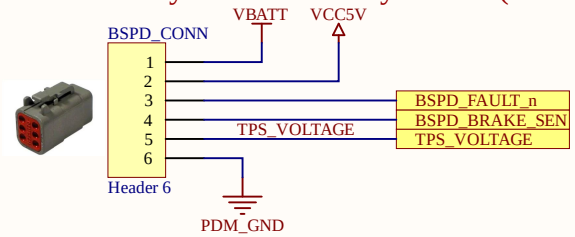
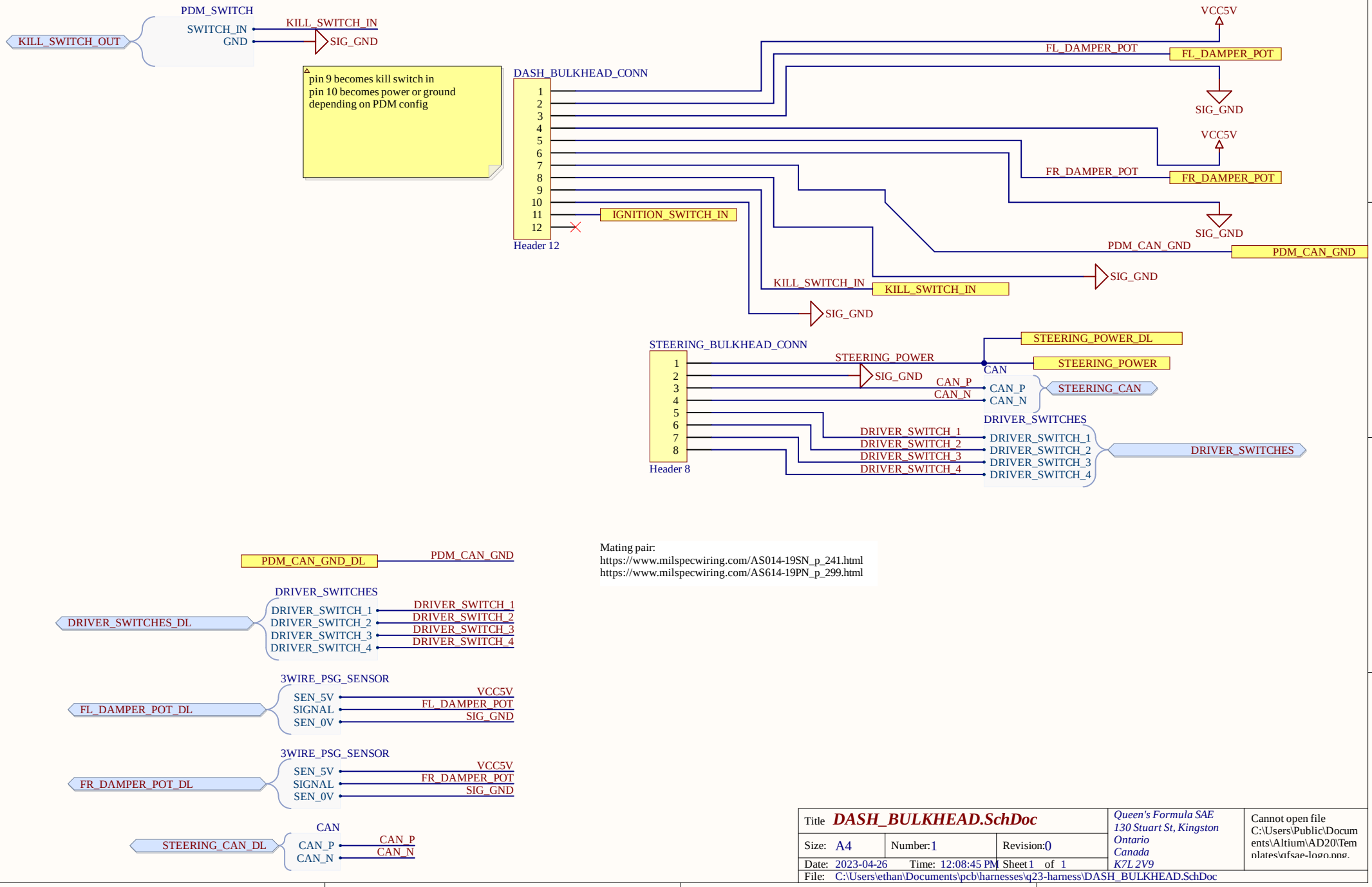
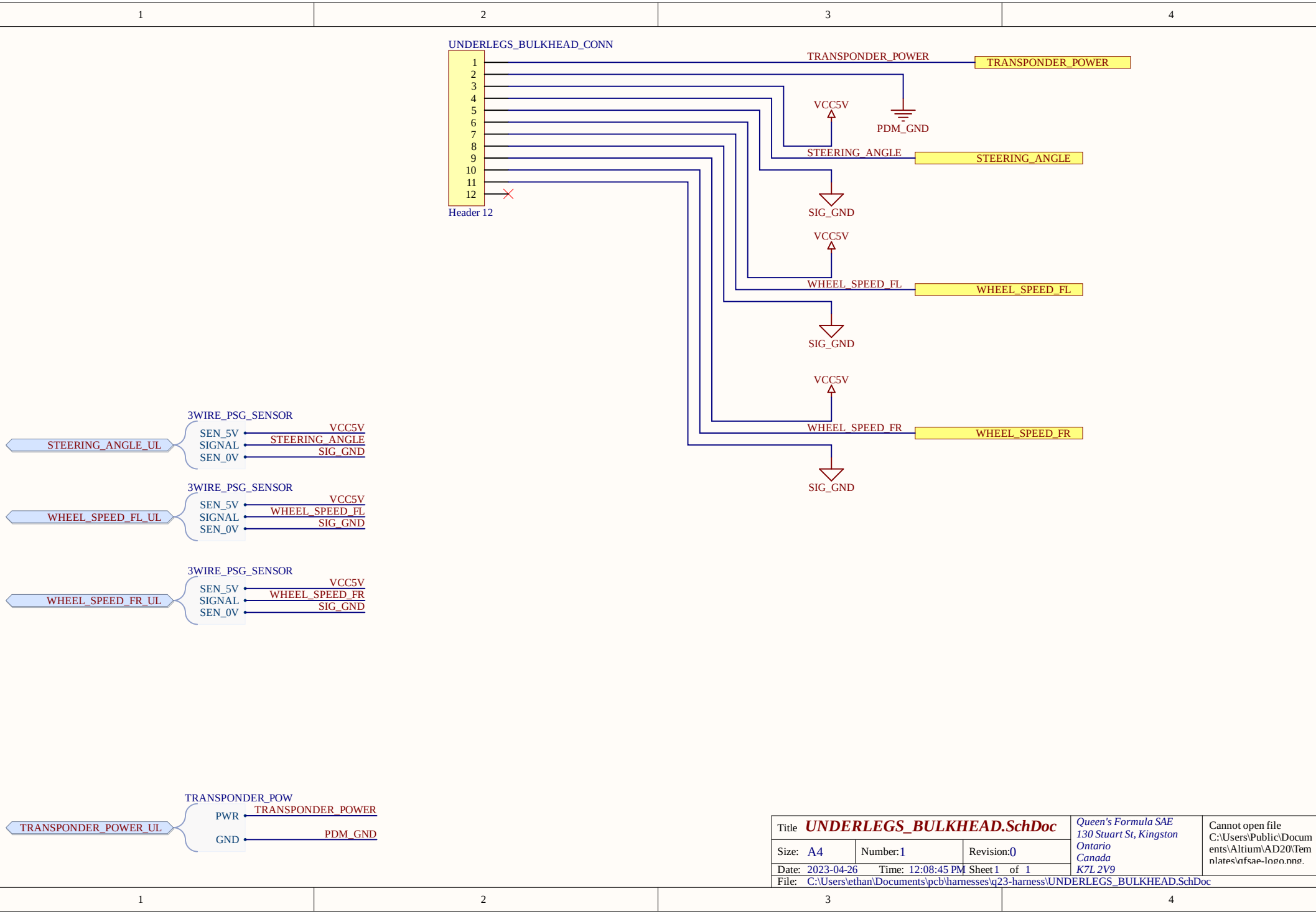
Brake System Plausibility Device (BSPD)



