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AC Energy Meter/Dimmer

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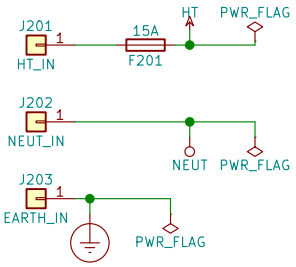
AC Input Connections

From Panel AC Input Socket ->



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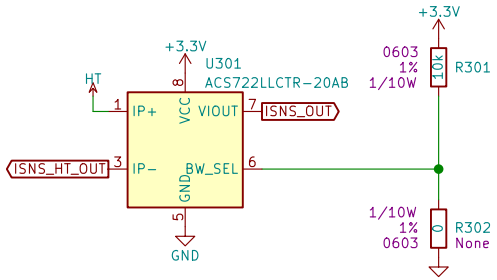
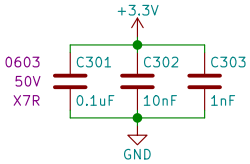
AC Current Sensor



10.7ARMS Max to support full output swing of conditioning stages



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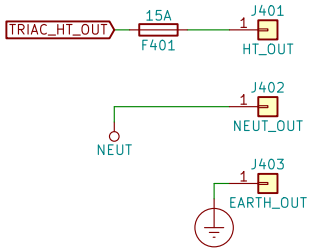
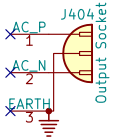
AC Output Connections



-> To Panel AC Output Socket



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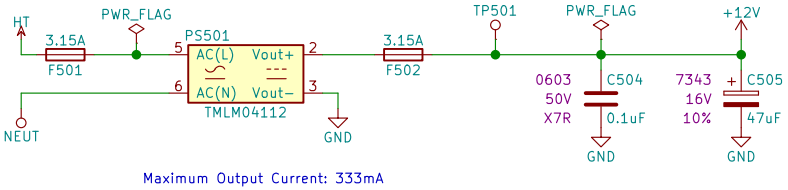
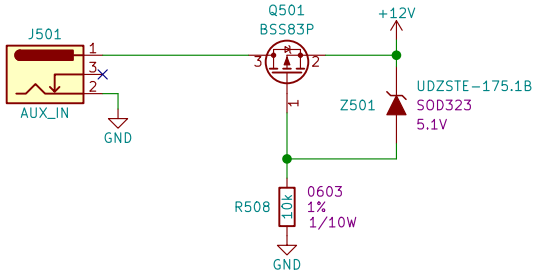
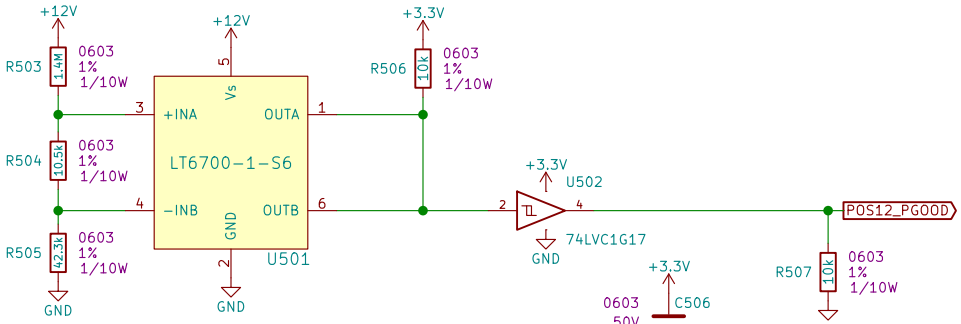
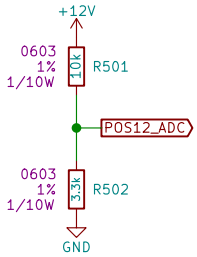
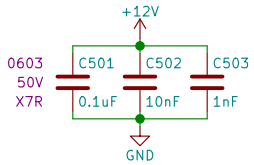
+12V 4W Isolated AC/DC Converter, +12V PGOOD Window Comparator











