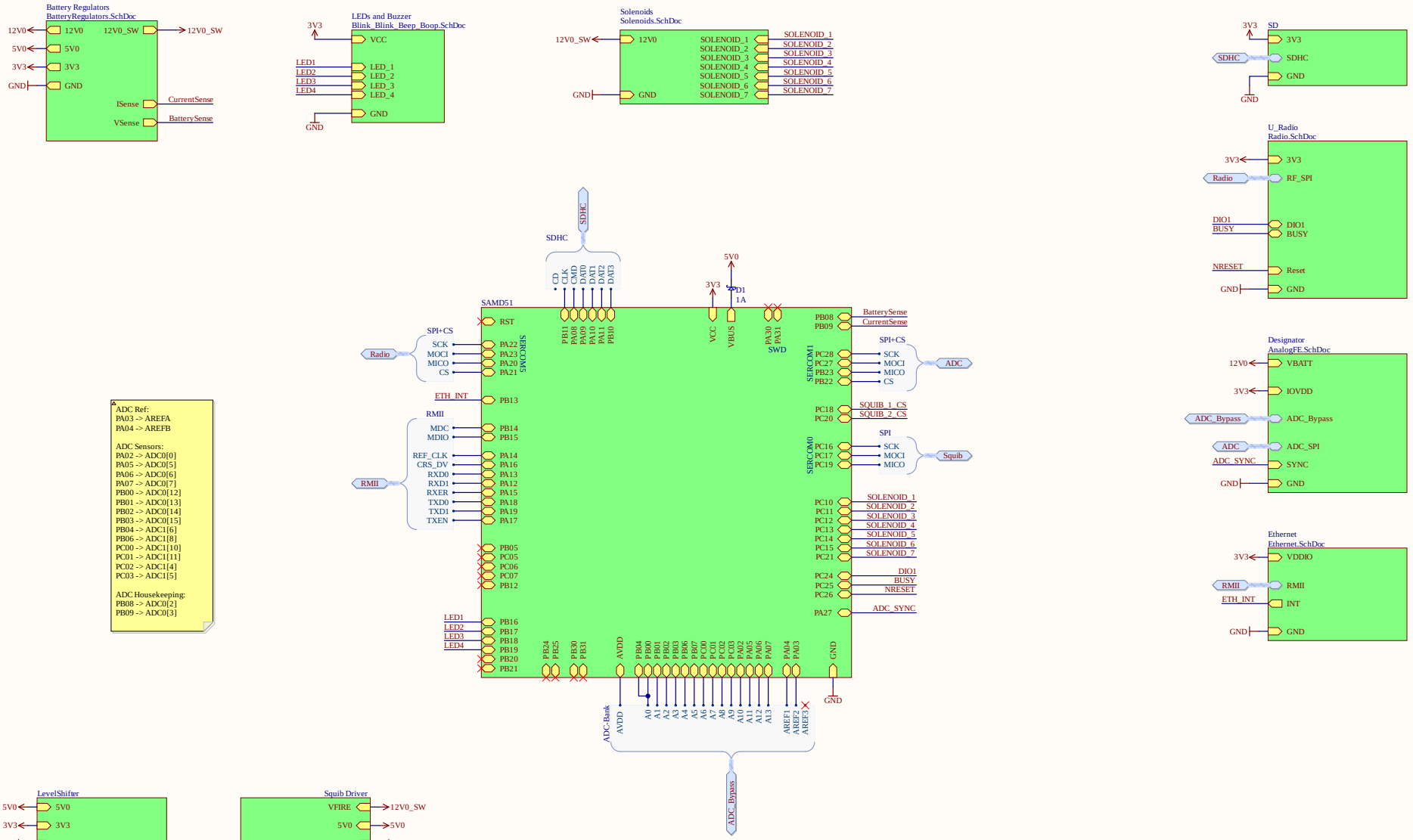
Battery Regulators
BatteryRegulators.SchDoc
12V0
5V0
3V3
GND
12V0_SW
ISense
VSense
CurrentSense
BatterySense
LEDs and Buzzer
Blink_Blink_Beep_Boop.SchDoc
VCC
LED_1
LED_2
LED_3
LED_4
Solenoids
Solenoids.SchDoc
SOLENOID_1
SOLENOID_2
SOLENOID_3
SOLENOID_4
SOLENOID_5
SOLENOID_6
SOLENOID_7
SD
SDHC
U_Radio
Radio.SchDoc
RF_SPI
DIO1
BUSY
NRESET
Reset
Designator
AnalogFE.SchDoc
VBATT
IOVDD
ADC_Bypass
ADC_SPI
SYNC
Ethernet
Ethernet.SchDoc
VDDIO
RMII
INT
SAMD51
RST
SERCOM5
SPI+CS
SCK
MOCI
MICO
CS
Radio
ETH_INT
MDC
MDIO
REF_CLK
CRS_DV
RXD0
RXD1
RXER
TXD0
TXD1
TXEN
SERCOM1
ADC
SERCOM0
SPI
Squib
SQUIB_1_CS
SQUIB_2_CS
ADC_SYNC
LED1
LED2
LED3
LED4
ADC-Bank
AVDD
ADC_Bypass
SWD
VBUS
ADC Ref:
PA03 -> AREFA
PA04 -> AREFB
ADC Sensors:
PA02 -> ADC0[0]
PA05 -> ADC0[5]
PA06 -> ADC0[6]
PA07 -> ADC0[7]
PB00 -> ADC0[12]
PB01 -> ADC0[13]
PB02 -> ADC0[14]
PB03 -> ADC0[15]
PB04 -> ADC1[6]
PB06 -> ADC1[8]
PC00 -> ADC1[10]
PC01 -> ADC1[11]
PC02 -> ADC1[4]
PC03 -> ADC1[5]
ADC Housekeeping:
PB08 -> ADC0[2]
PB09 -> ADC0[3]
LevelShifter
Squib Driver
VFIRE
CS_1_3V3
CS_2_3V3
CS_1_5V0
CS_2_5V0
SPI_3V3
SPI_5V0
CS_B
CS_A
K1
K2
K3
K4
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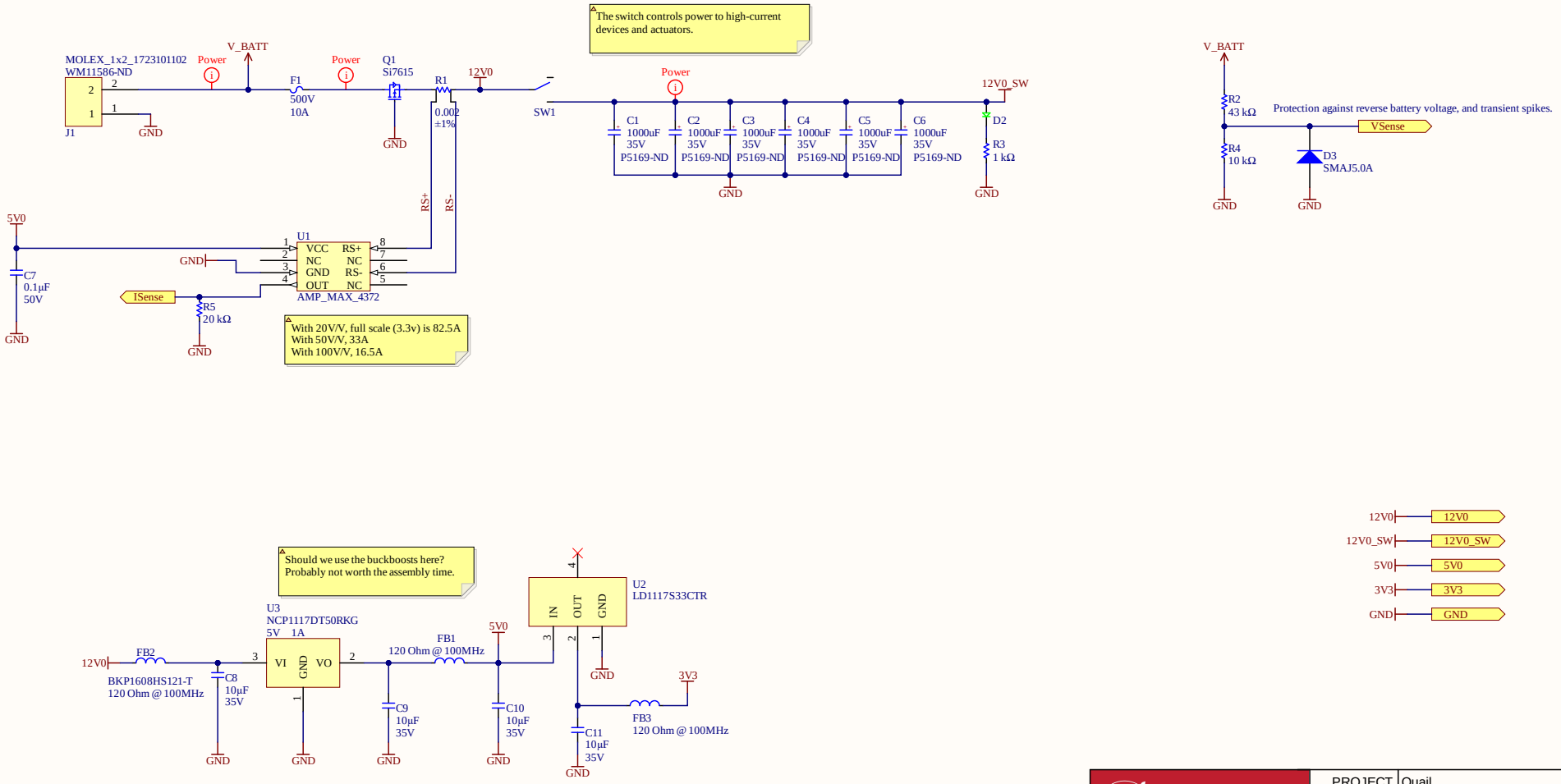
PROJECT Quail
SHEET Top Sheet
ENGINEER Damian Loya
ENGINEER Matthew Pauly
REVISION 1.0
Sheet 1 of 8
REVIEWER
REVIEWED ON



