Stepped Frequency Pulser BOM

BHC 2021

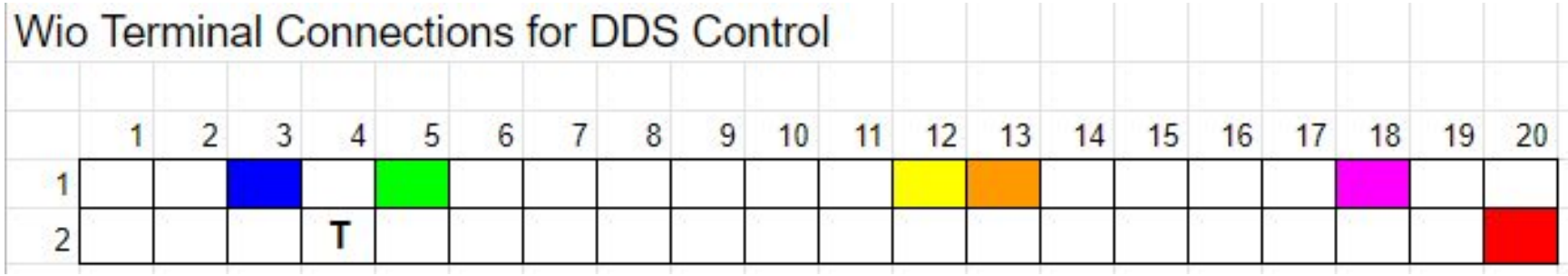
Stepped Frequency Modulation

- Features:
  - User defined sequences adds flexibility
    - csv loaded onto microcontroller flash (USB)
      - No C++ unless you want to...
  - Highly accurate frequency delivery
    - DDS
    - Externally triggered with switching times <1 ms.
  - Low Cost
    - $60

BOM

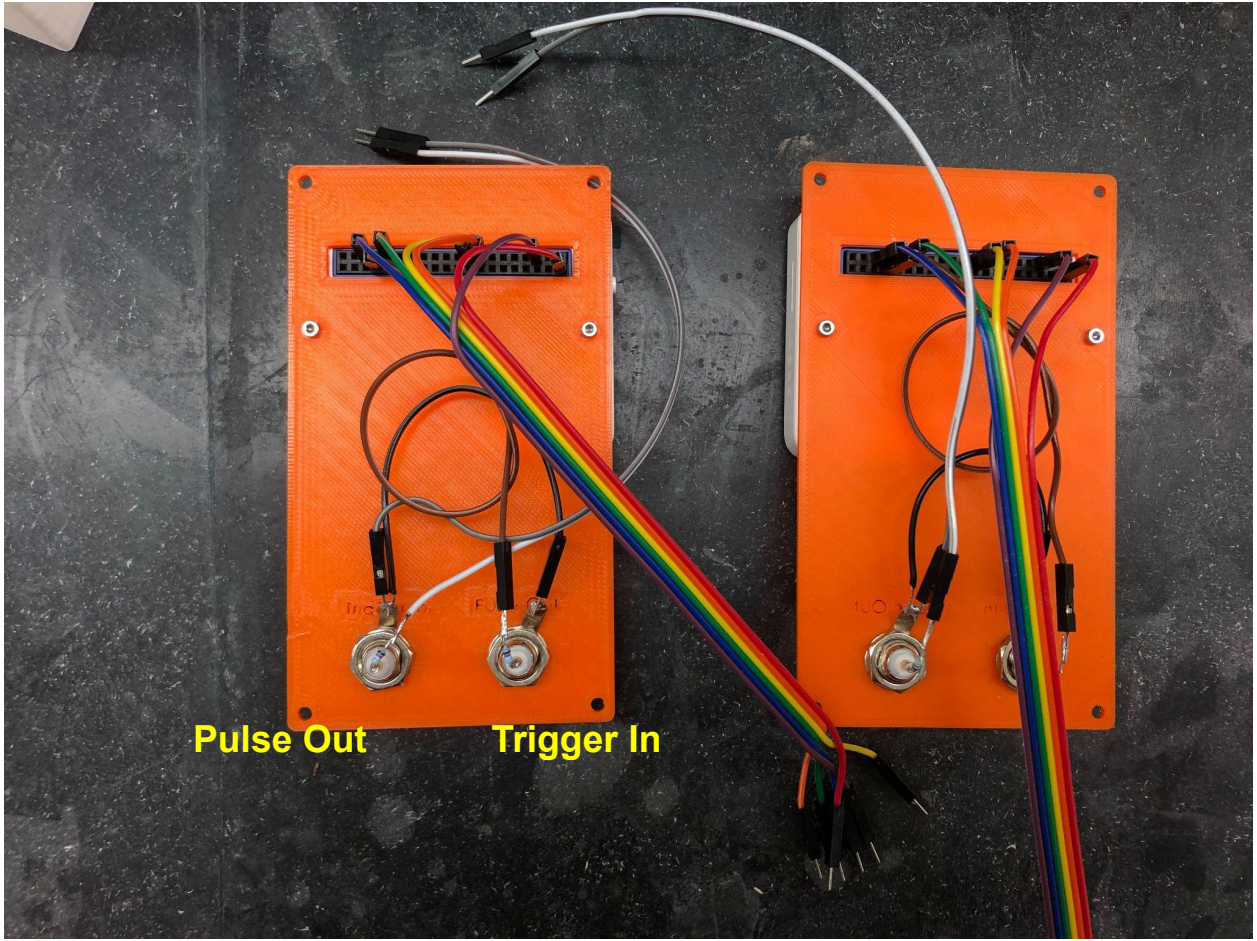
- Wio Terminal
  - https://www.digikey.com/en/product-highlight/s/seeed/wio-terminal
- DDS
  - AD9850
    - https://www.amazon.com/HiLetgo-AD9850-Generator-0-40MHz-Equipment/dp/B01J7XPWNU
- BNC Connectors
  - https://www.amazon.com/Female-Bulkhead-Connector-20-Pack-Adapters/dp/B07DGV6482
- Protoboard Platform
  - Mini breadboard
  - https://www.amazon.com/LampVPath-12Packs-solderless-breadboard-Arduino/dp/B01KKE602W
- Level Shifter
  - Github Repository: https://github.com/bhclowers/Stepped-Pulser
- 3D Printed Housing
  - Github Repository: https://github.com/bhclowers/Stepped-Pulser

