Side-channel Attack Standard Evaluation Board
SASEBO-GIII Specification

- Version 1.1 -

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1. Overview

The SASEBO-GIII is a successor of SASEBO-GII board, and is for further side-channel attack experimentation. The board has Xilinx 28-nm Kintex-7 FPGA device, which enables advanced measurement with on-the-edge technology. The basic features of SASEBO-GIII are as follows:

- 200 mm x 150 mm x 1.6mm, FR-4, eight layers.
- Two Xilinx FPGAs
  - Cryptographic FPGA: Kintex-7 XC7K160T-1FBGC
  - Control FPGA: Spartan-6 XC6LX45-2FGG484C
- 1 Gigabit DDR3 SDRAM.
- External power source supplies the on-board power regulators and the FPGAs with 5.0 V.
- Shunt resistor is provided to insert on the core VDD line of the cryptographic FPGA for measuring power traces.
- The host PC controls and communicates with the board via the USB port.

Table 1 : Specification

FPGA #1	FPGA	Xilinx Kintex-7 XC7K160T-1FBG676C
	Configuration ROM	64Mbit BPI Flash Memory PC28F640P30TF65
	Configuration Mode	Configuration from BPI Flash: ・Master BPI (x16) Configuration from FPGA#2: ・Master SelectMAP (x8, x16) ・Slave SelectMAP (x8) ・Master Serial ・Slave Serial ・Master SPI (x1, x2, x4)
	Clock	・System Clock 200MHz (Differential) ・DDR3 Reference Clock 200MHz (Differential)
	User LED	10bit
	User Switch	DIP Switch 8bit / Push Switch 1bit
	User GPIO	・Header 10bit ・SMA 2pairs (Differential, Clock Capable)
	DRAM	DDR3-800MHz SDRAM
	FMC	LPC (w/o GTX, 2.5V only)
	Measurement point	High side of VCCINT (Core)
FPGA #2	FPGA	Xilinx Spartan-6 XC6SLX45-2FG484C
	Configuration ROM	32Mbit BPI Flash Memory XCF32PVOG48C
	Clock	・System Clock 24MHz
	User LED	10bit
	User Switch	DIP Switch 8bit / Push Switch 1bit
	User GPIO	・Header 10bit ・SMA 2pairs (Differential, Clock Capable)
	FMC	LPC (w/o GTX, 2.5V only)
	USB I/F	FTDI FT2232H (Channel A, Channel B)
	FPGA Interconnect	78 pin (39 pairs)
	Rated board voltage	・5V ±5% ・12V ±5% (for FMC)
	Rated board current	・USB bus power : 0.75A (Protected by fuse) ・External power input : 6A (Rated by switch)
	Substrate	8 Layers, FR-4, 1.6t
	Dimensions	200mm × 150mm

2. Operational Instructions

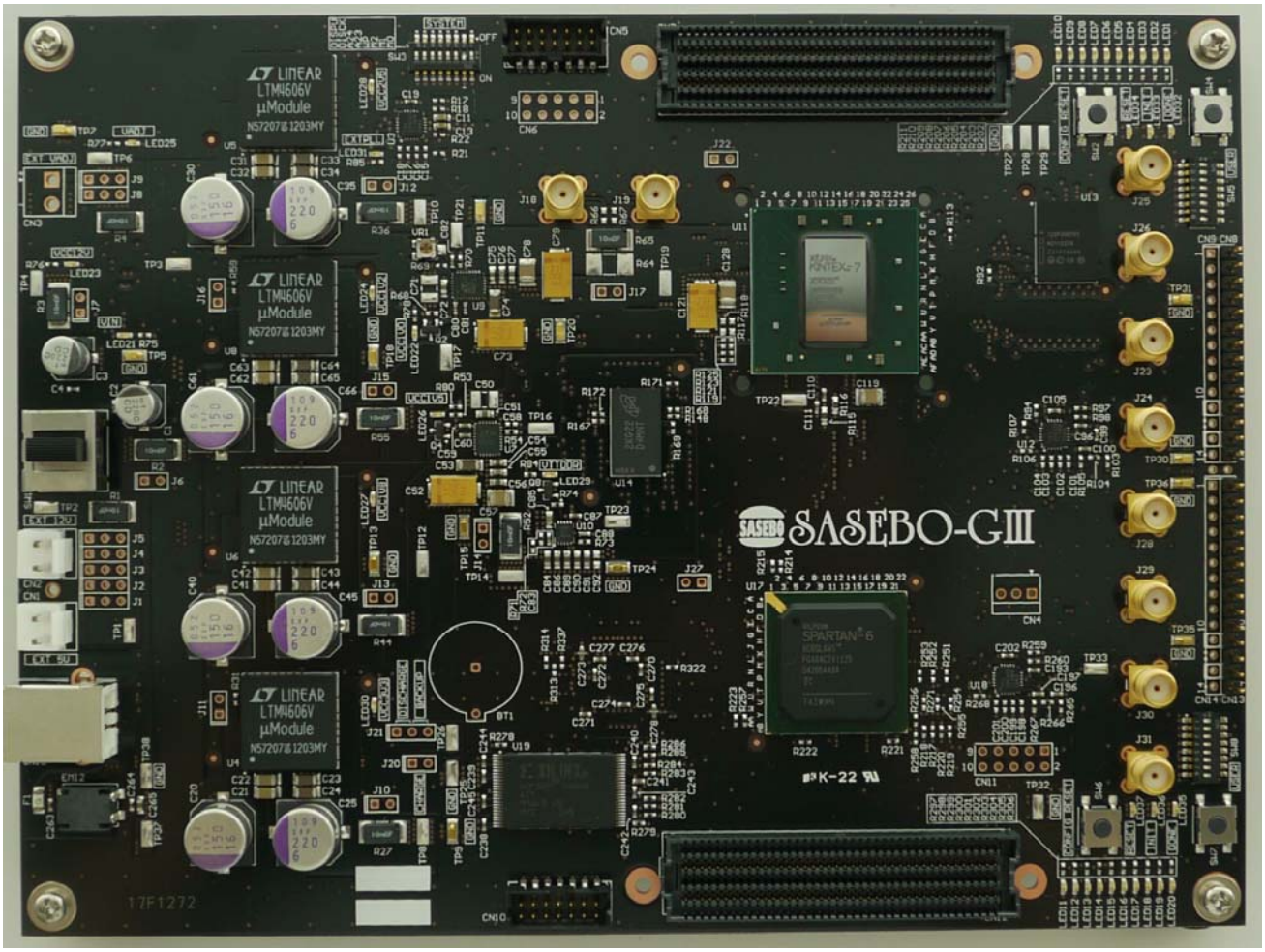


Figure 1： SASEBO-GIII Top View

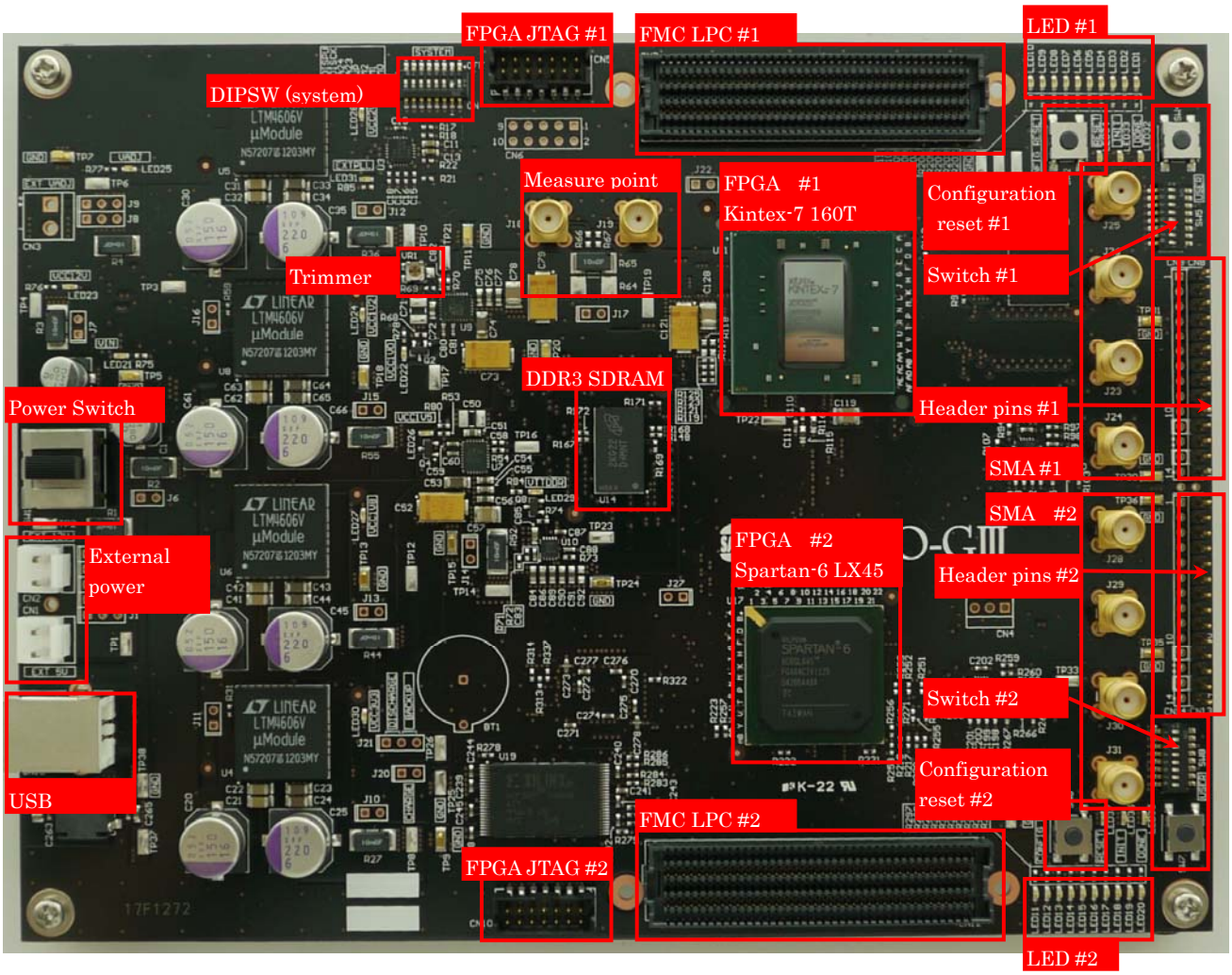


Figure 2 : SASEBO-GIII Board Functions

2.1. Power Circuit

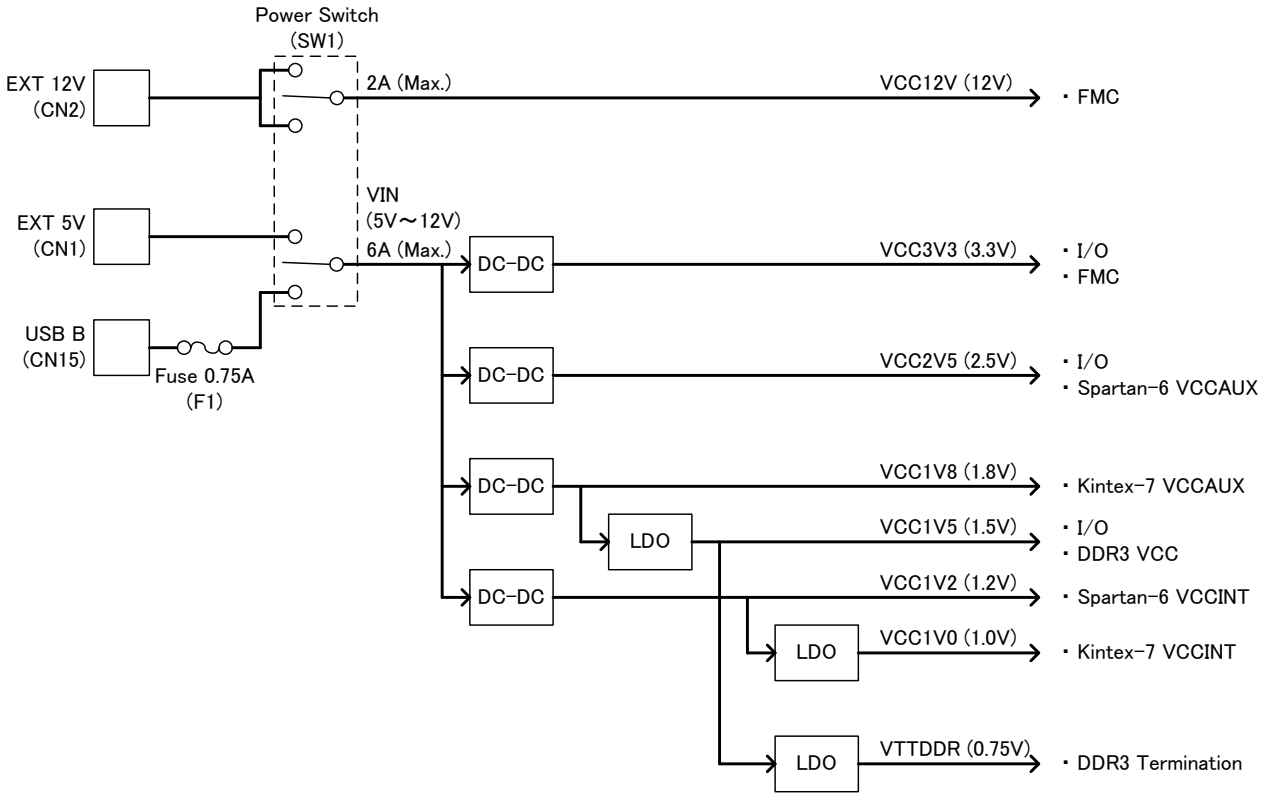


Figure 3 : Power Circuit

2.2. Voltage Calibration

The following voltage can be calibrated by trimmer.

Table 2 : Voltage Calibration Point

Trimmer	Voltage
VR1	FPGA Kintex-7 VCCINT (Core) 1.0V (0.9～1.1V)

2.3. Power-On Sequences

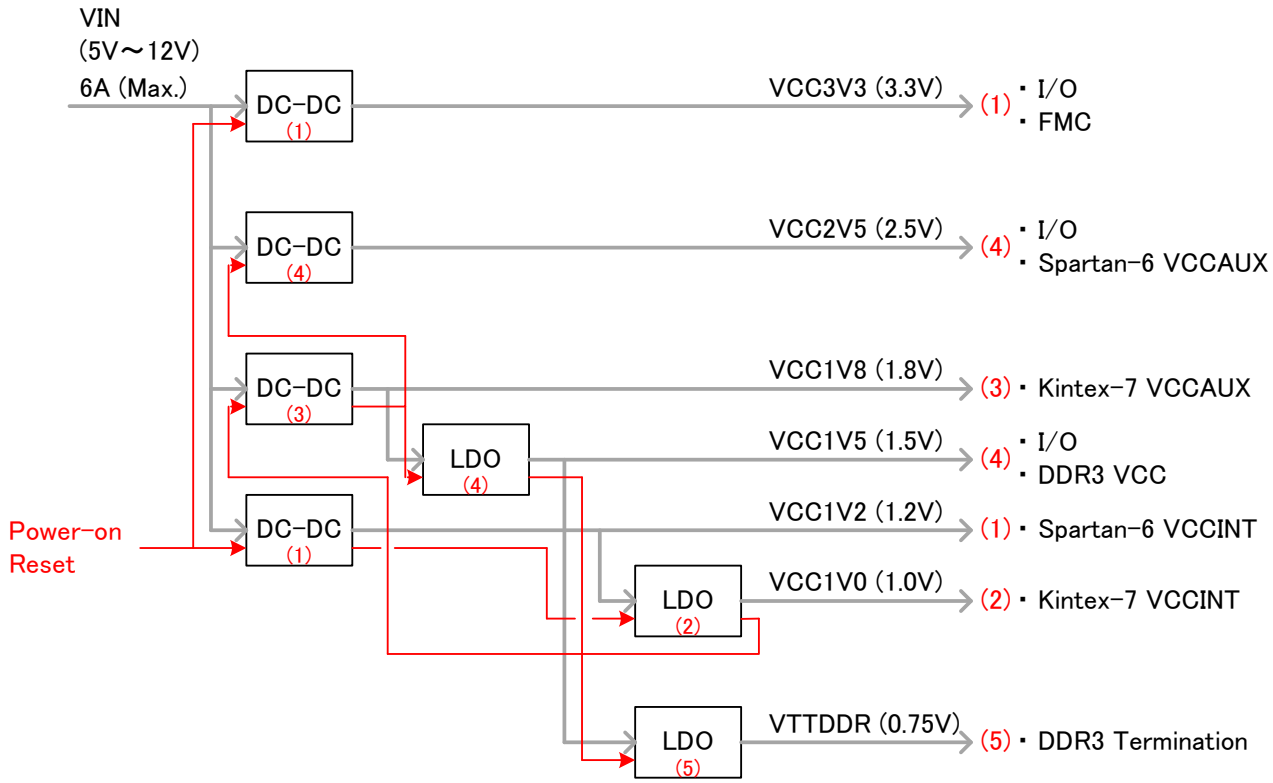


Figure 4 : Power-On Sequence

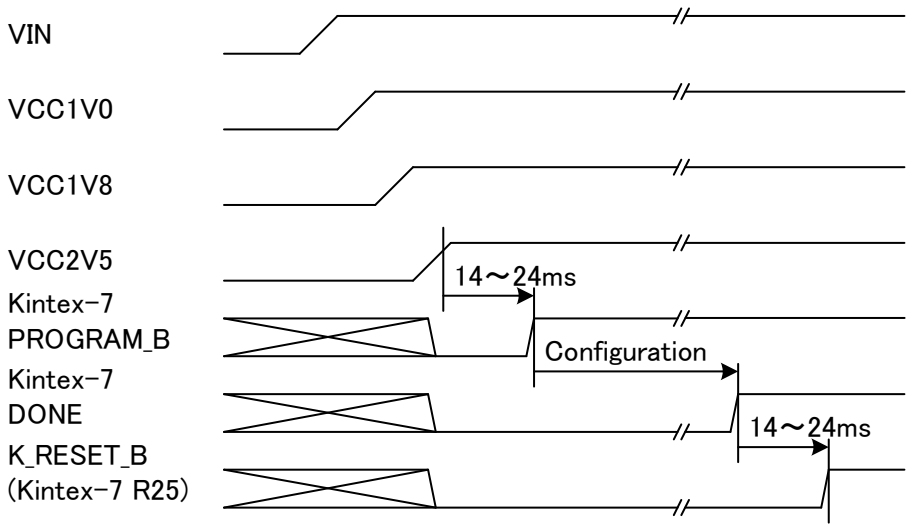


Figure 5 : Kintex-7 Reset Sequence

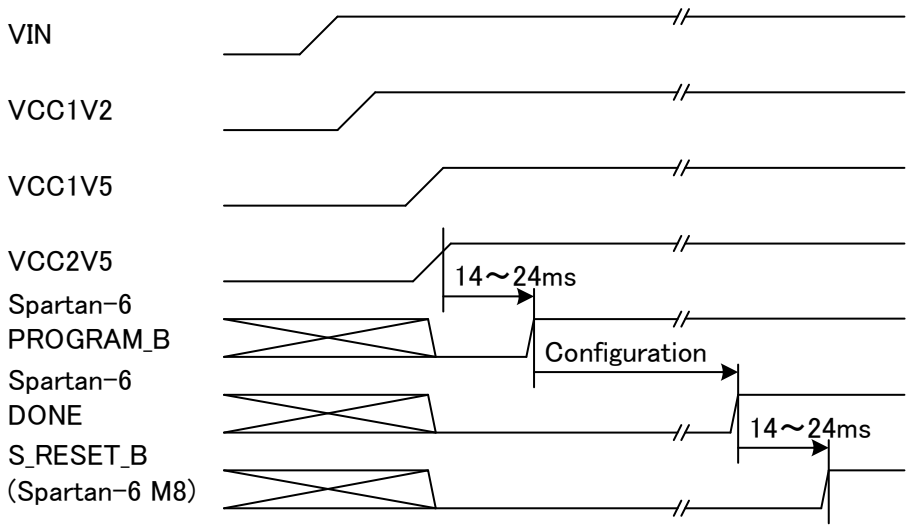


Figure 6 : Spartan-6 Reset Sequence

2.4. Configuration

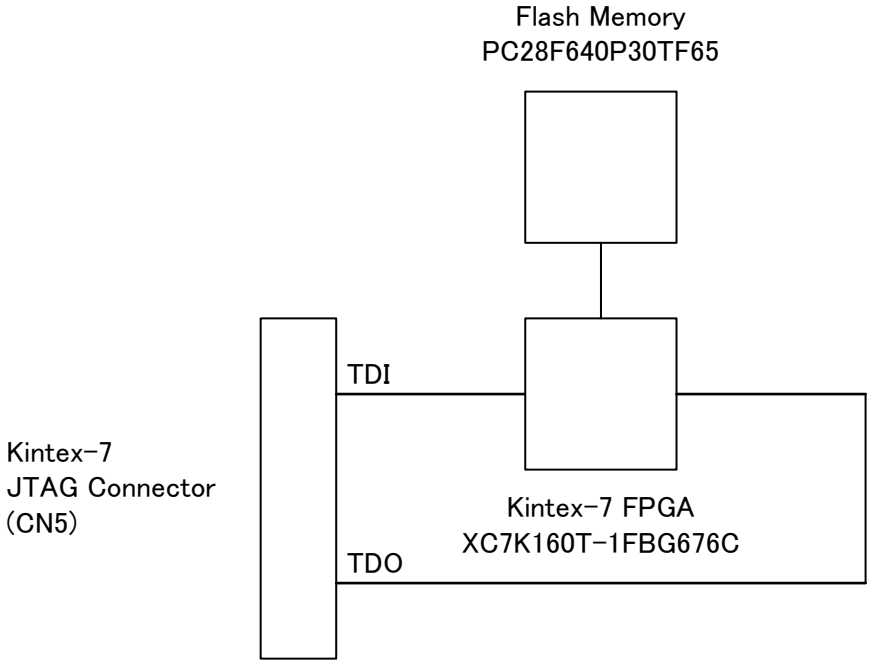


Figure 7 : Kintex-7 JTAG Chain

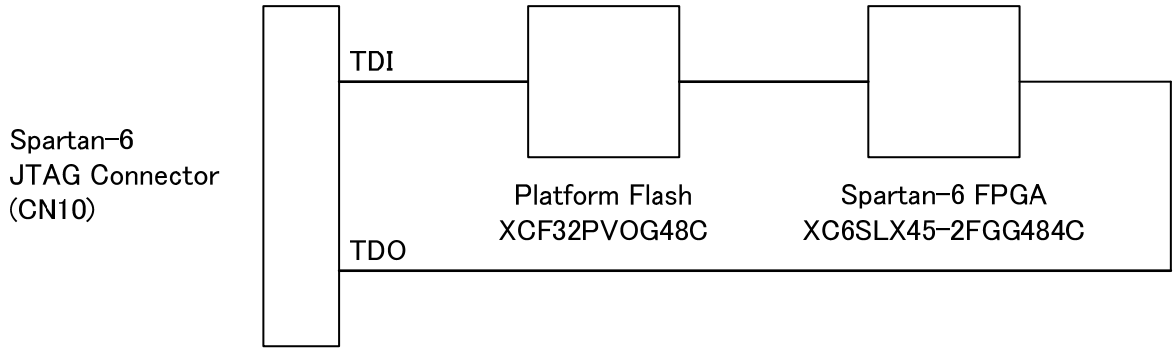


Figure 8 : Spartan-6 JTAG Chain

2.5. Clock System

(TBD)

2.6. Measurement Points

(TBD)

2.7. Connectors

Table 3 : Abstract of connectors

Connector	Function
CN1	External power supply(5.0V)
CN2	External power supply(12V) for FMC
CN3	Unused
CN4	Unused
CN5	Kintex-7 JTAG
CN6	Unused
CN7	Kintex-7 FMC LPC
CN8	Kintex-7 GPIO
CN9	Unused
CN10	Spartan-6 JTAG
CN11	Unused
CN12	Spartan-6 FMC LPC
CN13	Spartan-6 GPIO
CN14	Unused
CN15	USB

Table 4 : CN1, external power supply (5.0V)

Pin	Function
1 (▲)	VIN (5.0V)
2	GND

Table 5 : CN2, external power supply (12V)

Pin	Function
1 (▲)	VIN (12V)
2	GND

Table 6 : CN5 Kintex-7 JTAG

Pin	Function
1	GND
2	2.5V
3	GND
4	TMS

5	GND
6	TCK
7	GND
8	TDO
9	GND
10	TDI
11	GND
12	N.C.
13	GND
14	N.C.

Table 7 : CN8 Kintex-7 GPIO

Pin	Function
1	IO1
2	IO2
3	IO3
4	IO4
5	IO5
6	IO6
7	IO7
8	IO8
9	IO9
10	IO10
11	GND
12	2.5V
13	GND
14	VIN (12V)

Table 8 : CN10 Spartan-6 JTAG

Pin	Function
1	GND
2	2.5V
3	GND
4	TMS
5	GND

6	TCK
7	GND
8	TDO
9	GND
10	TDI
11	GND
12	N.C.
13	GND
14	N.C.

Table 9 : CN13 Spartan-6 GPIO

Pin	Function
1	IO1
2	IO2
3	IO3
4	IO4
5	IO5
6	IO6
7	IO7
8	IO8
9	IO9
10	IO10
11	GND
12	2.5V
13	GND
14	VIN (12V)

2.8. Switches

Table 10 : Abstract of switches

Switch	Function
SW1	Power
SW2	Kintex-7 Configuration Reset
SW3	System Settings
SW4	Kintex-7 User Push Switch
SW5	Kintex-7 User DIP Switch
SW6	Spartan-6 Configuration Reset
SW7	Spartan-6 User Push Switch
SW8	Spartan-6 User DIP Switch

Table 11 : SW1 Power

	Function
USB	VIN power supply via USB (CN15). 12V power supply for FMC via CN2.
OFF	Off.
EXT	VIN power supply via EXT5V (CN1). 12V power supply for FMC via CN2.

Table 12 : SW3 System Settings

Pin	Function	On	Off
1	M0	M0=1	**M0=0** (*)
2	M1	**M1=1** (*)	M1=0
3	M2	M2=1	**M2=0** (*)
4	Kintex-7 BPI Flash Write Protect	Protected	**Writable** (*)
5	(Reserved)		(*)
6	(Reserved)		(*)
7	Kintex-7 Clock Inhibit	Oscillator Disable	**Oscillator Enable** (*)
8	Kintex-7 PUDC_B	Hi-Z	**Pull-up** (*)

(*) Default Settings

3. I/O Assignments

3.1. Kintex-7

Table 13 : Kintex-7 Clock

Signal Name	Kintex-7 (U11) Pin	Destination	Voltage
K_CLK_OSC0_HSTL_N	AC2	U15.5	1.5
K_CLK_OSC0_HSTL_P	AB2	U15.4	1.5
K_CLK_OSC1_HSTL_N	AA2	U16.5	1.5
K_CLK_OSC1_HSTL_P	AA3	U16.4	1.5
K_CLK_INH_B	J8	U15.1, U16.1	2.5

Table 14 : Kintex-7 Reset

Signal Name	Kintex-7 (U11) Pin	Destination	Voltage
K_RESET_B	R25	U12.16	2.5
K_WDT_WDI	P25	U12.20	2.5
K_WDT_WDO_B	AD11	U12.19	1.5

Table 15 : Kintex-7 Configuration

Signal Name	Kintex-7 (U11) Pin	Spartan-6 (U17) Pin	Flash (U13) Signal	Others	Volt.
K_CONF_A0	J23		A1		2.5
K_CONF_A1	K23		A2		2.5
K_CONF_A2	K22		A3		2.5
K_CONF_A3	L22		A4		2.5
K_CONF_A4	J25		A5		2.5
K_CONF_A5	J24		A6		2.5
K_CONF_A6	H22		A7		2.5
K_CONF_A7	H24		A8		2.5
K_CONF_A8	H23		A9		2.5
K_CONF_A9	G21		A10		2.5
K_CONF_A10	H21		A11		2.5
K_CONF_A11	H26		A12		2.5
K_CONF_A12	J26		A13		2.5
K_CONF_A13	E26		A14		2.5
K_CONF_A14	F25		A15		2.5
K_CONF_A15	G26		A16		2.5

K_CONF_A16	K17		A17		2.5
K_CONF_A17	K16		A18		2.5
K_CONF_A18	L20		A19		2.5
K_CONF_A19	J19		A20		2.5
K_CONF_A20	J18		A21		2.5
K_CONF_A21	J20		A22		2.5
K_CONF_A22	K20		A23		2.5
			A24	SW3.5	2.5
			A25	SW3.6	2.5
			A26	(N.C.)	2.5
			A27	(N.C.)	2.5
K_CONF_D0	B24	D1 (*)	D0		2.5
K_CONF_D1	A25	D2 (*)	D1		2.5
K_CONF_D2	B22	B1 (*)	D2		2.5
K_CONF_D3	A22	C3 (*)	D3		2.5
K_CONF_D4	A23	C4 (*)	D4		2.5
K_CONF_D5	A24	D3 (*)	D5		2.5
K_CONF_D6	D26	E4 (*)	D6		2.5
K_CONF_D7	C26	E5 (*)	D7		2.5
K_CONF_D8	C24	E3 (*)	D8		2.5
K_CONF_D9	D21	C1 (*)	D9		2.5
K_CONF_D10	C22	B2 (*)	D10		2.5
K_CONF_D11	B20	A2 (*)	D11		2.5
K_CONF_D12	A20	F3 (*)	D12		2.5
K_CONF_D13	E22	B3 (*)	D13		2.5
K_CONF_D14	C21	D5 (*)	D14		2.5
K_CONF_D15	B21	E6 (*)	D15		2.5
K_CONF_PROGRAM_B	P6	G3 (*)			2.5
K_CONF_INIT_B	G7	A4 (*)	/RST		2.5
K_CONF_DONE	J7	F5 (*)			2.5
K_CONF_CCLK	C8 (*)	J4 (*)	CLK (*)		2.5
K_CONF_PUDC_B	B25				2.5
K_CONF_EMCCLK	B26	F2 (*)			2.5
K_CONF_FCS_B	C23	E1 (*)	/CE		2.5
K_CONF_FOE_B	M17		/OE		2.5
K_CONF_FWE_B	L18		/WE		2.5

K_CONF_RDWR_B	E25	G1 (*)			2.5
K_CONF_ADV_B	D20		/ADV		2.5
K_CONF_CSI_B	G25	H2 (*)			2.5
K_CONF_DOUT_CSO_B	D25	F1 (*)			2.5
			WAIT	(N.C.)	2.5
			/WP	SW3.4	2.5
K_M0				SW3.1	2.5
K_M1				SW3.2	2.5
K_M2				SW3.3	2.5
K_JTAG_TCK	L8			CN5.6	2.5
K_JTAG_TDI	R6			CN5.10	2.5
K_JTAG_TDO	R7			CN5.8	2.5
K_JTAG_TMS	N8			CN5.4	2.5

(*) : Small resistor (100Ω or 22Ω) is inserted.

