

BATTERY POWER PRODUCTS & TECHNOLOGY

Solutions for OEM Design Engineers, Integrators & Specifiers of Power Management Products

Batteries Used as Back-Up Power for New Terrestrial Microwave Network That Will Improve Communications in Southeast Alaska



Alaska Power & Telephone Company, an Alaskan electric and telecommunications utility, determined a need for a terrestrial microwave communications network within its strategic plan to serve the ongoing demands of its customer base to deliver voice and data communications needs within Southeast Alaska. Although the industry trend is to develop extensive fiber optic networks for long haul applications, this was neither practical nor economical in this geographically diverse region of Alaska. Some villages served with broadband services have less than 100 year round inhabitants. Due to the isolation of these communities, reliable communications services are vital for Internet access, telemedicine and distance learning applications. The project was developed and constructed by the AP&T Wireless division.

Any communications network is only as good as its weakest link, and in many cases this is reliable grid power with associated backup systems including auto starting AC generators and associated battery systems. This is a difficult and operationally intense task for any telecommunications carrier, but applying this concept to mountain top sites in Southeast Alaska is especially difficult. The average elevation for various AP&TW communications sites are 3,000 feet and they are exposed to severe wind and icing conditions from the Pacific Ocean air currents and their rapid rise caused by the mountain ranges. This can cause conditions where it is difficult if not impossible to

safely travel to a site via helicopter (as there are no roads) to restore power or make other repairs.

To achieve minimum 99.999 percent availability of the communications system, fully discrete, redundant power systems are a must. In addition, the battery systems within this environment must be capable of sustaining the communications site for an extended period of time. In this case, a seven day minimum reserve time is required. In order to achieve this, AP&T employ load management techniques, including load shedding in sequence from non critical, sub critical and critical loads.

AP&T continued on page 4

News in Brief

Saft Wins \$170 Million Maximum Contract with the US Defense Logistics Agency

Saft has been awarded a major multi-year contract by the US Defense Logistics Agency (DLA) to supply the US Army, Navy, Air Force and Marine Corps with BA5590 lithium sulfur dioxide (Li-SO₂) batteries. The terms of the contract include Li-SO₂ batteries for several portable military applications such as communications and electronics systems. The contract with DLA is an indefinite quantity contract with a two-year base period for an amount of up to \$64 million and three one-year option periods for a total contract value of up to \$170 million.

NREL Joins A123Systems to Improve Advanced-Vehicle Batteries

The US Department of Energy's National Renewable Energy Laboratory (NREL) and A123Systems have teamed up to support the battery-maker's effort to develop more powerful and longer lasting batteries for hybrid-electric vehicles. The Laboratory and the battery-maker have signed a three-year, Cooperative Research and Development Agreement to examine and develop new techniques to improve thermal management in advanced transportation batteries.

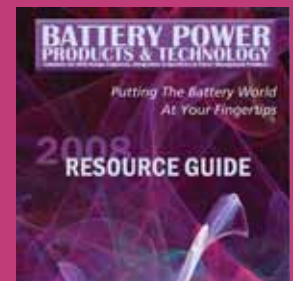
EnerSys Awarded \$13 Million in Submarine Battery Contracts

EnerSys has been awarded contracts for submarine batteries worth more than \$13 million. The batteries are scheduled for delivery over the next several years. The orders were received from HDW, the German shipbuilder and are for the supply of submarine batteries for propulsion power on diesel electric vessels with several navies worldwide. The contracts include the supply of the batteries as well as the ongoing maintenance and technical support for the customers.

Please look at the mailing label below and read the code in the red box.
Code=A: You are receiving the complimentary issue due to your involvement in the industry. To start your free subscription today, please go to www.BatteryPowerOnline.com and subscribe.
Code=B: Your subscription is about to expire. Go to www.BatteryPowerOnline.com and renew your subscription today.
Code=C: Your subscription is active and current.

INSIDE

Transformer-Free UPS Design: Small Footprint, Big Power p 11



Battery Power 2008 Resource Guide Between pages 12-13

Battery Monitor Users be Aware p 12

Preventative Maintenance is The Best Defense to Downtime p 14

The Automotive Dream for Energy Storage p 16

Strategic Overview of Silver-Zinc Rechargeable Batteries p 22

PRODUCTS & SERVICES



New Batteries On the Market p 4

Charging & Testing p 5

Integrated Circuits & Semiconductors p 7

Battery Components p 9

Power Supplies p 10

DEPARTMENTS

Industry News p 17

Calendar of Events p 21

Marketplace p 21

www.BatteryPowerOnline.com

QUALLION

Powering Life



Vehicles



Military



Aerospace



Medicine

Since 1998, Quallion has delivered custom battery solutions for demanding applications. From medical implants to high voltage power supplies, Quallion leads the Lithium ion battery industry in safety, reliability and performance. Drawing upon its unique ties to the Japanese Lithium ion battery market, Quallion now offers new battery solutions to the Heavy Duty Truck Market. Enabling technologies such as the Matrix™ Battery Design, Zero-Volt™ capability and SaFE-LYTE™ offer proven battery solutions that can pass the most aggressive test conditions, including full crush and constant overcharge.

Quallion's Matrix™ Battery System was designed specifically for the vehicle market. The concept is based on matrix arrays of 18650 Li ion cells arranged in series to establish voltage, and strings of cells configured in parallel to establish capacity. The advantage of this approach is nominal use of control electronics and cell redundancy for efficient increases in reliability and survivability. Utilization of commercial grade 18650 cells offers the greatest cost effective solution and the highest variability of chemistry configuration as the cells are interchangeable in the Matrix™.

Quallion was founded by biotechnology entrepreneur and philanthropist Alfred E. Mann and Dr. Hisashi Tsukamoto.



(Top) Quallion's new 48.8V Matrix™ Module (4.2kg) comes in 7.5Ah, 9.5Ah and 12.5Ah configurations.

(Above) This 72Ah matrix-design pack offers as a lead-acid replacement for military applications for high power or high energy.

(818) 833-2000

www.quallion.com



QUALLION

Powering Life.

BPP&T**Editor & Publisher**
David Webster**Director of Content**
Shannon Given**Associate Editors**
Jeremy Martin, Nick Depperschmidt**Assistant Editors**
Heather Krier, Joanna Larez**News Editors**
Jeremy Fleming, Karen Poulson,
Jessi Carter, Scott Nash,
Suzanne Harrold, Sue Hannebrink**Manager of Administration**
Marsha Grillo**Advertising, Sales and Marketing**
Jessi Carter, Director of Sales
Jeremy Fleming, Account Executive
Jennifer Graham, Marketing Assistant
Kristen Reming, Marketing Assistant
Jessica Thebo, Marketing Manager
Julie McCann, Production Manager**Director of Support Services**
Marc Vang**Circulation**
Andy Gurokovich

BATTERY POWER PRODUCTS & TECHNOLOGY (ISSN #1092-3616) is published bi-monthly by Webcom Communications Corp., 7355 E. Orchard, #100 Greenwood Village, CO 80111. Free for the qualified US \$58.00 non-qualified US and \$72.00 elsewhere. Periodicals Postage paid at Englewood, CO and additional mailing offices.

POSTMASTER:Send address changes to:
Webcom Communications
7355 E. Orchard, #100
Greenwood Village, CO 80111**Photocopy Rights:** Permission to photocopy for internal or personal use, or the internal or personal use of specific clients is granted by *Battery Power Products & Technology* for users through Copyright Clearance Center, provided that the base fee of \$2.50 per copy of the article, plus \$1.00 per page is paid directly to the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923 USA (978) 750-8400. For government and/or classroom use, the Copyright Clearance Center should be contacted. The rate for this use is 0.03 cents per page. Please specify ISSN #1092-3616 *Battery Power Products & Technology*. © Copyright 2008 Webcom Communications Corp. Material in this publication may not be reproduced in any form without written permission. Requests for permission should be directed to the customer service manager.**Webcom Communications Corp.**
7355 E. Orchard Rd., # 100
Greenwood Village, CO 80111
Phone 720-528-3770
Fax 720-528-3771
www.BatteryPowerOnline.com**Office hours:**
7 a.m. to 5 p.m. MST

New Batteries on the Market

**New Battery Demonstrates Evolution of Power For Network Power Applications**

Exide Technologies has introduced the Absolyte GP, the company's latest addition to its stand-by power product family of valve-regulated, network power batteries. Engineered, marketed and sold by Exide's GNB Industrial Power Business, the Absolyte GP incorporates a technologically and environmentally-advanced design that delivers a 20 year design life with enhanced cycling performance, a key attribute to support photovoltaic, wind turbine and other renewable energy initiatives.

The Absolyte GP is designed to support a wide range of network power applications, including telecommunications, uninterruptible power supply, alternative energy, outside plant, railway and utility/switchgear. The Absolyte GP will be a direct replacement for the Absolyte IIP.

One critical objective of the R&D surrounding the Absolyte GP was to create an industrial power product that supports environmental sustainability. To address that objective, the Absolyte GP is designed with a patented, proprietary alloy that reduces the content of heavy metal in the finished product, making it easier than ever to recycle spent batteries. In addition, the battery is manufactured with an increased ratio of recycled materials compared to previous generations.

The improved design of the Absolyte GP offers a number of additional environmental benefits, including a 75 percent lower float current compared to previous generation products that will result in reduced energy consumption and reduced heat generation. This would be a significant benefit for large users, both telecom and data centers, who are looking to reduce energy costs required to maintain and cool battery rooms. In addition, the Absolyte GP can provide more than 1,200 cycles at 80 percent depth of discharge, and significantly more cycles for more shallow discharges. These attributes make the Absolyte GP well suited to photovoltaic and other alternative energy applications that require routine cycling.

E-One Moli Introducing New Li-Ion Battery for Power Applications

E-One Moli Energy Corp. has released its new generation of high power lithium-ion battery. E-one Moli uses advanced spinel technology to develop a new formula of high power lithium-ion battery. The new generation of manganese (spinel)-based lithium-ion battery features great rate capability and improved cycle life.

The new high power battery offers a capacity retention rate of more than 80 percent after 1,200 cycles and improved safety, even under harsh environments. With the advanced spinel technology, E-One Moli provides the industry with a new level of power source that promises high power density, safety, long cycle life and low material cost.

Blue Spark Technologies Unveils Innovative Printed Battery Designs

Blue Spark Technologies, a supplier of thin, flexible printed battery solutions, now offers two additional battery designs that expand potential markets and product development possibilities for the company's eco-friendly, carbon-zinc printed battery technology. The new battery designs are variations on the company's ST (standard) series of thin battery solutions and were developed in response to customer needs for customized low voltage power sources to power new and existing products.

Blue Spark's two new battery designs can be integrated into the design, manufacturing and packaging of a vast array of products easily, affordably and with reliable results.

The industry's thinnest printed battery currently in production, the UT series batteries, are extremely flexible, even under high duty levels. The lower laminate profile (as thin as 500 microns ~ 0.020 inches) makes the UT series well suited to a wide variety of thin form factors including transit tickets, loyalty cards, "smart cards" and RFID smart labels. Blue Spark has been working with a variety of printed display and electronic ink manufacturers to create some truly innovative new products and applications ranging from gaming to financial transactions.

Blue Spark UT batteries are available in a variety of shapes and sizes. Typical standard form factors are 1.5 V and can deliver approximately 12 mAh of energy. Overall voltage, storage capacity and thickness can be adjusted according to individual customer's power requirements.

The Blue Spark HD (high-drain) series is designed to provide an extra boost of power in applications requiring higher peak current delivery, the HD series offers about 5x greater peak drain current than Blue Spark's ST series. They are well-suited for use in applications involving transmission of power to an LED, display, sensor, speaker or other electronic device.

*Batteries continued on page 4***Batteries in Action****Micro Power Supplies Custom Battery Pack for Vocollect Healthcare Systems**

Micro Power has manufactured a new, custom li-ion battery pack specifically for Vocollect Healthcare Systems' AccuNurse voice-assisted care system for the long-term care industry.

The battery pack uses a single prismatic li-ion cell. The cell is a 103450 configuration, provides 2.0 amp-hours of capacity, and complies with the IEEE 1625 Standard for Rechargeable Batteries for Portable Computing. The battery pack gives healthcare providers a full shift of mobility while administering personalized resident care and reporting daily activities with simple voice cues through their headsets.

AccuNurse opens a two-way dialogue between care staff and the resident information they need to provide the best care possible. With simple voice requests, staff can hear plan-of-care details and document activities as they are completed, using the most natural form of communication available: voice.

"The healthcare industry continues to improve mobility of

both healthcare workers and patients to increase quality of care and efficiency. The AccuNurse system is a perfect

example of enabling healthcare workers to offer faster and more personalized resident care," said Jeff VanZwol, marketing manager for Micro Power. "Using our expertise in the medical field, Micro Power provided Vocollect with a portable and reliable battery pack for this application."

Micro Power is a Food and Drug Administration (FDA) registered and ISO 9001:2000 certified supplier of custom battery systems for portable mission-critical equipment. The company serves the

portable medical equipment markets, Automatic Identification and Data Collection (AIDC) markets and commercial military markets. The company's battery systems power close to 70 percent of all portable Automated External Defibrillators (AEDs) in the market today.



The batteries are well suited for power-hungry RFID applications, such as active or real-time location systems (RTLS). In addition, their customizable, symmetric design allows for non-rectilinear shapes, such as might be used in transdermal drug delivery patches, wound care and such novelty items as greeting cards with miniature speakers. Typically, peak current delivery can be in the area of 6 mA and beyond, depending on individual application's circuit requirements.

Blue Spark HD batteries are available in a variety of shapes and sizes. The new cells feature 1.5 V battery chemistry and overall energy storage capacity similar to the Blue Spark ST series.

All Blue Spark carbon-zinc printed batteries offer a significantly thinner profile than standard button or coin batteries. Plus they are "green" and disposable, fully meeting the European Union's RoHS (Restrictions on Hazardous Substances) directive.

AP&T continued from the cover

This is achieved with an Argus power system CXCP controller and associated low voltage disconnects. In addition, they utilized remotely open or close battery disconnects on the battery strings. There is no augmentation to the battery systems, photovoltaic panels or wind power is not practical in the extreme operating environment.

In spite of the load management system, a seven day reserve time requires significant Ah capacity, even for a relatively small load. Battery plant design was outsourced to Reeve Engineers of Anchorage, Alaska.



VRLA (valve regulated lead acid) batteries were specified primarily due to past operational and logistics experience and practical considerations. It was possible to get a higher density of Ah/cu ft within limited space, spill resistant (important for helicopter sling loads) and simplified modular construction meant achieving UBC seismic zone 4 installation versus a wet cell design. A caveat to VRLA's are their susceptibility to thermal overload conditions. As a safety measure, temperature probes were installed on each battery string that controls rectifier output in the event of a thermal condition. Also, plate inspection is impossible due to the opaque plastic jars. Specific gravity measurements are not possible due to the sealed design.

As a general rule, battery strings within remote sites across Alaska do not get the amount of regularly scheduled maintenance they require, primarily due to economic factors (it can cost as much as \$3,000 to charter a flight to some areas) and many cases the lack of a controlled environment. State wide, AP&T operate more than 30 sites and have developed experience with various battery types and manufacturers. Out of this experience, the Deka Unigy II AVR series works best compared to other manufacturers they tried. Specifically, they selected the 3AVR95-33 series. The installation is straightforward. Some "burping" of the cells were necessary to eliminate case bulging. This was due to the rapid elevation change during transport (sea level to 3,000 feet). Initial tests were made, a freshening charge was applied, then put into service.



In the November of 2007 AP&T got their first opportunity for a practical test of the system. They lost all AC power generation to a faulty fuel system pump design. Of course, the weather was lousy. The site lasted 12 days on batter backup until the weather cleared and crews dispatched. Like so much of what they have to do, it was trial by fire.

For more information, please contact Tom Ervin, General Manager, Telecom Engineering, AP&T at tom.e@aptalaska.com.

Solutions in Advanced Technology

Webcom Communications serves advanced technology fields worldwide through its magazines, Web portals, e-newsletters, directories, database products and industry events.

IN-DEPTH PUBLICATIONS

INDUSTRY DIRECTORIES & DATA

ONLINE CONTENT & PRODUCT SEARCH

CONFERENCES & TRAINING

SOFTWARE BUSINESS CONFERENCE

ENERGY EFFICIENCY & SUSTAINABILITY SYMPOSIUM 2008

THERMAL MANAGEMENT SYMPOSIUM

Remote 2008 CONFERENCE AND EXPO

2008 Antenna Systems Conference

BATTERY POWER 2008

Visit Us Online at www.infowebcom.com

Charging & Testing



RedHawk Energy Systems, LLC Introduces Advanced Portable Battery Discharge Testers

RedHawk Energy Systems, LLC and Microlynx Systems have teamed up to develop the RH1 and RH2 series portable battery capacity testers. The RH1 and RH2 series provide enhanced capabilities and features in a convenient and economical package. The RH1 and RH2 series testers are designed to test batteries that are in-service as well as batteries at the shop or laboratory. While testing in-service batteries the tester isolates the battery being tested from the charger and the load, measures its performance and then automatically reconnects the battery to the system.

The RH1 tester is suitable for many applications with its constant current discharge mode and user adjustable discharge rates and termination conditions. The RH2 tester is more capable with constant power and constant resistance test modes, 100 hours of internal memory and a Kelvin connection capability. Both models are powered by the battery being tested, auto-adjust to the battery voltage and can discharge at up to 500 W or 50 A. Both models are packaged in a compact, durable aluminum case designed to withstand the rigors of field use and with its integrated carry handle, transporting the tester is easy.

Xtreme Charge Introduces Dual-Station 12-Volt Maintenance Charger

To better service those needing to charge and maintain more than one battery at a time, PulseTech Products Corp. has introduced the Xtreme Charge X2, a ruggedly designed dual-station 12-volt maintenance charger.

Most households employ multiple 12-volt batteries used in automobiles, light trucks, motorcycles, boats, lawn and garden tractors and off-roaders. In situations like these, use of a single-station maintenance charger, although possible, requires more user intervention to support the ongoing needs of today's power hungry and seasonally used vehicle batteries.

In addition to providing dual station service to maintain and charge 12-volt batteries, Xtreme Charge X2 would equally apply to many dual battery 24-volt systems, which are composed of two 12-volt batteries connected in series. Potential uses would include generators, transit, tour and/or charter buses, private coaches, heavy trucks, off-highway/construction equipment, fork and scissor lifts and alternative energy applications.

The CUL approved Xtreme Charge X2 is designed to be a maintenance charger for any type of 12-volt lead-acid battery. Like its single

station sibling the XC100, during the initial connection, Xtreme Charge X2 automatically determines the appropriate rate of charge based on the battery's specific size and condition. It tests the battery continually for as long as it is connected to the charger to determine the optimal bulk or float charge rate. The test step also incorporates a Bad Battery indication if it determines the battery is either faulty and cannot be re-charged or is below 7 volts.

As part of the five-stage charging process, Xtreme Charge X2 continually pulse charges to minimize the size of lead sulfate crystals allowing the battery to accept as much charge as possible. This patented process ensures that new batteries will stay in like-new condition while dramatically improving the performance

and life expectancy of older batteries.

The Xtreme Charge X2 works with all types and sizes of 12-volt lead-acid batteries including standard flooded, AGM, gel and maintenance-free (from less than 10 Ah to over 150 Ah). The Xtreme Charge X2 features four built-in wall-mount tabs and includes two fuse-protected quick-disconnect battery clamps and lugs, important safety instructions and a quick-start guide.

Introducing a new product? Send the press release to Shannon Given, Director of Content, at shannong@infowebcom.com

Power Up!

Connect with our "Little Things"

For over 55 years Keystone has been supplying Battery Holders, Clips and Contacts for a wide variety of industrial applications.

We pride ourselves in designing and manufacturing quality products that you can depend on.

While our catalog products meet most standard requirements, our Application Engineering Group is always available to modify existing items or design and develop specific products for your special applications.

Contact us. It's Your Move!

Battery Holders, Clips & Contacts

RoHS Compliant - ISO 9001 Certified

KEYSTONE

ELECTRONICS CORP.

(718) 956-8900 • (800) 221-5510 • FAX (718) 956-9040
e-mail: kcc@keyelco.com • Website: keyelco.com

Call or Click for Catalog M55
Available from our global distributor network

ECotality's eTec Launches New Minit-Charger SC Fast-Charger

Electric Transportation Engineering Corp. (eTec), a wholly owned subsidiary of ECotality, Inc., a renewable energy company, has received UL approval for its new line of Minit-Charger SC battery fast-charge systems. Utilizing Minit-Charger's patented advanced algorithm technology, the SC Charger is a compact and cost-effective fast-charging system that serves a variety of material-handling-equipment applications.

The SC Charger is a high-frequency, single-connector charger designed for medium and heavy duty applications. Providing up to 250 amps of output, the SC Charger can fast-charge battery systems of 36 volts or lower four times faster than convention charger. The SC Charger features a light and compact design that allows for the system to be pole or wall mounted in order to save valuable floor space and allows better cable management. The SC Charger also features advanced data collection capabilities, including the patented Minit-Trak fleet and system data management system, which provides the most comprehensive performance evaluation of a battery's state-of-health and state-of-charge and automatically adjusts its charging rates to increase and maximize battery life.



Coulomb Technologies Announces New Smart Charging Infrastructure for Plug-in Vehicles

Coulomb Technologies has introduced a smart charging infrastructure for plug-in vehicles. Coulomb has developed a complete solution targeting plug-in vehicles including extended range electric vehicles, plug-in hybrid vehicles and battery electric vehicles. Coulomb's ChargePoint Network includes public charging stations, a consumer subscription plan and utility grid management technology for electric utility companies to smooth electrical demands on the grid.



Coulomb's ChargePoint Network integrates three unique components into a scalable, cost-effective solution. At the edge of the ChargePoint Network are Smartlet charging stations that are individually controlled through the wireless Smartlet Communications

Network and the ChargePoint network operating system. Coulomb's core technology includes the elements required to build and enable a smart charging infrastructure for plug-in vehicles.

The Smartlet charging stations perform bi-directional energy metering and control, user authentication, and 802.15.4 wireless local area network technology, which enables a subscription model through communication with a data center.

The ChargePoint network operating system (NOS) manages the Smartlet charging stations through the Smartlet communications network. The ChargePoint network also provides Web portals for subscribers, hosts and utilities. Functions include user authentication, access control, energy flow control, location management, utility company policy administration, user portal, host property portal, utility portal and GPS system interface.

Fully Automatic Battery Chargers for Backup Generators, PLC Remote Signaling, Automated Gate Entry Systems and Telecommunications Backup Systems

The ACL series for 12, 24 and 36 volt lead acid battery systems is a line of fully automatic battery chargers from Japlar Group, Inc., that can be left on batteries indefinitely and used with any type lead-acid batteries. They are available in stationary and portable designs. These models have output voltage temperature compensation, output current limiting, reverse polarity and short circuit protection and a low battery voltage start feature that requires 3 VDC. All units are built to UL1012 or UL1236 (approval pending) and the meter-equipped units meet the requirements of the NFPA110 Standard for Emergency and Standby Power Systems 2005. The optional Alarm Control Module detects and activates Form C relay contacts (2 amps open and closed loop systems) for low battery voltage, high battery voltage, open-circuit between the charger and batteries, AC power loss and battery charger failure.



HES Series 301 Power System

Hoffman Engineered Systems (HES), a manufacturer of power control systems, has introduced a new product certified for use in the medical industry to manage power in mobile applications. The HES series 301 power system is designed to manage 12 volt sealed lead acid batteries most commonly found in mobile medical carts and workstations. It provides comprehensive battery management that allows optimum battery charge and optimum battery life while automatically detecting and avoiding safety issues such as overheating, out gassing and faulty batteries; very important criteria in medical environments. The user's burden is also reduced by using a simple display, either dedicated or through a GUI interface to the system PC, to display key information including time remaining to charge/discharge, rather than traditional green/yellow/red indicators.

The 301 Power System is designed specifically for mobile applications requiring full charge/discharge cycles. The power scheme is significantly different than those used by UPS based systems that remain fully charged awaiting a power loss event. UPS based systems are designed for ensuring the survival of the equipment for a short period of time and to provide a graceful shut down. Fully mobile products require a different design as they must operate as long as possible and provide a graceful shut down when required. The charge time in a mobile product charging system is therefore optimized to provide a complete battery charge in the shortest available time without danger or reduction in life of the battery.

The Series 301 Power System is also designed to allow power to be used directly from the batteries regulated as DC rather than converting it to AC. This eliminates the efficiency loss due to the DC/AC conversion and therefore extends run times significantly. Since the system eliminates the use of AC power directly from the wall, as with UPS based systems, the power is inherently isolated and diminishes many safety concerns.

The Series 301 Power System is also designed to allow power to be used directly from the batteries regulated as DC rather than converting it to AC. This eliminates the efficiency loss due to the DC/AC conversion and therefore extends run times significantly. Since the system eliminates the use of AC power directly from the wall, as with UPS based systems, the power is inherently isolated and diminishes many safety concerns.

Webcom's
2008 Worldwide Battery Industry Directory



**Battery Manufacturers, Power Management Companies
Charging, Testing & Monitoring Companies Component
Manufacturers, Suppliers, Distributors, OEMs and more!**

With Webcom's 2008 Worldwide Battery Industry Directory, you can increase your sales, enhance your marketing efforts, perform market research, find new suppliers and monitor your competition.

Each directory provides the most comprehensive, accurate and up-to-date industry listings.

The 2008 directory provides details for more than
4,000 contacts and 1,900 companies
Available in hard copy, CD-ROM and PDF

Company Listings include:
Names and titles of key personnel in all functions, type of company, year established, revenue range, markets served, number of employees, plus much more

For more information or to order, contact:
Webcom Communications Corp. | 7355 E. Orchard Rd., Suite 100 | Greenwood Village, CO 80111
Phone 800-803-9488 or 720-528-3770 | Fax 720-528-3771
www.infowebcom.com or marcvc@infowebcom.com

TI Battery Charger Achieves Faster, Cooler Charging in Mobile Phones and Portable Electronics

Texas Instruments, Inc. (TI) has introduced a 3-MHz, switch-mode battery charge management integrated circuit (IC) for portable electronics that can be charged from an adaptor or a USB port. The 2 mm by 2 mm switching charger, the bq24150, significantly improves charge time, reduces power dissipation and cuts board space in half compared to typical implementation with linear chargers.

TI's bq24150 device with integrated 1.25-A FETs is the industry's smallest I2C programmable buck-charger solution, providing maximum battery charging performance and design flexibility in USB-powered applications, such as smart phones, portable media players or other consumer electronics. The 3-MHz charger requires the use of a 1-uH inductor and small ceramic capacitors, resulting in a solution size of 7.6 mm by 10.4 mm. The bq24150 also features a reverse boost USB On-the-Go (OTG) mode that generates a voltage supply to power accessories that are plugged into a mini-USB port, eliminating the need for another discrete device.

The bq24150 fully complies with USB charging standards. The device can achieve high peak efficiency of up to 92 percent, while supporting a USB battery charging current up to 900 mA. This speeds the charging rate without exceeding the 500-mA input current limit mandated by the USB standard. In addition, the bq24150 significantly reduces power dissipation, as compared to linear charging, making it well suited for high-performance, ultra-space constrained applications.

The device's USB-friendly boot-up sequence allows the charge IC to boot



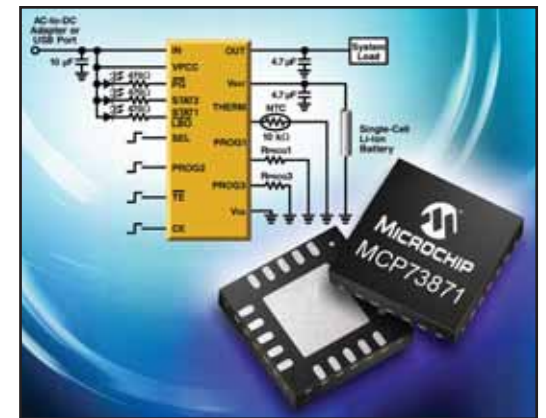
autonomously, which helps replenish deeply discharged batteries. In addition, the bq24150 features input current sensing and offers multiple programmable charge parameters through an I2C communications interface.

The bq24150 charger is available in a 20-ball, 2 mm by 2 mm chip-scale package. Suggested resale pricing in 1,000-piece quantities is \$2.00.

Microchip Technology Debuts USB/AC Load-Sharing Li-Ion/Li-Polymer Battery Charger

Microchip Technology, Inc. has released the MCP73871 charge-management controller—a Li-Ion/Li-Polymer charger with an intelligent charge management feature that enables simultaneous AC-DC-adaptor or USB-port charging and powering of devices. The single-chip charger features an integrated pass transistor, and numerous battery and termination-voltage options—making it well suited for complex, space-constrained portable applications.

By enabling electronic devices to be simultaneously powered and charged via either an AC-to-DC adapter or through a USB port, the MCP73871 charge-management controller simplifies the charging and powering of today's portable electronic devices. With highly accurate voltage regulation of 0.5 percent, the new charger extends battery life by allowing the battery to be charged closer to its optimal limit.



Integrated Circuits & Semiconductors continued on page 8

Don't let Technology pass you by.

Testing Instrumentation
for Your Battery and Ultra-capacitor Needs

Arbin INSTRUMENTS

Battery & Ultra-capacitor Testers

- Automated Multi-Channel Testing Systems for Battery, Supercapacitor, and more...
- INDUSTRY LEADING Customer Support
- Logical, Powerful, and Easy to Use Control Software
- Multiple Current and Voltage Ranges for Improved Accuracy
- Linear Bipolar, Linear Unipolar, and PWM Circuitry Available to Cover a Wide Range of Applications
- Multi-Channel Potentiostat/Galvanostat Circuitry for Combinatorial Electrochemistry
- Flexibility Allows for General Cycling or Advance Electrochemical Experimentation
- Vast Experience in Multiple Markets from Advanced R&D to Manufacturing

Serving All of Your Testing Needs

www.arbin.com

Phone: 979-690-2751 Fax: 979-690-2761 Email: info@arbin.com

A Proven Approach to Assembling Batteries and Battery Packs

Aluminum to mesh

Nickel cells

Copper tab

Copper to mesh

STAPLA's Ultrasonic metal welders bond similar and dissimilar metals: components and parts typical of Lithium ion cells and packs as well as other types of batteries and capacitors.

- Single or multilayer Copper tabs to Copper or Nickel plated Copper terminals
- Aluminum terminals and multilayer tabs to covers and cans
- Nickel tabs to Copper and Aluminum foils
- Nickel tabs to Nickel foam, or felt (spot or seam weld)
- Copper tabs to Copper mesh
- Connections of wires and terminals, power management and monitoring units typical of battery pack assemblies

Advantages of using STAPLA Ultrasonics Welders:

- Quality monitoring built into every system allowing for easy process control
- Fast cycle times
- Custom designed tooling with special plating for improved tool life and maximum surface contact for optimum electrical performance
- Systems easily integrated into dry room environment

Global Support
Technical support is provided by Schunk Sonosystems Group network of service offices around the world.

For better quality and higher productivity at a lower cost, send us a sample of your application for a free evaluation or call.

STAPLA Ultrasonics Corporation
ISO 9001: 2000 Certified

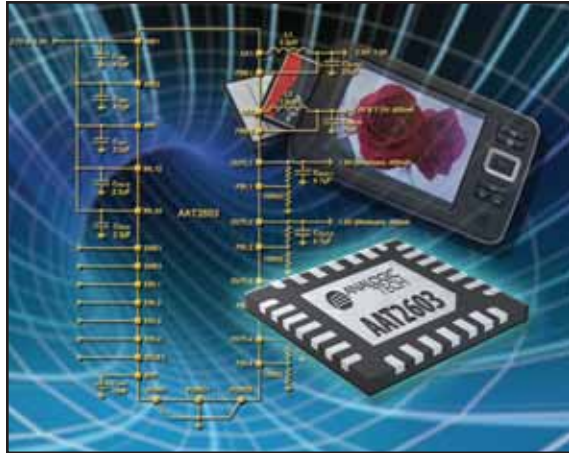
250 Andover Street • Wilmington, MA 01887
Tel.: 978-658-9400 • Fax: 978-658-6550
Web: www.staplaultrasonics.com
E-mail: info@staplausa.com

Schunk Sonosystems Group

Additionally, with its integrated pass transistor, the charger eliminates the need for an external FET, and only a few small passive components are necessary. This results in smaller, less complex and less expensive designs. The MCP73871 charger is available in a 20-pin, 4 mm by 4 mm QFN package, for \$1.28 each in 10,000-unit quantities.

AnalogicTech's New Power Management IC Streamlines Mobile GPS, PMP Designs

Advanced Analogic Technologies, Inc. (AnalogicTech) has introduced the AAT2603, a new highly integrated power management IC targeted at mobile GPS devices, portable media players (PMPs) and other handheld mobile systems operating off a single lithium-ion battery. Offering maximum design flexibility, the new device integrates six power functions, including two step-down converters and four LDOs, each with its own independent enable pin, in a small 4 by 4 mm TDFN package.



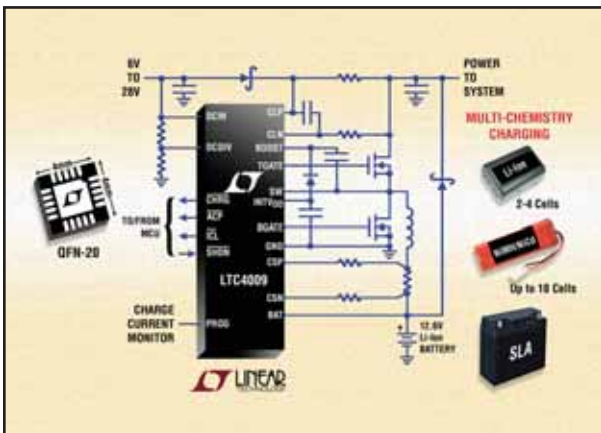
The AAT2603 operates off a 2.7 V to 5.5 V input range and offers high efficiency across the entire load range. Delivering with 200 mV of head room, the first step-down converter supports functions requiring high output current and low dropout voltage. The second step-down converter supplies 600 mA and adds a two-step dynamic output voltage capability to match the needs of common system processors. The converter dynamically shifts between the two output voltages by toggling the SELB2 pin.

Four LDOs supply power to a variety of system functions. Two LDOs deliver 200 mA and are designed to power noise sensitive circuits. The second pair of LDOs offers 400 mA output. Each of the four LDOs consumes 50 μ A of quiescent current.

The new IC also features multiple protection circuits including those for short-circuit, over-current and over-temperature protection. The AAT2603 is qualified across the -40°C to 85°C temperature range. It is available in a Pb-free, 28-pin, 4 by 4 mm TQFN package. The device sells for \$1.64 in 1,000 quantities.

New Multi-Cell, Multi-Chemistry Battery Charger Controller in a Compact Package

Linear Technology Corp. has introduced the LTC4009, a fast-charge 4 A capable, high efficiency switchmode battery charger controller for multiple battery chemistries which minimizes power dissipation without compromising board space. The LTC4009 supports li-ion/polymer, NiMH, NiCd and sealed lead acid battery chemistries in multi-cell configurations. AC adapter current limiting maximizes the charge rate for a given fixed input power level, allowing the end product to operate at the same time the battery is charging without complex load management algorithms. The IC operates from input volt-



ages up to 28 V and is intended for applications including portable computers, portable instruments and battery backup systems.

