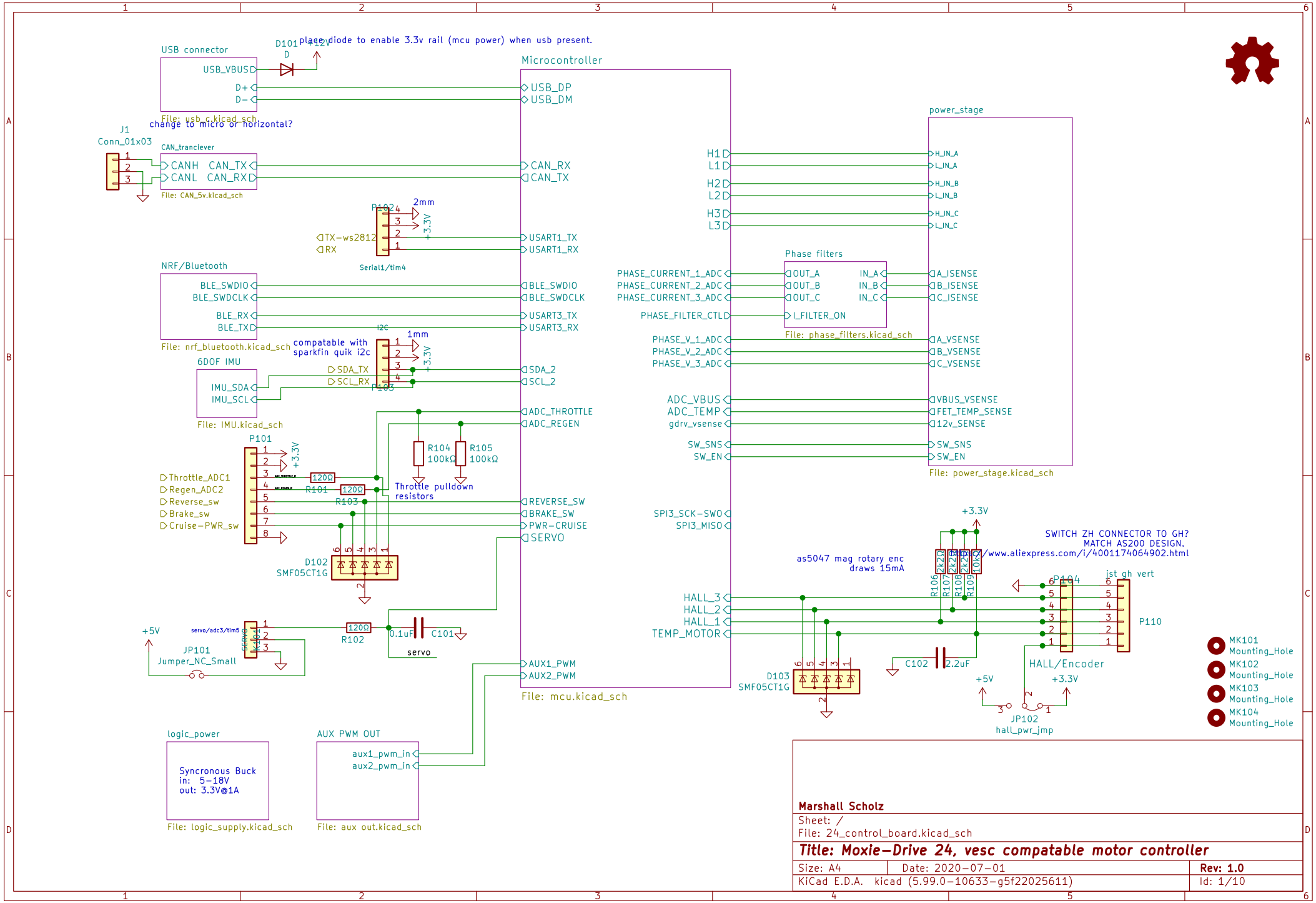
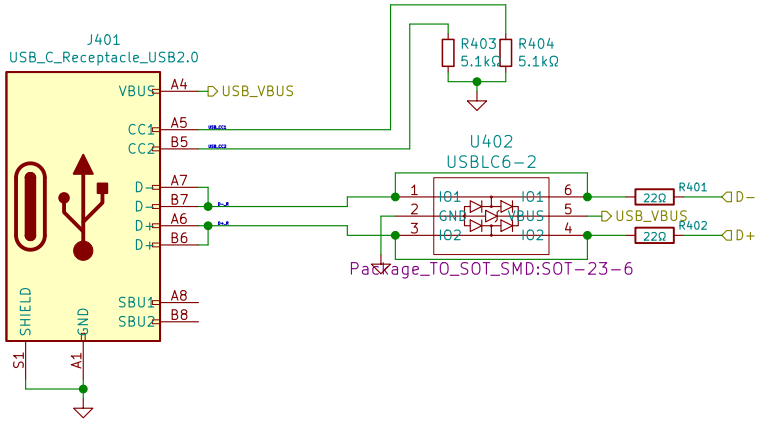

