

# Thermal Camera

[https://github.com/drewsum/THERMAL\\_Camera](https://github.com/drewsum/THERMAL_Camera)

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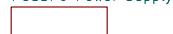
02. POS12 Input

POS12\_Input  


03. POS12 Telemetry

POS12 Telemetry  


04. POS3P0 Power Supply

POS3P0 Power Supply  


05. POS3P0 Telemetry

POS3P0 Telemetry  


B 06. POS1P8 Power Supply

POS1P8 Power Supply  


07. POS1P8 Telemetry

POS1P8 Telemetry  


08. POS2P8 Power Supply

POS2P8 Power Supply  


09. POS2P8 Telemetry

POS2P8 Telemetry  


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POS1P2 Power Supply  


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POS1P2 Telemetry  


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LCD Backlight Power Supply  


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LCD Backlight Telemetry  


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Battery Management  


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PIC32MZ DA Programming  


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PIC32MZ DA Clocking  


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PIC32MZ DA Power  


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PIC32MZ DA 2  


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External Storage  


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Status LEDs  


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Sheet: /

File: Thermal\_Camera.kicad\_sch

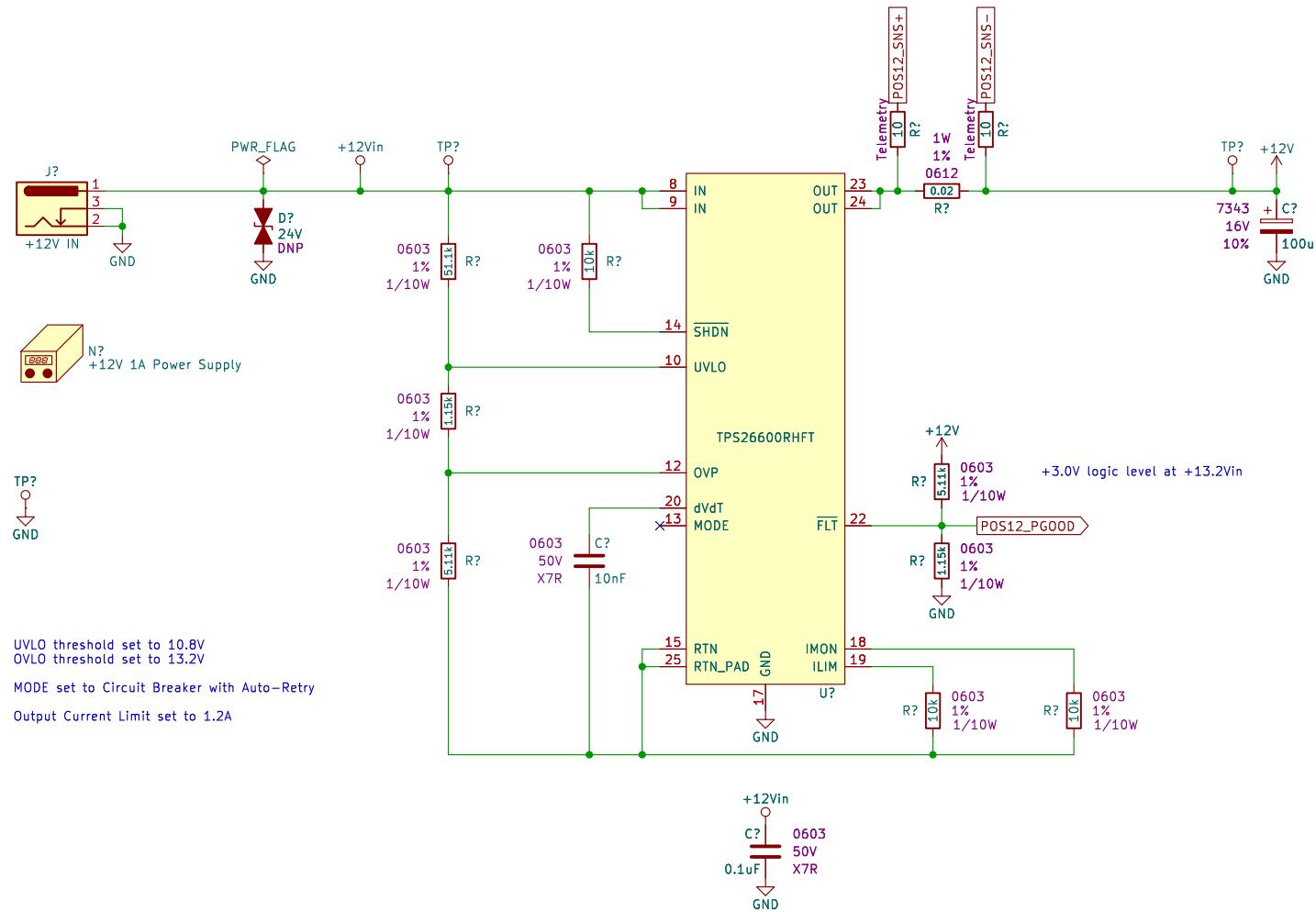
Title: Thermal Camera

Size: A Date: 2023-11-13

KiCad E.D.A. kicad 7.0.1

Rev: PRELIM

Id: 1/28



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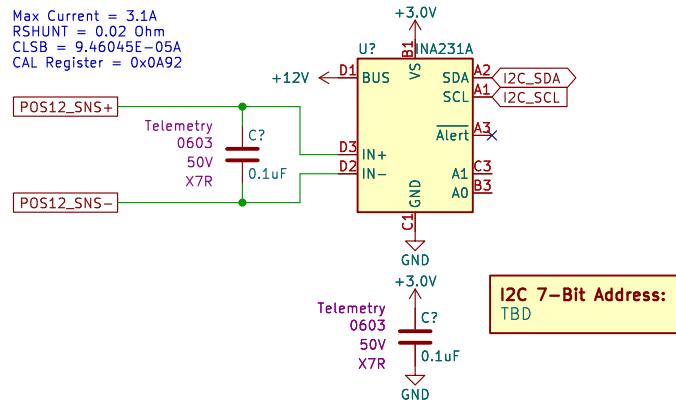
Sheet: /POS12\_Input/  
File: POS12\_Input.kicad\_sch

Title: Thermal Camera

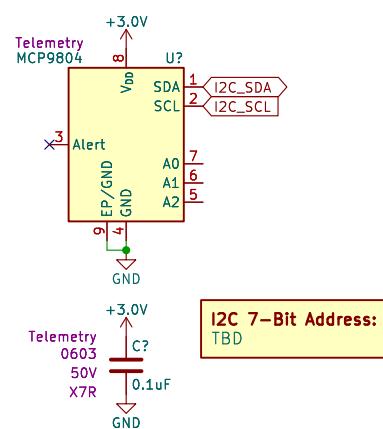
Size: A Date: 2023-11-13  
KiCad E.D.A. kicad 7.0.1

Rev: PRELIM  
Id: 2/28

A



B

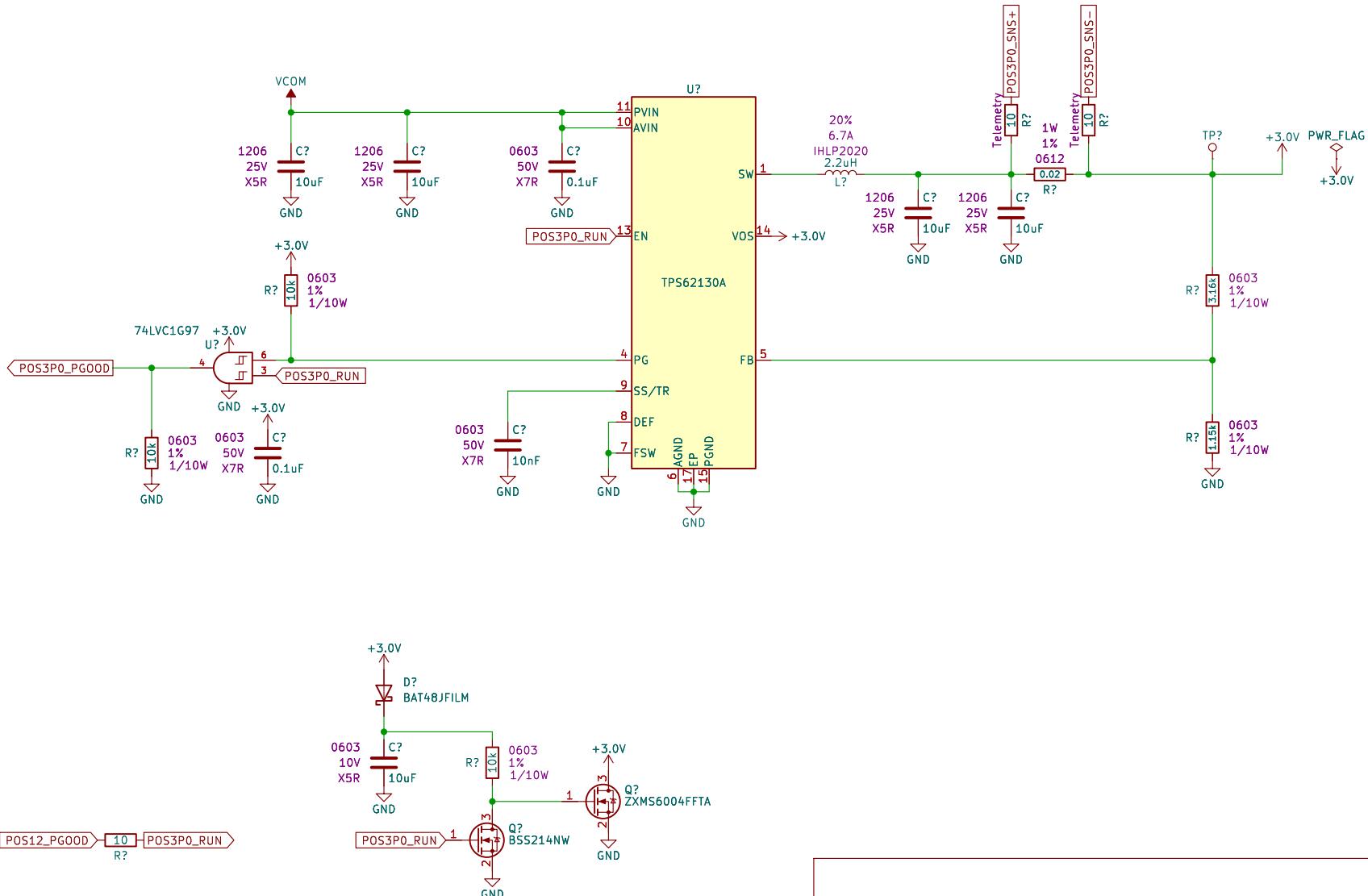


C

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Sheet: /POS12\_Telemetry/  
File: POS12\_Telemetry.kicad\_sch**Title: Thermal Camera**Size: A | Date: 2023-11-13  
KiCad E.D.A. kicad 7.0.1Rev: PRELIM  
Id: 3/28