Table 16 : Kintex-7 DDR3

Signal Name	Kintex-7 (U11) Pin	DDR3 (U13) Signal	Volt.
K_DDR3_A0	AE1	A0	1.5
K_DDR3_A1	AB6	A1	1.5
K_DDR3_A2	AE3	A2	1.5
K_DDR3_A3	AC6	A3	1.5
K_DDR3_A4	Y6	A4	1.5
K_DDR3_A5	AD4	A5	1.5
K_DDR3_A6	AA5	A6	1.5
K_DDR3_A7	AF3	A7	1.5
K_DDR3_A8	AB5	A8	1.5
K_DDR3_A9	AF2	A9	1.5
K_DDR3_A10	AD3	A10	1.5
K_DDR3_A11	AC4	A11	1.5
K_DDR3_A12	AD1	A12	1.5
K_DDR3_A13	AE2	A13	1.5
K_DDR3_A14	AC3	A14	1.5
K_DDR3_BA0	AF4	BA0	1.5
K_DDR3_BA1	Y5	BA1	1.5
K_DDR3_BA2	AD5	BA2	1.5
K_DDR3_CKE	U2	CKE	1.5

K_DDR3_CK_N	W5	CK#	1.5
K_DDR3_CK_P	W6	CK	1.5
K_DDR3_CS_B	AE5	CS#	1.5
K_DDR3_RAS_B	AE6	RAS#	1.5
K_DDR3_CAS_B	AD6	CAS#	1.5
K_DDR3_WE_B	AF5	WE#	1.5
K_DDR3_ODT	U1	ODT	1.5
K_DDR3_RESET_B	AB7	RESET#	1.5
K_DDR3_DQ0	AA9	DQ0	1.5
K_DDR3_DQ1	AD9	DQ1	1.5
K_DDR3_DQ2	AB9	DQ2	1.5
K_DDR3_DQ3	AF7	DQ3	1.5
K_DDR3_DQ4	AA8	DQ4	1.5
K_DDR3_DQ5	AA7	DQ5	1.5
K_DDR3_DQ6	AE7	DQ6	1.5
K_DDR3_DQ7	AC7	DQ7	1.5
K_DDR3_DQ8	V9	DQ8	1.5
K_DDR3_DQ9	Y10	DQ9	1.5
K_DDR3_DQ10	V8	DQ10	1.5
K_DDR3_DQ11	Y11	DQ11	1.5
K_DDR3_DQ12	Y8	DQ12	1.5
K_DDR3_DQ13	V11	DQ13	1.5
K_DDR3_DQ14	V7	DQ14	1.5
K_DDR3_DQ15	W11	DQ15	1.5
K_DDR3_DQS0_N	AD8	LDQS#	1.5
K_DDR3_DQS0_P	AC8	LDQS	1.5
K_DDR3_DQS1_N	W9	UDQS#	1.5
K_DDR3_DQS1_P	W10	UDQS	1.5
K_DDR3_DM0	AC9	LDM	1.5
K_DDR3_DM1	Y7	UDM	1.5

Table 17 : Kintex-7 Switch

Signal Name	Kintex-7 (U11) Pin	Destination	Volt.
K_DIPSW_0	J21	SW5.1	2.5
K_DIPSW_1	N19	SW5.2	2.5
K_DIPSW_2	M16	SW5.3	2.5

K_DIPSW_3	M20	SW5.4	2.5
K_DIPSW_4	L17	SW5.5	2.5
K_DIPSW_5	N24	SW5.6	2.5
K_DIPSW_6	K21	SW5.7	2.5
K_DIPSW_7	E21	SW5.8	2.5
K_PUSHSW	L23	SW4	2.5

Table 18 : Kintex-7 FMC

Signal Name	Kintex-7 (U11) Pin	CN7 Pin	Volt.
K_FMC_CLK0_M2C_N	E17	G7	2.5
K_FMC_CLK0_M2C_P	F17	G6	2.5
K_FMC_CLK1_M2C_N	D18	D9	2.5
K_FMC_CLK1_M2C_P	E18	D8	2.5
K_FMC_LA00_CC_N	F10	G7	2.5
K_FMC_LA00_CC_P	G11	G6	2.5
K_FMC_LA01_CC_N	D11	D9	2.5
K_FMC_LA01_CC_P	E11	D8	2.5
K_FMC_LA02_N	E16	H8	2.5
K_FMC_LA02_P	E15	H7	2.5
K_FMC_LA03_N	D13	G10	2.5
K_FMC_LA03_P	D14	G9	2.5
K_FMC_LA04_N	F20	H11	2.5
K_FMC_LA04_P	G19	H10	2.5
K_FMC_LA05_N	D16	D12	2.5
K_FMC_LA05_P	D15	D11	2.5
K_FMC_LA06_N	B19	C11	2.5
K_FMC_LA06_P	C19	C10	2.5
K_FMC_LA07_N	A17	H14	2.5
K_FMC_LA07_P	B17	H13	2.5
K_FMC_LA08_N	E20	G13	2.5
K_FMC_LA08_P	F19	G12	2.5
K_FMC_LA09_N	A19	D15	2.5
K_FMC_LA09_P	A18	D14	2.5
K_FMC_LA10_N	C18	C15	2.5
K_FMC_LA10_P	C17	C14	2.5
K_FMC_LA11_N	G16	H17	2.5

K_FMC_LA11_P	H16	H16	2.5
K_FMC_LA12_N	B16	G16	2.5
K_FMC_LA12_P	C16	G15	2.5
K_FMC_LA13_N	A15	D18	2.5
K_FMC_LA13_P	B15	D17	2.5
K_FMC_LA14_N	F15	C19	2.5
K_FMC_LA14_P	G15	C18	2.5
K_FMC_LA15_N	A14	H20	2.5
K_FMC_LA15_P	B14	H19	2.5
K_FMC_LA16_N	E12	G19	2.5
K_FMC_LA16_P	E13	G18	2.5
K_FMC_LA17_CC_N	C11	D21	2.5
K_FMC_LA17_CC_P	C12	D20	2.5
K_FMC_LA18_CC_N	D10	C23	2.5
K_FMC_LA18_CC_P	E10	C22	2.5
K_FMC_LA19_N	D8	H23	2.5
K_FMC_LA19_P	D9	H22	2.5
K_FMC_LA20_N	G9	G22	2.5
K_FMC_LA20_P	G10	G21	2.5
K_FMC_LA21_N	A12	H26	2.5
K_FMC_LA21_P	A13	H25	2.5
K_FMC_LA22_N	F8	G25	2.5
K_FMC_LA22_P	F9	G24	2.5
K_FMC_LA23_N	J16	D24	2.5
K_FMC_LA23_P	J15	D23	2.5
K_FMC_LA24_N	H8	H29	2.5
K_FMC_LA24_P	H9	H28	2.5
K_FMC_LA25_N	F13	G28	2.5
K_FMC_LA25_P	F14	G27	2.5
K_FMC_LA26_N	H13	D27	2.5
K_FMC_LA26_P	J13	D26	2.5
K_FMC_LA27_N	B11	C27	2.5
K_FMC_LA27_P	B12	C26	2.5
K_FMC_LA28_N	B9	H32	2.5
K_FMC_LA28_P	C9	H31	2.5
K_FMC_LA29_N	A8	G31	2.5

K_FMC_LA29_P	A9	G30	2.5
K_FMC_LA30_N	F12	H35	2.5
K_FMC_LA30_P	G12	H34	2.5
K_FMC_LA31_N	J10	G34	2.5
K_FMC_LA31_P	J11	G33	2.5
K_FMC_LA32_N	A10	H38	2.5
K_FMC_LA32_P	B10	H37	2.5
K_FMC_LA33_N	G14	G37	2.5
K_FMC_LA33_P	H14	G36	2.5
K_FMC_PG_EN	U16	D1	2.5
K_FMC_PRSNT_B	J14	H2	2.5
K_FMC_SCL_2V5	C14	C30	2.5
K_FMC_SDA_2V5	C13	C31	2.5

Table 19 : Kintex-7 GPIO

Signal Name	Kintex-7 (U11) Pin	Destination	Volt.
K_HEADER_0	D19	CN8.1	2.5
K_HEADER_1	N17	CN8.2	2.5
K_HEADER_2	N16	CN8.3	2.5
K_HEADER_3	P24	CN8.4	2.5
K_HEADER_4_N	E23 (CC)	CN8.5	2.5
K_HEADER_4_P	F22 (CC)	CN8.6	2.5
K_HEADER_6_N	F23 (CC)	CN8.7	2.5
K_HEADER_6_P	G22 (CC)	CN8.8	2.5
K_HEADER_8_N	F24 (CC)	CN8.9	2.5
K_HEADER_8_P	G24 (CC)	CN8.10	2.5
K_CLK_EXT0_N	H18 (CC)	J24	2.5
K_CLK_EXT0_P	H17 (CC)	J23	2.5
K_CLK_EXT1_N	F18 (CC)	J26	2.5
K_CLK_EXT1_P	G17 (CC)	J25	2.5
K_RSVIO_0_N	D24 (CC)	TP29	2.5
K_RSVIO_0_P	D23 (CC)	TP28	2.5

(CC): Clock Capable pin

Table 20 : Kintex-7 LED

Signal Name	Kintex-7 (U11) Pin	Destination	Volt.
K_LED_0	G20	LED1	2.5

K_LED_1	L19	LED2	2.5
K_LED_2	K18	LED3	2.5
K_LED_3	H19	LED4	2.5
K_LED_4	K15	LED5	2.5
K_LED_5	P16	LED6	2.5
K_LED_6	T19	LED7	2.5
K_LED_7	T18	LED8	2.5
K_LED_8	H12	LED9	2.5
K_LED_9	H11	LED10	2.5

3.2. Spartan-6

Table 21 : Spartan-6 Clock

Signal Name	Spartan-6 (U17) Pin	Destination Pin	Volt.
S_CLK_OSC	M3	U20.3	2.5
S_CLK_INH_B	M1	U20.1	2.5

Table 22 : Spartan-6 Reset

Signal Name	Spartan-6 (U17) Pin	Destination Pin	Volt.
S_RESET_B	M8	U18.16	2.5
S_WDT_WDI	R9	U18.20	2.5
S_WDT_WDO_B	R22	U18.19	1.5

Table 23 : Spartan-6 Configuration

Signal Name	Spartan-6 (U17) Pin	Flash (U19)	Volt.
S_CONF_BUSY	T20		2.5
S_CONF_CCLK	Y21	CLK	2.5
S_CONF_CSI_B	AB20		2.5
S_CONF_CSO_B	T5		2.5
S_CONF_D0	AA20	D0	2.5
S_CONF_D1	U14	D1	2.5
S_CONF_D2	U13	D2	2.5
S_CONF_D3	AA6	D3	2.5
S_CONF_D4	AB6	D4	2.5
S_CONF_D5	W4	D5	2.5
S_CONF_D6	Y4	D6	2.5
S_CONF_D7	Y7	D7	2.5
S_CONF_DONE	Y22	/CE	2.5

S_CONF_HSWAPEN	A3		2.5
S_CONF_INIT_B	T6	OE, /RESET	2.5
S_CONF_M0	AA22		2.5
S_CONF_M1	U15		2.5
S_CONF_PROGRAM_B	AA1	/CF	2.5
S_CONF_RDWR_B	AB7		2.5

Table 24 : Spartan-6 Switch

Signal Name	Spartan-6 (U17) Pin	Destination	Volt.
S_DIPSW_0	R20	SW8.1	1.5
S_DIPSW_1	T21	SW8.2	1.5
S_DIPSW_2	U20	SW8.3	1.5
S_DIPSW_3	V21	SW8.4	1.5
S_DIPSW_4	W22	SW8.5	1.5
S_DIPSW_5	V22	SW8.6	1.5
S_DIPSW_6	U22	SW8.7	1.5
S_DIPSW_7	T22	SW8.8	1.5
S_PUSHSW	M19	SW7	1.5

Table 25 : Spartan-6 FMC

Signal Name	Spartan-6 (U17) Pin	CN12 Signal	Volt.
S_FMC_CLK0_M2C_N	K4	H5	2.5
S_FMC_CLK0_M2C_P	K5	H4	2.5
S_FMC_CLK1_M2C_N	J1	G3	2.5
S_FMC_CLK1_M2C_P	J3	G2	2.5
S_FMC_LA00_CC_N	AB11	G7	2.5
S_FMC_LA00_CC_P	Y11	G6	2.5
S_FMC_LA01_CC_N	Y12	D9	2.5
S_FMC_LA01_CC_P	W12	D8	2.5
S_FMC_LA02_N	AB2	H8	2.5
S_FMC_LA02_P	AA2	H7	2.5
S_FMC_LA03_N	AB3	G10	2.5
S_FMC_LA03_P	Y3	G9	2.5
S_FMC_LA04_N	AB4	H11	2.5
S_FMC_LA04_P	AA4	H10	2.5
S_FMC_LA05_N	Y8	D12	2.5

S_FMC_LA05_P	W9	D11	2.5
S_FMC_LA06_N	V9	C11	2.5
S_FMC_LA06_P	U9	C10	2.5
S_FMC_LA07_N	AB8	H14	2.5
S_FMC_LA07_P	AA8	H13	2.5
S_FMC_LA08_N	V5	G13	2.5
S_FMC_LA08_P	U6	G12	2.5
S_FMC_LA09_N	AB9	D15	2.5
S_FMC_LA09_P	Y9	D14	2.5
S_FMC_LA10_N	Y10	C15	2.5
S_FMC_LA10_P	W10	C14	2.5
S_FMC_LA11_N	V7	H17	2.5
S_FMC_LA11_P	W8	H16	2.5
S_FMC_LA12_N	AB10	G16	2.5
S_FMC_LA12_P	AA10	G15	2.5
S_FMC_LA13_N	T11	D18	2.5
S_FMC_LA13_P	R11	D17	2.5
S_FMC_LA14_N	W11	C19	2.5
S_FMC_LA14_P	V11	C18	2.5
S_FMC_LA15_N	R13	H20	2.5
S_FMC_LA15_P	T14	H19	2.5
S_FMC_LA16_N	W13	G19	2.5
S_FMC_LA16_P	V13	G18	2.5
S_FMC_LA17_CC_N	AB12	D21	2.5
S_FMC_LA17_CC_P	AA12	D20	2.5
S_FMC_LA18_CC_N	AB13	C23	2.5
S_FMC_LA18_CC_P	Y13	C22	2.5
S_FMC_LA19_N	U16	H23	2.5
S_FMC_LA19_P	U17	H22	2.5
S_FMC_LA20_N	T15	G22	2.5
S_FMC_LA20_P	T16	G21	2.5
S_FMC_LA21_N	AB15	H26	2.5
S_FMC_LA21_P	Y15	H25	2.5
S_FMC_LA22_N	AB14	G25	2.5
S_FMC_LA22_P	AA14	G24	2.5
S_FMC_LA23_N	Y14	D24	2.5

S_FMC_LA23_P	W14	D23	2.5
S_FMC_LA24_N	AB17	H29	2.5
S_FMC_LA24_P	Y17	H28	2.5
S_FMC_LA25_N	AB16	G28	2.5
S_FMC_LA25_P	AA16	G27	2.5
S_FMC_LA26_N	W17	D27	2.5
S_FMC_LA26_P	V17	D26	2.5
S_FMC_LA27_N	T17	C27	2.5
S_FMC_LA27_P	T18	C26	2.5
S_FMC_LA28_N	Y18	H32	2.5
S_FMC_LA28_P	W18	H31	2.5
S_FMC_LA29_N	R15	G31	2.5
S_FMC_LA29_P	R16	G30	2.5
S_FMC_LA30_N	AB19	H35	2.5
S_FMC_LA30_P	Y19	H34	2.5
S_FMC_LA31_N	AB18	G34	2.5
S_FMC_LA31_P	AA18	G33	2.5
S_FMC_LA32_N	AB21	H38	2.5
S_FMC_LA32_P	AA21	H37	2.5
S_FMC_LA33_N	V18	G37	2.5
S_FMC_LA33_P	V19	G36	2.5
S_FMC_PG_EN	R8	D1	2.5
S_FMC_PRSNT_B	Y2	H2	2.5
S_FMC_SCL	V15	C30	2.5
S_FMC_SDA	T7	C31	2.5

Table 26 : Spartan-6 FTDI

Signal Name	Spartan-6 (U17) Pin	FTDI (U21) Pin	Volt.
S_FTDI_ACBUS0_RXF_B	H1	26	2.5
S_FTDI_ACBUS1_TXE_B	P5	27	2.5
S_FTDI_ACBUS2_RD_B	L6	28	2.5
S_FTDI_ACBUS3_WR_B	M5	29	2.5
S_FTDI_ACBUS4_SIWUA	L3	30	2.5
S_FTDI_ACBUS5_CLKOUT	K3	32	2.5
S_FTDI_ACBUS6_OE_B	L1	33	2.5
S_FTDI_ACBUS7	M6	34	2.5

S_FTDI_ADBUS0_D0	N4	16	2.5
S_FTDI_ADBUS1_D1	H4	17	2.5
S_FTDI_ADBUS2_D2	M2	18	2.5
S_FTDI_ADBUS3_D3	H3	19	2.5
S_FTDI_ADBUS4_D4	K6	21	2.5
S_FTDI_ADBUS5_D5	M4	22	2.5
S_FTDI_ADBUS6_D6	K2	23	2.5
S_FTDI_ADBUS7_D7	K1	24	2.5
S_FTDI_BCBUS0_RXF_B	T2	48	2.5
S_FTDI_BCBUS1_TXE_B	U1	52	2.5
S_FTDI_BCBUS2_RD_B	V2	53	2.5
S_FTDI_BCBUS3_WR_B	T3	54	2.5
S_FTDI_BCBUS4_SIWUB	V1	55	2.5
S_FTDI_BCBUS5	U4	57	2.5
S_FTDI_BCBUS6	T1	58	2.5
S_FTDI_BCBUS7_PWRSAV	V3	59	2.5
S_FTDI_BDBUS0_D0	P4	38	2.5
S_FTDI_BDBUS1_D1	N1	39	2.5
S_FTDI_BDBUS2_D2	P1	40	2.5
S_FTDI_BDBUS3_D3	P2	41	2.5
S_FTDI_BDBUS4_D4	R4	43	2.5
S_FTDI_BDBUS5_D5	R1	44	2.5
S_FTDI_BDBUS6_D6	R3	45	2.5
S_FTDI_BDBUS7_D7	T4	46	2.5
S_FTDI_PWREN_B	U3	60	2.5
S_FTDI_RESET_B	P3	14	2.5
S_FTDI_SUSPEND_B	N3	36	2.5

Table 27 : Spartan-6 GPIO

Signal Name	Spartan-6 (U17) Pin	Destination	Volt.
S_HEADER_0	F7	CN13.1	2.5
S_HEADER_1	G4	CN13.2	2.5
S_HEADER_2	G6	CN13.3	2.5
S_HEADER_3	G7	CN13.4	2.5
S_HEADER_4_N	A18	CN13.5	2.5
S_HEADER_4_P	B18	CN13.6	2.5

S_HEADER_6_N	H8	CN13.7	2.5
S_HEADER_6_P	J7	CN13.8	2.5
S_HEADER_8_N	K8	CN13.9	2.5
S_HEADER_8_P	K7	CN13.10	2.5
S_CLK_EXT0_N	C12 (CC)	J29	2.5
S_CLK_EXT0_P	D11 (CC)	J28	2.5
S_CLK_EXT1_N	A11 (CC)	J31	2.5
S_CLK_EXT1_P	C11 (CC)	J30	2.5
K_RSVIO_0	N7	TP33	2.5

(CC): Clock Capable pin

Table 28 : Spartan-6 LED

Signal Name	Spartan-6 (U17) Pin	Destination	Volt.
S_LED_0	N22	LED11	1.5
S_LED_1	N20	LED12	1.5
S_LED_2	P20	LED13	1.5
S_LED_3	P22	LED14	1.5
S_LED_4	P21	LED15	1.5
S_LED_5	H5	LED16	2.5
S_LED_6	H6	LED17	2.5
S_LED_7	J6	LED18	2.5
S_LED_8	N6	LED19	2.5
S_LED_9	M7	LED20	2.5

3.3. FPGA Interconnects

Table 29 : FPGA Interconnects

Signal Name	Kintex-7 (U11)	Spartan-6 (U17)	Voltage
KS_HPIC_00_N	W4	D22	1.5
KS_HPIC_00_P	V4	D21	1.5
KS_HPIC_01_N	V1	B20	1.5
KS_HPIC_01_P	V2	C19	1.5
KS_HPIC_02_N	Y1	B22	1.5
KS_HPIC_02_P	W1	B21	1.5
KS_HPIC_03_N	AC1	D20	1.5
KS_HPIC_03_P	AB1	D19	1.5
KS_HPIC_04_N	Y2	C22	1.5
KS_HPIC_04_P	Y3	C20	1.5

KS_HPIC_05_N	V6	F19	1.5
KS_HPIC_05_P	U7	F18	1.5
KS_HPIC_06_N	W3	A21	1.5
KS_HPIC_06_P	V3	A20	1.5
KS_HPIC_07_N	AF9	F22	1.5
KS_HPIC_07_P	AF10	F21	1.5
KS_HPIC_08_N	AD13	K19 (CC)	1.5
KS_HPIC_08_P	AC13	K20 (CC)	1.5
KS_HPIC_09_N	AF12	H22 (CC)	1.5
KS_HPIC_09_P	AE12	H21 (CC)	1.5
KS_HPIC_10_N	U5	L19 (CC)	1.5
KS_HPIC_10_P	U6	M20 (CC)	1.5
KS_HPIC_11_N	AF13	J22 (CC)	1.5
KS_HPIC_11_P	AE13	J20 (CC)	1.5
KS_HPIC_12_N	AB10 (CC)	J19	1.5
KS_HPIC_12_P	AA10 (CC)	H20	1.5
KS_HPIC_13_N	AC12 (CC)	L22	1.5
KS_HPIC_13_P	AB12 (CC)	L20	1.5
KS_HPIC_14_N	AB4 (CC)	E22	1.5
KS_HPIC_14_P	AA4 (CC)	E20	1.5
KS_HPIC_15_N	AF8	F20	1.5
KS_HPIC_15_P	AE8	G19	1.5
KS_HPIC_16_N	AE10	G22	1.5
KS_HPIC_16_P	AD10	G20	1.5
KS_HPIC_17_N	Y12	H18	1.5
KS_HPIC_17_P	Y13	H19	1.5
KS_HPIC_18_N	AA12	M22	1.5
KS_HPIC_18_P	AA13	M21	1.5
KS_HPIC_CLK_N	AC11 (CC)	K22	1.5
KS_HPIC_CLK_P	AB11 (CC)	K21	1.5
KS_HRIC_00_N	T23	C8	2.5
KS_HRIC_00_P	T22	D9	2.5
KS_HRIC_01_N	L24	A15	2.5
KS_HRIC_01_P	M24	C15	2.5
KS_HRIC_02_N	K26	D17	2.5
KS_HRIC_02_P	K25	E16	2.5

KS_HRIC_03_N	P26	A14	2.5
KS_HRIC_03_P	R26	B14	2.5
KS_HRIC_04_N	L25	A17	2.5
KS_HRIC_04_P	M25	C17	2.5
KS_HRIC_05_N	T17	D8	2.5
KS_HRIC_05_P	U17	D7	2.5
KS_HRIC_06_N	M26	A16	2.5
KS_HRIC_06_P	N26	B16	2.5
KS_HRIC_07_N	R17	A6	2.5
KS_HRIC_07_P	R16	B6	2.5
KS_HRIC_08_N	R20	A10 (CC)	2.5
KS_HRIC_08_P	T20	B10 (CC)	2.5
KS_HRIC_09_N	R23 (CC)	A12 (CC)	2.5
KS_HRIC_09_P	R22 (CC)	B12 (CC)	2.5
KS_HRIC_10_N	M22	A7	2.5
KS_HRIC_10_P	M21	C7	2.5
KS_HRIC_11_N	T25	C14	2.5
KS_HRIC_11_P	T24	D14	2.5
KS_HRIC_12_N	N23 (CC)	C16	2.5
KS_HRIC_12_P	P23 (CC)	D15	2.5
KS_HRIC_13_N	N22 (CC)	A13	2.5
KS_HRIC_13_P	N21 (CC)	C13	2.5
KS_HRIC_14_N	P21 (CC)	C10	2.5
KS_HRIC_14_P	R21 (CC)	D10	2.5
KS_HRIC_15_N	M19	C6	2.5
KS_HRIC_15_P	N18	D6	2.5
KS_HRIC_16_N	P18	A5	2.5
KS_HRIC_16_P	R18	C5	2.5
KS_HRIC_17_N	U20	A8	2.5
KS_HRIC_17_P	U19	B8	2.5
KS_HRIC_18_N	P20	A9	2.5
KS_HRIC_18_P	P19	C9	2.5

(CC) Clock Capable pin

4. Parts List, Schematic, and Board Layout

Table 30 : Parts List

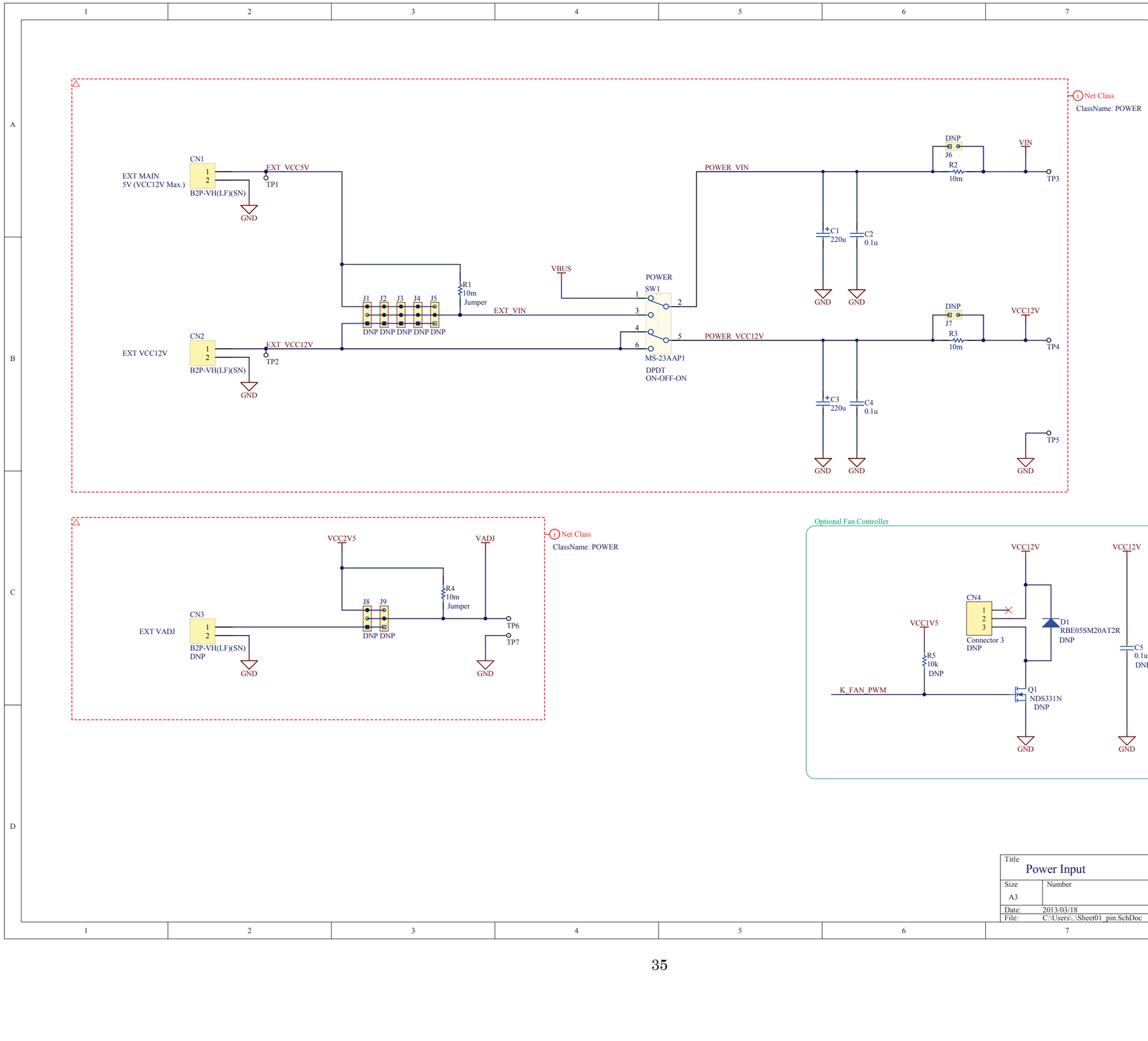
Description	Part Number	Maker	Reference Designator	Spec.
Capacitor	UCD1C221MCL1GS	Nichicon	C1, C3	220u
Capacitor	GRM155B31C104KA87D	Murata	C2, C4, C10, C19, C27, C37, C47, C68, C87, C94, C105, C110, C111, C144, C146, C147, C149, C150, C151, C152, C153, C154, C155, C156, C157, C158, C159, C160, C161, C162, C163, C164, C165, C166, C167, C168, C169, C170, C171, C172, C173, C174, C202, C238, C239, C240, C241, C242, C243, C244, C245, C257, C263, C264, C270, C271, C272, C274, C275, C276, C277, C283	0.1u
Capacitor	LMK107BJ106MALTD	Taiyo Yuden	C6, C51, C56, C72, C77, C84, C86, C89, C90, C91, C145, C148, C175, C189, C192, C246, C247, C262, C265	10u
Capacitor	NFM18PC105R0J3	Murata	C7, C8, C188, C191, C261, C267, C269, C273, C278	1u
Capacitor	GRM155B11E103KA01D	Murata	C9, C60, C81, C114, C115, C116, C117, C187, C190, C260	0.01u
Capacitor	GRM188B31E105KA75D	Murata	C11, C12, C13, C14, C183, C184, C255, C256	1u
Capacitor	16SVP150M	SANYO	C20, C30, C40, C61	150u
Capacitor	GRM31CR71C106KAC7L	Murata	C21, C22, C28, C31, C32, C38, C41, C42, C48, C62, C63, C69	10u
Capacitor	C3216JB0J476M	TDK	C23, C24, C33, C34, C43, C44, C53, C64, C65, C74	47u
Capacitor	6SVP220M	SANYO	C25, C35, C45, C66	220u
Capacitor	GRM1552C1H101JZ01D	Murata	C29, C39, C49, C70	100p
Capacitor	T520V337M2R5ATE025	Kemet	C52, C73, C79, C120, C121, C122	330u
Capacitor	EMK107BJ225KA-T	Taiyo Yuden	C54, C75	2.2u
Capacitor	GRM188R60J475ME19D	Murata	C55, C76, C85, C123, C124, C125, C126, C127, C129, C130, C131, C133, C134, C137, C138, C139, C141, C205, C209, C214, C220, C228, C229, C236, C266,	4.7u

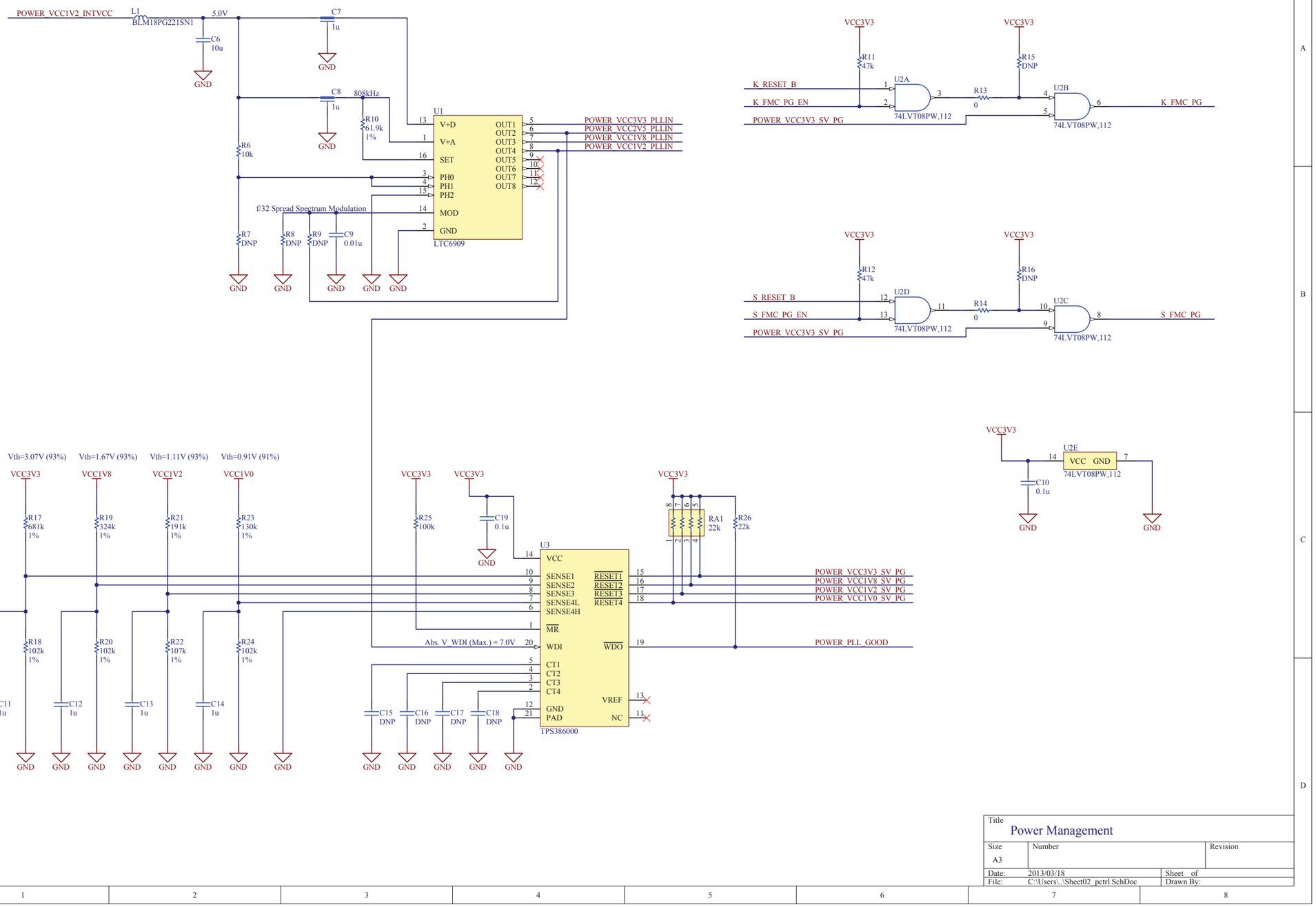
			C268	
Capacitor	GRM32ER60J107ME20L	Murata	C57, C78, C106, C107, C108, C109, C112, C113, C118, C119, C128, C132, C204, C208, C213, C219, C230, C237	100u
Capacitor	GRM155B11H102KA01D	Murata	C59, C80, C82, C83, C96, C97, C98, C99, C100, C193, C194, C195, C196, C197	1000p
Capacitor	GRM1552C1H100JZ01D	Murata	C88	10p
Capacitor	T520B476M006ATE070	Kemet	C95, C135, C136, C140	47u
Capacitor	GRM155B31A105KE15D	Murata	C176, C177, C178, C179, C180, C181, C182, C185, C186, C248, C249, C250, C251, C252, C253, C254, C258, C259	1u
Capacitor	GRM155R60J474KE19D	Murata	C206, C207, C210, C211, C212, C215, C216, C217, C218, C221, C222, C223, C224, C225, C226, C227, C231, C232	0.47u
Capacitor	GRM1552C1H220JZ01D	Murata	C281, C282	22p
Connector	B2P-VH(LF)(SN)	JST	CN1, CN2	
Connector	87832-1420	Molex	CN5, CN10	
Connector	ASP-134603-01	Samtec	CN7, CN12	
Header	TSW-114-07-L-S	Samtec	CN8, CN13	
Connector	XM7B-0442	Omron	CN15	
EMI Filter	DLW21HN900SQ2	Murata	EMI1	
EMI Filter	ACM90V-701-2PL-TL00	TDK	EMI2	
Fuse	0437 .750WR	Littlefuse	F1	0.75A
SMA Jack	901-144	Amphenol	J18, J19, J23, J24, J25, J26, J28, J29, J30, J31	
Inductor	BLM18PG221SN1	Murata	L1, L3, L4, L5, L6, L7, L8, L9, L10	
Resistor	MCR01MZPJ000	Rohm	L2, R324	0
LED	SML-310MTT8	Rohm	LED1, LED2, LED3, LED4, LED5, LED6, LED7, LED8, LED9, LED10, LED11, LED12, LED13, LED14, LED15, LED16, LED17, LED18, LED19, LED20, LED21, LED22, LED23, LED24, LED25, LED26, LED27, LED28, LED29, LED30, LED31, LED32, LED33, LED34, LED35, LED36, LED37	
FET	NDS331N	FAIRCHILD	Q2, Q3, Q4, Q5, Q6, Q7, Q8, Q9, Q12, Q13, Q14, Q15, Q18, Q19, Q20, Q21, Q22	

