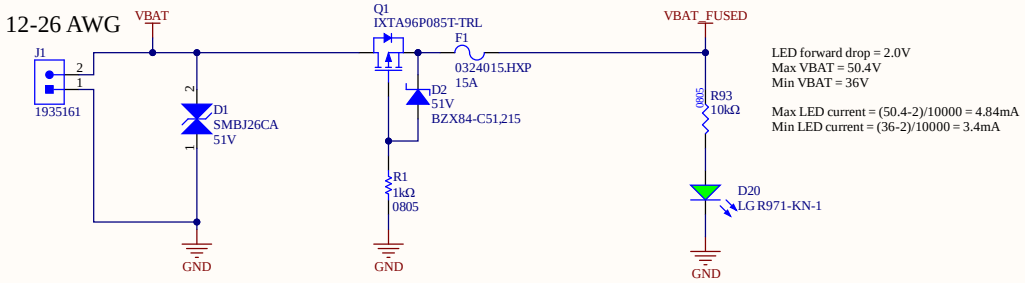
Battery Input (12s1p)

Input voltage range: 36-50.4V

Reverse Polarity Protection



Title: Power			
Project: Power Distribution Board.PrjPcb			
Rev: 3	Reviewer: Lance Bantoto		
	Engineer: Farris Matar		
Date: 2021-10-19	Sheet: 1 of 9		

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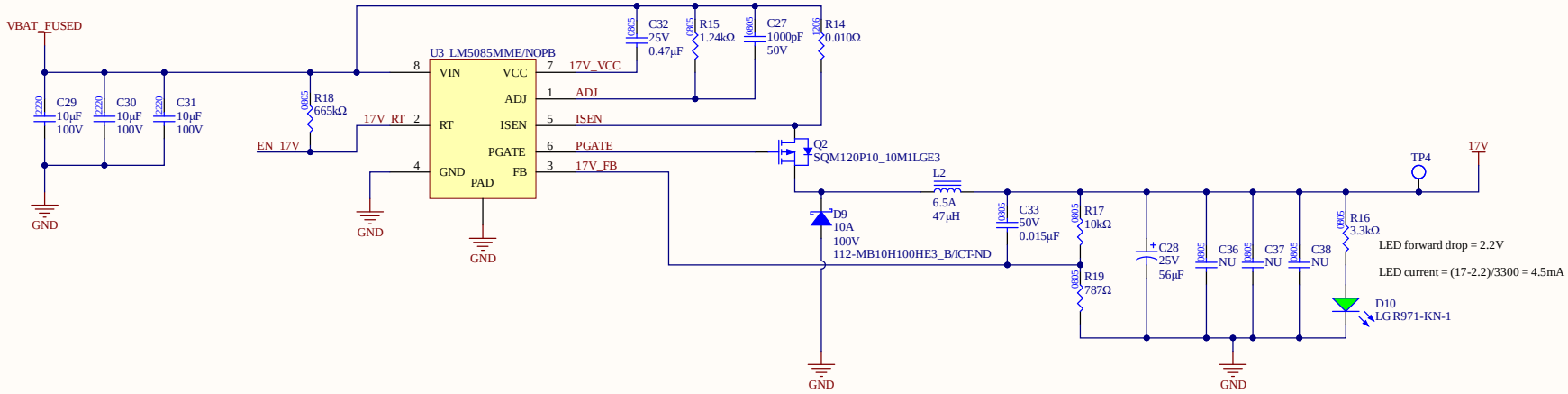
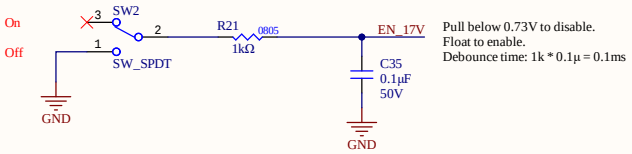
17V Regulator @ 4A Max

Input voltage range: 36-50.4V



On/Off Switch



Pull below 0.73V to disable.
Float to enable.
Debounce time: 1k * 0.1µ = 0.1ms

Title: 17V Buck Converter		
Project: Power Distribution Board.PrjPcb		
Rev: 3	Reviewer: Lance Bantoto	
	Engineer: Farris Matar	
Date: 2021-10-19	Sheet: 2 of 9	