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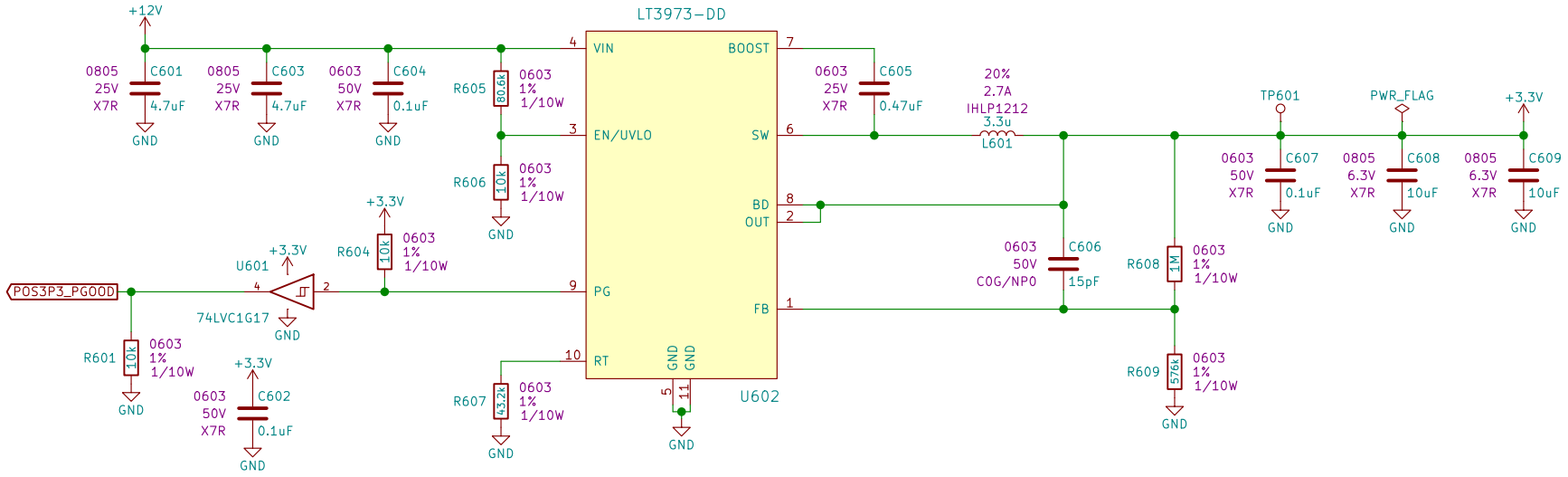
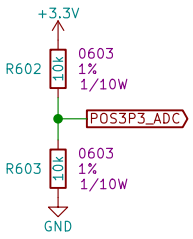
+3.3V, 750mA, 2MHz Buck Converter





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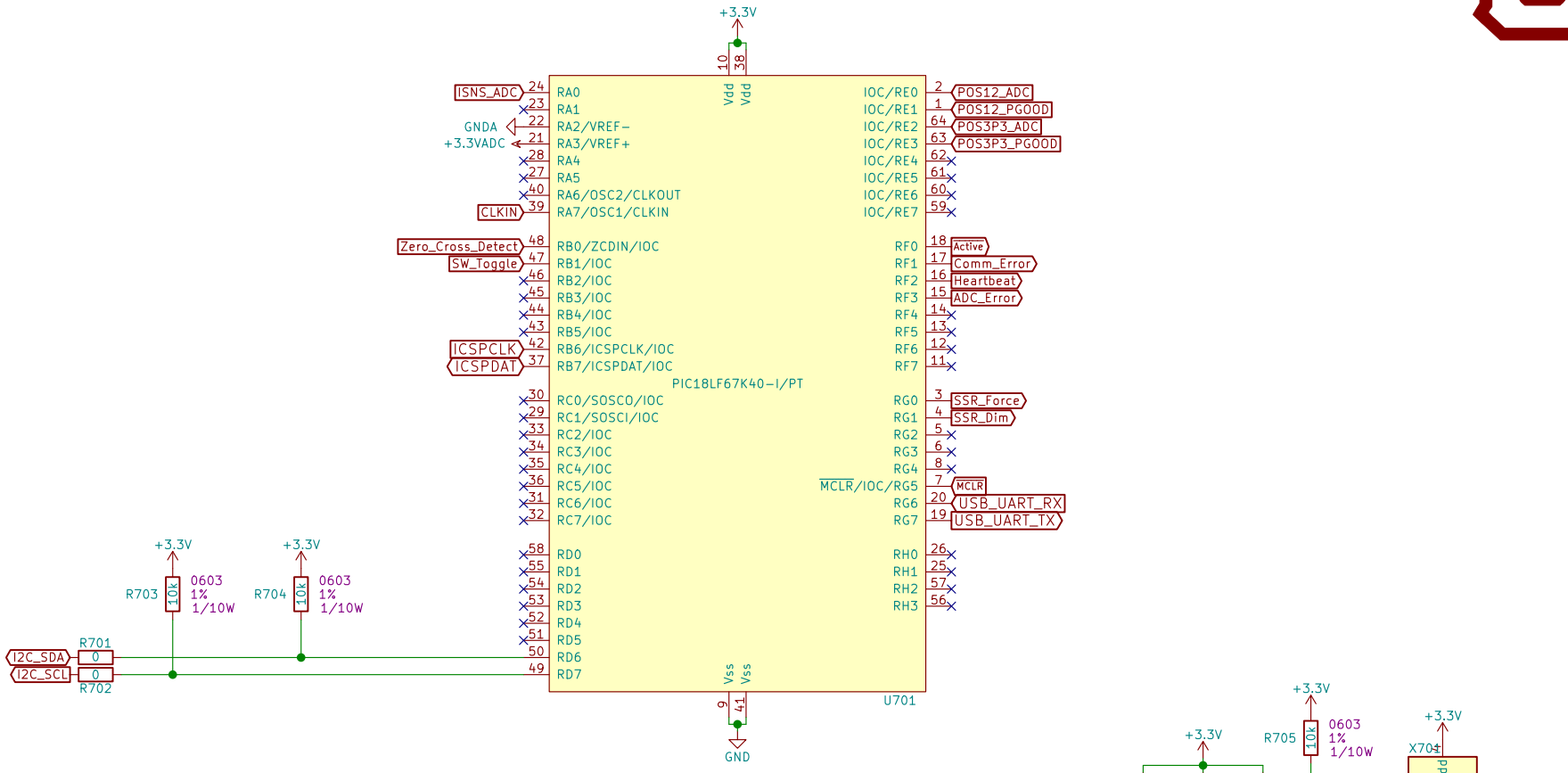
8 bit High Performance Enhanced Flash PIC Microcontroller



