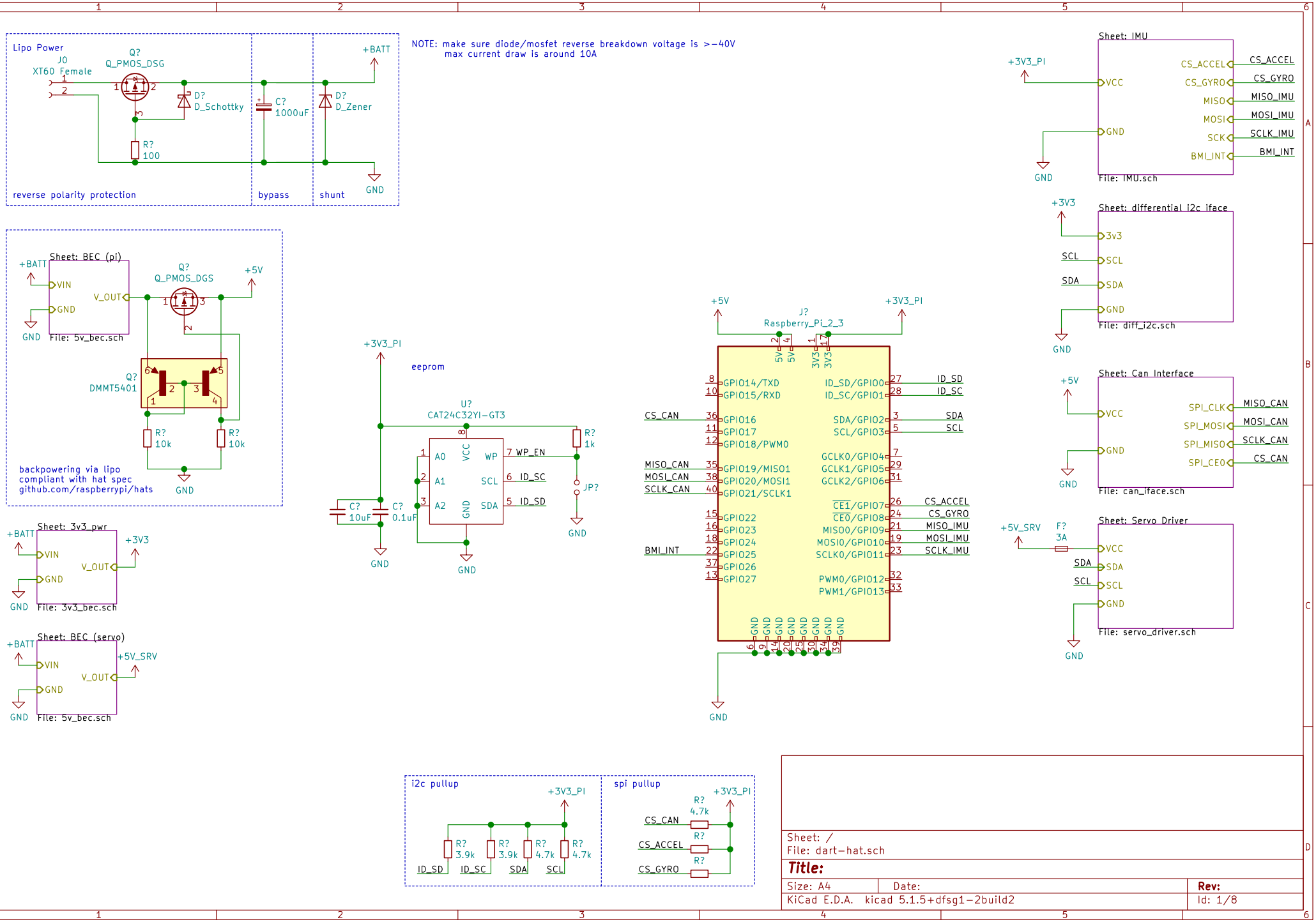
