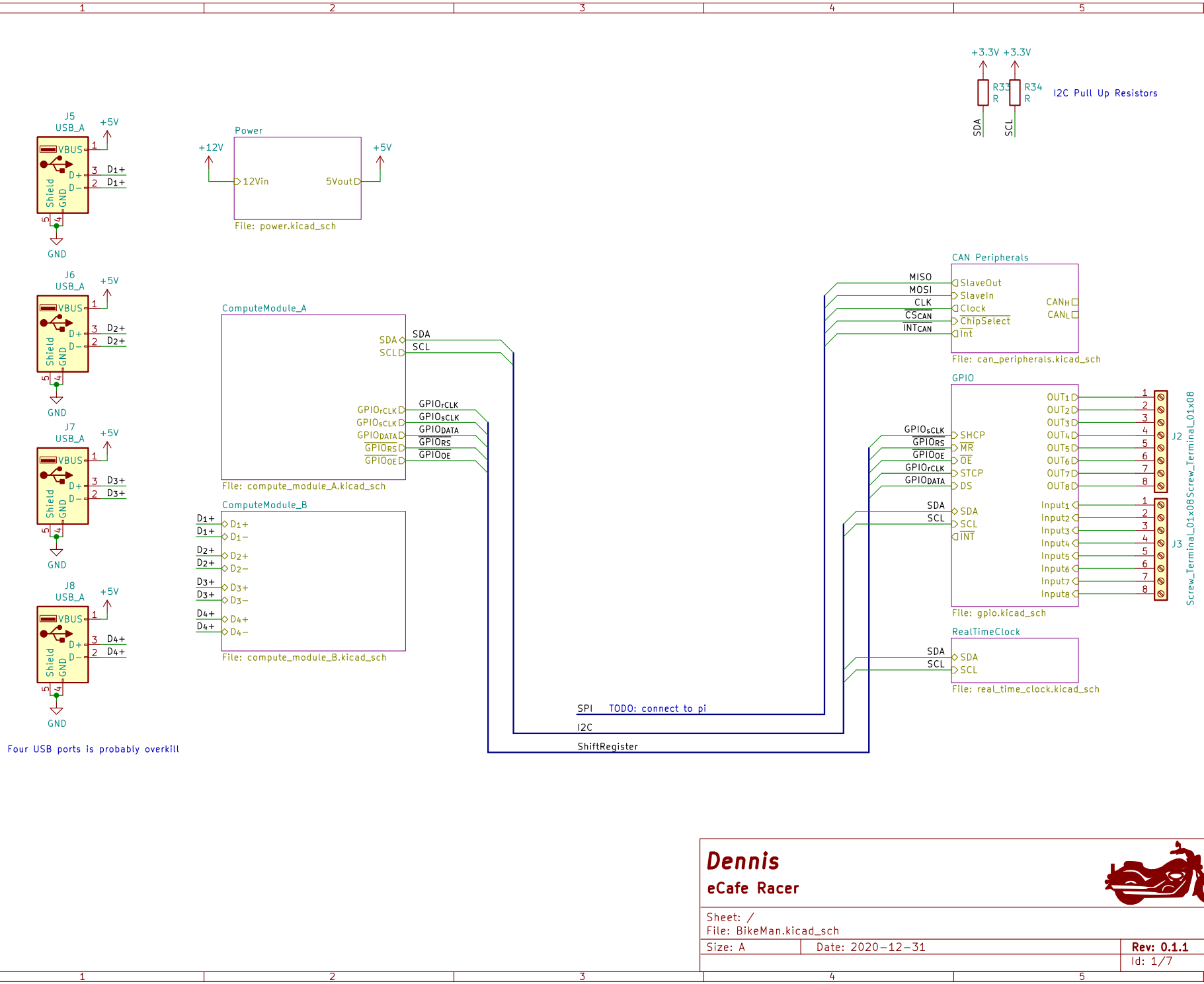

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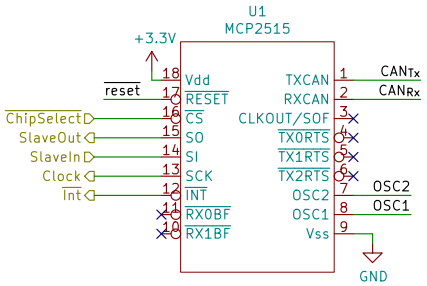
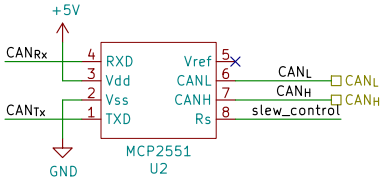
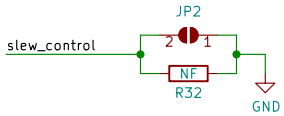
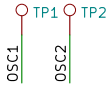
Sheet: /		
File: BikeMan.kicad_sch		
Size: A	Date: 2020-12-31	**Rev: 0.1.1**
		Id: 1/7

