BATTERY

J1
B2B-ZR
1
2

SW10
ES02MSABE
3 2 1

VBATT

C1
4.7UF

D1
uClamp0511T

RF_ON/OFF

U17 SP6205EM5-L-3-3
Vin Vout
ON/OFF
BYPASS GND

C8
4.7UF
C9
10nF

C2
4.7UF
C3
39pF

RF_3.3V

U18 SP6205EM5-L-3-3
Vin Vout
ON/OFF
BYPASS GND

C10
4.7UF
C11
10nF

C4
4.7UF
C5
39pF

RFPWR_3.3V

U19 LP2985AIMX-3.0
Vin Vout
ON/OFF
BYPASS GND

C12
4.7UF
C13
10nF
C14
10nF

C6
4.7UF
C7
1nF

MEMS_3V

ADC_DC_IN

R1
20K

R3
10K

U20
SC4215H
VIN VO
EN FB
GND
NC
NC
NC

C15
10uF
C16
4.7uF
C17
0.1uF

R2
30.1K, 1%

C18
10uF
C19
39pF

DIG_3.3V

R4
5.1K, 1%

U21 EP5357HUI
PVIN VOUT
AVIN VOUT
ENABLE
LLM VSENSE
VS0 NC
VS1 NC
VS2 NC
AGND PGND NC

C20
4.7uF
R6
10K
R7
10K
R5
10K

C22
10uF
C23
4.7uF
C24
0.1uF

DIG_1.8V

L1
10uH

RF_1.8V

C25
10uF

U22 EP5357LUI
PVIN VOUT
AVIN VOUT
ENABLE
LLM VSENSE
VS0 NC
VS1 NC
VS2 NC
AGND PGND NC

C21
4.7uF
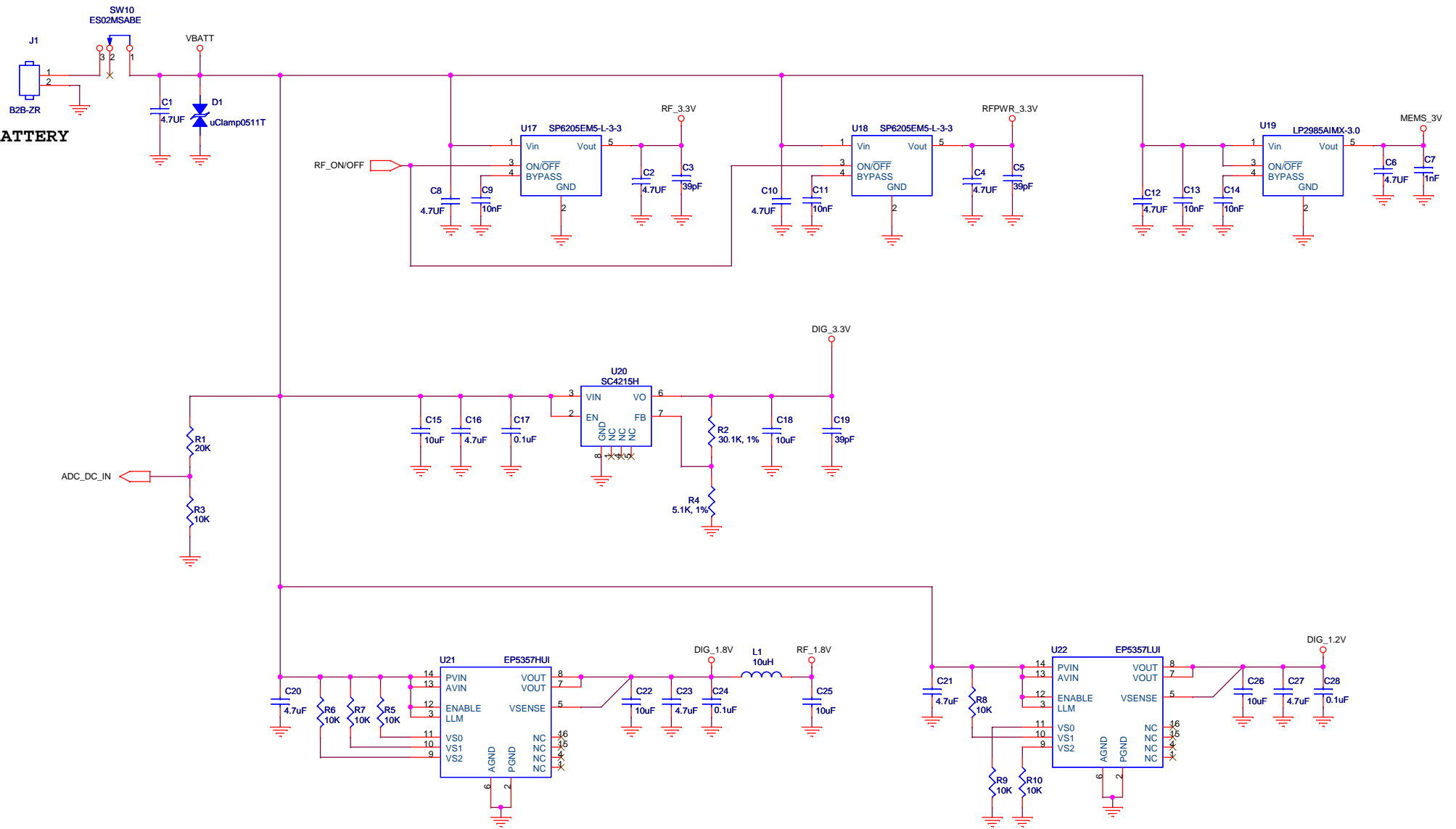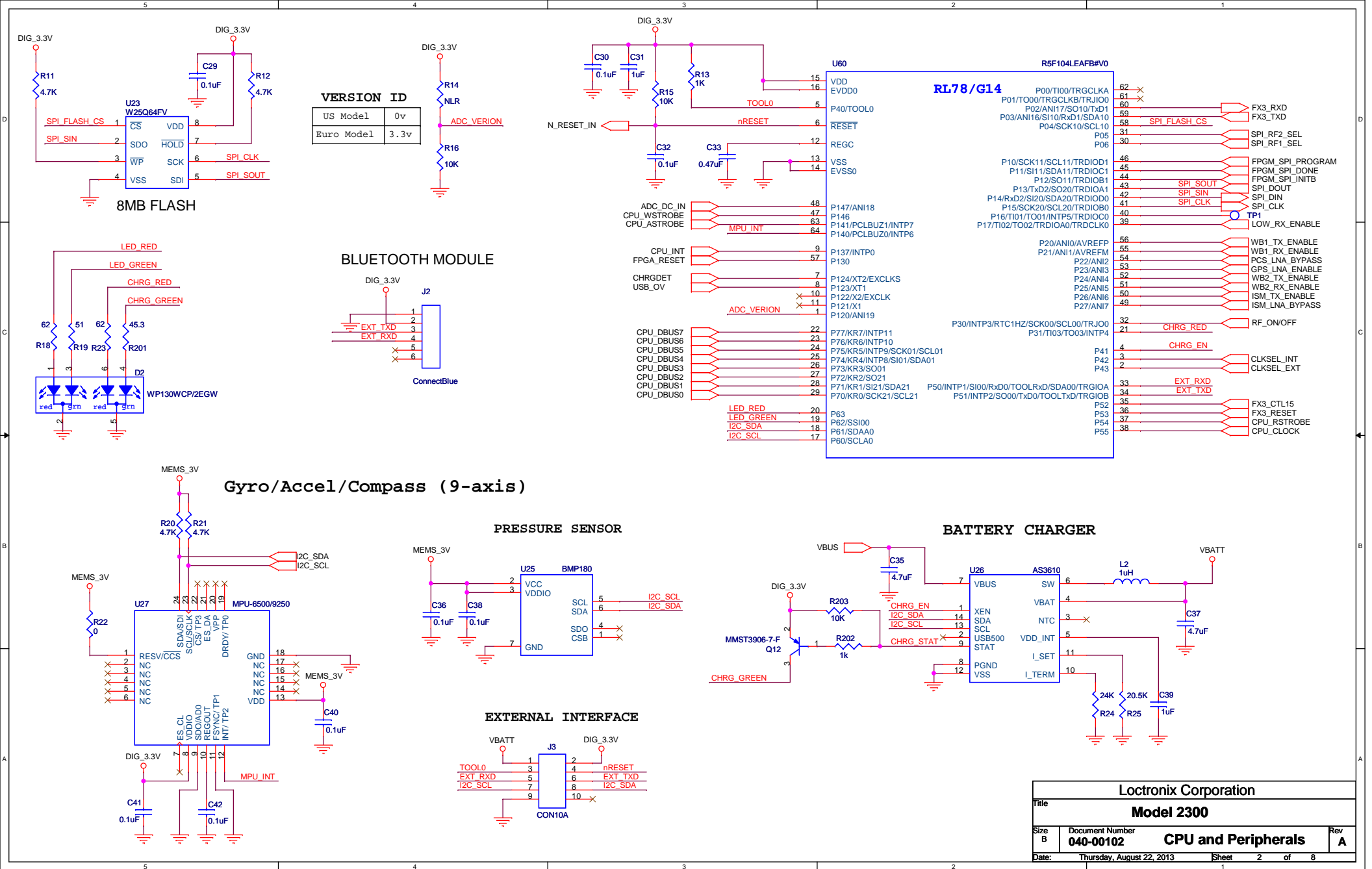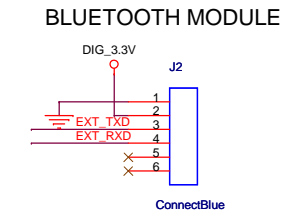R8
10K