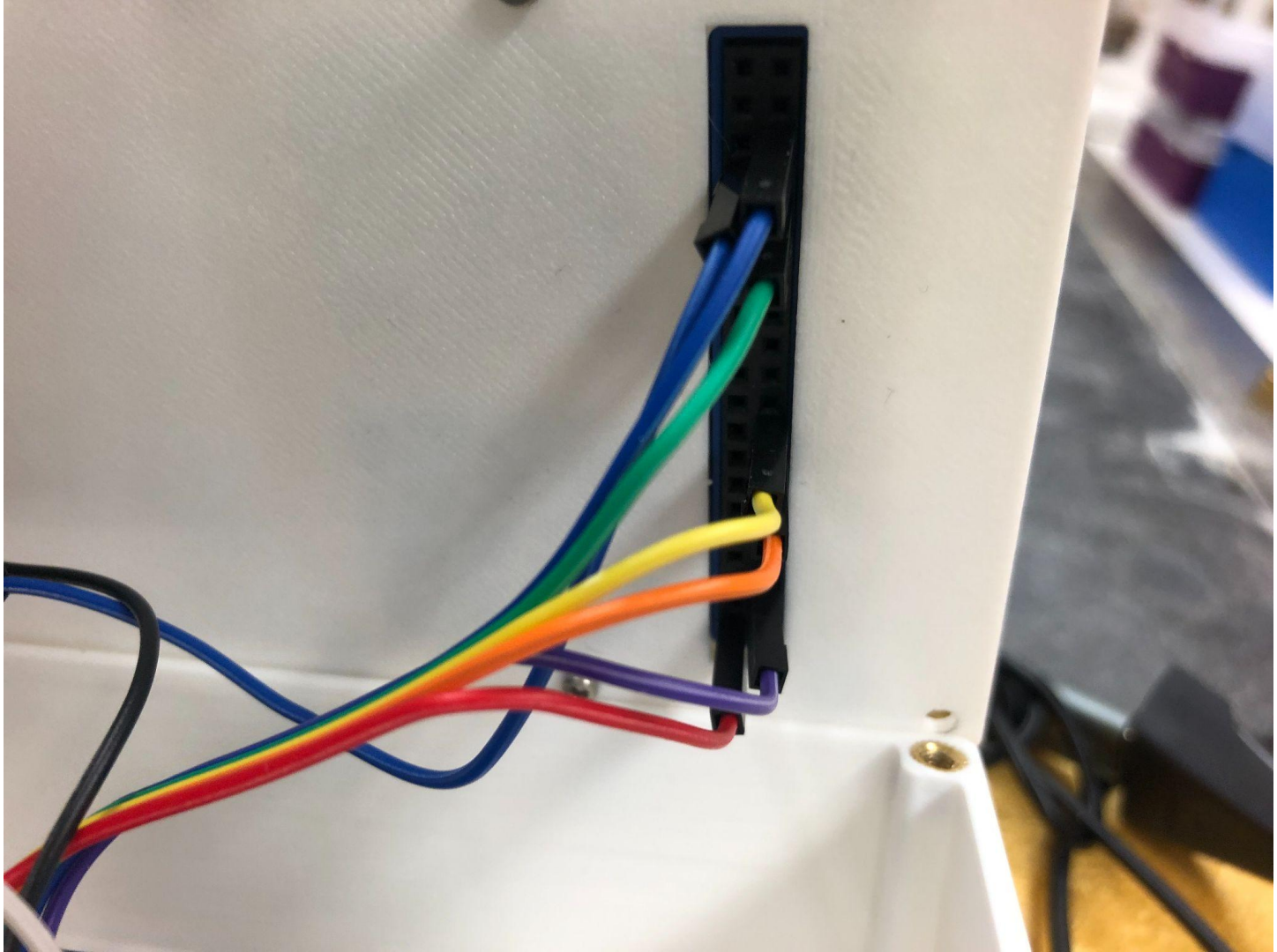
Connection Diagram

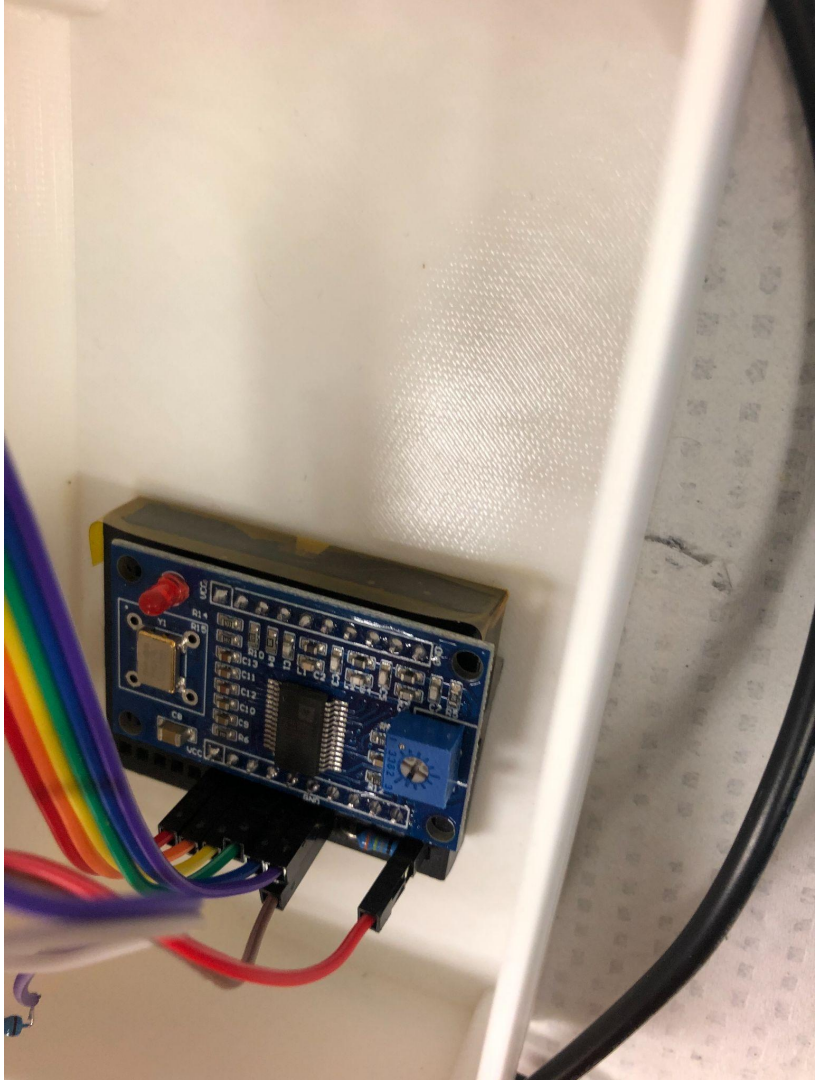