# figure out sequencing



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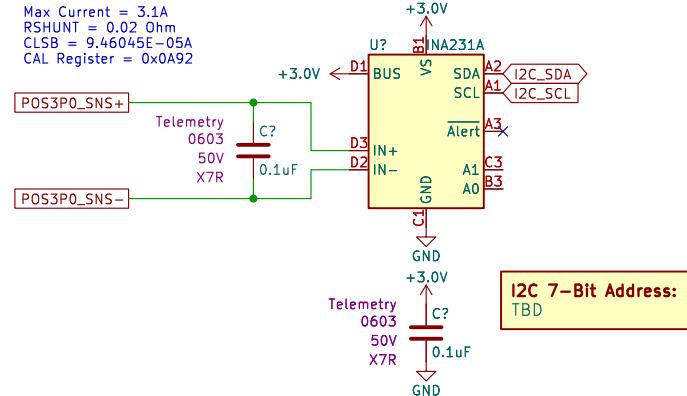
Sheet: /POS3P0 Power Supply/  
File: POS3P0\_Power\_Supply.kicad\_sch

Title: Thermal Camera

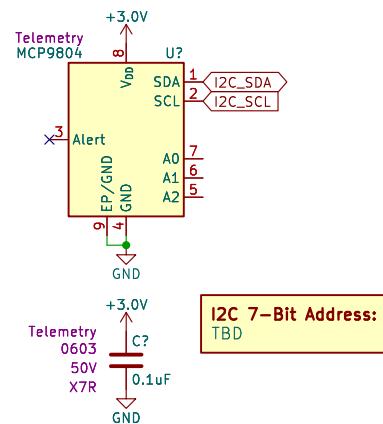
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KiCad E.D.A. kicad 7.0.1

Rev: PRELIM  
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A



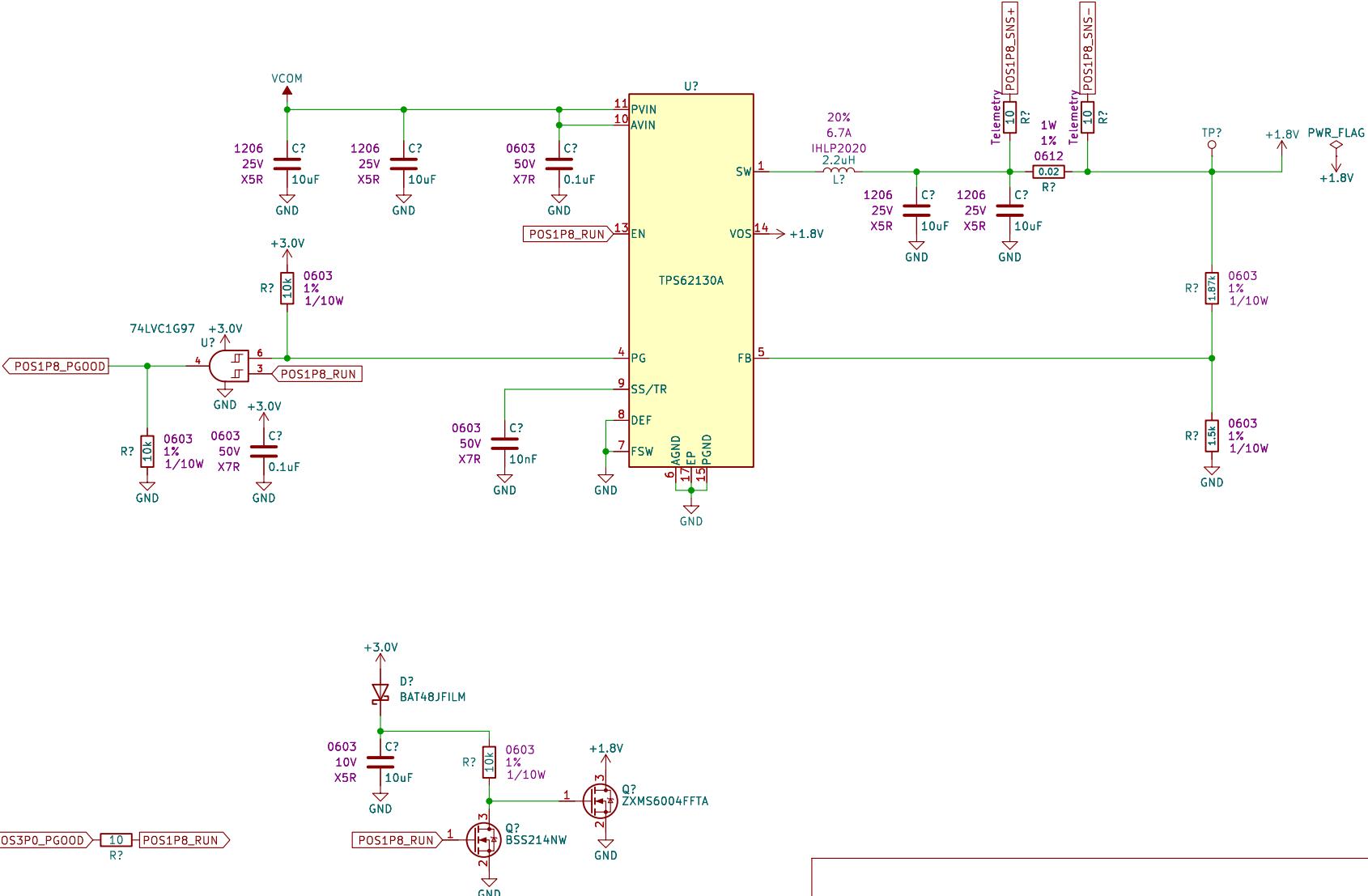
B



C

Drew Maatman and Michael Laffin

Sheet: /POS3PO\_Telemetry/  
File: POS3PO\_Telemetry.kicad\_sch**Title: Thermal Camera**Size: A | Date: 2023-11-13  
KiCad E.D.A. kicad 7.0.1Rev: PRELIM  
Id: 5/28



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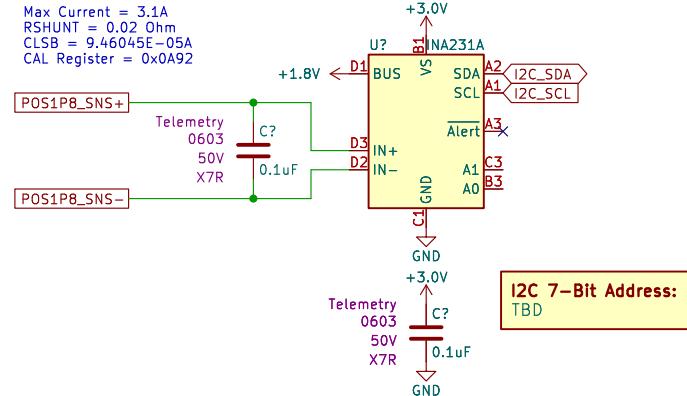
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File: POS1P8\_Power\_Supply.kicad\_sch

Title: Thermal Camera

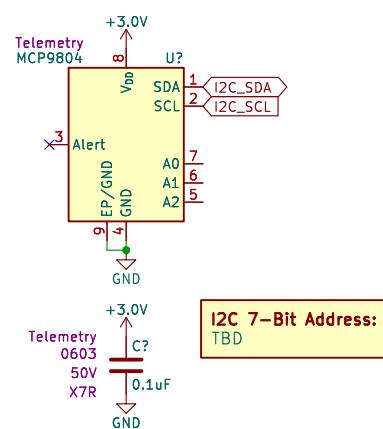
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KiCad E.D.A. kicad 7.0.1

