

A

A

B

B

C

C

D

D

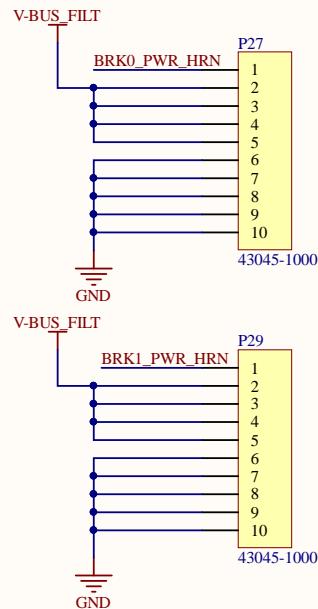
# MAIN IO

## POD 5

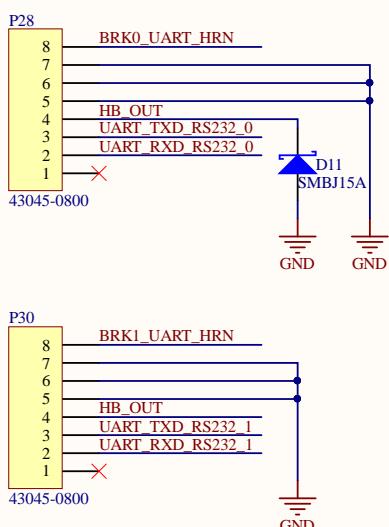
REV 1

Title <b>Main IO</b>		Badgerloop Electrical 133 Engineering Research Building 1500 Engineering Drive Madison, Wi 53706	
Engineer:	Revision:	Date: 6/13/2020 Time: 3:59:20 PM Sheet 1 of 1	

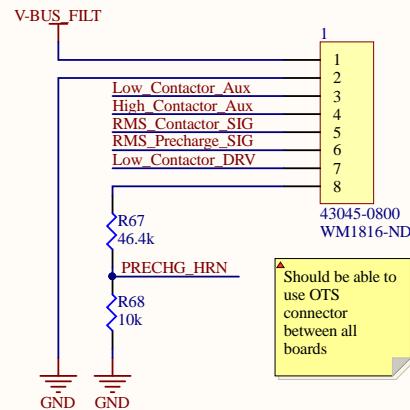
## BrakingIO PWR



## BrakingIO UART



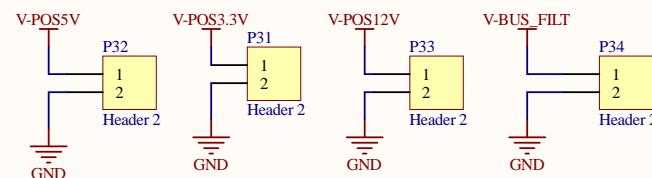
## Precharge Board



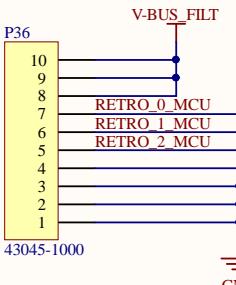
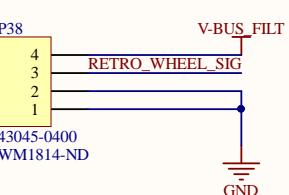
## BMS & RMS

See respective schematics

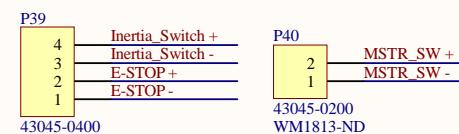
## Debug



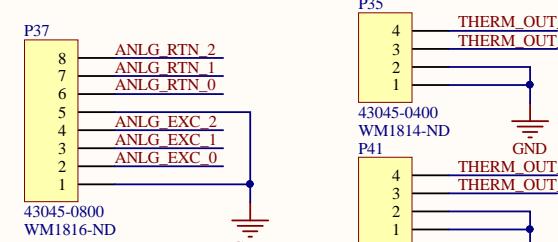
## Retro Sensors



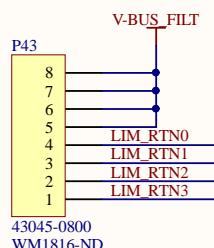
## Shutdown Circuit Inputs



## Analog Sensors



- MH1 ○ 4-40 Mount Hole
- MH2 ○ 4-40 Mount Hole
- MH3 ○ 4-40 Mount Hole
- MH4 ○ 4-40 Mount Hole



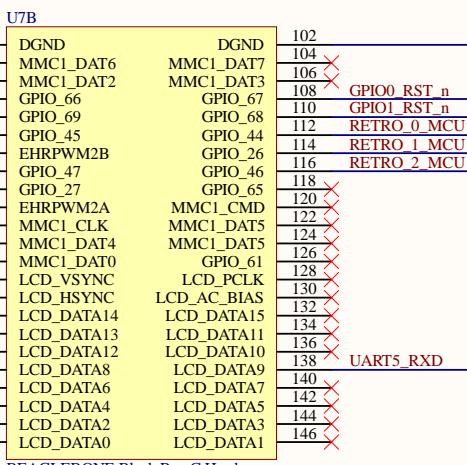
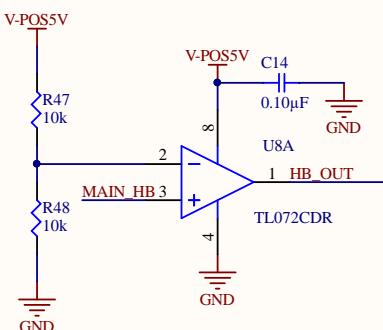
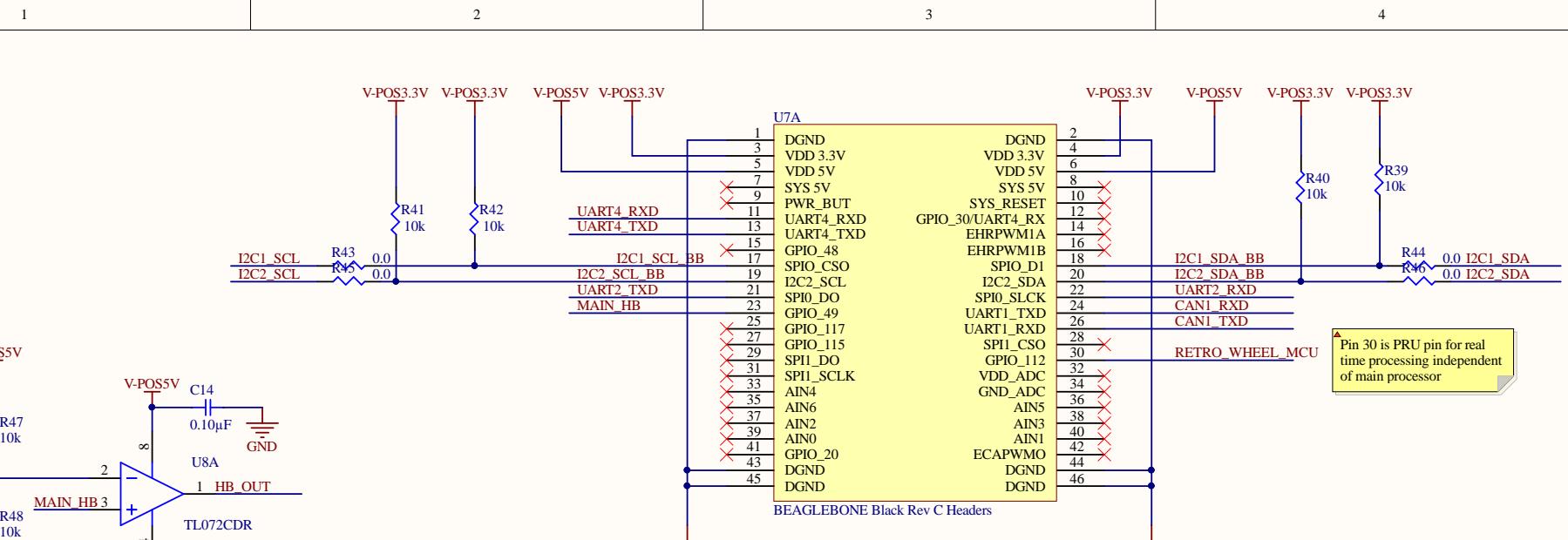
## Limit Switches

## Fiducials

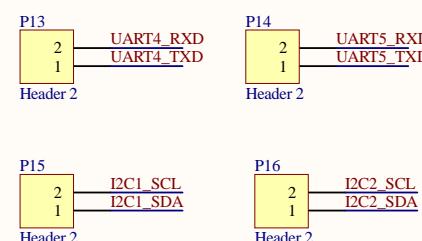
- TP59 2mm\_Fiducial
- TP60 2mm\_Fiducial
- TP61 2mm\_Fiducial

## Connectors

Engineer:	Revision:	Badgerloop Electrical 133 Engineering Research Building 1500 Engineering Drive Madison, Wi 53706
Date: 6/13/2020	Time: 3:59:20 PM	Sheet 2 of
File: connectors.SchDoc		<b>BADGER LOOP</b>

