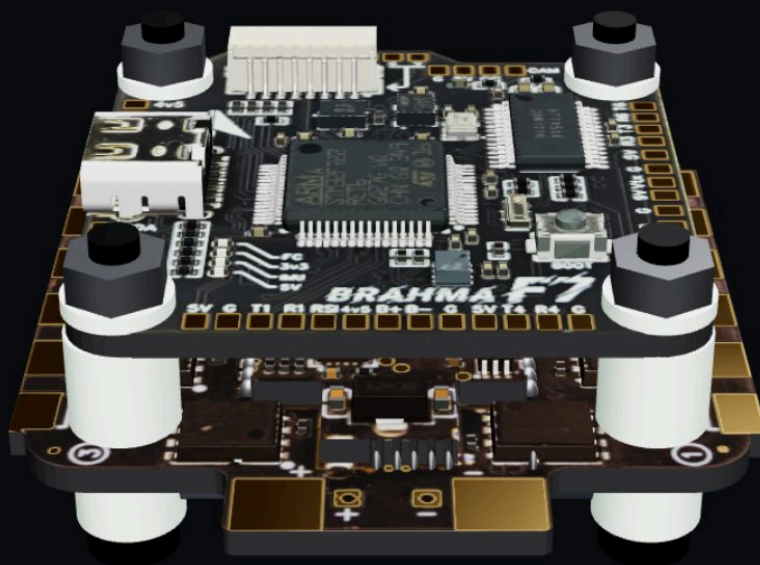


FLIGHT CONTROLLER + 4-IN-1 ESC · USER GUIDE

Stack 760



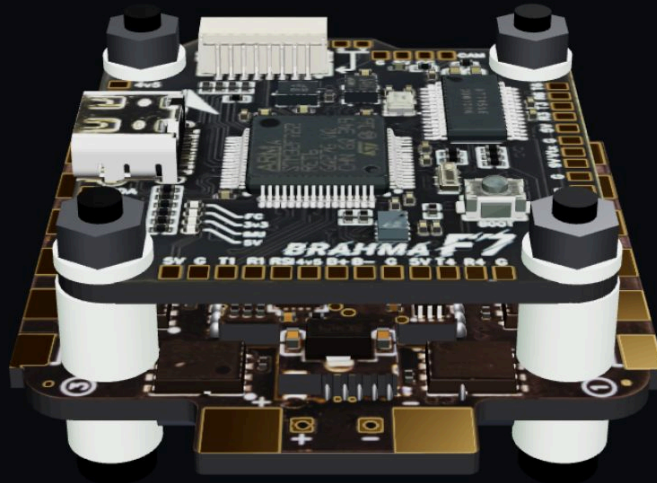
Contents

- 01 Stack 760 (Brahma F7 + Vishnu 60)
- 02 Brahma F7 flight controller
- 03 How to flash Betaflight on the Brahma F7
- 04 How to flash INAV on the Brahma F7
- 05 Connect a receiver to the Brahma F7
- 06 Vishnu 60 4-in-1 ESC

Need help?

WhatsApp or call **+91 80171 93277** (Mon–Sat, 12 PM–8 PM) · info@thedarkmatter.in · join the DM Community from thedarkmatter.in. The docs have this guide with every 3D view live: turn the board, click a step, and the pads light up: thedarkmatter.in/pages/docs?doc=stack-760

01 Stack 760 (Brahma F7 + Vishnu 60)



Brahma F7 flight controller on a Vishnu 60 4-in-1 ESC, matched and shipped as one stack on the standard 30.5 × 30.5 mm mount. Drag the stack to turn it.

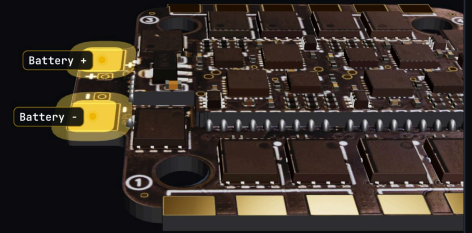
Assembly

1 Grommets and screws

Four M3 × 25 mm screws come up through the frame. A soft grommet goes in every mounting hole of both boards, fat body down, so frame vibration stays out of the gyro.

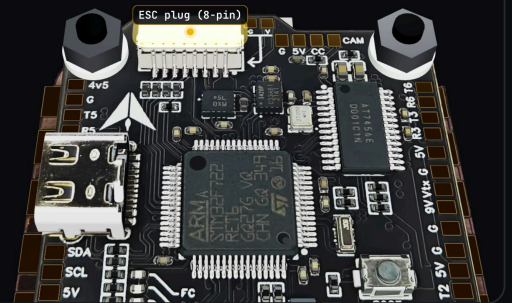
2 Vishnu 60 first

The Vishnu 60 goes on first, turned so its battery pads face away from the Brahma F7's ESC plug. Solder the capacitor and battery leads before you mount it.



3 Brahma F7 on top

The Brahma F7 goes on top, arrow pointing forward. Join the two boards with the 8-pin cable from the box, then fit the four nuts: snug, not tight, so the grommets keep their give.



The two boards

Brahma F7

Specifications, every pad, UARTs, wiring, firmware.

[Open the Brahma F7 docs →](#)

Vishnu 60

Specifications, battery, motor numbering.

[Open the Vishnu 60 docs →](#)

Firmware

The stack ships with the firmware you choose when you order. To reflash:

Betaflight

Freestyle and racing: the fastest tune and the biggest community.

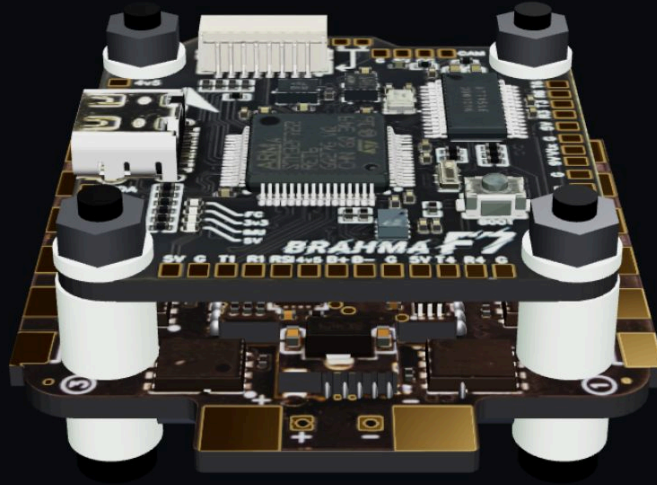
[How to flash Betaflight on the Brahma F7 →](#)

INAV

GPS features for fixed-wing and long range: return to home, waypoints.

[How to flash INAV on the Brahma F7 →](#)

In the box



- 1 × Brahma F7
- 1 × Vishnu 60
- 1 × 8-pin ESC-FC cable
- 8 × grommets
- 1 × 1000 μ F low-ESR capacitor
- 1 × XT60 battery connector
- 12 AWG battery wire
- 4 × M3 25 mm screws
- 4 × M3 nuts
- 1 × tin box

Downloads

Stack 760 manual (PDF)

The original slide manual

Warranty

The Stack 760 has a 6-month warranty against manufacturing defects from the date of purchase. Keep your invoice: we need a copy for any claim.

