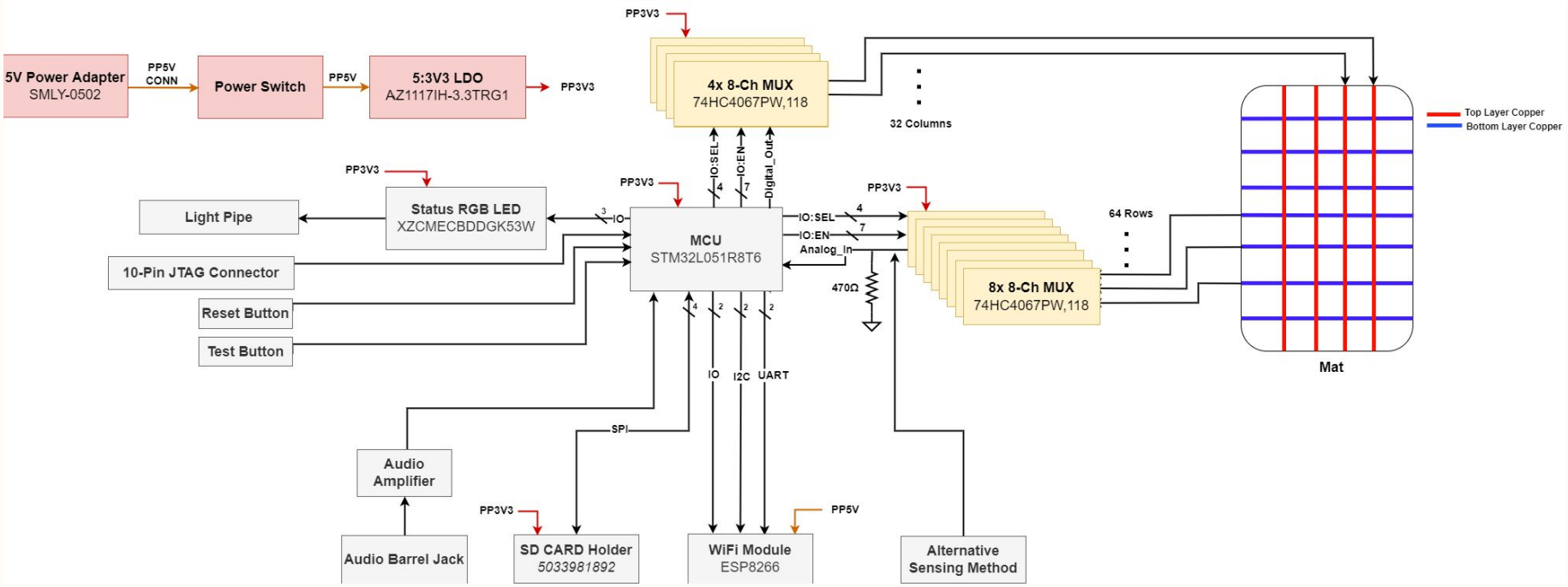

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Size: B	Number:*	Revision:*	
Date: 1/22/2022	Time: 5:54:12 AM	Sheet 1 of 8	
File: C:\Users\User\Documents\mattrics\Electrical\MLB_REV1\BLOCK_DIAGRAM.SchDoc			

