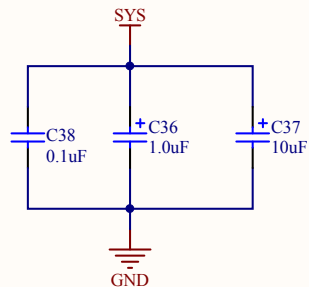
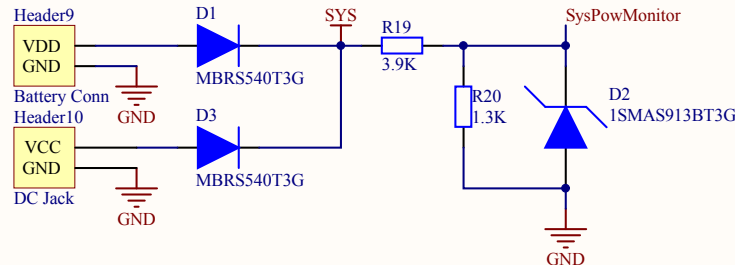


3S Lipo Battery



Power Input, Selection, and Monitoring

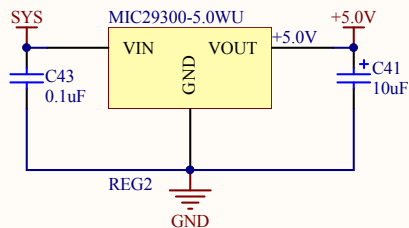


Power Rails:

+5.0V Rated: 3000mA
 +3.3V Rated: 3000mA
 +2.8V Rated: 150mA
 +1.5V Rated: 150mA
 +1.2V Rated: 3000mA

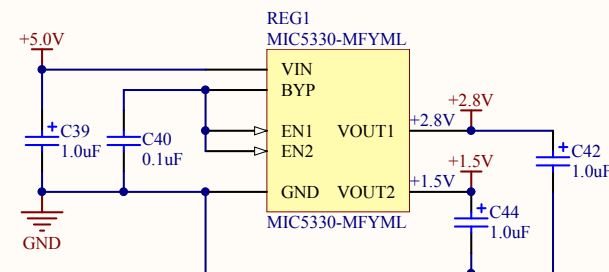
+6 to +11.7 VDC

Battery -> 5.0 VDC

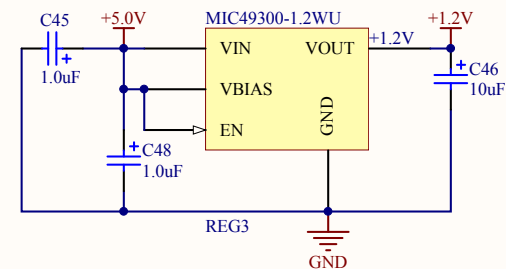


+5.0 VDC

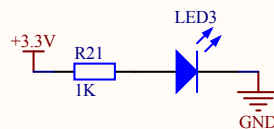
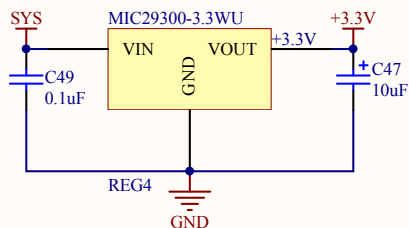
5.0 -> 2.8 & 1.5 VDC



5.0 -> 1.2 VDC



Battery -> 3.3 VDC



Title		
Size A	Number	Revision
Date:	3/25/2012	Sheet 1 of
File:	C:\Users\...\Power.SchDoc	Drawn By:

A

B

C

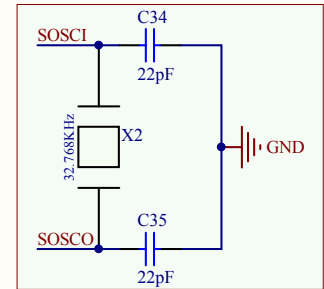
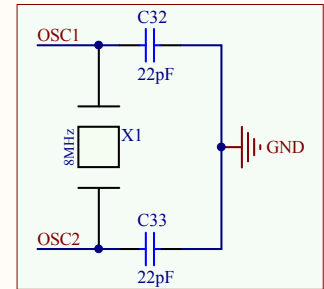
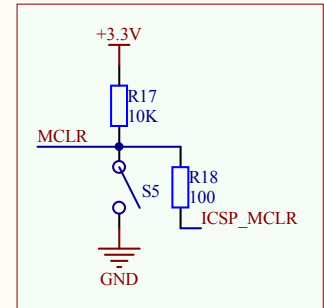
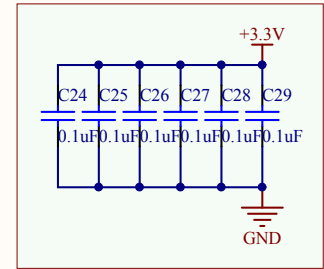
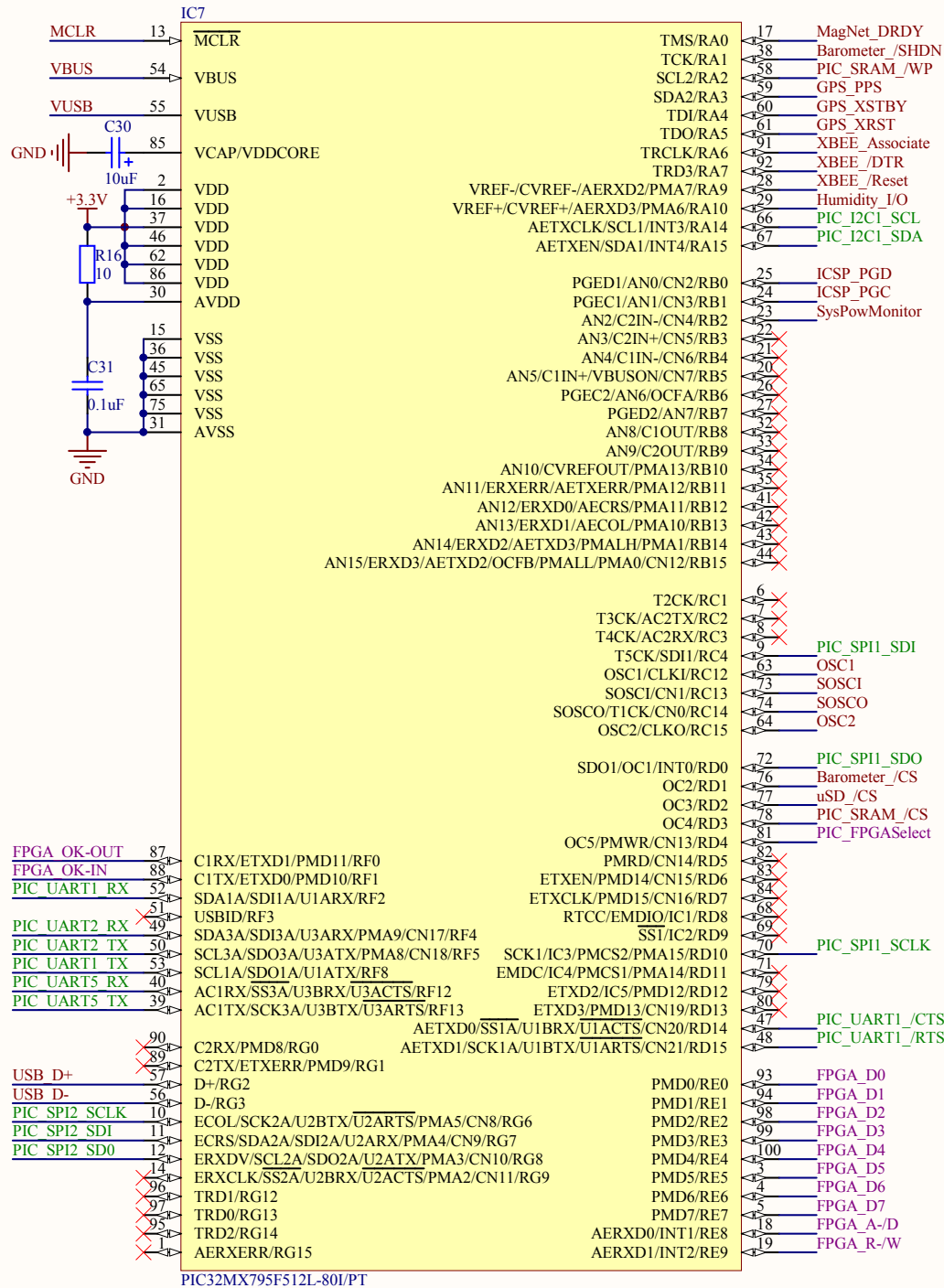
D

