

A

B

C

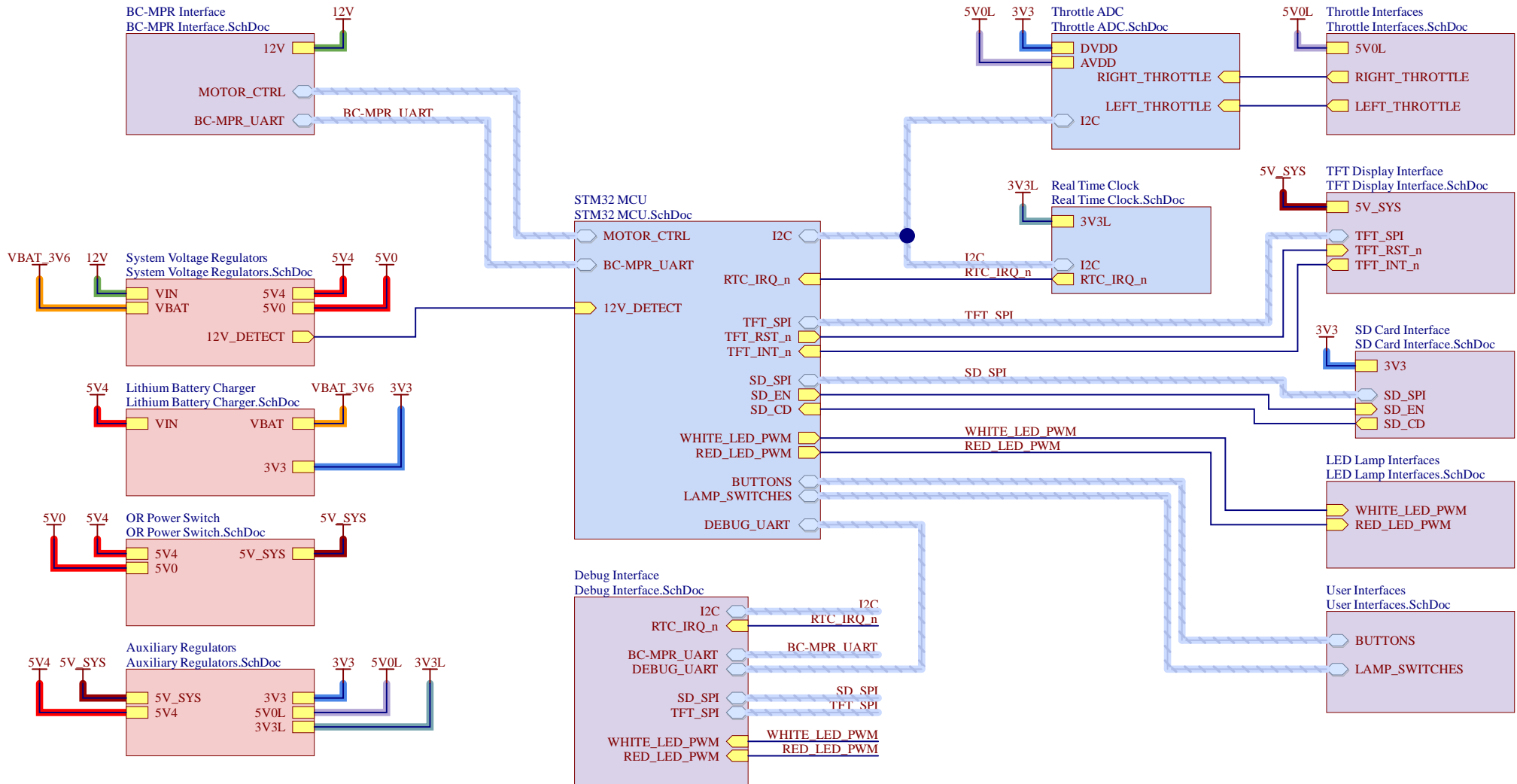
D

A

B

C

D



### Mounting Holes

MH1

MH2

MH4

MH3

TP24

TP25

TP26

TP27

GND

GND

GND

GND

University of Waterloo  
200 University Ave W  
Waterloo, Ontario, Canada  
N2L 3G1

