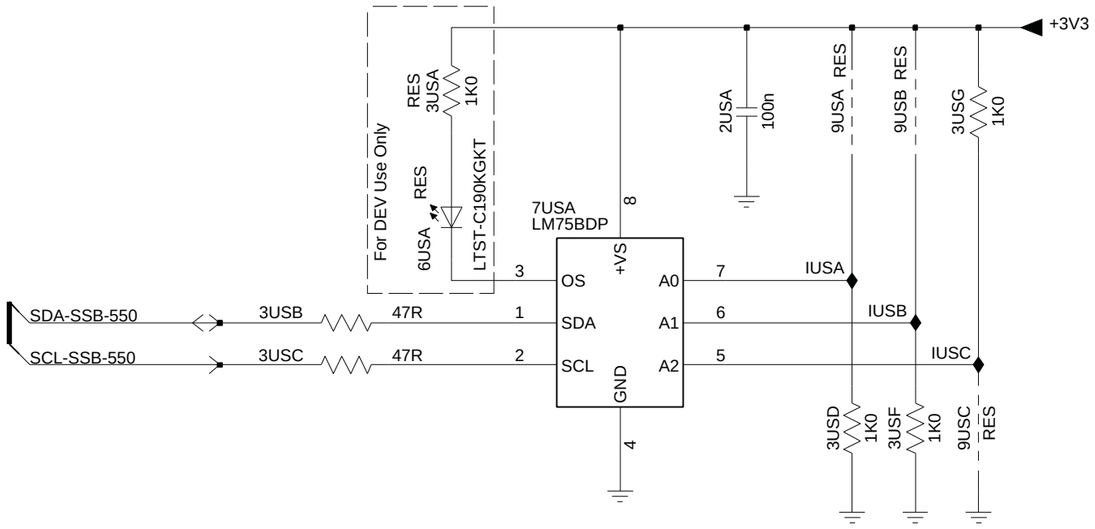


PNX 85500 VGA	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

19220_052_120228.eps
120509

B05O PNX 85500: Temperature sensor

B05O

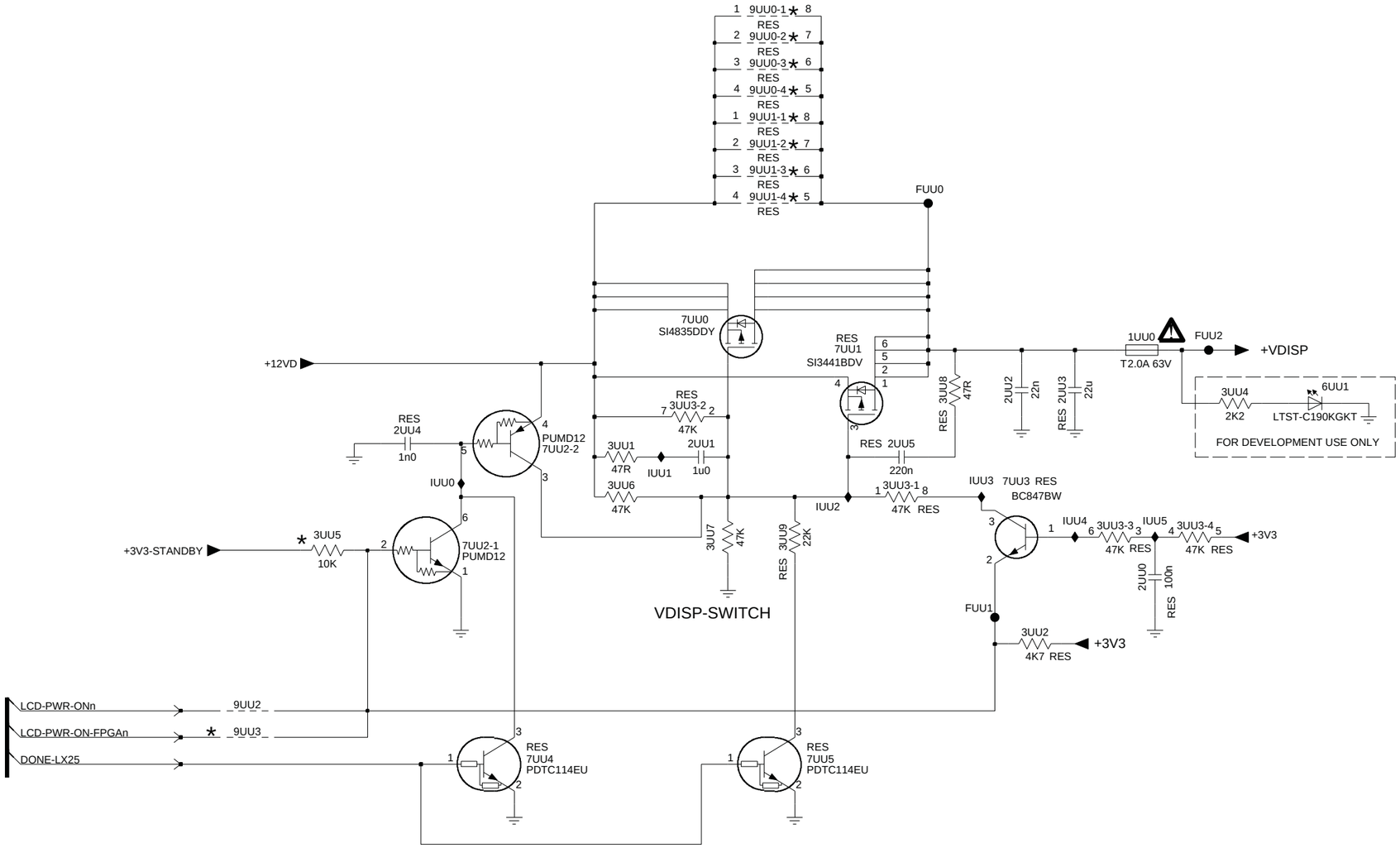


PNX 85500 Temperature sensor	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

19220_053_120228.eps
120509

B05P PNX 85500: Vdisp-switch

B05P



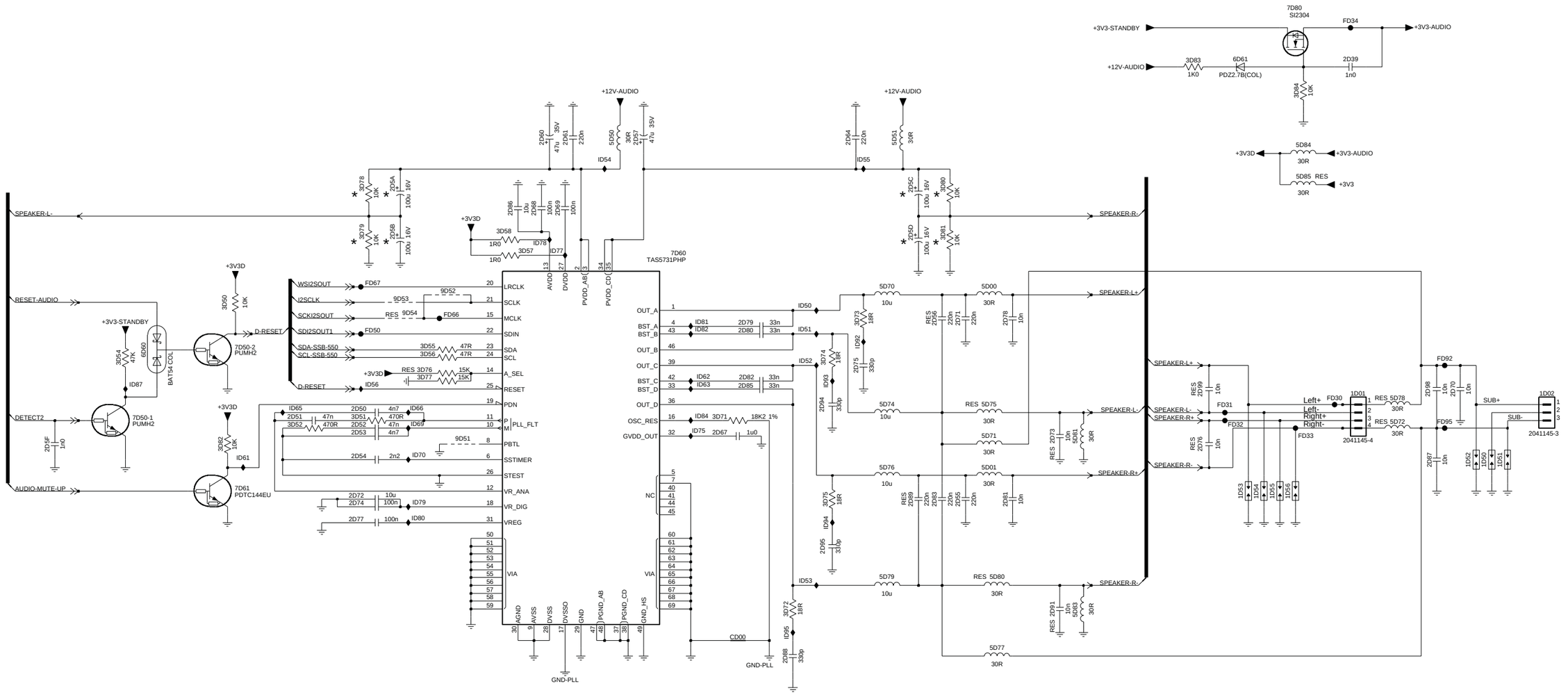
PNX 85500 Vdisp-switch	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

19220_054_120228.eps
120509

10-4-25 Class-D amplifier

B06A Class-D amplifier

B06A



	+12V-AUDIO (5000 & 5500 series)	+24V-AUDIO (4500 series)
2D57	100uF 16V (2022 031 00538)	47uF 35V (2020 031 00753)
2D60	100uF 16V (2022 031 00538)	47uF 35V (2020 031 00753)
3D83	1K0 (3198 031 01020)	6K8 (3198 031 06820)
6D61	BZX2V7 (3198 020 52780)	BZX5V6 (3198 020 55680)

Speaker Configuration	1D02	2D70	2D87	2D98	2D55	2D71	2D83	5D71	5D77	2D56	2D73	2D76	2D89	2D91	2D99	5D75	5D80	5D72	5D78	5D81	5D83	2D5A	2D5B	2D5C	2D5D	3D78	3D79	3D81	3D81
Active 2.1 (with Virtual Ground)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
★ Active 2.1 (E-cap in speaker)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No	No	No	No	No	Yes	Yes	No	No	No	No	No	No	No	No
Passive 2.1	Yes	Yes	Yes	Yes	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No	No	No	No	No
2.0	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No	No

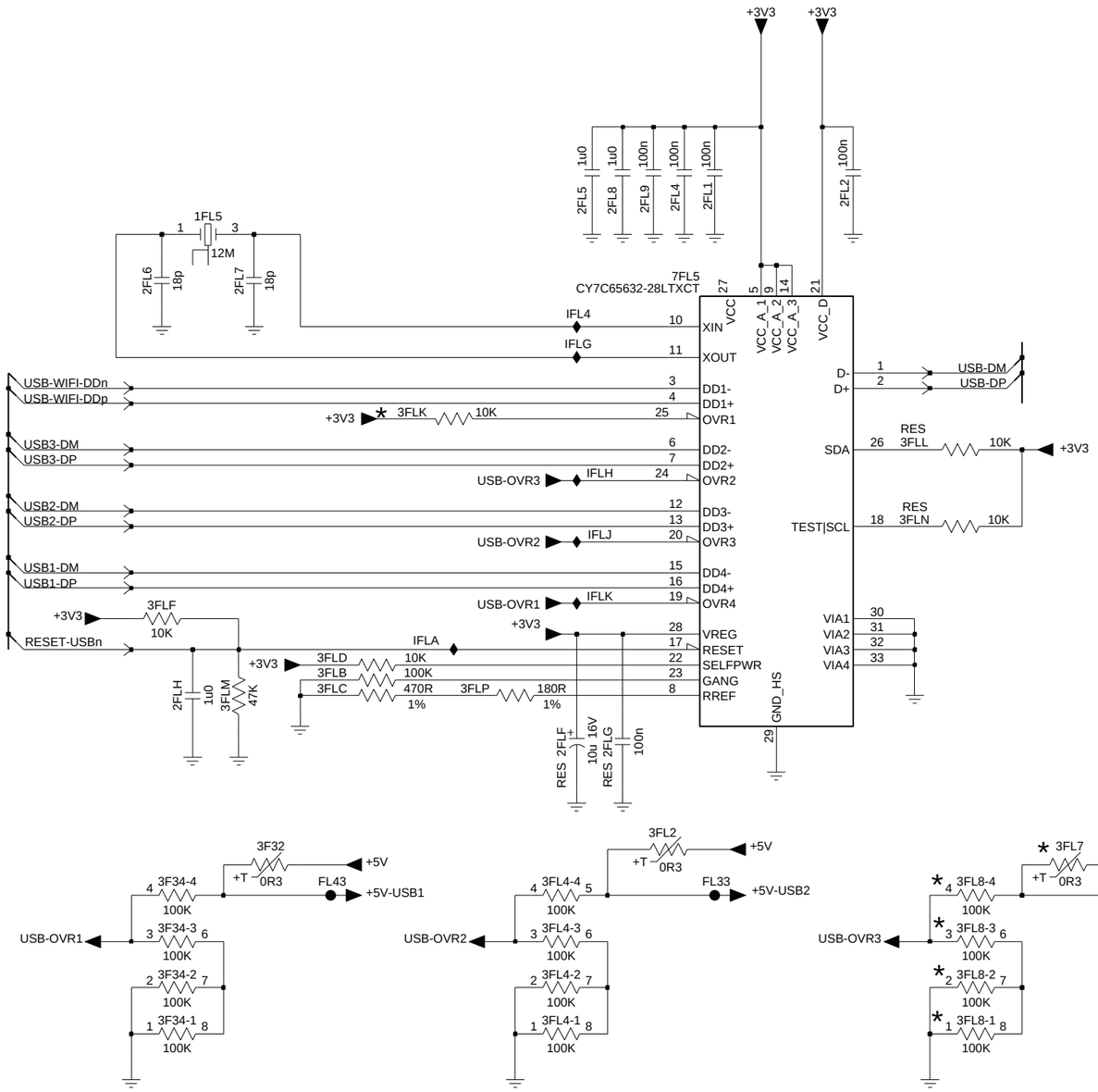
★ Current Configuration

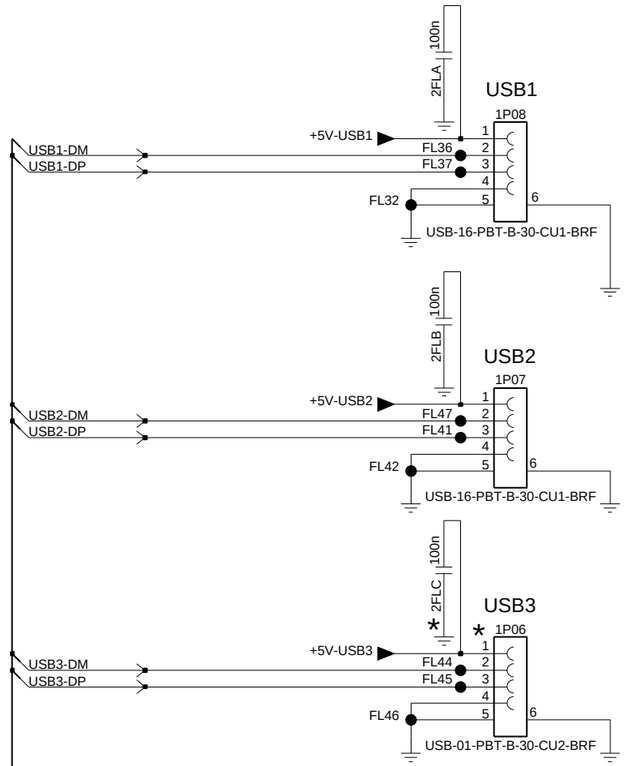
Class-D amplifier	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

