



PRODUCTS AND SERVICES
FROM MICRO POWER ELECTRONICS

THE POWER IS ON™



-  BATTERY SYSTEMS
-  CHARGING SYSTEMS
-  SYSTEM INTEGRATION

MICRO POWER ELECTRONICS IS THE LEADING DEVELOPER OF CUSTOM POWER SYSTEMS FOR THE PORTABLE MEDICAL, INDUSTRIAL HANDHELD COMPUTING AND MILITARY MARKETS.



Micro Power Electronics specializes in the development of mission-critical systems, which are designed, verified and manufactured for superior run times, reliability, durability, safety and ease of use. With a proven track record of technical excellence, superior quality and on-time delivery, more portable equipment manufacturers are turning to Micro Power to deliver power solutions for products that must perform flawlessly in the field.



Micro Power's expertise extends across the full breadth of advanced portable power systems development; our battery experience ranges from cell characterization, verification and optimization, to fuel gauges, battery management, and SMBus communications. Our chargers incorporate the latest multi-channel, software controlled microcontroller architectures for single- and multi-bay chargers as well as docking stations.

Portable devices are becoming indispensable to people who use them each day to perform their jobs, complete their missions, ensure safety or deliver care. In response, more and more equipment manufacturers strive to achieve maximum dependability and power efficiency the only way possible: with a battery and charger system customized to the application and the device.

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Micro Power Electronics specializes in serving the needs of the most demanding markets including:

Medical Equipment. There's no job more mission-critical than saving lives. Leading manufacturers of portable medical instruments look to Micro Power to keep their life-saving equipment running at peak performance. Whether the medical device is used for a life-sustaining or life-saving operation, Micro Power can meet the stringent requirements demanded by medical OEMs. Devices powered by Micro Power include defibrillators, ultrasounds, monitors, pumps, and ventilators.

Rugged Handheld Computing. Applications in retail, distribution, and manufacturing are characterized by long and demanding work days. Manufacturers of handheld devices supporting Automatic Identification and Data Collection (AIDC) and handheld computing solutions benefit from optimal battery life, rugged durability and innovative charger designs for optimized usage models.

Commercial Military. With the recent modernization of the military armament, soldiers are becoming more reliant on mobile power sources and military batteries, and today's soldier is becoming overburdened with battery weight. Portable power systems for ruggedized equipment must be tuned to the device's power requirements, power load characteristics, usage patterns, operating temperatures, vibration, humidity, dust and shock patterns. Delivering custom portable power solutions with these unique attributes has made Micro Power the preferred supplier for today's portable military equipment.



SecuraPACK™
Battery Packs

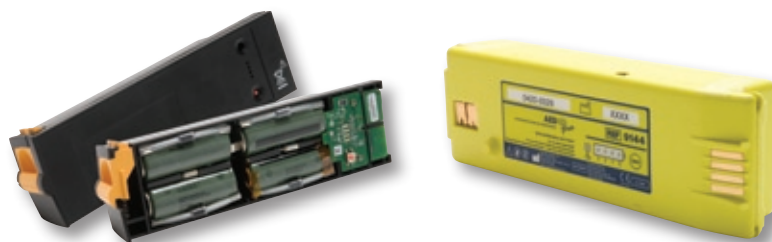
MICRO POWER ELECTRONICS' TWENTY YEARS OF EXPERIENCE
IN CELL CHEMISTRY, BATTERY MANAGEMENT ELECTRONICS, AND
MECHANICAL DESIGN YIELDS PRIMARY AND RECHARGEABLE
BATTERY PACKS WITH INCOMPARABLE PERFORMANCE.

SecuraPACK™

Battery Packs

SecuraPACK Custom Battery Packs

In order to meet the demanding power requirements of modern, feature-laden, portable devices, Micro Power Electronics offers SecuraPACK, a line of custom battery packs at the heart of our portable power solution. Micro Power's twenty years of experience in cell chemistry, battery management electronics and mechanical design yields primary and rechargeable battery packs of incomparable performance. Each battery pack is optimized for the portable device's individual usage profile in order to provide the performance necessary for your product's success. Our batteries are safe, reliable and more than functional; they will help differentiate your product with superb performance and runtime, small size and light weight.



