

Wheel Sensor Board

U_MainConnector
MainConnector.SchDoc

U_STM32F417VGT6TR
Processor.SchDoc

U_Oscillator
Oscillator.SchDoc

U_Programming
Programming.SchDoc

U_MicroSD
MicroSD.SchDoc

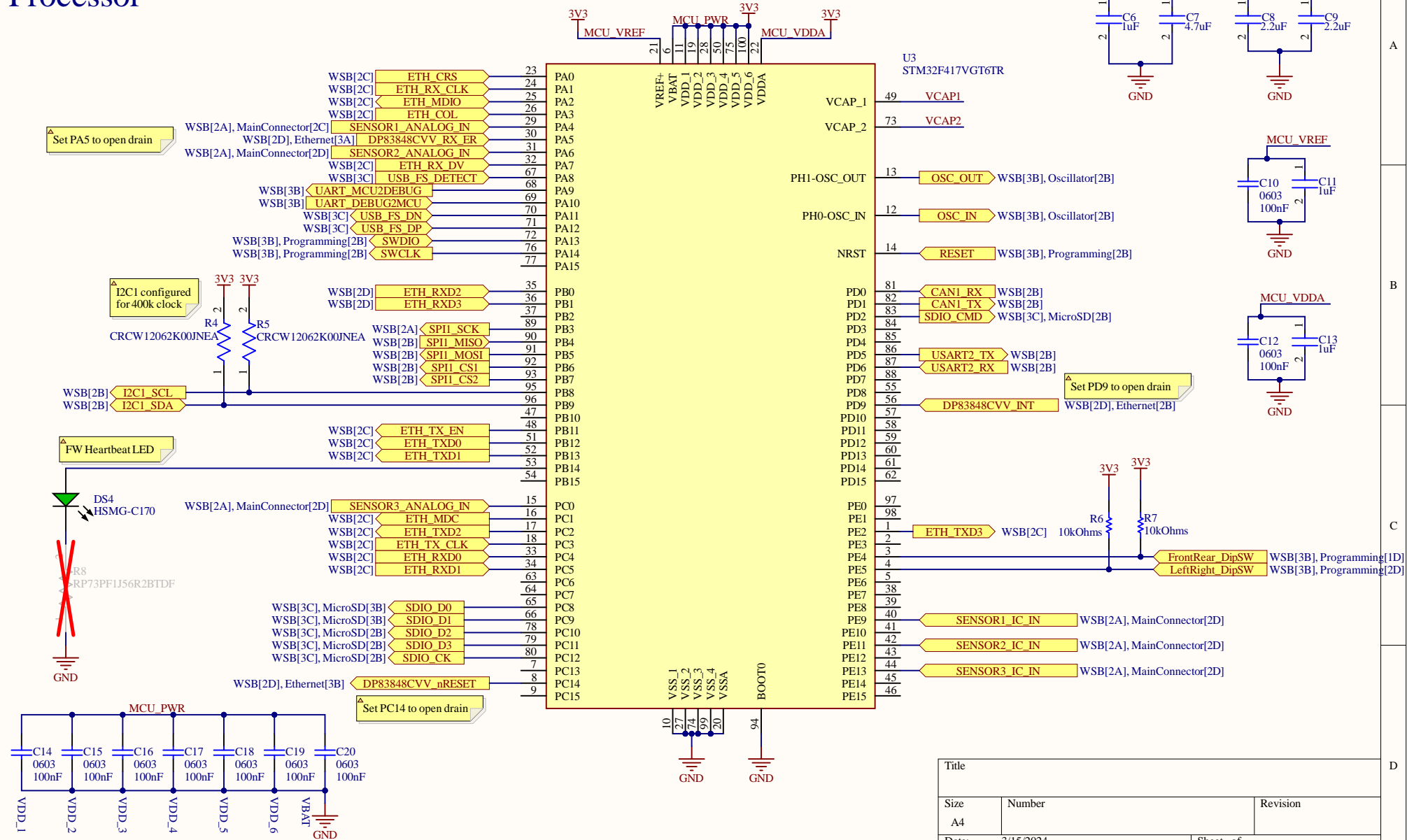
U_VehicleCAN
CAN.SchDoc

U_Ethernet
Ethernet.SchDoc

U_POWER
Power.SchDoc

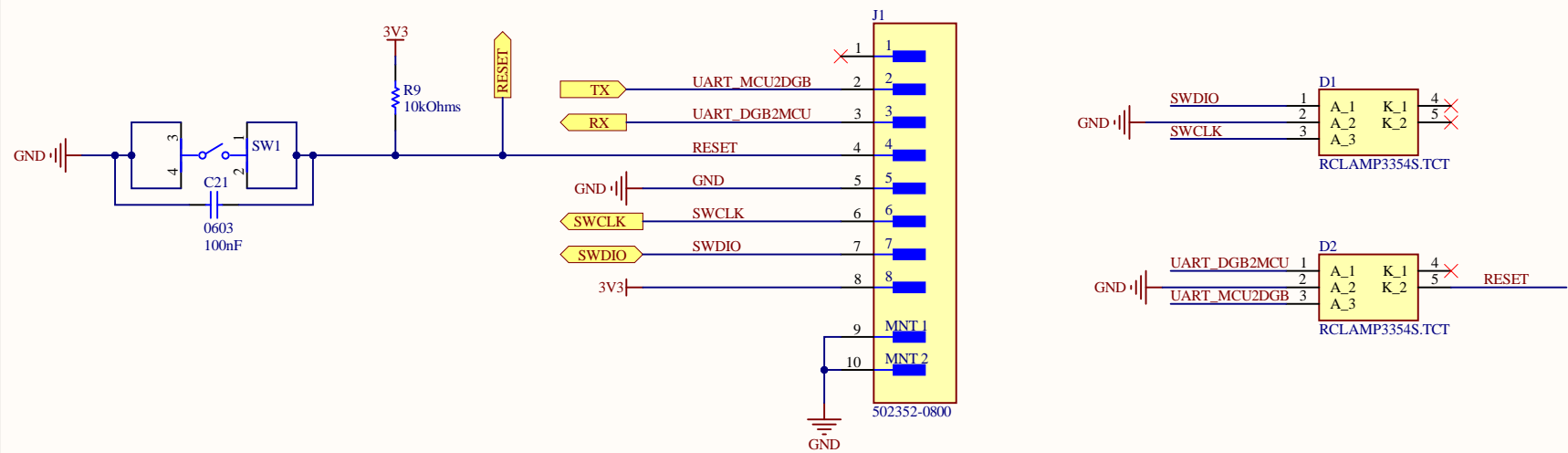
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File:	C:\Users\...\WSB.SchDoc		Drawn By:

Processor



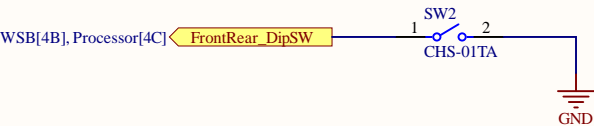
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Programming



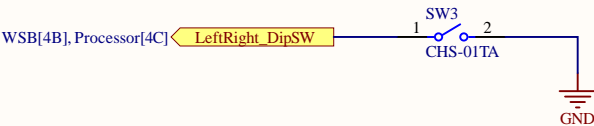
Front/Rear Dip Switch

Close switch to configure as rear WSB



Left/Right Dip Switch

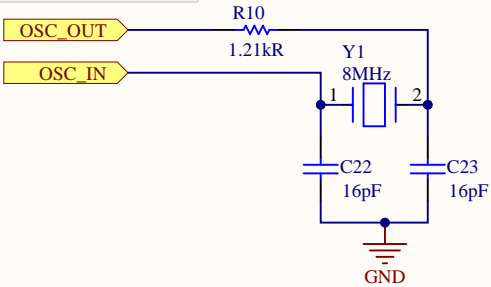
Close switch to configure as right WSB



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Oscillator

