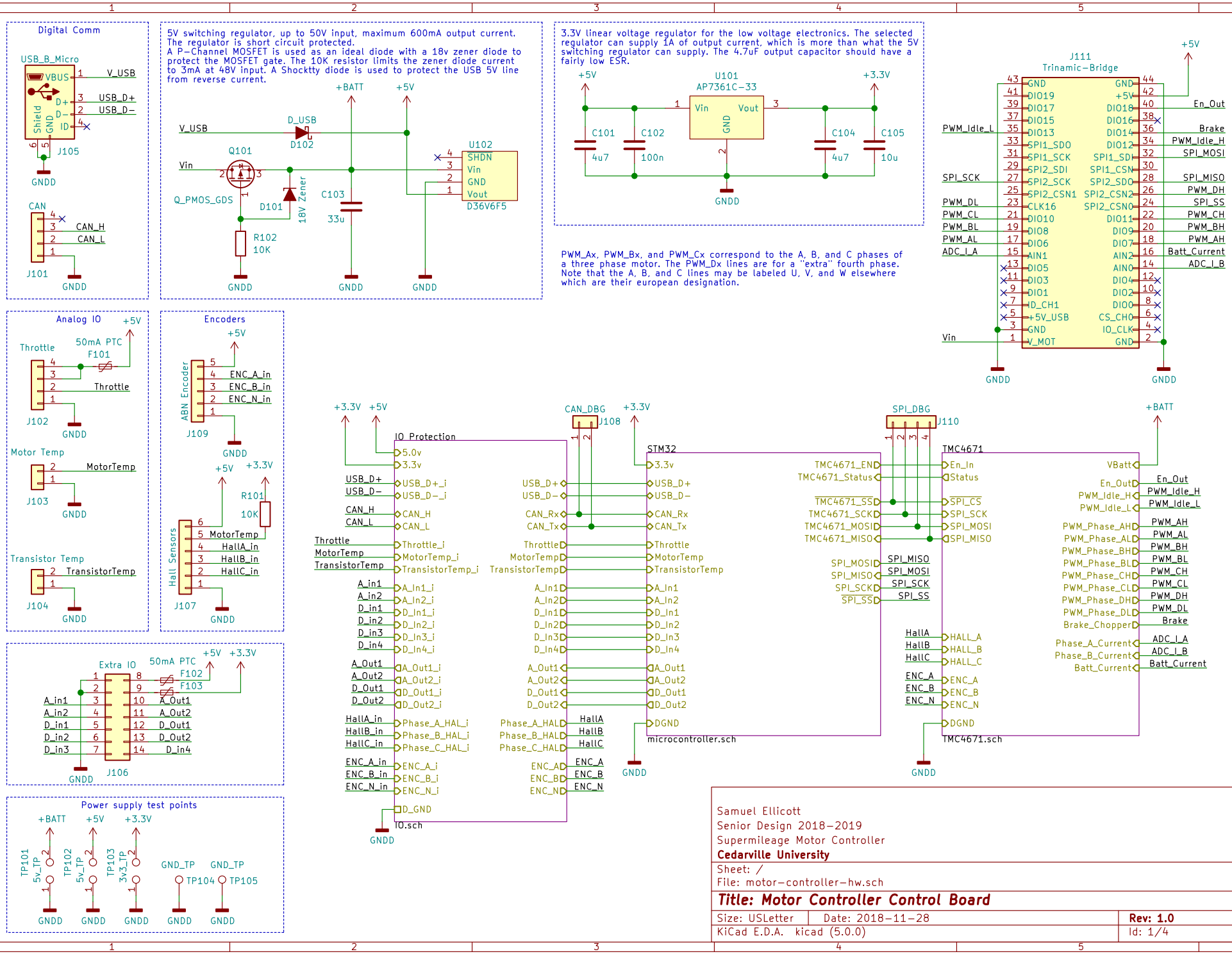

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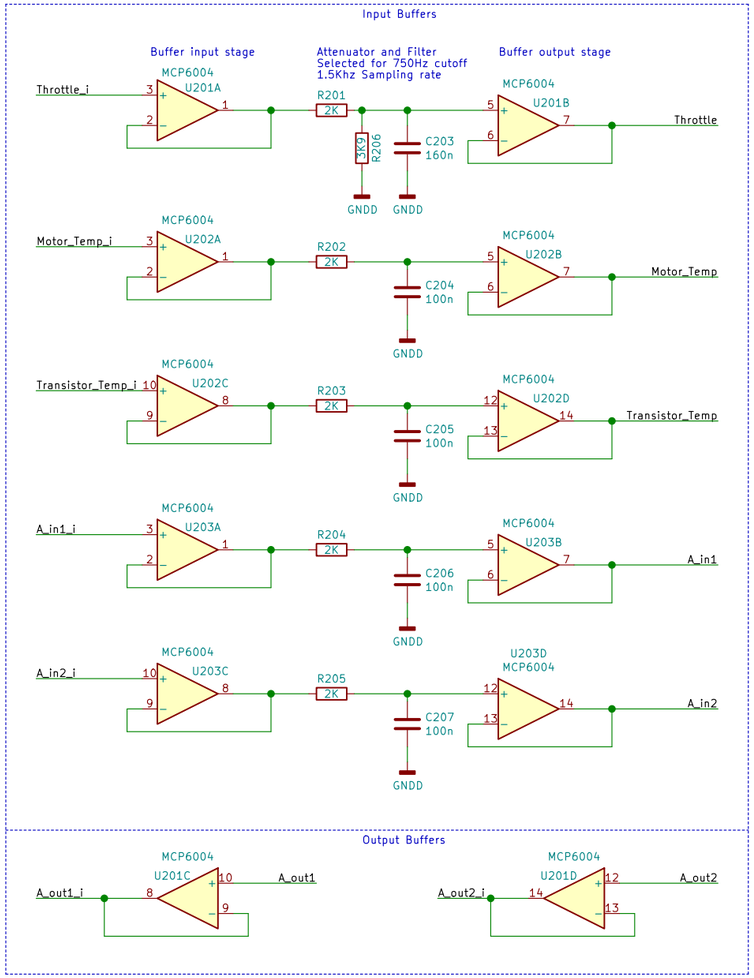
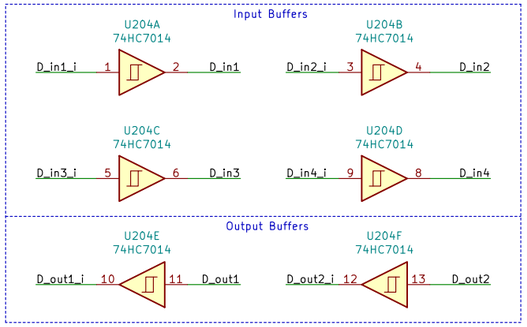
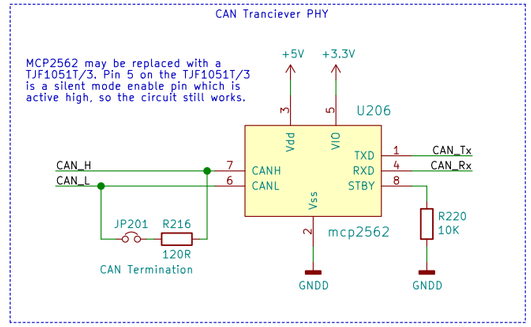
Sheet: /
File: motor-controller-hw.sch

