Table of Contents:

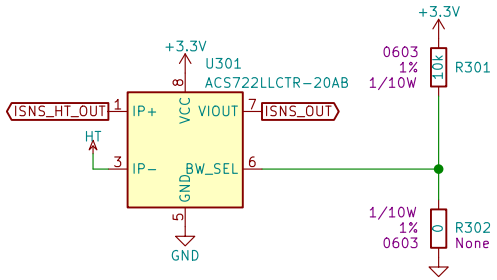
AC Power Meter/Dimmer

Sheet: /		
File: AC_Power_Meter.sch		
Title:		
Size: A	Date: 2018-10-01	**Rev: A**
KiCad E.D.A. kicad (5.0.0)		Id: 1/18

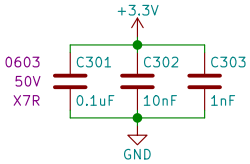
AC Input Connections

Sheet: /AC Input/ File: AC_Input.sch		
Title:		
Size: A	Date: 2018-10-01	**Rev: A**
KiCad E.D.A. kicad (5.0.0)		Id: 2/18

AC Current Sensor

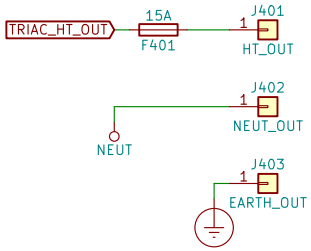


10.7ARMS Max to support full output swing of conditioning stages

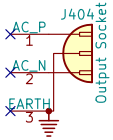


Sheet: /AC Current Sensor/ File: AC_Current_Sensor.sch		
Title:		
Size: A	Date: 2018-10-01	**Rev: A**
KiCad E.D.A. kicad (5.0.0)		Id: 3/18

AC Output Connections

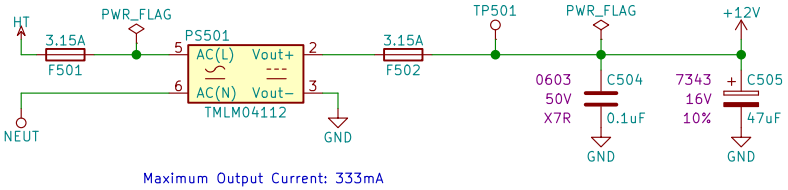


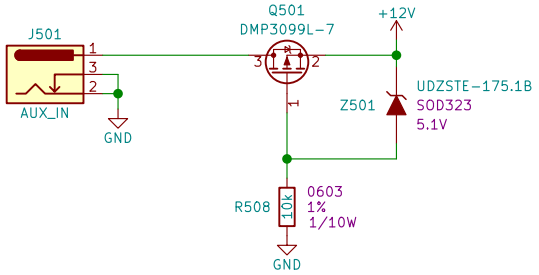
-> To Panel AC Output Socket

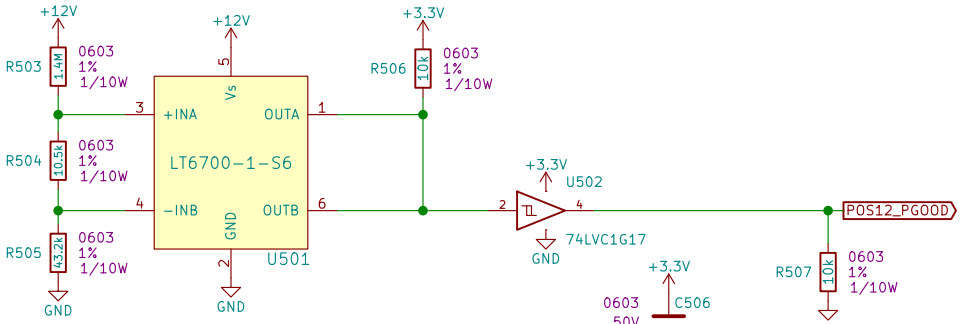


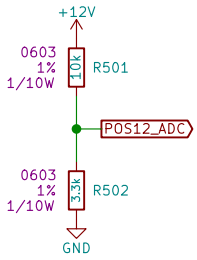
Sheet: /AC Output/ File: AC_Output.sch		
Title:		
Size: A	Date: 2018-10-01	**Rev: A**
KiCad E.D.A. kicad (5.0.0)		Id: 4/18

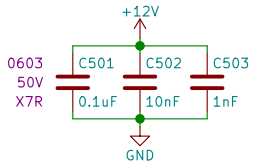
+12V 4W Isolated AC/DC Converter, +12V PGOOD Window Comparator





