

JetCore FC User Manual

1. Introduction

JetCore FC is an integrated compute and flight control platform built for advanced drones, robotics, and edge AI systems. It combines NVIDIA Jetson processing capability with Cube compatible flight controller integration on a single compact board, helping reduce wiring complexity, lower system weight, improve packaging efficiency, and simplify overall system architecture.

The board is designed for teams that need onboard AI, perception, autonomy, and reliable control in one hardware platform. With support for multiple Jetson modules, rich peripheral connectivity, onboard storage expansion, and industrial grade operating conditions, JetCore FC is suitable for research, prototyping, and deployment oriented applications.

Key Features

- Supports NVIDIA Jetson Xavier NX, Orin Nano, Orin NX, Nano, and TX2 NX modules.
- Compatible with Cube autopilot architecture for integrated flight control workflows.
- Provides USB, UART, CAN, I2C, PWM, Ethernet, video, and storage interfaces for complete system integration.
- Includes integrated 6 axis IMU support and built in Crypto Auth IC for hardware level security support.
- Compact, rugged form factor with operating range from -40°C to +85°C for demanding environments.

2. Technical Specifications

Specification	Details
Supported Modules	NVIDIA Jetson Xavier NX, Orin Nano, Orin NX, Nano, TX2 NX
Flight Controller Compatibility	Cube autopilot compatible, Pixhawk ecosystem
Networking	1 × Gigabit Ethernet, 8 pin Molex connector
USB Ports	5 × USB 2.0, 1 × USB 3.0 via FPC, 1 × USB 2.0 via JST GH
Video Output	1 × Micro HDMI, 1920 × 1080
Power Input, Jetson Side	12 to 18 V DC
Power Input, FCU Side	4 to 5.5 V DC
Security	Built in Crypto Auth IC
PWM Outputs	14 PWM outputs, 6 FMU + 8 IO
RC Inputs	PPM, Spektrum/DSM, SBus
CAN Ports	2 × CAN Bus, JST GH
UART Ports	Multiple UART interfaces, JST GH
I2C Ports	2 × I2C, JST GH
Storage Expansion	M.2 Key M interface for NVMe SSD
Operating Temperature	-40°C to +85°C
Dimensions and Weight	136 mm × 66 mm × 16 mm and 55g

3. Getting Started

3.1 Package Contents

- JetCore FC carrier board
- Power connector cable
- M.2 mounting screw
- Quick guide and warranty information

3.2 Hardware Setup, Jetson Side

- Prepare a clean, static safe workspace before handling the board or Jetson module.
- Inspect the board for any visible shipping damage, loose parts, or bent connectors before use.
- Install the supported Jetson module carefully into the module slot and ensure it is seated correctly.
- Connect the main power input with a stable 12 to 18 V DC source that can support the total system load.
- Attach required peripherals such as Micro HDMI, Ethernet, USB accessories, camera or display interfaces, and optional M.2 NVMe storage.
- Power on the board only after verifying all mechanical and electrical connections.

3.3 Hardware Setup, Flight Controller Side

- Mount a Cube compatible autopilot module onto the 80 pin DF17 connector using the correct orientation markings on the board.
- Secure the module carefully with the recommended screws. Do not overtighten.
- Provide 5 V power to the FC power connector and verify the power indicator before proceeding further.
- Connect required peripherals such as GPS, telemetry radio, RC receiver, ESC or servo outputs, CAN sensors, and I2C devices.
- Use the internal USB connection between Jetson and the flight controller for MAVLink communication. No external cable is required for this internal link.

3.4 Initial Software Setup

- Install the required NVIDIA JetPack version on the Jetson module using NVIDIA SDK Manager or the approved flashing workflow.
- Flash or update autopilot firmware using Mission Planner or QGroundControl.
- Complete all required flight controller calibrations, including accelerometer, compass, radio, ESC range, and flight mode setup where applicable.
- Verify that the Jetson side can detect the communication link to the flight controller and receive MAVLink heartbeat data.

Note: For first time bring up, always test the board on a bench setup before integrating it into a final vehicle or robotic platform.

4. Functional Interfaces

JetCore FC provides the connectivity required for companion computing, sensing, payload integration, and flight control. The following interfaces are available for common system level integration tasks.

4.1 Power

The Jetson side accepts 12 to 18 V DC input, while the flight controller side accepts 4 to 5.5 V DC. Always use a stable power source with sufficient current margin, especially when running cameras, storage, radios, or other high load peripherals.

4.2 Networking

A Gigabit Ethernet interface is provided for wired networking, high speed data transfer, remote access, and integration with development or ground infrastructure.

4.3 USB

Multiple USB interfaces are available for peripherals such as cameras, wireless adapters, storage devices, debugging accessories, and custom payload hardware. Ensure the correct cable type and connector orientation are used for FPC based interfaces.

4.4 UART, CAN, and I2C

UART ports support serial communication with external modules. CAN ports enable robust communication with compatible industrial or robotic devices. I2C ports allow integration of sensors and low speed peripherals. Use the correct voltage levels and connector standards when integrating external hardware.

4.5 PWM and RC Inputs

JetCore FC supports 14 PWM outputs for motor, servo, and actuator control. It also supports standard RC input options including PPM, Spektrum/DSM, and SBus.

4.6 Video and Storage

The board includes Micro HDMI output for display and bring up tasks, and an M.2 Key M slot for NVMe SSD storage expansion. This is useful for logging, onboard datasets, AI models, and mission data storage.

5. Configuration and Advanced Usage

- Configure the internal Jetson to flight controller communication link for MAVLink based companion computer workflows.
- Use ground station software to verify GPS, telemetry, RC, sensor, and actuator connectivity before any field operation.
- When integrating cameras or custom AI payloads, validate both power stability and thermal conditions under expected runtime load.
- For deployed systems, perform a full bench validation of compute, storage, communication, and actuator interfaces before flight or autonomous operation.

6. Troubleshooting

Power Issues

- Check that the Jetson side receives 12 to 18 V DC and the FC side receives 4 to 5.5 V DC.
- Verify polarity, connector seating, and current capability of the power source.
- Inspect for loose cables, damaged connectors, or unstable bench power supplies.

Jetson Does Not Boot

- Confirm that the Jetson module is seated correctly.
- Check power stability and monitor any available LED or boot indication.
- Reflash software if the module was previously configured incorrectly or interrupted during setup.

Flight Controller Not Detected

- Verify Cube module installation and connector alignment.
- Check FC power and confirm the internal USB based communication path is configured correctly.
- Use Mission Planner or QGroundControl to verify firmware status and calibration progress.

Peripheral or Interface Not Working

- Recheck connector orientation for FPC and JST based interfaces.
- Confirm cable compatibility and supported voltage levels.
- Test one peripheral at a time to isolate interface and power related issues.

7. Maintenance and Care

- Handle the board by its edges and avoid direct contact with exposed components or connector pins.
- Keep the product in a clean, dry, dust free environment when not in use.
- Ensure adequate airflow and avoid operating the board in enclosed spaces without thermal consideration.
- Do not clean the board with liquids or chemicals. Use only a soft, dry cloth when needed.
- Do not modify hardware or attempt disassembly unless explicitly approved by the manufacturer.

8. Warranty and Support

JetCore FC is covered by a 12 month warranty against defects in materials and workmanship under normal use. The warranty does not cover misuse, improper installation, unauthorized modification, liquid damage, or operation outside the recommended conditions.

For technical support, troubleshooting help, and documentation updates, contact support@vecros.com or visit discuss.vecros.com.