Altium

POWER

5V Barrel Jack Connector

Mates with SMLY-0502

Reverse Voltage Protection

J1 PJ-102BH

PP5V_CONN

TP3

Q1 AO3423

PP5V_RVP

TP4

D1 DF2S10FS,L3M

D2 MM3Z8V2ST1G 8.2V 0.3W

TP7

R27 125mW 1K 1% 0805

10uF 10V 0805 C1

22uF 10V 0805 C2

S1 SW-SPST GF-126-0159

PP5V_SW1

PP5V_SW2

TP6

J13 4-103328-1

J15 QPC02SXGN-RC

LDO 5:3V3

IC1 ADJ/GND OUTPUT INPUT VOUT AZ1117IH-3.3TRG1

10uF 10V 0805 C3

22uF 10V 0805 C4

TP2

PP3V3

DS1 YellowGreen 2.4V

R26 225R 0805 1%

LED Calc: R = (3.3-2.4)/0.004 = 225 Ohms

GND

DEBUG

PP3V3

R21 0805 1% 100R

TP1

R1 0805 10K 1%

R19 0805 10K 1%

R20 0805 10K 1%

R22 33R 0805 1% SWDIO

R23 33R 0805 1% SWDCLK

R24 33R 0805 1% JTAG_TDO

R25 33R 0805 1% JTAG_TDI

JTAG_RST_N

TP5

J14A

J14B

R28 0805 10KOhm 1%

MCU

U3A STM32L152RBT6A

BOOT1

20 MHz Crystal - External Capacitor Calc C_X1=C_X2=2(C_L-C_stray) = 2(9p-2p) = 14pF

R29 10KOhm 1% 0805

R30 1% 510 0805

R31 0805 0R DNI

R32 225R 0805 1%

R33 1% 0805 1MR

Y1

C12 0805 14pF 5%

C13 0805 14pF 5%

R35 10KOhm 1% 0805

BOOT0

R36 1% 510 0805

R38 0805 0R DNI

MCU_NRST

R37 0805 10KOhm 1%

R39 0805 10KOhm 1%

Reset Button

SW1 SPST PTS645SM43SMTR92 LFS

C21 0.10 µF 0805 25 V

SENSE_MUX7_EN_L
SENSE_MUX8_EN_L
MCU_PA2
PWR_MUX_S1
PWR_MUX_S2
SPI1_SCK
PWR_MUX_S3
PWR_MUX1_EN_L
SENSE_MUX1_EN_L
SENSE_MUX2_EN_L
MCU_PA10
SPI1_MISO
SPI1_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
WIFI_TX
WIFI_RX
WIFI_EN
SENSE_MUX_S1
SENSE_MUX_S2
SENSE_MUX_S3

PA0-WKUP1 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

PC0 PC1 PC2 PC3 PC4 PC5 PC6 PC7 PC8 PC9 PC10 PC11 PC12 PC13-WKUP2 PC14-OSC32_IN PC15-OSC32_OUT

PD2

PH0-OSC_IN PH1-OSC_OUT

BOOT0 NRST

PWR_MUX4_EN_L
SENSE_MUX_OUT
MCU_BOOT1
JTAG_TDO
JTAG_RST_N
CS2
SD_CS_L
MCU_PB7
I2C_SDA
I2C_SCL
PWR_MUX_IN
MCU_PB11
BTN_TEST
MCU_PB13
AUDIO_OUT
MCU_PB15
WIFI_RST
MCU_PH0_OSC_IN
MCU_PH1_OSC_OUT
MCU_BOOT0

TEST HEADERS

J16 4-103328-1

J17 4-103328-1

J18 4-103328-1

J19 4-103328-1

MCU_PB7 MCU_PB11 MCU_PA2 MCU_PA10 MCU_PB13 MCU_PB15 MCU_PC6

U3B STM32L152RBT6A

PP3V3_VLCD

VLCD VDD_1 VDD_2 VDD_3 VDD_4 VSS_1 VSS_2 VSS_3 VSS_4 VDDA VSSA

R34 0805 0R

C14 C15 C16 C17 C18 50V 0805 100nF 1uF 16V

C19 0805 1uF 16V

C20 50V 0805 100nF

Title	POWER_MCU.SchDoc		
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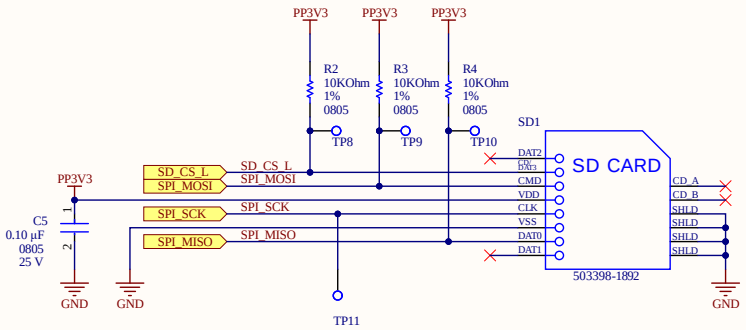
File: C:\Users\User\Documents\mattrics\Electrical\MLB_REV1\POWER_MCU.SchDoc			

