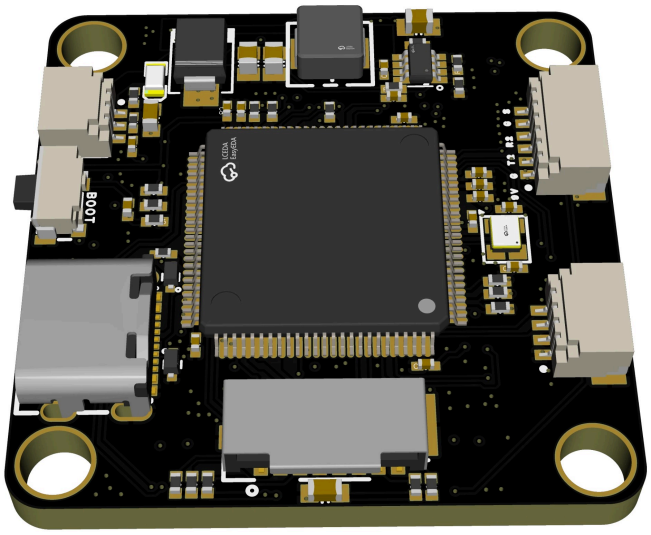
PRODUCT DATASHEET · HARDWARE REV 1.0 · DOCUMENT Rev 1.0 · October 2026

AeroH7

High-Performance STM32H7 Flight Controller · Dual-IMU · DJI O3/O4 & Analog Video



Representative CAD rendering

480 MHz
STM32H743VIT6
Cortex-M7 · 2 MB Flash

2 IMUs
BMI088 + BMI270
DPS310 baro · IST8310 mag

2S – 6S
6.0 – 27.0 V input
5 V + 9 V BEC · 3 A design rating

10 outputs
M1 – M10
motor / servo

6 + 1 UARTs
6 full + 1 RX-only (ESC tlm)
CAN · I²C · SWD · USB-C

36 × 36 mm
30.5 × 30.5 mm mount · 9 g
JST-GH or solder pads

Overview

AeroH7 is a high-performance flight controller that puts a 480 MHz STM32H7 processor, a dual-IMU sensor suite and a full navigation set into a 36 × 36 mm, 9 g package. Dedicated 5 V and 9 V power rails, a DJI O3/O4 Air Unit interface with integrated analog video input/output, CAN, and six full UARTs plus one RX-only UART for ESC telemetry let one board scale from agile FPV craft to autonomous, companion-computer UAVs – with no carrier board required.

Key features

- Dual-IMU configuration – BMI088 + BMI270
- Onboard DPS310 baro + IST8310 compass
- Plug-and-play DJI O3 / O4 HD port
- Analog video with AT7456E OSD
- DShot ×10 · bidirectional DShot ×8
- DroneCAN-ready CAN · GNSS port
- ArduPilot · PX4 · Betaflight · INAV
- MicroSD black box · USB-C · SWD

Applications

- FPV racing, freestyle and cinematic platforms
- Hexa / octocopters up to 10 outputs
- Autonomous and companion-computer UAVs

Contents

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2 Pinout – back & front 3
3 Pinout – MCU side & UART map 4
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1 Specifications

Processor & memory	
MCU	STMicroelectronics STM32H743VIT6
Core	Arm Cortex-M7, 480 MHz
Flash	2 MB internal
Data logging	MicroSD card slot (black-box)
OSD	AT7456E analog OSD (MAX7456 compatible)
Status LED	RGB

Sensors	
IMU 1	Bosch BMI088 · ±3 to ±24 g · ±125 to ±2000 °/s
IMU 2	Bosch BMI270 · ±2 to ±16 g · ±125 to ±2000 °/s
Barometer	Infineon DPS310 · 300 – 1200 hPa · ±0.002 hPa precision (high-precision mode) · ±0.06 hPa relative / ±1 hPa absolute accuracy
Magnetometer	iSentek IST8310 · ±1600 µT (X, Y) · ±2500 µT (Z)

Sensor figures are component manufacturer specifications (selectable ranges), not measured board-level performance.

