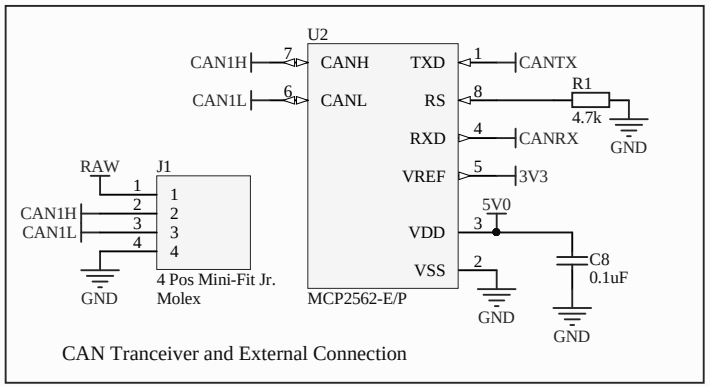
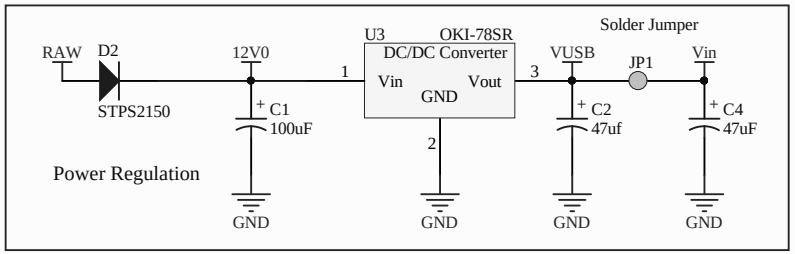
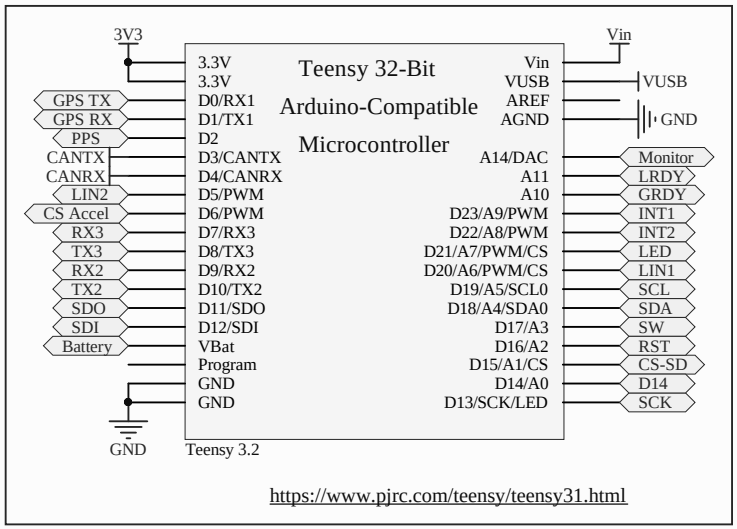


