PEACE OF MIND 24 / 7 / 365

CELLGUARD SYSTEM

BATTERY MONITORING SOLUTION

WITH PATENTED WIRELESS COMMUNICATIONS ARCHITECTURE

Uptime is a requirement in today's connected world. Power systems rely on batteries to provide critical back up energy. Deploying Midtronics battery monitoring solution ensures your batteries will perform as expected.

The Midtronics **CELLGUARD™ SYSTEM** combines wireless communication with patented, field-proven battery conductance analysis technology. **CELLGUARD SYSTEM** lowers total cost of ownership while providing the most thorough and easy to access stationary battery health diagnostics.
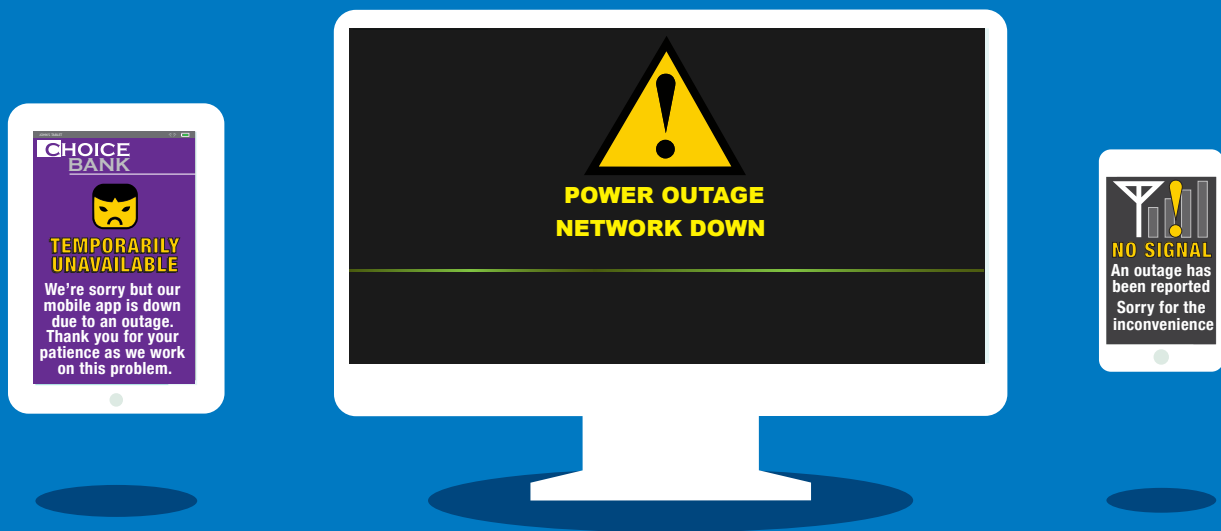
C&D TECHNOLOGIES

UPTIME IS A REQUIREMENT IN TODAY'S CONNECTED WORLD.

Dependency on network continuity is only going to increase in the future. For consumers, business owners and institutions, the network is a constant running lifeline.

BUSINESSES CANNOT AFFORD AN OUTAGE

Many factors can stress power system integrity, from natural disasters to human error. When power is lost, mission critical backup systems must perform. Without the proper surveillance of mission critical system status, there is a risk of catastrophic loss for healthcare organizations, financial institutions or any key service providers. Furthermore, customer satisfaction can be compromised resulting in far reaching financial impact.

CHOICE BANK

TEMPORARILY UNAVAILABLE

We're sorry but our mobile app is down due to an outage. Thank you for your patience as we work on this problem.

POWER OUTAGE NETWORK DOWN

NO SIGNAL
An outage has been reported
Sorry for the inconvenience

SYSTEM INTEGRITY IS A MUST

A UPS system provides needed reserve power to mitigate the potential of disruption. However, the UPS is dependent on the specified performance of batteries, an electro-chemical device prone to failure and premature degradation. To ensure health and availability of battery power, a battery monitor "closes the critical loop" of reserve power protection. *CELLGUARD SYSTEM* provides 24/7/365 surveillance of key battery performance parameters. These parameters are tracked, displayed and communicated to provide visibility to any potential change in the performance characteristics and expectations of each battery within the critical power system.

