

A

A

B

B

C

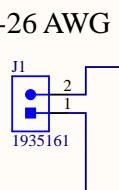
C

D

D

Battery Input (6s1p)

12-26 AWG



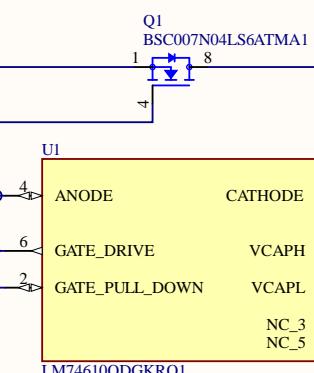
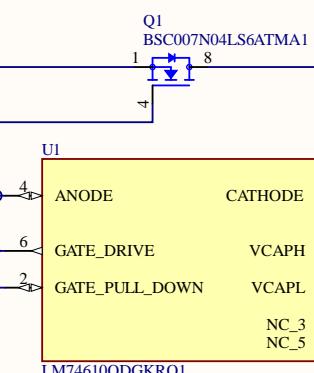
Max 18A

i

V_{BAT}

GND

Ideal Diode Controller



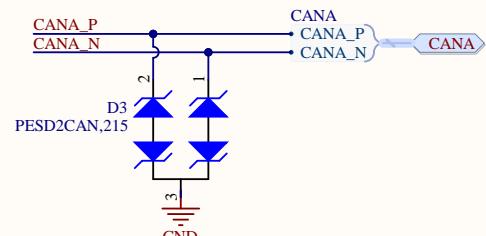
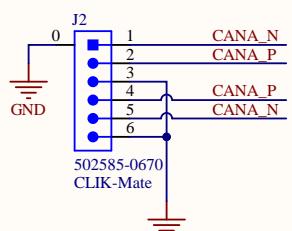
LED forward drop = 2.0V
Max V_{BAT} = 24V
Min V_{BAT} = 18V

Max LED current = (24-2)/4700 = 4.7mA
Min LED current = (18-2)/4700 = 3.4mA

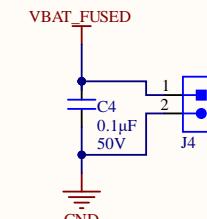
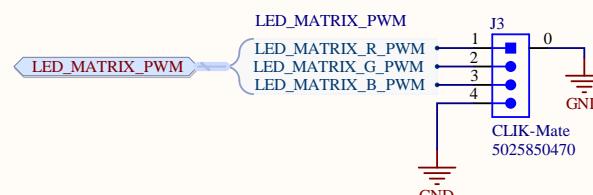
Title	Power Distribution Board Rev2 - Power	Altium Limited L3, 12a Rodborough Rd Frenchs Forest NSW Australia 2086
Size:	Letter	Drawn By: Cindy Li
Date:	2020-11-02	Sheet 1 of 12
File:	C:\Users\lance\GitHub\MarsRover2020-PCB\Projects\Power Distribution Board\Rev2\SH1 - POWER.SchDoc	



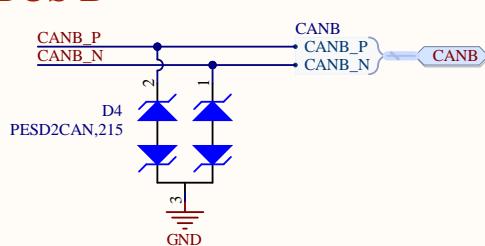
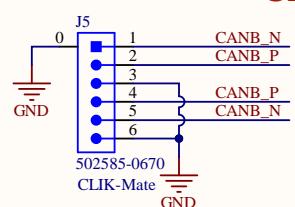
CAN BUS A