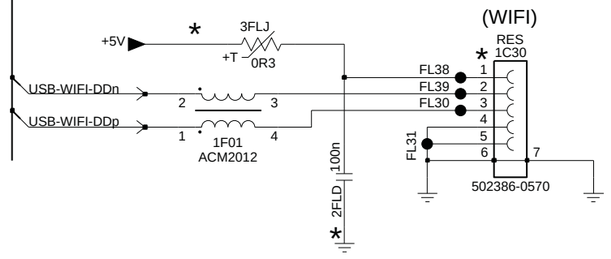
19220_055_120228.eps
120509

10-4-26 USB hub

B06B USB hub







* ONLY FOR 6000

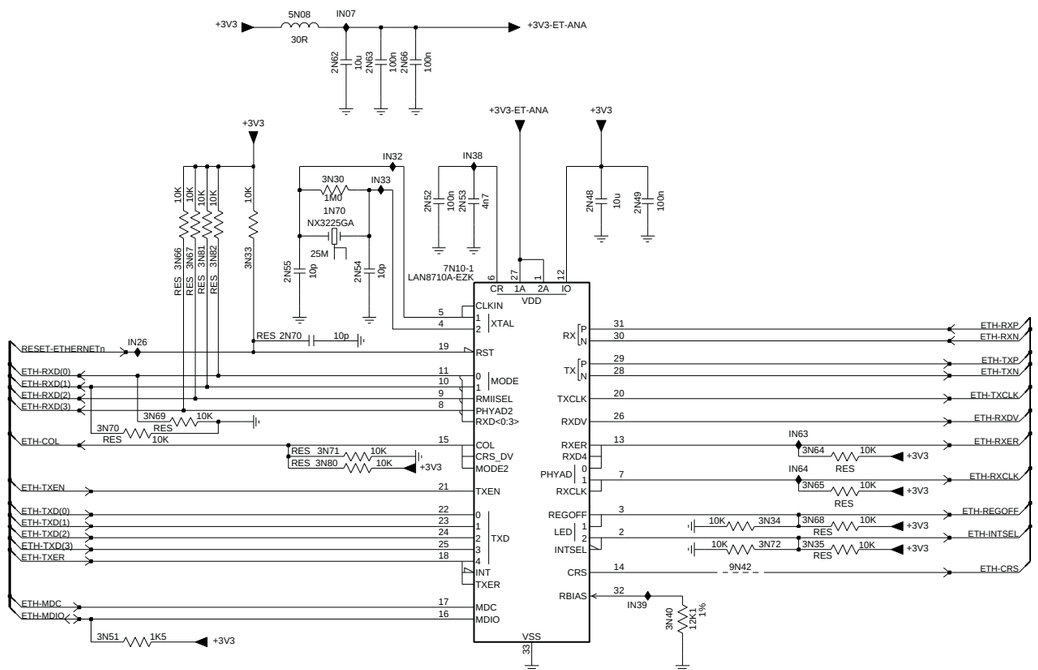
	7FL5
5000 2 × USB	CY7C65634
6000 3 × USB + WIFI	CY7C65632

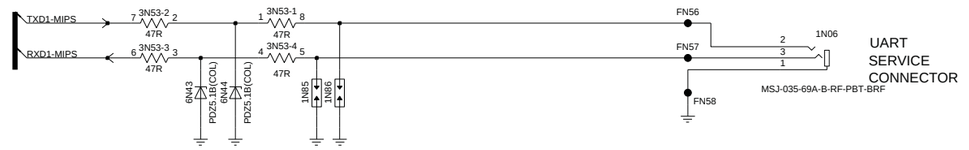
USB hub	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

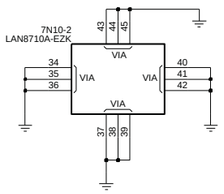
19220_056_120228.eps
120509

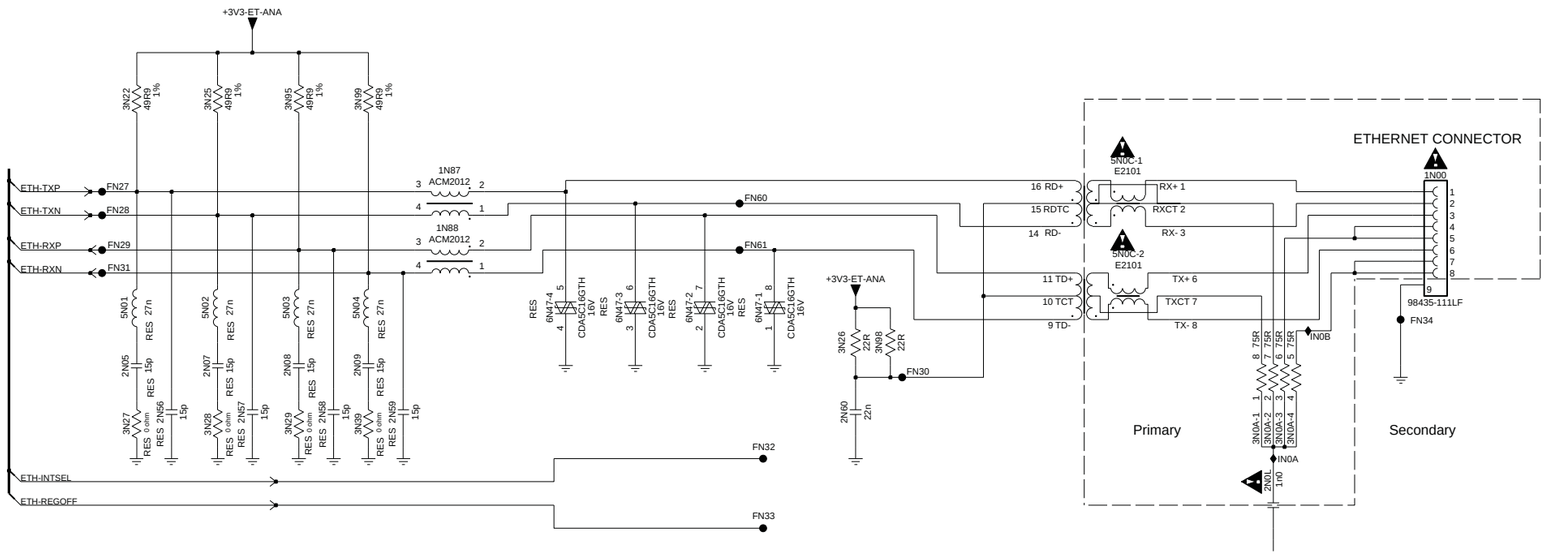
B06C Ethernet & service

B06C









CONFIGURATION RESISTOR SETTINGS

Resistor	POP	EMPTY
3N64 (RES)	PHYADD(0) = 1	PHYADD(0) = 0
3N65 (RES)	PHYADD(1) = 1	PHYADD(1) = 0
3N66 (RES)	PHYADD(2) = 1	PHYADD(2) = 0
3N67 (RES)	RMII mode selected	MII mode selected
3N68 (RES)	Internal 1.2V reg. disabled	Internal 1.2V reg. enabled
3N69 (RES)	MODE(0) = 0	MODE(0) = 1
3N70 (RES)	MODE(1) = 0	MODE(1) = 1
3N71 (RES)	MODE(2) = 0	MODE(2) = 1
3N72	INTERRUPT FUNCTION DISABLED ON nINT/TXER/TXD4 SIGNAL	INTERRUPT FUNCTION ENABLED ON nINT/TXER/TXD4 SIGNAL

Ethernet & service	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

19220_057_120228.eps
120509

B06D HDMI

B06D

I2C Address
SII9187B = 0xB2

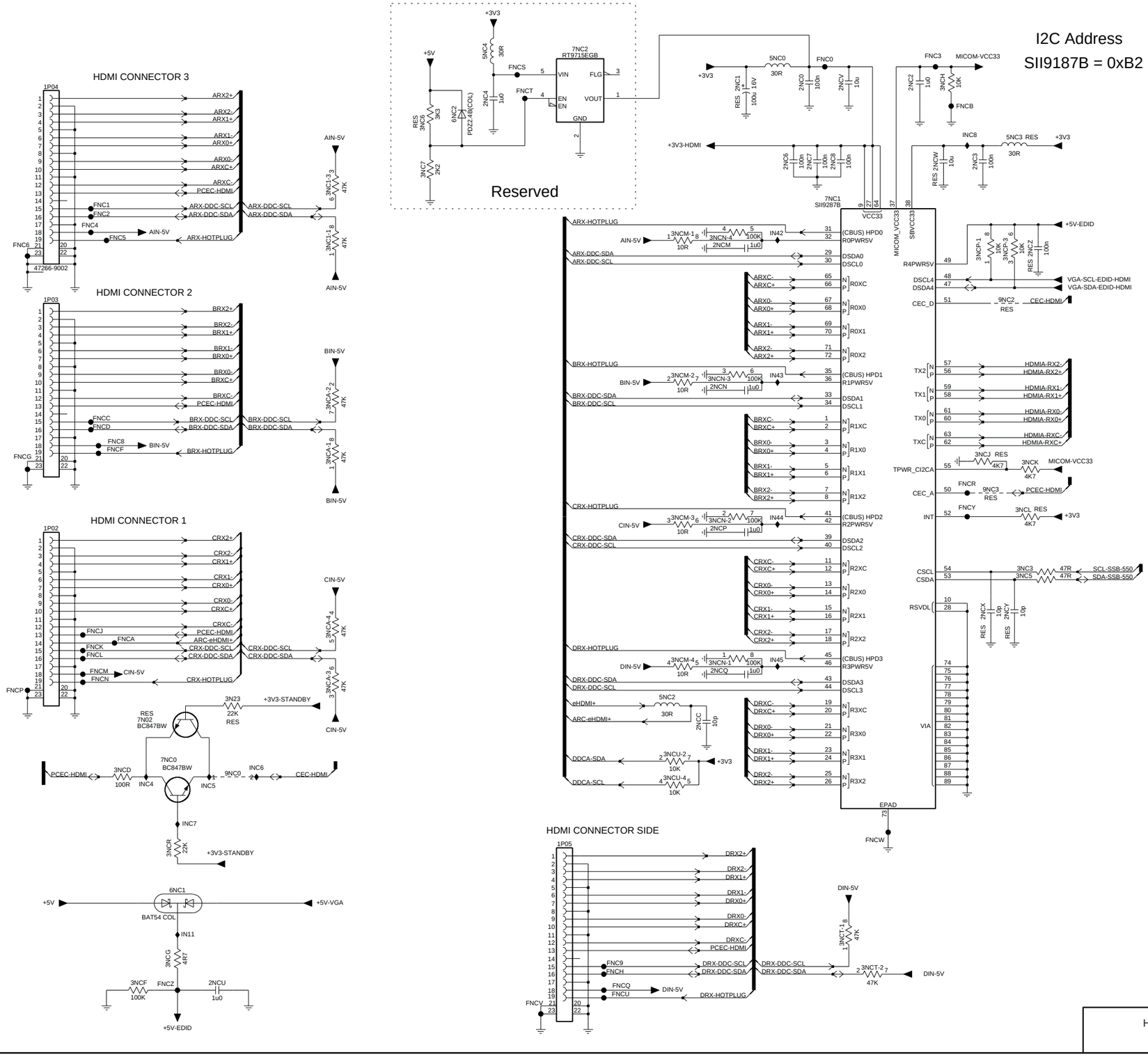
HDMI CONNECTOR 3

HDMI CONNECTOR 2

HDMI CONNECTOR 1

Reserved

HDMI CONNECTOR SIDE



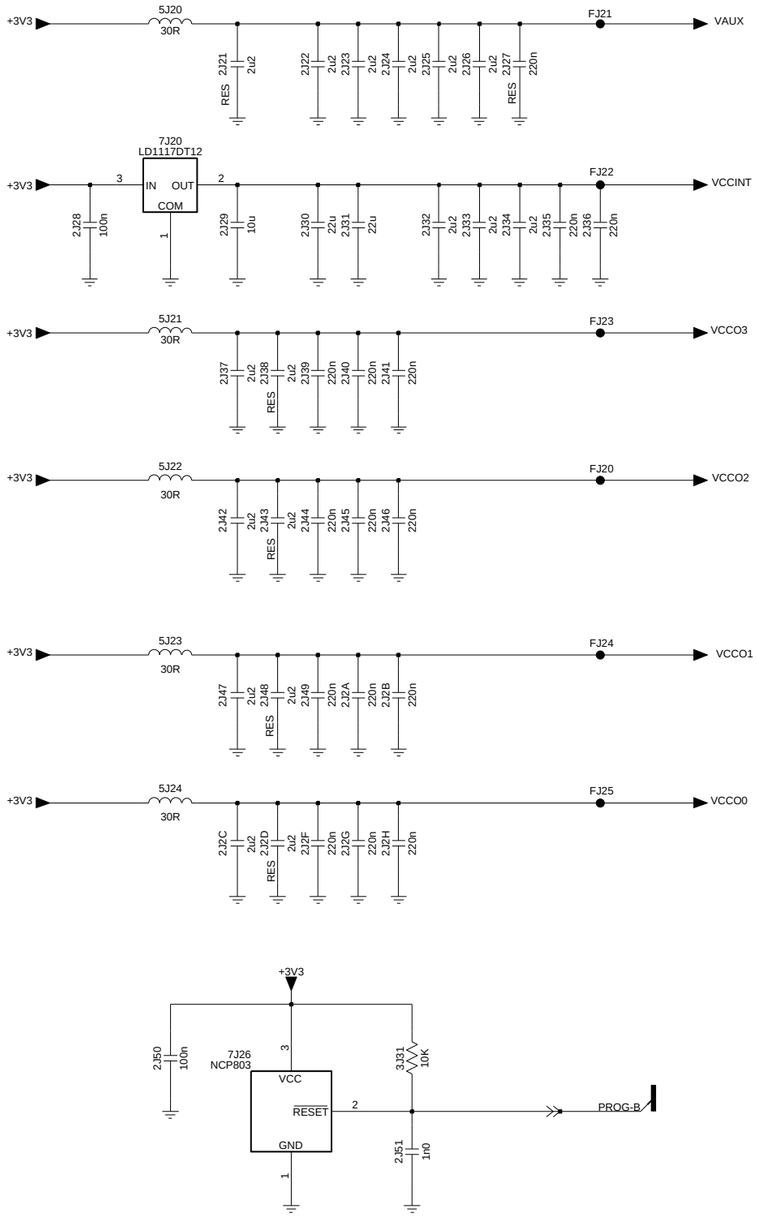
HDMI	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

