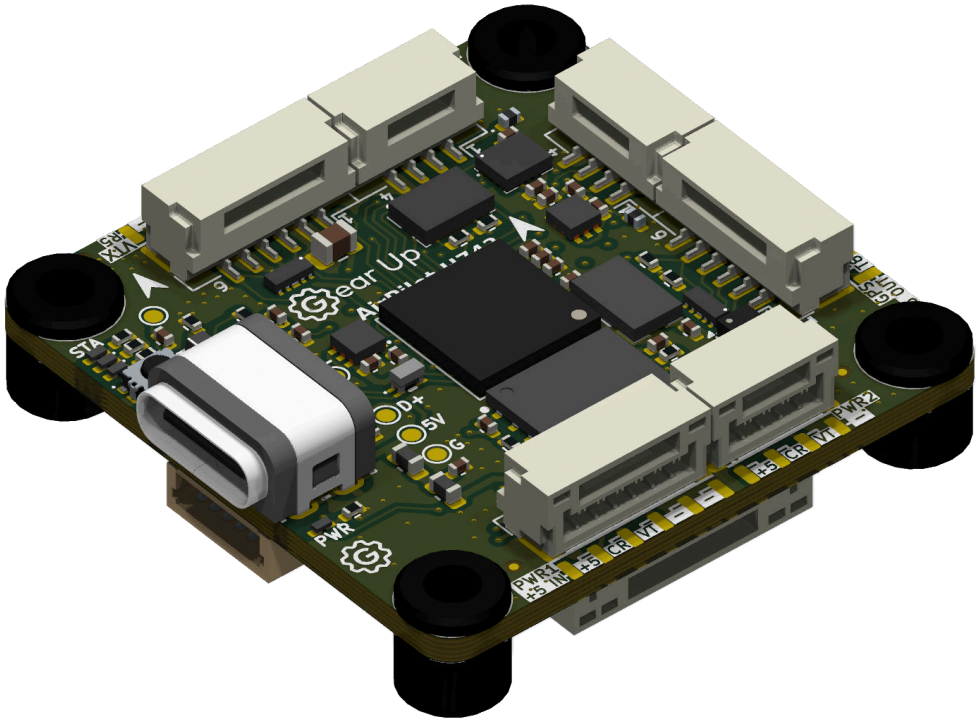


EU-BUILT PROFESSIONAL FLIGHT CONTROLLER

AirPilot H743.

Autopilot-class, three firmware stacks. JST connector and solder pad on every pin.

36 × 36 mm flight controller for professional integrator, OEM, and prosumer platforms. Heterogeneous dual IMU pair, CAN-FD, three redundant power inputs.

Preliminary, prototype phase | NDAA compliant | Made in Belgium | Dual IMU | CAN-FD | Dual-access I/O | 3-10S

MCU STM32H7, 480 MHz

BOARD 36 × 36 × 10 mm

MOUNTING 30.5 × 30.5 mm, 4 × M3

PINOUT Pixhawk GPS / telem / POWER1

AT A GLANCE

Differentiators

FIRMWARE LANES

3 stacks

Hardware compatible with Betaflight, ArduPilot, and PX4. Upstream targets planned after bring-up.

HETEROGENEOUS IMU PAIR

2 vendors

TDK ICM-45686 primary, Bosch BMI088 secondary. Vendor and technology diversity.

REDUNDANT POWER

3 inputs

VBAT direct plus Pixhawk-standard POWER1 plus a 4-pin POWER2 backup.

NDAA POSTURE

19 manufacturers

All 19 unique manufacturers in BOM domiciled in EU, US, Japan, or Taiwan.