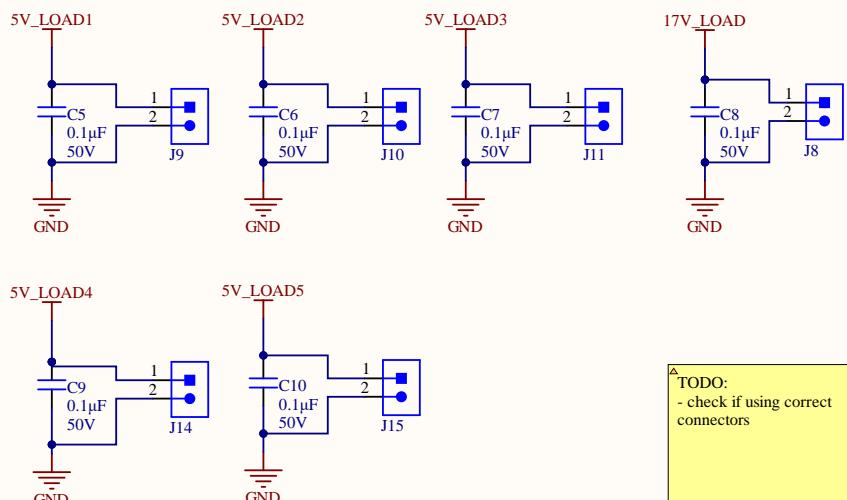
LED Matrix



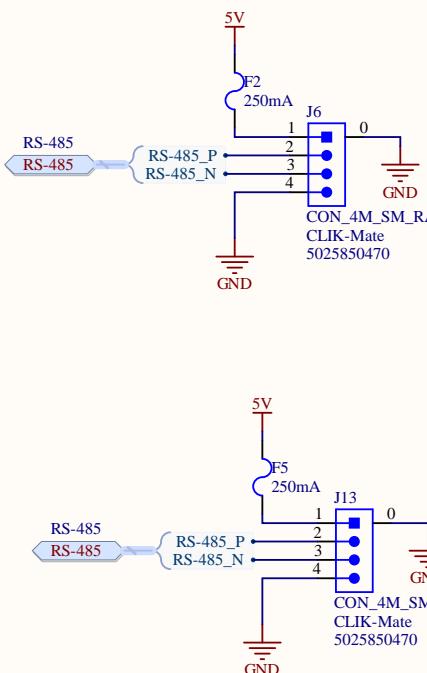
CAN BUS B



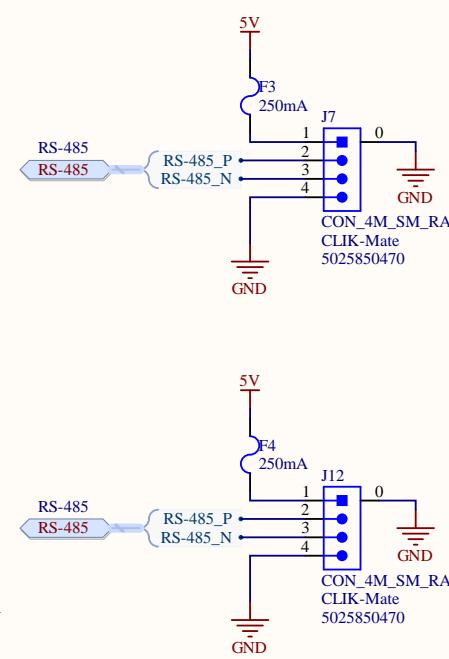
5V Output



17V Output



URM04 Ultrasonic Sensors



Can use 12-26AWG

TODO:
- check if using correct
connectors

Title Power Distribution Board Rev2 - Connectors

Size: Letter Drawn By: Cindy Li

Date: 2020-11-02 Sheet 2 of 12

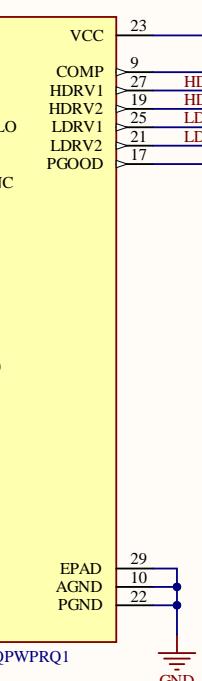
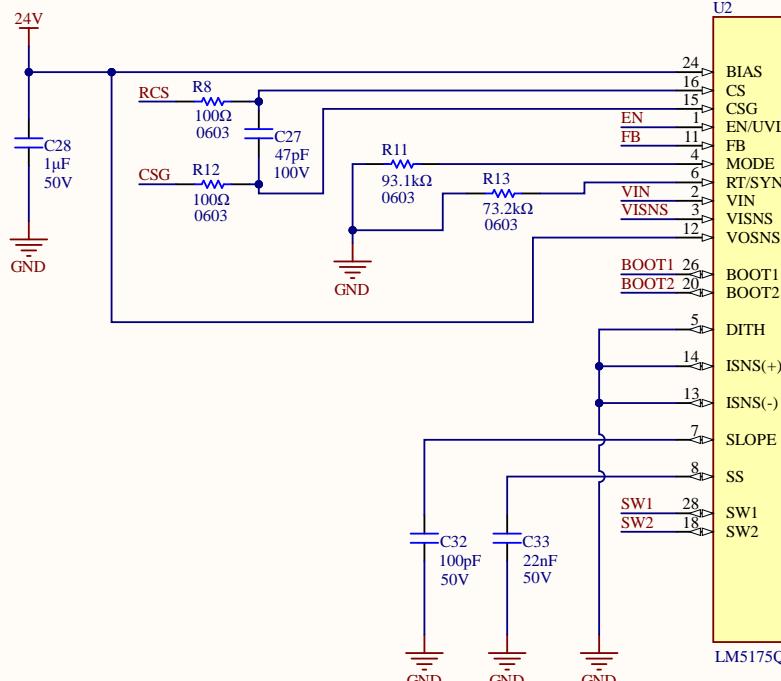
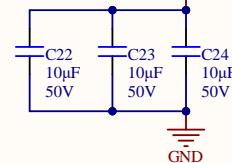
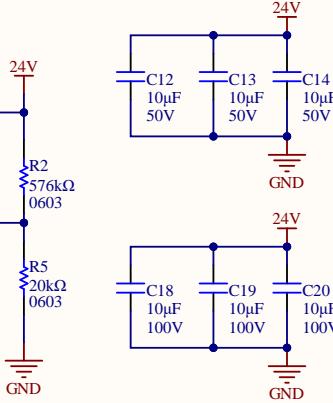
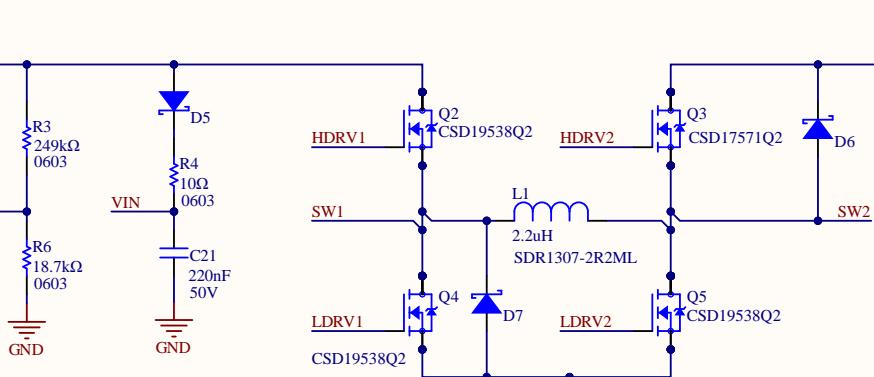
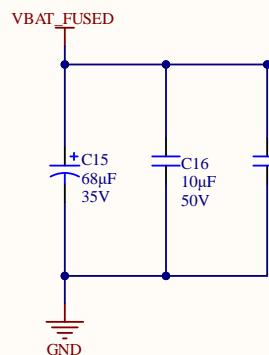
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Input voltage range: 18-25.8V

