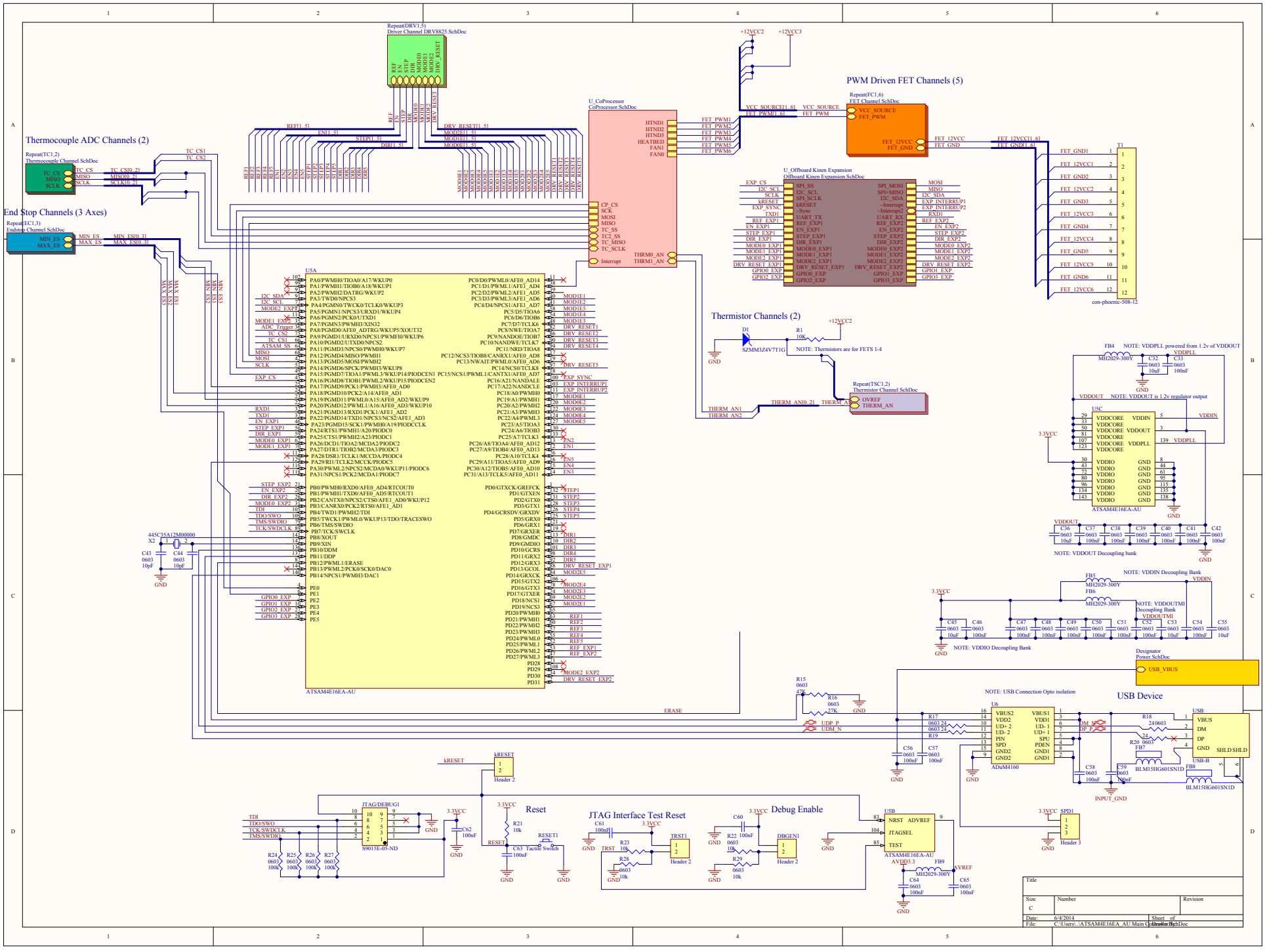
Repeat(DRV1,5)
Driver Channel DRV8825 SchDoc
REF
EN
STEP
DIR
MODE0
MODE1
MODE2
DRV_RESET
PWM Driven FET Channels (5)
Repeat(FC1,6)
FET Channel SchDoc
VCC_SOURCE
FET_PWM
FET_12VCC
FET_GND
+12VCC2
+12VCC3
U_CoProcessor
CoProcessor.SchDoc
HTND1
HTND2
HTND3
HEATBED
FAN1
FAN0
CP_CS
SCK
MOSI
MISO
TC_SS
TC2_SS
TC_MISO
TC_SCLK
Interrupt
THRM0_AN
THRM1_AN
Thermocouple ADC Channels (2)
Repeat(TC1,2)
Thermocouple Channel SchDoc
TC_CS
MISO
SCLK
TC_CS1
TC_CS2
End Stop Channels (3 Axes)
Repeat(EC1,3)
Endstop Channel SchDoc
MIN_ES
MAX_ES
U_Offboard Kinen Expansion
Offboard Kinen Expansion SchDoc
SPI_SS
SPI_MOSI
SPI+MISO
I2C_SCL
I2C_SDA
~Interrupt
~Interrupt2
UART_TX
UART_RX
RXD1
REF_EXP1
REF_EXP2
EN_EXP1
EN_EXP2
STEP_EXP1
STEP_EXP2
DIR_EXP1
DIR_EXP2
MODE0_EXP1
MODE0_EXP2
MODE1_EXP1
MODE1_EXP2
MODE2_EXP1
MODE2_EXP2
DRV_RESET_EXP1
DRV_RESET_EXP2
GPIO0_EXP
GPIO1_EXP
GPIO2_EXP
GPIO3_EXP
MOSI
MISO
I2C_SDA
EXP_INTERRUP1
EXP_INTERRUP2
T1
con-phoenic-508-12
Thermistor Channels (2)
D1
SZMM3Z4V7T1G
R1
10K
NOTE: Thermistors are for FETS 1-4
Repeat(TSC1,2)
Thermistor Channel SchDoc
OVREF
THERM_AN
THERM_AN1
THERM_AN2
U5A
ATSAM4E16EA-AU
FB4
NOTE: VDDPLL powered from 1.2v of VDDOUT
MH2029-300Y
VDDPLL
VDDOUT
NOTE: VDDOUT is 1.2v regulator output
VDDIN
3.3VCC
USC
VDDCORE
VDDIO
GND
ATSAM4E16EA-AU
NOTE: VDDOUT Decoupling bank
NOTE: VDDIN Decoupling Bank
FB5
FB6
NOTE: VDDOUTMI Decoupling Bank
VDDOUTMI
NOTE: VDDIO Decoupling Bank
Designator Power.SchDoc
USB_VBUS
USB Device
NOTE: USB Connection Opto isolation
U6
ADuM4160
VBUS1
VBUS2
VDD1
VDD2
UD+ 1
UD+ 2
UD- 1
UD- 2
SPU
PDEN
GND1
GND2
USB
VBUS
DM
DP
SHLD
USB-B
FB7
FB8
BLM15HG601SN1D
INPUT_GND
445C35A12M00000
X2
kRESET
Header 2
JTAG/DEBUG1
TDI
TDO/SWO
TCK/SWDCLK
TMS/SWDIO
S9015E-05-ND
Reset
R21
10k
RESET1
C63 Tactile Switch
JTAG Interface Test Reset
TRST1
R23
10k
R28
10k
Debug Enable
DBGEN1
R22 100nF
R29
10k
USB
NRST ADVREF
JTAGSEL
TEST
ATSAM4E16EA-AU
AVDD3.3
FB9
AVREF
SPD1
Header 3
ERASE
UDP_P
UDM_N
Title
Size
C
Number
Revision
Date: 6/4/2014
Sheet of
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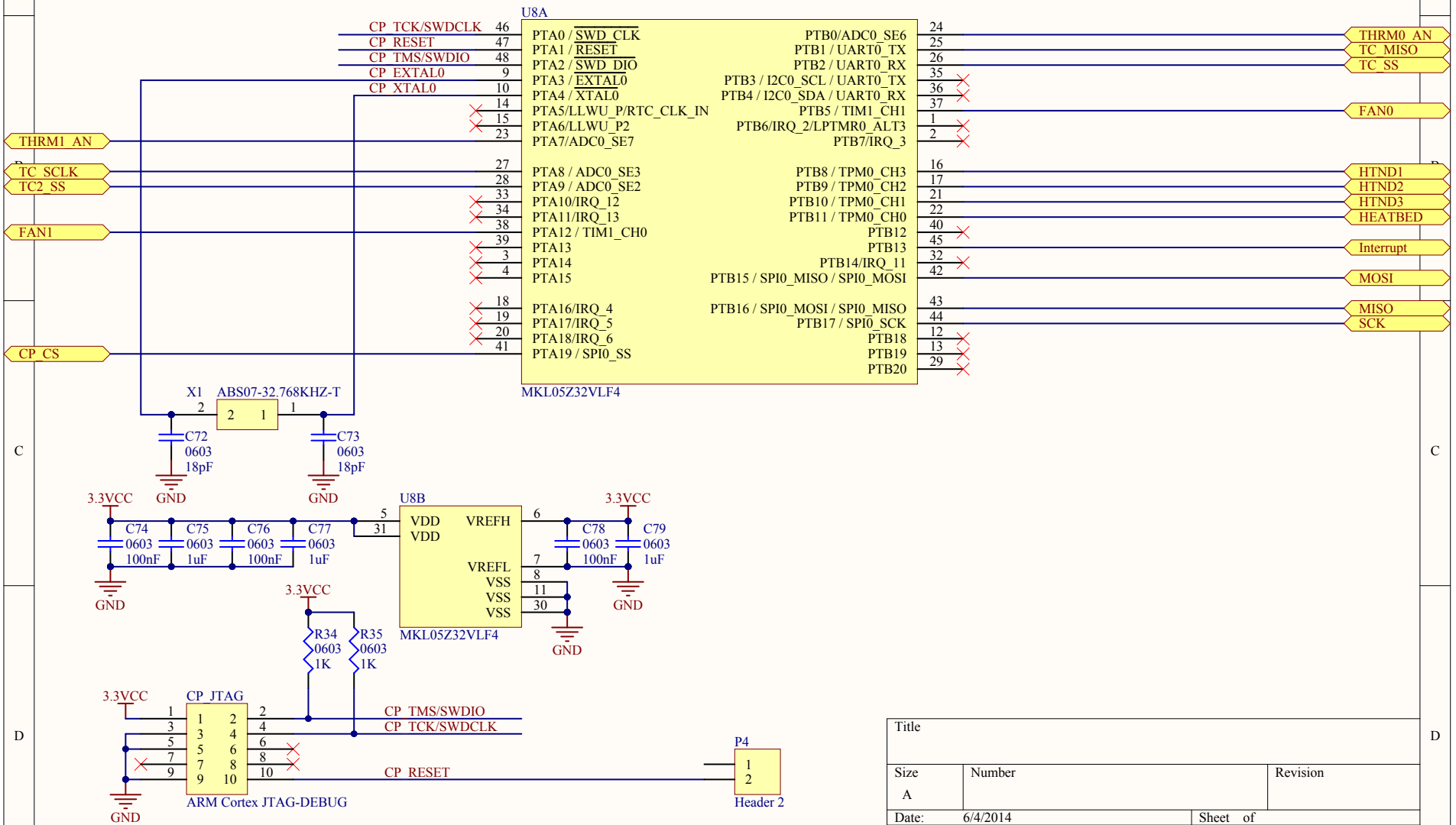
U8A
CP_TCK/SWDCLK 46
CP_RESET 47
CP_TMS/SWDIO 48
CP_EXTAL0 9
CP_XTAL0 10
PTA0 / SWD_CLK
PTA1 / RESET
PTA2 / SWD_DIO
PTA3 / EXTAL0
PTA4 / XTAL0
PTA5/LLWU_P/RTC_CLK_IN
PTA6/LLWU_P2
PTA7/ADC0_SE7
PTA8 / ADC0_SE3
PTA9 / ADC0_SE2
PTA10/IRQ_12
PTA11/IRQ_13
PTA12 / TIM1_CH0
PTA13
PTA14
PTA15
PTA16/IRQ_4
PTA17/IRQ_5
PTA18/IRQ_6
PTA19 / SPI0_SS
PTB0/ADC0_SE6
PTB1 / UART0_TX
PTB2 / UART0_RX
PTB3 / I2C0_SCL / UART0_TX
PTB4 / I2C0_SDA / UART0_RX
PTB5 / TIM1_CH1
PTB6/IRQ_2/LPTMR0_ALT3
PTB7/IRQ_3
PTB8 / TPM0_CH3
PTB9 / TPM0_CH2
PTB10 / TPM0_CH1
PTB11 / TPM0_CH0
PTB12
PTB13
PTB14/IRQ_11
PTB15 / SPI0_MISO / SPI0_MOSI
PTB16 / SPI0_MOSI / SPI0_MISO
PTB17 / SPI0_SCK
PTB18
PTB19
PTB20
MKL05Z32VLF4
THRM0_AN
TC_MISO
TC_SS
FAN0
HTND1
HTND2
HTND3
HEATBED
Interrupt
MOSI
MISO
SCK
THRM1_AN
TC_SCLK
TC2_SS
FAN1
CP_CS
X1 ABS07-32.768KHZ-T
C72 0603 18pF
C73 0603 18pF
GND
3.3VCC
U8B
VDD
VREFH
VREFL
VSS
MKL05Z32VLF4
C74 0603 100nF
C75 0603 1uF
C76 0603 100nF
C77 0603 1uF
C78 0603 100nF
C79 0603 1uF
R34 0603 1K
R35 0603 1K
CP_JTAG
ARM Cortex JTAG-DEBUG
P4
Header 2
Title
Size A
Number
Revision
Date: 6/4/2014
Sheet of
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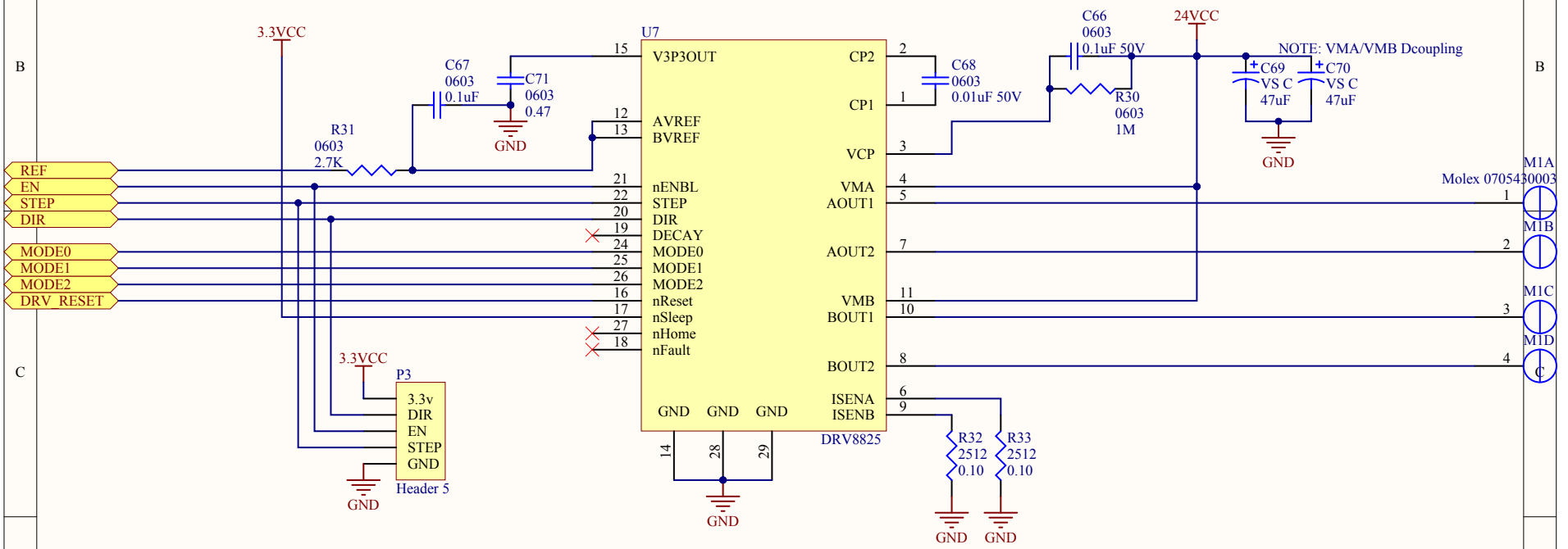
Drawn By:



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Size A	Number	Revision
Date: 6/4/2014	Sheet of	
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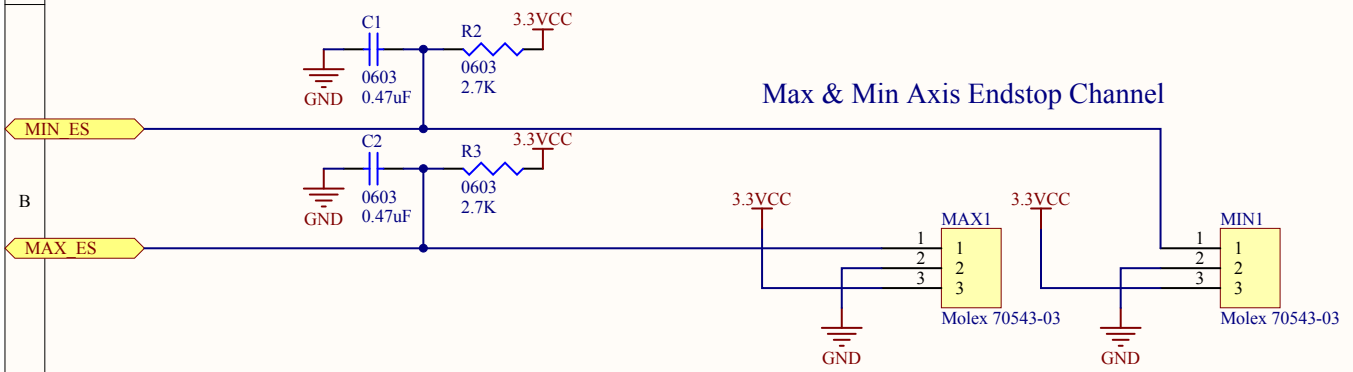
End Stop Channel



