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### **Electronic Display Logic Board**

Marguette University Senior Design 2018, Group E44 Drew Maatman, Kevin Etta, Logan Wedel, Caroline Gilger, Tuoxuan Ren

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Panel\_Data\_Connectors.sch

Test Points

Test\_Points.sch

Mechanical

Mechanical.sch

\* Draw custom footprints (SRAM, power supply ICs, etc)
\* Assign footprints

\* Assign Digi-Key Partnumbers \* Run ERC, resolve errors

\* Generate netlist

\* Generate BOM

\* Layout PCB

Note: If component footprints, tolerances, and power ratings are hidden, components are: 0603 case size, 1% tolerance, 1/10W power rating

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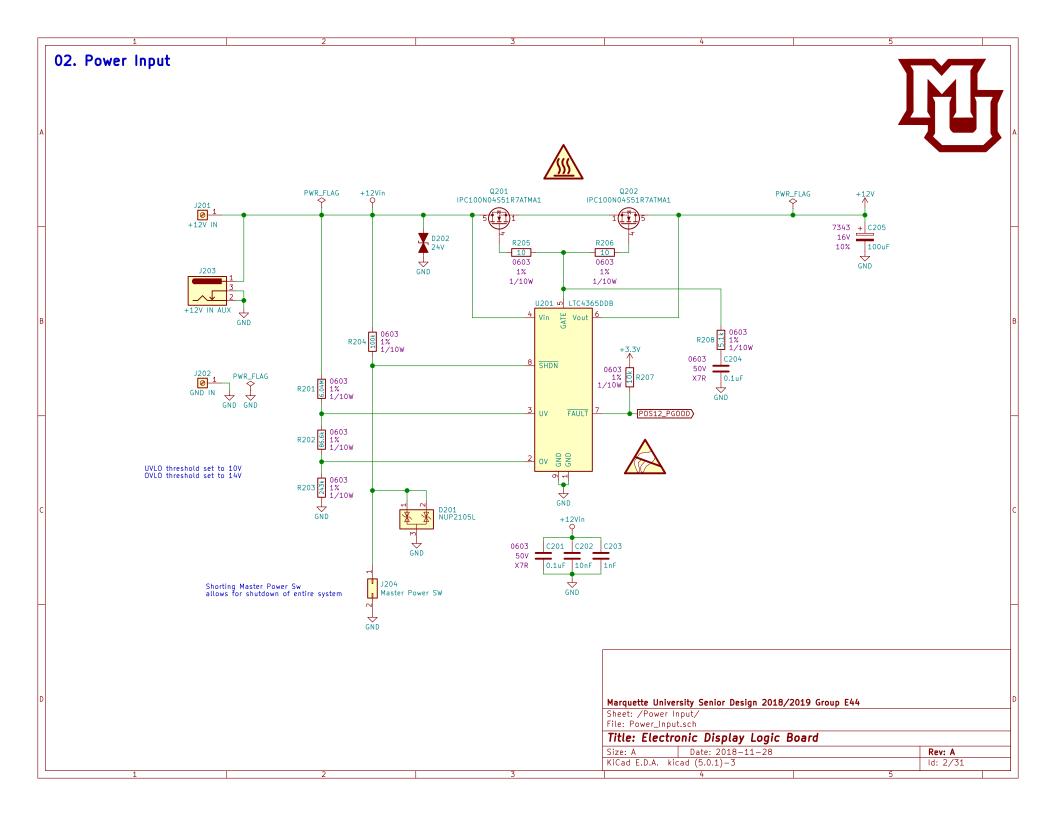
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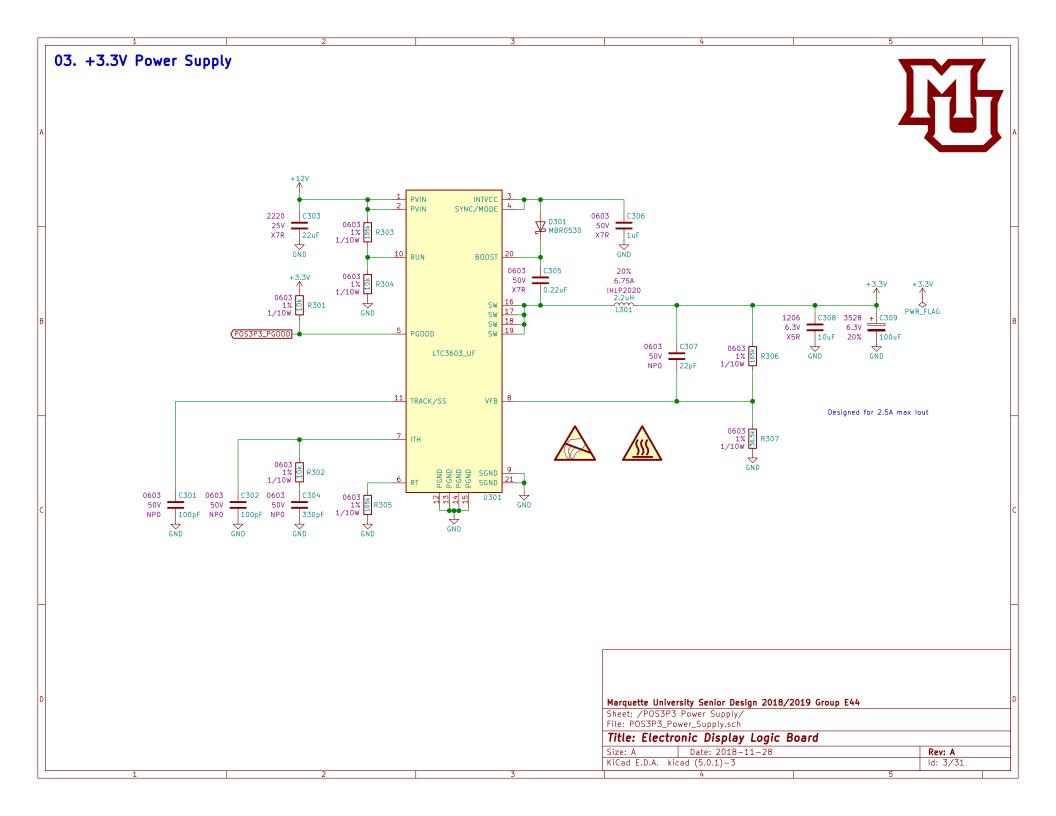
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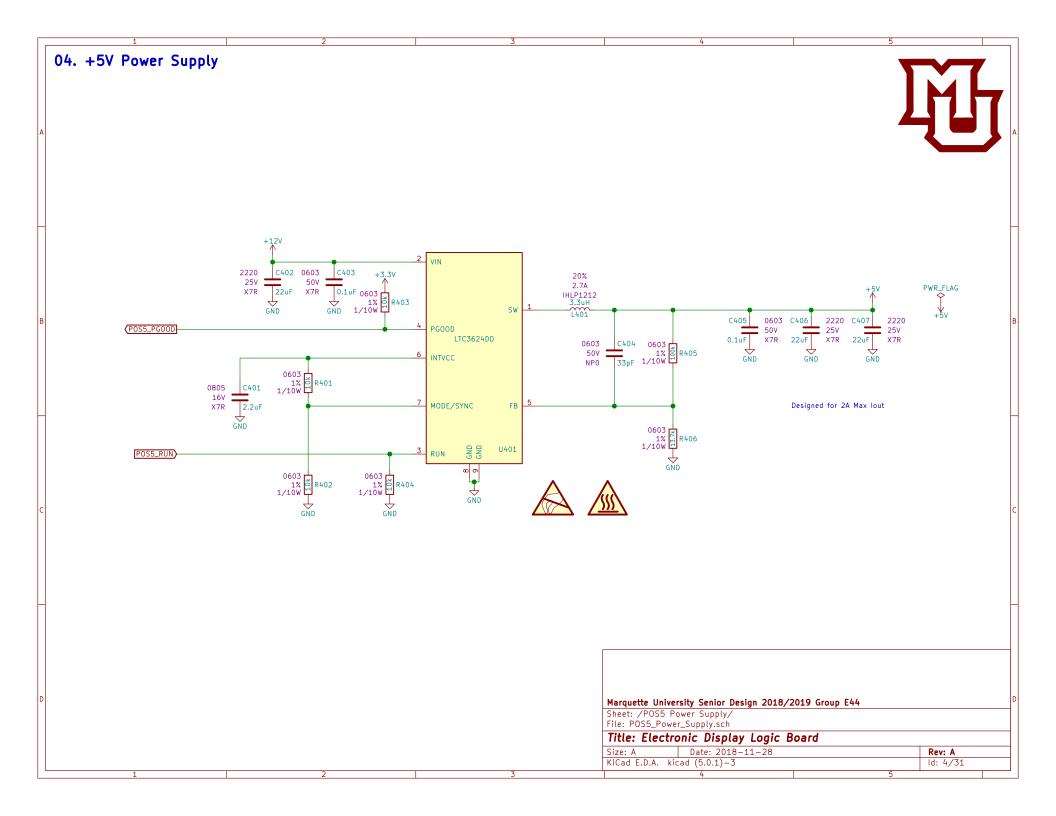
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Date: 2018-11-28 Size: A Rev: A ld: 1/31