Rev: PRELIM  
Id: 6/28

A



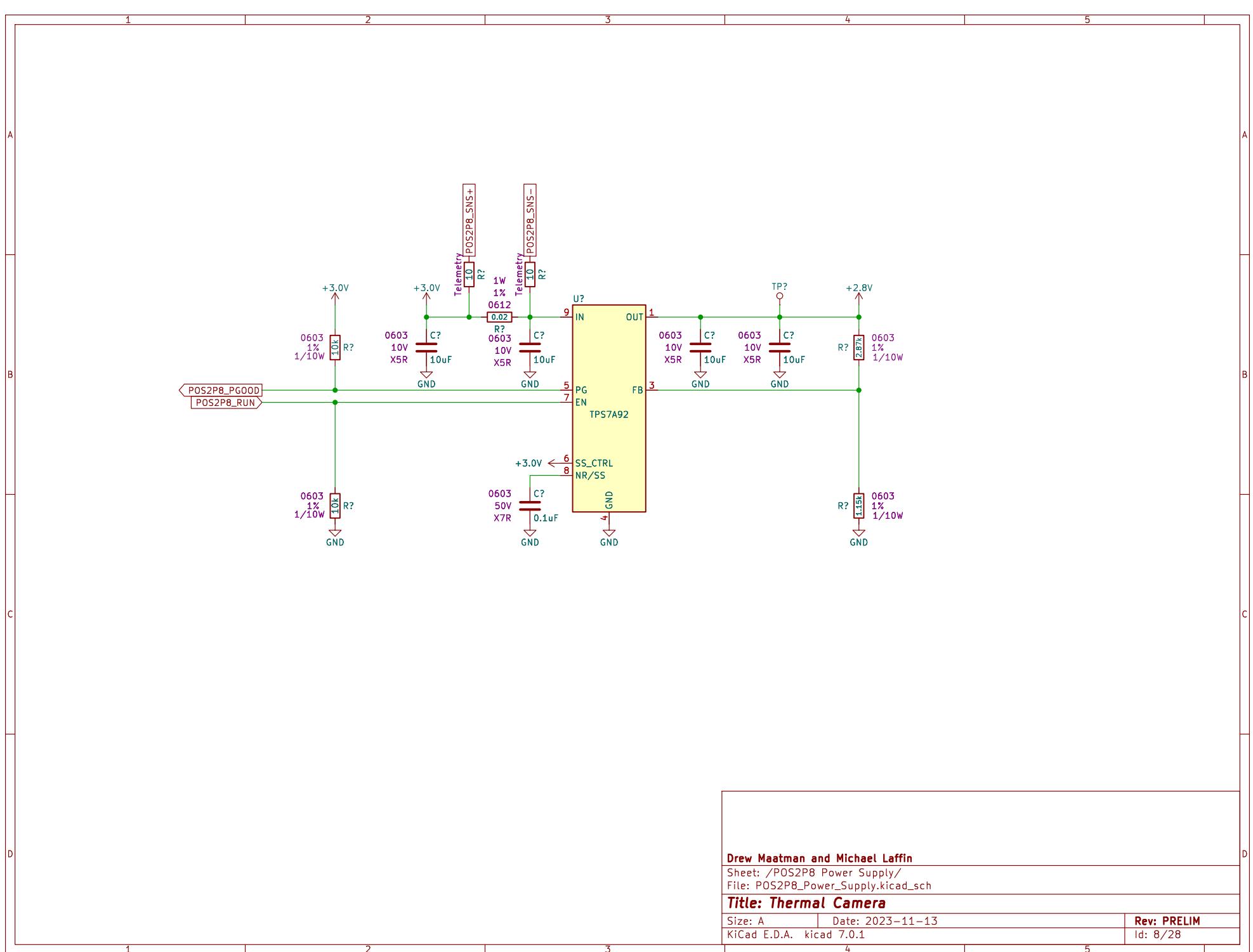
B



C

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Sheet: /POS1P8\_Telemetry/  
File: POS1P8\_Telemetry.kicad\_sch**Title: Thermal Camera**Size: A | Date: 2023-11-13  
KiCad E.D.A. kicad 7.0.1Rev: PRELIM  
Id: 7/28



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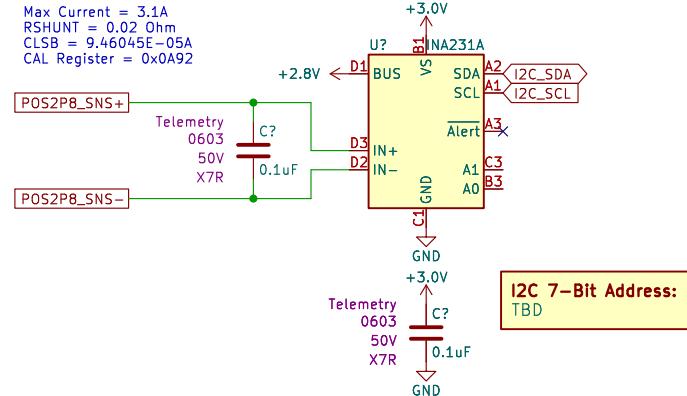
Sheet: /POS2P8 Power Supply/  
File: POS2P8\_Power\_Supply.kicad\_sch

**Title: Thermal Camera**

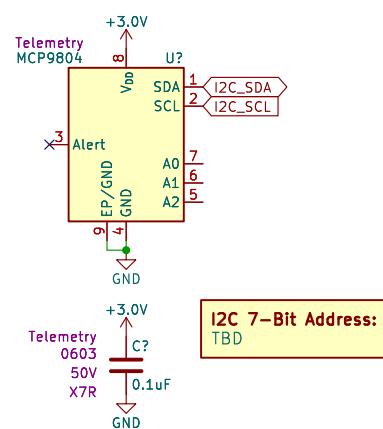
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KiCad E.D.A.	kicad 7.0.1

Rev: PRELIM
Id: 8/28

A



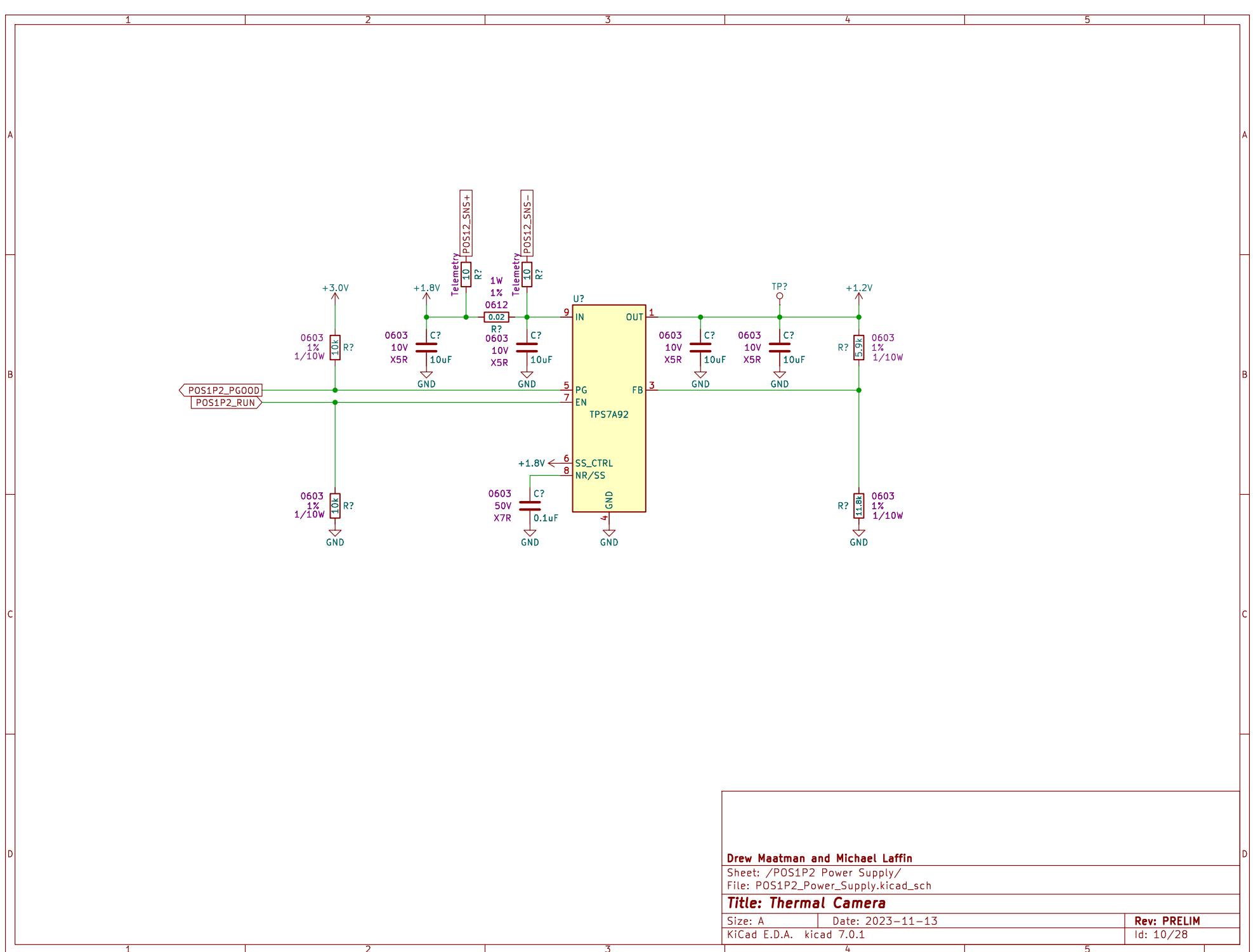
B



C

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Sheet: /POS2P8\_Telemetry/  
File: POS2P8\_Telemetry.kicad\_sch**Title: Thermal Camera**Size: A | Date: 2023-11-13  
KiCad E.D.A. kicad 7.0.1Rev: PRELIM  
Id: 9/28



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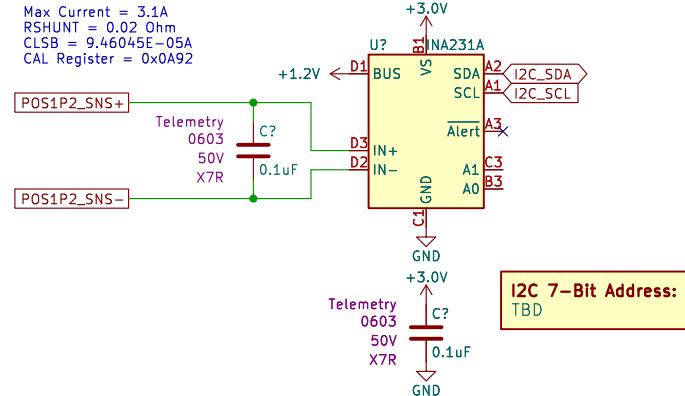
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File: POS1P2\_Power\_Supply.kicad\_sch

