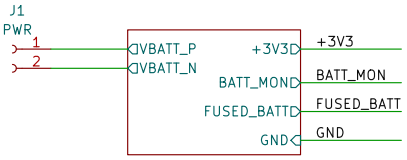
WIFI CAN & ESP32 Breakout

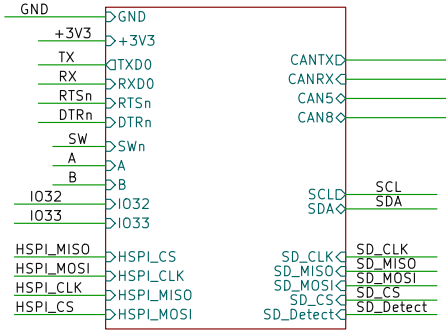
CAN / Display / Knob / uSD Card / UART

Changes 2023APR04:
- Power good LED for BATT_MON using LM317 to limit current over wide input range.
- Increased R10 to Q3B base to ensure IO0 is sufficiently pulled up during boot.
- R15 & R16 reduced to 2.7k to allow faster I2C/longer wires

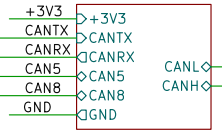
7~22VDC
- Vehicle 12V Lead-Acid
- Ryobi 18V Battery
- 9V battery



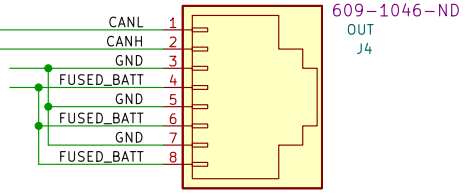
Power

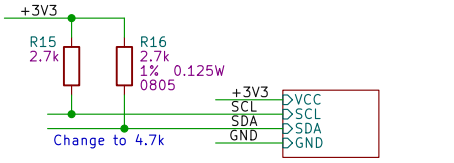


uC

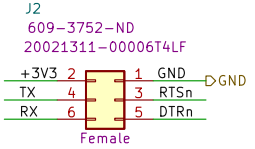


CAN

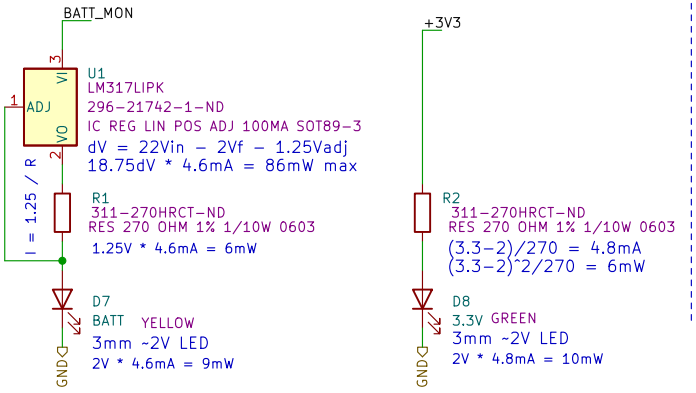




display

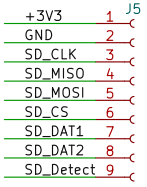


UART



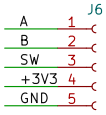
Power Good LEDs

Pin alignment for:
https://www.adafruit.com/product/4682
Micro SD SPI or SDIO Card Breakout.

