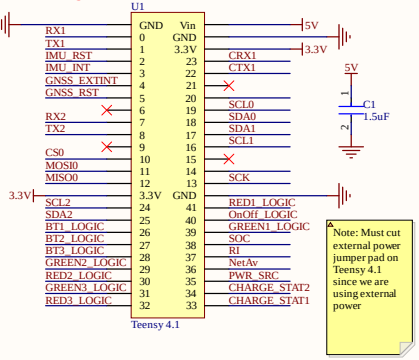
Teensy and IMU

Teensy 4.1



Note: Must cut external power jumper pad on Teensy 4.1 since we are using external power

GPIOs:

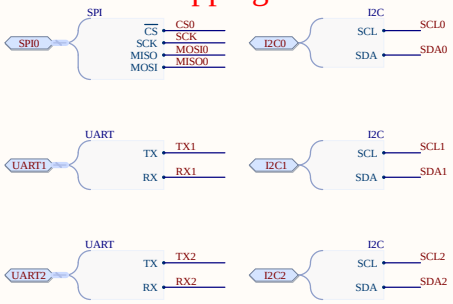
Outputs:
- IMU_RST (Active Low): Reset, Pull low to reset the sensor
- GNSS_EXTINT: Customizable GNSS module external interupt
- GNSS_RST (Active Low): Reset, Drive low to reset the GNSS module
- RED1_LOGIC, RED2_LOGIC, RED3_LOGIC, GREEN1_LOGIC, GREEN2_LOGIC, GREEN3_LOGIC (Active Low): Light up external RGY LEDs
- Onoff_LOGIC: Iridium on = low, Iridium off = high

Inputs:
- IMU_INT (Active Low): Interrupt/Data Ready. Indicates that the BNO085 needs the host's attention
- PWR_SRC: high= usb pwr, low = bat pwr
- CHARGE_STAT1, CHARGE_STAT2: See datasheet for state diagram
- NetAv (Active High): Iridium Network Available signal
- RI (Active Low): Iridium Ring Indicator signal
- BT1_LOGIC, BT2_LOGIC, BT3_LOGIC (Active High): External pushbutton press activated

Bidirectional:

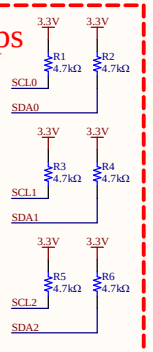
Analog Inputs:
- SOC: 1/2 of real PWR_SEL votlage. Need to map real voltage to % state of battery charge

Serial I/O Mapping

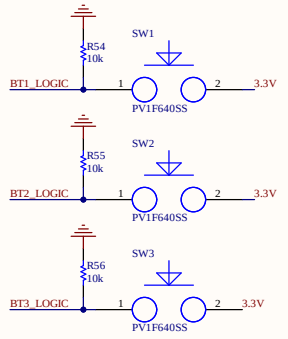


I2C Pullups

Using SCL0 for main communciation. Pull up resistors not populated since IMU daughter board has SDA and SCL 10k pull up resistors already connected.

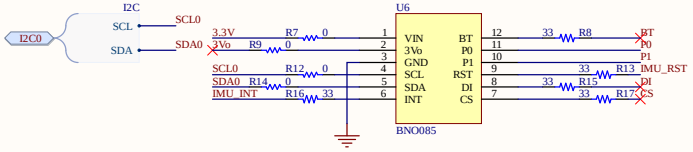


External Buttons

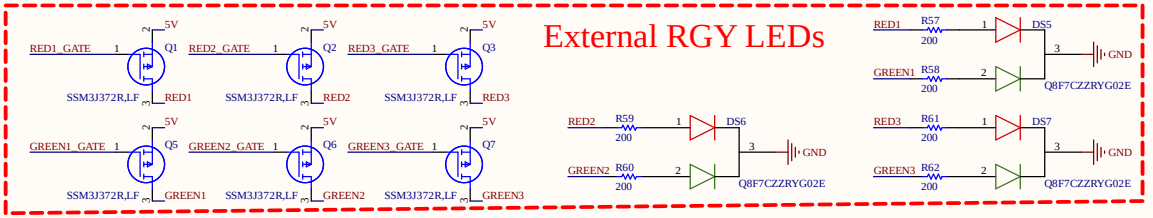


MFPN: PV1F640SS
Switch Function: OFF - (ON)
Termination Style: Screw
Will interface with PCB via PTHs
SW3 optional