USB connector
D101
+12V
place diode to enable 3.3v rail (mcu power) when usb present.
USB_VBUS
D+
D−
File: usb_c.kicad_sch
change to micro or horizontal?
J1
Conn_01x03
CAN_tranciever
CANH
CANL
CAN_TX
CAN_RX
File: CAN_5v.kicad_sch
Microcontroller
USB_DP
USB_DM
CAN_RX
CAN_TX
P102
2mm
+3.3V
TX−ws2812
RX
USART1_TX
USART1_RX
Serial1/tim4
NRF/Bluetooth
BLE_SWDIO
BLE_SWDCLK
BLE_RX
BLE_TX
USART3_TX
USART3_RX
File: nrf_bluetooth.kicad_sch
i2c
1mm
compatable with
sparkfin quik i2c
SDA_TX
SCL_RX
SDA_2
SCL_2
P103
6DOF IMU
IMU_SDA
IMU_SCL
File: IMU.kicad_sch
ADC_THROTTLE
ADC_REGEN
P101
+3.3V
Throttle_ADC1
Regen_ADC2
Reverse_sw
Brake_sw
Cruise−PWR_sw
120Ω
R101
R103
R104
100kΩ
R105
100kΩ
Throttle pulldown
resistors
REVERSE_SW
BRAKE_SW
PWR−CRUISE
SERVO
D102
SMF05CT1G
+5V
servo/adc3/tim5
SERVO
JP101
Jumper_NC_Small
R102
0.1uF
C101
servo
AUX1_PWM
AUX2_PWM
File: mcu.kicad_sch
power_stage
H1
L1
H2
L2
H3
L3
H_IN_A
L_IN_A
H_IN_B
L_IN_B
H_IN_C
L_IN_C
Phase filters
PHASE_CURRENT_1_ADC
PHASE_CURRENT_2_ADC
PHASE_CURRENT_3_ADC
PHASE_FILTER_CTL
OUT_A
OUT_B
OUT_C
I_FILTER_ON
IN_A
IN_B
IN_C
A_ISENSE
B_ISENSE
C_ISENSE
File: phase_filters.kicad_sch
PHASE_V_1_ADC
PHASE_V_2_ADC
PHASE_V_3_ADC
A_VSENSE
B_VSENSE
C_VSENSE
ADC_VBUS
ADC_TEMP
gdrv_vsense
VBUS_VSENSE
FET_TEMP_SENSE
12v_SENSE
SW_SNS
SW_EN
File: power_stage.kicad_sch
SPI3_SCK−SWO
SPI3_MISO
HALL_3
HALL_2
HALL_1
TEMP_MOTOR
as5047 mag rotary enc
draws 15mA
+3.3V
R106
2k2Ω
R107
2k2Ω
R108
2k2Ω
R109
10kΩ
SWITCH ZH CONNECTOR TO GH?
MATCH AS200 DESIGN.
https://www.aliexpress.com/i/4001174064902.html
P104
jst gh vert
P110
D103
SMF05CT1G
C102
2.2uF
HALL/Encoder
+5V
+3.3V
JP102
hall_pwr_jmp
MK101
Mounting_Hole
MK102
Mounting_Hole
MK103
Mounting_Hole
MK104
Mounting_Hole
logic_power
Syncronous Buck
in: 5−18V
out: 3.3V@1A
File: logic_supply.kicad_sch
AUX PWM OUT
aux1_pwm_in
aux2_pwm_in
File: aux out.kicad_sch
Marshall Scholz
Sheet: /
File: 24_control_board.kicad_sch
Title: Moxie−Drive 24, vesc compatable motor controller
Size: A4
Date: 2020−07−01
Rev: 1.0
KiCad E.D.A. kicad (5.99.0−10633−g5f22025611)
Id: 1/10