FEATURES

Real Time:

24/7/365 continuous monitoring of battery system status

System Integration Flexibility:

Advanced notification of potential battery problems via Email, Text Message, SNMP, Form C contacts, MODBUS 4 wire, with optional MODBUS TCP/IP

ROI:

Wireless communication architecture ensures optimal cost of ownership through reduced hardware, installation and maintenance costs

Managed Services:

Programs available for in-depth analysis and consultation for your battery monitoring system

Comprehensive Battery System Diagnostics:

Mono-Block / Cell / Jar Level Measurements
- Conductance - an ohmic State of Health measurement
- Voltage
- Temperature - measured at negative post
- Strap Resistance - between each mono-block / cell / jar
- Discharge voltage and temperature (load test or power outage)

String Level Measurements
- Voltage, Current, Ripple Current, and Ambient Temperature (2 pilot points)
- Discharge current and voltage (load test or power outage)

Standards Compliance

System architecture and reporting capabilities facilitate easy management and regulatory system compliance reporting

USER INTERFACE AND REMOTE ACCESSIBILITY

CELLTRAQ — ENTERPRISE BATTERY ASSET MANAGEMENT

CELLTRAQ software is a network based solution that allows quick and easy access to battery system data. The server that hosts the software can be setup to be accessible from anywhere on your network, or on the web. Multi-user access control allows you to customize the views and functionality available to each user. Once connected, users will have access to the most comprehensive battery diagnostic tools available in the industry.
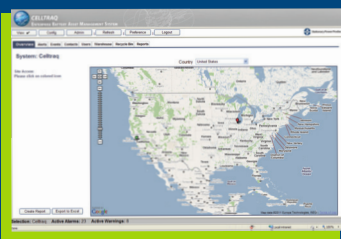
Figure 1. User interface—an organized approach to managing sites/locations
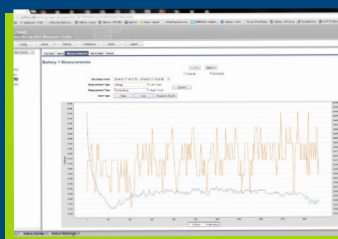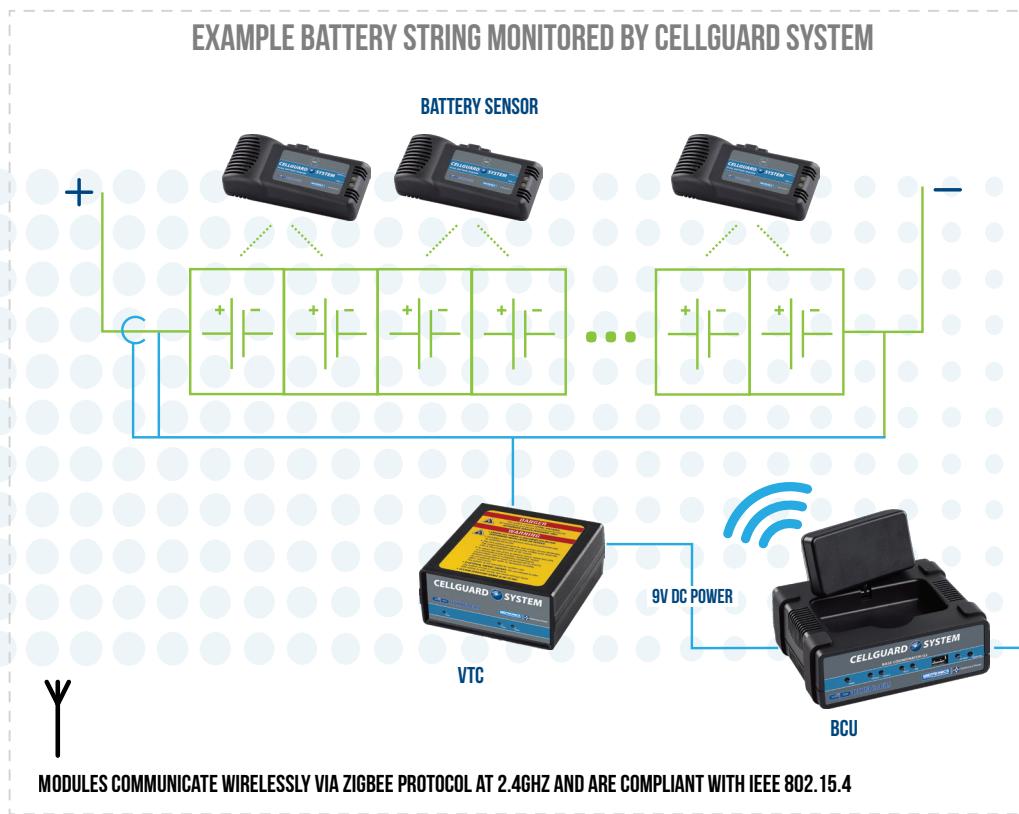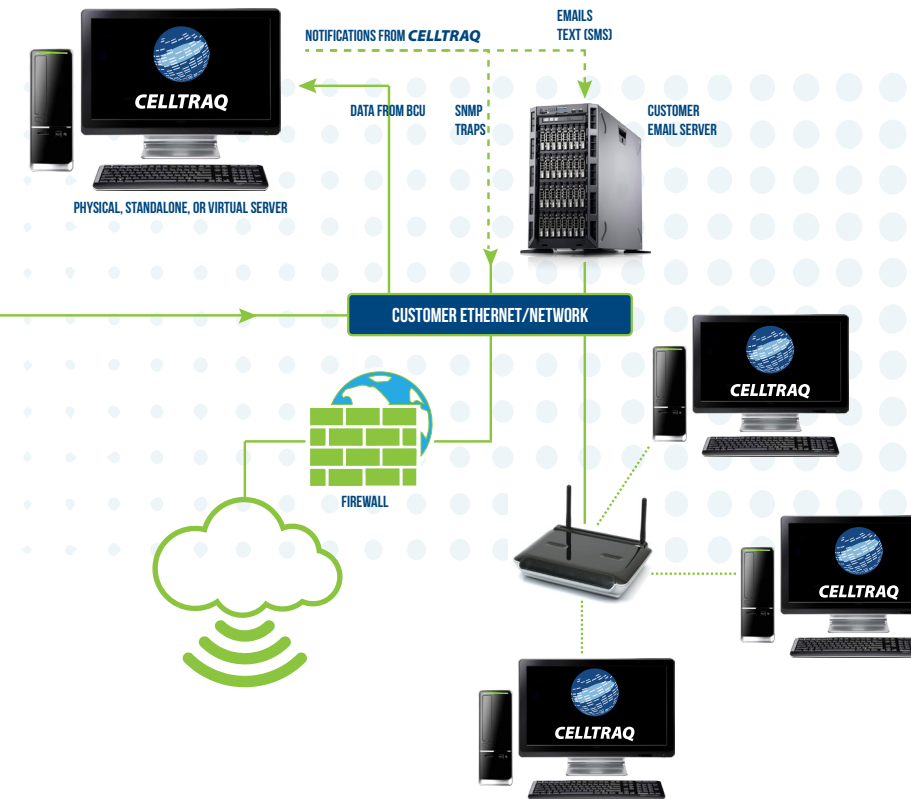
Figure 2. An example of graphical data output