Rechargeable Batteries

Micro Power offers rechargeable batteries based on all commercially available chemistries. As OEMs strive to differentiate in competitive markets, Micro Power has increasingly addressed our customer's needs with the highest performance Li-ion chemistry. Today, Micro Power has designed well over one thousand Li-ion battery packs. Choosing the optimal cell can contribute to the success or failure of a product in the field and requires extensive knowledge of the performance profile of the cells under consideration. Three cell chemistries, Nickel Metal Hydride (NiMH), Li-ion and Li-polymer, currently dominate.

- NiMH batteries have an average energy density of 200 Wh/L, and deliver 500 duty cycles.
- Li-ion battery characteristics include 1000 duty cycles per lifetime, higher load currents, and an average energy density of 500 Wh/L.
- Li-polymer cells have similar specifications to Li-ion, but they feature a semi-rigid and thin form factor.

Primary Batteries

Micro Power designs and manufactures non-rechargeable battery packs based on Li-primary chemistry for our customer's disposable power solution needs. The Li-primary cells offer higher voltage than traditional alkaline cells, in addition to extremely long shelf life and superb performance

in extreme temperature environments. With a negligible self-discharge rate, the Li-primary cell is optimal for maintaining a high state of readiness. Micro Power's Li-primary battery packs can deliver full performance after being stored for 5 or even 7 years. Several different chemistries are available, such as lithium manganese dioxide, lithium sulfur dioxide and lithium thionyl chloride. A wide operating temperature range is offered by these chemistries, in addition to the long shelf life yielding products that are ideal for outdoor, emergency use.

SMART Batteries

Micro Power's advanced SMART batteries communicate status to the portable device via an integrated circuit in the battery pack. This information might include: type, model number, manufacturer, characteristics, discharge rate, predicted remaining capacity, almost-discharged alarm, temperature and voltage. Micro Power has partnered with Texas Instruments to provide the most advanced fuel gauging with Impedance Track™ technology. Impedance Track calculates changes in impedance caused by battery age, temperature and cycle patterns to predict remaining run-time within 1% accuracy throughout the entire life of the battery. It maximizes system run-time by enabling use of the full chemical capacity available in the battery pack. Communication is delivered to the portable device via a communication bus (such as SMBus, I²C, or HDQ), and delivered to the user with LEDs.



Safety Features

The SecuraPACK brand offers OEM customers a high-performance solution with a customized, but most importantly, safe battery system that is resistant to dangerous malfunctions. SecuraPACK combines custom battery pack technology and specialized manufacturing processes to produce the safest and most reliable primary or rechargeable lithium battery system. SecuraPACK is compliant with the major requirements outlined in the IEEE 1625-2004 Standard for Rechargeable Batteries for Mobile Computers. The following features and processes accompany SecuraPACK designs:

- Safest, high-quality Lithium cells from tier-one cell suppliers.
- Testing incoming cells for electrical performance.
- Protection circuit that prevents over-voltage, over-current, under-voltage, and over-heating.
- Electrical tests include continuous charge, over-discharge, over-charge, and short-circuit tests.
- Mechanical tests include shock, vibration, altitude, thermal exposure, and mould stress.

For the most demanding portable device requirements, Micro Power offers additional safety precautions such as:

- Failure Mode and Effects Analysis (FMEA) of the battery system design or manufacturing process.
- Redundant protection circuit to ensure device operation.
- Authentication of the battery pack to eliminate the use of aftermarket alternatives.
- Cell balancing for packs with high number of cells in series.
- Plastics with fire-resistant additives.

Mechanical Options

Like its host device, battery packs are designed with mechanics that are adapted for the specific environment in which it will be used. Micro Power provides battery packs that are assembled in plastic shrink wrap and fully enclosed in the portable device.

