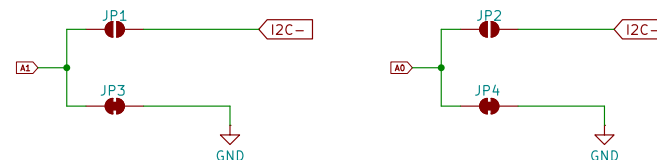
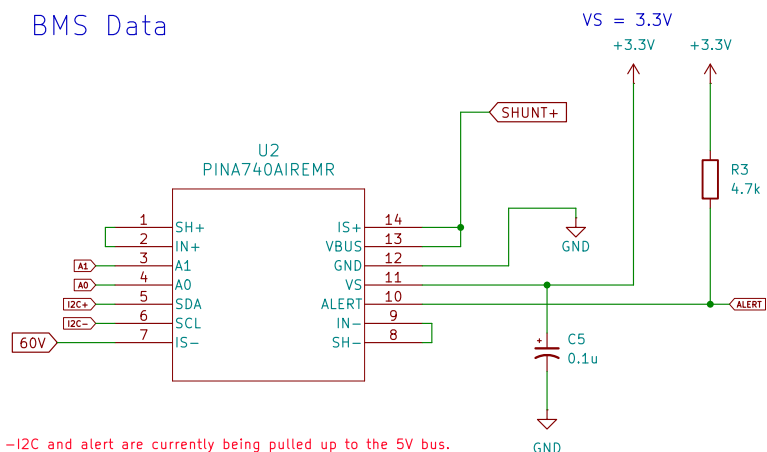


## Address Pins



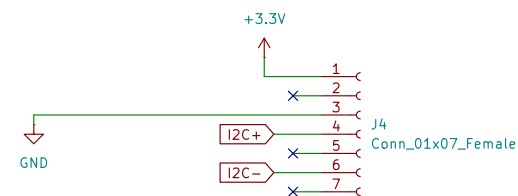
Configured by default to: 1000000 --> 0x40 (P.21)

## BMS Data



-I2C and alert are currently being pulled up to the 5V bus.  
This is bad practice, because the pico uses 3.3V logic.  
- We should either pull up to 3.3V or add a level shifter IC?  
- Could have the I2C pullups go to the 3V3 bus of the pico insted.  
That should fix it?

## BME280



check docs! copied over from pi hat pcb schematic

LaserShark Backplane PCB

**Cabrillo Robotics**

Sheet: /BMS\_Data/

File: BMS\_Data.kicad\_sch

**Title: I2C Sensors**

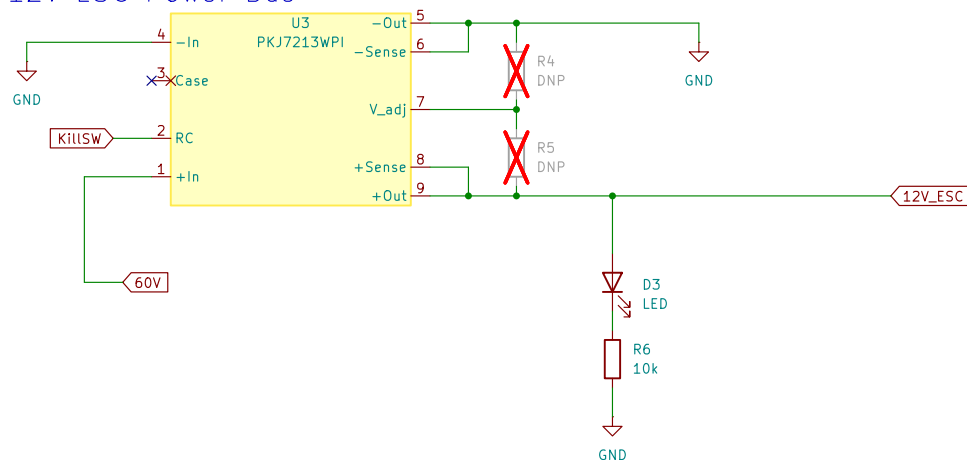
Size: A4

Date: 2024-10-29

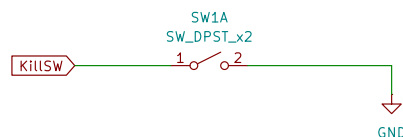
Rev: 1

KiCad E.D.A. 8.0.8

Id: 2/8

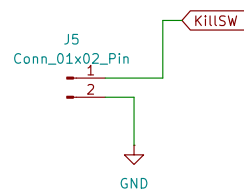


## Hardware Kill Switch



When RC is tied to 0V the brick turns on. This pun will be tied to a magnetic read switch. We need to make sure that this switch is stable.