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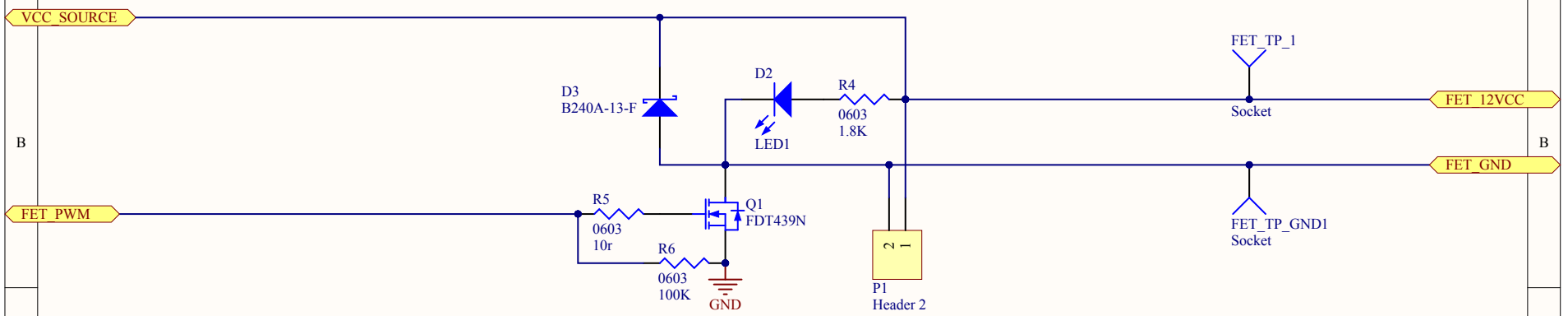
FET Channel 3A