Title **BSPD.SchDoc**			*Queen's Formula SAE* *130 Stuart St, Kingston* *Ontario* *Canada* *K7L 2V9*
Size: A4	Number: 1	Revision: 0	Cannot open file C:\Users\Public\Documents\Altium\AD20\Templates\qfsae-logo.png.
Date: 2023-04-26	Time: 12:08:45 PM	Sheet 1 of 1	
File: C:\Users\ethan\Documents\pcb\harnesses\q23-harness\BSPD.SchDoc			


PDM_SWITCH
KILL_SWITCH_OUT
SWITCH_IN
GND
KILL_SWITCH_IN
SIG_GND
pin 9 becomes kill switch in
pin 10 becomes power or ground
depending on PDM config
DASH_BULKHEAD_CONN
1
2
3
4
5
6
7
8
9
10
11
12
Header 12
IGNITION_SWITCH_IN
VCC5V
FL_DAMPER_POT
FL_DAMPER_POT
SIG_GND
VCC5V
FR_DAMPER_POT
FR_DAMPER_POT
SIG_GND
PDM_CAN_GND
PDM_CAN_GND
SIG_GND
KILL_SWITCH_IN
KILL_SWITCH_IN
SIG_GND
STEERING_BULKHEAD_CONN
1
2
3
4
5
6
7
8
Header 8
STEERING_POWER
SIG_GND
STEERING_POWER_DL
STEERING_POWER
CAN
CAN_P
CAN_N
CAN_P
CAN_N
STEERING_CAN
DRIVER_SWITCHES
DRIVER_SWITCH_1
DRIVER_SWITCH_2
DRIVER_SWITCH_3
DRIVER_SWITCH_4
DRIVER_SWITCH_1
DRIVER_SWITCH_2
DRIVER_SWITCH_3
DRIVER_SWITCH_4
DRIVER_SWITCHES
PDM_CAN_GND_DL
PDM_CAN_GND
DRIVER_SWITCHES
DRIVER_SWITCHES_DL
DRIVER_SWITCH_1
DRIVER_SWITCH_2
DRIVER_SWITCH_3
DRIVER_SWITCH_4
DRIVER_SWITCH_1
DRIVER_SWITCH_2
DRIVER_SWITCH_3
DRIVER_SWITCH_4
3WIRE_PSG_SENSOR
FL_DAMPER_POT_DL
SEN_5V
SIGNAL
SEN_0V
VCC5V
FL_DAMPER_POT
SIG_GND
3WIRE_PSG_SENSOR
FR_DAMPER_POT_DL
SEN_5V
SIGNAL
SEN_0V
VCC5V
FR_DAMPER_POT
SIG_GND
CAN
STEERING_CAN_DL
CAN_P
CAN_N
CAN_P
CAN_N
Mating pair:
https://www.milspecwiring.com/AS014-19SN_p_241.html
https://www.milspecwiring.com/AS614-19PN_p_299.html
Title DASH_BULKHEAD.SchDoc
Size: A4
Number:1
Revision:0
Date: 2023-04-26
Time: 12:08:45 PM
Sheet 1 of 1
File: C:\Users\ethan\Documents\pcb\harnesses\q23-harness\DASH_BULKHEAD.SchDoc
Queen's Formula SAE
130 Stuart St, Kingston
Ontario
Canada
K7L 2V9
Cannot open file
C:\Users\Public\Documents\Altium\AD20\Templates\qfsae-logo.png.


