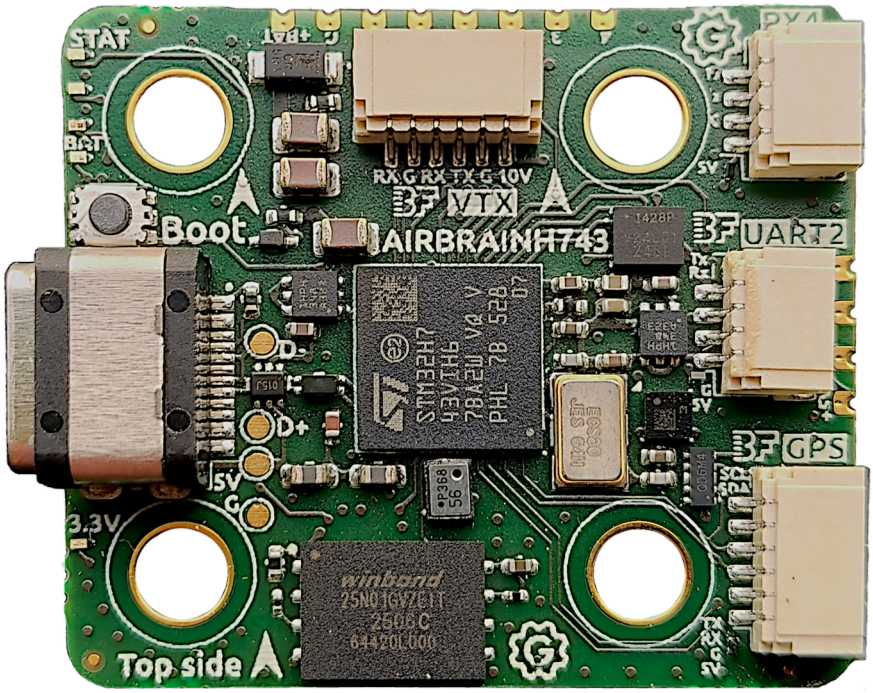
Air Brain



Small size, high-performance robust flight controller. Betaflight, ArduPilot, PX4 and INAV compatible.

Highlights

Product name	Air Brain
Target	AirBrainH743
Power input	10V – 42V, 3 – 10S LiPo
Mounting	20x20mm (3mm hole size)
Dimension	30mm (L) x 34mm (W) x 12mm (H)
MCU	STM32H743VIH6, 480MHz, 2 Mbytes Program Flash, 1 Mbytes RAM
IMU	TDK: ICM-42688-P
Compass	STM: LIS2MDL
Baro	Infineon: DPS368XTSA1
Onboard extra flash	Winbond: 128 Mbytes W25N01GVZEIT flash for logs (black box)

Features

- Ultra-fast H7 CPU (MCU)

High-performance 32-bit Arm ® Cortex ®-M7 core with double-precision FPU. For ultra-low-latency control-loop and extreme flight performance.

- High Precision GYRO with clock-signal from MCU and separate power supply

The ICM-42688-P is a 6-axis MEMS MotionTracking device that combines a 3-axis gyroscope and a 3-axis accelerometer. By using the H7 MCU as clock signal generator for the GYRO we have very accurate gyroscope sample points and very low noise, this feature is only available on the H7 series of MCU's. The GYRO in addition uses a separate voltage regulator from the rest of the system, to isolate it as much as possible and getting the best performance.

- High-performance 3-axis magnetometer

High accuracy tilt-compensated compass, for map rotation and orientation.

- High precision Barometric Air Pressure Sensor

Robust high precision pressure and temperature for harsh environment.

- Large flash for program

2 Mbytes of Flash memory with read-while-write support.

- Large flash for logging

128 Mbytes NAND non-volatile memory with continuous Read Mode on the board itself.

- 3-10S LiPo Support

Yes, up to 10s LiPo can be used, TVS protection diode fitted and polarization protection.

- High quality active and passive components

Switch IC's instead of diodes, ultra low noise voltage regulators, Wurth inductors.

- Battery Monitoring

Built in battery voltage monitoring, current input for ESC

- Large DC/DC converters for powering auxiliary components (5V@2A and 10V@2.5A)

More then enough current for powering your GPS, Receiver, LED Strip, VTX, camera's and other accessories.