IMU

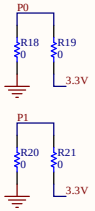


External RGY LEDs



IMU Communication Select

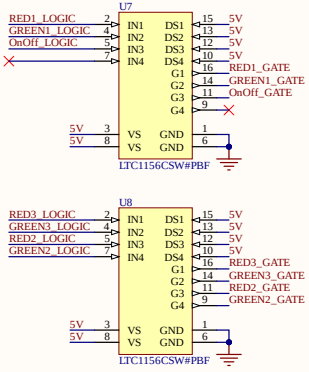
I2C (Default):
7-bit Address = 0x4A
SCL and SDA already pulled up (10k)



PS1	PS0	BNO08X (BOOTN=1)	BNO08X bootloader (BOOTN=0)
0	0	I²C	I²C
0	1	UART-RVC	Reserved
1	0	UART	UART
1	1	SPI	SPI

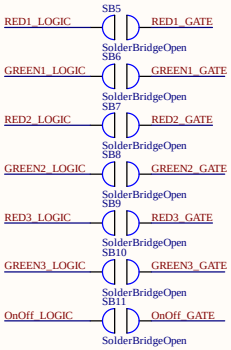
Figure 1-5: Protocol selection for BNO08X

LED Gate Drivers



Gate Drive Bypass

Short solder bridges together to bypass gate drivers if unpopulated



Project Name:	Capstone PCB.PrjPcb
Drawer:	Cameron Gordon
Variant:	[No Variations]
Revision:	V1.0
Date:	9/14/2023
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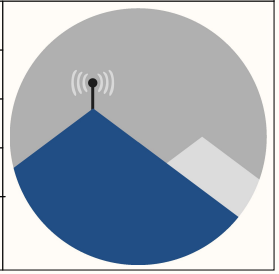
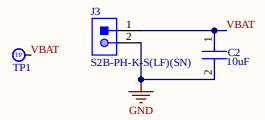
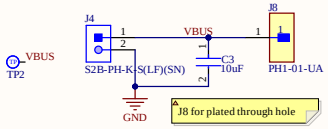


Power Management

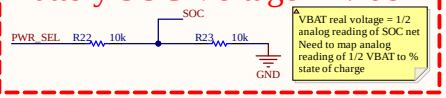
Battery Connector



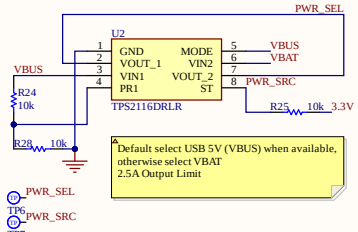
USB 5V Connector



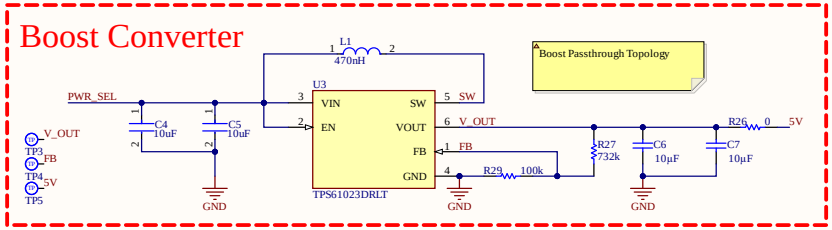
Battery SOC Voltage Divider



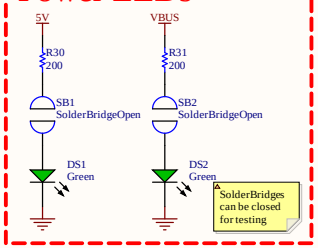
Power MUX



Boost Converter



Power LEDs



Battery Charger

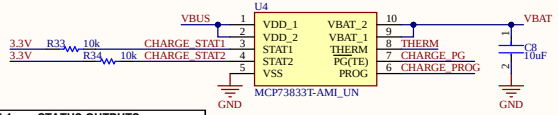
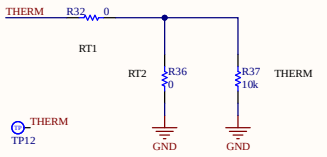


