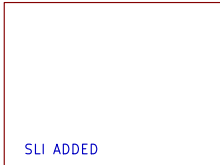
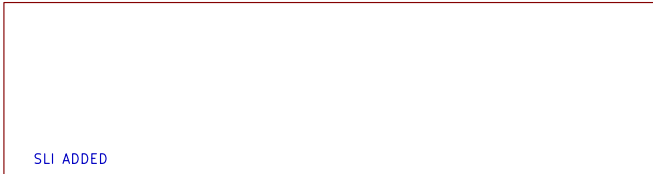
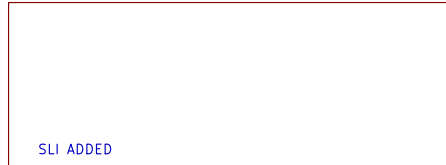
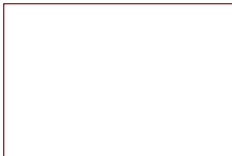
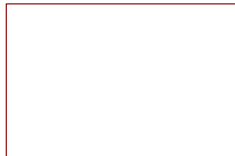
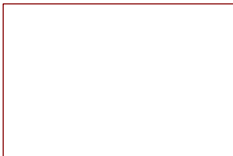
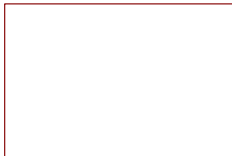
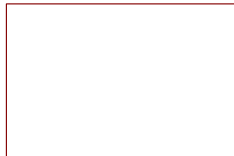
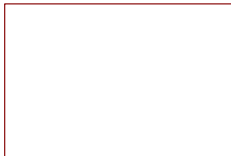
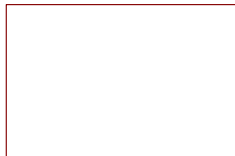
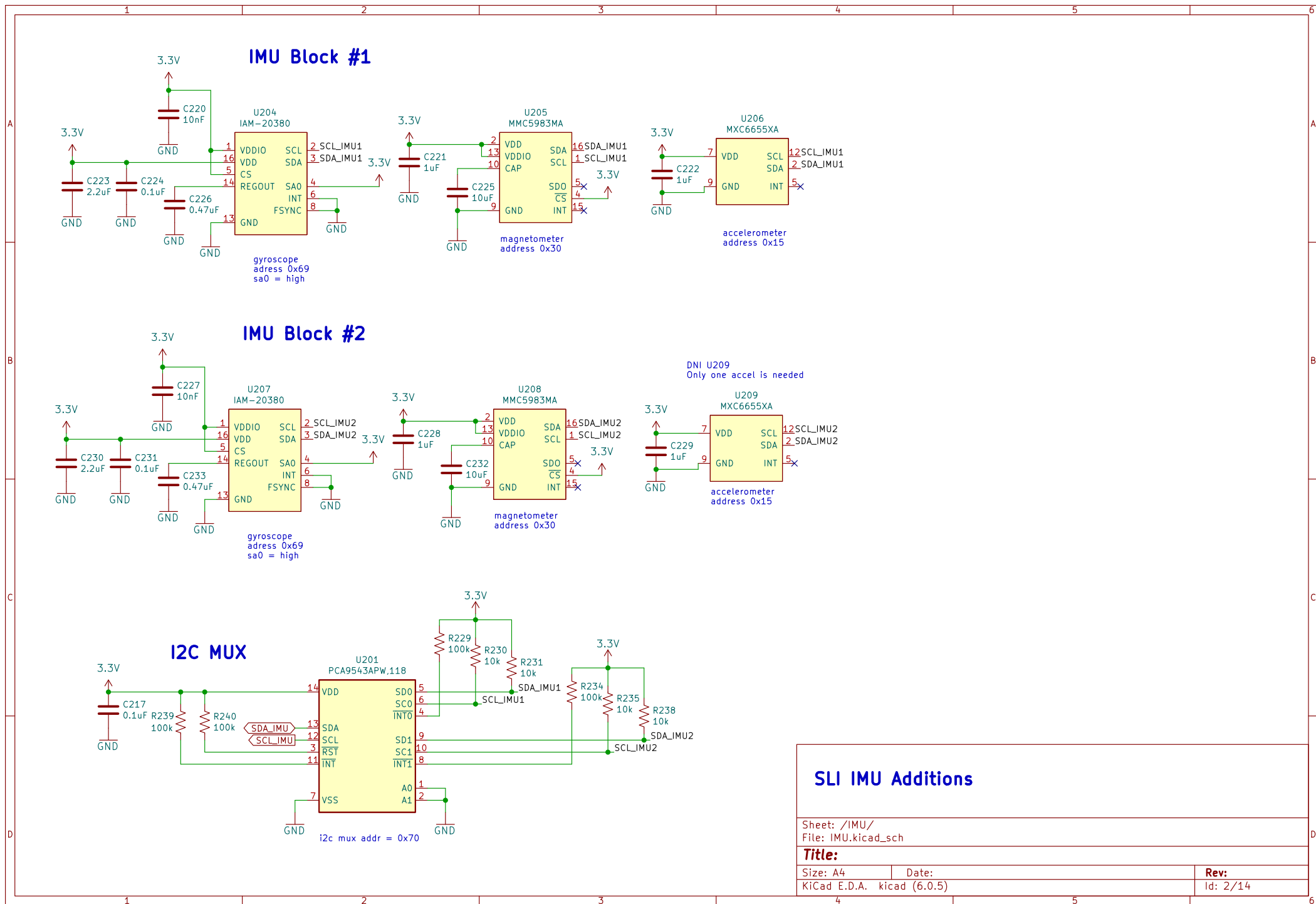
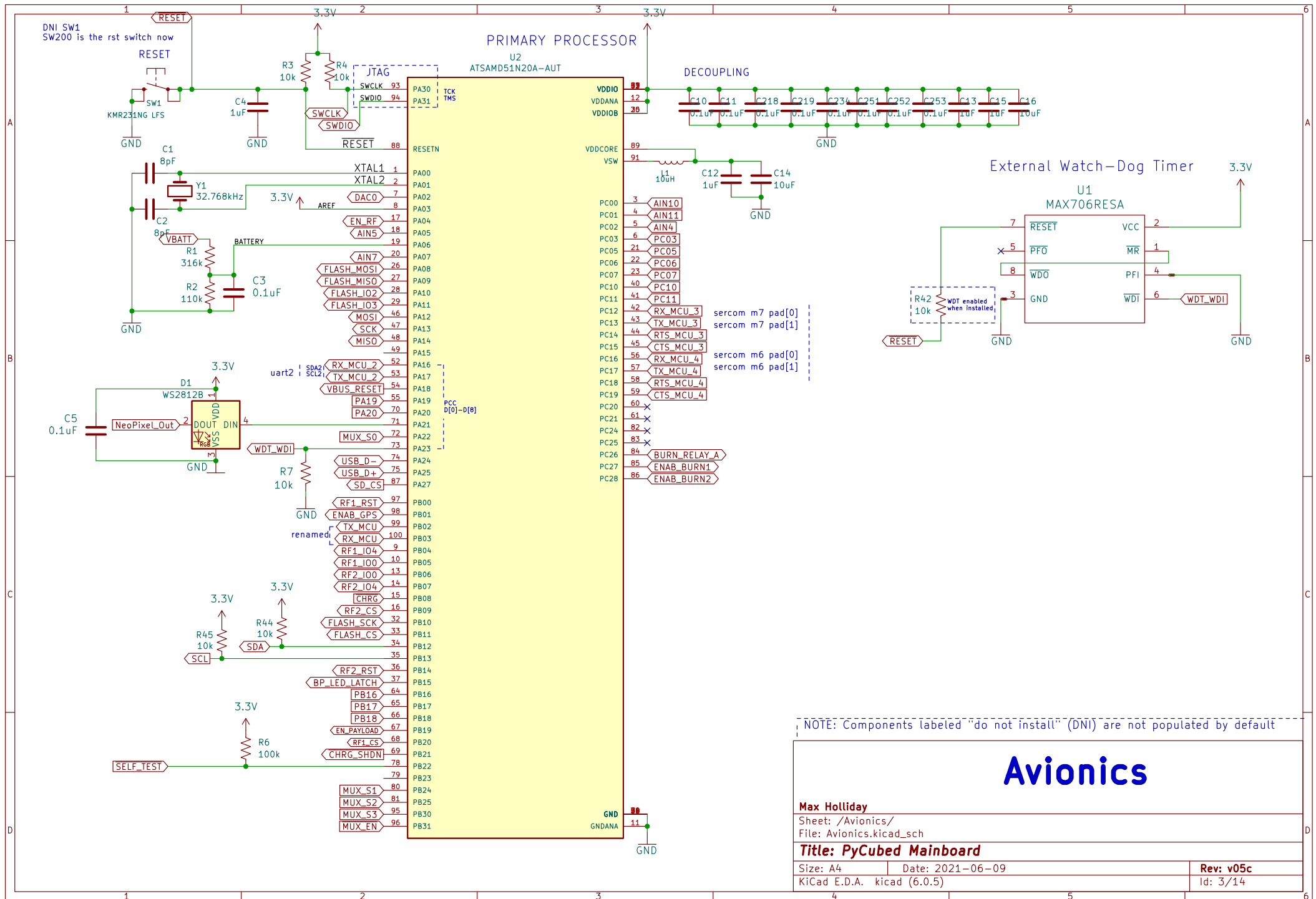


