

BatteryDAQ Module

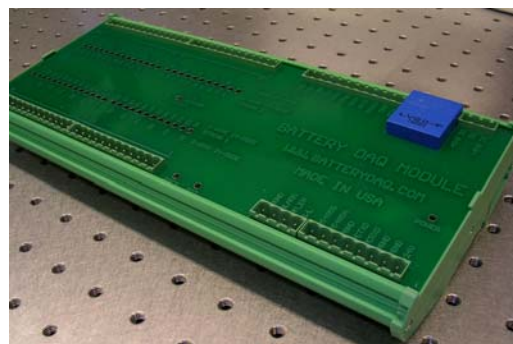
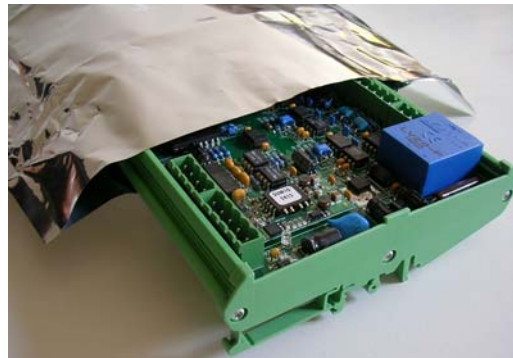
Every string of battery should have a valid monitoring companion to ensure the safety and reliability. - S Long, Founder of BatteryDAQ Inc, IEEE Senior Member

1.1 Introduction

BatteryDAQ focuses on design and production of intelligent integrated battery data acquisition modules which support users to build their battery testing or monitoring systems efficiently with advanced technologies and lower cost.

BatteryDAQ has solved the difficult problems for the applications, such as high common voltage, large number of cells, high accuracy, internal resistance measurement, reliable wiring, industrial standard communication, etc. All excellent performances come in a rigid, 2/3 book size compact module.

BatteryDAQ also provides software support for direct application and rapid integration.



1.2 Features

- Advanced precise IR (Internal Resistance) measurement technology
- Separate ohmic value for connection resistance between batteries (2-wire mode)
- +/-20V for each channel with +/-400V protection at any battery input terminal
- Up to 400VDC super wide voltage range for whole string
- 16-bit high resolution data acquisition
- No mechanical relays, high reliability for industrial application
- High noise immunity for high ripple application
- System on board design, no need for other controller
- Plug-and-play installation
- Drive for NI LabVIEW
- ActiveX drive and example with source code for integration

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- Industry standard communication: Modbus/RTU.
- ESD protected RS-232C and RS-485 interface
- Dual-color LEDs for each channel for scanning and battery condition indication
- Easy DIN-rail installation

1.3 DAQ Modules

Product Number	2-wire Mode	1-wire Mode	Typical Application
TM65-12	12 batteries	24 batteries (or 2 X 12)	24V Telecom
TM65-24	24 batteries	48 batteries (or 2 X 24)	48V Telecom or up to 400V UPS
TM65-30	30 batteries	59 batteries	120, 220VDC Electric Utility DC

(All modules have 20V full scale for each channel which works for 1.2V, 2V, 3.6V, 4V, 6V and 12V batteries within 400VDC string voltage.)

RM modules are factory set upon string voltage and battery capacity.

String Voltage	L (<200Ah)	M (200 to 800Ah)	H (800 to 3000Ah)
48V	RM-48-L	RM-48-M	RM-48-H
110V	RM-110-L	RM-110-M	RM-110-H
220V	RM-220-L	RM-220-M	N/A
400V	RM-400-L	RM-400-M	N/A

1.4 Application

- UPS (Uninterruptible Power Supply)
- Telecommunication Site
- Electric Utility DC Power
- Solar Power System
- Electric Vehicle Battery Testing
- Battery Development & Test Lab
- Battery Manufacture Formation and Test
- Battery discharge test for maintenance or capacity validation
- **Other systems which have many batteries ...**

Check the case study in website: www.batterydaq.com

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1.5 Specifications

1.5.1 Simple Power Supply

Voltage	+24VDC (+12V Optional upon order)
Maximum Power Consumption	< 10W
Isolation	500VDC@1min to battery string

1.5.2 Current Input

Current Sensor	Support 2 LEM current sensor (LEM LA-50, LA-100 suggested) Mode A: for 1 string of batteries, high current sensor for charge/discharge, low current sensor for floating current. Mode B: for 2 strings, 2 high current sensors
Accuracy	0.1% + sensor accuracy

1.4.3 Temperature Measurement

Temperature Sensor	On-chip CPU temperature detection. 1-Wire Bus Temperature Port.
Range	-20 to 60°C
Accuracy	1 °C

1.4.4 Battery Voltage Channel

Valid Input Range	+/- 20V
Protected input	+/-400V at any voltage input terminal
Accuracy	0.1%
Input Wiring	2-wire or 1-wire for each battery

1.4.5 String Voltage

Sensor	1 separate Channel for string voltage
Range	0 – 400V
Accuracy	1%

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1.4.6 Ohmic Measurement

Please provide battery capacity for RM module selection. RM module is not included in DAQ module.

Range	0 to 50mΩ
2-wire mode	Separate value for Internal Resistance of each battery and Connection Resistance between adjacent batteries.
1-wire mode	Total value of Internal + Connection resistance.

1.4.7 Communication

Serial Port	Isolated RS-232C and RS-485 interface (USB to RS232 converter available)
Isolation protection	500VDC to battery
Protocol	MODBUS
Transmission Mode	RTU
Connection Mode	Mode 1: One-to-One. 1 port to 1 module through RS-232 Mode 2: 1 st module links to PC through RS-232. Other modules interlink through RS-485. Mode 3: All modules link through RS-485
Transmission speed	Default 57600 (9600/19200/38400 selectable)
Maximum capacity per system	1 to 32 modules for MODBUS system

1.4.8 LED Indication and Alarm Output

- Dual-color LEDs for each channel
- Green LEDs indicate dynamic scanning
- Red LEDs indicate battery out of range.
- Digital alarm output. (DIN-rail relay optional)
- Programmable alarm condition.

1.5 Software and Drives

A. Configuration software

- Configure the channels and working mode
- Calibration and save in onboard EEPROM

B. Excel sheet application software

C. ActiveX for integration

D. LabVIEW Drive

Demo LabVIEW program

E. VB integration example and source code

F. Excel example and VBA source code

1.6 Reference

1. USABC website: Battery testing procedure and terminology.
2. IEEE Std 1188 (1996) IEEE Recommended Practice for Maintenance, Testing, and Replacement of Valve-Regulated Lead-Acid(VRLA) Batteries for Stationary Applications
3. IEEE Std 1491 (2005) IEEE Guide for Selection and Use of Battery Monitoring Equipment in Stationary Application