Not covered:

- Physical damage from use, such as water damage or tampered components.
- A burnt circuit from wrong wiring or overloading.
- A burnt ESC from spinning motors without propellers above 15% throttle while checking motor direction.
- A burnt ESC from arming without propellers in Angle mode: the flight controller keeps trying to level the craft and the motors will not slow down when you lower the throttle.

How a claim works: we inspect the board for physical damage and the points above. If it is eligible we replace it at no cost, and help you with your build. WhatsApp or call [+91 80171 93277](tel:+918017193277).

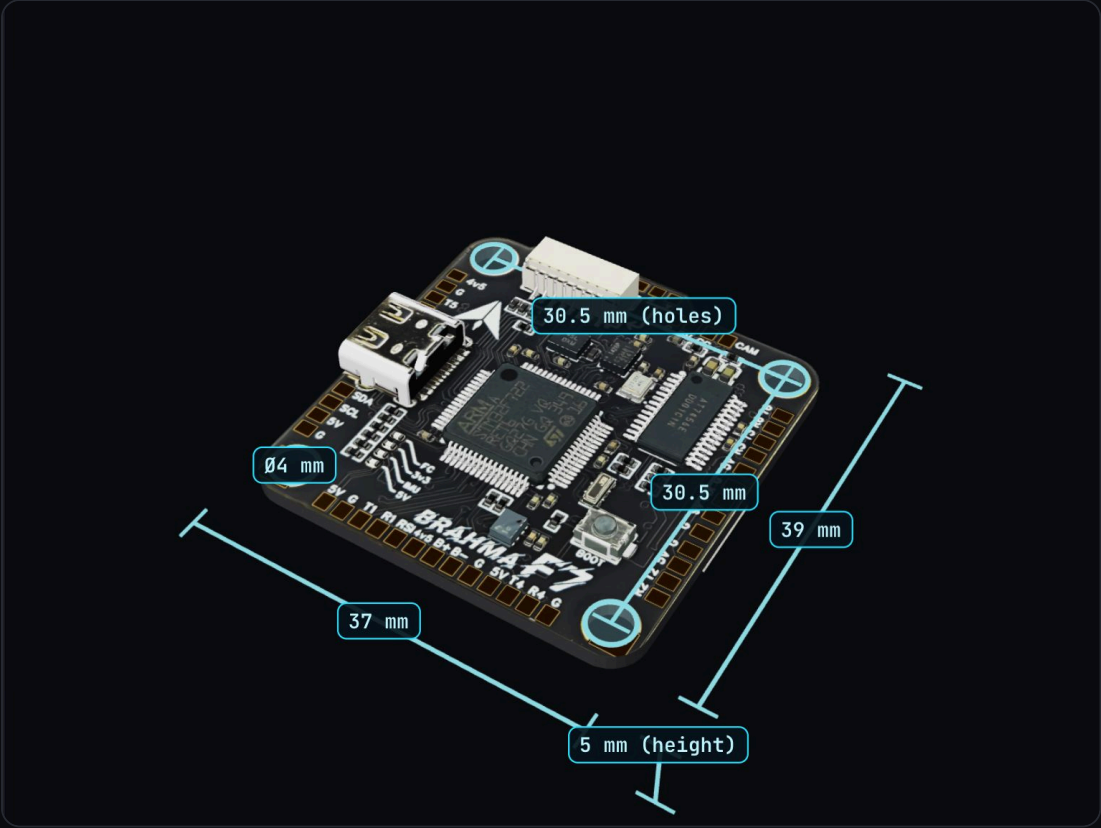
02 Brahma F7 flight controller

An STM32F722 flight controller for Betaflight and INAV, with an ICM42688P gyroscope, six UARTs, eight motor outputs and a plug-and-play HD video port.

Specifications

Product	Darkmatter® Brahma F7 flight controller
Processor (MCU)	STM32F722
Gyroscope (IMU)	ICM42688P
Barometer	DPS310
On-screen display	AT7456E
Blackbox	32MB Winbond flash
USB	Type-C
Firmware	Betaflight, INAV
Power input	2–6S LiPo
Mounting	30.5 × 30.5 mm, 4 mm holes
Dimensions	39 × 37 × 5 mm
Weight	9 g
5V output	7 groups (four 5V pads, BZ+ and two LED 5V pads), 2A total
9V output	1 pad, 2A
4.5V output	500mA from USB, for the receiver on the bench
3.3V output	Up to 500mA
LED	5V, G and LED pads on the underside (WS2812)
Buzzer	BZ+ and BZ– pads
Motors	M1–M4 on the ESC plug, M5–M8 on underside pads
Digital VTX	Plug-and-play port (DJI Air Unit and others)
BOOT button	Hold it while plugging in USB to enter DFU mode
RSSI input	RSI pad
UART	6: UART1, 2, 3 (ESC telemetry on R3), 4, 5, 6
I ² C	SDA and SCL pads, for compass, sonar and more
Operating temperature	–10 °C to 70 °C
Made in	India

Dimensions and mounting



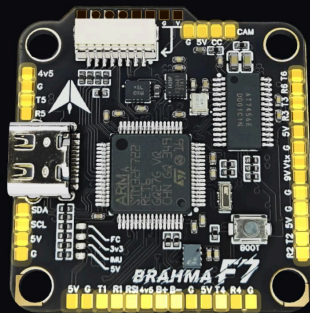
39 × 37 mm, 5 mm tall, 1.6 mm PCB. Holes 4 mm on a 30.5 × 30.5 mm pattern. Use the soft grommets from the box so frame vibration stays out of the gyro.

UARTs and serial ports

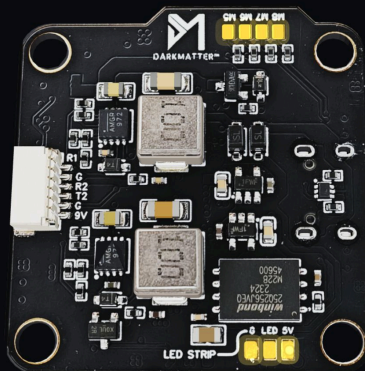
UART	Pads	ArduPilot	Notes
UART1	T1 R1	—	Receiver
UART2	T2 R2	—	Also on the HD video plug
UART3	T3 R3	—	ESC telemetry on R3
UART4	T4 R4	—	
UART5	T5 R5	—	GPS (INAV wizard)
UART6	T6 R6	—	

The Brahma F7 does not run ArduPilot.

Every pad



Top: every pad lit, names as printed on the board



Underside: every pad lit, names as printed on the board

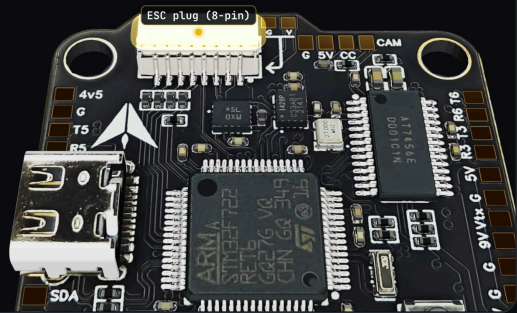
Every pad, by name. The same names are printed next to the pads on the board.

