

EinsyRetro 1.0b UltiMachine 11/08/2017

0.3a Revision Summary (for detailed information goto: <https://github.com/ultimachine/Einsy-Rambo/tree/0.3a>)

- Added TVS and over-voltage protection to select nets
- Added and corrected testpoints
- Added "XTRA0" net between 32U2 and 2560
- Removed via tenting underneath QFNs and other flat solder lug/heatsink primitives
- Added teardrops to vias
- Standardized via sizes to 10/22 and 15/30 (mils)
- New footprint for 5V SMPS inductor (fits two inductors now)
- Added I2C pullup footprints (resistors are "DNI")
- Fan connectors now have a 3rd pin for reading the TACH signal
- Added 100R to the gate of each FET
- Adjusted the stackup to better reflect a standard 4-layer stack

0.4a Revision Summary

- Touchup diode polarity markings in silkscreen
- New footprint for P3
- Moved thermistor TPs to connector pin
- Increased GND stitching
- Increased copper pour coverage
- Updated paste mask apertures on QFNs
- Added nAC_FAULT to pin_6 of Atmega2560
- Added J7, power failure relay input.
- Added R73
- Removed RN4
- Stole RX1 and TX1 from P1, moved to J19
- Combined 2560 ICSP (X18) with pins_9-14 of J19
- Removed J16-J18, X_MAX, Y_MAX, Z_MAX
- Changed X_MIN and Y_MIN endstops to 2-pin headers
- Changed Z_MIN endstop to Z_PROBE, 4-pin header
- Combined DIAG_0 and DIAG_1 on TMC2130 drivers
- TP40 moved 0.1" to the left
- TP32 moved 0.1" to the left

0.5a Revision Summary

- Added ferrites to motor controller outputs.
- Removed fuse and input filter for VMOT
- Move MOSFET pulldown resistors to input side of AND gates
- Added ferrites to all P1 and P2 signals.
- Changed RN1 and RN2 from 10k to 5.6k (increases voltage on motor controller Vref pins)
- Changed motor controller low-side I-sense resistors from 0.1 to 0.22Ohm
- Voltage regulator U3 is now sourced from VMOT (was +12V2)
- Added power bypass capacitors to J7 and J15
- +12V2(Logic) and +12V3(Bed) now have micro-controller ADC based voltage monitoring.
- Added 2 internal layers (now 6 layers total)
- Added filtered internal island for micro-controller Vcc
- Most bottom layer routing (Layer 6) was moved to the new adjacent internal layer (Layer 5)
- Moved MOSFET pulldowns R43 and R57 upstream from FETs and placed at input of AND gate.
- New pinout for J19 header.
- Motor connectors are now flush with the bottom edge of the board.

1.0a Revision Summary

- Populate FGND to GND resistor ties
- Changed motor drive sense resistors from 0.22R to 0.12R
- Added a 5V buck controller for more current and future flexibility
- Fan power is derived from 12V2 rail
- Hardware SPI nSS signal moved back to P2
- UART1 TX and RX moved back to P1

1.0b Revision Summary

- Added 3-state buffer between SD_MISO_3V3 and MISO_5V0

1.0c Revision Summary

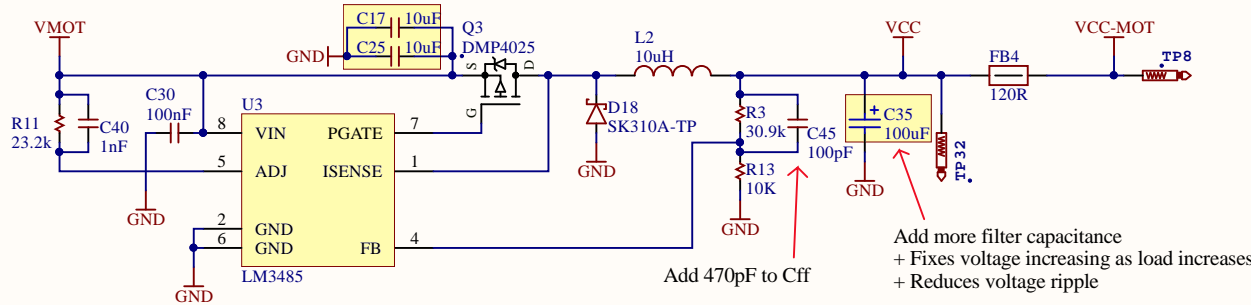
- Added 100nF capacitors to endstop power pins

Notes:

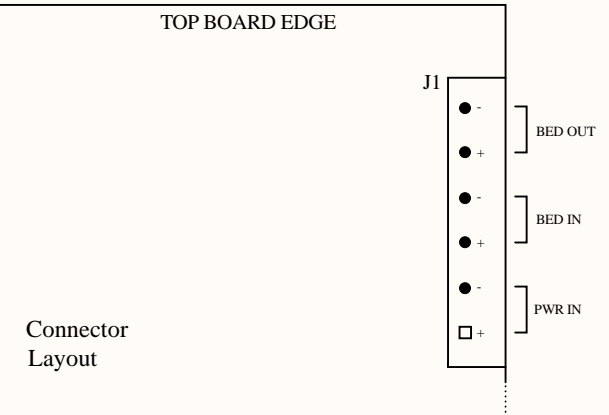
DNI = Do Not Include = No Populate

Project: EinsyRetro	Ver: 1.0 c
Title: Title Page	File: Title.SchDoc
Drawn by: UltiMachine	Sheet: 1 of 11