HIGHLIGHTS

Key features

- **STM32H7 MCU.** 480 MHz Cortex-M7 with double-precision FPU, 2 MB program flash.
- **Triple-redundant power.** VBAT direct, Pixhawk-standard POWER1, 4-pin POWER2 backup.
- **Isolated 3.3 V rails.** Dual ultra-low-noise LDOs, separate MCU and IMU rails.
- **128 MB onboard flash storage.** Blackbox and persistent log storage, no microSD.
- **Pixhawk-standard core ports.** GPS, telemetry, and POWER1 follow the Pixhawk connector standard. The remaining JST GHR ports are board-specific, every pin silkscreen-labeled. 11 × JST GHR plus 1 × JST-SH DEBUG.
- **0402 minimum passives.** Deliberate DFM choice for production yield, rework tolerance, and reflow self-alignment headroom.
- **Heterogeneous dual IMU.** TDK ICM-45686 primary plus Bosch BMI088 secondary. Vendor and technology diversity.
- **CAN-FD with AEC-Q100 transceiver.** On-board 120 Ω termination.
- **Dual high-current BEC.** 5 V at 2.5 A for RX / GPS / peripherals, 10 V at 2.5 A for VTX / camera.
- **Dual-access I/O on every broken-out pin.** JST connector for clean stack integration, plus a large labeled solder pad for direct wire access, bring-up, and field repair. Same signal, two ways in.
- **USB Type-C IP68.**
- **6-layer stackup.** EU fab.

FEATURES IN DETAIL

Features in detail

HETEROGENEOUS IMU PAIR WITH VENDOR AND TECHNOLOGY DIVERSITY

AirPilot H743 ships two independent inertial measurement units from two manufacturers using two different MEMS technologies. The primary is a TDK ICM-45686, driven from the MCU clock for tight gyro-to-PID timing. The secondary is a Bosch BMI088 running on its own internal oscillator. Different silicon vendors, different MEMS architectures, different clock domains. Autopilots that run redundant IMU lanes (ArduPilot, PX4) cross-check both sensors and fail over to the healthy one, so the vehicle keeps flying when one vendor or one technology has a bad day.

TRIPLE-REDUNDANT POWER

Three independent supplies feed the board through ideal-diode controllers. VBAT direct on the battery wire or screw terminal, POWER1 on the Pixhawk-standard 6-pin connector, POWER2 on a 4-pin backup connector with a board-specific pinout. Any one rail can fail or be hot-swapped without interrupting flight. The voltage divider is sized for 42 V maximum, covering 3S to 10S LiPo across the full safe operating range, with TVS clamping at 40 V.

CAN-FD WITH AEC-Q100 TRANSCEIVER

One CAN-FD port with an automotive-qualified transceiver, AEC-Q100 qualified for automotive temperature and reliability profiles. On-board 120 Ω termination, removable for daisy-chain topologies. The CAN-FD lane supports DroneCAN / Cyphal / proprietary protocols at standard CAN bitrates and FD bitrates.

DUAL ULTRA-LOW-NOISE 3.3 V LDOS, ISOLATED MCU AND IMU RAILS

Two ultra-low-noise LDOs split the 3.3 V supply into two physically isolated rails. The MCU rail powers the STM32H7 and digital periphery. The IMU rail powers the gyros, baro, and mag. Commutation transients from the ESCs and switching noise from the buck converters do not couple back into the gyro path. Blackbox logs stay cleaner at sustained high throttle.

DUAL HIGH-CURRENT BEC WITH WIDE INPUT RANGE

Two buck converters supply 5 V at 2.5 A and 10 V at 2.5 A. The 5 V rail powers RX, GPS, optical-flow sensors, and other peripherals. The 10 V rail powers analog video transmitters and cameras, and feeds the VTX port directly. Check the pinout before wiring any 5 V peripheral into that port. 3S to 10S LiPo input range across all use cases, no external regulator needed.

DUAL-ACCESS I/O ON EVERY BROKEN-OUT PIN

Every signal that leaves the MCU is exposed two ways. A JST connector for clean harness integration, and a large labeled solder pad next to it for direct wire access. Builders solder; integrators plug in. Bring-up engineers probe the pad, then move to connectors when the

harness is built. Field repair, in-place modification, and prototype iteration all work without cutting a single connector. The signal labels are silkscreened in full text, not numeric pin numbers, so the pad is readable without a pinout sheet in hand.

CONNECTOR MAP: PIXHAWK-STANDARD CORE PORTS, BOARD-SPECIFIC COMPACT PORTS

Three ports follow the Pixhawk connector standard: GPS, telemetry, and POWER1. The remaining JST GHR ports (ESC, PWM, RC, VTX, POWER2 backup) carry board-specific pinouts, chosen to fit the 36 × 36 mm outline. Every pin is silkscreen-labeled in full text and mirrored on a solder pad, so nothing depends on memorising a pinout. One JST-SH connector carries SWD DEBUG; the smaller pitch is a deliberate signal that DEBUG is for integrators, not end users. Take note: the VTX port carries the 10 V rail. Check the pinout before connecting any 5 V peripheral to it.