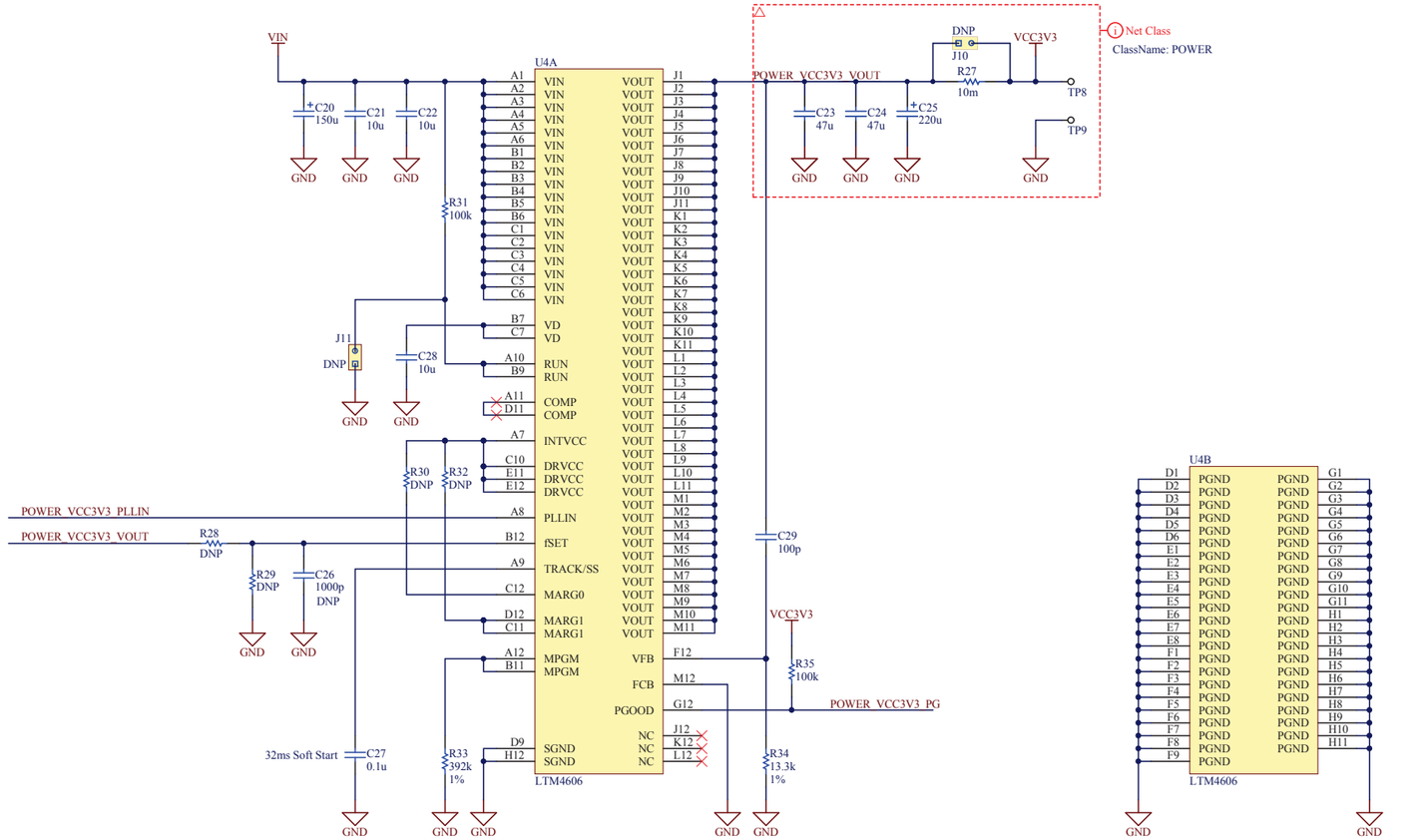
FET	NDS332P	FAIRCHILD	Q10, Q11, Q16, Q17	
Resistor	UR73D3ATTP10L0F	KOA	R1, R2, R3, R4, R27, R36, R44, R52, R55, R65	10m
Resistor	MCR01MZPF1002	Rohm	R6, R106, R136, R137, R139, R199, R268, R272, R273, R275, R294, R316, R318, R319	10k
Resistor	ERJ2RKF6192X	Panasonic	R10	61.9k
Resistor	MCR01MZPF4702	Rohm	R11, R12	47k
Resistor	MCR01MZPJ000	Rohm	R13, R14, R107, R135, R173, R174, R175, R176, R177, R178, R179, R180, R181, R182, R183, R184, R185, R186, R187, R188, R189, R190, R191, R192, R215, R278, R320, R323, R325, R326, R327	0
Resistor	ERJ2RKF6813X	Panasonic	R17	681k
Resistor	ERJ2RKF1023X	Panasonic	R18, R20, R24, R100, R102, R262, R264	102k
Resistor	ERJ2RKF3243X	Panasonic	R19, R97, R99, R101, R259, R261	324k
Resistor	ERJ2RKF1913X	Panasonic	R21	191k
Resistor	ERJ2RKF1073X	Panasonic	R22	107k
Resistor	MCR01MZPF1303	Rohm	R23	130k
Resistor	MCR01MZPF1003	Rohm	R25, R31, R35, R43, R51, R59, R63, R74	100k
Resistor	MCR01MZPF2202	Rohm	R26, R108, R109, R269, R270, R321, R322	22k
Resistor	ERJ2RKF3923X	Panasonic	R33, R41, R49, R61	392k
Resistor	ERJ2RKF1332X	Panasonic	R34	13.3k
Resistor	ERJ2RKF1912X	Panasonic	R42	19.1k
Resistor	ERJ2RKF3012X	Panasonic	R50	30.1k
Resistor	MCR01MZPF5102	Rohm	R53, R68	51k
Resistor	MCR01MZPF1001	Rohm	R54, R70	1.00k
Resistor	ERJ2RKF6042X	Panasonic	R62	60.4k
Resistor	MCR01MZPF102	Rohm	R71, R72	10.0k
Resistor	MCR01MZPF10R0	Rohm	R73	10
Resistor	MCR01MZPF1001	Rohm	R75, R91, R93, R112, R113, R141, R142, R212, R218, R220, R221, R222, R223, R307, R314	1k
Resistor	MCR01MZPF3301	Rohm	R76	3.3k
Resistor	RK73B1ETTP151J	KOA	R77, R86, R87, R88, R202, R203, R204, R205, R206, R207, R208, R209, R210, R211, R248, R249, R250, R297, R298,	150

			R299, R300, R301, R302, R303, R304, R305, R306	
Resistor			R78, R79, R80, R81, R82, R83, R84, R85	560
Resistor	RK73B1ETTP331J	KOA	R92, R140, R256, R308	330
Resistor	MCR01MZPF4701	Rohm	R94, R130, R131, R132, R133, R134, R167, R169, R171, R198, R213, R257, R293, R309	4.7k
Resistor	MCR01MZPF22R0	Rohm	R95, R96, R224, R228, R279, R280, R281, R282, R283, R284, R285, R286	22
Resistor	ERJ2RKF6812X	Panasonic	R98, R260	68.1k
Resistor	ERJ2RKF2103X	Panasonic	R103	210k
Resistor	ERJ2RKF2052X	Panasonic	R104	20.5k
Resistor	ERJ2RKF1373X	Panasonic	R105	137k
Resistor	MCR03EZPFX1000	Rohm	R110, R111, R115, R116, R276, R277	100
Resistor	MCR01MZPF1000	Rohm	R119, R120, R121, R122, R123, R124, R125, R126, R170	100
Resistor	ERJ2RKF49R9X	Panasonic	R143, R144, R145, R146, R147, R148, R149, R150, R151, R152, R153, R154, R155, R156, R157, R158, R159, R160, R161, R162, R163, R164, R165, R166	49.9
Resistor	MCR01MZPF2400	Rohm	R172	240
Resistor	MCR03EZPJ101	Rohm	R216, R225, R226, R227, R229, R230, R231, R232, R233, R234, R235, R236, R237, R238, R239, R240, R241, R242, R243, R244, R245, R246, R247	100
Resistor	ERJ2RKF2553X	Panasonic	R263	255k
Resistor	ERJ2RKF2263X	Panasonic	R265	226k
Resistor	ERJ2RKF1622X	Panasonic	R266	16.2k
Resistor	MCR01MZPF1103	Rohm	R267	110k
Resistor	MCR18EZPJ000	Rohm	R310	0
Resistor	MCR01MZPF1202	Rohm	R315	12.0k
Resistor	MCR01MZPF2201	Rohm	R317	2.2k
Resistor Array	MNR04M0APJ223	Rohm	RA1, RA7, RA8, RA9, RA10, RA11, RA12, RA13, RA14	22k
Resistor Array	MNR04M0APJ102	Rohm	RA2, RA3, RA4, RA5, RA6	1k
Switch	MS-23AAP1	NKK	SW1	
Switch	B3FS-1000	Omron	SW2, SW4, SW6, SW7	

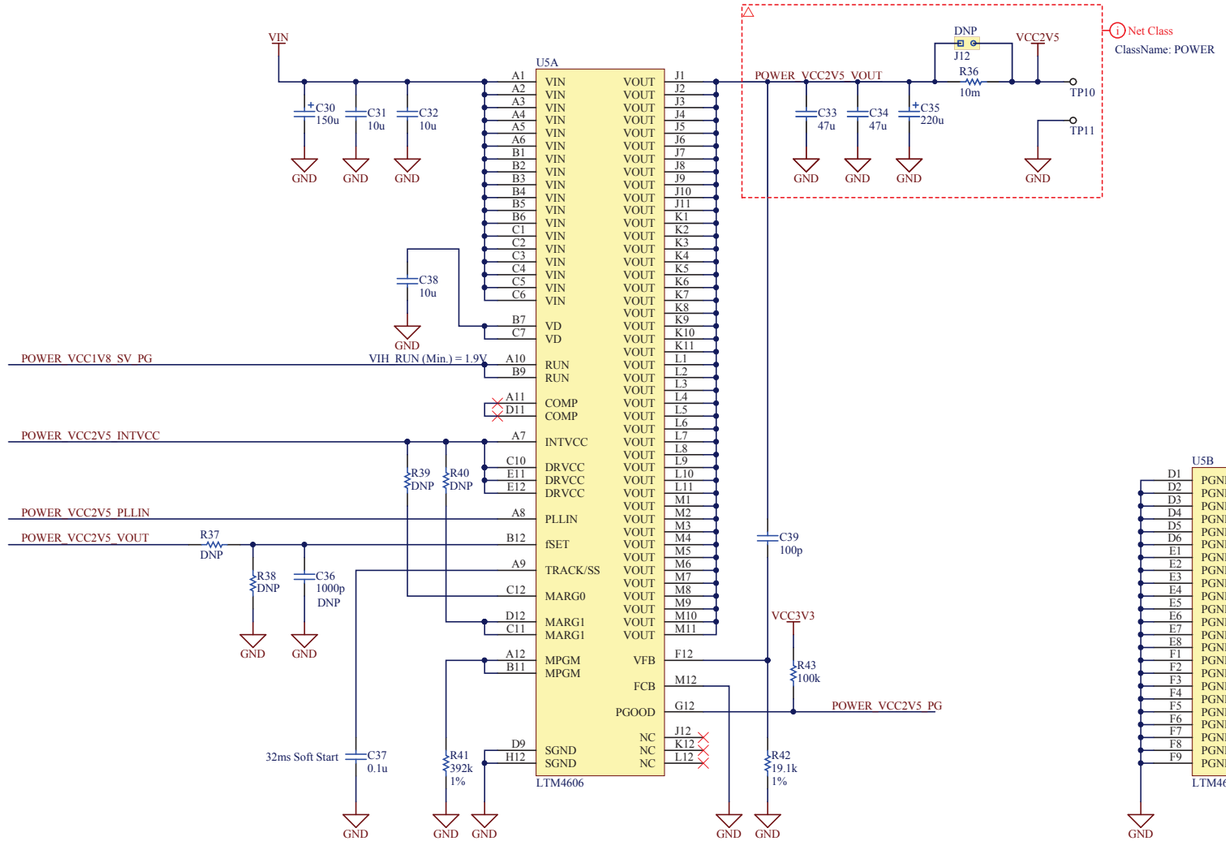
Switch	A6H-8102	Omron	SW3, SW5, SW8	
Test Pin	HK-2-G	MAC8	TP5, TP7, TP9, TP11, TP13, TP15, TP18, TP20, TP24, TP30, TP31, TP35, TP36	
IC	LTC6909CMS#PBF	LT	U1	
IC	74LVT08PW,112	NXP	U2	
IC	TPS386000RGPT	TI	U3, U12, U18	
IC	LTM4606EV#PBF	LT	U4, U5, U6, U8	
IC	LT3071EUFD#PBF	LT	U7, U9	
IC	TPS51200DRCR	TI	U10	
FPGA	XC7K160T-1FBG676C	Xilinx	U11	
IC	PC28F640P30TF65	Micron	U13	
IC	MT41J64M16JT-15E:G	Micron	U14	
Oscillator	KC7050T200.000L20E00	KYOCERA	U15, U16	200.000MHz
FPGA	XC6SLX45-2FG484C	Xilinx	U17	
IC	XCF32PVOG48C	Xilinx	U19	
Oscillator	KC5032C24.0000C20E00	KYOCERA	U20	24.000MHz
IC	FT2232HL-REEL	FTDI	U21	
Crystal Unit	NX3225DA-12.000MHz	NDK	U22	12.000MHz
IC	AT93C46D-TH-B	Atmel	U23	
Variable Resistor	ST32ETA103	Copal Electronics	VR1	10k


Net Class
ClassName: POWER
CN1
EXT MAIN
5V (VCC12V Max.)
B2P-VH(LF)(SN)
EXT_VCC5V
TP1
GND
CN2
EXT VCC12V
B2P-VH(LF)(SN)
EXT_VCC12V
TP2
GND
J1 J2 J3 J4 J5
DNP DNP DNP DNP DNP
R1
10m
Jumper
EXT_VIN
VBUS
POWER
SW1
MS-23AAP1
DPDT
ON-OFF-ON
POWER_VIN
POWER_VCC12V
DNP
J6
R2
10m
VIN
TP3
C1
220u
C2
0.1u
GND
DNP
J7
R3
10m
VCC12V
TP4
C3
220u
C4
0.1u
TP5
GND
Net Class
ClassName: POWER
CN3
EXT VADJ
B2P-VH(LF)(SN)
DNP
VCC2V5
VADJ
J8 J9
DNP DNP
R4
10m
Jumper
TP6
TP7
GND
Optional Fan Controller
CN4
Connector 3
DNP
VCC12V
VCC1V5
D1
RBE05SM20AT2R
DNP
C5
0.1u
DNP
R5
10k
DNP
K_FAN_PWM
Q1
NDS331N
DNP
GND
Title
Power Input
Size
A3
Number
Revision
Date: 2013/03/18
Sheet of
File: C:\Users\..\Sheet01_pin.SchDoc
Drawn By:


POWER_VCC1V2_INTVCC
L1
BLM18PG221SN1
5.0V
C6
10u
C7
1u
C8
1u
808kHz
R10
61.9k
1%
R6
10k
U1
V+D
V+A
SET
PH0
PH1
PH2
MOD
GND
OUT1
OUT2
OUT3
OUT4
OUT5
OUT6
OUT7
OUT8
LTC6909
f/32 Spread Spectrum Modulation
R7
DNP
R8
DNP
R9
DNP
C9
0.01u
POWER_VCC3V3_PLLIN
POWER_VCC2V5_PLLIN
POWER_VCC1V8_PLLIN
POWER_VCC1V2_PLLIN
VCC3V3
R11
47k
R15
DNP
K_RESET_B
K_FMC_PG_EN
POWER_VCC3V3_SV_PG
U2A
R13
0
U2B
74LVT08PW,112
K_FMC_PG
R12
47k
R16
DNP
S_RESET_B
S_FMC_PG_EN
U2D
U2C
S_FMC_PG
Vth=3.07V (93%)
Vth=1.67V (93%)
Vth=1.11V (93%)
Vth=0.91V (91%)
VCC1V8
VCC1V2
VCC1V0
R17
681k
1%
R19
324k
1%
R21
191k
1%
R23
130k
1%
R25
100k
C19
0.1u
RA1
22k
R26
22k
U3
VCC
SENSE1
SENSE2
SENSE3
SENSE4L
SENSE4H
MR
WDI
CT1
CT2
CT3
CT4
GND
PAD
RESET1
RESET2
RESET3
RESET4
WDO
VREF
NC
TPS386000
Abs. V_WDI (Max.) = 7.0V
POWER_VCC3V3_SV_PG
POWER_VCC1V8_SV_PG
POWER_VCC1V2_SV_PG
POWER_VCC1V0_SV_PG
POWER_PLL_GOOD
R18
102k
1%
R20
102k
1%
R22
107k
1%
R24
102k
1%
C11
1u
C12
1u
C13
1u
C14
1u
C15
DNP
C16
DNP
C17
DNP
C18
DNP
U2E
C10
0.1u
Title
Power Management
Size
A3
Number
Revision
Date:
2013/03/18
Sheet of
File:
C:\Users\..\Sheet02_pctrl.SchDoc
Drawn By:



Title	Power 3.3V		
Size	Number		Revision
A3			
Date:	2013/03/18	Sheet of	
File:	C:\Users\..\Sheet03_p3v3.SchDoc	Drawn By:	

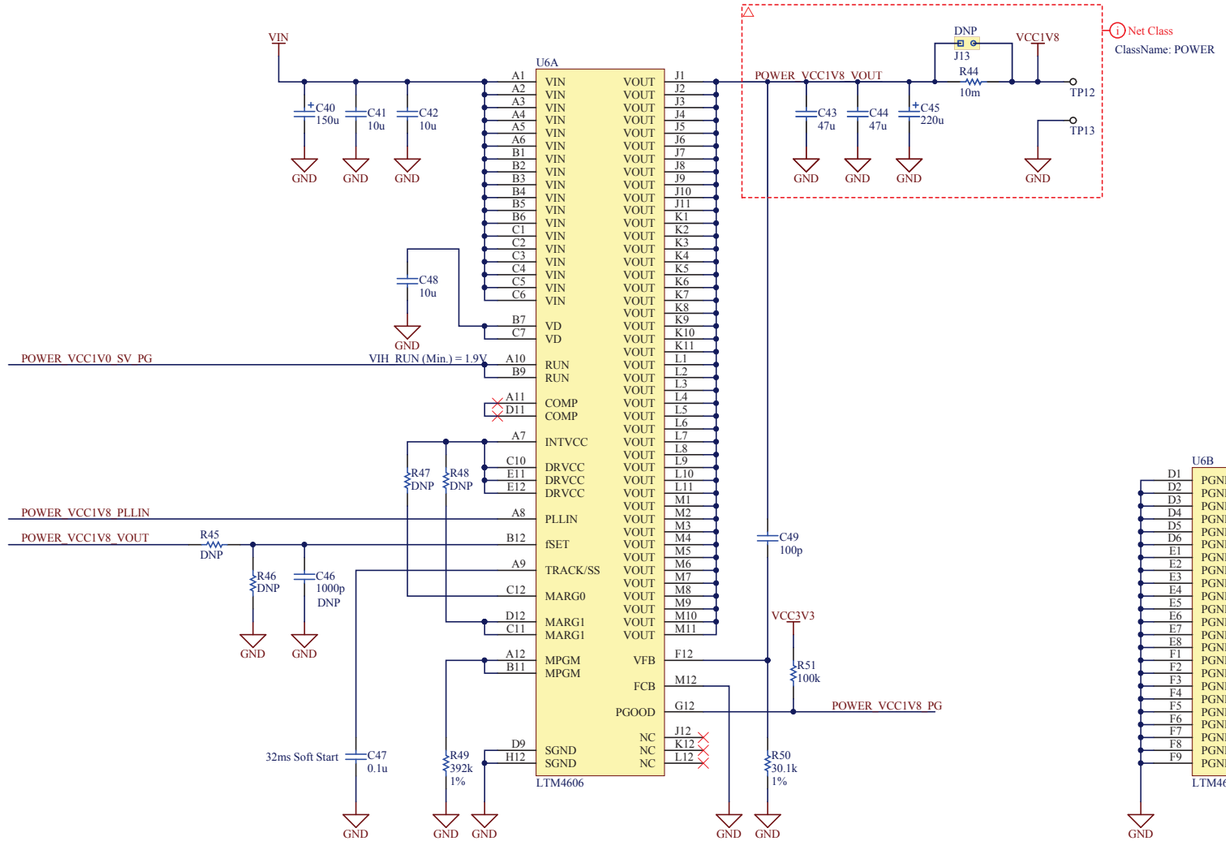


1	2	3	4	5	6	7	8

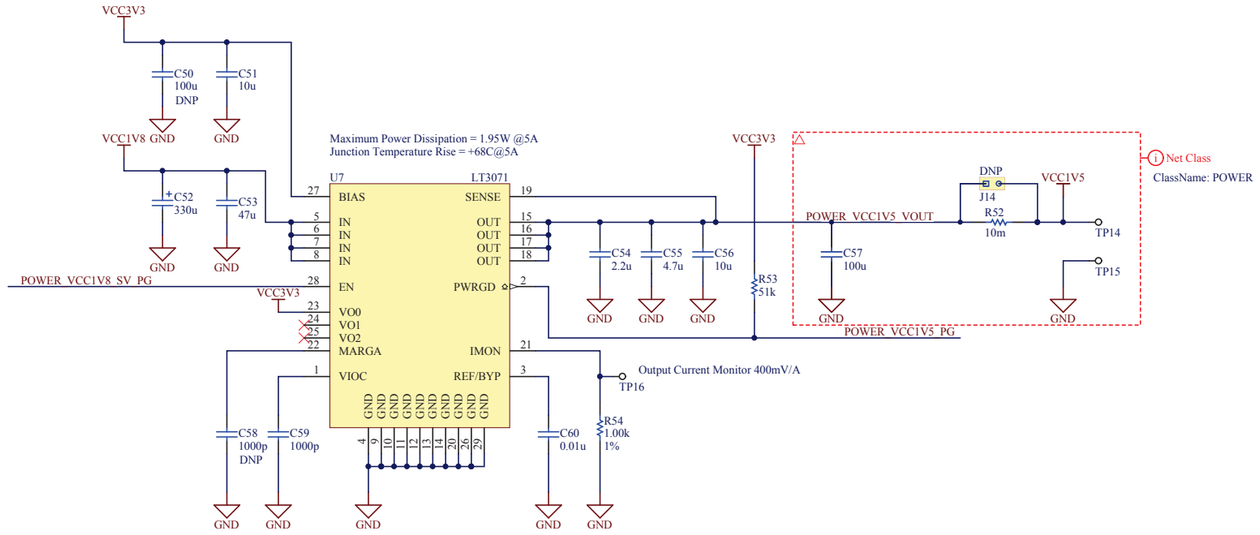
Title: Power 2.5V

Size	Number	Revision
A3		

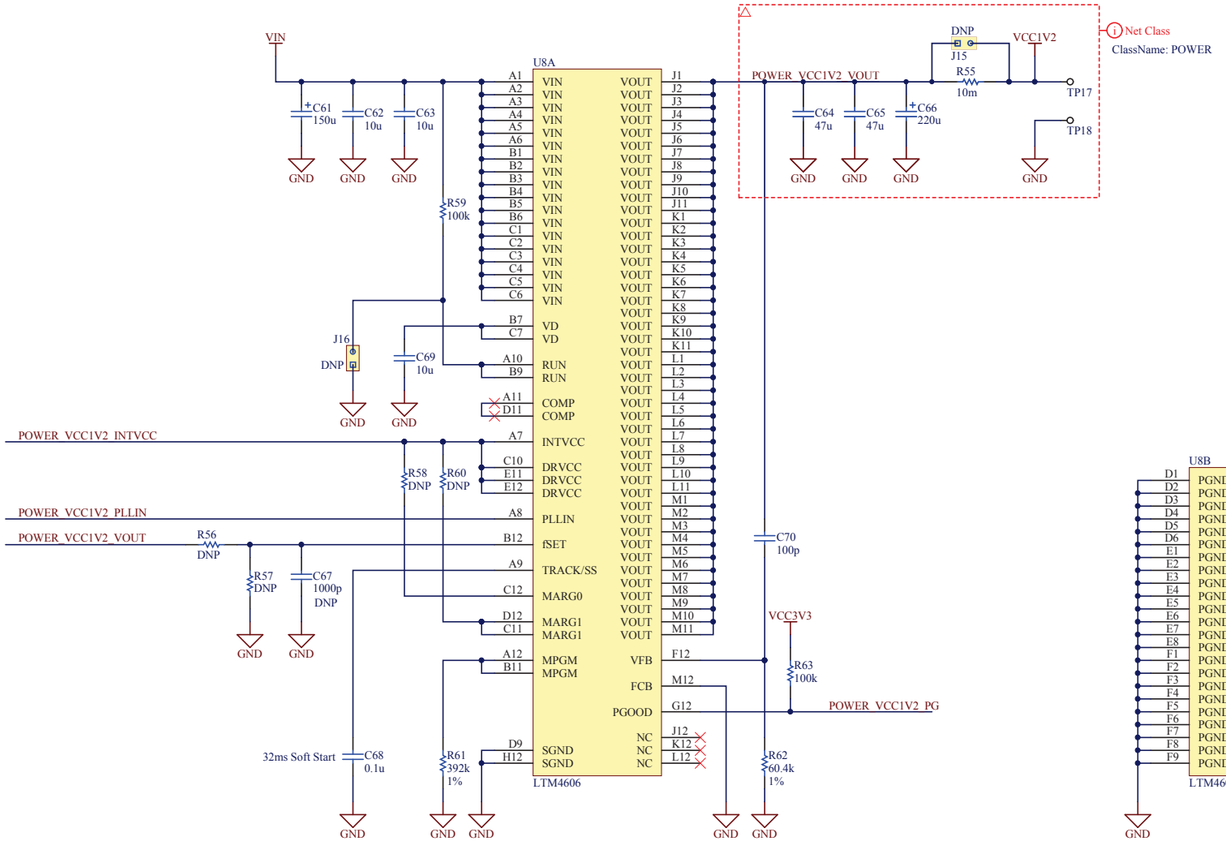
Date:	2013/03/18	Sheet of	
File:	C:\Users\..\Sheet04_p2v5.SchDoc	Drawn By:	



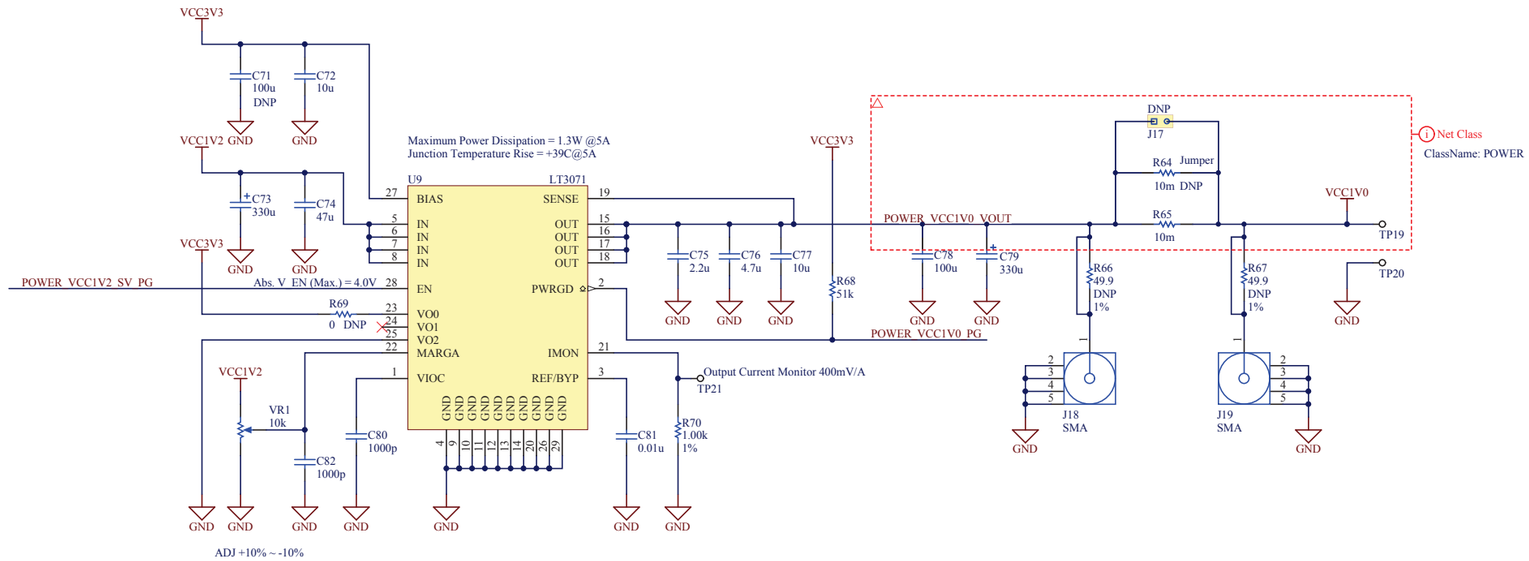
Title	Power 1.8V		
Size	Number		Revision
A3			
Date:	2013/03/18	Sheet of	
File:	C:\Users\..\Sheet05_p1v8.SchDoc	Drawn By:	



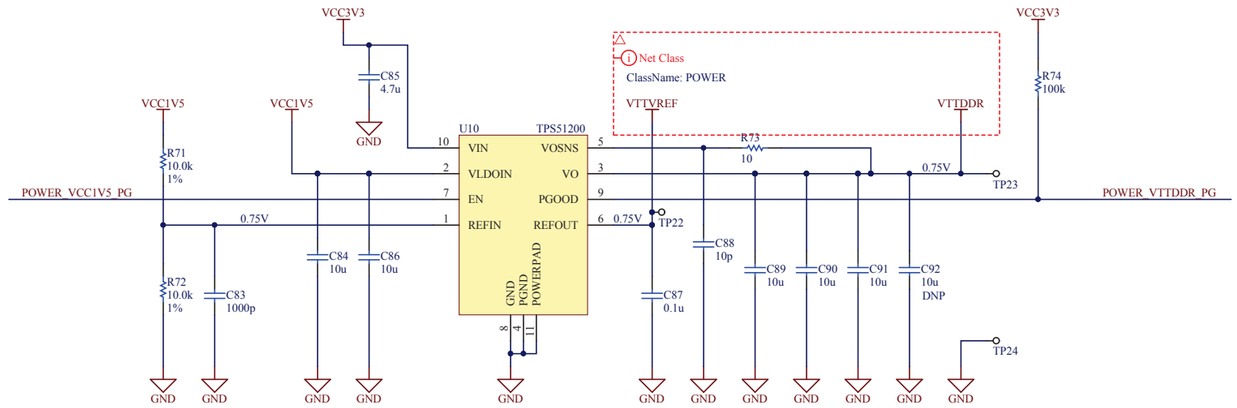
Title	Power 1.5V		
Size	Number		Revision
A3			
Date:	2013/03/18	Sheet of	
File:	C:\Users\..\Sheet06_p1v5.SchDoc	Drawn By:	



Title	Power 1.2V
Size	A3
Number	
Revision	
Date:	2013/03/18
Sheet of	
File:	C:\Users\..\Sheet07_p1v2.SchDoc
Drawn By:	



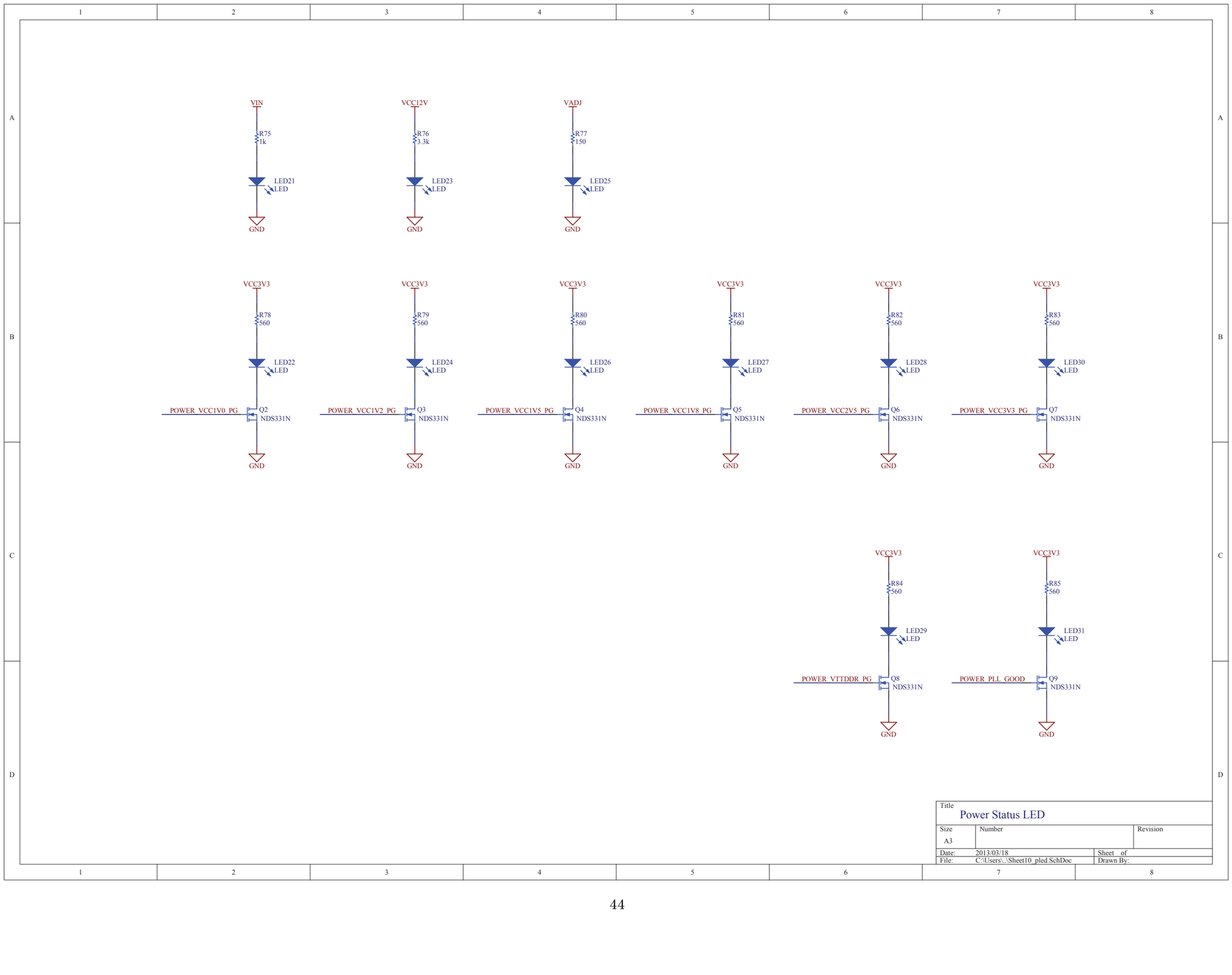
Title	Power 1.0V	
Size: A3	Number	Revision
Date: 2013/03/18		Sheet of
File: C:\Users\..\Sheet08_p1v0.SchDoc		Drawn By:

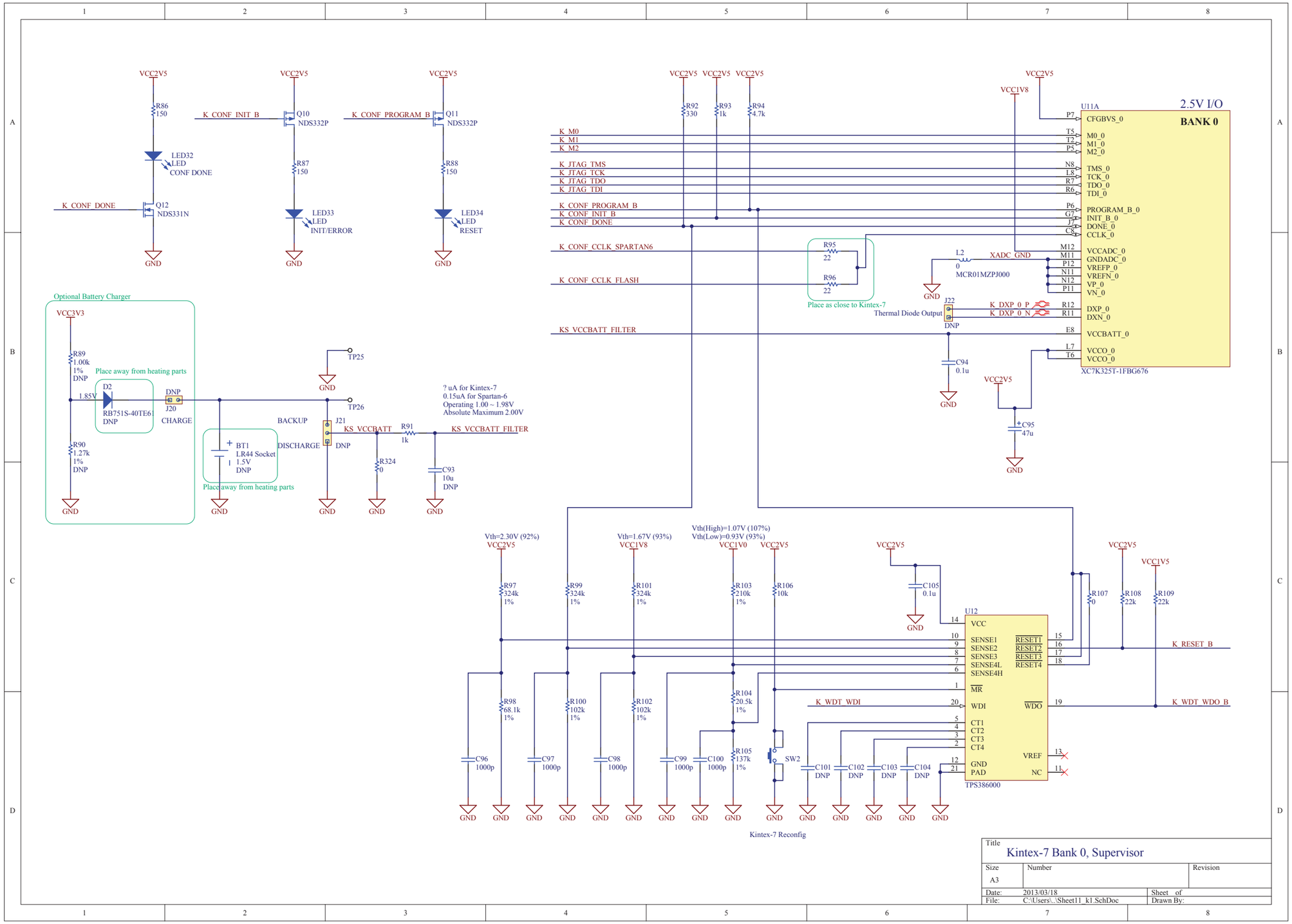


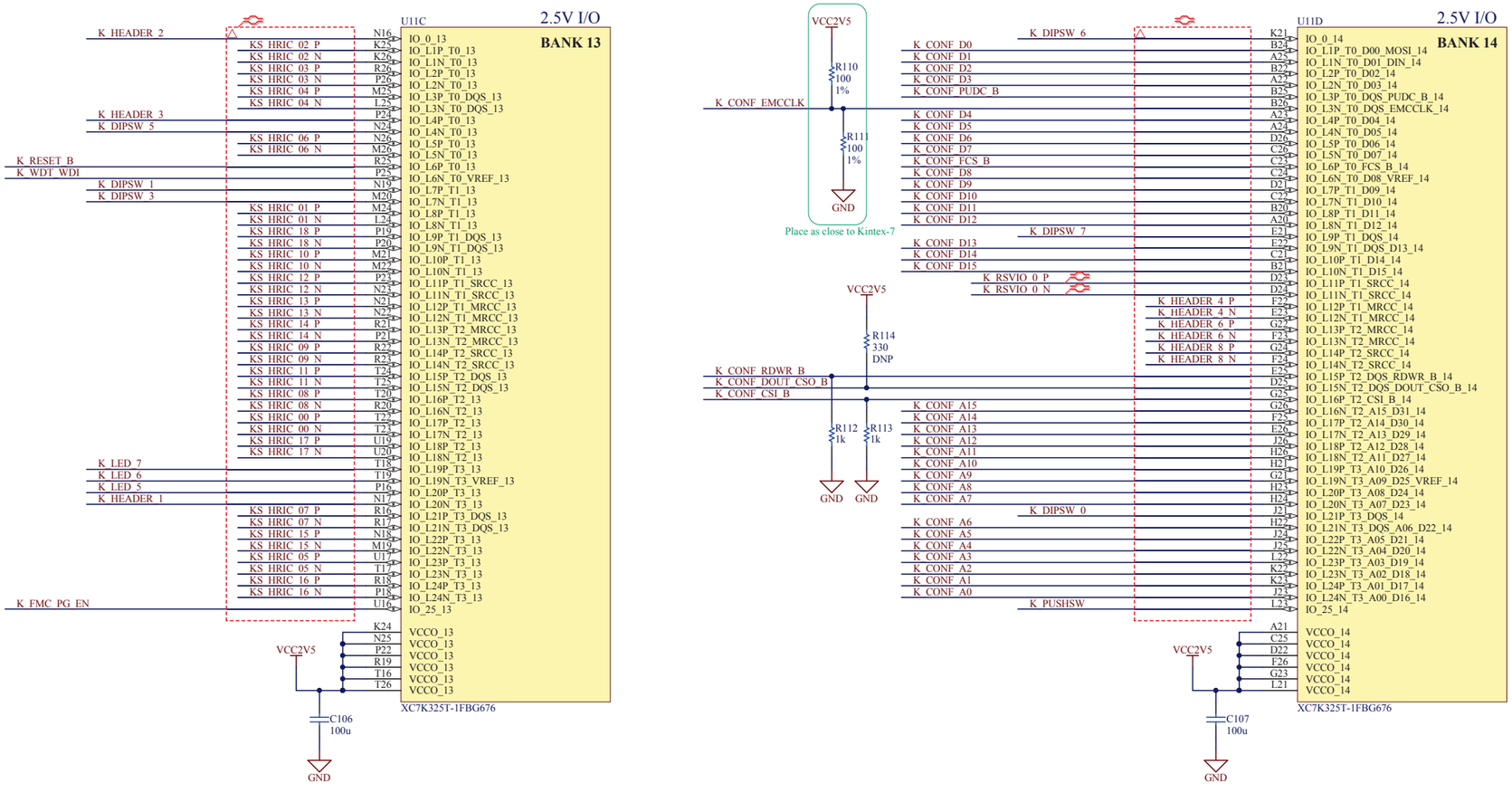
Title: Power DDR3 VTT

Size	Number	Revision
A3		

Date:	2013/03/18	Sheet of
File:	C:\Users\..\Sheet09_pvtt.SchDoc	Drawn By:

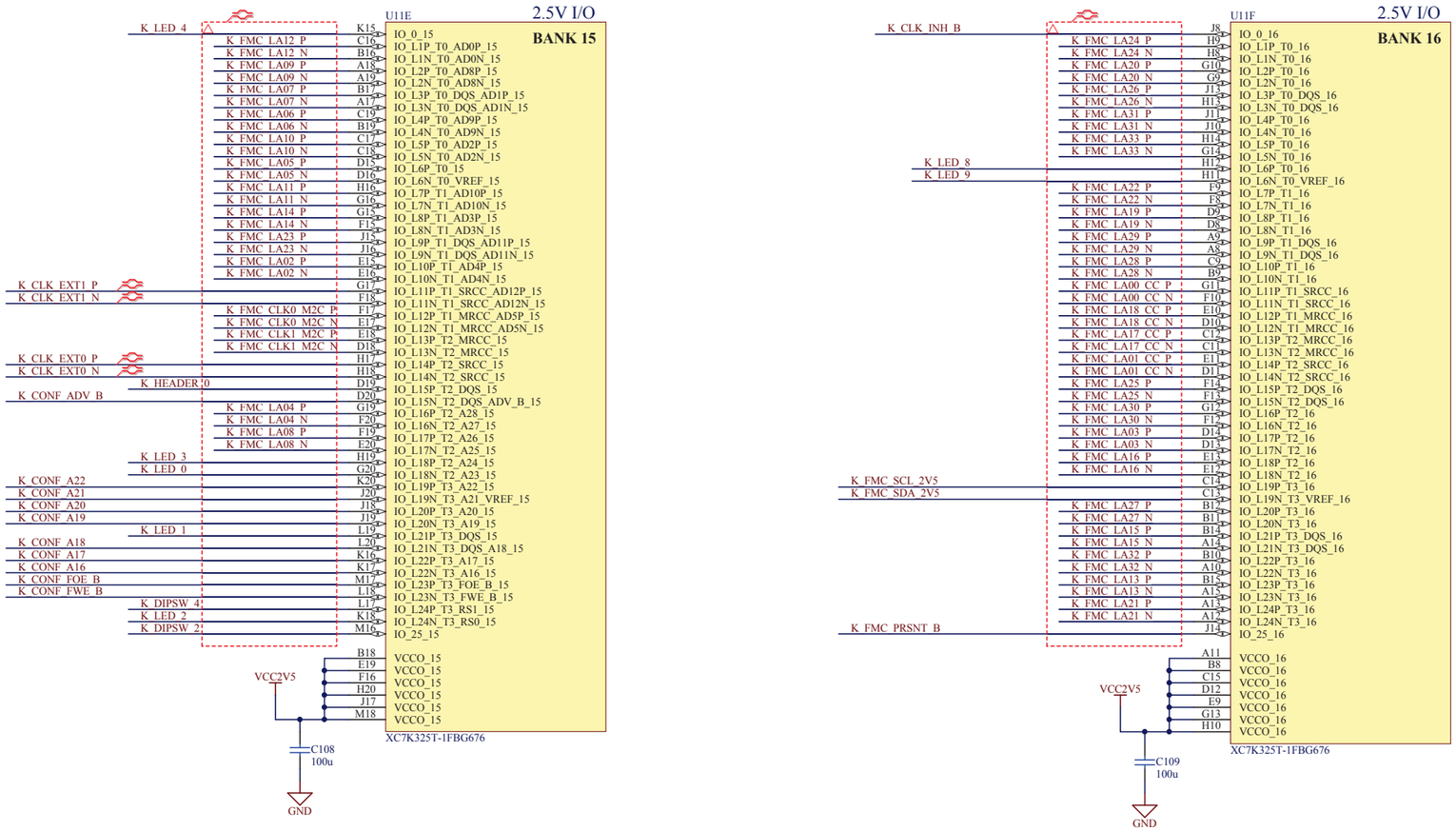

VIN
R75
1k
LED21
LED
GND
VCC12V
R76
3.3k
LED23
LED
GND
VADJ
R77
150
LED25
LED
GND
VCC3V3
R78
560
LED22
LED
POWER_VCC1V0_PG
Q2
NDS331N
GND
VCC3V3
R79
560
LED24
LED
POWER_VCC1V2_PG
Q3
NDS331N
GND
VCC3V3
R80
560
LED26
LED
POWER_VCC1V5_PG
Q4
NDS331N
GND
VCC3V3
R81
560
LED27
LED
POWER_VCC1V8_PG
Q5
NDS331N
GND
VCC3V3
R82
560
LED28
LED
POWER_VCC2V5_PG
Q6
NDS331N
GND
VCC3V3
R83
560
LED30
LED
POWER_VCC3V3_PG
Q7
NDS331N
GND
VCC3V3
R84
560
LED29
LED
POWER_VTTDDR_PG
Q8
NDS331N
GND
VCC3V3
R85
560
LED31
LED
POWER_PLL_GOOD
Q9
NDS331N
GND
Title
Power Status LED
Size
A3
Number
Revision
Date: 2013/03/18
Sheet of
File: C:\Users\..\Sheet10_pled.SchDoc
Drawn By:


VCC2V5
R86
150
K_CONF_INIT_B
Q10
NDS332P
K_CONF_PROGRAM_B
Q11
NDS332P
LED32
LED
CONF DONE
R87
150
R88
150
K_CONF_DONE
Q12
NDS331N
LED33
LED
INIT/ERROR
LED34
LED
RESET
GND
Optional Battery Charger
VCC3V3
R89
1.00k
1%
DNP
Place away from heating parts
D2
1.85V
RB751S-40TE61
DNP
DNP
J20
CHARGE
TP25
TP26
BACKUP
J21
DISCHARGE
DNP
BT1
LR44 Socket
1.5V
DNP
Place away from heating parts
KS_VCCBATT
R91
1k
KS_VCCBATT_FILTER
? uA for Kintex-7
0.15uA for Spartan-6
Operating 1.00 ~ 1.98V
Absolute Maximum 2.00V
R90
1.27k
1%
DNP
R324
0
C93
10u
DNP
R92
330
R93
1k
R94
4.7k
VCC1V8
U11A
2.5V I/O
BANK 0
CFGBVS_0
M0_0
M1_0
M2_0
TMS_0
TCK_0
TDO_0
TDI_0
PROGRAM_B_0
INIT_B_0
DONE_0
CCLK_0
VCCADC_0
GNDADC_0
VREFP_0
VREFN_0
VP_0
VN_0
DXP_0
DXN_0
VCCBATT_0
VCCO_0
VCCO_0
XC7K325T-1FBG676
K_M0
K_M1
K_M2
K_JTAG_TMS
K_JTAG_TCK
K_JTAG_TDO
K_JTAG_TDI
K_CONF_PROGRAM_B
K_CONF_INIT_B
K_CONF_DONE
K_CONF_CCLK_SPARTAN6
K_CONF_CCLK_FLASH
KS_VCCBATT_FILTER
R95
22
R96
22
Place as close to Kintex-7
L2
0
MCR01MZPJ000
XADC_GND
J22
Thermal Diode Output
K_DXP_0_P
K_DXP_0_N
DNP
C94
0.1u
C95
47u
Vth=2.30V (92%)
Vth=1.67V (93%)
Vth(High)=1.07V (107%)
Vth(Low)=0.93V (93%)
VCC1V0
R97
324k
1%
R98
68.1k
1%
R99
324k
1%
R100
102k
1%
R101
324k
1%
R102
102k
1%
R103
210k
1%
R104
20.5k
1%
R105
137k
1%
R106
10k
C105
0.1u
R107
0
R108
22k
R109
22k
K_RESET_B
K_WDT_WDI
K_WDT_WDO_B
U12
VCC
SENSE1
SENSE2
SENSE3
SENSE4L
SENSE4H
MR
WDI
CT1
CT2
CT3
CT4
GND
PAD
RESET1
RESET2
RESET3
RESET4
WDO
VREF
NC
TPS386000
SW2
C96
1000p
C97
1000p
C98
1000p
C99
1000p
C100
1000p
C101
DNP
C102
DNP
C103
DNP
C104
DNP
Kintex-7 Reconfig
Title
Kintex-7 Bank 0, Supervisor
Size
A3
Number
Revision
Date:
2013/03/18
Sheet of
File:
C:\Users\..\Sheet11_k1.SchDoc
Drawn By:

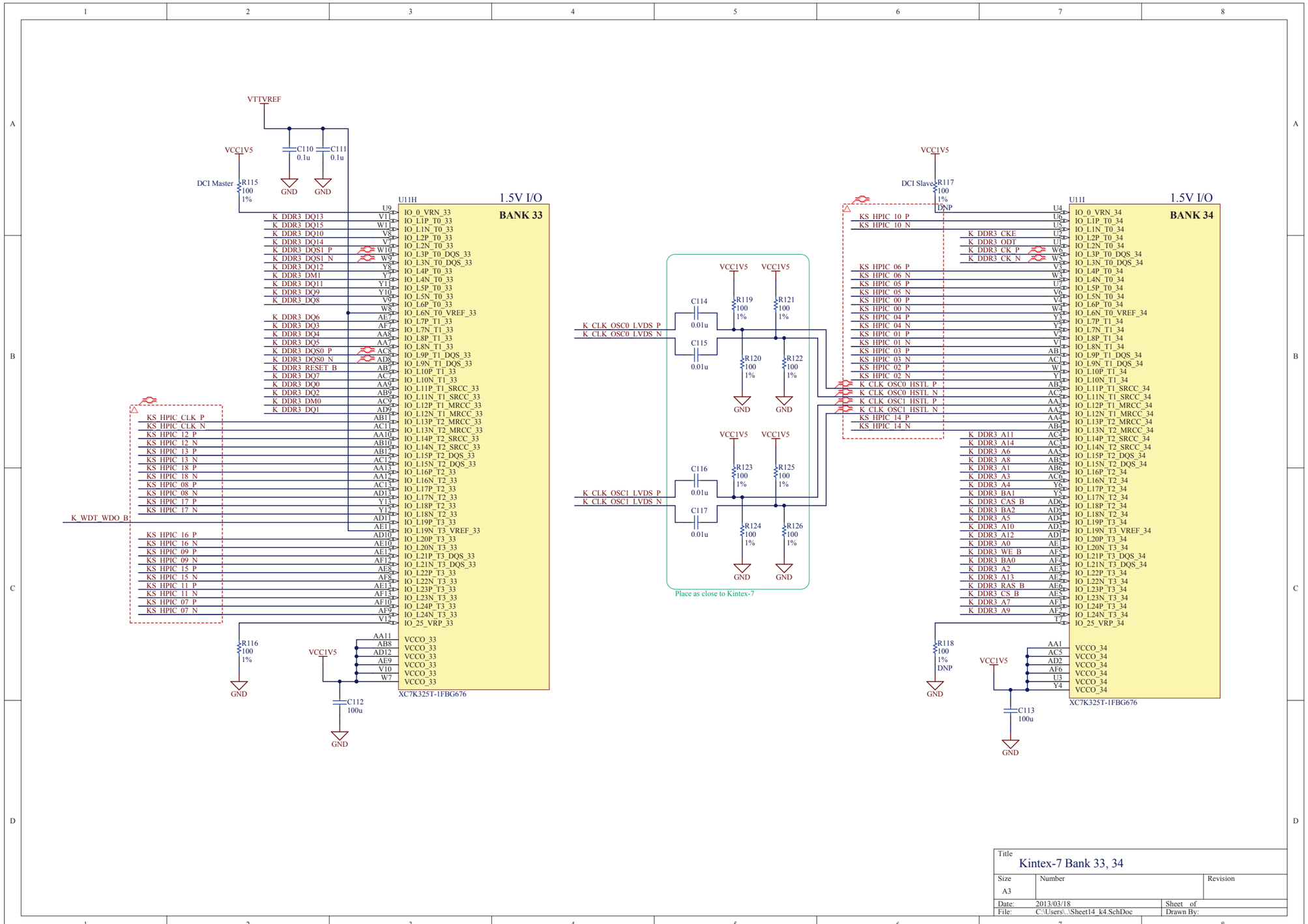


Title: Kintex-7 Bank 13, 14

Size	Number	Revision
A3		
Date: 2013/03/18		Sheet of
File: C:\Users\..\Sheet12_k2.SchDoc		Drawn By:

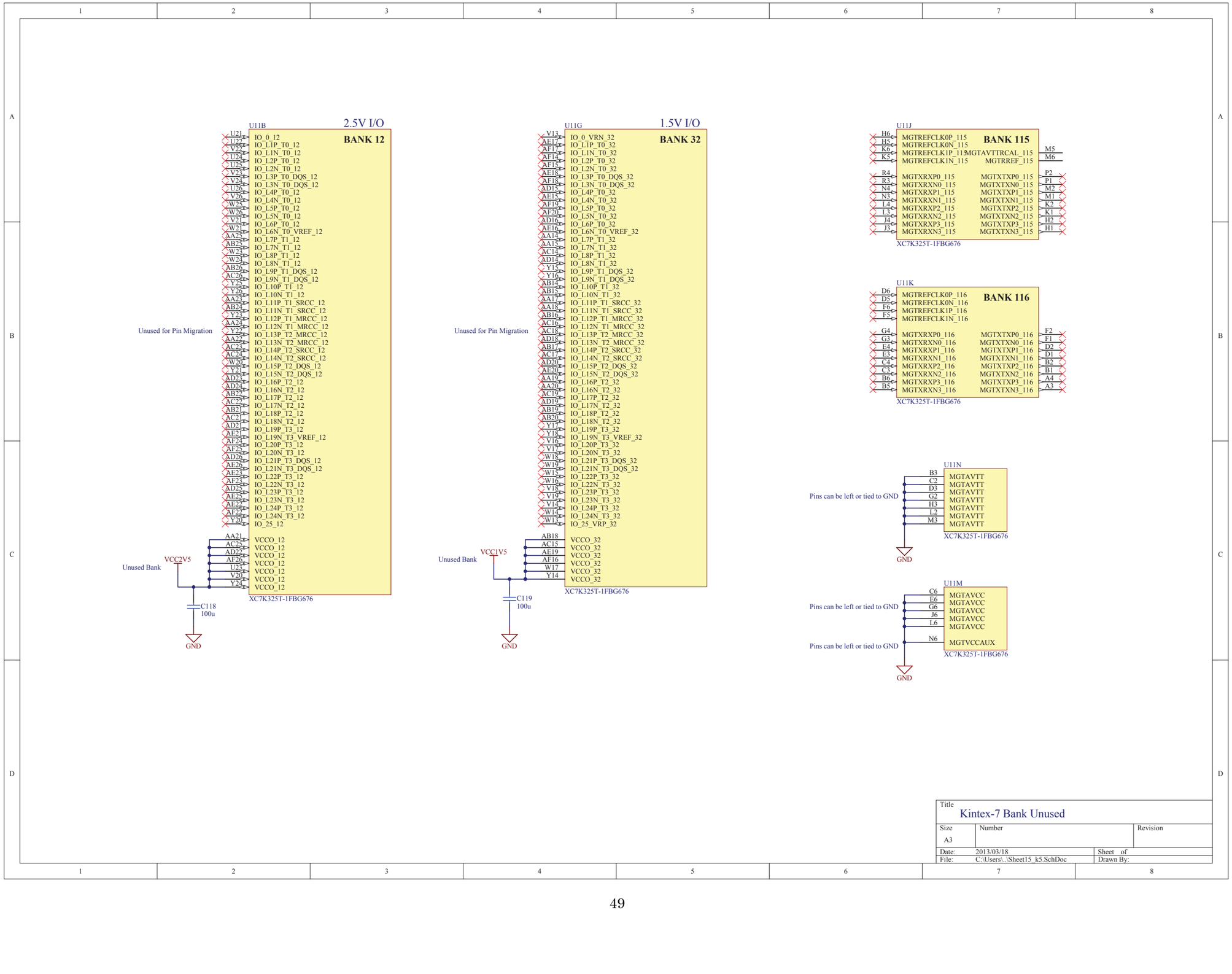


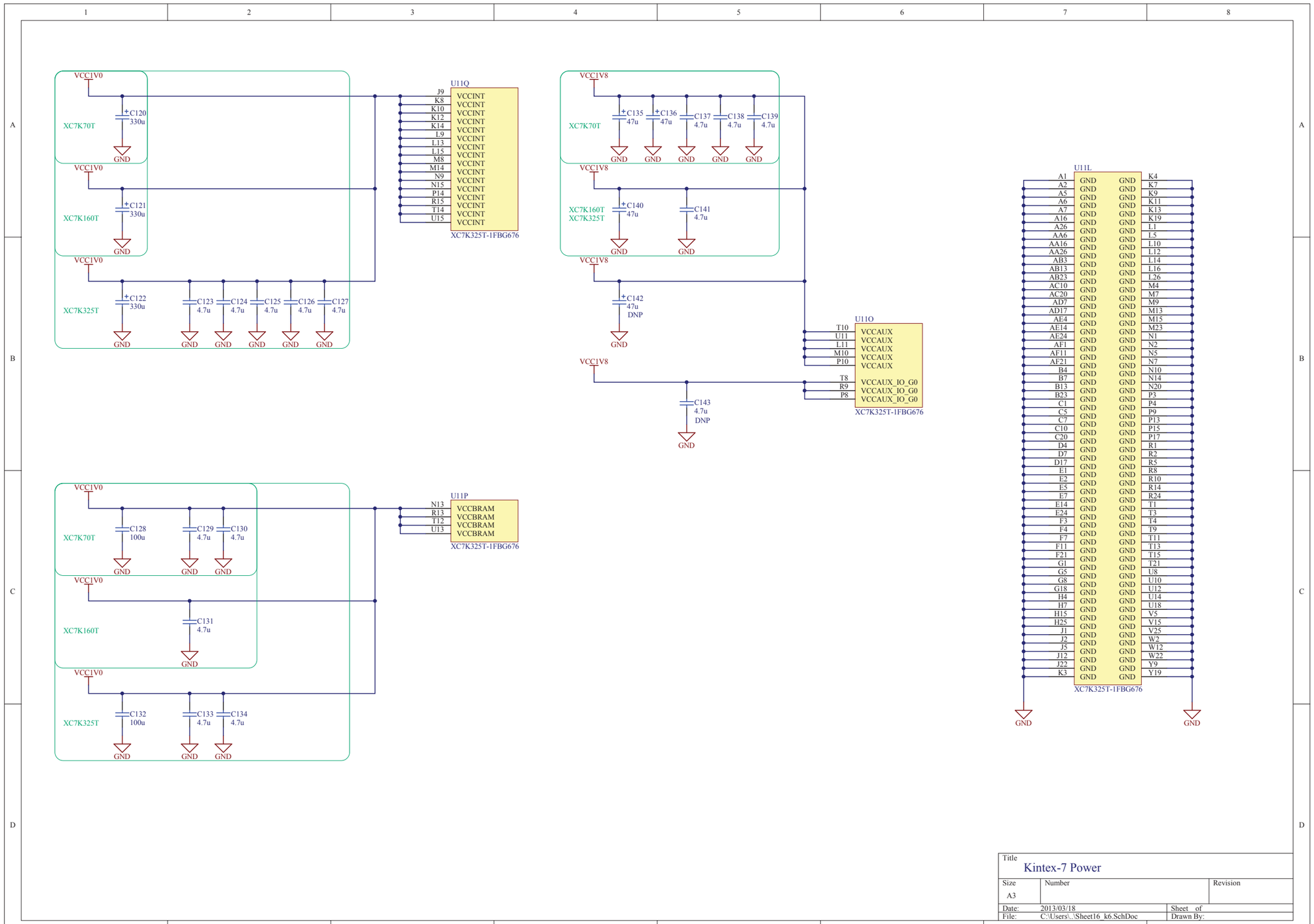
Title	Kintex-7 Bank 15, 16		
Size: A3	Number:		Revision:
Date: 2013/03/18		Sheet of	
File: C:\Users\..\Sheet13_k3.SchDoc		Drawn By:	

