

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

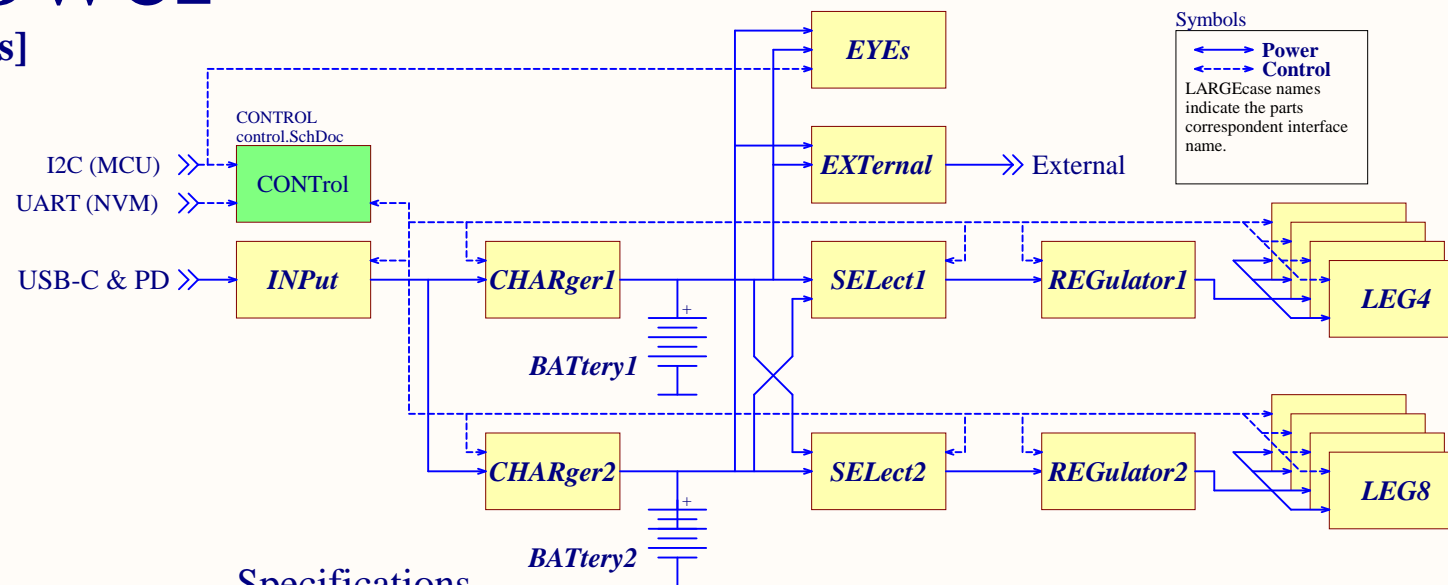
- * Serial interface
- * I2C control address:
 - CONTrol: 0x70
 - EYEs: 0x48
- * I2C slave addresses:
 - USB-PD: 0x28
 - Mux: 0x70 (1,2)
 - Charger: 0x6D
 - Leg-control: 0x60-0x63
 - Leg-isense: 0x70-0x73

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)

