# ibeos
14V SmallSat Electric Power System

OVERVIEW

Ibeos' 150-Watt SmallSat Electric Power Subsystem (EPS) is a radiation tolerant, flexible peak power tracking solution capable of efficient solar array power conversion and battery charging. The EPS card provides regulated 3.3-Volt, 5-Volt, and 12-Volt power, as well as unregulated 14V battery power through switched and un-switched, current-limited outputs. The system accepts commands and provides telemetry via SPI and I^{2}C interfaces. The EPS includes battery under/over-voltage and over-current protection in addition to a configurable watchdog timer for spacecraft loads.

BLOCK DIAGRAM
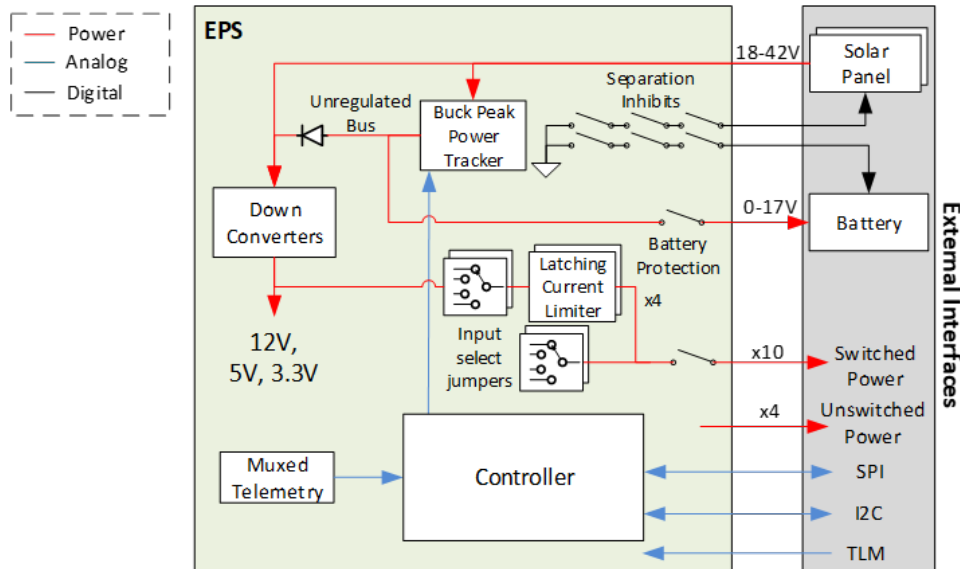
SPECIFICATIONS

Dimensions	96 x 90 x 14.5 mm
Mass	140 g
S/A Conversion Efficiency[1]	95%
12V Output Conversion Efficiency [1]	94%
5V Output Conversion Efficiency [1]	92%
3.3V Output Conversion Efficiency [1]	90%
Typical Quiescent Power Consumption [2]	1.4 W
Operating Temperature [3]	-40 to +105 °C
Single Event Effects	Operate through: LET > 37 Survive: LET > 55
Total Ionizing Dose	30 kRad (Si)

1. Typical Efficiency at >50% load, does not include ohmic loss from output switches
2. All converters enabled, no external loads
3. Designed to operate at full power with a 60°C interface temperature

Power Generation
- >150-Watt maximum input power (18–42 V)
- Solar array peak power tracking

Charging
- 16.8-Volt maximum charge voltage
- 7-Amp maximum charge current

Outputs
- 5.0-Volt regulated bus (6 A)
- 3.3-Volt regulated bus (3A)
- 12.0-Volt regulated bus (4A)
- Unregulated battery bus (10 A)
- 10x switched outputs
  - 15 mΩ typical resistance

C&DH
- I^{2}C @ 400 kbps
- SPI @ 1 Mbps
- System configuration, telemetry, and output control

Built-In Protection
- Battery over-charge/discharge
- Battery over-current
- Programmable spacecraft watchdog timer
- Output latching current limiters
- Two-fault tolerant separation inhibits

Inquiries
inof@ibeos.com