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1u CubeSat Kit

Datasheet

EDGEFLYTE CUBESATS

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Product Name: EdgeFlyte 1U CubeSat Kit
Manufacturer: EdgeFlyte
Product Code: EFP0550002 (SOLDER)
EFP0550001 (NO-SOLDER)
Revision: v1.2 (May 2025)
Product Page: edgeflyte.com/shop/1u-cubesat-kit
Use Case: Educational, prototyping, suborbital testing



1. GENERAL DESCRIPTION

The EdgeFlyte 1U CubeSat Kit is a modular open-source educational satellite platform, conforming to the 1U CubeSat standard. The platform consists of a multi-board architecture with an MCB (Main Control Board), BMS (Battery Management System), and ASB (Atmospheric Sensor Board). It supports full programmability, onboard telemetry, and real-time data acquisition through integrated wireless and sensor interfaces.

2. SYSTEM ARCHITECTURE

Modular Boards:

- **Main Control Board (MCB):** Mission control and data logging
- **Battery Management System (BMS):** Power regulation and battery charging
- **Atmospheric Sensing Board (ASB):** Environmental data acquisition

3. MECHANICAL SPECIFICATIONS

Parameter	Value
Dimensions	100 × 100 × 113.5 mm (1U)
Weight (Typical)	400-500 g
Structure Material	Polylactic Acid
Assembly Options	Solder <i>(soldering required)</i> or No-Solder
Mounting Rails	1U CubeSat deployment compatible

4. MAIN CONTROL BOARD (MCB)

Feature	Specification
MCU	Raspberry Pi Pico (RP2040)
Cores	Dual ARM Cortex-M0+ @ 133 MHz
Flash	2MB QSPI onboard
RAM	264KB SRAM
Interfaces	UART, I ² C, SPI, GPIO
Wireless	NRF24L01+ (2.4 GHz, up to 500 m LoS)
GPS	u-blox NEO-6M, <3 m CEP typical
IMU	MPU9250 (9-axis)
Bluetooth	AT-09 BLE module
Storage	MicroSD slot (FAT32, up to 32GB)
Programming	USB or FTDI via UART
Bootloader	UF2 (preloaded)
Features	RBF (Remove Before Flight) GPIO, telemetry-ready

5. BATTERY MANAGEMENT SYSTEM (BMS)

Feature	Specification
MCU	Atmega328PB (20 MHz, 32KB Flash)
Charger IC	Texas Instruments BQ25172DSGR
Battery Support	2800 mAh Li-ion
Charging Options	USB-C / Solar input
Solar Panels	4x flexible panels (demo use only)
Protections	Overvoltage, undervoltage, thermal
Interfaces	UART, I ² C
Programming	Via FTDI (UART)
Bootloader	Preloaded (Optiboot)

6. ATMOSPHERIC SENSOR BOARD (ASB)

Feature	Specification
MCU	Atmega328PB
Sensors	
– SHT41	Temp/Humidity, $\pm 0.2^{\circ}\text{C}$, $\pm 1.8\%$ RH
– BMP180	Barometric Pressure, ± 1 hPa
– ENS160	Air Quality Index, VOC
– AHT21	Temp/Humidity (backup)
– SPS30	PM1.0 / 2.5 / 4.0 / 10 ($\pm 10 \mu\text{g}/\text{m}^3$)
– SCD40 (optional)	CO ₂ Sensor (up to 5000 ppm, $\pm(50 \text{ ppm} + 5\%)$)
Expansion Support	I ² C sensor add-ons, GPIO available
Interfaces	UART, I ² C, GPIO
Programming	FTDI (UART)
Bootloader	Preloaded (Optiboot)

7. SOFTWARE & PROGRAMMABILITY

Feature	Specification
Preloaded Firmware	All boards shipped with example firmware
Programming Methods	USB (RP2040), FTDI (ATmega328PB)
Languages	C/C++, Arduino, MicroPython (RP2040)
Platform Compatibility	Windows, macOS, Linux, Web IDE
Bootloaders	RP2040 UF2, Optiboot (ATmega)
Open Source	Code, 3D models, board layouts

8. ENVIRONMENTAL RATINGS

Parameter	Specification
Operating Temperature	-20°C to +60°C
Storage Temperature	-40°C to +60°C
Humidity	0–80% RH (non-condensing)
Vibration & Shock	Not rated for launch
Space Qualification	Not space-certified (demo use only)

9. DOCUMENTATION & RESOURCES

Assembly Guide	https://edgeflyte.com/static/download/1u-cubesat-kit/assemblyguide.pdf
Instructional Material	https://edgeflyte.com/static/download/1u-cubesat-kit/instructionalmaterial.pdf
Firmware	https://github.com/edgeflyte/CubeSatV1/tree/main
3D Files	https://www.thingiverse.com/thing:6282465
Purchase Page	https://store.edgeflyte.com/products/cubesat-kit
MGSE – Support Jig	https://www.thingiverse.com/thing:7050066