R9
10K
R10
10K

C26
10uF
C27
4.7uF
C28
0.1uF

DIG_1.2V

Loctronix Corporation
Title
Model 2300
Size B
Document Number 040-00102
Power Supplies
Rev A
Date: Thursday, August 22, 2013
Sheet 1 of 8

Model 2300 — CPU and Peripherals

8MB FLASH

U23 — W25Q64FV

Pin	Name		Name	Pin
1	CS		VDD	8
2	SDO		HOLD	7
3	WP		SCK	6
4	VSS		SDI	5

SPI_FLASH_CS, SPI_SIN, SPI_CLK, SPI_SOUT

DIG_3.3V
R11 4.7K
C29 0.1uF
R12 4.7K

VERSION ID

US Model	0v
Euro Model	3.3v

R14 NLR
R16 10K
ADC_VERION
DIG_3.3V

Gyro/Accel/Compass (9-axis)

U27 — MPU-6500/9250

MEMS_3V

R20 4.7K R21 4.7K
R22 0

I2C_SDA, I2C_SCL
MPU_INT

1	RESV/CCS		GND	18
2	NC		NC	17
3	NC		NC	16
4	NC		NC	15
5	NC		NC	14
6	NC		VDD	13

Pins: SDA/SDI, SCL/SCLK, CS/TP3, ES_DA, VPP, DRDY/TP0
ES_CL, VDDIO, SDO/AD0, REGOUT, FSYNC/TP1, INT/TP2

C40 0.1uF, C41 0.1uF, C42 0.1uF
DIG_3.3V

LED_RED, LED_GREEN, CHRG_RED, CHRG_GREEN
R18 62, R19 51, R23 62, R201 45.3
D2 — WP130WCP/2EGW
red grn red grn

BLUETOOTH MODULE

DIG_3.3V
J2 — ConnectBlue
1	
2	
3	EXT_TXD
4	EXT_RXD
5	
6	

PRESSURE SENSOR

U25 — BMP180
MEMS_3V
C36 0.1uF, C38 0.1uF

2	VCC		SCL	5
3	VDDIO		SDA	6
			SDO	4
7	GND		CSB	1

I2C_SCL, I2C_SDA

EXTERNAL INTERFACE

J3 — CON10A
VBATT, DIG_3.3V
1		2	
3	TOOL0	4	nRESET
5	EXT_RXD	6	EXT_TXD
7	I2C_SCL	8	I2C_SDA
9		10	

CPU (U60 — RL78/G14, R5F104LEAFB#V0)

DIG_3.3V
C30 0.1uF, C31 1uF
C32 0.1uF, C33 0.47uF
R13 1K, R15 10K
TOOL0, nRESET, N_RESET_IN

Pin	Signal	Pin	Signal
15	VDD	62	P00/TI00/TRGCLKA
16	EVDD0	61	P01/TO00/TRGCLKB/TRJIO0
5	P40/TOOL0	60	P02/ANI17/SO10/TxD1 — FX3_RXD
6	RESET	59	P03/ANI16/SI10/RxD1/SDA10 — FX3_TXD
12	REGC	58	P04/SCK10/SCL10 — SPI_FLASH_CS
13	VSS	31	P05 — SPI_RF2_SEL
14	EVSS0	30	P06 — SPI_RF1_SEL
48	P147/ANI18 — ADC_DC_IN	46	P10/SCK11/SCL11/TRDIOD1 — FPGM_SPI_PROGRAM
47	P146 — CPU_WSTROBE	45	P11/SI11/SDA11/TRDIOC1 — FPGM_SPI_DONE
63	P141/PCLBUZ1/INTP7 — CPU_ASTROBE	44	P12/SO11/TRDIOB1 — FPGM_SPI_INITB
64	P140/PCLBUZ0/INTP6 — MPU_INT	43	P13/TxD2/SO20/TRDIOA1 — SPI_DOUT
9	P137/INTP0 — CPU_INT	42	P14/RxD2/SI20/SDA20/TRDIOD0 — SPI_SIN
57	P130 — FPGA_RESET	41	P15/SCK20/SCL20/TRDIOB0 — SPI_CLK
7	P124/XT2/EXCLKS — CHRGDET	40	P16/TI01/TO01/INTP5/TRDIOC0 — TP1
8	P123/XT1 — USB_OV	39	P17/TI02/TO02/TRDIOA0/TRDCLK0 — LOW_RX_ENABLE
10	P122/X2/EXCLK	56	P20/ANI0/AVREFP — WB1_TX_ENABLE
11	P121/X1	55	P21/ANI1/AVREFM — WB1_RX_ENABLE
49	P120/ANI19 — ADC_VERION	54	P22/ANI2 — PCS_LNA_BYPASS
22	P77/KR7/INTP11 — CPU_DBUS7	53	P23/ANI3 — GPS_LNA_ENABLE
23	P76/KR6/INTP10 — CPU_DBUS6	52	P24/ANI4 — WB2_TX_ENABLE
24	P75/KR5/INTP9/SCK01/SCL01 — CPU_DBUS5	51	P25/ANI5 — WB2_RX_ENABLE
25	P74/KR4/INTP8/SI01/SDA01 — CPU_DBUS4	50	P26/ANI6 — ISM_TX_ENABLE
26	P73/KR3/SO01 — CPU_DBUS3	49	P27/ANI7 — ISM_LNA_BYPASS
27	P72/KR2/SO21 — CPU_DBUS2	32	P30/INTP3/RTC1HZ/SCK00/SCL00/TRJO0 — CHRG_RED
28	P71/KR1/SI21/SDA21 — CPU_DBUS1	21	P31/TI03/TO03/INTP4 — RF_ON/OFF
29	P70/KR0/SCK21/SCL21 — CPU_DBUS0	4	P41 — CHRG_EN
20	P63 — LED_RED	3	P42 — CLKSEL_INT
19	P62/SSI00 — LED_GREEN	2	P43 — CLKSEL_EXT
18	P61/SDAA0 — I2C_SDA	33	P50/INTP1/SI00/RxD0/TOOLRxD/SDA00/TRGIOA — EXT_RXD
17	P60/SCLA0 — I2C_SCL	34	P51/INTP2/SO00/TxD0/TOOLTxD/TRGIOB — EXT_TXD
		35	P52 — FX3_CTL15
		36	P53 — FX3_RESET
		37	P54 — CPU_RSTROBE
		38	P55 — CPU_CLOCK

