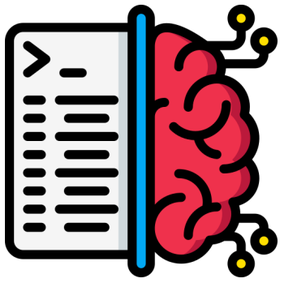

# Robot LEGO Controller

## PCB Pages

01—Microcontroller and Extras

File: 01—Microcontroller and Extras.kicad_sch

02—System Power Supply and USB

File: 02—System Power Supply and USB.kicad_sch

03—System Inputs A

File: 03—System Inputs A.kicad_sch

04—System Inputs B

File: 04—System Inputs B.kicad_sch

05—System Outputs A

File: 05—System Outputs A.kicad_sch

06—System Outputs B

File: 06—System Outputs B.kicad_sch

## Power Rail

| | |
|---|---|
| +3.3V | 3V3 Power Supply (LDO 4V2) |
| +5V | 5V Power Supply (Boost 4V2) |
| +9V | 9V Power Supply (Boost 4V2) |
| +4.2V | 4V2 Maln Power Supply Rail |
| VBUS | [5-12]V USB Input Supply |
| +BATT | Battery Voltage 3.7V-4.2V |
| GND | Ground |

## PCB Revision

| ID0 | ID1 | Revision |
|---|---|---|
| 0 | 0 | PCB Rev A |

## Variant

| Var | Description |
|---|---|
| V1 | Production |

H1 3mm GND
H2 3mm GND
H3 3mm GND
H4 3mm GND

FID1 Fiducial
FID2 Fiducial
FID3 Fiducial
FID4 Fiducial

SYMBOL3
open source hardware
SYMBOL2
Lego Robot Controller
SYMBOL1
designed by SGGTAV

santiagogoldaraz@gmail.com
**Santiago Goldaraz**

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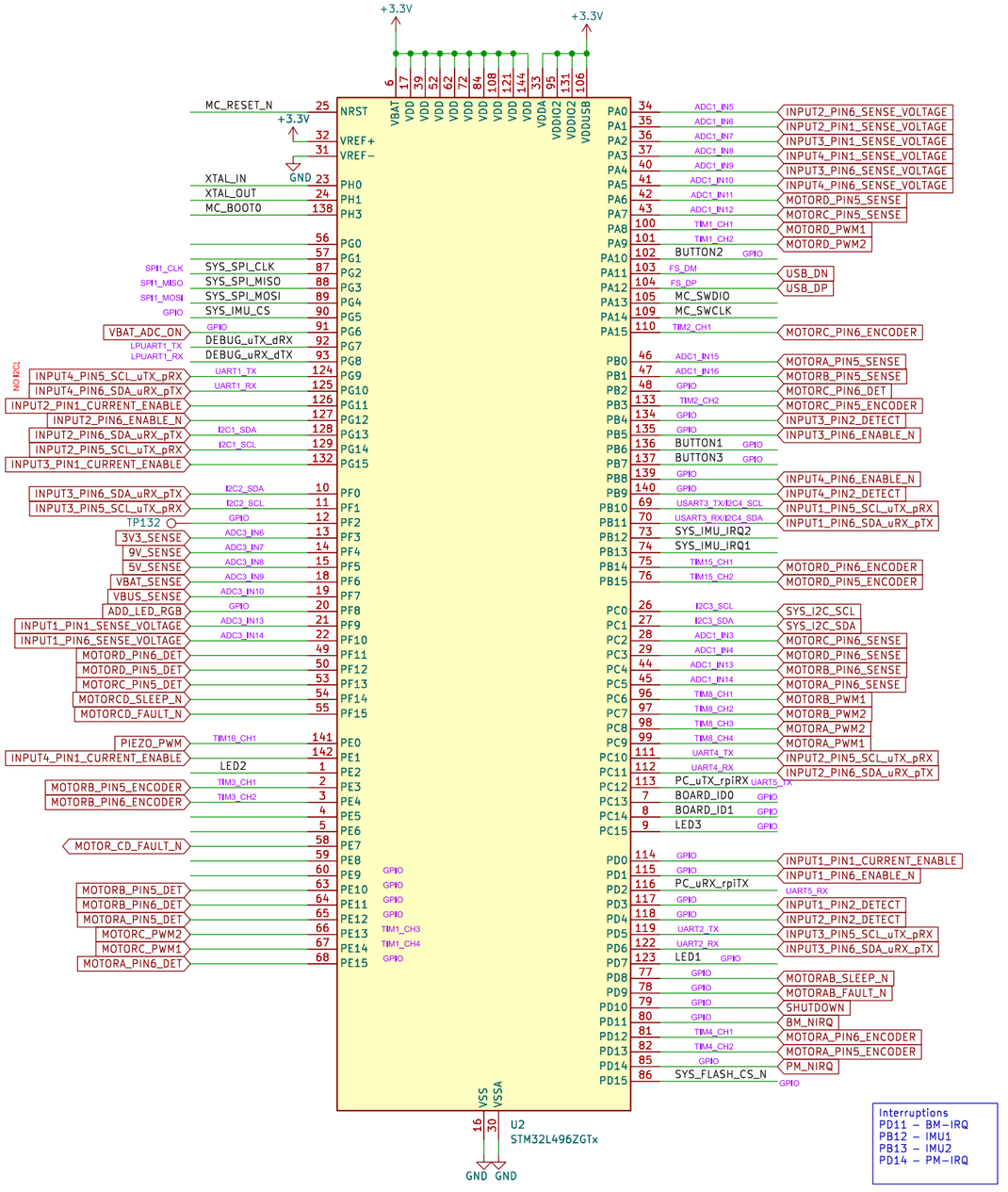
Sheet: /
File: RobotLegoController.kicad_sch

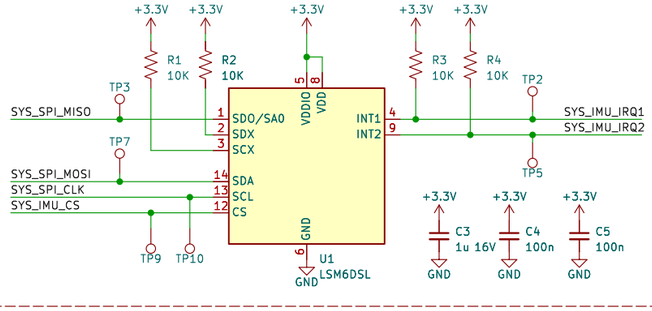
***Title: Robot Lego Controller***

| | | |
|---|---|---|
| Size: A3 | Date: 2023-02-22 | **Rev: REV A** |
| KiCad E.D.A. kicad (7.0.0) | | Id: 1/7 |

