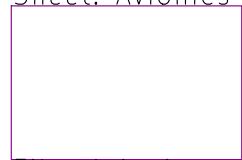


Sheet: Avionics



File: Avionics.sch

Sheet: Connectors



File: Connectors.sch

Sheet: Power



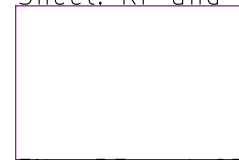
File: Power.sch

Sheet: Burn Wires



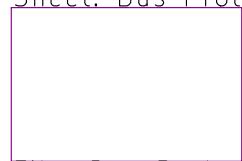
File: Burn\_Wires.sch

Sheet: RF and GPS



File: RF\_and\_GPS.sch

Sheet: Bus Protection



File: Bus\_Protection.sch

# PyCubed

**Max Holliday**

Sheet: /  
File: mainboard.sch

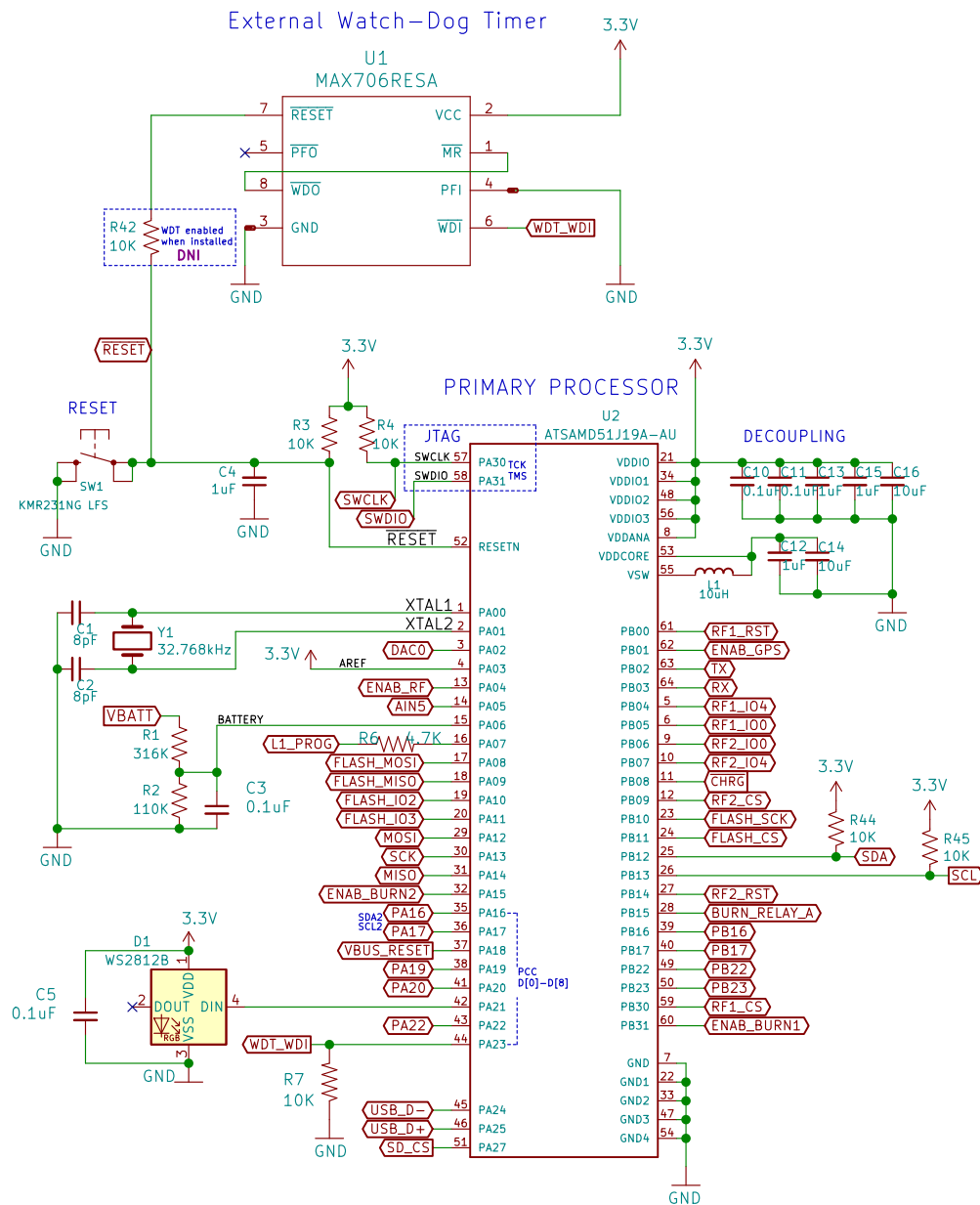
**Title: PyCubed Mainboard**

Size: A4 Date: 2021-06-09

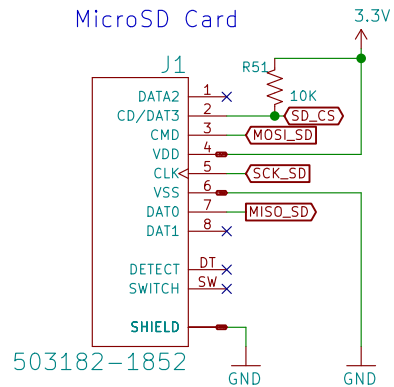
KiCad E.D.A. kicad (5.1.5)-3

**Rev: v05c**

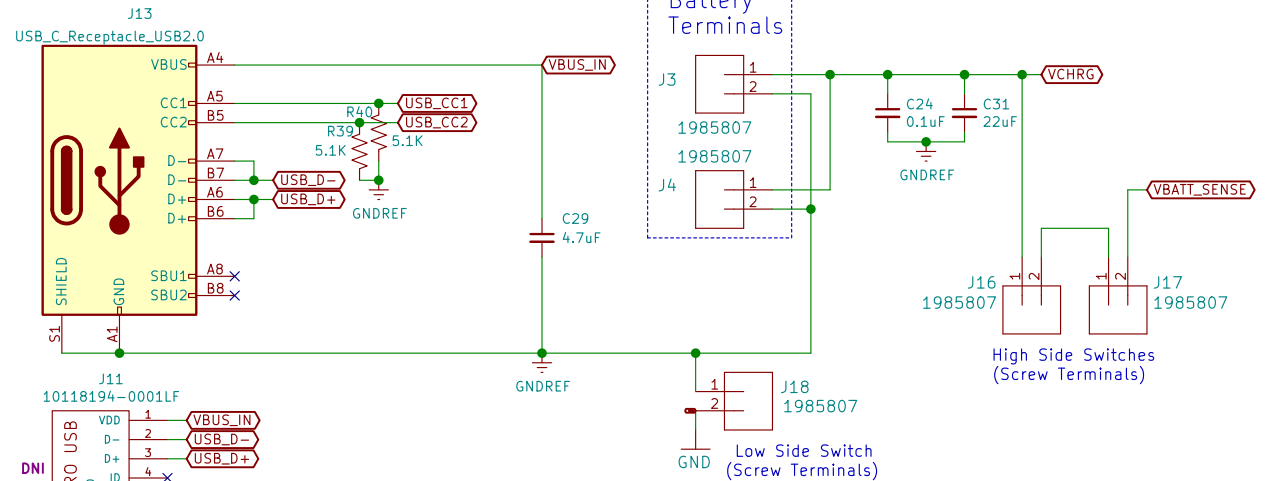
Id: 1/7



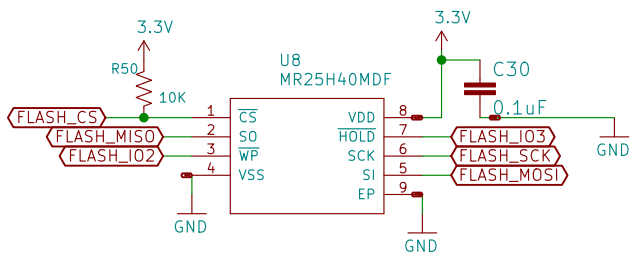
## MicroSD Card



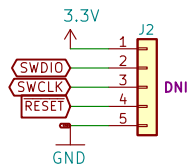
## Power Connectors: USB-C Power Delivery to 2S Li-ion Battery