The LTC4009's synchronously rectified, buck switching topology drives all n-channel MOSFETs and enables efficiencies as high as 90 percent at 4 A. Final float voltage accuracy is specified at ± 0.5 percent and charge current is programmable with accuracy of ± 4 percent. The LTC4009's quasi-constant frequency PWM architecture guarantees no audible noise operation and minimizes filtering needs, while the high operating frequency of 550 kHz allows the use of small inductors and capacitors. Improved non-overlap control keeps efficiency high as external power FET turn on/off times may vary with temperature and supplier. The LTC4009 consumes <20 μ A in shutdown, increasing battery run time in portable applications. For safety and autonomous charge control, the IC includes battery float voltage over-voltage protection, reverse charge current protection, charge current monitoring, soft start, AC adapter present indication and current

limit indication.

The LTC4009 is housed in a 20-lead, low-profile (0.75 mm) 4 mm by 4 mm QFN package. It is guaranteed for operation from 0°C to 85°C ambient temperature. Pricing starts at \$2.95 each in 1,000-piece quantities.

Highly Integrated Power-Management IC for DDR Cache-Memory Battery Backup

Maxim Integrated Products has introduced the DS2731 integrated power-management IC (PMIC) for DDR cache-memory backup. This PMIC integrates a single-cell Li+ charger, power-steering system to control switchover between system power and battery power, and a 2 MHz synchronous buck regulator that regulates the DDR memory supply. This level of integration eliminates more than 15 separate components in existing solutions, thus saving both cost and space. The DS2731 is compatible with the PCI Express 12 V power rail in DDRII and DDRIII, and is therefore well suited for RAID server/system memory cards, as well as RAID on motherboard (ROMB) and modular RAID on motherboard (MROMB) systems.

Integrated charge FETs enable the DS2731 to fast charge a single Li+ battery cell at a rate up to 1.5 A from a 12 V supply using the constant-current, constant-voltage (CCCV) charge method. The charge rate, charge voltage and safety timer length are all user definable through external resistors, which increases implementation flexibility. Additionally, the DS2731 monitors charge status and reports results through three dedicated pins that can be used to drive LEDs.

An auxiliary supply voltage or battery provides the supply voltage for the cache-memory system. If the auxiliary supply falls below 2.93 V, an internal comparator switches the supply from system power to battery power. This switchover occurs through internal power FETs, and is implemented as a break-before-make sequence to prevent current from flowing between the battery and the auxiliary supply. The DS2731 automatically switches back to auxiliary supply when the supply rises above a 3.03 V threshold.

The DS2731's buck regulator provides up to 450 mA to the DDR cache memory to maintain operation. At light loads, the regulator operates in burst mode for maximum efficiency. To prolong battery life, all nonessential functions of the DS2731 are disabled while it supplies holdup current to the cache memory. Additionally, when the battery voltage drops below a user-programmable threshold, the IC goes into very-low-power standby mode.

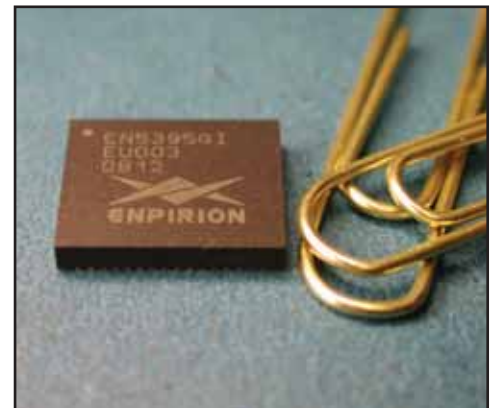
The DS2731 is available in a lead-free, 28-pin TSSOP package with exposed pad. Prices start at \$4.23 (1,000-up, FOB USA).

Enpirion Power Supply Sets New Power Density Benchmark

Enpirion has released the availability of a 9 A DC-DC converter that sets a new standard for power density by delivering over 76 watts per square inch (over 11 watts per square centimeter). The EN5395Q1 features Enpirion's proprietary integrated-inductor technology and ultra-high switching frequency, enabling the PwrSoC (power supply on a chip) to achieve high noise immunity with a very small footprint. The part also offers two options for setting the output voltage, providing the utmost flexibility for the user.

Enpirion's 9A synchronous buck PWM (pulse-width modulation) DC-DC converter integrates the inductor, MOSFETS, and controller into a 10 by 12 by 1.85 mm package. The part requires as few as five external MLCC capacitors for a complete power management solution, with a total footprint of 250 sq mm. The EN5395Q1 delivers up to 30 watts of continuous output power, and achieves up to 93 percent efficiency.

In addition to small footprint, low part count, and low noise, the EN5395Q1 simplifies design as a result of output voltage scaling. Output voltage is programmed using a 3-pin voltage-ID (VID) input, allowing designers to choose one of seven pre-programmed output voltages. This allows developers to conserve power by optimizing the part's output voltage to each specific load requirement. It also provides the flexibility to use the same device for multiple solutions that require different output voltages. Increasing load current capacity is also simple; two to four devices can be placed in parallel to provide a single load with up to 36 A of output current.



Are you an A, B or C? Your subscription to Battery Power magazine may be about to expire. Check your status in the colored box located in the mailing label on the front cover. Subscribe online at www.BatteryPowerOnline.com.

Battery Components

Hydrogen Detector Hits the Market from Storage Battery Systems

Storage Battery Systems, Inc. has recently introduced the SBS Hydrogen Gas Detector (HDGI) designed to provide dissipation and warning before any concentration from lead-acid storage battery reaches the lower explosive limit (LEL) of 4 percent.

The hydrogen gas monitor is a prerequisite component for any flooded wet cell vented lead acid battery room. It is also required for any flooded nickel-cadmium system that also produces hydrogen. The HDGI offers visual and audible signals, as well as a dry contact closure when the concentration of hydrogen gas reaches a level of caution and another as it clears the pre-explosive hazard threshold level. The HDGI represents affordable insurance for the safety of a battery room that even the most modest due diligence would demand.



Advanced Design 9-Volt Insulated Battery Straps

High performance and pre-wired 9 volt insulated battery straps, designed to connect most 9 V batteries in series or in parallel, are available from Keystone Electronics Corp.

Keystone's Premium design is made of molded polyethylene or rigid fiber that incorporate quality insulators and sturdy phosphor bronze or spring steel, nickel-plated, snap-on connectors. Available in "T" or "I" configurations, these straps provide greater dependability while featuring soldered-in #26AWG red and black wire leads. Shielded types, which reduce short circuit and contact tampering potential, are also offered.

A cost-saving alternative, the company's Economy group features a similar design and is available in "T" or "I" configurations. Fully insulated, these have brass, nickel-plated contacts with a molded ABS or vinyl covered bases. Wire lengths are 4.00,

6.00 or 8.00 inches. Lead lengths are in red and black.

The third style is a pre-wired "Dual" battery strap which connects 9 V batteries in parallel. These are manufactured with fiber bases and have steel, nickel-plated contacts. Featured are pre-tinned #22AWG red and black leads; and wire lengths of 7.00 inches length, soldered-in for enhanced reliability.

Enfora Releases Ultra Low Power Wireless Platform

Enfora, a supplier of intelligent wireless networking solutions, has introduced the Enabler Low Power Platform (LPP). This new platform provides developers with a wireless solution that can extend battery life from 30 days to as much as 18 months. With the ability to support and manage extended battery life, the Enabler LPP platform is purpose built, supporting applications that track mobile enterprise assets, vehicle fleets and a host of other equipment in a variety of vertical markets.

"This new platform is a great fit for anyone who needs to track and manage remote mobile assets, but is concerned with the very limited battery life of current devices," said Brian Murphy, vice president, worldwide sales, Enfora. "This new platform represents a major leap in battery performance, potentially extending the battery life of asset tracking devices by several orders of magnitude."

The Enabler LPP is a network edge wireless IP platform that combines global wide-area GSM/GPRS wireless and GPS location capabilities in an embeddable form factor that boasts a <math><10 \mu A</math> system idle. The development tools and embedded software environment for the Enabler LPP bring together the key hardware and software elements required to enhance the rapid development of business critical applications. Utilizing a programmable rules engine, network router, along with unique control and automation capabilities, the Enabler LPP simplifies the deployment, operation and remote management of devices. The LPP developer tools provide a unique interface to actively manage all aspects of power consumption on the device ensuring extended battery life.

BATTERY POWER ONLINE KNOWLEDGE CENTER

White Papers • Web Seminars • Articles
 Market Reports • Training Courses
 Standards/Regulations • Industry Links
 Battery Safety Resources • Application Profiles

**Visit the Knowledge Center at
www.BatteryPowerOnline.com**

www.swe.com 800.231.3612 info@swe.com

SWE
 SOUTHWEST ELECTRONIC ENERGY GROUP

Since 1964

POW-R SOLVE
 Continuous Cell Balancing*
 in a Battery Pack

SouthWest Electronic Energy Group (SWE) announces the industry's first continuous cell balancing method for Li-Ion batteries. Our patented POW-R SOLVE has truly unique circuitry that is capable of continuously balancing cells with high balancing currents during charging, discharging, quiescence, and storage. There are many advantages of using this device: 1) faster balancing; 2) does not reduce pack shelf life; 3) mission critical packs are always in balance, continuously ready to use at maximum capacity; 4) can balance high capacity packs; and 5) built in charge regulation for missions that use solar panels, fuel cells, or power supplies as a source of charge energy.

*U.S. Patent 7,279,867 Method for Balancing Cells or Groups of Cells in a Battery Pack

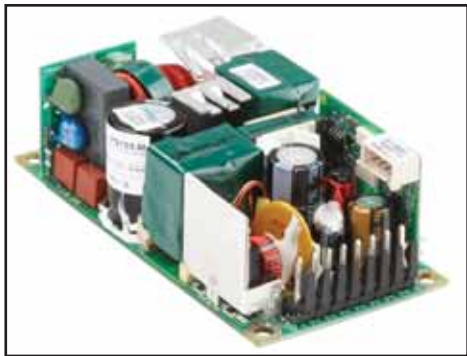
Lithium Primary POW-R SOLVE POW-R MINDER Lithium Ion

QUALITY RELIABILITY SERVICE

From outer space to under the sea to five miles beneath our planet's land surface, SWE designs and assembles high reliability, customer-specific battery packs and chargers.

SouthWest Electronic Energy

ISO 9001:2000



Emerson Network Power Launches a High Efficiency AC-DC Power Supply

Emerson Network Power has launched a high efficiency 100 to 150 watt AC-DC supply that features both ITE and non-patient contact and non-patient critical medical safety approvals. The new LPS103-M power supply is a compact open-frame design. Measuring 2 by 4 inches, with a height of 1.29 inches, it has a typical full load efficiency of 88 percent and a power density in excess of 14 watts per cubic inch. The supply is primarily intended for use in information technology equipment and light industrial systems, as well as for equipment intended for non-patient contact and non-patient critical use in low power medical, dental and laboratory applications.

The LPS103-M features a universal 85 to 264 VAC input, enabling it to be used anywhere in the world, and is also capable of operating from a 120 to 300 VDC input. The power supply produces a tightly regulated main 12 VDC output, together with an isolated 12 VDC fan output; the latter is rated at 1 A, while the main output can deliver up to 8.3 A continuously with convection cooling, or up to 12.5 A continuously

with 30 CFM forced air cooling. The main output can be adjusted over the range 10.8 to 13.2 VDC, and remote sense facilities are provided to compensate for a drop of up to 0.5 V between the output terminals and the load.

Active power factor correction is employed to minimize input harmonic current distortion and ensure compliance with the international EN61000-3-2 standard, the LPS103-M has a power factor of 0.99 typical. The power supply has a maximum safety-ground leakage current of 275 μ A, and the main output has a hold-up time of 16 ms minimum when the supply is fed with a 120 VAC input and is delivering 150 watts of output power.

LPS103-M power supplies are comprehensively protected against overvoltage, overtemperature and short-circuit conditions, and feature a power fail signal for remote monitoring purposes that will change state at least 6 ms before the main output loses regulation. The power supplies have a full load ambient operating temperature range of 0°C to 50°C without de-rating and can cold-start from temperatures as low as -20°C. Between 50°C and 70°C, the output should be derated by 2.5 percent per degree.

SL Power Electronics 12-Watt External Power Supply Meets Highest Energy Star and EISA Standards

SL Power Electronics has released a new 12 watt external power supply family that meets both the Environmental Protection Agency's Energy Star Level IV criteria and the new Energy Independence and Security Act of 2007 (EISA) requirements. The new PW149RB series is compact, measuring 3.35 inches

by 1.81 inches by 1.30 inches. It is available in desktop styles with a single output of 10 to 12 watts in eight different voltage models.

The series features a 100 to 240 VAC universal input and an impact resistant polycarbonate enclosure. It is also available in wall mount configurations for North America, Japan, the United Kingdom and Europe.

Available in eight voltage models ranging from 5 to 48 volts, all PW149RB models can be modified to meet unique power or connectivity requirements. SL Power Electronics also can design a completely custom solution to meet specific OEM requirements and private-label marking needs. The new standard series is priced at approximately \$7.50 in OEM quantities.

UPS for Industrial Applications

The Quint DC UPS from Phoenix Contact ensures uninterruptible 24 VDC power to mission critical devices, even in the event of a power outage. The device has long-life lead acid batteries that provide long buffer times at high currents.

The UPS is designed to be powered by a Quint 24 VDC power supply. With its narrow, modular form factor, the Quint DC UPS is easy to mount in the control cabinet. It features remote battery diagnostics, remote status contacts and timed shutdown.



UPS Systems in Action

Plainfield Community School District Trusts Tripp Lite to Connect and Protect its Expanding Network

The Plainfield Community School District 202 (PCSD) is a 64 square-mile Illinois public school district serving the communities of Plainfield and parts of Joliet, Naperville, Romeoville, Bolingbrook, Shorewood, Will and Kendall counties, located approximately 35 miles southwest of Chicago. Russell Moore, PCSD's Network Manager, oversees a network infrastructure that supports 30 buildings with more than 29,000 students and 3,100 staff members. Moore recently upgraded the local networks of three schools and chose Tripp Lite products to protect and support the critical equipment and data that administrators, faculty and students rely on to keep PCSD running efficiently.

"We serve one of the fastest growing communities in the nation," said Moore. "It's imperative that our network is consistently functional and productive. We simply can't afford downtime, equipment damage or data loss."

PCSD is experiencing a huge growth spurt, taking the school district (with a combined total of more than 30,000 students and staff-equivalent to a major university campus) to an estimated 60,000 students and faculty in 55 buildings by 2020. Growth is what defines the school district, and Moore is responsible for ensuring the network equipment—such as phones systems, servers, alarm systems, patch panels, routers, PCs and wireless connections—can support it. If the network were to go down, PCSD would face consequences that would severely hinder the educational productivity of the school district.

Moore chose Tripp Lite to play an integral role in the improved network power protection and connectivity plan.

"We rely on Tripp Lite's SmartOnline SU1500RTXL2Ua UPS systems to protect



the network equipment, and Tripp Lite Surge Suppressors to protect and distribute power from the UPS to individual devices," said Moore about the new setup. "Plus, Tripp Lite Category 6 cabling is used for all the network patch connections in the MDFs and IDFs."

The SU1500RTXL2Ua is a 1,500 VA on-line UPS system designed to safeguard critical servers and network equipment from all power problems, including prolonged blackouts, through a double-conversion process. It converts dirty incoming AC power to DC, and then reconverts output back into full-time sine wave output. That cleaner output helps protect and extend the life of PCSD's network equipment. It also protects equipment from line noise and regulates overvoltages up to 138 V and brownouts to 65 V without using battery backup, so equipment gets continuous, converted power in all conditions. In addition, the UPS removes harmonic distortion, fast electrical impulses and frequency variations, a feature usually found on a more expensive system.

Each UPS system was fitted with an SNMP/Web card so Moore and his staff can manage and control power remotely. Tripp Lite's PowerAlert software allows Moore and his team control of multiple UPS systems from a centralized location. Each UPS is also expandable with an optional battery pack, so the systems can grow along with the network—and the district.

Tripp Lite's Category 6 cabling provides PCSD with faster data transmission speeds and supports a wide variety of applications. Tripp Lite Power Strips, including the RS-1215-RA 1U rackmount model, provide reliable AC power distribution in a variety of styles with versatile mounting options. Plus, Tripp Lite surge suppressors defend against damage from power surges, spikes and line noise.

"We liked that Tripp Lite surge suppressors come in many different sizes and configurations," said Moore. "This gave us the flexibility to adapt to different power protection

requirements throughout our network infrastructure."

Overall, the constant availability, flexibility and scalability of PCSD's network means faculty and administration can productively focus on increasing the quality of education for PCSD students.

Transformer-Free UPS Design: Small Footprint, Big Power

Ed Spears, Product Marketing Manager
George Oughton, Engineering Specialist
Eaton

First appearing at lower power levels, transformer-free uninterruptible power system (UPS) designs have been around for about two decades. A vast majority of designs below 30 kVA are now transformer-free, meaning that the UPS does not contain power line frequency magnetics (transformers or inductors). This transformer-free design trend is moving up in power levels because power line magnetics are both material and labor intensive, though the high frequency power processing needed is technology intensive. Fortunately, advances in technology have matured sufficiently to support improved value to the customer without sacrificing needed reliability.

At higher power levels reaching above 30 kVA and now as high as 1,100 kVA, the challenge is to switch high currents rapidly at high voltages without high losses or excessive peak voltages. Over the last decade, high power insulated gate bipolar transistors (IGBT) have matured enough to allow conversion frequencies of 10 kHz and above without large sacrifices in efficiency at these higher power levels. In addition, some creative control strategies permit further reduction of switching losses to the point where the new transformer-free technology UPS is competitive with the old technology UPS, even when measured in terms of system efficiency.

Considering the basic topology of the legacy and new transformer-free technology UPS powertrain, a phase-controlled rectifier, while efficient and cost effective, produces large harmonic input currents and reduced input power factor that is unacceptable at many sites and incompatible with some generators. Large input inductors and harmonic filters are needed to bring the harmonics down to 5 to 10 percent total harmonic distortion (THD) and power factor (PF) up to >0.99 PF. These components add cost and weight and increase footprint. In addition, they do not hold THD down and PF up over a wide load range. They are typically effective only above 60 percent of full load. At light loads below approximately 40 percent, the input PF can actually become leading and will cause incompatibility with generators. The PF also varies with line voltage but is only specified at nominal line.

The transformer-free design with an IGBT rectifier inherently holds PF up and THD down from 10 to 100 percent load. It is highly compatible with generators and avoids the additional generator over-sizing commonly required with a phase-controlled rectifier. These superior input characteristics are maintained over the input voltage operating range.

There are also battery management advantages of a transformer-free UPS. Note that a half bridge converter can control battery voltage independent of bus voltage and also allows a range of battery voltages (e.g. 192 through 240 cells) to be accommodated. This converter also enables the battery to rest in an open circuit state to avoid continuous ripple current and the accelerated aging (especially at elevated temperatures) resulting from floating at a voltage significantly higher than open circuit volt-

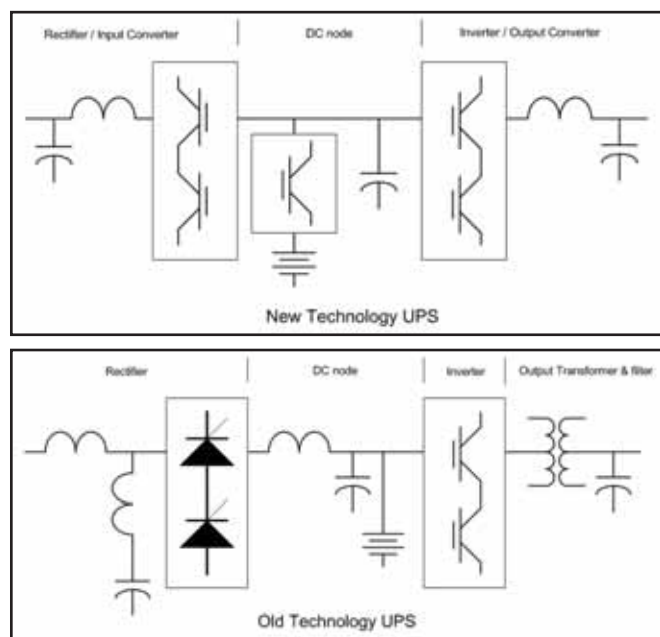


Figure 1. Illustrations of New Versus Old UPS Technology

age. With these additional capabilities, charging techniques can be more effective in extending battery service life.

An example of what is eliminated by using a transformer-free design is shown in Figure 1. The output transformer, input line inductors, DC bus choke, output filter inductors and input harmonic filter inductors are included. Not only is it very heavy, but it is also a significant contributor to the size of the overall unit. The size and obvious weight difference in legacy components versus new transformer-free technology is visually apparent when the units are compared side by side.

It is important to compare the components of a traditional legacy UPS to a transformer-free UPS to understand the technology. It is also important to understand the cost-saving benefits of a transformerless UPS design, which will ultimately impact an organization's bottom line.

Space: Floor space in data centers costs on average \$600 to \$900 per square foot annually; in places like Manhattan, it can cost \$1,500 per square foot. One of the top requests from IT and facility managers is to minimize the footprint of power protection products so they can utilize floor space for servers. Though it is not feasible to minimize the size of batteries, removing transformers from a medium to large size UPS can save as much as 60 percent of space. This also reduces the weight of the UPS by up to 50 percent, which can save thousands upfront on shipping costs.

Installation: A transformer-free UPS is smaller and lighter compared to a legacy UPS which can actually simplify the installation process. Companies often overlook the installation process when considering purchasing a UPS, but it is important to consider how the UPS will physically be brought into the building. For example, an elevator may be weight rated for 2,500 lbs. but the UPS module could weigh 3,000 to 5,000 lbs. This oversight could result in unexpected construction costs to widen doorways or even to rent a crane to lift a UPS through a window, simply because the weight of the UPS exceeds the weight limit of the elevator.

Efficiency: A transformerless UPS is energy efficient which ultimately saves on power costs. Although a legacy UPS can claim high efficiency at full load, a vast majority of UPSs are running at a 40 to 50 percent day-to-day operating level. Companies operating at partial-load versus 100 percent capacity can lose 2 to 3 percent efficiency points, a high dollar amount in terms of power costs. But for a transformer-free UPS running at 50 percent load, efficiency is almost the same as it would be at 100 percent capacity. For a large, transformerless 500 kVA UPS, a company can save about \$2,000 to \$3,000 a year, and at the smaller level, 100 kVA, it can save approximately \$1,000 per year. These figures result in real savings considering the average UPS service life is 15 years.

**WORLD'S #1
RECHARGEABLE BATTERY
PROVIDER**

**Top-Notch Customer Service
and Technical Support**

We believe that providing superior tech support, delivering product as promised and reliability that exceeds spec is just the way one does business in a technical world.

It's the marketing guys that love the awards. But we know it's the day-to-day that makes us the #1 provider of batteries to your market.

C'mon. Challenge us. Contact us at www.sanyobatteries.com with your toughest spec.

SANYO

Batteries

The Biggest & the Best



Eaton continued on page 17

Battery Monitor Users be Aware

Jeff Albér, Vice President of Marketing

Glenn Albér, Consultant

Albér

We are all aware that batteries are the weakest link in the power system and that battery monitoring has become an integral part of every critical system specification. We are not all aware, however, of the fact that owning a monitor by itself is not going to keep a system from crashing. This article will deal with some of the realities of properly maintaining a reliable battery backup system.

System Reliability

In today's digital world, millions of dollars are at stake when a computer hiccups. Users spend a great deal of money on the equipment required to ensure reliability (UPS, chargers, inverters, etc.). However, for some reason, when it comes to the batteries that support the UPS, they tend to look for the cheapest solution. With millions of dollars on the line, it is imperative to invest in the proper technology and preventative maintenance program to avoid battery failures entirely.

Guaranteeing is a strong word, but with the proper equipment and procedures, it is possible to approach 100 percent uptime. A critical system user must be aware of what the right monitoring equipment is and also understand what a monitor can and cannot do. For example, a monitor cannot perform corrective action such as replacing a failing cell or adjusting the room temperature. The system owner must be a willing participant for the process to be successful. This means either training in-house personnel or hiring a competent service company.

Too many monitor owners have a false sense of security, believing that just because the monitor is there, they are fully protected. Reliability comes from preventing problems and therefore requires early problem detection. Early warning of incipient problems comes from trending the state of health of the battery and recognizing when something abnormal is happening. Someone has to pay attention to the monitor and respond to the early warning alarms.

Being proactive means that some action must take place. The corrective action phase of the program is very important and it must be done in a timely manner by someone who understands the impact of the action on the overall string.

Monitoring Equipment

As with any purchase, the caveat "let the buyer beware" holds true. The buyer must be knowledgeable enough to determine his actual needs and not allow a monitor salesman to dictate what is required in the particular situation.

Some monitor specifications that appear in today's bid documents were most likely written by one of the battery monitor manufacturers and therefore reflect only the salient features of that manufacturer's product. Also, some of these specifications have

clauses that are outdated and require updating based on technological advancements and consideration of the features available on the market today.

The IEEE has been working for quite a few years on a monitor guide for selecting and using monitors in the field. It is not a standard, but more of a tutorial type document that does not explicitly tell a user how and what to do.

This article will not discuss the details of why flooded and VRLA batteries fail (please see reference 1 for a detailed discussion or contact the authors directly), but will instead address the main failure modes and why a monitor must have certain capabilities.

Major Failure Modes Flooded Batteries

1. *Positive grid corrosion* - This leads to a reduced conduction path and grid growth. The grid growth causes the active material paste to break away from the grid causing high resistance connection. This is the most common failure mode, and will definitely show up as an increase in internal resistance.

Major Failure Modes VRLA:

1. *Grid corrosion*, same as flooded batteries.
2. *Dry out of the electrolyte* - This will lead to an increase in internal resistance, but not until 30 percent of capacity has been lost. This is the most common failure.
3. *Undercharged negative plates* - This new phenomenon, not seen in flooded batteries, will cause an increase in resistance and loss of capacity.

Buying a monitor is like buying most high tech electronic devices, there are different features and prices available. So what is the trade-off and how do you know what you need? Besides the normal voltage, current and temperature readings, there is a list of absolutely must have features. The following recommendations do not come from a salesman's perspective; but rather from the first-hand experience.

1. *The ability to read internal resistance of a cell/module* - Every battery failure is preceded by an increase in the internal resistance. As a battery deteriorates, the effects can be seen by measuring the internal resistance.
2. *Ability to measure inter-cell and inter-tier resistance* - This is very important for high current applications where even a 1 milli-ohm connection can start a fire. Most catastrophic failures such as fires and explosions are the result of poor quality or corroded external battery connection.
3. *The ability to auto detect battery discharges* - When a battery goes under load, it is necessary to see how every single cell/module in the system responds. Since most UPS hits are typically only 20 second or less in duration, it is necessary for the monitor to be capable of scanning all parameters several times within that interval. This is also a key feature for battery warranty purposes.
4. *The ability to display real time battery data during a discharge* - During a scheduled discharge test such as a commissioning test, it is necessary to see the

performance of each cell/module. There have been many incidents of poor or faulty intercell connections that lead to a catastrophic failure such as fire and/or explosions under load. Some monitors only record data during the discharge and then display after the fact. Who needs to see a failure after the fact? The idea is to see the poor connections and prevent the failure from occurring.

Without the above four capabilities, a battery monitor will not adequately protect against system failures.

Unfortunately, in today's world the decisions for system reliability end up in the hands of the financial departments. As a result, the number one selection criterion is driven by the price of the system. It is time for the technical people to step up and realize that price should only be a consideration if the system meets the needs of the requirement. Think about what is required and then write a spec that must be met before any proposal is accepted. After all, when your facility experiences downtime, it will not be the finance department that takes the heat.

Below is a list of items potential battery monitor users must be aware of:

1. Flooded batteries are much more reliable than VRLA.
2. VRLA batteries fail abruptly and therefore require more intensive monitoring. Cost and

Free Subscription Application

Complete form and fax to 720-528-3771 or submit online at www.BatteryPowerOnline.com

Do you wish to receive Battery Power Products & Technology Magazine Free of Charge? (Outside US \$72) Yes No

Please select your desired format (check only one): Electronic Copy Hard Copy

X Signature (required) _____ Date _____

Print Name _____

Title _____

Company _____

Address _____

City _____ State _____ ZIP _____

Business Phone _____ Business Fax _____

E-mail (required for electronic format) _____

You may receive renewal reminders via email. If you do not want to receive other business related, third party email offers, please check here.

A. Primary product or service? (Check one)

- | | | |
|---|---|---|
| <input type="checkbox"/> 1 Consumer electronics & power tools | <input type="checkbox"/> 6 Aerospace/aviation products | <input type="checkbox"/> 14 Batteries |
| <input type="checkbox"/> 2 Communications systems & equipment | <input type="checkbox"/> 7 Medical Equipment | <input type="checkbox"/> 15 Battery assemblies |
| <input type="checkbox"/> 3 Wireless products | <input type="checkbox"/> 8 Test & measurement equipment | <input type="checkbox"/> 16 Distributor of batteries/components |
| <input type="checkbox"/> 4 Computers/peripherals | <input type="checkbox"/> 9 Military products | <input type="checkbox"/> 17 Chargers |
| <input type="checkbox"/> 5 Automotive | <input type="checkbox"/> 10 Industrial power/utility | <input type="checkbox"/> 19 Power management ICs |
| | <input type="checkbox"/> 11 Electrical Power/Utility | <input type="checkbox"/> 21 Technical/engineering consulting firm |
| | <input type="checkbox"/> 12 Security | |

B. Principal job function? (Check one)

- | | |
|---|--|
| <input type="checkbox"/> 23 Design/development engineering (including mgmt) | <input type="checkbox"/> 26 Engineering services |
| <input type="checkbox"/> 24 Industrial power supply engineering/operations | <input type="checkbox"/> 27 Research & development |
| <input type="checkbox"/> 25 Manufacturing/production/testing | <input type="checkbox"/> 28 Corporate management |
| | <input type="checkbox"/> 29 Purchasing/procurement |
| | <input type="checkbox"/> 30 Marketing/Sales |
| | <input type="checkbox"/> 31 Engineering consulting |

BATTERY POWER PRODUCTS & TECHNOLOGY

Solutions for OEM Design Engineers, Integrators & Specifiers of Power Management Products

*Putting The Battery World
At Your Fingertips*

2008
RESOURCE GUIDE

Powering Vehicles

QUALLION

Powering Military

Powering Life

Powering Aerospace

Powering Medicine

Quallion LLC is the proud recipient of the 2007 Frost & Sullivan Award for Technology Innovation in Lithium Ion Power Sources for Medical, Military, & Aerospace Applications.

Quallion's new 48.8 V Matrix™ Module (4.2kg) comes in 7.5Ah, 9.5Ah and 12.5Ah configurations.



Since 1998, Quallion has delivered custom battery solutions for demanding applications. From medical implants to high voltage power supplies, Quallion leads the Lithium ion battery industry in safety, reliability and performance. Drawing upon its unique ties to the Japanese Lithium ion battery market, Quallion now offers new battery solutions to the military for vehicles, aircrafts, UUVs, UAVs, and stationary back-up power. Enabling technologies such as the Matrix™ Battery Design, Zero-Volt™ capability and SaFE-LYTE™ offer proven battery solutions that can pass the most aggressive test conditions, including full crush and constant overcharge.



This 28V, 38Ah Matrix™ pack offers a drop-in replacement for high power or high energy for military applications.



2007

FROST & SULLIVAN

North American Lithium Ion Power Sources for Medical, Military, & Aerospace Applications Technology Innovation Award

Quallion LLC | 12744 San Fernando Road | Sylmar, CA 91342 | info@quallion.com

www.quallion.com (818) 833-2000

BPP&T

Editor & Publisher

David Webster

Director of Content

Shannon Given

Associate Editors

Jeremy Martin, Nick Depperschmidt

Assistant Editors

Heather Krier, Joanna Larez

News Editors

Jeremy Fleming, Karen Poulson, Jessi Carter,
Scott Nash, Suzanne Harrold, Sue Hannebrink

Manager of Administration

Marsha Grillo

Advertising, Sales and Marketing

Jessi Carter, Director of Sales
Jeremy Fleming, Account Executive
Jennifer Graham, Marketing Assistant
Kristen Reming, Marketing Assistant
Jessica Thebo, Marketing Manager
Julie McCann, Production Manager

Director of Support Services

Marc Vang

Circulation

Andy Gurokovich

BATTERY POWER PRODUCTS & TECHNOLOGY (ISSN #1092-3616) is published bi-monthly by Webcom Communications Corp., 7355 E. Orchard, #100 Greenwood Village, CO 80111. Free for the qualified US \$58.00 non-qualified US and \$72.00 elsewhere.

Periodicals Postage paid at Englewood, CO and additional mailing offices.

POSTMASTER:

Send address changes to:

Webcom Communications
7355 E. Orchard, #100

Greenwood Village, CO 80111

Photocopy Rights: Permission to photocopy for internal or personal use, or the internal or personal use of specific clients is granted by *Battery Power Products & Technology* for users through Copyright Clearance Center, provided that the base fee of \$2.50 per copy of the article, plus \$1.00 per page is paid directly to the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923 USA (978) 750-8400. For government and/or classroom use, the Copyright Clearance Center should be contacted. The rate for this use is 0.03 cents per page. Please specify ISSN #1092-3616 *Battery Power Products & Technology*.

© Copyright 2008 Webcom Communications Corp. Material in this publication may not be reproduced in any form without written permission. Requests for permission should be directed to the customer service manager.

Webcom Communications Corp.

7355 E. Orchard Rd., # 100
Greenwood Village, CO 80111
Phone 720-528-3770
Fax 720-528-3771
www.BatteryPowerOnline.com

Office hours:

7 a.m. to 5 p.m. MST

Welcome to the first stand-alone issue of the Battery Power Products & Technology Resource Guide. Within these pages you will find listings of manufacturers and suppliers in the battery industry and the products and markets they serve. Batteries are categorized by chemistry and type for easy reference. The guide also covers battery supplies, from cables and enclosures to integrated circuits and watering systems.

Additionally, Frost & Sullivan has contributed a feature article on Green initiatives, which starts on page 4. There is also a preview of Battery Power 2008 on pages 24-25.

We hope you will find the 2008 Resource Guide and useful reference tool. As always, we welcome your feedback.

Shannon Given, Director of Content
shannong@infowebcom.com

Battery Chemistries/Types

Alkaline, Lead-Acid	10
Lithium, Li-Ion	14
Lithium Polymer, Manganese, Ni-CD	18
Ni-MH	19
Rechargeable	20
Silver, Thermal, Zinc	21

Battery Manufacturers

Battery Pack/Assembly Manufacturers	22
Primary Batteries	26
Secondary Batteries	26

Suppliers

Accessories	27
Cables/Harnesses	27
Capacitors/Ultracapacitors	27
Chargers	28
Coatings	31
Components	31
Consulting Services	32
Converters	32
Docking Stations	32
Dry Rooms	33
Electrolytes	33
Enclosures	33

Fuses	34
Holders	34
Integrated Circuits/ Semiconductors	
Battery Monitors, Charge Controllers, Current Controllers, Fuel Gauges	34
Microcontrollers, Power Conversion, Temperature Sensors	35
Manufacturing Systems	36
Materials	36
Monitoring Systems	36
Powders	36
Power Supplies	37
Raw Materials	37
Recycling	40
Standby Power/ UPS Systems	40
Supply Chain/Distributor	41
Testing Services	41
Testing Systems & Equipment	42
Watering Systems	44

An Era of *Green* Initiatives

Vishal Sapru, Industry Manger

Frost & Sullivan's Power Systems Group

Extreme weather patterns are observed throughout the world. From rising temperatures to a combination of melting glaciers and extremely harsh winters, global warming and climate change are hot topics. These factors significantly affect the existing ecosystem and call for environmental friendly power generation technologies like renewable energy to reduce impact of harmful greenhouse gas emissions, largely from fossil fuel power plants that cause global warming.