**Title: Thermal Camera**

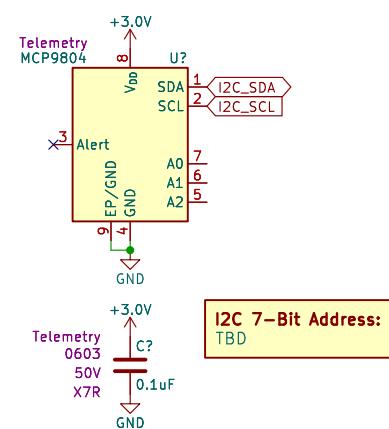
Size: A	Date: 2023-11-13
KiCad E.D.A.	kicad 7.0.1

Rev: PRELIM
Id: 10/28

A



B



C

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Sheet: /POS1P2\_Telemetry/  
File: POS1P2\_Telemetry.kicad\_sch**Title: Thermal Camera**

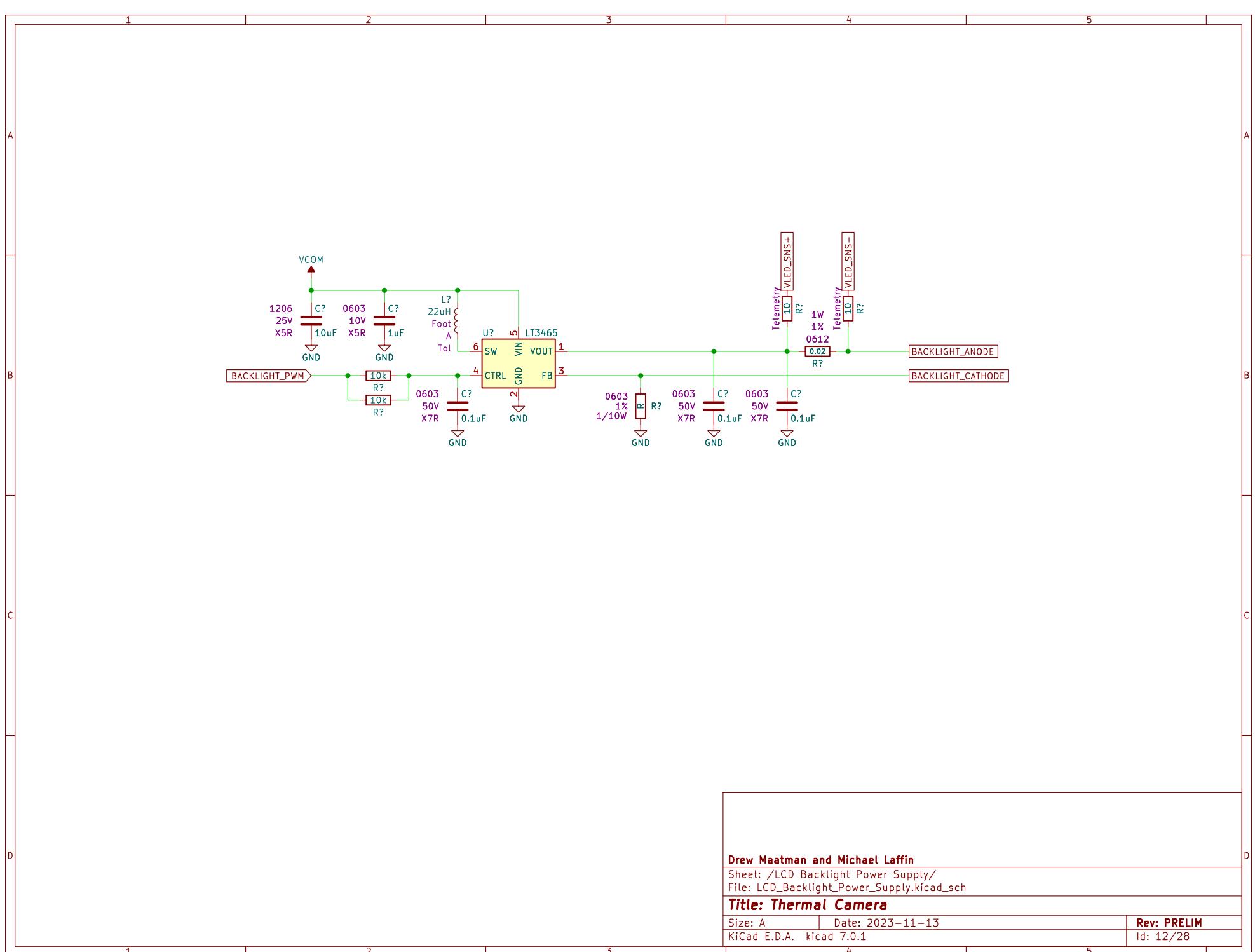
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KiCad E.D.A. kicad 7.0.1

Rev: PRELIM

Id: 11/28

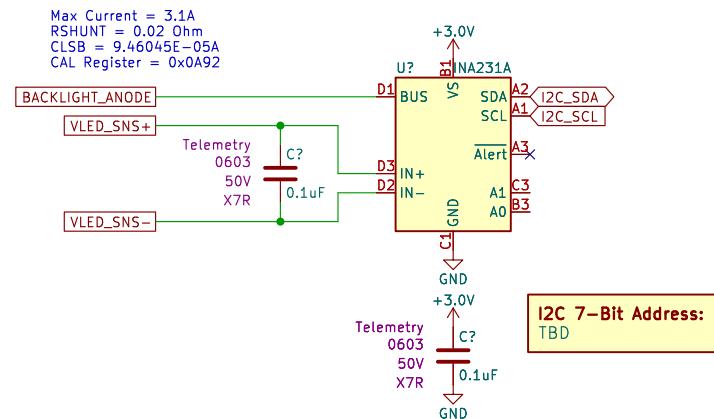
1 2 3 4 5



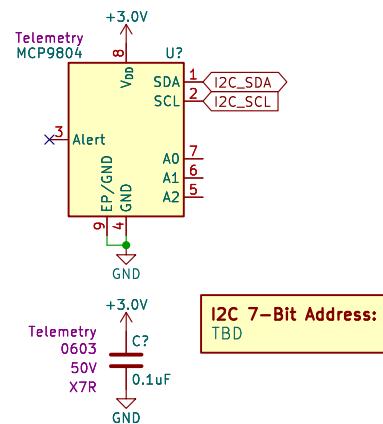
Drew Maatman and Michael Laffin  
Sheet: /LCD Backlight Power Supply/  
File: LCD\_Backlight\_Power\_Supply.kicad\_sch  
**Title: Thermal Camera**  
Size: A Date: 2023-11-13  
KiCad E.D.A. kicad 7.0.1 Rev: PRELIM  
Id: 12/28

