

# ASH Power

Variant: [No Variations]

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## Introduction

This board manages power control and distribution for my Octapod.

The power board has the following responsibilities:

- \* Regulate servo voltage from 2 or 3S Li-ion battery packs.
- \* Measure voltage and current to servos.
- \* Supply the main board with power (not regulated).
- \* Provide soft-start functionality for servos.
- \* Control power on/off to servos.
- \* Protect batteries with UVLO and OVLO.
- \* Integrated charger using external USB-C supply.
- \* Provide an interface for both main board MCU(I2C) and NVM(serial-SCPI).

## Specifications

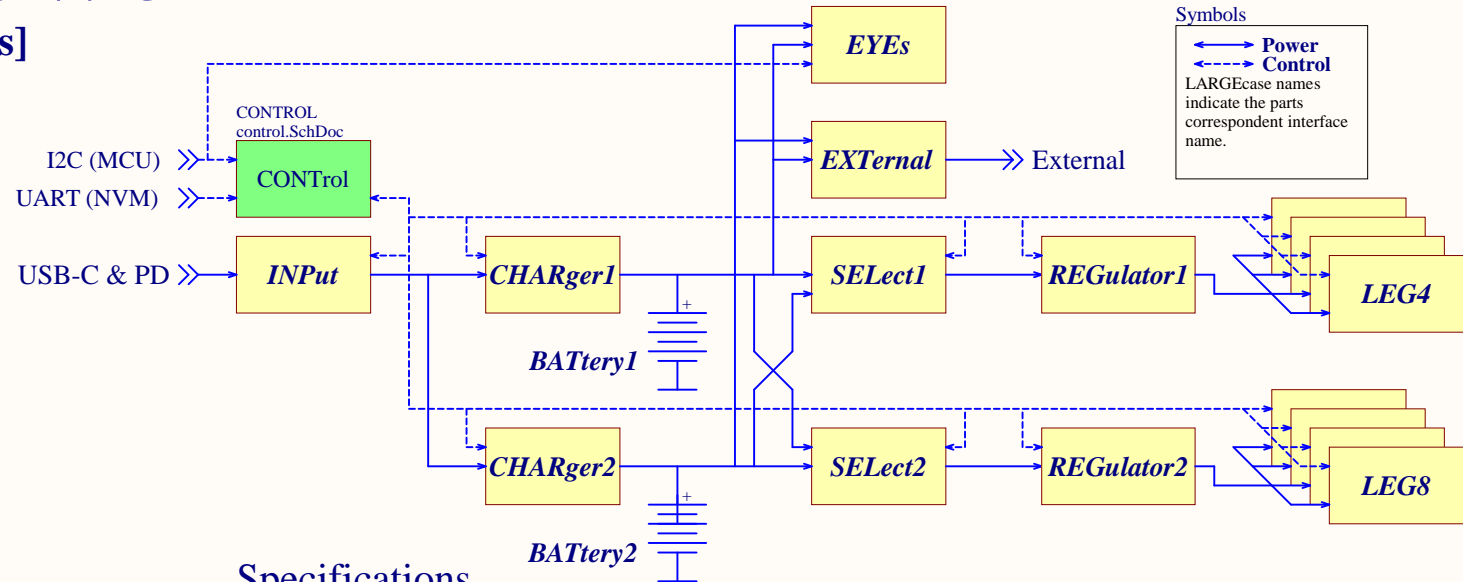
- \* Serial interface
- \* I2C control address:
  - CONTrol: 0x70
  - EYEs: 0x48
- \* I2C slave addresses:
  - USB-PD: 0x28
  - Mux: 0x70 (1,2)
  - Charger: 0x6D
  - Leg-control: 0x60-0x63
  - Leg-isense: 0x70-0x73

### Carrier connector

- 1 - NC
- 2 - GND
- 3 - \MASTER\_FAULT
- 4 - NC
- 5 - \BATTERY\_LOW
- 6 - NC
- 7 - SELF\_TEST\_OK
- 8 - NC
- 9 - RX (Carrier TX)
- 10 - TX (Carrier RX)

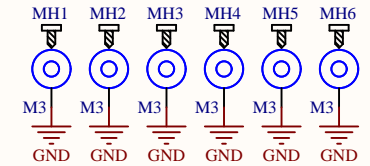
### External connector

- 1 - SCL
- 2 - GND
- 3 - GND
- 4 - SDA
- 5 - VS
- 6 - VS



### Symbols

Power  
Control  
LARGEcase names indicate the parts correspondent interface name.