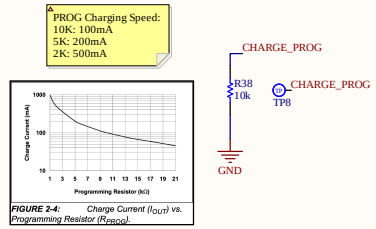
TABLE 5-1: STATUS OUTPUTS

Charge Cycle State	STAT1	STAT2	PG
Shutdown	Hi-Z	Hi-Z	Hi-Z
Standby	Hi-Z	Hi-Z	L
Charge in Progress	L	Hi-Z	L
Charge Complete (EOC)	Hi-Z	L	L
Temperature Fault	Hi-Z	Hi-Z	L
Timer Fault	Hi-Z	Hi-Z	L
System Test Mode	L	L	L

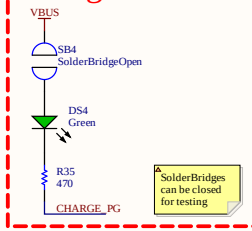
Charge Temperature Set



Charge Current Set



Charge PG LEDs



Project Name:	Capstone PCB.PrjPcb
Drawer:	Cameron Gordon
Variant:	[No Variations]
Revision:	V1.0
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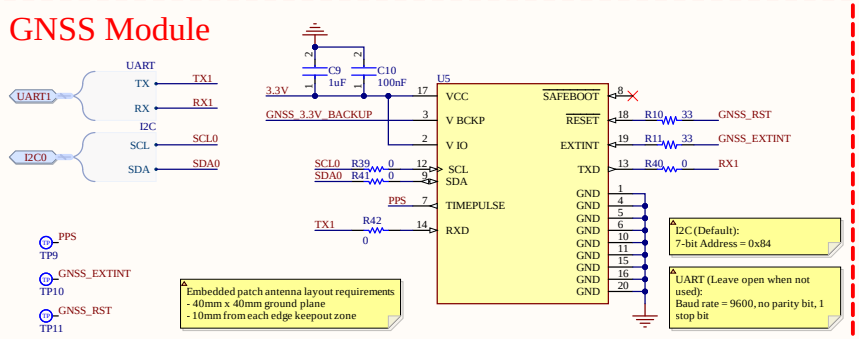
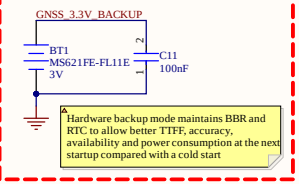
GNSS Module and Iridium Transceiver