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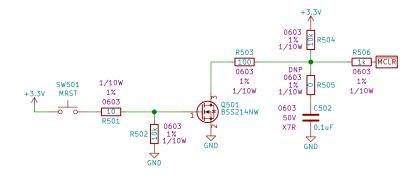




### 05. Microcontroller Programming



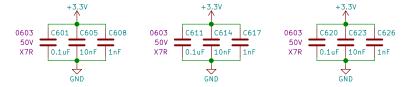


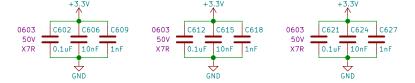


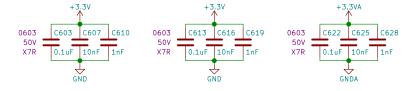
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File: Microcontroller\_Programming.sch

Size: A	Date: 2018-11-28	Rev: A	
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#### 06. Microcontroller Power



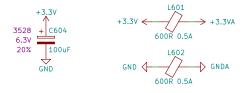












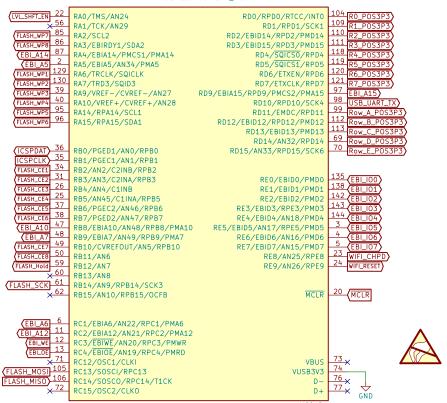


Marquette University Senior Design 2018/2019 Group E44

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Title: Electronic Display Logic Board				
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# 07. Microcontroller IO Bank 1 PIC32MZ2048EFH144\_IPL



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Sheet: /Microcontroller 1/ File: Microcontroller\_1.sch

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 Size: A
 Date: 2018-11-28
 Rev: A

 KiCad E.D.A. kicad (5.0.1)-3
 Id: 7/31

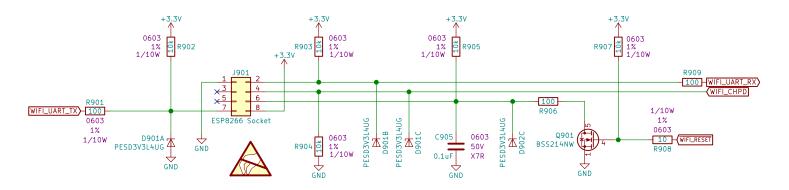
Row A is Least Significant Bit

2

#### 08. Microcontroller IO Bank 2 PIC32MZ2048EFH144\_IPL USB\_UART\_RX) 124 RF0/EBID11/RPF0/PMD11 114 Panel\_CLK\_POS3P3 RJ0/ETXERR ×125 RF1/EBID10/RPF1/PMD10 115 Panel\_LAT\_POS3P3 RJ1/EMDIO POS5\_RUN 79 RF2/SDA3/RPF2 116 Panel\_OE\_POS3P3 RJ2/EBIRDY3 POS5\_PGOOD) 78 RF3/RPF3/USBID RJ3/EBIA22 RJ4/EBICSO 132 G0\_P0S3P3 RJ5/EBICS1 RJ6/EBICS2 RJ7/EBICS3 G2\_POS3P3 POS5P\_RUN 57 RF13/TDI/AN30/RPF13/SCK5 RJ8/AN35/ETXD0 8 G4\_P0S3P. RJ9/AN36/ETXD1 10 G5\_P0S3P3 RJ10/EBIBS1 27 G6\_P0S3P3 Panel\_Dim\_PWM 128 RGO/EBID8/RPGO/PMD8 RJ11/AN37/ERXCLK/EREFCLK EBI\_Error\_LED 127 RG1/EBID9/RPG1/PMD9 RJ12/EBIBSO 9 G7\_POS3P SPI\_Error\_LED 14 RG6/AN14/C1IND/RPG6/SCK2 RJ13/EBIA13/PMA13 28 EBI\_A13 WIFI\_UART\_TX 15 RG7/AN13/C1INC/RPG7/SDA4 RJ14/EBIA11/PMA11 29 EBI\_A11 WIFI\_UART\_RX 16 RG8/AN12/C2IND/RPG8/SCL4 RJ15/EBIAO/PMAO 30 EBI\_AO EBI\_A2 21 RG9/EBIA2/AN11/C2INC/RPG9/PMA2 Panel\_Enable\_LED 140 RG12/TRD1/SQID1 WIFLError\_LED 141 RG13/TRD0/SQID0 RKO/EBIA16 19 EBI\_A16 USB\_Error\_LED 139 RG14/TRD2/SQID2 ACTIVE\_LED 1 RG15/AN23 53 EBI\_A17 RK3/EBIA17 92 Display\_Enable RK4/EBIA18 POS3P3\_ADC) 43 RHO/AN38/ETXD2 RK5/EBIA19 93 ENCODER\_STEP POS12\_ADC 44 RH1/AN39/ETXD3 94 ENCODER\_DIR RK6/EBIA20 RH2/EBIRP RK7/EBIA21 Other\_Error\_LED 46 RH3 POSSP5\_ADC 65 RH4/AN40/ERXERR POS5\_ADC 66 RH5/AN41/ERXD1 B1\_P0S3P3 82 RH9/ERXD3 B2\_P0S3P3 83 RH10/ECOL B3\_P0S3P3 84 RH11/EBIRDY2 B4 POS3P3 100 RH12/ECRS B5\_POS3P3 101 RH13/ERXDV/ECRSDV B6\_P0S3P3 102 RH14 B7\_P0S3P3 103 RH15/EBIA23 U601C Marquette University Senior Design 2018/2019 Group E44 Sheet: /Microcontroller 2/ File: Microcontroller\_2.sch Title: Electronic Display Logic Board Date: 2018-11-28 Size: A Rev: A KiCad E.D.A. kicad (5.0.1)-3ld: 8/31

