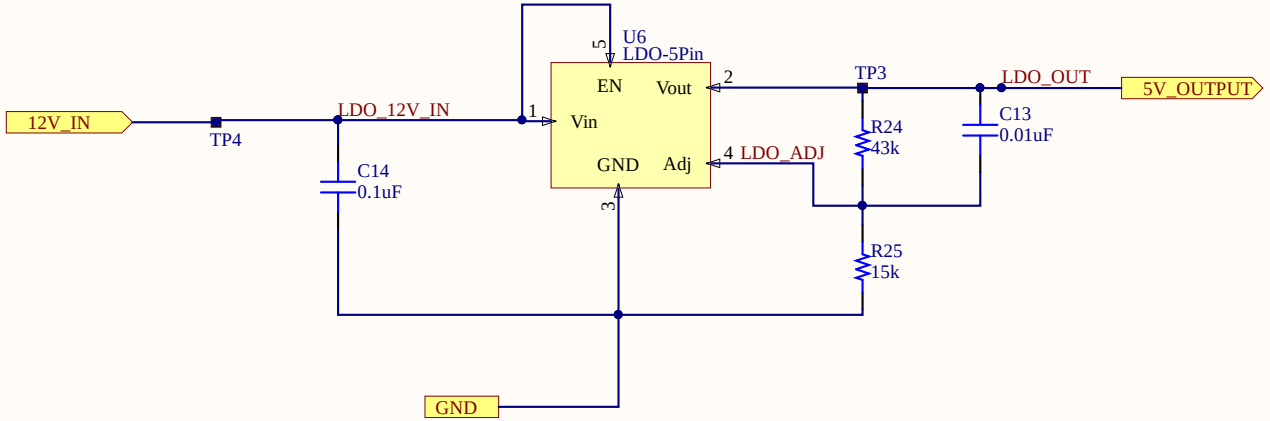
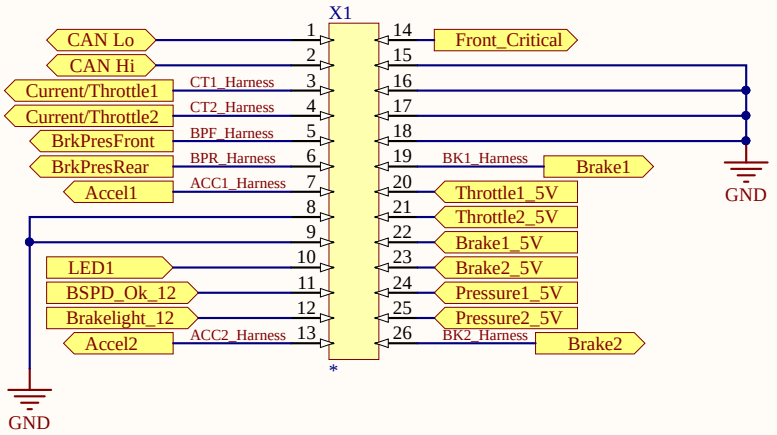
Takes the 12V input and converts it to 5V output using an LDO.

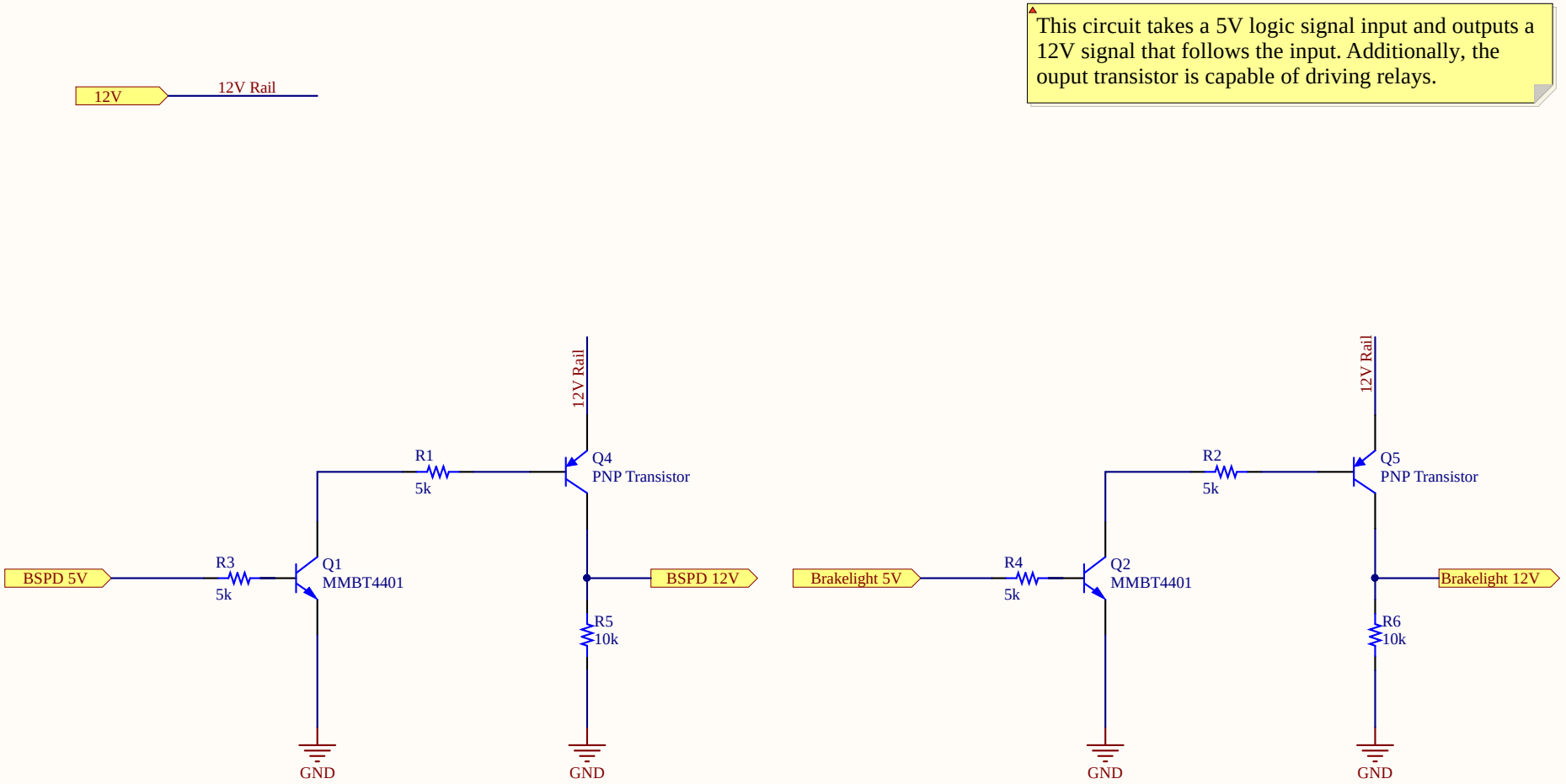
Degrees Celsius rise = 105 * current (A)