Changing Face of Energy

- Greater awareness of fossil fuel effects on the environment
- Rising gas prices
- Rising residential electricity prices per kilowatt hour; prices have doubled since 2005
- Concerns about increasing frequency of brownouts and blackouts
- Move toward renewable/alternative energy sources in demand such as solar power and wind energy
- Grid-tied connectivity expects to be major segment of renewable energy-based systems, especially in developed regions of the world
- Off-grid segment to cater to distributed power generation requirements in isolated and rural regions

Major regions of the world can significantly contribute toward increased installed capacity of various renewable energy systems by effectively utilizing the abundant resource potential in biomass, small hydropower, geothermal power and solar energy. There is an ongoing effort to promote the renewable energy industry through government incentives, non-govern-

mental organizations (NGOs) initiatives and extensive public support. This is likely to increase the role of renewable energy in power generation in the coming years. Chart 1 represents the key drivers and restraints in the renewable market.

Market Trends

Some key market initiatives taken by governments and companies include the following:

- US production tax credit for wind power
- State renewable portfolio standards
- Numerous European indicatives in green energy, especially Germany
- China approved funding of 17 clean energy projects based on self-developed technology
- Brazil energy independent, major potential source for ethanol
- GE: Ecomagination
- Honda: Environmentology
- BP: Beyond Petroleum
- Dow: The Human Element
- Toyota: Sold over one million hybrids
- Shell: Involved in wind, solar, hydro, geothermal and biofuels
- Rolls Royce: \$1 million dedicated to renewable energy

Energy Storage Markets

Overview

When one thinks of energy storage, the first technology that comes to mind is batteries. There are a number of battery chemistries that have evolved, from the age-old lead acid to nickel-based chemistries and most recently, lithium chemistries. However, these chemistries are best fit for certain specific applications among the plethora of existing applications. Lithium batteries have captured the electronics markets to a large extent. Their superior performance and technology specifications imply great value and potential for the automotive sector. Lithium-based technology and its suitability for automobiles is under investigation. This comes at a time when there is an emphasis on technology innovation to identify good energy storage mechanisms for a world that is fixated on reduction in gas consumption, especially for big economies such as North America and Europe. On the other hand, the current market scenario suggests that NiMH batteries are predominantly used for hybrid electric vehicles. A combination of battery chemistries is likely to be of greater use in the market and reduce gas consumption.

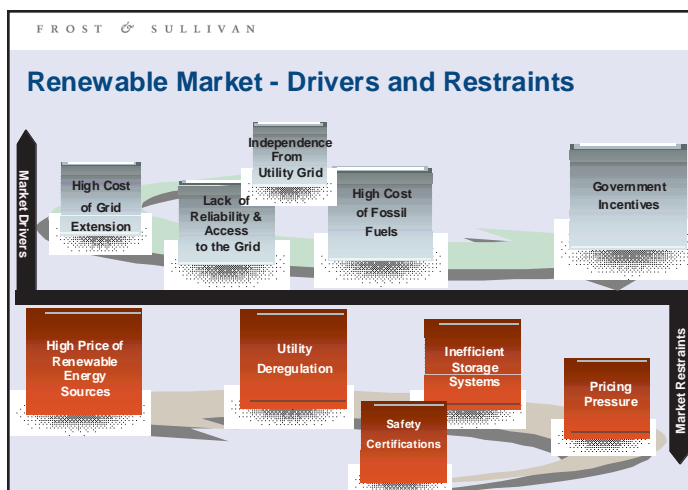


Chart 1

Frost continued on page 6

World's #1 Rechargeable Battery Provider

Top-Notch Customer Service and Technical Support



We believe that providing superior tech support, delivering product as promised and reliability that exceeds spec is just the way one does business in a technical world. It's the marketing guys that love the awards. But we know it's the day-to-day that makes us the #1 provider of batteries to your market.

C'mon. Challenge us. Contact us at www.sanyobatteries.com with your toughest spec.

SANYO
Batteries

The Biggest & The Best

www.SanyoBatteries.com

NiMH and Lithium-Ion Chemistries

The markets for Lithium-ion and Lithium-ion polymer batteries were \$6.40 billion in 2007. Similarly, markets for NiMH batteries were \$1.16 billion in 2007. A prime driver for these markets in the future could be the automotive segments due to their ability to have a truly "green" effect to reduce dependence on the depleting oil resources in the world. Additionally, they will enable nations that are highly dependent on outside sources for oil to strengthen their weakening economies with the help of in-house technology to efficiently store energy.

Clean Alternatives - The Flywheel and the Ultracapacitor

Another area gaining attention is clean energy storage solutions such as flywheels and ultracapacitors. These technologies are commercial and seen on many levels in various applications. A significant drawback for both technologies is the inability to provide power for longer durations. They provide power from 10 seconds to a minute although they charge easily. These technologies are considered suitable in tandem with existing battery technology to either extend the life of the battery, or to add more power for finer features. These markets have yet to achieve high adoption rates. Additionally, the increased cost involved in purchasing these systems is high. Hence, these technologies are set to make an impact on the markets once their price points are on par with battery technology.

Renewable Energy-Based Inverter Market

With a move toward renewable and alternative energy-based solutions, there is a need to convert raw electrical energy into usable power. This is where products like renewable power inverter come into play; for converting direct current (DC) to alternating current (AC) that can be used for different applications.

The demand for the renewable power inverter is likely to increase during the forecast period as the need for "green" increases. Sales of power supplies for renewable energy systems are dependent on the expansion of new renewable energy

system installations. Increasing energy costs and a depleting reserve of conventional fossil fuel sources have made these systems essential; past demand was driven by environmental issues. Recently, economic challenges caused by skyrocketing fuel prices have sparked renewed interest in renewable energy systems. Power supplies used in these systems are typically inverters. Core elements of the system harness the natural renewable energy sources, such as wind, solar and fuel cells to provide electrical energy, while the inverters convert the electrical energy produced to a usable form. Chart 2 shows the revenue forecast of the non-renewable and renewable power inverter market.

Market Characteristics

Salient Features

- Inverters are a component of the balance of system (BoS) in the renewable energy setup. Though they perform a critical function in these systems, their consumption is completely driven by the expansion of the installation base of renewable energy systems.
- Inverter vendors in the market are powerless in terms of the influence they create in the market. Any amount of technology development or price reduction does not translate into increased demand, but it does help in building a competitive advantage.
- Incentives and government policies indirectly control the demand for inverter products used in the renewable energy systems. Incentives for installation of renewable energy systems indirectly drive the demand for inverters.
- Most inverters are manufactured by vendors that specialize in power electronics, because strong technical knowledge is essential to produce, sell and service these products. Most of the designs in the market are proprietary and difficult to replicate.
- Solar inverters, especially with grid-tied capabilities, require a strong technical knowledge for vendors to develop an effective power conversion solution. Apart from the core conversion function, vendors offer a wide range of control and monitoring equipment that make the system more efficient and user friendly.
- Inverters are used primarily in small-scale wind systems, which have limited installations in the market due to lack of proper promotion or support through federal policies.
- Most of the small-scale wind energy systems are stand-alone and are located in isolated areas. There are few grid-tied systems in this end-user segment. In most of the cases, the inverter is used in a battery-backed wind energy system wherein they convert the battery DC power into AC power. In many other cases, inverters used in hybrid systems are a combination of one or more alternative systems such as wind turbines, micro-turbines, diesel generators and solar energy systems.
- Unlike the solar energy systems, wind energy systems require very specific surrounding conditions for proper efficiency and effective wind energy harnessing. Therefore, small wind energy systems are installed in rural and isolated regions.
- Small-scale units have a much higher installation and maintenance cost per unit of power than the utility scale wind energy

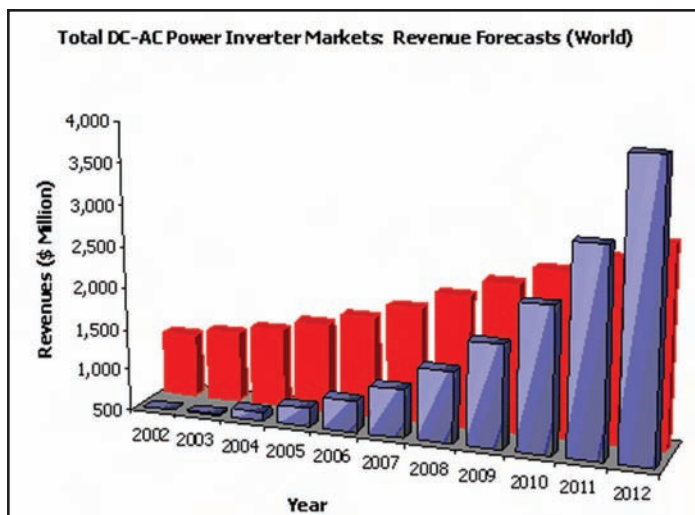


Chart 2

Frost continued on page 8



Power Up!

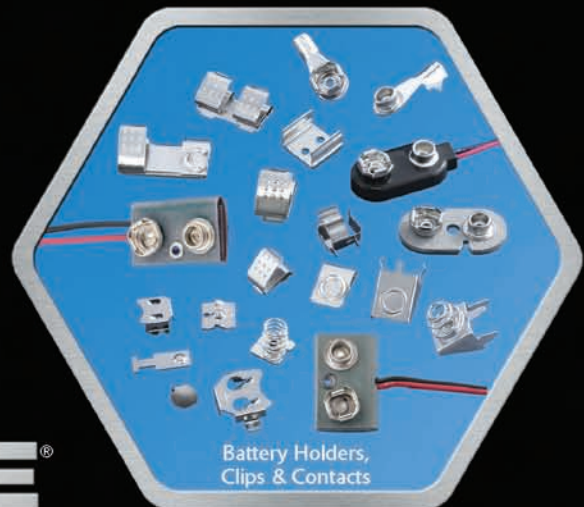
Connect with our "Little Things"

For over 55 years Keystone has been supplying Battery Holders, Clips and Contacts for a wide variety of industrial applications.

We pride ourselves in designing and manufacturing quality products that you can depend on.

While our catalog products meet most standard requirements, our Application Engineering Group is always available to modify existing items or design and develop specific products for your special applications.

Contact us. It's Your Move!



Battery Holders,
Clips & Contacts

RoHS Compliant ~ ISO 9001 Certified
KEYSTONE[®]
ELECTRONICS CORP.

(718) 956-8900 • (800) 221-5510 • FAX (718) 956-9040
e-mail: kec@keyelco.com • Website: keyelco.com

Call or Click for Catalog M55
Available from our global distributor network

systems. Inverters tend to be a major component of the total small wind energy system.

- Inverters in the fuel cell energy market are currently sold in very low volumes, primarily in the stationary fuel cells segment. The primary reason for this is the elusiveness of a proper fuel cell design that can be developed at a low cost and create the required commercialization of the fuel cells in the market.
- Very few vendors manufacture inverters for fuel cells as they do not generate enough demand and are less profitable, but this is expected to change when fuel cell technology becomes fully commercialized.
- Inverters used in fuel cell systems are being designed to properly handle the variations in output from fuel cells. As a result of the improved designs, the inverters cost is slightly higher in comparison to the general application inverters. This leads to a high inverter cost contribution to the total fuel cell system.
- Inverters in this market typically cater to the fuel cell market with two different power ranges, primarily the small (below 5 kW units), and mostly in the above 50 kW segment. Stationary fuel cell units typically exist as small (below 10 kW) and large (above 10 kW, averaging close to 200 kW) power units. The high-power segment has been the largest contributor to the renewable energy power systems market in terms of megawatts installed. The high power units (up to 300 kW), have very low volume demand and vendors cater to it with relatively customized products.
- Small fuel cells are becoming popular in the form of CHP (combined heat and power plants) units that involve the generation of both power and heat in the same unit.
- In comparison to the other two renewable energy sources, such as wind and solar, the inverters used for the fuel cells tend to have higher cost.

Chart 3 illustrates the percentage of revenue by renewable power inverter type.

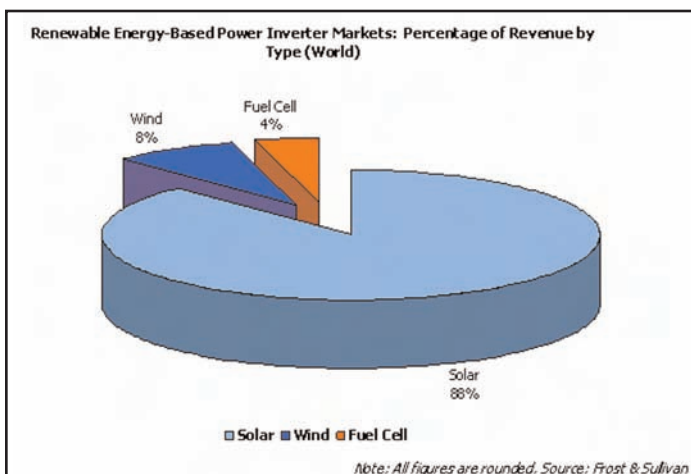


Chart 3

Market Analysis of Each Renewable Power Inverter Type

Solar Energy Power Inverters

- The market is growing at a CAGR of 30 to 35 percent.
- The inverter markets are dependent on the developments in the solar photovoltaic markets.
- Demand driven by incentive programs offered by local governments.
- Vendors are offering a wide range of control and monitoring equipment that make the system more efficient and user friendly.
- Most of the inverters are manufactured by vendors who specialize in power electronics.
- Most of the designs in the market are proprietary and are normally hard to replicate.

Fuel Cells Energy Power Inverters

- The market is growing at a CAGR of 20 to 25 percent.
- Inverters in this market are currently sold in very low volumes.
- Very few vendors manufacture inverters for fuel cells.
- In comparison to wind and solar, inverters used for fuel cells tend to have higher cost.
- As the fuel cell market heads towards commercialization, larger demand is expected, leading to a proportionate increase in the consumption of inverters.

Wind Energy Power Inverters

- The market is growing at a CAGR of 25 to 30 percent.
- The focus of the figure is on the non-utility scale or small scale (below 100 kW) wind energy systems.
- Most of these systems are stand-alone and located / installed in rural and isolated regions.
- Requires surrounding conditions for proper efficiency and effective wind energy harnessing.
- Higher installation and maintenance cost per unit of power than the utility scale wind energy systems.

Conclusion

It is clear that renewable energy has gained special importance in the minds of policy makers as well as the corporate world. High growth, government initiatives and technology development have proved to be significant pointers to growth of renewable energy markets. Solar energy, wind energy and fuel cells are technologies that have a promising future among other contributors. With these explicitly defined initiatives and the right amount of enthusiasm to move ahead, this era of green initiatives is set to transform the direction of energy for the upcoming century.

For more information regarding this article, please contact Johanna Haynes at johanna.haynes@frost.com.

Remote 2008

CONFERENCE AND EXPO

SCADA, Device Networking, M2M, Wireless Technology, Onsite Power,
And Security for Remote Sites and Equipment

Onsite Power Sessions Highlight Remote 2008!

No other industry conference brings together technology users that manage remote sites like the Remote 2008 Conference and Expo. Over 50 conference sessions will provide cutting-edge technology direction and application strategies from the companies and users driving the growth in SCADA, M2M, device networking, data communications, system & site security, emerging wireless technology, remote monitoring and automated control, and onsite powering of distributed equipment, networks and facilities.

Onsite and Back up Power Sessions Include:

Remote Monitoring for Large Scale Renewable Energy Systems

- Mythos Solar Energy, Inc.

The New Alternative: Direct Methanol Fuel Cells for Remote Power

- Smart Fuel Cell

The Ten Commandments of Solar Design

- Solarcraft, Inc.

Flywheel Technology Provides Energy Efficient and Sustainable Back-up Power

- Pentadyne Power Corp.

Ultra Low-Cost Power Quality and Energy Measurement Technology

- Power Standards Lab

Telecommunications Installation for Truly Extended Run Backup Power

- IdaTech

For more information about Registering Visit
www.RemoteExpo.com

NOVEMBER 5-6, 2008 - ATLANTA, GA.

Alkaline

Batteries Plus	www.batteriesplus.com
Bay Batteries Inc	www.baybatteries.com
Bharat Electronics Ltd	www.bel-india.com
Bitrode Ltd	www.bitrode.com
Cell Energy Inc	www.batteries4everything.com
Cell-Con Inc	www.cell-con.com
Electritek-AVT	www.electritek.com
Energizer	www.energizer.com
Forward Technology	www.forwardtech.com
GMK Batteries	www.gmkbatteries.co.uk
GN National Electric Inc	www.gnbatteries.com
Great Power Battery Co Ltd	www.greatpower.net
Jasco Battery Inc	www.jascobattery.com
Joint Stock Battery Co RIGEL	www.rigel.ru
Julian A McDermott Corp	www.mcdermottlight.com
K2 Energy Solutions	www.k2battery.com
Ningbo Osel Battery Co Ltd	www.ningbobattery.com
NL Technologies Inc	www.nltinc.com
North American Battery Co	www.nabcorp.com
Northeast Battery	www.northeastbattery.com
Northern Battery	www.northernbattery.com
Panasonic OEM Batteries	www.panasonic.com/batteries
Pasco Inc	www.pascoelectric.com
Peak Energy Solutions Inc	www.peakbattery.com
PEC North America Inc	www.peccorp.com
Rozon Batteries Inc	www.worldbatteries.com
Safe-Start Inc	www.safe-start.com
SAFT	www.saftbatteries.com
SANYO Energy (USA) Corp	www.sanyobatteries.com
Spectrum Brands	www.spectrumbrands.com
Stark Electronics Inc	www.starkelectronics.com
Statron AG	www.statron.com
Steatite Ltd	www.steatite.co.uk
Steven Engineering Inc	www.electrobase.com/steven
STI (Hong Kong) Ltd	www.supreme-battery.com
Stuart Electronics	www.stuarthelectronics.com
Sunbelt Battery Systems	www.batterysystems.net
Sunn Battery Co	www.sunnbattery.com
Supertech Power Ltd	www.st-power.ca
The Power Source Inc	www.thepowersource.com
The Roethle Group Inc	www.theroethlegroup.com
Timcal Graphite & Carbon	www.timcal.com
TNR Technical Inc	www.batterystore.com
Total Battery Sales	www.totalbattery.com
Toxco Inc	www.toxco.com
Tronic Technology Global Ltd	www.tronic.hk
T-San Electronics Inc	www.tsan.net
VCP International Inc	www.vcpcom.com
Wellington Battery Co	www.wellingtonbattery.com
Wholesale Batteries Inc	www.wholesalebatteries.net
Williamson Electronique	www.willelec.com
Winner International	www.winner-intl.com
Yuntong Industrial Ltd	www.yuntong-batt.com
Zack Electronics	www.zackinc.com

Lead Acid

DARAMIC

A POLYFORE Company

Daramic, LLC

11430 N Community House Rd
Charlotte, NC 28277
Contact: Tucker Roe
704-587-8408
troe@daramic.com
www.daramic.com

Supplier

EnerSys
Power/Full Solutions

EnerSys

2366 Bernville Rd.
Reading, PA 19605
Contact: Sales Department
610-208-1991
reservepower@enersys.com
www.enersys.com

EnerSys manufactures, distributes and services reserve power, motive power and starting, lighting and ignition (SLI) batteries, chargers, power equipment, and battery accessories to customers worldwide.

House of Batteries

10910 Talbert Ave.
Fountain Valley, CA 92708
Contact: Don West
800-432-3385
sales@houseofbatteries.com
www.houseofbatteries.com

Master Distributor & Custom Battery Assembler

Indium Corporation

1676 Lincoln Ave.
Utica, NY 13502
Contact: Sales Department
1-800-446-3486
chemicals@indium.com
www.indium.com

A premiere materials supplier to the global electronics assembly, semiconductor fabrication and packaging, solarphotovoltaic, and thermal management markets.



Hi-MECHA



Stacking Machine



Sealing Machine

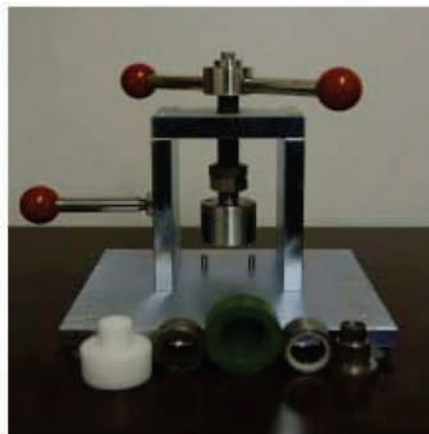


Forming Machine

Hohsen



Manual Crimper



Coin Cell Disassembler

Pred Materials Offers a Line of Products for Battery Manufacturers

- Production equipment from lab to pre-production scale
- Hand tools
- Coin cell parts
- Foils and chemicals

Pred Materials and Hohsen Corporation are pleased to announce the availability of pre-production battery manufacturing equipment from Hi-Mecha of Japan. These include the featured Stacking, Sealing, and Forming machines above. All Hi-Mecha equipment so far has been customized for each manufacturer's needs. Some standardized machines will soon be available.

In addition to these large-scale systems from Hi-Mecha, we are pleased to present these manual tools:

* our Manual Coin Cell Crimper, available for our standard coin sizes (2016, 2025, 2032, 2320)

* our new Coin Cell Disassembler which allows for dismantling a coin, doing minimal damage to internal elements, is newly available for sizes 2016, 2025 and 2032.

For these products and Pred's line of battery equipment, parts and chemicals, please visit our web site or contact us by email or phone.

PRED
MATERIALS

INTERNATIONAL, INC.

Pred Materials International, Inc.
60 East 42nd Street, Suite 1456
New York, NY 10165

Contact Steve Pred
Tel: 212-286-0068
Fax: 212-286-0072
email: steve@predmaterials.com

www.predmaterials.com

Lead Acid Continued



**U.S. Energy
Network Operations Center**
6451 Box Springs Blvd.
Riverside, CA 92507
Contact: Customer Service Department
800-582-5028
sales@usenergysys.com
www.usenergysys.com

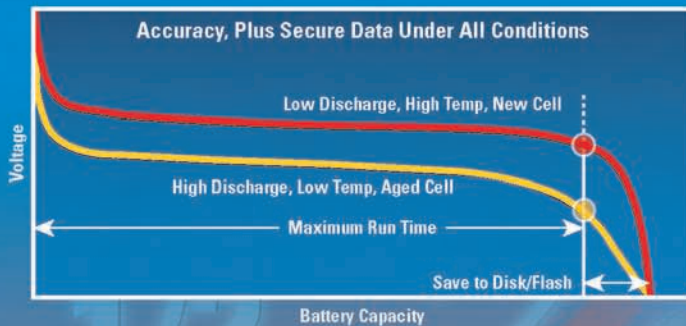
Complete AC & DC Power Integration

Action Batteries Unlimited	www.actionbatteries.com	JFM Engineering Inc	www.jfmeng.com
AERC Recycling Solutions	www.aerc recycling.com	Johnson Controls Inc	www.johnsoncontrols.com
Alpha Technologies Inc	www.alpha.com	Julian A McDermott Corp	www.mcdermottlight.com
Applied Power Systems Inc	www.appliedps.com	K & W Asia Tech Co Ltd	www.kwasia.com
Aztec Electronics Pty Ltd	www.aztecelectronics.co.za	K V International	www.geocities.com/kvintl
Battery Council International	www.battery council.org	Kung Long Batteries Industrial Co Ltd	www.klb.com.tw
Battery Warehouse	www.batterywarehouseonline.com	Kussmaul Electronics Co Inc	www.kussmaul.com
BlueStar Advanced Technology Corp	www.bstar.com	Kyocera America Inc	www.americas.kyocera.com
Clore Automotive	www.cloreautomotive.com	Lenmar Enterprises Inc	www.lenmar.com
Concorde Battery Corp	www.concordebattery.com	Leoch Battery Corp	www.lichpower.com
Cummins Power Generation	www.cumminspower.com	Lester Electrical Inc	www.lesterelectrical.com
Daitron Inc	www.daitron.com	Levo Batterien AG	www.levobatterien.com
Daramic, LLC	www.daramic.com	Lincon Batteries Ltd	www.lincon.co.uk
Dixon Batteries	www.dixonbatteries.co.za	Lind Electronics Inc	www.lindelectronics.com
Douglas Battery	www.douglasbattery.com	Magnacharge Battery Corp	www.magnacharge.com
Electric Fuel Battery Corp	www.electric-fuel.com	Midstate Battery	www.midstatebattery.com
EnerSys	www.enersys.com	Minnesota Industrial Battery	www.gnb.com
EnXergy	www.enxergy.com	Minwa Electronics Co Ltd	www.minwa.com
Exide Technologies	www.exide.com	Mission Critical Power Systems	www.mcps.us
Galaxy Power Inc	www.galaxypower.com	Mysore Thermo Electric Pvt Ltd	www.microtexindia.com
High Energy Batteries Ltd	www.highenergyltd.com	National Power Corp	www.nationalpower.com
House of Batteries	www.houseofbatteries.com	NDC Automation Inc	www.ndca.com
IBC Corp	www.ibccorporation.com	NED Energy Ltd	www.nedenergy.net
Ibex Manufacturing Inc	www.ibexmfg.com	Northern Battery	www.northernbattery.com
iGo Corp	www.igo.com	NorthStar Battery LLC	www.northstarbattery.com
IMC Power Sources	www.imcpower.com	Novitronic AG	www.novitronic.ch
Inci Exide Battery Industry Co	www.inciexide.com.tr	Oerlikon Stationary Batteries Ltd	www.accuoerlikon.com
Indium Corporation	www.indium.com	Ohlin Sales Co dba OSI Batteries	www.osibatteries.com
Innergy Power Corp	www.innergypower.com	Pivotal Power Inc	www.pivotalpower.com
Innovative Machine Corp	www.innovativemach.com	Power Batteries Ltd	www.powbat.co.uk
Interberg Batteries Ltd	www.interberg.com	Powerstride Battery	www.powerstriebattery.com
Interlink Power System Pte Ltd	www.interlinkpower.com	R&D Batteries Inc	www.rdbatteries.net
IntraPack Corp	www.intrapack.com	Rage Battery	www.ragebattery.com
ISL Products International	www.islproducts.com	Shijiazhuang Huabei Storage Battery Co Ltd	www.hbxdc.com
J & M Schaefer Inc	www.jmschaefer.com	Sunbelt Battery Systems	www.batterysystems.net
Jasco Battery Inc	www.jascobattery.com	Sunn Battery Co	www.sunnbattery.com
Jauch Quartz GmbH/JQG Batteries	www.jauch-batteries.com	TCC Industries Inc	www.tccinc.com
JBIC Corp	www.jbicorp.com	Techforce Telecom	www.techforcetelecom.com
Jerome Industries Corp	www.jeromeindustries.com	Technical House Inc	www.technicalhouse.com
		Techworld Industries Ltd	www.tworld.com.hk
		Terrell Battery Corp	www.terrellbattery.com
		TESSCO Technologies Inc	www.tessco.com
		Texas Battery Co Inc	www.texasbattery.com
		Texas Instruments Inc	www.ti.com
		Topin Battery Ltd	www.topinbattery.com
		Total Battery Sales	www.totalbattery.com
		Unikor Industry Co Ltd	www.unikor.com
		Union Battery Corp	www.unionbattery.com
		US Energy Network Operations Center	www.usenergysys.com
		Vencon Technologies Inc	www.vencon.com
		Ventronics Inc	www.ventronicsinc.com
		Wellington Battery Co	www.wellingtonbattery.com
		Xenotronix Inc	www.xenotronix.com
		Yuasa Battery Inc	www.yuasabatteries.com
		Yuntong Industrial Ltd	www.yuntong-batt.com

Run Smarter, Run Longer

System-Side Impedance Track™ Battery Fuel Gauge

The new **bq27500** system-side battery fuel gauge from Texas Instruments accurately predicts battery run time in smart phones and other handheld electronic devices. Featuring TI's patented Impedance Track technology, the IC maintains accuracy for the entire life of the battery under all conditions, reserves energy to save data and never sacrifices run time. **That's High-Performance Analog >>Your Way™.**



www.ti.com/bq27500 1.800.477.8924 ext. 1407
Get Samples and Evaluation Modules



Lithium



SQM North America
 3101 Towercreek Parkway Suite 450
 Atlanta, GA 30339
 Contact: Daniel Pizarro
 770-916-9436
 ind-northamerica@sqm.com
 www.sqm.com

Worldwide leader in known lithium reserves, production capacity and global distribution. SQM maintains warehousing and commercial offices across the five continents.

Advanced Battery Systems Inc	www.advanced-battery.com
Axess International Ltd	www.axessinternational.com
Batteries Plus	www.batteriesplus.com
Bristol Batteries Ltd	www.bristolbatteries.com
Coghlin Electric/Electronics	www.coghlin.com
Devon Co	www.xenousa.com
Eastman Kodak Co	www.kodak.com
EnergyPlex Corp	www.energyplex.com
Huanyu Power Source Co Ltd	www.huanyubattery.com
ITN Energy Systems Inc	www.itnes.com
Jameco Electronics Components	www.jameco.com
Jasco Battery Inc	www.jascobattery.com
Jauch Quartz GmbH/JQG Batteries	www.jauch-batteries.com
Jiangmen Jianshun Battery Co Ltd	www.jianshun.com
LG Chemical	www.lgchem.com
Limtech Lithium Industries Inc	www.limtech.com
Magnacharge Battery Corp	www.magnacharge.com
Maxell Europe Ltd	www.eu.maxell.com
Mobile Power Solutions	www.mobilepowersolutions.com
Nokia Mobile Phones	www.nokia.com
Northeast Battery	www.northeastbattery.com
Ohlin Sales Co dba OSI Batteries	www.osibatteries.com
Peak Energy Solutions Inc	www.peakbattery.com
Powertron Battery Co	www.powertronbatteryco.com
RD Systems	www.easymation.com
Royal Battery	www.royalbattery.com
Shenzhen Motoma Power Co Ltd	www.motoma.com
SION Power Corp	www.sionpower.com
Spectrum Brands	www.spectrumbrands.com
SQM North America	www.sqm.com
SWE	www.swe.com
Sunn Battery Co	www.sunnbattery.com
Sunoco Inc	www.sunocoinc.com
Texmac Inc	www.texmacusa.com
Unipower Europe	www.unipowercorp.com
Unipure Environmental	www.unipure.com
Uniross Batteries (HK) Ltd	www.uniross.com
Universal Technical Systems Inc (UTS)	www.uts.com
Vale Distribution Co Inc	www.valedistro.com

Lithium Ion



Battery Technology, Inc. (BTI) specializes in the design and manufacturing of replacement batteries and ac power supplies for notebook computers. As an ISO-9001 certified company, BTI enforces strict safety measures to produce the highest quality replacement batteries. This includes using the highest quality lithium ion cells from companies like Panasonic and eOne-Moli Energy. BTI's batteries are designed to meet or exceed the specifications of the OEM pack. Products come with a one year warranty.

Battery Technology, Inc.
 16500 Gale Avenue
 City of Industry, CA 91745
 Contact: Sales Department
 626-336-6878
 sales@batterytech.com
 www.batterytech.com



Electro Energy has the largest manufacturing capacity for 18650 lithium ion cells in the USA. Its manufacturing facility located in Gainesville, FL has the capability to produce more than 30 million cells per year. This is a fully automated state-of-the-art facility, producing high-quality and reliable cells available for rapid delivery. Electro Energy has a successful history of advanced battery development for satellites, aircraft and military applications. Its patented bipolar wafer cell technology is being evaluated for aircraft and transportation applications. Its bipolar design brings unique advantages over conventional designs with smaller, lighter and powerful batteries for a variety of industries.

Electro Energy Florida LLC
 12871 NW US Hwy 441
 Alachua, FL 32615
 Contact: Lou Magnarella
 386-462-5080 x303
 lmagnarella@electroenergyinc.com
 www.electroenergyinc.com



Charles®



**SOLID
POWER**

Is your battery charger intelligent?

The New Charles InChargers
Intelligent. Solid Power.

The need for industrial power is constant. Trust a battery charger with the brains and brawn to deliver trouble-free power and performance. The new InCharger features:

- Universal AC input and configuration for Gel, Flooded Lead Acid, AGM or NiCAD batteries with 12 or 24 VDC selectable output
- Bright, fully digital touch-screen display
- Unique charging parameters stored on a Smart Memory Button™
- Microprocessor controlled high temperature graphic display
- Monitoring and alarm functions
- Quick-connect plugs for ease of installation

www.charlesindustries.com



Charles

UL 1546, FCC Part 15 Class A, NFPA 99, NFPA 110 Approvals with a 3-year product warranty

Lithium Ion Continued



EnerSys
 2366 Bernville Rd.
 Reading, PA 19605
 Contact: Sales Department
 610-208-1991
 reservepower@enersys.com
 www.enersys.com

EnerSys manufactures, distributes and services reserve power, motive power and starting, lighting and ignition (SLI) batteries, chargers, power equipment, and battery accessories to customers worldwide.



Progressive Technologies
 331 Shelleybrook Drive
 Pilot Mountain, NC 27041
 Contact: Ken Hanson
 800-333-1375
 sales@protechnologies.com
 www.protechnologies.com

Custom Battery Pack Design and Assembly. ISO9001 & ISO13485



With Leading lithium technology in the world, and more than 20 years experience in lithium battery manufacturing and researching, EVE Energy Co., Ltd. provides full range of cutting-edge, green power lithium batteries, including 42 kinds of Li/SOCL2 batteries and 41 kinds of Li/MnO2 batteries in worldwide.

Eve Battery
 EVE Industrial Park, Xikeng Industrial Zone
 Huihuan Town, Huizhou, Guangdong, China 516006
 (86-752)2610582
 postmaster@evebattery.com
 www.evebattery.com



Quallion LLC is a Lithium Ion battery company that produces primary and secondary cells and batteries for the medical, aerospace, military and automotive industries. Founded in 1998, Quallion began as a medical device battery company and soon developed a range of novel enabling technologies, including the world's smallest implantable secondary battery, as well as its proprietary Zero-Volt™ and SaFe-LYTETM technologies. Leveraging its core engineering capabilities, Quallion has since expanded into the aerospace and military markets by focusing on niche markets where advanced battery technology, safety, reliability and custom engineering are most valued. Quallion has recently entered the automotive market and is actively developing products for clean energy vehicles like hybrid electric vehicles (HEV) and plug-in hybrid electric vehicles (PHEV).

Quallion was founded by biotechnology entrepreneur and philanthropist Alfred E. Mann and Dr. Hisashi Tsukamoto.