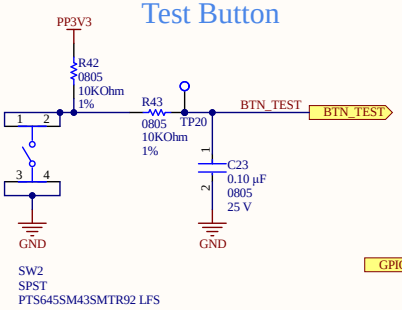
Altium

SD Card

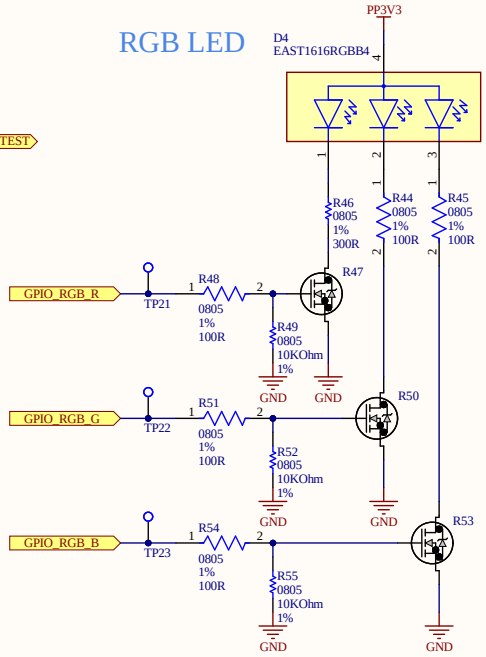


Support

Test Button



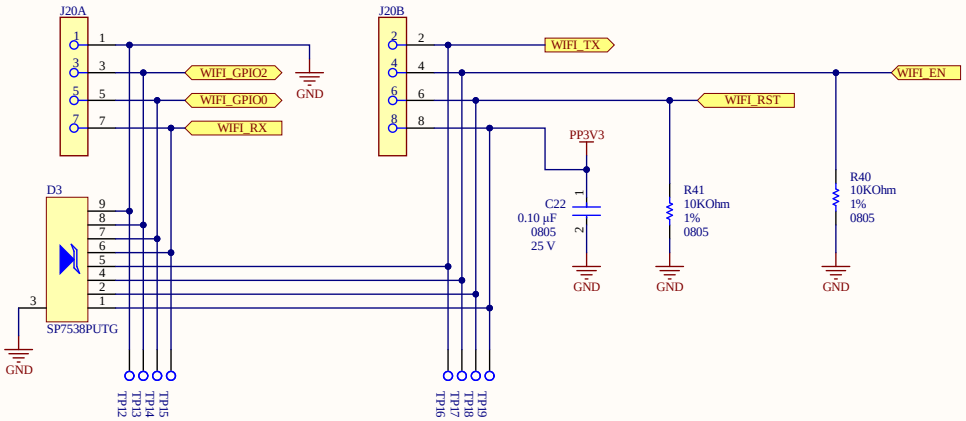
RGB LED

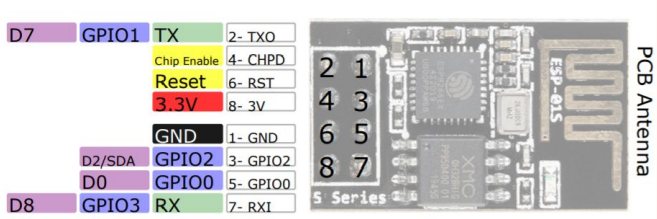


RGB LED Calc:
Pin1, R = (3.3-2.8)/0.005 = 100 Ohms
Pin2, R = (3.3-2.8)/0.005 = 100 Ohms
Pin3, R = (3.3-1.8)/0.005 = 300 Ohms