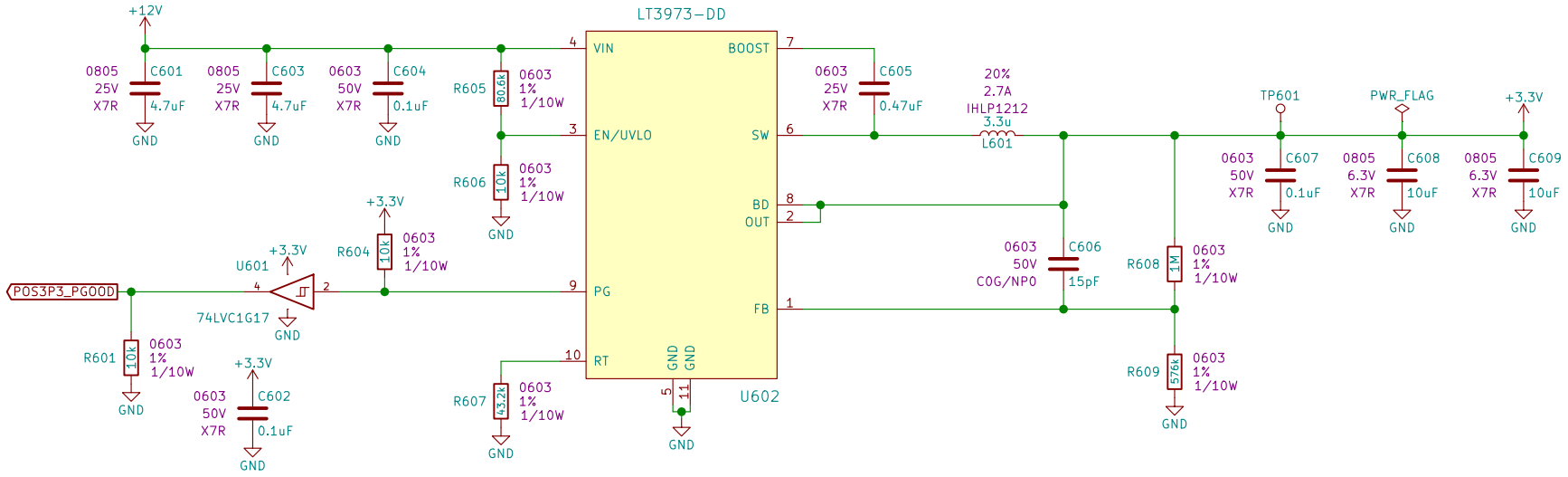


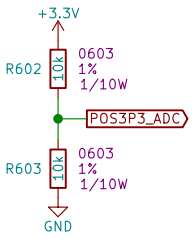




Sheet: /POS12 Power Supply/		
File: POS12_Power_Supply.sch		
Title:		
Size: A	Date: 2018-10-01	**Rev: A**
KiCad E.D.A. kicad (5.0.0)		Id: 5/18

