

CORE 64 INTERACTIVE CORE MEMORY BADGE V0.3 DUAL BOARD

Sheet: Power

File: Interactive Core Memory Badge (Logic) Power v0.3.sch

Sheet: IO Expansion

File: Interactive Core Memory Badge (Logic) IO Expansion V0.3.sch

Sheet: Core Array Driver

File: Interactive Core Memory Badge (Logic) Driver v0.3.sch

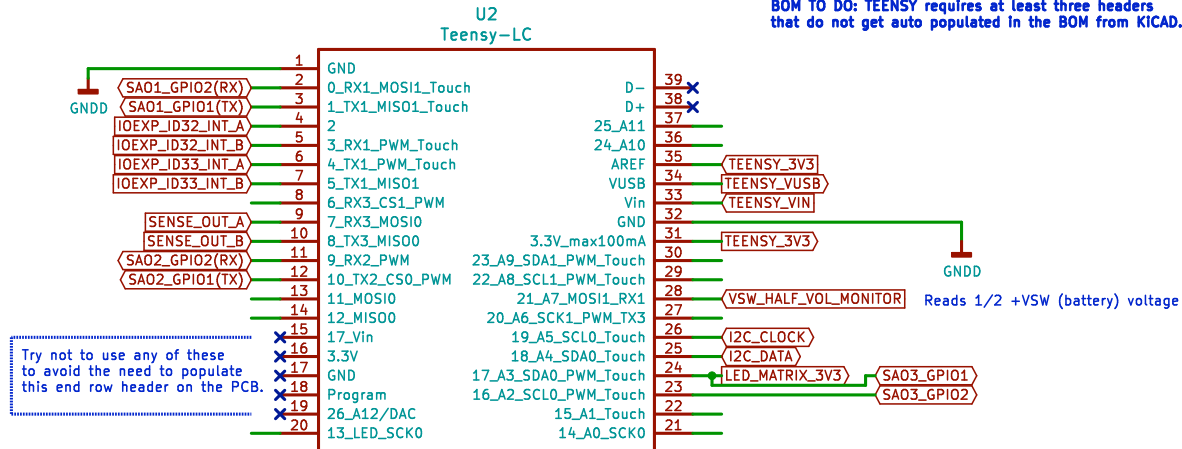
Sheet: SENSE

File: Interactive Core Memory Badge (Logic) Sense v0.3.sch

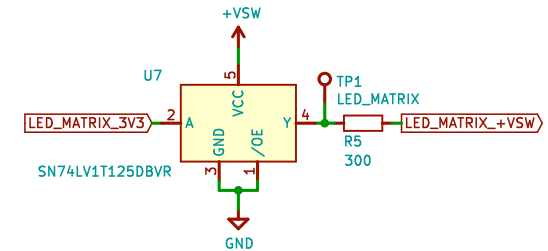
TEENSY MCU CONNECTIONS

Teensy LC has incoming USB power/programming on board.
*** CUT THE USB-VIN bridge. ***

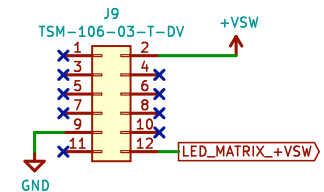
BOM TO DO: TEENSY requires at least three headers that do not get auto populated in the BOM from KICAD.



LED ARRAY DRIVE LEVEL SHIFT



PARTIAL RASPI HEADER FOR LED ARRAY



I2C ADDRESS TABLE

Required

IO EXPANDER 1: 32 decimal, 0x20
IO EXPANDER 2: 33 decimal, 0x21
HALL SENSOR 1: 48 decimal, 0x30
HALL SENSOR 2: 49 decimal, 0x31
HALL SENSOR 3: 50 decimal, 0x32
HALL SENSOR 4: 51 decimal, 0x33
EEPROM ID: 160 decimal, 0xA0