#### 09. WiFi Module





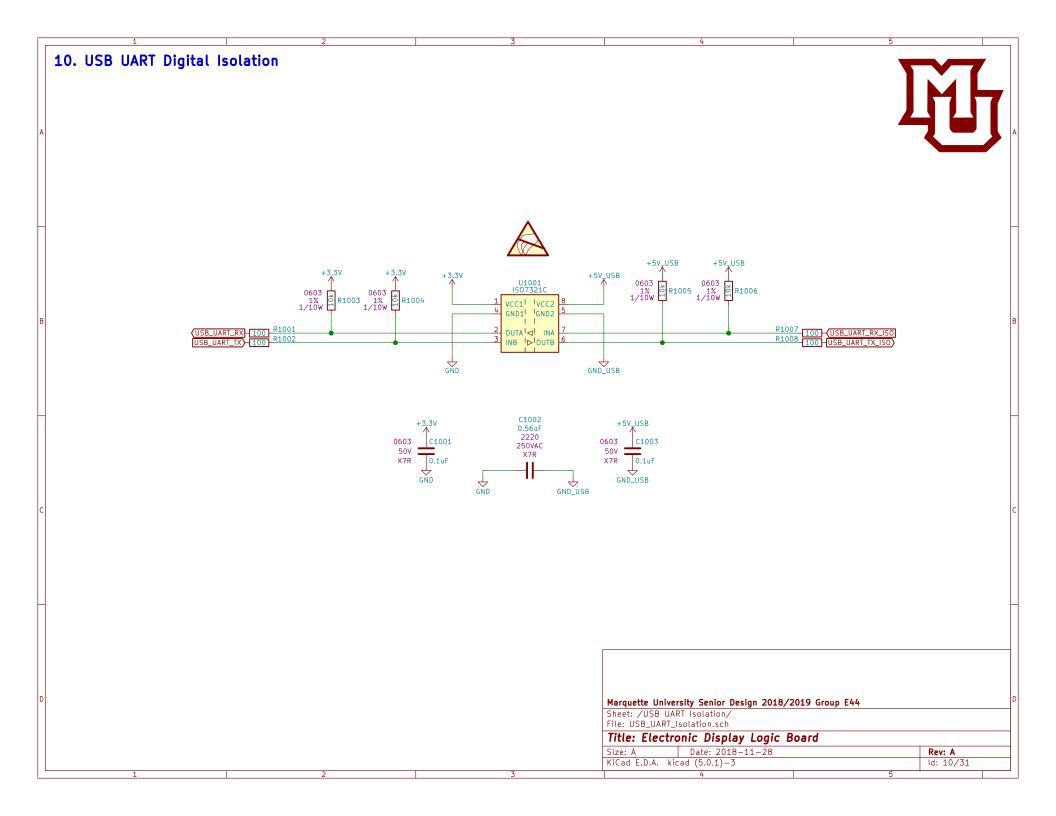
ESP8266 Pinout does not match default KiCad pin socket footprint. Use a custom footprint (maybe?)