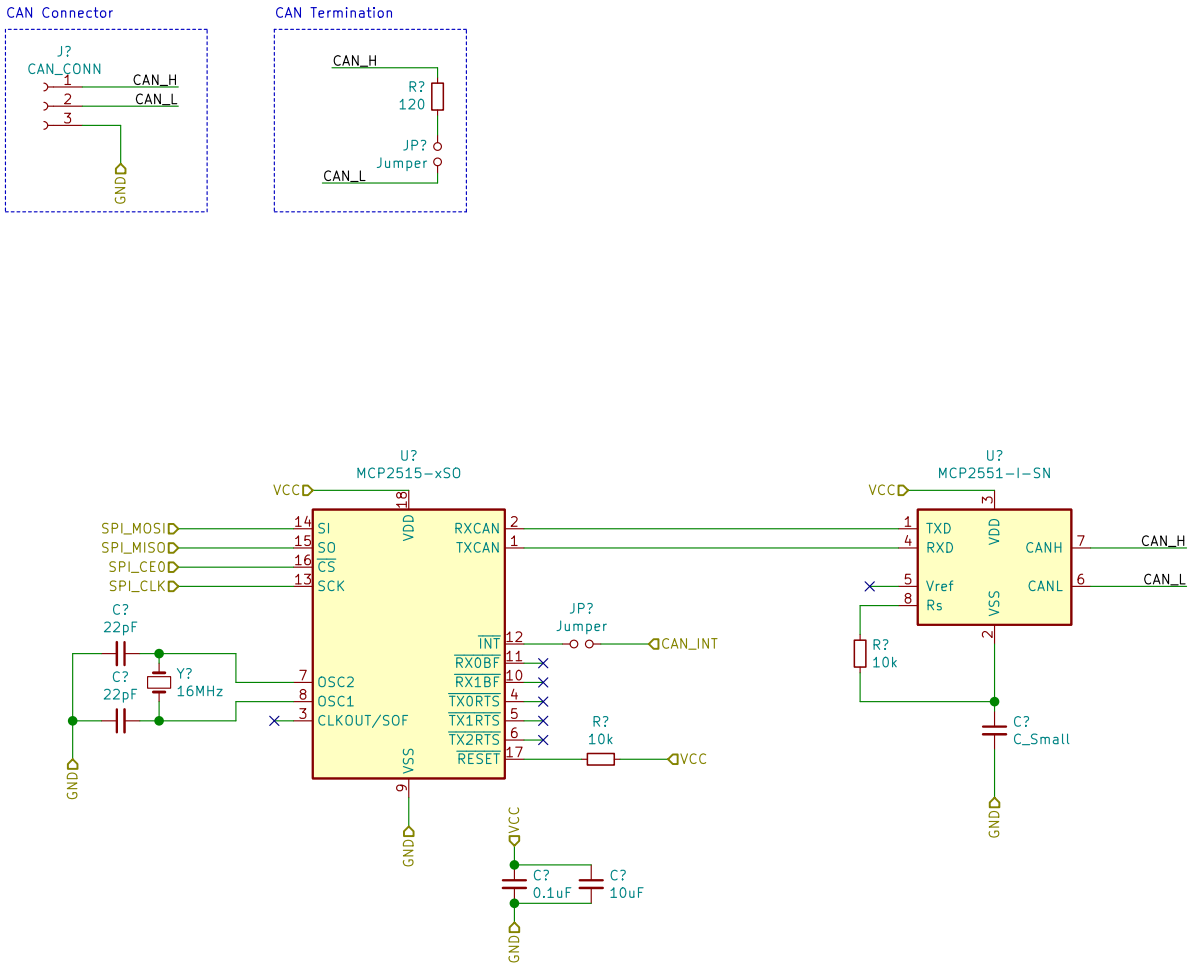