REV

PROJECT  
CRIB.PrjPcb, BUILD

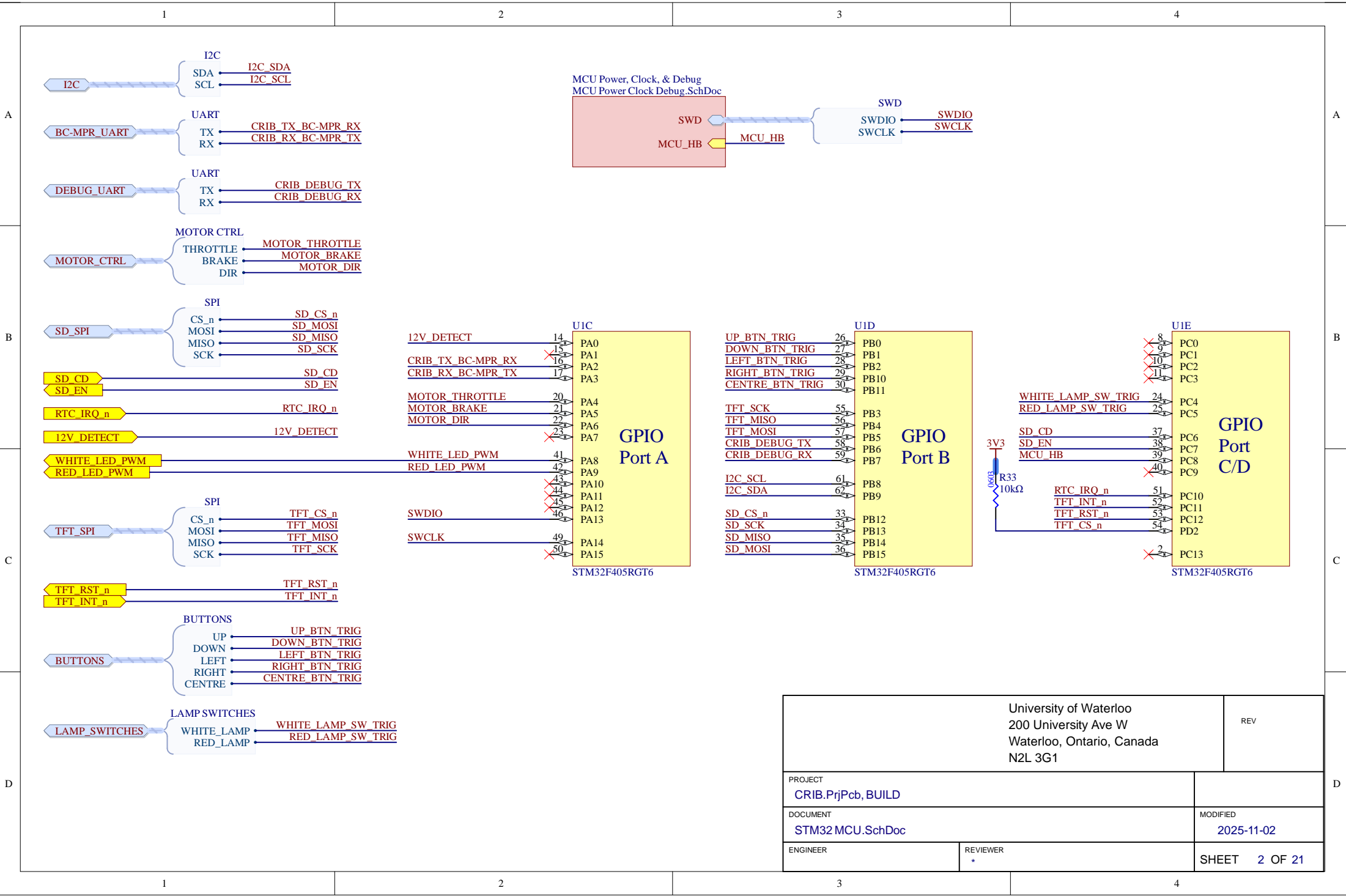
DOCUMENT  
Top.SchDoc

ENGINEER

REVIEWER  
\*

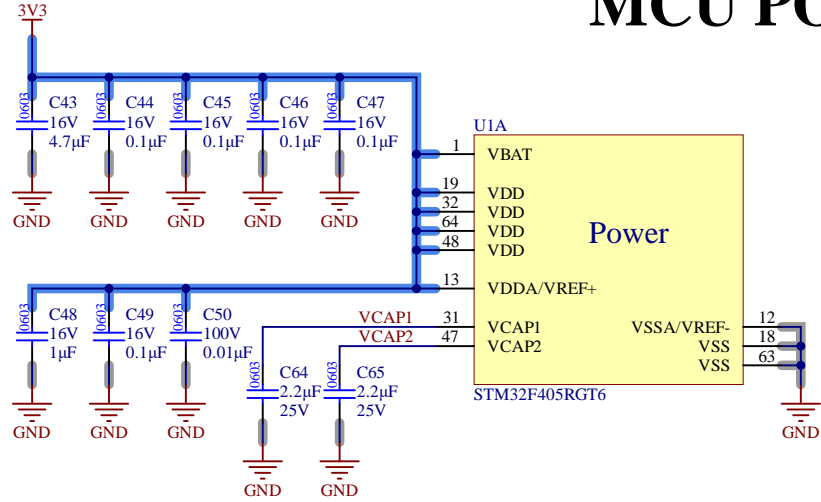
MODIFIED  
2025-11-09

SHEET 1 OF 21

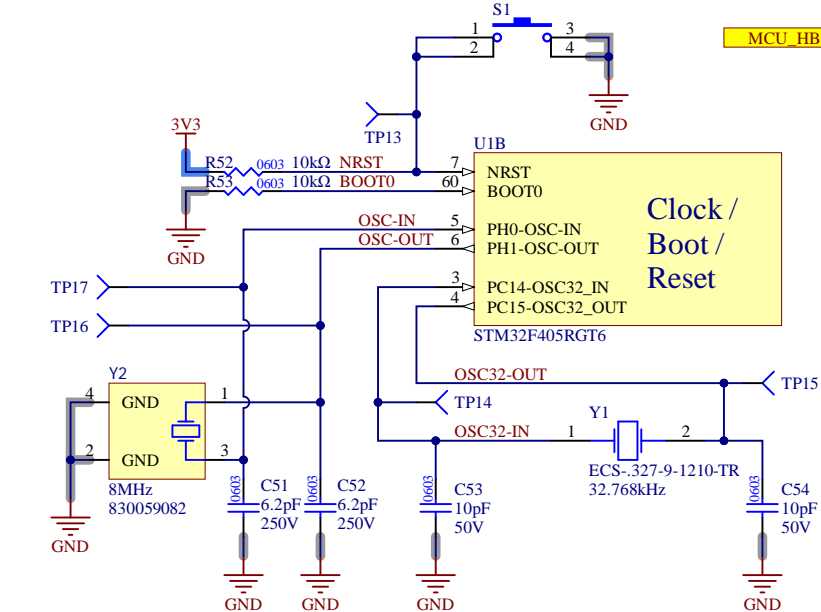
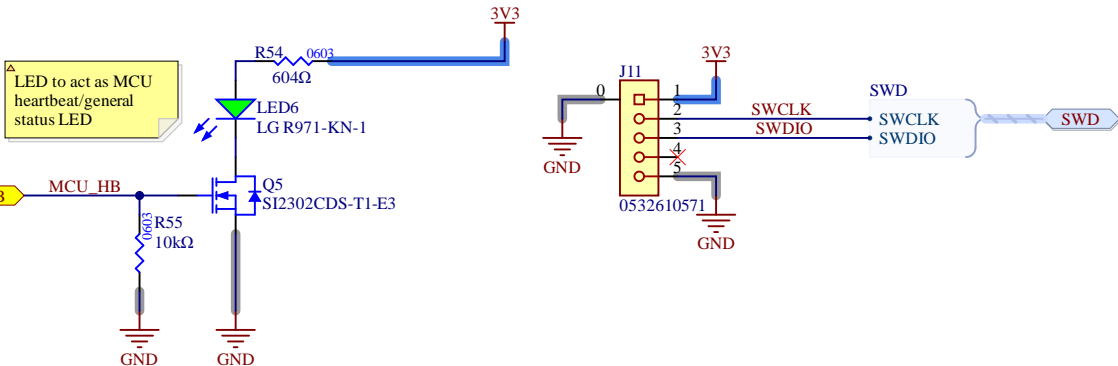


University of Waterloo 200 University Ave W Waterloo, Ontario, Canada N2L 3G1		REV
PROJECT CRIB.PrjPcb,BUILD		
DOCUMENT STM32 MCU.SchDoc		MODIFIED 2025-11-02
ENGINEER	REVIEWER *	SHEET 2 OF 21

# MCU POWER / CLOCK / DEBUG

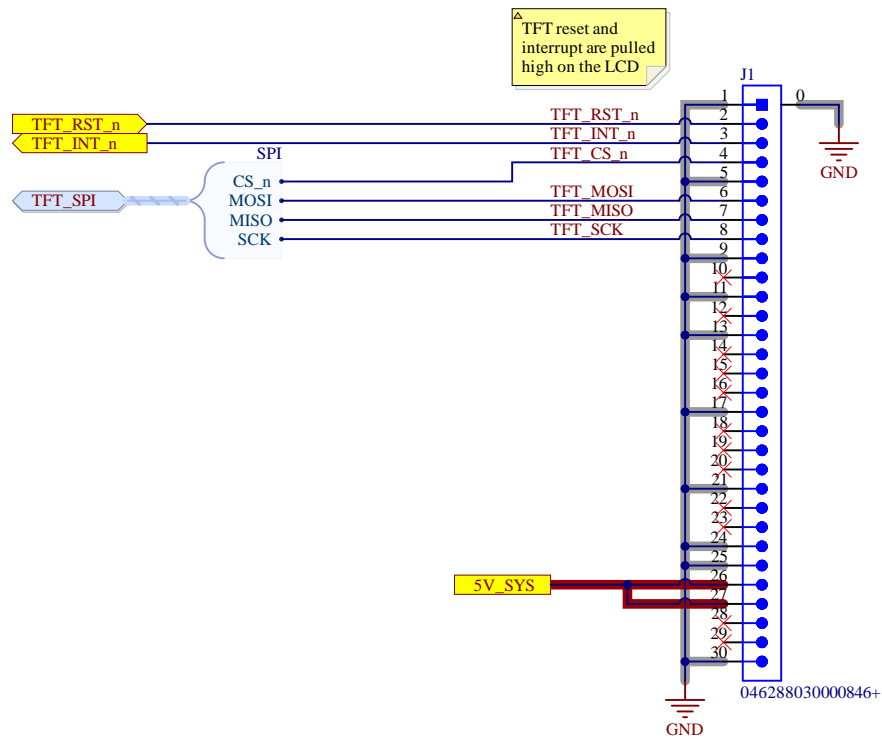


## Debug / Programming Connector



University of Waterloo 200 University Ave W Waterloo, Ontario, Canada N2L 3G1		REV
PROJECT CRIB.PrjPcb, BUILD		
DOCUMENT MCU Power Clock Debug.SchDoc	MODIFIED 2025-11-16	
ENGINEER *	REVIEWER *	SHEET 3 OF 21

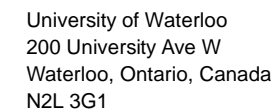
# TFT DISPLAY INTERFACE



University of Waterloo 200 University Ave W Waterloo, Ontario, Canada N2L 3G1		REV
PROJECT CRIB.PrjPcb, BUILD		
DOCUMENT TFT Display Interface.SchDoc	MODIFIED 2025-11-16	
ENGINEER	REVIEWER *	SHEET 4 OF 21

