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Electronic Display Logic Board

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

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05. Microcontroller Programming
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07. Microcontroller IO Bank 1

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17. External SRAM 18. External FLASH 1 19. External FLASH 2 20. External FLASH 3 21. External FLASH 4 22. External FLASH 5 23. External FLASH 6 24. External FLASH 7 25. External FLASH 8 26. Panel Data Level Shifters 1 27. Panel Data Level Shifters 2 28. Panel Data Level Shifters 3 29. Panel Data Connectors

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ile: LED_Display_Controller.sch
itle: Electronic Display Logic Board

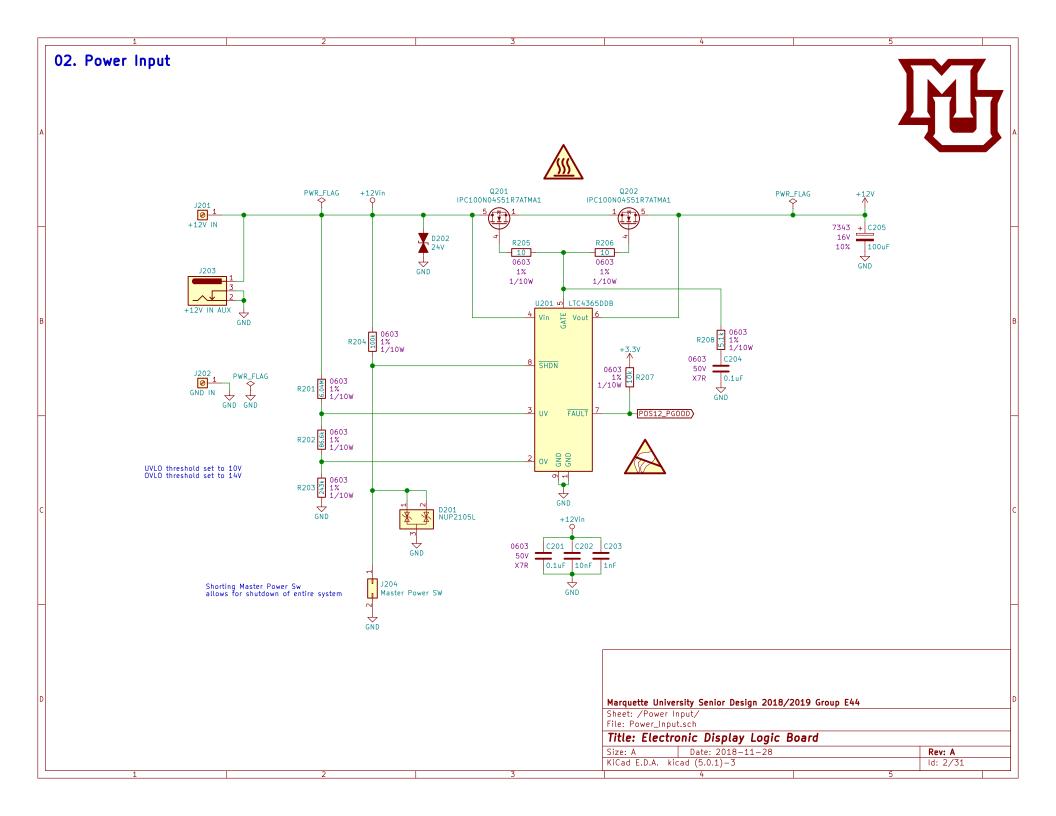
Note: If component footprints, tolerances, and power ratings are hidden, components are: 0603 case size, 1% tolerance, 1/10W power rating

 File: LÉD_Display_Controller.sch

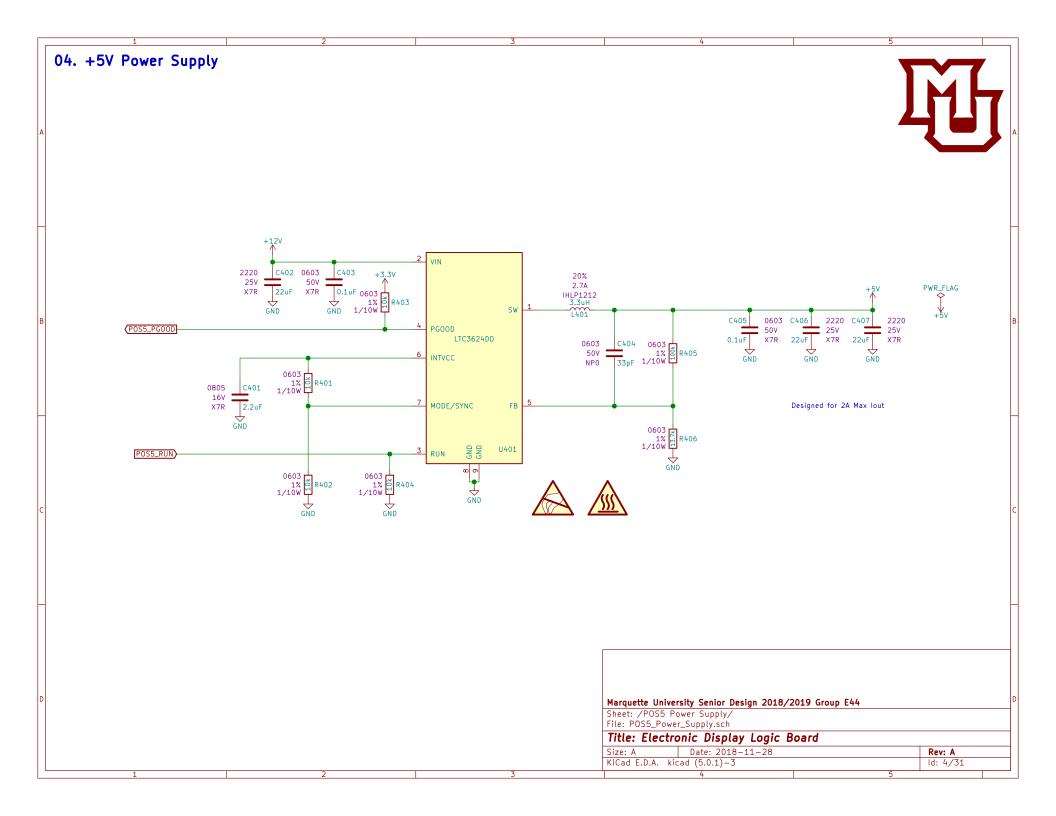
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 Size: A
 Date: 2018-11-28
 Rev: A

