

Prototype of forward facing expansion connector

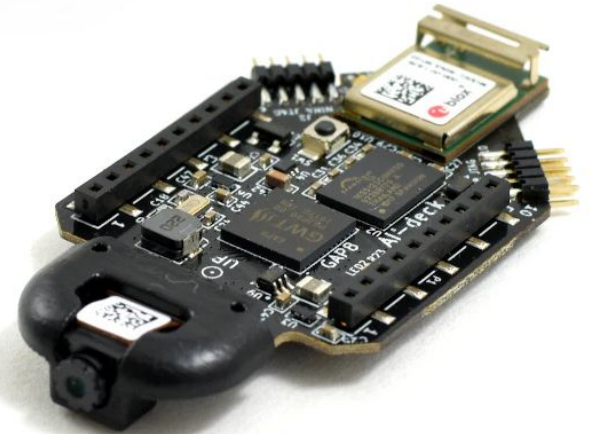
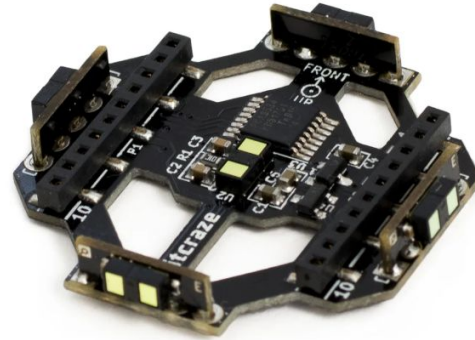
The deck subsystem

- Released in 2014 with the Crazyflie 2.0
- Automatic detection with 1-wire memories
- Supports multiple decks at once
- Mount top/bottom and varying height
- Multiple busses (I2C, SPI, UART)
- Various other signals (Wakeup, 1-wire, GPIO, VCC, VUSB, VCOM, GND)



Front facing expansions

- We already have boards with front facing sensors
- But we want to easily be able to ...
 - ... update sensors without new plastic parts
 - ... update sensors without redoing all electronics
 - ... update with new MCUs for sensors without redesigning electronics for each sensor



