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



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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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Sheet: /

File: LED_Display_Controller.sch

Title: Electronic Display Logic Board

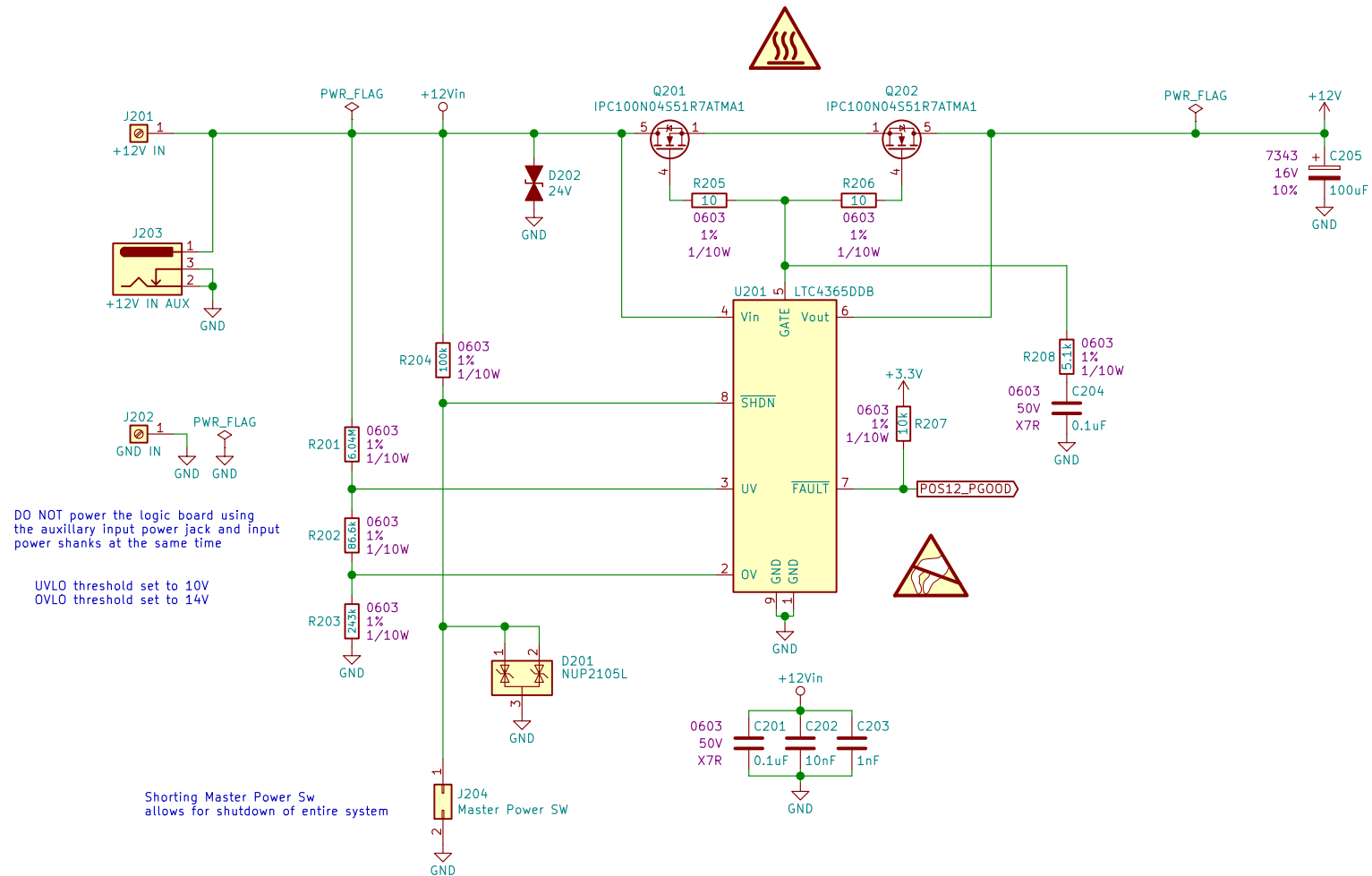
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KiCad E.D.A. kicad (5.1.0)-1

Rev: A

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02. Power Input



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Sheet: /Power Input/
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Title: Electronic Display Logic Board

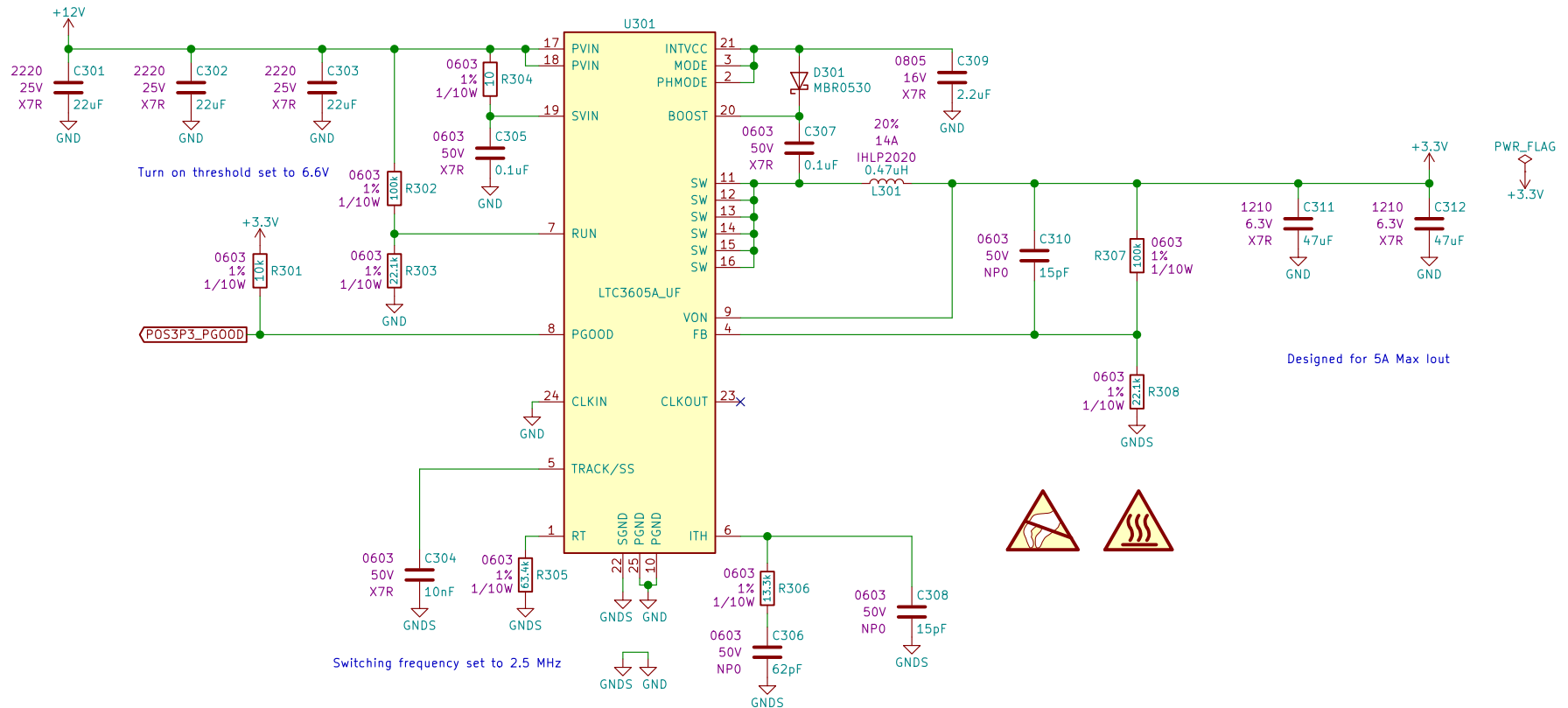
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KiCad E.D.A. kicad (5.1.0)-1

Rev: A

Id: 2/32

03. +3.3V Power Supply



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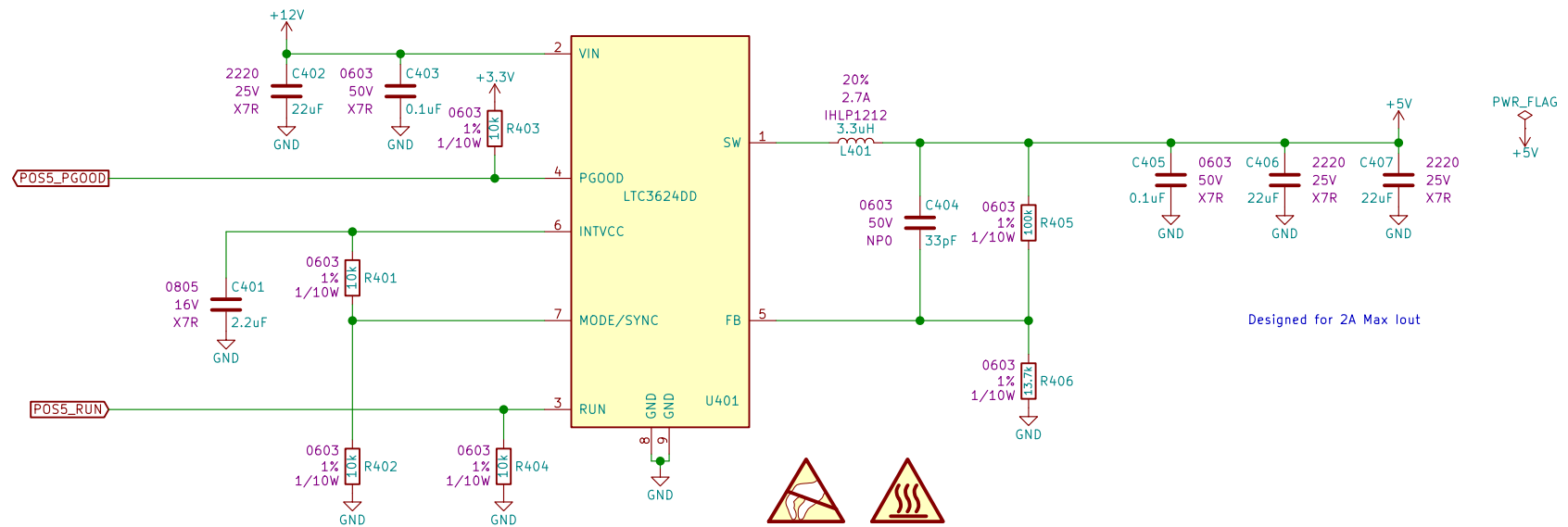
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Title: Electronic Display Logic Board

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KiCad E.D.A. kicad (5.1.0)-1

Rev: A
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04. +5V Power Supply



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File: POS5_Power_Supply.sch

Title: Electronic Display Logic Board

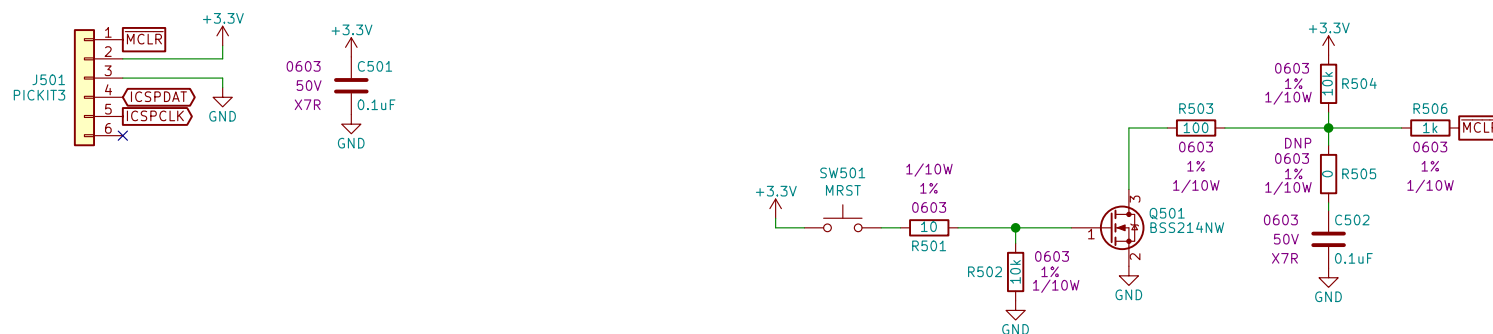
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Rev: A