A

B

C

D



Notes:

- VCAP is a 6V 1-Ohm Tantalum Capacitor

Title		
Size	Number	Revision
A		
Date:	3/25/2012	Sheet of
File:	C:\Users\...\Navigator Core.SchDoc	Drawn By:

PIC SPI-1 Interface (PIC Peripherals)

PIC_SPI1_SCLK	PIC_SPI1_SDI	PIC_SPI1_SDO
uSD_SCLK	uSD_SDO	uSD_SDI
PIC_SRAM_SCK	PIC_SRAM_SO	PIC_SRAM_SI
Barometer_SCLK	Barometer_DOUT	Barometer_DIN

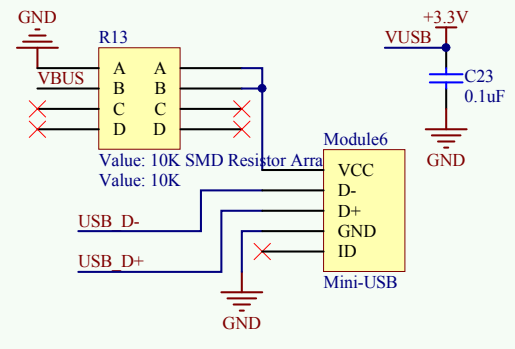
PIC SPI-2 Interface (PIC-FPGA Connection)

PIC_SPI2_SCLK	PIC_SPI2_SDI	PIC_SPI2_SDO
PIC_SCLK	PIC_MISO	PIC_MOSI

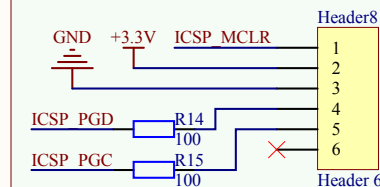
PIC I2C-1 Interface

PIC_I2C1_SCL	PIC_I2C1_SDA
Magnet_SCL	Magnet_SDA
DS1085_SCL	DS1085_SDA

PIC32 USB Interface



In-Circuit Serial Programming Interface



PIC UART-2/5 Interface (Trimble GPS Module)

PIC_UART2_RX	PIC_UART2_TX
GPS_TXB	GPS_RXB
PIC_UART5_RX	PIC_UART5_TX
GPS_TXA	GPS_RXA

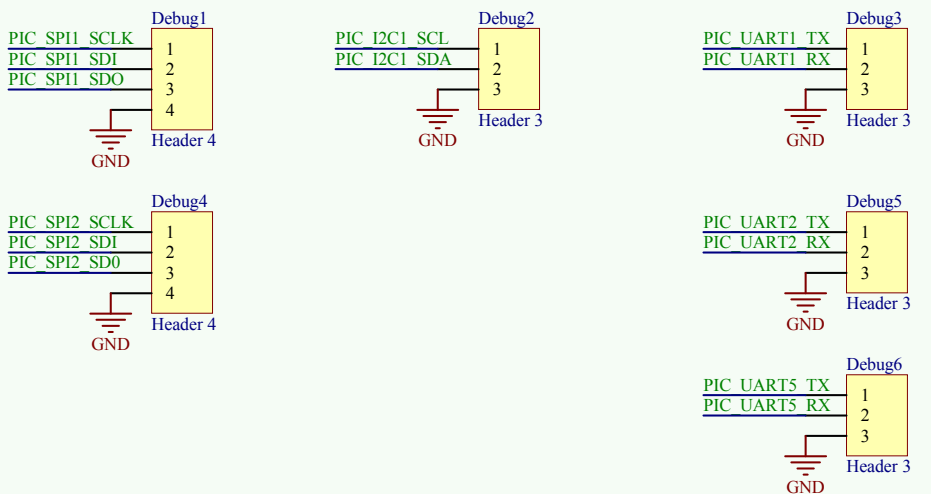
PIC UART-1 Interface (XBee Pro)