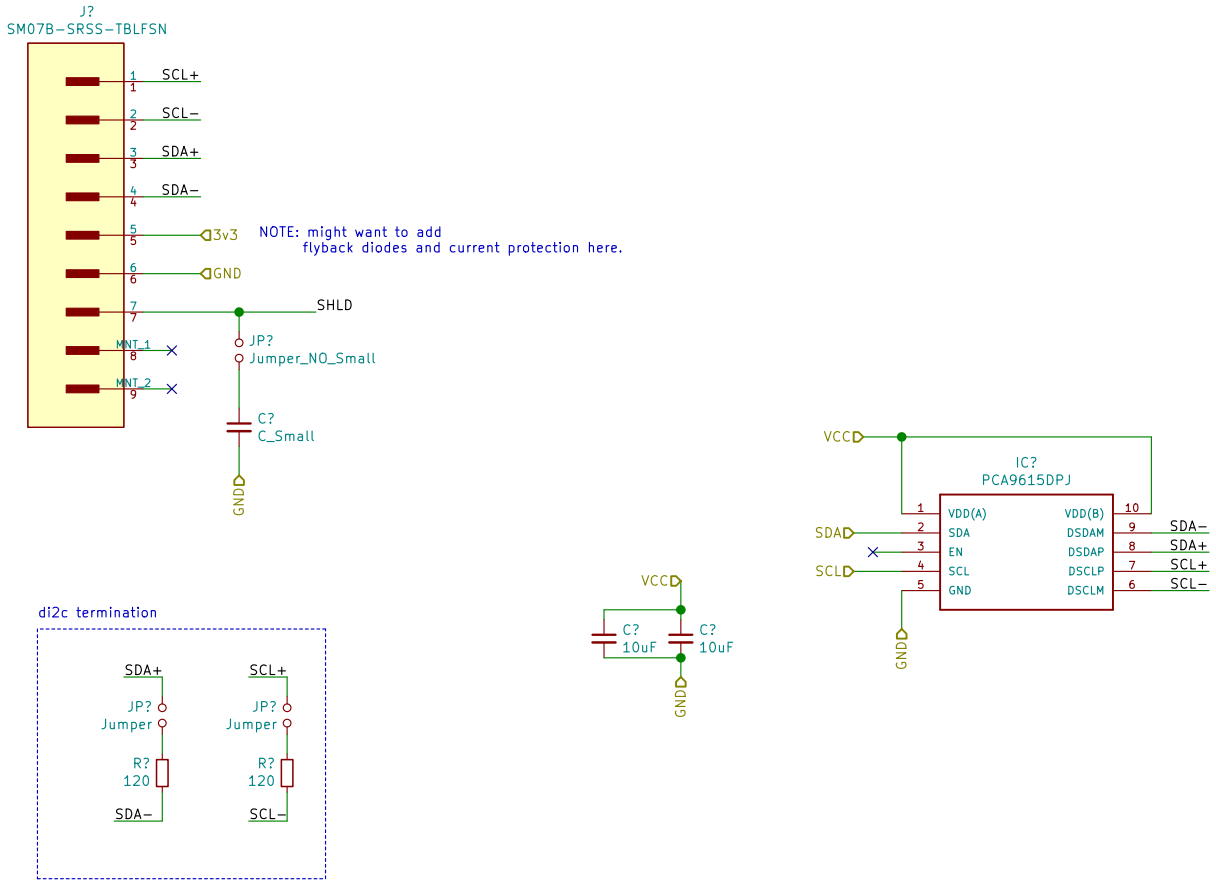