24V Buck-Boost Converter @ 3A Max



Title PDB Rev2 - 24V Buck-Boost Converter

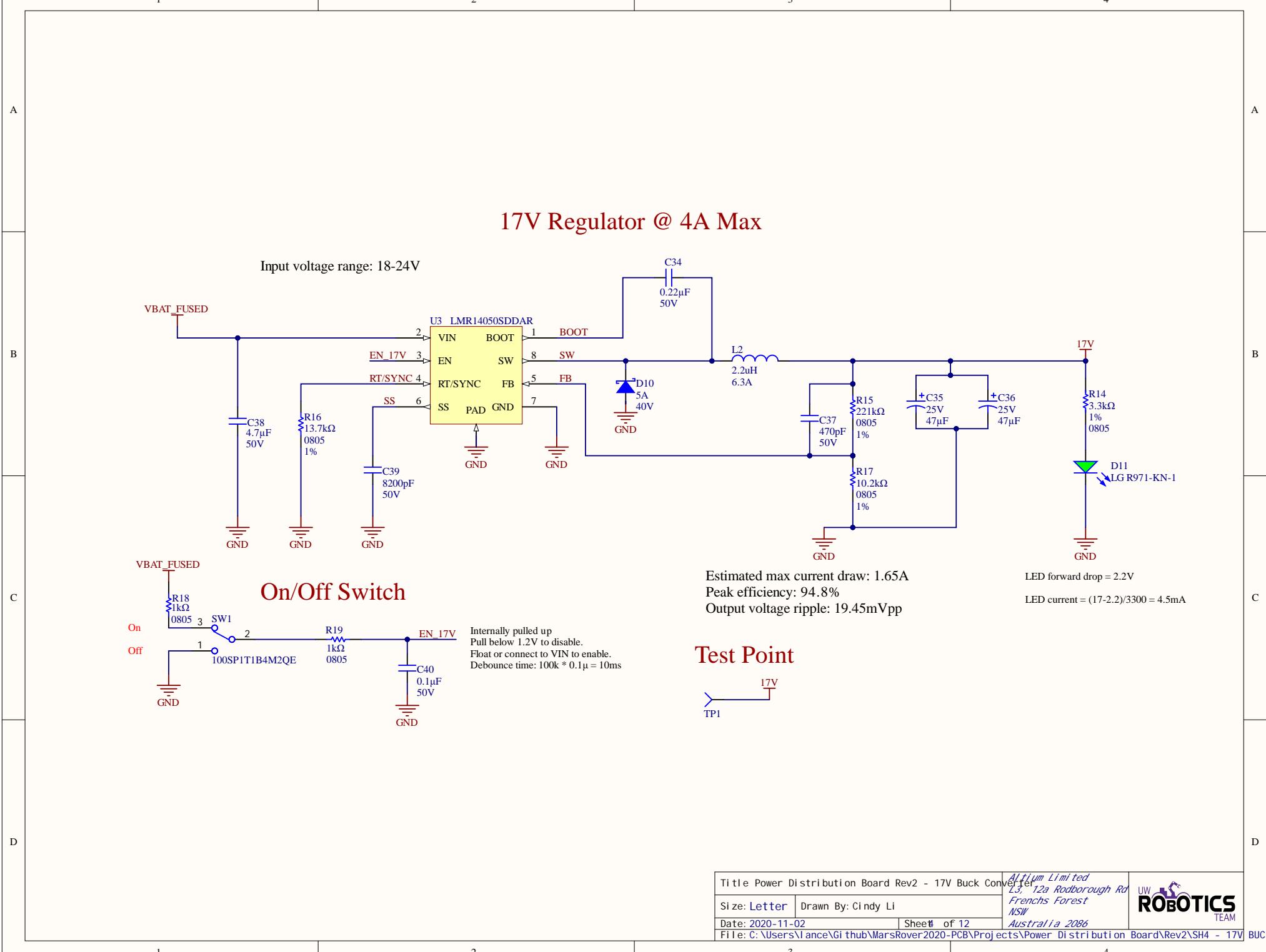
Size: Letter Drawn By: Cindy Li

