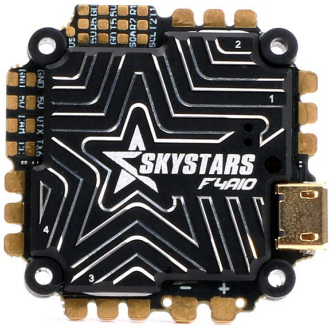
Jupiter F405 40A AIO

Skystars – flight controller (FC) with electronic speed controllers (ESC)
User manual



Read the entire manual before installation. Remove the propellers for all bench tests.

www.rotorama.com

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1. Safety instructions

1.1 Before you start

The Skystars Jupiter F405 40A AIO is an electronic component designed to be built into an FPV drone. Installation requires soldering and a basic knowledge of building and setting up drones. If you have no experience with this, leave the installation to a more experienced modeller.

- This product is not a toy. Keep it away from children; small parts (connectors, screws, capacitor) can be swallowed.
- Do not power the board from a battery with a higher voltage than stated in the specifications (3–6S LiPo).
- The board and heat sink may be hot during and shortly after operation.

1.2 Soldering and installation

- Solder only with the battery and the USB cable disconnected.
- Use a temperature-controlled soldering iron and flux, and work in a ventilated area.
- After soldering, check that there are no solder bridges between neighbouring pads and that no wire overlaps a neighbouring pad.
- Route the motor and power wires so that they cannot get into the propellers and are not strained by tension or by a sharp frame edge.

※ Before connecting the battery for the first time, use a multimeter to check that there is no short circuit between the power pads. Use a smoke stopper or a current-limited power supply for the first power-up.

1.3 LiPo batteries

- Use only undamaged LiPo batteries. Never use a swollen, punctured or otherwise damaged battery.
- Charge the battery under supervision, with a charger designed for LiPo, on a non-flammable surface.
- Never short-circuit the battery and never leave it connected to the drone unattended. If you notice a smell, smoke or heating, disconnect it immediately.

1.4 Motor tests

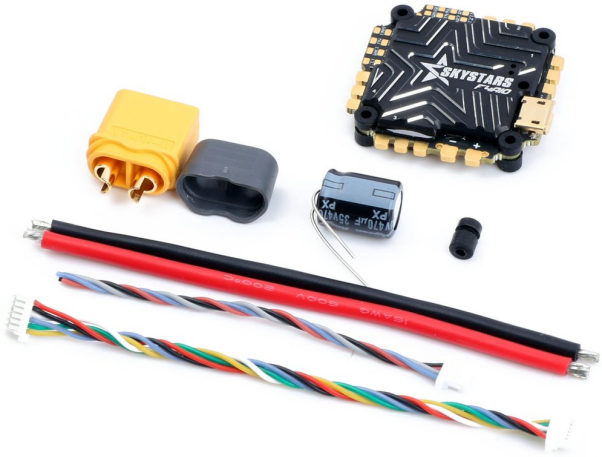
- For all bench tests, when connected to a computer and during setup, **always remove the propellers**.
- After connecting the battery, keep your hands away from the motors and place the drone so that it cannot take off unexpectedly.
- Test the Arm function (motors on) only after checking the failsafe (chapter 5.2).

2. Product description

2.1 Package contents

Item	Qty
AIO board (flight controller and ESCs)	1×
Capacitor	1×
XT60 connector	1×
16AWG cable	1×
External USB-C connector	1×
Cable set	1×

Battery, motors, propellers, frame, receiver, camera and video transmitter are not included.