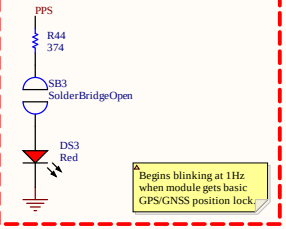
GNSS Module



GNSS Backup 3.3V

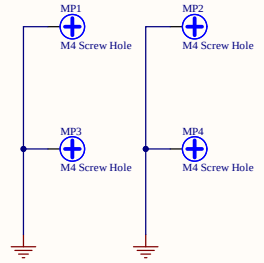


Position Lock LED



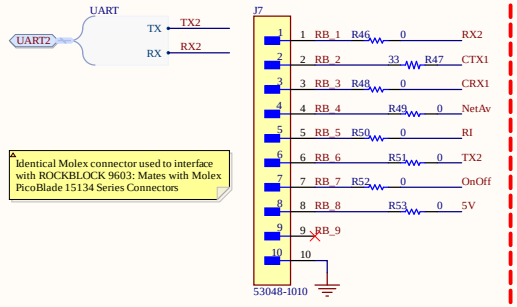
Mechanical

Mounting



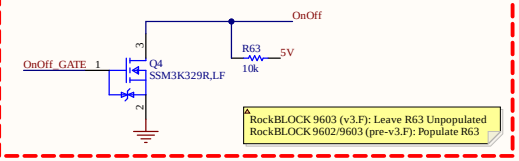
Fiducials

ROCKBLOCK 9603 Connector



ROCKBLOCK 9603 Breakout Header

ROCKBLOCK 9603 OnOff Control



Project Name:	Capstone PCB.PrjPcb
Drawer:	Cameron Gordon
Variant:	[No Variations]
Revision:	V1.0
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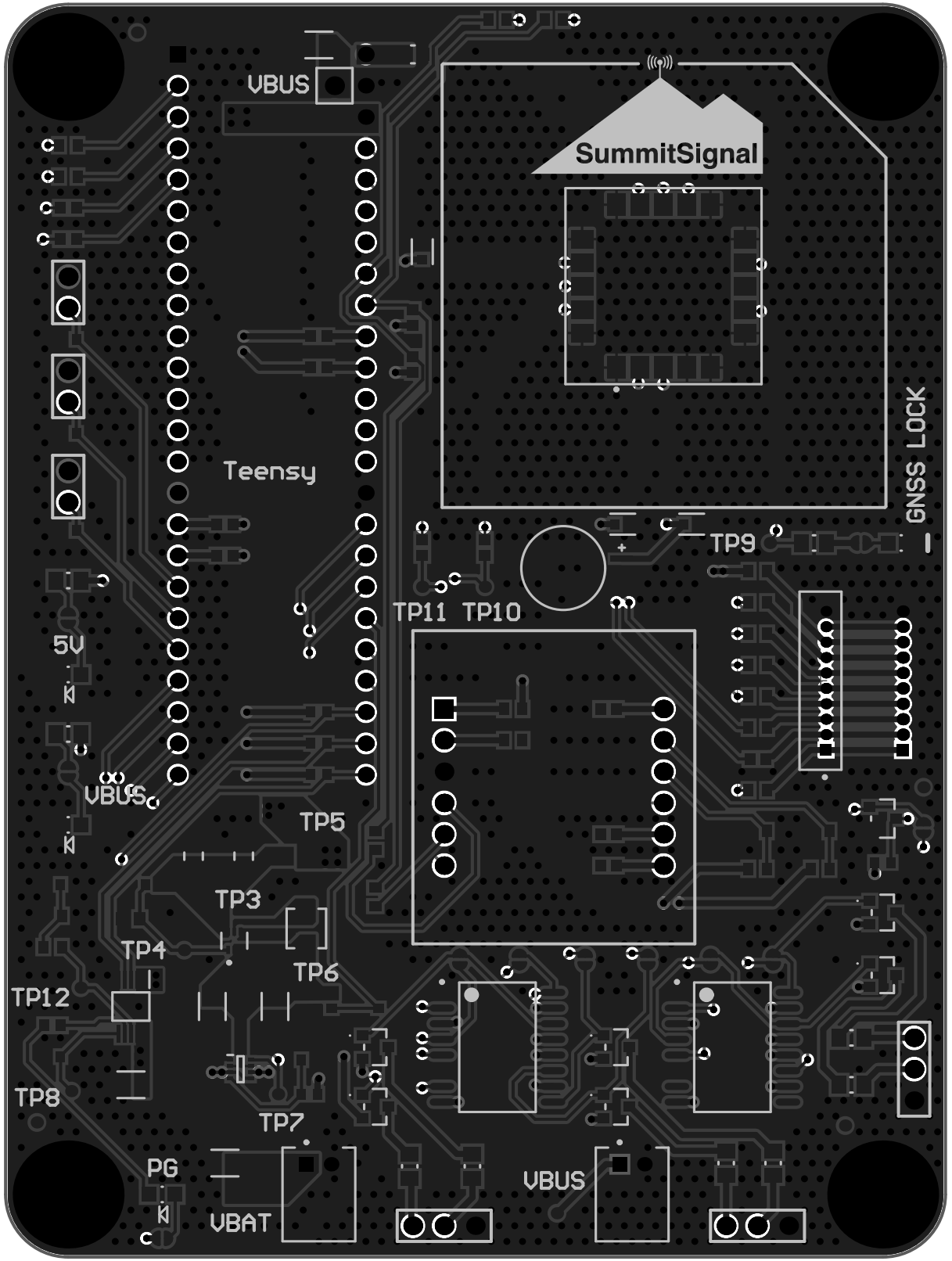
VBUS
SummitSignal
Teensy
GNSS LOCK
TP9
TP11
TP10
5V
VBUS
TP5
TP3
TP4
TP6
TP12
TP8
TP7
PG
VBAT
VBUS