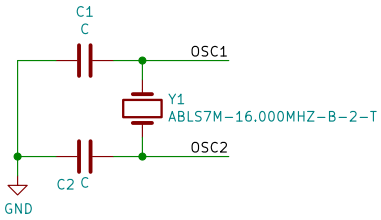




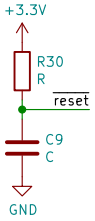


Slew Rate Control circuit.
The slew rate of CAN_H and CAN_L are determined by
the resistance between the Rs pin and ground. Connect directly
to ground for high speed mode, or limit the slew rate to help with EMI
reduction

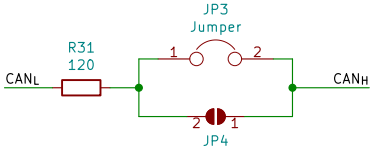




Crystal Oscillator Circuit
(16MHz)



Power On Reset Circuit
Needs to hold reset state for >2us
after power up



120 ohm termination resistor required by CAN bus.
Can be configured with either jumper or solder bridge

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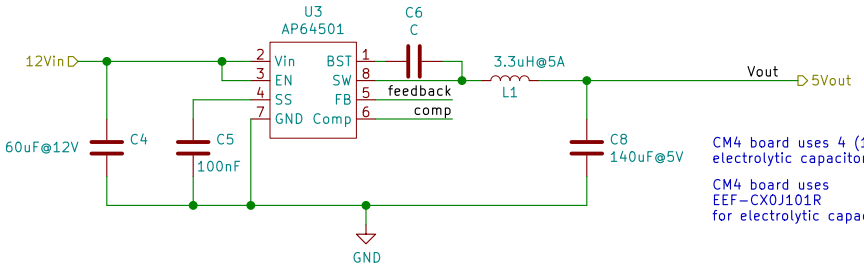
Sheet: /CAN Peripherals/
File: can_peripherals.kicad_sch

Size: A	Date: 2020-12-31	**Rev: 0.1.1**
		Id: 2/7

Buck Converter
12V -> 5V @ 5A max output

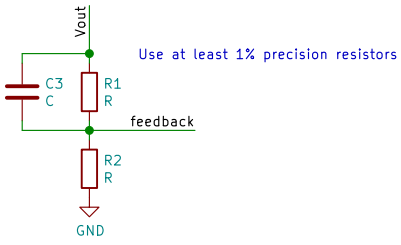


CM4 board uses 4 (10uF) ceramic and 1 (100uF) electrolytic capacitors in parallel

CM4 board uses
EEF-CX0J101R
for electrolytic capacitor

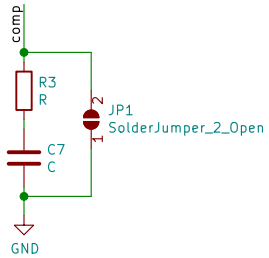
Vout is determined by this feedback divider circuit through the equation: $R_{high} = R_{low} * (V_{out} / 0.8V - 1)$

Optional capacitor can improve transient response



Feedback Circuit

Compensation Circuit
(See Datasheet)