Lipo Power
J0
XT60 Female
Q?
Q_PMOS_DSG
D?
D_Schottky
C?
1000uF
D?
D_Zener
+BATT
R?
100
GND
reverse polarity protection
bypass
shunt
NOTE: make sure diode/mosfet reverse breakdown voltage is >-40V
max current draw is around 10A
Sheet: IMU
+3V3_PI
VCC
GND
CS_ACCEL
CS_GYRO
MISO
MOSI
SCK
BMI_INT
CS_ACCEL
CS_GYRO
MISO_IMU
MOSI_IMU
SCLK_IMU
BMI_INT
File: IMU.sch
Sheet: BEC (pi)
+BATT
VIN
GND
V_OUT
Q?
Q_PMOS_DGS
+5V
Q?
DMMT5401
R?
10k
R?
10k
GND
File: 5v_bec.sch
backpowering via lipo
compliant with hat spec
github.com/raspberrypi/hats
+3V3_PI
eeprom
U?
CAT24C32YI-GT3
A0
A1
A2
VCC
WP
SCL
SDA
GND
WP_EN
ID_SC
ID_SD
R?
1k
JP?
C?
10uF
C?
0.1uF
GND
+5V
+3V3_PI
J?
Raspberry_Pi_2_3
5V
5V
3V3
3V3
GPIO14/TXD
GPIO15/RXD
GPIO16
GPIO17
GPIO18/PWM0
GPIO19/MISO1
GPIO20/MOSI1
GPIO21/SCLK1
GPIO22
GPIO23
GPIO24
GPIO25
GPIO26
GPIO27
ID_SD/GPIO0
ID_SC/GPIO1
SDA/GPIO2
SCL/GPIO3
GCLK0/GPIO4
GCLK1/GPIO5
GCLK2/GPIO6
CE1/GPIO7
CE0/GPIO8
MISO0/GPIO9
MOSI0/GPIO10
SCLK0/GPIO11
PWM0/GPIO12
PWM1/GPIO13
CS_CAN
MISO_CAN
MOSI_CAN
SCLK_CAN
BMI_INT
ID_SD
ID_SC
SDA
SCL
CS_ACCEL
CS_GYRO
MISO_IMU
MOSI_IMU
SCLK_IMU
GND
Sheet: differential i2c iface
+3V3
3v3
SCL
SDA
GND
File: diff_i2c.sch
Sheet: Can Interface
+5V
VCC
GND
SPI_CLK
SPI_MOSI
SPI_MISO
SPI_CE0
MISO_CAN
MOSI_CAN
SCLK_CAN
CS_CAN
File: can_iface.sch
Sheet: Servo Driver
+5V_SRV
F?
3A
VCC
SDA
SCL
GND
File: servo_driver.sch
Sheet: 3v3_pwr
+BATT
VIN
GND
V_OUT
+3V3
File: 3v3_bec.sch
Sheet: BEC (servo)
+BATT
VIN
GND
V_OUT
+5V_SRV
File: 5v_bec.sch
i2c pullup
+3V3_PI
R?
3.9k
R?
3.9k
R?
4.7k
R?
4.7k
ID_SD
ID_SC
SDA
SCL
spi pullup
+3V3_PI
R?
4.7k
CS_CAN
R?
CS_ACCEL
R?
CS_GYRO
Sheet: /
File: dart-hat.sch
Title:
Size: A4
Date:
Rev:
KiCad E.D.A. kicad 5.1.5+dfsg1-2build2
Id: 1/8