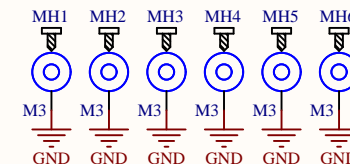
External connector

- 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

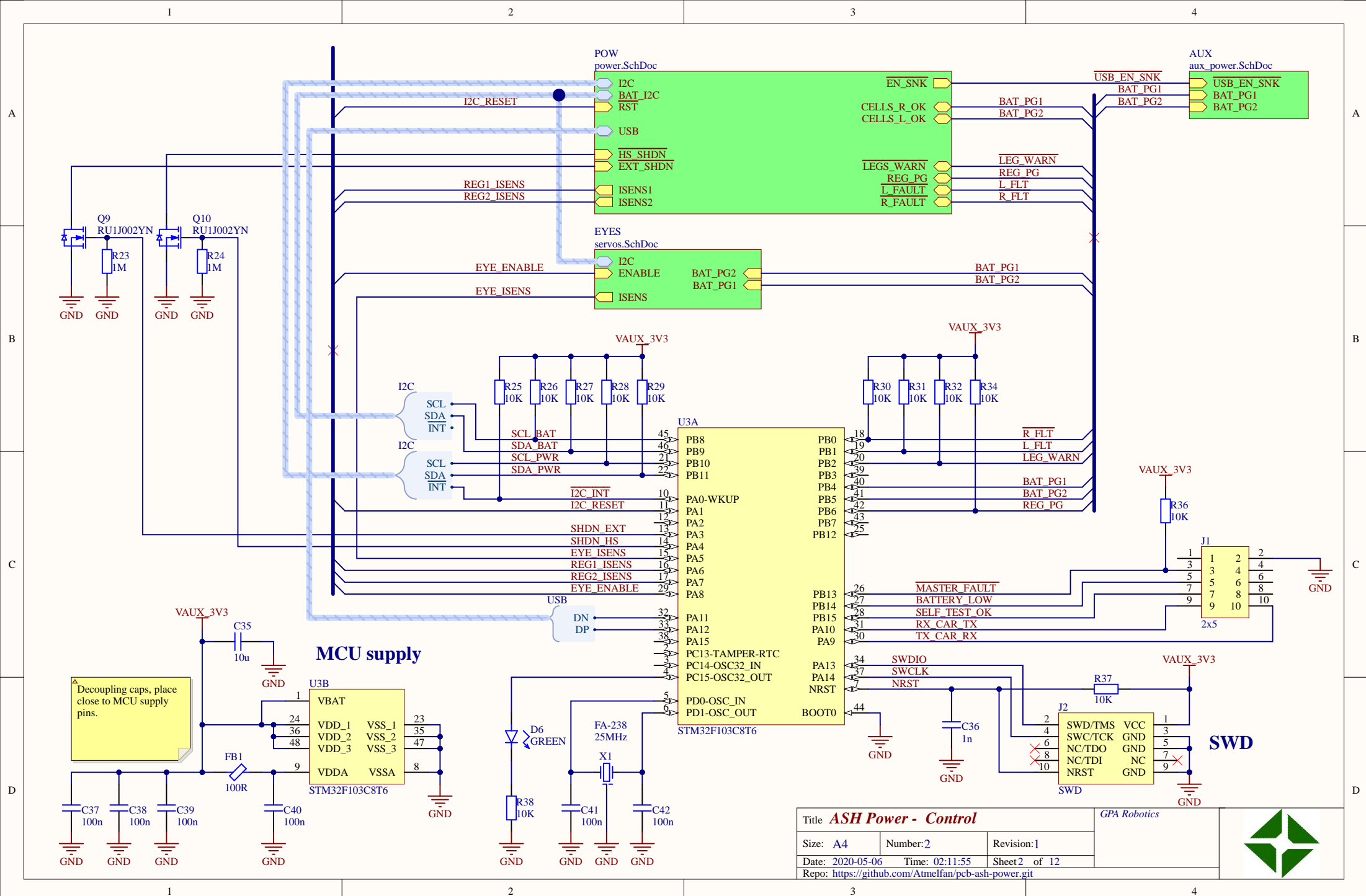