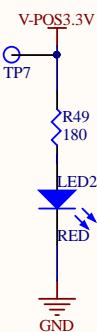


Beaglebone Headers

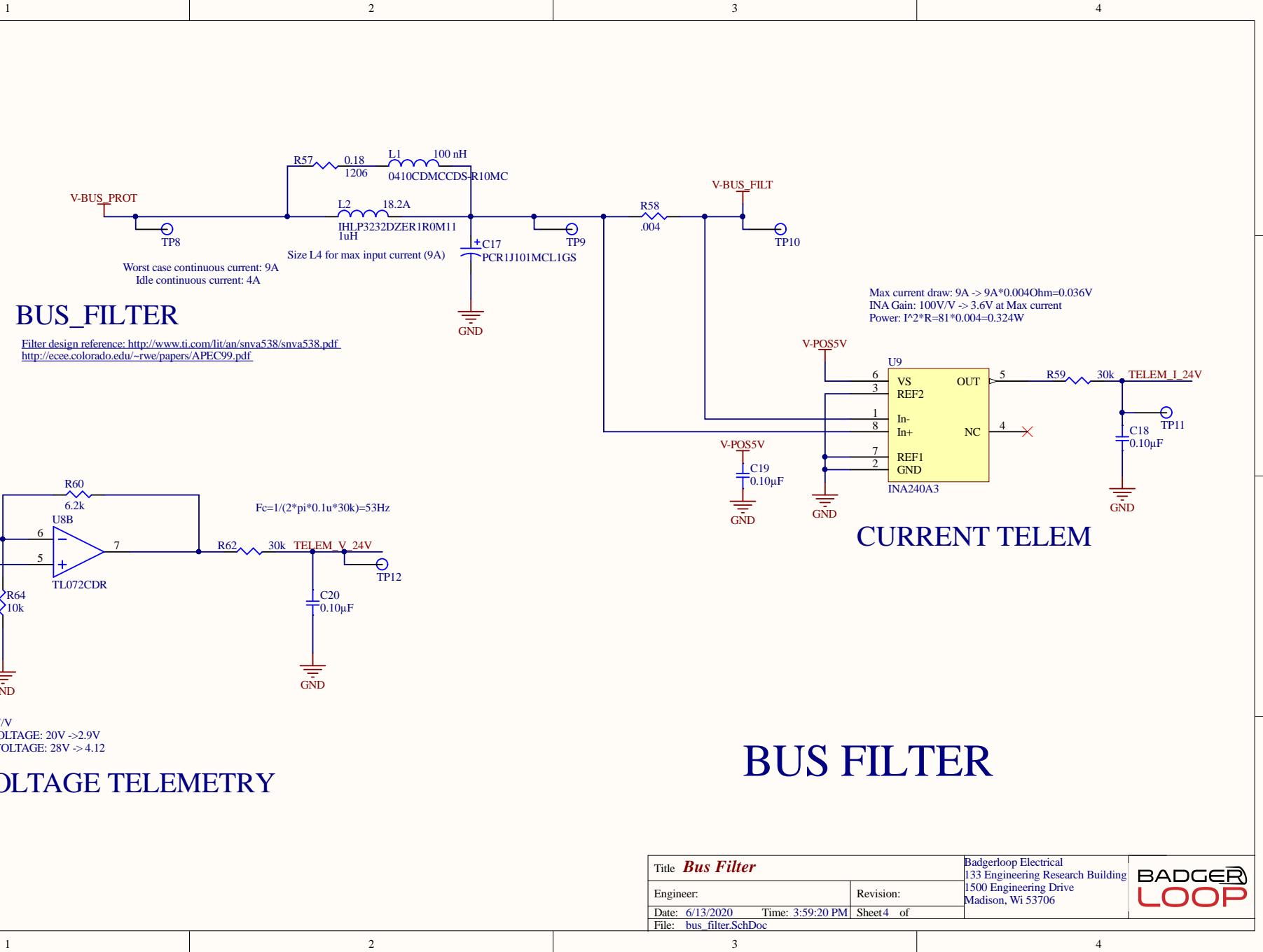


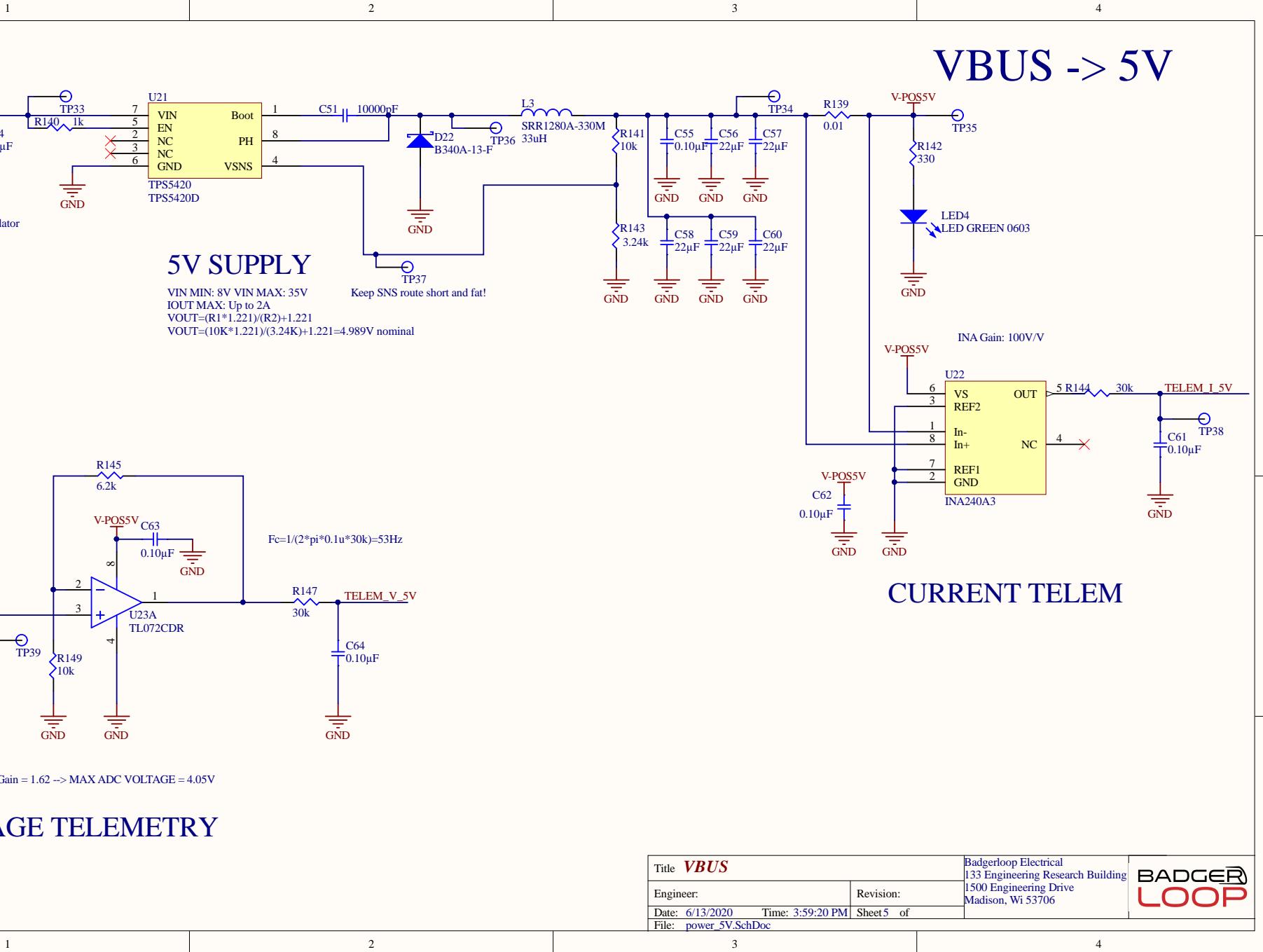
## Debug Header

Title <b>Beaglebone</b>		Badgerloop Electrical
Engineer:	Revision:	133 Engineering Research Building
Date: 6/13/2020	Time: 3:59:20 PM	1500 Engineering Drive
File: beaglebone.SchDoc		Madison, WI 53706