1	2	3	4	5	6				
A									
IMU		SLI_Card		Solar Charge Regulator					
									
File: IMU.kicad_sch		File: SLI-Backplane-Blank-Card-KiCad.kicad_sch		File: Solar Charge Regulator.kicad_sch					
adc_mux									
									
File: analog_mux.kicad_sch									
SLI CHANGES ~~~									
-----									
Avionics		Connectors		Power					
									
File: Avionics.kicad_sch		File: Connectors.kicad_sch		File: Power.kicad_sch					
				Burn Wires					
									
				RF and GPS					
									
				File: RF_and_GPS.kicad_sch					
Bus Protection									
									
File: Bus_Protection.kicad_sch									
D									
<div><div>PyCubed</div><div>Max Holliday</div><div>Sheet: / File: mainboard.kicad_sch</div><div>Title: <b>PyCubed Mainboard</b></div><div>Size: A4Date: 2021-06-09KiCad E.D.A. kicad (6.0.5)</div><div>Rev: v05cId: 1/14</div></div>									
1	2	3	4	5	6				





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

# Avionics

Max Holliday

Sheet: /Avionics/  
File: Avionics.kicad\_sch

**Title: PyCubed Mainboard**

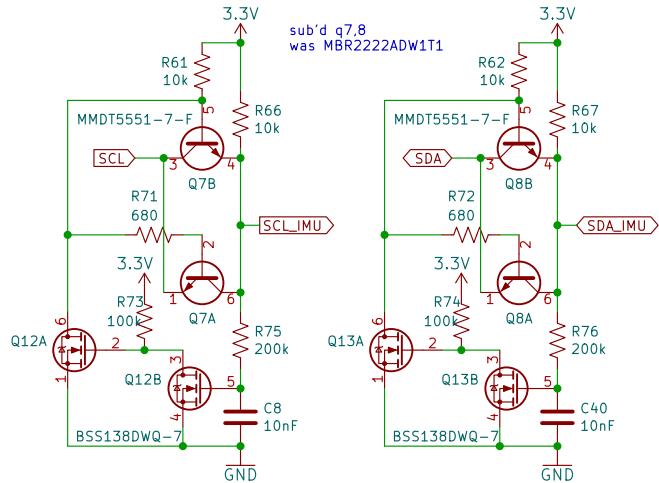
Size: A4 Date: 2021-06-09

KiCad E.D.A. kicad (6.0.5)

