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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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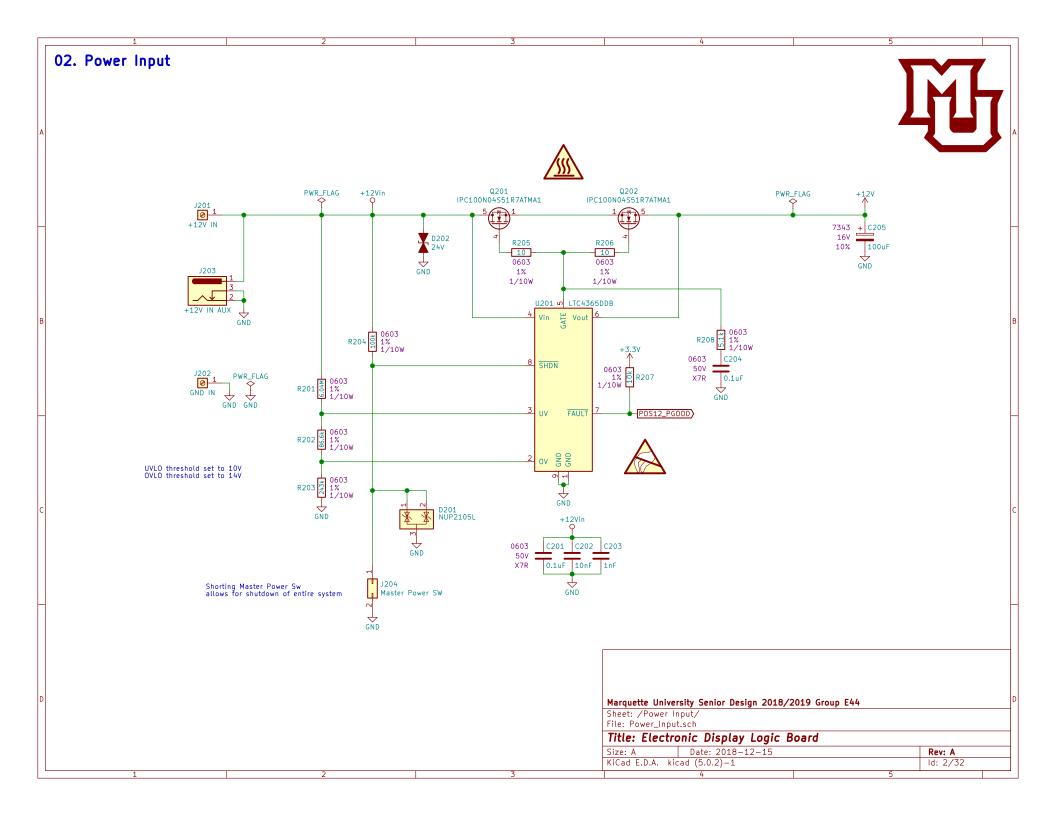
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File: LED_Display_Controller.sch

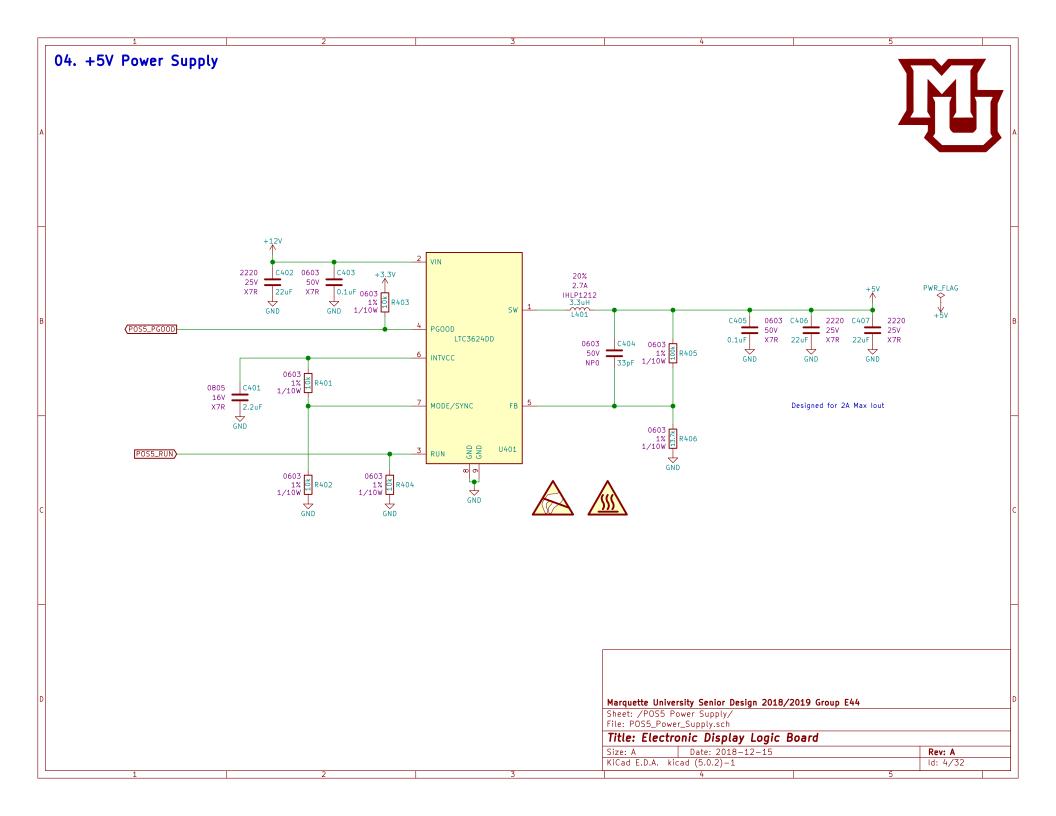
Title: Electronic Display Logic Board

Date: 2018-12-15 Size: A Rev: A KiCad E.D.A. kicad (5.0.2)-1ld: 1/32

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

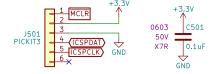


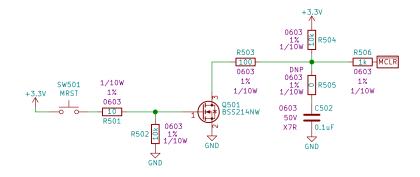
03. +3.3V Power Supply INTVCC 18 C309 0805 MODE C301 2220 2220 C303 C302 2220 1% 1/10W D301 MBR0530 16V R304 PHMODE 25V X7R 25V X7R 25V X7R 2.2uF X7R 22uF GND 22uF 22uF GND BOOST GND GND 20% 0603 50V 0603 C307 C305 14A PWR_FLAG +3.3V 50V IHLP2020 0.47uH L301 0.1uF X7R X7R 0603 1% 1/10W Turn on threshold 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: 2018-12-15 Size: A Rev: A KiCad E.D.A. kicad (5.0.2)-1 ld: 3/32



05. Microcontroller Programming





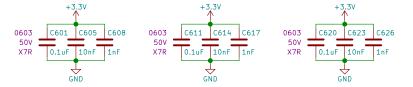


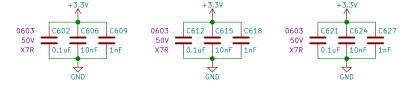
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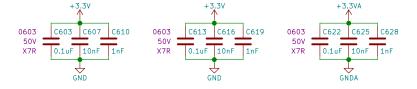
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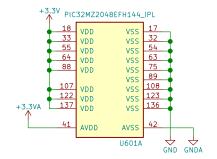
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06. Microcontroller Power





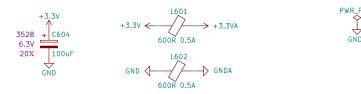












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Sheet: /Microcontroller Power/ File: Microcontroller_Power.sch

