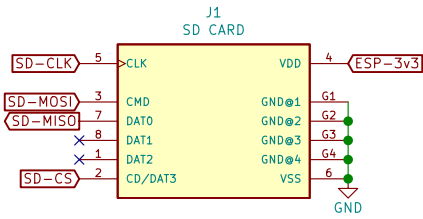
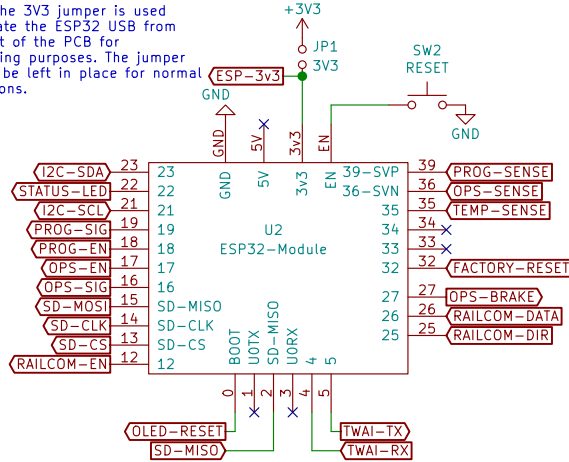


MicroSD Storage

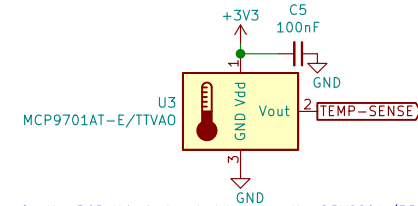


It is highly recommended to use a MicroSD card instead of the built-in flash for persistent configuration data as this will reduce the wear on the flash. The TTGO-T1 board has a built-in MicroSD slot that is wired in parallel to this one.

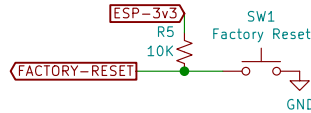
Note: The 3V3 jumper is used to isolate the ESP32 USB from the rest of the PCB for debugging purposes. The jumper should be left in place for normal operations.



Ambient temperature sensor

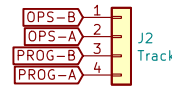


On the PCB this is located between the DRV8801 (PROG) and the DRV8873 (OPS). The goal being to alert the user(s) when the PCB temperature is exceeding safe thresholds that are configured by the user.

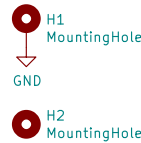
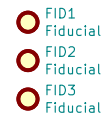
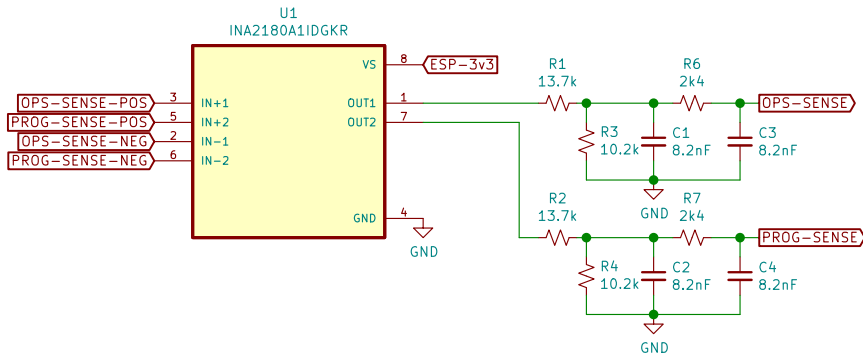


The Factory Reset jumper can be put in place during startup to force clear all persistent configuration data.

OPS and PROG track connection



OPS and PROG current sense monitoring



Sheet: Power	Sheet: OpenLCB	Sheet: OPS	Sheet: PROG	Sheet: Status
File: power.sch	File: OpenLCB.sch	File: OPS.sch	File: PROG.sch	File: status.sch

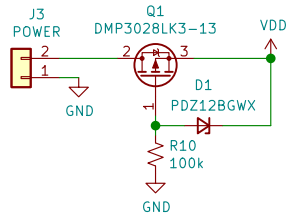


Sheet: /
File: esp32cspcb.sch

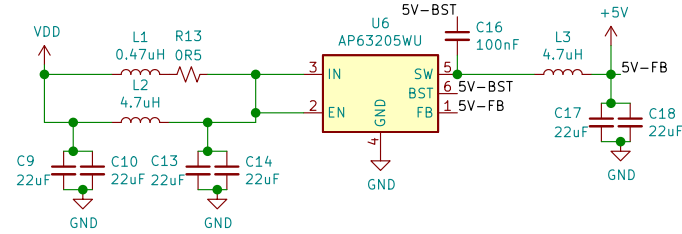
Title: ESP32 Command Station

Size: A4	Date: 2021-03-01	Rev: v1.5.1
KiCad E.D.A. kicad 5.1.9		Id: 1/6

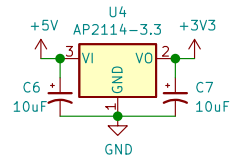
Incoming power with
Reverse Current protection