Rev: v05c

Id: 3/14

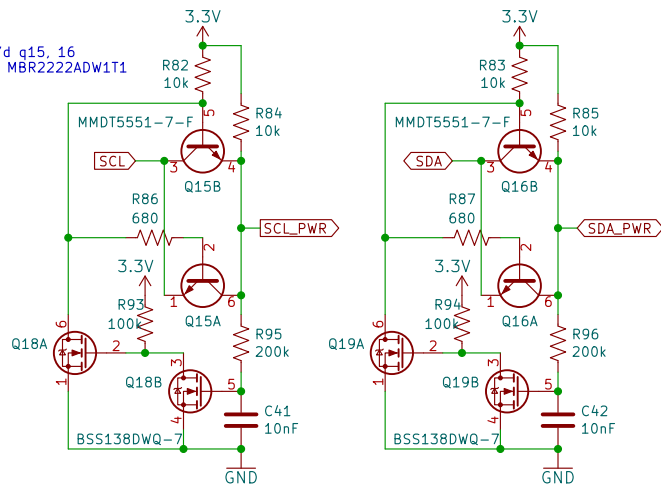
## I2C Bus Protection – IMU



sub'd q7,8  
was MBR2222ADW1T1

## I2C Bus Protection – Power Monitor & USB Charger

sub'd q15, 16  
was MBR2222ADW1T1



## NOTE

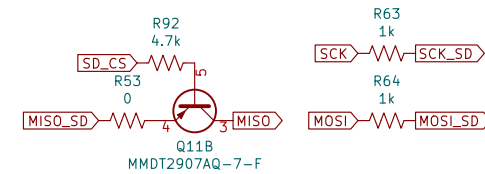
These novel bus protection circuits prevent traditional I2C/SPI failure modes where a single slave failure can disable the entire bus.

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

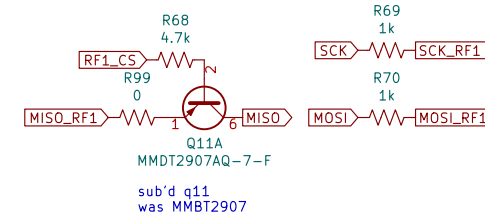
By default, slave clock and/or data lines can be held low and the Master (SAMD51) will still be able to communicate with the remainder of the bus.

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

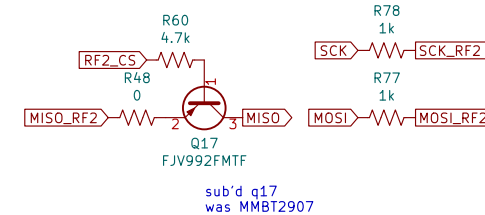
## SPI Bus Protection – SD Card and Payloads