Quallion LLC
 Sylmar Biomedical Park
 12744 San Fernando Road
 Sylmar, California 91342
 Contact: Paul Beach
 818-833-2000
 paulb@quallion.com
 www.quallion.com



Nexergy, Inc.
 1909 Arlingate Lane
 Columbus, OH 43228
 Contact: Mark Magoon
 888-696-4589
 sales@nexergy.com
 www.nexergy.com

Nexergy is the leading designer, integrator, and manufacturer of custom battery packs and battery chargers

- | | |
|---------------------------------|----------------------------|
| ABSL Power Solutions Ltd | www.abslpower.com |
| Absolute Battery UK Ltd | www.absolutebattery.co.uk |
| Advanced Battery Systems Inc | www.advanced-battery.com |
| Advanced Measurements Inc | www.advmeas.com |
| Advanced Membrane Systems Inc | www.amsmembranes.com |
| Advanced Power Products Inc | www.app-bgl.com |
| Armor Battery | www.adcour.com |
| Battery Solutions Inc | www.batteryrecycling.com |
| Battery Technology, Inc. | www.batterytech.com |
| Boston-Power Inc | www.boston-power.com |
| Bourns Inc | www.bourns.com |
| Bren-Tronics Inc | www.bren-tronics.com |
| Daitron Inc | www.daitron.com |



SOUTHWEST ELECTRONIC ENERGY GROUP

Southwest Electronic Energy (SWE) was founded in 1964 with the belief that providing exceptional service, quality, and reliability were, and still are, the main ingredients for a successful business.

SWE designs and assembles high reliability, customer-specific battery packs of primary lithium, large capacity lithium-ion, solar power, and other major chemistries for OEM, EOEM and MRO customers. Many are used in extreme environments from outer space to under the sea to five miles beneath our planet's land surface.

SWE designs and assembles customer-specific battery packs and battery chargers. We want to add value to your company through our hassle-free service, quality, and reliability.

SWE
 12701 Royal Drive
 Stafford, TX 77477
 800-231-3612
 info@swe.com
 www.swe.com

- | | |
|------------------------------------|--|
| Dan Energy | www.danenergy.com |
| Dusenbery Worldwide | www.dusenbery.com |
| Electro Energy Florida LLC | www.electroenergyinc.com |
| Emerging Power Inc | www.emergingpower.com |
| Emerson Network Power/Leibert Corp | www.liebert.com |
| Enercon Industries Corp | www.enerconind.com |
| Energex Batteries Inc | www.energexbatteries.com |
| Energy Access Inc | www.energyaccess.com |
| Energy Sales Inc | www.energy-sales.com |
| EnergyPlex Corp | www.energyplex.com |
| EnerSys | www.enersys.com |
| EUROBAT | www.eurobat.org |
| EV Info | www.evinfos.com |
| Eve Battery | www.evebattery.com |
| Ever Corp (Canada) Ltd | www.evercorp.com |
| ExtraEnergy eV | www.ExtraEnergy.org |
| Fedco Electronics Inc | www.fedcoelectronics.com |
| Ferro Corp | www.ferro.com |
| Ferro Magnetics Corp | www.ferromc.com |
| FiFe Batteries Ltd | www.fifebatteries.co.uk |
| FMA Inc | www.fmaincorporated.com |
| Foshan U&T Battery Co Ltd | www.utbattery.com |
| GN National Electric Inc | www.gnbatteries.com |
| Harding Energy Inc | www.hardingenergy.com |
| HBL Power Systems Ltd | www.hbl.in |
| Hubgiant Co Ltd | www.hubgiant.com |

THE ONE STOP SOLUTION FOR BATTERIES & PORTABLE POWERED PRODUCTS



- ⊕ Batteries & Chargers
- ⊕ 12 Volt Accessories
- ⊕ Security Products



- ⊕ Private Label & OEM
- ⊕ Third Party Logistics Services
- ⊕ Cellular Accessories & Bluetooth Products



1720 Hayden Dr. T 866.892.1122
 Carrollton, TX 75006 P 469.892.1122
 sales@upgi.com F 469.892.1123



TAP OUR EXPERTISE.

www.upgi.com



Lithium Ion Continued

J T Packard	www.jtpackard.com
Jameco Electronics Components	www.jameco.com
Jasco Battery Inc	www.jascobattery.com
Kinsbursky Brothers Inc	www.kinsbursky.com
Mahavir Shree International	www.msi.com.np
Mark Electronics Supply Inc	www.markelectronics.com
Marlec Engineering Co Ltd	www.marlec.co.uk
Martking Electronic (Shenzhen) Co Ltd	www.martking.com
Miyachi Unitek Corp	www.miyachiunitek.com
Mobile Power Solutions	www.mobilepowersolutions.com
Nexergy, Inc.	www.nexergy.com
Ohlin Sales Co dba OSI Batteries	www.osibatteries.com
Polypore International INC	www.polypore.net
Powell Electronics Inc	www.powell.com
Power & Network Technologies	www.tima.com
Power Glory Battery Tech (HK) Co Ltd	www.omnergy.com.hk
Power Products	www.powerproducts.com
Progressive Technologies	www.protechnologies.com
Quallion LLC	www.quallion.com
R&D Batteries Inc	www.rdbatteries.net
Radio Wholesale	www.radiowholesale.net
Rathbone Energy Inc	www.rathboneenergy.com
RD Systems	www.easymation.com
Rebling Plastics	www.reblingplastics.com
Saft America Inc	www.saftbatteries.com
SAFT America Inc	www.saftamerica.com
Sask T Zero	www.cameronwilkes.com
SciMat Ltd	www.scimat.com
Solectria Corp	www.solectria.com
Sonobond Ultrasonics	www.sonobondultrasonics.com
Sparton Technology Inc	www.sparton.com
SWE	www.swe.com
Stark Electronics Inc	www.starkelectronics.com
Staticon Ltd	www.staticon.ca
Telecom Battery Systems Inc	www.telbatt.com
Texas Battery Co Inc	www.texasbattery.com
Tronic Technology Global Ltd	www.tronic.hk
T-San Electronics Inc	www.tsan.net
Universal Power Group	www.upgi.com
uPOWER Supply	www.upowersupply.com
UpStart Battery	www.upstartbattery.com
Vale Distribution Co Inc	www.valedistro.com
Valence Technology Inc	www.valence.com
VARTA Microbattery GmbH	www.varta-microbattery.com
VB Autobatterie GmbH & Co KGaA	www.varta.com
VCP International Inc	www.vcpcom.com
Vector Marine Service International SA	www.vectormarine.ro
Vencon Technologies Inc	www.vencon.com
Ventronics Inc	www.ventronicsinc.com
Vita Needle Co	www.vitaneedle.com
Voller Energy Ltd	www.voller.com
W & W Manufacturing Co	www.w-w-manufacturing.com
Weiss Instrument Inc	www.weissinstrument.com
Wellington Battery Co	www.wellingtonbattery.com

Lithium Polymer

Adcour Inc	www.adcour.com
DLG Battery Co Ltd	www.dlgbattery.com
DMS Technologies	www.dmstech.co.uk
Energy Sales Inc	www.energy-sales.com
EnXergy	www.enxergy.com
EscoVale Consultancy Services	www.escovale.com
ETI Pack Co	www.batterypack.com.tw
FDK Corp	www.fdk.co.jp
Gami Battery	www.gami.cl
Gaston Battery Industrial Ltd	www.gaston.com.hk
National Power Corp	www.nationalpower.com
Ultralife Batteries Inc	www.ulbi.com
Yardney Technical Products	www.yardney.com

Manganese

Great Power Battery Co Ltd	www.greatpower.net
PolyPlus Battery Co Inc	www.polyplus.com
Yueda Enterprises Ltd	www.capacell.com
Yuntong Industrial Ltd	www.yuntong-batt.com
Zhongshan Sunlit Hi-Tech Co Ltd	www.cenlite.com

NiCD

APak Batteries Inc	www.apak-batteries.com
Chung Pak Group Evergreen	www.chungpak.com
EAC Corp	www.eac.com
EaglePicher Technologies LLC	www.eaglepicher.com
EnergyPlex Corp	www.energyplex.com
Hitachi Maxell US	www.maxell.com
Jasco Battery Inc	www.jascobattery.com
K2 Energy Solutions	www.k2battery.com
Leoch Battery Corp	www.lichpower.com
Maxell Europe Ltd	www.eu.maxell.com
Multiplier Industries Corp	www.multiplier.com
Power Storage Europe BV	www.pbg-batteries.com
Power-Sonic Corp	www.power-sonic.com
PowerStream Technology	www.powerstream.com
R&D Batteries Inc	www.rdbatteries.net
Rose Electronics	www.rosebatteries.com
Saft America Inc	www.saftbatteries.com
Supertech Power Ltd	www.st-power.ca
Total Battery Sales	www.totalbattery.com
Toxco Inc	www.toxco.com
T-San Electronics Inc	www.tsan.net
Tungstone Power Inc	www.tungstonepower.com
Umicore Marketing Services USA Inc	www.unicore.com
Unipower Europe	www.unipowercorp.com
Uniross Batteries (HK) Ltd	www.uniross.com
Vencon Technologies Inc	www.vencon.com
Wholesale Batteries Inc	www.wholesalebatteries.net
Williamson Electronique	www.willelec.com
Yuntong Industrial Ltd	www.yuntong-batt.com
Zhejiang Mustang Battery Co Ltd	www.mustangbattery.com
Zhongshan Xianke Battery Co Ltd	www.jinba.com

NiMH

AA Portable Power Corp	www.aaportablepower.com
Astratec Electronics Ltd	www.astratec.co.uk
Astro Flight Inc	www.astroflight.com
BTI Technology & Innovation	www.bticcs.com
C&D Technologies Inc	www.cdpowerelectronics.com
Cell Energy Inc	www.batteries4everything.com
Cly-Del Mfg Co, The	www.cly-del.com
Duracell	www.duracell.com
Dusenbery Worldwide	www.dusenbery.com
EaglePicher Technologies LLC	www.eaglepicher.com
Eirich Machines Inc	www.eirich.de
Electrolock Inc	www.electrolock.com
ELIT JSC	www.elit-cap.com
Emerging Power Inc	www.emergingpower.com
Fedco Electronics Inc	www.fedcoelectronics.com
FIC Corp	www.ficcorp.com
Galaxy Power Inc	www.galaxypower.com
Gamewell	www.gamewell.com
Gami Battery	www.gami.cl
HDM Systems Corp	www.ion-x.net
HeatTek Inc	www.heattek.com
INCO Special Products	www.incosp.com
Ind and Ag Chem	www.semr.net
JFM Engineering Inc	www.jfmeng.com
Kinsbursky Brothers Inc	www.kinsbursky.com
LaMantia Products Ltd	www.lamantia.ca
Leoch Battery Corp	www.lichpower.com
Masline Electronics Inc	www.masline.com
Micro Power Electronics	www.micro-power.com
Mission Critical West Inc	www.mcwestinc.com
Multiplier Industries Corp	www.multiplier.com
NIFE Baterias Industrials Ltda	www.nife.com.br
NL Technologies Inc	www.nltinc.com
Nokia Mobile Phones	www.nokia.com
Panasonic OEM Batteries	www.panasonic.com
Powell Electronics Inc	www.powell.com
Power Sources Unlimited Inc	www.psui.com
Precision Tool & Engineering	www.ptc-fl.com
Pure Energy Visions Inc	www.pevi.ca
Rathbone Energy Inc	www.rathboneenergy.com
RD Systems	www.easymation.com
Rose Electronics	www.rosebatteries.com
Rozon Batteries Inc	www.worldbatteries.com
SAFT America Inc	www.saftamerica.com
SANYO Energy Corp	www.sanyobatteries.com
Shogyo International Corp	www.shogyo.com
SOC America Inc	www.socamericainc.com
Spectrum Brands	www.spectrumbrands.com
Strategic Analysis Inc	www.strategicanalysis.com
Sunn Battery Co	www.sunnbattery.com
The Right Co	www.rightcompany.com
Total Battery Sales	www.totalbattery.com
Tronic Technology Global Ltd	www.tronic.hk
T-San Electronics Inc	www.tsan.net

Uniglobe Kisco	www.uniglobe-kisco.com
uPOWER Supply	www.upowersupply.com
VARTA Microbattery GmbH	www.varta-microbattery.com
Vencon Technologies Inc	www.vencon.com
Ventronics Inc	www.ventronicsinc.com
Virtual Industries Inc	www.virtual-ii.com
Warehouse Battery Outlet	www.wboinc.com
Weiss Instrument Inc	www.weissinstrument.com
Wellington Battery Co	www.wellingtonbattery.com
Wholesale Batteries Inc	www.wholesalebatteries.net
Yueda Enterprises Ltd	www.capacell.com

ULBRICH, Your Metal Source for Battery Cans, Inlays, and Tabs.

- Supply material on traverse wound spools
- Supply 20lbs. and up of weld free coils
- Supply natural round edges from rolled wire
- Meet exacting thickness tolerances
- Meet stringent cleanliness requirements
- Meet rigorous straightness and property requirements



We Deliver Precision™
www.ulbrich.com

ALUMINUM ALLOYS
COPPER ALLOYS
NICKEL ALLOYS
STAINLESS STEEL

APPLICATIONS
Cans, Inlays, Tabs



Ulbrich Stainless Steels and Special Metals, Inc.
57 Dodge Avenue, P.O. Box 294, North Haven, CT USA, 06473-1191
(203) 239-4481 • (800) 243-1676 FAX: (203) 239-7479 • E-Mail: info@ulbrich.com

Rechargeable



PowerGenix
10109 Carroll Canyon Road
San Diego, CA 92131
Contact: Sales & Marketing Department
858-547-7300
info@powergenix.com
www.powergenix.com

Cleaner, Lighter, Smaller More Powerful NiZn Batteries



SANYO Energy is the world's largest manufacturer of rechargeable batteries. Meeting the needs of portable power demands in communications, power tools, notebook computers and other industries. Sanyo offers the latest in state-of-the-art power solutions. Extensive Research and Development assures superior quality and proven reliability. Whether your applications requires Nickel Cadmium, Nickel Metal Hydride, Lithium Ion, Lithium Polymer or primary cells like Lithium, our in-house Engineering Dept. can quickly help you find the solution you require. Sanyo also offers the same high quality products for retail under the GE/SANYO brand name. Visit our website at www.sanyobatteries.com.

Sanyo Energy
2600 Network Blvd, Suite 600
Frisco, Texas 75034
(469) 362-5600
www.sanyobatteries.com

Advanced Battery Systems	www.advancedbattery.com
Battery Solutions Inc	www.batteryrecycling.com
Battery Specialists	www.batteryspecialists.com
Beckerle Reserve Power	www.beckerleconsultants.com
Berkeley Varitronics Systems Inc	www.bvsystems.com
C&D Technologies Inc	www.cdtechno.com
China Hipower Energy Group	www.chinahipower.com.cn
Coopower Battery Industrial Co, Ltd	www.coopower.com
DESIRE Power Co Ltd	www.desire-battery.com
Deutronic Elektronik GmbH	www.deutronic.com
E/W Electronics	www.ewelectronics.com
EAC Corp	www.eac.com

Electritek-AVT	www.electritek.com
Electrochem Commercial Power	www.electrochempower.com
Emerging Power Inc	www.emergingpower.com
EverFast Rechargeables Ltd	www.everfast.com.hk
eVionyx Inc	www.evonyx.com
Galaxy Power Inc	www.galaxypower.com
Gami Battery	www.gami.cl
Hansung World Co Ltd	www.heid.co.kr
Hawker	www.hepi.com
Hudson Tool & Die Co Inc	www.hudsonstool.com
Infinite Power Solutions	www.infinitepowersolutions.com
InHand Electronics Inc	www.inhandelectronics.com
Jasco Battery Inc	www.jacobattery.com
Jauch Quartz GmbH/JQG Batteries	www.jauch-batteries.com
Jerome Industries Corp	www.jeromeindustries.com
Lamart Corp	www.lamartcorp.com
Lenmar Enterprises Inc	www.lenmar.com
Lester Electrical Inc	www.lesterelectrical.com
Levo Batterien AG	www.levobatterien.com
Martronics Inc	www.abcmartronics.com
Masline Electronics Inc	www.masline.com
Mathews Associates Inc	www.maifl.com
Minmax Energy Technology Co, Ltd	www.maxbattery.com
Northern Battery	www.northernbattery.com
Pentadyne Power Corp	www.pentadyne.com
PeopleSource Solutions Inc	www.peoplesourcesolutions.com
Petra Industries Inc	www.petra.com
Power Resources Inc	www.upssystem.com
Power-cell Battery Products	www.powercellbattery.com
PowerGenix	www.powergenix.com
Precision Tool & Engineering	www.rpt-fl.com
Premier Communications	www.pryme.com
Priebe Electronics	www.priebe-electronics.com
Rage Battery	www.ragebattery.com
Rathbone Energy Inc	www.rathboneenergy.com
Rebling Plastics	www.reblingplastics.com
Rechargeable Battery Corp (RBC)	www.rbctx.com
RechargeablesOnline	www.rechargeablesonline.com
Royal Battery	www.royalbattery.com
Rozon Batteries Inc	www.worldbatteries.com
RPS Industries Co Ltd	www.rpsintl.com
Safe-Start Inc	www.safe-start.com
Saft America Inc	www.saftbatteries.com
Sakthi Battery Industries	www.sakthipower.com
Sanyo Energy	www.sanyobatteries.com
Sask T Zero	www.cameronwilkes.com
Scientific Climate Systems Inc	www.dryrooms.com
Techworld Industries Ltd	www.tworld.com.hk
Telecom Italia	www.tim.it
Thermtrol Corp	www.thermtrol.com
Ultralife Batteries Inc	www.ulbi.com
VARTA Microbattery GmbH	www.varta-microbattery.com
VARTA SA	www.varta.fr
Williamson Electronique	www.willelec.com
Zhongshan Highyes Electronics	www.kingneed.com
ZPower Inc	www.zpowerbattery.com

Silver

Advanced Measurements Inc	www.advmeas.com
BST Systems Inc	www.bstsys.com
Engineered Conductive Materials	www.conductives.com
Euro Energy Resources Ltd	www.euroenergy.co.uk
Gil Import Ltd	www.igil.co.il
GN National Electric Inc	www.gnbatteries.com
Magnacharge Battery Corp	www.magnacharge.com
Martronics Inc	www.abcmartronics.com
North American Battery Co	www.nabcorp.com
Northern Battery	www.northernbattery.com
Plainview Batteries Inc	www.plainviewbatteries.com
Rebling Plastics	www.reblingplastics.com
Renata AG	www.renata.com
Royal Battery	www.royalbattery.com
Spectrum Brands	www.spectrumbrands.com
Sunn Battery Co	www.sunnbattery.com
Tronic Technology Global	www.tronic.com.hk
Yardney Technical Products	www.yardney.com
Zack Electronics	www.zackinc.com
ZPower Inc	www.zpowerbattery.com

Thermal

AAA Hitec Modeco	www.hitecnow.com
Batteries Plus	www.batteriesplus.com
Dexmet Corp	www.dexmet.com
Eirich Machines Inc	www.eirich.de
EV Info	www.evinfo.com
JX Crystals Inc	www.jxcrystals.com
Kinsbursky Brothers Inc	www.kinsbursky.com
LaMantia Products Ltd	www.lamantia.ca
Maccor Inc	www.maccor.com
Powell Electronics Inc	www.powell.com
Powerline	www.powerline-battery.com
Rathbone Energy Inc	www.rathboneenergy.com
Thermtrol Corp	www.thermtrol.com
Toxco Inc	www.toxco.com

Zinc

APak Batteries Inc	www.apak-batteries.com
Batteries Plus	www.batteriesplus.com
BST Systems Inc	www.bstsys.com
Cly-Del Mfg Co, The	www.cly-del.com
Jasco Battery Inc	www.jascobattery.com
KCM SA	www.kcm.bg
Mathews Associates Inc	www.maifl.com
Mentzer Electronic	www.mentzer.de
Northern Battery	www.northernbattery.com
Powell Electronics Inc	www.powell.com
Power-cell Battery	www.powercellbattery.com
RD Systems	www.easymation.com
Rebling Plastics	www.reblingplastics.com
Renata AG	www.renata.com

Shogyo International Corp	www.shogyo.com
Sony Corp	www.world.sony.com
Spectrum Brands	www.spectrumbrands.com
Steatite Ltd	www.steatite.co.uk
Total Battery Sales	www.totalbattery.com
Toxco Inc	www.toxco.com
Tronic Technology Global Ltd	www.tronic.hk
Tronic Technology Global Ltd	www.tronic.com.hk
Umicore	www.umicore.com
UniBatt	www.ofek.org.il
Unipower Europe	www.unipowercorp.com
VARTA SA	www.varta.fr
VCP International Inc	www.vcpcom.com

Test Battery Cell Elements - Before They Cause Problems



Detect runs, trees and defective or damaged separators at the assembly level!

**Model 1652
Battery Element Tester:**

**Designed for High Volume
Production Lines**

Rapid Go/No-Go Test Results

Safe & Efficient

Easy to Use

Also available: CE Compliant Model 1653



801 Hailey St. Ardmore, OK 73401
Phone (580) 225-4773 Fax (580) 226-5757

**For more information visit our web site www.slaughterstest.com
e-mail: info@slughterstest.com or call 1-800-421-1921**

Battery Pack/Assembly Manufacturers



Battery Technology, Inc. (BTI) specializes in the design and manufacturing of replacement batteries and ac power supplies for notebook computers. As an ISO-9001 certified company, BTI enforces strict safety measures to produce the highest quality replacement batteries. This includes using the highest quality lithium ion cells from companies like Panasonic and eOne-Moli Energy. BTI's batteries are designed to meet or exceed the specifications of the OEM pack. Products come with a one year warranty.

Battery Technology, Inc.
16500 Gale Avenue
City of Industry, CA 91745
Contact: Sales Department
626-336-6878
sales@batterytech.com
www.batterytech.com



MicroSun Technologies is the leading global source for your portable energy needs. MicroSun's team applies cutting-edge technology, innovative engineering, and years of expertise to the design, assembly and testing of battery packs, chargers/conditioners, power supplies and testing equipment. MicroSun's patented thermal management makes Li-ion batteries a viable option for high power/temperature applications. Energy solutions are individually tailored for each customer's unique specifications and time-to-market requirements in a wide range of OEM applications. MicroSun USA and its offshore production facilities employ state-of-the-art equipment to integrate innovative engineering with optimum manufacturing and stringent qualification testing. Our facilities are equipped to handle variable production volumes from prototype to high volume.

MicroSun Technologies
1925 Ohio Street
Lisle, IL 60532
Contact: 630-968-5000 x323
inquiry@microsuntech.com
www.microsuntech.com



iTECH leads in innovating design and manufacture of power products including smart batteries, chargers, docking stations and power sub-systems. We provide both standard and engineered application-specific product solutions where performance is critical. iTECH works with all chemistries – SLA, NiCd/NiMH, Lithium ion and Lithium polymer. We serve vertical OEM and open market customers in the handheld electronics, medical, safety/security, military and communication markets.

iTECH
9454 Waples St.
San Diego, CA 92121
Contact: Frank Cooper
858-458-1500 Ext. 2030
fcooper@itecheng.com
www.itecheng.com



Nexergy, Inc.
1909 Arlingate Lane
Columbus, OH 43228
Contact: Mark Magoon
888-696-4589
sales@nexergy.com
www.nexergy.com

Nexergy is the leading designer, integrator, and manufacturer of custom battery packs and battery chargers



Progressive Technologies
331 Shelleybrook Drive
Pilot Mountain, NC 27041
Contact: Ken Hanson
800-333-1375
sales@protechnologies.com
www.protechnologies.com

Custom Battery Pack Design and Assembly. ISO9001 & ISO13485

Sonobond Ultrasonics

1191 McDermott Drive
West Chester, PA 19380
Contact: Janet Devine
610-696-4710
sales@sonobondultrasonics.com
www.sonobondultrasonics.com

Ultrasonic battery assembly for exceptional weld strength and electrical conductivity.

Innergy Power Corp

iTECH

Jasco Battery Inc
Laird Technologies
Maha Energy Corp
Merry Electronics (USA) Co Ltd
MicroSun Technologies
Multiplier Industries Corp
New Energy
New Leader Battery Industry Ltd
NEXcell Battery Co Ltd
Nexergy, Inc.

www.innergypower.com

www.itecheng.com

www.jascobattery.com

www.lairdtech.com

www.mahaenergy.com

www.merry.com.tw

www.microsuntech.com

www.multiplier.com

www.newenergyltd.com

www.newleader.com.hk

www.nexcell-battery.com

www.nexergy.com

www.nokia.com

www.pnl.gov

www.peakbattery.com

www.plainviewbatteries.com

www.posicharge.com

www.powercellbattery.com

www.powermaxusa.com

www.protechnologies.com

www.pvdproducts.com

www.shogyo.com

www.sonobondultrasonics.com

Nokia Mobile Phones

Pacific Northwest Natl Lab

Peak Energy Solutions Inc

Plainview Batteries Inc

PosiCharge

Power-cell Battery Products

Powermax Battery (USA) Inc

Progressive Technologies

PVD Products Inc

Shogyo International Corp

Sonobond Ultrasonics

SWE

Sunn Battery Co

U&C Batteries Private Ltd

www.sunnbattery.com

www.ucbatteries.com

Battery Technology, Inc.

Black & Decker
Boston-Power Inc
BYD Battery Co Ltd
Cell-Con Inc
County Battery Services Ltd
Dan Energy
Devon Co
EaglePicher Technologies LLC
Electric Fuel Battery Corp
Great Power Battery Co Ltd
Hong Kong Batteries Manufactory Ltd

www.batterytech.com

www.blackanddecker.com

www.boston-power.com

www.byd.com.cn

www.cell-con.com

www.countrybattery.co.uk

www.danenergy.com

www.xenousa.com

www.eaglepicher.com

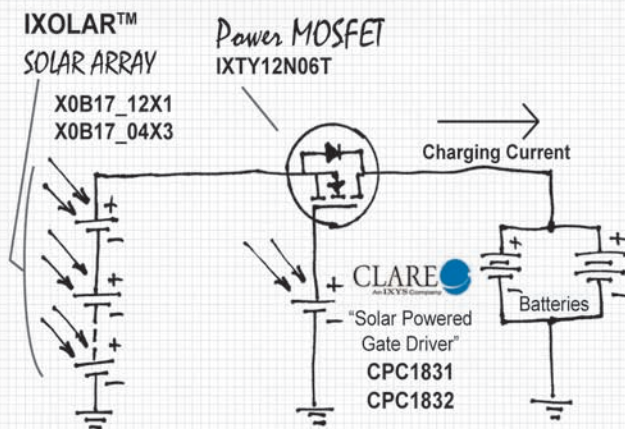
www.electric-fuel.com

www.greatpower.net

www.hk-batteries.com

High Efficiency Solar Charging ...

IXYS SOLAR POWER!



GREAT FOR CHARGING ALKALINE BATTERIES

With our solar components, designing a high-efficiency solar power solution is now simpler than ever!

Applications

- NiMH, NiCad, Alkaline, etc.
- Laptops, Cell phones, MP3 players
- GPS, Portable test equipment, Flashlights
- Security cameras
- Remote sensors
- Electric fences
- RV & automotive
- UPS



For more information, visit
www.ixyscolorado.com
and **www.clare.com**

For technical information,
call Gib Bates at
(970) 493-1902 ext. 22

BATTERY POWER 2008

September 4-5 • New Orleans, La.
Astor Crowne Plaza Hotel

The International Conference Highlighting the Latest Developments and Technologies in Batteries and Power Management

Battery Power 2008, an international conference highlighting the latest developments and technologies in the battery industry, will be held September 4-5 in the heart of the French Quarter in New Orleans, La.

This sixth annual event will feature presentations on portable, stationary and automotive battery technology, as well as battery manufacturing, materials and research & development. Topics will include new battery designs, emerging technologies, battery materials, power management, charging and testing systems, as well as the latest market trends affecting the industry.

The conference is designed for OEM design engineers, system engineers, technical and management professionals involved in battery powered products and systems, battery manufacturing, battery technology research and development and power management technology.

What's New for 2008

- Capital Ventures Investment Panel
- Product Demonstrations in the Exhibit Hall
- New Topics on International Regulatory Issues, Advanced Characterization Techniques and Battery Counterfeit Prevention Technology
- Expanded Program on Power Management

10 Great Reasons Why You Should Attend Battery Power 2008

- Discover How New Technology is Impacting Power Management
- Network with Potential Business Partners
- Attend Exceptional Pre-Conference Activities
- See the Latest Products Technologies Unveiled
- Learn to Optimize Your System Performance and Dependability
- Assure Compliance with Latest Safety Requirements And Standards
- Discuss Your Specific System Needs with Technology Experts
- Improve System Longevity and Power Delivery
- Maximize Return on Battery Technology System Investments
- Find the Latest Market, Pricing and Manufacturing Trends Worldwide

Who Needs to Attend:

- OEM design engineers of portable electronic products and battery-powered systems
- Developers and integrators of rechargeable battery products and systems
- System engineers of standby, backup and uninterruptible power systems
- System integrators, vendors, distributors
- Manufacturers of batteries and battery packs
- IC and chipset providers
- Manufacturers of charging, conditioning, monitoring and testing equipment
- System engineers of electric vehicles
- Product managers seeking new applications, and partnering opportunities
- Charging and testing system component providers
- Specialized energy materials suppliers
- Battery component providers

Battery Power 2008 will feature more than 35 technical presentations. To view the full program, please visit www.batterypoweronline.com/bp08_index.htm

Keynotes

Market Trends – Markets, Technologies and Major Players

Ying Wu, Ph.D., Senior Analyst • Lux Research, Inc.

Turning Up the Heat on Battery Safety: A Guide to Battery Safety Testing

Matthew Larkin, Senior Battery Consultant • TÜV SÜD

Featured Presentations

Venture Capitalist Investor Panel

*Richard Baxter, Ardour Capital Investments, LLC
William Lese, Braemar Energy Ventures • Matt Jones, Nth Power
Mark Cox, New Energy Fund, LP • James Kim, CMEA Ventures*

Technology to Prevent Counterfeiting in the Battery Industry

Steven J. Powell, General Manager and Director, Security Solutions • Eastman Kodak Company

General Sessions from These Industry-Leading Companies:

Council for Scientific and Industrial Research DPSS
Electro Energy, Inc.
Electrochem Commercial Power
Electrovaya Corp.
Enercon Industries Corp.
Energizer
Engineered Materials, Inc.
Exponent, Inc.
GEM Power, LLC
Hawaii Natural Energy Institute
IdaTech
Intersil
JSA Photonics, Inc.
Micro Power Electronics, Inc.
Microchip Technology, Inc.
Miyachi Unitek Corp

Motorola Product Testing Services
National Semiconductor
NEXcell Battery Co., Ltd.
Nexergy, Inc.
ON Semiconductor
PowerGenix
SmartSpark Energy Systems
SouthWest Electronic Energy Group
Sypris Test & Measurement
Texas Instruments
Timcal Graphite and Carbon
Toda Kogyo Europe GmbH
Toro
Voller Energy

Registration

Register online at www.BatteryPowerOnline.com.

Team Discount: If two people from your company will be attending the conference, \$300 is deducted from each attendee's registration fee. If three or more attendees will be attending the conference, \$400 is deducted from each attendee's registration fee.

www.BatteryPowerOnline.com

Exhibitors & Sponsors

Gold Sponsor



Supporting Organizations



Media Sponsors



Primary Batteries



EnerSys
 2366 Bernville Rd.
 Reading, PA 19605
 Contact: Sales Department
 610-208-1991
 reservepower@enersys.com
 www.enersys.com

EnerSys manufactures, distributes and services reserve power, motive power and starting, lighting and ignition (SLI) batteries, chargers, power equipment, and battery accessories to customers worldwide.

A123Systems	www.a123systems.com
B & B Battery (USA) Inc	www.bb-battery.com
Ceramatec Inc	www.ceramatec.com
Compass Co Ltd	www.compassource.com
Dyna Hi-Tech Power Systems Ltd	www.dynahitech.com
East Penn Mfg Co Inc	www.dekabatteries.com
Electric Fuel Corp	www.electric-fuel.com
EnerSys	www.enersys.com
Exide Technologies	www.exide.com
F A A M SpA	www.faam.com
GBP Battery Co Ltd	www.gbp-battery.com
GFX Power Inc	www.gfxpower.ca
Hawker Powersource	www.hawkerpowersource.com
Infinite Power Solutions	www.infinitepowersolutions.com
K & W Asia Tech Co Ltd	www.kwasia.com
K2 Energy Solutions	www.k2battery.com
Leoch Int'l (HK) Ltd	www.leoch.com
McNair Technology Co, Ltd	www.mcnair.com.cn
Ningbo KeQiang Battery Co Ltd	www.chinesebattery.com
Optima Batteries	www.optimabatteries.com
Power Battery srl	www.powbat.it
Quanzhou Yazhi Storage Battery Co Ltd	www.ya-zhi.com
Ritar Power Group (Hong Kong) Ltd	www.ritarpower.com
Sandia National Laboratories	www.sandia.gov/pstg/battery.html
Shenzhen Motoma Power Co Ltd	www.motoma.com
Tadiran Batteries	www.tadiran.com
Tai Kwong-Yokohama Battery Ind Sdn Bhd	www.tkyoko.com
Topon Technology Ltd	www.topon.com.cn
Tripp Lite	www.triplite.com
Trojan Battery Co	www.trojanbattery.com
Union Battery Corp	www.unionbattery.com
VARTA Microbattery GmbH	www.varta-microbattery.com
Wengter Electron Industry Co Ltd	www.wengter.com
Wuhan Intepower Co Ltd	www.intepower.com
XenoEnergy Co Ltd	www.xenoenergy.com
Yamado Inc	www.yamado.com
Yardney Technical Products	www.yardney.com
Yuasa Development Corp	www.yuasa-tech.com
Yucell Industry Ltd	www.yucell.com
Zhejiang 3-turn Battery Co Ltd	www.3turn.com

Secondary Batteries



For over 38 years Power-Sonic Corp. has been providing cost effective high quality SLA batteries on a global basis. Power-Sonic batteries are sold in more than 70 countries world wide. Power-Sonic's corporate headquarters and main distribution center are located in San Diego California, supplemented by strategically located distribution centers throughout the U.S. The corporation has wholly owned subsidiaries operating in Europe, Singapore and Mexico. The current product range encompasses the following batteries:

- PS and PSG series general purpose
- PSH series high rate discharge
- PG series long life
- Powersport series
- Nickel Cadmium
- Nickel Metal Hydride

The company also supplies battery chargers for SLA, Ni-Cd and Ni-MH batteries.

Power-Sonic Corporation

7550 Panasonic Way
 San Diego, CA 92154
 Tel: 619-661-2020
 Fax: 619-660-3650
 battery@power-sonic.com
 www.power-sonic.com

Aonon Battery Factory	www.aonon.com
BAE Batterien GmbH	www.bae-berlin.de
Eco-Battery Inc	www.eco-battery.com
EverFast Rechargeables Ltd	www.everfast.com.hk
GP Battery Marketing (Germany) GmbH	www.gpbattery.de
Harding Energy Inc	www.hardingenergy.com
HOPPECKE Batteries Inc	www.hoppecke-us.com
Johnson Controls Inc	www.johnsoncontrols.com
Joint Stock Battery Co RIGEL	www.rigel.ru
K & W Asia Tech Co Ltd	www.kwasia.com
K V International	www.geocities.com/kvintl
K2 Energy Solutions	www.k2battery.com
Levo Batterien AG	www.levobatterien.com
Lexel Battery Co Ltd	www.lexelbattery.com
Lithium Power Technologies Inc	www.lithiumpower.com
Ll'Accumulateur Tunisien Assad SA	www.atassad.com
Minmax Energy Technology Co, Ltd	www.maxbattery.com
Oerlikon Stationary Batteries Ltd	www.accuoerlikon.com
Ohlin Sales Co dba OSI Batteries	www.osibatteries.com
Power-Sonic Corporation	www.power-sonic.com
Rocket Electric Co Ltd	www.rocketla.com
Shenzhen EPT Battery Co Ltd	www.ept-battery.com
SKC PowerTech Inc	www.skc.co.kr
Sony Corp	www.world.sony.com
Taiwan Yuasa Battery Co Ltd	www.yuasa.com.tw
Topin Battery Ltd	www.topinbattery.com

Accessories



WirthCo Engineering, Inc.