Title **ASH Power - Cover**

GPA Robotics

Size: **A4**

Number: **1**

Revision: **1**

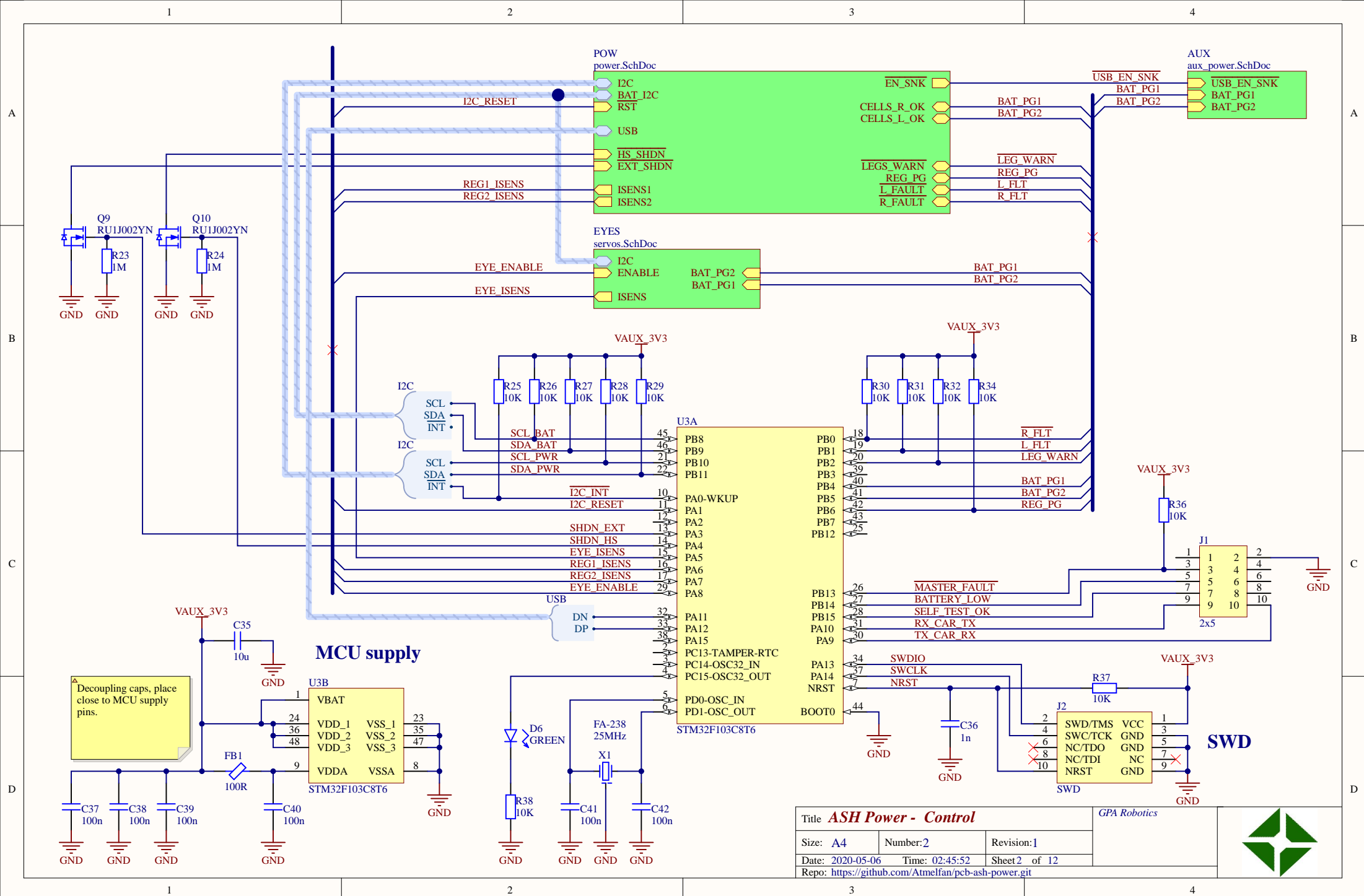