PWR_FLAG

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07. Microcontroller IO Bank 1 PIC32MZ2048EFH144_IPL RAO/TMS/AN24 RDO/RPDO/RTCC/INTO 109 R1_P0S3P3 X 56 RA1/TCK/AN29 RD1/RPD1/SCK1 FLASH_WP7 85 RA2/SCL2 110 R2_P0S3P3 RD2/EBID14/RPD2/PMD14 FLASH_WP8 86 RA3/EBIRDY1/SDA2 RD3/EBID15/RPD3/PMD15 (EBI_A14 87 RA4/EBIA14/PMCS1/PMA14 118 R4_POS RD4/SQICSO/RPD4 119 R5_P0S3P3 2 RA5/EBIA5/AN34/PMA5 RD5/SQICS1/RPD5 (EBI A5 FLASH_WP1 129 RA6/TRCLK/SQICLK RD6/ETXEN/RPD6 120 R6_POS3P FLASH_WP2 130 RA7/TRD3/SQID3 RD7/ETXCLK/RPD7 121 R7_POS3P FLASH_WP3 39 RA9/VREF-/CVREF-/AN27 RD9/EBIA15/RPD9/PMCS2/PMA15 97 EBI_A15) RD10/RPD10/SCK4 98 USB_UART_TX FLASH_WP4 40 RA10/VREF+/CVREF+/AN28 FLASH_WP5 95 RA14/RPA14/SCL1 RD11/EMDC/RPD11 99 Row_A_POS3P3 FLASH_WP6 96 RA15/RPA15/SDA1 RD12/EBID12/RPD12/PMD12 Row A is Least Significant Bit RD13/EBID13/PMD13 113 Row_C_POS3P: RD14/AN32/RPD14 69 Row_D_POS3P3 (ICSPDAT) 36 RB0/PGED1/AN0/RPB0 RD15/AN33/RPD15/SCK6 70 Row_E_POS3P3 ICSPCLK) 35 RB1/PGEC1/AN1/RPB1 RB2/AN2/C2INB/RPB2 FLASH_CE2 31 RB3/AN3/C2INA/RPB3 REO/EBIDO/PMDO 138 EBI_IO1 FLASH_CE3 26 RB4/AN4/C1INB RE1/EBID1/PMD1 142 (EBI_I02 FLASH_CE4 25 RB5/AN45/C1INA/RPB5 RE2/EBID2/PMD2 FLASH_CE5 37 RB6/PGEC2/AN46/RPB6 RE3/EBID3/RPE3/PMD3 EBI 103 FLASH_CE6 38 RB7/PGED2/AN47/RPB7 RE4/EBID4/AN18/PMD4 EBLA10 47 RB8/EBIA10/AN48/RPB8/PMA10 RB9/EBIA7/AN49/RPB9/PMA7 RE5/EBID5/AN17/RPE5/PMD5 EBI 105 RE6/EBID6/AN16/PMD6 **√**EBI_106 FLASH_CEF 50 RB10/CVREFOUT/AN5/RPB10 FLASH_CEE 50 RB11/AN6 RE7/EBID7/AN15/PMD7 EBI_107 RE8/AN25/RPE8 FLASH_Hold 59 RB12/AN7 24 WIFI_RESET RE9/AN26/RPE9 × 60 RB13/AN8

FLASH_SCK 61 RB14/AN9/RPB14/SCK3 X 62 RB15/AN10/RPB15/OCFB

FLASH_MISO 106

X 72 RC15/0SC2/CLK0

 EBLA6
 6
 RC1/EBIA6/AN22/RPC1/PMA6

 (EBLA12
 11
 RC2/EBIA12/AN21/RPC2/PMA12

 (EBLWE)
 12
 RC3/EBIWE/AN20/RPC3/PMWR

 (EBLOE)
 13
 RC4/EBIOE/AN19/RPC4/PMRD

 RC12/OSC1/CLKI

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Sheet: /Microcontroller 1/ File: Microcontroller_1.sch