Optional

OLED: 60 decimal, 0x3C

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Sheet: /

File: Interactive Core Memory Badge (Logic) Main v0.3.sch

Title: Core 64 – Main Sheet Index

Size: A4

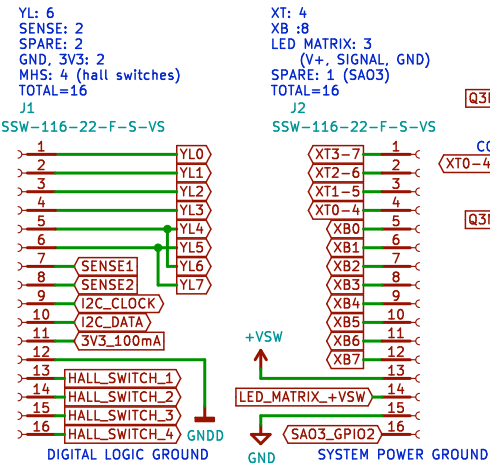
Date: 2020-03-20

Rev: 0.3

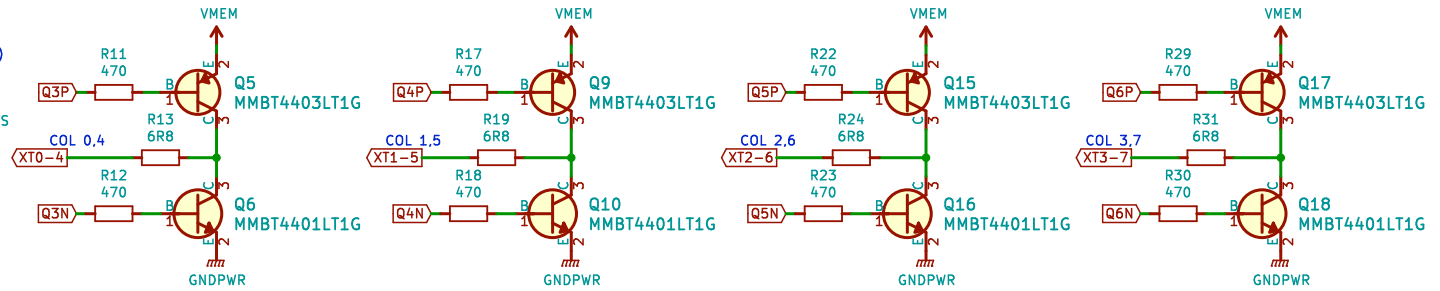
KiCad E.D.A. eeschema (5.1.2-1)-1

Id: 1/5

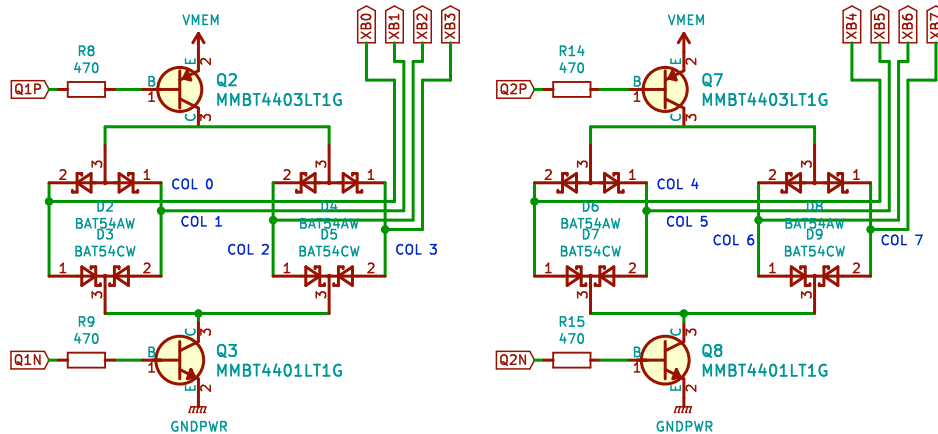
CORE BOARD INTERCONNECTS