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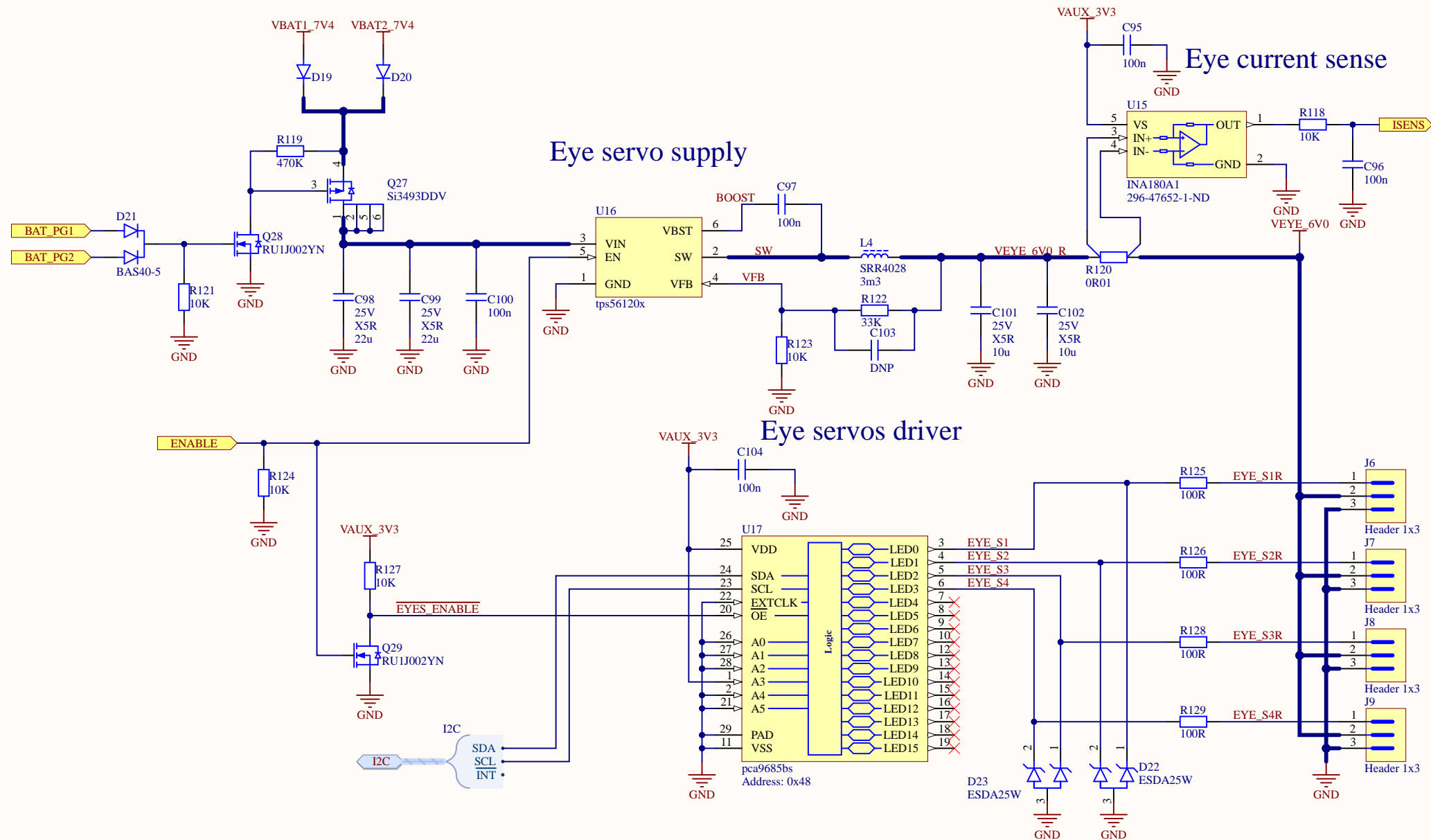
Time: **02:45:52**