Id: 4/32

05. Microcontroller Programming



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Sheet: /Microcontroller Programming/
File: Microcontroller_Programming.sch

Title: Electronic Display Logic Board

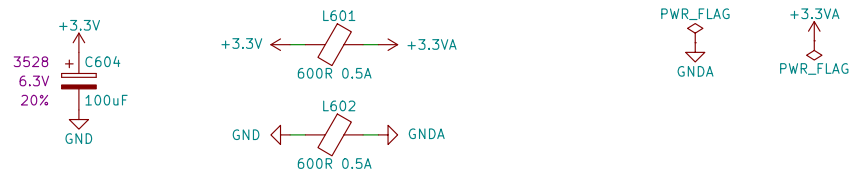
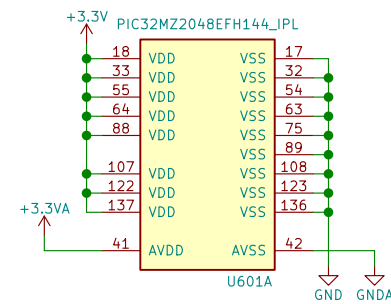
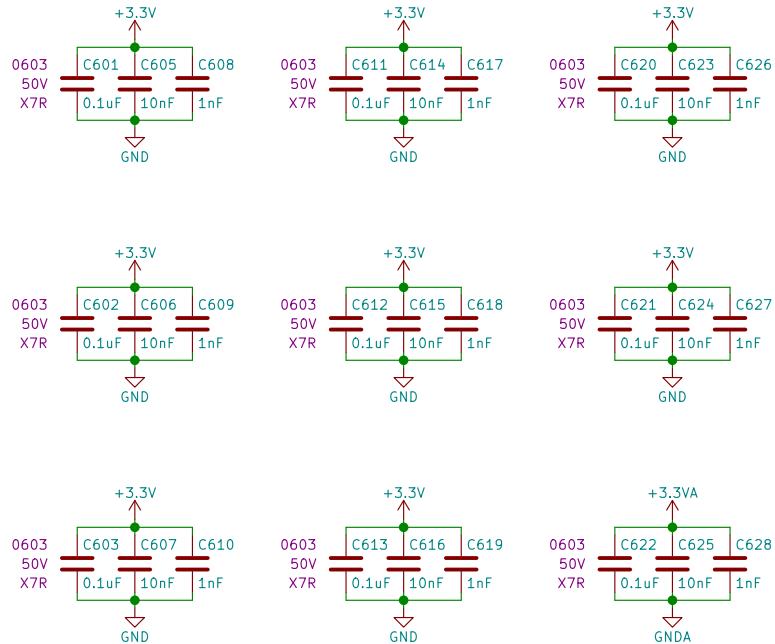
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Rev: A

Id: 5/32

06. Microcontroller Power



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Sheet: /Microcontroller Power/
File: Microcontroller_Power.sch

Title: Electronic Display Logic Board

Size: A Date: 2018-12-15
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08. Microcontroller IO Bank 2



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Sheet: /Microcontroller 2/

File: Microcontroller_2.sch

Title: Electronic Display Logic Board

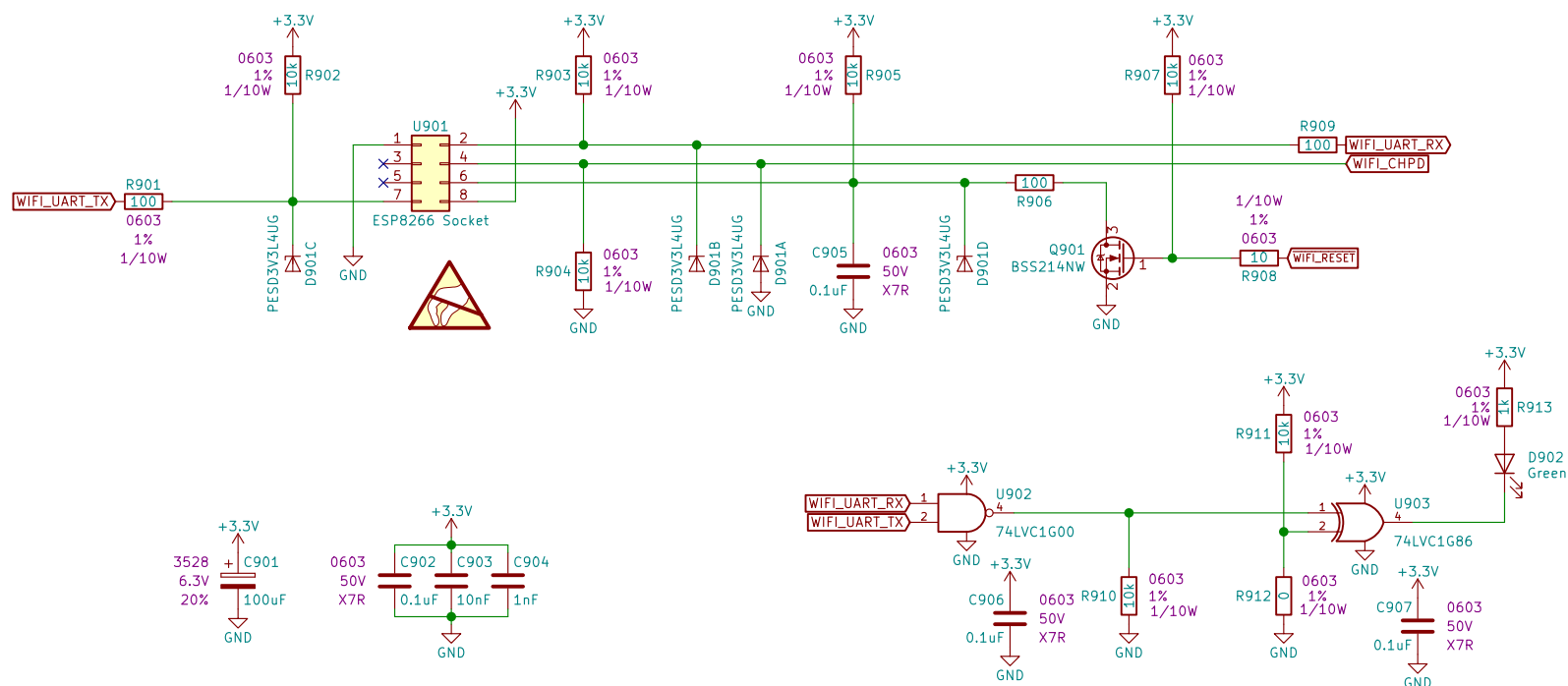
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Rev: A

Id: 8/32

09. WiFi Module



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Sheet: /WiFi Module/

File: Wi-Fi_Module.sch

Title: Electronic Display Logic Board

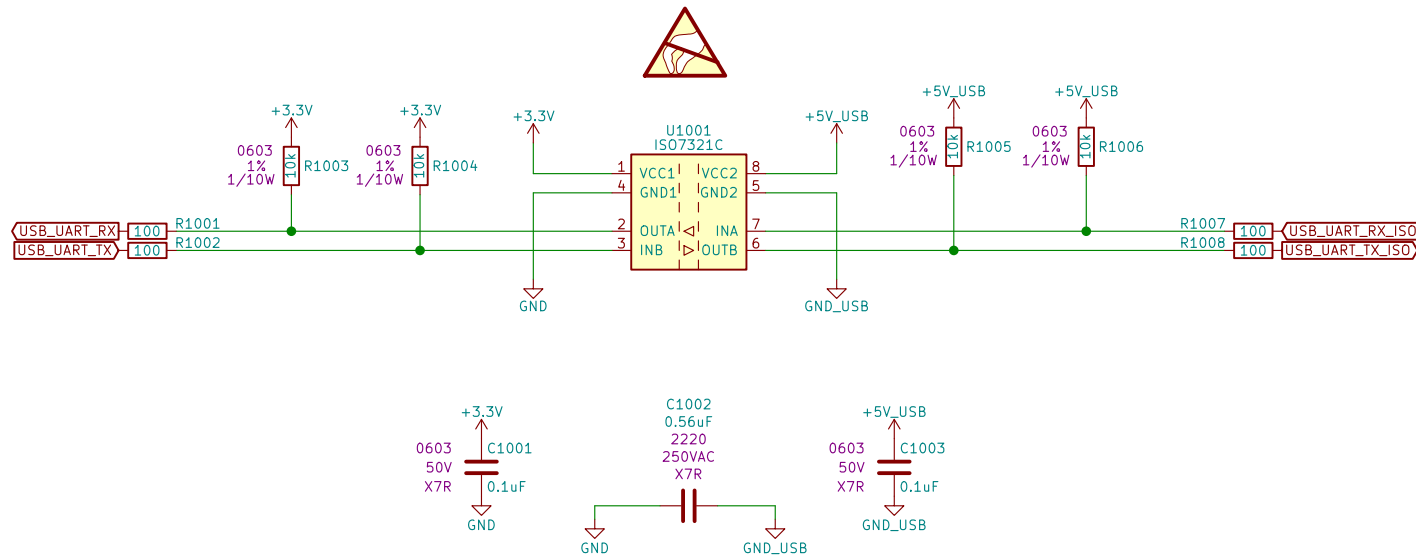
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KiCad E.D.A. kicad (5.1.0)-1

Rev: A

Id: 9/32

10. USB UART Digital Isolation



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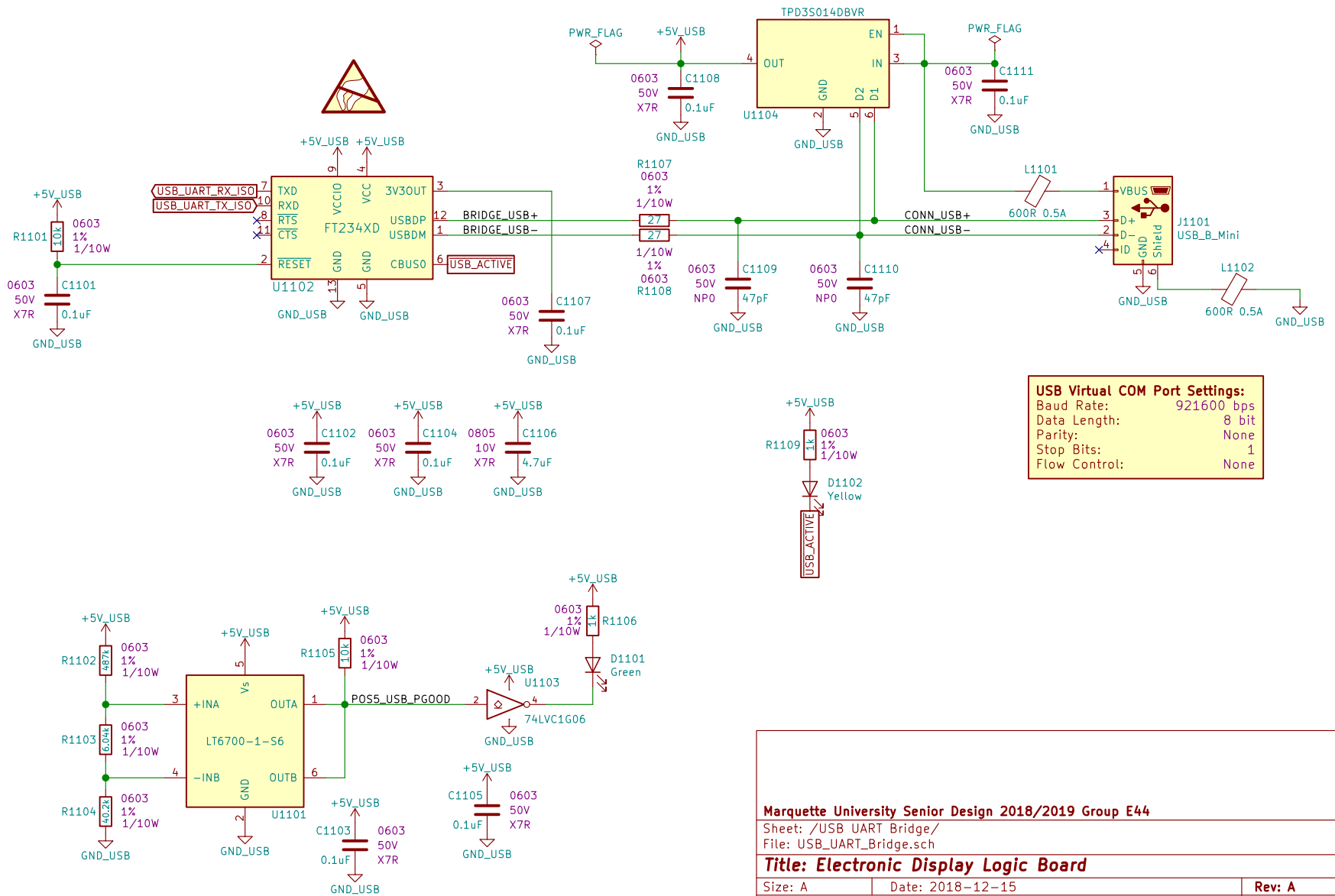
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Title: Electronic Display Logic Board