BATTERY CHARGER

U26 — AS3610
VBUS, VBATT
C35 4.7uF, C37 4.7uF, C39 1uF
L2 1uH
DIG_3.3V
R203 10K, R202 1k
Q12 — MMST3906-7-F
R24 24K, R25 20.5K

Pin	Signal	Pin	Signal
7	VBUS	6	SW
1	XEN — CHRG_EN	4	VBAT
14	SDA — I2C_SDA	3	NTC
13	SCL — I2C_SCL	5	VDD_INT
2	USB500	11	I_SET
9	STAT — CHRG_STAT	10	I_TERM
8	PGND		
12	VSS		

CHRG_EN, CHRG_STAT, CHRG_GREEN

Title Block

Loctronix Corporation
Title: Model 2300
Size: B
Document Number: 040-00102
CPU and Peripherals
Rev: A
Date: Thursday, August 22, 2013
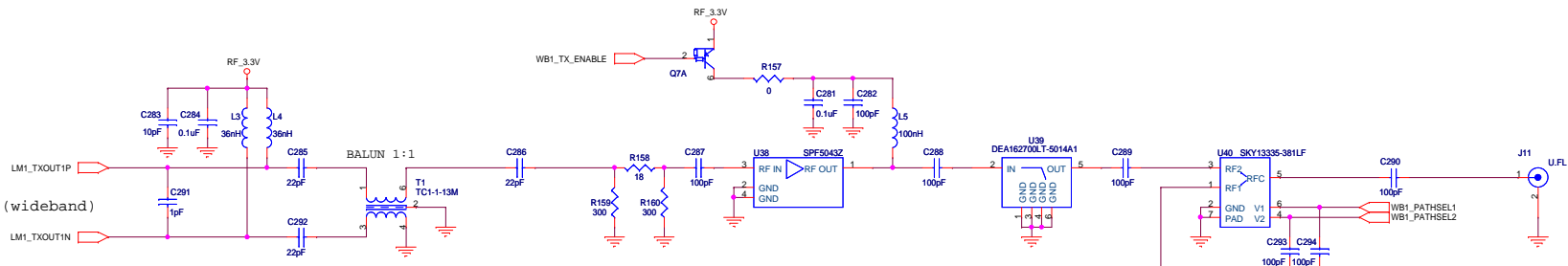Sheet 2 of 8

UP TO 128KB FLASH

USB 3.0

EZ-USB® FX3 SuperSpeed USB Controller

U28 / CYUSB301X

FPGA BANK 0

U16A — XC6SLX45 - BANK0

FPGA BANK 1

U16B — XC6SLX45 - BANK1

FPGA BANK 2

U16C — XC6SLX45 - BANK2

U16E — XC6SLX45 - GROUND

Bank 0 signals (U16A)

Pin	IO	Net	Signal
B3	IO_L1P_HSWAPEN_0		
A4	IO_L1N_VREF_0	cpu_wstrobe	CPU_WSTROBE
C5	IO_L2P_0	ep_io7	
A5	IO_L2N_0		
D6	IO_L3P_0	cpu_dbus7	CPU_DBUS7
C6	IO_L3N_0	cpu_astrobe	CPU_ASTROBE
B6	IO_L4P_0	ep_io6	
A6	IO_L4N_0		
C7	IO_L5P_0	ep_io5	
B8	IO_L5N_0	ep_io4	
A7	IO_L6P_0		
D7	IO_L6N_0	cpu_dbus6	CPU_DBUS6
C9	IO_L7P_0	cpu_interrupt	CPU_INT
C8	IO_L7N_0		
A9	IO_L8P_0		
A8	IO_L8N_VREF_0		
F9	IO_L15P_0		
H10	IO_L15N_0		
G9	IO_L16P_0		
E10	IO_L16N_0		
D9	IO_L32P_0	cpu_dbus5	CPU_DBUS5
D10	IO_L32N_0	cpu_reset	FPGA_RESET
C10	IO_L33P_0		
B10	IO_L33N_0		
A10	IO_L34P_GCLK19_0	cpu_dbus4	CPU_DBUS4
C11	IO_L34N_GCLK18_0	cpu_rstrobe	CPU_RSTROBE
A11	IO_L35P_GCLK17_0		
B12	IO_L35N_GCLK16_0	cpu_clock	CPU_CLOCK
A12	IO_L36P_GCLK15_0		
F11	IO_L36N_GCLK14_0		
C12	IO_L37P_GCLK13_0	cpu_dbus3	CPU_DBUS3
D11	IO_L37N_GCLK12_0		
E10	IO_L38P_0		
D15	IO_L38N_VREF_0		
E13	IO_L46P_0		
D13	IO_L46N_0	cpu_dbus2	CPU_DBUS2
D12	IO_L47P_0		
C13	IO_L47N_0		
A13	IO_L48P_0	ep_io3	
F12	IO_L48N_0		
A14	IO_L49P_0	ep_io2	
G11	IO_L50P_0		
B14	IO_L50N_0		
A15	IO_L51P_0		
C15	IO_L51N_0		
A16	IO_L62N_VREF_0	ep_io1	
C17	IO_L63P_SCP7_0	ep_io0	
B16	IO_L63N_SCP6_0	cpu_dbus0	CPU_DBUS0
C16	IO_L64P_SCP5_0		
C14	IO_L64N_SCP4_0		
B18	IO_L65P_SCP3_0		
A18	IO_L65N_SCP2_0	cpu_dbus1	CPU_DBUS1
	IO_L66P_SCP1_0		
	IO_L66N_SCP0_0		

VCCO_0: B4, B7, B11, B15, E9, E13, E17, G10

DIG_3.3V

C78 C79 C80 C81 C82 C83 — 10nF
FB7 BLM15AG100SN1D
C84 47nF C85 47nF
C102 0.47uF C96 4.7uF

EXPANSION PORT

J6
C106 1uF C107 0.1uF
VBATT
ep_io0, ep_io1, ep_io2, ep_io3, ep_io4, ep_io5, ep_io6, ep_io7

DIG_3.3V

D5 D6 D7 D8
R96 180 R97 180 R98 180 R99 180
MMST3904 Q2 MMST3904 Q3 MMST3904 Q4 MMST3904 Q5

led_0, led_1, led_2, led_3

Bank 1 signals (U16B)