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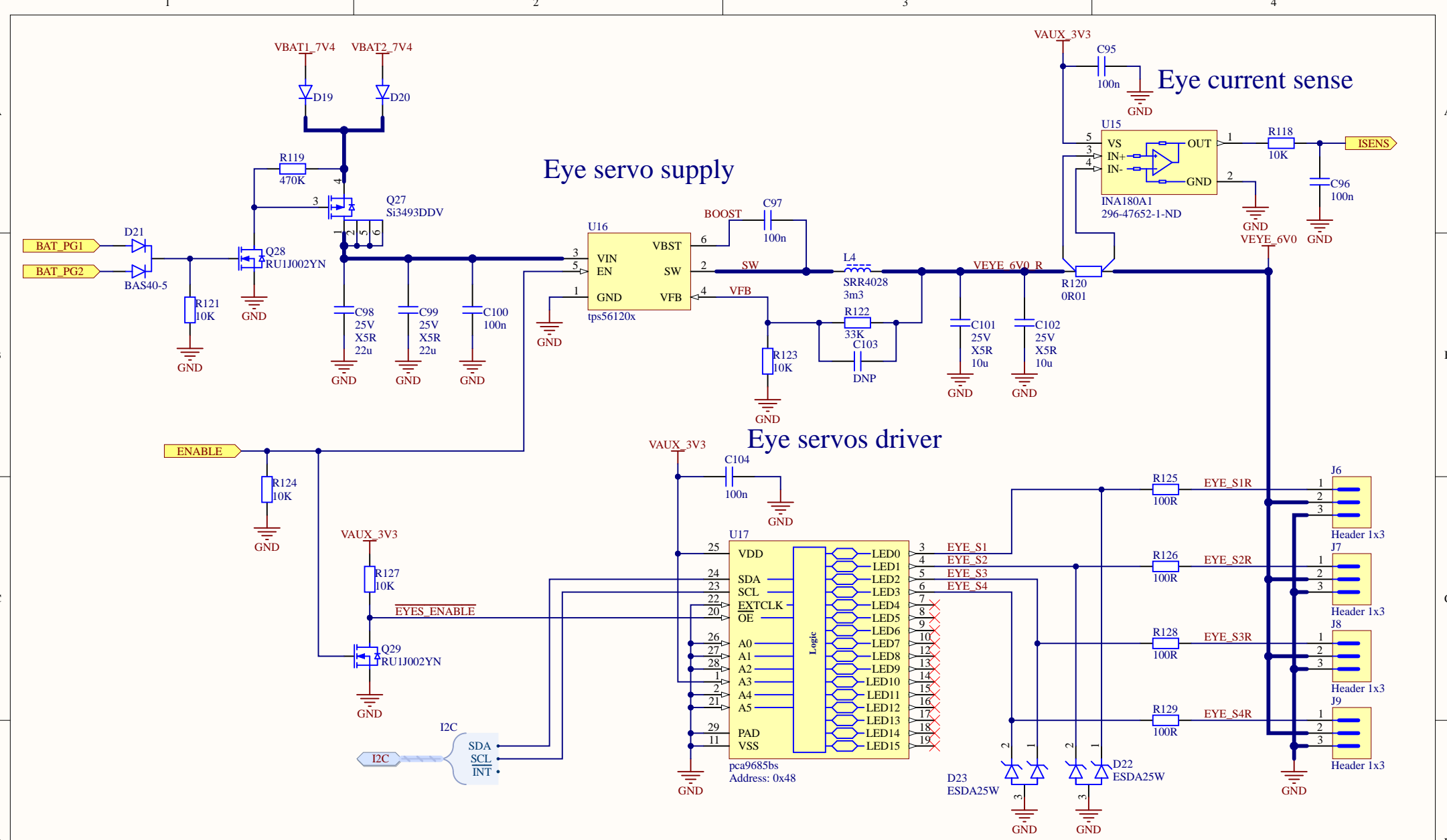
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Repo: <https://github.com/Atmelfan/pcb-ash-power.git>