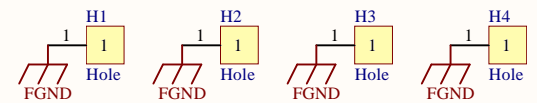
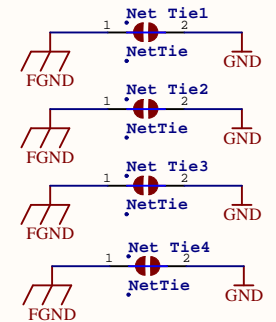
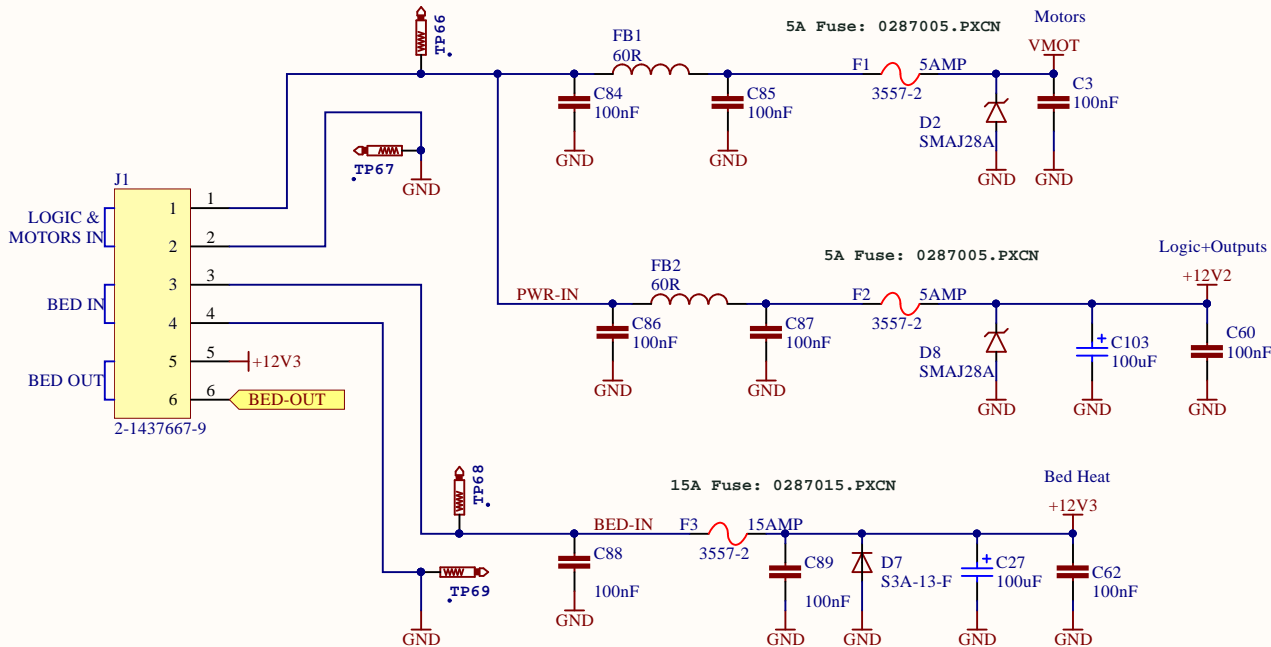
Voltage Regulator



TOP BOARD EDGE

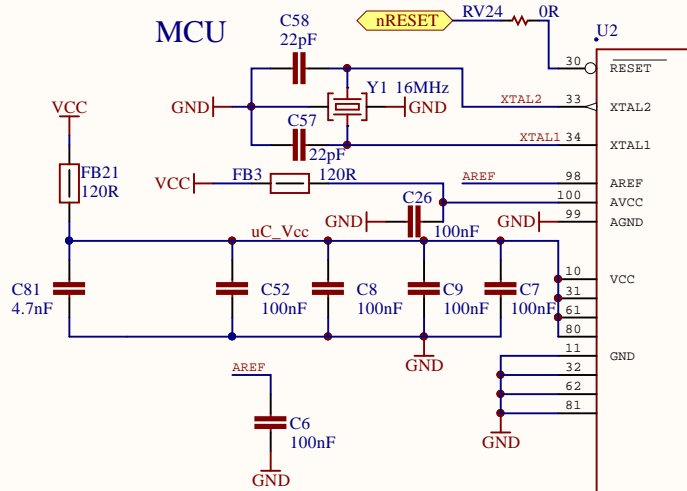


Power Input

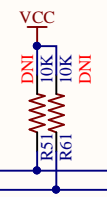


Project: EinsyRetro	Ver: 1.0 c
Title: Power-SMPS	File: Power-SMPS.SchDoc
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MCU