Power	
Battery input	2S – 6S LiPo · 6.0 – 27.0 V
5 V system BEC	5.0 V · 3.0 A design rating – FC, receiver, GPS, telemetry, sensors
9 V video BEC	9.0 V · 3.0 A design rating – DJI O3/O4, VTX, FPV camera
Battery monitoring	VBAT voltage – dedicated ADC input
Current monitoring	CURR input from ESC current sensor – dedicated ADC input
Voltage / current scale	VBAT voltage-sensing scale factor 21.2 · ArduPilot defaults: BATT_VOLT_PIN 10, BATT_CURR_PIN 11, BATT_VOLT_MULT 21.2, BATT_AMP_PERVLT 40.2 (current scale applies to the connected ESC sensor) – verify against a calibrated measurement

Interfaces	
UART	6 full (UART1, 2, 3, 4, 6, 8) + 1 RX-only (UART7, ESC telemetry) · 3.3 V logic
Motor / servo outputs	10 × M1–M10 control signals · DShot on all · Bi-DShot on M1–M8 (not PX4 / INAV) · protocol groups M1–4 / 5–6 / 7–10
CAN	1 × – CAN1 (DroneCAN capable, firmware dependent)
I²C	1 external bus (I2C1), shared by the I²C connector and the GPS connector
GPS	1 × combined connector – UART3 + I²C
RC input	UART6 (CRSF / ELRS) · SBUS pin (ref 13) hardware-inverted onto RX6
Digital video	DJI O3 / O4 Air Unit port – UART2 + SBUS + 9 V
Analog video	VIDEO-IN (camera) → VIDEO_OUT (VTX)
USB	USB Type-C – configuration, firmware, MAVLink
Debug	SWD (3V3 · GND · SWDIO · SWCLK) · BOOT button

Mechanical	
Dimensions	36 × 36 × 8 mm
Mounting	4 × corner holes · 30.5 × 30.5 mm · Ø 4 mm
Weight	9 g
Connectors	Variant A: JST-GH 1.25 mm, locking · Variant B: solder pads (8-pin JST power/motor connector retained)

Firmware support	
ArduPilot	4.6.0+ · analog OSD · DisplayPort · Bi-DShot M1–M8
Betaflight	4.5.0+ · Bi-DShot via bitbang
INAV	8.0.0+ · no Bi-DShot
PX4	1.16.0+ · no analog OSD / Bi-DShot
Download	HW Rev 1.0 · from our website

2 Pinout – back & front

Signal names are printed exactly as on the board. Colours follow the pinout artwork: 5V power · GND ground · TX1 TX / motor · RX1 RX / SDA / video · SCL SCL / 3V3 · CANL CANH CAN · SWDIO debug / current.

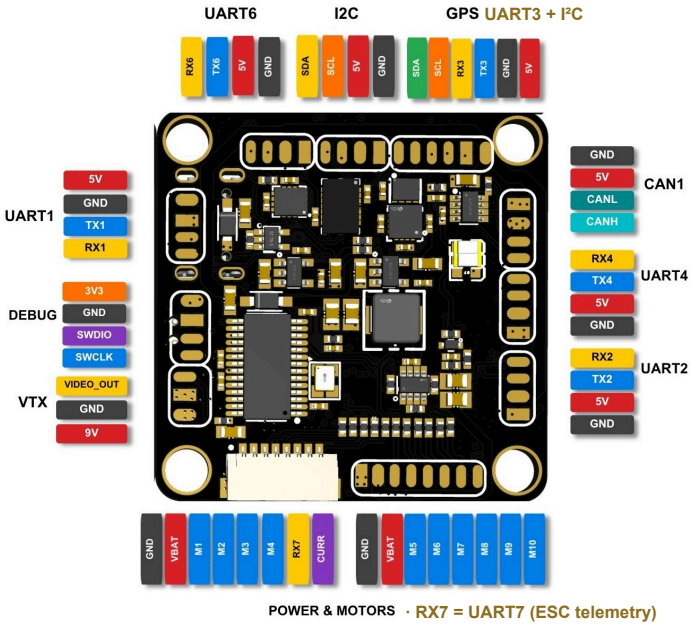


Figure 2-1. Back – connector side

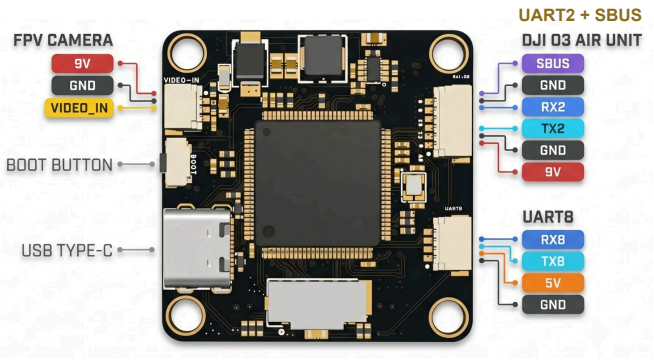


Figure 2-2. Front – MCU side

Shown: Variant A (JST connectors). Variant B replaces the back-side connectors with solder pads carrying the same signals in the same order; the 8-pin power/motor connector, the front-side connectors and USB-C are unchanged.