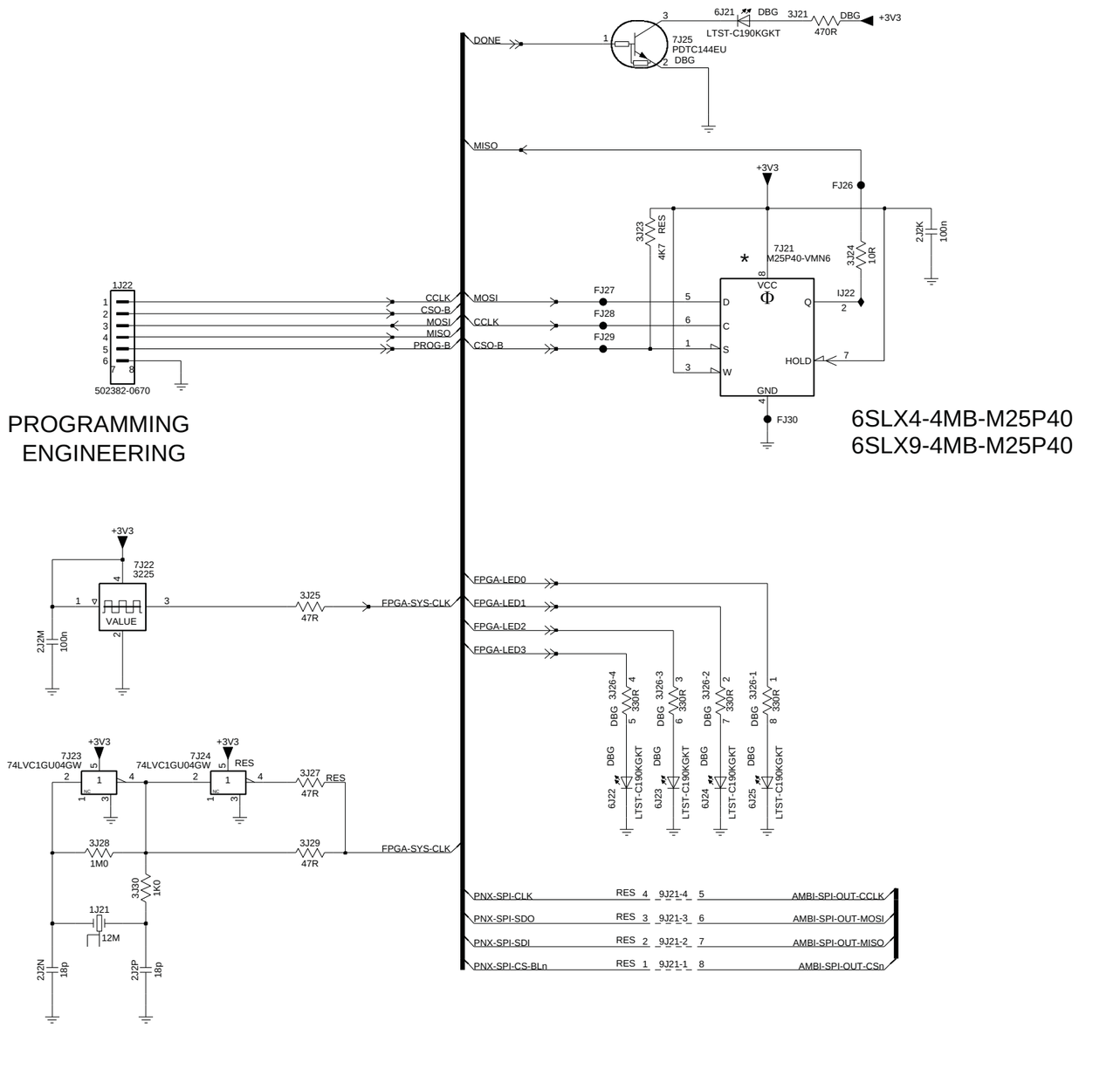
19220_058_120228.eps
120509

10-4-29 FPGA, power & control

B07A FPGA, power & control

B07A





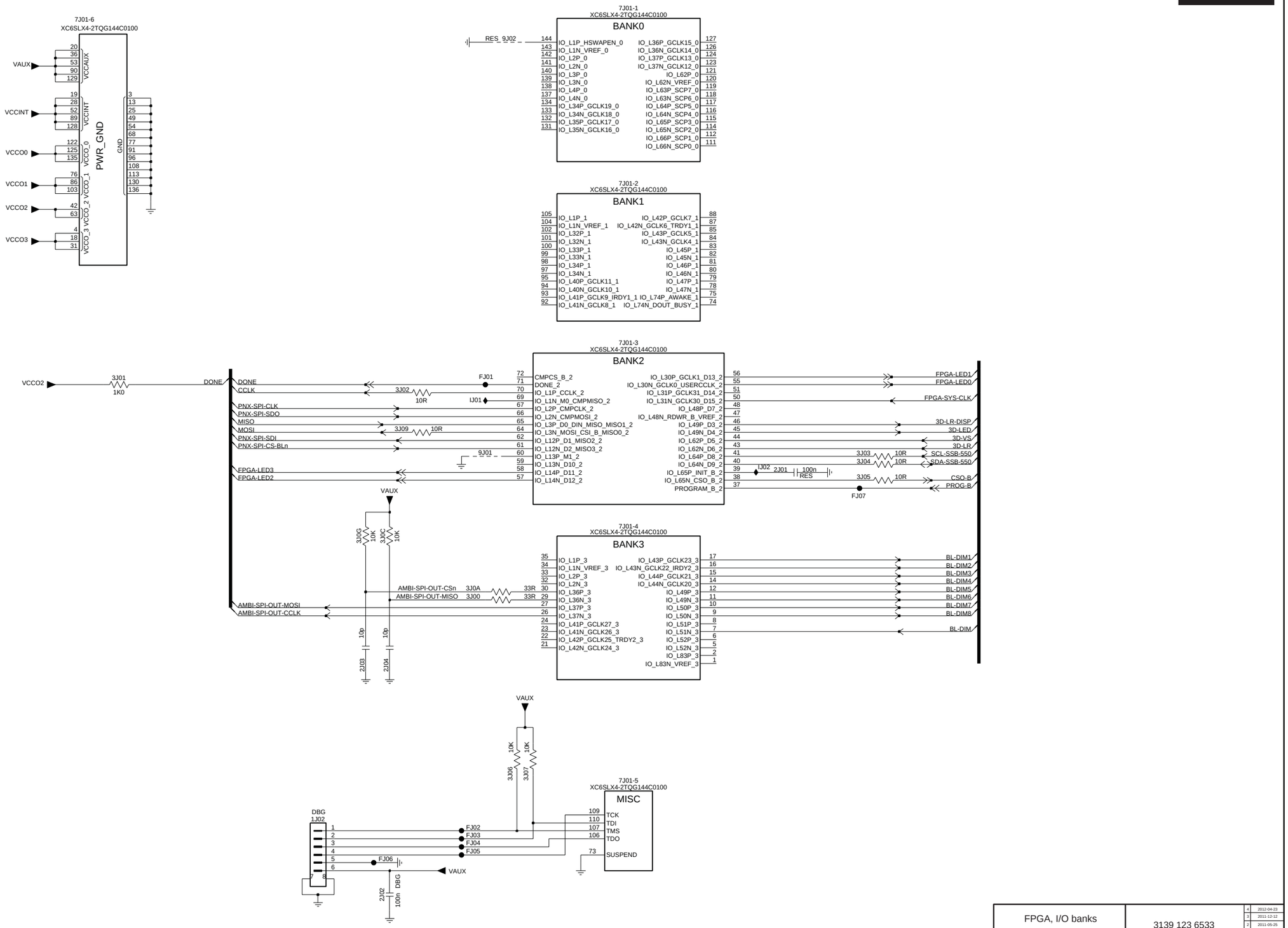
FPGA, power & control	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

19220_059_120228.eps
120509

10-4-30 FPGA, I/O banks

B07B FPGA, I/O banks

B07B



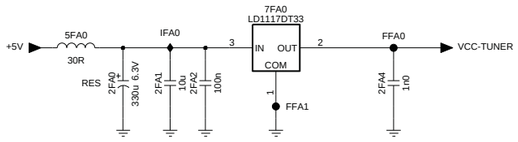
FPGA, I/O banks	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

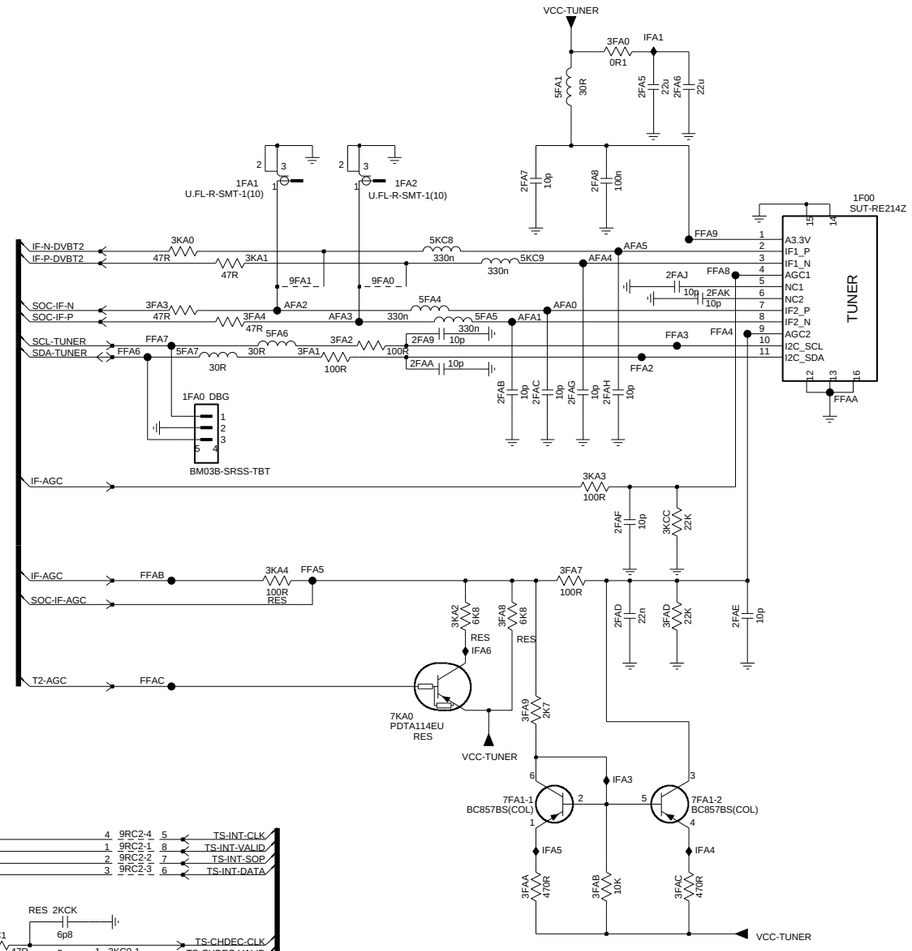
19220_060_120228.eps
120509

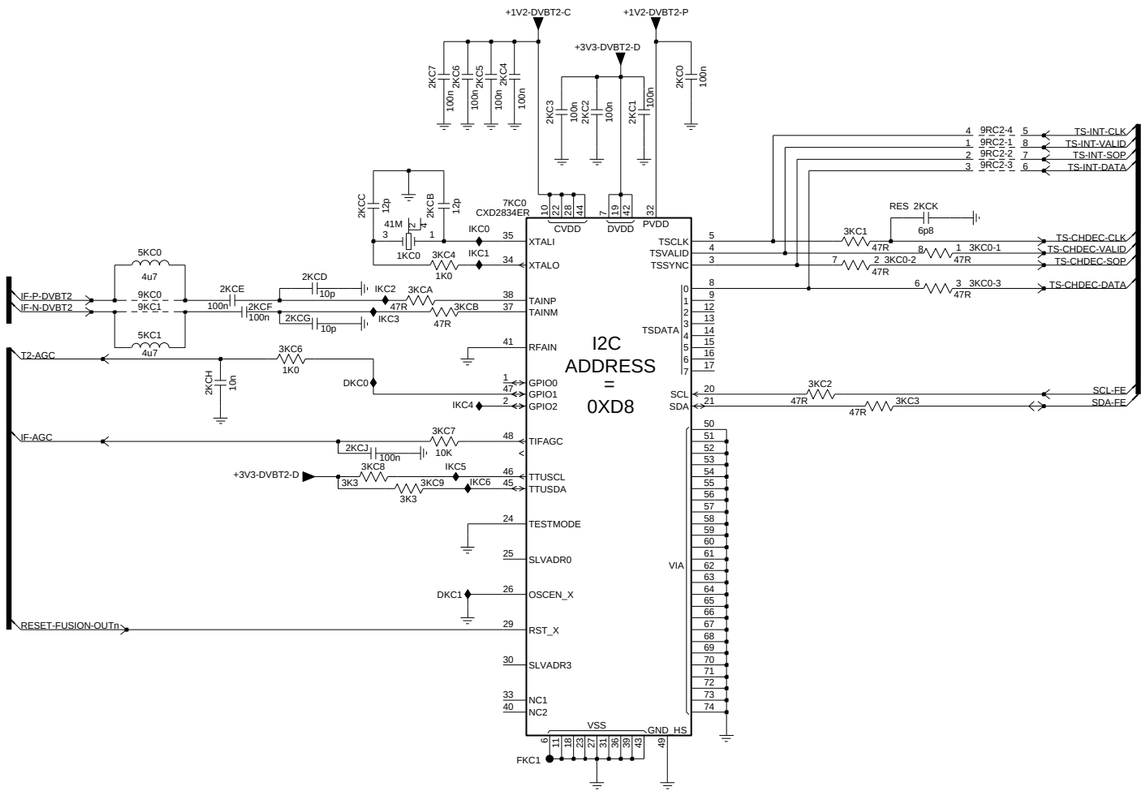
10-4-31 Tuner, channel decoder

B08A Tuner, channel decoder

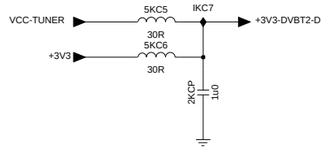
B08A

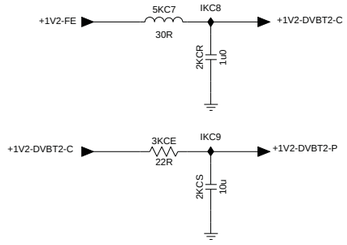






I2C ADDRESS = 0XD8





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

Tuner, channel decoder	3139 123 6533	4	2012-04-23
		3	2011-12-12
		2	2011-05-25

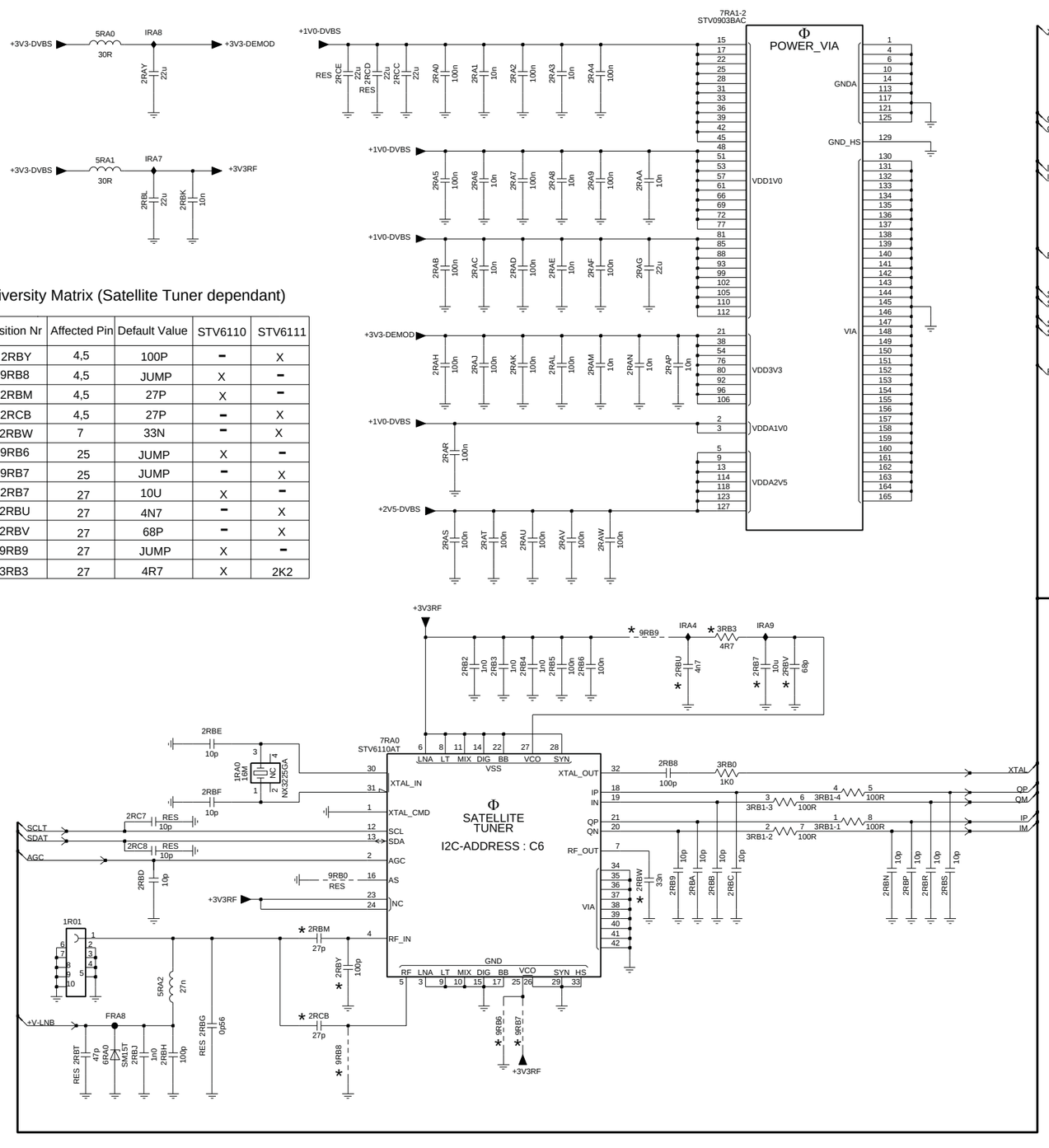
19220_061_120228.eps
120509

B08B DVBS, FE

B08B

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	-
2RCB	4,5	27P	-	X
2RBW	7	33N	-	X
9RB6	25	JUMP	X	-
9RB7	25	JUMP	-	X
2RB7	27	10U	X	-
2RBU	27	4N7	-	X
2RBV	27	68P	-	X
9RB9	27	JUMP	X	-
3RB3	27	4R7	X	2K2



