RASPBERRY PI ZERO POWER SENSOR HAT

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TEAM: P17105

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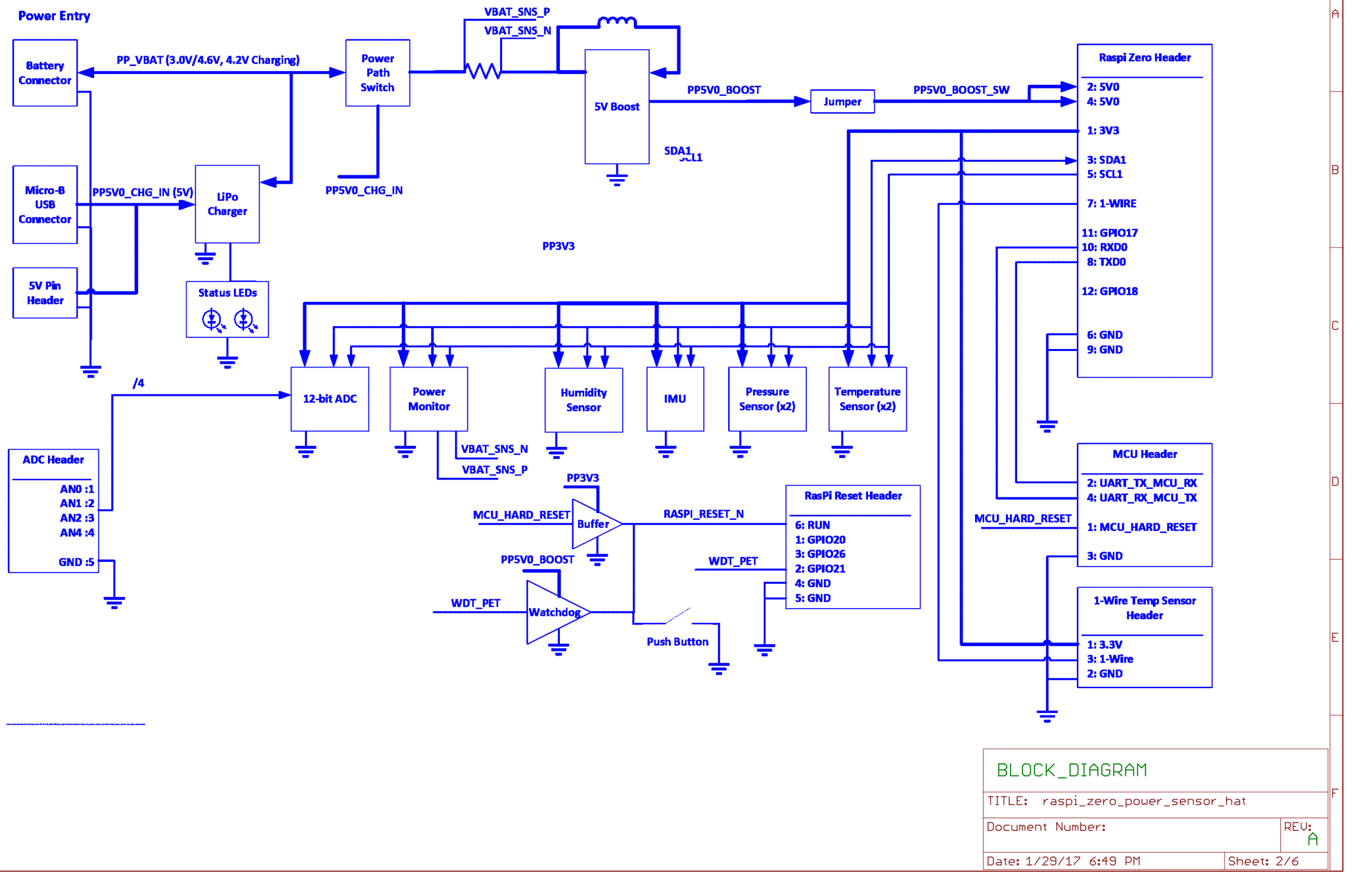
Raspberry Pi Zero Power/Sensor HAT Block Diagram