For user-replaceable batteries, the best choice is a battery pack with a hard plastic enclosure. Micro Power provides enclosures that meet the needs of the most demanding environments while augmenting your product's aesthetics and industrial design. Typical plastic choices include PolyCarbonate (PC), Acrylonitrile Butadiene Styrene (ABS), PC/ABS blends, Nylon, or Acrylic. Plastic enclosures will be sealed with ultrasonic welding for ease of manufacture and cost savings, but Micro Power also offers the option of adhesives, screws and gaskets for the most robust seals. The electrical connector is selected to be the most compatible with your device such as spring pins, formed metal contacts, blade connectors, and pads on the PCB. A custom battery pack offers the best physical integration with your portable device, in addition to the highest electrical performance.

SecuraPACK™
Battery Packs



MICRO POWER ELECTRONICS' CHARGERS WILL SEAMLESSLY INTEGRATE WITH THE BATTERY PACK AND PORTABLE DEVICE FOR EXCEPTIONAL EASE OF USE AND MAXIMUM ENERGY DELIVERY WITH A MINIMUM CHARGE TIME.

SelfCHARGE[®]
Charging Systems

SelfCHARGE®

Charging Systems

SelfCHARGE Battery Chargers and Docking Stations

Designing a battery charger starts with understanding the battery. As a complete power system solution provider, Micro Power Electronics has the fundamental battery chemistry knowledge that is the keystone of charger design. This allows Micro Power to design and manufacture a charger that will seamlessly integrate with the battery pack for exceptional ease of use and maximum energy delivery with a minimum charge time. Micro Power maintains a catalogue of in-house reference designs for use in configuring individual customer charger solutions. Micro Power's high-efficiency chargers can be either a circuit board embedded in your device or a stand alone charger in a configuration that best suits the usage model of the portable device.



Multi-Bay Chargers

In order for an end user to take full advantage of a portable device, it must be charged quickly and remain in a high state of readiness. Multi-bay battery chargers are the best way to keep the most demanding users up and running through multiple shifts, and our customer can optimize charge time according to the battery chemistry and the current available to the system. Micro Power routinely designs chargers with the number of bays ranging from one to eight. Our multi-bay chargers employ our unique microcontroller-based charging system and are available with the following features:

- Configurable LCD or LED status indicators for various battery conditions.
- AC or DC inputs.
- Battery management features including battery conditioning and gas gauge calibration.
- Battery health and status-of-charge indication.
- Power management and conditional charging.
- Fast charge regimens.
- Custom enclosures that can be ruggedized and have industrial design consistency with the device.
- Custom electrical contacts and battery latching schemes.
- Custom configurations such as vehicular-mount or desktop versions.
- Relevant safety and EMC certifications.

Single-Bay Chargers

Micro Power offers stand alone single-bay chargers in addition to the larger multi-bay chargers. These units offer many of the same features as the multi-bay chargers, such as a customer-defined charge time, custom plastic, and LED status indicators. Many device manufacturers require both single- and multi-bay chargers for the same device because of different usage models. Micro Power can design custom chargers that are easily applied to numerous configurations.

Docking Stations

Mobile and desktop docking solutions offer features beyond those expected of other chargers. Docking cradles provide the user with a repository for the portable device when it is not in active use. Our docking stations can be designed to be mechanically robust for the most demanding environments. The docking station will safely charge the battery, and can provide additional features and functionality. Features that can reside in the docking station include:

- Port replication
- Auxiliary battery power
- RF communications
- Host communications
- Printer capabilities

Microcontroller-based Charging

Our multi-channel, software-controlled charge architectures have the advantages of flexibility and efficiency while low-parts-count minimize cost. The microcontroller performs multiple duties, including pulse width modulation control for the charger(s), user interface control, system communications and logic functions based on dynamic input and output power conditions. Integration of all blocks of the power sub-system into one module yields lower cost and smaller size with less heat, fewer interconnects and superior EMC performance.

Embedded Charging Circuitry

Charging circuitry can be embedded in the portable device, and this scheme yields a number of advantages. Micro Power will design charging circuitry that seamlessly integrates in your portable application and deliver a fully qualified, reliable charger with minimal component count and flexible features. Embedded charger assemblies can be used to power the entire device as well as charge the batteries. This provides a clean, regulated DC source voltage to the main system power supply, simplifying design and lowering cost. As an integrated solution, the charger electronics can be accommodated on the same circuit board as the device electronics; this reduces design costs and valuable device real estate.