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Repo: <https://github.com/Atmelfan/pcb-ash-power.git>







Title **ASH Power - Eye servos**

GPA Robotics

Size: **A4**

Number: **3**

Revision: **1**

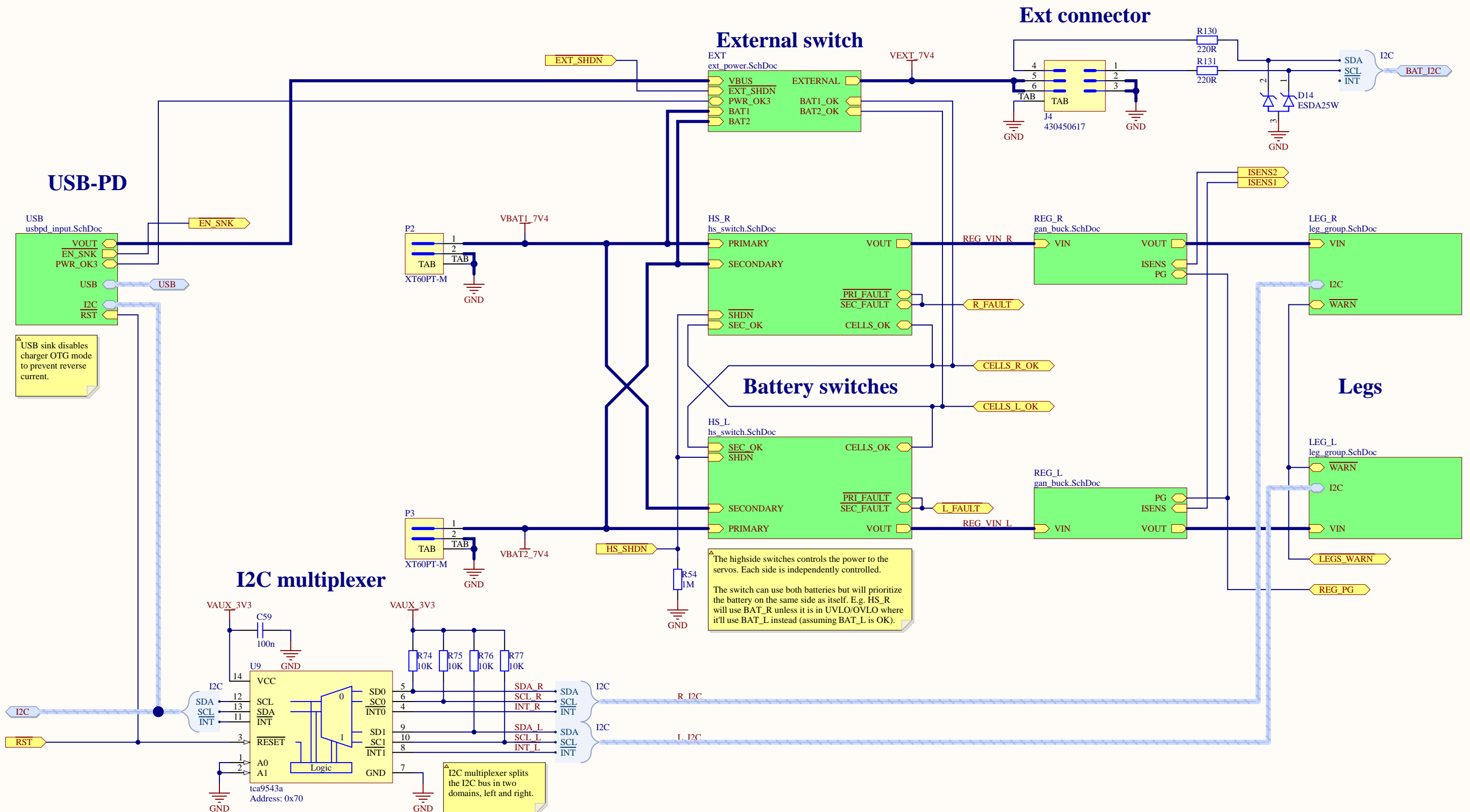
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Time: **02:45:52**

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Repo: <https://github.com/Atmelfan/pcb-ash-power.git>







