U_Power
Power.SchDoc

U_Driver
Driver.SchDoc

SPI_DRIVER
ST_ALONE
SG_TEST
$\overline{EN}$
STEP
DIR

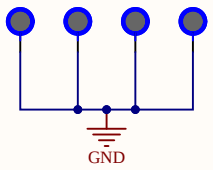
U_Microcontroller
Microcontroller.SchDoc

SPI_DRIVER
ST_ALONE
SG_TEST
$\overline{EN}$
STEP
DIR
CAN_TX
CAN_RX
USART_TX
USART_RX

U_TX2_Interface
TX2_Interface.SchDoc

CAN_TX
CAN_RX
USART_TX
USART_RX

Mounting holes



McMaster Mars Rover 1280 Main St W, Hamilton, ON L8S 4L8	
PROJECT: RAD_V1.1 - Respin.PrjPcb	AUTHOR:
TITLE: RAD_Parent.SchDoc	CHECKED BY [1]: CHECKED BY [2]:
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FILE NAME: RAD_Parent.SchDoc	SHEET 1 OF 5

Tables 2 and 3 show recommended component selections for the AP63203 and AP63205 referencing Figure 21.

AP63203				
Output Voltage (V)	**L (µH)**	**C1 (µF)**	**C2 (µF)**	**C3 (nF)**
3.3	3.9	10	2 x 22	100

Table 2. Recommended Component Selections for AP63203

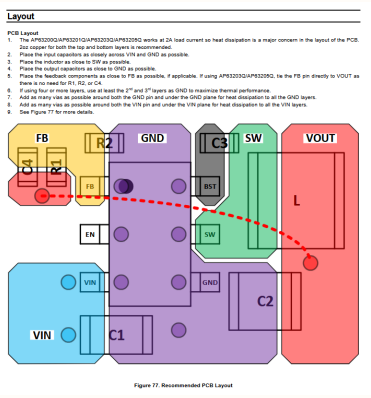
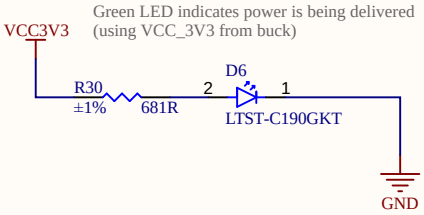
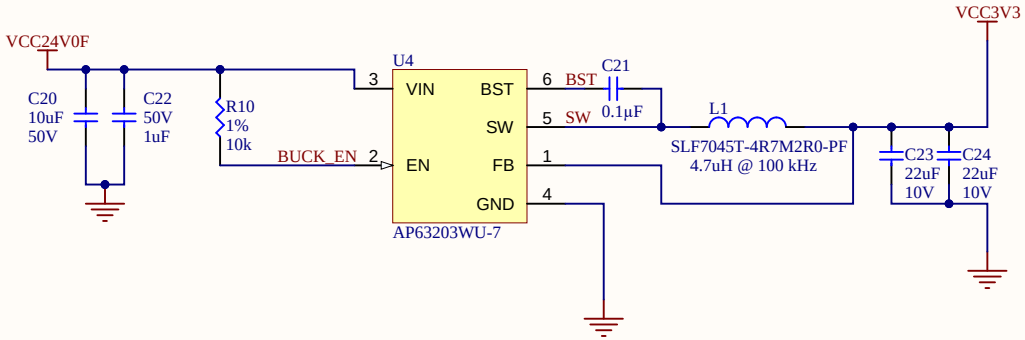


Figure 77. Recommended PCB Layout





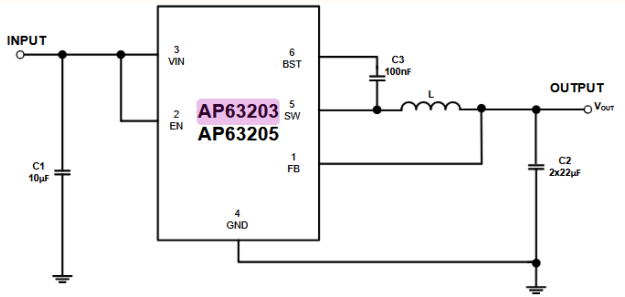
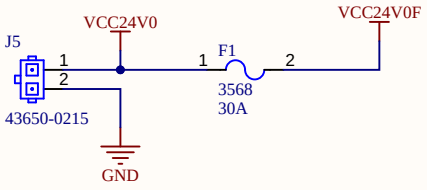