PROJECT	Quail
SHEET	Power Regulation
ENGINEER	Damian Loya
ENGINEER	Matthew Pauly
REVISION	1.0
REVIEWER	
Sheet 3 of 8	REVIEWED ON

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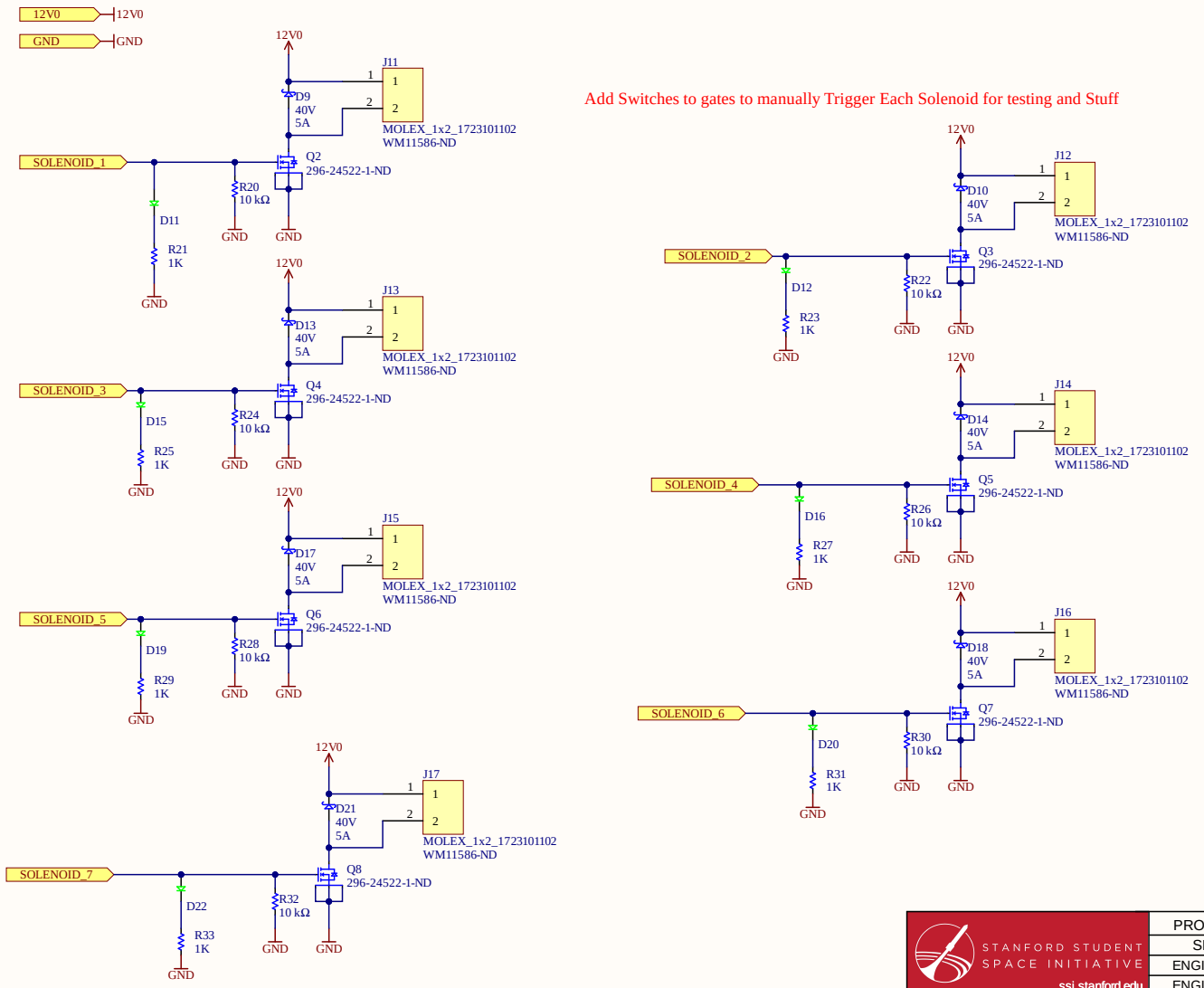
12V0
GND
SOLENOID_1
SOLENOID_2
SOLENOID_3
SOLENOID_4
SOLENOID_5
SOLENOID_6
SOLENOID_7
J11
J12
J13
J14
J15
J16
J17
MOLEX_1x2_1723101102
WM11586-ND
D9
D10
D11
D12
D13
D14
D15
D16
D17
D18
D19
D20
D21
D22
40V
5A
Q2
Q3
Q4
Q5
Q6
Q7
Q8
296-24522-1-ND
R20
R22
R24
R26
R28
R30
R32
10 kΩ
R21