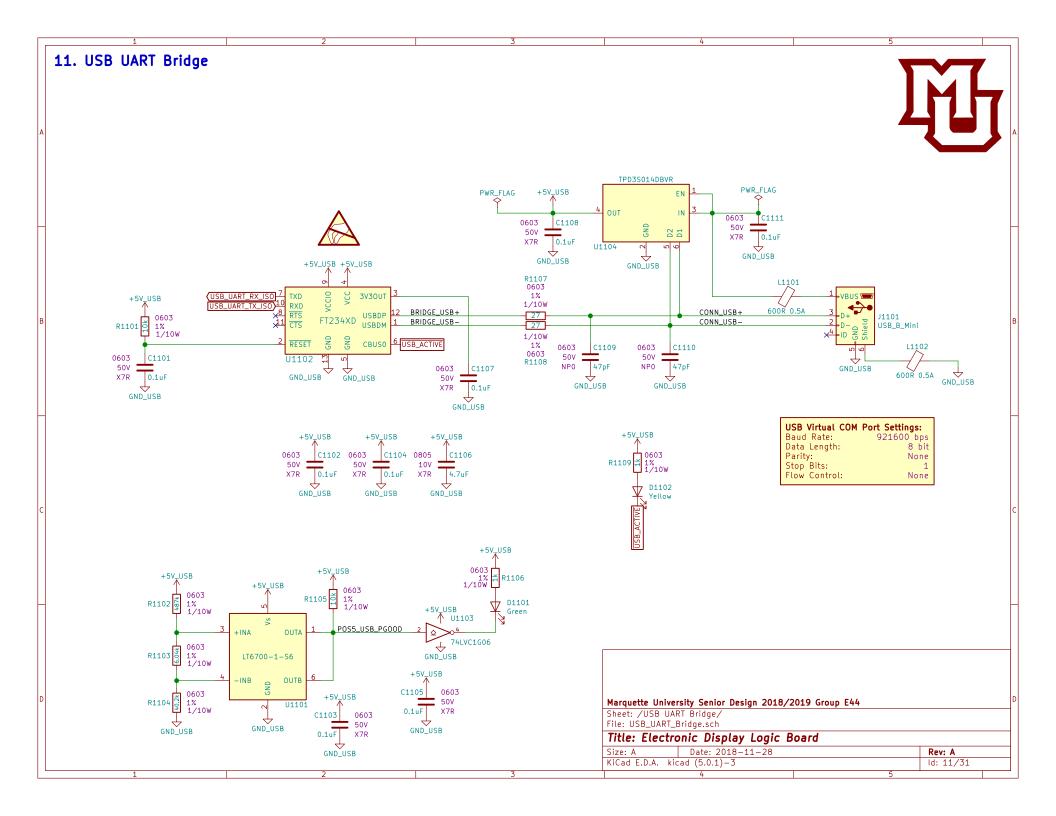


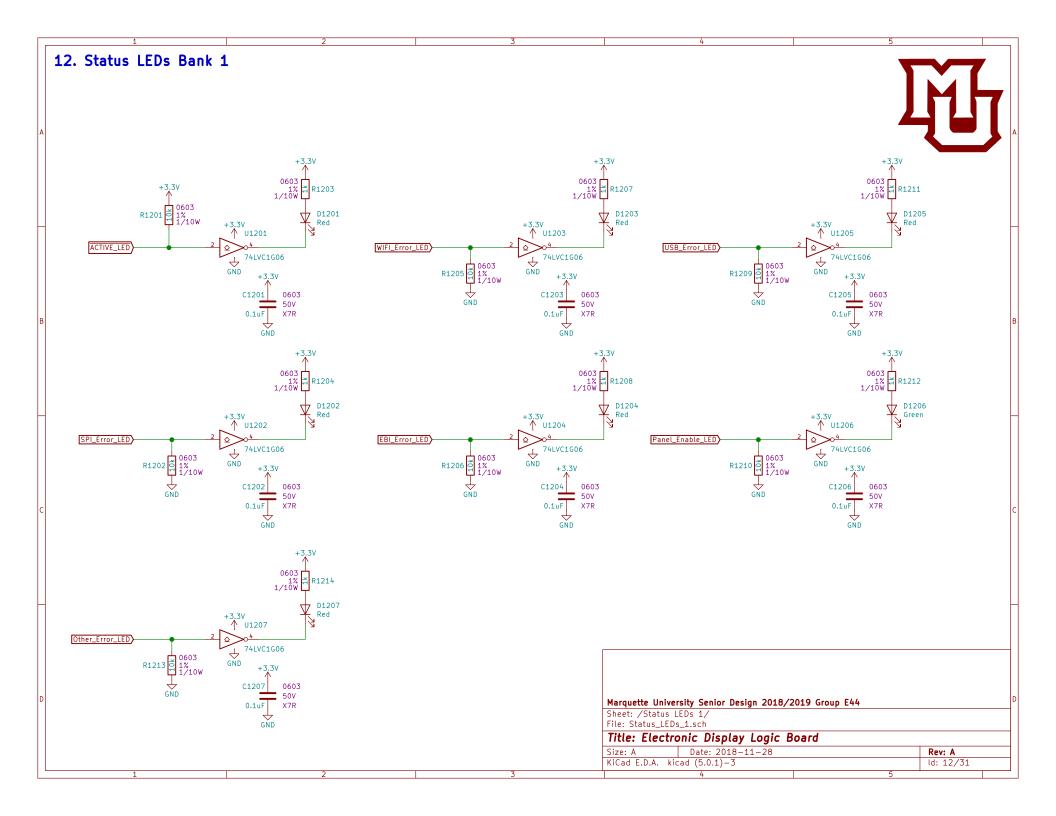
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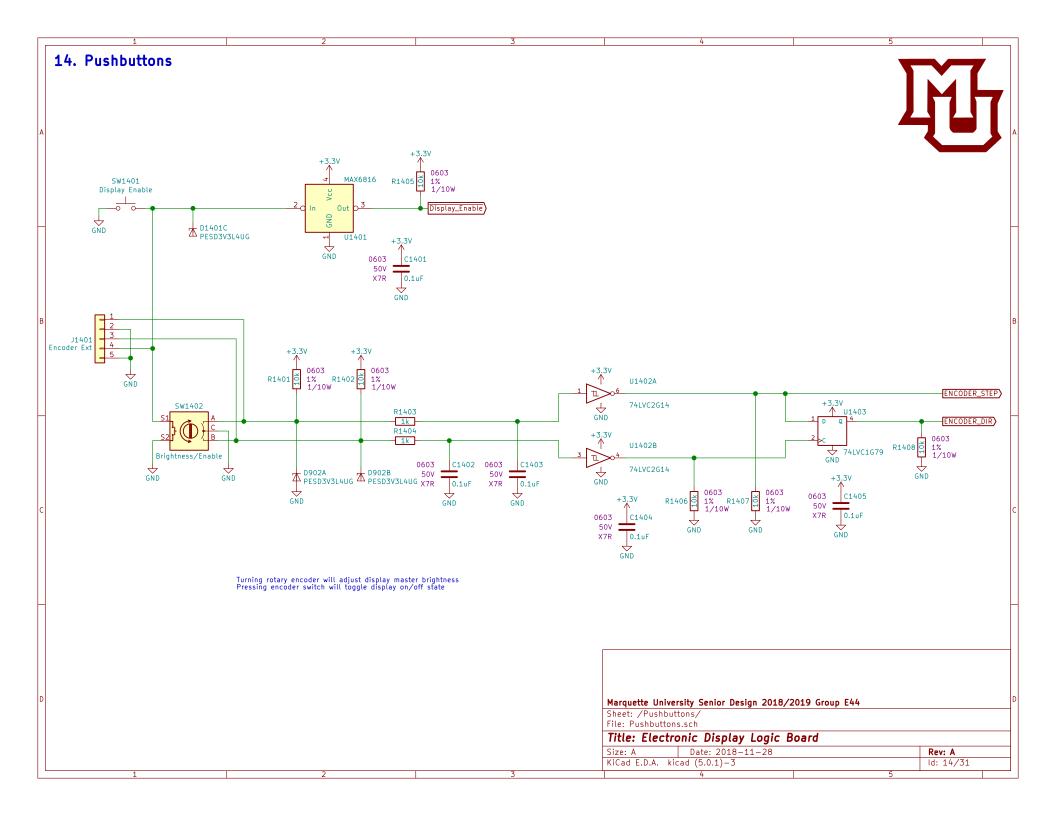
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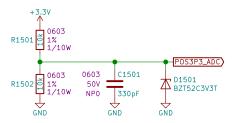


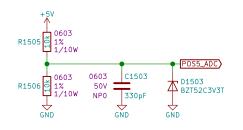
#### 13. Status LEDs Bank 2 D1303 Green D1301 D1302 Green D1304 Green +3.3V ↑ U1301 +3.3V ↑ U1304 Green +3.3V ↑ U1302 +3.3V ↑ U1303 74LVC1G06 74LVC1G06 74LVC1G06 74LVC1G06 GND +3.3V +3.3V 0.1uF 0.1uF 0.1uF 0.1uF 0603 50V 0603 0603 50V 500 50V X7R GND GND GND GND Marquette University Senior Design 2018/2019 Group E44 Sheet: /Status LEDs 2/ File: Status\_LEDs\_2.sch Title: Electronic Display Logic Board Size: A Date: 2018-11-28 Rev: A KiCad E.D.A. kicad (5.0.1)-3 ld: 13/31