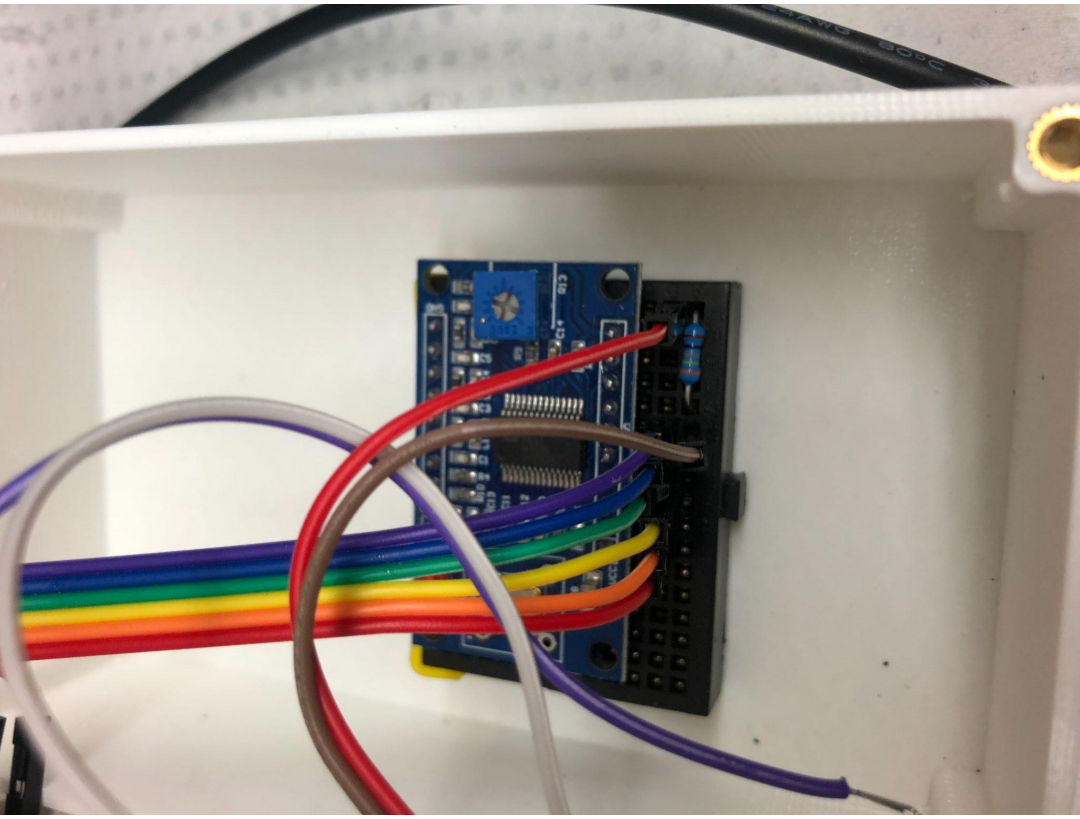
Assembly Photos