A

B

C

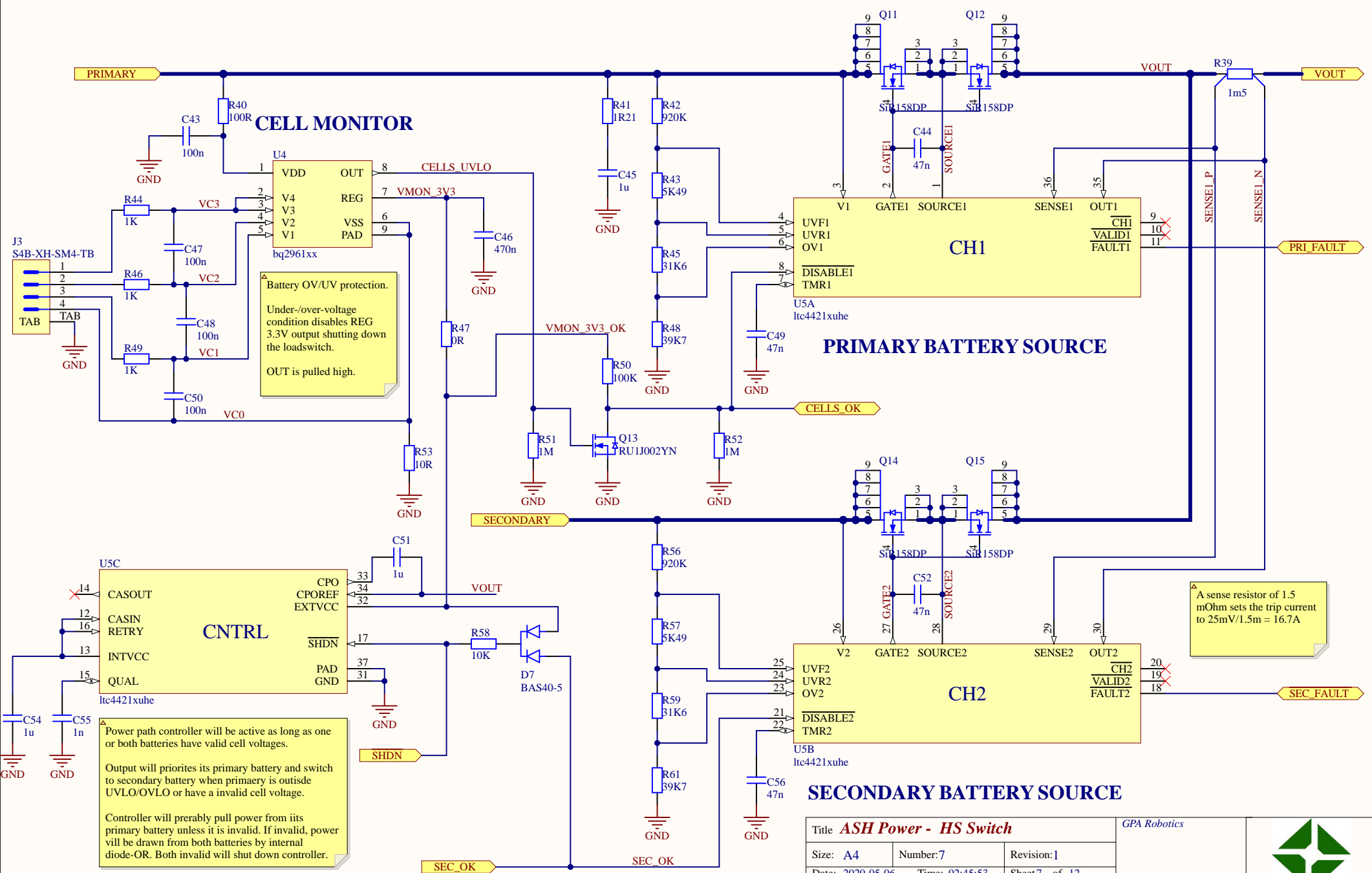
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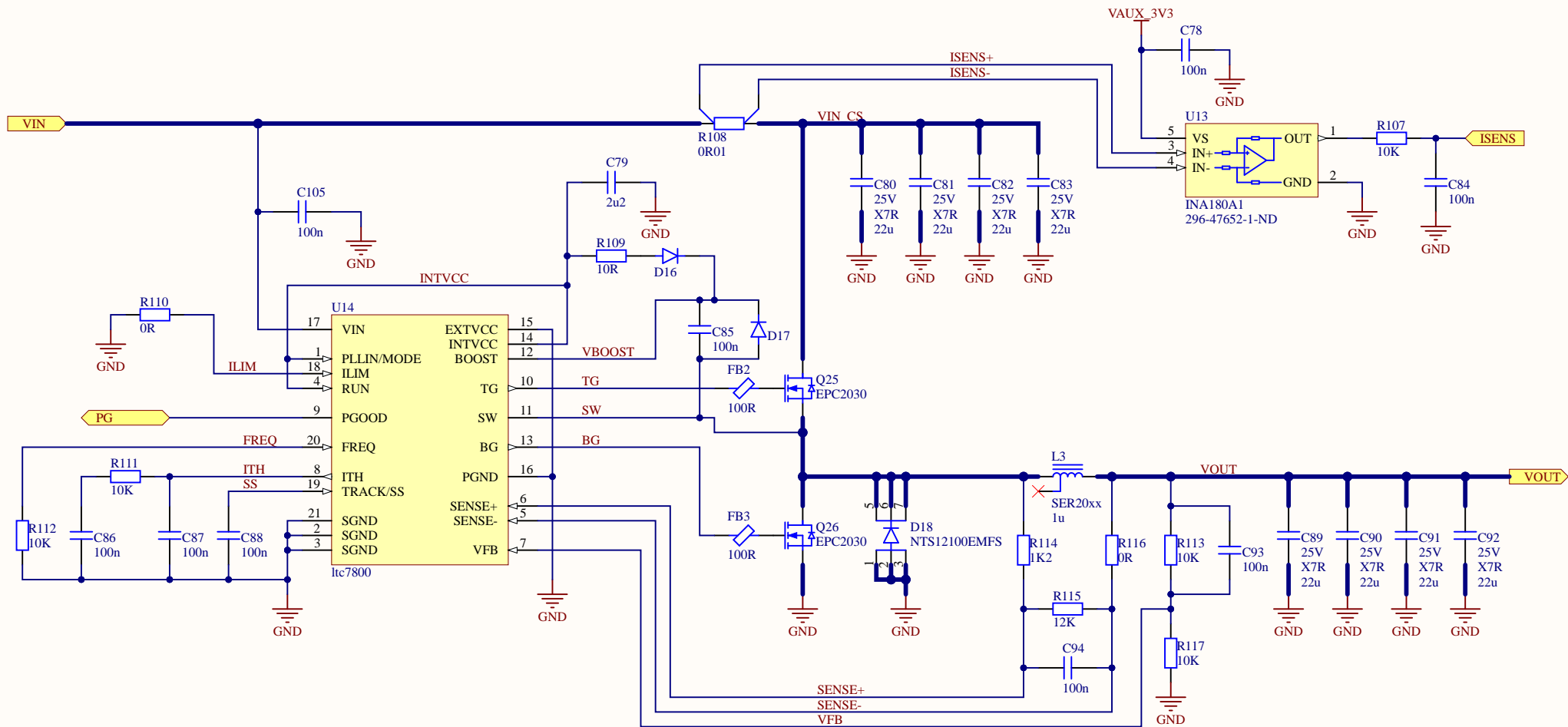
A

