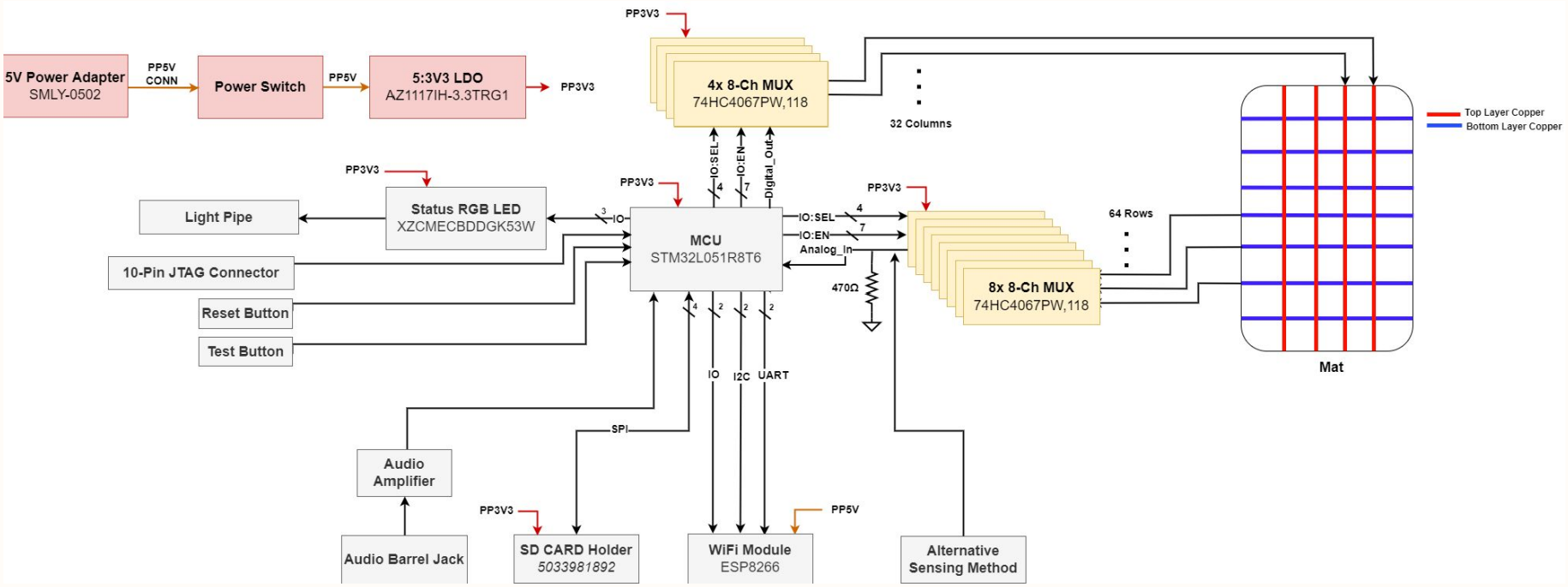

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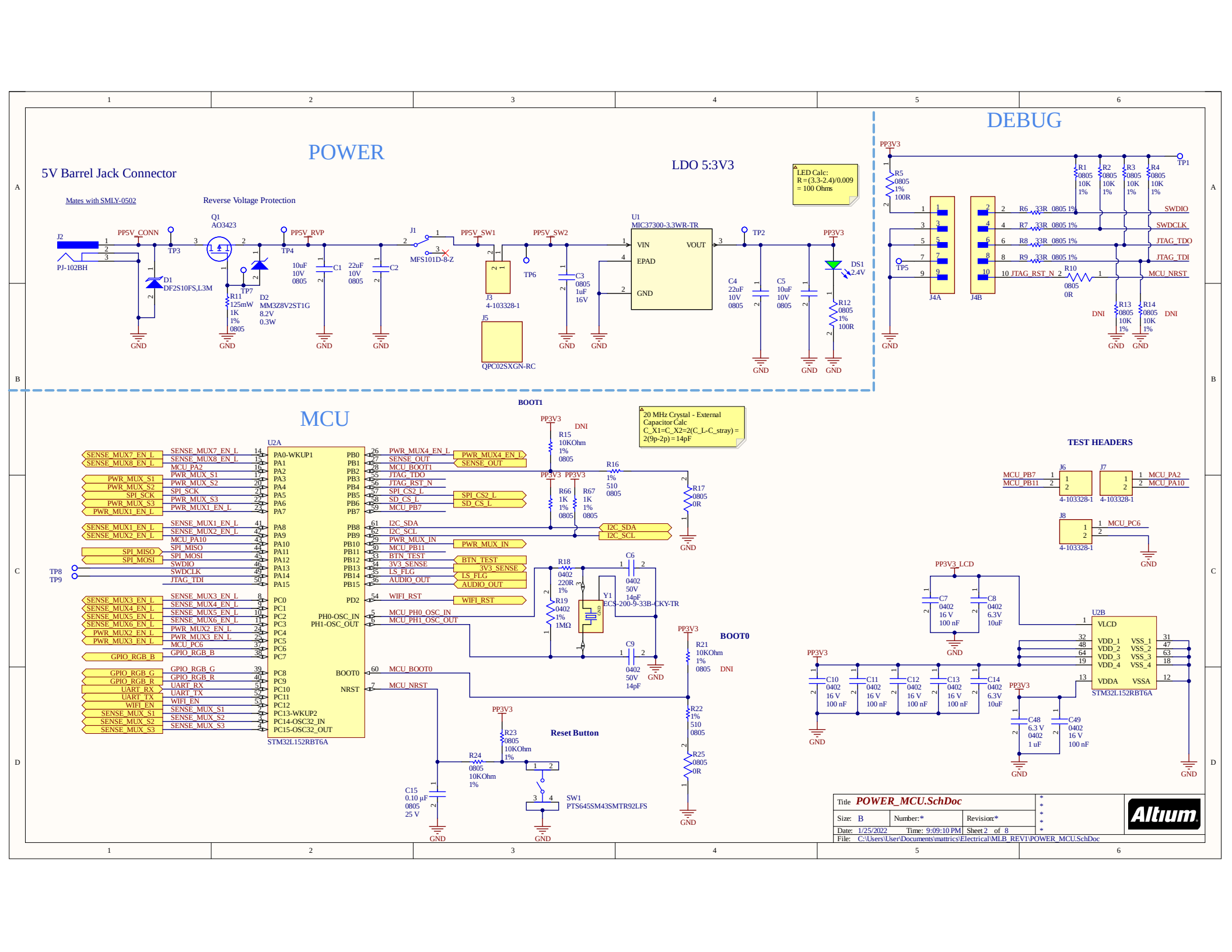
Size: B	Number:*	Revision:*	
Date: 1/25/2022	Time: 9:09:10 PM	Sheet 1 of 8	
File: C:\Users\User\Documents\mattrics\Electrical\MLB_REV1\BLOCK_DIAGRAM.SchDoc			