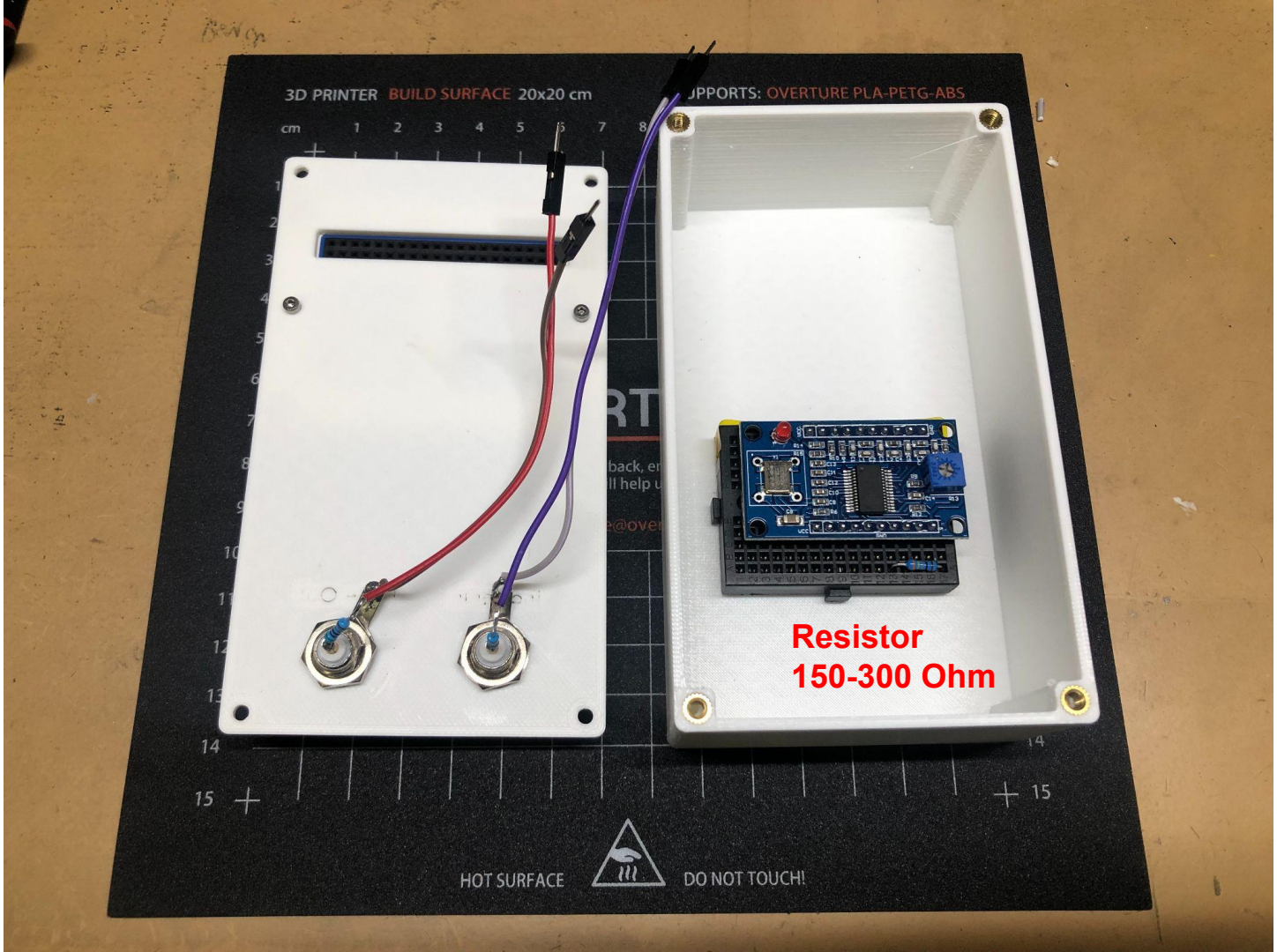
Each Input/Output has a 50 Ohm Resistor.