BLOCK_DIAGRAM		
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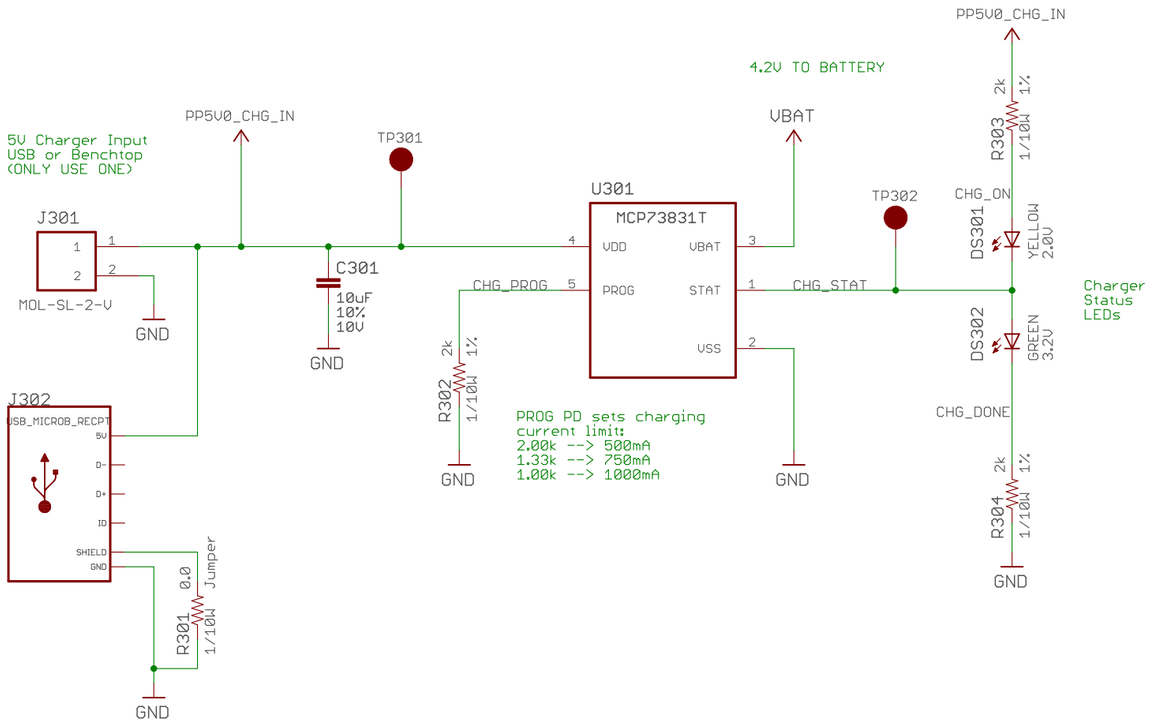
LiPo Battery Charger and Reset Circuitry