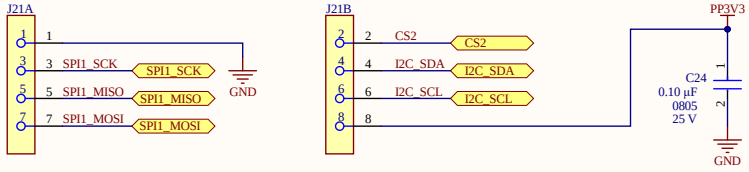
WiFi Shield Headers

WiFi dev board: ESP8266
https://www.sparkfun.com/products/17146





Communication Headers



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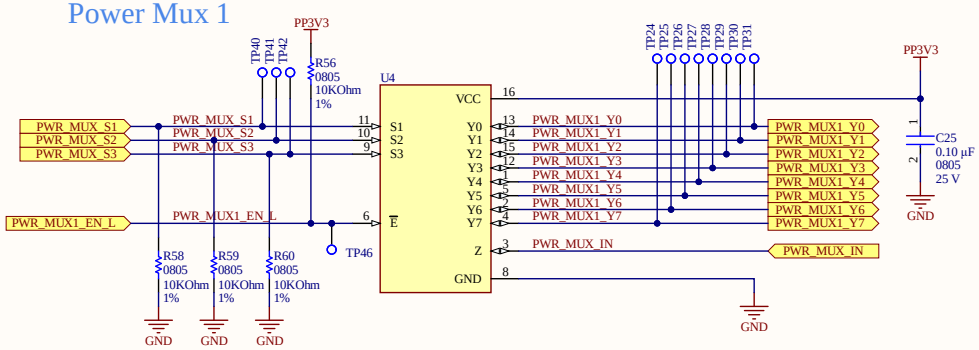
File: C:\Users\User\Documents\mattrics\Electrical\MLB_REV1\SD_CARD_WiFi.SchDoc			