PIC_UART1_/CTS	PIC_UART1_/RTS
XBEE_/RTS	XBEE_/CTS
PIC_UART1_RX	PIC_UART1_TX
XBEE_DOUT	XBEE_DIN

PIC Control Lines

Humidity_I/O
MagNet_DRDY
PIC_FPGASelect
Barometer_/CS
Barometer_/SHDN
uSD_/CS
PIC_SRAM_/WP
PIC_SRAM_/CS
GPS_PPS
GPS_XSTBY
GPS_XRST
XBEE_Associate
XBEE_/DTR
XBEE_/Reset

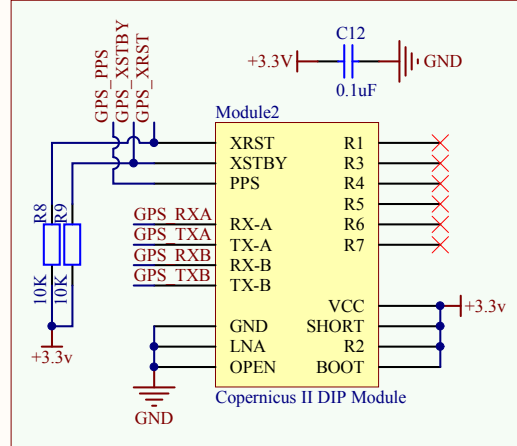
Communication Debug Headers



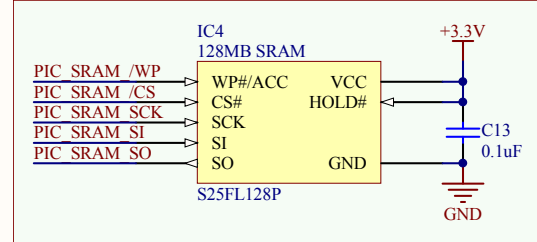
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Size	Number	Revision
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Date:	3/25/2012	Sheet of
File:	C:\Users\...\Navigator Connectors.SchDoc	Drawn By:

A

GPS Module 38.4Kbps TSIP / 4.8Kbps NMEA Interface



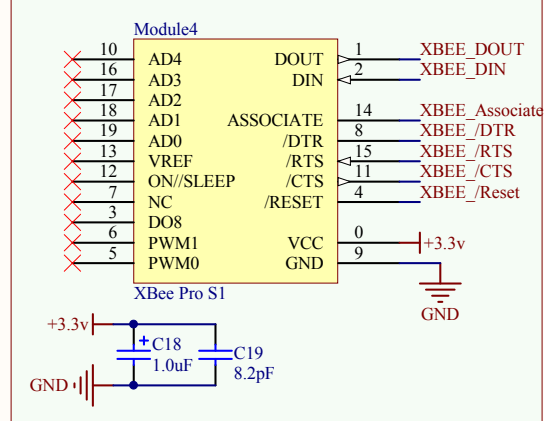
Serial SRAM 104/40MHz SPI Interface



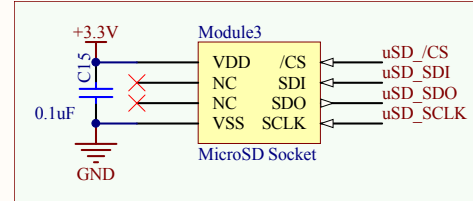
A

B

XBee Module 57.6 Kbps Serial Interface



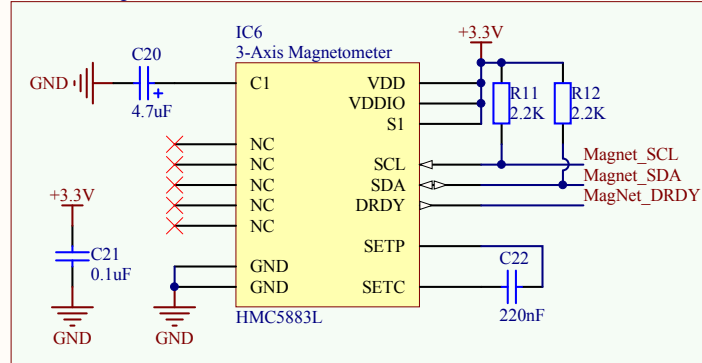
MicroSD Card 25MHz SPI Interface



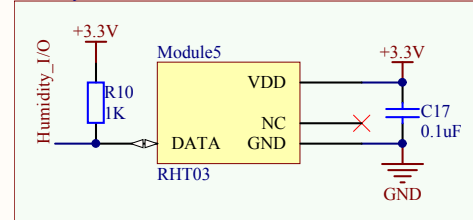
B

C

Three-Axis Magnetometer 400KHz I2C Interface



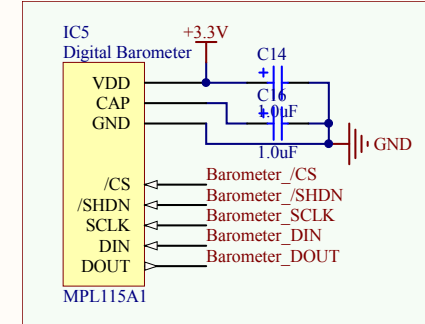
Humidity Sensor 1-Wire Interface



C

D

Barometric Sensor 8MHz SPI Interface

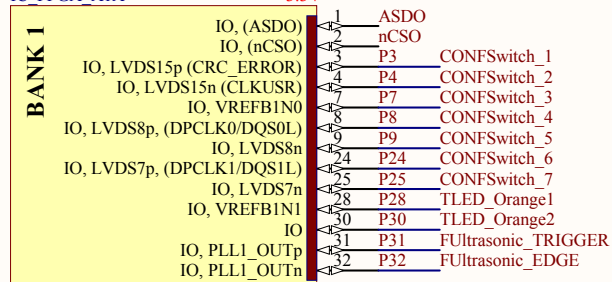


D

Title		
Size	Number	Revision
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Date:	3/25/2012	Sheet of
File:	C:\Users\...\Navigator Components.SchDoc Drawn By:	