Pin	IO	Net	Signal
F15	IO_L1P_A25_1	rf1_rxd0	RF1_RXD0
F16	IO_L1N_A24_VREF_1	rf1_rxd1	RF1_RXD1
F13	IO_L9P_1	rf1_rxd2	RF1_RXD2
F14	IO_L9N_1	rf1_rxd3	RF1_RXD3
G15	IO_L10P_1		
B19	IO_L10N_1	rf1_rxd6	RF1_RXD6
D20	IO_L11P_1	rf1_rxd7	RF1_RXD7
C18	IO_L11N_1	rf1_rxd8	RF1_RXD8
C19	IO_L12P_1	rf1_rxd9	RF1_RXD9
G17	IO_L12N_1	rf1_rxd10	RF1_RXD10
G19	IO_L13P_1	rf1_rxd11	RF1_RXD11
B20	IO_L13N_1	rf1_txd11	RF1_TXD11
A21	IO_L14P_1	rf1_txd10	RF1_TXD10
A20	IO_L14N_1	rf1_txd9	RF1_TXD9
F18	IO_L15P_1	rf1_txd8	RF1_TXD8
E8	IO_L15N_1	rf1_txd7	RF1_TXD7
A20	IO_L16P_1	rf1_txd6	RF1_TXD6
H17	IO_L16N_1		
H18	IO_L17P_1		
F19	IO_L17N_1		
F20	IO_L18P_1	rf1_txd3	RF1_TXD3
H12	IO_L18N_1	rf1_txd1	RF1_TXD1
G13	IO_L19P_1	rf1_txd0	RF1_TXD0
J16	IO_L19N_1		
H16	IO_L20P_1	rf2_txd11	RF2_RXD11
H13	IO_L20N_1	rf2_rxd9	RF2_RXD9
H14	IO_L21P_1	rf2_rxd8	RF2_RXD8
L15	IO_L21N_1	rf2_rxd7	RF2_RXD7
K16	IO_L28N_1	rf2_rxd6	RF2_RXD6
F21	IO_L29P_A23_M1A13_1	rf2_rxd5	RF2_RXD5
F22	IO_L29N_A22_M1A14_1	rf2_rxd4	RF2_RXD4
H19	IO_L30P_A21_M1RESET_1	rf2_rxd3	RF2_RXD3
H20	IO_L30N_A20_M1A11_1	rf2_rxd2	RF2_RXD2
E20	IO_L31P_A19_M1CKE_1	rf2_rxd1	RF2_RXD1
E22	IO_L31N_A18_M1A12_1	rf2_rxd0	RF2_RXD0
G20	IO_L32P_A17_M1A8_1		
G22	IO_L32N_A16_M1A9_1		
D21	IO_L33P_A15_M1A10_1		
D22	IO_L33N_A14_M1A4_1		
H22	IO_L34P_A13_M1WE_1		
C20	IO_L34N_A12_M1BA2_1	rf2_txd1	RF2_TXD1
C22	IO_L35P_A11_M1A7_1	rf2_txd2	RF2_TXD2
K18	IO_L35N_A10_M1A12_1	rf2_txd3	RF2_TXD3
K19	IO_L36P_A9_M1BA0_1		
B21	IO_L36N_A8_M1BA1_1	rf2_txd5	RF2_TXD5
E17	IO_L37P_A7_M1A0_1	rf2_txd6	RF2_TXD6
J17	IO_L37N_A6_M1A1_1	rf2_txd7	RF2_TXD7
J19	IO_L38P_A5_M1CLK_1	rf2_txd8	RF2_TXD8
J22	IO_L38N_A4_M1CLKN_1	rf2_txd9	RF2_TXD9
D17	IO_L39P_M1A3_1	rf2_txd10	ACTIVE_ANT
L17	IO_L40P_GCLK11_M1A5_1	rf_Gps_DcBiaSelect	RF2_TXD0
K17	IO_L40N_GCLK10_M1A6_1	rf2_txd0	FPGA_CLK
M18	IO_L41P_GCLK9_IRDY1_M1RASN_1	clkref1	
M19	IO_L41N_GCLK8_M1CASN_1	clkref2	
L19	IO_L42P_GCLK7_M1UDM_1		
K20	IO_L42N_GCLK6_TRDY1_M1LDM_1		
L20	IO_L43P_GCLK5_M1DQ4_1	rf2_rxiqsel	RF2_RXIQSEL
L21	IO_L43N_GCLK4_M1DQ5_1	rf1_rxiqsel	RF1_RXIQSEL
K21	IO_L44P_A3_M1DQ6_1	rf_Ism_nTxSelect	ISM_PATHSEL2
K22	IO_L44N_A2_M1DQ7_1	rf1_txd4	RF1_TXD4
M22	IO_L45P_A1_M1LDQS_1	rf1_rxd4	RF1_RXD4
N19	IO_L45N_A0_M1LDQSN_1	rf1_txd5	RF1_TXD5
N20	IO_L46P_FCS_B_M1DQ2_1		
N22	IO_L47P_FWE_B_M1DQ0_1	rf_Ism_nExtSelect	ISM_ANTSEL2
P21	IO_L47N_LDC_M1DQ1_1	rf_Gps_InExtSelect	GPS_INPUTSEL2
P22	IO_L48P_HDC_M1DQ8_1	rf_Wb2_RxSelect	WB2_PATHSEL1
R20	IO_L48N_M1DQ9_1		
P20	IO_L49P_M1DQ10_1	rf_Ism_TxSelect	ISM_PATHSEL1
T21	IO_L49N_M1DQ11_1	rf_Gps_ExtSelect	GPS_INPUTSEL1
T22	IO_L50P_M1UDQS_1		
U20	IO_L50N_M1UDQSN_1	rf_Wb2_nRxSelect	WB2_PATHSEL2
U22	IO_L51P_M1DQ12_1	rf_Wb1_nRxSelect	WB1_PATHSEL2
V21	IO_L51N_M1DQ13_1		
V22	IO_L52P_M1DQ14_1		
V20	IO_L52N_M1DQ15_1	rf_Wb1_RxSelect	WB1_PATHSEL1
W22	IO_L53P_1		
M16	IO_L53N_VREF_1	rf2_txd4	RF2_TXD4
M17	IO_L58P_1		
Z1	IO_L58N_1		
N15	IO_L59P_1		
N16	IO_L59N_1		
AA20	IO_L60P_1		
AB21	IO_L60N_1	rf2_rxiqsel	RF2_TXIQSEL
P15	IO_L61P_1	rf2_txen	RF2_TXEN
P16	IO_L62P_1	rf2_txclk	RF2_TXCLK
AA21	IO_L62N_1	rf2_rxen	RF2_RXEN
P19	IO_L63P_1	rf2_rxclk	RF2_RXCLK
P20	IO_L63N_1	rf1_txiqsel	RF1_TXIQSEL
P18	IO_L64P_1	rf1_txen	RF1_TXEN
AB19	IO_L64N_1	rf1_txclk	RF1_TXCLK
AB20	IO_L65P_1	rf1_rxen	RF1_RXEN
P17	IO_L65N_1	rf1_rxclk	RF1_RXCLK
P18	IO_L66P_1		
Y19	IO_L66N_1		
Y20	IO_L67P_1		
R15	IO_L67N_1		
R16	IO_L68P_1	led_3	
R17	IO_L68N_1	led_2	
R19	IO_L70P_1	led_1	
V19	IO_L70N_1	led_0	
V20	IO_L71P_1		
T17	IO_L71N_1		
T18	IO_L72P_1		
V17	IO_L72N_1		
T19	IO_L73P_1		
T20	IO_L74P_AWAKE_1	rf1_rxd5	RF1_RXD5
AA19	IO_L74N_DOUT_BUSY_1		

VCCO_1: B19, C21, E19, G14, G21, J18, L16, L21, N18, R21, U18, W21

FB11 BLM15AG100SN1D DIG_3.3V

C136 C137 C138 C139 C140 C141 — 10nF
C142 C143 C144 C145 C146 C147 — 47nF
C148 0.47uF C149 4.7uF

Bank 2 signals (U16C)