University of Waterloo 200 University Ave W Waterloo, Ontario, Canada N2L 3G1		REV
PROJECT <b>CRIB.PrjPcb, BUILD</b>		
DOCUMENT <b>Lithium Battery Charger.SchDoc</b>		MODIFIED <b>2025-11-16</b>
ENGINEER	REVIEWER *	SHEET <b>5 OF 21</b>

### 5.4V Buck Converter (2A Max)

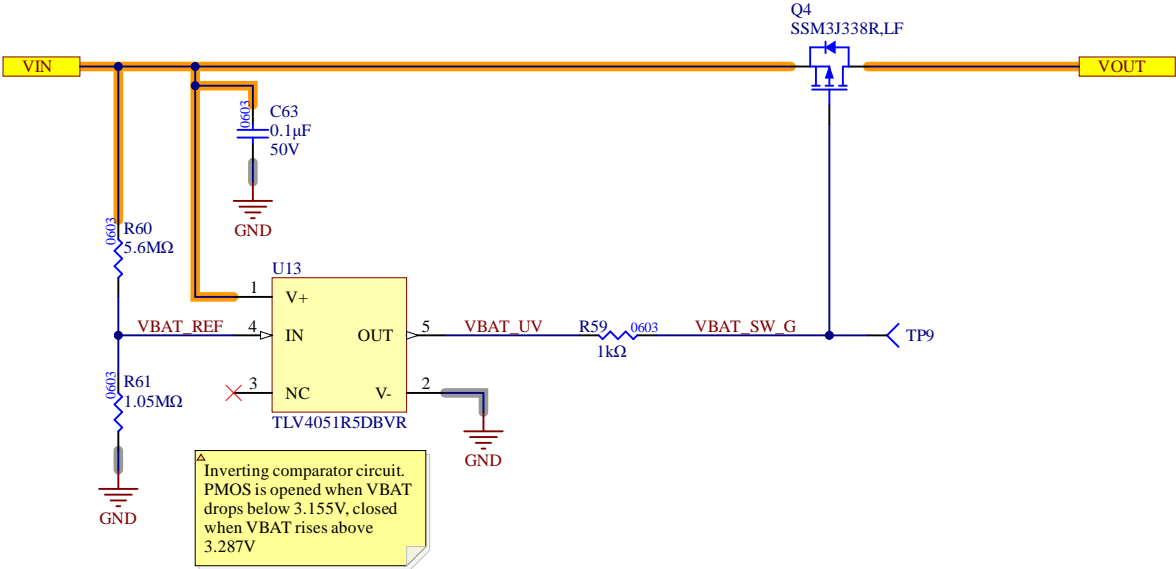


REV

MODIFIED	2025-10-08
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SHEET 6 OF 21

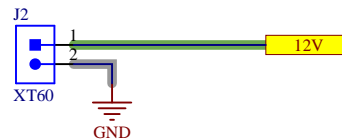
# LITHIUM BATTERY UVP SWITCH



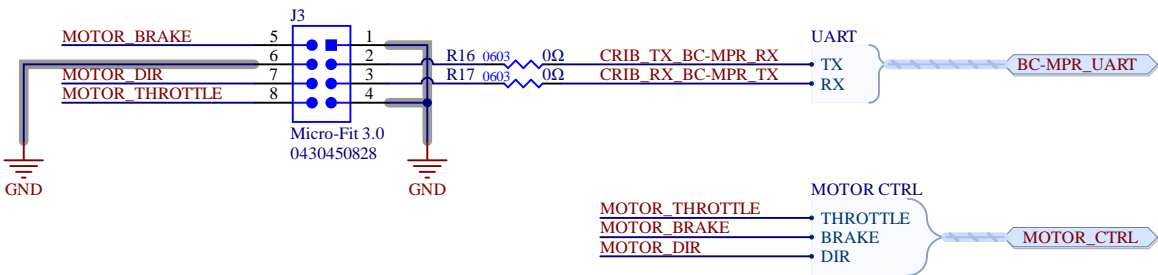
University of Waterloo 200 University Ave W Waterloo, Ontario, Canada N2L 3G1		REV
PROJECT CRIB.PrjPcb, BUILD		
DOCUMENT Lithium Battery UVP Switch.SchDoc		MODIFIED 2025-11-16
ENGINEER	REVIEWER *	SHEET 7 OF 21

# BC-MPR INTERFACE

## Power Input



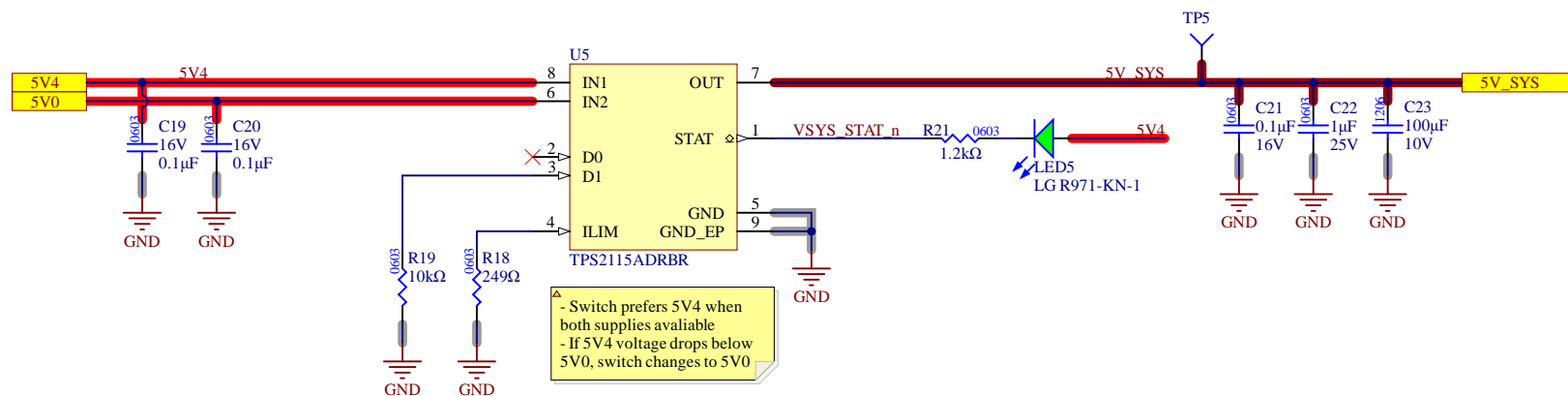
## Control Signals



University of Waterloo 200 University Ave W Waterloo, Ontario, Canada N2L 3G1		REV
PROJECT CRIB.PrjPcb, BUILD		
DOCUMENT BC-MPR Interface.SchDoc		MODIFIED 2025-08-18
ENGINEER	REVIEWER *	SHEET 8 OF 21