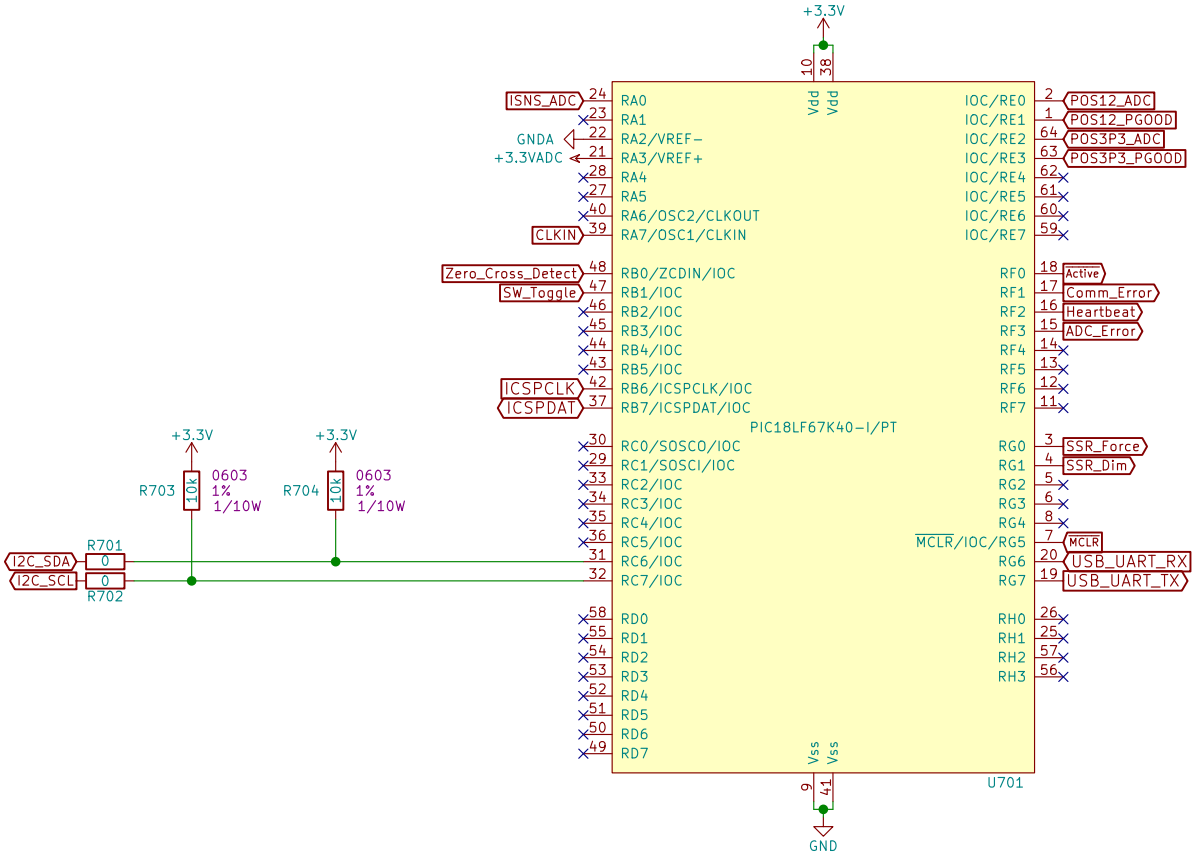
+3.3V, 750mA, 2MHz Buck Converter

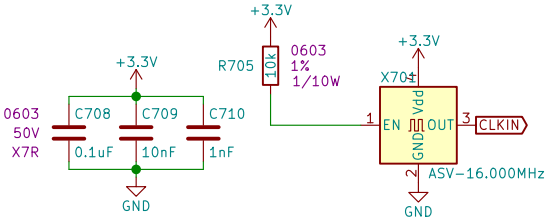


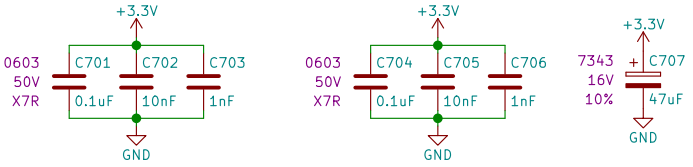


Sheet: /POS3P3 Power Supply/	
File: POS3P3_Power_Supply.sch	
Title:	
Size: A	Date: 2018-10-01
KiCad E.D.A. kicad (5.0.0)	Id: 6/18

8 bit High Performance Enhanced Flash PIC Microcontroller





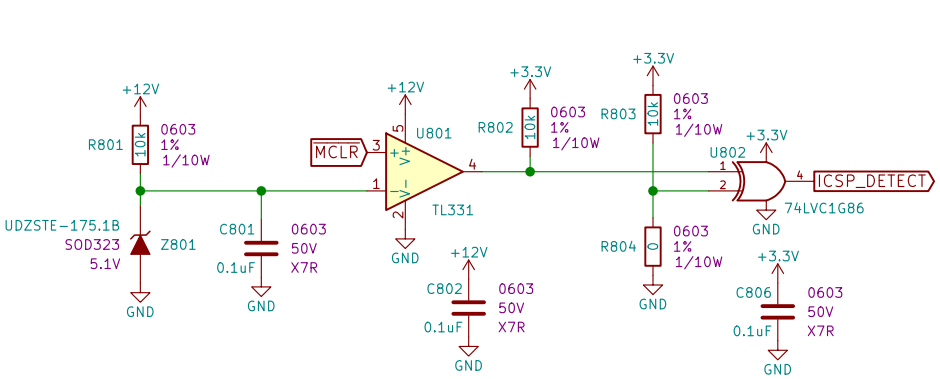


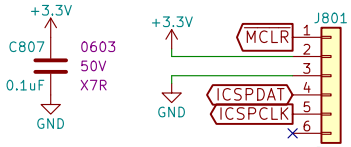
Sheet: /Microcontroller/
File: Microcontroller.sch

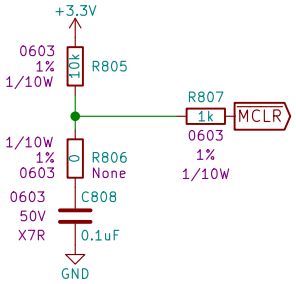
Title:

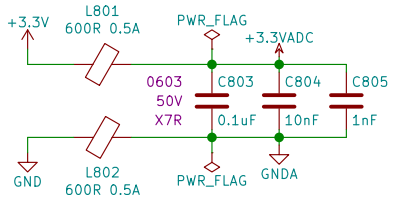
Size: A	Date: 2018-10-01	**Rev: A**
KiCad E.D.A. kicad (5.0.0)		Id: 7/18