1 2 3 4 5

A



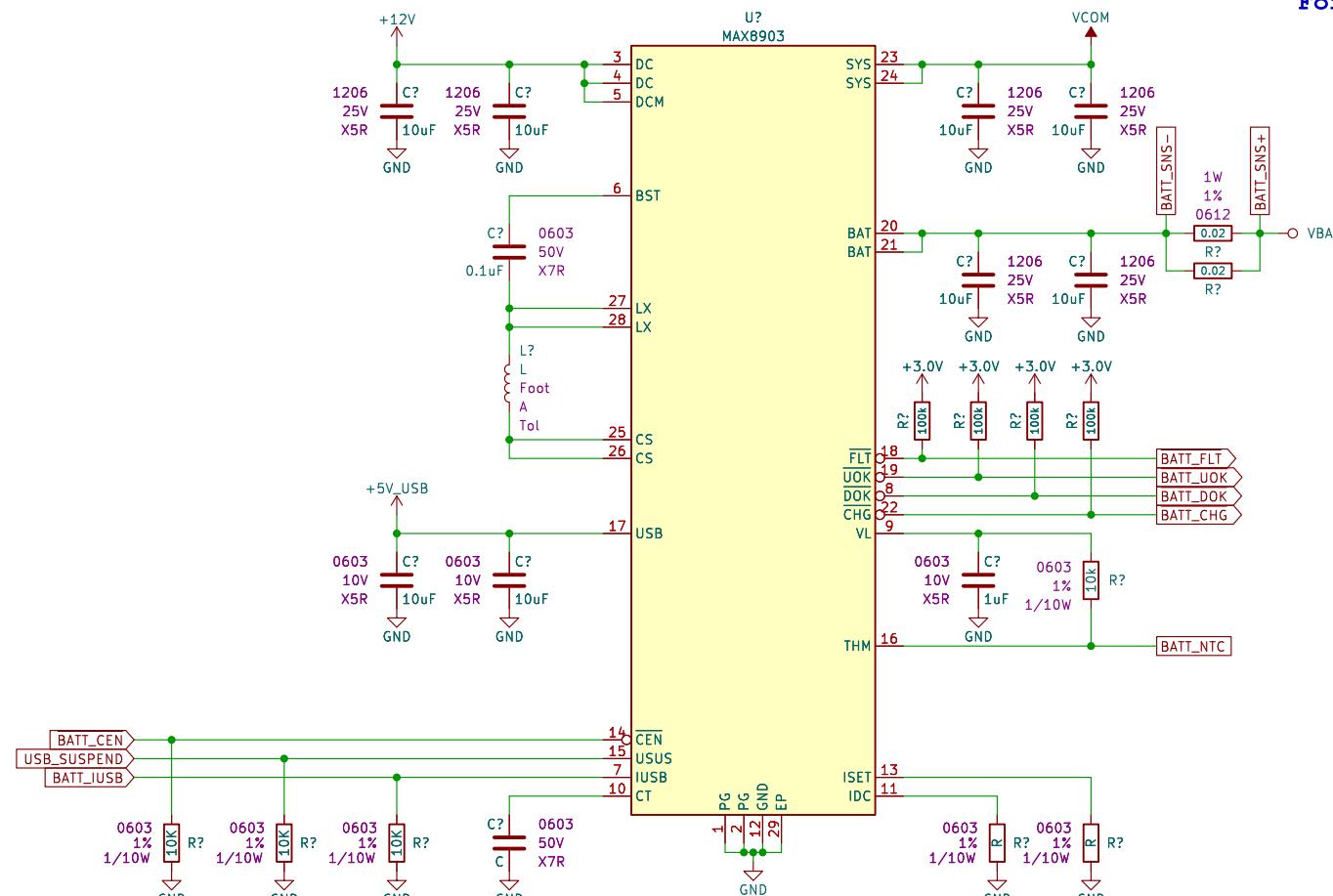
B



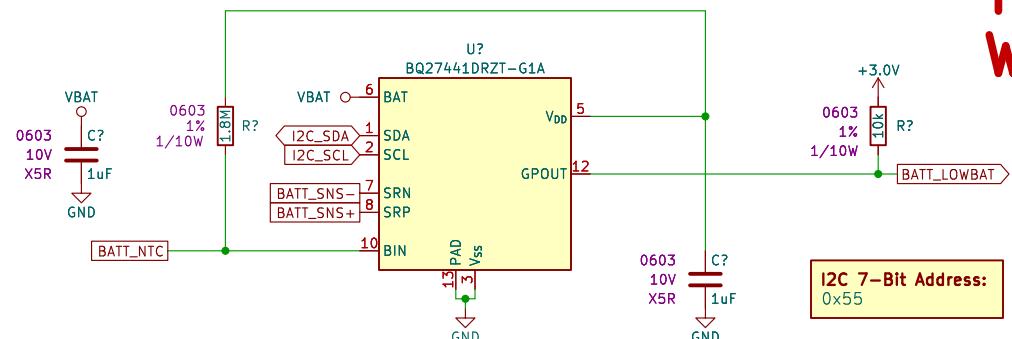
C

Drew Maatman and Michael Laffin

Sheet: /LCD Backlight Telemetry/  
File: LCD\_Backlight\_Telemetry.kicad\_sch**Title: Thermal Camera**Size: A | Date: 2023-11-13  
KiCad E.D.A. kicad 7.0.1Rev: PRELIM  
Id: 13/28



This fuel gauge is sketchy  
Want to find battery with NTC



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Sheet: /Battery Management/

File: Battery\_Management.kicad

## Title: Thermal Camera

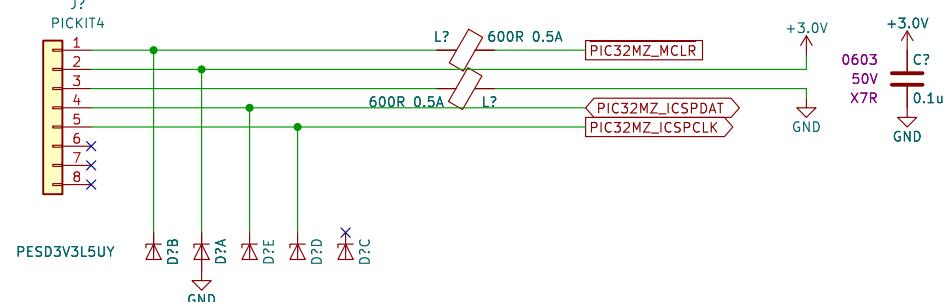
KiCad EDA - KiCad 7.0.1

— 5 —

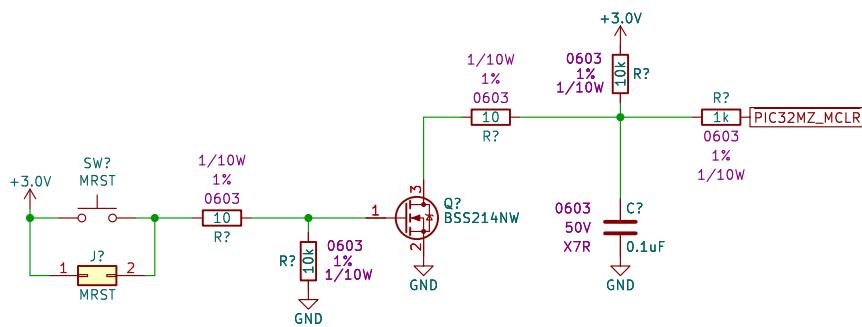
Rev: PRELIM  
Id: 14-138

1 2 3 4 5

A



B



C

D

Drew Maatman and Michael Laffin

Sheet: /PIC32MZ\_DA\_Programming/  
File: PIC32MZ\_DA\_Programming.kicad\_sch

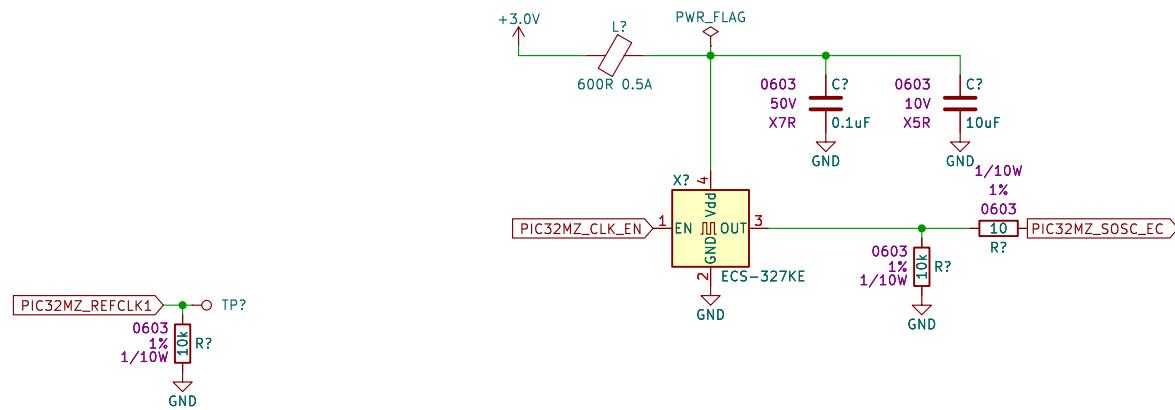
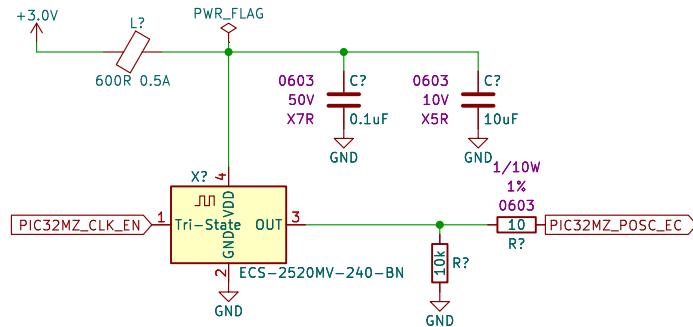
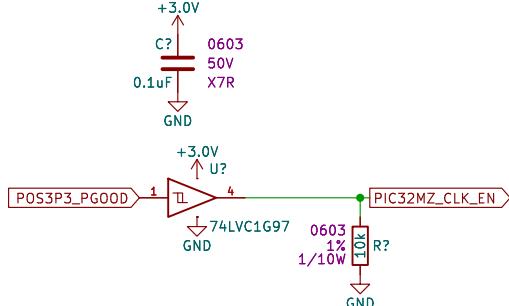
**Title: Thermal Camera**