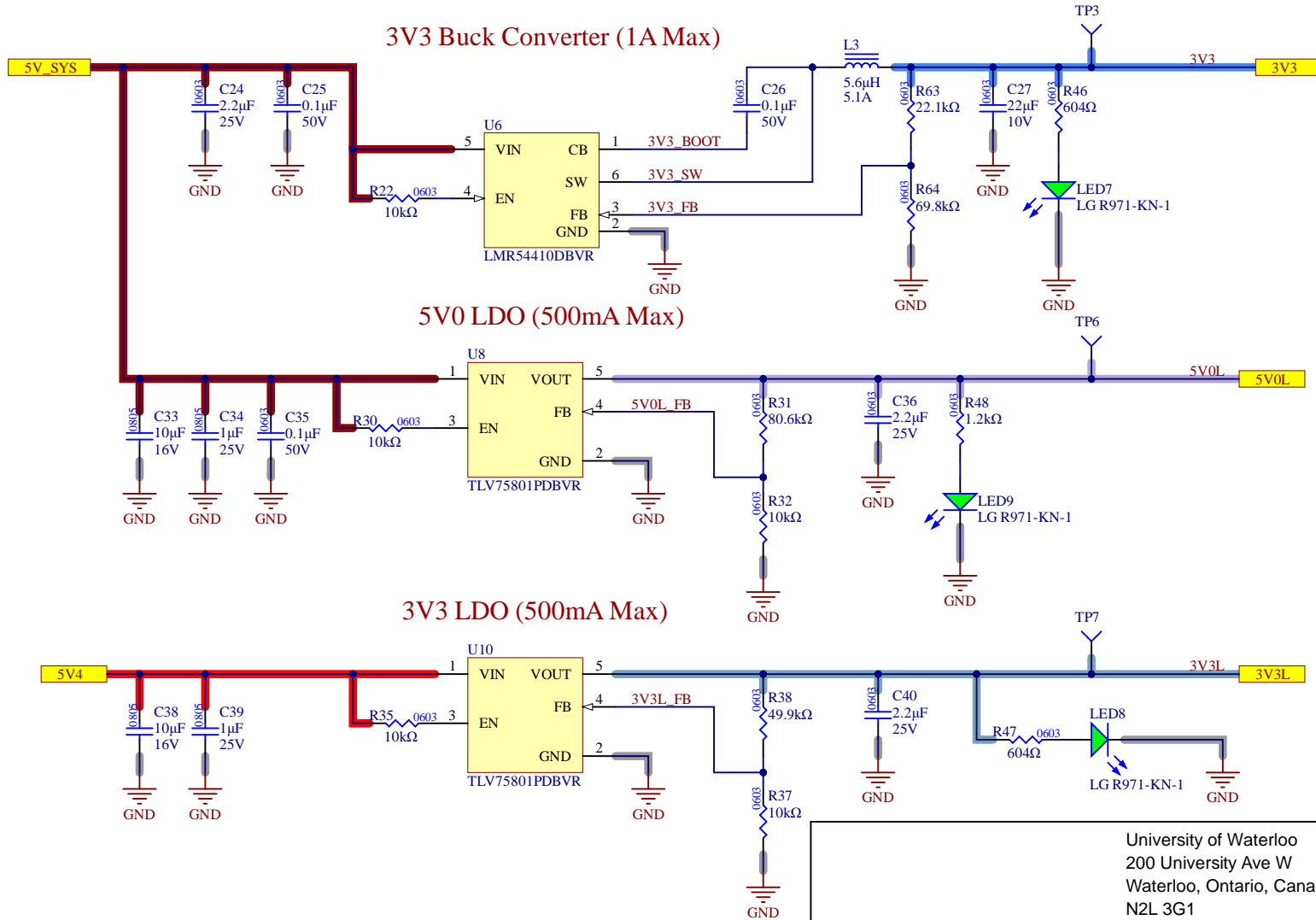


# OR POWER SWITCH



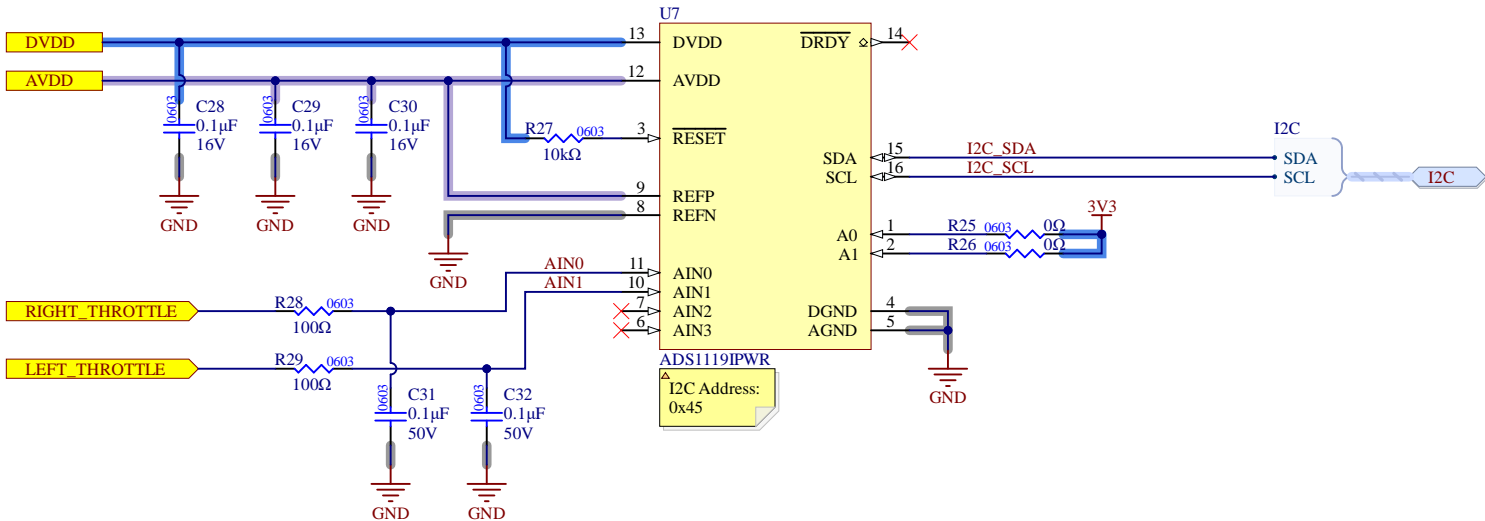
University of Waterloo 200 University Ave W Waterloo, Ontario, Canada N2L 3G1		REV
PROJECT CRIB.PrjPcb, BUILD		
DOCUMENT OR Power Switch.SchDoc		MODIFIED 2025-09-15
ENGINEER	REVIEWER *	SHEET 9 OF 21

# AUXILIARY REGULATORS



University of Waterloo 200 University Ave W Waterloo, Ontario, Canada N2L 3G1		REV
PROJECT CRIB.PrjPcb, BUILD		
DOCUMENT Auxiliary Regulators.SchDoc	MODIFIED 2025-09-14	
ENGINEER	REVIEWER *	SHEET 10 OF 21

# THROTTLE ADC



University of Waterloo  
200 University Ave W  
Waterloo, Ontario, Canada  
N2L 3G1

