LED Panel Controller

01. Table of Contents

02. +12V Input

03. +12V Telemetry

04. +3.3V Power Supply

05. +3.3V Telemetry

06. +5V Power Supply

07. +5V Telemetry

08. PIC32MZ Programming

09. PIC32MZ Bypass

10. PIC32MZ Clocking

11. PIC32MZ

12. Config Hardstraps

13. I2C Boost

14. Time of Flight

15. USB UART Bridge

16. SD Card Slot

17. WiFi Module

18. PGOOD LEDs

19. Status LEDs

20. Backup RTC

21. Pushbuttons

22. Mode LEDs

23. SPI Flash 0

24. SPI Flash 1

25. SPI Flash 2

26. SPI Flash 3

27. SPI Flash 4

28. SPI Flash 5

29. SPI Flash 6

30. SPI Flash 7

31. Panel Level Shifters

32. Panel Connectors

33. Mechanical

Sheet: +12V Input
File: POS12_Input.sch

Sheet: +12V Telemetry
File: POS12_Telemetry.sch

Sheet: +3.3V Power Supply
File: POS3P3_Power_Supply.sch

Sheet: +3.3V Telemetry
File: POS3P3_Telemetry.sch

Sheet: +5V Power Supply
File: POS5_Power_Supply.sch

Sheet: +5V Telemetry
File: POS5_Telemetry.sch

Sheet: PIC32MZ Programming
File: PIC32MZ_Programming.sch

Sheet: PIC32MZ Bypass
File: PIC32MZ_Bypass.sch

Sheet: PIC32MZ Clocking
File: PIC32MZ_Clocking.sch

Sheet: PIC32MZ
File: PIC32MZ.sch

Sheet: Config Hardstraps
File: config_hardstraps.sch

Sheet: I2C Boost
File: I2C_Boost.sch

Sheet: Time of Flight
File: Time_of_Flight.sch

Sheet: USB UART Bridge
File: USB_UART_Bridge.sch

Sheet: SD Card Slot
File: SD_Card_Slot.sch

Sheet: WiFi Module
File: WiFi_Module.sch

Sheet: PGOOD LEDs
File: PGOOD_LEDs.sch

Sheet: Status LEDs
File: Status_LEDs.sch