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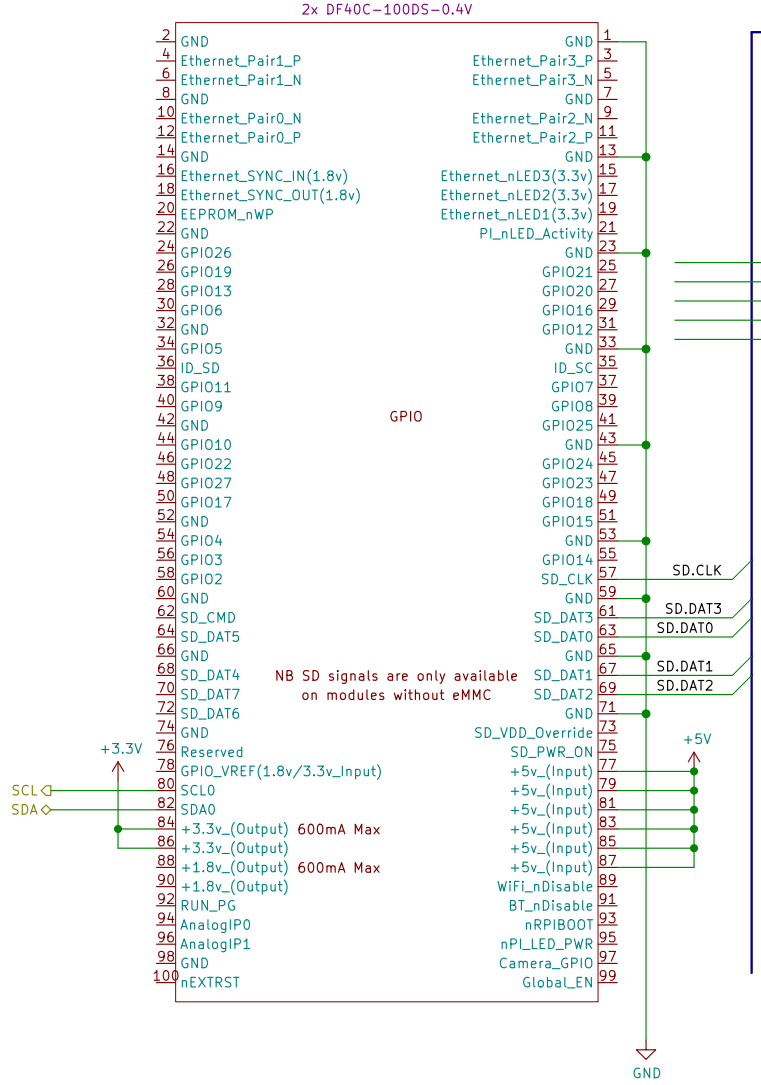
Sheet: /Power/		
File: power.kicad_sch		
Size: A	Date: 2020-12-31	**Rev: 0.1.1**
		Id: 3/7

Thinking more and more that ethernet and
power over ethernet might be worth it.

Would be helpful mainly if we want to install this in a server rack as
part of a dyno-room style electrical testing stand

Module1A
ComputeModule4-CM4
Hirose
2x DF40C-100DS-0.4V



+3.3V
SCL
SDA
+5V
GND

SD{DAT[0..3] CLK DET}

GPIO_OE
GPIO_RS
GPIO_rCLK
GPIO_sCLK
GPIO_DATA

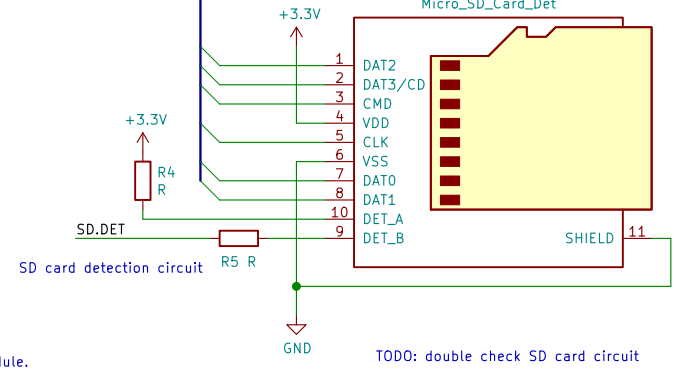
SD.CLK
SD.DAT3
SD.DAT0
SD.DAT1
SD.DAT2

5 GPIO pins are used to drive a shift register
controlling output on the board's 12V GPIO module.

TODO: select gpio pins to use

SD{DAT[0..3] CLK DET}

J1
Micro_SD_Card_Det



TODO: double check SD card circuit

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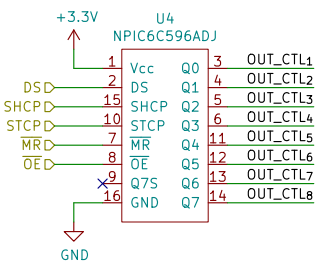
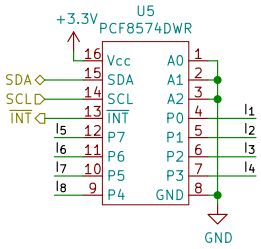
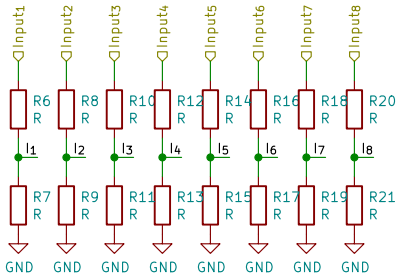
Sheet: /ComputeModule_A/
File: compute_module_A.kicad_sch