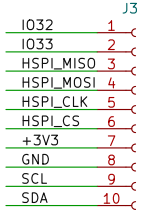


SDCARD

Quadrature Knob w/ SW



QENC



AUX

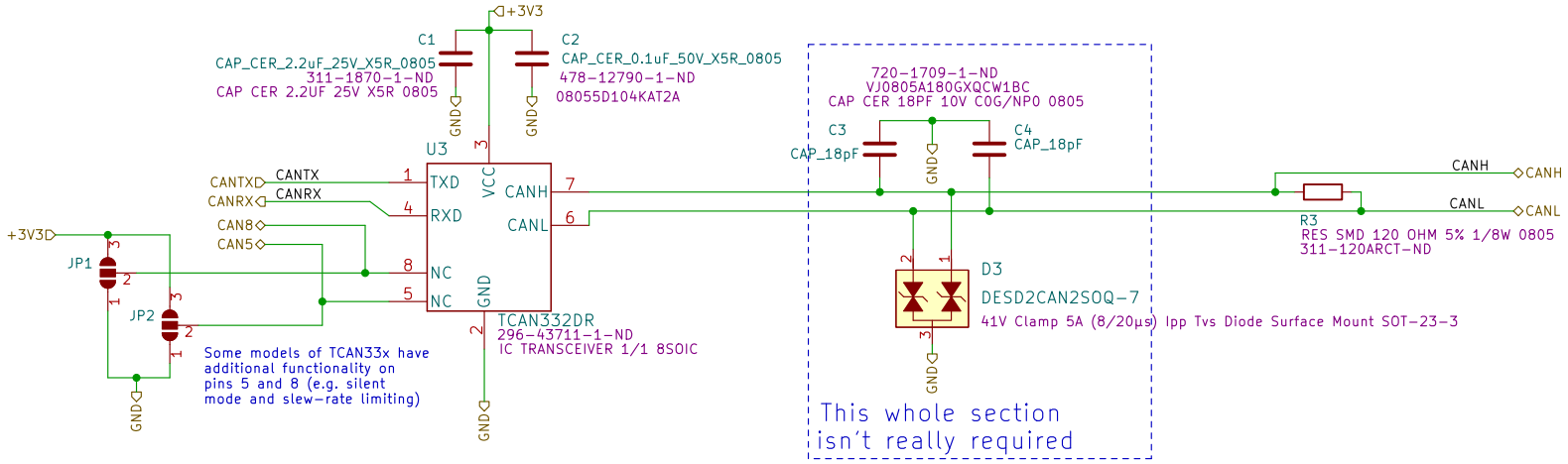
H1 MountingHole-Mechanical
H2 MountingHole-Mechanical
H3 MountingHole-Mechanical
H4 MountingHole-Mechanical

Sheet: /
File: Esp32CAN.kicad_sch

Title: WIFI CAN

Size: A4	Date: 2023-04-04	Rev: 0.1
KiCad E.D.A. kicad 6.0.4-6f826c9f35-116-ubuntu18.04.1		Id: 1/6

CAN Transceiver



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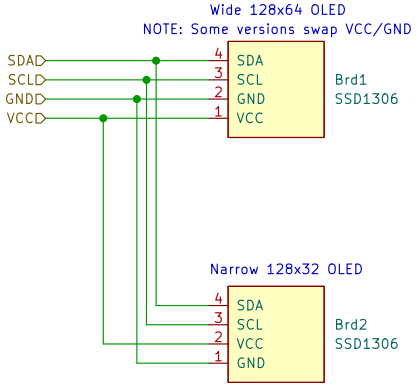
Size: A4	Date: 2023-04-04	**Rev: 0.1**
KiCad E.D.A. kicad 6.0.4-6f826c9f35-116-ubuntu18.04.1		Id: 2/6

I2C Displays

These are often sold as cheap display modules online.
They seem to occasionally swap VCC and GND, so keep
options open to allow for swapping these.



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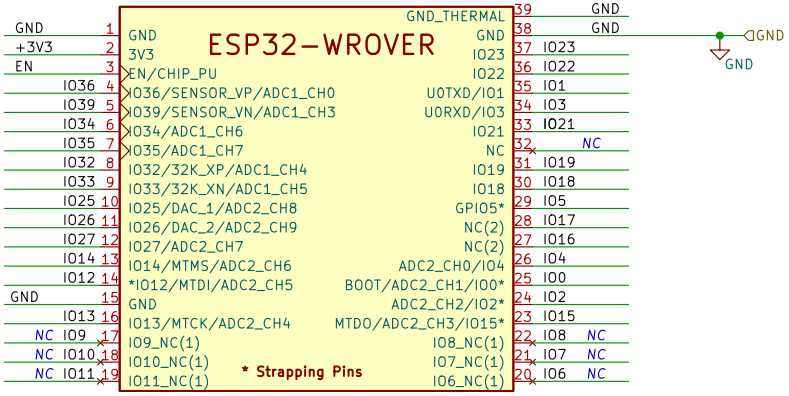
Title: Display		
Size: A4	Date: 2023-04-04	**Rev: 0.1**
KiCad E.D.A. kicad 6.0.4-6f826c9f35-116-ubuntu18.04.1		Id: 3/6