## MRAM – Nonvolatile Memory (4MB storage)



## JTAG



NOTE: Components labeled "do not install" (DNI) are not populated by default

# Connectors

Max Holliday

Sheet: /Connectors/

File: Connectors.sch

Title: PyCubed Mainboard

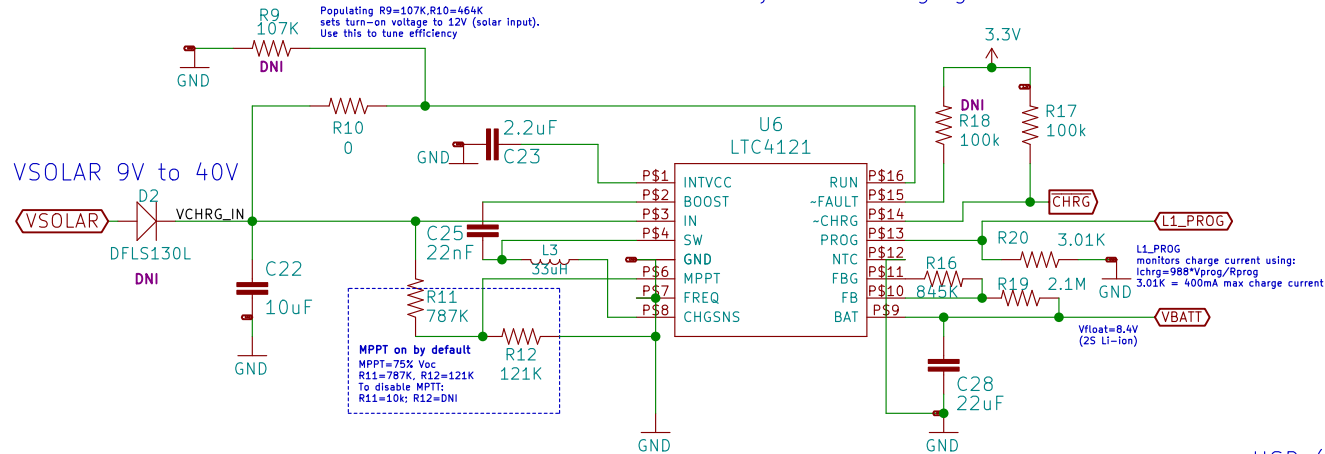
Size: A4 Date: 2021-06-09

KiCad E.D.A. kicad (5.1.5)-3

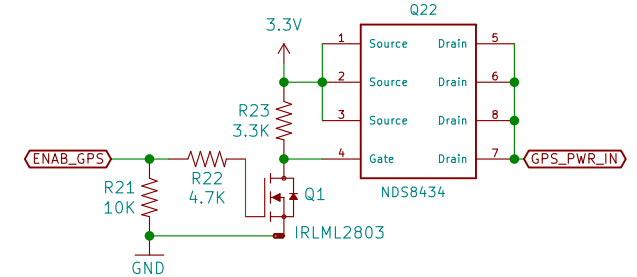
Rev: v05c

Id: 3/7

## 2S Li-Ion Battery Solar Charging Circuit



## GPS Power

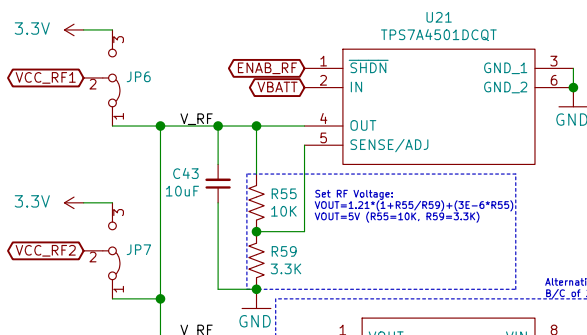


## RBF Jumpers

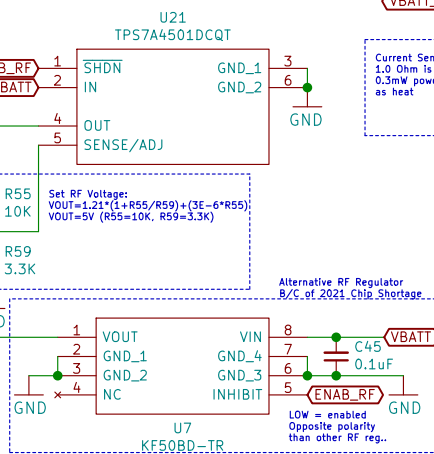
Add jumper to allow USB to power the board (even inside P-Pod).  
Add jumper to allow USB battery charging (even inside P-Pod).

Remove both jumpers before flight to remove risk of unknown BQ25883 radiation failure modes