Size: A	Date: 2020-12-31	**Rev: 0.1.1**
		Id: 4/7

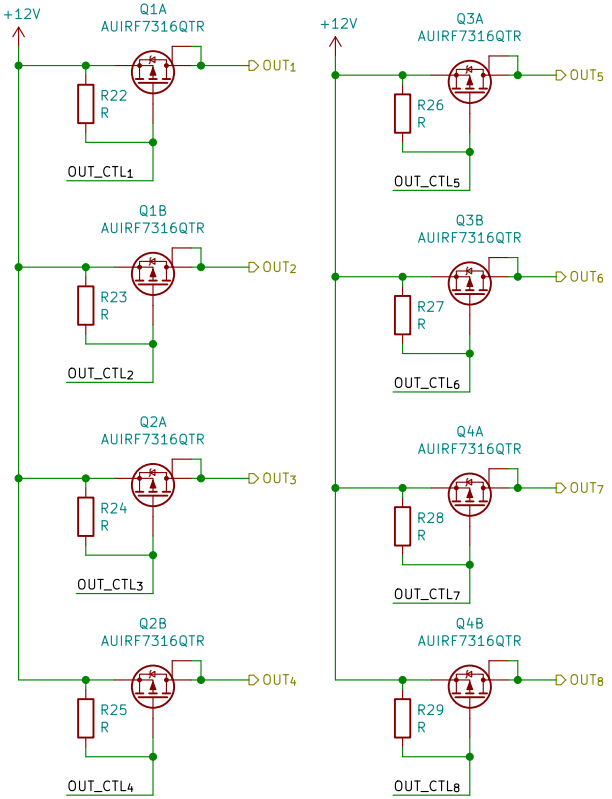




An I2C IO expander is used to read the inputs instead of connecting to the pi's gpio pins directly. This is mainly done for insurance so that the pi's pins cannot be accidentally exposed to the 12V signal.



Voltage Divider Network (12V -> 5V)
Used to read 12V digital input signals from other parts of the bike
Use integrated resistor network if possible (TODO: spec)



By far the most common use for these inputs will be to read the value of switches.
Need to think more about the best way to achieve this, it is most likely not this.

It might be nice to combine Input and Output pins into a single circuit which can be configured in software to act like either, like the gpio modules on microprocessors. Perhaps a "switch detection" mode could be added as well, which measures the resistance to ground instead of voltage

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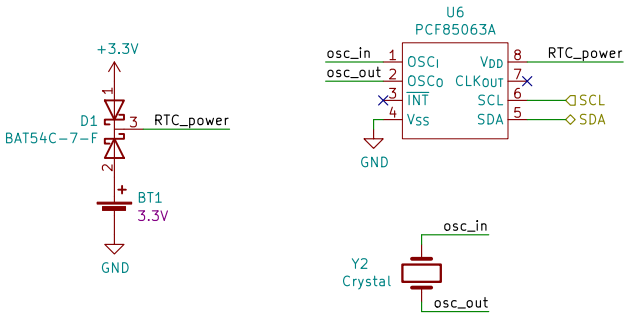
Sheet: /GPIO/
File: gpio.kicad_sch