UNDERLEGS_BULKHEAD_CONN
1
2
3
4
5
6
7
8
9
10
11
12
Header 12
TRANSPONDER_POWER
TRANSPONDER_POWER
VCC5V
PDM_GND
STEERING_ANGLE
STEERING_ANGLE
SIG_GND
VCC5V
WHEEL_SPEED_FL
WHEEL_SPEED_FL
SIG_GND
VCC5V
WHEEL_SPEED_FR
WHEEL_SPEED_FR
SIG_GND
3WIRE_PSG_SENSOR
STEERING_ANGLE_UL
SEN_5V
SIGNAL
SEN_0V
VCC5V
STEERING_ANGLE
SIG_GND
3WIRE_PSG_SENSOR
WHEEL_SPEED_FL_UL
SEN_5V
SIGNAL
SEN_0V
VCC5V
WHEEL_SPEED_FL
SIG_GND
3WIRE_PSG_SENSOR
WHEEL_SPEED_FR_UL
SEN_5V
SIGNAL
SEN_0V
VCC5V
WHEEL_SPEED_FR
SIG_GND
TRANSPONDER_POW
TRANSPONDER_POWER_UL
PWR
GND
TRANSPONDER_POWER
PDM_GND
Title UNDERLEGS_BULKHEAD.SchDoc
Size: A4
Number: 1
Revision: 0
Date: 2023-04-26
Time: 12:08:45 PM
Sheet 1 of 1
File: C:\Users\ethan\Documents\pcb\harnesses\q23-harness\UNDERLEGS_BULKHEAD.SchDoc
Queen's Formula SAE
130 Stuart St, Kingston
Ontario
Canada
K7L 2V9
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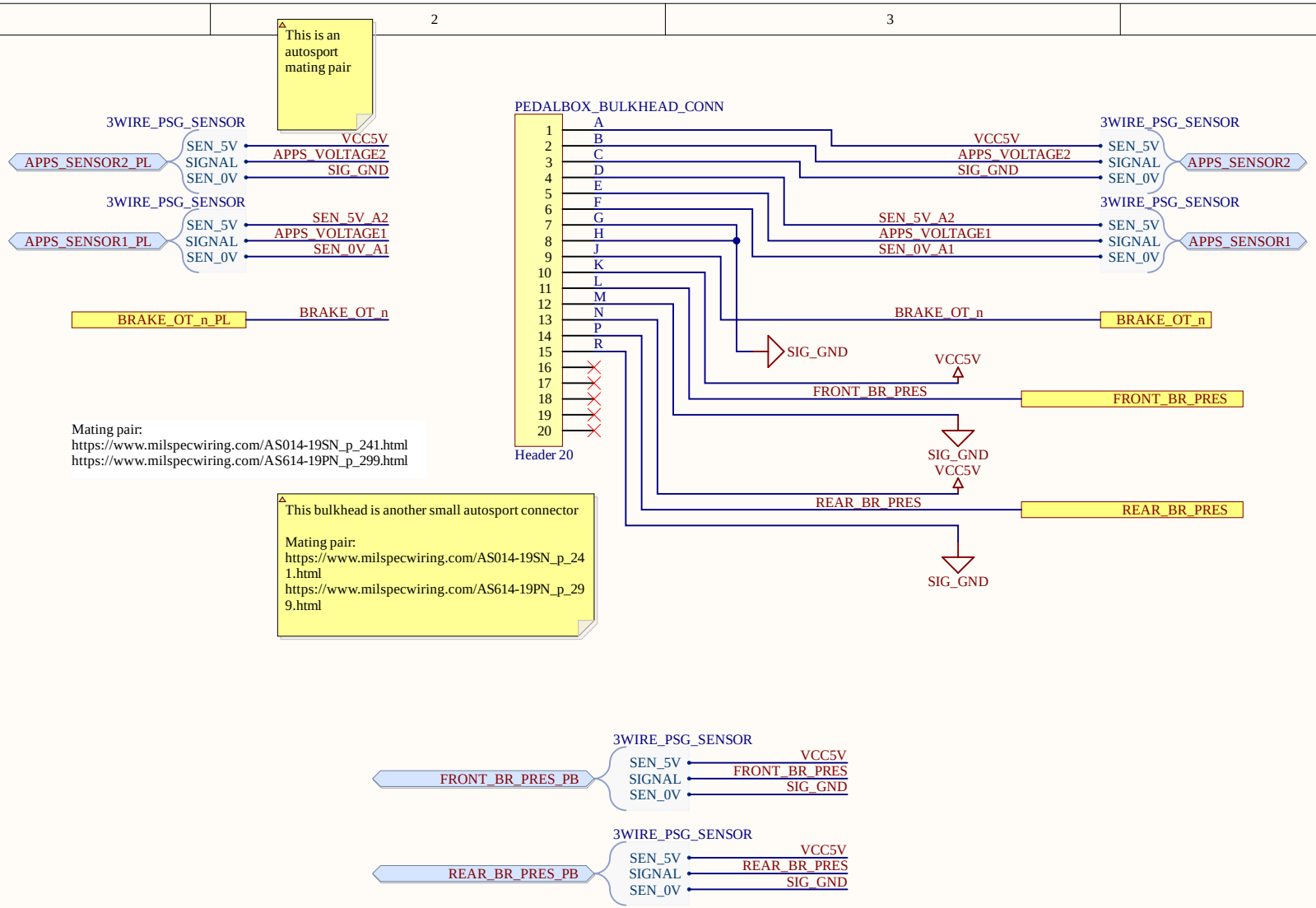
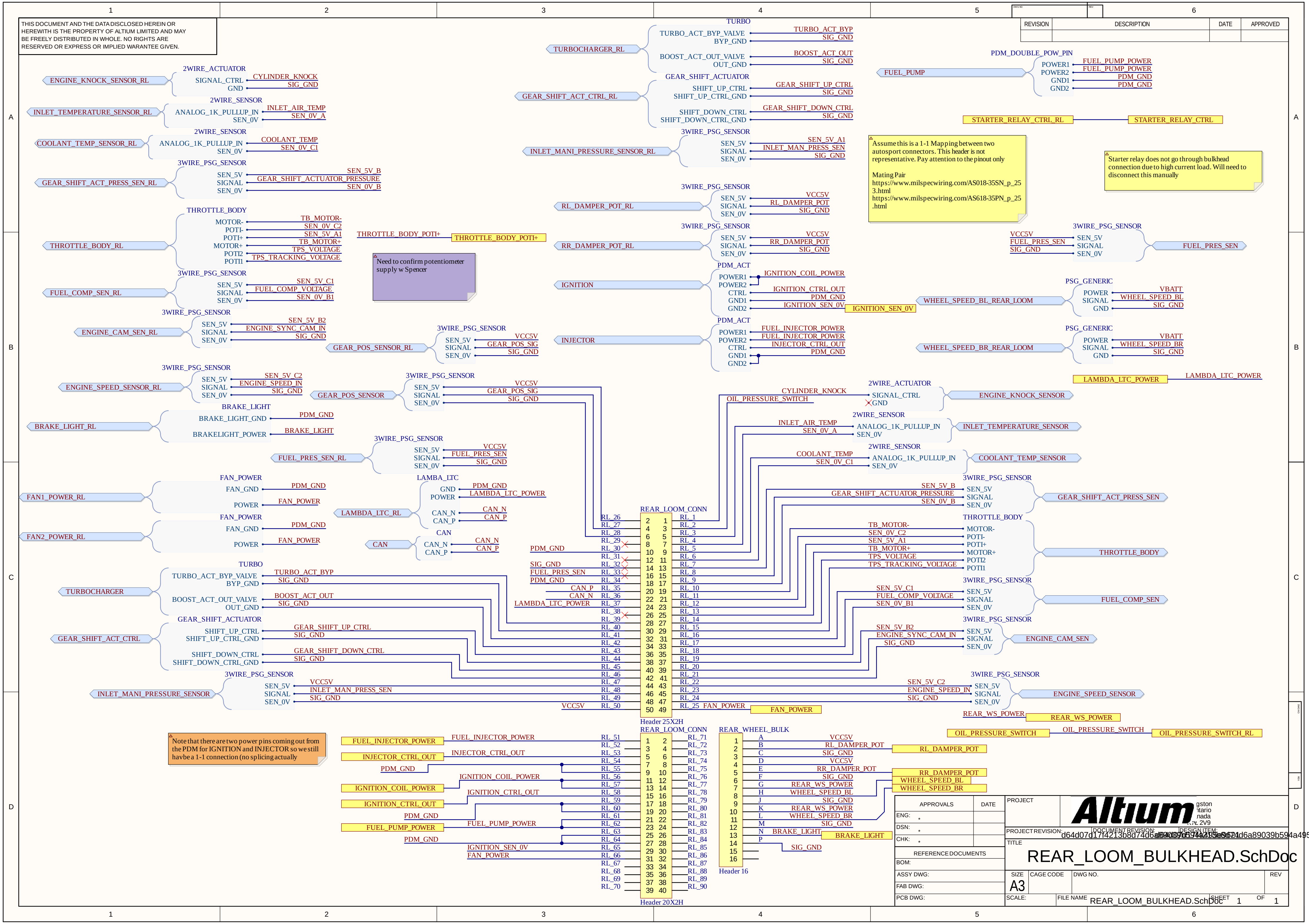


Title	***PEDALBOX_BULKHEAD.SchDoc***	*Queen's Formula SAE* *130 Stuart St, Kingston* *Ontario* *Canada* *K7L 2V9*	Cannot open file C:\Users\Public\Documents\Altium\AD20\Templates\qfsae-logo.png.
Size: A4	Number: 1	Revision: 0	
Date: 2023-04-26	Time: 12:08:46 PM	Sheet 1 of 1	
File: C:\Users\ethan\Documents\pcb\harnesses\q23-harness\PEDALBOX_BULKHEAD.SchDoc			