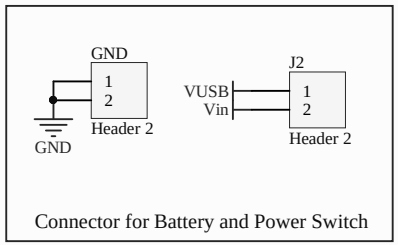
CAN Tranceiver and External Connection



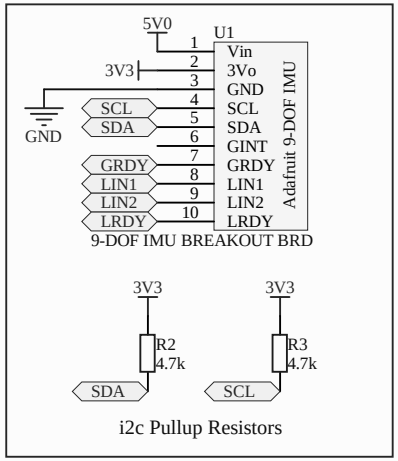
Power Regulation



https://www.pjrc.com/teensy/teensy31.html

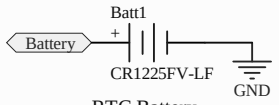


Connector for Battery and Power Switch

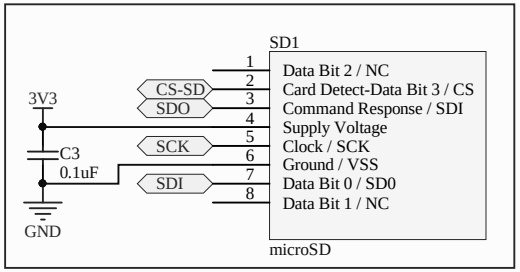


i2c Pullup Resistors

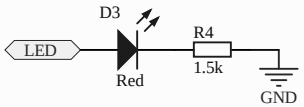
The RTC needs a crystal like the Citizen part num. CFS-206 Digikey part 300-8303-ND, 300-8763-ND, or 300-1002-ND.



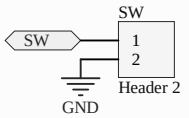
RTC Battery



microSD



LED Indicator. The brightness depends on resistance.



External Digital Input/Output

Notes on Battery Power:
Cut the Trace between VUSB and Vin on the Teensy if an external battery is used. Can only use 3.7-6V battery. An 18650 Li-Ion battery should fit in the case. A USB based battery charger could be used to keep up the charge. A strap can be used to hold a battery down underneath the PCB. To do this some risers will be needed to rais the board.

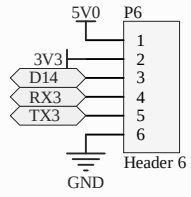
Notes on Headers and Pins:
The female receptical headers for a Teensy are:
2 - 14 pos. Sullins PPPC141LFBN-RC from Digi-Key (S7047-ND)
and
2 - 5 pos. Sullins PPPC051LFBN-RC from Digi-Key (S7038-ND)
These mate with:
2 - 14 pos. Sullins PBC14SAAN from Digi-Key (S1011E-14-ND)
and
2 - 5 pos Sullins PBC05SAAN from Digi-Key (S1011E-05-ND)
or
The Teensy 3.2 can be ordered with pins, but the 5pin header needs to be added. On one of the 5-pin headers, there is an extra pin that needs removed.

Notes on Screws and Spacers:
4 - #2 x 7/16" screws are needed to mount all the ADXL375 accelerometer board.
4 - #2 x 1/8" spacers will go with these screws.
6 - #2 x 3/4" screws are needed for the GPS and IMU.
6 - #2 x 7/16" spacers will be used to mount the GPS and IMU boards.
10 - #2 nylon insert lock nuts are needed.

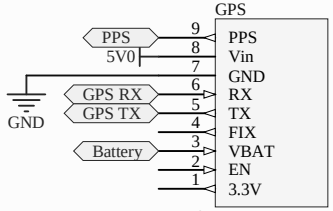
Notes on display:
A Serial Miniature OLED Module - 0.96" (uOLED-96-G2 GFX) from SparkFun may interface with the Serial/J1708 Header. The Wi-Fi breakout can also be repurposed to interface with this module.

All Through Hole Parts.

A separate breakout for the J1708 Tranciever is needed for J1708 communications. This header can also be used for a Serial Enabled LCD display.