Package contents

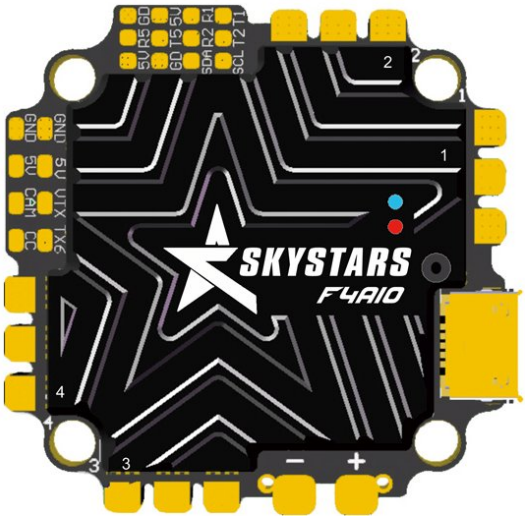
2.2 Specifications

Parameter	Value
Type	AIO – flight controller (FC) and four electronic speed controllers (ESC) on one board
Power supply	3–6S LiPo
ESC current rating	40 A
Processor (MCU)	F405
Gyroscope (IMU)	MPU6000
Barometer	integrated
Blackbox memory	16 MB
BEC	5 V / 3 A
Current sensor	yes (setting Scale 400, Offset 0)
ESC firmware	BLHeli_S
FC firmware – Betaflight target	SKYSTARSF405AIO
USB	integrated Micro USB; external USB-C (included)
I2C	SDA/SCL pads (e.g. for a compass)
Mounting holes	25.5 × 25.5 mm, M2
Cooling	aluminium heat sink on both sides of the board
Weight	12.6 g

※ The board is printed with “Blheli_s 45A”. Size the power system (motors, propellers) according to the 40 A value given in the table.

The board is suitable for smaller 3–4" drones and light 5" drones. The connectors for a digital video transmitter and for an RC receiver are on the bottom side of the board. The external USB-C connector is especially useful on cinewhoops, where the flight controller is hard to reach inside the frame.

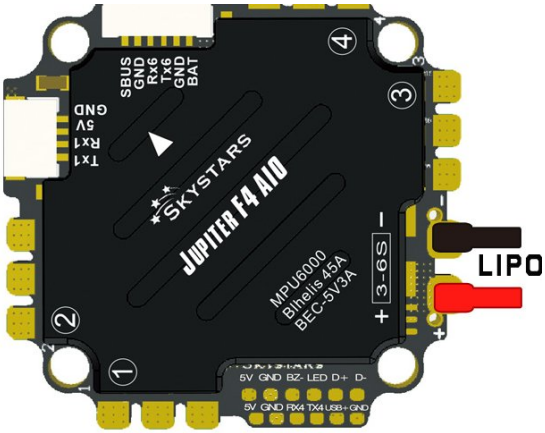
2.3 Top side of the board



Top side of the board (manufacturer's diagram)

Pads	Function
− / +	battery power (cable with XT60 and capacitor)
1, 2, 3, 4	outputs for motors 1–4 (three pads per motor)
GND, 5V, CAM, CC	analogue camera: ground, 5 V supply, video from camera (CAM); for CC see chapter 3.5
GND, 5V, VTX, TX6	analogue video transmitter: ground, supply, video to VTX, VTX control (UART6)
R1, T1	UART1 (also on the receiver connector)
R2, T2	UART2
R5, T5	UART5 (GPS)
SDA, SCL	I2C bus (compass)
5V, GND	5 V supply and ground for connected devices
USB	integrated Micro USB connector

2.4 Bottom side of the board



Bottom side of the board (manufacturer's diagram)

Connector / pads	Function
connector Tx1, Rx1, 5V, GND	RC receiver on UART1
connector SBUS, GND, Rx6, Tx6, GND, BAT	digital video transmitter (e.g. DJI) – UART6 and power
5V, GND, BZ−, LED, D+, D−	buzzer (BZ−), LED strip (LED), external USB-C (D+, D−)
5V, GND, RX4, TX4, USB+, GND	UART4, power for the external USB-C

2.5 UART assignment by the manufacturer

Port	Assignment by the manufacturer
UART1	receiver (Receivers)
UART2	free (Vacancy)
UART3	ESC telemetry (ESC TELE)
UART4	free (Vacancy)
UART5	GPS
UART6	DJI FPV / VTX

The free ports UART2 and UART4 can be used for other peripherals as needed. Only one device can work on a given UART at a time.