VBUS

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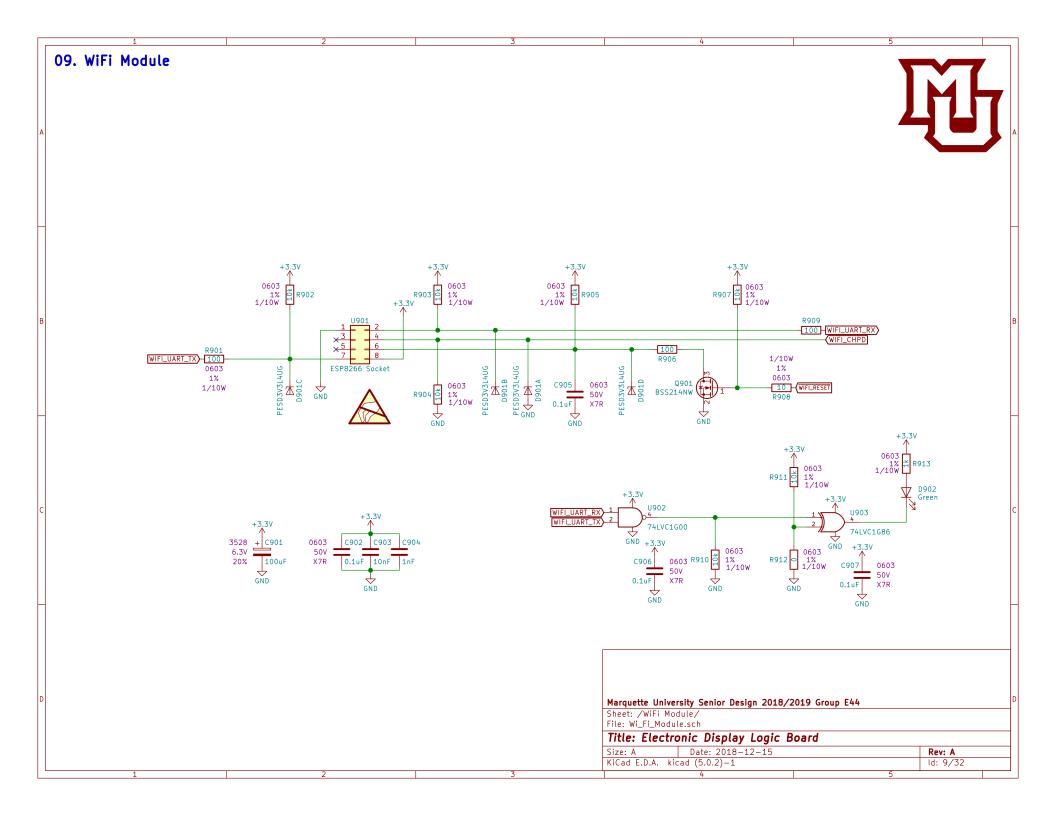
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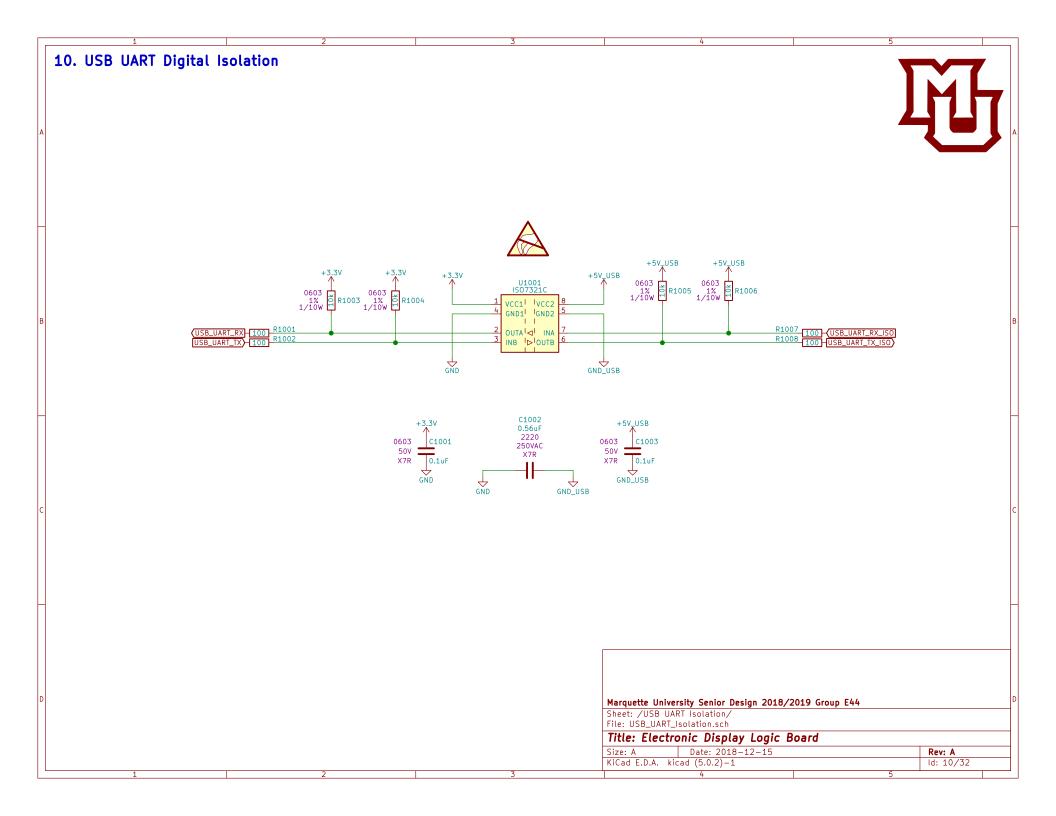
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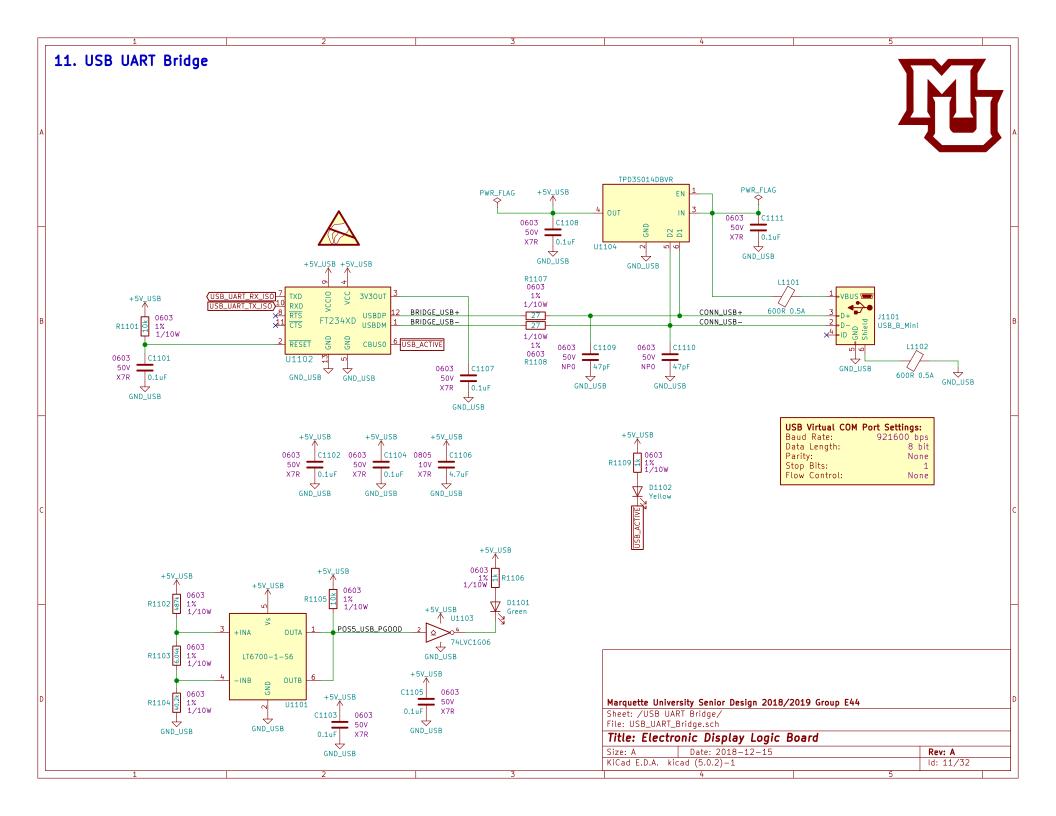
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 Rev: A

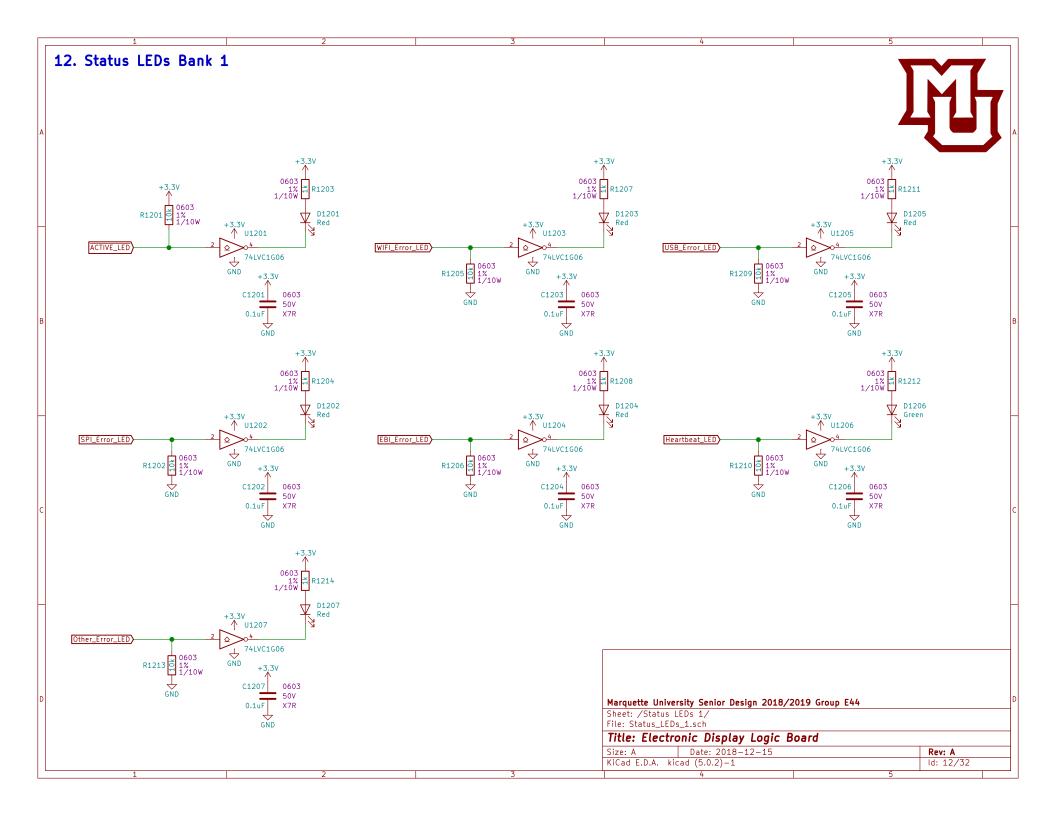
 KiCad E.D.A. kicad (5.0.2)-1
 Id: 7/32

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: 2018-12-15 Size: A Rev: A KiCad E.D.A. kicad (5.0.2)-1ld: 8/32