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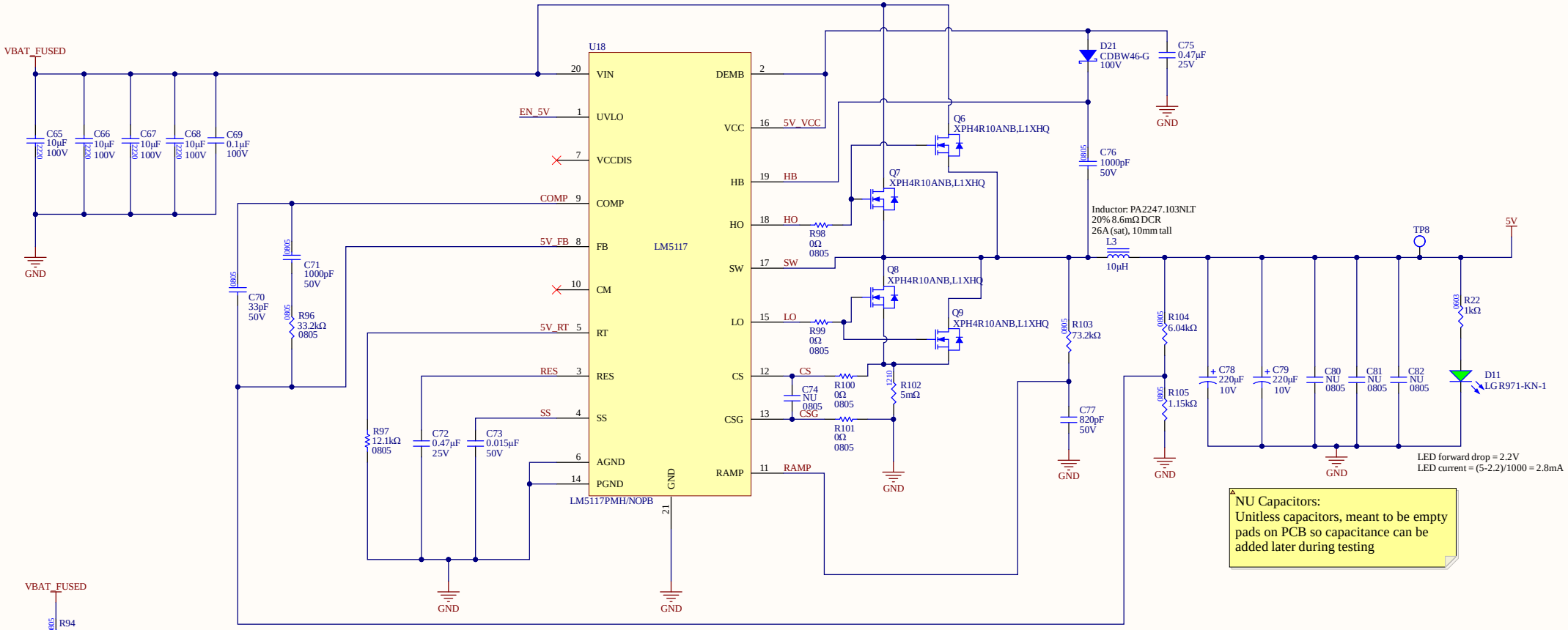
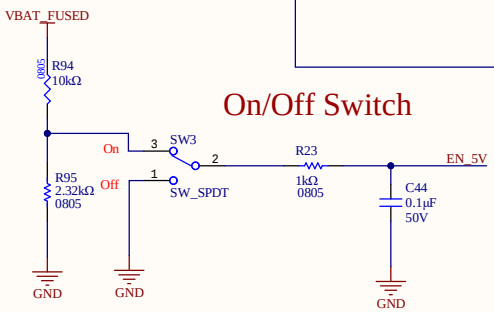
48-5V Buck Converter @ 16A Max

Input voltage range: 36-50.4V



NU Capacitors:
Unitless capacitors, meant to be empty pads on PCB so capacitance can be added later during testing

On/Off Switch



Pull below 1.25V to disable
Connect to VIN to enable (max 15V)
Debounce time: 1k * 0.1µ = 0.1ms