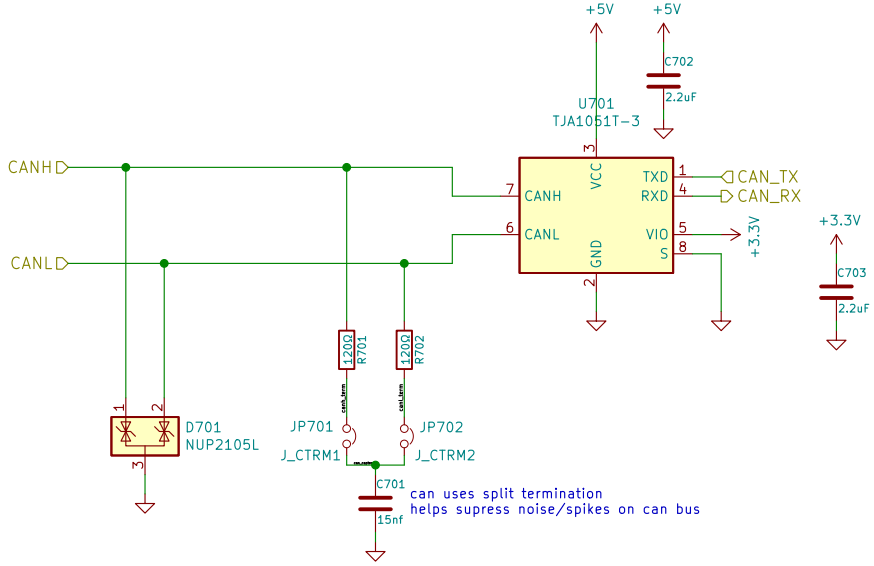
info on usb c correct detection:
https://www.scorpia.co.uk/2016/03/17/using-usb-type-c-on-hobyist-projects/

Marshall Scholz		
Sheet: /USB connector/ File: usb_c.kicad_sch		
Title: Moxie-Drive 24, vesc compatable motor controller		
Size: A4	Date: 2020-07-01	**Rev: 1.0**
KiCad E.D.A. kicad (5.99.0-10633-g5f22025611)		Id: 2/10

5v supply can trancievers are much more robust and cheaper
(have higher transient tolerance on can lines)

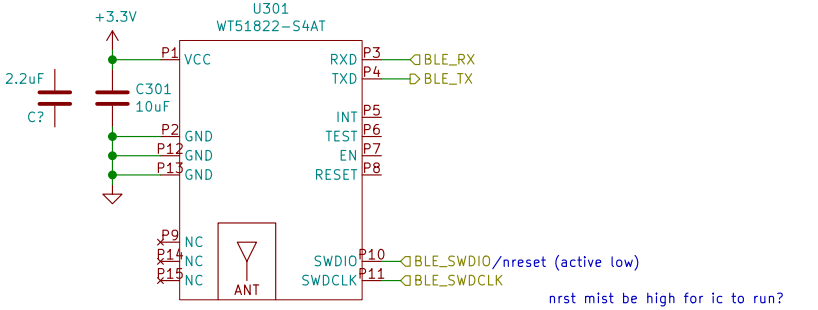
but really want to avoid extra 5v rail.