IC FPGA_A1A

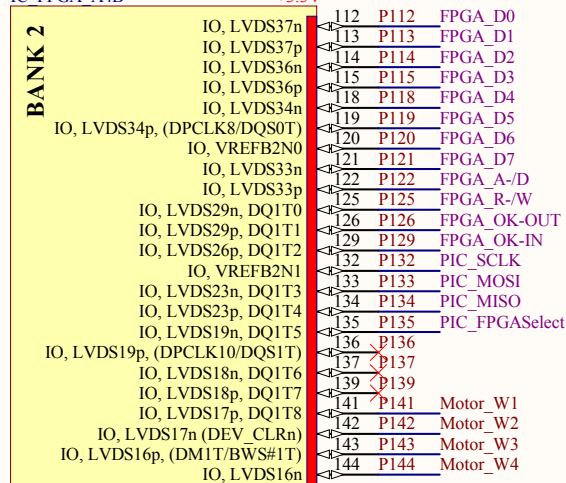
+3.3V



EP2C8T144C8N

IC FPGA_A4B

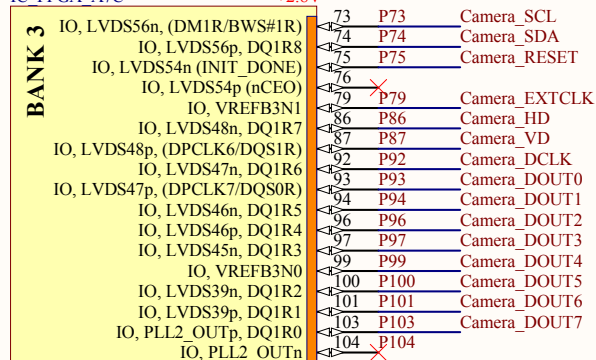
+3.3V



EP2C8T144C8N

IC FPGA_A7C

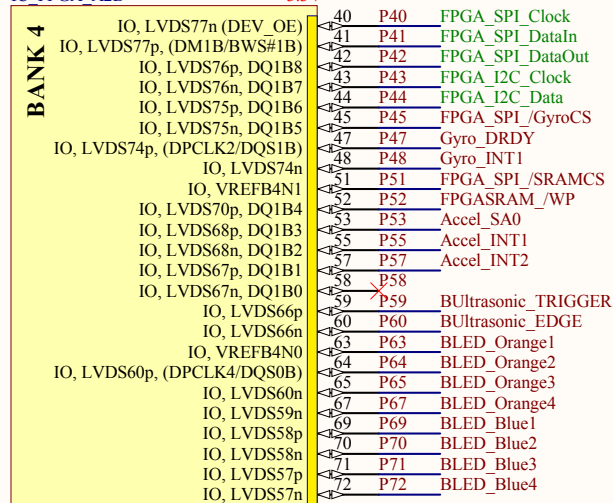
+2.8V



EP2C8T144C8N

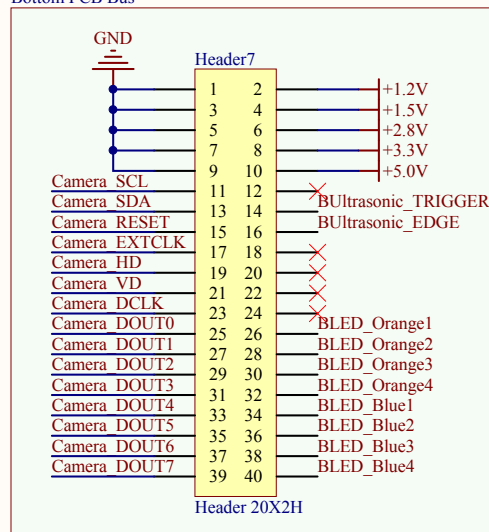
IC FPGA_A2D

+3.3V

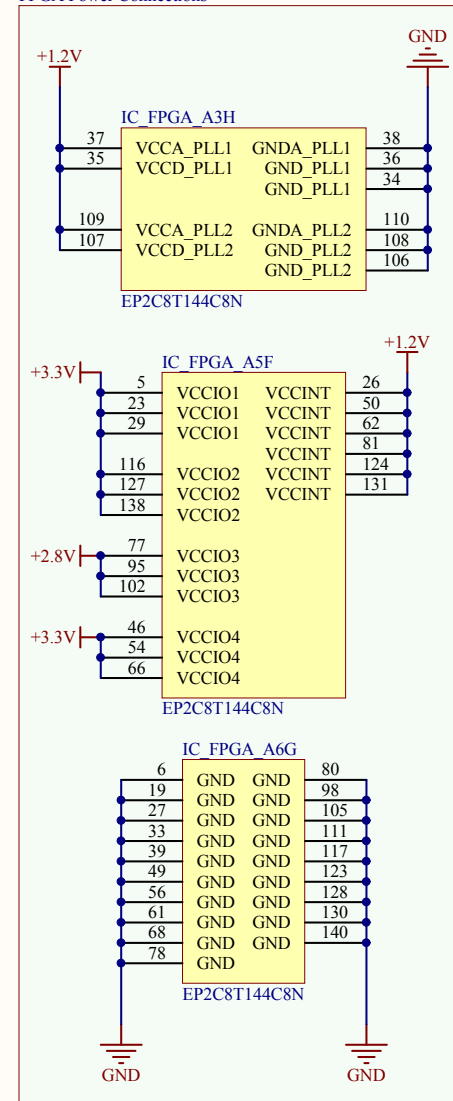


EP2C8T144C8N

Bottom PCB Bus



FPGA Power Connections



Title

Size

Number

Revision

Date:

3/25/2012

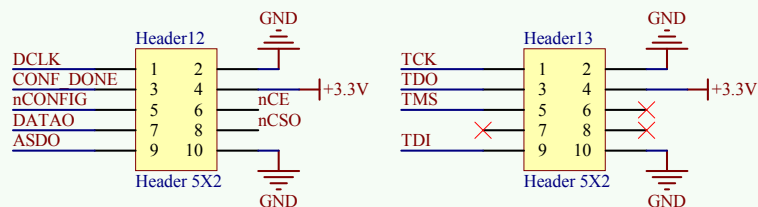
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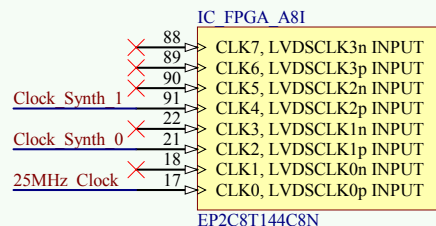
C:\Users\...\FPGA_Core.SchDoc