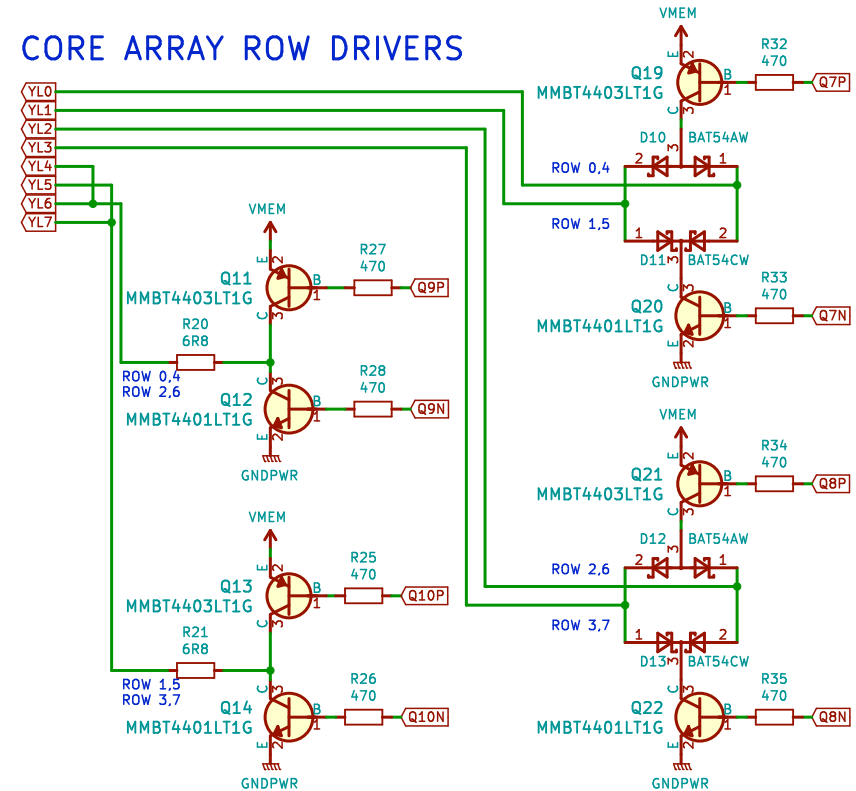
CORE ARRAY TOP COLUMN DRIVERS



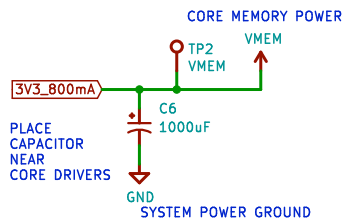
CORE ARRAY BOTTOM COLUMN DRIVERS



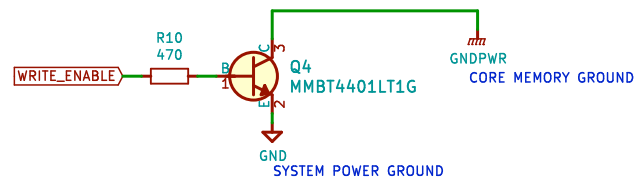
CORE ARRAY ROW DRIVERS



CORE ARRAY POWER



CORE ARRAY ENABLE



Drive Transistor current: $3.3/470=7\text{mA}$ (too much for Teensy LC)
Matrix 1/2 select current: $3.3/6.8=485\text{mA}$ (does not account for voltage drop in transistors)