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



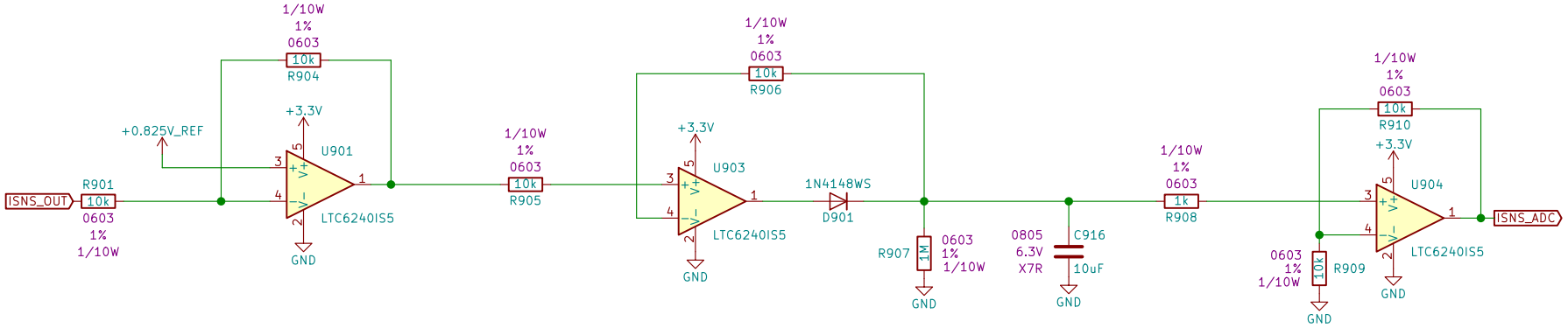


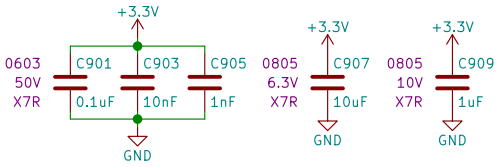


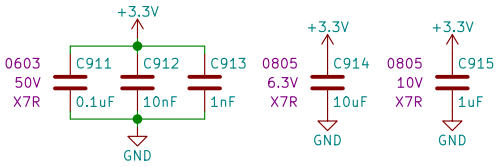


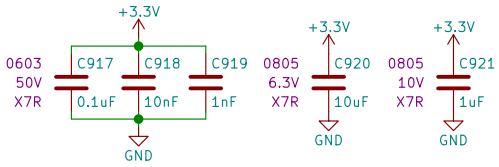
Sheet: /Microcontroller Programming/ File: Microcontroller_Programming.sch		
Title:		
Size: A	Date:	**Rev:**
KiCad E.D.A. kicad (5.0.0)		Id: 8/18