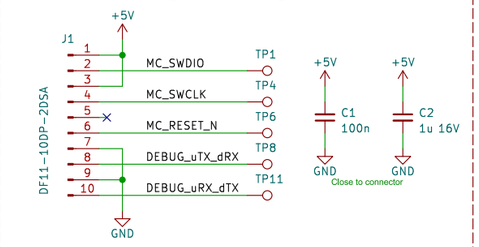
## Microcontroller



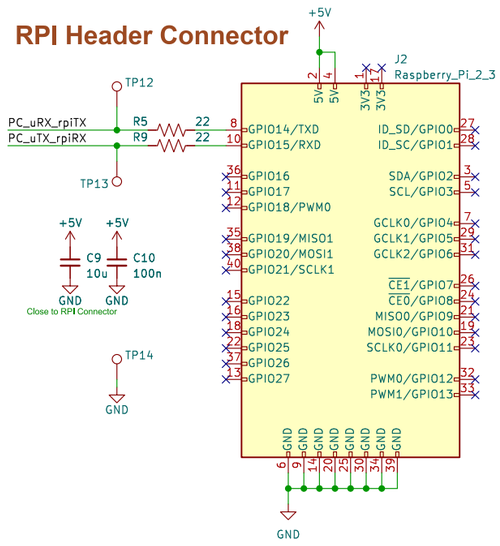

## IMU - Accelerometer and Gyro



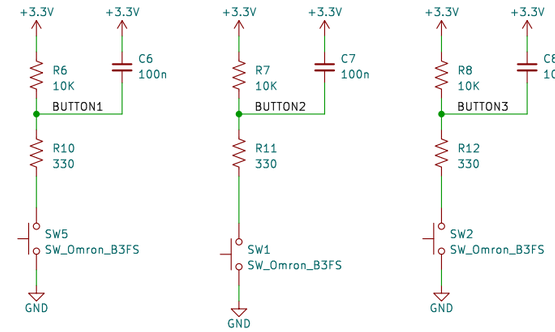

## Debug Connector Programming Port



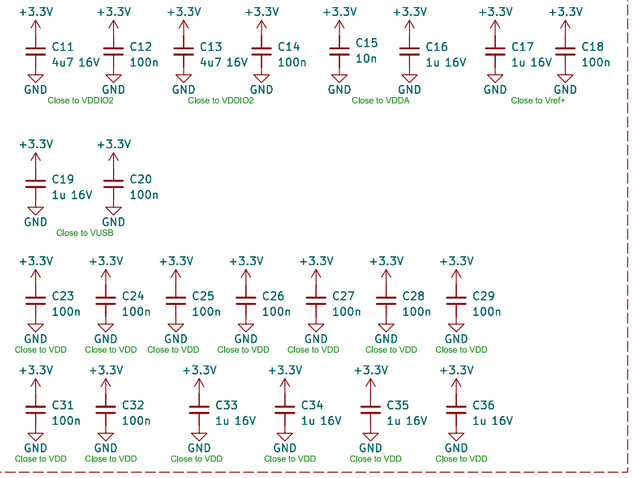

## RPI Header Connector



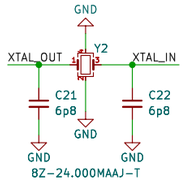

## Buttons



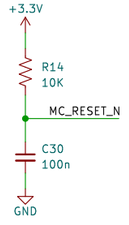

## Decoupling Caps



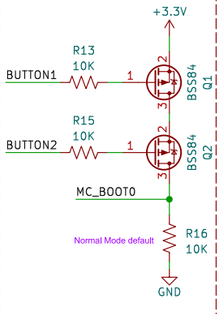

## Crystal



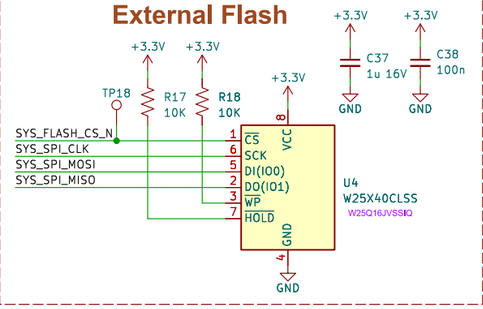

## Reset



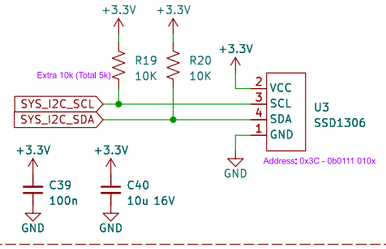

## Boot Control



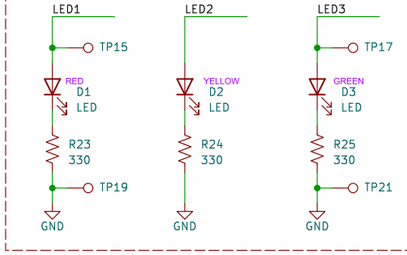

## External Flash



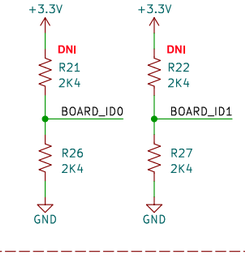

## Display OLED Module 0.96"




## LEDs




## Board ID

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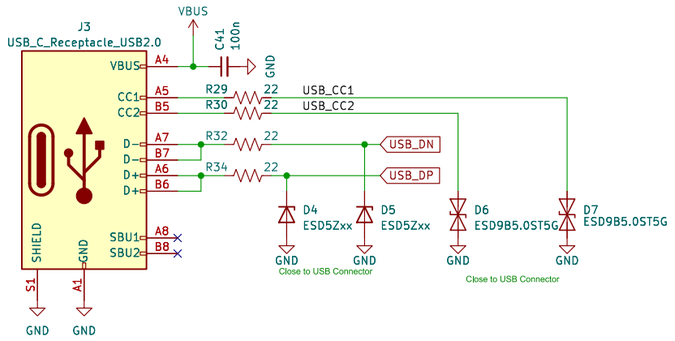
Sheet: /01–Microcontroller and Extras/
File: 01–Microcontroller and Extras.kicad_sch

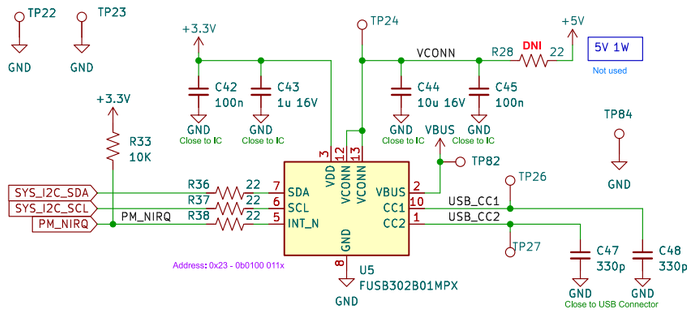
***Title: Microcontroller and Extras***

| Size: A3 | Date: 2023–02–22 | **Rev: REV A** |
|---|---|---|
| KiCad E.D.A. kicad (7.0.0) | | Id: 2/7 |