DVBS, FE	3139 123 6533	4	2012-04-23
		3	2011-12-12
		2	2011-05-25

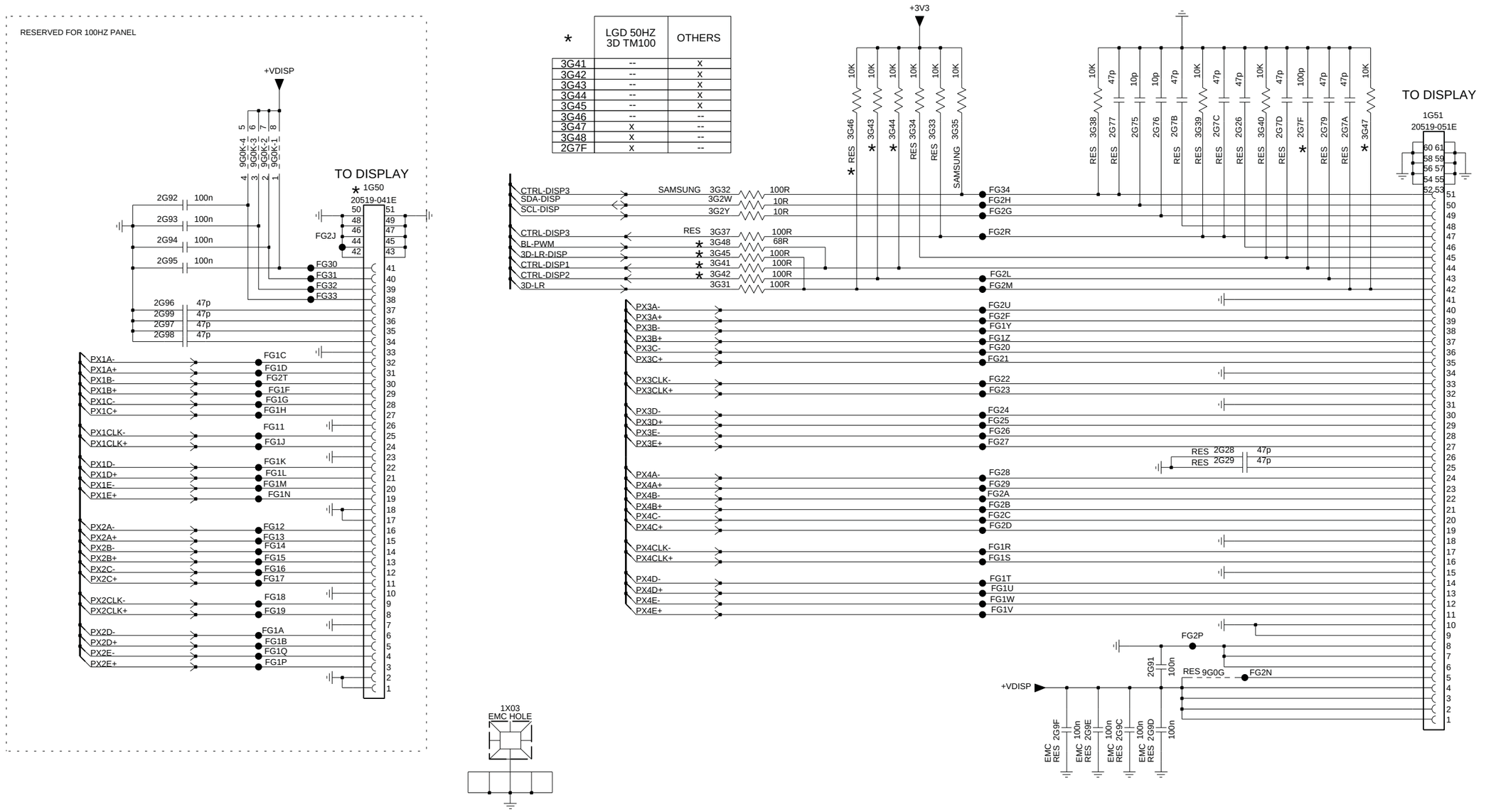
19220_062_120228.eps
120509

B09A Video out - LVDS

B09A

RESERVED FOR 100HZ PANEL

*	LGD 50HZ 3D TM100	OTHERS
3G41	--	X
3G42	--	X
3G43	--	X
3G44	--	X
3G45	--	X
3G46	--	--
3G47	X	--
3G48	X	--
2G7F	X	--

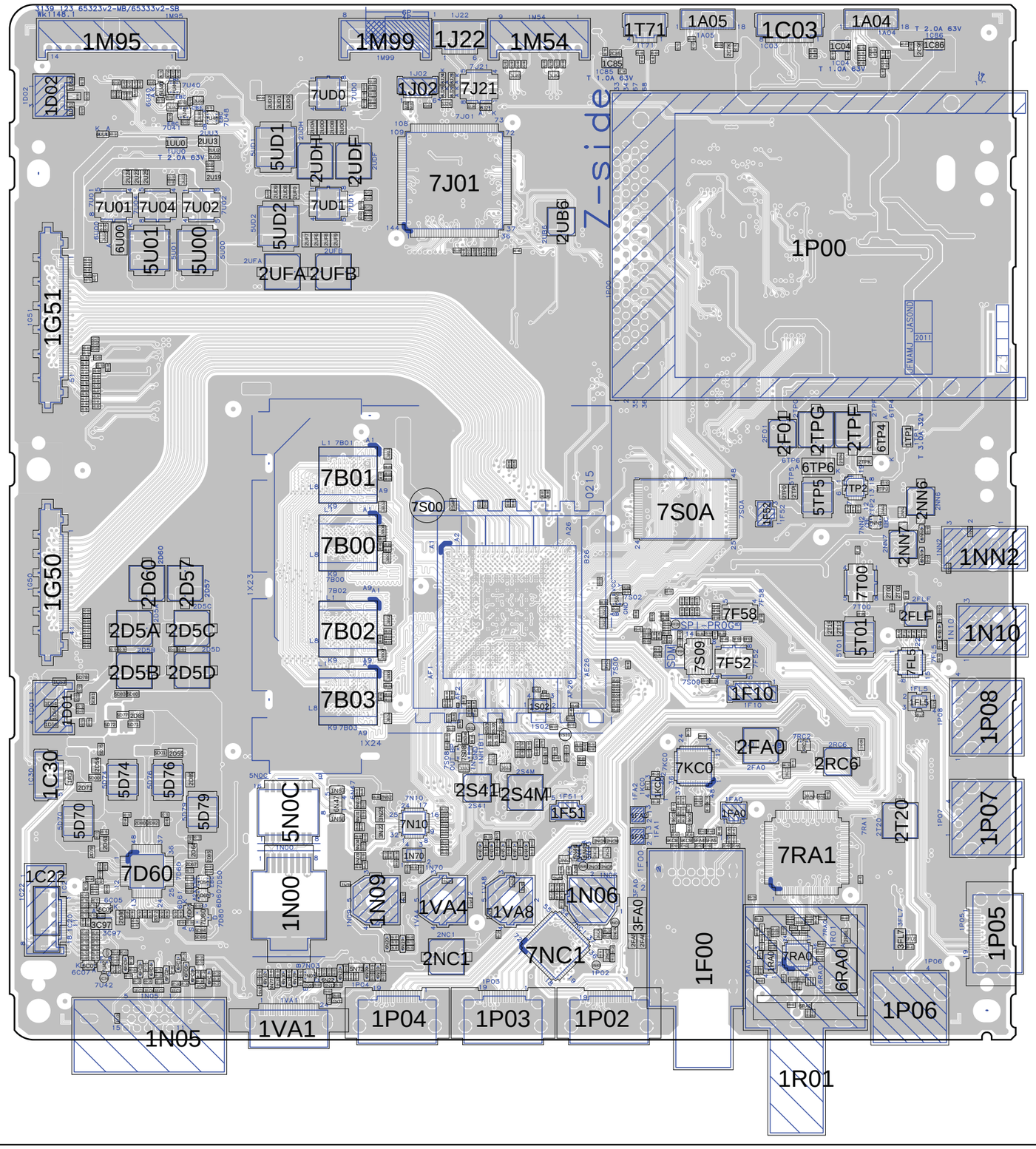


Video out - LVDS	3139 123 6533

4	2012-04-23
3	2011-12-12
2	2011-05-25

19220_063_120228.eps
120509

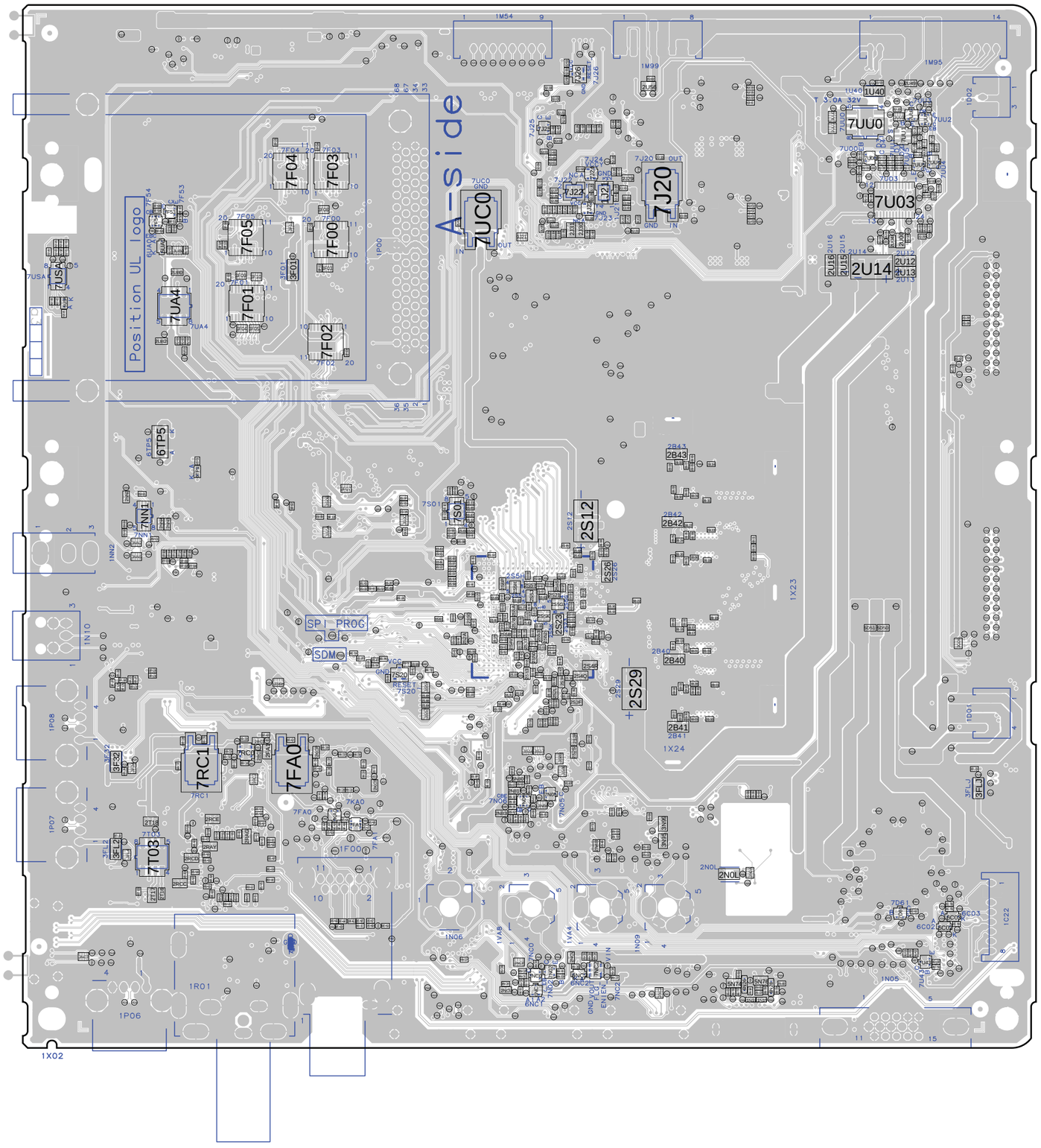
10-4-34 Layout top 3139 123 65333



Layout top	3139 123 6533	3 2011-12-12 2 2011-05-25

19220_064_120228.eps
120228

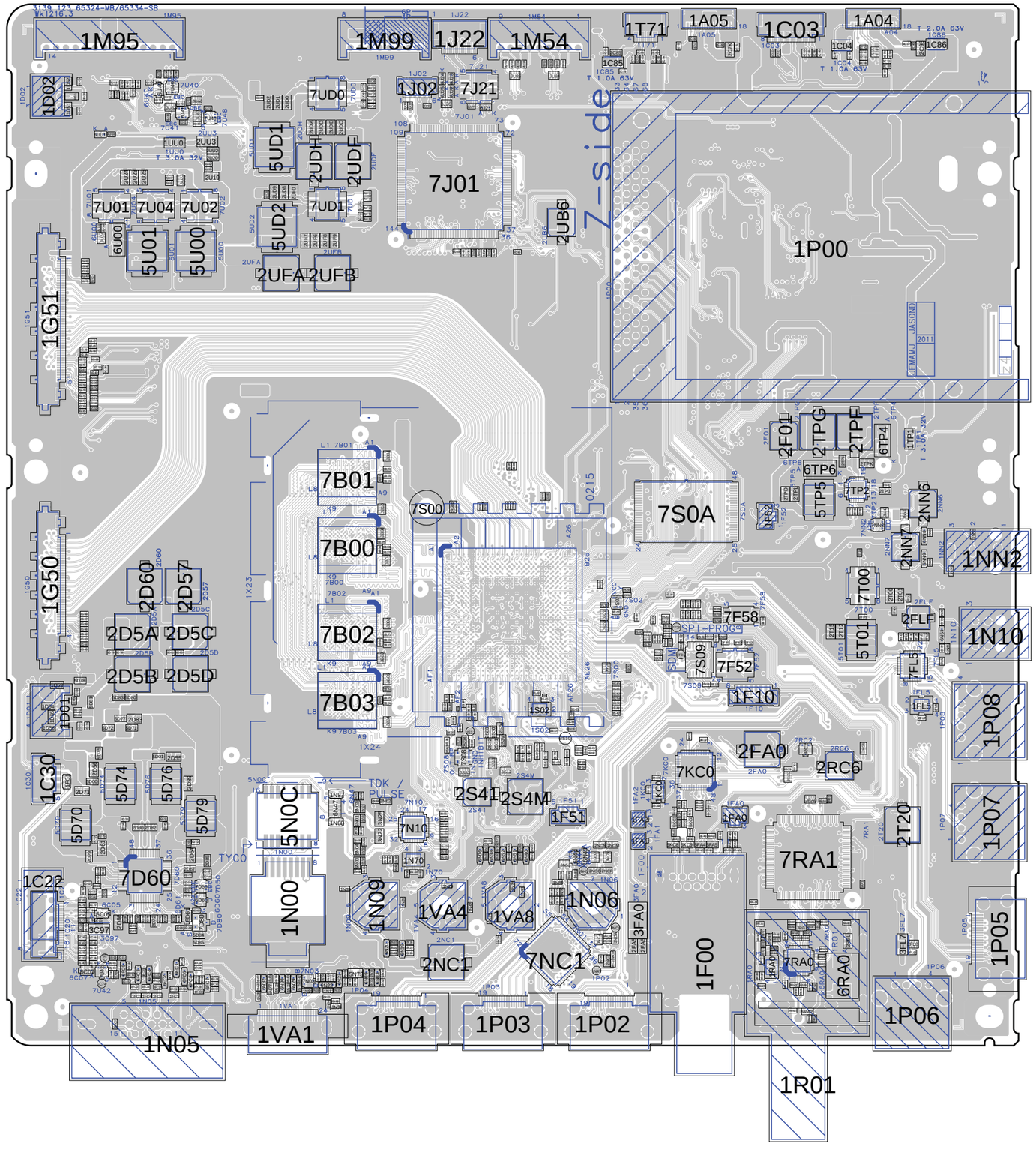
10-4-35 Layout bottom 3139 123 65333



Layout bottom	3139 123 6533	3 2011-12-12 2 2011-05-25

19220_065_120228.eps
120228

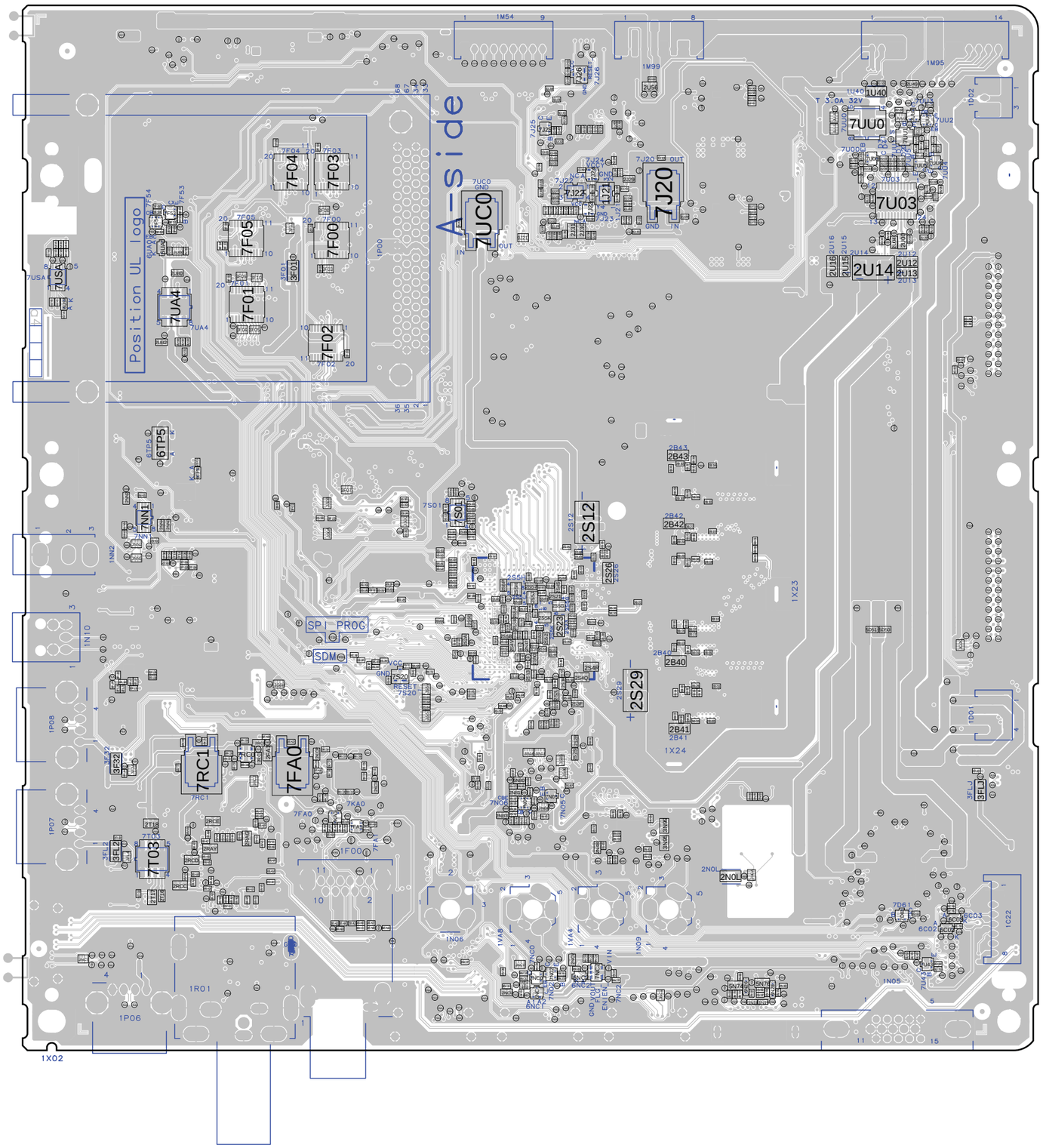
10-4-36 Layout top 3139 123 65334



Layout top	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

19221_001_120509.eps
120509

10-4-37 Layout bottom 3139 123 65334



Layout bottom	3139 123 6533	4 2012-04-23 3 2011-12-12 2 2011-05-25

19221_002_120509.eps
120509

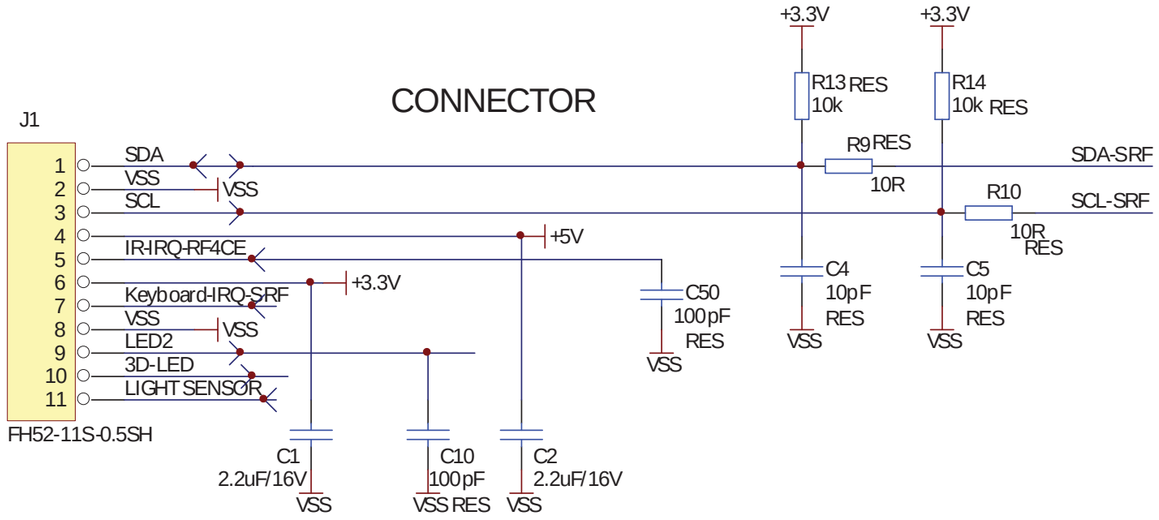
10.5 J 272217190529 Sensor board

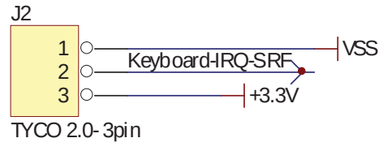