7491 Cahill Road
Minneapolis, MN 55439
Contact: Andrew Wirth
800-959-0879
sales@wirthco.com

www.wirthco.com • www.batterydoc.com

WirthCo is entering its 3rd decade as a primary manufacturer of automotive aftermarket accessories including Battery Chargers, Disconnects, Bolts and Taps under the brand of Battery Doctor®-12 volt products as well for some of the world's largest and most successful distributors, retailers, and OEMs.

Cables/Harnesses



Ell-Tron Manufacturing Co., Inc.

P.O. Box 416
Vanderbilt, MI 49795
(989) 983-3181
www.elltron.com

Almo Wire & Cable Inc	www.almo.com
Anderson Power Products	www.andersonpower.com
Antique Auto Battery Mfg Inc	www.antiqueautobattery.com
Coast Energy Corp Inc	www.wilpowerbattery.com
Cobra Wire & Cable Inc	www.cobrawire.com
Ell-Tron	www.elltron.com
E/W Electronics	www.ewelectronics.com
Farmer Mold & Machine Works Inc	www.farmermold.com
Helms-Man Industrial Co Ltd	www.helms-man.com
Holzberg Communications Inc	www.holzberg.com
Interpower Corp	www.interpower.com
ISL Products International	www.islproducts.com
Japlar/Schauer	www.battery-chargers.com
Kim Hotstart Mfg Co Inc	www.kimhotstart.com
MarathonNorco Aerospace Inc	www.mptc.com
Masline Electronics Inc	www.masline.com
Materials Transportation Co	www.mtcworldwide.com
Minwa Electronics Co Ltd	www.minwa.com
Mouser Electronics Inc	www.mouser.com
Multi-Contact USA	www.multi-contact-usa.com
O'Hara Metal Products Co	www.oharamfg.com
Peak Energy Solutions Inc	www.peakbattery.com
Phoenix Contact Inc	www.phoenixcon.com
Powell Electronics Inc	www.powell.com

Quick Cable Canada Ltd	www.quickcable.com
Right Connection Electronics Inc	www.trc12volt.com
Sinbon Electronics	www.sinbontech.com
Stark Electronics Inc	www.starkelectronics.com
Technical House Inc	www.technicalhouse.com
Techni-Tool Inc	www.techni-tool.com
The ProCom Group	www.theprocomgroup.com
Tyco Electronics Corp	www.tycoelectronics.com
UniBatt	www.ofek.org.il

Capacitors/Ultracapacitors

AVX	www.avx.com
DeWAL Industries Inc	www.dewal.com
Engineered Conductive Materials	www.conductives.com
Greatbatch Inc	www.greatbatch.com
Holzberg Communications Inc	www.holzberg.com
Illinois Capacitor Inc	www.illcap.com
Mission Critical Power Systems	www.mcps.us
OptiXtal Inc	www.optixtal.com
SBE Inc	www.SBElectronics.com
TIAX LLC	www.tiaxllc.com
TRACE Photonics Inc	www.tracephotonics.com
T-San Electronics Inc	www.tsan.net
Uniross Batteries (HK) Ltd	www.uniross.com
XenoEnergy Co Ltd	www.xenoenergy.com

Webcom's
2008 Worldwide Battery Industry Directory

Battery Manufacturers, Power Management Companies, Charging, Testing & Monitoring Companies, Component Manufacturers, Suppliers, Distributors, OEMs and more!

4,000 contacts and 1,900 companies
Available in hard copy, CD-ROM and PDF

For more information or to order, contact:
Webcom Communications Corp.
Phone 800-803-9488 Fax 720-528-3771
Web www.infowebcom.com
Email marcv@infowebcom.com

Chargers



Cadex designs and manufactures advanced battery chargers, battery analyzers and rapid testers, and battery management software. Our award-winning products are built with one goal in mind — to solve battery problems. Cadex products are the preferred choice for industry leaders in wireless communications, emergency services, mobile computing, avionics, bio-medical, automotive and defense applications. Latest innovations include the hand-held, CA-12 featuring Spectro technology capable of measuring capacity in 15 seconds for automotive and mobility applications, and laboratory C8000 battery testing system for battery-powered device developers. Cadex is ISO 9001 and ISO13485 certified and our products are sold in over 100 countries.

Cadex Electronics Inc.
22000 Fraserwood Way
Richmond, BC V6W1J6 Canada
Contact: Sales
604-231-7777
info@cadex.com
www.cadex.com



Energy Access, Inc. specializes in the manufacture of custom and standard **battery chargers for all chemistries**. Founded in 1998 to address the growing need for expertise in **Smart Battery Charger Technology**, we have supplied charger products to hundreds of customers worldwide.

Today as an **Industry Leader** we are dedicated to providing our customers with the best charging solution available for their applications, making efficient use of the **latest technology** and **proven designs**.

Expertise in SMBus and Intelligent Chargers

Proven Quality Products

Ability to Modify existing products and Design custom solutions

Committed to serving our customers

Energy Access, Inc.
5344 W. 79th Street
Indianapolis, IN 46268
ISO 9001:2000 Certified
Contact: Joe Chatman
317-201-8074
jchatman@energyaccess.com
www.energyaccess.com



Based in Rolling Meadows, IL, Charles M&I is a provider of high quality, innovative industrial transformers, battery chargers and AC and DC electrical products, including inverters, isolation and boosting transformers and cable products. More information about Charles Industries is available at www.charlesindustries.com.

Charles Industries
5600 Apollo Drive
Rolling Meadows, IL 60008
(847) 258-8546
www.charlesindustries.com



iTECH leads in innovating design and manufacture of power products including smart batteries, chargers, docking stations and power sub-systems. We provide both standard and engineered application-specific product solutions where performance is critical. iTECH works with all chemistries – SLA, NiCd/NiMH, Lithium ion and Lithium polymer. We serve vertical OEM and open market customers in the handheld electronics, medical, safety/security, military and communication markets.

iTECH
9454 Waples St.
San Diego, CA 92121
Contact: Frank Cooper
858-458-1500 Ext. 2030
fcooper@itecheng.com
www.itecheng.com

Advanced Power Products Inc	www.app-bgl.com	Kim Hotstart Mfg Co Inc	www.kimhotstart.com
Advanced Projects Research Inc	www.advancedprojects.com	Kinetik	www.kinetikpower.com
AdvanceTec Industries Inc	www.advancetec.com	Koehler-Bright Star Inc	www.flashlight.com
Alpine Power Systems Inc	www.alpinepowersystems.com	Kussmaul Electronics Co	www.kussmaul.com
Analytic System	www.analyticsystems.com	La Marche Mfg	www.lamarchemfg.com
Arrgh Manufacturing Co Inc	www.arrgh.com	LaMantia Products Ltd	www.lamantia.ca
Arrow International Pvt Ltd	www.okaya.in	Lind Electronics, Inc.	www.lindelectronics.com
Arthur N Ulrich Co	www.anu-co.com	Masline Electronics Inc	www.masline.com
Better Power Electronic	www.better-power.com	Mathews Associates Inc	www.maifl.com
Bing Technologies	www.bing-tech.com	McDowell Research	www.mcdowellresearch.com
Bitrode Ltd	www.bitrode.com	Mentzer Electronic	www.mentzer.de
Bonitron Inc	www.bonitron.com		
Boundless Corp	www.boundlesscorp.com		
BRUSA Elektronik	www.brusa.ch		
BTI Technology & Innovation	www.bticcs.com		
Cadex Electronics Inc.	www.cadex.com		
Canada Battery Inc	www.canadabatteryinc.ca		
Carber Power Technologies Inc	www.carber.com		
CBC Battery	www.cbcbattery.com		
Charles Industries Ltd	www.charlesindustries.com		
Cliplight Manufacturing Co	www.cliplight.com		
Delta Electronics Inc	www.deltaww.com		
Delta-Q Technologies Corp	www.delta-q.com		
Deltran Corp	www.batterytender.com		
Deutronic Elektronik	www.deutronic.com		
Digatron Industrie-Elektronik	www.digatron.net		
Directparts	www.directpartsdepot.com		
Douglas Battery	www.douglasbattery.com		
Dynapower Corp	www.dynapower.com		
Dyno Battery Co	www.dynobattery.com		
Edison Minit-Charger	www.mini-charger.com		
Elak Private Ltd	www.elakindia.com		
Eldrive Norge AS	www.eldrive.no		
Electric Fuel Battery Corp	www.electric-fuel.com		
Electritek-AVT	www.electritek.com		
Elektropower Ltd	www.elektropower.hu		
Eltek Energy LLC	www.eltekenegy.com		
Energy Access, Inc.	www.energyaccess.com		
ENERMEX SA de CV	www.grupoimsa.com		
Enerpro Inc	www.enerpro-inc.com		
EnerSys	www.enersys.com		
First National Battery	www.battery.co.za		
FMA Inc	www.fmaincorporated.com		
FRIWO USA Inc	www.friwoemc.com		
Galaxy Power Inc	www.galaxypower.com		
Gami Battery	www.gami.cl		
GEM Power LLC	www.gempower.biz		
Go Power Electric Inc	www.gpelectric.com		
Great Power Battery Co Ltd	www.greatpower.net		
H M Cragg Co	www.hmcragg.com		
Hansung World Co Ltd	www.heid.co.kr		
HindlePower Inc	www.hindlepowerinc.com		
iTECH	www.itecheng.com		
KEPCO INC	www.kepcochargers.com		
Keystone Electronics Corp.	www.keyelco.com		

www.swe.com 800.231.3612 info@swe.com



Since 1964



POW-R SOLVE®
Continuous Cell Balancing*
in a Battery Pack

SouthWest Electronic Energy Group (SWE) announces the industry's first continuous cell balancing method for Li-Ion batteries. Our patented POW-R SOLVE has truly unique circuitry that is capable of continuously balancing cells with high balancing currents during charging, discharging, quiescence, and storage. There are many advantages of using this device: 1) faster balancing; 2) does not reduce pack shelf life; 3) mission critical packs are always in balance, continuously ready to use at maximum capacity; 4) can balance high capacity packs; and 5) built in charge regulation for missions that use solar panels, fuel cells, or power supplies as a source of charge energy.

*U.S. Patent 7,279,867 Method for Balancing Cells or Groups of Cells in a Battery Pack



Lithium Primary



POW-R TOTE®



POW-R MINDER®



Lithium Ion

QUALITY RELIABILITY SERVICE

From outer space to under the sea to five miles beneath our planet's land surface, SWE designs and assembles high reliability, customer-specific battery packs and chargers.

SouthWest Electronic Energy



Chargers Continued



KEPCO INC. has long enjoyed an excellent reputation as a leading manufacturer of precision laboratory and OEM type power supplies and now brings its 60+ years of expertise in power conversion to the battery charger market.

The KEPCO KES product line is uniquely suitable for any engine-start application and offers the latest in switch mode power supply technology.

Call us for more information and let us help you with your charger needs.

KEPCO INC

131-38 Sanford Avenue
Flushing, NY 11355 USA
Contact: Oscar Rozo
718-461-7006 x 5151
hq@kepcopower.com
www.kepcochargers.com



For more than 55 years Keystone has designed and manufactured the latest advances in Battery Holders, Clips and Contacts. Add to these a vast array of standard and custom interconnect components and hardware for a variety of industries.

Keystone takes pride in meeting all requirements, efficiently and promptly. Our skilled and dedicated technicians, experienced production personnel and customer service teams contribute to our reputation as an industry leader.

ISO-9002 certified and RoHS compliant, the firm strives to exceed customer needs at competitive prices. A global distribution network assures rapid response.

Keystone Electronics Corp.

31-07 20th Road
Astoria, NY 11105
(800) 221-5510 or (718) 956-8900
www.keyelco.com
kec@keyelco.com

MES-DEA SA	www.cebi.com
MFJ Enterprises Inc	www.mfjenterprises.com
Midstate Battery	www.midstatebattery.com
Midtronics Inc	www.midtronics.com
PEC North America Inc	www.peccorp.com
Peco II Inc	www.peco2.com
Pin Xin Int'l Ltd	www.powerhaus.com.hk
Pivotal Power Inc	www.pivotalpower.com
PortaPower (HK) Ltd	www.portapower.com
PosiCharge	www.posicharge.com
Sackett Systems Inc	www.sackett-systems.com
Salcomp USA LLC	www.salcomp.com
Samya Technology Co Ltd	www.samyatech.com.tw
Sinbon Electronics	www.sinbontech.com
SL Power Electronics Corp	www.slpower.com
SMH Systems Material Handling	www.smhco.com
SOC America Inc	www.socamericainc.com
Solectria Corp	www.solectria.com
Sorfin Yoshimura Tokyo Ltd	www.sorfin-yoshimura.com
SOTA Enertech Inc	www.sota.cc
Storage Battery Systems Inc	www.sbsbattery.com
Stored Energy Systems	www.sens-usa.com
Su-Kam Communication Systems Ltd	www.su-kam.net
Summer Way Ltd	www.hkmoney.net
Supertech Power Ltd	www.st-power.ca
Sure Power Industries Inc	www.surepower.com
SWE	www.swe.com
T R I A D USA International	www.malltui.com
Talley Communications Corp	www.talleycom.com
Technical House Inc	www.technicalhouse.com
TecMate (International) NV	www.tecmate-int.com
Telecom Italia	www.tim.it
Terrell Battery Corp	www.terrellbattery.com
Texas Instruments Inc	www.ti.com
The Centronix Corp	www.centronix.com
TIAX LLC	www.tiaxllc.com
Topin Battery Ltd	www.topinbattery.com
TRACE Photonics Inc	www.tracephotonics.com
Trojan Battery Co	www.trojanbattery.com
Tronic Technology Global Ltd	www.tronic.com.hk
UniBatt	www.ofek.org.il
Uni-Firm Ltd	www.unifirm.com
Uniross Batteries (HK) Ltd	www.uniross.com
Universal Power Group	www.upgi.com
Valor Wireless Phone Assembly	www.2valor.com
VARTA Autonakut	www.varta-automotive.fi
Vencon Technologies Inc	www.vencon.com
Ventronics Inc	www.ventronicsinc.com
Vmark Int'l Ltd	www.vmarkpower.com
Voller Energy Ltd	www.voller.com
Weiss Instrument Inc	www.weissinstrument.com
Weldex Sales Corp	www.weldexsales.com
Wellington Battery Co	www.wellingtonbattery.com
Wikgo Technology Ltd	www.wikgo.com
Wintop Int'l (HK) Ltd	www.m-ups.com
Xantrex Technology Inc	www.xantrex.com

Coatings

Acheson Colloids Co	www.achesonindustries.com
Arcotronics Italia SpA	www.arcotronics.com
Ballard Material Products	www.avcarb.com
CAIG Laboratories Inc	www.caig.com
Cladan Corp	www.cladancorp.com
Cly-Del Mfg Co, The	www.cly-del.com
Electric Fuel Battery Corp	www.electric-fuel.com
Engineered Conductive Materials	www.conductives.com
General Chemical Corp	www.generalchem.com
Great Power Battery Co Ltd	www.greatpower.net
H & T Battery Components	www.ht-group.com
H & T Battery Components	www.trumac.com
IBC Corp	www.ibccorporation.com
Indium	www.indium.com
Innovative Machine Corp	www.innovativemach.com
Liberty Precision Industries	www.libertypi.com
Lithium Power Technologies Inc	www.lithiumpower.com
Midstate Battery	www.midstatebattery.com
MIRWEC Film Inc	www.mirwecfilm.com
Plastic Dip Moldings Inc	www.plasticdipmoldings.com
Sure Power Industries Inc	www.surepower.com
Techni-Tool Inc	www.techni-tool.com
Texmac Inc	www.texmacusa.com
Weldex Sales Corp	www.weldexsales.com

Components

AMETEK	www.ametekmetals.com
AVX	www.avx.com
Bourns Inc	www.bourns.com
Circuit Components Inc	www.circuitcomponents.com
Electrochemical Coatings Inc	www.ececs.com
H & T Battery Components	www.trumac.com
Interpower Corp	www.interpower.com
Kothari Acid Proof Tiles Co	www.acidproof.com
Motion Micro Solutions	www.motionmicro.com
Nippin Sheet Glass Co, Ltd	www.nsg.co.jp
O'Hara Metal Products Co	www.oharamfg.com
OPTEK Technology Inc/TT Electronics	www.optekinc.com
Philadelphia Scientific	www.phlsci.com
Powa Electronics Co Ltd	www.powachina.com
Quadra Sales Corp	www.quadrasales.com
Raditek	www.raditek.com
Sanford Battery Manufacturing Ltd	www.sanfordbattery.on.ca
Su-Kam Communication Systems Ltd	www.su-kam.net
TAB Tovarna Akumulatorskih Baterij dd	www.tab.si
Taiyo Yuden (USA) Inc	www.t-yuden.com
Termar Srl	www.termar.it
Terrell Battery Corp	www.terrellbattery.com
T-San Electronics Inc	www.tsan.net
Vicor Corp	www.vicorpower.com



ENERGY VERY ENDURING

ENERGY VERY ENDURING

- Over 20 years R&D experience
- More than ten million batteries serving on meter
- Manufacturer
- Provide 42 kinds of Li/SOCl₂ batteries
- Provide 41 kinds of Li/MnO₂ batteries
- 16 patents





Address: Guangdong, China
 Tel : +86-752-2610582
 Fax: +86-752-2606033
 E-mail: sales@evebattery.com
[Http://www.evebattery.com](http://www.evebattery.com)

Consulting Services



Hal-Tec
 405 North Reo Street Suite 240
 Tampa, FL 33609
 Contact: Randy Carpenter
 813-289-4119
 drcarpenter@hal-tec.com
 www.hal-tec.com

Full service network reliability management and outsourcing services company, with industry experience and state of the art service offerings, including battery installation and maintenance.

ABI Research	www.abiresearch.com
Advanced Projects Research Inc	www.advancedprojects.com
AVICENNE Development	www.avicenne.com
Battery Research & Testing Inc	www.batteryresearch.com
BNS Solutions	www.bnssolutions.com
Enersol Consulting Services Inc	www.enersolinc.com
Frezzi Energy Systems	www.frezzi.com
Frost & Sullivan	www.frost.com
Hal-Tec	www.hal-tec.com
Southwest Research Institute	www.fire.swri.org
TIAX LLC	www.tiaxllc.com

Converters



Lind Electronics, Inc. designs and builds high quality power accessories for laptops and portable computer systems. Airline and Automobile power adapters are available for all major laptops, portable printers, handhelds and DVD players. We manufacture multiple output DC adapters and auxiliary battery packs for portable office applications. The rugged design of Lind power adapters make them ideal for military and emergency vehicle applications.

Lind Electronics, Inc.
 6414 Cambridge Street
 Minneapolis, MN 55426
 800-659-5956
 lrlind@lindelectronics.com
 www.lindelectronics.com
 T. J. Neville

Docking Stations



iTECH leads in innovating design and manufacture of power products including smart batteries, chargers, docking stations and power sub-systems. We provide both standard and engineered application-specific product solutions where performance is critical. iTECH works with all chemistries – SLA, NiCd/NiMH, Lithium ion and Lithium polymer. We serve vertical OEM and open market customers in the handheld electronics, medical, safety/security, military and communication markets.

iTECH
 9454 Waples St.
 San Diego, CA 92121
 Contact: Frank Cooper
 858-458-1500 Ext. 2030
 fcooper@itecheng.com
 www.itecheng.com

Applied Power Systems Inc	www.appliedps.com
Argus Technologies Ltd	www.argusdcpower.com
Aztec Electronics Pty Ltd	www.aztecelectronics.co.za
Batteries Are Us	www.batteriesareus.com
Bonitron Inc	www.bonitron.com
Delta-Q Technologies Corp	www.delta-q.com
Hitachi America Ltd	www.hitachi.us
Holzberg Communications Inc	www.holzberg.com
Industrial Semiconductor Inc	www.industrialsemi.com
La Marche Mfg	www.lamarchemfg.com
Lind Electronics, Inc.	www.lindelectronics.com
LWC Distributors Inc	www.lwcdistributors.com
Mega Electronics, Inc	www.megaelectronics.com
National Semiconductor	www.national.com
Uniross Batteries (HK) Ltd	www.uniross.com

Dry Rooms

AAA Hitec Modeco	www.hitecnow.com
Acumuladores Moura S/A	www.moura.com.br
Arrow International Pvt Ltd	www.okaya.in
Chasewood Environmental Inc	www.chasewoodsys.com
Environmental Specialties Inc	www.LuwaUSA.com
Glascock International LLC	www.glascockinternational.com
Great Power Battery Co Ltd	www.greatpower.net
Harris Environmental Systems	www.harris-env.com
Scientific Climate Systems Inc	www.dryrooms.com

Enclosures

CMW Automation GmbH	www.cmw-automation.com
Direct Power and Water Corp	www.directpower.com
EnXergy	www.enxergy.com
Hutton Communications Inc	www.huttononline.com
IBC Corp	www.ibccorporation.com
Jameco Electronics Components	www.jameco.com
Masline Electronics Inc	www.masline.com
O'Hara Metal Products Co	www.oharamfg.com
Pac-Tec	www.pactecenclosures.com

Electrolytes

A A Silva	www.autosil.pt
AAA Hitec Modeco	www.hitecnow.com
Acumuladores Moura S/A	www.moura.com.br
Allied Battery Co Inc	www.alliedbattery.com
Arrow International Pvt Ltd	www.okaya.in
Atlas Battery Ltd	www.atlasgroupk.com
AVICENNE Development	www.avicenne.com
Battery Sales	www.batterysales.com
BYD Battery Co Ltd	www.byd.com.cn
Canada Battery Inc	www.canadabatteryinc.ca
Carber Power Technologies Inc	www.carber.com
CBC Battery	www.cbcbattery.com
eVionyx Inc	www.evonyx.com
Expan Inc	www.expaninc.com
Ferro Corp	www.ferro.com
First National Battery	www.battery.co.za
FMC Lithium	www.fmclithium.com
Gami Battery	www.gami.cl
High Energy Batteries	www.highenergyltd.com
Huitong Industry Co Ltd	www.autobikeparts.com
Limtech Lithium Industries	www.limtech.com
Midstate Battery	www.midstatebattery.com
Minnesota Industrial Battery	www.gnb.com
Ohara Corp	www.oharacorp.com
Peace Bay Power Co Ltd	www.peacebay.com
Peak Energy Solutions	www.peakbattery.com
Rozon Batteries Inc	www.worldbatteries.com
Sakthi Battery Industries	www.sakthipower.com
SOTA Eneritech Inc	www.sota.cc
Storage Battery Systems	www.sbsbattery.com
Terrell Battery Corp	www.terrellbattery.com
Topin Battery Ltd	www.topinbattery.com
Toxco Inc	www.toxco.com
TRACE Photonics Inc	www.tracephotonics.com
UniBatt	www.ofek.org.il
Valence Technology Inc	www.valence.com
VARTA Autonakut	www.varta-automotive.fi
Wuhan Lixing Power Sources	www.lisun.com
XenoEnergy Co Ltd	www.xenoenergy.com



Don't let Technology pass you by.

Testing Instrumentation

for Your Battery and Ultra-capacitor Needs



Battery & Ultra-capacitor Testers

- Automated Multi-Channel Testing Systems for Battery, Supercapacitor, and more...
- INDUSTRY LEADING Customer Support
- Logical, Powerful, and Easy to Use Control Software
- Multiple Current and Voltage Ranges for Improved Accuracy
- Linear Bipolar, Linear Unipolar, and PWM Circuitry Available to Cover a Wide Range of Applications
- Multi-Channel Potentiostat/Galvanostat Circuitry for Combinatorial Electrochemistry
- Flexibility Allows for General Cycling or Advance Electrochemical Experimentation
- Vast Experience in Multiple Markets from Advanced R&D to Manufacturing




Serving All of Your Testing Needs

www.arbin.com

Phone: 979-690-2751 Fax: 979-690-2761 Email: info@arbin.com

Fuses



Thermshield, LLC
Exclusive Distributor North America
 P.O. Box 1641 Laconia, NH 03247
 Contact: 603-524-3714
tco@thermshield.com
www.thermshield.com

- | | |
|-----------------------------|--|
| EnXergy | www.enxergy.com |
| Holzberg Communications Inc | www.holzberg.com |
| Quick Cable Corp | www.quickcable.com |
| SOC America Inc | www.socamericainc.com |
| Thermshield | www.thermshield.com |
| Uniross Batteries (HK) Ltd | www.uniross.com |

HOLDERS

- | | |
|----------------------------------|--|
| AAA Hitec Modeco | www.hitecnow.com |
| Acme Model Engineering Co | www.acmemodel.com |
| Acom Communications Corp | www.cellcom.com.tw |
| Advanced Power Products Inc | www.app-bgl.com |
| Arbin Instruments | www.arbin.com |
| Atlantic Components | www.atcomhq.com |
| Changsha Lyrun Material Co Ltd | www.lyrun.com |
| Concord Electronics Corp | www.concord-elex.com |
| EAC Corp | www.eac.com |
| FIC Corp | www.ficcorp.com |
| IDX System Technology Inc | www.idx.tv |
| Keystone Electronics Corp | www.keyelco.com |
| Masline Electronics Inc | www.masline.com |
| Memory Protection Devices Inc | www.batteryholders.com |
| MFJ Enterprises Inc | www.mfjenterprises.com |
| Midstate Battery | www.midstatebattery.com |
| Mouser Electronics Inc | www.mouser.com |
| Power Dynamics Inc | www.powerdynamics.com |
| Priebe Electronics | www.priebe-electronics.com |
| Semyung Ever Energy Co Ltd | www.eckorea.net/semyung |
| Shokai Far East Ltd | www.shokaifareast.com |
| Specialty Electronics Inc | www.connectorsolutions.com |
| Stark Electronics Inc | www.starkelectronics.com |
| Stevens Products Inc | www.stevensproducts.com |
| Su-Kam Communication Systems Ltd | www.su-kam.net |
| SY Kessler Sales Inc | www.sykessler.com |
| Tronic Technology Global Ltd | www.tronic.com.hk |
| UniBatt | www.ofek.org.il |

Integrated Circuits & Semiconductors

Battery Monitors

- | | |
|------------------------------|--|
| Applied Electronics Labs Ltd | www.ael.lv |
| Aztec Electronics Pty Ltd | www.aztecelectronics.co.za |
| National Semiconductor | www.national.com |
| SOC America Inc | www.socamericainc.com |
| T-San Electronics Inc | www.tsan.net |
| Texas Instruments | www.ti.com/sc/ampic |

Charge Controllers

- | | |
|------------------------------------|--|
| Advanced Analogic Technologies Inc | www.analogictech.com |
| AITEC Inc | www.ccspower.com |
| Maxim Integrated Products Inc | www.maxim-ic.com |
| Summit Microelectronics Inc | www.summitmicro.com |
| Texas Instruments | www.ti.com/sc/ampic |

Current Controllers

- | | |
|-------------------------------|--|
| Fairchild Semiconductor | www.fairchildsemi.com |
| Maxim Integrated Products Inc | www.maxim-ic.com |
| Texas Instruments | www.ti.com/sc/ampic |

Fuel Gauges



Texas Instruments offers complete solutions with high performance portable power management products, from power conversion to battery charging and fuel gauging, TI's complete portfolio of power management ICs help you differentiate your designs and get to market fast. TI also makes design easier with leading-edge tools and support. Take advantage of our vast selection of high-performance portable power management products today by visiting power.ti.com.

Texas Instruments
 12500 TI Blvd.
 Dallas, TX 75243
 Contact: Product Information Center
 800-477-8924
www.ti.com/sc/ampic
power.ti.com

Euro Energy Resources Ltd	www.euroenergy.co.uk
National Semiconductor	www.national.com
Powell Electronics Inc	www.powell.com
Quadra Sales Corp	www.quadrasales.com
Sorfin Yoshimura Tokyo Ltd	www.sorfin-yoshimura.com
Stark Electronics Inc	www.starkelectronics.com
Su-Kam Communication Systems Ltd	www.su-kam.net
Texas Instruments	www.ti.com/sc/ampic

Microcontrollers

B F Systems Inc	www.thomasregister.com
BTI Technology & Innovation	www.btics.com
EM Microelectronic-US Inc	www.emmicroelectronic.com
Fairchild Semiconductor	www.fairchildsemi.com
Freescale Semiconductor Inc	www.freescale.com
Harris Semiconductor Corp	www.harris.com
Hitachi America Ltd	www.hitachi.us
International Rectifier (IOR)	www.irf.com
Intersil Corp	www.intersil.com
IXYS Corp	www.ixys.net
Jameco Electronics Components	www.jameco.com
Maxim Integrated Products Inc	www.maxim-ic.com
Maxwell Technologies Inc	www.maxwell.com
Micro Linear Corp	www.microlinear.com
Microchip Technology Inc	www.microchip.com
National Semiconductor	www.national.com

ON Semiconductor	www.onsemi.com
Philips Semiconductors	www.semiconductors.philips.com
Power Integrations Inc	www.powerint.com
Powerex Inc	www.pwr.com
STMicroelectronics Inc	www.st.com
Vicor Corp	www.vicorpower.com

Power Conversion

Empire Battery Industries	www.empirebattery.com
H C Starck Inc	www.hcstarck.com
National-Standard Co	www.nationalstandard.com
Schlenk Metallfolien GmbH & Co KG	www.schlenk.de
Texas Instruments	www.ti.com/sc/ampic

Temperature Sensors

Alegna Innovations LLC	www.alegna.com
Kae LII Machine Manufacturing Co Ltd	www.kaelii.com.tw
National Semiconductor	www.national.com
Navbharat Electronics Co	www.navbharateyelets.com
Wirtz Mfg Co Inc	www.wirtzusa.com



Energy Access *Battery Charging Specialists*
Incorporated

New
Integrated Bullet Charger Series

2S, 3S, 4S
Lithium Charger



Universal Input (AUS, EU, UK Adapters)

A High Quality/ Low-Cost Solution

- Lithium Ion / Lithium Polymer (up to 4S)
- Nickel Metal Hydride (up to 14S)
- Wall-Mount Charger
- U.S. Plug in Charger Housing (Folding Prongs)
- Proper Charge Termination
- Charge Top-off and Restart
- LED Indication
- Easily Customized
- Regulatory Markings: UL, CE, FCC Class B
- CEC Efficiency Rating: IV

Smart Bus Battery Series Intelligent Charging Series Integrated Bullet Series
Qualified Sourced Consumer Chargers Accessories

Energy Access, Incorporated • 5344 W. 79th Street • Indianapolis, IN 46268
Voice: 317-496-8044 Fax: 317-337-0019 • www.EnergyAccess.com



CHARGE IT!

KEPCO'S ENGINE-START BATTERY CHARGERS



The KEPCO KES product line is uniquely suitable for any engine-start application. The KES offers the latest in switch mode power supply technology. While most engine-start chargers do not require an electrically quiet output, the KES boast communications quality output, at a switchgear charger price. The KES is also suitable as a battery eliminator.

FEATURES

- Single-Rate Charger
- Analog Current Meter
- Form C Charge Fault Output
- Temperature Compensation (Optional)
- Local/Remote ON-OFF

KES MODELS AVAILABLE

- KES 12-20, 12V/20A
- KES 12-40, 12V/40A
- KES 24-10, 24V/10A
- KES 24-20, 24V/20A
- KES 24-50, 24V/50A
- KES 48-5, 48V/5A
- KES 48-10, 48V/10A
- KES 48-25, 48V/25A

www.kepcochargers.com



AN ISO 9001 COMPANY
KEPCO
THE POWER SUPPLIER™
SINCE 1946

KEPCO INC. • 131-38 Sanford Avenue,
Flushing, NY 11352
Tel: (718) 461-7000 • Fax: (718) 767-1102
Email: hq@kepco.com

Manufacturing Systems

AAA Hitec Modeco	www.hitecnow.com
Acumuladores Ajax Ltda	www.ajax.com.br
Arrow International Pvt Ltd	www.okaya.in
Branson Ultrasonics Corp	www.bransonultrasonics.com
Cellusuede Products Inc	www.cellusuede.com
Enercon Industries Corp	www.enerconind.com
Glascock International LLC	www.glascockinternational.com
Hadi Maschinenbau GmbH	www.hadi.at
Indium Corp of America	www.indium.com
JFM Engineering Inc	www.jfmeng.com
Kallstrom Engineering AB	www.kallstrom.com
MAC Engineering & Equipment Co Inc	www.mac-eng.com
PenTech Associates	www.silostanksconveyors.com
Precision Tool & Engineering	www.pte-fl.com
Sakthi Battery Industries	www.sakthipower.com
SOTA Enertech Inc	www.sota.cc
Sovema SpA	www.sovema.it
Stone Battery (Shanghai) Co Ltd	www.stonetech.com.tw
Tiegel Manufacturing Co	www.tiegelmfg.com
Topin Battery Ltd	www.topinbattery.com

Materials



**EXPANDED METAL FOILS
FOR BATTERIES AND FUEL CELLS**

51513 Industrial Dr. Phone: (586) 725-0405
New Baltimore, MI 48047 Fax: (586) 725-0559
Email: sales@expaninc.com Toll Free: (800) 613-6999

www.expaninc.com

Acheson Colloids Co	www.achesonindustries.com
Cly-Del Mfg Co, The	www.cly-del.com
Covalent Associates, Inc	www.covalentassociates.com
Enerize Corporation	www.enerize.com
Engineered Conductive Materials	www.conductives.com
Engineered Materials Inc	www.staticintercept.com
Expan Inc	www.expaninc.com
FMC Lithium	www.fmclithium.com
Great Western Minerals Group Ltd	www.gwmg.ca
Hyperion Catalysis International	www.hyperioncatalysis.com
Indium Corp	www.indium.com
Li-Tech LLC	www.litechcorp.com
Magneti Ljubljana DD	www.magneti.si
SCI Engineered Materials Inc	www.sciengineeredmaterials.com
T/J Technologies	www.tjtechnologies.com
The Shepherd Chemical Co	www.shepherdchemical.com

Monitoring Systems

All Power Battery	www.allpowerbattery.com
Allied Battery Co Inc	www.alliedbattery.com
Argus Technologies Ltd	www.argusdcpower.com
BatteryCorp	www.batterycorp.com
Bonitron Inc	www.bonitron.com
Compact Power Inc	www.compactpower.com
Compower Systems Ltd	www.compower.ca
Direct Power and Water Corp	www.directpower.com
Emerging Power Inc	www.emergingpower.com
GENEREX GmbH	www.generex.de
Masline Electronics Inc	www.masline.com
Mathews Associates Inc	www.maifl.com
Peak Energy Solutions Inc	www.peakbattery.com
Peco II Inc	www.peco2.com
ResCorp International Inc	www.rescorp.com
Stark Electronics Inc	www.starkelectronics.com
Su-Kam Communication Systems Ltd	www.su-kam.net
Talley Communications Corp	www.talleycom.com
Topin Battery Ltd	www.topinbattery.com
UniBatt	www.ofek.org.il
Weiss Instrument Inc	www.weissinstrument.com
Wetac BV	www.wetac.nl
Wilson Engineered Systems Inc	www.wilsonengineered.com

Powders

Carbone Lorraine	www.carbonelorraine.com
Celgard LLC	www.celgard.com
Chemetall Foote Corp	www.chemetalllithium.com
Daramic Inc - Europe	www.daramic.com
Dexmet Corp	www.dexmet.com
Empire Battery Industries	www.empirebattery.com
Gerard Daniel Worldwide	www.gdw-bhp.com
Hollingsworth & Vose Co	www.afn-hv.com
IBC Corp	www.ibccorporation.com
Johns Manville	www.jm.com
Microporous Products LP	www.mplp.com
National-Standard Co	www.nationalstandard.com
Nippin Sheet Glass Co, Ltd	www.nsg.co.jp
Polymer Group Inc	www.polymergroupinc.com
Polypore International Inc	www.polypore.net
Powerplus Electric Co	www.powerpluselect.com
SciMat Ltd	www.scimat.com
Semyung Ever Energy Co Ltd	www.eckorea.net/semyung
Shanghai Shilong Hi-Tech Co Ltd	www.doc.cn.com
SIREG SPA	www.sireg.it
SOTA Enertech Inc	www.sota.cc
Sparco Batteries Pvt Ltd	www.business.vsnl.com/sparco
Sure Power Industries Inc	www.surepower.com
Surface Specialties	www.films.ucb-group.com
Termar Srl	www.termar.it
Topin Battery Ltd	www.topinbattery.com
TREIBACHER Industrie AG	www.treibacher.com
UCB SA Secteur Films	www.ucb.be
UniBatt	www.ofek.org.il

Power Supplies



Since its inception in 1983, IXYS Corporation, a Silicon Valley power semiconductor company, has been developing technology-driven products to improve power conversion efficiency. IXYS (Nasdaq: IXYS) is a U.S. pioneer in the development of power semiconductors, mixed-signal integrated circuits and RF power & systems that manage electrical voltage to produce maximum effect with least expenditure of energy. The company has a customer base of over 2000 telecommunications, transportation, industrial, medical and consumer companies. IXYS also provides power semiconductors for wind/solar power equipment. IXYS recently developed solar cells for charging portable batteries in myriad applications.