**BADGER**  
**LOOP**

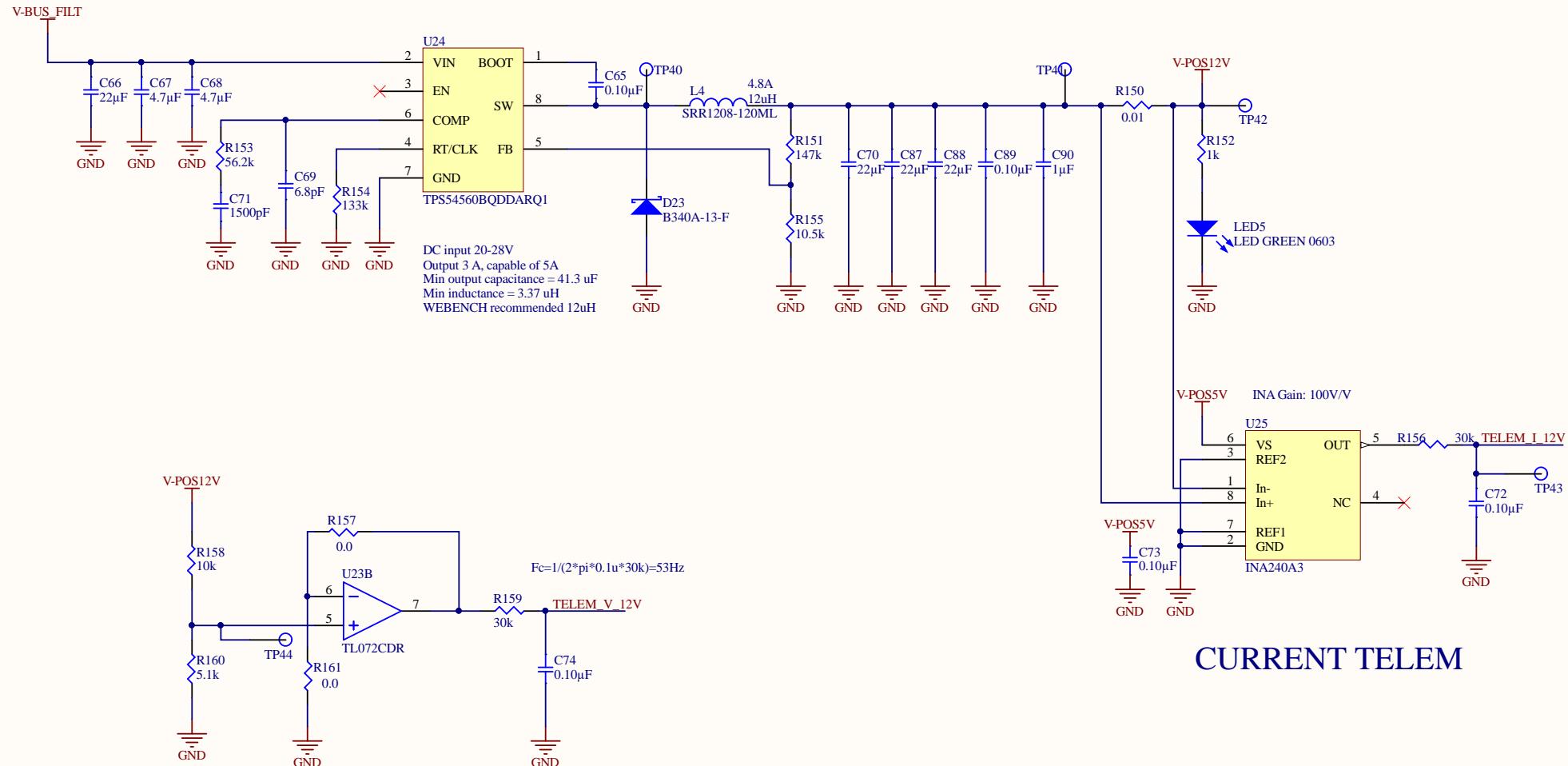




Title <b>VBUS</b>		Badgerloop Electrical
Engineer:	Revision:	133 Engineering Research Building
Date: 6/13/2020	Time: 3:59:20 PM	1500 Engineering Drive
File: power_5V.SchDoc		Madison, WI 53706

**BADGER**  
**LOOP**

# VBUS -> 12V



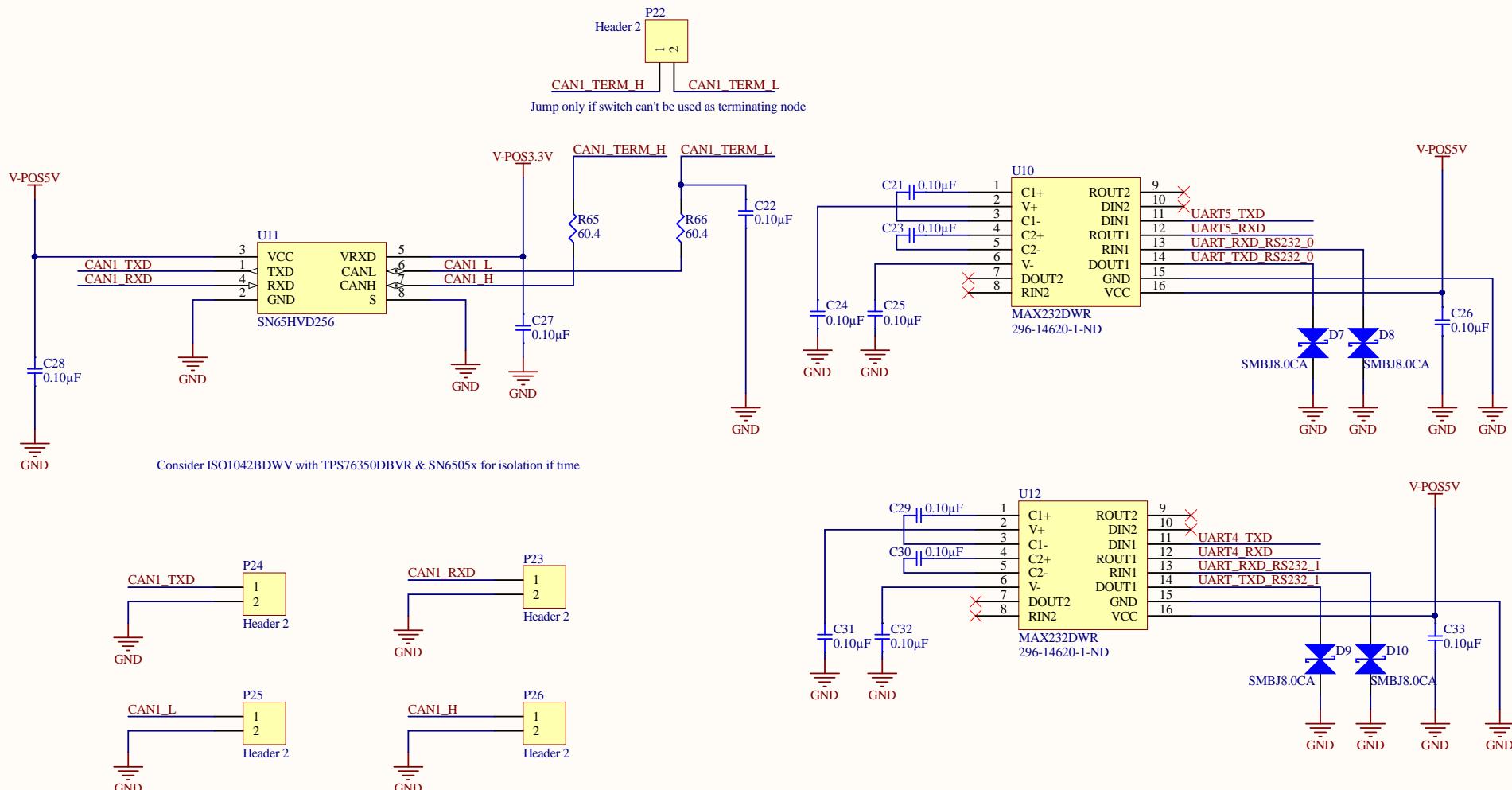
Title <b>12V PWR</b>		Badgerloop Electrical 133 Engineering Research Building 1500 Engineering Drive Madison, Wi 53706
Engineer:	Revision:	
Date: 6/13/2020	Time: 3:59:21 PM	Sheet 6 of
File: power_12V.SchDoc		<b>BADGER</b> <b>LOOP</b>

1

2

3

4

**CAN****UART (x2)**Title **CAN and UART Interfaces**

Engineer:

Date: 6/13/2020

File: can\_uart.SchDoc

 Badgerloop Electrical  
 133 Engineering Research Building  
 1500 Engineering Drive  
 Madison, Wi 53706