Pin	IO	Net	Signal
T15	CMPCS_B_2		
U16	DONE_2		CONFIG_DONE
W17			CONFIG_CCLK
Y18			CONFIG_M0
AA18	IO_L1N_M0_CMPMISO_2	fx3_data0	FX3D0
AB18	IO_L1P_CCLK_2	fx3_data13	FX3D13
Y17	IO_L2P_CMPCLK_2		CONFIG_DIN
AB17	IO_L2N_CMPMOSI_2	x3_flagB	FX3_FLAGB
AA16	IO_L3P_D0_DIN_MISO_MISO1_2	fx3_data1	FX3D1
AB16	IO_L3N_MOSI_CSI_B_MISO0_2	fx3_data14	FX3D14
Y15	IO_L4P_2		
AB15	IO_L4N_VREF_2	fx3_EpSwitch	FX3_EPSWITCH#
V13	IO_L5P_2	fx3_data2	FX3D2
W13	IO_L12P_D1_MISO2_2	fx3_data15	FX3D15
U15	IO_L12N_D2_MISO3_2		
V15	IO_L13P_M1_2	fx3_nPktEnd	FX3_PKTEND#
W15	IO_L13N_D10_2	fx3_data3	FX3D3
Y16	IO_L14P_D11_2	fx3_data16	FX3D16
AA14	IO_L14N_D12_2	fx3_nSIRd	FX3_SLRD#
AB14	IO_L15P_2	fx3_nSIcs	FX3_SLCS#
W14	IO_L15N_2	fx3_data4	FX3D4
Y14	IO_L16P_2	fx3_data17	FX3D17
U14	IO_L16N_VREF_2	fx3_data26	FX3D26
Y10	IO_L20N_2	fx3_nSIOe	FX3_SLOE#
W11	IO_L29P_GCLK3_2	c3_sys_clk	FPGA_CLK
AA12	IO_L29N_GCLK2_2	fx3_data30	FX3D30
Y11	IO_L30P_GCLK1_D13_2	fx3_data12	FX3D12
AB12	IO_L30N_GCLK0_USERCCLK_2	fx3_data18	FX3D18
AB11	IO_L31P_GCLK30_D14_2	fx3_data27	FX3D27
AA10	IO_L31N_GCLK29_2	fx3_nSIWr	FX3_SLWR#
AB10	IO_L32P_GCLK28_2	fx3_clk	FX3_PCLK
	IO_L32N_GCLK2_2	fx3_data19	FX3D19
U13	IO_L33N_2		
V13	IO_L34P_2		
T12	IO_L41P_2		
AB13	IO_L41N_2	fx3_data5	FX3D5
W12	IO_L42P_2	fx3_data28	FX3D28
Y12	IO_L42N_2	fx3_addr0	FX3_A0
R11	IO_L43P_2	fx3_data6	FX3D6
T11	IO_L43N_2	fx3_data29	FX3D29
V11	IO_L44P_2	fx3_addr1	FX3_A1
W10	IO_L44N_2	fx3_data7	FX3D7
T10	IO_L45P_2	fx3_data22	FX3D22
U10	IO_L45N_2	fx3_data8	FX3D8
U9	IO_L46P_2	fx3_data23	FX3D23
V9	IO_L46N_2	fx3_gpio50	FX3_GPIO50
W9	IO_L47P_2	fx3_addr2	FX3_A2
Y9	IO_L47N_2	fx3_data24	FX3D24
W8	IO_L48P_D7_2	fx3_gpio51	FX3_GPIO51
AA8	IO_L48N_RDWR_B_VREF_2	fx3_data31	FX3D31
AB8	IO_L49P_D4_2	fx3_data10	FX3D10
V8	IO_L49N_D3_2	fx3_data25	FX3D25
W6	IO_L50N_2	fx3_gpio52	FX3_GPIO52
Y6	IO_L62N_2	fx3_addr3	FX3_A3
Y7	IO_L62P_D5_2	fx3_data11	FX3D11
AB7	IO_L63P_2	fx3_gpio0	FX3_FLAGA
AA6	IO_L63N_2	fx3_gpio3	FX3_GPIO57
AB6	IO_L64N_D9_2	fx3_addr4	FX3_A4
AA7	IO_L64P_D8_2		
V7	IO_L65P_INIT_B_2		CONFIG_INIT_B
AB5	IO_L65N_CSO_B_2		CONFIG_PROGRAM_B
AA1	PROGRAM_B_2		

VCCO_2: T9, T13, V8, V12, V16, AA11, AA15

DIG_3.3V

C90 C91 C92 C93 C94 C95 — 10nF
FB8 BLM15AG100SN1D
C97 47nF C98 47nF C105 4.7uF

FX3D[0..31]

POWER UP CONFIGURATION

DIG_3.3V

R91 R92 R93 R94 R95 — 10K

CONFIG_M0
CONFIG_M1
CONFIG_PROGRAM_B
CONFIG_INIT_B
CONFIG_DONE
CONFIG_CCLK
CONFIG_DIN

FPGM_SPI_PROGRAM
FPGM_SPI_INITB
FPGM_SPI_DONE
SPI_CLK
SPI_DOUT

JTAG PROGRAMMING

U16H — XC6SLX45 - MISC

Pin		Signal
D14	TCK	
E14	TDO	
E18	TDI	
E16	TMS	FPGA_RESET

J7 CON10A DIG_3.3V

(VFS) NC — U19
(TDO) NC — T16
(VBATT) NC — U17
SUSPEND — W18
R100 10K

VCC (U16F) — XC6SLX45 - VCC

VCCAUX: D16, F11, G12, H9, H15, K15, L8, M15, N8, R6, R10, R12, L11, V6

DIG_3.3V
FB9 BLM15AG100SN1D
C108 C110 C111 C112 C113 — 10nF
C120 C121 C122 C123 C124 C133 — 47nF

VCC (U16G) — XC6SLX45 - VCC

VCCINT: J8, J10, J12, J14, K9, K11, K13, L10, L12, L14, M9, M11, N10, N12, P9, P11, P13, R14

DIG_1.2V
FB10 BLM15AG100SN1D
C114 C115 C116 C117 C118 C119 — 10nF
C126 47nF C127 47nF

GROUND (U16E) — XC6SLX45 - GROUND

GND pins: A1, A22, B5, B9, B13, C17, D18, E2, E11, E15, E21, G8, H7, J2, J9, J11, J13, J15, J20, K10, K12, K14, L9, L13, L18, M10, M12, M14, N2, N9, N11, N17, N21, P10, P12, P14, R5, R18, U7, U21, V4, V10, V14, W7, W16, AA5, AA9, AA13, AA17, AB1, AB22

FX3D[0..31]

FPGA BANK 3

U16D XC6SLX45 - BANK 3

Pin	Signal
AA2	IO_L1P_3
AB2	IO_L1N_VREF_3
Y2	IO_L2P_3
Y1	IO_L2N_3
W4	IO_L7P_3
Y4	IO_L7N_3
Y3	IO_L8P_3
AB3	IO_L8N_3
W3	IO_L9P_3
W1	IO_L9N_3
U8	IO_L10P_3
T7	IO_L10N_3
T8	IO_L11P_3
R7	IO_L11N_3
AA4	IO_L12P_3
AB4	IO_L12N_3
U6	IO_L13P_3
U5	IO_L13N_3
U4	IO_L18P_3
V3	IO_L18N_3
R9	IO_L19P_3
T6	IO_L19N_3
T5	IO_L20P_3
P4	IO_L20N_3
R4	IO_L21P_3
P6	IO_L21N_3
P5	IO_L22P_3
R3	IO_L22N_3
P8	IO_L23P_3
N7	IO_L23N_3
N6	IO_L24P_3
M6	IO_L24N_3
M7	IO_L25P_3
T4	IO_L25N_3
M6	IO_L26P_3
T3	IO_L26N_3
L6	IO_L31P_3
	IO_L31N_VREF_3