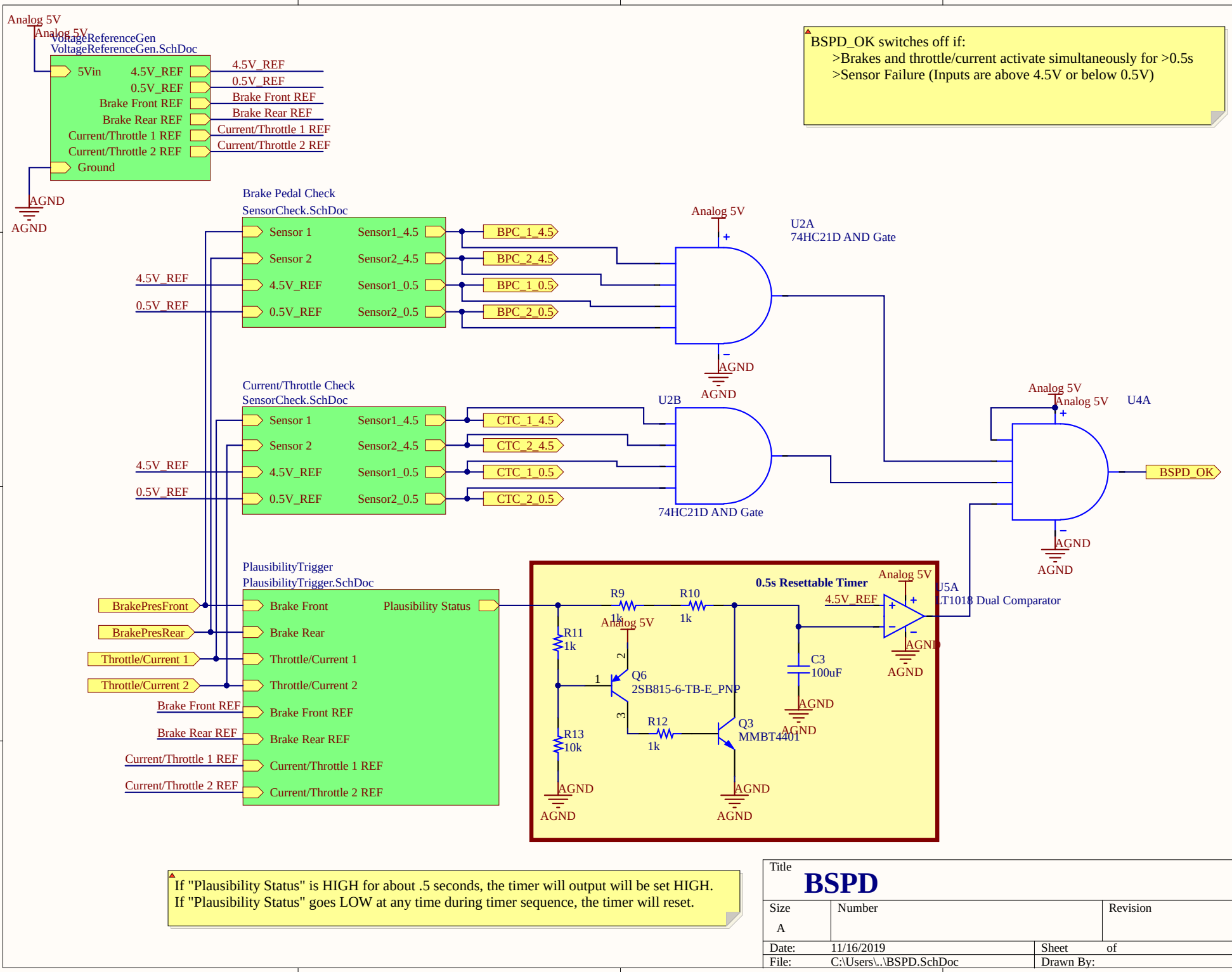
Title	12V_to_5V_Converter	
Size: A	Number:	Revision:
Date: 11/16/2019	Sheet of	
File: C:\Users\..\12V_to_5V_LDO_1A.SchDoc	Drawn By:	

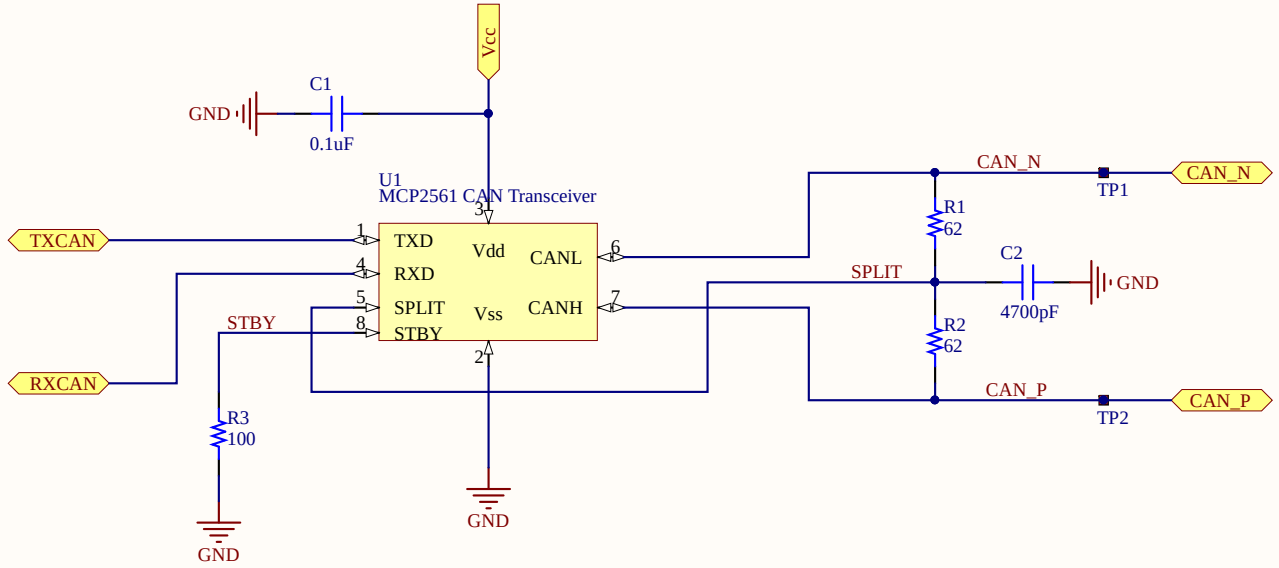


Title	**Pedalbox Superseal**	
Size: A	Number:	Revision:
Date: 11/16/2019		Sheet of
File: C:\Users\..\26PinSuperseal.SchDoc		Drawn By:



Title	5V_12V_Logic	
Size: A	Number:	Revision:
Date: 11/16/2019		Sheet of
File: C:\Users\..\5V_12V_Logic.SchDoc		Drawn By:

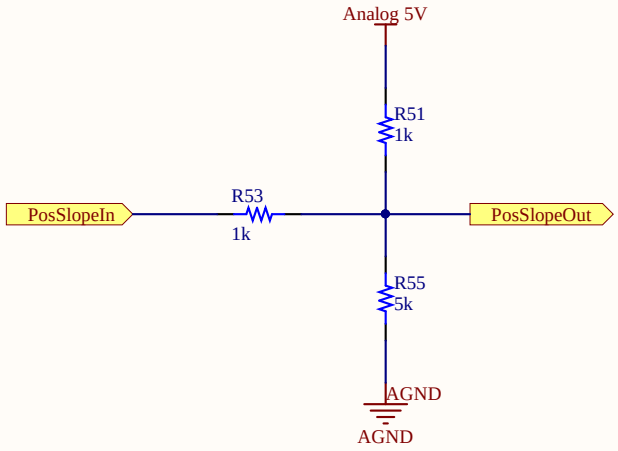

Analog 5V
Analog 5V
VoltageReferenceGen
VoltageReferenceGen.SchDoc
5Vin
4.5V_REF
0.5V_REF
Brake Front REF
Brake Rear REF
Current/Throttle 1 REF
Current/Throttle 2 REF
Ground
4.5V_REF
0.5V_REF
Brake Front REF
Brake Rear REF
Current/Throttle 1 REF
Current/Throttle 2 REF
AGND
AGND
BSPD_OK switches off if:
>Brakes and throttle/current activate simultaneously for >0.5s
>Sensor Failure (Inputs are above 4.5V or below 0.5V)
Brake Pedal Check
SensorCheck.SchDoc
Sensor 1
Sensor 2
4.5V_REF
0.5V_REF
Sensor1_4.5
Sensor2_4.5
Sensor1_0.5
Sensor2_0.5
BPC_1_4.5
BPC_2_4.5
BPC_1_0.5
BPC_2_0.5
Analog 5V
U2A
74HC21D AND Gate
AGND
AGND
Current/Throttle Check
SensorCheck.SchDoc
CTC_1_4.5
CTC_2_4.5
CTC_1_0.5
CTC_2_0.5
U2B
74HC21D AND Gate
Analog 5V
Analog 5V
U4A
BSPD_OK
AGND
AGND
PlausibilityTrigger
PlausibilityTrigger.SchDoc
BrakePresFront
BrakePresRear
Throttle/Current 1
Throttle/Current 2
Brake Front REF
Brake Rear REF
Current/Throttle 1 REF
Current/Throttle 2 REF
Brake Front
Brake Rear
Throttle/Current 1
Throttle/Current 2
Brake Front REF
Brake Rear REF
Current/Throttle 1 REF
Current/Throttle 2 REF
Plausibility Status
0.5s Resettable Timer
R9
1k
R10
1k
R11
1k
R12
1k
R13
10k
Q6
2SB815-6-TB-E_PNP
Q3
MMBT4401
C3
100uF
Analog 5V
4.5V_REF
U5A
LT1018 Dual Comparator
AGND
AGND
AGND
AGND
AGND
AGND
If "Plausibility Status" is HIGH for about .5 seconds, the timer will output will be set HIGH.
If "Plausibility Status" goes LOW at any time during timer sequence, the timer will reset.
Title
BSPD
Size
A
Number
Revision
Date: 11/16/2019
Sheet of
File: C:\Users\..\BSPD.SchDoc
Drawn By:

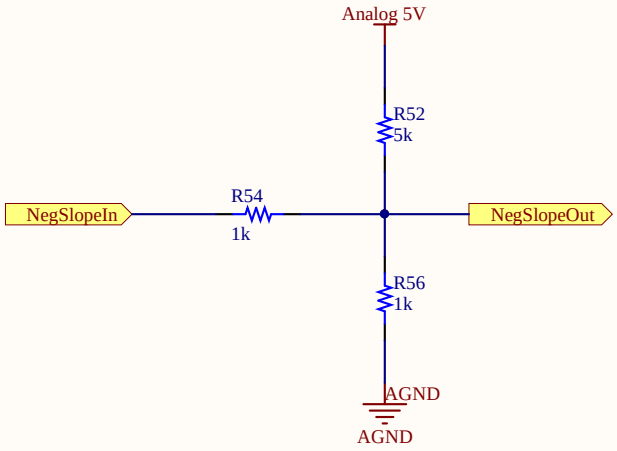


Title		
Size: A	Number	Revision
Date: 11/16/2019		Sheet of
File: C:\Users\..\CAN_5V.SchDoc		Drawn By:

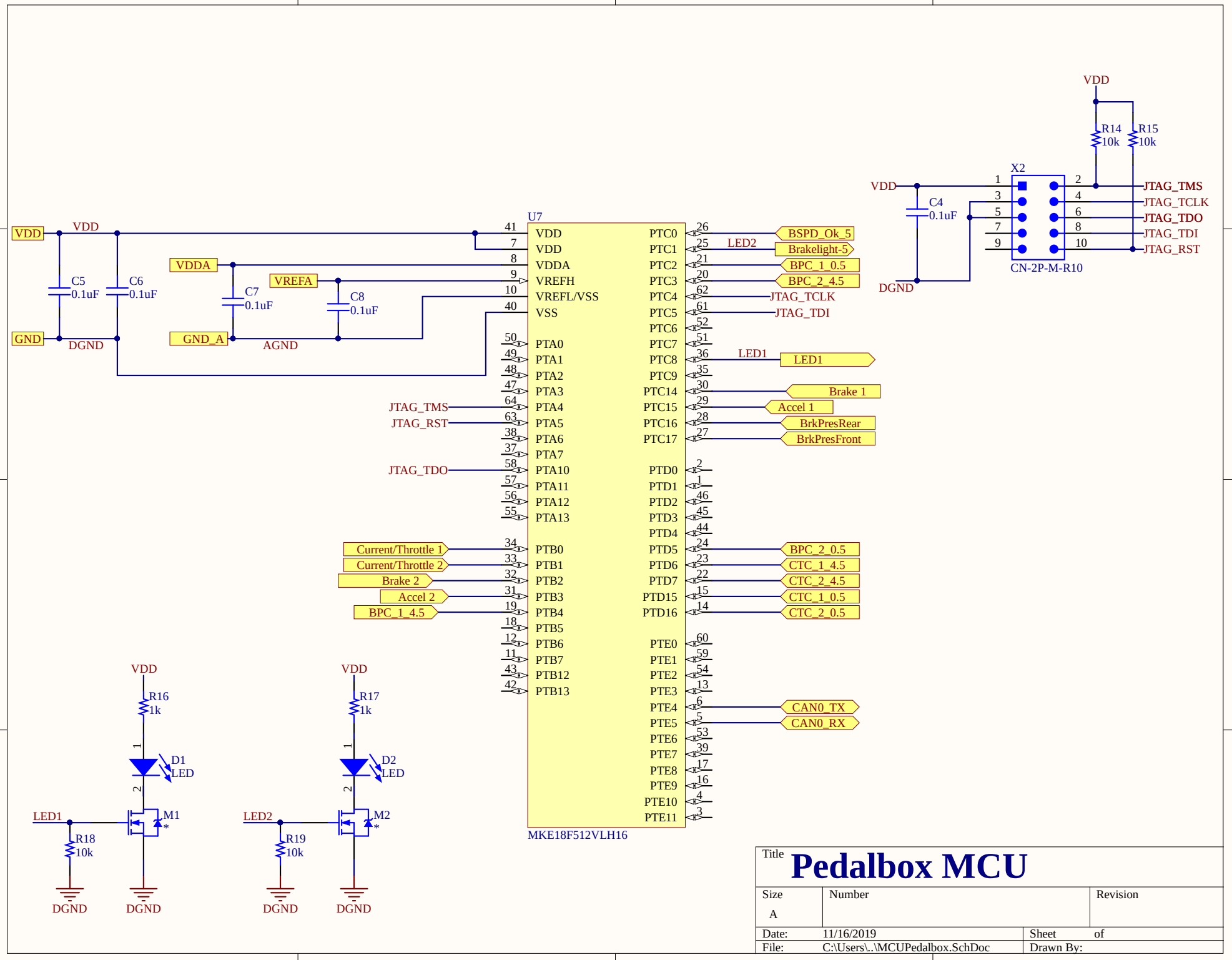
This passive Circuitry takes signals from sensors with inverted voltage slopes that cross at their midpoints, and will offset them such that they only cross at the beginning of their slopes

To bypass circuit:
Place a 0-ohm jumper in the input resistor position.
Omit resistors from other positions.

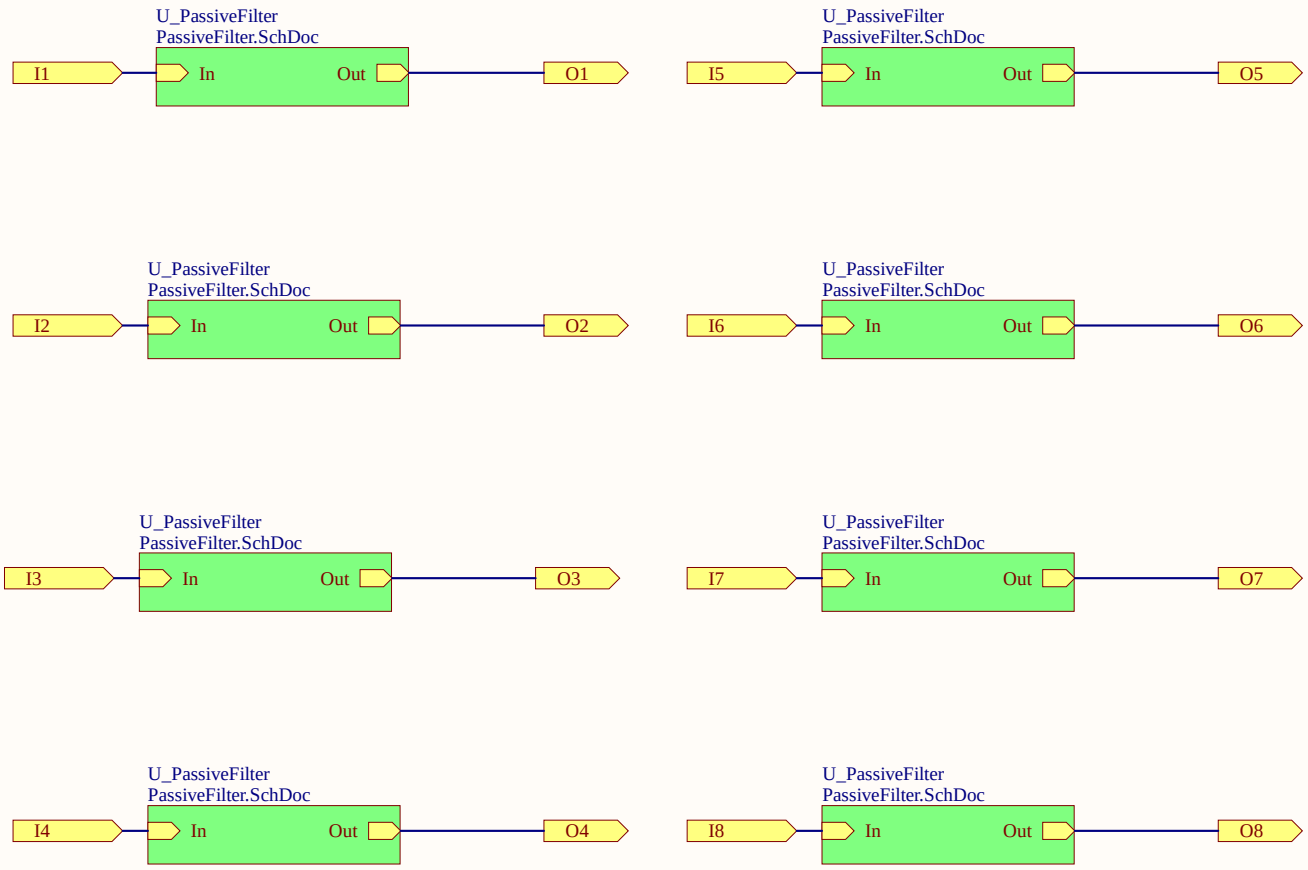




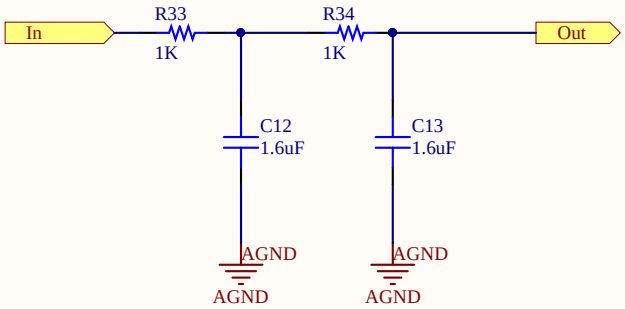
Title	**Divergent Signal Offset**		
Size A	Number		Revision
Date:	11/16/2019	Sheet	of
File:	C:\Users\..\DivergentSignalOffset.SchDoc	Drawn By:	