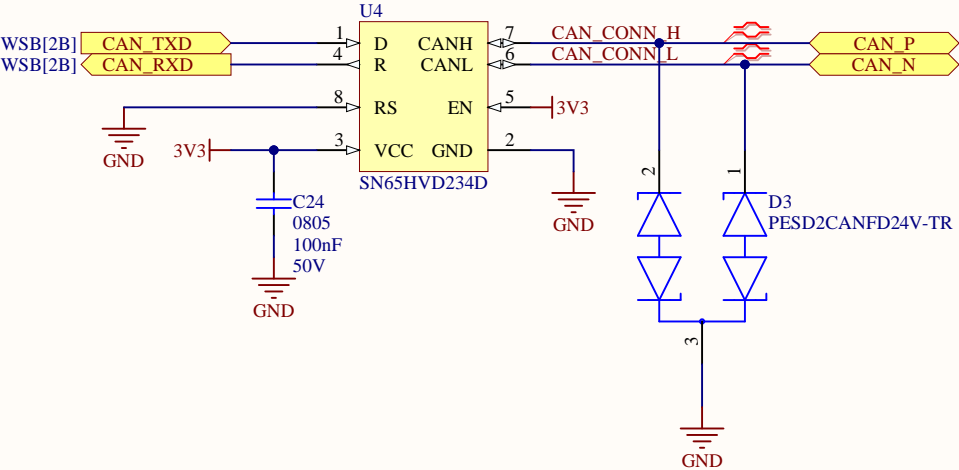
⚠ Oscillator external resistor must be selected to limit power dissipation to < 100uW. Value selected based value used for existing F7 boards but should be verified experimentally but a general equation in AN2867 is given in section 3.5.3 as:
 $R_EXT = 1/(2*\pi*F_osc*C_L2)$
 $R_EXT = 1/(2*\pi*(8*10^6)*(16*10^{-12}))$
 $R_EXT = 1243$



⚠ See ST AN2867 Rev 19 and datasheet section 5.3.8 External clock source characteristics for details. MCU datasheet recommends a 10pF estimate for pararsitic capacitance. This is a Pierce Oscillator (variant of Colpitts Oscillator). R_Ext is used to limit inverter output current. See Figure 5 in AN2867. From AN2867 Section 3.3 with C_L1 = C_L2 and C_L as 18pF:
 $C_L1 = 2*(C_L - C_s)$
 $C_L1 = 16pF$