Microcontroller And Pinout

Module Only

U2A1
ESP32-WROVER-E

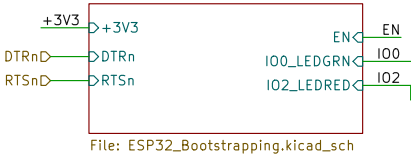


*IO12: Controls PSRAM LDO; *MUST* Float or PD at bootup for WROVER-(i)E
*IO0: PD for boot mode; float or PU for normal mode
*IO2: Float or PD if IO0 is low, else undocumented test modes
*IO15: Float/PU for U0TXD Debug Info; PD for silent boot
*IO5: PU default; mostly doesn't matter unless using SDIO slave-boot; Might PWM at boot
NC(1): GPIO6 to GPIO11 are connected to the SPI flash integrated on the WROVE-(i)E module
NC(2): GPIO16 and GPIO17 are used for PSRAM integrated on the WROVER-(i)E module
ADC2 pins do not operate properly as ADC with WIFI active
ADC readings are non-linear and weird near rails
RTC Wakeup IO: 0,2,4,12-15,25-27,32-36,39
2x I2C; Any pin; Arduino defaults to IO21/SDA1 & IO22/SCL1
VSPI Default: IO23/MOSI, IO19/MISO, IO18/CLK, IO5/CS
HSPI Default: IO13/MOSI, IO12/MISO, IO14/CLK, IO15/CS
IO Output High/PWM During Boot: 1, 3, 5, 6-11, 14, 15

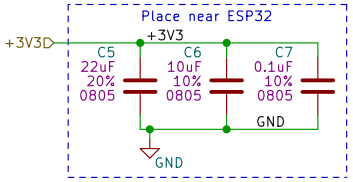
U2B1
ESP32-DevKitC

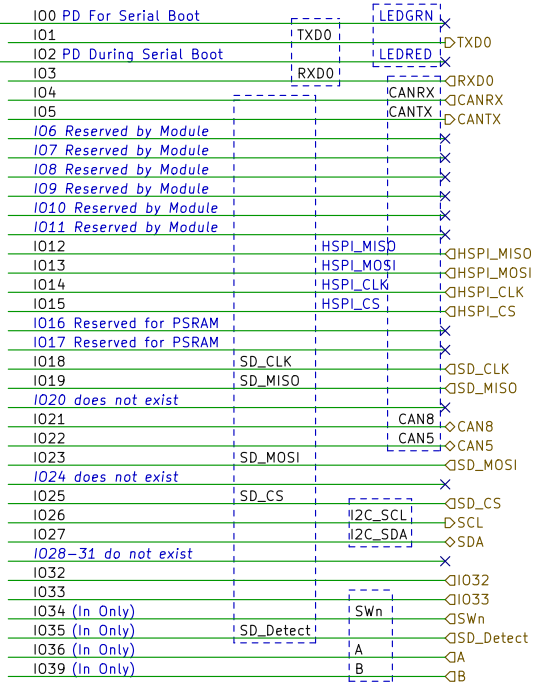
DevKitC - DNI

ESP32_Bootstrapping



File: ESP32_Bootstrapping.kicad_sch





Probably Review ESP-WROVER-KIT_SCH-3

Seems to have some of the extras, like pulling IO2 down to avoid undocumented test modes.
/home/junknerd/Electronics/datasheets/ESP32 Stuff/

Review my old DevKitTestProject for one I used w/ a TFT display, I2C, and a few other things.

/home/junknerd/esp/MyProjects/DevkitTestProject/main/

Review firework control code for CAN pin assignment.