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Sheet: /Core Array Driver/

File: Interactive Core Memory Badge (Logic) Driver v0.3.sch

Title: Core 64 – Core Array Driver

Size: A Date: 2020-03-15

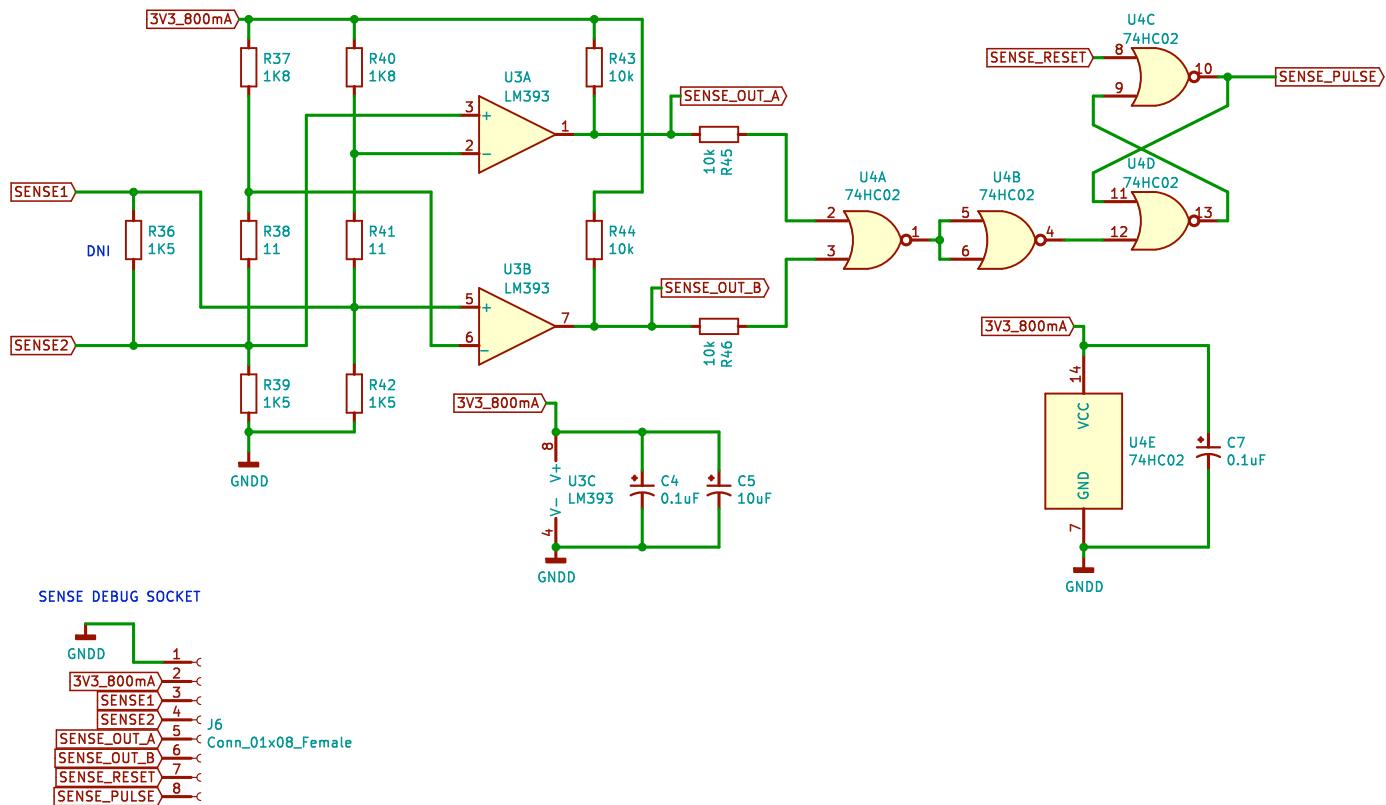
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Rev: 0.3

Id: 2/5

SENSE SIGNAL PROCESSING

SENSE SIGNAL RS LATCH



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Sheet: /SENSE/

File: Interactive Core Memory Badge (Logic) Sense v0.3.sch

Title: Core 64 – Sense

Size: A4	Date: 2020-03-15
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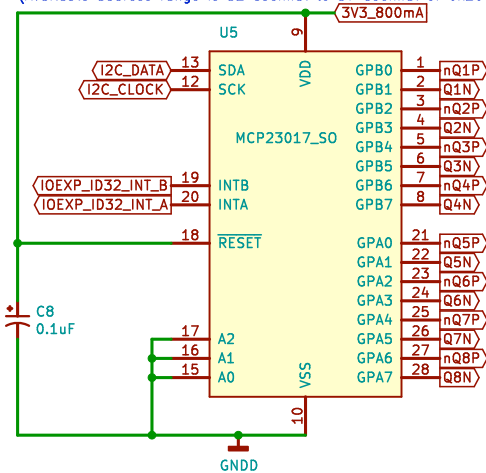
KiCad E.D.A. eeschema (5.1.2-1)-1