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 Id: 1/31



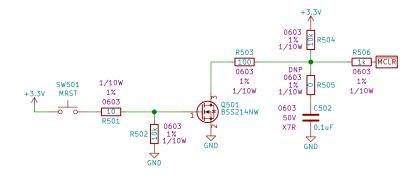
03. +3.3V Power Supply INTVCC 18 C309 0805 MODE C301 2220 2220 C303 C302 2220 1% 1/10W D301 MBR0530 16V R304 PHMODE 25V X7R 25V X7R 25V X7R 2.2uF X7R 22uF GND 22uF 22uF GND BOOST GND GND 20% 0603 50V 0603 C307 C305 14A PWR_FLAG +3.3V 50V IHLP2020 0.47uH L301 0.1uF X7R X7R 0603 1% 1/10W Turn on threshold set to 6.6V SW SW SW SW +3.30 1210 C311 1210 C312 6.3V X7R 6.3٧ 47uF GND 47uF 0603 R307 | 0603 1% 1/10W X7R 50V NP0 0603 1% 1/10W 0603 GND SW 1% T R303 LTC3605A_UF GND VON (POS3P3_PGOOD FB PGOOD Designed for 5A Max lout GND 24 CLKOUT 23× CLKIN GND TRACK/SS 0603 50V X7R 0603 1% 1/10W R305 C304 25 GND 10 0603 1% 1/10W 10nF 0603 C308 GND 50V GND 15pF NP0 0603 GND 50V 62pF NP0 Switching frequency set to 2.5 MHz GND Marquette University Senior Design 2018/2019 Group E44 Sheet: /POS3P3 Power Supply/ File: POS3P3_Power_Supply.sch Title: Electronic Display Logic Board Date: 2018-11-28 Size: A Rev: A KiCad E.D.A. kicad (5.0.1)-3 ld: 3/31



05. Microcontroller Programming





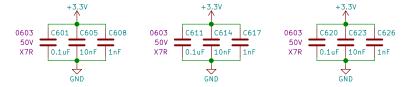


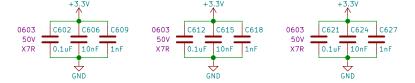
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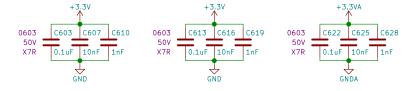
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06. Microcontroller Power



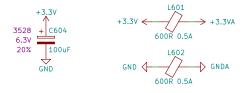














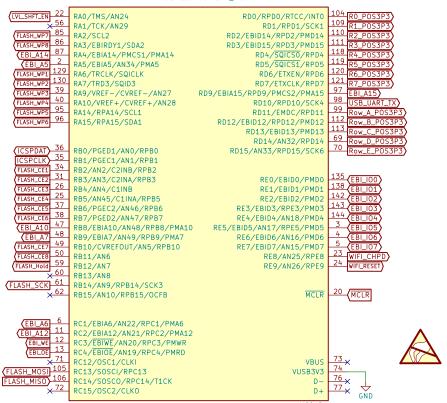
Marquette University Senior Design 2018/2019 Group E44

Sheet: /Microcontroller Power/ File: Microcontroller_Power.sch

Title: Electronic Display Logic Board

rice. Electronic Display Logic Board				
Size: A	Date: 2018-11-28		Rev: A	
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07. Microcontroller IO Bank 1 PIC32MZ2048EFH144_IPL



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Sheet: /Microcontroller 1/ File: Microcontroller_1.sch

Title: Electronic Display Logic Board

 Size: A
 Date: 2018-11-28
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Row A is Least Significant Bit

2

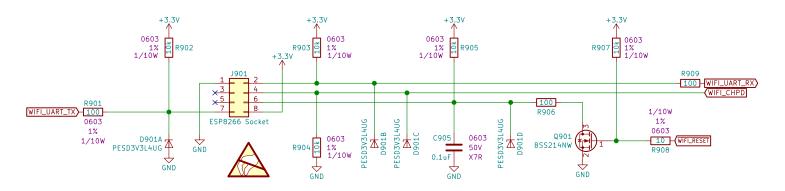
08. Microcontroller IO Bank 2 PIC32MZ2048EFH144_IPL USB_UART_RX) 124 RF0/EBID11/RPF0/PMD11 114 Panel_CLK_POS3P3 RJ0/ETXERR ×125 RF1/EBID10/RPF1/PMD10 115 Panel_LAT_POS3P3 RJ1/EMDIO POS5_RUN 79 RF2/SDA3/RPF2 116 Panel_OE_POS3P3 RJ2/EBIRDY3 POS5_PGOOD) 78 RF3/RPF3/USBID RJ3/EBIA22 RJ4/EBICSO 132 G0_P0S3P3 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 EBLA2 21 RG9/EBIA2/AN11/C2INC/RPG9/PMA2 Heartbeat_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 POS5_ADC 67 RH6/AN42/ERXD2 (EBI_A4 68 B0_POS3P3 81 RH8/ERXD0 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)-3