- High-performance 3-axis magnetometer

- SWD – Debug port on connector

- Small form factor, only 20mmx20mm hole pattern

- EMC and ESD protection

- NDAA-compliant, exclusively EU / US / JP /TW components

- Made in Europe 🇪🇺

Hardware specifications

- 7x UART

- 8x PWM (support Dshot)

- 1x I2C

- 1x SPI

- 1x SWD debug

- 2x ADC (VBAT, Current)

- 3x programmable led

- 2x power led

- 1x AUX GPIO output

- 1x AUX GPIO trough transistor (buzzer -)

- Boot button

- USB Type-C IP rated

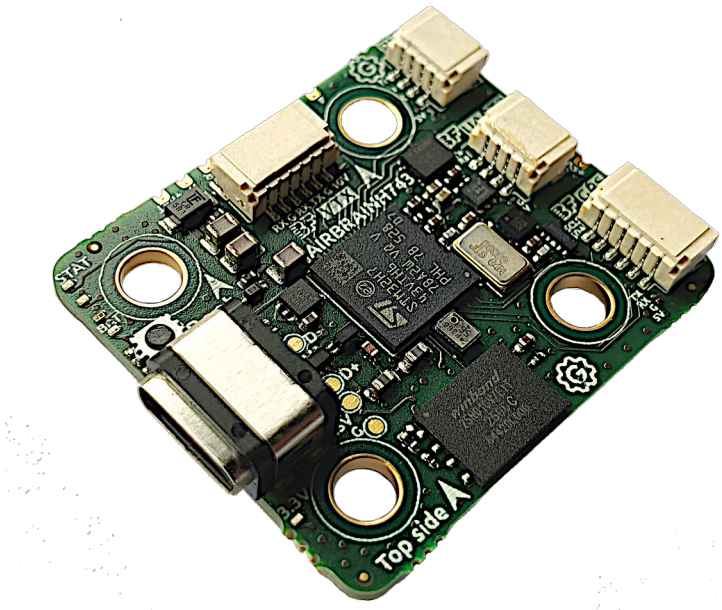
- BEC 5V 2A output (for controller, receiver, GPS, optical flow or other devices)

- BEC 10V 2.5A output (for video transmitter, camera)