REV

PROJECT  
CRIB.PrjPcb, BUILD

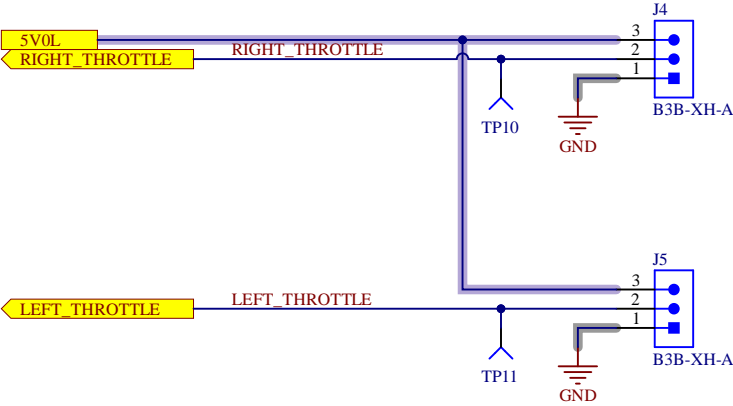
DOCUMENT  
Throttle ADC.SchDoc

MODIFIED	2025-08-31
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ENGINEER	REVIEWER
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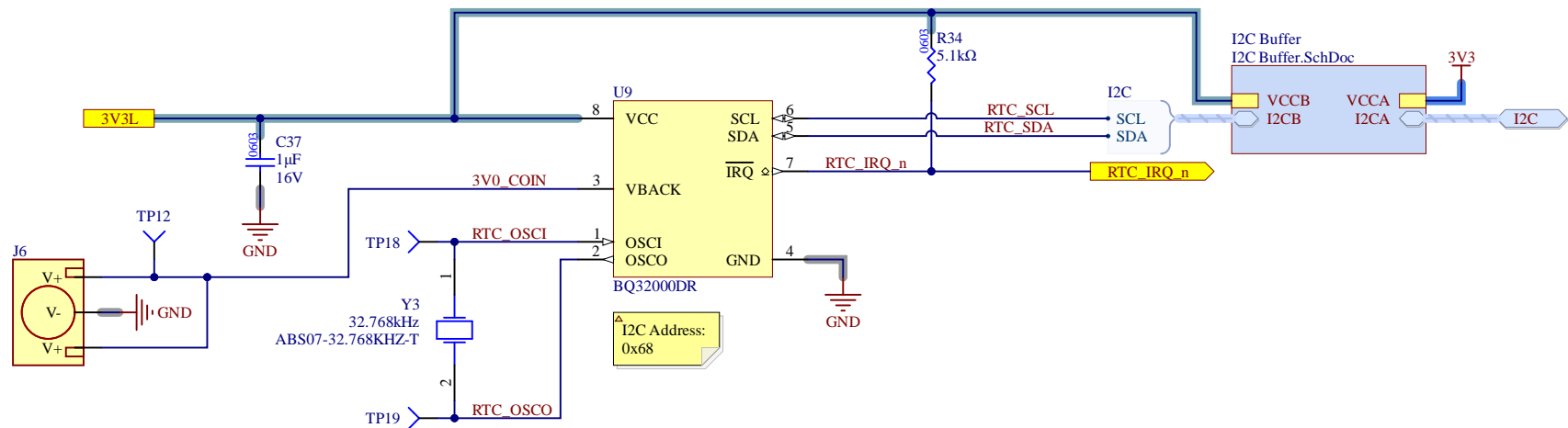
SHEET 11 OF 21

# THROTTLE INTERFACES



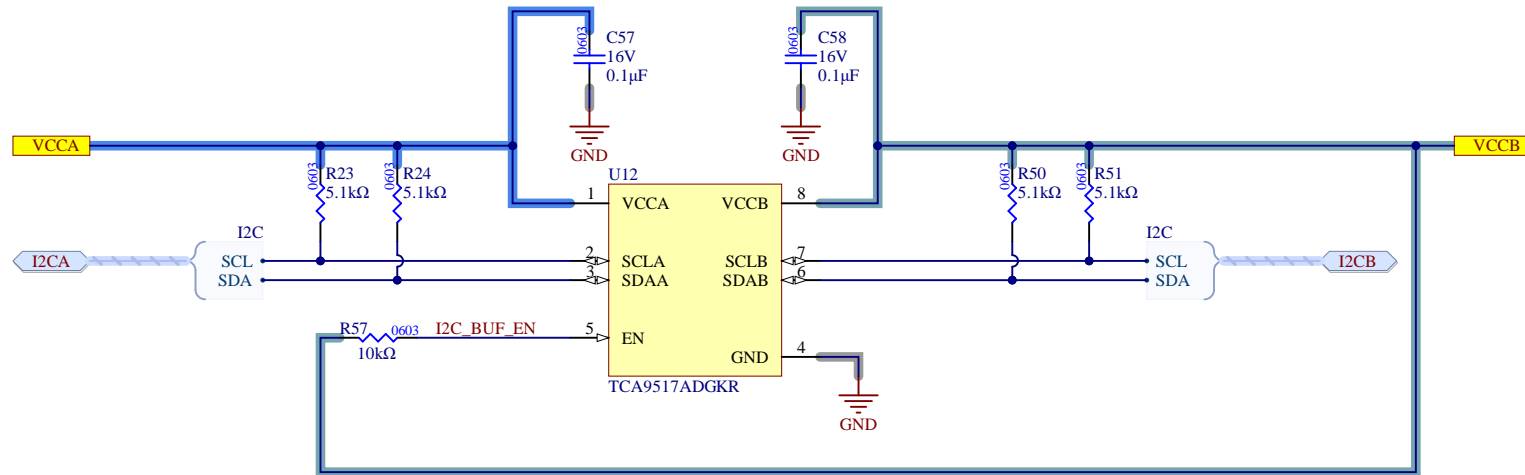
University of Waterloo 200 University Ave W Waterloo, Ontario, Canada N2L 3G1		REV
PROJECT CRIB.PrjPcb, BUILD		
DOCUMENT Throttle Interfaces.SchDoc		MODIFIED 2025-11-02
ENGINEER	REVIEWER *	SHEET 12 OF 21

# REAL TIME CLOCK



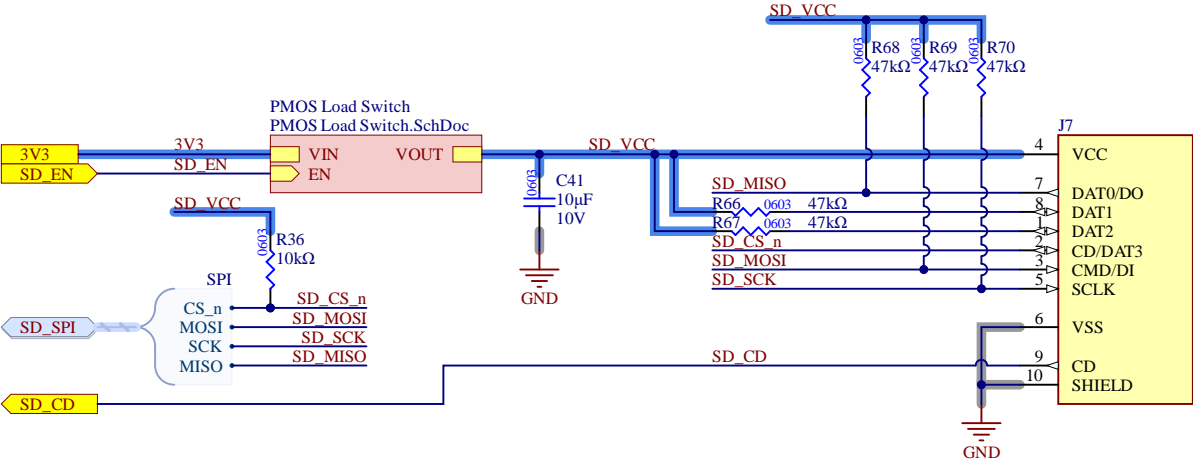
University of Waterloo 200 University Ave W Waterloo, Ontario, Canada N2L 3G1		REV
PROJECT CRIB.PrjPcb, BUILD		
DOCUMENT Real Time Clock.SchDoc		MODIFIED 2025-10-18
ENGINEER	REVIEWER *	SHEET 13 OF 21

# I2C BUFFER



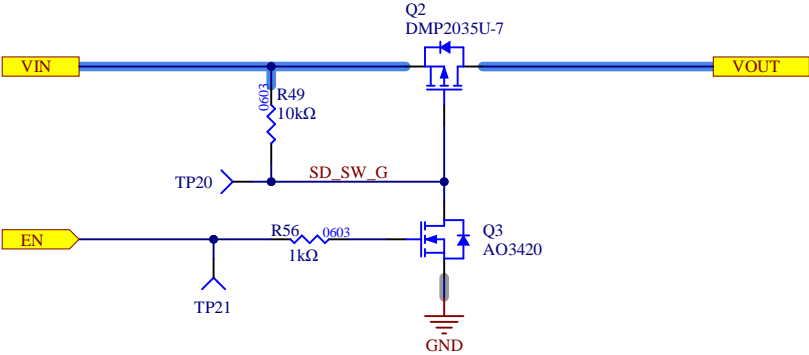
University of Waterloo 200 University Ave W Waterloo, Ontario, Canada N2L 3G1		REV
PROJECT CRIB.PrjPcb, BUILD		
DOCUMENT I2C Buffer.SchDoc		MODIFIED 2025-08-31
ENGINEER	REVIEWER *	SHEET 14 OF 21

SD CARD INTERFACE



University of Waterloo 200 University Ave W Waterloo, Ontario, Canada N2L 3G1		REV
PROJECT CRIB.PrjPcb, BUILD		
DOCUMENT SD Card Interface.SchDoc		MODIFIED 2025-10-18
ENGINEER	REVIEWER *	SHEET 15 OF 21