/home/junknerd/esp/MyProjects/DevkitTestProject/main/

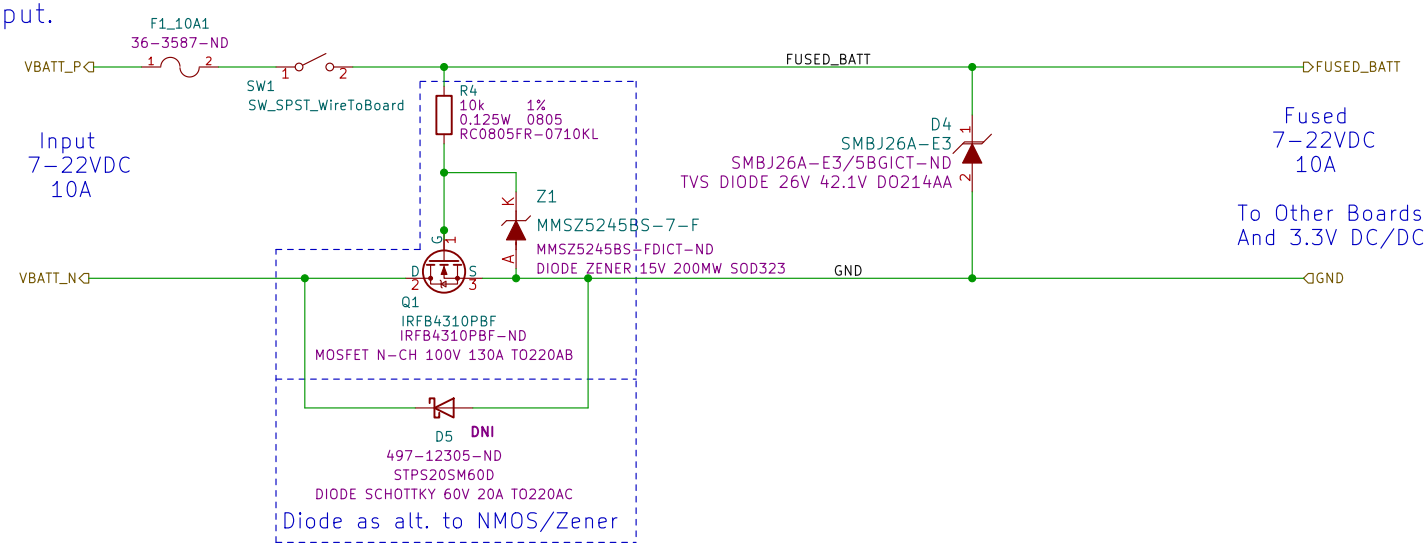
Sheet: /uC/
File: uC.kicad_sch

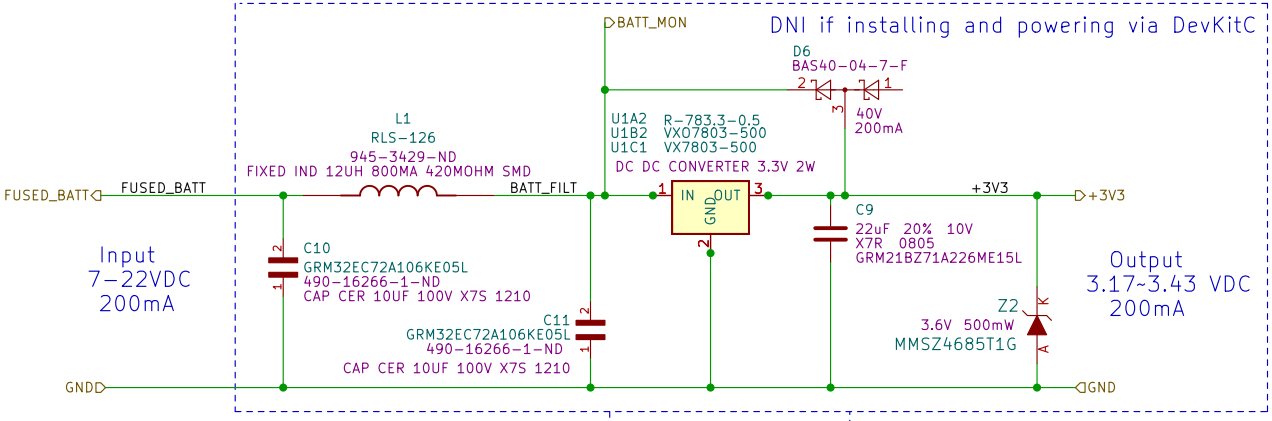
Title: Microcontroller

Size: A4	Date: 2023-04-04	Rev: 0.1
KiCad E.D.A. kicad 6.0.4-6f826c9f35-116-ubuntu18.04.1		Id: 4/6

Power Conditioning

NOTE: Typical use expected to include
18V Lithum battery and 9V battery,
so 7~22VDC input.