10-5-1 IR/LED/analogue light sensor

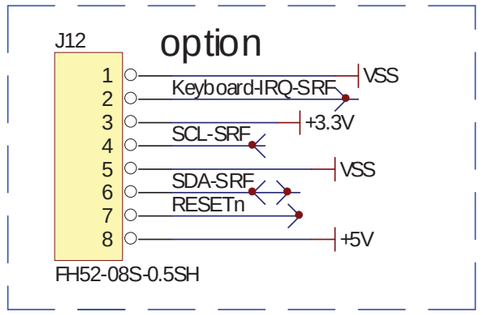
J

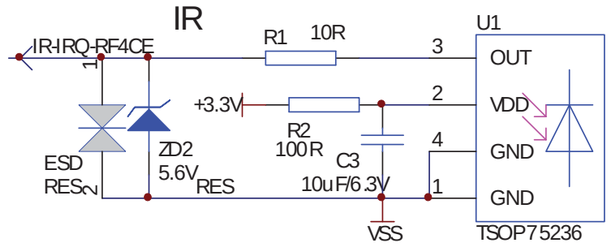
IR/LED/analogue light sensor

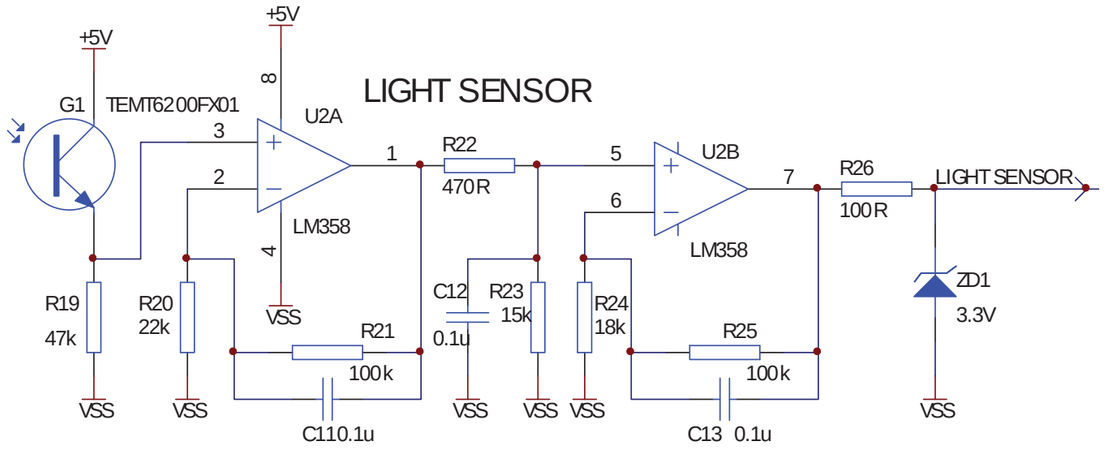
J

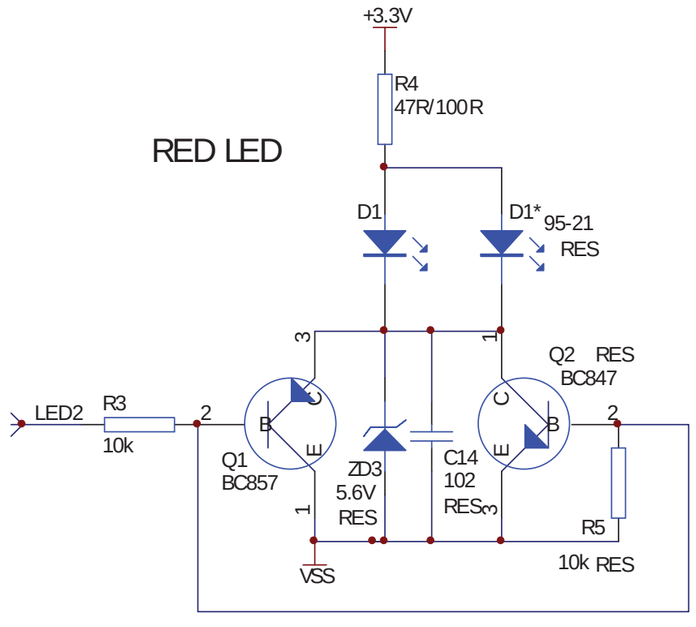










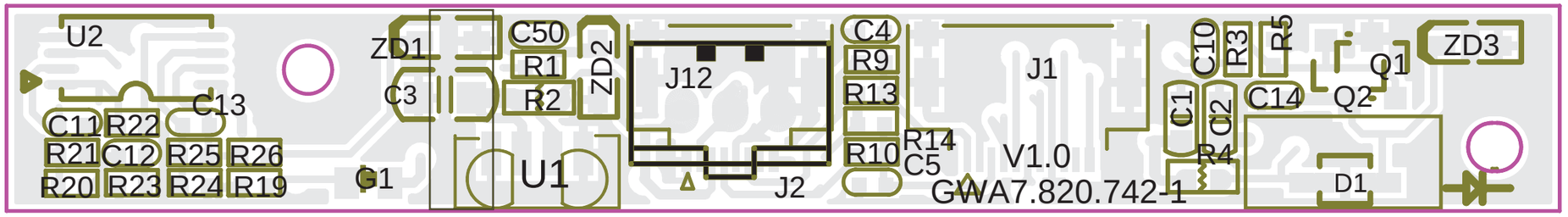


IR/LED/ analogue light sensor	2722 171 90529	1 2011-12-27

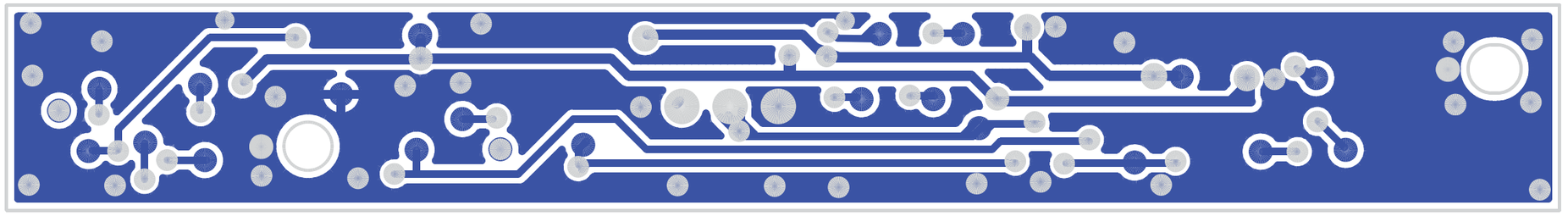
19220_084_120229.eps
120229

10-5-2 IR/LED/analogue light sensor board layout

Layout IR/LED Board (Top Side)



Layout IR/LED Board (Bottom Side)



Layout	2722 171 90529	1 2011-12-27

19220_085_120229.eps
120229

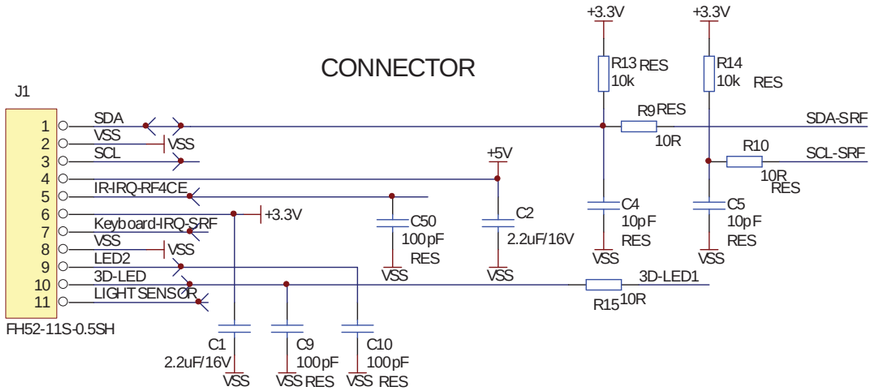
10.6 J 272217190532 Sensor board

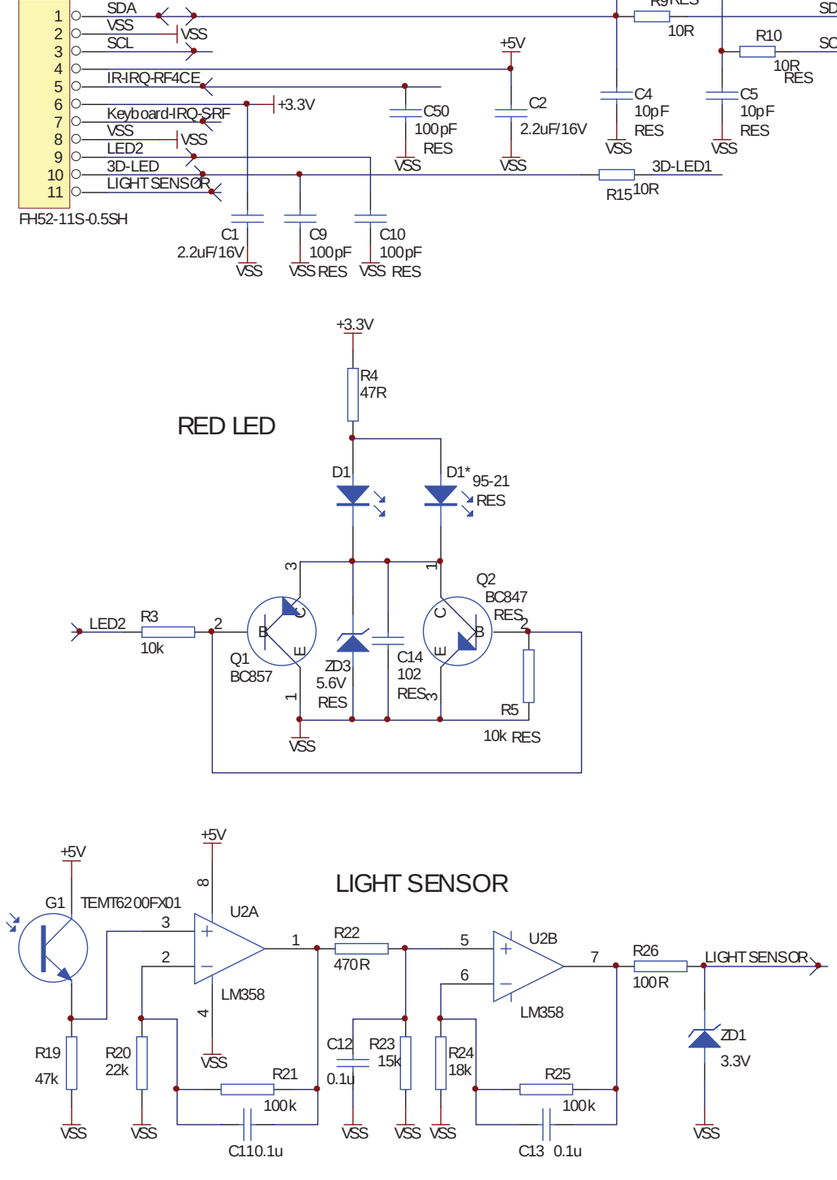
10-6-1 IR/LED/analogue light sensor/3D blaster

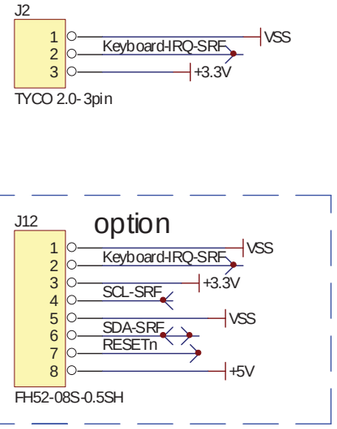
J

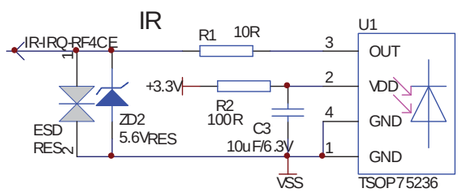
IR/LED/analogue light sensor/3D blaster

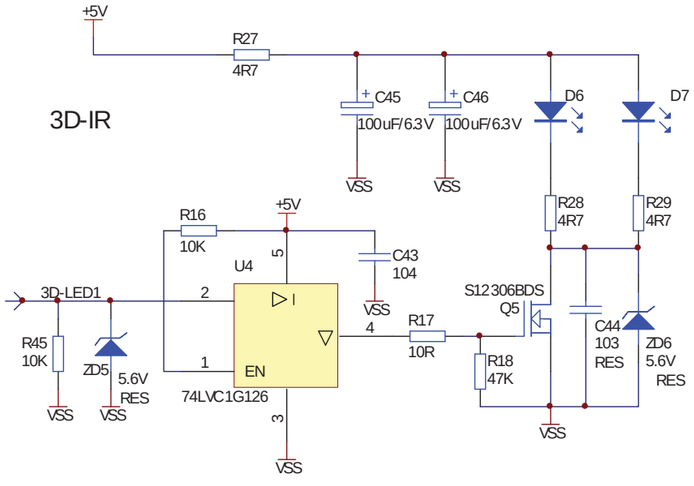
J









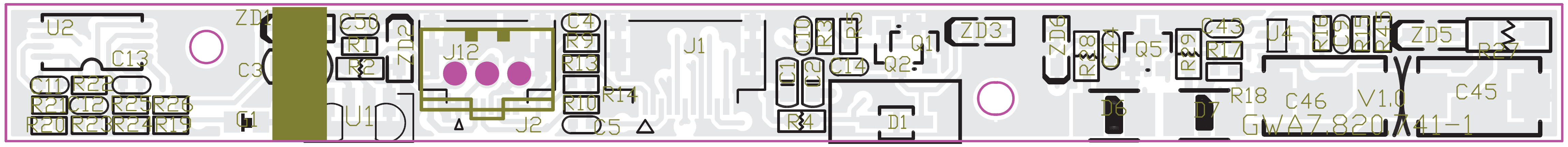


IR/LED/analogue light sensor/3D blaster	2722 171 90532	1 2011-12-30

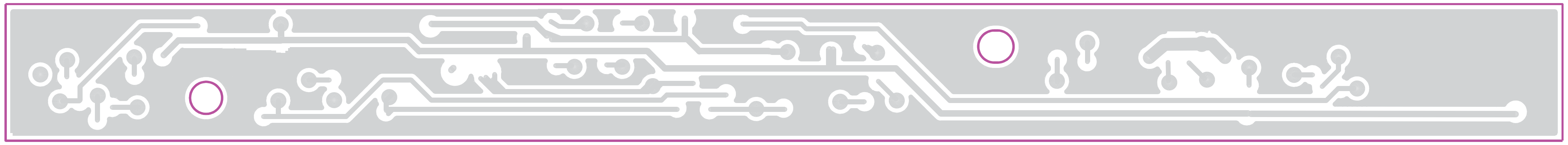
19220_087_120229.eps
120229

10-6-2 IR/LED/analogue light sensor board layout

Layout IR/LED Board (Top Side)