IXYS Corporation
1590 Buckeye Drive
Milpitas, CA 95035
Contact: Marketing Department
408-457-9004
productinfo@ixyspower.com
www.ixys.com

Raw Materials



Pred Materials is a 100% American company, founded in 1996. We market specialty chemicals and equipment, made mostly in Japan, to support the advanced energy storage industry, fine ceramics, and other high-tech markets. We have a growing line of lithium titanates, nano-sized powders and carbon nanotubes. Most of our products are listed on our web site, with together with technical data: www.predmaterials.com.

We are pleased to be Hohsen Corporation's North American distributor of their laboratory, pilot-scale, and pre-production levels of battery-making parts and equipment.

Pred Materials International, Inc.
60 E. 42nd Street, Suite 1456
New York, NY 10165
Contact: Steve Pred
212-286-0068
steve@predmaterials.com
www.predmaterials.com

Online Buyers Guide is the battery professional's
24/7 guide for:

- ✓ **Buyers**
looking for solutions that you provide
- ✓ **Suppliers/distributors/dealers**
interested in doing business with your company
- ✓ **Investors/partners**
looking for companies in your industry

To get your company connected, place a Storefront advertisement that describes your latest product and service offering. Your Storefront is linked to pertinent categories in the Online Buyers Guide and directly links Online Buyers Guide users to your own website.

View your listing options and pricing!
www.batterypoweronline.com/bppt_qc/q-order-bppt.htm



For more information, contact:
Steve Buschkamp
720-528-3770 x 110
steveb@infowebcom.com



The founders of Maccor designed and built their first computer based automated test system in 1983 for use in the development of a rechargeable Lithium battery. Many consider Maccor to be the pioneer of the modern commercial battery test industry. Maccor's strong nucleus of engineers experienced in emerging battery technologies and computer control systems has enabled the company to experience continued and rapid growth. Today, Maccor designs and manufactures an extensive range of automated test equipment, cell formation, battery recertification, and materials analysis equipment, for use in applications including materials testing, R&D, manufacturing, quality control, and product testing for a wide range of products (i.e. batteries, super-capacitors, fuel cells, etc.) and cell chemistries.

Maccor, Inc.
2805 West 40th Street
Tulsa, OK 74107
918-446-1874
www.maccor.com
m.hulse@maccor.com
Mark Hulse

Raw Materials Continued



Raw Materials Company (RMC) is a unique battery processing facility located in Port Colborne, Ontario, Canada with an additional facility located in Buffalo, New York. RMC specializes in the processing of primary alkaline batteries and rechargeable batteries for recycling and recovery. For 18 years RMC has operated an Ontario Ministry of the Environment permitted processing facility for recycling. RMC has patented processes for the recycling and recovery of metals from spent batteries. As an ISO 14001 registered company since the year 2000, RMC is truly committed to diversion from Landfill through diligent health & safety programs and environmentally sound management of spent waste batteries. Feel free to contact us at: Raw Materials Company (Division of International Marine Salvage Inc.), 1-888-937-3382, nwinger@rawmaterials.com, www.rawmaterials.com

Raw Materials Company
17 Invertose Drive, PO Box 6
Port Colborne, ON L3K 5V7 Canada
Contact: Nicki Winger
905-835-1203
nwinger@rawmaterials.com
www.rawmaterials.com



Ulbrich Stainless Steels and Special Metals, Inc., an international company supplies custom rolled strip, foil, flat, fine and shaped wire products. Ulbrich is involved in the battery industry in our strip and wire divisions. Our strip division supplies materials with stringent tolerances and cleanliness requirements. Our Specialty Wire Group supplies wire rolled from rod. This produces a clean, smooth edge. This technology eliminates burrs and metal slivers. Ultrasonic cleaning produces wire free of dirt and oxides. This highly increases the material's weld ability. Ulbrich developed this process exclusively for Li-Ion components. Ulbrich's rolling technology produces wire with low surface roughness averages (RA).

Ulbrich Stainless Steels and Special Metals, Inc.
57 Dodge Ave.
North Haven, CT 06473
Contact: Doug Napoli
1-800-243-1676
info@ulbrich.com
www.ulbrich.com

AMETEK Specialty Metals Products	www.ametekmetals.com
Battery Research & Testing Inc	www.batteryresearch.com
Canada Battery Inc	www.canadabatteryinc.ca
Carber Power Technologies Inc	www.carber.com
CC "UkrBat". Ex "Lugansk Battery"	www.ukrbat.com.ua
CMW Automation GmbH	www.cmw-automation.com
Communication Services Inc	www.com-serv.com
Coolohm Inc	www.chemconsultants.org
Engineered Materials Inc	www.staticintercept.com
Gami Battery	www.gami.cl
Hadi Maschinenbau GmbH	www.hadi.at
Harbin ZEEMOO Automation Co Ltd	www.zeemoo.com.cn
Indium Corp	www.indium.com
Industrial Battery & Services Inc	www.ibsbattery.com
Infinite Power Solutions	www.infinitepowersolutions.com
JBIC Corp	www.jbicorp.com
Midstate Battery	www.midstatebattery.com
MIRWEC Film Inc	www.mirwecfilm.com
Multi-Contact USA	www.multi-contact-usa.com
Peak Energy Solutions Inc	www.peakbattery.com
Polytronics Engineering Ltd	www.polytronicseng.com
Porous Materials Inc	www.pmiapp.com
Porvair Advanced Materials	www.porvairadvancedmaterials.com
PosiCharge	www.posicharge.com
Power Sources Unlimited Inc	www.psui.com
PowerLogics Co Ltd	www.powerlogics.co.kr
Pred Materials International, Inc.	www.predmaterials.com
Professional Engineering Solutions, Inc	www.pesi-fl.com
PulseTech Products Corp	www.pulsetech.net
QuFu Sacred Sun Power Sources	www.sacredsun.com.cn
Raw Materials Company	www.rawmaterials.com
Royal Battery	www.royalbattery.com
Shenzhen Sunnyway Battery	www.sunnyway-battery.com
Southern California Edison	www.sce.com/electrodrive
Southwest Research Institute	www.fire.swri.org
Sparton Technology Inc	www.sparton.com
Stark Electronics Inc	www.starkelectronics.com
Su-Kam Communication Systems Ltd	www.su-kam.net
Sure Power Inc	www.sure-power.com
T R I A D USA International	www.malltui.com
TecMate (International) NV	www.tecmate-int.com
Terrell Battery Corp	www.terrellbattery.com
Texcel Technology PLC	www.texceltechnology.com
Topin Battery Ltd	www.topinbattery.com
TREIBACHER Industrie AG	www.treibacher.com
Ulbrich Stainless Steels and Special Metals, Inc.	www.ulbrich.com
UniBatt	www.ofek.org.il
Wisconsin Power Control	www.wipowercontrol.com

THERMAL MANAGEMENT & TECHNOLOGY SYMPOSIUM 2008

SEPTEMBER 25-26 • AUSTIN, TEXAS

Thermal Management and Technology Symposium 2008 is a conference highlighting the latest advancements in thermal technology for product design, system development and process management. This event will feature presentations on thermal manufacturing technology, materials and research & development.

Who Should Attend?

- Design Engineers
- System Engineers
- Process Engineers
- Material Scientists
- R&D Managers

Benefits of Attending:

- Optimize your system performance and dependability
- Discuss your specific system needs with technology experts
- Find out the latest market, pricing and manufacturing trends worldwide
- Discover new technologies entering the market

Presentations Will Include:

Evolution of Thermal Management in Electronics
Dr. Richard Hill, Director of Technology, Laird Technologies

The Data Center Cooling Problem Solved: Breakthrough Economization Strategies
Ian Seaton, Technology Marketing Manager, Chatsworth Products, Inc.

Advancements in Heat Transfer Technology
Dr. Girish Upadhy, Director of Applications Engineering, Cooligy, Inc.

Design Guidelines for Vapor Chamber Based Coolers
S. K. Chu, R&D Engineer, CT Electronics Limited

Thermal Management of Future Electronic Products through Airflow Monitoring
Rajesh Nair, CTO and Founder, Degree Controls, Inc.

Platinum RTD Temperature Sensor Technology
Robert Gliniecki, Product Manager, DWM & Associates, Inc.

Smart Control: Process Heating in Three Dimensions
Paul Mills, EIT, Inc.

Computational Fluid Dynamics Using EFD in the Design of Advanced LED-based Lighting Systems
Chris Watson, Senior EFD Applications Engineer, Flomerics

Processing Effects on Indium Solder Thermal Interface Materials
Amanda Whittemore, Applications Engineer, Indium Corp.

Non-intrusive Measurement of Surface Temperature and Heat Flux Transients
Mark J. Mutton BSEE, Project Engineer, Industrial Measurement Systems, Inc.

Going "Off the Curve" in Developing New Thermal Interface Materials
Sara N. Paisner, PhD, Senior Research Scientist, Lord Corp.

Selecting the Best Heat Sink Technology – Lowest Cost is Not Always the Optimum Thermal Solution
Christopher Soule, Engineering Director, Thermshield, LLC

Unique Fanless Air Cooling for LED Lighting
Raghav Mahalingam, Co-Founder and Director of Product Development, Nuventix, Inc.

Contact Joanna Larez, at JoannaL@infowebcom.com or 800-803-9488 ext. 126 for more information regarding the program and possible speaking opportunities.

Become an exhibitor or sponsor at Thermal Management and Technology Symposium 2008! There are packages available to fit every budget. Contact Jeremy Fleming at JeremyF@infowebcom.com or 800-803-9488 ext. 121.

Pre-Conference Workshops

Full Day

Air: The Ultimate Heat Sink
Presented by Tony Kordyban

Advanced Thermal Management Materials
Presented by Dr. Carl Zweben, Advanced Thermal Materials Consultant

Half Day

Temperature Sensing for Embedded Systems
Presented by Microchip Technology, Inc.

Registration Information

Discounted rates are available for government and military personnel. For more details and to register, visit: www.thermalnews.com/TN08_reg.php
• HYATT REGENCY AUSTIN •

Brochure & Final Program Available at: www.ThermalNews.com

Recycling

Rechargeable Battery Recycling Corporation

1000 Parkwood Circle, Suite 450

Atlanta, GA 30339

Contact: Theresa Hall

678-419-9996

thall@rbrc.com

www.rbrc.com

The Rechargeable Battery Recycling Corporation (RBRC) is a non-profit public, service organization dedicated to portable rechargeable battery recycling in the U.S. and Canada.

Standby Power/UPS Systems

Gaia Power Technologies

116 John St., Suite 2320

New York, NY 10038

Contact: Sales Department

212-732-5507

contact@gaiapowertech.com

www.gaiapowertech.com

Extended runtime battery-based backup power solutions for home and business.

Arrgh Manufacturing Co Inc	www.arrgh.com
Associated Equipment Corp	www.associatedequip.com
Avtron Manufacturing Inc	www.avtron.com
Backup Power Systems Inc	www.batterytrending.com
Battery Sales	www.batterysales.com
Carber Power Technologies Inc	www.carber.com
Critical Power Systems, Inc	www.compupower-systems.com
Digatron Industrie-Elektronik GmbH	www.digatron.net
EaglePicher Technologies LLC	www.eaglepicher.com
GMW Associates	www.gmw.com
Hadi Maschinenbau GmbH	www.hadi.at
ISL Products International	www.islproducts.com
IVEK Corp	www.ivek.com
Kinsbursky Brothers Inc	www.kinsbursky.com
LaMantia Products Ltd	www.lamantia.ca
Lester Electrical Inc	www.lesterelectrical.com
OTC/SPX Service Solutions	www.otctools.com
Peak Energy Solutions Inc	www.peakbattery.com
PEC North America Inc	www.peccorp.com
PowerLogics Co Ltd	www.powerlogics.co.kr
Professional Engineering Solutions, Inc	www.pesi-fl.com
Programma Electric AB	www.gepower.com
PulseTech Products Corp	www.pulsetech.net
Rathbone Energy Inc	www.rathboneenergy.com
Rechargeable Battery Recycling Corp	www.rbrc.com
Right Connection Electronics Inc	www.trc12volt.com
Schumacher Electric Corp	www.schumacherproducts.com
Solartron Analytical	www.solartronanalytical.com
Sorfin Yoshimura Tokyo Ltd	www.sorfin-yoshimura.com
Sovema SpA	www.sovema.it
T R I A D USA International	www.malltui.com
Techni-Tool Inc	www.techni-tool.com
TecMate (International) NV	www.tecmate-int.com
Terrell Battery Corp	www.terrellbattery.com
Texmac Inc	www.texmacusa.com
Thexton Manufacturing Co	www.thexton.com
Topin Battery Ltd	www.topinbattery.com
Uniross Batteries (HK) Ltd	www.uniross.com
Vencon Technologies Inc	www.vencon.com

**Storage Battery Systems, Inc**

N56 W16665 Ridgewood Dr.

Menomonee Falls, WI 53051

Contact: Ryan Sberna

Phone: 262-703-5800

Fax: 262-703-3073

ryans@sbsbattery.com

www.sbsbattery.com

SBS provides Flooded, VRLA & Ni-Cad Batteries to Utility & Telecom markets

Aztec Electronics Pty Ltd	www.aztecelectronics.co.za
BAE Batterien GmbH	www.bae-berlin.de
Chloride Eastern Industries Pte Ltd	www.cbsea.com.sg
Delta Electronics Inc	www.deltaww.com
DMS Technologies	www.dmstech.co.uk
Gaia Power Technologies	www.gaiapowertech.com
Interlink Power System Pte Ltd	www.interlinkpower.com
Invensys Controls	www.invensyscontrols.com
Johnson Controls Inc	www.johnsoncontrols.com
Mission Critical West Inc	www.mcwestinc.com
NED Energy Ltd	www.nedenergy.net
NorthStar Battery LLC	www.northstarbattery.com
Optima Batteries	www.optimabatteries.com
Peco II Inc	www.peco2.com
Philtek Power Corp	www.philtek.com
ReliOn	www.relion-inc.com
ResCorp International Inc	www.rescorp.com
Statron AG	www.statron.com
Storage Battery Systems, Inc	www.sbsbattery.com
Tamarac International Corp	www.upsMP.com
Techforce Telecom	www.techforcetelecom.com
Tyco Electronics	www.tycoelectronics.custhelp.com
UltraVolt Inc	www.ultravolt.com
US Energy Network Operations Center	www.usenergysys.com
Wetac BV	www.wetac.nl
Yuasa Batteries France SA	www.yuasa.fr

Supply Chain/Distributor



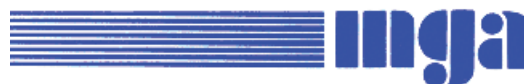
Universal Power Group, Inc. (AMEX:UPG) is a premier supply chain management company specializing in third party logistics services and value-added services, and a leading supplier and global distributor of batteries, Bluetooth products, cellular accessories, security products related portable power products and accessories.

By providing a unique platform of supply chain and third party logistics capabilities, coupled with expanding product lines that focus on meeting increasing consumer needs for accessibility, portability and mobility, we give our customers the added competitive edge to maximize overall operational efficiencies and in turn, facilitate strategic growth.

Universal Power Group, Inc.

1720 Hayden Drive
Carrollton, TX 75006
866-892-1122
sales@upgi.com
www.upgi.com

Testing Services



MGA Research Corporation
12790 Main Road
Akron, NY 14001
Contact: Suzanne Phillips
1-877-2-TESTNOW
suzanne.phillips@mgaresearch.com
www.mgaresearch.com

MGA Research Corporation has been a leader in providing battery testing services for over 25 years. We provide high quality, responsive testing to international regulations and OEM requirements. Contact us to experience the MGA Advantage.

AccuPower Europe	www.accupower.de
Advanced Power Products Inc	www.app-bgl.com
Bonitron Inc	www.bonitron.com
Chroma ATE Inc	www.chromaus.com
E7 Technologies, Inc	www.e7ti.com
EnergyPlex Corp	www.energyplex.com
EnXergy	www.enxergy.com
Ever Corp (Canada) Ltd	www.evercorp.com
GENEREX GmbH	www.generex.de
JFM Engineering Inc	www.jfmeng.com
MGA Research Corporation	www.mgaresearch.com
Sagentia Catella AB	www.sagentiacatella.com
Storage Battery Systems Inc	www.sbsbattery.com
Sypris Test & Measurement	www.fwbell.com/www.wetest.com
Techforce Telecom	www.techforcetelecom.com
TIAX LLC	www.tiaxllc.com

Everything you need to know about the industry. Right in your Box.



Industry News New Products
Exclusive Features
Market Research Industry Events

Subscribe to the Battery Power Industry Report for full industry Coverage:

Visit www.infowebcom.com/newsletters_form.php
To Subscribe to all Webcom industry e-newsletters

Testing Systems & Equipment



Alber is the industry leader in the design and manufacture of storage battery test equipment. Alber manufactures a wide variety of test, diagnostic, and trending products, including data acquisition systems, continuous load units, cell resistance testers CRT-400, single cell test systems, single cell chargers, and battery monitoring and diagnostic systems. Telephone and power utilities, data centers, and other facilities that cannot have power interrupted rely on Alber equipment to ensure the integrity of their emergency power systems. Through knowledgeable and objective problem solving and consultation, Alber has earned respect throughout the standby power battery industry.

Albercorp

3101 N. Andrews Ave.
Pompano Beach, FL 33064

Contact: Sales
800-851-4632
sales@alber.com
www.alber.com



Cadex designs and manufactures advanced battery chargers, battery analyzers and rapid testers, and battery management software. Our award-winning products are built with one goal in mind — to solve battery problems. Cadex products are the preferred choice for industry leaders in wireless communications, emergency services, mobile computing, avionics, bio-medical, automotive and defense applications. Latest innovations include the hand-held, CA-12 featuring Spectro technology capable of measuring capacity in 15 seconds for automotive and mobility applications, and laboratory C8000 battery testing system for battery-powered device developers. Cadex is ISO 9001 and ISO13485 certified and our products are sold in over 100 countries.

Cadex Electronics Inc.

22000 Fraserwood Way
Richmond, BC V6W1J6 Canada

Contact: Sales
604-231-7777
info@cadex.com
www.cadex.com



Arbin Instruments is one of the fastest growing manufacturers of energy-related testing equipment. Combining the global talents of electrochemists, expert electronic and software engineers, and an exceptional customer support staff, Arbin Instruments has revolutionized the automated testing instrumentation market. We offer standard and customized testing solutions for a wide variety of energy-storage devices such as batteries, supercapacitors, and fuel cells. Arbin's focus is exceptional quality, performance, and reliability. Our instruments provide scientists and engineers a tool for performing R&D, quality control, production, and characterization in various markets including Hybrid Electric Vehicles, medical, telecom, military, alternative energy, space, consumer products and others.

Arbin truly is helping to bring clean energy to market!

Arbin Instruments

762 Peach Creek Cut Off Rd.
College Station, TX 77845

Contact: Antony Parulian
979-690-2751
sales@arbin.com
www.arbin.com



Respect for Humanity & Contribution to Society

Established in 1935 Hioki has grown to be a global leader in the development and manufacture of advanced test and measurement instrumentation. Hioki's pledge to its "quality first" policy is second to none! Hioki has earned the international standards recognition of ISO 9001 (Quality) and the ISO 14001 (Environmental - Green) certifications. The use of the HiQS Quality Control System and the HiPS Production System techniques ensure a timely release of high quality products. The dedication of our R&D staff of 130 engineers continue to develop state of the art instruments to meet tomorrows needs.

Hioki USA Corporation

6 Corporate Drive
Cranbury, NJ 08512

Contact: Wayne Price
609-409-9109
wayneprice@hiokiusa.com
www.hiokiusa.com



Maccor Inc. was the pioneer, and is the world's largest commercial manufacturer of Automated Test Systems adaptable to a wide range of products (i.e. batteries, super-capacitors, fuel cells, etc.) and battery chemistries. The founders of Maccor designed and built their first computer based test system in 1983. Maccor's range of equipment not only provides standard discharge and cycle testing but is capable of sophisticated pulse testing, together with high-speed data acquisition and interface with smart battery packs. In addition, cyclic voltammetry, 3-electrode, and AC Impedance experiments can be performed. Today Maccor has over 1,500 systems in more than 40 countries with local sales and customer support services available in many areas.

Maccor, Inc
2805 W 40th St.
Tulsa, OK 74107
Contact: Mark Hulse
918-630-2256
m.hulse@maccor.com
www.maccor.com



Slaughter Test Systems provides innovative, dependable solutions for electrical test and measurement. STS Battery Element Testers provide a unique method for the detection of assembly level insulation defects in lead-acid batteries, including missing and damaged separators. STS serves a wide variety of industries including manufacturers of motors, windings, electromechanical devices, coils and lead-acid batteries. Worldwide customers include leading manufacturers of appliances, automobiles, home & garden equipment, power tools, batteries and industrial controls.

Slaughter Test Systems
801 Hailey Street
Ardmore, OK 73401
580-223-4773
Sean Snyder
sales@slaughtertest.com
www.slaughtertest.com

Now Available Electronically!

Subscribe today to

**BATTERY POWER
PRODUCTS & TECHNOLOGY**



New Products,
Company and Industry News,
R&D, Market Trends,
Feature Articles and
Industry Events

For a new subscription, or to renew
your current subscription go to:

www.BatteryPowerOnline.com/bppt_sub.php
and select Print or Electronic Edition

Testing Systems & Equipment Continued

Advanced Power Products Inc	www.app-bgl.com
Albercorp	www.alber.com
Applied Electronics Labs Ltd	www.ael.lv
Arbin Instruments	www.arbin.com
Automation Engineering LLC	www.automationengineering.org
Aztec Electronics Pty Ltd	www.aztecelectronics.co.za
BatteryTest Inc	www.batterytestinc.com
Bonitron Inc	www.bonitron.com
Cadex Electronics Inc.	www.cadex.com
Chroma ATE Inc	www.chromaus.com
Command Solar Engineering	www.commandsolar.com
Cressall Resistors Ltd	www.cressall.com
Dataforth Corp	www.dataforth.com
Digatron Industrie-Elektronik GmbH	www.digatron.net
Dynamic Power Solutions	www.dynamicpowersolutions.com
Emerging Power Inc	www.emergingpower.com
EnerSys	www.enersys.com
EnXergy	www.enxergy.com
GENEREX GmbH	www.generex.de
Hioki USA Corporation	www.hiokiusa.com
Holzberg Communications Inc	www.holzberg.com
JFM Engineering Inc	www.jfmeng.com
Maccor, Inc	www.maccor.com
MarathonNorco Aerospace Inc	www.mptc.com
Midtronics Inc	www.midtronics.com
NEXcell Battery Co Ltd	www.nexcell-battery.com
Precision Tool & Engineering	www.ptefl.com
Slaughter Test Systems	www.slaughterstest.com
Storage Battery Systems, Inc	www.sbsbattery.com
TIAX LLC	www.tiaxllc.com
VIASPACE Corp	www.viaspace.com
Wetac BV	www.wetac.nl
XenoEnergy Co Ltd	www.xenoenergy.com

Watering Systems

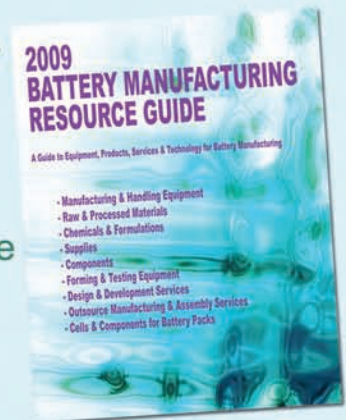
Battery Filling Systems	www.batteryfillingsystems.com
Electra Start Inc	www.electrastart.net
EnerSys	www.enersys.com
Glascock International LLC	www.glascockinternational.com
HOPPECKE Batteries Inc	www.hoppecke-us.com
Shenzhen Center Power Tech Co Ltd	www.vision-batt.com
Strong's Plastic Products Ltd	www.strongs.co.uk

2009 BATTERY MANUFACTURING RESOURCE GUIDE

Equipment, Products, Services & Technology for Battery Manufacturing

The annual Battery Manufacturing Resource Guide will be distributed to 20,000 influential buyers and integrators of battery manufacturing equipment, supplies, materials, components and services worldwide.

Primary, secondary and battery pack manufacturers will use this guide as a comprehensive view of products and services available.



The Resource Guide publishes in December 2008, with a 20,000 worldwide distribution.

To make sure your company is featured, contact Jeremy Fleming at 720-528-3770 ext 121 or at jeremyf@infowebcom.com.

Reserve your copy today at
www.BatteryPowerOnline.com

2008 ANTENNA SYSTEMS CONFERENCE

SEPTEMBER 25-26
HYATT REGENCY AUSTIN
AUSTIN, TEXAS

BRINGING YOU THE LATEST ADVANCEMENTS IN ANTENNA SYSTEMS & TECHNOLOGY

2008 KEYNOTE SPEAKERS



Standards Will Fuel the Spread of Wireless Network Technologies

Barry Blount
Director of Business Development,
GreenPeak Technologies



Increased Performance with Antenna Enhancements in 3G And Next-Gen Technology

Dr. Rao Yallapragada
Senior Director,
Qualcomm Mobile Broadband

WHAT TO EXPECT

- More than 35 technical sessions from leading wireless service providers
- Interactive exhibit hall featuring new products and technology
- Informative Pre-Conference Workshop
- Numerous networking opportunities with peers, technical experts and potential business partners
- Learn how new technology will impact your product performance

WHO SHOULD ATTEND

- OEM Design Engineers & Development Managers
- System Design Engineers & Managers
- Systems Integrators / Value Added Resellers
- Component Manufacturers & Providers
- Antenna Manufacturers
- Product Managers Seeking New Applications, Technology & Partnering Opportunities
- Wireless Professionals Intent on Staying Up-to-Date with the Latest Cutting-Edge Technology

SPEAKERS TO INCLUDE

- Antenova Ltd.
- ETS-Lindgren
- West Technology Research
- Ethertronics
- Georgia Institute of Technology
- Powerwave Technologies, Inc.
- Andrew Wireless Solutions
- KMW Communications
- Consumer Electronics Association
- Maxtena, Inc.
- Arlon-MED
- AMANT Antennas
- Agile RF
- SkyCross, Inc.
- Monarch Antenna
- Bluetooth SIG
- ARINC
- Agilent EEs of EDA
- CST of America
- Selex Communications
- USDigiComm Corp.

AND MANY MORE

FINAL PROGRAM AVAILABLE ONLINE AT
WWW.ANTENNASONLINE.COM



For more information
contact Jeremy Martin
720-528-3770 Ext. 118
jeremym@infowebcom.com
www.antennasonline.com

SEPTEMBER 25-26 ▾ AUSTIN, TEXAS ▾ WWW.ANTENNASONLINE.COM

Alber Corp.	47	Pred Materials International Inc.	11
	www.alber.com		www.predmaterials.com
Arbin Instruments.	33	Quallion.	2
	www.arbin.com		www.quallion.com
Charles Industries.	15	Sanyo.	5
	www.charlesindustries.com		www.sanyobatteries.com
Energy Access Inc.	35	Slaughter Test Systems.	21
	www.energyaccess.com		www.slaughterstest.com
EVE Battery.	31	SouthWest Electronic Energy.	29
	www.evebattery.com		www.swe.com
Hioki USA Corp.	48	Texas Instruments.	13
	www.hiokiusa.com		www.ti.com
IXYS Solar.	23	Ulbrich Stainless Steels and Special Metals, Inc.	19
	www.ixyscolorado.com		www.ulbrich.com
Kepeco.	35	Universal Power Group Inc.	17
	www.kepcochargers.com		www.upgl.com
Keystone Electronics Corp.	7	Webcom Communications	9, 24, 25, 37, 39, 45
	www.keyelco.com		www.infowebcom.com
Maccor Inc.	37		
	www.maccor.com		

Calendar of Events

September

4-5 - Battery Power 2008, New Orleans, La. Contact Webcom Communications at 720-528-3770 or at www.BatteryPowerOnline.com

14-18 - Intelec 2008, San Diego, Calif.

23-26 - 11th European Lead Battery Conference, Warsaw, Poland

October

8-10 - Batteries 2008, French Riviera

November

5-6 - Remote 2008 Conference & Expo, Atlanta, Ga.

December

1-5, MRS Fall, Boston, Mass.

**Send Calendar of Event Items to
Shannon Given at
ShannonG@infowebcom.com**



The **\$36 billion** energy storage/battery market is evolving at a rapid pace. Frost & Sullivan identifies the best areas for growth, allowing your company to capitalize on key opportunities in the market.

For more information, contact johanna.haynes@frost.com.

www.frost.com FROST & SULLIVAN

**Job Opening?
Equipment for Sale?**

Place a Classified Ad!

**Contact Jeremy Fleming at
jeremyf@infowebcom.com
for details.**

Battery Test Equipment you can trust!

CRT-400 The Cellcorder®

- Albér Reliability
- Flexible Clamps
- Lighted Probe Options
- New USB Flash Drive for Data Transfer
- Bluetooth® Capable Interface

The Cellcorder is a test instrument for battery condition assessment. Albér's patented internal resistance measurement method is the best way to detect early signs of battery performance problems.



Easy to use interface, test connection options for every application, and powerful trending, analysis and reporting software allow you to do your job without wasting time.

Log on to www.alber.com for more information about Cellcorder and Albér's technology

Alber

Battcon International Battery Conference
Visit www.battcon.com for details.

Trust Your Batteries™

Albécorp

3103 N. Andrews Ave. Extension / Pompano Beach, FL 33064 / Phone: 800.851.4632 / Fax: 954.623.6671
Internet: www.alber.com / email: sales@alber.com

For a Dependable Diagnosis...



starting at
\$2,495



60VDC
maximum
between
terminals

3554 Battery HiTester

- 60 Volt Range
- Auto-hold & Auto-Data Storage
- Enhanced resistance against UPS noise
- Store up to 4800 sets of data
- USB PC Interface
- Data management PC software

...you need products you can depend on.



\$1995

**3197
Power Quality Analyzer**

Measures:

- Power & Power Factor
- Active/Reactive Energy
- Demand kWh
- Load Changes (graph display)
- Transient voltage/inrush current



\$439⁹⁵

**3453
Digital MΩ HiTester**

Efficient Insulation Measurement

- 125 V/40 M, 250 V/2000 M, 500 V/2000 M, 1000 V/4000 M
- Backlit Digital Display
- Built-in memory
- Auto discharge



\$219⁹⁵

**3454-11
Digital MΩ HiTester**

Insulation Resistance Tester

- 250 V DC/500 V DC/1000 V DC
- Comparator function
- AC Voltage up to 750V
- Built-in safety cover
- Auto discharge



\$2495

**3455-01
High Voltage HiTester**

5KV Compact Performance

- Test Voltage 250V to 5kV
- Measure insulation of high voltage equipment up to 5T Ω
- Auto Calculate & Display PI and DAR
- Data Storage & USB Interface

HIOKI

6 CORPORATE DRIVE • CRANBURY, NEW JERSEY
PHONE: 609.409.9109 • FAX: 609.409.9108
www.hiokiusa.com

floor space savings are at the expense of reliability. Decisions must be made based on the reliability requirements.

3. Early problem detection is the key to reliability. Pro-active testing and state of health monitoring is a must when failure is not an option.
4. Capacity testing is the most reliable way to determine a battery's state of health; and a monitor must be capable of supporting or conducting this test.
5. New batteries are delivered without being fully formed. Therefore an acceptance test may show 90 to 100 percent capacity. This is not a problem.
6. Do not accept a new battery installation until all cells/modules float within the manufacturers specified limits. A lot of battery problems appear early on and can be prevented. If cells do not float uniformly, then the low cells will sulfate and have low capacity problems. The high floating cells will gas excessively, venting out electrolyte and running the risk of going into thermal runaway.
7. When replacing faulty cells/modules, make sure the replacement cell/module is fully charged and is the same exact model. Some users/service companies replace cells/modules without paying attention to how the replacement module floats with respect to the rest of the battery. Typically a fully charged new battery will float at a much higher voltage than the rest of the string and therefore runs the risk of going into thermal runaway.
8. Some monitors offer voltage management, which controls the individual cells/module voltage. This is not a good idea. If a cell is having internal problems that cause the voltage to deviate from the norm, then that problem will be masked by forcing the cell voltage to be in line with all the rest. This control will mask what is really going on beneath the cover of that cell.
9. The benefits of monitoring outweigh the sometimes short-sighted financial decisions:
 - a. The price of a monitor is insignificant in comparison with the cost of a failure. This does not even consider the cost of customer goodwill.
 - b. With monitoring, maintenance people can now focus on problem resolution instead of being data collectors
 - c. Warranty data is collected 24/7
 - d. Avoid abrupt power failure that could damage equipment
 - e. Keep maintenance people safe by reducing their exposure to dangerous high voltages
 - f. Avoid potential hazardous situations like battery room fires; by proactively replacing bad cells/modules and identifying bad/loose inter cell connections.
10. All monitors are not created equally. Do your homework and specify the required features to ensure a safe and reliable system.

Monitoring the Monitor

Now we know what the monitor can and should do, but all that pertinent information is wasted unless someone is monitoring the data and managing the system. It doesn't matter whose monitor is used or how good it is, if the system owner does not close the loop, system failure is sure to follow.