Figure 21. Typical Application Circuit of AP63203/AP63205



McMaster Mars Rover 1280 Main St. W, Hamilton, ON L8S 4L8		
PROJECT: RAD_V1.1 - Respin.PrjPcb	AUTHOR:	
TITLE: Power.SchDoc	CHECKED BY [1]: CHECKED BY [2]:	
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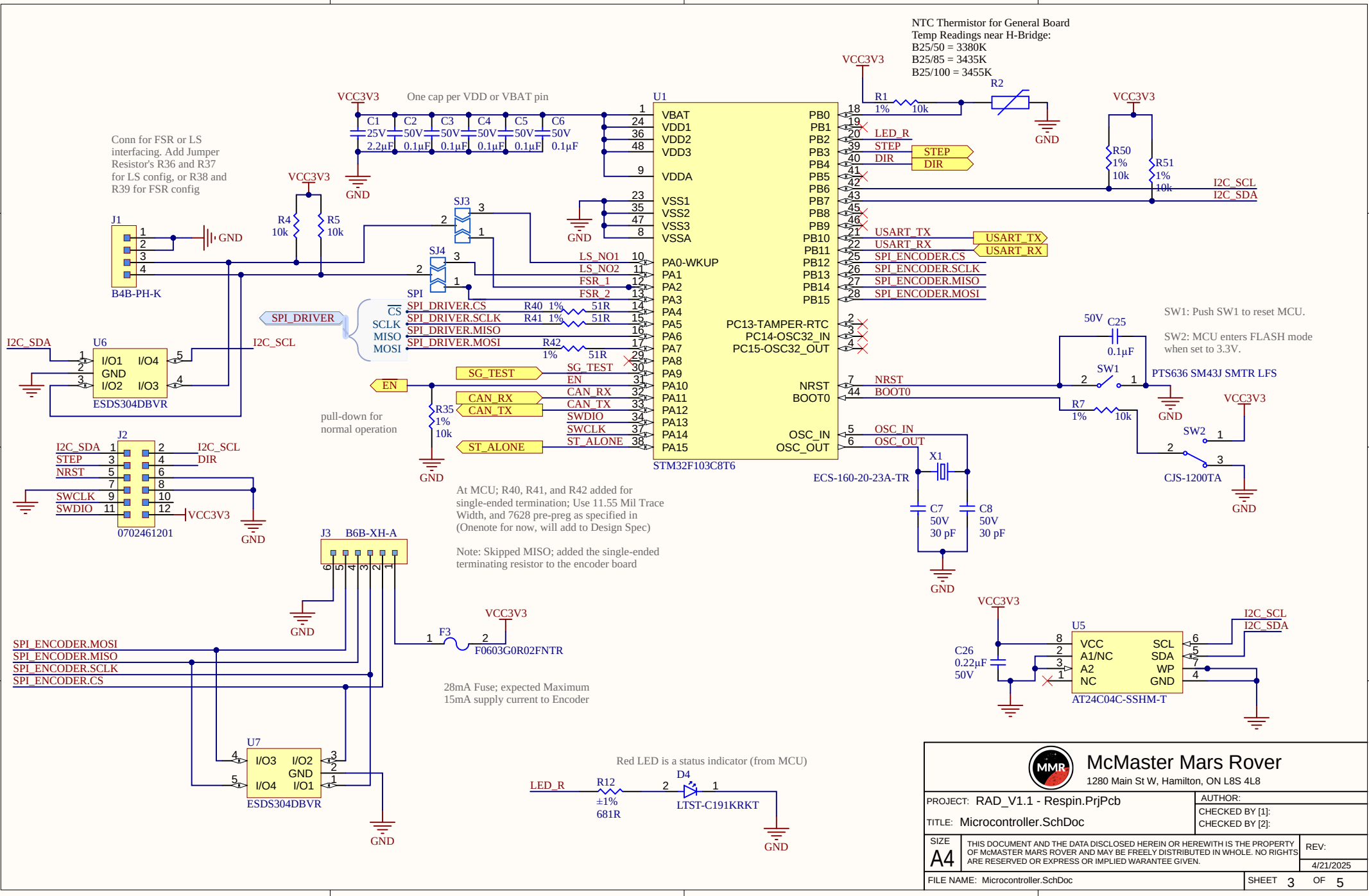
FILE NAME: Power.SchDoc	SHEET 2 OF 5	