3. Installation and wiring

3.1 Mounting in the frame

- Mount the board in a frame with the standard 25.5 × 25.5 mm hole pattern using M2 screws. Do not overtighten the screws.
- We recommend using anti-vibration grommets so that frame vibrations are not transmitted to the gyroscope.
- If you mount the board rotated relative to the direction of flight, set the rotation in Betaflight (*Configuration → Board and Sensor Alignment*).
- Neither the board nor the heat sink may touch the carbon frame – carbon is electrically conductive.

3.2 Power and capacitor

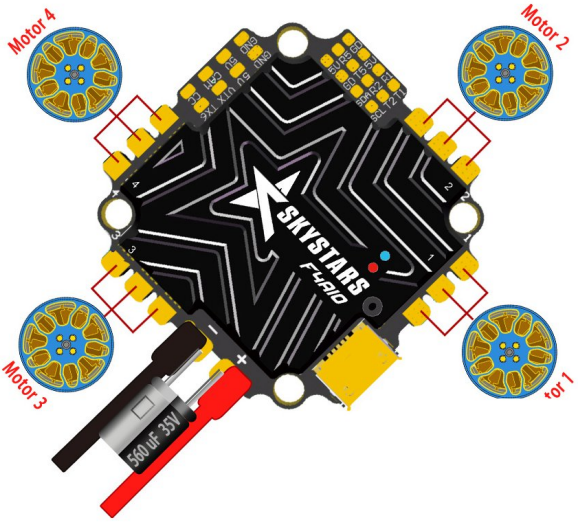
Solder the cable with the XT60 connector to the **+** (red wire) and **−** (black wire) pads. Solder the supplied capacitor to the same pads – observe its polarity (the negative lead is marked with a stripe on the housing).

❉ The manufacturer explicitly requires the use of the supplied low-ESR capacitor. Without it, voltage spikes may damage the ESCs.

- Reversing the power polarity will destroy the board. Check the polarity again before connecting the battery for the first time.
- Place the capacitor as close to the power pads as possible and secure it against vibration (e.g. with heat-shrink tubing or a cable tie).

3.3 Motors

Each motor has three wires, which are soldered to the set of three pads at the corresponding corner of the board. The order of the three wires of one motor only determines the direction of rotation – this can be changed later in software (chapter 4.4), so there is no need to re-solder the wires.



Motor numbering and capacitor connection (manufacturer's diagram)

- The motor number must match the pad numbers on the board (1–4) and the diagram in the figure.
- Cut the wires to the required length so that they are not in the way but are not under tension.

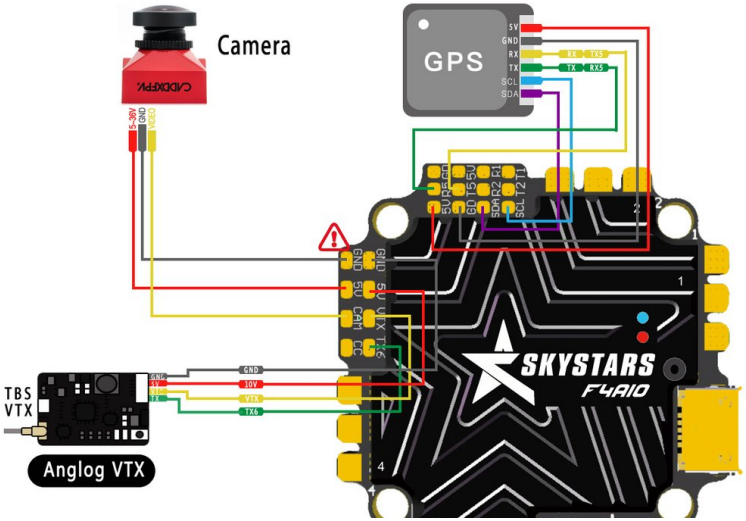
3.4 RC receiver

Connect an ExpressLRS / CRSF receiver with a cable to the **Tx1, Rx1, 5V, GND** connector on the bottom side of the board (UART1):

Receiver	Board
RX	Tx1
TX	Rx1
5V (power input)	5V
GND	GND

- The wires cross over: receiver RX to board TX and receiver TX to board RX.
- Before connecting, check in the receiver manual that it is designed for a 5 V supply.

