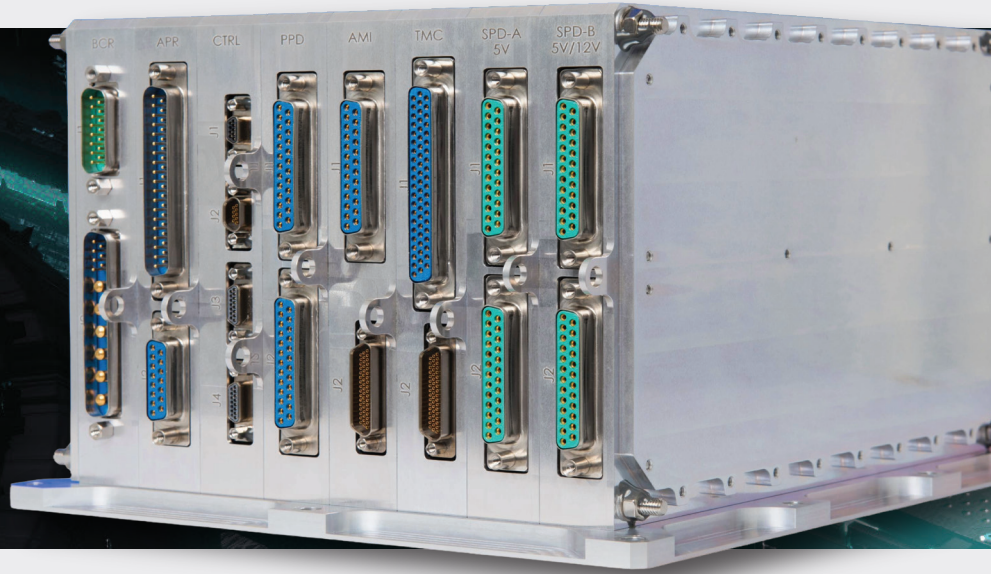


STARBUCK-MINI

RELIABLE,
MODULAR,
& CONFIGURABLE
POWER



NOW WITH 2.5kW POWER

STARBUCK-MINI is a modular, scalable PCDU providing reliable power control for small satellite missions. Supporting solar arrays up to 2.5 kW using advanced MPPT technology. STARBUCK-MINI PCDU maximizes efficiency and adapts to your mission's needs.

With up to 15 modules per unit, STARBUCK-MINI offers tailored performance in a compact, dependable architecture.

The STARBUCK-MINI platform offers a wide range of stackable distribution modules, designed like interchangeable building blocks. These modules can be swapped in and out to easily configure custom variations for customer requirements.

- STARBUCK-MINI is designed for high reliability and radiation tolerance.
- Supports long duration missions: 5–7 years in LEO, qualified to 20 kRAD.
- Internal redundancies provide single point failure tolerance, and Starbuck Mini is a perfect match for redundant critical payloads.

System Functions



Power Control

- Communication via CAN bus or RS422 (redundant links for telecommand & telemetry)
- Discrete pulse-command signals for controller switchover & restart
- Triple voting of separation switches for reliable launch vehicle separation detection



Battery & Solar Array Management

- Undervoltage Lockout (UVLO) with telecommand override
- End of Charge Voltage (EoCV) adjustable by telecommand
- Configurable charge current regulation (up to 60A) with telemetry
- Interfaces for battery, solar thermistors
- MPPT or S3R (DET) solar regulation



Power Distribution

- Provides LCL protected switches up to class 20
- 28V primary bus, with options for 5V and 12V secondary buses
- Support for electric propulsion with dedicated high power outputs at 28V and 50V
- Telemetry monitoring of voltage and current per channel