B

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D





Title **ASH Power - GaN Step-down**

GPA Robotics

Size: **A4**

Number: **8**

Revision: **1**

Date: **2020-05-06**

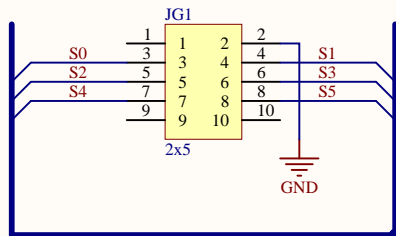
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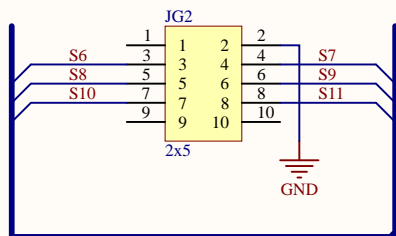
Repo: <https://github.com/Atmelfan/pcb-ash-power.git>



## Front pair

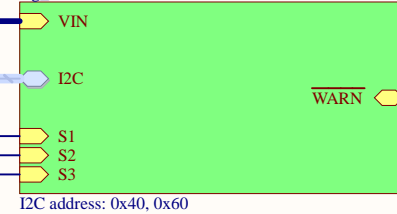


## Back pair



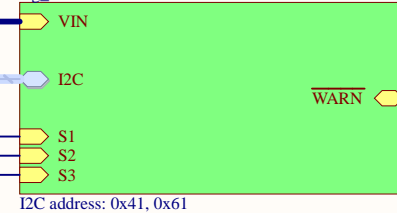
## LEG1

leg\_module.SchDoc



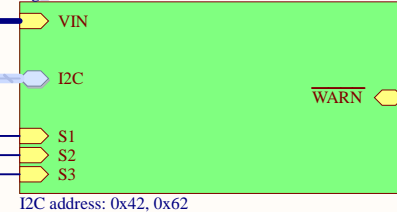
## LEG2

leg\_module.SchDoc



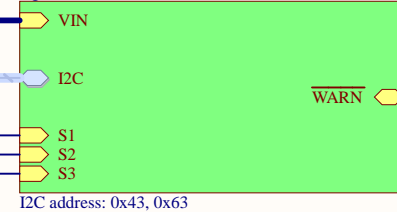
## LEG3

leg\_module.SchDoc



## LEG4

leg\_module.SchDoc



The board has two leg groups, right and left. Each group consists of four legs which is further divided into two pairs, front and back. Each pair has a input PWM signal connector (JG1 and JG2).

Each leg has its own independent step-down converter and power monitor (for each of the legs three servos).