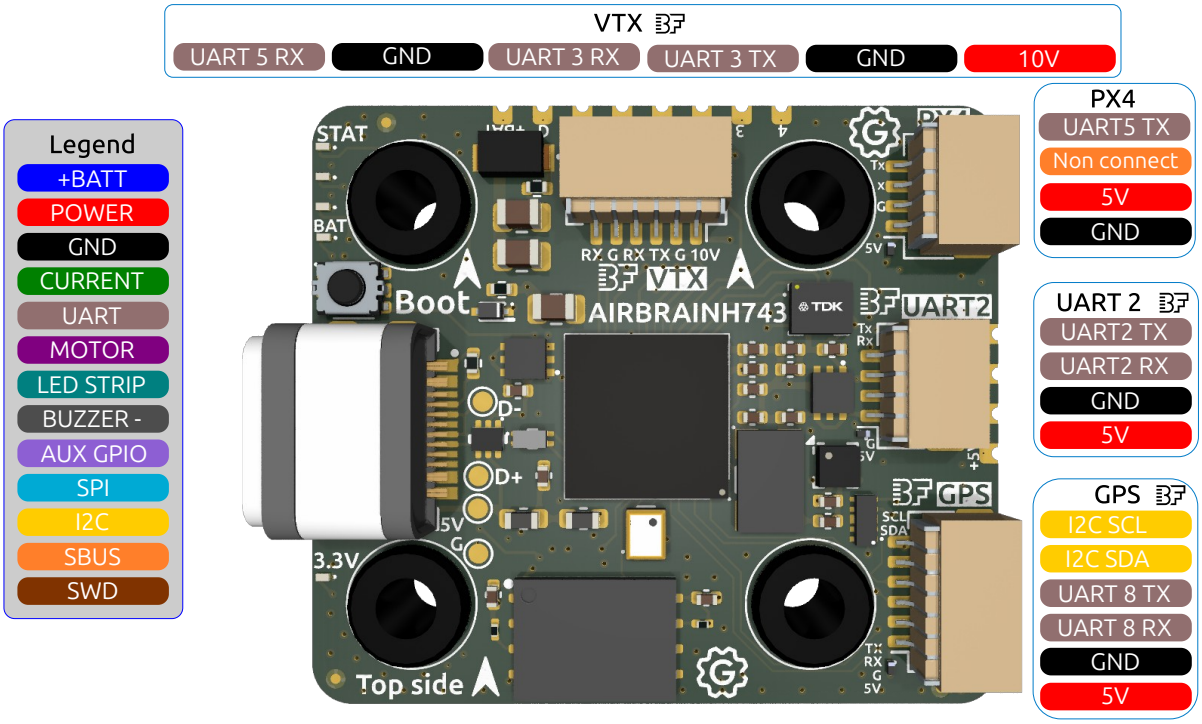
- Betaflight standardized connectors

- Next to connectors, there are also castellated pins for ESC and UART2

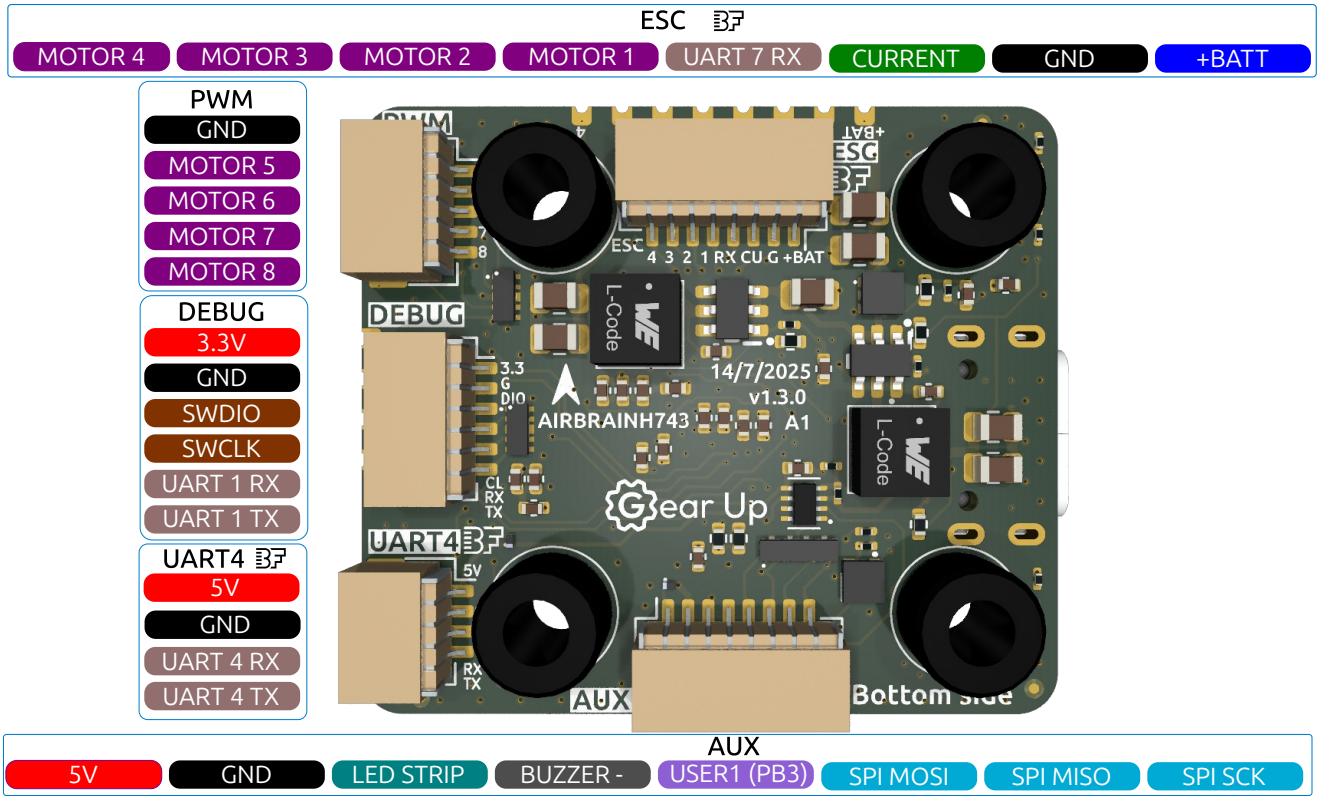
- 20mmx20mm holes and low profile



Pinout

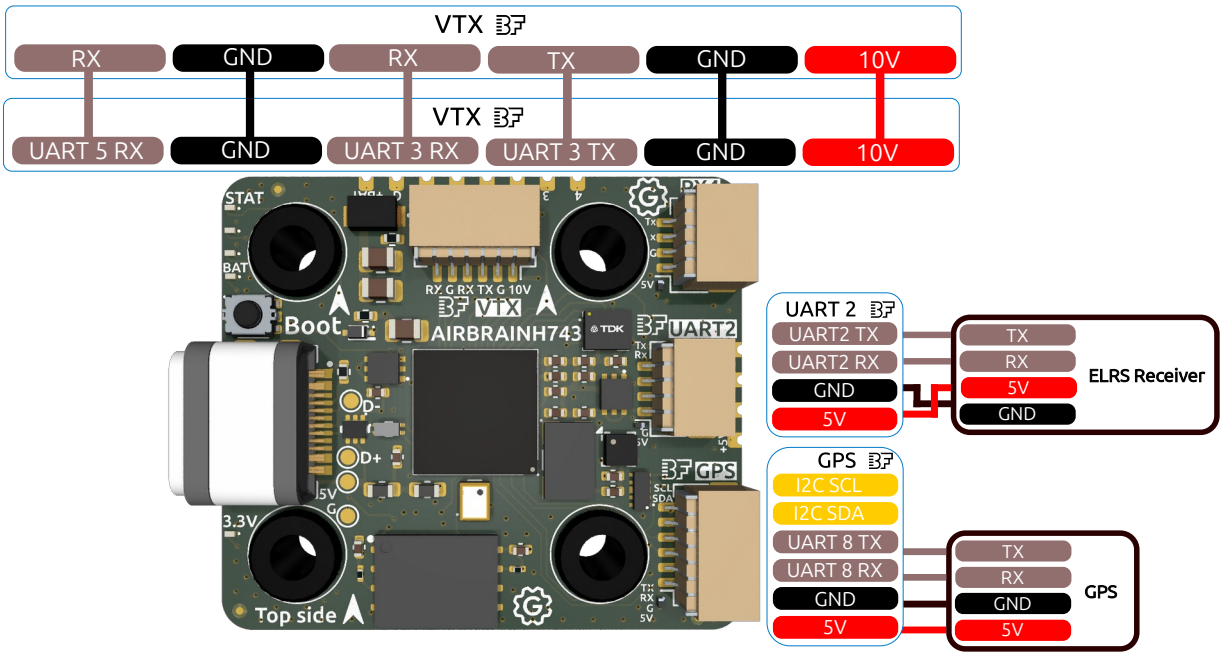

VTX
UART 5 RX
GND
UART 3 RX
UART 3 TX
GND
10V
Legend
+BATT
POWER
GND
CURRENT
UART
MOTOR
LED STRIP
BUZZER -
AUX GPIO
SPI
I2C
SBUS
SWD
PX4
UART5 TX
Non connect
5V
GND
UART 2
UART2 TX
UART2 RX
GND
5V
GPS
I2C SCL
I2C SDA
UART 8 TX
UART 8 RX
GND
5V
STAT
BAT
Boot
RX G RX TX G 10V
VTX
AIRBRAINH743
UART2
GPS
D-
D+
5V
G
3.3V
Top side