Title **ASH Power - Eye servos**

GPA Robotics

Size: **A4**

Number: **3**

Revision: **1**

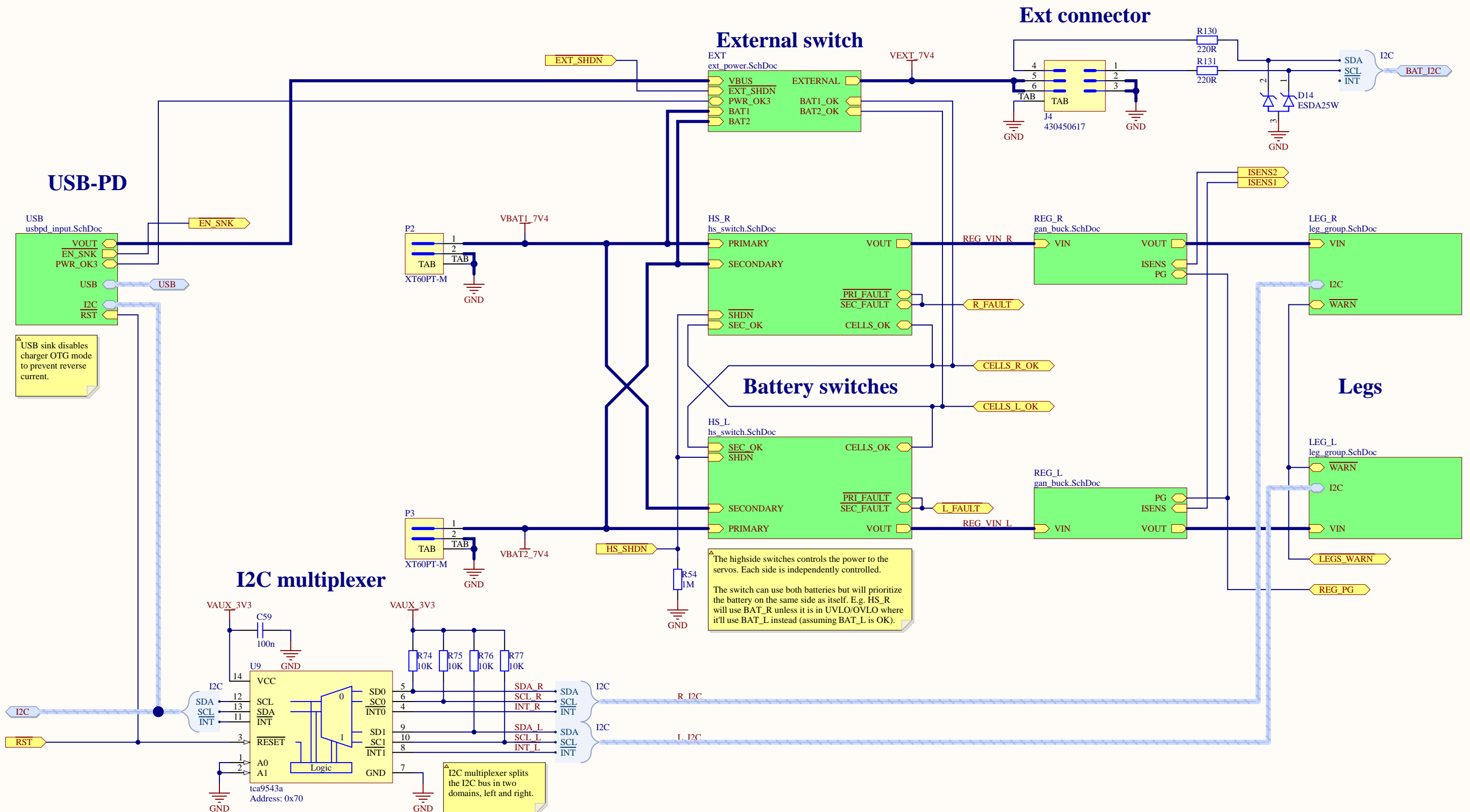
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