## SPI Bus Protection – Radio 1



## SPI Bus Protection – Radio 2



sub'd q17  
was MMBT2907

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.kicad\_sch

Title: PyCubed Mainboard

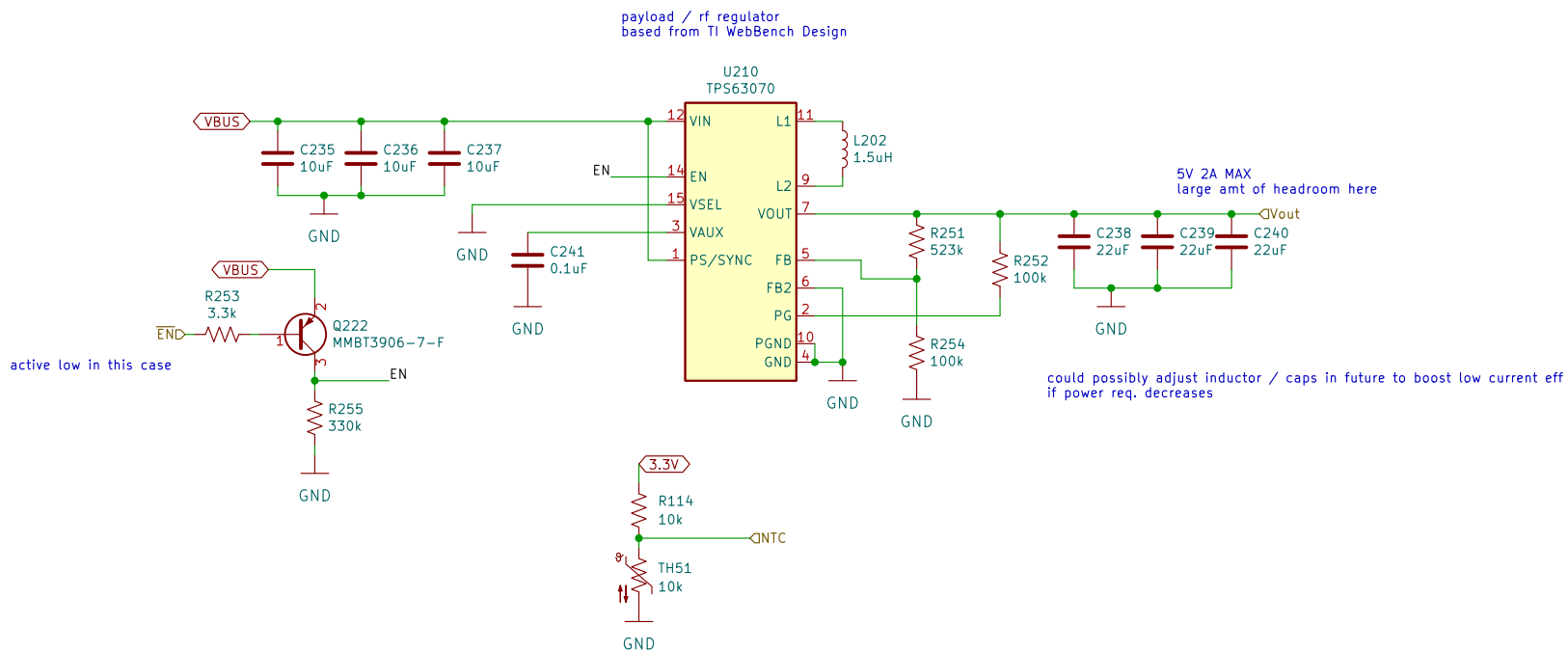
Size: A4 Date: 2021-06-09

KiCad E.D.A. kicad (6.0.5)

Rev: v05c

Id: 4/14





Sheet: /SLI\_Card/Payload\_Regulator/  
File: 5V\_regulator.kicad\_sch

**Title:**

Size: A4

Date:

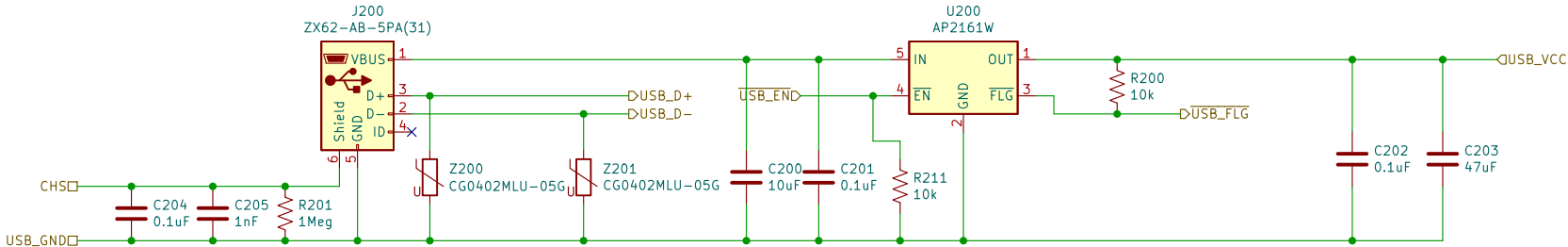
KiCad E.D.A. kicad (6.0.5)

**Rev:**

Id: 6/14

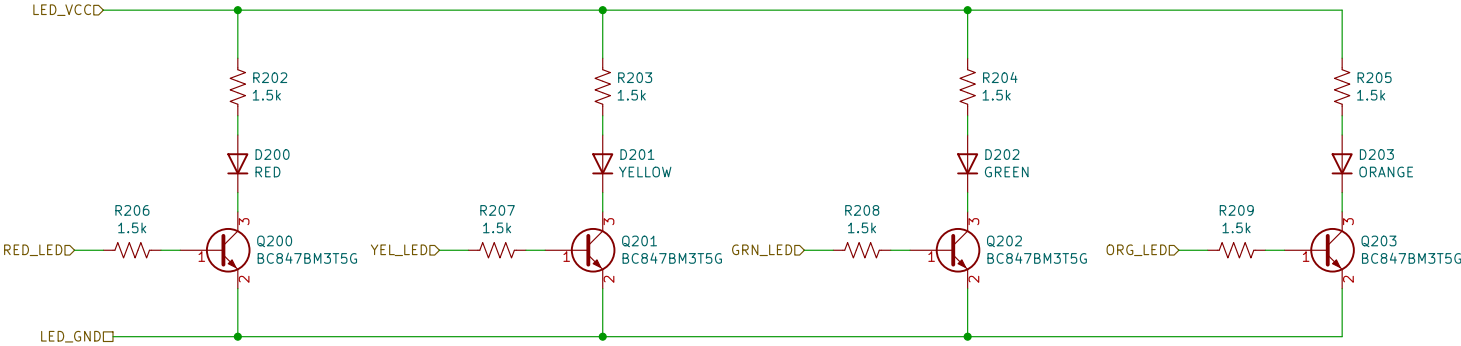
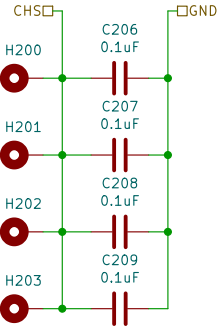
# USB protection

U200 limits USB current to 1.5A (1A rec by mfr.)