Layout IR/LED Board (Bottom Side)



Layout	2722 171 90532	1	2011-12-30

19220_088_120229.eps
120229

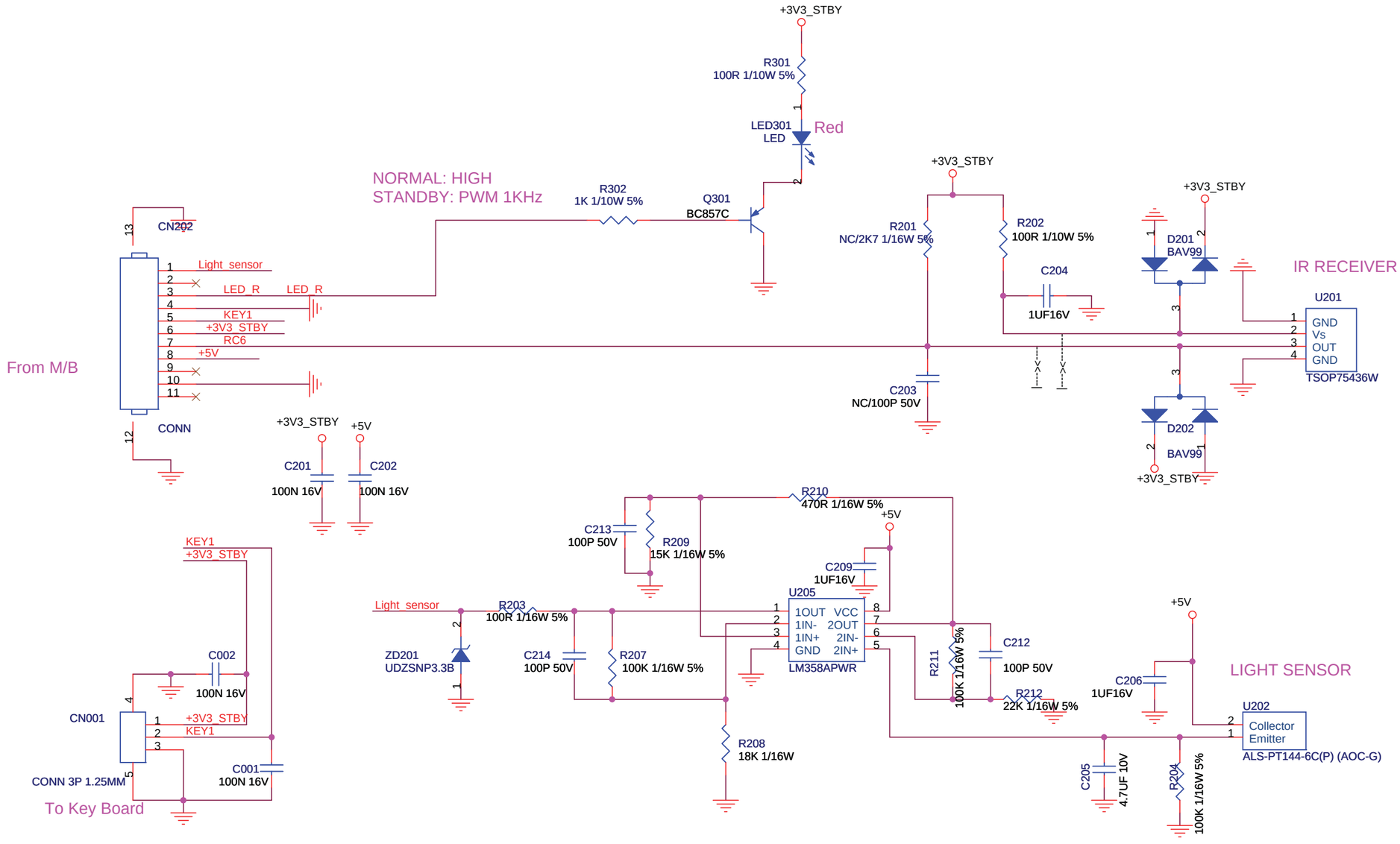
10.7 J 715G5255 Sensor board

10-7-1 IR/LED board

J

IR/LED 4000 series

J



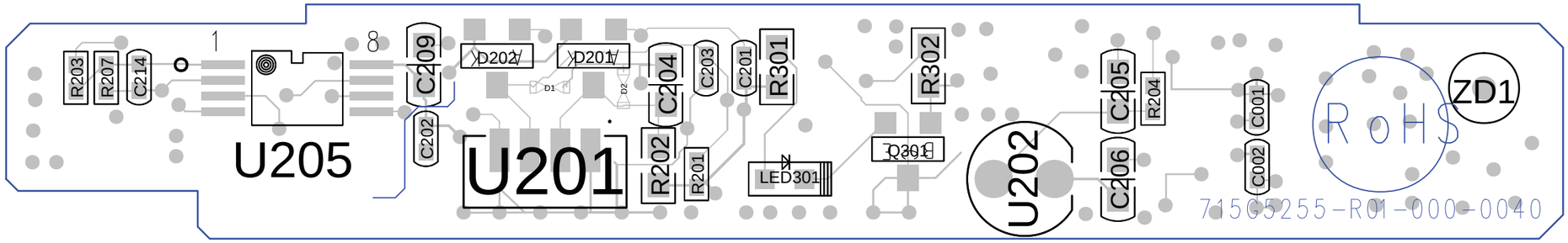
Key function items are denominated “001~015”
IR function items are denominated “201~215”
LED function items are denominated “301~315”

IR/LED board 4000 series	715G5255	1 2011-10-07

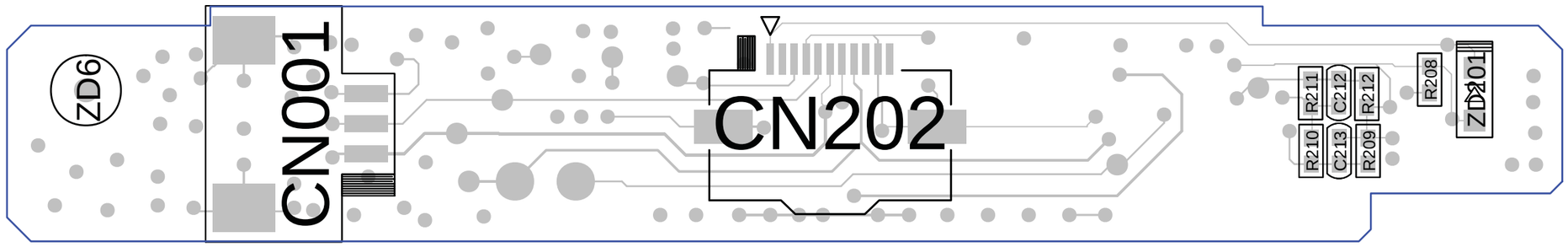
19220_081_120229.eps
120229

10-7-2 IR/LED board layout

Layout IR/LED Board (Top Side)



Layout IR/LED Board (Bottom Side)



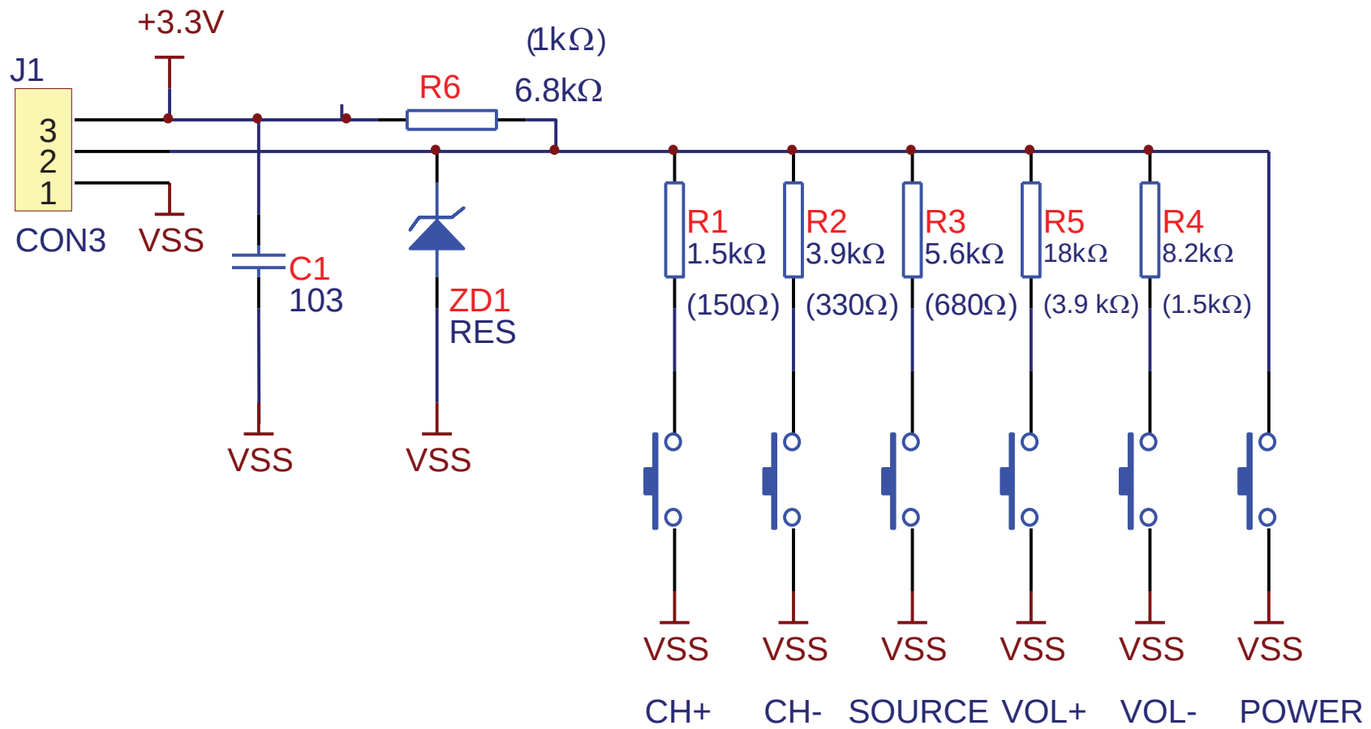
Layout	715G5255	1 2011-10-07

19220_082_120229.eps
120229

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

10-8-1 Keyboard control panel

E Keyboard control panel E

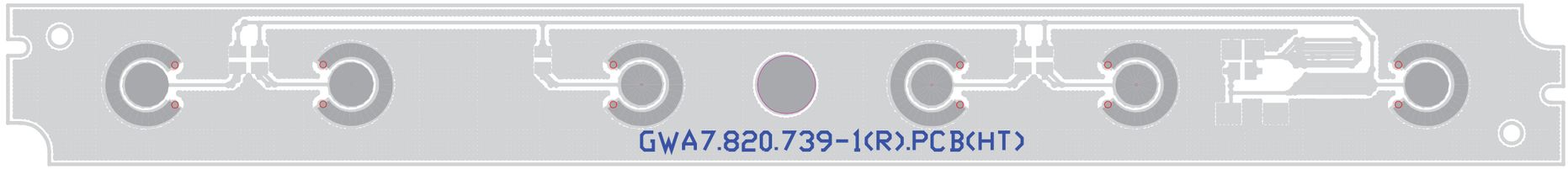


Keyboard control panel	2722 171 90545, 2722 171 90547, 2722 171 90549, 2722 171 90552, 2722 171 90558	1.1 2012-02-16

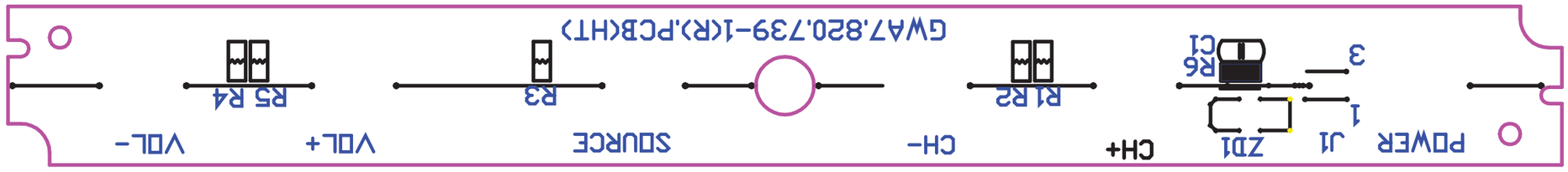
19280_068_120426.eps
120426

10-8-2 Keyboard control panel layout

Layout top



Layout bottom



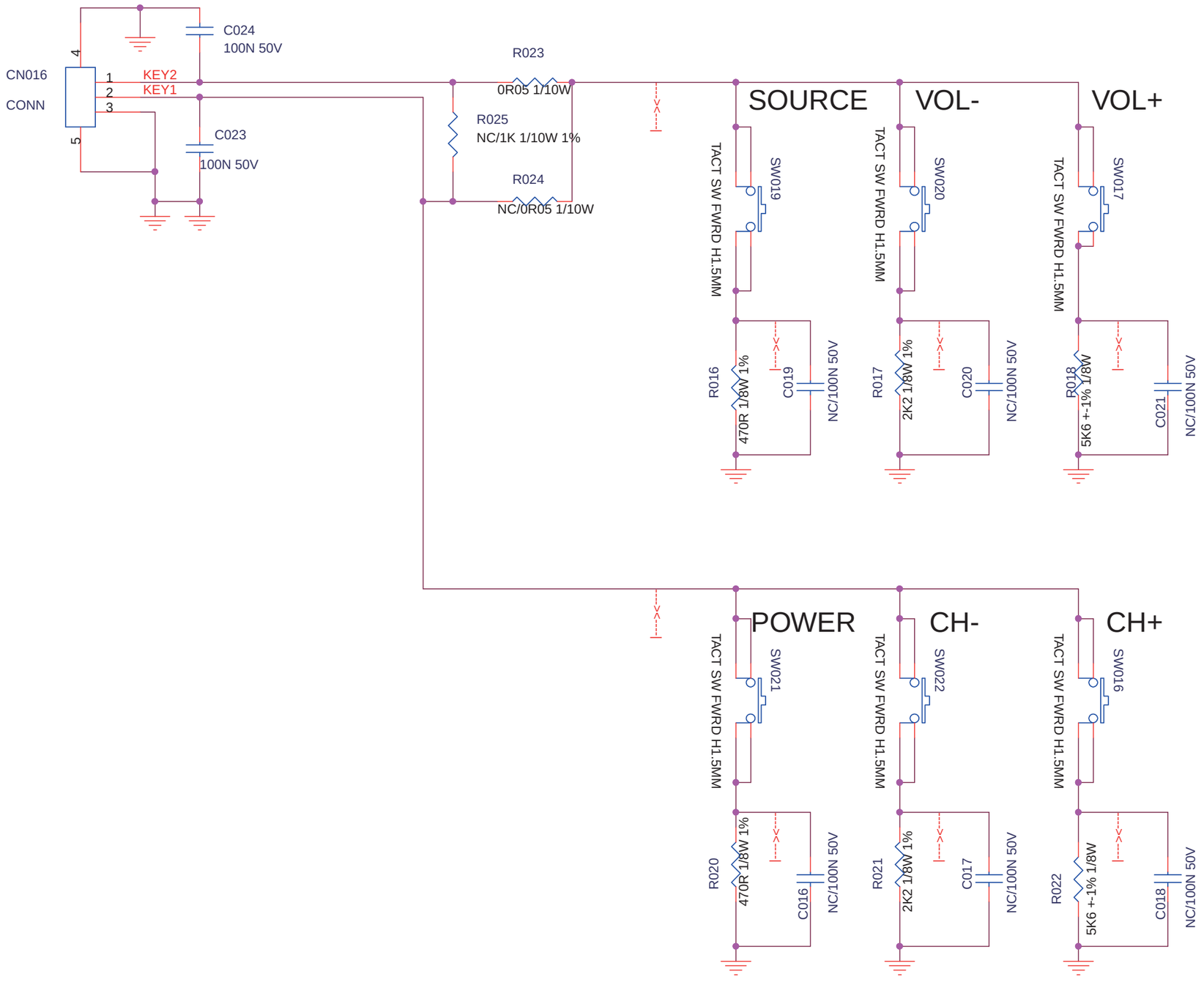
Layout	2722 171 90545, 2722 171 90547, 2722 171 90549, 2722 171 90552, 2722 171 90558	1:1 2012-02-16

19280_071_120426.eps
120426

10.9 E 715G5252 Keyboard control panel 3500/4000 series

10-9-1 Keyboard control panel

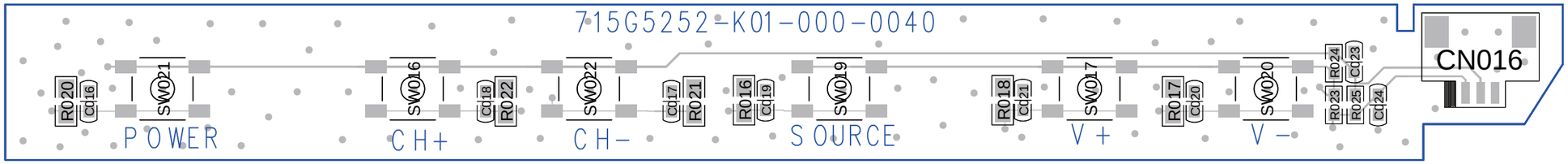
E Keyboard control panel E



19240_513_120215.eps
120629

10-9-2 Keyboard control panel layout

Layout Keyboard control panel (top side)