In a tough competitive world, it is hard to justify additional specialized personnel on the payrolls. Each company has its own ideas and philosophy on how to deal with this issue.

However, a system failure resulting in millions of dollars worth of damage cannot be tolerated, so a choice between in-house trained personnel versus outsourcing must be made.

There are several service companies around the country that offer Battery Monitoring Services. There are also companies that will analyze data from the monitor sent to them, and then advise the battery owner what corrective action is required. There are also large companies working on a business plan to offer customers reliable power. These plans are based on the provider supplying the UPS, the

batteries and the service required. Service may or may not include battery monitoring with remote access.

Summary

Be aware that monitor selection and user follow-on support are key to maintaining a failure-free battery system. The only way to approach the 100 percent guarantee that was mentioned earlier is to install a full-function monitor and to be diligent with taking the appropriate actions based on the information gathered from the monitor.

There is no substitute for doing it right. Why waste your company's money on a monitor that does not substantially improve the system reliability and that provides no financial paybacks?

References

- 1: *Guaranteeing Battery System Performance*. Sept 1995, *Power Quality Conference*, Glenn Alber & Marco Migliaro

Contact Alber at www.alber.com.

Remote 2008

CONFERENCE AND EXPO

SCADA, Device Networking, M2M, Wireless Technology, Onsite Power, And Security for Remote Sites and Equipment

Onsite Power Sessions Highlight Remote 2008!

No other industry conference brings together technology users that manage remote sites like the Remote 2008 Conference and Expo. Over 50 conference sessions will provide cutting-edge technology direction and application strategies from the companies and users driving the growth in SCADA, M2M, device networking, data communications, system & site security, emerging wireless technology, remote monitoring and automated control, and onsite powering of distributed equipment, networks and facilities.

Onsite and Back up Power Sessions Include:

- Remote Monitoring for Large Scale Renewable Energy Systems
 - Mythos Solar Energy, Inc.
- Battery Powering and Monitoring Considerations for Remote Locations
 - Interstate PowerCare
- The New Alternative: Direct Methanol Fuel Cells for Remote Power
 - Smart Fuel Cell
- The Ten Commandments of Solar Design
 - Solarcraft, Inc.
- Flywheel Technology Provides Energy Efficient and Sustainable Back-up Power
 - Pentadyne Power Corp.
- Ultra Low-Cost Power Quality and Energy Measurement Technology
 - Power Standards Lab
- Telecommunications Installation for Truly Extended Run Backup Power
 - IdaTech

Registering at www.RemoteExpo.com
 Save \$300 if you sign up by Sept. 13th
 Huge Team Discounts!

NOVEMBER 5-6, 2008 - ATLANTA, GA.

Preventative Maintenance is the Best Defense To Downtime

Henry Hu, Service Product Manager
Liebert Services

As organizations become increasingly dependent on data center systems, there is a need for great reliability in the critical power system. For many organizations, the IT infrastructure has evolved into an interdependent business-critical network that includes data, applications, storage, servers and networking. A power failure at any point along the network can impact the entire operation and have serious consequences for the business.

To keep running through power outages, utility spikes and other unforeseeable power issues, critical systems are dependent on the reliability of the UPS system.

While the UPS systems are designed to offer the utmost reliability and performance at an affordable price, they are not failure prone. Factors, such as application, installation, design, real world operating conditions and maintenance practices can impact the reliability and performance of the UPS systems. Remember, the reliability of a system only lasts as long as the shortest component life in the unit. However, some manufacturers, including Liebert, are addressing this issue by reducing the number of parts that need to be replaced, thus decreasing the chance of a failure.

However, the reality is failures still occur, therefore being proactive with its maintenance can greatly reduce your chances for downtime.

Preventative Maintenance is the Key

One way end users can minimize unit-related failures is to institute a comprehensive Preventative Maintenance (PM) program that is implemented by original equipment manufacturer (OEM) trained and certified technicians. When equipment is not maintained especially in adverse conditions, such as dirty environments and/or high temperatures, it can result in system deterioration up to and including load loss.

PM programs maximize the reliability and performance of the Uninterruptible Power Supply (UPS) systems on which organizations depend on critical systems running. When correctly implemented, PM visits ensure maximum reliability of data center equipment by providing systematic inspections, detection and correction if incipient failures, either before they occur or before they develop into major defects that could translate into costly downtime. Typical PM programs include inspections, tests, measurements, adjustments, parts replacement and housekeeping practices.

Frequency of PM Depends on the UPS

The frequency of PM visits depends on the type of UPS being utilized in the organization. Small UPS devices, like the GXT product line, should be inspected annually. For medium and large systems, it's recommended that inspection take place at least twice a year to ensure proper function and confirm that the unit is operating within the manufacturer's specifications.

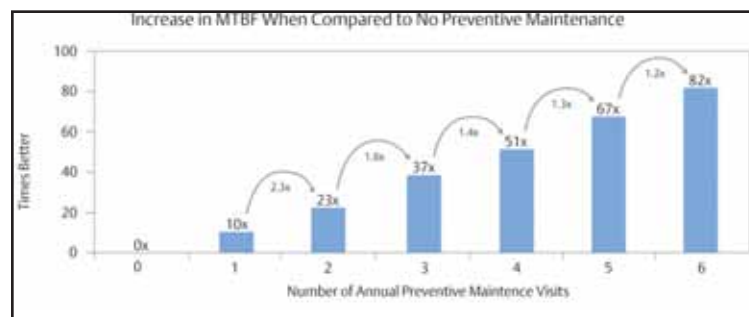


Figure 1. An increase in the number of annual preventive maintenance visits increases the MTBF.

For VRLA batteries that have been in service for four or more years, an evaluation is in your best interest. This is important because of the fact that even a single bad cell in a string of batteries could compromise your entire backup system, leaving you without protection. By proactively replacing batteries, this will help to keep your system running up to specifications and minimize the risk of downtime to your business operations.

Benefits of PM

PM has a number of benefits for the end-user. First, better reliability is delivered by adding another layer of redundancy. This is achieved by combining leading service with cutting-edge equipment.

Other benefits include extending product lifecycle and optimizing capital expenditure for the equipment. Also, by providing risk management at a fixed cost, this aids in budget preparation and promotes fiscal responsibility. Also, PM gives you better control of the business environment.

Semi-Annual Service

- Perform a temperature check on all breakers, connections and associated controls. Repair and/or report all high temperature areas.
- Perform a complete visual inspection of the equipment including subassemblies, wiring harnesses, contacts, cables and major components. Check air filters for cleanliness.

2009 ONSITE POWER RESOURCE GUIDE

Guide to Manufacturers, Distributors, Integrators and Suppliers Standby, Back-up, Uninterruptible & Off-Grid Power Systems

The annual Onsite Power Resource Guide will be distributed to 50,000 influential executives and managers of facilities, mission-critical equipment, remote & emergency operations in North America.

Managers, engineers and service professionals will use this guide as a comprehensive view of products and services available.

The Resource Guide publishes in December 2008, with a 50,000 North American distribution.

To make sure your company is featured, contact Scott Nash at 303-317-2505 or at scottn@infowebcom.com

Reserve your copy today at www.RemoteMagazine.com

Online Buyers Guide is the battery professional's 24/7 guide for:

- **Buyers** looking for solutions that you provide
- **Suppliers/distributors/dealers** interested in doing business with your company
- **Investors/partners** looking for companies in your industry

To get your company connected, place a Storefront advertisement that describes your latest product and service offering. Your Storefront is linked to pertinent categories in the Online Buyers Guide and directly links Online Buyers Guide users to your own website.

View your listing options and pricing!
www.batterypoweronline.com/bppt_qc/q-order-bppt.htm

For more information, contact:
Steve Buschkamp
720-528-3770 x 110
steveb@infowebcom.com

- Check module(s) completely for rectifier and inverter snubber boards for discoloration, power capacitors for swelling or leaking oil and DC capacitor vent caps that have extruded more than 1/8 inch.
- Record all voltage and current meter readings on the module control cabinet or the system control cabinet.
- Measure and record harmonic trap filter currents.

Annual Service

- Perform a temperature check on all breakers, connections and associated controls. Repair and/or report all high temperature areas.
- Perform a complete visual inspection of the equipment including subassemblies, wiring harnesses, contacts, cables and major components. Check air filters for cleanliness.
- Check module(s) completely for rectifier and inverter snubber boards for discoloration, power capacitors for swelling or leaking oil and DC capacitor vent caps that have extruded more than 1/8 inch.
- Record all voltage and current meter readings on the module control cabinet or the system control cabinet.
- Measure and record harmonic trap filter currents.
- Check inverter and rectifier snubbers for burned or broken wires.
- Ensure all nuts, bolts, screws and connectors for tightness and heat discoloration.
- Verify fuses on the DC capacitor deck for continuity (if applicable).
- With customer approval, perform operational test of the system including unit transfer and battery discharge.
- Calibrate and record all electronics to system specifications.
- Install or perform Engineering Field Change Notices (FCN) as necessary.
- Measure and record all low-voltage power supply levels.
- Measure and record phase-to-phase input voltage and currents.
- Review system performance with customer to address any questions and to schedule any repairs.

Don't Forget About Battery Service

One important procedure performed during the UPS Semi-Annual and Annual PM Service is the inspection of the battery. This includes checking for NO-OX grease or oil on all connections, ensuring battery jars have proper liquid levels (if flooded cells), checking for corrosion on all terminals and cables; and examining the physical cleanliness of the battery room and jars. It's also important to measure and record DC bus ripple voltage (if applicable) and total battery float voltage. While these visual inspections are steps in PM, it is not intended to replace a full preventive maintenance program for the battery system.



Figure 2. It is extremely important to make sure batteries are operating properly and within manufacturers' specifications. In fact, your battery warranty may even be voided if proper maintenance is not provided.

Full Preventive Maintenance Service

- Full PM Service usually requires a shut-down to ensure electrical connection integrity.
- Perform a complete visual inspection of the internal sub-assemblies, wiring harnesses, contactors, cables, major components and check for proper clearance around the unit.
 - Examine all transformer, terminal block and ground/neutral bus bar connections as well as input and output breaker(s) for tightness.
 - Inspect high and low voltage junction box terminals for tightness.
 - Inspect all option wiring for tightness (spike suppressor, ground fault, phase rotation/loss).
 - Inspect all capacitor bank connections for a solid fit.
 - Verify that all cooling fans are functional and air ducts are open.
 - Confirm continuity of all fuses and that they are correctly rated.
 - Measure input and output phase to phase voltage.
 - Determine the output, neutral and ground current.
 - Verify KVA load and capacity per phase.
 - Validate grounding electrode conductor and any isolated grounds.
 - Measure all filter capacitor currents at no load for

- all three phases (if applicable).
- Measure primary, secondary, second harmonic and third harmonic (if applicable). All should be balanced within 2.5 percent deviation.
- Verify EPO lamps are illuminated.
- Check that the local and remote EPO's are functioning properly (if permitted).
- Confirm that the monitor is recording within +/- 2 percent of those values measured.
- Activate the transformer over-temp alarm and shut down circuits to confirm proper operation (if permitted).
- Verify the operation of any option for alarm or shut-down sequence (if permitted) and of any customer alarm circuit(s) and specified messages.
- Make sure of specified restart capabilities (manual or auto-restart).
- Verify the operation of the bypass switch and the bypass transformer over temp alarm (if applicable).

There are also preventive measures for desktop power management tools, including surge suppression and smaller UPS systems. Ensure the unit performs a battery test regularly and proactively replace batteries / UPS before they fail. These units are mainly swapped out when defective.

Once You Choose Your PM Strategy, Let Professionals Handle It

Most preventive maintenance measures should be left to qualified persons. UPS and batteries contain high voltage among other things, and only qualified personnel should attempt preventive maintenance or repair. End users can provide preventive support such as replacing air filters when dirty, ensuring environmental specifications are met and monitoring the UPS for alarms.



Figure 3. For customers who require the highest level of service response for their critical cooling and power systems they should employ a tried and true professional account management group. Securing a comprehensive offering designed to provide service support, critical facility information and customer relationship management will pay off over time.

When choosing a service provider, seek out a group that offers a comprehensive portfolio of services. Service can be customized to satisfy customer requirements. In addition, preventive maintenance service, service contracts should include, 24 x 7 emergency services, parts replacement, a variety of end-user training seminars detailing best practices and service tips for end-users. The service provider should provide access to highly trained technicians that engage in ongoing industry training.

For more information concerning service capability for your entire facility infrastructure contact 1-800-543-2378 or view additional information at: www.liebert.com/servicesupport_pages/ServiceSupport.aspx?x=servicesupport.

Energy Access Incorporated *Battery Charging Specialists*

New Integrated Bullet Charger Series

2S, 3S, 4S Lithium Charger

Universal Input (AUS, EU, UK Adapters)

A High Quality/ Low-Cost Solution

- Lithium Ion / Lithium Polymer (up to 4S)
- Nickel Metal Hydride (up to 14S)
- Wall-Mount Charger
- U.S. Plug in Charger Housing (Folding Prongs)
- Proper Charge Termination
- Charge Top-off and Restart
- LED Indication
- Easily Customized
- Regulatory Markings: UL, CE, FCC Class B
- CEC Efficiency Rating: IV

Smart Bus Battery Series Intelligent Charging Series Integrated Bullet Series
Qualified Sourced Consumer Chargers Accessories

Energy Access, Incorporated • 5344 W. 79th Street • Indianapolis, IN 46268
Voice: 317-496-8044 Fax: 317-337-0019 • www.EnergyAccess.com ISO 9001:2000 Certified

CHARGE IT!

KEPCO'S ENGINE-START BATTERY CHARGERS

The KEPCO KES product line is uniquely suitable for any engine-start application. The KES offers the latest in switch mode power supply technology. While most engine-start chargers do not require an electrically quiet output, the KES boast communications quality output, at a switchgear charger price. The KES is also suitable as a battery eliminator.

FEATURES

- Single-Rate Charger
- Analog Current Meter
- Form C Charge Fault Output
- Temperature Compensation (Optional)
- Local/Remote ON-OFF

KEPCO MODELS AVAILABLE

- KES 12-20, 12V/20A
- KES 12-40, 12V/40A
- KES 24-10, 24V/10A
- KES 24-20, 24V/20A
- KES 24-50, 24V/50A
- KES 48-5, 48V/5A
- KES 48-10, 48V/10A
- KES 48-25, 48V/25A

www.kepcochargers.com

AN ISO 9001 COMPANY
KEPCO
THE POWER SUPPLIER™
SINCE 1946

KEPCO INC. • 131-38 Sanford Avenue,
Flushing, NY 11352
Tel: (718) 461-7000 • Fax: (718) 767-1102
Email: hq@kepco.com

The Automotive Dream for Energy Storage

Anu Elizabeth Cherian, Industry Analyst
Frost & Sullivan

In the wake of the global oil crisis, several new technologies strive to become a viable alternative to petroleum. A particular area of interest is the transportation segment where the consumption is an average of over 20,000 barrels of oil per day.

Rising demand and inadequate supply are factors that have led the US government to impose tougher fuel economy rules. These factors, along with a dramatic shift in consumer attitude toward fuel efficiency, have caused automakers to radically shift their global strategy. In many respects, Toyota has forged ahead to find their niche with the Prius and the nickel metal hydride battery. Their popularity not only reflects in year-over-year sales, but additionally earns the company green credits. This accomplishment is attributed to careful planning since the 1990s.

Whatever one chooses to call this phenomenon, forward thinking or the next road-to-market plan, the results span well for Toyota. In June of 2008, oil prices reached all-time highs. Some gas station owners are forced to leave their businesses as economics suggest the threat of bankruptcy due to increasing oil prices. The market is forced to speculate and forward-looking statements from several automakers indicate a drive for cheaper fuel alternatives. In the short term, manufacturers are quickly developing hybrid systems to reduce reliance on petroleum.

Current available energy storage options for hybrid vehicles include traditional lead acid (flooded, deep cycle and VRLA), nickel cadmium, nickel metal hydride and lithium-ion.

Despite many options, the grim reality indicates that none of these chemistries can provide sufficient energy density within the operational requirements of the automobile. If one of these chemistries successfully works for an automobile, this can provide a major boost to current fuel economy levels.

Lead-acid batteries are certainly the most mature technology, but global lead-acid manufacturers face a predominantly declining market. In addition, lead-acid batteries cannot supply the necessary power density. On the other hand, nickel-metal-hydride chemistry is a technology that has found its niche in hybrid vehicle technology. It is predominantly used in the hybrids created by Toyota, Honda, Nissan, Ford, GM and Chrysler. To date, lithium-ion technology has not made it to production vehicles. Several manufacturers are racing to make lithium technology viable and part of production vehicles on or before the year 2010.

Peripheral Value Additions for Energy Storage

The interesting part of the global energy storage market is the fact that we have alternatives in flywheels and ultracapacitors that can add value to existing technology to create a new revolution in the automotive sector.



Innovations

An example of one such innovation is a two wheeler recently found in the Asian subcontinent; a vehicle powered by wind and solar energy. A demonstration of a prototype reveals there is potential; however, there are many more hurdles to cross before this highly innovative technology takes over.

The ultracapacitor is seen as a solution that specializes in capturing energy derived from regenerative braking. It is also seen by many car manufacturers, such as BMW, as a component that can serve to enhance fuel economy while maintaining a performance-oriented driving experience.

A common feature of the flywheel and the ultracapacitor is the short run time. The power density, however, is high and helps to provide burst power for stop-and-go applications.

So, what are the real options both theoretically as well as practically?

The nickel-metal-hydride cells used by all hybrid vehicles as of 2008 are the only commercially viable technology for the hybrid electric vehicle. Its success is attributed to its ability to provide reasonable energy density, along with a fairly large amount of power density to keep up with automotive power demands. It has increased the fuel efficiency factor and has enabled the onset of the green outlook in the automotive world.

Moving forward, we can say there is light at the end of the tunnel when technological progress reduces overall fuel consumption in the transportation market by 50 percent. Many are sceptical that advances to battery chemistry will happen in the near future. These advances are paramount to the introduction of extended range electric vehicles like the Chevrolet Volt.

The battery needed for the Chevrolet Volt is presently a non-existent battery chemistry. This battery has peak power density as provided by an ultracapacitor. It also has the best energy density. Although theoretically possible, practical considerations, cost in particular, weigh heavy on the horizon. So which technologies can tolerate each other to make the marriage work between the car and the ultimate fuel efficiency? The current and most keenly observed areas are the use of an ultracapacitor in tandem

with a lithium-ion battery.

The world will be curiously watching the road in 2010 to see if General Motors, or some other manufacturer, can fill the road with ultra-efficient, near-zero emission vehicles. If successful, you can be sure that under the hood lies the latest in technological innovation.

Anu Elizabeth Cherian is an Industry Analyst with Frost & Sullivan's North American Energy & Power Systems practice. She focuses on monitoring and analyzing emerging trends, technologies, and market dynamics in the energy storage, alternative energy, power supplies, and power quality industries worldwide. Since joining Frost & Sullivan in April 2005, Cherian has completed several research studies and consulting projects on ultracapacitors, fuel cells, flywheels, UPS, and DC power systems focused on telecommunications and power factor correction capacitors.

For more information regarding this article, please contact Johanna Haynes at johanna.haynes@frost.com.

Eaton continued from page 11

Green: Companies striving to be environmentally-friendly may want to avoid large transformers if possible. Iron and copper, materials that are expensive (see Figure 2) and non-renewable, make up much of the composition of transformers.



Figure 2. Copper Price Chart

Also, the building process of transformers often involves dipping them in an environmentally hazardous, chemical varnish and baking them in an oven, emitting harmful fumes. While UPS products still contain some copper and iron, the elimination of the transformer significantly decreases the energy required for production and supports the green nature of the product.

Overall, the new transformer-free topology with small and lightweight filter inductors, high performance IGBTs in both inverter and rectifier, and advanced control strategies can bring improved performance and value to an organization. Compared to legacy UPS topology designs, a transformer-free UPS is typically only 25 percent the weight and occupies 60 percent the footprint. Low input THD (<4.5 percent at full load) and high input power factor (>0.99) are supported down to nearly 10 percent load without the need for an additional input filter. In addition, full load efficiency can reach 94 percent and above. The packaging can be designed so that cooling and wiring do not require side or rear access or clearance. With these new benefits, this technology-intensive design will become the preferred topology.

Ed Spears is a product marketing manager in Eaton's Critical Power Solutions Division in Raleigh, N.C. A 28-year veteran in the power systems industry, Spears has experience in UPS systems testing, sales, applications engineering and training—as well as working in power quality engineering and marketing for telecommunications, data centers, cable television and broadband public networks. He may be reached at EdSpears@Eaton.com.

George Oughton is an engineering specialist at Eaton's Critical Power Solutions Division in Raleigh, N.C. Oughton has more than 30 years' experience in the power systems industry with an expertise in high frequency power conversion: HF motive chargers, HF telecom rectifiers, CATV standby supplies, HF PWM UPS: single and three phase, and PWM motor drives. He has achieved more than a dozen patents. He may be reached at GeorgeWOughton@eaton.com.

Global Market for Portable Battery Powered Products Worth \$461.5 Billion by 2013

According to a new technical market research report, "Portable Battery-Powered products: Global Markets" from BCC Research, the global market for portable battery-powered products was worth \$425.3 billion in 2007. This is expected to increase to \$443.2 billion in 2008 and \$461.5 billion by the end of 2013, a compound annual growth rate (CAGR) of 0.8 percent.

The market is broken down into applications for communication, entertainment, computer, navigation, camera, timepiece, tools, lighting, toy and novelty, medical, scientific and military. Of these, communication products have the largest share of the market. Valued at \$127.6 billion in 2007 and an estimated \$135.2 billion in 2008, this segment is expected to decline to \$120.0 billion in 2013, a CAGR of -2.3 percent. This decline is due to a convergence of function seen in PDAs and smartphones that causes individual markets to shrink as new converged markets grow.

Computer products, the second largest segment, was worth \$98.0 billion in 2007. It is expected to reach \$103.0 billion in 2008 and \$118.7 billion in 2013, for a CAGR of 2.8 percent. Medical products also represent a significant share of the market, generating \$66.1 billion in 2007 and an estimated \$68.6 billion in 2008. This should increase to \$94.0 billion in 2013, for a CAGR of 6.5 percent.

The fastest growing segment is expected to be military products. This segment was worth \$1.3 billion in 2007 and is expected to increase to \$1.8 billion in 2008 and \$3.2 billion in 2013, a CAGR of 12.0 percent.

The key technology that enables these portable products is the \$72 billion worth of batteries used to provide power. Although advanced high-energy battery systems, like lithium-ion and nickel-metal-hydride, have gained the most attention, primary alkaline batteries are still widely used. Battery chargers remain a smaller market. In 2007, 2.1 billion internal and external battery chargers worth \$43 billion were used with portable battery-powered products.

USABC Awards \$12.9 Million Battery Technology Development Contract to Compact Power, Inc.

The US Advanced Battery Consortium (USABC) has awarded a \$12.9 million plug-in hybrid electric battery technology development contract to Compact Power, Inc. (CPI). USABC formally awarded the contract earlier this year, in collaboration with the US Department of Energy

(DOE), which previously announced the award, pending agreement on all terms and conditions. The 27-month cost-share contract is for the development of battery cell, module and pack technology for plug-in hybrid-electric vehicle (PHEV) applications.

USABC is a division of the US Council for Automotive Research LLC (USCAR). Enabled by a cooperative agreement with the DOE, USABC's mission is to develop electrochemical energy storage technologies that support commercialization of fuel cell, hybrid and electric vehicles.

The CPI contract is to develop lithium-ion batteries for 10-mile range PHEVs using high-energy and high-power manganese-spinel chemistry.

The new CPI contract follows research previously conducted with USABC on lithium-ion battery cell development, which focused on improving life cycle, calendar life, cold-cranking power, abuse-tolerance and low-temperature performance, as well as creating designs for a new cell pouch and separator. Module development also included lithium-ion thermal issues, battery module electronics, cell interconnections and abuse testing.

The US DOE's overarching mission is to advance the national, economic and energy security of the US. DOE's Vehicle Technologies Program works with industry to develop advanced transportation technologies that reduce the nation's use of imported oil and increase our energy security. Electrochemical energy storage has been identified as a critical enabling technology for advanced, fuel-efficient, light and heavy duty vehicles.

Nexergy, Inc. Receives Commitment for Purchase of More Than \$1 Million Intrinsicly Safe Lithium Ion Battery Packs Used for Miners' Cap Lamps

Nexergy, Inc. has received a commitment to purchase more than \$1 million of lithium ion battery packs from a UK-based company supplying batteries for use in mines and other environments characterized by the potential presence of explosive gas.

These batteries represent one of the first lithium ion battery packs approved for and used in applications that require intrinsically safe systems. The packs are used to power miner's cap lamps that have been qualified to IEC 62013-1, a standard of the International Electrotechnical Commission.

The intrinsically safe qualified eight-cell battery packs

Industry News continued on page 18

Custom Cable & Connector Molding

- Custom Design
- Low Minimum Quantities
- Wide Variety of connectors
- Quick Turnaround (Days not Weeks)
- NATO - Slave Plug
- Military Battery Connectors



See our entire product listing at:
www.lindelectronics.com
Call to speak with one of our
Application Engineers.

Power Specialists **LIND**
for Mobile Computing

Lind Electronics, Inc. 5414 Cambridge Street Minneapolis, MN 55426 USA
US Tele: 952-927-6303 Fax: 952-927-7740 ewilson@lindelectronics.com
Europe Tele: +49 (0) 7158 987 5460 Fax: +49 (0) 7158 987 5461 europe@lindelectronics.com



Since 1927, we have been developing and manufacturing high quality, german engineered Lead-Acid and Nickel-Cadmium battery systems.

Our experience means that when you suffer a power cut, we have the technology to cut in! In telecoms and IT, railway, power supply and emergency standby, whatever your application, HOPPECKE has a fail-safe solution that will give you total peace of mind.



HOPPECKE Batteries Inc. 1960 Old Cuthbert Road,
Suite 130, Cherry Hill, NJ 08034 Tel: +1 856 660 032
Fax: +1 856 660 132 • E-mail: LM@hoppeckeUS@pcs.com
www.hoppecke.com

HOPPECKE
POWER FROM INNOVATION

replace large sealed lead acid batteries. The key requirement for intrinsic safety is that the device not contain any components that produce sparks or that can hold enough energy to produce a spark of sufficient energy to cause an ignition in an explosive atmosphere.

As the alternative energy source to the heavier sealed lead acid battery, the lithium ion battery reduces the weight of a miner's cap lamp battery from 4.6 lbs. to 1.3 lbs. while providing the same runtime between charges. Additionally, the lithium ion battery packs are maintenance-free, as opposed to most sealed lead acid batteries, which require regular maintenance.

Currently, Nexergy is producing these battery packs for use in the customer's European and Australian markets. The production rate of these packs is expected to increase by 20 percent in the North American market upon the approval of the design by the US Department of Labor's Mine Safety and Health Administration (MSHA).

The product is the result of more than two years' worth of development and collaboration with the customer to ensure the battery pack meets the needs of this demanding market.

Odyne Corp. Awarded Patent for Battery Thermal Management System

Odyne Corp., a clean technology company that develops advanced hybrid electric vehicle propulsion systems, has been awarded US Patent for its Battery Thermal Management System (BTMS).

According to Joe Ambrosio, founder and CTO of Odyne, "The use of the technology embodied in this patent will improve the functionality and extend the operating life of battery packs used in mobile applications. Battery enclosures need to be placed within a variety of locations within a vehicle, sometimes not in the best place for keeping a battery at optimal temperatures. Batteries are like people, they like to be kept near or at room temperature. Our patented design allows for chilled or heated fluids to be pumped to the battery wherever it is located within the vehicle."

Approved for patent is a battery tray enclosure, designed to provide a method for thermally managing commercially available battery modules through conduction cooling or heating. The BTMS provides several key features: such as protection from the environment, structural integrity, passive/active thermal management and the ability to scale the design for a variety of bat-

tery module shapes/sizes. Although the design can be used in any mobile application, Odyne's BTMS is optimized for use in Class 6, 7 and 8 buses and trucks where a variety of terrains and environmental conditions are experienced year round.

Denali National Park Goes Greener with Hybrid Commercial Bus from IC Bus

Visitors to Alaska's Denali National Park and Preserve, one of the largest protected intact ecosystems in the world, will now have the opportunity to explore the park with the aid of an environmentally friendly vehicle; a fuel-efficient and emissions-reducing hybrid bus. IC Bus, North America's largest school bus and commercial bus manufacturer, delivered the park's first hybrid bus in July.

Assigned for use as part of the park's shuttle service, which extends 90 miles into the wilderness, the hybrid bus will transport visitors along a 45-mile route through August 30, during the Park's peak season, enhancing visitors' experience. A quieter engine will improve wildlife viewing as visitors see and hear nature in a way the other buses do not allow.

When Doyon/ARAMARK, the concessioner responsible for the Park's transportation service, won the Denali contract in 2003, the park challenged them to explore new bus technology, including hybrid. In turn, Doyon/ARAMARK approached Cascadia International, the IC Bus dealership in Anchorage. Cascadia is loaning the hybrid bus to Doyon/ARAMARK to test at the Park.

"This bus is for demo and evaluation purposes. The National Park Service is looking at this technology and is very interested in the feasibility and economic viability of future fleet replacements. The price of diesel fuel in the Denali area tops \$5.00/gallon so fuel economy is a genuine consideration with this project along with reducing environmental impact," said Matt Gerber, statewide sales executive of Cascadia International, LLC.

Doyon/ARAMARK currently has 110 buses in its Denali National Park and Preserve fleet which drive an average of 1.2 million miles per year. As more of the diesel-engine buses are replaced by hybrids, the reduced impact on the environment and fuel savings become that much greater.

The hybrid system, developed by Enova Systems, couples a diesel engine with an 80-kilowatt powertrain, incorporating a transmission, batteries and an electric

motor. The system recovers kinetic energy during regenerative braking, charging the batteries while the bus is slowing down. This provides additional power for acceleration, making the hybrid buses well suited because of the frequent starting and stopping of the bus.

ECotality's Innergy Power to Develop And Manufacture Battery Systems for Electric Vehicle Applications

ECotality, Inc. has announced immediate plans for its subsidiary Innergy Power Corp., to develop and manufacture advanced battery systems for electric vehicle (EV) and plug-in hybrid electric vehicle (PHEV) applications. Electric Transportation Engineering Corp. (eTec), also a subsidiary of ECotality, will provide Innergy Power with its Advanced Charge Management (ACM) technology that optimizes battery performance for fast-charging with the eTec Minit-Charger fast-charge systems and provides real-time battery condition information for users.

The Innergy Power battery systems will be designed with eTec's Advanced Charge Management technology that maximizes fast-charging capabilities and provides dual communication capabilities between the battery and the charging station to provide instant feedback to users about the state-of-charge, battery charging history and overall battery condition.

Specifically designed for eTec Minit-Charger systems, Innergy Power's battery systems will feature optimized fast-charging capabilities to enable an EV or PHEV to be charged in 10 to 15 minutes while eliminating the risks of overcharging and extending overall battery life. While Innergy Power's advanced battery systems can be recharged overnight using standard 120 V outlets, the ACM technology enhances fast charging capabilities to greatly reduce recharging time and provides an easy and convenient solution for recharging an EV or PHEV while on the go. Innergy Power will be custom designing these battery systems for use in various electric transportation applications including full-sized electric vehicles, plug-in hybrids, neighborhood electric vehicles, electric scooters and electric bikes.

ICP Solar Enters into Sales Contract with Nissan for New OEM Solar Charger

ICP Solar Technologies, Inc., a developer, manufacturer and marketer of solar panels and products, have entered into a sales contract with Nissan in Europe and North America for OEM solar charger. A discharged battery is one of the most common problems facing the automotive industry, with cars sitting in parking lots for a long period of time in cold or hot conditions. The ICP Solar OEM solar charger will help reduce the related costs and will avoid strong 12 V battery drain using the power of the sun.

"ICP Solar Technologies wants to be a major player in the automotive industry, which is looking for a more cost effective green solution to the dead battery problem. We have proved in the past with other car manufacturers that this OEM solar charger placed on the dashboard inside the car would be a great cost saving tool for 12 V battery in the entire automotive industry," said Sass Peress, CEO, ICP Solar.

Lithium Technology Corp. Selected For PHEV Project with Volkswagen AG and E.ON

Lithium Technology Corp.'s German subsidiary, GAIA Akkumulatorenwerke GmbH (GAIA), was recently selected to participate in a passenger car fleet project for Plug-In Hybrid Electric Vehicles (PHEV) sponsored by the German Federal Government. GAIA batteries will power the project made possible in conjunc-



JOINT INTERNATIONAL MEETING

- 214th Meeting of ECS — The Electrochemical Society
- 2008 Fall Meeting of The Electrochemical Society of Japan
and with the technical co-sponsorship of
- Japan Society of Applied Physics
- Korean Electrochemical Society
- Electrochemistry Division of the Royal Australian Chemical Institute
- Chinese Society of Electrochemistry

Visit the ECS website for meeting details.
www.electrochem.org

GENERAL TOPICS

<ul style="list-style-type: none"> • Batteries, Fuel Cells, and Energy Conversion • Biomedical Applications and Organic Electrochemistry • Corrosion, Passivation, and Anodic Films • Dielectric and Semiconductor Materials, Devices, and Processing • Electrochemical / Chemical Deposition and Etching 	<ul style="list-style-type: none"> • Electrochemical Synthesis and Engineering • Fullerenes, Nanotubes, and Carbon Nanostructures • Physical and Analytical Electrochemistry • Sensors and Displays: Principles, Materials, and Processing
--	--

HONOLULU, HI ✦ HILTON HAWAIIAN VILLAGE ✦ OCTOBER 12-17, 2008

DEADLINES

Registration: Deadline for advance meeting registration is September 12, 2008.
Hotel: The Hilton Hawaiian Village is the meeting headquarters hotel. Reservations are due September 12, 2008.

SHORT COURSES

The following courses are planned, as of press-time: Basic Impedance Spectroscopy, PEM Fuel Cells, Electrodeposition of Magnetic Materials, Operation and Applications of Electrochemical Capacitors, Fundamentals of Electrochemistry, and Atomic Layer Deposition.

tion with Volkswagen AG and E.ON.

Over the next three years, GAIA will deliver a total of seven lithium ion batteries that are based on iron phosphate cathode chemistry with energy content of about 12 kWh. The project will partially be funded by the German Federal Government.

The project aims to demonstrate the use of electricity generated by renewable energy such as wind and solar for powering up 20 PHEV's in a fleet trial under real-time conditions. The project will also validate the advanced lithium ion batteries to power such vehicles and evaluate the use of various methods of integrating these vehicles into the electric power grid for stabilization purposes.

"At the present time the automobile is unthinkable without a highly efficient diesel or gasoline engine. The future however, and that is certain, will belong to the electric motors fueled by the wall power plug," said Professor Winterkorn, CEO of Volkswagen AG. "On this way to the future, our innovative motors (TDI/TSI) combined with electric motors and highly efficient battery systems create advanced propulsion systems."

PHEVs are part of a family of electric-drive technologies that will play an important role in achieving the objectives of energy security and a reduction of greenhouse gas emissions. The relatively large battery installed enables a full electric driving over distances typical in urban situations as the battery can be charged directly from the electricity grid. The increased use of renewable energy sources such as wind and solar put stress on the grid stability as power generation becomes less predictable. PHEV batteries can play a role in stabilizing the grid by charging at times of excess power generation capability and by feeding power back to the grid when there is a power generation shortage.