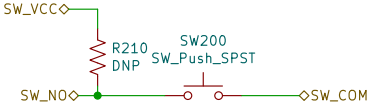


# LEDs

## Mounting Holes



# Switch



Sheet: /SLI\_Card/Blank-Card-Default/  
File: Blank-Card-Default.kicad\_sch

## Title:

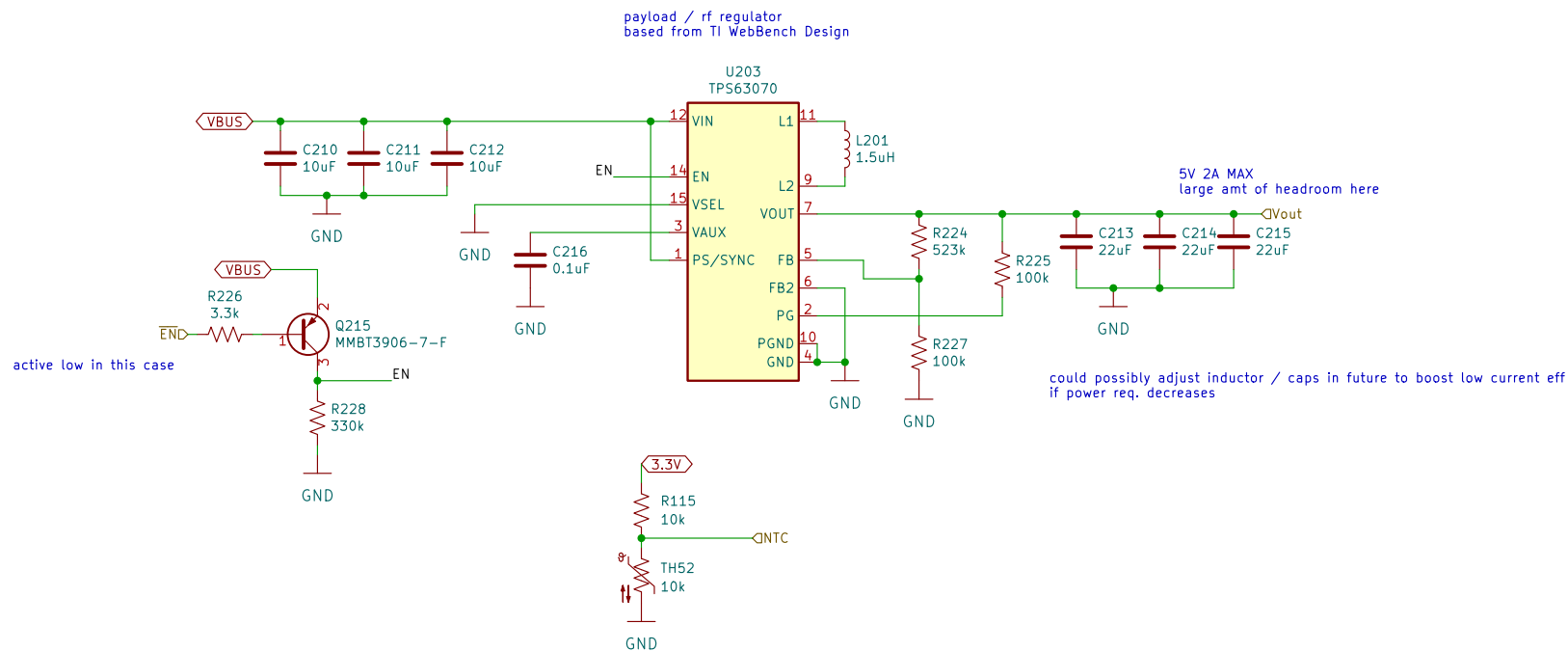
Size: A4

Date:

KiCad E.D.A. kicad (6.0.5)

Rev:

Id: 7/14



Sheet: /SLI\_Card/RF\_Regulator/  
File: 5V\_regulator.kicad\_sch

**Title:**

Size: A4

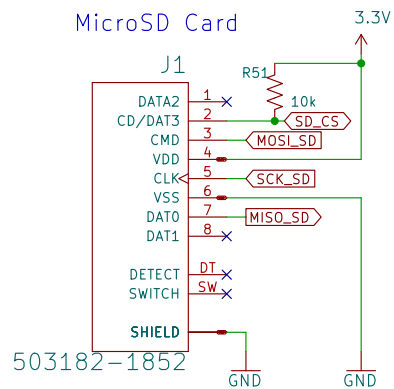
Date:

KiCad E.D.A. kicad (6.0.5)

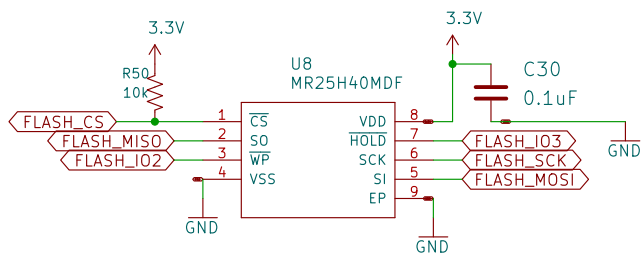
**Rev:**

Id: 8/14

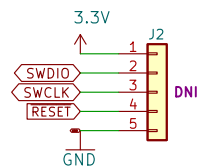




MRAM – Nonvolatile Memory  
(4MB storage)



JTAG



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

# Connectors

Max Holliday

Sheet: /Connectors/

File: Connectors.kicad\_sch

Title: PyCubed Mainboard

Size: A4

Date: 2021-06-09

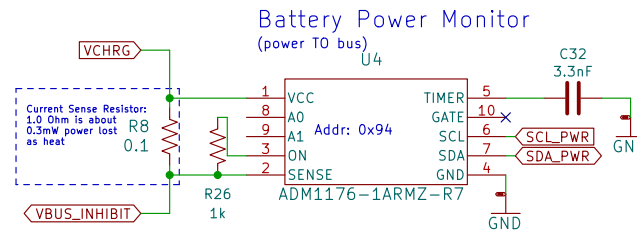
Rev: v05c

KiCad E.D.A. kicad (6.0.5)

