

A

B

C

D

A

B

C

D

Einsy Rambo 1.1a
UltiMachine
9/18/2017

0.3a Revision Summary (for detailed infomation 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

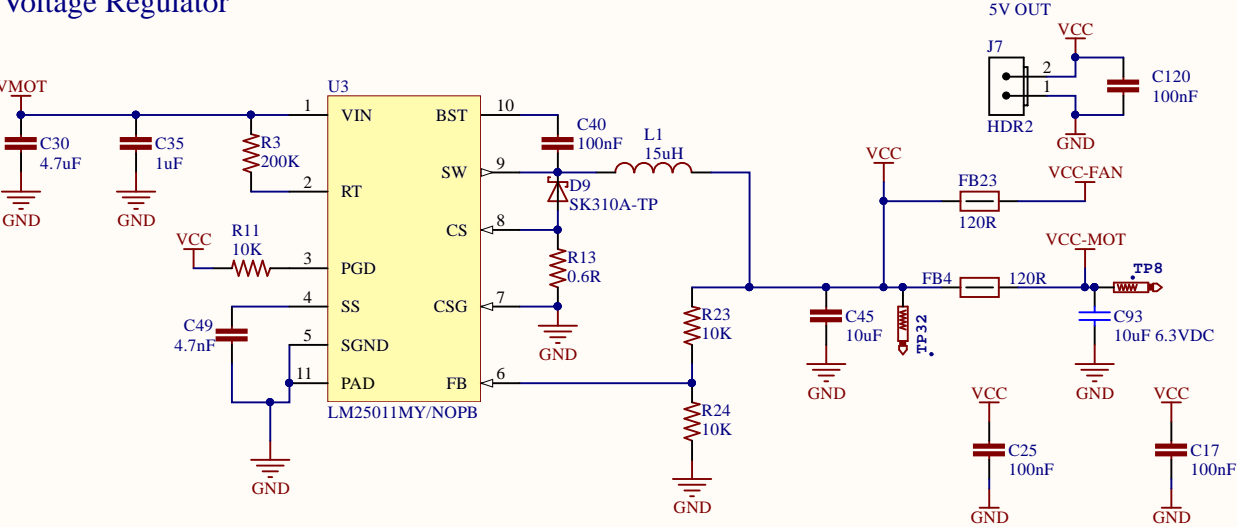
1.1a Revision Summary

- Added 2Mb serial flash
- Added voltage translators for serial flash
- Added tri-state buffer to block 3.3V MISO on the SD Card from the 5V MISO bus
- Added barrel-relief to bottom side of thermal vias for TMC2130, FETs and SMPS
- Added 3.3V LDO for serial flash

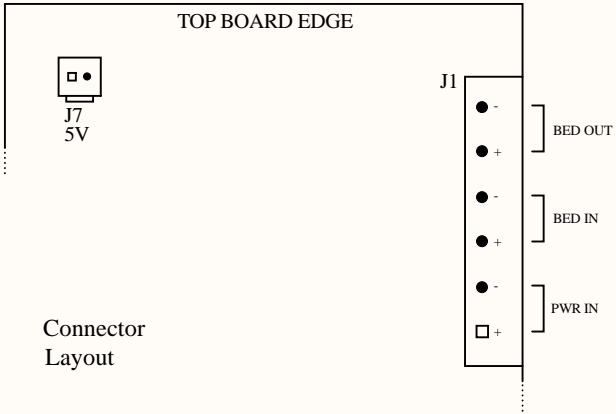
Notes:
DNI = Do Not Include = No Populate

Project: Einsy Rambo	Ver: 1.1 a	Cannot open file
Title: *	File: Title.SchDoc	C:\Users\Aaron\Documents\Libs
Drawn by: AWS	Sheet: 1 of 11	\Sch Template UMLogo\logo_