Size: A Date: 2023-11-13  
KiCad E.D.A. kicad 7.0.1

Rev: PRELIM  
Id: 15/28

1 2 3 4 5

# COPIED FROM PIC32MZ EF FIX FOR PIC32MZ DA



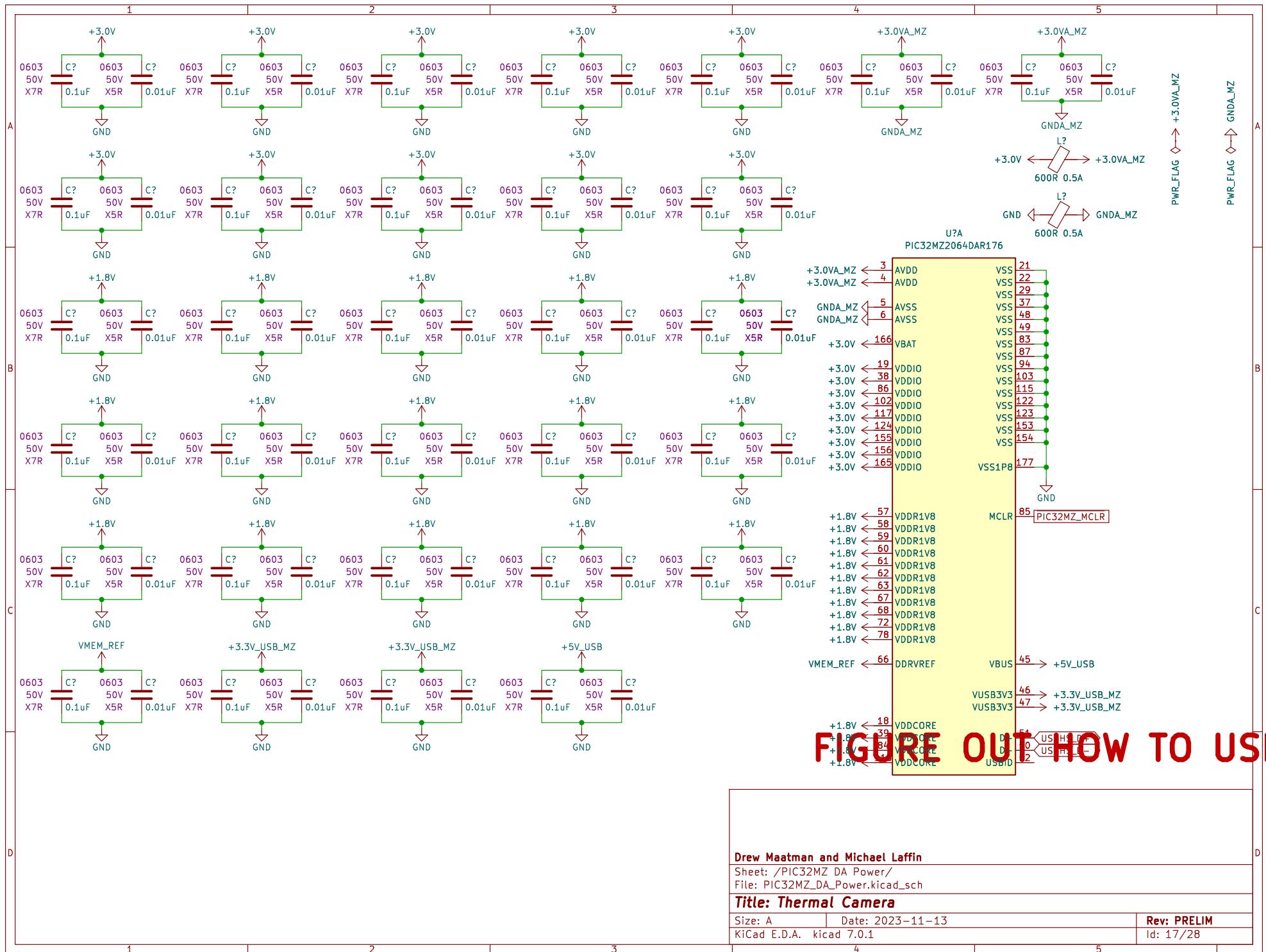
Drew Maatman and Michael Laffin

Sheet: /PIC32MZ DA Clocking/  
File: PIC32MZ\_DA\_Clocking.kicad\_sch

Title: Thermal Camera

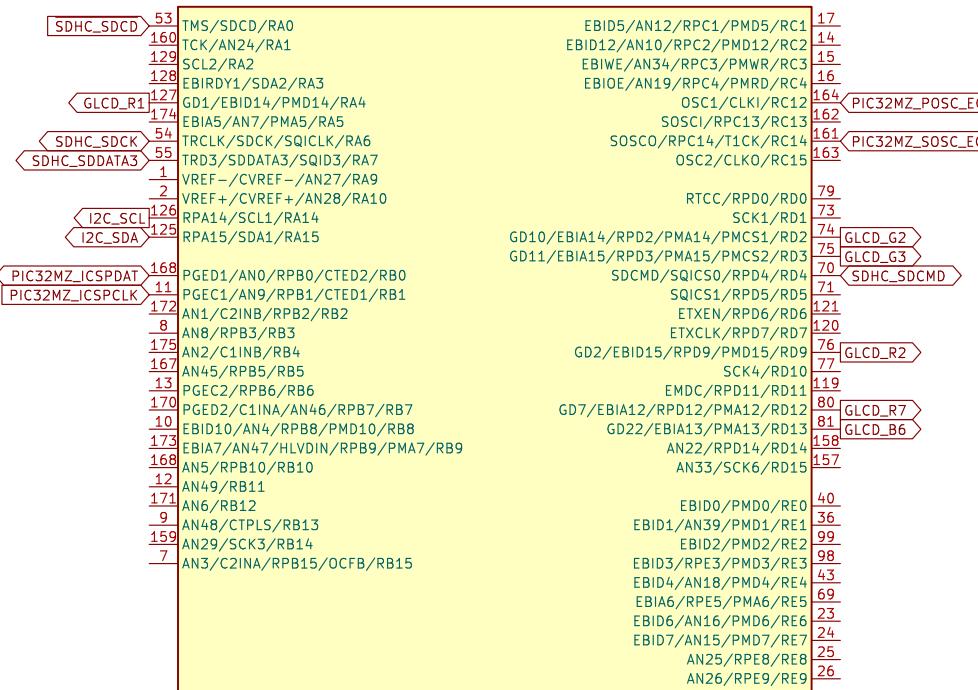
Size: A Date: 2023-11-13  
KiCad E.D.A. kicad 7.0.1

Rev: PRELIM  
Id: 16/28

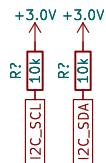


See TABLE 36-1:RGB COLOR MAPPING for Graphic LCD Pin Mapping

U?B  
PIC32MZ2064DAR176



DOUBLE CHECK  
SOSC PIN



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Sheet: /PIC32MZ\_DA\_1/  
File: PIC32MZ\_DA\_1.kicad\_sch

Title: Thermal Camera

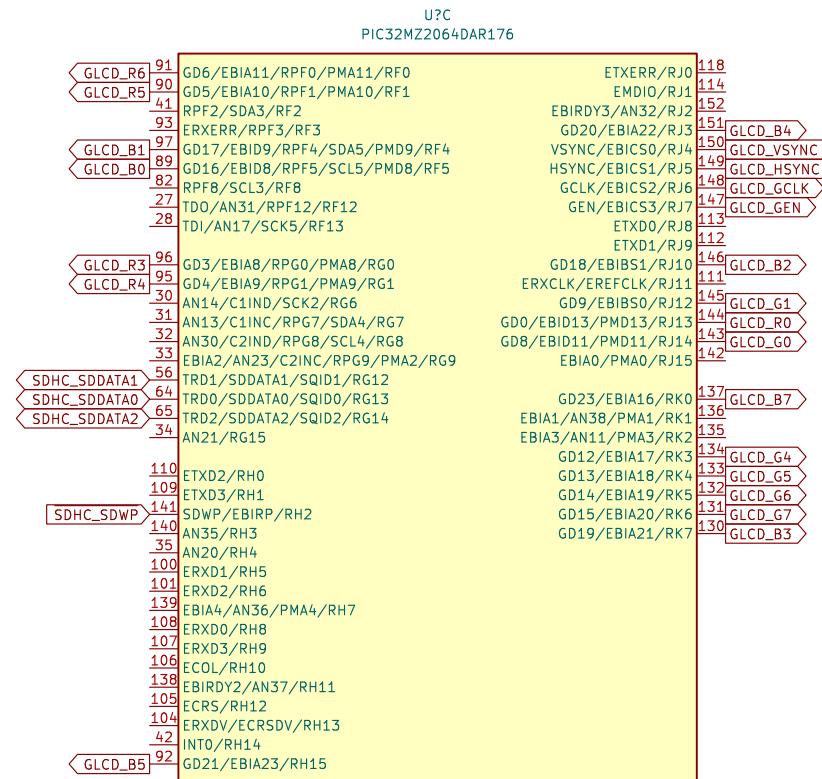
Size: A Date: 2023-11-13  
KiCad E.D.A. kicad 7.0.1