**BADGER**  
**LOOP**

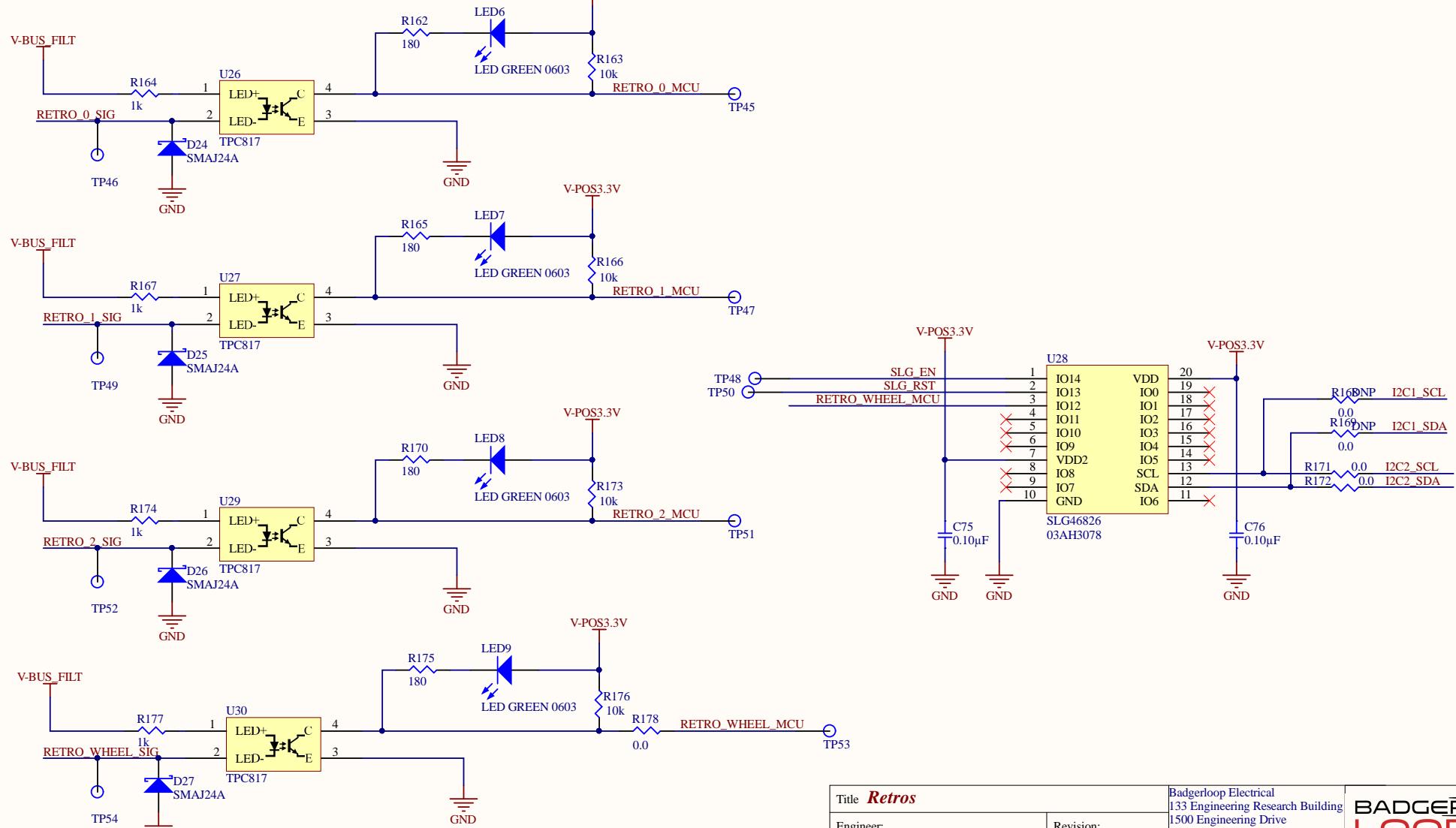
1

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4

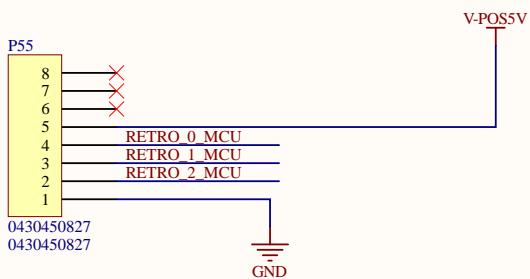
# Retros & Non-driven Wheel Sensor



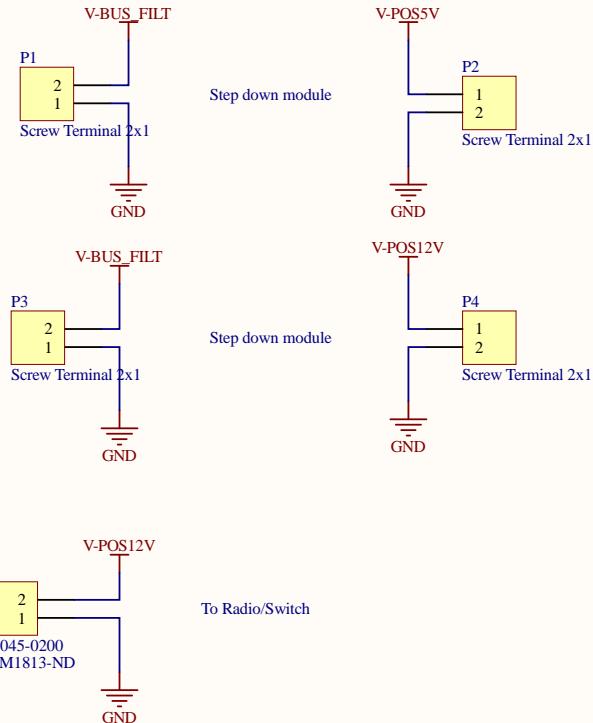
Title <i>Retros</i>		Badgerloop Electrical 133 Engineering Research Building 1500 Engineering Drive Madison, Wi 53706	<b>BADGER</b> <b>LOOP</b>
Engineer:	Revision:		
Date: 6/13/2020	Time: 3:59:21 PM	Sheet 8 of	
File: retros.SchDoc			

## Arduino Interface

Only if SX still requires this



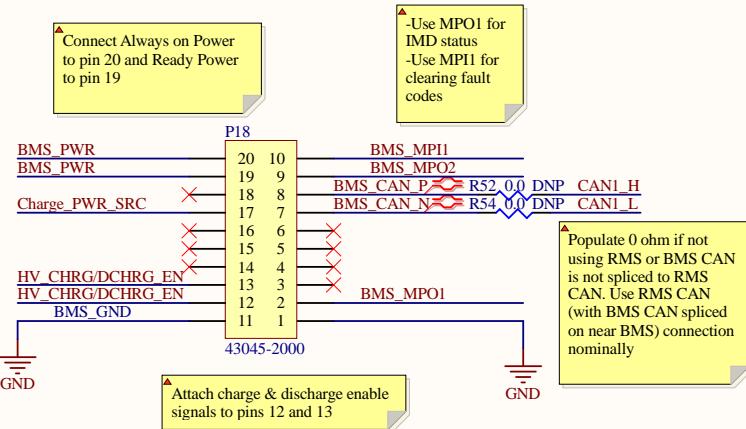
## OTS Device Connections



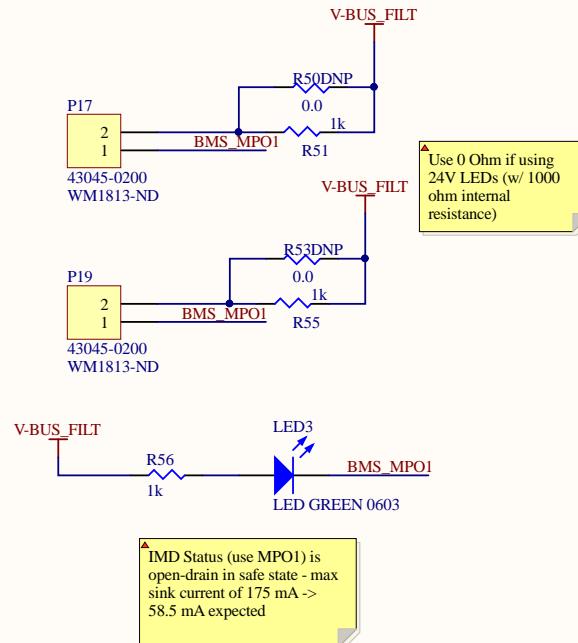
Title <b>Arduino Shield</b>		Badgerloop Electrical 133 Engineering Research Building 1500 Engineering Drive Madison, Wi 53706
Engineer:	Revision:	
Date: 6/13/2020	Time: 3:59:21 PM	Sheet 9 of
File: <a href="#">arduino_shield.SchDoc</a>		<b>BADGER LOOP</b>

# BMS Interface

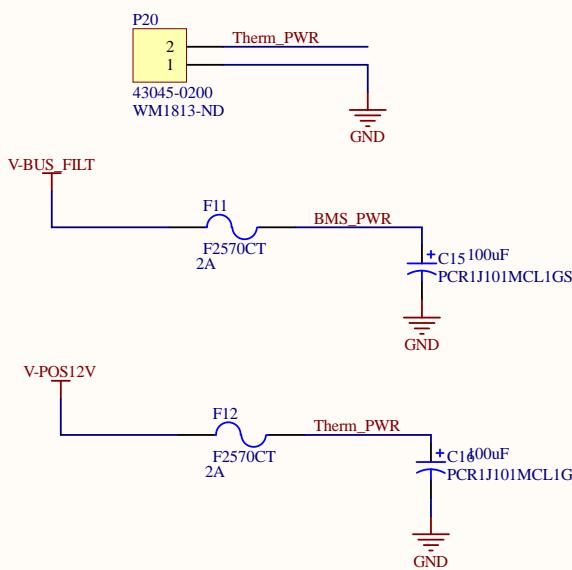
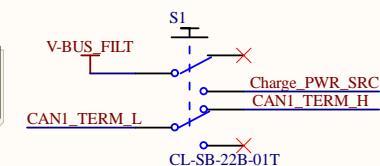
## BMS/Term Main Connectors



## IMD Light circuit



## Charge Enable & Termination Resistors



## Charger Connector

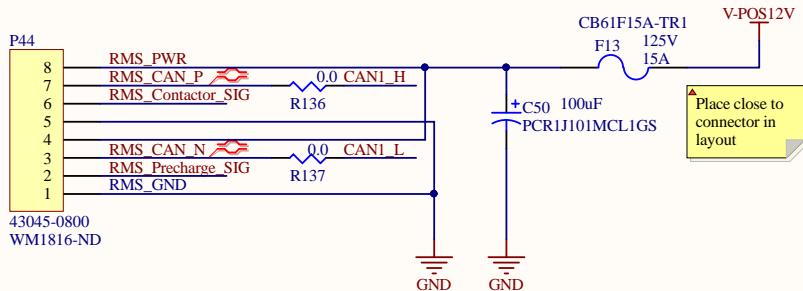


Title <b>BMS Interface</b>		Badgerloop Electrical 133 Engineering Research Building 1500 Engineering Drive Madison, Wi 53706
Engineer: Shelby Riggelman	Revision:A	
Date: 6/13/2020	Time: 3:59:21 PM	Sheet 10 of
File: bms_interface.SchDoc		<b>BADGER</b> <b>LOOP</b>