## Kill Switch Saftey Bypass



## Capactor banks

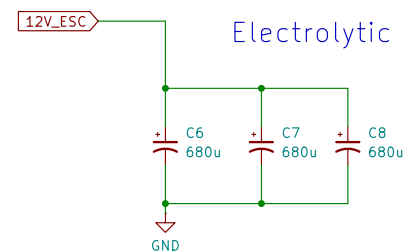
The data sheet says:

- recommended capacitive load 3000uF on the output of this bus.
  - ESR is important and operation is guaranteed with a verified ESR value greater than 5mOhm across the output connections
- Should use both ceramic and electrostatic capacitors

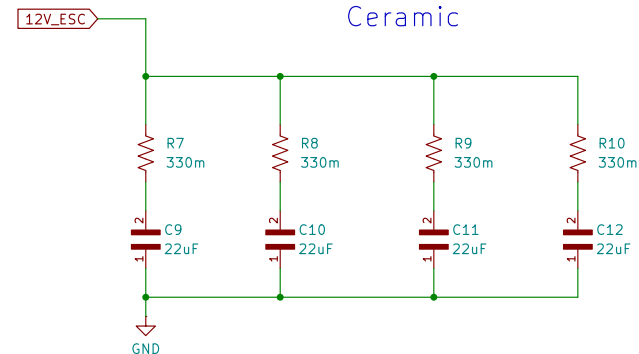
- $3/16 + 4/R = 1/5 \rightarrow R = 320\text{m}\Omega = 0.320\Omega$  (tempture controlled persistance)
- We must add series resistors inline with the ciramice caps in order to get with in the threshold of  $5\text{m}\Omega$ .

- $-R_{total} = (3/16 + 4/320)^{-1} = 5.0m \rightarrow$  OK! We could increase the value  
thses resistors a little bit to stay a safe difference above the 5m.

- $C_{total} = 3 \cdot 680 + 4 \cdot 22 = 2128u$
- Think this is close enough to the specified value of 333u



Ceramic



## LaserShark Backplane PCB

## Cabrillo Robotics

Sheet: /ESC\_Power\_Bus/  
File: ESC\_Power\_Bus.kicad\_sch

**Title:** ESC Power Bus

Size: A4	Date: 2024-10-29
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Size: A4
KiCad E.D.A. 8.0.8

Rev: 1

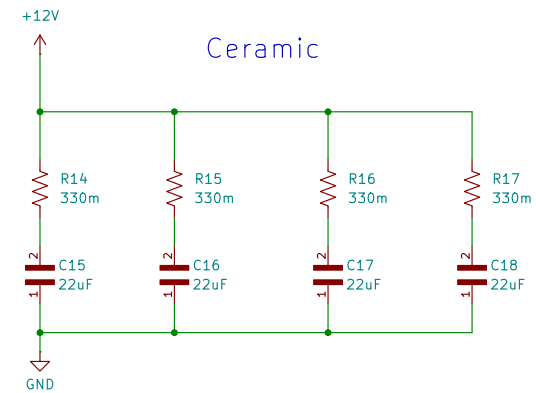
Id: 3/8

### 12V Clean Power Bus

The diagram shows a 12V Clean Power Bus circuit. A yellow box represents the PKJ7213WPI regulator (U4). The circuit includes a 60V source connected to pin 1 (+In). Pin 4 (-In) is connected to GND. Pin 3 (Case) is connected to GND. Pins 5 (-Out) and 6 (-Sense) are connected to GND. Pins 7 (V\_adj) and 8 (+Sense) are connected to a divider consisting of a 10k resistor (R13) to GND and an LED (D4) to the +12V output. Pins 9 (+Out) and 9 (+Sense) are connected to the +12V output. Pins 2 (RC) and 9 (+Sense) are connected to a divider consisting of a 10k resistor (R12) to GND and an LED (D4) to the +12V output. Pins 1 (+In) and 9 (+Sense) are connected to a divider consisting of a 10k resistor (R11) to GND and an LED (D4) to the +12V output. A note indicates a connection to add in a full power path IC expiration later.