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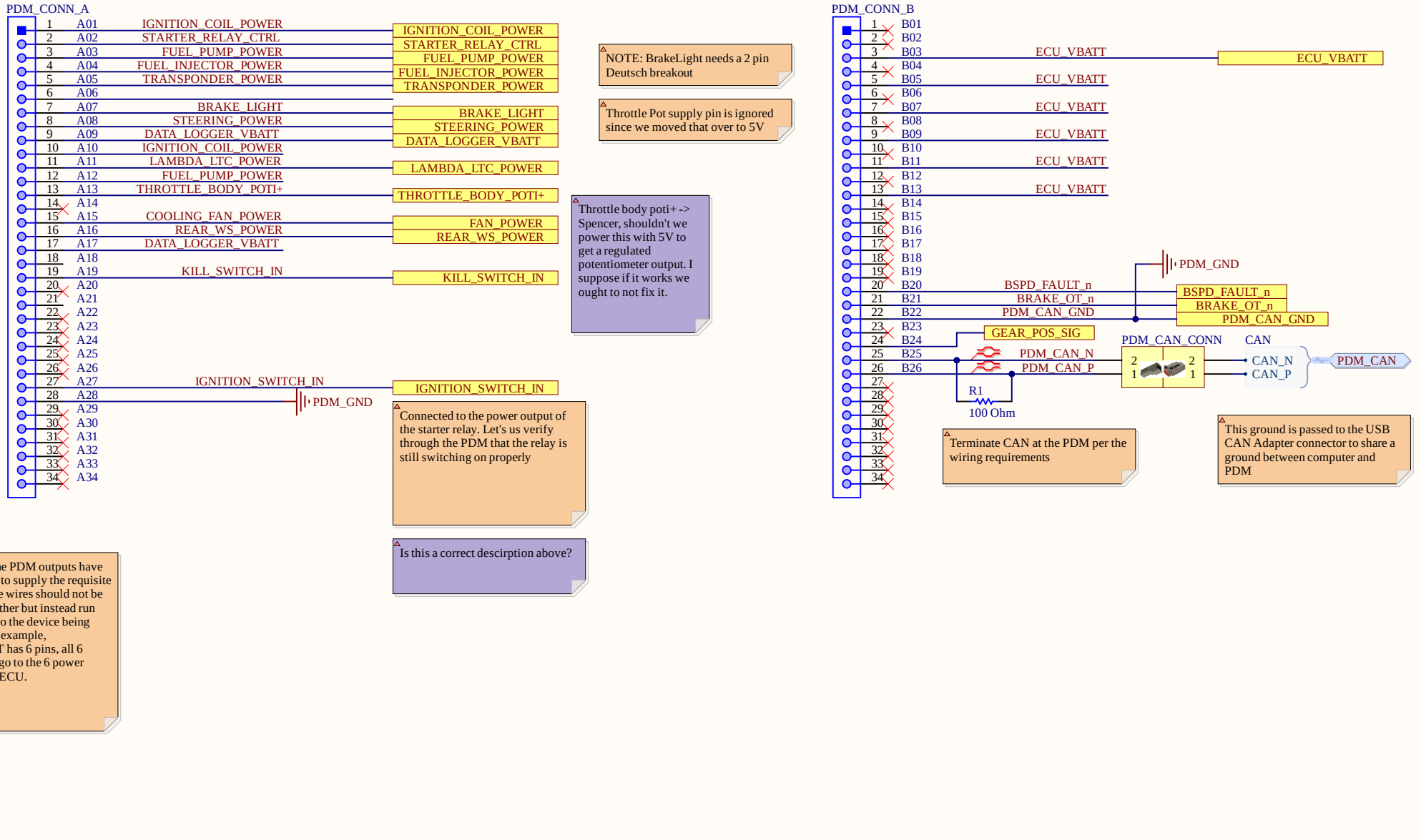
REVISION
DESCRIPTION
DATE
APPROVED
ENGINE_KNOCK_SENSOR_RL
2WIRE_ACTUATOR
SIGNAL_CTRL
GND
CYLINDER_KNOCK
SIG_GND
INLET_TEMPERATURE_SENSOR_RL
2WIRE_SENSOR
ANALOG_1K_PULLUP_IN
SEN_0V
INLET_AIR_TEMP
SEN_0V_A
COOLANT_TEMP_SENSOR_RL
COOLANT_TEMP
SEN_0V_C1
GEAR_SHIFT_ACT_PRESS_SEN_RL
3WIRE_PSG_SENSOR
SEN_5V
SIGNAL
SEN_5V_B
GEAR_SHIFT_ACTUATOR_PRESSURE
SEN_0V_B
THROTTLE_BODY_RL
THROTTLE_BODY
MOTOR-
POTI-
POTI+
MOTOR+
POTI2
POTI1
TB_MOTOR-
SEN_0V_C2
SEN_5V_A1
TB_MOTOR+
TPS_VOLTAGE
TPS_TRACKING_VOLTAGE
THROTTLE_BODY_POTI+
Need to confirm potentiometer supply w Spencer
FUEL_COMP_SEN_RL
SEN_5V_C1
FUEL_COMP_VOLTAGE
SEN_0V_B1
ENGINE_CAM_SEN_RL
SEN_5V_B2
ENGINE_SYNC_CAM_IN
SIG_GND
GEAR_POS_SENSOR_RL
VCC5V
GEAR_POS_SIG
ENGINE_SPEED_SENSOR_RL
SEN_5V_C2
ENGINE_SPEED_IN
GEAR_POS_SENSOR
BRAKE_LIGHT_RL
BRAKE_LIGHT
BRAKE_LIGHT_GND
BRAKELIGHT_POWER
PDM_GND
FUEL_PRES_SEN_RL
FUEL_PRES_SEN
FAN1_POWER_RL
FAN_POWER
FAN_GND
POWER
FAN2_POWER_RL
LAMBDA_LTC
LAMBDA_LTC_RL
LAMBDA_LTC_POWER
CAN_N
CAN_P
CAN
TURBOCHARGER
TURBO
TURBO_ACT_BYP_VALVE
BYP_GND
TURBO_ACT_BYP
BOOST_ACT_OUT_VALVE
OUT_GND
BOOST_ACT_OUT
GEAR_SHIFT_ACT_CTRL
GEAR_SHIFT_ACTUATOR
SHIFT_UP_CTRL
SHIFT_UP_CTRL_GND
GEAR_SHIFT_UP_CTRL
SHIFT_DOWN_CTRL
SHIFT_DOWN_CTRL_GND
GEAR_SHIFT_DOWN_CTRL
INLET_MANI_PRESSURE_SENSOR
INLET_MAN_PRESS_SEN
Note that there are two power pins coming out from the PDM for IGNITION and INJECTOR so we still havbe a 1-1 connection (no splicing actually
TURBOCHARGER_RL
GEAR_SHIFT_ACT_CTRL_RL
INLET_MANI_PRESSURE_SENSOR_RL
SEN_5V_A1
RL_DAMPER_POT_RL
RL_DAMPER_POT
RR_DAMPER_POT_RL
RR_DAMPER_POT
IGNITION
PDM_ACT
POWER1
POWER2
CTRL
GND1
GND2
IGNITION_COIL_POWER
IGNITION_CTRL_OUT
IGNITION_SEN_0V
INJECTOR
FUEL_INJECTOR_POWER
INJECTOR_CTRL_OUT
PDM_DOUBLE_POW_PIN
FUEL_PUMP
FUEL_PUMP_POWER
STARTER_RELAY_CTRL_RL
STARTER_RELAY_CTRL
Assume this is a 1-1 Mapping between two autosport connectors. This header is not representative. Pay attention to the pinout only
Mating Pair
https://www.milspecwiring.com/AS018-35SN_p_253.html
https://www.milspecwiring.com/AS618-35PN_p_25.html
Starter relay does not go through bulkhead connection due to high current load. Will need to disconnect this manually
PSG_GENERIC
VBATT
WHEEL_SPEED_BL_REAR_LOOM
WHEEL_SPEED_BL
WHEEL_SPEED_BR_REAR_LOOM
WHEEL_SPEED_BR
OIL_PRESSURE_SWITCH
ENGINE_KNOCK_SENSOR
INLET_TEMPERATURE_SENSOR
COOLANT_TEMP_SENSOR
GEAR_SHIFT_ACT_PRESS_SEN
FUEL_COMP_SEN
ENGINE_CAM_SEN
ENGINE_SPEED_SENSOR
REAR_WS_POWER
OIL_PRESSURE_SWITCH_RL
REAR_LOOM_CONN
RL_1 … RL_50
Header 25X2H
RL_51 … RL_90
Header 20X2H
REAR_WHEEL_BULK
Header 16
BRAKE_LIGHT
PROJECT
PROJECT REVISION:
DOCUMENT REVISION:
DESIGN ITEM:
d64d07d17f4213b8d74d6a89039b594a2495e
TITLE
REAR_LOOM_BULKHEAD.SchDoc
APPROVALS
DATE
ENG:
DSN:
CHK:
REFERENCE DOCUMENTS
BOM:
ASSY DWG:
FAB DWG:
PCB DWG:
SIZE
A3
CAGE CODE
DWG NO.
REV
SCALE:
FILE NAME
REAR_LOOM_BULKHEAD.SchDoc
SHEET 1 OF 1