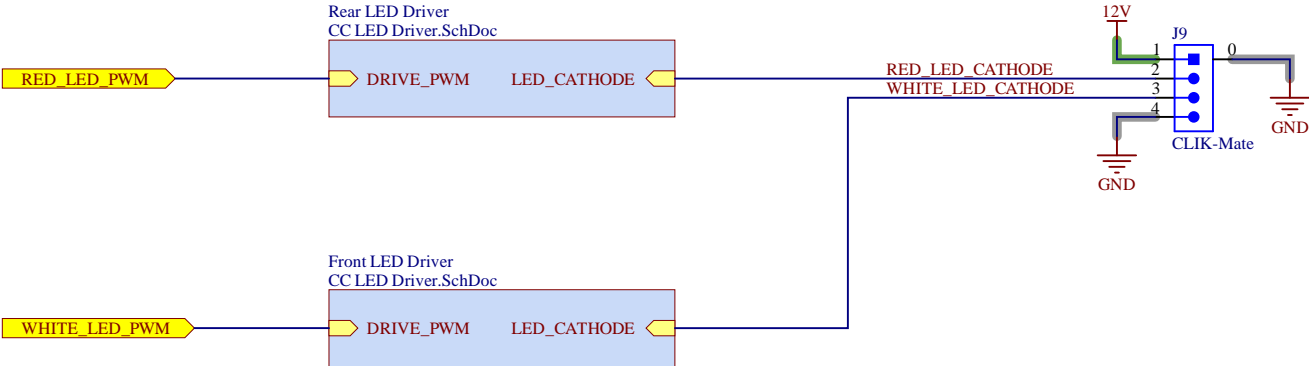
# PMOS LOAD SWITCH



University of Waterloo 200 University Ave W Waterloo, Ontario, Canada N2L 3G1		REV
PROJECT CRIB.PrjPcb, BUILD		
DOCUMENT PMOS Load Switch.SchDoc		MODIFIED 2025-09-07
ENGINEER	REVIEWER *	SHEET 16 OF 21

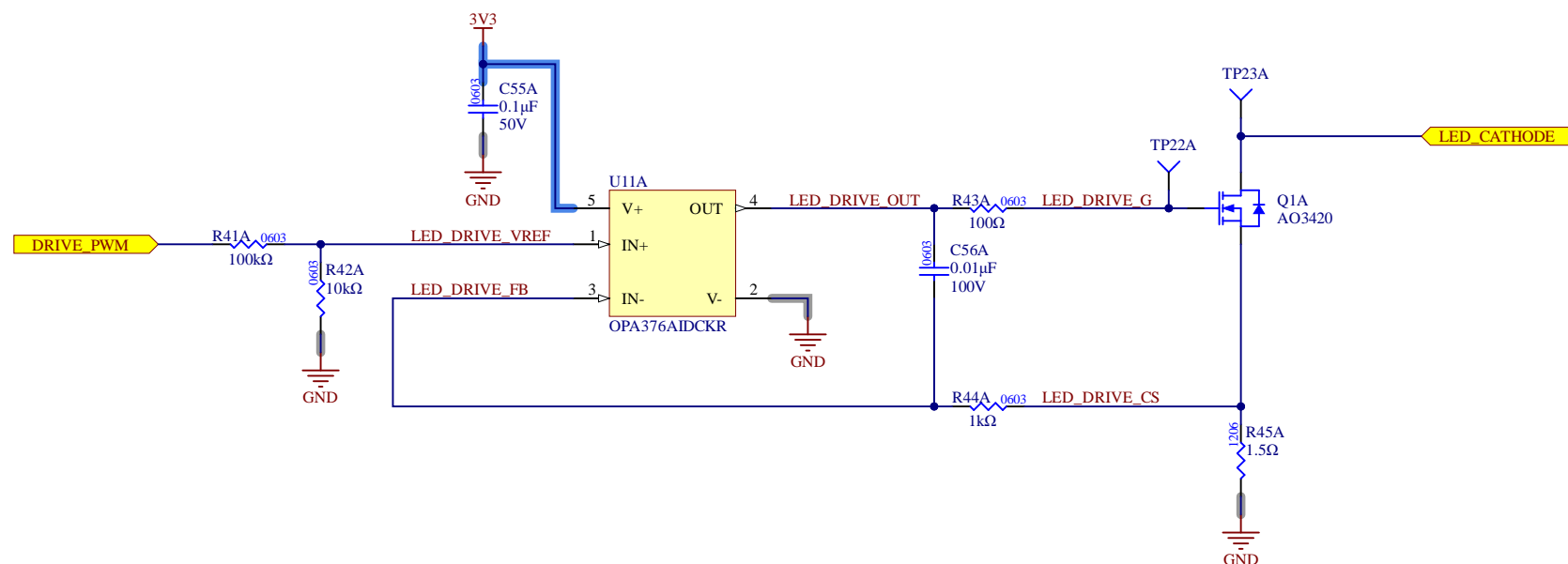


# LED LAMP INTERFACES



University of Waterloo 200 University Ave W Waterloo, Ontario, Canada N2L 3G1		REV
PROJECT CRIB.PrjPcb, BUILD		
DOCUMENT LED Lamp Interfaces.SchDoc		MODIFIED 2025-10-18
ENGINEER	REVIEWER *	SHEET 17 OF 21