NTC Thermistor for General Board
Temp Readings near H-Bridge:
B25/50 = 3380K
B25/85 = 3435K
B25/100 = 3455K
VCC3V3
R1 1% 10k
R2
GND
R50 1% 10k
R51 1% 10k
I2C_SCL
I2C_SDA
One cap per VDD or VBAT pin
C1 25V 2.2µF
C2 50V 0.1µF
C3 50V 0.1µF
C4 50V 0.1µF
C5 50V 0.1µF
C6 50V 0.1µF
U1
VBAT
VDD1
VDD2
VDD3
VDDA
VSS1
VSS2
VSS3
VSSA
PA0-WKUP
PA1
PA2
PA3
PA4
PA5
PA6
PA7
PA8
PA9
PA10
PA11
PA12
PA13
PA14
PA15
PB0
PB1
PB2
PB3
PB4
PB5
PB6
PB7
PB8
PB9
PB10
PB11
PB12
PB13
PB14
PB15
PC13-TAMPER-RTC
PC14-OSC32_IN
PC15-OSC32_OUT
NRST
BOOT0
OSC_IN
OSC_OUT
STM32F103C8T6
LED_R
STEP
DIR
USART_TX
USART_RX
SPI_ENCODER.CS
SPI_ENCODER.SCLK
SPI_ENCODER.MISO
SPI_ENCODER.MOSI
Conn for FSR or LS interfacing. Add Jumper Resistor's R36 and R37 for LS config, or R38 and R39 for FSR config
J1
B4B-PH-K
R4 10k
R5 10k
SJ3
SJ4
LS_NO1
LS_NO2
FSR_1
FSR_2
SPI
SPI_DRIVER
SPI_DRIVER.CS
SPI_DRIVER.SCLK
SPI_DRIVER.MISO
SPI_DRIVER.MOSI
R40 1% 51R
R41 1% 51R
R42 1% 51R
I2C_SDA
I2C_SCL
U6
I/O1
I/O2
I/O3
I/O4
GND
ESDS304DBVR
SG_TEST
EN
CAN_RX
CAN_TX
SWDIO
SWCLK
ST_ALONE
R35 1% 10k
pull-down for normal operation
At MCU; R40, R41, and R42 added for single-ended termination; Use 11.55 Mil Trace Width, and 7628 pre-preg as specified in (Onenote for now, will add to Design Spec)
Note: Skipped MISO; added the single-ended terminating resistor to the encoder board
50V C25 0.1µF
SW1
PTS636 SM43J SMTR LFS
SW1: Push SW1 to reset MCU.
SW2: MCU enters FLASH mode when set to 3.3V.
R7 1% 10k
SW2
CJS-1200TA
X1
ECS-160-20-23A-TR
C7 50V 30 pF
C8 50V 30 pF
J2
STEP
DIR
NRST
SWCLK
SWDIO
0702461201
J3 B6B-XH-A
F3
F0603G0R02FNTR
28mA Fuse; expected Maximum 15mA supply current to Encoder
U7
ESDS304DBVR
C26 0.22µF 50V
U5
VCC
A1/NC
A2
NC
SCL
SDA
WP
AT24C04C-SSHM-T
Red LED is a status indicator (from MCU)
R12 ±1% 681R
D4
LTST-C191KRKT
McMaster Mars Rover
1280 Main St W, Hamilton, ON L8S 4L8
PROJECT: RAD_V1.1 - Respin.PrjPcb
TITLE: Microcontroller.SchDoc
AUTHOR:
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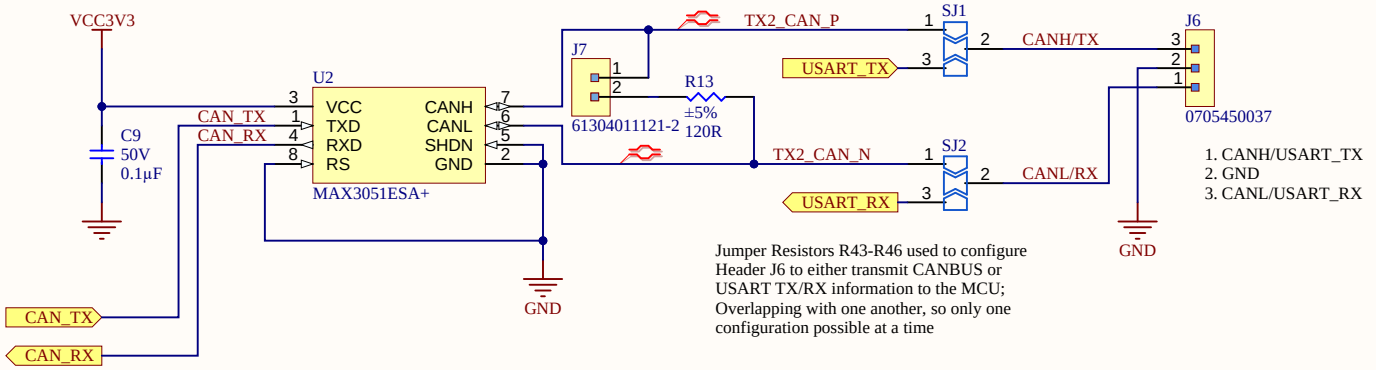
FILE NAME: Microcontroller.SchDoc
SHEET 3 OF 5