Sheet: Backup RTC
File: Backup_RTC.sch

Sheet: Pushbuttons
File: Pushbuttons.sch

Sheet: Mode LEDs
File: Mode_LEDs.sch

Sheet: SPI Flash 0
File: SPI_Flash_0.sch

Sheet: SPI Flash 1
File: SPI_Flash_1.sch

Sheet: SPI Flash 2
File: SPI_Flash_2.sch

Sheet: SPI Flash 3
File: SPI_Flash_3.sch

Sheet: SPI Flash 4
File: SPI_Flash_4.sch

Sheet: SPI Flash 5
File: SPI_Flash_5.sch

Sheet: SPI Flash 6
File: SPI_Flash_6.sch

Sheet: SPI Flash 7
File: SPI_Flash_7.sch

Sheet: Panel Level Shifters
File: Panel_Level_Shifters.sch

Sheet: Panel Connectors
File: Panel_Connectors.sch

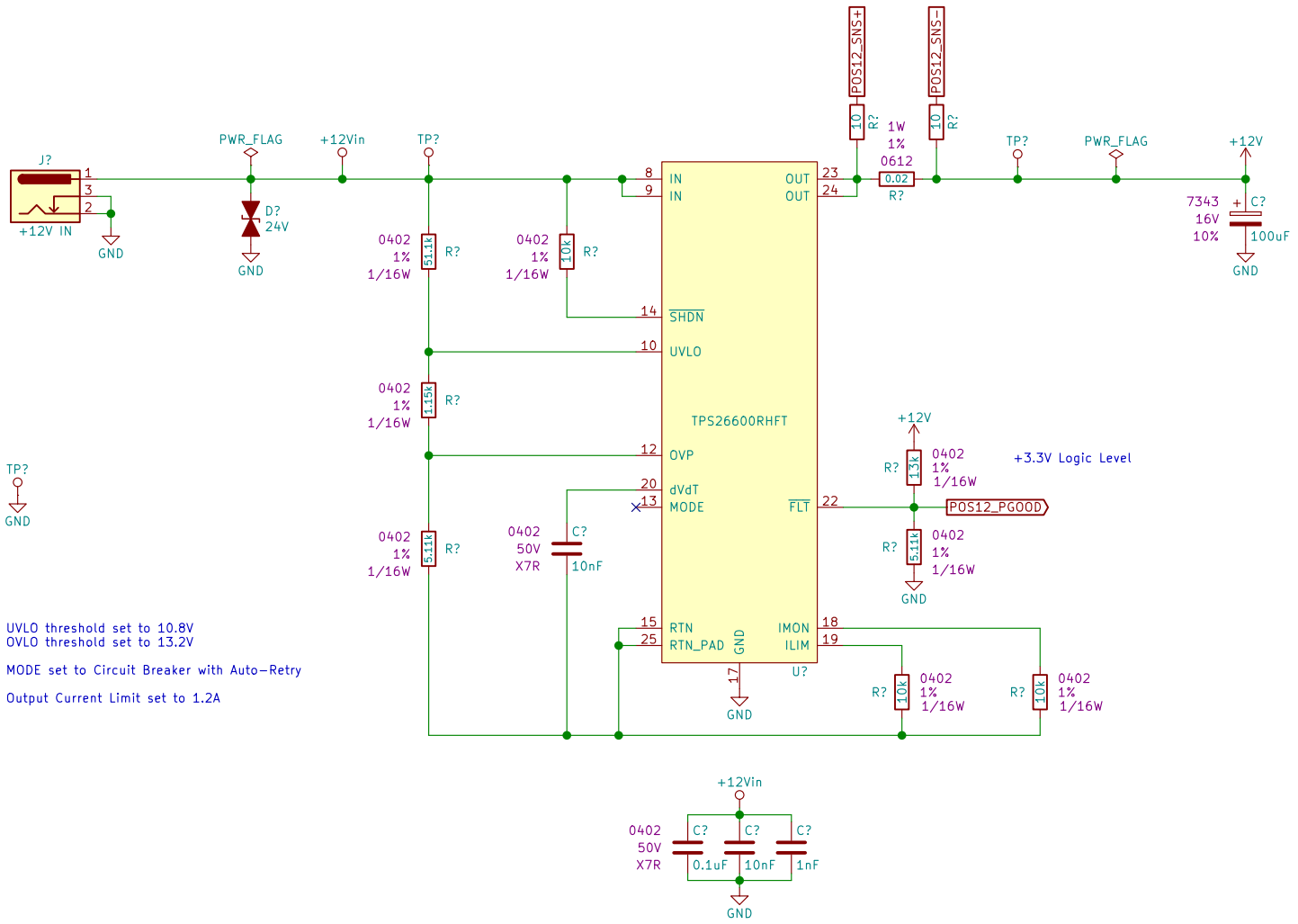
Sheet: Mechanical
File: Mechanical.sch

TODO:
* Determine actual +12V current draw, reevaluate input prot
* Determine image size, external flash size
* Determine +5V current draw, decide on converter
* Determine +3.3V Current Draw, decide on converter
* Remove high frequency PIC32MZ bypass caps
* Add PIC32MZ SOSC oscillator
* Add +5V_USB capacitance/ESD?
* Figure out panel connetors
* Figure out panel level shifting
* Figure out SPI flash circuit
* Figure out screen modes/mode LEDs
* Draw SD card sheet
* Draw WiFi module sheet
* Draw I2C boost sheet with LTC1694
* Determine what will be configurable, add hardstraps
* What will pushbuttons do?
* What PIC32MZ SKU will we use? Should be highest memor
* Change PGOOD LEDs sheet to use +3.3V_PGL global power

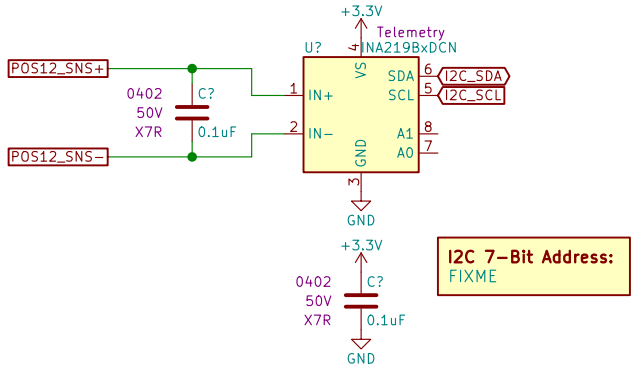
Sheet: /
File: LED_Panel_Controller.sch

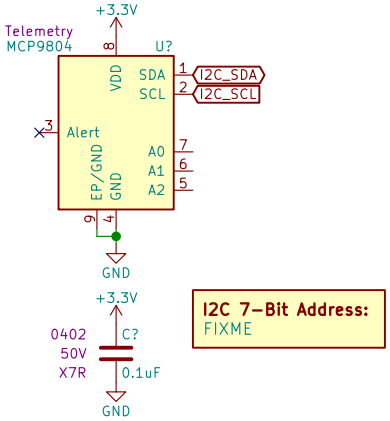
Title:

Size: A	Date: 2020-09-08	**Rev:**
KiCad E.D.A. kicad (5.1.4)-1		Id: 1/33

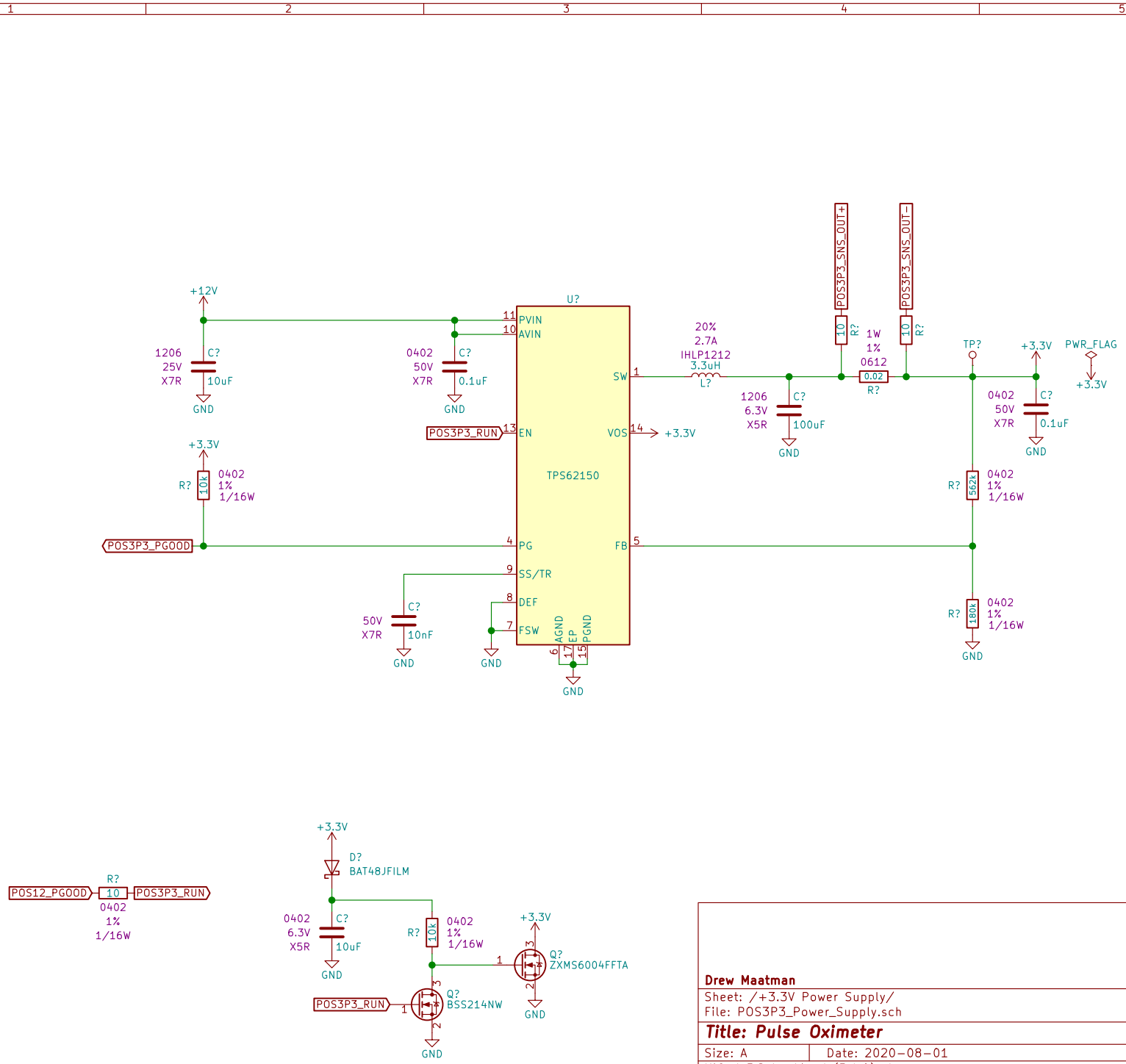


Drew Maatman		
Sheet: /+12V Input/		
File: POS12_Input.sch		
Title: Analog Clock		
Size: A	Date: 2020-08-15	**Rev: A**
KiCad E.D.A. kicad (5.1.4)-1		Id: 2/33





Drew Maatman		
Sheet: /+12V Telemetry/		
File: POS12_Telemetry.sch		
Title: Pulse Oximeter		
Size: A	Date: 2020−08−01	**Rev: A**
KiCad E.D.A. kicad (5.1.4)−1		Id: 3/33



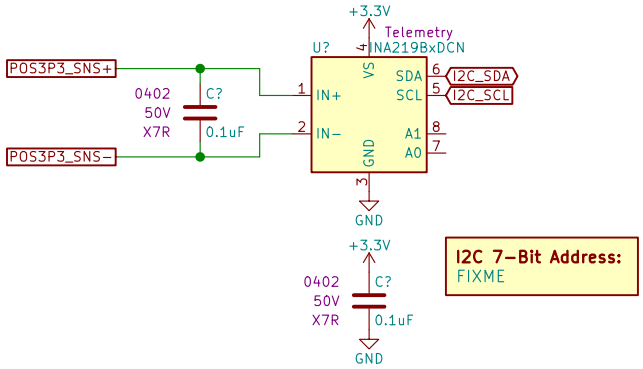
Drew Maatman

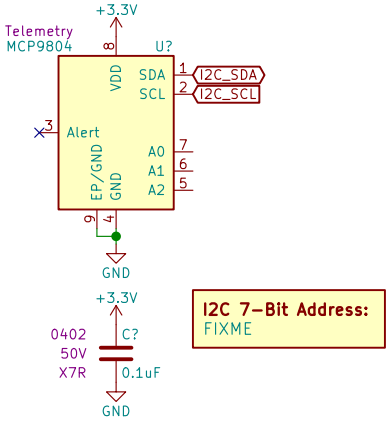
Sheet: /+3.3V Power Supply/

File: POS3P3_Power_Supply.sch

Title: Pulse Oximeter

Size: A	Date: 2020-08-01	**Rev: A**
KiCad E.D.A. kicad (5.1.4)-1		Id: 4/33



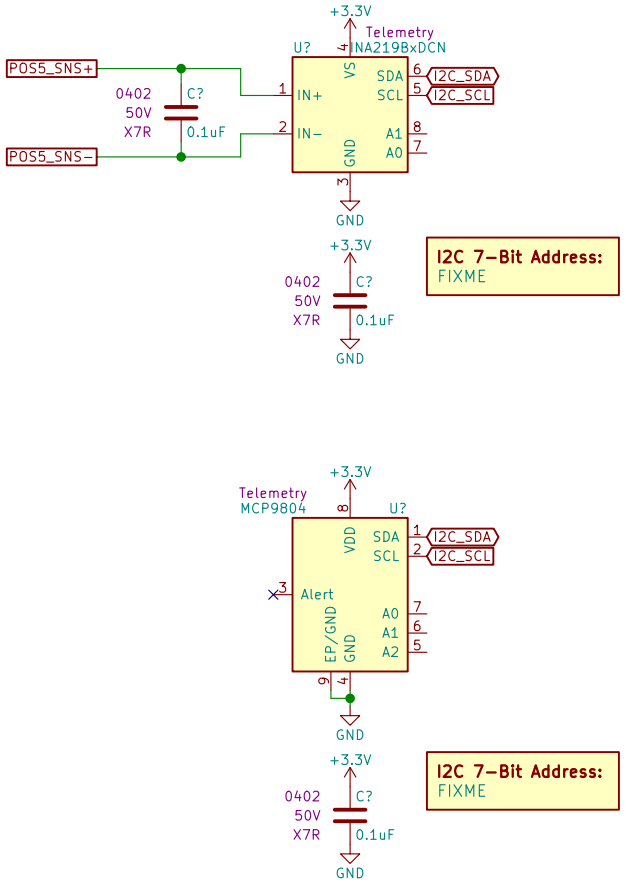


Drew Maatman		
Sheet: /+3.3V Telemetry/		
File: POS3P3_Telemetry.sch		
Title: Pulse Oximeter		
Size: A	Date: 2020−08−01	**Rev: A**
KiCad E.D.A. kicad (5.1.4)−1		Id: 5/33

