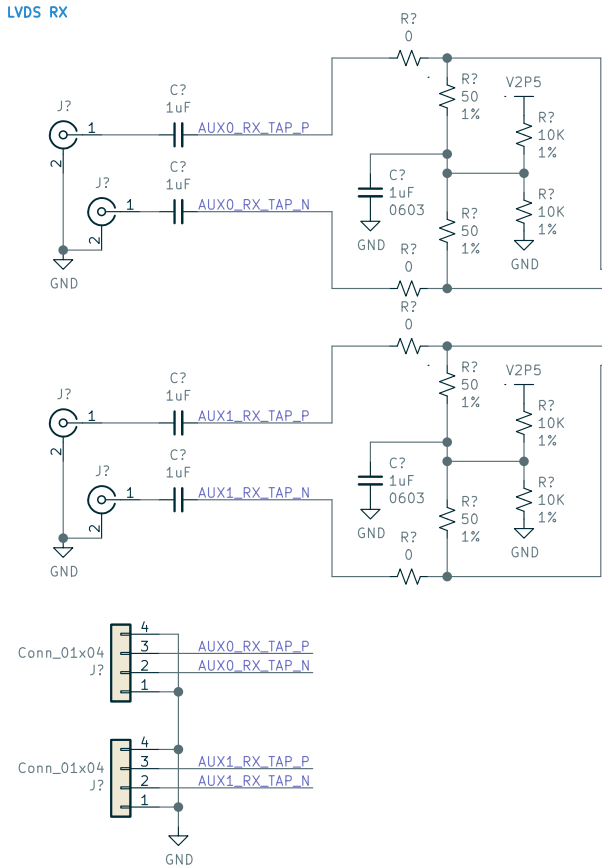


Ignition Target

LVDS RX



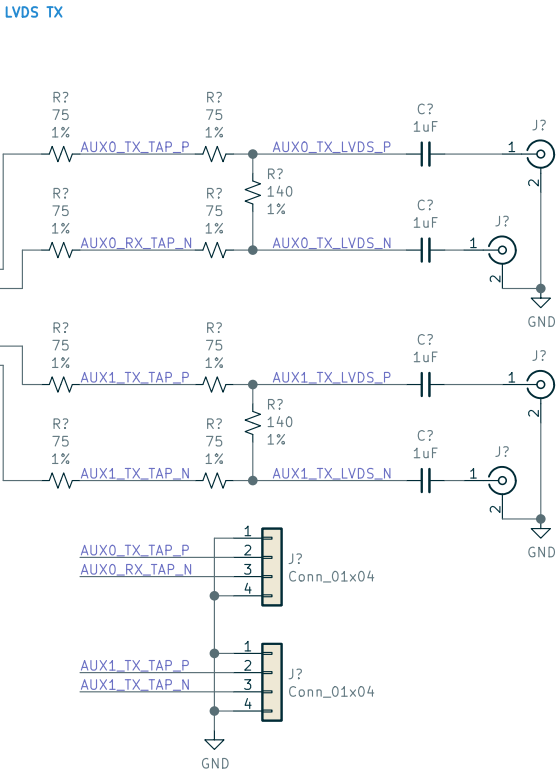
The LVDS transmitter pair is implemented as per Lattice FPGA-TN-1253 using PIO pin pairs in Bank 3. The ICE40 inputs expect a proper LVDS signal so the inputs are biased after the AC-coupling cap. Resistor and capacitor values can be tuned where required.

An optional header footprint/via is placed near the SMA connector to allow for alternate prototyping, using either single-ended or differential signaling. The zero ohm resistor footprint can be used for termination or slew limiting resistors if desired.

TODO:

- Check TX/RX cap values against bit rate
- Add TPs, mounting holes, fiducials, logo, P/N, S/N "parts"

LVDS TX



The LVDS transmitter pair is implemented as per Lattice FPGA-TN-1253 using PIO pin pairs in Bank 3. The resistor values above were derived using the equations on p. 4 and the following assumptions:

$Z_0 = 50 \text{ ohm}$
 $V_{CCIO} = 2.5V$
 $V_{OD} = 0.35V$
 $R_{OUTPUT} = 30 \text{ ohm}$

$$R_P = 2 * ((Z_0 * V_{CCIO}) / (V_{CCIO} - (2 * V_{OD})))$$
$$= 2 * (165 / 1.8)$$
$$= 139 \text{ ohm}$$

$$R_S = ((Z_0 * R_P / 2) / ((R_P / 2) - Z_0) - R_{OUTPUT})$$
$$= (3472 / 19) - 30$$
$$= 149 \text{ ohm}$$