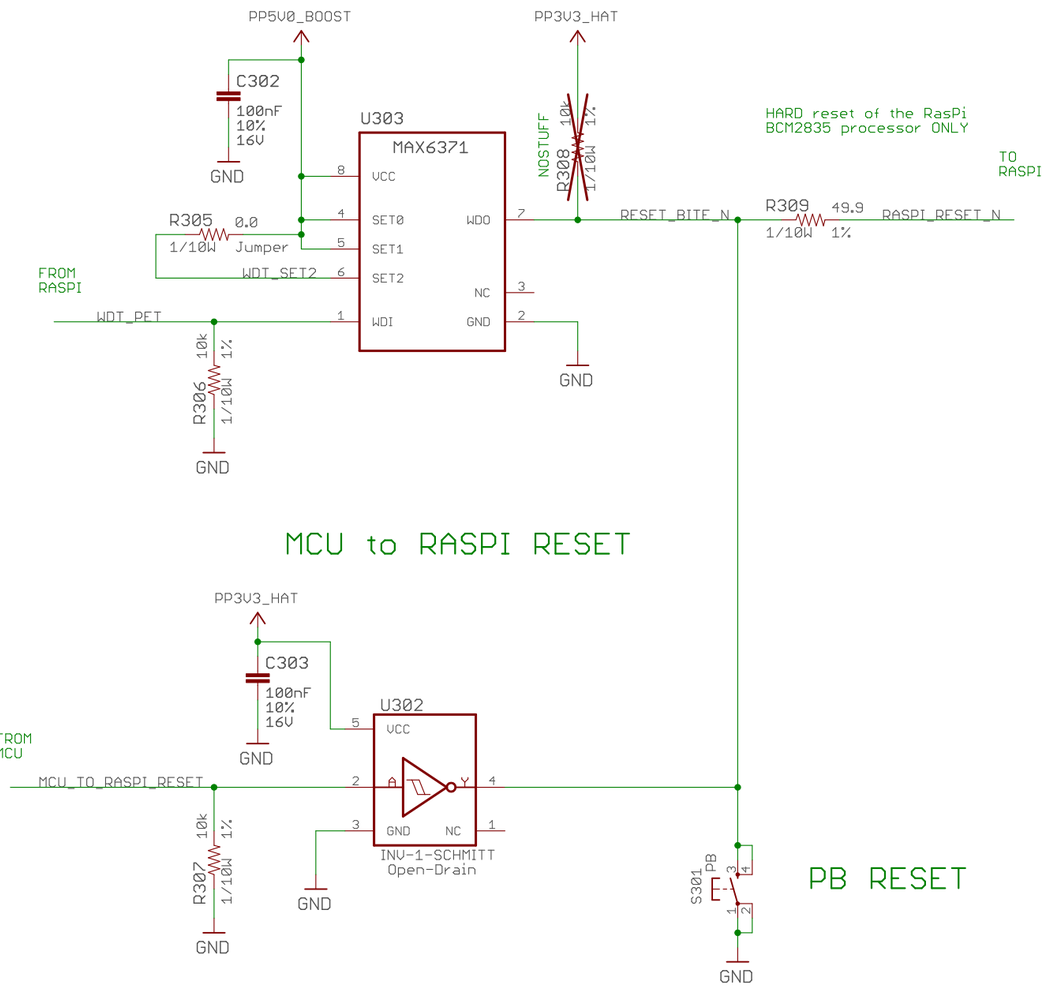
1-cell LiPo Battery Charger



WATCHDOG TIMER

WDO is OD active low for at least 100us
Power-on delay is minimum of 60s

SET2	SET1	SET0	Mode
VCC	VCC	VCC	60s timeout
GND	VCC	VCC	Disabled



MCU to RASPI RESET

LIPO_CHARGER_AND_RESET		
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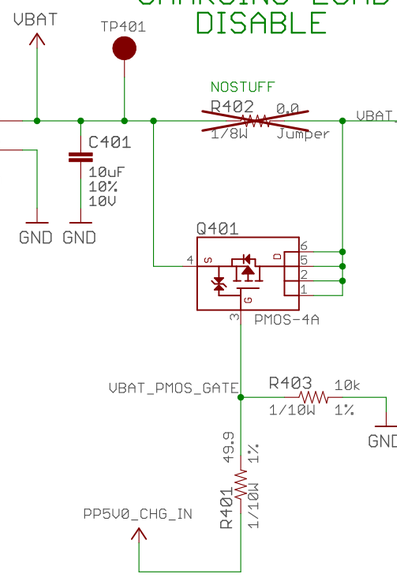
POWER ENTRY, 5V BOOST, AND 3.3V LDO