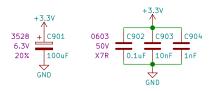
ld: 8/31

09. WiFi Module





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



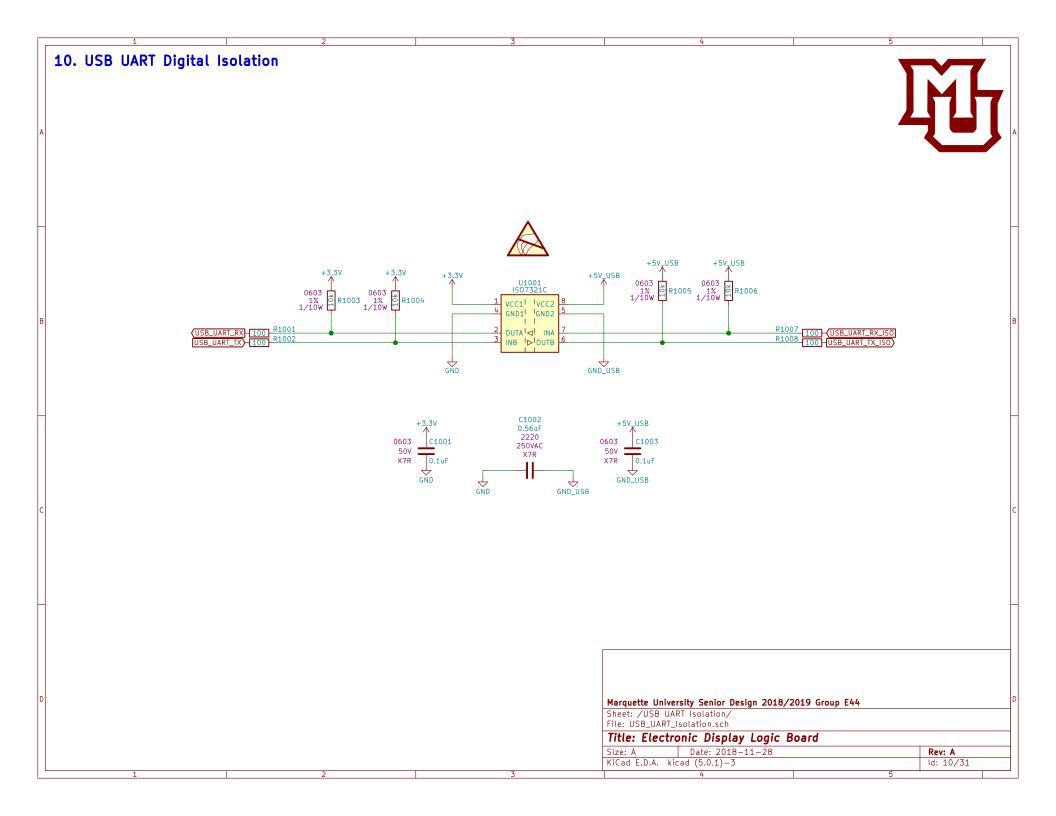
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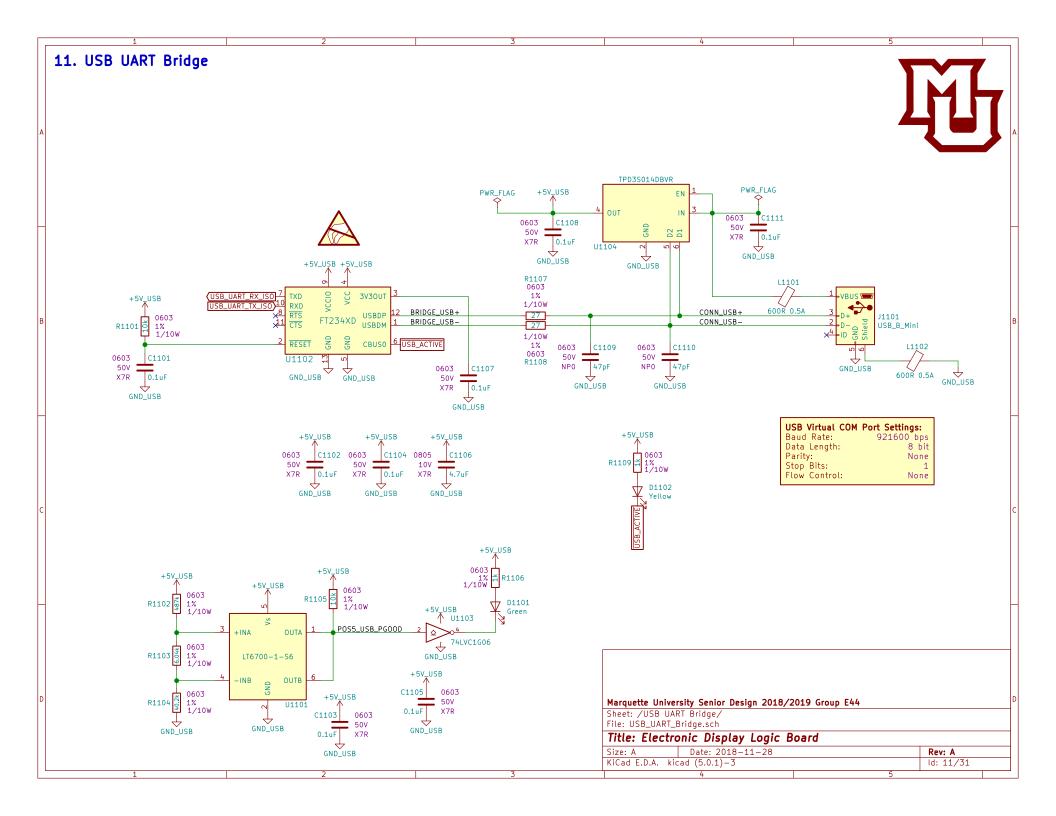