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

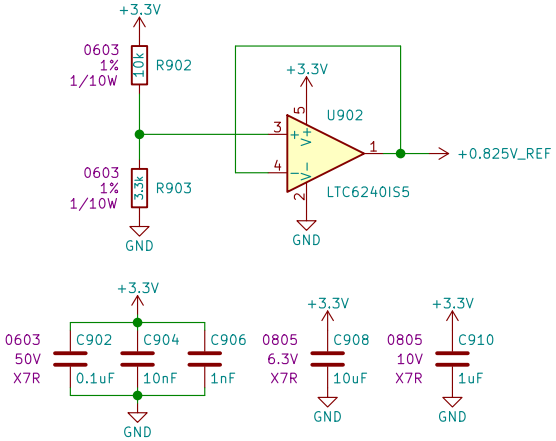






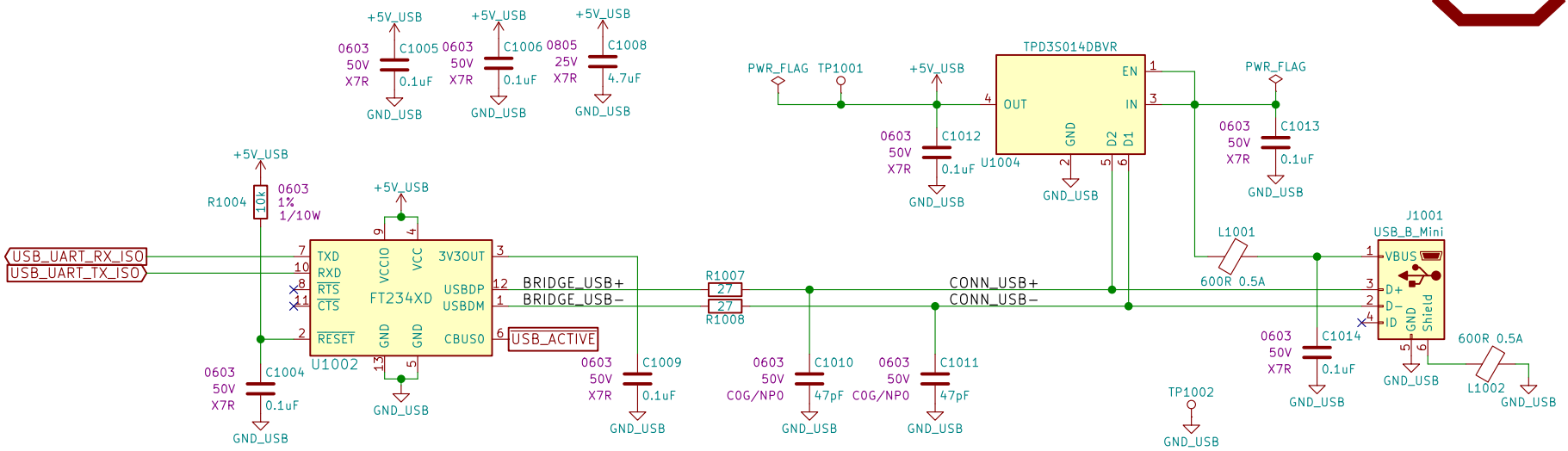


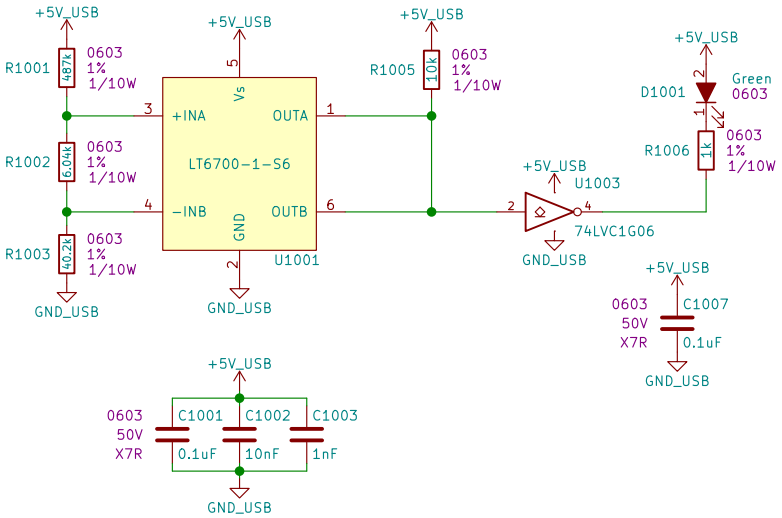
ISNS_ADC Scaling: 5.35ARMS/V

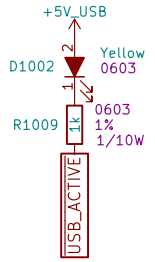


Sheet: /Sensor Signal Conditioning/		
File: Sensor_Signal_Conditioning.sch		
Title:		
Size: A	Date: 2018-10-01	**Rev: A**
KiCad E.D.A. kicad (5.0.0)		Id: 9/18

UART to USB Bridge, +5V USB Window Comparator

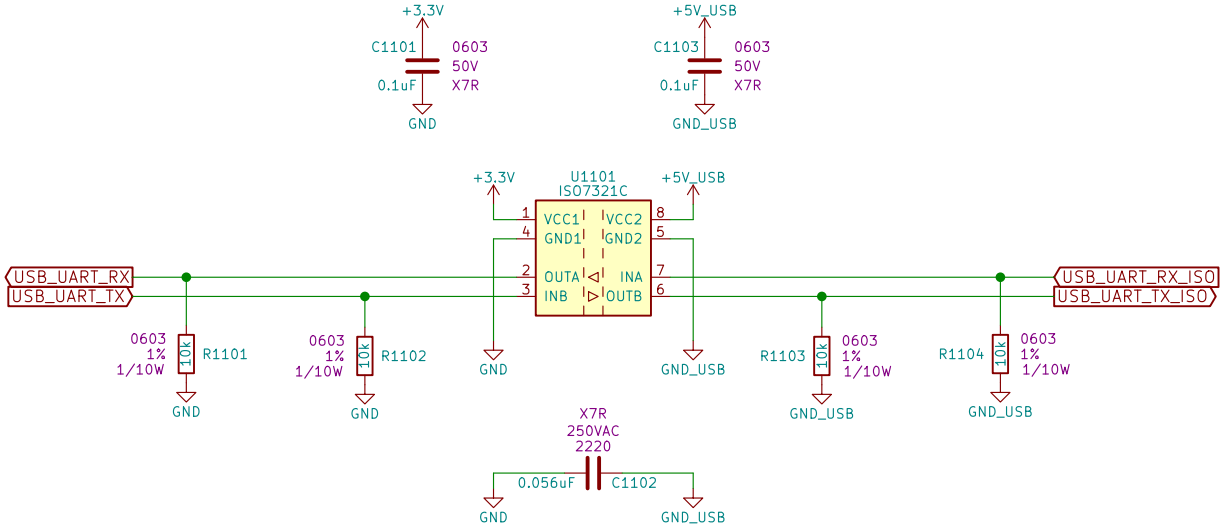






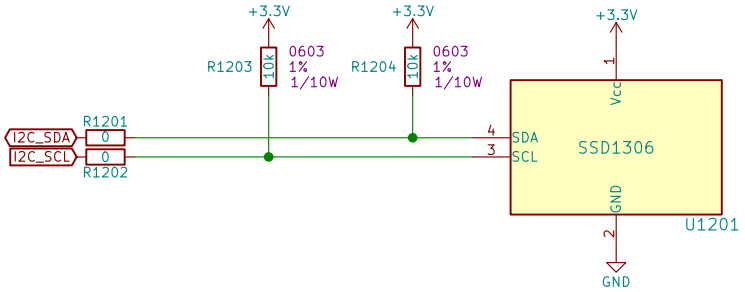
Sheet: /USB UART Bridge/		
File: USB_UART_Bridge.sch		
Title:		
Size: A	Date:	**Rev:**
KiCad E.D.A. kicad (5.0.0)		Id: 10/18