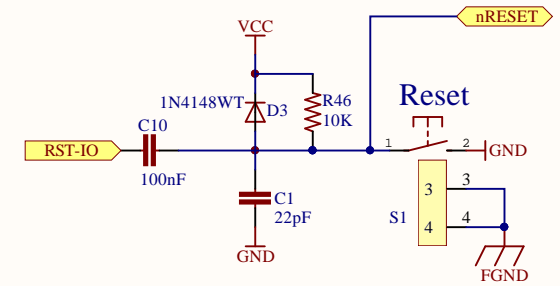


Part Pin#	Arduino Pin#	Component
(AD7) PA7	71 29	X-EN
(AD6) PA6	72 28	Y-EN
(AD5) PA5	73 27	Z-EN
(AD4) PA4	74 26	E0-EN
(AD3) PA3	75 25	
(AD2) PA2	76 24	
(AD1) PA1	77 23	
(AD0) PA0	78 22	
(OC0A/OC1C/PCINT7) PB7	26 pwm 13	ACTIVE
(OC1B/PCINT6) PB6	25 pwm 12	
(OC1A/PCINT5) PB5	24 pwm 11	
(OC2A/PCINT4) PB4	23 pwm 10	
(MISO/PCINT3) PB3	22 50	
(MOSI/PCINT2) PB2	21 51 R27	22R RV8
(SCK/PCINT1) PB1	20 52 R20	22R RV18
(SS/PCINT0) PB0	19 53 R34	22R
(A15) PC7	60 30	
(A14) PC6	59 31	
(A13) PC5	58 32	PC5
(A12) PC4	57 33	
(A11) PC3	56 34	E0-STEP
(A10) PC2	55 35	Z-STEP
(A9) PC1	54 36	Y-STEP
(A8) PC0	53 37	X-STEP
(T0) PD7	50 38	
(T1) PD6	49 83	XTRA_0
(XCK1) PD5	48 82	PD5
(ICP1) PD4	47 81	X_MAX
(TXD1/INT3) PD3	46 18	TX1
(RXD1/INT2) PD2	45 19	RX1
(SDA/INT1) PD1	44 20	
(SCL/INT0) PD0	43 21	SDA SCL
(CLKO/ICP3/INT7) PE7	9 80	TACH_1
(T3/INT6) PE6	8 79	TACH_0
(OC3C/INT5) PE5	7 pwm 3	HEAT-0
(OC3B/INT4) PE4	6 pwm 2	
(OC3A/AIN1) PE3	5 pwm 5	
(XCK0/AIN0) PE2	4 78	
(TXD0) PE1	3 1	TX0
(RXD0/PCIN8) PE0	2 0	RX0
(ADC7/TDI) PF7	90 A7	PF7
(ADC6/TDO) PF6	91 A6	PF6
(ADC5/TMS) PF5	92 A5	PF5
(ADC4/TCK) PF4	93 A4	
(ADC3) PF3	94 A3	Y_MAX
(ADC2) PF2	95 A2	THERM2
(ADC1) PF1	96 A1	THERM1
(ADC0) PF0	97 A0	THERM0
(OC0B) PG5	1 pwm 4	BED-HEAT
(TOSC1) PG4	29 70	PG4
(TOSC2) PG3	28 71	PG3
(ALE) PG2	70 39	Y_nCS
(RD) PG1	52 40	
(WR) PG0	51 41	X_nCS



42 42	PL7
43 41	PL6
44 40	PL5 (OC5C)
45 39	PL4 (OC5B)
46 38	PL3 (OC5A)
47 37	PL2 (T5)
48 36	PL1 (ICP5)
49 35	PL0 (ICP4)
A15 82	PK7 (ADC15/PCINT23)
A14 83	PK6 (ADC14/PCINT22)
A13 84	PK5 (ADC13/PCINT21)
A12 85	PK4 (ADC12/PCINT20)
E0_nCS A11 86	PK3 (ADC11/PCINT19)
E0_DIAG A10 87	PK2 (ADC10/PCINT18)
A9 88	PK1 (ADC9/PCINT17)
A8 89	PK0 (ADC8/PCINT16)
74 79	PJ7
77 69	PJ6 (PCINT15)
76 68	PJ5 (PCINT14)
75 67	PJ4 (PCINT13)
73 66	PJ3 (PCINT12)
72 65	PJ2 (XCK3/PCINT11)
14 64	PJ1 (TXD3/PCINT10)
15 63	PJ0 (RXD3/PCINT9)
85 27	PH7 (T4)
9 18	PH6 (OC2B)
8 17	PH5 (OC4C)
7 16	PH4 (OC4B)
6 15	PH3 (OC4A)
84 14	PH2 (XCK2)
17 13	PH1 (TXD2)
16 12	PH0 (RXD2)