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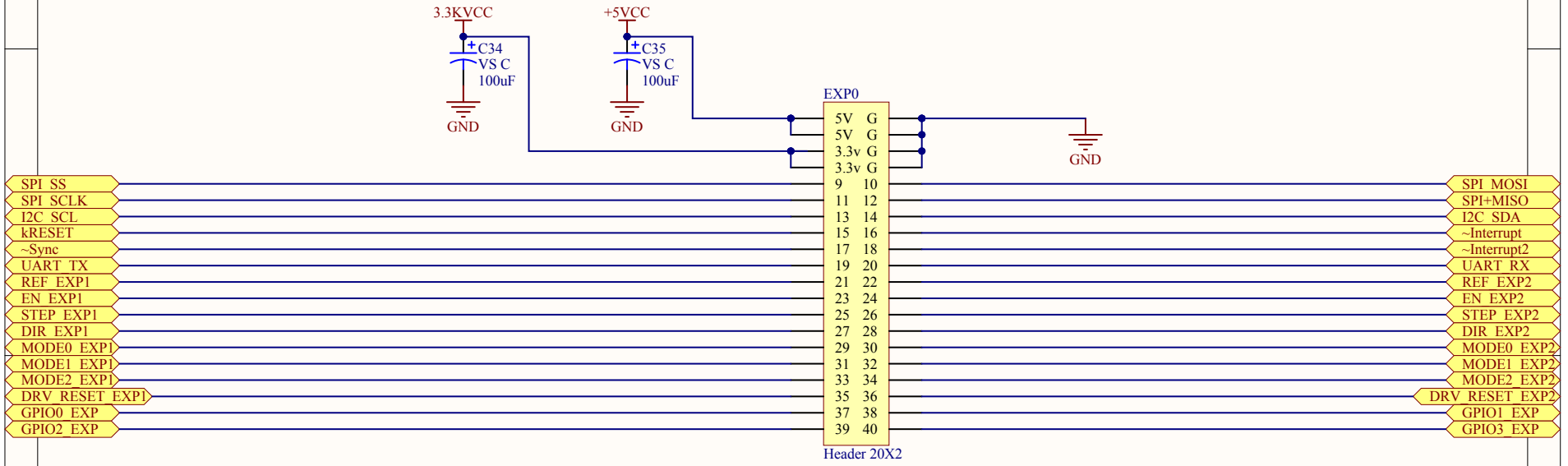