ENABLING SCIENCE & EXPLORATION

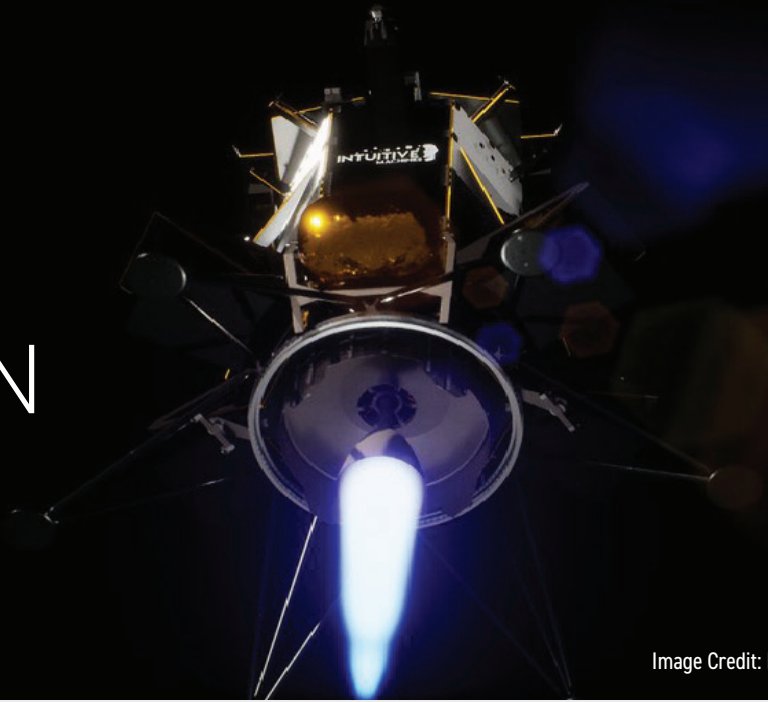


Image Credit: Intuitive Machines



Heritage & Flight Legacy

The design heritage of STARBUCK-MINI dates back to 2015 when our first SmallSat power distribution system was launched via Sweden's MATS satellite. The STARBUCK-MINI has flown on several missions since then including:

- The Intuitive Machines lunar lander missions: The STARBUCK-MINI powered the landers.
- The ESA Arctic Weather Satellite (AWS): the STARBUCK-MINI powered climate monitoring in Sun Synchronous Orbit.

Extensive qualification campaigns and successful missions have brought STARBUCK-MINI to TRL 9, ensuring confidence for future spacecraft applications.



**MODULAR
DESIGN, MISSION
ADAPTABLE**



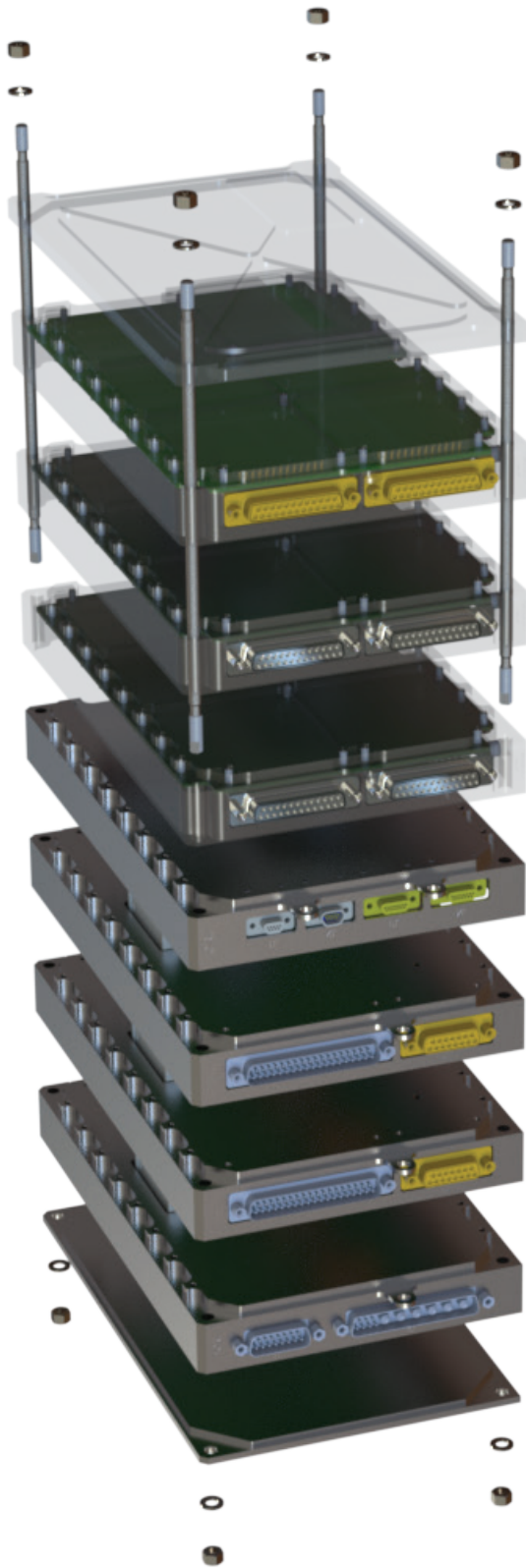
TRL 9



**EM: 6 months,
FM: 10 months**

STARBUCK-MINI PCDU: Engineered for higher power. Proven in space. Ready for your mission.