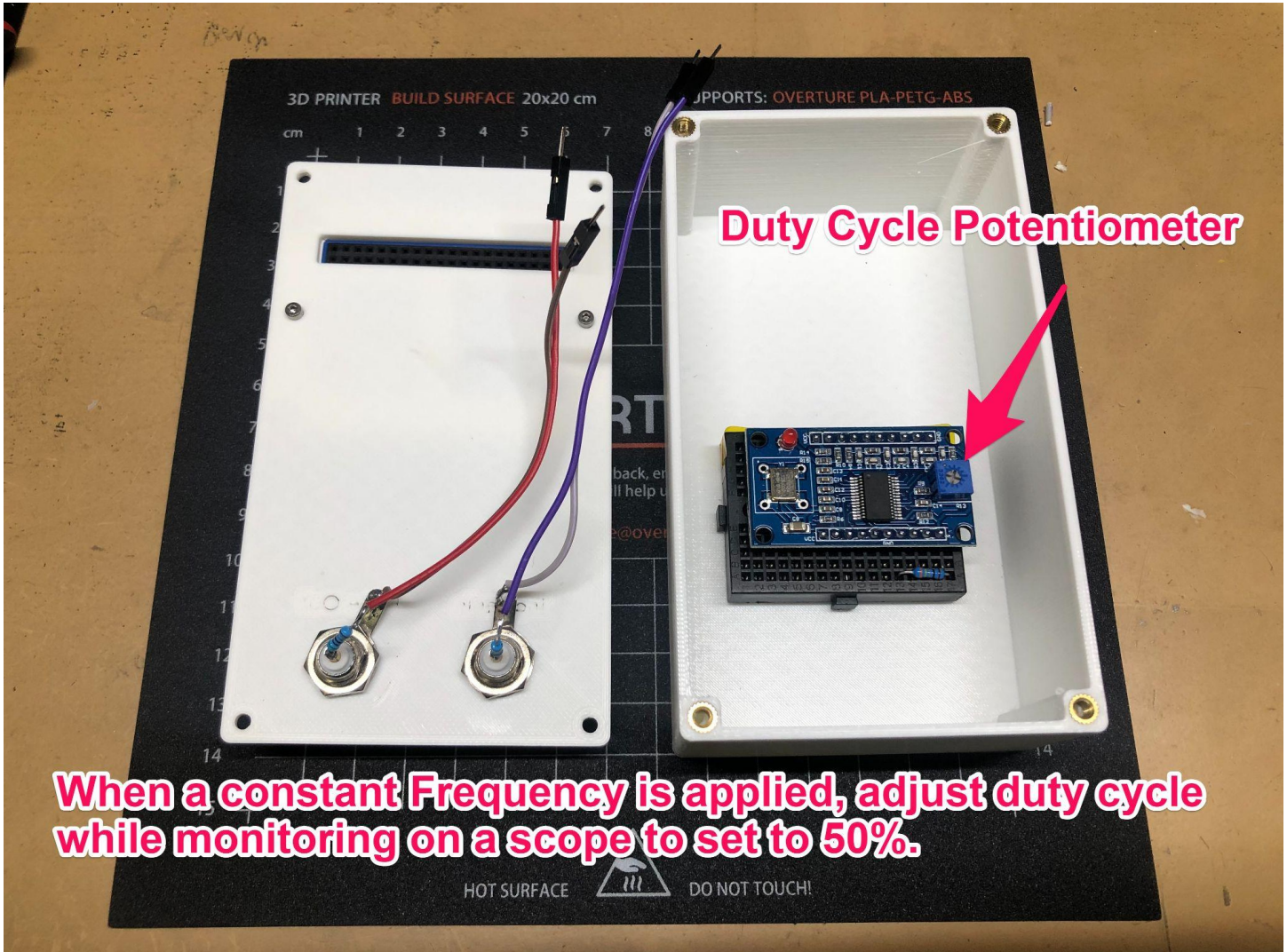







3D PRINTER BUILD SURFACE 20x20 cm
UPPORTS: OVERTURE PLA-PETG-ABS
Resistor
150-300 Ohm
HOT SURFACE
DO NOT TOUCH!