Altium


POWER
5V Barrel Jack Connector
Mates with SMLY-0502
Reverse Voltage Protection
LDO 5:3V3
LED Calc:
R = (3.3-2.4)/0.009
= 100 Ohms
PJ-102BH
PP5V_CONN
PP5V_RVP
PP5V_SW1
PP5V_SW2
PP3V3
TP1
TP2
TP3
TP4
TP5
TP6
TP7
Q1
AO3423
D1
DF2S10FS,L3M
D2
MM3Z8V2ST1G
8.2V
0.3W
R11
125mW
1K
1%
0805
10uF
10V
0805
C1
22uF
10V
0805
C2
J1
MFS101D-8-Z
J3
4-103328-1
J5
QPC02SXGN-RC
U1
MIC37300-3.3WR-TR
VIN
VOUT
EPAD
GND
C3
0805
1uF
16V
C4
22uF
10V
0805
C5
10uF
10V
0805
DS1
2.4V
R12
0805
1%
100R
DEBUG
R5
0805
1%
100R
J4A
J4B
R1
R2
R3
R4
0805
10K
1%
SWDIO
SWDCLK
JTAG_TDO
JTAG_TDI
MCU_NRST
R6 33R 0805 1%
R7 33R 0805 1%
R8 33R 0805 1%
R9 33R 0805 1%
JTAG_RST_N
R10
0805
0R
R13
R14
DNI
MCU
BOOT1
20 MHz Crystal - External
Capacitor Calc
C_X1=C_X2=2(C_L-C_stray) =
2(9p-2p) = 14pF
U2A
STM32L152RBT6A
SENSE_MUX7_EN_L
SENSE_MUX8_EN_L
PWR_MUX_S1
PWR_MUX_S2
SPI_SCK
PWR_MUX_S3
PWR_MUX1_EN_L
SENSE_MUX1_EN_L
SENSE_MUX2_EN_L
SPI_MISO
SPI_MOSI
SWDIO
SWDCLK
JTAG_TDI
SENSE_MUX3_EN_L
SENSE_MUX4_EN_L
SENSE_MUX5_EN_L
SENSE_MUX6_EN_L
PWR_MUX2_EN_L
PWR_MUX3_EN_L
MCU_PC6
GPIO_RGB_B
GPIO_RGB_G
GPIO_RGB_R
UART_RX
UART_TX
WIFI_EN
SENSE_MUX_S1
SENSE_MUX_S2
SENSE_MUX_S3
PWR_MUX4_EN_L
SENSE_OUT
MCU_BOOT1
JTAG_TDO
JTAG_RST_N
SPI_CS2_L
SD_CS_L
MCU_PB7
I2C_SDA
I2C_SCL
PWR_MUX_IN
MCU_PB11
BTN_TEST
3V3_SENSE
LS_FLG
AUDIO_OUT
WIFI_RST
MCU_PH0_OSC_IN
MCU_PH1_OSC_OUT
MCU_BOOT0
MCU_NRST
TP8
TP9
R15
10KOhm
1%
0805
DNI
R16
510
R17
0R
R66
R67
1K
R18
0402
220R
R19
1MΩ
Y1
ECS-200-9-33B-CKY-TR
C6
C9
0402
50V
14pF
R21
R22
R25
BOOT0
Reset Button
R23
R24
C15
0.10 µF
25 V
SW1
PTS645SM43SMTR92LFS
TEST HEADERS
J6
J7
J8
4-103328-1
MCU_PB7
MCU_PB11
MCU_PA2
MCU_PA10
MCU_PC6
PP3V3_LCD
U2B
VLCD
VDD_1
VDD_2
VDD_3
VDD_4
VSS_1
VSS_2
VSS_3
VSS_4
VDDA
VSSA
C7
C8
C10
C11
C12
C13
C14
0402
16 V
100 nF
6.3V
10uF
C48
6.3 V
1 uF
C49
GND
Title POWER_MCU.SchDoc
Size: B
Number: *
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Sheet 2 of 8
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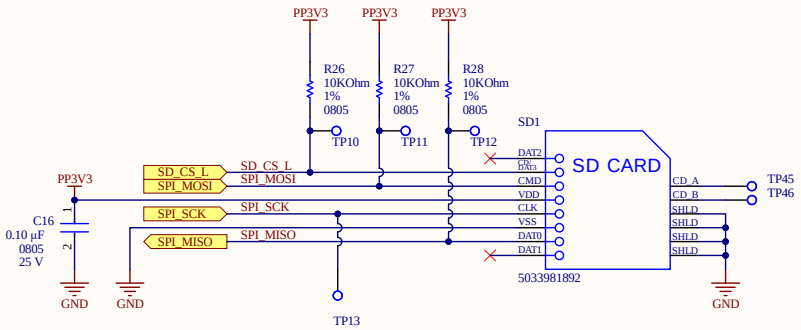
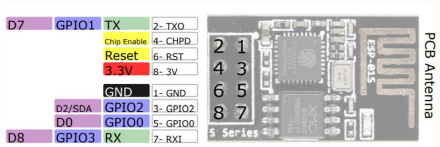
SD Card