Title: 5V Buck Converter		
Project: Power Distribution Board.PrjPcb		
Rev: 3	Reviewer: Lance Bantoto	
	Engineer: Farris Matar	
Date: 2021-10-19	Sheet: 3 of 9	

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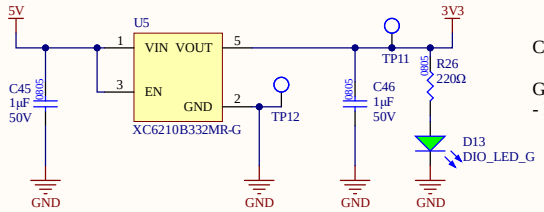
3.3V LDO @ 600mA Max



Current Calculations

Green LED voltage drop: 2.2V
- I = (3.3-2.2V)/220 = 5mA

Title: 3.3V Linear Regulator		
Project: Power Distribution Board.PrjPcb		
Rev: 3	Reviewer: Lance Bantoto	
	Engineer: Farris Matar	
Date: 2021-10-19	Sheet: 4 of 9	

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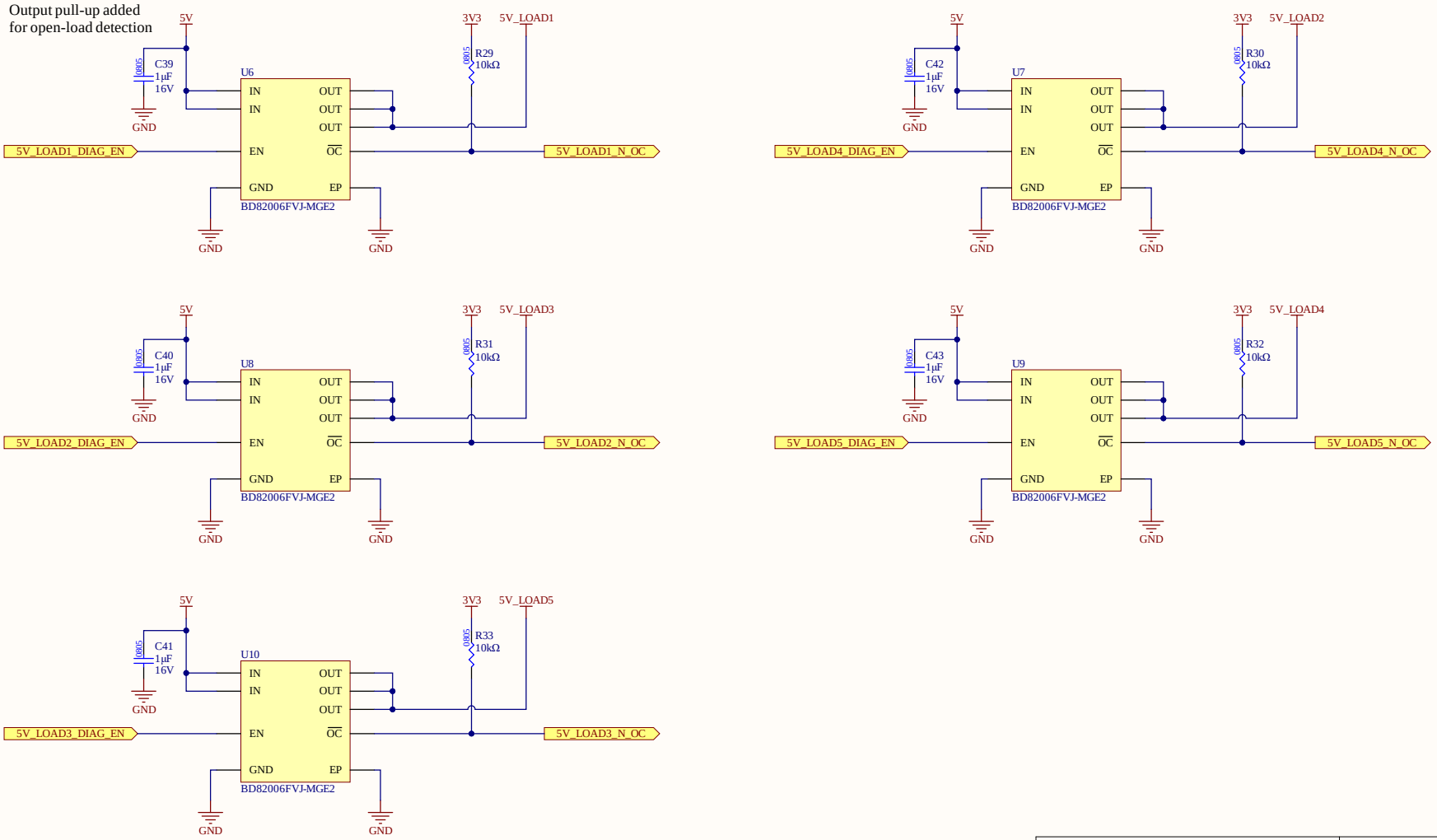
5V Smart High-Side Switches