Rev: 0.3

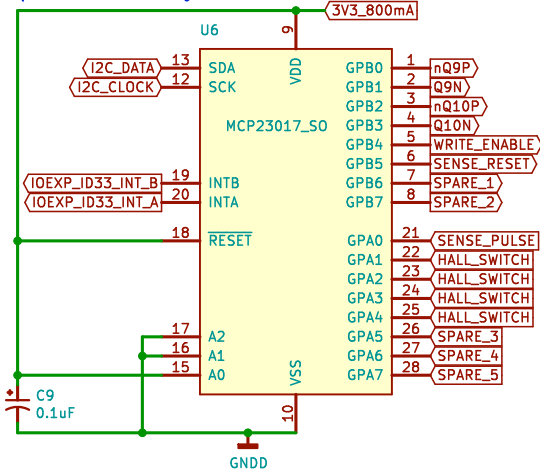
Id: 3/5

IO EXPANDER FOR CORE DRIVE ARRAY

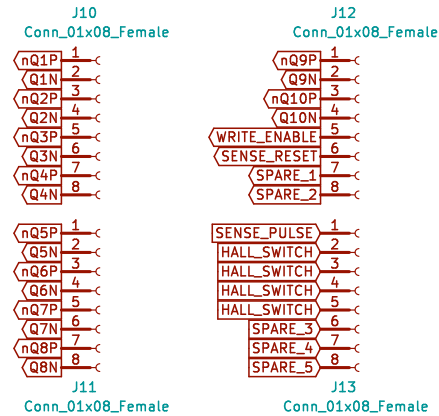
I2C ID: 0100000 (7-bit address) 32 decimal 0x20
(Available address range is 32 decimal to 37 decimal or 0x20 to 0x27)



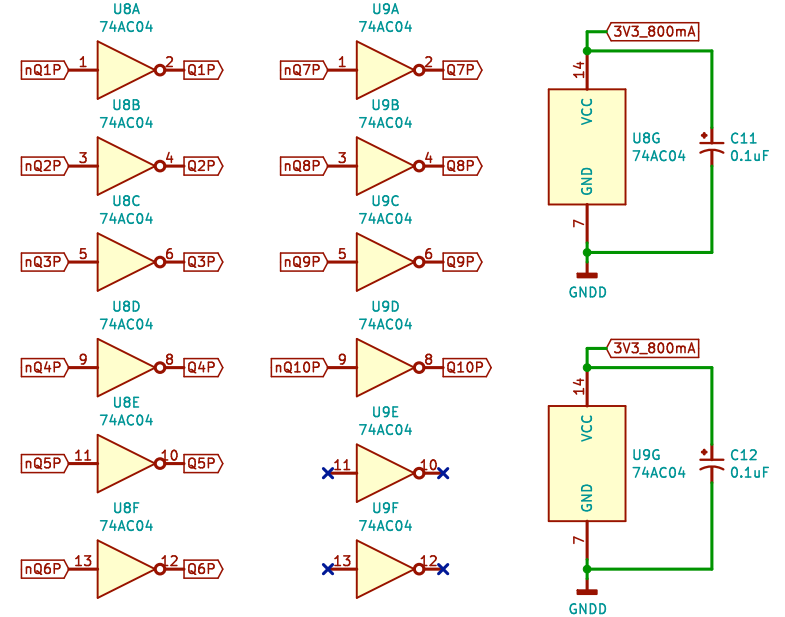
I2C ID: 0100001 (7-bit address) 33 decimal 0x21
(Available address range is 32 decimal to 37 decimal or 0x20 to 0x27)



IO Expansion/debug header if there is room...