Drawn By:

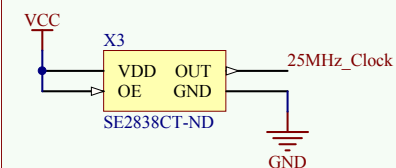
FPGA JTAG Configuration Headers



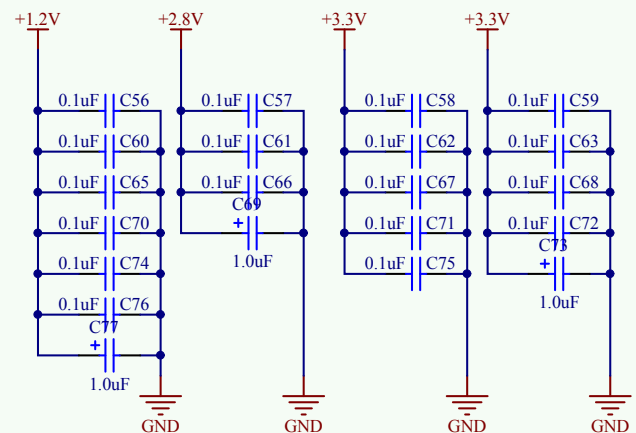
FPGA Clock Connections



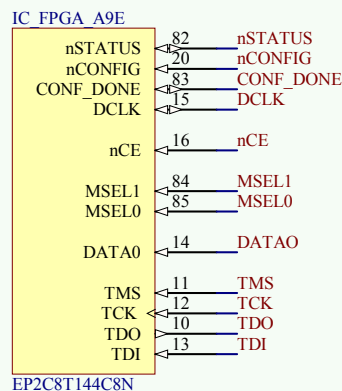
25.175MHz Master Clock



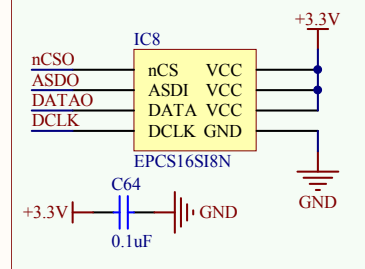
FPGA Bypass Capacitors



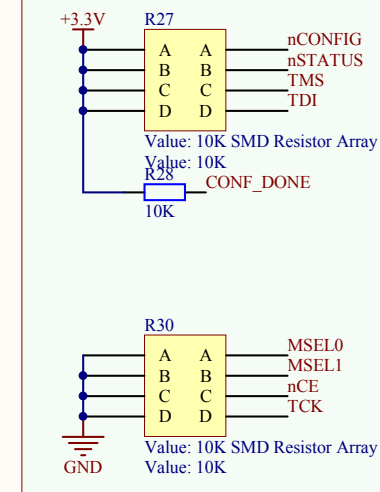
FPGA Configuration Connections



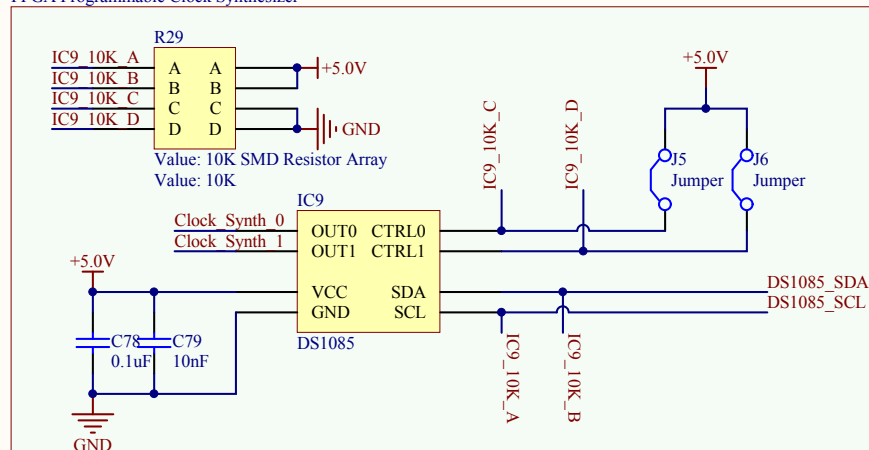
FPGA Configuration Memory



FPGA Signal Conditioning



FPGA Programmable Clock Synthesizer

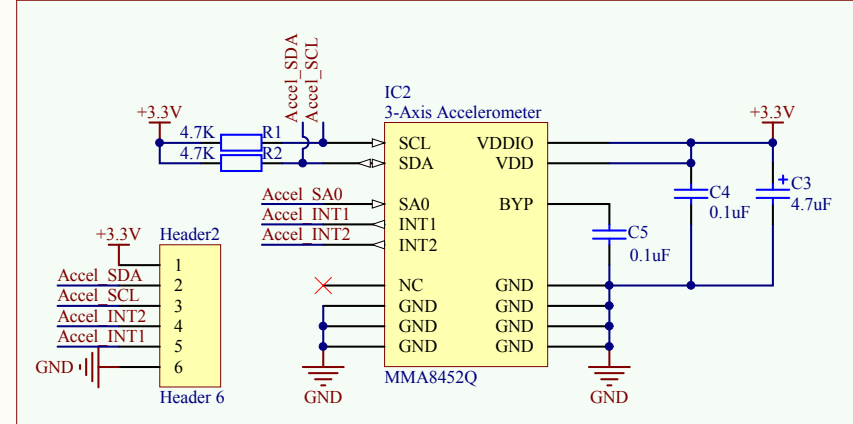
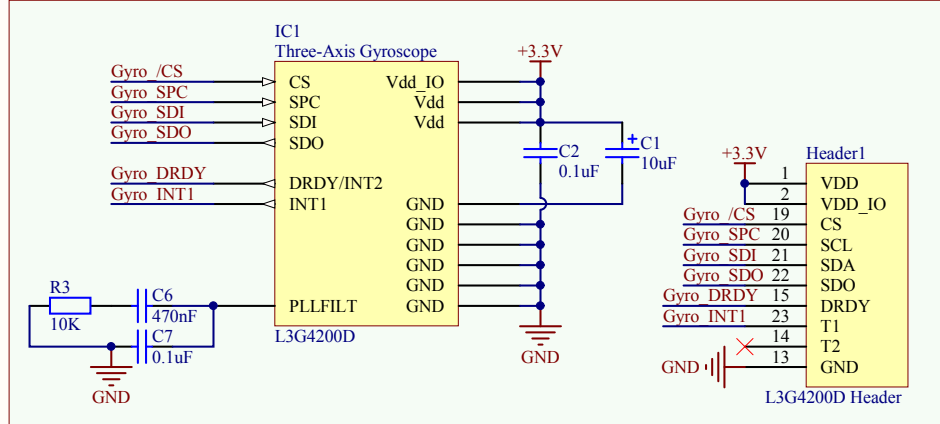