Size: A Date: 2018-12-15
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Id: 10/32

11. USB UART Bridge



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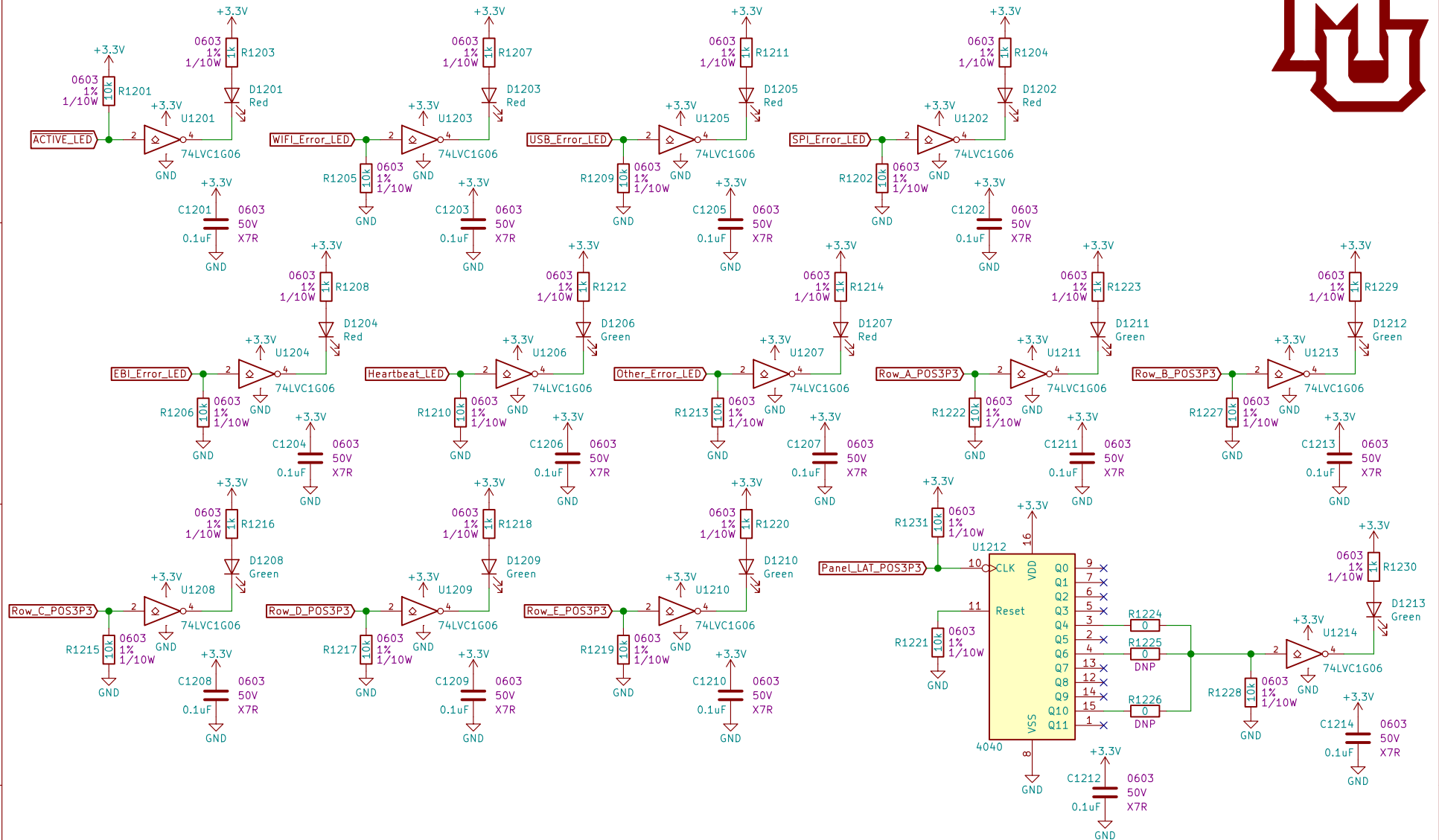
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Title: Electronic Display Logic Board

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KiCad E.D.A. kicad (5.1.0)-1

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Id: 11/32

12. Status LEDs Bank 1



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Sheet: /Status LEDs 1/
File: Status_LEDs_1.sch

Title: Electronic Display Logic Board

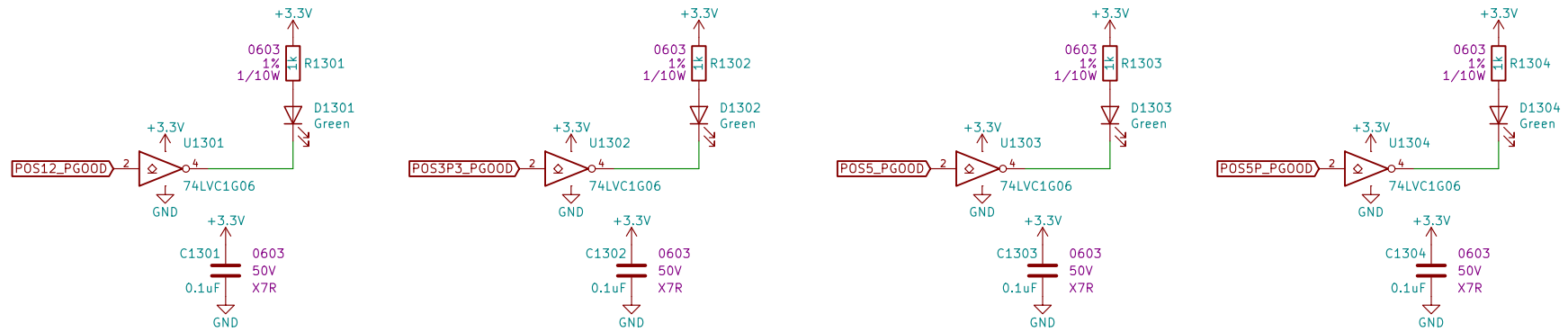
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Rev: A

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Id: 12/32

13. Status LEDs Bank 2



Marquette University Senior Design 2018/2019 Group E44

Sheet: /Status LEDs 2/

File: Status_LEDs_2.sch

Title: Electronic Display Logic Board

Size: A

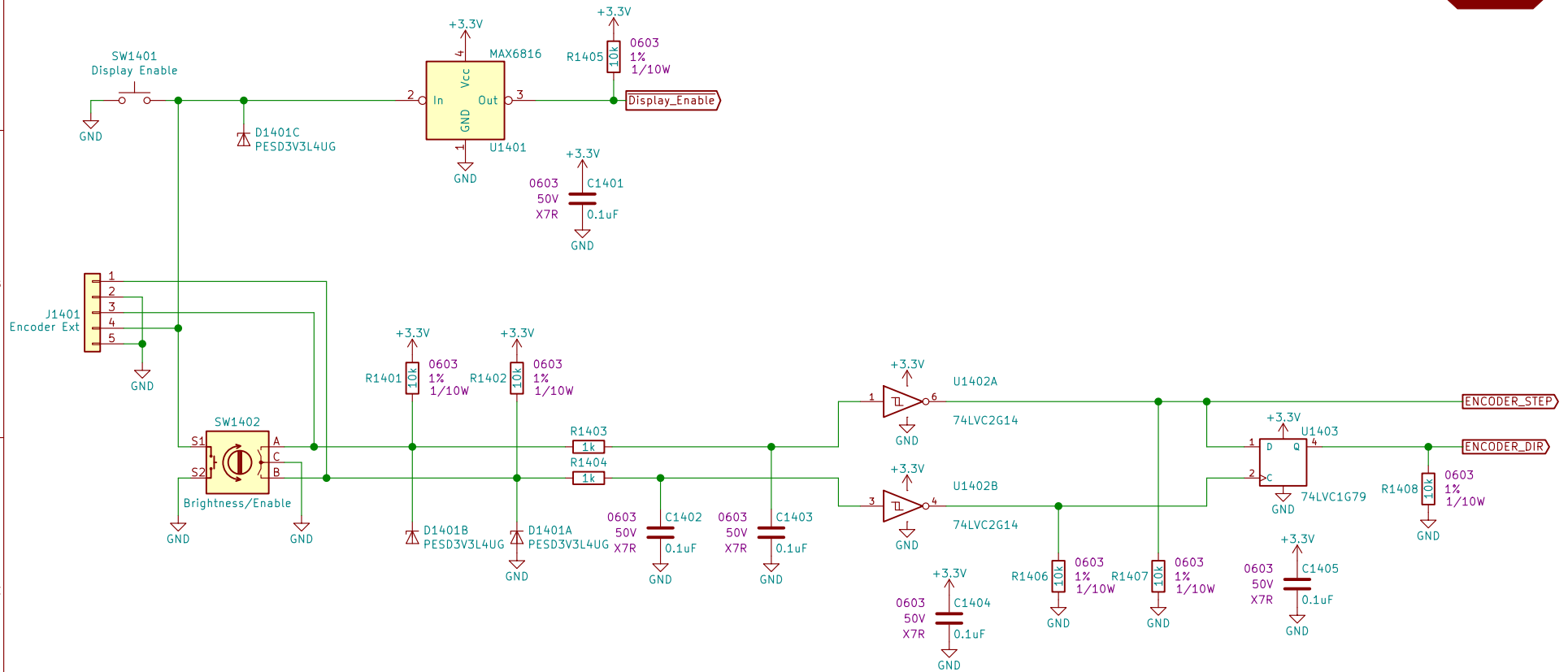
Date: 2018-12-15

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Id: 13/32

14. Pushbuttons



Turning rotary encoder will adjust display master brightness
Pressing encoder switch will toggle display on/off state

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Sheet: /Pushbuttons/
File: Pushbuttons.sch