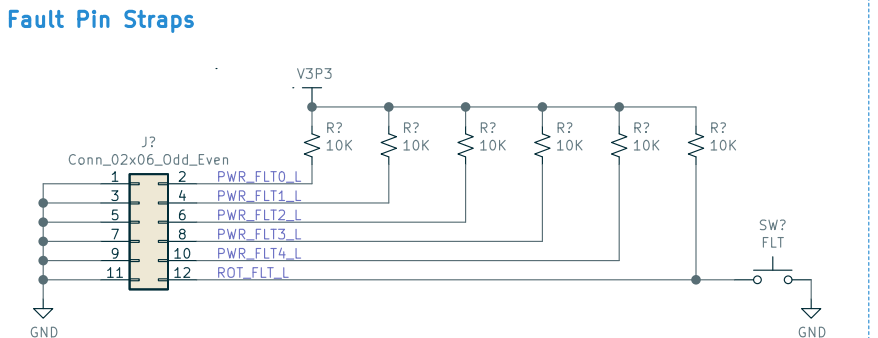
The series resistor is broken into two pieces of 75 ohm each. The intent here is that one pin of a 100 mil header/ footprint is inserted between the two resistors. If done using a tight layout this via should add minimal disruption at the edge rates of these transmitters.

Inserting the via would allow for IO pin to be reused for alternative prototyping by not fitting the second series resistor, parallel resistor and SMA connector, while using the first resistor footprint as slew limiting resistor or for series termination.

One possible application of this alternative scheme is to allow the Ignition protocol to be carried using single ended LVCMOS signaling at 3.3V between this board and an ECP5 dev board without requiring SMA connectors for the link partner. This would simplify initial prototyping work.

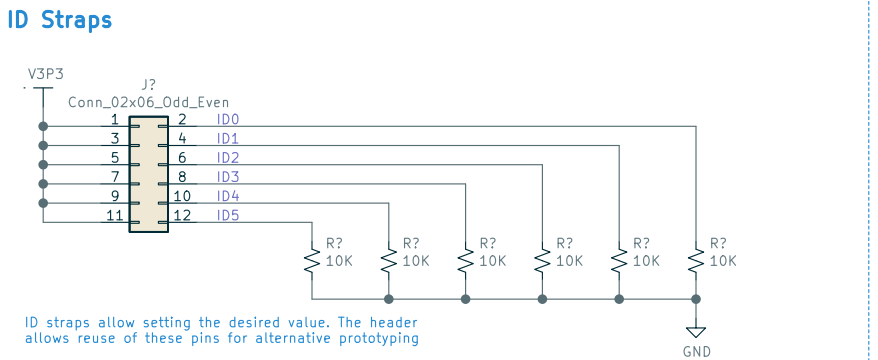
The AC coupling capacitors near the SMA connector are optional in case one wants to experiment. The layout should allow for some copper nearby connected to ground so experiments with a choke are possible. If not in use 0 ohm resistors should be fitted.

Fault Pin Straps

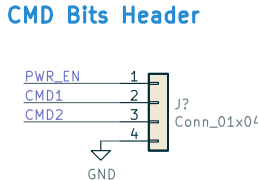


Fault pin straps allow setting fixed fault values. The switch attached to ROT_FLT provides a convenient way to cause fault interrupts during integration tests. The header allows reuse of these pins for alternative prototyping.