Variant Explanation:
- R13 is placed if the RAD board is used as a terminal CAN node
- R43 and R45 are placed if MCU is using CAN communication instead of USART
- R44 and R46 are placed if MCU is using USART communication instead of CAN

R13 (Jumper Cable) is placed if RAD is being used as a terminal CAN node.



McMaster Mars Rover 1280 Main St W, Hamilton, ON L8S 4L8	
PROJECT: RAD_V1.1 - Respin.PrjPcb	AUTHOR:
TITLE: TX2_Interface.SchDoc	CHECKED BY [1]: CHECKED BY [2]:
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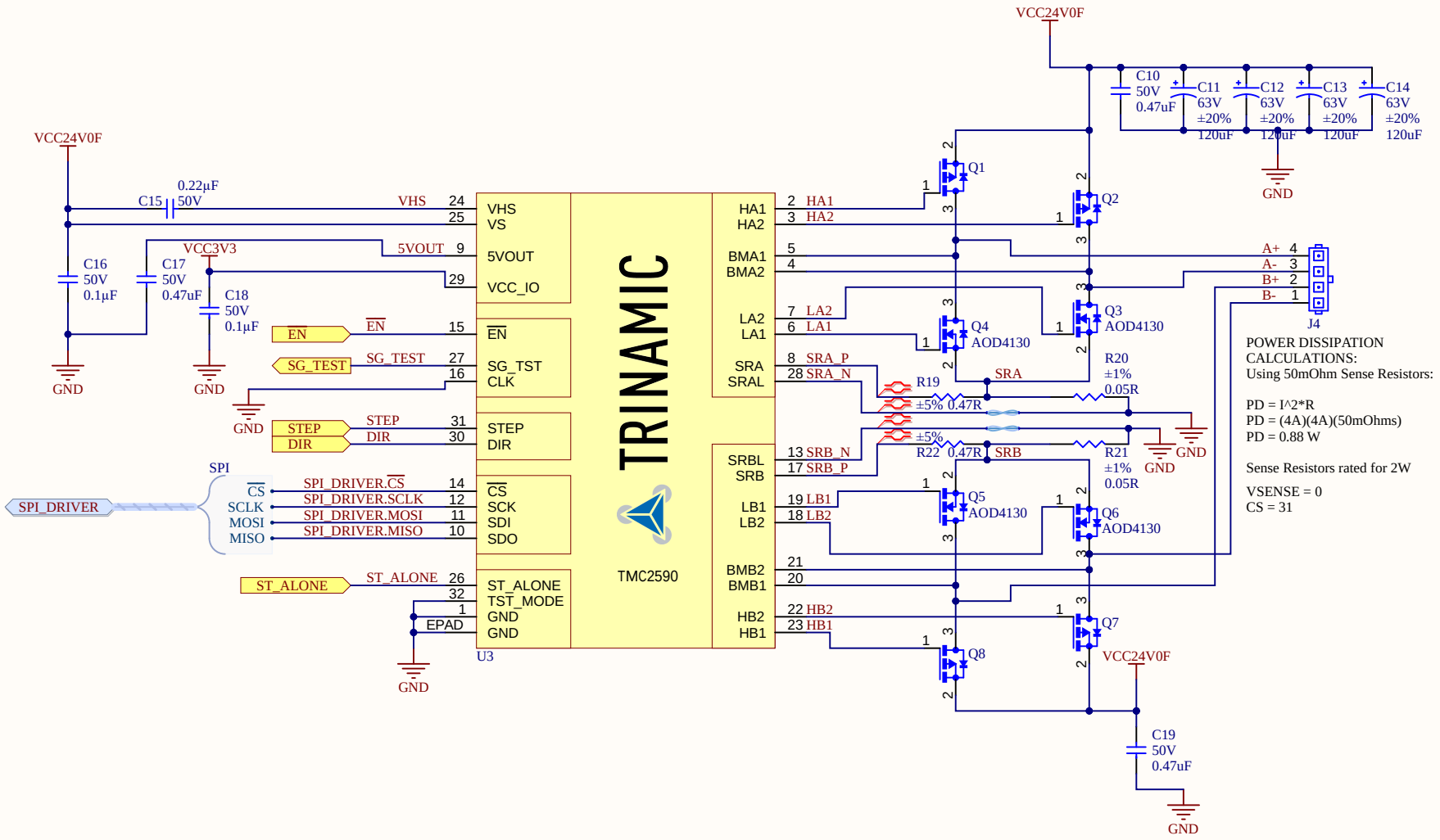
FILE NAME: TX2_Interface.SchDoc	SHEET 4 OF 5



McMaster Mars Rover	1280 Main St. W, Hamilton, ON L8S 4L8
PROJECT: RAD_V1.1 - Respin.PrjPcb	AUTHOR:
TITLE: Driver.SchDoc	CHECKED BY [1]:
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FILE NAME: Driver.SchDoc	SHEET 5 OF 5

Board Stack Report

Stack Up		Layer Stack			
Layer	Board Layer Stack	Name	Material	Thickness	Constant
1		Top Overlay		0mm	
2		Top Solder	SM-001	0.0254mm	4
3		Top Surface Finish	PbSn	0.01999mm	
4		Top Layer	CF-004	0.035mm	
5		Dielectric 1	PP-023	0.10521mm	4.5
6		Dielectric 2	PP-023	0.10521mm	4.5
7		GND	CF-004	0.01519mm	
8		Dielectric 3	Core-025	1.065mm	4.6
9		POWER	CF-004	0.01519mm	
10		Dielectric 4	PP-023	0.10521mm	4.5
11		Dielectric 5	PP-023	0.10521mm	4.5
12		Bottom Layer	CF-004	0.035mm	
13		Bottom Surface Finish	PbSn	0.01999mm	
14		Bottom Solder	SM-001	0.0254mm	4
15		Bottom Overlay		0mm	
	Height : 1.67698mm				