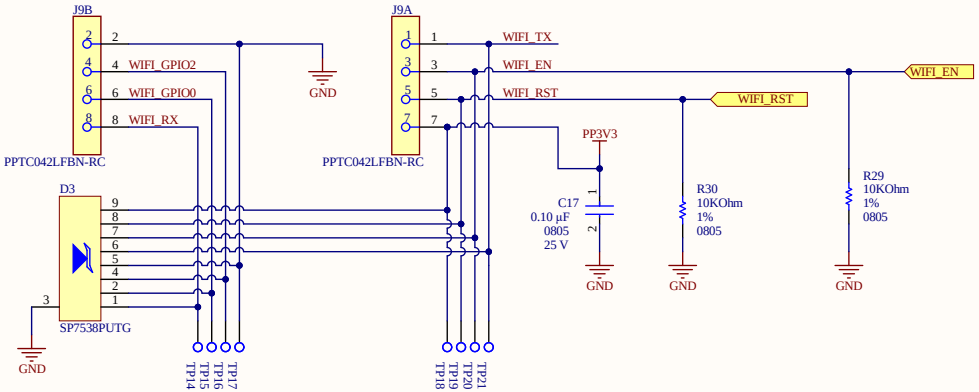


WiFi Shield Headers



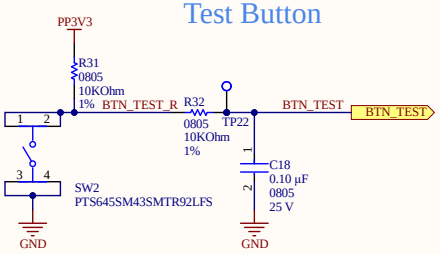
WiFi dev board: ESP8266

https://www.sparkfun.com/products/17146

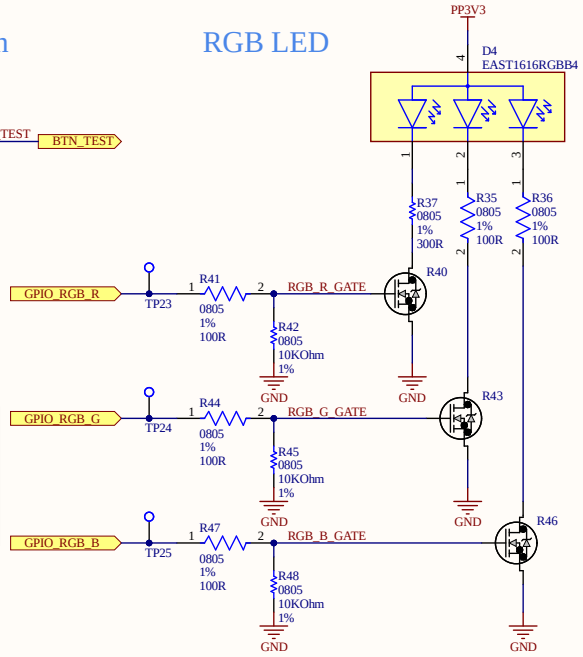


Support

Test Button

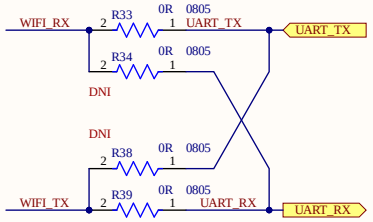


RGB LED

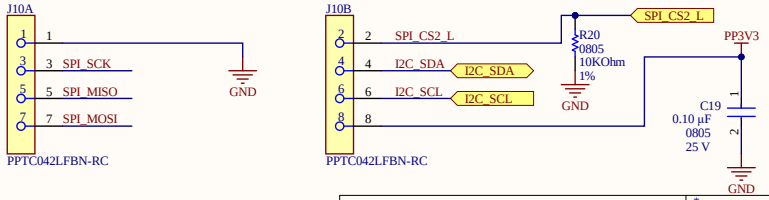


RGB LED Calc:
Pin3 (B), R = (3.3-2.8)/0.005 = 100 Ohms
Pin2 (G), R = (3.3-2.8)/0.005 = 100 Ohms
Pin1 (R), R = (3.3-1.8)/0.005 = 300 Ohms

UART TX/RX SWAPPING



Communication Headers



Title	SD_CARD_WiFi.SchDoc		
Size: B	Number:*	Revision:*	
Date: 1/25/2022	Time: 9:09:10 PM	Sheet 3 of 8	
File: C:\Users\User\Documents\mattrics\Electrical\MLB_REV1\SD_CARD_WiFi.SchDoc			

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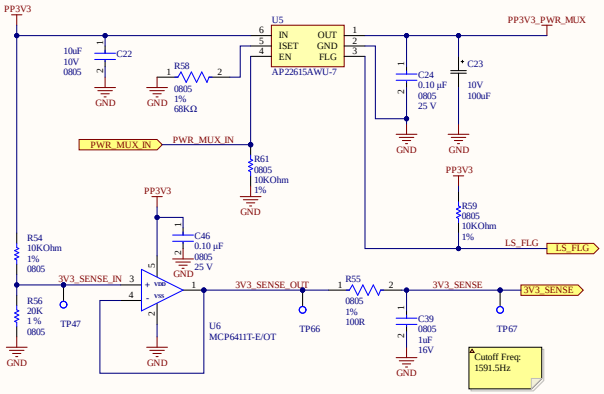
Load Switch