R1	R2	R3	R4	R5	R6	T1	T2	T3	T4	T5	T6	4V5 × 2	5V × 6
5V underside	9V	BZ+	BZ-	CAM	CC	G × 9	G underside	LED underside	M5 underside				
M6 underside	M7 underside	M8 underside	RSI	SCL	SDA	VTX							

Wiring

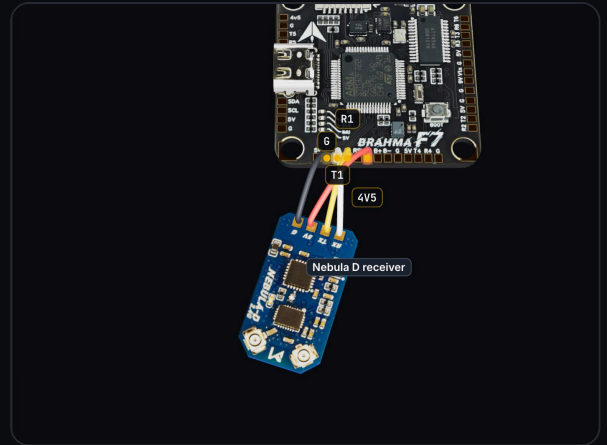
1 ESC

Plug a Vishnu 4-in-1 ESC into the 8-pin port with the cable from the box: M1-M4, current, telemetry and battery voltage in one plug.



2 Receiver (ExpressLRS / CRSF)

On UART1: receiver TX → **R1**, receiver RX → **T1**, 5V → **4V5**, G → **G**.

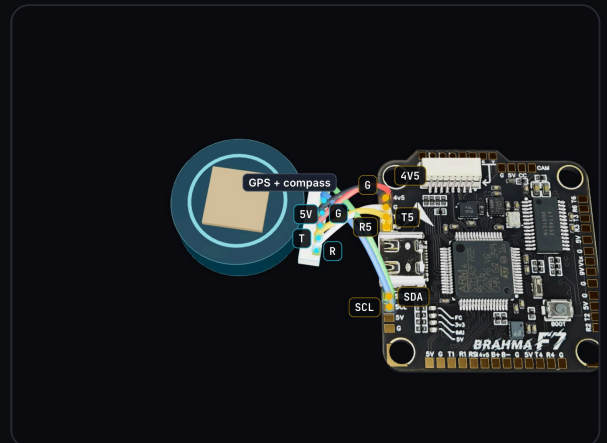


3 GPS and compass

GPS on UART5: GPS TX → **R5**, GPS RX → **T5**.
Compass: **SDA**, **SCL**. Power from the **4V5** and **G** pads above T5: 4V5 is live on USB too, so the GPS gets its fix on the bench without a battery. All on the left edge.

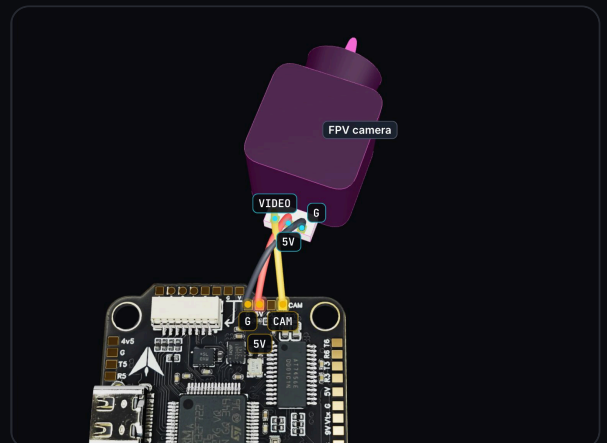
TIP

Mount the GPS on a mast, away from the VTX, the ESC and the battery leads, with its arrow pointing forward.



4 Analog camera

Camera video → **CAM**, power from **5V** and **G** next to it.



5 Analog VTX

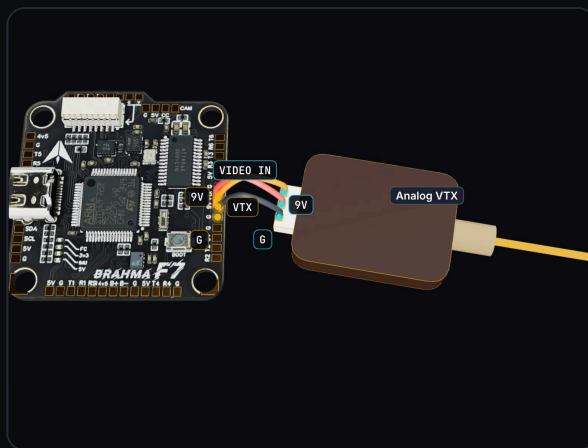
The video goes through the flight controller so the OSD can draw on it: camera video → **CAM**, and **VTX** → the video transmitter's video input.

VTX video in ← **VTX**, power from **9V** and **G** on the right edge. For SmartAudio or Tramp, connect the control wire to a free UART TX pad and set it as the VTX peripheral in the Ports tab.

Pick **TBS SmartAudio** or **IRC Tramp** for that UART in the Ports tab (check which one your VTX uses) and load a VTX table in the Video Transmitter tab, or the VTX menu will not work. Camera and VTX grounds go to the same ground pad, or pads next to each other, to keep lines out of the picture.

IMPORTANT

Screw the antenna on before the VTX gets power. A VTX that transmits without an antenna can burn out in seconds.



6 Digital VTX

A digital system plugs into the HD video port on the underside: R1, G, R2, T2, G, 9V.



7 Motors 5-8

M5-M8 are solder pads on the underside.



Firmware

Every Brahma F7 ships with the firmware you pick when you order. You can reflash it any time with one of these guides.

Betaflight

Freestyle and racing: the fastest tune and the biggest community.

[How to flash Betaflight on the Brahma F7 →](#)