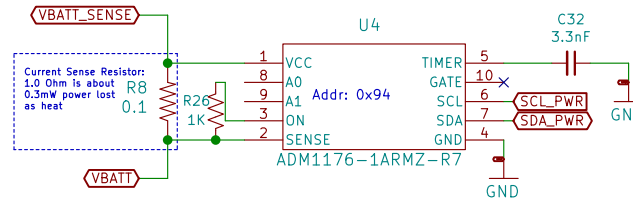
## Radio VDD Select



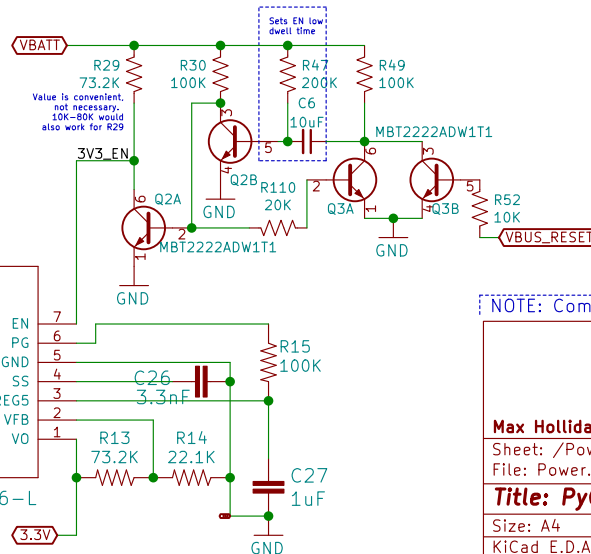
## RF Regulator



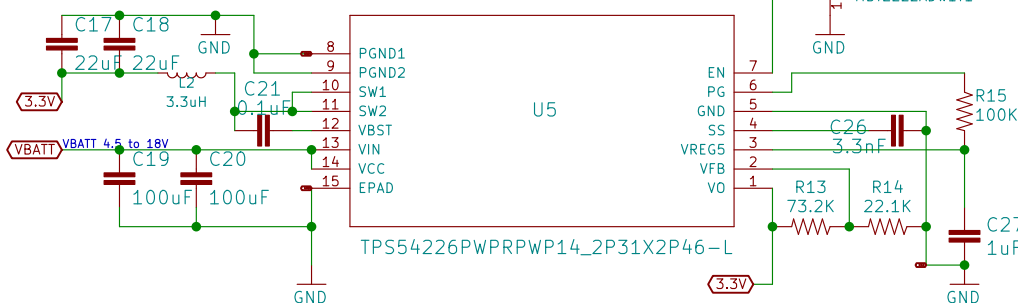
## Battery Power Monitor



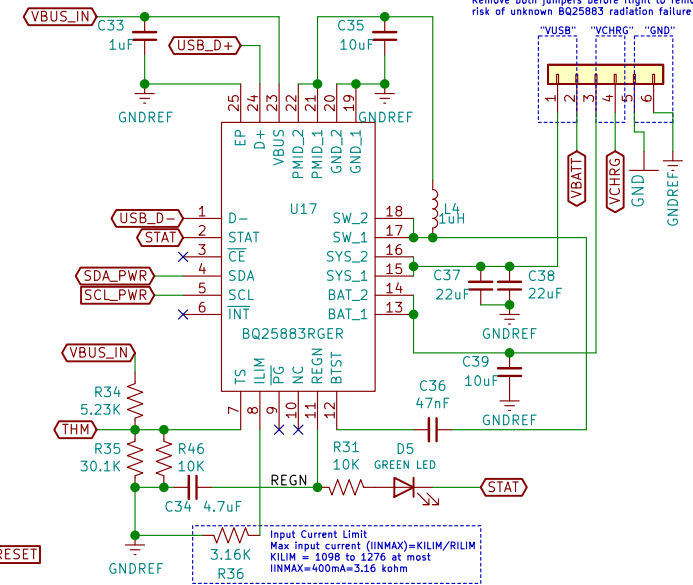
## "One Shot" Regulator Reset



## Regulator - 3.3V OUT



## USB (Boost) Charging for 2-cell Li-Ion



NOTE: Components labeled "do not install" (DNI) are not populated by default

# Power

Max Holliday

Sheet: /Power/

File: Power.sch

Title: PyCubed Mainboard

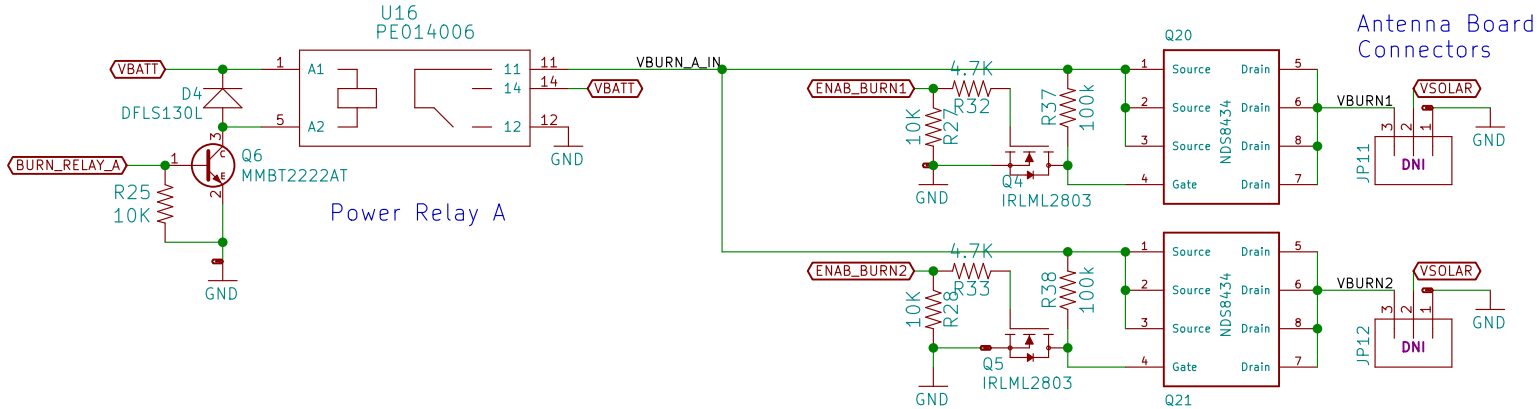
Size: A4 Date: 2021-06-09

KiCad E.D.A. kicad (5.1.5)-3

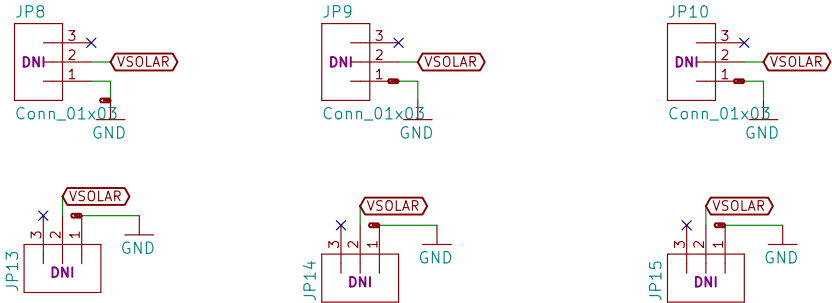
Rev: v05c

Id: 4/7

Burn Wire Control (Antenna Depolym)