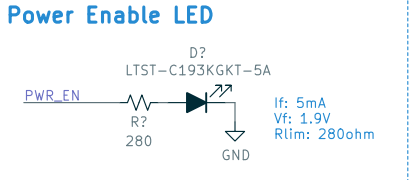
ID Straps



CMD Bits Header



Power Enable LED



Sheet: Power

File: ignitionlet-power.sch

Sheet: Config

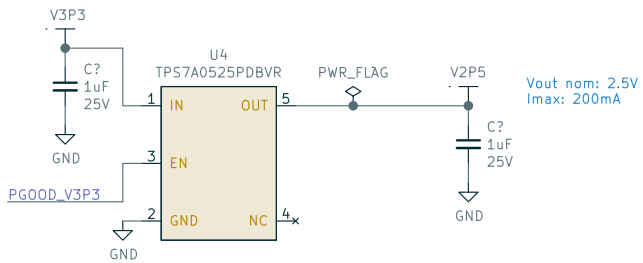
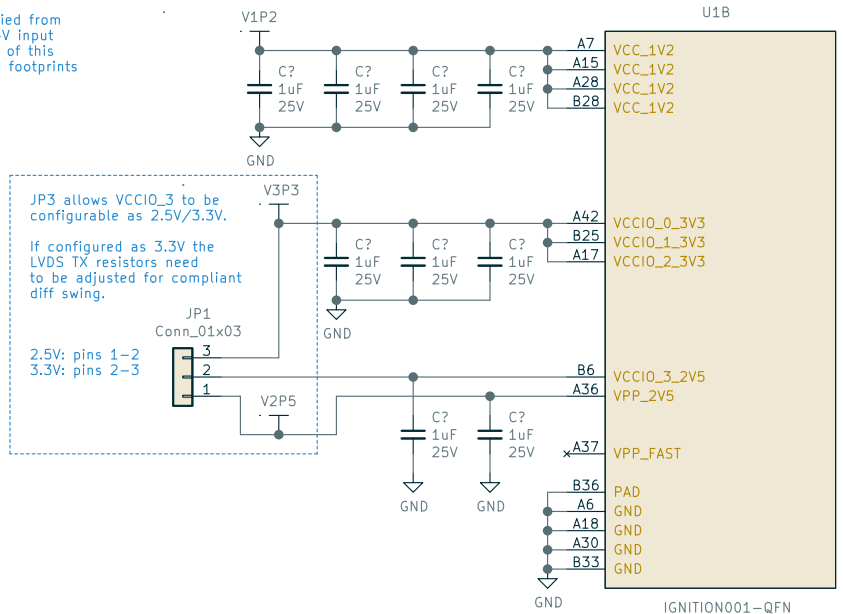
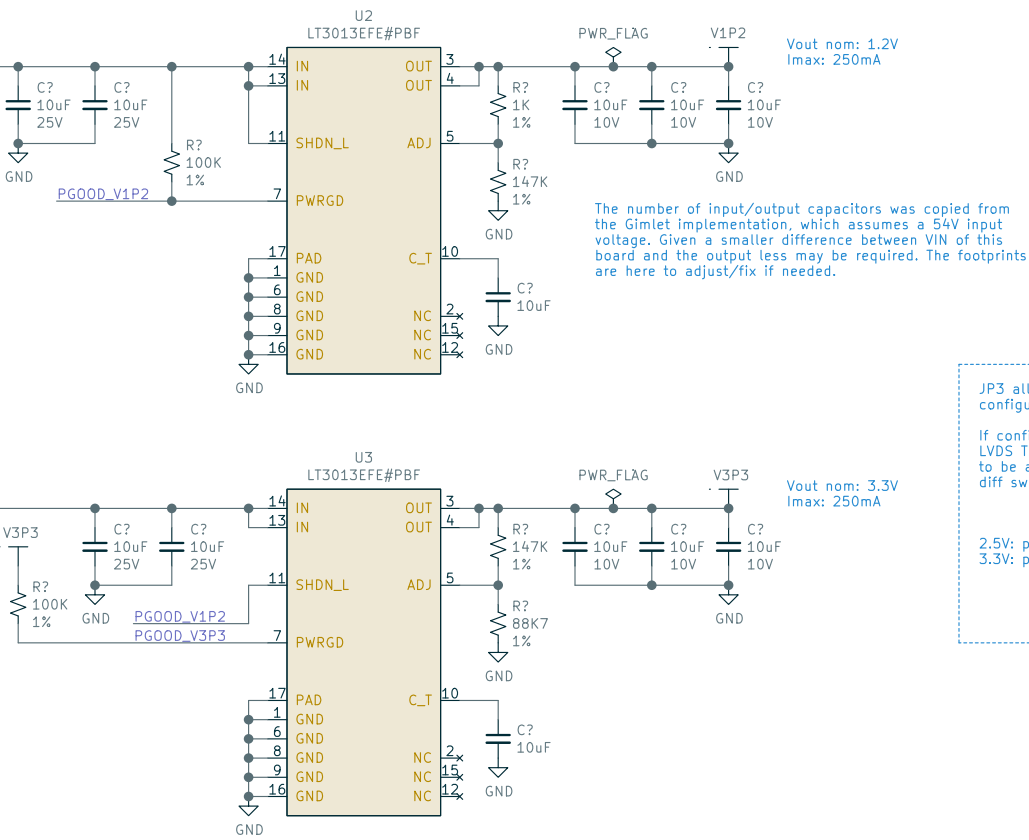
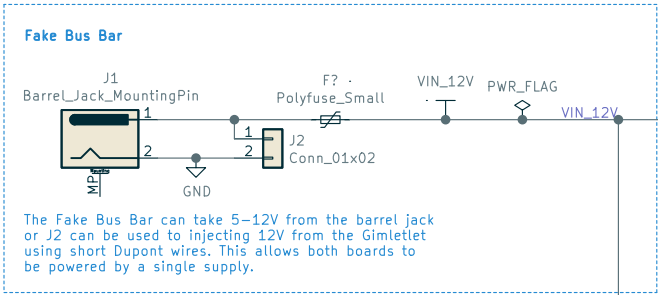
File: ignitionlet-config.sch

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Title: Ignition Target

Size: A3 Date: 2021-06-18
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Rev: 1
Id: 1/3



Sheet: /Power/
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Title: Power

Size: A3 Date: 2021-06-18
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Rev: 1
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