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Date: 6/4/2014	Sheet of	
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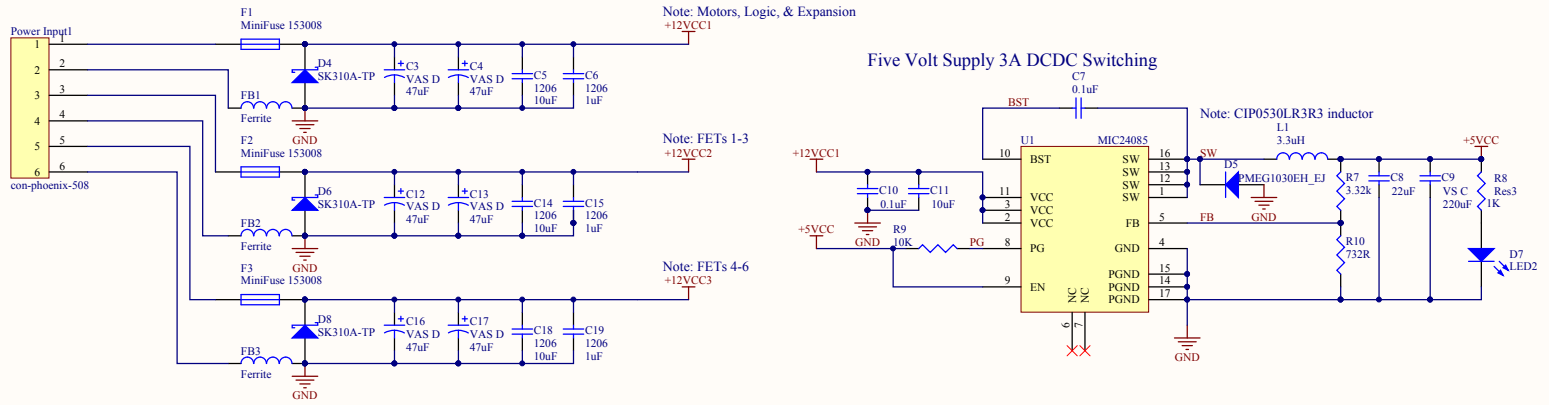
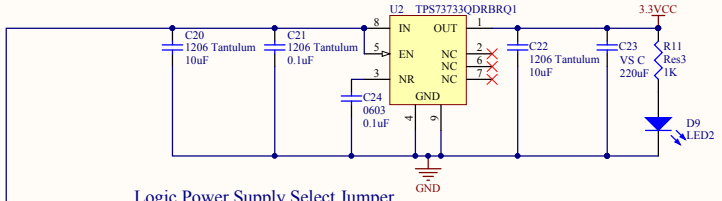
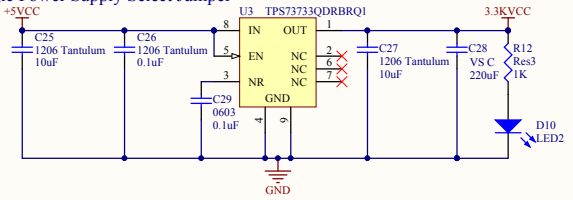