Solar Panel Connectors

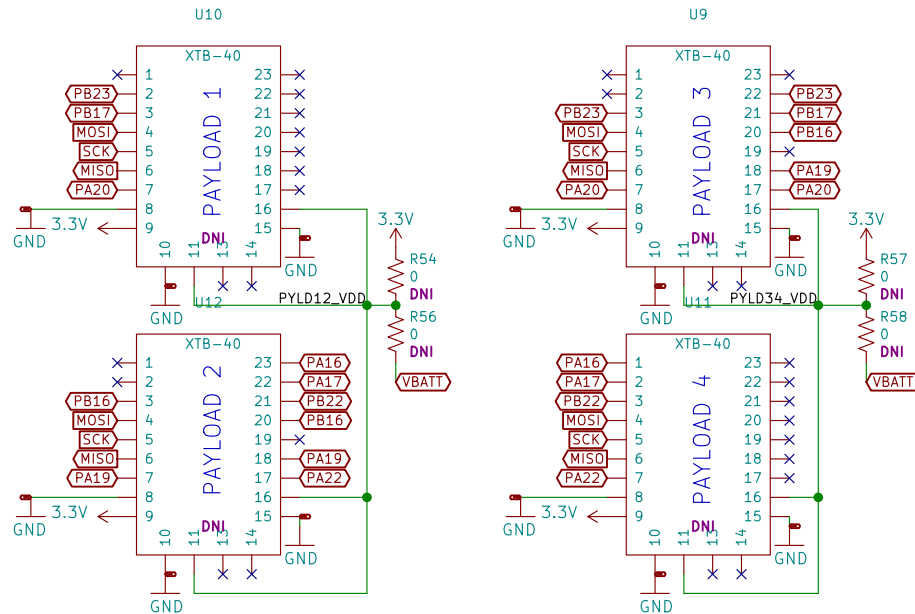


NOTE: Components labeled "do not install" (DNI) are not populated by default

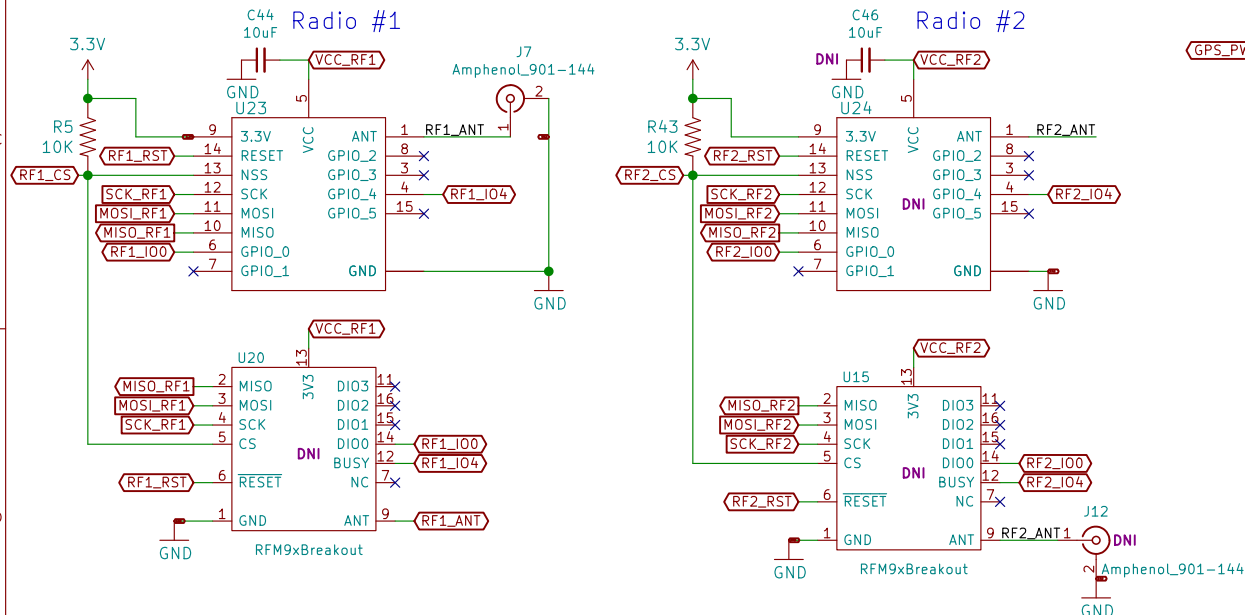
Burn Wires

Max Holliday	
Sheet: /Burn Wires/ File: Burn_Wires.sch	
Title: PyCubed Mainboard	
Size: A4	Date: 2021-06-09
KiCad E.D.A. kicad (5.1.5)-3	Rev: v05c Id: 5/7

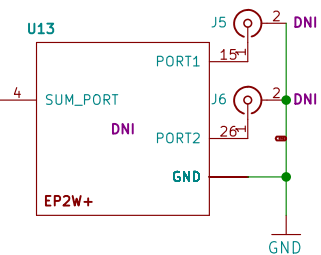