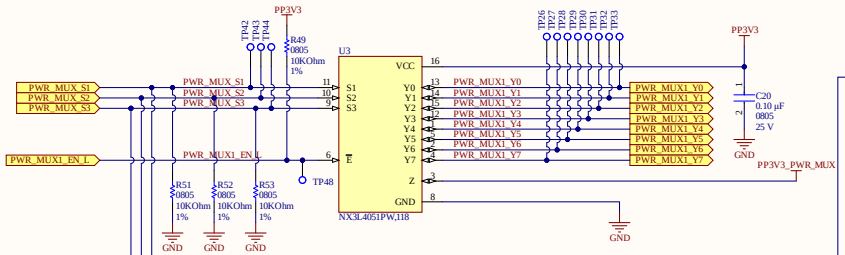
The power demuxes share select lines and input signals. The operational mux is selected using the individual enable signals.

To power a column, the power mux enables the load switch to the input of the muxes. A voltage sensor senses the 3V3 rail so FW can use it for calculations.

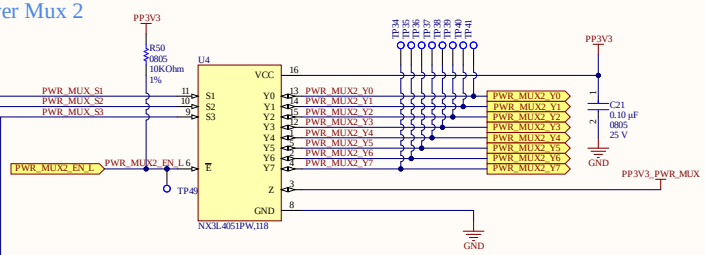


3V3 Voltage Sensing Circuit

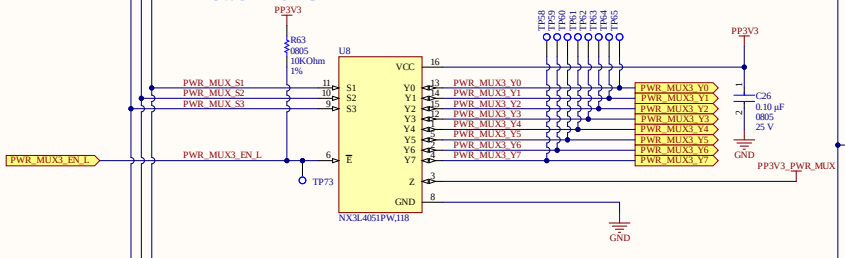
Power Mux 1



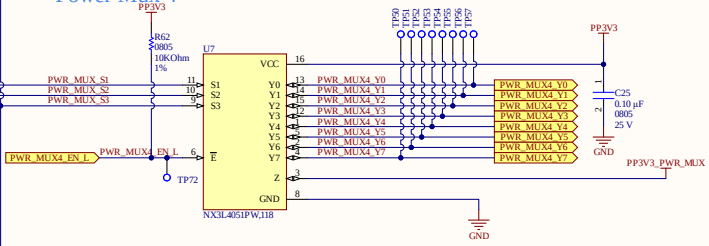
Power Mux 2



Power Mux 3



Power Mux 4



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Size: C	Number: *	Revision: *	
Date: 1/25/2022	Time: 9:09:10 PM	Sheet 4 of 8	
File: C:\Users\User\Documents\mattrics\Electrical\MLB_REV1\POWER_MUXES.SchDoc			