footprint also compatable with TI tcan332



Marshall Scholz		
Sheet: /CAN_tranciever/		
File: CAN_5v.kicad_sch		
Title: Moxie-Drive 24, vesc compatable motor controller		
Size: A4	Date: 2020-07-01	**Rev: 1.0**
KiCad E.D.A. kicad (5.99.0-10633-g5f22025611)		Id: 3/10

http://www.wireless-tag.com/wireless_module/BLE/WT51822-S4AT.html
or

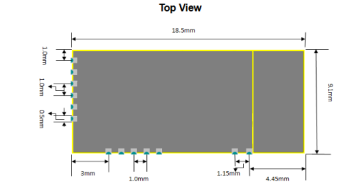


nrst mist be high for ic to run?

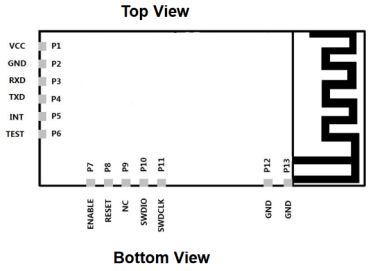
swdclk has no effect on operation of ic?

swdclk must be kept low during reset --- perfect to pair with boot1!

4. Module package size



2. Module Pin Definitions

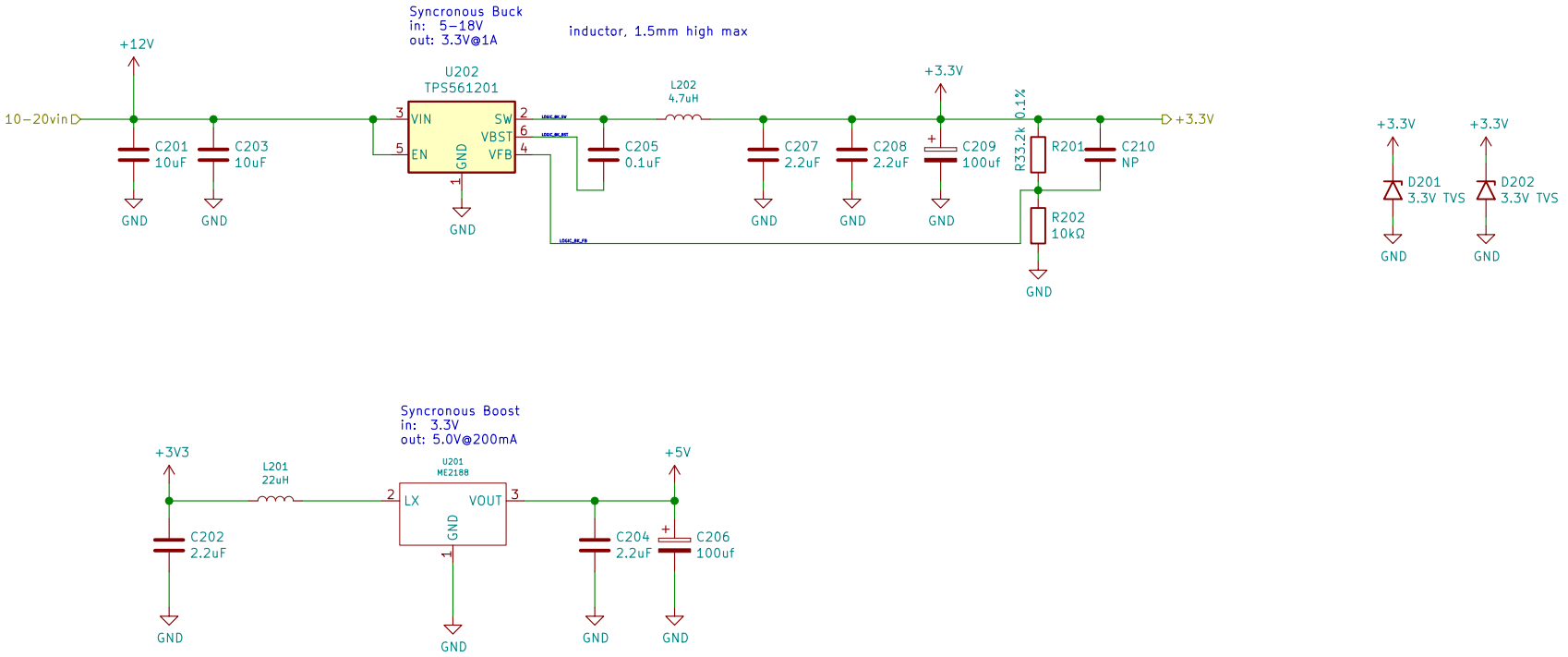


Marshall Scholz

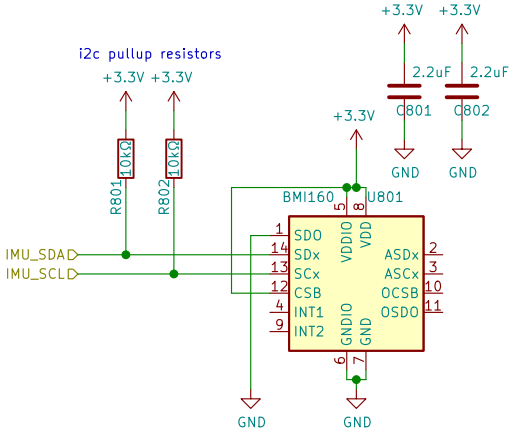
Sheet: /NRF/Bluetooth/
File: nrf_bluetooth.kicad_sch

Title: Moxie-Drive 24, vesc compatable motor controller

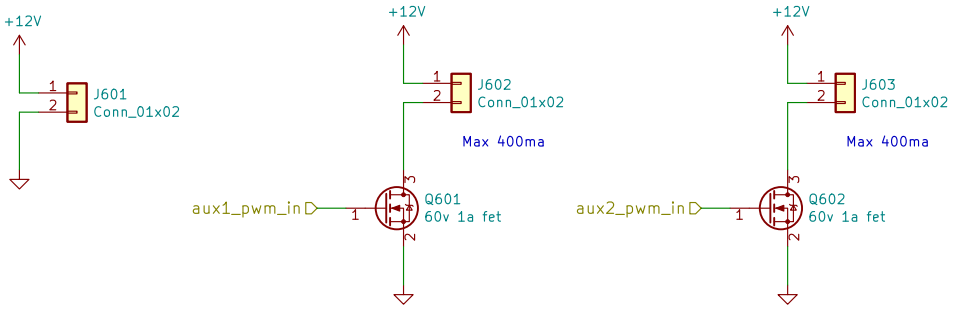
Size: A4	Date: 2020-07-01	**Rev: 1.0**
KiCad E.D.A. kicad (5.99.0-10633-g5f22025611)		Id: 4/10



Marshall Scholz	
Sheet: /logic_power/	
File: logic_supply.kicad_sch	
Title: Moxie-Drive 24, vesc compatable motor controller	
Size: A4	Date: 2020-07-01 **Rev: 1.0**
KiCad E.D.A. kicad (5.99.0-10633-g5f22025611)	Id: 5/10