INAV

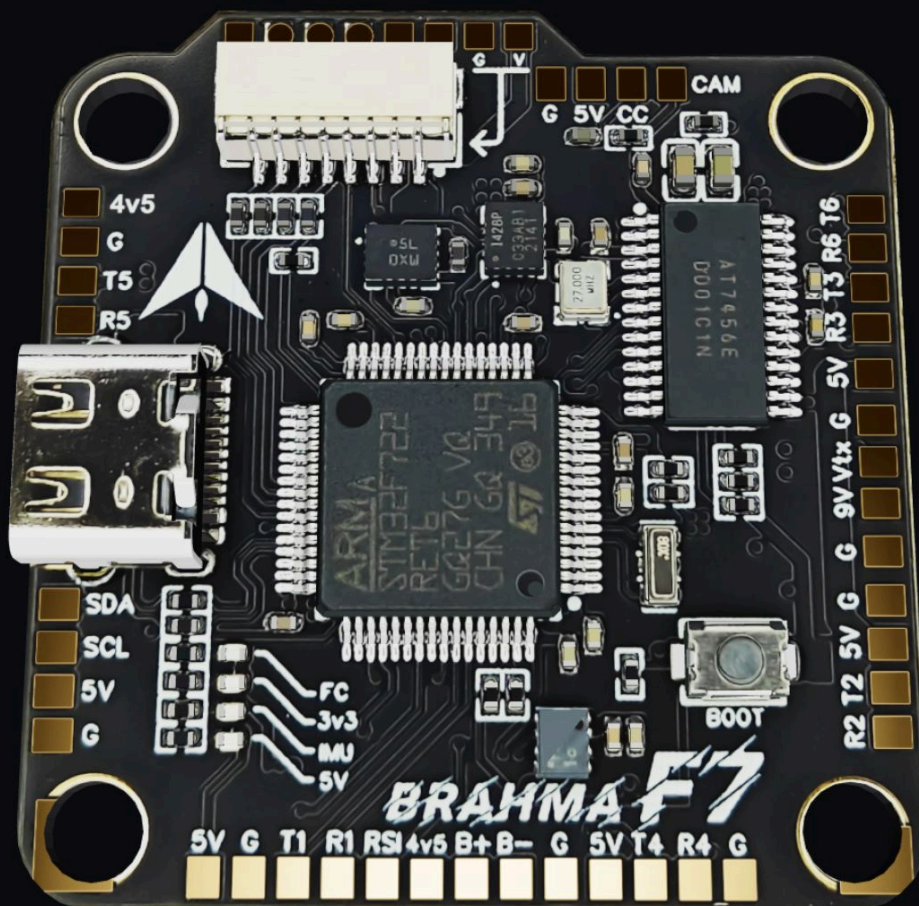
GPS features for fixed-wing and long range: return to home, waypoints.

[How to flash INAV on the Brahma F7 →](#)

Connect accessories

- [Connect a receiver \(ExpressLRS, IBUS\)](#)

In the box



- 1 × Brahma F7 flight controller
- 1 × SH 1.0 mm 8-pin cable, 30 mm (flight controller to ESC)

Downloads

Brahma F7 manual (PDF)

The original slide manual

Firmware files: see each firmware guide above, or **all downloads**.

Warranty

The Brahma F7 flight controller has a 6-month warranty against manufacturing defects from the date of purchase. Keep your invoice: we need a copy for any claim.

Not covered:

- Physical damage from use, such as water damage or tampered components.
- A burnt circuit from wrong wiring or overloading.

How a claim works: we inspect the board for physical damage and the points above. If it is eligible we replace it at no cost, and help you with your build. WhatsApp or call [+91 80171 93277](tel:+918017193277).

03 How to flash Betaflight on the Brahma F7

Betaflight 4.5.2 for the Brahma F7 is a Darkmatter build. About 5 minutes.

You need: [Betaflight Configurator](#), a USB-C data cable

1 Download the firmware

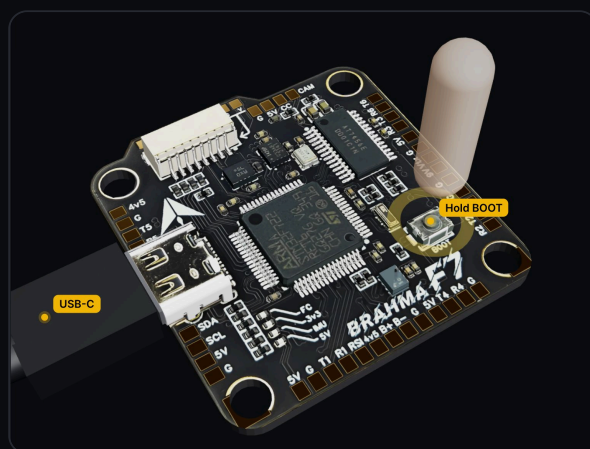
BETAFLIGHT4.5.2_-_BRAHMA_F7_-_CRSF.hex

Betaflight 4.5.2, CRSF build

An IBUS build for FlySky receivers is coming to the downloads page.

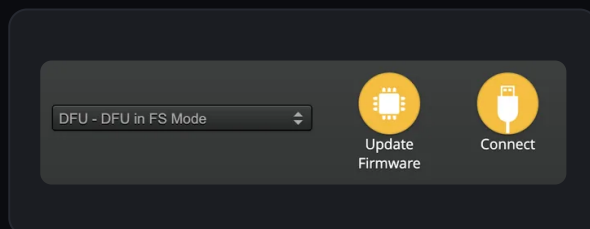
2 Hold BOOT and plug in USB-C

Unplug the battery. Press and hold the **BOOT** button on the Brahma F7, then plug the USB-C cable into your computer. Release the button once it is plugged in: the board starts in DFU (flashing) mode.



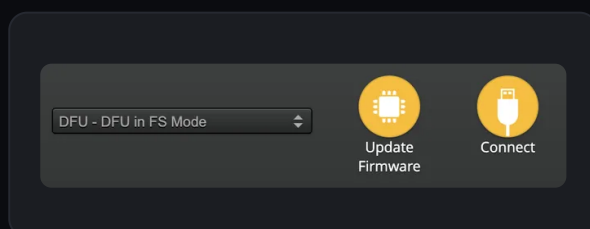
3 Open Betaflight Configurator

Open Betaflight Configurator. The board shows up as **DFU** instead of a COM port. If it does not, try another cable (some USB-C cables carry power only) and hold BOOT while plugging in again. On Windows, a board that shows up as "STM32 BOOTLOADER" but not as DFU needs its driver fixed: run ImpulseRC Driver Fixer, or switch it to WinUSB with Zadig.



4 Update Firmware

With **DFU** selected, click **Update Firmware**, and turn on **Full chip erase**.



5

Load the file

Click **Load Firmware [Local]** and choose the .hex you downloaded.

Load Firmware [Local]

 BETAFLIGHT4.5.2 - BRAHMA F7 - CRSF.hex

6

Flash

Click **Flash Firmware** and wait for erasing and flashing to finish. If it stops with “read protection not active”, untick **Full chip erase** and flash again, then type `defaults` in the CLI.

Flash Firmware

Erasing ...

7

Close the warning, open the CLI

Connect, close the accelerometer warning, and open CLI.

Warning

The following problems with your configuration were detected:

• the accelerometer is enabled but it is not calibrated.

If you plan to use the accelerometer, please follow the instructions for 'Calibrate Accelerometer' on the 'Setup' tab. If any function that requires the accelerometer (auto level modes, GPS rescue, ...) is enabled, arming of the craft will be disabled until the accelerometer has been calibrated.

If you are not planning on using the accelerometer it is recommended that you disable it in 'System configuration' on the 'Configuration' tab.

You need to fix these problems before attempting to fly your craft.

Close

Setup

Ports

Configuration

Power & Battery

Failsafe

Presets

PID Tuning

Receiver

Modes

Adjustments

Motors

OSD

Video Transmitter

LED Strip

Sensors

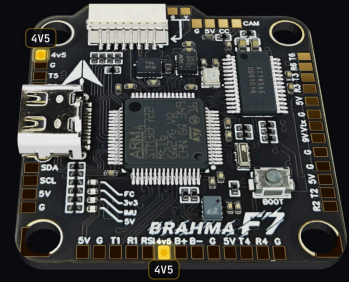
Tethered Logging

Blackbox

CLI

8 Count the 4V5 pads

The CLI settings depend on your board revision: current Brahma F7 boards have **two** 4V5 pads (left edge and bottom edge); older boards have **one**. Paste the settings for your board, then type `save`. The settings files are coming to the downloads page; until then, message us on WhatsApp for yours.