A

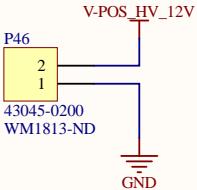
A

## Motor Controller Interface



B

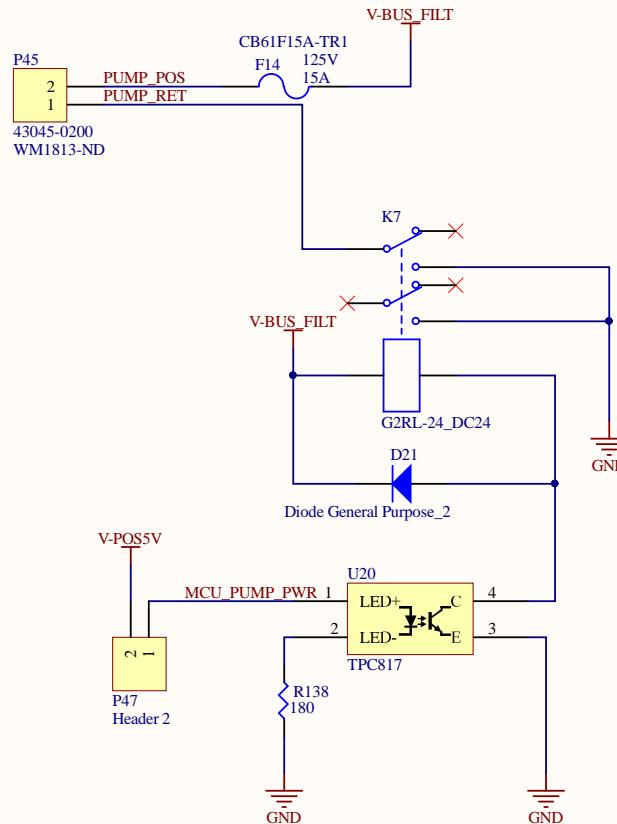
B



C

C

## Pump Power



D

D

Title **RMS & Precharge Interface**

Engineer: Shelby Riggleman

Date: 6/13/2020 Time: 3:59:21 PM

File: motor\_controller\_interface.SchDoc

Badgerloop Electrical  
133 Engineering Research Building  
1500 Engineering Drive  
Madison, Wi 53706

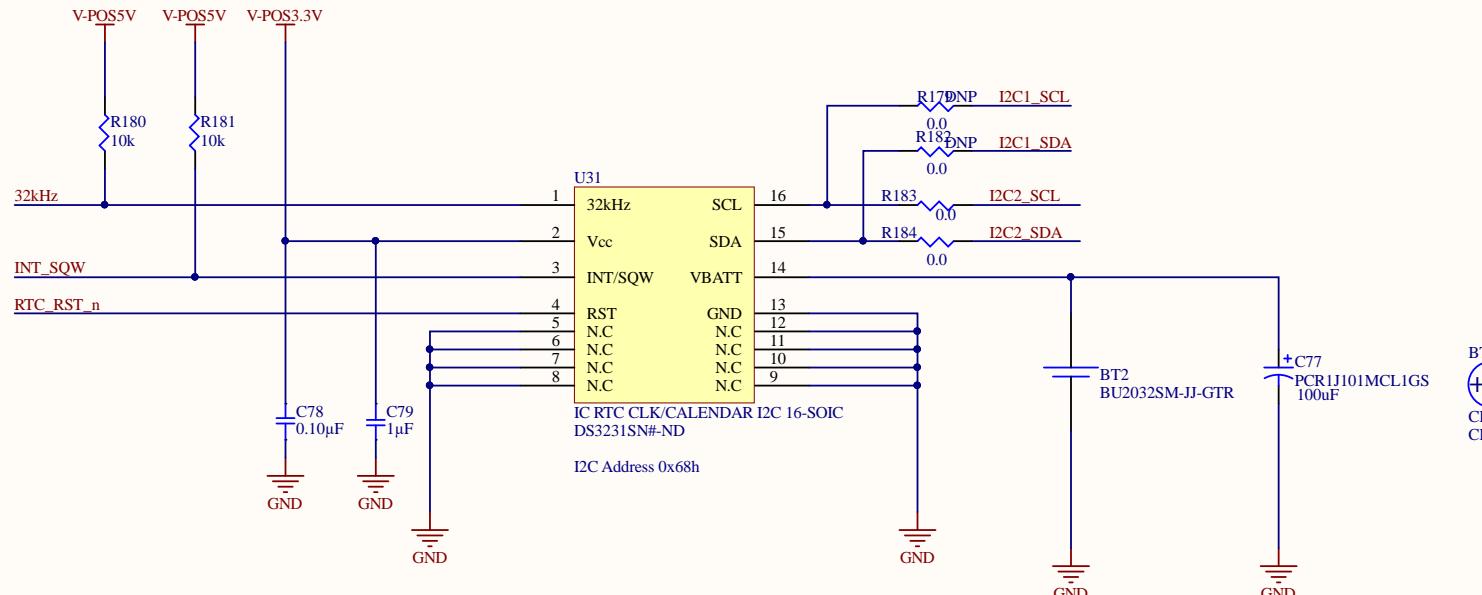


# Real Time Clock & Coin Cell

A

A

Function determined by INTCN bit in OEh - SQW if 0, Active low interrupt if 1 and alarm enabled  
Default = interrupt, but alarm is disabled