mcb3_rzq   R101   100   SDRAM_VREF

mcb3_zio   R102   NLR

SDRAM_VDDPULLUP

R104 49.9 R105 49.9 R106 49.9 R107 49.9 R108 49.9 R109 49.9 R110 49.9 R111 49.9 R112 49.9 R113 49.9

R103 20K   SDRAM_VDD

R115 49.9 R116 49.9 R117 49.9 R118 49.9 R119 49.9 R120 49.9 R121 49.9 R122 49.9 R123 49.9

R114 20K   C150 0.1uF   SDRAM_VREF

SDRAM_VDDQ
SDRAM_VDD

R124 100

U32 MT47H64M16HR-3

SDRAM 64Mx16

Pin	Signal
V2	IO_L32P_M3DQ14_3 mcb3_dram_dq14
V1	IO_L32N_M3DQ15_3 mcb3_dram_dq15
U3	IO_L33P_M3DQ12_3 mcb3_dram_dq12
U1	IO_L33N_M3DQ13_3 mcb3_dram_dq13
T2	IO_L34P_M3UDQS_3 mcb3_dram_udqs
	IO_L34N_M3UDQS_N_3 mcb3_dram_udqs_n
R3	IO_L35P_M3DQ10_3 mcb3_dram_dq10
R1	IO_L35N_M3DQ11_3 mcb3_dram_dq11
P2	IO_L36P_M3DQ8_3 mcb3_dram_dq8
P1	IO_L36N_M3DQ9_3 mcb3_dram_dq9
N3	IO_L37P_M3DQ0_3 mcb3_dram_dq0
N1	IO_L37N_M3DQ1_3 mcb3_dram_dq1
M2	IO_L38P_M3DQ2_3 mcb3_dram_dq2
L3	IO_L38N_M3DQ3_3 mcb3_dram_dq3
L1	IO_L39P_M3LDQS_3 mcb3_dram_dqs
K2	IO_L39N_M3LDQSN_3 mcb3_dram_dqs_n
K1	IO_L40P_M3DQ6_3 mcb3_dram_dq6
J1	IO_L40N_M3DQ7_3 mcb3_dram_dq7
H2	IO_L41P_GCLK27_M3DQ4_3 mcb3_dram_dq4
H1	IO_L41N_GCLK26_M3DQ5_3 mcb3_dram_dq5
N4	IO_L42P_GCLK25_TRDY2_M3UDM_3 mcb3_dram_udm
P3	IO_L42N_GCLK24_M3LDM_3 mcb3_dram_dm
	IO_L43P_GCLK23_M3RASN_3 mcb3_dram_ras_n
	IO_L43N_GCLK22_IRDY2_M3CASN_3 mcb3_dram_cas_n
G3	IO_L44P_GCLK21_M3A5_3 mcb3_dram_a5
G1	IO_L44N_GCLK20_M3A6_3 mcb3_dram_a3
M4	IO_L45P_M3A3_3 mcb3_dram_a3
M3	IO_L45N_M3ODT_3 mcb3_dram_odt
F2	IO_L46P_M3CLK_3 mcb3_dram_ck
F1	IO_L46N_M3CLKN_3 mcb3_dram_ck_n
M5	IO_L47P_M3A0_3 mcb3_dram_a0
L4	IO_L47N_M3A1_3 mcb3_dram_a1
E3	IO_L48P_M3BA0_3 mcb3_dram_ba0
E1	IO_L48N_M3BA1_3 mcb3_dram_ba1
K4	IO_L49P_M3A7_3 mcb3_dram_a7
K3	IO_L49N_M3A2_3 mcb3_dram_a2
D2	IO_L50P_M3WE_3 mcb3_dram_we_n
D1	IO_L50N_M3BA2_3 mcb3_dram_ba2
K6	IO_L51P_M3A10_3 mcb3_dram_a10
K5	IO_L51N_M3A4_3 mcb3_dram_a4
C3	IO_L52P_M3A8_3 mcb3_dram_a8
C1	IO_L52N_M3A9_3 mcb3_dram_a9
J6	IO_L53P_M3CKE_3 mcb3_dram_cke
J4	IO_L53N_M3A12_3 mcb3_dram_a12
B2	IO_L54P_M3RESET_3
B1	IO_L54N_M3A11_3 mcb3_dram_a11
H4	IO_L55P_M3A13_3
H3	IO_L55N_M3A14_3
H6	IO_L57P_3
H5	IO_L57N_VREF_3 SDRAM_VREF
H8	IO_L58P_3
J7	IO_L58N_3
K8	IO_L59P_3
K7	IO_L59N_3
E4	IO_L60P_3
F3	IO_L60N_3

mcb3_dram_odt   ODT   K9
mcb3_dram_cke   CKE   K2
mcb3_dram_ck   CK   J3
mcb3_dram_ck_n CK#   K8

mcb3_dram_ras_n CS#   L8
mcb3_dram_cas_n RAS# K7
mcb3_dram_we_n   CAS# L7
                 WE#   K3

mcb3_dram_ba2   BA2   L1
mcb3_dram_ba1   BA1   L3
mcb3_dram_ba0   BA0   L2

                RFU   R8
                RFU   R7
                RFU   R3

mcb3_dram_a11   A11   T1
mcb3_dram_a10   A10   P7
mcb3_dram_a9   A9   M2
mcb3_dram_a8   A8   P3
mcb3_dram_a7   A7   P2
mcb3_dram_a6   A6   N7
mcb3_dram_a5   A5   N3
mcb3_dram_a4   A4   N2
mcb3_dram_a3   A3   M7
mcb3_dram_a2   A2   M3
mcb3_dram_a1   A1   M1
mcb3_dram_a0   A0   M3

UDQS A8 mcb3_dram_dqs
UDQS# A8 mcb3_dram_dqs_n
LDQS F7 mcb3_dram_udqs
LDQS# E8 mcb3_dram_udqs_n
UDM   B3 mcb3_dram_dm
LDM   B3

DQ15 B9 mcb3_dram_dq15
DQ14 B1 mcb3_dram_dq14
DQ13 D9 mcb3_dram_dq13
DQ12 D1 mcb3_dram_dq12
DQ11 D7 mcb3_dram_dq11
DQ10 C2 mcb3_dram_dq10
DQ9   C8 mcb3_dram_dq9
DQ8   F9 mcb3_dram_dq8
DQ7   F1 mcb3_dram_dq7
DQ6   H1 mcb3_dram_dq6
DQ5   H9 mcb3_dram_dq5
DQ4   H3 mcb3_dram_dq4
DQ3   H7 mcb3_dram_dq3
DQ2   G3 mcb3_dram_dq2
DQ1   G1 mcb3_dram_dq1
DQ0   G8 mcb3_dram_dq0

NC   E2
NC   A2

VREF K9

R125 4.7K   R126 4.7K   R127 100

Pin	Signal
C2	VCCO_3
F4	VCCO_3
F6	VCCO_3
G2	VCCO_3
J5	VCCO_3
L2	VCCO_3
L7	VCCO_3
N5	VCCO_3
R2	VCCO_3
U5	VCCO_3
W2	VCCO_3
W5	VCCO_3
AA3	VCCO_3

IO_L73P_3   C2
IO_L73N_3   F4
IO_L74P_3   F6
IO_L74N_3   G2
IO_L75P_3   J5
IO_L75N_3   L2
IO_L80P_3   F7
IO_L80N_3   C4
IO_L81P_3   D3
IO_L81N_3   D5
IO_L82P_3   D6
IO_L82N_3   A3
IO_L83P_3   A2
IO_L83N_VREF_3   SDRAM_VREF