## Modular Payloads



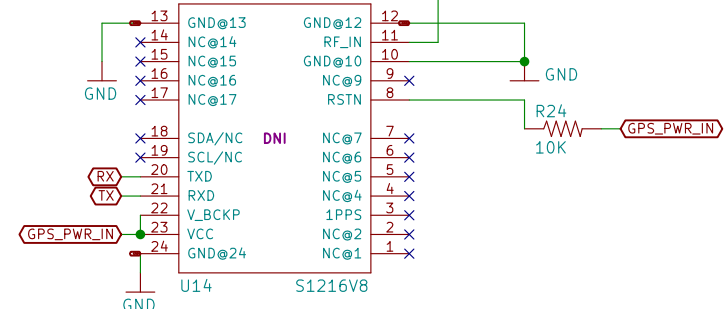
## Modular Radios (HopeRF format)



## RF Splitter (2 Way, 0deg DC-Pass)



## GPS Module



NOTE: Components labeled "do not install" (DNI) are not populated by default

# Radio, GPS, Payloads

Max Holliday

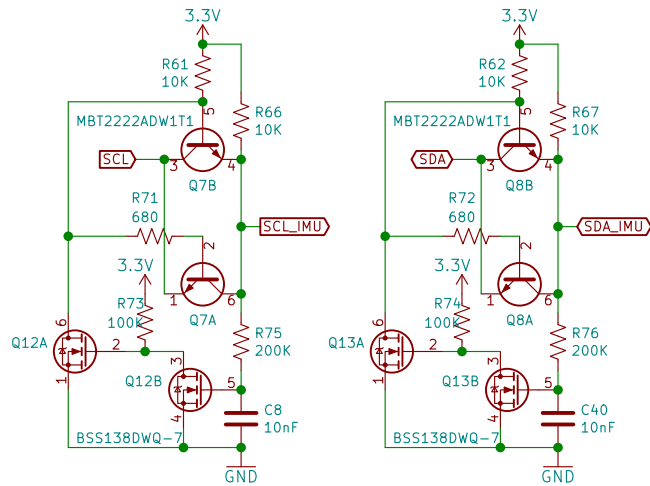
Sheet: /RF and GPS/  
File: RF\_and\_GPS.sch