Five Volt Supply 3A DCDC Switching

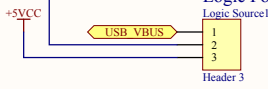
Logic Power Supply (3.3VDC)



Logic Power Supply Select Jumper



Logic Power Supply Select Jumper



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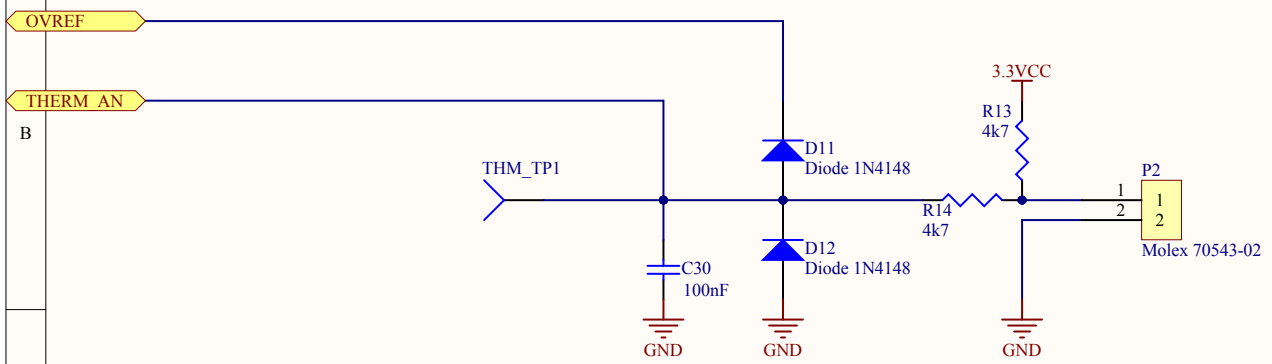
Thermistor Channel



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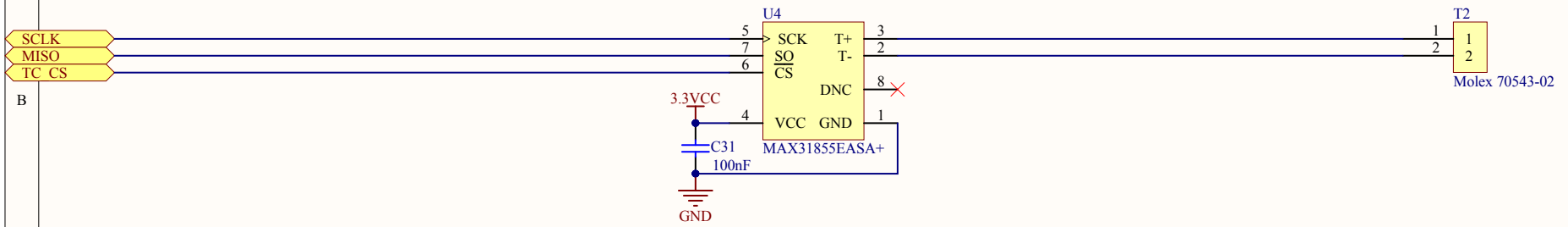
MAX31855 Thermocouple ADC Channel