Gyroscope

10MHz SPI Interface

Accelerometer

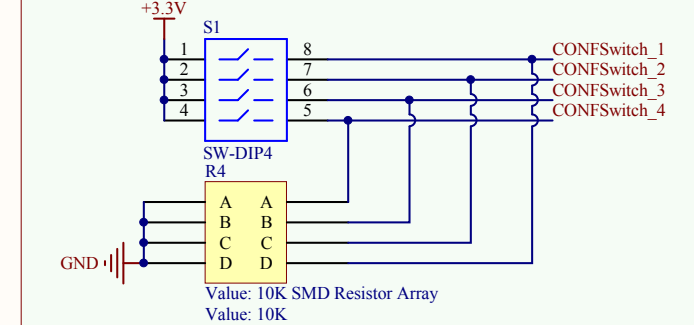
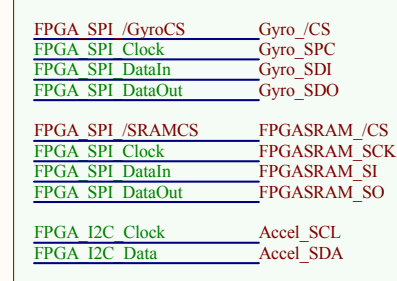
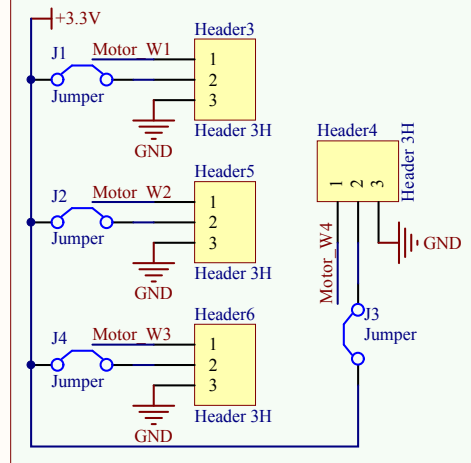
2.25MHz I2C Interface



Motor ESC Connectors

Data Bus Connections

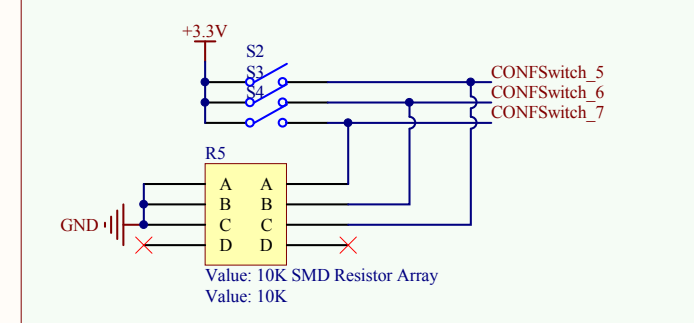
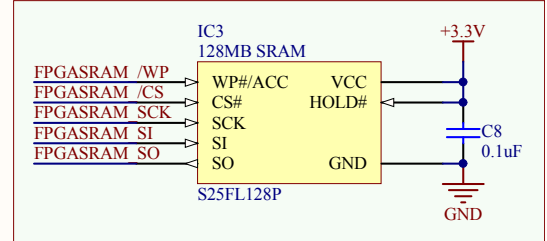
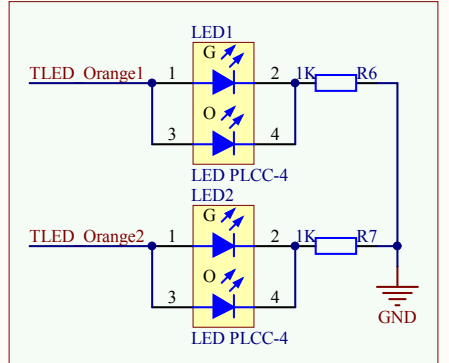
FPGA Switches