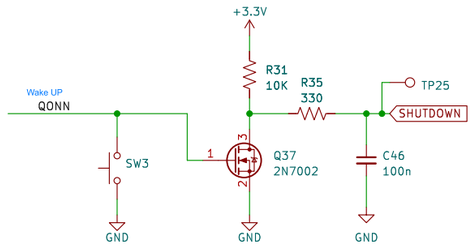
## USB C Main Connector



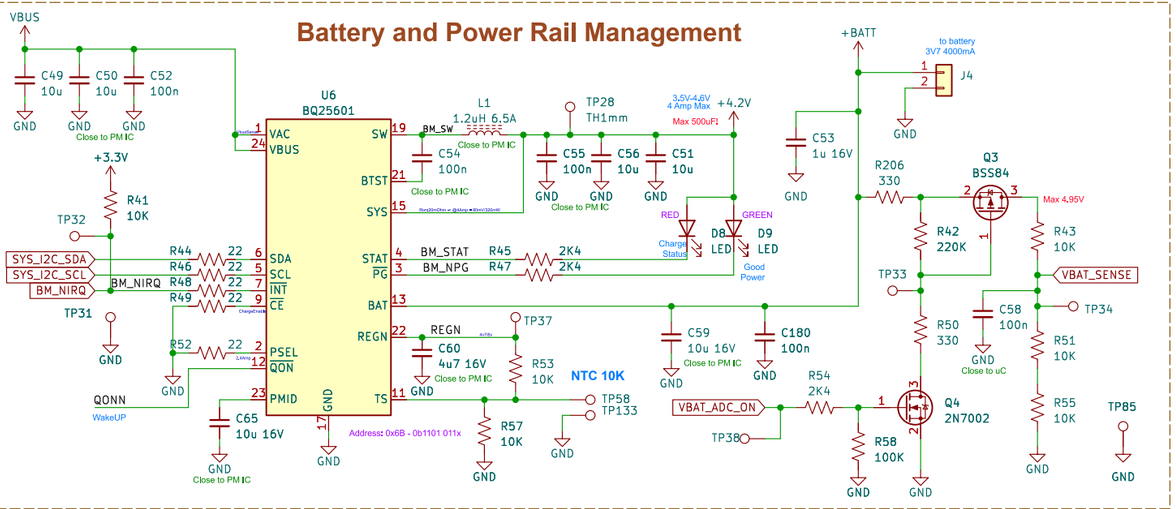

## USB Power Delivery Controller



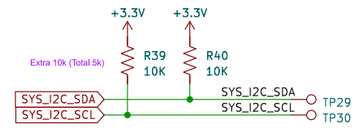

## System Shutdown and WakeUP



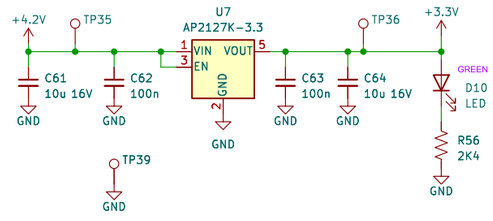

## Battery and Power Rail Management



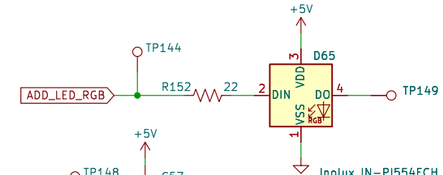

## System I2C



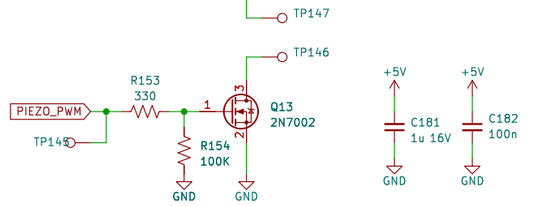

## 3V3 Power Supply



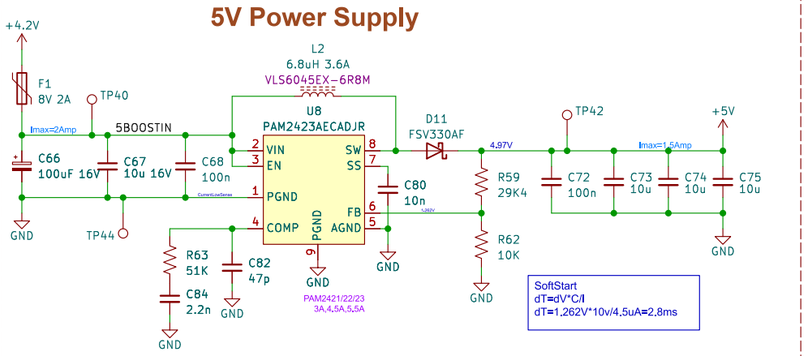

## RGB LED



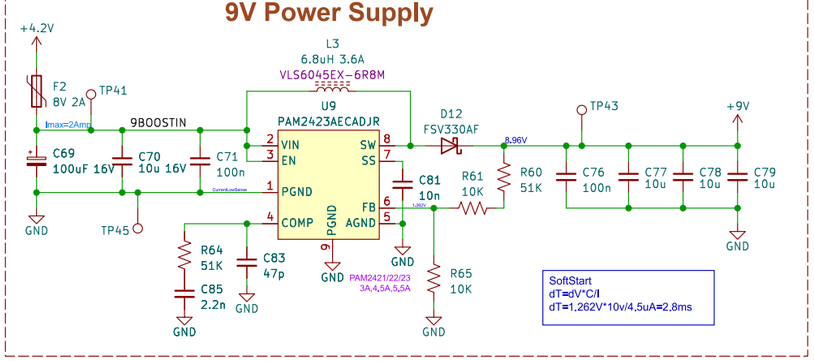

## Piezo PWM Out



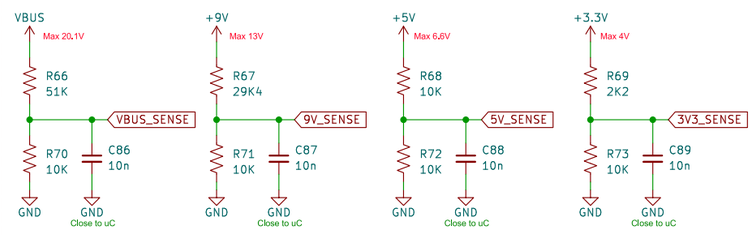