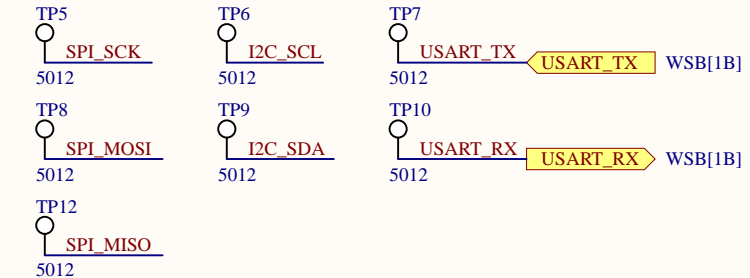
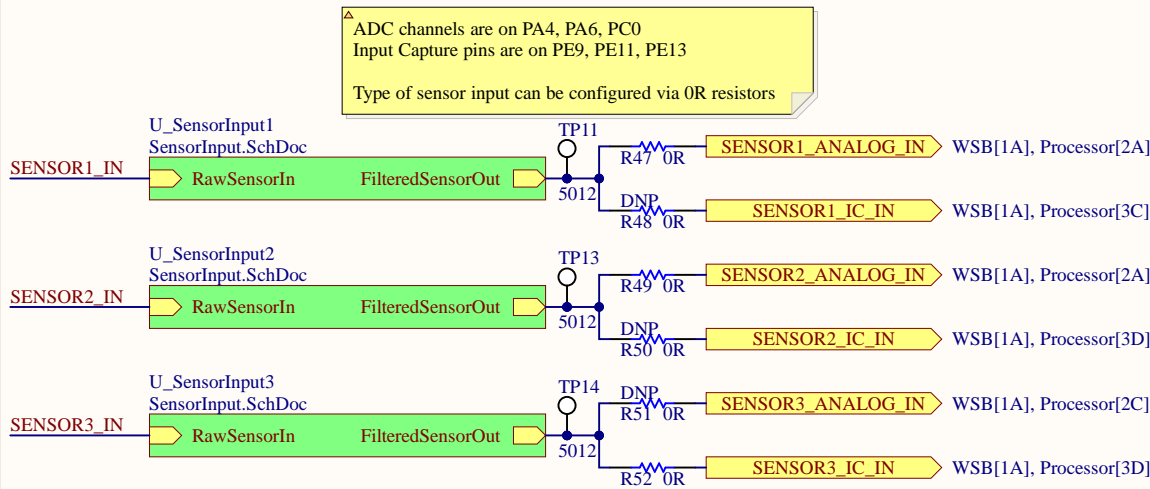
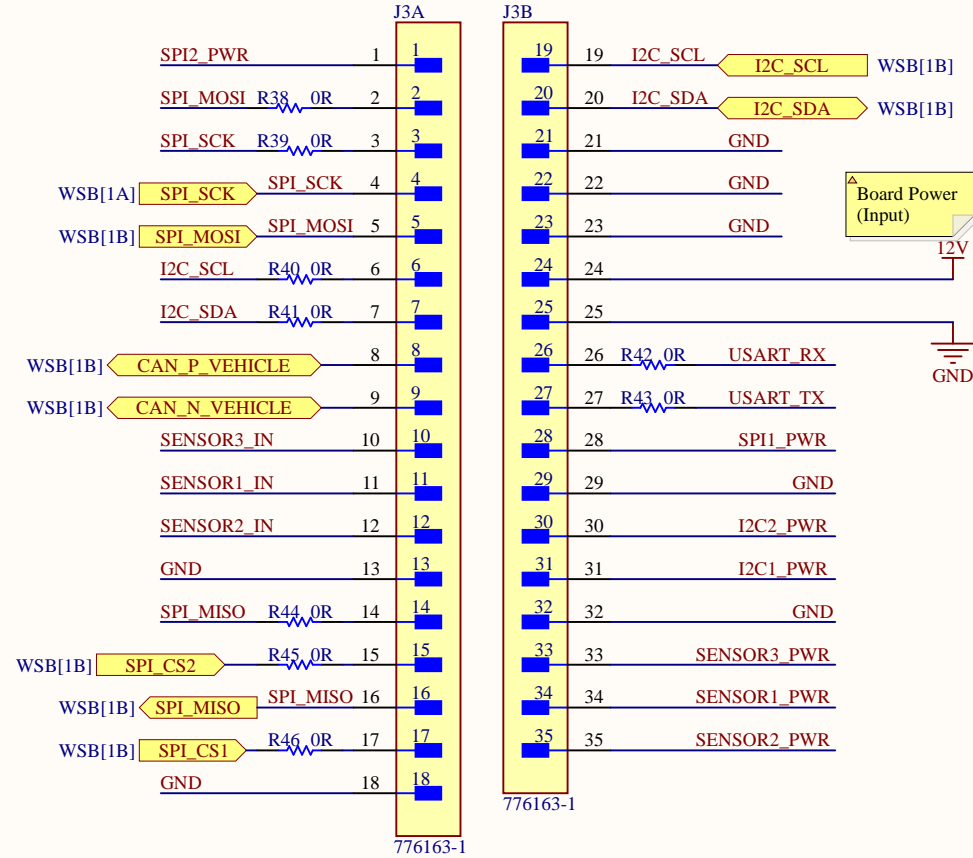
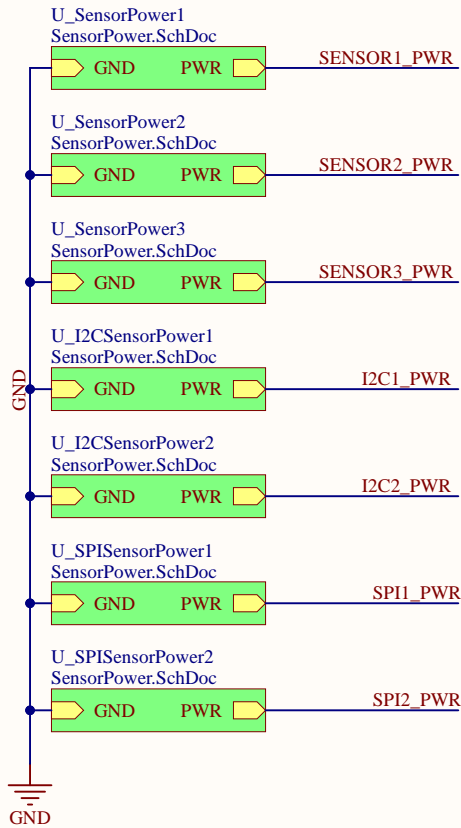
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CAN



