Crazyflie 2.1 Brushless kit user manual

Safety and Regulatory information

Crazyflie 2.1 Brushless was designed by Bitcraze AB, Södra Bulltoftavägen 46, 212 22 Malmö, Sweden and is assembled in China.

Disclaimer

The information in this document is subject to change without notice. Bitcraze AB assumes no responsibility for any omissions or inaccuracies and specifically disclaims liabilities, losses, or risks, personal or otherwise, incurred as a consequence, directly or indirectly, of the use of any of the contents of this document. Please contact Bitcraze AB for the latest version of this documentation.

FCC Statement

For regulatory identification purposes, Crazyflie 2.1 Brushless is assigned a model number of CF21BLKIT.
Crazyflie Brushless FCC ID is 2AUV3CF21BLKIT. This FCC ID can only be found printed on the product box.

FCC Regulatory Compliance
- This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
- changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
- This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.
- If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
- -- Reorient or relocate the receiving antenna.
- -- Increase the separation between the equipment and receiver.
- -- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- -- Consult the dealer or an experienced radio/TV technician for help.
-

FCC Radiation Exposure statement
- This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with

minimum distance 20cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Safety precautions

Read and follow this manual before using the Crazyflie 2.1 Brushless. Do not use the Crazyflie 2.1 Brushless if it has been damaged.

Handle battery packs carefully. The product contains a lithium-ion polymer battery. There is a risk of fire and burns if the battery is handled improperly.

To avoid damaging the product or the battery, this product can only be used with a compatible battery.

Warning: To reduce the risk of fire or burns, do not disassemble, crush, puncture, short external contacts or circuit, expose to temperature above 60°C (140°F), or dispose of in fire or water. Do not expose the battery to extremely low air pressure as this may result in an explosion or leakage of flammable liquid or gas.
Recycle or dispose of used batteries according to the local regulations or reference guide supplied with your product.

RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORRECT TYPE. DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS

Warning: Do not operate the Crazyflie 2.1 Brushless outside the temperature range specified in the Specifications section below.

Warning: Do not charge the Crazyflie 2.1 Brushless unattended.

Keep body parts away from fan blades

3mm or over   XXX-XXXXXXX

Assembly

Assembling your Crazyflie 2.1 Brushless will probably take less than 10 minutes, but there are a few pitfalls. So make sure to follow the instructions below!

Unpacking the box

Start by unpacking the box. It should contain the following items:
- 1 x Crazyflie Brushless control board
- 1 x 350mAh LiPo battery
- 4 x Brushless motor
- 5 x Legs (1 spare)
- 5 x Legs/propeller guards (1 spare)
- 14 x Screws
- 1 x Foam battery pad
- 5 x CCW propellers (3 spare)
- 5 x CW propellers (3 spare)
- 1 x Battery holder deck
- 2 x Short male deck connectors
- 2 x Long male deck connectors
- 1 x Micro-USB cable (48cm)
- 1 x Screwdriver

Mount the motors

Mount the motors by screwing in three screws for each motor from below. Attach the motor cables to their connectors and twist the wire 180 degrees to attach to the connector.

Mount the legs

Mount the legs or propeller guards on the Crazyflie 2.1 Brushless by clicking them on from below, starting with the slimmer end.

Attach the propellers

Note: There are two kinds of propellers, the clock wise (CW) and counterclockwise (CCW) propellers. They need to be mounted on the correct arm. As a help there are arrows printed on the PCB next to each motor. When determining the direction each prop, make sure to note the following;

- Make sure that the correct side is facing up, the top side should be convex.
- Look at the shape of the tip, the sharper corner is on the back side of the rotation direction.
- Look at the angle of the blades. The higher side is facing forward in the rotational direction

Here's a view of where to attach CW and CCW propellers.

Attach the foam pad

The rubber pad should be attached to the Crazyflie Brushless between the expansion headers on the top side. This will create friction to keep the battery from slipping out and also protect the electronics on the board.

Attach pin headers

There are two types of pin headers in the box, long and short ones. Find the long ones and insert them into the expansion connector from below.

Attach the battery

Place the battery between the headers inserted into the expansion connector and insert the battery holder board onto the headers. Watch out for the pins that can be a bit sharp when inserting it. The friction should hold the battery in place so tighten it until it does.

Now connect the battery and you are finished with the assembly. The battery wires can preferably be bent and placed underneath the PCB to be out of the way.

Assembled Crazyflie 2.1 Brushless:

Power on!

The assembly is finished, now it's time to power it on! Note that the power button is a push button, not a sliding button, and can be found at the front of the drone. During the power-on there will be a short melody from the motors. Make sure you hear it, if you don't then check the motor connections. If the motors beep continuously, this means that the battery is not connected.

Getting to know your Crazyflie

First of all, let's look at what is front and back, this is important when flying and also when mounting expansion decks. The small "bump" (the antenna) is on the front and the blue LEDs are at the back.

Start up sequence

When the Crazyflie 2.1 Brushless is powered on it will automatically go through a short sequence of events to get ready for flight.

1. Run self tests - the Crazyflie 2.1 Brushless checks that the hardware is OK
2. Calibrate sensors - the Crazyflie 2.1 Brushless reads its sensors to get base values. It must be absolutely still to do this, so it's best to put it on a level surface for a second.
3. The front left LED blinks Green multiple times (do not worry about a slow red blinking LED, it's normal). The Crazyflie 2.1 Brushless is unarmed as default, and can not fly until an arming command is sent.

Understanding LEDs

You also need to understand what the LEDs mean.

- Power on and all is good: The blue LEDs (2 and 3) are fully lit and the front right LED (1) is blinking red twice every second.
- Power on and all is good but sensors are not yet calibrated: The blue LEDs (2 and 3) are fully lit and the front right LED (1) is blinking red with a 2 second interval. Put the Crazyflie Brushless on a level surface and keep it absolutely still to calibrate.
- Radio connected: The front left LED (4) is flickering in red and/or green.
- Battery low: The front right LED (1) is fully lit in red. It's time to land and re-charge the battery.
- Charging: The back left blue LED (3) is blinking while the right back blue LED (4) is lit.
- Bootloader mode: The blue LEDs (2 and 3) at the back are blinking approximately once every second.
- Self test fail: The right front LED (1) is repeatedly blinking five short red pulses with a longer pause between groups.

Charging the battery

To charge the battery of the Crazyflie 2.1 Brushless, just plug in a micro USB cable. Make sure the device is powered on. While the battery is charging, the back left blue LED will blink. When the LED is fully lit the battery is charged.

Specifications

Weight: 34g (including motor mount feet and 35mAh battery)
Size (WxHxD): 82x82x30mm (motor-to-motor and including motor mount feet)
Discharge temperature range: 10°C to 50°C
Charging temperature range: 10°C to 40°C