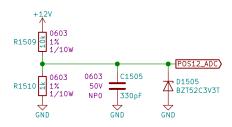


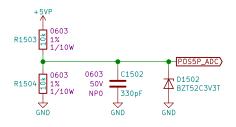
#### 15. Internal Rail Monitoring

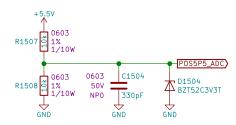








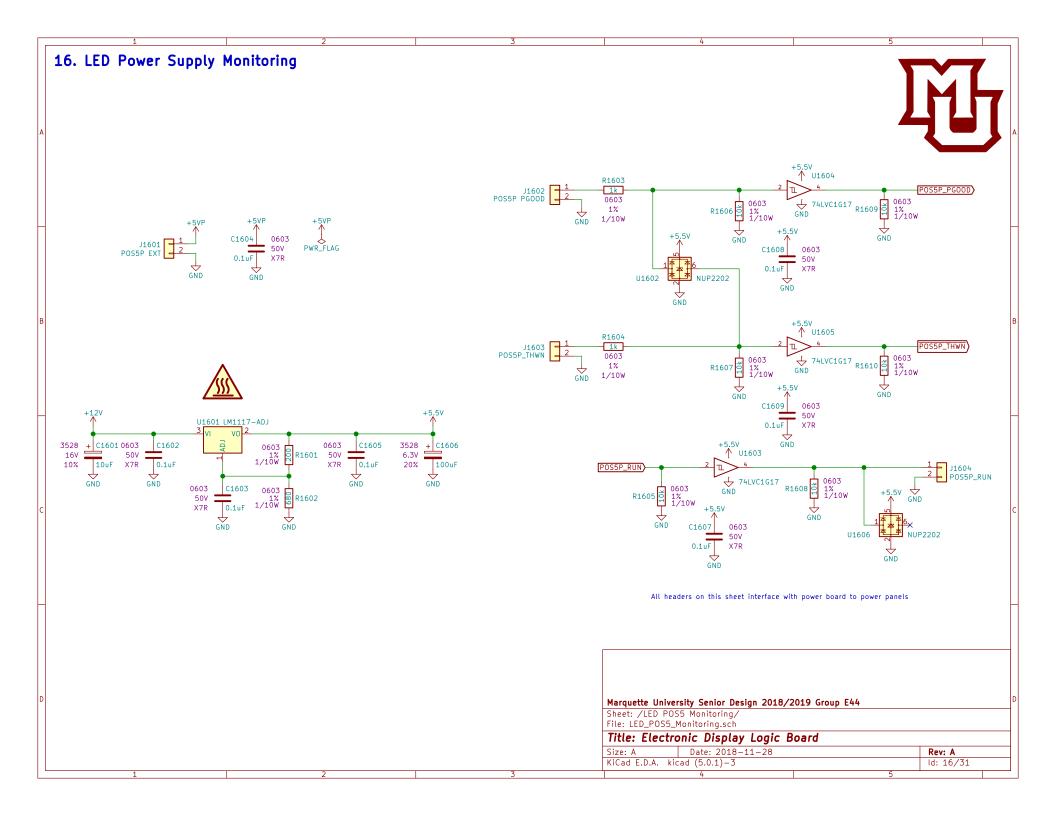


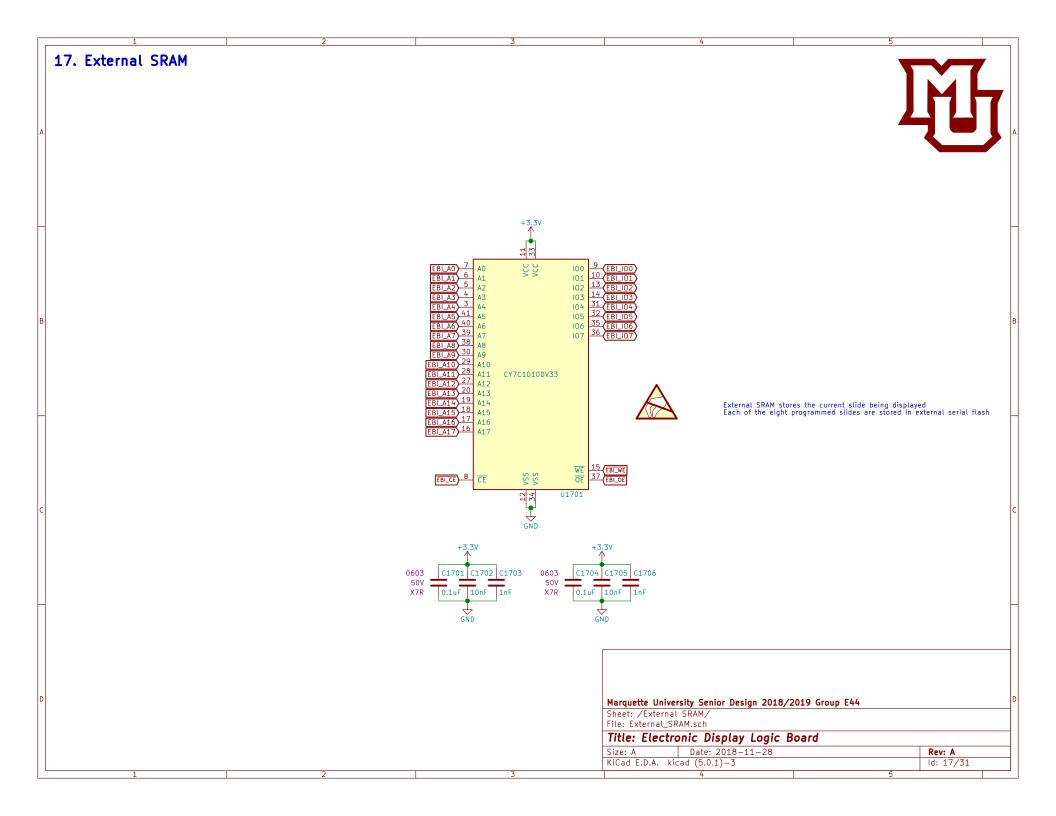


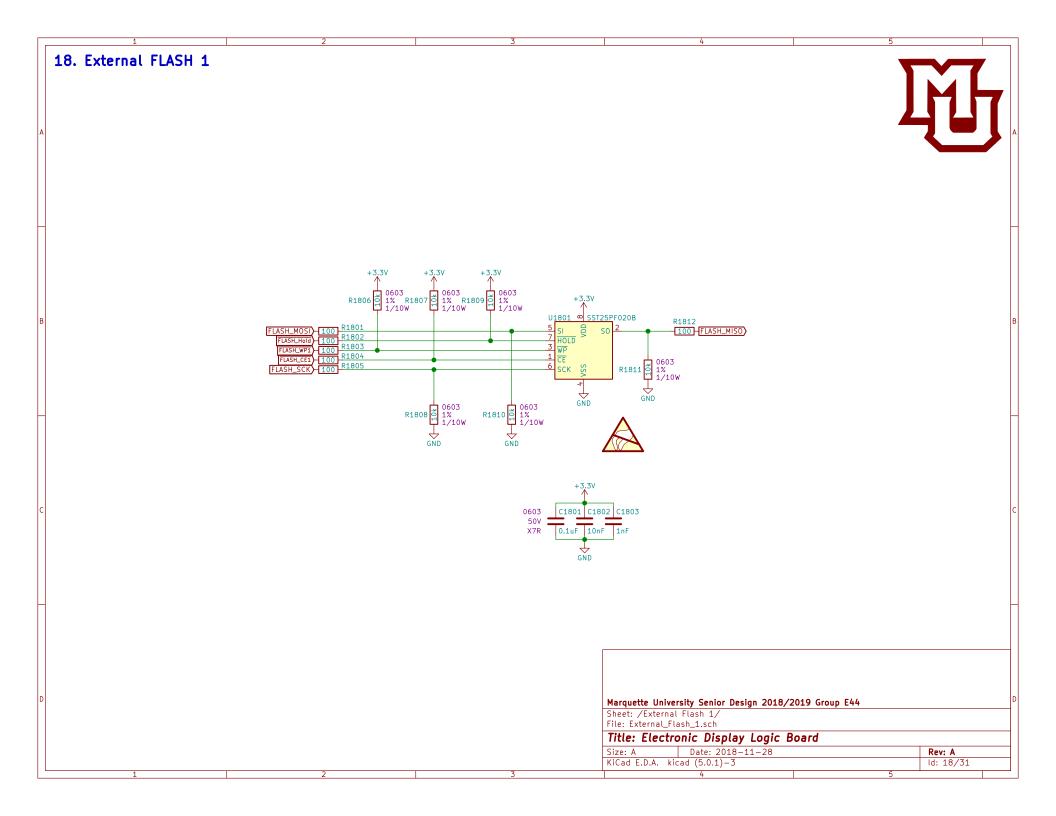
Marquette University Senior Design 2018/2019 Group E44