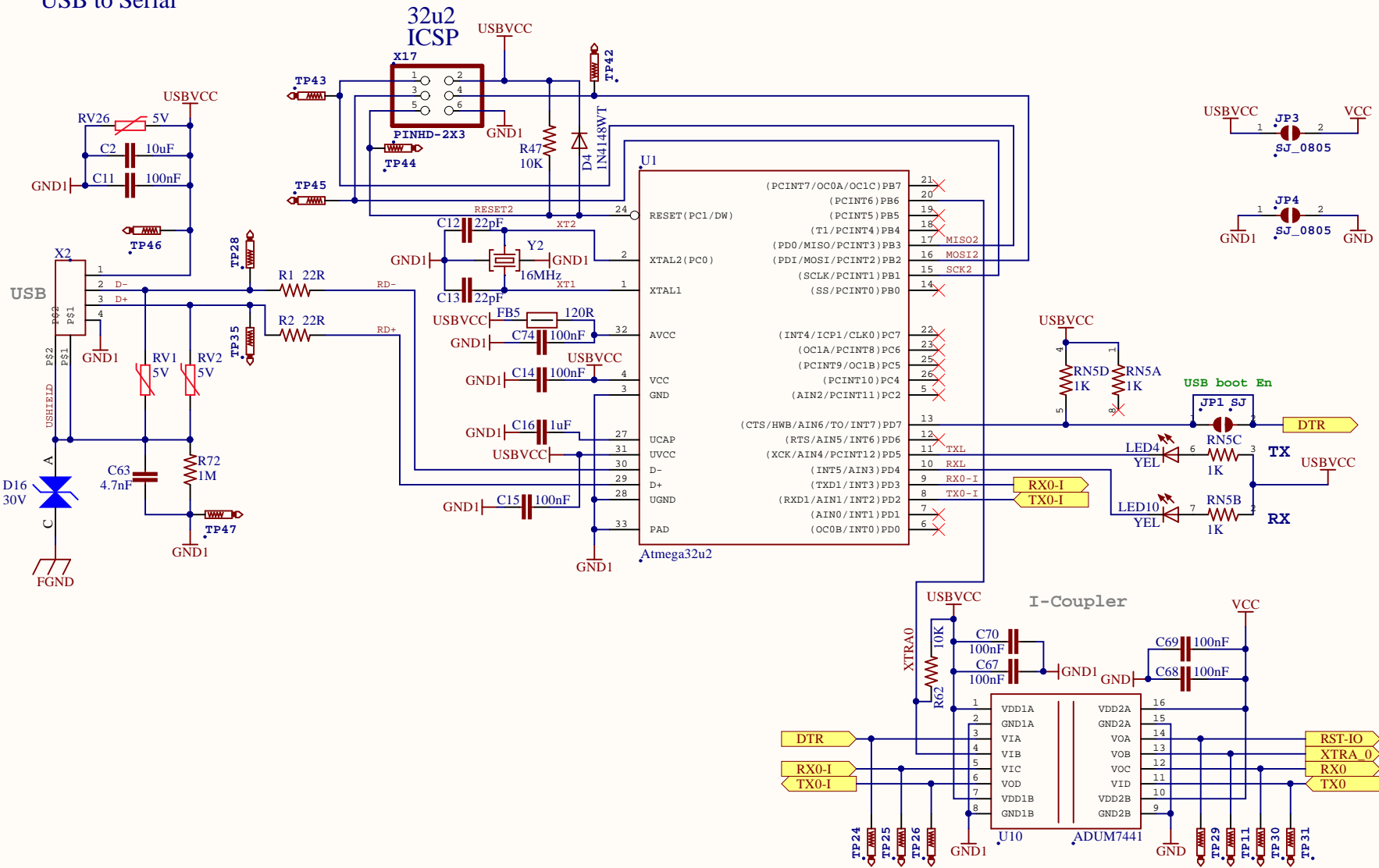
Atmega2560



Project: EinsyRetro	Ver: 1.0 c
Title: MCU	File: MCU.SchDoc
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Atmega 32u2 USB

USB to Serial



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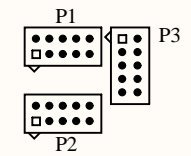


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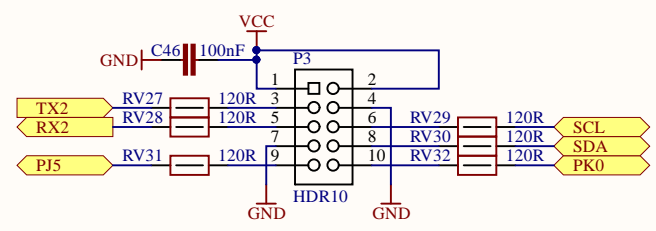
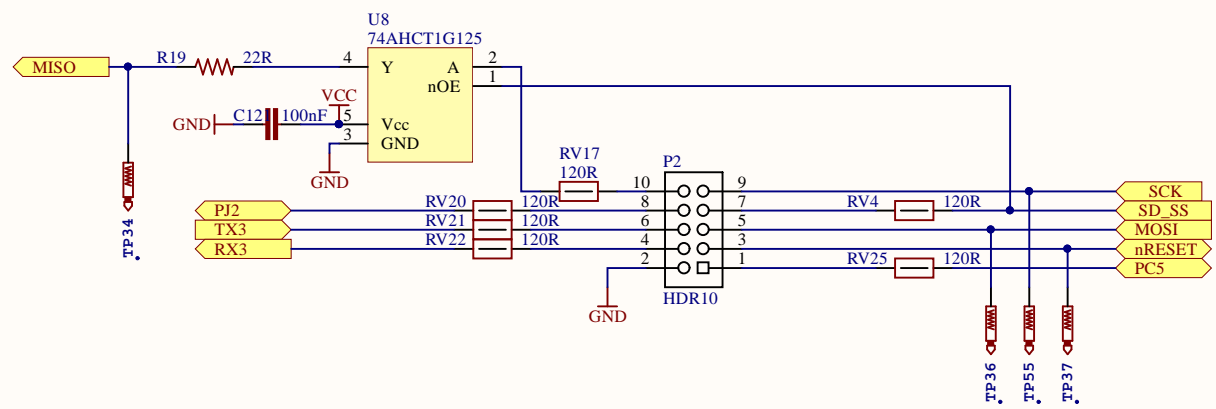
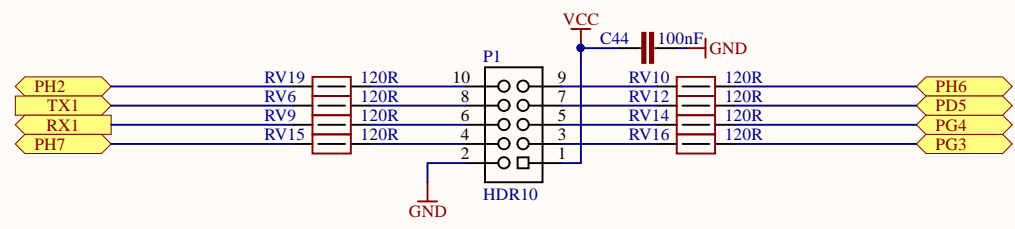
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Expansion Connectors