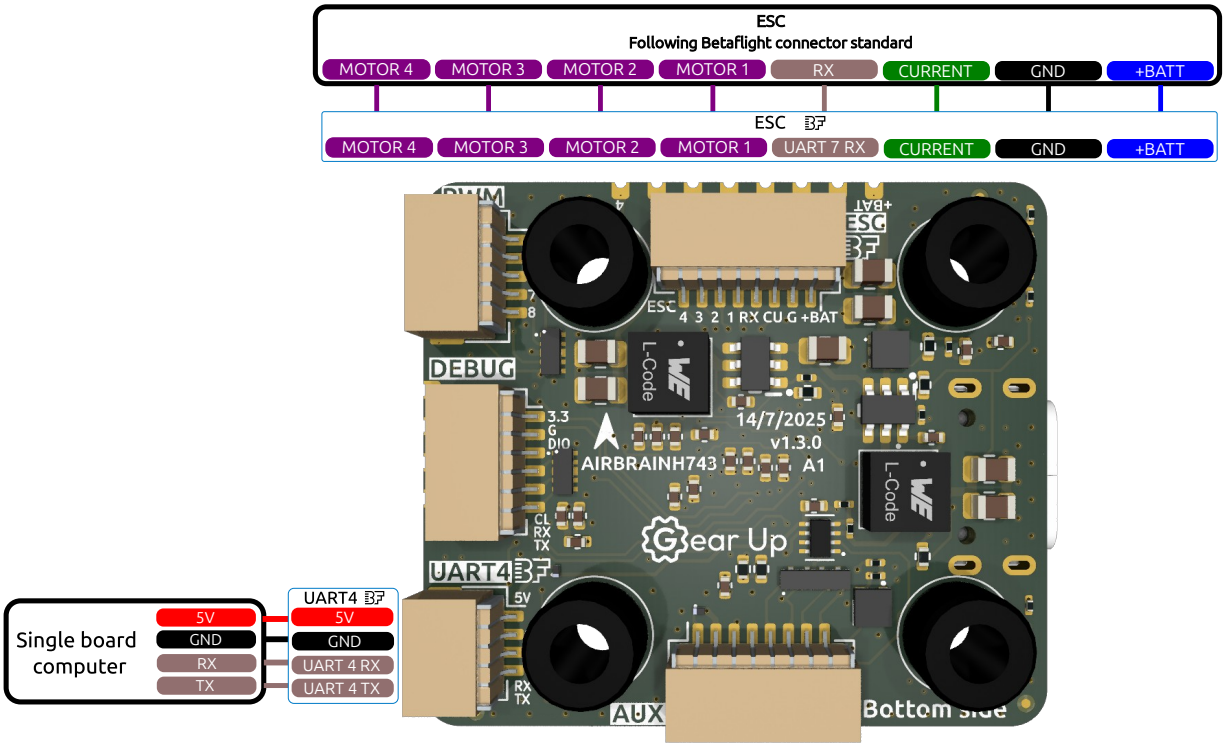
.


ESC
MOTOR 4
MOTOR 3
MOTOR 2
MOTOR 1
UART 7 RX
CURRENT
GND
+BATT
PWM
GND
MOTOR 5
MOTOR 6
MOTOR 7
MOTOR 8
DEBUG
3.3V
GND
SWDIO
SWCLK
UART 1 RX
UART 1 TX
UART4
5V
GND
UART 4 RX
UART 4 TX
ESC
4 3 2 1 RX CU G +BAT
DEBUG
14/7/2025
v1.3.0
A1
AIRBRAINH743
Gear Up
UART4
AUX
Bottom side
AUX
5V
GND
LED STRIP
BUZZER -
USER1 (PB3)
SPI MOSI
SPI MISO
SPI SCK