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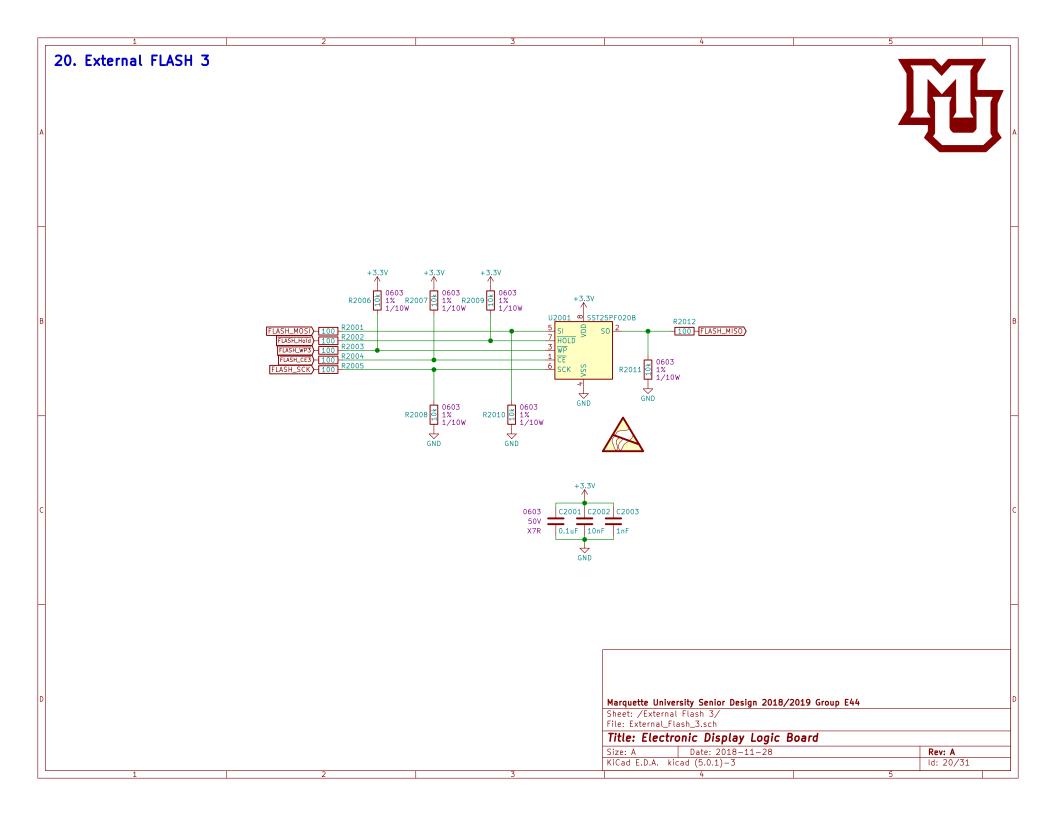
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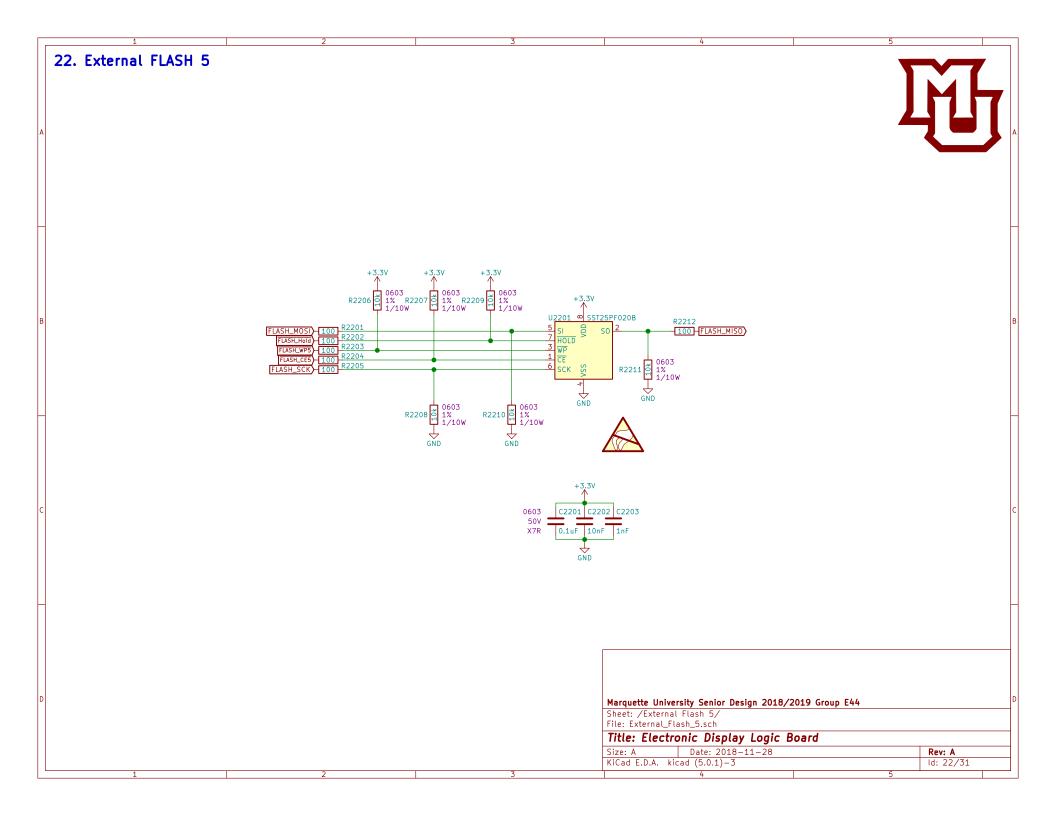




## 19. External FLASH 2 GND 50V X7R Marquette University Senior Design 2018/2019 Group E44 Sheet: /External Flash 2/ File: External\_Flash\_2.sch Title: Electronic Display Logic Board Date: 2018-11-28 Size: A Rev: A KiCad E.D.A. kicad (5.0.1)-3 ld: 19/31