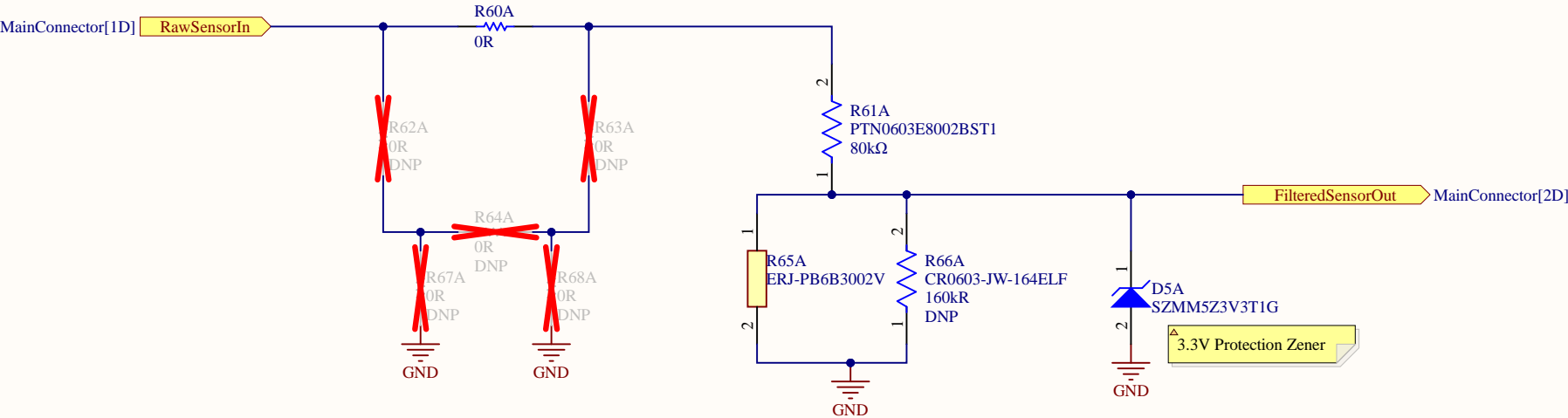
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Main Connector



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Sensor Input

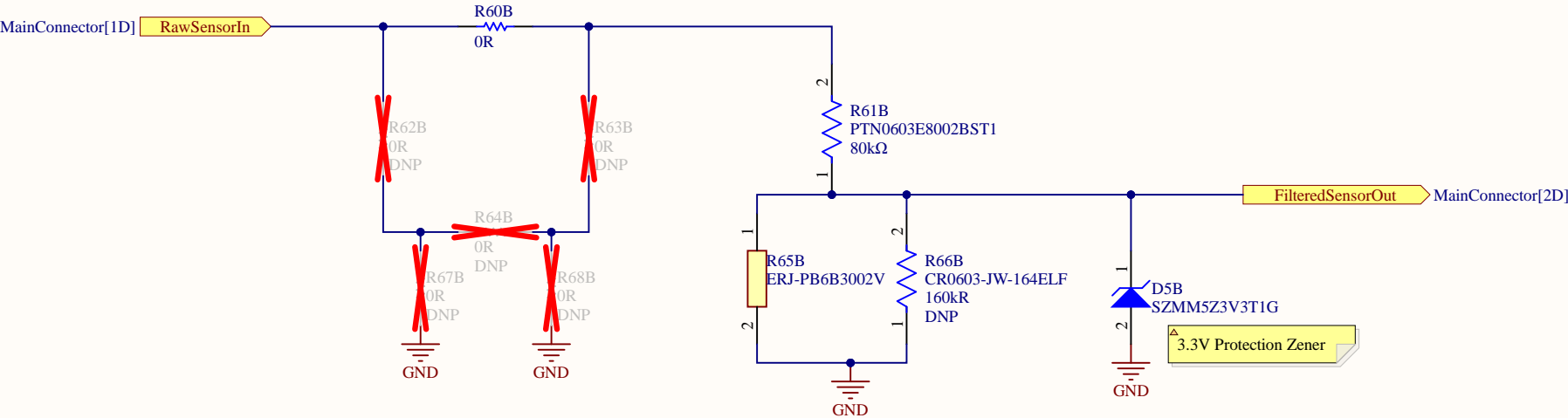


Filter Stage
Optional band pass filter with 0805 components

Step Down Stage
Populate 30kOhm Resistor if sensor output is 12V,
160kOhm if 5V, bridge 80kOhm if 3.3V

