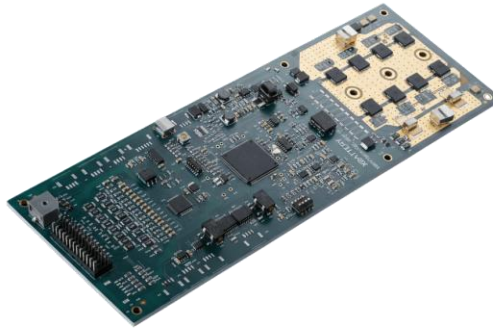




FEATURES

- Engineered for Indian ESS & telecom deployments
- LFP-optimized — up to 16 cells in series (51.2 V)
- 100 A continuous / 150 A peak discharge
- ± 3 mV cell-voltage measurement accuracy
- Up to 240 mA - passive balancing
- CAN 2.0B + UART + optional Wi-Fi/BLE
- UART / CAN for firmware upgrades
- Configurable safety & protection parameters

INTRODUCTION

The Xbattery BharatBMS™ (51.2 V) is a compact, high-efficiency Battery Management System engineered in India for next-generation Energy Storage Systems, UPS, and telecom applications. Built around a precise cell-monitoring architecture, it manages up to 16 series-connected LFP cells with ± 3 mV accuracy and comprehensive thermal coverage.

The platform accepts a 40 V – 60 V input supply and features MOSFET-based protection switching with a resistive pre-charge circuit for inrush current limiting. It supports 4 external NTC sensors delivering thermal visibility across the entire pack.

Communication interfaces include CAN 2.0B (500 kbps) and UART, with optional Wi-Fi/BLE connectivity. A PC-based GUI provides live monitoring, parameter configuration, and firmware updates via UART or CAN ready for fleet-wide deployments.

KEY CAPABILITIES

SAFETY

- Over / under voltage (cell & pack)
- Over-temp & under-temp cut-offs
- Short-circuit & overcurrent protection
- Optional ground-fault detection (RCD/GFD)
- MOSFET switching + precharge circuit

USABILITY

- PC GUI over UART / CAN
- Firmware upgrades via UART or CAN
- Timestamped non-volatile fault log
- Self-test on boot, watchdog & CAN alive
- Battery-backed RTC (optional)

BATTERY HEALTH

- ± 3 mV cell-voltage accuracy
- 240 mA passive balancing (PWM configurable)
- 4 NTC channels for thermal mapping
- Thermal runaway detection
- 6000+ cycle life expectancy

PERFORMANCE

- Up to 16S LFP — 51.2 V nominal
- 100 A continuous, 150 A peak 10 s
- < 5 m Ω internal circuit resistance
- CAN 2.0B, UART, optional BLE

APPLICATIONS



Small Stationary ESS
Compact off-grid storage



UPS / Backup Power
Uninterrupted, stable power backup



Telecom Infrastructure
Reliable backup for towers

1. GENERAL & ELECTRICAL	
Cell Chemistry	Lithium Iron Phosphate (LFP)
Cell Count	Up to 16S
Nominal Pack Voltage	51.2 V DC (16S × 3.2 V/cell)
Pack Voltage Range	40.0 V – 58.4 V
Input / Logic Power	12 V – 60 V battery pack input
Internal Circuit Resistance	< 5 mΩ (BMU + cabling)
2. CURRENT HANDLING	
Continuous Charge Current	50A
Peak Charge / Discharge	150 A for 10 s
Continuous Discharge	100 A
Overcurrent Protection	150 A (firmware configurable)
Protection Switching Topology	MOSFET
Pre-charge Circuit	Yes — resistive soft-start
3. CELL VOLTAGE & BALANCING	
Voltage Measurement Range	0 V to 5 V
Measurement Accuracy	± 3 mV
Balancing Topology	Passive (dissipative)
Balancing Current	240 mA (PWM configurable)
Balance Enable	During charging (default)
4. TEMPERATURE & THERMAL	
Temperature Sensors	4 NTCs (10 kΩ typical)
Sensor Accuracy	± 1 °C
Pack Operation Range	–40 °C to +70 °C
Charge Temp Cut-off	0 °C to +55 °C
Discharge Temp Cut-off	–20 °C to +60 °C
Thermal Runaway Detection	Yes (configurable threshold)
5. PROTECTIONS & SAFETY – All Parameters Configurable	
Over-voltage (per cell)	> 3.6 V
Over-voltage (pack)	> 57.6 V
Under-voltage (per cell)	< 2.7 V
Under-voltage (pack)	< 43.2 V
6. COMMUNICATION	
Supported Protocols	CAN UDS • Modbus • Xbb (proprietary)
CAN Speed Range	125 kbps – 1 Mbps
UART Baud Rates	9600 – 115200
Host Interfaces	CAN/UART to host/controller/charger
7. SOFTWARE & DIAGNOSTICS	
Configuration Tool	PC-based GUI over UART / CAN
Event / Error Logging	Timestamped fault log (non-volatile)
RTC Support	Battery-backed RTC (optional)
Diagnostics	Self-test on boot, watchdog, CAN alive
Firmware Upgrade	UART or CAN supported
8. MECHANICAL & ENV.	
Dimensions (PCB)	304mm × 102mm × 50mm
Operating Temperature	–20 °C to +70 °C
Storage Temperature	–40 °C to +70 °C
Humidity	10 – 90 % RH, non-condensing
Ingress Protection	IP20 – IP65 (enclosure dependent)