Title: PyCubed Mainboard

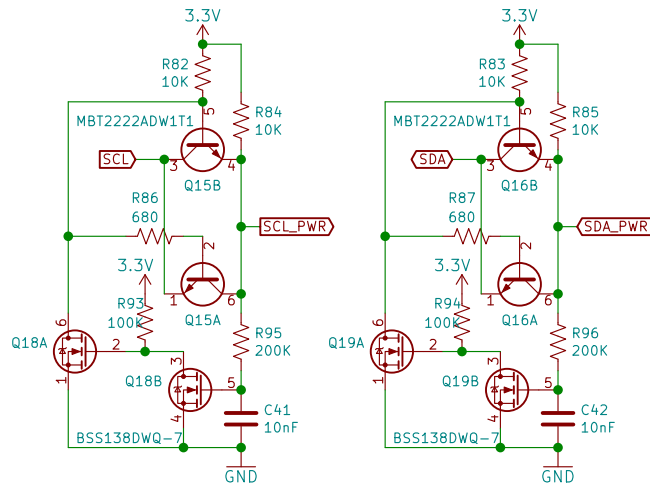
Size: A4 Date: 2021-06-09  
KiCad E.D.A. kicad (5.1.5)-3

Rev: v05c  
Id: 6/7

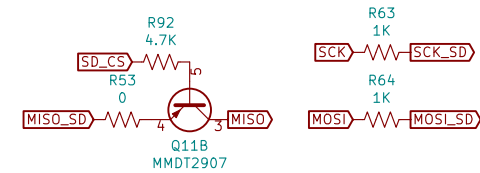
## I2C Bus Protection – IMU



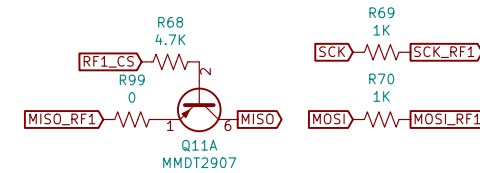
## I2C Bus Protection – Power Monitor & USB Charger



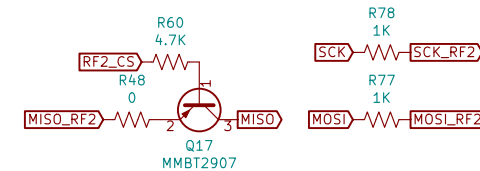
## SPI Bus Protection – SD Card and Payloads



## SPI Bus Protection – Radio 1



## SPI Bus Protection – Radio 2



### NOTE

These novel bus protection circuits prevent traditional I2C/SPI failure modes where a single slave failure can disable the entire bus.

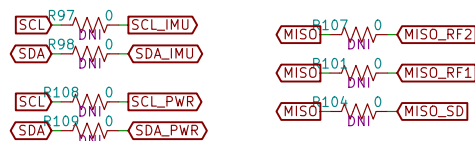
Learn more:  
<https://doi.org/10.36227/techrxiv.15166620>

By default, slave clock and/or data lines can be held low and the Master (SAMD51) will still be able to communicate with the remainder of the bus.

They can individually be bypassed by removing the transistor(s) and soldering the 0ohm the jumpers below.

NOTE: Components labeled "do not install" (DNI) are not populated by default

## Bus Protection – Bypass Jumpers



# Bus Protection

Max Holliday

Sheet: /Bus Protection/  
File: Bus\_Protection.sch

Title: PyCubed Mainboard

Size: A4 Date: 2021-06-09

KiCad E.D.A. kicad (5.1.5)-3

Rev: v05c

Id: 7/7