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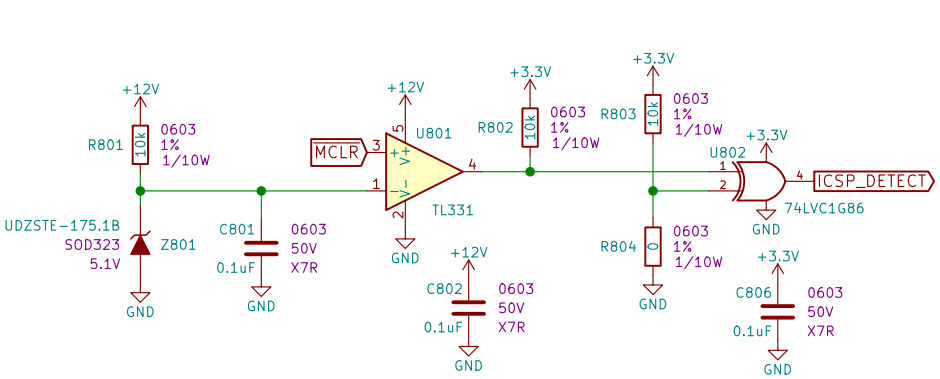
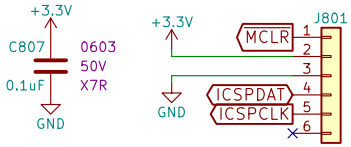
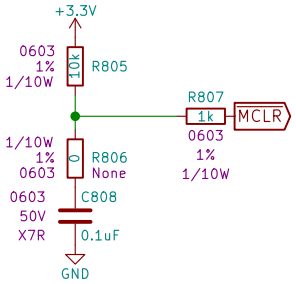
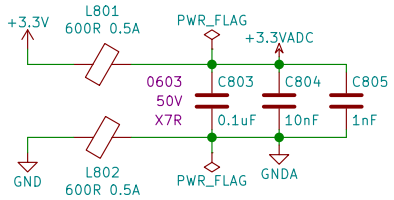
Programming Header, $\overline{\text{MCLR}}$ Reset Filter, ICSP Detection