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Sensor Input

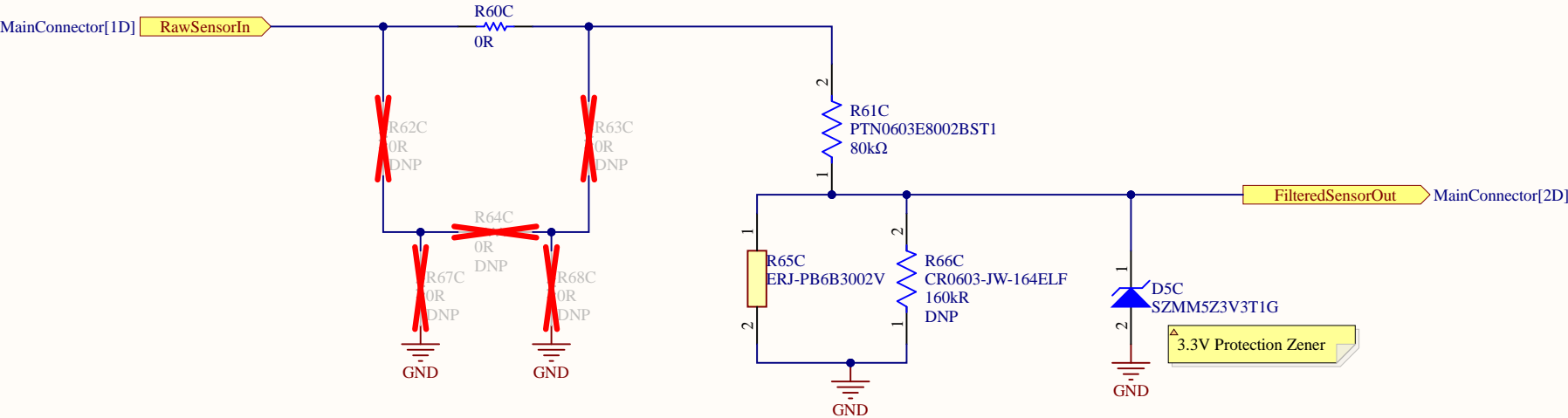


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Optional band pass filter with 0805 components

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Sensor Input

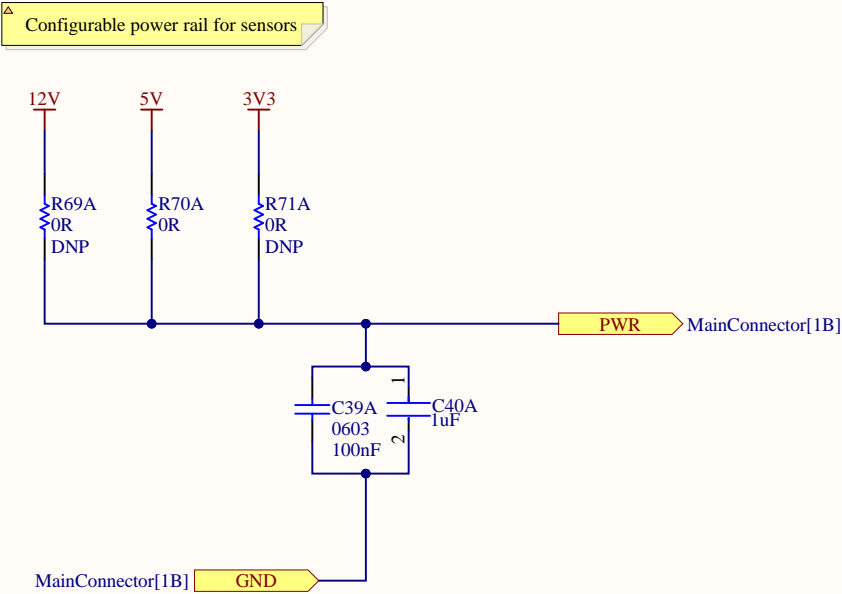


▲ Filter Stage
Optional band pass filter with 0805 components

▲ Step Down Stage
Populate 30kOhm Resistor if sensor output is 12V,
160kOhm if 5V, bridge 80kOhm if 3.3V

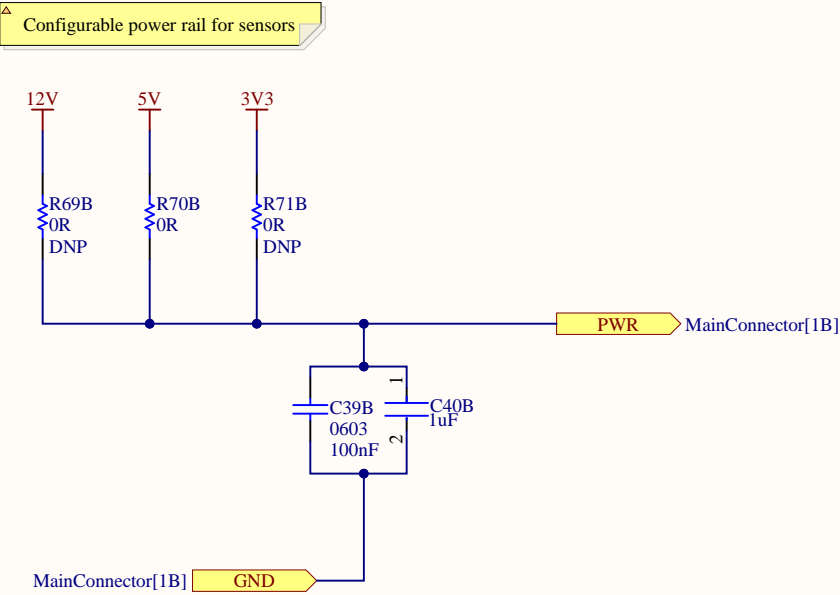
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Sensor Power