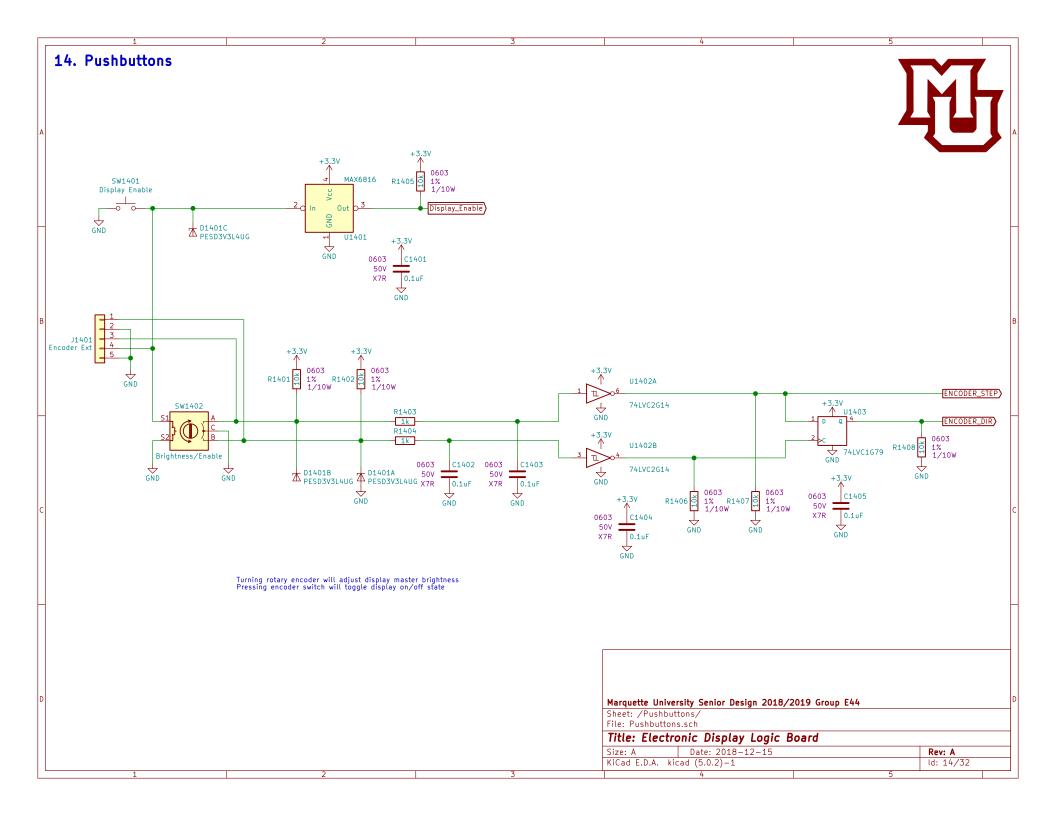






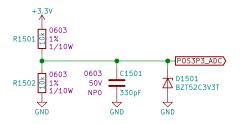


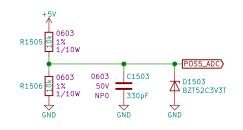
13. Status LEDs Bank 2 D1303 Green D1301 D1302 Green D1304 Green +3.3V ↑ U1301 +3.3V ↑ U1304 Green +3.3V ↑ U1302 +3.3V ↑ U1303 74LVC1G06 74LVC1G06 74LVC1G06 74LVC1G06 GND +3.3V +3.3V 0.1uF 0.1uF 0.1uF 0.1uF 0603 50V 0603 0603 50V 500 50V GND GND GND GND Marquette University Senior Design 2018/2019 Group E44 Sheet: /Status LEDs 2/ File: Status_LEDs_2.sch Title: Electronic Display Logic Board Size: A Date: 2018-12-15 Rev: A KiCad E.D.A. kicad (5.0.2)-1 ld: 13/32

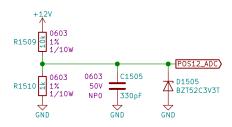


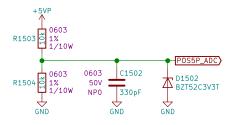
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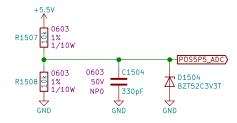