Size: A	Date: 2020-12-31	**Rev: 0.1.1**
		Id: 5/7



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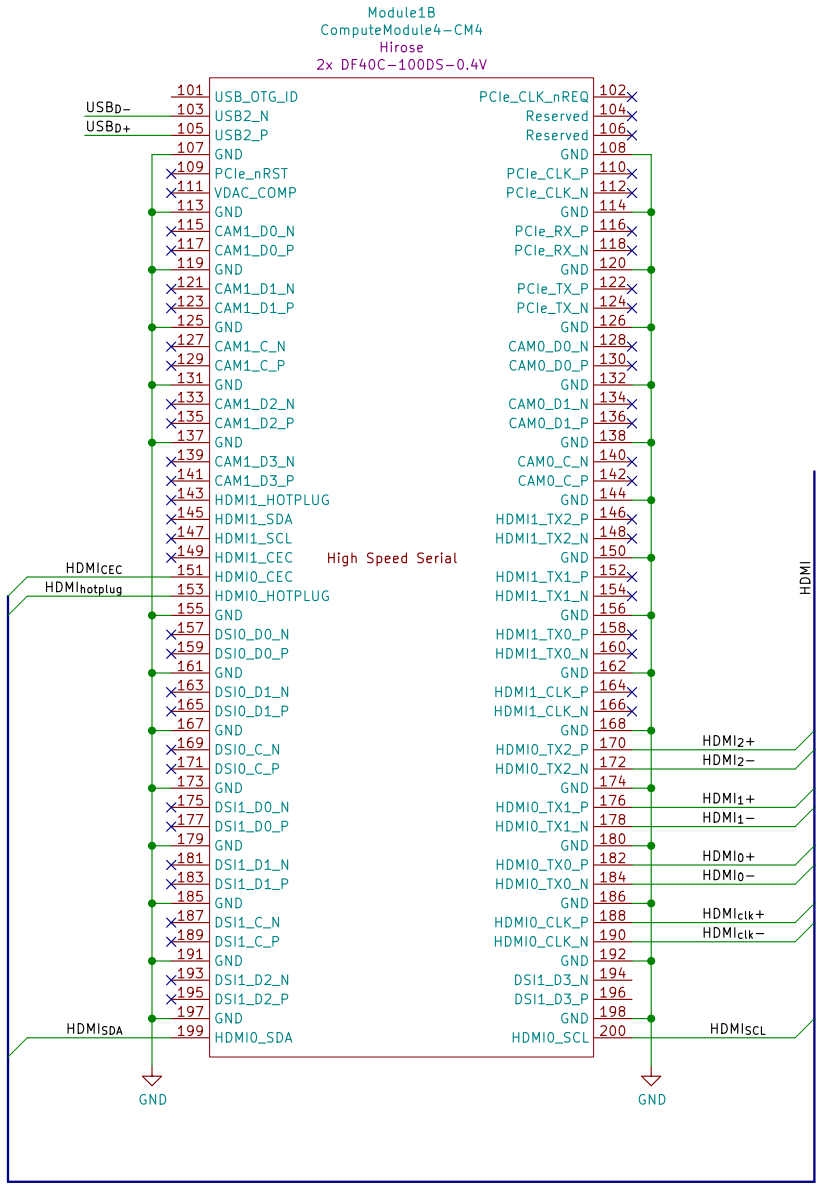
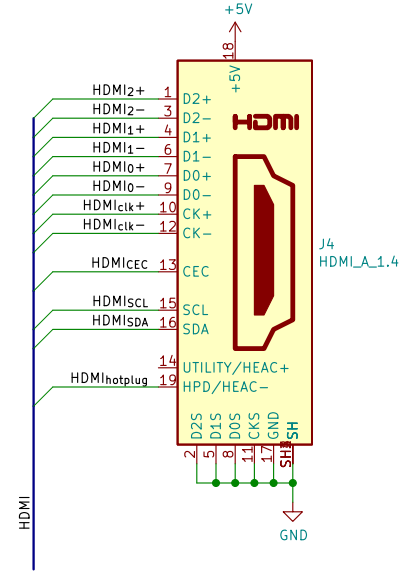
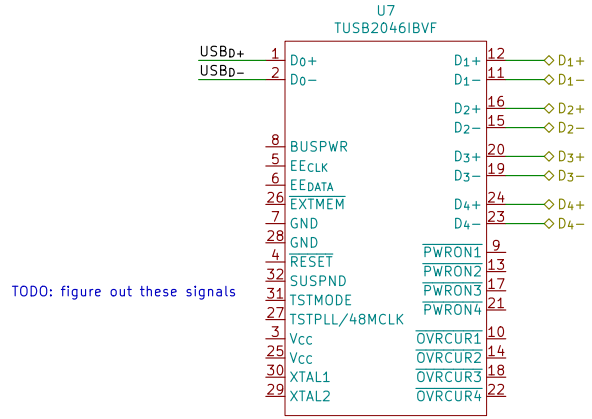
eCafe Racer

Sheet: /RealTimeClock/
File: real_time_clock.kicad_sch

Size: A	Date: 2020-12-31	**Rev: 0.1.1**
		Id: 6/7







TODO: figure out these signals

USB hub IC allows up to 4 devices to talk to the Pi's USB port.
This is mainly to allow hooking up a keyboard and mouse to the board for debugging and configuration, and will most likely not be a part of the board when it becomes a product.

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Sheet: /ComputeModule_B/		
File: compute_module_B.kicad_sch		
Size: A	Date: 2020-12-31	**Rev: 0.1.1**
		Id: 7/7