## 5V Power Supply




## 9V Power Supply




## System Input Voltage Sense





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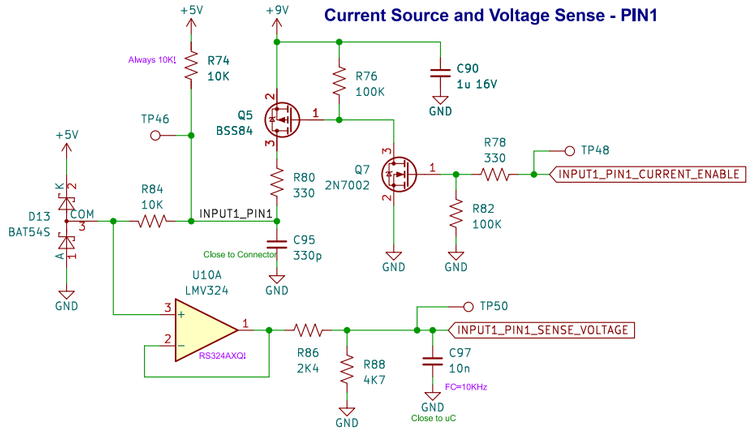
Sheet: /02-System Power Supply and USB/
File: 02-System Power Supply and USB.kicad_sch

***Title: Power supply and USB***

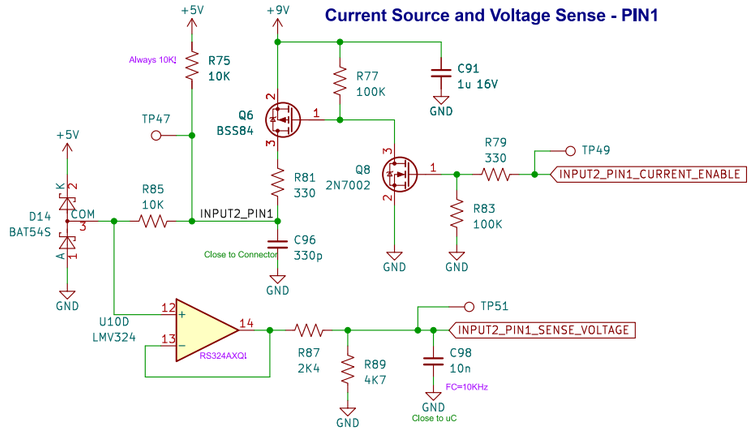
| | | |
|---|---|---|
| Size: A3 | Date: 2023-02-22 | **Rev: REV A** |
| KiCad E.D.A. kicad (7.0.0) | | Id: 3/7 |

# General SENSOR Input 1

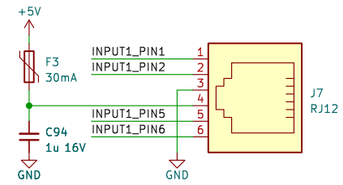
## Current Source and Voltage Sense - PIN1