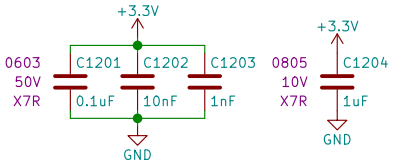
USB UART Isolation



Sheet: /USB UART Isolation/		
File: USB_UART_Isolation.sch		
Title:		
Size: A	Date:	**Rev:**
KiCad E.D.A. kicad (5.0.0)		Id: 11/18

OLED Display





Sheet: /OLED Display/ File: OLED_Display.sch		
Title:		
Size: A	Date: 2018-10-01	**Rev: A**
KiCad E.D.A. kicad (5.0.0)		Id: 12/18

Mounting Holes and Mechanical Components

MH1301
MountingHole

MH1303
MountingHole

MH1305
MountingHole

MH1307
MountingHole

MH1302
MountingHole

MH1306
MountingHole

MH1308
MountingHole

4-40 Screw
MK1303

4-40 Screw
MK1307

4-40 Screw
MK1311

4-40 Screw
MK1315

4-40 Screw
MK1304

4-40 Screw
MK1312

4-40 Screw
MK1316

4-40 Standoff
MK1305

4-40 Standoff
MK1309

4-40 Standoff
MK1313

4-40 Standoff
MK1317

4-40 Standoff
MK1306

4-40 Standoff
MK1314

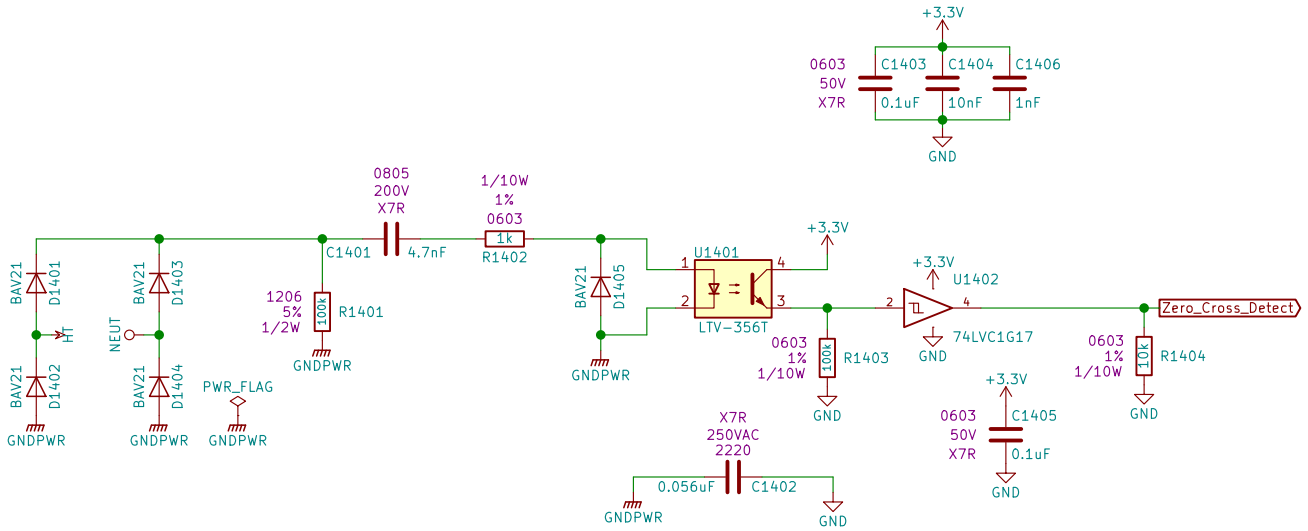
4-40 Standoff
MK1318

MK1301
Housing

MK1302
Lid

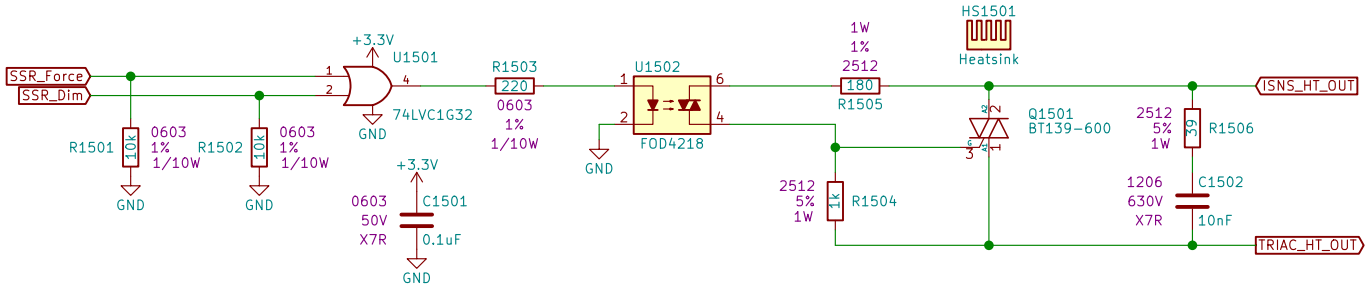
Sheet: /Mechanical/ File: Mechanical.sch		
Title:		
Size: A	Date: 2018-10-01	**Rev: A**
KiCad E.D.A. kicad (5.0.0)		Id: 13/18

Input AC Zero-Cross Detection



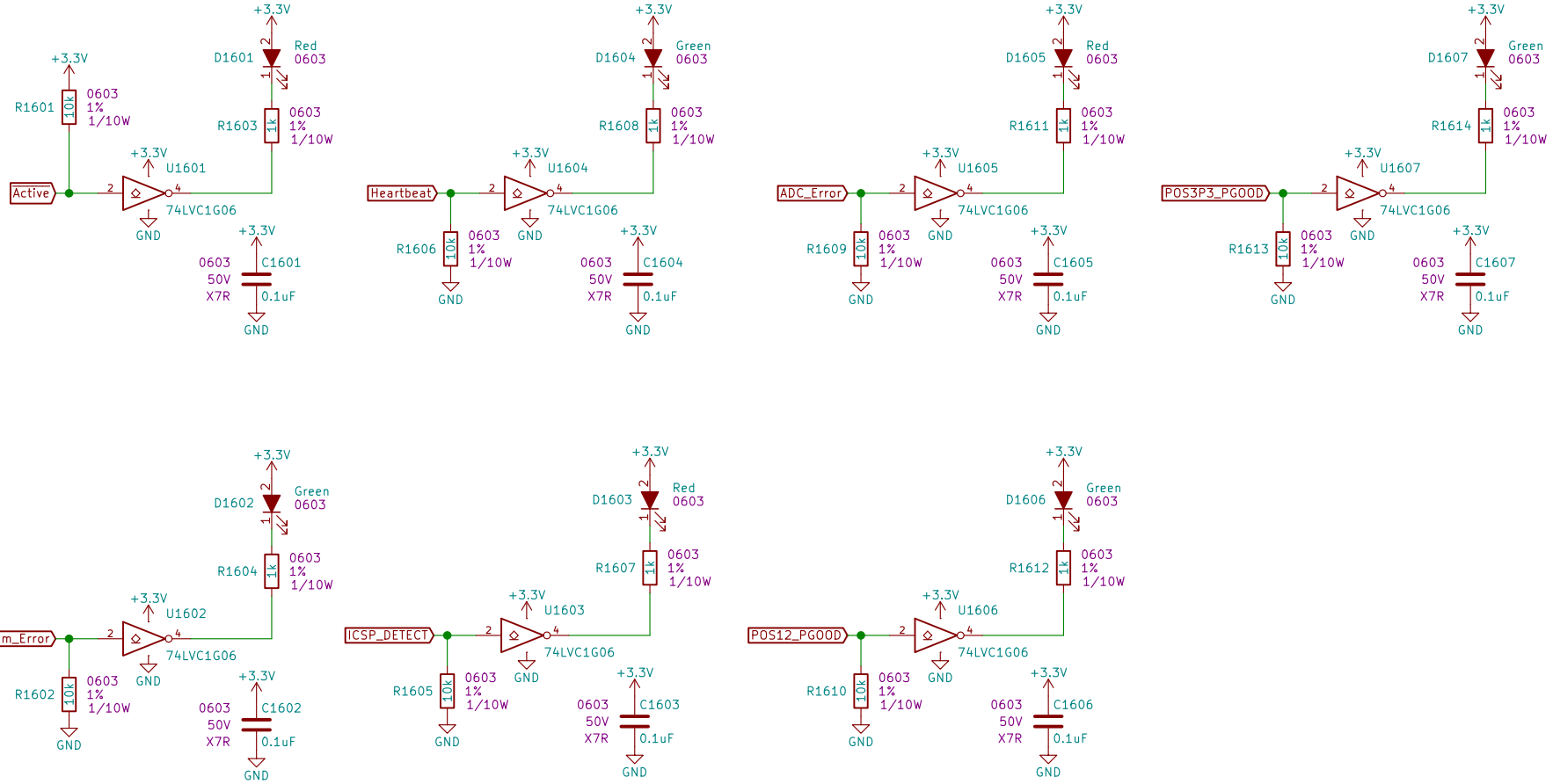
Sheet: /Zero Cross Detect/		
File: Zero_Cross_Detect.sch		
Title:		
Size: A	Date:	**Rev:**
KiCad E.D.A. kicad (5.0.0)		Id: 14/18