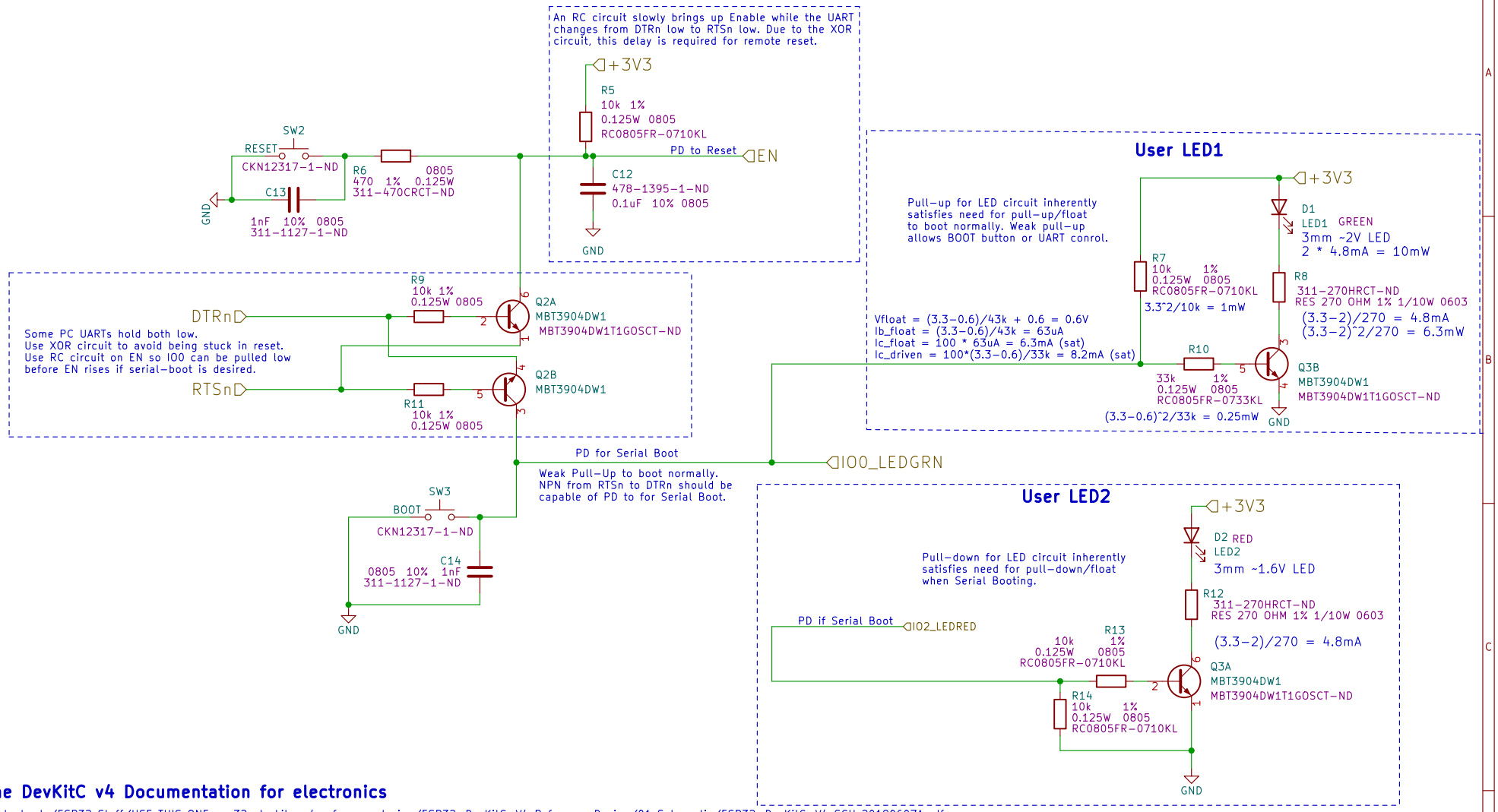




== DC/DC Selection ==
R-783.3-0.5
- Most expensive
+ Most efficient
+ Lowest noise & ripple
VX(0)7803-500
+ Much cheaper
+ Wider input range
- Less efficient
- More noise

Sheet: /Power/		
File: power.kicad_sch		
Title: Power Conditioning		
Size: A4	Date: 2023-04-04	**Rev: 0.1**
KiCad E.D.A. kicad 6.0.4-6f826c9f35-116-ubuntu18.04.1		Id: 5/6

Bootstrapping of ESP32 and User LEDs



Review the DevKitC v4 Documentation for electronics

/Electronics/datasheets/ESP32 Stuff/USE THIS ONE_esp32-devkitc-v4_reference_design/ESP32-DevKitC-V4_Reference_Design/01_Schematic/ESP32-DevKitC-V4_SCH_20180607A.pdf

Things that exist onboard DevKitC-V4

3V3: Bypass with 22uF and 0.1uF to GND
EN: RC to delay EN slightly
- 10k PU resistor and 0.1uF cap to GND
- Momentary btn to gnd w/ parallel 0.1uF to debounce

IO0: 1:Normal Boot 0:Download New Code
- Momentary btn to gnd w/ parallel 0.1uF to debounce

IO0 and EN: Consult connection to DTR and RTS to allow
USB/UART to automatically handle reset and boot-mode.

Sheet: /uC/ESP32_Bootstrapping/
File: ESP32_Bootstrapping.kicad_sch

Title: ESP32 Bootstrapping and LEDs

Size: A4	Date: 2023-04-04	Rev: 0.1
KiCad E.D.A. kicad 6.0.4-6f826c9f35-116-ubuntu18.04.1		Id: 6/6