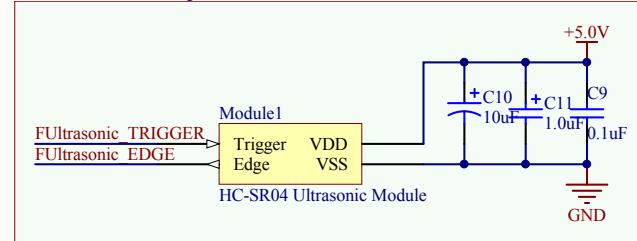
FPGA LED's

Serial SRAM

104/40MHz SPI Interface

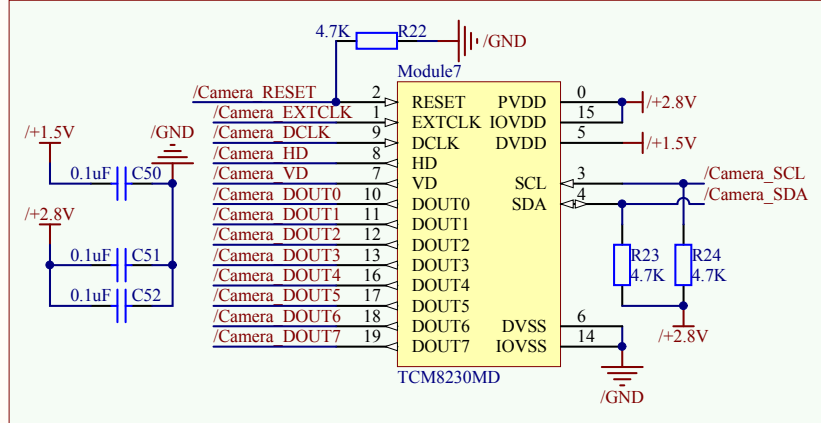


Forward Ultrasonic Ranger

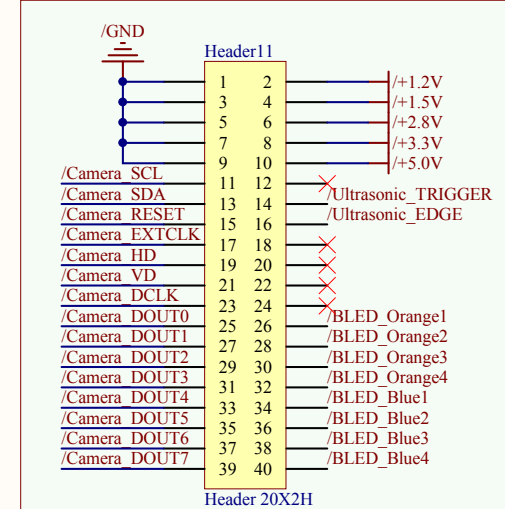


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Date:	3/25/2012	Sheet of
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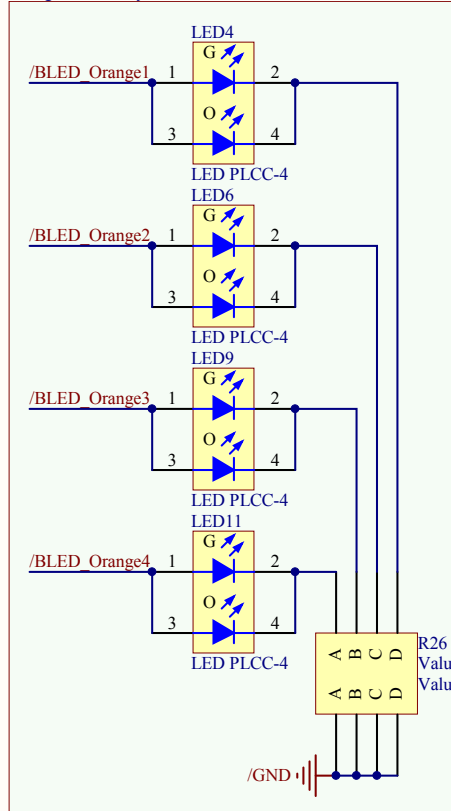
Camera 400KHz I2C / 50MHz Parallel Interface



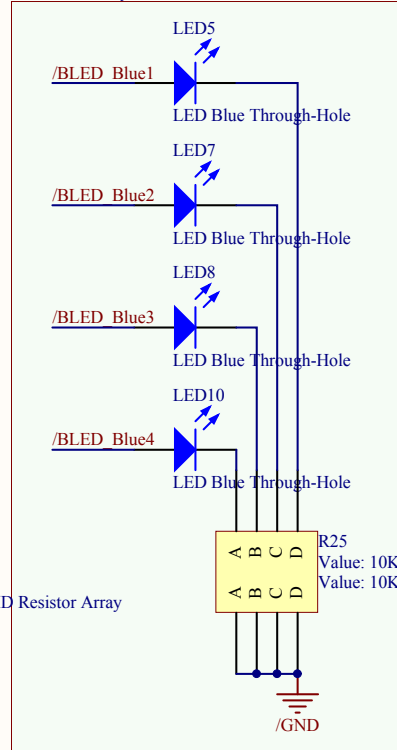
To Main Board



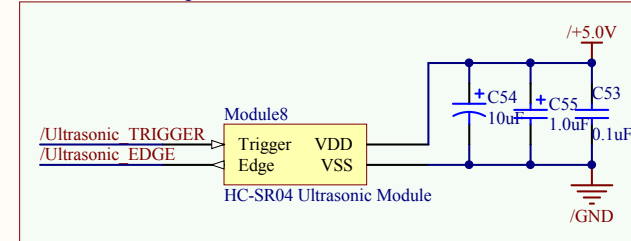
Orange LED Array



Blue LED Array



Bottom Ultrasonic Ranger



Title		
Size	Number	Revision
A		
Date:	3/25/2012	Sheet of
File:	C:\Users\...\Bottom Board.SchDoc	Drawn By:

Bill of Materials

<Parameter Title not found>

Source Data From: Ad-Flier.PrjPcbProject: Ad-Filer.PrjPcb

Variant: None

Creation Date:	3/25/2012	12:05:42 AM
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Print Date: 25-Mar-12 12:05:46 AM