LiPo Battery: ~3.0V-4.2V or
3xAA Battery: ~3.7V to 4.6V
Battery Current: ~400mA (AVG)
~775mA (PEAK)

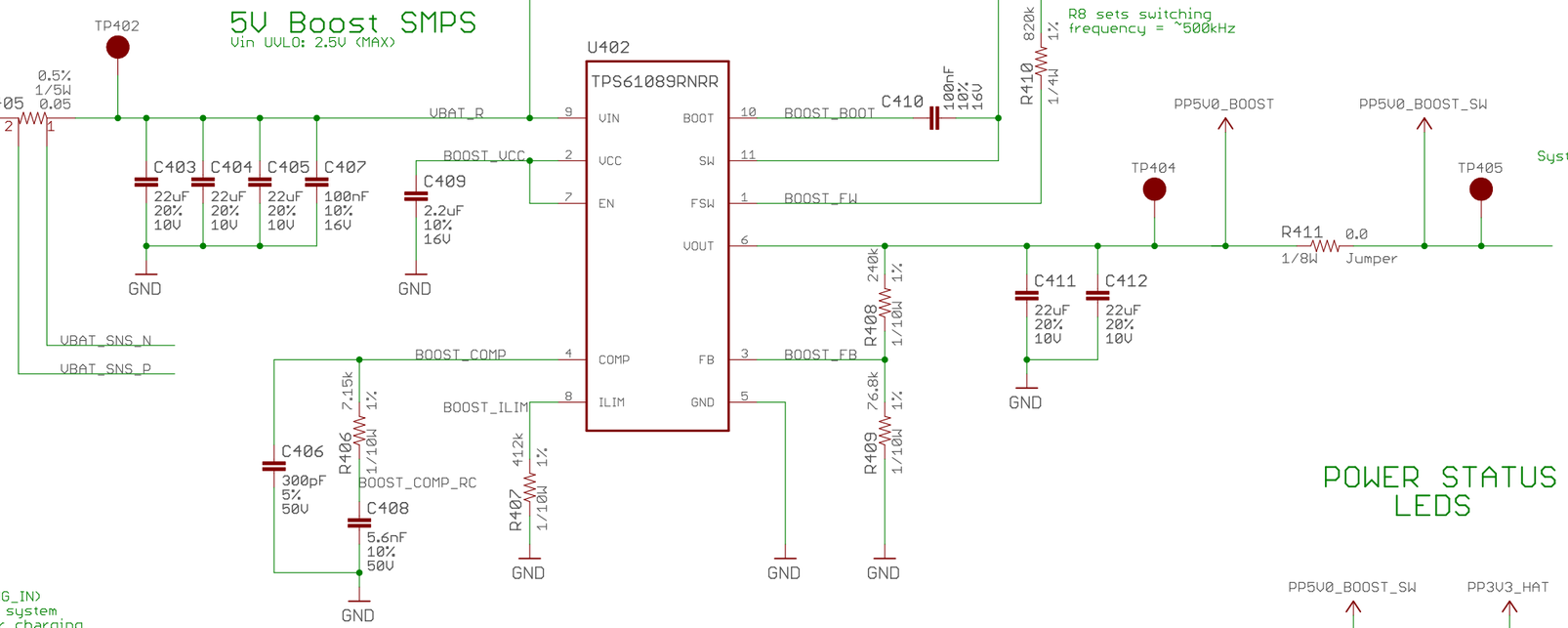
CHARGING LOAD DISABLE



When charger is attached (PP5V0_CHG_IN)
the PMOS FET is turned off and the system
is disconnected from the battery for charging
(if this is not desired, remove Q401 and stuff R402)

5V Boost SMPS

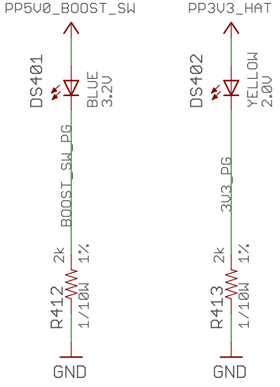
Vin UVLO: 2.5V (MAX)