Sheet: /Can Interface/		
File: can_iface.sch		
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. kicad 5.1.5+dfsg1-2build2		Id: 2/8



Sheet: /differential i2c iface/
File: diff_i2c.sch

Title:

Size: A4	Date:	**Rev:**
KiCad E.D.A. kicad 5.1.5+dfsg1-2build2		Id: 3/8

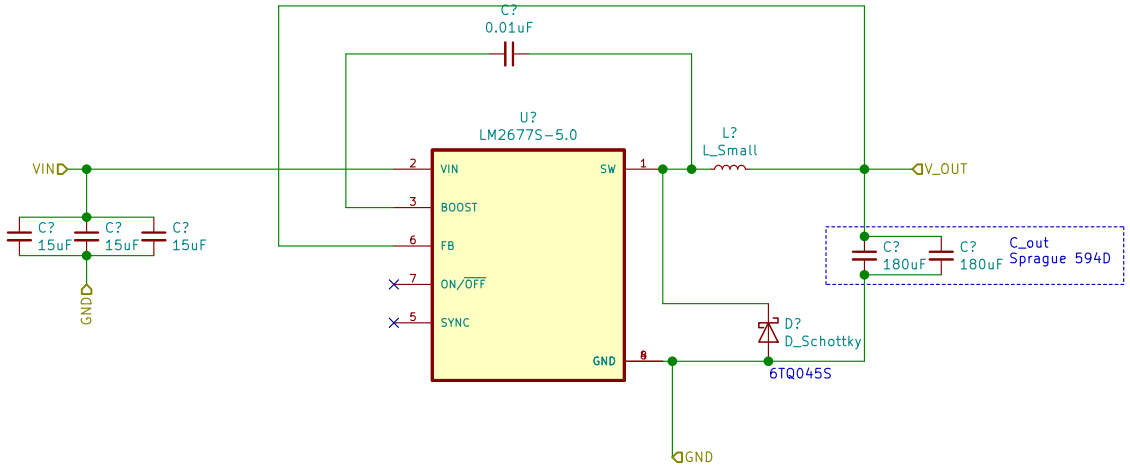
TODO: reread the datasheet and get the right specs.
At the moment i do not have the time nor patience to
complete the power side of things so i'm gonna move
this into a hierarchical sheet and forget about it for now

Inductors (L41, 22uH, 5.22A max)
- Pulse Engineering P0841

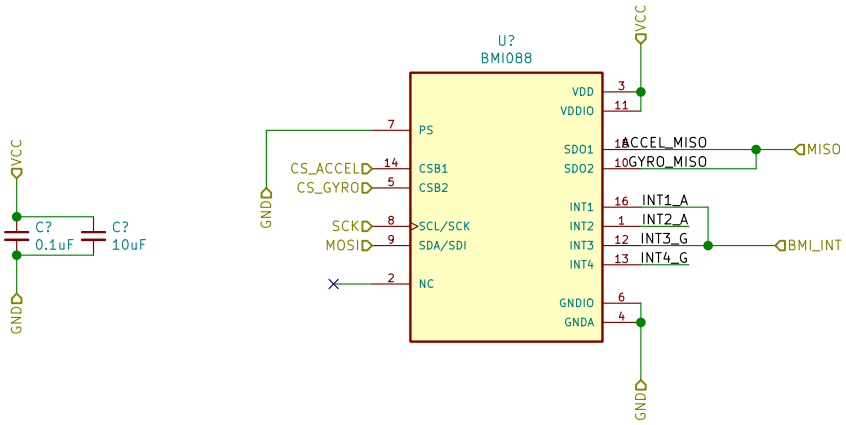
C_out:
- 3xC2 (AVX), 2xC7 (Sprague), 3xC4 (kemet)

C_in:
- 3xC13 (sprague), 4xC12(kemet)

Diode:
- MBRB1545CT
- 6TQ045S



Sheet: /BEC (pi)/		
File: 5v_bec.sch		
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. kicad 5.1.5+dfsg1-2build2		Id: 4/8



NOTES: bmi088 driver has DRDY wired to gpio26 (pin 6 on wiringpi)
- i2c should be easier but i'm going for SPI since the old implementation works
- shuttle has interrupt pin jumper
- might want to not only expose the jumper for this,
  but also tie in 2 separate GPIO pins with the 2.54mm
  headers on each interrupt so i can manually connect
  interrupt pins?