R23
R25
R27
R29
R31
R33
1K
Add Switches to gates to manually Trigger Each Solenoid for testing and Stuff
STANFORD STUDENT SPACE INITIATIVE
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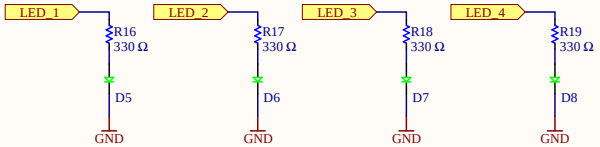
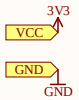
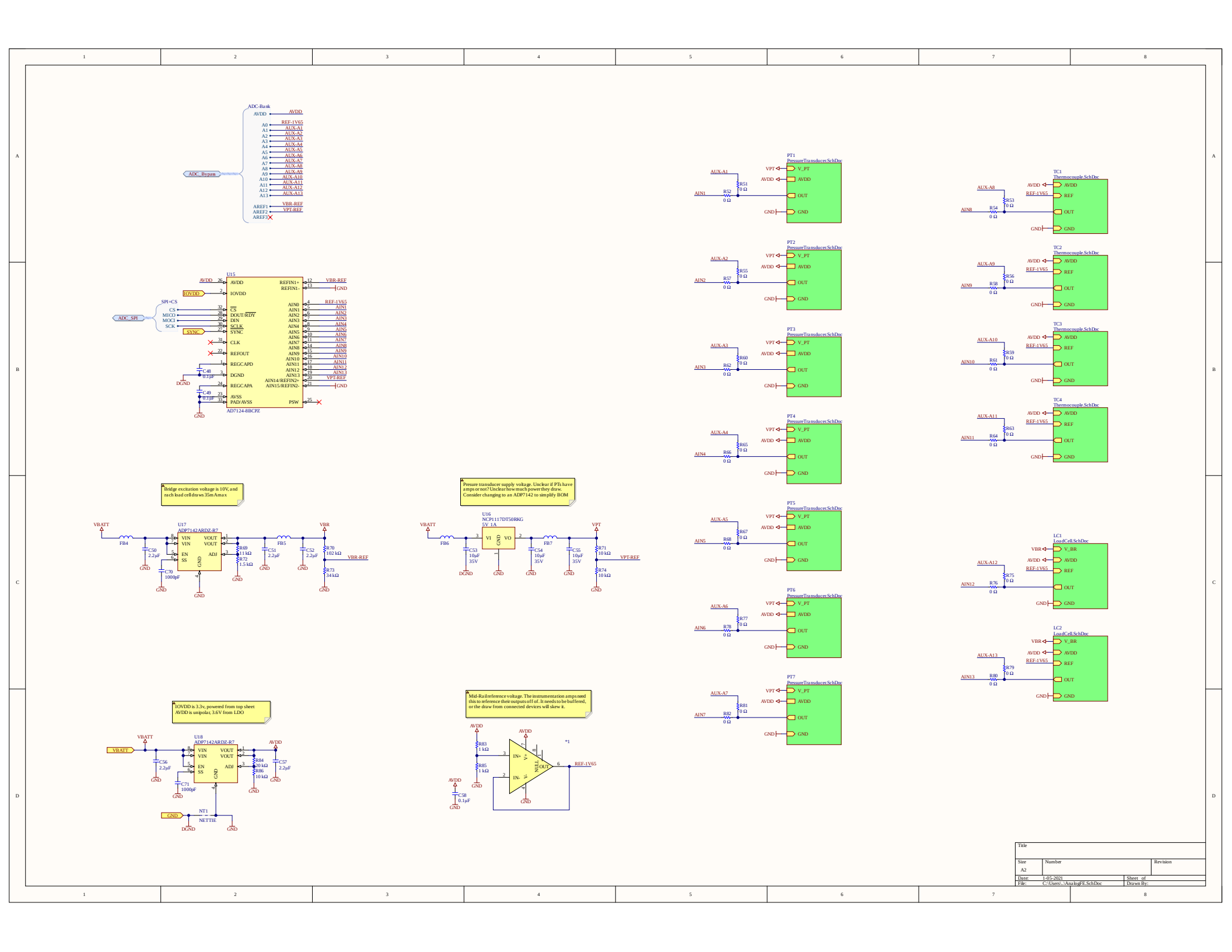
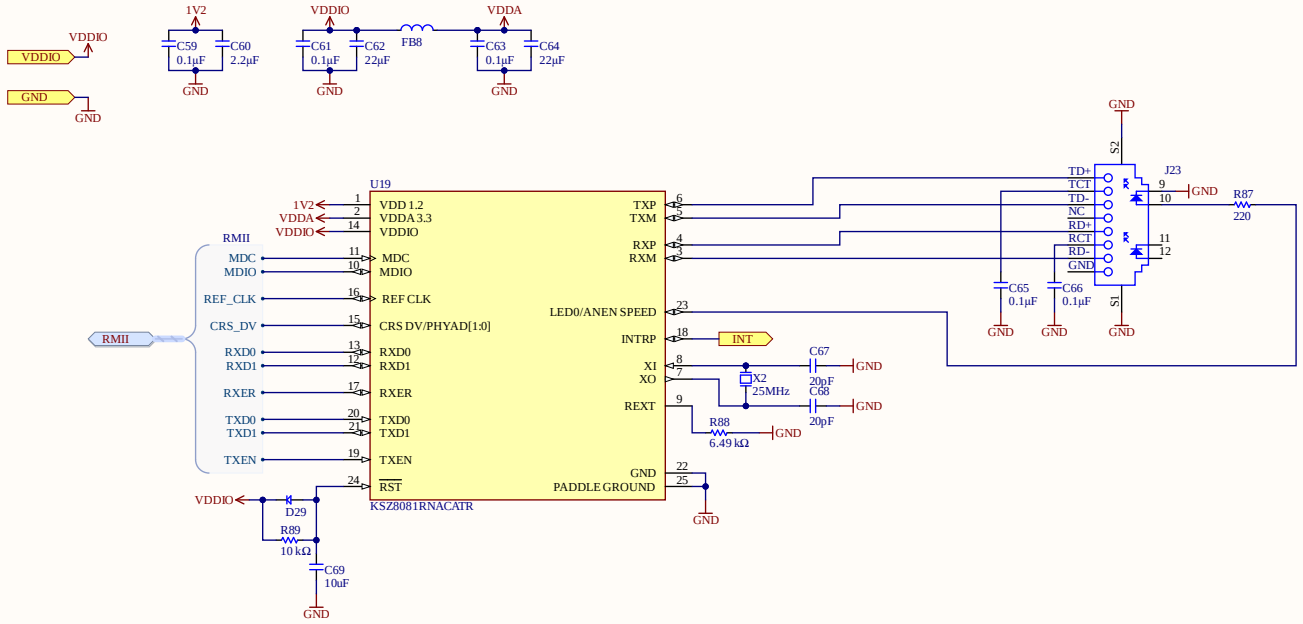
PROJECT Quail
SHEET Solenoids & Pressure Transducers
ENGINEER Damian Loya
ENGINEER Matthew Pauly
REVISION 1.0
REVIEWER
Sheet 8 of 8
REVIEWED ON