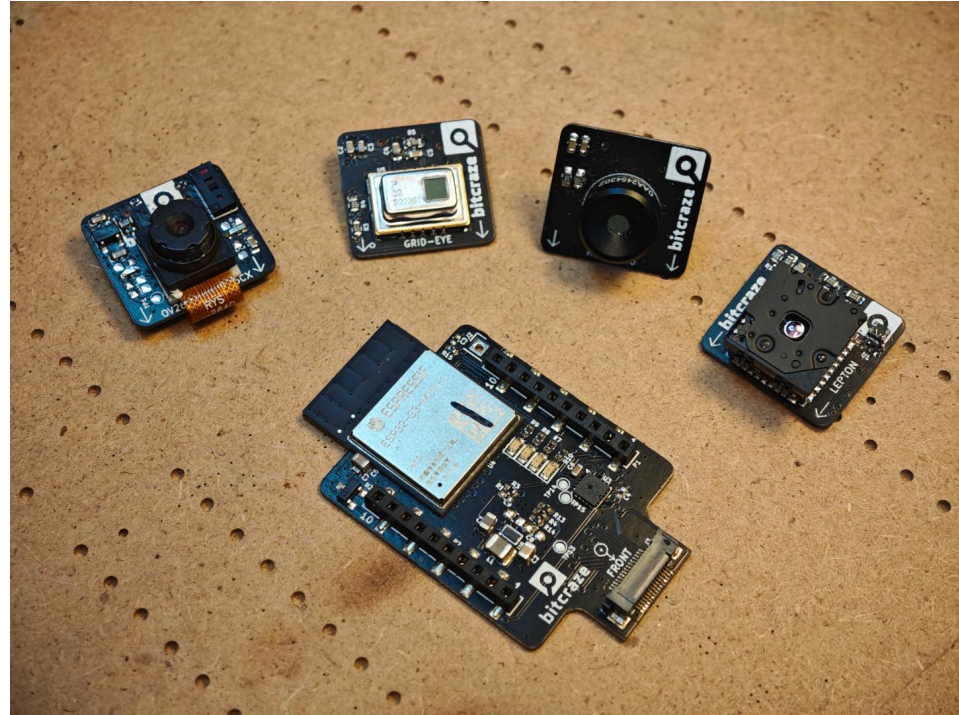
Some of the requirements

- Small and light
- Handle higher data rate
- Easy to exchange - 1-wire
- Handle crashes
- Users should be able to make their own
- Must fit with different platforms, propellers, motors and other decks
- Lots of signals for things like DVP camera interfaces