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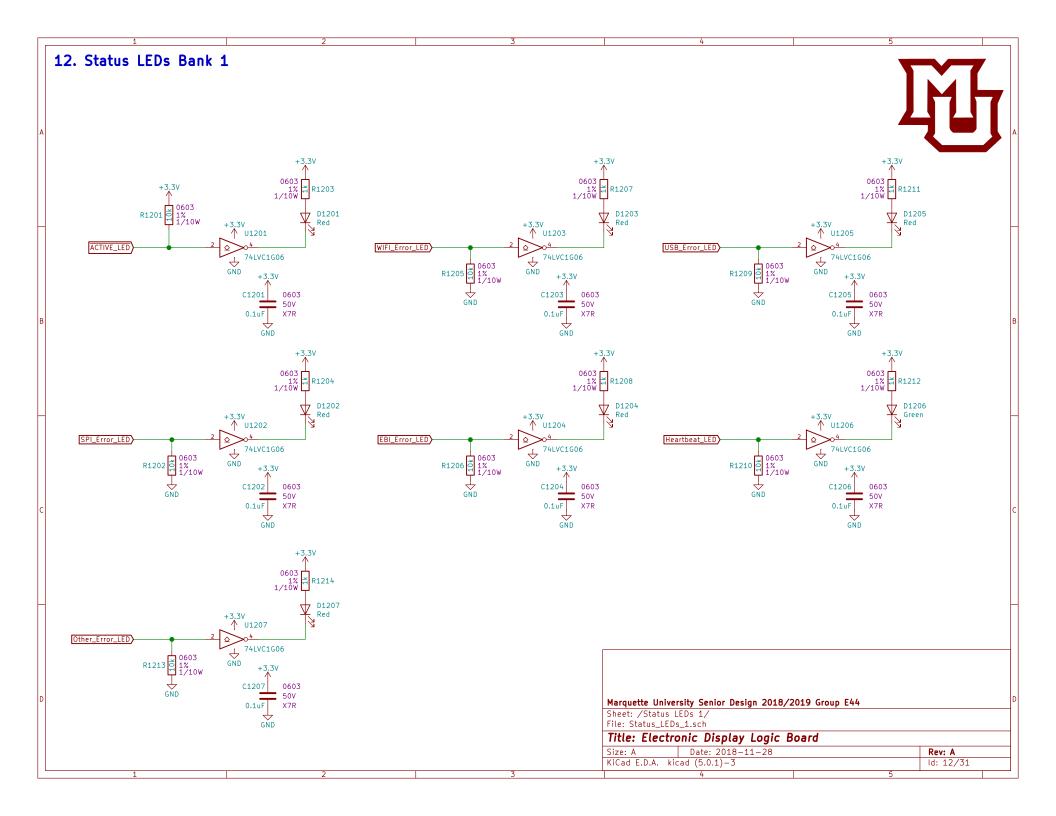
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Size: A	Date: 2018-11-28	Rev: A
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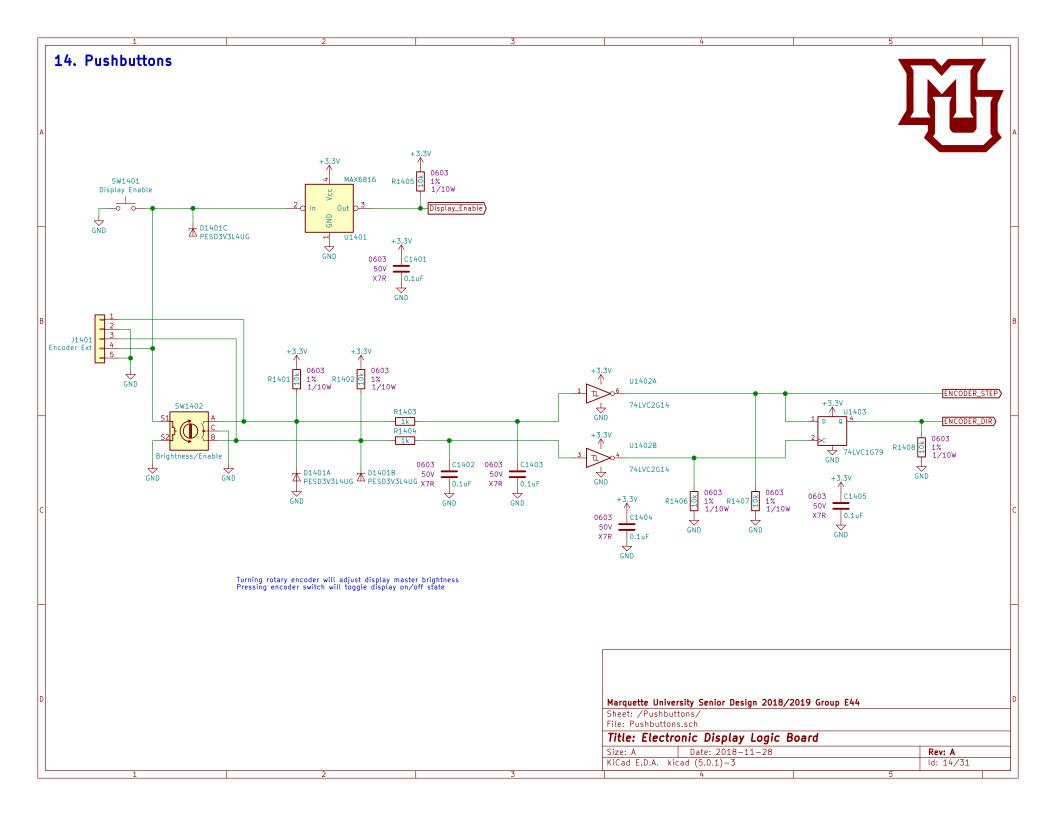
1 2 3