Output AC Solid State Switch, Random Phase



Sheet: /Output Switch/		
File: Output_Switch.sch		
Title:		
Size: A	Date:	**Rev:**
KiCad E.D.A. kicad (5.0.0)		Id: 15/18

Status LEDs



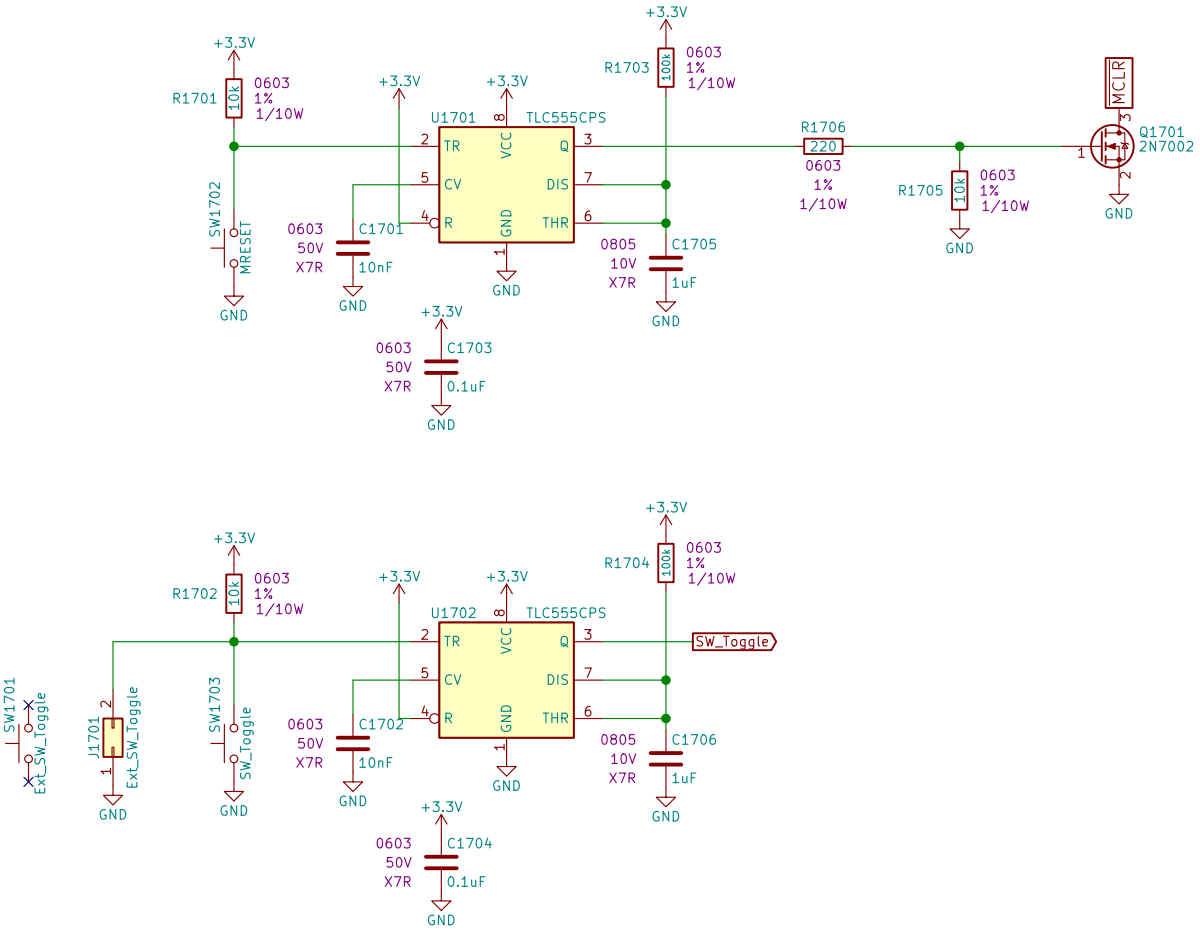
Sheet: /Status LEDs/
File: Status_LEDs.sch

Title:

Size: A | Date: | **Rev:**

KiCad E.D.A. kicad (5.0.0) | Id: 16/18

Pushbuttons and Debouncing



Sheet: /Pushbuttons/		
File: Pushbuttons.sch		
Title:		
Size: A	Date:	**Rev:**
KiCad E.D.A. kicad (5.0.0)		Id: 17/18

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 RB6:7 as MSSP1 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

Sheet: /Firmware Notes/		
File: Firmware_Notes.sch		
Title:		
Size: A	Date:	**Rev:**
KiCad E.D.A. kicad (5.0.0)		Id: 18/18