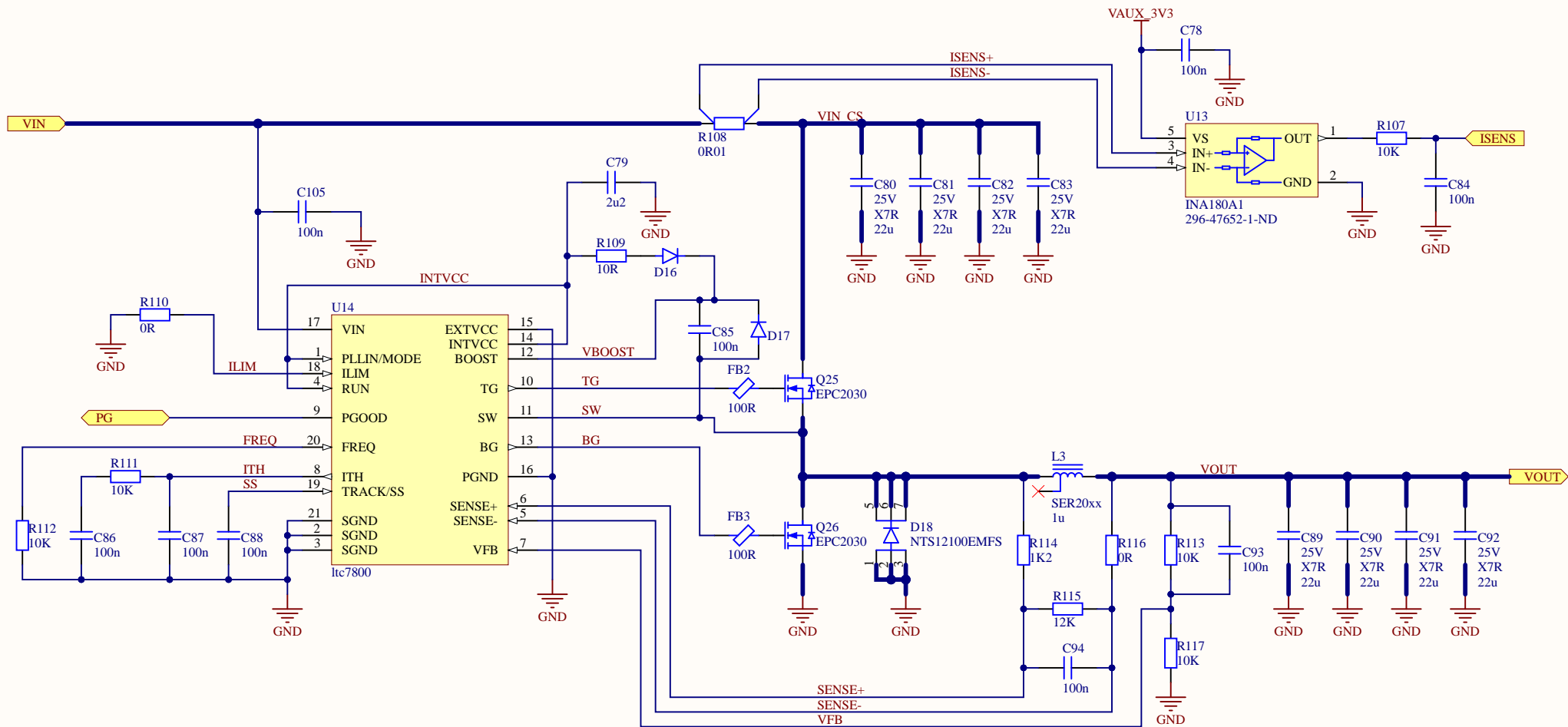
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Repo: <https://github.com/Atmelfan/pcb-ash-power.git>