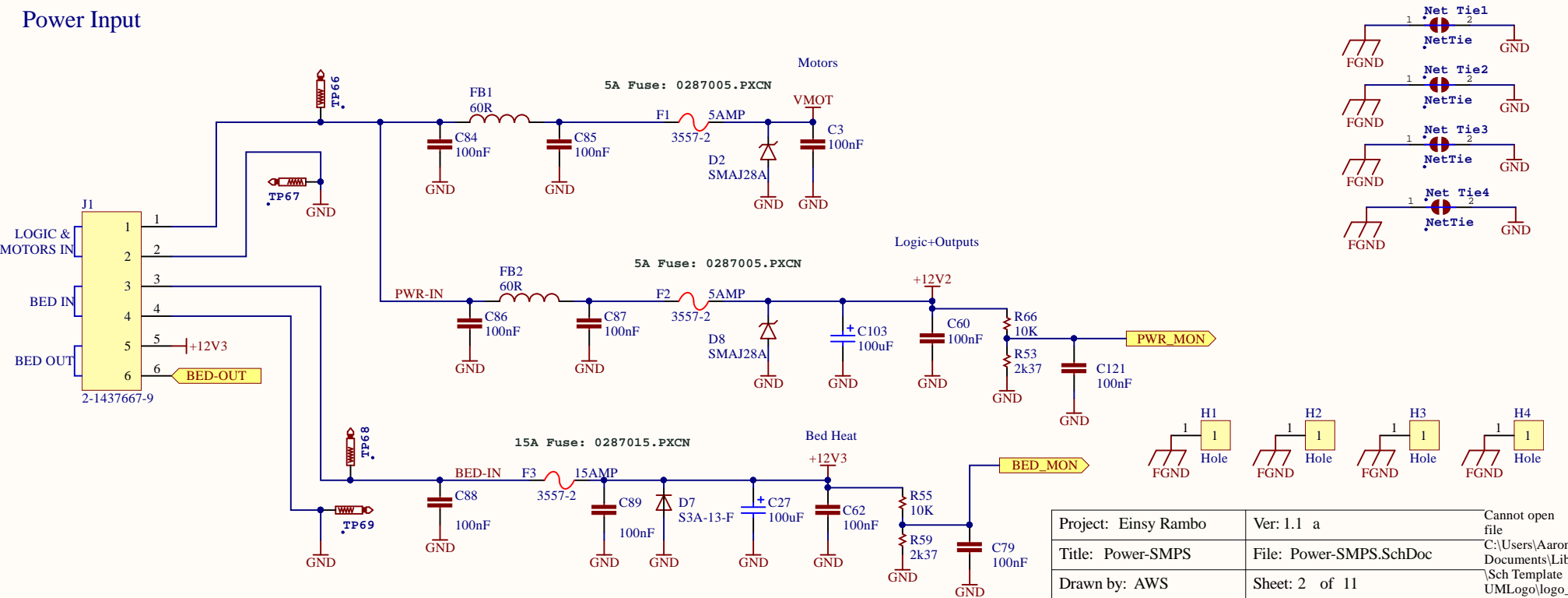
Voltage Regulator



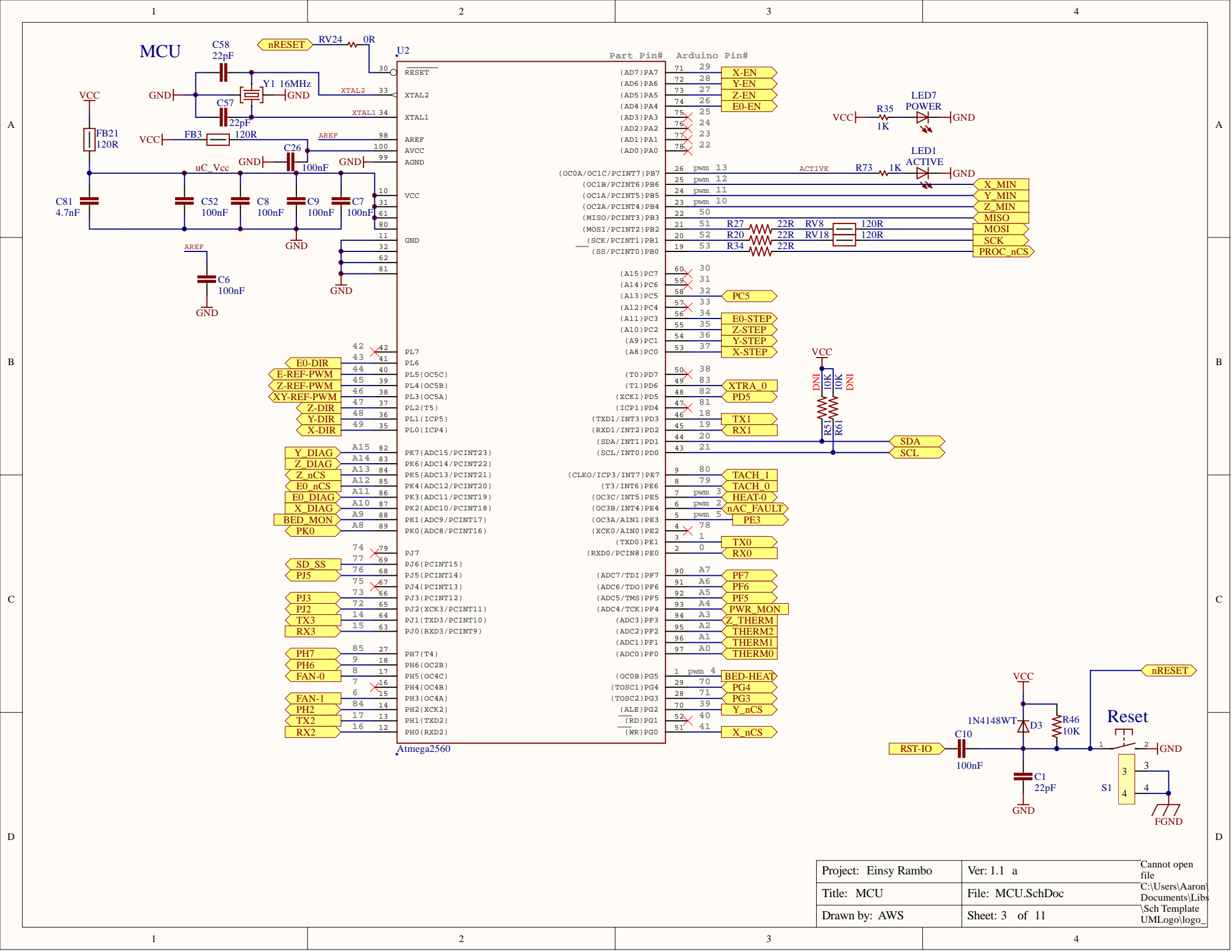
TOP BOARD EDGE



Power Input

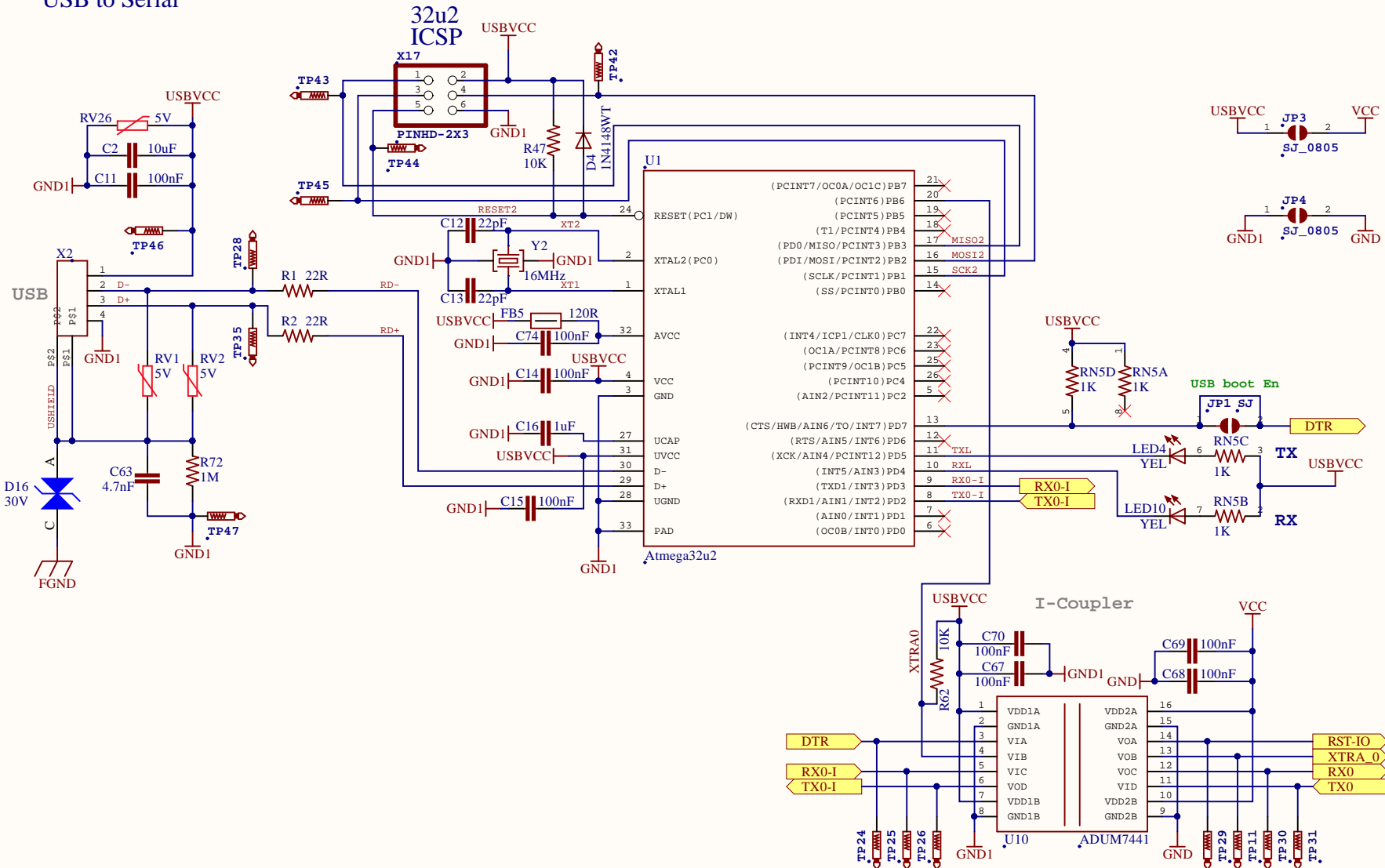


Project: Einsy Rambo	Ver: 1.1 a	Cannot open file
Title: Power-SMPS	File: Power-SMPS.SchDoc	C:\Users\Aaron\Documents\Libs
Drawn by: AWS	Sheet: 2 of 11	\Sch Template UMLogo\logo



Atmega 32u2 USB

USB to Serial