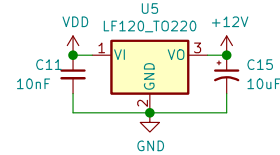
5V 2A buck converter



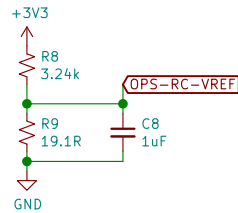
3.3V 1A LDO



12V 500mA LDO

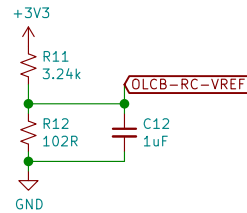


OPS track RailCom
reference voltage



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

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

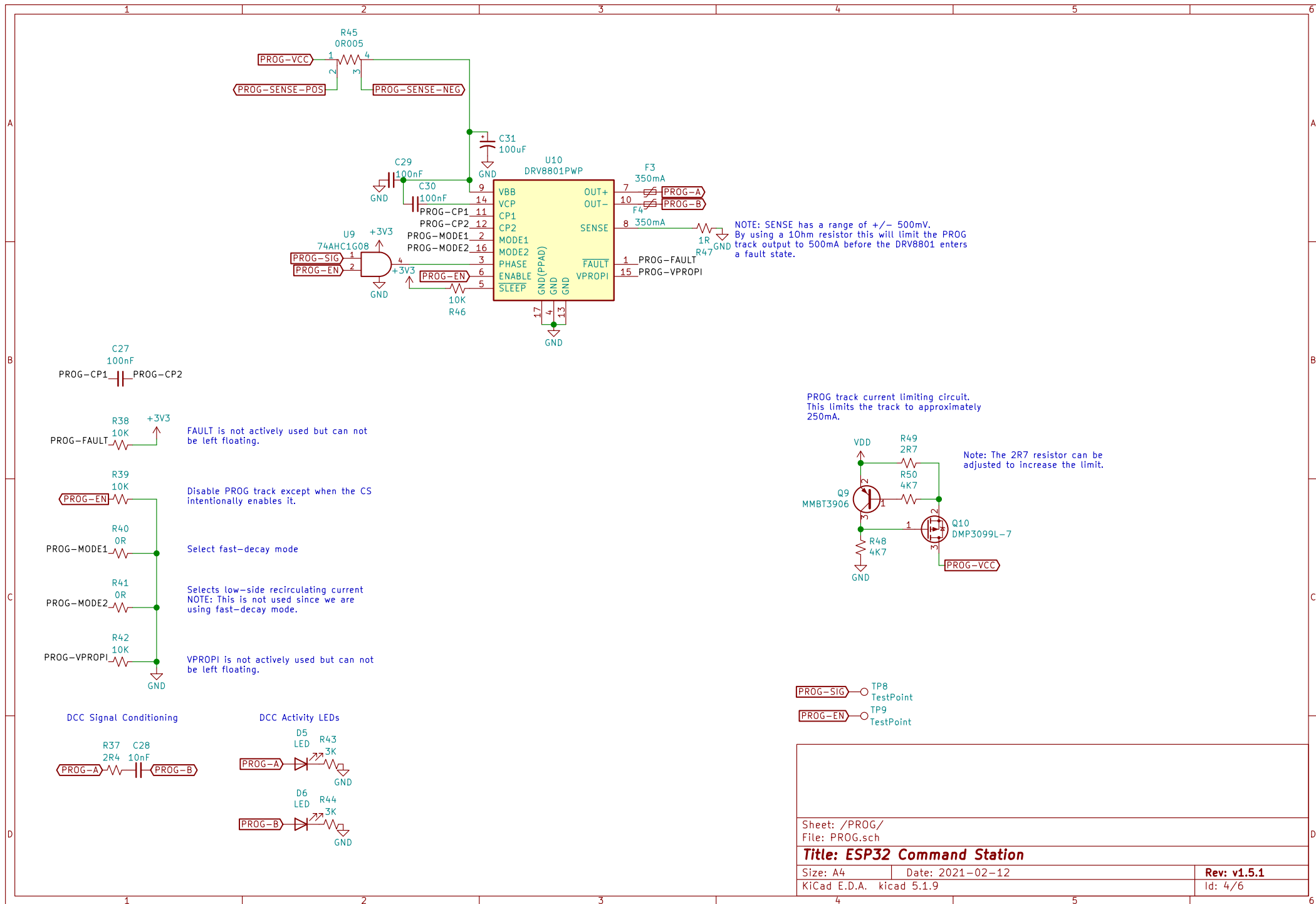
Title: ESP32 Command Station

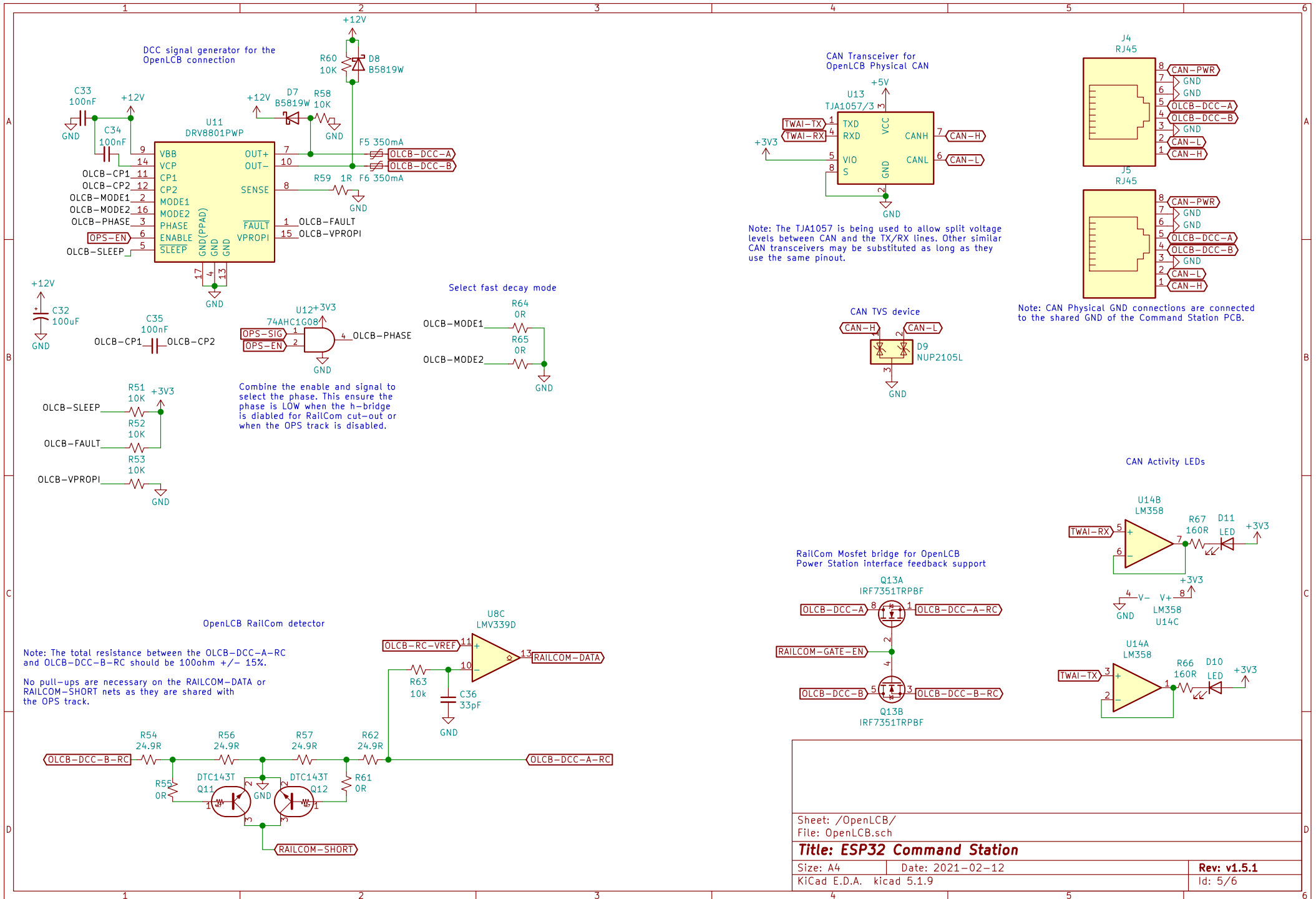