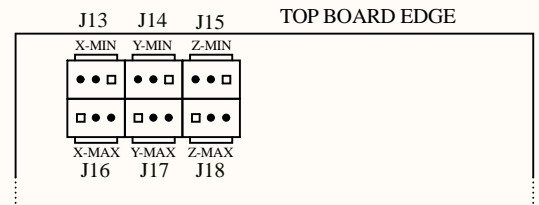
TOP BOARD EDGE



Connector Layout

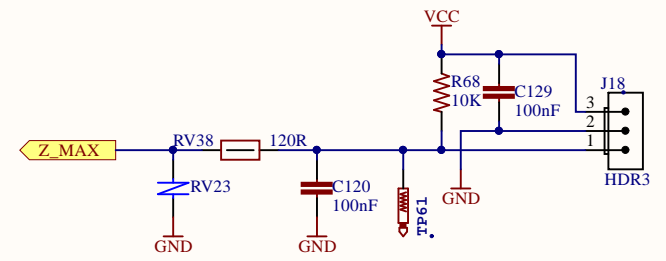
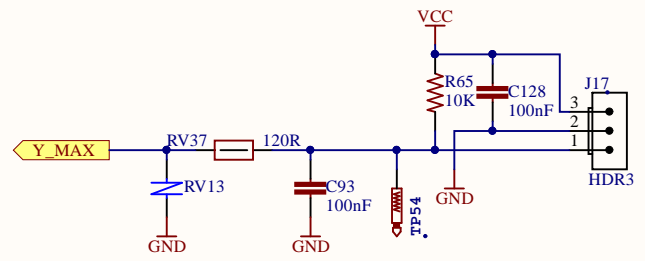
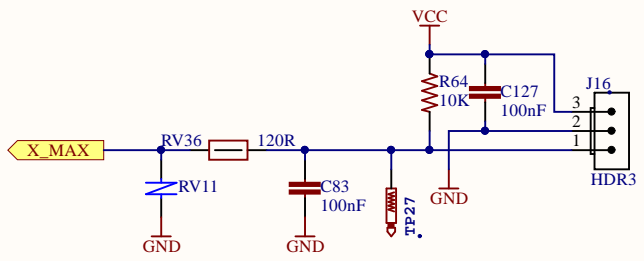
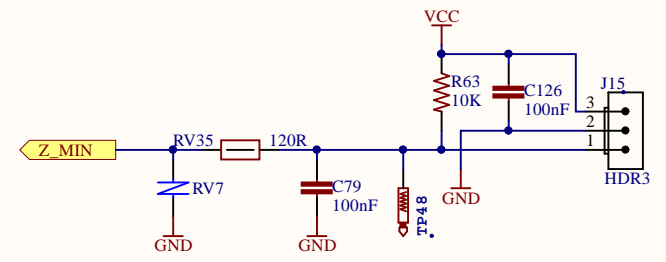
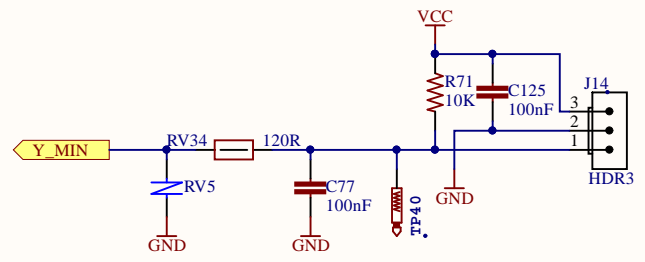
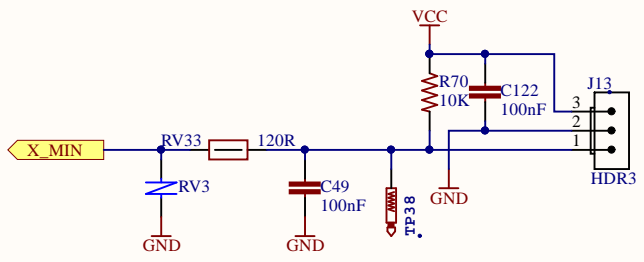


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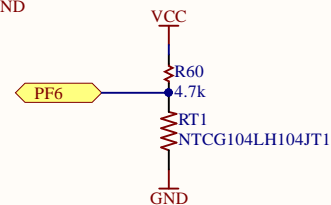
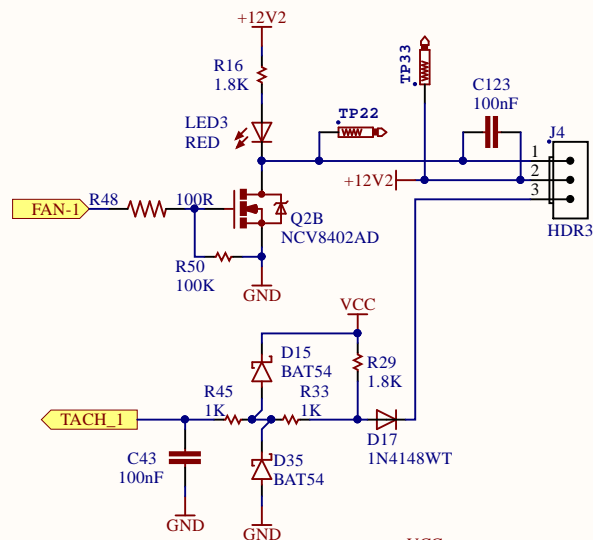
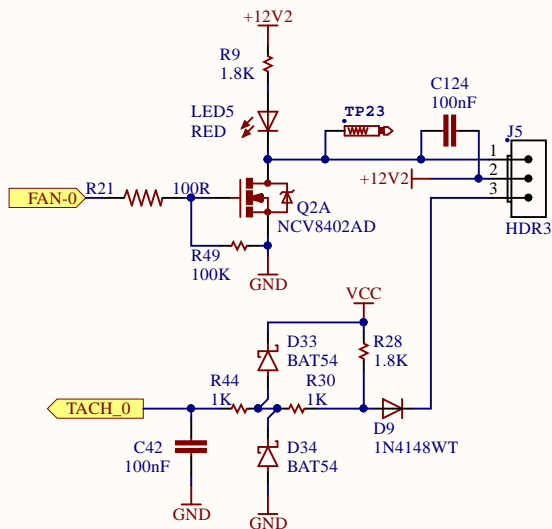
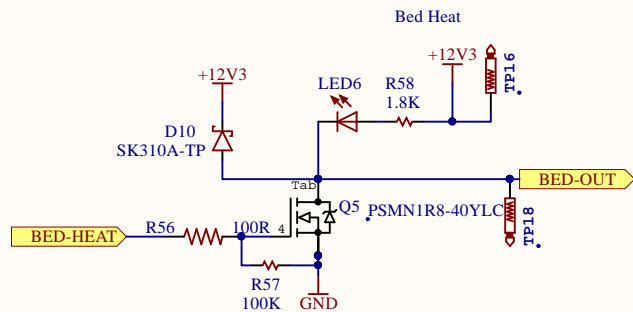
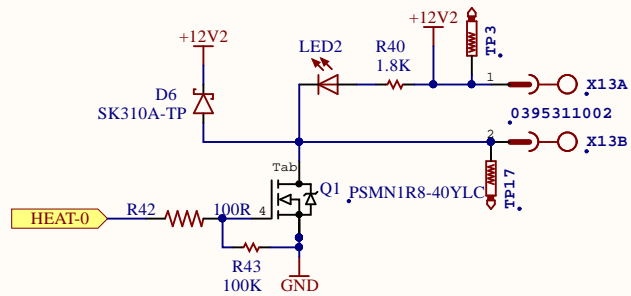
Connector Layout