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Date: 2023-04-26	Time: 12:08:46 PM	Sheet 1 of 1	
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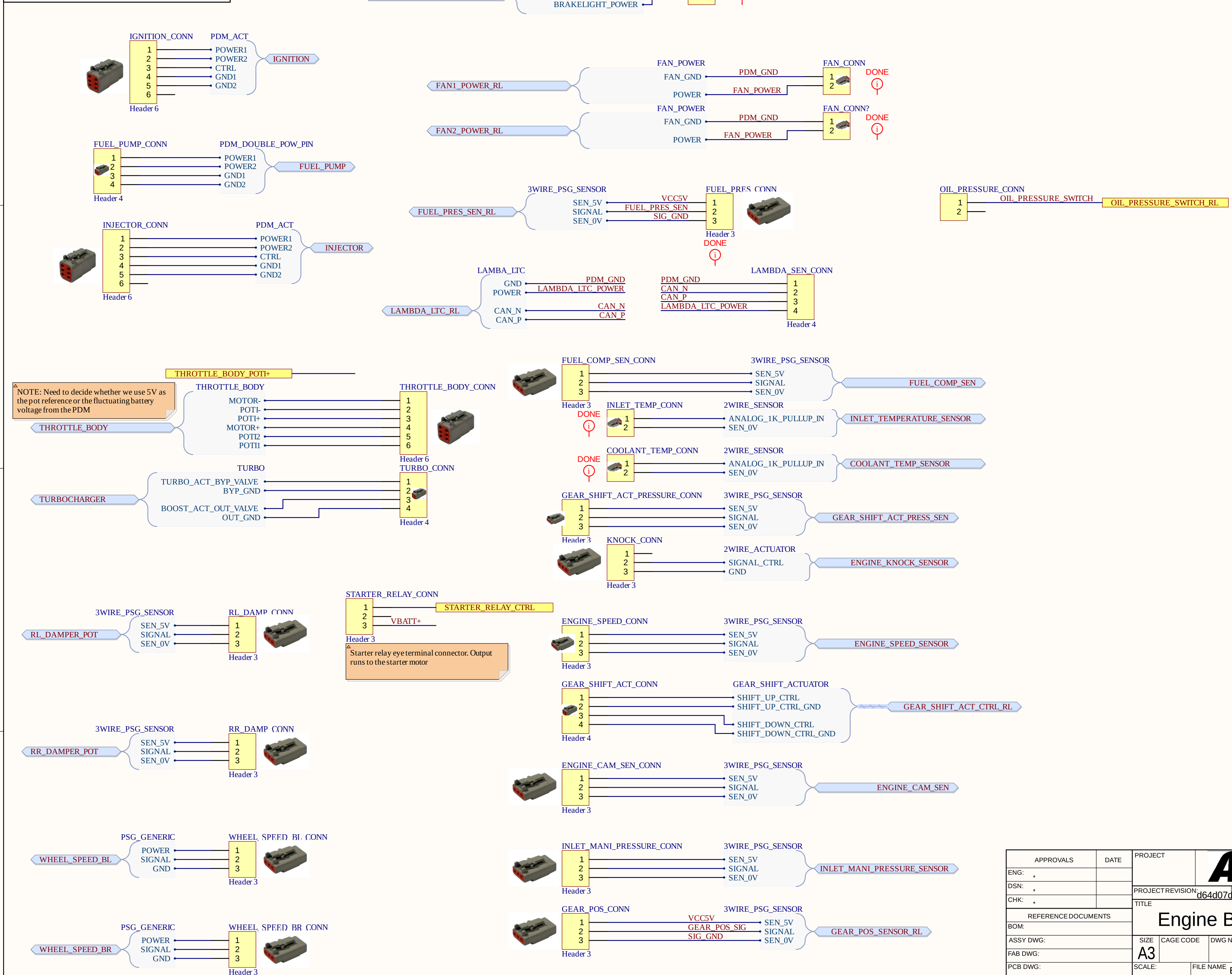
REVISION	DESCRIPTION	DATE	APPROVED



APPROVALS	DATE
ENG: *	
DSN: *	
CHK: *	

REFERENCE DOCUMENTS
BOM:
ASSY DWG:
FAB DWG:
PCB DWG:

PROJECT
PROJECT REVISION: d64d07d17f4213b8d74d6a89039b594a495e9621
DOCUMENT REVISION:
DESIGN ITEM:

TITLE
Engine Bay and Rear Tube.SchDoc

SIZE A3 | CAGE CODE | DWG NO. | REV
SCALE: | FILE NAME Engine Bay and Rear Tube.SchDoc | SHEET 1 OF 1

PDM and ECU ground pins are limited so we will have to decide what gets a true device ground connection during the build

All these grounds are connected but we choose certain connection locations to minimize loop size where possible. Each one also goes into its own eyelet at the ground point.

Differential Directive means we use the differential twisted pair cable.

All connectors supplying power or data will be male. This is typical convention in harness designs to prevent accidental shorts.

VBATT is direct from VBATT+ terminal. (Through the master key switch)

VCC5V is from Ryan C's adapter board. VBATT -> VCC5V

Connector Inventory Results

Only deficit is 3 pin deutsch DTM connectors. Need 10 Mating pairs, with plugs as well. Also purchase a bunch of crimps

COLOR SCHEME:
ECU / Direct Battery GND = BLACK WIRE
VBATT Power (PDM or VBATT) = RED WIRE
12 V Sensor signal (ex. wheelspeed) = WHITE WIRE
5V power = ORANGE WIRE
ECU / SIGNAL GND = BROWN WIRE
5V sensor signal = PURPLE WIRE

Title **LEGEND.SchDoc**			*Queen's Formula SAE* *130 Stuart St, Kingston* *Ontario* *Canada* *K7L 2V9*
Size: A4	Number: 1	Revision: 0	
Date: 2023-04-26 Time: 12:08:47 PM	Sheet 1 of 1		
File: C:\Users\ethan\Documents\pcb\harnesses\q23-harness\LEGEND.SchDoc			

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Lap Time Transponder

TRANSPONDER_CONN

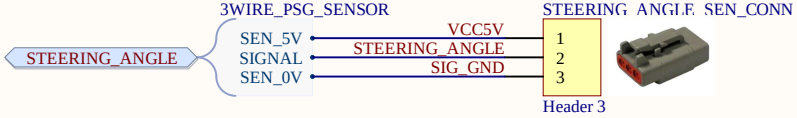
1
2

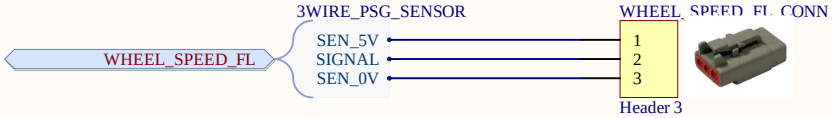
Header 2

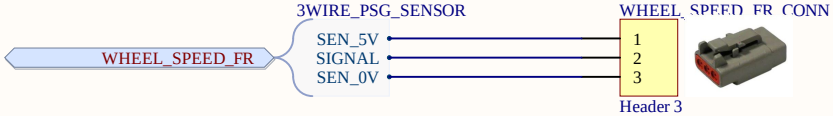
TRANSPONDER_POW

PWR
GND

TRANSPONDER_POWER

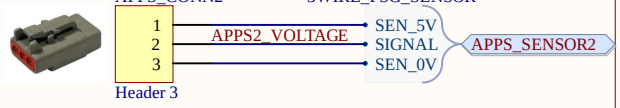




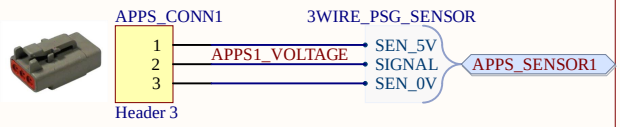


Title	***Under Legs.SchDoc***		*Queen's Formula SAE* *130 Stuart St, Kingston* *Ontario* *Canada* *K7L 2V9*
Size: A4	Number: 1	Revision: 0	Cannot open file C:\Users\Public\Documents\Altium\AD20\Templates\qfsae-logo.png.
Date: 2023-04-26	Time: 12:08:47 PM	Sheet 1 of 1	
File: C:\Users\ethan\Documents\pcb\harnesses\q23-harness\Under Legs.SchDoc			