System Current: ~250mA (AVG)
~500mA (PEAK)

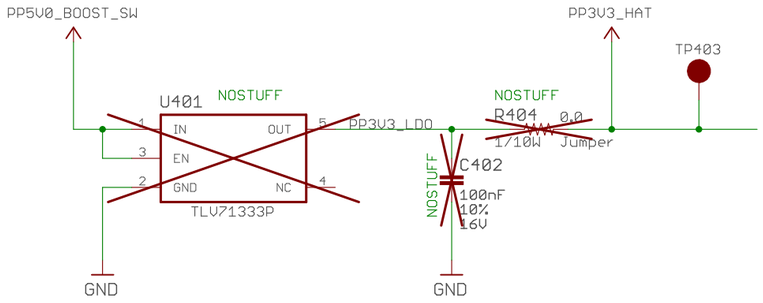
POWER TO SYSTEM

POWER STATUS LEDS



3.3V LDO (No RasPi Operation)

Placeholder for 3.3V rail supply if the
board is used without a RasPi, since the
RasPi supplies the 3.3V rail during operation



POWER_ENTRY_BOOST_LDO	
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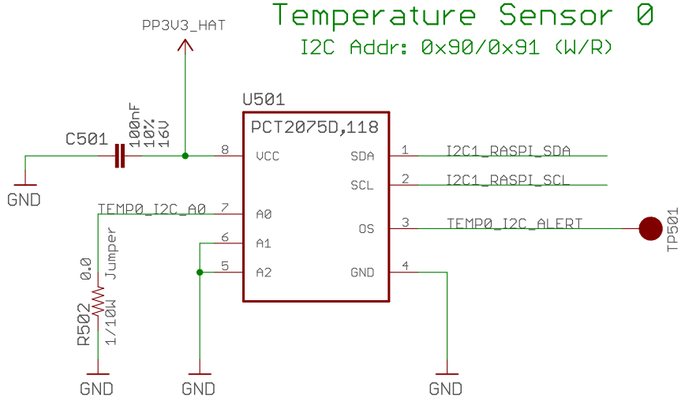
SENSORS

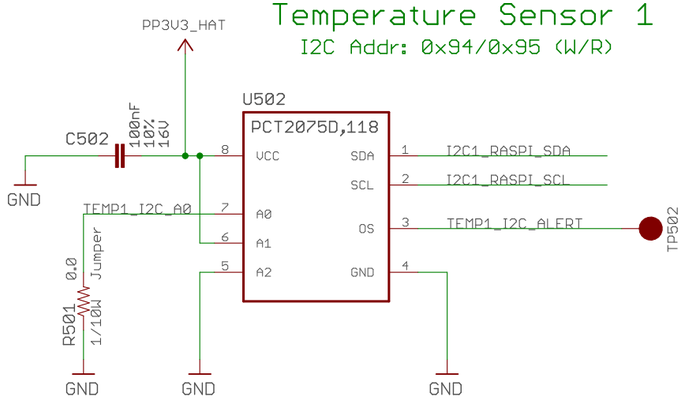
Temperature Sensor 0

I2C Addr: 0x90/0x91 (W/R)



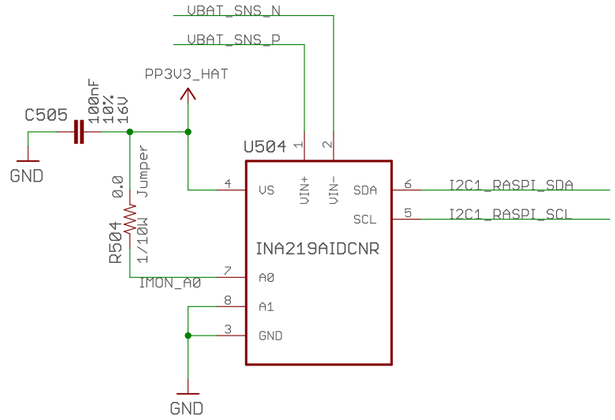
Temperature Sensor 1

I2C Addr: 0x94/0x95 (W/R)



Current/Voltage Sense Amp.