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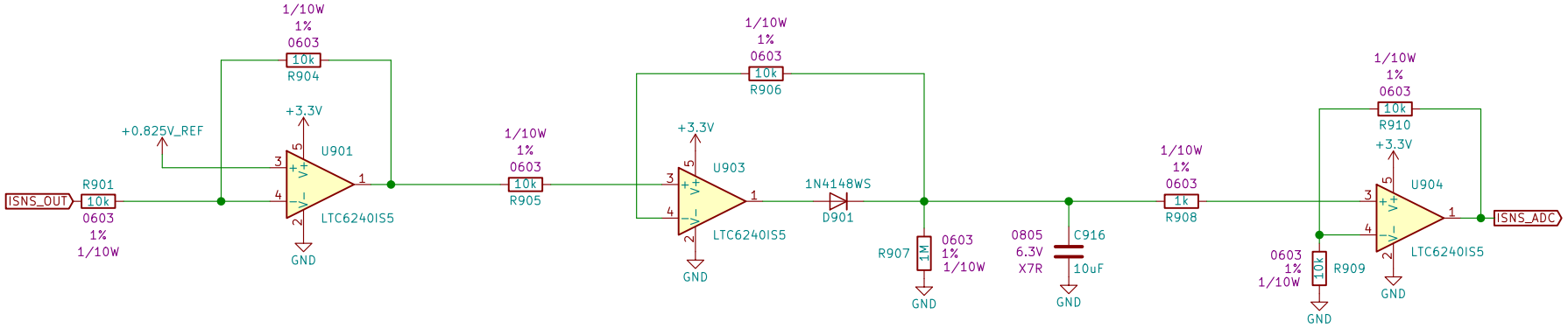
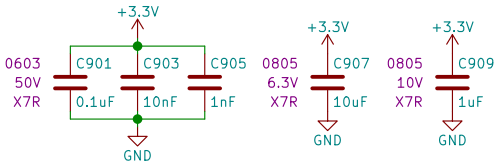
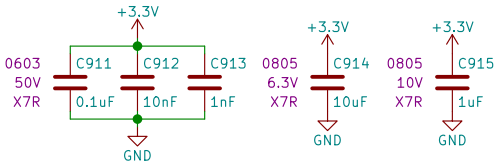
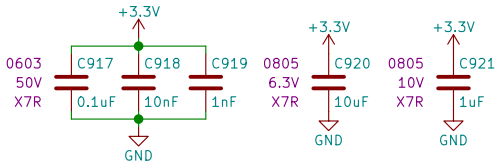
Offset Removal, Active Peak Detector, 2V/V Gain Stage