Title: Load Monitoring 1		
Project: Power Distribution Board.PrjPcb		
Rev: 3	Reviewer: Lance Bantoto	
	Engineer: Farris Matar	
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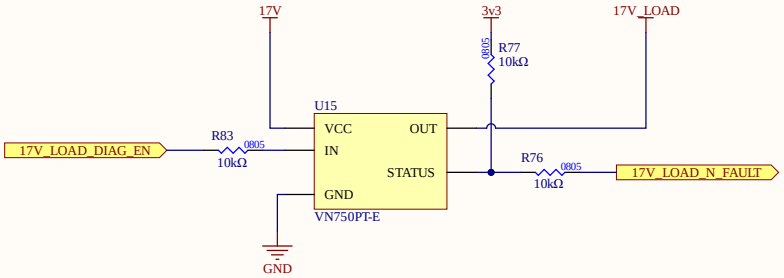
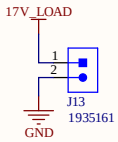
17V Load Smart Switch

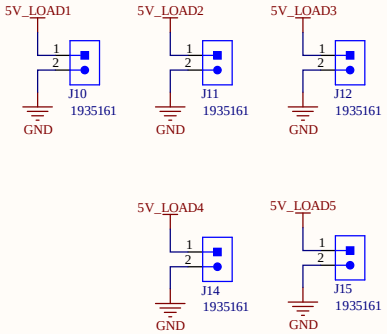


17V Output



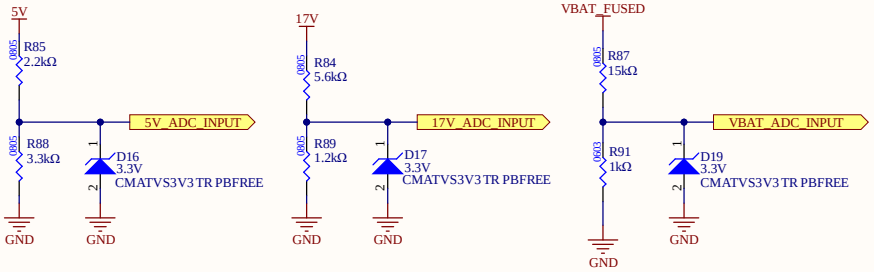
17V power to Nvidia Jetson board

5V Outputs



5V power to Science, Gimbal, and Localization boards (plus two spare)

Power Rail Voltage Monitoring



Divides 5V to 3V

Divides 17V to 3V

Divides 48V to 3V

Title: Load Monitoring 2		
Project: Power Distribution Board.PrjPcb		
Rev: 3	Reviewer: Lance Bantoto	
	Engineer: Farris Matar	
Date: 2021-10-19	Sheet: 6 of 9	