## Electrolytic



## LaserShark Backplane PCB

## Cabrillo Robotics

Sheet: /12V\_Power\_Bus/

File: 12V\_Power\_Bus.kicad\_sch

**Title: 5V and 12V Power Bus**

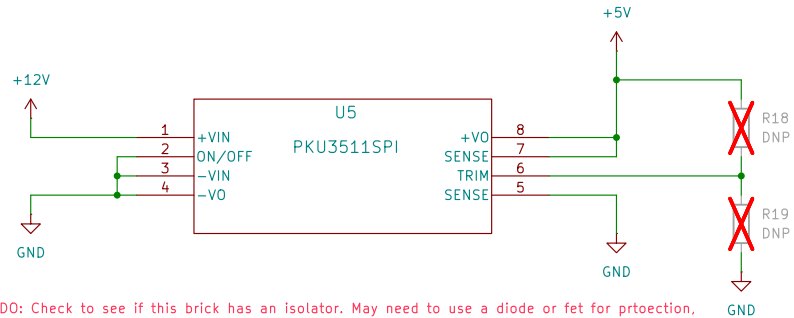
Size: A4	Date: 2024-10-29
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Rev: 1

Id: 4/8

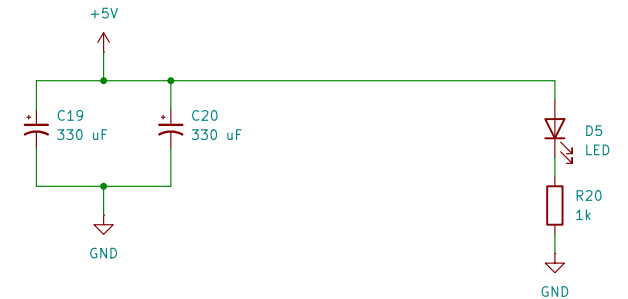
## 5V Power Bus



TODO: Check to see if this brick has an isolator. May need to use a diode or fet for prtioection, when connecting to the KillSW node. Could possibly also use a read SW with 2 chanles

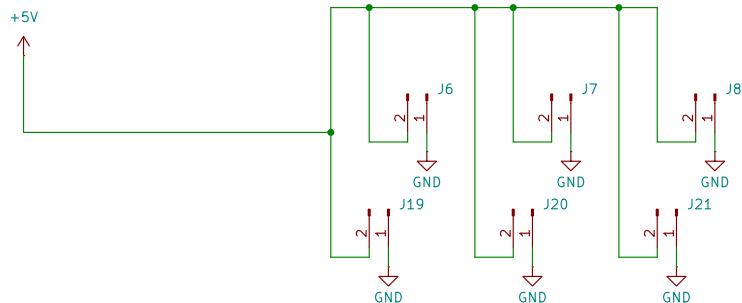
Note: Currently aways on. We do not want to kill the full buss in the event that the kill switch is pulled

## 5V Power Bus Cap Banks and status LEDs

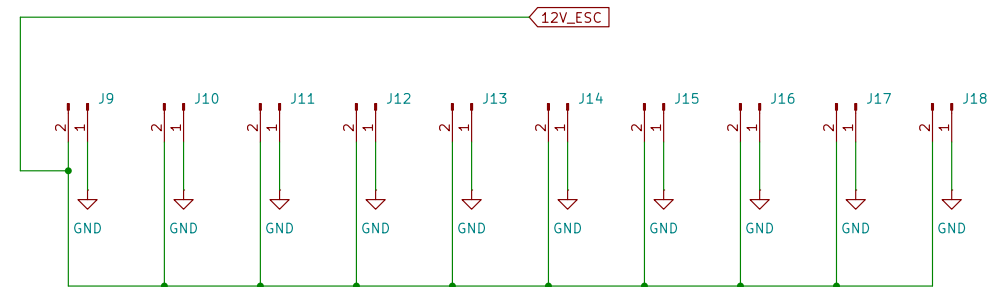


Must make sure that the number idenxing of the footprints/ connetors line up to what you have here on the schmatic!!!!