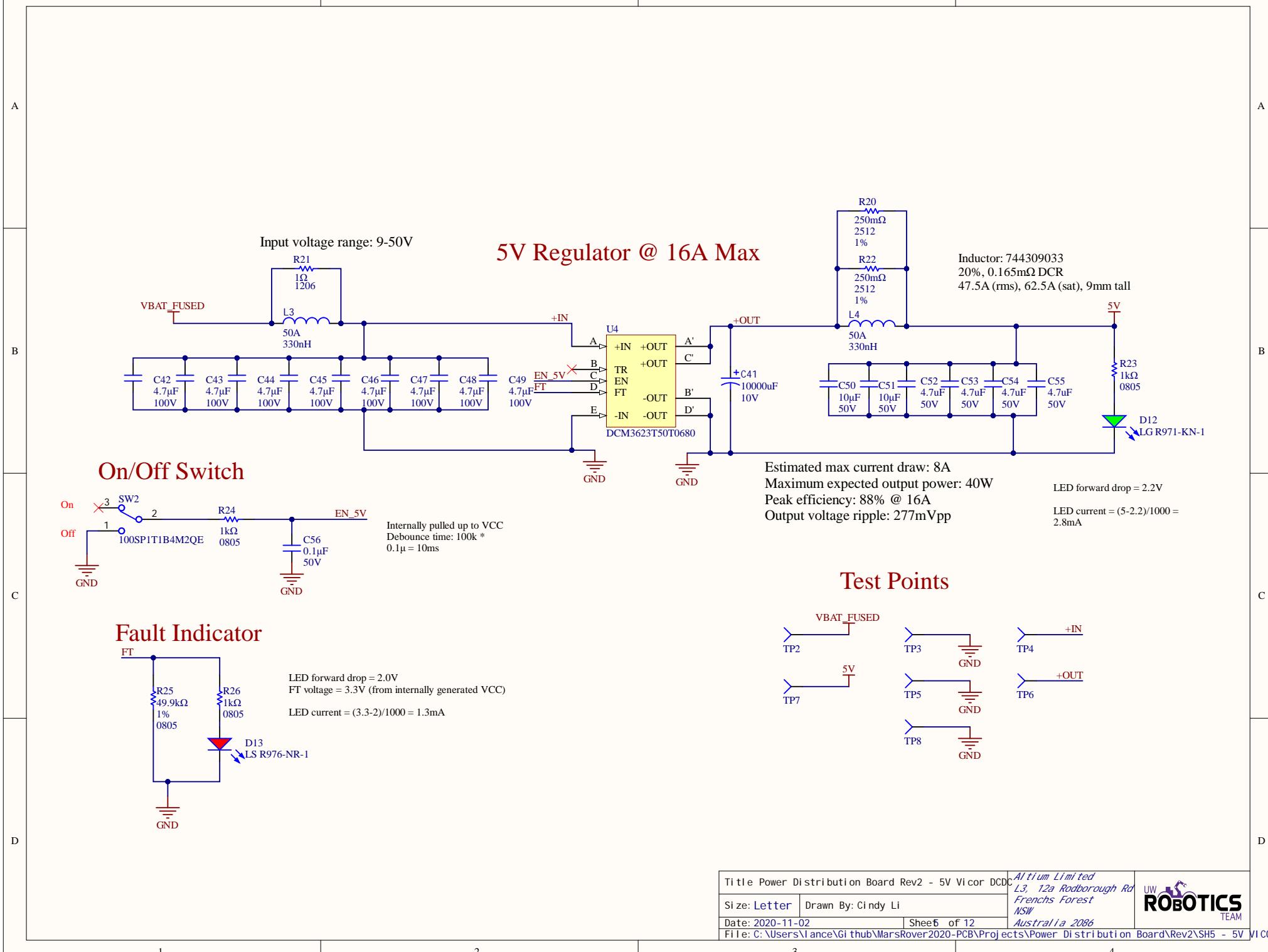
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File: C:\Users\lance\GitHub\MarsRover2020-PCB\Projects\Power Distribution Board\Rev2\SH3 - 24V