Reference Designs ARE PROVIDED "AS IS" AND "WITH ALL FAULTS". We DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, REGARDING PRODUCTS, INCLUDING BUT NOT LIMITED TO, ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

We may make changes to specifications and product descriptions at any time, without notice. The Customer must not rely on the absence or characteristics of any features or instructions marked "reserved" or

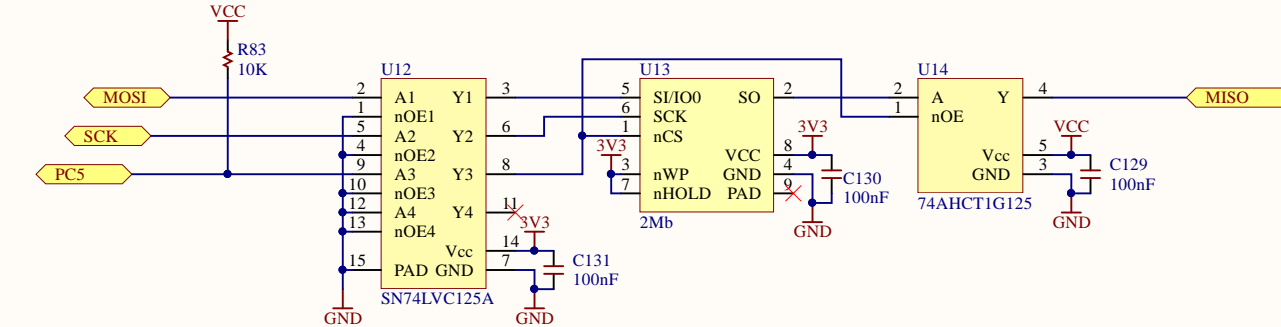
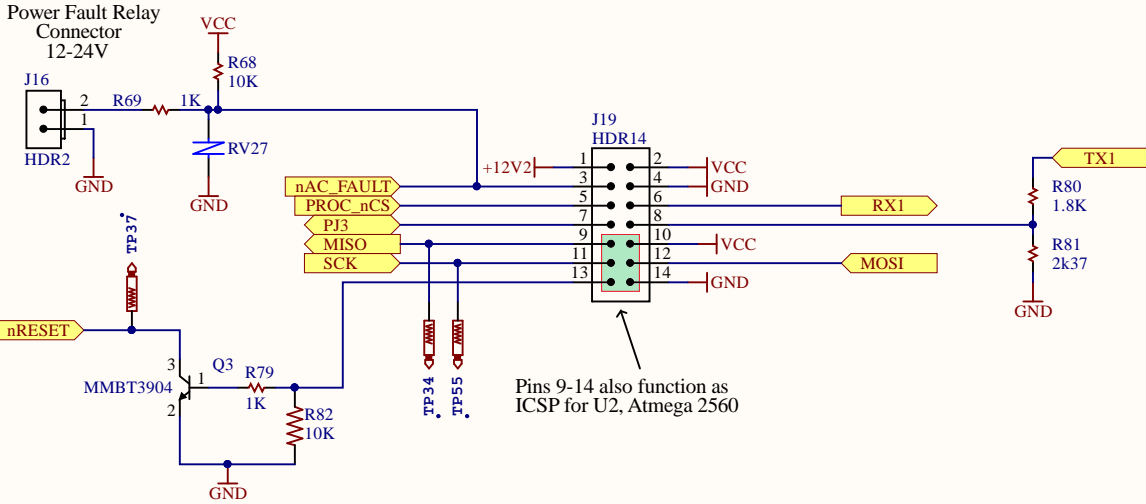
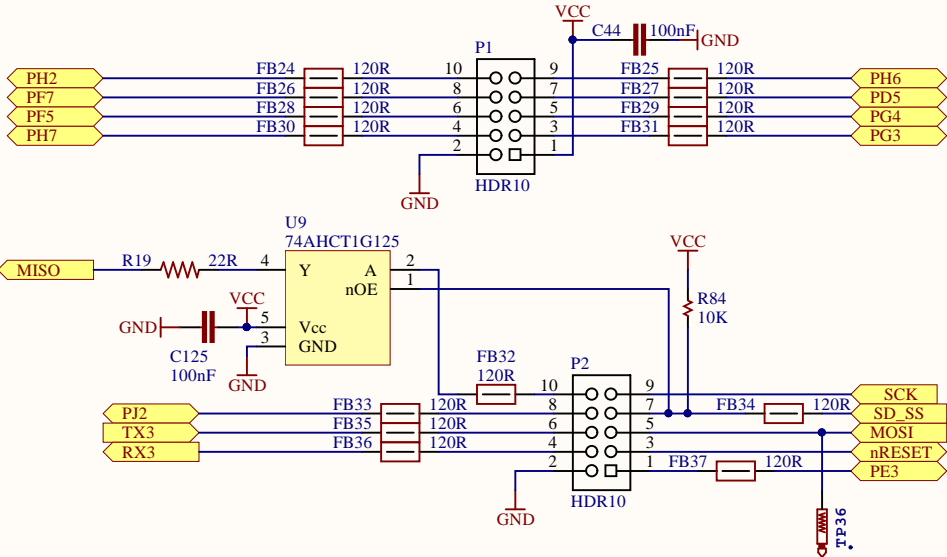
"undefined." We reserve these for future definition and shall have no responsibility whatsoever for conflicts or incompatibilities arising from future changes to them. The product information on the Web Site or Materials is subject to change without notice. Do not finalize a design with this information.