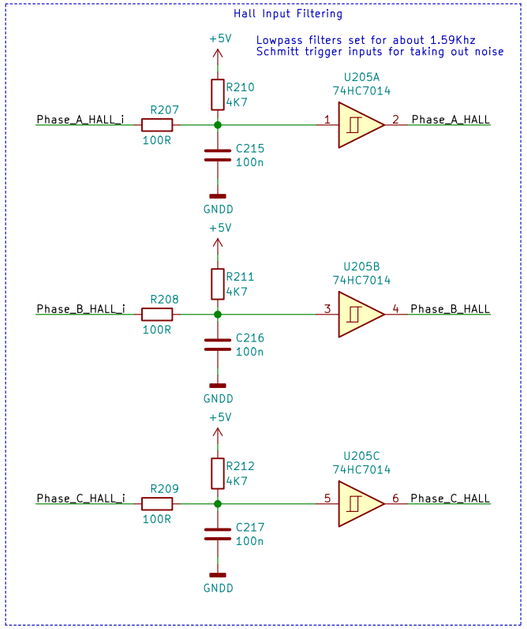
Title: Motor Controller Control Board

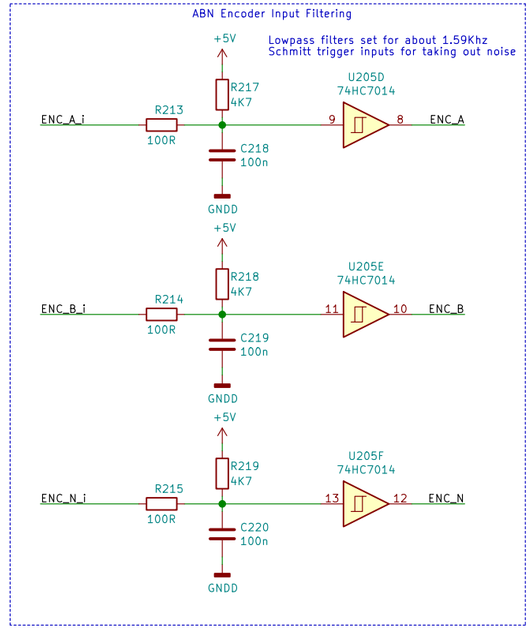
Size: USLetter	Date: 2018-11-28	**Rev: 1.0**
KiCad E.D.A. kicad (5.0.0)		Id: 1/4

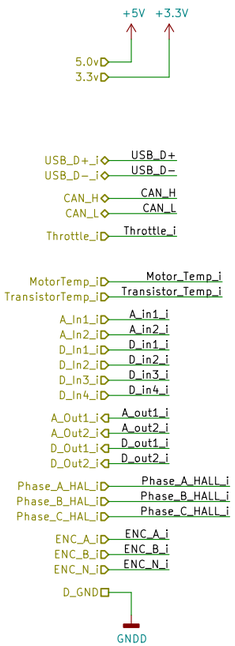


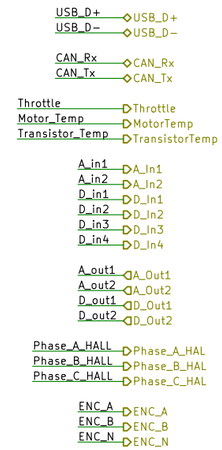












This sheet contains input/output proteciton and conditioning circuitry.
Note that the stm32 USB lines pass through this sheet
without modification.

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Sheet: /IO Protection/
File: IO.sch