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

GPA Robotics

Size: **A4**

Number: **8**

Revision: **1**

Date: **2020-05-06**

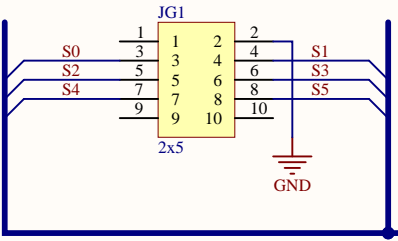
Time: **02:11:56**

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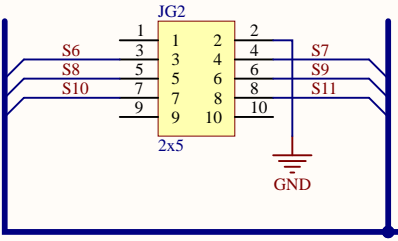
Repo: <https://github.com/Atmelfan/pcb-ash-power.git>



Front pair



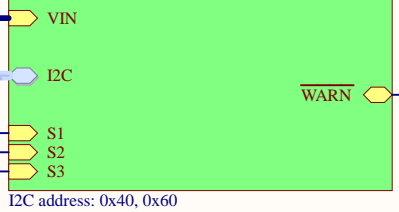
Back pair



VIN

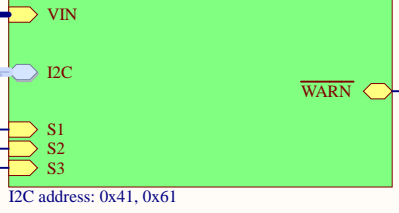
LEG1

leg_module.SchDoc