STM32H7 MCU

32-bit Arm Cortex-M7 core at 480 MHz with double-precision FPU. 2 MB on-chip Flash with read-while-write. Modern autopilot stacks (PX4, ArduPilot) have headroom for state estimators, EKFs, onboard logging, and CAN-FD bus management without preempting the control loop.

128 MB ONBOARD FLASH STORAGE FOR PERSISTENT LOGGING

A 128 MB flash storage with continuous-read mode is fitted on-board. Enough capacity for a full inspection-mission session at high log-rate without rotation. No microSD slot, on-board only, no removable-media handling concerns for integrators.

0402 MINIMUM PASSIVE COMPONENTS FOR PRODUCTION YIELD

The smallest passive component on the board is 0402 (1005 metric). AirPilot avoids 0201 deliberately. Larger pads improve pick-and-place yield, tolerate placement misalignment better, allow reflow self-alignment to recover small offsets, and remain reworkable with manual tools. The tradeoff is slightly more board area, accepted in exchange for production yield.

6-LAYER STACKUP WITH SOLID GND PLANES

Six-layer stackup engineered for low-impedance return paths on the high-speed STM32H7 signals and clean reference for the CAN-FD, SPI, I^2C, and IMU lines.

NDAA-CLEAN BOM, EU FINAL ASSEMBLY

Across the 138-line BOM, all 19 unique manufacturers are domiciled in the European Union, United States, Japan, or Taiwan. No vendors from countries on US procurement-restriction lists. Two parts use Taiwan-fab silicon, documented for Trusted-Foundry-overlay programmes above the NDAA baseline. Final assembly and test in Belgium.

I/O QUICK REFERENCE

— Hardware specifications, full list

Same content as the spec table, in compact bullet form for quick scan.

- 8 × UART
- 1 × I²C
- 1 × SWD debug (JST-SH, integrator access)
- 6 × ADC (VBAT main, VBAT POWER1, VBAT POWER2, current main, current POWER1, current POWER2)
- BEC 5 V at 2.5 A, for RX, GPS, optical-flow sensors, peripherals
- 11 × JST GHR connectors (Pixhawk-standard GPS / telemetry / POWER1, board-specific others) + 1 × JST-SH DEBUG
- 36 × 36 mm board, 30.5 × 30.5 mm hole pattern
- Made in Belgium 🇪🇺
- 9 × PWM (DShot capable, 4 ch on J6 ESC + 4 ch on J8 PWM EXTRA + 1 spare)
- 1 × SPI
- 1 × CAN-FD (AEC-Q100 transceiver, on-board 120 Ω termination)
- USB Type-C, IP68 rated receptacle
- BEC 10 V at 2.5 A, for video transmitter and cameras
- Dual-access I/O: JST connector plus large labeled solder pad on every broken-out pin
- NDAA compliant, EU / US / JP / TW components

ENGINEERING DEEP-DIVE

The decisions that show up in flight logs

Heterogeneous IMU pair

Two IMUs from two vendors using two MEMS architectures, TDK ICM-45686 plus Bosch BMI088. Redundancy-aware autopilots fail over and keep flying through single-vendor and single-technology failure modes.

MCU-clocked primary IMU

The STM32H7 clock drives the primary IMU sample timing directly. No software interpolation between sensor read and the PID loop. Wider gain budget before stick filtering needs to step in.

Isolated 3.3 V rails

Two independent ultra-low-noise LDOs, one for the MCU rail, one for the IMU rail. Switching noise and commutation transients stay out of the gyro path.

Triple-redundant power input

VBAT direct, Pixhawk-standard POWER1, 4-pin POWER2 backup. Three ideal-diode-controlled paths. Hot-swappable, fault-tolerant.

CAN-FD with AEC-Q100 transceiver

Automotive-qualified silicon. On-board 120 Ω termination. DroneCAN, Cyphal, and proprietary protocol support at FD bitrates.

Dual-access I/O on every pin

JST connector for clean stack integration, large labeled solder pad next to it for direct wire access. Builders solder, integrators plug in, bring-up engineers probe. Same signal, two ways in.

WHAT PARTNERS BUILD WITH IT

Target platforms

INTEGRATOR PLATFORMS

NDAA-compliant flight controller for OEMs and integrators with supply-chain origin requirements.