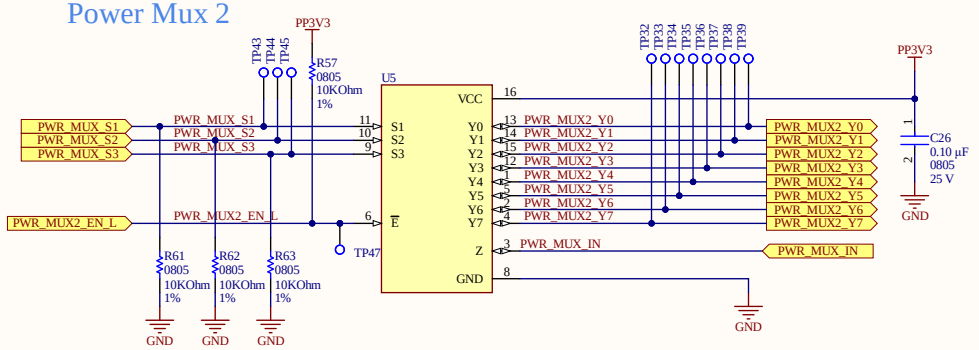
Altium

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

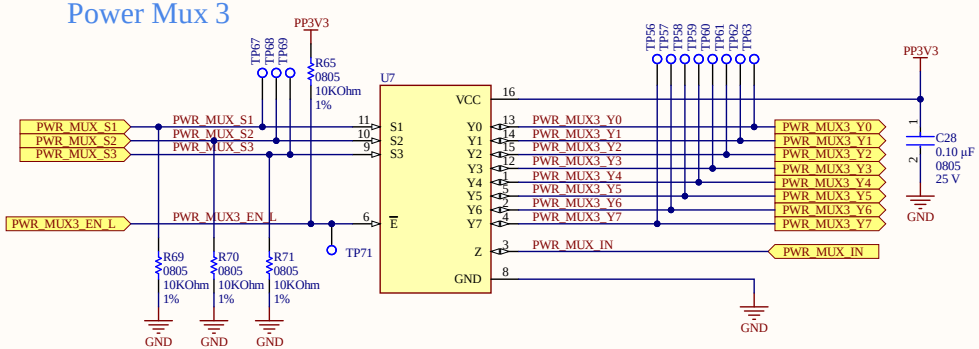
Power Mux 1



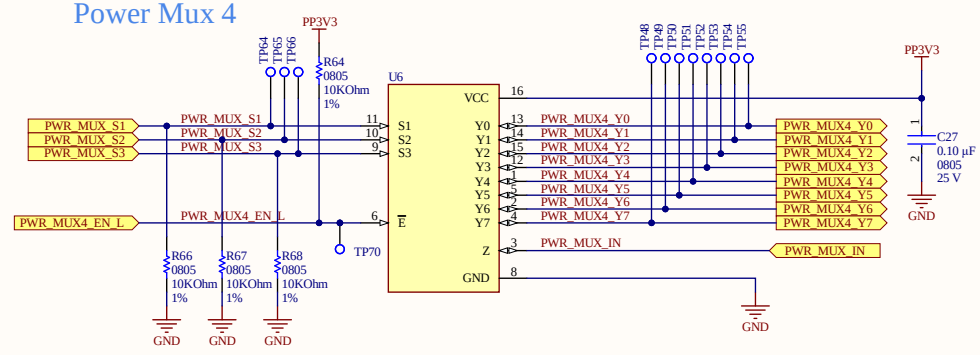
Power Mux 2



Power Mux 3



Power Mux 4



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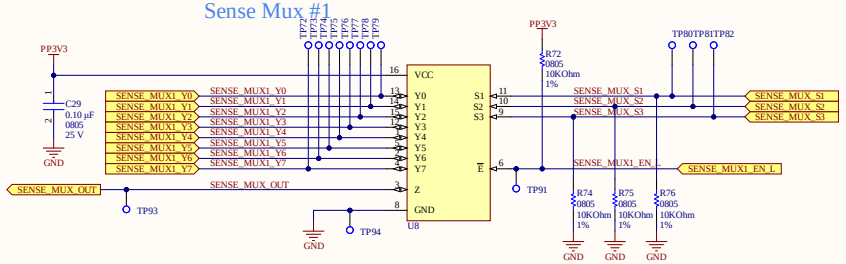
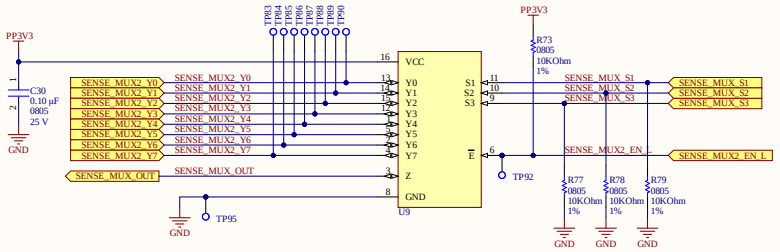
File: C:\Users\User\Documents\mattrics\Electrical\MLB_REV1\POWER_MUXES.SchDoc			