3.5 Analogue camera and video transmitter



Wiring of the analogue camera, analogue VTX and GPS (manufacturer's diagram)

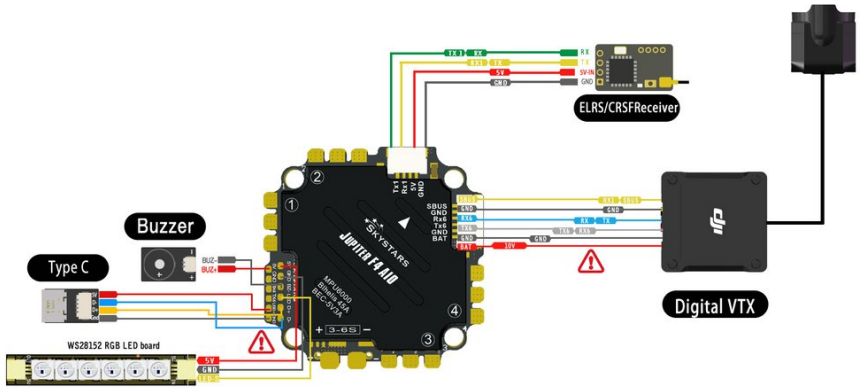
① **Camera:** GND → GND, power → 5V, camera video output → CAM.

② **Analogue VTX:** GND → GND, power → 5V according to the board marking, VTX video input → VTX, VTX control wire (SmartAudio / Tramp) → TX6.

※ The manufacturer's diagram labels the VTX power wire “10V”, but marks the pad on the board as 5V. Before connecting, check the permitted supply voltage in the manuals of the video transmitter and the camera.

The **CC** pad is neither wired nor described in the manufacturer's diagram. Do not use it without knowing its function.

3.6 Digital video transmitter



Wiring of the digital VTX, receiver, buzzer, LED and external USB-C (manufacturer's diagram)

Connect a digital VTX (e.g. DJI) with a cable to the six-pin connector on the bottom side of the board:

Board	Digital VTX
SBUS	SBUS
GND	GND
Rx6	TX
Tx6	RX
GND	GND
BAT	unit power supply

- The **BAT** pin powers the VTX unit; the manufacturer's diagram labels this wire “10V” and adds a warning symbol. Before connecting, check the permitted supply voltage range in the VTX manual.
- According to the manufacturer's diagram, the SBUS wire is routed to RX1 (UART1). If you use SBUS control from the DJI unit, do not connect a receiver to UART1 at the same time.
- UART6 serves either the digital VTX or the control of an analogue VTX (TX6) – not both at the same time.

3.7 GPS and compass

Connect the GPS module to the pads at the top of the board (see the figure in chapter 3.5):

GPS module	Board
5V	5V
GND	GND
RX	T5
TX	R5
SCL (compass)	SCL
SDA (compass)	SDA

Connect the SCL and SDA wires only if the GPS module has a compass.

3.8 Buzzer, LED and external USB-C

- **Buzzer:** negative lead (BUZ−) → BZ−, positive lead (BUZ+) → 5V.
- **WS2812 LED strip:** 5V → 5V, GND → GND, data wire → LED.
- **External USB-C:** connect with the supplied cable to the D+, D−, power and GND pads according to the diagram in chapter 3.6. Make sure D+ and D− are not swapped.

4. Betaflight setup

4.1 Connecting to a computer

Connect the flight controller to a computer with a USB cable (integrated Micro USB or external USB-C) and start the **Betaflight Configurator** application. When connected via USB, only the flight controller is powered – the ESCs are not powered until you connect the battery.