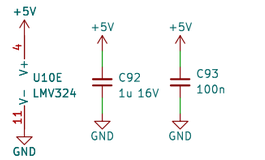



## Current Source and Voltage Sense - PIN1

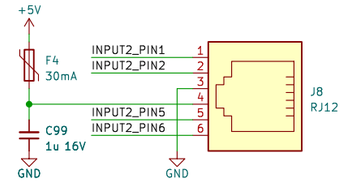



## Main Sensor Connector 1

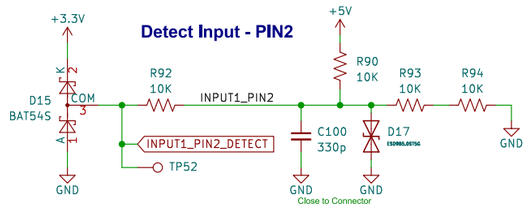


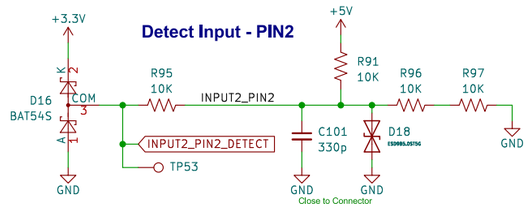

## Main Sensor Connector 2



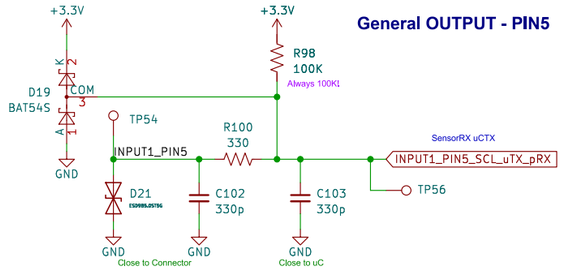

## Detect Input - PIN2



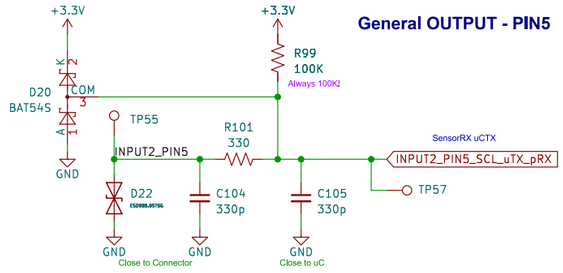

## Detect Input - PIN2



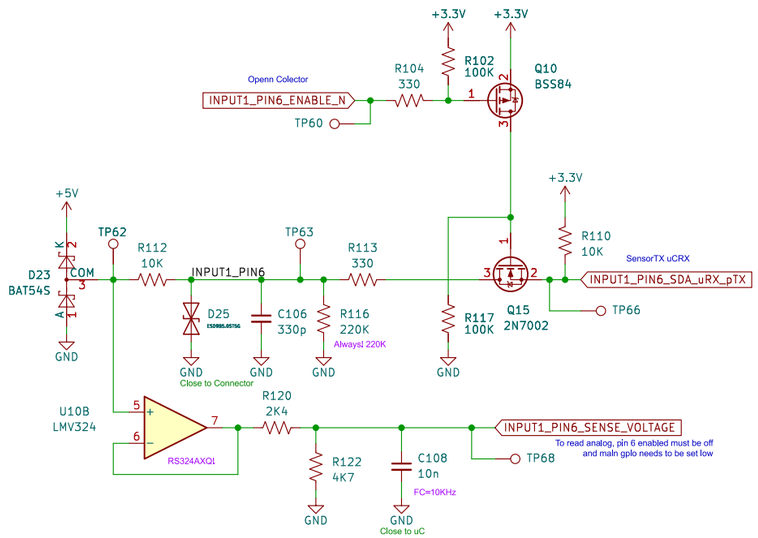

## General OUTPUT - PIN5



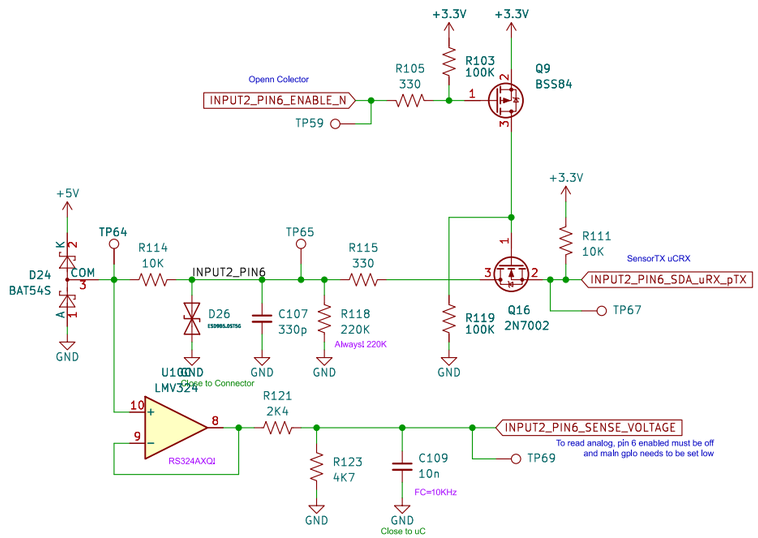

## General OUTPUT - PIN5




## General INPUT - PIN6




## General INPUT - PIN6




Pin 1. ADC@5 V ref, 9V With resistor limiter
Pin 2. GPIO, Auto ID functionality
Pin 3. Ground
Pin 4. VCC 5 V
Pin 5. Digital I/O, SCL (I2C), UART RX
Pin 6. Digital I/O, SDA (I2C), ADC@5 V ref, UART TX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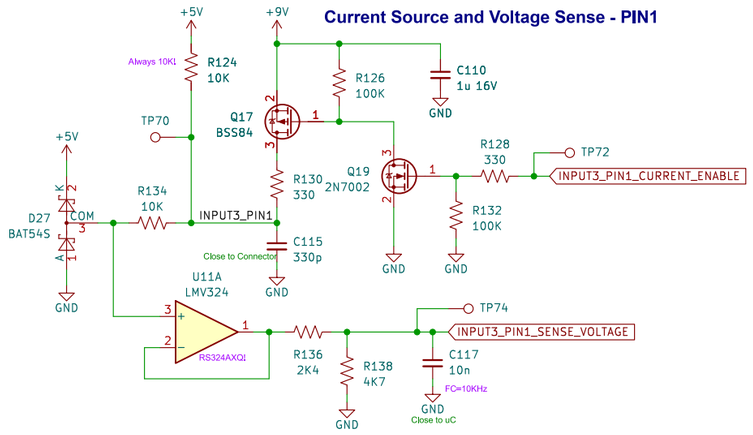
Sheet: /03-System Inputs A/
File: 03-System Inputs A.kicad_sch

**Title: System Inputs**

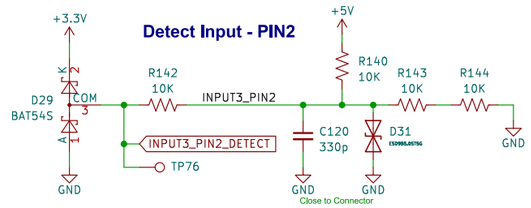
| Size: A3 | Date: 2023-02-22 | **Rev: REV A** |
|---|---|---|
| KiCad E.D.A. kicad (7.0.0) | | Id: 4/7 |

# General SENSOR Input 3

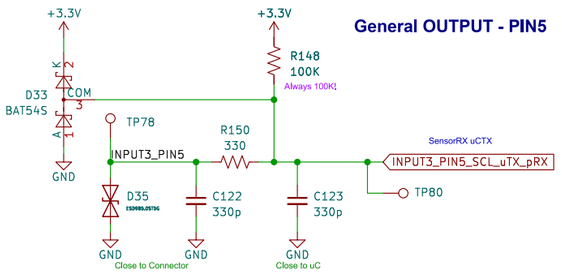
## Current Source and Voltage Sense - PIN1