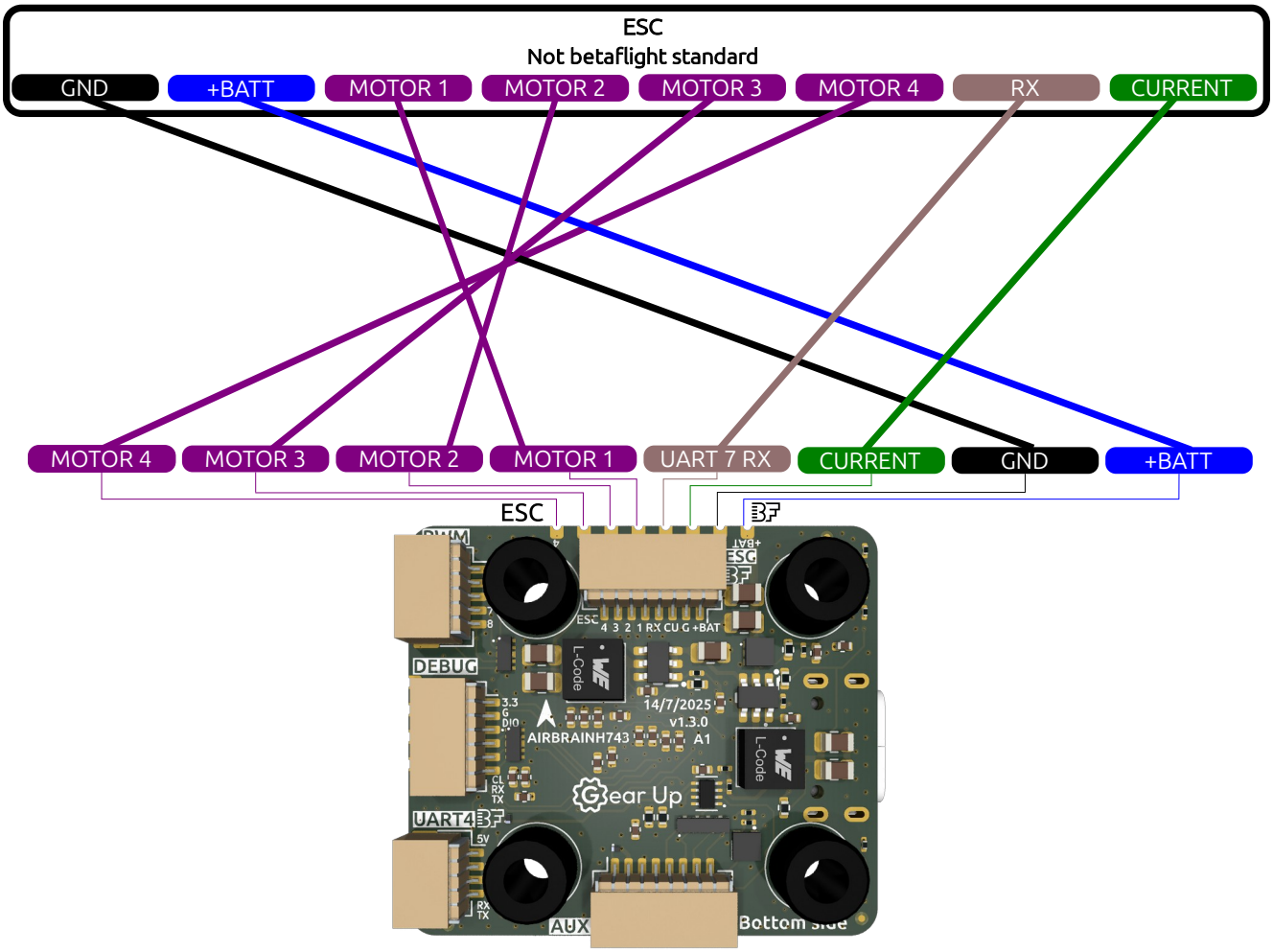
Connection diagram

ESC with Betaflight standardized connector

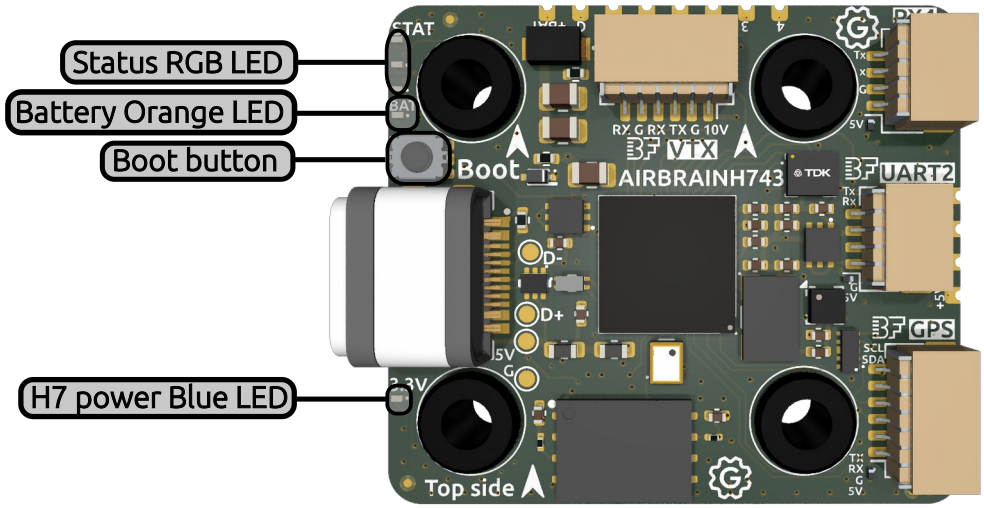




ESC with other connector



Buttons and LED’s



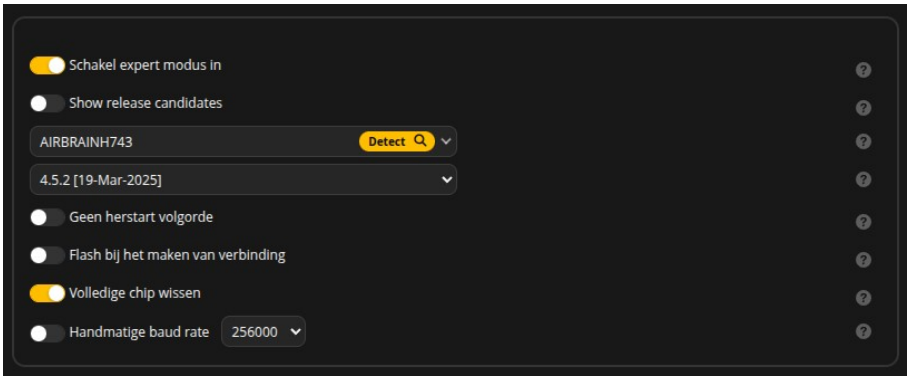
Software

Betaflight and ardupilot firmware for the Airbrain can be downloaded on the communities respective websites. As a backup and documentation hub for the AirBrain H743 flight controller. We have made a github repo where you can find pre-release firmware:

https://github.com/GearUp-Company/AirBrainH743

https://www.betaflight.com **https://ardupilot.org**

Betaflight app:



How to enter DFU mode?

1. **Power of FC**
2. **Push the 'Boot' button**
3. **Plug in USB, whilst pushing 'Boot' button**
4. **Blue status LED Slightly on, now you can see as mass storage device**

Electrical characteristics

MAX IO voltage level	3.3V
MAX +VBAT voltage level	42V (10S)
MAX current 3.3V	0.5A
MAX current 5V	2A
MAX current 10V	2.5A