End Stops

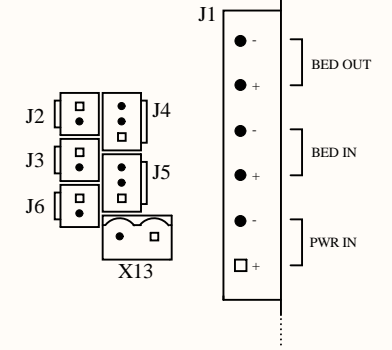


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Heater Outputs

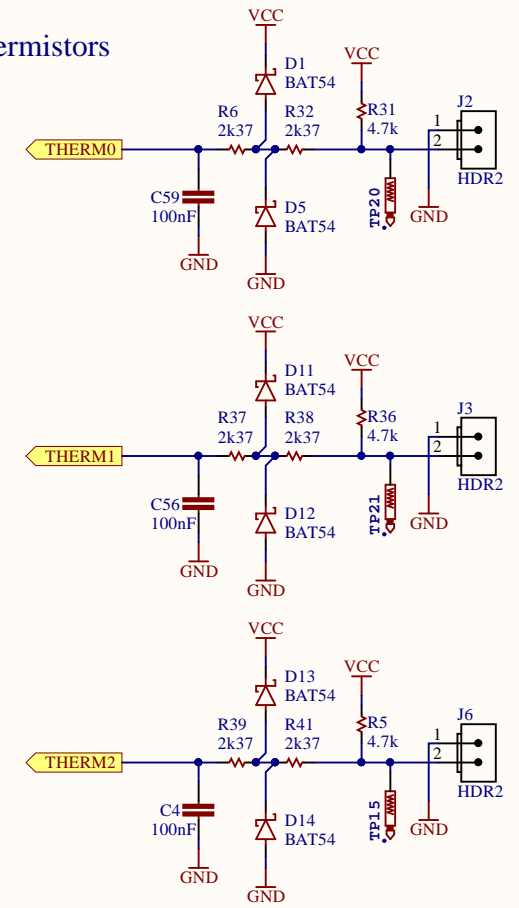


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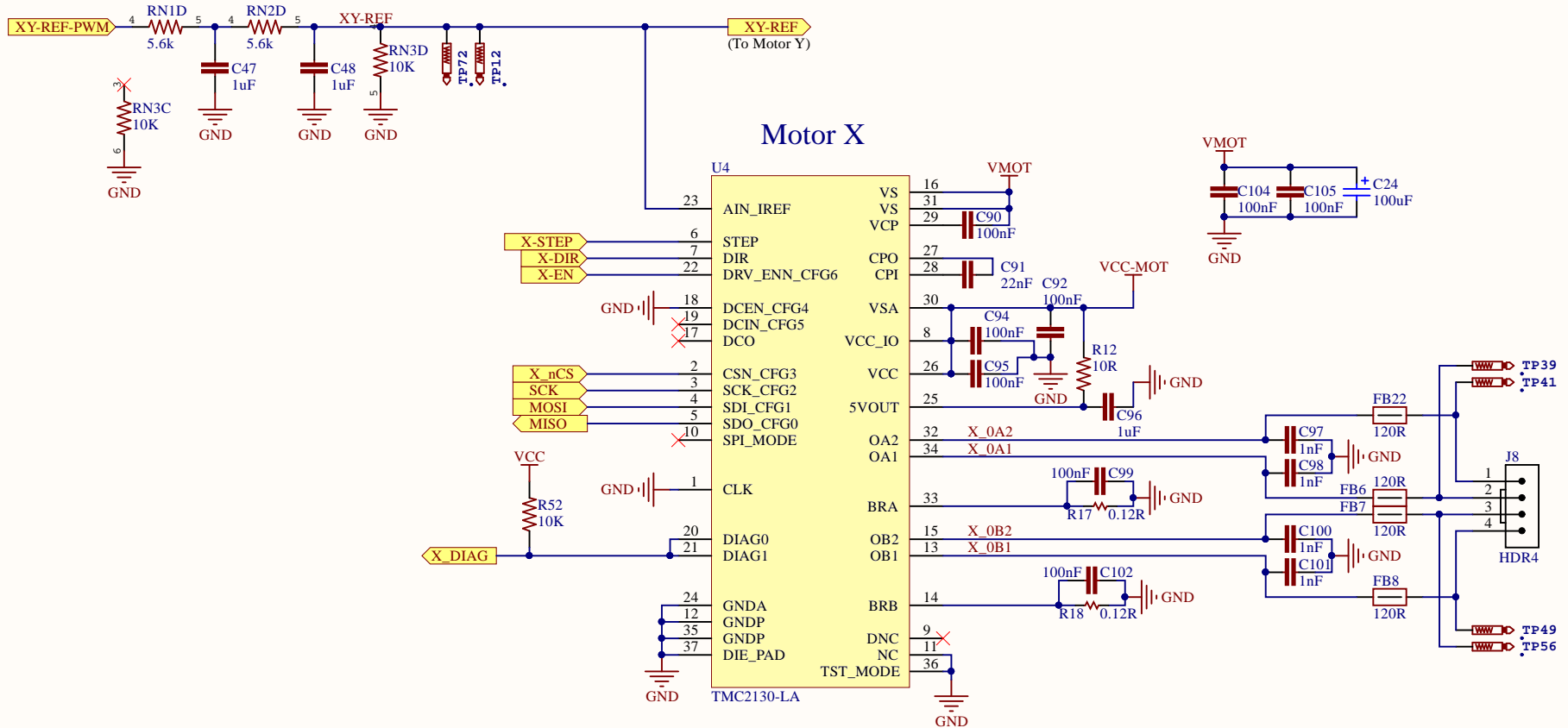
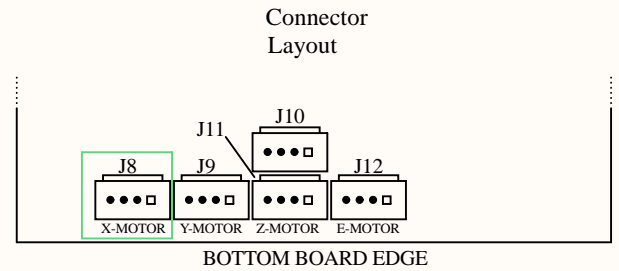