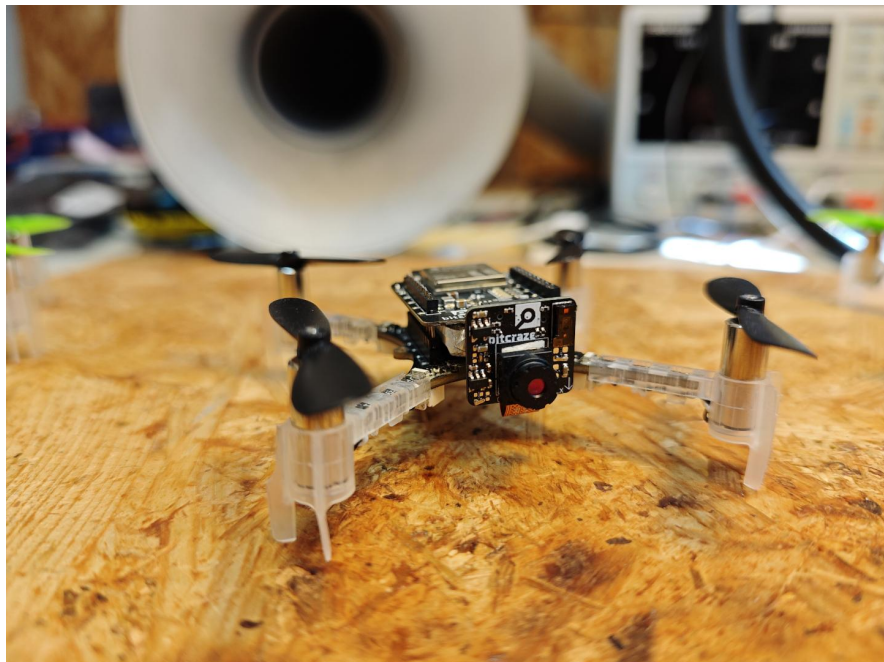


Current prototypes being tested

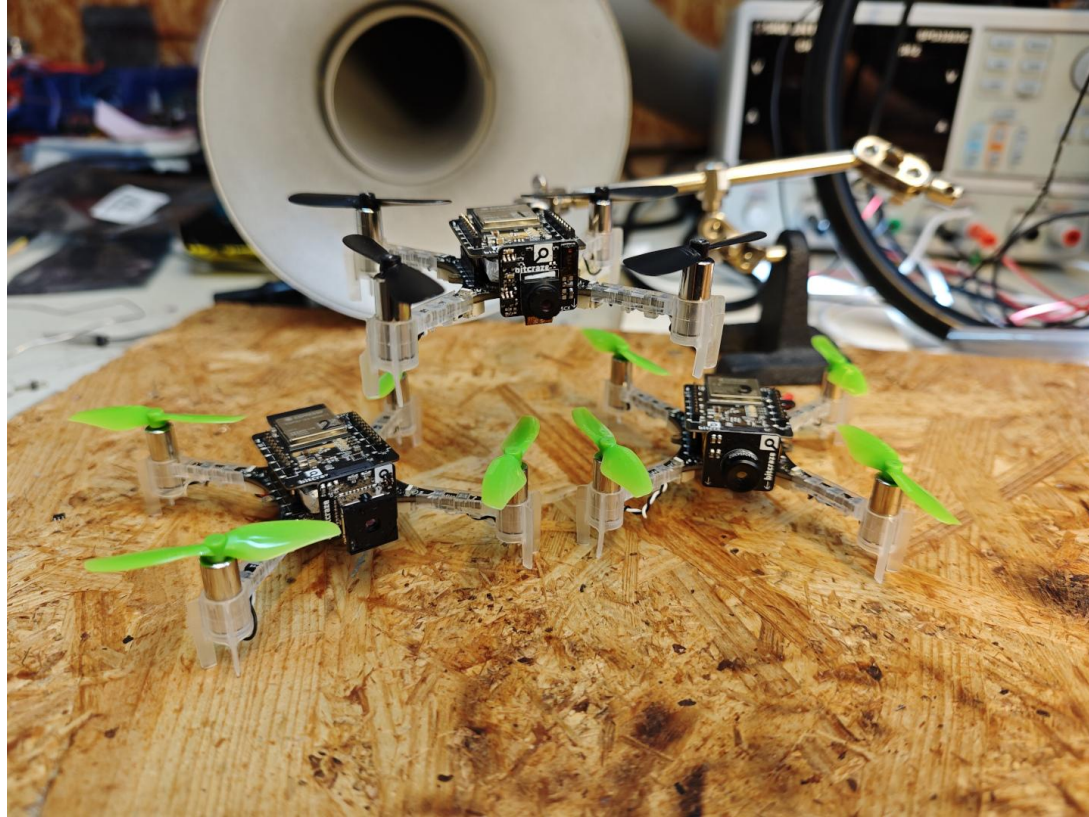
- Deck is ESP32-S3 based
- Multiple vision expansions
 - OV2640+VL53L5CX
 - Flir Lepton 3.5
 - MLX90640
 - Grid-EYE (AMG88)
- Being tested on multiple platforms
 - Crazyflie 2.1
 - Crazyflie BL
- Deck is ~4 g and expansions ~2 g
 - AI deck is 4.4 grams, ~1 gram less