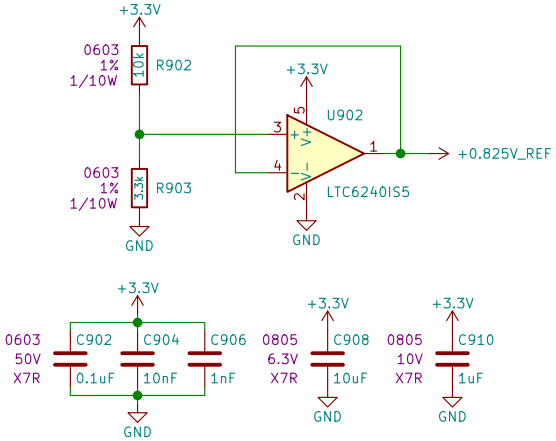








ISNS_ADC Scaling: 5.35ARMS/V



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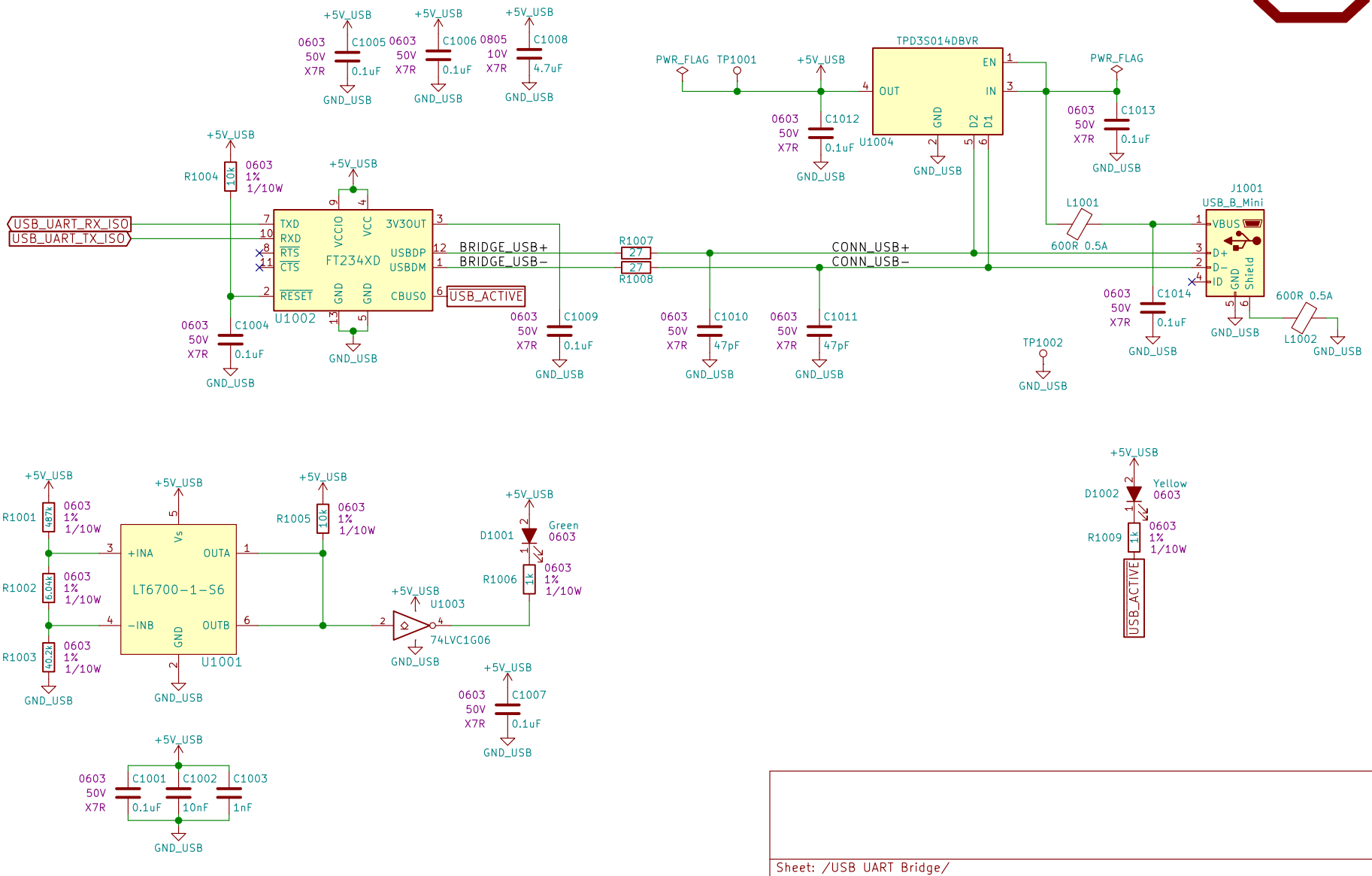
UART to USB Bridge, +5V USB Window Comparator



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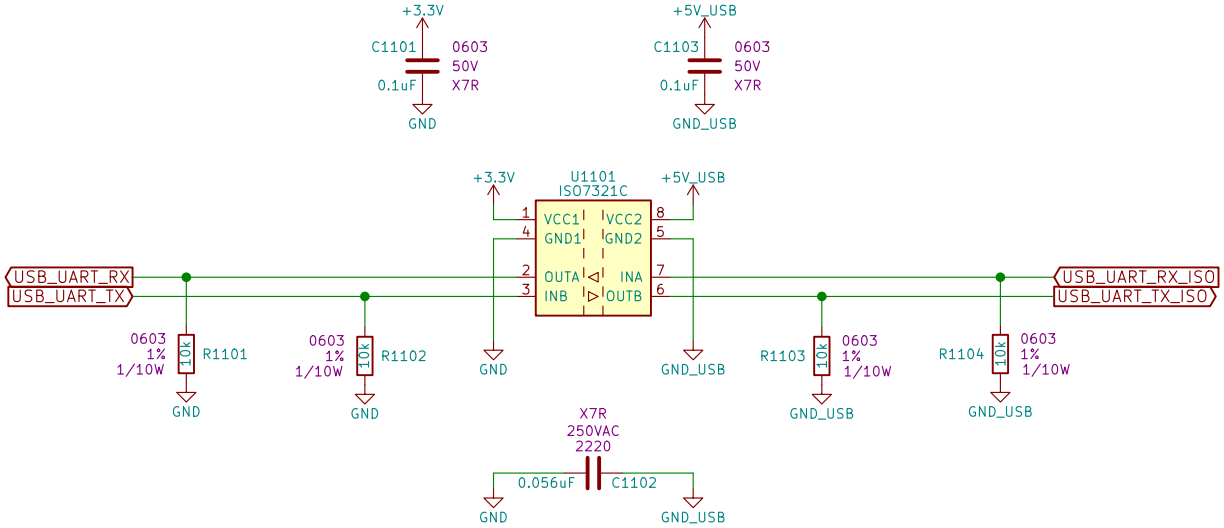
USB UART Isolation