Figure 3. Printed report output

SYSTEM ARCHITECTURE

EXAMPLE BATTERY STRING MONITORED BY CELLGUARD SYSTEM

BATTERY SENSOR

9V DC POWER

VTC

BCU

MODULES COMMUNICATE WIRELESSLY VIA ZIGBEE PROTOCOL AT 2.4GHZ AND ARE COMPLIANT WITH IEEE 802.15.4

CELLTRAQ ENTERPRISE BATTERY ASSET MANAGEMENT

NOTIFICATIONS FROM *CELLTRAQ*

EMAILS TEXT (SMS)

DATA FROM BCU

SNMP TRAPS

CUSTOMER EMAIL SERVER

CELLTRAQ

PHYSICAL, STANDALONE, OR VIRTUAL SERVER

CUSTOMER ETHERNET/NETWORK

TCP / IP

FIREWALL

CELLTRAQ

CELLTRAQ

CELLTRAQ

CELLTRAQ **Software Suite**
- Included with monitoring system
- Web interface with SQL database providing comprehensive battery system SOH reports
- Generates email and text (SMS) notifications using customer email server
- Sends SNMP traps to customer BMS

CELLTRAQ **Server**
- Provided by customer
- Option to purchase from Midtronics
- Physical, standalone or virtual server
- Min reqs 4GB RAM, 50 GB Storage, 2ghz CPU
- Windows OS compatible (32 or 64 bit)
- Windows Server 2003, 2005, 2008
- Windows 2000, XP, 7
- SQL Server 2005, 2008

CELLGUARD SYSTEM

Comprised of three base components, simplifying installation and long-term serviceability.