Layout Keyboard control panel (bottom side)

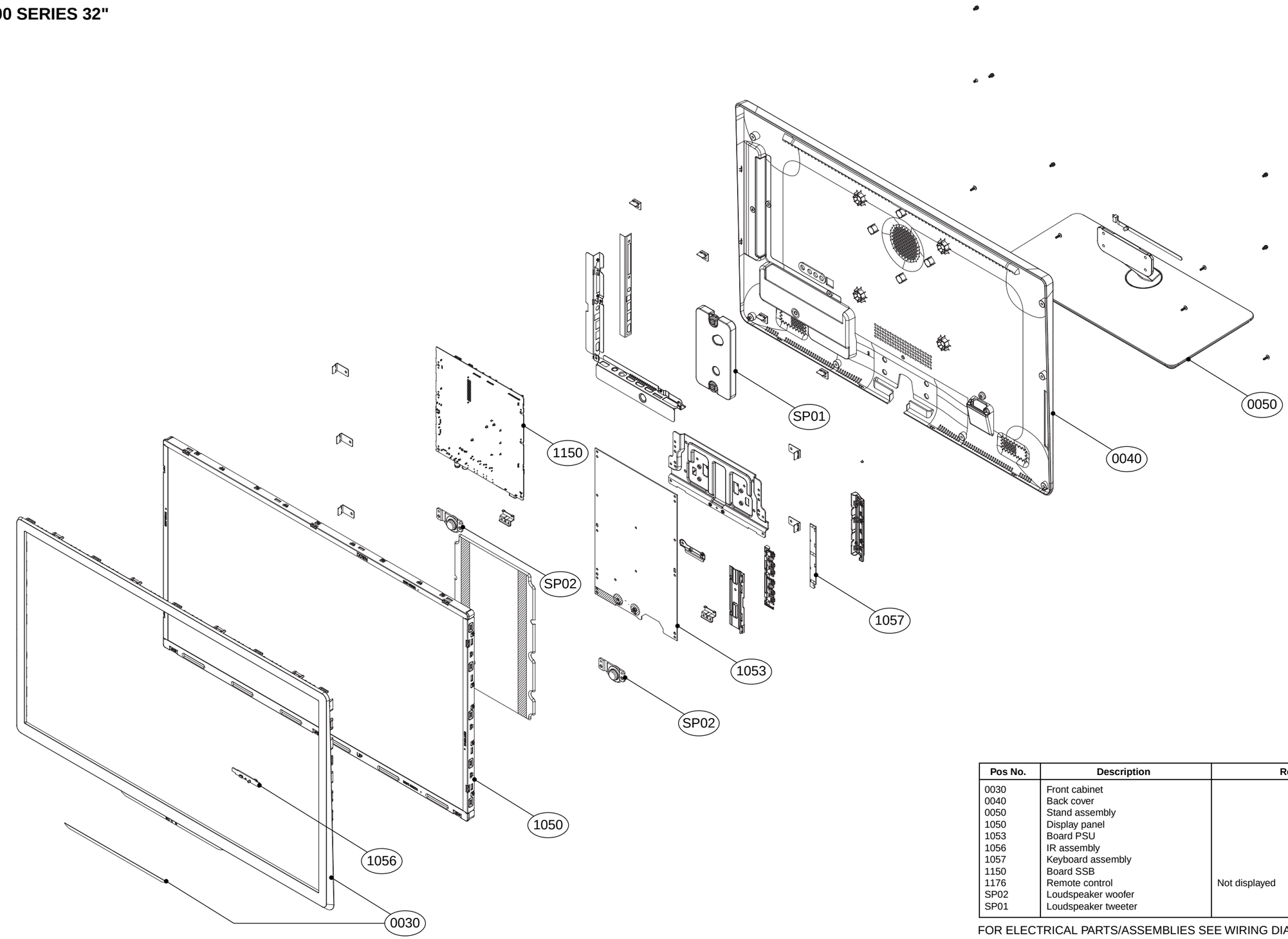
Keyboard control panel layout top/bottom	715G5252	1 2012-01-09

19240_514_120215.eps
120629

11. Styling Sheets

11.1 4000 series 32"

4000 SERIES 32"



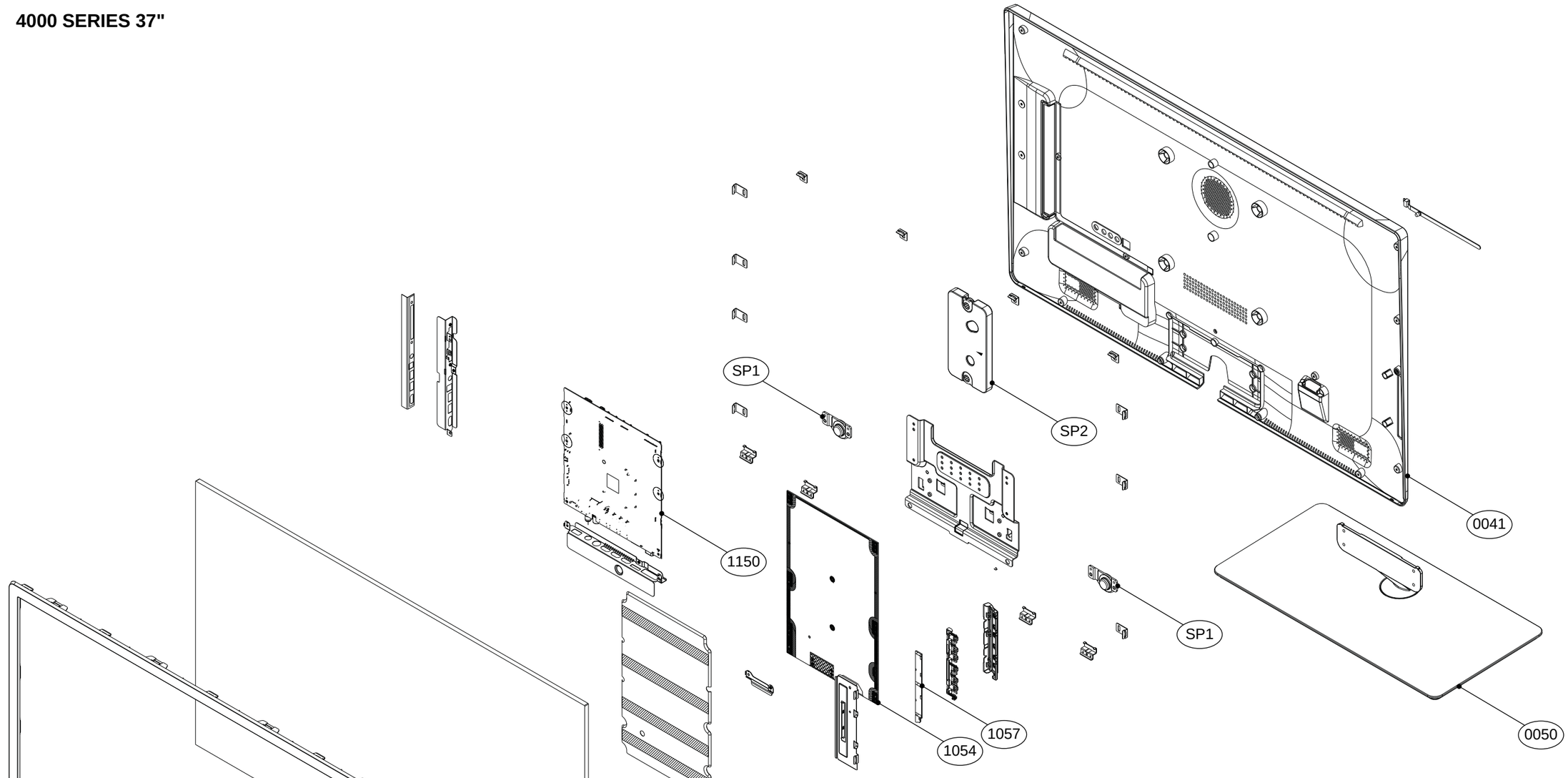
Pos No.	Description	Remarks
0030	Front cabinet	
0040	Back cover	
0050	Stand assembly	
1050	Display panel	
1053	Board PSU	
1056	IR assembly	
1057	Keyboard assembly	
1150	Board SSB	
1176	Remote control	Not displayed
SP02	Loudspeaker woofer	
SP01	Loudspeaker tweeter	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

19220_088_120301.eps
120301

11.2 4000 series 37"

4000 SERIES 37"



Pos No.	Description	Remarks
0031	Front cabinet	
0036	Front cover deco style	
0041	Back cover	
0050	Stand assembly	
1050	Display panel	
1054	Board PSU	
1056	IR assembly	
1057	Keyboard assembly	
1150	Board SSB	
1176	Remote control	Not displayed
SP2	Loudspeaker woofer	
SP1	Loudspeaker tweeter	

FOR ELECTRICAL PARTS/ASSEMBLIES SEE WIRING DIAGRAM CHAPTER 9

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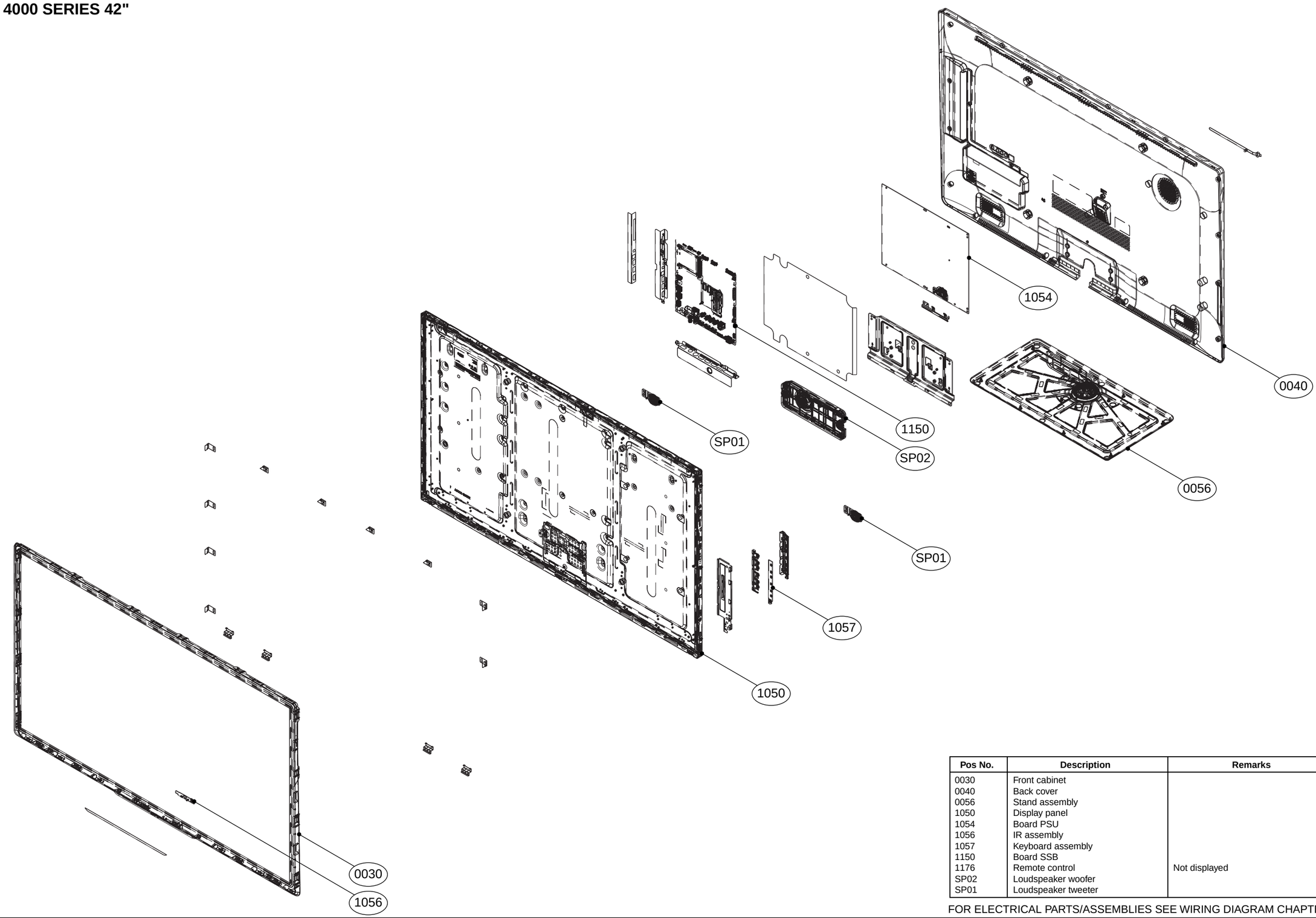
11.3 4000 series 42"

4000 SERIES 42"



Pos No.	Description	Remarks
0030	Front cabinet	
0040	Back cover	
0056	Stand assembly	
1050	Display panel	
1054	Board PSU	
1056	IR assembly	
1057	Keyboard assembly	
1150	Board SSB	
1176	Remote control	Not displayed
SP02	Loudspeaker woofer	
SP01	Loudspeaker tweeter	

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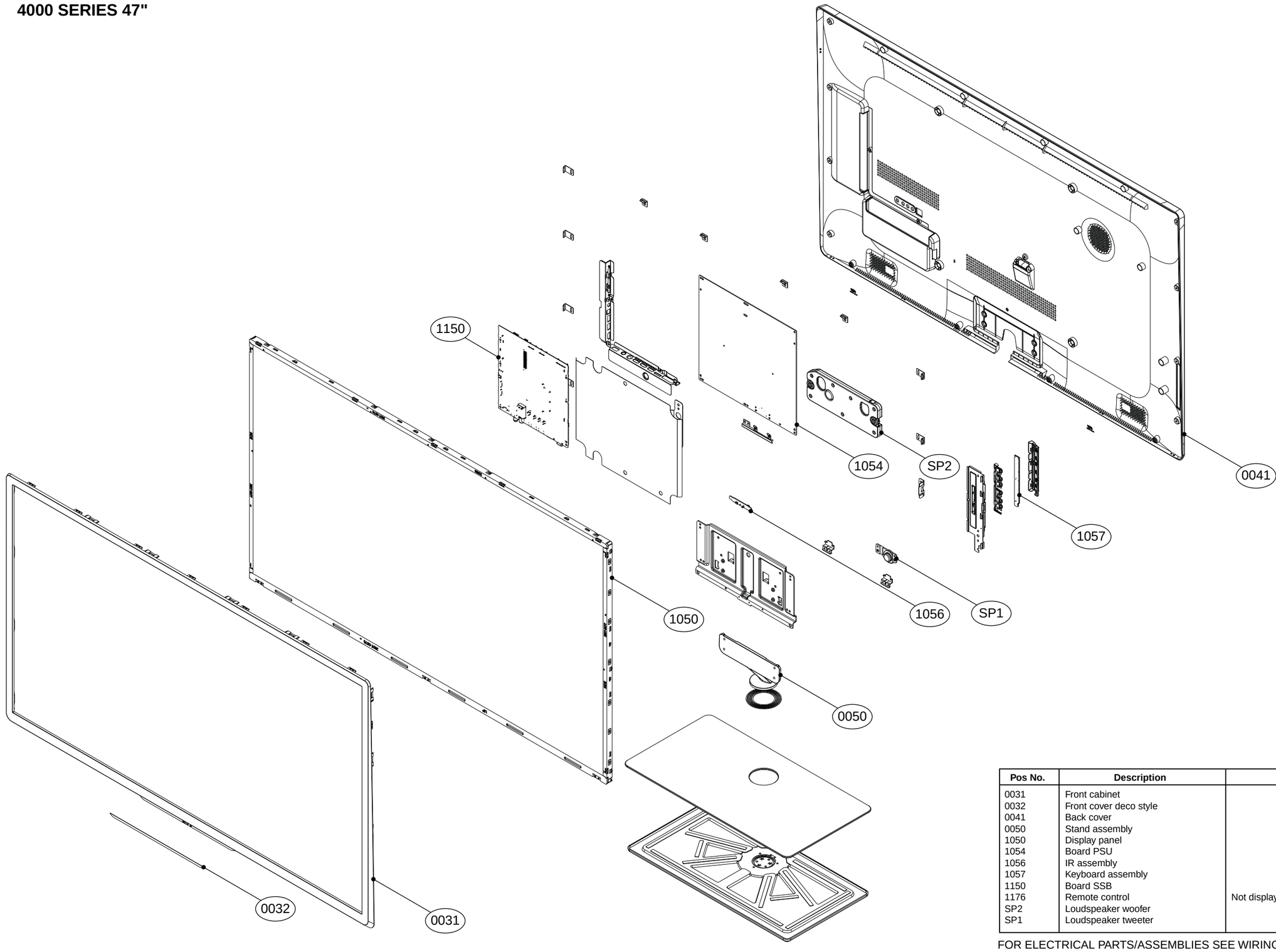
11.4 4000 series 47"

4000 SERIES 47"



Pos No.	Description	Remarks
0031	Front cabinet	
0032	Front cover deco style	
0041	Back cover	
0050	Stand assembly	
1050	Display panel	
1054	Board PSU	
1056	IR assembly	
1057	Keyboard assembly	
1150	Board SSB	
1176	Remote control	Not displayed
SP2	Loudspeaker woofer	
SP1	Loudspeaker tweeter	