Size: A4 Date: 2021-02-12

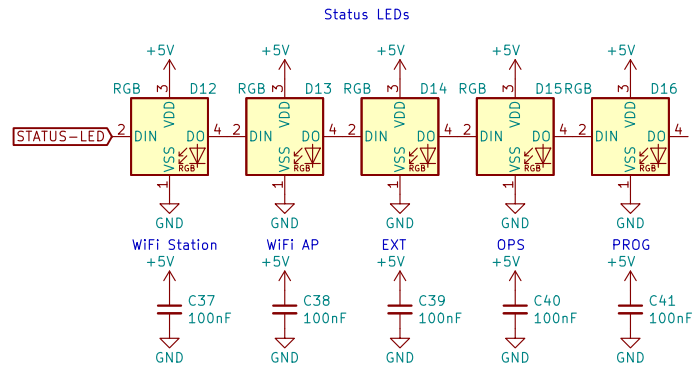
KiCad E.D.A. kicad 5.1.9

Rev: v1.5.1

Id: 2/6



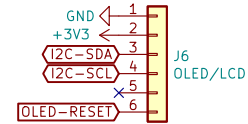




WiFi:
 Green [ON] – Station Connected
 Green [Flashing] – Station Connecting
 Blue [ON] – SoftAP Active
 Blue [Flashing] – SoftAP Starting
 Red – Disconnected

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: 2021-02-12

KiCad E.D.A. kicad 5.1.9

Rev: v1.5.1

Id: 6/6