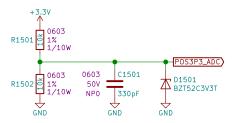


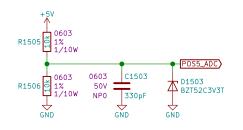
13. Status LEDs Bank 2 D1303 Green D1301 D1302 Green D1304 Green +3.3V ↑ U1301 +3.3V ↑ U1304 Green +3.3V ↑ U1302 +3.3V ↑ U1303 74LVC1G06 74LVC1G06 74LVC1G06 74LVC1G06 GND +3.3V +3.3V 0.1uF 0.1uF 0.1uF 0.1uF 0603 50V 0603 0603 50V 500 50V X7R GND GND GND GND Marquette University Senior Design 2018/2019 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

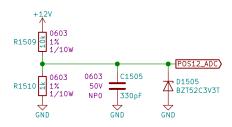


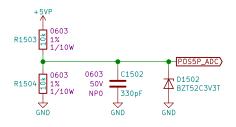
15. Internal Rail Monitoring

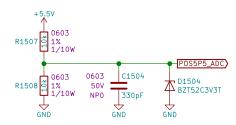










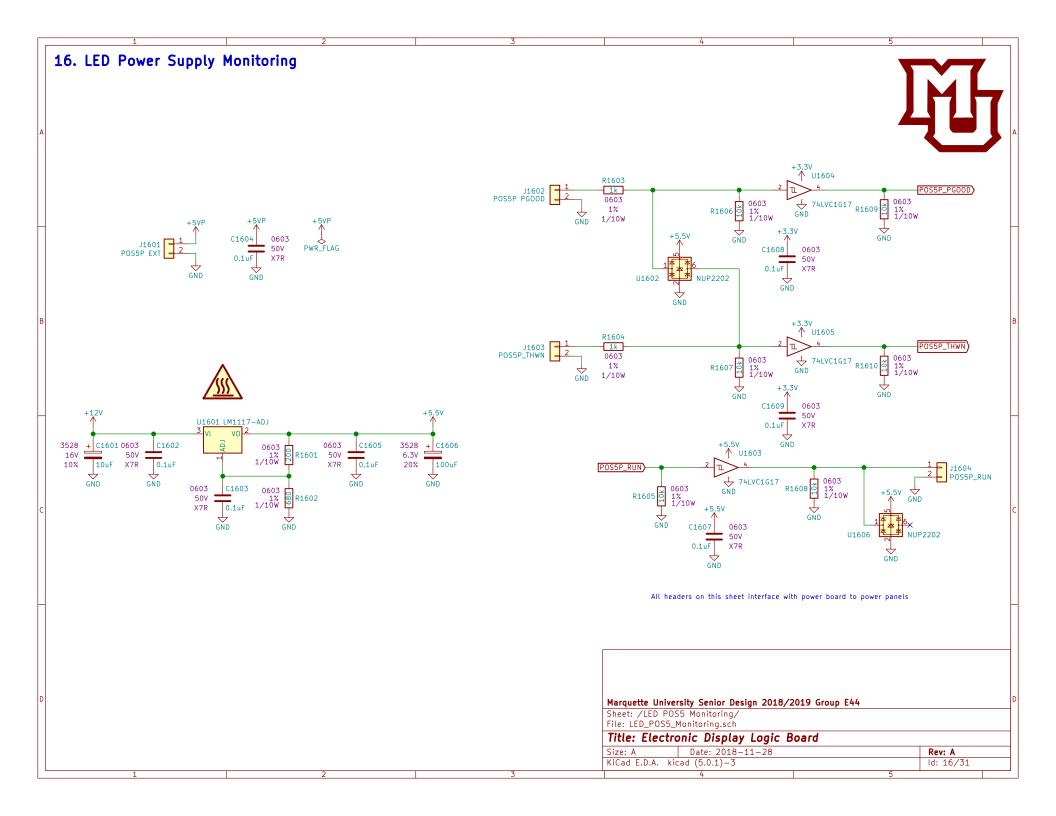


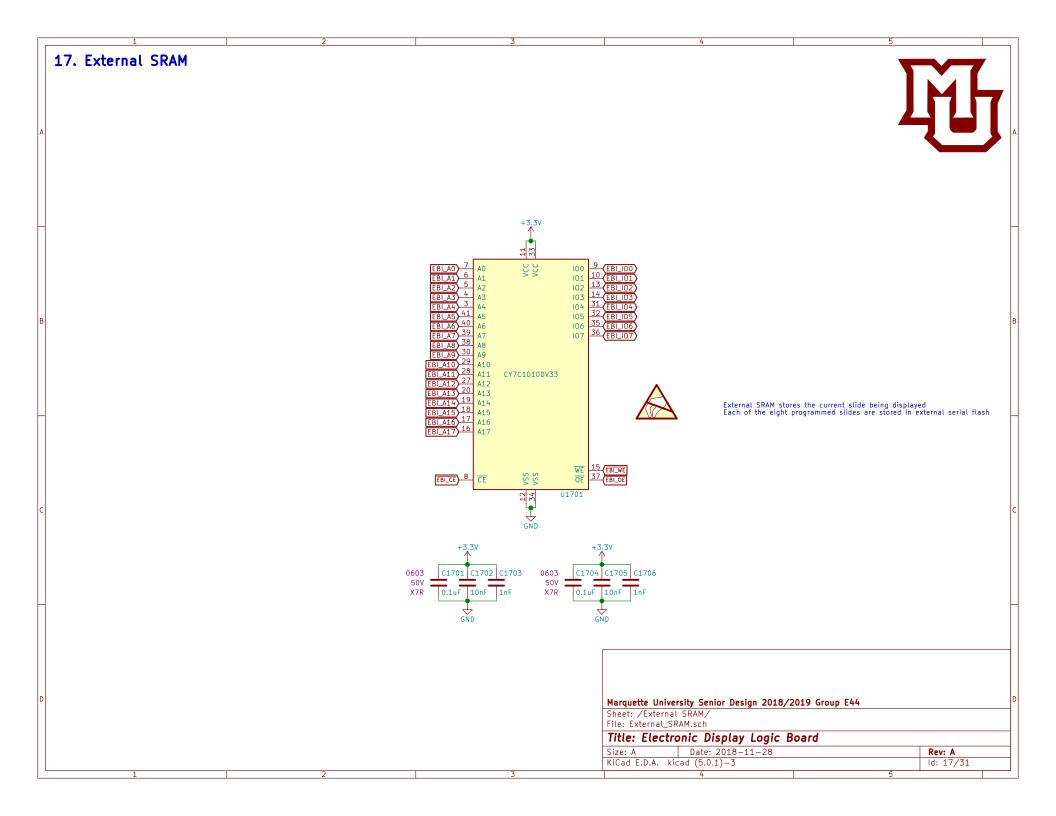
Marquette University Senior Design 2018/2019 Group E44

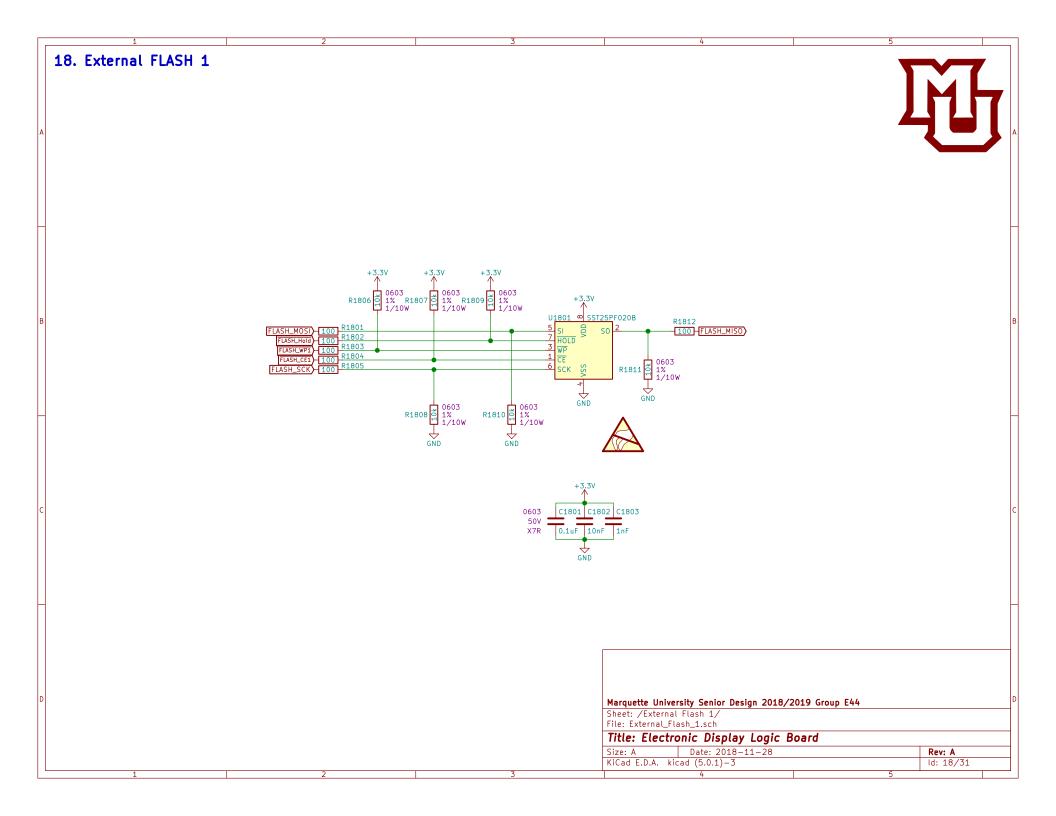
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Title: Electronic Display Logic Board