TABLE 2-1. CONNECTOR-SIDE CONNECTORS (REFS 1 – 11)

Ref	Connector	Signals, in labelled order	Function
1	**UART6**	RX6 TX6 5V GND	RC receiver (CRSF / ELRS; UART6)
2	**I²C**	SDA SCL 5V GND	External I²C sensors
3	**GPS (UART3 + I²C)**	SDA SCL RX3 TX3 GND 5V	GNSS / RTK module with compass
4	**UART1 / TELEM1**	5V GND TX1 RX1	Primary telemetry
5	**DEBUG / SWD**	3V3 GND SWDIO SWCLK	Programming and debug
6	**VTX**	VIDEO_OUT GND 9V	Analog VTX (video out + 9 V supply)
7	**CAN1**	GND 5V CANL CANH	CAN / DroneCAN – **not** Pixhawk pin order
8	**UART4**	RX4 TX4 5V GND	Secondary telemetry / companion computer
9	**UART2 / TELEM2**	RX2 TX2 5V GND	Telemetry (UART2 is shared with ref 13)
10	**Power & Motors A**	GND VBAT M1 M2 M3 M4 RX7 CURR	Battery in, M1–M4, ESC telemetry, current sense
11	**Power & Motors B**	GND VBAT M5 M6 M7 M8 M9 M10	Battery in, M5–M10

3 Pinout – MCU side & UART map

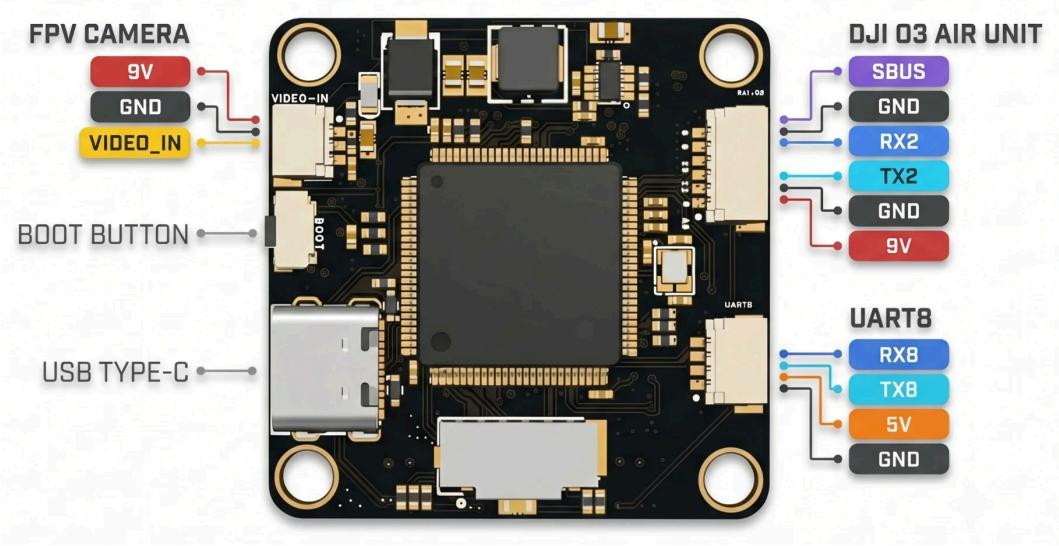


Figure 3-1. MCU-side pinout

TABLE 3-1. MCU-SIDE INTERFACES & CONTROLS (REFS 12 – 17)

Ref	Connector	Signals, in labelled order	Function
12	**VIDEO-IN (FPV camera)**	9V · GND · VIDEO_IN	Analog camera input
13	**DJI O3 / O4**	6·SBUS · 5·GND · 4·RX2 · 3·TX2 · 2·GND · 1·9V	Digital VTX (UART2 + SBUS) · SH1.0 6-pin · **pin 1 = 9 V**
14	**UART8**	RX8 · TX8 · 5V · GND	Spare / expansion
15	**BOOT**	—	Push button – bootloader (DFU) entry
16	**USB Type-C**	—	Configuration, firmware, MAVLink over USB
17	**MicroSD slot**	—	Black-box / flight data logging

Shared UART2. TELEM2 (ref 9, 5 V) and the DJI O3/O4 connector (ref 13, 9 V) are two physical connections to the same UART2 – not two UARTs. Use only one of them at a time.