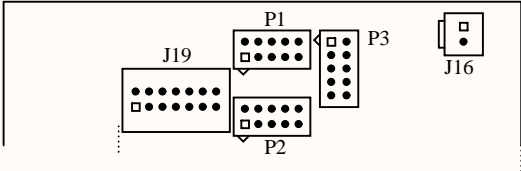
Open Source Hardware
Copyright 2017 - UltiMachine

Project: Einsy Rambo	Ver: 1.1 a	Cannot open file
Title: USB-Serial	File: USB-Serial.SchDoc	C:\Users\Aaron\Documents\Libs
Drawn by: AWS	Sheet: 4 of 11	\Sch Template UMLogo\logo_

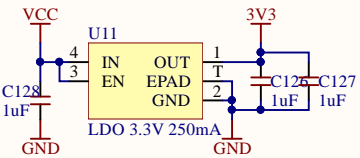
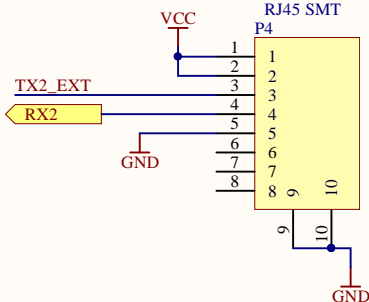
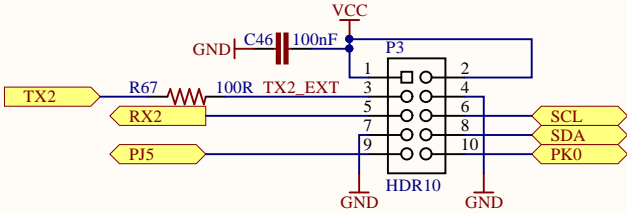
Expansion Connectors