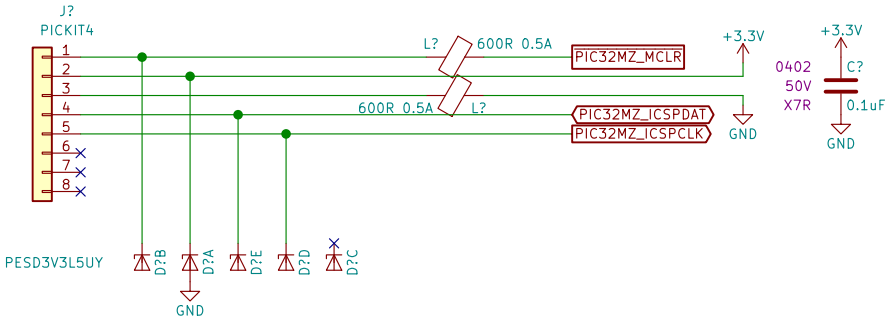
Sheet: /+5V Power Supply/
File: POS5_Power_Supply.sch

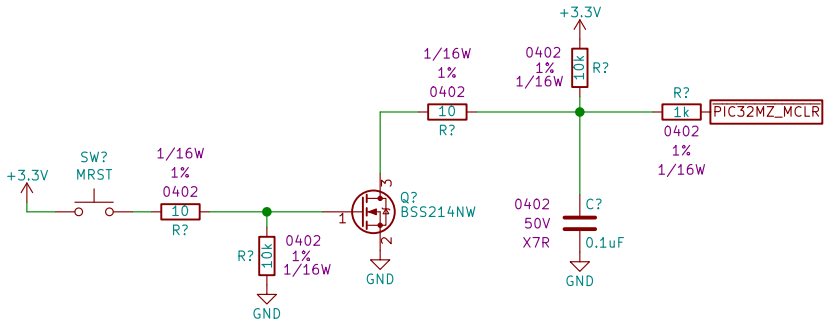
Title:

Size: A	Date: 2020-09-08	**Rev:**
KiCad E.D.A. kicad (5.1.4)-1		Id: 6/33

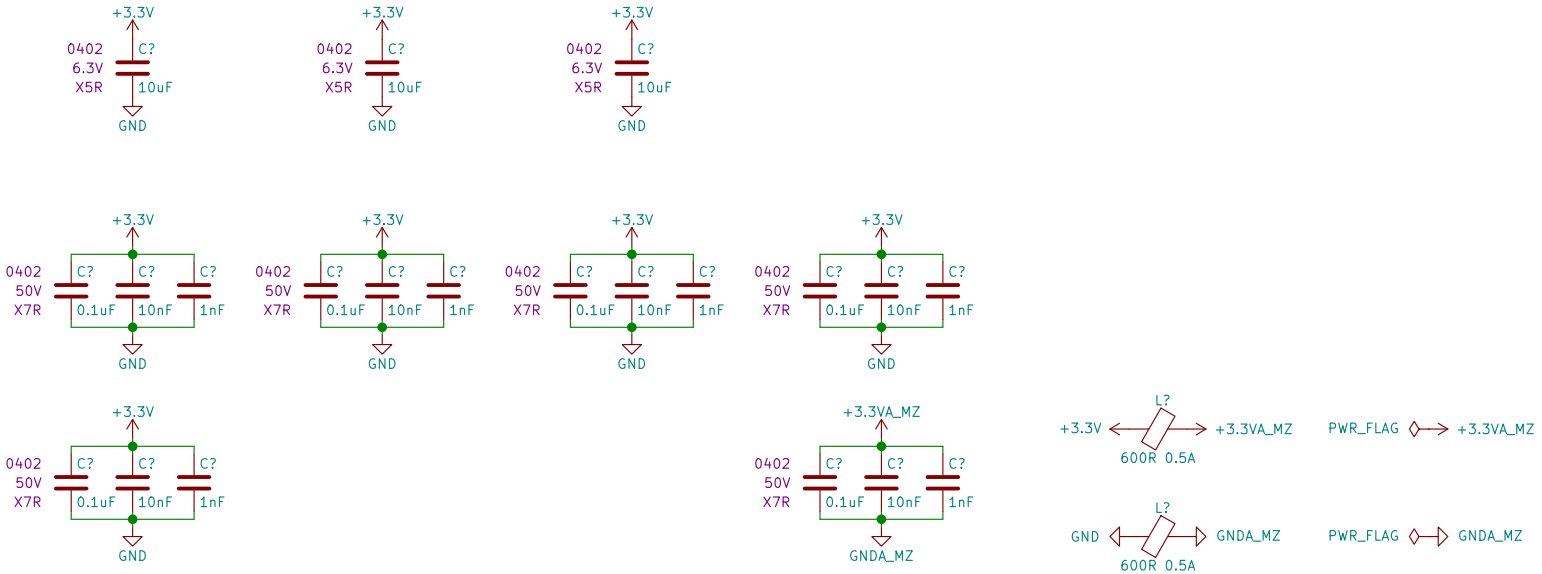


Drew Maatman		
Sheet: /+5V Telemetry/		
File: POS5_Telemetry.sch		
Title: Pulse Oximeter		
Size: A	Date: 2020−08−01	**Rev: A**
KiCad E.D.A. kicad (5.1.4)−1		Id: 7/33

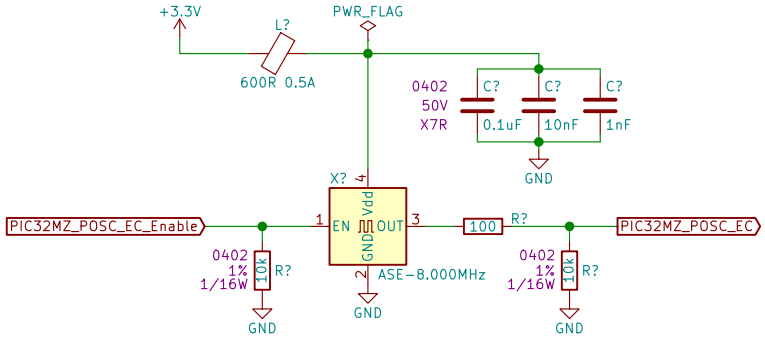


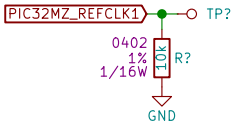


Drew Maatman		
Sheet: /PIC32MZ Programming/		
File: PIC32MZ_Programming.sch		
Title: Analog Clock		
Size: A	Date: 2020-08-15	**Rev: A**
KiCad E.D.A. kicad (5.1.4)-1		Id: 8/33