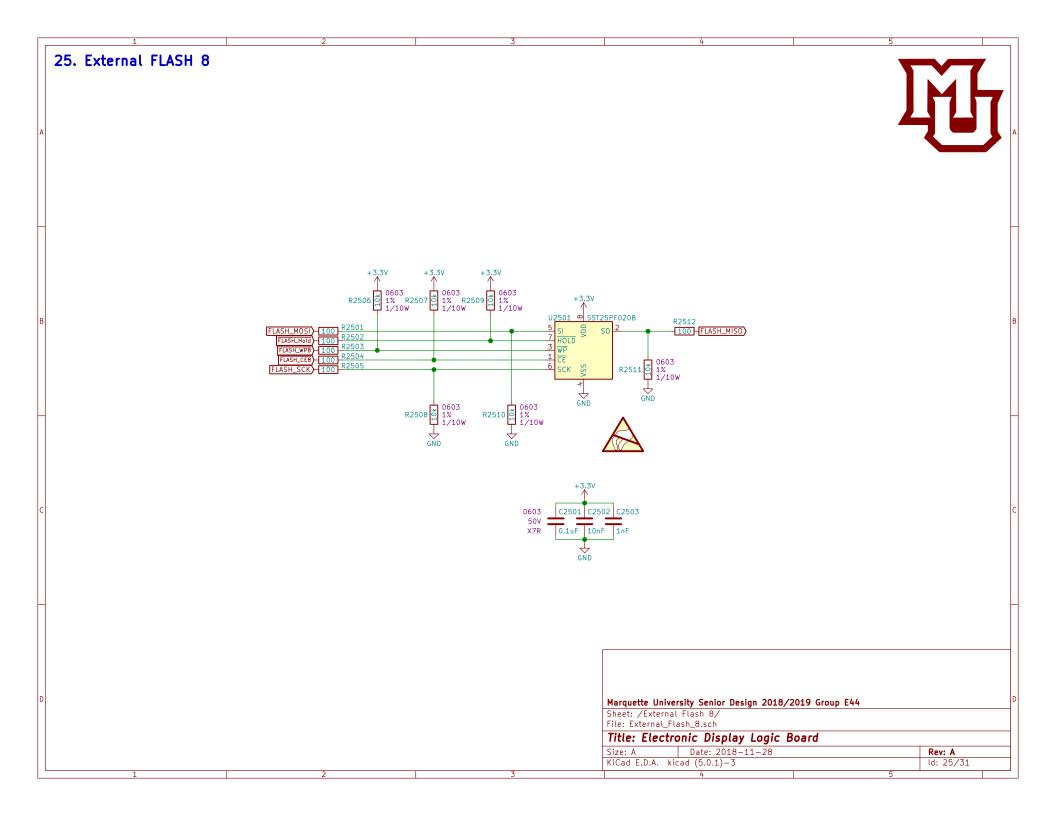


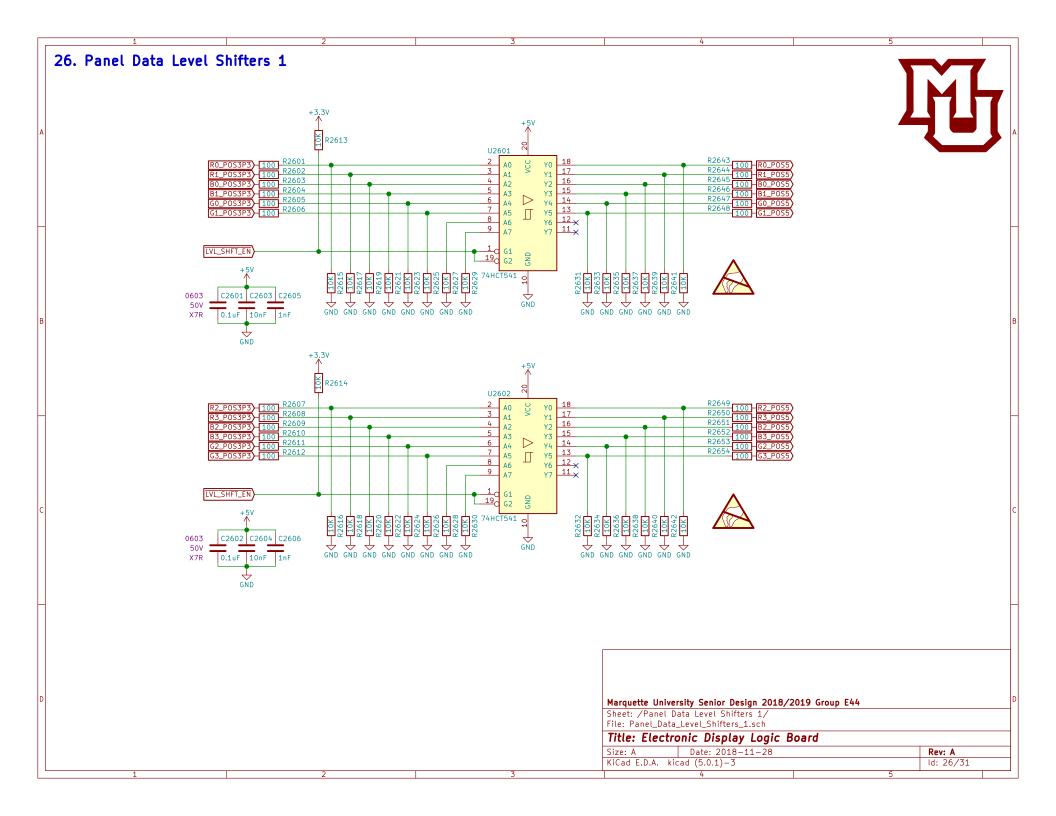
## 21. External FLASH 4 U<u>2101 <sup>∞</sup> SST25P</u>F020B GND 50V X7R Marquette University Senior Design 2018/2019 Group E44 Sheet: /External Flash 4/ File: External\_Flash\_4.sch Title: Electronic Display Logic Board Date: 2018-11-28 Size: A Rev: A KiCad E.D.A. kicad (5.0.1)-3 ld: 21/31