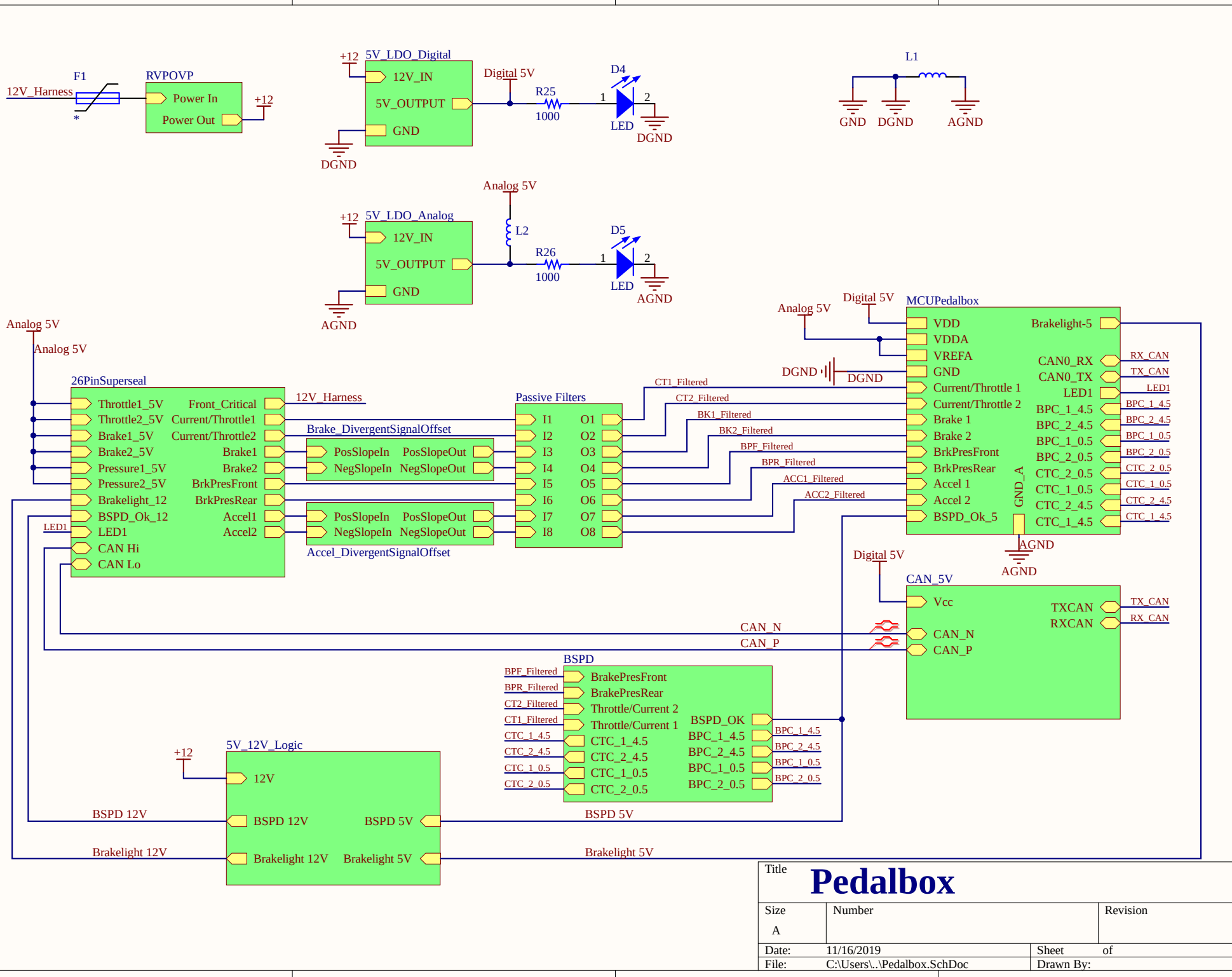
Title	**Pedalbox MCU**	
Size: A	Number:	Revision:
Date: 11/16/2019		Sheet of
File: C:\Users\..\MCUPedalbox.SchDoc		Drawn By:

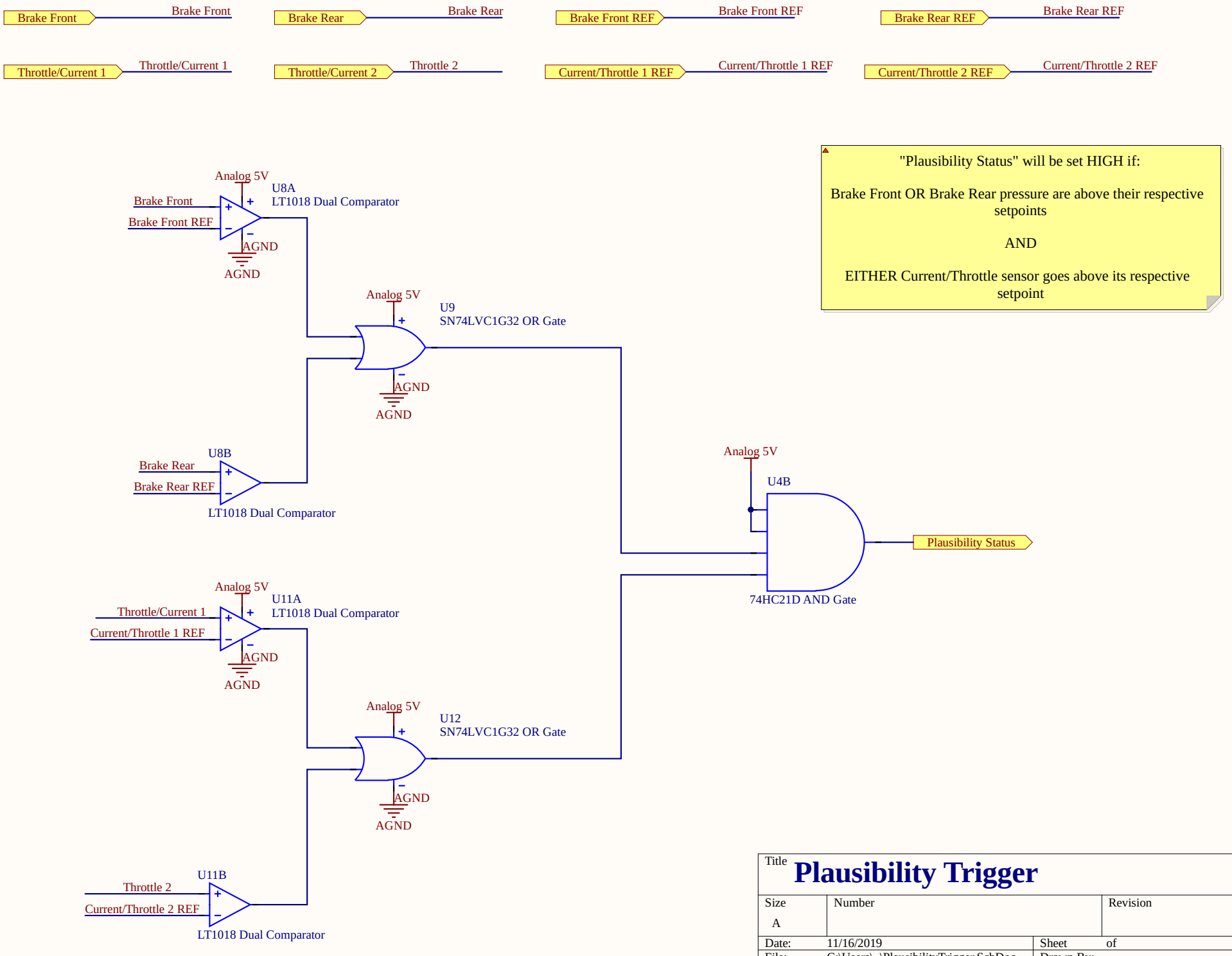


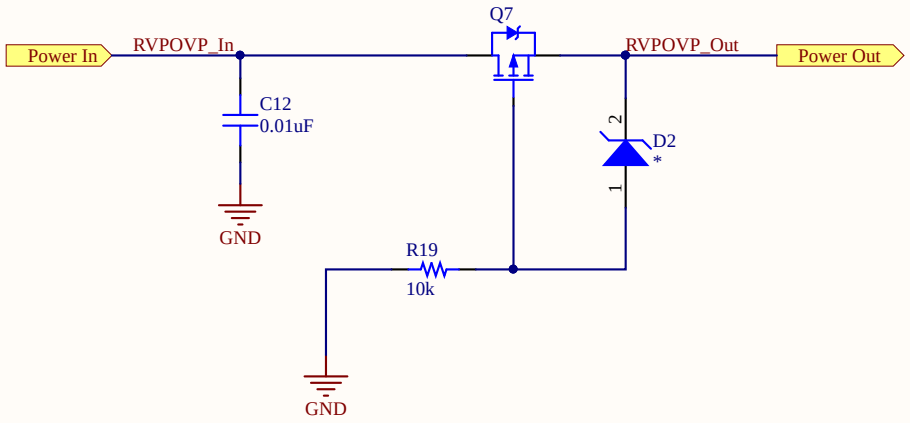
Title		
Size A	Number	Revision
Date: 11/16/2019		Sheet of
File: C:\Users\..\Passive Filters.SchDoc		Drawn By:



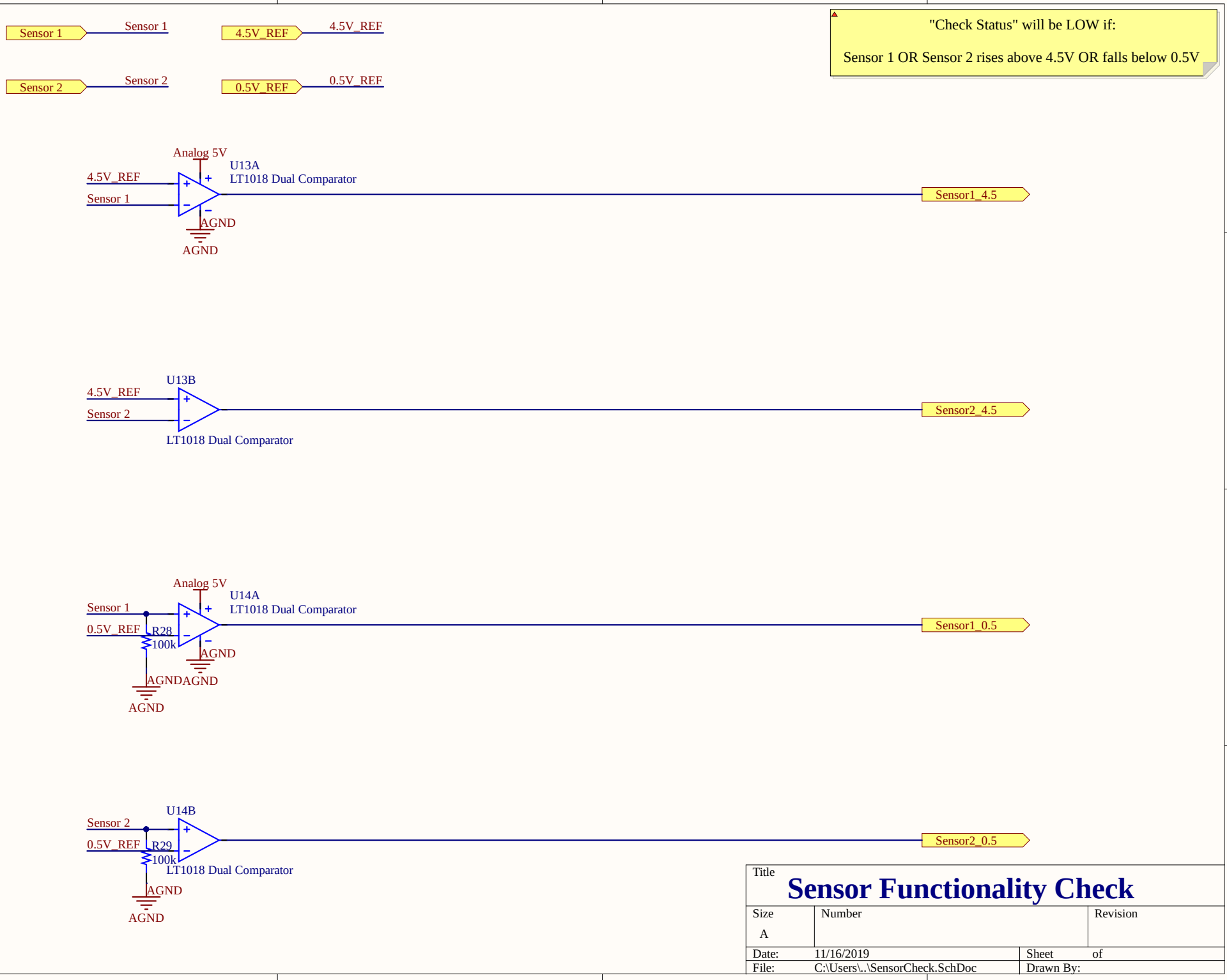
Title	**Passive Filter**		
Size A	Number		Revision
Date:	11/16/2019	Sheet	of
File:	C:\Users\..\PassiveFilter.SchDoc	Drawn By:	


