

CubeSat-class Spacecraft Bus

Applications

- General-purpose 3U CubeSat missions for Earth-observation missions

Features

- 3U-size CubeSat
- Modular, customizable architecture
- >1300cc payload volume
- Multiple solar array configurations possible (e.g. "Propeller", "Turkey Tail", "Space Dart")
- Optional GPS
- Supports a minimum of 3 Separation Switches

Incorporated Subsystems

- Pumpkin CubeSat KitTM Pro chassis
- Pumpkin 5th-generation PMDSAS fixed and/or deployable solar panels with up to 46 triple-junction solar cells (1W BOL each)
- Pumpkin fixed side panels with integrated Pumpkin Panel Release Mechanisms (PRMs)
- MAI MAI-400 ADCS with dual Earth-Horizon Sensors (EHS) for attitude knowledge and control
- Pumpkin Solar Interface Module (SIM)
- Pumpkin ADCS Interface Module, with:
 - AstroDevTM Lithium-2TM UHF transceiver
 - AstroDevTM UHF splitter/phaser
- Pumpkin Battery Module 1 (BM 1), with:
 - 40Wh energy storage
 - 2S2P cell configuration
- Clyde Space XUEPS 6-channel EPS, with:
 - Unregulated VBATT output
 - Regulated +5V_SYS and VCC_SYS outputs
- Pumpkin Motherboard (MB), with choice of Pumpkin Pluggable Processor Module (PPM)
- Pumpkin UHF deployable RHCP turnstyle antenna system

Also Includes

- Test & validation software



Propeller configuration shown

ORDERING INFORMATION

Pumpkin P/N 715-00553

Option Code	Configuration
/00 (standard)	standard
per factory	consult factory

Contact factory for availability of optional configurations.
Option code /00 shown.



CAUTION

Electrostatic
Sensitive
Devices

Handle with
Care



User Customization

- End-users can customize this configuration in a variety of ways, e.g., alternate solar panel(s) configuration, alternate transceivers, alternate antennas, etc. Please consult factory for further information.

CHANGELOG

Rev.	Date	Author	Comments
A	20140121	AEK	Initial version.
B	20140209	AEK	Added mass table, overall dimensions and exploded view.

OPERATIONAL DESCRIPTION

Pumpkin's configurable MISC 3 bus is a complete hardware solution for 3U-size CubeSat nanosatellites.

MISC 3 P/N 715-00930 utilizes the MAI MAI-400 miniature ADCS to achieve sub-degree attitude knowledge and control. The remaining Pumpkin bus components (SIM, ADCS I/F Module with transceiver and splitter/phaser, optional GPS, BATT, EPS, C&DH, PRMs and antennas) form an integrated, wiring-free solution with a standardized 104-pin connector interface to the end-user's payload.

An optional GPS receiver – Pumpkin's GPSRM 2 – can be fitted in-between the ADCS I/F Module and the BM 1 Battery Module. The GPS antenna is located on top of the ADCS, on the zenith end of the CubeSat.

CONSTRUCTION

Pumpkin's MISC 3 P/N 715-00930 employs a highly modular construction with a minimum of internal wiring. Major components include:

- Solar panels (fixed and deployed) with panel release mechanisms (PRMs), temperature sensors and coarse Sun sensors
- CubeSat Kit™ Pro chassis with multiple Separation Switches
- ADCS with Earth Horizon Sensor
- Bus: SIM, ADCS I/F (w/transceiver & splitter), EPS, BATT, C&DH (MB+PPM)
- Quad turnstyle deployable UHF antenna (RHCP)

MISC 3 P/N 715-00930 is intended for nadir pointing of the payload. All of the bus components are arranged at the zenith end. The remaining volume is available for a nadir-facing payload.