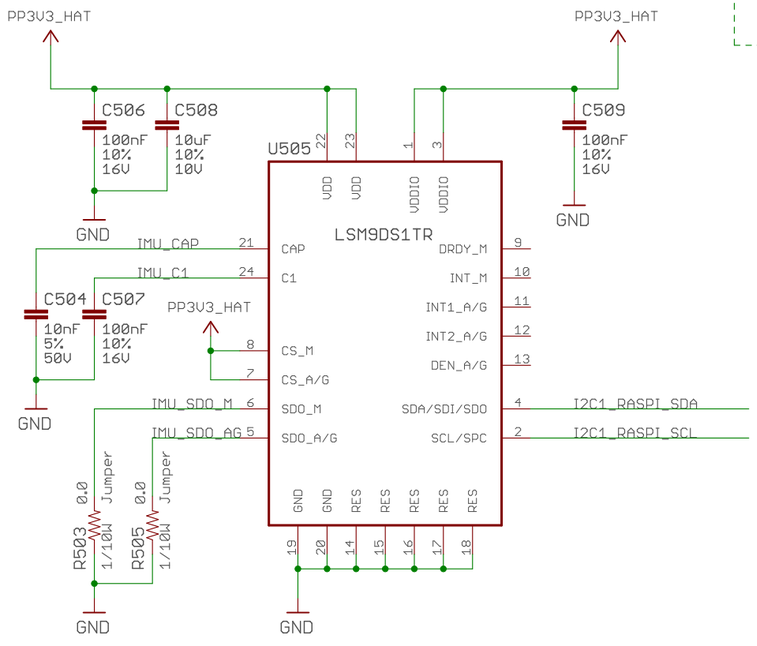
I2C Addr: 0x82/0x83 (W/R)



IMU (Accel, Gyro, Mag)

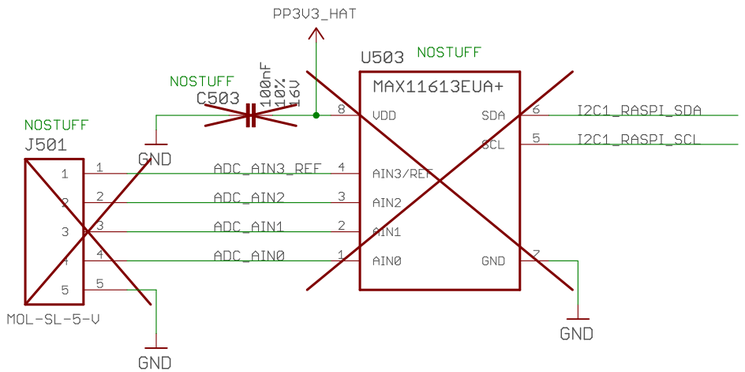
Accel/Gyro I2C Addr: 0xD4/0xD5 (W/R)

Mag I2C Addr: 0x38/0x39 (W/R)



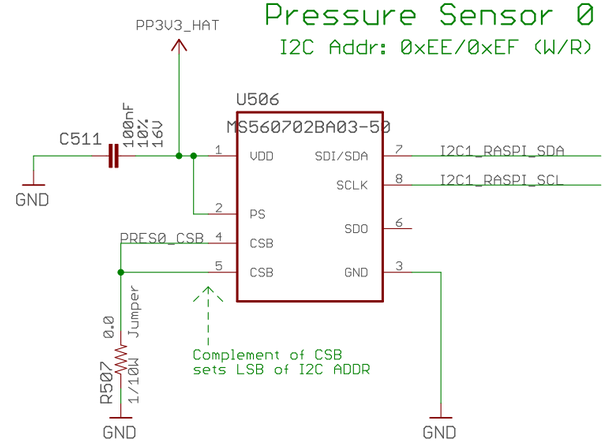
12-bit ADC

I2C Addr: 0x68/0x69 (W/R)