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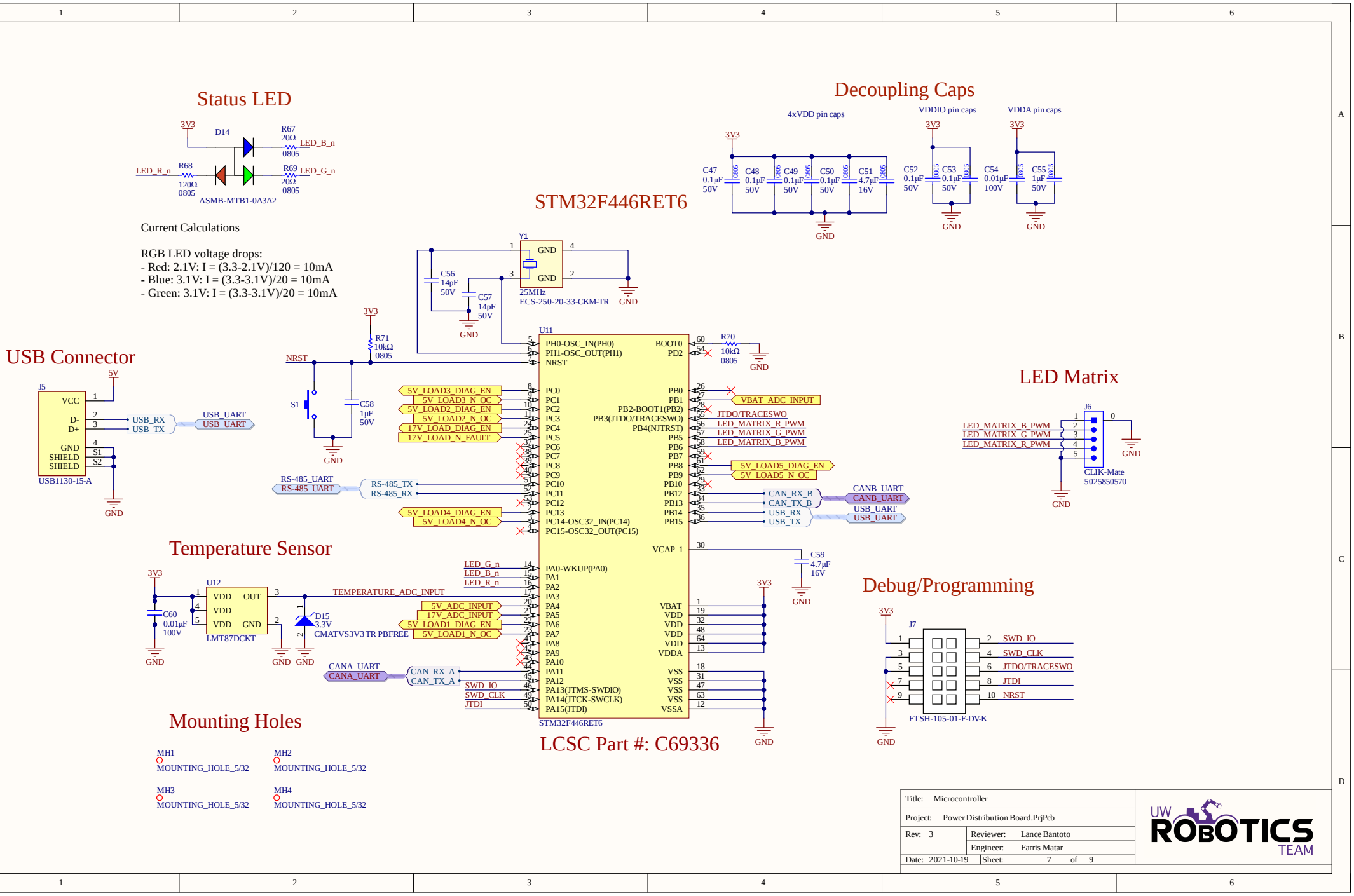
Status LED
3V3
D14
R67
20Ω
0805
LED_B_n
LED_R_n
R68
120Ω
0805
R69
20Ω
0805
LED_G_n
ASMB-MTB1-0A3A2
Current Calculations
RGB LED voltage drops:
- Red: 2.1V: I = (3.3-2.1V)/120 = 10mA
- Blue: 3.1V: I = (3.3-3.1V)/20 = 10mA
- Green: 3.1V: I = (3.3-3.1V)/20 = 10mA
Decoupling Caps
4xVDD pin caps
VDDIO pin caps
VDDA pin caps
C47 0.1µF 50V
C48 0.1µF 50V
C49 0.1µF 50V
C50 0.1µF 50V
C51 4.7µF 16V
C52 0.1µF 50V
C53 0.1µF 50V
C54 0.01µF 100V
C55 1µF 50V
0805
GND
STM32F446RET6
Y1
25MHz
ECS-250-20-33-CKM-TR
C56 14pF 50V
C57 14pF 50V
U11
PH0-OSC_IN(PH0)
PH1-OSC_OUT(PH1)
NRST
BOOT0
PD2
R70 10kΩ 0805
R71 10kΩ 0805
S1
C58 1µF 50V
PC0
PC1
PC2
PC3
PC4
PC5
PC6
PC7
PC8
PC9
PC10
PC11
PC12
PC13
PC14-OSC32_IN(PC14)
PC15-OSC32_OUT(PC15)
PB0
PB1
PB2-BOOT1(PB2)
PB3(JTDO/TRACESWO)
PB4(NJTRST)
PB5
PB6
PB7
PB8
PB9
PB10
PB12
PB13
PB14
PB15
VCAP_1
PA0-WKUP(PA0)
PA1
PA2
PA3
PA4
PA5
PA6
PA7
PA8
PA9
PA10
PA11
PA12
PA13(JTMS-SWDIO)
PA14(JTCK-SWCLK)
PA15(JTDI)
VBAT
VDD
VDDA
VSS
VSSA
5V_LOAD3_DIAG_EN
5V_LOAD3_N_OC
5V_LOAD2_DIAG_EN
