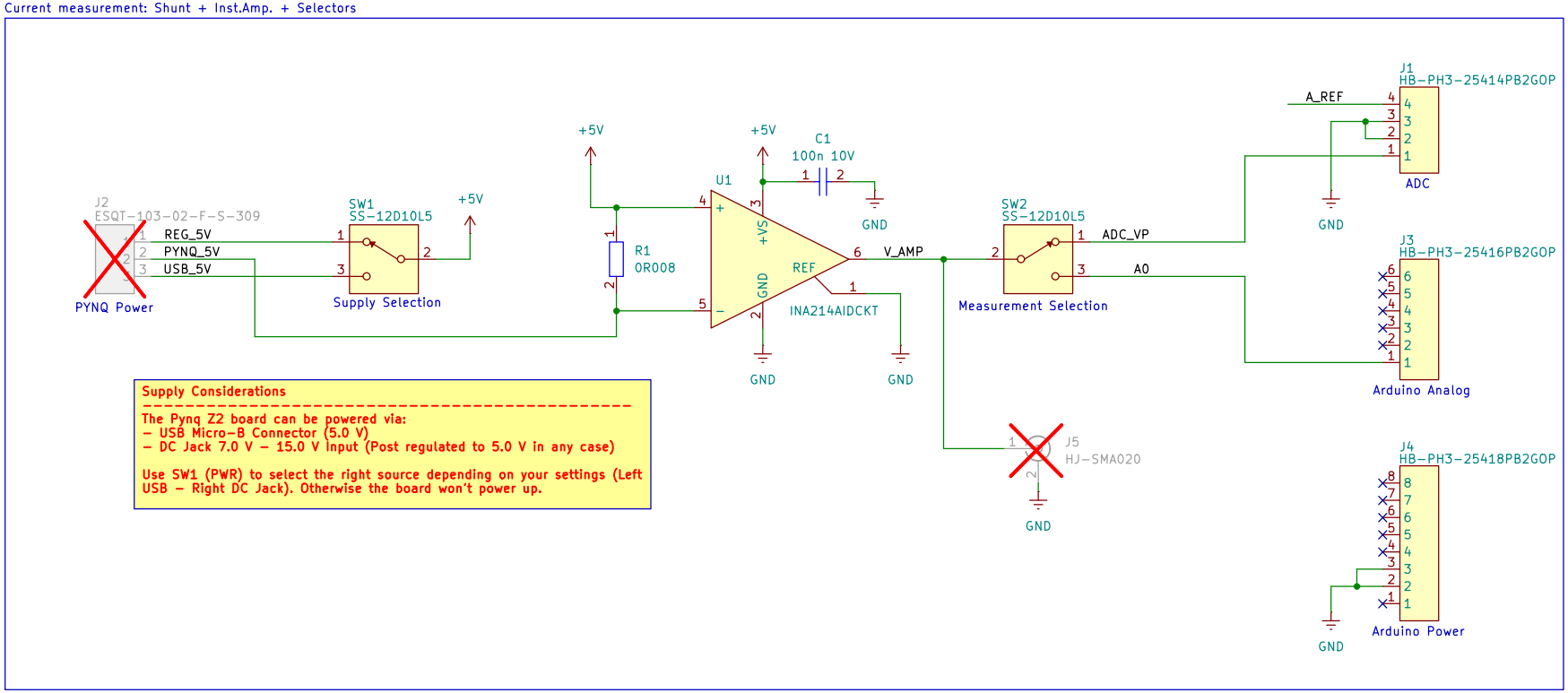
Current measurement: Shunt + Inst.Amp. + Selectors

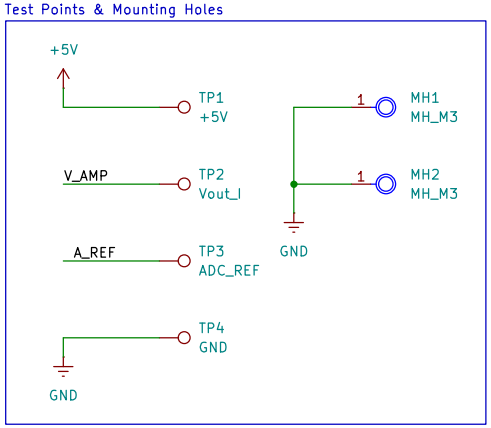


Supply Considerations

The Pynq Z2 board can be powered via:
- USB Micro-B Connector (5.0 V)
- DC Jack 7.0 V – 15.0 V input (Post regulated to 5.0 V in any case)

Use SW1 (PWR) to select the right source depending on your settings (Left USB – Right DC Jack). Otherwise the board won't power up.

Test Points & Mounting Holes



Measurement Considerations

The on-board ADC of the Pynq Z2 board has a reference voltage of 1.0 V Signals can be digitized in two ways:
- Through the arduino-compatible pins A0-A5.
- Through the VP pin on the vertical female connector adjacent to the buttons.

The arduino-compatible pins are internally connected to a resistor voltage divider that outputs 1.0 V when the input voltage is 3.3 V.
The VP pins are directly connected to the ADC input.

Thus, the range of the Arduino-pins is higher at a cost of their resolution.

To toggle between the two inputs, use the SW2 (ANA) switch (Left VP – Right Arduino A0 Pin)

The amplifier has a gain of 100 V/V, and the shunt resistor is 8 mΩ.
Thus $V_{ADC} = (I_{LOAD} * R_{SHUNT}) * 100$

Taking this into account, for the VP pin, we have that saturation (V_{ADC} = 1.0 V), will be reached when I_{LOAD} = 1.25 A.
If currents greater than 1.25 A are required (to power external PMODs, for instance), the switch should be set to A0.

The obtained resolution is:
- 0.3 mA for VP
- 1.0 mA for A0

Author: Alejandro Lopez Rodriguez
Author: Ruben Rodriguez Alvarez
Author: Miguel Peón Quirós
Author: Taraneh Aminosharieh Najafi
EPFL, Embedded Systems Laboratory

Sheet: /
File: Pynq_Power_Ranger.kicad_sch

Title: Pynq Power Ranger

Size: A4	Date: 2024-06-19	**Rev: 0**
KiCad E.D.A. 8.0.4		Id: 1/1