Rev: PRELIM  
Id: 18/28

See TABLE 36-1:RGB COLOR MAPPING for Graphic LCD Pin Mapping

A

A



B

B

C

C

D

D

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Sheet: /PIC32MZ\_DA\_2/

File: PIC32MZ\_DA\_2.kicad\_sch

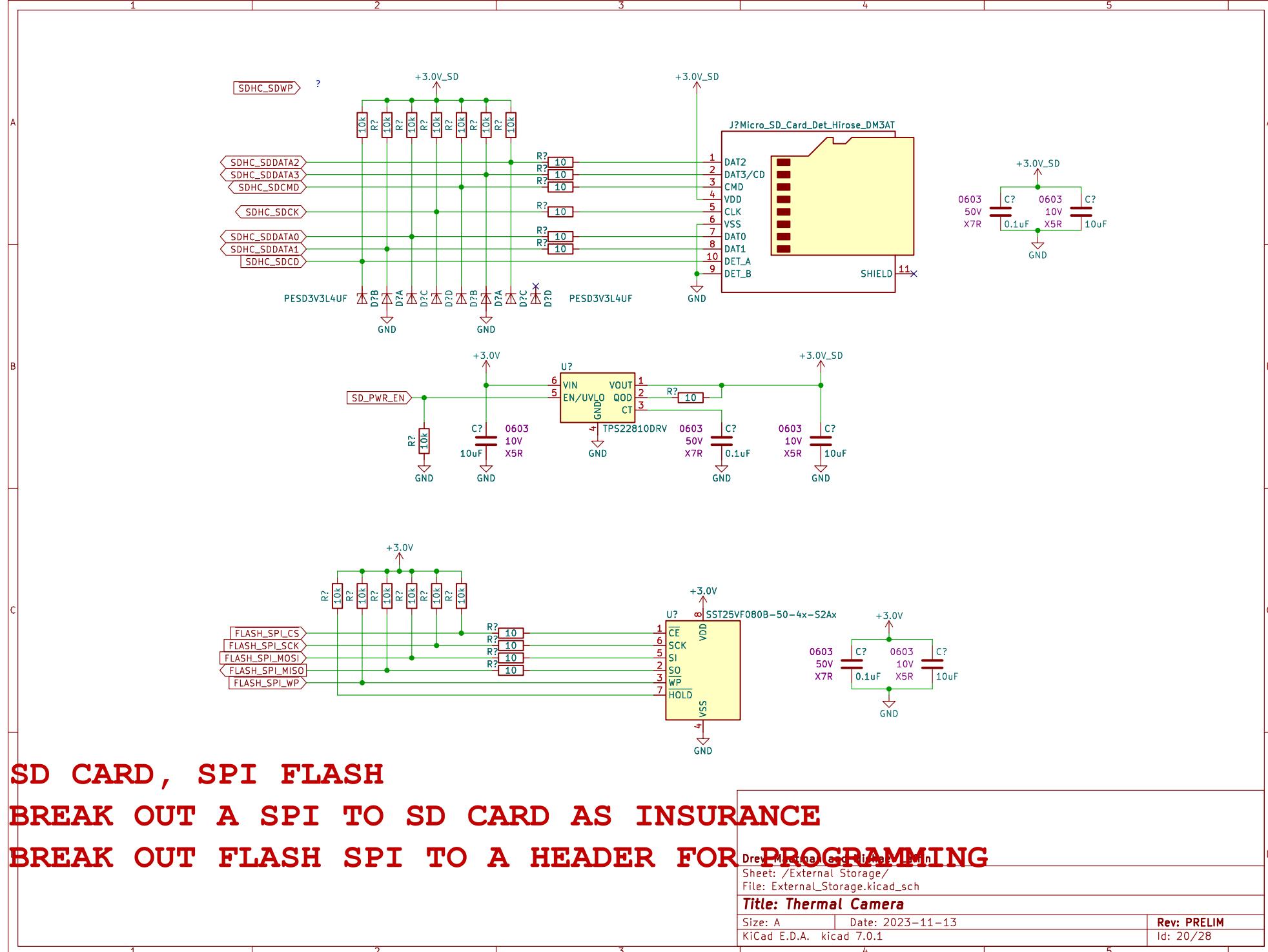
**Title: Thermal Camera**

Size: A Date: 2023-11-13

KiCad E.D.A. kicad 7.0.1

Rev: PRELIM

Id: 19/28



**SD CARD, SPI FLASH**

**BREAK OUT A SPI TO SD CARD AS INSURANCE**

**BREAK OUT FLASH SPI TO A HEADER FOR PROGRAMMING**

Drew Martin - drew.martin@minnstate.edu

Sheet: /External Storage/

File: External\_Storage.kicad\_sch

Title: Thermal Camera

Size: A Date: 2023-11-13

KiCad E.D.A. kicad 7.0.1

Rev: PRELIM

Id: 20/28

A

GLCD\_VSYNC  
GLCD\_HSYNC  
GLCD\_GCLK  
GLCD\_GEN

A

GLCD\_R0  
GLCD\_R1  
GLCD\_R2  
GLCD\_R3  
GLCD\_R4  
GLCD\_R5  
GLCD\_R6  
GLCD\_R7

B

GLCD\_G0  
GLCD\_G1  
GLCD\_G2  
GLCD\_G3  
GLCD\_G4  
GLCD\_G5  
GLCD\_G6  
GLCD\_G7

B

GLCD\_B0  
GLCD\_B1  
GLCD\_B2  
GLCD\_B3  
GLCD\_B4  
GLCD\_B5  
GLCD\_B6  
GLCD\_B7

C

C

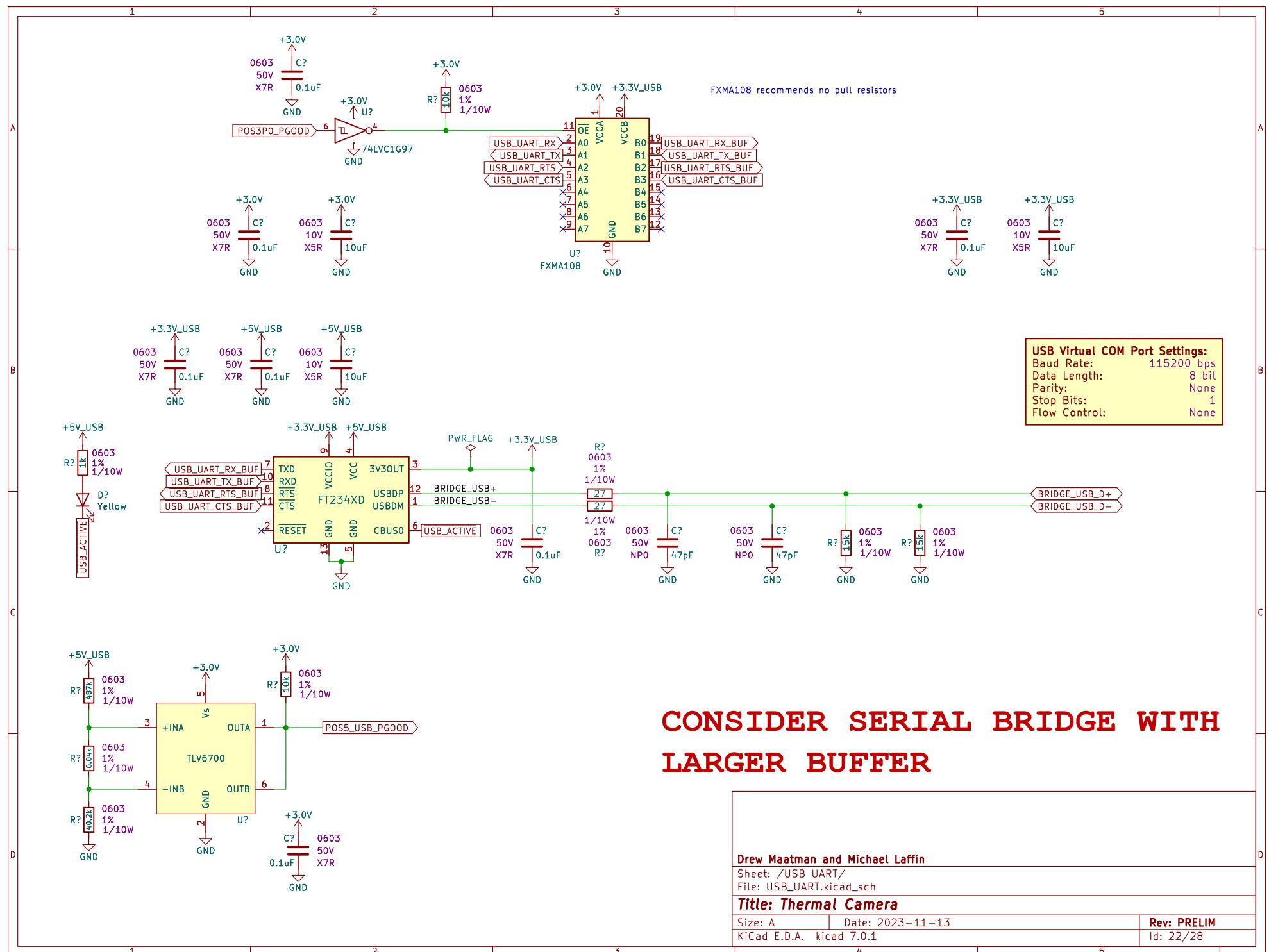
Drew Maatman and Michael Laffin

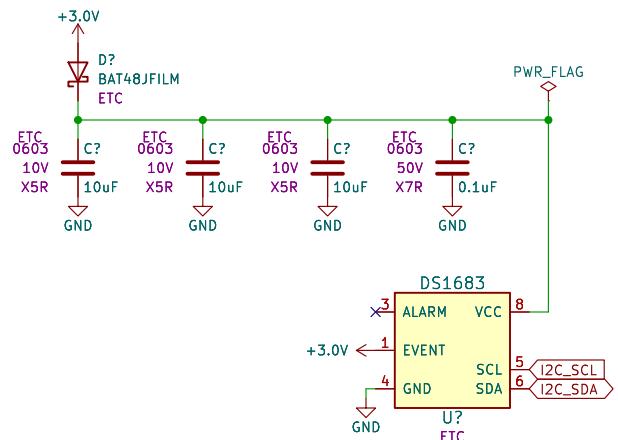
Sheet: /Graphic LCD/  
File: Graphic\_LCD.kicad\_sch

**Title: Thermal Camera**

Size: A | Date: 2023-11-13  
KiCad E.D.A. kicad 7.0.1

**Rev: PRELIM**  
Id: 21/28





**I2C 7-Bit Address:**  
0x6B

Drew Maatman and Michael Laffin

Sheet: /Elapsed Time Counter/  
File: Elapsed\_Time\_Counter.kicad\_sch

**Title: Thermal Camera**

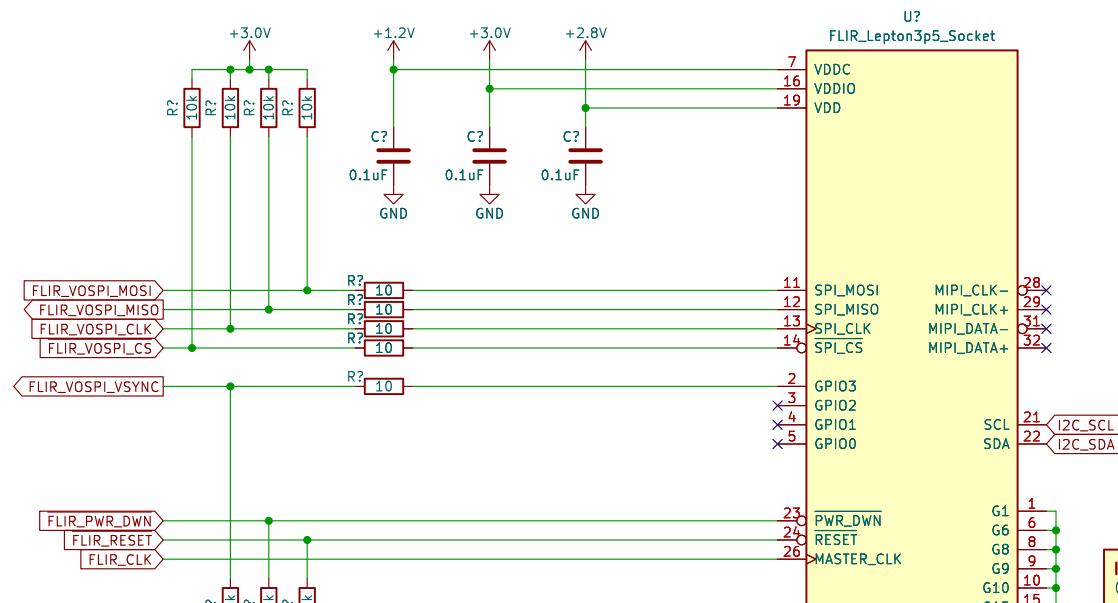
Size: A	Date: 2023-11-13
KiCad E.D.A.	kicad 7.0.1