Before the first flight

1 Accelerometer

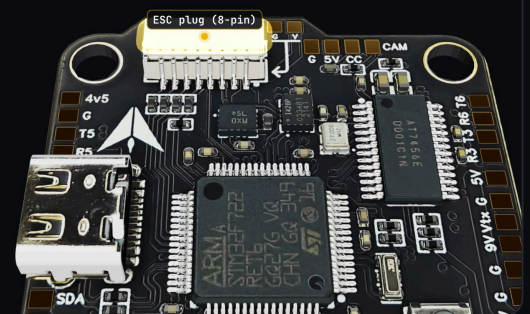
Setup tab: put the quad on a level surface and click **Calibrate Accelerometer**. Tilt it by hand: the 3D model on screen must follow.

2 Receiver

Ports: Serial Rx on UART1. **Receiver** tab: Serial (via UART), provider CRSF, telemetry on. Move each stick and check the bars follow the right channel (AETR for ExpressLRS). Set a switch for ARM in **Modes**.

3 Motors, props off

Battery through a smoke stopper, props off. In **Motors**, spin each motor at low throttle and check it matches the position and direction in Betaflight's diagram. Reorder or reverse there instead of re-soldering.



4 Failsafe

Failsafe tab (turn on Expert Mode if you do not see it): stage 2 is **Drop** by default, right for freestyle. For long range use GPS Rescue, and only after the GPS shows 8 or more satellites and you have tested it close and low. Switch the radio off with the props off and check the quad disarms.

5 RPM filter

With BlueJay on the Vishnu ESC, use **DShot300**, turn on bidirectional DShot and set the motor poles (usually 14). In the Motors tab every motor must show RPM and an error rate (E) of 0%; if not, drop to DShot150.

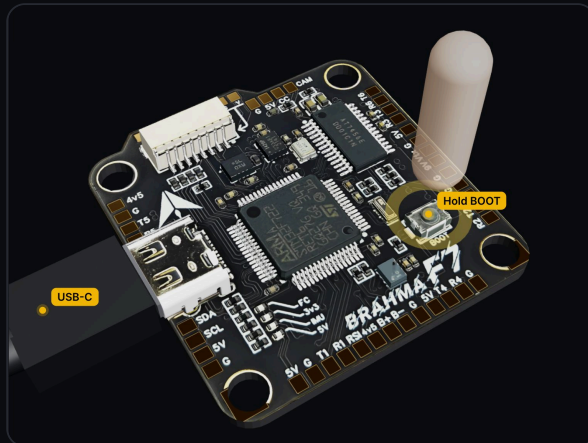
04 How to flash INAV on the Brahma F7

The Brahma F7 is an official INAV target, `BRAHMA_F722`. About 10 minutes, including the setup wizard.

You need: [INAV Configurator](#), a USB-C data cable

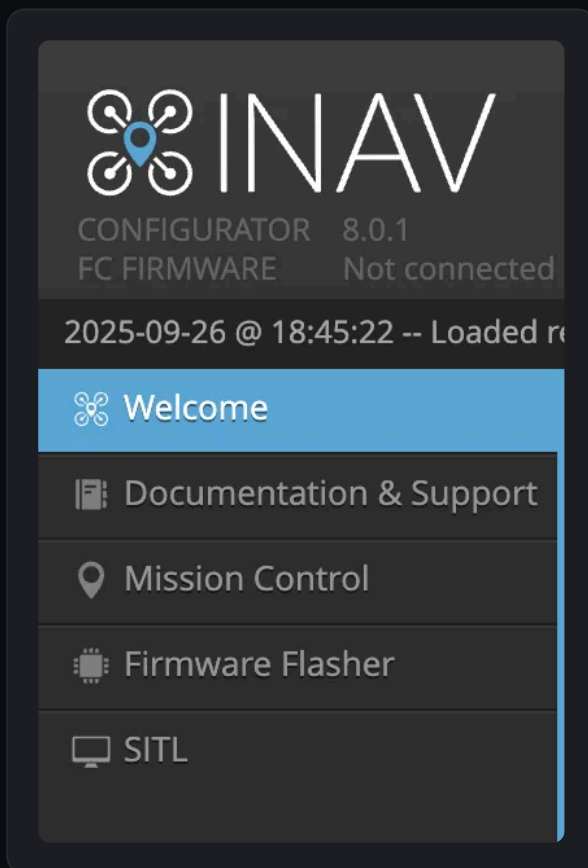
1 Hold BOOT and plug in USB-C

Unplug the battery. Press and hold the **BOOT** button on the Brahma F7, then plug the USB-C cable into your computer. Release the button once it is plugged in: the board starts in DFU (flashing) mode.



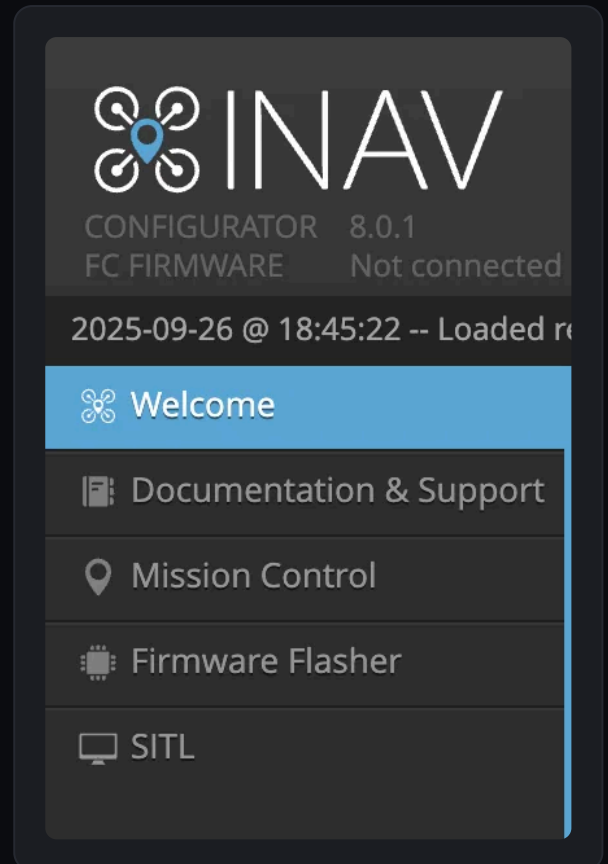
2 Open INAV Configurator

Open INAV Configurator. The board shows up as **DFU** instead of a COM port. If it does not, try another cable (some USB-C cables carry power only) and hold BOOT while plugging in again. On Windows, a board that shows up as "STM32 BOOTLOADER" but not as DFU needs its driver fixed: run ImpulseRC Driver Fixer, or switch it to WinUSB with Zadig.