F1
12V_Harness
RVPOVP
Power In
Power Out
+12
5V_LDO_Digital
12V_IN
5V_OUTPUT
GND
Digital 5V
R25
1000
D4
LED
DGND
L1
GND
DGND
AGND
5V_LDO_Analog
Analog 5V
L2
R26
D5
AGND
MCUPedalbox
VDD
VDDA
VREFA
GND
Current/Throttle 1
Current/Throttle 2
Brake 1
Brake 2
BrkPresFront
BrkPresRear
Accel 1
Accel 2
BSPD_Ok_5
GND_A
Brakelight-5
CAN0_RX
CAN0_TX
LED1
BPC_1_4.5
BPC_2_4.5
BPC_1_0.5
BPC_2_0.5
CTC_2_0.5
CTC_1_0.5
CTC_2_4.5
CTC_1_4.5
RX_CAN
TX_CAN
26PinSuperseal
Throttle1_5V
Throttle2_5V
Brake1_5V
Brake2_5V
Pressure1_5V
Pressure2_5V
Brakelight_12
BSPD_Ok_12
LED1
CAN Hi
CAN Lo
Front_Critical
Current/Throttle1
Current/Throttle2
Brake1
Brake2
BrkPresFront
BrkPresRear
Accel1
Accel2
12V_Harness
Brake_DivergentSignalOffset
PosSlopeIn
PosSlopeOut
NegSlopeIn
NegSlopeOut
Accel_DivergentSignalOffset
Passive Filters
I1
I2
I3
I4
I5
I6
I7
I8
O1
O2
O3
O4
O5
O6
O7
O8
CT1_Filtered
CT2_Filtered
BK1_Filtered
BK2_Filtered
BPF_Filtered
BPR_Filtered
ACC1_Filtered
ACC2_Filtered
CAN_5V
Vcc
CAN_N
CAN_P
TXCAN
RXCAN
BSPD
BrakePresFront
BrakePresRear
Throttle/Current 2
Throttle/Current 1
CTC_1_4.5
CTC_2_4.5
CTC_1_0.5
CTC_2_0.5
BSPD_OK
BPC_1_4.5
BPC_2_4.5
BPC_1_0.5
BPC_2_0.5
5V_12V_Logic
12V
BSPD 12V
BSPD 5V
Brakelight 12V
Brakelight 5V
Title
Pedalbox
Size
A
Number
Revision
Date:
11/16/2019
Sheet
of
File:
C:\Users\..\Pedalbox.SchDoc
Drawn By:


Brake Front
Brake Front
Brake Rear
Brake Rear
Brake Front REF
Brake Front REF
Brake Rear REF
Brake Rear REF
Throttle/Current 1
Throttle/Current 1
Throttle/Current 2
Throttle 2
Current/Throttle 1 REF
Current/Throttle 1 REF
Current/Throttle 2 REF
Current/Throttle 2 REF
"Plausibility Status" will be set HIGH if:
Brake Front OR Brake Rear pressure are above their respective setpoints
AND
EITHER Current/Throttle sensor goes above its respective setpoint
Analog 5V
U8A
LT1018 Dual Comparator
Brake Front
Brake Front REF
AGND
AGND
Analog 5V
U9
SN74LVC1G32 OR Gate
AGND
AGND
U8B
Brake Rear
Brake Rear REF
LT1018 Dual Comparator
Analog 5V
U4B
Plausibility Status
74HC21D AND Gate
Analog 5V
U11A
LT1018 Dual Comparator
Throttle/Current 1
Current/Throttle 1 REF
AGND
AGND
Analog 5V
U12
SN74LVC1G32 OR Gate
AGND
AGND
U11B
Throttle 2
Current/Throttle 2 REF
LT1018 Dual Comparator
Title
Plausibility Trigger
Size
A
Number
Revision
Date:
11/16/2019
Sheet
of
File:
C:\Users\..\PlausibilityTrigger.SchDoc
Drawn By:

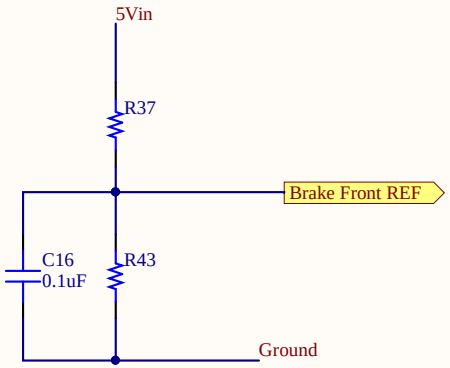


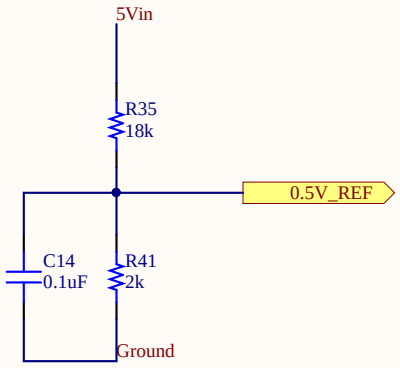
Title		
Size: A	Number	Revision
Date: 11/16/2019		Sheet of
File: C:\Users\..\RVPOVP.SchDoc		Drawn By:

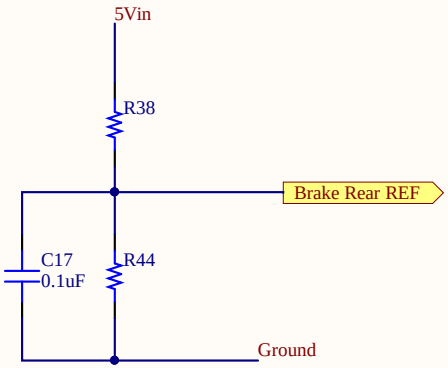

Sensor 1
Sensor 1
4.5V_REF
4.5V_REF
Sensor 2
Sensor 2
0.5V_REF
0.5V_REF
"Check Status" will be LOW if:
Sensor 1 OR Sensor 2 rises above 4.5V OR falls below 0.5V
Analog 5V
U13A
LT1018 Dual Comparator
4.5V_REF
Sensor 1
AGND
AGND
Sensor1_4.5
U13B
4.5V_REF
Sensor 2
LT1018 Dual Comparator
Sensor2_4.5
Analog 5V
U14A
LT1018 Dual Comparator
Sensor 1
0.5V_REF
R28
100k
AGND
AGND
AGND
Sensor1_0.5
U14B
Sensor 2
0.5V_REF
R29
100k
LT1018 Dual Comparator
AGND
AGND
Sensor2_0.5
Title
Sensor Functionality Check
Size
A
Number
Revision
Date:
11/16/2019
Sheet
of
File:
C:\Users\..\SensorCheck.SchDoc
Drawn By:

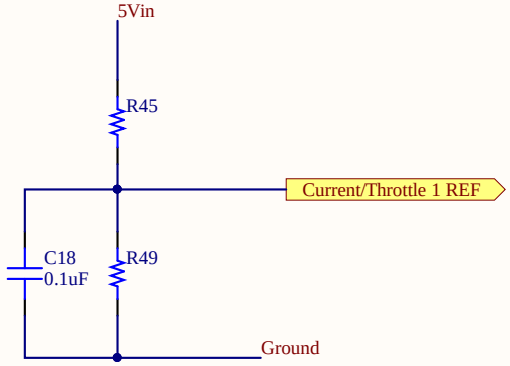
Simple resistive voltage reference generator. Generates a set 4.5V and 0.5V reference for sensor checking.
(There are no longer adjustment pots as a space saving measure)

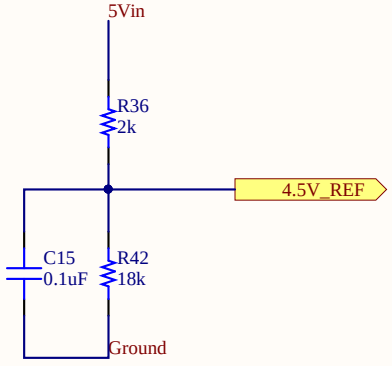
NOTE: Resistor values intentionally left out of adjustable refrences to alllow for proper selection during testing and implimentation, to better match the real world sensor.

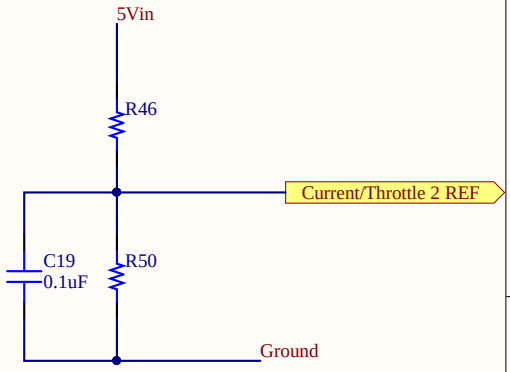


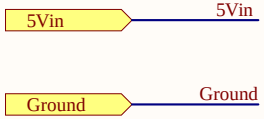




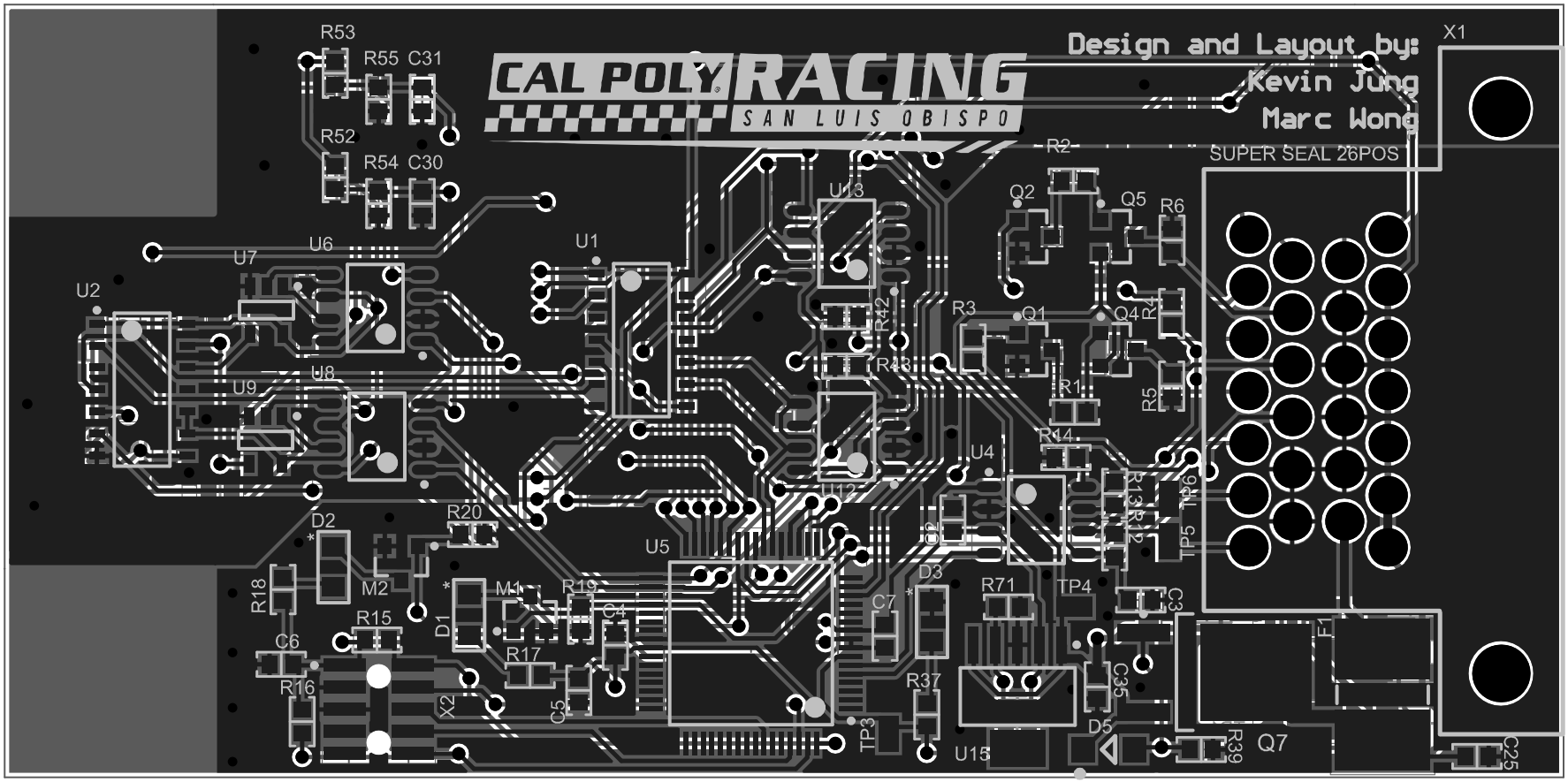








Title: **Voltage Reference Generator**		
Size: A	Number:	Revision:
Date: 11/16/2019		Sheet of
File: C:\Users\..\VoltageReferenceGen.SchDoc		Drawn By:


CAL POLY RACING
SAN LUIS OBISPO
Design and Layout by:
Kevin Jung
Marc Wong
SUPER SEAL 26POS
X1
R53
R55 C31
R52
R54 C30
U7
U6
U1
U2
U8
U9
U13
R2
Q2
Q5
R6
R42
R43
R3
Q1
Q4
R4
R1
R5
R14
U4
U12
R13
R12
TP6
TP5
D2
R20
U5
R18
M2
M1
R19
C4
D1
R15
C6
R17
R16
X2
C5
C7
D3
R71
TP4
C3
F1
R37
C35
TP3
U15
D5
R39
Q7
C25