Title **ASH Power - Leg group**

GPA Robotics

Size: A4

Number: 9

Revision: 1

Date: 2020-05-06

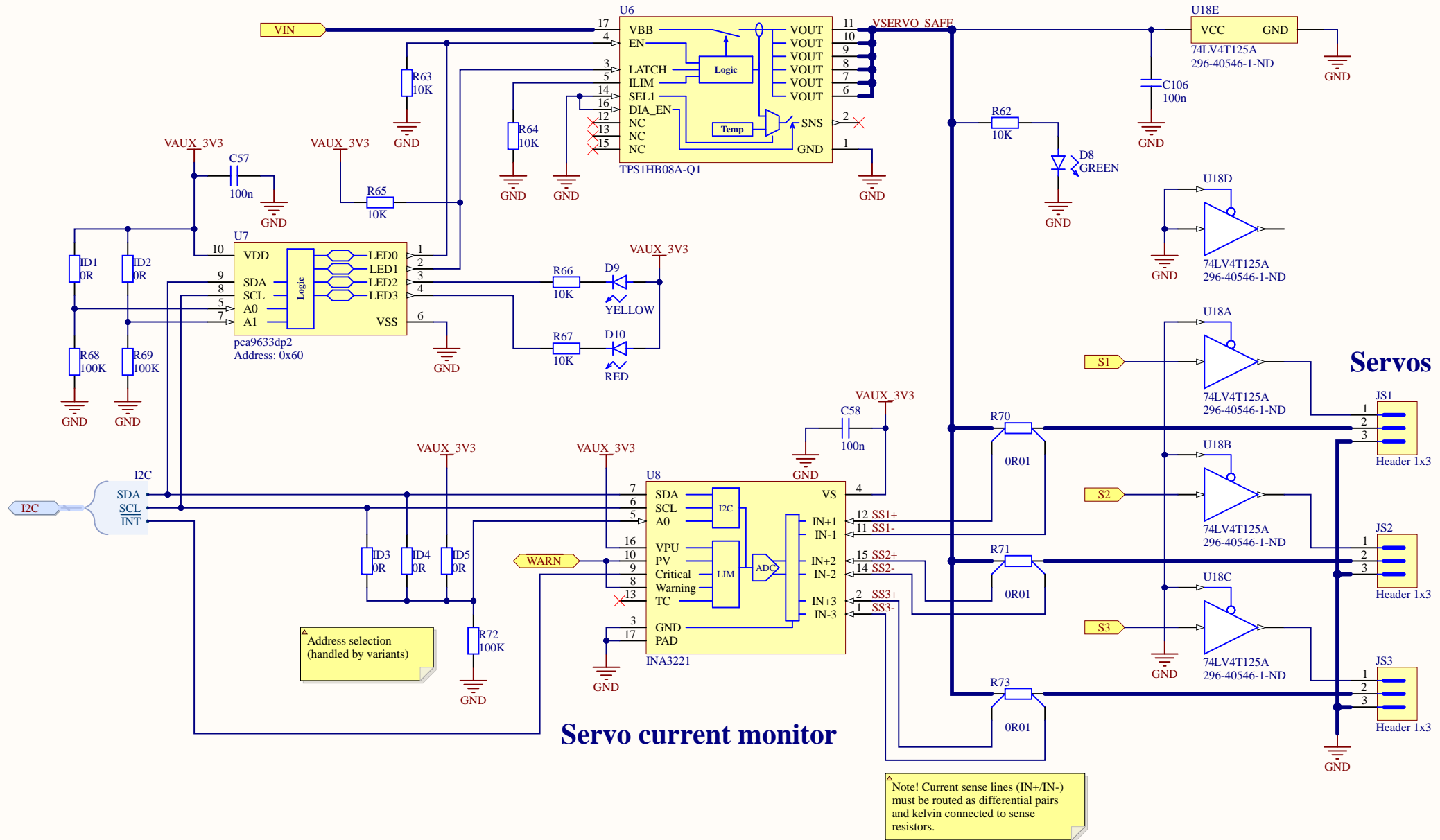
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Repo: <https://github.com/Atmelfan/pcb-ash-power.git>





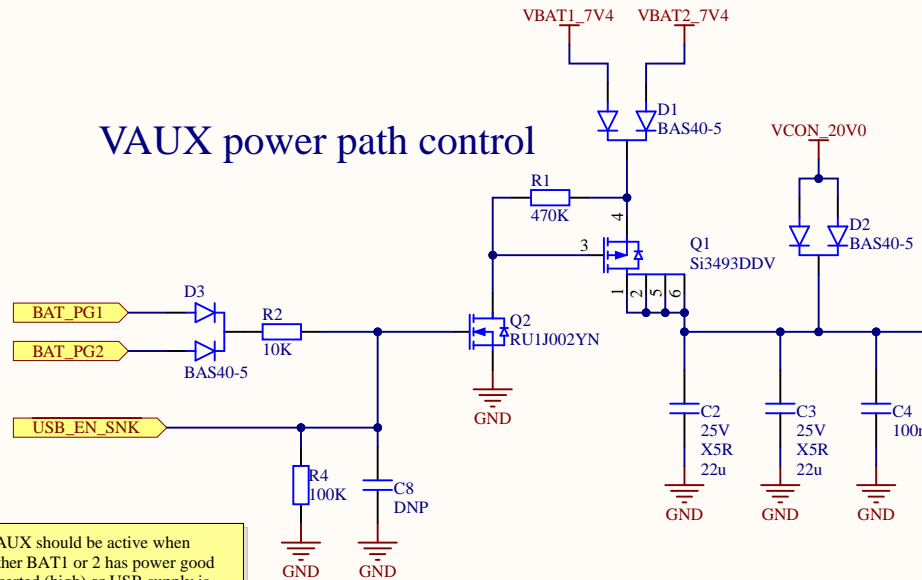


Servo current monitor

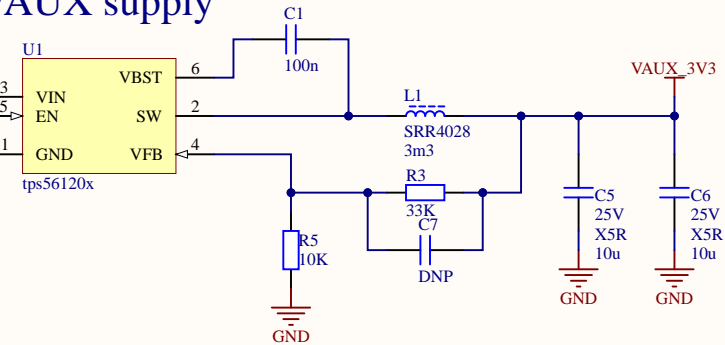
Servos

Note! Current sense lines (IN+/IN-) must be routed as differential pairs and kelvin connected to sense resistors.