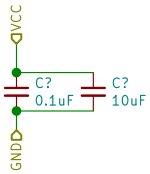
IMPORTANT: review the SPI initialization behavior (6.1, p45, bmi088 datasheet)
- looks like GND on PS sets gyro to SPI mode
- giving a rising edge on the CS pin for the accel switches it to spi mode. this can be done via a dummy read/write oper

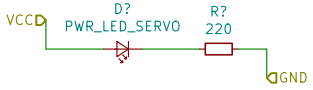
Sheet: /IMU/
File: IMU.sch

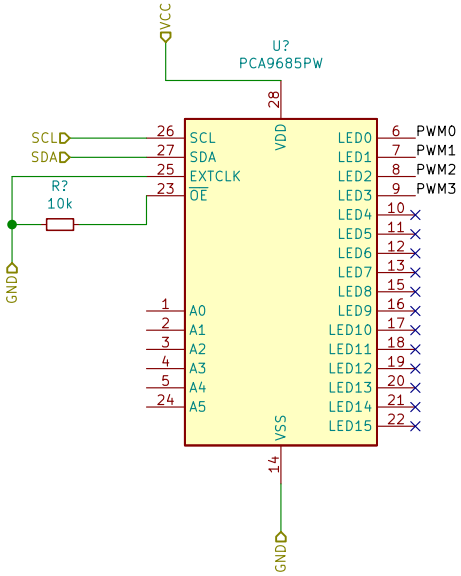
Title:

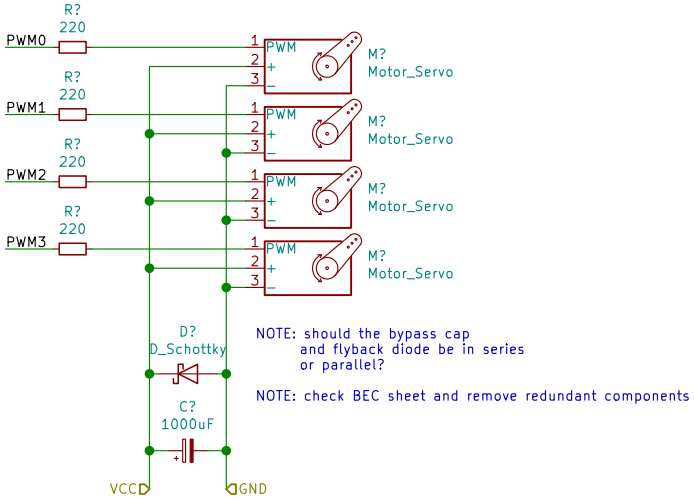
Size: A4	Date:	**Rev:**
KiCad E.D.A. kicad 5.1.5+dfsg1-2build2		Id: 5/8

TODO:
- reverse voltage protection (backcurrent)
- decoupling
- fuses
- power setup









Sheet: /Servo Driver/
File: servo_driver.sch

Title:

Size: A4	Date:	**Rev:**
KiCad E.D.A. kicad 5.1.5+dfsg1-2build2		Id: 6/8

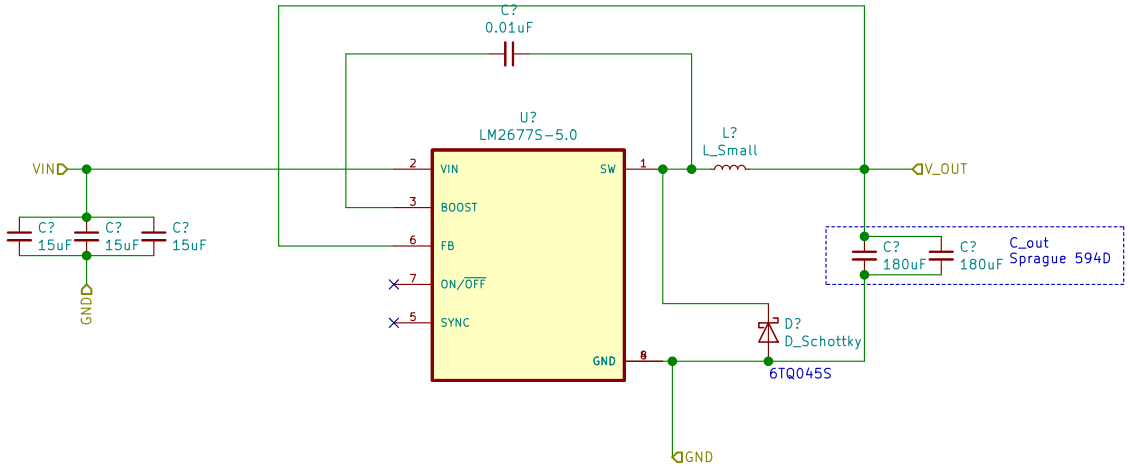
TODO: reread the datasheet and get the right specs.
At the moment i do not have the time nor patience to
complete the power side of things so i'm gonna move
this into a hierarchical sheet and forget about it for now