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Australia 2086







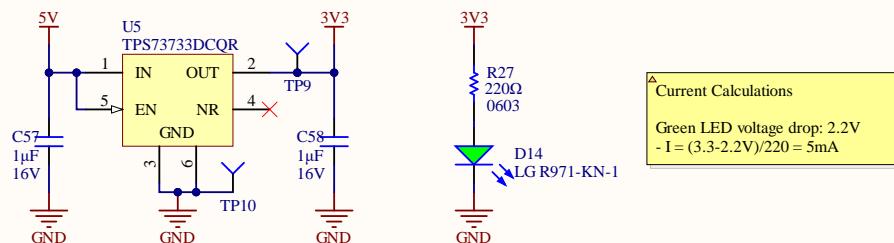
A

A

B

B

5V to 3.3V LDO



C

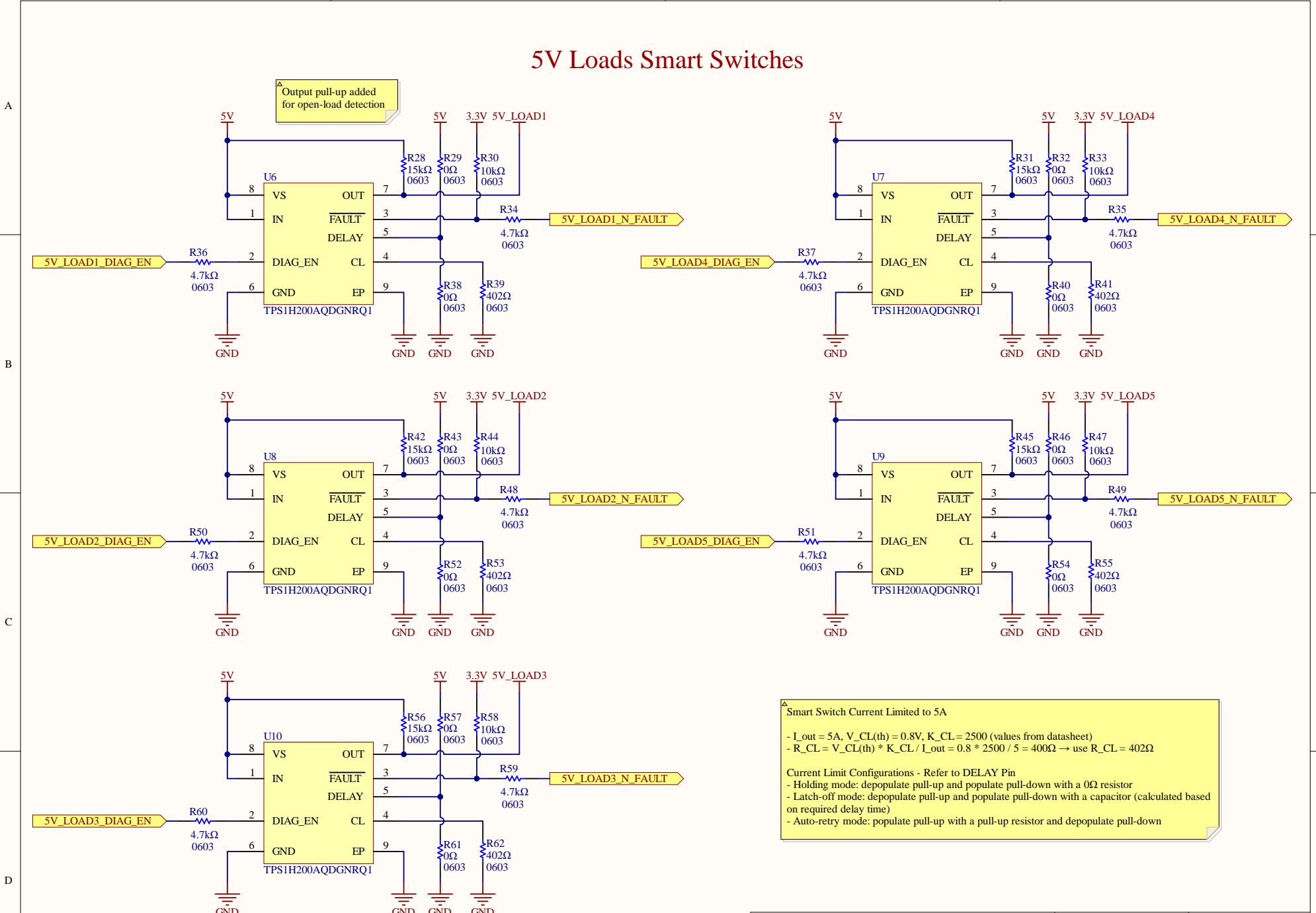
C

D

D

Title Power Distribution Board Rev2 - 3.3V Linear		Altium Limited 23/728 Rodborough Rd Frenchs Forest NSW Australia 2086
Size: Letter	Drawn By: Cindy Li	
Date: 2020-11-02	Sheet 6 of 12	
File: C:\Users\lance\GitHub\MarsRover2020-PCB\Projects\Power Distribution Board\Rev2\SH6 - 3.3V LINEAR REGULATO		UW ROBOTICS TEAM

5V Loads Smart Switches



Smart Switch Current Limited to 5A

- $I_{out} = 5A$, $V_{CL(th)} = 0.8V$, $K_{CL} = 2500$ (values from datasheet)
- $R_{CL} = V_{CL(th)} * K_{CL} / I_{out} = 0.8 * 2500 / 5 = 400\Omega \rightarrow$ use $R_{CL} = 402\Omega$

Current Limit Configurations - Refer to DELAY Pin

- Holding mode: depopulate pull-up and populate pull-down with a 0Ω resistor
- Latch-off mode: depopulate pull-up and populate pull-down with a capacitor (calculated based on required delay time)
- Auto-retry mode: populate pull-up with a pull-up resistor and depopulate pull-down

Title	Power Distribution Board Rev2 - Load Monitor	Altium Limited
Size:	Letter	123, 12a Rodborough Rd Frenchs Forest NSW Australia 2086
Date:	2020-11-02	Sheet of 12
File:	C:\Users\lance\GitHub\MarsRover2020-PCB\Projects\Power Distribution Board\Rev2\SH7 - LOAD MONITORING 1.Sch	