PROFESSIONAL UAV

Survey, mapping, inspection, and industrial autonomy on ArduPilot or PX4 with CAN-FD peripherals.

LONG-RANGE MAPPING

Triple-redundant power and dual IMU for missions that cannot afford a single-point failure.

HEAVY LIFT

3S to 10S LiPo input range, 9 × DShot PWM, CAN-FD for high-channel-count ESC topologies.

RESEARCH LABS

Open hardware target across three flight stacks once upstream submissions land.

PROSUMER CINEMA

Race cine FPV and professional cinema platforms on Betaflight.

SPECIFICATIONS

Hardware specifications

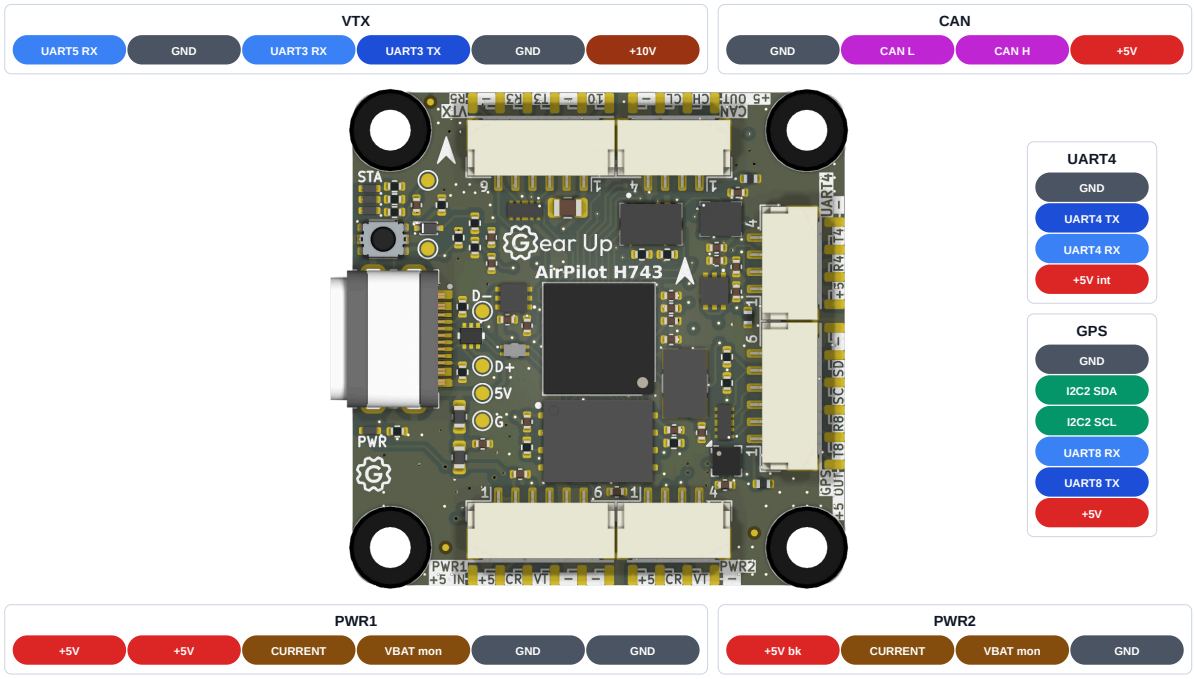
MCU & SENSORS	
MCU	STM32H7, 480 MHz, 2 MB flash
IMU primary	TDK ICM-45686
IMU secondary	Bosch BMI088
Barometer	Infineon DPS368
Magnetometer	STMicro LIS2MDL, 3-axis
Onboard storage	Winbond W25N01, 128 MB flash storage

I/O	
UARTs	8
Motor outputs	9 × DShot PWM (4 on ESC connector, 4 on PWM EXTRA, 1 spare)
CAN-FD	1 × (AEC-Q100 transceiver, 120 Ω on-board)
Other buses	1 × I^2C, 1 × SPI
USB	USB Type-C 2.0, IP68 rated receptacle
SWD	Debug on JST-SH (integrator access)
ADC	6 × (VBAT main + POWER1 + POWER2, current main + POWER1 + POWER2)
Connectors	11 × JST GHR (GPS / TELEM / POWER1 Pixhawk-standard) + 1 × JST-SH DEBUG

