



Skeletonized 1U Flight Model with third-party transceiver installed shown approximately life-size.

## Profile

- The first off-the-shelf professionally engineered CubeSat kit. Ready to turn your CubeSat mission into reality.

## Benefits

- 300g total mass<sup>1</sup> maximizes available user payload.
- Provides hardware solutions for structure, C&DH, COM, mass storage, RBF and development / debug systems in a single commercial off-the-shelf (COTS) package.
- FM430 Flight Module and its powerful 16-bit RISC microcontroller can operate continuously while in orbit due to ultra-low power requirements.
- Wiring-free interconnect scheme accepts user modules and/or PC/104 modules as payload on standardized stacking connectors, thereby increasing reliability.
- Compatibility with any conforming transceiver eases COM integration.
- Included Salvo<sup>TM</sup> Pro multitasking RTOS and Flight Module libraries speed software design and reduce system complexity -- ideal for software design teams.
- +5Vdc primary supply for all on-board electronics simplifies power supply design.
- Available in multiple configurations (standard and custom) tailored to your mission.

## You

- Add power, antenna, AD&C, payload and software to complete your CubeSat.
- Transition seamlessly from development / debug / test environment to your launchable CubeSat with included Development Board and Flight Model.
- Meet your launch date on time and under budget.

# Features

- Rigid and lightweight aluminum construction with only three major assemblies and all-stainless fasteners.
- Structure is fully alodined for electrical conductivity. Wear surfaces are hard-anodized.
- Available in standard 1U (10x10x10cm), ½U, 1½U, 2U, 3U and custom configurations.
- All flight components rated for -40 to +85 °C.
- Flight MCU is TI's 3.3V ultra-low-power MSP430F14x/16x/161x RISC microcontroller. 2-8mW typical, 10µW in standby / sleep. 2-10KB RAM, 60-48KB ROM, 48 I/O pins, 2 USARTs, 2 SPI, I²C, 12-channel 12-bit ADC, 2-channel 12-bit DAC, 3-channel DMA, multiple timers, 32.768kHz / 7.3728MHz / DCO clock sources, single-cycle 16x16-bit multiply, JTAG interface and 4 low-power modes.
- 104-pin stackable CubeSat Kit Bus connects user modules without wires. Supports multiple stacking heights.
- Accepts up to 5 PC/104-sized user modules. COTS +5V PC/104 modules supported on separate bus.
- Configurable Remove-Before-Flight (RBF) and Launch switches rated at 10A each.<sup>2</sup>
- Kit can accommodate any +5V/+3.3V transceiver via adapters or as a user-designed module. Drop-in compatibility with Microhard Systems MHX series OEM transceivers.<sup>3</sup>
- Bus-powered USB interface for on-the-launcher monitoring, firmware upgrades, etc. On-board electronics can be powered directly from USB interface.<sup>4</sup>
- Requires only a single +5Vdc power supply -- also has external +5Vdc bus power connector.
- Development Board is electrically identical to FM430 Flight Module, with additional features for debugging.
- Kit contents<sup>5</sup> are shown below. Requires only a Salvo-certified MSP430 compiler / toolset<sup>6</sup> and a PC to begin development. Transceivers / modems / antennae / batteries / solar panels are **not** included.



# Contact



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1. Figure for complete skeletonized chassis, FM430 Flight Module, Microhard MHX-2400 transceiver and fastening hardware.
2. Each switch has NC and NO contacts available.
3. +5Vdc is available to power transceiver. User radios matching the MHX series' physical and electrical form factors can plug directly into the FM430 Flight Module. See <http://www.microhardcorp.com> for more information on the MHX series of spread-spectrum transceivers. User radios can also be implemented as PC/104-size modules that connect directly to the CubeSat Kit Bus.
4. 500mA max over USB. Multi-platform USB drivers included with kit.
5. CubeSat Kit shown with solid-wall chassis Flight Model with transceiver installed. The appearance and specifications of some components shown may differ from current production.
6. Priced for every budget -- see <http://www.pumpkininc.com> for a list of certified MSP430 tools.

Specifications subject to change without notice. Made in USA.

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707-00273-E 04/2006