STANFORD STUDENT SPACE INITIATIVE ssi.stanford.edu		PROJECT	Quail
		SHEET	Blinks and Boops
		ENGINEER	Damian Loya
		ENGINEER	Matthew Pauly
Powered By Altium	REVISION 1.0	REVIEWER	
	Sheet 8 of 8	REVIEWED ON	

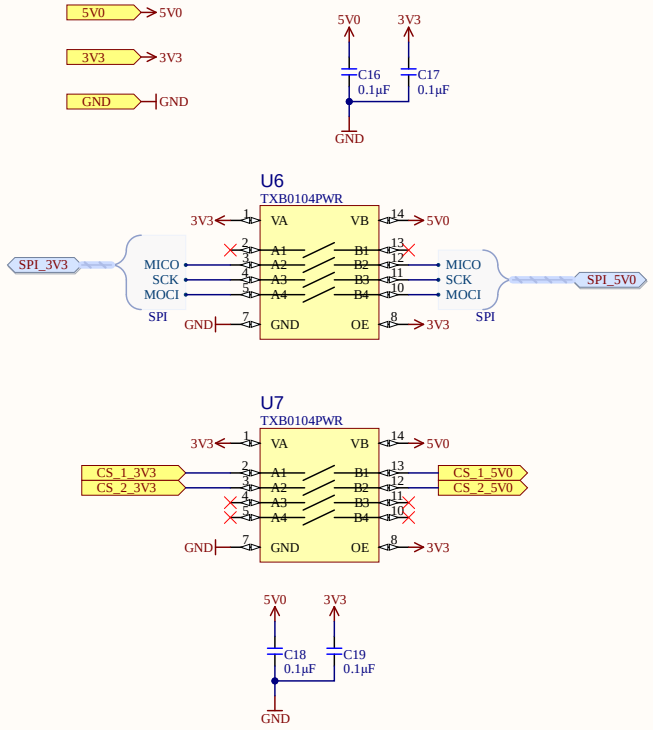

ADC-Bank
AVDD
REF-1V65
AUX-A1
AUX-A2
AUX-A3
AUX-A4
AUX-A5
AUX-A6
AUX-A7
AUX-A8
AUX-A9
AUX-A10
AUX-A11
AUX-A12
AUX-A13
VBR-REF
VPT-REF
AREF1
AREF2
AREF3
ADC_Bypass
U15
AD7124-8BCPZ
ADC_SPI
SPI+CS
MISO
MOSI
SCK
SYNC
IOVDD
DGND
GND
VBR-REF
REF-1V65
AIN0
AIN1
AIN2
AIN3
AIN4
AIN5
AIN6
AIN7
AIN8
AIN9
AIN10
AIN11
AIN12
AIN13
VPT-REF
Bridge excitation voltage is 10V, and each load cell draws 35mAmax
U17
ADP7142ARDZ-R7
VBATT
FB4
FB5
VBR
VBR-REF
Presure transducer supply voltage. Unclear if PTs have amps or not? Unclear how much power they draw. Consider changing to an ADP7142 to simplify BOM
U16
NCP1117DT50RKG
5V 1A
FB6
FB7
VPT
VPT-REF
IOVDD is 3.3v, powered from top sheet
AVDD is unipolar, 3.6V from LDO
U18
ADP7142ARDZ-R7
NT1
NETTIE
Mid-Rail reference voltage. The instrumentation amps need this to reference their outputs off of. It needs to be buffered, or the draw from connected devices will skew it.
REF-1V65
PT1
PressureTransducer.SchDoc
PT2
PressureTransducer.SchDoc
PT3
PressureTransducer.SchDoc
PT4
PressureTransducer.SchDoc
PT5
PressureTransducer.SchDoc
PT6
PressureTransducer.SchDoc
PT7
PressureTransducer.SchDoc
TC1
Thermocouple.SchDoc
TC2
Thermocouple.SchDoc
TC3
Thermocouple.SchDoc
TC4
Thermocouple.SchDoc
LC1
LoadCell.SchDoc
LC2
LoadCell.SchDoc
Title
Size
A2
Number
Revision
Date: 1-05-2021
File: C:\Users\..\AnalogFE.SchDoc
Sheet of
Drawn By:



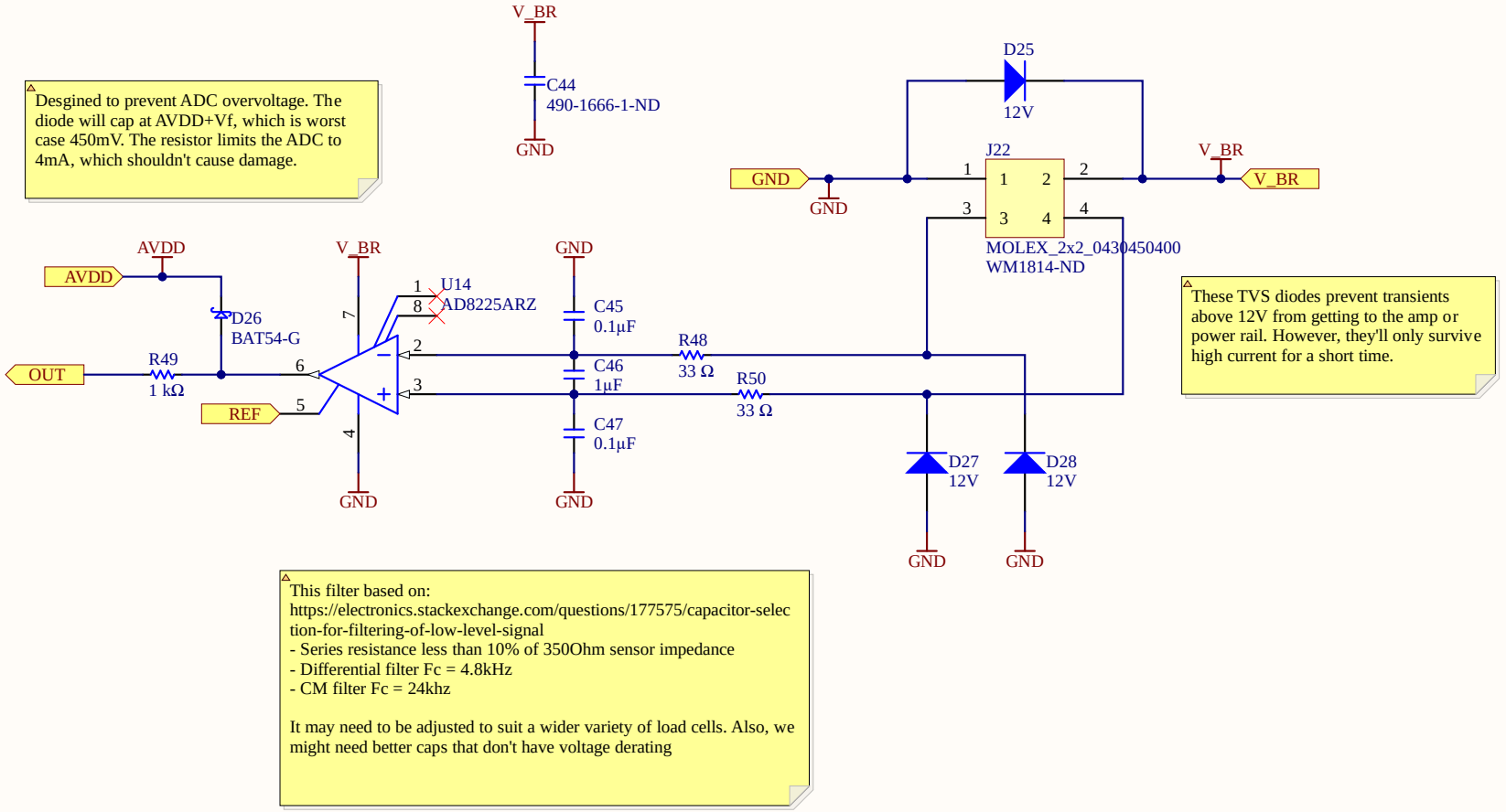
Title		
Size: A3	Number	Revision
Date: 1-05-2021		Sheet of
File: C:\Users\..\Ethernet.SchDoc		Drawn By:

Level Shifters

The Squib Drivers operates using 5V logic, the MCU (SAMD51) uses 3.3V so the SPI interface between them needs to be converted



STANFORD STUDENT SPACE INITIATIVE ssi.stanford.edu		PROJECT	Quail
		SHEET	Misc
		ENGINEER	Damian Loya
		ENGINEER	Matthew Pauly
Powered By Altium	REVISION 1.0	REVIEWER	
	Sheet n of m	REVIEWED ON	



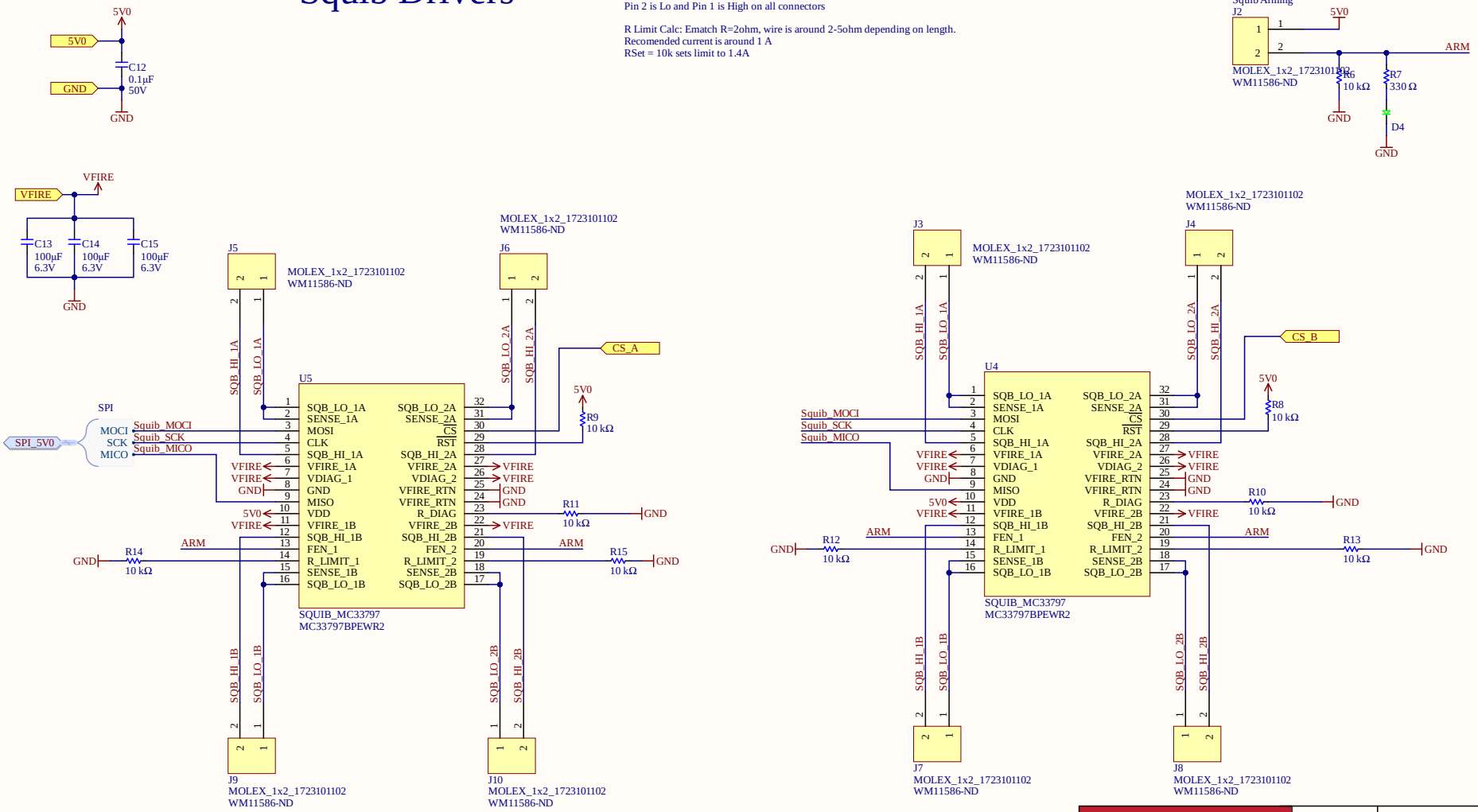
Title		
Size: A	Number	Revision
Date: 1-05-2021		Sheet of
File: C:\Users\..\LoadCell.SchDoc		Drawn By:

Squib Drivers

Two Chips (MC33797) for 8 total channels

Pin 2 is Lo and Pin 1 is High on all connectors

R Limit Calc: Ematch R=2ohm, wire is around 2-5ohm depending on length.
Recomended current is around 1 A
RSet = 10k sets limit to 1.4A



PROJECT	Quail
SHEET	Squibs
ENGINEER	Damian Loya
ENGINEER	Matthew Pauly
REVISION	1.0
REVIEWER	
Sheet n of m	REVIEWED ON

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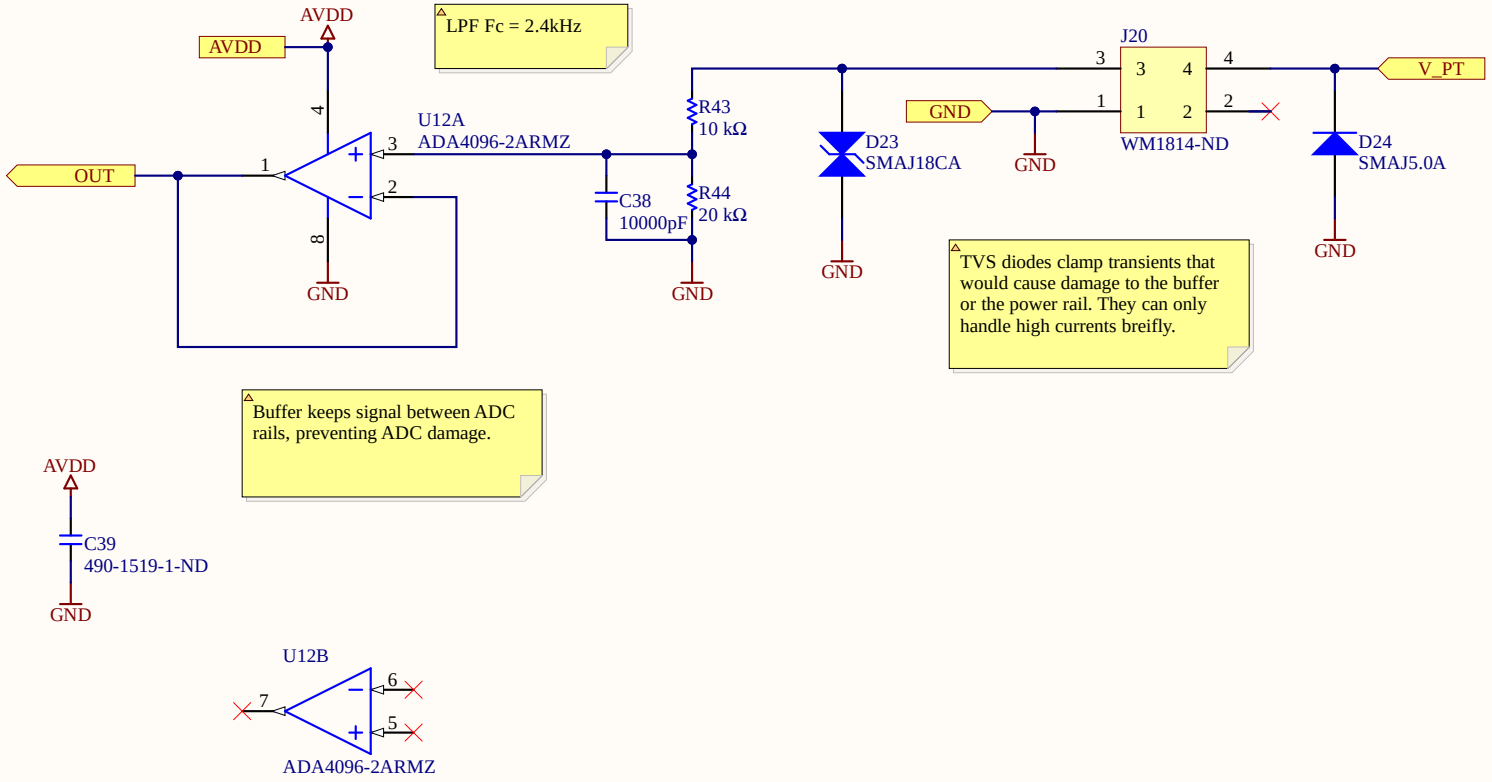


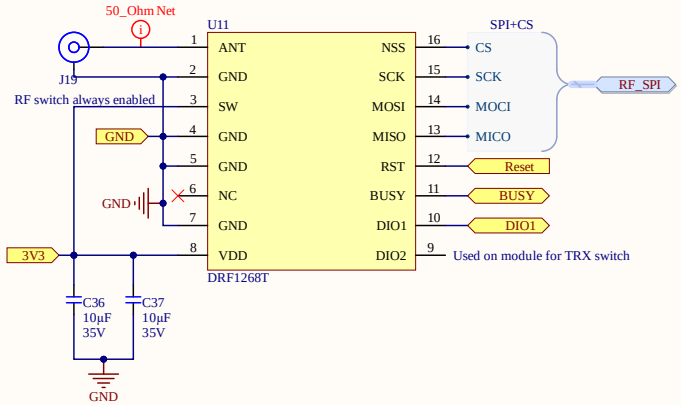
Title		
Size: A	Number:	Revision:
Date: 1-05-2021		Sheet of
File: C:\Users\..\PressureTransducer.SchDoc		Drawn By:

Radio Module

TODO

Swap Out with DRF Module

Radio for wireless communiactions
Dorji DRF1268T being used
Mainly on Tims Recomendation