5V_LOAD2_N_OC
17V_LOAD_DIAG_EN
17V_LOAD_N_FAULT
5V_LOAD4_DIAG_EN
5V_LOAD4_N_OC
5V_LOAD5_DIAG_EN
5V_LOAD5_N_OC
VBAT_ADC_INPUT
JTDO/TRACESWO
LED_MATRIX_R_PWM
LED_MATRIX_G_PWM
LED_MATRIX_B_PWM
CAN_RX_B
CAN_TX_B
USB_RX
USB_TX
CANB_UART
USB_UART
RS-485_TX
RS-485_RX
RS-485_UART
LED_G_n
LED_B_n
LED_R_n
5V_ADC_INPUT
17V_ADC_INPUT
5V_LOAD1_DIAG_EN
5V_LOAD1_N_OC
CAN_RX_A
CAN_TX_A
CANA_UART
SWD_IO
SWD_CLK
JTDI
STM32F446RET6
USB Connector
J5
VCC
D-
D+
GND
SHIELD
SHIELD
USB1130-15-A
USB_RX
USB_TX
USB_UART
LED Matrix
J6
CLIK-Mate
5025850570
Temperature Sensor
U12
VDD
OUT
GND
LMT87DCKT
C60 0.01µF 100V
D15
3.3V
CMATVS3V3 TR PBFREE
TEMPERATURE_ADC_INPUT
C59 4.7µF 16V
Debug/Programming
J7
FTSH-105-01-F-DV-K
SWD_IO
SWD_CLK
JTDO/TRACESWO
JTDI
NRST
Mounting Holes
MH1
MOUNTING_HOLE_5/32
MH2
MOUNTING_HOLE_5/32
MH3
MOUNTING_HOLE_5/32
MH4
MOUNTING_HOLE_5/32
LCSC Part #: C69336
Title: Microcontroller
Project: Power Distribution Board.PrjPcb
Rev: 3
Reviewer: Lance Bantoto
Engineer: Farris Matar
Date: 2021-10-19
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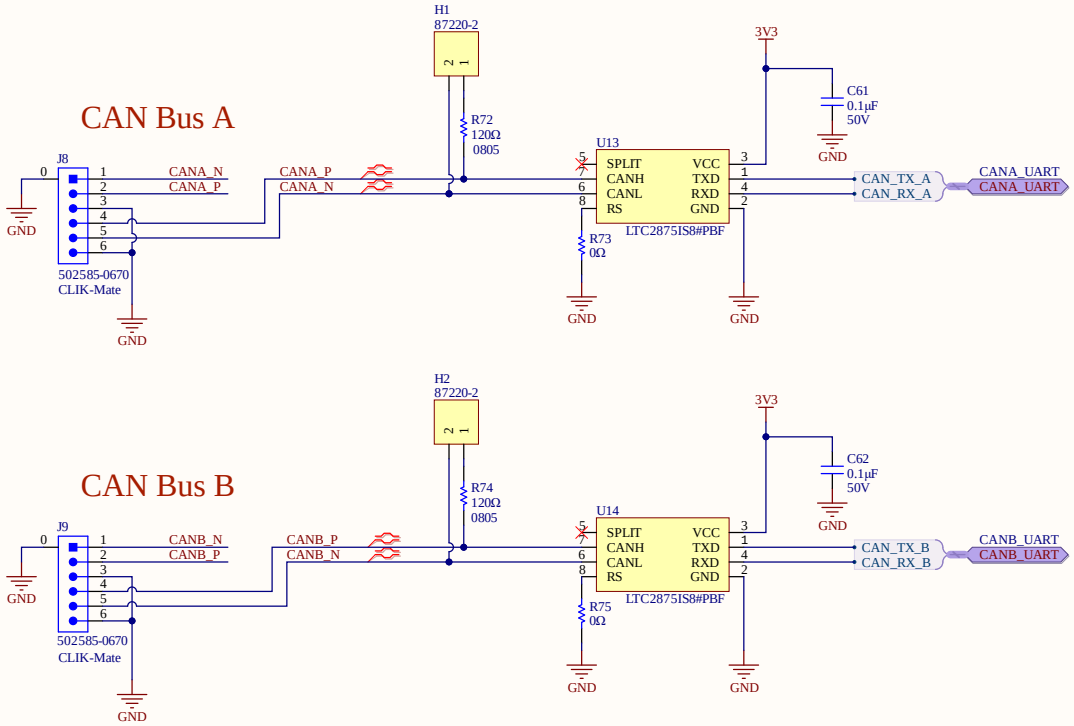
CAN Transceivers