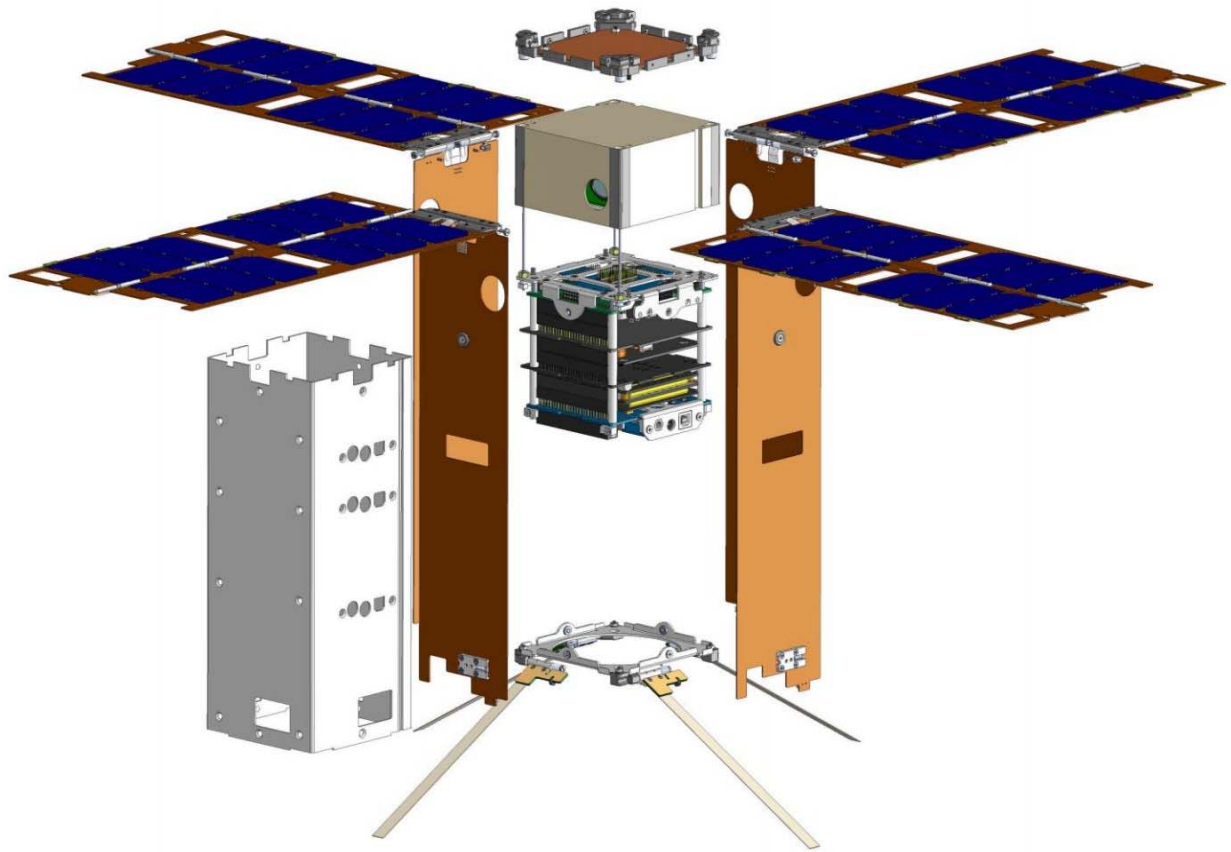


Figure 1: Exploded View

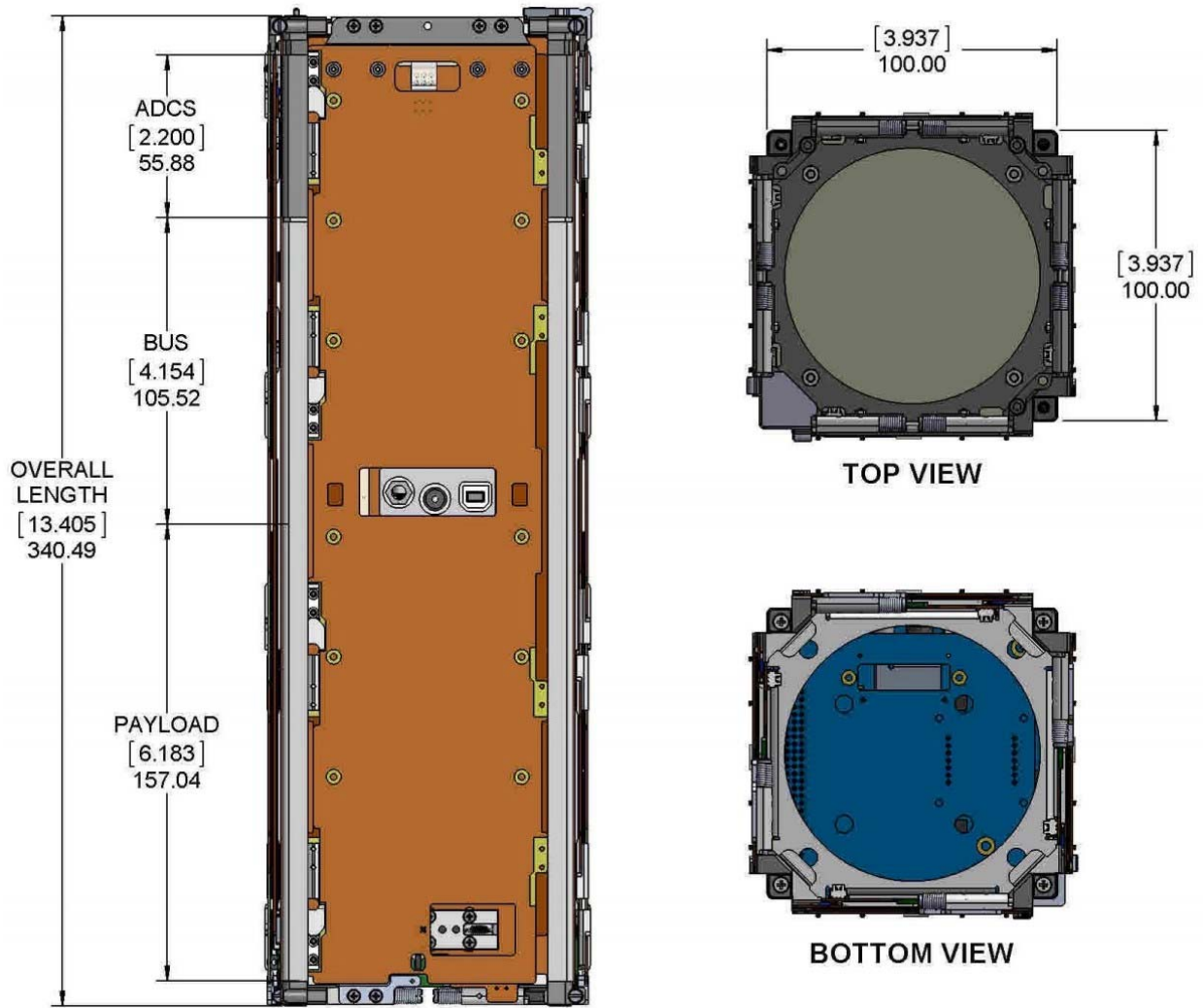


Figure 2: External dimensions (stowed), showing internal lengths associated with ADCS, bus and payload

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Value	Units
Operating temperature ¹	T _A	-40 to +85	°C

PHYSICAL CHARACTERISTICS

Parameter	Conditions / Notes	Symbol	Min	Typ	Max	Units
Mass	Estimated, when outfitted in "propeller" configuration with four fixed and eight deployable solar panels.			2800		g
Overall length (Z)	Conforms to CubeSat specification			340.5		mm
Overall width (X)				100.0		
Overall depth (Y)				100.0		
Aperture on zenith end				88		mm

Item	Breakdown	Qty	Mass (g)
MISC 3 Chassis		1	317
ADACS	MAI-400	1	672
ADACS Adapter Plate		1	35
High-Rise Module	High-Rise Spacer + Feet + Hardware	1	54
	High-Rise PCB Placeholder	1	19
Solar Interface Module		1	22
ADACS Interface Module	Including Li-2 Radio and Splitter	1	91
EPS Module	Clyde Space XUEPS	1	194
Battery Module	Clyde Space Battery	1	258
C&DH Module	Pumpkin Motherboard + PPM	1	112
MISC 3 Panel Assembly		4	209
	MISC 3 Deployable Winglet		62
	MISC 3 Center Deployable		61
	MISC 3 Side Panel with PRM		55
	Panel Brace		12
	Deployable Panel Hardware		19
Antenna Sub-Assembly	Balun PCB + antenna element + antenna hinge + spring + RF cable	4	10
Large Aperture Cover Plate	Including four feet	1	37
Hardware	Standoffs, Threaded Rods, Harnesses, Screws, Etc.		113
Complete MISC 3	Total satellite mass without user payload		2800

Figure 3: Component and total masses

¹ For most components. A few notable components are not specified for operation over the entire industrial temperature range; these may include the ADACS and individual batteries. Please consult the manufacturer's datasheets for more information.

TRADEMARKS

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- CubeSat Kit™ and the CubeSat Kit logo

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