

A MODULAR BATTERY MANAGEMENT SYSTEM FOR LFP BATTERIES

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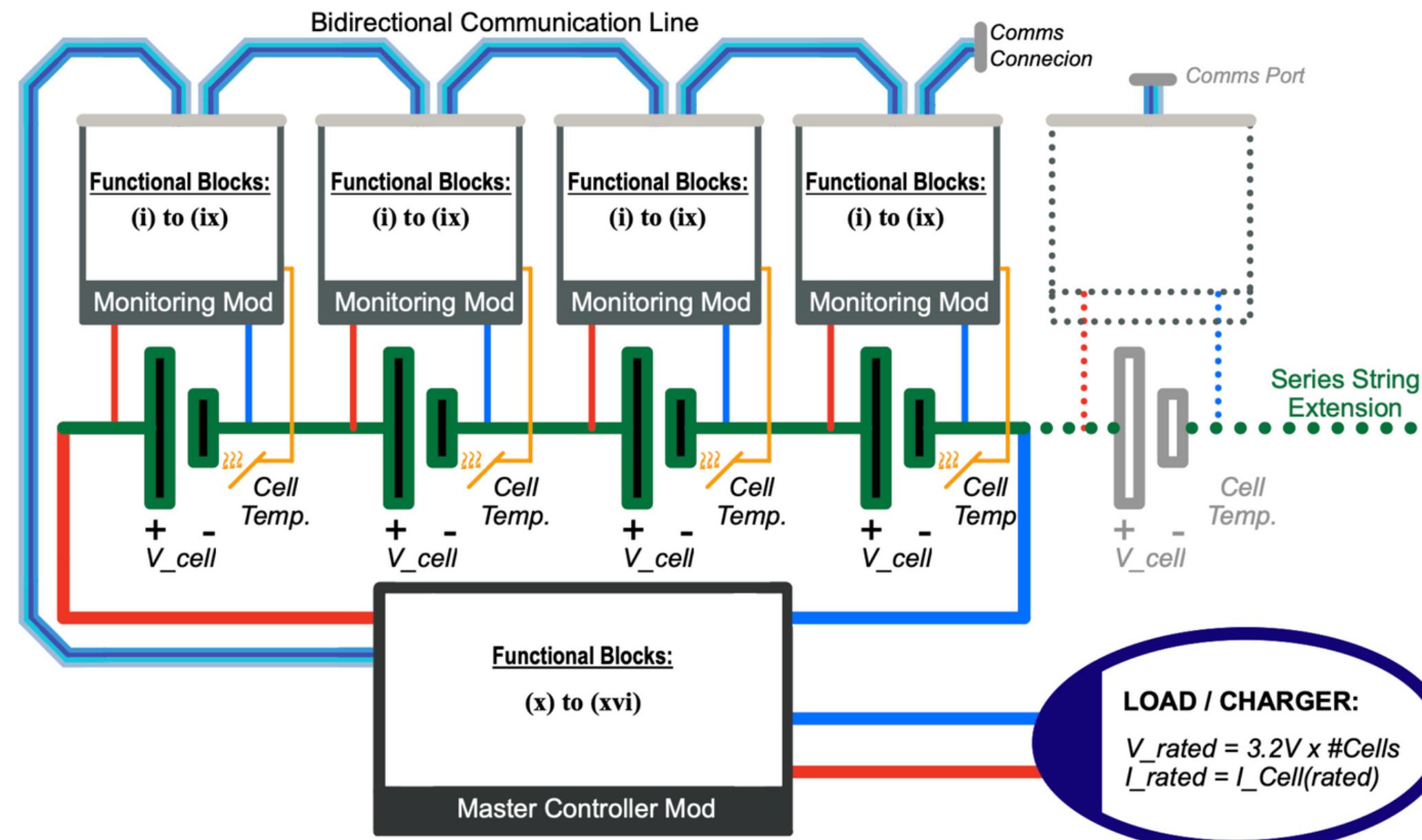
INTRODUCTION

This project pioneers a scalable, modular Battery Management System (BMS) designed for Lithium Ferro Phosphate (LFP) batteries, pivotal for renewable energy storage.