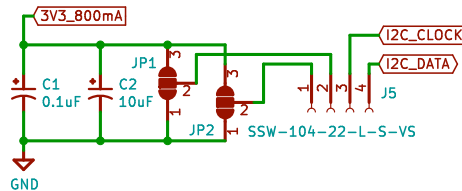


INVERT DRIVE SIGNALS FOR PNP TRANSISTORS

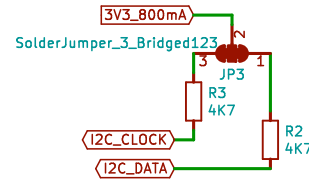


OLED DISPLAY (OPTIONAL)

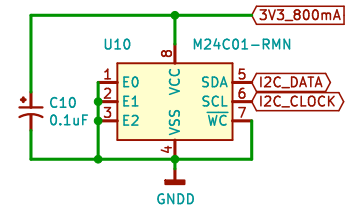
0.96" (128x64)
I2C 4-pins, ADDRESS: 0x3C (60 decimal)
(alternate is 0x3D, not 0x7A or 0x7B!)



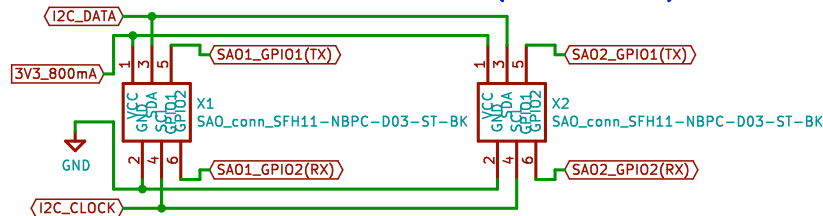
I2C PULL-UPS



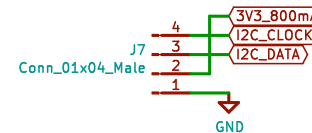
BOARD I.D. AND S/N



SUPERIOR ADD-ON SOCKETS (OPTIONAL)



QWIC CONNECTOR



A.K.A. SAO v1.69bis (<https://hackaday.io/project/52950-shitty-add-ons>) using Sullins SFH11-NBPC-D03-ST-BK
<https://www.digikey.com/product-detail/en/sullins-connector-solutions/SFH11-NBPC-D03-ST-BK/S9717-ND/4558818>

Sheet: /IO Expansion/
File: Interactive Core Memory Badge (Logic) IO Expansion V0.3.sch

Title: Core 64 - IO Expansion

Size: A4 Date: 2020-03-24

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Rev: v0.3

Id: 4/5

TEENSY LC OR 3.2 AND ALKALINE/NIMH BATTERY PACK

*** MUST CUT VIN-VUSB TRACE ON TEENSY ***

THIS IS THE STANDARD MANUFACTURED KIT CONFIGURATION

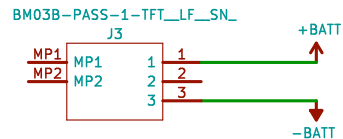
HACKER POWER OPTION: ADAFRUIT FEATHER WITH REQUIRED LIPO

*** MUST REMOVE ALKALINE/NIMH BATTERY PACK ***

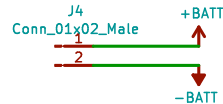
USER MODIFICATION REQUIRED

TWO POWER MODES SELECTED BY DOUBLE-THROW SWITCH:

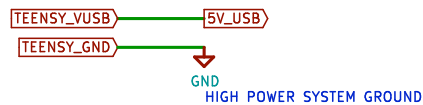
MODE 1
 BUILT-IN BATTERY PACK (Keystone 2482CN) WITH 4X "AAA" ALKALINE OR NIMH CELLS
 ...or 3-4 "AA" alkaline/NiMH, or 1S LiPo, but the logic board does not recharge these batteries automatically from USB power.
 CONNECTED TO 3 PIN input for Battery Pack
 On PCB: SMT CONN, 3 TERM, HORZ, 2mm spacing, detent lock
 Such as: Keystone 976, JST PA BM03B-PASS-1-TFT(LF)(SN), Adafruit 4391 (JST PH 3-pin aka STEMMA)
 from KAWEEI Technology CW2001-03T-H01-BD-A,



ALTERNATE CONNECTOR - Generic SMT 2-pin .1" header option for everything else.