(G)FSK/4(G)FSK/LoRa Modulation
433Mhz transceiver
Max.22dBm output power
-147dBm sensitivity
Standard SPI interface
Low RX current: 5.7 mA
Automatic RF sense and CAD monitor
Data Rate: <300 kbps
Standby current: <1uA
Supply voltage: 3.3V

STANFORD STUDENT SPACE INITIATIVE ssi.stanford.edu		PROJECT	Quail
		SHEET	*
		ENGINEER	Damian Loya
		ENGINEER	Matthew Pauly
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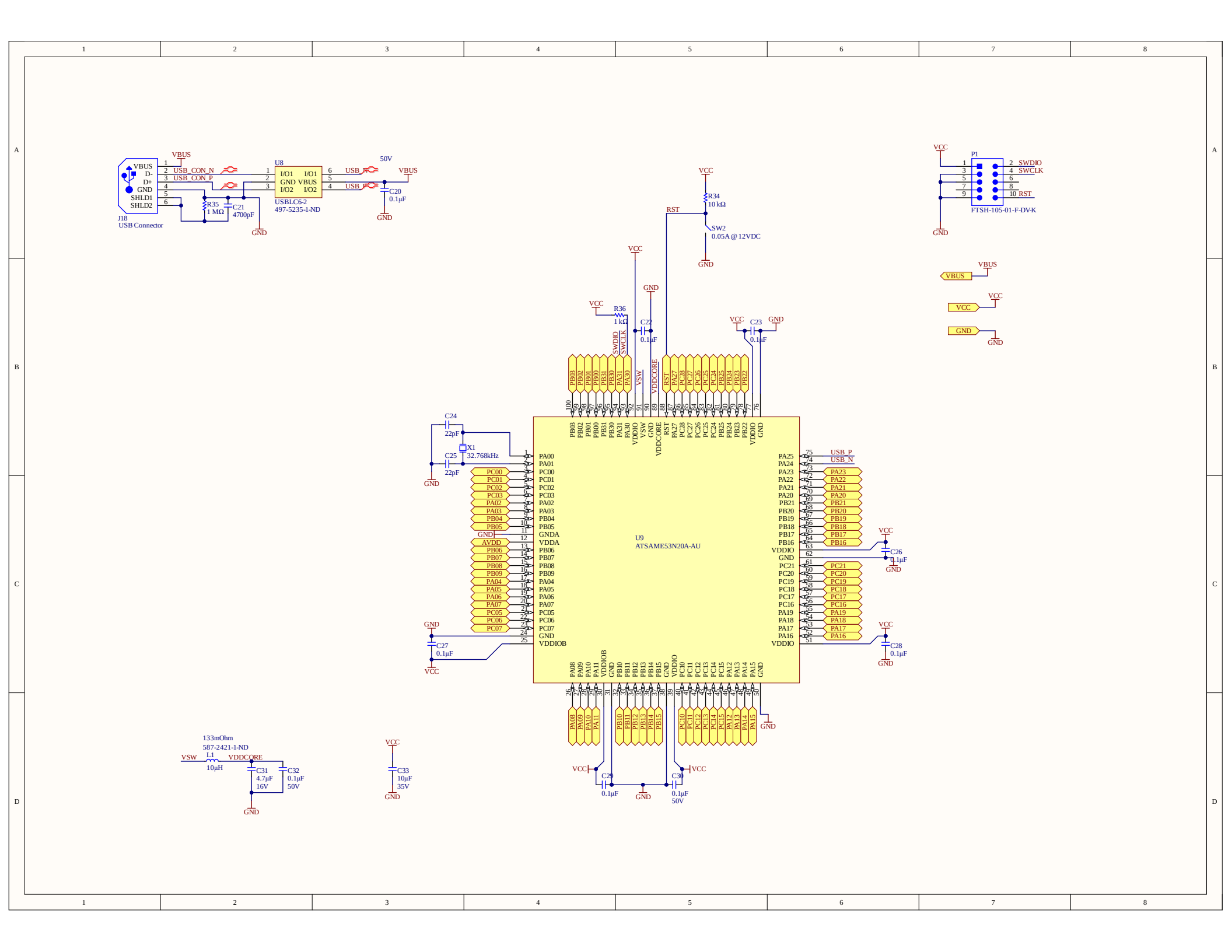
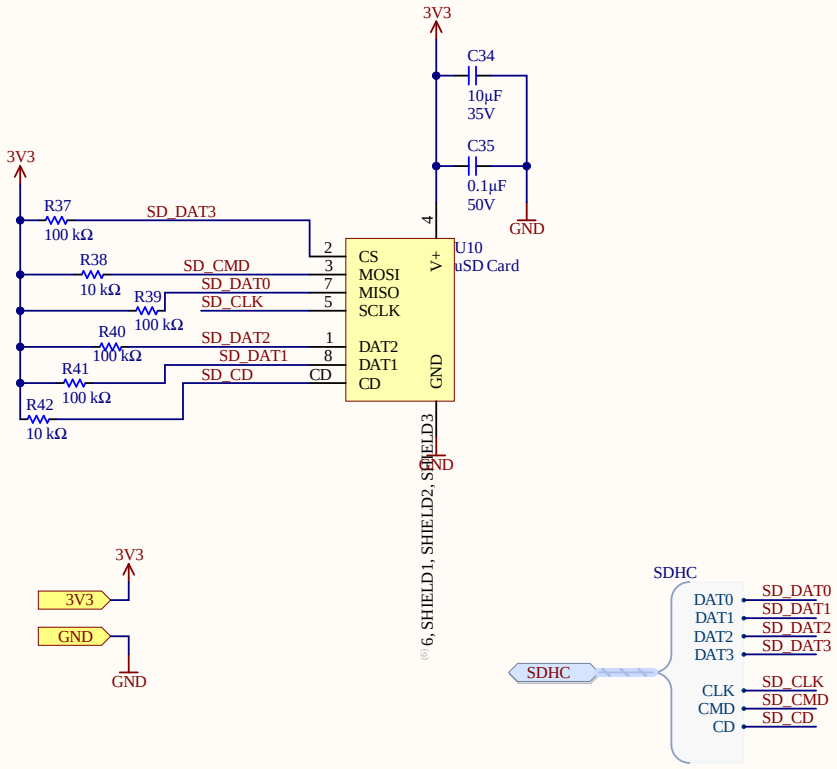
	Sheet * of *	REVIEWED ON	