TABLE 3-2. UART RESOURCE MAP

UART	Pins	Connector	ArduPilot	PX4	Default use
USB	—	16 · USB-C	SERIAL0	ttyACM0	Configurator / MAVLink
UART1	TX1 RX1	4 · TELEM1	SERIAL1	TELEM1 · ttyS0	MAVLink 2 telemetry
UART2	TX2 RX2	9 · TELEM2 *or* 13 · DJI	SERIAL2	TELEM2 · ttyS1	HD VTX (DisplayPort)
UART3	TX3 RX3	3 · GPS	SERIAL3	GPS1 · ttyS2	GNSS
UART4	TX4 RX4	8 · UART4	SERIAL4	TELEM3 · ttyS3	MAVLink 2 / companion
UART6	TX6 RX6	1 · UART6	SERIAL5	RC · ttyS4	RC input
UART7	RX7	10 · Pwr & Motors A	SERIAL6	ttyS5	ESC telemetry (RX only)
UART8	TX8 RX8	14 · UART8	SERIAL7	TELEM4 · ttyS6	Spare (VTX ctrl / flow)

All UARTs are DMA-enabled. Defaults can be reassigned in the firmware (ArduPilot: SERIALn_PROTOCOL). UART signals are 3.3 V logic.

4 System wiring diagram 4.1 – connector side (back)

A typical complete build – every peripheral on its recommended port, with each cable leaving the connector where it sits on the board. Filled chips are AeroH7 pins in board order; outlined chips are the device pins. MCU-side wiring follows in 4.2.

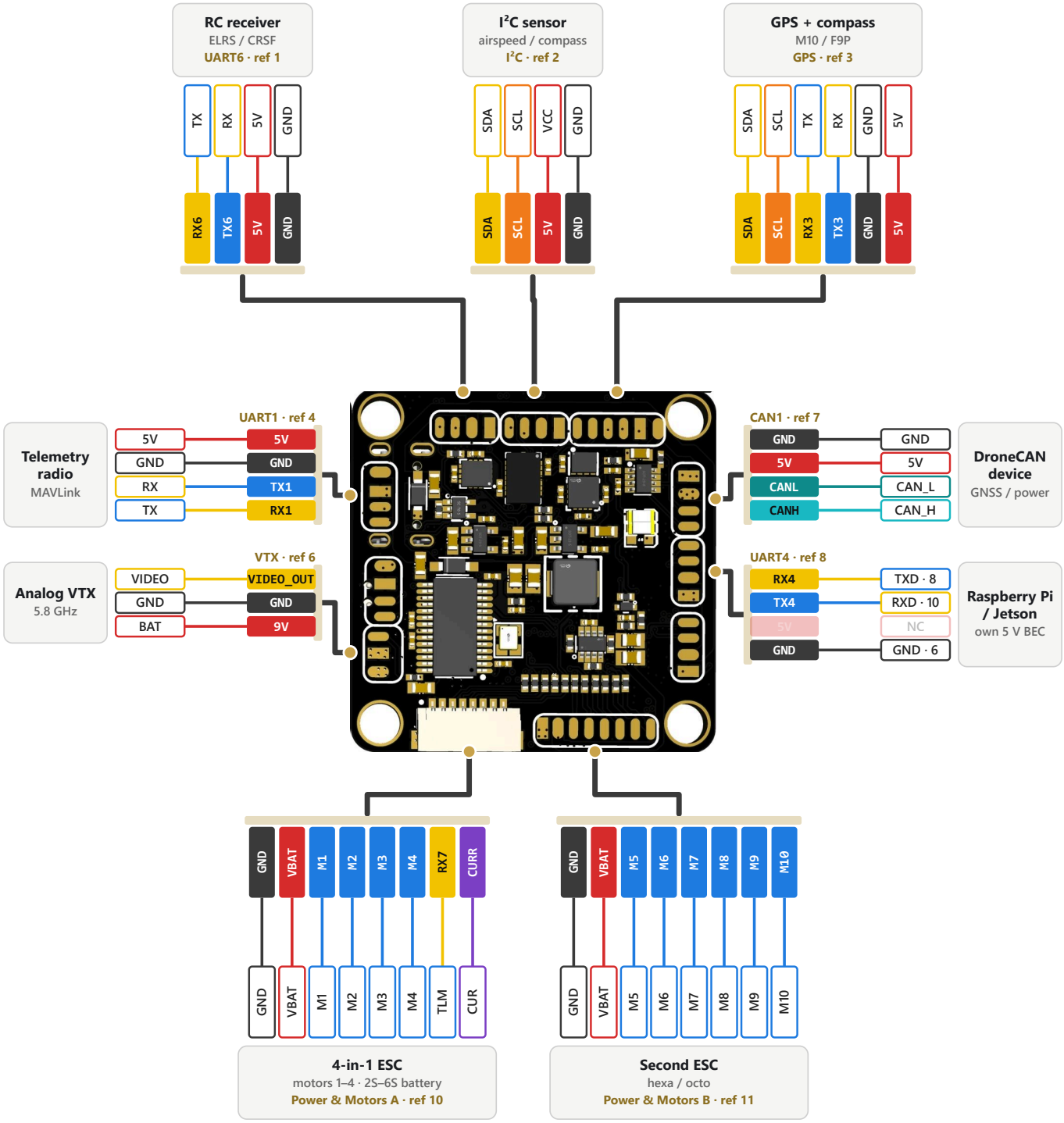


Figure 4-1. AeroH7 system wiring – connector side (back)