B

B

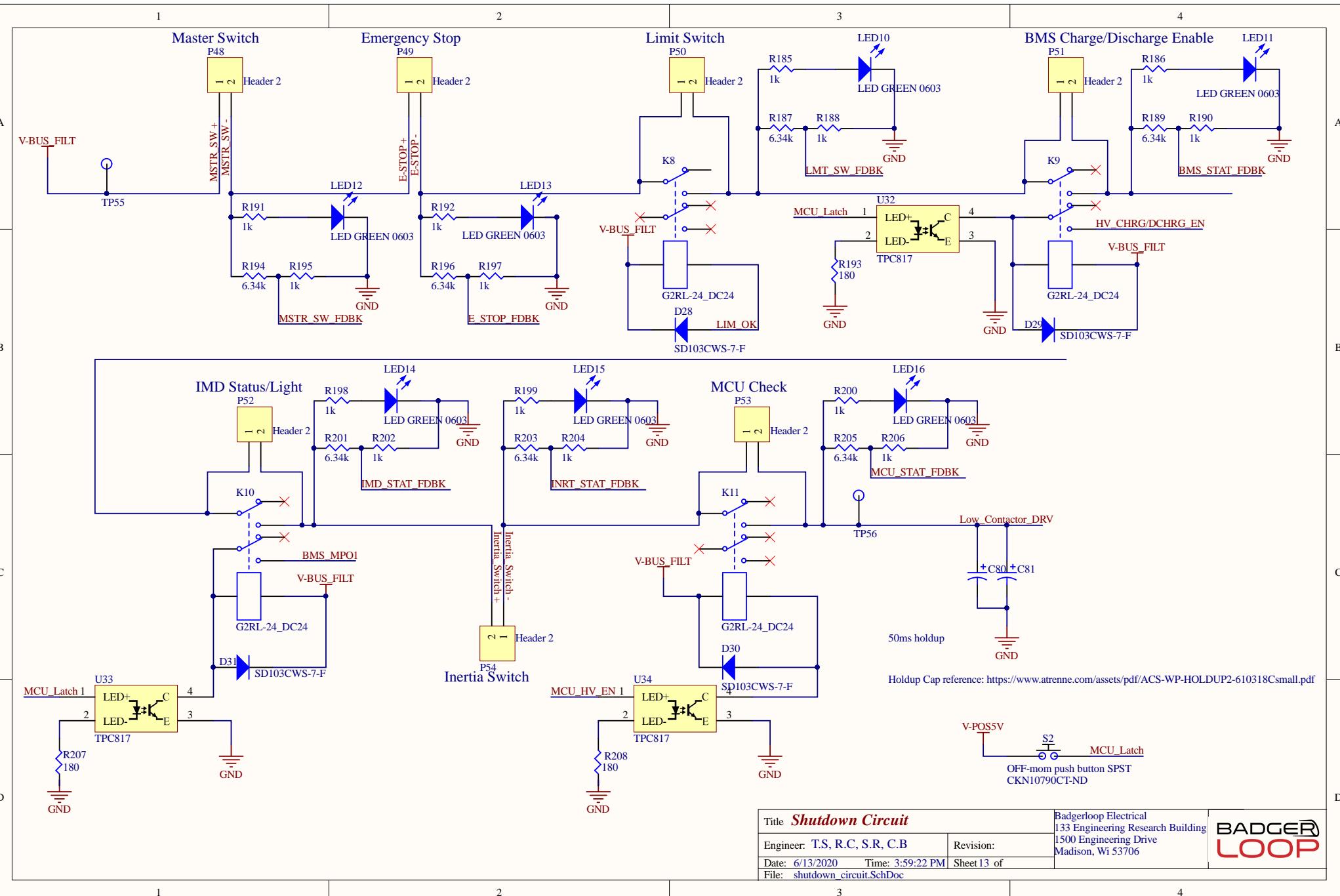
C

C

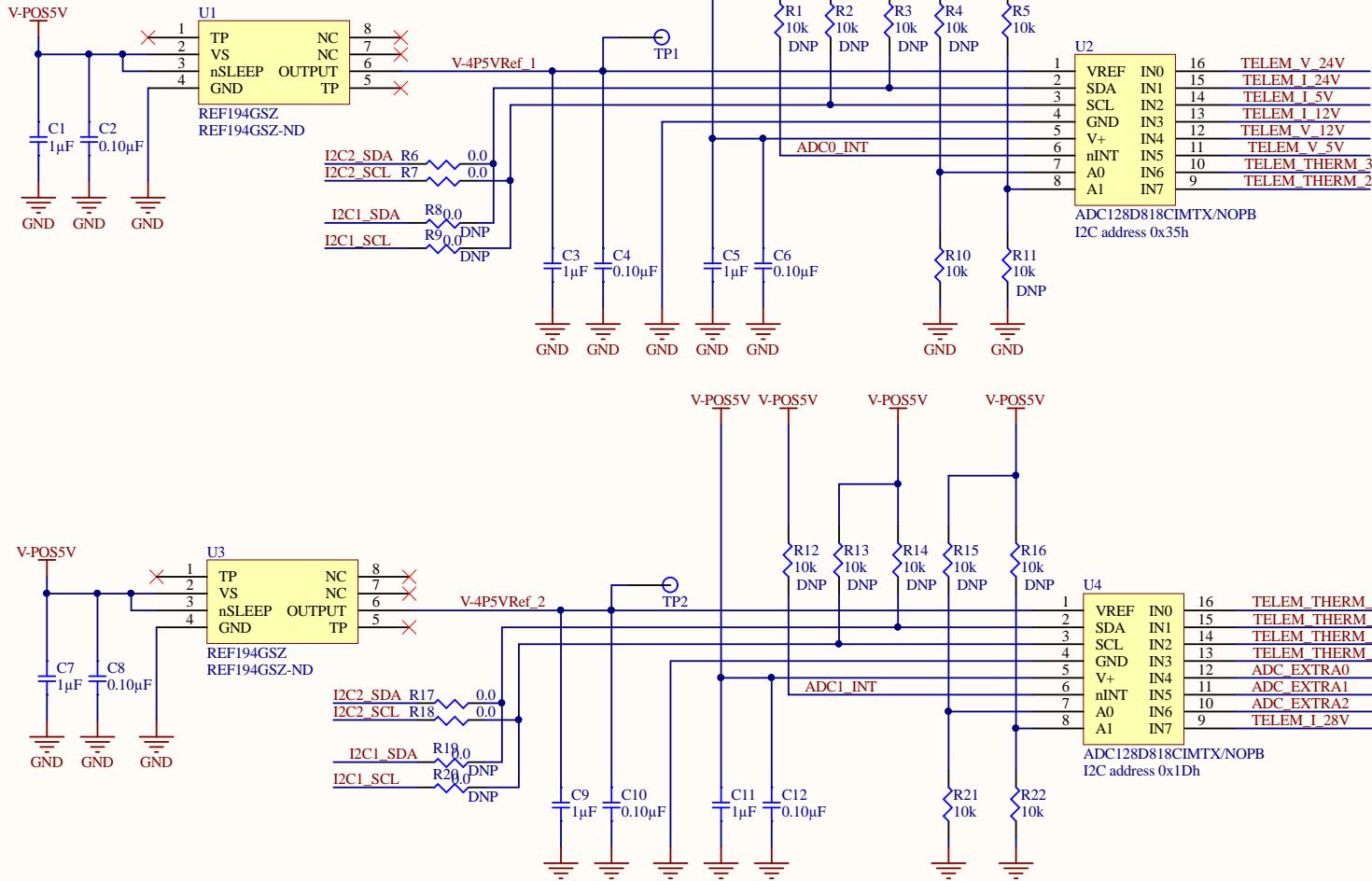
D

D

Title <b>RTC</b>			<i>Badgerloop</i> 133 Engineering Research Building Madison, WI 53715	<b>BADGER</b> <b>LOOP</b>
Size: A4	Number:	Revision:		
Date: 6/13/2020	Time: 3:59:22 PM	Sheet 12 of		
File: C:\Users\Windows PC\Desktop\Badgerloop\git_repos\hardware\main_io\RTC.SchDoc				

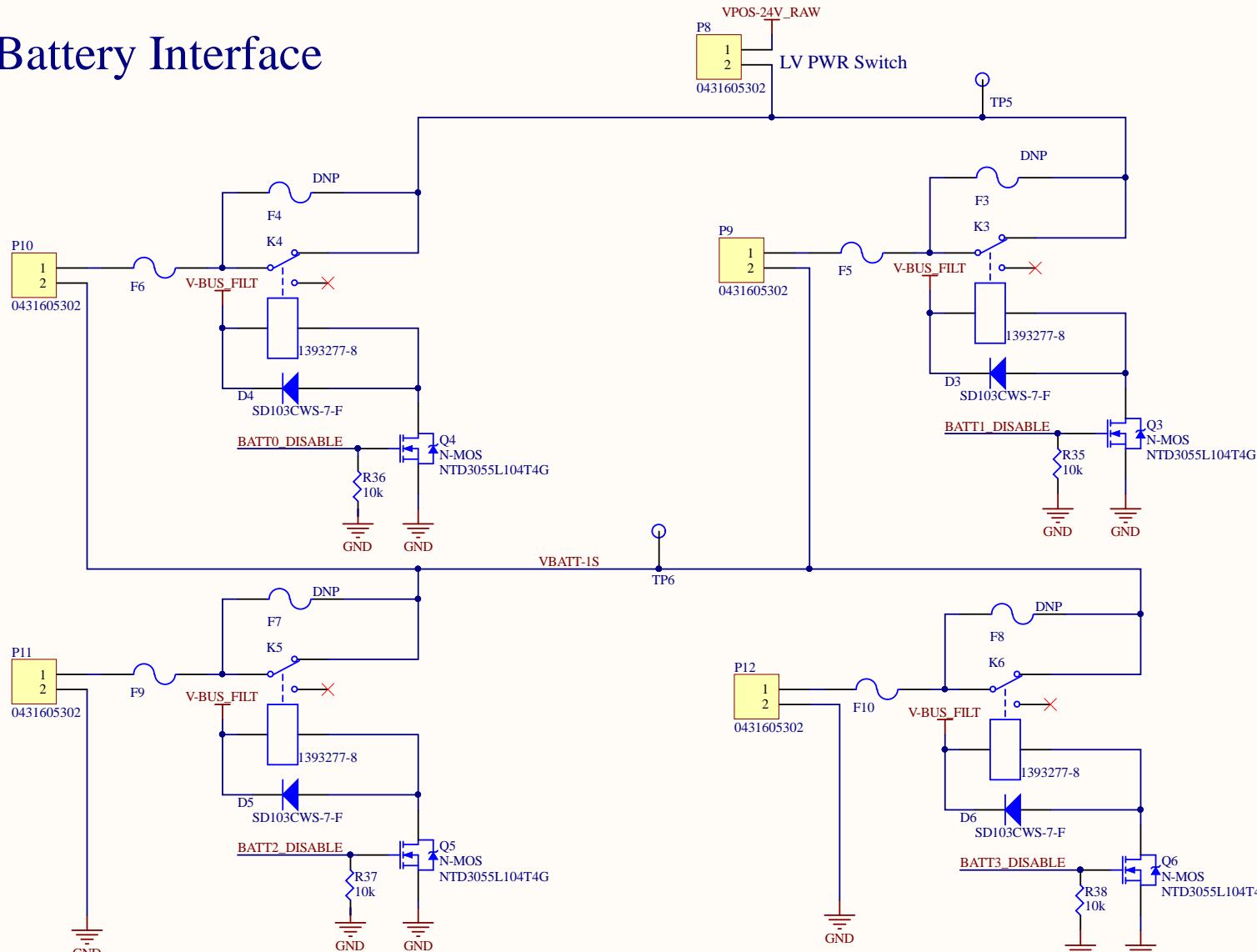


# Analog Inputs



Title <b>ADC</b>			<i>Badgerloop</i> 133 Engineering Research Building Madison, WI 53715
Size: A4	Number:	Revision:	
Date: 6/13/2020	Time: 3:59:22 PM	Sheet 14 of	
File: C:\Users\Windows PC\Desktop\Badgerloop\git_repos\hardware\main_io\adc.SchDoc			

# LV Battery Interface



Title <b>LV Battery Interface</b>			<b>Badgerloop</b> 133 Engineering Research Building Madison, WI 53715	<b>BADGER</b> <b>LOOP</b>
Size: <b>A4</b>	Number:	Revision:		
Date: 6/13/2020	Time: 3:59:22 PM	Sheet 15 of		
File: C:\Users\Windows PC\Desktop\Badgerloop\git_repos\hardware\main_io\battery_interface.SchDoc				