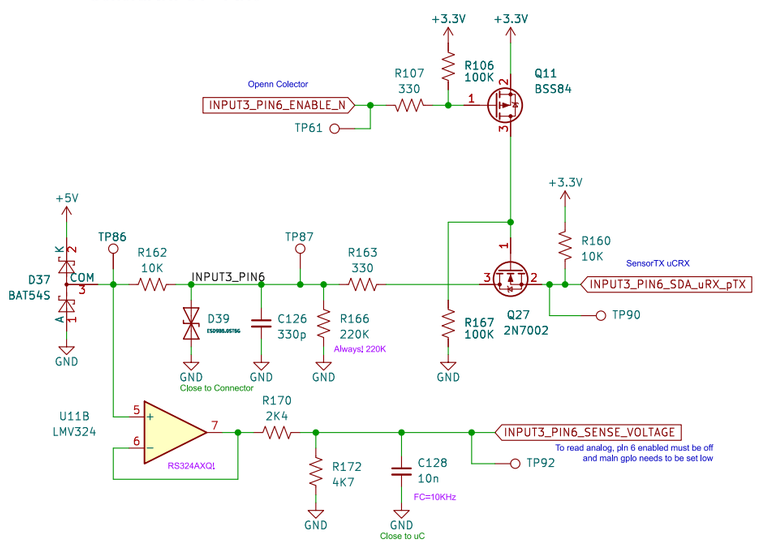

## Detect Input - PIN2




## General OUTPUT - PIN5

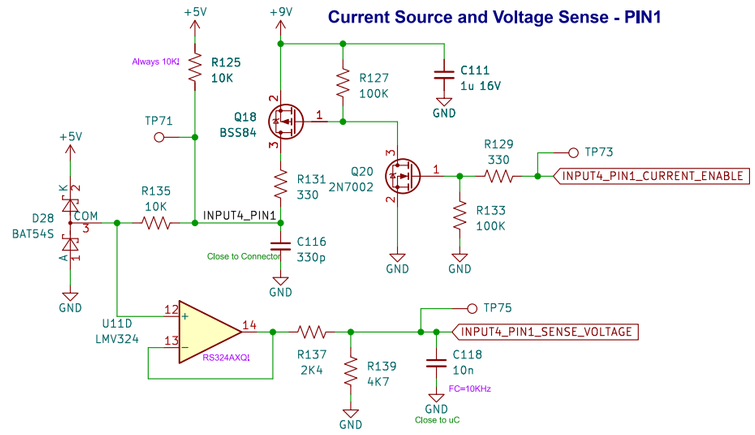



## General INPUT - PIN6

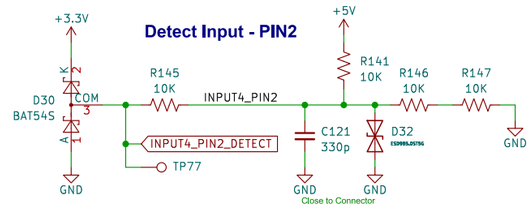



# General SENSOR Input 4

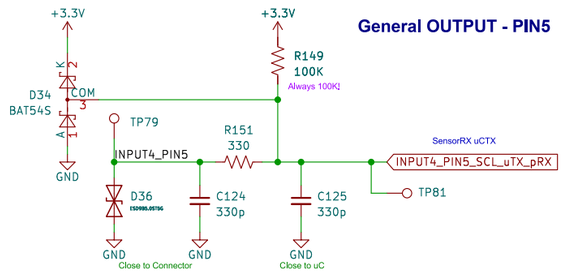
## Current Source and Voltage Sense - PIN1



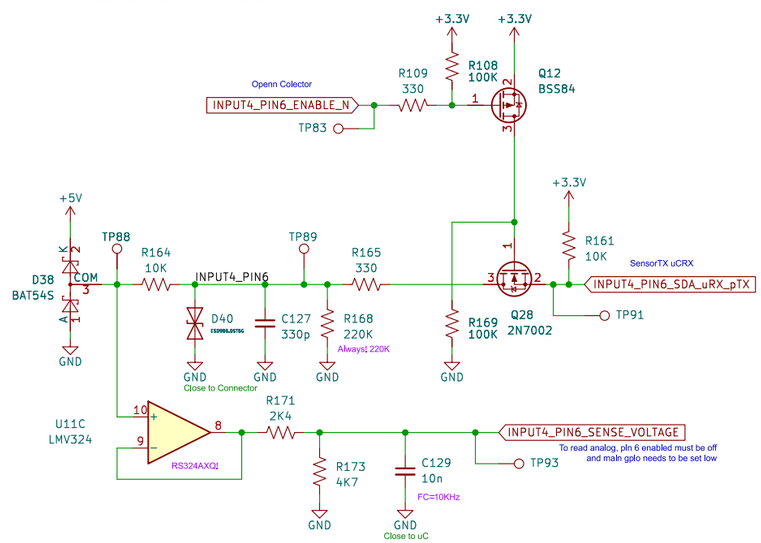

## Detect Input - PIN2



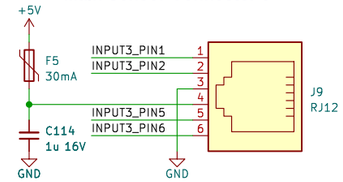

## General OUTPUT - PIN5



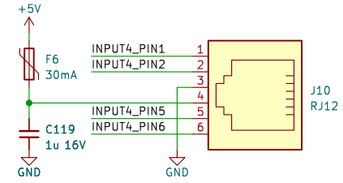

## General INPUT - PIN6

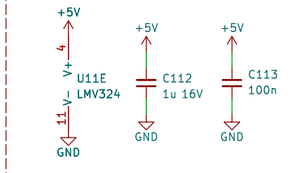



## Main Sensor Connector 3




## Main Sensor Connector 4




Pin 1. ADC@5 V ref, 9V With resistor limiter
Pin 2. GPIO, Auto ID functionality
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Pin 4. VCC 5 V
Pin 5. Digital I/O, SCL (I2C), UART RX
Pin 6. Digital I/O, SDA (I2C), ADC@5 V ref, UART TX


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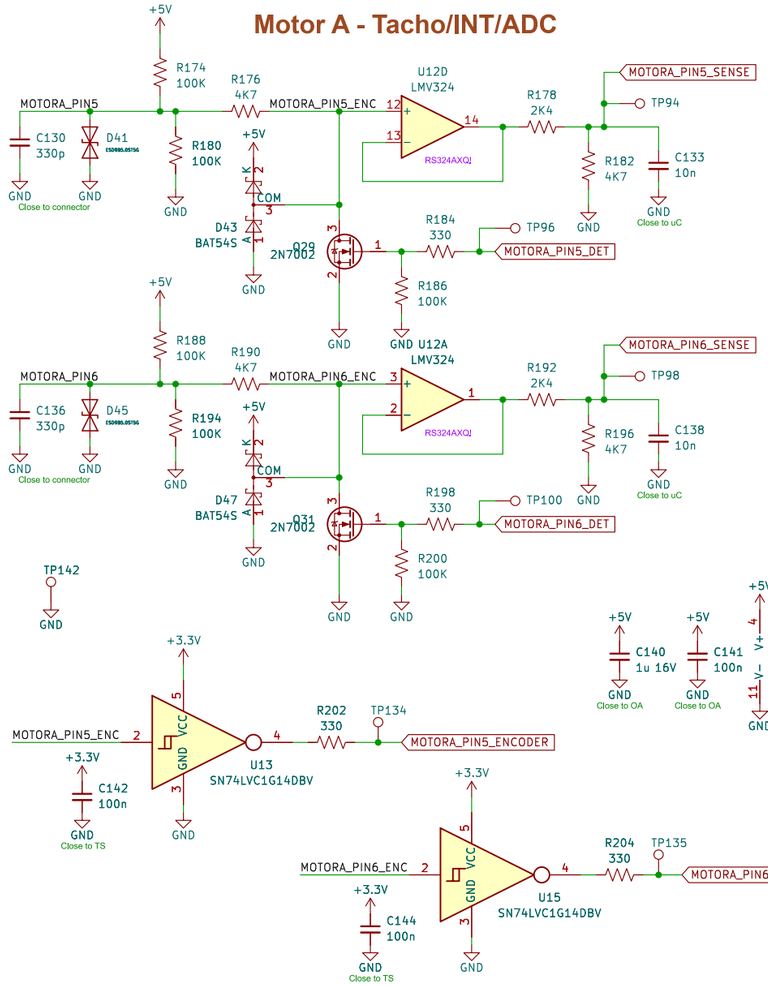
Sheet: /04-System Inputs B/
File: 04-System Inputs B.kicad_sch