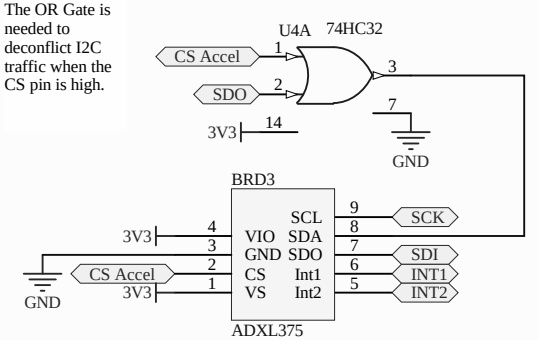


Serial/J1708 Header

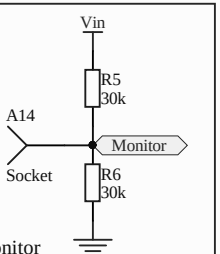


Adafruit Ultimate GPS

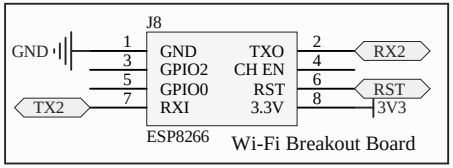
The OR Gate is needed to deconflict I2C traffic when the CS pin is high.



Analog Devices 3-Axis, ±200 g Digital MEMS Accelerometer



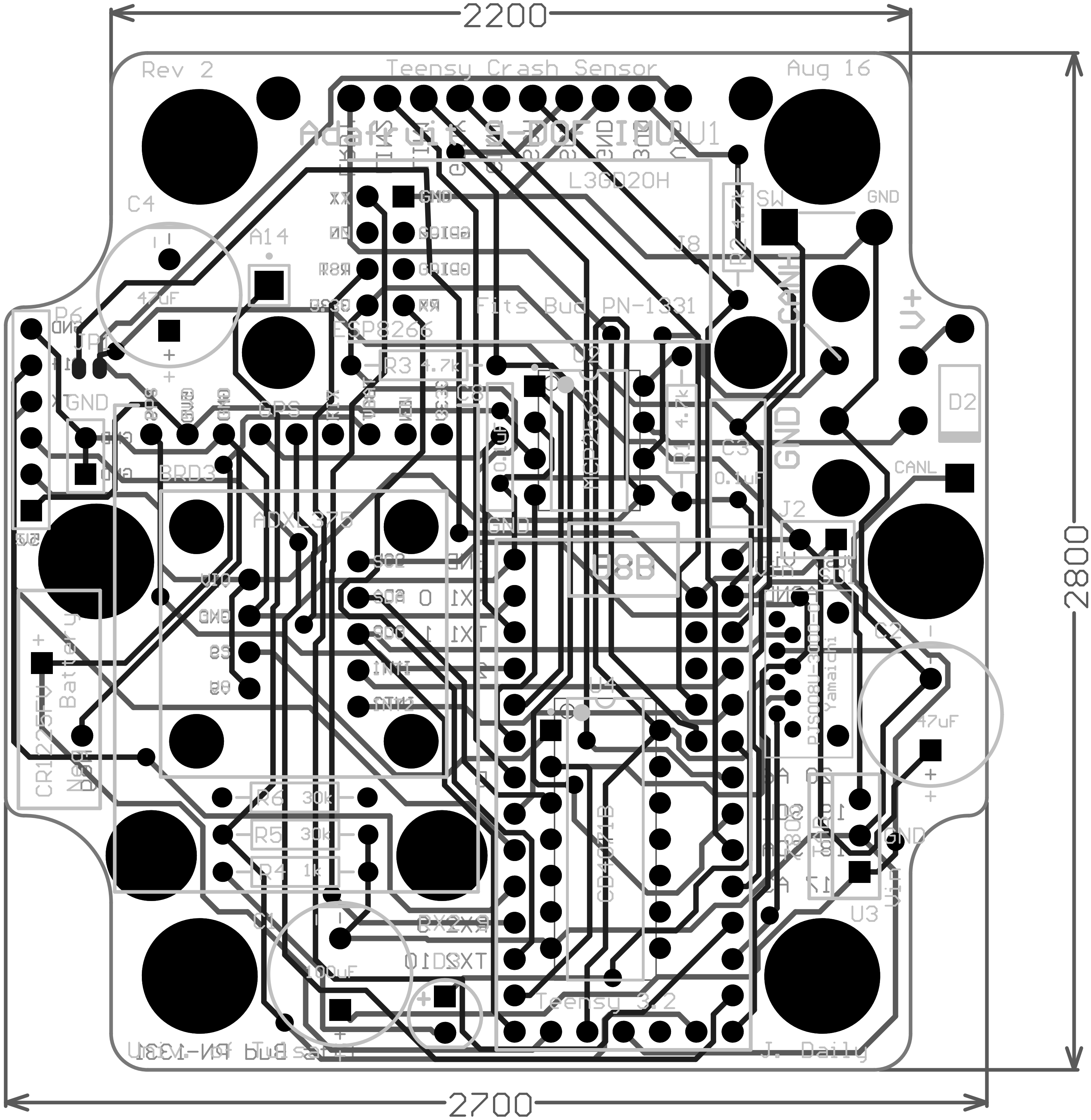
Voltage Monitor



Wi-Fi Breakout Board

Title: ***Teensy SD, CAN, Wi-Fi, GPS, IMU, High-G***			*Dr. Jeremy Daily* *Mechanical Engineering* *University of Tulsa* *800 S Tucker Dr* *Tulsa, OK 74104*
Project: Teensy Crash Sensor.PrjPcb	Size: Letter	Rev: 2	
Date: 8/28/2016 Time: 6:10:09 PM	Sheet 1 of 1		
File: C:\Users\jeremy-daily.UTULSA\Dropbox (JHSI)\Electronics\Teensy Crash EDR\Teensy with CAN SD GPS and IMU v2.SchDoc			

THE UNIVERSITY of TULSA
Department of Mechanical Engineering


2200
2800
2700
Rev 2
Teensy Crash Sensor
Aug 16
Adafruit 9-DOF IMU
U1
L3GD20H
J8
SW
GND
CANH
V+
D2
CANL
C4
A14
47uF
P6
JP1
Fits Bud PN-1331
ESP8266
R3 4.7k
R1 4.7k
C8
C3
0.1uF
MCP2562
GPS
BRD3
ADXL375
J2
C2
47uF
Battery
R6 30k
R5 30k
R4 1k
C1
100uF
U4
CD4071B
U3
Teensy 3.2
J. Daily