DIG_1.8V

FB13 BLM15AG100SN1D

C191 10uF C192 10uF C193 10uF C194 2.2uF C195 2.2uF C196 2.2uF C197 0.1uF C198 0.1uF

SDRAM_VDD

FB12 BLM15AG100SN1D   SDRAM_VDDQ

C151 10nF C152 10nF C153 10nF C154 10nF C155 10nF C156 10nF   C157 10nF C158 10nF C159 10nF C160 10nF C161 10nF C162 10nF C163 10nF C164 10nF C165 10nF C166 10nF

C167 47nF C168 47nF C169 47nF C170 47nF C171 47nF C172 47nF

SDRAM_VDDPULLUP

C187 10nF C188 0.1uF C189 0.1uF C190 1uF

LMS6002D (U33)

TRANSMITTER

TXINQP 54
TXINQN 56
TXINIP 52
TXININ 51

RF1_TXCLK 19 TX_CLK
RF1_TXIQSEL 20 TX_IQ_SEL

RF1_TXD0 21 TXD0
RF1_TXD1 22 TXD1
RF1_TXD2 23 TXD2
RF1_TXD3 24 TXD3
RF1_TXD4 25 TXD4
RF1_TXD5 26 TXD5
RF1_TXD6 27 TXD6
RF1_TXD7 28 TXD7
RF1_TXD8 29 TXD8
RF1_TXD9 30 TXD9
RF1_TXD10 31 TXD10
RF1_TXD11 32 TXD11

RF1_TXEN 66 TXEN
PLL1_CLK 71 PLLCLK
RF1_RXEN 76 RXEN

RF1_RXCLK 17 RX_CLK
RF1_RXIQSEL 16 RX_IQ_SEL

RF1_RXD0 15 RXD0
RF1_RXD1 14 RXD1
RF1_RXD2 13 RXD2
RF1_RXD3 10 RXD3
RF1_RXD4 8 RXD4
RF1_RXD5 9 RXD5
RF1_RXD6 6 RXD6
RF1_RXD7 7 RXD7
RF1_RXD8 5 RXD8
RF1_RXD9 4 RXD9
RF1_RXD10 3 RXD10
RF1_RXD11 2 RXD11

RECEIVER

TXOUT1P 48 LM1_TXOUT1P
TXOUT1N 50 LM1_TXOUT1N
TXOUT2P 46
TXOUT2N 44
TXCPOUT 64
TXVTUNE 57
RXCPOUT 80
RXVTUNE 87

RXIN1EP 97
RXIN1EN 99
RXIN1P 96 LM1_RXIN1P
RXIN1N 98 LM1_RXIN1N 1.575GHz (GPS)
RXIN2P 100 LM1_RXIN2P
RXIN2N 102 LM1_RXIN2N 1930MHz to 1990MHz (PCS)
RXIN3P 108 LM1_RXIN3P
RXIN3N 110 LM1_RXIN3N 400MHz to 3.8GHz (wideband)

XRES12K 89

R138 10K 39 XRESAD
38 VREFAD
R136 12K

C211 0.1uF 42 ATP
RXOUTIP 116
RXOUTIN 115
RXOUTQP 113
RXOUTQN 114

TP2
67 SAEN   SPI_RF1_SEL
68 SADO   SPI_DIN
69 SADIO SPI_DOUT
70 SACLK SPI_CLK
75 RESET N_RESET_IN

C199 470pF R128 820 C201 10nF
R130 1.2K C203 150pF
C205 470pF R132 820 C207 10nF
R134 1.2K C209 150pF

LMS6002D (U34)

TRANSMITTER

TXINQP 54
TXINQN 56
TXINIP 52
TXININ 51

RF2_TXCLK 19 TX_CLK
RF2_TXIQSEL 20 TX_IQ_SEL

RF2_TXD0 21 TXD0
RF2_TXD1 22 TXD1
RF2_TXD2 23 TXD2
RF2_TXD3 24 TXD3
RF2_TXD4 25 TXD4
RF2_TXD5 26 TXD5
RF2_TXD6 27 TXD6
RF2_TXD7 28 TXD7
RF2_TXD8 29 TXD8
RF2_TXD9 30 TXD9
RF2_TXD10 31 TXD10
RF2_TXD11 32 TXD11

RF2_TXEN 66 TXEN
PLL2_CLK 71 PLLCLK
RF2_RXEN 76 RXEN

RF2_RXCLK 17 RX_CLK
RF2_RXIQSEL 16 RX_IQ_SEL

RF2_RXD0 15 RXD0
RF2_RXD1 14 RXD1
RF2_RXD2 13 RXD2
RF2_RXD3 11 RXD3
RF2_RXD4 8 RXD4
RF2_RXD5 9 RXD5
RF2_RXD6 6 RXD6
RF2_RXD7 7 RXD7
RF2_RXD8 5 RXD8
RF2_RXD9 4 RXD9
RF2_RXD10 3 RXD10
RF2_RXD11 2 RXD11

RECEIVER

TXOUT1P 48 LM2_TXOUT1P
TXOUT1N 50 LM2_TXOUT1N
TXOUT2P 46 LM2_TXOUT2P
TXOUT2N 44 LM2_TXOUT2N
TXCPOUT 64
TXVTUNE 57
RXCPOUT 80
RXVTUNE 87

RXIN1EP 97
RXIN1EN 99
RXIN1P 96 LM2_RXIN1P
RXIN1N 98 LM2_RXIN1N 375MHz to 650MHz
RXIN2P 100 LM2_RXIN2P
RXIN2N 102 LM2_RXIN2N 2.4GHz (ISM)
RXIN3P 108 LM2_RXIN3P
RXIN3N 110 LM2_RXIN3N 400MHz to 3.8GHz (wideband)

XRES12K 89

R139 10K 39 XRESAD
38 VREFAD
R137 12K

C212 0.1uF 42 ATP
RXOUTIP2 116
RXOUTIN2 115
RXOUTQP2 113
RXOUTQN2 114

TP3
67 SAEN   SPI_RF2_SEL
68 SADO   SPI_DIN
69 SADIO SPI_DOUT
70 SACLK SPI_CLK
75 RESET N_RESET_IN

C200 470pF R129 820 C202 10nF
R131 1.2K C204 150pF
C206 470pF R133 820 C208 10nF
R135 1.2K C210 150pF

Decoupling (U33)

RF_1.8V DIG_3.3V RF_3.3V RFPWR_3.3V
C213 10uF C214 1uF C215 0.1uF
C216 10uF C217 0.1uF C218 1uF C219 0.1uF C220 0.1uF C221 0.1uF C222 0.1uF C223 0.1uF C224 0.1uF C225 0.1uF C226 0.1uF C227 0.1uF C228 0.1uF C229 0.1uF
C230 10uF C231 10uF

C251 1uF C252 1uF C253 1uF
RF_1.8V R140 22   RF_1.8V R141 22
C257 0.1uF C258 10uF C259 0.1uF C260 10uF

Decoupling (U34)

RF_1.8V DIG_3.3V RF_3.3V RFPWR_3.3V
C232 10uF C233 1uF C234 0.1uF
C235 10uF C236 0.1uF C237 1uF C238 0.1uF C239 0.1uF C240 0.1uF C241 0.1uF C242 0.1uF C243 0.1uF C244 0.1uF C245 0.1uF C246 0.1uF C247 0.1uF C248 0.1uF
C249 10uF C250 10uF

C254 1uF C255 1uF C256 1uF
RF_1.8V R142 22   RF_1.8V R143 22
C261 0.1uF C262 0.1uF C263 10uF