A

A

B

B

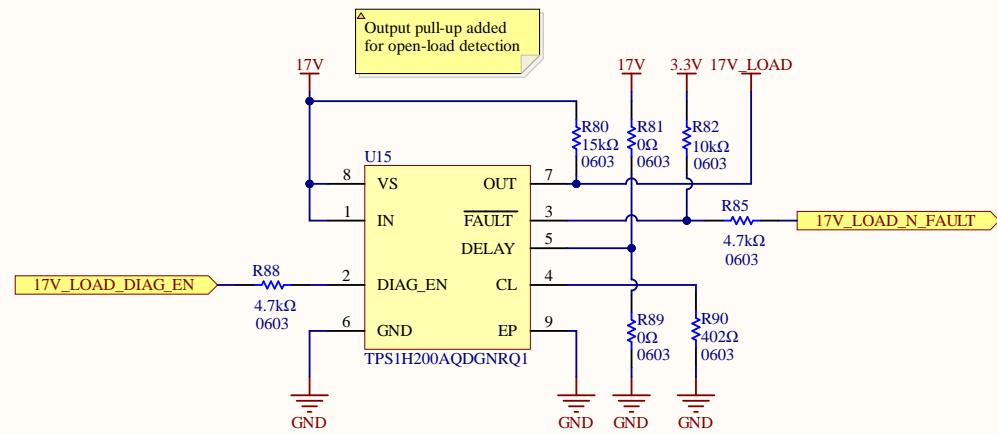
C

C

D

D

Jetson Smart Switch



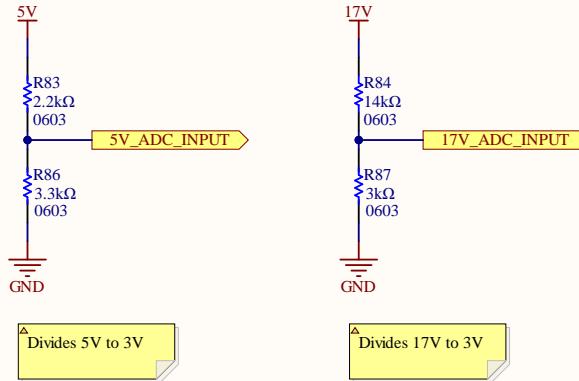
Smart Switch Current Limited to 5A

- $I_{out} = 5A$, $V_{CL(th)} = 0.8V$, $K_{CL} = 2500$ (values from datasheet)
- $R_{CL} = V_{CL(th)} * K_{CL} / I_{out} = 0.8 * 2500 / 5 = 400\Omega \rightarrow$ use $R_{CL} = 402\Omega$

Current Limit Configurations - Refer to DELAY Pin

- Holding mode: depopulate pull-up and populate pull-down with a 0Ω resistor
- Latch-off mode: depopulate pull-up and populate pull-down with a capacitor (calculated based on required delay time)
- Auto-retry mode: populate pull-up with a pull-up resistor and depopulate pull-down

Power Rail Voltage Monitoring



TODO:

- Test points for load voltages?

Title: Power Distribution Board Rev2 - Load Monitor	Altium Limited 13, 12a Rodborough Rd Frenchs Forest NSW Australia 2086
Size: Letter	Drawn By: Cindy Li
Date: 2020-11-02	Sheet 8 of 12
File: C:\Users\lance\GitHub\MarsRover2020-PCB\Projects\Power Distribution Board\Rev2\SH8 - LOAD MONITORING. SchDoc	UW ROBOTICS TEAM

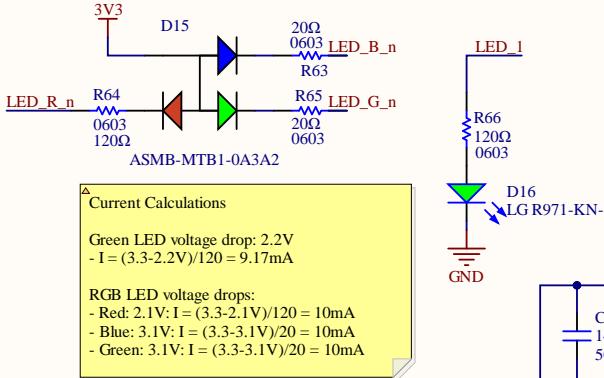
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2

