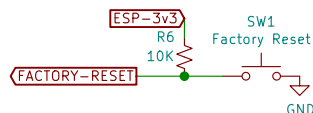
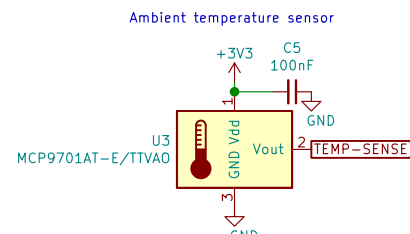


Note: The 3V3 jumper is used to isolate the ESP32 USB from the rest of the PCB for debugging purposes. The jumper should be left in place for normal operations.



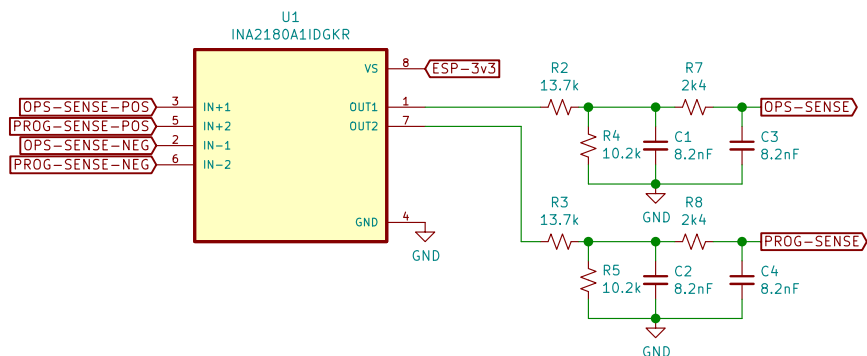
The Factory Reset jumper can be put in place during startup to force clear all persistent configuration data.

## OPS and PROG track connection



On the PCB this is located between the DRV8801 (PROG) and the DRV8873 (OPS). The goal being to alert the user(s) when the PCB temperature is exceeding safe thresholds that are configured by the user.

## OPS and PROG current sense monitoring



Sheet: Power

Sheet: OpenLCB

Sheet: OPS

Sheet: PROG

Sheet: Status

File: power.sch

File: OpenLCB.sch

h File: OPS.sch

File: PROG.sch

File: status.sch



Sheet: /  
File: esp32cspcb.sch

**Title: ESP32 Command Station**

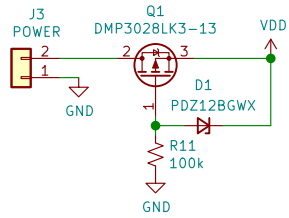
Size: A4	Date: 2021-01-29
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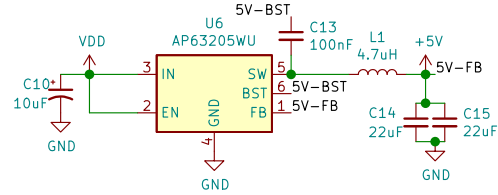
Rev: v1.5

Id: 1/6

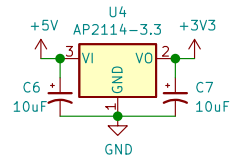
Incoming power with  
Reverse Current protection



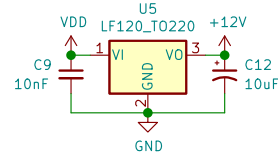
5V 2A buck converter



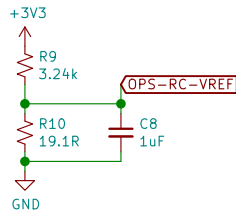
3.3V 1A LDO



12V 500mA LDO

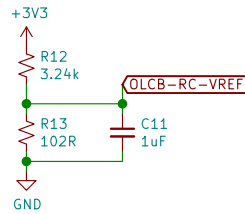


OPS track RailCom  
reference voltage



$$\begin{aligned} \text{OPS-RC-VREF} &= (3.3\text{v} \times \text{R}) / (\text{R} + \text{R}) \\ \text{OPS-RC-VREF} &= (3.3 \times 19.1) / (3240 + 19.1) \\ \text{OPS-RC-VREF} &= 19\text{mV} \end{aligned}$$

OpenLCB connection RailCom  
reference voltage



$$\begin{aligned} \text{OLCB-RC-VREF} &= (3.3\text{v} \times \text{R}) / (\text{R} + \text{R}) \\ \text{OLCB-RC-VREF} &= (3.3\text{v} \times 102) / (3240 + 102) \\ \text{OLCB-RC-VREF} &= 101\text{mV} \end{aligned}$$