POWER	
Battery inputs	3 × redundant (VBAT direct + POWER1 + POWER2)
Battery range	3-10S LiPo, up to 42 V
BEC outputs	5 V at 2.5 A, 10 V at 2.5 A
3.3 V rails	Dual ultra-low-noise LDOs, isolated MCU and IMU
Monitoring	3 × VBAT ADC, 3 × current ADC
Protection	TVS (40 V clamp), reverse-polarity, ESD on every external connector

MECHANICAL	
Board	36 × 36 mm
Mounting	4 × M3 holes, 30.5 mm corner pitch
Stackup	6-layer, EU fab
Min passive	0402 (1005 metric), deliberate DFM choice
Weight	≈ 8 g
Operating temp	0 - 60 °C

Pinout, top side

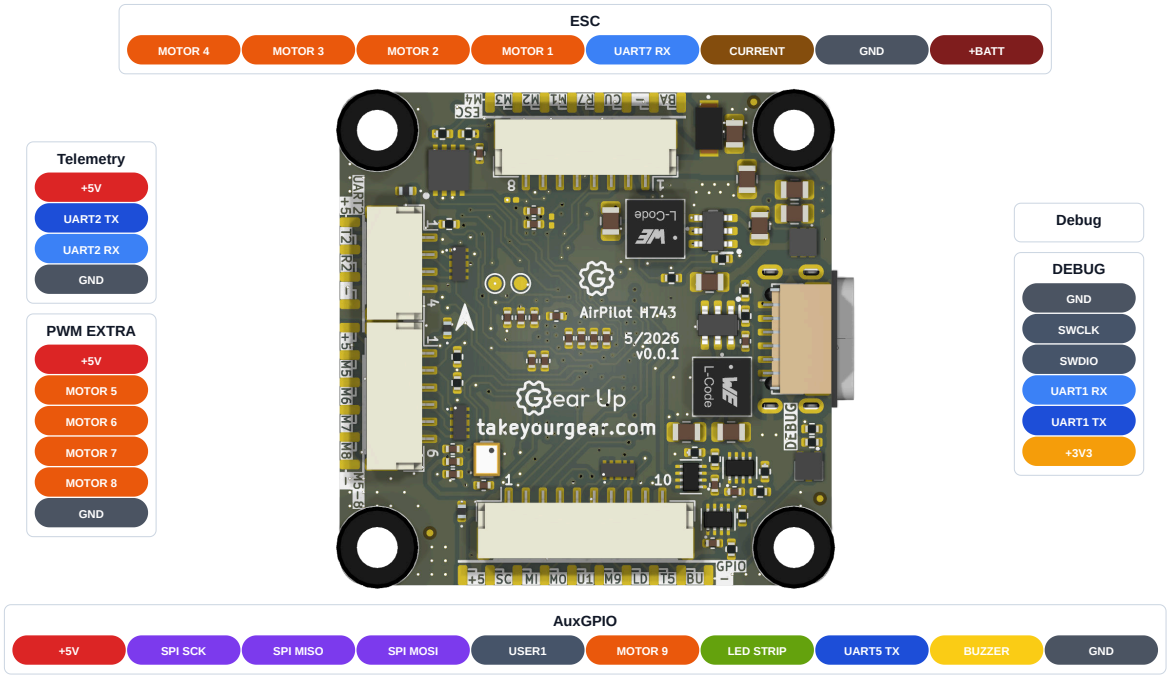


Top-side connector and pin layout. Refer to silkscreen for definitive labels.

+5V	UART TX	PWM / Motor
+10V	UART RX	ADC
VBAT	I2C	LED
+3V3	SPI	Buzzer
GND	CAN	GPIO

Pin function colour legend (applies to both pinout pages).