Title: Electronic Display Logic Board

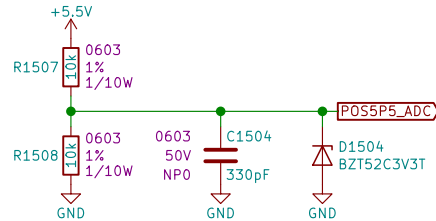
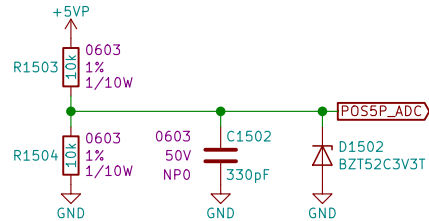
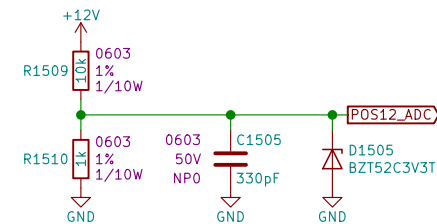
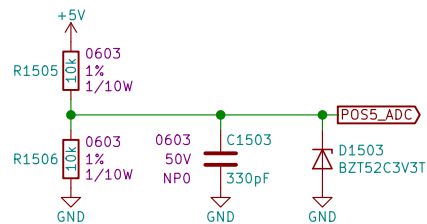
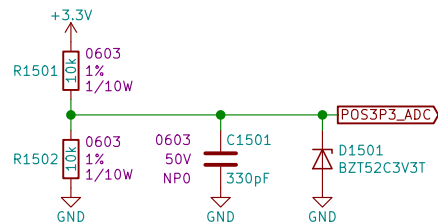
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KiCad E.D.A.	kiCad (5.1.0)-1

Rev: A

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15. Internal Rail Monitoring



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Sheet: /Internal Rail Monitoring/
File: Internal_Rail_Monitoring.sch

Title: Electronic Display Logic Board

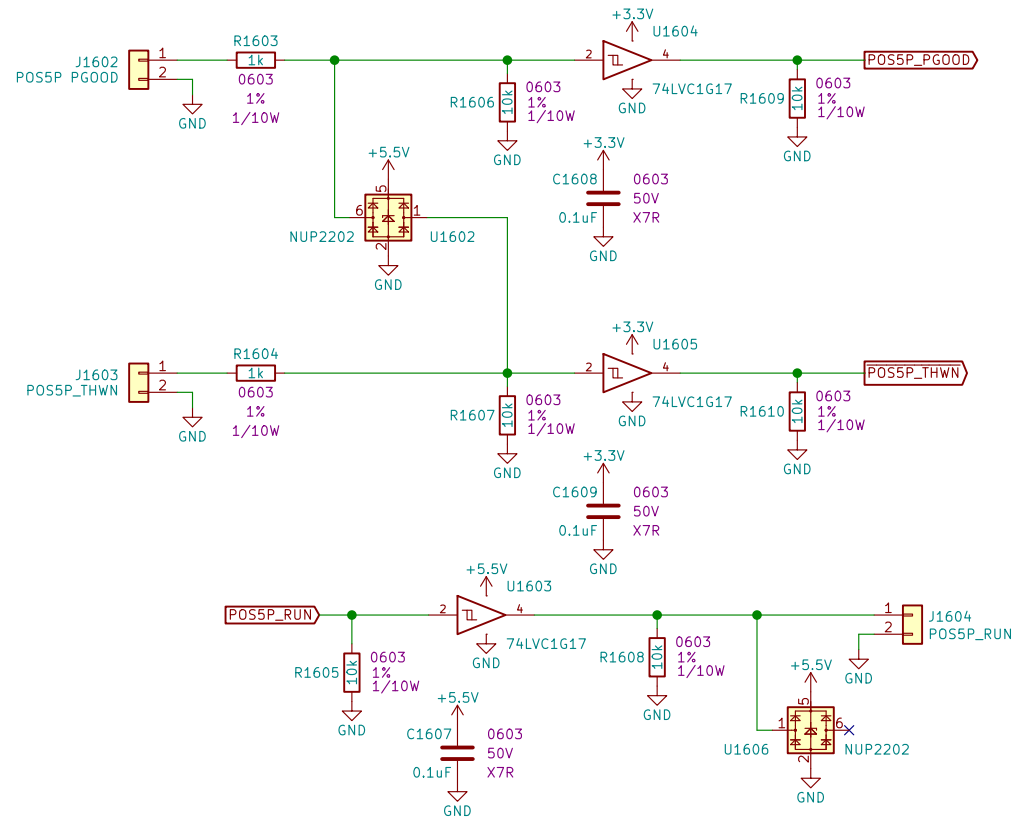
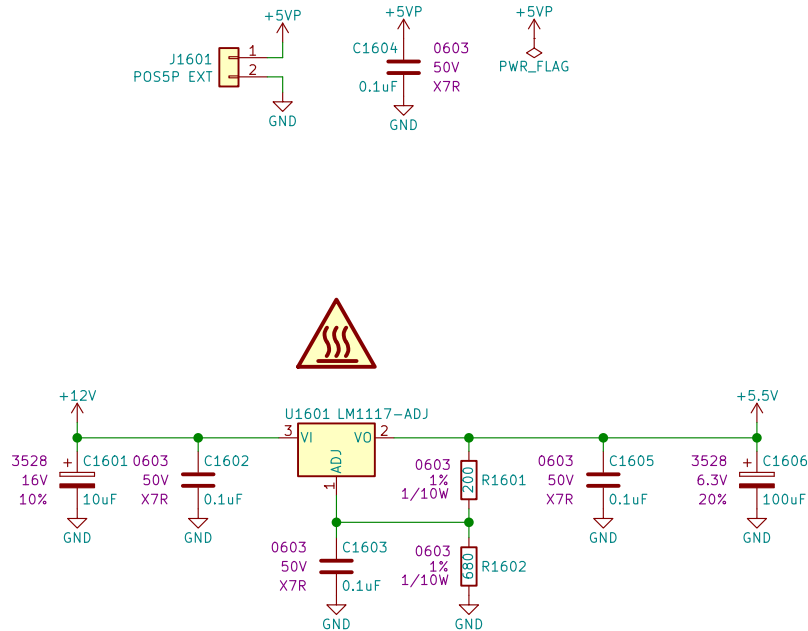
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KiCad E.D.A. kicad (5.1.0)-1

Rev: A

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16. LED Power Supply Monitoring



All headers on this sheet interface with power board to power panels

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Sheet: /LED POS5 Monitoring/
File: LED_POS5_Monitoring.sch

Title: Electronic Display Logic Board

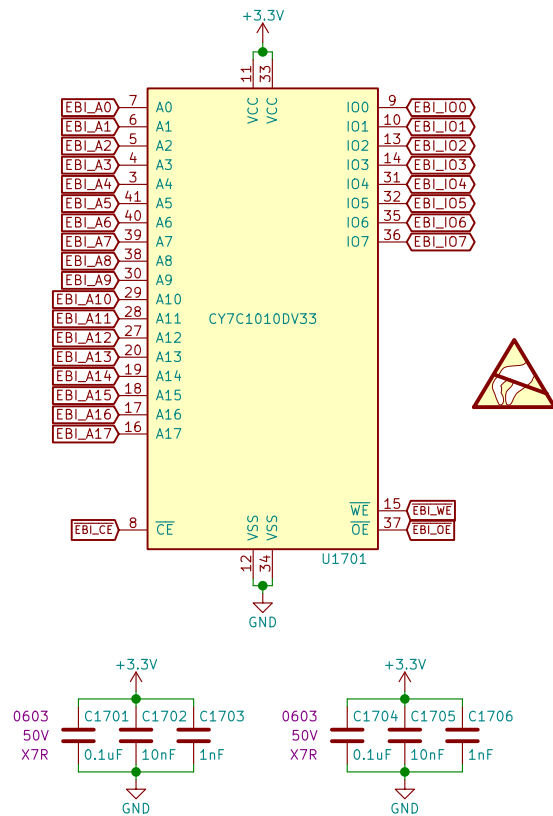
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Size: A	Date: 2018
KiCad E.D.A.	kicad (5.1.0)-1

Rev: A

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17. External SRAM



External SRAM stores the current slide being displayed
Each of the eight programmed slides are stored in external serial flash