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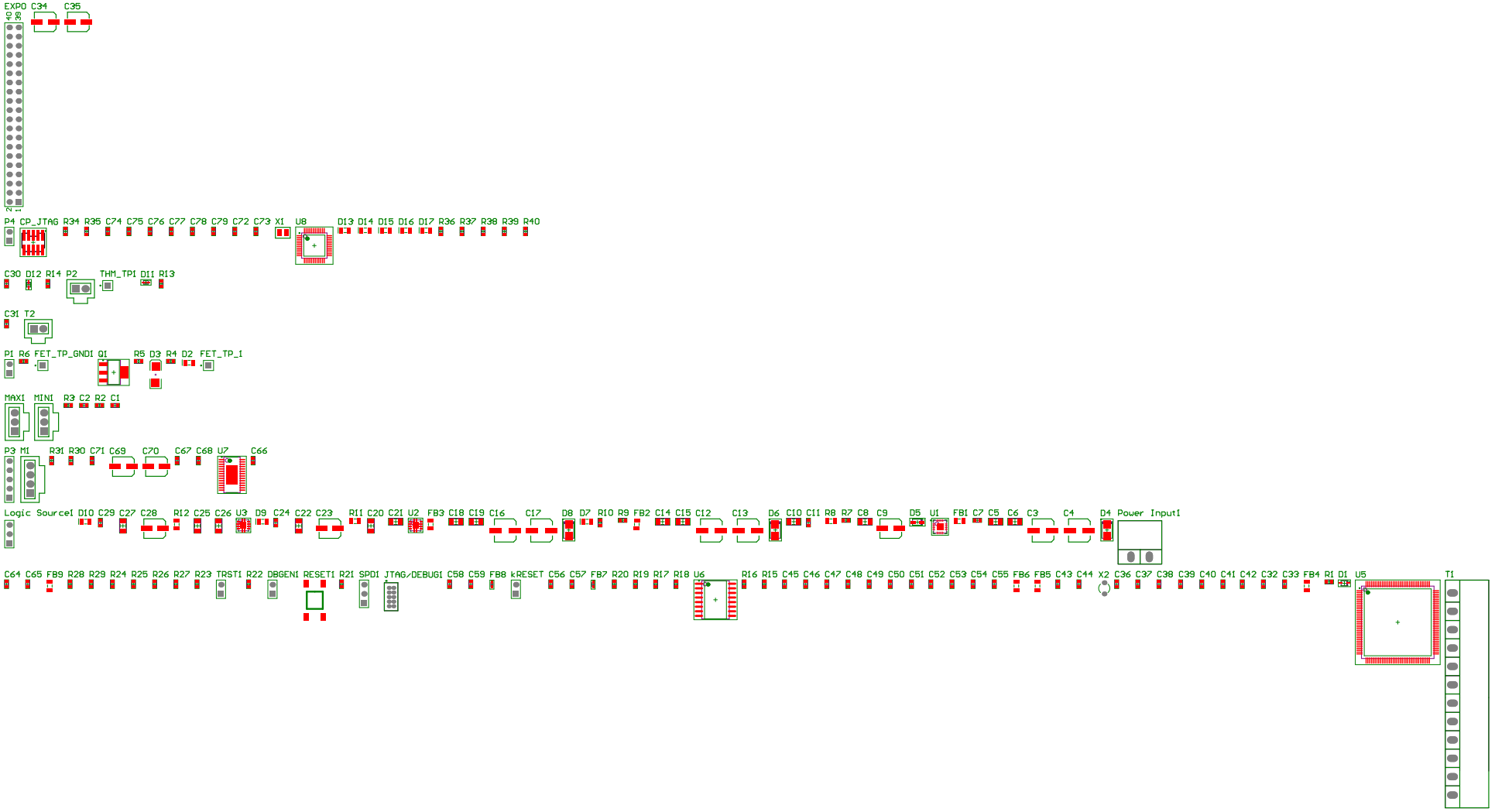
EXP0 C34 C35
40 39
2 1
P4 CP_JTAG R34 R35 C74 C75 C76 C77 C78 C79 C72 C73 X1 U8 D13 D14 D15 D16 D17 R36 R37 R38 R39 R40
C30 D12 R14 P2 THM_TP1 D11 R13
C31 T2
P1 R6 FET_TP_GND1 Q1 R5 D3 R4 D2 FET_TP_1
MAX1 MIN1 R3 C2 R2 C1
P3 M1 R31 R30 C71 C69 C70 C67 C68 U7 C66
Logic Source1 D10 C29 C27 C28 R12 C25 C26 U3 D9 C24 C22 C23 R11 C20 C21 U2 FB3 C18 C19 C16 C17 D8 D7 R10 R9 FB2 C14 C15 C12 C13 D6 C10 C11 R8 R7 C8 C9 D5 U1 FB1 C7 C5 C6 C3 C4 D4 Power Input1
C64 C65 FB9 R28 R29 R24 R25 R26 R27 R23 TRST1 R22 DBGEN1 RESET1 R21 SPD1 JTAG/DEBUG1 C58 C59 FB8 kRESET C56 C57 FB7 R20 R19 R17 R18 U6 R16 R15 C45 C46 C47 C48 C49 C50 C51 C52 C53 C54 C55 FB6 FB5 C43 C44 X2 C36 C37 C38 C39 C40 C41 C42 C32 C33 FB4 R1 D1 U5 T1