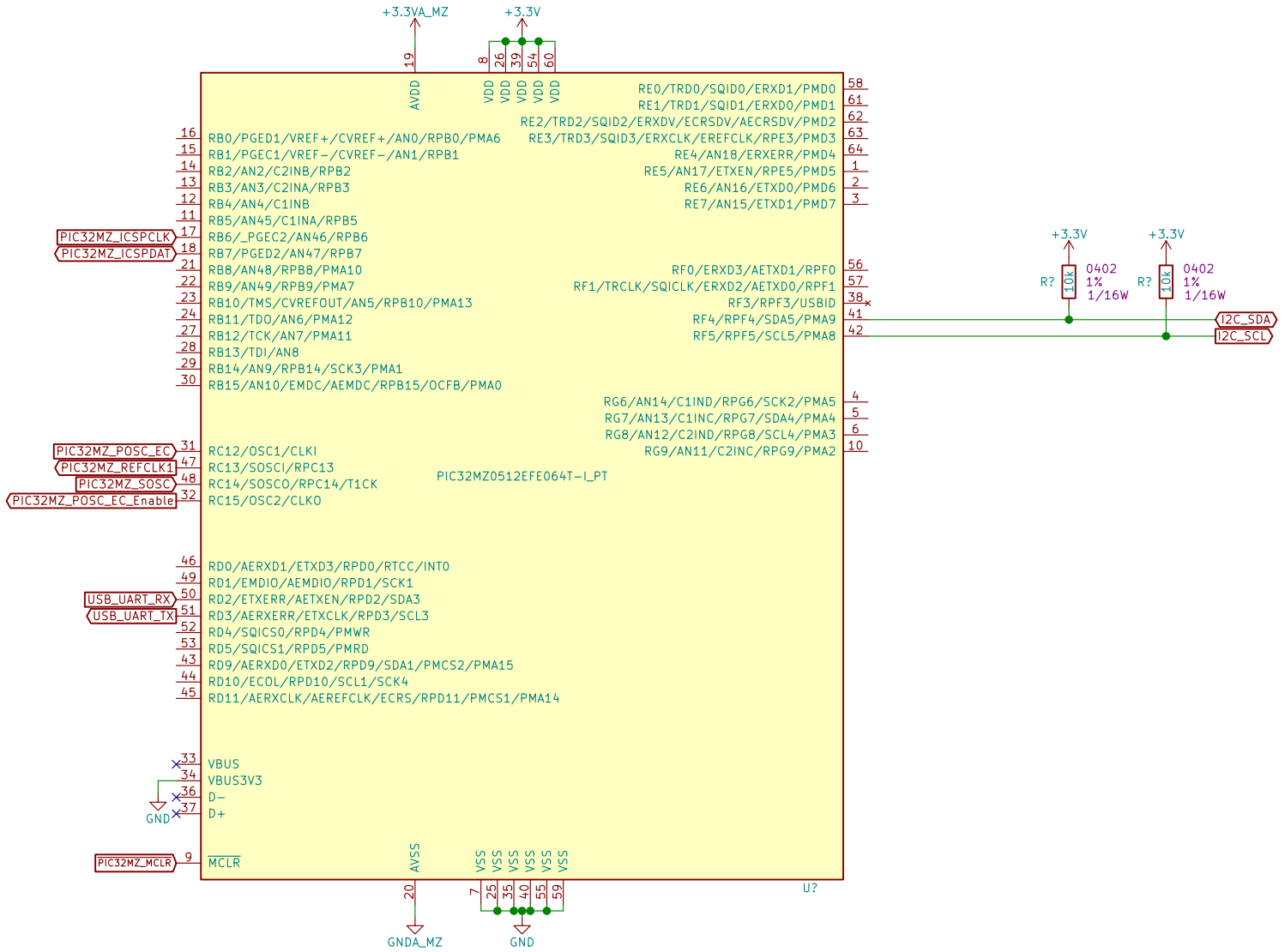


Drew Maatman		
Sheet: /PIC32MZ Bypass/		
File: PIC32MZ_Bypass.sch		
Title: Pulse Oximeter		
Size: A	Date: 2020-08-01	**Rev: A**
KiCad E.D.A. kicad (5.1.4)-1		Id: 9/33





Drew Maatman		
Sheet: /PIC32MZ Clocking/		
File: PIC32MZ_Clocking.sch		
Title: Pulse Oximeter		
Size: A	Date: 2020-08-01	**Rev: A**
KiCad E.D.A. kicad (5.1.4)-1		Id: 10/33



Drew Maatman		
Sheet: /PIC32MZ/		
File: PIC32MZ.sch		
Title: Pulse Oximeter		
Size: A	Date: 2020-08-01	**Rev: A**
KiCad E.D.A. kicad (5.1.4)-1		Id: 11/33

Sheet: /Config Hardstraps/
File: config_hardstraps.sch

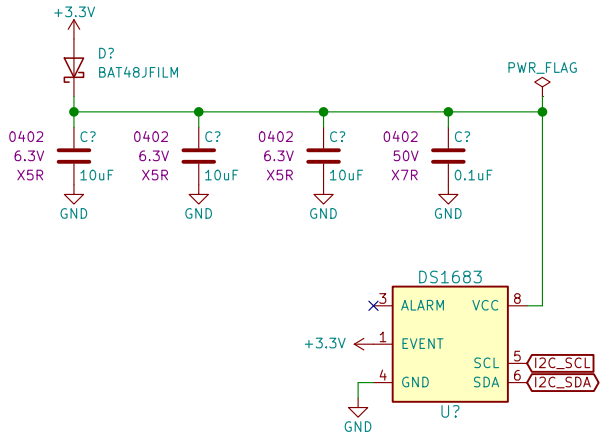
Title:

Size: A	Date: 2020-09-08	**Rev:**
KiCad E.D.A. kicad (5.1.4)-1		Id: 12/33

Sheet: /I2C Boost/
File: I2C_Boost.sch

Title:

Size: A	Date: 2020-09-08	**Rev:**
KiCad E.D.A. kicad (5.1.4)-1		Id: 13/33



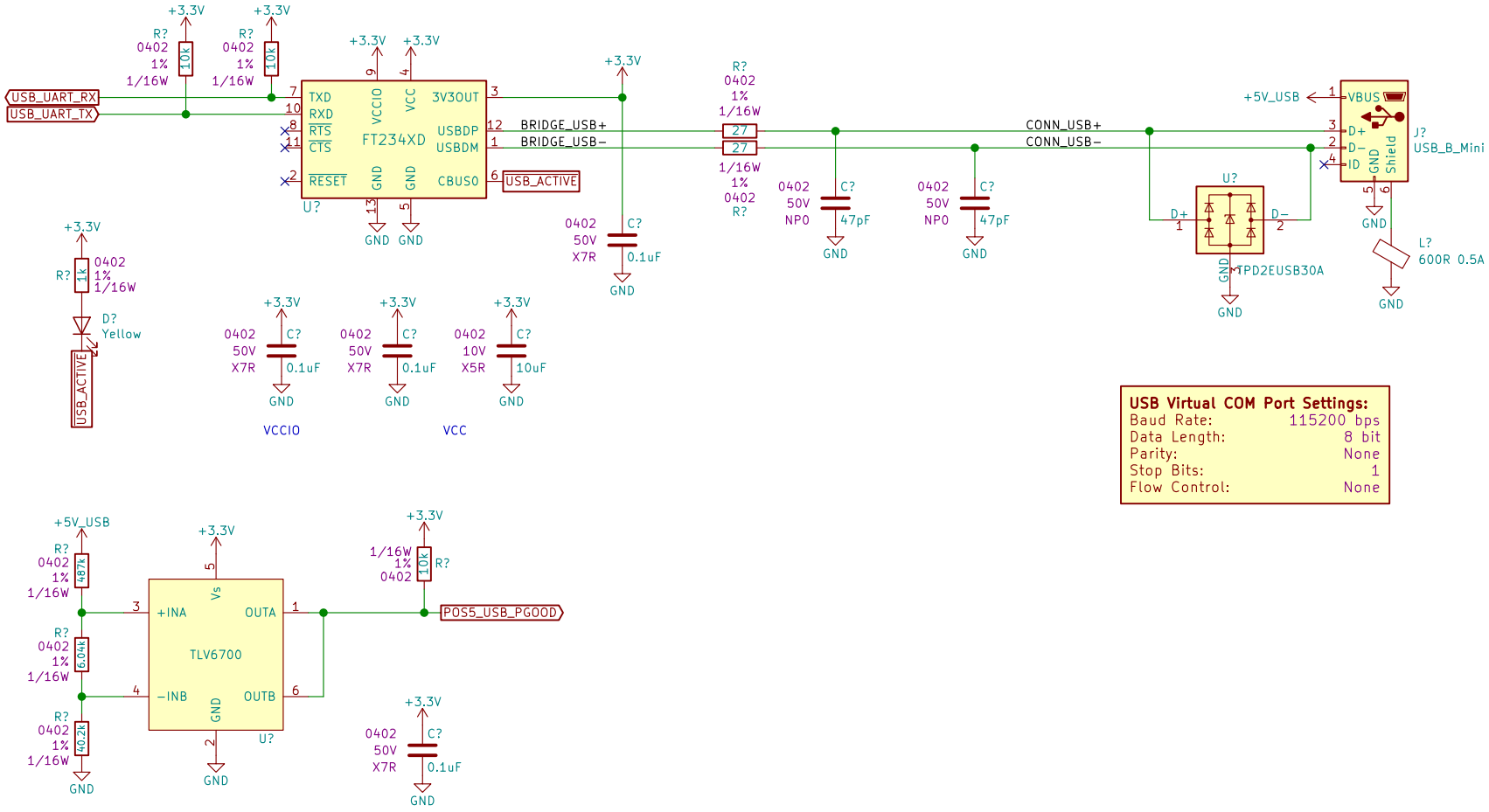
I2C 7-Bit Address:
0x6B

Drew Maatman

Sheet: /Time of Flight/
File: Time_of_Flight.sch

Title: Pulse Oximeter

Size: A	Date: 2020-08-01	**Rev: A**
KiCad E.D.A. kicad (5.1.4)-1		Id: 14/33



USB Virtual COM Port Settings:

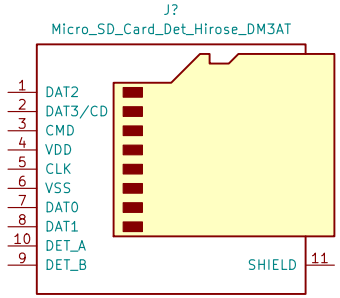
Baud Rate:	115200 bps
Data Length:	8 bit
Parity:	None
Stop Bits:	1
Flow Control:	None