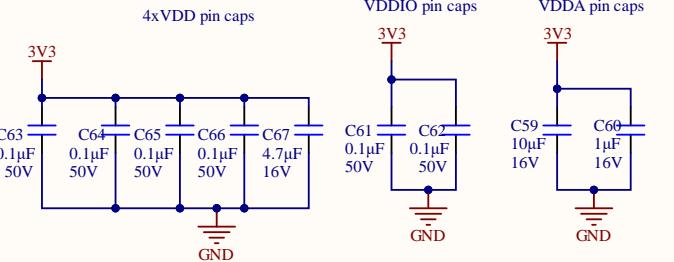
3

4

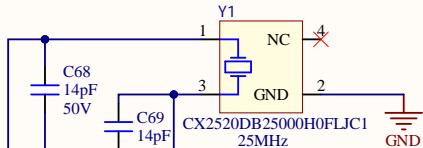
Status/Debug LEDs



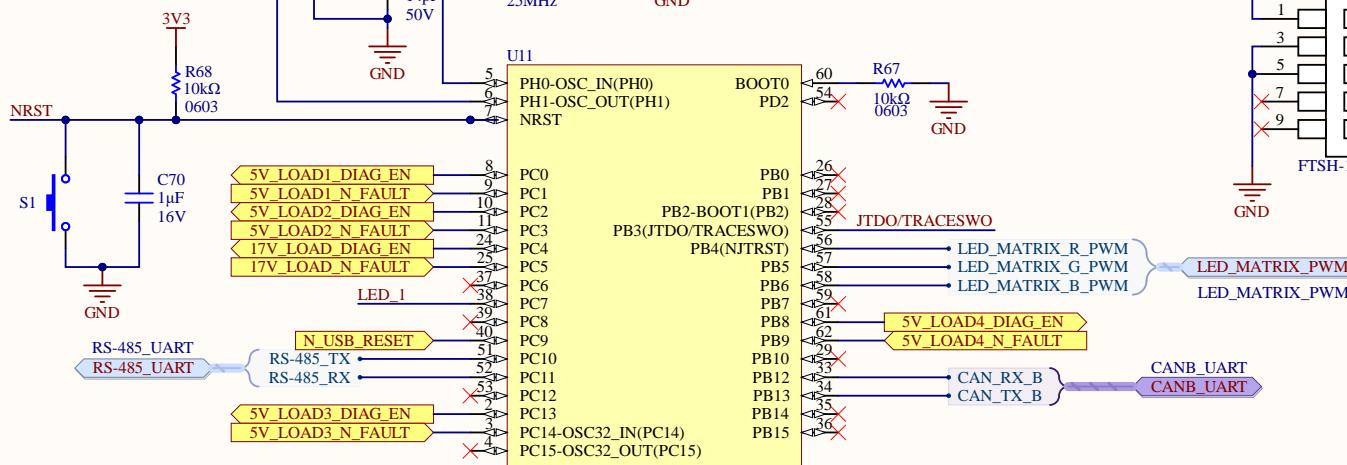
Decoupling Caps



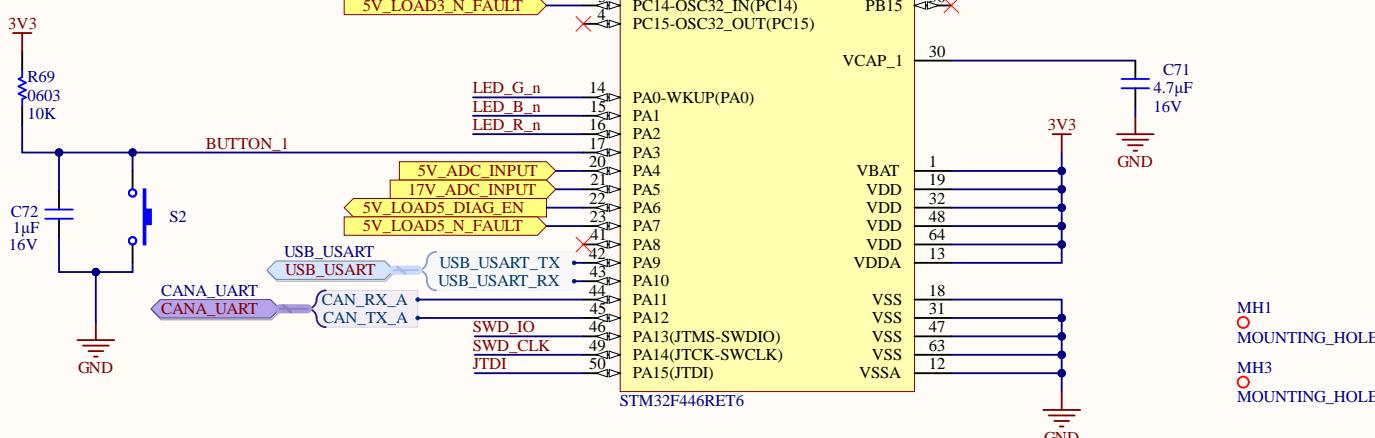
STM32F446RET6



B

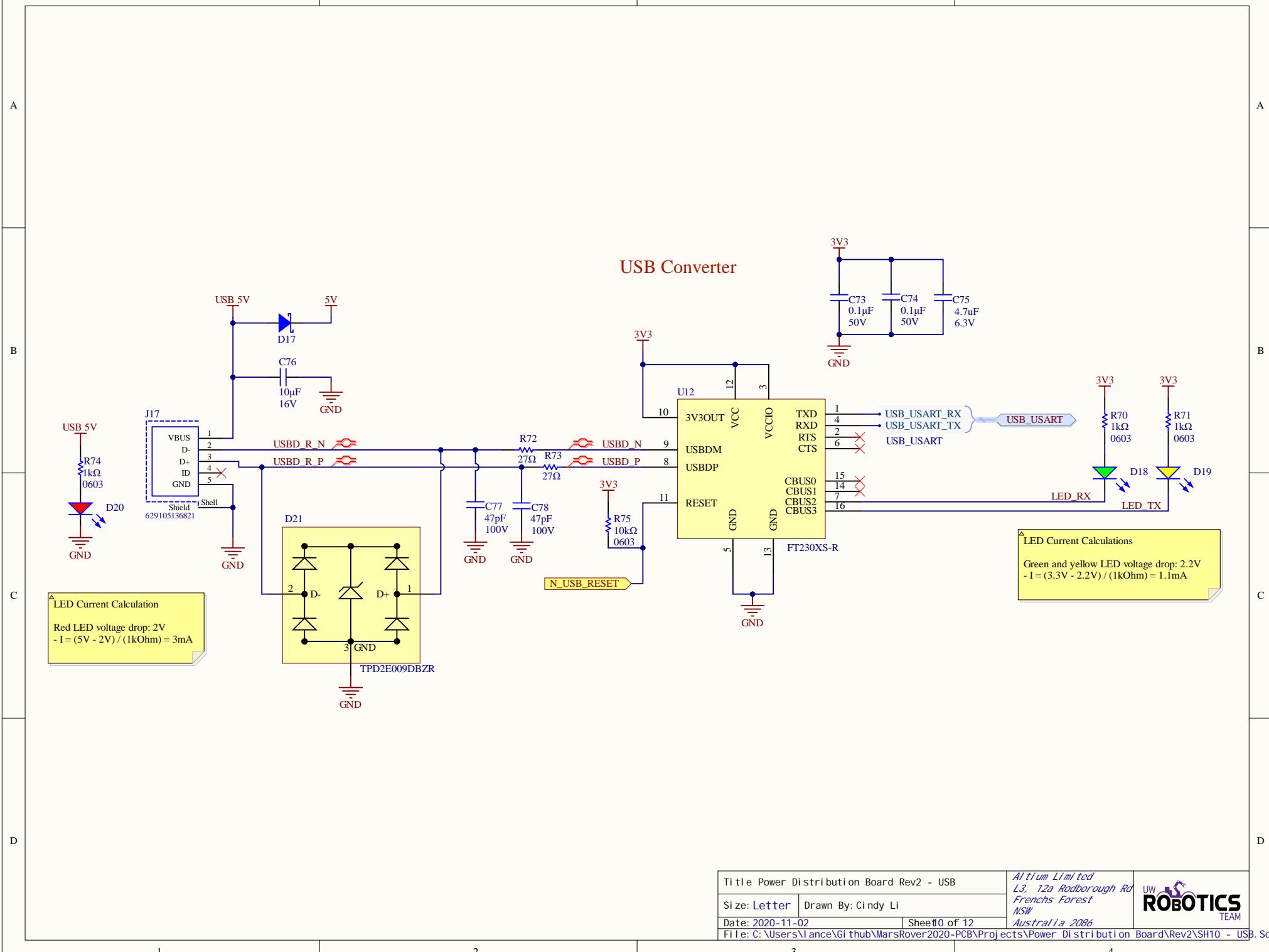


C

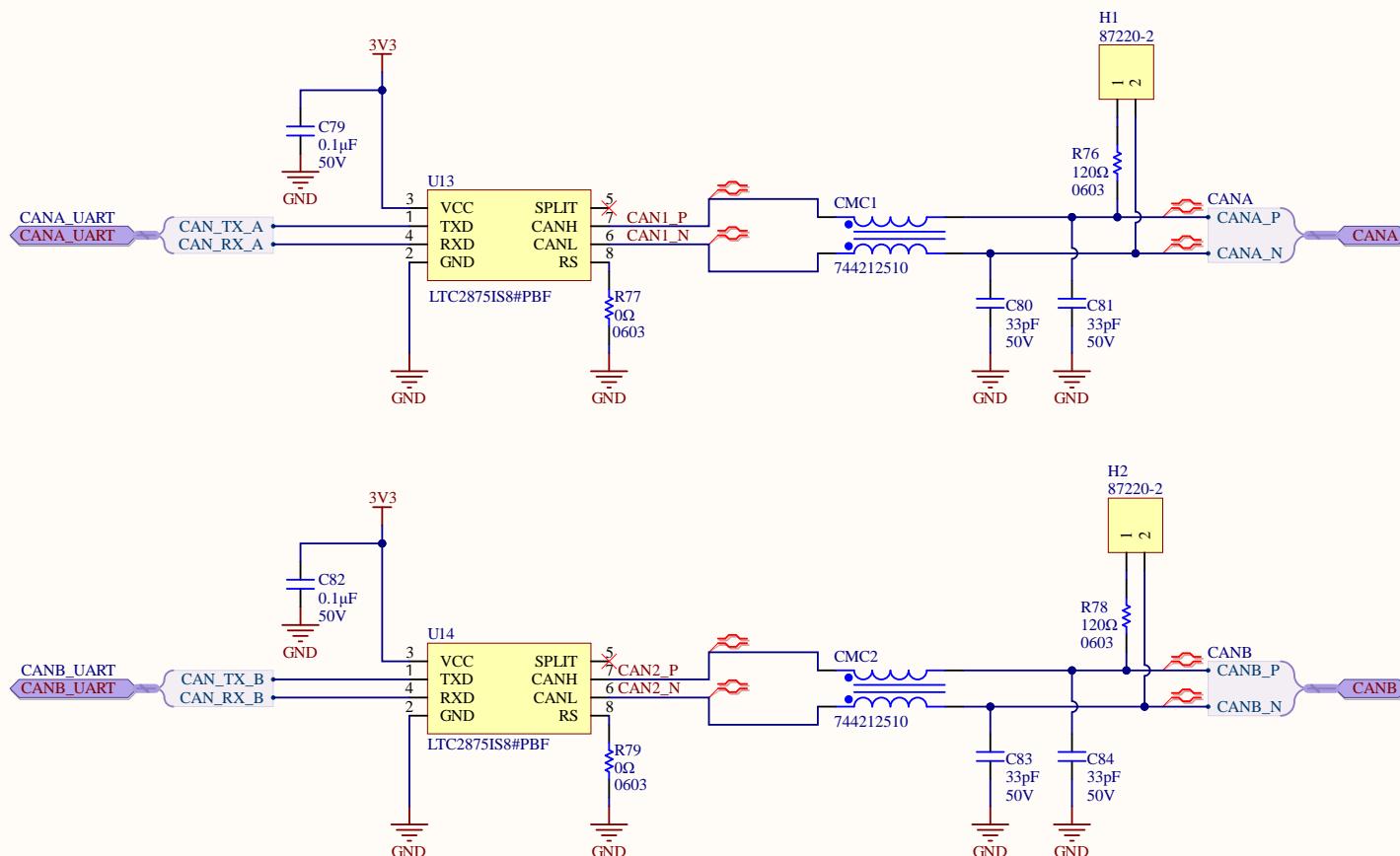


D

Title	Power Distribution Board Rev2 - MCU	Altium Limited
Size:	Letter	Drawn By: Cindy Li
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CAN Transceivers



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Size: Letter	Drawn By: Cindy Li	
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RS-485 Transceiver