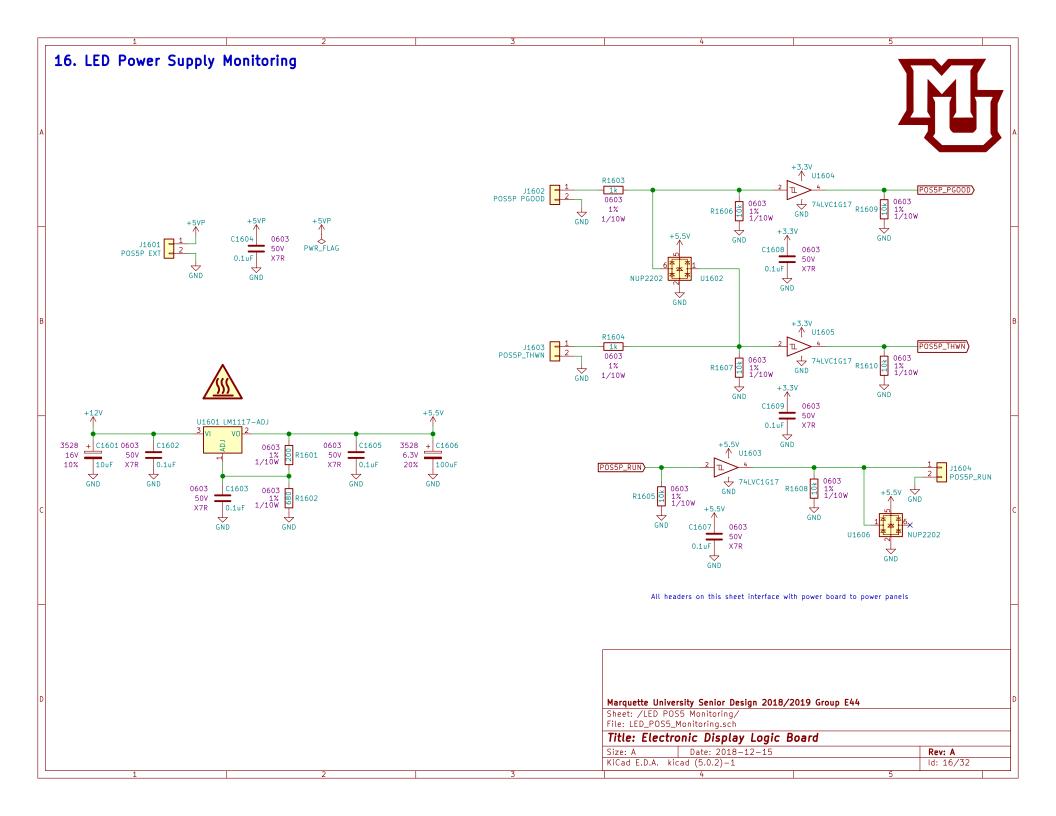


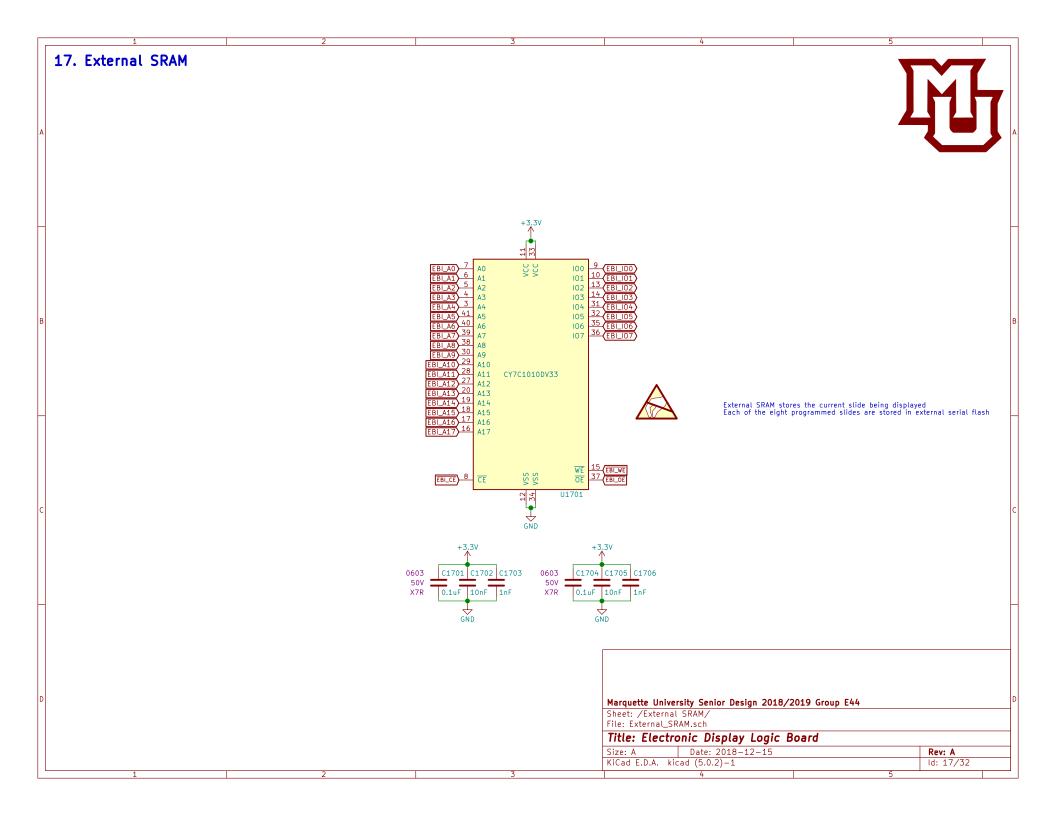


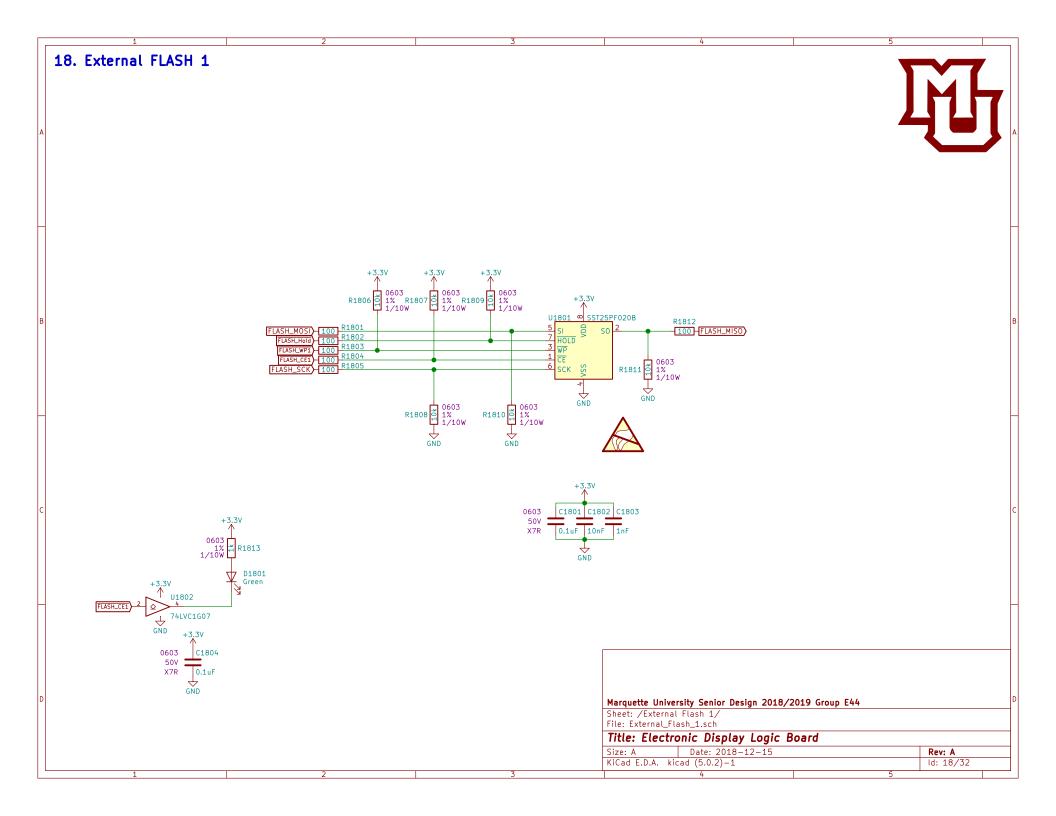
Marquette University Senior Design 2018/2019 Group E44

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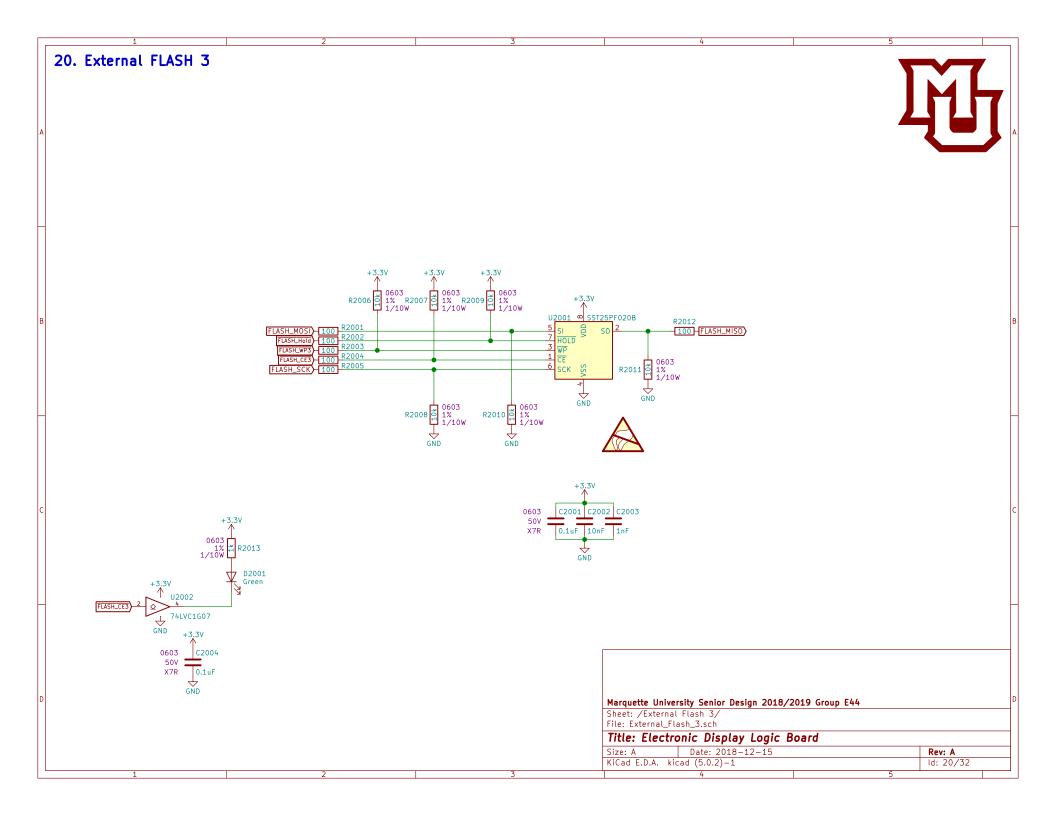
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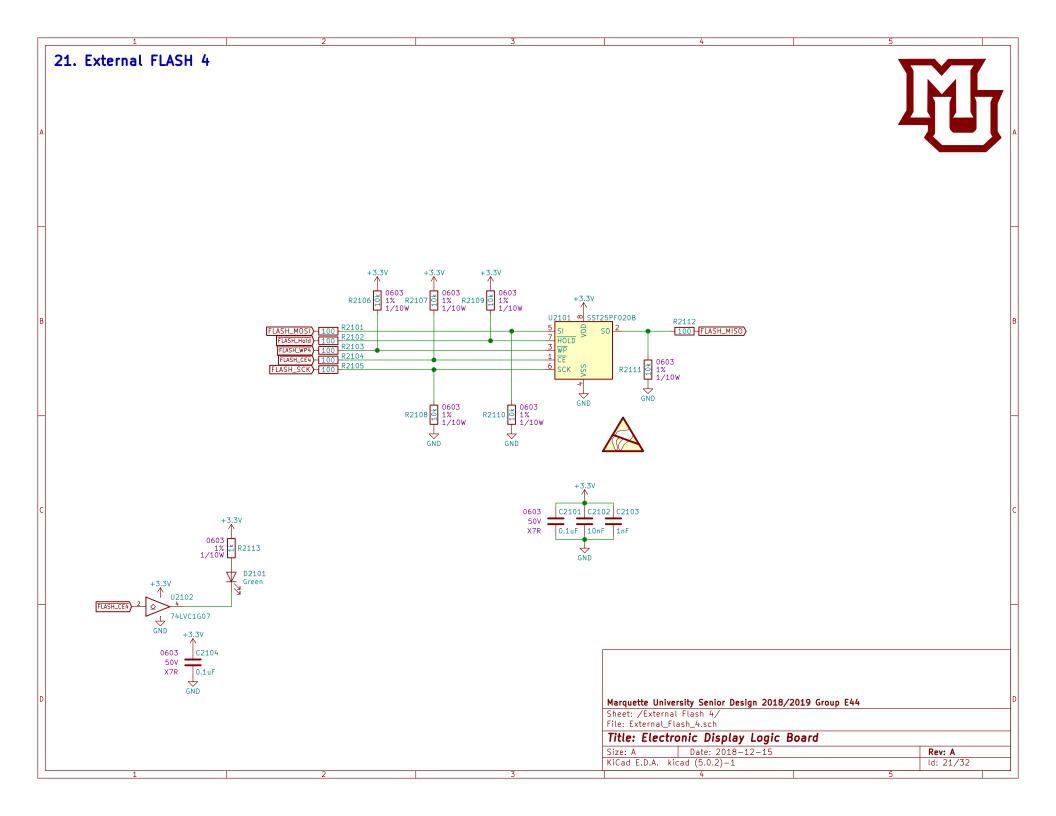


