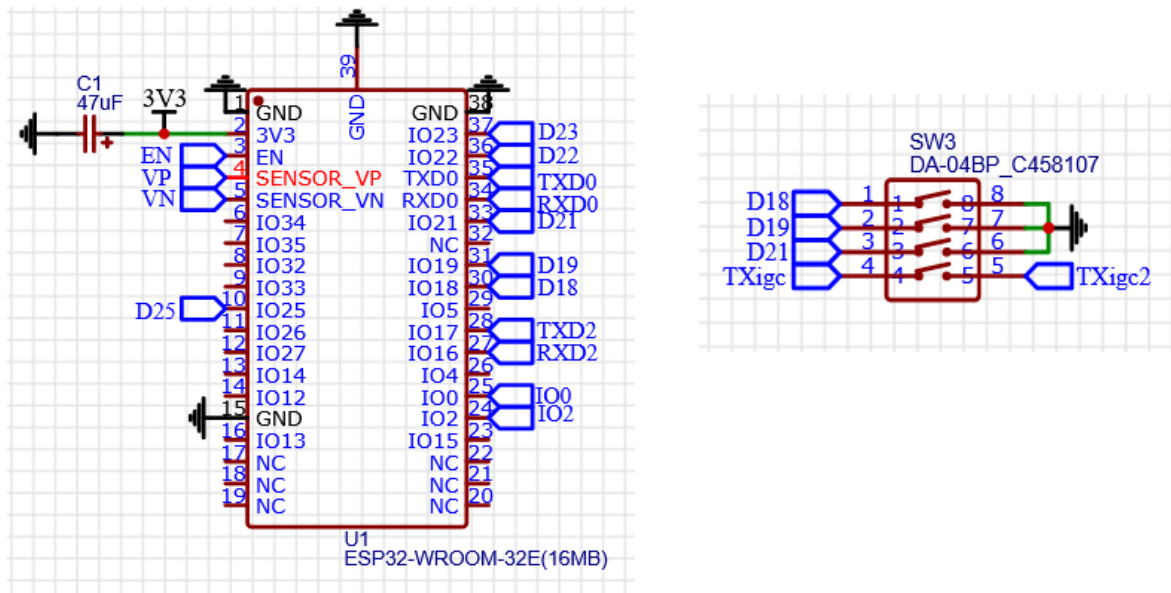


ESP32 LED Flasher

Hardware: ESP32-WROOM-32E(16MB)

Software IDE: Arduino



Basic features of the program:

- NMEA Data input at serial 2 port (RXD2)
- Automatic baudrate detection
- Forward serial 2 data stream to Bluetooth and allow to send NMEA inputs from Bluetooth device (so both directions)
- Analyse NMEA „PFLAU“ sentence and trigger LED flash sequence depending on the warning level
- Monitor 3 DIP switches for some basic setup: enable/disable Bluetooth, set 3 different LED flash sequences/ power level

NMEA data:

- Detailed documentation: <https://flarm.com/wp-content/uploads/man/FTD-012-Data-Port-Interface-Control-Document-ICD.pdf>
- Baudrate detection when powering on the ESP32 until it verified a connection and selected a baudrate. Possible baudrates are: 4800, 9600, 19200, 28800, 38400, 57600, 115200
- Analyse PFLAU NMEA sentence (page 16 – 21 of documentation)

Syntax:

PFLAU,<RX>,<TX>,<GPS>,<Power>,<AlarmLevel>,<RelativeBearing>,<AlarmType>,<RelativeVertical>,<RelativeDistance>[,<ID>]

- <GPS>: 1 = on ground and LED should not flash; 2 = airborne and LED should flash; a delay of about 10 seconds should be applied to properly determine the status. If airborne, the LED flasher should continuously flash with a long pause of e.g. 2200 ms
- <AlarmLevel>: 0, 1, 2, 3 → depending on the alarm level the long pause between the flash sequence should be adjusted. E.g. 0: 1800 ms; 1: 1500 ms ; 2: 1100 ms; 3: 800 ms

- <RelativeBearing>: only trigger a higher alarm level if the value is between -50 and 50
- <AlarmType>: only trigger higher alarm if it's an aircraft alarm, so value 2
- <RelativeVertical>: only trigger a higher alarm if the value is in between -300 and 300

Pinout:

- LED flash signal: D25 (IO25)
- Serial 2: TXD2 (IO17); RXD2 (IO16)
- DIP switch enable Bluetooth: D18 (IO18); high = on; low = off
- DIP switch power setting: D19 high & D21 high: high power setting; D19 or D21 high: mid power setting; D19 and D21 low: low power setting

LED Flash sequence:

- Low power setting: 35 ms on - 50 ms off - 35 ms on - 2200 ms off - 35 ms on - ... (Alarm level 0: 1800 ms instead of 2200 ms long pause, level 1: 1500 ms; 2: 1100 ms; 3: 800 ms)
- Mid power setting: 35 ms on - 50 ms off - 35 ms on - 50 ms off - 35 ms on - 2200 ms off - 35 ms on - ... (Alarm level 0: 1800 ms instead of 2200 ms long pause, level 1: 1500 ms; 2: 1100 ms; 3: 800 ms)
- High power setting: 35 ms on - 50 ms off - 35 ms on - 50 ms off - 35 ms on - 1500 ms off - 35 ms on - ... (Alarm level 0: 1100 ms instead of 1500 ms long pause, level 1: 900 ms; 2: 700 ms; 3: 500 ms)

Power on routine:

- When powering on, flash with the selected power setting for flash 5 cycles. There the <GPS> setting doesn't matter, so it should also blink on the ground.