PUMPKIN™
SPACE SYSTEMS

Products & Services

Small Satellite Conference 2024

EPSM1 – TRL9

- 12-channel all-in-one integrated power system for CubeSats
- FPGA & GaNFET-based, >96% eff.
- User-configurable NVM settings
- 400W total kHz-speed MPPT inputs
- 300W total regulated outputs
- 400W total battery channels
- Robust, space-proven architecture with generous operating margins
- Advanced firmware with multiple safety features (hw & sw WDT, OC, OT, OV, etc.)
- Real-time telemetry & control over 104-pin bus

Figure 1: 12-channel EPSM1 -- 6 MPPT inputs, 3V3/5V0/12V/6-48V outputs & BAT1+BAT2

Battery Module 2 (BM2) – TRL9

- Intelligent, protected Li-Ion battery system
- Supports Li-Ion and ***(new)*** LiFePO4 18650 cells
- Available in 2S4P, 3S2P & 4S2P 8-16V configurations
- 160W & 80W power in 16V & 8V Li-Ion flavors
- 100Wh energy in 16V & 8V Li-Ion flavors
- User-configurable NVM settings
- Fast charging & discharging (up to 10A)
- Independent primary & secondary hardware safety features, plus OV, UV, OC, OT, etc.
- Advanced firmware to automatically clear on-orbit safety faults
- Real-time telemetry & control over 104-pin bus
- Compatible with most space power systems
- Ideal energy companion to Pumpkin's EPSM1 & AMPS power systems

Figure 2: 16V (4S2P), 100Wh, 160W BM2 with optional SUPERNOVA brackets attached

Battery Module 3 (BM3)

coming soon

- All BM2 features in a package supporting 3S2P (12V) to 8S1P (32V) configurations

AMPS – TRL6

- Modular, expandable space power system
- FPGA & GaNFET-based, >98% eff.
- n_1 400W kHz-speed MPPT input channels
- n_2 400W regulated output channels
- n_3 200W battery channels
- Robust, proven architecture with generous operating margins
- Advanced firmware with multiple safety features (hw & sw WDT, OC, OT, OV, etc.)
- Real-time telemetry & control over I2C, RS422/485, USB & Ethernet interfaces
- Thermally-optimized design
- 600cc/2kg per 4-channel slice

Figure 3: Advanced Modular Power System (AMPS) -- one four-channel slice shown

July 2024 – document Rev. A

Solar Panels & Arrays – TRL9

- Available in a wide range of configurations: fixed, deployable & SADA-articulated
- Utilize 32.2% eff. triple-junction CICs
- Off-the-shelf (COTS) configurations from 2W to 375W
- Custom configurations from 2W to 5kW
- CubeSat configurations from <10W to dual independently articulated 200W arrays
- LEO, GEO, GTO & lunar applications
- 7th-generation process, 100% on-orbit success

Figure 4: 375W DCSA

Figure 5: 72W MoonRanger

Spacecraft Buses – TRL9

- SUPERNOVA architecture applied to 3U, 6U & 12U CubeSats
- Class-leading software, safety, power, energy & payload accommodations
- Rust-based GUTS FSW w/independent bus and payload services running on GHz-class Linux host over TCP/IP & UDP/IP
- GraphQL requests over HTTP/MQTT
- S- & X-band radios w/AES-256 encryption over CCSDS, plus bidirectional Iridium SBD
- MPT-based thruster & multiple ACDS options
- Includes automatic discovery, on-orbit reprogramming, text-based config files
- Easy to use & customize, extensively tested

Figure 6: 12U SUPERNOVA EO/IR bus for SMC RROCI1 & RROCI2 missions

Figure 7: Rackmount SUPERNOVA Satellite Simulator (RS3)

Figure 8: 6U SUPERNOVA w/64W array

Testing

- Local and remote space companies will benefit from Pumpkin's thermal and TVAC test chambers at affordable rates
- Fully automated and heavily instrumented, these chambers permit lights-out 24x7 testing, thereby reducing overall test campaign costs
- Multiple configurable thermal, power, RF, GNSS & communications channels
- Full Grafana dashboards for all captured telemetry (chamber and DUT) w/remote access

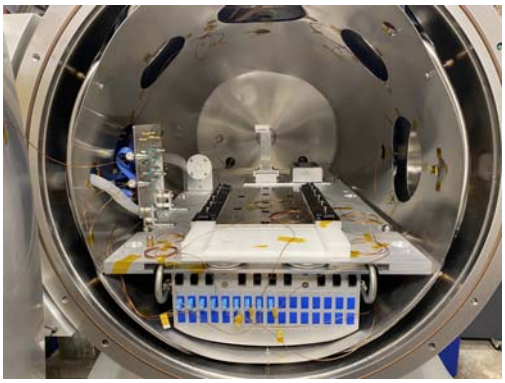

Figure 9: Pumpkin's TVAC chamber ready for 12U NASA GEVS & SMC-16 thermal testing

PUMPKIN™
SPACE SYSTEMS

web: http://www.pumpkinspace.com/
email: info@pumpkininc.com

744 Naples Street, San Francisco, CA 94112 USA
tel: (415) 584-6360

web: http://www.cubesatkit.com/
email: info@cubesatkit.com