J18
USB Connector
VBUS
USB_CON_N
USB_CON_P
R35
1 MΩ
C21
4700pF
GND
U8
USBLC6-2
497-5235-1-ND
I/O1
GND
I/O2
VBUS
USB_N
USB_P
50V
C20
0.1µF
P1
FTSH-105-01-F-DV-K
SWDIO
SWCLK
RST
R34
10 kΩ
SW2
0.05A @ 12VDC
R36
1 kΩ
C22
0.1µF
C23
0.1µF
C24
22pF
C25
22pF
X1
32.768kHz
U9
ATSAME53N20A-AU
C26
0.1µF
C27
0.1µF
C28
0.1µF
C29
0.1µF
C30
0.1µF
50V
L1
133mOhm
587-2421-1-ND
10µH
VDDCORE
C31
4.7µF
16V
C32
0.1µF
50V
C33
10µF
35V



Title *			*
Size: A4	Number:*	Revision:*	*
Date: 2021-01-05	Time: 04:04:23	Sheet* of *	*
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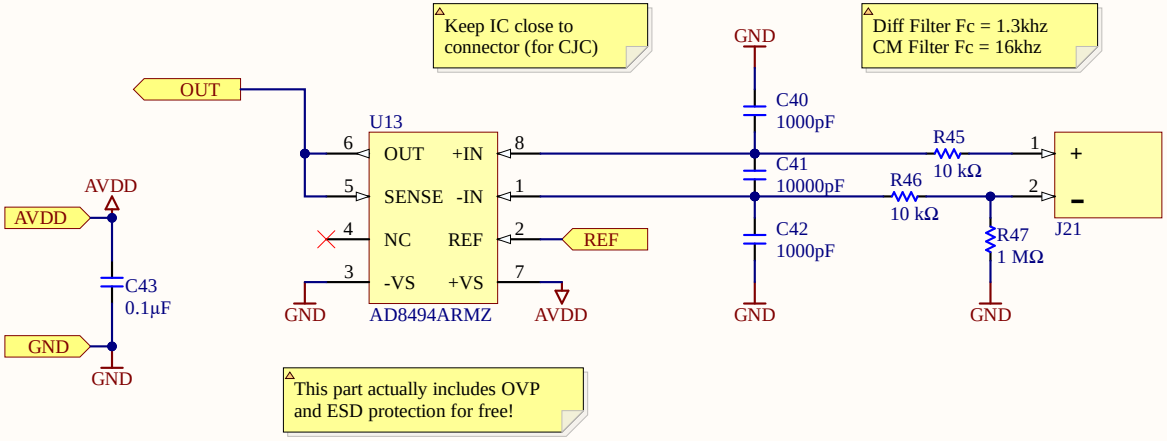
Altium



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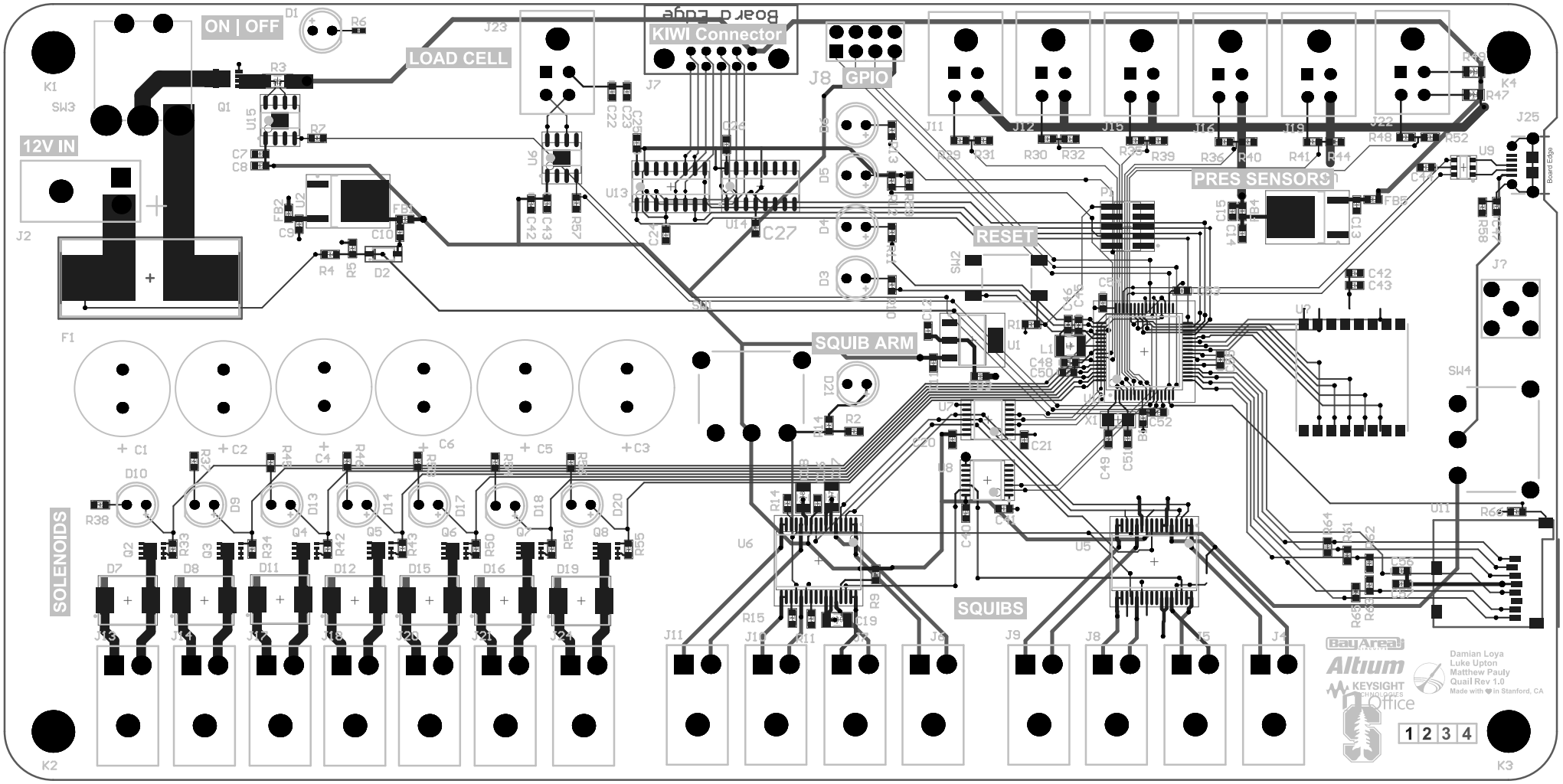
Size: A	Number	Revision
Date: 1-05-2021		Sheet of
File: C:\Users\..\Thermocouple.SchDoc		Drawn By:


ON | OFF
LOAD CELL
KIWI Connector
GPIO
12V IN
PRES SENSORS
RESET
SQUIB ARM
SOLENOIDS
SQUIBS
Damian Loya
Luke Upton
Matthew Pauly
Quail Rev 1.0
Made with ♥ in Stanford, CA
1 2 3 4