VIASPACE Energy Begins Sales of Its Battery Electrode Health Analyzer with Order in Japan

VIASPACE, Inc. has received an order for its BA-1000 Battery Electrode Health Analyzer product from Hohsen Corp. of Japan. Hohsen Corp. is a major distributor of high technology products including fuel cell and battery test stations to both manufacturers and universities in Japan, which includes many of the world's largest battery manufacturers such as Sanyo and Sony corporations in the multi-billion dollar lithium battery market.

Improving the performance and safety of lithium batteries is a major challenge for battery manufacturers and university researchers throughout the world. Battery capacity and safety is limited by electrode changes during charge and discharge cycles. The BA-1000 Battery Electrode Health Analyzer is the first instrument developed to study these changes using a new, patent pending, nondestructive technique, which enables continuous analysis over the lifecycle of the battery.

VIASPACE CEO Carl Kukkonen said, "Hohsen is a well respected corporation in the battery field in Japan, with many major Japanese battery manufacturers and respected universities among its customer base. We believe that the BA-1000 will help customers rapidly develop and optimize new designs for rechargeable batteries for electronics, power tools and electric vehicles."

Air Products Awarded Two Key Patents For Lithium Ion Batteries

Air Products has received two US patents covering usage of its Stabilife fluorinated electrolyte salts in lithium ion batteries. These salts have been formulated to stand up to the difficult conditions expected from next generation portable power applications as well as hybrid electric vehicles (HEV).

"These patents will help Air Products develop the materials for next generation HEVs," said Wayne Mitchell, vice president and gener-


al manager of Performance Materials for Air Products. "They are testament to the enabling characteristics of fluorinated materials for lithium ion batteries, as well as our company's 30 years of experience working with fluorine compounds."

Air Products' Stabilife salts are electrolyte salts based on the poly-fluorinated borane cluster anions. Stabilife salts have exhibited extraordinary thermal and hydrolytic stability that can allow for the use of safer, lower cost electrode materials, such as LiMn2O4 and LiFePO4, in large format lithium ion batteries. They also have expanded the operating temperature window of lithium ion batteries versus currently employed lithium electrolyte salts.

In addition, Stabilife Salts' unique electrochemistry enables them to provide inherent overcharge protection to lithium ion batteries through redox shuttle chemistry. They are produced at a pilot plant housed within Air Products' fluorine-based chemicals plant in Hometown, Pa.

Are you an A, B or C? Your subscription to Battery Power magazine may be about to expire. Check your status in the colored box located in the mailing label on the front cover. Subscribe online at www.BatteryPowerOnline.com.

Created and co-ordinated by:




Information for growth

French Riviera

Batteries 2008

October 8TH - 9TH - 10TH

The international power supply conference and exhibition




lepublicsysteme

Batteries 2008 - Make it a date

The only event in Europe to meet buyers and suppliers

10th anniversary Edition • 60 speakers • 40 exhibitors • 350+ international delegates



Title: Mr Ms

Last name: First name:

Company name: Address:

City: Zip code:

Country:

Phone: Fax:

Mobile: Email:

Registration Fees:

Full access to Batteries 2008 - 3 days

€ 1,300 excluding VAT

€ 1,554.8 including VAT (19.6%)

Gala Dinner on 9th October 2008

€ 130 excluding VAT

€ 155.48 including VAT (19.6%)

Payment

by bank cheque payable to BCA cursus

by credit card Visa Eurocard/Mastercard

n° Exp. date: ___/___/___

Date: ___/___/___ Signature

The Registration Fees for the conference include: Conference papers, admission to all sessions, free entrance to the commercial exhibition, refreshments during session breaks, lunches. **Terms of participation:** All payments must be received prior to the event. **Cancellations and refunds:** All cancellations must be sent in writing to BCA. For refunds, please state your full bank account details in the written cancellation. For cancellations received before September 8th, 2008, payment will be refunded minus an administrative fee of 50 EUR. We regret that refunds cannot be made for cancellations received after September 8th 2008.

Registration Total Amount VAT included..... €

Complete and return with payment to:

BCA - 38, rue Anatole France - 92594 Levallois-Perret Cedex - France or by fax: +33 (0)1 70 94 65 25

Should you encounter any difficulties while registering please notify us:

E-mail: contact@batteries2008.com - Phone: +33 (0)1 70 94 65 22 - Fax: +33 (0)1 70 94 65 25

Online registration: www.batteries2008.com

Bosch and Samsung SDI Co. Ltd. Plan Joint Venture to Develop and Manufacture Lithium-Ion Batteries

Robert Bosch GmbH and Samsung SDI Co. Ltd. have decided to set up a joint venture to develop, manufacture and sell lithium-ion batteries. It is planned that the joint venture, which is to be named "SB LiMotive Co. Ltd." and to be headquartered in Korea, will start operations in September 2008. The shareholding of Robert Bosch GmbH will be 50 percent and that of Samsung SDI Co. Ltd. 50 percent. Both companies will be equally represented on the board of management and on the board of directors. The foundation of the joint venture is still subject to approval by antitrust authorities.

The companies plan to collaborate in the development, manufacture and worldwide sale of lithium-ion batteries for automotive applications. Lithium-ion batteries are the basis for forward-looking technologies in the automobile, such as hybrid or electrical drives. In connection with its hybrid project unit, Bosch has already built up comprehensive expertise in areas such as power electronics, battery management, electric motors, transmissions and DC/DC converters. The main focus of Samsung SDI Co. Ltd. is the further development of lithium-ion batteries, which it already produces for a large number of manufacturers of laptops, mobile phones and power tools. In 2007 Samsung SDI Co. Ltd. has produced 376 million battery cells.


EnerDel and Think Global Demonstrate Operational Battery Pack in Th!nk City Vehicle

Ener1, Inc. has reported that its lithium-ion battery subsidiary, EnerDel, has installed and demonstrated a fully functional lithium-ion battery pack in a Th!nk City electric vehicle at its manufacturing facility in Indianapolis. The integration of the battery pack into a Th!nk City EV was completed ahead of the schedule previously announced by EnerDel. The successful completion of this milestone indicates that EnerDel is on schedule to meet the year-end timetable for volume production under its supply agreement with Think Global of Oslo, Norway.

EnerDel delivered three functional 27 kWh lithium-ion battery packs to Think Global earlier this year for testing. Both companies are working to meet the scheduled roll-out of pre-production units over the next three months.

"This is a very exciting program to be involved in, with an aggressive time to market schedule," said EnerDel CEO Ulrik Grape. "Our collaboration with Think to develop a battery solution for the leading electric vehicle worldwide, the Th!nk City, has been rewarding. A lot of work remains both in terms of testing and evaluation, but we anticipate that we will be able to meet the schedule set by our supply agreement to begin production of integrated battery packs by the end of this year."

"We are very pleased with the progress EnerDel and Think have made on the lithium-ion battery solution for the Th!nk City vehicle," said Think Global CEO Jan-Olaf Willums. "EnerDel has achieved an important milestone and met our expectations so far. We are confident that the project is on schedule to introduce the EnerDel battery in production vehicles by the end of the year."



MRS
fall meeting
2008
Boston, MA
December 1-5

2008 MRS FALL MEETING

www.mrs.org/fall2008

Meeting Chairs	Symposia	Meeting Activities
<p>S. Ashok The Pennsylvania State University tel. 814-863-4580 sashok@psu.edu</p> <p>Shanda M. Baker Harvey Mudd College tel. 909-621-8643 shanda_baker@hmc.edu</p> <p>Michael R. Fitzsimmons Los Alamos National Laboratory tel. 505-665-4045 fitz@lanl.gov</p> <p>Young-Chang Joo Seoul National University tel. 82-2-880-8986 ycjoo@plaza.snu.ac.kr</p> <p style="text-align: center;">***</p> <p>For Additional Information, visit the MRS Web site at www.mrs.org/meetings/ or contact:</p> <p>Member Services Materials Research Society 506 Keystone Drive Warrendale, PA 15086-7573 Tel: 724-779-3003 Fax: 724-779-8313 info@mrs.org</p>	<p>ELECTRONICS, PHOTONICS, AND MAGNETISM</p> <p>A: Performance and Reliability of Semiconductor Devices</p> <p>B: Transparent Conductors and Semiconductors for Optoelectronics</p> <p>C: Theory and Applications of Ferroelectric and Multiferroic Materials</p> <p>D: Rare-Earth Doping of Advanced Materials for Photonic Applications</p> <p>E: Materials and Technologies for 3-D Integration</p> <p>F: Low-Cost Solution-Based Deposition of Inorganic Films for Electronic/Photonic Devices</p> <p>G: Organic and Hybrid Materials for Large-Area Functional Systems</p> <p>H: Physics and Technology of Organic Semiconductor Devices</p> <p>I: Reliability and Properties of Electronic Devices on Flexible Substrates</p> <p>J: Material Science for Quantum Information Processing Technologies</p> <p>K: Magnetic Nanostructures by Design</p> <p>L: New Materials with High Spin Polarization and Their Applications</p> <p>ENERGY AND THE ENVIRONMENT</p> <p>M: Energy Harvesting—Molecules and Materials</p> <p>N: Next-Generation and Nano-Architected Photovoltaics</p> <p>O: Structure/Property Relationships in Fluorite-Derivative Compounds</p> <p>P: Photovoltaic Materials and Manufacturing Issues</p> <p>Q: Scientific Basis for Nuclear Waste Management XXXII</p> <p>R: Materials for Future Fusion and Fission Technologies</p> <p>S: Solid-State Ionics</p> <p>T: Mobile Energy</p> <p>U: Advanced Intermetallic-Based Alloys for Extreme Environment and Energy Applications</p>	<p>ENGINEERED MATERIALS AND MODELING</p> <p>V: Materials, Devices, and Characterization for Smart Systems</p> <p>W: Computational Materials Design via Multiscale Modeling</p> <p>Y: Biomimetic Interfaces—From Experiment to Theory</p> <p>Z: Mechanics of Biological and Biomedical Materials</p> <p>AA: Materials for Optical Sensors in Biomedical Applications</p> <p>BB: Polymer-Based Smart Materials—Process, Properties, and Application</p> <p>CC: Design, Fabrication, and Self Assembly of "Patchy" and Anisometric Particles</p> <p>DD: Materials in Tissue Engineering</p> <p>NANOSCIENCE</p> <p>EE: Nano- and Microscale Materials—Mechanical Properties and Behavior under Extreme Environments</p> <p>FF: Nanofunctional Materials, Structures, and Devices for Biomedical Applications</p> <p>GG: Microelectromechanical Systems—Materials and Devices II</p> <p>HH: Advances in Material Design for Regenerative Medicine, Drug Delivery, and Targeted Imaging</p> <p>II: Bio-inspired Transduction, Fundamentals, and Applications</p> <p>JJ: Nanotubes, Nanowires, Nanobelts, and Nanocoils—Promise, Expectations, and Status</p> <p>KK: Transport Properties in Polymer Nanocomposites</p> <p>LL: Nanowires—Synthesis, Properties, Assembly, and Application</p> <p>MM: Applications of Group IV Semiconductor Nanostructures</p> <p>NN: <i>In-situ</i> Studies across Spatial and Temporal Scales for Nanoscience and Technology</p> <p>OO: Grazing-Incidence Small-Angle X-Ray Scattering</p> <p>PP: Solid-State Chemistry of Inorganic Materials VII</p> <p>QQ: Synthesis and Processing of Organic and Polymeric Functional Materials for a Sustainable Energy Economy</p> <p>RR: Artificially Induced Grain Alignment in Thin Films</p> <p>SS: Selecting and Qualifying New Materials for Use in Regulated Industries</p> <p>TT: Local Structure and Dynamics in Amorphous Systems</p> <p>GENERAL INTEREST</p> <p>X: Frontiers of Materials Research</p>
		<p>Symposium Tutorial Program</p> <p>Available only to meeting attendees, the symposium tutorials will concentrate on new, rapidly breaking areas of research.</p> <p>Exhibit</p> <p>A major exhibit encompassing the full spectrum of equipment, instrumentation, products, software, publications, and services is scheduled for December 2-4 in the Hyatt Convention Center. Convenient to the technical session rooms and scheduled to complement the program, the MRS Fall Exhibit offers everything you need all under one roof.</p> <p>Publications Desk</p> <p>A full display of over 350 books will be available at the MRS Publications Desk. Symposium Proceedings from the 2007 MRS Fall Meeting and 2008 MRS Spring Meeting will be featured.</p> <p>Student Opportunities</p> <p>Graduate students planning to attend the 2008 MRS Fall Meeting are encouraged to apply for a Symposium Assistant position and/or a Graduate Student Award. Applications will be accessible on the MRS Web site by June 1.</p> <p>Career Center</p> <p>A Career Center for MRS members and meeting attendees will be open Tuesday through Thursday.</p>

ActaCell Closes \$5.8 Million Series A Financing; Investment Consortium Led By DFJ Mercury Includes Google.org, Applied Ventures and Good Energies

ActaCell, Inc. has secured \$5.8 million in Series A financing. DFJ Mercury led the round with syndicate investment from Google.org's RechargeIT program, Applied Ventures, LLC, the venture capital arm of Applied Materials, Inc. and Good Energies, an investor in the renewable energy and energy efficiency industry. The proceeds from the Series A financing will be used to hire key technical talent and to further develop ActaCell's lithium-ion battery technology for commercial purposes.

ActaCell, Inc. is an Austin-based technology start-up commercializing lithium-ion battery technology developed in Professor Arumugam Manthiram's Material Science and Engineering lab at The University of Texas at Austin. This new technology is focused on delivering substantially longer cycle life at low cost while maintaining safety as the number one priority.

"We were highly impressed with ActaCell's pedigree," said Ned Hill, managing director at DFJ Mercury. "We believe their technology will significantly impact industries that rely on rechargeable batteries, particularly those that require high power and long cycle life such as Plug-in Hybrid Electric Vehicles. Low cost, long life and safety are key attributes of ActaCell's battery roadmap, the holy grail of battery technologies on the market today." RechargeIT is a Google.org initiative that aims to reduce carbon dioxide (CO₂) emissions, cut oil use and stabilize the electrical grid by accelerating the adoption of plug-in hybrid electric vehicles and vehicle-to-grid technology. Google.org demonstrates the technology using its own fleet and supporting others through grants and investments.

Still in the development phase, ActaCell's technology has not been publicly disclosed. Full product and technology announcements will follow in early 2009.

Everything you need to know about the industry. Right in your Box.



Subscribe to the Battery Power Industry Report for full industry coverage:

Industry News

New Products

Exclusive Features

Market Research

Industry Events

Other Webcom Industry e-Newsletters include:

- e-Drive, Equipment Protection, Remote Site & Equip. Management,
- Antenna Systems & Technology, LED Journal, Materials Engineering News,
- Organic and Printed Electronics Software Business, Thermal News,
- TeleHealth World, Software Investor News, Green Power,
- Instrument Design & Technology, Magnetics Business & Technology

Visit www.infowebcom.com/newsletters_form.php
To Subscribe to all Webcom industry e-newsletters

Index of Advertisers

Alber Corp.23 <i>www.alber.com</i>	Kepeco.15 <i>www.kepcochargers.com</i>	SouthWest Electronic Energy.9 <i>www.swe.com</i>
Arbin Instruments.7 <i>www.arbin.com</i>	Keystone Electronics Corp.5 <i>www.keyelco.com</i>	Stapla Ultrasonics.7 <i>www.staplaltrasonics.com</i>
Energy Access Inc.15 <i>www.energyaccess.com</i>	Lind Electronics.17 <i>www.lindelectronics.com</i>	Webcom Communications4, 13, 14, 20, 22 <i>www.infowebcom.com</i>
Hioki USA Corp.24 <i>www.hiokiusa.com</i>	Quallion.2 <i>www.quallion.com</i>	
Hoppecke Batteries.17 <i>www.hoppecke.com</i>	Sanyo.11 <i>www.sanyobatteries.com</i>	

Calendar of Events

September

4-5 - Battery Power 2008, New Orleans, La.
Contact Webcom Communications at
www.BatteryPowerOnline.com

12-17 - Electrochemical Society Annual Meeting, Honolulu, HI.

14-18 - Intelec 2008, San Diego, Calif.

23-26 - 11th European Lead Battery Conference, Warsaw, Poland

October

8-10 - Batteries 2008, French Riviera

November

5-6 - Remote 2008 Conference & Expo, Atlanta, Ga.

December

1-5 - MRS Fall, Boston, Mass.

2-4 - Power-Gen International 2008, Orlando, Fla.

8-9 - Lithium Mobile Power, Las Vegas, Nev.

2009

March

10-12 - Aviation Industry Expo, Las Vegas, Nev.

16-19 - 26th International Battery Seminar & Exhibit, Fort Lauderdale, Fla.

April

27-29 - Battcon 2009, Orlando, Fla.

June

8-9 - Advanced Automotive Battery Conference 2009, Long Beach, Calif.

Send Calendar of Event Items to
Shannon Given at
ShannonG@infowebcom.com

Battery Recycling!
All types of batteries recycled.
Responsible, Environmentally Friendly,
Call **Battery Solutions, Inc.** Today!
248-446-3001 Fax 248-446-1927
service@batteryrecycling.com
www.batteryrecycling.com

Yasui Seiki Co.,(USA)
Lab Services: Electrode Coating, Patch Coating, Tape casting, Fuel Cell Coatings, Adhesion Primer Coating, all from 1 micron to 200+ microns thickness. Locations in Indiana-USA, Kanagawa-Japan and Nagasaki-Japan.
Custom Equipment: Slurry preparation, Coating/Casting Machines, Lamination, Calendering, and Slitting equipment. Highest quality production is with our technology and machines.
See Website Tel 812.331.0700 ♦ Fax 812.331.2800
www.yasui.com ♦ *coating@yasui.com*

**Job Opening?
Equipment for Sale?**
Place a Classified Ad!
Contact Jeremy Fleming at
jeremyf@infowebcom.com
for details.

The **\$36 billion** energy storage/battery market is evolving at a rapid pace. Frost & Sullivan identifies the best areas for growth, allowing your company to capitalize on key opportunities in the market.
For more information, contact *johanna.haynes@frost.com*.
www.frost.com FROST & SULLIVAN

Conception Implementation
The Perfect Tools for Battery Research and Testing

Bio-Logic has provided the best in battery test workstations and multi-channel potentiostats for over 20 years. **...Bio-Logic has you covered!**

- **5 or 16 channel units** – increases throughput...fits your application and budget
- **Independent EIS** – no need for multiplexer and expensive external analyzer...increases speed
- **Nine dedicated battery protocols** – eliminates custom programming...saves your time
- **Unique potential drift correction** – increases accuracy of measurements
- **3,4,5 terminal connections** – measure anode/cathode potentials
- **USB and Ethernet** – flexibility in computer connections...no PC card required
- **Self calibration feature** – check instrument performance without service call
- **Modular construction** – flexibility in configuration...buy only what you need...easily upgraded

USA Customer: **BioLogic USA**
Science Instruments
Phone: 865.769.3800
Web: *www.bio-logic.us*

Designed by Electrochemists...
for Electrochemists
Outside USA: Bio-Logic SAS • Tel: +33 476 98 68 31 • Web: *www.bio-logic.info*

Strategic Overview of Silver-Zinc Rechargeable Batteries

Dr. Ross Dueber, President and CEO
ZPower, Inc.



At the heart of the \$55 billion global battery market is the chemical conundrum of power supply. Today's consumer has the ability to watch an entire movie on a palm-sized device—but portable power technology has not kept up. Engineers admit that they are "hitting the wall" on lithium polymer and lithium-

ion performance. Unstable lithium-ion batteries have resulted in a number of high product recalls by manufacturers of notebook computers. These market trends are creating a pressing need for a better battery.

This improved battery chemistry can now be found in silver-zinc (AgZn) rechargeable battery technology. Silver-zinc battery chemistry has a long, successful history of use by the military, international space programs and by underwater marine applications. The chemistry is currently poised to move into the commercial marketplace for use in consumer electronics.

This new silver-zinc battery chemistry uses the latest in advanced polymers, nano-technology, power electronics and processing methods to create a battery that surpasses other rechargeable batteries for notebook computers, mobile phone and consumer electronics applications.

The advantages of silver zinc batteries can be summed up overall as follows:

High Performance - Up to 40 percent more run time than traditional lithium-ion batteries. And with recent improvements in battery cycle life, silver zinc batteries achieve 200+ cycles at 100 percent discharge to 80 percent of rated capacity and thousands of cycles at intermediate discharge.

Clean Technology - More than 95 percent of key battery elements can be recycled and reused. The raw materials recovered in the recycling process of silver-zinc batteries are the same quality as those that went into the creation of the battery. Environmental impact is lessened since the need to mine for new materials is minimized. Also, there will be financial incentives for consumers to recycle their silver-zinc batteries.

Safe - Silver zinc batteries contain no lithium and are inherently safe. They are not subject to the recent FAA air travel restrictions now placed on lithium-ion batteries. Silver zinc batteries feature a water-based chemistry that is not flammable. The battery is therefore free from the problems of thermal runaway and fire.

To provide further insight on just how "clean" silver zinc batteries are when compared with lithium-

ion technology, the difference is dramatic. The primary materials of silver zinc batteries (i.e. silver and zinc) are fully recyclable. That means that the materials derived from recycling process are of the same quality as the materials that went into the initial creation of the battery. Recycling the raw materials results in using a fraction of the energy required to mine for new materials.

In contrast, most elements of traditional lithium-ion batteries are downcycled and cannot be reused. The downcycling process reduces the original battery into raw materials of lower quality which can't be reused for battery production (cobalt is the notable exception). Additional lithium must be obtained before another battery can be produced.

The silver recycling process already exists. Refiners perfected the processes over centuries for jewelry, tableware, photographic film and electronics. Additionally, silver obtained from scrap makes up over 30 percent of the silver that is needed each year to satisfy world demand.

The success of silver zinc technology can be found in three important areas:

Composite Polymer Zinc (Zn) Anode - The zinc anode in silver zinc batteries is a composite polymer electrode which inhibits shape change and dendrite growth. In the past, shape change and dendrite growth in traditional silver-zinc cells frequently shortened the overall cycle life of the battery.

Multi-Functional, Layered Separator - A separator stack within the silver zinc battery resists dendrite growth from the zinc anode, while simultaneously resisting degradation from the silver cathode. At the same time, it allows ions to move freely from the cathode to the anode to minimize the cell's internal resistance. This results in a superior silver-zinc battery cell which offers long life.

Nano-Particle Silver Oxide (AgO) Cathode - The silver oxide cathode in silver-zinc rechargeable batteries is coated with nano particles. This nano-technology enhances conductivity for lower internal resistance and faster charge times than traditional silver zinc batteries.

Silver zinc has significantly higher volumetric energy density than existing battery technologies such as lithium-ion or nickel cadmium, nickel metal hydride, or lead acid. It has 40 percent more energy density than traditional lithium-ion batteries and offers plenty of runway to safely increase energy density and cycle life.

The batteries have passed a wide range of tests, including environmental high-performance tests (heating, temperature cycling, storage); electrical performance tests (short circuit, abnormal charge, forced discharge); mechanical performance tests (impact, crush, test, nail penetration).

At the present time in the development of silver-zinc rechargeable battery chemistry, there are no serious obstacles to bringing the technology into the market. Many of the fundamental chemical and technology challenges that were experienced in the earlier phases have been overcome. Right now, the focus is on scaling manufacturing processes to meet high anticipated demand. The current work is focused on achieving and maintaining world class quality.

A silver zinc battery option will be rolled out in a major notebook computer in early 2009. The battery is slated to be released as a premium extended life battery. The notebook will be "dual chemistry enabled" which means it will work with either silver-zinc or lithium ion batteries.

Contact ZPower, Inc. at www.zpowerbattery.com

2009 BATTERY MANUFACTURING RESOURCE GUIDE
Equipment, Products, Services & Technology for Battery Manufacturing

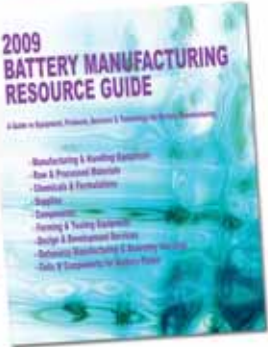
The annual Battery Manufacturing Resource Guide will be distributed to 20,000 influential buyers and integrators of battery manufacturing equipment, supplies, materials, components and services worldwide.

Primary, secondary and battery pack manufacturers will use this guide as a comprehensive view of products and services available.

The Resource Guide publishes in December 2008, with a 20,000 worldwide distribution.

To make sure your company is featured, contact Jeremy Fleming at 720-528-3770 ext 121 or at jeremyf@infowebcom.com.

Reserve your copy today at www.BatteryPowerOnline.com



FREE YOUR PRESS

If industry experts are writing about your company, shouldn't you spread the word?

Your customers, prospects and employees need to know:

- How your company delivers exceptional value to your market
- The unique benefits of your products or services
- When you do something innovative that helps your customers

Unlock the value of your editorial and reach beyond this publication. Contact The YGS Group today to request customized reprints of your coverage.

BATTERY POWER PRODUCTS & TECHNOLOGY
Solutions for OEM Design Engineers, Integrators & Suppliers of Power Management Products

The YGS Group is the authorized provider of custom reprint products and content licensing from Webcom Communications Corporation.

Our clients use reprints to support their marketing efforts through:

- Recruiting Packages
- Direct Mail
- Event Collateral
- Online Marketing
- Media Kits
- Trade Shows

the YGS group
Integrated Publishing Solutions

800.290.5460

BatteryPowerProductsandTechnology@theYGSgroup.com

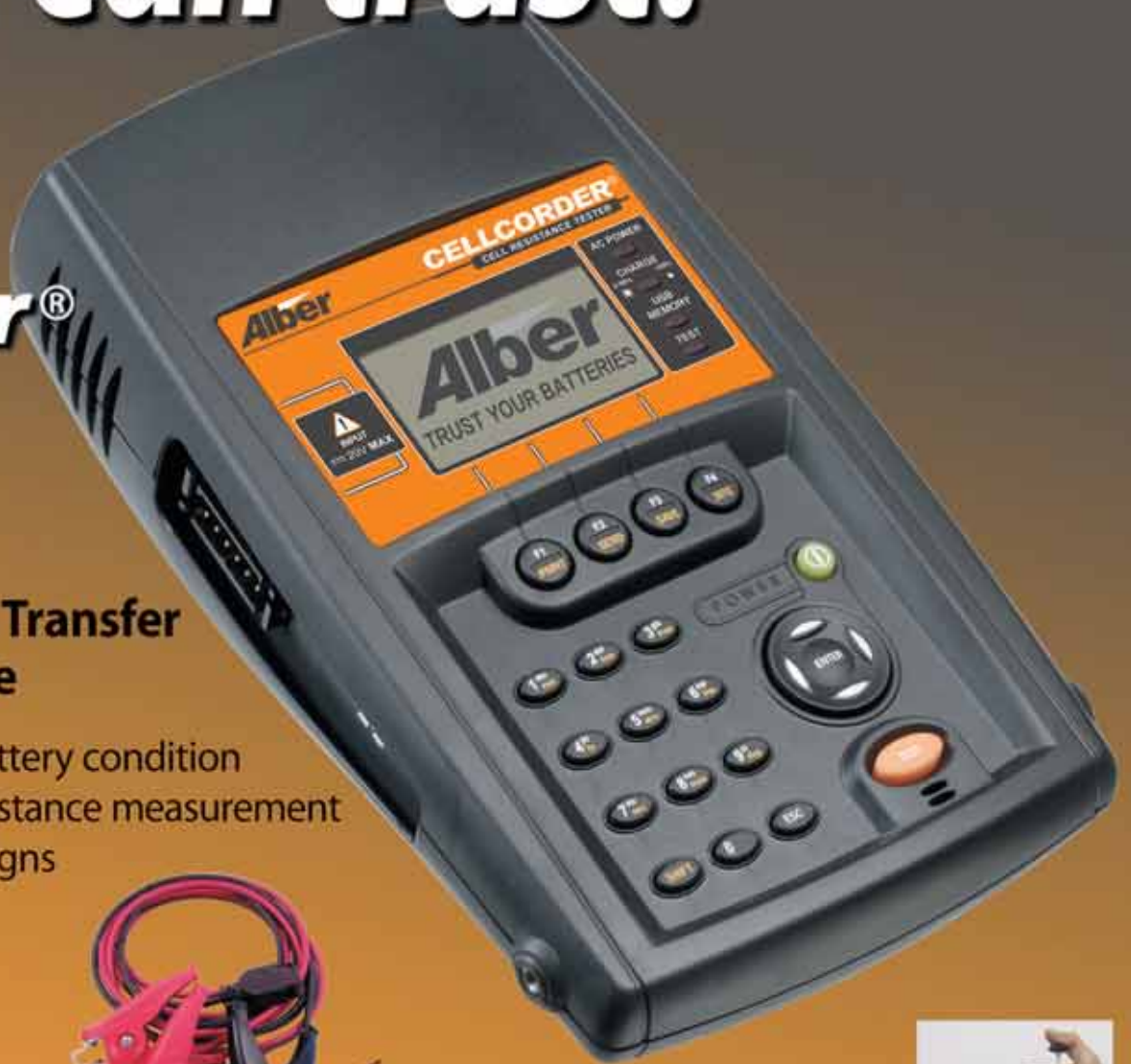
www.theYGSgroup.com/reprints

Battery Test Equipment you can trust!

CRT-400 The Cellcorder®

- Albér Reliability
- Flexible Clamps
- Lighted Probe Options
- New USB Flash Drive for Data Transfer
- Bluetooth® Capable Interface

The Cellcorder is a test instrument for battery condition assessment. Albér's patented internal resistance measurement method is the best way to detect early signs of battery performance problems.



Easy to use interface, test connection options for every application, and powerful trending, analysis and reporting software allow you to do your job without wasting time.

Log on to www.alber.com for more information about Cellcorder and Albér's technology

Alber

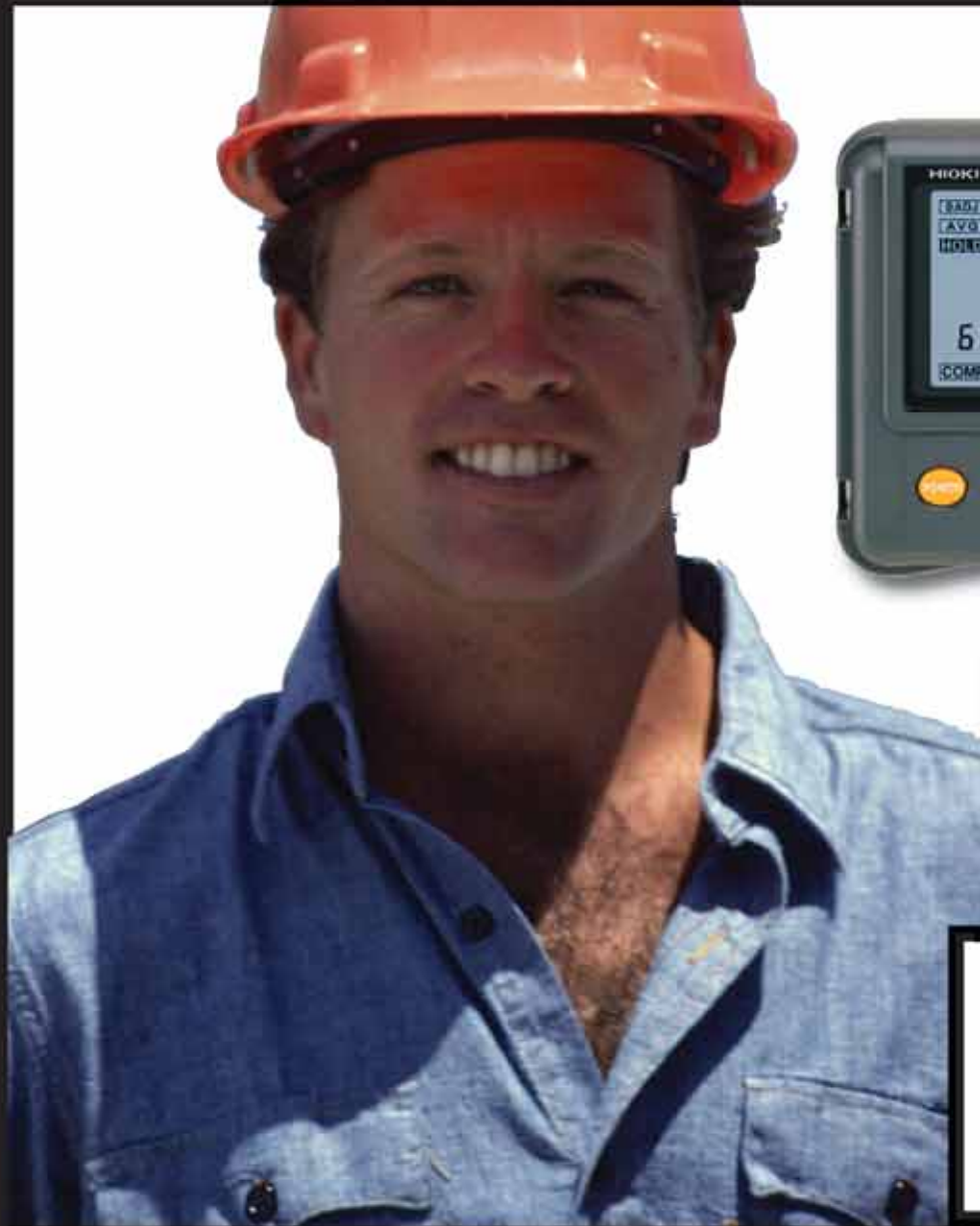
Battcon International Battery Conference
Visit www.battcon.com for details.

Trust Your Batteries™

Albécorp

3103 N. Andrews Ave. Extension / Pompano Beach, FL 33064 / Phone: 800.851.4632 / Fax: 954.623.6671
Internet: www.alber.com / email: sales@alber.com

For a Dependable Diagnosis...



starting at
\$2,495



3554 Battery HiTester

- 60 Volt Range
- Auto-hold & Auto-Data Storage
- Enhanced resistance against UPS noise
- Store up to 4800 sets of data
- USB PC Interface
- Data management PC software

...you need products you can depend on.



\$1995

**3197
Power Quality Analyzer**

- Measures:
- Power & Power Factor
 - Active/Reactive Energy
 - Demand kWh
 - Load Changes (graph display)
 - Transient voltage/Inrush current



\$439⁹⁵

**3453
Digital MΩ HiTester**

- Efficient Insulation Measurement
- 125 V/40 M, 250 V/2000 M, 500 V/2000 M, 1000 V/4000 M
 - Backlit Digital Display
 - Built-in memory
 - Auto discharge



\$219⁹⁵

**3454-11
Digital MΩ HiTester**

- Insulation Resistance Tester
- 250 V DC/500 V DC/1000 V DC
 - Comparator function
 - AC Voltage up to 750V
 - Built-in safety cover
 - Auto discharge



\$2495

**3455-01
High Voltage HiTester**

- 5KV Compact Performance
- Test Voltage 250V to 5KV
 - Measure insulation of high voltage equipment up to 5T Ω
 - Auto Calculate & Display PI and DAR
 - Data Storage & USB Interface

HIOKI

6 CORPORATE DRIVE • CRANBURY, NEW JERSEY
PHONE: 609.409.9109 • FAX: 609.409.9108

www.hiokiusa.com