Rev: PRELIM
Id: 23/28

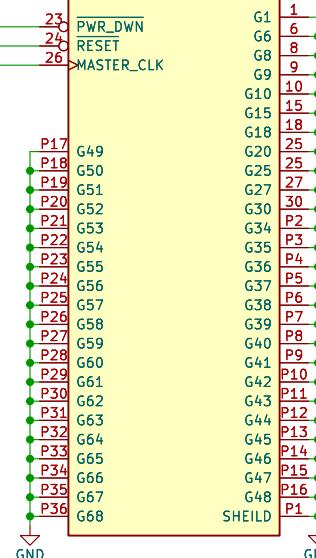
1 2 3 4 5

**Power Supply Considerations:**  
 VDDC: 1.20V (1.14V min, 1.26V max), 50mVpp max ripple, 110mA max draw  
 VDD: 2.80V (2.72V min, 2.88V max), 30mVpp max ripple, 16mA max draw  
 VDDIO: 2.8V min, 3.1V max, 50mVpp max ripple, 310mA max draw

A



B

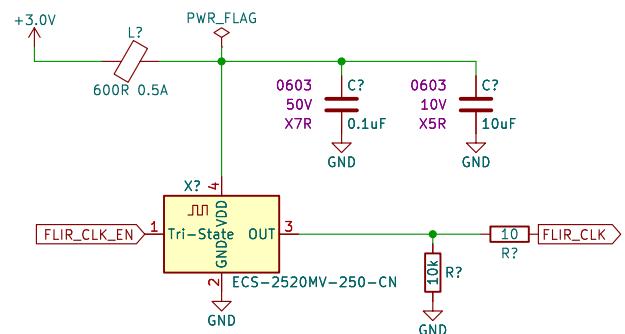


I2C 7-Bit Address:  
0x2A

See FLIR document #110-0144-04 for I2C register map



D



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Sheet: /FLIR Lepton Sensor/  
File: FLIR\_Lepton\_Sensor.kicad\_sch

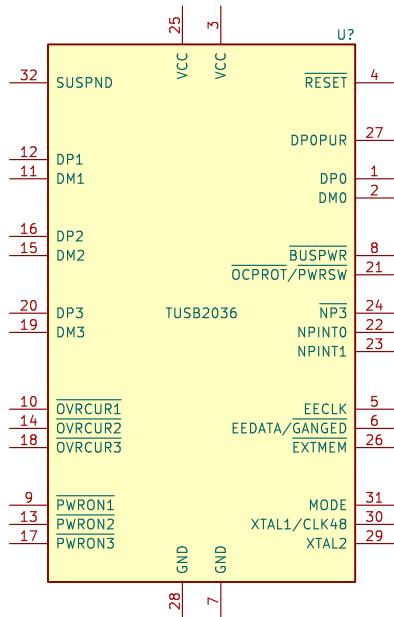
**Title: Thermal Camera**

Size: A | Date: 2023-11-13  
KiCad E.D.A. kicad 7.0.1

Rev: PRELIM  
Id: 24/28

1 2 3 4 5

# CONSIDER CHANGING TO TUSB2046



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Sheet: /USB\_Hub/  
File: USB\_Hub.kicad\_sch

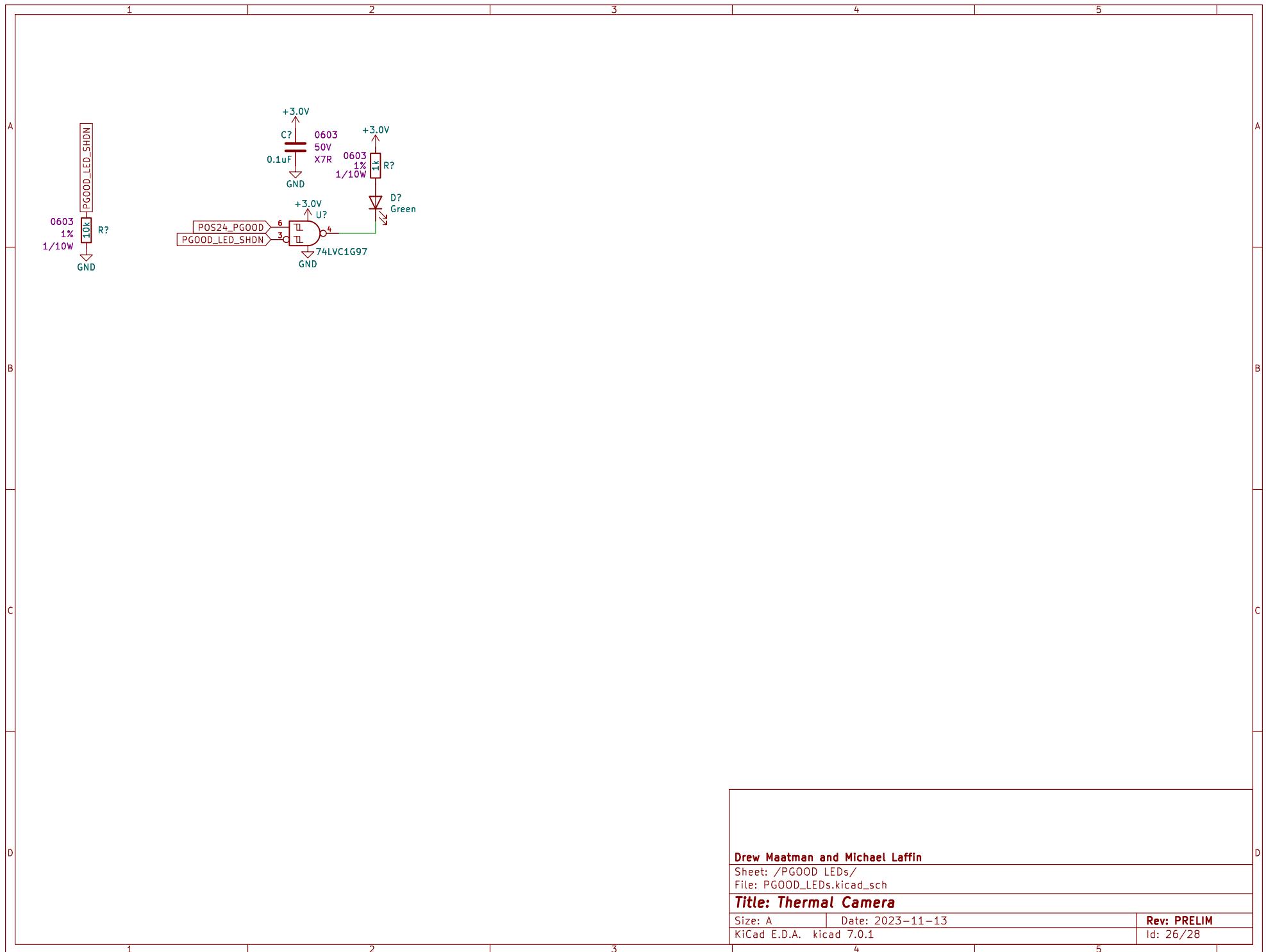
## Title: Thermal Camera

Size: A Date:

KiCad E.D.A. kicad 7.0.1

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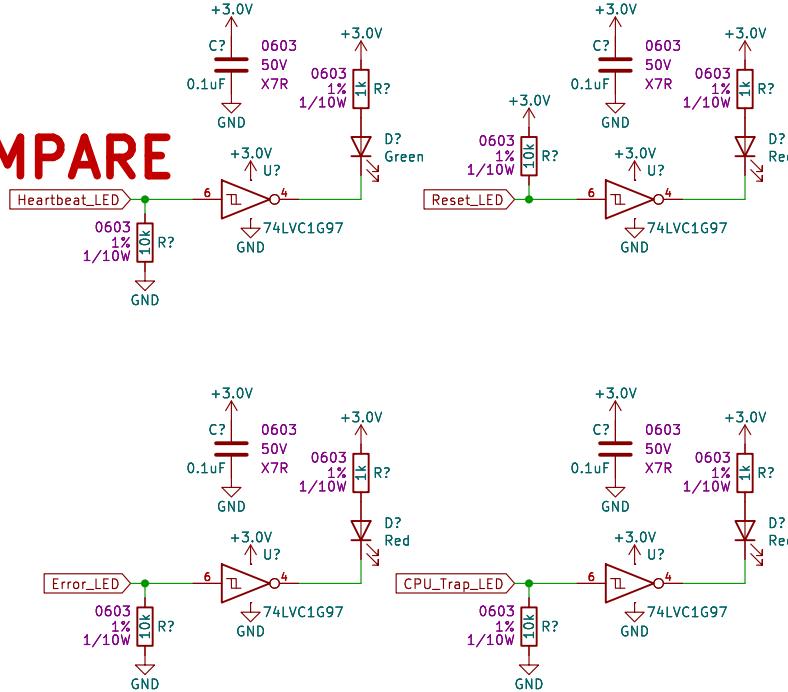
Sheet: /PGOOD LEDs/  
File: PGOOD\_LEDs.kicad\_sch

**Title: Thermal Camera**

Size: A	Date: 2023-11-13
KiCad E.D.A.	kicad 7.0.1

Rev: PRELIM
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# MUST USE OUTPUT COMPARE PIN



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Sheet: /Status LEDs/  
File: Status\_LEDs.kicad\_sch

Title: Thermal Camera

Size: A Date: 2023-11-13  
KiCad E.D.A. kicad 7.0.1

Rev: PRELIM  
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1

2

3

4

5

A

A

B

B

C

C

D

D



Drew Maatman and Michael Laffin

Sheet: /Mechanical/  
File: Mechanical.kicad\_sch

**Title: Thermal Camera**

Size: A | Date: 2023-11-13  
KiCad E.D.A. kicad 7.0.1

Rev: PRELIM  
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1

2

3

4

5