System Installation

Planning and project management are performed by the Midtronics Field Service network. This ensures all customer site attributes are known and all resources are prepared prior to the physical integration, resulting in an efficient and cost effective installation.

Reduce Risk: Midtronics Managed Services

- Offers options for comprehensive data analysis and consultation on your battery management programs
- Over 30 years of experience using methods that meet or exceed applicable IEEE standards such as:
  - IEEE1188 recommended practice for maintenance, testing, and replacement of vented lead-acid batteries for stationary applications
  - IEEE450 recommended practice for maintenance, testing, and replacement of valve-regulated lead-acid (VRLA) batteries for stationary applications
- Reduce cost and improve reliability and predictable operation of your critical power system.

BASE COORDINATOR UNIT (BCU)

- Controls testing activity for all VTC and wireless sensor modules
- Each BCU can monitor up to 6 strings and/or 960 batteries
- Collects test data and communicates with *CELLTRAQ* server via TCP/IP
- Available Form C Contact (Binary/Dry) alarm I/O
- Available Modbus RS-485 or TCP/IP (optional)
- Powered by the VTC, eliminating the need for external power source

STRING VOLTAGE, TEMPERATURE AND CURRENT MODULE (VTC)

- String level monitoring module
- Measurements include Voltage, Current, Ripple Current, and Ambient Temperature (2 pilot points)
- Captures string level discharge current and voltage when batteries are under load
- Compatible with battery string configurations commonly found in telecommunications, power utility, and UPS applications between 18-480VDC nominal
- The VTC is powered by the battery string, eliminating the need for external power source

SENSOR MODULE

- Battery level monitoring module
- Measurements include Conductance, Voltage, Temperature, and Strap Resistance (intercell integrity) for each mono-block/cell /jar
- Captures discharge voltage and temperature during load test or power outage
- Sensors compatible with 2V, 4V, 6V, 8V, 12V, & 16V batteries
- Test circuitry utilizes patented Conductance technology to provide the most accurate, efficient, and non-invasive method possible for monitoring a battery's state of health
- Designed to work within telecommunications, power utility, UPS environments and other reserve power applications
- Connects to and receives power from the battery being monitored, minimizing wiring, installation costs and simplifying maintenance

Base Specifications

Battery Level Measurements

Conductance
Range: 100 to 15,000 Siemens (mhos)
Test current: Approx. 5 Amps RMS

Voltage
2V Battery Accuracy: +/- 10 mv
12V Battery Accuracy: +/- 30 mv

Temperature (negative post)
Range: 0° C to +65° C
Accuracy: +/- 2° C

Strap Resistance
2 µOhms minimum
Measured in µOhms

String Level Measurements

Voltage
Range: 18 to 600 VDC
Accuracy: 5%

Discharge Current
Range: -15A to -2400A

Charge Current
Range: 15A to 200A

Ripple Current
Peak AC ripple detection

Ambient Temperature
Range: 0° C to +65° C

Communication Interfaces

Ethernet-TCP/IP @ 100 Mbps
USB-A "on-the-go"
USB-B virtual comport (57.6 kps)
MODBUS - 4 wire, TCP/IP optional

Alarms

Form C binary/dry contact with
alarm input and outputs

Environmental

Regulatory Compliance
UL, FCC, CE, RoHS, WEEE compliant

Operating Temperature
(0° C to +65° C)

Storage Temperature
(-10° C to +80° C)

Power Requirements

Base Coordinator Unit Module
Powered by VTC, 9 V DC wall plug
adapter (optional), or POE

VTC String Monitor
Powered from the battery string

Sensor Power
Powered from the monitored mono-block /
cell / jar

Protection

Sensor (2 V, 4V, 6V, 8V, 12V, 16V)
Test load and power paths are fused

VTC
Power leads fuse and diode protected

Wireless Architecture

Communication between BCU, VTC,
and Sensors is IEEE 802.15.4
compliant RF transport @ 2.4 GHz

Physical Dimensions

BCU - Base Coordinator Unit
5.3 in x 6.5 in x 2.35 in
13.5 cm x 16.5 cm x 6 cm

VTC - String Level Monitor
5.08 in x 5.25 in x 2.25 in
12.9 cm x 13.3 cm x 5.7 cm

Battery Sensors
5.1 in x 2.15 in x 1.2 in
13 cm x 5.5 cm x 3 cm

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MIDTRONICS | Stationary Power