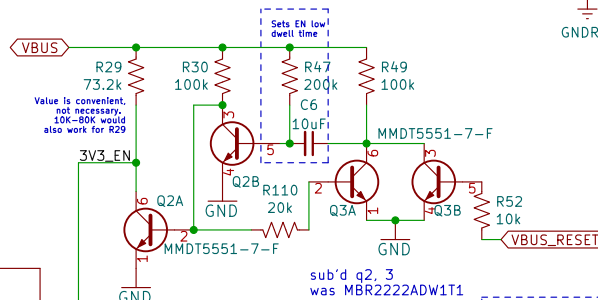
Id: 9/14

Solar Charge Regulator  
replaced

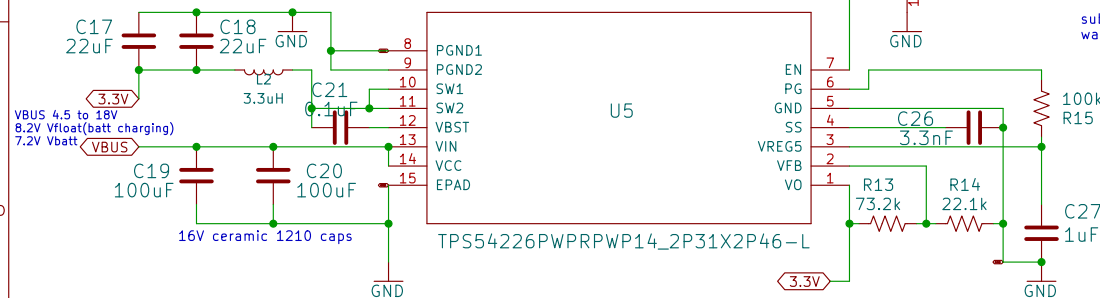
RF Regulator  
replaced



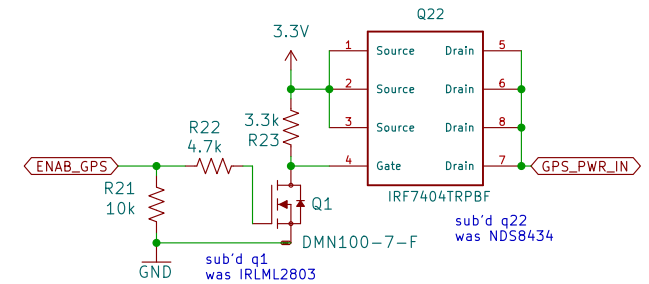
"One Shot" Regulator Reset



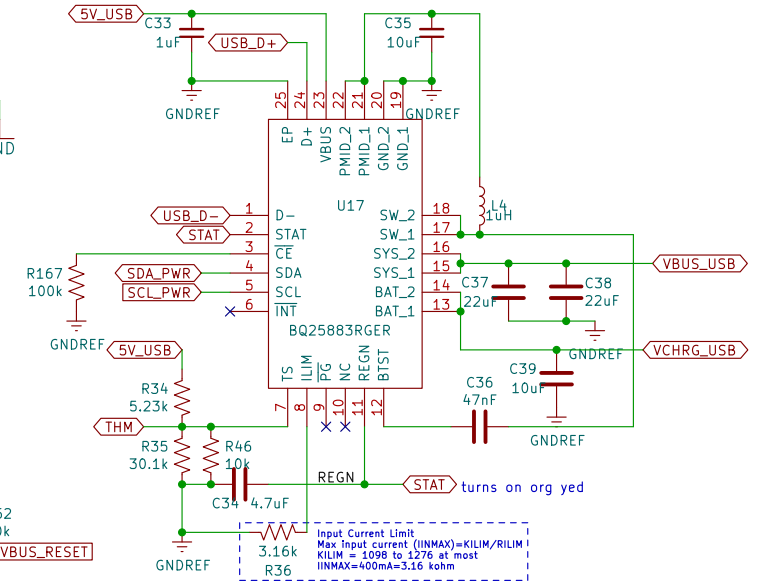
Regulator – 3.3V OUT



GPS Power Switch



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.kicad\_sch

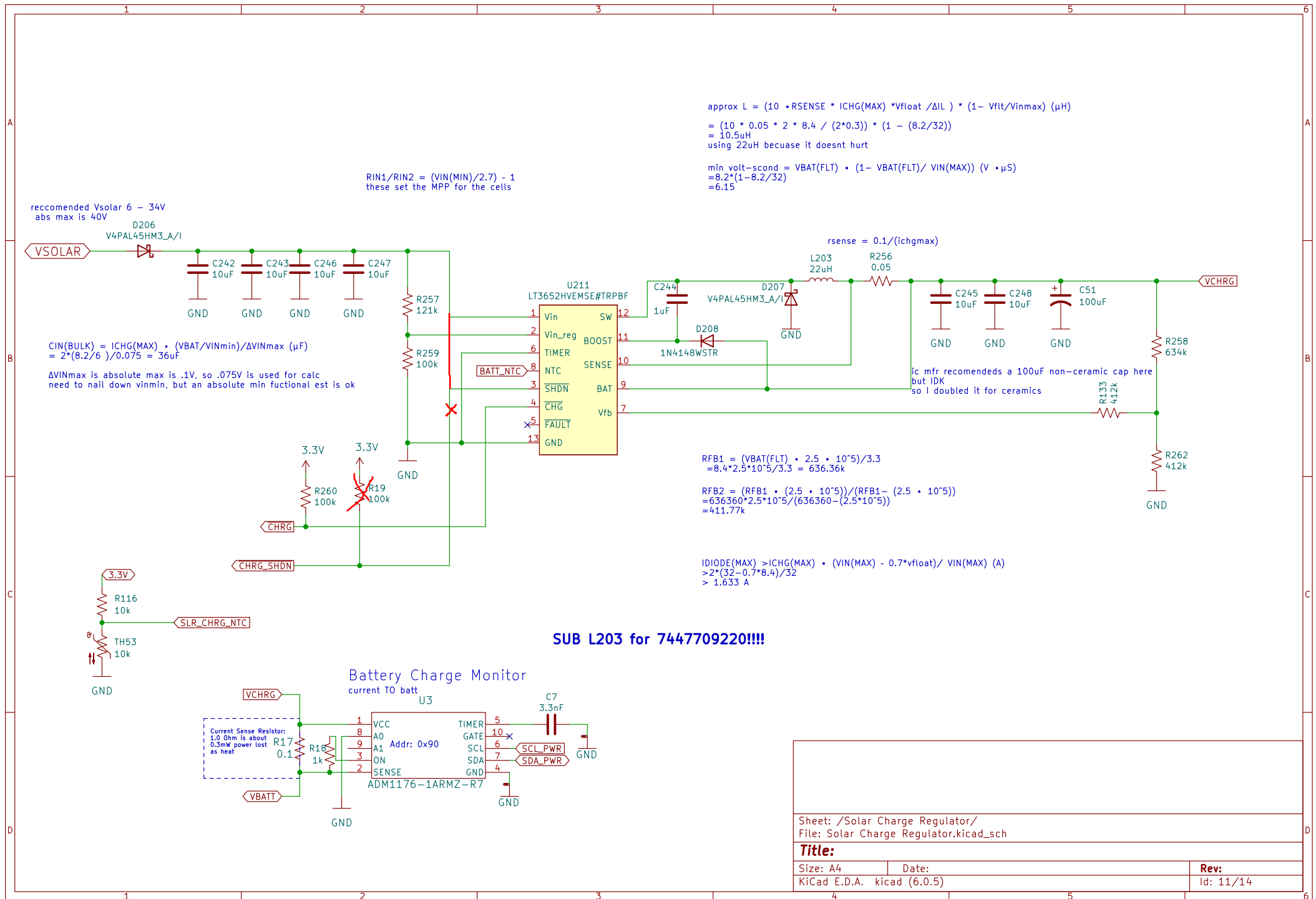
Title: PyCubed Mainboard