I/Q TEST ADAPTER

J8
1 RXOUTIP1   2 RXOUTIN1
3 RXOUTQP1   4 RXOUTQN1
5 TXINIP   6 TXININ
7 TXINQP   8 TXINQN
9 RXOUTIP2   10 RXOUTIN2
11 RXOUTQP2 12 RXOUTQN2
13   14

SMH140-LPSE-D05-ST-BK

RF and Acquisition Clocks

32MHz, +/-2ppm

RF_3.3V R149 100
U36 CTC6W320000MP10NM0
4 VDD OUT 3
1 GND GND 2
5 NC 6 NC
C272 0.1uF C273 4.7uF C274 1nF

C269 10nF R153 49.9
RF_3.3V
C265 0.1uF
R147 200
R150 47K
Q6 NPN
C267 10nF R151 0
C270 NLC
C271 10nF

U35 MASWSS0136
1 RF 1
2 RF 2
3 V1
4 V2
5 RFC
6 GND
CLKSEL_INT
CLKSEL_EXT
C279 1nF C280 1nF

U37 CDCV304
RF_3.3V R148 0 R17 0
R145 10nF
C268 10nF
CLKIN 1Y0 1
OE 1Y1 8
VDD 1Y2 7
GND 1Y3
C275 0.1uF C276 4.7uF
C277 10nF C278 10nF
R152 NLR R154 NLR
R155 150 R156 150
U.FL J9 FPGA_CLK

R144 1K C264 4.7pF PLL1_CLK
R146 1K C266 4.7pF PLL2_CLK

U.FL J10

EXTERNAL TX
WIDEBAND
ANTENNA

400MHz to 3.8GHz (wideband)

EXTERNAL RX
WIDEBAND
ANTENNA

400MHz to 3.8GHz (wideband)
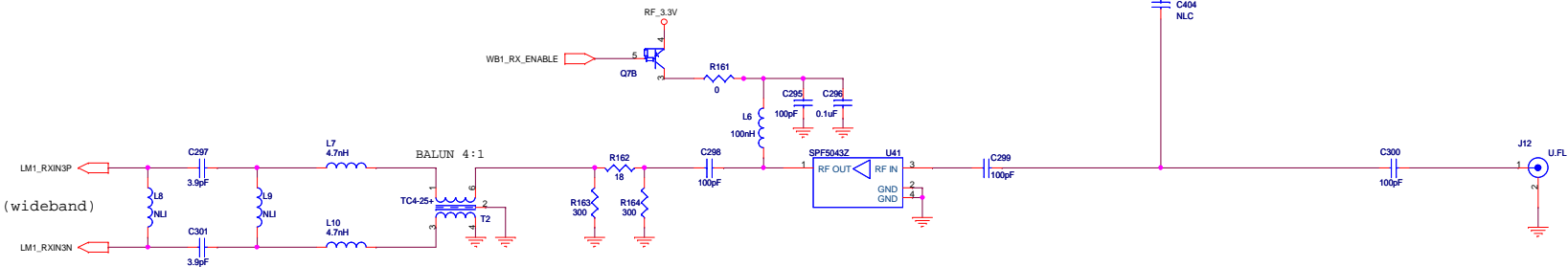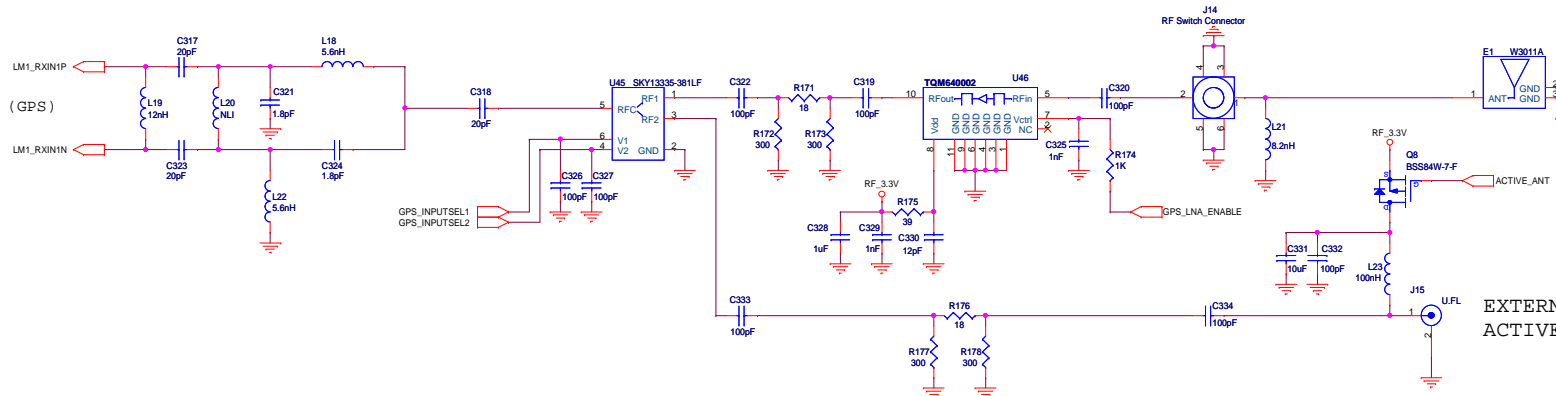
1930MHz to 1990MHz (PCS)
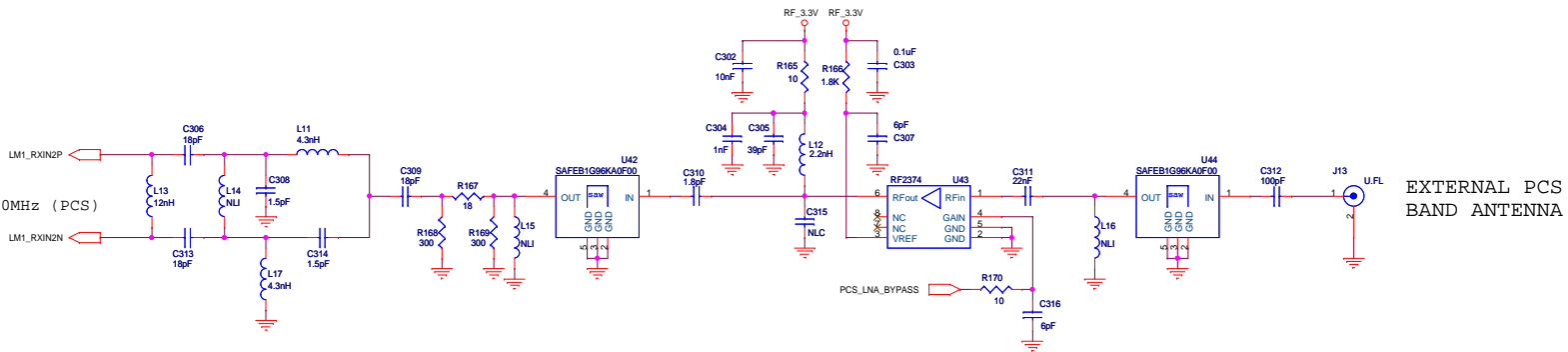
EXTERNAL PCS
BAND ANTENNA

1.575GHz (GPS)

INTERNAL GPS
BAND ANTENNA

EXTERNAL GPS
ACTIVE ANTENNA

EXTERNAL TX WIDEBAND ANTENNA

400MHz to 3.8GHz (wideband)

BALUN 1:1

EXTERNAL RX WIDEBAND ANTENNA

400MHz to 3.8GHz (wideband)

BALUN 4:1

2.4GHz (ISM)

EXTERNAL ISM BAND ANTENNA

2.4GHz (ISM)

INTERNAL ISM BAND ANTENNA

EXTERNAL LOW FREQUENCY ANTENNA

375MHz to 650MHz