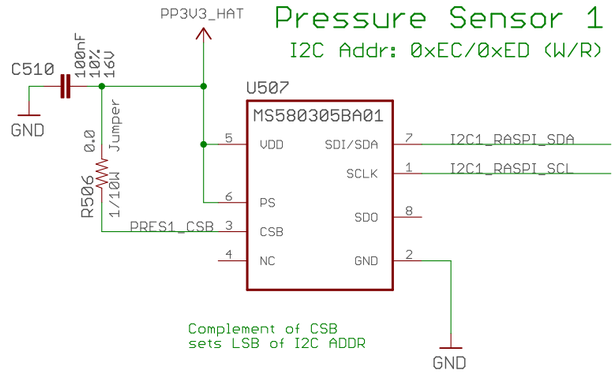
Pressure Sensor 0

I2C Addr: 0xEE/0xEF (W/R)



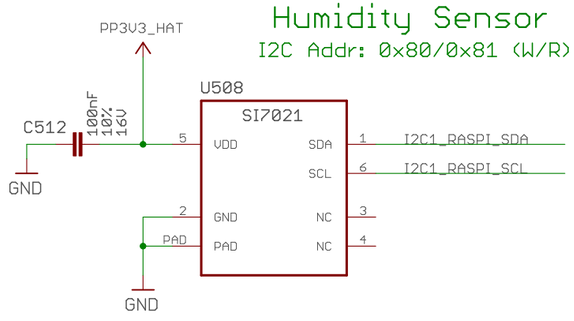
Pressure Sensor 1

I2C Addr: 0xEC/0xED (W/R)



Humidity Sensor

I2C Addr: 0x80/0x81 (W/R)



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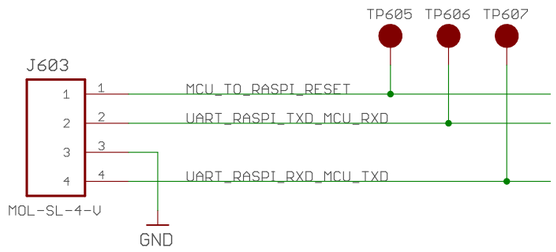
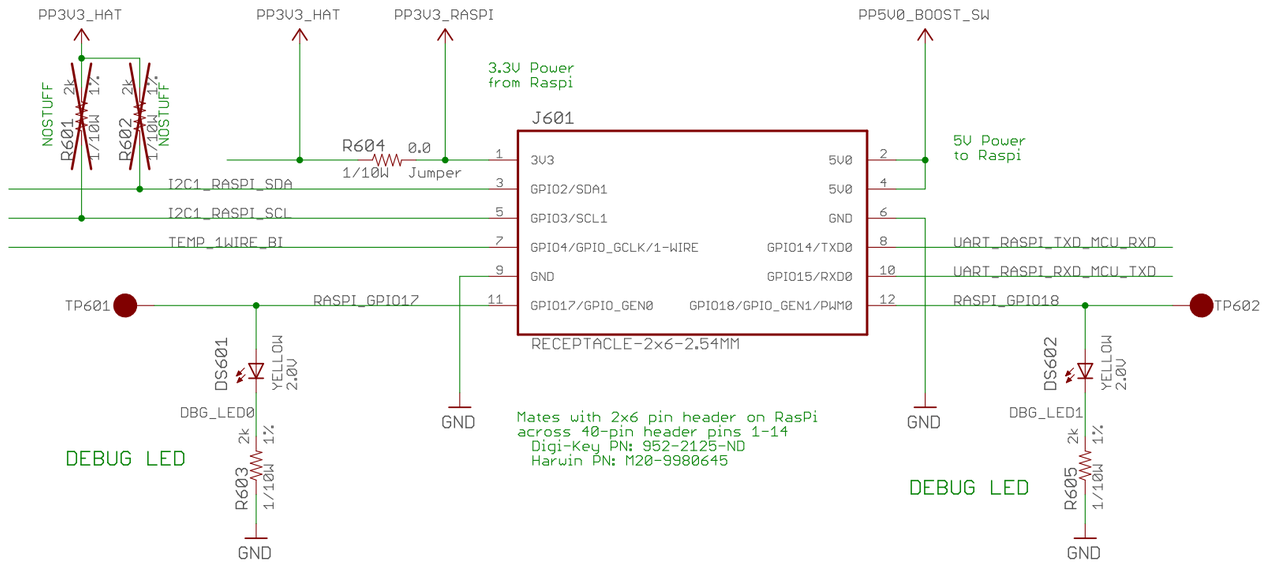
HOST/RASPI CONNECTORS and MOUNTING