Altium

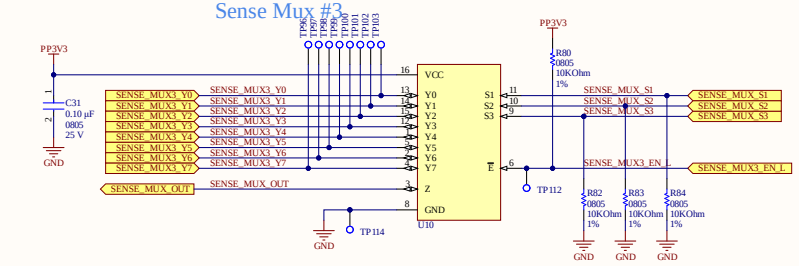
Sense Mux #1



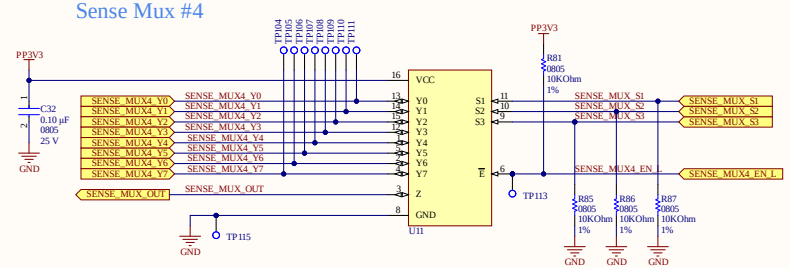
Sense Mux #2



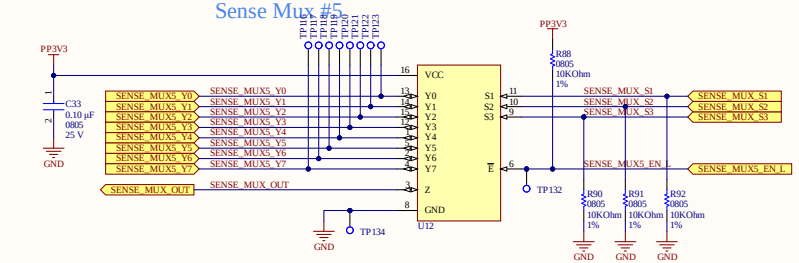
Sense Mux #3



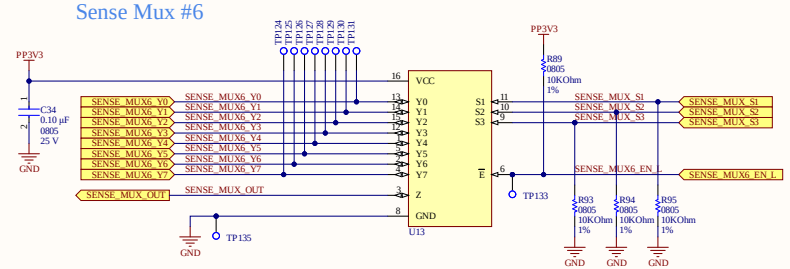
Sense Mux #4



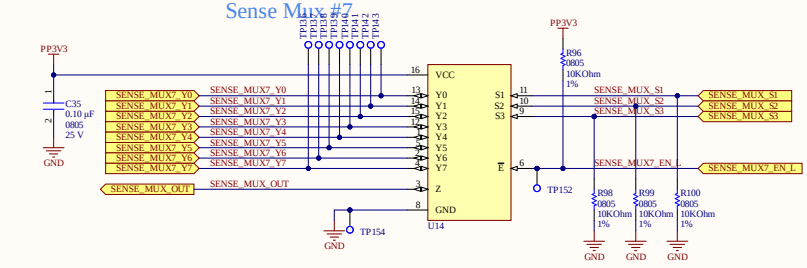
Sense Mux #5



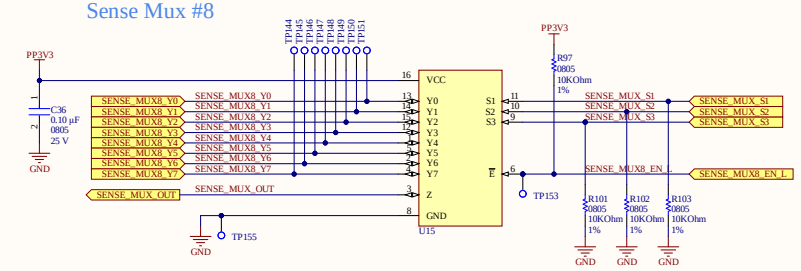
Sense Mux #6



Sense Mux #7



Sense Mux #8



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File: C:\Users\User\Documents\mattrics\Electrical\MLB_REV1\SENSE_MUXES.SchDoc			