Bill of Materials

<Parameter Title not found>

Source Data From: ZMBo.PrjPcb
Project: ZMBo.PrjPcb
Variant: None

Creation Date: 6/4/2014 5:18:04 PM
Print Date: 41794 41794.72105

Footprint	Comment	LibRef	Designator	Description	Quantity
1608[0603]	0603	Cap Semi	C1, C2, C24, C29, C32, C33, C36, C37, C38, C39, C40, C41, C42, C43, C44, C45, C46, C47, C48, C49, C50, C51, C52, C53, C54, C55, C56, C57, C58, C59, C64, C65, C66, C67, C68, C71, C72, C73, C74, C75, C76, C77, C78, C79	Capacitor (Semiconductor SIM Model)	44
Panasonic VS D	VAS D	Cap Pol1	C3, C4, C12, C13, C16, C17	Polarized Capacitor (Radial)	6
C1206	1206	Cap Semi	C5, C6, C14, C15, C18, C19	Capacitor (Semiconductor SIM Model)	6
1608[0603]	Cap Semi	Cap Semi	C7, C11, C30, C31	Capacitor (Semiconductor SIM Model)	4
C1206	Cap Semi	Cap Semi	C8, C10	Capacitor (Semiconductor SIM Model)	2
Panasonic VS C	VS C	Cap Semi, Cap Semi, Cap Semi, Cap Pol1, Cap Pol1, Cap Pol1, Cap Pol1	C9, C23, C28, C34, C35, C69, C70	Capacitor (Semiconductor SIM Model), Capacitor (Semiconductor SIM Model), Capacitor (Semiconductor SIM Model), Polarized Capacitor (Radial), Polarized Capacitor (Radial), Polarized Capacitor (Radial), Polarized Capacitor (Radial)	7
C1206	1206 Tantulum	Cap Semi	C20, C21, C22, C25, C26, C27	Capacitor (Semiconductor SIM Model)	6
CAPC1608L	Cap Semi	Cap Semi	C60, C61, C62, C63	Capacitor (Semiconductor SIM Model)	4
FTSH-105-XX-X-DV	ARM Cortex JTAG-DEBUG	ARM Cortex JTAG-DEBUG Header	CP_JTAG		1
SZMM3Z4V7T1G	SZMM3Z4V7T1G	D Zener	D1	Zener Diode	1
SM 0805 polarized	LED1	LED1	D2	Typical RED GaAs LED	1
SMB	B240A-13-F	D Schottky	D3	Schottky Diode	1
SK310A-TP	SK310A-TP	D Schottky	D4, D6, D8	Schottky Diode	3
PMEG1030EH_EJ	PMEG1030EH_EJ	PMEG1030EH_EJ	D5	Default Diode	1
SM 0805 polarized	LED2	LED2	D7, D9, D10	Typical RED, GREEN, YELLOW, AMBER GaAs LED	3
1N4148WT	Diode 1N4148	Diode 1N4148	D11, D12	High Conductance Fast Diode	2
HDR1X2	Header 2	Header 2	DBGEN1, kRESET, P1, P4, TRST1	Header, 2-Pin	5
HDR2X20	Header 20X2	Header 20X2	EXP0	Header, 20-Pin, Dual row	1
TinyFuseATO_Carrier	MiniFuse 153008	Fuse 1	F1, F2, F3	Fuse	3
SM 0805 - gap trimmed	Ferrite	Inductor	FB1, FB2, FB3	Inductor	3
SM 0805 - gap trimmed	MH2029-300Y	Inductor	FB4, FB5, FB6, FB9	Inductor	4
BLM18PG121SN1D	BLM15HG601SN1D	BLM15HG601SN1D	FB7, FB8	BLM15HG601SN1D	2
PIN1	Socket	Socket	FET_TP_1, FET_TP_GND1	Socket	2
S9015E-05-ND	S9015E-05-ND	S9015E-05-ND	JTAG/DEBUG1		1
CIP0530LR3R3	Inductor	Inductor	L1	Inductor	1
HDR1X3	Header 3	Header 3	Logic Source1, SPD1	Header, 3-Pin	2
Molex 0705430003	Molex 0705430003	Molex 0705430003 Alt	M1	Molex 4 Pin Clip Connector	1
MOLEX Endstop	Molex 70543-03	Molex Endstop	MAX1, MIN1		2
Molex 70543-02	Molex 70543-02	Molex 70543-02	P2, T2	Molex 70543-02	2
HDR1X5	Header 5	Header 5	P3	Header, 5-Pin	1
con-phoenix-508	con-phoenix-508	con-phoenix-508	Power Input1		1
Fairchild FDT439N	FDT439N	Fairchild FDT439N	Q1	N-Channel MOSFET	1
J1-0603	Res3	Res3	R1, R7, R9, R10, R13, R14, R21, R23	Resistor	8
J1-0603	0603	Res3	R2, R3, R4, R5, R6, R15, R16, R17, R18, R19, R20, R22, R24, R25, R26, R27, R28, R29, R30, R31, R34, R35	Resistor	22
SM 0805 - gap trimmed	Res3	Res3	R8, R11, R12	Resistor	3
Resistor2512	2512	Res3	R32, R33	Resistor	2
TL3301	Tactile Switch	Tactile Switch	RESET1		1
con-phoenix-508 - 12	con-phoenic-508-12	con-phoenic-508-10_1	T1	con-phoenic-508-12	1
PIN1	TP4	Socket	THM_TP1	Socket	1
MIC24085-AYML	MIC24085	MIC24085	U1		1
TI-DRB8-1750X1500TP_V	TPS73733QDRBRQ1	TPS73733QDRBRQ1	U2, U3	Single Output Automotive LDO, 1 A, Fixed 3.3 V Output, 2.2 to 5.5 V Input, with Reverse Current Protection, 8-pin SON (DRB), -40 to 125 degC, Green (RoHS & no Sb/Br)	2
MAXM-S8+4_N	MAX31855EASA+	MAX31855EASA+	U4	Cold Junction Compensated Thermocouple to Digital Converter, 14 Bits Temperature Resolution, -40 to 125 degC, 8-Pin SOIC (S8+4), Pb-Free	1
LQFP144_N	ATSAM4E16EA-AU	ATML-ATSAM4EXEA-LQFP-144	U5		1
ADuM4160	ADuM4160	ADuM4160	U6	USB Opto Isolator	1
DRV8825	DRV8825	DRV8825	U7	DRV8825 Ti Stepper Driver	1
MKL05Z32VLF4	MKL05Z32VLF4	MKL05Z32VLF4	U8	ARM Cortex M0+	1
	USB-B	USB-B	USB		1
ABS07-32.768KHZ-T	ABS07-32.768KHZ-T	ABS07-32.768KHZ-T	X1	ABS07-32.768KHZ-T RTC Crystal Oscillator	1
R38	445C35A12M00000	XTAL	X2	Crystal Oscillator	1
					173

Approved **Notes**