Acceleration Pedal Position Sensor 2 (APPS)

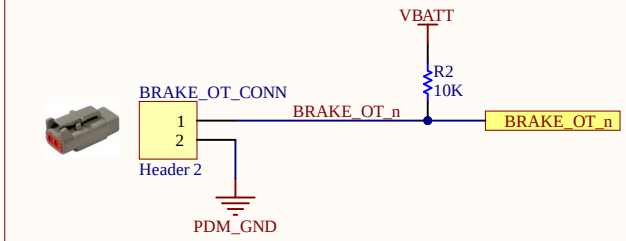


Acceleration Pedal Position Sensor 1 (APPS)



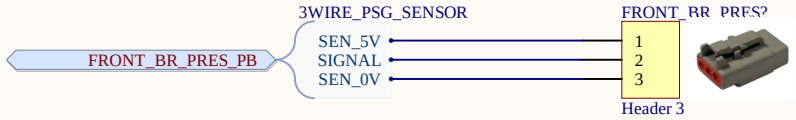
NOTE: Series resistors between SEN_5V and SEN_0V may be required to get the desired voltage range for APPS of 1-5V

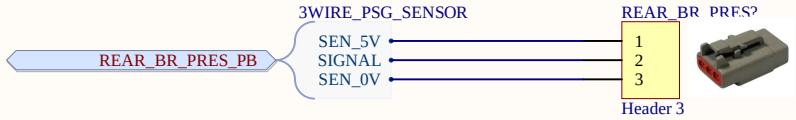
Brake Overtravel Switch



VBATT is direct from VBATT+ terminal

VCC5V is from Ryan C's adapter board. VBATT -> VCC5V regulator





Active low fault output of the BSPD. Needs to go master shutdown input of the PDM

Also need to make sure brake voltage is in the right range

BSPD NEEDS TPS NOT APPS

Title **Pedalbox.SchDoc**			*Queen's Formula SAE* *130 Stuart St, Kingston* *Ontario* *Canada* *K7L 2V9*
Size: A4	Number: 1	Revision: 0	
Date: 2023-04-26	Time: 12:08:47 PM	Sheet 1 of 1	
File: C:\Users\ethan\Documents\pcb\harnesses\q23-harness\Pedalbox.SchDoc			

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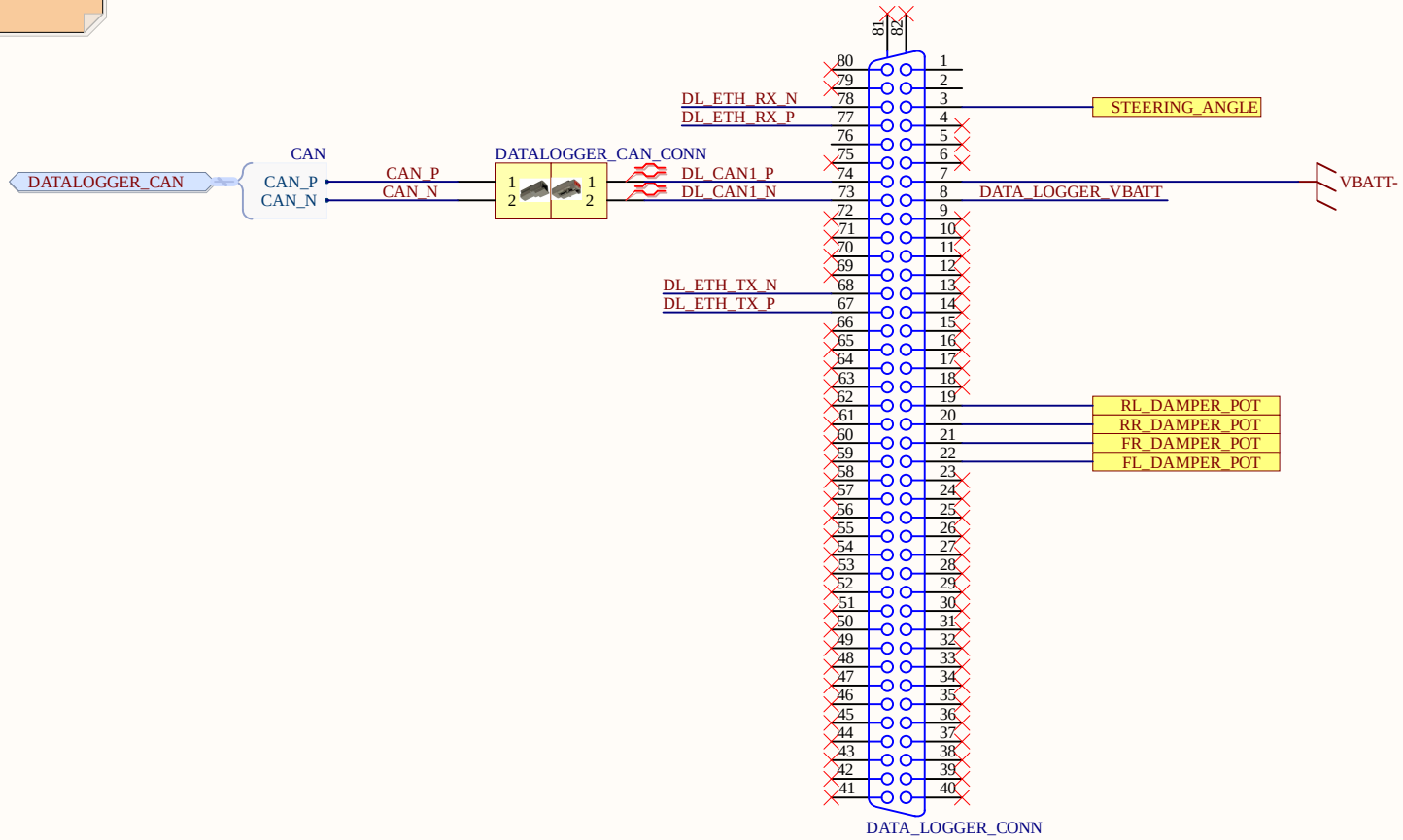
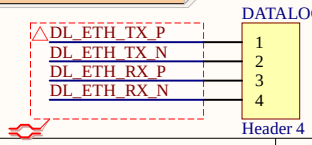
Pin numbers on the connector correspond to pin numbers on the motorsport connector directly



Connector represents a standard RJ45 Ethernet cable



DATA_LOGGER_VBATT — DATA_LOGGER_VBATT

Title	**Data Logger.SchDoc**		*Queen's Formula SAE* *130 Stuart St, Kingston* *Ontario* *Canada* *K7L 2V9*
Size: A4	Number: 1	Revision: 0	Cannot open file C:\Users\Public\Documents\Altium\AD20\Templates\qfsae-logo.png.
Date: 2023-04-26	Time: 12:08:48 PM	Sheet 1 of 1	
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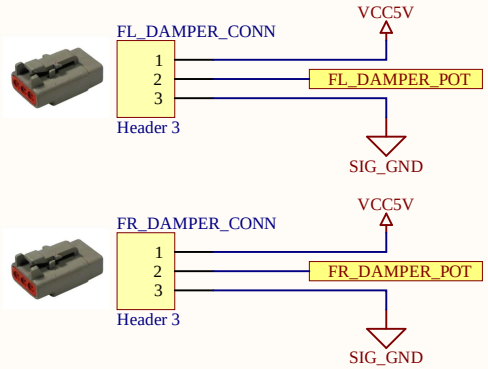
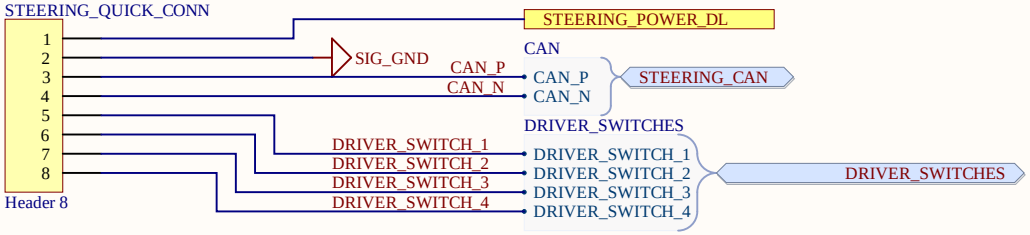
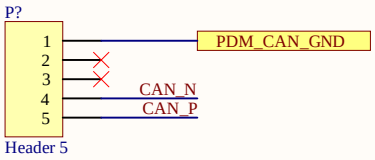