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Sheet: /External SRAM/

File: External_SRAM.sch

Title: Electronic Display Logic Board

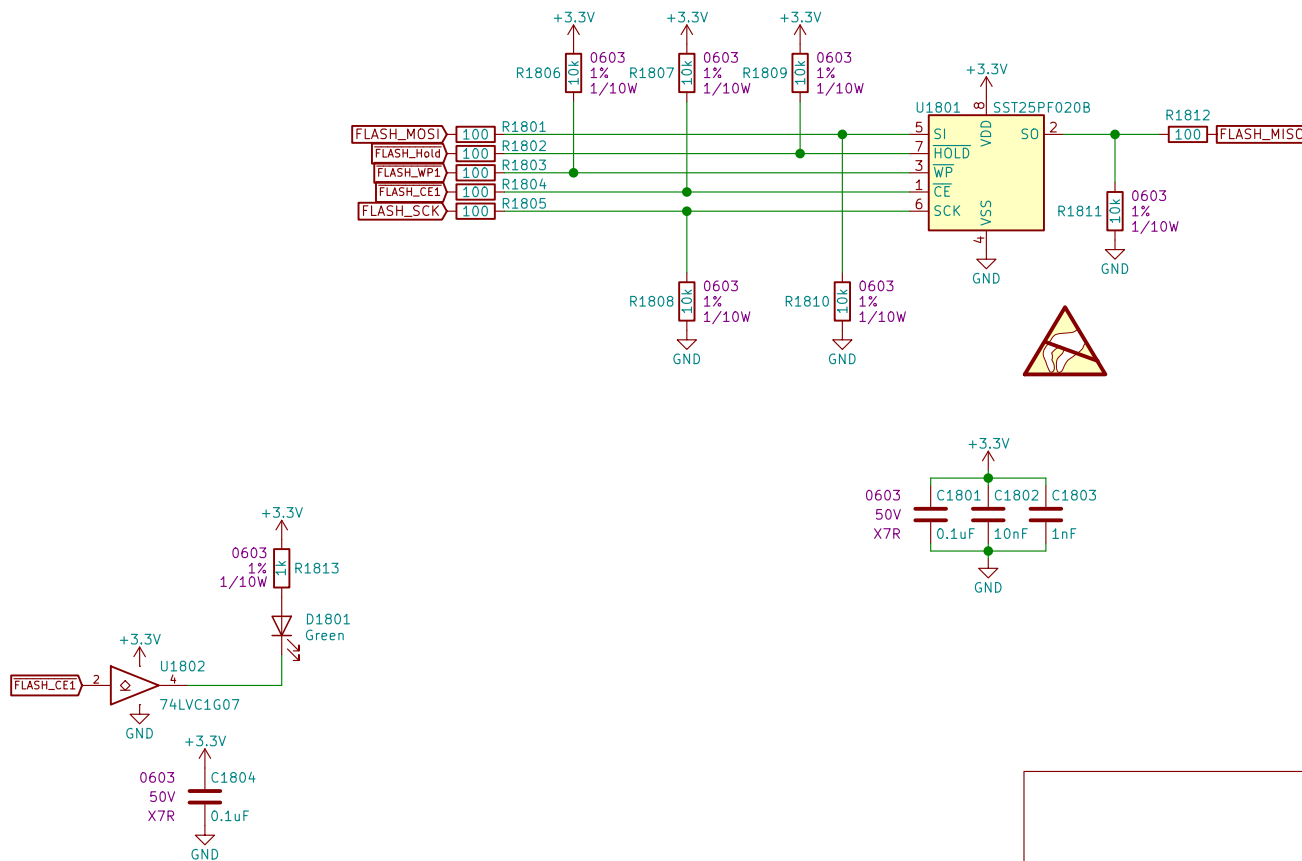
Size: A Date: 2018-12-15

KiCad E.D.A. kicad (5.1.0)-1

Rev: A

Id: 17/32

18. External FLASH 1



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Sheet: /External Flash 1/

File: External_Flash_1.sch

Title: Electronic Display Logic Board

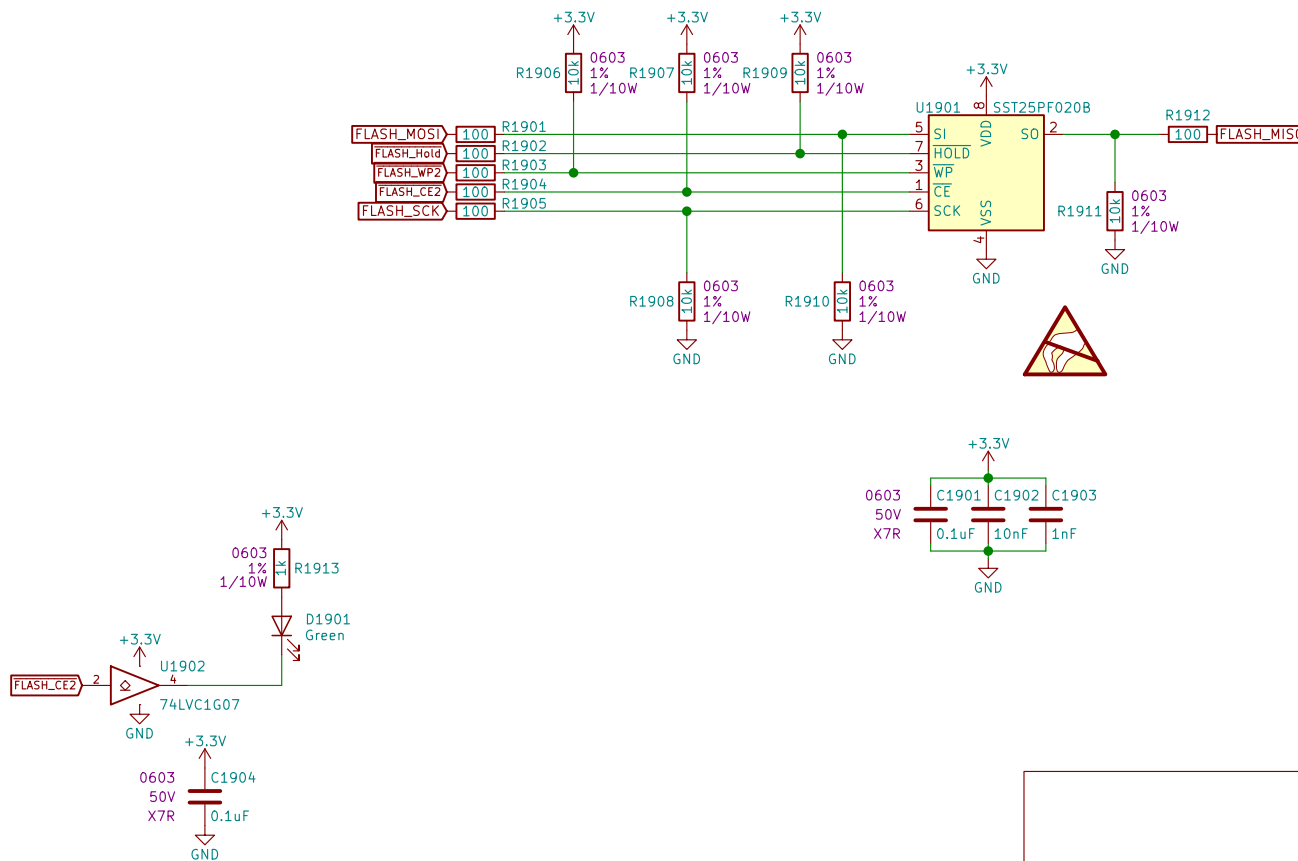
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Size: A	Date: 2018
KiCad E.D.A.	kiCad (5.1.0)-1

Rev: A

Id: 18/32

19. External FLASH 2



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Sheet: /External Flash 2/

File: External_Flash_2.sch

Title: Electronic Display Logic Board

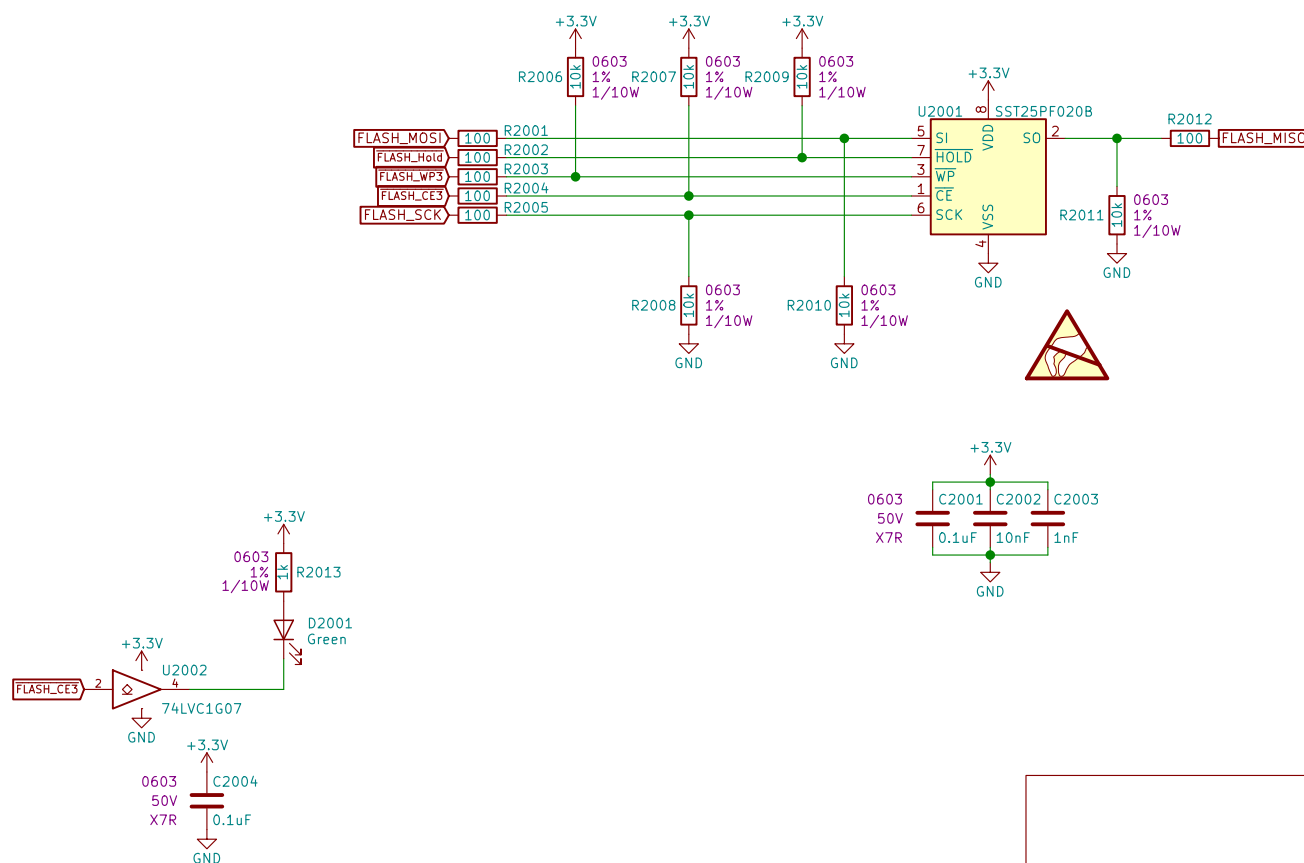
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KiCad E.D.A. kicad (5.1.0)-1

Rev: A

Id: 19/32

20. External FLASH 3



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Sheet: /External Flash 3/

File: External_Flash_3.sch

Title: Electronic Display Logic Board

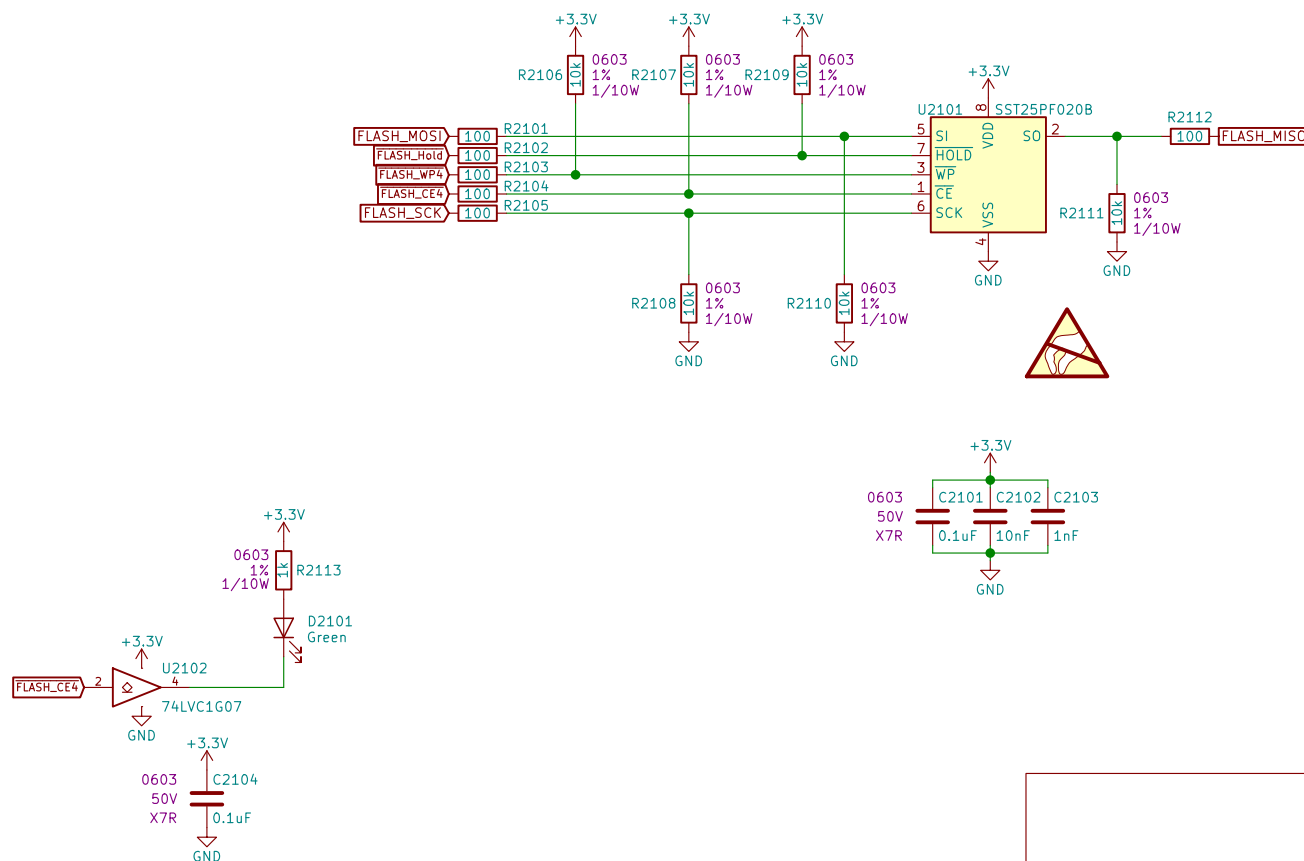
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KiCad E.D.A.	kicad (5.1.0)-1

