

# SkyPulse Helios FMU

Public knowledge datasheet - consolidated from the supplied SkyPulse documentation set.



## Publication status

REVIEW REQUIRED. Two source conflicts are intentionally preserved in this document: minimum input voltage and module weight. Resolve them before using this file as the sole public source of truth.

## Product overview

SkyPulse Helios is an integrated avionics and compute stack engineered for next-generation unmanned systems. It combines a sensor-redundant flight controller with an onboard companion computer based on Raspberry Pi Compute Module 5. The supplied documentation describes native support for ArduPilot and PX4 and a low-SWaP-C design intended for advanced autonomy and mission-critical integration.

## Canonical product facts from the supplied documentation

| Field                   | Current source value                                        |
|-------------------------|-------------------------------------------------------------|
| Architecture            | Integrated flight controller + onboard companion computer   |
| Flight firmware         | ArduPilot and PX4; custom builds are described as supported |
| Default flight firmware | ArduCopter by default; PX4 can be flashed via USB           |
| Companion computer      | Raspberry Pi Compute Module 5 (eMMC variant)                |
| Companion OS            | Debian Bookworm clean image                                 |
| CPU                     | 4x Arm Cortex-A76 cores @ 2.4 GHz                           |
| Memory                  | 4 GB or 8 GB RAM                                            |
| Storage                 | 32 GB or 64 GB onboard eMMC                                 |
| Wireless                | Wi-Fi + Bluetooth                                           |

| Field                            | Current source value                                                                      |
|----------------------------------|-------------------------------------------------------------------------------------------|
| AI expansion                     | Up to 60 TOPS using the SkyPulse accelerator module                                       |
| Flight-controller sensors        | Triple onboard IMUs, dedicated compass, onboard barometer                                 |
| UART                             | 6x                                                                                        |
| Motor outputs                    | 8x; DSHOT, PWM, OneShot; protocols may be mixed                                           |
| CAN                              | 2x CAN bus ports                                                                          |
| I2C                              | 3x I2C ports on separate buses                                                            |
| RC input                         | ELRS, CrossFire, SBUS, FrSky                                                              |
| Logging / status                 | Micro-SD slot, buzzer, RGB status LED, FRAM for parameters and mission waypoints          |
| Power draw                       | ~12 W full load; ~7 W moderate load; 2.7 W idle                                           |
| Power connector                  | 2-pin Molex Nano-Fit locking connector, 45130-0201                                        |
| FMU / interface connector family | Molex Pico-Clasp 501189-3010                                                              |
| Manufacturing / compliance       | Documentation states 100% NDAA compliant and based on high-quality non-Chinese components |

## Companion-computer interfaces

- 1x USB 2.0; 2x USB 3.0; 2x MIPI CSI-2; Gigabit Ethernet.
- micro-HDMI output and analog video output.
- PCIe for AI accelerators, SDRs, storage, and other expansion.
- GPIOs exposed for servos, actuators, and custom I/O.
- J3 (Interface) is described as the typical connector for Ethernet transceivers, USB cameras, and AI accelerator integration.
- J4 (GPIO) exposes additional GPIOs, USB ports, UART-related signals, and dual-use ports.

## Flight-controller capabilities

- Main IMU: low drift and high accuracy in harsh vibration environments.
- Secondary IMU: high vibration rejection and strong temperature stability.
- Third IMU: 6-DOF industrial IMU with extended temperature range.
- Compass: onboard dedicated compass with accurate heading and extremely low drift.
- Barometer: onboard barometer described as centimeter-level accuracy.
- Analog voltage and current sensing; safety-switch input.

## Power guidance

### Safety-critical

Maximum documented input is 36 V. For systems up to 6S, the supplied documentation describes direct battery connection as typical. For direct 8S connection, an external filter / protection is required because of inductive motor spikes. Reversing J5 polarity can damage the unit.

If the system voltage is higher than 36 V, the documentation recommends using a BEC with adequate current capacity. Because Helios can draw up to approximately 12 W at full load, the source recommends a BEC capable of delivering more than 20 W to preserve headroom.

## Source conflicts that must be resolved

| Field                 | Current source value                                                                                                                                                                       |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Minimum input voltage | Website Docs Key Features: 5-36 V. J5 power diagram: 6-36 V. Do not publish a definitive minimum input voltage until engineering confirms the current hardware revision.                   |
| Weight                | Website Docs: 73 g. Current Shopify/PDP material used in this project has also shown 112 g. Confirm the current shipping configuration / hardware revision before making weight canonical. |
| Battery wording       | Website Docs Key Features says "2-6S battery" while the J5 diagram says "2-8S"; the detailed power section clarifies that direct 8S requires external filter / protection.                 |

### Assistant rule

Until the conflicts above are resolved, a public assistant should state that the source set is inconsistent rather than choosing a number.

## Software and communications

- Companion computer can run packages including TensorFlow, OpenCV, ROS, and other apps from the SkyPulse software stack.
- The documentation reports testing across hundreds of flight hours on ELRS, CrossFire, DTC, MicroHard, Siyi, FrSky, Futaba, RFD900x, Silvus, Doodle Labs, and fiber-optic communication links.
- CM\_RX and CM\_TX (ttyAMA0) are connected to the flight controller SERIAL3 / UART4 interface.

## Source provenance

Primary source: supplied "Website Docs.pdf" dated 2026-08-02, plus the supplied Helios J5, flight-controller connector, companion-computer connector, and enclosure/interface diagrams. This document is a normalized knowledge artifact and does not add unsupported product claims.