Size: A4  
KiCad E.D.A. kicad (6.0.5)

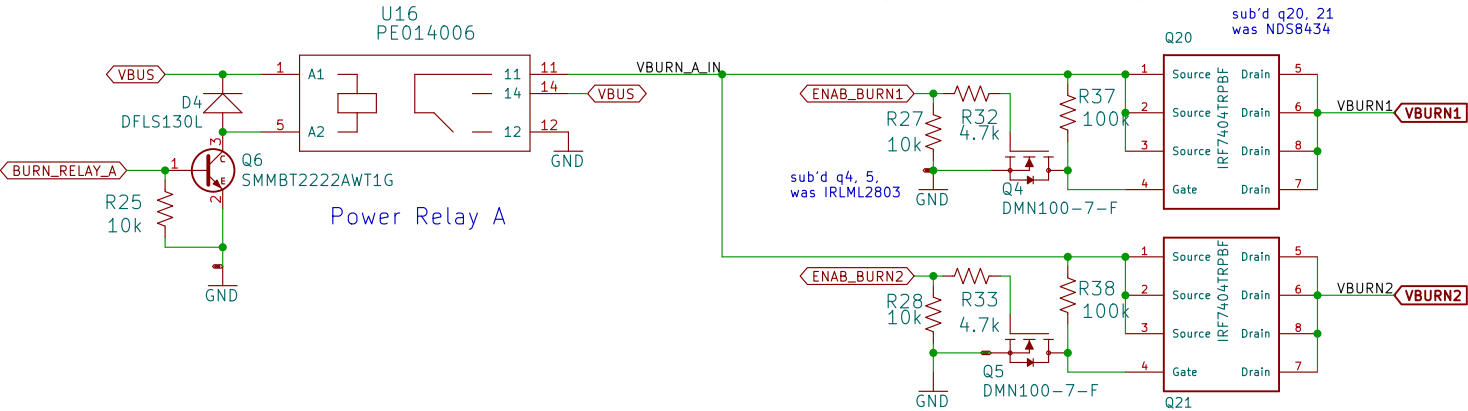
Date: 2021-06-09

Rev: v05c

Id: 10/14



Burn Wire Control (Antenna Depolyment)



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

# Burn Wires

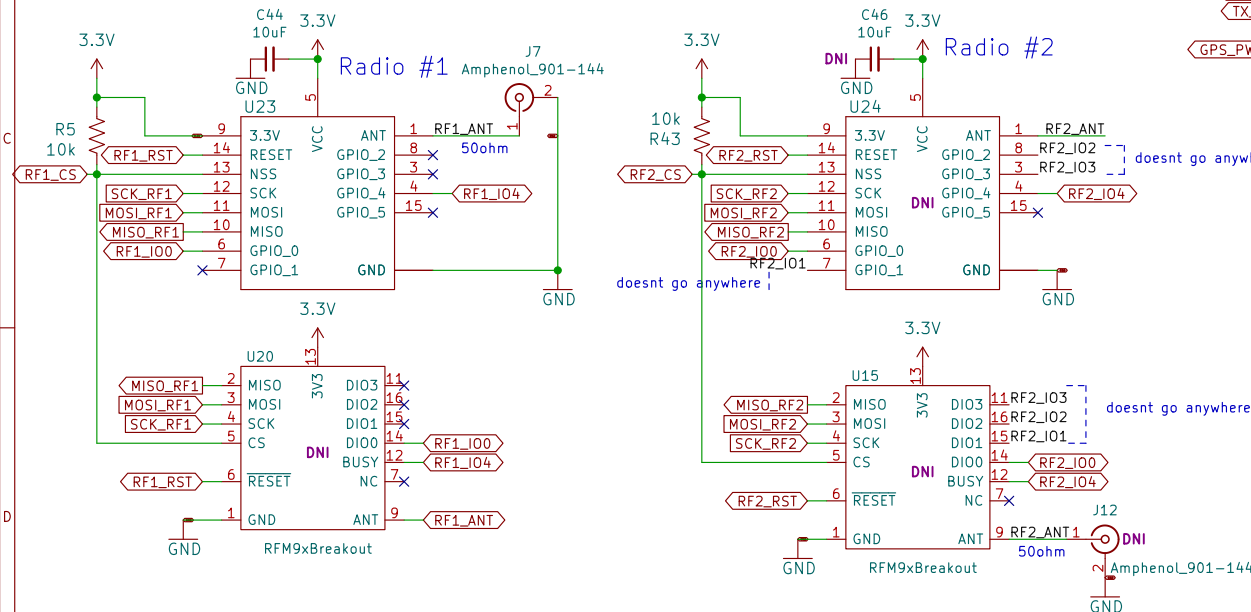
Max Holliday		
Sheet: /Burn Wires/		
File: Burn_Wires.kicad_sch		
Title: PyCubed Mainboard		
Size: A4	Date: 2021-06-09	Rev: v05c
KiCad E.D.A. kicad (6.0.5)		Id: 12/14