Connector
Layout

Thermistors



Project: EinsyRetro	Ver: 1.0 c
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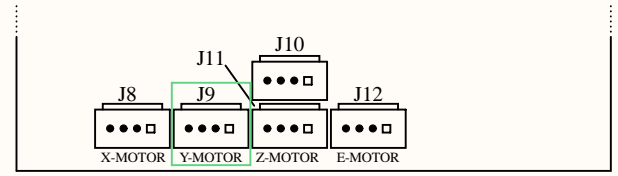


Deprecated Test Points

X_OA1	TP75
X_OA2	TP73
X_OB1	TP1
X_OB2	TP74

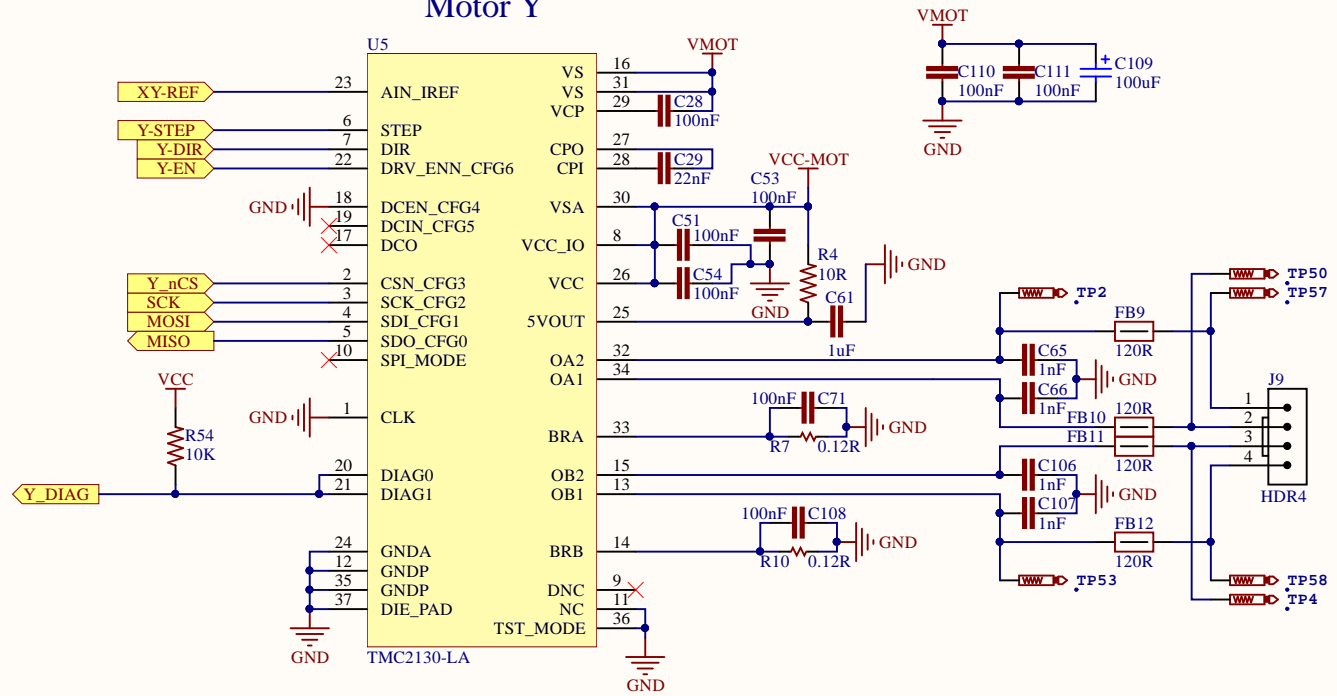
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Connector Layout

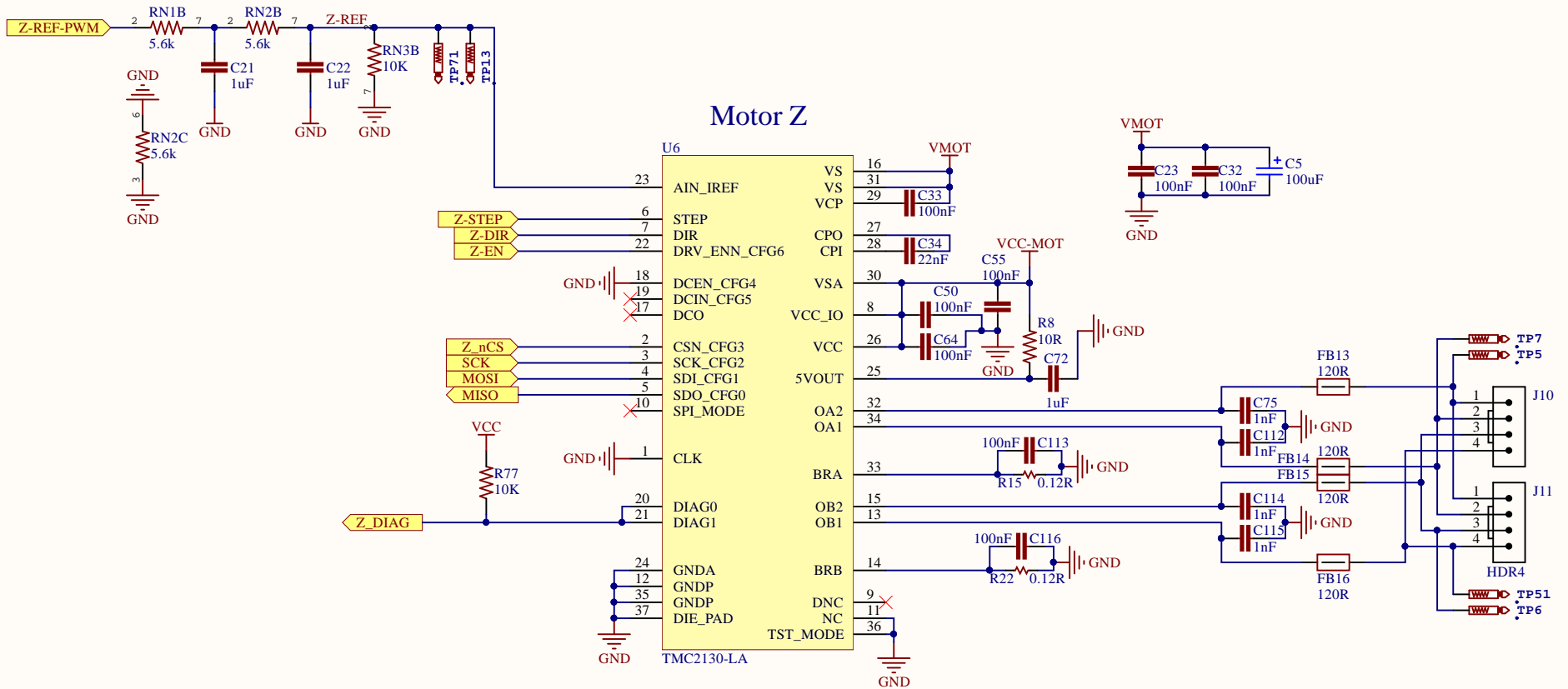
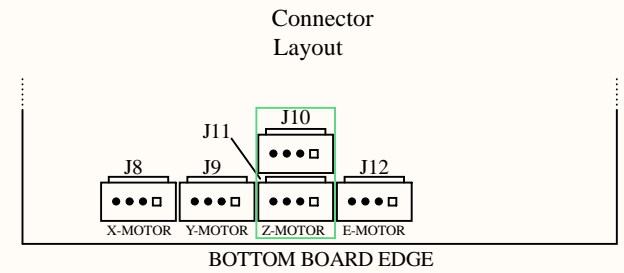