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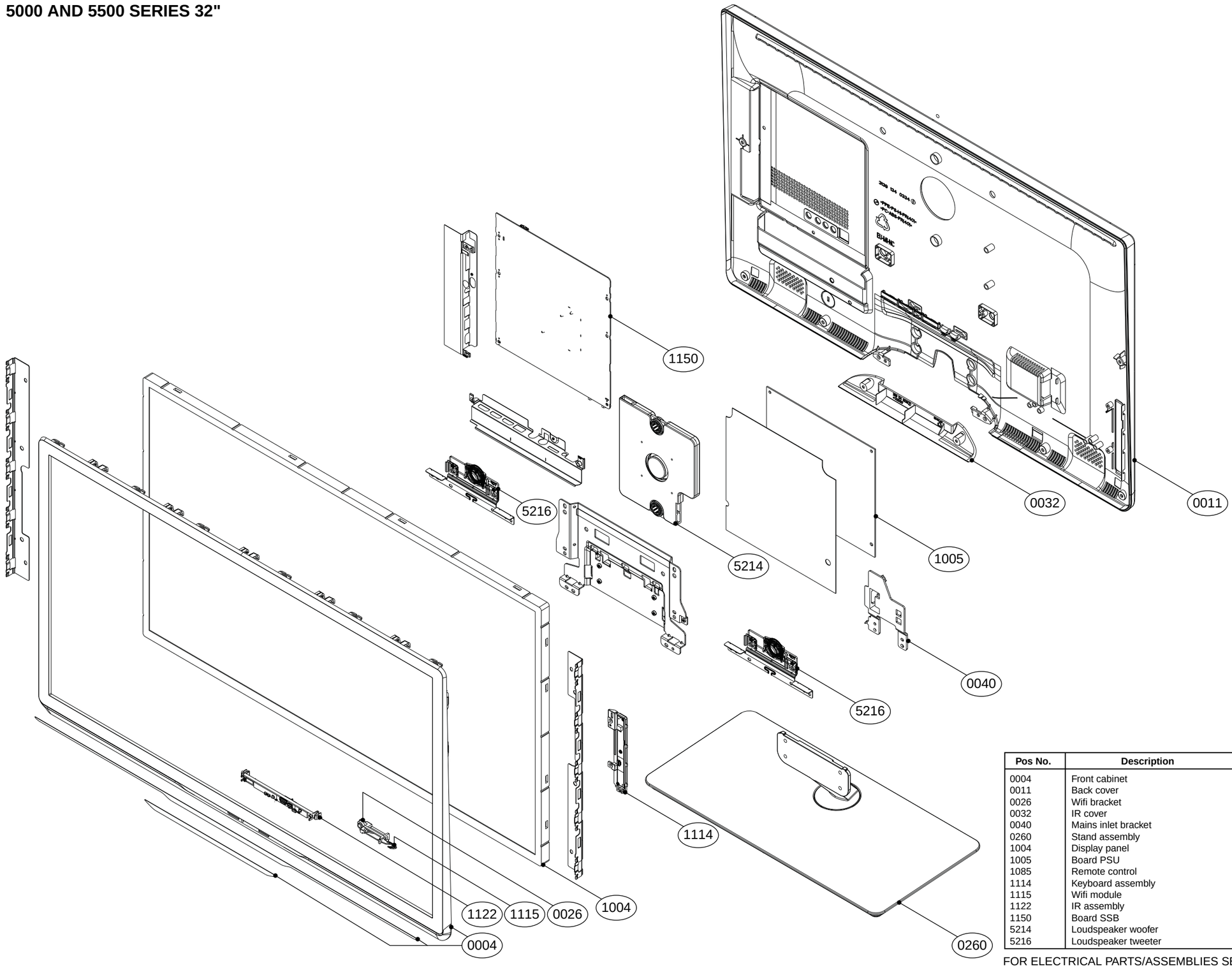
11.5 5000 series 32"

5000 AND 5500 SERIES 32"



Pos No.	Description	Remarks
0004	Front cabinet	
0011	Back cover	
0026	Wifi bracket	
0032	IR cover	
0040	Mains inlet bracket	
0260	Stand assembly	
1004	Display panel	
1005	Board PSU	
1085	Remote control	Not displayed
1114	Keyboard assembly	
1115	Wifi module	
1122	IR assembly	
1150	Board SSB	
5214	Loudspeaker woofer	
5216	Loudspeaker tweeter	

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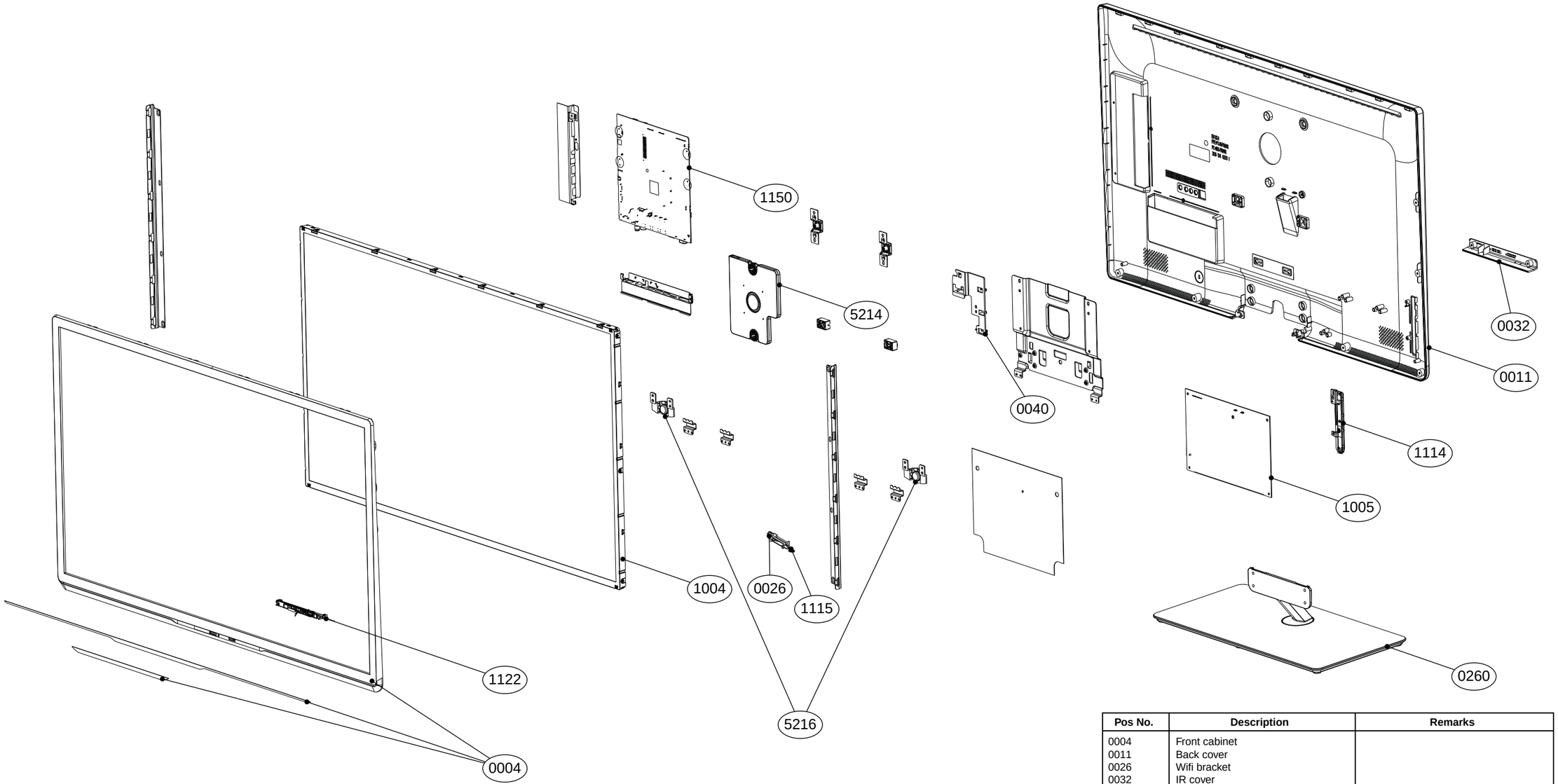
11.6 5000 series 40"

5000 AND 5500 SERIES 40"



Pos No.	Description	Remarks
0004	Front cabinet	
0011	Back cover	
0026	Wifi bracket	
0032	IR cover	
0040	Mains inlet bracket	
0260	Stand assembly	
1004	Display panel	
1005	Board PSU	
1085	Remote control	Not displayed
1114	Keyboard assembly	
1115	Wifi module	
1122	IR assembly	
1150	Board SSB	
5214	Loudspeaker woofer	
5216	Loudspeaker tweeter	

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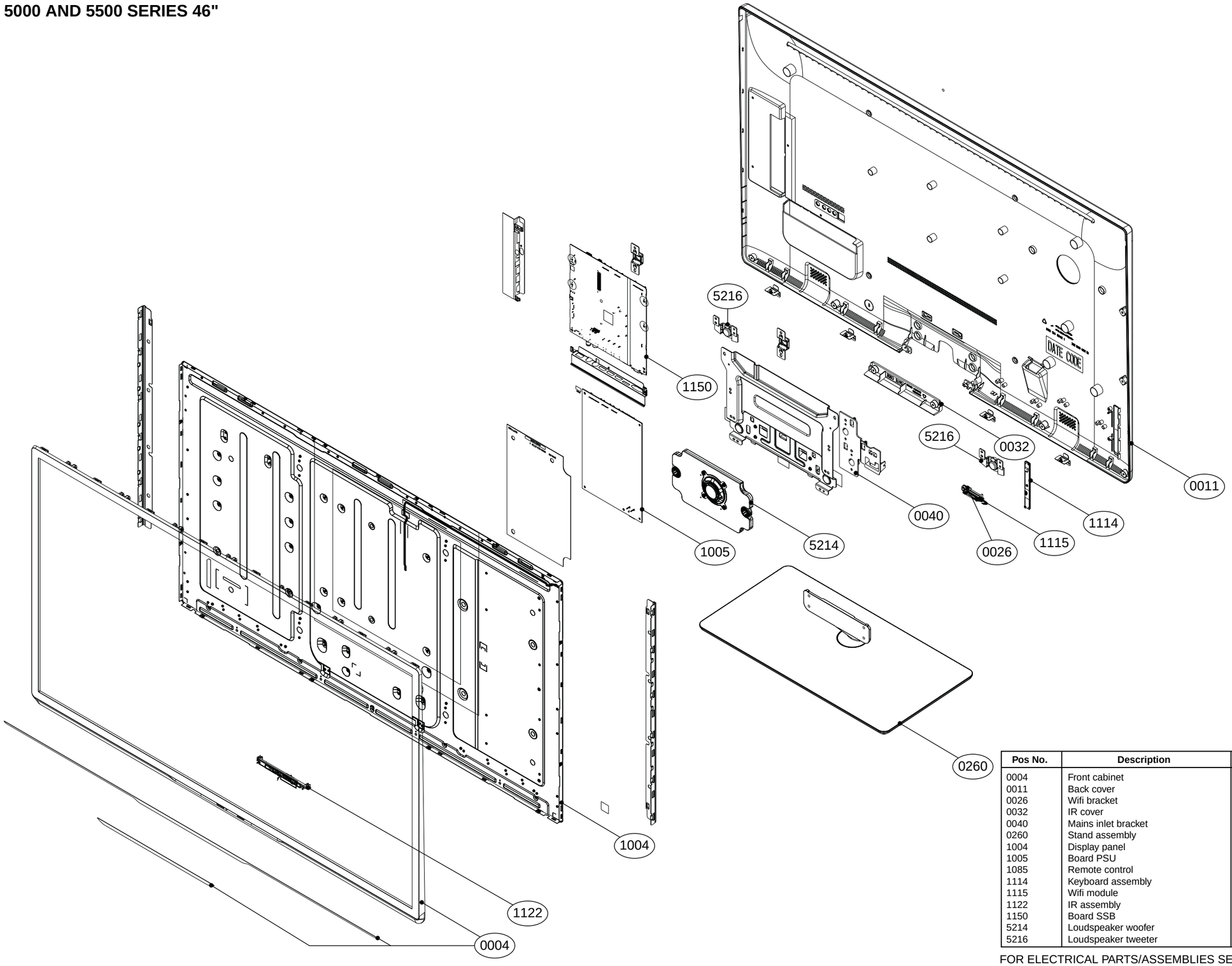
11.7 5000 series 46"

5000 AND 5500 SERIES 46"



Pos No.	Description	Remarks
0004	Front cabinet	
0011	Back cover	
0026	Wifi bracket	
0032	IR cover	
0040	Mains inlet bracket	
0260	Stand assembly	
1004	Display panel	
1005	Board PSU	
1085	Remote control	Not displayed
1114	Keyboard assembly	
1115	Wifi module	
1122	IR assembly	
1150	Board SSB	
5214	Loudspeaker woofer	
5216	Loudspeaker tweeter	

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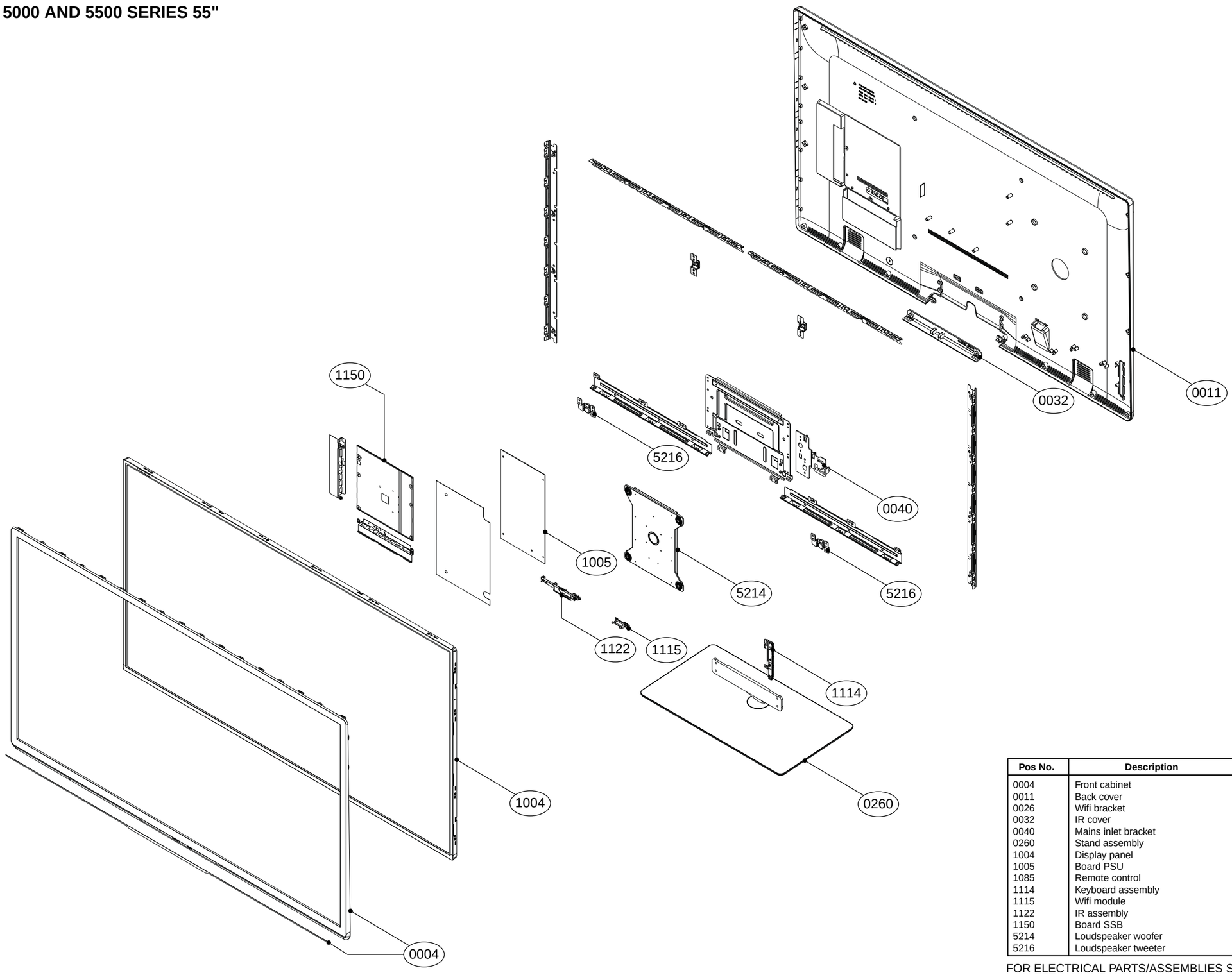
11.8 5000 series 55"

5000 AND 5500 SERIES 55"



Pos No.	Description	Remarks
0004	Front cabinet	
0011	Back cover	
0026	Wifi bracket	
0032	IR cover	
0040	Mains inlet bracket	
0260	Stand assembly	
1004	Display panel	
1005	Board PSU	
1085	Remote control	Not displayed
1114	Keyboard assembly	
1115	Wifi module	
1122	IR assembly	
1150	Board SSB	
5214	Loudspeaker woofer	
5216	Loudspeaker tweeter	

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