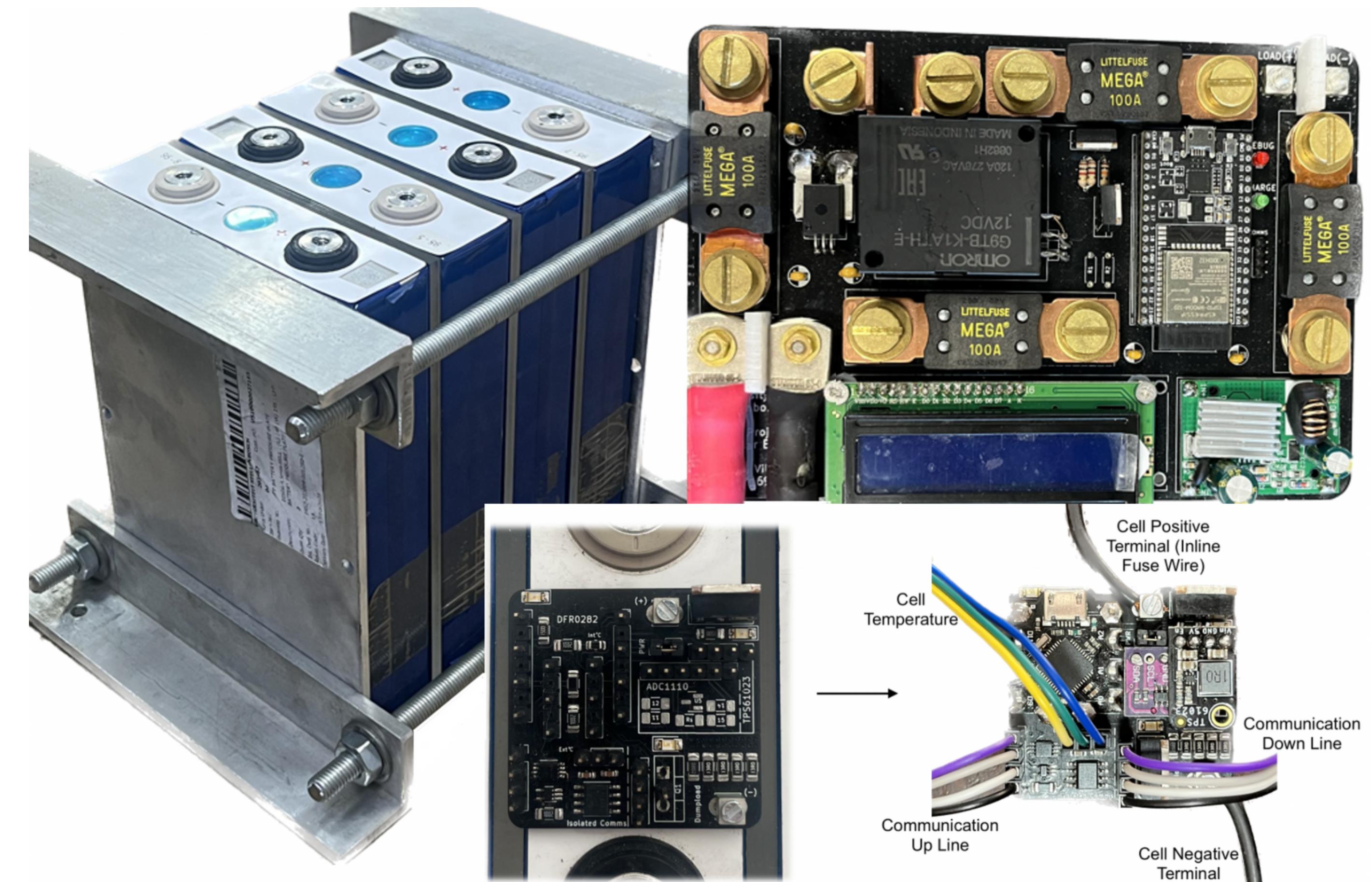
SCOPE OF PROJECT

Addressing the challenges of traditional BMS in high-voltage battery banks. Designing individual monitoring modules for each cell to improve accuracy and reliability. Enhancing scalability to accommodate large-scale energy systems.

SYSTEM OVERVIEW



Functional Block	Subsystems
4.3 Monitoring Module:	
i	Cell Connection
ii	Voltage Regulation
iii	Supply Jumper & Force Reset
iv	Monitoring Microcontroller
v	Onboard Diagnostics
vi	Cell Voltage Measurement
vii	Cell Balancing
viii	Cell Temperature Measurement
ix	Isolated Module Communication
4.4 Master Controller:	
x	Terminals & Fuse Protection
xi	Power Supply
xii	Master Microcontroller
xiii	Battery Current Measurement
xiv	System Information Display
xv	Load/Charge Disconnect
xvi	Scalable Isolated Communication



MAIN OUTCOMES

Successfully designed a prototype BMS with individual cell monitoring capabilities. Implemented a scalable architecture that simplifies wiring complexity and ensures precision. Developed a Master Controller with integrated Wi-Fi for real-time data processing and cloud connectivity. Validated the design through comprehensive testing of electrical, thermal, and system fault responses.

FUTURE DIRECTIONS

Focus on refining communication protocols to handle an expanded network of cell modules. Improve user interfaces for more efficient diagnostics and system management. Develop advanced algorithms for charge balancing and health assessment to elevate BMS performance.

CONCLUSION

The project establishes a foundation for next-generation BMS technology, advocating for enhanced modularity and monitoring precision to support the ever-increasing reliance on sustainable energy solutions.