HOST MCU CONNECTOR



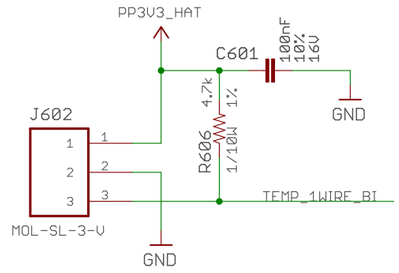
1.8K I2C pullups on RasPi

RASPBERRY PI PWR/GPIO HEADER

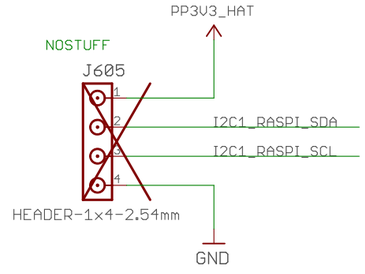


EXTERNAL TEMPERATURE SENSOR (1-Wire) CONNECTOR

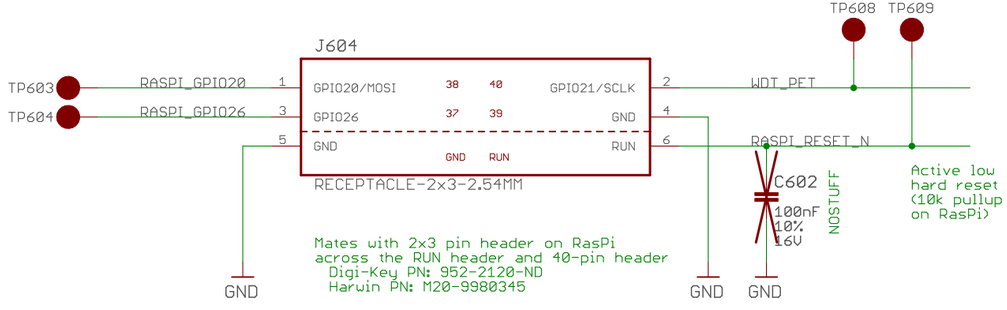
Digi-Key PN: DS18B20+-ND
Maxim PN: DS18B20+



I2C DEBUG HEADER



RASPBERRY PI RESET/GPIO HEADER



RASPI ZERO HAT OUTLINE

Only using 3 mounting holes since
the 2x6 pin connector stabilizes
the upper left board quadrant.

This allows for easier routing of the
boost output to the Pi's 5V0 pin.

RASPI CAM MOUNTING HOLES

Mounting holes for the Raspi Camera

H601
2.2mm_drill_2.0mm_radius

H602
2.2mm_drill_2.0mm_radius

H603
2.2mm_drill_2.0mm_radius

H604
2.2mm_drill_2.0mm_radius

PI_MCU_CONNECT_AND_MOUNTING	
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