- **UART links cross over.** Device TX → FC RX, device RX → FC TX. I²C, CAN and video go straight across.
- **Power rails:** 5 V and 9 V, each 3 A design rating, shared by every device on that rail.
- **Unused in this build:** the TELEM2 connector (ref 9) – UART2 is assigned to the DJI Air Unit (ref 13) – and DEBUG / SWD (ref 5).
- **Companion computers** need their own 5 V BEC – never the FC 5 V pin (5 V NC).
- **Check third-party harnesses** (ESC, DJI, Pixhawk-style CAN/GPS) against section 2–3 before power-up.

4 System wiring diagram 4.2 – MCU side (front)

The MCU side carries the DJI HD port, the analog camera input and UART8, plus USB-C, BOOT and the MicroSD slot. Each cable leaves the connector where it sits in Figure 3-1.

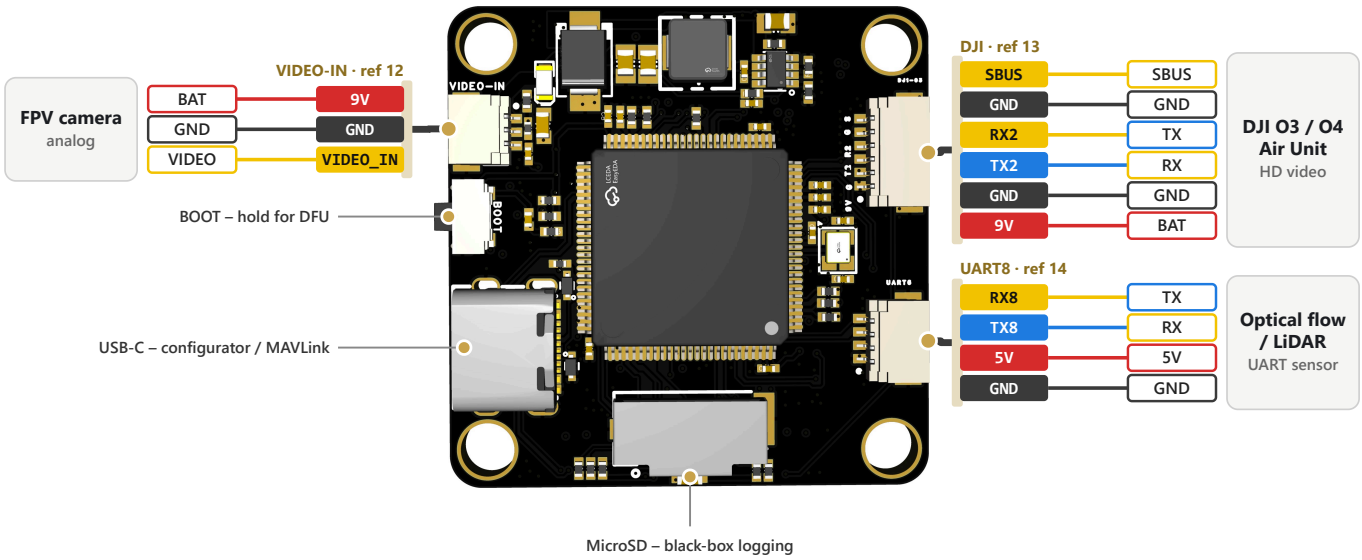


Figure 4-2. AeroH7 system wiring – MCU side (front)

- **UART2 is shared** by the DJI port (ref 13) and TELEM2 (ref 9) – connect only one.
- **DJI pin 1 is 9 V** – never connect a 5 V-only device to ref 13.
- **SBUS (ref 13) is inverted onto RX6.** Leave it unconnected when a receiver is on UART6.
- **Camera video** from VIDEO-IN passes through to VIDEO_OUT (ref 6, back) for the analog VTX.