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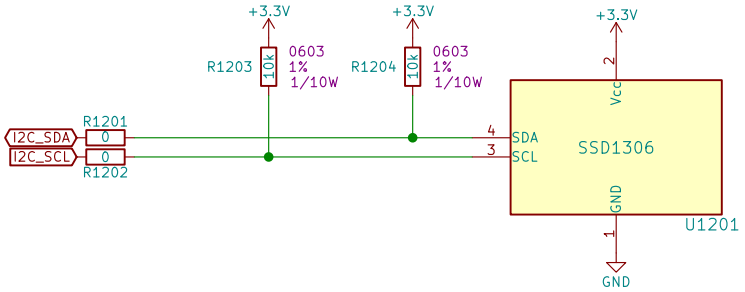
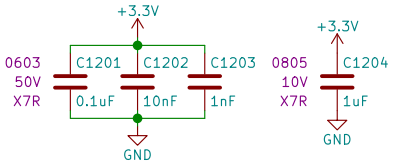
OLED Display





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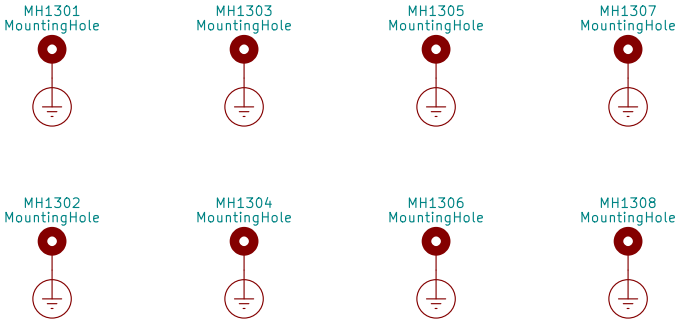
Mounting Holes and Mechanical Components



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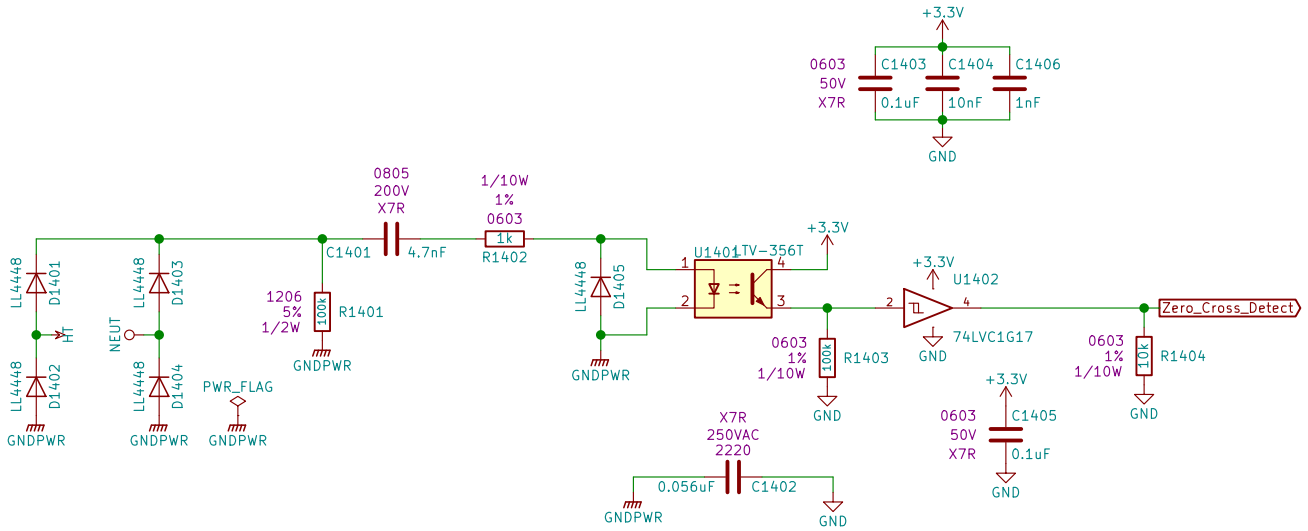
Input AC Zero-Cross Detection



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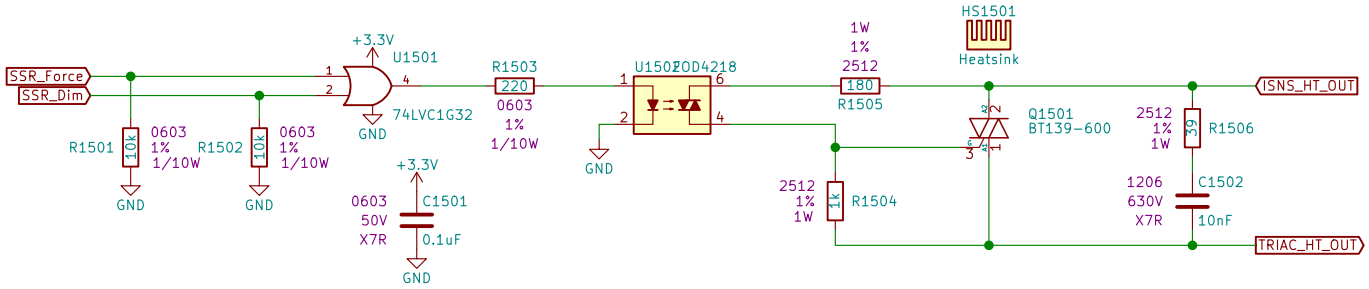
Output AC Solid State Switch, Random Phase