Rev: A

Id: 20/32

21. External FLASH 4



Marquette University Senior Design 2018/2019 Group E44

Sheet: /External Flash 4/

File: External_Flash_4.sch

Title: Electronic Display Logic Board

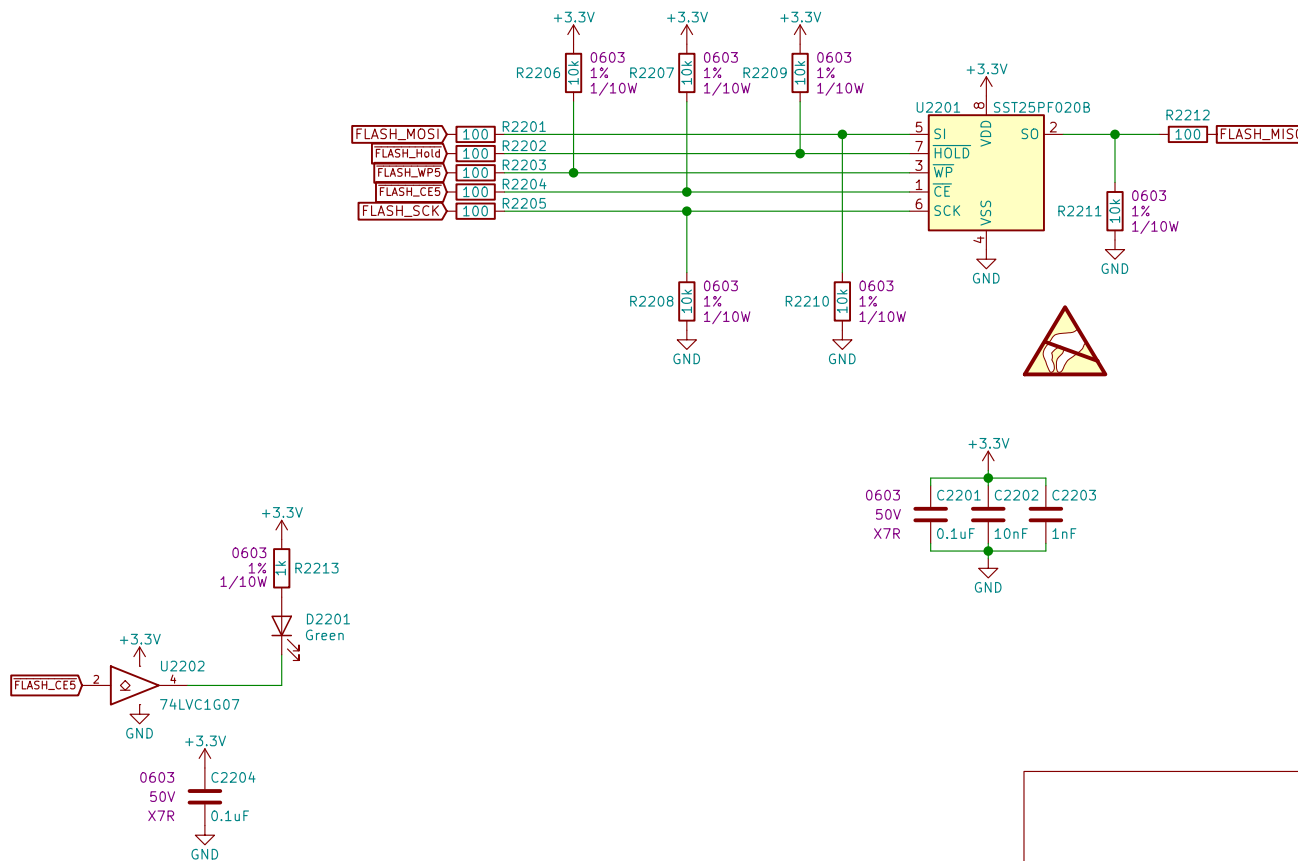
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Size: A	Date: 2018
KiCad E.D.A.	kicad (5.1.0)-1

Rev: A

Id: 21/32

22. External FLASH 5



Marquette University Senior Design 2018/2019 Group E44

Sheet: /External Flash 5/

File: External_Flash_5.sch

Title: Electronic Display Logic Board

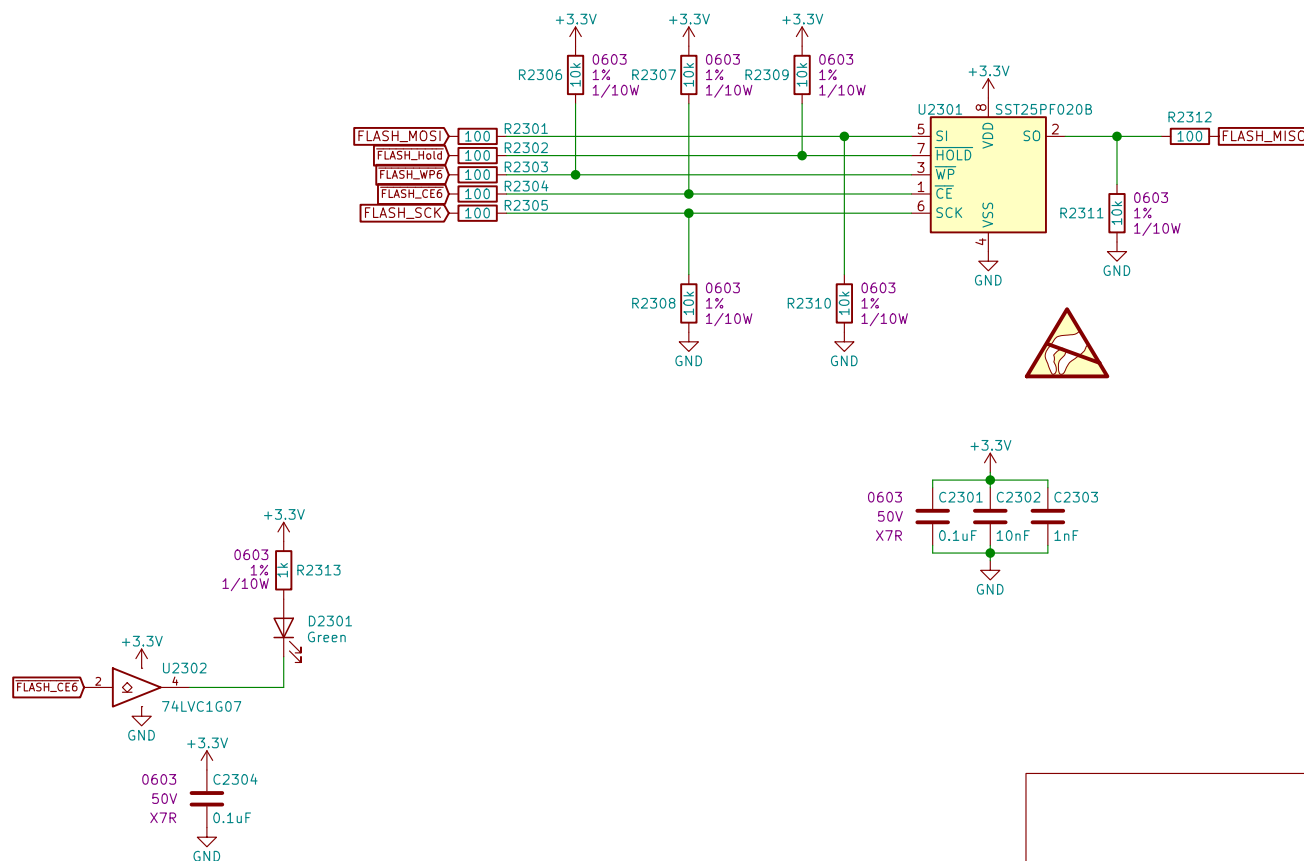
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KiCad E.D.A. kicad (5.1.0)-1

Rev: A

Id: 22/32

23. External FLASH 6



Marquette University Senior Design 2018/2019 Group E44

Sheet: /External Flash 6/

File: External_Flash_6.sch

Title: Electronic Display Logic Board

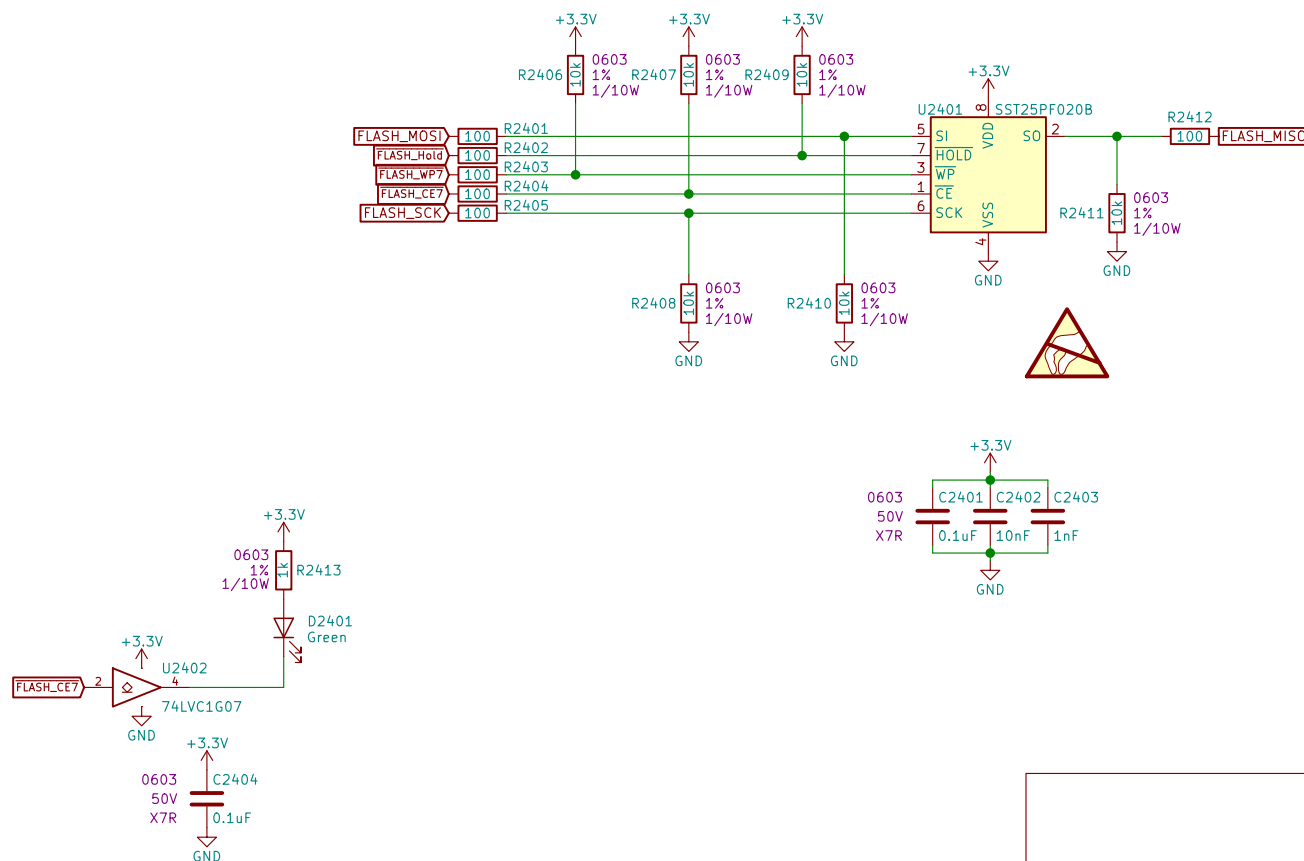
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KiCad E.D.A.	kicad (5.1.0)-1