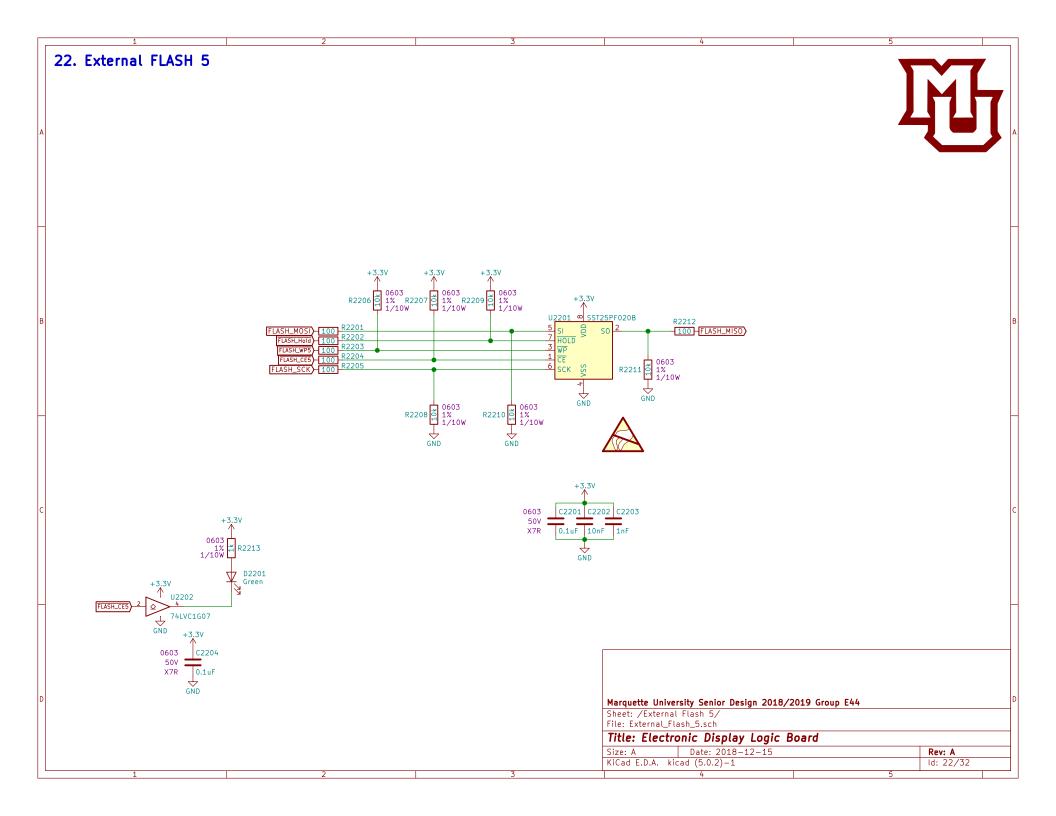


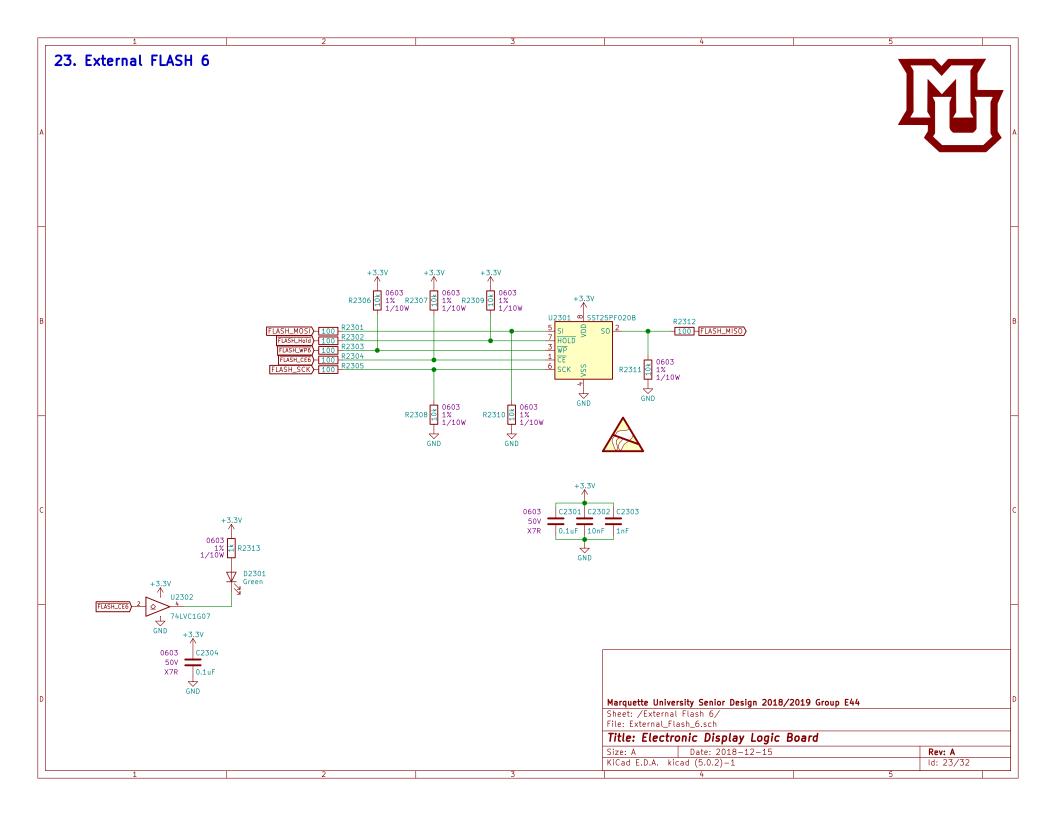


19. External FLASH 2 GND R1910 0603 1% 1/10W 50V X7R +3.3V 101902 74LVC1G07 +3.3V C1904 0603 50V X7R Marquette University Senior Design 2018/2019 Group E44 Sheet: /External Flash 2/ File: External_Flash_2.sch Title: Electronic Display Logic Board Size: A Date: 2018-12-15 Rev: A KiCad E.D.A. kicad (5.0.2)-1 ld: 19/32