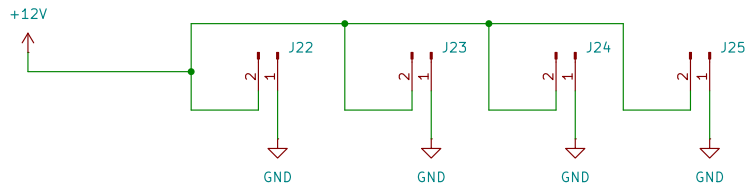
## 5V Power Bus External Power Connections



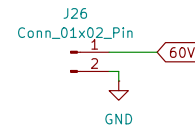
## 12V ESC Power Bus External Power Connections



## 12V Clean Power Bus External Power Connections



## Input Test Accesses



LaserShark Backplane PCB

**Cabrillo Robtics**

Sheet: /Power\_Connectors/  
File: Power\_Connectors.kicad\_sch

**Title: Backplane\_Board**

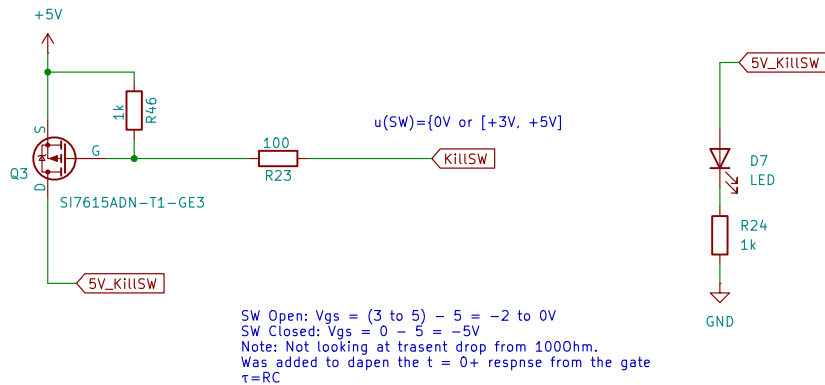