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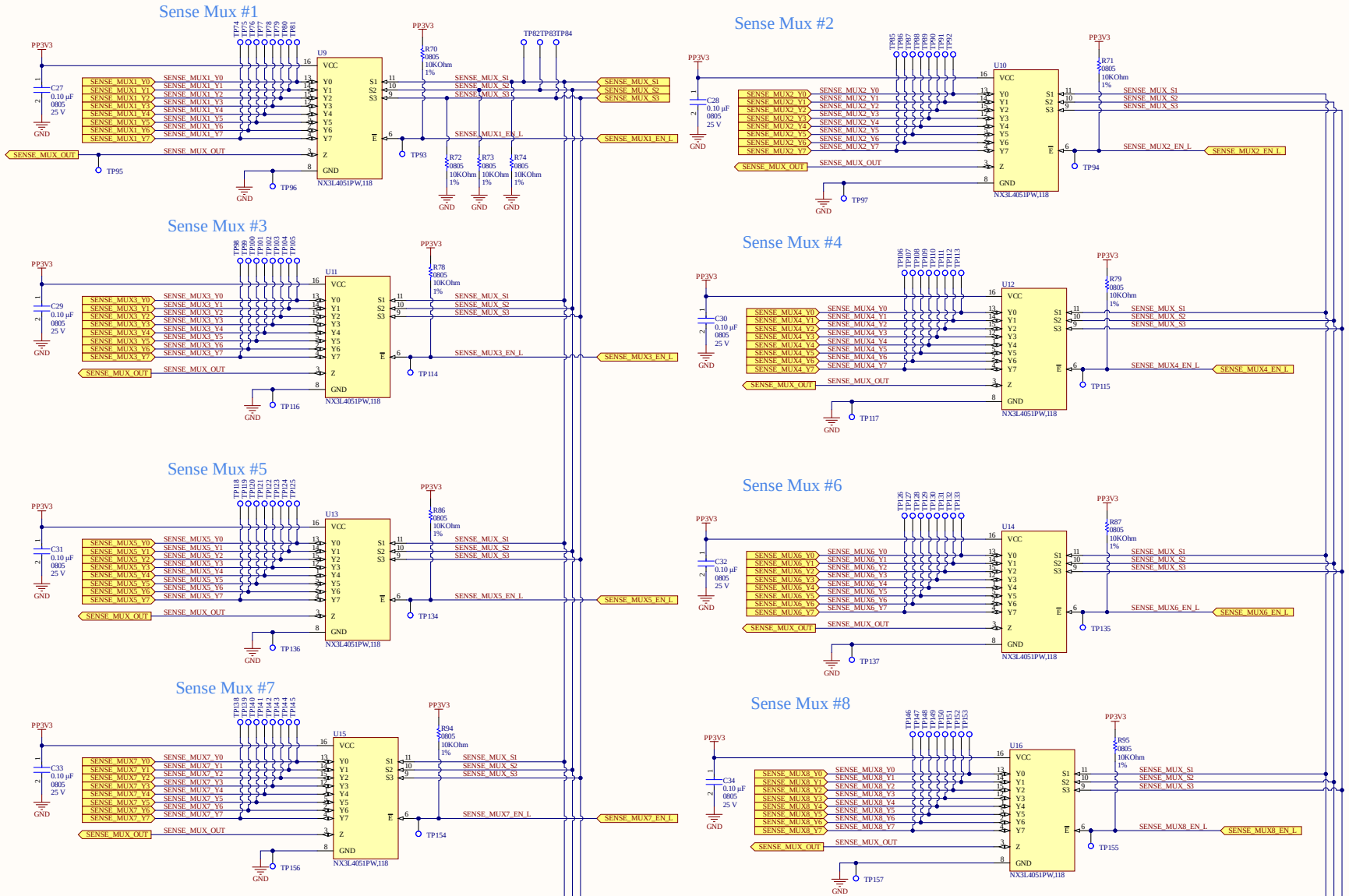

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Size: C	Number:	Revision: *	
Date: 1/25/2022	Time: 9:09:10 PM	Sheet5 of 8	
File: C:\Users\User\Documents\mattrics\ElectricalMLB_REVT\SENSE_MUXES.SchDoc			