Current prototypes being tested

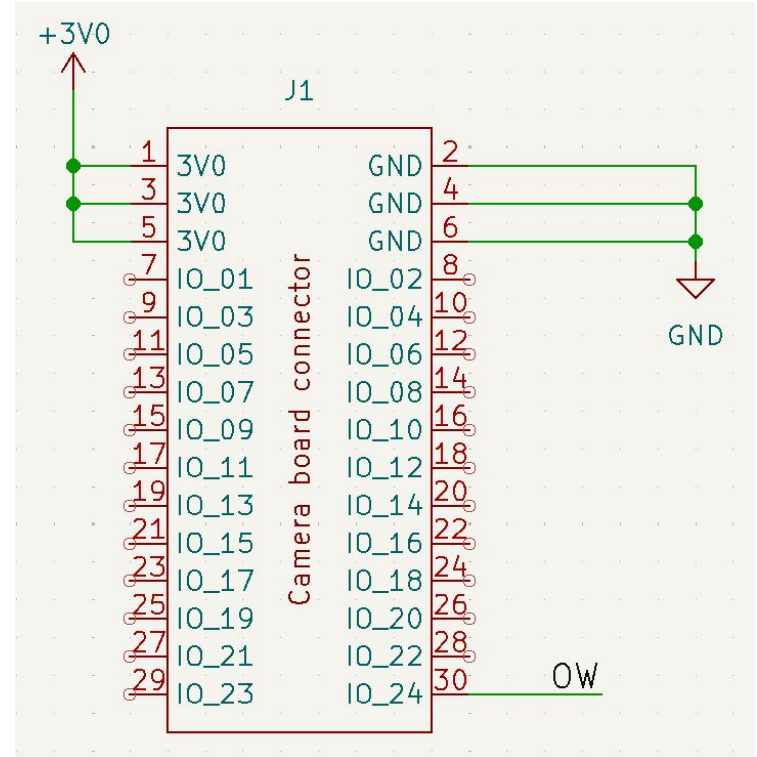


Current prototypes being tested



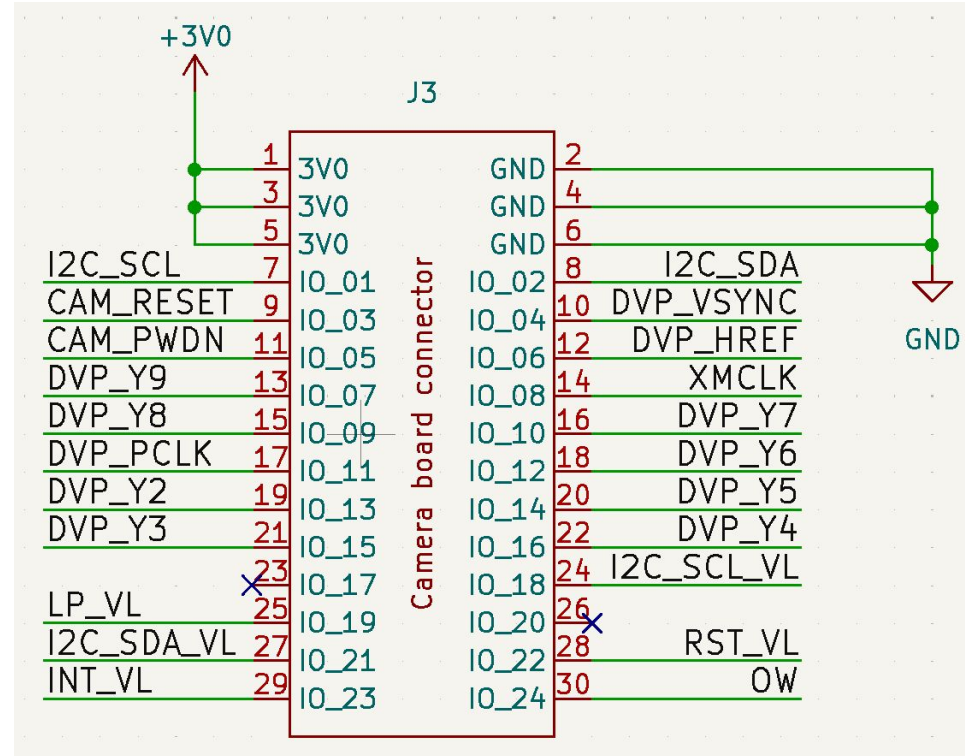
Current connector

- $3 * 300 \text{ mA} = 900 \text{ mA @ } 3\text{V0}$
- Same 1-wire as current deck subsystem
- 23 signals available
 - Uses ESP32 pin-mux, so no fixed signals yet for prototyping