TABLE 4-1. PORT ALLOCATION – TYPICAL BUILD (BOTH SIDES)

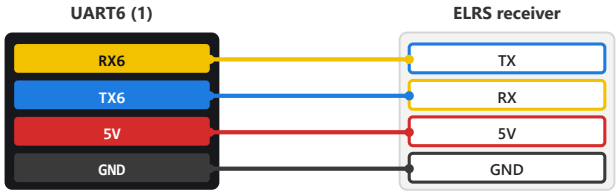
Side	Ref	Port	Device
Back	1	UART6	RC receiver (ELRS / CRSF)
Back	2 · 3	I²C · GPS	I²C sensor · GPS + compass
Back	4	UART1	Telemetry radio (MAVLink 2)
Back	6	VTX	Analog VTX
Back	7 · 8	CAN1 · UART4	DroneCAN device · Raspberry Pi / Jetson
Back	10 · 11	Power & Motors A · B	4-in-1 ESC (M1–M4) · second ESC (M5–M10)
Front	12	VIDEO-IN	Analog FPV camera
Front	13	DJI O3 / O4	DJI Air Unit (HD video, OSD, SBUS)
Front	14	UART8	Optical flow / LiDAR

5 Peripheral connection guide 5.1 – video, control & navigation

Left: AeroH7 connector, pins in board order. Right: device pins. Greyed FC pins marked NC stay unconnected. UART links always cross over: **TX** → **RX**, **RX** ← **TX**.

RC receiver – ELRS / CRSF

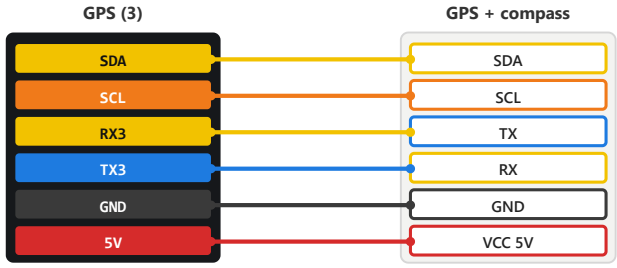
Ref 1 · UART6



- Connect receiver **TX** → **AeroH7 RX6** and receiver **RX** → **AeroH7 TX6**; 5V and GND by label.
- Receiver pad order varies by model – wire by signal name, not by connector position.
- Single-wire serial receivers can go straight to **RX6**.
- SBUS receivers: use the **SBUS** pin (ref 13), which is hardware-inverted onto RX6 – leave UART6 RX6 unconnected then.

GPS / GNSS module with compass

Ref 3 · GPS



- e.g. u-blox M8N / M10 / F9P (RTK) modules with QMC5883 / IST8310 compass.
- GPS **TX** → **RX3**, GPS **RX** → **TX3**; SDA/SCL go straight across.
- Mount the GPS mast away from power wires and the VTX for a clean compass.

Analog FPV camera

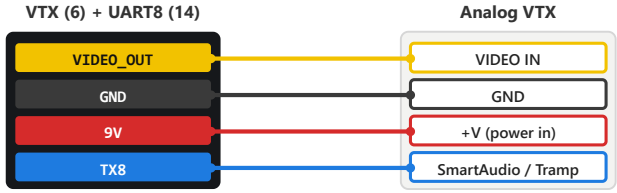
Ref 12 · VIDEO-IN



- Camera is powered from the 9 V video BEC – check the camera accepts 9 V input.
- Use the camera's video ground next to the video signal to reduce noise lines.
- Video passes through to ref 6 (VIDEO_OUT) for the analog VTX.

Analog VTX

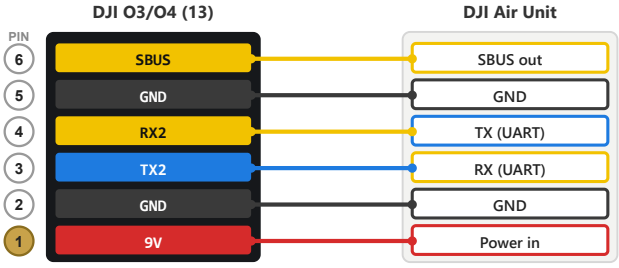
Ref 6 · VTX + Ref 14 · UART8



- 9 V from the video BEC powers the VTX – confirm the VTX input range includes 9 V.
- Optional VTX control (SmartAudio / IRC Tramp) on **TX8**; set UART8 to VTX control in firmware.
- Always fit an antenna before powering a VTX.

DJI O3 / O4 Air Unit (digital FPV)

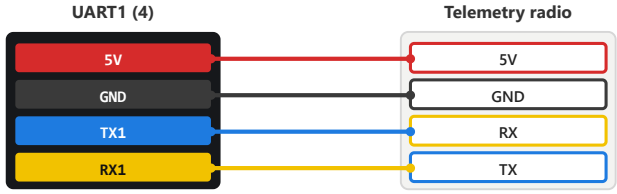
Ref 13 · DJI



- SH1.0 6-pin. Shown as in Figure 3-1 (MCU side, top to bottom): **pin 1 = 9 V** is the bottom pin, beside the white pin-1 dot. Never connect a 5 V-only device.
- UART2 carries MSP DisplayPort OSD (firmware default). **SBUS** (inverted onto RX6) is needed only with a DJI remote controller.
- **UART2 is shared with ref 9 (TELEM2)** – do not use both connectors at the same time.
- Walksnail / HDZero digital VTX can use the same port with a matched cable.