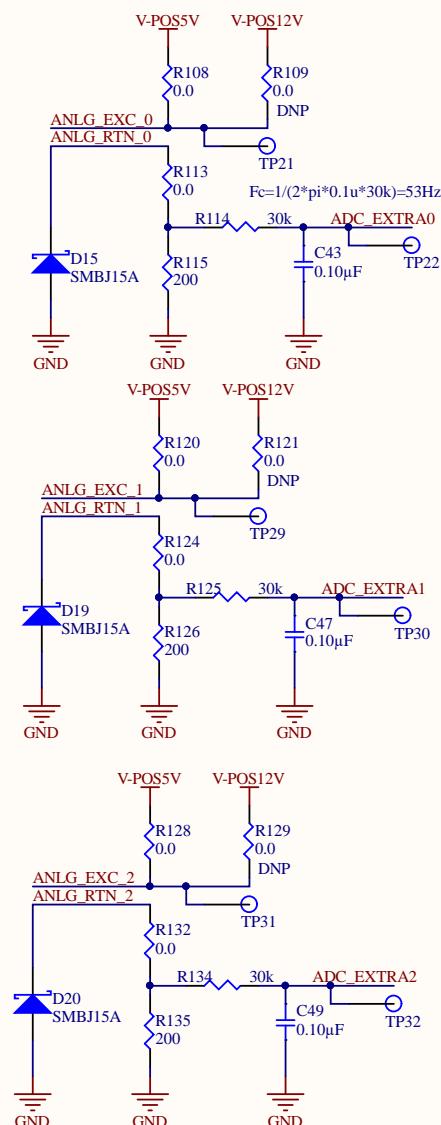
1

2

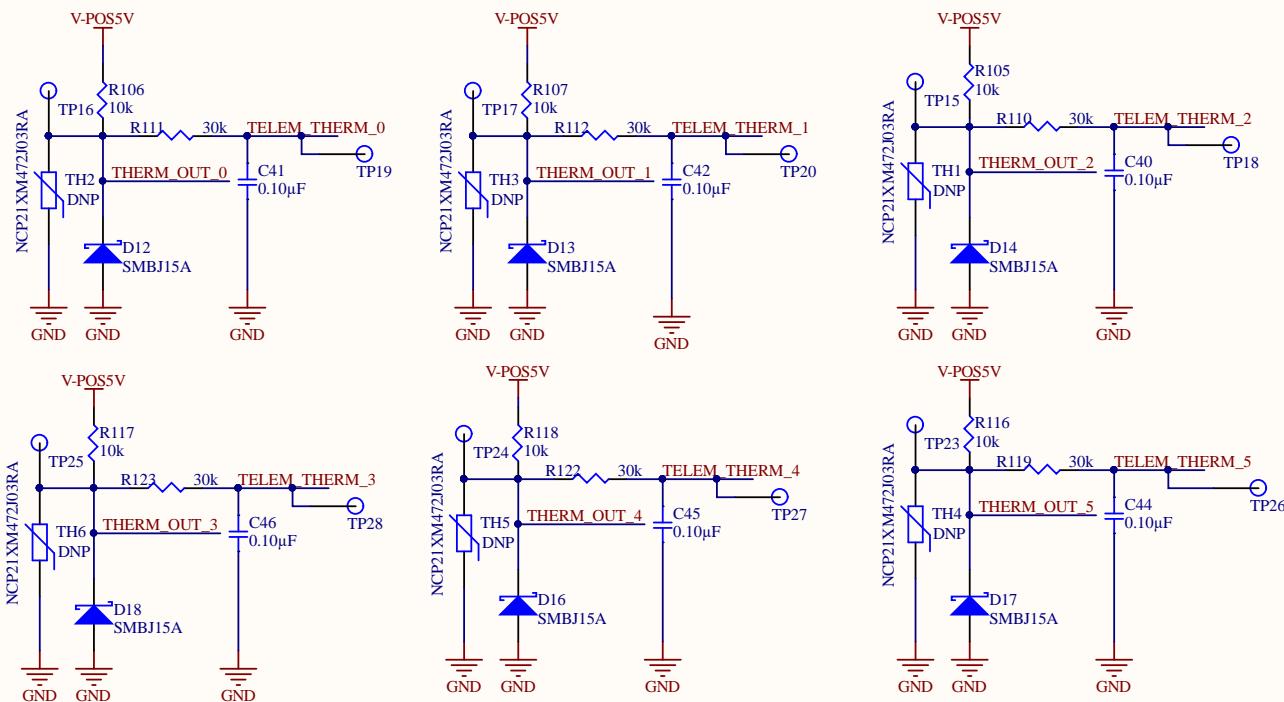
3

4

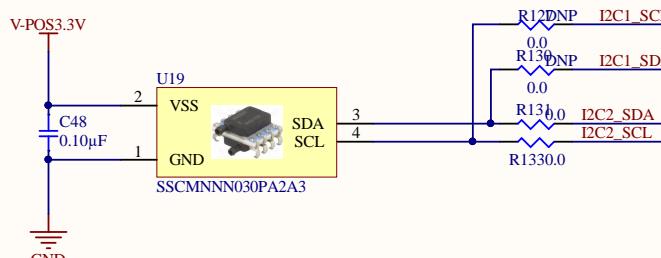
## Extra Analog Sensors



## Thermistors



## Ambient Pressure Sensor



Title: <b>Sensors</b>			Badgerloop 133 Engineering Research Building Madison, WI 53715	BADGER LOOP
Size: A4	Number:	Revision:		
Date: 6/13/2020	Time: 3:59:22 PM	Sheet 16 of		
File: C:\Users\Windows PC\Desktop\Badgerloop\git_repos\hardware\main_io\misc_sensors.SchDoc				

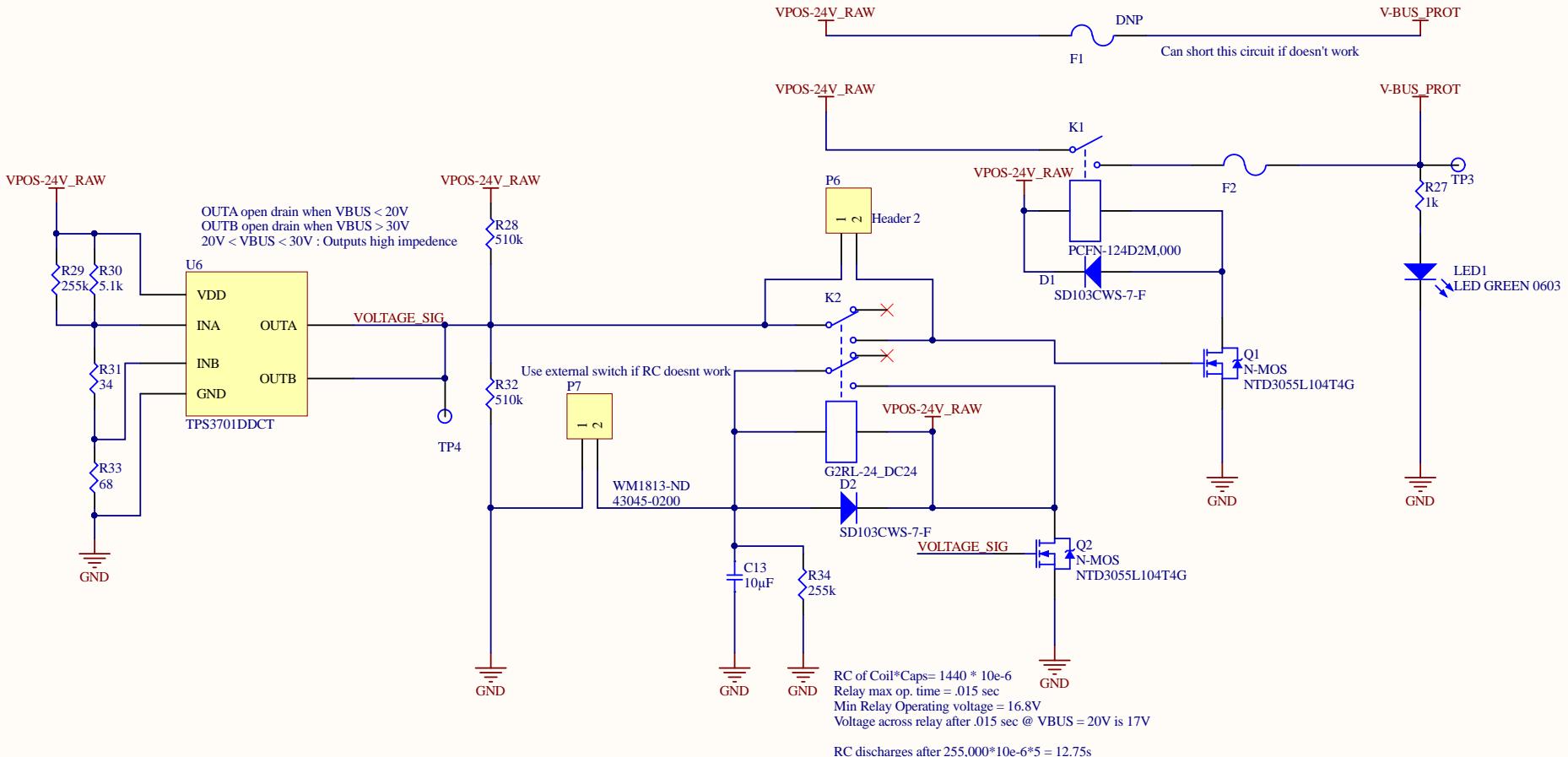
1

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# BATTERY PROTECTION



Title <b>Battery Protection</b>			Badgerloop 133 Engineering Research Building Madison, WI 53715	<b>BADGER LOOP</b>
Size: A4	Number:	Revision:		
Date: 6/13/2020	Time: 3:59:23 PM	Sheet 17 of		
File: C:\Users\Windows PC\Desktop\Badgerloop\git_repos\hardware\main_io\batt_protection.SchDoc				