Rev: A

Id: 23/32

24. External FLASH 7



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Sheet: /External Flash 7/

File: External_Flash_7.sch

Title: Electronic Display Logic Board

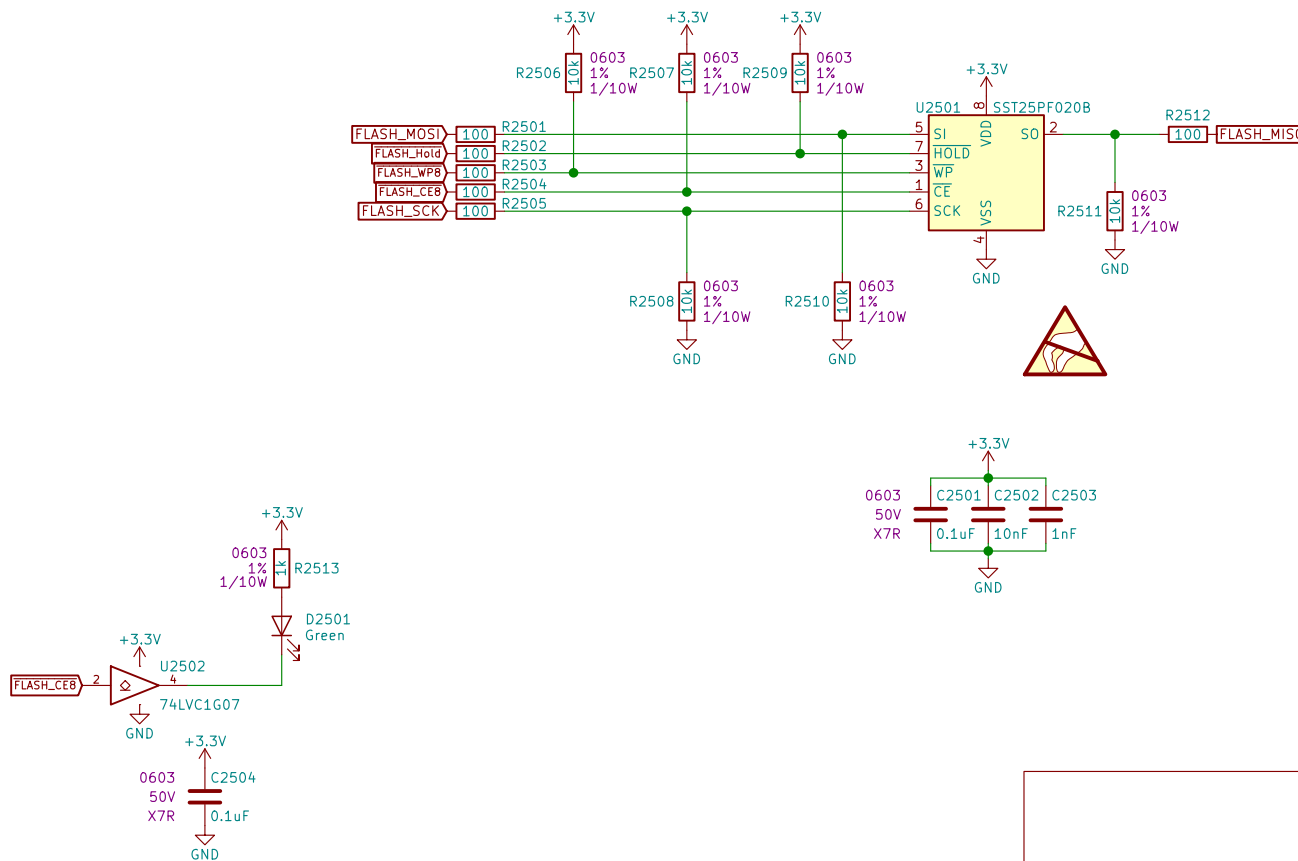
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Rev: A

Id: 24/32

25. External FLASH 8



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Sheet: /External Flash 8/

File: External_Flash_8.sch

Title: Electronic Display Logic Board

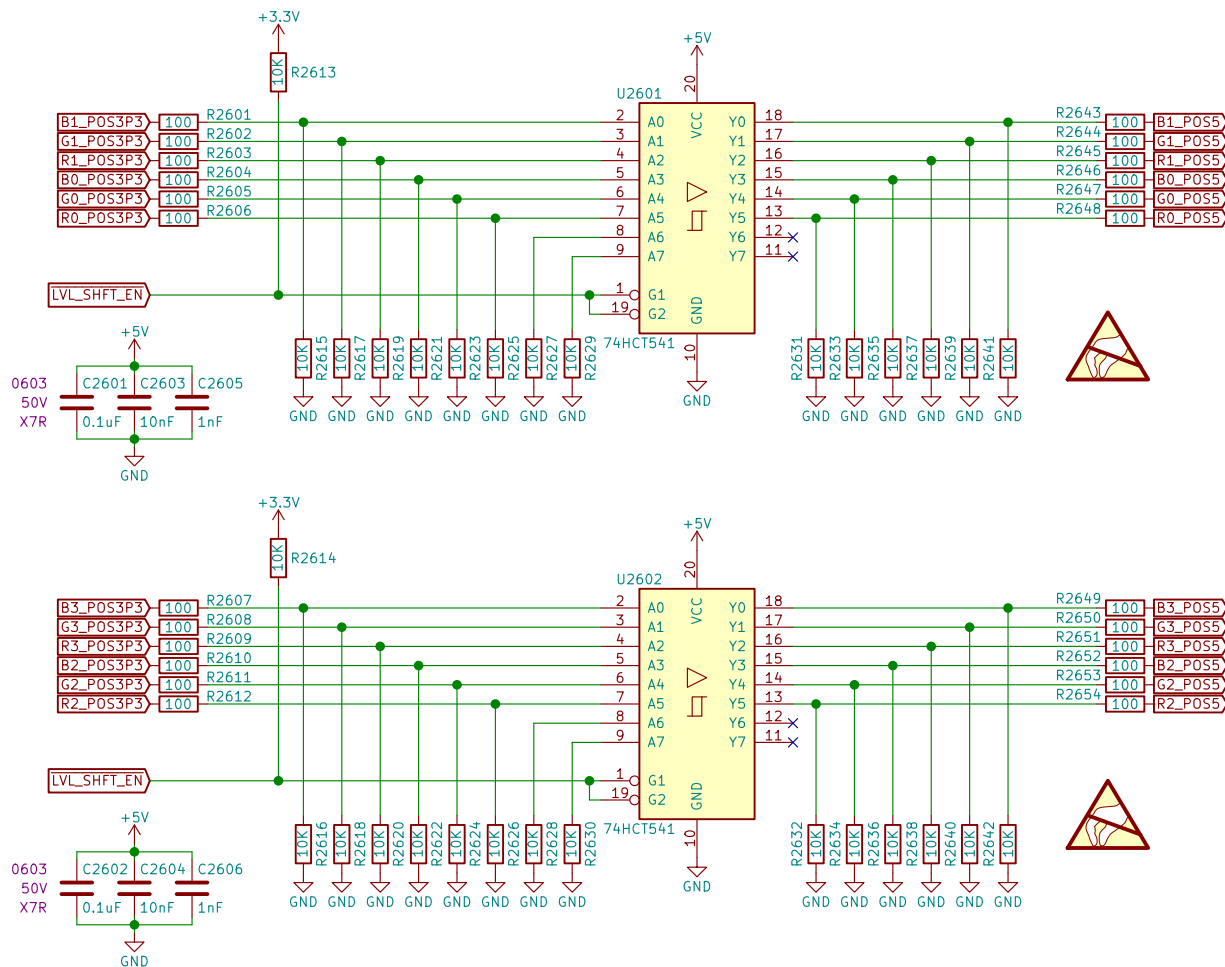
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Rev: A

Id: 25/32

26. Panel Data Level Shifters 1



Marquette University Senior Design 2018/2019 Group E44

Sheet: /Panel Data Level Shifters 1/

File: PanelData_LevelShifters_1.sch

Title: Electronic Display Logic Board

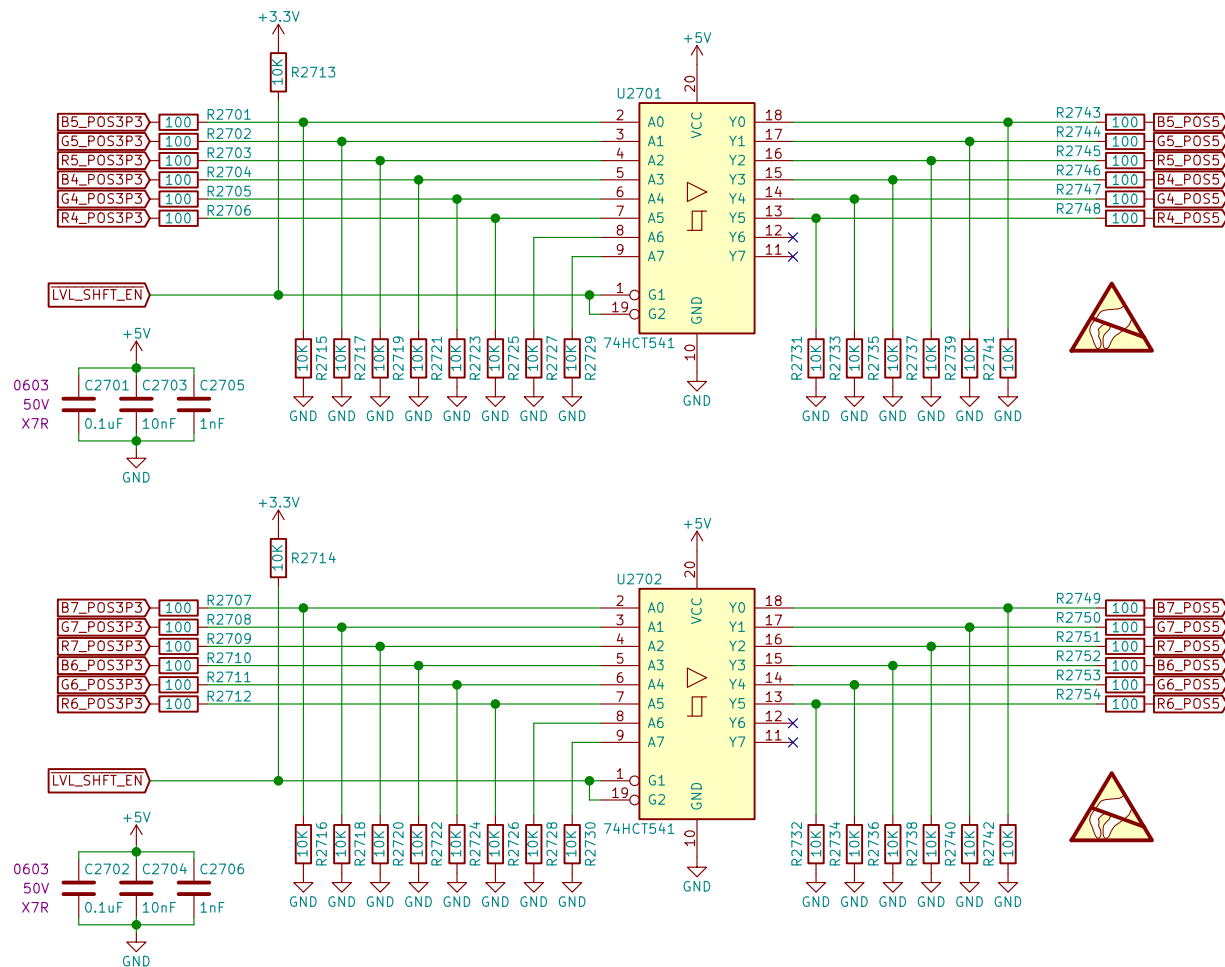
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Rev: A