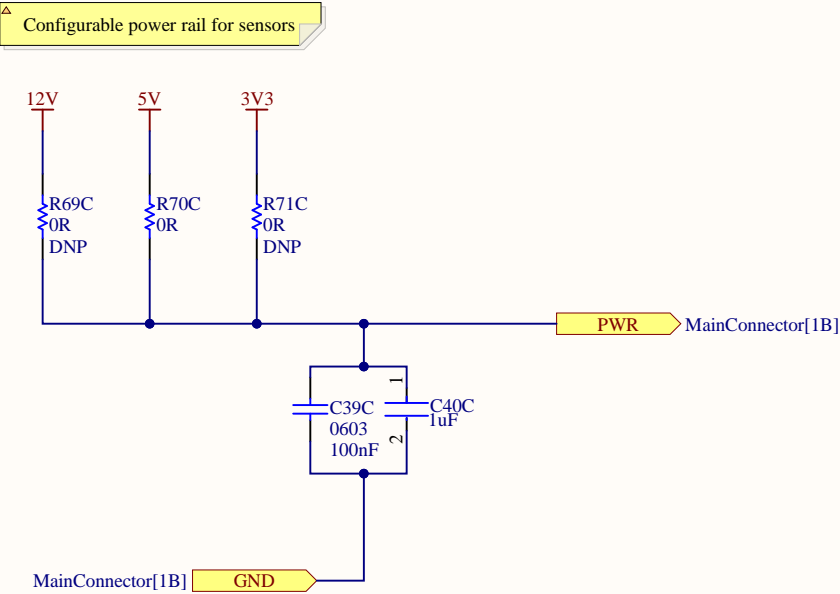
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Sensor Power



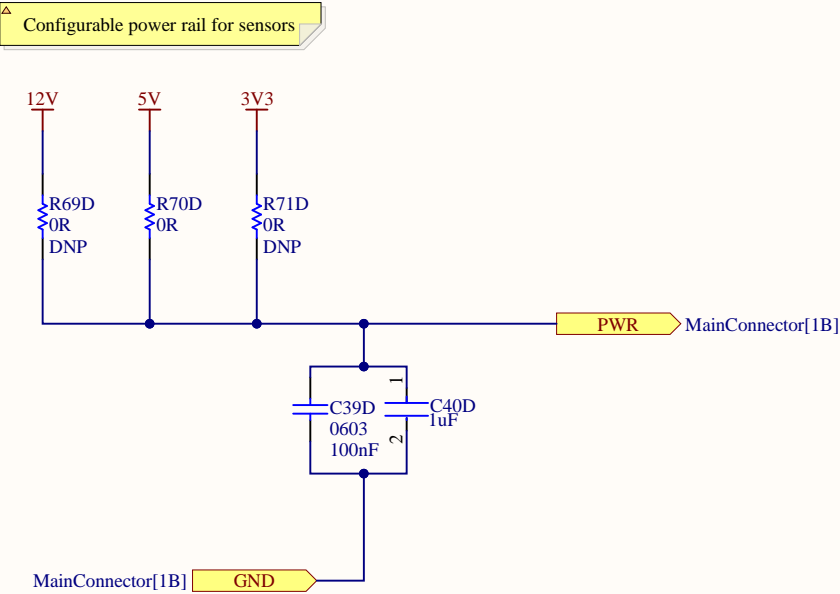
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Sensor Power



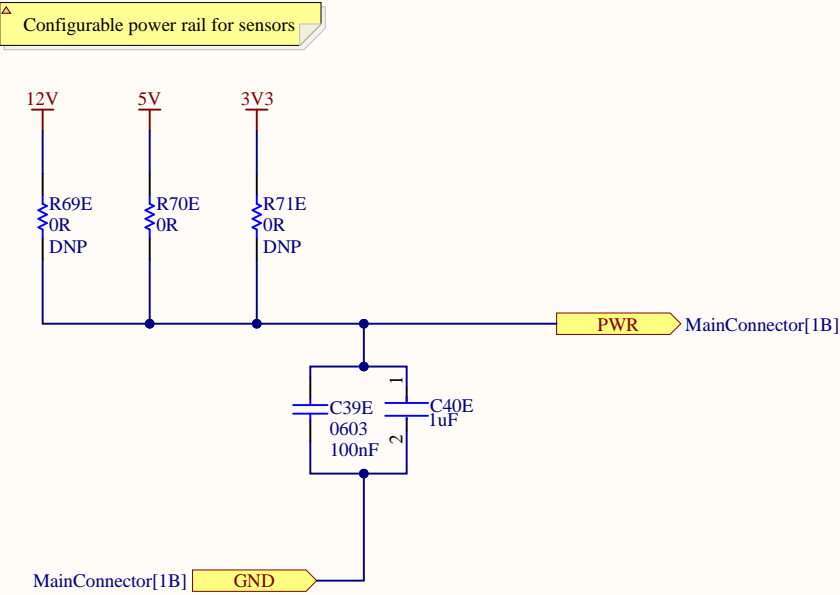
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Sensor Power