- If the computer does not recognise the board, try another cable (some cables are charge-only) and install the drivers offered by Betaflight Configurator.
- When updating the firmware, select the target **SKYSTARSF405AIO**.

4.2 Ports tab

On the *Ports* tab, configure the ports according to the connected devices. Settings recommended by the manufacturer:

Port	Setting
USB VCP	*Configuration/MSP* on
UART1	*Serial Rx* on (receiver)
UART3	*Sensor Input*: ESC
UART5	*Sensor Input*: GPS
UART6	DJI digital VTX: *Configuration/MSP* on; other VTX: *Peripherals*: VTX (e.g. TBS SmartAudio)

After changing the settings, click *Save and Reboot*. For the receiver, then select *Serial (via UART)* on the *Receiver* tab and the protocol matching the receiver (e.g. CRSF for ExpressLRS).

4.3 Current sensor

On the *Power & Battery* tab, in the *Amperage Meter* section, set **Scale 400** and **Offset 0** as specified by the manufacturer. You can fine-tune the Scale value later according to the capacity actually recharged into the battery.

4.4 Motors and direction of rotation

- On the *Configuration* tab, check the frame type (Quad X) and the ESC protocol (DShot).
- On the *Motors* tab, with the **propellers removed** and the battery connected, spin up the motors one by one and check that the order matches the diagram in Betaflight.
- Set the direction of rotation of the motors according to the chosen configuration (Props In / Props Out). Reverse a motor spinning the wrong way in software – in Betaflight Configurator with the motor direction tool or in an ESC configurator (e.g. ESC Configurator) – without re-soldering the wires.

5. Before the first flight

5.1 Check without propellers

- On the *Setup* tab, check that the model on the screen follows the tilt of the board in the correct axes.
- On the *Receiver* tab, check that all channels respond to the stick movements in the correct direction.
- Check the voltage and current readings and the order and direction of rotation of the motors (chapter 4.4).

5.2 Arm, Disarm and failsafe

- Assign **Arm** (motors on) and **Disarm** (motors off) to a switch on the radio on the *Modes* tab, not to a stick combination.
- On the *Failsafe* tab, set the behaviour on signal loss (*Drop* – motors off – is recommended).
- Test the failsafe without propellers: after Arm, switch off the radio – the motors must stop.

5.3 Drone operation and regulations

The assembled drone is subject to the rules for the operation of unmanned aircraft – in the EU in particular Regulation (EU) 2019/947. National regulations differ from country to country (registration, pilot competence, zones, insurance). **The law of the country in which you operate the drone always applies.**

Battery	Fully charged	End flight	Storage
per cell	4.20 V	3.5 V	3.8 V
3S LiPo	12.6 V	10.5 V	11.4 V
4S LiPo	16.8 V	14.0 V	15.2 V
5S LiPo	21.0 V	17.5 V	19.0 V
6S LiPo	25.2 V	21.0 V	22.8 V

Always insert a fully charged battery before flight. End the flight at 3.5 V per cell at the latest.

6. Maintenance, storage and firmware

6.1 Maintenance and storage

- After each flight, check the solder joints, the motor wires and the capacitor mounting.
- Keep the board dry and protect it from dust and dirt. Moisture and conductive debris (carbon dust, metal chips) can cause a short circuit.
- If the board gets wet, disconnect the battery immediately and let the board dry thoroughly before connecting it again.
- After a crash, check that the components, heat sink and pads are not damaged and that nothing touches the carbon frame.
- Store the product in a dry place at room temperature. Store the battery disconnected, at 3.8 V per cell.

6.2 Firmware update

- Flight controller: Betaflight, target **SKYSTARSF405AIO**. Before updating, save a backup of your settings (the *diff all* command on the *CLI* tab).
- ESCs: **BLHeli_S** firmware. Configure and update them only with a tool intended for BLHeli_S and only if you know what you are changing – unsuitable firmware will damage the ESCs irreversibly.
- Always check the settings after an update, especially ports, receiver and failsafe.

7. Troubleshooting

Problem	Possible cause and solution
The computer does not recognise the board	Faulty or charge-only cable – replace it. Missing drivers – install them from Betaflight Configurator.
The receiver does not respond	Swapped RX/TX, wrong UART on the *Ports* tab or wrong protocol on the *Receiver* tab. The receiver is not bound to the radio.
A motor does not spin	Battery not connected (USB does not power the ESCs), cold solder joint on the motor pads, wrong motor order.
A motor spins the wrong way	Change the direction in software (chapter 4.4).
The drone cannot be armed	On the *Setup* tab, check the reasons for blocking Arm (e.g. tilt, uncalibrated accelerometer, active failsafe).
VTX control does not work	UART6 is not set to the correct function (MSP for DJI, VTX for an analogue transmitter).
Incorrect current reading	Set Scale 400 and Offset 0 (chapter 4.3) and fine-tune if necessary.
GPS does not find satellites	Swapped RX/TX, UART5 not set as GPS, the module has no clear view of the sky.

8. Information for the EU and Czech Market

8.1 Importer and responsible person in the EU

The product is placed on the European Union market by the importer stated below, who is at the same time the responsible person within the meaning of Article 16 of Regulation (EU) 2023/988 of the European Parliament and of the Council on general product safety (GPSR).

Importer / responsible person in the EU	Rotorama, s.r.o.
Company ID (IČO)	051 57 692
VAT ID (DIČ)	CZ05157692
Registered office	Okrajová 1351, 674 01 Třebíč, Czech Republic
E-mail	info@rotorama.cz
Phone	+420 252 252 098
Website	www.rotorama.com

8.2 Product conformity

CE

- The product bears the **CE** marking and complies with the requirements of the applicable European Union harmonisation legislation.
- A copy of the **EU Declaration of Conformity** is available from the importer at the address stated above or at the e-mail address info@rotorama.cz.
- **Product identification:** the type designation (Jupiter F4 AIO) is printed on the board.

8.3 Disposal of electrical equipment



- The crossed-out wheeled bin symbol on the product, its packaging or in the documentation means that at the end of its service life the product **must not be disposed of together with mixed municipal waste**.
- Hand it over at a take-back point for electrical equipment – at a collection yard, at a take-back point of a collective system, or at the retailer when purchasing a new equivalent product. Take-back is free of charge for the end user.
- The obligations under Act No. 542/2020 Coll., on end-of-life products, are fulfilled by the importer through a collective take-back system.
- Proper disposal helps prevent negative impacts on the environment and human health and contributes to the reuse of secondary raw materials.

Through its contractual partner **ASEKOL a.s.**, the company ensures the take-back of waste electrical equipment from households and the separate collection of waste electrical equipment, batteries and accumulators in accordance with the applicable legislation. The customer is entitled to hand over old electrical equipment or a battery or accumulator at any collection point of the above contractual partner. The addresses of these take-back points are listed at www.asekol.cz, www.ecobat.cz and also https://visoh2.mzp.cz/RegistrMistZO/RegistrMistZOPublic/MapaMistZpetOdberu.

9. Warranty and rights arising from defective performance

The rights and obligations of the contracting parties are governed by Czech law, in particular by Act No. 89/2012 Coll., the Civil Code, and Act No. 634/1992 Coll., on consumer protection.

- The seller is liable to the buyer for the product being free of defects on receipt. If the buyer is a consumer, a defect may be notified **within two years of receipt** of the product (Section 2165 of the Civil Code).
- If a defect appears within **one year** of receipt, the product is deemed to have been defective already at the time of receipt (Section 2161(5) of the Civil Code).
- When purchasing online, a consumer has the right to **withdraw from the contract within 14 days** of receiving the goods without giving a reason (Section 1829 of the Civil Code).
- Claims should be made with the retailer from whom you purchased the product. The importer's contact details are given in Chapter 8.1.
- The competent body for out-of-court settlement of consumer disputes is the **Czech Trade Inspection Authority**, Štěpánská 796/44, 110 00 Prague 1, www.coi.cz.