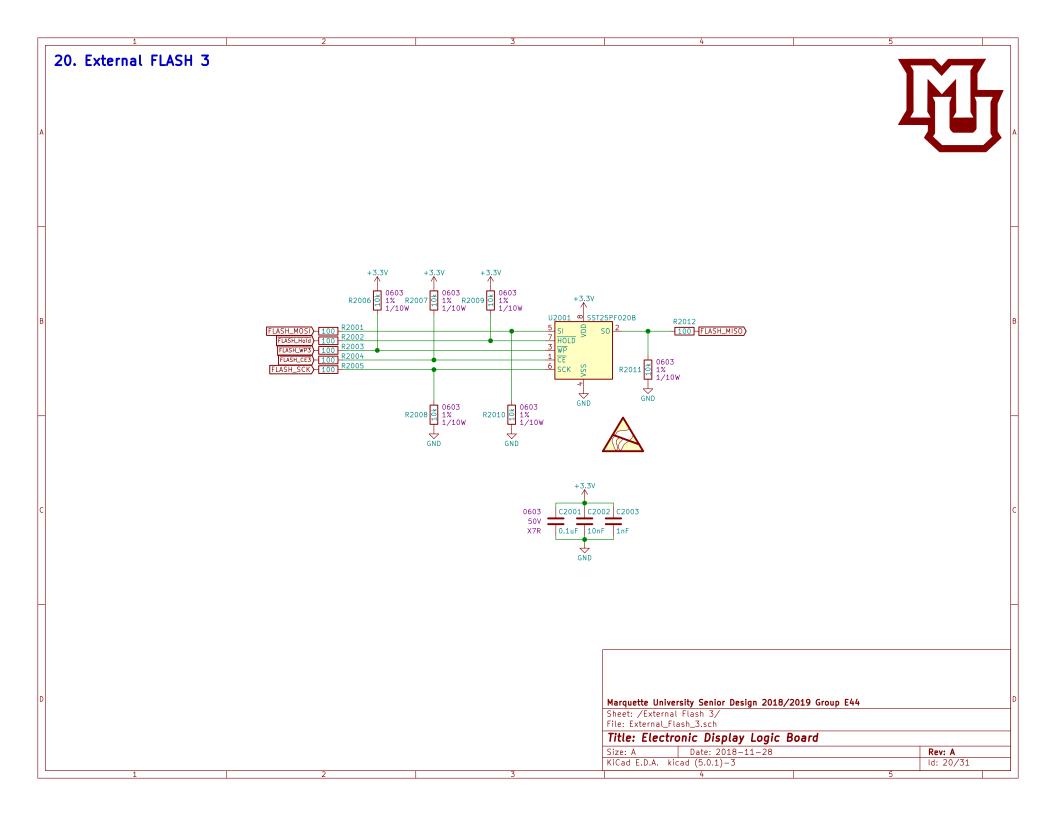
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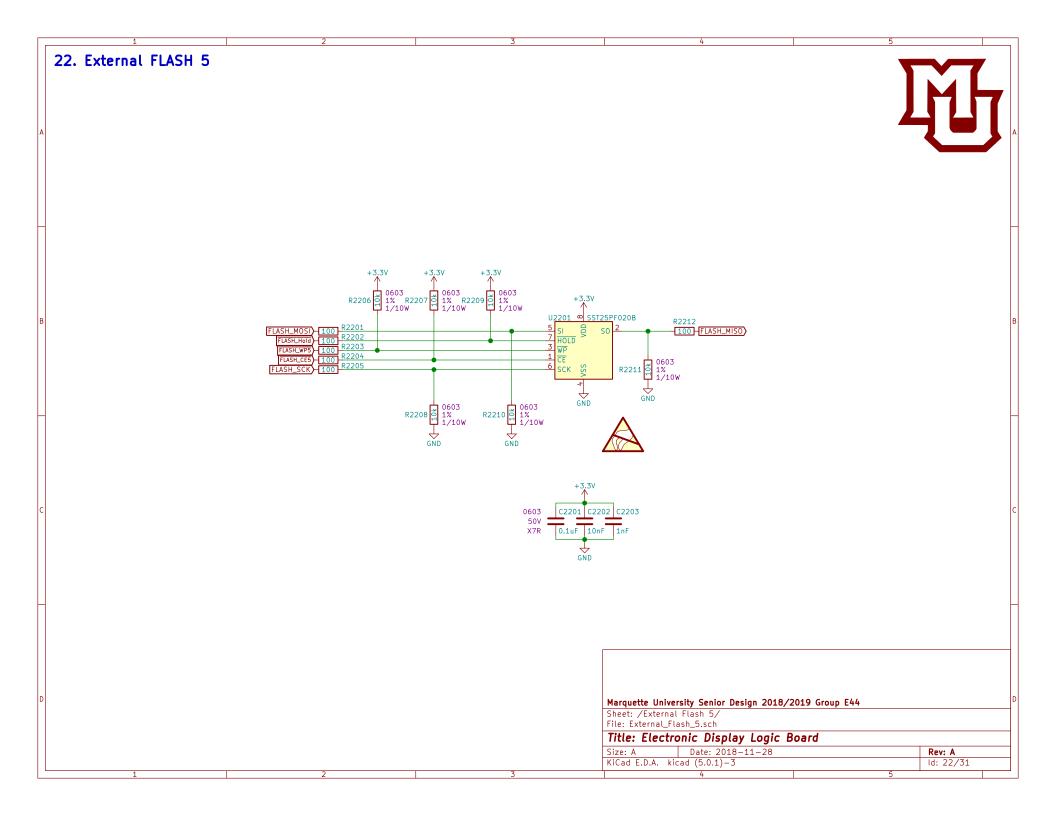