Pinout, bottom side



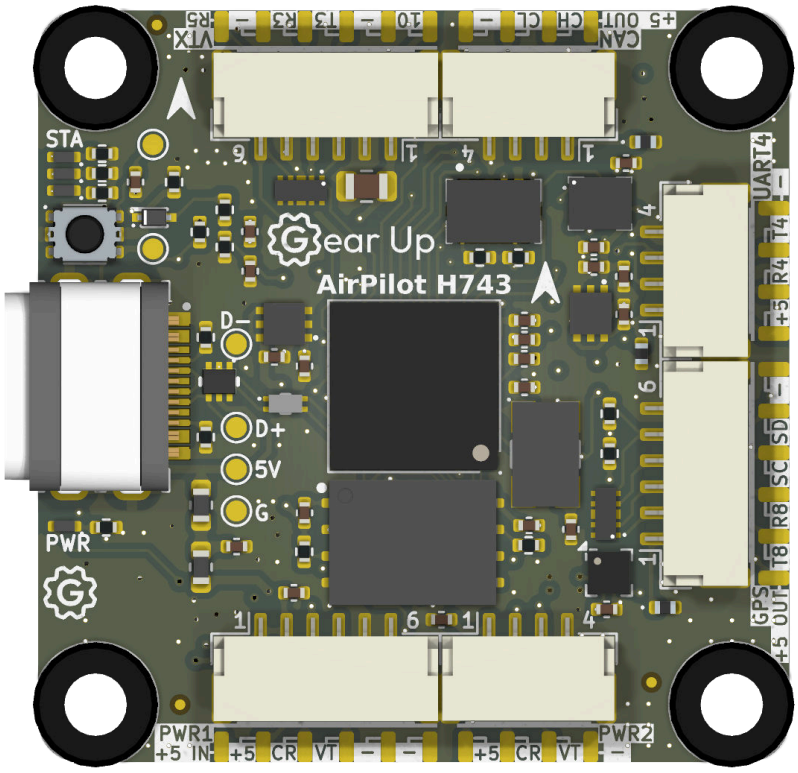
Bottom-side connectors (ESC, AUX GPIO, Telemetry, PWM EXTRA, DEBUG).

+5V	UART TX	PWM / Motor
+10V	UART RX	ADC
VBAT	I2C	LED
+3V3	SPI	Buzzer
GND	CAN	GPIO

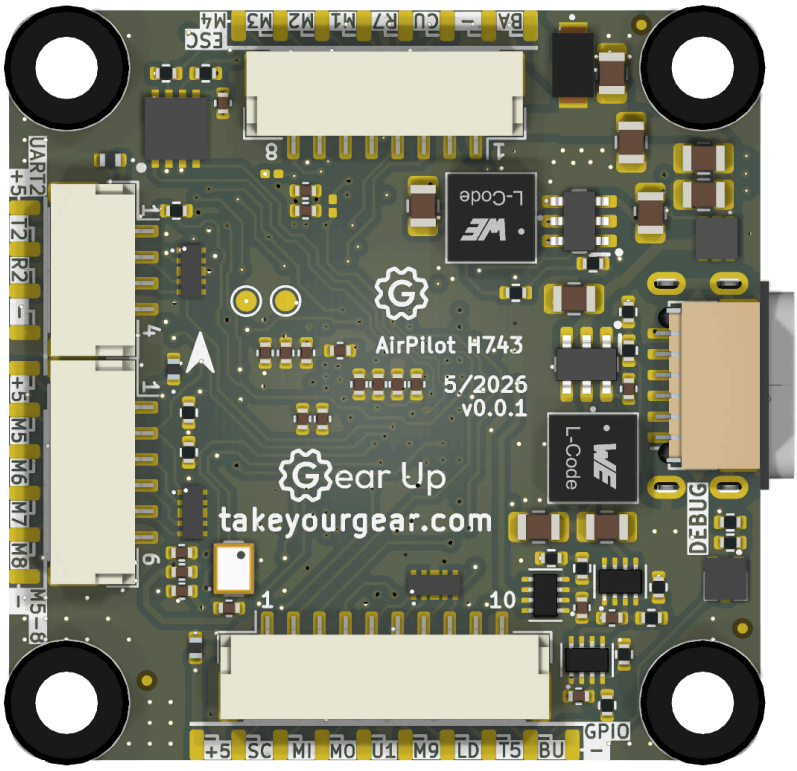
Pin function colour legend (applies to both pinout pages).

PRODUCT VIEWS

Front and back



Front (top side).



Back (bottom side).

SOFTWARE

Firmware support

AirPilot H743 is hardware compatible with four flight stacks. The planned hardware target identifier is `AIRPILOTH743`. Upstream-target submission to Betaflight, ArduPilot, and PX4 is planned after prototype bring-up validation. Until then, custom builds are available for evaluator units against any of the three stacks. Contact us for evaluator firmware access.

Betaflight

`planned: AIRPILOTH743`

For racing, freestyle, and race cine FPV platforms. Hardware target submission planned post-bring-up.