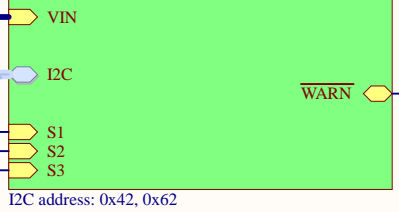
LEG2

leg_module.SchDoc



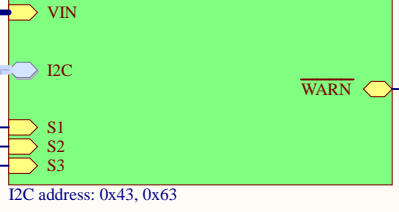
LEG3

leg_module.SchDoc



LEG4

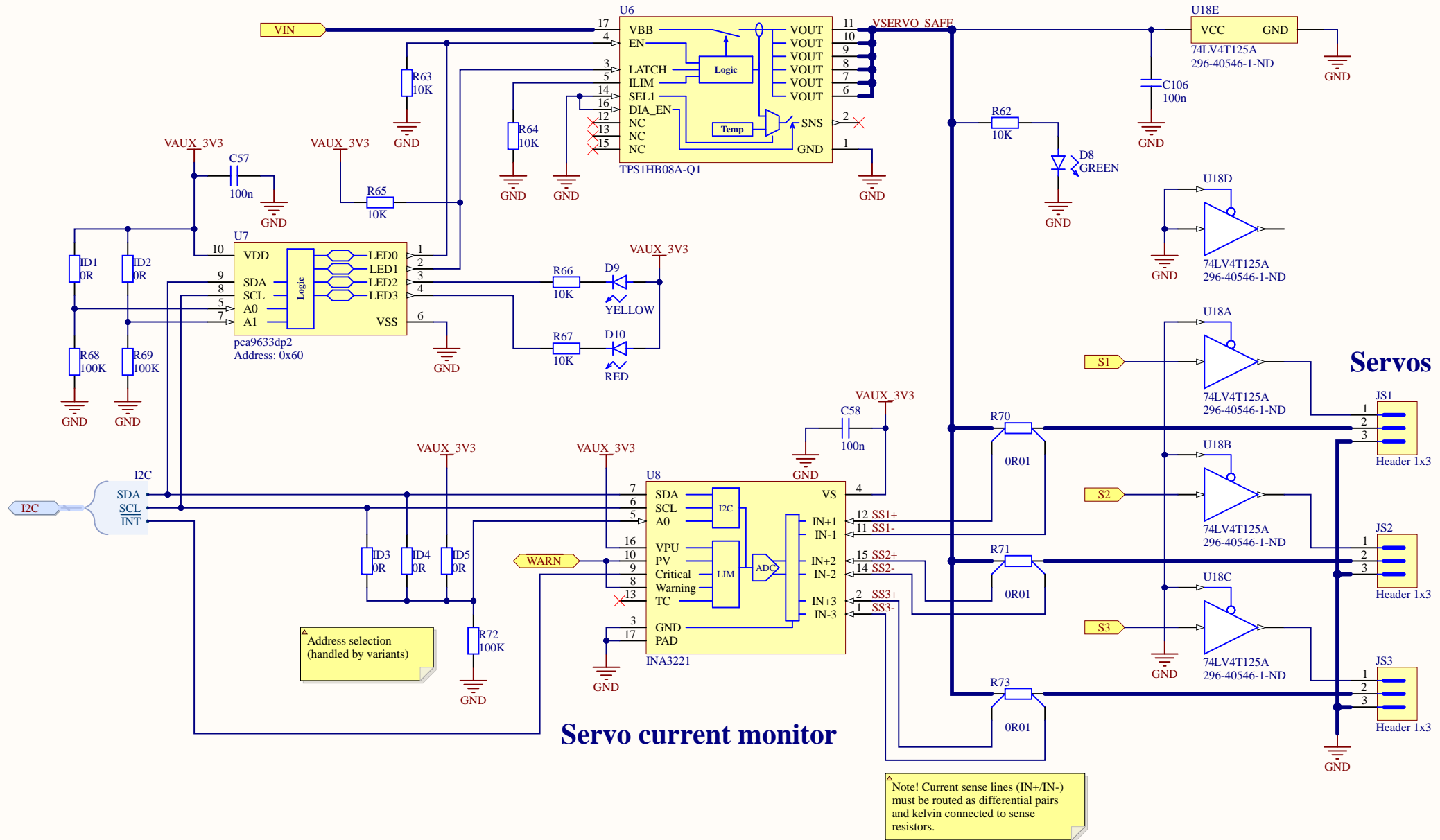
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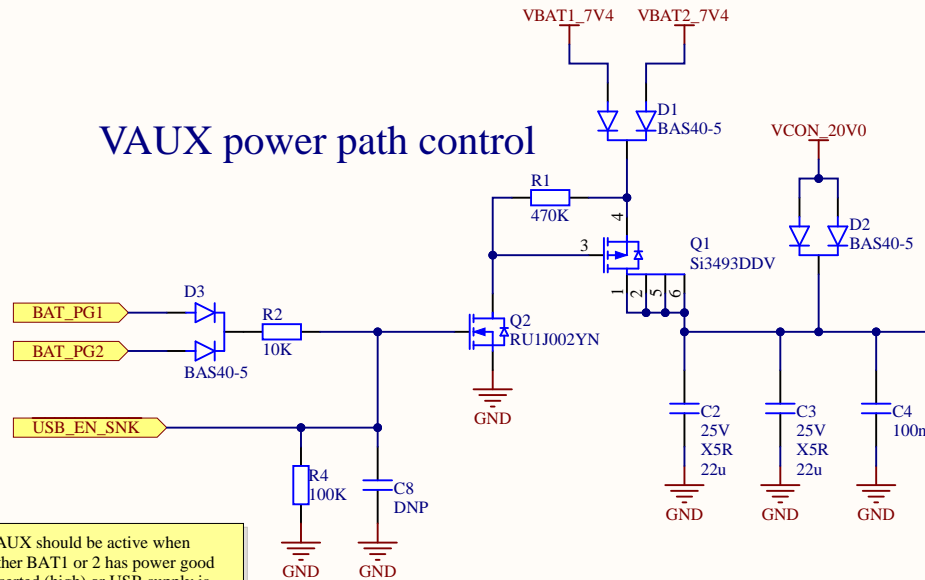
The board has two leg groups, right and left. Each group consists of four legs which is further divided into two pairs, front and back. Each pair has a input PWM signal connector (JG1 and JG2).

