



External MAXLAB ESP32 programmer can be used to flash and interact with the camera via the TagConnect cable

Note: 3v3 and 5v are used as an output here to power the external programmer UART buffers. Internal programmer LDO output must be disabled then

TODO: write comments about IO3, IO46, IO45 strapping pins

U10 ESP32-S3-WROOM-1

Bus connections to ESP32 MCU are optimized for easier layout

TODO: decide if sophisticated AGND connection (layout) is required for camera connector

Found in AI-Thinker design, purpose is yet to be understood

Pull-down is included for CAM\_RST and CAM\_PWDN internally.

Power Down Mode datasheet quote: To initiate hardware power-down, the PWDN pin (pin B6) must be tied to high. When this occurs, the OV2640 internal device clock is halted and all internal counters are reset. The current draw is less than 15  $\mu$ A in this standby mode

Layout: Put LDOs as close as possible to the camera connector

Keep separate "island" for camera connector and LDOs there

Layout: Put IRLED driver away from sensitive digital or analog lines

Given OV2640 sensitivity, an optimal LED should be C396643 @ LCSC ( $I_{max}$  -40ma for  $T <= 60C$ ,  $f_{peak} = 850nm$ , MPN: E6C0603IRAC1UDA)

Forward drop should be in a region of -1.6V The driver is capable of driving 7 white LEDs. WLED forward drop should be in the vicinity of -3V. Meaning that, hypothetically, we can drive up to 14 IR LEDs on this unit

Shutdown current for U12 is 1uA

$I_{led} = [V_{th} = 94mV <-> 114mV] / [-2.4R] \approx 40mA$

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Title: MaxLab AI Camera

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Id: 1/1

- ESP\_EN TP1
- ESP\_BOOT TP2
- TXDO TP3
- RXDO TP4
- PIR\_CTRL\_LE TP7
- PIR\_CTRL\_D TP8
- IRLED\_CTRL TP10
- BATT\_DETECT TP11
- PWR\_EN TP12
- PWR\_PIR TP13
- IRLED\_PWM TP14
- TP21
- TP22
- TP23
- TP24
- TP16
- TP17
- TP18
- TP19
- TP20