## VAUX power path control



## VAUX supply



VAUX supplies the control circuitry of the power board.

VAUX should be active when either BAT1 or 2 has power good asserted (high) or USB supply is available.

If USB supply is available (5-20V) batteries should not be used for VAUX (even if VBATn > VBUS).

Title **ASH Power - AUX supply**

GPA Robotics

Size: **A4**

Number: **11**

Revision: **1**

Date: **2020-05-06**

Time: **02:45:53**

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Repo: <https://github.com/Atmelfan/pcb-ash-power.git>



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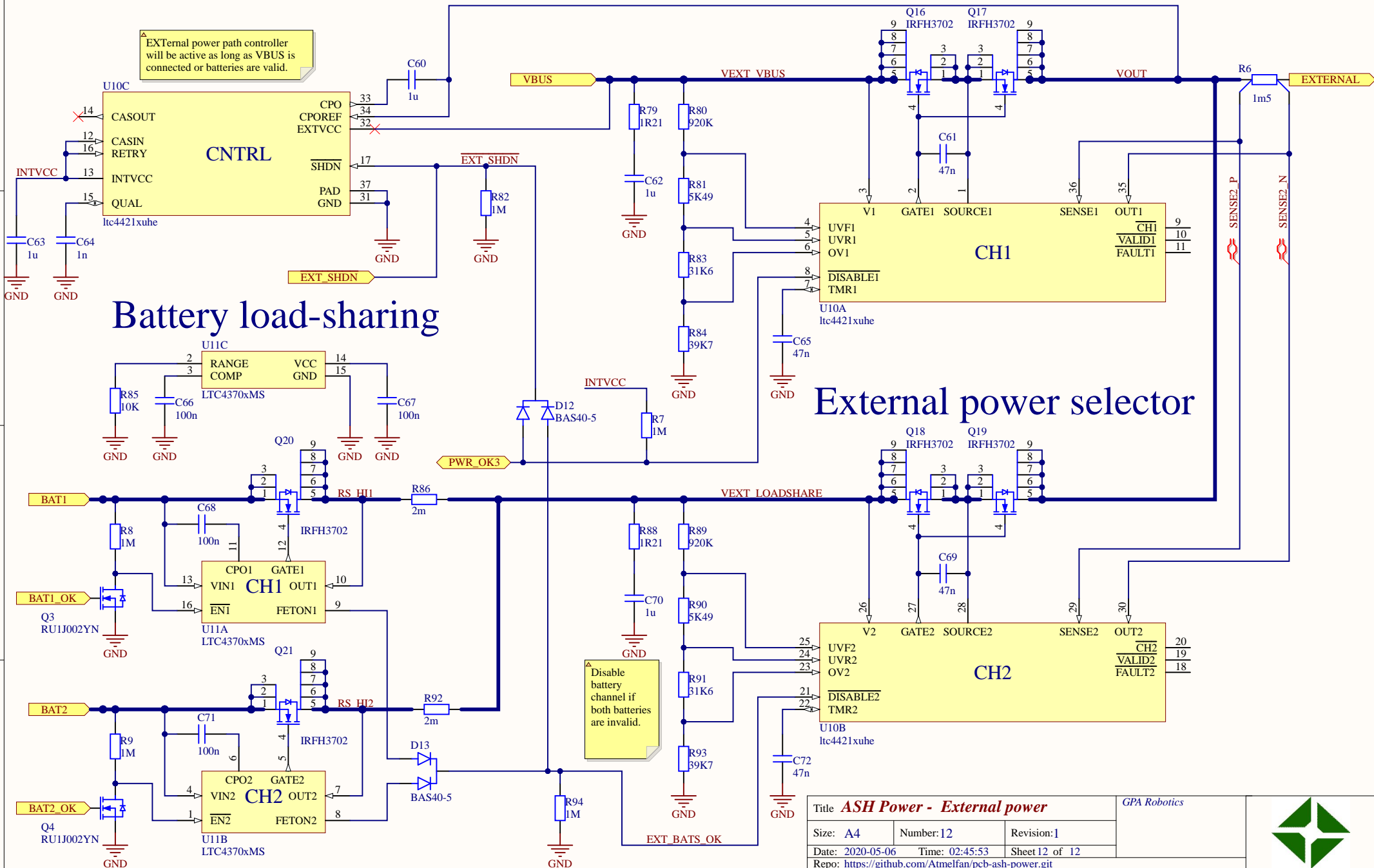
A

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D

EXTERNAL power path controller  
will be active as long as VBUS is  
connected or batteries are valid.



Title **ASH Power - External power**

GPA Robotics

Size: A4

Number: 12

Revision: 1

Date: 2020-05-06

Time: 02:45:53

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Repo: <https://github.com/Atmelfan/pcb-ash-power.git>