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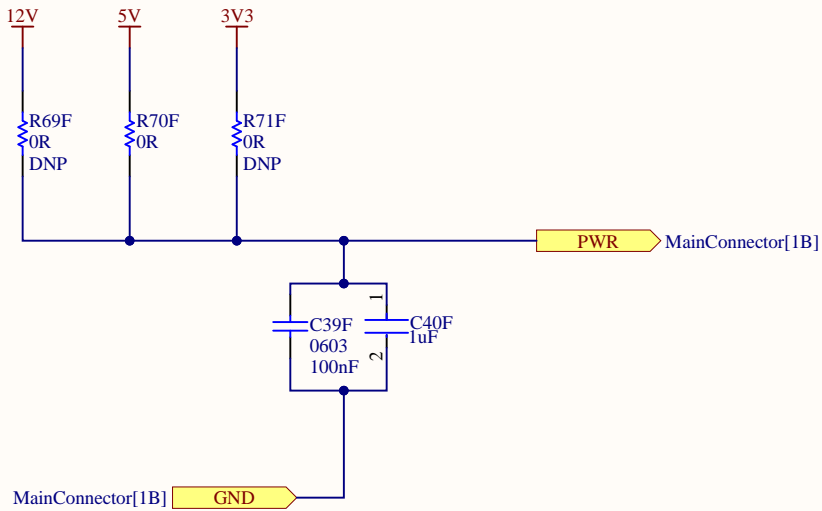
Sensor Power



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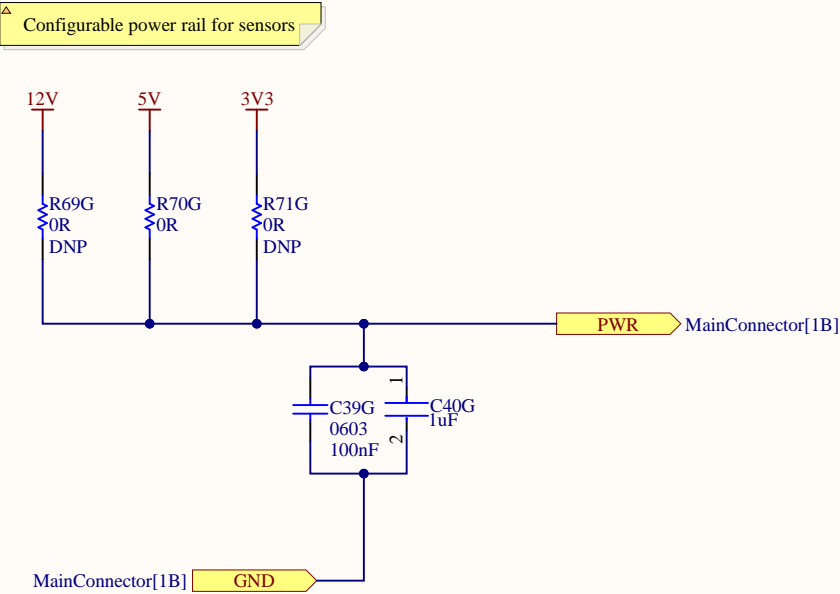
Sensor Power

Configurable power rail for sensors



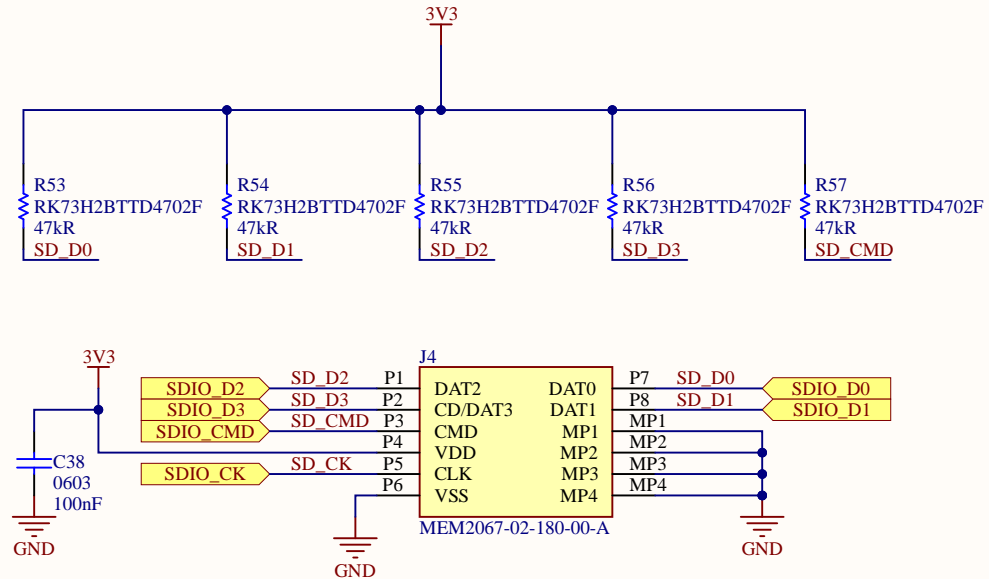
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Sensor Power