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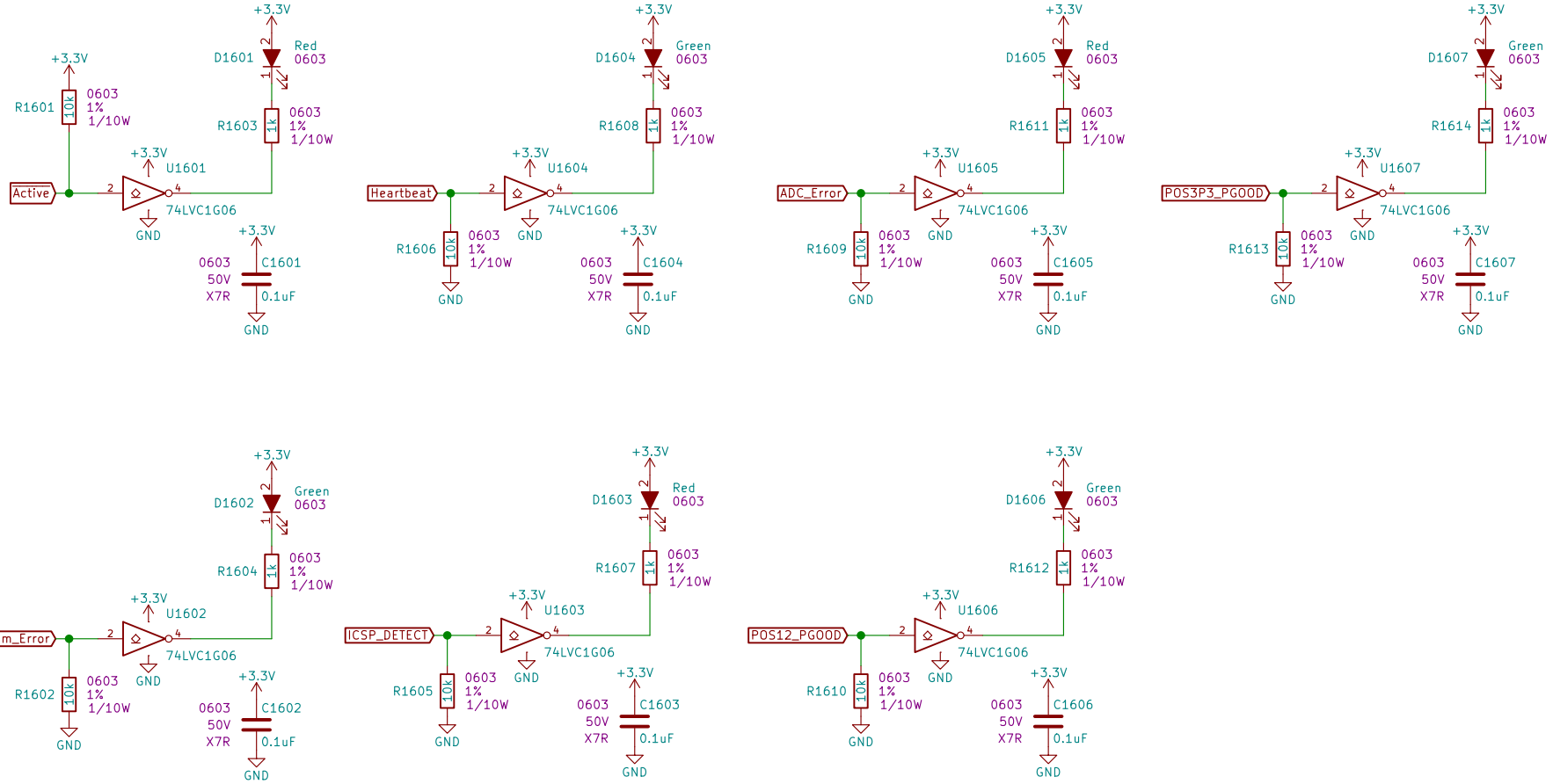
Status LEDs