Title: CAN		
Project: Power Distribution Board.PrjPcb		
Rev: 3	Reviewer: Lance Bantoto	
	Engineer: Farris Matar	
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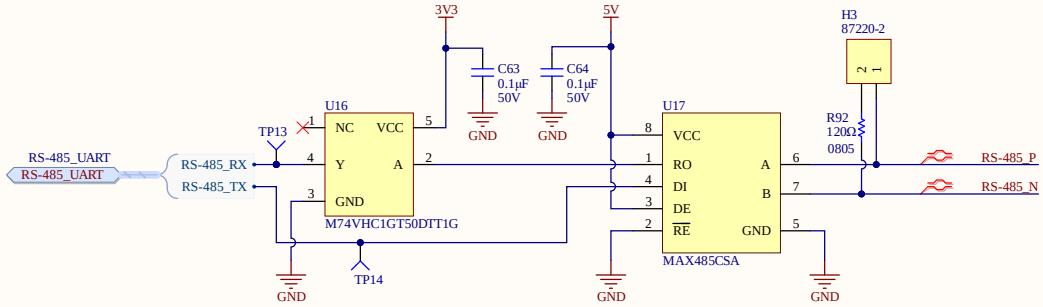
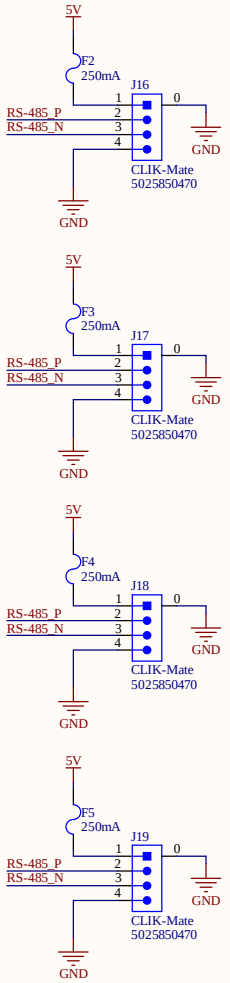
URM04 Ultrasonic Sensors

RS-485 Transceiver





Title: RS-485		
Project: Power Distribution Board.PrjPcb		
Rev: 3	Reviewer: Lance Bantoto	
	Engineer: Farris Matar	
Date: 2021-10-19	Sheet: 9 of 9	

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