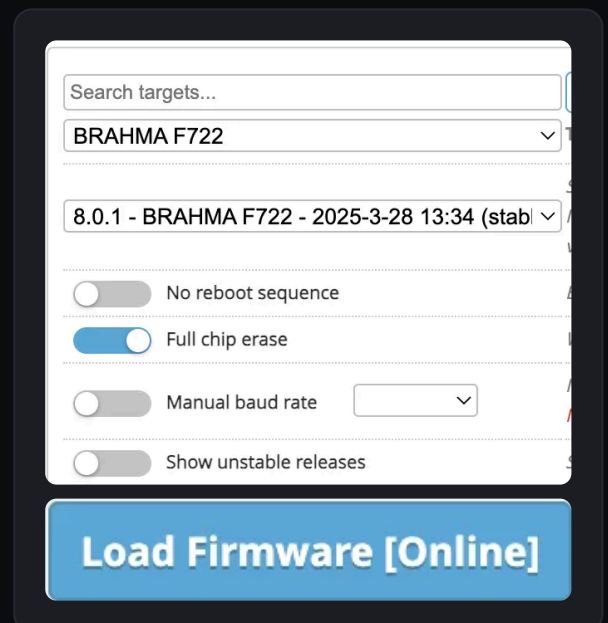
3 Firmware Flasher

Once the board shows as DFU, open **Firmware Flasher**.



4 Choose the target

Target: **BRAHMA_F722**, the latest stable release. Turn on **Full chip erase**.



5 Flash

Click **Load Firmware [Online]**, then **Flash Firmware**. Wait for erasing and flashing to finish.



6 Craft type

Connect. The setup wizard asks what you are building: pick your craft so INAV loads the right defaults.

Default values

INAV Configurator would like to know which kind of UAV you are configuring. Based on this information it will modify some default values to unlock the best flying performance.

Avoid blindly restoring all PID and filter configuration from the previous version of INAV. The best result can be obtained by retuning from defaults!

Mini Quad with 3" propellers

Mini Quad with 5" propellers

Mini Quad with 7" propellers

Airplane with a Tail

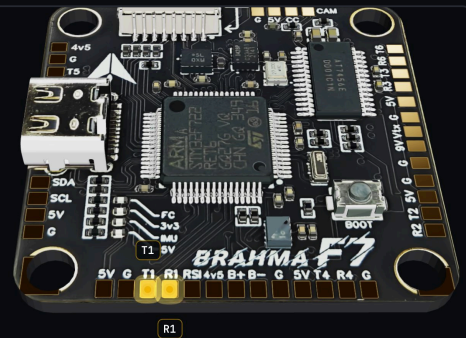
Airplane without a Tail (Wing, Delta, etc)

Rovers & Boats

Keep current settings (Not recommended)

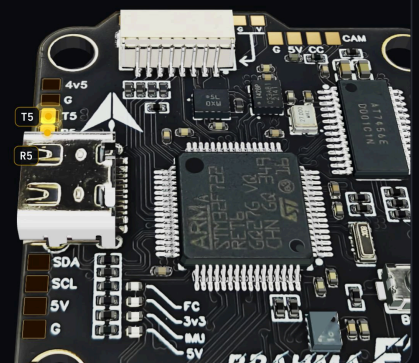
7 Receiver

Receiver serial port: **UART1**. Protocol: **CRSF** for ExpressLRS.



8 GPS

GPS serial port: **UART5** (T5/R5), 115200 baud, protocol UBLOX.



05 Connect a receiver to the Brahma F7

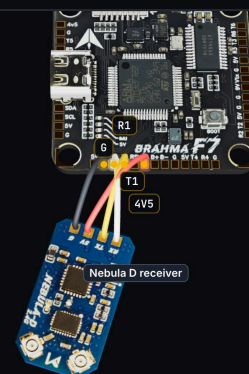
Your receiver goes on UART1. Here it is wire by wire.

1 ExpressLRS (Nebula D)

Four wires to UART1: receiver **TX** → **R1**, receiver **RX** → **T1**, **5V** → **4V5**, **G** → **G**. The 4V5 pad is live on USB, so you can bind and set up on the bench without a battery.

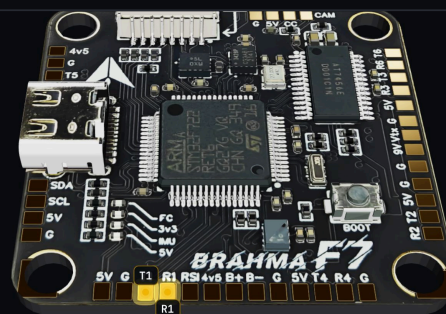
TIP

Receiver and transmitter must run the same ExpressLRS major version (3.x with 3.x). Set the same binding phrase on both, and the receiver binds on its own.



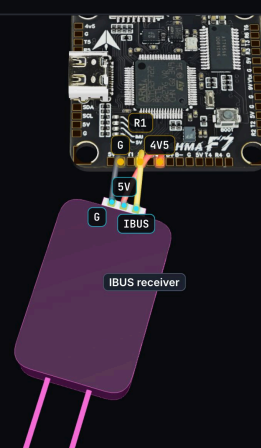
2 Betaflight / INAV

Betaflight: **Ports** tab → **Serial Rx** on UART1, receiver protocol CRSF. INAV: the setup wizard, receiver port UART1, CRSF.



3 FlySky IBUS

Three wires: IBUS signal → **R1**, 5V → **4V5**, G → **G**. In Betaflight the firmware must be built with IBUS selected: reflash with IBUS, then turn on Serial Rx on UART1.