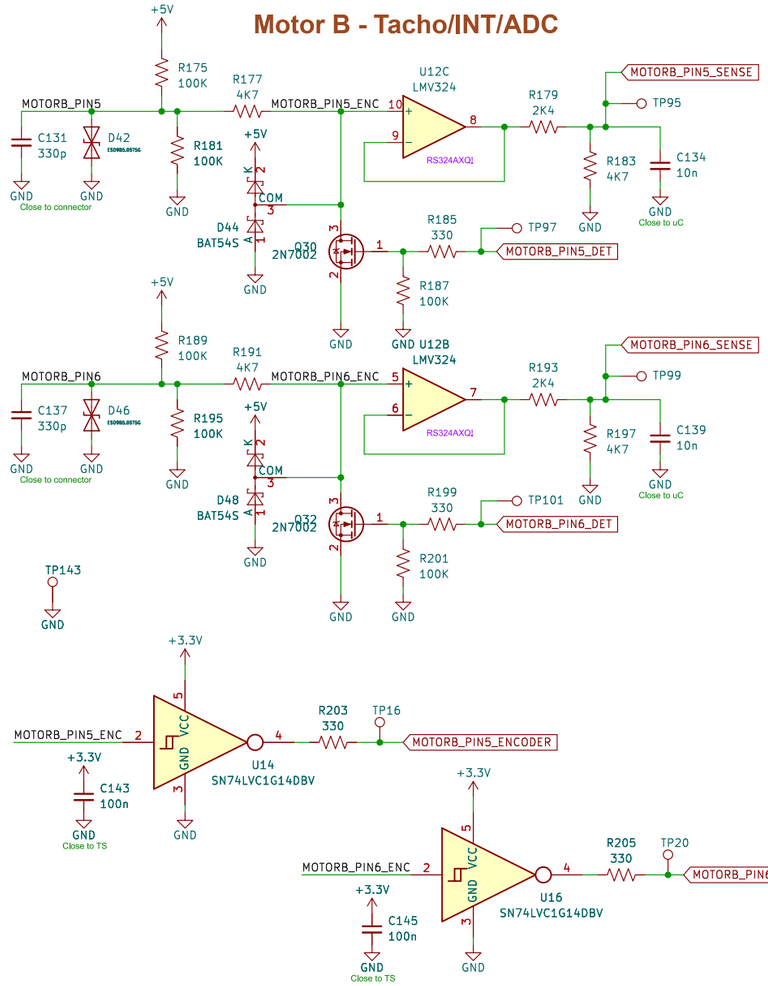
***Title: System Inputs***

| Size: A3 | Date: 2023-02-22 | **Rev: REV A** |
|---|---|---|
| KiCad E.D.A. kicad (7.0.0) | | Id: 5/7 |

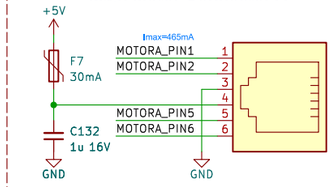
## Motor A - Tacho/INT/ADC



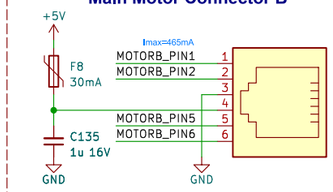

## Motor B - Tacho/INT/ADC




## Main Motor Connector A



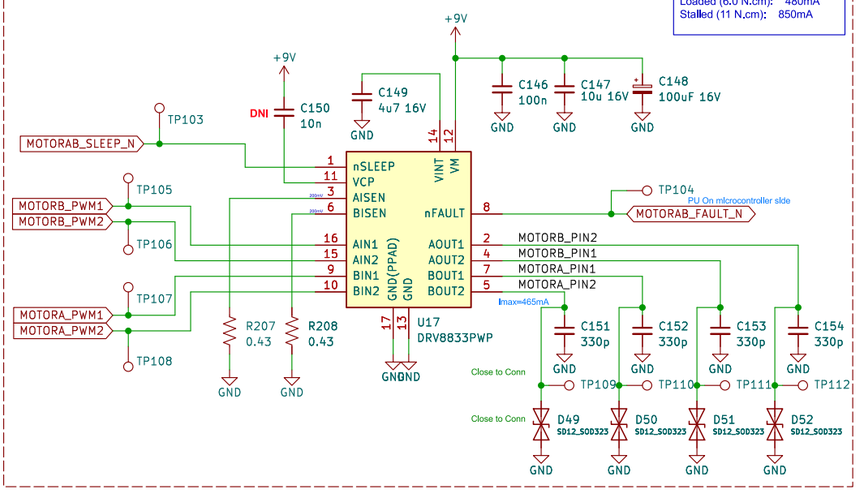

## Main Motor Connector B




Pin 1. PWM signal
Pin 2. PWM signal
Pin 3. Ground
Pin 4. VCC, 5 Volt
Pin 5. Digital I/O Tacho IC, Auto ID, ADC reference 5V
Pin 6. Digital I/O Tacho IC, Auto ID

## Motor Driver A and B

No load: 65mA
Loaded (3.6 N.cm): 310mA
Loaded (6.0 N.cm): 480mA
Stalled (11 N.cm): 850mA





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Sheet: /05-System Outputs A/
File: 05-System Outputs A.kicad_sch