Size: A4 Date: 2024-10-29

KiCad E.D.A. 8.0.8

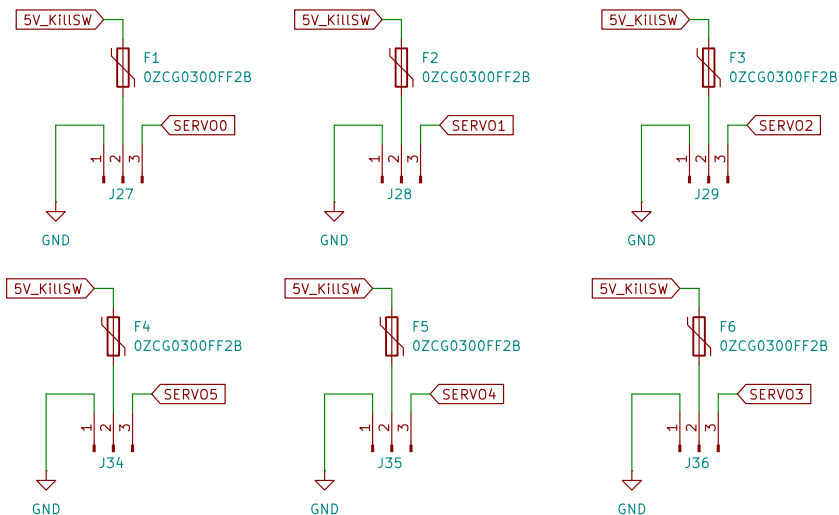
**Rev: 1**

Id: 5/8

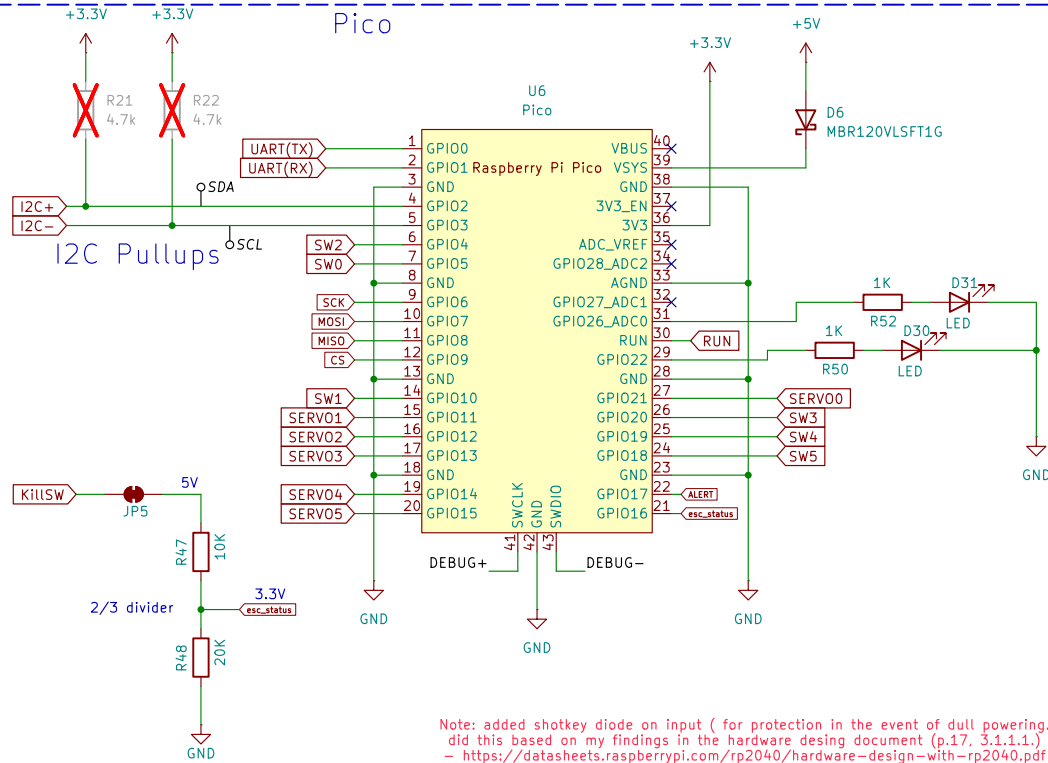
## 5V Kill Switch



## Servo Connections

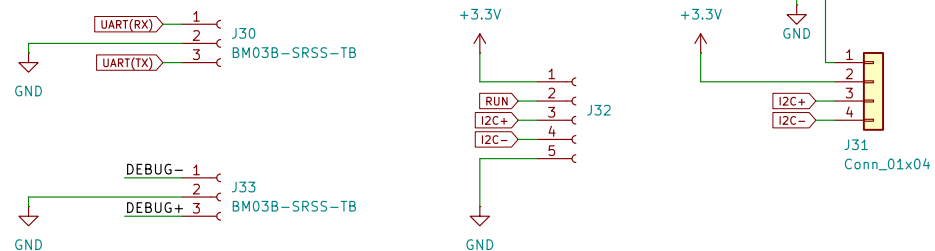


## Pico



## Pico Interface Connections

TODO: Must configure the pins/ connectors, so they work plugging into the OTS pico debugger  
 - <https://datasheets.raspberrypi.com/debug/debug-connector-specification.pdf>