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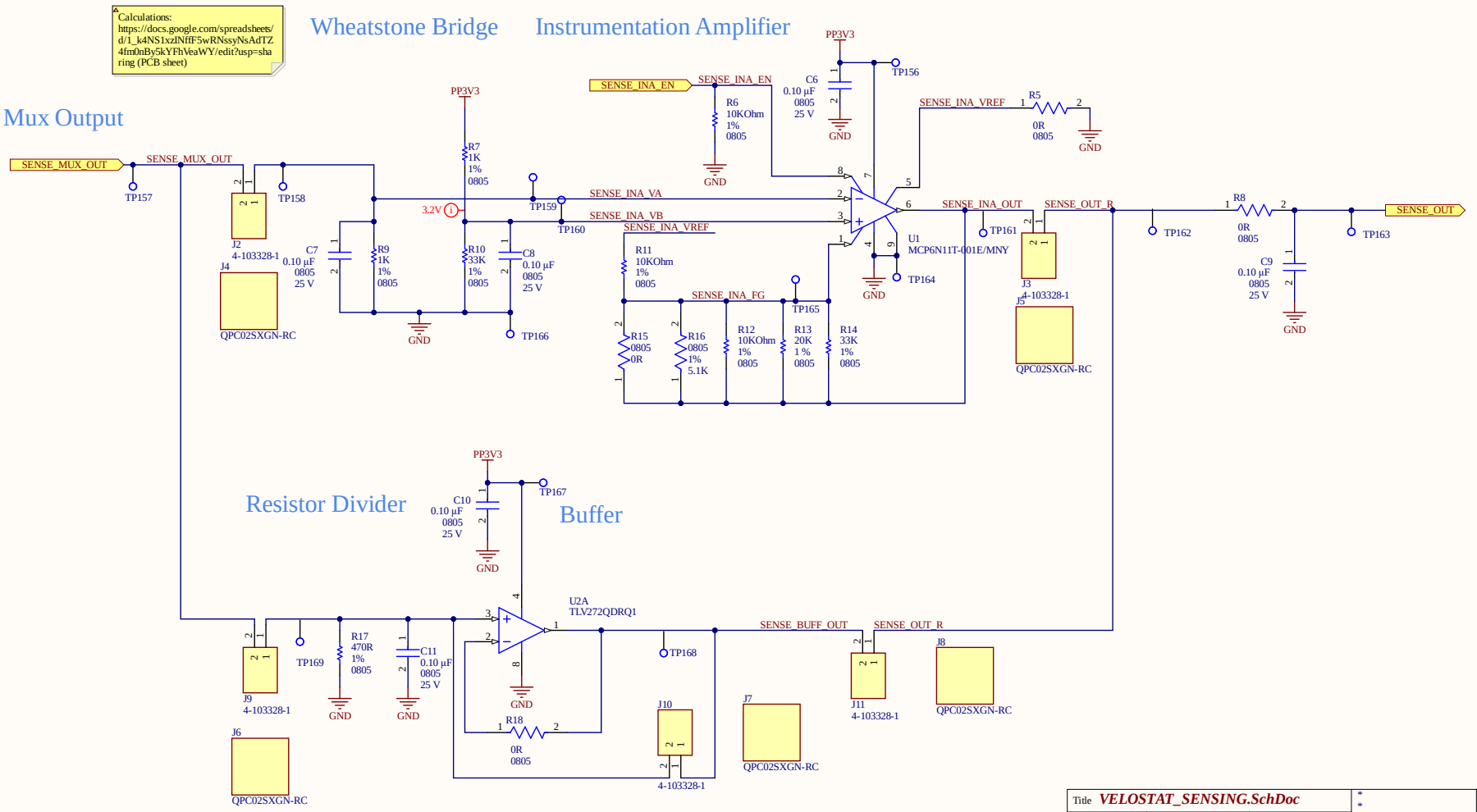
Velostat Resistance Measurement Circuitry



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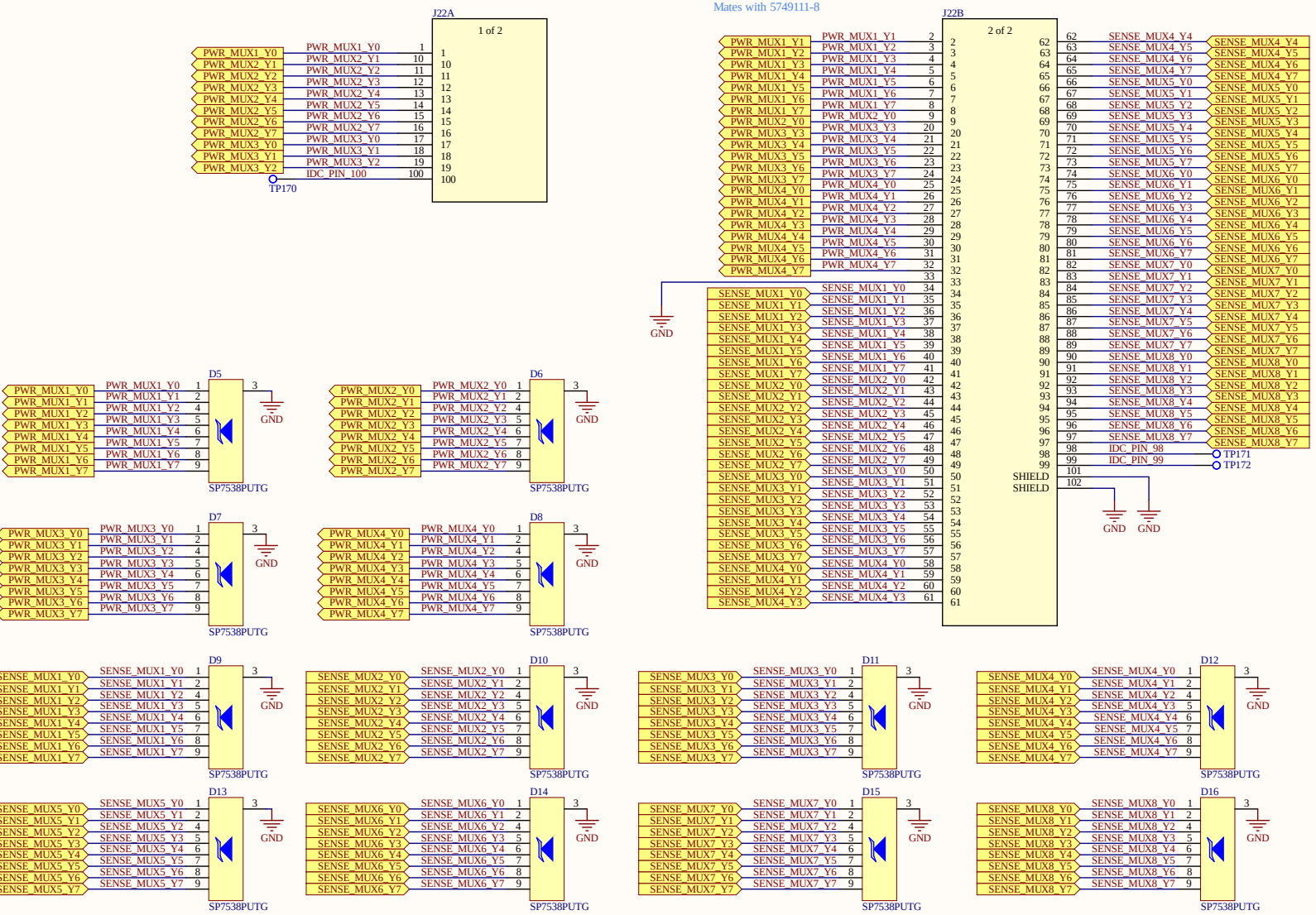
File: C:\Users\User\Documents\mattrics\Electrical\MLB_REV1\VELOSTAT_SENSING.SchDoc			

Altium

Mat Cabling Connector

Mates with 5749111-8



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Date: 1/22/2022	Time: 5:54:12 AM	Sheet 7 of 8	
File: C:\Users\User\Documents\mattrics\Electrical\MLB_REV1\MAT_CABLING_CONNECTOR.SchDoc			

Audio Sensing

Electret Microphone

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

J12
HOUSING
0355070300

P1
35363-0360

PP3V3
TP173
C38
0.10 µF
0805
25 V
TP175
GND
GND

D17
D18
D19
DF2S10FS,L3M
DF2S10FS,L3M
DF2S10FS,L3M
TP180
GND
GND
GND

AUDIO_CONN
TP179
R104
0805
0R
AUDIO_CONN_R
R106
0805
0R
TP178
DNI
GND

Buffer

PP3V3
C37
0.10 µF
0805
25 V
TP174
GND

U16A
TLV272QDRQ1
GND
TP181
AUDIO_OUT_J
R107
0R
0805

J25
4-103328-1

J26
QPC02SXGN-RC

to internal 12bit ADC

TP176
J23
4-103328-1
AUDIO_OUT_R
R105
0R
0805
TP177
AUDIO_OUT
AUDIO_OUT
C39
0.10 µF
0805
25 V
GND

J24
QPC02SXGN-RC

16bit ADC

TP182
R108
0R
0805
J27
4-103328-1
AUDIO_ADC_IN+
AUDIO_ADC_IN-
TP183
C40
0.10 µF
0805
25 V
R109
0805
0R
GND
GND

U17
VIN+ SCL
VIN- SDA
GND VDD
ADS1110A2IDBVR
I2C_SCL
I2C_SDA
I2C_SCL
I2C_SDA
PP3V3
TP184
C41
0.10 µF
0805
25 V
TP186
TP185
GND
GND
GND

J28
QPC02SXGN-RC

Title	MICROPHONE.SchDoc		
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