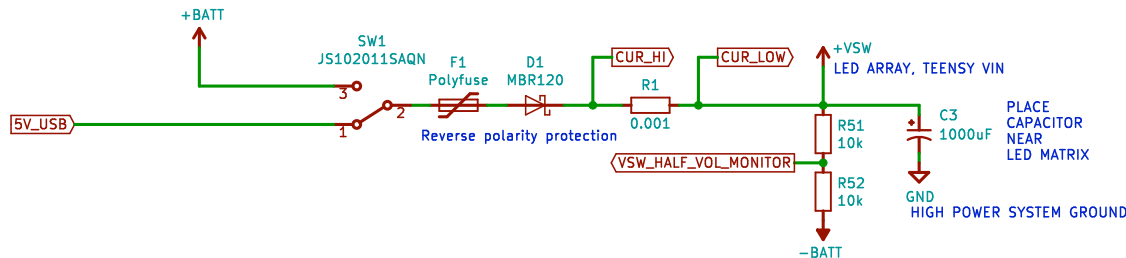
MODE 2
 USB 5V through Teensy LC or 3.2
 VUSB is 5V from USB cable.



BOTH MODES REQUIRE:
 VIN must be supplied TO the Teensy
 (because VIN-VUSB is cut) and the
 Core 64 Logic Board provides it here.

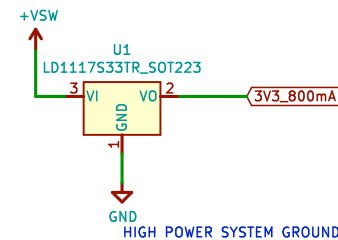


POWER SWITCH, POWER PROTECTION, VOLTAGE & CURRENT MONITOR

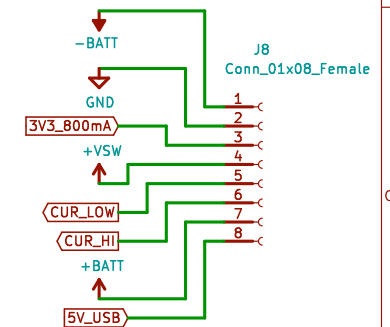


3.3V POWER SUPPLY

CORES AND ACCESSORIES

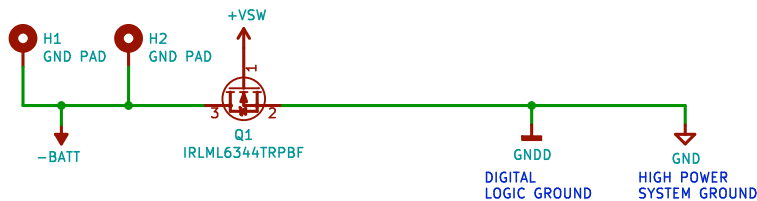


POWER RAILS



REVERSE POLARITY PROTECTION

ALL SYSTEM STAR GROUNDING



REVERSE POLARITY DETECTION AND SYSTEM
 CURRENT MEASUREMENT CLOSE TO BATTERY.

REF: <https://www.instructables.com/Id/Reverse-polarity-protection-for-your-circuit-with-IRLML6344TRPBF> <https://www.digikey.com/product-detail/en/infinion-technologies/IRLML6344TRPBF/IRLML6344TRPBFCT-ND/2538168>

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Sheet: /Power/

File: Interactive Core Memory Badge (Logic) Power v0.3.sch

Title: Core 64 - Power Schematic

Size: A4 Date: 2020-03-15

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Rev: 0.3

Id: 5/5