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

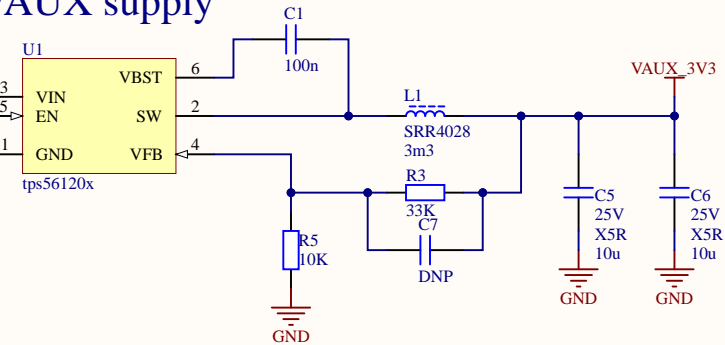




VAUX power path control



VAUX supply



^A 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).

^A VAUX supplies the control circuitry of the power board.

Title **ASH Power - AUX supply**

GPA Robotics

Size: **A4**

Number: **11**

Revision: **1**

Date: **2020-05-06**

Time: **02:11:56**

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



A

B

C

D

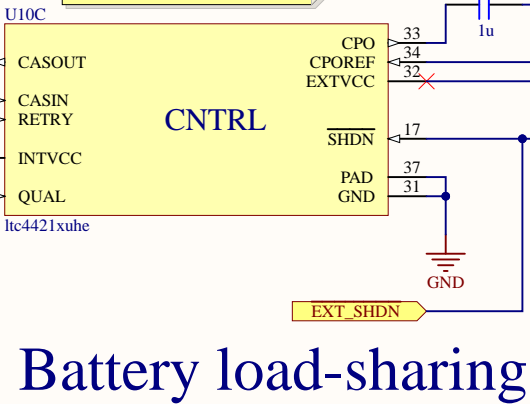
A

B

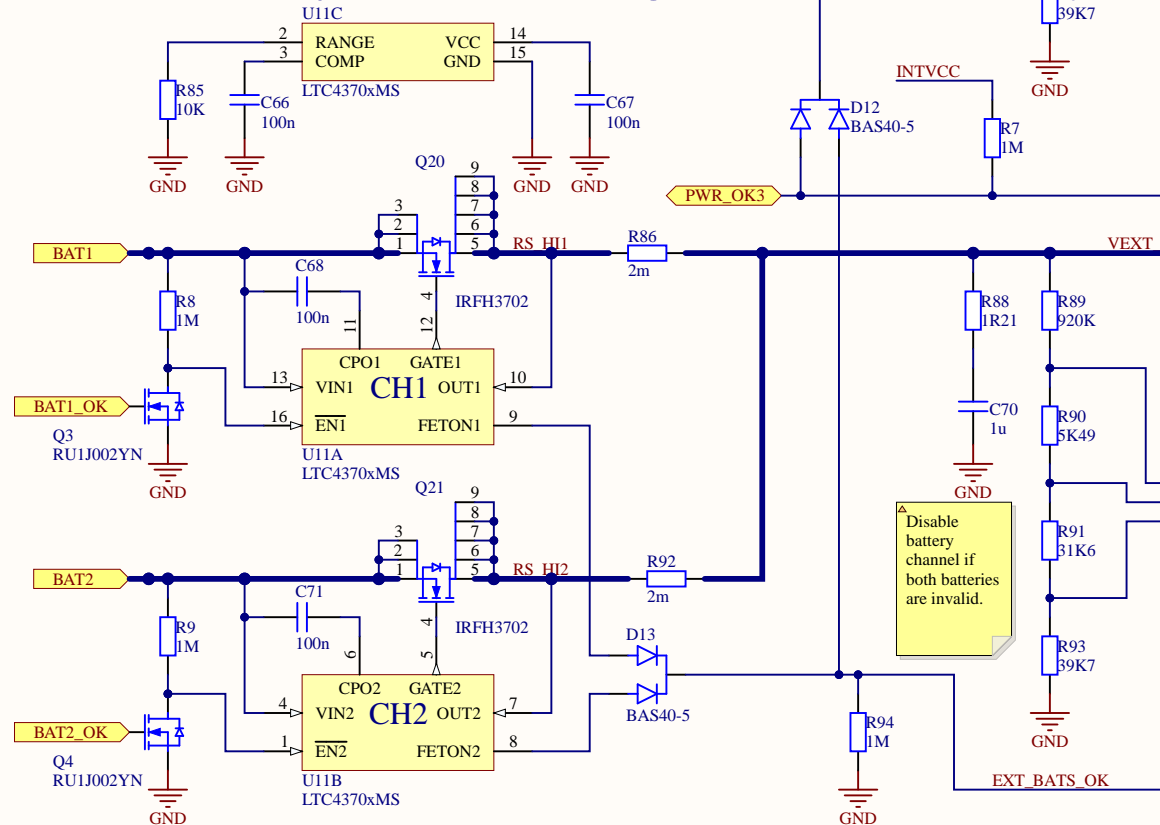
C

D

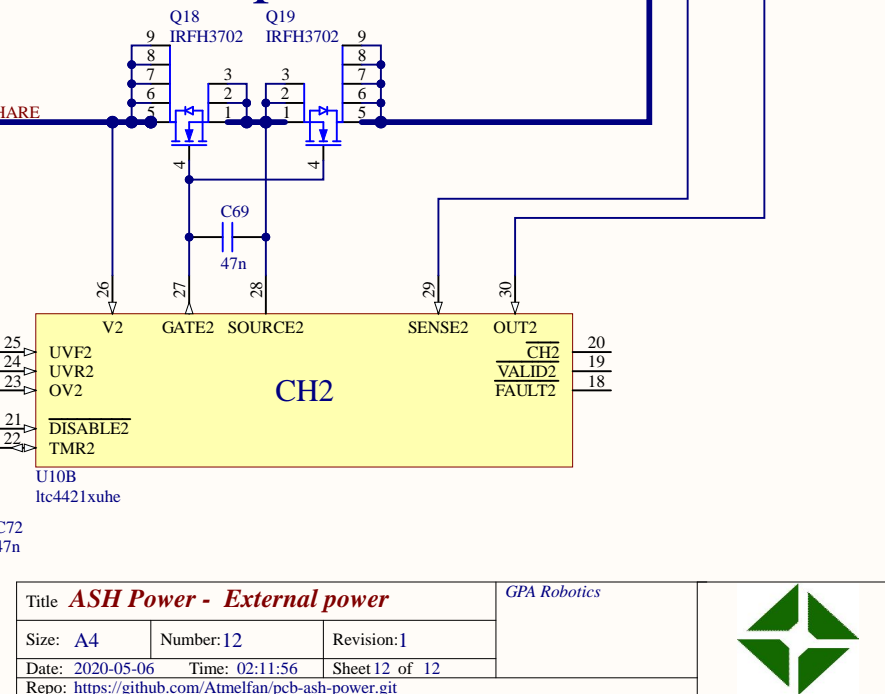
EXTERNAL power path controller
will be active as long as VBUS is
connected or batteries are valid.



Battery load-sharing



External power selector



Title **ASH Power - External power**

GPA Robotics

Size: A4 Number: 12 Revision: 1
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Repo: <https://github.com/Atmelfan/pcb-ash-power.git>