Represents the Steering quick release connector. Ideally, want to get all driver switches running over CAN bus



Represents PDM USB CAN CONNECTOR

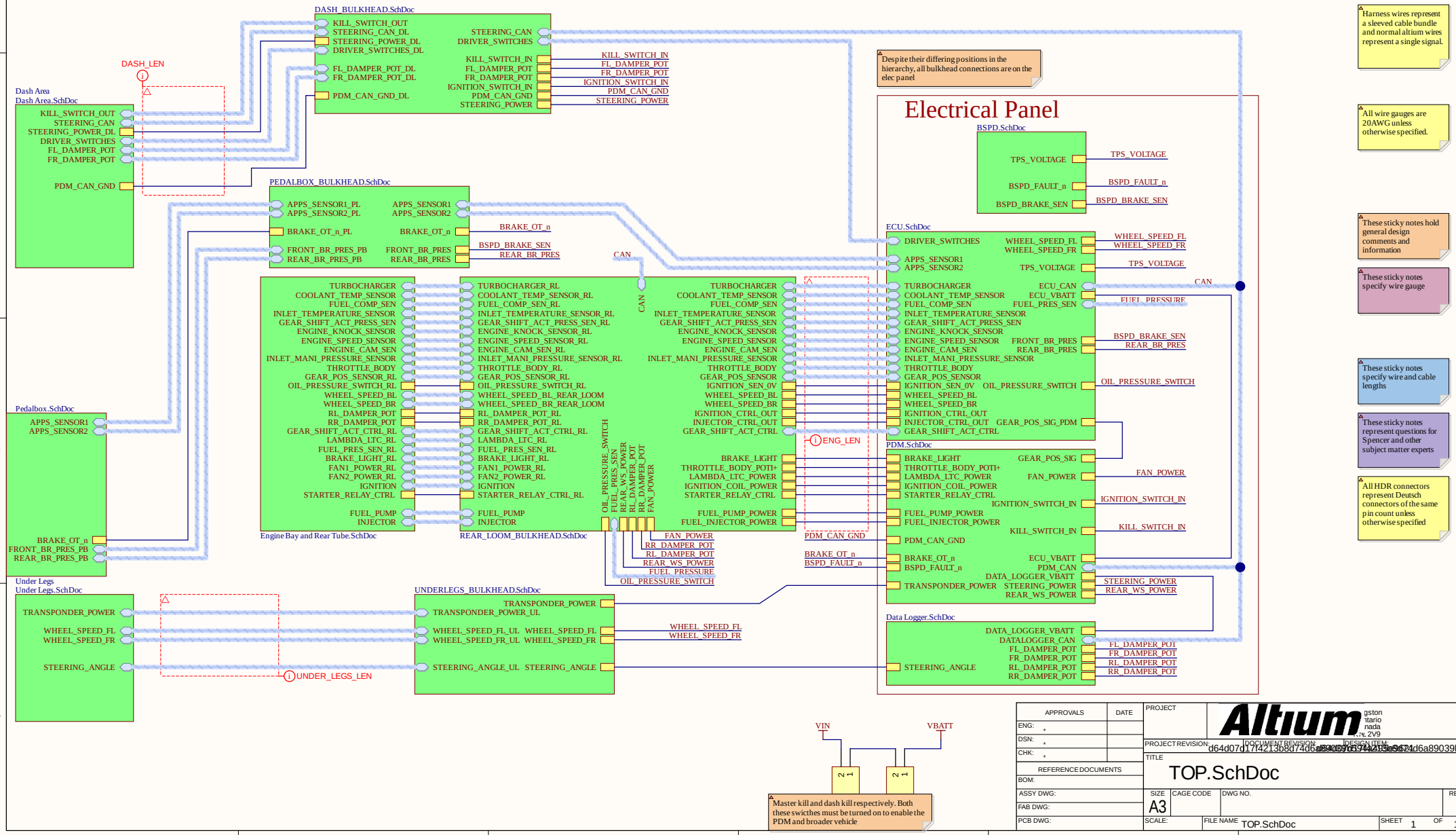


A female connector has been added to the driver kill switch with this mapping tab up.

Kill switch in is the white signal wire, brown is ground

Title **Dash Area.SchDoc**			*Queen's Formula SAE* *130 Stuart St, Kingston* *Ontario* *Canada* *K7L 2V9*
Size: A4	Number: 1	Revision: 0	Cannot open file C:\Users\Public\Documents\Altium\AD20\Templates\qfsae-logo.png.
Date: 2023-04-26	Time: 12:08:48 PM	Sheet 1 of 1	
File: C:\Users\ethan\Documents\pcb\harnesses\q23-harness\Dash Area.SchDoc			

REVISION	DESCRIPTION	DATE	APPROVED



APPROVALS	DATE
ENG: *	
DSN: *	
CHK: *	
REFERENCE DOCUMENTS	
BOM:	
ASSY DWG:	
FAB DWG:	
PCB DWG:	

PROJECT

PROJECT REVISION:

DOCUMENT REVISION:

IDESIGN ITEM:

d64d07d17f4213b8d74d6a89039b594a495e

TITLE

TOP.SchDoc

SIZE	CAGE CODE	DWG NO.	REV
A3			

SCALE:

FILE NAME TOP.SchDoc

SHEET 1 OF 1

MOTEC M150 ECU

REVISION	DESCRIPTION	DATE	APPROVED

ECU_CONN_A

1	A01	COOLANT_TEMP	
2	A02	OIL_PRESSURE_SWITCH	OIL_PRESSURE_SWITCH
3	A03		
4	A04		
5	A05		
6	A06		
7	A07		
8	A08		
9	A09		
10	A10	SEN_5V_C1	
11	A11		
12	A12		
13	A13		
14	A14		
15	A15		
16	A16		
17	A17		
18	A18	SEN_5V_C2	
19	A19	SEN_5V_B2	
20	A20		
21	A21		
22	A22		
23	A23		
24	A24		
25	A25		
26	A26	SEN_0V_C1	
27	A27	SEN_0V_C2	
28	A28		
29	A29		
30	A30	ECU_CAN2_P	CAN_P
31	A31	ECU_CAN2_N	CAN_N
32	A32		
33	A33	SEN_0V_B1	
34	A34	SEN_0V_A1	

VBATT-

CAN: CAN_P, CAN_N → ECU_CAN

VBATT-

ECU_CONN_B

1	B01		
2	B02		
3	B03	WHEEL_SPEED_FL	WHEEL_SPEED_FL
4	B04	WHEEL_SPEED_FR	WHEEL_SPEED_FR
5	B05	WHEEL_SPEED_BL	WHEEL_SPEED_BL
6	B06	WHEEL_SPEED_BR	WHEEL_SPEED_BR
7	B07		
8	B08		
9	B09		
10	B10		
11	B11		FRONT_BR_PRES
12	B12		REAR_BR_PRES
13	B13	ECU_VBATT	
14	B14		
15	B15		
16	B16	APPS_VOLTAGE2	
17	B17		
18	B18		
19	B19	ECU_VBATT	
20	B20		
21	B21	BOOST_ACT_OUT	
22	B22		
23	B23		
24	B24		
25	B25		
26	B26	SEN_5V_A1	
27			
28			
29			
30			
31			
32			
33			
34			