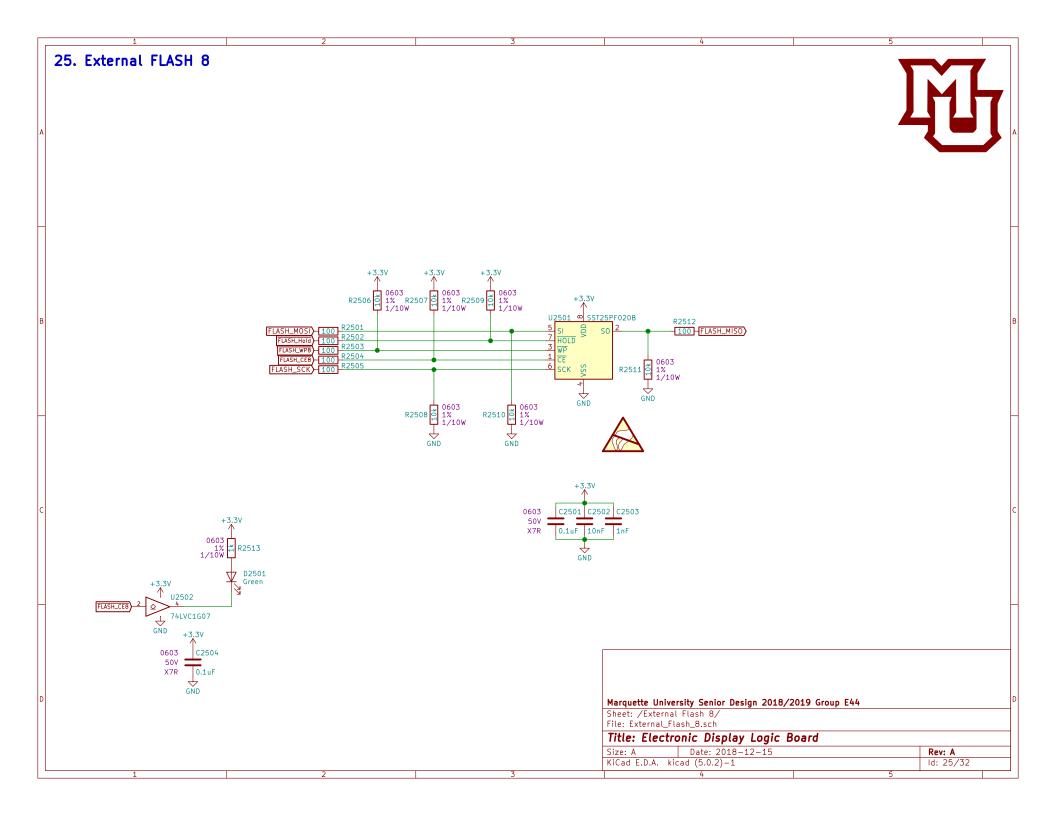


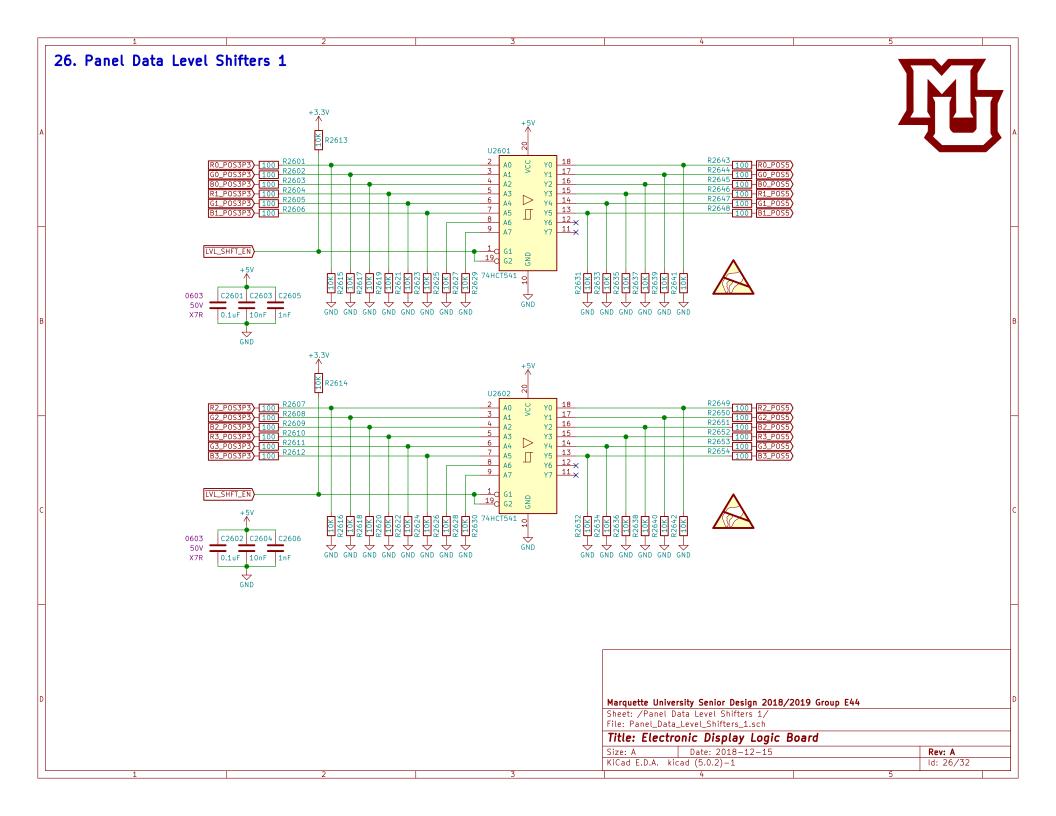


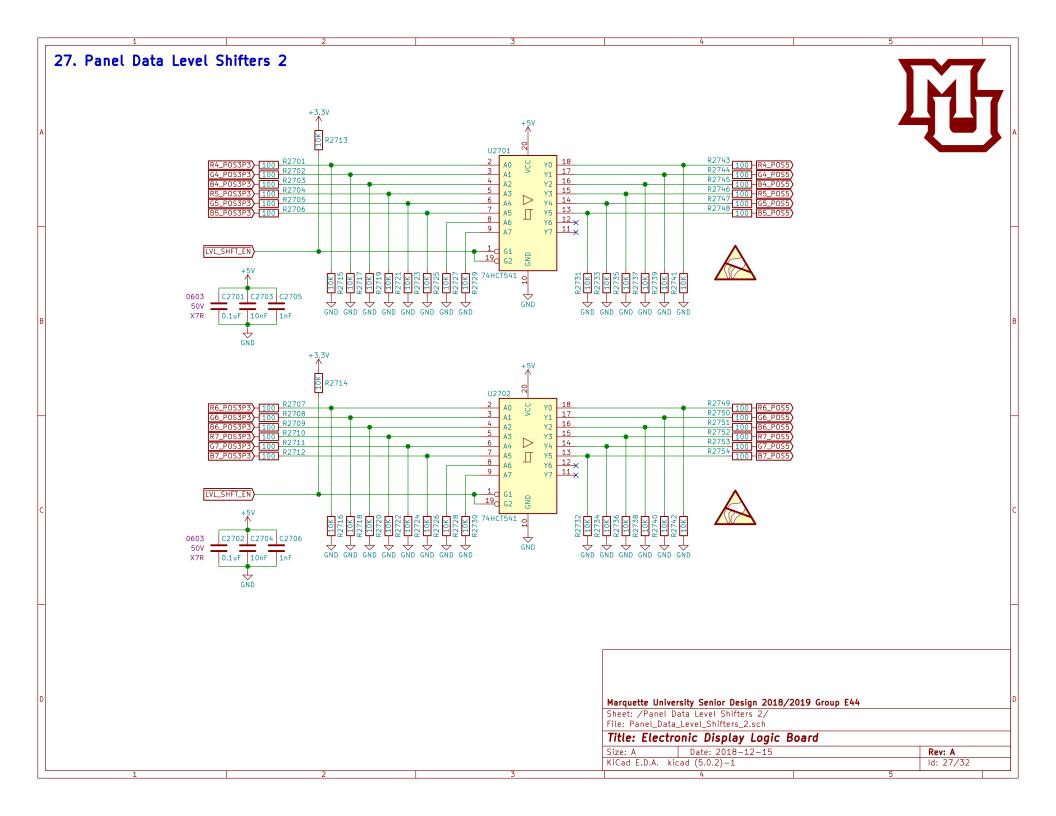


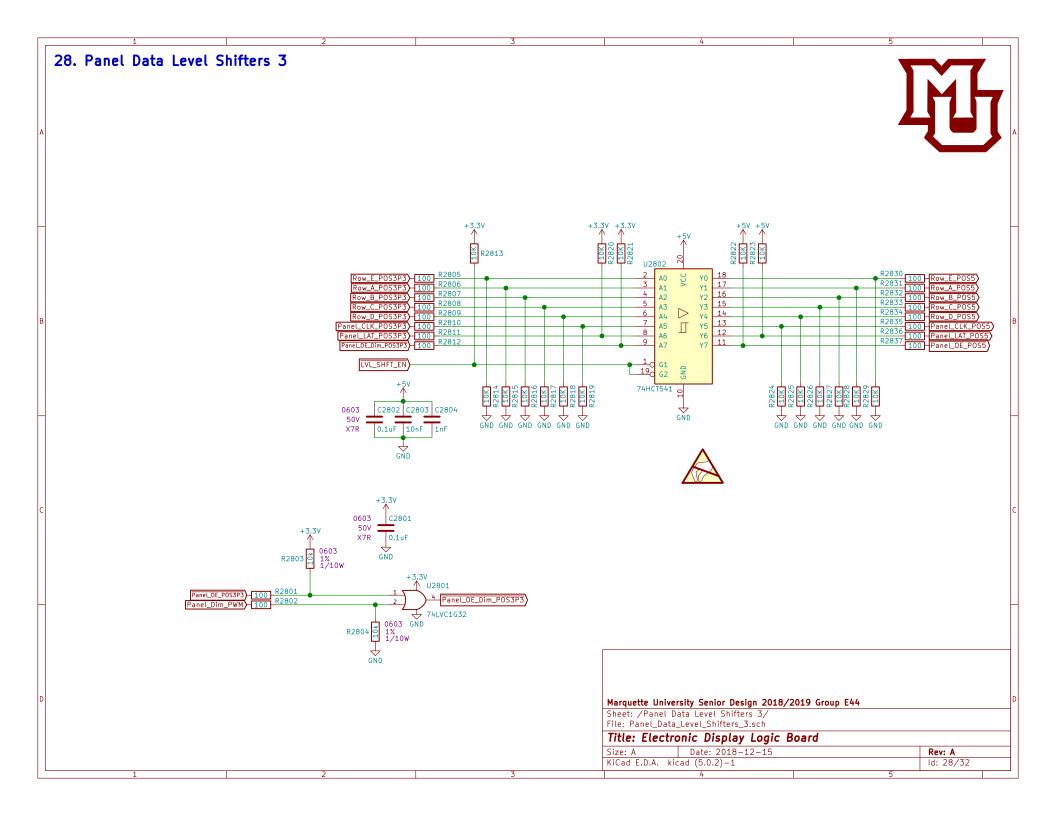


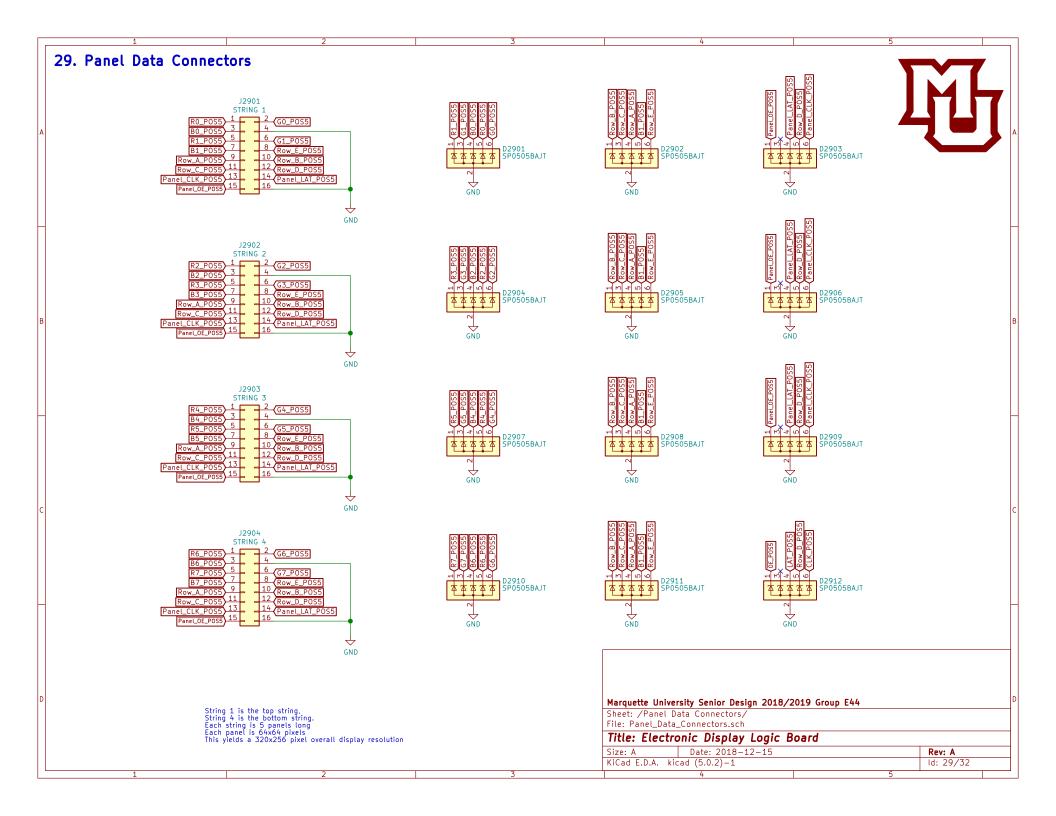
24. External FLASH 7 U<u>2401 [∞] SST25P</u>F020B R2412 —100 FLASH_MISO GND 50V X7R 74LVC1G07 +3.3V 0603 50V X7R C2404 Marquette University Senior Design 2018/2019 Group E44 Sheet: /External Flash 7/ File: External_Flash_7.sch Title: Electronic Display Logic Board Size: A Date: 2018-12-15 Rev: A KiCad E.D.A. kicad (5.0.2)-1 ld: 24/32





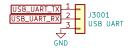






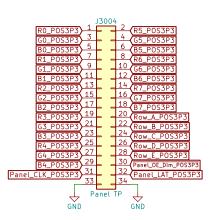
30. Test Points



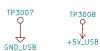












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31. Mechanical 4-40 Standoff 4-40 Standoff 4-40 Standoff 4-40 Standoff 4-40 Standoff 4-40 Standoff MK3101 MK3105 MK3109 MK3113 MK3117 MK3121 4-40 Standoff 4-40 Standoff 4-40 Standoff 4-40 Standoff 4-40 Standoff 4-40 Standoff MK3102 MK3106 MK3110 MK3114 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: 2018-12-15 Size: A Rev: A ld: 31/32 KiCad E.D.A. kicad (5.0.2)-1

32. Additional Capacitance





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