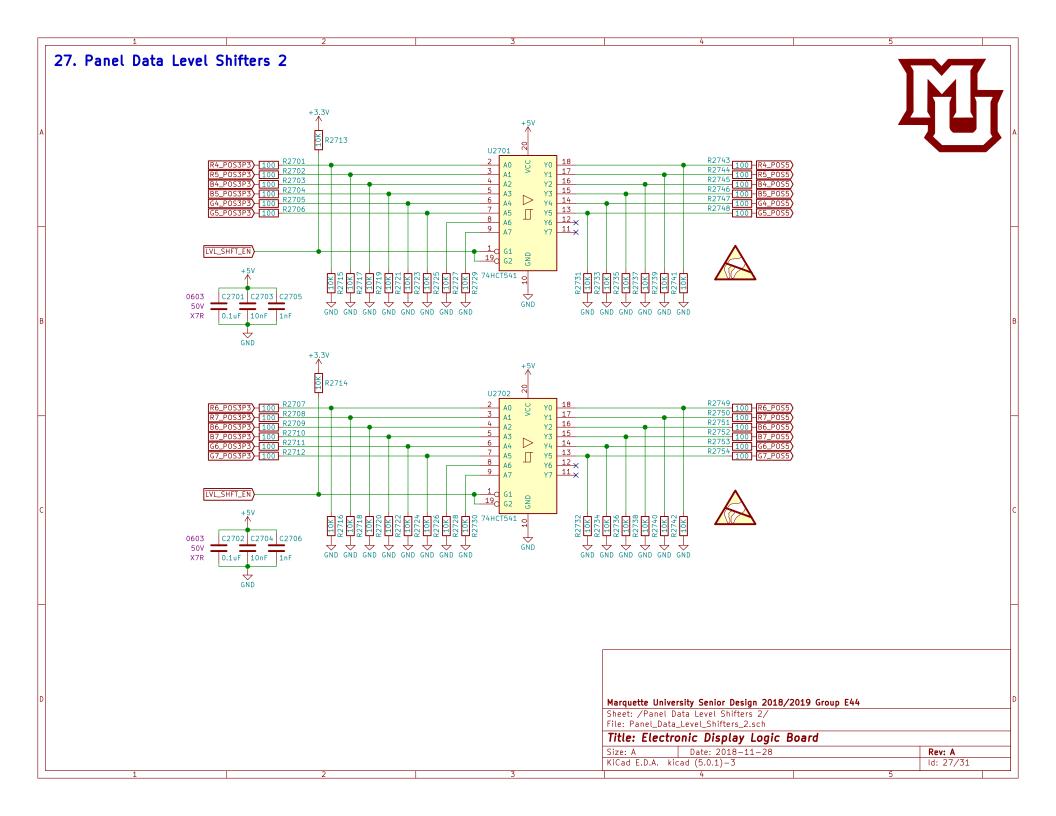


## 23. External FLASH 6 U<u>2301 <sup>∞</sup> SST25P</u>F020B FLASH\_MOSI) 100 R2301 FLASH\_Hold 100 R2302 FLASH\_WP6 100 R2303 FLASH\_CE6 100 R2304 FLASH\_SCK 100 R2305 GND 50V X7R Marquette University Senior Design 2018/2019 Group E44 Sheet: /External Flash 6/ File: External\_Flash\_6.sch Title: Electronic Display Logic Board Date: 2018-11-28 Size: A Rev: A KiCad E.D.A. kicad (5.0.1)-3 ld: 23/31

# 24. External FLASH 7 R2412 —100 FLASH\_MISO 50V X7R Marquette University Senior Design 2018/2019 Group E44 Sheet: /External Flash 7/ File: External\_Flash\_7.sch Title: Electronic Display Logic Board Date: 2018-11-28 Size: A Rev: A KiCad E.D.A. kicad (5.0.1)-3 ld: 24/31







### 28. Panel Data Level Shifters 3 R2813 0603 50V X7R 17 16 15 14 13 Y1 Y2 Y3 Y4 Y5 Y6 R2832 R2803 0603 1% 1/10W R2808 R283 R2834 R2835 R2810 R2836 R2837 R2804 1/10W LVL\_SHFT\_EN G2 74HCT541 C2802 C2803 C2804 GND 0603 50V X7R GND Marquette University Senior Design 2018/2019 Group E44 Sheet: /Panel Data Level Shifters 3/ File: Panel\_Data\_Level\_Shifters\_3.sch Title: Electronic Display Logic Board

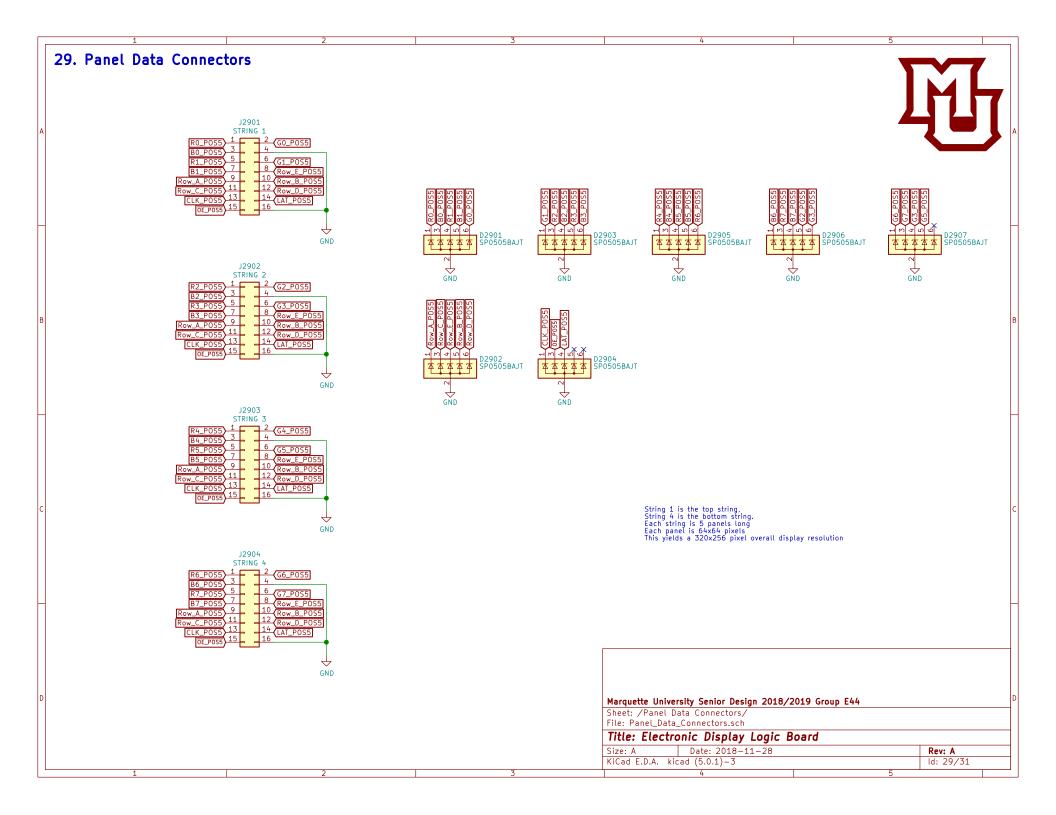
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ld: 28/31

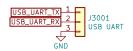
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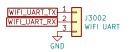
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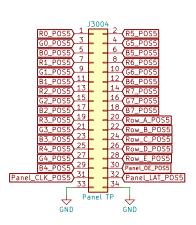
# 30. Test Points



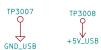












Marquette University Senior Design 2018/2019 Group E44

Sheet: /Test Points/ File: Test\_Points.sch

Title: Electronic Display Logic Board

Size: A	Date: 2018-11-28	Rev: A	
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1 2 3

#### 31. Mechanical 4-40 Standoff 4-40 Standoff 4-40 Standoff 4-40 Standoff 4-40 Standoff 4-40 Standoff MK3101 MK3105 MK3109 MK3113 MK3117 MK3121 4-40 Standoff 4-40 Standoff 4-40 Standoff 4-40 Standoff 4-40 Standoff 4-40 Standoff MK3102 MK3106 MK3110 MK3114 MK3118 MK3122 4-40 Screw 4-40 Screw 4-40 Screw 4-40 Screw 4-40 Screw 4-40 Screw MK3103 MK3107 MK3111 MK3115 MK3119 MK3123 1 4-40 Screw 4-40 Screw 4-40 Screw 4-40 Screw 4-40 Screw 4-40 Screw MK3108 MK3112 MK3116 MK3120 MK3124 MK3104 1 H3111 3mm Mounting Hole H3103 H3105 H3109 3mm Mounting Hole H3104 3mm Mounting Hole H3110 3mm Mounting Hole H3102 3mm Mounting Hole H3106 3mm Mounting Hole H3108 3mm Mounting Hole H3112 3mm Mounting Hole Marquette University Senior Design 2018/2019 Group E44 Sheet: /Mechanical/ File: Mechanical.sch Title: Electronic Display Logic Board Date: 2018-11-28 Size: A Rev: A ld: 31/31 KiCad E.D.A. kicad (5.0.1)-3