- **Project** https://betaflight.com
- **Web configurator** https://app.betaflight.com
- **Desktop configurator** https://github.com/betaflight/betaflight-configurator/releases

ArduPilot

`planned: AIRPILOTH743`

For autonomous, mapping, and long-range platforms. Copter, Plane, Rover, Sub, and Blimp targets flash this hardware once the hwdef lands upstream. Mission Planner and QGroundControl auto-detect over USB.

- **Project** https://ardupilot.org
- **Mission Planner** https://ardupilot.org/planner
- **QGroundControl** http://qgroundcontrol.com

PX4

`planned: gearup_airpiloth743`

For research, advanced autonomy, and custom airframes. Board source submission to PX4-Autopilot planned post-bring-up.

- **Project** https://px4.io
- **QGroundControl** http://qgroundcontrol.com
- **Source repository** https://github.com/PX4/PX4-Autopilot

MECHANICAL

Dimensions

36 × 36 mm board with M3 corner mounting (rubber grommets, M3 bolts). Overall height including connectors and final mechanical weight will be confirmed at prototype.

Length	36 mm
Width	36 mm
Mounting pattern	4 × M3 holes, 30.5 mm corner pitch
Height (overall)	10 mm including connectors
Weight	≈ 8 g

OPERATING ENVELOPE

Electrical & environmental characteristics

ELECTRICAL	
Max VBat	42 V (10S), TVS-clamped at 40 V
Battery range	3-10S LiPo
Max IO voltage	3.3 V
Max 5 V BEC current	2.5 A
Max 10 V BEC current	2.5 A
USB cable length	≤ 2 m
Power cable length	≤ 0.5 m

ENVIRONMENT	
Operating temp	0 - 60 °C
Storage temp	-20 to 70 °C
Humidity	non-condensing
ESD handling	ESD-safe environment required

FREQUENTLY ASKED

FAQ

How does AirPilot H743 differ from AirBrain H743?

Same STM32H7 family, different positioning. AirPilot H743 is 36 × 36 mm with Pixhawk-standard core ports (GPS, telemetry, POWER1), heterogeneous dual IMU pair, CAN-FD, triple-redundant power, and NDAA-clean BOM. AirBrain H743 is the compact 20 × 20 mm Betaflight-aligned variant. Different missions, different SKUs.

Is it really NDAA compliant?

All 19 unique manufacturers in the 138-line BOM are domiciled in EU / US / JP / TW. No vendors from countries on US procurement-restriction lists. NDAA posture covers Sections 848, 889, 1709, and 5949 (Section 5949 effective 2027-12-23).

Does it have CAN-FD?

Yes. One CAN-FD port with an AEC-Q100 transceiver. On-board 120 Ω termination, removable for daisy-chain topologies.

Which firmware should I flash first?

Until upstream targets land, evaluator units ship with a custom build for your preferred stack (Betaflight, ArduPilot, or PX4). Upstream-target submission to all three stacks is planned post-bring-up.

Is there an SD card slot?

No. AirPilot H743 uses 128 MB on-board NAND for blackbox and persistent log storage. Removable media is intentionally absent to simplify integration.

What is the warranty / RMA process?

Production hardware will carry a 24-month defect warranty. Contact info@takeyourgear.com or your reseller. Prototype-phase units are covered under separate evaluator-unit terms agreed at allocation.

NDAA, LAYER BY LAYER

Procurement-grade evidence, not just a checkbox

SECTION 889

Covered telecommunications equipment

Restricts federal agencies from procuring covered telecommunications equipment from designated foreign vendors. UAS components fall under follow-on provisions.

AirPilot: no designated covered-list vendors in the BOM.

SECTION 848

Covered foreign entities for UAS

Restricts federal agencies from procuring UAS or UAS components from covered foreign entities and their state-controlled affiliates.

AirPilot: no critical components sourced from covered countries.

SECTION 1709

Battery-component provisions

Restricts federal procurement of certain battery components from covered foreign entities. AirPilot is a flight controller, not a battery, but the same sourcing discipline carries across the board.

AirPilot: no covered vendors.

SECTION 5949

Semiconductor procurement restriction (effective 2027-12-23)

Restricts federal procurement of certain semiconductors from covered foreign entities. Forward-applicable to AirPilot H743 supply chain at the 2027 effective date.

AirPilot: no covered semiconductor vendors in BOM.