Inductors (L41, 22uH, 5.22A max)
- Pulse Engineering P0841

C_out:
- 3xC2 (AVX), 2xC7 (Sprague), 3xC4 (kemet)

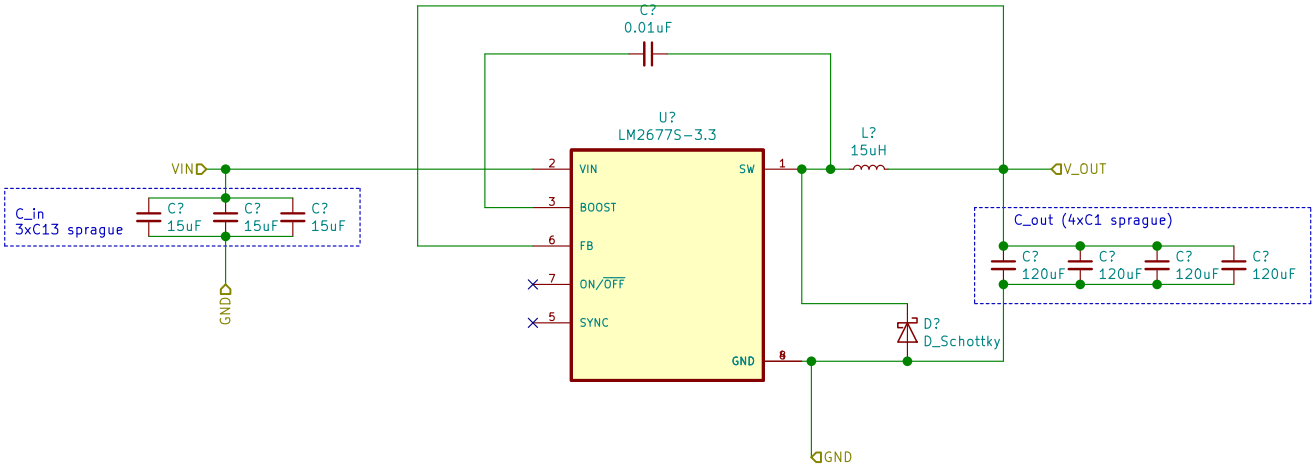
C_in:
- 3xC13 (sprague), 4xC12(kemet)

Diode:
- MBRB1545CT
- 6TQ045S



Sheet: /BEC (servo)/		
File: 5v_bec.sch		
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. kicad 5.1.5+dfsg1-2build2		Id: 7/8

TODO: reread the datasheet and get the right specs.
At the moment i do not have the time nor patience to
complete the power side of things so i'm gonna move
this into a hierarchical sheet and forget about it for now



Inductors (L46, 15uH, 5.6A max)
- Pulse Engineering P0846
- Coilcraft DO5022P-153HC

C_out:
- 4xC1(avx tps), 4xC1 (sprague), 4xC3 (kemet)

C_in:
- 3xC13 (sprague), 4xC12(kemet)

Diode:
- 6TQ045S

Sheet: /3v3_pwr/
File: 3v3_bec.sch

Title:

Size: A4 | Date: | **Rev:**
KiCad E.D.A. kicad 5.1.5+dfsg1-2build2 | Id: 8/8