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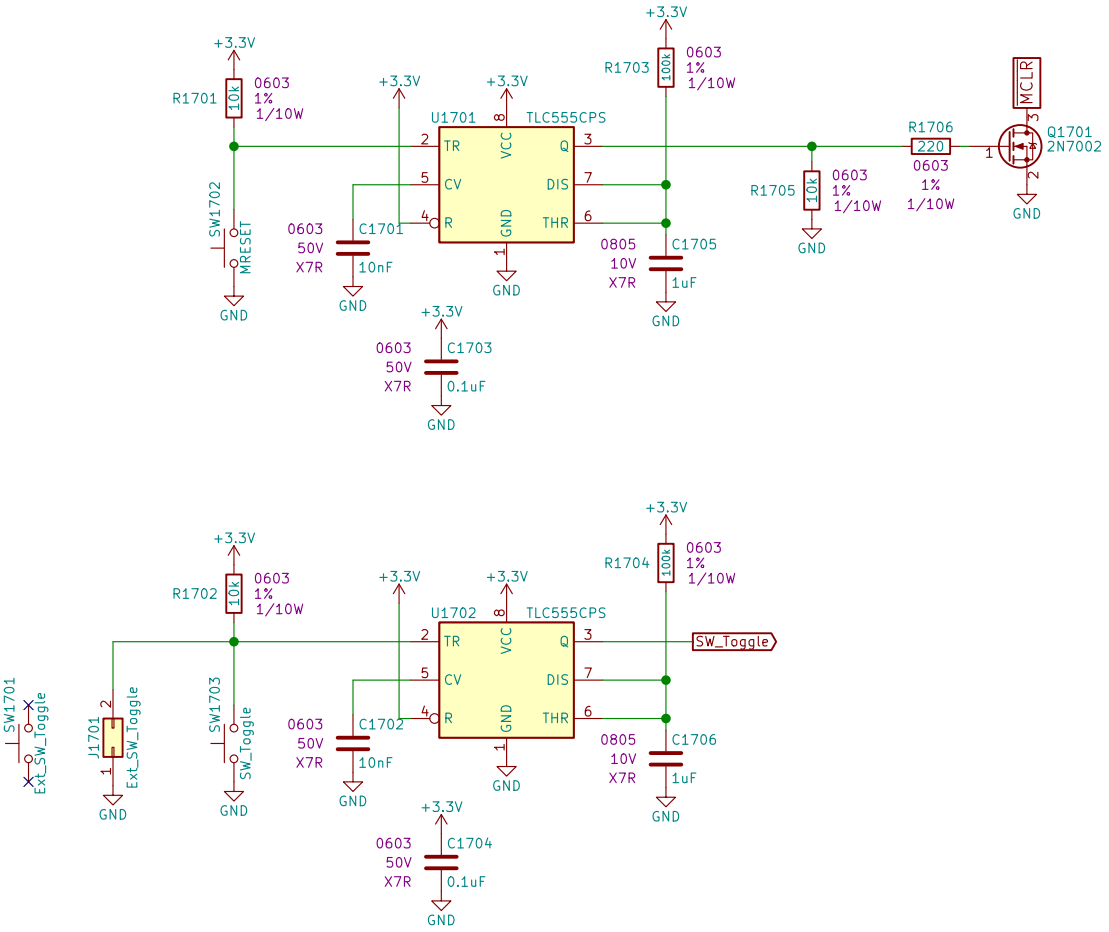
Pushbuttons and Debouncing



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Firmware Notes

* Configure RA0 as both an ADC input and the inverting input into an internal comparator
* Comparator will be used with internal DAC to set a current limit
* Configure ADC clock as FRC, external +/-VREF
* Configure clocking structure to use ECM clock mode, 16MHz clock input, 4xPLL = 64MHz SYSCLK
* Configure RB0 as EXTINT0 for ZCD, and RB1 as EXTINT1 for output switching
* Configure RD6:7 as MSSP2 I2C IO
* Configure RE0 and RE2 as ADC inputs
* Configure RE1 and RE3 as interrupt on change inputs
* Configure RF0 as open drain output, force low after booting
* Configure RF1:3 as push pull outputs, start low
* Configure RG6 as EUSART2 RX and RG7 as EUSART2 TX
* Configure the ADC to use digital filtering with lowest crossover frequency
* Use Timer7 to gather ADC data on all channels and run calculations on it at a fixed time base
* Use Timer5 as the time base for output dimming
* Use Timer6 as hearthbeat time base

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