Telemetry radio / WiFi MAVLink

Ref 4 · UART1 / TELEM1



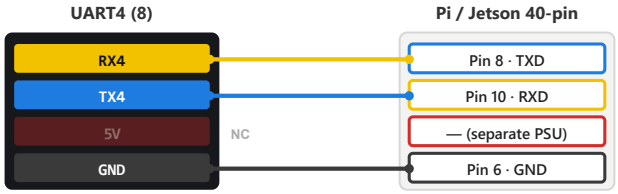
- SiK 433 / 915 MHz, RFD900x, ESP8266 / ESP32 WiFi bridges, LTE modems.
- FC **TX1** → **radio RX**, FC **RX1** ← **radio TX**. Protocol: MAVLink 2, typically 57 600 baud.
- High-power radios (RFD900x) draw a lot of current from the 5 V rail – include them in the power budget.

5 Peripheral connection guide

5.2 – companion, power & expansion

Raspberry Pi / NVIDIA Jetson companion

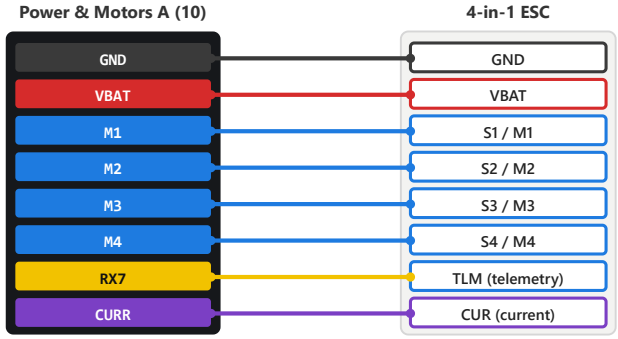
Ref 8 · UART4



- Raspberry Pi 4 / 5 (GPIO14 TXD, GPIO15 RXD) and Jetson Orin Nano / NX (40-pin header) use the same pins 8 · 10 · 6.
- **Do not power the companion computer from the FC 5 V pin** – use a separate 5 V BEC from the battery (Pi 5: 5 V / 5 A).
- 3.3 V logic on both sides – no level shifter needed. MAVLink 2 at 921 600 baud (MAVROS / MAVSDK / pymavlink).
- Alternative: USB-C on the FC to a USB port on the computer.

4-in-1 ESC (motors M1–M4)

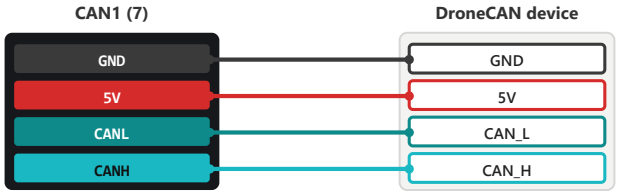
Ref 10 · Power & Motors A



- Battery power for the FC comes in on this connector (2S–6S).
- **ESC harness pin order differs between brands** – re-pin the cable to match this table, never plug in blind.
- ESC telemetry TX → **RX7**; ESC current-sense output → **CURR**.
- M1–M10 are ESC / servo control signals – they cannot drive motors directly.
- Hexa / octo: second ESC on ref 11 (M5–M10).

CAN / DroneCAN peripherals

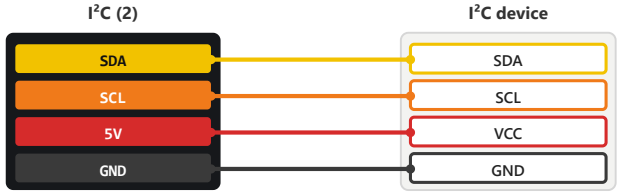
Ref 7 · CAN1



- DroneCAN GPS, power monitors, airspeed sensors, CAN ESCs (firmware dependent).
- **Pin order is not the Pixhawk standard** (5V · CAN_H · CAN_L · GND) – a standard Pixhawk CAN cable must be re-pinned.
- Terminate the far end of the bus with 120 Ω if the device does not include it.