TOP BOARD EDGE

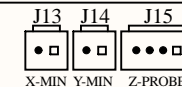


Connector Layout



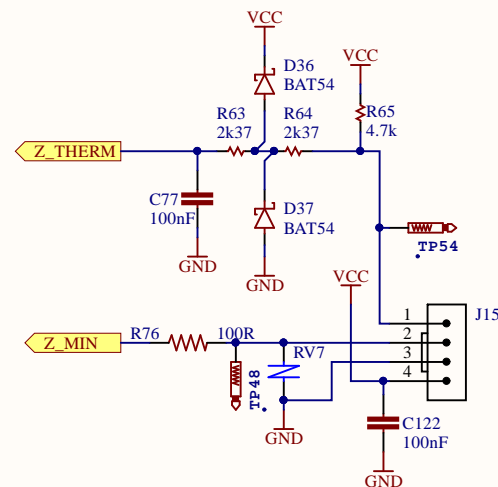
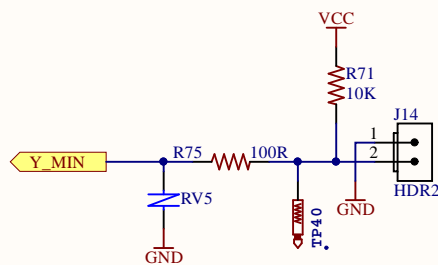
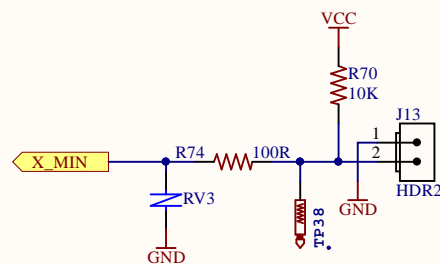
Project: Einsy Rambo	Ver: 1.1 a	Cannot open file
Title: Connectors	File: Connectors.SchDoc	C:\Users\Aaron\Documents\Libs
Drawn by: AWS	Sheet: 5 of 11	\Sch Template UMLogo\logo

TOP BOARD EDGE



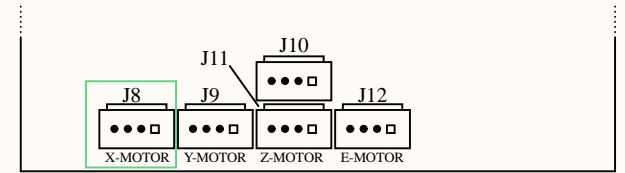
Connector
Layout

End Stops



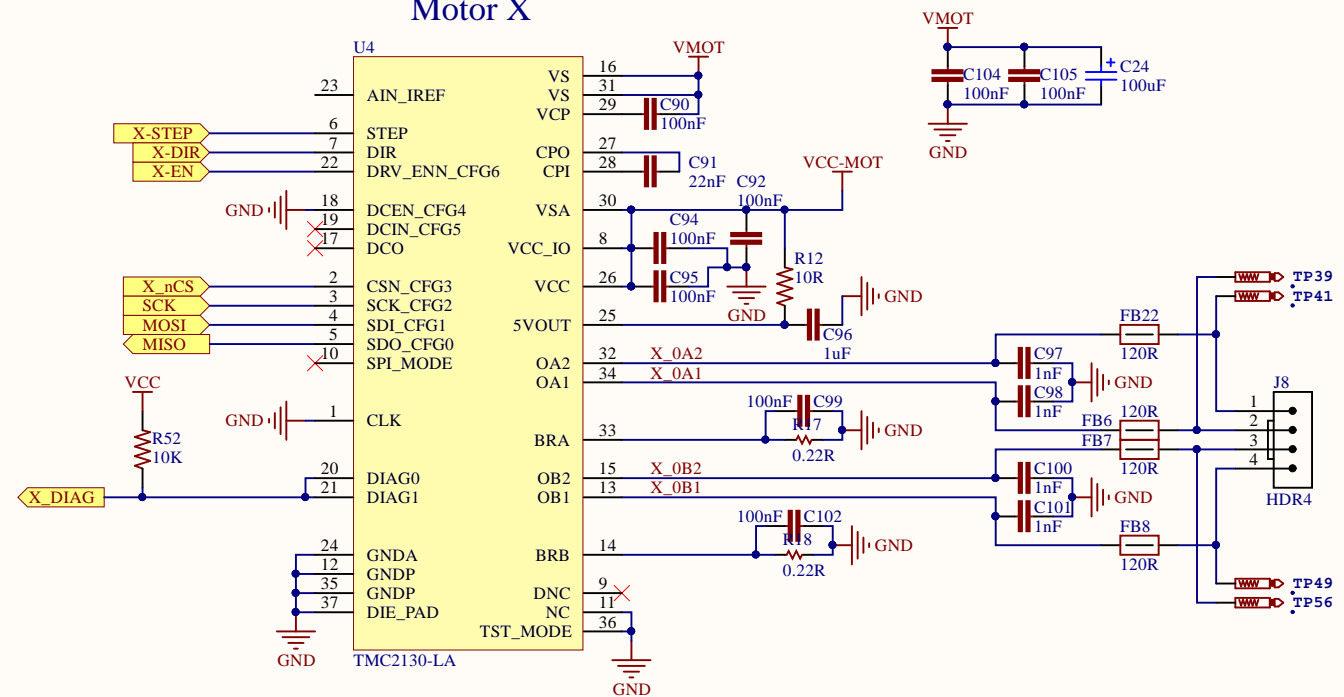
Project: Einsy Rambo	Ver: 1.1 a	Cannot open file
Title: Endstops	File: Endstops.SchDoc	C:\Users\Aaron\Documents\Libs
Drawn by: AWS	Sheet: 6 of 11	\Sch Template UMLogo\logo_