LaserShark Backplane PCB

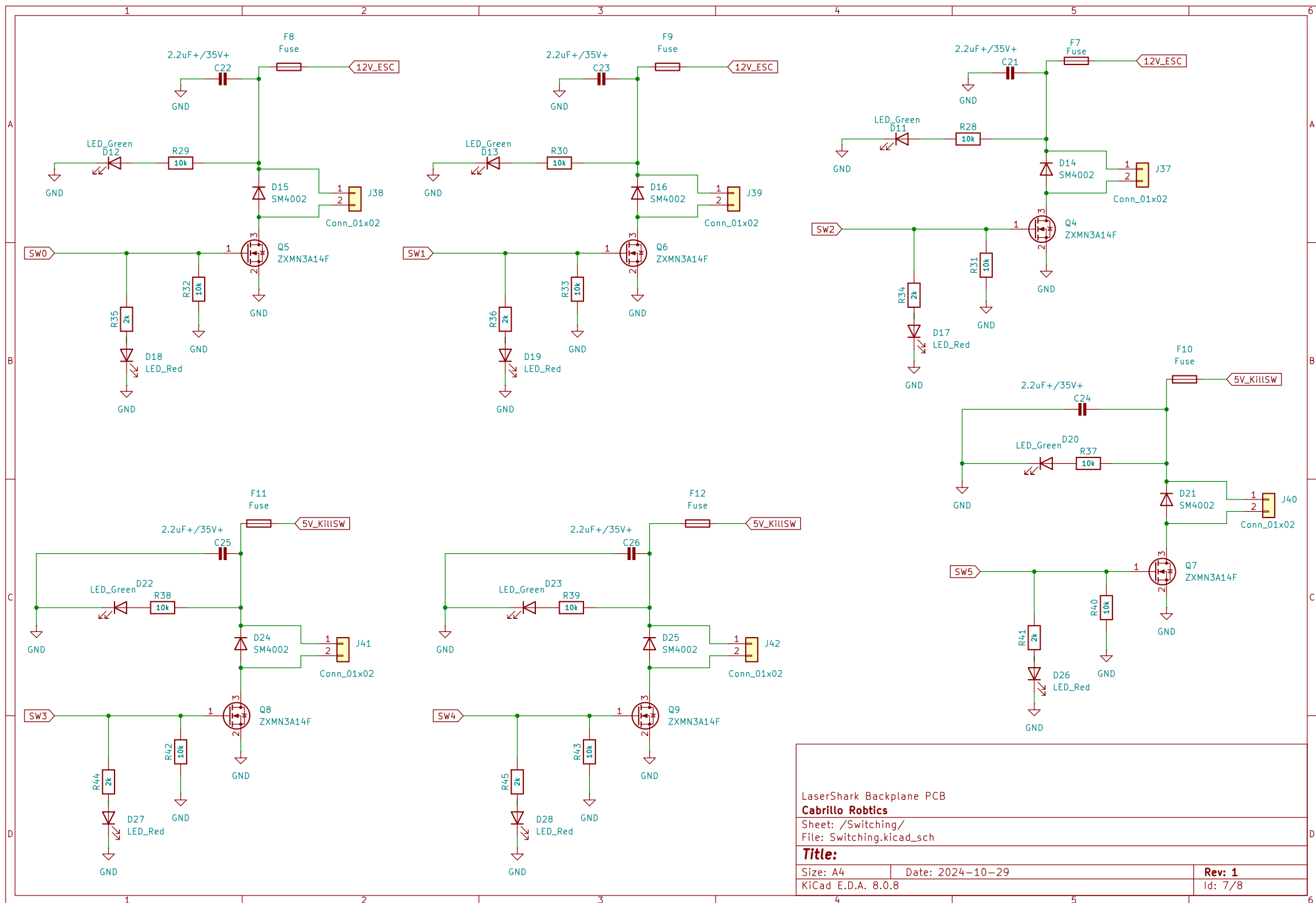
**Cabrillo Robotics**

Sheet: /BoardBoardConnections/  
 File: BoardBoardConnections.kicad\_sch

**Title: Backplane\_Board**

Size: A4 Date: 2024-10-29  
 KiCad E.D.A. 8.0.8

**Rev: 1**  
 Id: 6/8



LaserShark Backplane PCB

**Cabrillo Robotics**

Sheet: /Switching/