Marshall Scholz	
Sheet: /6DOF IMU/	
File: IMU.kicad_sch	
Title: Moxie-Drive 24, vesc compatable motor controller	
Size: A4	Date: 2020-07-01
KiCad E.D.A. kicad (5.99.0-10633-g5f22025611)	Id: 6/10
	Rev: 1.0



Marshall Scholz

Sheet: /AUX PWM OUT/
File: aux out.kicad_sch

Title: Moxie-Drive 24, vesc compatable motor controller

Size: A4	Date: 2020-07-01	**Rev: 1.0**
KiCad E.D.A. kicad (5.99.0-10633-g5f22025611)		Id: 7/10

pins that work with ws2812:
chan: (tim4)
0: CH1 (PB6)
1: CH2 (PB7)

2-3 extra i/o? (3 if get rid of button read i/o)
move spi to dedicated connector? or piggyback miso/clk to hall pins for hw spi encoder read.

or spi add to debug conn and use swdio/clk as cs pins
would like brake sw to be adc3-4

mcu draws 50-100ma from 3.3v

fw note: phase isense and vsense swapped

servo sig should also go to adc
check that 5v tolerant?

servo must be on timer with dma for servo decode
was on gpio b6 in vesc6. using timer 4.

10 io needed
11 io available
12 if use pb2/boot1
(but needs to be strapped
high/low to boot?, use for led?)

oscillator switched from 8mhz in other vesc designs to 16 mhz smaller and more common will work with dfu mode

boot0 high for dfu mode

boot1 and ble_swdclk must be held low on reset

BOOT1 should always be pulled down on startup

Reset pin internally pulled up

Uart3 Bluetooth

Bypass, place next to VDD pins

Programming / Debug
not populated by default

U501

STM32F40X_LQFP64

LQFP64

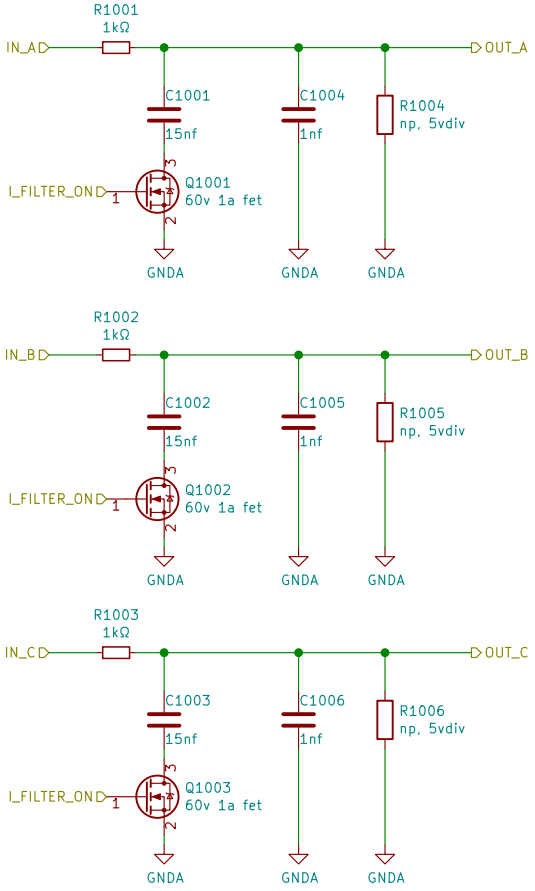
D504 SMF05CT1G

SWD_DEBUG

J501 Unused_IO

NT1 Net-Tie_2

Marshall Scholz	
Sheet: /Microcontroller/	
File: mcu.kicad_sch	
Title: Moxie-Drive 24, VESC compatable motor controller	
Size: A4	Date: 2020-07-01
KiCad E.D.A. kicad (5.99.0-10633-g5f22025611)	Rev: 1.0
	Id: 8/10