Connector
Layout

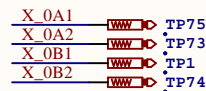


BOTTOM BOARD EDGE

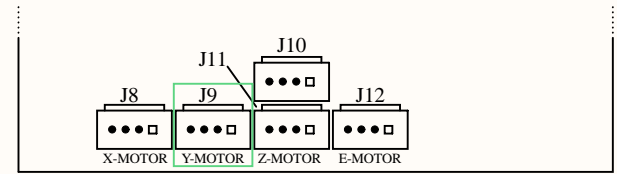
Motor X



Deprecated Test Points

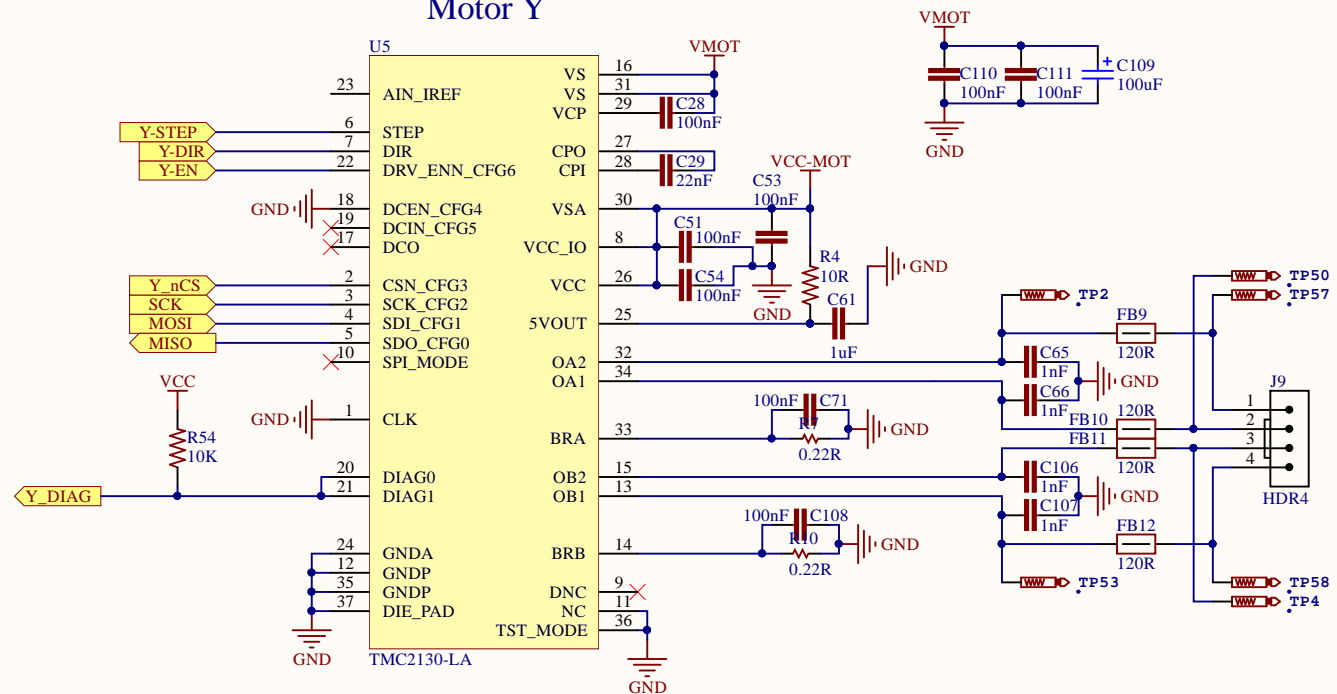


Project: Einsy Rambo	Ver: 1.1 a	Cannot open file
Title: Motor-X	File: Motor-X.SchDoc	C:\Users\Aaron\Documents\Libs
Drawn by: AWS	Sheet: 8 of 11	\Sch Template UMLogo\logo_