19. External FLASH 2 GND 50V X7R Marquette University Senior Design 2018/2019 Group E44 Sheet: /External Flash 2/ File: External_Flash_2.sch Title: Electronic Display Logic Board Date: 2018-11-28 Size: A Rev: A KiCad E.D.A. kicad (5.0.1)-3 ld: 19/31

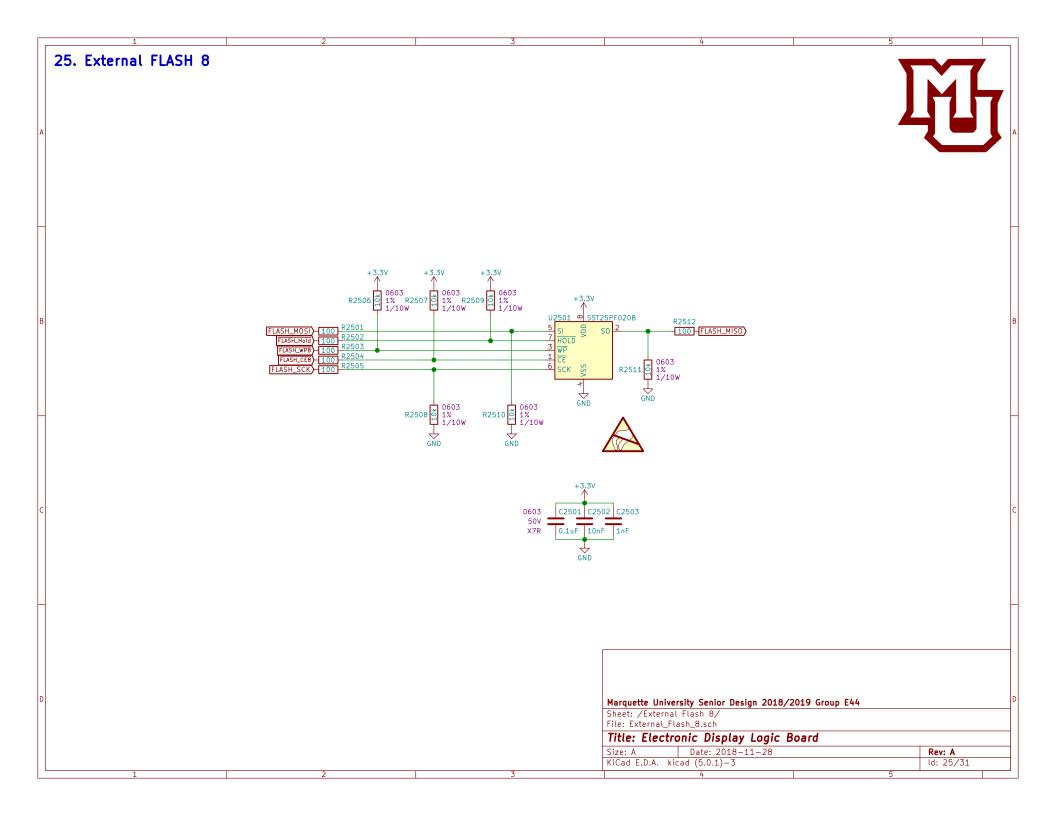


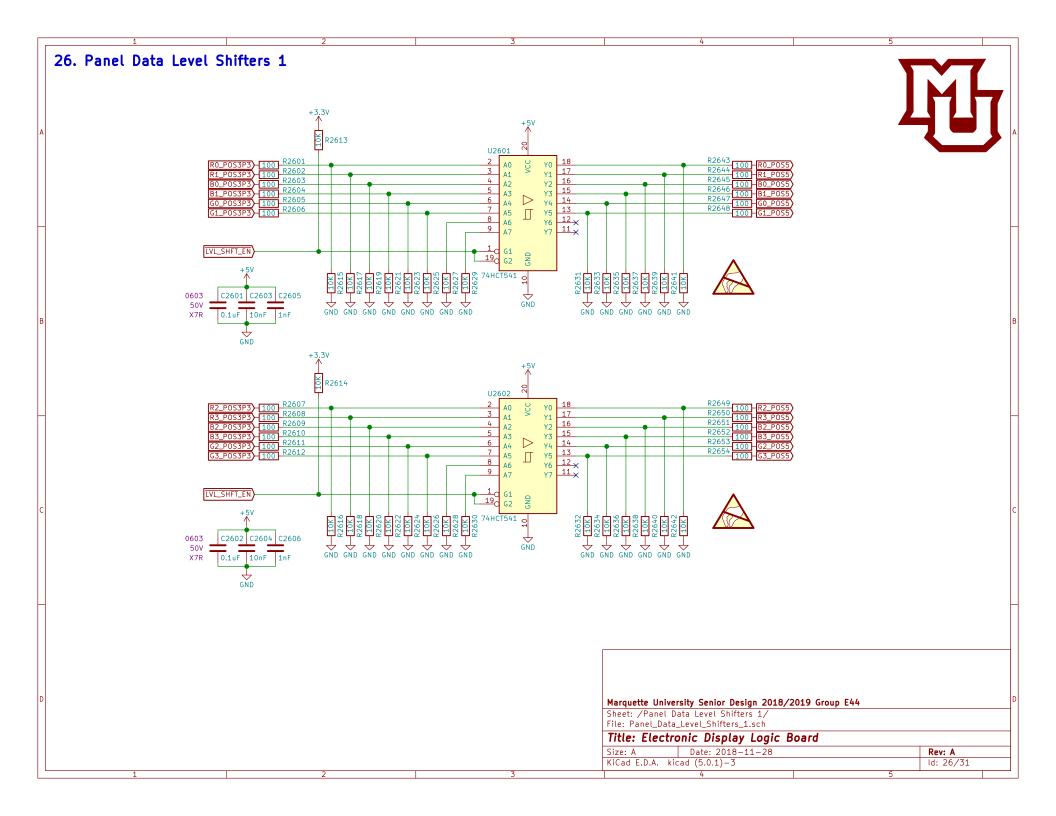
21. External FLASH 4 U<u>2101 [∞] SST25P</u>F020B GND 50V X7R Marquette University Senior Design 2018/2019 Group E44 Sheet: /External Flash 4/ File: External_Flash_4.sch Title: Electronic Display Logic Board Date: 2018-11-28 Size: A Rev: A KiCad E.D.A. kicad (5.0.1)-3 ld: 21/31