Component	Comment	LibRef	Designator	Description	Quantity
Capacitor - Tantalum Case A	10uF Low-ESR Tantalum Case A	SMD_Cap_Tant alum	D1, C30, C41, C46, C47	Tantalum Capacitor - Case A	5
SMD 1206	0.1uF SMD 1206	Cap	C2, C4, C5, C7, C8, C9, C12, C13, C15, C17, C21, C23, C24, C25, C26, C27, C28, C29, C31, C40, C43, C48, C50, C51, C52, C53, C56, C57, C58, C59, C60, C61, C62, C63, C64, C65, C66, C67, C68, C70, C71, C72, C74, C75, C76, C78	Capacitor	46
Capacitor - Tantalum Case A	4.7uF Low-ESR Tantalum Case A	SMD_Cap_Tant alum	C3, C20	Tantalum Capacitor - Case A	2
SMD 0603	470nF SMD 0603	Cap	C6	Capacitor	1
CAPPR2-561	1.0uF Electrolytic	Cap Polt1	C10, C37, C54	Polarized Capacitor (Radial)	3
Capacitor - Tantalum Case A	10uF Low-ESR Tantalum Case A	SMD_Cap_Tant alum	C11, C14, C16, C18, C19, C42, C44, C45, C46, C55, C73, C77	Tantalum Capacitor - Case A	13
SMD 0805	8.2uF SMD 0805	Cap	C19	Capacitor	1
SMD 0603	220nF SMD 0603	Cap	C22	Capacitor	1
SMD 1206	222uF SMD 1206	Cap	C32, C33, C34, C36	Capacitor	4
CAPPR2-561	1.0uF Electrolytic	Cap Polt1	C36	Polarized Capacitor (Radial)	1
CAPR05-5	0.1uF Ceramic	Cap	C38	Capacitor	1
SMD 1206	0.1uF SMD 1206	Cap	C79	Capacitor	1
MERS54073G	1MSA54073G	MERS54073G	D1, D3	40V 5A Scottity Diode	2
TS90	1MSA59138T3	TS90	D2	3.3V 1.5W Zener Diode	1
HD1R04	Header 4	Header 4	Header1, Debug1	Header, 4-Pin	2
HD1R3	Header 3	Header 3	Header2, Debug2, Debug3, Debug4	Header, 3-Pin	4
DFP24	Header 24	Header 24	Header1	Header, 24-Pin	1
HD1R16	Header 6	Header 6	Header2, Header3	Header, 6-Pin	2
HD1R20H	Header 20H	Header 20H	Header4, Header5, Header6, Header7	Header, 3-Pin, Right Angle	2
HD1R20QH	Header 20QH	Header 20QH	Header7, Header11	Header, 20-Pin, Dual row, Right Angle	1
PC Wire Connector	PC Wire Connector	PC Wire Connector	Header9	PC Wire Connector	1
DC Power Jack	DC Jack	DC Jack	Header10	DC Power Jack	1
HD1R26	Header 5/2	Header 5/2	Header12, Header13	Header, 5-Pin, Dual row	2
LS34200TH	LS34200	LS34200	K1	Three-Axis Digital Output MEMS Gyroscopes	1
MM4A84S20T	MM4A84S20	MM4A84S20	K2	3-Axis, 12-bit/8-bit Digital Accelerometer	1
S2FL128P	S2FL128P	S2FL128P	K3, K4	128MB 104-MHz SPI Flash Memory	2
MP115A1	MP115A1	MP115A1	K5	Monitors SPI Digital Accelerometer	1
HM5C83L	HM5C83L	HM5C83L	K6	3-Axis Digital Compact IC	1
TR					
TOPF.	CS230709V51	CS230709V51	K7	High Performance 80 MHz MIPS-Based 32-Bit Flash Microcontroller with USB, CAN and Ethernet, 512KB Program Memory, 100-pin TQFP, Industrial Temperature	1
PT100.	2L-80P7T	2L-80P7T			
EPCS1658H	EPCS1658H	EPCS1658H	K8	16MB FPGA CONFIGURATION DEVICE	1
SO-8	D51085	D51085	K9	On-Chip Oscillator Frequency Synthesizer	1
TOP141NM	EP02C114402N	EP02C114402N	K10	Cyclone II Family, 1.2V FPGA, 85 I/O Pins, 2 PLLs, 144-Pin TQFP, Speed Grade II, Commercial Grade, Pb-Free	1
HC595	Jumper	Jumper	P1, P2, J5, J4, J6, J8	Surface Mount Chip LED	6
LEDD12	LEDD12	LEDD12	LEDD1, LEDD2, LEDD3, LEDD4, LEDD5, LEDD11	Surface Mount Chip LED	1
Blue LED	LEDD12	LEDD12	LEDD2, LEDD3, LEDD4, LEDD5	Blue LED	4
HC-SR04 Ultrasonic Ranger	HC-SR04 Ultrasonic Module	HC-SR04 Ultrasonic Module	Module1, Module2	HC-SR04 Ultrasonic Module	2
Copernicus DPS Module	Copernicus DPS Module	Copernicus DPS Module	Module2	Copernicus DPS Module	1
MicroSD Socket	MicroSD Socket	MicroSD Socket	Module3	MicroSD SPI Interface	1
Cart Slot	Xbee Pro S1	Xbee Pro S1	Module4	Xbee Pro S1 600mW Wireless Module	1
RH703 Humidity Sensor	RH703	RH703	Module5	Digital Humidity & Temp Sensor	1
Mini USB Camera	Mini-USB Connector	Mini-USB Connector	Module6	Mini-USB	1
TCM230MD	TCM230MD	TCM230MD	Module7	Toshiba 640x480 Camera	1
SMD 0805	4.7K SMD 0805	Res2	R1, R2, R32, R33, R34	Resistor	5
SMD 0805	10K SMD 0805	Res2	R3, R5, R7, R28	Resistor	5
SMD 0805	Value 10K	SMD Resistor Array	R6, R8, R10, R26, R27, R29, R30	4-Count Resistor Array	1
Array YC164	SMD Resistor Array	Array			
SMD 0805	1K SMD 0805	Res2	R8, R9, R10, R21	Resistor	4
SMD 0805	2.2K SMD 0805	Res2	R11	Resistor	1
SMD 0805	100 SMD 0805	Res2	R12, R15, R16	Resistor	1
RES12-2	3.6K Radial	Res2	R17	Resistor	1
RES12-2	1.3K Radial	Res2	R19	Resistor	1
MC3330	MC3330	MC3330	REG1	4.0 300mA LDO (RoHS Free Compliant)	1
MFYML TR	MFYML	MFYML	REG2	3.0 100mA LDO (RoHS Free Compliant)	1
TO-263	MC2930D	MC2930D	REG3	3.0 LDO Fixed Volt. (LDOs Compliant)	1
DDPAK	5.0WU	5.0WU	REG4	Dual Supply, LV 3.0A LDO(RoHS Compliant)	1
MC49300	1.2WU	1.2WU			
PAK-5	3.3WU	3.3WU	REG4	3.0 LDO Fixed Volt. (RoHS Compliant)	1
TO-263	MC2930D	MC2930D			
DDPAK	3.3WU	3.3WU			
DP-8	SW DPA	SW DPA	S1	DP Switch	1
MC3330	MC3330	MC3330	S2, S3, S4, S5	Single-Pole, Single Throw Switch, SMD	4
MC3330	MC3330	MC3330	S6, S7, S8, S9	Tactile Switch	1
XTM20ANAM	XTM20ANAM	XTM20ANAM	K1	BMH SMD Crystal	1
BMH - 8MHz Crystal					
32.768KHz Crystal	SSP-76-TFP-CT20PMP	SSP-76-TFP-CT20PMP	X2	32.768KHz 7pF SMD Crystal	1
SC-408PCE Crystal	SE2380CT2D	SE2380CT2D	X3	OSCILLATOR 25.175MHz 82 SMD	1

Approved	Notes
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Notes