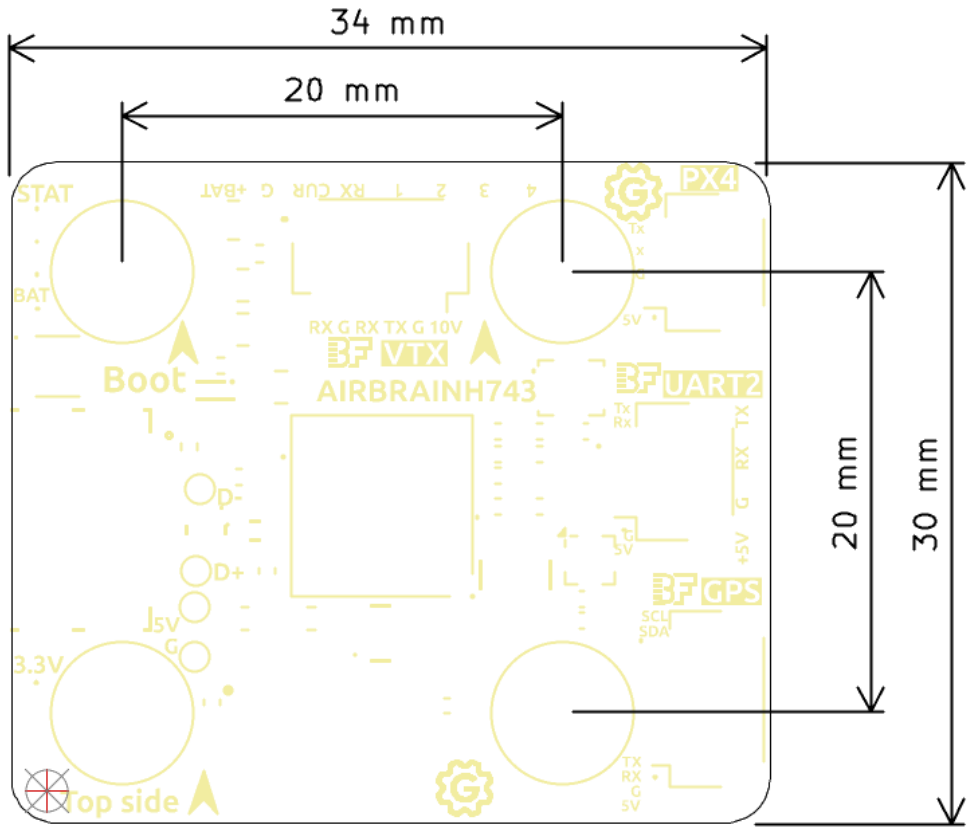
Environment characteristics

Temperature range	0 - 60 °C
Humidity	0 - 90%, no condensation allowed

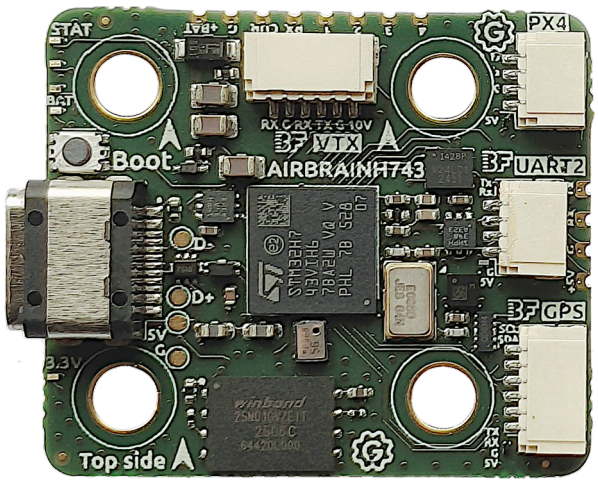
Types of JST cables

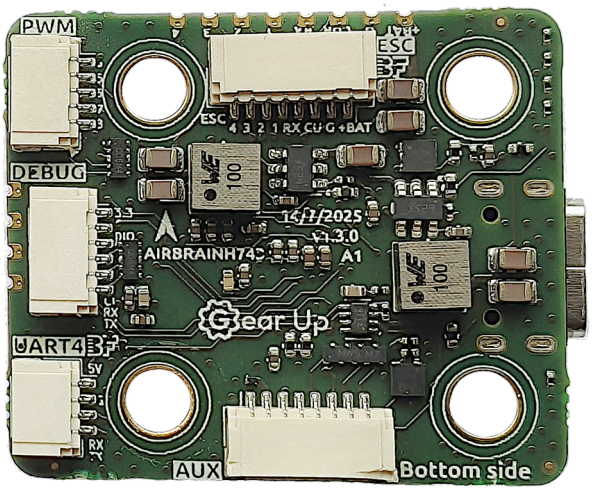
4 pin JST SH 1.0mm pitch	UART2, PX4-1, PX4-2
5 pin JST SH 1.0mm pitch	PWM
6 pin JST SH 1.0mm pitch	VTX, GPS, DEBUG
8 pin JST SH 1.0mm pitch	ESC, AUX

Mechanical drawing



Front & back picture





Safety Information

- This product is intended as a flight controller for UAVs.
- Not a toy. Only to be installed by qualified users familiar with UAV safety.
- Maximum input voltage: 42 V DC. Exceeding this may damage the device.
- Operate within 0–60 °C and 0–90% RH, non-condensing.
- Handle only in ESD-safe environments.

Installation & Use

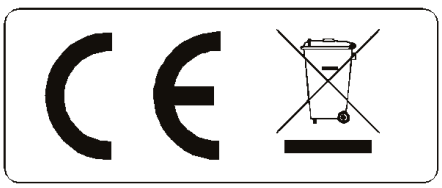
- Connect only to supported UAV power systems (3–10S LiPo).
- Ensure correct polarity of power input. Reverse polarity may cause permanent damage.
- Mount securely to minimize vibration.
- Do not operate near flammable materials.

Regulatory & Compliance

- **CE Compliance**:
  This product has been designed and tested for conformity with the essential requirements of:
  - Electromagnetic Compatibility (EMC) Directive 2014/30/EU
  - Restriction of Hazardous Substances (RoHS) Directive 2011/65/EU (as amended by 2015/863)
- **CE Marking**:
  The CE mark affixed to this product indicates conformity with applicable EU legislation.
  The EU Declaration of Conformity for this product is available at:
  www.takeyourgear.com/pages/compliance
- **Electromagnetic Compatibility (EMC)**:
  The device has undergone EMC testing. Users must install and operate the product according to this manual to maintain EMC performance.
- **RoHS Compliance**:
  All electronic components and assemblies are compliant with RoHS substance restrictions.
- **WEEE / Disposal**:
  This product is subject to EU Waste Electrical and Electronic Equipment (WEEE) regulations. Do not dispose of this product with household waste. At end of life, return it to an authorized collection facility for recycling.
- **ESD Precautions**:
  This product contains sensitive electronic components. Handle only in an ESD-safe environment and use proper grounding measures.

Disclaimer

- Improper installation or misuse may result in loss of vehicle control.
- Always follow local UAV regulations when operating.
- The manufacturer is not liable for damages resulting from misuse or modification.



Sales & support

Website: www.takeyourgear.com

Email: info@takeyourgear.com

Made in Belgium