BOTTOM BOARD EDGE

Motor Y

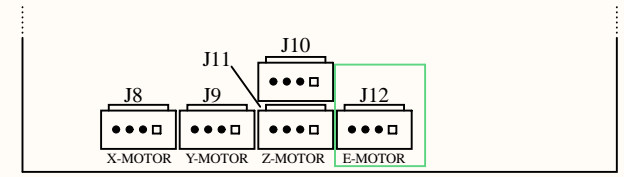


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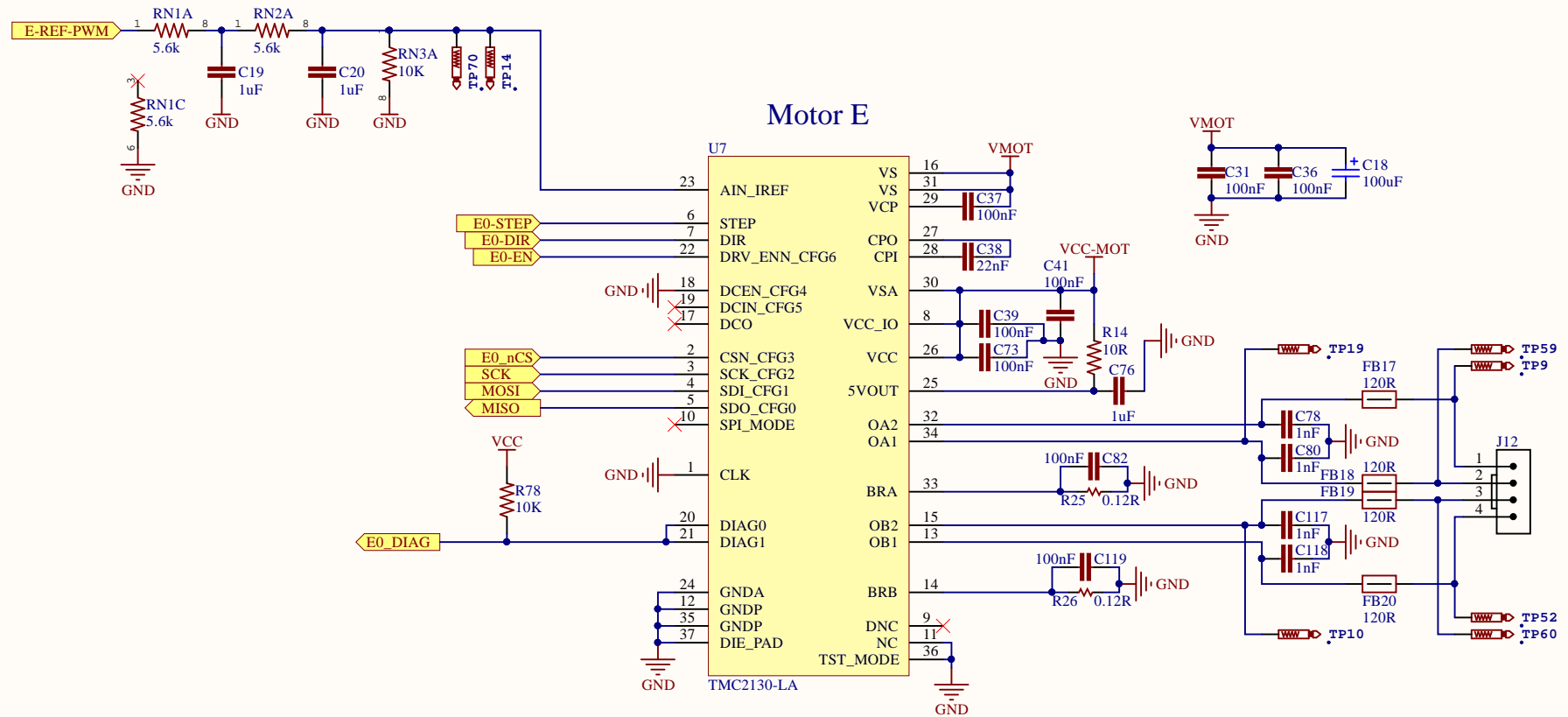


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Title: Motor-Z	File: Motor-Z.SchDoc
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Connector
Layout



BOTTOM BOARD EDGE



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