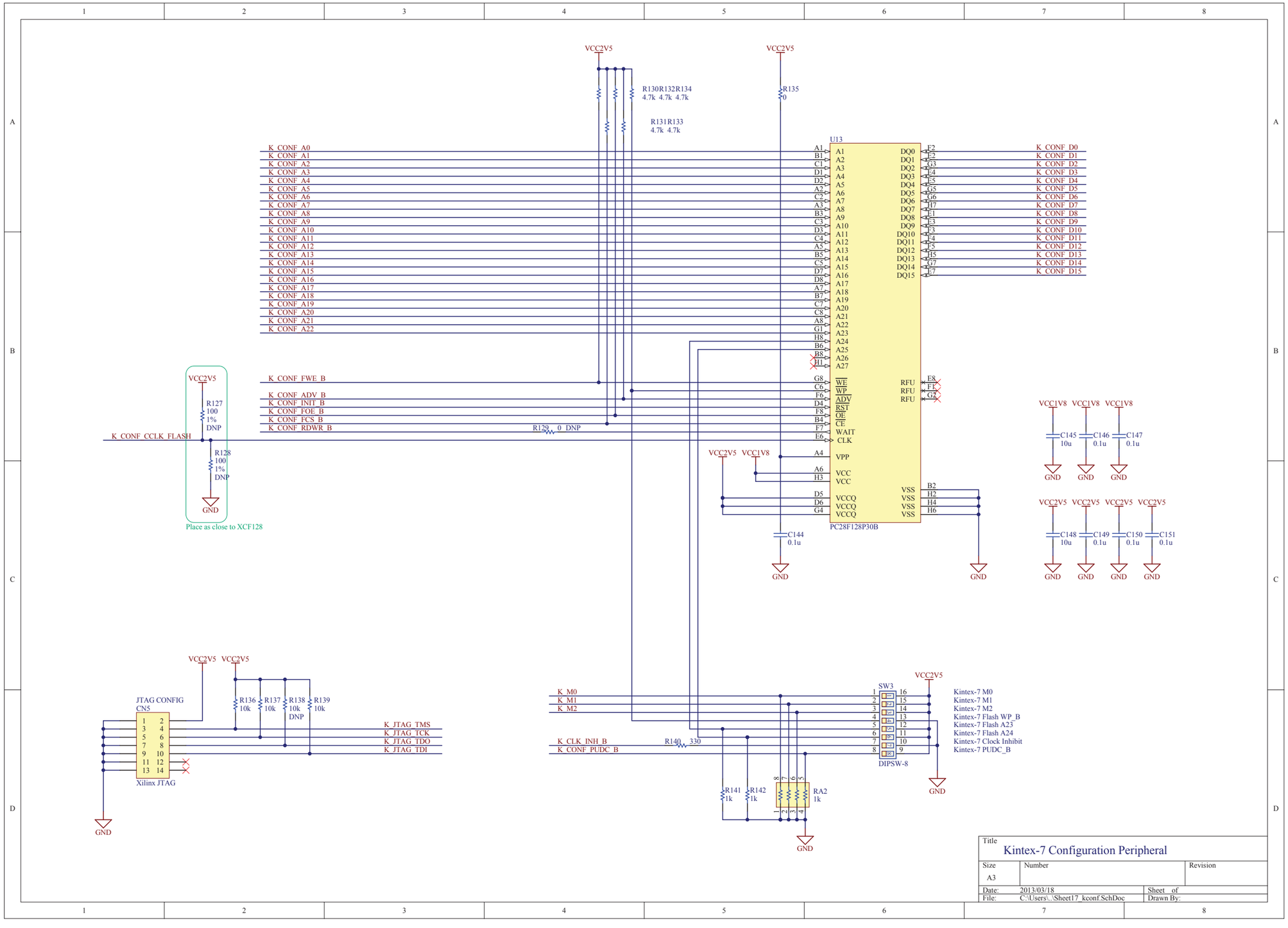


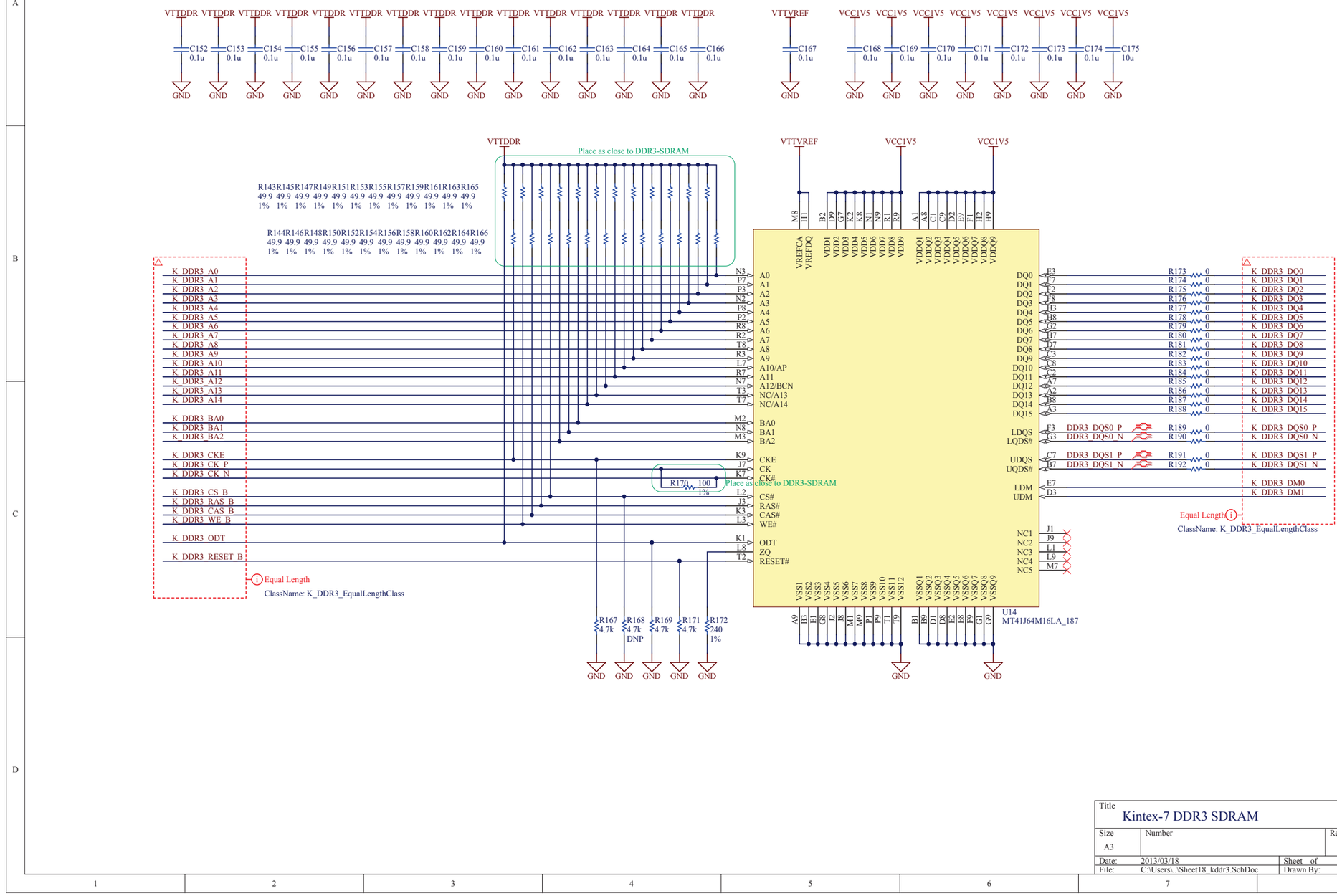
Title: Kintex-7 Bank 33, 34

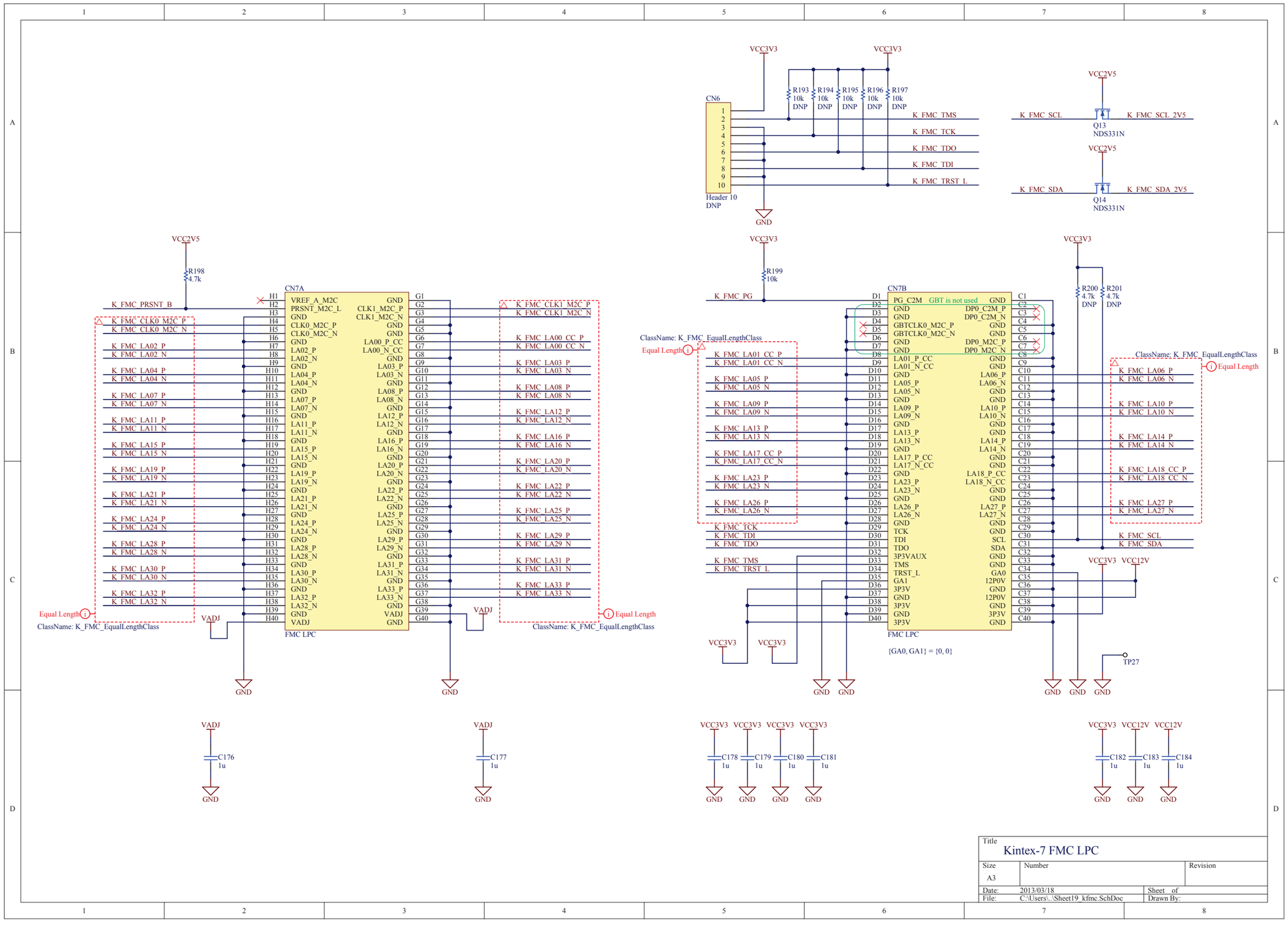
Size	Number	Revision
A3		
Date: 2013/03/18		Sheet of
File: C:\Users\..\Sheet14_k4.SchDoc		Drawn By:

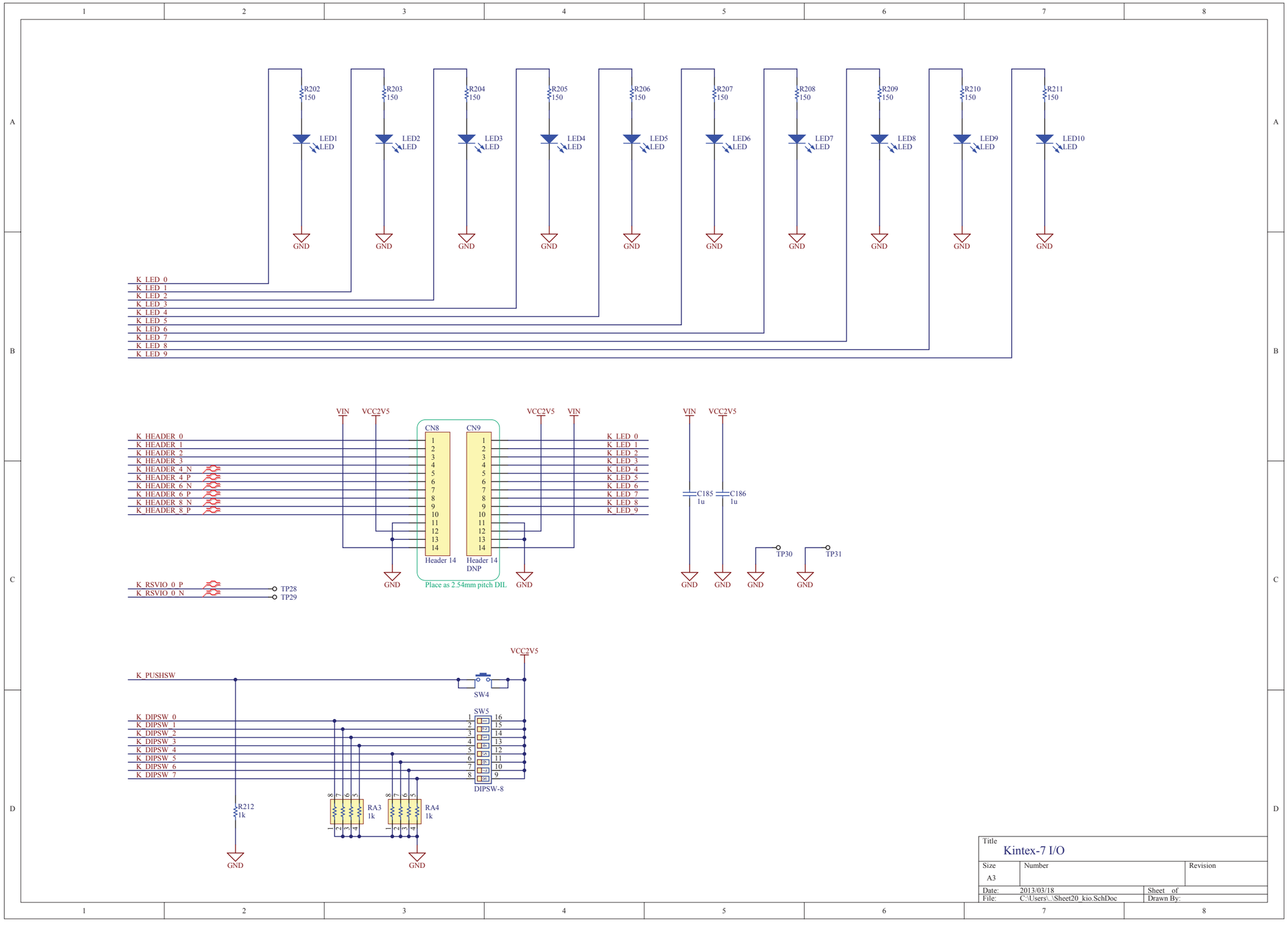

U11B
2.5V I/O
BANK 12
IO_0_12
IO_L1P_T0_12
IO_L1N_T0_12
IO_L2P_T0_12
IO_L2N_T0_12
IO_L3P_T0_DQS_12
IO_L3N_T0_DQS_12
IO_L4P_T0_12
IO_L4N_T0_12
IO_L5P_T0_12
IO_L5N_T0_12
IO_L6P_T0_12
IO_L6N_T0_VREF_12
IO_L7P_T1_12
IO_L7N_T1_12
IO_L8P_T1_12
IO_L8N_T1_12
IO_L9P_T1_DQS_12
IO_L9N_T1_DQS_12
IO_L10P_T1_12
IO_L10N_T1_12
IO_L11P_T1_SRCC_12
IO_L11N_T1_SRCC_12
IO_L12P_T1_MRCC_12
IO_L12N_T1_MRCC_12
IO_L13P_T2_MRCC_12
IO_L13N_T2_MRCC_12
IO_L14P_T2_SRCC_12
IO_L14N_T2_SRCC_12
IO_L15P_T2_DQS_12
IO_L15N_T2_DQS_12
IO_L16P_T2_12
IO_L16N_T2_12
IO_L17P_T2_12
IO_L17N_T2_12
IO_L18P_T2_12
IO_L18N_T2_12
IO_L19P_T3_12
IO_L19N_T3_VREF_12
IO_L20P_T3_12
IO_L20N_T3_12
IO_L21P_T3_DQS_12
IO_L21N_T3_DQS_12
IO_L22P_T3_12
IO_L22N_T3_12
IO_L23P_T3_12
IO_L23N_T3_12
IO_L24P_T3_12
IO_L24N_T3_12
IO_25_12
VCCO_12
VCCO_12
VCCO_12
VCCO_12
VCCO_12
VCCO_12
VCCO_12
XC7K325T-1FBG676
Unused for Pin Migration
Unused Bank
VCC2V5
C118
100u
GND
U11G
1.5V I/O
BANK 32
IO_0_VRN_32
IO_L1P_T0_32
IO_L1N_T0_32
IO_L2P_T0_32
IO_L2N_T0_32
IO_L3P_T0_DQS_32
IO_L3N_T0_DQS_32
IO_L4P_T0_32
IO_L4N_T0_32
IO_L5P_T0_32
IO_L5N_T0_32
IO_L6P_T0_32
IO_L6N_T0_VREF_32
IO_L7P_T1_32
IO_L7N_T1_32
IO_L8P_T1_32
IO_L8N_T1_32
IO_L9P_T1_DQS_32
IO_L9N_T1_DQS_32
IO_L10P_T1_32
IO_L10N_T1_32
IO_L11P_T1_SRCC_32
IO_L11N_T1_SRCC_32
IO_L12P_T1_MRCC_32
IO_L12N_T1_MRCC_32
IO_L13P_T2_MRCC_32
IO_L13N_T2_MRCC_32
IO_L14P_T2_SRCC_32
IO_L14N_T2_SRCC_32
IO_L15P_T2_DQS_32
IO_L15N_T2_DQS_32
IO_L16P_T2_32
IO_L16N_T2_32
IO_L17P_T2_32
IO_L17N_T2_32
IO_L18P_T2_32
IO_L18N_T2_32
IO_L19P_T3_32
IO_L19N_T3_VREF_32
IO_L20P_T3_32
IO_L20N_T3_32
IO_L21P_T3_DQS_32
IO_L21N_T3_DQS_32
IO_L22P_T3_32
IO_L22N_T3_32
IO_L23P_T3_32
IO_L23N_T3_32
IO_L24P_T3_32
IO_L24N_T3_32
IO_25_VRP_32
VCCO_32
VCCO_32
VCCO_32
VCCO_32
VCCO_32
VCCO_32
VCCO_32
XC7K325T-1FBG676
Unused for Pin Migration
Unused Bank
VCC1V5
C119
100u
GND
U11J
BANK 115
MGTREFCLK0P_115
MGTREFCLK0N_115
MGTREFCLK1P_115
MGTREFCLK1N_115
MGTAVTTRCAL_115
MGTRREF_115
MGTXRXP0_115
MGTXRXN0_115
MGTXRXP1_115
MGTXRXN1_115
MGTXRXP2_115
MGTXRXN2_115
MGTXRXP3_115
MGTXRXN3_115
MGTXTXP0_115
MGTXTXN0_115
MGTXTXP1_115
MGTXTXN1_115
MGTXTXP2_115
MGTXTXN2_115
MGTXTXP3_115
MGTXTXN3_115
XC7K325T-1FBG676
U11K
BANK 116
MGTREFCLK0P_116
MGTREFCLK0N_116
MGTREFCLK1P_116
MGTREFCLK1N_116
MGTXRXP0_116
MGTXRXN0_116
MGTXRXP1_116
MGTXRXN1_116
MGTXRXP2_116
MGTXRXN2_116
MGTXRXP3_116
MGTXRXN3_116
MGTXTXP0_116
MGTXTXN0_116
MGTXTXP1_116
MGTXTXN1_116
MGTXTXP2_116
MGTXTXN2_116
MGTXTXP3_116
MGTXTXN3_116
XC7K325T-1FBG676
U11N
MGTAVTT
XC7K325T-1FBG676
Pins can be left or tied to GND
GND
U11M
MGTAVCC
MGTVCCAUX
XC7K325T-1FBG676
Pins can be left or tied to GND
GND
Title
Kintex-7 Bank Unused
Size
A3
Number
Revision
Date: 2013/03/18
Sheet of
File: C:\Users\..\Sheet15_k5.SchDoc
Drawn By:

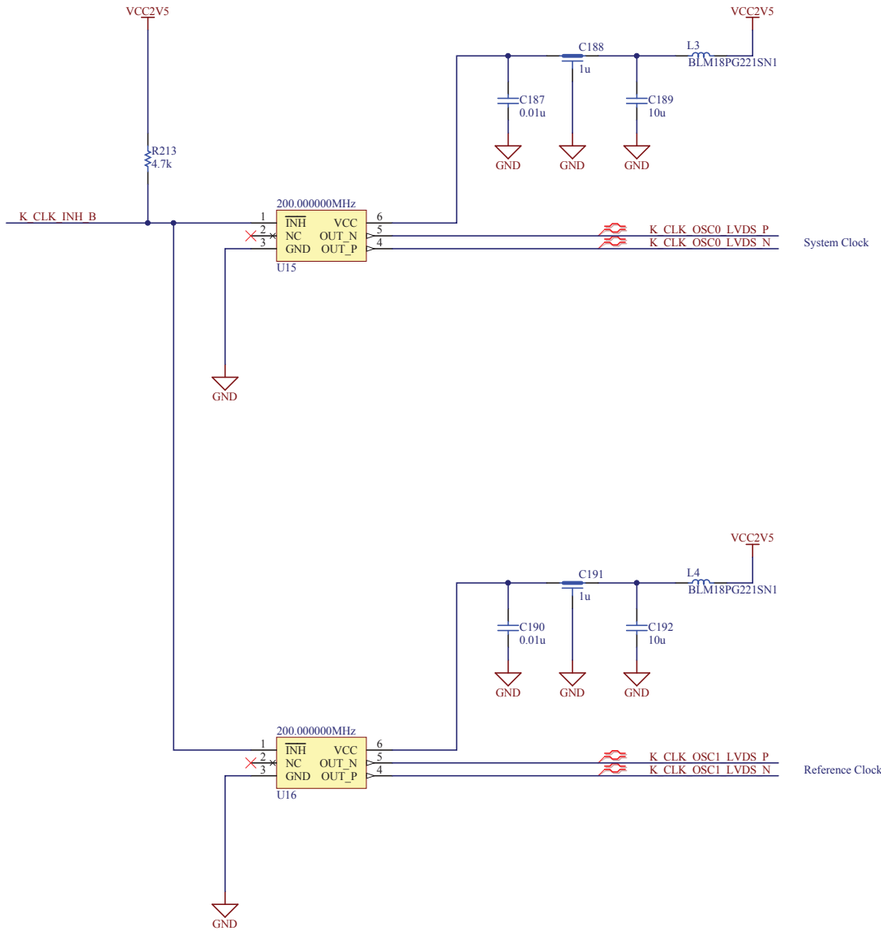

VCC1V0
XC7K70T
C120
330u
GND
VCC1V0
XC7K160T
C121
330u
GND
VCC1V0
XC7K325T
C122
330u
C123
4.7u
C124
4.7u
C125
4.7u
C126
4.7u
C127
4.7u
U11Q
J9
K8
K10
K12
K14
L9
L13
L15
M8
M14
N9
N15
P14
R15
T14
U15
VCCINT
XC7K325T-1FBG676
VCC1V8
XC7K70T
C135
47u
C136
47u
C137
4.7u
C138
4.7u
C139
4.7u
XC7K160T
XC7K325T
C140
47u
C141
4.7u
C142
47u
DNP
C143
4.7u
DNP
U11O
T10
U11
L11
M10
P10
T8
R9
P8
VCCAUX
VCCAUX_IO_G0
XC7K325T-1FBG676
U11L
A1
A2
A5
A6
A7
A16
A26
AA6
AA16
AA26
AB3
AB13
AB23
AC10
AC20
AD7
AD17
AE4
AE14
AE24
AF1
AF11
AF21
B4
B7
B13
B23
C1
C5
C7
C10
C20
D4
D7
D17
E1
E2
E5
E7
E14
E24
F3
F4
F7
F11
F21
G1
G5
G8
G18
H4
H7
H15
H25
J1
J2
J5
J12
J22
K3
K4
K7
K9
K11
K13
K19
L1
L5
L10
L12
L14
L16
L26
M4
M7
M9
M13
M15
M23
N1
N2
N5
N7
N10
N14
N20
P3
P4
P9
P13
P15
P17
R1
R2
R5
R8
R10
R14
R24
T1
T3
T4
T9
T11
T13
T15
T21
U8
U10
U12
U14
U18
V5
V15
V25
W2
W12
W22
Y9
Y19
GND
XC7K325T-1FBG676
VCC1V0
XC7K70T
C128
100u
C129
4.7u
C130
4.7u
XC7K160T
C131
4.7u
XC7K325T
C132
100u
C133
4.7u
C134
4.7u
U11P
N13
R13
T12
U13
VCCBRAM
XC7K325T-1FBG676
Title
Kintex-7 Power
Size
A3
Number
Revision
Date:
2013/03/18
Sheet of
File:
C:\Users\...\Sheet16_k6.SchDoc
Drawn By:

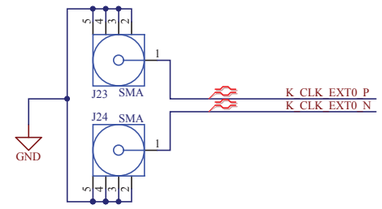

VCC2V5
R130R132R134
4.7k 4.7k 4.7k
R131R133
4.7k 4.7k
R135
0
U13
K_CONF_A0
K_CONF_A1
K_CONF_A2
K_CONF_A3
K_CONF_A4
K_CONF_A5
K_CONF_A6
K_CONF_A7
K_CONF_A8
K_CONF_A9
K_CONF_A10
K_CONF_A11
K_CONF_A12
K_CONF_A13
K_CONF_A14
K_CONF_A15
K_CONF_A16
K_CONF_A17
K_CONF_A18
K_CONF_A19
K_CONF_A20
K_CONF_A21
K_CONF_A22
K_CONF_D0
K_CONF_D1
K_CONF_D2
K_CONF_D3
K_CONF_D4
K_CONF_D5
K_CONF_D6
K_CONF_D7
K_CONF_D8
K_CONF_D9
K_CONF_D10
K_CONF_D11
K_CONF_D12
K_CONF_D13
K_CONF_D14
K_CONF_D15
K_CONF_FWE_B
K_CONF_ADV_B
K_CONF_INIT_B
K_CONF_FOE_B
K_CONF_FCS_B
K_CONF_RDWR_B
K_CONF_CCLK_FLASH
R127
100
1%
DNP
R128
100
1%
DNP
GND
Place as close to XCF128
R129 0 DNP
VCC2V5 VCC1V8
VCC2V5
VCC1V8 VCC1V8 VCC1V8
C145
10u
C146
0.1u
C147
0.1u
C144
0.1u
VCC2V5 VCC2V5 VCC2V5 VCC2V5
C148
10u
C149
0.1u
C150
0.1u
C151
0.1u
PC28F128P30B
JTAG CONFIG
CN5
Xilinx JTAG
R136
10k
R137
10k
R138
10k
DNP
R139
10k
K_JTAG_TMS
K_JTAG_TCK
K_JTAG_TDO
K_JTAG_TDI
K_M0
K_M1
K_M2
K_CLK_INH_B
K_CONF_PUDC_B
R140 330
SW3
DIPSW-8
Kintex-7 M0
Kintex-7 M1
Kintex-7 M2
Kintex-7 Flash WP_B
Kintex-7 Flash A23
Kintex-7 Flash A24
Kintex-7 Clock Inhibit
Kintex-7 PUDC_B
R141
1k
R142
1k
RA2
1k
Title
Kintex-7 Configuration Peripheral
Size
A3
Number
Revision
Date: 2013/03/18
Sheet of
File: C:\Users\..\Sheet17_kconf.SchDoc
Drawn By:

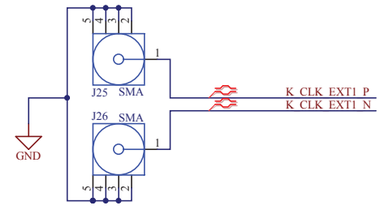

VTTDDR C152 0.1u C153 0.1u C154 0.1u C155 0.1u C156 0.1u C157 0.1u C158 0.1u C159 0.1u C160 0.1u C161 0.1u C162 0.1u C163 0.1u C164 0.1u C165 0.1u C166 0.1u
GND
VTTVREF C167 0.1u
VCC1V5 C168 0.1u C169 0.1u C170 0.1u C171 0.1u C172 0.1u C173 0.1u C174 0.1u C175 10u
Place as close to DDR3-SDRAM
R143R145R147R149R151R153R155R157R159R161R163R165 49.9 1% ×12
R144R146R148R150R152R154R156R158R160R162R164R166 49.9 1% ×12
K_DDR3_A0 K_DDR3_A1 K_DDR3_A2 K_DDR3_A3 K_DDR3_A4 K_DDR3_A5 K_DDR3_A6 K_DDR3_A7 K_DDR3_A8 K_DDR3_A9 K_DDR3_A10 K_DDR3_A11 K_DDR3_A12 K_DDR3_A13 K_DDR3_A14
K_DDR3_BA0 K_DDR3_BA1 K_DDR3_BA2
K_DDR3_CKE K_DDR3_CK_P K_DDR3_CK_N
K_DDR3_CS_B K_DDR3_RAS_B K_DDR3_CAS_B K_DDR3_WE_B
K_DDR3_ODT
K_DDR3_RESET_B
Equal Length
ClassName: K_DDR3_EqualLengthClass
R170 100 1%
Place as close to DDR3-SDRAM
R167 4.7k
R168 4.7k DNP
R169 4.7k
R171 4.7k
R172 240 1%
U14
MT41J64M16LA_187
A0 A1 A2 A3 A4 A5 A6 A7 A8 A9 A10/AP A11 A12/BCN NC/A13 NC/A14
BA0 BA1 BA2
CKE CK CK# CS# RAS# CAS# WE#
ODT ZQ RESET#
VREFCA VREFDQ
VDD1 VDD2 VDD3 VDD4 VDD5 VDD6 VDD7 VDD8 VDD9
VDDQ1 VDDQ2 VDDQ3 VDDQ4 VDDQ5 VDDQ6 VDDQ7 VDDQ8 VDDQ9
VSS1 VSS2 VSS3 VSS4 VSS5 VSS6 VSS7 VSS8 VSS9 VSS10 VSS11 VSS12
VSSQ1 VSSQ2 VSSQ3 VSSQ4 VSSQ5 VSSQ6 VSSQ7 VSSQ8 VSSQ9
DQ0 DQ1 DQ2 DQ3 DQ4 DQ5 DQ6 DQ7 DQ8 DQ9 DQ10 DQ11 DQ12 DQ13 DQ14 DQ15
LDQS LDQS# UDQS UDQS#
LDM UDM
NC1 NC2 NC3 NC4 NC5
R173 0 R174 0 R175 0 R176 0 R177 0 R178 0 R179 0 R180 0 R181 0 R182 0 R183 0 R184 0 R185 0 R186 0 R187 0 R188 0
K_DDR3_DQ0 K_DDR3_DQ1 K_DDR3_DQ2 K_DDR3_DQ3 K_DDR3_DQ4 K_DDR3_DQ5 K_DDR3_DQ6 K_DDR3_DQ7 K_DDR3_DQ8 K_DDR3_DQ9 K_DDR3_DQ10 K_DDR3_DQ11 K_DDR3_DQ12 K_DDR3_DQ13 K_DDR3_DQ14 K_DDR3_DQ15
DDR3_DQS0_P DDR3_DQS0_N DDR3_DQS1_P DDR3_DQS1_N
R189 0 R190 0 R191 0 R192 0
K_DDR3_DQS0_P K_DDR3_DQS0_N K_DDR3_DQS1_P K_DDR3_DQS1_N
K_DDR3_DM0 K_DDR3_DM1
Equal Length
ClassName: K_DDR3_EqualLengthClass
Title
Kintex-7 DDR3 SDRAM
Size A3
Number
Revision
Date: 2013/03/18
Sheet of
File: C:\Users\..\Sheet18_kddr3.SchDoc
Drawn By:


CN6
Header 10
DNP
R193 10k DNP
R194 10k DNP
R195 10k DNP
R196 10k DNP
R197 10k DNP
K_FMC_TMS
K_FMC_TCK
K_FMC_TDO
K_FMC_TDI
K_FMC_TRST_L
VCC3V3
GND
K_FMC_SCL
K_FMC_SCL_2V5
K_FMC_SDA
K_FMC_SDA_2V5
VCC2V5
Q13
NDS331N
Q14
NDS331N
R198 4.7k
CN7A
FMC LPC
K_FMC_PRSNT_B
K_FMC_CLK0_M2C_P
K_FMC_CLK0_M2C_N
K_FMC_LA02_P
K_FMC_LA02_N
K_FMC_LA04_P
K_FMC_LA04_N
K_FMC_LA07_P
K_FMC_LA07_N
K_FMC_LA11_P
K_FMC_LA11_N
K_FMC_LA15_P
K_FMC_LA15_N
K_FMC_LA19_P
K_FMC_LA19_N
K_FMC_LA21_P
K_FMC_LA21_N
K_FMC_LA24_P
K_FMC_LA24_N
K_FMC_LA28_P
K_FMC_LA28_N
K_FMC_LA30_P
K_FMC_LA30_N
K_FMC_LA32_P
K_FMC_LA32_N
K_FMC_CLK1_M2C_P
K_FMC_CLK1_M2C_N
K_FMC_LA00_CC_P
K_FMC_LA00_CC_N
K_FMC_LA03_P
K_FMC_LA03_N
K_FMC_LA08_P
K_FMC_LA08_N
K_FMC_LA12_P
K_FMC_LA12_N
K_FMC_LA16_P
K_FMC_LA16_N
K_FMC_LA20_P
K_FMC_LA20_N
K_FMC_LA22_P
K_FMC_LA22_N
K_FMC_LA25_P
K_FMC_LA25_N
K_FMC_LA29_P
K_FMC_LA29_N
K_FMC_LA31_P
K_FMC_LA31_N
K_FMC_LA33_P
K_FMC_LA33_N
Equal Length
ClassName: K_FMC_EqualLengthClass
VADJ
GND
R199 10k
K_FMC_PG
CN7B
PG_C2M GBT is not used
K_FMC_TCK
K_FMC_TDI
K_FMC_TDO
K_FMC_TMS
K_FMC_TRST_L
R200 4.7k DNP
R201 4.7k DNP
TP27
{GA0, GA1} = {0, 0}
C176 1u
C177 1u
C178 1u
C179 1u
C180 1u
C181 1u
C182 1u
C183 1u
C184 1u
Title
Kintex-7 FMC LPC
Size
A3
Number
Revision
Date: 2013/03/18
Sheet of
File: C:\Users\..\Sheet19_kfmc.SchDoc
Drawn By:

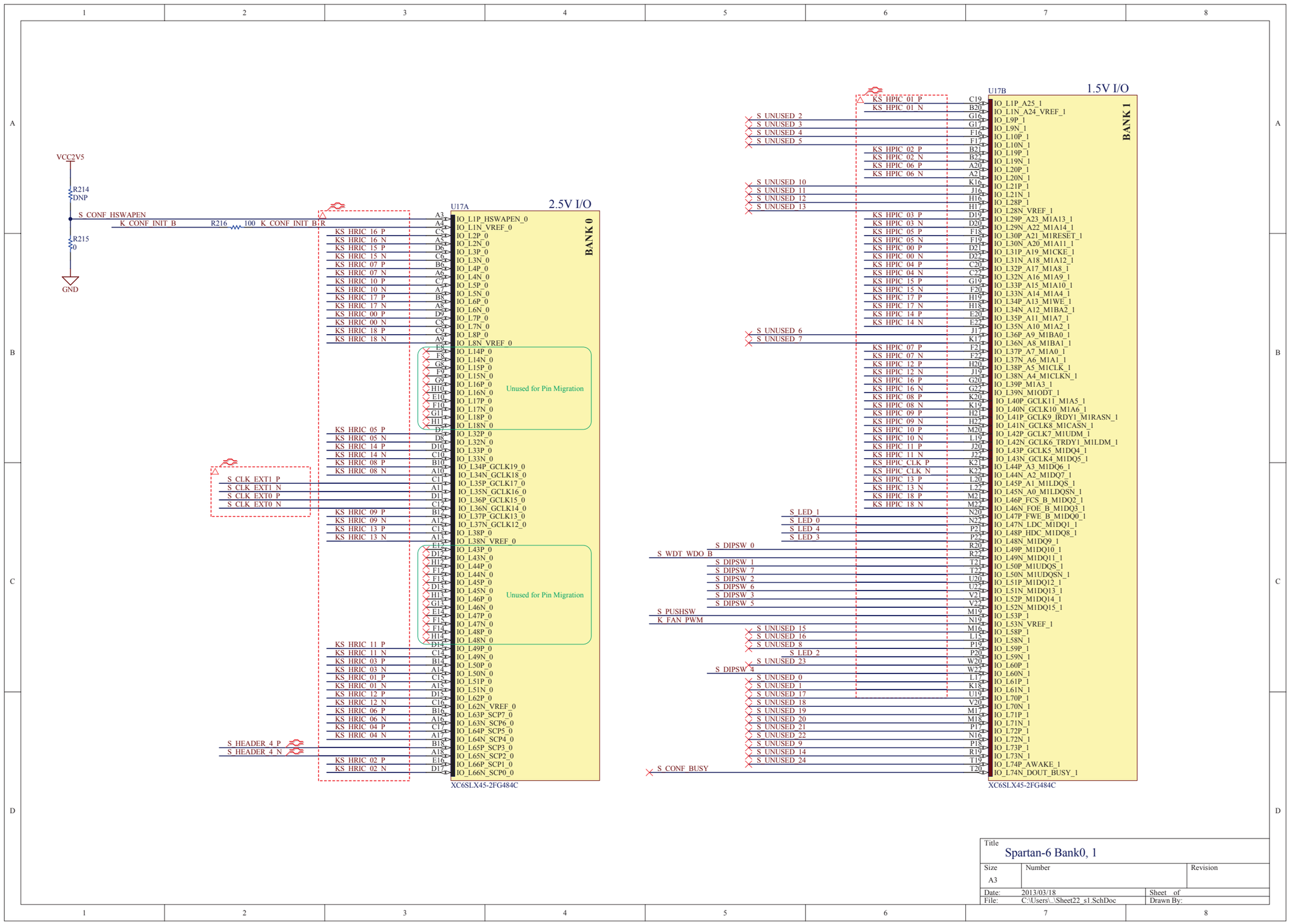

R202 150
R203 150
R204 150
R205 150
R206 150
R207 150
R208 150
R209 150
R210 150
R211 150
LED1 LED
LED2 LED
LED3 LED
LED4 LED
LED5 LED
LED6 LED
LED7 LED
LED8 LED
LED9 LED
LED10 LED
GND
K_LED_0
K_LED_1
K_LED_2
K_LED_3
K_LED_4
K_LED_5
K_LED_6
K_LED_7
K_LED_8
K_LED_9
VIN
VCC2V5
CN8
CN9
K_HEADER_0
K_HEADER_1
K_HEADER_2
K_HEADER_3
K_HEADER_4_N
K_HEADER_4_P
K_HEADER_6_N
K_HEADER_6_P
K_HEADER_8_N
K_HEADER_8_P
Header 14
Header 14 DNP
Place as 2.54mm pitch DIL
C185 1u
C186 1u
TP30
TP31
K_RSVIO_0_P
K_RSVIO_0_N
TP28
TP29
K_PUSHSW
SW4
SW5
K_DIPSW_0
K_DIPSW_1
K_DIPSW_2
K_DIPSW_3
K_DIPSW_4
K_DIPSW_5
K_DIPSW_6
K_DIPSW_7
DIPSW-8
R212 1k
RA3 1k
RA4 1k
Title
Kintex-7 I/O
Size
A3
Number
Revision
Date: 2013/03/18
Sheet of
File: C:\Users\..\Sheet20_kio.SchDoc
Drawn By:







Title	Kintex-7 Clock	
Size: A3	Number	Revision
Date: 2013/03/18		Sheet of
File: C:\Users\..\Sheet21_kclk.SchDoc		Drawn By:


VCC2V5
R214
DNP
S_CONF_HSWAPEN
R215
0
GND
K_CONF_INIT_B
R216
100
K_CONF_INIT_B_R
U17A
2.5V I/O
BANK 0
IO_L1P_HSWAPEN_0
IO_L1N_VREF_0
IO_L2P_0
IO_L2N_0
IO_L3P_0
IO_L3N_0
IO_L4P_0
IO_L4N_0
IO_L5P_0
IO_L5N_0
IO_L6P_0
IO_L6N_0
IO_L7P_0
IO_L7N_0
IO_L8P_0
IO_L8N_VREF_0
IO_L14P_0
IO_L14N_0
IO_L15P_0
IO_L15N_0
IO_L16P_0
IO_L16N_0
IO_L17P_0
IO_L17N_0
IO_L18P_0
IO_L18N_0
Unused for Pin Migration
IO_L32P_0
IO_L32N_0
IO_L33P_0
IO_L33N_0
IO_L34P_GCLK19_0
IO_L34N_GCLK18_0
IO_L35P_GCLK17_0
IO_L35N_GCLK16_0
IO_L36P_GCLK15_0
IO_L36N_GCLK14_0
IO_L37P_GCLK13_0
IO_L37N_GCLK12_0
IO_L38P_0
IO_L38N_VREF_0
IO_L43P_0
IO_L43N_0
IO_L44P_0
IO_L44N_0
IO_L45P_0
IO_L45N_0
IO_L46P_0
IO_L46N_0
IO_L47P_0
IO_L47N_0
IO_L48P_0
IO_L48N_0
Unused for Pin Migration
IO_L49P_0
IO_L49N_0
IO_L50P_0
IO_L50N_0
IO_L51P_0
IO_L51N_0
IO_L62P_0
IO_L62N_VREF_0
IO_L63P_SCP7_0
IO_L63N_SCP6_0
IO_L64P_SCP5_0
IO_L64N_SCP4_0
IO_L65P_SCP3_0
IO_L65N_SCP2_0
IO_L66P_SCP1_0
IO_L66N_SCP0_0
XC6SLX45-2FG484C
KS_HRIC_16_P
KS_HRIC_16_N
KS_HRIC_15_P
KS_HRIC_15_N
KS_HRIC_07_P
KS_HRIC_07_N
KS_HRIC_10_P
KS_HRIC_10_N
KS_HRIC_17_P
KS_HRIC_17_N
KS_HRIC_00_P
KS_HRIC_00_N
KS_HRIC_18_P
KS_HRIC_18_N
KS_HRIC_05_P
KS_HRIC_05_N
KS_HRIC_14_P
KS_HRIC_14_N
KS_HRIC_08_P
KS_HRIC_08_N
KS_HRIC_09_P
KS_HRIC_09_N
KS_HRIC_13_P
KS_HRIC_13_N
KS_HRIC_11_P
KS_HRIC_11_N
KS_HRIC_03_P
KS_HRIC_03_N
KS_HRIC_01_P
KS_HRIC_01_N
KS_HRIC_12_P
KS_HRIC_12_N
KS_HRIC_06_P
KS_HRIC_06_N
KS_HRIC_04_P
KS_HRIC_04_N
KS_HRIC_02_P
KS_HRIC_02_N
S_CLK_EXT1_P
S_CLK_EXT1_N
S_CLK_EXT0_P
S_CLK_EXT0_N
S_HEADER_4_P
S_HEADER_4_N
U17B
1.5V I/O
BANK 1
IO_L1P_A25_1
IO_L1N_A24_VREF_1
IO_L9P_1
IO_L9N_1
IO_L10P_1
IO_L10N_1
IO_L19P_1
IO_L19N_1
IO_L20P_1
IO_L20N_1
IO_L21P_1
IO_L21N_1
IO_L28P_1
IO_L28N_VREF_1
IO_L29P_A23_M1A13_1
IO_L29N_A22_M1A14_1
IO_L30P_A21_M1RESET_1
IO_L30N_A20_M1A11_1
IO_L31P_A19_M1CKE_1
IO_L31N_A18_M1A12_1
IO_L32P_A17_M1A8_1
IO_L32N_A16_M1A9_1
IO_L33P_A15_M1A10_1
IO_L33N_A14_M1A4_1
IO_L34P_A13_M1WE_1
IO_L34N_A12_M1BA2_1
IO_L35P_A11_M1A7_1
IO_L35N_A10_M1A2_1
IO_L36P_A9_M1BA0_1
IO_L36N_A8_M1BA1_1
IO_L37P_A7_M1A0_1
IO_L37N_A6_M1A1_1
IO_L38P_A5_M1CLK_1
IO_L38N_A4_M1CLKN_1
IO_L39P_M1A3_1
IO_L39N_M1ODT_1
IO_L40P_GCLK11_M1A5_1
IO_L40N_GCLK10_M1A6_1
IO_L41P_GCLK9_IRDY1_M1RASN_1
IO_L41N_GCLK8_M1CASN_1
IO_L42P_GCLK7_M1UDM_1
IO_L42N_GCLK6_TRDY1_M1LDM_1
IO_L43P_GCLK5_M1DQ4_1
IO_L43N_GCLK4_M1DQ5_1
IO_L44P_A3_M1DQ6_1
IO_L44N_A2_M1DQ7_1
IO_L45P_A1_M1LDQS_1
IO_L45N_A0_M1LDQSN_1
IO_L46P_FCS_B_M1DQ2_1
IO_L46N_FOE_B_M1DQ3_1
IO_L47P_FWE_B_M1DQ0_1
IO_L47N_LDC_M1DQ1_1
IO_L48P_HDC_M1DQ8_1
IO_L48N_M1DQ9_1
IO_L49P_M1DQ10_1
IO_L49N_M1DQ11_1
IO_L50P_M1UDQS_1
IO_L50N_M1UDQSN_1
IO_L51P_M1DQ12_1
IO_L51N_M1DQ13_1
IO_L52P_M1DQ14_1
IO_L52N_M1DQ15_1
IO_L53P_1
IO_L53N_VREF_1
IO_L58P_1
IO_L58N_1
IO_L59P_1
IO_L59N_1
IO_L60P_1
IO_L60N_1
IO_L61P_1
IO_L61N_1
IO_L70P_1
IO_L70N_1
IO_L71P_1
IO_L71N_1
IO_L72P_1
IO_L72N_1
IO_L73P_1
IO_L73N_1
IO_L74P_AWAKE_1
IO_L74N_DOUT_BUSY_1
XC6SLX45-2FG484C
KS_HPIC_01_P
KS_HPIC_01_N
KS_HPIC_02_P
KS_HPIC_02_N
KS_HPIC_06_P
KS_HPIC_06_N
KS_HPIC_03_P
KS_HPIC_03_N
KS_HPIC_05_P
KS_HPIC_05_N
KS_HPIC_00_P
KS_HPIC_00_N
KS_HPIC_04_P
KS_HPIC_04_N
KS_HPIC_15_P
KS_HPIC_15_N
KS_HPIC_17_P
KS_HPIC_17_N
KS_HPIC_14_P
KS_HPIC_14_N
KS_HPIC_07_P
KS_HPIC_07_N
KS_HPIC_12_P
KS_HPIC_12_N
KS_HPIC_16_P
KS_HPIC_16_N
KS_HPIC_08_P
KS_HPIC_08_N
KS_HPIC_09_P
KS_HPIC_09_N
KS_HPIC_10_P
KS_HPIC_10_N
KS_HPIC_11_P
KS_HPIC_11_N
KS_HPIC_CLK_P
KS_HPIC_CLK_N
KS_HPIC_13_P
KS_HPIC_13_N
KS_HPIC_18_P
KS_HPIC_18_N
S_UNUSED_2
S_UNUSED_3
S_UNUSED_4
S_UNUSED_5
S_UNUSED_10
S_UNUSED_11
S_UNUSED_12
S_UNUSED_13
S_UNUSED_6
S_UNUSED_7
S_UNUSED_15
S_UNUSED_16
S_UNUSED_8
S_UNUSED_23
S_UNUSED_0
S_UNUSED_1
S_UNUSED_17
S_UNUSED_18
S_UNUSED_19
S_UNUSED_20
S_UNUSED_21
S_UNUSED_22
S_UNUSED_9
S_UNUSED_14
S_UNUSED_24
S_LED_1
S_LED_0
S_LED_4
S_LED_3
S_LED_2
S_DIPSW_0
S_DIPSW_1
S_DIPSW_7
S_DIPSW_2
S_DIPSW_6
S_DIPSW_3
S_DIPSW_5
S_DIPSW_4
S_WDT_WDO_B
S_PUSHSW
K_FAN_PWM
S_CONF_BUSY
Title
Spartan-6 Bank0, 1
Size
A3
Number
Revision
Date: 2013/03/18
Sheet of
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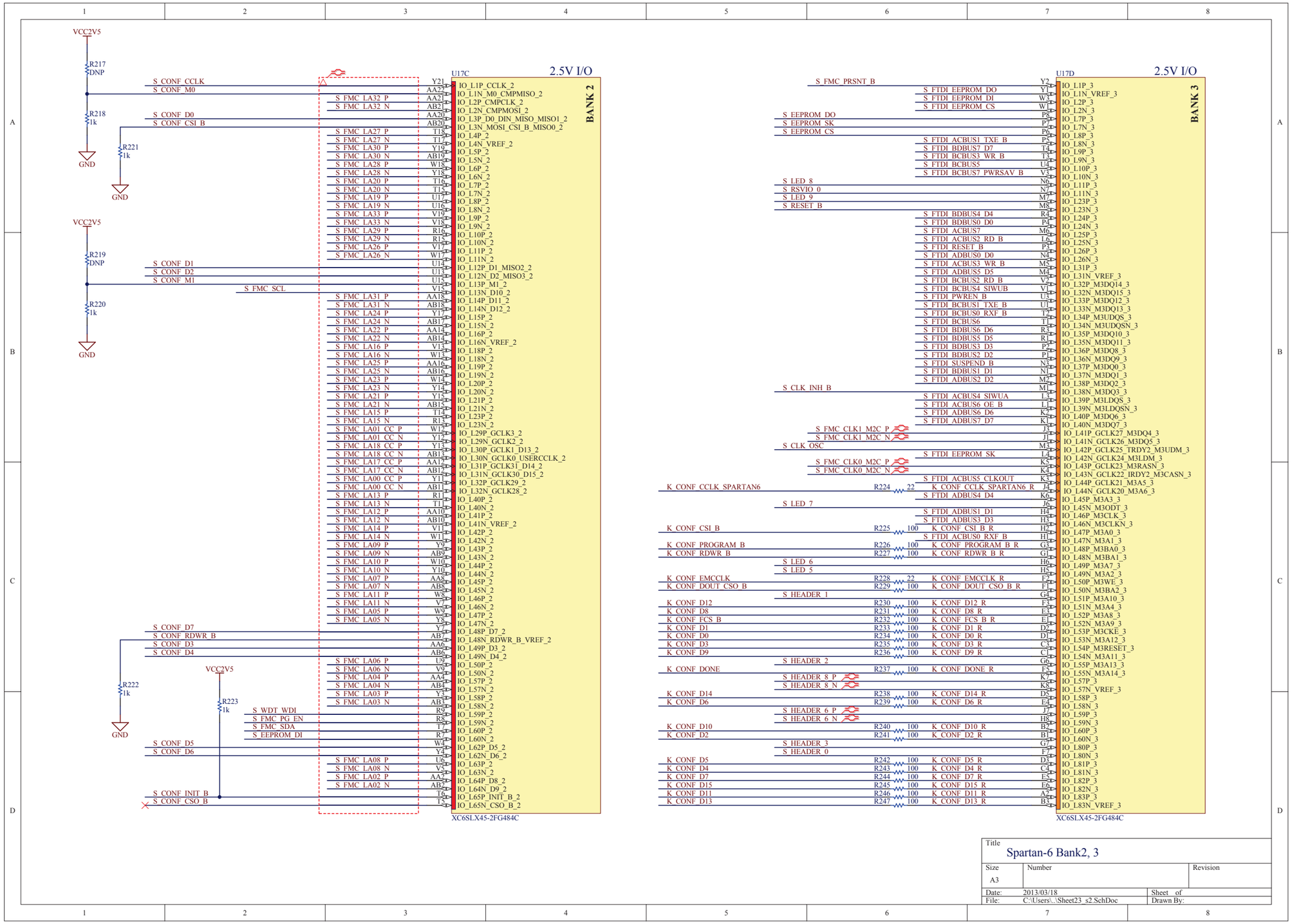
VCC2V5
R217
DNP
R218
1k
R221
1k
GND
GND
VCC2V5
R219
DNP
R220
1k
GND
U17C
2.5V I/O
BANK 2
S_CONF_CCLK
S_CONF_M0
S_CONF_D0
S_CONF_CSI_B
S_CONF_D1
S_CONF_D2
S_CONF_M1
S_FMC_SCL
S_FMC_LA32_P
S_FMC_LA32_N
S_FMC_LA27_P
S_FMC_LA27_N
S_FMC_LA30_P
S_FMC_LA30_N
S_FMC_LA28_P
S_FMC_LA28_N
S_FMC_LA20_P
S_FMC_LA20_N
S_FMC_LA19_P
S_FMC_LA19_N
S_FMC_LA33_P
S_FMC_LA33_N
S_FMC_LA29_P
S_FMC_LA29_N
S_FMC_LA26_P
S_FMC_LA26_N
S_FMC_LA31_P
S_FMC_LA31_N
S_FMC_LA24_P
S_FMC_LA24_N
S_FMC_LA22_P
S_FMC_LA22_N
S_FMC_LA16_P
S_FMC_LA16_N
S_FMC_LA25_P
S_FMC_LA25_N
S_FMC_LA23_P
S_FMC_LA23_N
S_FMC_LA21_P
S_FMC_LA21_N
S_FMC_LA15_P
S_FMC_LA15_N
S_FMC_LA01_CC_P
S_FMC_LA01_CC_N
S_FMC_LA18_CC_P
S_FMC_LA18_CC_N
S_FMC_LA17_CC_P
S_FMC_LA17_CC_N
S_FMC_LA00_CC_P
S_FMC_LA00_CC_N
S_FMC_LA13_P
S_FMC_LA13_N
S_FMC_LA12_P
S_FMC_LA12_N
S_FMC_LA14_P
S_FMC_LA14_N
S_FMC_LA09_P
S_FMC_LA09_N
S_FMC_LA10_P
S_FMC_LA10_N
S_FMC_LA07_P
S_FMC_LA07_N
S_FMC_LA11_P
S_FMC_LA11_N
S_FMC_LA05_P
S_FMC_LA05_N
S_FMC_LA06_P
S_FMC_LA06_N
S_FMC_LA04_P
S_FMC_LA04_N
S_FMC_LA03_P
S_FMC_LA03_N
S_FMC_LA08_P
S_FMC_LA08_N
S_FMC_LA02_P
S_FMC_LA02_N
IO_L1P_CCLK_2
IO_L1N_M0_CMPMISO_2
IO_L2P_CMPCLK_2
IO_L2N_CMPMOSI_2
IO_L3P_D0_DIN_MISO_MISO1_2
IO_L3N_MOSI_CSI_B_MISO0_2
IO_L4P_2
IO_L4N_VREF_2
IO_L5P_2
IO_L5N_2
IO_L6P_2
IO_L6N_2
IO_L7P_2
IO_L7N_2
IO_L8P_2
IO_L8N_2
IO_L9P_2
IO_L9N_2
IO_L10P_2
IO_L10N_2
IO_L11P_2
IO_L11N_2
IO_L12P_D1_MISO2_2
IO_L12N_D2_MISO3_2
IO_L13P_M1_2
IO_L13N_D10_2
IO_L14P_D11_2
IO_L14N_D12_2
IO_L15P_2
IO_L15N_2
IO_L16P_2
IO_L16N_VREF_2
IO_L18P_2
IO_L18N_2
IO_L19P_2
IO_L19N_2
IO_L20P_2
IO_L20N_2
IO_L21P_2
IO_L21N_2
IO_L23P_2
IO_L23N_2
IO_L29P_GCLK3_2
IO_L29N_GCLK2_2
IO_L30P_GCLK1_D13_2
IO_L30N_GCLK0_USERCCLK_2
IO_L31P_GCLK31_D14_2
IO_L31N_GCLK30_D15_2
IO_L32P_GCLK29_2
IO_L32N_GCLK28_2
IO_L40P_2
IO_L40N_2
IO_L41P_2
IO_L41N_VREF_2
IO_L42P_2
IO_L42N_2
IO_L43P_2
IO_L43N_2
IO_L44P_2
IO_L44N_2
IO_L45P_2
IO_L45N_2
IO_L46P_2
IO_L46N_2
IO_L47P_2
IO_L47N_2
IO_L48P_D7_2
IO_L48N_RDWR_B_VREF_2
IO_L49P_D3_2
IO_L49N_D4_2
IO_L50P_2
IO_L50N_2
IO_L57P_2
IO_L57N_2
IO_L58P_2
IO_L58N_2
IO_L59P_2
IO_L59N_2
IO_L60P_2
IO_L60N_2
IO_L62P_D5_2
IO_L62N_D6_2
IO_L63P_2
IO_L63N_2
IO_L64P_D8_2
IO_L64N_D9_2
IO_L65P_INIT_B_2
IO_L65N_CSO_B_2
XC6SLX45-2FG484C
VCC2V5
R222
1k
R223
1k
GND
S_WDT_WDI
S_FMC_PG_EN
S_FMC_SDA
S_EEPROM_DI
S_CONF_D5
S_CONF_D6
S_CONF_INIT_B
S_CONF_CSO_B
U17D
2.5V I/O
BANK 3
S_FMC_PRSNT_B
S_EEPROM_DO
S_EEPROM_SK
S_EEPROM_CS
S_LED_8
S_RSVIO_0
S_LED_9
S_RESET_B
S_CLK_INH_B
S_CLK_OSC
S_LED_7
S_LED_6
S_LED_5
S_HEADER_1
S_HEADER_2
S_HEADER_3
S_FTDI_EEPROM_DO
S_FTDI_EEPROM_DI
S_FTDI_EEPROM_CS
S_FTDI_ACBUS1_TXE_B
S_FTDI_BDBUS7_D7
S_FTDI_BCBUS3_WR_B
S_FTDI_BCBUS5
S_FTDI_BCBUS7_PWRSAV_B
S_FTDI_BDBUS4_D4
S_FTDI_BDBUS0_D0
S_FTDI_ACBUS7
S_FTDI_ACBUS2_RD_B
S_FTDI_RESET_B
S_FTDI_ADBUS0_D0
S_FTDI_ACBUS3_WR_B
S_FTDI_ADBUS5_D5
S_FTDI_BCBUS2_RD_B
S_FTDI_BCBUS4_SIWUB
S_FTDI_PWREN_B
S_FTDI_BCBUS1_TXE_B
S_FTDI_BCBUS0_RXF_B
S_FTDI_BCBUS6
S_FTDI_BDBUS6_D6
S_FTDI_BDBUS5_D5
S_FTDI_BDBUS3_D3
S_FTDI_BDBUS2_D2
S_FTDI_SUSPEND_B
S_FTDI_BDBUS1_D1
S_FTDI_ADBUS2_D2
S_FTDI_ACBUS4_SIWUA
S_FTDI_ACBUS6_OE_B
S_FTDI_ADBUS6_D6
S_FTDI_ADBUS7_D7
S_FTDI_EEPROM_SK
S_FTDI_ACBUS5_CLKOUT
S_FTDI_ADBUS4_D4
S_FTDI_ADBUS1_D1
S_FTDI_ADBUS3_D3
S_FTDI_ACBUS0_RXF_B
S_HEADER_8_P
S_HEADER_8_N
S_HEADER_6_P
S_HEADER_6_N
S_HEADER_0
S_FMC_CLK1_M2C_P
S_FMC_CLK1_M2C_N
S_FMC_CLK0_M2C_P
S_FMC_CLK0_M2C_N
K_CONF_CCLK_SPARTAN6
K_CONF_CSI_B
K_CONF_PROGRAM_B
K_CONF_RDWR_B
K_CONF_EMCCLK
K_CONF_DOUT_CSO_B
K_CONF_D12
K_CONF_D8
K_CONF_FCS_B
K_CONF_D1
K_CONF_D0
K_CONF_D3
K_CONF_D9
K_CONF_DONE
K_CONF_D14
K_CONF_D6
K_CONF_D10
K_CONF_D2
K_CONF_D5
K_CONF_D4
K_CONF_D7
K_CONF_D15
K_CONF_D11
K_CONF_D13
R224 22 K_CONF_CCLK_SPARTAN6_R
R225 100 K_CONF_CSI_B_R
R226 100 K_CONF_PROGRAM_B_R
R227 100 K_CONF_RDWR_B_R
R228 22 K_CONF_EMCCLK_R
R229 100 K_CONF_DOUT_CSO_B_R
R230 100 K_CONF_D12_R
R231 100 K_CONF_D8_R
R232 100 K_CONF_FCS_B_R
R233 100 K_CONF_D1_R
R234 100 K_CONF_D0_R
R235 100 K_CONF_D3_R
R236 100 K_CONF_D9_R
R237 100 K_CONF_DONE_R
R238 100 K_CONF_D14_R
R239 100 K_CONF_D6_R
R240 100 K_CONF_D10_R
R241 100 K_CONF_D2_R
R242 100 K_CONF_D5_R
R243 100 K_CONF_D4_R
R244 100 K_CONF_D7_R
R245 100 K_CONF_D15_R
R246 100 K_CONF_D11_R
R247 100 K_CONF_D13_R
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IO_L1N_VREF_3
IO_L2P_3
IO_L2N_3
IO_L7P_3
IO_L7N_3
IO_L8P_3
IO_L8N_3
IO_L9P_3
IO_L9N_3
IO_L10P_3
IO_L10N_3
IO_L11P_3
IO_L11N_3
IO_L23P_3
IO_L23N_3
IO_L24P_3
IO_L24N_3
IO_L25P_3
IO_L25N_3
IO_L26P_3
IO_L26N_3
IO_L31P_3
IO_L31N_VREF_3
IO_L32P_M3DQ14_3
IO_L32N_M3DQ15_3
IO_L33P_M3DQ12_3
IO_L33N_M3DQ13_3
IO_L34P_M3UDQS_3
IO_L34N_M3UDQSN_3
IO_L35P_M3DQ10_3
IO_L35N_M3DQ11_3
IO_L36P_M3DQ8_3
IO_L36N_M3DQ9_3
IO_L37P_M3DQ0_3
IO_L37N_M3DQ1_3
IO_L38P_M3DQ2_3
IO_L38N_M3DQ3_3
IO_L39P_M3LDQS_3
IO_L39N_M3LDQSN_3
IO_L40P_M3DQ6_3
IO_L40N_M3DQ7_3
IO_L41P_GCLK27_M3DQ4_3
IO_L41N_GCLK26_M3DQ5_3
IO_L42P_GCLK25_TRDY2_M3UDM_3
IO_L42N_GCLK24_M3LDM_3
IO_L43P_GCLK23_M3RASN_3
IO_L43N_GCLK22_IRDY2_M3CASN_3
IO_L44P_GCLK21_M3A5_3
IO_L44N_GCLK20_M3A6_3
IO_L45P_M3A3_3
IO_L45N_M3ODT_3
IO_L46P_M3CLK_3
IO_L46N_M3CLKN_3
IO_L47P_M3A0_3
IO_L47N_M3A1_3
IO_L48P_M3BA0_3
IO_L48N_M3BA1_3
IO_L49P_M3A7_3
IO_L49N_M3A2_3
IO_L50P_M3WE_3
IO_L50N_M3BA2_3
IO_L51P_M3A10_3
IO_L51N_M3A4_3
IO_L52P_M3A8_3
IO_L52N_M3A9_3
IO_L53P_M3CKE_3
IO_L53N_M3A12_3
IO_L54P_M3RESET_3
IO_L54N_M3A11_3
IO_L55P_M3A13_3
IO_L55N_M3A14_3
IO_L57P_3
IO_L57N_VREF_3
IO_L58P_3
IO_L58N_3
IO_L59P_3
IO_L59N_3
IO_L60P_3
IO_L60N_3
IO_L80P_3
IO_L80N_3
IO_L81P_3
IO_L81N_3
IO_L82P_3
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IO_L83N_3
XC6SLX45-2FG484C
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Spartan-6 Bank2, 3
Size
A3
Number
Revision
Date: 2013/03/18
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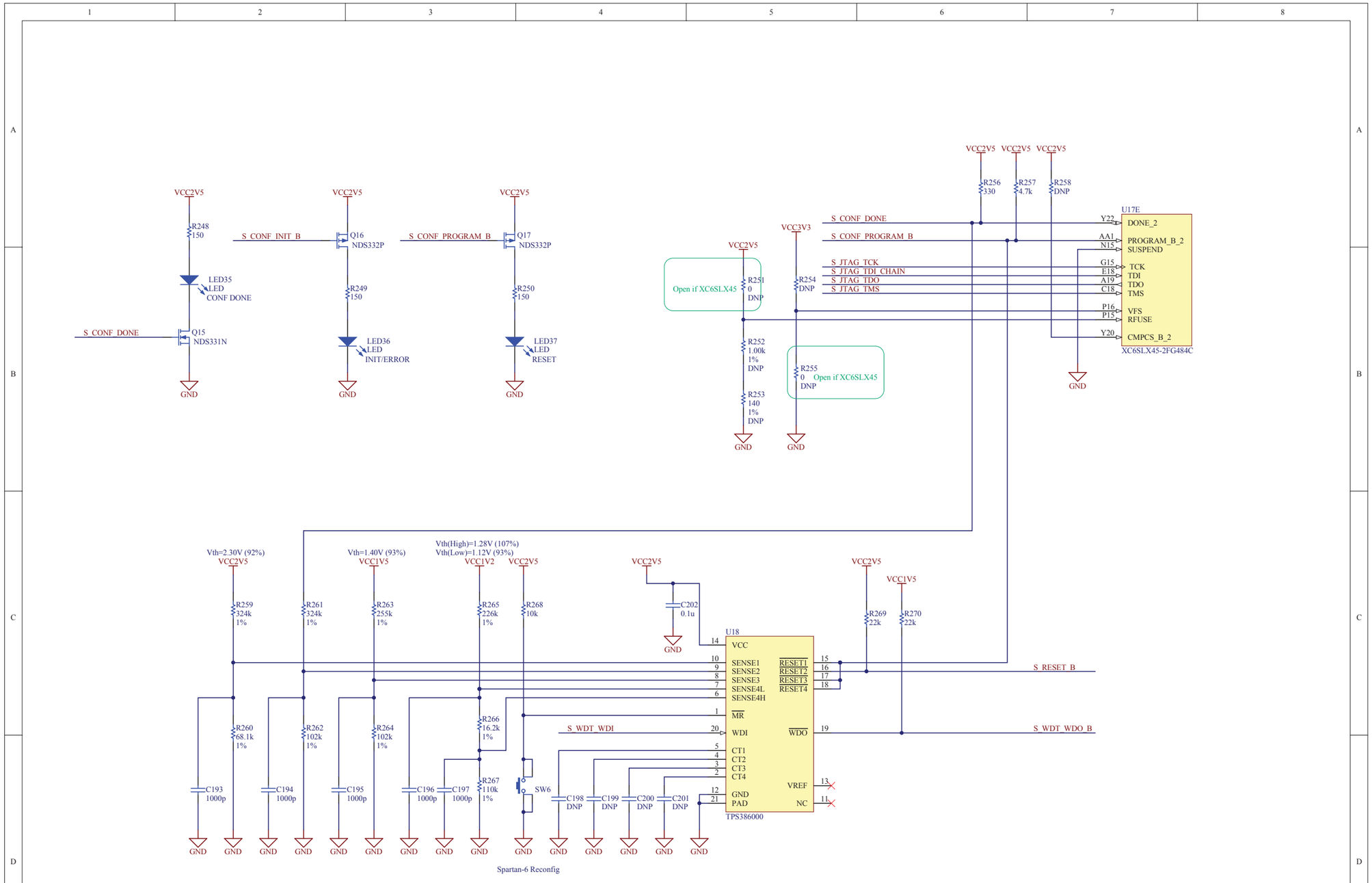
VCC2V5
R248
150
LED35
LED
CONF DONE
S_CONF_DONE
Q15
NDS331N
GND
S_CONF_INIT_B
Q16
NDS332P
R249
150
LED36
LED
INIT/ERROR
S_CONF_PROGRAM_B
Q17
NDS332P
R250
150
LED37
LED
RESET
VCC3V3
R251
0
DNP
Open if XC6SLX45
R252
1.00k
1%
DNP
R253
140
1%
DNP
R254
DNP
R255
0
Open if XC6SLX45
DNP
R256
330
R257
4.7k
R258
DNP
U17E
DONE_2
PROGRAM_B_2
SUSPEND
TCK
TDI
TDO
TMS
VFS
RFUSE
CMPCS_B_2
XC6SLX45-2FG484C
S_JTAG_TCK
S_JTAG_TDI_CHAIN
S_JTAG_TDO
S_JTAG_TMS
Vth=2.30V (92%)
Vth=1.40V (93%)
VCC1V5
Vth(High)=1.28V (107%)
Vth(Low)=1.12V (93%)
VCC1V2
R259
324k
1%
R260
68.1k
1%
R261
324k
1%
R262
102k
1%
R263
255k
1%
R264
102k
1%
R265
226k
1%
R266
16.2k
1%
R267
110k
1%
R268
10k
C193
1000p
C194
1000p
C195
1000p
C196
1000p
C197
1000p
SW6
C198
DNP
C199
DNP
C200
DNP
C201
DNP
C202
0.1u
U18
VCC
SENSE1
SENSE2
SENSE3
SENSE4L
SENSE4H
MR
WDI
CT1
CT2
CT3
CT4
GND
PAD
RESET1
RESET2
RESET3
RESET4
WDO
VREF
NC
TPS386000
S_WDT_WDI
S_RESET_B
S_WDT_WDO_B
R269
22k
R270
22k
Spartan-6 Reconfig
Title
Spartan-6 Supervisor
Size
A3
Number
Revision
Date: 2013/03/18
Sheet of
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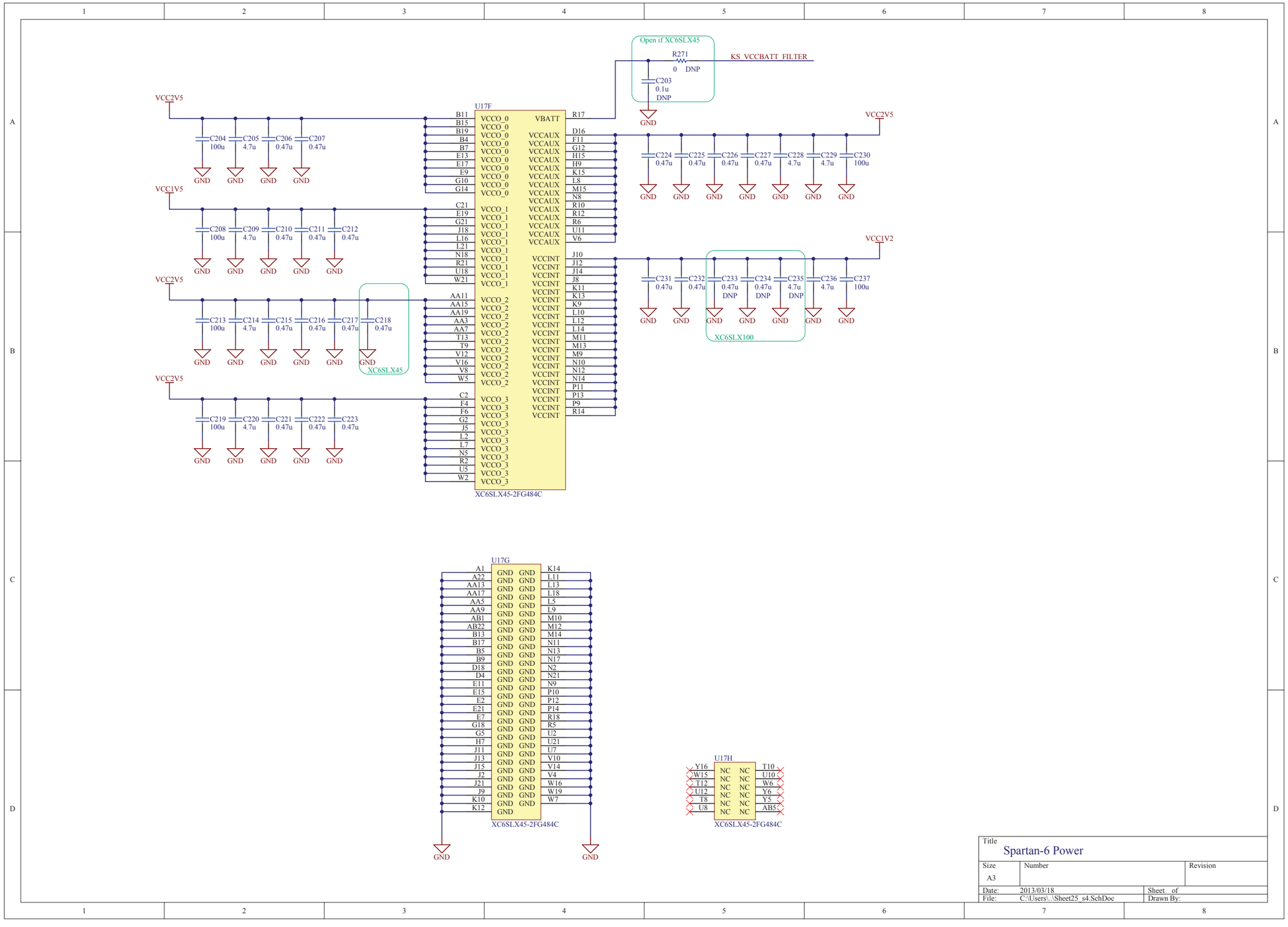
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R271
0 DNP
KS_VCCBATT_FILTER
C203
0.1u
DNP
GND
U17F
VCC2V5
VCC1V5
VCC2V5
VCC2V5
B11 B15 B19 B4 B7 E13 E17 E9 G10 G14
C21 E19 G21 J18 L16 L21 N18 R21 U18 W21
AA11 AA15 AA19 AA3 AA7 T13 T9 V12 V16 V8 W5
C2 F4 F6 G2 J5 L2 L7 N5 R2 U5 W2
VCCO_0 VCCO_1 VCCO_2 VCCO_3
VBATT
R17
VCCAUX
D16 F11 G12 H15 H9 K15 L8 M15 N8 R10 R12 R6 U11 V6
VCCINT
J10 J12 J14 J8 K11 K13 K9 L10 L12 L14 M11 M13 M9 N10 N12 N14 P11 P13 P9 R14
C204 100u
C205 4.7u
C206 0.47u
C207 0.47u
C208 100u
C209 4.7u
C210 0.47u
C211 0.47u
C212 0.47u
C213 100u
C214 4.7u
C215 0.47u
C216 0.47u
C217 0.47u
C218 0.47u
C219 100u
C220 4.7u
C221 0.47u
C222 0.47u
C223 0.47u
XC6SLX45
XC6SLX45-2FG484C
VCC2V5
C224 0.47u
C225 0.47u
C226 0.47u
C227 0.47u
C228 4.7u
C229 4.7u
C230 100u
VCC1V2
C231 0.47u
C232 0.47u
C233 0.47u DNP
C234 0.47u DNP
C235 4.7u DNP
C236 4.7u
C237 100u
XC6SLX100
U17G
A1 A22 AA13 AA17 AA5 AA9 AB1 AB22 B13 B17 B5 B9 D18 D4 E11 E15 E2 E21 E7 G18 G5 H7 J11 J13 J15 J2 J21 J9 K10 K12
GND GND
K14 L11 L13 L18 L5 L9 M10 M12 M14 N11 N13 N17 N2 N21 N9 P10 P12 P14 R18 R5 U2 U21 U7 V10 V14 V4 W16 W19 W7
GND
XC6SLX45-2FG484C
GND
GND
U17H
Y16 W15 T12 U12 T8 U8
NC NC
T10 U10 W6 Y6 Y5 AB5
XC6SLX45-2FG484C
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Spartan-6 Power
Size
A3
Number
Revision
Date: 2013/03/18
Sheet of
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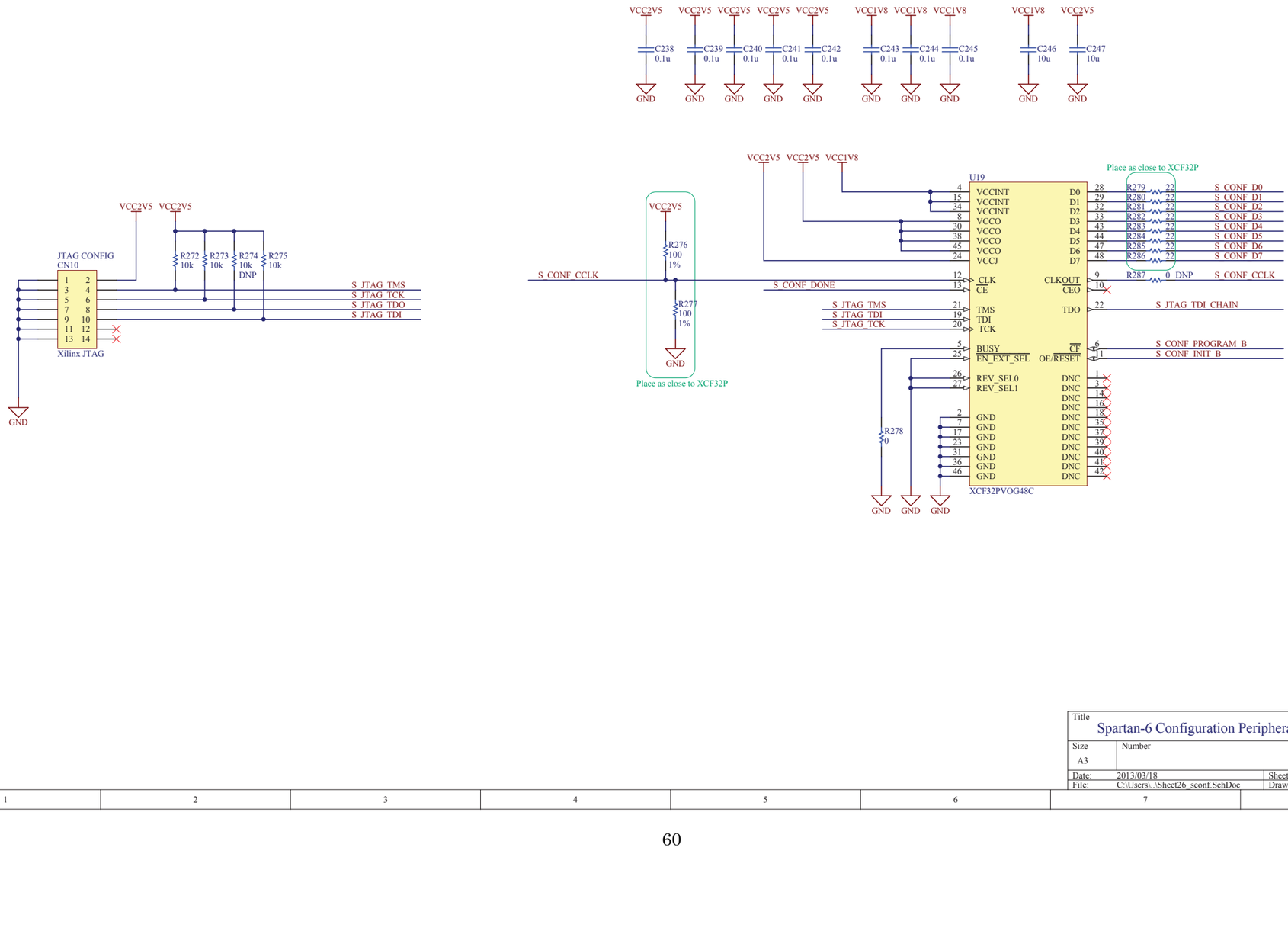
VCC2V5 VCC2V5 VCC2V5 VCC2V5 VCC2V5
C238 0.1u
C239 0.1u
C240 0.1u
C241 0.1u
C242 0.1u
GND GND GND GND GND
VCC1V8 VCC1V8 VCC1V8
C243 0.1u
C244 0.1u
C245 0.1u
GND GND GND
VCC1V8 VCC2V5
C246 10u
C247 10u
GND GND
VCC2V5 VCC2V5
JTAG CONFIG
CN10
1 2
3 4
5 6
7 8
9 10
11 12
13 14
Xilinx JTAG
R272 10k
R273 10k
R274 10k DNP
R275 10k
S_JTAG_TMS
S_JTAG_TCK
S_JTAG_TDO
S_JTAG_TDI
GND
VCC2V5
R276 100 1%
R277 100 1%
GND
Place as close to XCF32P
VCC2V5 VCC2V5 VCC1V8
U19
Place as close to XCF32P
4 VCCINT
15 VCCINT
34 VCCINT
8 VCCO
30 VCCO
38 VCCO
45 VCCO
24 VCCJ
S_CONF_CCLK
12 CLK
S_CONF_DONE
13 CE
S_JTAG_TMS
S_JTAG_TDI
S_JTAG_TCK
21 TMS
19 TDI
20 TCK
5 BUSY
25 EN_EXT_SEL
26 REV_SEL0
27 REV_SEL1
2 GND
7 GND
17 GND
23 GND
31 GND
36 GND
46 GND
R278 0
GND GND GND
XCF32PVOG48C
D0 28
D1 29
D2 32
D3 33
D4 43
D5 44
D6 47
D7 48
R279 22
R280 22
R281 22
R282 22
R283 22
R284 22
R285 22
R286 22
S_CONF_D0
S_CONF_D1
S_CONF_D2
S_CONF_D3
S_CONF_D4
S_CONF_D5
S_CONF_D6
S_CONF_D7
CLKOUT 9
CEO 10
R287 0 DNP
S_CONF_CCLK
TDO 22
S_JTAG_TDI_CHAIN
CF 6
OE/RESET 1
S_CONF_PROGRAM_B
S_CONF_INIT_B
DNC 1
DNC 3
DNC 14
DNC 16
DNC 18
DNC 35
DNC 37
DNC 39
DNC 40
DNC 41
DNC 42
Title
Spartan-6 Configuration Peripheral
Size A3
Number
Revision
Date: 2013/03/18
Sheet of
File: C:\Users\..\Sheet26_sconf.SchDoc
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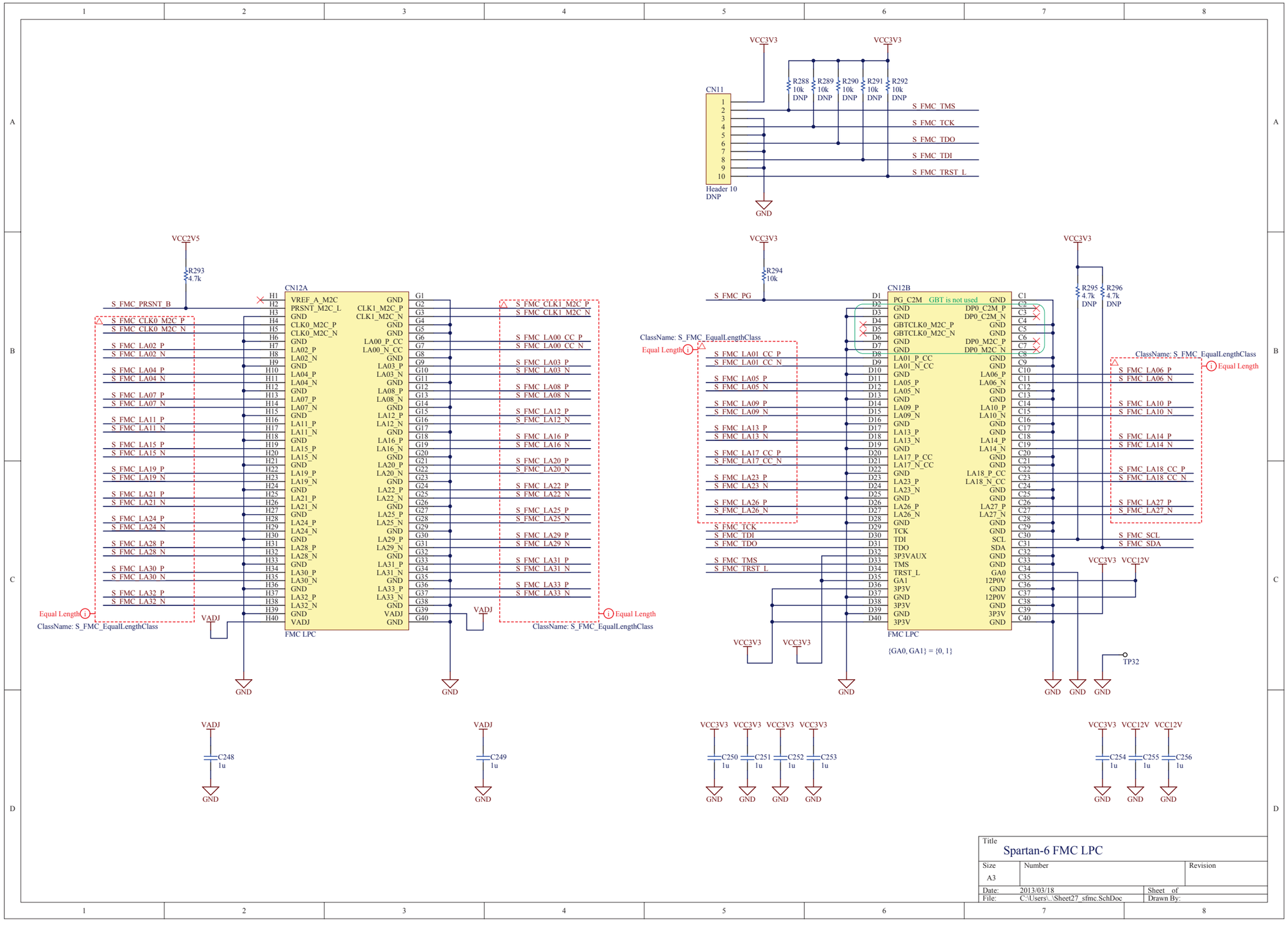
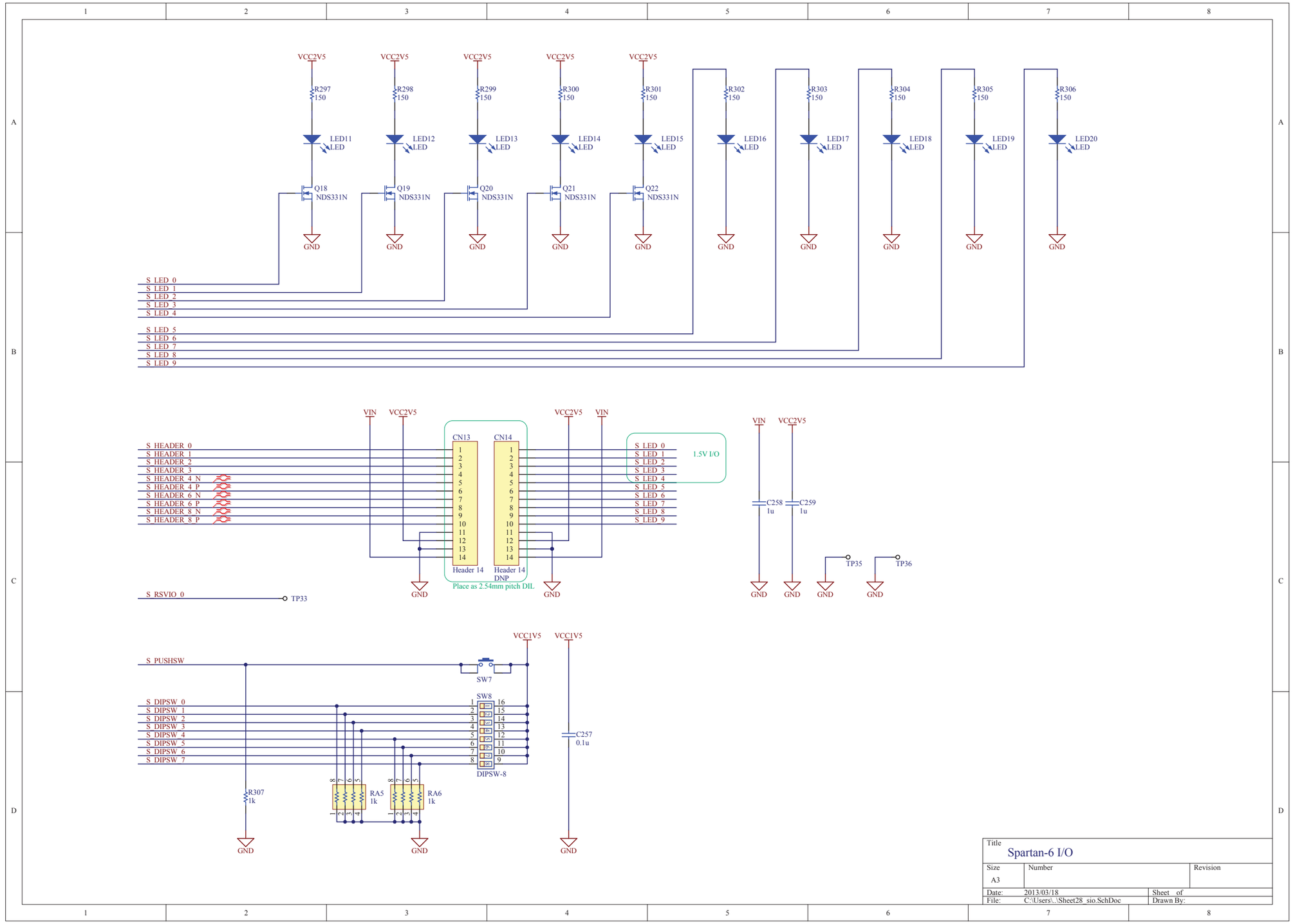