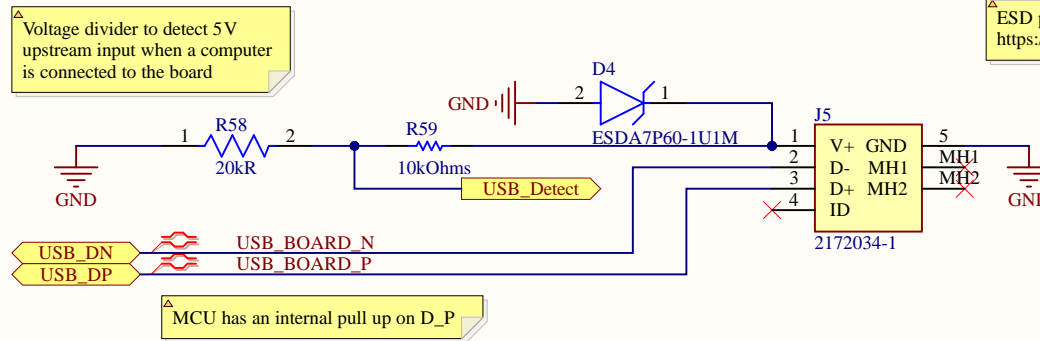


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MicroSD (logging)



MiniUSB-B (MicroSD card access)

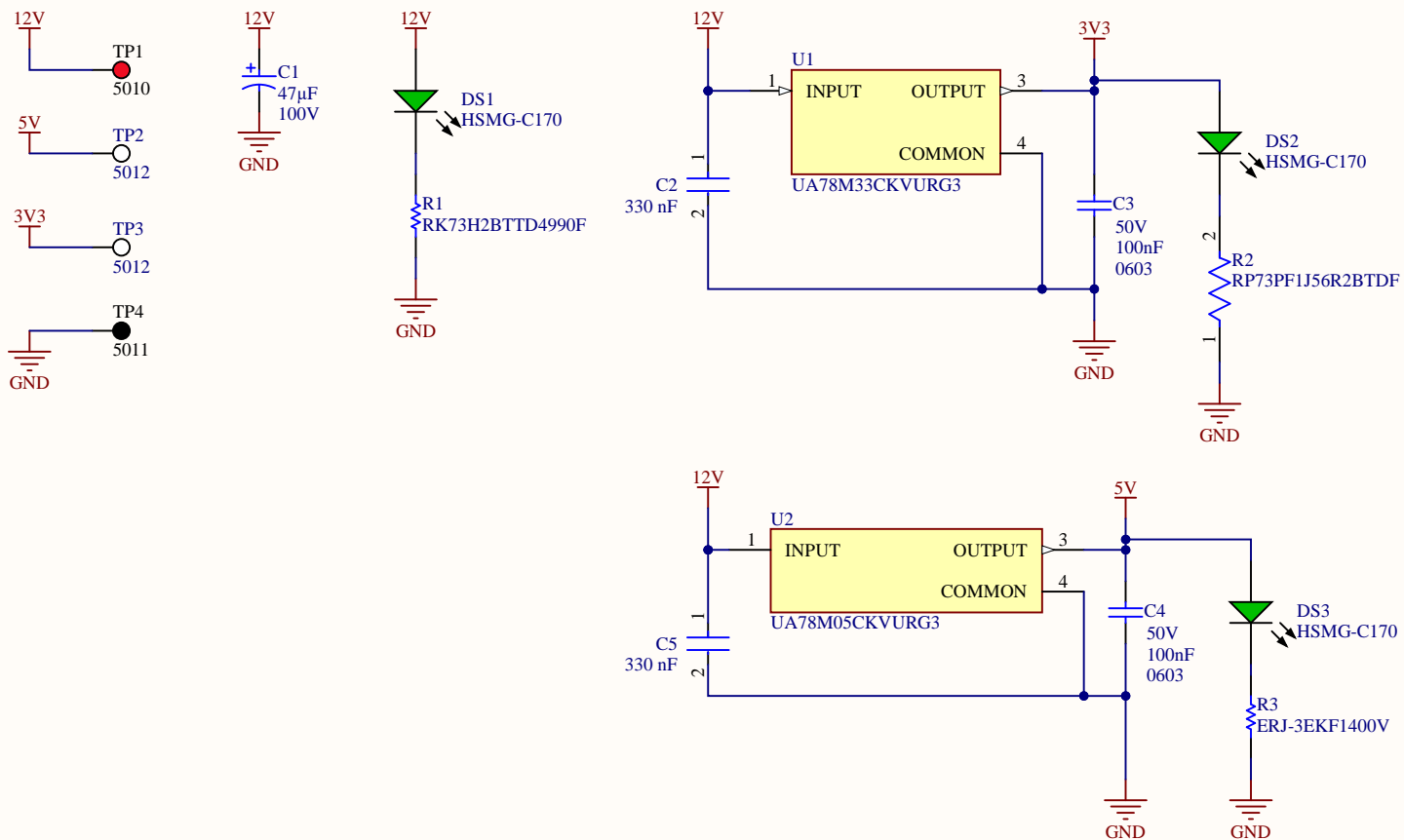


△ To optimize the power consumption on self-powered platforms, only a USB PHY and a controller must be started on the VBUS detection
https://www.st.com/resource/en/application_note/an4879-introduction-t

△ ESD protection for VBUS:
<https://www.st.com/resource/en/a>

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File:	C:\Users\...\MicroSD.SchDoc	Drawn By:

Power



Title		
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Date:	3/15/2024	Sheet of
File:	C:\Users\...\Power.SchDoc	Drawn By:

