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BAYCKRC Dolphin FC

BAYCKRC Dolphin Flight Controller User Manual

Model: Dolphin FC

Brand: BAYCKRC

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1. INTRODUCTION

The BAYCKRC Dolphin Flight Controller is an advanced drone MCU designed for superior stability and performance in unmanned aerial vehicles. It integrates high-performance processing, precise sensor technology, and comprehensive connectivity options to enhance your flying experience. This manual provides essential information for the proper installation, operation, and maintenance of your Dolphin Flight Controller.

2. SAFETY INFORMATION

- **General Safety:** Always operate drones responsibly and in accordance with local regulations. Ensure all connections are secure before flight.
- **Power Safety:** The flight controller operates on 3-6S input voltage. Incorrect voltage can cause permanent damage. Always verify power connections before applying power.
- **Heat Warning:** Electronic components can generate heat during operation. Ensure adequate ventilation.
- **Fire Hazard:** Keep the flight controller and associated components away from fire and extreme heat sources.
- **Age Recommendation:** This product is recommended for users 14 years and older due to the technical nature of drone assembly and operation.
- **Static Discharge:** Handle the flight controller by its edges to avoid static discharge, which can damage sensitive electronic components.

3. PACKAGE CONTENTS

Verify that all items listed below are present in your package:

- 1x BAYCKRC Dolphin FC
- 4x M3 Silicone Grommets

- 1x Service Card
- 1x 35mm cable for ESC
- 1x 65mm cable for Camera
- 1x 65mm cable for Video Transmitter
- 1x 65mm cable for Receiver
- 1x 70mm cable for ESC
- 1x 100mm cable for LED and Buzzer
- 1x 170mm cable for GPS

4. PRODUCT OVERVIEW

The Dolphin Flight Controller is engineered for high-performance drone applications. Key features include:

- **Ultimate Stability Flight Control:** Features an AT32F435 MCU paired with an ICM42688P gyroscope, achieving a Double 8KHz PID frequency for exceptionally smooth and stable flight.
- **Smart Locking Socket Design:** Seven SH1.0 locking sockets ensure secure connections for cameras, video transmitters, receivers, GPS modules, LED strips, and BB speakers.
- **Dual Power Supply System:** Equipped with powerful 9V3A + 5V3A dual channel BECs, including LC filtering on the 9V channel for clear image transmission and TVS diode protection.
- **Complete Connectivity Hub:** Direct connections for ESC interface, analog camera, compass, GPS module, LED strip with BB interface, receiver, and both digital and analog video transmitter interfaces.
- **Enhanced Safety Features:** Built with SS56L anti-reverse connection diode and HD07B surge protection TVS diode. Includes a 16MB Black Box (W25Q128JVS1Q) for flight data logging and an integrated barometer for altitude precision.

Note: No product images or videos are available for embedding in this manual.

5. SETUP

5.1 Mounting the Flight Controller

1. Ensure your drone frame has 30.5mm x 30.5mm mounting holes.
2. Place the provided M3 Silicone Grommets into the mounting holes of the flight controller.
3. Carefully mount the Dolphin FC onto your drone frame, ensuring proper orientation (usually indicated by an arrow on the board).
4. Secure the flight controller using appropriate screws, being careful not to overtighten.

5.2 Wiring Connections

The Dolphin FC features SH1.0 locking sockets for secure connections. Refer to the pinout diagram (not provided in this manual, typically found on the manufacturer's website or included with the product) for specific connections. Use the provided cables for the following:

- **ESC (Electronic Speed Controller):** Connect the ESC signal and power wires using the 35mm and 70mm ESC cables. Oversized 1.5mm×2mm solder pads are available on the reverse side for direct soldering if preferred.
- **Camera:** Connect your analog camera using the 65mm camera cable to the designated camera port.
- **Video Transmitter (VTX):** Connect your analog or digital VTX using the 65mm video transmitter cable. The 9V BEC channel provides filtered power for clear video.

- **Receiver (RX):** Connect your receiver (e.g., SBUS, CRSF, ELRS) using the 65mm receiver cable to the appropriate UART port.
- **GPS Module:** Connect your GPS module using the 170mm GPS cable to the dedicated GPS UART.
- **LED & Buzzer:** Connect LED strips and a buzzer using the 100mm cable to the BB interface.

Always double-check polarity before powering on the flight controller to prevent damage.

5.3 Firmware Flashing (Betaflight)

The Dolphin FC comes pre-flashed with Betaflight 4.5 firmware. If you need to update or re-flash the firmware:

1. Download the latest Betaflight Configurator software from the official Betaflight website.
2. Connect the Dolphin FC to your computer via a USB cable.
3. In Betaflight Configurator, navigate to the "Firmware Flasher" tab.
4. Select the correct target for the Dolphin FC (refer to the manufacturer's documentation or Betaflight target list for AT32F435 based boards).
5. Choose the desired Betaflight version and click "Load Firmware [Online]" or "Load Firmware [Local]" if you have a downloaded .hex file.
6. Click "Flash Firmware" and wait for the process to complete. Do not disconnect the flight controller during flashing.

6. OPERATING INSTRUCTIONS

6.1 Initial Configuration (Betaflight)

After flashing, connect the flight controller to Betaflight Configurator and perform the following initial setup steps:

1. **Ports Tab:** Configure UARTs for your receiver, VTX, GPS, and other peripherals.
2. **Configuration Tab:** Set up your ESC protocol (e.g., DShot), accelerometer trim, board alignment, and other basic settings.
3. **Receiver Tab:** Verify receiver input and channel mapping.
4. **Modes Tab:** Configure flight modes (Arm, Angle, Acro, etc.) and assign them to your radio switches.
5. **PID Tuning:** While the Dolphin FC offers excellent default performance, fine-tune PID values if necessary for your specific drone build and flying style.
6. **OSD:** Configure the On-Screen Display (OSD) to show relevant flight data.
7. **Black Box:** The integrated 16MB Black Box automatically logs flight data. You can analyze this data using the Blackbox Explorer tool for tuning and troubleshooting.

Always save your configuration after making changes. Perform a full functional check of your drone on a test bench before its maiden flight.

6.2 Pre-Flight Checks

- Ensure all propellers are securely attached and in the correct orientation.
- Verify battery voltage and connection.
- Check radio control link and functionality.
- Confirm GPS lock (if applicable) and barometer readings.
- Inspect all wiring for loose connections or damage.

7. MAINTENANCE

- **Regular Inspection:** Periodically inspect the flight controller for any signs of physical damage, loose connections, or corrosion.
- **Cleaning:** If necessary, gently clean the board with a soft brush and isopropyl alcohol. Ensure the board is completely dry before reapplying power.
- **Firmware Updates:** Keep your Betaflight firmware updated to benefit from new features, bug fixes, and performance improvements.
- **Data Backup:** Regularly back up your Betaflight configuration using the "Diff All" or "Dump" commands in the CLI tab of Betaflight Configurator.

8. TROUBLESHOOTING

| Problem | Possible Cause | Solution |
|--|--|---|
| Flight controller not powering on | Incorrect voltage input, reverse polarity, faulty power connection. | Verify input voltage (3-6S). Check for correct polarity. Inspect all power connections. |
| No connection to Betaflight Configurator | Faulty USB cable, incorrect drivers, FC in DFU mode. | Try a different USB cable. Install Zadig or ImpulseRC Driver Fixer. If in DFU mode, flash firmware. |
| Drone not arming | Safety checks failing (e.g., accelerometer not calibrated, low battery, throttle too high, arm switch not configured). | Check Betaflight Configurator "Setup" tab for sensor calibration. Verify battery voltage. Ensure throttle is at its lowest position. Configure arming switch in "Modes" tab. Check CLI for "status" command output. |
| Unstable flight / oscillations | Incorrect PID tuning, motor/propeller issues, vibration. | Review PID settings. Check motors for damage and propellers for balance. Ensure FC is soft-mounted correctly. Analyze Black Box logs. |
| No video signal from VTX | Incorrect VTX wiring, VTX not powered, camera not connected. | Verify VTX power and signal connections. Ensure camera is properly connected and powered. Check OSD settings. |

9. SPECIFICATIONS

| | |
|---------------------|---|
| Brand | BAYCKRC |
| Model Number | Dolphin FC |
| MCU | AT32F435 |
| IMU (Gyro) | ICM42688P (Reserved Bonding pad for MPU 6000) |
| OSD | AT7456E |
| Barometer | BMP280 |

| | |
|------------------------|---|
| Black Box | 16MB (W25Q128JVS1Q) |
| Input Voltage | 3~6S |
| 5V-BEC | 5V/3A |
| 9V-BEC | 9V/3A |
| Firmware | Betaflight 4.5 |
| Size | 38mm x 38mm x 6.5mm (1.5 x 1.5 x 0.09 inches) |
| Mounting Hole | 30.5mm x 30.5mm |
| Weight | 8g (0.8 ounces) |
| ASIN | B0FWR6KWXL |
| Recommended Age | 14 years and up |

10. WARRANTY AND SUPPORT

For warranty information and technical support, please refer to the official BAYCKRC website or contact your retailer. Keep your proof of purchase for any warranty claims.

Online Resources:

- For Betaflight documentation and support, visit: betaflight.com
- For general drone building and troubleshooting communities, search online forums and groups dedicated to FPV and RC drones.