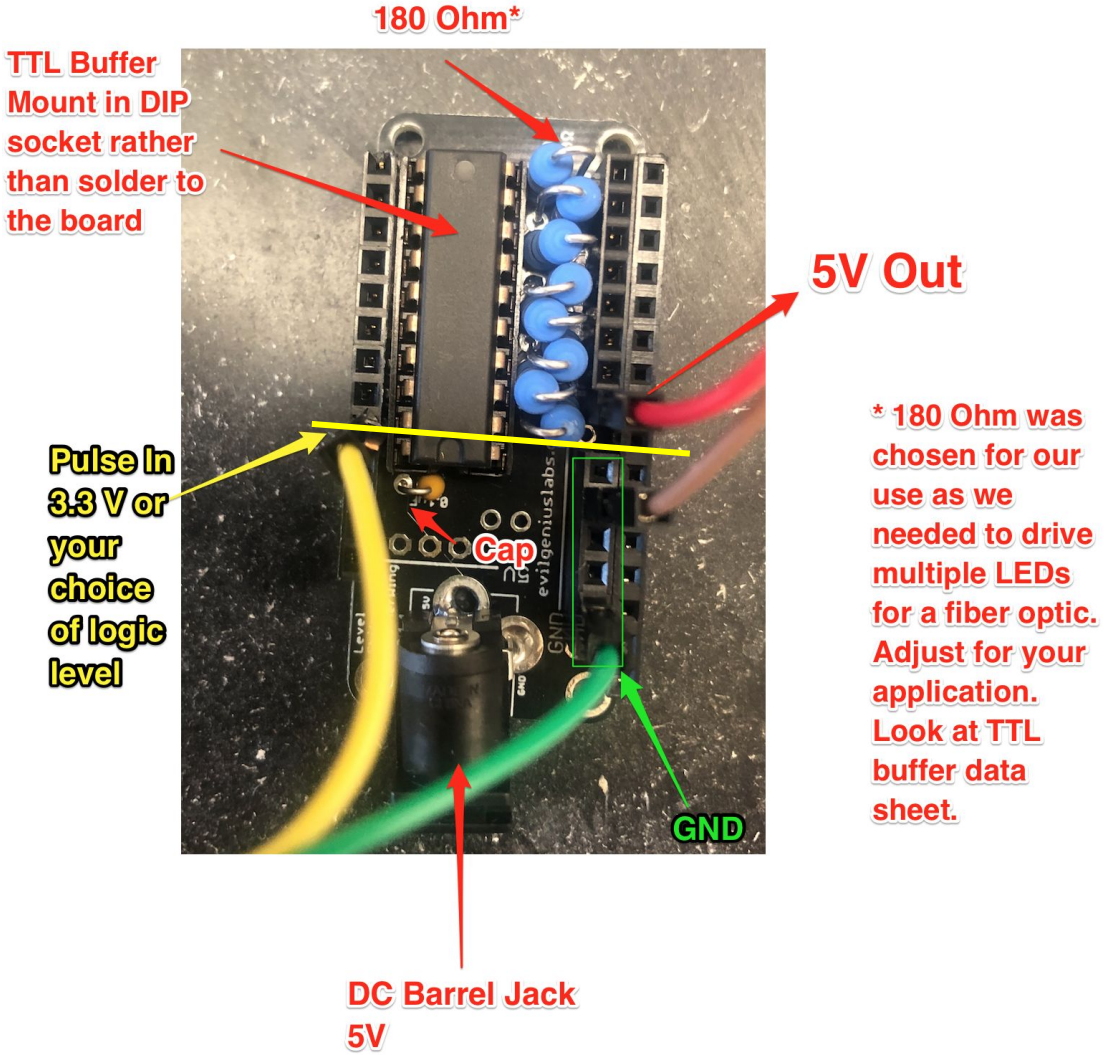
Depending upon the state of the DDS chip from the vendor it is possible that no signal will be observed on the output until the duty cycle pot is adjusted correctly. To verify, using a scope probe you can evaluate the output signal on the last 4 pins on the bottom right for an output signal.



Level Shifter Wiring

- Notice that the input of the TTL buffer is not horizontally aligned with the output. The offset is due to the board layout.

- MOUNT TTL buffer in socket so you can replace it if it blows.



Pulser File Format

- CSV
- Two columns
  - First column is the frequency
  - Second column is currently not used by the code but will be in a future iteration.
    - Set all values in this column to 127
  - Don’t change it.

Example:

320,127

350,127

380,127

1000,127

3000,127