1

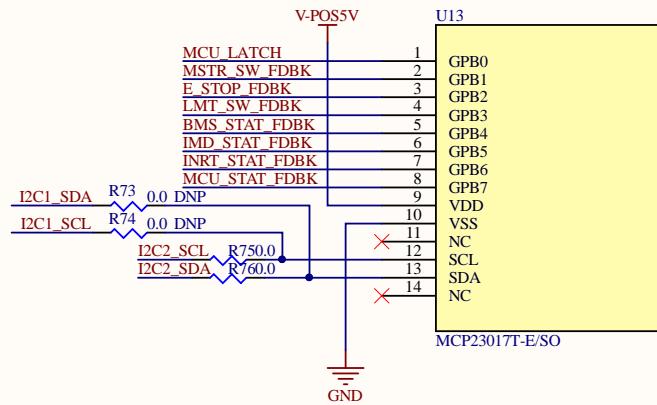
2

3

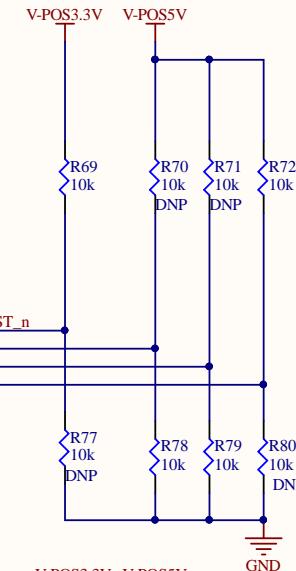
4

## GPIO

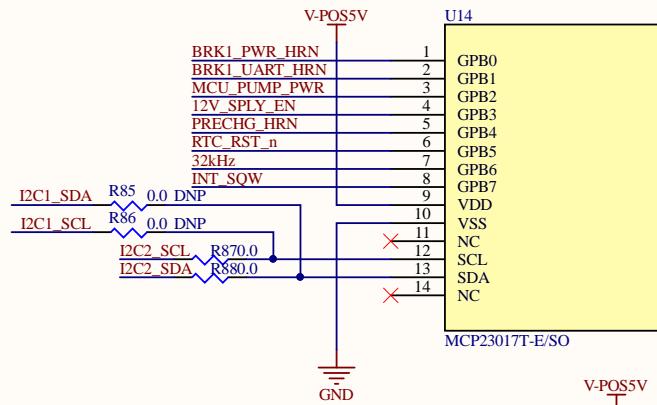
A



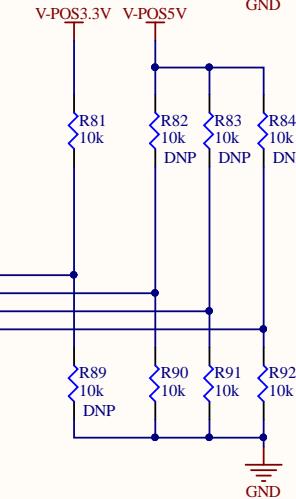
GPB0	28	MCU_HV_EN
GPB1	27	BMS_MPI1
GPB2	26	LIM_MCU3
GPB3	25	LIM_MCU2
GPB4	24	LIM_MCU1
GPB5	23	LIM_MCU0
GPB6	22	Charge_lv
GPB7	21	
VDD	20	
VSS	19	
NC	18	
SCL	17	*RESET
SDA	16	
NC	15	



B

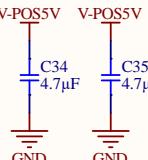


GPB0	28	BRK0_UART_HRN
GPB1	27	BRK0_PWR_HRN
GPB2	26	High_Contactor_Aux
GPB3	25	Low_Contactor_Aux
GPB4	24	BATT1_DISABLE
GPB5	23	BATT0_DISABLE
GPB6	22	BATT2_DISABLE
GPB7	21	BATT3_DISABLE
VDD	20	
VSS	19	
NC	18	
SCL	17	*RESET
SDA	16	
NC	15	



C

Place close to U?



D

Title: <b>GPIO</b>			Badgerloop
Size: A4	Number:	Revision:	133 Engineering Research Building Madison, WI 53715
Date: 6/13/2020	Time: 3:59:23 PM	Sheet 18 of	BADGER LOOP
File: C:\Users\Windows PC\Desktop\Badgerloop\git_repos\hardware\main_io\gpio.SchDoc			

1

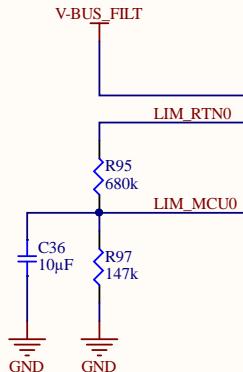
2

3

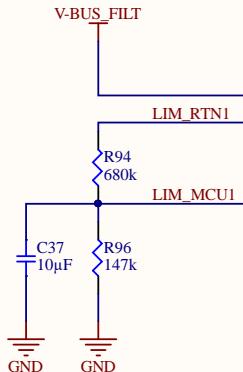
4

## Limit Switch Feedback

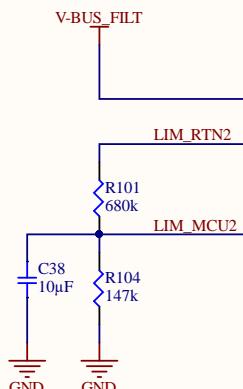
A



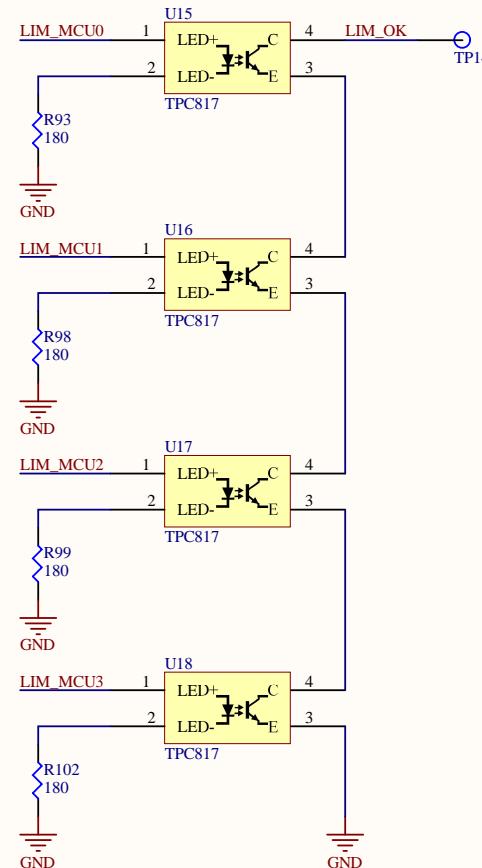
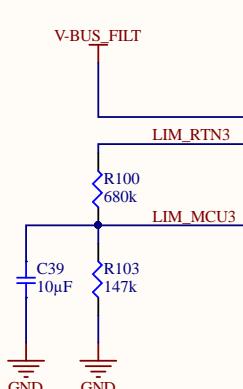
B



C

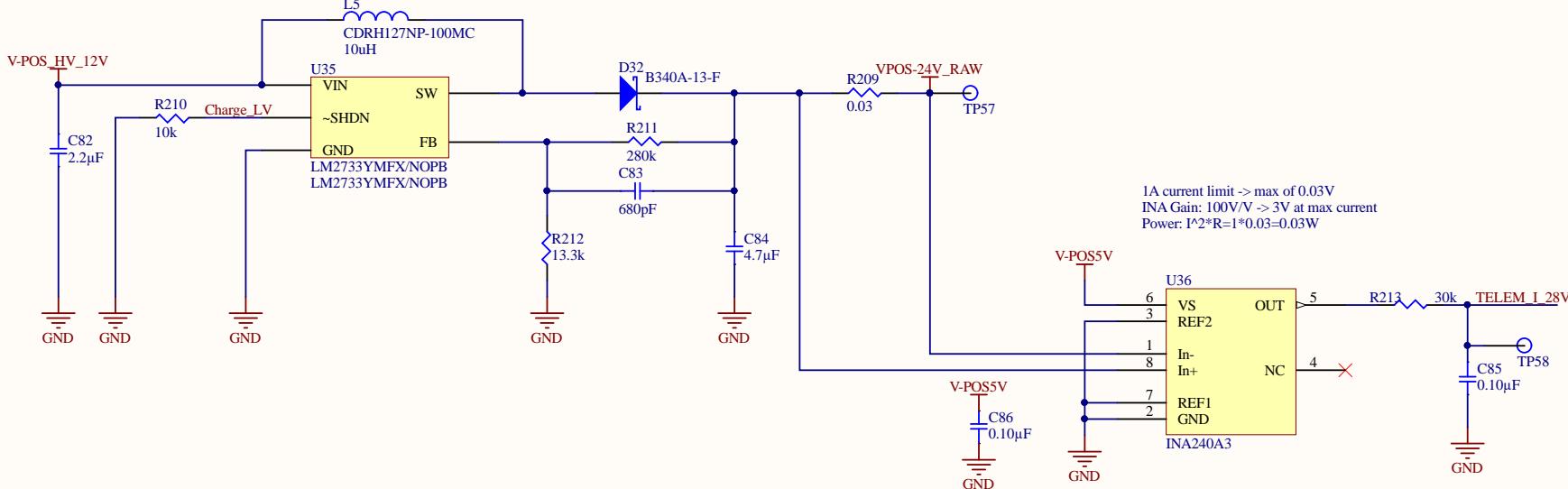


D



Title: <b>Limit Switches</b>	Badgerloop 133 Engineering Research Building Madison, WI 53715
Size: A4	Number:
Date: 6/13/2020	Revision:
File: C:\Users\Windows PC\Desktop\Badgerloop\git_repos\hardware\main_io\limit_switches.SchDoc	Time: 3:59:23 PM Sheet 19 of

# HV Batt 12V -> 28V



## CURRENT TELEM

Title <b>28V Boost</b>	Badgerloop 133 Engineering Research Building Madison, WI 53715
Size: A4	Number:
Date: 6/13/2020	Revision:
File: C:\Users\Windows PC\Desktop\Badgerloop\git_repos\hardware\main_io\power_28V.SchDoc	Time: 3:59:23 PM Sheet 20 of

**BADGER LOOP**