Power Supply Configurations

Micro Power provides AC/DC and DC/DC power supplies from 5 to 350 watts as an integral piece of our power solutions. Our power supplies range from external off-the-shelf wall-plugs, desktop units, or a custom internal power subsystem with an integrated charger. AC/DC converters, integrated with the micro-controlled charger, provide cost savings, fewer points of failure, and improved mobility. Micro Power offers power supplies that meet all safety and EMC standards including all major medical requirements (UL2601-1, CE marked to EN60601-1-2:2001), FCC Class B, and CISPR 11 Class B emissions standards.

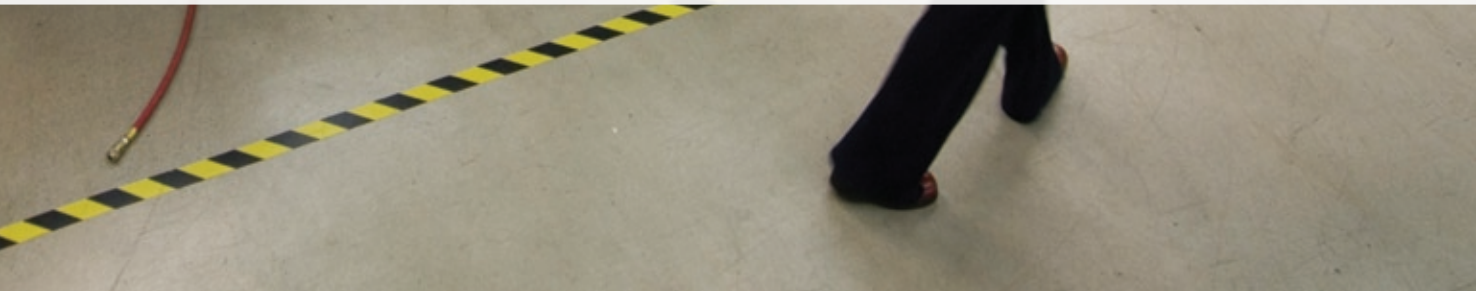


SelfCHARGE[®]
Charging Systems

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Micro Power Electronics' engineering, manufacturing and customer service staff have the knowledge and dedication to make your device's portability and runtime surpass expectation. Our 20 years of experience and continuous improvement ensure greater flexibility, faster turnaround, superior cost efficiency and the industry's best quality record.



MICRO POWER ELECTRONICS' CUSTOMERS BENEFIT FROM OUR FIRST-CLASS ENGINEERING, MANUFACTURING, AND CUSTOMER SERVICE CAPABILITIES.

Manufacturing

- Approximately 80,000 square feet for domestic manufacturing with quality that regularly passes audits by the FDA.
- Asian manufacturing facilities for high-volume products.
- FDA Registered, ISO 9001:2000 and 13485 certification.
- Continuous improvement, lean manufacturing, and Just in Time (JIT) product delivery.
- The lowest failure rate in the entire portable power industry.
- Soldering and welding reliability second to none.
- Strategic partnerships with top-tier cell manufacturers, IC vendors and plastic manufacturers.

Engineering

- New products developed and released using a deliverables-focused New Product Introduction process which guarantees accurate translation of customer requirements.
- Diverse experience in electrical and mechanical engineering, cell chemistry, manufacturing and project management.
- Design-for-manufacturing principles for higher system reliability.
- Risk mitigation of faulty design or manufacturing achieved with Failure Mode Effect and Criticality Analysis (FMECA) and Process Failure Mode and Effect Analysis (PFMEA).

Customer Service

- Customer service delivered by a dedicated team for flawless project execution.
- Emphasis on continuous communication.
- Flexibility provided by Kanban and Vendor Managed Inventory (VMI).
- Cradle-to-grave product life cycle support.
- Proactive management of our supply chain resulting in cost reduction benefits for our customers.



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Global Leader in Portable Power Systems™