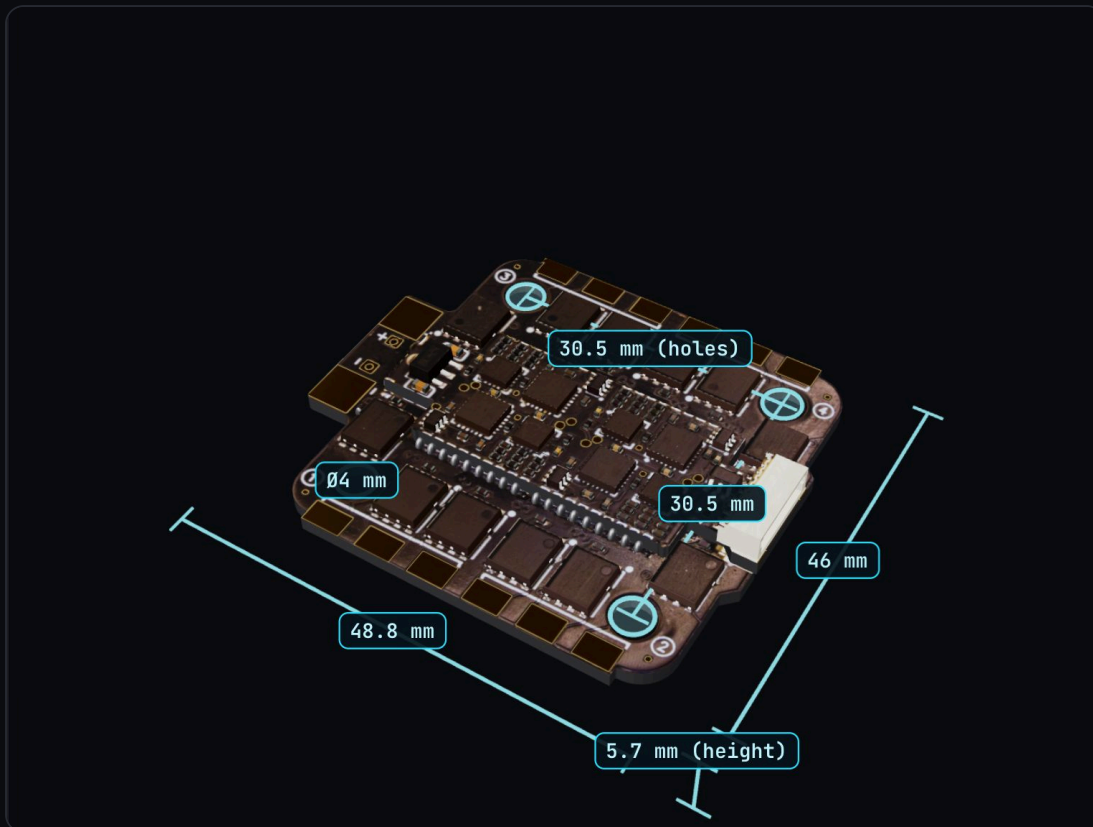
06 Vishnu 60 4-in-1 ESC

A 4-in-1 ESC for 2–6S builds: 60A continuous per motor, 90A burst, ships with BLHeli_S (BlueJay ready), DShot300/600 and a built-in current sensor, on a 30.5 × 30.5 mm mount.

Specifications

Product	Darkmatter® Vishnu 60 4-in-1 ESC
Firmware	Ships with BLHeli_S. For RPM filtering (bidirectional DShot), flash BlueJay in ESC Configurator: target J-H-50
Continuous current	60A × 4 = 240A
Burst current	90A for 7 seconds
Protocol	DSHOT300 / DSHOT600
Power input	2–6S LiPo
Power output	VBAT
Current sensor	Built in
Mounting	30.5 × 30.5 mm, 4 mm holes
Dimensions	46 × 48.8 × 5.7 mm
Weight	14 g
Motors	Check the maximum current in your motor maker's data: it should stay below 70–80A. If you will fly at full throttle most of the time with the biggest propeller the motor supports, stay at 60A or below.
Operating temperature	–20 °C to 70 °C
Made in	India

Dimensions and mounting



46 × 48.8 mm, 5.7 mm tall, 1.6 mm PCB. Holes 4 mm on the standard 30.5 × 30.5 mm pattern, so it stacks under any Brahma.

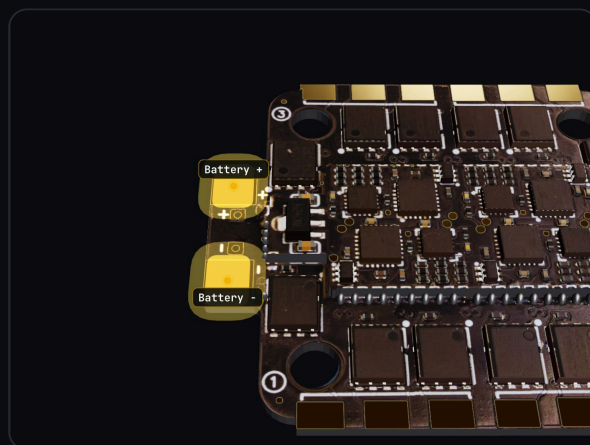
Battery and capacitor

1 Solder the capacitor first

Solder the 1000 μ F low-ESR capacitor from the box across the battery pads: + to +, - to -. Connect the battery - lead to the capacitor's - side only.

IMPORTANT

Without the capacitor, voltage spikes from the motors can destroy the ESC.



2 Battery leads

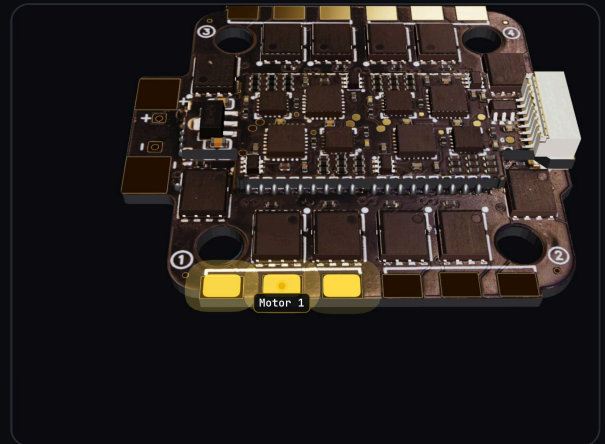
Solder the 12 AWG leads and the XT60 connector from the box to the same pads. Red to +, black to -. Check twice: reversed polarity is not covered by the warranty.

Motor numbering

With the board this side up, motor 1 is bottom left, 2 bottom right, 3 top left and 4 top right, matching the numbers printed on the board. Each motor has three pads; swap any two of a motor's wires to reverse it (or reverse it in BLHeli/BlueJay).

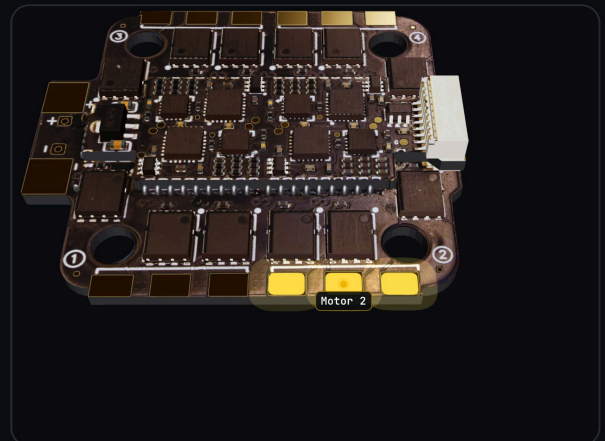
1 Motor 1

The three pads for motor 1.



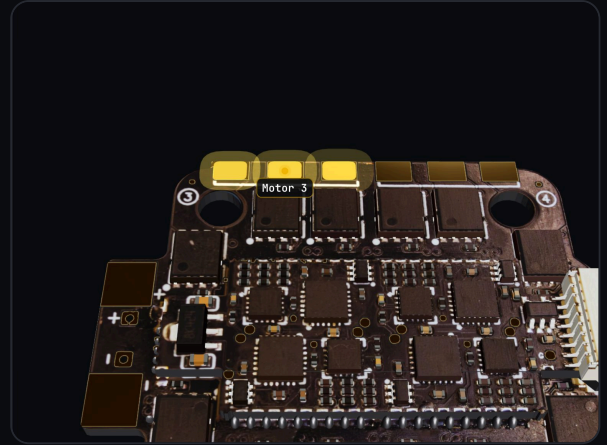
2 Motor 2

The three pads for motor 2.