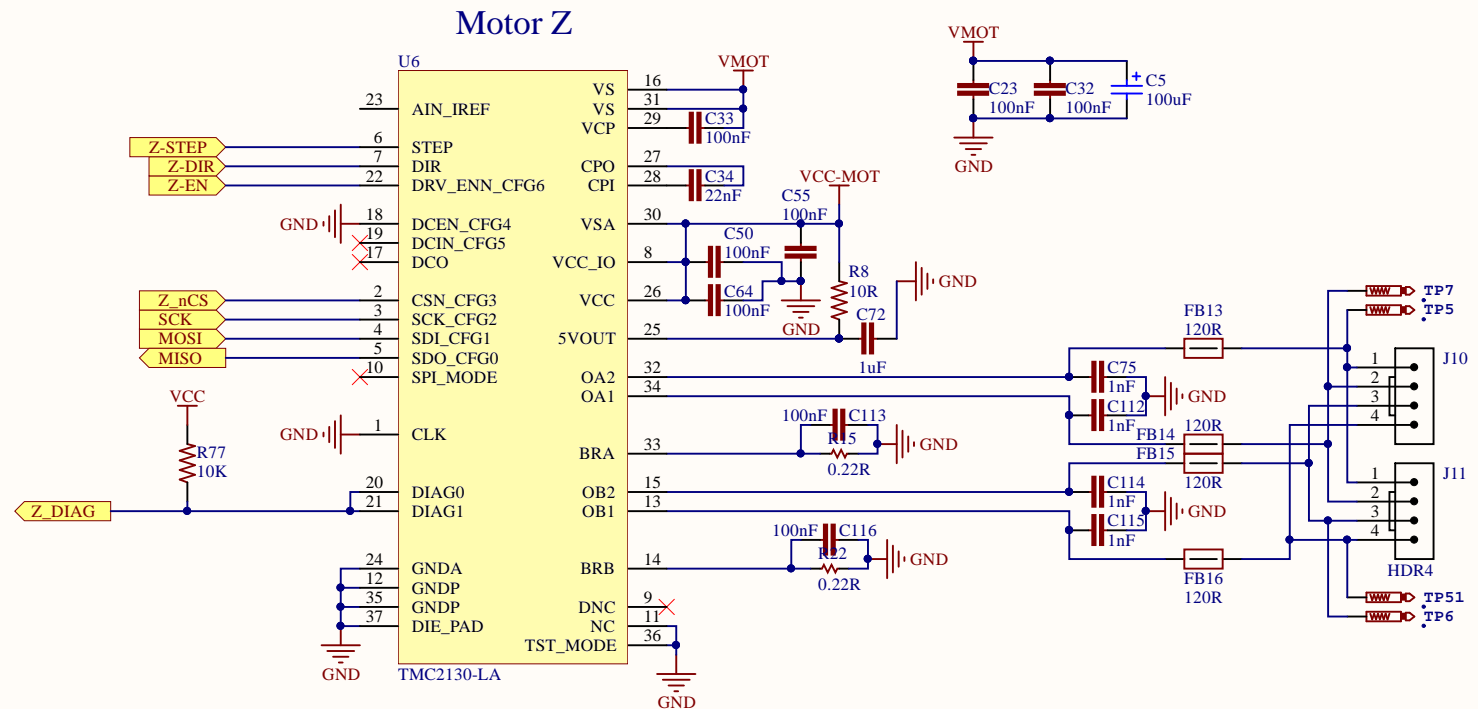
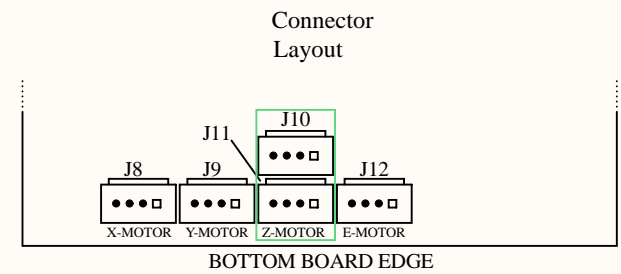
Connector
Layout

BOTTOM BOARD EDGE

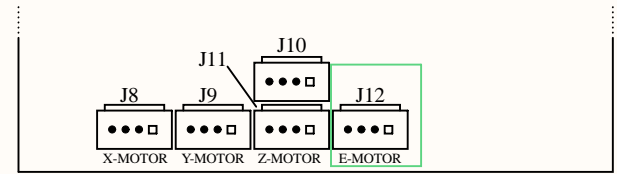
Motor Y



Project: Einsy Rambo	Ver: 1.1 a	Cannot open file
Title: Motor-Y	File: Motor-Y.SchDoc	C:\Users\Aaron\Documents\Libs
Drawn by: AWS	Sheet: 9 of 11	\Sch Template UMLogo\logo_



Project: Einsy Rambo	Ver: 1.1 a	Cannot open file
Title: Motor-Z	File: Motor-Z.SchDoc	C:\Users\Aaron\Documents\Libs
Drawn by: AWS	Sheet: 10 of 11	\Sch Template UMLogo\logo_

Connector
Layout

Motor E