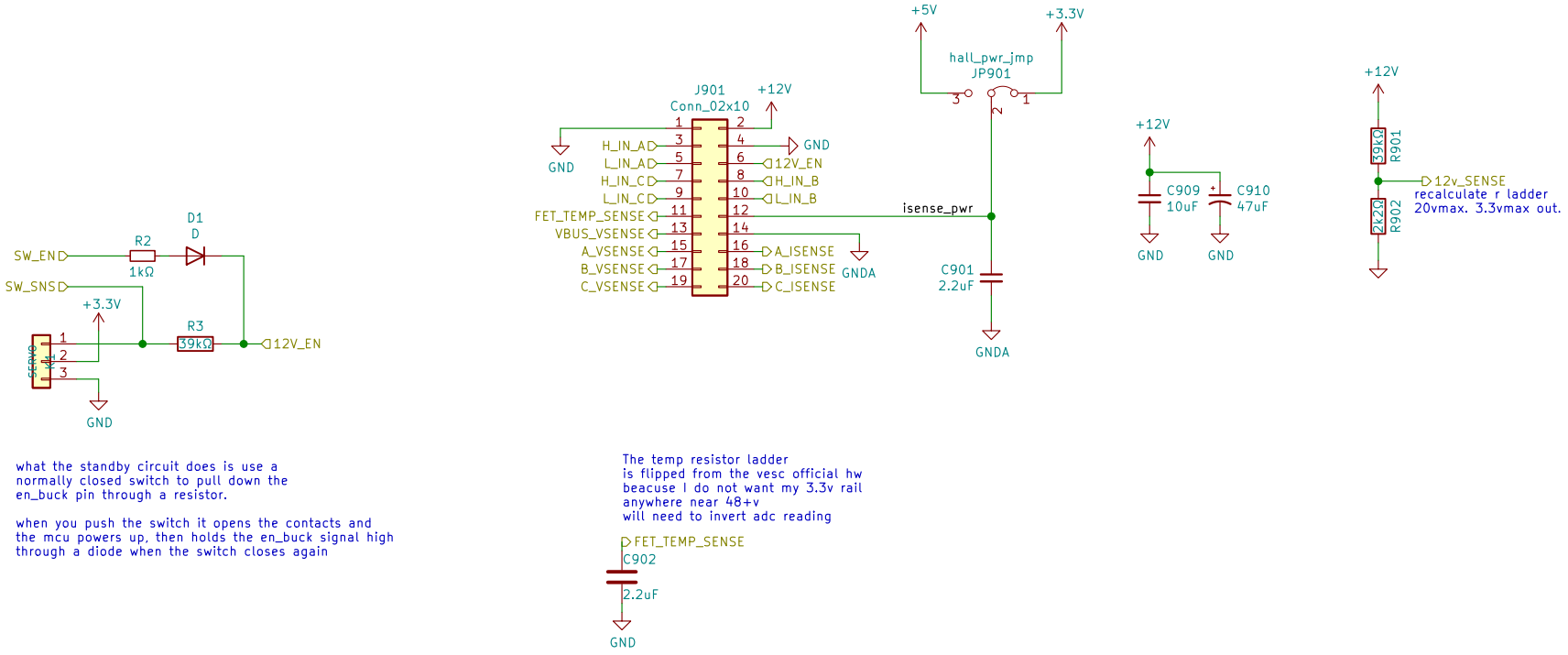


Marshall Scholz

Sheet: /Phase filters/
File: phase_filters.kicad_sch

Title: Moxie-Drive 24, vesc compatable motor controller

Size: A4	Date: 2020-07-01	**Rev: 1.0**
KiCad E.D.A. kicad (5.99.0-10633-g5f22025611)		Id: 9/10



Marshall Scholz		
Sheet: /power_stage/		
File: power_stage.kicad_sch		
Title: Moxie-Drive 24, vesc compatable motor controller		
Size: A4	Date: 2020-07-01	**Rev: 1.0**
KiCad E.D.A. kicad (5.99.0-10633-g5f22025611)		Id: 10/10