***Title: System Outputs***

| Size: A3 | Date: 2023-02-22 | **Rev: REV A** |
|---|---|---|
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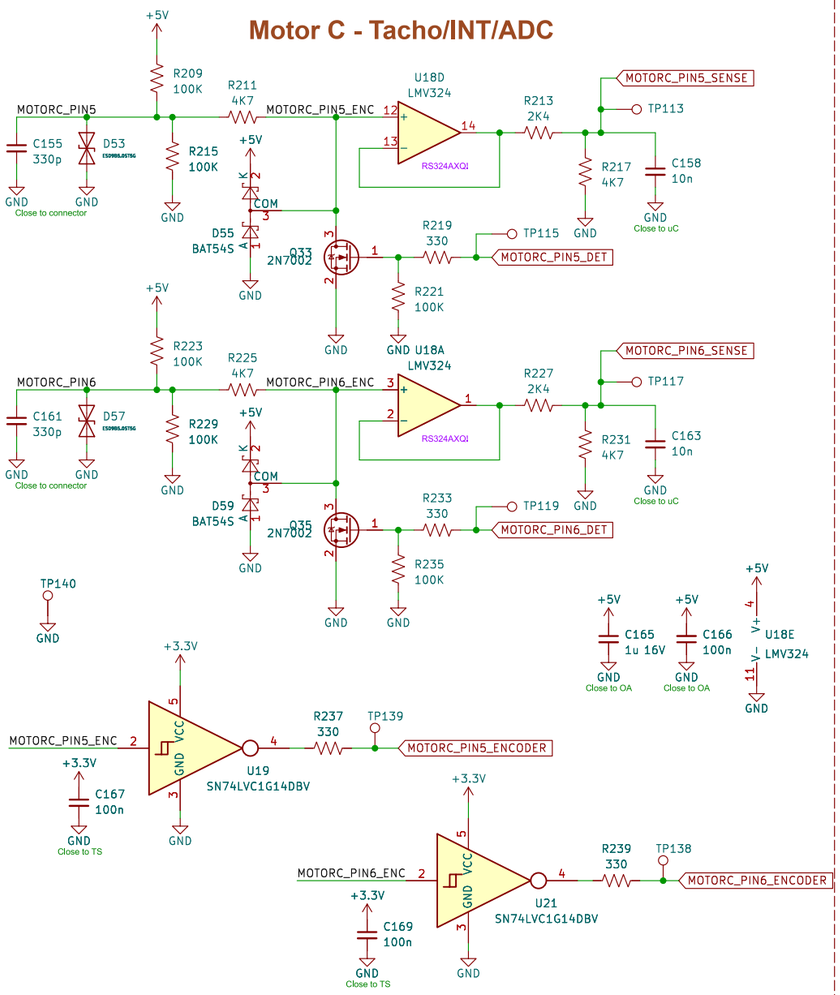
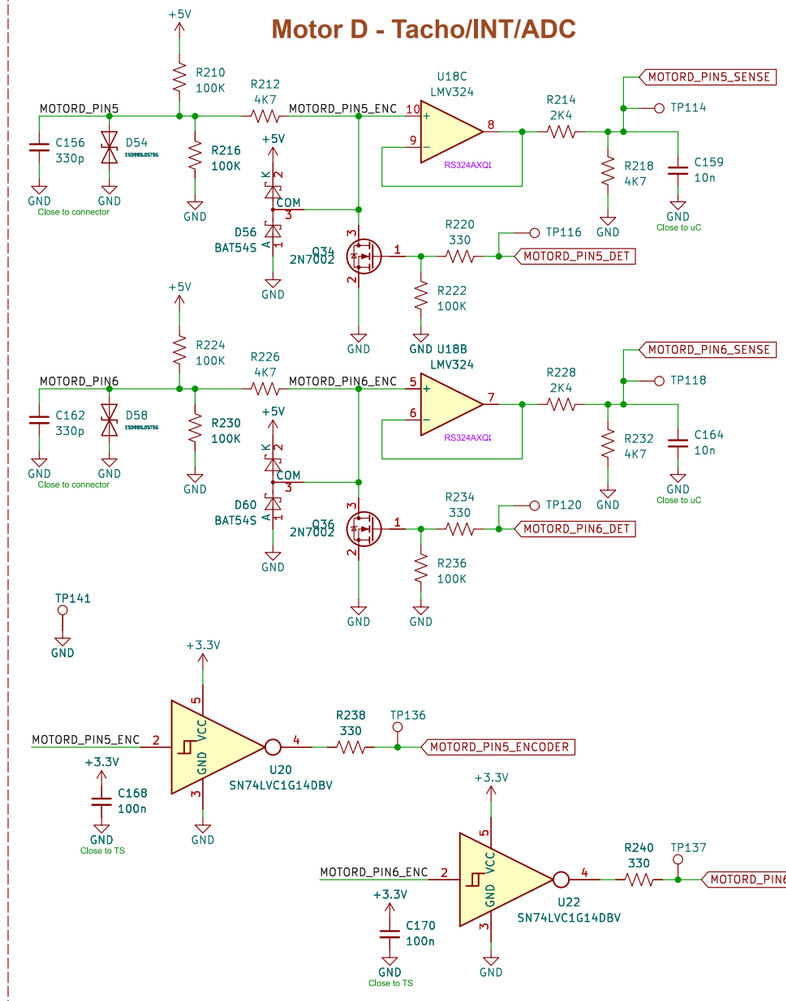
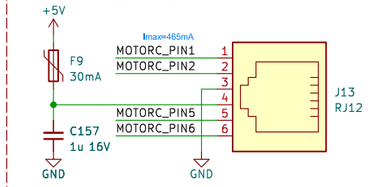
## Motor C - Tacho/INT/ADC



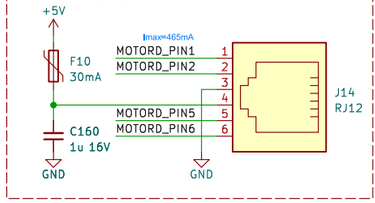

## Motor D - Tacho/INT/ADC




## Main Motor Connector C



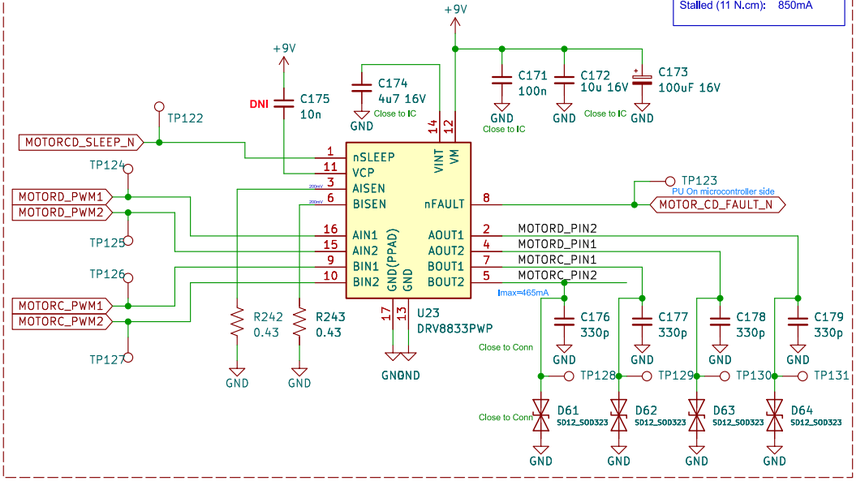

## Main Motor Connector D




1. Pin 1. PWM signal
2. Pin 2. PWM signal
3. Pin 3. Ground
4. Pin 4. VCC, 5 Volt
5. Pin 5. Digital I/O Tacho IC, Auto ID, ADC reference 5V
6. Pin 6. Digital I/O Tacho IC, Auto ID

## Motor Driver C and D

No load: 65mA
Loaded (3.6 N.cm): 310mA
Loaded (6.0 N.cm): 480mA
Stalled (11 N.cm): 850mA





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Sheet: /06-System Outputs B/
File: 06-System Outputs B.kicad_sch

***Title: System Outputs***

| | | |
|---|---|---|
| Size: A3 | Date: 2023-02-22 | **Rev: REV A** |
| KiCad E.D.A. kicad (7.0.0) | | Id: 7/7 |