File: Switching.kicad\_sch

**Title:**

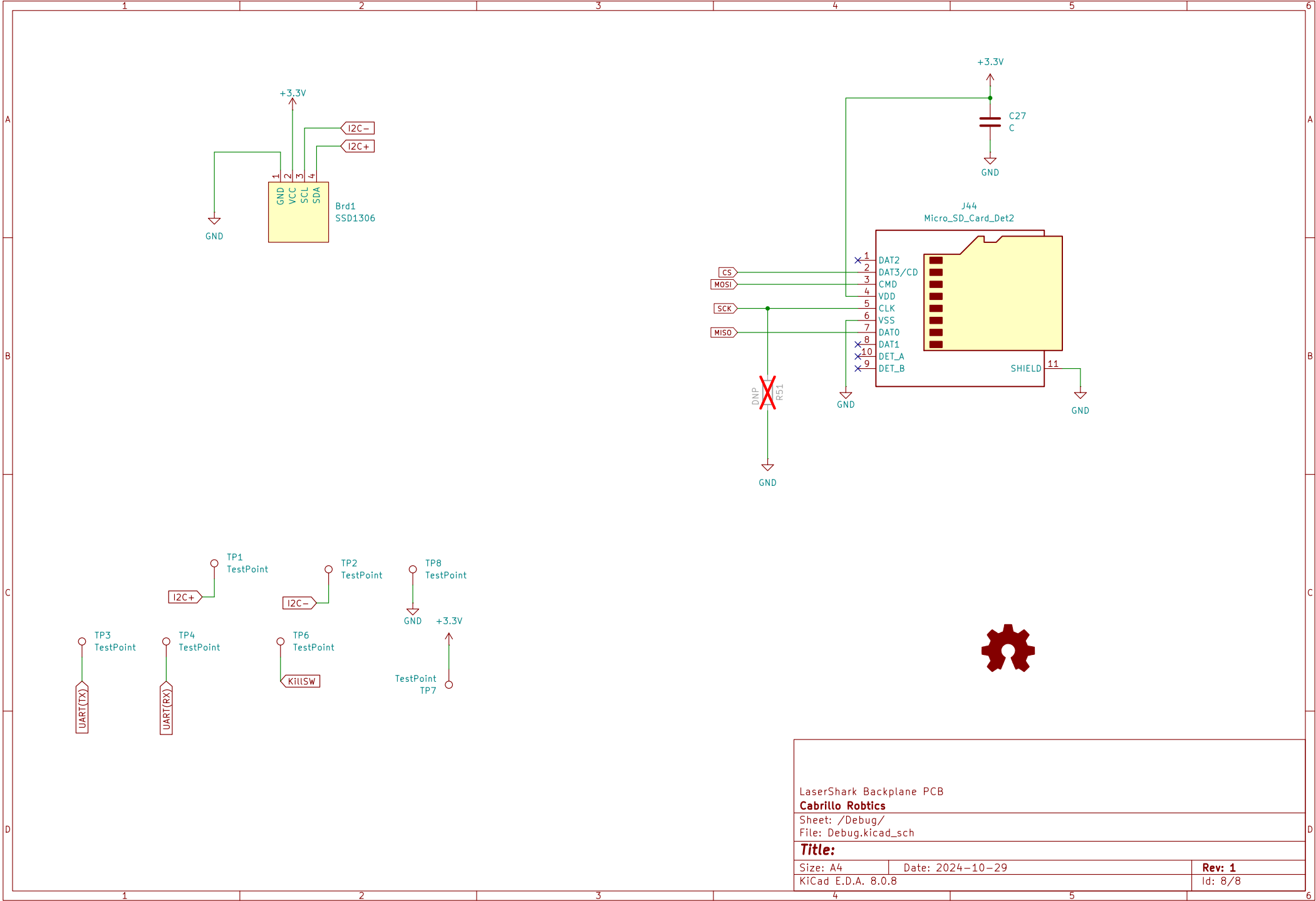
Size: A4

Date: 2024-10-29

**Rev: 1**

KiCad E.D.A. 8.0.8

Id: 7/8



LaserShark Backplane PCB

**Cabrillo Robotics**

Sheet: /Debug/

File: Debug.kicad\_sch

**Title:**

Size: A4

Date: 2024-10-29

Rev: 1

KiCad E.D.A. 8.0.8

Id: 8/8