Title: Input Protection and Filtering

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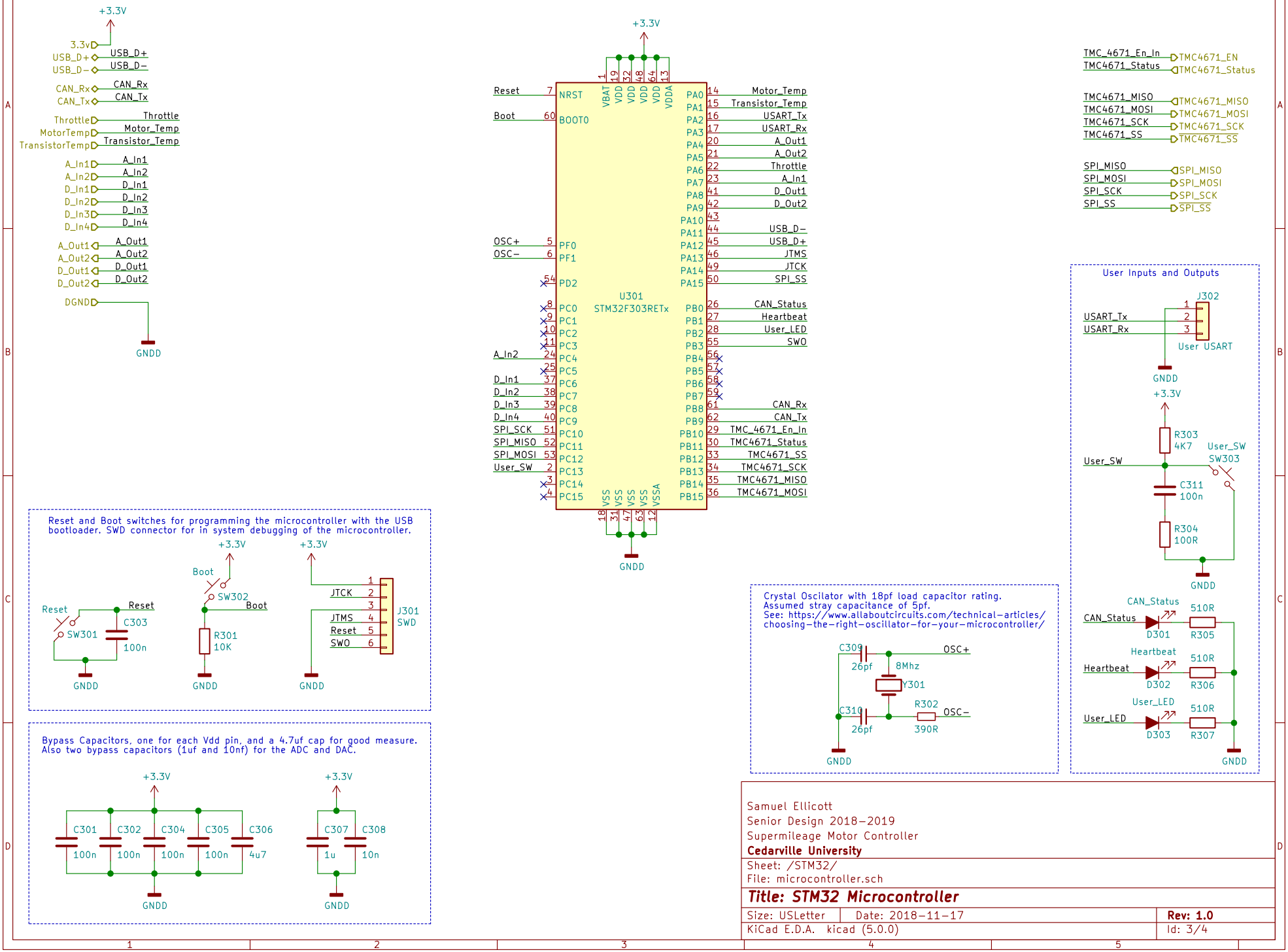
+3.3V
3.3v
USB_D+
USB_D−
CAN_Rx
CAN_Tx
Throttle
MotorTemp
TransistorTemp
Motor_Temp
Transistor_Temp
A_In1
A_In2
D_In1
D_In2
D_In3
D_In4
A_Out1
A_Out2
D_Out1
D_Out2
DGND
GNDD
U301
STM32F303RETx
NRST
BOOT0
PF0
PF1
PD2
PC0
PC1
PC2
PC3
PC4
PC5
PC6
PC7
PC8
PC9
PC10
PC11
PC12
PC13
PC14
PC15
PA0
PA1
PA2
PA3
PA4
PA5
PA6
PA7
PA8
PA9
PA10
PA11
PA12
PA13
PA14
PA15
PB0
PB1
PB2
PB3
PB4
PB5
PB6
PB7
PB8
PB9
PB10
PB11
PB12
PB13
PB14
PB15
VBAT
VDD
VDDA
VSS
VSSA
Reset
Boot
OSC+
OSC−
JTMS
JTCK
SPI_SS
CAN_Status
Heartbeat
User_LED
SWO
CAN_Rx
CAN_Tx
TMC_4671_En_In
TMC4671_Status
TMC4671_MISO
TMC4671_MOSI
TMC4671_SCK
TMC4671_SS
SPI_MISO
SPI_MOSI
SPI_SCK
SPI_SS
TMC4671_EN
Reset and Boot switches for programming the microcontroller with the USB bootloader. SWD connector for in system debugging of the microcontroller.
SW301
C303
100n
SW302
R301
10K
J301
SWD
Bypass Capacitors, one for each Vdd pin, and a 4.7uf cap for good measure.