Sheet: /Power/  
File: power.sch

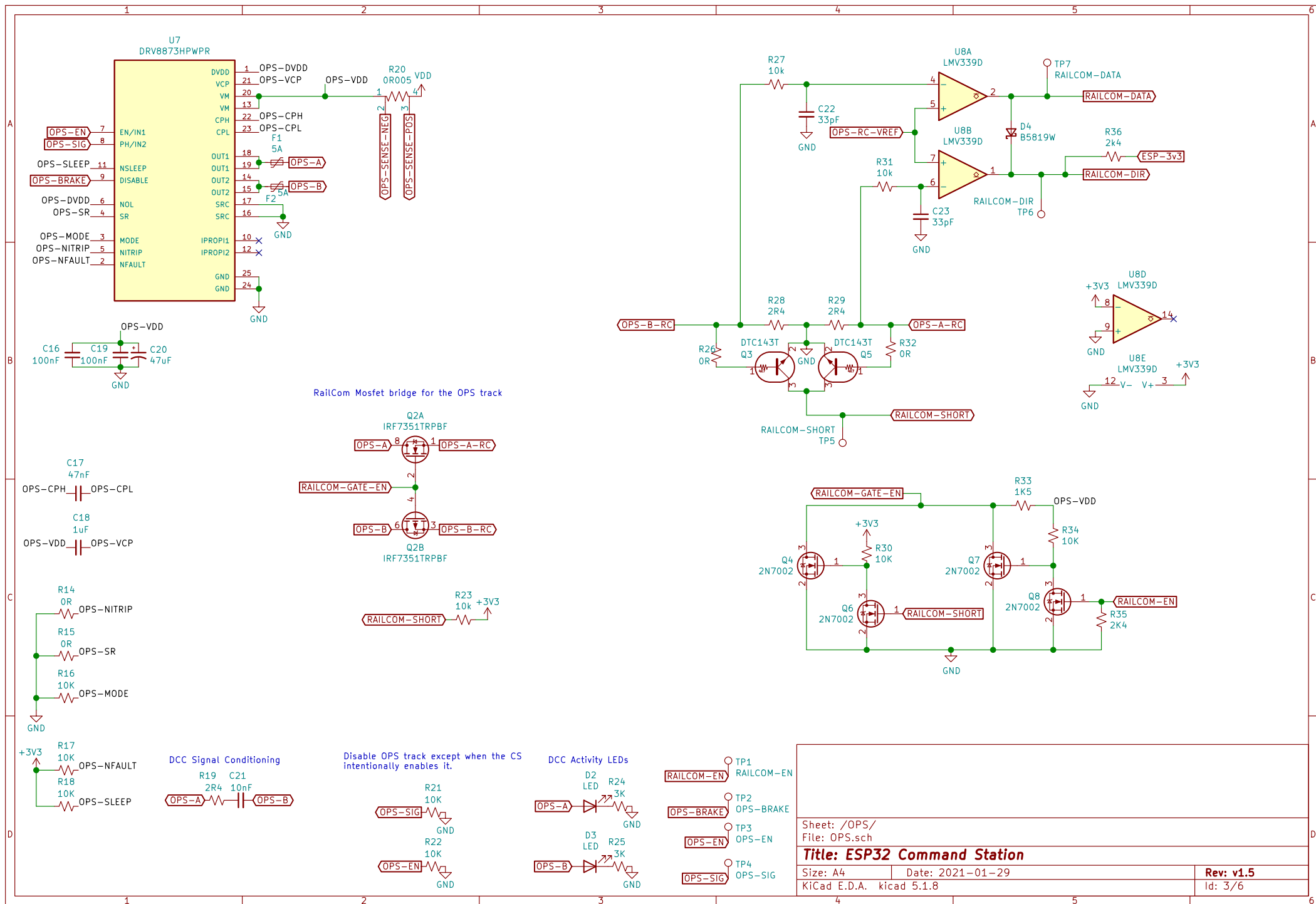
**Title: ESP32 Command Station**

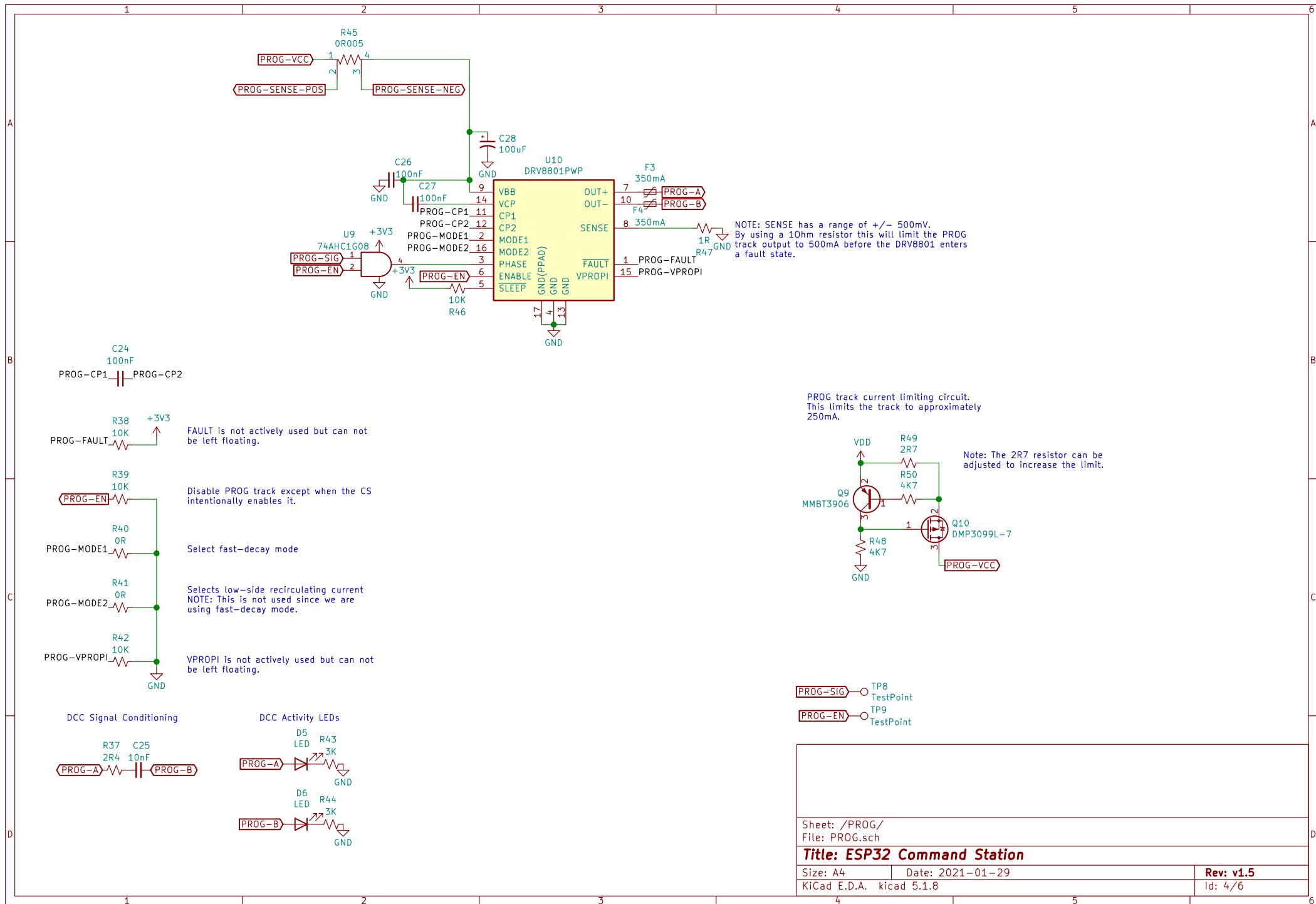
Size: A4 Date: 2021-01-29

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**Rev: v1.5**

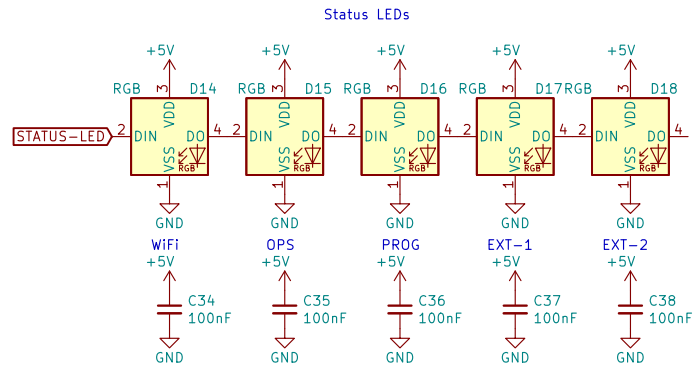
Id: 2/6





Sheet: /PROG/	
File: PROG.sch	
<b>Title: ESP32 Command Station</b>	
Size: A4	Date: 2021-01-29
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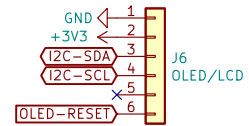




WiFi:  
 Green [ON] - Connected  
 Green [Flashing] - Connecting  
 Blue - SoftAP Active  
 Red - Disconnected

OPS / PROG:  
 Green = On  
 Off/Black = Off  
 Yellow = Usage warning (75% of limit)  
 Red = Fault/Short

#### Status Display connection



The Status Display connection is for adding an OLED or LCD display to the Command Station. The display shows real-time statistics and status information about the Command Station.

Note: OLED-RESET will be pulsed LOW for approximately 50ms during startup to allow a connected OLED display to reset.

#### I2C pull-up resistors



Sheet: /Status/  
 File: status.sch

#### Title:

Size: A4 Date: 2021-01-29  
 KiCad E.D.A. kicad 5.1.8

Rev:  
 Id: 6/6