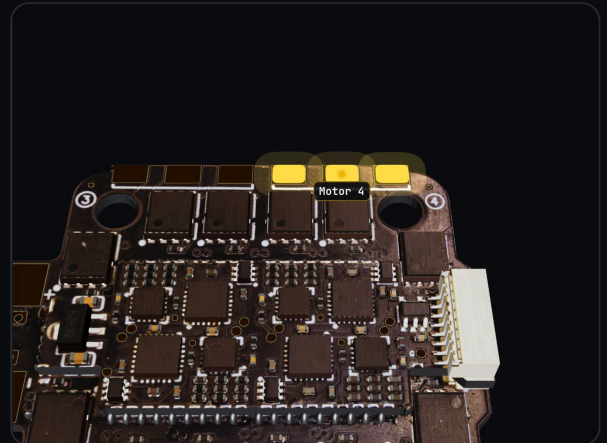
3 Motor 3

The three pads for motor 3.



4 Motor 4

The three pads for motor 4.

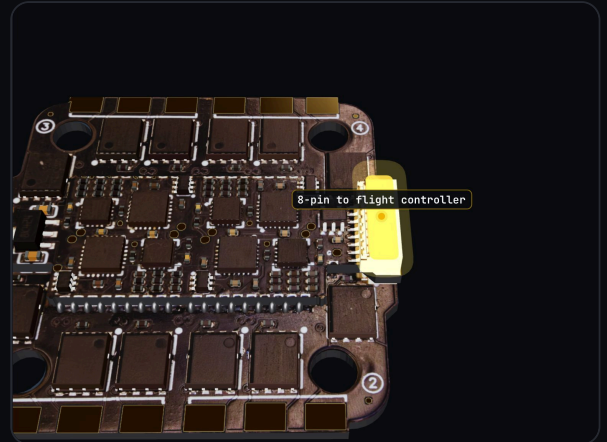


Connect to the flight controller

Use the 8-pin cable from the box. It carries the four motor signals, current, telemetry, ground and battery voltage in one plug, straight into any Brahma. Or solder to the 7 pads on the underside (4, 3, 2, 1, C, G, V).

1 8-pin plug

Plug one end here and the other into the flight controller's ESC port.



2 Direct-solder pads

On the underside: 4, 3, 2, 1 (motor signals), C (current), G, V (battery voltage).



Stacks: [Stack H760](#), [Stack 760](#), [Stack 460](#).

Before the first flight

- **First power-up through a smoke stopper** (or a current-limited bench supply). A solder bridge then costs you a fuse, not an ESC.
- **Bidirectional DShot:** with BlueJay on the ESC, use DShot300 and turn on bidirectional DShot in Betaflight (Configuration tab, or `set dshot_bidir = 0N`) and set your motor pole count (`set motor_poles = 14` for most 5-inch motors). That enables the RPM filter, the biggest single improvement to a tune. Stock BLHeli_S does not support it.
- **Motor order:** check it in the Motors tab with the props off. The flight controller expects its own motor order; if a motor spins in the wrong place, remap it rather than swapping wires around.

IMPORTANT

Test motor direction **without propellers** and keep it below 15% throttle. Never arm without propellers in Angle mode: the flight controller tries to level the craft and the motors will not slow down when you lower the throttle.

BlueJay and PWM frequency

The Vishnu 60 ships with BLHeli_S. For the RPM filter (bidirectional DShot) you need BlueJay.

1 Flash BlueJay

For RPM filtering (bidirectional DShot), flash BlueJay in the [ESC Configurator](#): target **J-H-50**.



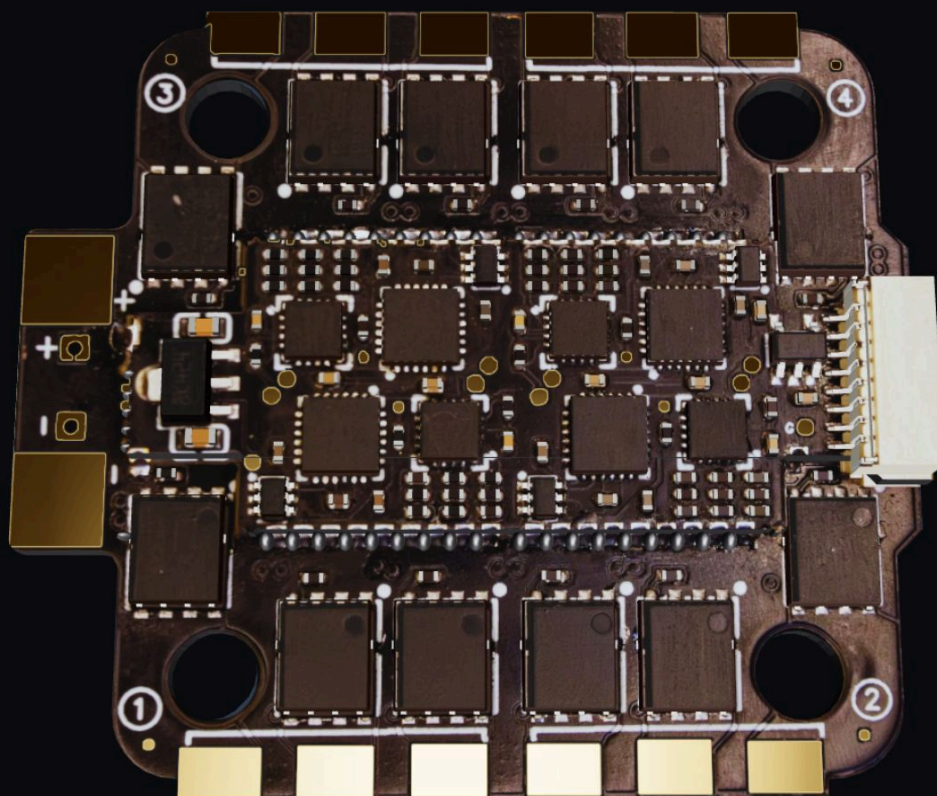
2 Set PWM by prop size

After flashing BlueJay, set PWM by prop size:

Props	PWM frequency
Larger than 5"	24 kHz
5"	48 kHz
Smaller than 5"	96 kHz

A lower PWM frequency gives the motors firmer braking and keeps switching heat in the ESC down, which suits bigger props; it does not add thrust. A higher frequency runs the motors smoother and more efficiently at part throttle, which helps small motors most. If motors stutter, desync or will not start, flash again one step lower.

In the box



- 1 × Vishnu 60 4-in-1 ESC
- 1 × 1000 μ F 35V low-ESR capacitor
- 12 AWG battery wire
- 1 × XT60 connector
- 1 × SH 1.0 mm 8-pin cable, 30 mm

Downloads

Vishnu 60 manual (PDF)

The original slide manual

Warranty

The Vishnu 60 ESC has a 6-month warranty against manufacturing defects from the date of purchase. Keep your invoice: we need a copy for any claim.

Not covered:

- Physical damage from use, such as water damage or tampered components.
- A burnt circuit from wrong wiring or overloading.
- A burnt ESC from spinning motors without propellers above 15% throttle while checking motor direction.
- A burnt ESC from arming without propellers in Angle mode: the flight controller keeps trying to level the craft and the motors will not slow down when you lower the throttle.

How a claim works: we inspect the board for physical damage and the points above. If it is eligible we replace it at no cost, and help you with your build. WhatsApp or call [+91 80171 93277](tel:+918017193277).