Comment	Description	Designator	Footprint	LibRef	Quantity	Manufacturer 1	Manufacturer Part Number 1	Supplier 1	Supplier Currency 1	Supplier Order Qty 1	Supplier Part Number 1	Supplier Stock 1	Supplier Subtotal 1	Supplier Unit Price 1
Socket	Socket	A14	PIN1	Socket	1									
CR1225FV-LF	Coin Cell Battery 3V 2-PIN VERT 48mAh 12.5 x 2.5mm	Batt1	Coin Cell with Tabs	CR2032 Battery Holder	1	Renata	CR1225FV-LF	Mouser	USD	1	614-CR1225FV-LF	639	1.41	1.41
ADXL375	Analog Devices EVAL-ADXL375Z	BRD3	ADXL375 Eval	ADXL375 Eval	1	Analog Devices Inc.	EVAL-ADXL375Z	Digi-Key	USD	1	EVAL-ADXL375Z-ND	33	37.5	37.5
100uF	CAP ALUM 100UF 20% 63V RADIAL	C1	Elec. Cap 5 x 10mm	Electrolytic Cap	1	Panasonic Electronic Components	EEU-FC1J101	Digi-Key	USD	1	P10343-ND	21560	0.54	0.54
47uf	CAP ALUM 100UF 20% 63V RADIAL	C2, C4	Elec. Cap 5 x 10mm	Electrolytic Cap	2	Panasonic Electronic Components	EEU-FC1J101	Digi-Key	USD	2	P10343-ND	21560	1.08	0.54
0.1uF	Multilayer Ceramic Capacitors MLCC - Leaded 50volts 0.1uF 10% X7R	C3, C8	RAD-0.2	Cap	2	AVX	SR215C104KAA	Mouser	USD	2	581-SR215C104K	13567	0.2	0.1
STPS2150	Schottky Diodes & Rectifiers 2.0 Amp 150 Volt	D2	DO-41	Diode 1N4003	1	STMicroelectronics	STPS2150	Mouser	USD	1	511-STPS2150	7482	0.4	0.4
Red	LED RED DIFFUSED 0805 SMD	D3	5mm Rad LED	LED - SMD	1	OSRAM Opto Semiconductors Inc.	LS R976-NR-1	Digi-Key	USD	1	475-1278-1-ND	204960	0.27	0.27
Header 2	Header, 2-Pin	GND, J2, SW	HDR1X2	Header 2	3									
Adafruit Ultimate GPS	Adafruit Ultimate GPS	GPS	GPS	GPS - Adafruit	1	Adafruit Industries LLC	746	Digi-Key	USD	1	1528-1153-ND	236	39.95	39.95
4 Pos Mini-Fit Jr.	CONN HEADER 4POS 4.2MM VERT TIN	J1	4 POS Vertical MINI-FIT JR	4 Pos Header Vert	1	Molex, LLC	39299042	Digi-Key	USD	1	WM7325-ND	2911	0.66	0.66
ESP8266	Sparkfun ESP8266 Module (WRL-13678)	J8	ESP8266	ESP8266	1	SparkFun Electronics	WRL-13678	Digi-Key	USD	1	1568-1235-ND	766	6.95	6.95
Solder Jumper		JP1	Solder Jumper	Solder Jumper	1			Digi-Key						
Header 6	Header, 6-Pin	P6	HDR1X6	Header 6	1	Wurth Electronics	61303211121	Mouser	USD	1	710-61303211121	227	2.08	2.08
4.7k	RES 4.7K OHM 1/4W 5% CARBON FILM	R1, R2, R3	AXIAL-0.4	Res2	3	Stackpole Electronics Inc.	CF14JT4K70	Digi-Key	USD	3	CF14JT4K70TR-ND	380000		
1.5k	RES 4.7K OHM 1/4W 5% CARBON FILM	R4	AXIAL-0.4	Res2	1	Stackpole Electronics Inc.	CF14JT4K70	Digi-Key	USD	1	CF14JT4K70TR-ND	380000		
30k	RES 4.7K OHM 1/4W 5% CARBON FILM	R5, R6	AXIAL-0.4	Res2	2	Stackpole Electronics Inc.	CF14JT4K70	Digi-Key	USD	2	CF14JT4K70TR-ND	380000		
microSD	Memory Card Connectors MicroSD Card Conn Ver Dip Mnt Manual	SD1	SD- Vertical	SD Card Holder Vertical	1	Yamaichi Electronics	PJS008U-3000-0	Mouser	USD	1	945-PJS008U-3000-0	0	0.87	0.87
Teensy 3.2	32 Bit Arduino-Compatible Microcontroller	Teensy 3.2	Teensy	Teensy	1	SparkFun Electronics	DEV-13736	Digi-Key	USD	1	1568-1231-ND	800	22.5	22.5
9-DOF IMU BREAKOUT BRD	Adafruit 9-DOF IMU Breakout - L3GD20H + LSM303 PRODUCT ID: 1714	U1	Adafruit 9-DOF IMU	Adafruit 9-DOF IMU	1	Adafruit Industries LLC	1714	Digi-Key	USD	1	1528-1029-ND	26	19.95	19.95
MCP2562-E/P	High-Speed CAN Transceiver, 8-Pin PDIP, Extended Temperature	U2	PDIP300-P8	MCP2551-E/P	1	Microchip Technology	MCP2562-E/P	Digi-Key	USD	1	MCP2562-E/P-ND	718	0.93	0.93
OKI-78SR	5V DC/DC Converter (7805 replacement)	U3	78xx	7805	1	Murata Power Solutions Inc.	OKI-78SR-5/1.5-W36-C	Digi-Key	USD	1	811-2196-5-ND	11114	4.3	4.3
74HC32	Quad 2-Input OR G	U4	N14A	74ACT32PC	1	Texas Instruments	SN74HC32N	Mouser	USD	1	595-SN74HC32N	6571	0.46	0.46