SUPPLY CHAIN

NDAA-clean BOM at the manufacturer level

All components sourced from manufacturers in EU, US, JP and TW. No listed foreign entities in the supplier chain.

AirPilot: NDAA-clean sourcing.

TRUSTED-FOUNDRY OVERLAY

Above-NDAA programmes

Two parts use Taiwan-fab silicon (TDK fabless via TSMC, Winbond Taiwan fabs). NDAA-clean baseline.

AirPilot: NDAA-clean baseline.

SAFETY & REGULATORY

Safety information

Intended use. AirPilot H743 is a flight controller for unmanned aerial vehicles. Not a toy. Install only by qualified users familiar with UAV safety. Always follow local UAV regulations.

INSTALLATION & OPERATION

- Maximum input voltage **42 V DC**. Exceeding may damage the device.
- Ensure correct polarity. Reverse polarity may cause permanent damage.
- Handle only in **ESD-safe environments** with proper grounding.
- Connect only to **3 - 10S LiPo** supported UAV power systems.
- Mount securely to minimise vibration. Do not operate near flammable materials.
- Operating temperature and humidity envelope **to be confirmed at prototype validation**.

Regulatory & compliance

CE	Declaration of conformity ships with the production release after prototype validation. Compliance posture: TBC at prototype validation phase.
EMC	Pre-compliance EMC sweep planned during prototype validation. Production release will include the EMC test summary.
RoHS	BOM is RoHS-targeted at MPN level. Component-level RoHS conformity in progress, final declaration ships with production release.
WEEE	Subject to EU Waste Electrical and Electronic Equipment regulations. Do not dispose with household waste; return to an authorised collection facility at end-of-life.
NDAA	138-line BOM, 19 unique manufacturers, all in EU / US / JP / TW.

Disclaimer. Improper installation or misuse may result in loss of vehicle control. The manufacturer is not liable for damages resulting from misuse or modification. Always verify your build against local regulations before flight.

Sub-assembly intended for integration. This datasheet describes a sub-assembly (a flight controller) intended for integration into a final UAV or robotics product. **CE conformity will be declared by EUnify BV at production release.** Integrator declares conformity for the final product (against the EU Machinery Directive 2006/42/EC, Radio Equipment Directive 2014/53/EU, EU UAS regulation 2019/947, civil-aviation rules, or any application-specific standards). Re-test as a system if you change EMC-relevant elements (motors, ESCs, transmitters, antennas, enclosures).

DOCUMENT CONTROL

Datasheet revisions

v0.24 · 2026-09-24	Positioning copy aligned with takeyourgear.com.
v0.23 · 2026-08-14	IMU base references restored in all sections (TDK ICM-45686, Bosch BMI088): base part references are needed by integrators for evaluation and are public via the upstream firmware configurations. Exact ordering codes remain out of scope for this document. Layout: quick-spec strip joined onto the cover, Differentiators and Key features consolidated onto one page, Dimensions joined with Electrical and environmental characteristics, safety disclaimer pulled back onto the Safety page; four stranded or near-empty pages removed (24 to 20 pages); duplicate NDAA bullet removed in favour of the NDAA posture card.
v0.22 · 2026-08-04	Bottom-side pinout diagram corrected: Telemetry and PWM EXTRA callouts showed the pin order reversed (+5 V and GND at swapped ends); DEBUG callout order corrected. Verified pin-by-pin against the design netlist. Top-side diagram unaffected.
v0.21 · 2026-07-14	Connector compatibility stated per port: Pixhawk-standard GPS, telemetry, POWER1; remaining ports board-specific. VTX port 10 V caution added.
v0.20 · 2026-07-14	Battery input range corrected to 3S to 10S.
v0.19 · 2026-07-14	Wording corrections.
v0.18 · 2026-06-23	Preliminary issue.

REVISIONS

Hardware changelog

v0.0.1 · 2026	Initial design. STM32H7, heterogeneous IMU pair, CAN-FD, triple-redundant power.

Sales & support

Direct route to the engineering desk. Evaluator units, procurement enquiries, and integration partnerships welcome.

takeyourgear.com

info@takeyourgear.com

Made in Belgium

Gear Up is a brand of EUnify BV · Lierde, Belgium · Preliminary Datasheet v0.24, 2026-09-24
Preliminary specifications, prototype phase. Subject to confirmation at bring-up. © 2026 EUnify BV. All rights reserved.