Also two bypass capacitors (1uf and 10nf) for the ADC and DAC.
C301
C302
C304
C305
C306
C307
C308
100n
4u7
1u
10n
Crystal Oscilator with 18pf load capacitor rating.
Assumed stray capacitance of 5pf.
See: https://www.allaboutcircuits.com/technical-articles/choosing-the-right-oscillator-for-your-microcontroller/
C309
C310
26pf
8Mhz
Y301
R302
390R
User Inputs and Outputs
J302
User USART
USART_Tx
USART_Rx
R303
4K7
User_SW
SW303
C311
100n
R304
100R
CAN_Status
Heartbeat
User_LED
D301
D302
D303
R305
R306
R307
510R
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Sheet: /STM32/
File: microcontroller.sch
Title: STM32 Microcontroller
Size: USLetter
Date: 2018-11-17
Rev: 1.0
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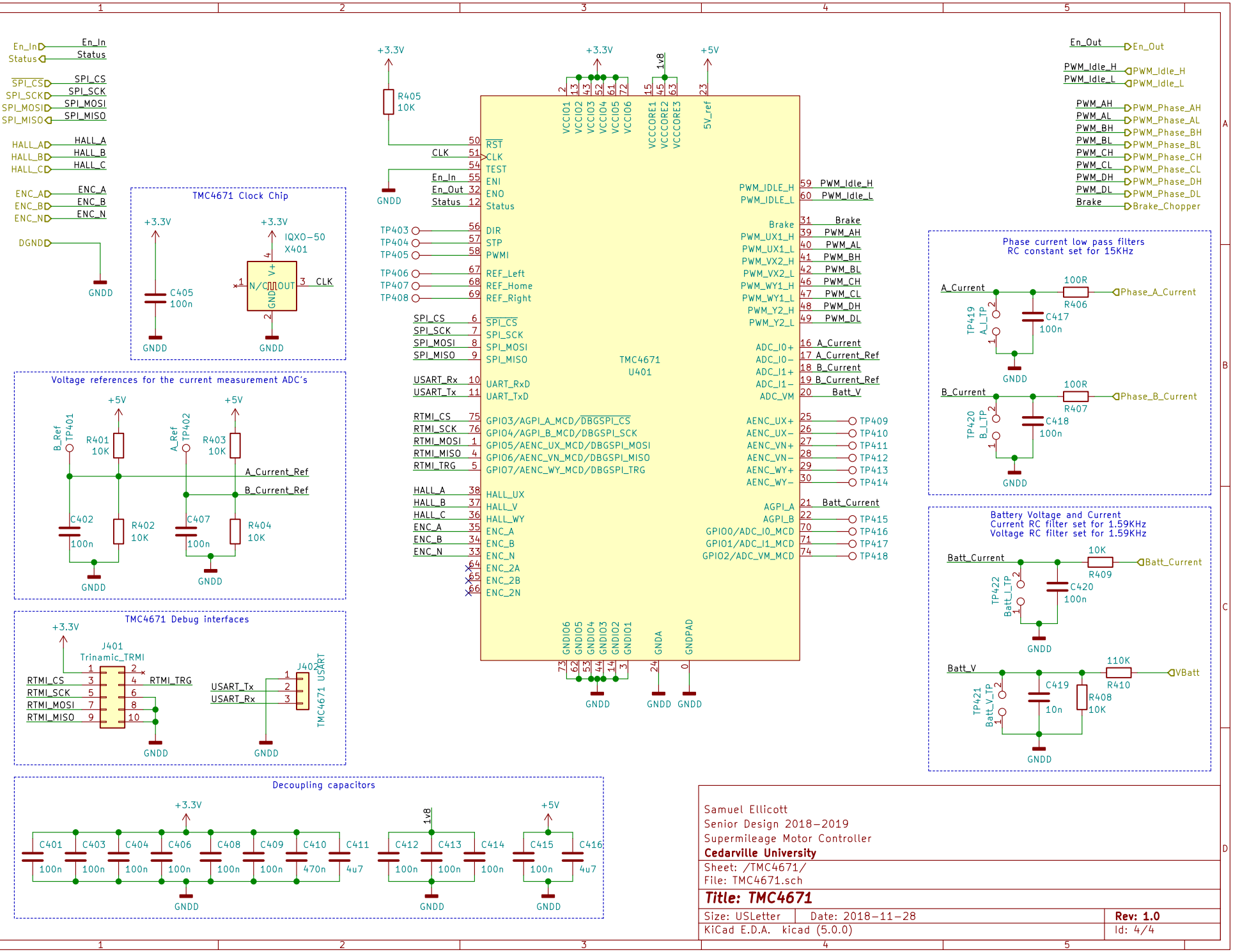
Id: 3/4



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Sheet: /TMC4671/
File: TMC4671.sch

Title: TMC4671

Size: USLetter	Date: 2018-11-28	**Rev: 1.0**
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