CN11
Header 10
DNP
R288 10k DNP
R289 10k DNP
R290 10k DNP
R291 10k DNP
R292 10k DNP
S_FMC_TMS
S_FMC_TCK
S_FMC_TDO
S_FMC_TDI
S_FMC_TRST_L
VCC3V3
GND
CN12A
FMC LPC
VCC2V5
R293 4.7k
S_FMC_PRSNT_B
S_FMC_CLK0_M2C_P
S_FMC_CLK0_M2C_N
S_FMC_LA02_P
S_FMC_LA02_N
S_FMC_LA04_P
S_FMC_LA04_N
S_FMC_LA07_P
S_FMC_LA07_N
S_FMC_LA11_P
S_FMC_LA11_N
S_FMC_LA15_P
S_FMC_LA15_N
S_FMC_LA19_P
S_FMC_LA19_N
S_FMC_LA21_P
S_FMC_LA21_N
S_FMC_LA24_P
S_FMC_LA24_N
S_FMC_LA28_P
S_FMC_LA28_N
S_FMC_LA30_P
S_FMC_LA30_N
S_FMC_LA32_P
S_FMC_LA32_N
S_FMC_CLK1_M2C_P
S_FMC_CLK1_M2C_N
S_FMC_LA00_CC_P
S_FMC_LA00_CC_N
S_FMC_LA03_P
S_FMC_LA03_N
S_FMC_LA08_P
S_FMC_LA08_N
S_FMC_LA12_P
S_FMC_LA12_N
S_FMC_LA16_P
S_FMC_LA16_N
S_FMC_LA20_P
S_FMC_LA20_N
S_FMC_LA22_P
S_FMC_LA22_N
S_FMC_LA25_P
S_FMC_LA25_N
S_FMC_LA29_P
S_FMC_LA29_N
S_FMC_LA31_P
S_FMC_LA31_N
S_FMC_LA33_P
S_FMC_LA33_N
VADJ
Equal Length
ClassName: S_FMC_EqualLengthClass
C248 1u
C249 1u
VCC3V3
R294 10k
S_FMC_PG
CN12B
PG_C2M GBT is not used
S_FMC_LA01_CC_P
S_FMC_LA01_CC_N
S_FMC_LA05_P
S_FMC_LA05_N
S_FMC_LA09_P
S_FMC_LA09_N
S_FMC_LA13_P
S_FMC_LA13_N
S_FMC_LA17_CC_P
S_FMC_LA17_CC_N
S_FMC_LA23_P
S_FMC_LA23_N
S_FMC_LA26_P
S_FMC_LA26_N
S_FMC_TCK
S_FMC_TDI
S_FMC_TDO
S_FMC_TMS
S_FMC_TRST_L
{GA0, GA1} = {0, 1}
R295 4.7k DNP
R296 4.7k DNP
S_FMC_LA06_P
S_FMC_LA06_N
S_FMC_LA10_P
S_FMC_LA10_N
S_FMC_LA14_P
S_FMC_LA14_N
S_FMC_LA18_CC_P
S_FMC_LA18_CC_N
S_FMC_LA27_P
S_FMC_LA27_N
S_FMC_SCL
S_FMC_SDA
VCC12V
TP32
C250 1u
C251 1u
C252 1u
C253 1u
C254 1u
C255 1u
C256 1u
Title
Spartan-6 FMC LPC
Size
A3
Number
Revision
Date: 2013/03/18
Sheet of
File: C:\Users\..\Sheet27_sfmc.SchDoc
Drawn By:


VCC2V5
R297 150
R298 150
R299 150
R300 150
R301 150
R302 150
R303 150
R304 150
R305 150
R306 150
LED11 LED
LED12 LED
LED13 LED
LED14 LED
LED15 LED
LED16 LED
LED17 LED
LED18 LED
LED19 LED
LED20 LED
Q18 NDS331N
Q19 NDS331N
Q20 NDS331N
Q21 NDS331N
Q22 NDS331N
GND
S_LED_0
S_LED_1
S_LED_2
S_LED_3
S_LED_4
S_LED_5
S_LED_6
S_LED_7
S_LED_8
S_LED_9
VIN
S_HEADER_0
S_HEADER_1
S_HEADER_2
S_HEADER_3
S_HEADER_4_N
S_HEADER_4_P
S_HEADER_6_N
S_HEADER_6_P
S_HEADER_8_N
S_HEADER_8_P
CN13
CN14
Header 14
Header 14 DNP
Place as 2.54mm pitch DIL
1.5V I/O
C258 1u
C259 1u
TP35
TP36
S_RSVIO_0
TP33
VCC1V5
S_PUSHSW
SW7
SW8
S_DIPSW_0
S_DIPSW_1
S_DIPSW_2
S_DIPSW_3
S_DIPSW_4
S_DIPSW_5
S_DIPSW_6
S_DIPSW_7
DIPSW-8
R307 1k
RA5 1k
RA6 1k
C257 0.1u
Title
Spartan-6 I/O
Size
A3
Number
Revision
Date: 2013/03/18
Sheet of
File: C:\Users\..\Sheet28_sio.SchDoc
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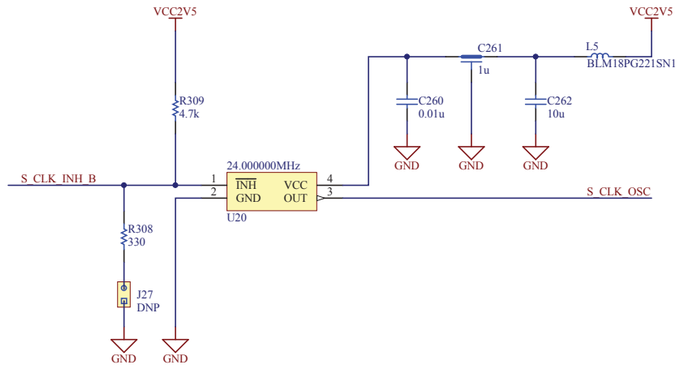

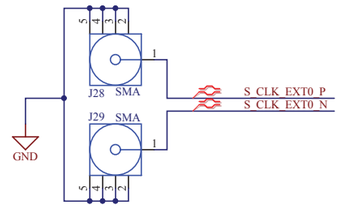

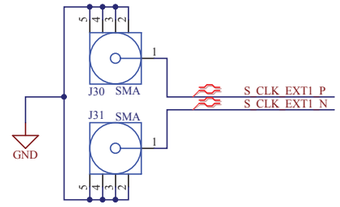

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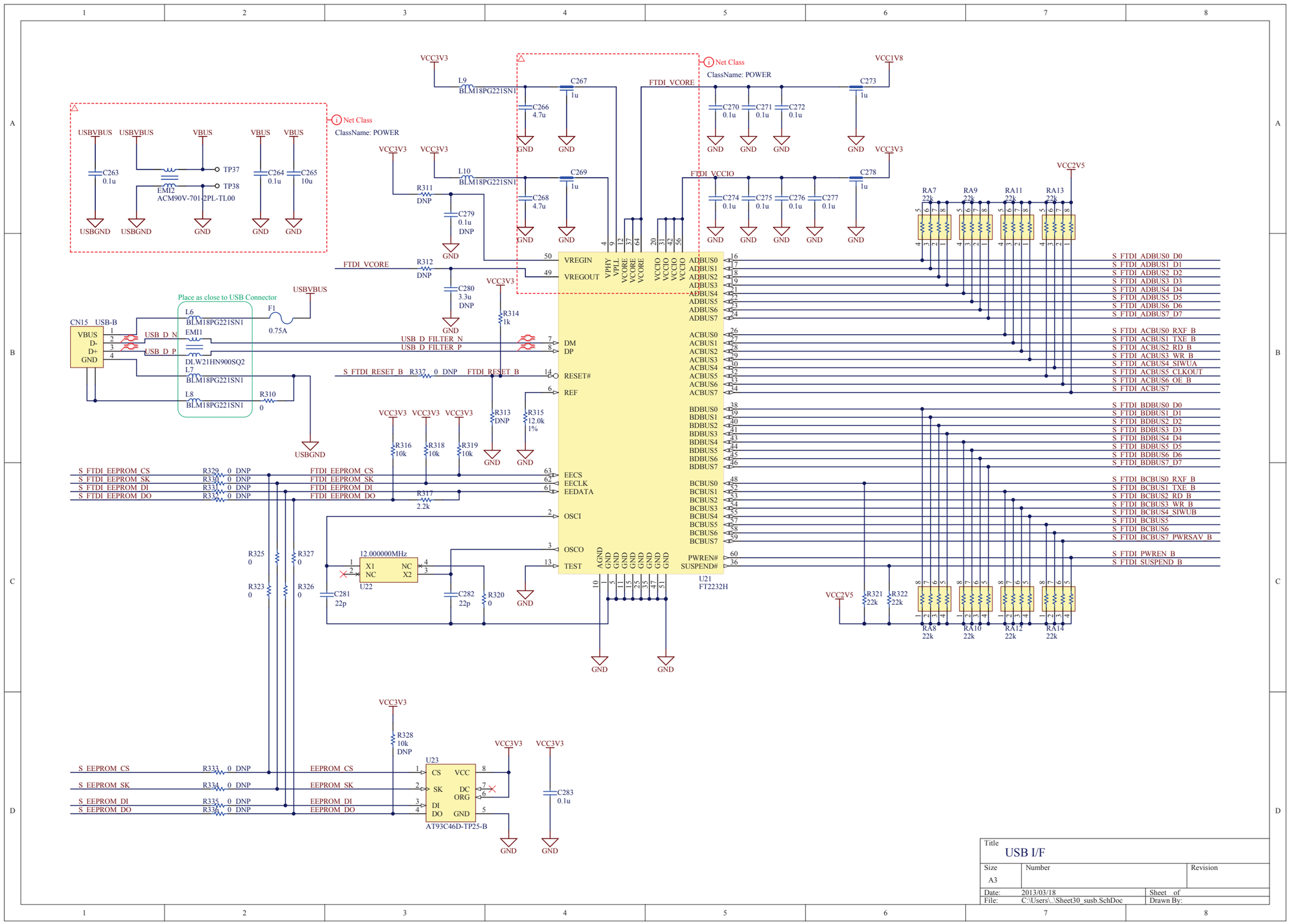
Date: 2013/03/18		Sheet of
File: C:\Users\..\Sheet29_sclk.SchDoc		Drawn By:


Net Class
ClassName: POWER
USBVBUS
VBUS
C263 0.1u
C264 0.1u
C265 10u
TP37
TP38
EMI2
ACM90V-701-2PL-TL00
USBGND
GND
VCC3V3
L9 BLM18PG221SN1
L10 BLM18PG221SN1
C266 4.7u
C267 1u
C268 4.7u
C269 1u
FTDI_VCORE
FTDI_VCCIO
C270 0.1u
C271 0.1u
C272 0.1u
C273 1u
C274 0.1u
C275 0.1u
C276 0.1u
C277 0.1u
C278 1u
VCC1V8
VCC2V5
R311 DNP
R312 DNP
C279 0.1u DNP
C280 3.3u DNP
Place as close to USB Connector
CN15 USB-B
VBUS
D-
D+
GND
USB_D_N
USB_D_P
L6 BLM18PG221SN1
L7 BLM18PG221SN1
L8 BLM18PG221SN1
EMI1
DLW21HN900SQ2
F1
0.75A
R310 0
USB_D_FILTER_N
USB_D_FILTER_P
R314 1k
S_FTDI_RESET_B
R337 0 DNP
FTDI_RESET_B
R313 DNP
R315 12.0k 1%
R316 10k
R318 10k
R319 10k
R317 2.2k
VREGIN
VREGOUT
VPHY
VPLL
VCORE
VCCIO
DM
DP
RESET#
REF
EECS
EECLK
EEDATA
OSCI
OSCO
TEST
AGND
ADBUS0
ADBUS1
ADBUS2
ADBUS3
ADBUS4
ADBUS5
ADBUS6
ADBUS7
ACBUS0
ACBUS1
ACBUS2
ACBUS3
ACBUS4
ACBUS5
ACBUS6
ACBUS7
BDBUS0
BDBUS1
BDBUS2
BDBUS3
BDBUS4
BDBUS5
BDBUS6
BDBUS7
BCBUS0
BCBUS1
BCBUS2
BCBUS3
BCBUS4
BCBUS5
BCBUS6
BCBUS7
PWREN#
SUSPEND#
U21
FT2232H
12.000000MHz
X1
X2
NC
U22
C281 22p
C282 22p
R320 0
R321 22k
R322 22k
RA7 22k
RA9 22k
RA11 22k
RA13 22k
RA8 22k
RA10 22k
RA12 22k
RA14 22k
S_FTDI_ADBUS0_D0
S_FTDI_ADBUS1_D1
S_FTDI_ADBUS2_D2
S_FTDI_ADBUS3_D3
S_FTDI_ADBUS4_D4
S_FTDI_ADBUS5_D5
S_FTDI_ADBUS6_D6
S_FTDI_ADBUS7_D7
S_FTDI_ACBUS0_RXF_B
S_FTDI_ACBUS1_TXE_B
S_FTDI_ACBUS2_RD_B
S_FTDI_ACBUS3_WR_B
S_FTDI_ACBUS4_SIWUA
S_FTDI_ACBUS5_CLKOUT
S_FTDI_ACBUS6_OE_B
S_FTDI_ACBUS7
S_FTDI_BDBUS0_D0
S_FTDI_BDBUS1_D1
S_FTDI_BDBUS2_D2
S_FTDI_BDBUS3_D3
S_FTDI_BDBUS4_D4
S_FTDI_BDBUS5_D5
S_FTDI_BDBUS6_D6
S_FTDI_BDBUS7_D7
S_FTDI_BCBUS0_RXF_B
S_FTDI_BCBUS1_TXE_B
S_FTDI_BCBUS2_RD_B
S_FTDI_BCBUS3_WR_B
S_FTDI_BCBUS4_SIWUB
S_FTDI_BCBUS5
S_FTDI_BCBUS6
S_FTDI_BCBUS7_PWRSAV_B
S_FTDI_PWREN_B
S_FTDI_SUSPEND_B
S_FTDI_EEPROM_CS
S_FTDI_EEPROM_SK
S_FTDI_EEPROM_DI
S_FTDI_EEPROM_DO
R329 0 DNP
R330 0 DNP
R331 0 DNP
R332 0 DNP
FTDI_EEPROM_CS
FTDI_EEPROM_SK
FTDI_EEPROM_DI
FTDI_EEPROM_DO
R325 0
R327 0
R323 0
R326 0
R328 10k DNP
S_EEPROM_CS
S_EEPROM_SK
S_EEPROM_DI
S_EEPROM_DO
R333 0 DNP
R334 0 DNP
R335 0 DNP
R336 0 DNP
EEPROM_CS
EEPROM_SK
EEPROM_DI
EEPROM_DO
U23
CS
SK
DI
DO
VCC
DC
ORG
GND
AT93C46D-TP25-B
C283 0.1u
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USB I/F
Size
A3
Number
Revision
Date: 2013/03/18
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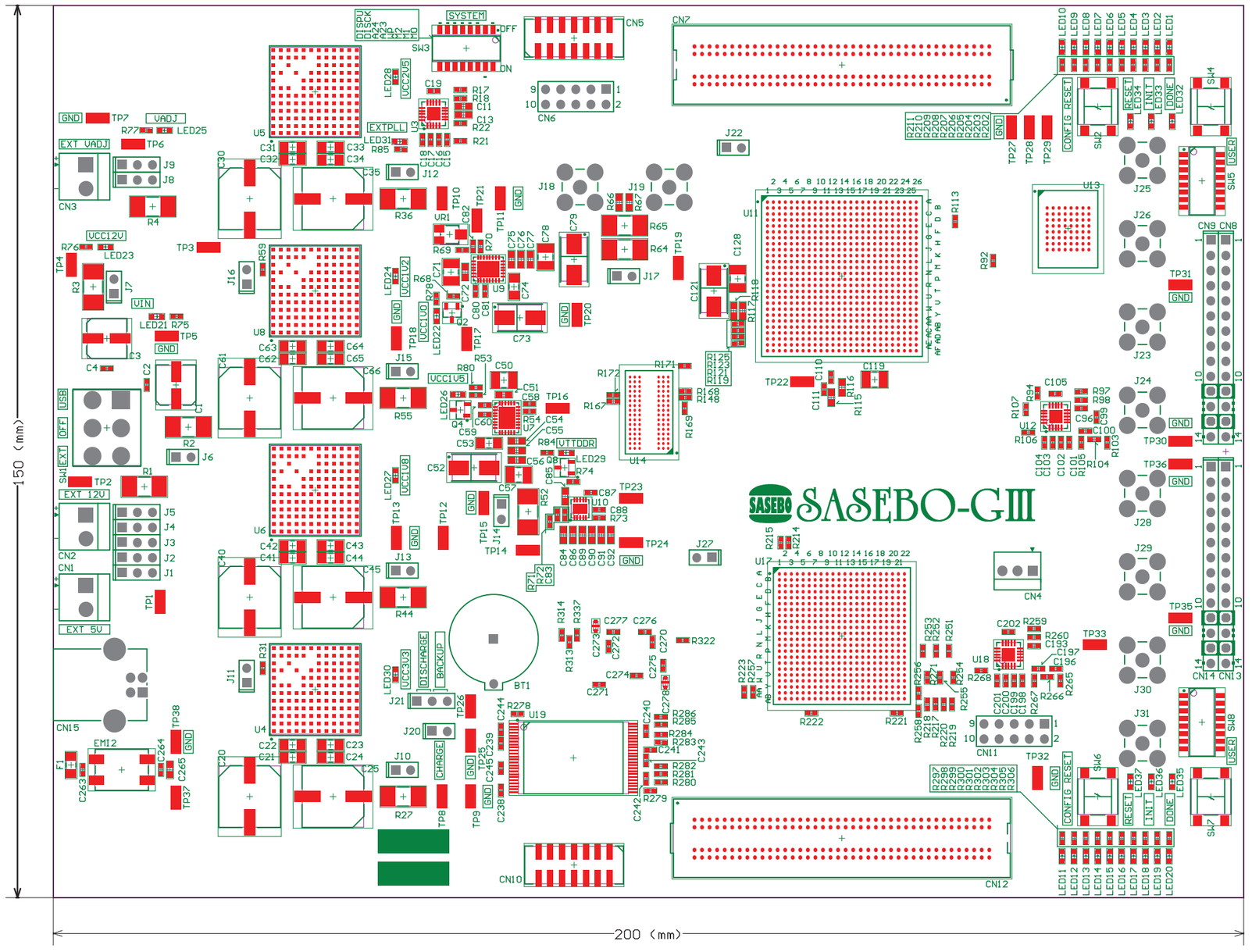