Id: 26/32

27. Panel Data Level Shifters 2



Marquette University Senior Design 2018/2019 Group E44

Sheet: /Panel Data Level Shifters 2/

File: PanelData_LevelShifters_2.sch

Title: Electronic Display Logic Board

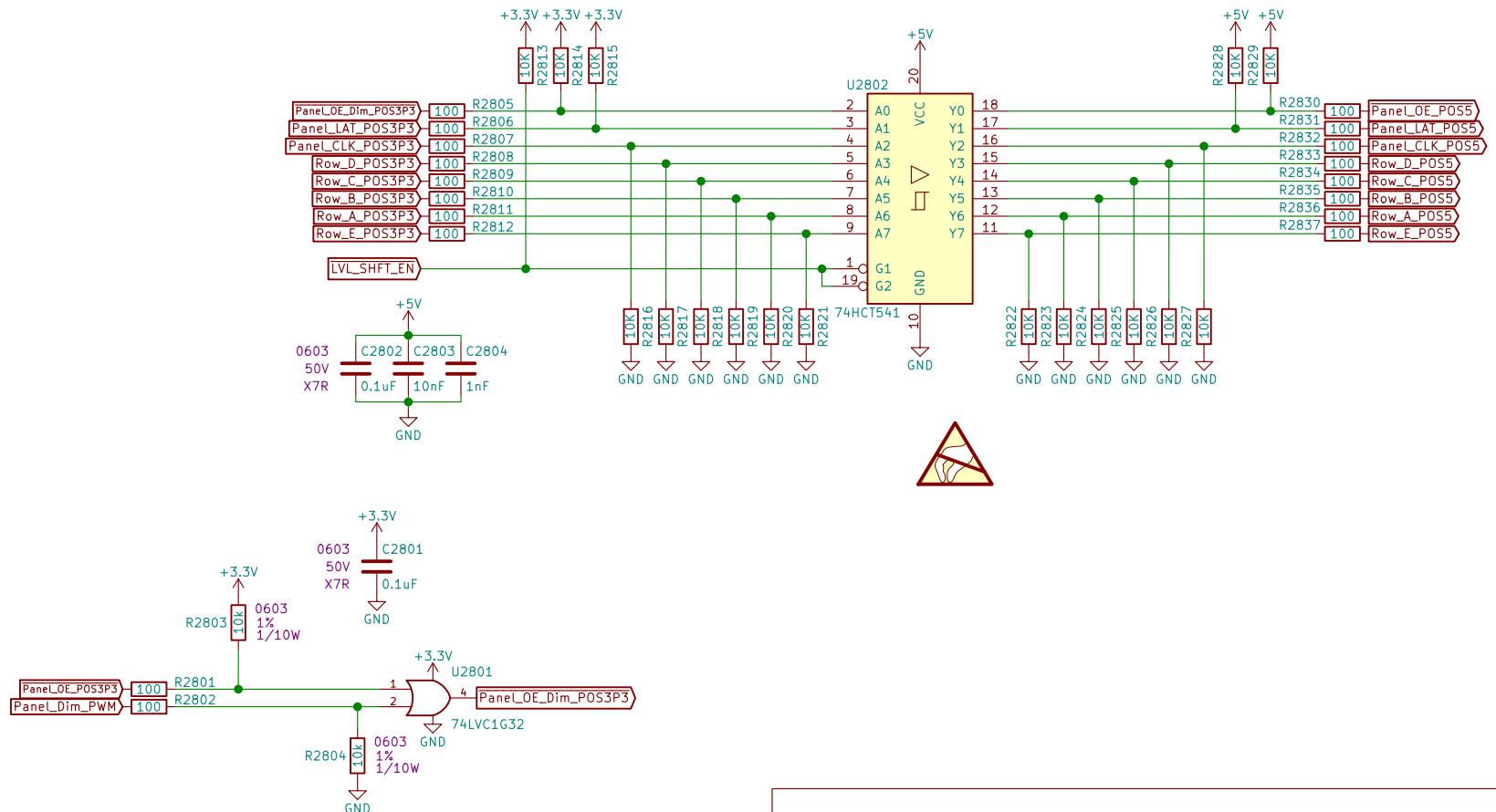
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KiCad E.D.A. kicad (5.1.0)-1

Rev: A

Id: 27/32

28. Panel Data Level Shifters 3



Marquette University Senior Design 2018/2019 Group E44

Sheet: /Panel Data Level Shifters 3/

File: PanelData_LevelShifters_3.sch

Title: Electronic Display Logic Board

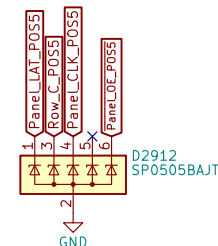
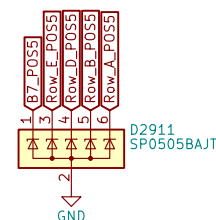
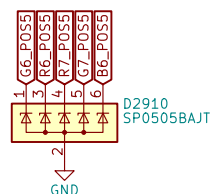
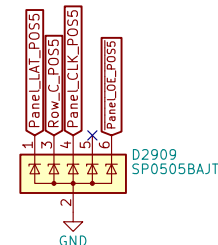
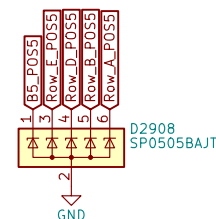
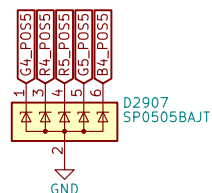
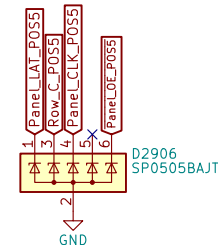
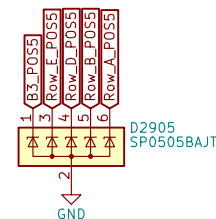
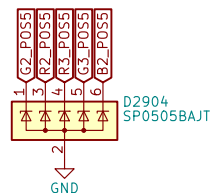
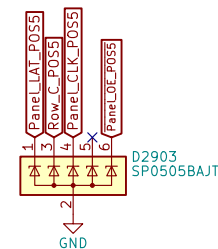
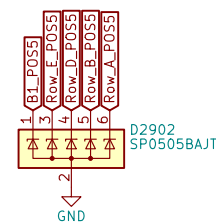
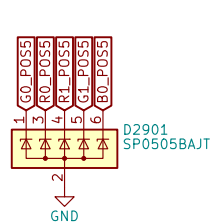
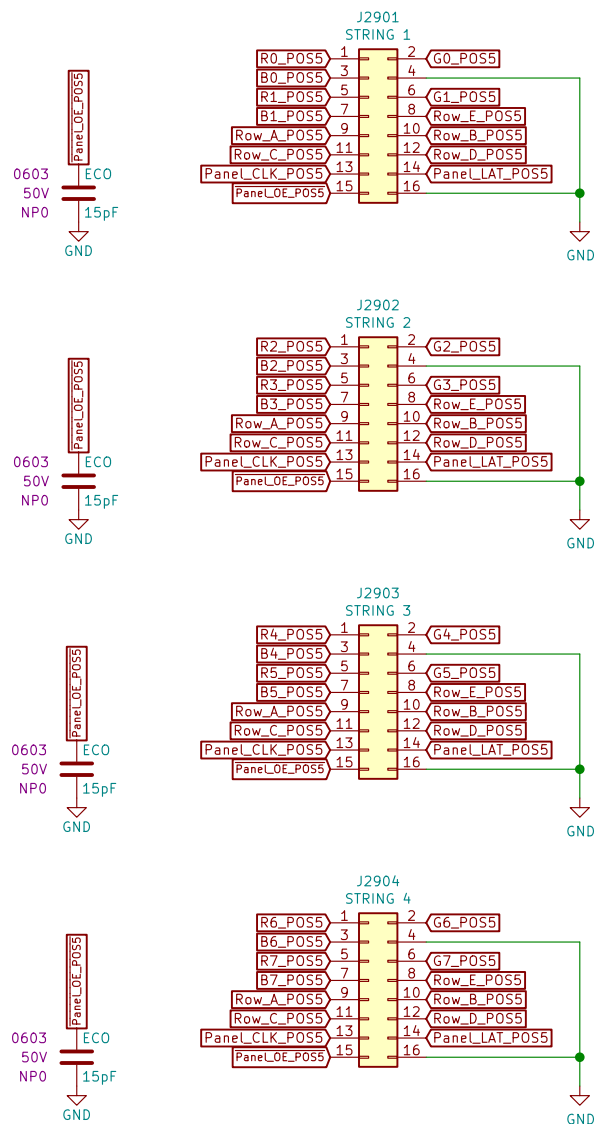
Size: A Date: 2018-12-15

KiCad E.D.A. kicad (5.1.0)-1

Rev: A

Id: 28/32

29. Panel Data Connectors



ECO 15pF caps added to slow down \overline{OE} rising edge

String 1 is the top string.
String 4 is the bottom string.
Each string is 5 panels long
Each panel is 64x64 pixels
This yields an overall 320x256 pixel display resolution

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Sheet: /Panel Data Connectors/
File: PanelData_Connectors.sch

Title: Electronic Display Logic Board

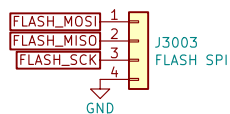
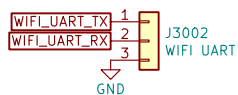
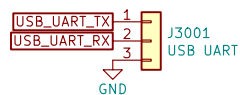
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KiCad E.D.A. kicad (5.1.0)-1

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30. Test Points



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Sheet: /Test Points/
File: Test_Points.sch

Title: Electronic Display Logic Board

Size: A Date: 2018-12-15
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Rev: A
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31. Mechanical



4-40 Standoff
MK3101



4-40 Standoff
MK3105



4-40 Standoff
MK3109



4-40 Standoff
MK3113



4-40 Standoff
MK3117



4-40 Standoff
MK3121



4-40 Standoff
MK3102



4-40 Standoff
MK3106



4-40 Standoff
MK3110



4-40 Standoff
MK3114



4-40 Standoff
MK3118



4-40 Standoff
MK3122



4-40 Screw
MK3103



4-40 Screw
MK3107



4-40 Screw
MK3111



4-40 Screw
MK3115



4-40 Screw
MK3119



4-40 Screw
MK3123



4-40 Screw
MK3104



4-40 Screw
MK3108



4-40 Screw
MK3112



4-40 Screw
MK3116



4-40 Screw
MK3120



4-40 Screw
MK3124



H3101
3mm Mounting Hole



H3103
3mm Mounting Hole



H3105
3mm Mounting Hole



H3107
3mm Mounting Hole



H3109
3mm Mounting Hole



H3111
3mm Mounting Hole



H3102
3mm Mounting Hole



H3104
3mm Mounting Hole



H3106
3mm Mounting Hole



H3108
3mm Mounting Hole



H3110
3mm Mounting Hole



H3112
3mm Mounting Hole



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Sheet: /Mechanical/
File: Mechanical.sch

Title: Electronic Display Logic Board

Size: A Date: 2018-12-15

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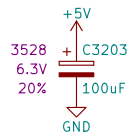
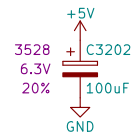
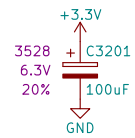
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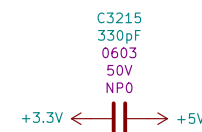
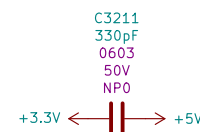
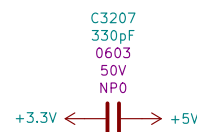
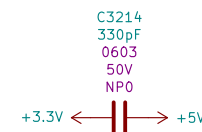
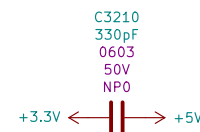
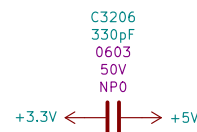
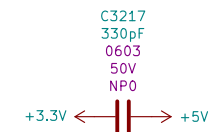
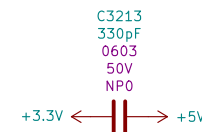
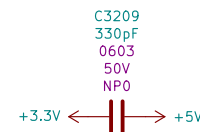
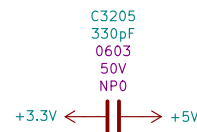
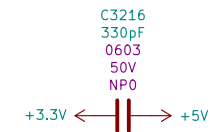
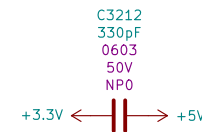
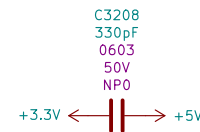
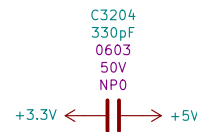
32. Additional Capacitance



Bulk Capacitors



Stitching Capacitors



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Sheet: /Additional Capacitance/

File: Additional_Capacitance.sch

Title: **Electronic Display Logic Board**

Size: A Date: 2018-12-15

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