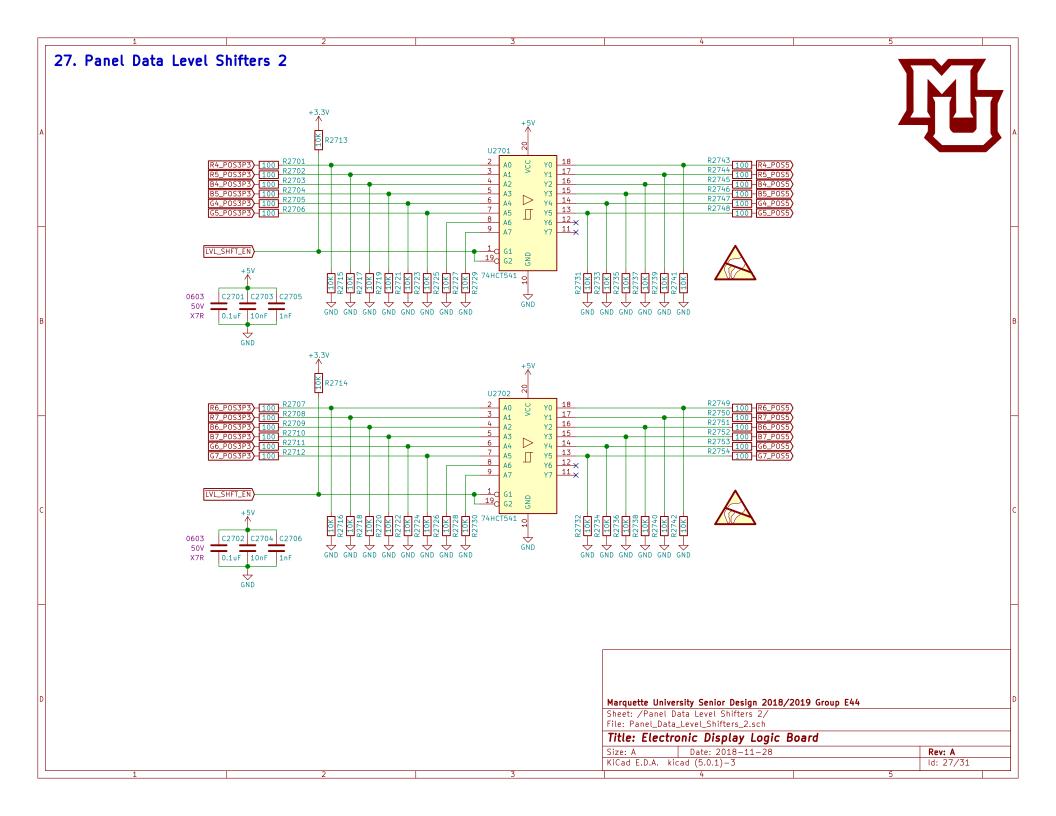


23. External FLASH 6 U<u>2301 [∞] SST25P</u>F020B FLASH_MOSI) 100 R2301 FLASH_Hold 100 R2302 FLASH_WP6 100 R2303 FLASH_CE6 100 R2304 FLASH_SCK 100 R2305 GND 50V X7R Marquette University Senior Design 2018/2019 Group E44 Sheet: /External Flash 6/ File: External_Flash_6.sch Title: Electronic Display Logic 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

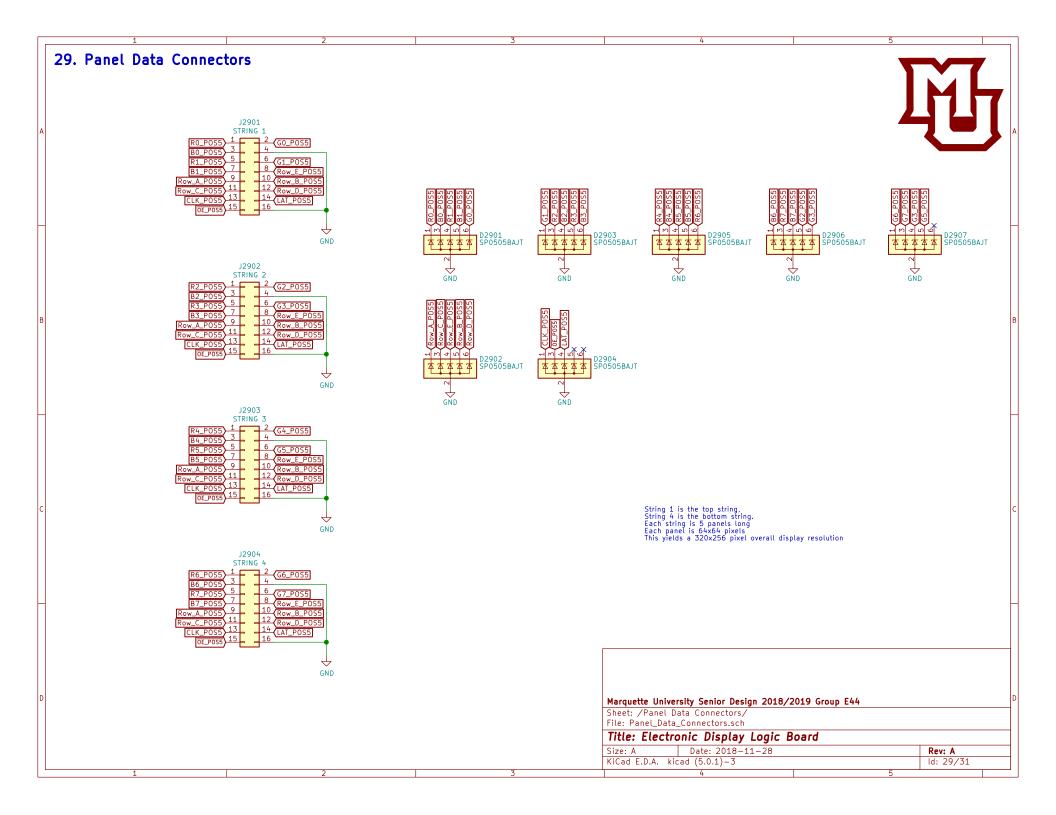
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Rev: A

ld: 28/31

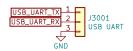
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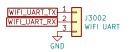
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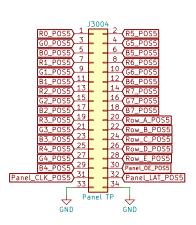
30. Test Points



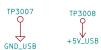












Marquette University Senior Design 2018/2019 Group E44

Sheet: /Test Points/ File: Test_Points.sch

Title: Electronic Display Logic Board

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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