Figure 9 : L1 Assembly Image

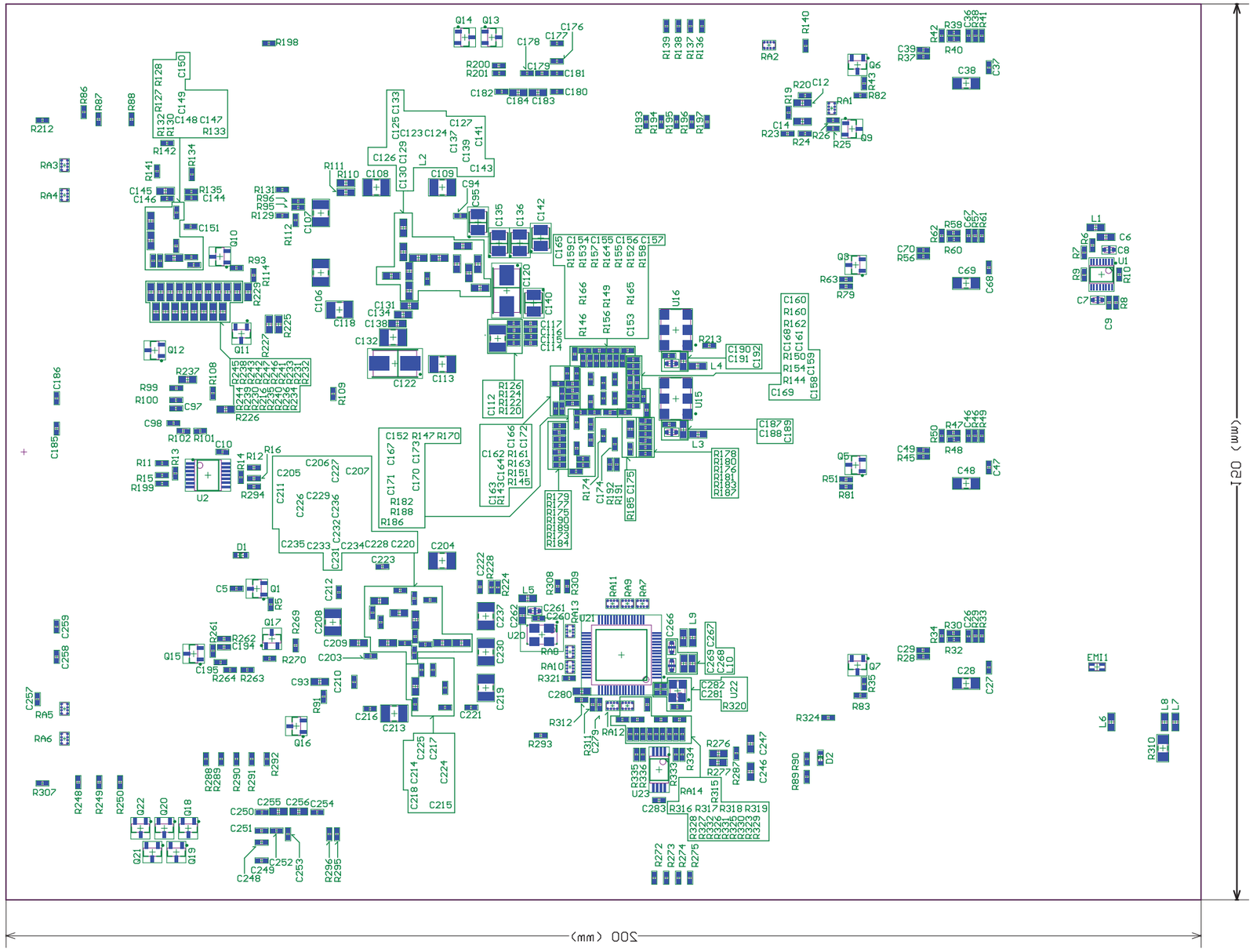

Figure 10 : L8 Assembly Image (Flipped)

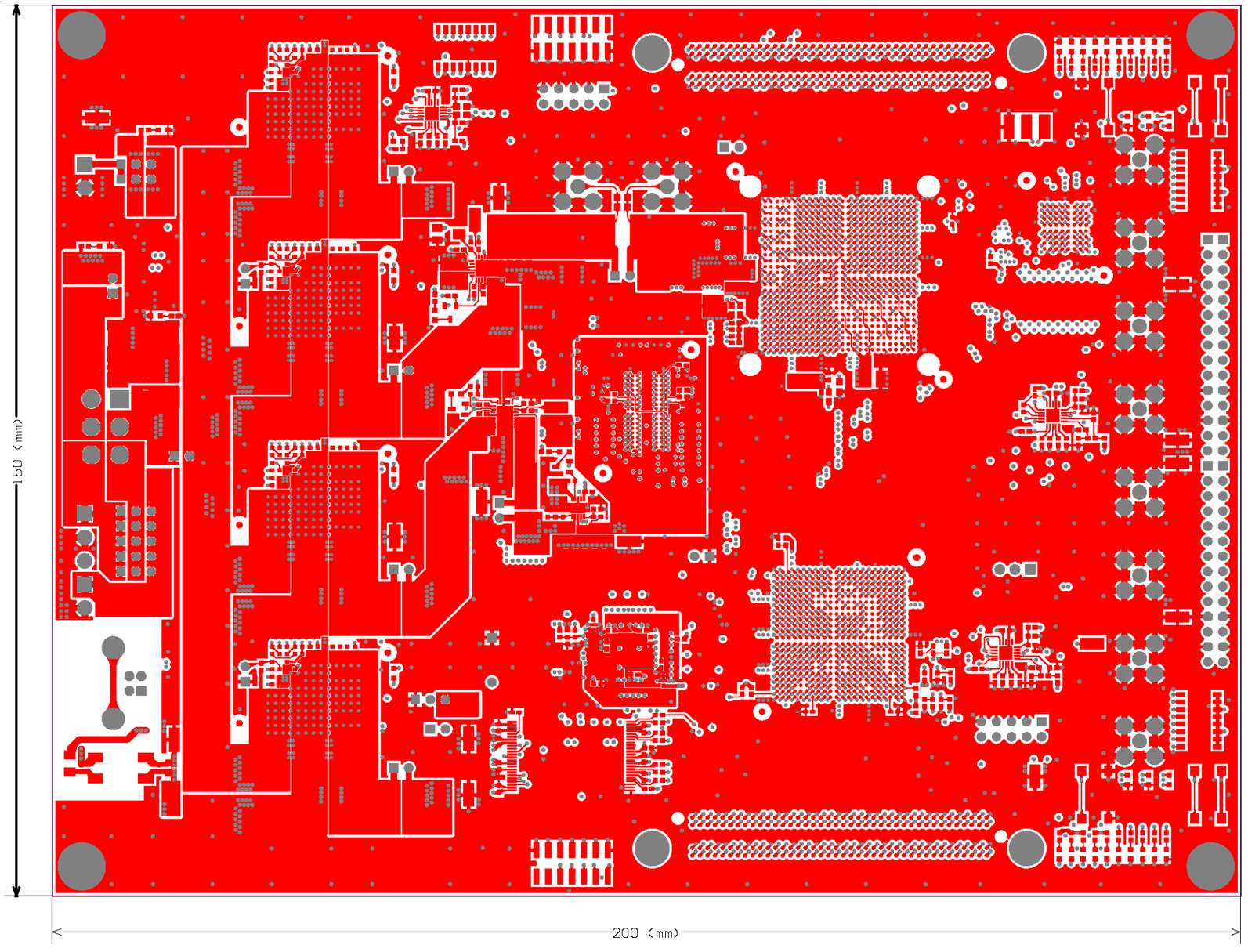

Figure 11 : L1 Pattern

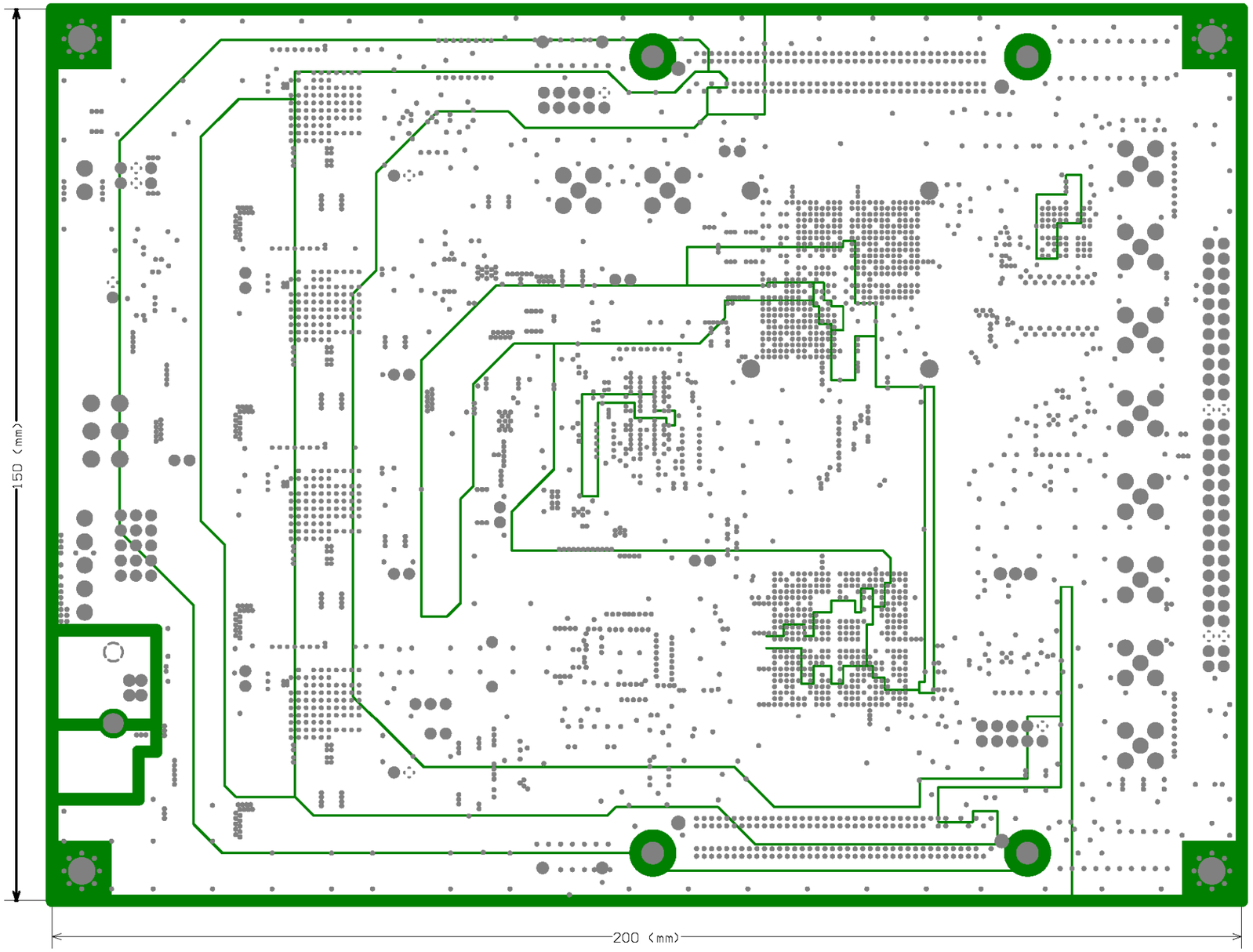

Figure 12 : L2 Cut Pattern

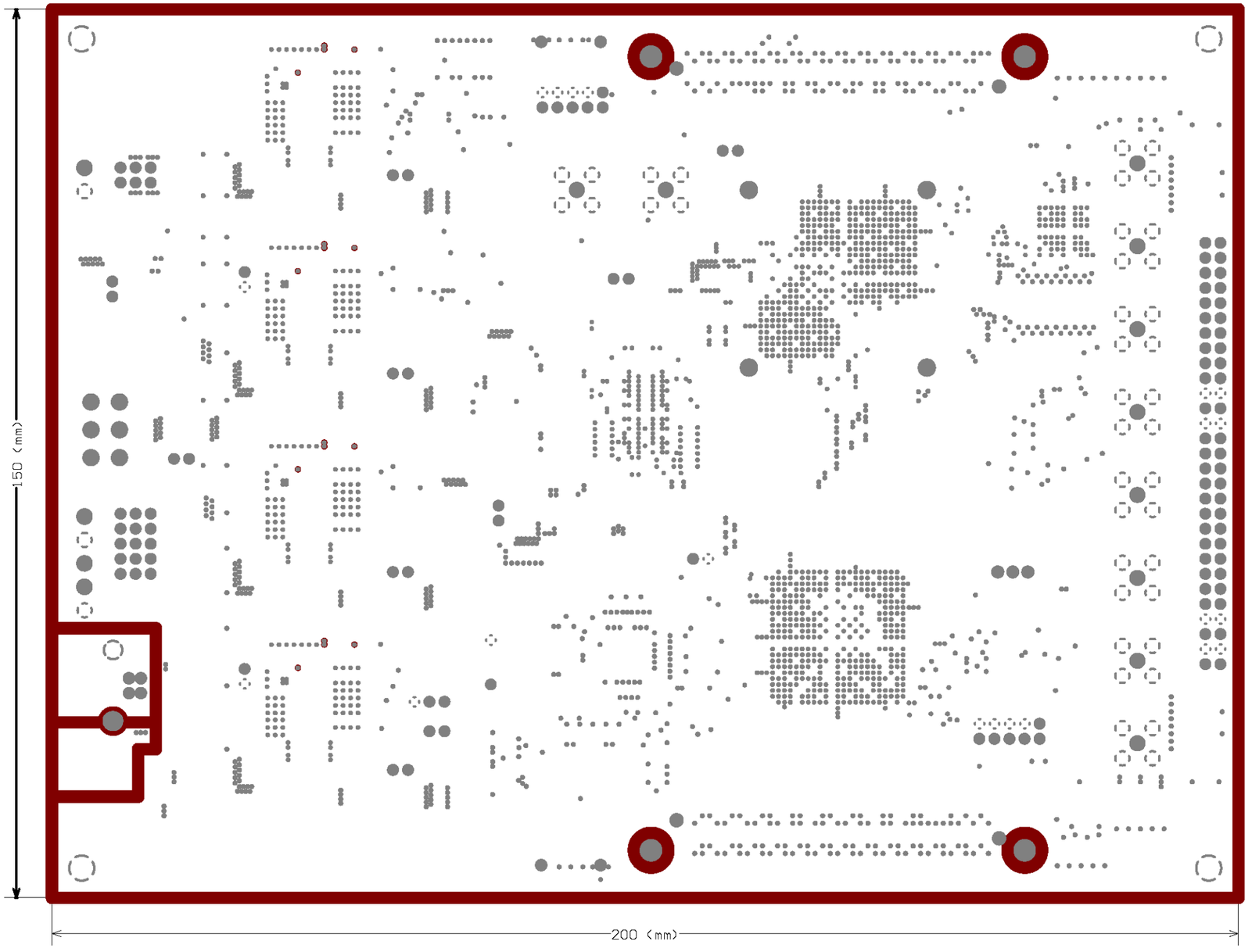

Figure 13 : L3 Cut Pattern

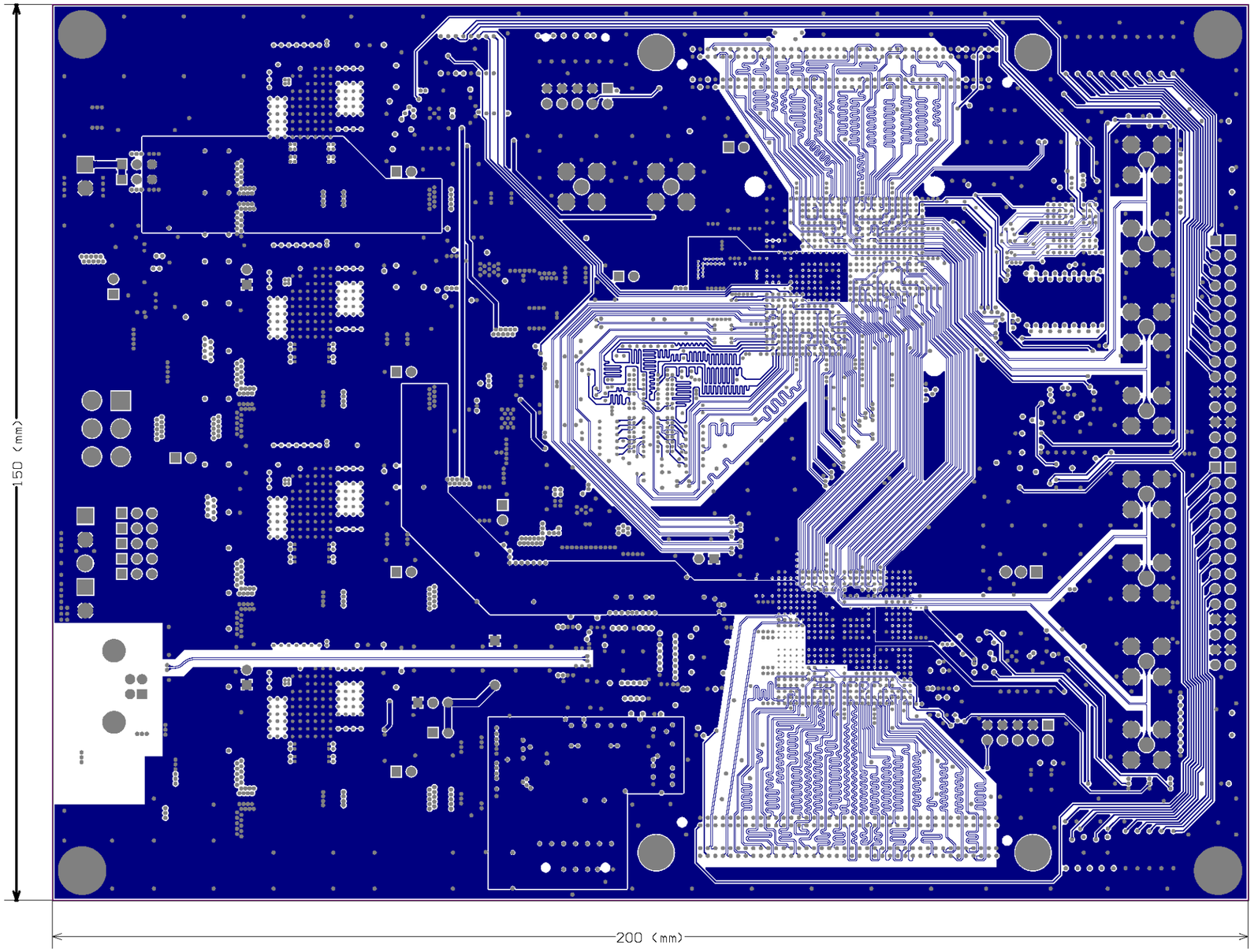

Figure 14 : L4 Pattern

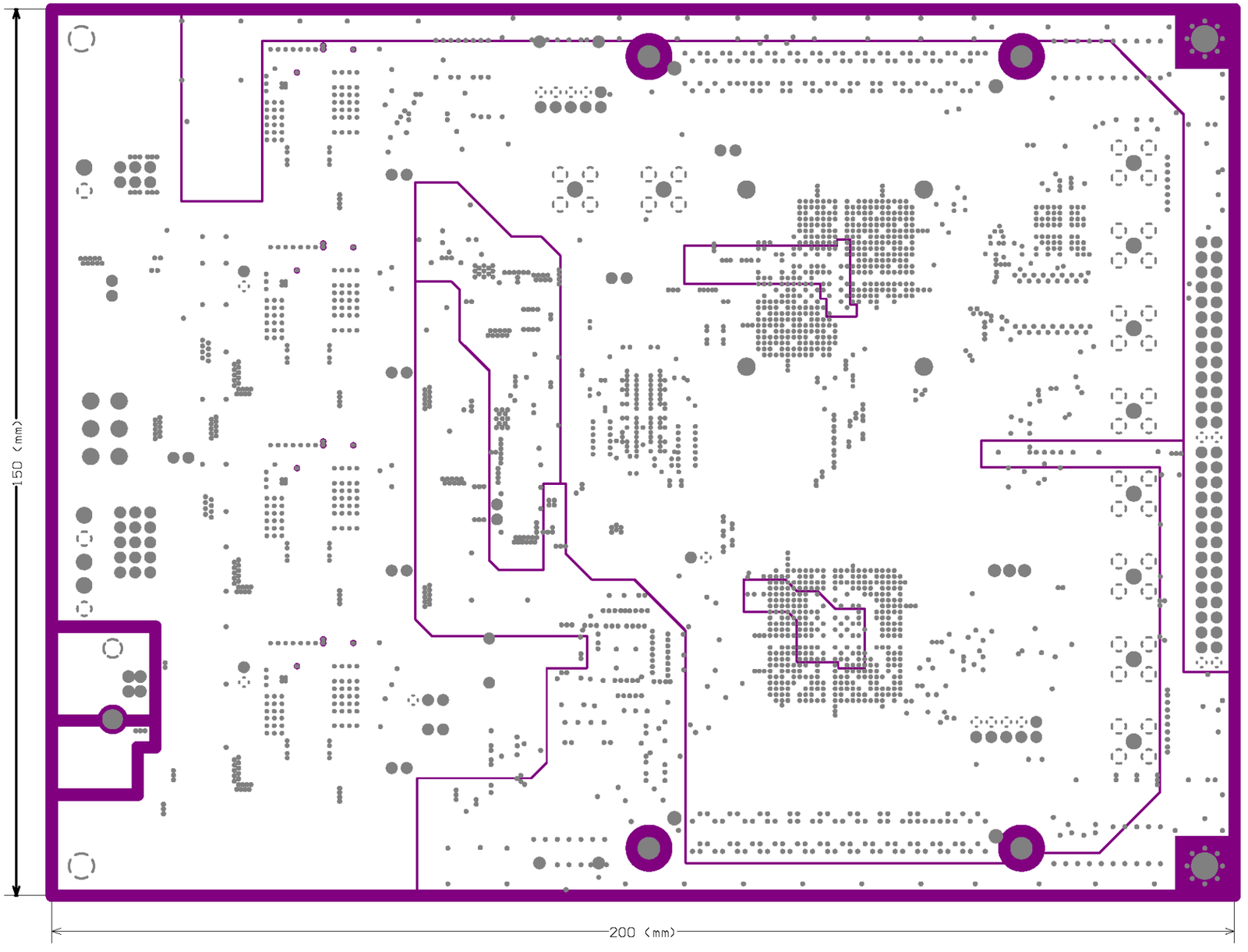

Figure 15 : L5 Cut Pattern

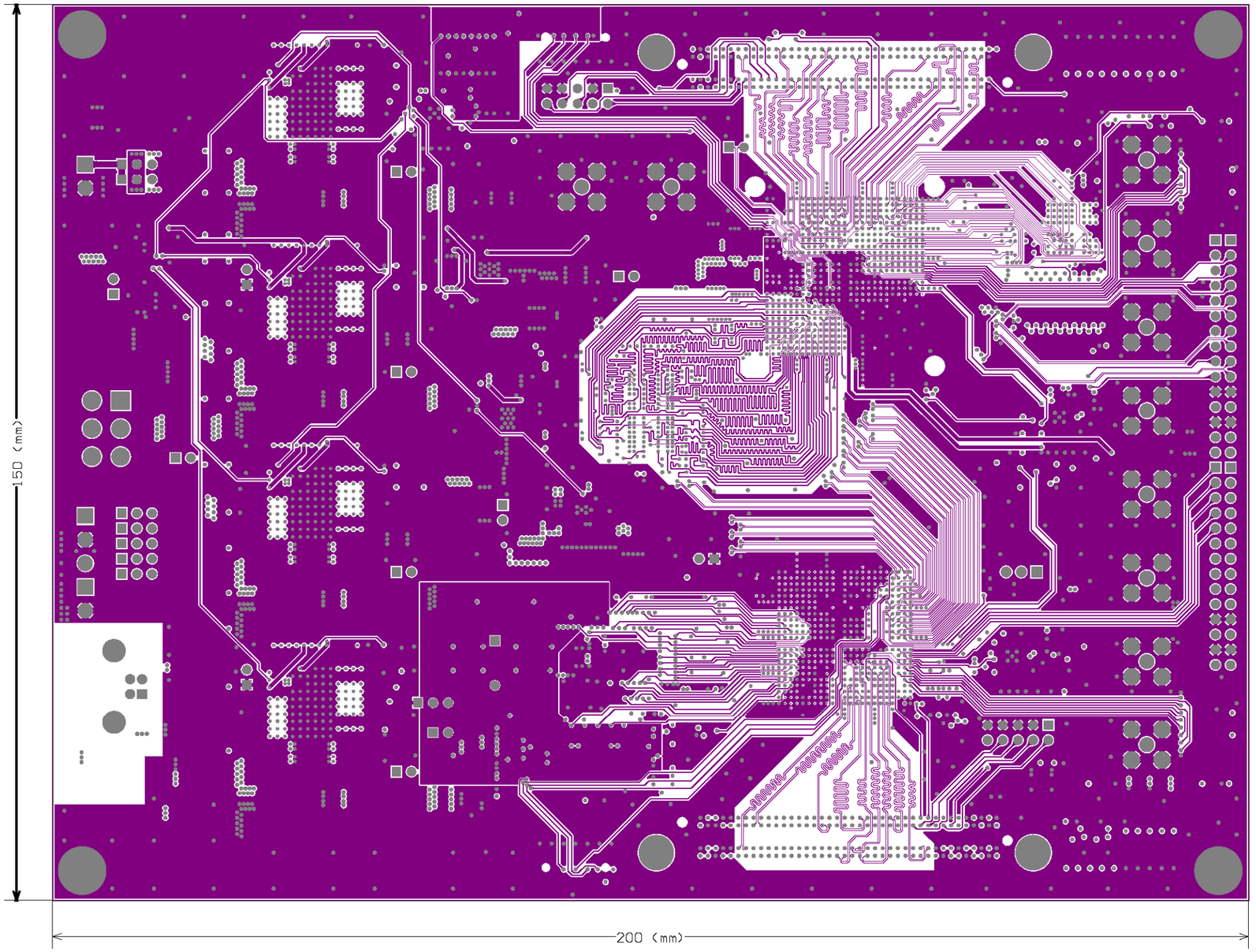

Figure 16 : L6 Pattern

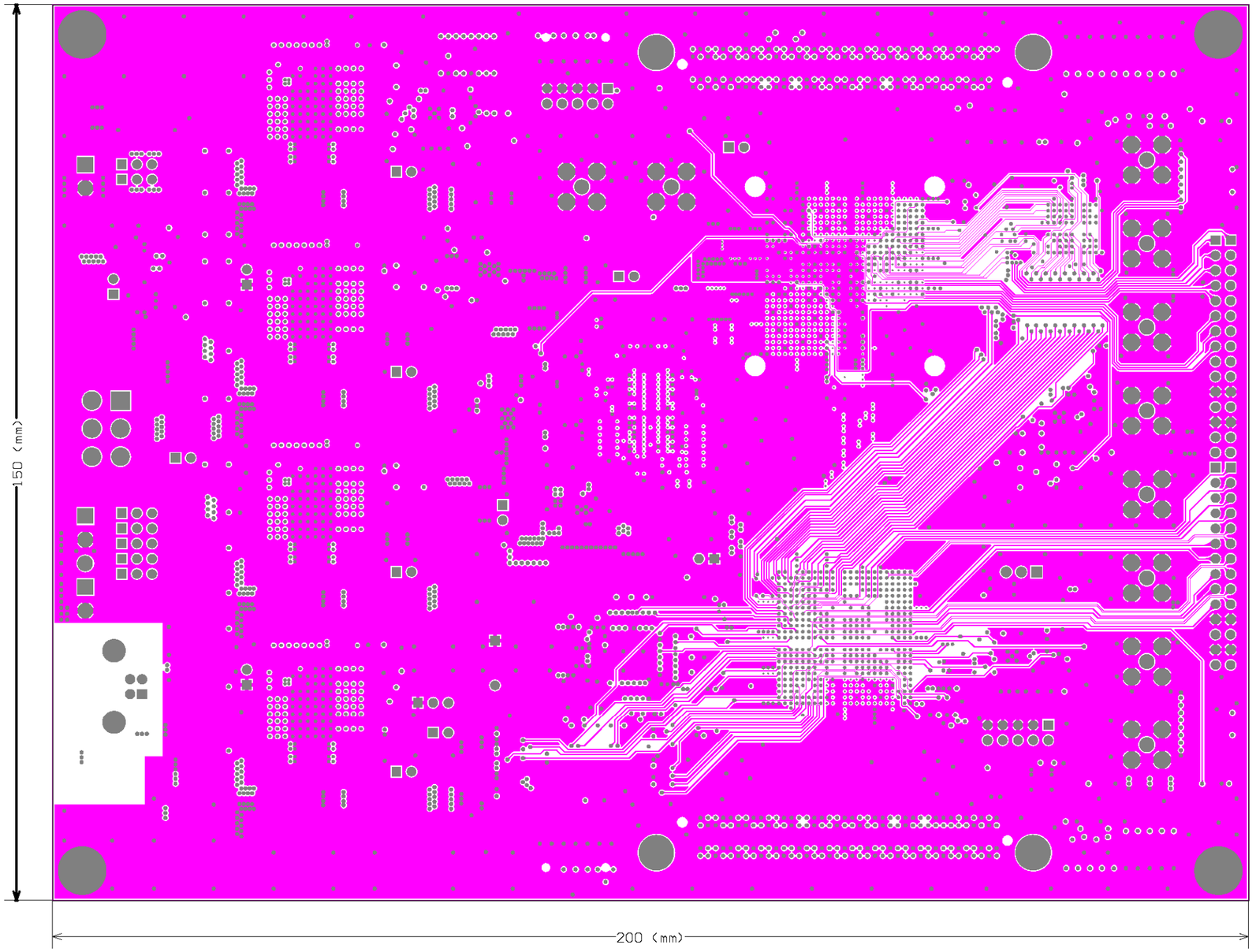

Figure 17 : L7 Pattern

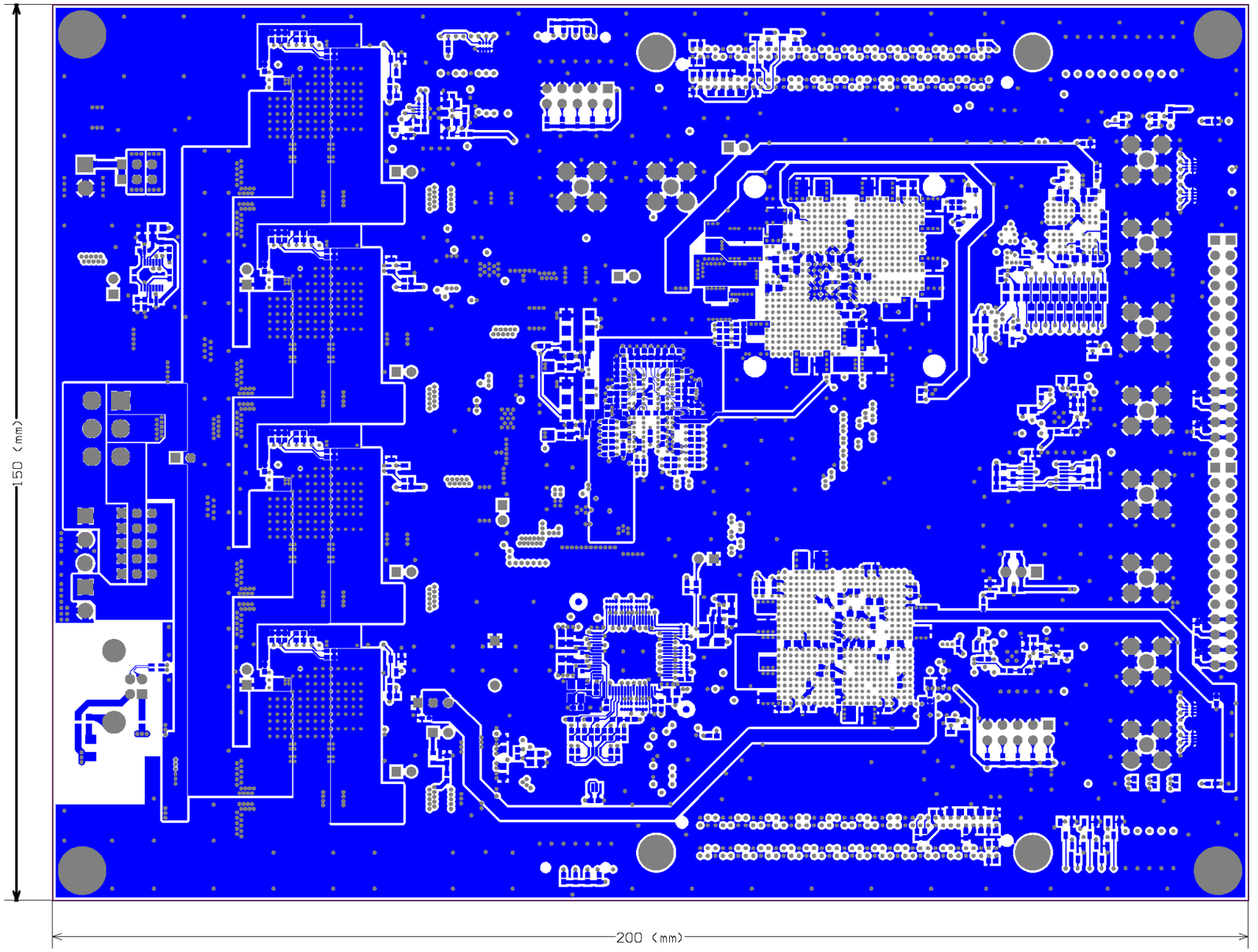

Figure 18 : L8 Pattern

The SASEBO-GIII board was developed by AIST undertaking projects sponsored by JST (Japan Science and Technology Agency)

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