# CONSTANT CURRENT LED DRIVER

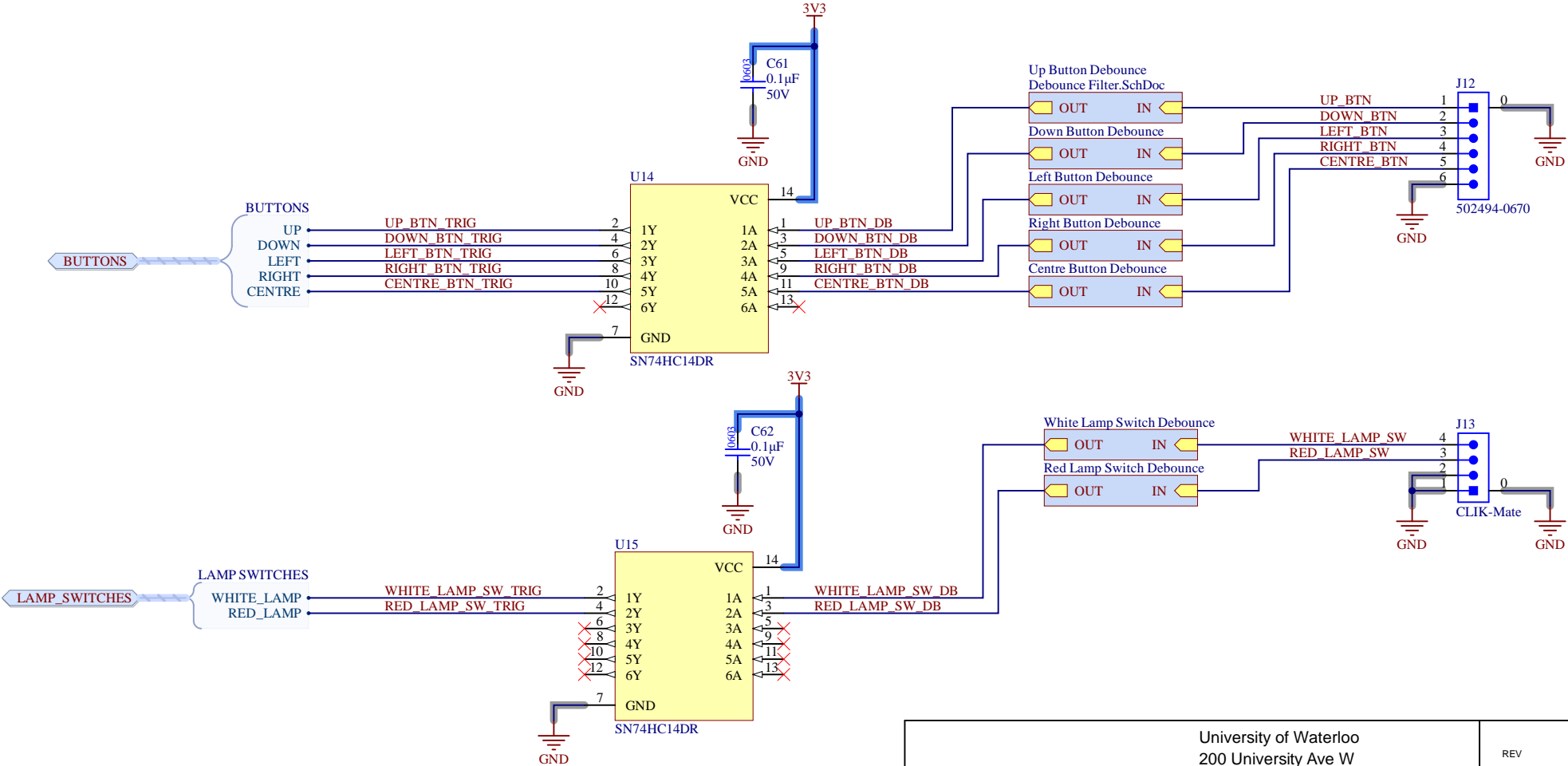


University of Waterloo 200 University Ave W Waterloo, Ontario, Canada N2L 3G1		REV
PROJECT CRIB.PrjPcb, BUILD		
DOCUMENT CC LED Driver.SchDoc		MODIFIED 2025-10-18
ENGINEER	REVIEWER *	SHEET 18 OF 21

The schematic shows an OPA376AIDCKR op-amp (U11B) configured as a voltage follower. The non-inverting input (IN+) is connected to a 3V3 supply through a 100kΩ resistor (R41B) and a 10kΩ resistor (R42B) to ground. The inverting input (IN-) is connected to the output (OUT) through a feedback loop. The output (OUT) is connected to the gate of an AO3420 MOSFET (Q1B) through a 100Ω resistor (R43B). The MOSFET's source is connected to ground through a 1.5Ω resistor (R45B). The MOSFET's drain is connected to the LED\_CATHODE. The LED's anode is connected to the 3V3 supply through a 1kΩ resistor (R44B). A 0.1μF capacitor (C56B) is connected between the LED\_CATHODE and the MOSFET's gate. A 0.1μF capacitor (C55B) is connected between the 3V3 supply and ground. The op-amp's supply pins (V+ and V-) are connected to the 3V3 supply and ground, respectively. A 0.1μF capacitor (C55B) is connected between the 3V3 supply and ground. The op-amp's output (OUT) is connected to the MOSFET's gate through a 100Ω resistor (R43B). The MOSFET's source is connected to ground through a 1.5Ω resistor (R45B). The MOSFET's drain is connected to the LED\_CATHODE. The LED's anode is connected to the 3V3 supply through a 1kΩ resistor (R44B). A 0.1μF capacitor (C56B) is connected between the LED\_CATHODE and the MOSFET's gate. A 0.1μF capacitor (C55B) is connected between the 3V3 supply and ground.

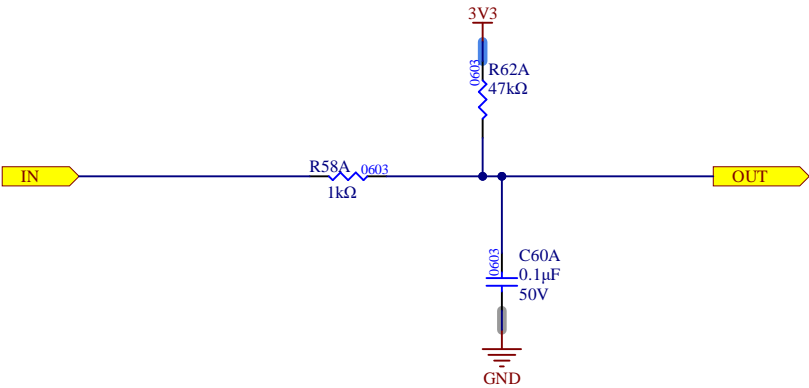
University of Waterloo 200 University Ave W Waterloo, Ontario, Canada N2L 3G1		REV
PROJECT <b>CRIB.PrjPcb, BUILD</b>		
DOCUMENT <b>CC LED Driver.SchDoc</b>		MODIFIED <b>2025-10-18</b>
ENGINEER	REVIEWER *	SHEET <b>18</b> OF <b>21</b>

# USER INTERFACES



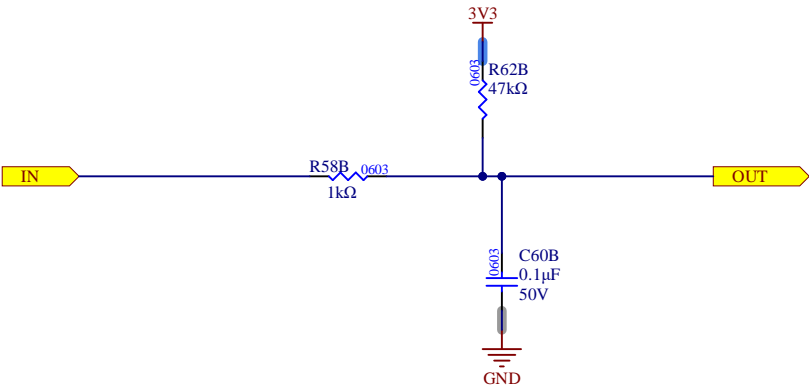
University of Waterloo 200 University Ave W Waterloo, Ontario, Canada N2L 3G1		REV
PROJECT CRIB.PrjPcb,BUILD		
DOCUMENT User Interfaces.SchDoc		MODIFIED 2025-10-18
ENGINEER	REVIEWER *	SHEET 19 OF 21

# DEBOUNCE FILTER



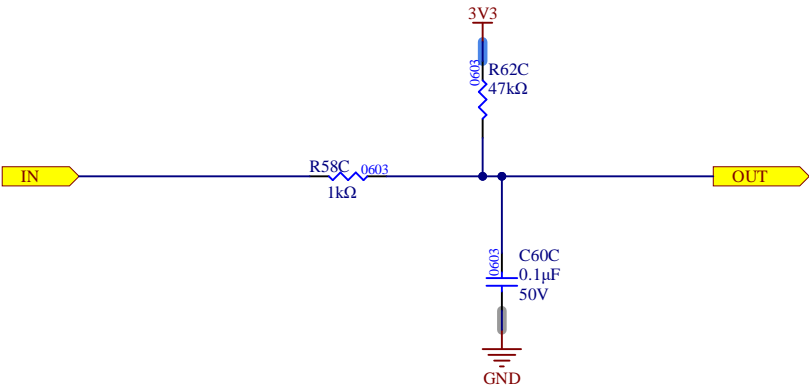
University of Waterloo 200 University Ave W Waterloo, Ontario, Canada N2L 3G1		REV
PROJECT CRIB.PrjPcb, BUILD		
DOCUMENT Debounce Filter.SchDoc		MODIFIED 2025-09-21
ENGINEER	REVIEWER *	SHEET 20 OF 21

# DEBOUNCE FILTER



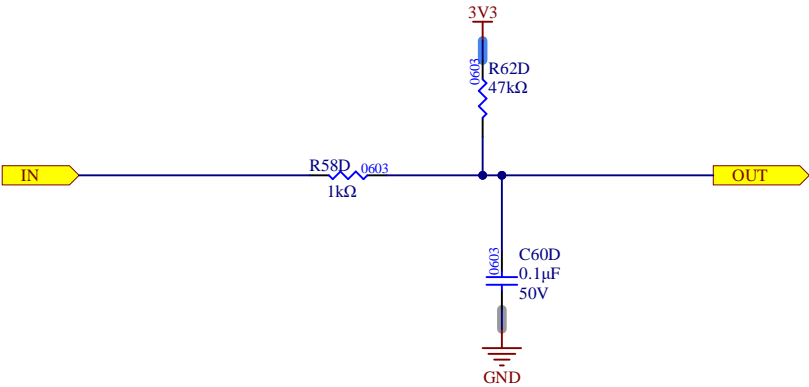
University of Waterloo 200 University Ave W Waterloo, Ontario, Canada N2L 3G1		REV
PROJECT CRIB.PrjPcb, BUILD		
DOCUMENT Debounce Filter.SchDoc		MODIFIED 2025-09-21
ENGINEER	REVIEWER *	SHEET 20 OF 21