# Modular Payloads

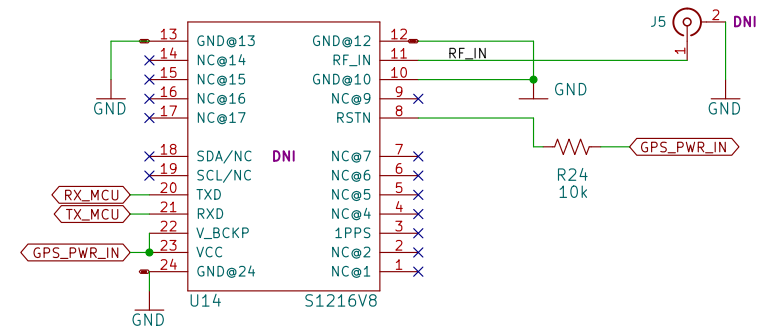
removed

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

## Modular Radios (HopeRF format)



## 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.kicad\_sch

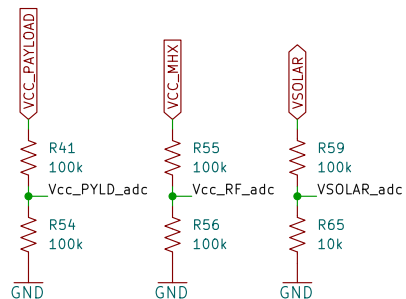
Title: PyCubed Mainboard

Size: A4 Date: 2021-06-09

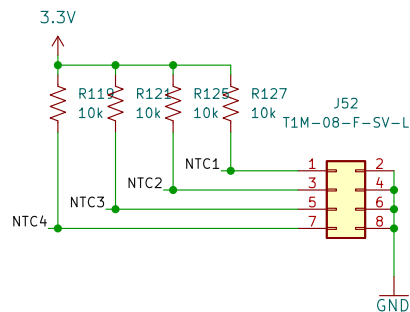
KiCad E.D.A. kicad (6.0.5)

Rev: v05c

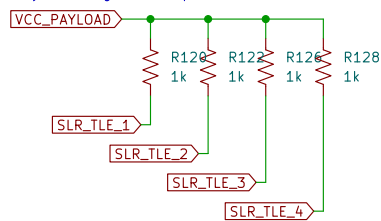
Id: 13/14



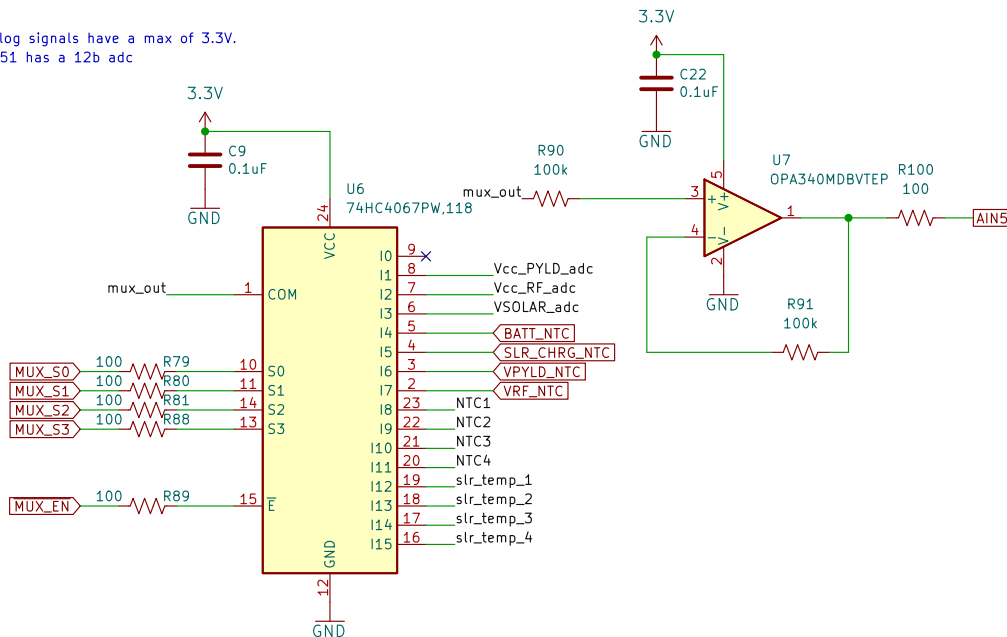
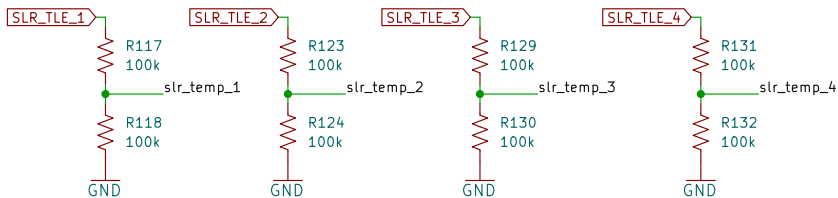
all analog signals have a max of 3.3V.  
atdamd51 has a 12b adc



lm355a is rated to 100degC  
arbitrarily selecting max temp sensed as 400K - 125C



really should have an op amp here but board space is already constrained



Sheet: /adc\_mux/  
File: analog\_mux.kicad\_sch

**Title:**

Size: A4

Date:

KiCad E.D.A. kicad (6.0.5)

**Rev:**

Id: 14/14