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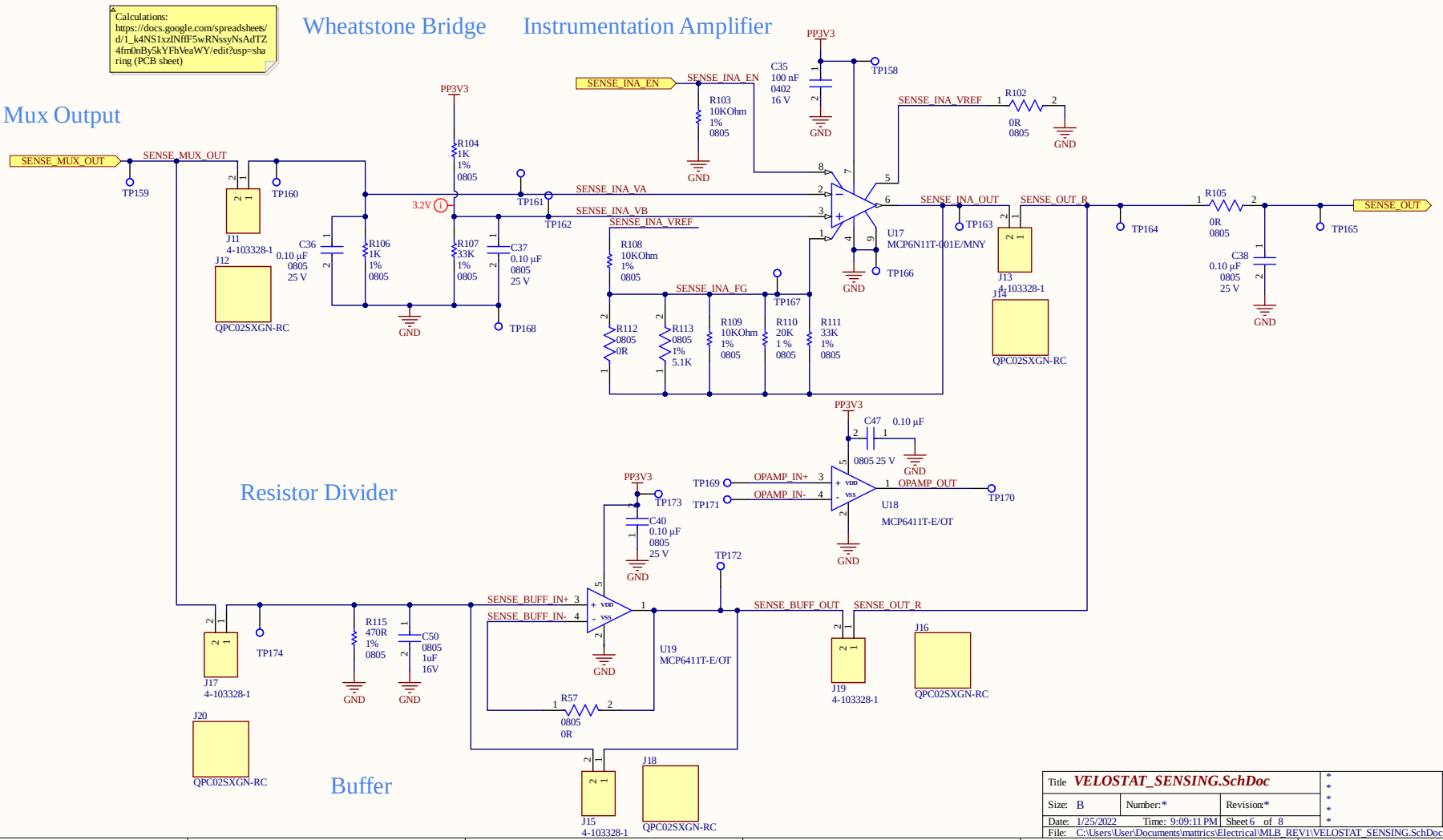
Velostat Resistance Measurement Circuitry



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Size: B	Number:*	Revision:*	
Date: 1/25/2022	Time: 9:09:11 PM	Sheet 6 of 8	
File: C:\Users\User\Documents\mattrics\Electrical\MLB_REV1\VELOSTAT_SENSING.SchDoc			