Drew Maatman

Sheet: /USB UART Bridge/
File: USB_UART_Bridge.sch

Title: Analog Clock

Size: A	Date: 2020−08−15	**Rev: A**
KiCad E.D.A. kicad (5.1.4)−1		Id: 15/33

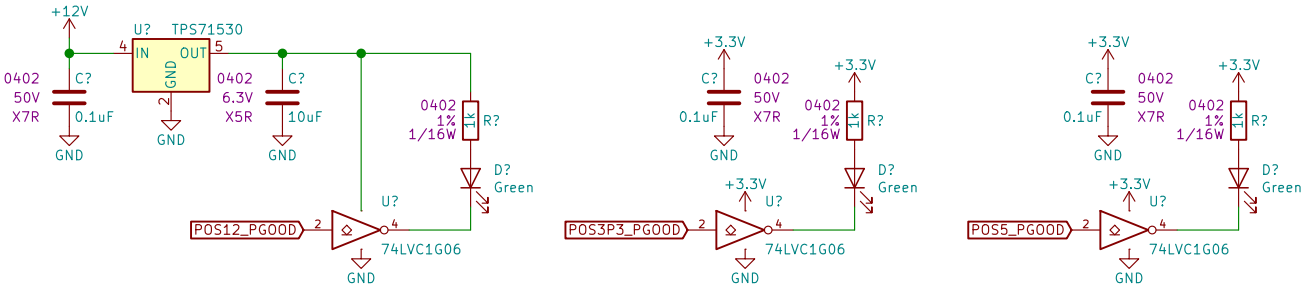


Sheet: /SD Card Slot/ File: SD_Card_Slot.sch		
Title:		
Size: A	Date: 2020-09-08	**Rev:**
KiCad E.D.A. kicad (5.1.4)-1		Id: 16/33

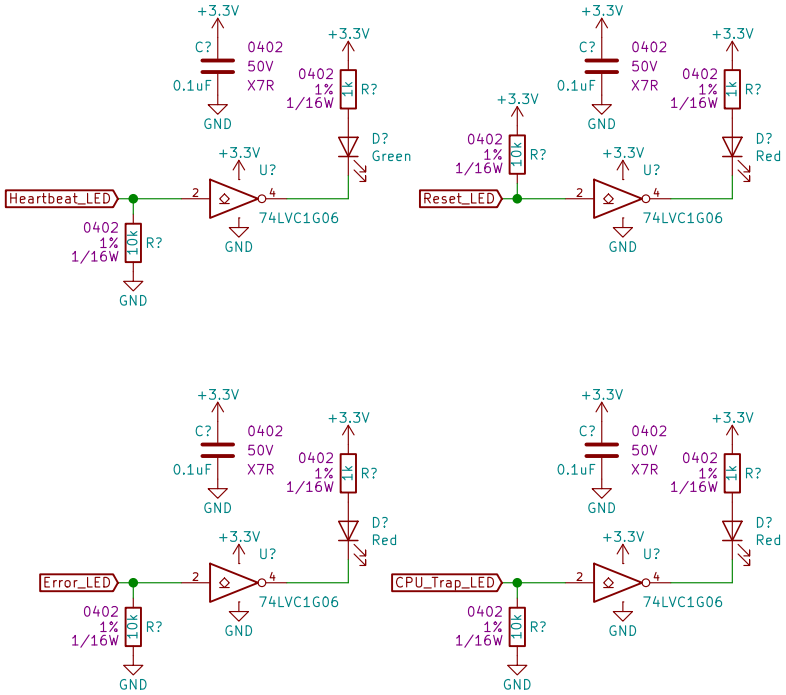
Sheet: /WiFi Module/
File: WiFi_Module.sch

Title:

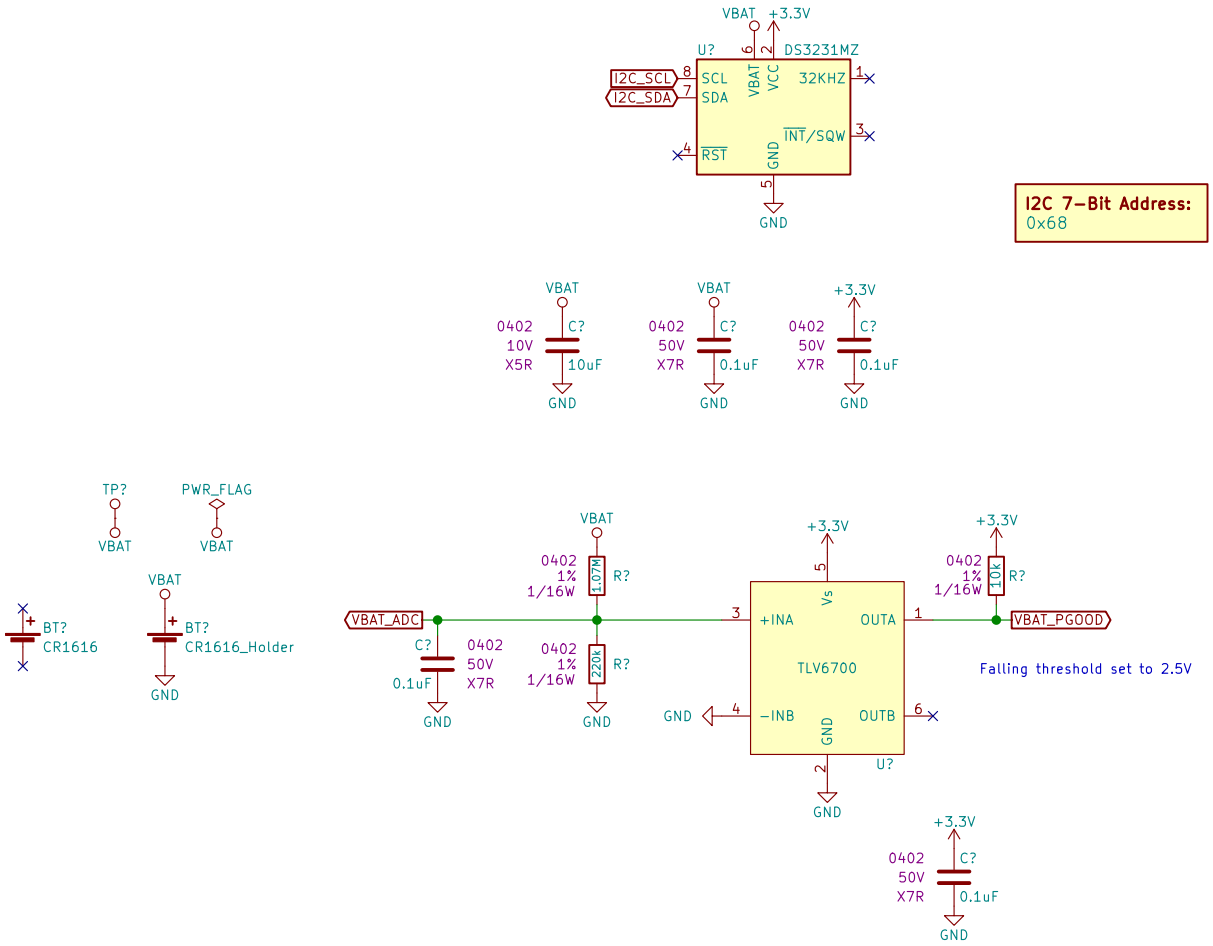
Size: A	Date: 2020-09-08	**Rev:**
KiCad E.D.A. kicad (5.1.4)-1		Id: 17/33