I²C sensors

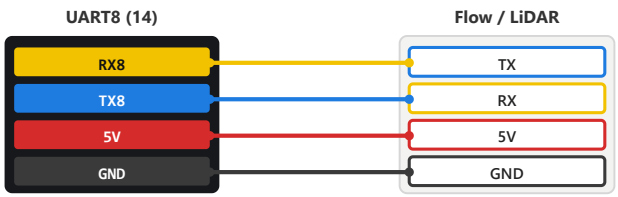
Ref 2 · I²C



- External compass, airspeed sensor (MS4525DO), I²C rangefinder (VL53L1X, TF-Luna), OLED display.
- SDA → SDA and SCL → SCL (no cross-over). Each device on the bus needs a unique I²C address.
- **The 5 V pin is peripheral power only.** Confirm the device's I²C logic level and pull-up voltage are 3.3 V compatible; never add 5 V pull-ups.

Optical flow / UART rangefinder

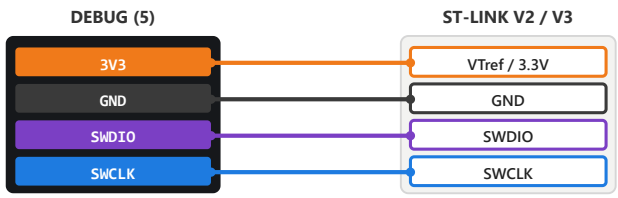
Ref 14 · UART8



- e.g. Matek 3901-L0X, Benewake TFmini-S / TF-Luna (UART mode) and other UART flow / LiDAR sensors.
- Sensor **TX** → **RX8**, sensor **RX** → **TX8**. Mount facing straight down, clear view of the ground.
- UART8 can be used for VTX control instead (see Analog VTX).

ST-LINK / SWD debugger

Ref 5 · DEBUG



- For bootloader recovery and firmware development only – normal users flash over USB-C.
- 3V3 is a reference; power the board from USB or battery while debugging.

6 Power & mechanical

POWER BUDGET

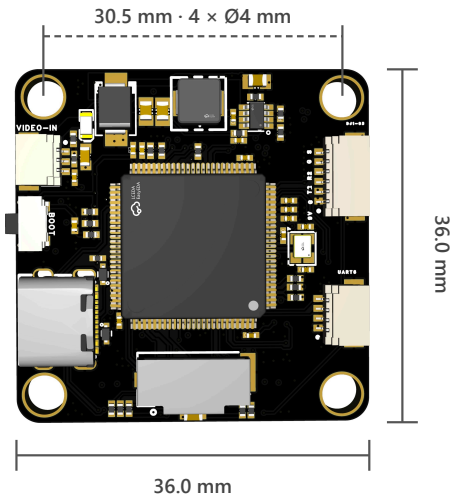
Rail	Rating	Feeds
VBAT	2S–6S · 6.0–27.0 V	Refs 10 and 11 – ESCs and FC input
5V	5.0 V · 3.0 A design rating	FC + all 5 V pins: refs 1, 2, 3, 4, 7, 8, 9, 14
9V	9.0 V · 3.0 A design rating	Refs 6 (VTX), 12 (camera), 13 (DJI)
3V3	Reference only	Ref 5 (SWD) – do not load

- The current shown is shared by every pin on that rail – add up all connected devices.
- 3 A per rail is a design rating, subject to board-level validation. Simultaneous full load on both rails is not rated; allow thermal margin.
- Companion computers (Raspberry Pi, Jetson) need their own BEC.

FIRST POWER-UP CHECKLIST

1. Check every harness against the connector reference (sections 2–3) – third-party cable pin orders differ.
2. First power-up over USB-C only, props off.
3. Flash firmware, then set the UART functions (Table 3-2).
4. Calibrate the accelerometer and compass; set the voltage and current scale.
5. Check motor order and direction with props off.

MECHANICAL



BOARD CONTROLS

BOOT	Hold while connecting USB-C to enter the STM32 DFU bootloader (firmware recovery / first flash).
USB-C	Configurator and firmware update. USB powers the MCU for setup; 9 V devices need the battery.
MicroSD	Black-box / dataflash logs. Use a quality card formatted FAT32.

VARIANTS

Variant A – JST	JST-GH 1.25 mm locking connectors for plug-in harnesses
Variant B – Pads	Connector-side ports become solder pads; one 8-pin JST power/motor connector, MCU-side connectors and USB-C unchanged

REVISION HISTORY

Revision	Date	Changes
Rev 1.0	October 2026	First release

Specifications are subject to change without notice. Sensor figures are manufacturer component values. Fit for a given airframe depends on firmware, actuators, power, thermal behaviour and system-level testing by the integrator. The manufacturer is not liable for damage from incorrect wiring or operation. DJI, Raspberry Pi, NVIDIA Jetson and other names are trademarks of their owners.