Wheelspeed needs VBATT supply and GND

ECU_CONN_C

1	C01	TB_MOTOR+	
2	C02	SEN_5V_A2	
3	C03		
4	C04	IGNITION_CTRL_OUT	IGNITION_CTRL_OUT
5	C05		
6	C06		
7	C07		
8	C08		
9	C09	SEN_5V_B	
10	C10	VBATT-	
11	C11		
12	C12		
13	C13		
14	C14	GEAR_SHIFT_ACTUATOR_PRESSURE	
15	C15	APPS_VOLTAGE1	
16	C16	TPS_VOLTAGE	TPS_VOLTAGE
17	C17	TPS_TRACKING_VOLTAGE	
18	C18	TB_MOTOR-	
19	C19		
20	C20		
21	C21		
22	C22		
23	C23	INJECTOR_CTRL_OUT	INJECTOR_CTRL_OUT
24	C24		
25	C25	FUEL_PRES_SEN	
26	C26	ECU_VBATT	
27	C27		
28	C28		
29	C29		
30	C30		
31	C31		
32	C32	GEAR_SHIFT_UP_CTRL	
33	C33	GEAR_SHIFT_DOWN_CTRL	
34	C34	TURBO_ACT_BYP	

ECU_CONN_D

1	D01	ENGINE_SPEED_IN	
2	D02	DRIVER_SWITCH_1	
3	D03	INLET_AIR_TEMP	
4	D04		
5	D05		
6	D06		
7	D07	CYLINDER_KNOCK	
8	D08	DRIVER_SWITCH_2	
9	D09	DRIVER_SWITCH_3	
10	D10	DRIVER_SWITCH_4	
11	D11	FUEL_COMP_VOLTAGE	
12	D12		
13	D13		
14	D14	ENGINE_SYNC_CAM_IN	
15	D15	SEN_0V_A	
16	D16	SEN_0V_B	
17	D17		IGNITION_SEN_0V
18	D18		
19	D19	SEN_6V3	
20	D20		
21	D21	GEAR_POS_SIG	GEAR_POS_SIG_PDM
22	D22	INLET_MAN_PRESS_SEN	
23	D23	ECU_ETH_TX_P	
24	D24	ECU_ETH_TX_N	
25	D25	ECU_ETH_RX_P	
26	D26	ECU_ETH_RX_N	
27			
28			
29			
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34			

ECU_ETH_CONN: 1, 2, 3, 4 — Header 4

Connector represents a standard RJ45 Ethernet cable

Power for ignition and injector comes from PDM, be sure to use PDM ground when connecting in the engine section.

SEN_0V and SEN_5V net names follow the "Full name" column of the ECU datasheet. See docs folder for more info.

2WIRE_SENSOR: INLET_AIR_TEMP, SEN_0V_A → ANALOG_1K_PULLUP_IN, SEN_0V → INLET_TEMPERATURE_SENSOR

2WIRE_SENSOR: COOLANT_TEMP, SEN_0V_C1 → ANALOG_1K_PULLUP_IN, SEN_0V → COOLANT_TEMP_SENSOR

3WIRE_PSG_SENSOR: GEAR_SHIFT_ACTUATOR_PRESSURE, SEN_0V_B → SEN_5V, SIGNAL, SEN_0V → GEAR_SHIFT_ACT_PRESS_SEN

3WIRE_PSG_SENSOR: SEN_5V_A2, APPS_VOLTAGE1, SEN_0V_A1 → SEN_5V, SIGNAL, SEN_0V → APPS_SENSOR1

THROTTLE_BODY: TB_MOTOR-, SEN_0V_C2, SEN_5V_A1, TB_MOTOR+, TPS_VOLTAGE, TPS_TRACKING_VOLTAGE → MOTOR-, POTI-, POTI+, MOTOR+, POTI2, POTI1 → THROTTLE_BODY

3WIRE_PSG_SENSOR: SEN_5V_C1, FUEL_COMP_VOLTAGE, SEN_0V_B1 → SEN_5V, SIGNAL, SEN_0V → FUEL_COMP_SEN

VCC5V

3WIRE_PSG_SENSOR: APPS_VOLTAGE2 → SEN_5V, SIGNAL, SEN_0V → APPS_SENSOR2

SIG_GND

2WIRE_ACTUATOR: CYLINDER_KNOCK → SIGNAL_CTRL, GND → ENGINE_KNOCK_SENSOR

VBATT-

3WIRE_PSG_SENSOR: SEN_5V_C2, ENGINE_SPEED_IN → SEN_5V, SIGNAL, SEN_0V → ENGINE_SPEED_SENSOR

SIG_GND

Need more info on how this was wired. Power supply and grounding

ANS: This should actually one wire. possibly two wire with a ground.

SIG_GND

GEAR_SHIFT_ACTUATOR: GEAR_SHIFT_UP_CTRL → SHIFT_UP_CTRL, SHIFT_UP_CTRL_GND; GEAR_SHIFT_DOWN_CTRL → SHIFT_DOWN_CTRL, SHIFT_DOWN_CTRL_GND → GEAR_SHIFT_ACT_CTRL

More signals still need to be added to this interface for shifting

What is the power supply for these shifter Solenoids? PDM Output I assume

DRIVER_SWITCHES: DRIVER_SWITCH_1, DRIVER_SWITCH_2, DRIVER_SWITCH_3, DRIVER_SWITCH_4 → DRIVER_SWITCH_1, DRIVER_SWITCH_2, DRIVER_SWITCH_3, DRIVER_SWITCH_4 → DRIVER_SWITCHES

Can you tell me what you want each switch pin to do for the steering code? Ex. switch 1 downshift switch 2 upshift etc.

These go to steering wheel, pull up resistors and supply power are provided on the steering PCB.

3WIRE_PSG_SENSOR: SEN_5V_B2, ENGINE_SYNC_CAM_IN → SEN_5V, SIGNAL, SEN_0V → ENGINE_CAM_SEN

SIG_GND

3WIRE_PSG_SENSOR: VCC5V, FUEL_PRES_SEN → SEN_5V, SIGNAL, SEN_0V → FUEL_PRES_SEN

SIG_GND

Need more info on how this was wired. Power supply and grounding

ANS: this should actually include a temperature line for a four wire connection also wired to a 1k pullup input

INLET_MANI_PRESS: SEN_5V_A1, INLET_MAN_PRESS_SEN, INLET_MAN_TEMP_SEN → SEN_5V, P_SIG, TEMP_SIG, SEN_0V → INLET_MANI_PRESSURE_SENSOR

SIG_GND

TURBO: TURBO_ACT_BYP → TURBO_ACT_BYP_VALVE, BYP_GND; BOOST_ACT_OUT → BOOST_ACT_OUT_VALVE, OUT_GND → TURBOCHARGER

SIG_GND

3WIRE_PSG_SENSOR: VCC5V, GEAR_POS_SIG → SEN_5V, SIGNAL, SEN_0V → GEAR_POS_SENSOR

SIG_GND

ECU_VBATT → ECU_VBATT

APPROVALS	DATE
ENG: *	
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ASSY DWG:	
FAB DWG:	
PCB DWG:	

PROJECT: Altium™ * * * *

PROJECT REVISION: DOCUMENT REVISION: DESIGN ITEM: d64d07d17f4213b8d74d6a89039b594a495e9621

TITLE: *

SIZE: A3 | CAGE CODE | DWG NO. | REV

SCALE: | FILE NAME: ECU.SchDoc | SHEET * OF