Drew Maatman		
Sheet: /PGOOD LEDs/		
File: PGOOD_LEDs.sch		
Title: Pulse Oximeter		
Size: A	Date: 2020-08-01	**Rev: A**
KiCad E.D.A. kicad (5.1.4)-1		Id: 18/33

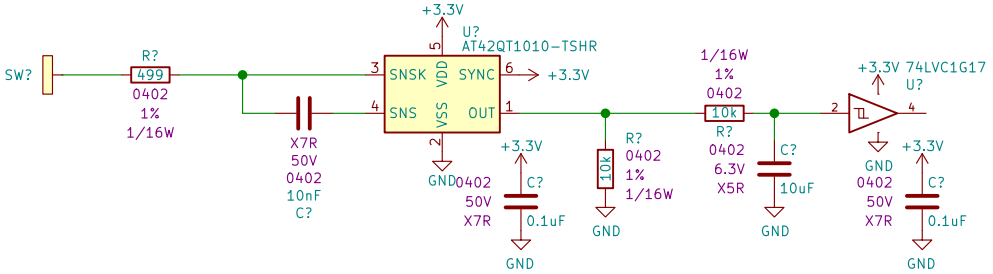


Drew Maatman		
Sheet: /Status LEDs/		
File: Status_LEDs.sch		
Title: Pulse Oximeter		
Size: A	Date: 2020-08-01	**Rev: A**
KiCad E.D.A. kicad (5.1.4)-1		Id: 19/33



Drew Maatman	
Sheet: /Backup RTC/	
File: Backup_RTC.sch	
Title: Analog Clock	
Size: A	Date: 2020-08-15
KiCad E.D.A. kicad (5.1.4)-1	Id: 20/33

Rev: A



Drew Maatman		
Sheet: /Pushbuttons/		
File: Pushbuttons.sch		
Title: Pulse Oximeter		
Size: A	Date: 2020-08-01	**Rev: A**
KiCad E.D.A. kicad (5.1.4)-1		Id: 21/33

Sheet: /Mode LEDs/
File: Mode_LEDs.sch

Title:

Size: A	Date:	**Rev:**
KiCad E.D.A. kicad (5.1.4)-1		Id: 22/33

Sheet: /SPI Flash 0/
File: SPI_Flash_0.sch

Title:

Size: A	Date:	**Rev:**
KiCad E.D.A. kicad (5.1.4)-1		Id: 23/33

Sheet: /SPI Flash 1/
File: SPI_Flash_1.sch

Title:

Size: A	Date:	**Rev:**
KiCad E.D.A. kicad (5.1.4)-1		Id: 24/33

Sheet: /SPI Flash 2/
File: SPI_Flash_2.sch

Title:

Size: A	Date:	**Rev:**
KiCad E.D.A. kicad (5.1.4)-1		Id: 25/33

Sheet: /SPI Flash 3/
File: SPI_Flash_3.sch

Title:

Size: A	Date:	**Rev:**
KiCad E.D.A. kicad (5.1.4)-1		Id: 26/33

Sheet: /SPI Flash 4/
File: SPI_Flash_4.sch

Title:

Size: A	Date:	**Rev:**
KiCad E.D.A. kicad (5.1.4)-1		Id: 27/33

Sheet: /SPI Flash 5/
File: SPI_Flash_5.sch

Title:

Size: A	Date:	**Rev:**
KiCad E.D.A. kicad (5.1.4)-1		Id: 28/33

Sheet: /SPI Flash 6/
File: SPI_Flash_6.sch

Title:

Size: A	Date:	**Rev:**
KiCad E.D.A. kicad (5.1.4)-1		Id: 29/33

Sheet: /SPI Flash 7/
File: SPI_Flash_7.sch

Title:

Size: A	Date:	**Rev:**
KiCad E.D.A. kicad (5.1.4)-1		Id: 30/33

Sheet: /Panel Level Shifters/
File: Panel_Level_Shifters.sch

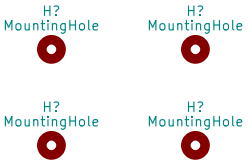
Title:

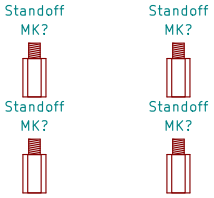
Size: A	Date:	**Rev:**
KiCad E.D.A. kicad (5.1.4)-1		Id: 31/33

Sheet: /Panel Connectors/
File: Panel_Connectors.sch

Title:

Size: A	Date:	**Rev:**
KiCad E.D.A. kicad (5.1.4)-1		Id: 32/33





Drew Maatman

Sheet: /Mechanical/
File: Mechanical.sch

Title: Pulse Oximeter

Size: A	Date: 2020-08-01	**Rev: A**
KiCad E.D.A. kicad (5.1.4)-1		Id: 33/33