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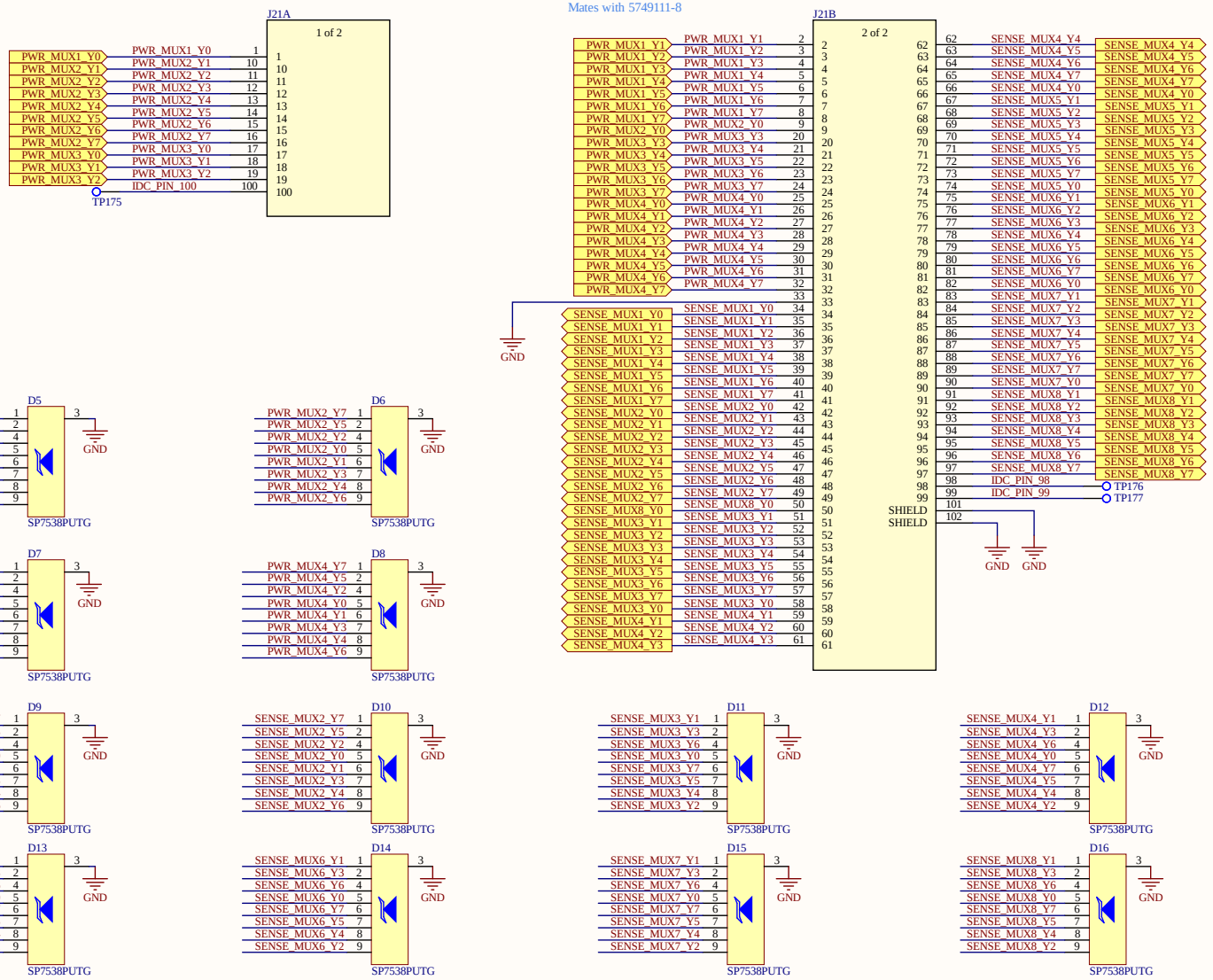
Mat Cabling Connector

Mates with 5749111-8



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Size: B	Number:*	Revision:*	
Date: 1/25/2022	Time: 9:09:11 PM	Sheet 7 of 8	
File: C:\Users\User\Documents\mattrics\Electrical\MLB_REV1\MAT_CABLING_CONNECTOR.SchDoc			

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Audio Sensing

Electret Microphone

Electret Microphone Adafruit:
https://www.adafruit.com/product/1063

J24
HOUSING
0355070300

P1
35363-0360

PP3V3
TP182
C42
0.10 µF
0805
25 V
TP183
GND

D17 DF2S10FS,L3M
D18 DF2S10FS,L3M
D19 DF2S10FS,L3M
TP189

AUDIO_CONN
TP187
R118
0805
0R
TP188
DNI
R119
0805
0R

Buffer

PP3V3
TP181
C41
0.10 µF
0805
25 V
TP184

AUDIO_BUFF_IN+
AUDIO_BUFF_IN-
U20
MCP6411T-E/OT
R116
0805
0R
J23
4-103328-1
J22
QPC02SXGN-RC

AUDIO_OUT_J
TP186
J25
4-103328-1
J26
QPC02SXGN-RC

to internal 12bit ADC

AUDIO_OUT_R
R117
0R
0805
C43
0.10 µF
0805
25 V
TP70
TP185
AUDIO_OUT
AUDIO_OUT

16bit ADC

PP3V3
TP71
C45
0.10 µF
0805
25 V
C51
0805
10V
10uF
R65
0805
0R
TP190
R64
1K
1%
0805
AUDIO_ADC_IN+
C44
0.10 µF
0805
25 V
J27
4-103328-1
J28
QPC02SXGN-RC
IC5
IN
REF+
REF-
GND_2
VCC
SDA
SCL
GND_1
LTC2451ITS8
I2C_SDA
I2C_SCL
TP69

Title	MICROPHONE.SchDoc		
Size: B	Number:*	Revision:*	
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File: C:\Users\User\Documents\mattrics\Electrical\MLB_REV1\MICROPHONE.SchDoc			

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