# DEBOUNCE FILTER



University of Waterloo 200 University Ave W Waterloo, Ontario, Canada N2L 3G1		REV
PROJECT CRIB.PrjPcb, BUILD		
DOCUMENT Debounce Filter.SchDoc		MODIFIED 2025-09-21
ENGINEER	REVIEWER *	SHEET 20 OF 21

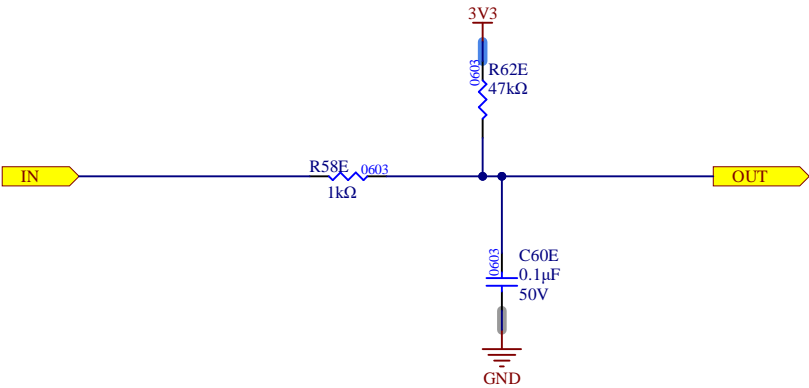
# DEBOUNCE FILTER



University of Waterloo 200 University Ave W Waterloo, Ontario, Canada N2L 3G1		REV
PROJECT CRIB.PrjPcb, BUILD		
DOCUMENT Debounce Filter.SchDoc		MODIFIED 2025-09-21
ENGINEER	REVIEWER *	SHEET 20 OF 21

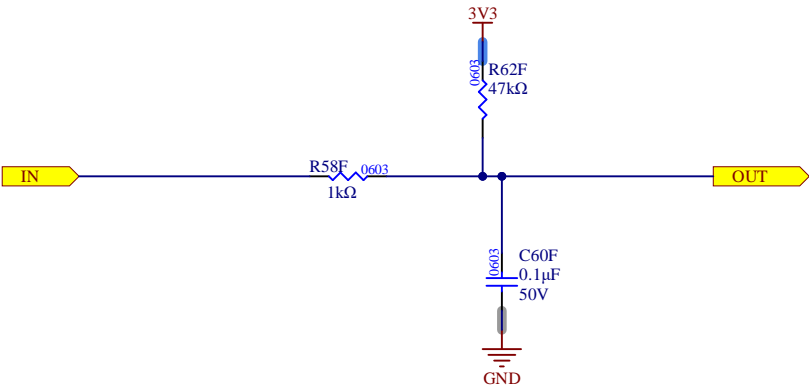


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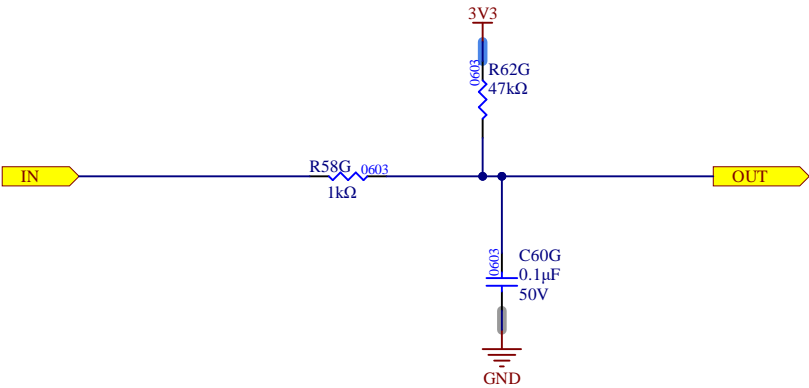
University of Waterloo 200 University Ave W Waterloo, Ontario, Canada N2L 3G1		REV
PROJECT CRIB.PrjPcb, BUILD		
DOCUMENT Debounce Filter.SchDoc		MODIFIED 2025-09-21
ENGINEER	REVIEWER *	SHEET 20 OF 21

# DEBOUNCE FILTER



University of Waterloo 200 University Ave W Waterloo, Ontario, Canada N2L 3G1		REV
PROJECT CRIB.PrjPcb, BUILD		
DOCUMENT Debounce Filter.SchDoc		MODIFIED 2025-09-21
ENGINEER	REVIEWER *	SHEET 20 OF 21

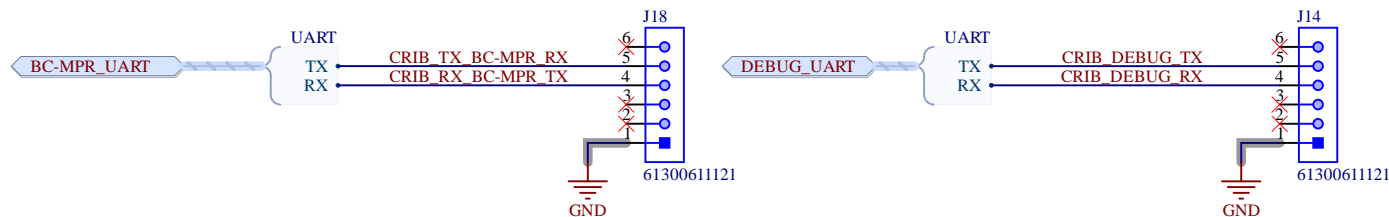
# DEBOUNCE FILTER



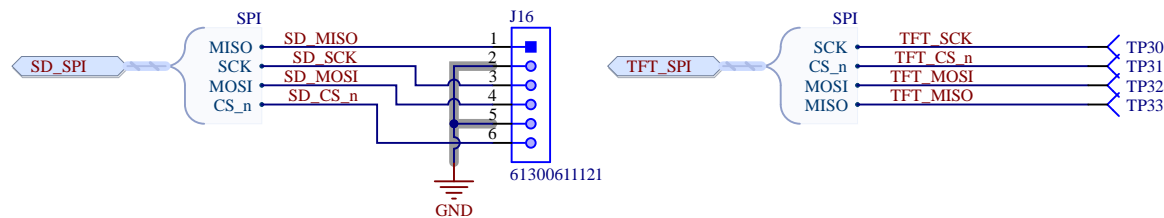
University of Waterloo 200 University Ave W Waterloo, Ontario, Canada N2L 3G1		REV
PROJECT CRIB.PrjPcb, BUILD		
DOCUMENT Debounce Filter.SchDoc		MODIFIED 2025-09-21
ENGINEER	REVIEWER *	SHEET 20 OF 21

# DEBUG INTERFACE

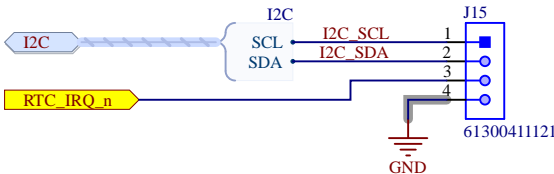
## FTDI USB to UART Debug



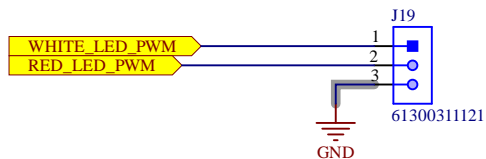
## SPI Breakout



## I2C Breakout



## Lamp PWM Breakout



University of Waterloo 200 University Ave W Waterloo, Ontario, Canada N2L 3G1		REV
PROJECT CRIB.PrjPcb, BUILD		
DOCUMENT Debug Interface.SchDoc		MODIFIED 2025-11-05
ENGINEER	REVIEWER *	SHEET 21 OF 21