TECHNICAL SPECIFICATIONS



Distribution Modules	
PPD (Primary Power Distribution)	• Unregulated 28V bus outputs • Up to 20 outputs per module • Retriggerable LCLs for auto startup and reset after trips & startup on separation • Arm-Fire Interlock: hardware-based 2-step process + optional firmware interlock • Configurable LCL class (ECSS-E-ST-20-20C compliant)
SPD (Secondary Power Distribution)	• Galvanically isolated, 5V and 12V regulated outputs • Two independent converters per module (20W continuous, 30W peak each) • 12 LCLs per module (6 per converter) • Retriggerable and configurable LCL protection
EPP1 Module	• Designed for electric propulsion requiring regulated above battery level • Provides 600W at 50V • Two modules can be combined for 1.2 kW output
EPP2 Module	• Two LCL-protected outputs providing unregulated 28V • 600W continuous power per output • Handles large current transients via output capacitor bank
AMI (Actuator & Magnetorquer Interface)	• 6 HDRM outputs (current or voltage mode) • 6 magnetorquer drivers split into two redundant groups • 8 analogue (0-5V) + 8 thermistor inputs
TMC (Thermal Monitoring & Control)	• 31 heater outputs (1A each) across 8 HLCLs • 25 thermistor input channels
MCC-X (Motor Control Module)	• Integrated motor control directly within Starbuck-Mini • Advanced drive functions for mission subsystems
Solar Array Power Regulation Modules	
MPPT	• 500 W Solar Array power per module • 4 independent maximum power point trackers with integrated power limitation and passivation • Upto 5 modules per PCDU (2.5 kW from Solar Array)
S3R (Direct energy Transfer)	• 900 W solar array power per module • 9 seperate solar array channels with passivation

TECHNICAL SPECIFICATIONS

General	
Design Life	5-7 years in LEO
Primary Bus Voltage	22-34 V (8 cell lithium)
Solar Power Regulation	MPPT or S3R
Battery Charge Regulation	CC-CV
Idle Power Consumption Range	10W Typically
Operating Temperature	-30°C to +60°C
Radiation Tolerance (TiD)	20 kRAD (qualified >30 kRAD,Si)

Dimensions	
Height	147 mm
Depth	249 mm



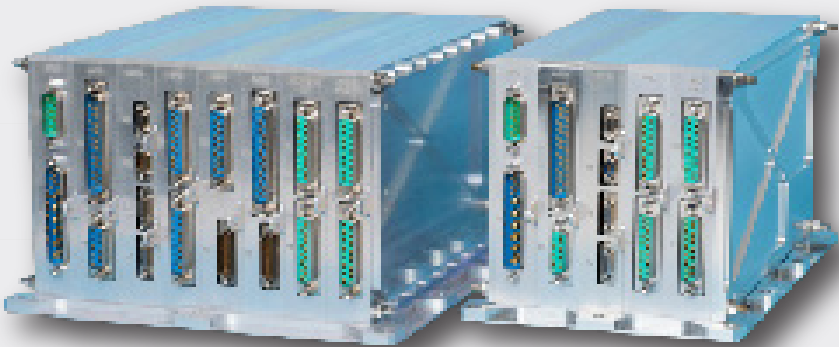
	5 Module Example	15 Module Example
Mass	3.9 kg	11.8 kg
Width	142 mm	361 mm
Specifications	500 W Solar Array; 20 x 28V LCLs, 6 x 5V LCLs, 6 x 12V LCLs	2.5 kW Solar Array; 100 x 28V LCLs; 1.2 kW 50V output for electric propulsion
Status	Qualified and delivered	Qualified and delivered

Availability & Customisation

STARBUCK-MINI PCDUs are available as Flight Models (FM), EQM, EM, and DevKit. In-house environmental testing (including TVAC) is available. Custom modules and tailored configurations are available on request.

To make an enquiry, request a quotation or learn about AAC Clyde Space's other products and services, please contact:

enquiries@aac-clyde.space



#SPACEISAWESOME

www.aac-clyde.space

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