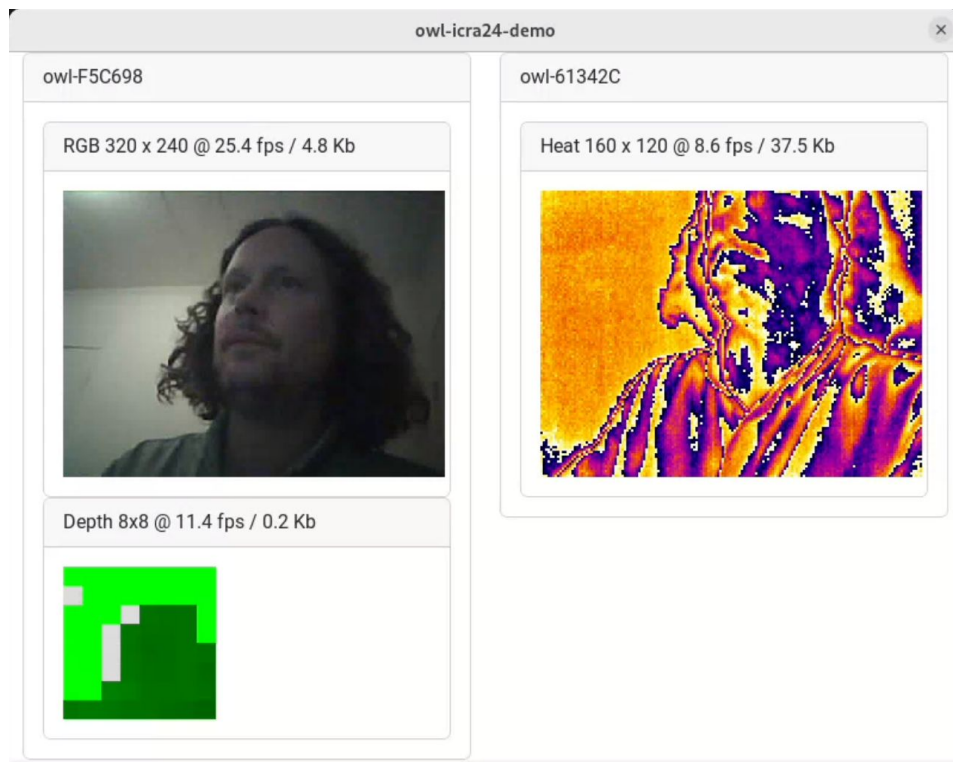
OV2640 + VL53L5Cx connector

- Power (6 pins)
- Camera DVP bus and control (17 pins)
- VL data and control (5 pins)
- 1-wire (1 pins)



ICRA 2024 demo

- 2 x Crazyflies
 - OV2640+VL53L5CX
 - Flir Lepton 3.5
- Tauri + React
- Streaming via UDP



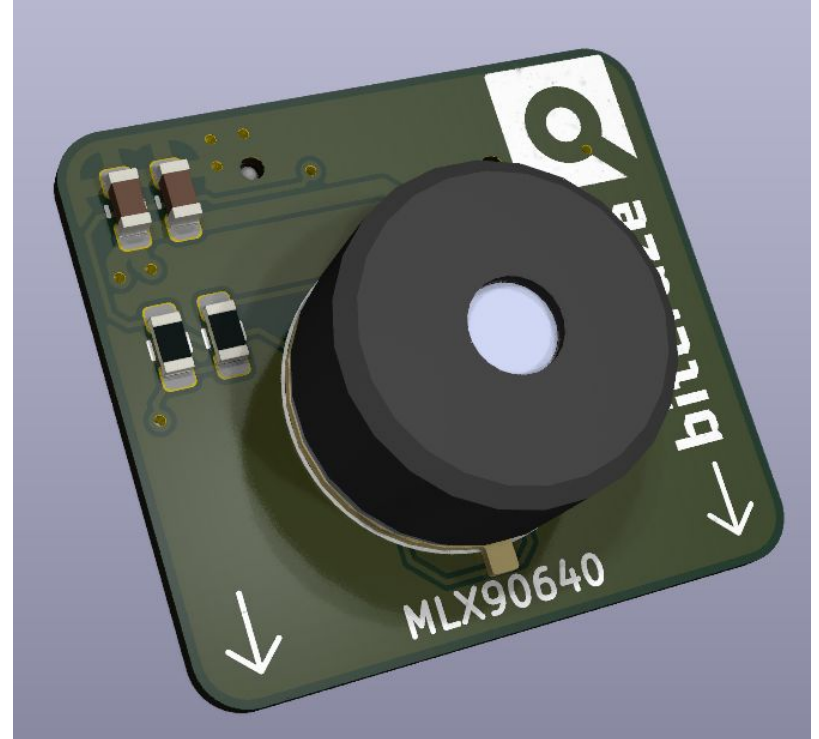
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Next steps

- Evaluate solution
- Define signals for interface
- Investigate other deck architectures



Q & A and ideas